EPA-10-OR-LINCOLN-SWLC -WWTW-76

DRAFT

Environmental Impact Statement

Southwest Lincoln County Sanitary District

DRAFT

Environmental Impact Statement

DRAFT ENVIRONMENTAL STATEMENT

WASTEWATER TREATMENT SYSTEMS FOR THE SOUTHWEST LINCOLN COUNTY SANITARY DISTRICT

EPA-10-OR-Lincoln-WWTS-76

Prepared By
U. S. Environmental Protection Agency
Region X
Seattle, WA 98101

With Technical Assistance By
Jones & Stokes Associates, Inc.
455 Capitol Mall, Suite 835
Sacramento, CA 95814

In association with
Don Owen & Associates
and
Gruen Gruen + Associates

RESPONSIBLE OFFICIAL:

Clifford V. Smith, Jr., Ph.D., P.E.
Regional Administrator

APR 20 1976

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

SUMMARY

DRAFT ENVIRONMENTAL STATEMENT -- WASTEWATER TREATMENT SYSTEMS FOR THE SOUTHWEST LINCOLN COUNTY SANITARY DISTRICT

Environmental Protection Agency
Region X
1200 Sixth Avenue
Seattle, Washington 98101

1. Type of Statement: Draft (X) Final ( )

2. Type of Action: Administrative (X) Legislative ( )

3. Description of Action:

The objective of this project is to provide a wastewater treatment and disposal program for the Southwest Lincoln County Sanitary District, located between the Cities of Waldport and Yachats, Lincoln County, Oregon. This Draft Environmental Impact Statement identifies alternatives for providing the district with wastewater facilities designed to meet the needs of the residents of the district and maintenance of environmental quality. The district covers approximately 3,000 acres and has a population of 2,024 permanent residents and approximately 660 seasonal residents.

Much of the Southwest Lincoln County Sanitary District is underlain by impermeable soils and a high groundwater table. Such conditions have created periodic sewage waste disposal problems causing septic systems to fail and sewage to appear in surface drainage areas and on beaches. Surveys conducted by the Lincoln County Health Department and the Oregon Department of Environmental Quality during 1968, 1972 and 1974 documented several cases of septic system failures and sewage on surface areas throughout the district.

During 1973 and 1974, the Southwest Lincoln County Sanitary District was formed and a facilities plan was developed identifying a variety of alternative means of providing sewage service to the district.

4. Summary of Environmental Impacts and Adverse Environmental Effects:

The impacts and magnitude of those impacts will vary according to the alternatives proposed. Alternatives 1 through 5 represent alternative treatment facilities while Alternatives 6 and 7 represent no action and septic tank maintenance.

Short-term impacts such as temporary loss of vegetation, disruption of wildlife, traffic congestion, utility service disruption, soil erosion, safety hazard, aerial pollutant, visual impact, noise, spoil disposal and water quality impairments will occur with Alternatives 1 through 5. No short-term impacts will be associated with Alternatives 6 and 7.

Long-term impacts of Alternatives 1 through 5 will include protection of groundwater, minor effects on stream water quality and biota, possible minor geologic hazards, air quality changes, possible disturbance of archeological sites, impacts on vegetation, wildlife and marine biota, changes in visual character, increases in energy consumption, impact on parks, land use patterns and planning, increased traffic, changes in population, and the economic ramifications on the local economy and the private landowner.

Major impacts associated with Alternatives 6 and 7 will be the likely periodic problem of groundwater and ground surface contamination by sewage, the potential for a health hazard, and effects on land use patterns and state park operations.

5. Alternatives Considered:

Alternative 1 - Waconda Beach/San Marine treatment facilities with ocean outfalls. Both plants would be 350,000 gallons per day capacity (gpd). Capital cost - $6,506,100.

Alternative 2 - Waldport/Yachats. This alternative would utilize existing treatment plants but would be upgraded to handle added sewage flows. Outfalls would be in the Alsea Bay channel and off of a rocky shore at Yachats. Capital cost - $5,678,600.

Alternative 3 - Big Creek alternative. Sewage would be disposed of at one treatment facility at Big Creek. The plant would have a 750,000 gpd capacity. Capital cost - $5,518,000.

Alternative 4 - Yachats alternative. Wastewater would flow south to a new Yachats plant having a capacity of 750,000 gpd. Effluent disposal would be to the ocean. Capital cost - $5,154,200.

Alternative 5 - Waldport alternative. All wastewater in the district would flow northward to a new 750,000 gpd capacity plant in Waldport. The effluent outfall would be to the channel in Alsea Bay. Capital cost - $5,140,400.

Alternative 6 - No action alternative. This alternative would involve the continuation of existing conditions of installing septic tanks and leach fields to handle individual home sewage. Associated with this alternative would be the continuation of periodic septic system failures and surfacing sewage wastes. The present practice of retrofitting or replacing failing systems would continue.

Alternative 7 - District maintenance of septic tanks. The district would purchase a septic tank pumping truck, would periodically inspect all septic systems within the district, and as required, pump the tanks and convey pumpage to an aerobic digester at the Yachats treatment plant. Capital cost - $310,000.

6. The following State, Federal and local agencies and interested groups were invited to comment on the Environmental Impact Statement.

FEDERAL AGENCIES

Council on Environmental Quality

U.S. Department of Agriculture

U.S. Department of Defense

U.S. Department of Interior

U.S. Department of Health, Education and Welfare

U.S. Department of Housing and Urban Development

U.S. Department of Transportation

Federal Energy Office

National Marine Fisheries Service

Advisory Council on Historic Preservation

MEMBERS OF CONGRESS

Mark O. Hatfield
U.S. Senate

Les AuCoin
U.S. House of Representatives

Robert W. Packwood
U.S. Senate

STATE

Governor of Oregon

Max C. Rijken - Representative District 38

Oregon State Clearinghouse

Department of Environmental Quality

REGIONAL AND LOCAL

LINCOLN COUNTY BOARD OF COMMISSIONERS

LINCOLN COUNTY PLANNING DEPARTMENT

LINCOLN COUNTY PERMITS, UTILITIES & RESOURCES DEPARTMENT

LINCOLN COUNTY HEALTH DEPARTMENT

LINCOLN COUNTY LIBRARY

SOUTHWEST LINCOLN COUNTY SANITARY DISTRICT

BAY TO BAY SANITARY DISTRICT

INTERESTED GROUPS AND INDIVIDUALS

ROBERT E. MEYERS, ENGINEERS INC.

OREGON WILDLIFE FEDERATION

1000 FRIENDS OF OREGON

NORTHWEST ENVIRONMENTAL DEFENSE CENTER

OSPIRG

OREGON ENVIRONMENTAL COUNCIL

OREGON STATE UNIVERSITY

WILLIAM E. WARE

THOR H. MORK

THOMAS GANATT

JEAN DUCKETT

CHRISTOPHER MINOR

RICHARD BENNER

THIS DRAFT ENVIRONMENTAL IMPACT STATEMENT WAS MADE AVAILABLE TO THE COUNCIL ON ENVIRONMENTAL QUALITY (CEQ) AND THE PUBLIC ON APR 30 1976.

I. INTRODUCTION

Purpose and Objectives

The National Environmental Policy Act of 1969 (NEPA) requires that all agencies of the federal government prepare a detailed Environmental Impact Statement (EIS) on proposals for projects that may significantly affect the quality of the human environment. NEPA requires that agencies (in this case the Environmental Protection Agency [EPA]) include in their decision-making process all considerations of environmental aspects of proposed actions, the environmental impacts of the proposed project and its alternatives, and a discussion of ways to avoid or minimize adverse effects. The EIS is to be a "full disclosure" document and must follow specific regulations of the EPA as contained in 40 CFR, part 6, as published in the Federal Register, Vol. 40, No. 72, April 14, 1975.

Because the Southwest Lincoln County Sanitary District project can be 75 percent funded by the EPA, as a part of Construction Grants Program authorized by the Federal Water Pollution Control Act amendments of 1972 (PL 92-500), it requires NEPA action. After reviewing the proposed wastewater facilities plan for the Southwest Lincoln County Sanitary District, it was decided by the EPA that an EIS was needed. This decision was based on the likely changes in land use patterns as determined by such factors as vacant land subject to increased development pressure, the increase in population which may be induced, the faster rate of population change, changes in population density, the extent to which landowners may benefit from the areas subject to increased development and the nature of land use regulations in the affected area, and their potential effects on development. Of equal importance were the likely effects of the project on "parklands, other public lands or areas of recognized scenic, recreational, archeological or historic value" (40 CFR, part 6).

Data for this EIS were compiled from various existing studies of the southwest Lincoln County area, field reconnaissance and numerous personal contacts with involved individuals. A complete listing of references is in the Bibliography.

The EIS process encourages public input into the decision-making process. This EIS is prepared in draft form to be widely circulated for public comment. Announcements in the local press and a public hearing will be held to solicit responses. After a 45-day public comment period, all replies will be addressed and the EPA decision recommending a grant fundable project will be published as the Final Environmental Impact Statement. Following a 30 day comment period on the Final EIS, the EPA Regional Administrator will announce his decision concerning a grant award for the district.

Background of Past Events

Problems associated with sewage and inadequate waste disposal were present in southwest Lincoln County some time before September 1974 when the Southwest Lincoln County Sanitary District first submitted a facilities plan to the State of Oregon.

In 1968 the Lincoln County Health Department conducted a beach survey to determine the extent of sewage disposal problems on the coastal strip of Lincoln County. In the course of the 1968 survey, approximately 50 problem sources of sewage were located and described, eight of which were within the boundaries of the Southwest Lincoln County Sanitary District (Oregon State Health Division, 1973).

In April 1970, the Lincoln County Regional Water and Sewerage Plan was prepared for the County Board of Commissioners. The purpose of the study was to determine existing conditions and needs within the county, sufficient to serve as the basis for a comprehensive sewer and water plan.

At the request of Governor Tom McCall in late 1972, the Oregon State Health Division and the Department of Environmental Quality, conducted a review of the water, sewer and septic tank problems in Lincoln County. The general intent of the study was to develop a comparison between 1972 sewage conditions and the situation as it existed in 1968. The survey results indicated a continuation of sewage problems in Lincoln County, and a compounding of the problem because of additional subdividing and commercial and residential development along the coast. The study recommended the formation of sanitation districts, among those communities having sewage problems, to establish a means of alleviating sewage disposal problems.

In 1973 several residents of southwest Lincoln County founded a group to create a sanitary district. Shortly thereafter, the residents voted and approved the formation of the Southwest Lincoln County Sanitary District which thereafter developed a wastewater facilities plan for the district.

In January 1974, a comprehensive water, sewerage, and solid waste management plan was prepared for the Lincoln County Board of Commissioners. That plan identified a variety of alternative means of providing sewerage service to the southwest Lincoln County Area.

By September 1974 the Southwest Lincoln County Sanitary District had submitted its facilities plan to the Department of Environmental Quality.

The following is a summary of events from 1974 leading to this required EIS.

Date	Event
September 1974	Southwest Lincoln County Sanitary District (S.W.L.C.S.D.) Facilities Plan submitted to DEQ.
June 27, 1975	Public Hearing on proposed fiscal year 1976 Priority List. Southwest Lincoln County Sanitary District was below the expected funding level. Lincoln County made a presentation challenging the low ranking of the project.
June 28-July 10, 1975	DEQ revised Priority List, resulting in the elevation of the project to a fundable level.
July 11, 1975	Environmental Quality Commission adopted Revised Priority List, placing the project within funding range.
July 11, 1975	EPA's Oregon Operations Office (Project Engineer) recommended to the EPA Region 10 office of Seattle that an EIS be prepared on the project
July 22, 1975	EPA approved Oregon's fiscal year 1976 Priority List.
July 31, 1975	EPA completed its environmental review of Southwest Lincoln County proposed project. Notice of Intent to prepare an EIS was prepared, but delayed at request of S.W.L.C.S.D.
August 21, 1975	Letter to Henry F. Baldwin, Jr. (President, Board of Directors, Southwest Lincoln County Sanitary District) from Regional Administrator notifying district of an EIS requirement on their proposed project.
September 3, 1975	Southwest Lincoln County Board requests further delay of Notice of Intent in order to appeal EIS decision.

September 4, 1975	Letter from Environmental Impact Section to Southwest Lincoln County Board of Commissioners granting extension from September 5 to September 12 before release of Notice of Intent. Delay was granted to allow time for S.W.L.C.S.D.
September 12, 1975	EPA received letter from S.W.L.C.S.D. requesting additional 3-week delay of Notice of Intent.
September 12, 1975	Regional Administrator grants 2- to 3-week delay on Notice of Intent
September 25, 1975	Meeting with S.W.L.C.S.D. officials. Tour of district.
September 30, 1975	EPA's Notice of Intent released.
December 8, 1975 through January 9, 1976	Headquarters Washington, D.C., awards contract to Jones & Stokes Associates, Inc. to assist EPA in preparation of EIS.
January 20-22, 1976	Meeting at project area with EPA's consulting team and Southwest Lincoln County Sanitary District Board.
January 9	Preparation of preliminary draft EIS.

Important Issues and Considerations

In the course of preparing this EIS, it became clear that there were several key issues relating to the proposed sewerage system. These issues became evident after discussions with involved Lincoln County residents and personnel of various state and federal agencies having interest in the project.

The issues listed below are to be identified and evaluated in the Environmental Setting and Environmental Impact sections of this report. Those issues remaining unresolved and/or of greater scope than covered in this EIS will be discussed in Chapter VI - Implementation and Issues to be Resolved. Of particular importance are the following questions:

1. Present and projected land use and the relationship of such use to Lincoln County and Oregon State Land Conservation and Development Commission (LCDC) planning goals, guidelines and regulations.

2. The rate and distribution of future construction on vacant land that can be tied to the sewerage project as compared to retention of the present situation.

3. Patterns of land ownership and level of monetary benefit to be derived by landowners from a sewerage project.

4. Response of traffic and circulation patterns to growth in relation to present and planned roads, streets and highways.

5. The cumulative impact of district growth and activities on surrounding lands and their relationships to possible "carrying capacity".

6. Possible interrelationships between district development and general tourism.

7. Possible direct impacts of projects on parks and public use lands, and the impacts of public use on residential and commercial uses.

8. General level of hazard to public health and aesthetics of using septic tanks.

9. The financial impact of capital and operating costs on present and future residents in the district.

10. The purpose and objectives of doing an EIS.

II. ENVIRONMENTAL SETTING

Physical and Biological Features

Location

The Southwest Lincoln County Sanitary District study area is located along a 7-mile segment of the central Oregon coast, between the Cities of Yachats and Waldport. Waldport is approximately 94 miles northwest of Eugene, 85 miles from Salem and 114 miles from Portland. The area is bounded on the west by the Pacific Ocean and the east by private land holdings and the Siuslaw National Forest (Figure 1). Most residential and commercial development within the district is within a one quarter to one half mile strip bordering U. S. Highway 101.

The sanitary district encompasses 3,000 acres of land along a narrow strip varying in width from a maximum of 1-1/2 miles in the north to less than one half mile in the south.

Climate

The central coastal region of Oregon has a maritime climate, with high humidity and moderate temperatures the entire year. Average annual precipitation in the Newport area is 66 inches; however, it varies substantially along the Coast Range. Approximately 86 percent of the precipitation falls during the months of October through April (Figure 2).

Due to the maritime influence, temperatures vary only slightly between seasons, with a daily average temperature of 58°F in summer and 44°F in winter.

Fog commonly occurs along the coast during the warmer summer months, particularly during the morning and evening hours. Winds characteristically blow from the northwest during the periods of high barometric pressure and from the southwest during the stormy winter months.

Air Quality

Coastal Lincoln County area has excellent air quality and ventilation due to the oceanic influence, area topography and favorable wind conditions. The low population and general lack of industrial development result in few air quality problems.

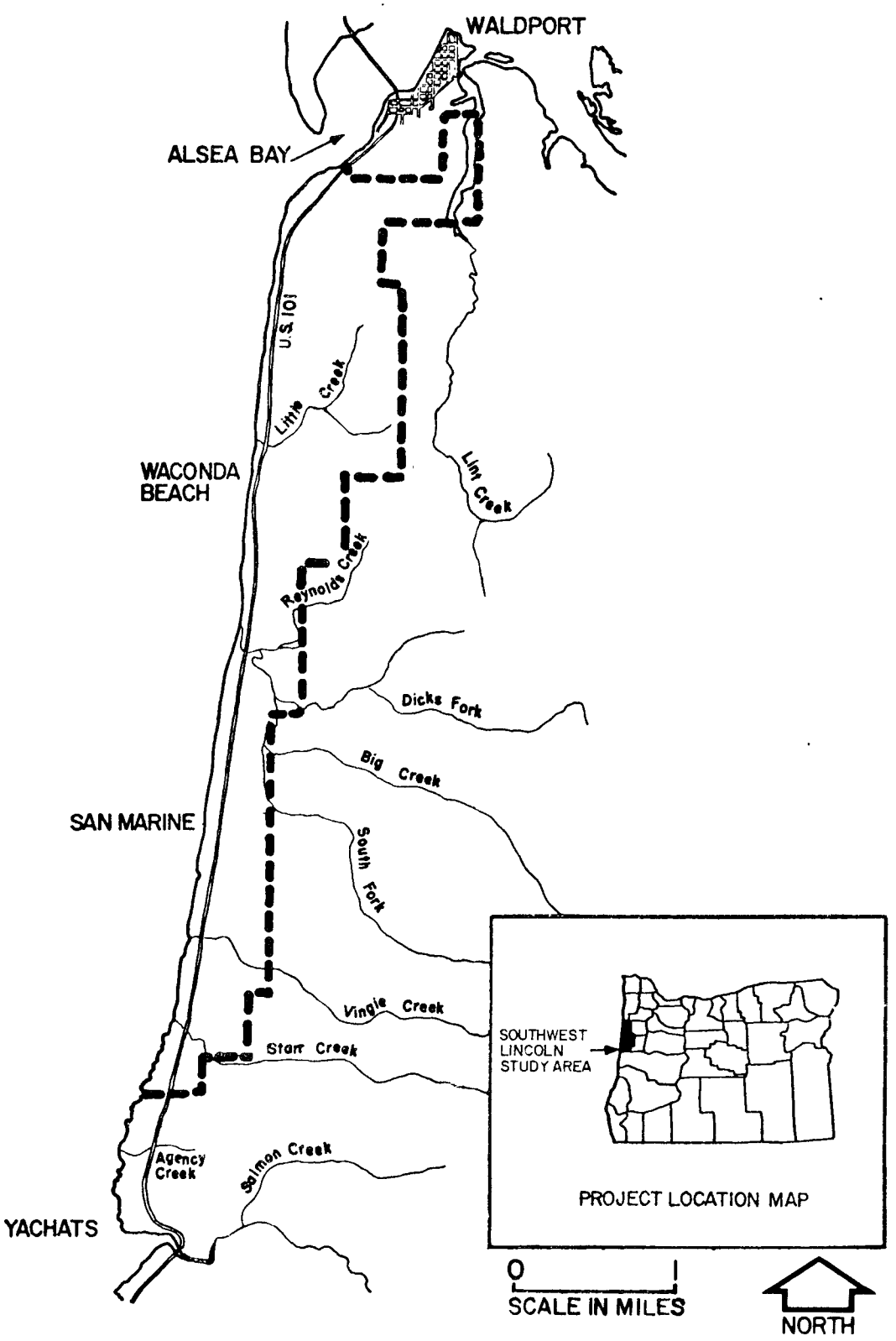

FIGURE I. LOCATION OF SOUTHWEST LINCOLN COUNTY SANITARY DISTRICT

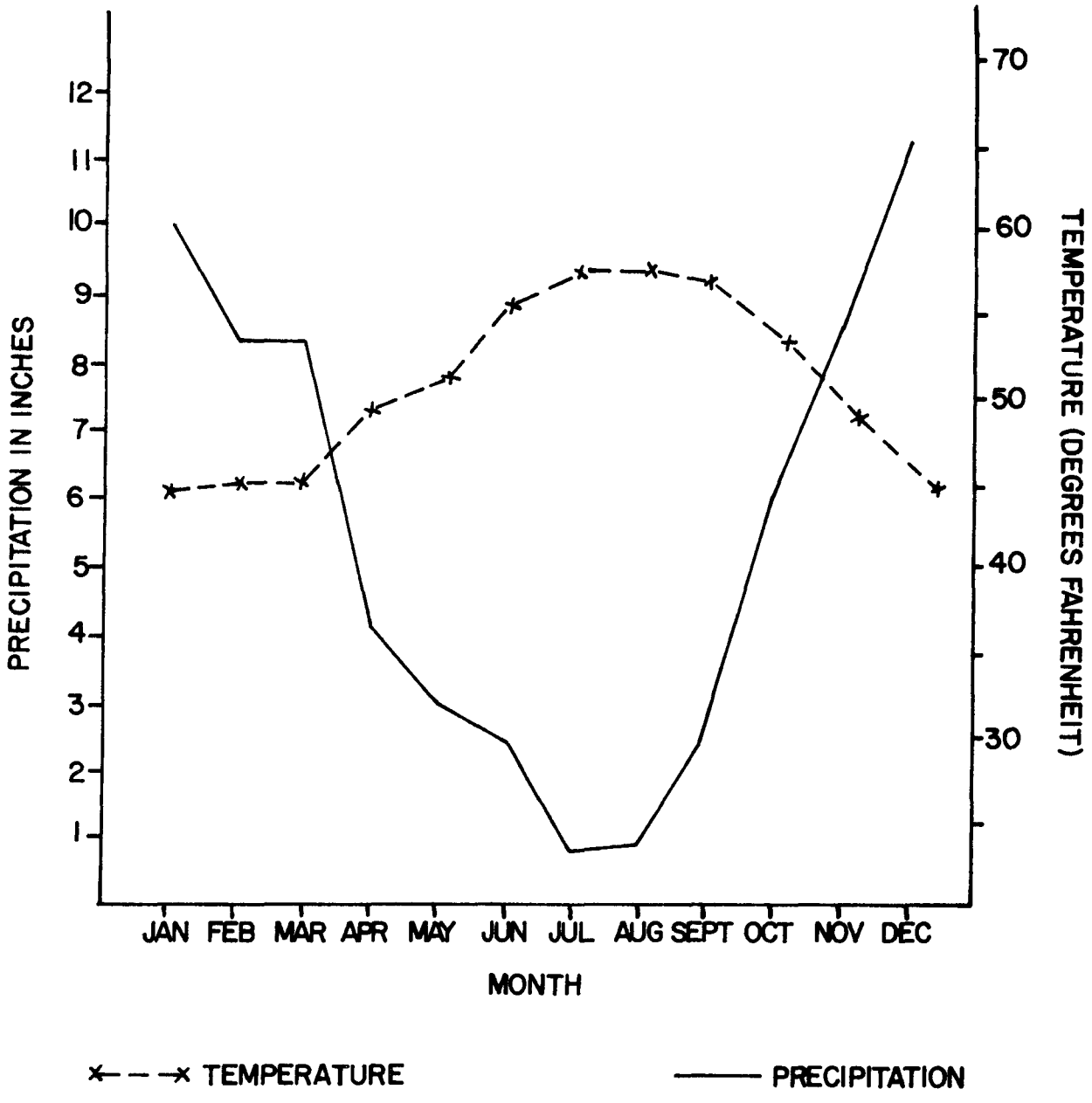

FIGURE 2. MEAN MONTHLY PRECIPITATION AND TEMPERATURE IN NEWPORT, OREGON. (STATE OF OREGON, 1973, U.S. DEPARTMENT OF COMMERCE, 1974).

A few monitoring studies have been done on air quality in Lincoln County; however, the Department of Environmental Quality is in the process of preparing profiles for each of the air quality control regions of the state (Johnson, pers. comm.).

Estimates of pollutant emissions in Lincoln County show the Georgia Pacific plant in Toledo to be the major source of particulate and sulfur dioxide pollutants in the county (Table 1). Other major sources include automobiles and trucks, controlled open burning and forest fires. However, Federal and State air quality standards have not been exceeded.

Topography and Drainage

The southwest Lincoln study area lies along the coastal margin of the western flank of the Coast Range. Virtually all of the sanitary district is located on marine terraces ranging from 10 to 80 feet above mean sea level. These terraces form a narrow shelf which gradates eastward to the more steeply sloped uplands of the Coast Range.

The study area is bisected with numerous small coastal streams originating in the coastal mountains and flowing westward to the Pacific Ocean. Those creeks include Patterson, Little, Reynolds, Big, Vingie, Starr, Michell, and Agency Creeks and Dicks Fork. Virtually all of these creeks could represent flood threats during periods of heavy rain; however, Big Creek (drainage area 2.7 square miles) represents the only creek in the study area having substantial flood hazard (State of Oregon, 1973). The U.S. Army Corps of Engineers has not conducted any flood hazard studies in the area to date (Akre, pers. comm.).

Edaphic Features

According to the U. S. Soil Conservation Service study (1972) conducted in Lincoln County, much of the southwest Lincoln study area is underlain by three major soil associations -- Nelscott-Depoe Association, Ferrelo-Lint Association and Netarts-Yaquina Association. However, the area is covered predominantly by the Nelscott-Depoe Association (Figure 3). The pattern of distribution of the soil association is strongly influenced by parent material and physiographic location.

Virtually all of the soils making up the three major associations have severe restrictive features for septic tank absorption field use (Table 2). These restrictions are due to high water table, cemented sands restricting permeability, or rapid percolation and potential for groundwater contamination.

Table 1

SUMMARY ESTIMATES OF EMISSIONS IN LINCOLN COUNTY

Source	Tons/Year Pollutant Emissions	
	Particulates	Sulfur Dioxide
Georgia Pacific - Toledo	2,000	389
Motorized vehicles		
Light duty	149	36
Heavy duty	21	30
Slash burning	374	
Forest fires	64	

Source: Department of Environmental Quality, Johnson, pers. comm.

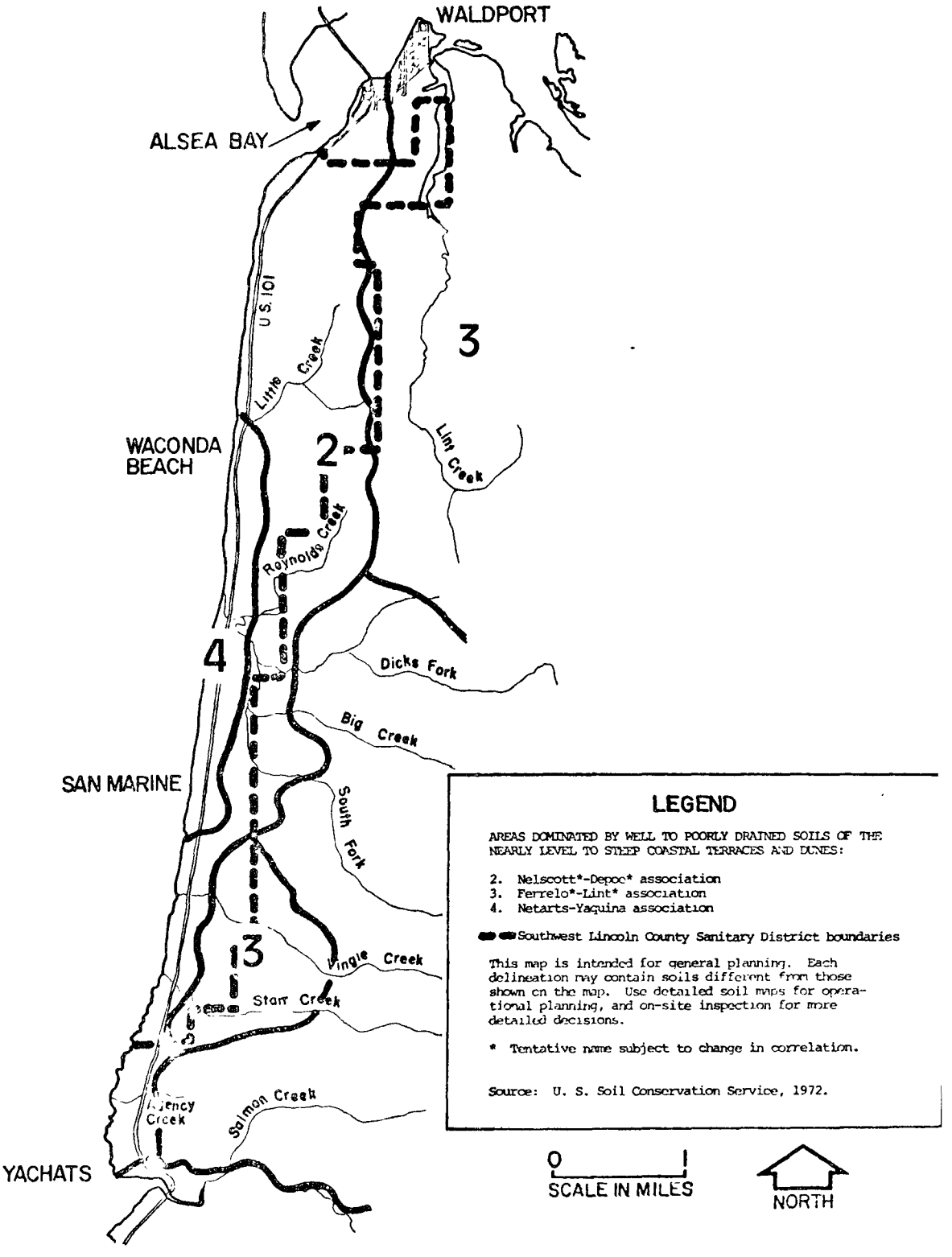

FIGURE 3. SOIL ASSOCIATIONS PRESENT IN SOUTHWEST LINCOLN COUNTY SANITARY DISTRICT

Table 2

CHARACTERISTICS OF SOIL ASSOCIATIONS OF THE STUDY AREA

* 2 Nelscott-Depoe Association

Nelscott Soils - Deep loam over clay loam, soils formed on water deposited or stabilized dune material. These soils occur on marine terraces above the ocean beaches. Permeability is moderately slow. There is a severe limitation in septic tank and absorption field use of the soil because of the moderately slow permeability.

Depoe Soils - Poorly drained clay loam soils formed in water deposited materials. The soil has 0 to 3 percent slopes and a slightly concave position on marine terraces. Subsoil layers contain alternating layers of clay loam and hard cemented iron pans. Permeability is slow and there are severe limitations for dwellings, septic tanks and absorption fields and numerous other uses. Water table is seasonally high -- from 4 to 12 inches below the surface.

3 Ferrelo-Lint Association

Ferrelo Soils - This loamy soil phase is generally found on 5 to 30 percent slopes. There are generally severe restrictions for septic fields, sewage lagoons and moderate limitations for building construction. The soil is found on marine terrace deposits.

Lint Soils - This soil phase is a silty clay loam usually found on 3 to 25 percent slopes in the study area. There are moderate limitations for building sites and severe restrictions for septic fields and sewage lagoons because of contamination to groundwater.

4 Netarts-Yaquina Association

Netarts Soils - Well drained soils formed on old stabilized sand dunes. Slopes are 7 to 30 percent. The surface layer is fine sandy loam and the subsoil is fine sand about 40 inches thick. Permeability is moderately rapid. There is a slight to severe limitation of use of this soil for septic tanks, absorption fields and sewage lagoons due to the rapid percolation and potential for pollution of groundwater. Depth to water table usually greater than 6 feet.

Yaquina Soils - This soil series is poorly drained and formed on an interdune position and old stabilized dunes. Slopes are 0 to 3 percent. Permeability is moderately rapid. Elevation is 10 to 50 feet. Water table is seasonally high (November through April) and at the surface or to 2 feet below it. There are severe limitations to septic tank, absorption field and dwelling use.

* Represents major soil association within the study area.

High water tables and poor drainage are common throughout the area since most of the soils are old dune sand, overlying marine terrace deposits and are at low elevation (less than 80 feet above sea level).

> "Septic tanks are often ineffective, and without proper storm drainage and sewer installations even low-density development is impractical. When terrace soils become permeated by solutions containing soaps, detergents, water softeners and other substances found in septic tank effluent, oxidation ponds, sanitary landfills, or other waste disposal facilities, the result is an increased soil sensitivity and reduction of strength" (State of Oregon, 1973).

However, there are locations where septic tank disposal systems may be used efficiently, but these locations must be determined by case study.

Geology

The geologic composition of the southwest Lincoln study area is relatively uniform. Virtually the entire area consists of Quaternary marine terrace deposits and old dune sands. Marine terrace deposits are "predominantly massive, fine- to medium-grained, friable sandstone of beach origin" (State of Oregon, 1973). Most of the terrace deposits are 20 feet or less in depth in the Waldport area, with surface elevations from sea level to 80 feet. The semiconsolidated and old stabilized dunes overlying these marine terraces deposits range in thickness from a few feet to more than 20 feet.

Small portions of the study area near Big Creek are unconsolidated surficial deposits -- both floodplain alluvium (Qal) and beach sand and primary dunes (S) (Figure 3). The floodplain alluvium is a mixture of sand, silt, clay and organic matter, underlain by gravel. Lower floodplain areas around Big Creek are of sandy silt, clayey silt and silty clay composition. The thickness of the deposits ranges from 10 to 40 feet.

The beach sand and primary dunes are unconsolidated and susceptible to wave and wind erosion. These dune deposits occur west of Highway 101 and south of Big Creek State Park.

Areas of Alsea siltstone (Toa) are scattered throughout the study area. This geologic unit is predominant to the east of the marine terrace deposits.

Geologic Hazards

Geologic hazards in the study area consist of coastal erosion of marine terraces and sand areas, fault zones, high groundwater tables, flooding, and landslides and slumping.

Erosion. Erosion of marine terraces, sediments, sand spits and dune areas is a critical concern along all of the coastal portion of the study area. The State of Oregon (1973) in its report entitled the Environmental Geology of Lincoln County, Oregon, identified the entire coastal region of sand dunes and marine terraces from Waldport to Yachats as having critical erosion potential. Changes in the profile of the shore occur constantly as a combination of natural forces act to erode and deposit sand and sediments. In general, the terrace margins are retreating at the rate of one foot per year due to wave erosion and sloughing of sand on steep cuts (State of Oregon, 1973). Human alterations of the beachline greatly affect these natural erosions sometimes in an unpredictable manner.

Earthquake faults. The southwest Lincoln study area is intersected by six concealed earthquake faults, all trending in a northwest or northeast direction. Each fault is concealed in the semiconsolidated dune sands on the marine terrace deposits indicating that fault movement is at least 0.5 million years old. Figure 4 shows the estimated locations of those faults. Historical earthquake data show that seven seismic events have occurred in Lincoln County since 1897 (Table 3). All were of a III or IV Mercalli intensity (approximately 3.5 to 4 on the Richter scale). During an earthquake event, ground motion is generally magnified in areas of unconsolidated or semiconsolidated deposits. Saturated lowland soils may result in landslides and liquefaction.

High groundwater. High groundwater tables underlie virtually the entire study area. Such a condition is due to the thin layers of cemented sands in the marine terraces which restrict the downward percolation of water. The problem of high groundwater in the area from Yachats to Waldport appears due to a downwarping, hillside seepage and saturated soils from high rainfall.

Flooding. Flooding can be caused by heavy rainfall, melting snow, high ocean tides and strong winds and a number of other factors. Stream flooding is a potential hazard along virtually all streams in the study area and particularly along Big Creek -- the largest stream within the study area. Flood damage from high tides and/or storms is possible along the entire coast of the study area (State of Oregon, 1973). Such an event occurred during December 1967 when the entire Lincoln County coastline was battered by high storm waves.

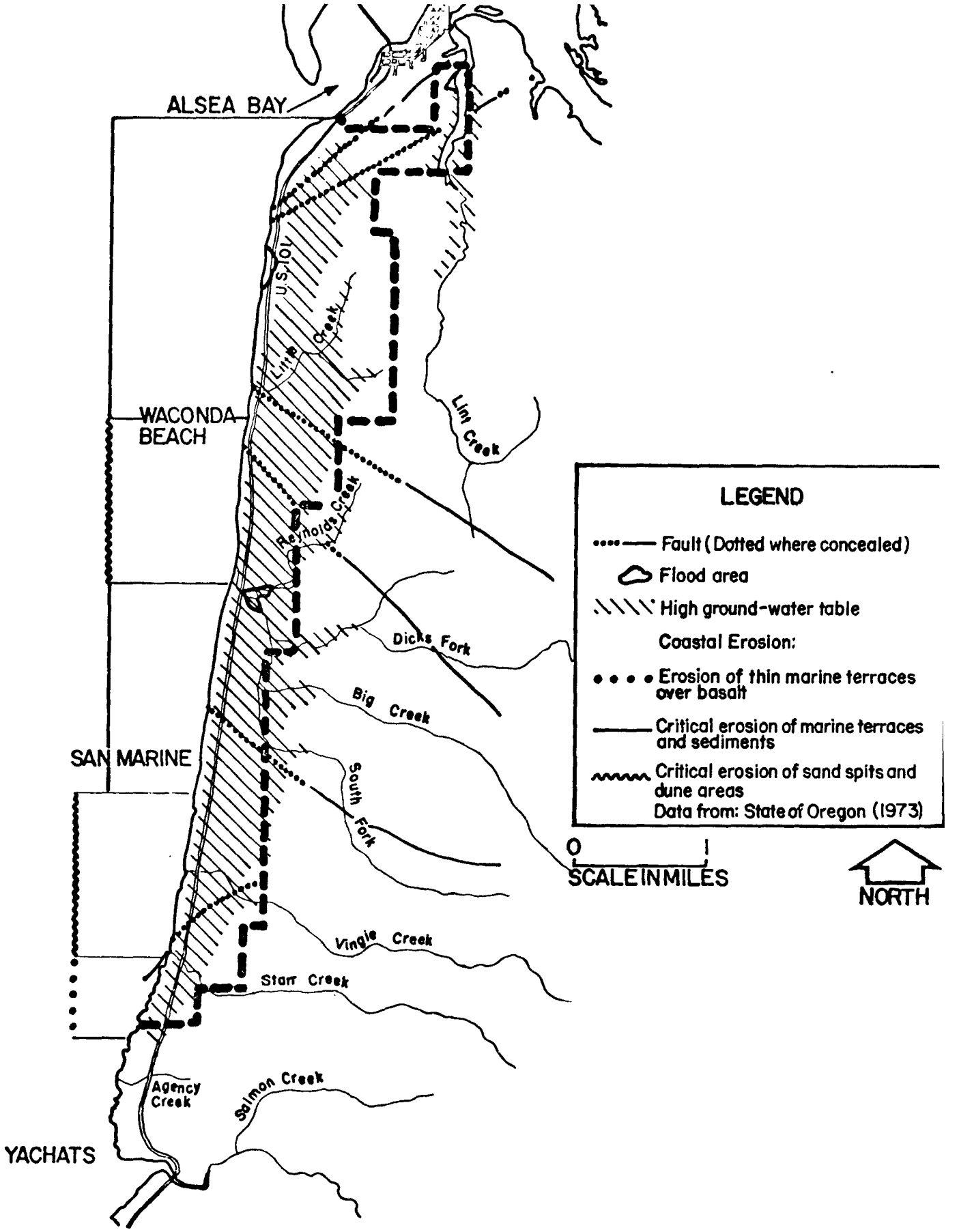

FIGURE 4. GEOLOGIC HAZARDS OF THE STUDY AREA

Table 3

RECORDED EARTHQUAKES IN THE LINCOLN COUNTY AREA

Year	Date	Location	Intensity (Modified Mercalli)	Remarks
1897	January 26	Newport	IV	
1902	June 14	Newport	IV	
1916	January 4	Newport	IV	
1928	September 4	Newport (44.7° N-124.1°W)	IV	Felt for radius of 10 miles
1940	May 25	Waldport	IV	Felt at Toledo and Depoe Bay; small objects were moved at Waldport
1941	October 19	Seal Rock	III	
1957	March 22	Alsea	III	

Source: State of Oregon, 1973.

Landslides and slumping. The hazard of landslides and land slumping is generally slight within the study area. Areas of hazard occur just to the north of Alsea Bay in the upper Buckley Creek watershed and in slope areas greater than 50 percent.

The hazard of landslides along the shoreline is slight since most of the shoreline of the study area consists of low terrace deposits. The erosion hazard is generally high, however.

Biotic Resources

The coastal location of the study area provides for a variety of habitats and biotic life forms. The biotic resources consist of three major groups -- marine, freshwater and terrestrial. Each has its own characteristic flora and fauna.

Marine environment. Marine life occurs along the entire beach shoreline of the study area and in Alsea Bay to the north of Waldport. By far the most abundant marine habitat within the study area is the open-coast sandy beach which extends from Waldport to just north of Yachats. Sandy beaches are sparsely populated in comparison with rocky shores and mudflats of estuaries and bays. Appendix A-3 lists the life forms most commonly found in the marine environment -- in the bays, on the beaches and immediately offshore. The marine environment represents an important economic feature of the central Oregon coast.

Freshwater environment. A majority of the streams within the study area originate in the nearby coastal mountains and enter directly into the Pacific Ocean. As a result, most streams support anadromous fish populations and few resident species. Small coastal ponds and marshes are scattered throughout the district. Appendix A-4 lists those fish species most common to the streams of the study area.

Terrestrial environment. The flora of coastal southwest Lincoln County is characterized by vegetative forms varying from the prostrate pioneering sand binders (such as *Poa macrantha* and *Festuca rubra*) to the later successional species such as beach pine (*Pinus contorta*), Sitka spruce (*Picea sitchensis*) and red cedar (*Thuja plicata*). The beach pine is the most common vegetative species of the stabilized sand dune and strand communities.

Appendix A-1 identifies the more common vegetation of the study area, while Figure 5 and Table 4 show the present vegetative cover types of the study area.

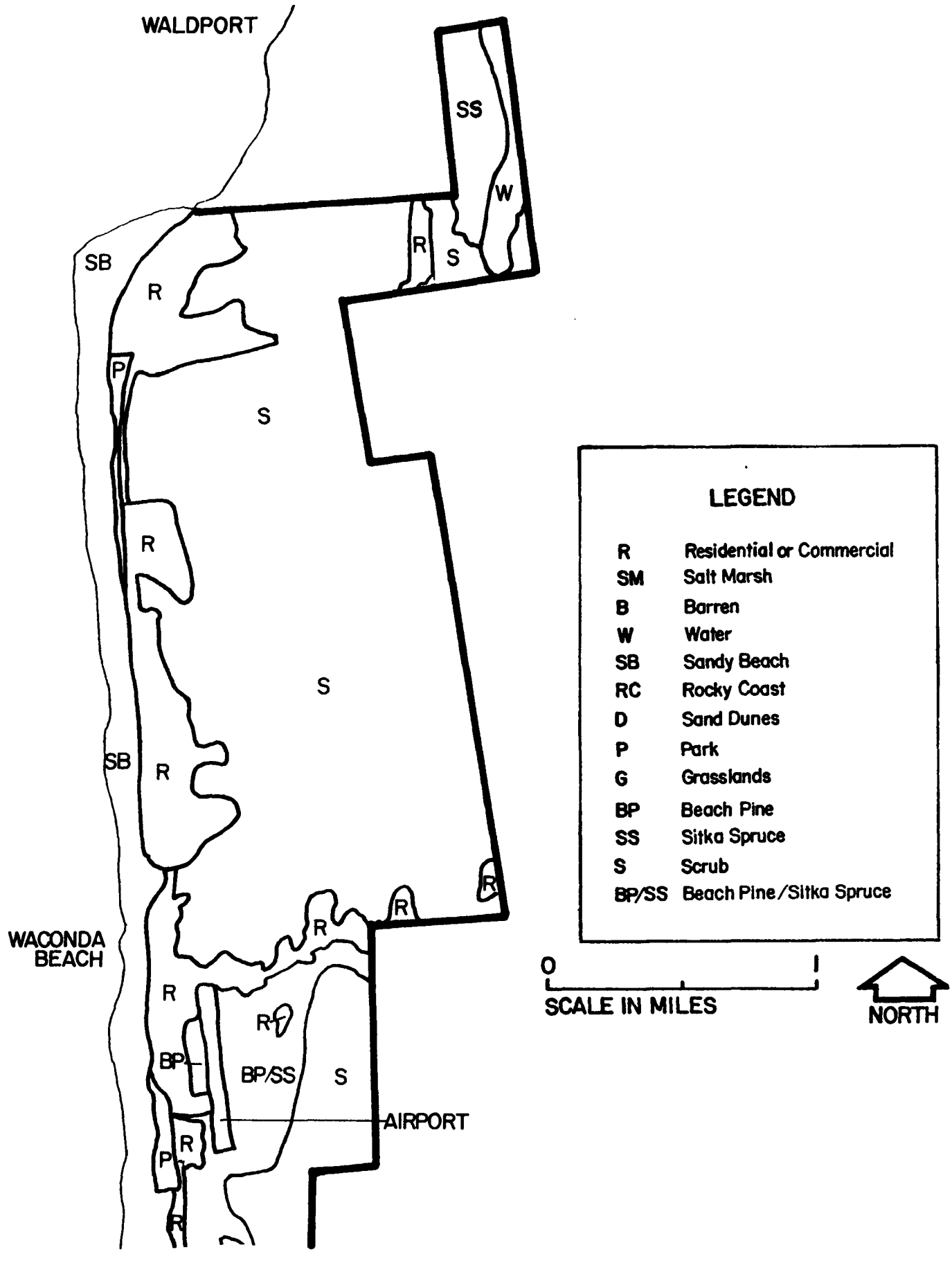

FIGURE 5 VEGETION AND LAND USE-SOUTHWEST LINCOLN COUNTY SANITARY DISTRICT (SECTION I)

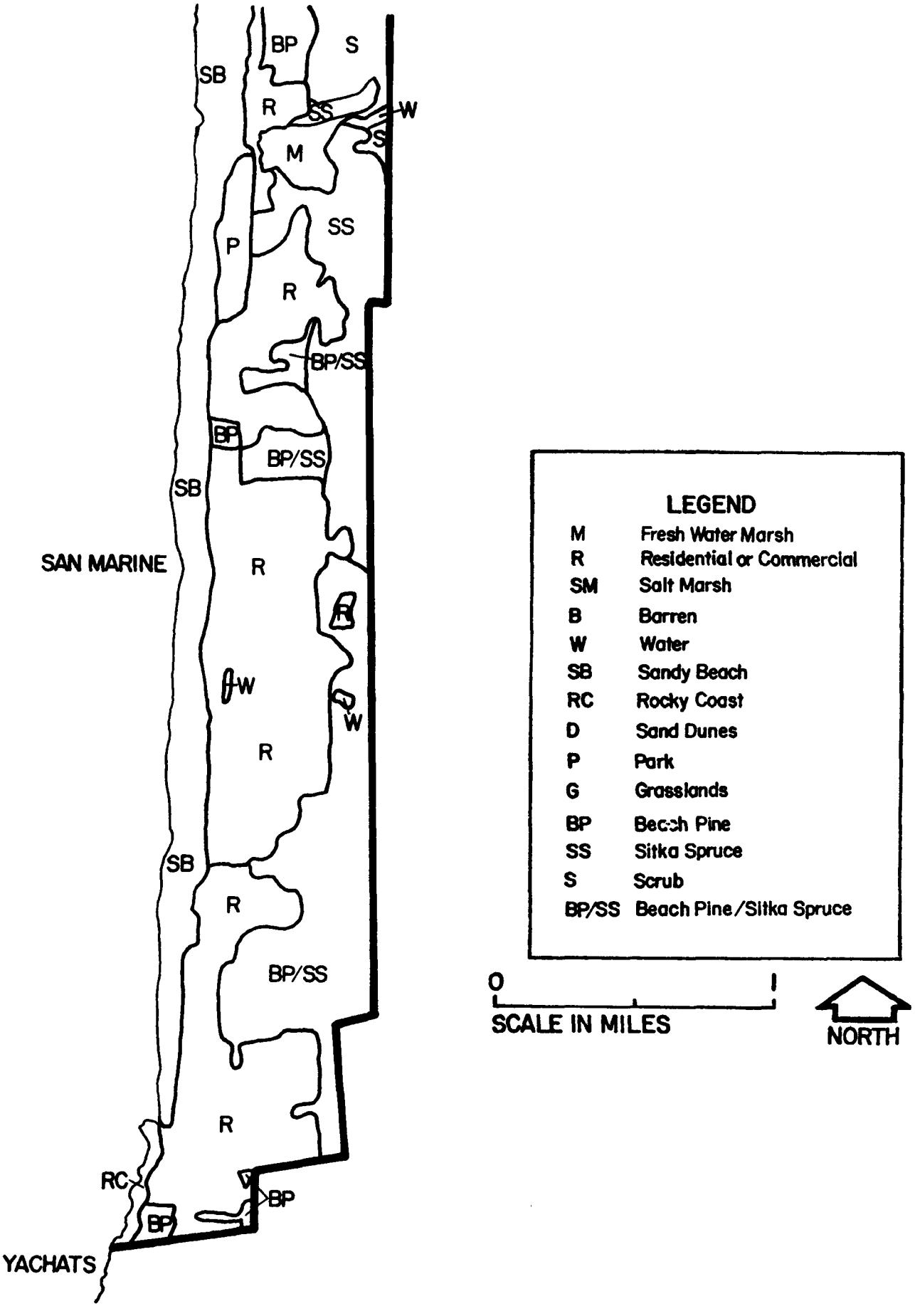

FIGURE 5 VEGETATION AND LAND USE-SOUTHWEST LINCOLN COUNTY SANITARY DISTRICT(SECTION 2)

Table 4

VEGETATION AND LAND USE - SOUTHWEST
LINCOLN COUNTY SANITARY DISTRICT

Land Use or Vegetative Type	Approximate Acres	Percent
Residential	1,286	41
Beach Pine and Sitka Spruce	1,441	46
Sandy Beach	352	11
Rocky Coast	17	1
Parks*	43	1
Total Acreage	3,139	100

* Represents only developed areas - natural vegetation on parklands is included in other categories.

A wide variety of wildlife species are associated with the coastal dune and strand communities. Common birds, reptiles, amphibians and mammals are identified in Appendix A-2.

The black-tailed deer (Odocoileus hemiones columbians) is the most common of the big game mammals in southwest Lincoln County. Roosevelt elk (Cervus canadensis), black bear (Ursus americanus) and mountain lion (Felis concolor) occur in the more remote portions of Lincoln County.

Band-tailed pigeon (Columba fasciata), mountain quail (Oreortyx picta) and blue grouse (Dendragapus obscurus) are found in varying numbers throughout the region. The band-tailed pigeon is the most common game bird and nests in the coastal Sitka spruce zone (Smith and Lauman, 1972).

Rare and endangered wildlife. Nine species of wildlife identified by the U. S. Department of Interior (1973) and the Oregon State Game Commission (1973) as rare, endangered or possibly threatened with extinction could occur within the project area. Those animals are listed in Table 5.

Among the nine species, the white-footed vole, northern spotted owl and flammulated owl are likely to be found in the study area. The other listed species could occur in the study area for at least part of the year. One amphibian - the tailed frog (Ascaphus truei), is deemed a rare species in part of its range (Wallowa Mountains), yet is a common species within the study area (Storm, pers. comm.).

Aesthetic Values

Much of the ocean, beach and forest lands surrounding the sanitary district are in their natural status, thus providing a scenic environment encompassing exposed rocky coast, sandy beaches, coastal sand dunes, shore pine vegetation and spruce-cedar forests on the higher inland slopes.

Alsea Bay directly to the north of the study area provides additional natural scenic values. Although the coastal region often has periods of rain, clouds and fog, the area is nonetheless highly attractive to tourists and seasonal residents.

When traveling Highway 101 from Yachats to Waldport, the landscape is dominated by beach pine vegetation and scattered residential-commercial development. Many structures throughout the district are in a state of disrepair and probably detract

Table 5

RARE, ENDANGERED AND THREATENED VERTEBRATE SPECIES WHOSE DISTRIBUTION INCLUDES THE SOUTHWEST LINCOLN STUDY AREA

Common Name	Scientific Name	Present Status[1] Federal FR	Federal T	State[2] R	State[2] E
	MAMMALS				
Fisher	Martes pennanti		SU	x	
White-footed vole	Phenacomys (Arborimus) albipes			x	
	BIRDS				
Brown pelican	Pelecanus occidentalis	x			
Northern bald eagle	Haliaeetus leucocephalus alascans				x
Aleutian Canada goose	Branta canadensis leucopareia	x			
Peregrine falcon	Falco peregrinus	x			x
Northern spotted owl	Strix occidentalis caurina			x	
Flammulated owl	Otus flammeolus			x	
Western snowy plover	Charadrius alexandrinus nivosus		SU	x	
	AMPHIBIANS				
Tailed frog	Ascaphus truei*			x	

[1] Status

FR Federal Register - Species is on the official endangered species list, Federal Register, June 4, 1973.

T Those species identified by U. S. Fish and Wildlife Service, 1973. Threatened Wildlife of the United States.

SU Status Undetermined - A status undetermined species or subspecies is one that has been suggested as possibly threatened with extinction, but about which there is not enough information to determine its status. More information is needed.

R Rare

E Endangered

[2] State of Oregon - Information from the Oregon State Game Commission Bulletin, January 1973, Vol. 29, No. 1.

* Tailed frog population not considered rare within study area (Storm, pers. comm.).

from the scenic beauty. However, the aesthetic qualities of the area attract large numbers of summer residents and vacationers. The beauty of the coastline and associated recreational facilities represent positive aesthetic values in the Yachats/Waldport area.

Water Resources and Water Quality

Surface water. Surface water resources are plentiful within the study area. Nine streams originating in the coastal mountains flow through the study area to the ocean. The Alsea and Yachats River represent major surface water sources to the north and south of the study area. The Alsea River, with a watershed covering 743 square miles (234 square miles in Lincoln County), is one of the largest river systems in Lincoln County. The Yachats River has a watershed of approximately 61 square miles (Clark and Groff Engineers, Inc., 1970).

With the abundant rainfall and runoff in Lincoln County, surface water supply is maintained in most streams throughout the entire year.

The water quality of most surface streams is generally good. The water quality standards for surface waters of the State of Oregon are located in Appendix C-1.

Groundwater. Virtually all of the southwest Lincoln County study area between Waldport and Yachats has been identified as an area having a high groundwater table. Much of the problem with high groundwater in the area is due to perched water tables created by impermeable soils and lateral and downslope movement of water from upland areas.

The marine terrace area (Qmt) and some dune areas (S) offer the greatest potential for providing large quantities of water for domestic purposes. Existing wells in marine terrace deposits have the highest average yield (19 gallons per minute) of any of the geologic formations in Lincoln County.

Contamination from septic tanks and leach fields constitutes the major problem associated with use of dune and marine terrace groundwater resources for domestic supply.

The quality of groundwater in areas free of contamination is usually good and suitable for most purposes. Some wells in dune or marine terrace deposits have iron and manganese content in excess of 0.3 ppm (parts per million).

Water use and supply. The Southwest Lincoln County Sanitary District boundaries are essentially the same as the coundaies for the Southwest Lincoln County Water District. Existing water facilities consist of two diversion dams on Big Creek and Starr Creek. The combined low summer flows of the two sources range between 0.6 and 1.1 million gallons per day. A 200,000 gallon storage tank is located at the north end of the district near Waldport.

According to a Lincoln County Regional Water and Sewerage plan prepared by Clark & Groff Engineers, Inc. (1970), the present system at a maximum daily demand of 300 gallons per capita per day would be sufficient to support a population of 2,000. The use of 300 gallons of water per capita per day (gpcd) appears unnecessarily high as the national average rate of consumption is estimated to be 150 gpcd. According to Robert E. Meyer Engineers, Inc. (1974), the annual average rate of water consumption in the Southwest Lincoln County Sanitary District is 150 gpcd. At such an average rate of consumption, the existing water system would be sufficient to support a population of 4,000.

The water district has considered Vingie Creek as a future source of water. It has water rights for 0.3 cubic feet per second (0.19 mgd) of flow. It is projected that an additional 320,000 gallons of reservoir storage will be needed in the district to meet 1990 population needs. The combined water supply from the three creeks would supply a summer population of 3,000 people. The quantity of water available to the district is sufficient to meet the needs of all projected growth in the area, assuming that storage and transfer facilities are constructed as necessary.

The physical and chemical water quality standards and recommendations of the Public Health Service and the Oregon Board of Health appear in Appendix C-2.

Existing Sewage Disposal Conditions

Septic tanks with subsurface leach fields are the major means of treating and disposing of sewage in the Southwest Lincoln County Sanitary District. Virtually all residences and commercial buildings have horizontal leachfields or vertical seepage pit disposal systems, although seepage pits are no longer allowable under Department of Environmental Quality requirements. The Camp Angell Job Corps Center and

Tillicum Beach maintain a small (0.02 mgd capacity) sewage treatment plant which discharges secondary treated wastewater to Big Creek.

Portions of coastal Lincoln County have sewage disposal problems. During 1968 and again in 1972, these problems along county beaches were surveyed by the Lincoln County Sanitation Department, the Oregon State Health Division and the Department of Environmental Quality (Oregon State Health Division, 1973). In southwest Lincoln County, eight problem sources of sewage were conclusively identified during the 1972 survey. Tests on eight other dwellings were inconclusive and two dwellings were found to have satisfactory disposal systems. Those problem sources appeared clustered in two major areas -- from Yaquina John Point south to Waconda Beach and at San Marine.

Soil conditions within Southwest Lincoln County Sanitary District greatly influence the performance of septic tank systems. The sedimentary substratum is often overlain by layers of impervious sandstone, blue clays or silt which appear as alternating bands. These impervious layers cause water to accumulate and form a perched water table which typically flows laterally westward, breaking to the surface on cliffs, cut banks and beaches. Under Lincoln County regulations, septic systems cannot be installed wherever the depth to this perched water table is less than two feet from the surface during any season of the year.

The problems of impervious soils and high groundwater are compounded by the fact that many dwellings are located in dense clusters and on small lots (sometimes as small as 3,750 square feet). Such small lots are of inadequate size to support a septic tank, leachfield plus full replacement area in case the existing septic system fails. While many homes in the past were constructed on small lots, in the future (after July 1, 1976) septic system approvals must be based on a minimum lot size of 7,500 square feet. It is quite possible that 7,500 square feet may not be adequate for proper sewage disposal, and that a lot size on the order of 15,000 square feet would be more suitable (Oregon State Health Division, 1973; Dobey, pers. comm.; Osborne, pers. comm.). According to the subdivision evaluation in the Oregon State Health Division report (1973), "on all lots examined the biggest limiting factor for the proper installation of a subsurface sewage disposal system is the lot size. The average size of the 1,005 lots examined was approximately 85 by 100 feet. Even in ideal situations, it is impossible to place a house, driveway, garage and septic tank drainfield with full repair area on this sized lot". Even with larger lot sizes, approval of a septic system may not be possible if the groundwater is too close to the surface, the slope is great or percolation is inadequate. Septic systems on large lots have been disapproved in the past in southwest Lincoln County (Lincoln County Health Department, individual site evaluations for subsurface sewage, 1971-1974).

The presence of a possible health hazard in southwest Lincoln County has been documented in the 1968 and 1972 beach surveys and during a 1974 Department of Environmental Quality field survey in the Yaquina John Point area. Those septic systems found in violation during the 1972 survey have been for the most part corrected by pumping out the septic wastes and/or relocating seepage pits or adequate leachfields. However, because of the inherent soils and groundwater problems, most corrections have been considered as "stop-gap" measures (Dobey, pers. comm.; Osborne, pers. comm.).

In March 1975 the Oregon Department of Environmental Quality prepared an Area Review Report - Waldport to Yachats. This report reviewed past surveys done in southwest Lincoln County and summarized the documented septic system problems and possible health hazards in the area. Examples of sewage problems from the report are as follows:

"1. Beachside State Park has had problems continually. Systems have failed in the past and 12 dry wells were installed in 1972 and these failed within two weeks.

"2. The Special Services Division conducted a house-to-house survey in July 1974 on Seabrook Lane and found many sewage system failures. One man interviewed said that 'most of the septic tanks run into the streams mostly through springs which erupt along the canyon...'.

"3. Twenty unit trailer park at Yaquina John Point has had sewage in ditches.

"4. Wakonda Beach - Center Street - some sewage problems but low use homes.

"5. Big Creek area - homes south of Big Creek have failed because of high water table sewage.

"6. Failures have occurred at Sea Shore Cottages." (Department of Environmental Quality, 1975)

Although most of the documented septic system failures and problems in southwest Lincoln County have been in the area west of Highway 101, septic system denials have been spread throughout the district, indicating that the problem of high groundwater and impermeable soils is general to the study area rather than of a localized nature. This is verified by Figure 4, Geologic Hazards of the Study Area.

In all likelihood, high groundwater in some parts of the southwest Lincoln County study area is in contact with sewage effluent from septic systems. During the rainy winter months and in very wet years, sewage and groundwater contact probably becomes more prevalent. Since a majority of the residences of the Southwest Lincoln County Sanitary District are on a district water supply, the documentation of well contamination is nonexistent (Dobey, pers. comm.).

Archeological - Historical

Cultural background. When the first Europeans arrived on the Oregon coast, two groups of people, the Alsea and the Yaquina, occupied the coast between the present Towns of Newport and Yachats. Historically the Yaquina were restricted to Yaquina Bay and the lower 30 miles of the Yaquina River (Dorsey, 1890). The majority of known Alsea sites were situated on Alsea Bay and the Alsea River. Unlike the Yaquina, several coastal sites were reported for the Alsea. The northernment village, Ku-tau-wa, was situated at Seal Rock. The southernmost village, Ya-qai-yak, underlies the modern Town of Yachats (Dorsey, 1890).

The Yaquina and Alsea were linguistically classified as Penutian-speaking people (Schaeffer, 1959) and, along with the Siuslaw, further subdivided into the Yakonan stock (Swanton, 1952). Dorsey (1890) noted that the Yaquina and the Alsea spoke the same dialect but could be "distinguished by a few provincialisms". Lacking any other distinction, the Yaquina are often lumped with the Alsea and discussed as a single group (Beckham, 1973).

Mooney (1928) estimated the pre-contact (1780) Alsea, Yaquina, and Siuslaw population to be around 6,000 individuals. The 1910 census lists 29 Alsea and 19 Yaquina (Department of Commerce, Bureau of the Census, 1915). By 1930 only nine Alsea remained (Swanton, 1952). Numerous diseases introduced by Europeans were responsible for most of the population decline. Displacement of native groups by Euro-Americans and the resultant increased pressure on limited natural resources accelerated the rate of decline.

With the establishment of the reservation system in 1856, the Yaquina-Alsea were placed under the jurisdiction of the Alsea subagency. Coos, Lower Umpqua, and Alsea populations were concentrated in several villages, the largest at Yachats, and encouraged to become agriculturalists. Most attempts at agriculture failed.

The Alsea subagency was opened for Euro-American settlement in 1876. Those Yaquina-Alsea who had not already done so were moved to the Siletz or Grande Ronde reservations (Beckham, 1973).

Our knowledge of the native cultures of the central Oregon coast is tragically deficient. The more affluent and colorful peoples to the north and south monopolized the interest of early coastal observers. The coastal peoples of Oregon, removed from the main line of communication, were viewed as "an eddy in the swirling current of North Pacific culture" (Drucker, 1939). When the deficiency was recognized, it was too late. All that remained were a few scattered elderly individuals, several generations removed from a now extinct cultural system. From these informant's vague images were resurrected of several lesser-known coastal cultures, included among them the Alsea (Drucker, 1939). Unless otherwise cited, the following brief outline of Alsea culture was gleaned from Drucker's 1939 monograph.

The Alsea (including the Yaquina) had developed an adaptive strategy designed to exploit four generalized habitat types: (1) intertidal zones; (2) estuaries; (3) coastal streams; and (4) upland meadows. East-west flowing river systems bound these exploitative zones together. The importance of the river systems in Alsea-Yaquina sites were located on the Yaquina River or the estuary near its mouth. Seventeen of 20 Alsea sites were similarly located on the other Alsea River system (Dorsey, 1890).

The river systems supplied the Alsea-Yaquina with their primary resource, salmon. From midsummer to late fall the rivers were choked with runs of chinook, silver and dog salmon. Salmon were netted, speared, or caught in weirs. Some meat was eaten fresh, but most was dried or smoked and stored for winter consumption. Other economically important fish included smelt, herring, flounder, perch, and lamprey eels. Fishing was confined to rivers, estuaries, and intertidal pools. The Alsea were not known to have fished offshore.

Land mammals were rarely exploited. Deer were taken in the summer and elk in the fall. Fur-bearing mammals, such as beaver and sea otter, were frequently killed. Very little information exists on how these mammals were procured.

The only consistently hunted sea mammals were seals and sea lions which were clubbed or harpooned on offshore rocks. Sea mammals were not pursued on the open ocean. Whaling was not practiced although beached whales were utilized.

Birds were occasionally exploited. Quail, grouse, sea gulls, and various waterfowl were the most actively pursued.

While the above resources were collected by males, females added molluscs, tide-pool species of plants and animals, roots, berries, and other vegetable foods to the diet. One of the more important root crops was camas collected in upland meadows. Acorns were also commonly collected in the uplands.

Permanent winter villages were usually established in a protected location near the forest-littoral ecotone and salt-freshwater ecotone. These criteria generally fit only one habitat, an estuary.

Winter dwellings were large, rectangular, semisubterranean plank houses with gabled roofs and vertical plank walls. Smaller rectangular, gabled roof structures were erected at temporary summer camps. The covering was grass thatch instead of planks.

Transportation was by foot or canoe. Three kinds of canoes were employed historically. Ocean-going Nootka canoes were highly prized and occasionally purchased from northern groups. A similar but smaller Chinookan canoe was manufactured locally, and a shovel-nosed river canoe was also of local origin. The lack of locally manufactured ocean-going canoes emphasizes the relative unimportance of the open ocean in Alsea-Yaquina culture.

The Alsea-Yaquina were patrilineal and patrilocal. They did not have a ranked, hereditary social system. A man rose to prominence by accumulating wealth and gained prestige by distributing his wealth. The wealthiest man in a village was generally the headman, but several lineage heads could jointly assume this role. Villages were politically autonomous. The only bonds between villages were kinship and a shared language. Polygamy was allowed although rarely practiced. Slaves were often purchased, but slave raids were not undertaken.

Archeological background. Since 1951 three systematic surveys and one major excavation have occurred on the Oregon coast between Newport and Yachats. The pioneering survey was accomplished by Lloyd Collins in 1951. He recorded three sites within the confines of the proposed impact area. These sites were 35LNC14, 35LNC15, and 35LNC16 (site files, Museum of Natural History, University of Oregon).

In 1968 Wilbur Davis identified 78 sites along the central Oregon coast. Only one new site, at the mouth of Deer Creek, was added to the inventory in our study area (field notes on file, Oregon State University). Many of these sites have yet to be recorded on the state inventory.

Extensive excavation of the Seal Rock midden (35LNC14) was begun by Oregon State University under the direction of Richard Ross in 1972. A second field season at the same site was completed in 1974. Analysis of the Seal Rock data is still in progress.

The Oregon State Parks and Recreation Department, Oregon State Highway Division, authorized an archeological survey of state parks along the coast beginning in 1975. The survey is being accomplished by Oregon State University under the direction of Richard Ross. Although sites have been found between Newport and Yachats, they are well beyond the impact area for the sewage lines (field notes on file, Oregon State University).

Federal and state inventory of historic sites. According to the latest published version of the National Register of Historic Places (February, 19, 1976), only one site is listed in Lincoln County -- the old Yaquina Bay lighthouse, Yaquina Bay State Park.

The Statewide Inventory of Historic Sites maintained at the Historic Preservation Office, Parks and Recreation Department, Oregon State Highway Division, lists two historic properties within the impact area which may be eligible for inclusion in the National Register -- the Oregon Coast Highway and the Seal Rock midden.

Socio-Economic Features

Population

Existing conditions. The Southwest Lincoln County Sanitary District population fits into three distinct analytical categories: (1) permanent year-round residents; (2) vacation summer home occupants; and (3) transient tourist population. Both the vacation and transient population components have contributed most to recent population increases, while the permanent component has increased very slowly and, in various surrounding cities, actually declined between the last two census periods. During the period between 1960 and 1970, Lincoln County population increased much more slowly than the State of Oregon, while the population in Waldport City, north of the district increased only slightly faster than the County of Lincoln. These data are presented in Table 6a.

The median age of residents of Lincoln County in 1970 was 38 years, while the median for the Waldport Statistical Division was 42.7 years. This indicates a greater concentration of retirement age residents in the project area. Lincoln County as a whole contains the largest concentration of retired persons among all Oregon counties. In 1970, 18.7% of its total population were age 65 or older.

Table 6a

REGIONAL POPULATION - 1970 AND 1960

	1970	1960	% Chg.
Waldport City	700	667	4.9
Lincoln County	25,755	24,635	4.5
Oregon	2,091,385	1,768,687	18.2

Source: U. S. Bureau of the Census.

Table 6b

EXISTING AND PROJECTED NONTRANSIENT POPULATION

	Year-Round		Part-Time		Total	
	Persons	Housing Units	Persons	Housing Units	Persons	Housing Units
Present (1975) population	815	340	1,225	510	2,040	850
Historical annual absorption	---	9	---	14	---	23
Projected						
1985	1,030	430	1,560	650	2,590	1,080
1995	1,260	520	1,885	790	3,145	1,310
2025	1,920	790	2,880	1,210	4,800	2,000

Sources: Present housing unit count from Southwest Lincoln Water District (Campbell); the district has about 900 current users of which 50 are non-residential. Present population from County Sewerage and Solid Waste Management Study via Robert E. Meyers. The total estimate was about 2,700,

Permanent residents. The lack of a stable employment and economic base has inhibited the formation and growth of a population base in the typical labor force participation age range. The approximate permanent population in the District based on Lincoln County Water, Sewerage and Solid Waste Management population studies and EPA surveys, is currently over 816 persons.

The rate of population growth, 4.9% from 1960 to 1970, as indicated in Table 6a, may be considered an accurate reflection of the population growth in the study area, but a more important aspect of the district's population characteristics is the age distribution mentioned above. During the early 1960's, several small wood-processing and logging operations in the area ceased operations, adversely affecting the employment possibilities for local residents. A concentration of timber-related industry formed in and around the City of Toledo, approximately 35 miles to the northeast. Hence, an out-migration of permanent resident labor force participants, coupled with an in-migration of permanent retired residents, has tended to result in a nearly stable population level. Although growth in numbers of permanent residents has been very slow, the age composition of the population has been changing.

Vacation summer home occupants. In 1970, 12,521 housing units existed in Lincoln County, of which 3,014 were vacant yet not for sale; 94%, or 2,386 of these units, were located along the coastal strip of Lincoln County from Lincoln City to Yachats. The actual number of these coastal units located within the Southwest Lincoln County Sanitary District has not been accurately tabulated.

Using Southwest Lincoln County Water District connections of approximately 850 residential service units, and assuming a persons-per-unit factor of 2.4, a district population estimate of 2,040 persons is obtained. A survey of subdivisions within the district indicated a housing ownership pattern of approximately 40 percent permanent residents and 60 percent seasonal residents. Assuming a 60 percent seasonal occupancy of structures served by the water district, a seasonal population of 1,224 persons is estimated. This added to the 8.6 estimated permanent residents yields a total of 2,040 non-transient residents (i.e., permanents plus part-time residents).

Transient Population. The firm of Robert E. Meyer Engineers, Inc., estimated the current peak Southwest Lincoln County population at 2,700 persons, 660 of which are designated tourist. A tourist is generally one who stays overnight in the project area in other than a permanent or seasonal residence.

The tourist industry is very widely discussed and little understood; no attempt was made to arrive at an alternative projection. Extensive data were reviewed on the use of area tourist facilities such as motels, state parks and campsites. It appears that steady increases in tourist traffic are occurring especially during the peak season and that estimates of 660 tourists may be too low. Tourist estimates for future years (HGE, January 1974) would be 760 in 1980, 914 in 1990 and 1,063 in 2000.

Population projections. Some units in the Southwest Lincoln County Sanitary District appear to pre-date 1920, the year in which the district's first six subdivision recordings took place. By using an estimate of 850 housing units within the district, it appears that the annual absorption of housing units has been around 23 since 1920. Between 1920 and 1959, only three additional subdivision maps were filed; the bulk of subdividing has taken place since 1960. Construction activity in the district appears to have been more active from the 1950's to the present than at any time since the 1920's. Records on building permits go back only to 1972. However, field inspections, independent estimates of buildout by subdivision and of recent and current second-home ownership in Lincoln County suggest that a range of 20-24 units/year is appropriate for projection purposes. In Table 6b, an annual increase of 23 housing units is applied to the estimate of the current housing stock to result in projection of future housing in 1985, 1995 and 2024 (10, 20 and 50 year projections). These have been broken down into two components, year-round and part-time, to reflect the addresses of the present owners of existing units (about 60 percent out-of-town and 40 percent local owners, based on a sample compiled by GG+A).

The population increases implied by the figures presented in Table 6b represent a more rapid rate of growth than has been experienced by Waldport recently (Table 6a). This would not be unexpected, since there is more vacant land available in the more open and rural areas outside the towns.

The population projections presented in Table 6b correspond closely to those provided by HGE Engineers and Planners in Volume 1 of the Lincoln County Comprehensive Water, Sewerage and Solid Waste Management Plan. HGE projects a 1995 peak population of 4,118 which includes transients who would amount to about 24 percent of the total peak season population. Deducting 24 percent from the 1995 total estimate of 4,118 for the district leaves 3,130 year-round and part-time residents as the 1995 HGE estimate, as compared with the projection of 3,145 presented in Table 6b based on historic absorption of 20-25 housing units per year.

The projections in Table 6b are somewhat lower than those presented in the Southwest Lincoln County Sanitary District Sewerage Study (Meyer, 1974). The peak population in 1995 would be 4,300 compared with 3,145 in Table 6b, while by 2025 the difference would be 6,000 (Meyer, 1974) vs. 4,800 (Table 6b). The Meyer report takes into consideration what the project engineer believes to be the stimulating effect of provision of sewerage in the area on growth, while the figures in Table 6b represent simply a continuation of existing trends. Table 6b figures also assume a household size of 2.4 (from 2,040 year-round plus part-time residents divided by 850 housing units) which is slightly lower than Meyer's 2.5 persons-per-household (drawn from census data reflecting only the permanent population).

In evaluating the projections, the reader should keep in mind the distinction between a projection and a forecast. A projection is an extrapolation into the future of existing trends. A forecast involves the application of additional information and judgment to adjust a projection with a view toward making it more accurate.

The figures presented in Table 6b have not been adjusted. Although many variables may well alter over time, there is not enough information available to translate the projection into an informed forecast. For example, the housing recession of recent years may be protracted and projected new construction in the project area may therefore be overstated. The historic division between local, permanent residents and out-of-town, second-home owners may not persist into the future and the growth rate for one group may turn out to be faster (or slower) than for the other. A full market study would be necessary to pin down this variable more accurately. Demographic variables may also alter: average household size can change over time; the exodus of the permanent population in the older teenage and young adult years could slow down (or speed up); the second home market could be reduced by saturation or by the prior absorption of the most desirable building sites; changes in preference among consumers affecting the disposition of recreational expenditures; or decelerating advances in real income. While these and other contingencies have not been taken into account, it is hoped that the figures presented will suffice for the purpose of considering environmental impacts.

Economy

The economy of Lincoln County is driven by three primary activities: (1) tourism, (2) fishing and fish processing, and (3) forest products. All three basic industries are highly seasonal and susceptible to cyclical variations generated by the state and national economy and natural phenomena. This economic instability is a major contributing factor to the slow population growth in the Southwest Lincoln County Sanitary District.

Tourism. Tourism appears to be the fastest growing economic benefit within the study area and the second largest source of revenue for the county as a whole. A good index of tourist activity in the project area is the average daily traffic flow on Highway 101. This flow is tabulated and presented in Table 7. A substantial 22 percent increase in traffic volume is shown for the five-year period between 1969 and 1974. The decrease shown between 1973 and 1975 is considered a reflection of both the temporary gasoline shortage and the generally depressed economic condition at that time, which resulted in fewer vacation trips to the Oregon coast. The recession years of 1970 and 1971 are also reflected in the traffic volume data by a smaller than usual increase in traffic flow.

Tourism in the county, however, is not only susceptible to cyclical movements, but is characterized by wide seasonal variations in level of activity. Table 8 lists the monthly average daily traffic in the study area by percentage of 1974 annual average daily traffic.

The tourist season for Oregon extends between the months of May through August and is most intense during the month of August, dropping sharply after the Labor Day weekend. This pattern is clearly demonstrated by the Average Daily Traffic (ADT) data in Table 8 which shows traffic flows well in excess of 100 percent of the annual average during these months. Examination of the distribution of traffic flow from 1969 to 1974 indicates that 1974 was a typical year.

Estimates of the number of tourist vehicles passing through the study area on a yearly basis from 1969 to 1974 were also calculated and are presented in Table 9.

A comparison of percentage increases in Table 7 and 9, indicates that tourism is most responsible for overall increases in traffic flow throughout the study area. Although tourism is not significant during the winter months, local residents and business operators in the area, when questioned, all indicated

TABLE 7

Historical Average Annual Daily Traffic
U.S. 101: Yaquina Bay to Yachats

Year	Average Daily Traffic
1969	4,188
1970	4,615
1971	4,870
1972	5,303
1973	5,409
1974	5,106
% Increase 1969-1974	22%

Source: Oregon State Highway Division
Traffic Volume Tables, 1974

TABLE 8

Average Daily Traffic by Month: 1974
U.S. 101: Yaquina Bay to Yachats

Month	% of 1974 ADT (5106) Experienced	Volume of Traffic per Month	
January	56.7	2,895	
February	62.4	3,188	
March	82.8	4,227	
April	92.7	4,734	
May	107.4	5,486	Tourist Season
June	124.4	6,350	
July	147.2	7,516	
August	162.8	8,315	
September	122.2	6,241	
October	90.1	4,599	
November	78.9	4,031	
December	72.2	3,687	

Source: Oregon State Highway Division
Traffic Volume Tables, 1974

TABLE 9

Average Daily Tourist Traffic 1969-1974
U.S. 101: Yaquina Bay to Yachats

Year	Average Daily Tourist Traffic
1969	1,379
1970	1,532
1971	1,603
1972	1,745
1973	1,800
1974	1,680
% Increase 1969-1974	22%

Source: Gruen Gruen + Associates; compiled from
Oregon State Highway Division
Traffic Volume Tables, 1974

that weekend traffic throughout the year had increased substantially in recent years. The relationship between weather in the Willamette Valley and along the coast during the winter can greatly influence a winter tourism. The percentage increase in average daily tourist traffic increased by 30% between the 1969 through 1973 period.

The many coastal state parks and campsites which are located along Highway 101 have, no doubt, had a salubrious effect on the travel industry in recent years. Table 10 contains data on the usage of these facilities during recent years as compared with that of all similar state facilities. Some interesting comparisons result from this data which seem to set this area apart from the rest of Oregon in terms of its tourist industry. Between the years of 1971 and 1975, a 33.3% increase in campernights spent in the study area was observed, while only a 2.4% increase in usage was observed for all state facilities.

The divergence between state-wide and study area use is explained by the accessibility advantages which the facilities in the study area have over the majority of the facilities in the state. Campsites in the study area are located adjacent to U.S. 101 which is a major Oregon coast tourist route, but many of the camping facilities throughout the state are located off lesser traveled roads. Coastal campsites and particularly those in the project area therefore tend to capture a larger amount of the tourist traffic than the less accessible inland facilities. It is significant to note that these data were compiled from counts of incoming vehicles to the project area facilities, and many of the parks in Oregon do not have traffic counters. Where they are lacking, park attendants usually estimate usage on a weekly or monthly basis. Thus, the project area usage data will generally be more accurate than that of the state as a whole.

When compared with similar facilities throughout the state, day use facilities in the area showed a smaller increase in usage. Again, accessibility differences may be responsible for this divergence. Day use sites tend to be visited more steadily on a year-round basis by local residents than by seasonal visitors. The permanent population of the area is, of course, very small compared to that of more developed areas within the county and state and, therefore, local day use facilities received less usage than those in heavily populated areas. The day use and overnight camper data seems consistent with a slow permanent population growth rate and a relatively fast increase in tourist population.

TABLE 10

State Park Usage: 1971-1975

Fiscal Year	Project Area Campsites	All State Campsites
1970-1971	69,639	1,578,173
1974-1975	92,831	1,616,645
% Increase	33.3	2.4

Day Use Facilities

	Project Area Parks	All State Parks
1970-1971	1,277,124	22,325,353
1974-1975	1,462,905	27,160,202
% Increase	14.5	21.6

Source: Gruen Gruen + Associates; compiled from Oregon State Highway Dept., Parks & Recreation Division raw park usage data

The travel industry is a difficult one to analyze statistically; however, the tourism data indicate a strong growth potential for the area. In order to gauge its importance, a motel survey of seven establishments in and around the study area from Yaquina Bay to the northern border of Yachats was conducted. The results of that survey follow: (1) motels ranged in size from seven to ninety-two units and tended to average between 16 to 20 units; (2) all motels were open year-round; (3) occupancy varied seasonally and August was cited as the busiest month, with 90% to 100% occupancy. All noted December and January as the slowest months when occupancy ranged from 25% to 40%; (4) all motels indicated that their occupants were almost exclusively tourist, except for one near Waldport which reported only a 75% tourist market, the remainder being business, government and forest services occupancy; (5) rates varied between summer and winter for all except one of the motels; (6) owners and operators reported that their visitors came from all over the United States and Canada. Those visitors from Oregon come primarily from the Willamette Valley Region; (7) six of the seven owner/operators indicated that they felt tourist activity in the vicinity was increasing; (8) four of the seven outlined plans for upgrading and improving their facilities within the next two years; and (9) three owner/operators said they considered a new motel in the area would be a good investment. Two said they wouldn't build a new motel, one said motels tie you down too much, and one talked about high taxes and minimum wage laws.

No projections were attempted as to the magnitude of future employment or sales resulting from this industry. But in 1973, over 1,200 persons were employed in various jobs related to the travel industry in Lincoln County (1974 OCCDC, p. B20). In 1972, about 465 persons were employed in hotels and other lodging places in Lincoln County (Census, County Business Patterns, 1972), a tripling of the 1962 persons so employed.

Seasonal vactioners. A second component of the tourist industry is the seasonal resident population which increases substantially during the summer months. The bulk of this population owns property in the area on which they may have constructed summer homes or set mobile homes. The District seasonal resident population consists of approximately 1,225 persons and real estate activities point to a steady future growth of this component.

A survey of the study area residential ownership patterns was conducted. The study was conducted by randomly selecting 127 lots from various subdivisions within the Sanitary District, of which 100 had dwelling units. The incidence of nonresident

ownership of all property sampled was 61.1%, while residents owned 38.9%. It was further discovered that approximately 60% of dwelling units (not including trailers) were owned by non-residents, while 40% were owned and occupied by residents. Lincoln County building permit records further indicate that of all building permits granted for housing construction within the Sanitary District boundaries (since 1972 when permits became mandatory), over 70% of new home construction was by non-residents. The residence addresses of these new builders ranged throughout the United States and Canada, but the bulk of them were in the Willamette Valley fifty to eighty miles east of the study area. Present trends indicate that future building in the area will be mostly second homes for persons having permanent residences in other parts of Oregon. This growth will add further to the seasonal population and retirement economy base that typifies the Sanitary District.

Forest products. Forest products, as a major component of the Lincoln County economy, still play an important role in providing employment income to the area. Peak employment was reached in 1960, with a level of 2,019 forest product-related jobs. That number has been steadily decreasing, and in 1973, forest products accounted for only 609 jobs in Lincoln County. Forest products in the project area appears to have diminished more quickly since 1960 than for the County of Lincoln in general. A number of small mills closed because of their inability to compete with larger scale operations based in Toledo and other areas. The Siuslaw National Forest is the largest potential timber resource near the project area, but it holds little potential for bolstering the local forest product economy. Much of the timber harvested is shipped to larger processing plants in surrounding Lincoln County and other communities.

Fishing. In 1973, Lincoln County accounted for approximately 20% of the Oregon coast total fish catch. About 475 persons in Lincoln County were employed in the fishing industry in 1967 (Clark and Groff, 1970). Newport, north of the study area, is the major fishing and fish-processing center in Lincoln County, but its growth potential is inhibited by the lack of adequate port and processing facilities. Recent estimates indicate that over 90% of the Newport salmon and albacore catch and 30% of the crab catch is shipped elsewhere for processing. This catch constitutes the bulk of the Yaquina Bay fishery. Experimental work in aqua culture and clam harvesting in the Yaquina Bay area may eventually enhance the commercial fishery. Although an important component of the

overall Lincoln County economic base, fishing and fish processing offer little potential for economic growth in the project area.

Employment. Although study area specific data on employment were not available, existing county-wide data and extensive tours of the area enable one to make some general conclusions about its employment characteristics. The relatively high proportion of population over the age of 65 serves to support the assumption that self-employment and retirement benefits constitute a major source of income for district residents. U.S. 101, which runs the length of the district, is dotted with a number of small gift shops, garden and flower shops, and small item grocery stores, not to mention the motels discussed earlier. Real estate is also to be an important employment category with employment in that sector showing an increase of 70 percent between 1962 and 1972 (Census, County Business Patterns). Over half of the buildable area in the district has been subdivided since 1960 (County Assessor's records). Additionally, Lincoln County had a rate of self-employment in 1970 of 16.6% of its labor force, while the nationa average is about 9% self-employed. Nearly 6% of those in the labor force were past the normal retirement age of 65 and 40% of this group was self-employed (Lincoln County Planning Department, 1973). In 1973, Lincoln County had 5,050 recipients of Social Security retirement benefits (of the coastal counties, only Coos County had a greater number) or 18% of total population, which was the largest percentage of all coastal counties in Oregon.

The three major employment sources for Lincoln County constitute a relatively unstable and seasonal economic base. This fact is reflected in the unemployment rates experienced in Lincoln County since 1960, as presented in Table 11.

Income. In 1970, the annual family income for the majority of Lincoln County families was between $5,000 and $10,000 (1970 U.S. Census). The average family income was $9,031.00 per annum which was lower than that of all the surrounding counties as well as that of the state.

Given the importance of self-employment and retirement benefits as a source of income in this district, the mean income levels by source in Table 12 are illuminating in terms of the study area income level.

TABLE 11

Annual Average Unemployment Rate
Lincoln County, 1960-1971

Year	Labor Force	Unemployed	% of Labor Force Unemployed
1960	8,100	560	6.9
1961	7,740	800	10.3
1962	7,640	590	7.7
1963	7,470	510	6.8
1964	7,850	530	6.8
1965	8,400	530	6.2
1966	8,550	560	6.5
1967	8,950	630	7.0
1968	9,100	520	5.7
1969	9,140	570	6.2
1970	9,400	740	7.9
1971	9,420	740	7.8

Source: Research & Statistics, State of Oregon, Employment Division, Corvallis; January, 1972. In: Lincoln County Planning Department, 1972; overall economic development plan, Lincoln County, Oregon.

TABLE 12

Source of Income
Lincoln County: 1970

Source	Mean Income
Wage and Salary	$7,868
Non-Farm, Self-Employed	6,585
Social Security	1,793

Source: 1970 U.S. Census of Population

Because of the higher-than-average concentration of retired and self-employed residents in the district it appears likely that income in the area is well below that of the county and the state for the bulk of the permanent population.

Future Trends in Population Growth

Factors affecting future population growth. The population growth of the project area is at best difficult to predict because of the changing character of the community. Generally, increased employment prospects tend to result in population growth within a given area.

Since the Southwest Lincoln County Sanitary District population consists of such a large proportion of individuals who are non-participants in the labor force, other factors such as property values, availability of tourist accommodations and natural environmental amenities may become more important forces in shaping the future character and size of the Southwest Lincoln County community.

Future employment prospects. The forest products industry and the fishing and the fish-processing industry are not likely to result in significantly increased future employment opportunities for residents of the community. To the contrary, increased mechanization in both of these industries could appreciably diminish already existing opportunities.

The tourist industry appears to hold the greatest potential for the area in terms of employment prospects. Presently, the privately owned and operated motels, gift shops, restaurants and small grocery stores cater to this market. It is the largest source of self-employment presently in the community. Because of the seasonal character of this market, it appears that additional proprietor participation will take the form of expansion of existing facilities before new entries of a significant level are realized. This industry also furnishes a source of seasonal employment for the retirement aged residents.

Retirement and vacation population growth. This has been the largest source of population growth in recent years. It is of course highly dependent on land availability and prices. Assessed valuation trends of the Southwest Lincoln County Sanitary District are presented in Table 13 and provide a comparison with trends in property valuation at the county and state level. The present total property tax rate in the Waldport-Tidewater section of Lincoln County is $19.73 per $1,000 of assessed valuation.

TABLE 13

Real Property Valuation

Year	State of Oregon	Lincoln County	Southwest Lincoln County Sanitation District
1969	13,215,725,797	281,526,299	9,374,690
1975	26,190,390,714	568,637,940	17,521,722
% Increase	98%	102%	87%

Source: Gruen, Gruen + Associates

Table 13 indicates that property values within the Southwest Lincoln County Sanitary District have not been increasing as fast as all property within the State of Oregon, and an increase at a rate well below that of the rest of Lincoln County. The relatively slow growth in Southwest Lincoln County District property values may be explained in part by restrictions placed on property owners in the area during recent years. In an effort to preserve the environmental quality of the area and comply with State Department of Environmental Quality regulations and directives, Lincoln County Sanitary officials have disallowed a number of requests for building permits on the basis of inadequate soil conditions for septic tanks. The bulk of property in the district is zoned for residential usage and held by individuals with intentions to build retirement or second homes. Many of the building lots, however, are smaller than the minimum size eligible for septic tank usage and therefore cannot be developed for their intended purpose. This has probably been a factor in holding property values down within the district and may account for some of the divergence between district and county assessed value trends.

Future growth of the retirement population will depend not only on the level of land prices in the district but on the tax and service rates resulting from providing the necessary sewerage facility and other utilities which will enable the building of retirement and second homes. Large increases in property values may discourage newcomers to the area and inhibit anticipated buildout while excessive sewer district costs may actually depress property values and thus discourage future growth.

Tourist population. The management of state parks and recreation facilities within the district will be a key element determining future growth of the area transient population. Further acquisitions of beach property are not presently planned by the State of Oregon. However, the development of two coastal parks in Southwest Lincoln is planned. Smelt Sands and San Marine will be developed for tourist usage within the coming years and should therefore accommodate a larger peak tourist population. Any expansion of motel facilities or additional entries to the industry will surely result in an increased peak population during the summer months.

Land Use

The Southwest Lincoln County Sanitation District extends south along the Oregon coast from Yaquina John Point to Mitchell Creek north of Yachats. Existing development in the District

has tended to hug the coastal strip and concentrate itself on embayments and on either side of U.S. Highway 101. The developed areas to the west of the highway provide easy access to the sandy beaches and rocky coastal sites which abound in the project area. Because of steep and rugged terrain to the east of and in places along Highway 101, development has tended to occur in clusters which afford the greatest highway access and ocean view. General land use in the area is shown in Figure 5.

The inland boundary of the district lies one to two miles east of the coast. Approximately 3,000 acres of land are contained within the district boundaries, the distribution of which is indicated in Table 4.

Residential. The Sanitary District contains 20 legal subdivisions. However, it is not known how many lots within these subdivisions are actually buildable. A substantial portion date back to the early 1900's when streets in some instances were dedicated yet no rights-of-way have been granted, only from 20 to 30 feet has been set aside for roads. Many of these dedicated streets end at the beach front and provide public access to the beach. The topography and soil conditions of some areas make it very unlikely that streets or utilities will ever be installed in some of the platted subdivisions.

The newer subdivisions (those established since 1950) are more likely to have streets which have been designed in conformance with the physical conditions of the land. An examination of the actual sites and subdivision area maps, as well as county assessment records, indicates that approximately 30% of the subdivision lots have been built upon. Table 14 lists the district subdivisions and indicates the age and level of present development, as well as the percentage of buildings owned by local residents. These dates and percentages are rough estimates compiled from extensive tours of the area and conversations with county assessor's office officials.

Recreation. There are four developed and operating state parks and recreation facilities in the district. The state has plans to develop two others, Smelt Sands and San Marine, as indicated on the land use map, Figure 6. In addition to the state parks, the U.S. Department of Agriculture maintains the Siuslaw National Forest and the Tillicum Campgrounds for vacation use. These federal and state parks and recreation areas offer beach access and wilderness areas for many users each year and demand for these facilities is expected to increase during the coming years.

Table 14

SUBDIVISIONS IN SOUTHWEST LINCOLN SANITARY DISTRICT

Subdivision	Year Subdivided	Approx. Number of Lots Current	Estimated Current Build Out	% Local Owners
Yaquina John Point	1930	250	85%	75%
Seawood Parks	1945	26	30%	10%
Sea Brooks	1950	90	70%	75%
Rolling Hills	1964	58	50%	50%
Pine Crest	1960	18	50%	40%
Big Stump	1968	25	95%	10%
Edgewater Shores	1970	15	95%	10%
Pacific Sands	1960	15	80%	50%
Wakeeturn Green	1970	6	80%	20%
Surf Pines	1970	9	1%	0
Wakonda Beach	1920	300	70%	50%
Big Creek Estates	1971	16	50%	70%
Tillicum Beach	1920	35	50%	50%
San Marine	1920	500	30%	40%
Shore Pine Crest	1969	17	75%	25%
Crab Apple Hill	1965	750	30%	20%
Raymondville	1920	36	75%	20%
Aqua Vista	1920	200	70%	60%
Ocean Crest	1920	40	60%	50%
Fairway Heights	1970	32	10%	80%

Source: Gruen Gruen + Associates from estimates by Miller, pers. comm. Acreage figures not available. It should be noted that the number of lots given is only for the plotted sections of subdivisions, some of the subdivisions can expand to adjacent lands, thereby increasing the number of lots.

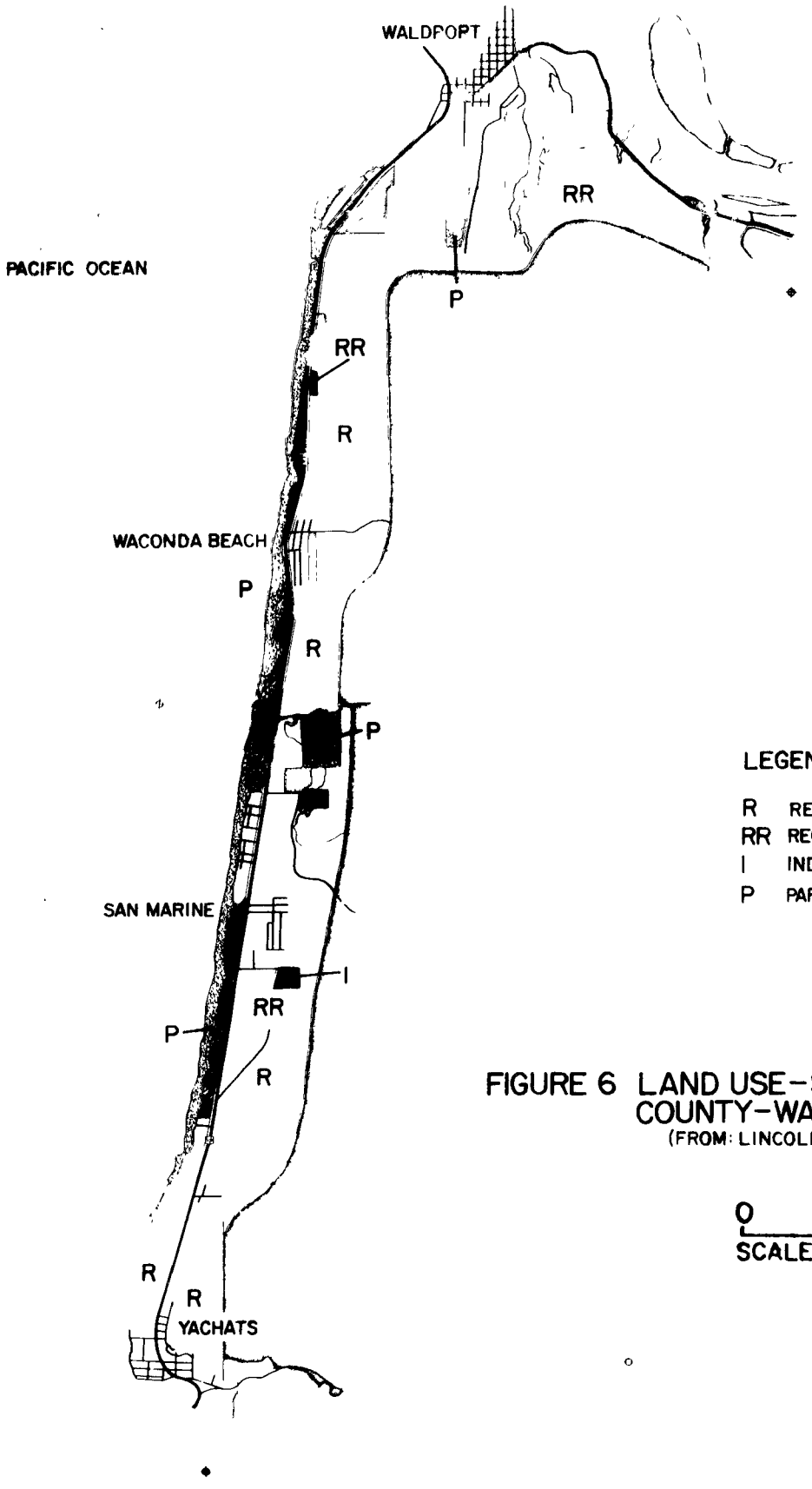

FIGURE 6 LAND USE-SOUTHWEST LINCOLN COUNTY-WALDPORT TO YACHATS
(FROM: LINCOLN COUNTY, LAND USE PLAN, 1970)

A golf course is also located in the district which serves the seasonal and vacation population of the area and receives its heaviest usage during the months of May through September.

Highways and roadways. U.S. Highway 101 is the major arterial which links the town Yachats in the south to Waldport in the north. Currently, Highway 101 receives its heaviest usage between May and August. Most other roadways are not surfaced and not maintained by any governmental authority; consequently, their conditions range from fair to poor.

Commercial. Tourism is the largest category of commercial activity in the southwest Lincoln County district. A number of motels and cottages located along Highway 101 provide easy access to the sandy beaches along the coast.

A number of small grocery stores and gift shops, located along the coast highway, capture the bulk of their business from the seasonal tourist traffic. Also located within the district are a few small greenhouse and bedding plant businesses which serve the local as well as the tourist population.

Airport. The Wakonda Beach Air Strip is located south of Waldport between U.S. 101 and the western boundary of the Siuslaw National Forest. Currently, the facility serves resident private aircraft and a number of vacation aircraft. During the last few years, the airport has received increased usage by seasonal residents and tourists.

Educational facilities. School-age children residing in the Sanitary District attend schools in Yachats (one elementary school with a 1975 enrollment of 63), Waldport (one high school, one junior high school and one elementary school; 1975 enrollment at the three schools totaled 667), and Newport (one high school, one junior high school and three elementary schools; 1975 enrollment at all five totaled 1,463). The future enrollment of the schools is expected to decline, but not as sharply as in the decade between 1965 and 1975 when enrollment fell almost 20% (Neubauer, pers. comm.).

Other uses. In conjunction with the operation of Siuslaw National Forest, a Federal Job Corps center, maintained within the study area at Big Creek, accommodates 150 students on a year-round basis.

Land Use Planning

Land use planning in the southwest Lincoln County Sanitary District is undertaken by the county level planning authority. The local planning authorities in the State of Oregon are established by the 1973 Land Use Act. By the provisions of this act, all local city or county planning jurisdictions are required to develop and maintain comprehensive land use plans which conform with adopted statewide planning goals.

State authority. The 1973 Land Use Act established the Oregon Land Conservation and Development Commission (LCDC). The commission consists of seven members appointed by the Governor and subject to approval by the legislature. Each commissioner is appointed to a four-year term of office but may be removed for cause by directive of the Governor. No member is allowed to serve on the commission for more than two full terms (SB 100, 1973, ORS, Ch. 197.5).

Following its creation in 1973, LCDC began the task of formulating a series of comprehensive statewide planning goals to be used in coordinating local planning efforts throughout Oregon. After conducting a series of public hearings and reviewing existing state land use planning goals, a series of 14 goals with accompanying guidelines for compliance were adopted by the commission on January 1, 1975. All local planning authorities were then directed to produce comprehensive land use plans and to submit them to LCDC by January 1, 1976, for commission review. By law, local planning authorities who fail to meet the required deadline can have their planning responsibilities carried out for them, at local expense, by the LCDC planning staff. Those local authorities unable to meet LCDC's deadline may be allowed extensions, provided that evidence of satisfactory progress in completing their comprehensive plans is provided. By January 1, 1976, only five planning jurisdictions in the State of Oregon had submitted complete comprehensive plans to LCDC for their review. Lincoln County was not among them.

The extent to which LCDC will be effective in centralizing and directing land use in Oregon is a subject which has received wide discussion in recent months. Many argue that the powers intended for LCDC are merely to insure a coordinated statewide planning effort through adherence to its adopted goals. But a second authority of LCDC's is to grant planning and siting permits to individuals or public agencies for land use activities of statewide significance. Activities of statewide significance are defined in the 1973 Land Use Act as

follows: (1) the planning and siting of public transportation facilities; (2) the planning and siting of public sewerage systems, water supply systems and solid waste disposal sites and facilities; and (3) the planning and siting of public schools (Oregon statutes related to comprehensive land use planning, ORS, Chapter 197.4).

It would appear that this permit authority broadens the powers of LCDC considerably beyond the coordinating level. By controlling the planning and siting of public services, such as sewerage systems, LCDC in effect could become the authority in determining community growth policy. This authority could have significant effect on the SWL County Sanitary District.

Local planning authority. A planning commission consisting of nine members from various geographic locations in Lincoln County is appointed by the County Board of Commissioners, each to serve a four-year term. The Planning Commission has authority to adopt comprehensive planning and zoning ordinances for its jurisdiction. A County Planning Director is designated by the commission to oversee the operations of the Planning Department and serve as the chief administrative arm of the County Planning Commission.

A series of preliminary land use plans have been formulated for areas within Lincoln County including the Alsea Bay Planning Area, which includes part of the Southwest Lincoln County Sanitary District. A comprehensive land use plan for Lincoln County has yet to be completed and an extension has been applied for to allow additional time to comply with LCDC goals. Zoning will have to conform to the comprehensive land use plan, and this may require significant zoning changes for some properties. The current schedule for completion of the comprehensive plan is January, 1978 (per conversation, J. Webb).

Future Land Use

Residential. The present acreage distribution among various uses is not expected to alter appreciably in the future. The bulk of acreage in the district is currently zoned for residential-commercial use and very little property remains which would be suitable for subdivision into building lots. Currently, the district subdivisions are approximately 40% built-out.

The land which is currently zoned for residential use on the western side of Highway 101 is likely to receive pressure in the future to accommodate additional multi-family, condominium or motel usage. This land has direct access to the highway routes and beach frontage and is generally more sought after for intense public and private usage than parcels to the east of Highway 101. Substantial changes, however, in land use and zone classification of the area are not expected to occur in the future. An intensification of almost all present uses is to be expected, particularly the development of additional seasonal and retirement homes.

Land ownership. Land absorption in the study area has been taking place faster by non-residents than by residents. This trend is unlikely to continue at its present rate. Non-resident lot owners in the study area are by and large non-speculative property holders. Many people have purchased a lot or two with future expectations of constructing a vacation or retirement home on the property and eventually becoming residents of the area. They tend to seek rural coastal locations, such as the project area, which afford them easy beach access and relatively low density use. Thus, as the area becomes further developed, beach access will, to some degree, diminish and open space will be used up. The result will be fewer non-resident purchases. The economic base of the area is not adequate to support large scale in-migration of a working population.

Commercial. Commercial land use in the study area is concentrated mainly along U.S. Highway 101 at the Waldport and Yachats ends of the district. Although some additional population-serving commercial facilities may be expected to enter the area as population growth proceeds, expanded land use of this type will develop very slowly. The seasonal nature of the market makes locations closer to the population centers of Newport and Waldport more attractive.

Public. The Parks and Recreation Division of the State of Oregon is a significant land owner in the study area. In addition to the three facilities, encompassing about 55 acres, currently being operated, plans exist to develop two additional sites: the Smelt Sands and San Marine properties. The development of these two facilities will result in additional summer time tourist population and could encourage the expansion of existing commercial usage.

III. ALTERNATIVE WASTEWATER TREATMENT FACILITIES

Introduction

Environmental Protection Agency rules and regulations for the preparation of an EIS (CFR 40, part 6) require that alternatives to a proposed project be developed, described, and objectively weighed when significant resource trade-offs are involved. In a project report prepared for SWCC by Robert E. Meyers Engineers, Inc. (1974) a project was prepared for the district which is included as an alternative among alternatives treated in this chapter. In this draft Environmental Impact statement analyses are performed to allow an independent comparison of the environmental and financial cost differences among the available alternatives without nominating one alternative for implementation. The reasons why a proposed alternative is selected as the best must be objectively determined and stated in detail.

At the present time, construction within the District is somewhat restricted by the inability of many property owners to obtain permits for utilization of septic tanks. The denial of permits has been based upon high groundwater conditions, unsuitable soil characteristics, small lot sizes, steepness of land slopes, or a combination of these factors. In December of 1972, the Oregon State Health Division conducted a survey of existing septic tanks in Lincoln County, using both dye and bacteriological testing. This study also summarized the denial of new permits in the District between 1970 and 1972. Within the District, out of 18 septic tank systems tested for contribution of raw sewage to the beach, eight were found in violation, two were found to be performing satisfactorily, and the remaining systems showed inconclusive results. Based on the Health Division survey, an evaluation of subdivision applications for septic tank permits between 1970 and 1972 showed that out of 211 parcels applying for permits, 173, or 82%, were denied permits. The primary, if not sole, cause for these denials was either a high groundwater level or unacceptable soils. Although detailed information is not available, numerous applications by single lot property owners have also been denied in the past years because of high groundwater and poor soils.

Problems have also been experienced at Beachside State Park, where septic tanks were pumped daily during part of the summer of 1974. After a threatened shutdown by DEQ, the park considered installing a small package plant, with disposal of effluent by spraying in a fenced area of the Siuslaw National Forest. However, this project was never carried out.

Until this draft EIS, the alternatives for wastewater management in the Southwest Lincoln County Sanitary District were described in "Sewerage Study, Southwest Lincoln County Sanitary District, Lincoln County, Oregon", prepared by Robert E. Meyer Engineers, Inc., and dated September 1974 (hereafter referred to as the Sewerage Study). Prior to this detailed Sewerage Study, the principal planning efforts had centered around the "Sewerage Facilities Development Plan" prepared as a portion of the Comprehensive Water, Sewerage, and Solid Waste Management Plan for Lincoln County, dated March 1, 1974.

The conclusion of the September 1974 Sewerage Study was that all sewage within the District should be conveyed to the existing Yachats treatment facility, which would be expanded accordingly. To transport sewage to the Yachats plant, a single interceptor would be constructed northward, terminating at the Yaquina John Point area. This interceptor would be over seven and one-half miles in length and require twelve separate pumping stations. This Statement includes as alternative 4 the project recommended in the September 1974 report.

Constraints on Alternative Development

In the development of project alternatives, there are certain institutional constraints imposed upon facility selection and cost of implementation. The principal constraints influencing the development of alternatives within the Southwest Lincoln County Sanitary District are:

1. PL 92-500 - Federal Water Pollution Control Act Amendments of 1972.

2. EPA Secondary Treatment Information, Federal Register, Vol. 38, No. 159, August 17, 1973.

3. EPA Cost-Effectiveness Analysis Guidelines, Federal Register, Vol. 39, No. 29, February 11, 1974.

4. Oregon State Department of Environmental Quality, Water Quality Standards.

5. Oregon State Department of Environmental Quality and EPA, National Pollutant Discharge Elimination System (NPDES) Permit.

6. Oregon Administrative Rules, Chapter 340, Division 7 - Subsurface and Alternative Sewage Disposal, Subdivision 1 - Standards for Subsurface and Alternative Sewage and Nonwater Carried Waste Disposal.

Public Law 92-500, the Federal Water Pollution Control Act Amendments of 1972, give EPA the responsibility for establishment of waste discharge criteria for all federally-funded wastewater treatment facilities. In addition, PL 92-500 provides three dates by which wastewater treatment facilities must meet certain effluent quality criteria. By July 1, 1977, all municipal treatment facilities should be capable of producing an effluent which meets EPA secondary treatment requirements. By July 1, 1983, all municipal treatment facilities should be providing treatment to a level referred to as "Best Practicable Waste Treatment Technology" (BPWTT). By July 1, 1985, municipal wastewater treatment facilities should have reached a condition of zero discharge of pollutants. Although this latter requirement is generally undefined and the nature of any future actions uncertain, the general definition of pollutant should be considered as any material in a discharge which adversely affects the beneficial uses of receiving body of water.

The EPA "Secondary Treatment Information" defines effluent quality requirements for achieving secondary treatment and thus compliance with PL 92-500. The requirements for secondary treatment stipulate concentration limits for effluent biological oxygen demand, suspended solids, fecal coliform bacteria, and pH.

The EPA "Cost-Effectiveness Analysis Guidelines" provide a uniform method for calculating cost of wastewater treatment projects, and they have been used as a portion of the cost evaluation in this EIS. These guidelines delineate the planning period to be utilized in alternative evaluation, the elements of cost which must be included, the method of handling prices for various components of the system, the interest rate which must be utilized, the service life of various facilities, and salvage value to be utilized for the proposed works. The guidelines provide a uniform method for comparing the cost of various alternatives for a given project, as well as the cost of any given project in the State. Therefore, while the monetary costs developed in the Cost-Effectiveness Guidelines may not always represent the "true cost" of a project, they do approximate the cost and present a uniform method for comparison of alternative projects.

The Oregon State Department of Environmental Quality (DEQ) has established minimum water quality requirements for receiving waters in this portion of the Oregon Coast. These criteria are contained in Section 11--010 of OAR Chapter 334, and they state, in general, that the highest and best wastewater treatment should be provided and that the control of waste discharge shall in every case be the best practical method. In 1973, the DEQ completed a "Draft Development Document for Water Quality Management for the Mid-Coast of Oregon",

to comply with EPA requirements (PL 92-500, 303) for performing comprehensive basin planning for all river basins in the State. This document summarized and discussed existing water quality data, water quality standards, and nutrient problems, among other subjects. The document did not, however, discuss alternatives for wastewater management nor recommend a wastewater management plan. Because of this, the EPA rejected the document, and the document is presently being revised by DEQ to fully comply with EPA requirements.

The Oregon State Department of Environmental Quality and the EPA must review and certify all National Pollution -Elimination System (NPDES) permits for wastewater discharge. The purpose of an NPDES permit is to establish specific effluent and receiving water quality requirements which must be met by a treatment plant. In formulating alternatives, only those that will meet the probable NPDES requirements are considered feasible. It should be noted that each wastewater discharger must possess an NPDES permit prior to discharge, and each permit is prepared to respond to the particular discharge situation.

The Oregon Administrative Rules, Chapter 340, Division 7 prescribe requirements for construction and operation/maintenance of septic tank systems. Any alternatives which do not provide 100% sewering of the District would permit new development in unsewered areas only in conformance with these state requirements for septic tanks.

Regionalization

The objective of a regionalized system is to provide the most cost-effective method for collection, treatment, and disposal of wastewater. It should be understood that regionalization does not imply or require that only one treatment facility be utilized, or that an entire area must be sewered, but rather that planning must be done for an entire region and not on a piece-meal basis. The term "cost-effectiveness" is comprised of three very important costs: monetary or dollar costs, environmental costs, and social costs. Within this chapter, only monetary costs are considered, since subsequent chapters describe the environmental and social impacts of the project alternatives. Typically environmental and social costs are not monetary but judgmental. The cost-effective project is that project which is judged to have the lowest overall monetary, social and environmental cost.

Several advantages can be attained by regionalization -- economy of scale in construction, operation and maintenance, wider distribution of costs, one operating authority for treatment facilities, treatment process efficiency control, easier inclusion of new residential and commercial developments into the system, and ability to plan for a basin or area as a whole. The principal disadvantage of regionalization is that local governments or agencies often must enter into joint powers agreements that extend local responsibilities beyond individual member control.

Flow and Waste Reduction Measures

At the present time, water consumption within the Southwest Lincoln County Water District (which has the same boundary as the Southwest Lincoln County Sanitary District) is about 150 gallons per capita per day (gpcd), as compared to a national average of about 200 gpcd. In most areas of the United States, roughly one-half of the water served to consumers is utilized indoors, and ultimately results in production of about 90-100 gpcd of sewage. In the study area, due to small amount of outdoor lawn irrigation, a higher percentage of delivered water is probably utilized indoors, and a sewage production of 110 gpcd (as utilized in the Sewerage Study) is considered a good estimate for planning purposes. In addition to sewage, community sewerage systems also pick up additional water by infiltration/inflow. Infiltration is groundwater which seeps into pipes due to poor joint construction, and inflow enters through manhole covers, ground drains and house roof drains connected to the sewer. Infiltration/inflow is usually highest during rainy seasons and/or when the groundwater level is high. In areas of a perched water table infiltration problems can be burdensome. The quantity of infiltration/inflow depends to a large extent on the "tightness" of the collection system, and whether house drains and other water drains are connected to the sanitary sewer system. The amount of infiltration/inflow will probably be less than 10 gpcd initially, and will gradually increase through the years, as coupling materials deteriorate, perhaps ultimately reaching 30 gpcd. It is recommended that roof drain connections to the sewer be prohibited by District ordinance, in order to keep inflow as low as possible. Because infiltration and inflow will not occur during the peak tourist season, which is the period of projected peak flow, the Sewerage Study estimate of 30 gpcd for infiltration/inflow seems high and should be documented by comparing the proposed system with existing systems having similar tourist peaking problems prior to EPA approval.

Reducing the quantity of sewage produced would be one method of reducing the existing septic tank problems, the size of major interceptors, and the construction and operation/maintenance costs of sewage treatment facilities. One method of reducing wastewater production within sewage systems is the installation of water meters on all water connections, and making a portion of the monthly sewer service charge a function of water usage; however, the installation of water meters is an expensive action. Wastewater flow can also be reduced by an enforced District ordinance prohibiting the connection of roof drains and other storm water collection facilities to the sewer system. There should be no major problems with infiltration of groundwater into the collection system and interceptors, as proper engineering design and materials selection coupled with proper inspection during pipeline construction should keep infiltration to a minimum. No further flow reduction measures are proposed.

Wastewater Management Options

Possible Alternatives

During the preliminary analysis of wastewater treatment/disposal alternatives, a number of wastewater facilities alternatives were considered and some were not considered viable for the District. The alternatives that were screened out, and the reasons for doing so, are discussed:

1. Land disposal of effluent. A requirement of EPA's Construction Grants Program is that land application of effluent must be considered as a means of meeting the 1983 and 1985 goals of PL 92-500. Possible means of land disposal include percolation ponds and spray application to the land. Percolation ponds are not considered feasible because of the relative impermeability of the soil and the localized high groundwater conditions. Spray application to the land surface was also dropped from additional consideration because of the above two reasons, as well as the extremely high cost of storing effluent during the winter rainy months and/or the cost of containing surface runoff within a spray disposal area.

2. Reuse of effluent for industry and/or agriculture. Another requirement of the Construction Grants Program is that reuse of the treated effluent must be considered in the formulation and screening of alternatives. Reuse of effluent, as a combined means of effluent disposal and water resource

conservation, was dropped because there is presently no significant water using agricultural or industrial operations within or adjacent to the District. The more than ample supplies of water within the District make effluent reuse unnecessary and inappropriate at the present time.

3. Trickling filter and aerated lagoon treatment. These two methods of wastewater treatment were dropped from further consideration either because of high construction costs or because they are not capable of consistently producing an effluent in compliance with the probable NPDES requirements unless land disposal of the final effluent is used, at which time no NPDES requirements would be needed. A more satisfactory effluent could be produced with this method if filters were added for algae control; however, such additional treatment requirements would substantially increase the cost of facilities and treatment.

4. Joint district and city sewerage systems. This alternative would include combining the facilities and sewerage needs of the City of Newport, Bay to Bay Sanitary District, City of Waldport, Southwest Lincoln County Sanitary District and the City of Yachats. This alternative was not considered further because of the difficulties of coordinating such an alternative and hurdling the political obstacles while at the same time meeting the sewerage needs of each of the cities and districts. Virtually all of the cities and districts have sewage problems and needs specific to their own situations -- Newport, Waldport and Yachats represent high density development clusters (cities) while the Bay to Bay and Southwest Lincoln County Sanitary Districts are more lightly populated areas with problems not paralleling those of the cities.

Treatment and Disposal Alternatives

Each of the treatment and disposal alternatives selected as feasible is described to acquaint the reader with their general characteristics. The two treatment alternatives being considered are activated sludge treatment and individual septic tank systems, or a combination of the two. Three separate disposal alternatives are considered feasible -- discharge to the ocean, discharge to Alsea Bay, or subsurface discharge to the ground in the case of septic tanks.

The Activated Sludge Process

This treatment process uses bacteria to decompose the organic matter in sewage. During this process, the bacteria convert sewage into more bacteria, i.e., multiply in number and mass, and some mass must be removed from the process in a form called sludge. Following removal from the liquid portion of the process, sludge is first treated by maintaining it for a lengthy period without a food supply in order to reduce its volume; it is then dewatered using a filter press and transported to disposal. Disposal can be either through utilization as a soil conditioner or by sanitary landfill.

Septic Tank Treatment

This type of treatment consists of two components: (1) the septic tank and (2) the leach field or other subsurface land disposal method. Both components must operate satisfactorily, or they will adversely affect the operation of each other. In the septic tank, solid materials settle and grease and oil rise and the organic matter is then biologically broken down by bacteria. Following settling of solid matter and biological breakdown, the liquid portion passes out of the septic tank to a subsurface ground disposal system. This disposal system may consist of (1) absorption trenches--perforated drain tiles laid in a trench on top of about one foot of gravel; (2) seepage beds--wide trenches (greater than three feet across) filled with gravel; and (3) seepage pits--large circular holes that are drilled or dug into the ground, often to depths of 20 feet or greater. This third method is often used where downward percolation is retarded or prevented by layers of clay or cemented aggregate. The purpose of the disposal system is to spread treated sewage and to allow it to percolate downward into the soil.

The reasons why septic tank treatment systems generally fail are:

1. Inadequate maintenance of septic tank - The tank must be pumped every few years to remove inert material and sludge that accumulates at the bottom and sometimes top of the tank. If this is not done, much of the volume of the septic tank becomes useless, and sewage passes through the septic tank untreated, carrying solid material into the ground disposal system. These solids clog the soil, and treated liquids can no longer percolate.

2. Poor soil - Soils which contain large amounts of clay or are underlain by clay, will percolate water very slowly. Such soils generally require large drainfields because of this slow percolating capability.

3. High groundwater - If the groundwater is less than several feet below a tile drainfield, the amount of unsaturated soil available for percolation is too small, and the rate of percolation is either slowed or stopped.

Regardless of the cause of failure, partially treated sewage begins to rise to the ground surface, and/or back up into the home, necessitating pumping of the tank. In both cases, a public health hazard results. Assuming adequate or nearly adequate soils and proper system design and construction, the most important factor in maintaining satisfactory performance is routine pumping of accumulated sludge from the septic tank.

Treatment Plant Site Options

Five locations were considered feasible for the location of sewage treatment facilities. Two of these sites are presently used for sewage treatment.

Site A - The City of Waldport treatment plant. This site, bordered by Alsea Highway, Lint Slough, and the Waldport High School, is too small for the needed plant expansion, and some land would have to be acquired from the adjacent high school athletic grounds. The new facilities would be constructed to the west of the existing facilities. The athletic fields of the school are between the proposed expansion and the school, thus acting as somewhat of a buffer.

Site B - Waconda Beach. This plant would be located on the inland side of the Highway, but a specific location has not been selected.

Site C - Big Creek. The plant would be located on the inland side of the Highway and the south side of the creek, but a specific location has not been selected.

Site D - San Marine. The plant would be located on the inland side of the Highway, but a specific location has not been selected.

Site E - The City of Yachats treatment plant. No new land area will be required for the treatment processes, and the new facilities will be located on the southwest portion of the property. The purchase of two lots on the northeast corner of the site has been recommended by the engineer as a means of keeping residential development from encroaching further on the plant site.

Implementation Options -- Financing and Organization

A variety of facilities are required for project implementation: treatment plant(s), Ocean or Bay outfalls, interceptors, and local collection sewers. The questions listed below are as important to District residents as the technical and environmental aspects of the project.

1. How will the facilities be paid for?

2. How will the cost of required facilities be allocated to residents within the District?

3. How will the facilities be operated?

Various methods of accomplishing the above actions are available, and they must be dealt with before a project becomes operational. Consequently, these subjects are discussed in the following text and should be kept in mind while reviewing the alternatives and their environmental and social impacts.

First, how will the facilities be paid for? This project, as a part of EPA's Construction Grants Program, is eligible for 75% Federal funding of treatment facilities, pumping stations, and interceptor pipelines. The remaining 25% is the local share and would have to be paid for by the District. Collection systems are not eligible for Federal Grants and must be financed 100% with local dollars. It should also be noted that land and right-of-way purchase is not an eligible cost and would not be paid for with EPA grant funds.

The 25% local share of treatment, interceptor, and pumping facilities will probably be financed by general obligation bonds sold by the District, bonds which would be repaid by money collected from ad valorem (property) taxes, and a monthly sewer service charge. Oftentimes, however, a lower interest rate can be obtained if the bonds are repaid by only ad valorem taxation. General obligation bonds must be approved by voters

within the District and are limited by Oregon State Statute to 13 percent of the assessed valuation of the District. Because state and federal agencies within the District are exempt from property tax, they will pay an initial, one-time cash payment to help offset facilities construction, a payment that would probably be based on the value of the properties, determined in a manner similar to that used by the county tax assessor. In addition, state and federal agencies would pay a monthly sewer service charge.

The collection system must be financed by District residents and governmental agencies holding land within the District. The Engineer has recommended that the District form one Local Improvement District (LID), encompassing the entire District, be formed to finance the necessary collection system. A 2/3 remonstrance of affected property owners is required before a LID can be stopped. The purpose of the LID is to collect money from those who could benefit from the proposed facilities. Assessments can be paid either in cash or through a process known as Bancroft Bonding, which allows assessments to be repaid in semi-annual payments at an interest rate of seven percent over periods of 10 and 20 years.

Secondly, how will the cost of required facilities be allocated? As discussed, the 25% local share of treatment, outfall, interceptor, and pumping facilities is allocated according to the assessed valuation of in the District properties. Allocation of the cost of the collection system to benefitting property will probably be accomplished using a procedure referred to as the area/benefit method. This method assesses a percentage of the cost over the entire District area that is sewered, and the remainder only to property that receives a direct benefit from sewer facilities. Normally, all benefitted property is assessed equally whether developed or undeveloped. A draft financial Plan for the District has proposed that 50% of the cost be allocated to area and 50% to benefitted property. Typically a connection fee and inspection fee are also charged when a property owner connects to the sewer. The possible charges to individual property owners is discussed further in a latter section of this report.

Thirdly, how will the District's proposed facilities be operated? The basic question is whether the District should have fulltime operation/maintenance personnel, or should they have only one or two employees and issue contracts for other work. The District will probably begin with only a Superintendent and a bookkeeper because the number of connections will be relatively small and the system will be relatively new. All services required, beyond the capabilities of these people, would probably be done by contract. This approach could only be utilized if treatment is done at Waldport and/or Yachats. If

Waconda Beach, Big Creek, or San Marine are locations selected for treatment, the District would likely have to hire two operators for the treatment facilities. The money to operate and maintain the District will come primarily from a monthly sewer service charge, which will probably be between three and six dollars per month per connection.

Existing Wastewater Treatment Facilities

The only existing treatment facility within the District is located at the Camp Angell Job Corps Camp. Constructed in 1966, it is operated by the U. S. Forest Service and serves both Camp Angell and the Tillicum Beach campground. Treatment is provided by a 20,000 gallon per day package treatment plant, followed by sand filtration and effluent discharge to Big Creek. Present plans are to shut down this plant when the District's proposed regional system becomes available.

There are two treatment facilities outside of, but relatively close to, the District boundaries. The facilities are owned by the City of Waldport and the City of Yachats. The Waldport plant was constructed in 1953 as a primary treatment plant and converted in 1973 to a secondary treatment plant with a rated capacity of 300,000 gallons per day (gpd). This contact stabilization plant, a modification of the activated sludge process, discharges through an outfall in to Lint Slough. One full-time operator is required, although other City Maintenance personnel occasionally work on the system. The plant was financed by local residents, with the help of an EPA grant.

The City of Yachats plant, constructed in 1974, has a treatment capacity of 150,000 gpd and uses a process called extended aeration which is also modification of the activated sludge process. Discharge is to the ocean. Sludge produced is dried on sand beds and/or applied to farm land for disposal. This method of sludge drying has not proven entirely satisfactory due to the climate of this portion of the Oregon Coast. One full-time operator is required. The plant was financed by local residents, with the help of an EPA construction grant.

Because both the Waldport and Yachats plants were partially financed by EPA, they have been designated as "regional plants" by DEQ. This designation means that logically related drainage areas, or adjacent areas, should consider contributing their flow to these plants. There was not, however, any requirement imposed by EPA during the grant funding of these plants that would require either the City of Yachats or Waldport to accept sewage from the District. If an agreement is reached between the District and either City, EPA has regulations which require that all costs arising from facility construction

and operation/maintenance be distributed among participants on a "fair and equitable basis". Thus, if Southwest Lincoln County Sanitary District sewage is contributed to either plant, the District would be responsible for all capital costs incurred due to their contribution, and would be required to pay a "fair and equitable" percentage of total plant operation. The EPA would approve the District's user charge system prior to the final step 3 grant payment.

Proposed Facilities Common to All Treatment and Disposal Alternatives

With the exception of two alternatives, Alternatives 6 and 7, a sewage collection system is common to all alternatives. Although there are some minor deviations between alternatives, the pipe length and total collection system cost are almost identical in Alternatives 1 to 5, and are roughly approximated by the collection system described in the Sewerage Study, pages IV-10 to IV-13. The system would consist of about 89,750 feet of pipe and three small pumping stations, with an estimated total 1974 cost of $2,001,000, which would probably escalate to about $2,401,000 by early 1977, the earliest anticipated date that construction could start.

Population Capacity of Project Facilities

All treatment facility alternatives have essentially equivalent capacities, which would handle flow from a population substantially greater than the present population. Within each alternative, various facilities are sized for various capacities, the sizing depending principally on the case of facility expansion.

The following tabulation shows the year various project facilities are proposed to be sized for.

Facility	Capacity Provided for Population to Year
Collection system	2025
Interceptors	2025
Pumping stations --	
Wet well	2025
Pumps	1990
Sewage treatment plant	2000

Based upon the year these facilities are planned to, the population each could accommodate can be calculated. For the collection system, interceptor, and pumping stations (excluding pumps) a total population, including tourists, of 6,700 could be accommodated. The pumps in the pumping stations could accommodate a total population of 3,900. In the case of the treatment facility, it is best to start with the proposed size, as treatment facilities are normally constructed in only certain sizes, and a certain amount of capacity increase is often required as a result. In Alternative 4, a capacity of 750,000 has been recommended by the Sewerage Study. The Sewerage Study also utilized a per capita sewage generation rate of 140 gallons per capita per day (gpcd), which consists of 30 gpcd infiltration/inflow and 110 gpcd sewage generated within the home. This results in a proposed treatment capacity capable of handling 5,357 people, a population which is expected to be reached in approximately 2005.

Description of Evaluated Regional Treatment and Disposal Alternatives

Alternative 1 - Waconda Beach - San Marine Alternative

In this alternative, all flow north of Big Creek would be transported to a new treatment plant at Waconda Beach, and all flow south of Big Creek would be transported to a new treatment plant at San Marine. The Waconda Beach treatment plant would be a package activated sludge plant with a capacity of 350,000 gallons per day (gpd) and the plant at San Marine would be identical, with a 350,000 gpd capacity. Both treatment plants would dispose of effluent to the Ocean, using new ocean outfalls, approximately 1000 feet long. Each treatment plant would require approximately one acre of land.

Interceptor sewers would contribute flow to these treatment plants as show on Figure 7. The interceptors contributing flow to the Waconda Beach plant would have a total length of about 20,100 feet and would vary in diameter from four and 12 inches. Five pumping stations would be required for the Waconda Beach interceptor. The interceptors which would transport sewage to the San Marine plant would total about 16,000 feet in length, varying in diameter from four to 12 inches. Five pumping stations would be required for the San Marine interceptor.

The costs of implementing Alternative 1, assuming that construction begins in early 1977, are estimated to be:

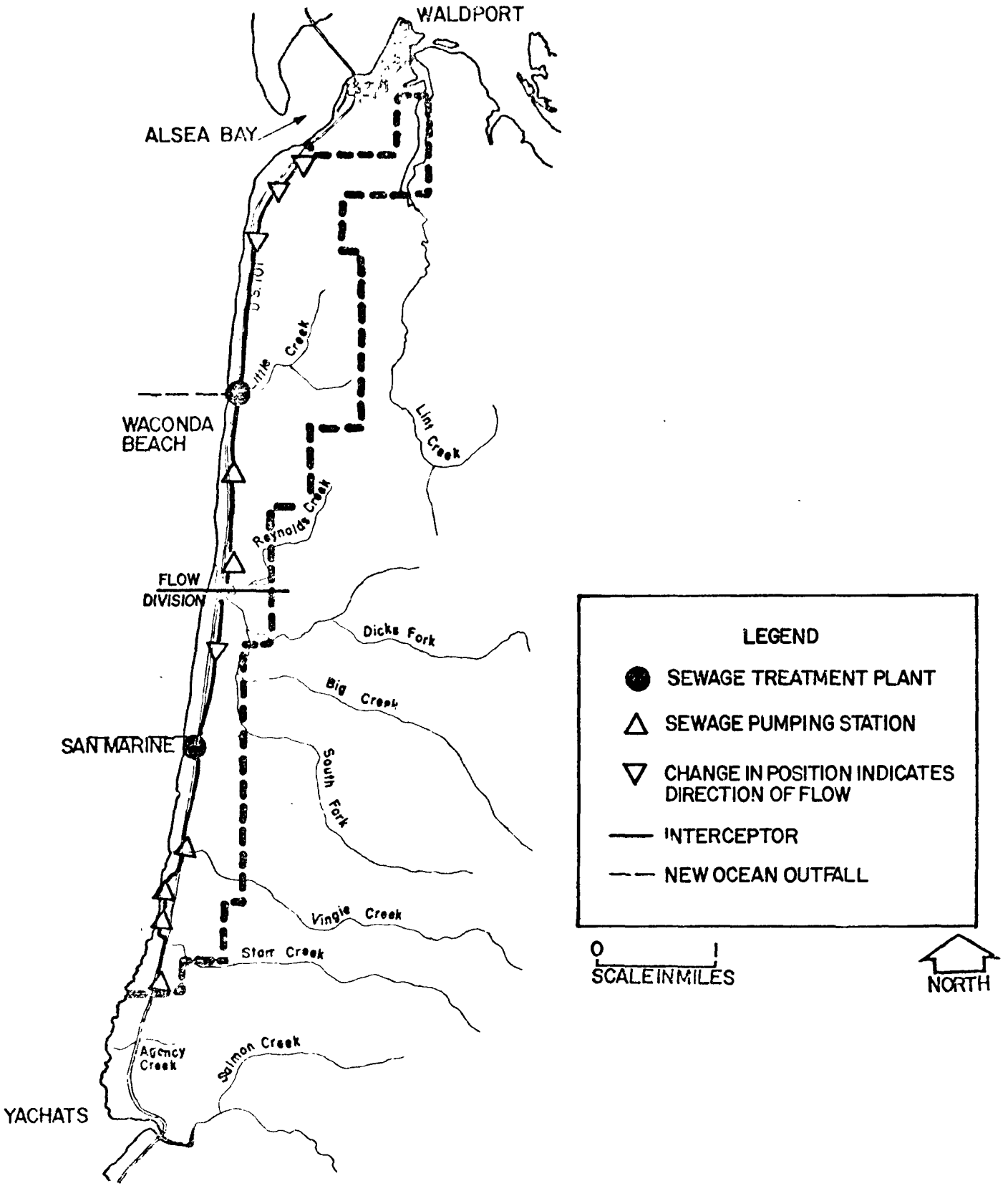

FIGURE 7. ALTERNATIVE I-WACONDA BEACH-SAN MARINE ALTERNATIVE

Capital Costs

Collection System	$ 2,401,000
Interceptors and Pump Stations	$ 1,497,100
Treatment Plant and Outfall	$ 2,538,000
District Headquarters and Vehicles	$ 70,000
	$ 6,506,100
Local Share*	$ 3,479,800

Annual Costs

Capital Recovery of Local Share**	$ 306,500/year
Interceptor System	$ 8,000/year
Treatment Plants	$ 30,800/year
District Administration & Operation	$ 33,000/year
	$ 378,300/year

* Local Share taken as 25% of interceptor, pump station, treatment plant, and outfall costs plus 100% of collection system and District Headquarters and vehicle cost.

** Interest rate -- Bonds at 6-1/8% for 20 years.

Alternative 2 - Waldport-Yachats Alternative

In this alternative, all flow north of Big Creek would be transported to a treatment facility to be constructed on the present site of the City of Waldport treatment plant. All flow south of Big Creek would be transported southwards to a new treatment facility to be constructed on the present site of the City of Yachats treatment plant. The plant on the City of Waldport site would be a package activated sludge plant with a capacity of 350,000 gpd and the plant at the City of Yachats site would be identical with a 350,000 gpd capacity. Discharge from the plant at Waldport would be through a new outfall into the main channel of Alsea Bay. This new outfall would be about 2,200 feet long, running through the city to the north and into the main channel. Discharge from the new plant at Yachats would be through the existing City of Yachats ocean outfall. Additional land requirements would be minimal, a small amount of land would be required from the high school athletic field at Waldport, and the additional facilities at Yachats could be located on the existing plant site. The Sewerage Study has recommended that two lots be purchased on the northeast corner of the existing Yachats plant site to avoid further encroachment of residential dwellings.

Interceptor sewers would contribute flow to these treatment plants as shown on Figure 8. The interceptor contributing flow to the Waldport Plant would have a total length of about 26,600 feet and would vary between four and 12 inches in diameter. Six pumping stations would be required for the Waldport interceptor. The interceptor which would transport sewage to the Yachats plant would total approximately 20,500 feet in length, vary in diameter from four to 12 inches. Six pumping stations would also be required for the Yachats intercaptor.

The costs of implementing Alternative 2, assuming that construction begins in early 1977, are estimated to be:

Capital Costs

Collection System	$ 2,401,000
Interceptors and Pump Stations	$ 1,725,600
Treatment Plants and Outfalls	$ 1,482,000
District Headquarters and Vehicles	$ 70,000
	$ 5,678,600
Local Share*	$ 3,272,900

Annual Costs

Capital Recovery of Local Share**	$ 288,200/year
Intercerceptor System	$ 8,000/year
Treatment Plants	$ 30,800/year
District Administration & Operation	$ 33,000/year
	$ 360,000/year

* Local Share taken as 25% of interceptor, pump station, treatment plant, and outfall costs plus 100% of collection system and District Headquarters and Vehicles costs.

** Interest rate -- Bonds at 6-1/8% for 20 years.

Alternative 3 - Big Creek Alternative

In this alternative, all flow north of Big Creek would be transported southwards towards a new treatment plant to be located at Big Creek, and all flow south of Big Creek would be transported northwards to the same plant. The plant at Big Creek would be a package activated sludge plant with a capacity

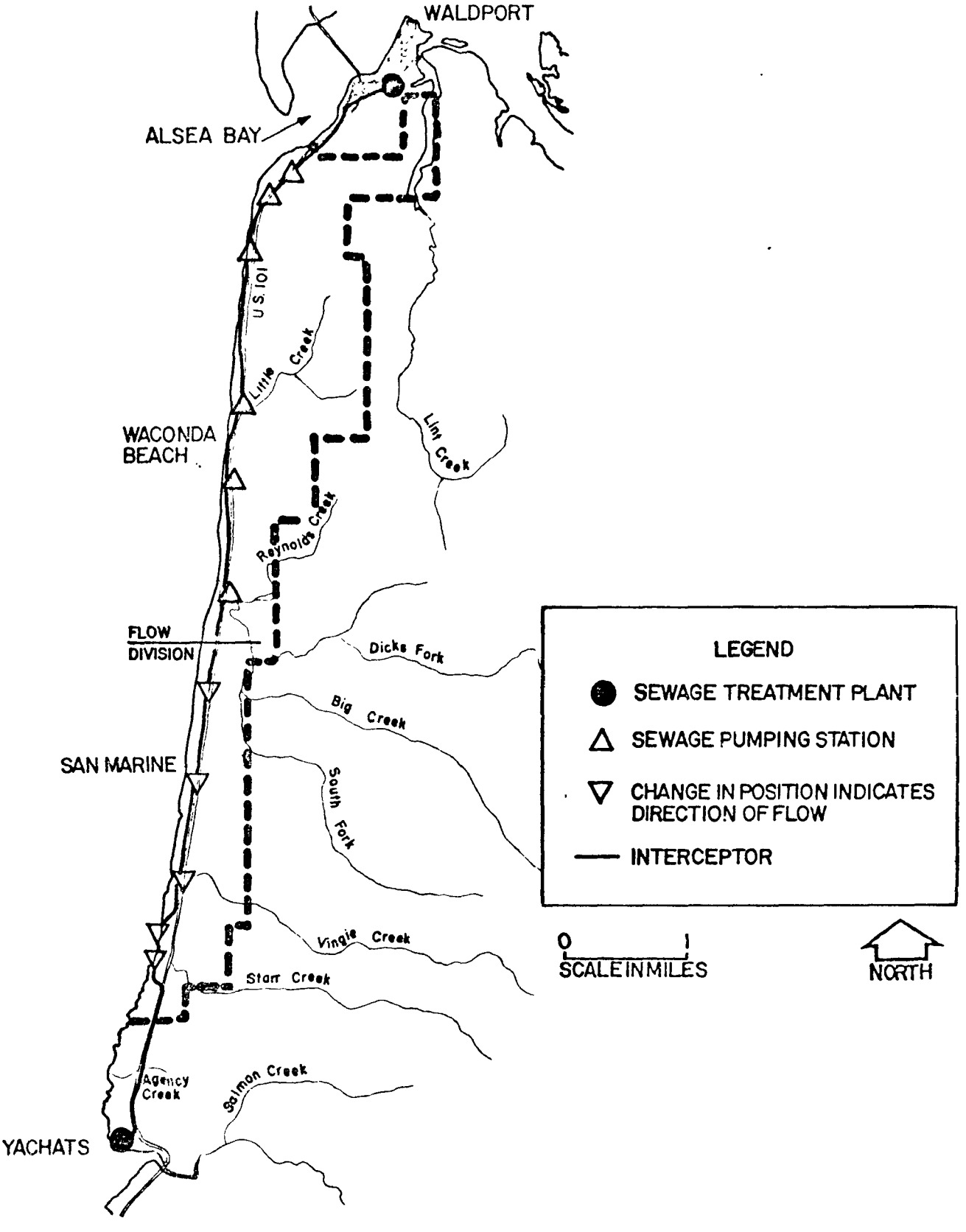

FIGURE 8. ALTERNATIVE 2-WALDPORT-YACHATS ALTERNATIVE

of 750,000 gpd. The treatment plant would dispose of effluent to the ocean, using a new outfall approximately 1,000 feet long. Land area required for the treatment plant would be approximately one acre. The interceptor sewers required to convey flow to the Big Creek treatment plant are shown on Figure 9. The interceptor running from the north District boundary to the treatment plant would have a total length of about 20,100 feet and would vary in diameter from four to 12 inches. Five pumping stations would be required on the north interceptor. The south interceptor which would transport sewage from the south District boundary to the new treatment plant would have a length of about 16,000 feet and would vary in diameter from four to 12 inches. Five pumping stations would also be required for the south interceptor.

The costs of implementing Alternative 3, assuming that construction begins in early 1977, are estimated to be:

Capital Costs

Collection System	$ 2,401,000
Interceptors and Pumping Stations	$ 1,497,100
Treatment Plants and Outfall	$ 1,550,000
District Headquarters and Vehicles	$ 70,000
	$ 5,518,100
Local Share*	$ 3,232,800

Annual Costs

Capital Recovery of Local Share**	$ 284,700/year
Interceptor System	$ 8,000/year
Treatment Plant	$ 24,000/year
District Administration & Operation	$ 33,000/year
	$ 349,700/year

* Local Share taken as 25% of interceptor, pump stations, treatment plant, and outfall costs plus 100% of collection system and District Headquarters and Vehicle costs.

** Interest rate -- Bonds at 6-1/8% for 20 years.

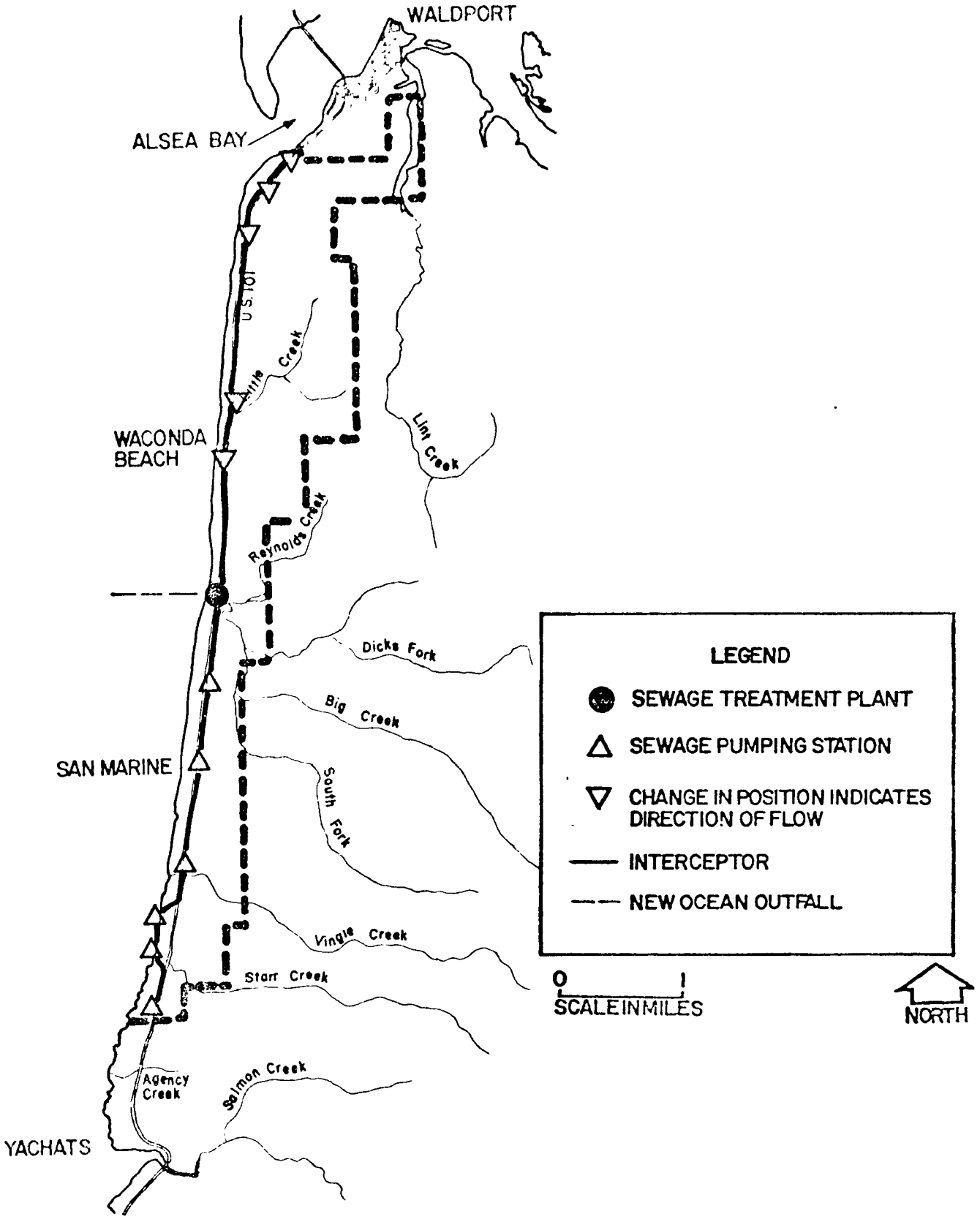

FIGURE 9. ALTERNATIVE 3-BIG CREEK ALTERNATIVE

Alternative 4 - Yachats Alternative

In Alternative 4, all flow from the north District boundary would be conveyed south to a new treatment plant to be constructed on the existing City of Yachats treatment plant site. The plant would be a package activated sludge plant with a capacity of 750,000 gpd. Effluent disposal would be to the ocean, using the existing City of Yachats outfall. Although no new land is required, as previously discussed, any expansion on the City of Yachats site should also consider acquisition of the two lots at the northeast corner of the existing site.

The interceptor sewer which would contribute flow to the treatment plant is shown on Figure 10. This interceptor would have a total length of about 41,050 feet and would vary in diameter from four to 18 inches. It would require a total of 12 pumping stations.

The costs of implementing Alternative 4, assuming that construction begins in early 1977, are estimated to be:

Capital Costs

Collection System	$ 2,401,000
Interceptor and Pump Stations	$ 1,765,200
Treatment Plant	$ 918,000
District Headquarters and Vehicles	$ 70,000
	$ 5,154,200
Local Share*	$ 3,141,800

Annual Costs

Capital Recovery of Local Share**	$ 276,700/year
Interceptor System	$ 8,000/year
Treatment Plant	$ 24,000/year
District Administration & Operation	$ 33,000/year
	$ 341,700/year

* Local Share taken as 25% of interceptor, pump stations, and treatment plant, plus 100% of collection system and District Headquarters and Vehicle costs.

** Interest rate -- Bonds at 6-1/8% for 20 years.

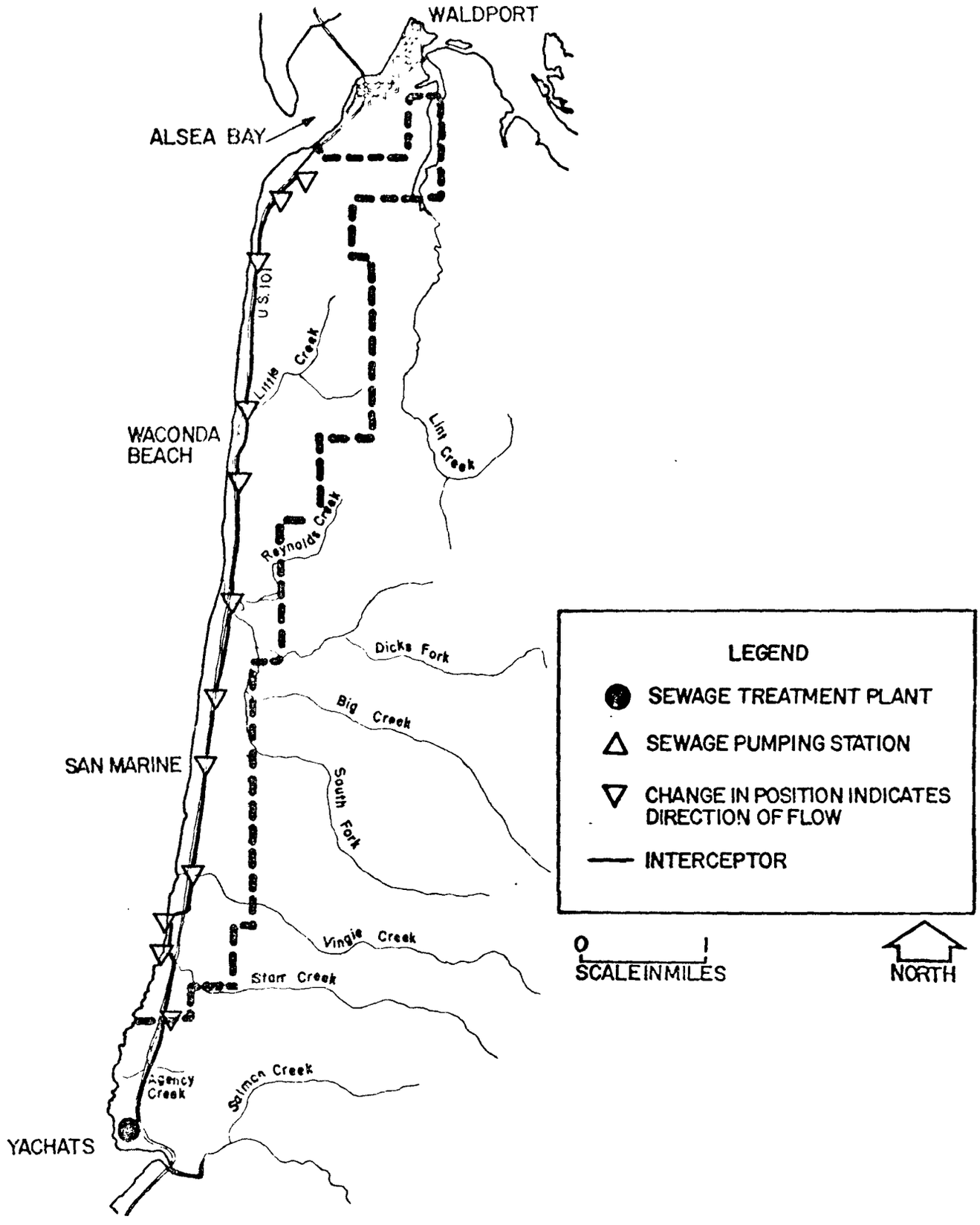

FIGURE 10. ALTERNATIVE 4 -YACHATS ALTERNATIVE

Alternative 5 - Waldport Alternative

In Alternative 5, all flow from the south portion of the District would be transported northward to a new treatment facility to be constructed on the present site of the City of Waldport treatment plant. The new treatment plant would be a package activated sludge plant with a capacity of 750,000 gpd. Discharge would be through a new outfall approximately 2,200 feet long, into the main channel of Alsea Bay.

The interceptor sewer and locations of the pumping stations which would be required are shown on Figure 11. The interceptor sewer would have a total length of 42,600 feet and would vary in diameter from six inches to 15 inches. For the entire interceptor, a total of 12 pumping stations would be required, to locations as shown on Figure .

The costs of implementing Alternative 5, assuming that construction begins in early 1977, are estimated to be:

Capital Costs

Collection System	$ 2,401,000
Interceptors and Pump Stations	$ 1,793,400
Treatment Plant and Outfall	$ 1,026,000
District Headquarters and Vehicles	$ 70,000
	$ 5,290,400
Local Share*	$ 3,175,900

Annual Costs

Capital Recovery of Local Share**	$ 279,700/year
Interceptor System	$ 8,000/year
Treatment Plant	$ 24,000/year
District Administration & Operation	$ 33,000/year
	$ 344,700/year

* Local share taken as 25% of interceptor, pump stations, treatment plant and outfall, plus 100% of collection system and District Headquarters and Vehicle costs.

** Interest rate -- Bonds at 6-1/8% for 20 years.

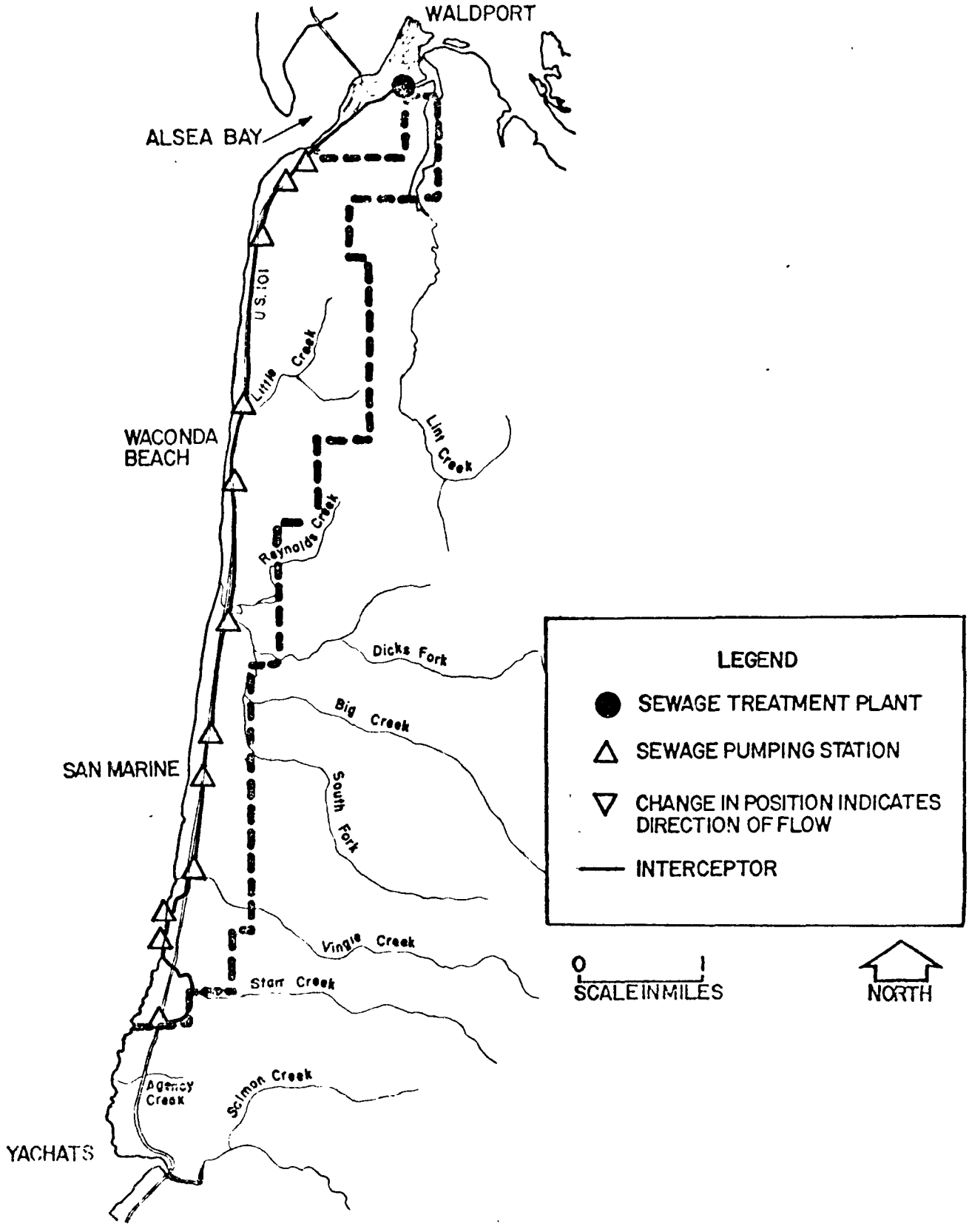

FIGURE II. ALTERNATIVE 5-WALDPORT ALTERNATIVE

Alternative 6 - No Action Alternative

In this alternative, no action would be taken to change the present county controlled program for using septic tanks for wastewater treatment and disposal. No treatment plants, sewers, interceptors, or pumping stations would be constructed within the Southwest Lincoln County Sanitary District.

The general condition of sewage treatment and disposal using septic tanks was described in Chapter II (ENVIRONMENTAL SETTING). As discussed, numerous applications for permits to utilize septic tanks have been denied, amounting to a denial of 23 percent out of 293 applications. It is understood that almost all those existing systems found to be in violation of county requirements have been modified and upgraded, either by the addition of new leach lines, by the expansion of septic tank capacity, or by a combination of the two (Dobey, pers. comm.).

The ability to modify and upgrade existing septic tank systems, as well as to construct a new system in some situations, is the principal reason that the No Action Alternative must be considered. Many existing systems were constructed prior to the adoption of existing Oregon state standards for subsurface sewage disposal, resulting in some cases in installation of systems with inadequate leach line and/or septic tank capacity. Thus, many systems failed as they grew older and their capacity decreased at the same time that the quantity of sewage increased due to a greater domestic use of water. Although a potential public health hazard can exist when septic tank systems fail and sewage rises to the surface of the ground, the situation can often be eliminated by repositioning or expanding the leach line length and/or expanding septic tank capacity. This has been adequately demonstrated by the upgrading of existing systems that have failed in the past.

The principal impediments to the use of septic tanks have been inadequate lot size, too steep a lot slope, too high a groundwater table, impervious soil, or a combination of these conditions. The adequacy of any lot greater than 7,500 square feet must be determined on a case-by-case basis. However, in cases where permits were denied, approval may have been obtained if the lot size was larger, a condition which could in many cases be solved during the subdivision of acreages. The compilation of two or more lots into one of a size permitting the use of a septic tank is possible. While these actions represent an economic impact, they could allow the continued utilization of septic tanks within the District. It should be recognized, however, that some properties would still be denied septic tank permits, even if adjacent lots were purchased or property were subdivided into larger lots.

Another factor which should be considered is the presently used percolation test which is designed to test the lot for the use of horizontal leach line fields and not vertical seepage pits. While there are a number of restrictions on the utilization of seepage pits, and they are discouraged by the County Health Department and usually disallowed by the State, they nonetheless should be considered for subsurface disposal if County and State regulatory conditions can be met. In areas where there are impervious layers interspersed among aquifers and where there is no present or foreseeable use of the regional groundwater for domestic supply, septic tank disposal using vertical seepage pits should be given consideration. Any evaluation of the continued or expanded use of septic tanks, as previously described, requires considerable investigation of each parcel of land to determine the cost impacts on individual landowners.

In summary, based upon the above discussion, relating to both existing systems and proposed new systems, the No Action Alternative is described, and one may conclude that some existing systems can be upgraded to avoid public health problems, and adequate new systems can probably be built on many of the larger lots. Quantification of the situation would require an extensive evaluation of lots. Thus, while the No Action Alternative may have direct adverse economic impacts on some lot owners, it would allow continued growth within the District.

Alternative 7 - District Maintenance of Septic Tanks

In Alternative 7, no sewers, interceptors, or pumping stations would be constructed. The District would purchase a septic tank pumping truck and be responsible to maintain all septic tanks in satisfactory operating condition. To accomplish this, the District would periodically inspect all septic tanks within the District, and as required, pump the tanks and convey the pumpage to aerobic digestion facilities to be constructed at the existing City of Yachats treatment plant. The new treatment facilities would consist of aerobic digestion facilities and sludge dewatering facilities. The liquid portion from aerobic digestion of the sludge would be pumped to the City of Yachats plant for additional treatment. The digested sludge would be dewatered and hauled to a sanitary landfill.

This alternative is considered less satisfactory than sewering of the District. The basic problem with the alternative lies not with the maintenance of existing septic tanks, but primarily with the maintenance of tanks which could be constructed in areas presently prohibited for septic tank use

by the County Health Department. In those areas which are presently denied septic tank permits, it has normally been found that a combination of high groundwater and poor soil conditions have led to the rejection. In essence, this condition indicates that operational problems will not be with the septic tank design or with poor maintenance of the septic tank, but rather lie with effluent disposal (percolation). Tanks under such conditions would be operated as storage vaults. It should be noted that Alternative 7 only solves a septic tank maintenance problem, not present a solution for effluent disposal problems. Alternative 7, to some extent, represents the cost that could be borne by local residents for maintenance of their septic tanks. The alternative in this context can be compared to the other alternatives, and therefrom District residents can achieve an estimate for how much their present sewerage is costing as compared to a complete sewer system.

Capital Costs

Collection System	$ 0.00
Interceptors & Pump Stations	$ 0.00
Treatment Facilities	$ 220,000
District Headquarters and Vehicles	$ 90,000
	$ 310,000
Local Share*	$ 145,000

Annual Costs

Capital Recovery of Local Share**	$ 12,800/year
Interceptor System	$ 0.00/year
Treatment Facilities	$ 15,000/year
District Administration & Operation	$ 53,000/year
	$ 60,800/year

* 25% of treatment facility plus 100% of District Headquarters and Vehicle cost.
** Interest rate -- Bonds at 6-1/8% for 20 years.

Sewage Sludge Handling and Disposal Options

In all of the alternatives described except no action, sewage sludge from the treatment processes or septic tank maintenance must be disposed of. The existing Waldport and

Yachats sewage plants have aerobic digesters and sludge drying beds to dewater the sludge prior to disposal at a land site. The drying bed method of sludge dewatering has not been particularly effective in Lincoln County because of the inherent high humidity, rainfall and cool temperatures of the coastal region (Peer, pers. comm.).

A number of disposal options are possible for the various project alternatives.

- Direct land disposal of sewage sludge. This option would involve disposing of a large volume of sludge directly onto a land area. Such a disposal method would require a large amount of land having proper topographic, soils and water quality aspects. The sludge is usually plowed under when dried. Land disposal would only be suitable for Alternatives 1 through 5. The wastes from Alternative 7 (septic tank maintenance) would be partially digested and unsuitable for direct land disposal. Dewatering sludge can be easily applied to farmlands and plowed under periodically. This method is now used at the Yachats treatment plant; however, there is no established disposal site.

- Incineration. Sludge incineration is a means of reducing the volume of sewage sludge to an ash or small volume of sludge. The residue must ultimately be disposed of in a landfill or onto farmland. There are several methods of incineration -- multiple hearth, flash-drying and fluidized bed. With adequate dewatering (to approximately 30 percent solids) the process can be self-sustaining, without the need for supplemental fuel except for warmup and heat control (Metcalf and Eddy, Inc., 1972). When using raw sludge in a multiple hearth or fluidized bed system, the heat necessary for incineration can be obtained from combustion of volatile matter in the sludge.

- Sludge dewatering and drying.

  1) Drying beds. This dewatering method is presently utilized at Waldport and Yachats treatment facilities. The dried sludge is transported to a farmland disposal site and spread on the surface. As mentioned earlier, this method of drying has proved unsatisfactory in the past.

  2) Vacuum filtration. With this method the sludge must be conditioned before filtering. A dewatered sludge cake is produced which must be hauled to a sanitary

landfill, disposed of on farmland or sold or given away. The sludge yield is typically 4-5 pounds per square foot of filter per hour (Metcalf and Eddy, Inc., 1972).

3) Centrifugation. This dewatering method requires a significant amount of electricity and noise control. A major problem is that the liquid residues are high in nonsettling suspended solids which could affect effluent quality.

4) Pressure filtration. With this dewatering method, a chemically conditioned sludge is pumped between rectangular plates and 60-180 pounds per square inch of pressure applied. The end product is a sludge cake with a moisture content from 55-70 percent. The sludge can then transported to a suitable disposal site.

- Lagooning. Raw sludge or digested sludge may be deposited in lagoons where aerobic and anaerobic decomposition takes place. This method of disposal could be satisfactorily used for Alternative 7 (septic tank maintenance). A major problem is the lack of adequate land for a lagoon system. Lincoln County is presently faced with a problem of finding a suitable site for the disposal of pumped septic tank wastes as the city treatment facilities can no longer handle septic system wastes (Dobey, pers. comm.).

  The quality of septic tank pumpage is such that it cannot be disposed of on farmland without further aerobic or anaerobic decomposition. The sludge may, however, be disposed of at a sanitary landfill site so long as groundwater or surface water quality are not adversely impacted. Adequate sites for a sanitary landfill in Lincoln County are scarce, and the county is in the process of implementing a regional resource recovery program at Agate Beach which is designed to significantly reduce the volume of solid waste requiring landfill disposal.

- Landfill disposal. A sanitary landfill can be used for the disposal of stabilized or unstabilized sludge. The future county landfill site will be located at Agate Beach, approximately 27 miles from Yachats and 19 miles from Waldport. The costs of hauling such a distance would dictate that the sludge be dewatered for volume reduction.

Cost Comparison and Summary

Three separate methods can be utilized to compare the overall costs of the proposed alternatives:

1. Total cost to construct and operate over 20 years

2. Local cost to construct and operate over 20 years

3. Total cost using EPA Cost-Effectiveness Guidelines

Table 15 summarizes the first two of these methods and shows that Alternatives 3, 4, and 5 are the least costly of the viable alternatives, from both local cost and total cost standpoints, and all have essentially equal costs. It should be noted that in each of these three alternatives, only one treatment facility would be constructed, whereas in Alternatives 1 and 2, there are two separate treatment facilities.

The third method of comparing costs utilizes the EPA Cost-Effectiveness Guidelines. Briefly, these guidelines establish a number of criteria, such as interest rate, planning period, service life, and a number of other factors, which allow EPA to compare all projects in Oregon and in the United States on essentially a uniform cost basis. In evaluating the Southwest Lincoln County Sanitary District project according to Guidelines, the following deviations from all previous cost estimates should be noted:

1. EPA requires a 20-year period for comparison, rather than the 25 year period utilized in the Sewerage Study and the previously discussed cost estimates. The EPA does not require that facilities actually be sized for a 20-year capacity, but leaves the decision of actual cost-effective sizing to the Regional Administrator.

2. EPA does not allow annual costs to be escalated with time.

3. EPA requires that salvage values at the end of 20 years must be subtracted from the total cost.

Table 15

SOUTHWEST LINCOLN COUNTY SANITARY DISTRICT WASTEWATER PROJECT
20-YEAR COMPARISON OF LOCAL COSTS*
(THOUSANDS OF DOLLARS)

ALTERNATIVE	COSTS ELIGIBLE FOR 75% FEDERAL GRANT **			25% LOCAL SHARE OF GRANT ELIGIBLE COSTS	SEWAGE COLLECTION SYSTEM, DIST. HEADQUARTERS VEHICLES	LOCAL OPERATION & MAINTENANCE COSTS FOR A 20-YR PERIOD***	TOTAL LOCAL PRESENT WORTH COST FOR A 20-YR PERIOD	TOTAL PRESENT WORTH COST FOR A 20-YR PERIOD
	PUMP STA. & INTERCEPTOR	TREATMENT PLANT	OUTFALL					
1	1,497.1	1,638.0	900.0	1,008.8	2,471.0	815.1	4,294.9	7,321.3
2	1,725.6	1,374.0	108.0	801.9	2,471.0	815.1	4,088.0	6,493.7
3	1,497.1	1,100.0	450.0	761.8	2,471.0	737.9	3,910.7	6,256.1
4	1,765.2	918.0	-	670.8	2,471.0	737.9	3,879.7	5,892.1
5	1,793.4	918.0	108.0	704.9	2,471.0	737.9	3,913.8	6,028.3
6	-	-	-	-	-	-	-	
7	-	220.0	-	55.0	90.0	510.9	655.9	820.9

* Assuming construction begins in early 1977.

** 75% of estimated grant eligible costs will be funded by EPA.

*** Assumes interest rate of 6-1/8% and inflation rate of 6-1/8%. Includes operation of interceptor system, treatment plant, and district administration and operation.

Based upon these differences, costs derived using the EPA Guidelines are lower than the previous costs estimates for this project. Contained in Appendix A is an explanation of facility sizing and an analysis of the Southwest Lincoln County Sanitary District using the EPA Guidelines. Costs determined using the EPA Guidelines are summarized in Table 16. It should be noted that these costs are only for interceptor, treatment, and outfall facilities and do not include collection system costs or costs of normal District operation. As shown, Alternatives 3, 4, and 5 again are the lowest cost alternatives.

Table 16

SOUTHWEST LINCOLN COUNTY SANITARY DISTRICT WASTEWATER PROJECT
EPA COST-EFFECTIVENESS COMPARISON OF COSTS*

ALTERNATIVE	1977 PRESENT WORTH OF CAPITAL & ANNUAL COSTS
1	$ 3,943,800
2	$ 3,208,100
3	$ 2,971,700
4	$ 2,654,900
5	$ 2,793,200
6	-
7	$ 705,800

* Costs are for interceptors, pumping stations, treatment plants, and outfalls only.

IV. ANALYSIS OF THE ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES

Introduction

Central to the evaluation of the proposed viable alternatives are the varying environmental impacts that result. In this chapter, both beneficial and adverse impacts are identified. Primary attention is given to those factors most evidently affected by the proposed actions.

The Environmental Protection Agency guidelines for the preparation of environmental impact statements (40 CFR, Part 6, §§ 6.304(C) require that primary and secondary environmental impacts, of short and long term duration, be evaluated. This draft EIS identifies the short-term, long-term direct and long-term secondary impacts related to all project alternatives.

Impacts Common to All Alternatives

Many of the impacts of the wastewater treatment and disposal project occur regardless of choice of any particular alternative plan. These common impacts come about as the result of general construction and development activities and operation of the system.

Short-Term Impacts

Short-term impacts are, as the name implies, a short and definite period of impact, usually from the start of construction until completion of the project. Such impacts can usually be effectively mitigated. Common short-term impacts and mitigation measures are presented in Table 17.

Long-Term Direct Impacts

Long-term direct impacts result from the construction, location and/or operation of the facilities and generally remain in force for the life of the project or longer. The time span may be 20 to over 50 years. These impacts tend to be on or near a facilities site or pipeline route or in the area of wastewater disposal. Some are generally common to all alternatives in that the magnitude of variation in degree of impact among alternatives is small. These impacts do not

Table 17

SHORT-TERM IMPACTS -- SOUTHWEST LINCOLN COUNTY SANITARY DISTRICT

The direct short-term impacts of this project are related to construction activities. These impacts are relatively minor in effect and magnitude and in most cases the adverse impact can be effectively mitigated. The impacts considered, their mitigation and our judgment of the relative positive or negative merit are given in the following matrix.

Short-Term Impacts	Alternatives 1	2	3	4	5	6	7	Recommended Mitigation Measures
Temporary loss of vegetation	-	-	-	-	-	0	0	• Replant after construction or allow for natural regrowth of shrubs and trees. • Vegetation adjacent to pipelines should be flagged or fenced to keep vegetative destruction to a minimum.
Disruption of wildlife	-	-	-	-	-	0	0	• Vegetation stripping for the pipelines should occur during the late summer or fall months when nesting birds are not present.
Construction-related traffic	-	-	-	-	-	0	0	• Construction should occur, if possible, during the fall periods when traffic volume is lower.
Utility service disruption	-	-	-	-	-	0	0	• Advance notice of anticipated utility disruption should be given. • If a lengthy period of disruption is necessary, utility bypasses should be provided.
Disruption of through and local traffic	-	-	-	-	-	0	0	• Barricades and flagmen should be posted as necessary to guide traffic through construction zones, residents in area should be notified as to location, nature and duration of construction.
Dust	-	-	-	-	-	0	0	• Keep soil wetted down in construction area.
Increased potential soil erosion	-	-	-	-	-	0	0	• If possible, construction should be done during the drier months of the year. • After construction, exposed soil areas should be reseeded using grasses native to the area.
Employment	+	+	+	+	+	0	0	• None necessary.
Economic activity	+	+	+	+	+	0	0	• None necessary.
Safety hazard	-	-	-	-	-	0	0	• All open trenches should be covered or fenced at the end of each work day. • All construction equipment should be secured against unauthorized use.

ort-Term Impacts	Alternatives 1	2	3	4	5	6	7	Recommended Mitigation Measures
rial pollutants	-	-	-	-	-	0	0	• All vehicles and equipment should be fitted with appropriate pollution control devices that are properly maintained.
sual impact of nstruction equipment d construction site	-	-	-	-	-	0	0	• Equipment should be stored in a designated area. All litter should be picked up. • Fence or otherwise screen construction maintenance area.
oil disposal	-	-	-	-	-	0	0	• Disposal of spoil material from the pipeline should be coordinated with other ongoing projects needing fill material.
ockpiling and storage spoil	-	-	-	-	-	0	0	• All spoil material not needed for backfilling should be removed from the pipeline route or spread over the surface and seeded.
creased noise	-	-	-	-	-	0	0	• All equipment should have mufflers, properly installed and maintained. • Construction activities should be limited to daylight hours.
ıter quality (streams)	-	-	-	-	-	0	0	• Construction activities in streamways should be limited to low flow periods. • Care should be taken not to discharge petroleum or other pollutants into stream.
ıy and ocean ıter quality (outfall ɔnstruction)	-	-	-	-	-	0	0	• Care should be taken not to discharge petroleum products or other pollutants into the bay or ocean.
emporary blockage of treamways, increased urbidity and distur- ance of fish life.	-	-	-	-	-	0	0	• Construction should occur during low flow periods (late summer) and when anadromous fish populations would be least affected.

+ Beneficial impact - Adverse impact 0 No impact

greatly influence the selection of a recommended plan from among the alternatives even though the impact may be signficantly adverse. For ease of understanding, the following long-term impacts have been divided according to major areas of concern -- physical and biological resources, social features and financial considerations.

Physical and Biological Resources

The following list indicates those physical and biological resource impacts to be discussed in the subsequent text.

- Water resources - quality and quantity
- Geologic hazards
- Air quality
- Archeological and historical
- Vegetation and terrestrial wildlife
- Marine biota
- Aesthetics
- Energy

Water resources - quality and quantity.

- o *The construction and hookup of a sewerage system will protect the groundwater from sewage contamination.*

Under present conditions, septic tank systems periodically fail in southwest Lincoln County due to high groundwater levels, impermeable soils, poor tank design, construction and maintenance and inadequate lot size. Under such conditions, groundwater resources and sewage often come in contact, and may move laterally along a cemented soil layer until surfacing in downslope areas. Even though most of the residents of the sanitary district are not dependent on groundwater as a potable source, any contamination of the water table by sewage would be unacceptable and a violation of Oregon Revised Statutes (ORS) (Sections 449.105 and 449.150).

The construction and operation of a sewerage system would generally alleviate potential groundwater pollution and prevent its occurrence as the area is more densely populated in the future. This protection of the local groundwater resources would represent a beneficial impact.

- *The elimination of sewage effluent on the beaches, drainways and other ground surfaces and a reduction in potential public health hazards and nuisances.*

The presence of sewage wastewater was clearly evident at locations on the beach and on some other ground surfaces of southwest Lincoln County during 1968, 1972 and 1974 surveys. Such conditions were in violation of ORS Sections 449.105 and 449.150 and Oregon Administrative Rules (OAR) Section 41-015.

The treatment facility and interceptor system (assuming mandatory hookup as required by Southwest Lincoln County Sanitary District ordinances) will greatly reduce and eventually eliminate the discharge of sewage wastewater to beaches and ground surfaces. This action will reduce the likelihood of public exposure to direct contact with raw sewage, and greatly improve the aesthetic quality of use of the beaches and drainages in southwest Lincoln County.

- *Impact on stream biota and water quality.*

Since none of the alternatives would discharge wastewater to streams in the project area, there will be no direct long-term impact on stream biota or water quality. A beneficial impact will be realized from eliminating the present discharge of 0.02 mgd of wastewater to Big Creek from the Camp Angell sewage treatment facilities.

The impacts on streams instead relate to secondary effects to be brought about by increased development in the southwest Lincoln County area. The conversion of land from natural vegetative to impermeable surfaces will affect runoff patterns and rates. Human activity in the area will change the quality characteristics of the receiving waters and thus affect stream biota. Residential or commercial development in poorly drained or flood hazard areas often times results in the need or desire for flood protection and control resulting in stream channelization projects. Table 18 gives an indication of the changes in runoff water quality associated with various land use types. Under existing conditions, the southwest Lincoln County area probably represents the non-urban land use type shown on Table 18. The reader can then see what projected emission rates would be if land uses were to change to primarily residential/commercial or industrial use types.

TABLE 18

URBAN AND NON-URBAN RUNOFF EMISSION RATES

Constituent	Land Use Types: Residential and Commercial[a]	Industrial[b]	Non-Urban
COD			
lbs/acre/in	25	38	NA
mg/l	110	170	
BOD_5[c]			
lbs/acre/in of rainfall	5	7.5	0.5
mg/l	22	33	2.2
Suspended Solids			
lbs/acre/in of rainfall	40	60	150
mg/l	180	270	670
Nitrogen			
lbs/acre/in	0.8	1.2	0.4
mg/l	3.5	5.3	1.8
Phosphorous			
lbs/acre/in	0.14	0.21	0.03
mg/l	0.62	0.93	0.13
Oil and Grease			
lbs/acre/in	2.9	4.4	0.34
mg/l	13	19	1.5
Cadmium			
lbs/acre/in	0.001	0.0017	0.00010
mg/l	0.0049	0.0074	0.00045
Chromium			
lbs/acre/in	0.041	0.062	0.015
mg/l	0.18	0.27	0.068
Copper			
lbs/acre/in	0.074	0.11	0.0050
mg/l	0.33	0.50	0.022
Lead			
lbs/acre/in	0.21	0.32	0.0082
mg/l	0.93	1.4	0.036
Mercury			
lbs/acre/in	0.027	0.041	0.000014
mg/l	0.12	0.18	0.00006
Nickel			
lbs/acre/in	0.018	0.021	0.0068
mg/l	0.080	0.12	0.030
Zinc			
lbs/acre/in	0.24	0.36	0.011
mg/l	1.1	1.7	0.047
DDT compounds			
lbs/acre/in	0.000047	0.000071	0.0000035
mg/l	0.00021	0.00032	0.000015
PCB's			
lbs/acre/in	0.00041	0.00061	0.0000045
mg/l	0.0018	0.0027	0.000020

[a] Source: Sartor J. D., and G. B. Boyd, Water Pollution Aspects of Street Surface Contaminants. EPA Report EPA-R2-72-081, November 1972; average values used in basin plan calculations except mercury, which was assumed as one-tenth the value listed.

[b] Value as residential and commercial increased 50 percent.

[c] $BOD:BOD_5 = 5.0$

Source: California State Water Resources Control Board, 1974.

- o *Operational reliability of pumping and treatment facilities in protection of the environment.*

The alternatives proposed for this project include between 10 and 12 pumping stations, depending upon the alternative implemented. Each pumping station would be equipped with a backup pump-motor combination which would be utilized in the event of pump-motor failure. Each pump and motor combination would be capable of pumping the entire flow through the pumping station by itself. There will be no standby electrical power provided at the pumping stations, although each will be equipped with an alarm system that will signal to an operator either a mechanical or electrical malfunction. In the event of a sustained electrical outage, a portable electric generator(s) would be utilized to provide power for pumping the raw sewage through the various pumping stations.

With the exception of the no-action alternative, all of the six viable alternatives would have sufficient operational reliability to meet anticipated waste water treatment and disposal requirements. The activated sludge process is a well-proven process, one which has worked more than adequately in this general area along the Coast and one which would provide sufficient operational reliability to protect the environment. No mitigation measures are proposed.

Geologic hazards.

- o *Damage to facilities and disruption of operations due to geologic hazards.*

The waste treatment facilities, interceptors, pump stations and treatment plant would be subject to disruption of operations or physical damage from earthquakes, high groundwater and surface flooding. Catastrophic coastal erosion also represents a physical hazard in some locations.

Although earthquakes have occurred in central and southwest Lincoln County, the known fault lines transecting the study area are concealed and reported to be inactive. Based on the history of seismic activity in the area, the probability of a major earthquake (Mercalli magnitude VII or larger) is judged to be low. However, if such an event did occur, the rupture of lines and tanks could cause raw sewage to enter drainageways and affect the surrounding environment.

The problems of high groundwater and flooding seem more likely to occur than seismic events. For example, high groundwater and heavy rains have caused problems with infiltration in the Waldport sewerage system (Seaman, letter of December 28, 1972). Such problems cause substantial increases in the volume of sewage entering a treatment facility.

Potential flood hazards exist at all streams within the study area. Unusually high stream discharge could cause damage to sewage lines crossing creeks, particularly from such things as streambed scour or heavy log flotsam.

In order to reduce the potential for such damage, the facilities would be designed to minimize catastrophic physical damage. Creek crossings should be designed so as to withstand the consequences of at least 100 year storm flooding. Since virtually the entire interceptor system will be constructed in areas subject to high groundwater, it will be necessary for sewers to meet the strongest leakage tests following construction to help ensure against groundwater infiltration.

Air quality.

o *Implications of air quality.*

Present air quality in Lincoln County is excellent. None of the project alternatives will create adverse effects on regional air quality, although treatment facilities may at times cause unpleasant odors of a localized nature. Nuisance odors can be produced from abnormal decomposition processes associated with an imbalance in the treatment process or other improper plant operation. Odors resulting from treatment imbalance sometimes occur with drastic changes in sewage quality caused by such things as shockloading, high or low pH, toxic substances or high temperature. Because of the seasonal nature of waste production in the area, shockloading is a potential problem. The sewage in the Southwest Lincoln County Sanitary District is of domestic origin, and therefore unlikely to have problems with pH or toxicity.

According to Robert E. Meyer Engineers, Inc. (1974) odors at the existing Waldport and Yachats plants have not been a significant problem. The proper operation of equipment will reduce the likelihood of offensive odors at any new facilities.

A normal condition in any treatment plant is the production of a musty or earthy smell, characteristic of a well-operating plant. While this may not be offensive to most people, there doubtless are some people who would consider this

an odor-producing situation. Thus, the proximity of the plant to residential or commercial developments will influence the degree to which complaints may be received. Expansion of facilities at the City of Waldport site could represent an adverse impact due to the proximity of commercial developments and a school. Also potentially adverse, would be the expansion of the City of Yachats plant due to the close proximity of residences. There should be no overall impact of odor production from treatment plants at Waconda Beach, Big Creek, or San Marine because sufficient land could be purchased to prevent the encroachment of residential development.

The alternative of sewage sludge incineration could cause the emission of air pollutants. The primary end products of sludge combusion are carbon dioxide, sulfur dioxide and ash. The particulates are potentially the major emission problem because of the violent upwards movement of combustion gases. However, particulate control can be achieved using wet scrubbers. Table 19 shows the likely emission factors from sewage sludge incinerators.

One means of reducing the likelihood of odors resulting from sewage treatment, is to utilize air injection in all force mains conveying raw sewage to the treatment plant. This air injection should guarantee that sewage influent will not be in a septic condition and therefore will not release odors upon entering the treatment plant.

A secondary impact on air quality, associated with providing sewerage facilities, will result from increased socio-economic development in the sanitary district. Added population growth will increase highway vehicular emissions, off-highway sources (utility engine and construction equipment emissions) and open burning of such things as wood and landscape refuse (some of this growth will occur without a project but at a slower rate). While such development will increase virtually all forms of pollutants (particulates, sulfur oxides, carbon monoxide, hydrocarbons and nitrogen oxides) the natural ventilating capabilities of the coastal area are expected to limit the degree of impact to an acceptable level.

Archeological-historical.

- o *Impact on federally or state recognized historic places.*

TABLE 19

EMISSION FACTORS FOR SEWAGE SLUDGE INCINERATORS

Pollutant	Emissions[a]			
	Uncontrolled[b]		After scrubber	
	lb/ton	kg/MT	lb/ton	kg/MT
Particulate	100	50	3	1.5
Sulfur dioxide	1	0.5	0.8	0.4
Carbon monoxide	Neg	Neg	Neg	Neg
Nitrogen oxides (as NO_2)	6	3	5	2.5
Hydrocarbons	1.5	0.75	1	0.5
Hydrogen chloride gas	1.5	0.75	0.3	0.15

[a] Unit weights in terms of dried sludge.

[b] Estimated from emission factors after scrubbers.

From: U.S. Environmental Protection Agency, 1975.

Only one site in Lincoln County is listed in the National Register of Historic Places. That one site, the old Yaquina Bay lighthouse, will not be impacted by any of the alternative sewage systems.

One historic property of statewide value, the Oregon Coast Highway, is within the study area. Although much of the construction would parallel the highway, the road would not be destroyed nor would its historic integrity be harmed.

o *Impact on archeological resources.*

Only one archeological site is threatened by the construction of alternatives 1 through 5. That site is located near the mouth of Starr Creek.

Starr Creek (site designation pending) (Figure 12). This is a midden site situated near Starr Creek at its confluence with the Pacific Ocean. A pumping station is proposed on this site as well as a sewer line which would transect the site. If the pumping station were located north of the gravel road and beach access, it will not impact the site. The sewer line running south from this pumping station, unless relocated approximately 100 feet east of its proposed location, will cut through the site requiring salvage excavation.

Although an initial field reconnaissance has been conducted, buried cultural materials may well be encountered during the construction of facilities for alternatives 1 through 5. In order to reduce the likelihood of cultural resource disturbance, the consulting archeologist should be sent copies of final construction plans and the professional archeologist should be "on call" in the event a buried site is encountered during construction. This will require an open line of communication between the archeologist and the principal contractor. The end result will be the potential salvage of invaluable information and the least possible delay in construction.

Vegetation and terrestrial wildlife.

o *The construction of sewage facilities will impact vegetation and attendant wildlife.*

Sewage facilities require land and the removal of native vegetation and wildlife. This removal of habitat will affect wildlife, both directly and indirectly. Subsurface dwelling and sedentary mammals, amphibians and reptiles at facilities locations will be destroyed by construction activities. Some birds, mammals and reptiles that periodically use facilities sites will be excluded from this use.

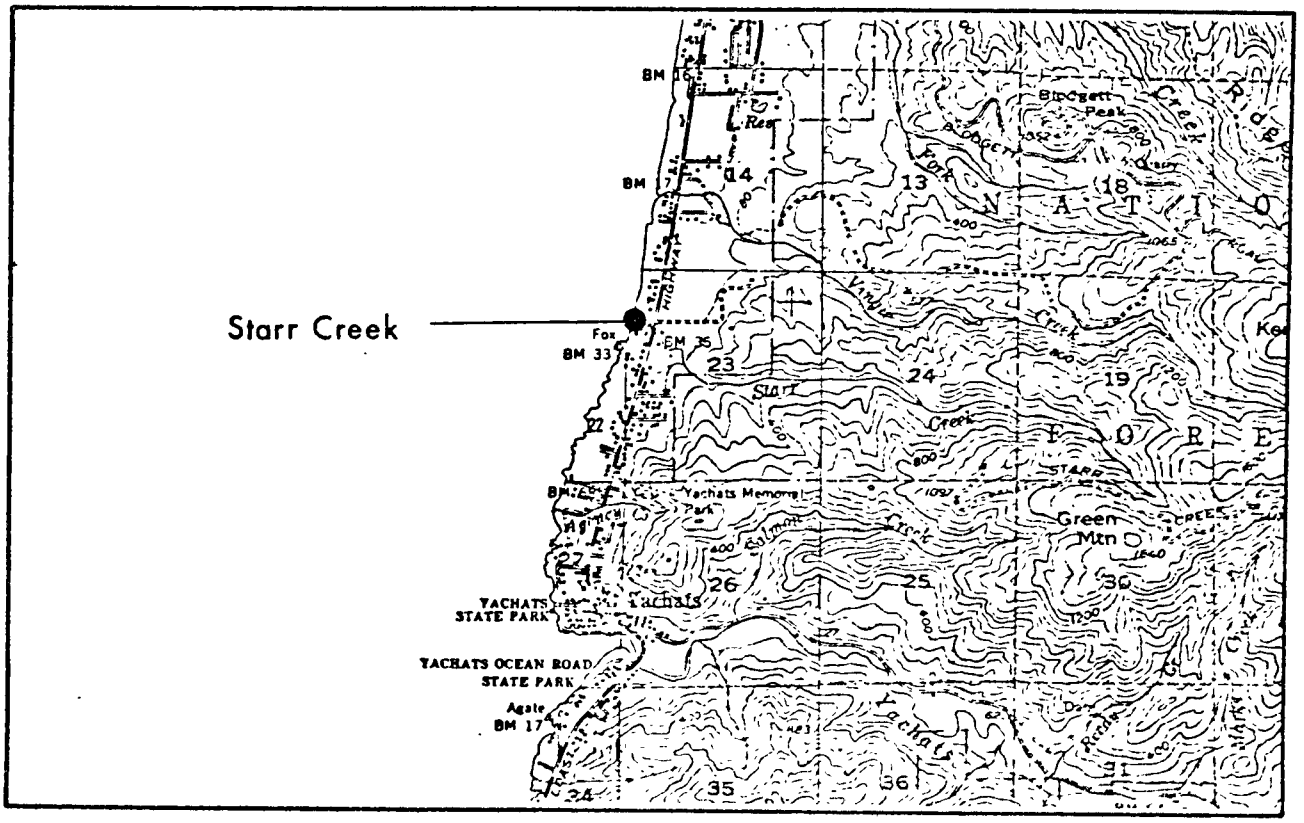

Figure 12. Location of Starr Creek Archeological Site (site designation pending)

The proposed interceptor system will, for the most part, parallel existing roadways -- U. S. Highway 101 and the numerous streets connecting to the main highway.

The construction of the pipeline in other than roadways will eliminate vegetation, wildlife habitat and some local populations of animals. Ground-dwelling mammals such as moles and shrews will be destroyed and populations of above-ground fauna reduced from loss of habitat. Birds, mammals, reptiles and amphibians utilizing the habitat will be indirectly affected. Since most pipeline construction will be in roadways this impact is expected to be intermittent.

Under the no action alternative (no. 6), there will be no impact on terrestrial vegetation and wildlife resources resulting from project implementation. The population growth and home development secondary impacts would be of a lesser magnitude with no action than those secondary impacts resulting from alternatives 1 through 5 and 7. Home development is expected to continue with all alternatives however at a slower rate with no action. That continued development will result in the loss of vegetation and many associated wildlife species.

o *Rare and endangered species.*

Several vertebrate species deemed rare, endangered or possibly threatened occur within the study area. Four of the species -- the northern bald eagle, Aleutian Canada goose, peregrine falcon and western snowy plover -- are seasonal visitors to the study area and may occur in the study area at least part of the year. Neither the sewage treatment plant nor the interceptor system will adversely affect those species.

The fisher, white-footed vole, northern spotted owl and flammulated owl are species of the higher elevations and dense sitka spruce, western red cedar and western hemlock forest. The spotted owl and flammulated owl may forage throughout the study area and would be indirectly affected by the project. The white-footed vole represents the only rare or endangered species likely to be directly impacted by interceptor or treatment plant construction. Virtually all of the white-footed vole habitat directly adjacent to the U. S. Highway 101 is of marginal quality because of disturbance from previous road and water main construction activities.

The greatest impact on rare or endangered wildlife is most likely to result from the future residential development in the sanitary district. Residential and commercial structures with their attendant roadways, service rights-of-way and other

facilities, will cause a greater loss of wildlife habitats than will occur from the sewage treatment plant, pumps and the interceptor system. Beach pine-sitka spruce habitat that now supports spotted owls, flammulated owls and the white-footed vole, will be reduced as development increases. The more substantial impact on rare and endangered wildlife will be most likely to occur with full sewering of the sanitary district as provided for in Alternatives 1 through 5.

The impacts on rare and endangered species can be mitigated by 1) constructing the interceptor system and sewage treatment facilities on previously disturbed sites and 2) regulating the density and distribution of residential and commercial buildings within the District. The implementation of the latter mitigation measure would be dependent on Lincoln County and LCDC decisions on land use.

Marine biota.

o *Impact on marine biota.*

Of the seven possible project alternatives, five would discharge wastewater into an estuarine or marine receiving water.

Estuarine outfall. Alternatives 2 and 5 would involve the Waldport sewerage treatment plant and the discharge of treated wastewater into Alsea Bay. Under Alternative 2, 0.19 mgd of wastewater flow (1975 population) would be added to the existing 0.1 mgd discharge, while Alternative 5 would add 0.38 mgd to the 0.1 mgd discharge. Presently the Waldport sewerage treatment plant discharges into Lint Slough; however, expansion of these facilities would necessitate an extension of the outfall into the main Alsea Bay channel. The present dispersion and dilution qualities of Lint Slough were determined by DEQ to be insufficient to handle the additional treated wastewater without causing degradation of the receiving water quality.

To take advantage of the bay's natural ability to assimilate wastewater, the location of an outfall in the Alsea estuary is important to the maintenance of estuarine biota and water quality. Improper placement of an outfall could result in a number of adverse affects; for example, a reduction of dissolved oxygen, the deaths of some biota, an accumulation of heavy metals in the substrate or shellfish, increased turbidity and biostimulation (leading to growth of algae).

The placement of an outfall in an area having a good exchange of water and good dispersion greatly reduces the likelihood of adverse effects such as those previously mentioned. As a general rule, the nearer the main channel and the closer to the ocean one places the outfall the less the risk to water quality and biota.

Under existing conditions, the Waldport treatment facility cannot exceed a monthly average of 25 pounds per day BOD or a daily maximum of 56 pounds. The anticipated NPDES requirements for Alternatives 2 and 5 discharge to Alsea Bay would vary depending upon the season of the year. Between June 1 and October 31, a 20 milligram per liter biological oxygen demand and 20 milligram per liter suspended solids limitation are expected. Between November 1 and May 31, it is expected that these limits would be increased to 30 milligrams per liter for each.

With stringent NPDES (National Pollutant Discharge Elimination System) requirements for fecal coliform bacteria (presently 70 MPN for 100 ml) there should not be a health hazard through shellfish harvesting associated with sewage discharge to the estuary.

The malfunction of the sewerage facilities or accidental discharge of untreated waste into Alsea Bay would constitute a threat to estuarine biota and to public health.

One additional adverse impact may result from the addition of phosphates to Alsea Bay. Phosphates may create localized algae growth problems.

Ocean outfall. Alternatives 1, 2, 3, and 4 would discharge to the ocean with Alternatives 1 and 3 requiring outfalls off open sandy beaches. Alternatives 2 and 4 located at Yachats would discharge through an existing outfall off the rocky shore. As with any wastewater discharge, the important concerns for ocean wastewater discharge are the quality of the effluent, the dispersion capacity of the receiving water and the sensitivity of the receiving environment to wastewater discharge.

The location and length of a beach outfall are important factors relative to the impact on water quality, the marine biota and beach recreation. The combination of tidal currents, on-shore winds, water depth and volume of discharge usually determine the location and the length of the outfall needed to prevent adverse effects.

Alternative 1 (Waconda Beach/San Marine sewerage treatment plants) would each support half of the district population, or 1,350 people in 1975 and 2,350 for the year 2000. Discharge volume at each plant for 1975 and 2000 populations, would be 0.19 mgd and 0.33 mgd respectively. Alternative 3 (Big Creek sewerage treatment plant) would require a wastewater flow of 0.38 mgd at 1975 population levels and 0.66 mgd for a year 2000 population. The length of outfalls for Alternatives 1 and 3 would have to be sufficient to place the top of the outfall 10 feet below mean low lower tide level. It is estimated that this would require an outfall about 1000 feet in length. It is felt that NPDES permits for those outfalls would stipulate a 50-foot radius mixing zone as similar for the existing City of Yachats outfall.

Whatever effects sewage effluent would have on marine biota would probably be restricted to very near the point of discharge. Combinations of factors such as wind and tides could cause effluent to be driven on-shore, having localized effects on intertidal biota such as shellfish (razor clams) and other benthic fauna and on recreation uses of the beach.

If the contamination of shellfish or the water is severe enough, the beach areas can be closed due to a health hazard. Such events seem unlikely because the amount of wastewater discharged is relatively small, and the levels of treatment required by the EPA and DEQ for the NPDES waste discharge permit are designed to meet the water quality standards for marine waters of Oregon (OAR Chapter 334 [Section 11-010; 11-205; 11-070]).

The discharge of wastewater off of rocky coastline, as in Alternatives 2 and 4, is thought to have less potential for adverse impact than would discharging off of a sandy beach or into an estuary. The combination of good dispersion capacities, aeration, sufficient water depth and little recreational use level ensure the lesser potential for adverse impact. However, a long term malfunction of sewage facilities, thus discharge of untreated waste, onto a rocky shoreline would likely have a greater impact on marine biota than would a like discharge onto a sandy beach. This is because there is a greater diversity of marine species inhabiting a rocky shore. The NPDES water discharge permit will establish required effluent quality conditions to ensure compliance with state water quality standards.

Aesthetics.

o *Aesthetics impact.*

The sewerage facilities, with the attendant pump stations along the interceptor line, will cause changes in the aesthetic condition of the area. Alternatives 2, 4 and 5 would require the expansion of existing treatment facilities at Waldport and Yachats, while Alternatives 1 and 3 would require new treatment plants, either at Waconda Beach, San Marine or Big Creek.

Construction of these treatment facilities would impact the existing aesthetic quality of their locations in a variety of ways. The existing Yachats and Waldport sewage treatment plants (Alternatives 2, 4 and 5) are located adjacent to residential development and to school property. Treatment facility expansion would probably include some of the school land. The location of both plants within the Cities of Waldport and Yachats could create a visual impact greater than will new treatment plants at Waconda Beach, Big Creek or San Marine. At new locations a treatment plant site may be selected which would be removed from the visual range of the Coast Highway, and a buffer area could be purchased to prevent the encroachment of residential development within close visual range of the treatment facility. A mitigation measure common to all treatment facility locations would be the provision of sufficient landscaping to provide a pleasing foreground to the treatment facility. In addition, any buildings which are constructed should be architecturally blended with the existing architecture of the area.

The aesthetic impact of no action (Alternative 6) would be the continuation of periodic septic tank overflow into surface drainages and onto beaches resulting in the aesthetic unpleasantness associated with raw sewage in public and private use areas. Those problem areas are likely to be throughout the sanitary district because high groundwater and impermeable soils conditions are prevalent over a wide area.

Pumping stations would be necessary for 5 of the 7 alternatives. All pumping stations would be buried except for a 2-foot high manhole extending above the ground.

A major secondary impact on the aesthetic quality of the area could be created by future residential and commercial development of the district. The magnitude of that impact would be dependent on the extent to which the area is built out, the size and location of residential lots, the quality of residential development and the measures taken by homeowners to build and maintain structures that fit the natural coastal setting.

In order to minimize the visual impact of any of the alternative facilities the treatment plants should be constructed using local building materials as much as possible and screening the plant by landscaping or wood fencing.

Pump stations should be constructed to conform with topographic profiles where possible and any exposed portions should be painted or landscaped to blend with the surrounding natural setting.

Energy.

o *Impact of consumptive use of energy.*

All alternatives will, in varying degrees, have an impact upon energy consumption. Alternatives 1 through 5 will require the greatest energy requirements, while Alternative 6, no action, will have no energy requirements unless mitigation measures such as septic tank repair or installation of storage vaults are enacted. The degree to which the six alternatives consume energy is presented in Table 20. Of the five treatment facility alternatives, the least energy-consuming is Alternative 3, principally because this alternative pumps all raw sewage towards the middle of the District, eliminating multiple pumping of sewage as is required in other alternatives. In addition to the electrical energy requirements shown in this table, Alternative 7 also has a requirement for diesel fuel for operation of the septic tank pumper truck. Estimates indicate that 91,200 gallons of diesel fuel would be required for a 20-year period of operation. There are no proposed mitigation measures to lessen the requirement for energy.

Social Features

The following list indicates those social impacts discussed in the subsequent text.

- Parks and natural areas
- Land use
- Land use planning
- Traffic
- Population characteristics
- Sewage facility management
- Cumulative effects

TABLE 20

ENERGY REQUIREMENTS

KILOWATT-HOURS/20 YEARS

ALTERNATIVE	TREATMENT	PUMPING	TOTAL
1	6,876,000	1,410,000	8,286,000
2	6,876,000	2,116,000	8,992,000
3	3,986,000	1,788,000	5,774,000
4	3,986,000	3,606,000	7,592,000
5	3,986,000	4,268,000	8,254,000
6	-	-	
7*	.600,000	0	1,600,000

* Alternative 7 also requires about 91,200 gallons of diesel fuel for the septic tank pumper truck every 20 years.

Parks and natural areas.

o *Impact on parks and natural areas.*

Five state and federal parks and campgrounds are in the Southwest Lincoln County Sanitary District. The five areas total 39 acres and contain 126 overnight campsites and numerous day-use picnic areas. Two areas -- San Marine State Wayside and Blodgett recreation site (U. S. Forest Service) -- are undeveloped and have no facilities. The remaining three areas contain day use or overnight facilities with toilet buildings and/or showers. All three areas have sewage disposal problems. Sewage from Tillicum Beach is presently pumped to the Camp Angell Job Corps Center for disposal (Collett, pers. comm.). Beachside State Park was closed during part of 1974; however, was reopened when a daily septic tank pumping program was undertaken. Waste pumped from the campground was disposed of at the Waldport sewage treatment plant.

Alternatives 1 through 5 would eliminate the septic tank failure problems now associated with the park and campground areas. Alternatives 6 and 7 (no project and septic tank maintenance) would be unacceptable (no project) or expensive (approximately $31,000 per camping season per park for Alternative 7).

Continued sewage disposal problems at the parks could result in the Department of Environmental Quality ordering closure of the facilities or prompting each park to install separate sewage treatment plants.

Land use.

o *Impact on land use patterns.*

None of the alternatives can be expected to alter the existing land use patterns of the district. The intensity of present uses, however, can be expected to vary according to alternatives selected. Generally, the no project alternative would result in a stagnation of property values and a slowing of real estate sales. Build-out levels below current expectations could result with the no project alternative. Difficulties may also be anticipated with overloading of existing on-site facilities during peak population months of the year.

In terms of secondary impacts, it appears unlikely that any change in current pattern of land use would result from the project. The present mix of public, private and commercial use is likely to be maintained. The no project alternative, however, would cause a decrease in the rate of vacation and retirement home construction as well as after property values in areas where septic tanks are prohibited.

Land use planning.

o *Impact on land use planning.*

No changes are anticipated in current zoning or land use plans as a result of any of the sewerage alternatives. The no project alternative, however, could result in substantial inconsistencies between current zoning and actual use. If Department of Environmental Quality and county criteria for soil and water table conditions suitable for septic tank use are adhered to then substantial portions of the district zoned residential, may in the absence of public sewerage facilities, be unusable in that classification, however other land uses would be allowed to occur.

The planning and siting of sewerage facilities has been deemed an activity of statewide significance, requiring a planning and siting action on the part of LCDC to determine whether or not the project conforms with statewide land use planning goals and, in this case, coastal zone management goals. Also a determination of compliance with the local comprehensive land use plan is required. Since neither the coastal zone management goals of the State of Oregon nor the Comprehensive Plan for Lincoln County have been adopted by LCDC, the intended state forum is not operating for the review of the proposed sewerage plans and their relationship to land use. LCDC officials have stated in a letter to the EPA that they, in conjunction with the Oregon Department of Environmeantal Quality, will oversee the planning and siting of this project and thereby insure that no hook-ups will be allowed until a comprehensive plan addressing land planning issue has been filed with LCDC. Whether LCDC has the authority to impose such restrictions on local residents is a matter which has yet to be resolved and, no doubt, will require a legal interpretation of the applicable statutes before a resolution is reached. The designation of urban growth boundaries surrounding the population center of Waldport and Yachats on either end of the district and comprehensive land use plans have not been made; thus, a determination of the orderliness of urbanization within the area cannot be made in conformance with the statewide adopted planning goals.

Traffic.

o *Impact from traffic.*

A secondary impact of sewerage facility development and subsequent residential development, will be an increase in traffic loads on all roads within the Southwest Lincoln area. Projected emissions generated from local and tourist traffic between Yachats and Yaquina Bay are presented in Table 21.

Daily traffic loads on Highway 101 are often at the capacity of the highway (about 8,000 ADT) during the summer months of June through August (Schwab, pers. comm.). At the present time there are no plans to increase the highway capacity of Highway 101, either by roadway improvement or construction of a new highway.

Given this information, it is likely that future development in Southwest Lincoln County will add to the existing seasonal traffic congestion problem. Local streets, which are unimproved, will degrade further and some may become impassable during the wet season.

Population characteristics.

o *Impact of permanent vs. transient use.*

In addition to the two state parks currently being operated in the district, the State intends to develop for park use its properties at Smelt Sands and San Marine (pers. comm., Larry Jacobson). These developments would surely add to the peak tourist population which has been steadily increasing in recent years. Commercial facilities which cater primarily to the tourist traffic will, of course, benefit from this expansion. Tourists who partake of the natural amenities of the area gain benefits from having sewered camping and picnicing facilities available to them.

An issue is whether a mechanism can be devised which insures that the small group of permanent residents is not adversely impacted by subsidizing the non-resident, non-tax-paying transient population as well as commercial proprietors who benefit from the increased tourist traffic. If no method is developed to insure that transient populations bear their share of the sewerage cost; permanent residents will be transferring their income to transient, non-residents who are primarily responsible for the peak capacity needs which influence the capital cost.

o *The population impact of a sewerage system.*

Table 21

PROJECTED AIR EMISSIONS (POUNDS PER DAY) FROM LOCAL AND TOURIST TRAFFIC -- YACHATS TO YAQUINA BAY

Year	Carbon Monoxide		Hydrocarbons Exhaust		Hydrocarbons Crankcase & Evaporation		Nitrogen Oxides (NO_x as NO_2)		Particulates Exhaust & Tire Wear		Sulfur Oxides (SO_2)	
	Local	Tourist	Local	Tourist	Local	Tourist	Local	Tourist	Local	Tourist	Local	Tourist
1974	2,960	1,452	290	142	106	52	275	135	31	15	11	5
1975	2,749	1,348	275	135	82	40	275	135	32	16	11	5
1980	1,501	692	157	72	35	16	202	93	38	17	13	6
1990	1,000	433	108	47	32	14	150	65	48	21	17	7
2000	1,216	505	131	58	39	16	182	76	59	25	20	8
2010	1,433	570	155	62	45	21	215	87	69	28	24	10
2020	1,650	650	178	70	52	21	248	98	79	31	28	11
2025	1,750	698	189	76	55	22	263	105	85	34	29	12

Source: Data projected from Oregon State Highway Division Traffic Volumes tables; population projections; U. S. Environmental Protection Agency, 1975.

Recent experience suggests that approximately 23 percent of current permit applications are being denied (Postle, reported in Meyer, April 1975); the fact that some permits are being refused is already reflected in the estimate of 20-25 units per year absorbed. It is this estimate which is used to approximate growth under the no project alternative.

The implementation of a sewerage system would facilitate future growth in the area. A number of the permits denied in the past might be resubmitted once wastewater problems of particular sites are solved, and a spurt of development reflecting the backlog of denied permits may be experienced. The magnitude of this "catch-up" component of future growth cannot easily be estimated, as some of those to whom a permit was denied may have found other acceptable properties in the interim.

In the period following the completion of a regional sewerage facility, annual growth would probably take place at a higher rate than the historical experience of 20-25 units. If 23 units were built when 23 percent of permit applications were rejected, then the total demand must have been in the vicinity of 30 units per year. Projecting this absorption forward, 20-year growth would result in a 1995 population of 3,480 non-transient persons, as is presented in Table 22. Population projections of the facilities engineer are presented in the same table for comparative purposes.

Over time, the annual growth increment is likely to decline from 30 units per year to some lower figure. This will happen because the remaining sites in any given year will be less desirable than in earlier years, the higher amenity (coast access and water view) sites having been absorbed first. Also, the level of urbanization itself may make the area less desirable from the viewpoint of a household in the market for a recreation home. Even in the recent past, there has been a decline in the numerical increase in the number of second homes in Lincoln County. That number rose by 377 between 1950 and 1960, but by 347 between 1960 and 1970. The realization of the higher growth figures presented in Table 22 probably depends on a shift in ownership patterns toward permanent, year-round occupancy, which in turn would require expansion of employment opportunities in the region.

Sewage facility management.

- *Personnel needed to operate the treatment facilities.*

Table 22

COMPARISON OF POPULATION PROJECTIONS

Source of Projection

Year	Historical Housing Unit Absorption[1]	Future Absorption Without Sewer Constraint (30 units/year)	Sewerage Study[2]		
			Total Peak	Loss Transient	Non-Transient Total
1975	2,040	2,040	2,700	600	2,024
1985	2,590	2,760	3,500	825	2,675
1995	3,145	3,480	4,300	975	3,325
2025	4,800	5,640	6,700	1,450	5,250

[1] See Table 6b.

[2] See Meyer, September 1974, Table I.

All of the treatment alternatives proposed will require a District staff comprised of a superintendent and a bookkeeper. In addition to this, operators will be required for the treatment plant. Projections at this time indicate that Alternatives 1 and 2 will require a total of 3-1/2 people; Alternatives 3, 4 and 5 will require 3 people, and Alternative 7 will require 2-1/2 people. Alternative 6 requires no personnel, as this is a no-action alternative, and no facilities will be constructed or maintained.

Cumulative effects.

o *Cumulative impact of sewering two sanitary districts.*

Although the southwest Lincoln County and Bay to Bay Sanitary Districts are considered as separate legal entities, the effects of sewering each district will not be limited just to the district boundaries, but instead will have an impact on surrounding communities and on each other.

The sewering of each district will provide a catalyst for residential and commercial development from Yachats to Newport. This increased growth will have a particularly profound impact on U. S. Highway 101, the only major transportation route along the coast. Traffic congestion under present conditions occurs in Waldport and Newport during the summer months. As with many cities and towns along the coast, the Highway 101 runs directly through the centers of Newport and Waldport, creating a mix of local and through traffic. The increased local population (that portion of the population owning homes or businesses in the area) and expected increases in tourist traffic, will create more traffic congestion throughout both sanitary districts and in nearby cities.

The increase in local population and home development will cause an increased demand in utilities -- electricity, water and natural gas and in community services in the area -- police and fire protection, street maintenance, and solid waste collection. It is unlikely that there will be a significant increase in school enrollment because of the summer resident and retirement nature of the community.

The sewering of the two sanitary districts will cause changes in land use along a 21-mile strip of coast. Land now as open space and covered with natural vegetation and supporting wildlife species, will be changed to a rural residential land use. Other areas of open lands may become commercial.

Financial Impacts

The following list indicates those financial impacts to be discussed in the subsequent text.

- Local economy
- Cost to property owners
- Property values

Local economy.

o *Impact on local economy.*

The project's impact will be felt as an injection to the local economy for expenditures on new and additional services. Some jobs may be created for the duration of the project. Approximately 1,308 man-days of labor will be necessary to complete the collection system and another 2,500 man-days necessary for treatment facilities and pumping stations. Approximately 20% of this labor may be supplied locally resulting in a total of approximately $60,928.00 of employment income. All of the necessary materials for the project are expected to be purchased outside the area.

The ability to expand existing commercial tourist facilities will have a salubrious effect on the local retail trade and service industry. Accelerated growth in residential building and real estate sales is expected regardless of which viable project alternative is selected. These long-term effects are difficult to quantify but the general pattern of development appears to be one of continued growth in residential housing with new motels and stores.

Costs to property owners.

o *Financial impact on local property owners for project implementation and operation.*

The total cost of implementing any alternative appears as a number of separate buildings to the user. The purpose of this section is, to approximate the separate costs which could be incurred and then to estimate example total costs for various lot sizes. Although no alternative is recommended by EPA to this

time, Alternative 4 - Yachats Alternative - is utilized to calculate these example user costs. Alternative 4 was selected because it represents one of the lowest cost alternatives and has been represented locally as an acceptable alternative.

Six different costs comprise the total implementation cost, and these are discussed in the following sections.

Initial costs.

- Connection cost - this is a one-time payment by property owners for connection to the public sewerage system. The District's Engineer has recommended an initial connection cost of $100.00, and a $500.00 cost for property connected more than 90 days after sewer availability.

- Inspection cost - This is a one-time payment to cover the District's cost of inspecting new service connections to their system. The District Engineer has recommended an inspection cost of $15.00.

- Lateral to public sewer - The sewer collection system to be constructed will include laterals to the individual property lines. The property owner is responsible for extending the lateral from the property line to his house connection. The cost of this extension will vary with distance and lot topography, but will probably fall between $100 and $500 per lot. A "middle of the road" cost of $250 has been utilized in this analysis. Based on sanitary district figures for the number of existing dwellings having water service, it is likely that there will be approximately 850 initial sewer hookups.

Annual costs.

- Local Improvement District (LID) assessment - This assessment is comprised of two costs:

    1. An area cost of $0.0264 per square foot assessed against all property within 300 feet of a proposed sewer.

    2. A benefit cost of $0.0395 per square foot assessed against the first 150 feet of property depth.

The assessment can be paid as an initial cash payment or can be financed at a rate of 7% over a 10 or 20-year period. Payments are made semi-annually.

- Sewer service charge - This is a monthly charge assessed against each connection to pay for sewage transportation, treatment, disposal and a portion of the bond payment. The District's Engineer has recommended a charge of $5.00/month/connection.

- Ad valorem taxes - These are property taxes that are calculated according to the assessed value of the various properties within the District. The rate of taxation was estimated to be $1.66 per $1,000 of assessed valuation in 1980, $1.07 per $1,000 in 1990, and $0.82/$1,000 in year 2000. The rate of taxation decreases with time principally because the District's assessed valuation is rising, and bond payments remain constant.

These taxes are not a part of operation and maintenance costs for the sewerage system, but rather represent property taxes designed to pay off bonds for treatment facilities.

Summarized in Table 23 are the intial and annual estimated costs for four different lot sizes. The assumptions made in the development of this table were:

1. L.I.D. assessments were financed over a 20-year period

2. Assessed valuation of lots was:

60' x 100' lot	-	$15,000
75.0' x 100' lot	-	$21,000
100' x 200' lot	-	$30,000
200' x 200' lot	-	$50,000

The table shows that an initial cost of about $365 would be required to hook up to the sewer and annual costs would range from about $122 to $353 in 1980 (depending on lot size), decreasing to about $109 to $311 per year (depending on lot size) in year 2000.

o *Ability to pay.*

The Southwest Lincoln area is characterized by comparatively low incomes, higher than average median age and relatively low residential property values. These are all indicators of possible difficulties in supporting a major public capital investment.

Table 23

PROJECTED COST TO PROPERTY OWNERS FOR IMPLEMENTATION OF ALTERNATIVE 4

LOT 1/ SIZE	INITIAL COSTS 6/				ANNUAL COSTS 6/							
	CONNECTION	INSPECTION	FROM HOUSE 2/ TO PUBLIC SEWER LATERAL	TOTAL	L.I.D. ASSESSMENT - 20-YR FINANCING PERIOD - $/YR	SEWER SERVICE CHARGE $/YR	AD VALOREM TAXES - $/YR 4/			TOTAL ANNUAL COST - $/YR		
							1980	1990	2000	1980	1990	2000
60x100	100.00	15.00	250.00	365 5/	36.99 3/	60.00	24.90	16.05	12.30	121.89	113.04	109.29
75x100	100.00	15.00	250.00	365	46.27	60.00	34.86	22.47	17.22	141.13	128.74	123.49
100x200	100.00	15.00	250.00	365	104.99	60.00	49.80	32.10	24.60	214.79	197.09	189.59
200x200	100.00	15.00	250.00	365	209.89	60.00	83.00	53.50	41.00	352.89	323.99	310.89

1/ 1st dimension is street frontage

2/ Varies with distance between house and property line as well as property topography. Expected range is $100 to $500.

3/ May be paid by initial cash payment, which would be from top of table to bottom: $395.00; $494.00; $1121.00; and $2241.00. May also be paid in semi-annual payments over a 10-year period, which would be from top to bottom: $55.59/year; $69.52/year; $157.75/year; and $315.36/year.The 20-year financing can also be paid in semi-annual payments.

4/ Tax rates were estimated to be: 1980-$1.66/1000; 1990-$1.07/1000; and 2000-$0.82/1000. Assessed valuations used to compute taxes were:

60x100' lot - $15,000
75x100' lot - $21,000
100x200' lot - $30,000
200x200' lot - $50,000

5/ This total initial cost would increase by $400 for a cost of $765 for connections made after the 90-day availability period.

6/ Total first year costs include the total initial costs plus total first year annual costs.

Source: Modified from financial plan prepared by Robert Meyer Engineers.

The two major sources of income for tax-paying residents of the area are retirement benefits and self-employment earnings. These sources tend to yield mean incomes well below that of median family income levels in the county as a whole, even though the county is below that of the State of Oregon. Table 24 presents 1970 median family incomes for the United States, Oregon and Lincoln County.

This low income factor must be taken into consideration when deciding the appropriate sewerage facility financial scheme.

It should also be recognized that the median age of the population in southwest Lincoln County is well above that of the county as a whole. This area is recognized as a retirement center. Retired and inadequately employed persons typically live on incomes which do not keep pace with inflation and, therefore, must be given adequate consideration lest they be displaced from the community as a result of unusually great utility and tax costs.

Property values.

o *The impact of a sewerage system on property values.*

Property values have tended to increase more slowly in southwest Lincoln County than in the county and the State. There may be a number of forces responsible for this lag, among which is the absence of adequate sewerage facilities. The provision of such facilities may cause property values to increase at a faster rate which could result in higher property taxes for residents. The State of Oregon has enacted legislation which provides for a homeowner's and renter's property tax refund applicable on a graduated scale for households earning $15,000 or less incomes per year which could mitigate the impact of increased taxes on many of the permanent residents. While the provision of sewer facilities may cause property values throughout the district to increase somewhat, Alternatives 1 and 3 which call for the location of treatment facilities at Waconda Beach, San Marine and Big Creek locations, may tend to have adverse impacts on property values immediately adjacent to the plants and outfalls. Alternatives 2, 4, and 5 would locate the treatment facilities outside the district boundaries and hence, would have no depressing effect on property values within the district. In the long term properties adjoining the plants in Yachats and

Waldport may decrease as the treatment plants enlarge, age and reach their treatment capacities, Alternative 6, the no project alternative, can be expected to result in diminished property values in residential zones which are deemed unsuitable for septic tank usage by the County. Alternative 7, which calls for a program of septic tank maintenance, would be an improvement over the no project alternative, however, would still result in property value losses to property owners who are unable to obtain septic tank facilities.

TABLE 24

Family Incomes in 1970 of Lincoln County as Compared to State and Nation

	Median Family Income
United States	$9,590
Oregon	9,489
Lincoln County	7,909

V. UNAVOIDABLE ADVERSE IMPACTS

The unavoidable adverse impacts of all alternatives are presented in Table 25. While most of the sewage facilities projects have similar impacts, there is a market difference between impacts of alternatives 1 through 5 and 6 and 7. The following is a summary of the adverse impacts of each of the alternatives.

1 Waconda Beach/San Marine Alternative. The impacts on groundwater, beaches, geologic hazards, air quality, vegetation and wildlife, marine biota, aesthetics, parks and land use patterns will be minor. Of major consequence are the impacts on land use planning, traffic, energy consumption, property owners and permanent vs. transient use. This alternative represents one of the more costly alternatives for local property owners.

2 Waldport/Yachats Alternative. The impacts of this alternative would be similar to those of the Waconda Beach/ San Marine alternative except that there would be a minor impact to both estuarine and ocean biota because of the two outfall locations. There would be a major financial impact on the local property owners and on the consumptive use of energy.

3 Big Creek Alternative. The impacts on groundwater, beaches, public health hazard, operational reliability, geologic hazards, air quality, vegetation and wildlife, marine biota, aesthetics, parks and land use patterns will be minor. There is a potential for a moderate adverse impact on archeological resources, land use planning, traffic, permanent vs. transient use and cost to property owners. Energy consumption would be less than alternatives 1 or 2.

4 Yachats Alternative. The adverse impacts associated with this alternative would be the same as those associated with alternative 3.

5 Waldport Alternative. The adverse impacts of this alternative are basically the same as those of alternative 4 except that effluent discharge will be into the Alsea estuary rather than as an ocean discharge. This alternative would also consume more energy than will alternative 4.

Table 25

ENVIRONMENTAL SUMMARY OF ADVERSE IMPACTS OF PROJECT ALTERNATIVES FOR THE SOUTHWEST LINCOLN COUNTY SANITARY DISTRICT

Impacts	1 Waconda Beach San Marine Sewage Treatment Plant	2 Expand Waldport and Yachats	3 Big Creek Sewage Treatment Plant	4 Yachats Expansion for Entire District	5 Waldport Expansion Entire District	6 No Project	7 Septic Tank Maintenance
Continued degradation of groundwater	-	-	-	-	-	+	Δ
Continued sewage on beaches and public health hazard	-	-	-	-	-	+	Δ
Direct effects on stream biota and water quality	0	0	0	0	0	Δ	0
Potential problems with operational reliability	-	-	-	-	-	NA	Δ
Potential geologic hazards	-	-	-	-	-	0	0
Impact on air quality	-	-	-	-	-	0	0
Potential impact on archeological resources	Δ	Δ	Δ	Δ	Δ	0	0
Vegetation and terrestrial wildlife loss	-	-	-	-	-	0	0
Rare and endangered species	-	-	-	-	-	0	0
Marine biota impact - estuary	NA	-	NA	NA	Δ	0	0
Marine biota impact - ocean	-	-	-	-	NA	-	-
Impact of aesthetics	-	-	-	-	-	+	-
Consumptive use of energy	+	+	Δ	Δ	+	0	-
Impact on parks	-	-	-	-	-	+	Δ
Impact on land use patterns	-	-	-	-	-	Δ	Δ
Impact on land use planning	Δ	Δ	Δ	Δ	Δ	-	-
Impact from traffic	Δ	Δ	Δ	Δ	Δ	-	-
Impact of permanent vs. transient use	Δ	Δ	Δ	Δ	Δ	-	-
Financial impact on local property owners	+	+	Δ	Δ	Δ	-	-
Ability to pay	+	+	Δ	Δ	Δ	-	-

Degree of Adversity:

+ Major impact
Δ Moderate impact
- Minor impact
0 No impact
NA Not applicable

6 No Project. The major adverse impacts of this alternative will be associated with groundwater degradation, sewage on beaches and a greater potential for a public health hazard. The periodic outflow of sewage onto beaches, ditches and cut banks will create a major adverse impact on aesthetic quality. Those state parks having sewage disposal problems will continue to be adversely impacted. The impact on land use patterns will be moderately adverse. No action will allow existing discharge of sewage effluent to Big Creek from Camp Angell.

7 Septic Tank Maintenance Alternative. Moderately adverse impacts associated with this alternative will be continued degradation of groundwater and potential for sewage on beaches and a potential health hazard. Even with septic tank maintenance, groundwater will continue to move laterally along cemented soil layers and thence out of cutbanks and beaches. Groundwater will continue to outcrop regardless of whether or not a septic tank and leachfield is used. Because of the inherent impermeable soils and high groundwater throughout the study area, the operational reliability of a septic tank maintenance program will be poor. Some state parks will continue to have periodic problems and landowners will likely continue to have septic system denials.

VI. LOCAL SHORT-TERM USES OF THE ENVIRONMENT VS. MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

All alternative wastewater treatment and disposal systems including no action involve the acceptance of trade-offs among beneficial and adverse project impacts. Selection of the most "cost effective" alternative is promulgated to result in the greatest beneficial effects obtainable at the least possible environmental, social and monetary costs.

The principal beneficial effects of alternatives 1 through 5 are the alleviation of adverse environmental effects related to the periodic malfunctioning of septic systems throughout the district, and the potential contamination of groundwater resources. These periodic malfunctions, have in the past, resulted in sewage on beaches, cut banks and in ditches and a maladorous and unsightly aesthetic situation.

Alternative 6 (no action) would allow for the continuation of such problems while alternative 7 (septic system maintenance) would reduce the incidences of malfunctions but would not alleviate the problem due to the inherent high groundwater and impermeable soils present throughout the district.

While alternatives 1 through 5 would remove the adverse community level impacts associated with the use of septic tanks, new impacts, probably seen as adverse by many local citizens will be engendered. These impacts relate to increased taxes and service charges, and the likelihood of a great population in the service area in the future.

Throughout much of the Southwest Lincoln County Sanitary District, the present means of sewage disposal can be considered a short-term use of the environment which has periodic adverse effects on the water resources and aesthetic quality of the area. The proper treatment of wastewater will become a long-term benefit to the area by eliminating the potential for groundwater contamination and reducing the likelihood of violations of state water quality regulations.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Depending on which alternative is chosen, there will be minor and major irreversible and irretrievable commitments of renewable and non-renewable resources. Significant commitments of general irrecoverable resources, i.e., time, building materials and energy, will be required during construction of any of the treatment alternatives.

After construction, operation of the treatment plant will require irrecoverable resources such as time, chemicals, energy and maintenance materials.

The secondary effects of population growth will result in the conversion of open, natural land to urban development, reduction in air quality, increased use of water, electricity, petroleum products, timber and food, and increased demand for social services. If growth occurs in a reasonably well conceived manner, none of these effects are forecasted to be significantly adverse. However, much of the area is not planned to obtain the best foreseeable growth uses and unless this situation is altered, adverse impacts are more likely to occur.

VIII. UNRESOLVED ISSUES

During the course of report preparation, it became clear that there were numerous questions and issues relative to a district sewerage project. Several of those issues were identified in the introduction of this draft impact statement and were further discussed throughout the report. The resolutions to several of the issues are institutional problems that must await further political and social actions. The following important issues must be dealt with by constituents of the sanitary district, county officials and state agencies having responsibilities in Lincoln County.

- How will the approval and construction of the sewerage facilities relate to the Coastal Goals finally established by the Oregon Coastal Conservation and Development Commission (OCCDC) and Land Conservation and Development Commission (LCDC), particularly as these goals relate to those coastal environments to be most affected: a) estuarine resources, b) shorelands and shorelands boundaries, and c) beaches and dunes.

- Should the subdivision and degree of development of land, secondary to the construction of a sewerage system, be allowed to preclude the implementation of planning options by Lincoln County? For example, if a particular area is subdivided prior to completion of the County Comprehensive Plan, this would effectively eliminate some potential management classification of the land such as natural resource conservation areas, etc.

- In order to assure a more orderly planning process in the project area and conformance with the future Comprehensive Plan, should Lincoln County choose to exercise its option of establishing Interim Zoning Ordinances as allowed under Oregon Statutes (ORS 215.104) related to comprehensive land use planning?

- Should LCDC designate the planning and siting of a sewerage system in the project area, a matter of statewide significance as allowed for in ORS 197.400?

- An unresolved question relates to the designation of urban growth boundaries in southwest Lincoln County. The LCDC guidelines require local planning authorities to distinguish between urban and rural lands in the county planning effort.

- There may be an inequity of cost distribution based on lot size. Sanitary district ordinances favor small, single-family residence lot owners over large, single-family residence lot owners, which increases density and may be contrary to the preservation of open space values on the coast and to any attempt to zone areas with a large minimum lot size, i.e., AG-1 or 5.

- While it has been recognized in the EIS that landowners should achieve some level of monetary benefit resulting from increases in property value, the actual degree of benefit to be derived is unknown. Numerous factors, including the demand for property, will dictate the degree of benefit. At present, only those lots which have failing septic tanks or cannot obtain permits for septic tanks are strongly disadvantaged and would obviously benefit monetarily from a common sewerage system. Other considerations in the pricing of property, make any determination of monetary benefits for the majority of district property unestimateable.

- What legal assurance will there be from LCDC that no new sewer hookups will take place prior to the completion of a Comprehensive Plan for the southwest Lincoln County area?

BIBLIOGRAPHY

American Birds. 1975. The seventy-fifth Christmas bird count, vol. 29, no. 2.

Battelle, Pacific Northwest Laboratories. 1973. The impact of travel on the Oregon economy and visitor use of tourist serving facilities. Prepared for the Bureau of Municipal Research and Service.

Beckham, Stephen D. 1973. Historical and archeological site inventory: preliminary report. Oregon Coastal Conservation and Development Commission.

Clark and Groff Engineers, Inc. 1970. Lincoln County regional water and sewerage plan. Prepared for Lincoln County Board of Commissions.

Dorsey, F. Owen. 1890. The gentile system of the Siletz tribes. Journal of American Folklore, 3: 227-237.

Drucker, Philip. 1939. Contributions to Alsea ethnography. University of California Publications in American Archaeology and Ethnology, 35(7): 81-102.

Federal Register. 1975. Environmental Protection Agency - preparation of environmental impact statements, final regulations. April 14, 1975, 40(72): 16815-16827.

Franklin, J. F. and C. T. Dyrness. 1969. Vegetation of Oregon and Washington. U. S. Forest Service Research Paper PNW80. 216 pp.

Goumer, Thomas, D. Demorg and L. Osis. 1973. 1971 Alsea River estuary resource use study. Oregon Fish Commission. 29 pp.

HGE, Inc. 1974. A comprehensive water sewerage and solid waste management plan, Lincoln County Oregon, vol. 1, introduction and projected development, vol. 2, water facilities development plan, vol. 3, sewerage facilities development plan.

Ingles, Lloyd G. 1965. Mammals of the Pacific states. Stanford University Press. 506 pp.

Lincoln County. 1965. Economic trends and population changes. Prepared by the Bureau of Muricipal Research and Service.

----------. 1969. Lincoln County long range planning report.

Lincoln County. Health Department. 1971-1974. Individual site evaluation for subsurface sewage.

Lincoln County. Planning Commission. 1964. Land use plan for the Lincoln County coast. A preliminary report.

Lincoln County. Planning Department. 1967. A preliminary comprehensive plan for the Lincoln County coast.

----------. 1971. Transportation plan.

----------. 1972. Alsea Bay regional land and water use plan.

----------. 1973. Overall economic development plan, Lincoln County, Oregon, 1973.

Metcalf & Eddy, Inc. 1972. Wastewater engineering - collection, treatment, disposal. McGraw-Hill. 782 pp.

Robert E. Meyer Engineers, Inc. 1974. Southwest Lincoln County Sanitary District, financial plan, December, 1974.

----------. 1974. Southwest Lincoln County Sanitary District, sewerage study, September, 1974.

----------. 1975. Supplemental appendix to the facilities plan - southwest Lincoln County Sanitary District, April, 1975.

Mooney, James. 1928. The Aboriginal population of America north of Mexico. Smithsonian Miscellaneous Collections 80: 7.

State of Oregon. 1973. Environmental geology of Lincoln County, Oregon. Department of Geology and Mines Industries Bulletin #81. 171 pp.

Oregon Coastal Conservation and Development Commission. 1974. Economic survey and analysis of the Oregon coastal zone.

----------. 1974. An identification of areas suitable for urbanization in the coastal zone.

Oregon. Department of Environmental Quality. 1975. Area review report - Waldport to Yachats. 3 pp. + attachments.

----------. 1975. Regulations relating to water quality control in Oregon. Oregon Administrative Rules, chapter 340.

Oregon Employment Division, Department of Human Resources. 1974. Occupational manpower trends in the State of Oregon, 1970-1980.

Oregon Land Conservation and Development Commission. 1974. Oregon land use handbook.

Oregon State Game Commission. 1973. Oregon State Game Commission Bulletin, January 1973, 29(1).

Oregon State Health Division. 1973. Lincoln County survey.

University of Oregon. Bureau of Governmental Research and Service. 1965. Economic trends and population changes.

----------. 1969. Preliminary land use plan for the Yaquina Bay area, 1969.

Peterson, Roger T. 1961. A field guide to western birds. Houghton-Mifflin Company, Boston. 309 pp.

Schaeffer, Claude. 1959. Indian tribes and languages of the old Oregon country. Map prepared for the Oregon Historical Society.

Sharp, W. C. and T. E. Adams, Jr. 1974. Erosion control symposium proceedings. U. S. Soil Conservation Service. 134 pp.

Smith, A. K. and J. E. Lawman. 1972. Fish and wildlife resources of the middle coast basins and their water requirements. Oregon State Game Commission. 98 pp.

Southern California Coastal Water Research Project (SCCWRP). 1973. The ecology of the southern California bight - implications for water quality management. SCCWRP TR104. 531 pp.

Stebbins, R. C. 1966. A field guide to western reptiles and amphibians. Houghton-Mifflin Company, Boston. 279 pp.

Swanton, John R. 1952. The Indian tribes of North America. Smithsonian Institution Bureau of American Ethnology Bulletin 145.

UMA Nortec, Inc. 1974. Solid waste management plan, Lincoln County, Oregon.

U. S. Bureau of the Census. 1915. Indian population in the United States and Alaska, 1910.

----------. 1950, 1960 and 1970. Decennial census reports, Oregon.

----------. 1962 and 1972. County business patterns.

U. S. Department of Commerce. 1974. Climatological data - Oregon, annual summary 1974, 80(13).

U. S. Department of Interior. 1973. Oregon, population, employment and housing units projected to 1990.

----------. 1973. Threatened wildlife of the United States. Resource Bulletin 114. 286 pp.

----------. 1974. Agriculture and food processing, Pacific Northwest, projections of production, employment and energy consumption to 1990.

U. S. Environmental Protection Agency. 1975. Compilation of air pollutant emission factors. U. S. E.P.A. AP-42.

U. S. Soil Conservation Service. 1972. General soil map - Lincoln County, Oregon.

Yocom, C. and R. Dasmann. 1965. The Pacific coastal wildlife region. Naturegraph Company. 117 pp.

PERSONAL COMMUNICATION

ALERE, WILLIAM. Floodplain Management U. S. Army Corps of Engineers, Portland, Oregon

BALDWIN, HENRY, JR. President, Southwest Lincoln County Sanitation District, Yachats, Oregon

BROOKHYSER, PAUL. Lincoln County Planning Department, Newport, Oregon

CARTER, GLEN. Oregon Department of Environmental Quality, Portland, Oregon

CLEMENS, GENE. Lincoln County Sanitarian, Newport, Oregon

COLLETT, LLOYD. U. S. Forest Service, Waldport Ranger Station, Waldport, Oregon

DEMORY, DARRELL. Oregon State Fish Commission, Newport, Oregon

DENNISON, DENNIS. Planner, Lincoln County Planning Department, Newport, Oregon

DOBEY, EMMETT. Lincoln County Sanitarian, Newport, Oregon

DOWNS, STEVE. Water Quality Specialist, Department of Environmental Quality, Salem, Oregon

DUCKETT, JEAN. Secretary, Southwest Lincoln County Sanitary District, Yachats, Oregon

FORTUNE, JOHN. Oregon State Fish Commission, Newport, Oregon

GONOR, SUSAN.

HANKS, JOHN. Traffic Department Planner, Oregon State Highway Division, Salem, Oregon

JACOBSON, LARRY. Oregon Department of Environmental Quality, Portland, Oregon

JOHNSON, JAMES. Planner, Lane County Planning Department

LOFQUIST, ED. Water Coordinator, Newport, Oregon

LONG, EDWARD. State Historic Preservation Office, Salem, Oregon

MCDUFFY, RAY. Private citizen

MILLER, JOE. Chief pilot, Newport Airport, Newport, Oregon

MILLER, ROSS. Chief Appraiser, Lincoln County Assessors Office

NEWBAUER, EUGENE. Assistant Superintendent, Lincoln County School District

OLIVER, LEON. Real Estate Salesman, Cox Realty

PEER, RON. Sanitation Engineer, Yachats, Oregon

POWELL, LEWIS. Robert E. Meyer Engineers, Inc., Beaverton, Oregon

POWERS, DAVID. Oregon Department of Parks and Recreation, Salem, Oregon

RIGDON, MELVIN. District Conservationist, U. S. Soil Conservation Service, Newport, Oregon

RILEY, HERBERT. Deputy Director, Oregon Land Conservation and Development Commission

ROSS, RICHARD, Ph.D. Anthropologist, Oregon State University, Corvallis, Oregon

ST. LOUIS, DAVID. Noise and Air Quality Specialist, Department of Environmental Quality, Salem, Oregon

SCHWAB, TOM. Planner, Oregon Department of Highways, Salem, Oregon
STORM, ROBERT, Ph.D. Oregon State University (amphibians/ reptiles), Corvallis, Oregon
STRAND, ALBERT. Commissioner, Lincoln County Board of Commissioners
STURGIS, HAROLD. Oregon State Wildlife Commission, Corvallis, Oregon
SWAN, ELIZABETH. Proprietor, The Three Swans Gift Shop
WATT, PETER. Land Conservation and Development Commission, Newport, Oregon
WEBB, JAMES. Lincoln County Planning Director, Newport, Oregon
YOSHINAKA, MARV. U. S. Fish and Wildlife Service, Portland, Oregon

APPENDICES

APPENDIX A

BIOTIC RESOURCES

APPENDIX A-1

COMMON VEGETATION OF THE TERRESTRIAL ENVIRONMENT

Common Name	Scientific Name
Beach pine	Pinus contorta
Bearberry	Arctostaphylos uva-ursi
Sand strawberry	Frageria chilensis
Sand verbena	Abronia latifolia
Sitka spruce	Picea sitchensis
Douglas fir	Pseudotsuga menziesii
Rhododendron	Rhododendron macrophylum
Cascara	Rhamnus purshiana
Western red cedar	Thuja plicata
Black huckleberry	Vaccinium ovatum
Salal	Gaultheria shallon
Oregon grape	Mahonia nervosa
Alder	Alnus rubra
Salmonberry	Rubus spectabilis
Sand binders	Poa macrantha
	Festuca rubra

Source: Franklin and Dyrness, 1969.

APPENDIX A-2

TERRESTRIAL VERTEBRATES OF THE SOUTHWEST
LINCOLN COUNTY STUDY AREA

Common Name	Scientific Name
Mammals	
Dusky shrew	*Sorex obscurus*
Pacific shrew	*S. pacificus*
Vagrant shrew	*S. vagrans*
Townsend mole	*Scapanus townsendii*
Little brown bat	*Myotis lucifugus*
California myotis	*M. californicus*
Striped skunk	*Mephitis mephitis*
Spotted skunk	*Spilogale putorius*
Snowshoe hare	*Lepus americanus*
Brush rabbit	*Sylvilagus bachmani*
Mountain beaver	*Aplodontia rufa*
Douglas squirrel	*Tamiasciurus douglasii*
Beaver	*Castor canadensis*
Deer mouse	*Peromyscus maniculatus*
Oregon meadow mouse	*Microtus oregoni*
Black-tailed deer	*Odocoileus hemoinus columbianus*
Bobcat	*Lynx rufus*
Roosevelt elk	*Cervus canadensis*
Black bear	*Ursus americanus*
Mountain lion	*Felis concolor*
Birds	
Common loon	*Gavia immer*
Horned grebe	*Podiceps auritus*
Double-crested cormorant	*Phalacrocorax auritus*
Brandt's cormorant	*P. penicillatus*
Great blue heron	*Ardea herodias*
American wigeon	*Anas americana*
Pintail	*Anas acuta*
Lesser scaup	*Aythya affinis*
Surf scoter	*Melanitta perspicillata*
Red-tailed hawk	*Buteo jamaicensis*
Marsh hawk	*Circus ayaneus*
Black oystercatcher	*Haematopus bachmani*
Surfbird	*Aphriza virgata*
Black-bellied plover	*Pluvialis squatarola*
Black turnstone	*Arenaria melanocephala*
Least sandpiper	*Calidris minutilla*
Dunlin	*C. alpina*

Common Name	Scientific Name
Birds (continued)	
Sanderling	*Crocethia alba*
California gull	*Larus californicus*
Band-tailed pigeon	*Columba fasciata*
Steller's jay	*Cyanocitta stelleri*
Common crow	*Corvus brachyrhynchos*
Chestnut-backed chickadee	*Parus rufescens*
Golden-crowned kinglet	*Regulus satrapa*
Starling	*Sturnus vulgaris*
Brewer's blackbird	*Euphagus cyanocephalus*
Dark-eyed junco	*Junco hyemalis oreganus*
White-crowned sparrow	*Zonotrichia leucophrys*
Mountain quail	*Oreortyx picta*
Blue grouse	*Dendragapus obscurus*
Amphibians	
Pacific giant salamander	*Dicamptodon ensatus*
Olympic salamander	*Rhyacotriton olympicus*
Brown salamander	*Ambystoma gracile*
Rough-skinned newt	*Taricha granulosa*
Ensatina	*Ensatina eschscholtzi*
Western red-backed salamander	*Plethodon vehiculum*
Tailed frog	*Ascaphus truei*
Pacific treefrog	*Hyla regilla*
Northern red-legged frog	*Rana aurora*
Bullfrog	*R. catesbeiana*
Reptiles	
Northern alligator lizard	*Gerrhonotus coeruleus*
Pacific rubber boa	*Charina bottae*
Red-spotted garter snake	*Thamnophis sirtalis*
Northwestern garter snake	*T. ordinoides*

APPENDIX A-3

COMMON BIOTIC RESOURCES OF THE MARINE ENVIRONMENT

Common Name	Scientific Name
Sandy Beaches - Exposed and Protected	
Razor clam	*Siliqua patula*
Beach hopper	*Orchestoidea* sp.
Sand crab	*Emerita analoga*
Polychaete worms	*Nainereis* sp.
	Nereis sp.
Surf smelt	*Hypomesus pretiosus*
Redtail surfperch	*Amphistichus rhodoterus*
Bays and Estuaries	
Softshell clam	*Mya arenaria*
Piddock clam	*Zirfaea pilsbryi*
	Penitella penita
Littleneck clam	*Venerupis staminea*
Gaper clam	*Tresus capax*
Cockle	*Clinocardium nuttallii*
Butter clam	*Saxidomus giganteus*
Dungeness crab	*Cancer magister*
Staghorn sculpin	*Leptocottus armatus*
Shiner perch	*Cymatogaster aggregata*
Starry flounder	*Platichthys stellatus*
Rock greenling	*Hexagrammos lagocephalus*
Chinook salmon	*Oncorhynchus tshawytscha*
Coho salmon	*O. kisutch*
Bay mussel	*Mytilus edulis*
Ghost shrimp	*Callianassa californiensis*
Mud shrimp	*Upogebia pugettensis*
Walleye surfperch	*Hyperprosopon argenteum*

Source: Gaumer, *et.al.*, 1973.

APPENDIX A-4

COMMON FRESHWATER AND ANADROMOUS FISH
OF THE STUDY AREA STREAMS

Common Name	Scientific Name
Pacific lamprey*	Lamptera tridentata
Black-nosed dace	Rhinichthys atratulus
Long-nosed dace	R. sp.
Redside shiner	Richardsonius balteatus
Squawfish	Ptychocheilus oregonensis
Coho salmon*	Oncorhynchus kisutch
Cutthroat trout*	Salmo clarki
Steelhead trout*	Salmo gairdneri
Buffalo sculpins	Enophrys bison
Staghorn sculpin	Leptocottus armatus

* Anadromous

Source: Smith and Lauman, 1972.

DEPARTMENT OF FISH AND WILDLIFE

NORTHWEST REGIONAL OFFICE

ROUTE 5, BOX 325, CORVALLIS, OREGON 97330 PHONE 757-4186

ROBERT W. STRAUB
GOVERNOR

February 24, 1976

Jonathan Ives
Jones & Stokes Assoc.
453 Capitol Mall
Sacramento, California 95814

Dear Mr. Ives:

My apologies for the delay in responding to your request. The comments that follow are general in some respects, but do reflect the current status of wildlife in the area of the project you're dealing with, from Newport to Yachats, and attempt to portray some possible consequences.

Wildlife-oriented recreational values are substantial in this coastal strip. The chief "uses" of wildlife are viewing, bird-watching, and photography. The abundant birds, in particular, add much to the experience of the recreationist and traveler. Hunting is a minor use. Occasional clearouts which lie east of Hwy 101 short distances do provide some deer hunting, but in the zone immediately adjacent to the highway there is little to attract hunters and few areas in which hunting is an appropriate activity. The Beaver Creek marsh may be lightly hunted for waterfowl.

Some 145 species of birds, mammals, reptiles, and amphibians share the shorepine-spruce vegetation of the coastal strip, making it the richest of all coastal vegetation types in total species present. An additional 20 species of shorebirds occur on the adjacent beaches numbering many thousands of individuals during the wintering period.

Unique or "sensitive" habitats and animal populations are few, but merit protection where they occur. The following have been identified:

- saltmarsh present along lower Beaver Creek
- an active heronry in SW¼ NE¼ Sec.1, T14S, R12W, in Reynolds Creek
- two nesting populations of the rare Snowy Plover, one at South Beach, south of the south jetty at Newport, and one at Bayshore, on the north spit of Alsea Bay.

A precise evaluation of the impacts of the proposed project is not possible, as the degree of change which may result cannot be determined, but some general observations may be made, assuming that the trend toward increasing development will continue.

- impacts on hunting will be negligible near Highway 101; if development progresses inland, some deer-hunting opportunities may be reduced or eliminated.

- a certain amount of clearing in the dense shorepine -spruce vegetation can benefit wildlife--principally song birds and small mammals--by creating an artificial meadow-forest edge; this is evident in may low-density residential areas along the coast; benefit can be assumed only if stands of native vegetation remain interspersed.

- development densities comparable to the residential and commercial patterns seen in and near the communities of Yachats, Waldport, and Newport are obviously inimical to maintaining abundant wildlife; substantial areas of native vegetation are sacrificed, and with it, adapted species; particularly vulnerable are large conifers which in a decadent condition provide essential habitat for the cavity-nesting birds and mammals and the raptors, as these are rarely left standing where they are a potential danger to life or property.

- harassment of nesting Snowy Plovers during the April-June period probably occurs at current levels of beach use and can be expected to intensify with increases in human activity.

I hope this will be of use to you in your evaluation. If we can provide more assistance, please contact us.

Sincerely Yours,

Harold Sturgis
District Wildlife Biologist

APPENDIX B

ARCHEOLOGICAL RESOURCES

OREGON STATE HIGHWAY DIVISION

300 HIGHWAY BUILDING SALEM, OREGON 97310

ROBERT W. STRAUB
GOVERNOR

F B KLABOE
Administrator and
State Highway Engineer

February 10, 1976

Mr. Jonathan H. Ives
Jones & Stokes Associates, Inc.
Suite 835 - 455 Capitol Mall
Sacramento, California 95814

Dear Mr. Ives:

The proposed sewage systems along the Lincoln County coast between Newport and Yachats, Oregon will be likely to encounter archeological sites. I am, therefore, forwarding a copy of the EIS Task Order with maps to Prof. Richard Ross of Oregon State University. Dr. Ross has been conducting a survey of coastal sites for this office and his input will be valuable. In addition, I am sending a second copy of the Task Order and maps to Prof. David Cole of the Oregon Museum of Natural History in Eugene. The Museum is the repository of official site surveys and reports and should also provide valuable input.

I am enclosing a copy of all listings on the Statewide Inventory for Lincoln County. I have marked the sites located within the survey area with a red check. There may be other sites affected which are not on this list. There are at present no sites in the project area which are listed on the National Register.

Our office would like to suggest that Archeological and Historical sites be located by hiring competent professionals to do ground surveys.

Form 81-734-3122

If we can be of further assistance, please feel free to contact us.

Sincerely,

Edward T. Long

Edward T. Long
Preservation Specialist/Archeologist
State Historic Preservation Office

EL:ko

Enc.

Department of Anthropology
Oregon State University
Corvallis, Oregon 97331 (503) 754-1515

18 February 1976

Mr. Jonathan H. Ives
Jones & Stokes Associates, Inc.
Suite 835 - 455 Capitol Mall
Sacramento, California 95814

Dear Mr. Ives:

Edward Long has forwarded a copy of your EIS Task Order on the sewage systems between Newport and Yachats, Oregon. This part of the coast line includes several areas that are sensitive in terms of archaeological resources. As a rule of thumb for the Oregon Coast, the estuaries and the area at the mouth of major rivers and streams, usually include a high percentage of archaeological sites. In the designated area of the EIS, several rivers and streams have their outfall. The Yaquina estuary has known sites around the edges, and several are known from the southern bank. The Waldport area at the mouth of the Alsea has been known for quite some time as having quite a number of sites. The Yachats area is also known to have a large number of sites. One of the most important areas, particularly in view of the alternative plan #4 (proposed project) is the area around Seal Rock. Ethnographic sources suggest that Seal Rock was the northernmost village of the Alsea Indians. Oregon State University has conducted archaeological excavations in the vicinity, and we have reports of several other sites in the area located on private property. This would be a very sensitive area for archaeological resources. There are several other individual sites located between Newport and Yachats which are fairly large and important but are not part of a cluster.

Once the site of the plant and the route of the lines has been decided on I would suggest an intense survey of the right of way be done by an archaeologist. In terms of planning it might be more feasible to survey before final plans are made since the location of sites influence the placement of the lines themselves.

If you need other information please contact me.

Sincerely,

Richard E. Ross

Richard E. Ross
Associate Professor

c: Ted Long
Dave Cole

APPENDIX C

WATER QUALITY STANDARDS

APPENDIX C-1

WATER QUALITY STANDARDS OF SURFACE WATERS OF OREGON

Division 4

WATER POLLUTION

Subdivision 1

STANDARDS OF QUALITY FOR PUBLIC WATERS OF OREGON AND DISPOSAL THEREIN OF SEWAGE AND INDUSTRIAL WASTES

[ED. NOTE: Unless otherwise specified, sections 41-005 through 41-070 of this chapter of the Oregon Administrative Rules Compilation were adopted by the Sanitary Authority June 1, 1967, and filed with the Secretary of State June 1, 1967 as Administrative Order SA 26. Repeals Administrative Order SA 8.]

Statutory Authority: ORS 449.080; 449.086

[NOTE: Effective July 1, 1969, the Sanitary Authority was replaced by the Department of Environmental Quality, consisting of a Department and of a Commission, known as the Environmental Quality Commission. Where Sanitary Authority is presently used in these regulations, it should be noted by readers of these rules that Department of Environmental Quality should be substituted unless the context or statutes clearly require the use of Environmental Quality Commission.]

41-005 DEFINITIONS. As used in this subdivision unless otherwise required by context:

(1) "Sewage" means the water-carried human or animal waste from residences, buildings, industrial establishments or other places together with such ground water infiltration and surface water as may be present. The admixture with sewage as above defined of industrial wastes or wastes, as defined in subsections (2) and (3) of this section, shall also be considered "sewage" within the meaning of this division.

(2) "Industrial waste" means any liquid, gaseous, radioactive or solid waste substance or a combination thereof resulting from any process of industry, manufacturing, trade or business, or from the development or recovery of any natural resources.

(3) "Wastes" means sewage, industrial wastes, and all other liquid, gaseous, solid, radioactive, or other substances which will or may cause pollution or tend to cause pollution of any waters of the state.

(4) "Pollution" means such contamination or other alteration of the physical, chemical or biological properties of any waters of the state, including change in temperature, taste, color, turbidity, silt or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive or other substance into any waters of the state which either by itself or in connection with any other substance present, will or can reasonably be expected to create a public nuisance or render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational or other legitimate beneficial uses or to livestock, wildlife, fish or other aquatic life or the habitat thereof.

(5) "Waters of the state" include lakes, bays, ponds, impounding reservoirs, springs, wells, rivers, streams, creeks, estuaries, marshes, inlets, canals, the Pacific Ocean within the territorial limits of the State of Oregon and all other bodies of surface or underground waters, natural or artificial, inland or coastal, fresh or salt, public or private (except those private waters which do not combine or effect a junction with natural surface or underground waters), which are wholly or partially within or bordering the state or within its jurisdiction.

(6) "Marine waters" means all oceanic, offshore waters outside of estuaries or bays and within the territorial limits of the state of Oregon.

(7) "Estuarine waters" means all mixed fresh and oceanic waters in estuaries or bays from the point of oceanic water intrusion inland to a line connecting the outermost points of the headlands or protective jetties.

(8) "Standard" or "standards" means such measure of quality or purity for any waters in relation to their reasonable and

necessary use as may be established by the Sanitary Authority pursuant to ORS Chapter 449.

(9) "Fish and other aquatic life" means all beneficial fishes, crustacea, mollusks, plankton, higher aquatic plants, and waterfowl.

41-010 HIGHEST AND BEST PRACTICABLE TREATMENT AND CONTROL REQUIRED. Notwithstanding the general and special water quality standards contained in this subdivision, the highest and best practicable treatment and/or control of wastes, activities and flows shall in every case be provided so as to maintain dissolved oxygen and overall water quality at the highest possible levels and water temperatures, coliform bacteria concentrations, dissolved chemical substances, toxic materials, radioactivity, turbidities, color, odor and other deleterious factors at the lowest possible levels.

41-015 RESTRICTIONS ON THE DISCHARGE OF SEWAGE AND INDUSTRIAL WASTES AND HUMAN ACTIVITIES WHICH AFFECT WATER QUALITY IN THE WATERS OF THE STATE. No wastes shall be discharged and no activities shall be conducted such that said wastes or activities either alone or in combination with other wastes or activities will violate or can reasonably be expected to violate, any of the general or special water quality standards contained in this subdivision.

41-020 MAINTENANCE OF STANDARDS OF QUALITY. (1) The degree of waste treatment required to restore and maintain the above standards of quality shall be determined in each instance by the Department of Environmental Quality and shall be based upon the following:

(a) The uses which are or may likely be made of the receiving stream.

(b) The size and nature of flow of the receiving stream.

(c) The quantity and quality of the sewage or wastes to be treated, and

(d) The presence or absence of other sources of pollution on the same watershed.

(2) All sewage shall receive a minimum of secondary treatment or equivalent (equal to at least 85% removal of 5-day biochemical oxygen demand and suspended solids) and shall be effectively disinfected before being discharged into any public waters of the state.

(3) All industrial waste shall receive, after maximum practicable inplant control, a minimum of secondary treatment or equivalent control (reduction of suspended solids and organic material where present in significant quantities, effective disinfection where bacterial organisms of public health are present, and control of toxic or other deleterious substances) before being discharged into any public waters of the state.

Hist: Amended 5-24-71 by DEQ 28

41-022 IMPLEMENTATION OF TREATMENT REQUIREMENTS AND WATER QUALITY STANDARDS. Waste treatment and control requirements prescribed under 41-010, 41-015 and 41-020 and such other waste treatment and controls as may be necessary to insure compliance with the standards contained in this subdivision shall be provided in accordance with specific permit conditions for those sources or activities for which permits are required and the following implementation program:

(1) For new or expanded waste loads or activities, fully approved treatment or control facilities or both shall be provided prior to discharge of any wastes from the new or expanded facility or conduct of the new or expanded activity.

(2) For existing waste loads or activities necessary treatment or control facilities or both shall be provided in accordance with a specific program and timetable incorporated into the waste discharge permit for the individual discharger or activity. In developing treatment requirements and implementation schedules for existing installations or activities, consideration shall be given to the impact upon the overall environmental quality including air, water, land use and aesthetics.

8-15-72

Hist: Filed 5-24-71 as DEQ 28
Amended 6-15-72 by DEQ 46

41-023 MIXING ZONES.(1) The Department may suspend the applicability of all or part of the water quality standards set forth in this subdivision, except those standards relating to aesthetic conditions, within a defined immediate mixing zone of very limited size adjacent to or surrounding the point of wastewater discharge.

(2) The sole method of establishing such a mixing zone shall be by the Department defining same in a waste discharge permit.

(3) In establishing a mixing zone in a waste discharge permit the Department:

(a) May define the limits of the mixing zone in terms of distance from the point of the wastewater discharge or the area or volume of the receiving water or any combination thereof,

(b) May set other less restrictive water quality standards to be applicable in the mixing zone in lieu of the suspended standards; and

(c) Shall limit the mixing zone to that which in all probability, will

(A) not interfere with any biological community or population of any important species to a degree which is damaging to the ecosystem; and

(B) not adversely affect any other beneficial use disproportionately.

Hist: Filed 7-2-73 as DEQ 55

41-024 TESTING METHODS. The analytical testing methods for determining compliance with the water quality standards contained in this subdivision shall be in accordance with the most recent edition of Standard Methods for the Examination of Water and Waste Water published jointly by the American Public Health Association, American Water Works Association, and Water Pollution Control Federation, unless the Department has published an applicable superseding method, in which case testing shall be in accordance with the superseding method; provided however that testing in accordance with an alternative method shall comply with this section if the Department has published the method or has approved the method in writing.

Hist: Filed 7-2-73 as DEQ 55

41-025 GENERAL WATER QUALITY STANDARDS. The following General Water Quality Standards shall apply to all waters of the state except where they are clearly superseded by Special Water Quality Standards applicable to specifically designated waters of the state. No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause in any waters of the state:

(1) The dissolved oxygen content of surface waters to be less than six (6) milligrams per liter unless specified otherwise by special standard.

(2) The hydrogen-ion concentration (pH) of the waters to be outside the range of 6.5 to 8.5 unless specified otherwise by special standard.

(3) The liberation of dissolved gases, such as carbon-dioxide, hydrogen sulfide or any other gases, in sufficient quantities to cause objectionable odors or to be deleterious to fish or other aquatic life, navigation, recreation, or other reasonable uses made of such waters.

(4) The development of fungi or other growths having a deleterious effect on stream bottoms, fish or other aquatic life, or which are injurious to health, recreation or industry.

(5) The creation of tastes or odors or toxic or other conditions that are deleterious to fish or other aquatic life or affect the potability of drinking water or the palatability of fish or shellfish.

(6) The formation of appreciable bottom or sludge deposits or the formation of any organic or inorganic deposits deleterious to fish or other aquatic life or injurious to public health, recreation or industry.

(7) Objectionable discoloration, turbidity, scum, oily sleek or floating solids, or coat the aquatic life with oil films.

(8) Bacterial pollution or other conditions deleterious to waters used for domestic purposes, livestock watering, irrigation, bathing, or shellfish propaga-

tion, or be otherwise injurious to public health.

(9) Any measurable increase in temperature when the receiving water temperatures are 64°F. or greater; or more than 0.5°F. increase due to a single-source discharge when receiving water temperatures are 63.5°F. or less; or more than 2°F. increase due to all sources combined when receiving water temperatures are 62°F. or less.

(10) Aesthetic conditions offensive to the human senses of sight, taste, smell or touch.

(11) Radioisotope concentrations to exceed Maximum Permissible Concentrations (MPC's) in drinking water, edible fishes or shellfishes, wildlife, irrigated crops, livestock and dairy products or pose an external radiation hazard.

(12) The concentration of total dissolved gas relative to atmospheric pressure at the point of sample collection to exceed one hundred and five percent (105%) of saturation, except when stream flow exceeds the 10-year, 7-day average flood.

Hist: Amended 4-5-72 by DEQ 39
Amended 7-2-73 by DEQ 55

41-030 BENEFICIAL USES OF WATERS TO BE PROTECTED BY SPECIAL WATER QUALITY STANDARDS. The Special Water Quality Standards contained in this subdivision are adopted for the purpose of protecting, together with pertinent general water quality standards, the beneficial uses of specified waters of the state as set forth in Table A and to conserve the waste assimilative capacity of the waters so as to accommodate maximum development and utilization of the resources of the state.

41-035 SPECIAL WATER QUALITY STANDARDS FOR PUBLIC WATERS OF GOOSE LAKE IN LAKE COUNTY. The provisions of this section shall be in addition to and not in lieu of the General Water Quality Standards contained in Section 41-025, except where this section imposes a conflicting requirement with the provisions of Section 41-025, this section shall govern. No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause in the waters of Goose Lake:

(1) Dissolved Oxygen (DO). DO concentrations to be less than 7 milligrams per liter.

(2) Organisms of the Coliform Group Where Associated with Fecal Sources. (MPN or equivalent MF using a representative number of samples) Average concentrations of coliform bacteria to exceed 1000 per 100 ml, with 20% of samples not to exceed 2400 per 100 ml.

(3) Hydrogen Ion Concentration (pH). pH values to be outside the range of 7.5 to 9.5

(4) Temperature. Daily average temperatures to exceed 70°F. or the daily mean ambient air temperature, whichever is greater.

41-040 SPECIAL WATER QUALITY STANDARDS FOR PUBLIC WATERS OF THE MAIN STEM KLAMATH RIVER. The provisions of this section shall be in addition to and not in lieu of the General Water Quality Standards contained in Section 41-025, except where this section imposes a conflicting requirement with the provisions of Section 41-025, this section shall govern. No wastes shall be discharged and no activities shall be conducted which either alone or in combination with other wastes or activities will cause in the waters of the Klamath River:

(1) Dissolved Oxygen (DO).

(a) (Main stem Klamath River from Klamath Lake to Keno Regulating Dam located approximately 16 river miles above the Oregon-California border). DO concentrations of surface waters to be less than 5 milligrams per liter unless caused by natural conditions.

(b) (Main stem Klamath River from Keno Regulating Dam to Oregon-California border). DO concentrations to be less than 7 milligrams per liter.

(2) Organisms of the Coliform Group Where Associated with Fecal Sources. (MPN or equivalent MF using a representative number of samples). Average concentrations of coliform bacteria to

APPENDIX C-2

DRINKING WATER QUALITY STANDARDS AND RECOMMENDATIONS

	USPHS	OSBH	AWWA
Color (units)	15	15	3
Turbidity (jtu)	5	5	0.1
Total Solids (mg/l)	500	500	200
Hardness (mg/l)	–	–	80
Bicarb. Alkalinity (mg/l)	–	120	**
Sulfate (mg/l)	250	250	250
Nitrates (mg/l)	45	45	–
Iron	0.3	0.3	0.05
Fluoride (mg/l)	1*	1*	1*
Chloride (mg/l)	250	250	–
Magnesium (mg/l)	–	125	–
Manganese	0.05	0.05	0.01
Aluminum (mg/l)		–	0.05

USPHS U. S. Public Health Service (standard)
OSBH Oregon State Board of Health (standard)
AWWA American Water Works Association (recommendation)

* Varies with temperature.
** Not to change more than 1.0 mg/l in distribution system or in 12 hours at 130°F in closed plastic bottle.

APPENDIX D

EPA COST EFFECTIVENESS EVALUATIONS

APPENDIX D

To compare the monetary cost of project alternatives, EPA requires that costs be compared using the EPA Cost-Effectiveness Guidelines, as published in the "Federal Register", Vol. 39, No. 29, February 11, 1974. These guidelines have been utilized in the following cost-effectiveness guidelines, with the exception that an interest rate of 6-1/8% was utilized, per EPA instructions.

According to these guidelines, a 20-year planning period must be utilized for sizing of interceptor, treatment, and outfall facilities. This criteria does not, however, restrict the actual sizing of facilities to only that required for a 20-year population growth if the EPA Regional Administrator approves a larger size as being more cost effective.

To determine treatment capacity for the 20 year period from 1977 (the probable year that construction would be initiated) to 1997, the estimated 1997 peak population of 4460 was multiplied by 140 gallons per capita per day. This resulted in a required 1997 capacity of 625,000 gallons per day, which was rounded off to 650,000 gallons per day. Treatment capacities used in the cost calculations were:

Alternative 1	-	Waconda Beach	0.35 mgd
		San Marine	0.30 mgd
Alternative 2	-	Waldport	0.35 mgd
		Yachats	0.30 mgd
Alternative 3	-	Big Creek	0.65 mgd
Alternative 4	-	Yachats	0.65 mgd

Alternative 5	-	Waldport	0.65 mgd
Alternative 6	-	No action alternative, i.e., no facilities	
Alternative 7	-	Aerobic digestion facilities only	

Interceptor costs were based upon costs presented in the Facilities Plan. Interceptors were sized according to DEQ requirements of 250 gallons per capita per day, a minimum velocity of 2 feet per second, and a minimum diameter of 8 inches.

20-YEAR COST-EFFECTIVENESS ANALYSIS

ALTERNATIVE NO. 1

CAPITAL COSTS	COST OR VALUE	1977 PRESENT WORTH FOR 20-YEAR PERIOD
Initial 1997 Costs		
Interceptors & Pump Sta.	$1,497,100	$1,497,100
Treatment Plants	$1,619,000	$1,619,000
Outfalls	$ 900,000	$ 900,000
1997 Salvage Value	$1,708,500	- $ 520,300
	SUBTOTAL	$3,495,800
ANNUAL COSTS		
Average Cost/Year - 1977-1997		
Interceptors & Pump Sta.	$ 8,000/yr	$ 90,800
Treatment Plant	$ 30,000/yr	$ 340,600
1987 Replacement Costs		
Treatment Plant	$ 30,000	$ 16,600
	SUBTOTAL	$ 448,000
TOTAL 1977 PRESENT WORTH		$3,943,800

NOTE: Interest rate = 6-1/8%

20-YEAR COST-EFFECTIVENESS ANALYSIS

ALTERNATIVE NO. 2

CAPITAL COSTS	COST OR VALUE	1977 PRESENT WORTH FOR 20-YEAR PERIOD
Initial 1997 Costs		
Interceptors & Pump Sta.	$ 1,725,600	$1,725,600
Treatment Plant	$ 1,328,400	$1,328,400
Outfall	$ 108,000	$ 108,000
1997 Salvage Value	$ 1,317,800	- $ 401,300
	SUBTOTAL	$2,760,700
ANNUAL COSTS		
Average Cost/Year - 1977-1997		
Interceptors & Pump Sta.	$ 8,000/yr	$ 90,800
Treatment Plant	$ 30,000/yr	$ 340,600
1987 Replacement Costs		
Treatment Plant	$ 30,000	$ 16,000
	SUBTOTAL	$ 447,400
	TOTAL 1977 PRESENT WORTH	$3,208,100

NOTE: Interest rate = 6-1/8%

20-YEAR COST-EFFECTIVENESS ANALYSIS

ALTERNATIVE NO. 3

CAPITAL COSTS	COST OR VALUE	1977 PRESENT WORTH FOR 20-YEAR PERIOD
Initial 1997 Costs		
Interceptors & Pump Sta.	$1,497,100	$1,497,100
Treatment Plant	$1,011,600	$1,011,600
Outfall	$ 450,000	$ 450,000
1997 Salvage Value	$1,255,700	- $ 382,400
	SUBTOTAL	$2,576,300
ANNUAL COSTS		
Average Cost/Year - 1977-1997		
Interceptors & Pump Sta.	$ 8,000	$ 90,800
Treatment Plant	$ 26,000	$ 295,200
1987 Replacement Costs		
Treatment Plant	$ 17,000	$ 9,400
	SUBTOTAL	$ 395,400
	TOTAL 1977 PRESENT WORTH	$2,971,700

NOTE: Interest rate = 6-1/8%

20-YEAR COST-EFFECTIVENESS ANALYSIS

ALTERNATIVE NO. 4

CAPITAL COSTS	COST OR VALUE	1977 PRESENT WORTH FOR 20-YEAR PERIOD
Initial 1997 Costs		
Interceptors & Pump Sta.	$1,765,200	$1,765,200
Treatment Plant	$ 828,000	$ 828,000
Outfall	-	-
1997 Salvage Value	$1,095,900	- $ 333,700
	SUBTOTAL	$2,259,500
ANNUAL COSTS		
Average Cost/Year - 1977-1997		
Interceptors & Pump Sta.	$ 8,000	$ 90,800
Treatment Plant	$ 26,000	$ 295,200
1987 Replacement Costs		
Treatment Plant	$ 17,000	$ 9,400
	SUBTOTAL	$ 395,400
TOTAL 1977 PRESENT WORTH		$2,654,900

NOTE: Interest rate = 6-1/8%

20-YEAR COST-EFFECTIVENESS ANALYSIS

ALTERNATIVE NO. 5

CAPITAL COSTS	COST OR VALUE	1977 PRESENT WORTH FOR 20-YEAR PERIOD
Initial 1997 Costs		
Interceptors & Pump Sta.	$1,643,400	$1,643,400
Treatment Plant	$ 828,000	$ 828,000
Outfall	$ 108,000	$ 108,000
1997 Salvage Value	$1,089,000	$ 331,600
	SUBTOTAL	$2,247,800
ANNUAL COSTS		
Average Cost/Year - 1977-1997		
Interceptors & Pump Sta.	$ 8,000	$ 90,800
Treatment Plant	$ 26,000	$ 295,200
1987 Replacement Costs		
Treatment Plant	$ 17,000	$ 9,400
	SUBTOTAL	$ 395,400
	TOTAL 1977 PRESENT WORTH	$2,643,200

NOTE: Interest rate = 6-1/8%

20-YEAR COST-EFFECTIVENESS ANALYSIS

ALTERNATIVE NO. 7

CAPITAL COSTS	COST OR VALUE	1977 PRESENT WORTH FOR 20-YEAR PERIOD
Initial 1977 Costs		
Treatment Plant (Aerobic digestion and sludge dewatering)	$ 220,000	$ 220,000
Outfall	-	-
1997 Salvage Value	$ 82,500	$ 25,100
	SUBTOTAL	$ 194,900
ANNUAL COSTS		
Average Cost/Year - 1977-1997		
Pumper Truck & Driver	$ 30,000/yr	$ 340,600
Sludge Treatment Facilities	$ 15,000/yr	$ 170,300
1987 Replacement Costs		
Treatment Plant		
	SUBTOTAL	$ 510,900
TOTAL 1977 PRESENT WORTH		$ 705,800

NOTE: Interest rate = 6-1/8%