# MID-COAST BASIN

STATE WATER RESOURCES BOARD
SALEM, OREGON
May 1965

COVER PICTURE

Coastal scene at Depoe Bay, Oregon. Oregon State Highway Department photo.

Price $2.50

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# 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 Mid-Coast Basin in Oregon.

The board's investigation activities were completed in June 1965. 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 Mid-Coast 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 (Newport, May 22, 1964), (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.

# FINDINGS AND CONCLUSIONS

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 geographical and seasonal distribution of runoff is such that there are seasonal water shortages in some areas and insufficient water in a few streams during periods of low flow to meet existing legal water rights.

3. Poor seasonal water distribution of the surface water supply can be reduced in many places by storage of surplus runoff. However, more detailed studies need to be conducted on the reported storage sites.

4. Salt water has penetrated far enough up the estuaries to reduce the usefulness of water in most tidal areas, particularly in the Salmon, Siletz, Yaquina, Alsea, and Siuslaw Bays.

5. Basic hydrological data are not adequate to properly determine the amounts or distribution of the waters of several of the major stream systems of the basin. Reestablishment of recently closed recording stations, and the addition of new stations is necessary in order to more completely evaluate the water resources of the basin.

6. Ground water supplies are very limited in both quantity and quality except possibly in some sand dune areas.

7. Basin economic studies have been related primarily to forest, agriculture, power, and harbor needs. Past studies have not directly established economic feasibility of water resource developments.

B. Water Rights

8. There are 940 water rights for 414 cubic feet per second of flow legally usable from the basin sources. All but eight of these are surface water rights.

9. About 98 percent of the total average annual surface water yield of the basin is unappropriated.

10. The actual consumption of water is estimated to be less

than one-half of one percent of the total average annual surface water yield of the basin.

11. Over-appropriation of minimum summer flows already exists on D River, Siletz River, North Fork and Fall Creek of Alsea River, Munsel Creek, and several small coastal and interior streams.

12. The waters of Little Creek and Mill Creek have been withdrawn by the State Engineer for municipal purposes. The State Engineer has also placed restrictions on the withdrawal of water from Siletz River and its Rock Creek tributary mainly for fish life purposes.

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

14. Major future water uses are expected to be for municipal, industrial, irrigation, recreation, and fish life purposes. Except at two large paper mills, most of the industrial use will probably be provided from municipal supplies.

15. Inadequate quantity and quality of domestic and municipal surface and ground water restricts development of many coastal areas. This problem is being investigated in Lincoln County by a separate special study.

16. Although adequate surface water supplies are available for the areas experiencing domestic and municipal shortages, interest has often been insufficient for the adoption of initially more expensive intercommunity or county water systems.

17. Population forecasts indicate that the water needs for human consumption will increase 50 percent by the year 2000. Development plans should include assuring water supplies to meet these requirements on six stream sources which have been chosen because of their superior yield and quality.

18. Irrigation is one of the major consumptive uses of water. There are about 6,400 acres of presently irrigated and 30,000 acres of potentially irrigable land.

19. Normal precipitation during the summer months is not

sufficient to attain maximum crop production. Irrigation is thus required if the farmer is to realize maximum benefit from his land.

20. Present streamflow during the irrigation season would not be adequate to irrigate one-half the potentially irrigable land. Storage has not been developed. There is practically no ground water for this purpose.

21. About 60,000 acre-feet of water would be required annually to develop the irrigation potential. On streams where present minimum flows are reserved for fish life or other public uses, storage is the only available source.

22. Pulp and paper manufacturers use enough water to make industry the major consumptive water user of the basin. This high proportionate use will probably continue because of the availability of raw wood product materials.

23. Potential for hydroelectric power development exists on the Salmon, Siletz, Yaquina, Alsea, and Siuslaw Rivers but economic justification is not now present.

24. Mining in the basin is related almost exclusively to sand, gravel, and stone operations which involve only small quantities of water use.

25. Recreational use of inland and coastal beaches by residents and tourists is of major importance to the basin.

26. Nonconsumptive recreation requirements of water are large and will continue to grow; probably at an accelerated rate.

27. The following lakes have high recreational value; Valsetz, Devils, Triangle, Mercer, Clear, Munsel, Woahink, Siltcoos, and Tahkenitch.

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

29. Anadromous fish spawning areas within the basin make a significant contribution to the important offshore commercial and sport fisheries. The same is true for bay and stream sport fishing.

## FINDINGS AND CONCLUSIONS

30. Maintenance of adequate streamflows would improve anadromous fish runs and benefit fish life, wildlife, and recreation.

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

32. The gaging of additional streams would provide a basis for future development of water facilities on the more critical stream systems.

33. Pollution of surface water is generally limited to salt water intrusion in tidal areas, high turbidity during flood stages and wood product wastes.

34. Contamination of ground water creates serious health hazards in many populated areas where shallow wells are used as the source of domestic water supplies.

35. Storage would aid in the control of flood, erosion, and drainage problems. Serious flood and drainage problems exist on a large portion of the arable lands.

36. There is only one major out-of-basin diversion at present which transfers water from Siltcoos and Tahkenitch Lakes to the Umpqua River Valley Basin.

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

38. The highest and best use of the water of the Mid-Coast Basin appears to be for domestic, livestock, municipal, irrigation, industrial, recreation, wildlife, and fish life purposes.

# THE BASIN

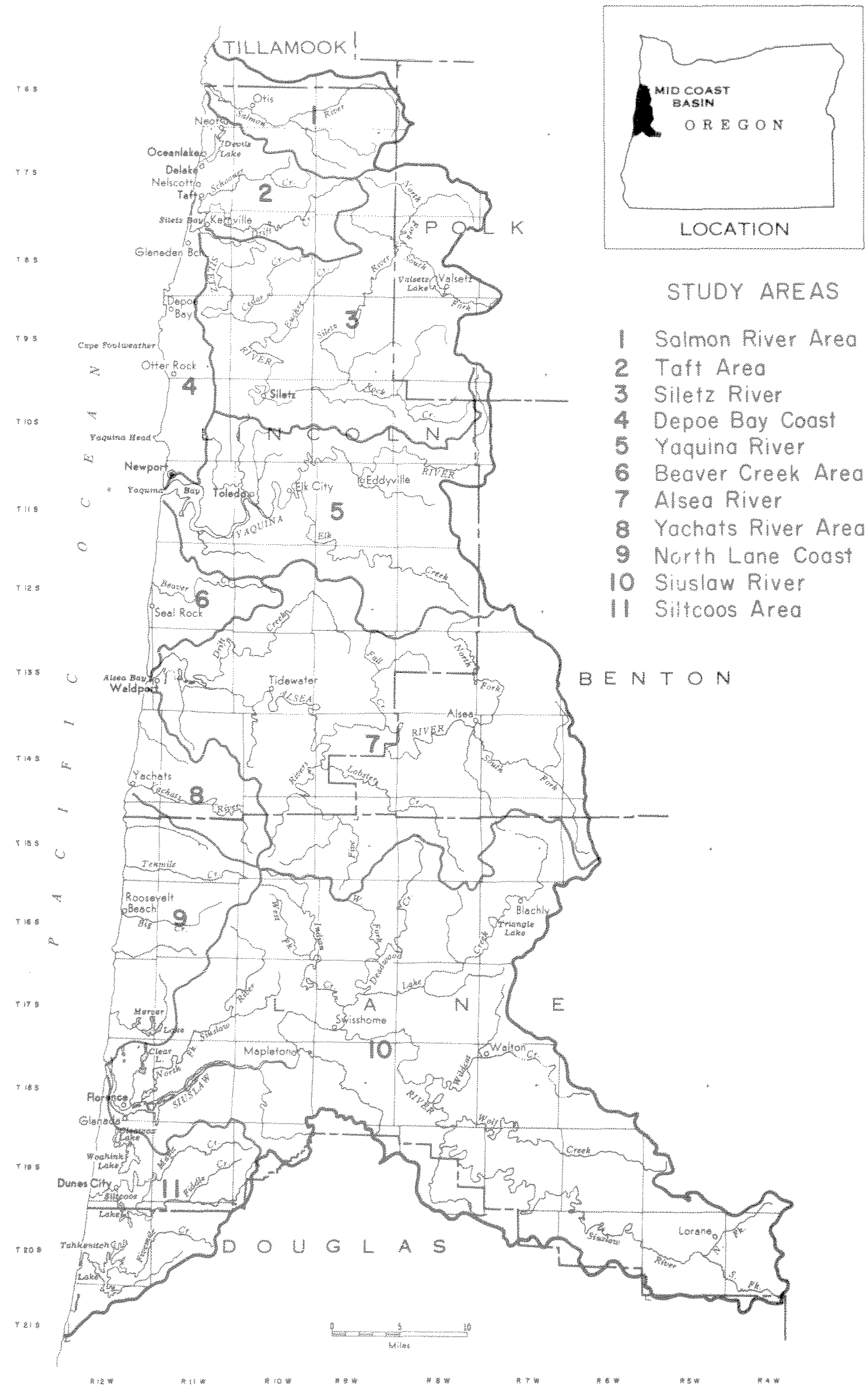



FIGURE 1. Mid-Coast Basin.

# M I D - C O A S T   B A S I N   S T U D Y

## PART I   THE BASIN

### PHYSICAL FEATURES

#### Geographic Setting

The Mid-Coast Basin is located in the central portion of western Oregon between the Pacific Ocean and the crest of the Coast Range. The location map, Figure 1, facing this page, and Table 1, locate, describe, and indicate the size of the Mid-Coast Basin.

TABLE 1

AREAS OF COUNTIES

| COUNTY | TOTAL AREA Sq. Mi. | AREA WITHIN MID-COAST BASIN | | | |
|---|---|---|---|---|---|
| | | Sq. Mi. | Acres | Percent of County | Percent of Basin |
| Tillamook | 1,139 | 14 | 9,100 | 1 | 1 |
| Polk | 740 | 100 | 64,000 | 13 | 4 |
| Lincoln | 998 | 983 | 629,000 | 98 | 41 |
| Benton | 668 | 184 | 117,900 | 28 | 8 |
| Lane | 4,610 | 991 | 634,000 | 21 | 42 |
| Douglas | 5,089 | 89 | 57,200 | 2 | 4 |
| BASIN TOTAL | - | 2,361 | 1,511,200 | - | 100 |

Note: Areas include coastal bays within main shoreline.

Data Source: U. S. Geological Survey quadrangles

The basin covers an area of approximately 2,361 square miles or 1,511,200 acres which is about 2.5 percent of the state's area. This coastal area includes the major watersheds of the Salmon, Siletz, Yaquina, Alsea, Yachats, and Siuslaw Rivers as well as many small independent watersheds all draining into the Pacific Ocean.

The northwest corner of the basin is near the town of Neskowin. The north boundary is the divide between Neskowin Creek and the Salmon River. The east boundary is the Coast Range summit extending between Tillamook and Douglas Counties. The basin extends southward to the north boundary of the Umpqua River watershed. About 91 airline miles of the basin have an ocean frontage. The basin is roughly triangular in shape having a width of only 14 miles on the north boundary and 52 miles on the south boundary.

#### Counties and Basin Areas

As shown in Table 1, the basin includes 98 percent of Lincoln,

## THE BASIN

28 percent of Benton, 21 percent of Lane, and 13 percent of Polk Counties plus small portions of Douglas and Tillamook Counties.

Within this long, relatively narrow basin a wide variety of features exists: extremes in topography, from the tidal plains to the rugged Coast Range; short coastal streams to major river systems heading high in the Coast Range; areas of sparse rural settlement to areas of intense industrial development; and other areas strongly oriented to tourism and recreation.

In order to analyze these and other features of the basin to the end that the best use of the water and related land resources be identified, the basin has been subdivided into eleven study areas. These areas include the six major river systems together with intervening coastal areas.

The various sections of this report first cover general conditions basinwide, then, in a definite order from north to south, cover specific features by study area, or river system. Throughout the report tables involving data for two or more streams or study areas list the streams or study areas in a north to south order.

### Stream System

The basin is drained by six major river systems: the Salmon, Siletz, Yaquina, Alsea, Yachats, and Siuslaw Rivers. All have their principal headwaters near the crest of the Coast Range and follow sinuous courses westward to the Pacific Ocean. In addition, 70 small named streams with short, low watersheds flow directly into the ocean.

Table 2 shows the size of the study areas by counties in square miles.

The basin's 212 recorded springs are generally small and contribute only nominally to minimum summer flows and domestic water needs. There is little ground storage of rainfall in the Mid-Coast Range as the soil mantle is relatively thin and predominantly overlies impervious sandstone. Most of the water finds its way quickly to stream channels being delayed only slightly by vegetative covering, humus, and the light soil cover.

The coast streams respond closely to the rain cycle, rising with the beginning of the rainy season, reaching their maximum flow about mid-winter, tapering off with a gradual letup as rainfall decreases and reaching their extreme lows in late summer and early fall. Destructive floods and extremely low flows both occurred during the 1964-1965 study period.

TABLE 2

WATERSHED AREAS IN SQUARE MILES

| STUDY AREA | TILLAMOOK | POLK | LINCOLN | BENTON | LANE | DOUGLAS | TOTAL |
|---|---|---|---|---|---|---|---|
| 1. Salmon River | 14 | 2 | 62 | 0 | 0 | 0 | 78 |
| 2. Taft | 0 | 0 | 76 | 0 | 0 | 0 | 76 |
| 3. Siletz River | 0 | 96 | 212 | 0 | 0 | 0 | 308 |
| 4. Depoe Bay Coast | 0 | 0 | 52 | 0 | 0 | 0 | 52 |
| 5. Yaquina River | 0 | 2 | 243 | 8 | 0 | 0 | 253 |
| 6. Beaver Creek | 0 | 0 | 50 | 0 | 0 | 0 | 50 |
| 7. Alsea River | 0 | 0 | 234 | 175 | 64 | 0 | 473 |
| 8. Yachats River | 0 | 0 | 50 | 0 | 11 | 0 | 61 |
| 9. North Lane Coast | 0 | 0 | 4 | 0 | 104 | 0 | 108 |
| 10. Siuslaw River | 0 | 0 | 0 | 1 | 739 | 33 | 773 |
| 11. Siltcoos | 0 | 0 | 0 | 0 | 73 | 56 | 129 |
| BASIN TOTAL | 14 | 100 | 983 | 184 | 991 | 89 | 2,361 |

Note: Areas include coastal bays within main shoreline.

Data Source: U. S. Geological Survey quadrangles

Many peaks of this basin rise more than 3,000 feet, including Saddleback Mountain rising 3,350 feet and Marys Peak, the highest, at 4,097 feet. The watershed is heavily timbered.

The coastal plains are broken at several points by rugged headlands rising abruptly from the ocean. The southern extremity has a combination of white sand dunes, green heavy timber, and large blue lakes well adapted to recreational use.

The annual runoff is more than adequate, requiring only the finding of suitable sites for and development of storage capacity to smooth out flow patterns and more fully utilize the abundant water resource. Rock formations in some of the upper canyons are suitable for dam construction, but the steep stream gradient and unstable soil materials make adequate storage at reasonable cost difficult to locate.

The rivers and streams which rise in the Mid-Coast Range and foothills flow down steep mountain valleys to their lower extremities where they have low, uniform gradients. Characteristic of the larger streams are silted estuaries with tidewater extending many miles inland. Each of the six major rivers has a broad, shallow bay near its mouth, the largest being Yaquina Bay. Broad tidal bottomlands border some of the estuaries at only a few feet above sea level. Elsewhere in the valleys, small scattered areas of level bottomland occur along the streams up to elevations approaching 400 feet.

Between the major rivers the narrow inhabited strip along the ocean is characterized by short, narrow, winding coastal valleys. Wider in the southern portion of the basin, the coastal plain and foothills area is characterized by stream systems blocked by dunes and beach sands, the backwater creating coastal lakes.

The Siuslaw River is the longest stream in the basin with a length of 118 miles. The lengths of other rivers are Salmon, 23 miles; Siletz, 84 miles; Yaquina, 59 miles; Alsea, 66 miles; and Yachats, 17 miles. Plate 1 of the Appendix shows stream miles along the various streams.

## Climate

The basin has a temperate, humid climate resulting from the moderating influences of the Pacific Ocean and from intensification of rainfall induced by the Coast Range barrier. Rainfall is strongly influenced by elevation, increasing from 60 to 90 inches along the seacoast to as high as 180 inches on the Coast Range divide. The lowest rainfall area is in the upper Siuslaw drainage around Lorane. The precipitation and yield map, Figure 9, page 27, of the Surface Water Section, shows lines of average annual precipitation and the acre-feet of outflow from major rivers.

The location of hydrological (precipitation) stations in the basin is shown on Plate 2 of the Appendix. Table A of the Appendix lists these stations by name, location, type of station, and period of record. The precipitation station at Newport has the longest record. With three years of correlations for missing records, this station provides 71 consecutive years of weather data. Stations with long rainfall records are located at Valsetz, Newport, Tidewater, and Canary. Long-term monthly averages for these stations are graphically shown in Figure 2.

Approximately 80 percent of the precipitation occurs from October through March. Average precipitation during this period is 8 to 12 inches monthly for coastal valleys and 12 to 20 inches for high mountain areas. Precipitation often occurs in moderate to heavy storms that may continue without interruption over prolonged periods.

Rainfall decreases to around one or two inches per month in the dry summer periods, with occasional light rainstorms and coastal


FIGURE 2. Long-term average monthly precipitation at representative stations.

fog supplying most of the precipitation. A relatively small portion of the water falling between April and October finds its way to coastal streams.

Annual snowfall normally varies from a few inches in coastal valleys to depths of three to four feet at higher elevations.

Figure 3 shows the mean and extremes of average monthly temperatures at Newport which are typical for the coastal area of the basin. Coast and low interior valley temperatures are markedly uniform throughout the year with the mean varying between 40 degrees Fahrenheit (° F.) and 60° F. Recorded high and low temperatures vary from 0° F. to 100° F.

The average of frost free days varies from around 140 days in the mountains to 250 days along the coast and low elevation interior valleys.

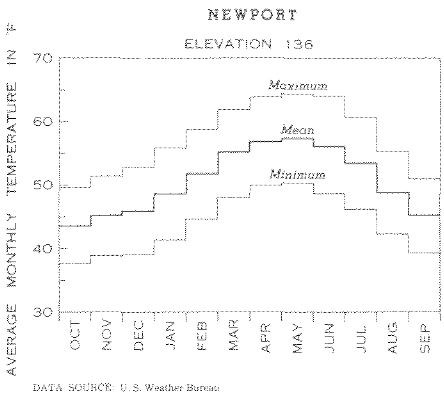



FIGURE 3. Long-term average monthly air temperatures at Newport.

Along the coast, wind velocities of 15 to 25 miles per hour are common. Prevailing winds generally vary from west to northwest. Storms, however, are generally accompanied by high south to southwesterly winds. High relative humidity is common most of the year.

## ECONOMIC FACTORS

### History of Settlement

It was probably Sir Francis Drake and his sea pirates on the vessel the "Golden Hind" that first sighted the green shores of the Mid-Coast Basin in about 1577. However, a period of over 250 years elapsed before white settlement in this area began.

By the year 1776 Captain James Cook sighted and named Cape Perpetua and Cape Foulweather. Recorded history of 1826 indicates that one of the first white men to cross the basin was a French Canadian who had trapped for the Hudson Bay Company. Early explorers found here several branches of the large Salish or Salishan tribe of Indians. These Indians subsisted principally upon the plentiful supply fo fish, clams, crabs, roots, berries, and wild game of the adjoining mountain forests. Further south were found the Siuslaw Indians who fashioned graceful canoes and crude shelters from cedars of the forests.

Beginning in the year 1846, and for 20 years following, there was a series of devasting forest fires in the Coast Range. In 1854 a great fire reached from Coos Bay to Tillamook and burned over 450,000 acres. Only small areas of virgin timber remained after these fires.

By the early 1880's settlement in coastal valleys was well underway. Further impetus to settlement came in 1892 when a portion of the Siletz Indian Reservation was opened to homesteading. Widespread publicity in Europe of this opening resulted in the arrival of immigrants from Poland who settled south of the Siletz and immigrants from Finland who settled near the coast. These farm people, who had no great outlet for farm produce, turned to fishing to obtain their cash requirements. Early industry included the gathering of oysters at Yaquina Bay and the canning of salmon on the Siletz River near Coyote Rock.

Polk County was created December 22, 1845. Benton County was created December 23, 1847 and at one time included all of southwestern Oregon. Lane County was created January 28, 1851. Lincoln County was formed February 20, 1893 by the union of parts of Polk and Benton Counties. All of these counties were named after public officials of that period.

Poor roads, small isolated valleys, and soils with limited capabilities made the early settlers' task of gaining a living from the soil and the sea very difficult.

## Population

The total population in the Mid-Coast Basin was about 35,800 or about two percent of the state's population in 1960. The population density is 15 persons per square mile as compared to 18 for the State of Oregon.

The 1960 population distribution of the basin by counties is shown in Table 3. Lincoln County, with 24,500 people, made up 68 percent of the basin total. The remaining population is distributed as follows: Lane, 27 percent; Benton, 2.5 percent; Polk, 2 percent; and Douglas, less than 1 percent.

TABLE 3

POPULATION DENSITY
1960

| COUNTY | POPULATION | PERCENT OF BASIN | PERSONS PER SQUARE MILE |
|---|---|---|---|
| Benton | 900 | 2.5 | 4.9 |
| Douglas | 100 | 0.3 | 1.1 |
| Lane | 9,600 | 26.8 | 9.7 |
| Lincoln | 24,500 | 68.4 | 24.9 |
| Polk | 700 | 2.0 | 7.0 |
| BASIN TOTAL | 35,800 | 100.0 | 15.2 |

Note: Population figures rounded to nearest 100.
Data Source: U. S. Bureau of the Census

There are three population concentrations in the basin. About 36 percent of the basin population resides along the lower reaches of the Yaquina River in and around the Cities of Newport, population 5,361, and Toledo, population 3,002. Another 13 percent of the basin population lives in and around Lincoln City, the recently incorporated area including the towns formerly known as Oceanlake, Delake, Nelscott, Taft, and Cutler City. The third highest population concentration is along the Siuslaw River in and around the City of Florence, population 1,766. About 8 percent of the people live on farms, and the remaining people live in small towns or in residences scattered along the coast and interior valleys.

The forest industry has been the major contributor to the economic change in the coastal counties. Population and economic growth were slow until the forest industry began to utilize the timber resources in the early 1920's. Following construction of a large sawmill at Toledo, population in that city tripled from 1920 to 1930 as shown in Table 4. As a result of the expanding

TABLE 4

POPULATION GROWTH IN LINCOLN COUNTY

| YEAR | NEWPORT | TOLEDO | OCEANLAKE | WALDPORT | RURAL FARM | COUNTY |
|---|---|---|---|---|---|---|
| 1963 | 5,361 | 3,002 | 1,405 | 715 | - | 22,487 |
| 1960 | 5,344 | 3,053 | 1,342 | 667 | 1,352 | 24,635 |
| 1950 | 3,241 | 2,323 | 700 | 689 | 2,965 | 21,308 |
| 1940 | 2,091 | 2,288 | - | 630 | 2,838 | 14,549 |
| 1930 | 1,530 | 2,137 | - | 367 | 3,024 | 9,903 |
| 1920 | 980 | 678 | - | 181 | - | 6,048 |
| 1910 | 721 | 541 | - | - | - | 5,587 |
| 1900 | 256 | 302 | - | - | - | 3,575 |

Data Source: U. S. Bureau of the Census and Oregon State Board of Census

timber industry Lincoln County population increased rapidly from 1930 to 1950.

Population continued to increase from 1950 to 1960 but at a slower rate. The population of Lincoln County has decreased from 24,635 in 1960 to 22,487 in 1964. Although the incorporated population has increased by 4 percent, the unincorporated population has decreased by over 22 percent resulting in a net population decrease of 9 percent for the four-year period as shown in Figure 4. The Lincoln County population decrease, similar to the pattern for the rest of the basin, is in contrast to an 8 percent increase for the entire State of Oregon between 1960 and 1964.

With the decline of the timber industry, other resources are influencing the population and economy of the area. The Mid-Coast area is exploiting its "amenity resources" - climate, coastline, and recreational opportunities, which particularly influence the location of retired or semi-retired people. Lincoln County has probably attracted more of these people than any other coastal county. The percentage of people age 65 or older is higher than any coastal county except Clatsop. The percentage of population in the working force is lower than in any other county in the state.

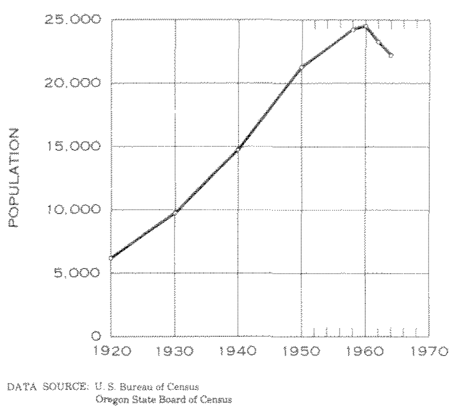



FIGURE 4. Lincoln County population growth.

The Mid-Coast Basin is attracting the semi-retired as well as the retired. These people are often engaged in businesses related to recreation or tourism. They usually have other sources of income and are not totally dependent upon their business for their livelihood. This, at least in part, explains the in-migration of older people into the coastal areas.

"Second homes" owned by people outside the basin are of appreciable importance to the economy of the area. These homes are also maintained because of the "amenity resources" of the area. In 1960 about 14 percent of the residences in Lincoln County were "second homes" as compared to about 4 percent for the state.

Owners of these homes contribute in several ways to the economy of the area. Construction of the houses contributes to employment, the property increases the tax base, and home owners are inclined to spend more money in the area than the occasional tourist.

Recently there has been a notable increase in construction of "second homes" and "retirement homes". Presently there are three large areas being subdivided along the ocean front. One being subdivided and developed at the mouth of the Alsea River includes 1,000 homes and a recreational complex. Development is also taking place along the larger rivers where river frontage is offered.

## Transportation

Until wagon trails were cut across from the Willamette Valley to the Salmon and Yaquina River, early transportation was limited to coastwise shipping into the Yaquina Harbor. The first recorded vessel to enter Yaquina Bay was the Calamet in 1856 which brought supplies for the army garrison at the Siletz blockhouse.

With completion of Highway 101 down the coast in 1937 and improved access roads to the Willamette Valley, this coastal strip was more fully utilized as a vacation land in which growth was supported by the timber and the sea. The surfaced state highway access roads include Highway 18 from Oceanlake to McMinnville; Highway 20 from Newport to Corvallis; Highway 34 from Waldport to Corvallis; and Highway 36 from Florence to Junction City. Bus and freight service are available on these routes. County and logging company roads follow all major river valleys, so all communities are on improved roads.

The north branch line of the Southern Pacific Railroad runs from Albany down the Alsea Valley to Toledo with freight service only. The south branch of the same railroad runs from Eugene to Mapleton and Coos Bay. There are two shortline railroads operated by private companies which serve wood product industries within the basin.

Each of the six major rivers has formed a small shallow bay at its mouth, but Yaquina Bay is the only one which has been developed sufficiently to accommodate shallow draft or partially loaded ocean vessels. Construction is now in progress on extending the Yaquina River jetties, and authorization has been approved for channel depths of 30 feet in the bay and 40 feet on the bar. The other harbors have docking facilities for commercial and private fishing vessels.

In 1943 the Civil Aeronautics Administration built an airport four miles south of Newport which is available for commercial service. Other airports suitable for private plane usage are located one mile south of Toledo, three miles south of Waldport, and one mile north of Florence.

## Land Use and Ownership

Figure 5 shows forest, agriculture, sand dunes, and urban areas within the basin. This figure clearly indicates the predominance of forest land in the Mid-Coast Basin. The forest land is bisected at intervals by agricultural land in the valleys. Urban and sand dune lands are concentrated in the coastal strip.

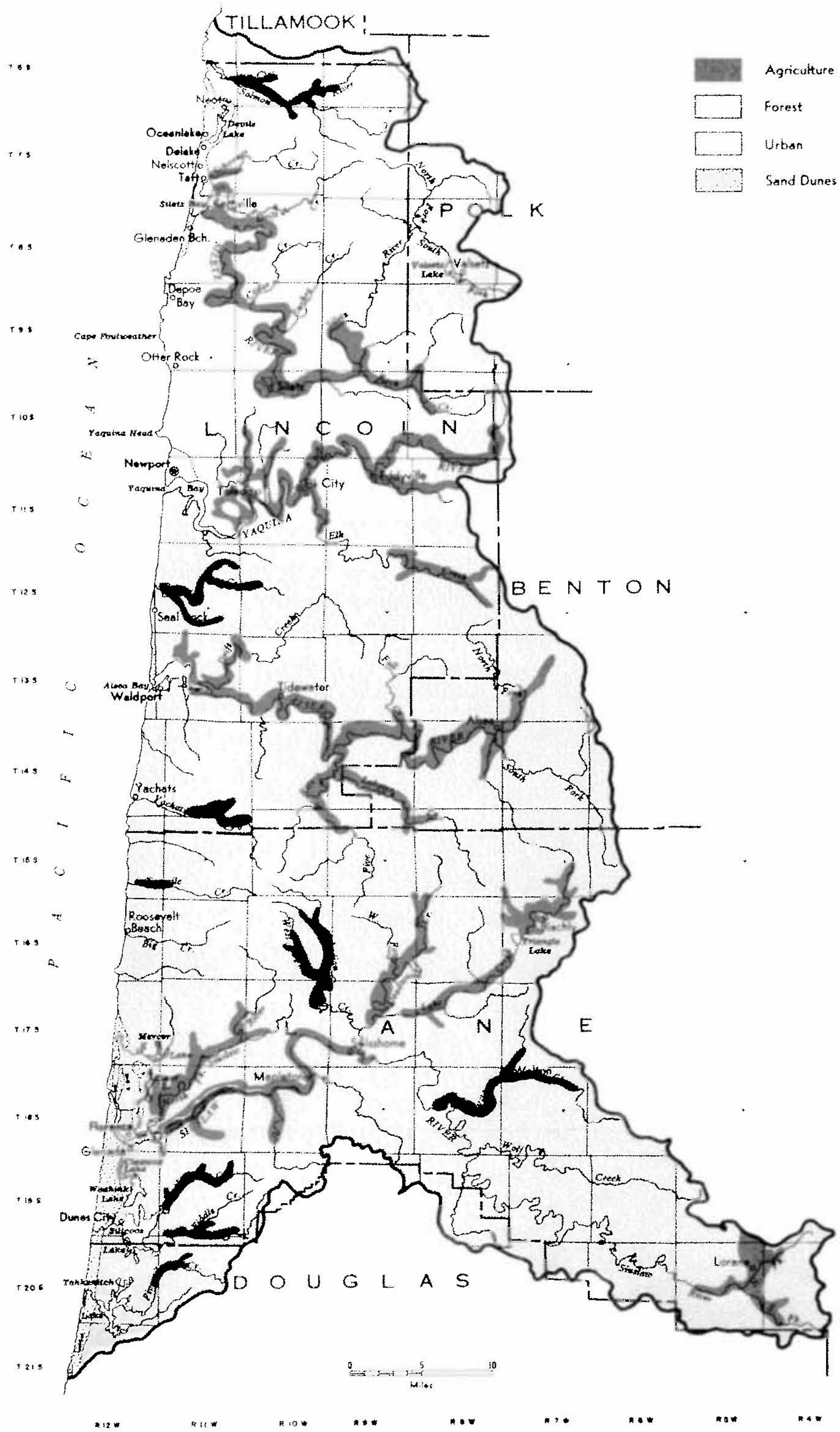



FIGURE 5. Land use.

# THE BASIN

Table 5 shows general land use by study areas. Of the basin's 2,361 square miles, 91 percent or 2,146 square miles is in forest

TABLE 5

LAND USE

| STUDY AREA | FOREST | | CROPLAND | | RANGELAND | | OTHER | | TOTAL AREA Sq. Mi. |
|---|---|---|---|---|---|---|---|---|---|
| | Area Sq. Mi. | % of Total | Area Sq. Mi. | % of Total | Area Sq. Mi. | % of Total | Area Sq. Mi. | % of Total | |
| 1. Salmon River | 73 | 94 | 2 | 2 | 2 | 3 | 1 | 1 | 78 |
| 2. Taft | 68 | 90 | 1 | 1 | 1 | 1 | 6 | 8 | 76 |
| 3. Siletz River | 289 | 94 | 9 | 3 | 4 | 1 | 6 | 2 | 308 |
| 4. Depoe Bay Coast | 48 | 92 | - | - | - | - | 4 | 8 | 52 |
| 5. Yaquina River | 222 | 87 | 9 | 4 | 4 | 2 | 18 | 7 | 253 |
| 6. Beaver Creek | 48 | 96 | 1 | 2 | 1 | 2 | - | - | 50 |
| 7. Alsea River | 447 | 94 | 12 | 3 | 5 | 1 | 9 | 2 | 473 |
| 8. Yachats River | 57 | 93 | 1 | 2 | - | - | 3 | 5 | 61 |
| 9. North Lane Coast | 102 | 94 | 1 | 1 | 1 | 1 | 4 | 4 | 108 |
| 10. Siuslaw River | 708 | 91 | 28 | 4 | 6 | 1 | 31 | 4 | 773 |
| 11. Siltcoos | 84 | 65 | 4 | 3 | - | - | 41 | 32 | 129 |
| BASIN TOTAL | 2,146 | 91 | 68 | 3 | 24 | 1 | 123 | 5 | 2,361 |

Data Source: U. S. Department of Agriculture cooperative report

land. About 1 percent or 24 square miles is rangeland, while less than 3 percent or 68 square miles is cropland. The "other" land use column comprising 5 percent of the land area or 123 square miles consists of roads, urban developments, estuaries, and seashore and sand dunes.

Present trends indicate that urban developments will spread along the coastline and up the river valleys. The communities of Neskowin, Lincoln City, Agate Beach, Yachats, and Heceta Beach are favored by an abundance of available land and fine sandy beaches. Depoe Bay, Newport, Waldport, and Florence are located on harbors favored by sport and commercial fishing fleets. The Westlake area has an abundance of space for its tourist and home-site facilities along its beaches, sand dunes, and large fresh water lakes. The large areas of publicly owned ocean frontage are being preserved and developed for public use. The long tide-water estuaries up each of the major rivers are attractive home-site areas.

The most common expanding uses of land are for year-round dwellings, vacation homes, and tourist accommodations and facilities. The density of development outside incorporated cities is increasing the problems of water supply, sewage disposal, flood damage, and drainage that will require land use standards, policies, and regulations.

Main crops are hay and pasture with only about 6,300 acres or 15 percent of this cropland irrigated in the average year. According to census figures the basic land use trend is away from farming and toward greater forest, recreation, and homesite use. Most of the 1,000 plus farms include woodland areas, where until 1959 farm families realized about 50 percent of their income from the sale of forest products.

Forest industry processing facilities are concentrated around Toledo. Seafood and sport fishing industries are located along the tidewater estuaries of the major rivers.

As shown in Table 6, over 52 percent of the basin is privately owned. The next largest owner is the federal government with 28.5 percent in the Siuslaw National Forest and 15.5 percent in other federal lands. State, county, and municipal ownership comprises 3.5 percent of the basin.

TABLE 6

LAND OWNERSHIP
1964

| OWNERSHIP | ACRES | PERCENT OF TOTAL AREA |
|---|---|---|
| National forest | 430,289 | 28.5 |
| Other federal | 234,318 | 15.5 |
| State | 49,201 | 3.3 |
| County and municipal | 2,557 | 0.2 |
| Private | 794,835 | 52.5 |
| TOTAL | 1,511,200 | 100.0 |

Data Source: U. S. Department of Agriculture and state agencies

All except 15,500 acres of the federal lands are in forest. The state, county, and municipal land is essentially all in forest. Private lands include 672,566 acres in forest, 58,520 acres for agricultural purposes, and 63,749 acres in other uses. Much of the eastern portion is in alternate section ownership between the Bureau of Land Management and private interests. This complex ownership pattern gives rise to many management and right-of-way problems. Large areas of beach frontage and beaches especially in the southern portion of the basin are in public ownership and can be used for public parks.

## Economic Base

Economic growth of the Mid-Coast Basin has been based on timber, agriculture, and tourism. Increasing economic benefits are now being derived from tourist usage and wood product industries. Future economic growth is expected to be slow except where facilities exist for the vacationer, for summer and retirement homes along the water, and for limited industry, trades, and services.

## THE BASIN

Timber harvest is being reduced toward a sustained yield basis. Agricultural areas with low fertility soils and isolation from agricultural markets have tended since 1955 to slowly decrease both as to acreage and income. Agriculture is also affected along the lower streams and bays by the pressures of the growing urban population. A shifting of agricultural land to other uses with resultant inflated values and more part-time farms is especially discernible on lower portions of the Salmon, Alsea, and Siuslaw Rivers. Agricultural trends in the interior portions of the basin show a marked shift from dairy to beef production, which may reverse the downtrend in agricultural income.

Appreciable industrial development is expected only in the Yaquina Bay area. Rock and gravel mining has but a nominal impact on the basin economy and uses insignificant amounts of water. Recreation and fish life are heavy nonconsumptive water users.

### Agriculture

Agriculture is giving way to recreation and tourism as second to timber in importance to the economy of the basin. Predominant agricultural activities involve the growing of pasture and forage for the production of dairy, beef, and sheep products. Minor sources of agricultural income are derived from small grain, fruits, vegetables, bulbs, and Christmas ornament plants.

Figure 6 shows arable land within the basin.

Pasture and hayland comprise about 90 percent of the 42,850 cropped acres. About 52,670 acres of forest and rangeland are grazed by sheep, beef cattle, and goats. These grazing lands are comprised of small cleared or cutover areas usually adjacent to agricultural lands.

About 6.4 percent of the basin is utilized for agricultural purposes of which less than one-half is cultivated land. Much of the cropland is located in the valleys where production is limited to pasture and hay due to flooding and drainage problems.

The historical background of agricultural development has established the present farming pattern. Most of the early homesteading was on timber claims where better valley lands were cleared and the rest remained in timber. The average acreage of cropland per farm is only 33 acres or a fourth the average for Oregon. The value of farm products per farm in 1959 was $3,757 as compared to $9,678 for the state. About 80 percent of the farmers own their land.

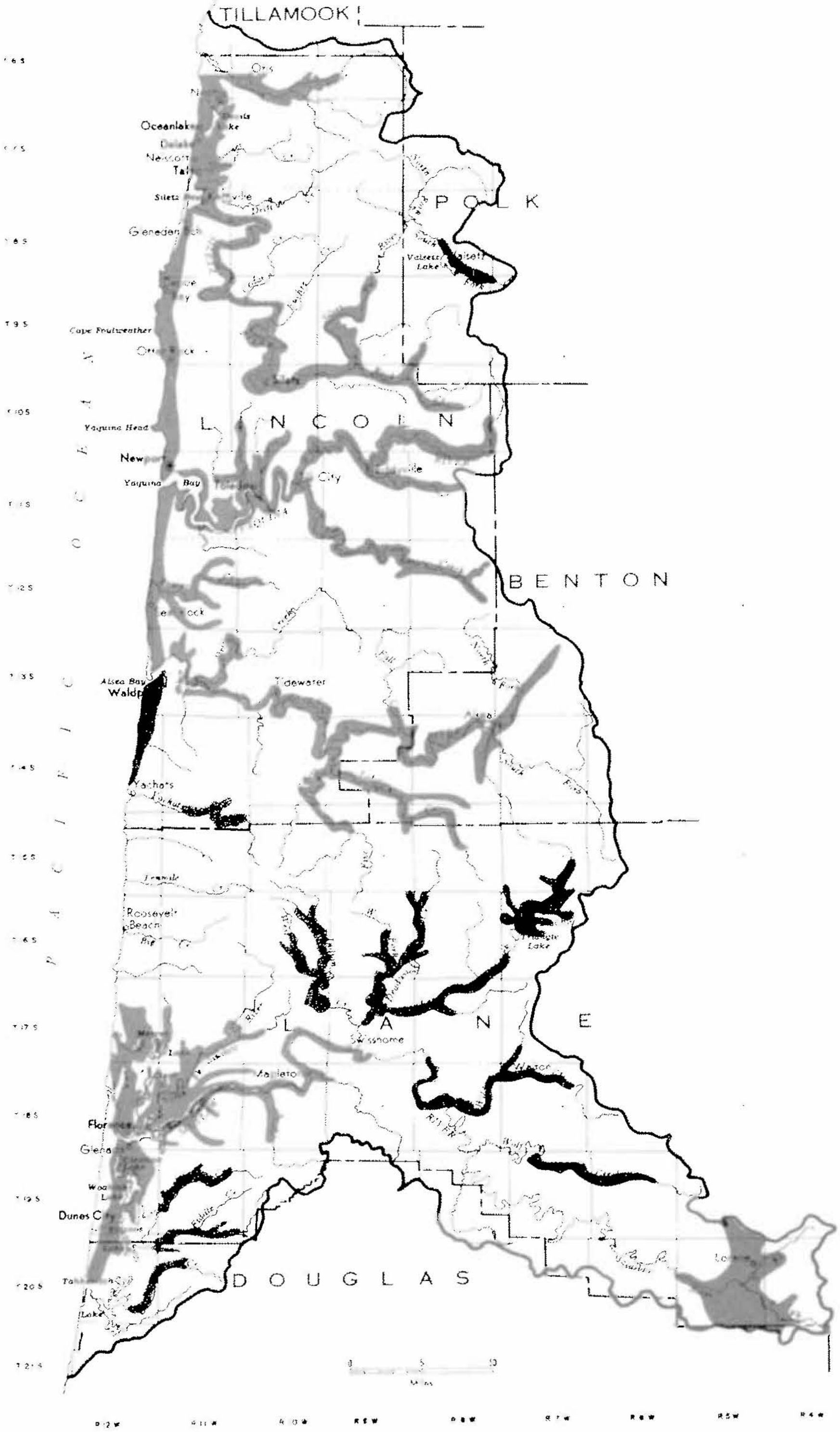



FIGURE 6. Arable land.

Table 7 shows the present and potential agricultural land use by study areas.

TABLE 7

AGRICULTURAL LAND USE
PRESENT AND POTENTIAL
Acres

| STUDY AREA | PASTURE | CROP | POTENTIAL CROP | IRRIGATED 1/ | IRRIGABLE 1/ |
|---|---|---|---|---|---|
| 1. Salmon River | 3,000 | 1,000 | 1,000 | 100 | 1,000 |
| 2. Taft | 2,900 | 700 | 500 | 100 | 800 |
| 3. Siletz | 6,080 | 5,400 | 3,000 | 680 | 5,000 |
| 4. Depoe Bay Coast | 60 | 50 | 50 | - | 70 |
| 5. Yaquina River | 9,300 | 6,000 | 1,500 | 900 | 4,500 |
| 6. Beaver Creek | 1,510 | 700 | 700 | 100 | 1,200 |
| 7. Alsea River | 15,510 | 7,630 | 2,800 | 1,810 | 5,700 |
| 8. Yachats River | 1,050 | 620 | 320 | 70 | 720 |
| 9. North Lane Coast | 1,350 | 700 | 120 | 10 | 400 |
| 10. Siuslaw River | 11,040 | 17,700 | 5,200 | 2,190 | 8,300 |
| 11. Siltcoos | 870 | 2,350 | 450 | 460 | 1,900 |
| TOTAL BASIN | 52,670 | 42,850 | 15,640 | 6,420 | 29,590 |

1/ Average irrigated annually and potentially irrigable lands.

Data Source: U. S. Department of Agriculture cooperative report

Irrigation water is utilized on about 6,400 acres annually. Valleys with largest present and potential irrigated acreages are the Siletz, Yaquina, Alsea, Lake Creek, Siuslaw, and the valleys around Siltcoos Lake. Irrigation is almost exclusively by sprinkling on an individual farm basis. There are almost 30,000 additional irrigable acres in the basin.

Available U. S. Census of Agriculture figures for Lincoln County were used to compute the following economic trends in the basin. Hayland averaged about 1.5 tons per acre plus pasture with no yield trend discernable. Hay was harvested on about one-third of the cropland acres. Most farms grew vegetables but only about three percent reported commercial sales. Acreage in farms increased between 1929 and 1944, then steadily decreased. Poorer crop and rangeland is being returned to timber uses. Forage production, other than that used for silage, has been decreasing. Production for silage has shown a marked increase.

There are only about 1,000 farms in the basin and the number is decreasing. Farming is a part-time endeavor except on larger dairy farms and livestock ranches. It is estimated that 65 percent of the farmers had outside employment. Most part-time farmers work in logging or related timber industries.

Livestock in the basin includes 17,100 cattle, 11,400 sheep, 2,700 goats, and a few horses. Both dairy and beef cattle herds are generally small and are grazed on valley pastures. Sheep, goats, and a few beef cattle utilize the range and open forest land. Partly due to depressed milk prices, there has been a marked shift from dairy to beef cattle in recent years. Other reasons include the adaptability of beef cattle to part-time farming since they require less attention and less investment in facilities. The goat and horse population is decreasing.

Development of modern highways has greatly alleviated the agricultural marketing problems of the past.

The joint U. S. Department of Agriculture, U. S. Department of Interior, Oregon State University Soil and Vegetative Survey, Alsea Area, dated May 25, 1964, describes typical soil characteristics of the basin. Characteristics of the soils indicate that they are strongly to moderately acid with an acidity range of pH 4.6 to 6.5. Most cleared soils are low in available nutrients for crop production but react favorably to fertilization. Most of the forested soils lie on slopes of 5 to 90 percent. The soil mantle is generally shallow over impervious sandstone, shale, or volcanic rock.

Table 8 shows that 74 percent of the gross agricultural income for Lincoln County is derived from livestock and related products. Forest products supply 18 percent while crops sold supply only 8 percent of the total. The above table does not include off-farm income.

TABLE 8

GROSS AGRICULTURAL INCOME
1959

| COMMODITY | THOUSANDS OF DOLLARS | PERCENT OF TOTAL |
|---|---|---|
| LIVESTOCK SOLD | | |
| Dairy products | 1,350 | 37 |
| Cattle and calves | 1,027 | 28 |
| Poultry products | 180 | 5 |
| Other livestock products | 163 | 4 |
| TOTAL LIVESTOCK PRODUCTS SOLD | 2,720 | 74 |
| TOTAL CROPS SOLD | 286 | 8 |
| TOTAL FOREST PRODUCTS SOLD | 650 | 18 |
| TOTAL FARM PRODUCTS SOLD | 3,656 | 100 |

Data Source: U. S. Department of Agriculture and U. S. Bureau of the Census

## Forestry

Forested land covers 1,373,600 acres or 91 percent of the basin. Douglas fir is the dominant species, followed by western hemlock, sitka spruce, western red cedar, and red alder. Other forest types include about 25 other hardwood and softwood species plus many kinds of underbrush. Much of the area is a true rain forest supported by an abundance of rainfall, high humidity, and temperate climate.

About one-half of the forest land is publicly owned, 60 percent of which is in the Siuslaw National Forest. Revested Oregon and California Railroad land administered by the Bureau of Land Management amounts to 33 percent, and state forest land amounts to 7 percent of the publicly owned lands. About three-fourths of the privately owned land is in large commercial ownerships, while the other one-fourth is in small ownerships averaging 160 acres.

Bureau of Land Management, Forest Service, and state forest lands are managed for permanent forest production in conformit with the principal of sustained yield for the purposes of providing a permanent timber supply, protecting watersheds, regulating streamflow, contributing to community and industrial stability, and providing recreational facilities. Although some private lands are managed for similar purposes, others are managed principally for their forest production.

Table 9 shows commercial forest areas and sawtimber volumes by owners in the basin. Commercial forest land contains 49.4 billion board feet of timber, mainly class I and II, which is rated as some of the best in the state and the northwest.

TABLE 9

COMMERCIAL FOREST AREA
AND SAWTIMBER VOLUMES
1964

| OWNERSHIP CLASS | AREA Thousand Acres | VOLUME Million Bd. Ft. |
|---|---|---|
| National forest | 418 | 22,726 |
| Other federal | 231 | 7,393 |
| State | 49 | 691 |
| County and municipal | 3 | NA |
| Small private | 149 | 1,086 |
| Large private | 523 | 17,485 |

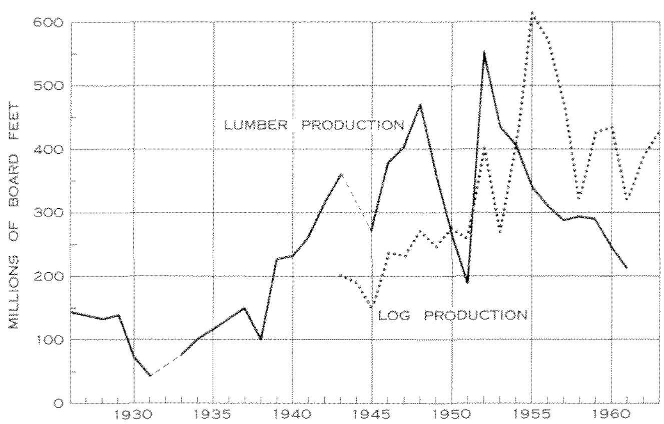
NA - Data not available

Data Source: U. S. Department of Agriculture

The 22 sawmills, 6 plywood and veneer plants, and 1 pulp and paper mill have an installed capacity of over one billion board feet per year. In recent years many of the small sawmills have been idle and a large volume of logs is shipped outside the basin for processing.

The basin's potential sustained yield from all commercial forest lands is estimated at 765 million board feet per year. The annual cut has been considerably reduced during the last few years to more nearly coincide with the sustained yield potential. The average annual growth rate per acre for timberland exceeds 500 board feet which produces a stumpage income of between $15 and $20.

Trends in timber harvest and lumber production in Lincoln County are shown in Figure 7. There has been a general downward trend since 1955.




DATA SOURCE: U. S. Forest Service
Oregon State Board of Forestry

FIGURE 7. Log and lumber production, Lincoln County.

## Mining

Revenue from stone, sand, and gravel operations in Lincoln County amounted to $692,000 in 1963. No other commodities were mined. The yearly average for the ten-year period 1954-1963 approached $544,000, ranging from a low of $355,917 in 1956 to a high of $872,958 in 1957. Stone ranked first in revenue throughout the period. Revenue figures are not available for the remainder of the basin where production was likewise limited to stone, sand, and gravel. Good hard rock is lacking throughout most of the basin.

A quarry on Cedar Creek north of Siletz and another near Mapleton supply igneous rock to the jetties at the mouths of the Yaquina and Siuslaw Rivers, respectively. Other igneous quarries are located on Tony Creek near Kernville, at Yaquina Head near Newport, on Eckman Creek near Waldport, along the Siuslaw River near Mapleton, and in remote areas in the Yaquina and Alsea River drainages. Various logging companies operate lesser quarries. Little water is used in the quarry operations.

Considerable sand and gravel is brought into the northern part of the basin from sources near Corvallis and into the southern part from Umpqua River sources. Beach sand is excavated under a State Land Board permit from Brockway Beach, just south of Gleneden Beach, for use as concrete aggregate as far south as Newport. Nearly 10,000 cubic yards of sand were excavated from this site in 1963. Sand is also taken from Drift Creek east of Siletz Bay. A gravel operation on Berry Creek north of Florence supplements construction needs in that area.

The U. S. Bureau of Mines in 1964 tested samples of dune sand from the Alsea Bay, Heceta Beach, Florence, Siltcoos Lake, and

Tahkenitch Lake areas for the purpose of determining its suitability for glass-making purposes. The sand was all found to contain too much iron and alumina for this use.

The sand is suitable for other uses such as foundry and molding sand, fillers, filtration media, brake sand, and concrete aggregate in some finishing work where iron-staining is not considered detrimental.

Major oil companies have conducted extensive geophysical and geological studies for oil off the Oregon coast since 1961. The work has indicated an oil potential by determining the presence of marine sedimentary rocks of Tertiary age and favorable geologic structures underlying the outer continental shelf area. Further evaluation of the oil potential must be done by deep drilling.

At a public sale in October 1964 eleven oil companies, bidding approximately $21,705,000, leased for drilling purposes 327,513 acres of federal shelf land situated off the Mid-Coast Basin. Yearly rental amounts to more than $982,500.

Drilling in the leased area started in April 1965 off Newport. A minimum of five or six deep test holes will be required to determine whether the shelf lands are productive. The three areas of main interest are more than ten miles offshore. The western margin of the lease block off Florence is 35 miles from shore, at which place the water is 500 feet in depth. It is not known at this time if this activity will generate appreciable needs for industrial or municipal water.

## Manufacturing

Manufacturing and industrial production has and will continue to play a nominal part in the economy of the Mid-Coast Basin according to studies made on labor force and industrial projections. In July 1963, Lincoln County was designated a redevelopment area. The present economic picture is not favorable with continuous substantial unemployment.

Industrial production is concentrated in the Toledo and adjoining Yaquina Bay areas due primarily to favorable sea, highway, and railroad transportation facilities. This area supports two sawmills, two lumber mills, one shingle mill, one plywood plant, one pulp mill, one ready-mix concrete plant, four seafood plants, plus commercial and sports fishing fleets.

The most critical water shortage area in the basin is the industrial complex around Toledo and Newport where most of the potable water supplies must be imported from surrounding stream systems. Sixteen of the industries in this area have reported that their maximum daily use totals 13.6 million gallons, which they estimate will increase to 20.9 million gallons in the next ten years. Converted to acre-feet, present maximum daily needs are 41.7 acre-feet and the maximum daily needs in ten years will be 64.1 acre-feet. High water-use months are January, February, and June through September. The dominant water user is the pulp and paper mill at Toledo. The county is developing facilities for further industrial expansion around Yaquina Bay.

According to the 1958 census, Lincoln County had 119 industrial establishments of which 97 were in the lumber and wood industries. Industrial employees total 2,449 with a payroll of $16,370,000. No accurate industrial census records are available for the small portions of Lane, Douglas, Benton, Polk, and Tillamook Counties in the basin.

Commercial fishing is important to the economy of the Depoe Bay, Newport, and Florence areas. Besides the major seafood species listed in Table 10, small quantities of oysters, clams, and shrimp are commercially harvested. Shell fish are also found in beds at Siletz and Alsea Bays. Other yields reported for 1962 include oysters, 4,000 pounds; clams, 9,000 pounds; and halibut, 99,000 pounds.

As shown in Table 10, harvest trends appear to be downward for salmon and variable for other species. Commercial and sportsman harvest of these seafoods is closely tied to price and the variable yield due to water quantity and quality. Facilities are considered adequate to handle foreseeable needs in this industry.

After a year of operation of the newly commissioned Oregon State University research vessel "Acona" out of Yaquina Bay, the future potential of oceanographic research has been greatly advanced. The new University Oceanography Research Complex has been completed. A $921,650 marine sciences research laboratory has been constructed at South Beach on Yaquina Bay. The 39,000-square-foot building includes three wings, one devoted to oceanography, one to fisheries and water resources, and one to community facilities including a museum-aquarium, auditorium, and library. Great interest in the project has been evidenced by related organizations, and it is expected that other agencies and industries will locate facilities close to the research center.

The other concentrated industrial area is located along the Siuslaw Bay between Florence and Cushman. This area supports five wood products plants, two seafood plants and one ready-mix concrete plant, plus commercial and sports fishing fleets. An analysis of present and future industrial water needs indicates that Munsel Creek plus sand dune wells will adequately supply the water requirements in the Florence area.

TABLE 10

COMMERCIAL FISH AND CRAB LANDINGS
MID-COAST PORTS

Pounds

DEPOE BAY

| YEAR | ALBACORE TUNA | CHINOOK SALMON | SILVER SALMON | CRABS |
|---|---|---|---|---|
| 1954 | - | 116,000 | 243,000 | 3,333,000 |
| 1955 | - | 96,000 | 255,000 | 2,172,000 |
| 1956 | 12,000 | 103,000 | 288,000 | 2,221,000 |
| 1957 | 1,000 | 108,000 | 365,000 | 5,915,000 |
| 1958 | 42,000 | 189,000 | 217,000 | 3,296,000 |
| 1959 | 40,000 | 65,000 | 207,000 | 2,086,000 |
| 1960 | 10,000 | 64,000 | 92,000 | 1,848,000 |
| 1961 | - | 40,000 | 241,000 | 2,304,000 |
| 1962 | 6,000 | 13,000 | 326,000 | 1,822,000 |
| 1963 | - | 14,000 | 202,000 | 1,160,000 |
| TOTAL | 111,000 | 808,000 | 2,436,000 | 26,157,000 |

FLORENCE

| YEAR | ALBACORE TUNA | CHINOOK SALMON | SILVER SALMON |
|---|---|---|---|
| 1954 | - | 179,000 | 132,000 |
| 1955 | - | 109,000 | 75,000 |
| 1956 | 7,000 | 167,000 | 123,000 |
| 1957 | 5,000 | 110,000 | 181,000 |
| 1958 | 22,000 | 56,000 | 130,000 |
| 1959 | 5,000 | 24,000 | 46,000 |
| 1960 | - | 66,000 | 48,000 |
| 1961 | 1,000 | 76,000 | 111,000 |
| 1962 | 80,000 | 81,000 | 224,000 |
| 1963 | - | 248,000 | 396,000 |
| TOTAL | 120,000 | 1,116,000 | 1,466,000 |

NEWPORT

| YEAR | ALBACORE TUNA | CHINOOK SALMON | SILVER SALMON | BOTTOM FISH |
|---|---|---|---|---|
| 1954 | 129,000 | 672,000 | 619,000 | - |
| 1955 | 57,000 | 1,448,000 | 645,000 | - |
| 1956 | 516,000 | 1,501,000 | 1,061,000 | - |
| 1957 | 850,000 | 942,000 | 1,136,000 | - |
| 1958 | 2,586,000 | 492,000 | 463,000 | - |
| 1959 | 2,910,000 | 143,000 | 176,000 | 4,708,000 |
| 1960 | 329,000 | 359,000 | 230,000 | 5,082,000 |
| 1961 | 305,000 | 363,000 | 684,000 | 5,578,000 |
| 1962 | 1,190,000 | 121,000 | 540,000 | 6,045,000 |
| 1963 | - | 105,000 | 343,000 | 5,996,000 |
| TOTAL | 8,872,000 | 6,146,000 | 5,897,000 | 27,409,000 |

Data Source: Fish Commission of Oregon

According to the Water Resources Committee survey no present or future industrial water needs problems were encountered at the eleven industrial plants scattered throughout the Lane County portion of the basin.

## Recreation

The Mid-Coast Basin is one of the most popular tourist areas of the state. It provides recreation for vacationers not only from the nearby Willamette Valley but also from California, Washington, and many other states throughout the nation. According to the Lincoln County Water Resources Committee tourism is rapidly replacing agriculture as the basin's second largest industry.

# T H E  B A S I N

Prime recreational attractions include 91 airline miles of ocean beaches and headlands, 8,000 acres of fresh water lakes, 10,000 acres of salt water bays and tidal estuaries, spectacular sand dunes, and clear running streams in forest settings.

Surface areas of lakes, reservoirs, bays, and tidal estuaries are given in Table 11.

TABLE 11

SURFACE AREA OF LAKES
RESERVOIRS, BAYS, AND TIDAL ESTUARIES

| STUDY AREA | NO. | ACRES |
|---|---|---|
| 1. SALMON RIVER | | |
| Lakes | 1 | 1 |
| Reservoirs | 4 | 4 |
| Bays and Estuaries | - | 180 |
| Total | - | 185 |
| 2. TAFT | | |
| Lakes | 1 | 613 |
| Reservoirs | 4 | 1 |
| Bays and Estuaries | - | 24 |
| Total | - | 638 |
| 3. SILETZ RIVER | | |
| Lakes | 8 | 402 |
| Reservoirs | 3 | 1 |
| Bays and Estuaries | - | 1,393 |
| Total | - | 1,796 |
| 4. DEPOE BAY COAST | | |
| Lakes | 0 | 0 |
| Reservoirs | 3 | 26 |
| Bays and Estuaries | - | 10 |
| Total | - | 36 |
| 5. YAQUINA RIVER | | |
| Lakes | 1 | 1 |
| Reservoirs | 4 | 153 |
| Bays and Estuaries | - | 4,031 |
| Total | - | 4,185 |
| 6. BEAVER CREEK | | |
| Lakes | 5 | 21 |
| Reservoirs | 1 | 1 |
| Bays and Estuaries | - | 178 |
| Total | - | 200 |
| 7. ALSEA RIVER | | |
| Lakes | 3 | 23 |
| Reservoirs | 3 | 40 |
| Bays and Estuaries | - | 2,029 |
| Total | - | 2,092 |
| 8. YACHATS RIVER | | |
| Lakes | 3 | 8 |
| Reservoirs | 1 | 7 |
| Bays and Estuaries | - | 85 |
| Total | - | 100 |
| 9. NORTH LANE COAST | | |
| Lakes | 9 | 547 |
| Reservoirs | 0 | 0 |
| Bays and Estuaries | - | - |
| Total | - | 547 |
| 10. SIUSLAW RIVER | | |
| Lakes | 6 | 326 |
| Reservoirs | 11 | 79 |
| Bays and Estuaries | - | 2,622 |
| Total | - | 3,027 |
| 11. SILTCOOS | | |
| Lakes | 27 | 5,980 |
| Reservoirs | 5 | 64 |
| Bays and Estuaries | - | 0 |
| Total | - | 6,044 |
| BASIN TOTAL | | |
| Lakes | 64 | 7,922 |
| Reservoirs | 39 | 376 |
| Bays and Estuaries | - | 10,552 |
| Total | - | 18,850 |

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

Popular activities include sightseeing, hiking, picnicking, swimming, scuba diving, fishing, hunting, boating, water skiing, clam digging, agate hunting, and collecting curios washed up by the sea.

The coastline is dotted with trailer parks, campgrounds, state parks, waysides, boat landings, and other recreational facilities for the tourist and local population. Improved roads and parks make it possible to penetrate and utilize the river valleys and forested areas. The large forest areas covering the slopes of the Coast Range provide hunting for many people each season.

Recreational facilities in the basin include 25 national forest camps; 31 state parks, waysides, and rest areas comprising 3,361 acres; 10 county parks; and 48 boat landings. The recreation areas are shown on Plate 5 of the Appendix. A summary of the areas and their facilities is given in Table E of the Appendix.

Recreational use of the Siuslaw National Forest increased from 1,760,000 visits in 1954 to 3,000,000 visits in 1960. Camping, picnicking, fishing, and hunting were the most popular activities. The U. S. Forest Service has estimated that such recreational use will increase 20 times by the year 2000.

Figure 8 illustrates the rapid increase in basin recreation usage.

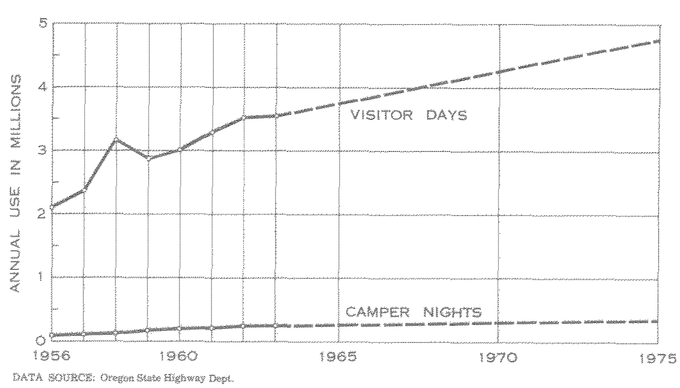



FIGURE 8. Annual use of state parks.

Much of the recreational activity within the basin is concentrated around fresh water, bay, and offshore fishing. Game fish caught in large volume include native trout, salmon, steelhead, black bass, catfish, perch, bluegill, and crappie.

Hunting for deer and elk is a popular recreational sport during open seasons. The basin's numerous coastal lakes, marsh areas, bays, and wild berry patches offer opportunities for the hunting of waterfowl, pigeons, and grouse.

Recreational boating is showing a phenomenal growth in the Mid-

# T H E   B A S I N

Coast Basin. The area's wealth of water resources - coastal bays and estuaries, rivers, lakes, and reservoirs - has stimulated a big increase in boat ownership and use for recreation. Sport fishing is the main activity among small boat owners but many hours are logged in cruising, water skiing, and sightseeing.

The doubling of the small boat registration in Oregon between 1957 and 1964 has had a major impact on the economy of this area. Projections indicate the number of boats will double again by 1980 when the ratio is expected to average one boat for every 23 people, according to a recent survey.

The increase in pleasure boats has created a need for more facilities for launching, berthing, and servicing the boats. Since the construction of a modern marina often is a major undertaking involving a large investment, public agencies are taking the lead in some areas in the development and expansion of small boat harbors. Well-planned marinas have proved to be major tourist attractions, with resultant benefits to the economy of the area.

After improvement of U. S. Highway 101 along the coast and State Highways 18, 20, 34, and 36 between the Willamette Valley and the coast, recreation will become increasingly important to the economy of the basin. The year around diversity of activities offered will attract rapid future recreational expansion.

The extensive areas of seashore lands remaining in public ownership will assure availability of this prime recreation resource for use by the general public. Public and private access roads to the beaches and to the interior forested areas have increased the forest, stream, and lake recreation potential.

# WATER SUPPLY

# PART II

# WATER SUPPLY

## SURFACE WATER

### Annual Yield

The term annual yield as used in this report refers to the volume of water leaving a drainage area during the twelve-month period from October through September of the following year.

The annual yield of a drainage area is a net value representing the precipitation on the area less surface infiltration and consumptive uses. Since these factors are constantly changing, the average annual yield reflects a composite change in both watershed characteristics and consumptive use.

At present there are only seven active stream gaging stations within the Mid-Coast Basin. Five of these stations are within the Alsea River drainage and one each in the Siletz and Yaquina River drainages. In addition to these seven active stations, records are available for ten inactive stream gaging stations.

A base period of 1937-1963 was selected as being representative of the long-term average. This selection was based on the precipitation at Newport for the period 1887 through 1963.

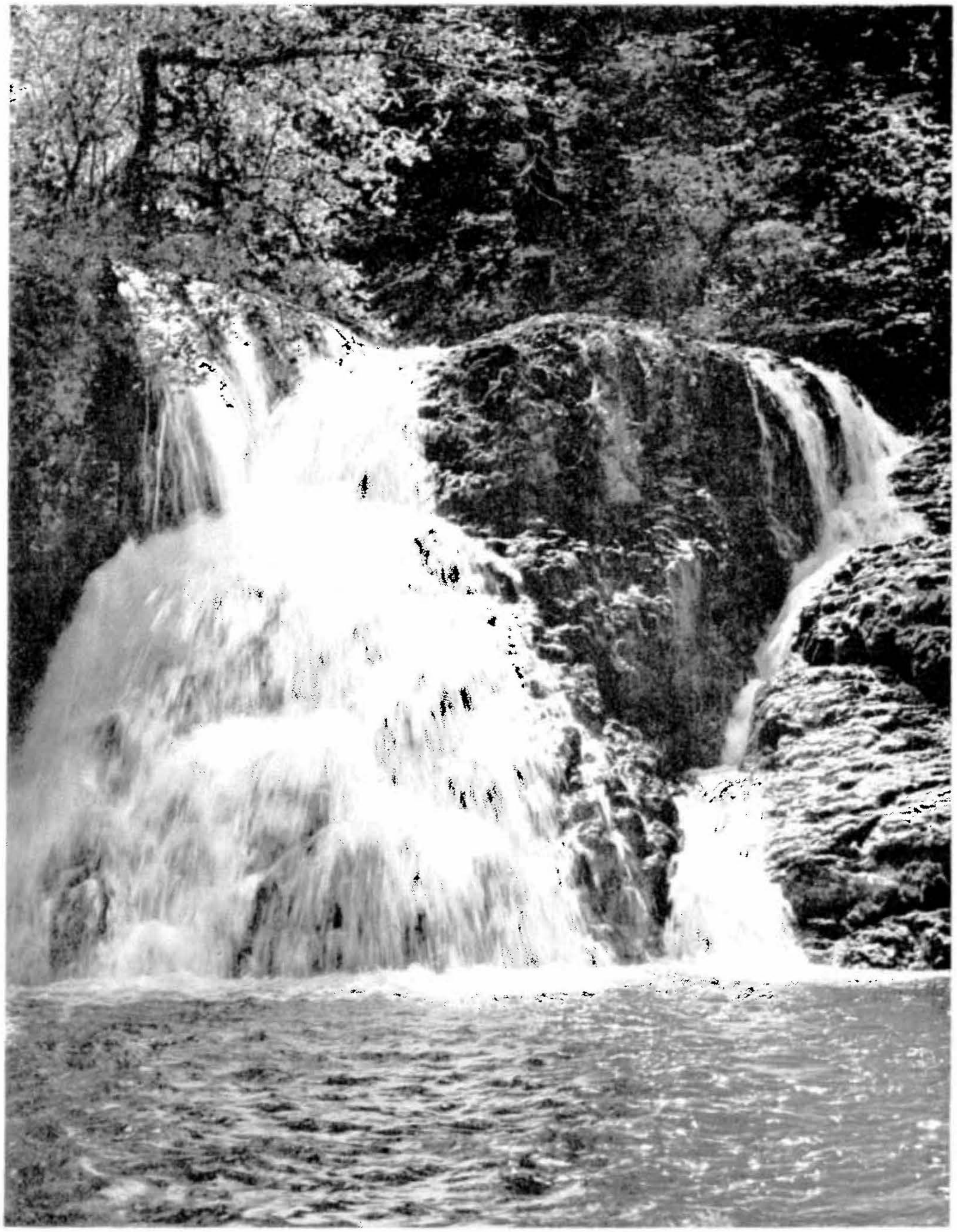
The locations of all hydrological stations, active and inactive, are shown on Plate 2 of the Appendix. Table A in the Appendix lists the name, location, and type and period of records available.

Only one stream gaging station within the basin has records covering the entire base period, Siletz River at Siletz, 1906 through 1912, and 1924 through 1963. Additional records are available for Alsea River near Tidewater, 1940 through 1963; Lake Creek at Triangle Lake, 1931 through 1955; and Siuslaw River above Wildcat Creek near Austa, 1931 through 1941. All other stations have six years or less of record and four have only a few months of record.

Major streams for which only miscellaneous discharge records are available are Salmon River, Yaquina River, Beaver Creek, and Yachats River. In addition, only miscellaneous discharge records are available on any of the minor streams flowing into the Pacific Ocean.

Where possible the records of all stream gaging stations were extended to cover the base period of 1937 through 1963. However, the yield of many areas had to be determined from precipitation. Both the yield of all major streams and the precipitation throughout the basin are shown in Figure 9.

# WATER SUPPLY



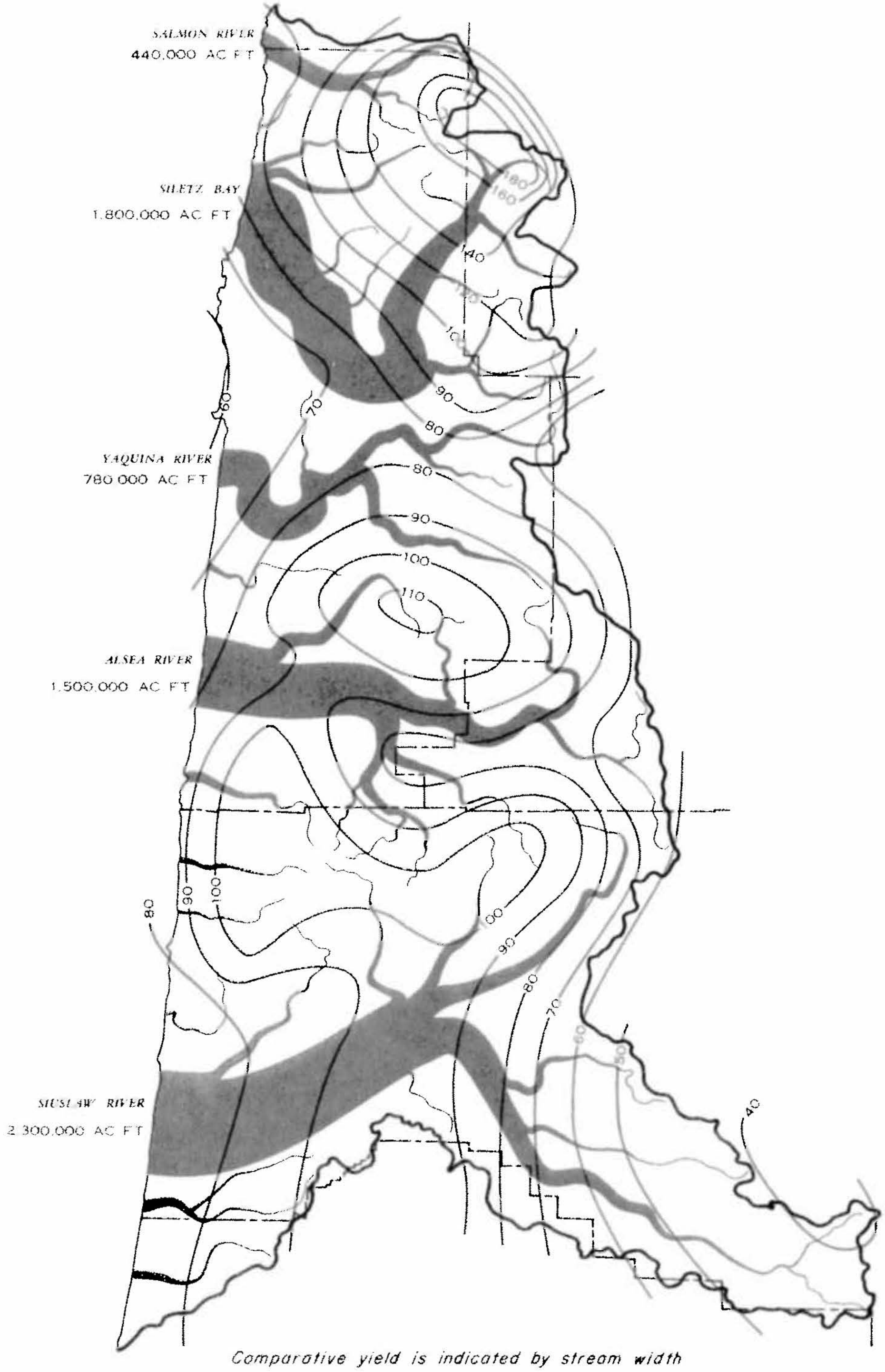



**FIGURE 9. Precipitation and yield.**

Table 13 gives average monthly discharges at gaging stations and estimates of discharge for principal ungaged streams.

TABLE 13

AVERAGE MONTHLY DISCHARGE OF PRINCIPAL STREAMS
1937-1963

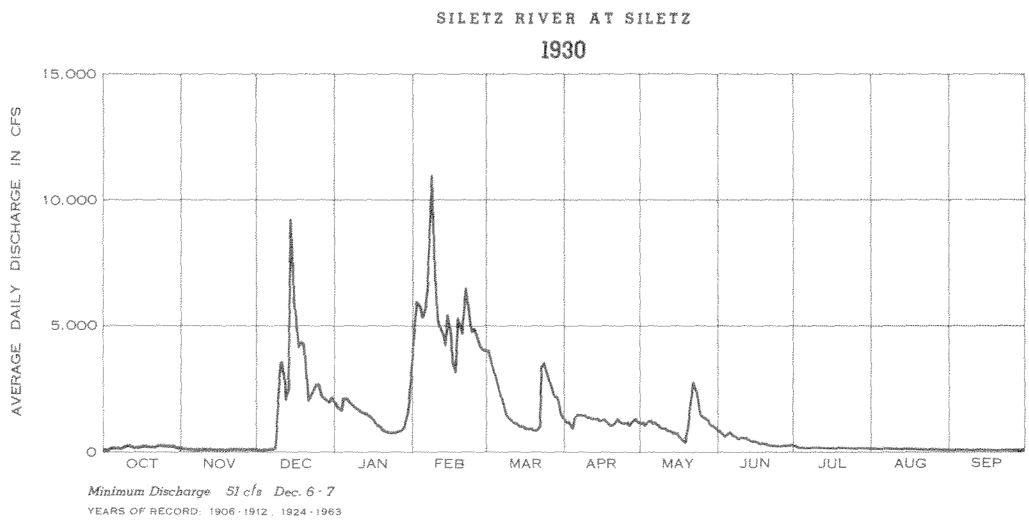
| STREAM | COMPLETE WATER YEARS OF RECORD | AVERAGE MONTHLY DISCHARGE IN CFS | | | | | | | | | | | | MEAN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Oct. | Nov. | Dec. | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | |
| Salmon River near Tidewater | None | 285 | 858 | 1,141 | 1,021 | 1,169 | 818 | 557 | 304 | 150 | 76 | 44 | 72 | 538 |
| *Siletz River at Siletz | 1926-63 | 806 | 2,423 | 3,243 | 2,888 | 3,318 | 2,313 | 1,587 | 868 | 432 | 211 | 128 | 203 | 1,525 |
| Yaquina River near Tidewater | None | 168 | 622 | 1,023 | 1,131 | 1,241 | 872 | 534 | 800 | 130 | 66 | 42 | 44 | 511 |
| *Alsea River near Tidewater | 1940-63 | 509 | 1,862 | 3,064 | 3,391 | 3,758 | 2,613 | 1,603 | 904 | 392 | 192 | 119 | 136 | 1,533 |
| *North Fork Alsea River at Alsea | 1958-63 | 95 | 376 | 576 | 634 | 687 | 507 | 292 | 171 | 70 | 37 | 24 | 25 | 289 |
| *South Fork Alsea River near Alsea | 1953-63 | 47 | 159 | 306 | 371 | 418 | 322 | 188 | 100 | 45 | 23 | 14 | 10 | 161 |
| *Fall Creek near Alsea | 1959-63 | 73 | 250 | 354 | 372 | 384 | 252 | 167 | 103 | 48 | 26 | 16 | 23 | 171 |
| *Five Rivers near Fisher | 1959-63 | 184 | 710 | 1,127 | 1,245 | 1,374 | 943 | 554 | 320 | 129 | 66 | 39 | 40 | 566 |
| Drift Creek near Tidewater | None | 139 | 418 | 556 | 497 | 570 | 399 | 271 | 148 | 73 | 37 | 21 | 45 | 262 |
| Beaver Creek near Tidewater | None | 22 | 82 | 135 | 149 | 164 | 115 | 71 | 40 | 17 | 9 | 5 | 6 | 68 |
| Yachats River near Tidewater | None | 73 | 269 | 442 | 489 | 537 | 377 | 231 | 130 | 57 | 29 | 18 | 19 | 221 |
| *Siuslaw River above Wildcat Creek | 1932-40 | 82 | 585 | 1,300 | 1,752 | 2,092 | 1,428 | 773 | 384 | 253 | 97 | 49 | 45 | 733 |
| *Lake Creek at Triangle Lake | 1932-55 | 52 | 229 | 432 | 514 | 506 | 366 | 228 | 119 | 58 | 27 | 15 | 16 | 219 |

*Gaged or correlated records, other values are estimates based on precipitation and runoff.

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

## Extreme Discharges

Because of the rapid runoff throughout the basin, daily discharges show extreme variations. This is illustrated in Figure 12, which shows daily discharges at gaging stations on the Siletz and Alsea Rivers for the water years having the lowest recorded discharge.



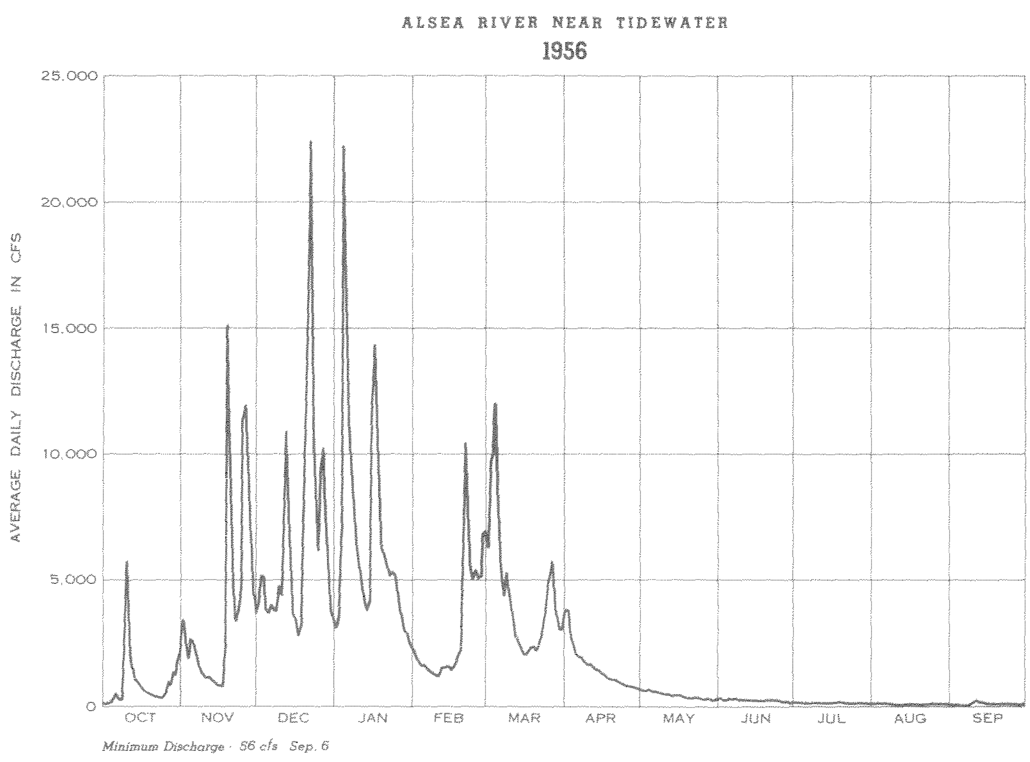




FIGURE 12. Extreme differences in daily flows.

# WATER SUPPLY

Table 14 lists the lowest miscellaneous discharge measurements made on selected streams within the basin. Since few measurements were made, the flows recorded may not be the lowest

TABLE 14

MINIMUM MISCELLANEOUS DISCHARGE MEASUREMENTS AT SELECTED LOCATIONS

| STREAM | MINIMUM MISCELLANEOUS DISCHARGE | |
|---|---|---|
| | Cfs | Date |
| 1. SALMON RIVER | | |
| Slickrock Creek at mouth | 5.5 | Sept. 1936 |
| Salmon River at Tidewater | 21.7 | Aug. 1931 |
| Salmon Creek at mouth | 0.3 | Aug. 1931 |
| Deer Creek at mouth | 0.2 | Aug. 1931 |
| 2. TAFT | | |
| Devils Lake outlet | 0.8 | Sept. 1936 |
| Schooner Creek at Tidewater | 5.4 | Sept. 1936 |
| Drift Creek at Tidewater | 22.9 | Aug. 1931 |
| 3. SILETZ RIVER | | |
| South Fork Siletz River at mouth | 9.6 | June 1926 |
| Sunshine Creek at county line | 3.0 | Aug. 1962 |
| 4. DEPOE BAY COAST | | |
| Forgarty Creek at mouth | 0.2 | Sept. 1936 |
| Depoe Bay Creek at mouth | 0.6 | Sept. 1935 |
| Rocky Creek at mouth | 1.0 | Aug. 1931 |
| Spencer Creek at mouth | 1.0 | Sept. 1937 |
| Wade Creek at mouth | 0.2 | Sept. 1935 |
| Moloch Creek at mouth | 0.5 | Sept. 1935 |
| Little Creek at mouth | 0.1 | Sept. 1934 |
| Big Creek at mouth | 0.2 | Sept. 1934 |
| 5. YAQUINA RIVER | | |
| Little Elk Creek at mile 2 | 0.4 | Sept. 1934 |
| Yaquina River at mile 28 | 4.0 | Sept. 1931 |
| Elk Creek above Bear Creek | 5.7 | Sept. 1936 |
| Depoe Creek at mile 2 | 1.2 | Sept. 1937 |
| Beaver Creek at mile 2 | 0.2 | Sept. 1934 |
| 6. BEAVER CREEK | | |
| Theal Creek at mouth | 0.2 | Aug. 1931 |
| South Fork Beaver Creek at mile 2.7 | 1.2 | Sept. 1953 |
| 7. ALSEA RIVER | | |
| North Fork Alsea River near mouth | 6.0 | Sept. 1931 |
| South Fork Alsea River at mile 1.0 | 3.5 | Sept. 1931 |
| Bummer Creek at mile 1.5 | 1.0 | Sept. 1963 |
| Fall Creek near mouth | 5.0 | Sept. 1931 |
| Scott Creek near mouth | 3.0 | Sept. 1931 |
| 8. YACHATS RIVER | | |
| Big Creek above Dicks Fork | 0 | Aug. 1931 |
| Big Creek at mouth | 1.1 | Sept. 1963 |
| Vingie Creek at mouth | 0 | Aug. 1931 |
| Starr Creek at mouth | 0.4 | Sept. 1934 |
| Yachats River above North Fork | 6.0 | Aug. 1962 |
| North Fork Yachats River | 2.6 | Sept. 1963 |
| 9. NORTH LANE COAST | | |
| Cummins Creek at mouth | 0.9 | Sept. 1935 |
| Bob Creek at mouth | 1.5 | Sept. 1935 |
| Tenmile Creek at mouth | 3.0 | Sept. 1935 |
| Rock Creek at mouth | 1.5 | Sept. 1935 |
| Big Creek at mouth | 1.9 | Sept. 1935 |
| China Creek at mouth | 0.3 | Sept. 1935 |
| Cape Creek at mouth | 4.5 | Sept. 1934 |
| Berry Creek at mouth | 0.8 | Sept. 1935 |
| Sutton Creek at Sutton Lake | 2.2 | Sept. 1935 |
| 10. SIUSLAW RIVER | | |
| Deadwood Creek at mouth | 4.8 | Sept. 1934 |
| Indian Creek at mouth | 8.4 | Sept. 1935 |
| Knowles Creek at mouth | 0.8 | Aug. 1963 |
| North Fork Siuslaw River above Condon Creek | 2.4 | Sept. 1934 |
| Condon Creek at mouth | 1.4 | Sept. 1934 |
| Munsel Creek at Munsel Lake | 0.1 | Sept. 1934 |
| 11. SILTCOOS | | |
| Siltcoos River at Tidewater | 4.3 | Sept. 1936 |
| Woahink Lake outlet | 1.6 | Sept. 1937 |
| Tahkenitch Lake outlet | 0 | Aug. 1949 |

Data Source: U. S. Geological Survey, Oregon State Engineer, and Oregon State Game Commission occurring on the stream. However, since all measurements were taken during the low flow season, they do indicate the relative magnitude of the low flows of these streams.

Minimum and maximum instantaneous discharges at these and other gaging stations are listed in Table 15. Measurements shown re-

TABLE 15

EXTREMES OF DISCHARGE AT SELECTED GAGING STATIONS

| MAP INDEX NO. | GAGING STATION | USGS STATION NUMBER | COMPLETE WATER YEARS OF RECORD | MINIMUM INSTANTANEOUS DISCHARGE | | MAXIMUM INSTANTANEOUS DISCHARGE | |
|---|---|---|---|---|---|---|---|
| | | | | Cfs | Month & Year | Cfs | Month & Year |
| 1 | Alsea River near Tidewater | 3065 | 1940-63 | 56.0 | Sept. 1956 | 32,800 | Nov. 1960 |
| 2 | Deer Creek near Salado | 3068.1 | 1959-63 | 0.3 | Sept. Oct. 1958 & 60 | 114 | Nov. 1960 |
| 3 | Drift Creek near Salado | 3066 | 1959-63 | 3.8 | Sept. 1958 | 2,300 | Nov. 1960 |
| 5 | Fall Creek near Alsea | 3063 | 1959-63 | 5.9 | Sept. 1961 | 2,970 | Nov. 1960 |
| 6 | Five Rivers near Fisher | 3064 | 1959-63 | 17.0 | Oct. 1958 | 15,700 | Nov. 1960 |
| 7 | Flynn Creek near Salado | 3068 | 1959-63 | 0.1 | Sept. 1958 & 60 | 78 | Nov. 1960 |
| 8 | Lake Creek at Triangle Lake | 3075 | 1932-55 | 2.7 | Aug. 1944 | 4,180 | Feb. 1949 |
| 9 | Mill Creek near Toledo | 3060.36 | 1960-63 | 0 | Sept. 1961 | 460 | Nov. 1960 |
| 10 | Needle Branch near Salado | 3067 | 1959-63 | 0 | Each year | 33 | Nov. 1960 |
| 11 | North Fork Alsea River at Alsea | 3061 | 1958-63 | 13.0 | Sept. 1958 | 12,000 | Dec. 1956 |
| 14 | Siletz River at Siletz | 3055 | 1906-11 1926-63 | 51.0 | Dec. 1929 | 37,000 | Feb. 1949 |
| 15 | Siuslaw River above Wildcat Creek at Austa | 3070 | 1932-40 | 20.0 | Sept. 1939 | 12,900 | Jan. 1936 |
| 16 | South Fork Alsea River near Alsea | 3062 | 1958-63 | 7.2 | Sept. 1958 | 4,340 | Nov. 1960 |

Data Source: U. S. Geological Survey

present only the extremes for the period for which the gage was active and may have been exceeded in ungaged years.

## Water Rights

Water rights in the Mid-Coast Basin have not been adjudicated. Consequently the number initiated prior to 1909, the year of enactment of the Oregon Surface Water Code, is not known. They are considered negligible, however, and should not appreciably affect rights established subsequent to 1909.

Table 16 summarizes surface water rights in the Mid-Coast Basin as of August 1, 1964 by study area. The surface water rights of record total 414 cfs, of which 331 are consumptive and 83 cfs nonconsumptive.

Industrial rights, 123 cfs, are the largest consumptive group;

TABLE 16

SURFACE WATER RIGHTS SUMMARY
As of August 1, 1964

| STUDY AREA AND STREAM SYSTEM | CONSUMPTIVE | | | | | | NONCONSUMPTIVE | | | | | TOTAL RIGHTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | DO. Cfs | MU. Cfs | IN. Cfs | IRRIGATION Cfs | IRRIGATION Acres | TOTAL Cfs | PW. Cfs | FS. Cfs | RE. Cfs | MI. Cfs | TOTAL Cfs | Cfs |
| 1. SALMON RIVER | | | | | | | | | | | | |
| Salmon River | 0.83 | 4.00 | 0.25 | 3.63 | 293 | 8.71 | 0 | 3.00 | 0.01 | 0 | 3.01 | 11.72 |
| 2. TAFT | | | | | | | | | | | | |
| D River | 0.36 | 3.70 | 0 | 0.94 | 87 | 5.00 | 0 | 0 | 0 | 0 | 0 | 5.00 |
| Schooner Creek | 0.32 | 7.89 | 0 | 0.12 | 9 | 8.33 | 0 | 0.01 | 0 | 0 | 0.01 | 8.34 |
| Drift Creek | 0.37 | 5.00 | 0 | 0.03 | 3 | 5.40 | 0 | 0.28 | 0 | 0 | 0.28 | 5.68 |
| Pacific Ocean Misc. | 0.27 | 0.93 | 0.10 | 0 | 0 | 1.30 | 0 | 0 | 0 | 0 | 0 | 1.30 |
| TOTAL | 1.32 | 17.52 | 0.10 | 1.09 | 99 | 20.03 | 0 | 0.29 | 0 | 0 | 0.29 | 20.32 |
| 3. SILETZ RIVER | | | | | | | | | | | | |
| Upper Siletz | 0.14 | 4.00 | 5.05 | 2.47 | 204 | 11.66 | | 11.02 | 0 | 0 | 11.02 | 22.68 |
| Lower Siletz | 2.46 | 10.10 | 43.19 | 8.17 | 672 | 63.92 | 0.90 | 0.90 | 0 | 0 | 1.80 | 65.72 |
| TOTAL | 2.60 | 14.10 | 48.24 | 10.64 | 876 | 75.58 | 0.90 | 11.92 | 0 | 0 | 12.82 | 88.40 |
| 4. DEPOE BAY COAST | | | | | | | | | | | | |
| Pacific Ocean Misc. | 1.98 | 22.02 | 3.08 | 1.19 | 96 | 28.27 | 0.30 | 0.90 | 0.05 | 0.10 | 1.35 | 29.62 |
| 5. YAQUINA RIVER | | | | | | | | | | | | |
| Upper Yaquina | 0.76 | 0 | 0.72 | 2.15 | 237 | 3.63 | 0 | 5.46 | 0 | 0 | 5.46 | 9.09 |
| Lower Yaquina | 1.24 | 17.10 | 0.91 | 6.31 | 569 | 25.56 | 0 | 0 | 0 | 0 | 0 | 25.56 |
| TOTAL | 2.00 | 17.10 | 1.63 | 8.46 | 806 | 29.19 | 0 | 5.46 | 0 | 0 | 5.46 | 34.65 |
| 6. BEAVER CREEK | | | | | | | | | | | | |
| Pacific Ocean Misc. | 1.39 | 2.95 | 1.30 | 1.27 | 102 | 6.91 | 0 | 0 | 0.65 | 2.00 | 2.65 | 9.56 |
| 7. ALSEA RIVER | | | | | | | | | | | | |
| Upper Alsea | 0.50 | 0.04 | 0 | 20.88 | 1,809 | 21.42 | 0.35 | 42.05 | 0 | 0 | 42.20 | 63.82 |
| Five Rivers | 0.11 | 0 | 0.11 | 3.39 | 226 | 3.61 | 0 | 0 | 0 | 0 | 0 | 3.61 |
| Lower Alsea | 1.47 | 5.44 | 0 | 3.22 | 285 | 10.13 | 0.40 | 5.09 | 0 | 0 | 5.13 | 15.26 |
| TOTAL | 2.08 | 5.48 | 0.11 | 27.49 | 2,320 | 35.16 | 0.39 | 47.14 | 0 | 0 | 47.53 | 82.69 |
| 8. YACHATS RIVER | | | | | | | | | | | | |
| Yachats River | 0.82 | 4.00 | 0 | 0.42 | 44 | 5.24 | 0 | 1.00 | 0 | 0 | 1.00 | 6.24 |
| Pacific Ocean Misc. | 1.19 | 8.75 | 0.15 | 0.31 | 25 | 10.40 | 0 | 0.50 | 1.00 | 0 | 1.50 | 11.90 |
| TOTAL | 2.01 | 12.75 | 0.15 | 0.73 | 69 | 15.64 | 0 | 1.50 | 1.00 | 0 | 2.50 | 18.14 |
| 9. NORTH LANE COAST | | | | | | | | | | | | |
| Pacific Ocean Misc. | 1.12 | 0.85 | 2.00 | 0.25 | 18 | 4.22 | 0.14 | 0 | 0 | 0 | 0.14 | 4.36 |
| 10. SIUSLAW RIVER | | | | | | | | | | | | |
| Upper Siuslaw | 0.17 | 0 | 4.37 | 9.36 | 782 | 13.90 | 0 | 0 | 1.01 | 0 | 1.01 | 14.91 |
| Wildcat Creek | 0.14 | 0 | 0.90 | 0.52 | 40 | 1.56 | 0 | 0 | 0 | 0 | 0 | 1.56 |
| Lower Siuslaw | 2.31 | 8.76 | 10.03 | 2.20 | 188 | 23.30 | 0 | 0 | 0 | 0 | 0 | 23.30 |
| Lake Creek | 0.88 | 0 | 2.24 | 6.01 | 678 | 11.13 | 0 | 5.00 | 0 | 0 | 5.00 | 16.13 |
| North Fork Siuslaw | 0.08 | 0 | 0 | 4.56 | 373 | 4.64 | 0 | 0.90 | 0 | 0 | 0.90 | 5.54 |
| TOTAL | 3.58 | 8.76 | 17.54 | 24.65 | 2,061 | 54.53 | 0 | 5.90 | 1.01 | 0 | 6.91 | 61.44 |
| 11. SILTCOOS | | | | | | | | | | | | |
| Siltcoos River | 1.13 | 0.20 | 12.45 | 2.60 | 263 | 16.38 | 0 | 0.01 | 0.25 | 0 | 0.26 | 16.64 |
| Tahkenitch Creek | 0.01 | 0 | 36.65 | 0 | 0 | 36.66 | 0 | 0 | 0 | 0 | 0 | 36.66 |
| TOTAL | 1.14 | 0.20 | 49.10 | 2.60 | 263 | 53.04 | 0 | 0.01 | 0.25 | 0 | 0.26 | 53.30 |
| BASIN TOTAL | 20.05 | 105.73 | 123.50 | 82.00 | 7,003 | 331.28 | 1.73 | 76.12 | 2.97 | 2.10 | 82.92 | 414.20 |

Data Source: Oregon State Engineer

5 25 30. 20. 18

followed by municipal, 106 cfs; irrigation, 82 cfs for 7,000 acres; and domestic, 20 cfs. Nonconsumptive rights total 76 cfs for fish life, 3 cfs for recreation, 2 cfs for mining, and 2 cfs for power.

Applications for surface water rights pending as of August 1, 1964 totaled 5.5 cfs on tributaries of Salmon, Alsea, and Siuslaw Rivers.

Figure 13 shows water rights by stream mile for the Siletz, Yaquina, Alsea, and Siuslaw Rivers. Although this figure shows

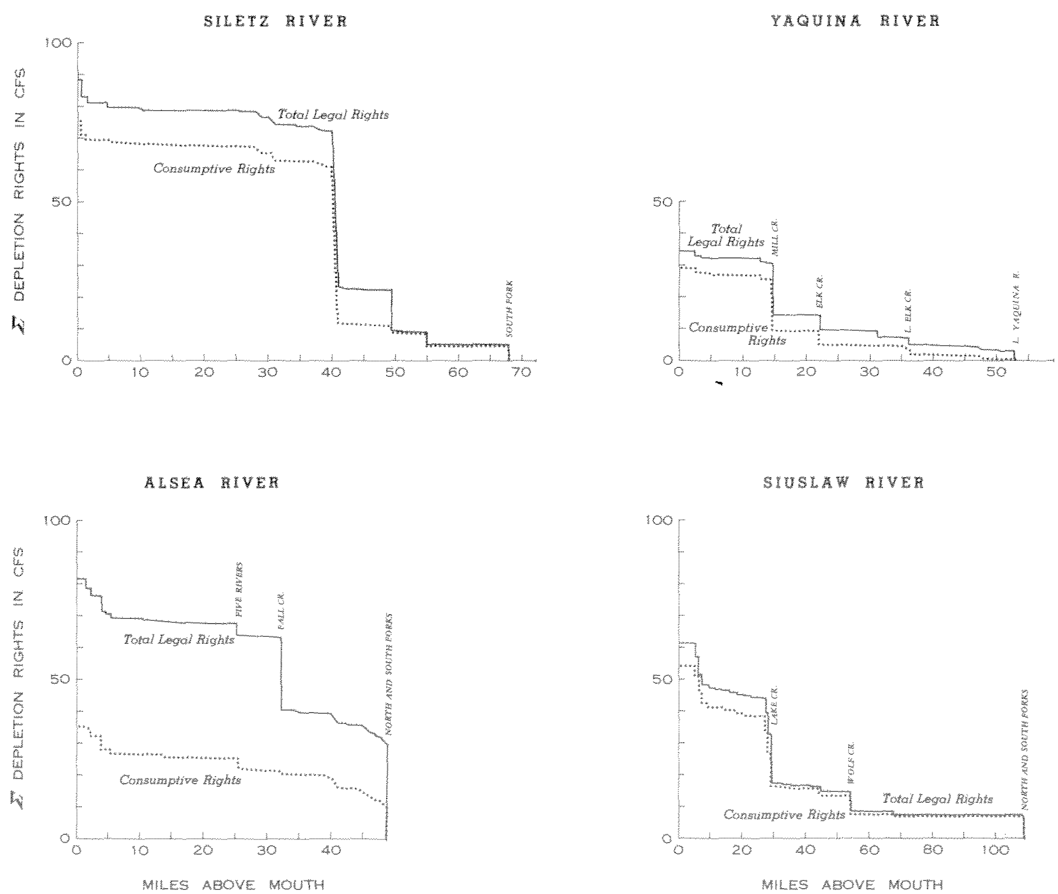



FIGURE 13. Legal depletions by stream mile.

the total rights both consumptive and nonconsumptive above each point it does not reflect the actual or seasonal distribution of water use.

# WATER SUPPLY

The largest single consumptive surface water right in the basin is 49 cfs from Siltcoos and Tahkenitch Lakes for industrial use. There are two rights for 20 cfs each for industrial use at mile 40 on the Siletz River. The largest nonconsumptive rights are for fish, 22 cfs and 20 cfs on Fall Creek and the North Fork Alsea River.

There are 40 reservoir rights within the basin representing a total capacity of about 35,400 acre-feet. Most of these rights are for industrial use. The largest is for 16,580 acre-feet from Tahkenitch Lake. Others are 15,070 acre-feet from Siltcoos Lake, 2,650 acre-feet from Olalla Creek and 515 acre-feet from Lake Creek. One storage right provides for 200 acre-feet from Big Creek for municipal use, another for 176 acre-feet from a tributary of Alsea River for fish. The remaining 34 reservoir rights for various uses total about 210 acre-feet.

As of August 1, 1964 there were four reservoir permit applications pending totaling about 1,100 acre-feet. These applications are for municipal use on tributaries of the Yaquina and Siuslaw Rivers.

## Legal Restrictions

In 1959 the State Engineer ordered that there was no unappropriated flow of Mill Creek in excess of that required to satisfy the present and future municipal needs of the City of Toledo and therefore no additional applications would be accepted for the appropriation of water from Mill Creek or its tributaries after the 7th day of December, 1959.

In 1960 the State Engineer ordered that it appeared all of the waters of Little Creek not required to satisfy existing rights, should be preserved as a municipal supply for the Agate Beach Water District and therefore no additional applications would be accepted for the appropriation of water from Little Creek except for the purpose of municipal use by the Agate Beach Water District after the 7th day of June, 1960.

As described in the Appendix, the State Engineer ordered as of the 22nd day of July, 1960, that no applications would be accepted for the appropriation or storage of the direct flow of Rock Creek (also known as Little Rock Creek or the South Fork of Rock Creek) and its tributaries above the north line of the SW¼NE¼, Section 7, Township 10 South, Range 8 West, Willamette Meridian, during the months of July, August, or September of each year.

On June 28, 1960 the State Engineer issued a statment of Findings of Fact, Conclusions and Order relative to appropriation of industrial water from Siltcoos and Tahkenitch Lakes. The State Engineer approved the permit for withdrawal of 12.42 cubic feet per second from Siltcoos Lake and 36.65 cubic feet per second from Tahkenitch Lake subject to construction of specified dams and the maintenance of minimum flows for fish life. Due to the bulky nature of this document it is not appended to the report.

### Maximum Legal Depletions

The volume of water that could be depleted if all of the surface water rights were fully utilized is given in Table 17. This does not include the water used for storage.

The maximum legal depletion of surface water for the basin is about 198,000 acre-feet annually. This does not include nonconsumptive uses since they are not depleted from the streams thus becoming available to downstream users. It is recognized, however, that they do constitute demands on upstream rights in accordance with relative priority.

Because many rights are used only intermittently and others not at all, the actual annual depletion of basin streamflow would be considerably less than indicated in Figure 13, page 35.

Assuming full utilization, the surface water rights would only deplete the basin by about 2.5 percent of its average annual yield. On this basis, runoff even in a critical year would be adequate to supply all future needs annually. As further described in the Water Use Section, however, storage will be required to satisfy future needs during critical summer low flow periods.

## GROUND WATER

### General

The quantity of ground water available to wells in the basin is meager except in some alluvial and sand dune areas. Ground water

TABLE 17

MAXIMUM LEGAL ANNUAL DEPLETIONS
CONSUMPTIVE RIGHTS
As of August 1, 1964

| STUDY AREA | CONSUMPTIVE DEPLETIONS BY USE | | | | |
|---|---|---|---|---|---|
| | DO. Ac.-ft. | MU. Ac.-ft. | IN. Ac.-ft. | IR. Ac.-ft. | TOTAL Ac.-ft. |
| 1. SALMON RIVER | | | | | |
| Salmon River | 601 | 2,896 | 181 | 733 | 4,411 |
| 2. TAFT | | | | | |
| D River | 261 | 2,679 | 0 | 218 | 3,158 |
| Schooner Creek | 232 | 5,712 | 0 | 23 | 5,967 |
| Drift Creek | 268 | 3,620 | 0 | 8 | 3,896 |
| Pacific Ocean Misc. | 195 | 673 | 72 | 0 | 940 |
| TOTAL | 956 | 12,684 | 72 | 249 | 13,961 |
| 3. SILETZ RIVER | | | | | |
| Upper Siletz | 101 | 2,896 | 3,656 | 510 | 7,163 |
| Lower Siletz | 1,781 | 7,312 | 31,270 | 1,680 | 42,043 |
| TOTAL | 1,882 | 10,208 | 34,926 | 2,190 | 49,206 |
| 4. DEPOE BAY COAST | | | | | |
| Pacific Ocean Misc. | 1,434 | 15,943 | 2,230 | 240 | 19,847 |
| 5. YAQUINA RIVER | | | | | |
| Upper Yaquina | 560 | 0 | 521 | 593 | 1,664 |
| Lower Yaquina | 898 | 12,380 | 659 | 1,423 | 15,360 |
| TOTAL | 1,448 | 12,380 | 1,180 | 2,016 | 17,024 |
| 6. BEAVER CREEK | | | | | |
| Pacific Ocean Misc. | 1,006 | 2,136 | 941 | 255 | 4,338 |
| 7. ALSEA RIVER | | | | | |
| Upper Alsea | 362 | 29 | 0 | 4,523 | 4,914 |
| Five Rivers | 80 | 0 | 80 | 565 | 725 |
| Lower Alsea | 1,064 | 3,939 | 0 | 713 | 5,716 |
| TOTAL | 1,506 | 3,968 | 80 | 5,801 | 11,355 |
| 8. YACHATS RIVER | | | | | |
| Yachats River | 594 | 2,896 | 0 | 110 | 3,600 |
| Pacific Ocean Misc. | 862 | 6,335 | 109 | 63 | 7,369 |
| TOTAL | 1,456 | 9,231 | 109 | 173 | 10,969 |
| 9. NORTH LANE COAST | | | | | |
| Pacific Ocean Misc. | 811 | 616 | 1,448 | 45 | 2,920 |
| 10. SIUSLAW RIVER | | | | | |
| Upper Siuslaw | 123 | 0 | 3,164 | 1,955 | 5,242 |
| Wildcat Creek | 101 | 0 | 651 | 100 | 852 |
| Lower Siuslaw | 1,672 | 6,342 | 7,262 | 470 | 15,746 |
| Lake Creek | 638 | 0 | 1,622 | 1,695 | 3,955 |
| North Fork Siuslaw | 58 | 0 | 0 | 933 | 991 |
| TOTAL | 2,592 | 6,342 | 12,699 | 5,153 | 26,786 |
| 11. SILTCOOS | | | | | |
| Siltcoos River | 818 | 145 | 9,014 | 658 | 10,635 |
| Tahkenitch Creek | 7 | 0 | 26,535 | 0 | 26,542 |
| TOTAL | 825 | 145 | 35,549 | 658 | 37,177 |
| BASIN TOTAL | 14,517 | 76,549 | 89,415 | 17,513 | 197,994 |

Data Source: Oregon State Engineer

quality is generally poor due to dissolved minerals, decomposed vegetation, and contamination from inadequate sewage treatment. The fast-increasing population, particularly along the coast, has in some areas contaminated the ground water supplies to the extent that the danger to health and welfare is critical.

## Geology

The Mid-Coast Basin is made up predominantly of marine sedimentary rocks and, to a lesser extent, of volcanic, pyroclastic, and intrusive igneous rocks. The rocks are fine-grained and relatively impermeable. No metamorphic rocks are known to occur in the basin. Principal rock units and geologic structures are shown on the generalized ground water geology map, Figure 14.

The Siletz River volcanic series of lava flows, tuffs, and breccias is the oldest exposed formation and underlies the entire basin. This formation is exposed in areas north and south of Alsea and north of the Siletz River where uplift and consequent erosion have removed the overlying sedimentary rocks. The Tyee formation, a thick sequence of sandstone and siltstone characterized by an abundance of yellowish mica flakes, is the most widespread surface formation in the basin.

The coastal area has undergone alternating periods of submergence and emergence due to changes in sea level caused by continental glaciation and deglaciation during the Ice Ages. River mouths, cut down during periods of emergence, were drowned when the sea again rose. The Siletz, Yaquina, and Alsea Bays have formed where the streams have not kept pace in filling their drowned mouths with alluvial deposits.

Large coastal lakes such as Woahink, Siltcoos, and Tahkenitch have an origin similar to that of the bays. Their streams are smaller and have not contributed enough alluvium to their drowned valleys to fill them. The small streams also lack sufficient volume of water to prevent sand from blocking their channels at sea level. Impoundment therefore occurs in parts of former river valleys, forming lakes instead of bays.

Vast quantities of sand, forming dunes up to 320 feet in elevation and three miles in width, have accumulated along the coast from near Mercer Lake to beyond the south border of the basin.

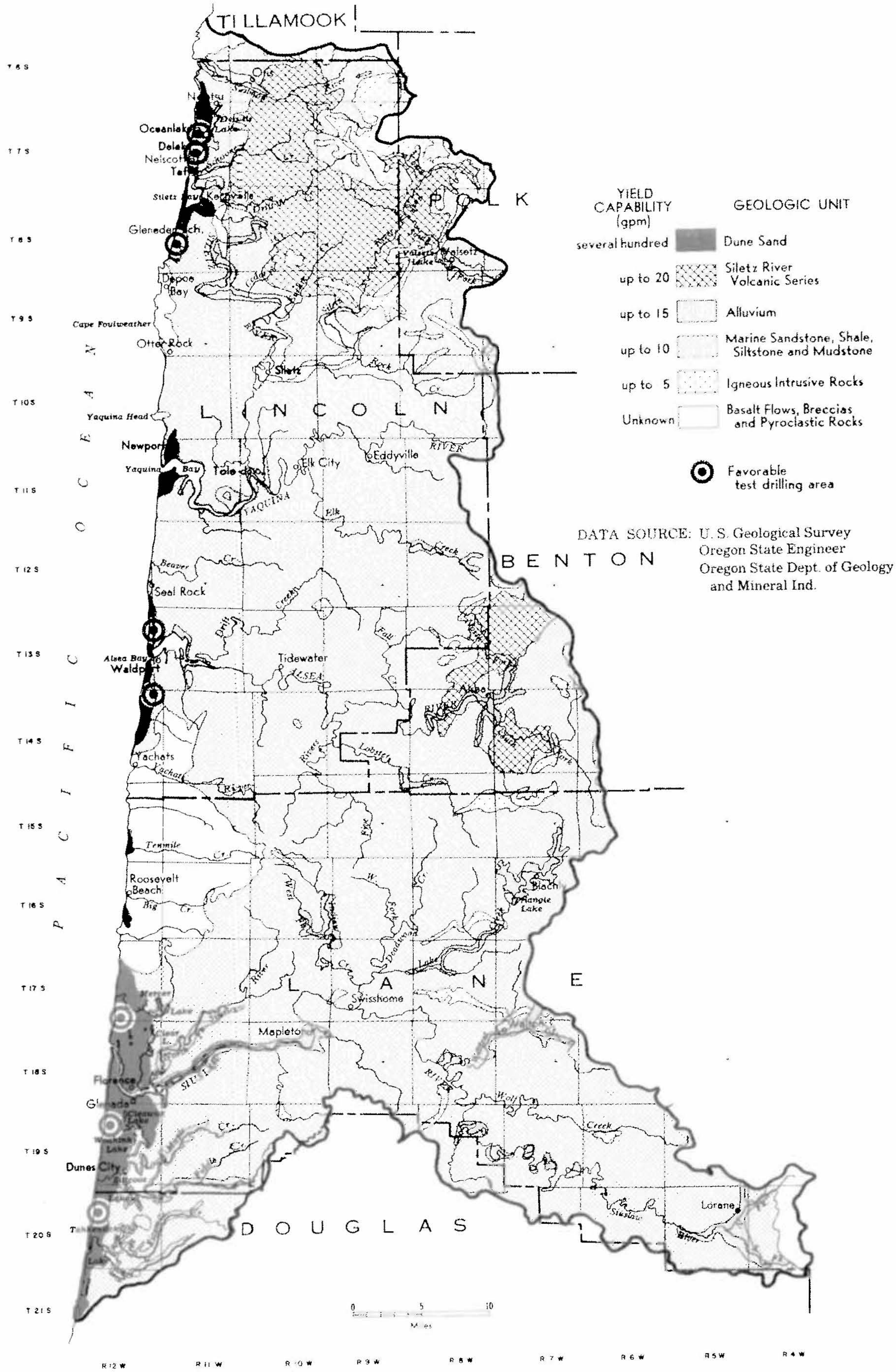



FIGURE 14. Generalized ground water geology.

A geologic cross-section through the Florence dune area is shown in Figure 15.

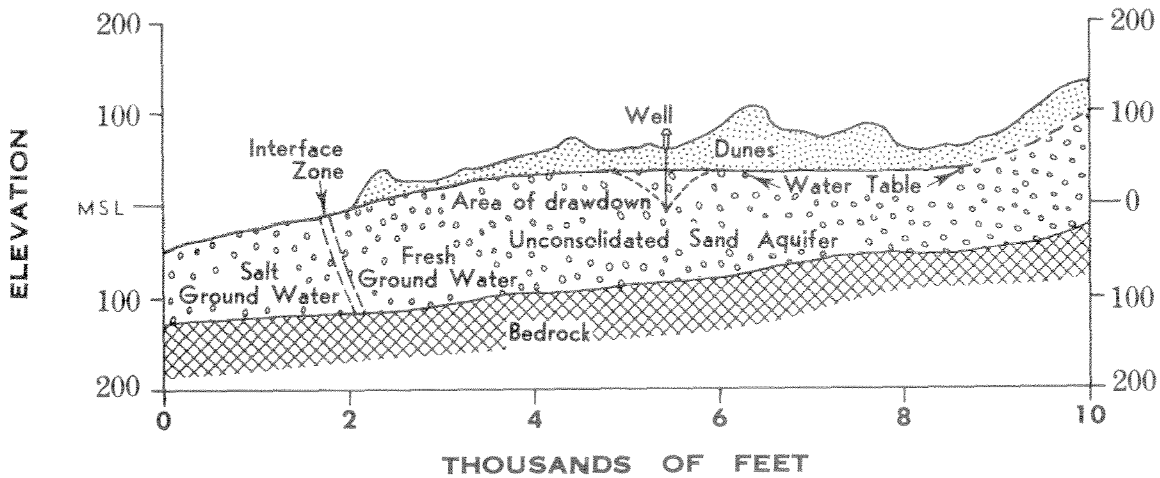



FIGURE 15. Typical geologic cross section of Florence dune area.

## Occurrence

With the exception of some sand dunes and alluvial deposits, the availability of ground water throughout the Mid-Coast Basin is meager. The predominantly sedimentary formations are so fine-grained that the minute void spaces between the grains prevent the ready release of water in them. Ground water yield to wells is therefore low in most areas of the basin.

The fact that most formations reject precipitation is apparent by the dendritic or tree-like drainage pattern throughout much of the basin. The pattern is characterized by irregular branching in all directions with the tributaries joining the main stream at all angles, as shown by the base map, Plate 1 of the Appendix. In some places, however, precipitation is retained in the soil mantle or "cover" and supplies small perennial springs.

Promising areas for ground water development in the basin are indicated by radial drainage patterns in the volcanic highlands north of the Siletz River and between Yachats and Heceta Head. These areas are respectively underlain by rocks of the Siletz River volcanic series and Goble volcanic series, shown on the generalized ground water geology map, Figure 14, page 40. Alluvial fan gravels from these highlands may underlie some of the younger sedimentary formations adjacent to the volcanics and form ground water aquifers.

The sand dunes are by far the most productive ground water aquifers in the basin. These deposits occur in relatively narrow bands from near Roads End to Lincoln Beach, north and south of the mouth of Yaquina Bay, from Seal Rock to near Yachats, in small areas north and south of Roosevelt Beach, and from near Lily Lake to beyond the south border of the basin. Within the basin, only the north portion of the latter area has been studied for its ground water potential.

A 1963 study by the U. S. Geological Survey of the 18-square-mile dune area extending from Florence north to Lily Lake showed that the sand absorbs about 55 inches of the 65-inch annual precipitation. An estimated 7 inches of this is lost to evapotranspiration, resulting in an annual recharge of 48 inches. The sand is very uniform, thereby providing maximum pore space, and is probably at least 100 feet thick throughout most of the area and more than 200 feet thick locally. A diagramatic cross-section through the area is shown in Figure 15, page 41.

The study showed that the 48 inches of annual recharge totals approximately 46,000 acre-feet per year or 41 million gallons per day. On a square-mile basis, this amounts to about 2,600 acre-feet per year or 2.3 million gallons per day. This quantity is discharged via springs, seeps, and as underflow to the ocean, the Siuslaw River, and three small perennial streams that drain the dune area. Most of the water could be recovered from wells without endangering its quality.

The water in the dunes is soft and of generally good chemical quality although at places it contains objectionable amounts of iron. Ground water beneath a few swampy, low-lying areas is excessively high in iron and has objectionable taste, odor, and color. Sea-water intrusion is prevented by the hydrostatic head or pressure and seaward movement of the overlying fresh water.

The City of Florence in 1964 drilled a test well in sand dunes near the east city limits to provide an alternate water source, the city system being used to near-capacity each summer. The 100-foot-deep, 12-inch-diameter well was test-pumped at 325 gallons per minute (gpm) with 37 feet of drawdown and full recovery in one hour. The water is very high in iron, containing 2.0 parts per million (ppm) as compared with the 0.3 ppm iron maximum recommended by the U. S. Public Health Service, and necessitates use of an iron-removal plant.

# W A T E R   S U P P L Y

Most of the ground water in the predominant marine sedimentary formations contain altered iron compounds and hydrogen sulfide and carbon dioxide in solution which cause staining and offensive taste, odor, and color. Incrustation of pipes or corrosive damage to steel pipes occurs in many areas. Ground water is so high in sulfur content in the Harlan, Deadwood, and Greenleaf areas that some residents, rather than use it, carry water from springs. The deeper wells in the basin generally produce brackish water unfit for use.

## Water Rights and Withdrawals

The eight ground water rights in the basin total 1.79 cfs or 1,232.5 acre-feet, of which 0.14 cfs are domestic, 1.56 cfs are municipal, and 0.09 cfs are for the irrigation of five acres. All the rights are for consumptive uses and are summarized by drainage areas in Table 18.

TABLE 18

LEGAL ANNUAL GROUND WATER WITHDRAWALS
As of August 1, 1964

| STUDY AREA | DOMESTIC | | MUNICIPAL | | IRRIGATION | | | TOTAL | NUMBER |
|---|---|---|---|---|---|---|---|---|---|
| | Cfs | Ac.-ft. | Cfs | Ac.-ft. | Cfs | Acres | Ac.-ft. | Ac.-ft. | OF WELLS |
| Siletz River | 0 | 0 | 0.22 | 159 | 0 | 0 | 0 | 159 | 1 |
| Depoe Bay Coast | 0.8 | 58 | 1.00 | 724 | 0 | 0 | 0 | 782 | 2 |
| Yaquina River | 0 | 0 | 0 | 0 | 0.02 | 1 | 2.5 | 2.5 | 1 |
| North Lane Coast | 0 | 0 | 0.34 | 246 | 0 | 0 | 0 | 246 | 2 |
| Siltcoos | 0.6 | 43 | 0 | 0 | 0 | 0 | 0 | 43 | 1 |
| TOTAL | 0.14 | 101 | 1.56 | 1,129 | 0.02 | 1 | 2.5 | 1,232.5 | 7 |

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.

Data Source: Oregon State Engineer

The statewide Ground Water Act of 1955 does not require water rights for watering stock, or for irrigating lawns and noncommercial gardens not exceeding one-half acre in area. Nor are water rights required for single or group domestic purposes not exceeding 15,000 gallons per day (gpd), or for any single industrial or commercial purposes not exceeding 5,000 gpd. Not all ground water withdrawn by wells, therefore, is represented by water rights. The quantity used generally is unknown.

All water rights, both ground and surface, are based on the doctrines of prior appropriation and beneficial use. The rate of

1/80 cfs (5.6 gpm), or a maximum amount of 2.5 acre-feet per acre per year is, under ordinary conditions, considered sufficient to irrigate an acre of ground in the basin. The rate of 1/100 cfs (4.5 gpm), or a maximum amount of 6,463 gallons per day, is considered sufficient for the domestic use of one family.

# WATER USE & CONTROL

# PART III

# WATER USE AND CONTROL

## WATER USE AND ASSOCIATED PROBLEMS

### Domestic

Domestic surface water rights total 20 cfs for a maximum legal depletion of 14,500 acre-feet per year. The maximum legal annual depletion for recorded domestic ground water rights is only 0.14 cfs or about 100 acre-feet.

An analysis of these figures indicates that few small domestic water users have protected their water source by establishing water rights. The total use of water for domestic purposes is not known because many rights are not used to their maximum legal limit.

About 11,000 people in rural areas and unincorporated communities in the basin depend primarily upon springs, streams, and wells for their domestic water supplies (household, stock, lawns, and gardens).

Domestic users depending on small coastal streams or shallow wells often have water shortages and quality problems during the summer months. Those depending upon larger streams report some autumn flavoring of water from mud and decaying organic materials but report that available quantities are adequate.

Most of the wells in the Lincoln and Benton County portions of the basin are shallow and all but one of those reported produce low yields. Domestic water sources in the Lane County portion of the basin are quite varied, are generally adequate quantity-wise but often have poor quality. Woahink Lake has been a reliable domestic water source. Streams and springs will continue to be a major domestic water source but treatment, not now generally practiced, is needed in populated areas.

A separate domestic-municipal water plan is being developed to serve the Lincoln County portion of the basin. The plan analyzes in detail population projections, adequacy, and potability of water sources, construction features, and financial repayment of costs from various sources.

### Municipal

Municipal and water district organizations serving more than six families have water rights totaling 106 cfs, which represent a legal annual depletion of 77,000 acre-feet. These rights equal 32 percent of the total legal consumption in the basin. Thirty-five municipalities and water districts of the basin serve approximately 24,100 of the 35,800 reported basin population. Group service, listed by counties, is about as follows: Polk, 700; Benton, 200; Lincoln, 20,100; and Lane, 3,100 people. Springs, streams, and shallow wells are the major water sources in the northern portion of the basin. In the southern portion deep wells and wells in the more shallow coastal sand dunes are also important water sources.

Many of the small coastal streams, springs, and wells that presently are sources for municipal water supplies are inadequate. Factors involved are heavy demand during low streamflow summer months, scarcity of feasible reservoir sites to store excess winter and spring runoff of streams involved, limited spring flow, low ground water yield, and water quality. Basinwide, however, adequate quantities of water are available. The survey report on Public Water Systems, Table 19, revealed a future shortage anticipated on 21 of the 29 systems. The present search for water is intensified primarily by a rapid housing expansion on waterfront property. Examples of developments necessitating the expansion of water services in Lincoln County include the following:

| Name | Location | Type of Development |
|---|---|---|
| Siletz Keys Area | S. of Kernville | 300 homesites ultimately |
| Salishan | N. of Gleneden Beach | 350 homesites plus commercial facilities |
| Bayshore | N. of Alsea Bay | 900 home and commercial sites |

Many proposed developments requiring group water service are concentrated in the "20 Miracle Miles" area. Farm land along Siletz and other bays and for many miles inland along the major tributaries thereto is being subdivided into homesites. Along Highway 101 and the Pacific Ocean, extensive travel facilities, shopping centers, golf courses, and homesites are being developed or planned, all of which require water service. In sight of practically every resort development is water - either the ocean, a lake, or a river.

During the 1964 calendar year, planning or construction was being undertaken on numerous public water systems. The following water services reported the enlargement of their intake, distribution, or reservoir facilities: Cutler City Water District; Kernville-

Gleneden Beach-Lincoln Beach Water District; Seal Rock Water District; and Waldport Municipal System. The City of Florence

TABLE 19

PUBLIC WATER SYSTEMS

| ORGANIZATION | SOURCE | TYPE OF TREATMENT * | POPULATION SERVED 1963 | AVERAGE OUTPUT MGD | MAXIMUM MONTHLY OUTPUT MG | SYSTEM CAPACITY MGD | WATER RIGHTS SURFACE MGD | WATER RIGHTS GROUND MGD |
|---|---|---|---|---|---|---|---|---|
| Lincoln County | | | | | | | | |
| Roads End W.S. | 2 springs | A | 190 | 0.015 | 0.536 | 0.05 | 0.01 | |
| Oceanlake W.D. | Rock Creek | A,B | 2,000 | 0.175 | 15.686 | 0.61 | 3.68 | |
| Taft-Nelscott-Delake W.D. | Schooner Creek & Erickson Creek (Aux.) | A | 1,700 | 0.578 | 23.662 | 1.90 | 5.16 | |
| Cutler City W.D. | Gordy Creek | A,B,C | 700 | | | 0.70** | 1.29 | |
| Kernville-Gleneden Beach-Lincoln Beach | 2 wells | - | 1,000 | | 9.851 | 0.30 | 2.07 | 0.79 |
| Depoe Bay W.D. | Depoe Bay Creek & 1 well | A | 850 | 0.080 | | | 0.98 | |
| Mirocco W.D. | Spring | - | 40 | | | 0.30** | 0.18 | |
| Otter Rock W.D. | 2 springs | - | 180 | | | 0.30** | 0.26 | |
| Beverly Beach W.D. | Spencer Creek | A,C | 160 | 0.056 | 2.019 | 0.40 | 0.10 | |
| Siletz Mu. Service | Logan Creek & Siletz River | A | 560 | 0.024 | 0.659 | 0.14 | 0.49 | |
| Georgia-Pacific Corp. Camp 12 | Mill Creek | A | 30 | | | | 0.01 | |
| Georgia-Pacific Corp. Upper Farm Housing | 2 springs | A | 30 | | | | | |
| Toledo Mu. Service | Siletz River & Mill Creek | A | 3,200 | 0.302 | 9.895 | 1.75 | 14.40 | |
| Agate Beach W.D. | Little Creek & 2 wells | A,B,C | 610 | 0.370 | 1.150 | 0.17 | 3.40 | |
| Newport Mu. Service | Blattner Creek & Big Creek | A,B,C,D,E | 5,360 | 0.440 | 20.900 | 1.50 | 12.30 | |
| South Beach W.D. | Creek | A | 200 | 0.023 | 1.196 | 0.35 | 0.26 | |
| Seal Rock W.D. | Fall Creek (or Hill Creek) | A | 500 | | | 0.11 | 1.26 | |
| Waldport Mu. Service | Weist Creek | A | 1,360 | 0.300 | | 0.12 | 3.25 | |
| S.W. Lincoln Co. W.D. | Big Creek & Starr Creek | A | 1,000 | | | 1.12 | 0.39 | |
| Yachats | Reedy Creek | A | 500 | | | 0.63 | 2.90 | |
| Lane County | | | | | | | | |
| Sutton Lake Service | Bath Creek | A | 30 | 0.004 | 0.224 | 0.35** | 0.23 | |
| E. Heceta Beach Service | Wells | A | 40 | | | 0.07** | | |
| Holt Park Service | Wells | A | 60 | | | 0.07** | | 0.22 |
| Florence Mu. Service | Munsel Creek | A,B,C,D,E | 1,650 | 0.220 | | 0.50 | 2.59 | |
| Mapleton W.D. | Berkshire Creek | A | 800 | 0.140 | | 0.30 | 0.29 | |
| Vaughn Lumber Group Service | County Creek | A | 90 | 0.003 | | 0.30** | | |
| Woahink Subdivision Service | Woahink Lake | A | 13 | | | 0.20** | 0.08 | |
| West Lake Group Service | Spring | A | 70 | | | | | |
| Dunes City | Woahink Lake | - | 80 | | | | | |
| Fish Mill Lodges | Spring | - | 40** | | | | 0.03 | |
| Walton Service | Wells & springs | - | 40** | | | | | |
| Deadwood Area | Wells & springs | - | 200 | | | | | |
| Indiola | Spring | - | 30 | | | | | |
| Benton County | | | | | | | | |
| Alsea Co-op. Inc. | Kiger Creek | A | 150 | 0.006 | | | 0.03 | |
| Polk County | | | | | | | | |
| Valsetz (Boise-Cascade) | Fanno Creek | A | 700 | 0.035 | | 1.08** | 0.06 | |

*A - Disinfection, B - Sedimentation, C - Filtration, D - Taste and Odor Control, E - Floridation
**Estimated

Data Source: Oregon State Board of Health, Oregon State Engineer, and County Health Department drilled and tested the 100-foot deep well described in the Ground Water Section.

Practically all systems reported water quality problems. Most streams inspected in the late fall had a dark color, offensive taste, and some odor occasioned by decomposing leaves and other organic material. During the winter flood season, streams were turbid. Chlorination is provided in practically all cases, while a few of the larger systems provide more extensive treatment such as sediment ponds, filtration, aeration, and chemical control. Where population density is increasing, pollution of shallow wells has been reported. The need for treatment of deep wells for excessive iron or sulphur has been reported around Mapleton and Canary.

Experience with Big Creek storage has pointed up the disadvantage of reservoir storage at low elevations: deterioration of water quality due to high water temperatures, chemical action, and the growth of algae. Complete removal of the resulting taste, odor, and color can only be accomplished by expensive flocculation, settling, filtration, and sterilization by chlorine. Algae growth in the reservoir can be retarded by applications of copper sulphate.

The separate "Water Sources, Supply, and Quality Study for Lincoln County" to be prepared subsequent to the basin report will analyze more fully the advantages and disadvantages of developing better quantity and quality water sources from higher elevations in the basin. Six stream sources were chosen from which water should be considered for municipal purposes because of their superior yield and quality.

Special quantity and quality studies are being undertaken on Slick Rock Creek, Drift Creek, Siletz River, Big Creek, Beaver Creek, Drift Creek (of Alsea River), and Yachats River in Lincoln County as streams which appear most adaptable for use in future expansion of public water systems serving the more densely populated areas. Other parts of the basin have relatively large quantities of readily available water which are better adapted to smaller facility distribution.

## Irrigation

The acreages of presently irrigated and potentially irrigable land by study area are given in Table 7, page 16. Irrigation, to date, has been developed by the efforts of individuals. Considering the minimum instantaneous discharges shown in Table 15, page 33, it appears that a fairly large portion of future development will be contingent upon developing storage, probably necessitating group action.

Surface water rights for irrigation total 82 cfs for the irrigation of 7,000 acres. There is only one ground water irrigation right which is for one acre. The irrigation rights allow a total legal annual diversion of 17,500 acre-feet. Table 16, page 34, entitled Surface Water Rights Summary, shows the water rights by stream system. Water rights allow a duty of water of about 2.5 acre-feet per acre per irrigation season.

It is estimated that about 6,400 acres were irrigated in the basin in 1964, approximately 95 percent for hay and pasture production. Although there are water rights for 600 acres more than appear to have been irrigated there are still some farmers within the basin irrigating without the benefit of rights.

Detailed data on presently irrigated and potentially irrigable lands is shown in Table B of the Appendix. This table summarizes watershed data compiled by the U. S. Department of Agriculture as part of the cooperative investigation.

Natural streamflow supplies practically all of the water used for irrigation in the basin. Many of the basin streams have been seasonally over-appropriated relative to long-term low flows. On these streams further development is limited without impoundment of winter and spring runoff.

Most of the agricultural land is better adapted to sprinkler than to flood irrigation due to perennial flooding, poor drainage, rolling or steep topography, or soil conditions not adapted to flooding methods. Practically all of the irrigation in the basin is by sprinkler systems. Individual plants are used to pump directly from the stream channel to the land irrigated. Prior to the development of sprinkler irrigation, flooding often damaged ditches and structures associated with flood-type irrigation systems.

Table 20 lists net and gross irrigation requirements by stream system for presently irrigated and potentially irrigable lands.

Development of the basin's irrigation potential is dependent upon the availability of an adequate water supply and the economic returns which can be expected from crops produced. Recent development has been depressed largely due to low livestock product prices.

The annual, net irrigation requirement is about 10 inches per acre. Using 44 percent efficiency for irrigation water distribution in coastal areas, this would establish the gross farm

TABLE 20

CONSUMPTIVE USE AND IRRIGATION REQUIREMENTS
BY STUDY AREA

| AGRICULTURAL AREA | CONSUMPTIVE USE | | IRRIGABLE | IRRIGATED | NET IRRIGATION REQUIREMENT | | GROSS IRRIGATION REQUIREMENT* | |
|---|---|---|---|---|---|---|---|---|
| | Gross Inches | Net Inches | Acres | Acres | Irrigated Ac.-ft. | Irrigable Ac.-ft. | Irrigated Ac.-ft. | Irrigable Ac.-ft. |
| Salmon River | 29.0 | 9.4 | 1,000 | 100 | 80 | 790 | 250 | 2,500 |
| Taft | 29.0 | 9.4 | 800 | 100 | 80 | 630 | 250 | 2,000 |
| Siletz River | 29.0 | 9.4 | 5,000 | 680 | 540 | 3,950 | 1,700 | 12,500 |
| Depoe Bay Coast | 29.0 | 9.4 | 70 | - | 0 | 60 | 0 | 175 |
| Yaquina River | 29.0 | 9.4 | 4,500 | 900 | 710 | 3,560 | 2,250 | 11,250 |
| Beaver Creek | 29.0 | 9.4 | 1,200 | 100 | 80 | 950 | 250 | 3,000 |
| Alsea River | | | | | | | | |
| Upper Alsea | 29.7 | 10.6 | 4,000 | 1,070 | 940 | 3,600 | 2,675 | 10,000 |
| Five Rivers | 29.7 | 10.6 | 700 | 440 | 390 | 620 | 1,100 | 1,750 |
| Lower Alsea | 29.7 | 10.6 | 1,000 | 300 | 260 | 880 | 750 | 2,500 |
| Yachats River | 29.7 | 10.6 | 730 | 70 | 60 | 630 | 175 | 1,825 |
| North Lane Coast | 29.7 | 10.6 | 400 | 10 | 10 | 350 | 25 | 1,000 |
| Siuslaw River | | | | | | | | |
| Upper Siuslaw | 29.7 | 10.6 | 2,200 | 500 | 440 | 1,940 | 1,250 | 5,500 |
| Lower Siuslaw | 29.7 | 10.6 | 1,600 | 170 | 150 | 1,410 | 425 | 4,000 |
| Lake Creek | 29.7 | 10.6 | 3,000 | 1,070 | 940 | 2,640 | 2,675 | 7,500 |
| North Fork Siuslaw | 29.7 | 10.6 | 1,500 | 450 | 400 | 1,320 | 1,125 | 3,750 |
| Siltcoos | 29.7 | 10.6 | 1,900 | 440 | 410 | 1,670 | 1,100 | 4,750 |
| TOTAL | | | 29,600 | 6,400 | 5,490 | 25,000 | 16,000 | 74,000 |

Note: *Based on 44 percent efficiency.

Data Source: Oregon State University, Experiment Station, Bulletin 500 and U. S. Department of Agriculture cooperative report

irrigation requirement at about 2 acre-feet per acre. Water rights allow for 2.5 acre-feet per acre which helps compensate for evaporation, transpiration, and transportation losses.

Although the basin water yield averages 1,600,000 acre-feet during the irrigation season, there are insufficient flows where and when needed to supply water to all irrigable land. There is a serious water supply problem on many tributary streams and on some of the major streams. Critically low or zero natural minimum flows occur on the following streams: D River; Rock Creek of Siletz River; Yaquina River; North Fork, South Fork, and Fall Creek of Alsea River; Upper Lake Creek, North Fork, and Munsel Creek of Siuslaw River.

# WATER USE AND CONTROL

## Industrial

Surface water rights for industrial use in the basin amount to 123.5 cfs. The two large basin industrial water users are paper mills at Toledo and Gardiner which have water rights to use 40 and 49 cfs, respectively. There are no recorded industrial ground water rights. Some public water systems serve industrial users and some processors pump from low yield wells.

Industrial rights allow a maximum annual legal depletion of 89,400 acre-feet. There are 40 reservoir rights, the largest of which includes: Olalla Reservoir, 2,650 acre-feet; Siltcoos Lake, 15,000 acre-feet; and Tahkenitch Lake, 16,600 acre-feet. Over 20 wood products companies have log ponds ranging in size from less than one acre to large estuary bays.

The paper mill at Toledo presently requires about 14 million gallons of water per day and has had studies made which show a possible future requirement of 50 million gallons per day. State Engineer's Permit No. 24288 authorizes the mill to appropriate 40 cfs of water from Olalla Creek supplemented with water pumped from the Siletz River. Storage at Olalla Reservoir and in Olalla Creek Slough, also, provide supplemental water. Appurtenant to the permit is a stipulation entered into by the Oregon State Game Commission, the Fish Commission of Oregon, and Georgia Pacific, Inc., the permittee, providing that the permittee shall cease pumping from the Siletz River whenever the streamflow falls below 75 cfs during the period from January 1 to September 30 or below 100 cfs during the period from October 1 to December 31 of each year. The minimum flows thereby established are binding only on the holder of Permit No. 24288 and are for the purpose of insuring sufficient water for fish passage. In October 1964, the Siletz River fell below the permissible withdrawal stage, Olalla Reservoir was lowered to a critical level, and all available water from Toledo's Mill Creek supply was used by the paper plant. Interested officials at that time inspected Sunshine Creek and Big Rock Creek Reservoir sites on the headwaters of Siletz River as possible additional water sources. The paper company estimated its additional storage needs to be 4,800 acre-feet.

The paper company at Gardiner, Oregon constructed dams at the outlets of Siltcoos and Tahkenitch Lakes to provide storage for its large water needs. Closely controlled in order to not adversely affect recreational developments on the lakes, the storage and release program improved recreational and fishing benefits until October 1964, when the water level was lowered to make possible the inspection and maintenance of Southern Pacific

Railroad trestles across Tahkenitch Lake. Lowering of the water level exposed a dense entanglement of water weeds which adversely affect resort usage. The water weed problem is developing on other lakes.

Other industrial water uses include timber processing, gravel and concrete production, fish packing, evergreen processing, and milk processing. Timber processing is the most important water use with 28 users having rights. Twelve small water rights are held by railroad companies. Except in the Toledo area, there were no significant water shortages among the 50 reporting water-using industries. The few problems reported involving industrial water have concerned quality, turbidity, and distribution rather than available yield from sources that can be economically developed. Most of the industries are located along rivers, lakes, and bays where sufficient water supplies are available.

Commercial and sport fishing are important industries in the Siletz, Depoe, Yaquina, Alsea, and Siuslaw Bay areas. Most of the industrial water sales are made to nine fish and other seafood processing industries. Because of the general downward trend in commercial fish landings and changes in processing it is doubtful that much additional water will be needed by seafood processors.

Expansion and further diversification are expected in both the wood products and tourist industries so the water needs for these industries are expected to increase.

## Mining

The two water rights for mining purposes in the basin total 2.1 cfs. They are both for surface water and allow an annual legal depletion of 1,500 acre-feet. The larger right of 2.0 cfs is for placer mining on Collins Creek near Seal Rock.

Five companies that reportedly wash sand and gravel in the basin were included under industries above. Only small quantities of water are used in the extraction of rock from quarries, for crushing and screening, or for the gathering of good mason sand from large pockets along the beaches. A considerable portion of the sand and gravel used is barged or trucked in from outside the basin.

Some stream pollution is caused by the gravel operation in Berry Creek north of Florence. Other operations, for the most part, are located off-channel and wash the rock in the pits as it is removed.

## Wildlife

No water rights have been issued exclusively for wildlife use. However, the basin contains an extensive and diverse wildlife population including Roosevelt elk, black-tailed deer, black bear, game birds, furbearers, and waterfowl.

Game birds include ring-necked pheasants, quail, grouse, pigeons, and doves. Waterfowl populations are primarily composed of migrating and wintering ducks and geese which are found principally in the bays, estuaries, and lakes of the coastal area. The principal furbearing animals are muskrat, mink, beaver, and raccoon.

Water is not generally reserved for wildlife. Its use is generally small except for nonconsumptive uses by waterfowl and certain furbearers. Wildlife water needs are supplied by the streams, lakes, springs, and marshy areas which, in turn, directly affect wildlife distribution. No quality or quantity water problems affecting wildlife have been reported.

## Fish Life

Basin water rights for fish life total 76 cfs which equals 55,100 acre-feet of nonconsumptive use. These 22 rights are all for fish propagation or culture.

The three largest rights are for state fish hatcheries on the following streams: Rock Creek of Siletz River, 11 cfs; North Fork of Alsea River, 20 cfs; Fall Creek of the Alsea River, 22 cfs. The other rights are for public and private fish propagation, culture, and fish pond uses.

Streams, bays, and lakes of the area provide habitat for 40 species of anadromous and resident fish, see Plate 3 of the Appendix. Anadromous species include chinook and silver salmon, steelhead, sea run cutthroat trout, shad, and striped bass. Resident fish include cutthroat and rainbow trout, largemouth bass, perch, catfish, crappie, bluegill, and sunfish. Numerous other bottom fish and shell fish are also harvested.

A conflict does and will continue to exist between agricultural, fish life, and recreational uses of water resources. Fortunately the hatcheries are generally located above irrigated land. Where such is the case, dual usage of water serving first the hatcheries then irrigation, is not in serious conflict. Problems do arise in rearing small anadromous fish and furnishing water transport to the ocean. Return of the adult anadromous fish to spawning grounds is often affected by inadequate flows, barriers, diversions, winter floods, predators, overfishing, pollution, high water temperatures, and sedimentation.

The Fish Commission of Oregon advises that: "Stream inventory surveys indicated that most tributary streams were found to contain sufficient amounts of spawning gravel for silver salmon production. It has been demonstrated that their production in tributaries is influenced more by the amounts of rearing area available during summer months than by the amount of spawning gravel present for adults. A combination of good spawning and rearing areas, pools to spawning riffles, is desirable for optimum silver salmon production.

"A survey was initiated to locate lakes along the Oregon coast which had potential for rearing juvenile salmon and to determine the suitability of these lakes by physical, chemical, and biological surveys. The best Mid-Coast Basin lakes were Sutton, Mercer, and Woahink for the rearing of juvenile silver salmon. Other lakes which appear to have excellent potential include Siltcoos and Tahkenitch Lakes."

The Oregon State Game Commission supplied the following data by stream system: "The Salmon River is a good producer of coho and fall chinook salmon, as well as steelhead and cutthroat trout. Additionally there are low to moderate spring chinook and chum salmon populations. It is a very popular and valuable angling stream because it is easily reached by anglers from the Willamette Valley. Access along Oregon Highway 18 is good. The stream frequently remains clear when many other larger coastal streams are too turbid for successful angling. It is fished heavily for steelhead, coho and fall chinook.

"Drift Creek, a tributary of Siletz Bay, produces good populations of coho and fall chinook salmon, steelhead and cutthroat trout. Angling pressure ranges from light to moderate due principally to the rather limited road access and greater popularity of other nearby streams. It is an important producer of fish taken in Siletz Bay, as well as to the sport and commercial ocean fisheries.

"The Siletz River produces excellent runs of coho salmon and winter and summer steelhead. It has good populations of spring and fall chinook salmon and anadromous cutthroat trout, as well as a few chum salmon. It if fished quite heavily now but has the potential of supporting much greater angler use similar in degree to that currently experienced on the Alsea River. The present populations of anadromous fish can provide for much greater angler use. The Siletz is the only Oregon coastal stream rising in the coast range which has a native run of summer steelhead. The Oregon Fish Commission's Rock Creek Hatchery is very successful in producing returning coho salmon.

"The Yaquina River is an excellent coho salmon producer. It also contains good runs of steelhead and cutthroat trout and fall chinook salmon besides some chum salmon. Most of the salmon angling is concentrated in the bay and ocean areas adjacent to the mouth. Steelhead and anadromous cutthroat angling usually occurs in the upper tidewater and lower main stem areas.

"Beaver Creek, particularly the North Fork, has good coho salmon, steelhead and cutthroat trout populations. Also it supports a small run of fall chinook salmon. Angling for anadromous fish is somewhat limited because of its small size and the popularity of nearby rivers such as the Alsea.

"The Alsea River contains excellent populations of coho salmon, steelhead and cutthroat trout. Also it produces good runs of spring and fall chinook and a few chum salmon. Summer steelhead have been introduced and the established run appears to be increasing. The Fish Commission and (the Game Commission) each operate a fish hatchery in the basin which are providing excellent returns of steelhead and coho salmon. The river is subjected to an extremely high degree of angler use for anadromous fish in both tidewater and upriver areas. The catch rate is generally good. The Game Commission is conducting extensive research on anadromous fish on the Alsea River and tributaries of Drift Creek.

"The Yachats River has excellent runs of coho salmon, steelhead and cutthroat trout. It also supports a few fall chinook salmon. The Game Commission surveys indicate that it has spawning and rearing potentials much higher than that now being utilized. Angling pressure ranges from light to moderate due principally to its geographical location in relation to human population centers and to the popularity of the larger Alsea and Siuslaw Rivers which are only a short distance to the north and south, respectively. With the continuation of adequate stream flows and a good management program, it can be expected that the angling value of this stream will increase.

## W A T E R   U S E   A N D   C O N T R O L

"The Siuslaw River is an excellent coho salmon, steelhead and cutthroat trout producer. It has a good fall chinook run. Most fish production occurs in tributaries since these have better summer water temperatures and quantities of spawning gravel. The bed of the main stem is largely bedrock with only limited gravel being available; however, it has much unrealized rearing potentials which we believe have been restricted somewhat by low stream flow volumes and warm water temperatures. The stream accommodates very heavy angling pressure for all anadromous salmonids. Salmon angling occurs throughout the tidewater areas of the river and bay, and in adjacent ocean areas. Steelhead angling occurs in the main stem above tidewater and in Lake Creek as does much resident trout fishing. The Game Commission has engaged in extensive stream clearance to open up additional spawning and rearing in tributary areas. Experimental steelhead stocking in upper Lake Creek above Triangle Lake shows promise if feasible means of laddering Lake Creek falls are developed. Angling for resident trout and warm-water game fish is excellent."

Table 21 gives maximum measured water temperatures of selected streams within the basin.

TABLE 21

MAXIMUM OBSERVED WATER TEMPERATURE
OF SELECTED STREAMS

| STREAM | WATER TEMPERATURE °F | DATE |
|---|---|---|
| Siletz River at gage 3055 | 73 | Not given |
| Alsea River at gage 3065 | 75 | Not given |
| North Fork Alsea River at gage 3061 | 76* | July 1958 |
| South Fork Alsea River at gage 3062 | 76* | July 1958 |
| Five Rivers at gage 3064 | 72* | July 1959 |
| Drift Creek at gage 3066 | 74* | July 1961 |
| Siuslaw River at stream mile 40.8 | 82 | July 1964 |
| Lake Creek at Triangle Lake | 82 | Not given |

*Recording thermograph

Data Source: U. S. Geological Survey and Oregon State Game Commission

### Power

There are five very small power rights in the Mid-Coast Basin totaling 1.7 cfs. Of these, three are nonelectrical such as rams and the other two are to supply 1.0 and 5.0 theoretical horsepower, respectively, to private individuals.

Table 22 lists 20 sites which have been studied for potential hydroelectric power development. For additional data on these

TABLE 22

UNDEVELOPED WATERPOWER SITES

| SITE | STREAM | DIVERSION OR POOL ELEVATION Ft.-msl | GROSS HEAD Ft. | AVERAGE ANNUAL GENERATION 1000 kwh |
|---|---|---|---|---|
| SALMON RIVER | | | | |
| Salmon | Salmon River | 400 | 320 | 22,800 |
| SILETZ RIVER | | | | |
| Valsetz | South Fork Siletz River | 1,160 | 220 | 18,300 |
| Gravel Creek | Siletz River | 940 | 250 | 104,300 |
| Holman Creek | Siletz River | 690 | 170 | 77,700 |
| Sunshine Creek | Siletz River | 520 | 500 | 282,800 |
| Sam Creek | Siletz River | 250 | 125 | 44,700 |
| Drift Creek | Drift Creek | 500 | 450 | 60,300 |
| Subtotal | | | | 588,100 |
| YAQUINA RIVER | | | | |
| Elk City | Yaquina River | 250 | 250 | 154,000 |
| ALSEA RIVER | | | | |
| County Line | North Fork Alsea River | 700 | 300 | 19,700 |
| Peak Creek | South Fork Alsea River | 625 | 300 | 16,100 |
| Scott Mountain | Alsea River | 350 | 270 | 237,300 |
| Tidewater | Alsea River | 80 | 80 | 77,700 |
| Slickrock | Drift Creek | 500 | 225 | 29,400 |
| Trout Creek | Drift Creek | 275 | 250 | 48,300 |
| Subtotal | | | | 428,500 |
| SIUSLAW RIVER | | | | |
| Alma | Siuslaw River | 600 | 132 | 25,500 |
| Austa | Siuslaw River | 468 | 178 | 69,900 |
| Upper Siuslaw | Siuslaw River | 290 | 190 | 106,300 |
| Triangle Lake | Lake Creek | 750 | 350 | 43,800 |
| Swisshome | Lake Creek | 400 | 300 | 157,100 |
| Mapleton | Siuslaw River | 100 | 90 | 100,400 |
| Subtotal | | | | 503,000 |
| BASIN TOTAL | | | | 1,696,400 |

Data Source: U. S. Geological Survey

sites refer to Table C of the Appendix. These studies were reported on by the Federal Power Commission, U. S. Geological Survey, an engineering company for the Central Lincoln Peoples Utility District, and by two geologists who apparently made original surveys on the Siletz River in 1931.

A summary of the findings indicates that firm energy could be imported or produced from fossil fuels at less cost than by local hydroelectric generation. The high cost of power and the possible conflicts with nonpower uses of the rivers renders the sites investigated unattractive at this time.

Lincoln County power requirements are served by the Pacific Power and Light Company from Lincoln Beach north. The Central Lincoln PUD serves the central and south portions along the coast. Consumers Power Inc. and Boise Cascade of Valsetz serve the eastern portion. Northwestern Lane County is served by the Central Lincoln PUD, Blachly-Lane Co-op, Lane County Electric Co-op, and the Pacific Power and Light Company.

The potential waterpower of the Mid-Coast Basin would produce an estimated average annual generation of 1,700 million kilowatt hours (kwh). This estimate is based on mean flow at the various sites and 8,760 hours at 80 percent efficiency. All sites having a potential of 1,000 kilowatts (kw) at 100 percent efficiency for discharges available 50 percent or more of the time are included in the estimate. Table 22 summarizes the information available on the sites.

There have been other plans to utilize the available head of the streams in the basin, however, the plan of development listed in Table 22 is the most recent and utilizes the latest U. S. Geological Survey quad sheets for determination of damsites and gross head.

H. Zinder and Associates in a report to the Central Lincoln Peoples Utility District concluded that "the lowest cost firm energy available from the projects investigated would be 10.6 mills per kilowatt hour, after giving credit for the sale of secondary energy". The report also states that a modern steam plant in Lincoln County could produce firm energy for about seven mills.

The U. S. Geological Survey reported in 1953 that the coastal streams have substantial power potential, although development does not seem likely in the foreseeable future.

Highway and railroad relocations would be required for the sites on the Siuslaw and Alsea Rivers. In addition the anadromous fish populations in the coastal streams are of major importance so that any power development would require fish passage facilities, adding to the cost of any proposed projects.

## Pollution Abatement

No water rights have been assigned to pollution abatement in the

Mid-Coast Basin. It is not a major water user generally due to the relatively small industrial development and the sparse population. The notable exceptions are the two large paper mills which use large quantities of water to transport mill wastes into the Pacific Ocean.

Most major population centers are served by primary, septic tank, sand filter, aerobic digestion, or lagoon-type sewage treatment plants. Table 23 lists the sewage disposal systems that are presently in operation.

TABLE 23

SEWAGE TREATMENT PLANTS
October 1964

| PLANT | YEAR BUILT | TYPE | DESIGN POP. | RECEIVING STREAM |
|---|---|---|---|---|
| Oceanlake | 1950 | Sand filter | 3,000 | D Lake to Ocean |
| Taft | 1963 | Lagoon | 1,500 | Schooner Creek |
| Siletz | 1944 | Septic tank | 120 | Siletz River |
| Salishan Beach | 1963 | Digestion | 150 | Siletz Bay |
| Newport | 1964 | Sand filter | 11,600 | Pacific Ocean |
| Toledo | 1955 | Primary | 3,500 | Yaquina River |
| Waldport | 1951 | Primary | 1,000 | Alsea Bay |
| Florence | 1962 | Primary | 4,000 | Siuslaw River |
| Mapleton housing | 1944 | Septic tank | 120 | Creek to Siuslaw |

Data Source: Oregon State Sanitary Authority

Most of the plants are adequate, but a few need enlargement, rehabilitation of their septic tanks, or sewer line repair.

According to a 1964 survey made by the State Sanitary Authority, septic tank systems serving rural areas are fairly satisfactory; but in most urban and suburban areas systems cannot be relied upon to function in a sanitary manner because of impervious soil formations, high ground water table, or inadequate drain fields. A part of Nelscott and the Delake area presently need sewers and treatment facilities. The area between Waldport and Yachats has a difficult sewage disposal situation.

The Sanitary Authority reports that "the only significant industrial waste in this basin comes from the Georgia Pacific complex at Toledo. These wastes are discharged to both the Pacific Ocean and Yaquina Bay. Disposal is not entirely adequate". Other studies have reflected the heavy concentrations of pollutants in the bay near Toledo and the reduced oxygen content of water for fish life habitat.

The area along Highway 101 between Sutton Lake and Florence has difficult sanitary problems involved with subsurface sewage disposal, a high water table, shallow wells, a dense population, and water samples that show high coliform counts. These problems cannot be solved and corrected by the present complex of individual and small group water supply and sanitary systems now serving this area.

Other areas with similar problems include Heceta Beach, Glenada, Westlake, and some of the urban areas around the various lakes and up the Siuslaw River. Local offices of the Department of Health have recommended that group water supply and disposal facilities should be constructed.

Stream pollution within the interior of the basin is intermittent and not normally a major problem. It usually occurs locally as a result of logging and wood processing, soil erosion, or raw sewage disposal into the stream systems.

## WATER CONTROL

### Flood Control

The small coastal basin streams on the heavily forested western slope of the Coast Range are in a humid zone. The soil and bedrock are relatively impervious. Torrential flood flows of more than 2 cfs per square mile of drainage area occasionally occur as a result of heavy rainfall, generally between November and March.

Winter floods occur during the period when precipitation is heavy. The bulk of the floodwater is made up of rainfall from warm southwest storms but sometimes is augmented by snowmelt. Almost without exception, the destructive floods on the west slope of the Coast Range are the result of warm rain falling at relatively high altitudes on previously accumulated snow. Flood hydrographs are usually flashy, with peaks of short duration.

About 17,300 acres of valley land are subject to flooding. Most of the flood problem exists along the estuaries of the major streams where homes and commercial structures are being installed at an ever-increasing rate. If the limits of the flood plains are not well defined and zoning restriction not enacted, it is reasonable to assume that extensive facilities will be located on sites subject to inundation. Ultimately public expenditures will be required to mitigate the flood losses associated with such development.

## WATER USE AND CONTROL

Flood mapping has proven to be a significant tool that can aid in avoiding the uneconomic development of flood plains. Such mapping can be considered as a part of a multipurpose program from which a wide range of benefits can accrue to both public and private interests.

Flood maps may be used to establish the hydrologic basis for flood plain regulations to guide the location of residential, commercial, and industrial structures. They are useful to municipal and county officials in such diverse aspects as locating roads, sanitary districts, sewage treatment plants, and providing guidance for flood plain zoning relative to residential and industrial development.

By locating sewage treatment plants above flood heights, it is possible to avoid shutdown and bypassing when the receiving streams flood. Flood free refuse disposal sites safeguard against saturation of the refuse by floodwater which in turn would mobilize the contaminants.

Flood mapping is an effective and dramatic means of communicating the flood situation to property managers. It is many times cheaper to administer a flood damage reduction program than to try to protect established facilities in misplaced locations. Lands subject to flooding are shown on Plate 4 of the Appendix.

Some flood control channel improvements and levees have been constructed to date. No storage reservoirs have been constructed to alleviate flood damage.

There is need for storage reservoirs, channel improvement, and bank protection to reduce flood damage and more fully utilize the basin's land and water resources.

Because of the flood damage threat, crops on lower valley land are mainly limited to sod-forming hay and pasture. Many small dikes have been constructed to prevent crop and land damage. Damages are primarily to crops, roads, structures, and soil.

### Erosion

Land damage from erosion is of minor importance in this basin. Cutover timberland rapidly revegetates and valley lands are mostly protected by perennial sod-forming crops. Wind erosion on agricultural land is not serious because the soils resist wind action and are well protected by crops, trees, or hills.

Streambank erosion is occurring along the swifter streams resulting in some loss of land. Contributing factors are accumulation of debris, constricted channels, and unstable channels. Bank protection is a continuing need.

## Drainage

There are over 23,000 acres or 16 percent of the basin soils subject to drainage problems. Mush of this land is covered with water in the wet season and has a shallow root zone to the water table during the summer growing period. Part of this land is utilized for timber production and other uses. Less than 15,000 acres are involved in agricultural land use.

Table 24 lists the areas by major watershed which have arable lands needing drainage.

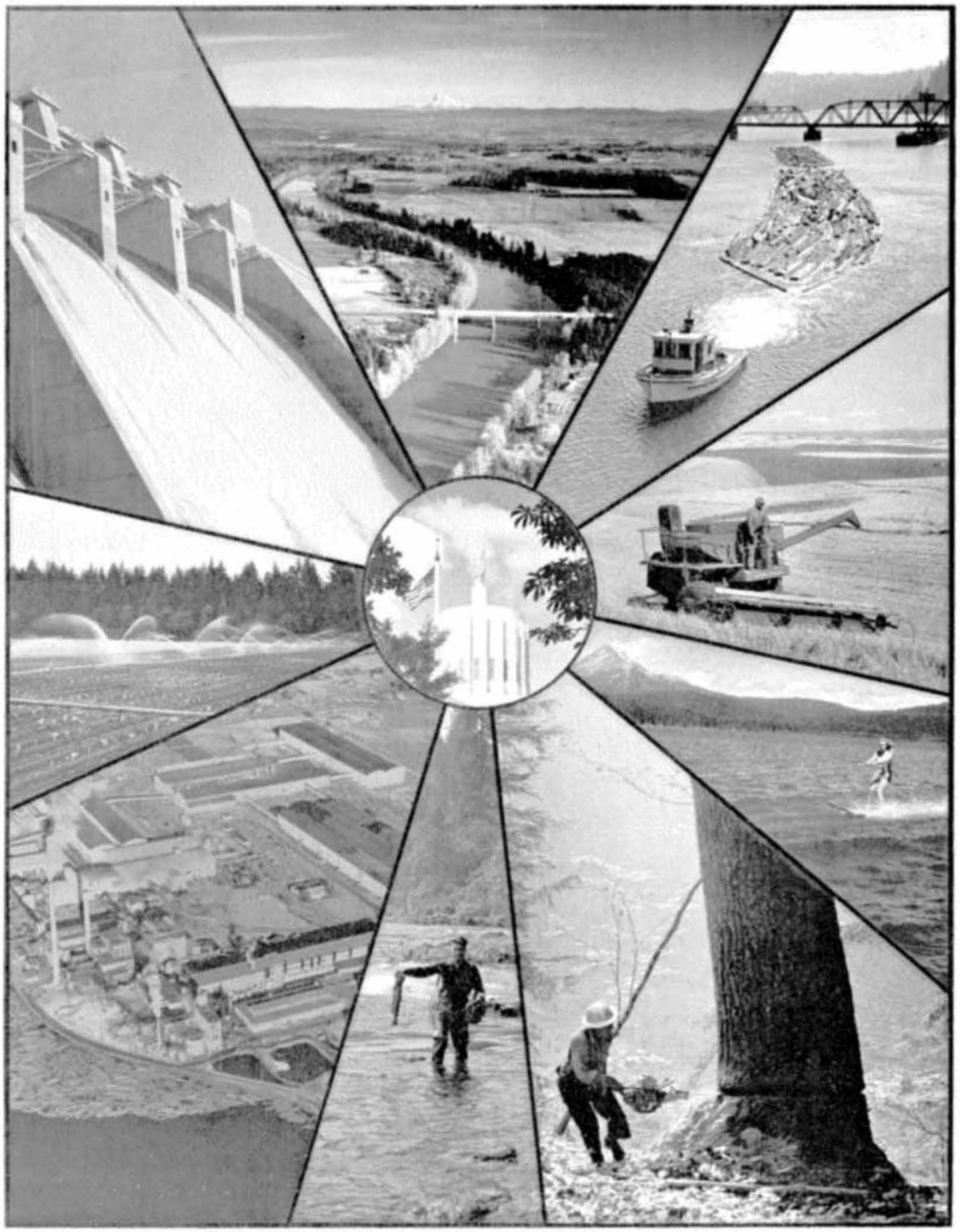
TABLE 24

DRAINAGE PROBLEMS

| STUDY AREA | ACRES NEEDING DRAINAGE |
|---|---|
| 1. Salmon River | 800 |
| 2. Taft | 450 |
| 3. Siletz River | 2,000 |
| 4. Depoe Bay Coast | - |
| 5. Yaquina River | 1,500 |
| 6. Beaver Creek | 900 |
| 7. Alsea River | |
| Upper Alsea | 2,000 |
| Five Rivers | 120 |
| Lower Alsea | 500 |
| 8. Yachats River | 100 |
| 9. North Lane Coast | 120 |
| 10. Siuslaw River | |
| Upper Siuslaw | 1,550 |
| Lake Creek | 1,000 |
| North Fork Siuslaw | 1,500 |
| Lower Siuslaw | 1,450 |
| 11. Siltcoos | 800 |
| TOTAL AREA | 14,790 |

Data Source: U. S. Department of Agriculture cooperative report

# DEVELOPMENT POTENTIAL



# PART IV

# DEVELOPMENT POTENTIAL

## General

Studies indicate that the total water resource development potential of the Mid-Coast Basin is greater than the land and human resources which will be available to use this water for the foreseeable future. Maldistribution makes use of all of this resource impractical. Major use has and will continue to come from surface water sources. Ground water potential development is very limited by both quantity and quality except in a few sand dune and coastal locations.

Future development of the water resources of this basin is dependent upon a number of interrelated factors. These include obtaining greater knowledge of the natural water 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 to control and develop these natural resources.

Usable water supplies may be increased by one or a combination of the following procedures: storage of surface flows; diversion of natural streamflow from areas of surplus to areas of need; improvement of the method of application and reuse of water; and using ground water resources, where available, to supplement the surface supplies. Water control to lessen flood damage and decrease erosion can be gained chiefly by channel work, bank revetment, and diking. Storage can produce only minor flood control benefits because of excessive runoff and inadequate storage sites above the flood damaged areas.

This area has a potential for major project developments in the following fields: flood control and diking on major stream systems; group irrigation developments, particularly those utilizing stored water where there are large contiguous areas of potentially irrigable land; development of additional stored water for industrial requirements; and expansion of municipal water facilities in areas of population concentrations. Most of the water resource development potential exists in the individual and small project category.

Various public and private agencies have conducted studies in the basin mainly involving forestry, agriculture, power, storage, flood control, fish culture, and harbor improvements. Plate 5 of the Appendix locates the 81 potential storage and power sites which have been investigated over the years. Table C of the Appendix lists available data pertaining to these sites.

The U. S. Department of Agriculture divided the basin into 20 small watersheds for gathering basic water and land use facts relative to possible projects under Public Law 566. This study was made in cooperation with the State Water Resources Board to supply the basis for determining agricultural and irrigation water requirements and has been used extensively in determining the development potential. Plate 5 and Table B of the Appendix show the watershed subdivisions and list reconnaissance land use data for each small watershed for 1964.

The U. S. Geological Survey and private companies have conducted reconnaissance power studies on 20 reservoir sites. These reports indicated that the coastal streams have substantial power potential, although development does not seem likely in the foreseeable future. Local power companies serving the area look most favorably at sites on the Siletz, Alsea, and upper Siuslaw Rivers as having a possible future "secondary energy" potential. The cost of production in each case would be considerably higher than costs from presently available steam or hydroelectric plants.

The Corps of Engineers has concentrated most of its studies and developments on such works as jetties and other harbor improvements. On April 27, 1964, the Corps held hearings to determine the need for diking and other flood control features around Yaquina Bay and in the Beaver Creek Valley.

The legal diversion rate for irrigation in the Mid-Coast Basin is one-eightieth of a cubic foot per second per acre. Water actually consumed by irrigated crops was computed to be between 9.4 and 10.6 inches per acre depending upon climate and culture. Water diversion for future human consumption and auxilary uses is projected on the basis of 340 gallons per capita day during the peak use period.

Fish life is the largest nonconsumptive water user. The Oregon State Game Commission provided valuable data on fish habitat, fish counts, problems encountered by fish life, and recommended minimum flows. The Fish Commission of Oregon supplied valuable data from their surveys concerning anadromous fish.

Table 25 lists unappropriated flows at designated stream miles on major streams together with suggested minimum flows after nominal allowance for imminent, consumptive use development. The quantities listed reflect streamflow records of sufficient duration to justify correlation.

# D E V E L O P M E N T   P O T E N T I A L

Due to the apparent lack of ore minerals and the deficiency of suitable hard rock and sand and gravel deposits, it is unlikely that mining activity will increase appreciably in the basin. No mining water problems, therefore, are foreseen.

TABLE 25

MINIMUM PERENNIAL STREAMFLOW

| STREAM | STREAM MILE | AVAILABLE FLOW | SUGGESTED MINIMUM FLOW |
|---|---|---|---|
| Salmon River | 5 | 19 | 16 |
| Drift Creek (Siletz) | 2 | 22* | 16 |
| Siletz River | 40 | 61 | 57 |
| Yaquina River | 25 | 2* | 0 |
| Alsea River | 21 | 91 | 75 |
| Drift Creek (Alsea) | 5 | 11* | 10 |
| Yachats River | 5 | 10* | 6 |
| Siuslaw River | 24 | 53* | 43 |

*From correlated records.

Relatively small quantities of water are expected to be required for industrial use if oil is discovered off-shore and should an oil refinery be constructed in the basin. The State Department of Geology and Mineral Industries reports that due to recycling, only about 20 percent of the water used for refining purposes is consumed. It is estimated that from 125 to 210 gallons of water are consumed in refining one barrel (42 gallons) of crude oil. This water would probably have to come from surface sources as ground water supplies are generally meager.

Six stream sources were chosen from which water should be considered for municipal purposes due to their superior yield and quality. Quantities needed were deducted to obtain available minimum flows.

To aid in future studies within the basin, better knowledge of the flows of streams is needed. Stream gages should be established as close to the bays as practicable on Salmon River, Schooner Creek, Drift Creek (Taft), Siletz River, Yaquina River, Drift Creek (Alsea), Yachats River, and Siuslaw River. Also needed, but with lower priority, is to establish and maintain gages near the mouth on all large tributaries of included rivers and on the larger small coastal streams where present and potential use is large. Development plans are severely hampered by lack of knowledge about streamflow patterns.

The following section briefly summarizes the physical and economic characteristics, water supply and distribution, and present and potential water-related needs and problems by major stream systems. Basic data has been included on which to establish minimum flows. Small coastal streams are normally combined into one study area for discussion purposes.

# D E V E L O P M E N T   P O T E N T I A L

## Salmon River Area

The Salmon River drains into the Pacific Ocean north of Oceanlake in the northern portion of the Mid-Coast Basin. The watershed comprises an area of 78 square miles in Tillamook, Lincoln, and Polk Counties.

The average annual precipitation ranges from 90 inches along the coast to over 180 inches on the Coast Range divide. Elevations range from sea level to 2,900 feet. Stream gradient is about 300 feet per mile in the mountainous area, flattening to zero near Otis Junction. Slick Rock Creek, a tributary, has a gradient averaging 35 feet per mile before reaching the farming area where it flattens to 45 feet per mile to its mouth.

The 1960 population of the Salmon River Valley was estimated at 1,880. The population is concentrated along the valleys as rural and small urban settlements. The present trend is toward subdivision of farmland into homesites along State Highway 18, access roads and the lower stream systems. The economy of this area is supported by forestry, agriculture, fishing, recreation, and summer homes.

The average annual yield of the Salmon River area is estimated at 450,000 acre-feet or about 5,770 acre-feet per square mile. In the absence of active gaging stations on this stream a mean minimum flow of 18 cubic feet per second was estimated from miscellaneous discharge records and precipitation runoff correlations. The observed minimum flow was 21.7 cubic feet per second.

As was pointed out in the Water Control Section of this report the Salmon River is favorably endowed with a fishery resource ranging from coho and fall chinook salmon to steelhead and cutthroat trout and with low to moderate spring chinook and chum salmon populations. This stream is particularly favorable for potential development because of its relatively clear water at times when other basin streams are too turbid for successful angling. The Oregon State Game Commission has recommended minimum flows, Table D of the Appendix, varying downward from 50 cfs in June to 20 cfs in September on Salmon River at the mouth of Slick Rock Creek.

Within the 50 farms in the watershed there are 100 acres presently irrigated and 1,000 acres potentially irrigable. The survey indicated that 150 of these irrigable acres are planned for development, requiring almost 2 cfs of water. About 94 percent of the area is used for timber production, about 800 acres need subsurface drainage and 1,000 acres are flooded annually.

Surface water rights on the Salmon River total 11.7 cfs, of which 8.7 cfs are for consumptive purposes. This includes 0.8 cfs for domestic, 4.0 cfs for municipal, 0.3 cfs for industry, and 3.6 cfs for the irrigation of 293 acres. The nonconsumptive rights of 3 cfs are for fish life. If all the surface water rights were used to their maximum legal extent, about 4,400 acre-feet would be diverted each year from the stream systems. No ground water rights exist, the small use made of ground water being limited to domestic purposes.

Other anticipated needs include water for domestic, livestock, municipal, and recreation purposes. Anticipated future municipal use from Slick Rock Creek would deplete about 4 cfs of the observed 5.5 cfs minimum flow. A present undeveloped municipal right for the coastal area and water for northern Lincoln County under a separate study are involved.

Three reservoir sites have been investigated with a total capacity of 7,450 acre-feet. Four existing small farm ponds do not materially influence streamflows. Although no unified interest in storage was noted during the survey, storage will be required before all of the above-mentioned potential water needs can be satisfied.

## Taft Area

The Taft area includes the watersheds of D River which drains through Devils Lake into the Pacific Ocean along with Schooner and Drift Creeks which drain into Siletz Bay. The watersheds include an area of 76 square miles, all within Lincoln County.

Precipitation ranges from 90 inches along the coast to 160 inches along the Coast Range divide. Stream gradients average 150 feet per mile in the timbered watershed and grade out to zero in the flat valley land. Tidewater affects Devils Lake and extends several miles up Schooner and Drift Creeks.

Areas population for 1960 was estimated at 2,960 persons. Most of the people are concentrated in the "20 miracle miles" and Lincoln City along U. S. Highway 101. The economy of the area is principally based on forestry, tourism, and summer homes.

The average annual yields of the three large stream systems in acre-feet are as follows: D River, 50,000; Schooner Creek, 80,000; and Drift Creek, 190,000. Average annual runoff per square mile equals 5,000 acre-feet.

A reconnaissance survey shows that flood control is needed on 550 acres and drainage is needed on 450 acres.

Surface water rights total 20.3 cfs of which about 20 cfs of the rights are consumptive and 0.3 cfs are for fish life. Consumptive uses by stream are as follows in cfs:

| STREAM | DOMESTIC | MUNICIPAL | INDUSTRIAL | IRRIGATION | TOTAL |
|---|---|---|---|---|---|
| D River | 0.36 | 3.70 | 0 | 0.94 | 5.00 |
| Schooner Creek | 0.32 | 7.89 | 0 | 0.12 | 8.33 |
| Drift Creek | 0.37 | 5.00 | 0 | 0.03 | 5.40 |
| Pacific Misc. | 0.27 | 0.93 | 0.10 | 0 | 1.30 |
| Consumptive Total | 1.32 | 17.52 | 0.10 | 1.09 | 20.03 |

If all the surface water rights were used to their maximum legal extent, about 14,000 acre-feet would be diverted annually from the stream systems. The several small springs being used at Roads End are fully appropriated. There are no water rights of record for the few small-yield wells presently in use. D River has an observed minimum flow of 0.8 cfs and consumptive water rights of 5.0 cfs. This stream is presently seasonally over-appropriated during periods of low flow. It appears that future needs will be mainly for summer homes, fish life, and recreation uses. Schooner Creek has an observed minimum flow of 5.4 cfs, consumptive water rights of 8.3 cfs. Although gaging records are meager it appears that there is less than 2 cfs of unappropriated water. It appears that near future domestic, municipal, recreation, and fish life needs will fully utilize remaining natural flows.

Drift Creek has a computed minimum flow of 22 cfs with allowance being made for water rights of 5.4 cfs. Due to use of this stream being seriously considered in a county-wide water plan, it would appear that about 4 cfs of these flows will be used for municipal purposes if the water plan is adopted. Drift Creek, as previously pointed out, produces good populations of silver and fall chinook salmon, steelhead, and cutthroat trout and is an important producer of fish caught in Siletz Bay as well as in the sport and commercial ocean fisheries. The Oregon State Game Commission has recommended minimum flows, Table D of the Appendix, varying downward from 40 cfs in June to 25 cfs in September at the covered bridge above the mouth of Drift Creek. Computed quantities indicate the availability of about 16 cfs for fish and other beneficial uses.

The Taft area has 30 farms with 100 acres presently irrigated and approximately 800 acres of potentially irrigable land. Storage or above minimum streamflows appear to be the available water sources in all areas except Drift Creek. A survey in 1964 on Drift Creek indicated that farmers planned to irrigate 160 of the potentially irrigable acres. Using one-eightieth of a cubic foot per second per acre, 2.0 cfs additional would be required for irrigation purposes.

To supply all of the above-stated needs would require storage during low flow seasons of some years. Two reservoir sites, one on Schooner and one on Drift Creek, have been investigated that would have a combined capacity of about 4,400 acre-feet.

## Siletz River Area

The Siletz River watershed covers an area of 308 square miles mainly in Lincoln County but with some of its headwaters extending into Polk and Benton Counties. Precipitation varies from 70 inches along the coast to over 180 inches in the headwaters above Valsetz. Elevations range from sea level to 2,850 feet along the Coast Range divide.

Approximately 94 percent of the area is covered by forest, 3 percent by cropland, and 3 percent by rangeland and other uses.

The economy of the area is based on forestry, agriculture, rock and gravel mining, and recreation. The Siletz River area population is estimated at 2,560 persons. The logging and mill town of Valsetz is located along the shore of Valsetz Lake in the upper reaches of the Siletz watershed. The communities of Logsden, Siletz, Camp 12, and The Maples are situated along Siletz River in the interior valley. The heavily populated resort areas of Kernville, Cutler City, and Taft are located along Siletz Bay. The above-named towns, the interior valley towns, and Toledo use the Siletz River and its tributaries as their major water sources. Population will become more widely distributed in this valley as transportation facilities improve and as water resources are further developed.

The average annual yield of the Siletz River is 1,400,000 acre-feet at its mouth. Runoff per square mile of watershed averages 4,500 acre-feet. The potential for ground water development is limited.

## DEVELOPMENT POTENTIAL

Surface water rights on the Siletz River total 88.4 cfs of which 75.6 cfs are for consumptive purposes. This includes 2.6 cfs for domestic, 14.1 cfs for municipal, 48.2 cfs for industry, and 10.7 cfs for the irrigation of 876 acres. The nonconsumptive rights include 0.9 cfs for power and 11.9 cfs for fish life. If all the surface water rights were used to their maximum legal extent, about 49,200 acre-feet would be diverted each year from the stream system.

Large municipal and industrial water users diverted water from the Siletz River 2.6 miles below the controlling stream gage. The rights involved must be accounted for at the gage to determine minimum flows that may be available below the diversion point. Municipal users have rights for 9 cfs. A large industrial user, Georgia Pacific Company, has a right for 20 cfs plus an additional 20 cfs when surplus flows are available in the Siletz River. The industrial right is subject to the stipulation referred to previously in the Water Control Section pertaining to industrial rights.

The U. S. Geological Survey-State Engineer recording gage No. 3055, upstream from the community of Siletz, has been operating for 43 years giving a good basis for determining expected minimum flows. The instantaneous minimum flow was recorded at 51 cfs in December 1929. The mean minimum flow during the heavy use period was computed at 91 cfs for the base period.

Industrial use of Siletz River water at Siletz was suspended on October 1964 for a short period because flows dropped below the quantities required for fish life passage.

By subtracting the municipal and industrial rights diverted 2.5 miles downstream from the computed mean minimum flows of 91 cfs, we obtain 61 cfs as the available minimum streamflow at the City of Toledo and Georgia Pacific Company pumping plants. This is less than the 75 cfs minimum flow stipulation under State Engineer water right Permit No. 24288 previously referred to. The stipulation, in effect, establishes a minimum flow as far as Permit No. 24288 is concerned but has no bearing on any other water right. There is an inflow of undetermined quantity from several small creeks below this point. There is one ground water right for 0.22 cubic feet per second, the equivalent of 159 acre-feet per year.

As previously discussed, the Siletz River and its tributaries has an excellent fish life potential. With additional summer flows and developed access to fishing areas, a much larger harvest of especially silver salmon and summer steelhead trout could be realized. It has the potential of supporting much greater angler use. The Oregon State Game Commission has recommended setting minimum flows, Table D of the Appendix, of 100 cfs at gage No. 3055 above Siletz.

Within the 170 farms in this watershed there were 680 acres irrigated in 1964 and 5,000 acres of potentially irrigable land. At one-eightieth cubic foot per second per acre the water requirement to develop the potentially irrigable land would require 62 cfs. Storage is the only source available during low flow periods.

It is probable that future storage developments will provide water for irrigation, municipal, industrial, fish life, and recreation, as well as space for limited flood control as parts of the multi-purpose benefits. Seven storage sites have been investigated with a total storage capacity of about 33,400 acre-feet. These storage sites are on Cedar, Euchre, Sam, Sunshine, Big Rock, Steere, and Jaybird Creeks. In addition, 12 hydroelectric power damsites have been considered on the main Siletz River but the cost-benefit ratio is not presently favorable. The Valsetz and Sunshine Reservoir sites are shown in Figure 16.

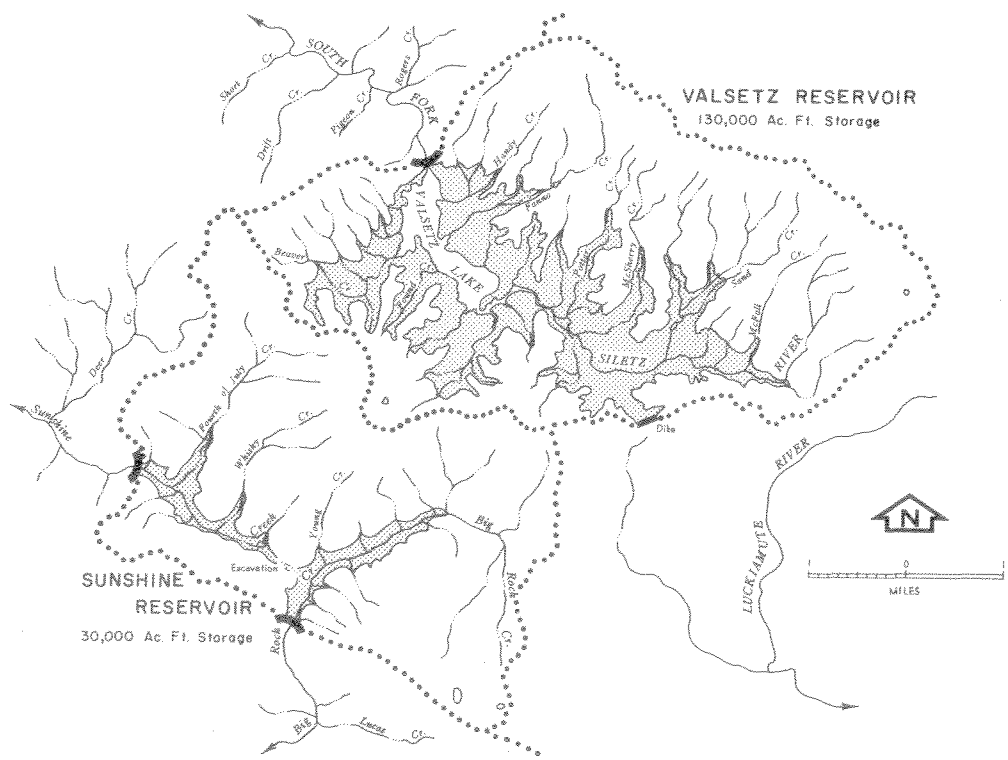



FIGURE 16. Potential reservoir sites.

County officials recommend that early consideration be given to a 3,000-acre-foot reservoir site on Sunshine Creek and a 4,000-acre-foot reservoir site on Big Rock Creek. These sites could be developed singly or jointly to a much larger capacity for multipurpose uses. Figure 16 shows potential reservoir sites at Valsetz with a capacity of 130,000 acre-feet and the combined Sunshine-Big Rock Creek site with a capacity of 30,000 acre-feet. Either of these proposed reservoirs would add materially to the water resource potential of the Siletz Valley and surrounding areas.

An industry at Toledo has stated that its future storage requirements on the Siletz River will be 4,900 acre-feet. Lincoln County will need additional flows for municipal purposes from the Siletz River sources according to a separate study now being completed.

Some interest has been shown in irrigation development between Logsden and the Siletz area. It is probable that 1,200 acres will be irrigated in the near future. Additional future needs, mainly from storage during the low flow period, will be about as follows: municipal, 4 cfs; industrial, about 20 cfs; irrigation, 15 cfs; and fish life, 100 cfs.

About 2,000 acres need improved drainage and about 2,500 acres adjacent to Siletz Bay and around the town of Siletz need flood protection.

## Depoe Bay Coast Area

The Depoe Bay Coast area contains 52 square miles. It includes numerous small creeks which drain into the Pacific Ocean from Gleneden Beach south to Newport. The area included is approximately 18 miles long and averages 3 miles in width. Elevations range from sea level to 1,000 feet on the divide of the Salmon River watershed. Average annual precipitation varies from 60 to 80 inches. The average growing season is 245 days.

The stream gradients vary considerably on the 21 recorded small streams shown on Plate 1 of the Appendix. The average annual yield of the entire area was estimated 110,000 acre-feet. Runoff per square mile averages 2,100 acre-feet. Ninety-two percent of the area is covered by forests with practically all the rest in highway, city, town, and seashore use. There are only five farms and 50 acres of cropped land with no irrigation potential reported.

The population for 1960 was estimated at 4,860 persons. Greatest population concentrations were in the towns and cities of Gleneden Beach, Lincoln Beach, Depoe Bay, Otter Rock, Beverly Beach, Agate Beach, and the part of Newport included in this study area. The economy of the area is based on forestry, tourism, and fishing.

Surface water rights total 29.6 cfs of which 28.3 cfs are consumptive. The distribution of water rights include: domestic, 2 cfs; municipal, 22 cfs; industrial, 3.1 cfs; irrigation, 1.2 cfs; power, 0.3 cfs; fish life, 0.9 cfs; and mining, 0.1 cfs. The stream and spring sources serve five water districts, the City of Newport and individuals. Ground water rights total 1.1 cfs or 782 acre-feet per year for domestic and municipal purposes. If consumptive rights were used to their maximum legal extent, 19,800 acre-feet would be depleted from available surface water sources.

Shortages and water quality problems were reported during the municipal water survey from most of the sources used. Streamflows become quite low during the summer heavy use period. Storage reservoirs at low elevations, similar to the one that has been constructed on Big Creek become quite warm which encourages algae growth which causes taste and odor problems.

Minimum observed flows of the creeks include: Fogarty, 0.2 cfs; Depoe Bay, 0.6 cfs; Rocky, 1.0 cfs; Spencer, 1.0 cfs; Wade, 0.2 cfs; Moloch, 0.5 cfs; Little, 0.1 cfs; and Big, 0.2 cfs.

Due to the lack of stream gaging and the over-appropriation of most of these streams during the summer high use-low flow period, it would be difficult to establish minimum flows for this area. It appears that remaining flows of Schoolhouse, Fogerty, Deadhorse, Rocky, and Molock Creeks have a high potential for human consumption, recreation, and fish life purposes. Flows of Depoe, Big, and Spencer Creeks are needed for the same purposes plus municipal use until such time as a county water plan might be developed.

An investigation has been made on a 900-acre-foot reservoir site on South Depoe Day Creek and a 1,000-acre-foot reservoir site on Rocky Creek.

### Yaquina River Area

The Yaquina River watershed covers an area of 253 square miles in Lincoln, Benton, and Polk Counties. The Yaquina River flows in a westerly direction from the summit of the Coast Range to Yaquina Bay and into the Pacific Ocean at Newport. Elevations range from sea level to 2,300 feet with most of the agricultural land below

400 feet. Average annual precipitation ranges from 60 inches along the coast to 110 inches in the high timbered area. The average growing season is 248 days at Newport and 195 days at Toledo.

About 85 percent of the area is covered by forest, 4 percent is cropland, and the remaining 11 percent comprises pasture, urban areas, bay, and seashore. Around 900 acres were irrigated in 1964 and 4,500 acres of additional land is suitable for irrigation development. It is expected that 1,100 acres might be developed in the near future requiring flows of about 13.7 cfs.

Approximately 1,500 acres are flooded annually in the lower portions of the river valley and another 1,500 acres are in need of drainage. There are 180 farms which grow mainly hay and pasture plus small areas of fruit and vegetables.

The 1960 population was estimated at 8,710 persons with most of the inhabitants located in the Toledo and Newport areas. Population is more widely distributed in this area because of an extensive transportation system and industrial development around Yaquina Bay.

The economy of the area is based on forestry, agriculture, wood processing industries, recreation, and fishing. Expansion is taking place in the industrial and tourism fields. Much of the offshore oil exploration services are operated from Newport. If oil is found and processed in the Yaquina Bay area, additional water will be needed in the refining process.

The average annual yield of the Yaquina River watershed is estimated at 780,000 acre-feet. Runoff per square mile is about 3,100 acre-feet annually. Stream gradients are quite low, averaging 60 to 90 feet per mile in the timbered watershed. Tidal influences extend several miles into the interior above Elk City along the Yaquina River and Big Elk Creek. Ground water supplies appear quite limited, and present recorded use is one small right for irrigation of one acre.

Two reservoir sites were investigated on Depot Creek with a combined storage capacity of 5,000 acre-feet. No suitable reservoir sites have been located in the upper Yaquina River watershed. Storage water would be required to support the development potential of the Yaquina River Valley and bay areas. If reservoir sites can be found, storage water could be used for an appreciable municipal-industrial potential, to supply 13.7 cfs for irrigation development and to supply more than the 10 cfs minimum flow recommended for fish life.

Two hydroelectric power sites on Yaquina River have also been investigated.

As previously reported, the Yaquina River is an excellent producer of silver salmon and other anadromous fish. Its potential could be materially enhanced by developing access points and by increasing minimum summer flows. The Oregon State Game Commission has recommended minimum flows, Table D of the Appendix, at tidewater on Yaquina River grading downward from 30 cfs in June to 10 cfs in September. On Elk Creek they recommend minimum flows of 6 cfs.

Heavy use period water needs are quite large, while the observed minimum flows has dropped below 4.0 cfs on the Yaquina River without adjusting for present rights. Although gaging records are inadequate to draw specific conclusions, available data indicate that both the Yaquina River and Elk Creek low summer flows are inadequate to supply the present needs.

A paper industry at Toledo has developed its major water source from the Siletz River because of inadequate flows in the Yaquina River watershed. Low summer flows on both Mill and Olalla Creek are insufficient to satisfy existing water rights on these streams.

Minimum observed flows of streams in this watershed above tidewater include: Yaquina River, 4.0 cfs; Big Elk Creek, 5.7 cfs; Olalla Creek, 0.3 cfs; Depot Creek, 1.2 cfs; Beaver Creek, 0.2 cfs; and Mill Creek, zero flow. Actual minimum flows would be somewhat below the flows listed above since only a few miscellaneous measurements were taken and not all of those were taken during low water years.

## Beaver Creek Area

The Beaver Creek area includes the Beaver Creek watershed and other coastal streams between Newport and Waldport in Lincoln County. Streams presently used by water districts are Henderson, Fall, Big, and Starr Creeks. The watershed comprises an area of 50 square miles. Elevations range from sea level to 1,600 feet with most of the agricultural land below 500 feet. Average annual precipitation varies from 70 to 90 inches and the growing season is 248 days.

Stream gradients average 180 feet per mile on the South Fork to 80 feet per mile on the North Fork Beaver Creek watersheds. Tidewater and seashore sand bars affect streamflow for several miles upstream in both of these valleys.

## D E V E L O P M E N T   P O T E N T I A L

Beaver Creek Valley is the main agricultural area with 2,210 acres used for the production of crops and livestock. Of this acreage 1,000 acres are grazed forest, 510 acres are range, and 700 acres are cropped. About 100 acres are irrigated pasture, hay, berries, and specialty crops. Within the 20 farms about 1,200 additional acres are potentially irrigable and 100 acres are planned for development. About 1,000 acres flood annually, and 900 acres require improved drainage. Approximately 28,500 acres or 92 percent of the watershed is forested and the remainder is mainly seashore or used for commercial facilities.

The 1960 population for the Beaver Creek area was estimated at 1,040 persons. They are mainly concentrated in the coastal towns of South Beach, Seal Rock, and along U. S. Highway 101. The present trend is toward subdivision of coastal lands into homesites. Local planning considers flooding lower portions of the Beaver Creek Valleys for lakes and homesite developments. The economy of this area is supported by forestry, recreation, tourism, and a small amount of agriculture.

The average annual water yield of this area is 160,000 acre-feet or 3,200 acre-feet per square mile. There are no active gages in this study area so Beaver Creek minimum streamflows were estimated from miscellaneous stream measurements. Observed minimum flows were 2.5 cfs on Beaver Creek at the mouth in September 1931. Mean minimum flows during dry years would be about 2.5 cfs on North Fork and 0.7 cfs on South Fork, respectively.

North Fork Beaver Creek is presently considered as a potential source of municipal water supply for the adjoining coastal areas. Seal Rock Water District has filed for a water right on the North Fork's Elkhorn Creek for 2 cfs, but studies indicate minimum flows below this requirement so the North Fork source would be more dependable. Plans for summer home use would further affect water supplies. One reservoir site was investigated on North Fork Beaver Creek with a reservoir capacity of 7,200 acre-feet.

Considering its small size, the North Fork Beaver Creek has good runs of silver salmon, steelhead, and cutthroat trout. As fishing pressure increases on other streams it is expected that greater use will be made of this fishery resource. The Oregon State Game Commission has recommended minimum flows, Table D of the Appendix, of 3 cfs on the North Fork and 1 cfs on the South Fork Beaver Creek.

Surface water rights in the Beaver Creek and adjoining area total 9.6 cfs of which 7.0 are consumptive and 2.6 are nonconsumptive rights. This includes 1.4 cfs domestic, 3.0 cfs municipal, 1.3

cfs industrial, 1.3 cfs irrigation, 0.6 cfs recreation, and 2.0 cfs for mining. Beaver Creek and tributaries have consumptive rights of 3.9 cfs with remaining rights on other coastal streams. There are no ground water rights of record.

It appears that available minimum flows will be needed for domestic, municipal, recreation, and fish life purposes on the North Fork Beaver, Henderson, Collins, and Thiel Creeks.

The South Fork Beaver Creek minimum flows are too small to satisfy either irrigation or benefits to fish life and recreation. As noted above, consumptive rights exceed minimum flows on most of the streams. Storage will be required before all of the above potential needs can be satisfied.

## Alsea River Area

The Alsea River watershed covers 473 square miles in Lincoln, Benton, and Lane Counties. Elevations range from sea level to over 3,000 feet. Precipitation varies from 60 inches along the coast to 110 inches in the upper watershed.

Approximately 94 percent of the area is covered by forest, 3 percent by cropland, and 3 percent by range and other uses. The yield is about 1,500,000 acre-feet or 3,200 acre-feet per square mile.

The 1960 population was estimated at 3,850 persons with the greatest concentrations in the bay area. The interior is sparsely settled except along the lower main stem where the river frontage is being subdivided for summer homes.

The economy of the Alsea River area is centered around forestry, agriculture, and recreation. Agriculture and sport fishing have long been in conflict, but efforts are being made to alleviate damages caused by fishermen to fences, crops, and other farm property. During periods of anadromous fish movements, up to 1,000 weekend fishermen have been recorded along the Alsea River. There are no ground water rights for this area.

The following discussion will cover technical aspects of three separate areas of the Alsea watershed:

Upper Alsea River - This area contains 213 square miles in Benton, Lincoln, and Lane Counties. Elevations range from 90 feet to over 3,000 feet. Average annual precipitation is 93 inches, with about 7 inches available during the growing season of 190 days in the agricultural valleys.

A reconnaissance survey indicates that 110 farms have 5,000 acres of cropped land with 1,070 acres in irrigated pasture, hay, berries, and vegetable crops. Potentially irrigable land totals 4,000 acres, of which about 1,000 acres are expected to be developed in the near future. Flooded land averages 900 acres annually and 2,000 acres of arable land need drainage. Four reservoir sites have been investigated on the North Fork of Alsea River, South Fork of Alsea River, Crooked Creek, and Peak Creek with a combined storage capacity of over 50,000 acre-feet. In addition, there are three undeveloped water power sites.

Surface water rights in the upper Alsea River area total 63.8 cfs of which 21.4 cfs are consumptive rights. This includes 0.5 cfs for domestic, 20.9 cfs for irrigation, 0.4 cfs for power, and 42 cfs for fish life. If all surface water rights were used to their maximum legal extent, about 4,900 acre-feet would be withdrawn.

Water rights on the North Fork and Fall Creek, tributaries to the Alsea River, include 20 cfs and 22 cfs, respectively, for fish life. The Oregon State Game Commission has recommended minimum flows on the North Fork of 18 cfs and on Fall Creek of 8 cfs, but they desire the flows to be protected from the hatcheries to the mouth of the streams.

Minimum recorded flows are North Fork 6 cfs, South Fork 3.5 cfs, Bummer Creek 1 cfs, and Fall Creek 5 cfs at gaged locations.

Records are inadequate for accurately establishing minimum flows. Six-year records are available from U. S. Geological Survey-State Engineer gages at North Fork Alsea River gage No. 3061 and South Fork Alsea River gage No. 3062. Five years of records are available for Fall Creek gage No. 3063. Storage would be required to supply either the irrigation or fish life potential requirements as identified.

Five Rivers - This area contains 115 square miles in Benton, Lincoln, and Lane Counties. The watershed includes Five Rivers and Lobster Creek which join above the U. S. Geological Survey-State Engineer inactive gage No. 3064 and flow westerly through a gorge to the Alsea River. Elevations range from 120 feet to over 3,400 feet with the most of the 1,630 acres of cropped land below 500 feet. The average annual precipitation is 96 inches and the agricultural area growing season averages 190 days. There are 40 farms in this drainage basin where 440 irrigated acres are in pasture, hay, mint, berries, and vegetable crops.

About 73,200 acres are forested, 700 acres are potentially irrigable, 400 acres are flooded annually, and 120 acres of arable land are in need of improved drainage. Natural streamflow is adequate for about 200 irrigated acres, and storage would be required for the rest. The greatest irrigation potential is on Lobster Creek, but storage would be required probably at the 1,500-acre-foot Preacher Creek site.

The Oregon State Game Commission recommends minimum flows, Table D of the Appendix, of 14 cfs on Five Rivers above the confluence of Lobster Creek and 20 cfs at the mouth of Five Rivers. Best fish habitat is the portion of Five Rivers which excludes Lobster Creek.

The minimum recorded flow at gage No. 3064 below the confluence of Lobster Creek was 17 cfs with five years of records. Dry year mean minimum flows would probably be about 10 cfs but records are inadequate for precise determination of minimum flow. Water rights include: domestic, 0.11 cfs; industrial, 0.11 cfs; and irrigation, 3.39 cfs for the irrigation of 226 acres. The survey indicated that 240 acres of the potentially irrigable acres probably would be irrigated requiring 3 cfs of additional water to serve them.

Lower Alsea River - This area contains 140 square miles below the U. S. Geological Survey-State Engineer gage No. 3065 near Tidewater and includes the Alsea Bay to the Pacific Ocean at Waldport. Elevations range from sea level to 2,800 feet on Scott Mountain. Average annual precipitation in the cropped area is 95 inches with about 8 inches available during the growing season of 200 days.

Approximately 83,000 acres are forested, 6,800 acres are grazed, and 1,000 acres are cropped.

About 300 acres are irrigated pasture, hay, vegetables, and specialty crops. About 800 acres are flooded annually and 500 acres of arable land are in need of drainage. An estimated 1,000 acres are potentially irrigable, of which about 100 acres would be irrigated from the Alsea River. This would require an additional 1.2 cfs plus a similar quantity from streams flowing directly into Alsea Bay.

One storage site on Drift Creek has been investigated with a capacity of 3,100 acre-feet. One hydroelectric power site on the main stem has been investigated.

D E V E L O P M E N T   P O T E N T I A L

The 24 years of gaged records on the Alsea River near Tidewater indicate a mean minimum flow of 91 cfs. Surface water rights for the total Alsea watershed are 82.7 cfs of which 35.2 are consumptive and 47.5 are nonconsumptive. This includes 2.1 cfs for domestic, 5.5 cfs for municipal, 0.1 cfs for industrial, 27.5 cfs for irrigation, 0.4 cfs for power, and 47.1 cfs for fish life. If all surface rights were used to their maximum legal extent, about 11,400 acre-feet would be withdrawn.

This stream has proven its sport fishing potential with an extremely high degree of angler use and catch rate. Increased production could be realized by increasing the summer rearing flows. The Alsea River and its tributaries supports excellent runs of silver salmon, steelhead, and cutthroat trout. It also supports a few fall chinook salmon. Extensive research is being conducted by the Oregon State Fish and Game Commissions on anadromous fish on the Alsea River and the Drift Creek tributary.

The Oregon State Game Commission has recommended establishing minimum flows, Table D of the Appendix, of 90 cfs at U. S. Geological Survey gage No. 3065. The analysis indicates that such a quantity is available for future potential use except in certain dry years. There are future needs above this point, however, of about 21 cfs for domestic, livestock, municipal, industrial, and irrigation purposes.

In addition to the foregoing, there are several side streams not controlled by the gage which require consideration. Flows of Scott Creek amounting to about 3 cfs are being considered for municipal purposes under a separate study. Weist Creek is the present municipal source for the City of Waldport. Headwaters of Drift Creek are being considered for municipal uses in coastal areas between the Cities of Newport and Waldport. Estimated present minimum flows on Drift Creek at tidewater are about 14 cfs which are available for beneficial uses such as municipal, 3 cfs; irrigation, 1 cfs; and fish life, 10 cfs. It appears that Grass and Canal Creeks along the lower Alsea River are well adapted for domestic, fish life, and recreation uses.

## Yachats River Area

This area includes the Yachats River watershed and the adjoining coastline north to near Waldport. The watershed includes an area of 61 square miles in Lincoln and Lane Counties. The Yachats River flows in a westerly direction from Yachats Mountain to the Pacific Ocean at Yachats. Small coastal streams include Patterson, Little, Big, Vingie, and Starr Creeks.

# D E V E L O P M E N T   P O T E N T I A L

Elevations range from sea level to over 2,300 feet with most of the agricultural land below 250 feet. Average annual precipitation varies between 80 and 105 inches while the average growing season is about 245 days in the agricultural areas. Stream gradients average 180 feet per mile in the North Fork and 110 feet per mile in the South Fork Yachats River watersheds. Gradients are considerably lower through the valley area and along the coastline.

The 1960 population for the area was estimated at 380. Main population concentrations are at the resort centers of Yachats, San Marine, and Waconda Beach with most of the remainder located along U. S. Highway 101. The present trend is toward subdividing forest, beach, and agricultural land into homesites. The economy of this area is supported by forestry, agriculture, tourism, and recreation.

The average annual yield of the Yachats River and small creeks of this area is estimated at 240,000 acre-feet or 3,900 acre-feet per square mile of drainage. There are no active gaging stations so minimum flows can only be estimated from observed miscellaneous flow readings. Observed low flows were as follows: Big Creek at mouth, 1.1 cfs; Vingie Creek at mouth, zero; Starr Creek at mouth, 0.4 cfs; South Fork Yachats River at mouth, 6 cfs; North Fork Yachats River at mouth, 2.6 cfs; Yachats River at mile 4, 16 cfs. Most of these records were accumulated during the 1963-64 study period so minimum flows during dry years could be about one-half the amounts observed, according to the hydrological study.

Approximately 26,000 acres or 94 percent of this study area is forested. In the Yachats River Valley 700 acres are grazed forest, 290 acres are pasture, and 600 acres are cropped. About 70 acres are irrigated pasture, hay, berries, and vegetable crops. Within the 20 farms about 100 acres are flooded annually and another 100 acres need improved drainage. About 700 acres of additional land are suitable for irrigation. The survey indicates that 160 acres will probably be irrigated, requiring about 2 cfs of additional streamflow.

Two storage sites were investigated on the North and South Forks of the Yachats River with a combined storage capacity of over 5,000 acre-feet. The relatively small agricultural acreage outside the Yachats River Valley was not studied.

Surface water rights in the Yachats River area total 18.1 cfs of which 15.6 cfs are for consumptive purposes and 2.5 cfs are nonconsumptive. This includes 2.0 cfs for domestic, 12.7 cfs for municipal, 0.2 cfs for industrial, 0.7 cfs for irrigation, 1.5 cfs for fish life, and 1.0 cfs for recreation purposes. About 8.7 cfs of the municipal rights are on small coastal streams. There are no ground water rights of record.

The Yachats River has a high anadromous fish spawning and rearing potential. With adequate streamflows and a good management program angling values are expected to increase. This stream has excellent runs of silver salmon, steelhead, and cutthroat trout. The Oregon State Game Commission has recommended minimum flows of 18 cfs at the head of tidewater on Yachats River.

Under separate studies, future municipal needs are estimated at 2 cfs from the North Fork Yachats River. Future domestic, municipal, fish life, and irrigation requirements total about 22 cfs for which there are an estimated 10 cfs available. With present trends toward homesite and recreation developments it would appear that a minimum flow of about 6 cfs could be maintained in the Yachats River. Storage would be required to realize maximum potential development of 2 cfs for municipal purposes, 8.8 cfs for irrigation purposes, and 18 cfs for fish life purposes.

Most of the minimum flows of Big, Starr, and Vingie Creeks are being used by the Southwest Lincoln County Water District and for domestic, recreation, and fish life purposes. Remaining flows appear to be best adapted to these uses.

## North Lane Coast Area

This coastal area contains 108 square miles between Yachats and Florence. The largest of the nine coastal streams discussed are Tenmile and Big Creeks. The elevation ranges from sea level to 2,300 feet with the cropland below 400 feet. Average annual precipitation varies from 80 to 105 inches and the cropland growing season is 245 days. Stream gradients range from 130 to 300 feet per mile in the rugged mountainous area to a low gradient around the natural lakes.

The 1960 population of the North Lane Coast was estimated at 1,040. The economy of this area is based on forestry and tourism with no noticeable trends developing except for homesites from Sutton Lake south to Florence.

Approximately 65,200 acres or 94 percent of this area is forested. About 1,350 acres are grazed and 700 acres are cropped to hay and pasture. Among the 30 farms there are about 400 acres of potentially irrigable land located mainly on Tenmile, Big, and Sutton Creeks. About 900 acres flood annually and 120 acres need drainage. One reservoir site was investigated on Big Creek with a potential storage capacity of 1,900 acre-feet.

The average annual yield of the area is 410,000 acre-feet or 3,800 acre-feet per square mile. There are no recording gages in this area but minimum observed flows at or near the mouth of these creeks were: Cummins, 0.9 cfs; Bob, 1.5 cfs; Tenmile, 3 cfs; Rock, 1.5 cfs; Big, 1.9 cfs; China, 0.3 cfs; Cape, 4.5 cfs; Berry, 0.8 cfs; and Sutton, 2.2 cfs. All of these flows were recorded during the years of 1934-36 and are probably only slightly above mean minimum flows.

The Oregon State Game Commission has recommended the establishment of the following minimum flows, Table D of the Appendix, by creeks: Cummins, 3 cfs; Bob, 2 cfs; Tenmile, 10 cfs; Rock, 3 cfs; Big, 5 cfs; and Cape, 6 cfs. As noted in the paragraph above observed miscellaneous minimum flows for the period 1934-36 were considerably below the Game Commission's recommended flows. It would appear, however, that available flows of the above named streams plus Cape Creek at Heceta Head and Quarry Creek are best adapted to domestic, fish life, and recreation uses.

Big, Tenmile, and Sutton Creeks also contain a potential irrigation requirement of about 1 cfs each.

A serious problem is the contamination of domestic ground water supplies in populated areas between Sutton Lake and Florence. Use of surface water sources would alleviate much of this problem. A water supply district should be created to serve the area and to provide the unified action and financial capability necessary to solve the problems of developing a water supply of acceptable standards.

Surface water rights total 4.4 cfs of which 4.2 cfs are for consumptive purposes. This includes 1.1 cfs domestic, 0.9 cfs municipal, 2.0 cfs industrial, 0.2 cfs irrigation, and 0.2 cfs for power rights. There is one 0.3 cfs water district ground water right at Heceta Beach.

The following natural lakes have a valuable homesite, fish life, and recreation potential: Alder, Buck, Sutton, Mercer, Collard, Clear, and Munsel Lakes.

# DEVELOPMENT POTENTIAL

## Siuslaw River Area

The Siuslaw River and its tributaries cover 773 square miles in Benton, Lane, and Douglas Counties. Elevations range from sea level to 3,000 feet with only a few northern portions over 1,300 feet. Precipitation varies from 40 to 100 inches.

Approximately 92 percent of the area is covered by forest, 3 percent by cropland, and 5 percent by range and other uses. Total water yield is about 2,300,000 acre-feet or 3,000 acre-feet per square mile.

The 1960 population was estimated at 7,180 persons with the greatest concentrations at Florence and along the northern edge of Siuslaw Bay. There are several small towns and villages in the interior where most of the remaining population resides.

The economy of the Siuslaw River study area is based on forestry, agriculture, timber processing, fishing, and recreation. Technical aspects of the watershed will be discussed separately under the following subareas: Lake Creek, North Fork Siuslaw River, upper Siuslaw River, and lower Siuslaw River.

Lake Creek - This study area is a northern tributary of the Siuslaw River with the town of Triangle Lake near its center. The area contains 223 square miles in Lincoln and Benton Counties. Lake Creek flows in a southerly direction to Swisshome where it enters the Siuslaw River. Major tributaries include Deadwood Creek and Indian Creek.

Elevations range from 120 feet to about 3,000 feet with the majority of the cropland below 750 feet. Average annual precipitation varies from 60 to 100 inches with the agricultural area growing season averaging 180 days.

A reconnaissance survey indicates that about 92 percent of the area is forested. About 3,500 acres are grazed and 5,700 acres are cropped. Within the 90 farms about 1,070 acres are irrigated for the production of hay, pasture, and corn silage. Around 3,000 acres of additional land are suitable for irrigation. To develop 1,000 acres of this potential, which is expected in the near future, would require 12.5 cfs of streamflow mainly in or near the Lake Creek Valley.

Problem lands include about 2,000 acres that are flooded annually, and 1,000 acres of arable land needing drainage. Flooding causes moderate sediment deposition, bank cutting, erosion, and damage to bridges and farm structures.

## D E V E L O P M E N T   P O T E N T I A L

All potential developments cannot be achieved without reservoir construction. Five reservoir sites have been investigated on the following creeks: Congdon, Swamp, Swartz, Indian, and Rogers with a combined storage potential of 12,300 acre-feet.

Lake Creek has good steelhead and resident trout fishing and sustains heavy angling pressure. Numerous plans have been made for fish life reproduction and habitat improvement in the Triangle Lake area. The Oregon State Game Commission has recommended minimum flows, Table D of the Appendix, of 8 cfs at Triangle Lake and 50 cfs at the mouth of Lake Creek. These amounts are considerably above estimated minimum flows. The Soil Conservation Service is preparing plans for installing a control structure at the mouth of Triangle Lake which will better control lake levels and change the flow pattern.

Inspection of water uses indicated that Deadwood and Indian Creeks might have undetermined surplus minimum flows which could be utilized for future domestic, recreation, and fish life purposes.

The U. S. Geological Survey-State Engineer gage No. 3075 at the mouth of Triangle Lake recorded a minimum flow of 2.7 cfs. Variable, inadequate records make setting a minimum flow questionable.

Surface water rights in this study area total 16.1 cfs of which 11.1 cfs are for consumptive purposes and 5 cfs are nonconsumptive. This includes 0.9 cfs domestic, 2.2 cfs industrial, 8.0 cfs irrigation, and 5.0 cfs for fish life. If all surface water rights were used to their maximum legal extent, about 4,000 acre-feet annually would be diverted from the stream system.

North Fork Siuslaw River - This study area contains 65 square miles, all within Lane County. The North Fork flows in a southwesterly direction from Saddle Mountain to its confluence with the Siuslaw River about one mile east of the City of Florence. Elevations range from sea level to 2,300 feet with most of the agricultural land below 250 feet. The average annual precipitation varies from 70 to 100 inches. The agricultural area growing season averages 240 days per year.

A reconnaissance survey indicates that 90 percent of the area is forested, that 700 acres are grazed and 2,900 acres are cropped. About 450 acres are irrigated hay and pasture with 1,500 acres of additional land suitable for irrigation. There are 50 farms, 2,000 acres flooded annually and 1,500 acres of arable land needing drainage.

# DEVELOPMENT POTENTIAL

Potential water use requirements would include 9.3 cfs for the 750 acres for which development has been indicated in the near future and 12 cfs, the Game Commission's recommended minimum flows for fish life. Observed minimum flows are 2.4 cfs above Condon Creek. Minimum flows appear to be fully utilized on the North Fork so potential developments would depend mainly upon stored water.

Four reservoir sites on North Fork Siuslaw River, Porter Creek, McLeod Creek, and Condon Creek have been investigated that have a combined multipurpose storage capacity of 7,700 acre-feet. The average annual surface water yield of this study area is 220,000 acre-feet.

Surface water rights total 5.5 cfs of which 4.6 cfs are consumptive and 0.9 cfs are for nonconsumptive purposes. This includes 0.1 cfs domestic, 4.5 cfs irrigation, and 0.9 cfs for fish life purposes. There are no recorded ground water rights at present, but one will probably be filed by the City of Florence for its new municipal well.

Upper Siuslaw River - The upper Siuslaw River drainage contains 256 square miles in Lane and Douglas Counties. Elevations range from around 300 feet to over 2,300 feet with most of the cropland below 750 feet. Average annual precipitation varies from about 40 inches in the Lorane area to 90 inches in the mountains. The average growing season in the Lorane agricultural area is 166 days.

A reconnaissance survey indicates that 94 percent of the area is forested, 5,300 acres are grazed and 6,500 acres are cropped on 110 farms. About 500 acres of cropland are used for irrigated pasture and hay. The survey indicates that 2,200 acres of additional land are suitable for irrigation development. Because of the low total and summer rainfall and the closeness to markets, this area would respond well to irrigation agriculture if additional summer water supplies were developed through storage.

Problems include some shortage of domestic water for yards and gardens in the Lorane area, 1,400 acres flooded annually and 1,550 acres of arable land that need drainage.

The intermediate reaches of the river have tributaries with excellent fish life and recreation potential. Opportunities exist for developing irrigation, recreation uses, flood protection, and channel improvement especially in the Lorane area. Reservoirs would be required before much of this potential could be realized.

## DEVELOPMENT POTENTIAL

Average annual yield equals 530,000 acre-feet or 2,070 acre-feet per square mile. Observed minimum flows include Wildcat Creek at the mouth, 8.8 cfs; Siuslaw River at U. S. Geological Survey-State Engineer gage No. 3070, 20 cfs; Wolf Creek at mile 10, 2.7 cfs; and Siuslaw River above Wolf Creek, 16 cfs. In that none of these readings were taken during dry years of record, establishment of mean minimum flows would be questionable.

The Siuslaw River Valley is practically all in a forested condition from Austa to river mile 108 near Lorane. The same is true for Wolf Creek between its mouth and river mile 20. Water yield from this area is practically all available for beneficial uses. An electric power company has recommended that two sites on the Siuslaw River above Austa be considered for large hydroelectric power developments.

Five storage reservoir sites have been investigated in watersheds above Lorane with a combined storage capacity of 7,500 acre-feet. Two sites in the upper Wolf Creek watershed could store about 7,800 acre-feet and one site on Wildcat Creek has a probable storage capacity of 1,500 acre-feet.

Surface water rights include 0.2 cfs domestic, 4.3 cfs industrial, 9.4 cfs irrigation, and 1 cfs recreation, for a total of 14.9 cfs. There are no ground water rights of record.

Lower Siuslaw River - This study area includes the main stem Siuslaw River from the Pacific Ocean upstream to its junction with Wildcat Creek at Austa. The area contains 174 square miles of land. Elevations range from sea level to over 2,300 feet with most of the agricultural land below 250 feet. Average annual precipitation varies from 70 inches along the coast to over 90 inches in the timbered watershed. The average growing season in the agricultural area exceeds 200 days.

A reconnaissance survey indicates that 92 percent of the watershed is forested, 1,540 acres are grazed and 3,600 acres are cropped. About 170 acres are in irrigated pasture and hay. About 1,600 acres of additional land are suitable for irrigation development. About one-half of this acreage could be irrigated from the present natural streamflow but storage would be required for the remainder. Two reservoir sites on Sweet Creek were investigated with a combined storage capacity of 3,600 acre-feet.

Problems include the flooding of 2,000 acres annually and the need for drainage on 1,450 acres. The maintenance of existing dikes and the construction of new dikes is needed to reduce the salt water contamination problem on hay and pasture land. Other problems include the contamination of domestic water supplies by floodwaters and the mineral quality of deep wells.

The City of Florence has developed a well in the sand dunes. Quantity was more than adequate but iron and other minerals were considerably above acceptable standards for municipal purposes. Experiments are now being undertaken to determine the economic feasibility of removing excess iron.

Average annual water yield from the lower Siuslaw River is 620,000 acre-feet. The yield from the four Siuslaw River study areas is 2,300,000 acre-feet at the mouth of Siuslaw Bay.

Tributaries of the Siuslaw River are good producers of silver and chinook salmon as well as steelhead and cutthroat trout. The main stem is a poor producer with little spawning gravel and high summer water temperatures. The Oregon State Game Commission has recommended a minimum flow, Table D of the Appendix, of 50 cfs on the Siuslaw River above the confluence of Lake Creek. The area is receiving increasing recreation and summer home use.

Studies indicate that minimum flows of about 43 cfs at river mile 24 are available for domestic, fish life, and recreation purposes.

The observed minimum flow on Munsel Creek was 0.1 cfs at Munsel Lake. A City of Florence municipal right for 4 cfs depletes Munsel Creek minimum streamflow.

Surface water rights on the lower Siuslaw River total 23.3 cfs. These include domestic, 2.3 cfs; municipal, 8.8 cfs; industrial, 10 cfs; and irrigation, 2.2 cfs. There are no ground water rights of record.

It would appear that remaining flows of Knowles and Hadsall Creeks have a high potential for domestic and recreation purposes. The other small streams flowing into Siuslaw Bay have a combination of potential uses which could not be clearly classified.

## Siltcoos Area

The Siltcoos area includes the Siltcoos and Tahkenitch drainages in Lane and Douglas Counties. The study area includes 129 square miles located in the southwest corner of the Mid-Coast Basin. The larger interior streams include Maple and Fiddle Creeks which are tributary to Siltcoos Lake.

# D E V E L O P M E N T   P O T E N T I A L

The two major coastal streams are Siltcoos River and Tahkenitch Creek. Elevations range from sea level to 1,800 feet with most of the cropland below 200 feet. Average annual precipitation is about 80 inches while the agricultural area growing season is around 245 days.

The 1960 population was estimated at 1,380 persons. A reconnaissance survey indicates that 65 percent of the area is forested and, except as described below, most of the rest is comprised of lakes, sand dunes, seashore, and public facilities. About 870 acres are grazed and 2,350 acres are cropped to hay and pasture. There are 50 farms and 460 acres presently irrigated. About 1,900 acres of additional land are suitable for irrigation development but only about 480 acres is planned for irrigation in the near future.

Problems include the flooding of 1,200 acres annually mainly along Maple, Fiddle, and Fivemile Creeks. Damage includes stream bank erosion, sedimentation, debris deposits, and considerable maintenance requirements on roads and farm structures. Wind erosion is a major problem in the dunes area where sand encroaches on forests, streams, lakes, highways, and other public facilities. About 800 acres need drainage and considerable channel work would help reduce drainage and flood problems.

The average annual water yield is 410,000 acre-feet with about 240,000 acre-feet of this yield produced in the Siltcoos and 110,000 acre-feet produced in the Tahkenitch areas. Miscellaneous minimum flow measurements include: Siltcoos River at tidewater, 4.3 cfs; Woahink Lake at outlet, 1.6 cfs, and Tahkenitch Lake at outlet, zero. Observed flows are probably slightly above minimum dry year flows.

Additional diversion requirements to develop one-fourth of the potentially irrigable land would be 6 cfs. Minimum flows are not adequate to supply these requirements. Three reservoir sites on Maple, Fivemile, and Leitel Creeks were investigated that had a combined storage capacity of 7,000 acre-feet.

The Oregon State Game Commission did not recommend minimum flows at the outlets of Siltcoos and Tahkenitch Lakes because they already have agreements covering storage releases. They have recommended establishing minimum flows, Table D of the Appendix, of 5 cfs on Woahink Creek below the lake of the same name. Minimum unappropriated flows are about 1 cfs which will probably be needed for domestic, fish life, and recreation purposes. Waters of Siltcoos River, Tahkenitch Creek, and Threemile Creek should probably be considered for similar purposes. The following lakes appear adaptable to additional homesite, recreation, and fish life uses: Clearwox, Woahink, Siltcoos, Tahkenitch, Threemile, Elbow, Perkins, Lost, Carter, and Loon Lakes.

Surface water rights total 53.3 cfs of which 53 cfs are for consumptive purposes. These include: domestic, 1.1 cfs; municipal, 0.2 cfs; industrial, 49.1 cfs; irrigation, 2.6 cfs; and recreation, 0.3 cfs. The large industrial right is for a paper mill at Gardner which is outside the basin. The legal annual depletion is 10,600 acre-feet from the Siltcoos and 26,500 acre-feet from the Tahkenitch Lake areas. There is only one 0.06 cfs domestic ground water right of record.

# APPENDIX

# 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;

AUTHORITY

"(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."

# O R D E R S   B Y   S T A T E   E N G I N E E R

| | | |
|---|---|---|
| "In the Matter of the Withdrawal<br>of Mill Creek, a Tributary of<br>Yaquina River, from Appropriation | )<br>)<br>) | ORDER |

"FINDINGS

"Mill Creek and its tributaries are located within sections 22, 23, 26, 27, 28, 32, 33, 34 and 35, Township 11 South, Range 10 West, W.M., and sections 2, 3, 4, 9 and 10, Township 12 South, Range 10 West, W.M. The confluence of Mill Creek with the Yaquina River is within the NE¼ NW¼ of Section 28, Township 11 South, Range 10 West, W.M.

"All of the rights of record for the appropriation of water from Mill Creek or its tributaries are in the name of the City of Toledo. These rights are recorded at Volume 8, Pages 9040, 9047, 9048 and 905, State Record of Water Rights certificates, and cover the appropriation of a total of 16.5 cubic feet per second of water for municipal use.

"In addition to the above noted certificate rights, the City of Toledo has filed applications numbered R-33459 and 33460 for permits to construct a reservoir on Mill Creek within Section 28, Township 11 South, Range 10 West, W.M., and store therein 400 acre feet of water to be appropriated for municipal use.

"CONCLUSION

"There is no unappropriated flow of Mill Creek in excess of that required to satisfy the present and future municipal needs of the City of Toledo.

"ORDER

"NOW THEREFORE IT IS ORDERED that no additional applications will be accepted for the appropriation of water from Mill Creek or its tributaries.

"Dated at Salem, Oregon this 7th day of December, 1959.

/s/ LEWIS A. STANLEY

Lewis A. Stanley
State Engineer"

# ORDERS BY STATE ENGINEER

"In the Matter of the )
Withdrawal of Little )
Creek from Appropriation )

ORDER

"Little Creek, being a direct tributary of the Pacific Ocean, and its tributaries are located within Sections 22, 27, 28, 29, 32 and 33, Township 10 South, Range 11 West, W.M. in Lincoln County, Oregon.

"The Agate Beach Water District, a municipal corporation, has requested that its application No. 33861 for a permit to appropriate 3.0 cubic feet per second of water from Little Creek for municipal purposes, be approved to the exclusion of all subsequent appropriations.

"It appears that all of the waters of Little Creek, not required to satisfy existing rights, should be preserved as a municipal supply for this municipality.

"NOW THEREFORE IT IS ORDERED that no additional applications will be accepted for the appropriation of water from Little Creek except for the purpose of municipal use by the Agate Beach Water District.

"Dated at Salem, Oregon, this 7th day of June 1960.

/s/ LEWIS A. STANLEY

Lewis A. Stanley
State Engineer"

"In the Matter of Acceptance of )
Application for Permits to )
Appropriate the Waters of Rock )
Creek and its Tributaries, a )
Tributary of the Siletz River )

ORDER

"Rock Creek is a small stream rising on the west slope of the Coast Range in Lincoln and Polk counties and flowing westerly to its confluence with the Siletz River in the NW¼NE¼ of Section 4, Township 10 South, Range 9 West, W.M. It has a drainage area of about 43 square miles of which 20 square miles is above the diversion point of the Oregon Fish Commission's Siletz River

## O R D E R S   B Y   S T A T E   E N G I N E E R

Salmon Hatchery in the SW¼NE¼ of Section 7, Township 10 South, Range 8 West, W.M.

"At hearings on July 8, 1960, an Application No. 28513 in the name of Cleone G. Hogevoll and Application No. 28457 in the name of R. N. Nash, representatives of the Fish Commission testified that for practical purposes all of the flow of Rock Creek is diverted and used in the hatchery operation during the summer season beginning about July 1. They have not kept any records of the amount of water appropriated, but estimated the minimum flow to be four to five cubic feet per second.

"There are no public records of the flow of Rock Creek during the summer months. An inspection of the hatchery facilities by a representative of the State Engineer was made on April 22, 1959, and his report indicates an installed system capacity from Rock Creek of about 9.0 cubic feet per second of water.

"It appears that the flow of Rock Creek above the diversion point of the Fish Commission is fully appropriated during the late summer months and that any further appropriations during this period would be in conflict with existing rights.

"NOW THEREFORE it is ORDERED that no application shall be accepted for the appropriation or storage of the direct flow of Rock Creek (also known as Little Rock Creek or the South Fork of Rock Creek) and its tributaries above the north line of SW¼NE¼, Section 7, Township 10 South, Range 8 West, W.M., during the months of July, August or September of each year.

"Dated at Salem, Oregon, this 22nd day of July, 1960.

/s/ LEWIS A. STANLEY

Lewis A. Stanley
State Engineer"

## O R D E R S   B Y   S T A T E   E N G I N E E R

| | |
|---|---|
| "In the matter of the application of Georgia-Pacific Plywood Company, Portland, Oregon, for a permit to appropriate 40 c.f.s. of water from Olallie Creek, and Siletz River with storage in the Olallie Creek for manufacturing. | Application No. 30542<br>Permit No. 24288 |

### S T I P U L A T I O N

"WHEREAS, the Georgia-Pacific Plywood Company, a Georgia Corporation, licensed to do business in the State of Oregon, has filed with the State Engineer of said State, an application for a permit to appropriate 40 c.f.s. of water from Olallie Creek and the Siletz River with upstream storage in the Olallie Creek all for the purpose of manufacturing and the production of paper, and

"WHEREAS, Olallie Creek and the Siletz River each support large numbers of steelhead trout, cutthroat trout and salmon, and

"WHEREAS, biological study and investigation of both said streams, conducted by the Oregon State Game Commission and the Fish Commission of Oregon, indicate that a minimum flow of water below the point of diversion is necessary for the maintenance and protection of said species of fish as follows:

"January 1 to September 30, each year, 75 c.f.s. and from October 1 to December 31, each year, 100 c.f.s. said minimum flows to be maintained only at those times when water is being diverted from the Siletz River, and

"WHEREAS, the applicant has expressed its willingness to enter into a stipulation with the Oregon State Game Commission and the Oregon Fish Commission concerning the maintenance of said minimum flows provided, that said Game Commission and said Fish Commission agree, each for itself, not to protect the granting of said application.

"Now, therefore, it is stipulated and agreed between the Georgia-Pacific Plywood Company, a corporation, and the Oregon State Game Commission and the Fish Commission of Oregon, as follows:

> "1. The applicant, in the event a water permit is issued to it under said application, will allow, maintain and permit a minimum flow of water in said stream,

below the point of diversion, as follows: From January 1 to September 30, each year 75 c.f.s. and from October 1 to December 3 each year, 100 c.f.s. provided, that said minimum flows shall be maintained only at those times when water is being diverted from the Siletz River.

"2. This stipulation shall be made a part of any permit issued by the State Engineer under said application, by reference thereto, to the same effect and as fully as if it were set out in said permit.

"3. The Oregon State Game Commission and the Fish Commission of Oregon, in consideration hereof, jointly and severally, agree not to file with said State Engineer a protest to said application provided, that this stipulation is accepted by said State Engineer and its terms and provisions are made a part of any permit issued thereunder, as hereinbefore provided.

"Dated this 6 day of July, 1956.

GEORGIA-PACIFIC PLYWOOD COMPANY

By Robert E. Flowerrer (SGD)
Vice-President

OREGON STATE GAME COMMISSION

By P. W. Schneider (SGD)
Director

FISH COMMISSION OF OREGON

By M. Hoy (SGD)
Director

"STATE OF OREGON )
) ss
"County of Marion )

"I certify that the within was received by me on the 10th day of July, 1956 at 10:08 a.m. and was recorded in Miscellaneous Records, Vol. 3, page 1067-68.

/s/ LEWIS A. STANLEY

Lewis A. Stanley
State Engineer"

EXHIBIT A

Application No. R 38789, 38790
Permit No. R 3257, 28789

"This application is submitted to supplement water right application No. 30542, permit No. 24288, and to accompany the application for a permit to make alterations and additions to Olallie Dam. Construction on Olallie Dam is scheduled for June 1963. Application for a supplemental water right is based on increased water requirements for the paper mill after completion of the paper mill expansion in March 1964.

"The existing water right permit (No. 24288) is for 20 cfs. This application for a permit to appropriate water is also for 20 cfs making a total of 40 cfs. In all cases water will be taken from Olallie Creek in the amount available from natural flow. When the required flow is not available in Olallie Creek, water will be pumped from the Siletz River to supplement the flow in Olallie Creek. The quantity of water to be pumped from the Siletz River will be governed by (a) the natural flow available in Olallie Creek and (b) the minimum flow requirements in the Siletz River as set forth in the attached copy of a stipulation between the Oregon State Fish Commission and Oregon State Game Commission, and Georgia-Pacific Plywood Company. When required flow is not available in Olallie Creek and the Siletz River, water will be released from the Olallie Reservoir as required to meet the mill requirements.

"Briefly, the existing water supply system for the Georgia-Pacific Corporation, Toledo Mill is as follows:

"1. Pump station on Siletz River near Camp Twelve. The capacity of the Siletz pump station is 19.5 cfs consisting of 3 - 6.5 cfs vertical turbine pumps. The pumping head is 275 feet. All pumps are operated by electric motors. No change is proposed for the Siletz pump station.

"2. Twenty-seven inch pipeline from Siletz pump station to West Olallie Creek now in use. The pipeline is approximately 6,000 feet long and terminates at the top of the divide in the NW¼, NW¼ of Section 21, Township 10 South, Range 10 West, Willamette Meridian. No change is proposed for the 27" pipeline.

"3. Olallie Dam constructed on West Olallie Creek. It is proposed that the existing dam be raised 14 feet. Application has been made for a permit to make alterations and additions to Olallie Dam.

"4. Olallie Barrier constructed on Olallie Creek near the City of Toledo, Oregon. See Item 6 of application for description of Olallie Barrier. No change is proposed for the Barrier.

"5. Pipeline barrier to mill consists of a 27" diameter pipeline approximately 1,000 feet long to a storage tank and approximately 1,500 feet of 30" diameter pipeline from the storage tank to the mill. The termination point at the mill will be within the mill site. No change is proposed for the pipeline."

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TABLE A

HYDROLOGICAL STATION SUMMARY

| MAP INDEX NO. | NAME | USGS STATION NO. | LOCATION Twp. | Rng. | Sec. | ACTIVE | TYPE | DRAINAGE AREA Sq. Mi. | WATER YEARS OF RECORD | COMPLETE WATER YEARS |
|---|---|---|---|---|---|---|---|---|---|---|
| | STREAM GAGING | | | | | | | | | |
| 1 | Alsea River near Tidewater | 3065 | 14S | 9W | 6 | x | Rec. | 334 | 1940-63 | 24 |
| 2 | Deer Creek near Salado | 3068.1 | 12S | 10W | 11 | x | Rec. | 1.2 | 1958-63 | 5 |
| 3 | Drift Creek near Salado | 3066 | 12S | 10W | 24 | | Rec. | 20.6 | 1958-63 | 5 |
| 4 | Euchre Creek near Siletz | 3060 | 9S | 10W | 22 | | Chain | 13.4 | 1924 | 0 |
| 5 | Fall Creek near Alsea | 3063 | 13S | 9W | 35 | | Rec. | 29.4 | 1958-63 | 5 |
| 6 | Five Rivers near Fisher | 3064 | 14S | 9W | 19 | | Rec. | 114 | 1958-63 | 5 |
| 7 | Flynn Creek near Salado | 3068 | 12S | 10W | 12 | x | Rec. | .84 | 1958-63 | 5 |
| 8 | Lake Creek at Triangle Lake | 3075 | 16S | 7W | 20 | | Rec. | 50 | 1931-55 | 24 |
| 9 | Mill Creek near Toledo | 3060.36 | 11S | 10W | 33 | x | Rec. | 4.15 | 1960-63 | 4 |
| 10 | Needle Branch near Salado | 3067 | 12S | 10W | 24 | x | Rec. | .32 | 1959-63 | 5 |
| 11 | North Fork Alsea River at Alsea | 3061 | 14S | 8W | 1 | x | Rec. | 63.0 | 1958-63 | 6 |
| 12 | Rock Creek near Logsden | 3050 | 10S | 9W | 12 | | Staff | 38.3 | 1924 | 0 |
| 13 | Siletz River at Logsden | 3045 | 9S | 9W | 33 | | Chain | 133 | 1924 | 0 |
| 14 | Siletz River at Siletz | 3055 | 10S | 10W | 11 | x | Rec. | 202 | 1906-12, 1924-63 | 44 |
| 15 | Siuslaw River above Wildcat Creek at Austa | 3070 | 18S | 8W | 16 | | Staff | 267 | 1931-41 | 9 |
| 16 | South Fork Alsea River near Alsea | 3062 | 14S | 8W | 12 | | Rec. | 49.5 | 1958-63 | 6 |
| 17 | South Fork Siletz River at Valsetz | 3040 | 8S | 8W | 28 | | Staff | 17.6 | 1924 | 0 |
| | CREST-STAGE GAGING | | | | | | | | | |
| 18 | Alder Brook near Rose Lodge | 3037 | 6S | 10W | 25 | x | | 1.09 | 1954-63 | |
| 19 | Rocky Creek near Depoe Bay | 3060.1 | 9S | 11W | 19 | | | 5.36 | 1954-57 | |
| 20 | South Fork Weist Creek near Waldport | 3068.5 | 13S | 11W | 33 | x | | 0.33 | 1953-63 | |
| 21 | Unnamed tributary of Deadwood Creek at Alpha | 3075.5 | 16S | 8W | 18 | x | | 0.75 | 1957-63 | |
| 22 | Unnamed tributary of Siuslaw River near Rainrock | 3076.1 | 17S | 10W | 27 | x | | 0.42 | 1957-63 | |
| | WATER QUALITY | | | | | | | | | |
| 23 | Alsea River near Tidewater | 3065 | 14S | 9W | 6 | | Spot | | 1958-59 | |
| 24 | Deer Creek at Mouth | | 12S | 10W | 11 | | Spot | | 1958-61 | |
| 25 | Drift Creek above Tidewater | | 13S | 11W | 13 | | Spot | | 1958-59 | |
| 26 | Fall Creek at Highway 34 Bridge | | 14S | 9W | 1 | | Spot | | 1958-59 | |
| 27 | Five Rivers at Mouth | | 14S | 9W | 18 | | Spot | | 1958-59 | |
| 28 | Flynn Creek at Mouth | | 12S | 10W | 12 | | Spot | | 1958-61 | |
| 29 | Needle Branch at Mouth | | 12S | 9W | 32 | | Spot | | 1958-61 | |
| 30 | North Fork Alsea River at Hatchery | | 13S | 7W | 20 | | Daily | | 1943-56 | |
| 31 | North Fork Alsea River at Hatchery Dam | | 13S | 7W | 20 | | Spot | | 1958-59 | |
| 32 | North Fork Alsea River at Highway 31 Bridge | | 13S | 7W | 29 | | Spot | | 1958-59 | |
| 33 | North Fork Alsea River 200 yards below Bridge at Alsea | | 14S | 8W | 1 | | Spot | | 1958-59 | |
| 34 | Siletz River at Siletz | 3055 | 10S | 10W | 11 | | Daily Spot | | 1911-12 1951 | |
| 35 | Siletz River 3 miles North of Siletz | | 9S | 10W | 28 | x | Spot | | 1960-63 | |
| 36 | Siuslaw River at Mapleton | | 18S | 10W | 2 | x | Spot | | 1960-63 | |
| 37 | South Fork Alsea River at Lobster Valley Road Bridge | | 14S | 8W | 12 | | Spot | | 1958-59 | |
| 38 | Yaquina Bay and Yaquina River to Toledo | | 11S | 10/11W | | | | | 1953-56 | |
| | WATER TEMPERATURE | | | | | | | | | |
| 39 | Alsea River near Tidewater | 3065 | 14S | 9W | 6 | x | Spot | 334 | 1947- | |
| 40 | Deer Creek near Salado | 3068 | 12S | 10W | 11 | x | Recorder | 1.20 | 1958-63 | 5 |
| 41 | Drift Creek near Salado | 3066 | 12S | 10W | 24 | | Recorder | 20.6 | 1959-63 | 4 |
| 42 | Fall Creek near Alsea | 3063 | 13S | 9W | 35 | | Recorder | 29.4 | 1958-59 | 1 |
| 43 | Five Rivers near Fisher | 3064 | 14S | 9W | 19 | | Recorder | 114 | 1959 | |
| 44 | Flynn Creek near Salado | 3068 | 12S | 10W | 12 | x | Recorder | 0.84 | 1958-63 | 5 |
| 45 | Lake Creek at Triangle Lake | 3075 | 16S | 7W | 20 | | Spot | 50 | 1947- | |

TABLE A - Continued

| MAP INDEX NO. | NAME | USGS STATION NO. | LOCATION Twp. | Rng. | Sec. | ACTIVE | TYPE | DRAINAGE AREA Sq. Mi. | WATER YEARS OF RECORD | COMPLETE WATER YEARS |
|---|---|---|---|---|---|---|---|---|---|---|
| | WATER TEMPERATURE - Continued | | | | | | | | | |
| 46 | Mill Creek near Toledo | 3065.36 | 11S | 10W | 33 | | Spot | 4.15 | 1960- | |
| 47 | Needle Branch near Salado | 3067 | 12S | 10W | 24 | x | Recorder | .32 | 1959-63 | |
| 48 | North Fork Alsea River at Trout Hatchery near Alsea | | 13S | 7W | 20 | x | Daily | | 1944-63 | 17 |
| 49 | North Fork Alsea River near Alsea | 3061 | 14S | 8W | 1 | x | Recorder | 63.0 | 1958-63 | 5 |
| 50 | Siletz River at Siletz | 3055 | 10S | 10W | 11 | | Spot | 202 | 1947 | |
| 51 | South Fork Alsea River near Alsea | 3062 | 14S | 8W | 12 | | Recorder | 49.5 | 1958-63 | 5 |

| MAP INDEX NO. | NAME | LOCATION Twp. | Rng. | Sec. | ACTIVE | TYPE | ELEV. | YEARS OF RECORD |
|---|---|---|---|---|---|---|---|---|
| | CLIMATOLOGICAL | | | | | | | |
| 52 | Alsea Fish Hatchery | 13S | 9W | 26 | x | P | 230 | 1940-41, 1954-63 |
| 53 | Deadwood<br>Formerly: Greenleaf<br>Alpha | 16S | 9W | 35 | | PT | 500 | 1899-1922 |
| 54 | Canary | 19S | 11W | 20 | x | PT | 100 | 1932-63 |
| 55 | Florence 3 NNW | 18S | 12W | 15 | x | PT | 49 | 1909-22, 1940-63 |
| 56 | Mapleton | 18S | 10W | 2 | | PT | 18 | 1924-29 |
| 57 | Nelscott | 7S | 11W | 27 | | PT | 38 | 1931-38 |
| 58 | Newport | 11S | 11W | 8 | x | PT | 136 | 1887-1963 |
| 59 | Otis 2 NE | 6S | 10W | 21 | x | PT | 150 | 1948-63 |
| 60 | Siletz | 10S | 10W | 9 | | P | 95 | 1939-40 |
| 61 | Summit | 11S | 7W | 7 | x | P | 746 | 1909-17, 1923-63 |
| 62 | Tidewater | 13S | 10W | 28 | x | PT | 58 | 1940-63 |
| 63 | Toledo | 11S | 10W | 8 | | PT | 120 | 1889-1920, 1922-29 |
| 64 | Triangle Lake | 16S | 8W | 35 | | PT | 200 | 1938-39 |
| 65 | Valsetz | 8S | 8W | 34 | x | PT | 1135 | 1925-31, 1936-63 |
| 66 | Yaquina Head L. S. | 10S | 11W | 30 | | P | 87 | 1941-61 |

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

## TABLE B

## WATERSHED RECONNAISSANCE DATA SUMMARY

| ITEM | UNIT | 1 SALMON RIVER AREA | 2 TAFT AREA | 3 SILETZ RIVER | 4 DEPOE BAY COAST | 5 YAQUINA RIVER | 6 BEAVER CREEK AREA | 7 ALSEA RIVER | | | | 8 YACHATS RIVER AREA | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | UPPER ALSEA | FIVE RIVERS | LOWER ALSEA | TOTAL | WACONDA BEACH | YACHATS RIVER | TOTAL |
| Farms | Number | 50 | 30 | 170 | 5 | 180 | 20 | 110 | 40 | 40 | 190 | 3 | 20 | 23 |
| Watershed area* | Acres | 49,900 | 48,500 | 197,000 | 33,400 | 161,900 | 32,300 | 136,500 | 76,700 | 89,800 | 303,000 | 10,900 | 27,900 | 38,800 |
| GENERAL LAND USE: | | | | | | | | | | | | | | |
| Forest land* | Acres | 46,960 | 43,900 | 184,720 | 30,500 | 141,890 | 30,660 | 129,700 | 73,190 | 82,980 | 285,870 | 10,700 | 26,050 | 36,750 |
| Grazed | do. | 1,900 | 2,300 | 3,500 | 50 | 6,700 | 1,000 | 5,800 | 1,000 | 5,200 | 12,000 | 50 | 700 | 750 |
| Nongrazed | do. | 45,060 | 41,600 | 181,290 | 30,450 | 135,190 | 29,660 | 123,900 | 72,190 | 77,780 | 273,870 | 10,650 | 25,350 | 36,000 |
| Cropland | Acres | 1,000 | 700 | 5,400 | 50 | 6,000 | 700 | 5,000 | 1,630 | 1,000 | 7,630 | 20 | 600 | 620 |
| Nonirrigated | do. | 900 | 600 | 4,720 | 50 | 5,100 | 600 | 3,930 | 1,190 | 700 | 5,820 | 20 | 530 | 550 |
| Irrigated | do. | 100 | 100 | 680 | - | 900 | 100 | 1,070 | 440 | 300 | 1,810 | 0 | 70 | 70 |
| Rangeland | Acres | 1,100 | 600 | 2,580 | 10 | 2,600 | 510 | 910 | 1,000 | 1,600 | 3,510 | 10 | 290 | 300 |
| Other | Acres | 840 | 3,300 | 4,300 | 2,840 | 11,410 | 430 | 890 | 880 | 4,220 | 5,990 | 170 | 960 | 1,130 |
| IRRIGATION: | | | | | | | | | | | | | | |
| Water source: | | | | | | | | | | | | | | |
| Streamflow | Acres | 95 | 95 | 650 | 0 | 860 | 100 | 1,050 | 440 | 280 | 1,770 | 0 | 70 | 70 |
| Reservoir | do. | 5 | 5 | 30 | 0 | 40 | 0 | 20 | 0 | 20 | 40 | 0 | 0 | 0 |
| Ground water | do. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Method of application: | | | | | | | | | | | | | | |
| Sprinkler | Acres | 100 | 100 | 630 | - | 900 | 100 | 1,070 | 440 | 300 | 1,810 | 0 | 25 | 25 |
| Gravity | do. | 0 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 45 | 45 |
| Water rights | Acres | 293 | 99 | 876 | 96 | 806 | 102 | 1,809 | 226 | 285 | 2,320 | 25 | 44 | 69 |
| Water shortage | Acres | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| POTENTIAL: | | | | | | | | | | | | | | |
| Cropland | Acres | 1,000 | 500 | 3,000 | 50 | 1,500 | 700 | 1,500 | 800 | 500 | 2,800 | 20 | 300 | 320 |
| Irrigable land | Acres | 1,000 | 800 | 5,000 | 70 | 4,500 | 1,200 | 4,000 | 700 | 1,000 | 5,700 | 20 | 700 | 720 |
| Available water* | Ac. ft. | 450,000 | 380,000 | 1,400,000 | 110,000 | 780,000 | 160,000 | 690,000 | 420,000 | 390,000 | 1,500,000 | 60,000 | 180,000 | 240,000 |
| Water source: | | | | | | | | | | | | | | |
| Streamflow | Acres | 200 | 700 | 500 | 60 | 500 | 300 | 1,000 | 200 | 400 | 1,600 | 20 | 200 | 220 |
| Storage reservoir | do. | 800 | 100 | 4,500 | 10 | 4,000 | 900 | 3,000 | 500 | 600 | 4,100 | 0 | 500 | 500 |
| Ground water | do. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DRAINAGE: | | | | | | | | | | | | | | |
| Arable land needing drainage | Acres | 800 | 450 | 2,000 | 0 | 1,500 | 900 | 2,000 | 120 | 500 | 2,620 | 0 | 100 | 100 |
| FLOODING: | | | | | | | | | | | | | | |
| Area | Acres | 1,000 | 550 | 1,500 | 0 | 1,500 | 1,000 | 900 | 400 | 800 | 2,100 | 10 | 100 | 110 |
| STORAGE: | | | | | | | | | | | | | | |
| Ponds (existing) | Number | 4 | 0 | 2 | 0 | 13 | 0 | 12 | 4 | 3 | 19 | 0 | 0 | 0 |
| Reservoirs (existing)* | Number | 4 | 4 | 3 | 3 | 4 | 1 | 2 | 1 | 0 | 3 | 1 | 0 | 1 |
| Reservoir sites studied | Number | 3 | 2 | 7 | 2 | 2 | 2 | 3 | 3 | 1 | 7 | 0 | 2 | 2 |

Source: U. S. Dept. of Agriculture; * State Water Resources Board

TABLE B - Continued

| ITEM | UNIT | 9. NORTH LANE COAST: N. LANE COAST | NORTH FLORENCE | TOTAL | 10. SIUSLAW RIVER: WILDCAT CREEK | UPPER SIUSLAW | LAKE CREEK | DUNCAN SLOUGH | N. FORK SIUSLAW | LOWER SIUSLAW | TOTAL | 11. SILTCOOS AREA | BASIN TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Farms | Number | 10 | 20 | 30 | 30 | 80 | 90 | 12 | 50 | 50 | 312 | 50 | 1,060 |
| Watershed area* | Acres | 55,500 | 13,600 | 69,100 | 35,100 | 163,900 | 142,800 | 7,200 | 41,500 | 104,400 | 494,900 | 82,400 | 1,511,200 |
| GENERAL LAND USE: | | | | | | | | | | | | | |
| Forest land* | Acres | 54,550 | 10,650 | 65,200 | 33,270 | 154,440 | 131,880 | 6,000 | 37,400 | 90,050 | 453,040 | 53,930 | 1,374,420 |
| Grazed | do. | 700 | 300 | 1,000 | 900 | 2,300 | 2,500 | 300 | 300 | 800 | 7,100 | 700 | 37,000 |
| Nongrazed | do. | 53,850 | 10,350 | 64,200 | 32,370 | 152,140 | 129,380 | 5,700 | 37,100 | 89,250 | 445,940 | 53,230 | 1,336,420 |
| Cropland | Acres | 300 | 400 | 700 | 900 | 5,600 | 5,700 | 700 | 2,900 | 1,900 | 17,700 | 2,350 | 42,850 |
| Nonirrigated | do. | 300 | 390 | 690 | 850 | 5,150 | 4,630 | 600 | 2,450 | 1,830 | 15,510 | 1,890 | 37,430 |
| Irrigated | do. | 0 | 10 | 10 | 50 | 450 | 1,070 | 100 | 450 | 70 | 2,190 | 460 | 6,420 |
| Rangeland | Acres | 300 | 50 | 350 | 300 | 1,800 | 1,000 | 200 | 400 | 240 | 3,940 | 170 | 15,670 |
| Other | Acres | 350 | 2,500 | 2,850 | 630 | 2,060 | 4,220 | 300 | 800 | 12,210 | 20,220 | 25,950 | 79,260 |
| IRRIGATION: | | | | | | | | | | | | | |
| Water source: | | | | | | | | | | | | | |
| Streamflow | Acres | 0 | 10 | 10 | 50 | 450 | 1,070 | 100 | 450 | 70 | 2,190 | 460 | 6,300 |
| Reservoir | do. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 120 |
| Ground water | do. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Method of application: | | | | | | | | | | | | | |
| Sprinkler | Acres | 0 | 5 | 5 | 50 | 415 | 1,070 | 100 | 450 | 70 | 2,155 | 460 | 6,285 |
| Gravity | do. | 0 | 5 | 5 | 0 | 35 | 0 | 0 | 0 | 0 | 35 | 0 | 135 |
| Water rights | Acres | 8 | 10 | 18 | 40 | 782 | 678 | 75 | 373 | 113 | 2,061 | 263 | 7,003 |
| Water shortage | Acres | 0 | 0 | 0 | 0 | 100 | 300 | 0 | 0 | 0 | 400 | 0 | 400 |
| POTENTIAL: | | | | | | | | | | | | | |
| Cropland | Acres | 50 | 70 | 120 | 500 | 2,800 | 1,000 | 50 | 600 | 250 | 5,200 | 450 | 15,640 |
| Irrigable land | Acres | 250 | 150 | 400 | 600 | 1,600 | 3,000 | 400 | 1,500 | 1,200 | 8,300 | 1,900 | 29,590 |
| Available water* | Ac. Ft. | 345,000 | 65,000 | 410,000 | 120,000 | 530,000 | 810,000 | 40,000 | 220,000 | 580,000 | 2,300,000 | 410,000 | 8,140,000 |
| Water source: | | | | | | | | | | | | | |
| Streamflow | Acres | 200 | 150 | 350 | 400 | 700 | 500 | 50 | 750 | 600 | 3,000 | 1,000 | 8,430 |
| Storage reservoir | do. | 50 | 0 | 50 | 200 | 900 | 2,500 | 350 | 750 | 600 | 5,300 | 900 | 21,160 |
| Ground water | do. | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DRAINAGE: | | | | | | | | | | | | | |
| Arable land needing drainage | Acres | 20 | 100 | 120 | 50 | 1,500 | 1,000 | 450 | 1,500 | 1,000 | 5,500 | 800 | 14,790 |
| FLOODING: | | | | | | | | | | | | | |
| Area | Acres | 800 | 100 | 900 | 100 | 1,300 | 2,000 | 500 | 2,000 | 1,500 | 7,400 | 1,200 | 17,260 |
| STORAGE: | | | | | | | | | | | | | |
| Ponds (existing) | Number | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 3 | 1 | 43 |
| Reservoir (existing)* | Number | 0 | 0 | 0 | 2 | 1 | 4 | 0 | 0 | 4 | 11 | 5 | 10 |
| Reservoir sites studied | Number | 1 | 0 | 1 | 1 | 7 | 5 | 0 | 4 | 2 | 19 | 3 | 50 |

*Source: U. S. Dept. of Agriculture;* * State Water Resources Board

TABLE C

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

| MAP INDEX NO. | STREAM | SITE NAME | 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. Mi. | |
| | | | | | | | | 1. SALMON RIVER AREA | | | | | | | | |
| 1 | Salmon River | | 20.9 | 94,900 | I-F-R | 90 | 580 | | 156 | | 5,620 | 6S | 9W | 29 | 15.0 | 1 |
| 2 | Salmon River | | | | P | 160 | | | | | | 6S | 10W | 25 | 10.4 | 2 |
| 3 | Treat Creek | | 2.3 | 10,600 | I-F-R | 96 | 400 | | | | | 6S | 10W | 36 | 0.7 | 1 |
| 4 | Panther Creek | | 1.7 | 6,700 | I-R | 64 | 175 | | 25 | | 640 | 6S | 10W | 34 | 0.7 | 1 |
| | | | | | | | | 2. TAFT AREA | | | | | | | | |
| 5 | Shooner Creek | | 14.6 | 55,400 | I-F-R D-M-In | 60 | 600 | | 93 | | 2,230 | 7S | 10W | 30 | 2.5 | 1 |
| 6 | Drift Creek | | 30.8 | 139,700 | I-F-R D-M-In | 58 | 300 | | 93 | | 2,160 | 8S | 10W | 4 | 9.7 | 1 |
| 7 | Drift Creek | | | | P | | | | | | | 8S | 10W | 4 | 9.2 | 2 |
| " | " " | | 31.3 | 161,350 | P | 170 | | 400 | | 30,000 | | " | " | " | " | 5 |
| | | | | | | | | 3. SILETZ RIVER | | | | | | | | |
| 8 | Siletz River | Gravel Creek | | | P | | | | | | | 8S | 8W | 18 | 66.5 | 2 |
| 9 | Siletz River | Falls #1 | | | P | 240 | | | 1,760 | | 175,870 | 8S | 9W | 24 | 64.8 | 2 |
| " | " " | " " | | | P | | | | | | | " | " | " | " | 3 |
| " | " " | " " | 83.2 | 504,872 | P | 240 | | 920 | | 150,000 | 175,000 | " | " | " | " | 5 |
| 10 | Siletz River | Falls #2 | | | P | | | | | | | 8S | 9W | 23 | 63.9 | 5 |
| 11 | Siletz River | Holmen Creek | | | P | | | | | | | 8S | 9W | 26 | 62.0 | 2 |
| 12 | Siletz River | Sunshine Creek (C) | | | P | 170 | 600 | | | | | 9S | 9W | 3 | 59.8 | 2 |
| 13 | Siletz River | Sunshine Creek (B) | | | P | 155 | 1,200 | | | | | 9S | 9W | 3 | 59.0 | 2 |
| 14 | Siletz River | Sunshine Creek (A) | | | P | 175 | 1,100 | | | | | 9S | 9W | 3 | 57.4 | 2 |
| 15 | Siletz River | Sunshine Creek | | | P | | | | | | | 9S | 9W | 15 | 56.7 | 2 |
| " | " " | " " | | | P | | | | | | | " | " | " | " | 3 |
| " | " " | " " | 118.7 | 722,430 | P | 100 | | | | 25,000 | | " | " | " | " | 5 |
| 16 | Siletz River | Euchre Creek | | | P | | | | | | | 9S | 9W | 16 | 54.5 | 2 |
| " | " " | " " | | | P | | | | | | | " | " | " | " | 3 |
| " | " " | " " | 125.0 | 754,110 | P | | | | | | | " | " | " | " | 5 |
| 17 | Siletz River | Sam Creek | | | P | | | | | | | 10S | 9W | 6 | 45.3 | 2 |
| 18 | Siletz River | Siletz Town. | 202.0 | 1,163,300 | P | | | | | | | 10S | 10W | 9 | 41.1 | 5 |
| 19 | South Fork Siletz River | Valsetz | | | P | | | | | | | 8S | 8W | 28 | 4.1 | 2 |
| " | " " " " | " | | | P | 93 | | | 1,870 | 70,000 | | " | " | " | " | 2 |
| " | " " " " | " | | | P | 103 | | | 2,120 | 90,000 | | " | " | " | " | 2 |
| " | " " " " | " | | | P | | | | | | | " | " | " | " | 3 |
| " | " " " " | " | 18.2 | 110,522 | P | | | 1,099 | | | | " | " | " | " | 5 |
| 20 | Sunshine Creek | | 5.7 | 28,800 | I-R | 43 | 250 | | 174 | 2,990 | | 9S | 9W | 12 | 3.0 | 1 |
| 21 | Big Rock Creek | | 6.6 | 33,400 | I-R | 50 | 300 | | 199 | 3,980 | | 9S | 8W | 17/20 | 5.0 | 1 |
| 22 | Steere Creek | | 7.3 | 31,700 | I-F-R | 84 | 400 | | 218 | 7,330 | | 10S | 8W | 8 | 0.5 | 1 |
| 23 | Sam Creek | | 14.4 | 43,000 | I-F-R D-M-In | 81 | 550 | | 311 | 10,100 | | 10S | 9W | 6 | 1.0 | 1 |
| 24 | Euchre Creek | | 11.5 | 48,900 | I-F-R | 62 | 700 | | 93 | | 2,310 | 9S | 10W | 14 | 2.5 | 1 |
| 25 | Cedar Creek | | 13.2 | 50,700 | I-F-R | 60 | 900 | | 174 | | 4,180 | 9S | 10W | 8 | 0.2 | 1 |
| 26 | Jaybord Creek | | 4.8 | 12,600 | I-F-R | 50 | 450 | | 125 | | 2,500 | 9S | 10W | 18 | 0.5 | 1 |
| | | | | | | | | 4. DEPOE BAY COAST | | | | | | | | |
| 27 | South Depot Bay Creek | | 2.6 | 5,700 | R D-M-In | 30 | 175 | | 75 | | 900 | 9S | 11W | 8 | 0.2 | 1 |
| 28 | Rocky Creek | | 2.5 | 5,400 | R-D-M-In | 50 | 300 | | 50 | | 1,000 | 9S | 11W | 21 | 2.4 | 1 |
| | | | | | | | | 5. YAQUINA RIVER | | | | | | | | |
| 29 | Yaquina River | Elk City | | | P | 250 | | | | | | 11S | 10W | 14/15 | 21.8 | 2 |
| 30 | Elk Creek | | | | P | 100 | 700 | | | | | 12S | 9W | 1 | 19.8 | 2 |
| 31 | Depot Creek | | 3.5 | 7,700 | I-F-R D-M-In | 55 | 650 | | 212 | | 4,660 | 10S | 10W | 30 | 5.0 | 1 |
| 32 | Beaver Creek | | 3.9 | 8,200 | " | 13 | 200 | | 75 | | 390 | 11S | 11W | 11 | 2.5 | 1 |

| MAP INDEX NO. | STREAM | SITE NAME | DR. AREA Sq. Mi. | AVERAGE ANNUAL YIELD Ac.-Ft. | PURPOSE | DAM HEIGHT Feet | DAM CREST LENGTH Feet | RESERVOIR MAX. POOL ELEV. Ft.-MSL | RESERVOIR MAX. POOL AREA Acres | RESERVOIR USABLE STORAGE Ac.-Ft. | RESERVOIR TOTAL STORAGE Ac.-Ft. | LOCATION Twp. | LOCATION Rng. | LOCATION Sec. | LOCATION Str. Mi. | SOURCE NO. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 6. BEAVER CREEK AREA | | | | | | | | | | | | | | | |
| 33 | North Fork Beaver Creek | | 9.2 | 31,500 | I-F-R | 100 | 700 | | 180 | | 7,200 | 12S | 11W | 14 | 5.3 | 1 |
| 34 | South Beaver Creek | | 3.8 | 12,200 | I-F-R | 40 | 450 | | 112 | | 1,800 | 12S | 11W | 33 | 2.8 | 1 |
| | 7. ALSEA RIVER | | | | | | | | | | | | | | | |
| 35 | Alsea River | Scott Mountain | | | P | | | | | | | 14S | 9W | 18 | 24.8 | 2 |
| " | " " | " " | | | P | 320 | | | 17,200 | | 2,000,000 | " | " | " | " | 2 |
| " | " " | " " | | | P | 270 | | | 17,200 | | 1,270,000 | " | " | " | " | 2 |
| " | " " | " " | | | P | | | | | | | " | " | " | " | 3 |
| " | " " | " " | 334.0 | 1,015,330 | P | 100 | | 200 | 2,920 | 80,000 | | " | " | " | " | 5 |
| 36 | Alsea River | Tidewater | | | P | | | | | | | 13S | 10W | 32 | 10.2 | 2 |
| " | " " | " | | | P | | | | | | | " | " | " | " | 2 |
| " | " " | " | | | P | | | | | | | " | " | " | " | 3 |
| 37 | North Fork Alsea River | | 6.0 | 23,900 | I-F-R | 42 | 200 | | 68 | | 1,140 | 13S | 8W | 2 | 13.6 | 1 |
| " | " " " " | | " | " | I-F-R | 125 | 400 | 1,000 | 200 | | 14,000 | " | " | " | " | 4 |
| " | " " " " | | " | " | I-F-R | 150 | 500 | 925 | 420 | | 25,000 | " | " | " | " | 4 |
| 38 | North Fork Alsea River | County Line | | | P | | | | | | | 13S | 8W | 13 | 11.4 | 2 |
| 39 | Crooked Creek | | 14.1 | 56,400 | I-F-R | 112 | 750 | | 106 | | 4,750 | 13S | 7W | 21 | 2.0 | 1 |
| 40 | South Fork Alsea River | South Fork | 17.0 | 40,000 | I-F-R | 100 | 900 | 900 | 870 | | 35,000 | 14S | 7W | 25 | 9.6 | 4 |
| 41 | South Fork Alsea River | Peak Creek | | | P | | | | | | | 14S | 7W | 23 | 5.0 | 2 |
| 42 | Peak Creek | | 10.4 | 33,900 | I-F-R | 94 | 400 | | 150 | | 5,640 | 14S | 7W | 24 | 1.0 | 1 |
| 43 | Green River | | 8.1 | 32,400 | I-F-R | 32 | 300 | | 87 | | 1,100 | 15S | 9W | 17 | 1.2 | 1 |
| 44 | Cascade Creek | | 4.9 | 19,700 | I-F-R | 50 | 250 | | 62 | | 1,240 | 14S | 10W | 26 | 1.0 | 1 |
| 45 | Preacher Creek | | 5.4 | 20,600 | I-F-R | 50 | 500 | | 75 | | 1,500 | 15S | 9W | 12 | 0.7 | 1 |
| 46 | Drift Creek | | 20.5 | 81,900 | I-F-R | 48 | 350 | | 162 | | 3,110 | 12S | 10W | 24 | 21.8 | 1 |
| 47 | Drift Creek | Slick Rock Creek | | | P | 225 | | | | | | 13S | 10W | 4 | 16.0 | 2 |
| 48 | Drift Creek | Trout Creek | | | P | | | | | | | 13S | 11W | 12 | 7.3 | 2 |
| " | " " | " " | 55.5 | 272,040 | P | 150 | | 200 | | 30,000 | | " | " | " | " | 5 |
| 49 | Eckman Creek | | 10.0 | | P | | | | | | | 13S | 11W | 28 | .1 | 5 |
| | 8. YACHATS RIVER AREA | | | | | | | | | | | | | | | |
| 50 | Yachats River | | 14.1 | 56,500 | I-F-R | 57 | 700 | | 112 | 2,550 | | 15S | 11W | 2 | 10.8 | 1 |
| 51 | North Fork Yahats River | | 10.1 | 40,300 | I-F-R | 50 | 300 | | 125 | 2,500 | | 14S | 11W | 35 | 0.7 | 1 |
| | 9. NORTH LANE COAST | | | | | | | | | | | | | | | |
| 52 | Big Creek | | 8.9 | 35,800 | R-D-M-In | 93 | 350 | | 50 | 1,860 | | 16S | 11W | 20 | 4.5 | 1 |
| | 10. SIUSLAW RIVER | | | | | | | | | | | | | | | |
| 53 | Siuslaw River | Alma | | | P | | | | | | | 19S | 7W | 35 | 80.2 | 2 |
| 54 | Siuslaw River | | | | P | 145 | 650 | | 5,520 | | | 19S | 7W | 28 | 72.2 | 2 |
| 55 | Siuslaw River | Austa | | | P | | | | | | | 18S | 8W | 21 | 46.0 | 2 |
| " | " " | " | | | P | 145 | 800 | | 5,520 | | | " | " | " | " | 2 |
| " | " " | " | | | P | | | | | | | " | " | " | " | 3 |
| " | " " | " | 255.0 | 509,180 | P | 200 | | 500 | 6,800 | 210,000 | | " | " | " | " | 5 |
| 56 | Siuslaw River | | | | P | 15 | 300 | | | | | 18S | 8W | 16 | 44.6 | 2 |
| " | " " | | | | P | | | | | | | " | " | " | " | 3 |
| 57 | Siuslaw River | Upper Siuslaw | | | P | | | | | | | 17S | 9W | 28 | 30.0 | 2 |
| 58 | Siuslaw River | Mapleton | | | P | | | | | | | 18S | 10W | 2 | 21.6 | 2 |
| 59 | Hawley Creek | | 6.4 | 5,000 | I-F-R | 50 | 450 | | 68 | | 1,360 | 20S | 4W | 5 | 2.5 | 1 |
| 60 | Farman Creek | | 1.2 | 1,000 | I-F-R | 44 | 300 | | 62 | | 1,090 | 19S | 5W | 35 | 2.5 | 1 |
| 61 | South Fork Siuslaw River | | 8.3 | 7,000 | I-F-R | 38 | 800 | | 131 | | 7,000 | 20S | 4W | 32 | 5.2 | 1 |
| 62 | Kelly Creek | | 4.0 | 3,000 | I-F-R | 50 | 450 | | 93 | | 1,860 | 20S | 4W | 29 | 1.5 | 1 |
| 63 | Letz Creek | | 7.1 | 6,000 | I-F-R | 48 | 200 | | 75 | | 1,440 | 20S | 5W | 29 | 1.0 | 1 |
| 64 | Wolf Creek | | 6.3 | 6,700 | I-F-R | 71 | 650 | | 224 | | 6,360 | 19S | 6W | 13 | 23.1 | 1 |
| 65 | Eames Creek | | 5.0 | 6,600 | I-R | 50 | 400 | | 50 | | 1,000 | 19S | 6W | 7 | 1.2 | 1 |
| 66 | Chickahominy | | 8.3 | 19,800 | I-F-R | 41 | 250 | | 93 | | 1,530 | 17S | 7W | 20 | 3.5 | 1 |
| 67 | Lake Creek | Triangle Lake | | | P | | | | | | 80,000 | 16S | 7W | 20 | 18.4 | 2 |

TABLE D - Continued

| STREAM | JAN. | FEB. | MAR. | APR. | MAY | JUNE | | JULY | | AUGUST | | SEPT. | | OCT. | | NOV. | DEC. | LOCATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7. ALSEA RIVER - continued | | | | | | | | | | | | | | | | | | |
| Buck Cr. | - | - | - | - | - | 12 | 8 | | 5 | 4 | 3 | | 3 | | - | - | - | Mouth |
| Cascade Cr. | - | - | - | - | - | 5 | 4 | 3 | 2 | | 1 | | 1 | | - | - | - | " |
| Green R. | - | - | - | - | - | 6 | 5 | | 4 | 3 | 2 | | 2 | | - | - | - | " |
| Lobster Cr. | - | - | - | - | - | 25 | 20 | 15 | 12 | | 9 | 9 | - | | - | - | - | " |
| L. Lobster Cr. | - | - | - | - | - | | 3 | | 2 | | 1 | | 1 | | - | - | - | " |
| Preacher Cr. | - | - | - | - | - | 4 | 3 | | 2 | | 1 | | 1 | | - | - | - | " |
| Grass Cr. | - | - | - | - | - | | 3 | | 2 | | 1 | | 1 | | - | - | - | " |
| Mill Cr. | - | - | - | - | - | 6 | 5 | | 3 | | 2 | | 2 | | - | - | - | " |
| N. Fk. Alsea R. | - | - | - | - | - | 50 | 40 | 30 | 25 | 20 | 18 | 18 | - | | - | - | - | USGS gage 14-3061 |
| Crooked Cr. | - | - | - | - | - | 10 | 8 | | 6 | | 5 | | 5 | | - | - | - | Mouth |
| Honey Grove Cr. | - | - | - | - | - | | 2 | | 1 | | 0.5 | | 0.5 | | - | - | - | " |
| Scott Cr. | - | - | - | - | - | 10 | 8 | | 7 | | 5 | | 5 | | - | - | - | " |
| S. Fk. Alsea R. | - | - | - | - | - | 25 | 20 | 15 | 12 | | 10 | 10 | - | | - | - | - | USGS gage 14-3062 |
| Bummer Cr. | - | - | - | - | - | 5 | 4 | | 2 | | 1 | | 1 | | - | - | - | Mouth |
| 8. YACHATS RIVER AREA | | | | | | | | | | | | | | | | | | |
| Big Cr. (Lincoln Co.) | - | - | - | - | - | | 3 | | 2 | | 1 | | 1 | | 1 | - | - | Mouth |
| Yachats R. | 100 | 100 | 100 | 100 | 100 | 50 | 40 | 30 | 20 | | 18 | | 18 | 18 | 100 | 100 | 100 | Head of tidewater |
| N. Fk. Yachats R. | 60 | 60 | 60 | 60 | 60 | | 10 | 8 | 6 | 5 | 3 | | 3 | 3 | 60 | 60 | 60 | Mouth |
| Williamson Cr. | 13 | 13 | 13 | 13 | 13 | 2 | 1.5 | 1 | 0.7 | | 0.7 | | 0.7 | 0.7 | 1 | 13 | 13 | " |
| S. Fk. Yachats | 80 | 80 | 80 | 80 | 80 | 20 | 15 | | 10 | 8 | 6 | | 6 | 6 | 80 | 80 | 80 | " |
| School Fk. | 12 | 12 | 12 | 12 | 12 | | 3 | 2 | 1.5 | | 1 | | 1 | 1 | 12 | 12 | 12 | " |
| 9. NORTH LANE COAST | | | | | | | | | | | | | | | | | | |
| Cummins Cr. | - | - | - | - | - | | 8 | | 6 | 4 | 3 | | 3 | | 3 | - | - | Mouth |
| Bob Cr. | - | - | - | - | - | | 4 | | 3 | | 2 | | 2 | | 2 | - | - | " |
| Tenmile Cr. | - | - | - | - | - | | 20 | | 15 | 12 | 10 | | 10 | | 10 | - | - | " |
| Rock Cr. | - | - | - | - | - | | 66 | | 5 | 4 | 3 | | 3 | | 3 | - | - | " |
| Big Cr. (Lane Co.) | - | - | - | - | - | | 15 | 12 | 8 | 6 | 5 | | 5 | | 5 | - | - | " |
| Cape Cr. | - | - | - | - | - | | 12 | 10 | 8 | | 6 | | 6 | | 6 | - | - | " |
| Sutton Cr. | - | - | - | - | - | | 3 | | 2 | | 1 | | 1 | | - | - | - | " |
| Sutton Cr. | - | - | - | - | - | 12 | 8 | 6 | 5 | | 4 | | 4 | | - | - | - | Highway 101 |
| 10. SIUSLAW RIVER | | | | | | | | | | | | | | | | | | |
| Siuslaw R. | 200 | 200 | 200 | 200 | 200 | 150 | 100 | 80 | 70 | 60 | 50 | | 50 | 50 | 200 | 200 | 200 | Confl. with Lake Cr. |
| Siuslaw R. | 100 | 100 | 100 | 100 | 100 | 60 | 40 | 35 | 25 | 20 | 18 | | 18 | 18 | 100 | 100 | 100 | Confl. with Wolf Cr. |
| Doe Cr. | - | - | - | - | - | 2 | 1.5 | 0.8 | 0.4 | | 0.4 | | 0.4 | | - | - | - | Mouth |
| Dogwood Cr. | - | - | - | - | - | 1 | 0.7 | 0.5 | 0.3 | | 0.3 | | 0.3 | | - | - | - | " |
| Douglas Cr. | - | - | - | - | - | 3 | 2 | 1 | 0.6 | | 0.4 | | 0.4 | | - | - | - | " |
| Esmond Cr. | - | - | - | - | - | 5 | 4 | 3 | 2 | | 1 | | 1 | | - | - | - | " |
| Fawn Cr. | - | - | - | - | - | 1 | 0.8 | 0.5 | 0.4 | | 0.3 | | 0.3 | | - | - | - | " |
| Hadsall Cr. | - | - | - | - | - | 2 | 1.5 | 1 | 0.7 | | 0.5 | | 0.5 | | - | - | - | " |
| Knowles Cr. | - | - | - | - | - | 2 | 1.5 | 1 | 0.7 | | 0.5 | | 0.5 | | - | - | - | " |
| Lake Cr. | - | - | - | - | - | | - | 80 | 70 | 60 | 50 | | 50 | | - | - | - | " |
| Lake Cr. | - | - | - | - | - | | 30 | 20 | 15 | 10 | 8 | | 8 | | - | - | - | Triangle Lk. outlet |
| Lake Cr. | - | - | - | - | - | | 12 | 8 | 6 | | 5 | | 5 | | - | - | - | River mile 29 |
| Congdon Cr. | - | - | - | - | - | | 6 | | 4 | 3 | 2.5 | | 2.5 | | - | - | - | Mouth |
| Deadwood Cr. | - | - | - | - | - | 40 | 30 | 20 | 15 | | 12 | | 12 | | - | - | - | " |
| Bear Cr. | - | - | - | - | - | | - | | - | | 0.2 | | 0.2 | | - | - | - | " |
| W. Fk. Deadwood | - | - | - | - | - | | 4 | 3 | 2 | | 1.5 | | 1.5 | | - | - | - | Confl. with Misery Cr. |
| Misery Cr. | - | - | - | - | - | | 2 | | 1.5 | | 1 | | 1 | | - | - | - | Confl. with West Fk. |
| Fish Cr. | - | - | - | - | - | 3 | 2.5 | 2.5 | 2 | | 1.5 | | 1.5 | | - | - | - | Mouth |
| Green Cr. | - | - | - | - | - | 3 | 2 | 1.5 | 1 | | 0.8 | | 0.8 | | - | - | - | " |
| Greenleaf Cr. | - | - | - | - | - | | 8 | 5 | 4 | | 3 | | 3 | | - | - | - | " |
| Indian Cr. | - | - | - | - | - | 50 | 40 | 35 | 25 | | 18 | | 18 | | - | - | - | " |

TABLE D - Continued

| STREAM | JAN. | FEB. | MAR. | APR. | MAY | JUNE | | JULY | | AUGUST | | SEPT. | OCT. | NOV. | DEC. | LOCATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10. SIUSLAW RIVER - Continued | | | | | | | | | | | | | | | | |
| Indian Cr. | - | - | - | - | - | 18 | 15 | 12 | 9 | | 7 | 7 | - | - | - | Confl. with West Fk. |
| W. Fk. Indian Cr. | - | - | - | - | - | | 6 | | 4 | | 3 | 3 | - | - | - | Confl. with Rogers Cr. |
| Rogers Cr. | - | - | - | - | - | 4 | 3 | | 2.5 | | 2.5 | 2.5 | - | - | - | Confl. with West Fk. |
| L. Lake Cr. | - | - | - | - | - | | - | | - | | 0.3 | 0.3 | - | - | - | Mouth |
| Nelson Cr. | - | - | - | - | - | 4 | 3 | 2 | 1 | | 0.5 | 0.5 | - | - | - | " |
| Swamp Cr. | - | - | - | - | - | | 1 | 0.7 | 0.5 | | 0.4 | 0.4 | - | - | - | " |
| Swartz Cr. | - | - | - | - | - | 1.5 | 1 | 0.7 | 0.5 | | 0.3 | 0.3 | - | - | - | " |
| Letz Cr. | - | - | - | - | - | | 2 | | 1.5 | | 1 | 1 | - | - | - | " |
| N. Fk. Siuslaw R. | - | - | - | - | - | | - | 25 | 20 | | 15 | 12 | - | - | - | Just below McLeod Cr. |
| Condon Cr. | - | - | - | - | - | 10 | 8 | 6 | 5 | | 4 | 4 | - | - | - | Mouth |
| Uncle Cr. | - | - | - | - | - | | - | | - | | 1 | 1 | - | - | - | " |
| Drew Cr. | - | - | - | - | - | | 3 | | 2 | | 1.5 | 1.5 | - | - | - | " |
| Elma Cr. | - | - | - | - | - | 3 | 2 | 1.5 | 1 | | 0.8 | 0.8 | - | - | - | " |
| McLeod Cr. | - | - | - | - | - | 7 | 5 | 4 | 3 | | 2 | 2 | - | - | - | " |
| Porter Cr. | - | - | - | - | - | | 3 | 2 | 1.5 | | 1.5 | 1.5 | - | - | - | " |
| Sam Cr. | - | - | - | - | - | | 3 | 2 | 1.5 | | 1.5 | 1.5 | - | - | - | " |
| Wilhelm Cr. | - | - | - | - | - | | 4 | 3 | 2 | | 2 | 2 | - | - | - | " |
| Shaw Cr. | - | - | - | - | - | 2 | 1.5 | 1 | 0.7 | | 0.4 | 0.4 | - | - | - | " |
| Sweet Cr. | - | - | - | - | - | | 7 | | 5 | | 3 | 3 | - | - | - | Head of tidewater |
| Turner Cr. | - | - | - | - | - | 1 | 0.7 | | 0.5 | | 0.3 | 0.3 | - | - | - | Mouth |
| Waite Cr. | - | - | - | - | - | | - | | - | | 0.2 | 0.2 | - | - | - | " |
| Whittaker Cr. | - | - | - | - | - | 6 | 5 | | 4 | 3 | 2 | 2 | - | - | - | " |
| Wildcat Cr. | - | - | - | - | - | 25 | 20 | 15 | 10 | | 8 | 8 | - | - | - | " |
| Wildcat Cr. | - | - | - | - | - | | 5 | 4 | 3 | 2 | 1.5 | 1.5 | - | - | - | River mile 10.5 |
| Chickahominy Cr. | - | - | - | - | - | 6 | 4 | 3 | 2 | 1.5 | 1 | 1 | - | - | - | Mouth |
| Petaha Cr. | - | - | - | - | - | 2 | 1.5 | 1 | 0.5 | | 0.3 | 0.3 | - | - | - | " |
| Wolf Cr. | - | - | - | - | - | 25 | 20 | 18 | 14 | 10 | 7 | 7 | - | - | - | " |
| Eames Cr. | - | - | - | - | - | 2 | 1.5 | | 1 | | 0.7 | 0.7 | - | - | - | " |
| Grenshaw Cr. | - | - | - | - | - | 1.5 | 1 | 0.7 | 0.4 | | 0.4 | 0.4 | - | - | - | " |
| Oat Cr. | - | - | - | - | - | 2 | 1.5 | | 1 | | 0.8 | 0.8 | - | - | - | " |
| Panther Cr. | - | - | - | - | - | 2 | 1.5 | | 1 | | 0.5 | 0.5 | - | - | - | " |
| Swamp Cr. | - | - | - | - | - | 2 | 1.5 | | 1 | | 0.5 | 0.5 | - | - | - | " |
| 11. SILTCOOS AREA | | | | | | | | | | | | | | | | |
| Fiddle Cr. | - | - | - | - | - | 3 | 1.5 | 1 | 0.6 | | 0.4 | 0.4 | - | - | - | Confl. with Billy Moore Cr. |
| Maple Cr. | - | - | - | - | - | 3 | 2 | 1.5 | 1 | | 1 | 1 | - | - | - | Confl. with Ryder Cr. |
| Ryder Cr. | - | - | - | - | - | 1.5 | 1 | 0.5 | 0.3 | | 0.2 | 0.2 | - | - | - | Confl. with Maple Cr. |
| Woahink Cr. | - | - | - | - | - | 10 | 8 | 6 | 5 | | 5 | 5 | - | - | - | Entire Cr. |
| Fivemile Cr. | - | - | - | - | - | | 1 | | 0.5 | | 0.5 | 0.5 | - | - | - | Confl. with Bell Cr. |
| Leitel Cr. | - | - | - | - | - | 2 | 1 | | 0.5 | | 0.4 | 0.4 | - | - | - | 4.0 miles above mouth |

1/ High flows in the fall and winter of 1964-65 prevented completion of studies necessary to develop many minimum spawning flow recommendations. The studies will be concluded in the spring of 1965.

Source: Oregon Game Commission

## TABLE E

## RECREATION AREAS SUMMARY

| MAP INDEX NO. | NAME | LOCATION Twp. | Rng. | Sec. | WATER FEATURE | WATER SUPPLY | COMFORT STA. | STOVES FIREPL. | PICNIC TABLES | CAMP-SITES | TRLR. SITES | SWIM. | BOAT. | FISH. | HUNT. | HIKING TRAILS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NATIONAL FOREST CAMPS | | | | | | | | | | | | | | | |
| 1 | Big Creek | 16S | 11W | 22 | Big Creek | x | x | | x | 4 | | | | x | x | |
| 2 | Big Elk | 12S | 8W | 7 | Elk Creek | x | x | x | x | 5 | | | | x | x | |
| 3 | Camp Tsiltcoos | 19S | 12W | 26 | Siltcoos Lake & River | x | x | | x | x | x | | | x | | x |
| 4 | Canal Creek | 14S | 10W | 8 | Canal Creek | | | | | 1 | | | | | | |
| 5 | Cape Perpetua | 15S | 12W | 3 | Ocean Viewpoint | x | x | x | x | 53 | | | | x | | |
| 6 | Carter Lake | 20S | 12W | 8 | Ocean, Carter Lake | x | x | x | 15 | 4 | 19 | | x | x | | x |
| 7 | Devil's Churn Picnic Area | 15S | 12W | 3 | Ocean Viewpoint | | x | x | x | | | | | x | | |
| 8 | Knowles Creek | 18S | 9W | 8 | Knowles Creek | x | x | | x | | x | | | x | x | |
| 9 | Launching Picnic Area | 14S | 9W | 18 | Alsea River | x | x | x | x | | | | | x | x | |
| 10 | Maples | 14S | 10W | 24 | Alsea River, Five Rivers | | x | x | x | 3 | | | | x | x | |
| 11 | Mike Bauer | 14S | 9W | 6 | Alsea River | x | x | x | x | 4 | | | | x | x | |
| 12 | North Creek | 8S | 10W | 4 | North Creek | x | | | | | 14 | | | x | x | x |
| 13 | Ocean Beach Picnic Area | 16S | 12W | 10 | Ocean | x | x | x | 4 | 4 | | | | x | | |
| 14 | Rock Creek | 16S | 12W | 15 | Ocean, Rock Creek | x | x | x | x | 5 | | | | x | | |
| 15 | Schooner Creek | 7S | 10W | 21 | Schooner Creek | x | | | | 7 | | | | x | x | |
| 16 | Siltcoos | 19S | 12W | 33 | Siltcoos Lake, Ocean | | x | x | x | 62 | 19 | | | x | | |
| 17 | Slide | 13S | 10W | 36 | Alsea River | x | x | x | x | 3 | | | | x | x | |
| 18 | Sutton Creek Campground | 17S | 12W | 35 | Sutton Creek | x | x | x | 17 | | | | | | | x |
| 19 | Sutton Lake | 17S | 12W | 35 | Sutton Lake | x | x | x | x | 30 | x | | x | x | | |
| 20 | Tahkenitch Lake | 20S | 12W | 32 | Tahkenitch Lake | x | x | x | x | 41 | x | | x | x | | |
| 21 | Tenmile Creek | 15S | 11W | 33 | Tenmile Creek | | x | x | x | 5 | | | | x | x | |
| 22 | Tillicum Beach | 14S | 12W | 11 | Ocean | x | x | x | x | 7 | 41 | | | x | | |
| 23 | Tree | 19S | 12W | 22 | Woahink Lake | x | x | x | x | 12 | | | x | x | | |
| 24 | Tyee | 19S | 12W | 34 | Siltcoos Lake & River | | x | x | x | 5 | | x | x | x | | |
| 25 | Wax Myrtle Camp | 20S | 12W | 4 | Loon Lake | | | | | | | | | | | |
| | BUREAU OF LAND MANAGEMENT PICNIC AREAS | | | | | | | | | | | | | | | |
| 26 | Clay Creek Recreation Area | 19S | 7W | 20 | Siuslaw River | x | x | | 20 | | | | | | | x |
| 27 | Haight Creek Recreation Area | 19S | 7W | 35 | Haight Creek | x | x | x | 10 | | | | | x | | |
| 28 | Missouri Bend | 14S | 9W | 13 | Alsea River | x | x | x | x | | | x | x | x | | |
| 29 | Turner Creek Campground | 18S | 9W | 15 | Turner Creek | x | x | | x | 8 | 8 | | | | | |
| 30 | Whittaker Creek Recreation Area | 18S | 8W | 21 | Whittaker Creek | x | x | | 10 | 10 | 10 | x | | x | | |
| | STATE PARKS, WAYSIDES, AND OTHER STATE RECREATION AREAS | | | | | | | | | | | | | | | |
| 31 | Alsea Bay North Bridgehead Wayside | 13S | 11W | 18 | Alsea Bay | | | | | | | | | | | |
| 32 | Alsea Mountain R.R.A. | 13S | 7W | 10 | Crooked Creek | x | x | | x | | | | | x | | |
| 33 | Beachside | 14S | 12W | 2 | Ocean | x | x | x | x | 60 | 20 | x | | x | | |
| 34 | Beverly Beach | 10S | 11W | 8 | Ocean, Spencer Creek | x | x | x | x | 166 | 52 | x | | x | | x |
| 35 | Big Creek | 14S | 12W | 2 | Ocean, Big Creek | | | | | | | x | | | | |
| 36 | Boiler Bay Wayside | 8S | 11W | 32 | Ocean Viewpoint | x | x | | x | | | | | x | | |
| 37 | Carl G. Washburne | 16S | 12W | 22 | Ocean, China Cr. | | x | | x | | | x | | | | |
| 38 | Depoe Bay | 9S | 11W | 8 | Ocean Viewpoint | x | x | | | | | | | | | |
| 39 | Devil's Elbow | 16S | 12W | 34 | Ocean | x | x | x | 36 | | | x | | x | | |
| 40 | Devil's Lake Overnight Camp | 7S | 11W | 11 | Ocean, Devil's Lake | x | x | x | x | 68 | 32 | x | | x | | |
| 41 | Devil's Lake Picnic Area | 7S | 11W | 14 | Devil's Lake | x | x | x | x | | | x | x | x | | |
| 42 | Devil's Punch Bowl | 9S | 11W | 32 | Ocean | x | x | x | x | | | | | x | | |
| 43 | Fogarty Creek | 8S | 11W | 32 | Ocean, Fogarty Creek | x | x | x | x | | | x | | x | | |

TABLE E - Continued

| MAP INDEX NO. | NAME | LOCATION Twp. | Rng. | Sec. | WATER FEATURE | WATER SUPPLY | COMFORT STA. | STOVES FIREPL. | PICNIC TABLES | CAMP-SITES | TRLR. SITES | SWIM. | BOAT. | FISH. | HUNT. | HIKING TRAILS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATE PARKS, WAYSIDES, AND OTHER STATE RECREATION AREAS - cont. | | | | | | | | | | | | | | | |
| 44 | H. B. Van Duzer Corridor | 6S | 9W | 29 | Salmon River | x | x | | x | | | | | x | | |
| 45 | Honeyman | 19S | 12W | 14 | Ocean, lakes | x | x | x | 91 | 209 | 56 | x | x | x | | x |
| 46 | Lost Creek | 12S | 11W | 7 | Ocean | | x | x | x | | | | | x | | |
| 47 | Moolack Beach R.R.A. | 10S | 11W | 17 | Ocean | | | | | | | x | | | | |
| 48 | Neptune | 15S | 12W | 10 | Ocean | x | x | x | x | 14 | | x | | x | | |
| 49 | Ona Beach | 12S | 11W | 18 | Ocean, Beaver Creek | x | x | x | x | | | x | x | x | | |
| 50 | Otter Crest Wayside | 9S | 11W | 29 | Ocean View | | | | | | | | | | | |
| 51 | Otter Rock R.R.A. | 10S | 11W | 5 | Ocean View | x | x | | x | | | | | | | |
| 52 | Patterson | 13S | 12W | 25 | Ocean | x | x | x | x | | | x | | x | | x |
| 53 | Ponslor Wayside | 16S | 12W | 22 | Ocean | x | x | x | 4 | | | x | | x | | |
| 54 | Rocky Creek Wayside | 9S | 11W | 19 | Ocean, Rocky Creek | x | x | x | x | | | | | x | | |
| 55 | Salmon River R.R.A. | 6S | 9W | 14 | Salmon River | x | x | | x | | | | | x | | |
| 56 | Seal Rock Wayside | 12S | 12W | 25 | Ocean View | x | x | x | x | | | | | x | | |
| 57 | W. B. Nelson Wayside | 13S | 11W | 20 | Eckman Slough | x | x | | x | | | | x | | | |
| 58 | William P. Keady Wayside | 13S | 11W | 19 | Alsea Bay | | | | | | | | | | | |
| 59 | Yachats | 14S | 12W | 27 | Yachats River | x | x | | x | | | | | x | | |
| 60 | Yachats Ocean Road Wayside | 14S | 12W | 27 | Yachats River | | x | | x | | | | | | | |
| 61 | Yaquina Bay | 11S | 11W | 18 | Ocean | x | x | x | x | | | | | x | | |
| | COUNTY PARKS | | | | | | | | | | | | | | | |
| 62 | Ada Park | 20S | 12W | 1 | Siltcoos Lake | x | x | | 7 | | | | x | x | | |
| 63 | Baker Beach Recreation Area | 17S | 12W | 15 | Ocean | | x | | x | | | | | x | | x |
| 64 | Camp Lane | 18S | 8W | 18 | Siuslaw River | x | x | | x | | | | x | x | | x |
| 65 | Farnham Landing | 17S | 10W | 34 | Siuslaw River | | x | | x | | | | x | x | | |
| 66 | Heceta Beach | 18S | 12W | 4 | Ocean | x | x | | 18 | | | x | | | | |
| 67 | Linslaw Park | 18S | 8W | 17 | Siuslaw River | x | x | | 10 | | | x | | x | | |
| 68 | Siuslaw Falls Park | 20S | 6W | 1 | Siuslaw River | | x | | x | | | x | | x | | |
| 69 | Siuslaw Harbor Vista | 18S | 12W | 9 | Ocean, Siuslaw River | x | x | x | 37 | 21 | 20 | | x | | | |
| 70 | Tide Wayside | 17S | 10W | 25 | Siuslaw River | x | x | | 11 | | | x | x | x | | |
| 71 | Triangle Lake Landing | 16S | 7W | 19 | Triangle Lake | x | | | | | | x | x | x | | x |
| | PRIVATE PARKS | | | | | | | | | | | | | | | |
| 72 | Elbow Lake Campground | 20S | 12W | 32 | Elbow Lake | x | x | | x | x | | | x | x | | |
| 73 | Lost Lake Campground | 20S | 12W | 17 | Lost Lake | x | x | | x | x | | | x | x | | |
| | DEVELOPED SMALL BOAT HARBORS | | | | | | | | | | | | | | | |
| 74 | Depoe Bay | 9S | 11W | 8 | Depoe Bay | | | | | | | | x | x | | |
| 75 | Siuslaw River | 18S | 12W | 35 | Siuslaw River | | | | | | | | x | x | | |
| 76 | Yaquina Bay | 11S | 11W | 8 | Yaquina Bay | | | | | | | | x | x | | |
| | BOAT LAUNCHING SITES | | | | | | | | | | | | | | | |
| (62) | Ada Park | 20S | 12W | 1 | Siltcoos Lake | x | x | | 7 | | | | x | x | | |
| 77 | Alsea, Waldport | 13S | 11W | 16 | Alsea River | | | | | | | | x | x | | |
| 78 | Blueback Landing | 18S | 11W | 30 | Siuslaw River | | | | | | | | x | x | | |
| 79 | Calkins Ramp | 7S | 11W | 15 | Devil's Lake | | | | | | | | x | x | | |
| 80 | Camp Indiola | 17S | 9W | 20 | Siuslaw River, Indian Creek | | | | | | | | x | x | | |
| (6) | Carter Lake | 20S | 12W | 6 | Carter Lake | x | x | x | 15 | 4 | 19 | | x | x | | x |
| 81 | Coyote Rock Landing | 8S | 11W | 13 | Siletz River | x | x | | x | x | x | | x | x | | |
| 82 | Cushman Landing | 18S | 11W | 20 | Siuslaw River | | | | | | | | x | x | | |
| 83 | Depoe Bay | 9S | 11W | 8 | Depoe Bay | | | | | | | | x | x | | |
| (41) | Devil's Lake | 7S | 11W | 14 | Devils Lake | x | x | x | x | | | x | x | x | | |
| 84 | Devil's Lake Regatta Grounds | 7S | 11W | 1 | Devils Lake | | | | | | | | x | x | | |
| (72) | Elbow Lake | 20S | 12W | 32 | Elbow Lake | x | x | | x | x | | | x | x | | |

TABLE E - Continued

| MAP INDEX NO. | NAME | LOCATION Twp. | Rng. | Sec. | WATER FEATURE | WATER SUPPLY | COMFORT STA. | STOVES FIREPL. | PICNIC TABLES | CAMP-SITES | TRLR. SITES | SWIM. | BOAT. | FISH. | HUNT. | HIKING TRAILS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BOAT LAUNCHING SITES - Cont. | | | | | | | | | | | | | | | |
| (65) | Farnham Landing | 17S | 10W | 34 | Siuslaw River | | x | | x | | | | x | x | | |
| 85 | Holiday Harbor | 18S | 12W | 35 | Siuslaw River | | x | x | | | | x | x | x | | |
| (45) | Honeyman | 19S | 12W | 14 | Ocean, lakes | x | x | x | 91 | 209 | 56 | x | x | x | | x |
| 86 | Kernville Launch | 8S | 11W | 11 | Siletz Bay | | | | | | | | x | x | | |
| 87 | Kernville - Private below Bridge | 8S | 11W | 2 | Siletz Bay | | x | | | | | | x | x | | |
| 88 | Kernville - Private below Bridge | 8S | 11W | 2 | Siletz Bay | | x | | | | | | x | x | | |
| (9) | Launching Picnic Area | 14S | 9W | 18 | Alsea River | x | x | x | x | | | | x | x | | |
| 89 | Lincoln County Launch | 7S | 11W | 1 | Devils Lake | | x | | | | | | x | x | | |
| 90 | Mack Landing | 8S | 10W | 20 | Siletz River | | | | | | | | x | x | | |
| 91 | Melco Landing | 8S | 10W | 19 | Siletz River | | | | | | | | x | x | | |
| 92 | Mercer Lake Landing | 17S | 12W | 36 | Mercer Lake | | | | | | | x | x | x | | x |
| (28) | Missouri Bend | 14S | 9W | 13 | Alsea River | x | x | x | x | | | x | x | x | | |
| 93 | Moorages Florence | 18S | 12W | 35 | Siuslaw Bay | | | | | | | | x | x | | |
| 94 | Morgan Landing | 8S | 10W | 31 | Siletz River | | | | | | | | x | x | | |
| 95 | Mowrey Landing | 9S | 11W | 1 | Siletz River | | | | | | | | x | x | | |
| 96 | Munsel Lake | 18S | 12W | 14 | Munsel Lake | | | | | | | x | x | x | | |
| 97 | Newport, Deep Six Marina | 11S | 11W | 8 | Yaquina River | | | | | | | | x | x | | |
| 98 | Newport, Near C. G. Station | 18S | 11W | 8 | Yaquina River | | x | | | | | | x | x | | |
| 99 | Newport, North side of Bay | 18S | 11W | 8 | Yaquina River | | x | | | x | | | x | x | | |
| 100 | Oceanlake City Park | 7S | 11W | 14 | Devil's Lake | | | | x | x | | | x | x | | |
| (49) | Ona Beach | 12S | 11W | 7 | Ocean | x | x | x | x | | | x | x | x | | |
| 101 | Oscar Waite Landing | 7S | 11W | 14 | Devil's Lake | | | | | | | | x | x | | |
| 102 | Point Terrace Landing | 18S | 10W | 17 | Siuslaw River Sweet Creek | | | | | | | | x | x | | |
| 103 | Salmon Creek Landing | 14S | 12W | 26 | Yachats River | | | | | | | | x | x | | |
| 104 | Salmon River | 6S | 10W | 30 | Salmon River | | | | | | | | x | x | | |
| 105 | Sand Point Landing | 7S | 11W | 1 | Devil's Lake | | | | | | | | x | x | | |
| 106 | Schindler Landing | 17S | 9W | 21 | Lake Creek | | | | | | | | x | x | | |
| (24) | Siltcoos River Landing (Tyee) | 19S | 12W | 34 | Siltcoos River & Lake | | x | x | x | 5 | | x | x | x | | |
| 107 | Siuslaw River, rock | 17S | 10W | 23 | Siuslaw River | | | | | | | | x | x | | |
| 108 | Sunset Landing | 8S | 10W | 16 | Siletz River | | | | | | | | x | x | | |
| (19) | Sutton Lake | 17S | 12W | 35 | Sutton Lake | x | x | x | x | 30 | x | | x | x | | |
| 109 | Swisshome Landing | 17S | 9W | 29 | Lake Creek | | | | | | | | x | x | | |
| 110 | Tahkenitch Lake | 20S | 12W | 29 | Tahkenitch Lake | | | | | | | | x | x | | |
| 111 | Tahkenitch Lake - Forest Service | 20S | 12W | 29 | Tahkenitch Lake | | x | | x | x | | | x | x | | |
| 112 | Toledo Ramp | 11S | 10W | 17 | Yaquina River | | | | | | | | x | x | | |
| (71) | Triangle Lake Landing | 16S | 7W | 19 | Triangle Lake | x | | | | | | x | x | x | | x |

(62) Boat launching site in conjunction with previously listed site

# ABBREVIATIONS AND SYMBOLS

| | |
|---|---|
| A.F. | 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 |
| E. | East |
| Elev. | Elevation |
| F. | Fish, fork |
| ° F. | Degrees Fahrenheit |
| Fk. | Fork |
| Ft. | Foot, feet |
| Ft./sec. | Feet per second |
| G. | Gulch |
| Gpd | Gallons per day |
| Gpm | Gallons per minute |
| I.,Irr. | Irrigation |
| In.,Ind. | Industrial, industries |
| Is. | Island |
| Kw | Kilowatts |
| Kwh | Kilowatt hours |
| L. | Lake, Little |
| M. | Mining |
| Max. | Maximum |
| Mdw. | Meadow |
| Mgd | Million gallons per day |
| Mi. | Mile |
| Min. | Minimum, mining |
| Misc. | Miscellaneous |
| MSL | Mean sea level |
| Mtn. | Mountain |
| Mu.,Mun. | Municipal |
| N. | North |
| P. | Power |
| Pt. | Point |
| Rec. | Recreation |
| R.,Riv. | River |
| R.,Rng. | Range |
| R.S. | Ranger Station |
| Res. | Reservoir |
| Rk. | Rock |
| S. | South |
| S.P. | State Park |
| Sec. | Section |
| Spr. | Spring |
| Sq. | Square |
| Sq.Mi. | Square mile |
| Sta. | Station |
| Str. | Stream |
| T.,Twp. | Township |
| Temp. | Temperature |
| Trib. | Tributary |
| W. | Wayside, west |
| $\Sigma$ | 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


STATE WATER RESOURCES BOARD
SALEM, OREGON
1964
MID-COAST
DRAINAGE BASIN
HYDROLOGICAL STATIONS
MAP NO. 18.6
PLATE 2
SCALE OF MILES
DRAINAGE BASIN KEY
LEGEND
COUNTY SEAT
OTHER INCORPORATED CITIES
UNINCORPORATED COMMUNITY
STREAM MILE
STREAM GAGE
PIPELINE
NUMBERED HIGHWAY
OTHER PRINCIPAL ROADS
Planimetric control based on U.S.G.S. quadrangle maps.
HYDROLOGICAL STATIONS
ACTIVE
INACTIVE
Stream Gaging Station
Crest-stage Gaging Station
Water Quality Station
Water Temperature Station
Climatological Station (precipitation only)
Climatological Station (precipitation and air temp.)
NOTE: Index numbers refer to SWRB Hydrological Station Summary.
NORTH COAST BASIN
MIDDLE WILLAMETTE BASIN
UPPER WILLAMETTE BASIN
UMPQUA BASIN
PACIFIC OCEAN
TILLAMOOK CO.
LINCOLN CO.
YAMHILL CO.
POLK CO.
BENTON CO.
LANE CO.
DOUGLAS CO.
OCEANLAKE
DELAKE
TAFT
SILETZ
NEWPORT
TOLEDO
WALDPORT
FLORENCE
DUNES CITY
CASCADE HEAD
CAPE FOULWEATHER
YAQUINA HEAD
CAPE PERPETUA
HECETA HEAD
R 12 W
R 11 W
R 10 W
R 9 W
R 8 W
R 7 W
R 6 W
R 5 W
R 4 W
T 6 S
T 7 S
T 8 S
T 9 S
T 10 S
T 11 S
T 12 S
T 13 S
T 14 S
T 15 S
T 16 S
T 17 S
T 18 S
T 19 S
T 20 S
T 21 S


STATE WATER RESOURCES BOARD
SALEM, OREGON
1964
MID-COAST DRAINAGE BASIN
RECREATION AREAS
MAP NO. 18.6
PLATE 3
SCALE OF MILES
0 1 2 3 4 5 6 7 8 9 10
DRAINAGE BASIN KEY
NORTH COAST 1
SANDY 3
HOOD 4
UMATILLA 7
GRANDE RONDE 8
WILLAMETTE 2
MID COAST 18
DESCHUTES 5
JOHN DAY 6
POWDER 9
MALHEUR 10
UMPQUA 16
17 SOUTH COAST
ROGUE 15
KLAMATH 14
GOOSE & SUMMER LAKES 13
MALHEUR LAKE 12
OWYHEE 11
LEGEND
COUNTY SEAT
OTHER INCORPORATED CITIES
UNINCORPORATED COMMUNITY
STREAM MILE
STREAM GAGE
PIPELINE
NUMBERED HIGHWAY
OTHER PRINCIPAL ROADS
Planimetric control based on U.S.G.S. quadrangle maps.
RECREATION AREAS
National Forest Camp
B L M Picnic Area
State Park, Wayside, etc.
County Park
Private Park
Developed Small Boat Harbor
Boat Landing
NOTE: Index numbers refer to SWRB Recreation Areas Summary.
NORTH COAST BASIN
MIDDLE WILLAMETTE BASIN
UPPER WILLAMETTE BASIN
UMPQUA BASIN
PACIFIC OCEAN
YAMHILL CO.
POLK CO.
TILLAMOOK CO.
LINCOLN CO.
POLK CO.
BENTON CO.
LINCOLN CO.
LANE CO.
BENTON CO.
LANE CO.
LANE CO.
DOUGLAS CO.
LANE CO.
DOUGLAS CO.
R 12 W
R 11 W
R 10 W
R 9 W
R 8 W
R 7 W
R 6 W
R 5 W
R 4 W
T 6 S
T 7 S
T 8 S
T 9 S
T 10 S
T 11 S
T 12 S
T 13 S
T 14 S
T 15 S
T 16 S
T 17 S
T 18 S
T 19 S
T 20 S
T 21 S
CASCADE HEAD
OCEANLAKE
DELAKE
TAFT
CAPE FOULWEATHER
YAQUINA HEAD
NEWPORT
SILETZ
TOLEDO
WALDPORT
CAPE PERPETUA
HECETA HEAD
FLORENCE
DUNES CITY
To Salem
To Falls City
To Corvallis
To Eugene
To Reedsport

STATE WATER RESOURCES BOARD
SALEM, OREGON
1964
MID-COAST DRAINAGE BASIN
DAMSITES AND FLOOD AREAS
MAP NO. 18.6
PLATE 4
SCALE OF MILES
0 1 2 3 4 5 6 7 8 9 10
LEGEND
COUNTY SEAT
OTHER INCORPORATED CITIES
UNDER 1,000
OVER 1,000
UNINCORPORATED COMMUNITY
STREAM MILE
STREAM GAGE
PIPELINE
NUMBERED HIGHWAY
OTHER PRINCIPAL ROADS
Planimetric control based on U.S.G.S. quadrangle maps.
DRAINAGE BASIN KEY
NORTH COAST 1
SANDY 3
HOOD 4
UMATILLA 7
GRANDE RONDE 8
WILLAMETTE 2
DESCHUTES 5
JOHN DAY 6
POWDER 9
MALHEUR 10
MID COAST 18
UMPQUA 16
SOUTH COAST 17
ROGUE 15
KLAMATH 14
GOOSE & SUMMER LAKES 13
MALHEUR LAKE 12
OWYHEE 11
DAMSITES
Storage Dam
Diversion Dam
NOTE: Index numbers refer to SWRB Potential Dam and Reservoir Site Summary.
FLOODING
Land Subject to Flooding
Source: U. S. Dept. of Agriculture
NORTH COAST BASIN
MIDDLE WILLAMETTE BASIN
UPPER WILLAMETTE BASIN
UMPQUA BASIN
PACIFIC OCEAN
TILLAMOOK CO.
LINCOLN CO.
YAMHILL CO.
POLK CO.
BENTON CO.
LANE CO.
DOUGLAS CO.
R 12 W
R 11 W
R 10 W
R 9 W
R 8 W
R 7 W
R 6 W
R 5 W
R 4 W
T 6 S
T 7 S
T 8 S
T 9 S
T 10 S
T 11 S
T 12 S
T 13 S
T 14 S
T 15 S
T 16 S
T 17 S
T 18 S
T 19 S
T 20 S
T 21 S
CASCADE HEAD
OCEANLAKE
DELAKE
TAFT
SILETZ
YAQUINA HEAD
NEWPORT
TOLEDO
WALDPORT
CAPE PERPETUA
FLORENCE
DUNES CITY
CAPE FOULWEATHER


STATE WATER RESOURCES BOARD
SALEM, OREGON
1964
MID-COAST DRAINAGE BASIN
ANADROMOUS FISH
MAP NO. 18.6
PLATE 5
SCALE OF MILES
0 1 2 3 4 5 6 7 8 9 10
LEGEND
COUNTY SEAT
OTHER INCORPORATED CITIES
UNDER 1,000
OVER 1,000
UNINCORPORATED COMMUNITY
STREAM MILE
STREAM GAGE
PIPELINE
NUMBERED HIGHWAY
OTHER PRINCIPAL ROADS
Planimetric control based on U.S.G.S. quadrangle maps.
KNOWN SPAWNING AREAS
Silver Salmon, Steelhead and Cutthroat Trout
Fall and Spring Chinook Salmon
Fall Chinook Salmon
Source: Oregon State Game Commission
Fish Commission of Oregon
DRAINAGE BASIN KEY
NORTH COAST 1
SANDY 3
HOOD 4
UMATILLA 7
GRANDE RONDE 8
WILLAMETTE 2
JOHN DAY 6
POWDER 9
DESCHUTES 5
MALHEUR 10
MID COAST 18
UMPQUA 16
MALHEUR LAKE 12
SOUTH COAST 17
ROGUE 15
KLAMATH 14
GOOSE & SUMMER LAKES 13
OWYHEE 11
NORTH COAST BASIN
MIDDLE WILLAMETTE BASIN
UPPER WILLAMETTE BASIN
UMPQUA BASIN
PACIFIC OCEAN
YAMHILL CO.
POLK CO.
TILLAMOOK CO.
LINCOLN CO.
BENTON CO.
LANE CO.
DOUGLAS CO.
OCEANLAKE
DELAKE
TAFT
SILETZ
NEWPORT
TOLEDO
WALDPORT
FLORENCE
DUNES CITY
R 12 W
R 11 W
R 10 W
R 9 W
R 8 W
R 7 W
R 6 W
R 5 W
R 4 W
T 6 S
T 7 S
T 8 S
T 9 S
T 10 S
T 11 S
T 12 S
T 13 S
T 14 S
T 15 S
T 16 S
T 17 S
T 18 S
T 19 S
T 20 S
T 21 S


STATE WATER RESOURCES BOARD
SALEM, OREGON
1964
MID-COAST
DRAINAGE BASIN
MAP NO. 18.6
PLATE 1
SCALE OF MILES
0 1 2 3 4 5 6 7 8 9 10
LEGEND
COUNTY SEAT
OTHER INCORPORATED CITIES
UNINCORPORATED COMMUNITY
STREAM MILE
STREAM GAGE
PIPELINE
NUMBERED HIGHWAY
OTHER PRINCIPAL ROADS
Planimetric control based on U.S.G.S. quadrangle maps.
DRAINAGE BASIN KEY
NORTH COAST 1
SANDY 3
HOOD 4
UMATILLA 7
GRANDE RONDE 8
WILLAMETTE 2
JOHN DAY 6
POWDER 9
DESCHUTES 5
MALHEUR 10
MID COAST 18
UMPQUA 16
GOOSE & SUMMER LAKES 13
MALHEUR LAKE 12
OWYHEE 11
SOUTH COAST 17
ROGUE 15
KLAMATH 14
NORTH COAST BASIN
MIDDLE WILLAMETTE BASIN
UPPER WILLAMETTE BASIN
UMPQUA BASIN
PACIFIC OCEAN
YAMHILL CO.
POLK CO.
TILLAMOOK CO.
LINCOLN CO.
BENTON CO.
LANE CO.
DOUGLAS CO.
R 12 W
R 11 W
R 10 W
R 9 W
R 8 W
R 7 W
R 6 W
R 5 W
R 4 W
T 6 S
T 7 S
T 8 S
T 9 S
T 10 S
T 11 S
T 12 S
T 13 S
T 14 S
T 15 S
T 16 S
T 17 S
T 18 S
T 19 S
T 20 S
T 21 S
CASCADE HEAD
OCEANLAKE
DELAKE
TAFT
SILETZ
CAPE FOULWEATHER
YAQUINA HEAD
NEWPORT
TOLEDO
WALDPORT
CAPE PERPETUA
HECETA HEAD
FLORENCE
DUNES CITY
To Corvallis
To Eugene
To Reedsport
To Roseburg