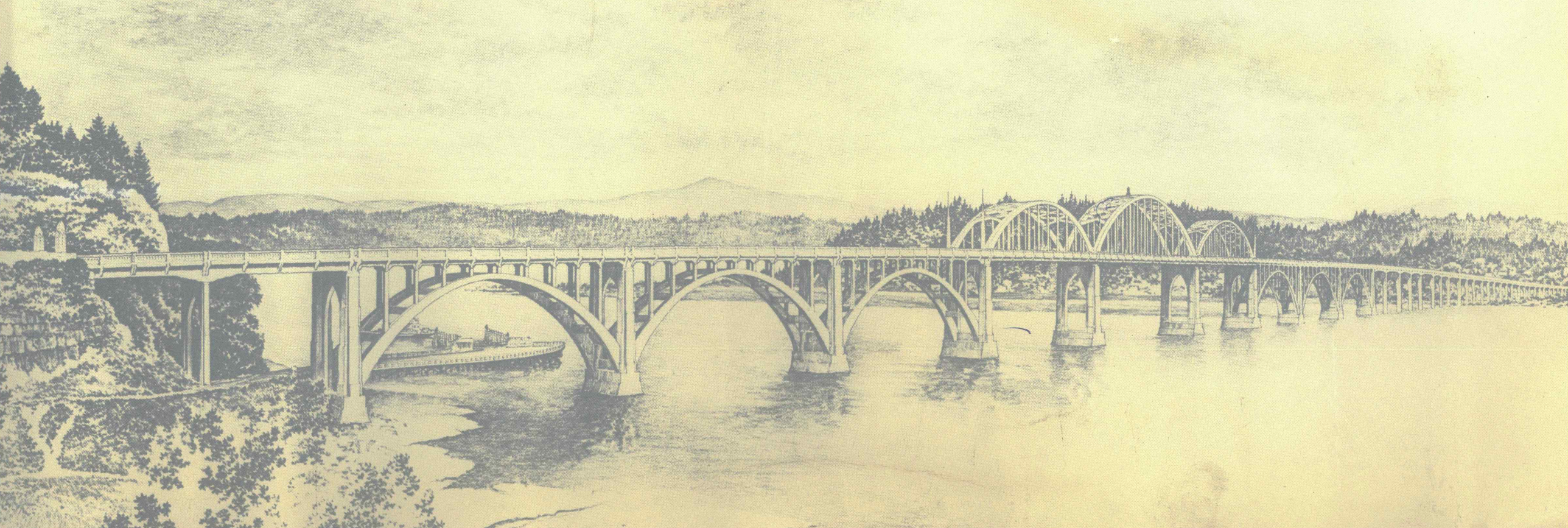
THE OREGON
ESTUARY PLAN BOOK



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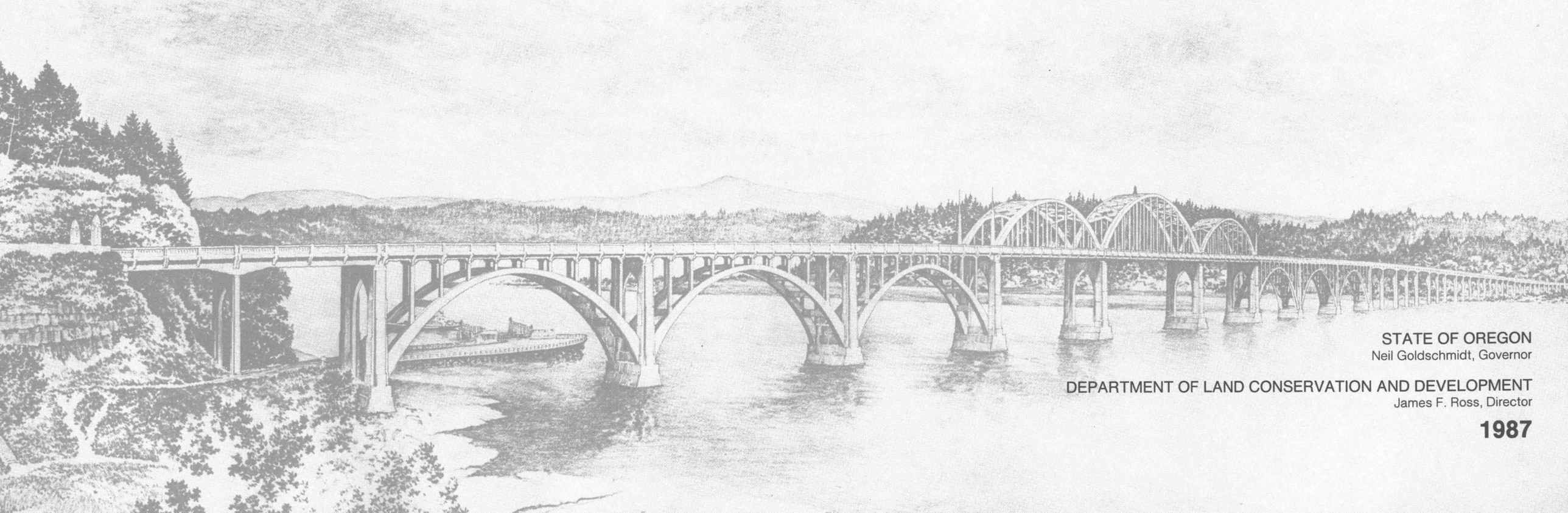

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Neil Goldschmidt, Governor

DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT
James F. Ross, Director

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MAP SOURCES

Oregon Division of State Lands, Estuary Maps, 1972-73.
Oregon Department of Fish and Wildlife, Estuary Habitat Maps, 1978-79.
Comprehensive Plan and Zoning maps from acknowledged comprehensive plans for Oregon's coastal cities and counties.

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COVER ILLUSTRATION

The Alsea Bay Bridge and estuary are from a 1936 drawing by F.G. Hutchinson. Drawing provided courtesy of the Oregon Department of Transportation. The Alsea Bay Bridge and the other McCulloch bridges across Oregon bays symbolize the objective of estuary planning: to provide for needed development in a manner that harmonizes with and protects estuarine values.

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INTRODUCTION

Oregon's estuary management plans balance the need to protect estuarine resources with the need to allow an appropriate level of estuarine and shoreland development.

Striking a balance between protection and development is not easy. Estuaries are complex, intricate, and enormously valuable ecosystems. Our understanding of exactly how estuaries work is limited, and development pressures are great. Serving as the link between free-flowing rivers and the sea, they play a crucial role in the food chain and life cycles for numerous species of fish, shellfish, and wildlife. Estuaries are also important for commerce, navigation, and recreation. They support recreational and commercial fishing and the transportation of forest products and other goods. In fact, almost every sector of the coastal economy depends at some point upon estuarine or shoreland resources for its vitality.

Over the past century, the ecological value of Oregon's estuaries has been dramatically compromised by human activities. Large productive tidal marshes have been diked and converted to pasture land. Tidelands and marshes have been filled to provide waterfront sites for industrial and commercial development. In some cases, nearly a quarter of the estuary has been permanently lost to development.

In the 1970's, concern about the future of our estuaries led the state and federal government to adopt laws to protect estuaries from inappropriate development. These laws require permits any time dredging or filling of estuaries is proposed. Although the regulations include strong standards limiting when dredging and filling are allowed, they only address development issues on a project-by-project basis. Both environmentalists and developers have been frustrated by this system, since neither is assured that its long-term interests are provided for.

Between 1971 and 1976, Oregon developed detailed policies to guide planning for the use of all lands in the state, including its estuaries and other coastal resources. The state's planning requirements for estuaries are embodied in Statewide Planning Goals 16 and 17. Goals 16 and 17 also constitute a large part of the state's overall estuary management program.

Since 1977, coastal cities and counties have prepared plans for all of Oregon's estuaries that implement the LCDC-adopted Goals. These plans, developed with input from various natural resource agencies and interested citizens, are based on the best available information about estuarine resources and their value. Estuary plans make overall decisions about what areas of each estuary will be preserved, conserved, or developed. The plans also establish procedures and standards for the consideration, by local governments and state and federal agencies, of individual development activities.

The maps included in this book show the results of estuary planning for Oregon's 17 largest estuaries. They show the location of various types of habitat and adopted plan and zone designations. Data provided along with the maps show how various estuarine habitats and adjacent shorelands are to be managed.

This book is intended as a guide to estuary plans for citizens, officials, and planners who are interested in Oregon's estuaries. In a very real way, the plans described here chart the future of Oregon's estuaries . . .

CHAPTER ONE

ESTUARIES IN OREGON

INTRODUCTION

Estuaries are special places where ocean and river mingle to create a dynamic, diverse, and highly productive environment. Plants and animals thrive in this unique environment driven by sunlight and the daily tides. Humans, too, are drawn to the estuary to harvest food, travel on its waters, and claim the flat lands for the purposes of civilization.

Twice each day, Oregon's estuaries are the stage for a slow, stately drama influenced by the moon, the sun, the wind, and the rain. Sinuous channels, branching and winding across the broad mud flats, are filled with incoming ocean waters. As the channels fill, the rising tide spreads slowly across the flat mud. The ever-deepening waters lift the eelgrass, fill the myriad burrows of little creatures, and creep into tiny channels that penetrate the fringing salt marshes. Finally, the waters surge upstream to the edge of the forest and gently lift trailing branches of rhododendron and cedar. The estuary is full.

For a moment, the drama pauses. Then as the earth turns, the ocean's push becomes a pull, and the waters of the estuary recede. Before long, logs at the edge of the salt marsh are grounded on the mud, the eelgrass lies limp and flat, and tiny creatures are stranded in isolated pools of water warming in the sun. Clam diggers move carefully across the muddy flats toward the edge of the winding channel. But in a short time, the cycle will begin again.

ESTUARIES IN OREGON

The large number of estuaries on the Oregon coast belies the fact that Oregon's total estuarine acreage is relatively small. Except for the Columbia River, all of Oregon's major and minor estuaries (approximate area of 53,000 acres) could fit inside of Grays Harbor estuary in Washington (approximately 58,000 acres). Most of the larger estuaries have been altered through dredging, filling or diking. Many of the smaller ones have escaped the impacts of civilization and remain in a natural state. In any case, all are important and are covered by Oregon's estuarine management program.

Distribution Along the Coast

The distribution of estuaries along the Oregon coast reflects the geology and topography of the mountains that meet the ocean. The Columbia River estuary overwhelms all the other estuaries on the coast. One of the major river systems in North America, the Columbia River has maintained its westward flow from the Rocky and Selkirk mountains across the rising Cascade and Coast Range mountains to empty into the Pacific. The present day estuary is a recent feature. Geologists now recognize that the Columbia once flowed across the Oregon country through long-eroded landscapes to the south of its present course, and may have once discharged its waters somewhere nearer Yaquina Bay.

WHAT IS AN ESTUARY?

An estuary is defined as a semi-enclosed body of water, connected to the ocean, where salt water is measurably diluted with fresh water from the land. In reality, an estuary...or bay...is a whole lot more. It is a zone of transition between the marine-dominated systems of the ocean and the upland river systems, a zone where the mix of the two yields one of the most biologically productive areas on Earth.

From the Columbia River estuary south to Cascade Head, the mountains are a complex mix of more recent sedimentary and volcanic rocks. Except for the wide valley carved by the several rivers now feeding Tillamook Bay, and Nehalem Bay at the mouth of the winding Nehalem River, the estuaries on the north coast tend to be small, fed by streams which drain small watersheds, and enclosed in indentations between rugged headlands and sand spits. Netarts Bay, Sand Lake and Salmon River are such estuaries.

Between the Salmon River estuary at Cascade Head and the Coquille River far to the south are the estuaries of Siletz Bay, Yaquina Bay, Alsea Bay, the Siuslaw and Umpqua rivers, and Coos Bay. Along this portion of the coast, the mountains are mostly older marine sediments and sands, clays, and muds eroded from ancient mountains to the south and east. Deposited on the ocean floor in a great trough from the Klamath Mountains to Vancouver Island, these sediments were uplifted by the force of colliding continents and eroded once again to create relatively wide river mouths. Rising seas filled these river valleys with sediments and created the conditions for present-day estuaries.

South of the Coquille River estuary at Bandon, there are few estuaries. Along this stretch of coastline, the hard, resistant cores of the ancient Klamath Mountains withstand erosion from rain, the river and the clawing surf. The gradient of the rivers and creeks are steep even at the ocean's edge. The Rogue, Elk, Sixes, Chetco and Winchuck Rivers have almost no tidelands. These rivers flow directly into the ocean.

Types of Estuaries

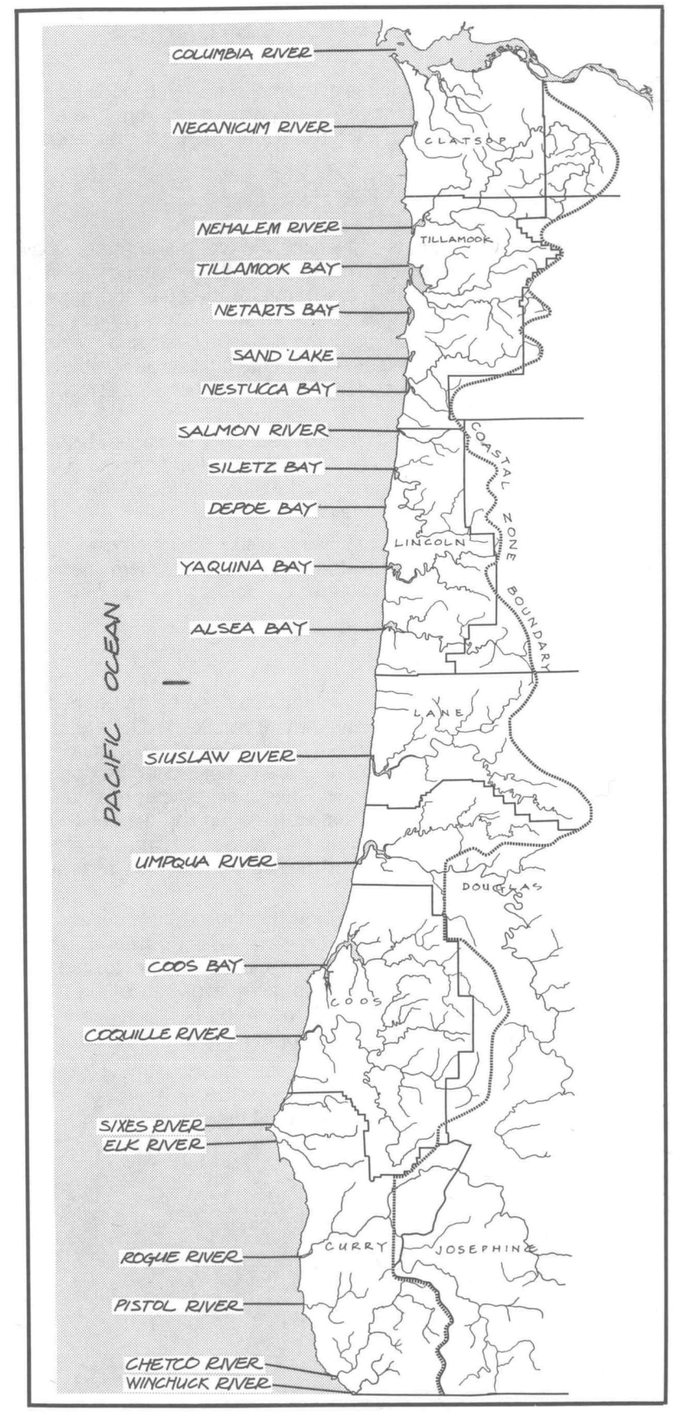
There are several types of estuaries on the Oregon coast.

River dominated: Some, like the Columbia River and Rogue River, are dominated by the freshwater flow of the river and have relatively small tideland areas.

Drowned river mouth: The majority, like Coos Bay, Siletz Bay, and Yaquina Bay, are the drowned river mouth variety, where winter's floods discharge high volumes of sediments through the estuary. In summer, seawater inflow dominates the estuary because streamflow is low.

Bar-built: Others, like Sand Lake and Netarts Bay, are "bar-built," where a sand spit creates a separate estuarine environment which receives very little freshwater inflow. Sand Lake has a watershed of only 14 square miles.

Blind: Some of the smaller estuaries, like Elk River and Sixes River in Curry County, are "blind" estuaries where low river flow in summer results in a sand bar completely closing off the mouth of the estuary.



SUBSYSTEMS OF OREGON ESTUARIES

Estuaries in Oregon are, in reality, complex systems made up of four major parts or subsystems. These parts blend from one another with no clear demarcation, but each has some distinct characteristics.

Marine

The Pacific Ocean greatly influences the water and the ecology of the estuary near its mouth. The degree of this influence is a product of two major factors linked to the seasons of the year: the amount of freshwater outflow pushing against the ocean's waters (which, in turn, depends upon the size and shape of the drainage basin and the amount of rainfall or snowmelt), and the strength of the tidal surge into the mouth of the estuary (which is influenced by the shape of the channel mouth, the height of the tide and, in winter, storm surge).

In this marine-dominated zone there is a steady mix of marine life into and out of the estuary. The main channel serves as the entrance and exit for many fish and larger invertebrates that take advantage of the food-rich estuarine environment during some part of their life cycle.

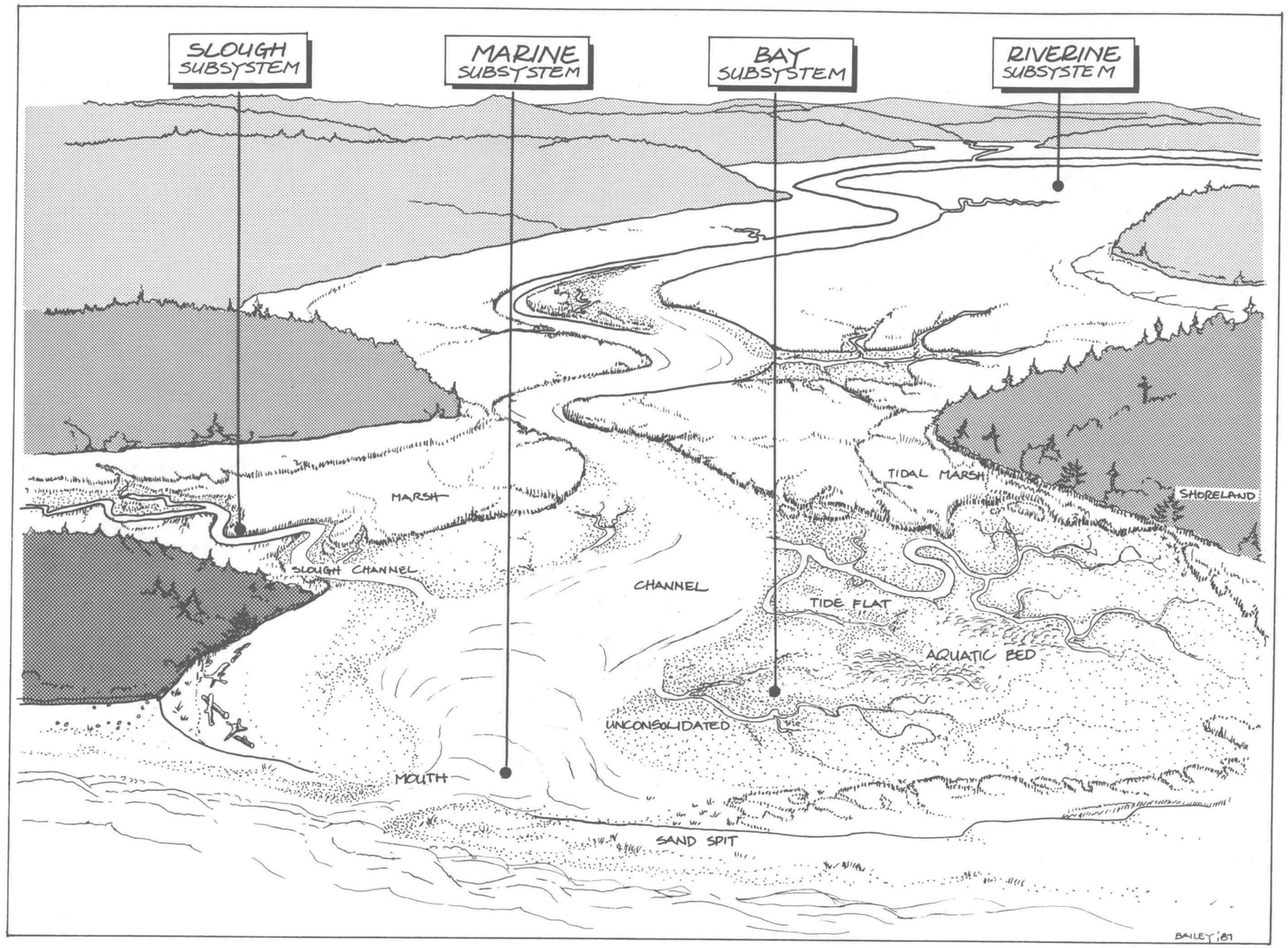
Although virtually all Oregon estuaries have some marine component to them, Sand Lake estuary and Netarts Bay are two where the marine component dominates because they lack major freshwater inflow.

Bay

The bay portion of the estuary is characterized by broad mud flats which are exposed to the air at low tide and flooded by a mix of salt and fresh waters at high tide. These flats are not just mud. Sand grains carried from the mountains by the river are deposited in the upper bay and along the edges of main channels, while finer particles of silt and clay drift farther to the edges of the flats near the fringing marshes. Marine sand carried along the ocean front in the "longshore current" is swept into the estuary on incoming tides and may be deposited as far as several miles upstream.

The catalyst for the tremendous productivity of the bay subsystem is the broad expanse of shallow, nutrient-rich water which covers these flats twice a day. This water provides the ideal medium for phytoplankton—microscopic free-floating plants—to capture sunlight and thereby continually add energy into the biologic food webs of the estuary. Solar energy drives the collective metabolism of the estuary.

The majority of the larger estuaries on the Oregon coast have extensive bay components. Alsea Bay, Yaquina Bay, Siletz Bay, and Coos Bay, for example, have relatively large bays as part of their estuarine system.



Four Major Subsystems of Estuaries on the Oregon Coast

This drawing shows the four major estuarine subsystems at low tide.

*The **riverine** subsystem dominates where the river flows from the mountains into the estuary. This wide single channel meanders through marshlands, many of which have been diked for pasture.*

*A **slough** subsystem occurs where small tributary streams with very little flow make their way toward the main channel. Salt marshes fringe these drainage ways.*

*The **bay** is dominated by broad tidal flats of mud and sand. This area will be covered by water at high tide.*

*At the mouth of the estuary, the surging flood tide brings the **marine** environment into the estuary.*

Slough

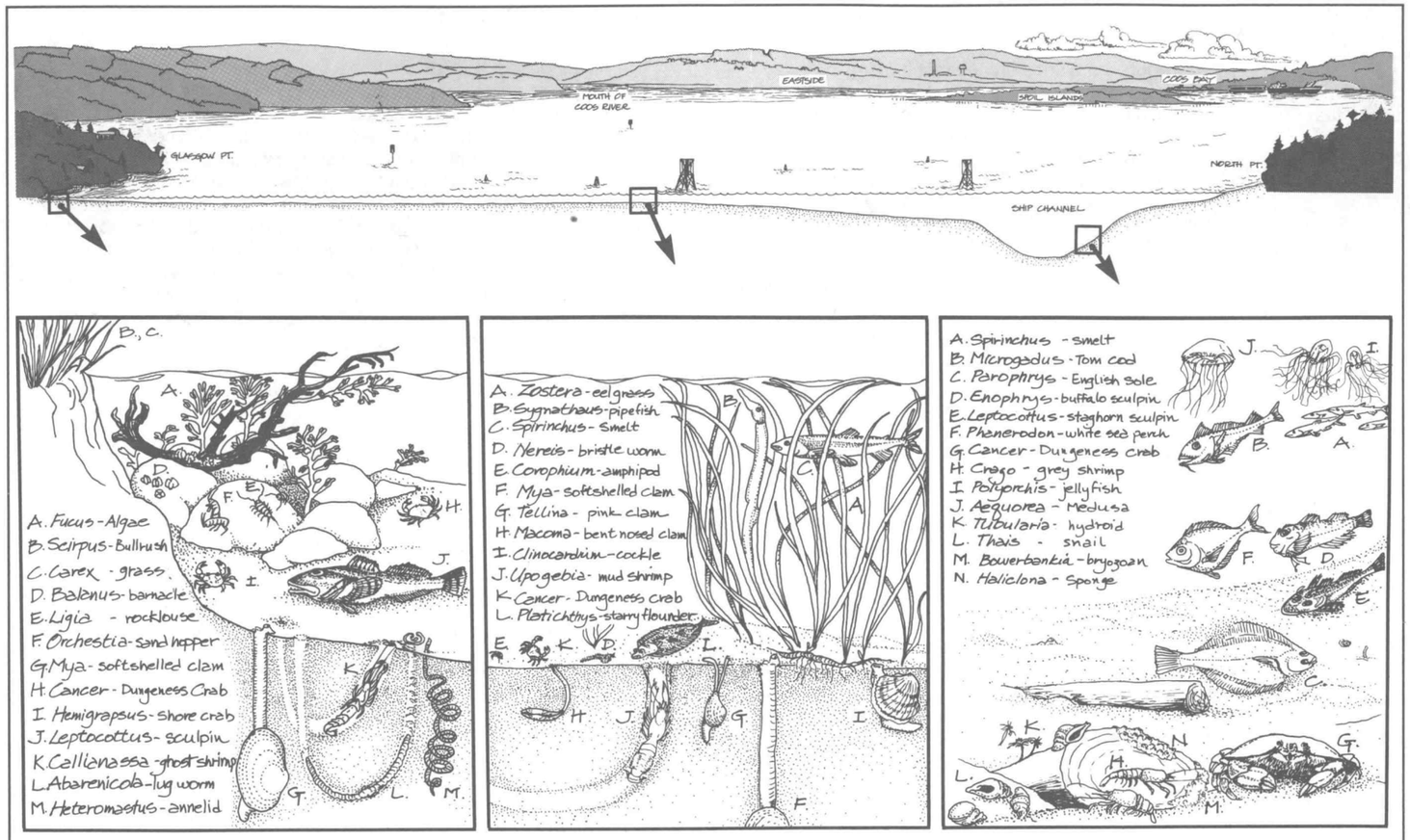
Sloughs are the smaller tributaries to the main bay and river channels. They have little freshwater inflow. Tidal flushing may not be as complete as in parts of the estuary that are closer to the ocean or main channel. Generally, sloughs consist of meandering channels that wind through fringing marshes and across mud flats to the main bay. It is these small channels that bring the tide up into the marsh and to the edge of the forest.

Coos Bay, for instance, has a number of sloughs which are relatively large and navigable for several miles, including Isthmus Slough, North Slough, and Catching Slough. In turn, smaller sloughs are tributary to these. South Slough, one of the major tributaries at Coos Bay, does not fit this general description. Rather, it is a separate, miniature estuarine system which shares with Coos Bay a common mouth to the ocean. South Slough was designated the first National Estuarine Sanctuary under a program established by Congress in 1972.

Riverine

Rivers and streams are parts of almost all estuaries on the Oregon coast. Coastal rivers often reach sea-level many miles inland while still confined by mountains and narrow river valleys (the Siuslaw River at Mapleton or the Umpqua River at Scottsburg). It is here that the tide begins to effect the flow of the river. However, it is not until much further downstream that tide flats begin to appear along the edges of the river and the bay subsystem characteristics prevail. On the Coquille River, for instance, this riverine portion extends to near Myrtle Point, over thirty river miles inland.

The Columbia River estuary is one major Oregon estuary dominated by the riverine component, although the dramatic influence of the river has been tempered by the many dams upstream. Historically, the late spring and summer were seasons of major freshwater discharge from snowmelt far inland. Now, the flow of freshwater is more moderate year round. This change in riverine influence has disturbed the equilibrium between fresh and salt water. The influence of the marine environment has crept slowly upstream. In general, however, the Columbia River continues to dominate its estuary.



Cross Section of the Coos Bay Ecosystem at Mid-Bay (view south)

Left: *The shallow edge of the estuary is submerged for only a short time at high tide. Woody debris and recently eroded sandstone rocks provides habitat for algae, barnacles, worms, and amphipods. At high tide, crabs and sculpins (locally called bullheads) scavenge in the jumble of rocks and sticks. At low tide, large algae like Fucus (seaweeds) lie limp on the mud and rocks to be grazed by small invertebrates.*

Above the water, marshes ring the edges of sloughs, bays and rivers where the soil is wet at least part of the year. Plants which have evolved a tolerance for saltwater advantage of the varying degrees of salinity nearer or farther from the marine-dominated waters. These salt marshes are particularly productive. The combination of sunlight and saline waters yields a rich crop of marsh grass that dies in the fall, is harvested by winter high tides and is distributed as nutrient debris to the estuarine food web.

Middle: *Across the broad tide flats, eelgrass meadows provide sheltered habitat and act as a nursery for a variety of fish, crabs, and other creatures. Its rhizomes are buried in the mud and so stabilize sediments and prevent erosion. Eelgrass grows rapidly in sunlight, fixes nutrients from mud and water, and generates detritus which releases nutrients to the food web as it decays. Eelgrass growth is adversely affected by turbidity.*

Flats are the result of thousands of years of sedimentary deposit onto the bottom of the estuary. As rivers and streams reach sea level, they lose energy necessary to retain their load of sand, clay and organic debris. Logging and road building in the watershed during modern times hastened erosion, added to the sediment load, and contributed to rapid filling of estuaries over the last century.

Right: *Continuously submerged, the deep channels of the estuary are conduits for many species of marine life to enter and leave the bay. Jellyfish float near the surface while marine fish move with the more saline waters of the bottom. In these channels, salmon and shad migrate downstream through the estuary to the ocean.*

The dendritic pattern of channels covers every portion of the mud flats and extends into the fringing salt marshes. The meander of these channels is influenced by the energy of the flow in them. The lower the energy, the more the meander. These dynamic environments provide limited primary habitat but are critical pathways between river and ocean.

FORCES THAT CREATE ESTUARIES IN OREGON

The estuaries of the Oregon coast are a unique result of the interplay of geologic forces, ocean conditions, and weather. These forces vary so that no two estuaries are alike, although many are similar.

Geologic Forces

The Oregon coast is part of the geologically active margin of the North American continental plate. This plate is moving slowly westward. As it does, it is overriding the last fragments of the oceanic Juan de Fuca plate, which are moving eastward away from their sub-sea volcanic origins along the Gorda and Juan de Fuca Ridges one hundred miles or so to the west. Forces from this inexorable collision have forced the oceanic plates downward and uplifted and crumpled the entire western edge of North America. This process uplifted the Rocky Mountains far inland and, more recently, the Cascade and Coast Range mountains along the coast. The process continues today; the Oregon coastline continues to slowly emerge from the sea.

Rising Sea Level

During the last great ice age, much of the water from the world's oceans was locked in ice. Ten thousand years ago, sea level was far lower than today. Then, the Pacific Ocean lapped at the edge of a wide plain some ten to forty miles to the west of the present coastline. As the great glaciers melted, water returned to the oceans, and sea level rose to cover that plain, which is known today as the continental shelf. This rising ocean gnawed at the edges of the coast range mountains and flooded into the canyons of rivers leading down from the mountains. These steep canyons eventually filled with sediments, the surfaces of which are now the broad tide flats of today's estuaries.

Seasonal Rainfall

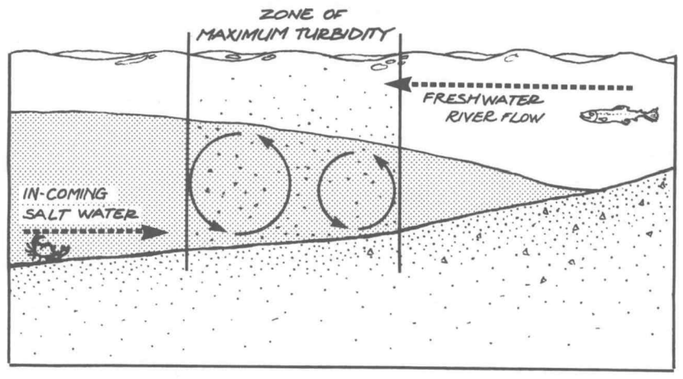
In the summer, a high pressure system typically builds over the entire Pacific northwest and pushes storm systems far to the north. Oregon receives very little rainfall. Because the coastal mountains build no snowpack in winter, have steep, small drainage basins, and have relatively thin soil cover, there is no groundwater reserve to sustain river levels during the summer drought. Coastal streams therefore dwindle. Summer freshwater input to the estuary is very low.

Summer Winds

Along the beach, this same high pressure system sets up strong winds which blow from the north/northwest and generate a fast-moving southward flowing ocean current near the shore. These "longshore currents" can carry great volumes of sediment and move the sand into long spits parallel to the ocean front. Sand spits divide and protect the estuarine environment from the dynamic influence of the ocean. In summer, this large volume of moving sand, coupled with low estuarine outflow, allows the sand spit to move into the mouths of estuaries and perhaps, if no jetties have been built, across the channel altogether.

Winter Storms

In winter, low pressure systems move back in over the northwest coast, bringing storms which blow onshore from the south or southwest. A strong northward flowing current, the Davidson Current, moves great quantities of sand northward along the coast. These storms drop tremendous amounts of rain onto the coastal mountains that discharge into...and through...estuaries. Combined with high tides and storm-generated high sea levels, the vigorous streamflow removes some of the sand spit built during the summer. Prior to the construction of jetties at the mouths of the rivers, high river runoff would often cause the river to breach the spit at an unpredicted location and create a new outlet to the sea. Winter also brings the highest tides flooding into the estuaries, removing plant material from even the highest marshes and distributing this organic debris throughout the estuary.



Stratification

Freshwater streamflows and intruding seawater form two wedges of water going in opposite directions. The freshwater flows on top of the heavier saltwater. These wedges create surface-to-bottom differences in salinity that significantly influence life and conditions in the estuary.

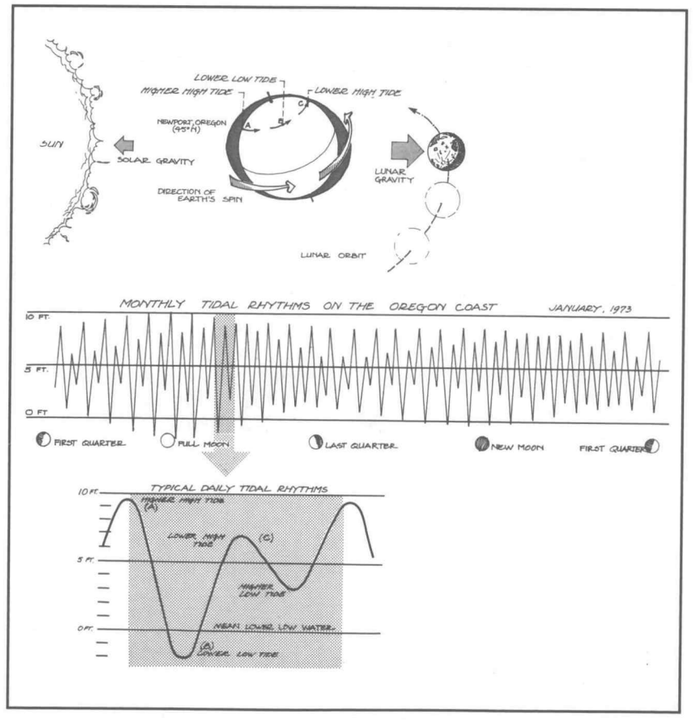
This layering, known as stratification, is strongest where the two wedges meet and when river flows are high. When stratification is strong, there is little mixing between surface and bottom waters. Stratification is weakest at the sources of the wedges...the river and the ocean...and when river flow is low. Weak stratification results in greater vertical mixing.

Turbidity is highest at the upstream end of the saltwater wedge, the zone of maximum resuspension of bottom sediments.

Tides

Year around, the ocean force with the greatest effect on estuaries is the daily tidal cycle. In Oregon, there is a dual high and low tide pattern with the high and low approximately six hours apart. These tides are seldom equal. On a daily basis, there is a "higher high" tide followed by a "higher low" tide, then a "lower high" tide, and finally a "lower low" tide. The elevations of these four tides vary as the moon moves through its phases. The highest tides of the year are in winter, when the Earth is closest to the sun and the moon is aligned with the sun in the "new moon" position. The lowest tides of the year come in the early summer.

The pull of the sun and moon create a "tidal bulge" on the ocean which affects the Oregon coast from south to north; high tide at Coos Bay is 20 to 30 minutes earlier than it is at the Columbia River. This regular ebb and flood of the tides brings saline, nutrient-rich ocean waters into the estuary to meet the sediment-laden fresh water. This interaction drives the sedimentation process that builds the broad tide flats and creates a wide variety of saline conditions that provide a diversity of habitat for plants and animals.



Tidal Rhythms on the Oregon Coast

A monthly progression of high tides and low tides at Coos Bay illustrates daily and monthly fluctuations in tide heights. The Earth rotates daily beneath tidal bulges, but the tilt of the Earth's axis results in a higher high tide at (A), a lower low tide at (B), and lower high tide at (C), and a higher low tide (hidden) before returning to (A). The Moon's orbit around the Earth brings it in and out of line with the sun. (from the Oregon Ocean Book)

CHAPTER TWO

PLANNING REQUIREMENTS

The Path To Estuary Planning

Oregon's land use planning program is a statewide effort to provide for needed growth and development without compromising the resources that make Oregon a special place to live. The program achieves this goal through locally adopted land use plans which decide in advance what lands will be available for needed industrial, commercial and residential development, and what lands will be protected for continued farming, forestry and other resource uses. Oregon's commitment to planning recognizes that the state can and must strike a balance between providing for growth and protecting its resources. Estuary plans are one element of this statewide program.

In the 1960's, people nationwide began to understand the extreme value and vulnerability of estuaries. The *National Estuary Study,* completed in 1969, documented the threat to estuaries and concluded that dramatic action was needed to prevent continued degradation of the nation's estuarine resources. In Oregon, concern about damage to estuaries led Governor Tom McCall to issue an executive order halting all state construction projects affecting estuaries. In 1971, the Removal-Fill Law established stringent regulations to limit dredging and filling in all waters of the state.

In the 1970's, proposals for estuary development became one of many battlegrounds between conservation and development interests. Local governments and state agencies were forced to weigh economic benefits against environmental losses. When permits for estuarine development were denied, developers argued that Oregon was a no-growth state, while environmentalists considered each new development project approval to be one more step in the irreversible loss of estuarine values. The state had no way to assure that both legitimate development needs and environmental protection would be provided for.

Impasse over specific projects led to a consensus among environmentalists and developers on the need for predictability about which areas would be developed and which would not. Environmentalists wanted a long-term commitment to estuary protection, and developers wanted to know what development was possible before they made major investments in land and development plans.

Reaching a consensus on how estuary planning should be done and agreement on what each plan should say has taken almost a decade. However, now estuary plans (and comprehensive plans) are in place which guide future decisions about where development will go. To the best of our knowledge and understanding, they provide for a level of development which provides for appropriate uses, yet still protect our estuarine ecosystems.

Land Use Planning: An Overview

Oregon's state land use law, codified as Oregon Revised Statutes (ORS) Chapter 197, authorized the Land Conservation and Development Commission (LCDC) to adopt mandatory planning procedures and standards to guide land use decisions by local governments and state agencies. These standards are the Statewide Planning Goals. Every city and county in the state is required to adopt a comprehensive plan that complies with the Goals. Once approved by LCDC, the plan takes the place of the Goals as the state's standard for most land use decisions. (State agencies are required to comply with both the Goals and acknowledged plans. In most cases, acknowledged plans fully carry out the goals, but there are several goal requirements that are not implemented through plans which must be applied by state agencies.)

There are 19 Statewide Planning Goals. Four of the Goals set planning requirements for coastal resources: estuaries, shorelands, beaches and dunes, and ocean resources. The goal requirements for estuaries and shorelands are discussed later in this chapter.

What is a comprehensive plan?

> "Comprehensive plan" means a generalized, coordinated land use map and policy statement of the governing body of a local government that interrelates all functional and natural systems and activities relating to the use of lands, including, but not limited to, sewer and water systems, transportation systems, educational facilities, recreational facilities and natural resources and air and water quality management programs. "Comprehensive" means all-inclusive, both in terms of the geographic area covered and functional and natural activities and systems occurring in the area covered by the plan. "General nature" means a summary of policies and proposals in broad categories and does not necessarily indicate the specific locations of any area, activity or use." ... "Land" includes water, both surface and subsurface, and the air.
>
> *(Definition from ORS 197.015(5))*

A comprehensive plan is the legal document that guides land use decisions within the area covered by the plan. Estuary management plans are one element of city and county comprehensive plans. Plans are typically divided into three parts: inventories, policies and implementing measures. Each part of the plan must be periodically updated to reflect changing needs, circumstances and information.

Inventories are the factual information about land use, resources, and development trends within the planning area; they provide the basis for plan policies. Inventories must be periodically updated to reflect the best current information about resources and trends that would affect plan decisions.

Policies are the decision-making and standard-setting parts of a plan. They are mandatory, enforceable statements which direct all subsequent land use decisions. The policy element of the plan includes plan maps which specify the location of various land use categories.

Implementing measures are the procedures and standards used to guide decisions on land use activities. They include zoning ordinances and other land use regulations which carry out plan policies. Zoning ordinances typically identify land use activities and the circumstances under which they are allowed in the various land use categories or zones. Capital improvement programs are another sort of implementing measure. They set priorities for how money is to be spent on sewers, roads and other capital improvements that shape the community.

STATEWIDE PLANNING GOALS

The Land Conservation and Development Commission (LCDC) has adopted 19 Statewide Planning Goals to guide comprehensive planning by cities and counties and land use decisions of state agencies and other units of government. The Goals deal with a wide range of topics.

GOAL 1: Citizen Involvement
GOAL 2: Land Use Planning
GOAL 3: Agricultural Lands
GOAL 4: Forest Lands
GOAL 5: Open Spaces, Scenic, Historic and Natural Resources
GOAL 6: Air, Water and Land Resources Quality
GOAL 7: Areas subject to Natural Disasters and Hazards
GOAL 8: Recreational Needs
GOAL 9: Economy of the State
GOAL 10: Housing
GOAL 11: Public Facilities and Services
GOAL 12: Transportation
GOAL 13: Energy Conservation
GOAL 14: Urbanization
GOAL 15: Willamette River Greenway
GOAL 16: Estuarine Resources
GOAL 17: Coastal Shorelands
GOAL 18: Beaches and Dunes
GOAL 19: Ocean Resources

Local Land Use Decision Processes

Local decisions on specific estuarine and shoreland activities are made in several ways. There are basically three types of land use decisions: ministerial, quasi-judicial and legislative. Public notice requirements and the detail of local review depend upon the type and intensity of the proposed activity.

Ministerial decisions involve activities which have been wholly anticipated in the plan and zoning ordinance. Such activities generally have minimal or predictable impacts that can be controlled by requiring that routine standards or conditions be met. Decisions are made by the local planning department and involve standards that can be easily measured or checked for compliance. For example, review of a building permit involves assuring that a structure is allowed by the zoning, meets setback and other zoning requirements, and that the building meets minimum requirements of the building codes. Ministerial decisions, by definition, do not require the exercise of judgment by the reviewer, and as such they require neither public notice nor review by other agencies.

Quasi-judicial decisions involve the application of more general standards to a specific proposal. By definition, such decisions affect a limited, identifiable group of people. Some form of public notice and opportunity for public review, comment, and appeal is required, since some discretion is exercised by the reviewer. Most estuarine uses are subject to some form of quasi-judicial decision-making. The most common quasi-judicial review is for a conditional use, which is an activity that may be permitted if it complies with certain conditions. Such conditions are generally aimed at minimizing the impacts of an activity upon surrounding resources or other human activities. Procedures for notice and hearing vary. Conditional use decisions are usually made by a city or county planning director or hearings officer. Some local governments provide notice in advance and then hold a public hearing. In other situations, particularly for non-controversial uses, the planning director prepares a written report addressing the standards in the local ordinance in advance of public notice. Notice of the planning director's proposed decision is then mailed to affected and interested parties, who usually have 10 to 30 days to either appeal or request a hearing on the proposed decision. Appeals are then considered by the planning commission or the governing body.

Legislative decisions are decisions which affect either a large area or many people. They are typically zoning ordinance or plan policy amendments; as such, the group of people affected by a decision is not readily identifiable, and thus only the publication of a general notice is required by law. Proposals for major plan amendments must be sent to LCDC. LCDC then notifies interested persons about the proposals. Zoning ordinance amendments must be consistent with the local plan, and major plan amendments must conform with the Statewide Planning Goals.

Coordination

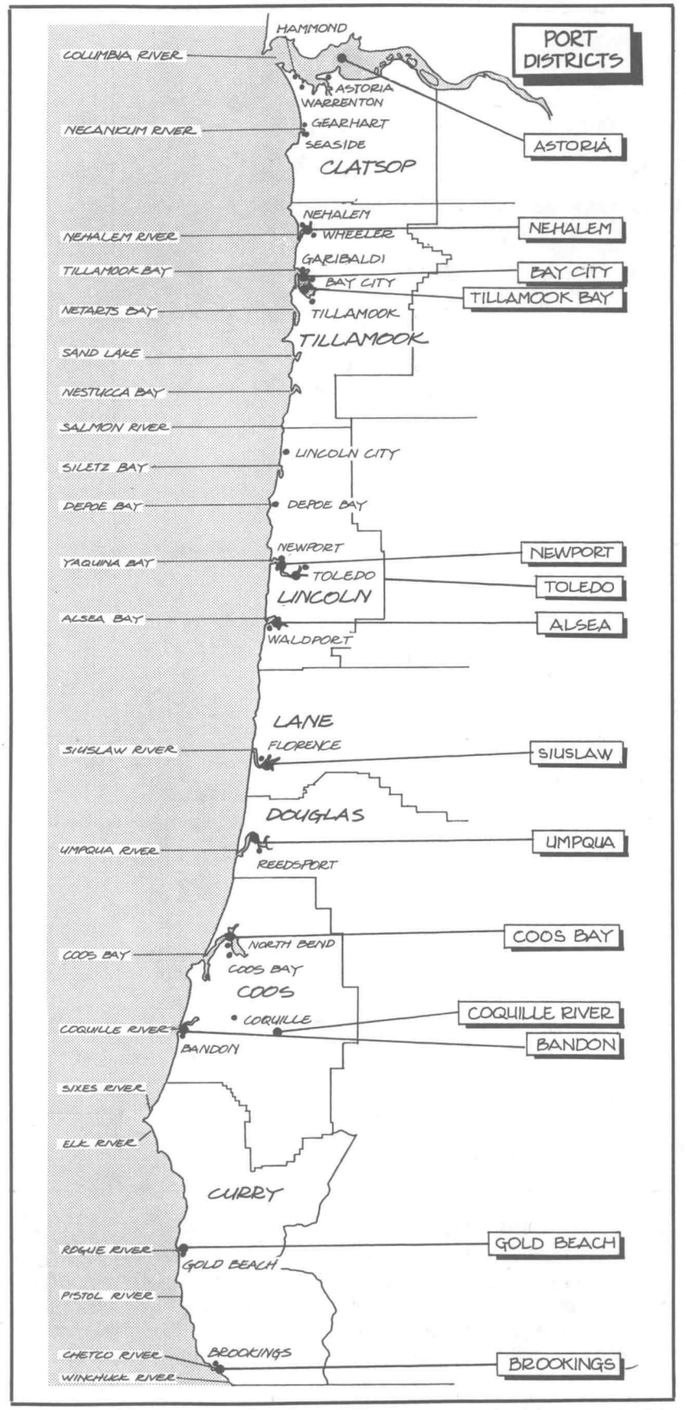
The Oregon Land Use Act of 1973 (ORS Chapter 197) and Statewide Planning Goal 2 (Land Use Planning) require that plans be "coordinated." A plan is "coordinated" when the needs of all levels of governments, semi-public and private agencies and the citizens of Oregon have been considered and accommodated as much as possible. Coordination means that local governments must provide other units of government an opportunity to express needs and interests in the planning area as the local government prepares, implements, or amends its comprehensive plan. Coordination is especially important in estuary planning, since several local, state and federal agencies are involved in the management of estuarine resources. Local governments must evaluate needs expressed by the local port district and other agencies involved in economic development. Locally adopted plans must also implement or be consistent with state and federal requirements for the management and protection of waterways and fish and wildlife resources. After plans are adopted and approved by LCDC, the state and federal agencies must adhere to them.

Most of Oregon's estuary plans were written with the close cooperation of affected units of government. They were prepared or reviewed by an interagency task force, and they reflect a consensus between local, state and federal agencies on how estuaries will be utilized in the future.

Coordination occurs as plans are both implemented and revised. Local governments give other units of government an opportunity to comment on land use decisions. DLCD provides notice of major plan amendments to interested parties through its post-acknowledgment plan amendment notice and through notice of periodic plan review.

Coastal Cities and Ports

Twenty-two cities and thirteen port districts have planning or management responsibilities for Oregon's major estuaries. Cities, in coordination with counties, are responsible for preparing and administering estuary plans. Port districts support development and maintenance of navigation improvements for water-oriented industry and commerce, as well as commercial fishing and recreational boating and fishing. Ports also play a key role in planning and implementing economic development strategies for the areas they serve.

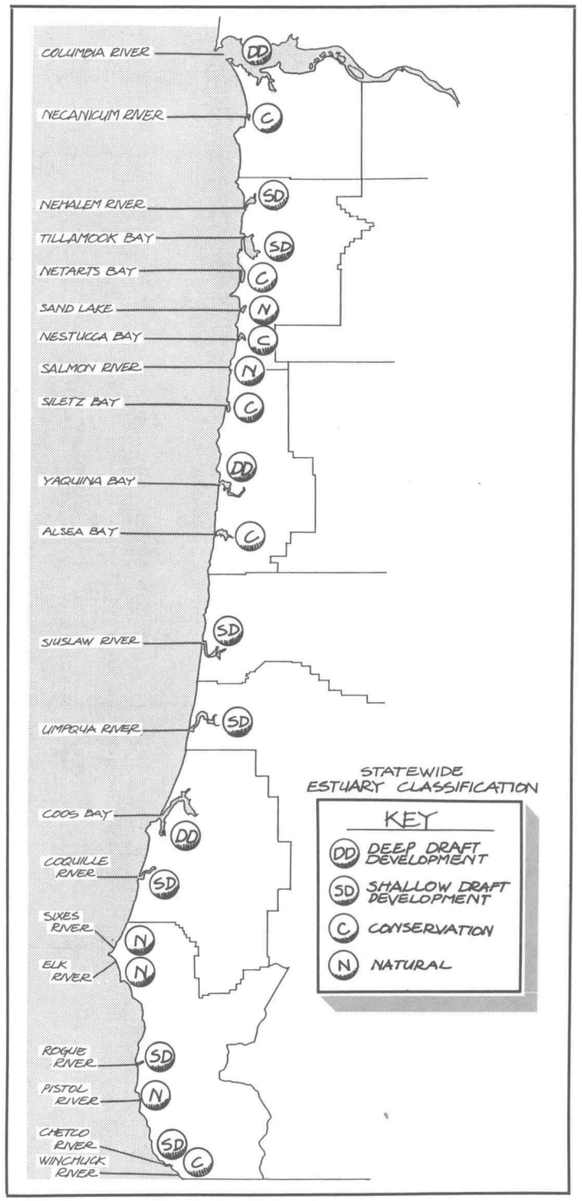


Estuary Planning Requirements

Statewide Planning Goal 16 (Estuarine Resources) establishes detailed requirements for the planning and management of Oregon's estuaries. The overall objective of Goal 16 is to "recognize and protect the unique environmental, economic and social values of each estuary and associated wetlands, and to protect, maintain, where appropriate develop and restore the long-term environmental, economic, and social values, diversity and benefits of Oregon's estuaries." To accomplish this, the Goal sets broad requirements for preparation of plans and for review of individual projects. The Goal calls for coordinated action by all local, state and federal agencies that regulate or have an interest in Oregon's estuaries.

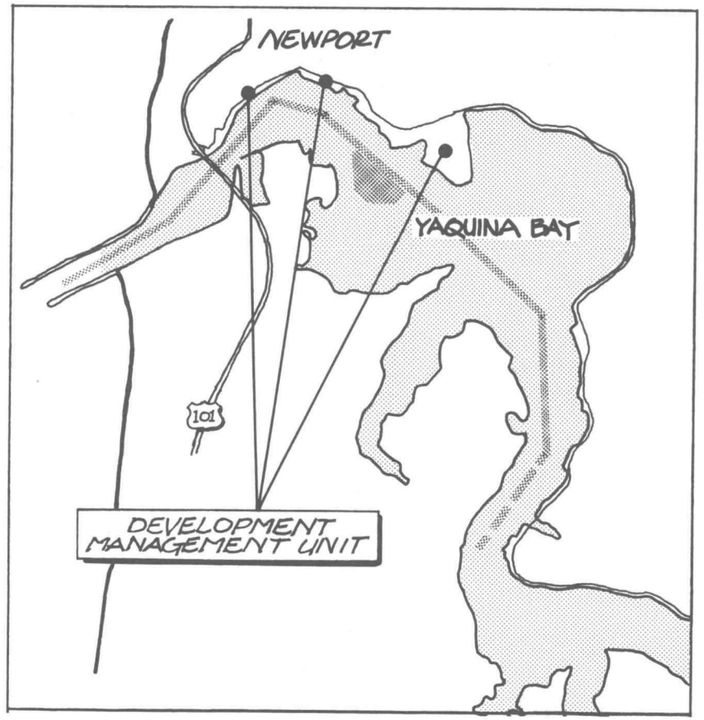
Goal 16 provides for management of estuaries in three ways. First, LCDC has established a coastwide classification system to maintain diversity between and among the state's estuaries. Second, individual estuary plans designate appropriate uses for different management units within each estuary. Third, local plans must provide for review of estuarine alterations to assure that they are as compatible as possible with the protection of estuarine values.

Most Goal 16 requirements are now implemented through locally adopted plans, but some are applied by state agencies through their review of permit applications. Both state and federal agencies assist in implementing estuary plans through review of specific projects.



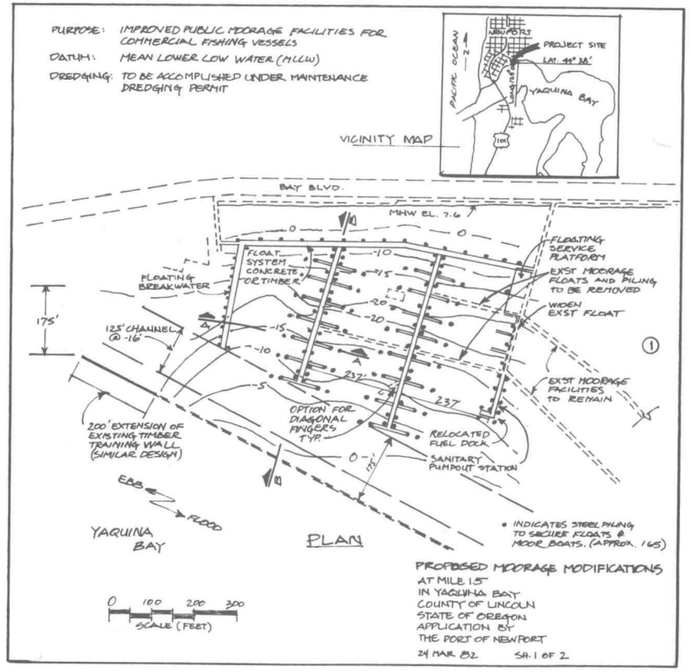
Estuary Classification

To maintain diversity among Oregon's estuaries, Goal 16 directs the Land Conservation and Development Commission to set overall limits on the amount of development that can occur in each estuary. The classification sets an upper limit on the types and intensities of development that can occur and serves as a guide to preparation of plans for each estuary.



Management Unit Designation

Plans are prepared for each estuary by the affected cities and counties with input from the public and other interested units of government. Plans divide each estuary into a number of different zones or areas called management units. Plans identify appropriate uses for each management unit. Goal 16 directs what kinds of areas are to be included in each management unit and what kinds of uses can be allowed in each type of management unit.



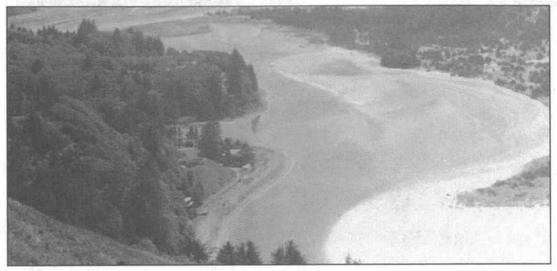
Project Review

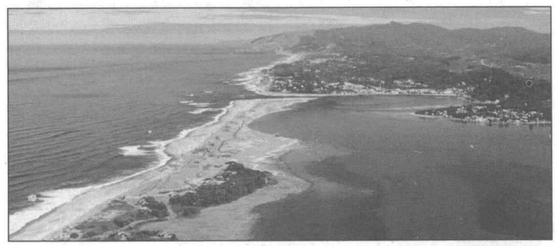
Goal 16 also requires that estuary plans include procedures and standards for review of proposed estuarine developments. Project review requirements are designed to ensure that new uses or alterations are compatible with resources in the area and that harmful effects are minimized. Most project review requirements are applied through review of permits for specific development projects.

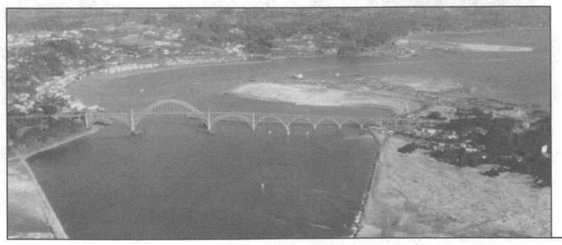
ESTUARY CLASSIFICATION

LCDC adopted an estuary classification system which defines the overall level of development permitted in each estuary (see chart at right). This system is designed to preserve diversity among Oregon's estuaries and guide development to estuaries that have been altered and which can support more development.

MAJOR ESTUARIES







CLASSIFICATION	Definition
NATURAL Sand Lake Salmon River Elk River* Sixes River* Pistol River*	Estuaries lacking maintained jetties or channels, and which are usually little developed for residential, commercial or industrial uses. They may have altered shorelines, provided that these altered shorelines are not adjacent to an urban area. Shorelands around natural estuaries are generally used for agriculture, forestry, recreation and other rural uses. Natural estuaries have only natural management units.
CONSERVATION Necanicum River Netarts Bay Nestucca River Siletz Bay Alsea Bay Winchuck River*	Estuaries lacking maintained jetties or channels, but which are within or adjacent to urban areas which have altered shorelines adjacent to the estuary. Conservation estuaries shall have conservation and natural management units.
SHALLOW DRAFT DEVELOPMENT Nehalem Bay Tillamook Bay Depoe Bay* Siuslaw River Umpqua River Coquille River Rogue River Chetco River	Estuaries with maintained jetties and a main channel (not entrance channel) maintained by dredging at 22 feet or less. Shallow draft development estuaries have development, conservation and natural management units.
DEEP DRAFT DEVELOPMENT Columbia River Yaquina Bay Coos Bay	Estuaries with maintained jetties and a main channel maintained by dredging to deeper than 22 feet. Deep draft development estuaries have development, conservation and natural management units.

* Because of their small size, little study has been done of these estuaries. ODFW habitat maps are not available, so these estuaries have been excluded from this document.

MINOR ESTUARIES

The Oregon Estuary Plan Book covers Oregon's seventeen largest estuaries. Four smaller "major" estuaries and seventeen "minor" estuaries are not covered because detailed mapping and habitat information is not available for them.

Minor estuaries are formed where smaller rivers and creeks meet the ocean. Despite their small size, most minor estuaries do have valuable estuarine habitat and support anadromous fish runs. In addition, most of them are largely unaltered by human development. Minor estuaries are required to be placed in either a conservation or natural classification in an estuary plan.

County	Estuary	Classification	Size[1]
Clatsop	Ecola Creek[2]	Conservation	50 acres
Tillamook	Neskowin Creek	Conservation	30 acres
Lincoln	Big Creek	Natural	20 acres
	Beaver Creek	Conservation	35 acres
	Yachats River[3]	Conservation	40 acres
Lane	Tenmile Creek	Natural	35 acres
	Big Creek	Natural	35 acres
	Berry Creek	Natural	30 acres
	Siltcoos River	Natural	45 acres
	Sutton Creek	Natural	45 acres
Douglas	Tahkenitch Creek	Natural	25 acres
Coos	Tenmile Creek	Natural	35 acres
	Twomile Creek	Natural	20 acres
	Fourmile Creek/New R.	Natural	20 acres
Curry	Floras Creek/New R.	Natural	125 acres
	Euchre Creek	Natural	45 acres
	Hunter Creek	Natural	50 acres

[1] The figures listed are very general estimates based on local maps and head-of-tide data.
[2] Ecola Creek is largely within the City of Cannon Beach.
[3] Yachats River estuary is largely within the City of Yachats.

MANAGEMENT UNIT DESIGNATION

Local plans divide each estuary into a series of management units. Each management unit is a discrete geographic area defined by biological and physical characteristics and features, within which particular uses and activities are promoted, encouraged, protected, or enhanced, and others are discouraged, restricted, or prohibited.

Goal 16 defines three types of estuary management units: natural, conservation, and development. They are described in detail below. The type of management units—and therefore the uses—allowed in an estuary depend on its classification. Natural estuaries may only include natural management units. Conservation estuaries may include both conservation and natural management units, while development estuaries may include all three types of management units.

Goal 16 requires that estuary plans list the uses permitted within each management unit. The Goal also prescribes the overall purpose of each type of management unit and limits the types of uses that are or can be allowed. The management objective provides an overall standard for planning and for review of proposed uses. Permissible uses are uses which are generally considered consistent with achieving the state management objective. Consequently, permissible uses are routinely approved, provided they meet other standards in the Goal for impact minimization. Resource capability uses may or may not be consistent with the management objective, depending on the size and location of the use and the resources affected.

Management unit boundaries are determined by the types of resources present in the estuary and the extent of past alterations. Local planners relied on published inventories and other state and federal agency studies and, when necessary, also made onsite visits to determine the precise extent of various types of habitat. Most planners based their judgements on the Oregon Department of Fish and Wildlife's estuary habitat maps. (ODFW's classification system is described in Chapter 3; habitat maps are reproduced in Chapter 5.)

Decisions about what constitutes a "major tract", "less biological significance" or "minimal biological significance" are judgments made by local governments which must be based on several factors. The major factor is the relative abundance of the particular habitat in the estuary. Existing development and past alterations were also important factors if they affect habitat quality. In either case, judgments about habitat significance were usually made with the assistance of state and federal resource agencies. Disagreements were resolved by LCDC at the time of plan acknowledgment. Changes after acknowledgment are subject to review against both the Goals and the policies in the adopted estuary plan.

NATURAL MANAGEMENT UNITS

Areas Included: Major tracts of salt marsh, tideflats, and seagrass and algae beds.

Management Objective: To assure the protection of significant fish and wildlife habitats, continued biological productivity in the estuary, and scientific research and educational needs. These areas are to be managed to preserve the natural resources in recognition of dynamic natural, geological and evolutionary processes.

Permissible Uses:

a. Undeveloped low-intensity, water-dependent recreation;
b. Research and educational observation;
c. Navigation aids, such as beacons and buoys;
d. Protection of habitat, nutrient, fish, wildlife and aesthetic resources;
e. Passive restoration measures;
f. Dredging necessary for on-site maintenance of existing functional tidegates and associated drainage channels, and bridge crossing support structures;
g. Riprap for protection of uses existing as of October 7, 1977; unique natural resources; historical and archeological values; and public facilities; and
h. Bridge crossings.

Resource Capability Uses:

a. Aquaculture which does not involve dredge or fill or other estuarine alteration, other than incidental dredging for harvest of benthic species or removable in-water structures such as stakes or racks;
b. Communication facilities;
c. Active restoration of fish and wildlife habitat or water quality and estuarine enhancement;
d. Boat ramps for public use, where no dredging, fill, or navigational access is needed;
e. Pipelines, cables and utility crossings, including incidental dredging necessary for their installation;
f. Installation of tidegates in existing functional dikes;
g. Temporary alterations; and
h. Bridge crossing support structures and dredging necessary for their installation.

CONSERVATION MANAGEMENT UNITS

Areas Included: Tracts of significant habitat smaller or of less biological importance than those included in natural management units, and recreational or commercial oyster and clam beds not included in natural management units. Areas that are partially altered and adjacent to existing development of moderate intensity which do not possess the resource characteristics of natural or development units are also included in this classification.

Management Objective: To provide for long-term uses of renewable resources which do not require major alterations to the estuary, except for the purpose of restoration. These areas are to be managed to conserve natural resources and benefits.

Permissible Uses:

a. Permitted and "conditional" uses allowed in natural management units (except temporary alterations).

Resource Capability Uses:

a. High-intensity water-dependent recreation, including boat ramps, marinas and new dredging for boat ramps and marinas;
b. Minor navigational improvements;
c. Mining and mineral extraction, including dredging necessary for mineral extraction;
d. Other water-dependent uses requiring occupation of water surface area by means other than dredge or fill;
e. Aquaculture requiring dredge or fill or other alteration of the estuary;
f. Active restoration for purposes other than protection of habitat, nutrient, fish, wildlife and aesthetic resources; and
g. Temporary alterations.

DEVELOPMENT MANAGEMENT UNIT REQUIREMENTS

Areas Included: Deep-water areas adjacent or in proximity to the shoreline, navigation channels, subtidal areas for in-water disposal of dredged material, and areas of minimal biological significance needed for uses requiring alteration of the estuary.

Management Objective: To provide for navigation and public, commercial, and industrial water-dependent uses consistent with the level of alteration allowed by the overall estuary classification.

Permissible Uses:

a. Dredge or fill, as allowed elsewhere in the goal;
b. Navigation and water-dependent commercial enterprises and activities;
c. Water transport channels where dredging may be necessary;
d. Flow-lane disposal of dredged material, monitored to assure that estuarine sedimentation is consistent with the resource capabilities and purposes of affected natural and conservation management units;
e. Water storage areas where needed for products used in or resulting from industry, commerce, and recreation;
f. Marinas;
g. Aquaculture;
h. Extraction of aggregate resources; and
i. Restoration.

Resource Capability Uses:

a. Water-related and nondependent, nonrelated uses not requiring dredge or fill;
b. Mining or mineral extraction; and
c. Other uses and activities allowed in natural and conservation management units.

Designation of Development Management Units

The effect of Goal 16 is that most estuarine areas are designated as natural or conservation management units. Usually, the only areas that automatically qualify as development management units are existing developed areas and authorized navigation channels. In order to designate new areas for development, plans must provide additional justification through a "goal exception." A goal exception is required whenever a use is proposed that is not permitted by the applicable Statewide Planning Goal.

Exceptions are required in order to allow development in areas that qualify as natural or conservation management units, because Goal 16 does not permit major alterations or intense development in such areas. The standards for preparation and approval of goal exceptions have been carefully refined through court cases, statutory amendments, and administrative rules.[4] To justify a goal exception, facts and reasons must be set forth which meet the following four tests:

1. Reasons justify why the state policy embodied in the applicable Goals should not apply;
2. Areas which do not require a new exception cannot reasonably accommodate the use;
3. The long-term environmental, economic, social and energy consequences resulting from the use at the proposed site with measures designed to reduce adverse impacts are not significantly more adverse than would typically result from the same proposal being located in areas requiring a goal exception other than the proposed site; and
4. The proposed uses are compatible with other adjacent uses or will be so rendered through measures designed to reduce adverse impacts.

LCDC has adopted an administrative rule (OAR 660-04-022(5)) which sets forth reasons that can be used to justify exceptions to Goal 16's requirements for natural and conservation units to designate new areas for water-dependent development:

To allow water-dependent industrial, commercial, or recreational uses in development and conservation estuaries which require an exception, an economic analysis must show that there is a reasonable probability that the proposed use will locate in the planning area during the planning period, considering the following:

a. Factors of Goal 9 [Economy of the State] or, for recreational uses, the factors of Goal 8 [Recreational Needs];
b. The generally predicted level of market demand for the proposed use;
c. The siting and operational requirements of the proposed use including land needs, and as applicable, moorage, water frontage, draft or similar requirements; and
d. Whether the site and surrounding area are able to provide for the siting and operational requirements of the proposed use;
e. The economic analysis must be based on the Goal 9 element of the county comprehensive plan and consider and respond to all economic information available or supplied to the jurisdiction. The scope of this analysis will depend on the type of use proposed, the regional extent of the market and the ability of other areas to provide for the proposed use.

To meet the exceptions requirements, local governments prepared detailed analyses of their economies to assess the need for water-dependent uses. Most relied on statewide and national economic forecasts of demand for various types of port facilities, and then assessed the likelihood that such facilities would locate in their areas. Based on these analyses, local governments identified specific sites with potential for future development.

Exceptions are adopted as part of the comprehensive plan. Exceptions included in acknowledged plans received detailed review by resource agencies and LCDC to assure that they were properly justified. After acknowledgment, new goal exceptions must be reviewed and approved through the plan amendment notice and review process or at the time of periodic review.

[4] The requirements for goal exceptions are set forth in OAR 660-04. Reasons which can justify goal exceptions are set forth in OAR 660-04-022.

PROJECT REVIEW

In addition to planning requirements, Goal 16 sets a number of requirements that apply to review of specific development projects. These tests are designed to assure that proposed uses are compatible with other uses of the estuary, and that possible harmful effects are kept to a minimum. Up to four different requirements affect how local governments and state agencies review specific proposals for estuarine development. These include the resource capabilities test; the dredge, fill and other alterations test; the impact assessment requirement; and the mitigation requirement.

Most of these requirements are applied by local governments through review of permits for specific projects. However, some plans have addressed project review requirements in the comprehensive plan. In a few cases, plans have deferred these requirements to resource agencies to apply through agency permit reviews. It is necessary to review each local plan to determine how these requirements are implemented.

THE RESOURCE CAPABILITIES TEST

The management unit charts on the previous page list uses as either "permissible uses" or "resource capability uses." Permissible uses are considered to be consistent with the purposes of the management unit and are, therefore, only subject to the dredge/fill test. Uses listed as resource capability uses, however, may or may not be "consistent with the resource capabilities of the area and the purposes of the management unit."

Through the resource capabilities test, local governments consider the effects of each conditional use on other uses, the resources in the area, and the management objective for the unit. Based on these considerations, a conditional use will either be allowed, not allowed, or limited in such a way that it is consistent with the uses, resources, and management objectives for the area. The resource capabilities test can be applied either during plan development or through the review of a particular project.

Whether or not a use is consistent with these values and objectives will depend on a site's ability to tolerate a particular type or level of use, considering:

- the resources present at the site;
- other uses in the area; and
- the size, scale or location of the proposed use.

Local governments weigh these factors to determine the appropriateness of a proposed use. A use or activity is considered appropriate when:

> **Either** the impacts of the use on estuarine species, habitats, biological productivity and water quality are not significant **or** the resources of the area are able to assimilate the use and activity and their effects, and continue to function in a manner which protects or conserves[5] important natural resource values or uses.

Important natural resource values in natural management units are significant wildlife habitats, natural biological productivity, and values for scientific research and education. Important resource values and uses in conservation management units are renewable resources, natural biological productivity, recreational and aesthetic values, and aquaculture.

Resource Agency Review

Resource agencies play an important role in making resource capability decisions. The test requires local governments to gather information about the impacts of proposed uses — information that is often available from state and federal resource agencies. The test also requires that a judgment be made about whether or not the use is appropriate. Such judgments also involve the expertise of resource agency personnel.

In several cases, local plans defer resource capability decisions to state agencies. For example, Tillamook County leaves decisions on the appropriateness of oyster culture operations to the Department of Fish and Wildlife; the appropriateness of log storage in Coos Bay is decided by the Department of Environmental Quality; and Douglas County leaves the review of dredge and fill activities in the Umpqua River to the Division of State Lands.

An Example of a Resource Capabilities Test

Consider a marina development proposed in a conservation management unit. Marinas are allowed in conservation management units if they have only insignificant impacts or where they are, in essence, compatible with other values and uses in the management unit.

Expansion of an existing marina in an area with minimal resource values by the addition of a few floats and pilings, and which involves no dredging, would probably be considered to have insignificant impacts. A proposal for a new, large marina which involves dredging, or which would impact existing uses or values, must be evaluated to determine whether or not it fits the resource values and uses in the area. If the proposed marina would interfere with an existing use or resource value, it would probably be inconsistent with the resource capabilities of the area. The local government might also determine that by reducing its size or changing its location or configuration, the marina could be made compatible with adjoining uses. If this is the case, the marina could be approved with appropriate limiting conditions.

[5] Activities in natural management units must preserve resource values. Activities in conservation management units are required to conserve the same values. Protect is defined as: "to save or shield from loss, destruction or injury or for future intended use." Conserve is defined as: "to manage in a manner which avoids wasteful or destructive uses and which provides for future availability."

DREDGE, FILL AND OTHER ALTERATIONS TEST

Estuaries are sensitive ecosystems. Even slight changes such as the placement of a few cubic yards of fill, or a small amount of dredging, can destroy habitat or damage a population. Because estuarine resources are so sensitive, the goal requires careful review of any proposed dredging, filling or other alteration to assure that the activity is needed and that harmful effects are kept to a minimum.The goal sets strict tests for allowing dredging or filling in the estuary. Dredging or filling is only allowed:

a. If required for navigation or other water-dependent uses that require an estuarine location, or if specifically allowed by the applicable management unit requirements of Goal 16;
b. If a need (i.e., a substantial public benefit) is demonstrated and the use or alteration does not unreasonably interfere with public trust rights;
c. If no feasible alternative upland locations exist; and
d. If adverse impacts are minimized.

Other activities which could affect the estuary's physical processes or biological resources are also subject to review. These "other alterations" include but are not limited to: inwater structures, riprap, log storage, application of pesticides and herbicides, water intake or withdrawal, wastewater discharge, and flow-lane disposal of dredged material. Other alterations which do not involve dredge or fill are allowed if the requirements in b, c and d are met.

These requirements may be applied at the time of plan development for activities that are identified in and anticipated by the plan. Otherwise, they must be addressed at the time of permit review.

IMPACT ASSESSMENT

The resource capabilities test and the dredge/fill and other alterations test require that information about estuarine impacts be gathered and analyzed to support individual decisions. An impact assessment is the mechanism for gathering and presenting such information.

An impact assessment must be prepared for any activity which would potentially alter the estuarine ecosystem. Such activities include dredging, fill, in-water structures, riprap, log storage, application of pesticides and herbicides, water intake or withdrawal, wastewater discharge, flowlane disposal of dredged material, and any other activity which could affect the estuary's physical processes or biological resources.

Impact assessments must include information on the following:

a. The type and extent of alterations expected;
b. The type of resource(s) affected;
c. The expected extent of impacts of the proposed alteration on water quality and other physical characteristics of the estuary, living resources, recreation and aesthetic use, navigation and other existing and potential uses of the estuary; and
d. The methods which could be employed to avoid or minimize adverse impacts.

The detail of impact assessments varies depending upon the nature of the proposed activity and the resources that are affected. Larger projects that involve extensive dredging or filling and that are proposed for sensitive areas will require more detailed reports than projects which involve only minor alterations. An assessment is adequate if it enables reviewers to gain a clear understanding of the impacts to be expected. An assessment need not be lengthy or complex so long as this standard is met. Impact assessments are generally prepared when a permit is requested, unless one has been made in the plan.

MITIGATION

The effects of development projects which involve fill or dredging in intertidal areas must be offset by the creation, restoration or enhancement of another part of the estuary. By replacing lost values, mitigation ensures that the integrity of the estuarine ecosystem is maintained. This requirement is also contained in the Removal-Fill Law implemented through administrative rules adopted by the Division of State Lands (DSL) (OAR 141-85-240). DSL decides how much mitigation is required for individual projects through its review of removal-fill permits.

Mitigation is not considered a reason or justification for allowing estuarine dredging or filling. Instead, the mitigation requirement is applied after a project meets the criteria for granting permits specified in the Removal-Fill Law. This includes a requirement that impacts of proposed fill or dredging must be minimized.

Goal 16 requires that plans designate and protect appropriate sites to mitigate or restore estuarine values that have been lost or damaged by past development. The number and type of sites designated in each estuary varies. Where it is possible to do so, plans must designate and protect sites which generally correspond to the type and size of intertidal areas proposed for dredging or filling.

OTHER STATE AND FEDERAL REGULATIONS

A number of state and federal laws regulate how estuaries may be used. Most of these laws require that a permit be obtained for any activity which would alter the estuary. Estuary plans provide a framework for permit decisions.

The state of Oregon's authority to regulate estuarine alterations is based on the state's ownership of the beds and banks of most waters in the state and the state's public trust responsibility to manage public resources—including water, fish and wildlife—in the public interest. Federal laws are based on the national government's general mandate to protect public health and welfare and its specific authority over all navigable waters. The authorities delegated to various state and federal agencies are outlined below.

Division of State Lands (DSL)

DSL administers the state's ownership interest in beds and banks of estuaries and issues permits for dredging and filling under the Removal-Fill Law. The Removal-Fill Law sets strict standards for resource protection and requires that DSL solicit comments from a variety of agencies and the public to assure that all public concerns are fully considered. DSL also administers the requirement for mitigation of dredge or fill in intertidal areas.

Department of Fish and Wildlife (ODFW)

ODFW manages fish and wildlife populations in the state and directly regulates fishing and hunting. Since protection of habitat is also critical to management, ODFW advises other agencies and local governments on proper measures to protect and enhance habitat. ODFW biologists and researchers play a critical role in advising DSL and other agencies considering actions which would affect an estuary. ODFW also regulates private fish hatcheries, and is responsible for state-operated fish hatcheries.

Department of Environmental Quality (DEQ)

The Department of Environmental Quality (DEQ) is responsible for maintaining water quality in state waters. DEQ regulates most activities which would affect water quality, including construction of new sewage treatment plants. DEQ is also responsible for regulating nonpoint source pollution (such as agricultural runoff) and hazardous waste disposal.

Other State Agencies

The Department of Agriculture issues and monitors leases for oyster rearing and other in-water aquaculture operations. The State Health Division monitors estuarine water quality to assure that oysters are safe to eat.

US Army Corps of Engineers (Corps)

The Corps is responsible for building and maintaining the jetties and ship channels in most development estuaries. The Corps also administers federal laws which require permits for estuarine alterations. These include Section 10 of the Rivers and Harbors Act, which gives the Corps jurisdiction over all navigable waters, and Section 404 of the Clean Water Act, which extends this jurisdiction to all waters of the United States. (This adds tributary streams and wetlands to Corps jurisdiction.) These laws set up standards and procedures similar to those in the Removal-Fill Law for protecting estuarine resources. The Corps is required to consult other agencies and the public before issuing permits.

U.S. Fish and Wildlife Service (USFWS)

USFWS is ODFW's federal counterpart. Under the Fish and Wildlife Coordination Act, USFWS has principal responsibility for advising the Corps about the effects of proposed permits on fish and wildlife. USFWS also advises the Corps on ways that harmful effects of proposed development projects can be avoided or mitigated.

National Marine Fisheries Service (NMFS)

NMFS is responsible for management of ocean fisheries and anadromous fish, such as salmon and steelhead. Since many marine fish are dependent on estuaries at some point in their life cycle, NMFS also advises the Corps about potential impacts of estuarine alterations.

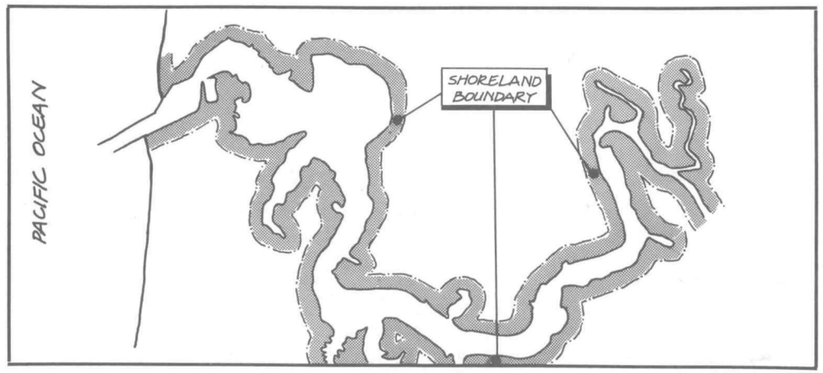
Other Federal Agencies

The Environmental Protection Agency (EPA) is responsible for implementation of the Clean Water Act and shares its authority under Section 404 with the Corps. EPA has other general authority for water quality maintenance similar to DEQ. The Coast Guard regulates construction of bridges and other structures that might interfere with navigation.

SHORELAND PLANNING REQUIREMENTS

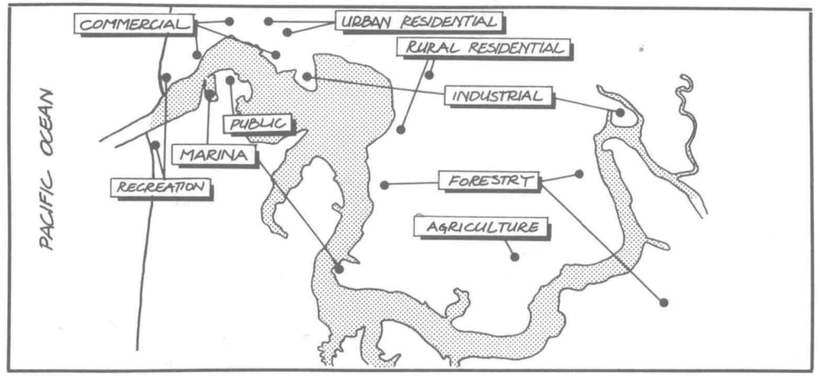
Lands bordering estuaries support a variety of uses which are important for both estuarine protection and development. Shorelands provide special habitat areas for wildlife and buffer the estuary from upland land uses. At the same time, proximity to the estuary is essential to some types of development and attractive to most others. As a result, shorelands are ecologically important and sensitive areas, yet subject to extreme development pressures.

Goal 17 (Coastal Shorelands) sets out planning and management requirements for lands bordering estuaries, as well as lands bordering coastal lakes and the ocean shore. Shorelands are also covered by the other Statewide Planning Goals. As a result, a wide variety of planning requirements apply to estuary shorelands.



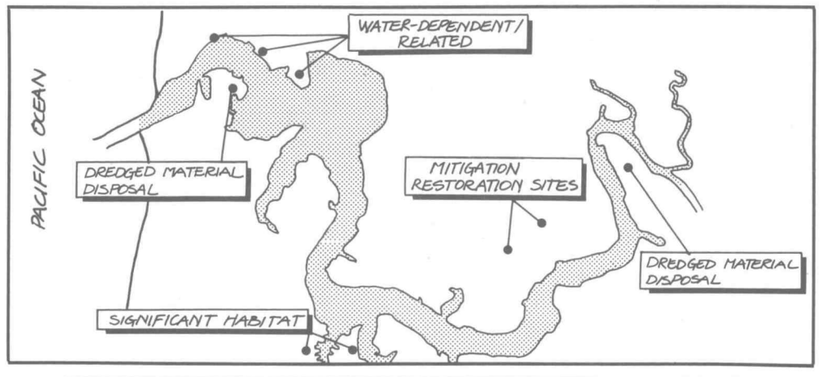
Shorelands Boundary

The first step in applying Goal 17's requirements is defining the area that is considered "coastal shorelands." The landward limit of the coastal shorelands boundary is set by inventorying lands within 1000 feet of the estuary shoreline. Resources important to the estuary within this "planning area" must be included within the coastal shorelands boundary.



Shoreland Uses

Coastal shorelands support a wide variety of uses. Since Goal 17 works in combination with other Statewide Planning Goals, an equally wide variety of plan and zone designations regulate uses in coastal shoreland areas. These cover the full range of uses, from urban and rural uses to natural area preservation.



Special Shoreland Sites

A few shoreland sites have special values which require additional protection above and beyond regular plan and zone designations. These include special zoning for sites which are needed for economic development, like sites for water-dependent development, as well as areas needed for estuarine protection and enhancement, like significant habitat and mitigation sites. Plans must identify and provide special protection for these sites.

COASTAL SHORELANDS BOUNDARY

Goal 17 requires that cities and counties establish a "coastal shoreland boundary" on lands bordering coastal waters, including estuaries. Lands within the boundary are to be planned and managed to recognize their relationship with, and importance to, coastal waters. The coastal shorelands boundary around estuaries must be a minimum of fifty feet upland of the estuary shoreline. The shoreline, or the upper limit of the estuary, is either the line of nonaquatic vegetation or mean higher high water, whichever is higher. The boundary must extend upland to include the following areas and resources:

- Areas subject to ocean flooding;
- Areas of geologic instability;
- Riparian vegetation;
- Significant shoreland and wetland biological habitats;
- Areas needed for water-dependent and water-related uses, including dredged material disposal and mitigation sites; and
- Areas of exceptional aesthetic or scenic quality.

The shorelands boundaries shown in the Estuary Plan Book reflect the boundaries in acknowledged comprehensive plans. In 1984, LCDC amended Goal 17 to allow cities and counties to narrow the shorelands boundary to exclude lands subject to estuary or riverine flooding. The effect of this amendment will be to exclude some floodplain areas, mostly agricultural lands, from the shorelands boundary. Cities and counties will be revising the shorelands boundaries at the time of periodic plan review.

COASTAL SHORELAND USES

All kinds of land uses occur on estuarine shorelands. Consequently, shorelands are covered by virtually every different kind of plan and zone designation used by coastal cities and counties. Although Goal 17 sets additional requirements for coastal shorelands, it is important to understand the limitations established by requirements of other Statewide Planning Goals which also apply within the shorelands boundary.

It is important to note that the zoning districts vary from jurisdiction to jurisdiction. The list of permitted and conditional uses presented here is generally representative of the uses typically permitted by plans and the applicable Statewide Planning Goals. Individual city and county comprehensive plans should be consulted to determine the actual list of permitted and conditional uses for each local zoning district.

The one to three letter symbols in parentheses (e.g., FU, F, RR, etc.) correspond to a generic zoning classification that is used to provide coastwide comparisons in Chapter Four. The classification matrix itself is included in the Appendix.

MIXED AGRICULTURAL AND FOREST LANDS (FF) Tracts of land that meet the criteria listed above for agricultural or forest land but are presently in smaller ownerships.

Minimum Lot Size: Usually 20 acres.

Permitted Uses:

Same or similar to uses listed as permitted in agricultural and forest lands.

Uses Subject to Review:

Same or similar to uses listed as subject to review in agricultural and forest lands

Permitted Uses:

Same or similar to uses listed as permitted in agricultural and forest lands.

Uses Subject to Review:

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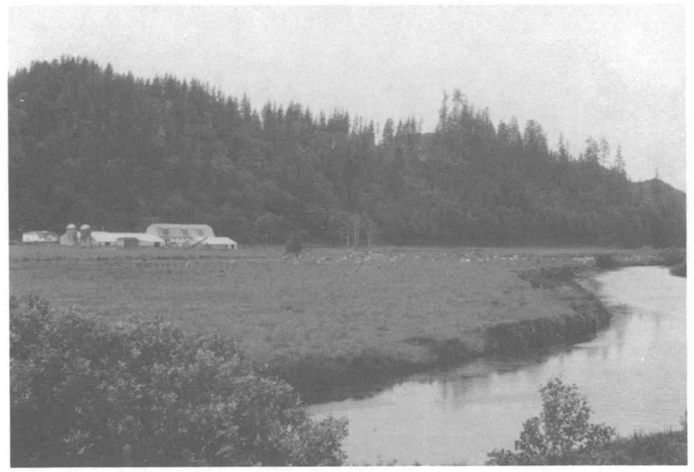


AGRICULTURAL LANDS (FU) Includes lands within SCS soil Classes I-IV and other lands used for farming or necessary for farm operations.

Minimum Lot Size: 40 acres is the most common minimum lot size used by coastal counties. In some situations, counties have applied larger or smaller minimum lot sizes to fit the pattern of agriculture in a particular area of the county. Counties may choose to specify no minimum lot size, but rather review proposed partitions on the basis that the resulting parcels will support commercial farm use.

Permitted Uses:

1. Farm use;
2. Propagation or harvest of forest products; and
3. Nonresidential buildings customarily provided in conjunction with farm use.

Uses Subject to Review:

1. Boarding horses for profit;
2. TV, radio and microwave transmission towers;
3. Utility facilities;
4. Exploration, mining, and processing of aggregate and other mineral or subsurface resources;
5. Personal use airports;
6. Home occupations;
7. Primary processing of forest products;
8. Aquaculture;
9. Private hunting and fishing preserves;
10. Schools;
11. Churches;
12. Golf courses;
13. Nonprofit government centers;
14. Nonfarm dwellings; and
15. Campgrounds.

FOREST LANDS (F): Includes existing and potential forest lands that are suitable for commercial forest uses, and other forested lands needed for watershed protection, wildlife and fisheries habitat, and recreation. (Lands suitable for commercial forest uses include all lands capable of growing 50 cubic feet or more per acre per year.)

Minimum Lot Size: 40 acres is the typical minimum lot size. A number of counties have 80 acre minimum lot sizes. The Goal also allows counties to choose not to specify a minimum lot size, in which case they review requests for divisions on a case-by-case basis to determine whether or not the lot size is sufficient to support commercial forest use.

Permitted Uses:

1. Commercial growing and harvesting of forest tree species;
2. Farm use;
3. Other activities regulated by the Forest Practices Act;
4. Uses accessory to commercial forest uses, including equipment storage and maintenance facilities, log sorting yards, mining for forest operations, helipads, impoundments for firefighting, and logging roads;
5. Temporary, portable facilities for the primary processing of forest products;
6. Exploration for geothermal, gas, and oil resources; and
7. Mining for commercial farm operations.

Uses Subject to Review:

1. Primary processing of forest products (limited to 10 acres in size);
2. Communication facilities and transmission towers;
3. Low level power distribution lines with rights-of-way 50 feet or less in width;
4. Small-scale reservoirs (limited to 10 acres in size);
5. Aquaculture;
6. Campgrounds;
7. Aids to navigation;
8. Logging equipment, repair and storage;
9. Log scaling and weigh stations;
10. Mining and processing of geothermal, gas, and oil resources;
11. Exploration, mining, and processing of aggregate and mineral resources;
12. Solid waste disposal sites (limited to 10 acres in size);
13. Commercial generation facilities (limited to 10 acres in size);
14. Temporary asphalt and concrete batch plants as accessory uses of highway projects;
15. Division of forest land for the purpose of creating a life estate where a preexisting dwelling is involved; and
16. Home occupations pursuant to ORS 215.448.

RURAL RESIDENTIAL LANDS (RR): Lands outside of urban growth boundaries that are either physically developed with homes or are committed to nonresource use by the surrounding pattern of nonresource related development (i.e., the pattern of existing development (homes, sewer, water, roads) makes it impractical to manage the land for farm or forest use).

Minimum Lot Size: Typically one, two, or five acres. Minimum lot sizes usually reflect the existing pattern of development in the area and the extent of available public facilities, especially public sewer and water systems. Areas with five acre minimum lot sizes typically provide their own water and have onsite sewage disposal systems, though some areas are served by community water systems. Lands developed and zoned for development between one and five acres typically are served by community water systems. Areas developed and zoned for one acre lots typically are served by both community sewer and water systems.

Permitted Uses:

1. Single family dwelling;
2. Home occupation;
3. Farm use;
4. Forest use; and
5. Public or private open space.

Uses Subject to Review:

1. Other uses allowed in farm or forest zones;
2. Fire stations; and
3. Bed and breakfast.

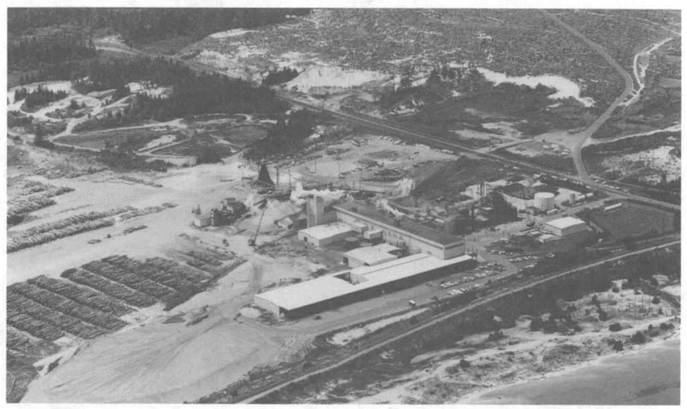
URBAN RESIDENTIAL (UR): Lands within UGB's that are presently developed at or designated for higher density residential development.

Minimum Lot Sizes: Typically range from 5,000 to 20,000 square feet.

Typical Use Provisions: Most cities have two to four different residential zones to provide for different densities and types of housing. These typically include an R-1 zone, which provides for single family dwellings on larger lots (10,000 square feet or more); an R-2 zone, which allows duplexes or manufactured housing, and which may have a smaller minimum lot size (typically 7,500 square feet); and an R-3 zone, which allows apartment buildings and/or mobile homes. An R-4 zone would usually allow higher density multifamily housing and some commercial uses such as motels or convenience stores.

COMMERCIAL (C): Commercially-zoned lands are typically located near high surface traffic areas with residential areas nearby. Minimum lot sizes vary according to the size of population being served. Cities usually have two or three zones to provide for different types of commercial uses.

Minimum Lot Sizes: Minimum lot sizes vary from zone to zone and jurisdiction to jurisdiction.



INDUSTRIAL (I): Industrially-zoned lands are usually located near sources of raw materials, power or transportation facilities, or established markets.

Minimum Lot Size: Most local governments do not specify minimum lot sizes in industrial zones.

Typical Use Provisions: Smaller cities generally have one industrial zone designation which allows a wide range of industrial uses. Larger cities have two or three industrial zones. Light Industrial zones typically allow industrial uses that do not cause off-site effects like noise, dust, vibration or smoke. Some commercial uses like warehousing are often allowed in Light Industrial zones. General Industrial zones allow all but the most intense industrial uses, such as large log, lumber, and pulp mills, which are allowed in Heavy Industrial zones.

PUBLIC FACILITIES (PUB): Publicly-owned lands or facilities except for state and federal forest lands. This includes sewer and water treatment facilities, schools, and may also include state parks.

Minimum Lot Size: There are typically no lot size requirements.

Typical Use Provisions: Public land and public facility zones generally only allow for the establishment or expansion of the types of public facilities described above. The State Parks and Recreation Division has developed State Park Master plans which detail the permitted uses of land within individual parks.

SPECIAL SHORELAND SITES

Although all shorelands are important, a few shoreland sites are especially important, either because of their proximity to the estuary or because they play a critical role in protection and proper development of estuarine resources. These include sites for estuarine mitigation and restoration, sites for disposal of dredged material, sites for water-dependent development, significant habitats, and riparian vegetation. Goal 17 recognizes the importance of these areas through additional requirements for protection of shoreland sites with special values.

Protecting Special Shoreland Sites

Protection of special shoreland sites is accomplished in a variety of ways, including special zoning districts, overlay zones, and supplementary requirements. Each of these zoning techniques either limit or prohibit uses which would prevent or interfere with use of the site for its intended purpose.

Special zoning districts are regular zones designed to provide for a particular type of use, like water-dependent industrial development. Permitted and conditional uses are listed in the zone, along with procedures and standards for approval of development.

A second approach is the use of an **overlay zone.** An overlay zone is a special zone that is applied 'over', or in addition to, a base zone. An overlay zone usually places additional restrictions on uses that are otherwise permitted by the underlying or parent zone. This technique is typically used to protect DMD and mitigation sites.

A third protection technique is the adoption of supplementary regulations. **Supplementary regulations** are special standards in a regular zoning district which apply only to certain resources or areas within the district. The standards usually include either a definition of the resource to be protected or a reference to a map or inventory of the protected resource. Supplementary regulations are used when a resource occurs in a variety of different zoning districts and the jurisdiction chooses not to use an overlay zone. For example, riparian vegetation is usually protected through supplementary regulations in most zoning ordinances.

DREDGED MATERIAL DISPOSAL

Historically, dumping of material dredged from navigation channels and harbors has been a major source of damage to estuarine resources. Estuary plans will avoid or minimize further losses by identifying appropriate locations and techniques for disposing of dredged material.

Plans for each estuary where dredging is proposed include a dredged material disposal (DMD) plan. The DMD plan includes several components:

1. An estimate of the amount and location of dredging likely to occur over the next 20 years. This estimate is based on the development designations approved in the plan and needs for channel maintenance or deepening in approved navigation channels.
2. An analysis of potential sites and techniques for disposal of dredged material. The particular types of sites and methods for dredged material disposal vary, depending upon the physical setting of the estuary, the availability and cost of upland disposal sites, and the amount of material that needs to be dredged and disposed of.
3. Designation and protection of sufficient appropriate sites for future use for dredged material disposal.

Estuary plans contain a variety of approaches to protect designated dredged material disposal (DMD) sites. Despite differences, most protection measures preclude land uses on the site that would prevent its use for dredged material disposal. Temporary uses and other uses which do not involve extensive improvements, such as parking, storage, or farming, are allowed. Uses which would involve more extensive capital improvements or the extension of utilities are restricted or prohibited. Protective zones typically contain provisions which remove protective zoning once the site has been fully used for disposal. Some plans and ordinances allow protective zoning to be removed if the site is replaced by an equally suitable site.

Some jurisdictions have inventoried DMD sites that do not merit the same protection as priority sites. Called "Reserve" or "Inventory" sites, they are generally not restricted as to permitted uses. Protection for these secondary DMD sites usually only involves special notice and review requirements for proposed land uses. Such provisions delay approval for up to 60 to 90 days to allow interested parties or agencies to negotiate for use of the site for dredge spoils before the land use is officially approved.

Types of Dredged Material Disposal Sites

Uplands *— These are shoreland sites that are either vacant or have only minimal development. Often marginal agricultural lands are designated for dredged material disposal. In non-agricultural areas, dredged material disposal can serve to make a site more developable. In EFU-zoned areas, DMD plans typically require that the area be restored to agricultural use once disposal is complete.*

Flow-lane disposal *— Flow-lane disposal involves the dumping of dredged material back into the estuary to allow river currents and tidal action to push the added material out of the estuary. Designation of flow-lane sites requires careful study of estuarine hydraulics to assure that dumped material is adequately flushed out of the estuary and does not pile up and smother productive subtidal or intertidal areas.*

Development Sites *— Dredged material is often used as a source of fill material for approved projects in development management units. It is difficult to estimate the capacity of such sites because the amount of fill allowed will usually be determined in the permit process, when the details of the particular project are known.*

Ocean Disposal *— Ocean disposal of dredged material is regulated by the Environmental Protection Agency (EPA). EPA-approved sites are designated outside a number of the state's important ports, including the Columbia River, Tillamook Bay, Depoe Bay, Yaquina Bay, and Coos Bay. Ocean disposal involves transporting material offshore on a barge or in a hopper dredge to be dumped in open ocean waters.*

MITIGATION AND RESTORATION SITES

One of the major objectives of estuary planning is to identify ways to repair the damage done to estuaries by past alterations. Mitigation and restoration planning identify shoreland sites that can be added to the estuary to increase estuarine values or offset effects of new development. The number and type of mitigation sites designated in plans must generally correspond to areas designated for development in the plan which would require mitigation.

Mitigation and restoration involve the same types of activities but are done for slightly different reasons. Both involve actions which either restore an area to the estuary, create a new estuarine area, or enhance an existing estuarine area. However, mitigation is done to compensate for damage done by new development, while restoration is done to offset historical losses and reestablish past values.

Mitigation is required whenever intertidal dredge or fill is permitted. The type and amount of mitigation generally must replace the habitats and values lost at the development site. There is no specific Goal requirement to carry out restoration. Consequently, restoration projects are usually undertaken by resource or land management agencies to provide for overall enhancement of estuarine values. Several restoration projects have been undertaken in the Salmon River Estuary by the US Forest Service.

It is important to note that the term "mitigation" has different meanings under state and federal law. In Oregon, mitigation only includes compensating for unavoidable losses through habitat creation, restoration, or enhancement. Federal agencies define mitigation much more broadly. They consider any method of reducing impacts of a proposed development project to be mitigation. Mitigation measures under federal law include redesign or relocation, as well as "compensation" for unavoidable habitat losses through creation or restoration of new areas. In terms of the federal definition of mitigation, Oregon's mitigation requirement is considered a compensation requirement.

Mitigation and Restoration Actions

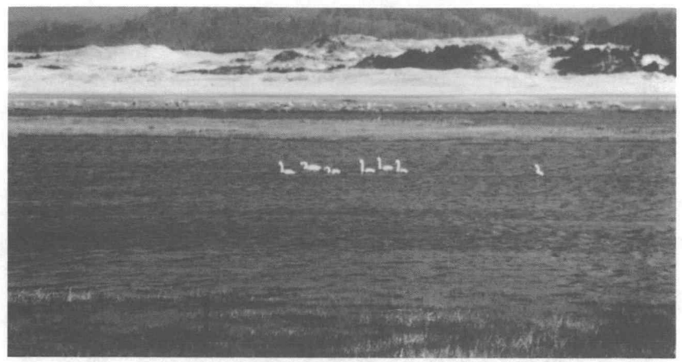
Types of Action	Definition	Typical Action
Creation	Addition of a new area to the estuary.	Scalping of a shoreland down to tidal elevation to create a marsh or tidal flat.
Restoration	Returning an area to estuary that was formerly part of the estuary.	Removing or breaching a dike to allow tidal action to return: usually to create a marsh.
Enhancement	Improving the quality of an area that is currently part of the estuary.	Widening or replacing a culvert to increase flushing to improve water quality.

WATER-DEPENDENT DEVELOPMENT SITES

A major purpose of estuary planning is to provide appropriate locations for new development. This is especially true for certain uses, like marinas and boat building and shipping facilities, that are considered water-dependent because they require access to the water in order to function. In the past, new lands for development have been created by dredging and filling productive estuarine areas. Goal 17 seeks to minimize the need for additional dredging and filling by making sure that suitable shorelands are reserved for water-dependent uses.

Goal 17 requires estuary plans to identify and protect shoreland sites that are especially suited for water-dependent uses (ESWD). To qualify as ESWD, a site must have deep water close to shore—to minimize need for dredging—and have adequate upland and supporting transportation connections to support expected uses. Most local zoning ordinances contain at least one zone designed to accommodate water-dependent uses. Although most ESWD zones contain a list of uses that qualify as water-dependent, many local governments choose to determine water-dependency on a case-by-case basis through a conditional use review. Through the conditional use process, the local government can examine the nature of a particular operation and determine whether or not it is water-dependent.

Water-related and non-dependent, non-related uses can be permitted in ESWD zones, if they are in conjunction with and incidental to a water-dependent use, or if they do not preclude subsequent use of the site for water-dependent development. Generally, to be in conjunction with and incidental to a water-dependent use, a non-water-dependent use must be constructed at the same time or after the water-dependent use, and be carried out together with the water-dependent use. Incidental means the non-water-dependent use is small in relation to the water-dependent operation, and does not interfere with the water-dependent use. Examples of uses which are in conjunction with and incidental to a water-dependent use include a restaurant on the second floor of seafood processing plant, or a retail sales room as part of a seafood processing plant.



SIGNIFICANT SHORELAND HABITATS

Significant shoreland habitats are areas which are especially important because of their proximity to the estuary. For example, bald eagles which feed in the estuary often depend on large trees and snags in nearby shorelands for perches and nesting sites.

This category of shoreland resources also includes "major marshes". These are wetlands which are close to the estuary but are not subject to tidal influence. Not all habitat or marshes within the shoreland boundary are significant or major. To qualify as "major" or "significant" a marsh or habitat must be large relative to other similar areas around the estuary, or possess some unique or special value which merits added special protection. For example, habitats of threatened or endangered species typically qualify because of the importance of protecting these species.

Significant shoreland habitats and major marshes are designated in the planning process. Uses which would conflict with protection of wetland or habitat values are not allowed. Other uses are allowed only if it is demonstrated that they will not conflict with protection of natural values.

RIPARIAN VEGETATION

Riparian vegetation is a dense narrow band of trees and shrubs at the edge of a water body. Riparian vegetation buffers estuarine waters from adjacent land uses and is an important wildlife habitat. Riparian vegetation is probably most important because it is a concentration point for a great variety of wildlife, providing food and cover near water. It also protects the quality and quantity of water for wildlife, and often is an important shelter and food source for fish. Riparian vegetation also permits greater use of open agricultural lands as wildlife feeding areas by providing needed cover. Most furbearing animals inhabit this zone. It also provides important nesting areas for songbirds, osprey, and wood ducks. Elk and deer use riparian vegetation for cover.

A wide variety of man's activities, including logging, road construction, and streambank protection, have destroyed and damaged riparian habitat in the past. Because of its importance to water quality, Goal 17 requires that riparian vegetation be retained and protected. Permanent removal of riparian vegetation is usually only allowed for water-dependent uses. Most local ordinances require that development in shorelands be set back from the shoreline and that riparian vegetation not be removed. Where bank stabilization is required to prevent erosion, most ordinances require that riparian vegetation be replanted.

CHAPTER THREE

HABITAT CLASSIFICATION

INTRODUCTION

Estuaries are not a single habitat, but rather a complex and interrelated web of habitats defined and distinguished by the interplay of geology, river-flows, tides, and other factors. Together these factors affect the composition, distribution and productivity of the biological communities that make up the living part of Oregon's estuaries. A major change in any single factor can create an environment suited to a wholly different set of species. In addition, the environmental requirements of a species may vary considerably throughout its life cycle and activities. For example, the environments in which a single species feeds, rests and spawns will usually differ.

Distinguishing between different habitats is important to understanding the effects of different kinds of activities and managing their impacts. Through the estuary classification scheme discussed below it is possible to identify unique environments that tend to control the production and composition of the communities that utilize them. It is possible to classify those environments by using only a few different parameters.

Oregon Estuarine Habitat Classification System[6]

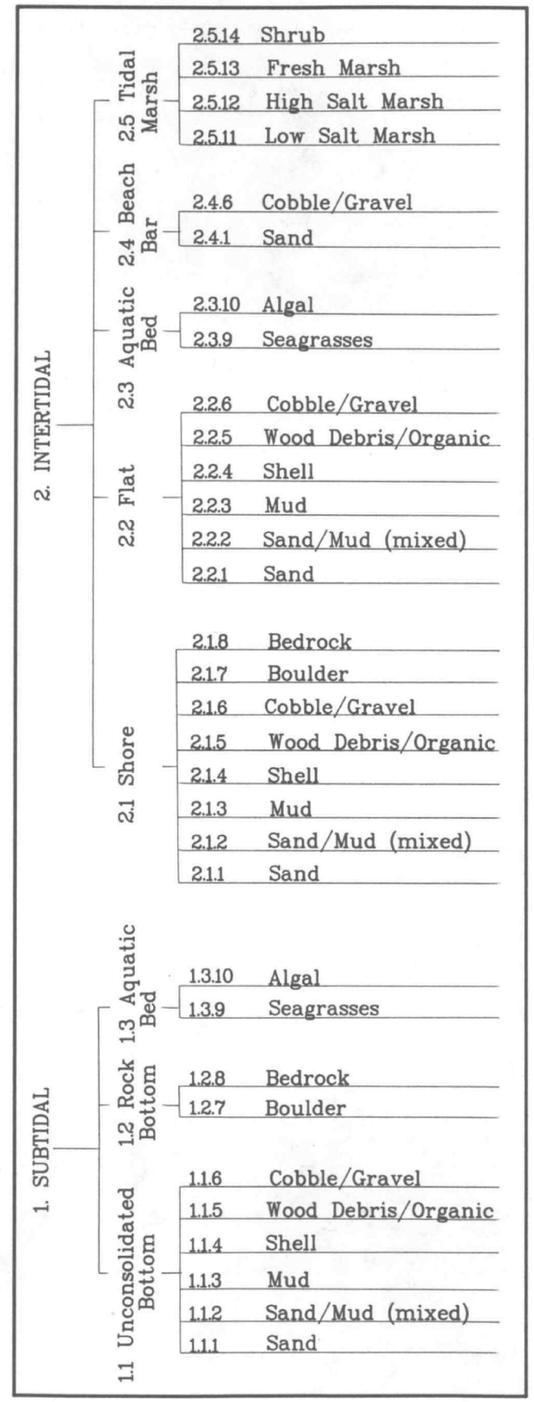
In 1979, the Oregon Department of Fish and Wildlife (ODFW) published a series of maps and reports that classified the various habitats in each of Oregon's major estuaries. Completed soon after LCDC adopted Statewide Planning Goals concerning coastal resources, ODFW'S maps were intended to be used by local governments as they developed their estuary management plans.

ODFW's classification system is based on a United States Fish and Wildlife Service (USFWS) habitat classification system (Cowardin et al., 1977) that was designed to address a large variety of parameters affecting aquatic habitats. Since the USFWS system was designed to be applicable to all types of aquatic habitats nationwide, it includes parameters that were unnecessary for describing Oregon's estuarine habitats. Consequently, ODFW modified the system to utilize only those parameters that have the greatest influence on Oregon's estuarine habitats.

Classification of habitats and their communities is useful in evaluating the potential environmental impacts of site-specific proposals on an estuary. The ODFW estuarine habitat classification system incorporates tidal regime, landform, and sediment or vegetation type. These have been identified as primary factors controlling the composition of biological communities. Although a classification system that relies heavily on benthic substrates does not address all types of estuarine communities, sessile plants and invertebrates are directly influenced by bottom types, and adaptations for burrowing, attachment, and feeding are closely linked to specific types of substrate. The distribution of fishes and other mobile species is dependent at least in part on the availability of feeding and spawning areas and protective cover along the estuary bottom.

Sediment distribution indicates both the source of the parent material and the velocity and direction of tidal or river forces transporting the sediment. Therefore, habitat distribution is also influenced by the balance of these forces. For example, river-dominated systems have a high percentage of low-salinity subtidal habitats based on terrestrial sediments. Estuaries with a greater marine influence typically have large amounts of intertidal habitat and a mixture of both marine and riverine sediments. Consequently, they offer greater diversity of habitat types and, in turn, probably support a greater diversity of species.

Finally, it is important to distinguish between sediment type and habitat type, since similar classes of substrate alone do not represent similar environments. For example, communities that inhabit subtidal sand bottoms in the lower and upper estuary often differ significantly due to variations in salinity, flow velocity, or other factors independent of substrate type. Thus the location of a substrate type within the entire estuarine system will affect the species composition utilizing that habitat.



[6] This chapter is adapted from ODFW'S 1979 Report "Habitat Classification and Inventory Methods for the Management of Oregon Estuaries," by Bottom et al.

ESTUARINE SUBSYSTEMS

It is possible to broadly define four types of subsystems in Oregon's estuaries which are distinguished by geologic, riverine, and tidal forces. These forces determine the shape and depth of the estuarine basin and the distribution of salt and other material throughout the system.

Marine

The marine subsystem is a high energy zone located near the estuary mouth. The bottom is influenced by strong currents, and the substrate is primarily coarse marine sand, cobble, or rock. Salinities are generally high due to the dominance of ocean water, but may be greatly reduced during high river flows in winter. Kelp and other algal species often cover the rock substrates and form microhabitats for many species. Benthic invertebrates may include marine and estuarine species and fish utilizing the marine subsystem are marine species.

Bay

The bay subsystem is a relatively protected environment, often characterized by a broad embayment between the estuary mouth and narrow upriver reaches of tidewater. Normally the bay subsystem has a large percentage of intertidal land. Since it is influenced by both the marine and the riverine systems, bay sediments are primarily a mixture of coarse marine sands and fine river-borne silts and clays. Salinities during the summer are moderate to high, depending on the basin size, but may vary considerably with tidal stage and freshwater flow. Most bays have a wide diversity of habitats with extensive intertidal flats, eelgrass beds, algal beds, and marshes.

Riverine

The riverine subsystem includes the upper tidewater portions of the larger tributaries which enter the estuary. A large percentage of the subsystem is narrow, subtidal river channel. Current velocities exhibit dramatic seasonal changes which influence benthic communities. Salinities are low most of the year, and portions of the subsystem may be entirely fresh water. Sediments range from fine silts and clays to cobble and gravel. Small fringing marshes frequently occur on narrow, intertidal portions of the river bank; riparian vegetation typically lines river banks where there are no marshes.

Slough

The slough subsystem is a sheltered environment, which is usually a narrow, isolated arm of the estuary with a very limited freshwater flow from uplands. Salinity is influenced by the proximity of the slough to the estuary mouth. Sloughs usually have fine organic sediments and high percentages of intertidal land consisting of flats, eelgrass beds, and marshes.

COMMONLY OCCURRING HABITAT TYPES IN OREGON ESTUARINE SUBSYSTEMS

HABITAT CLASS:

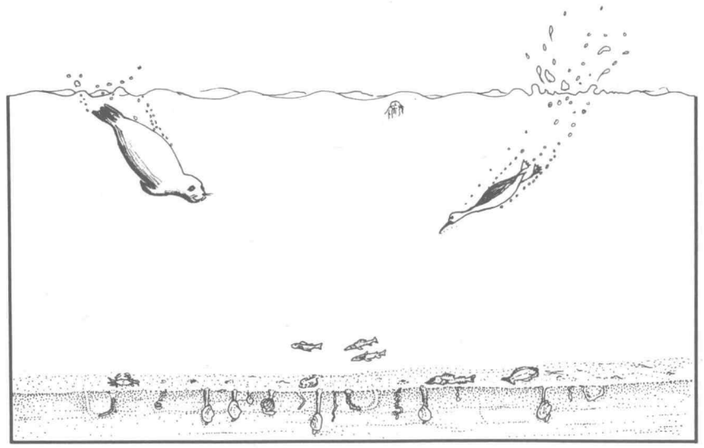
		SUBSYSTEM		
SUBTIDAL	**MARINE**	**BAY**	**SLOUGH**	**RIVERINE**
Unconsolidated Bottom	Sand Cobble/ gravel	Sand Sand/mud Mud	Sand Sand/mud Mud Cobble/ gravel	Sand Sand/mud
Rock bottom	Boulder Bedrock	Boulder Bedrock		Bedrock
Aquatic bed	Algae	Algae Eeelgrass	Algae Eelgrass	
INTERTIDAL				
Shore	Sand Boulder Bedrock Cobble/ gravel	Sand Sand/mud Mud	Sand Sand/mud Mud	Sand Sand/mud Mud Cobble/ gravel
Flat	Sand	Sand Sand/mud Mud	Sand Sand/mud Mud	
Aquatic bed	Algae	Algae Eelgrass	Algae Eelgrass	
Beach/bar	Sand Cobble/ gravel	— — —	— — —	— — —
Tidal marsh	Low salt marsh	Low salt marsh High salt marsh Diked marsh	Diked marsh Fresh marsh High salt marsh Shrub marsh	Low salt marsh High salt marsh Diked marsh Fresh marsh

TIDAL REGIME

Tide is a major limiting factor for many species in aquatic environments. The classification system distinguishes between intertidal and subtidal habitats, since biological communities often differ significantly according to the degree of tidal influence. Special adaptations are required by intertidal species to resist desiccation and tolerate large variations in temperature and salinity associated with tidal exposure.

Subtidal habitats are below extreme low water, and thus have continuously submerged substrates. Intertidal habitats are exposed and flooded by tides as often as twice daily or as seldom as a few times a year. The upper limit of the intertidal zone is defined for regulatory purposes as the line of nonaquatic vegetation, or as mean higher high water where such a line cannot be determined.

Within intertidal areas, a marked zonation of species is often apparent due to variation in the frequency and duration of exposure between lower and upper intertidal elevations. Although modifiers indicating tidal regime may be appropriate to differentiate intertidal habitats, intertidal elevations are not presently mapped for any Oregon estuaries.

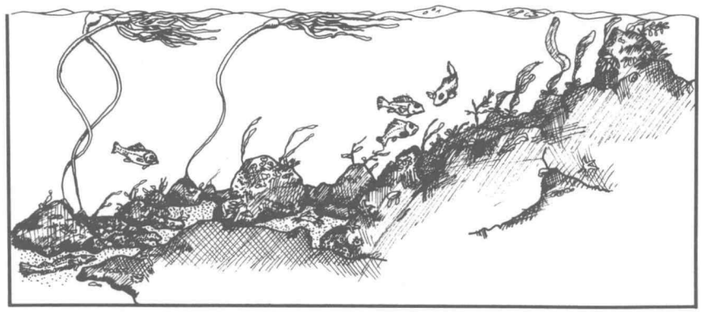


Unconsolidated bottom (1.1)

The habitat classification system identifies a range of sediment sizes that represent unique subtidal environments for benthic species. Physiological and morphological adaptations of benthic organisms allow certain species to flourish in particular types of sediment. For example, feeding adaptations of invertebrates are related to sediment size. Coarse, clean sands are generally inhabited by organisms that filter food from the water column. In quiet waters where fine, organically rich muds occur, deposit-feeding polychaetes or other invertebrates ingest the sediment directly.

Since sediments largely influence the type of invertebrates colonizing an area, activities which alter sediment characteristics have a significant impact on benthic communities. Although dredge or spoil sites can be recolonized, community structure will vary with new sediment properties. Activities of structures that alter existing currents affect patterns of erosion and deposition. Where deposition is rapid, benthic communities may be smothered, and where erosion is significant, only organisms adapted to unstable substrates may survive. An important consideration in evaluating proposed development in estuaries is its impact on current patterns and sedimentation processes, and the resulting effects on benthic habitats and communities.

Sand-mud bottoms are typically higher in organic content than sand bottoms, and are firmer and more aerated than mud. Mud bottoms are primarily silt and clay; organisms living in mud must be able to tolerate low oxygen concentrations. Wood and organic debris bottoms will be found where current velocities are low or where there is a continuous supply of organic material. Finally, finer sediments may be intermixed with cobble/gravel substrates.



Rock bottom (1.2)

Rock habitats in the high salinity zone near estuary mouths are highly productive environments for marine fishes and invertebrates. They are defined as being less than 30 percent covered with vegetation. Most subtidal rock habitats are located near the mouth where strong tidal currents and turbulence require that organisms be firmly attached to the substrate or seek the protection of sheltered cracks and crevices. Rock outcrops also extend into the upper estuary, particularly in the smaller systems south of Cape Blanco. Jetties have created the most extensive rock bottom habitats in Oregon estuaries.

Specialized and diverse fauna are adapted for attachment or browsing along rock substrates. Sucking devices such as the tube feet of star fish or more permanent methods of attachment such as the byssus threads of mussels are examples of adaptations to rocky substrates. Soft silt and sandstone outcrops in a few locations provide a unique habitat for highly specialized piddock clams capable of boring into the rock. A diversity of algal species attach to rocky substrates with a strong basal holdfast.

Aquatic bed, Subtidal (1.3) and Intertidal (2.3)

The aquatic bed category includes both subtidal and intertidal algal and eelgrass beds that frequently occur in bay and slough subsystems. These communities probably represent a significant portion of the primary production in Oregon estuaries. Eelgrass is the most common species of seagrass in Oregon estuaries. It grows in both sand and mud substrates. It is a rapid growing plant that provides habitat for a diverse community of estuarine plants and animals. Its leaves support large numbers of algal and invertebrate epiphytes which are consumed by fish and larger invertebrates and are the primary food of black brant during their migration along the Oregon coast. Clam beds are often associated with eelgrass. In some estuaries, eelgrass leaves provide a spawning surface for herring. Thick beds of eelgrass reduce currents near the bottom and promote deposition of sediment, while roots and rhizomes bind sediments and prevent erosion. Finally, eelgrass decomposition contributes nutrients to the detrital food chain.

Algal beds occur over unconsolidated or rock substrates and also provide habitat for fish and invertebrates. Huge mats of algal species turn broad intertidal flats bright green during spring and summer. Biomass then declines as the algae decays and releases nutrients to the system. In some deeper high salinity areas where there is suitable substrate for attachment, long blades of kelp may be seen floating at the water's surface. Kelp holdfasts represent a unique microhabitat for a rich community of invertebrates.

Plant production in Oregon estuaries is highly seasonal. The timing of fish migrations, spawning, and invertebrate reproduction in estuaries corresponds closely with dramatic increases in plant production during the spring and summer.

Reduction of light penetration due to shading or turbidity can limit plant growth. Logging and road construction in the upper watershed and dredging activities in the estuary can increase turbidity. Reduced flushing of eelgrass and some algal communities may decrease nutrient and gas exchange and, as a result, plant production. Significant modification of temperature or salinity patterns from changes in freshwater flow or estuarine circulation may further threaten aquatic beds.

Shore (2.1)

Shores are narrow, steeply sloped intertidal habitats that occur where river and tidal currents are relatively strong. Because these are generally high energy environments, rocky substrates or coarse sediments often predominate. Algal and invertebrate species are firmly attached to rocky shores, but waves and currents may limit plant and animal production on unstable, unconsolidated shores.

As in other intertidal habitats, there is a pronounced zonation of plant and animal species from lower to upper intertidal elevations, with generally fewer species inhabiting the upper intertidal zone. In some estuaries, mud and sandy shores are inhabited by burrowing or tube-dwelling invertebrates which are food sources for bottom-feeding fishes at high tide.

Substrate composition of shorelines may change periodically due to scouring. Smaller particles may be removed, while cobbles, boulders, and bedrock can be seasonally covered by sand or gravel.

Flat (2.2)

Broad intertidal flats commonly occur in the slough and bay subsystems of Oregon estuaries. They are generally sheltered from strong currents and wave action and their gradual slopes tend to dissipate wave and tidal energies. As a result, flats form a relatively stable environment for colonizing species. In addition, large shallow flats store heat and may have an important role in the temperature budget of the entire estuary. Ultimately, tidal flat community structure is influenced by sediment size, currents, wave action, temperature, and salinity.

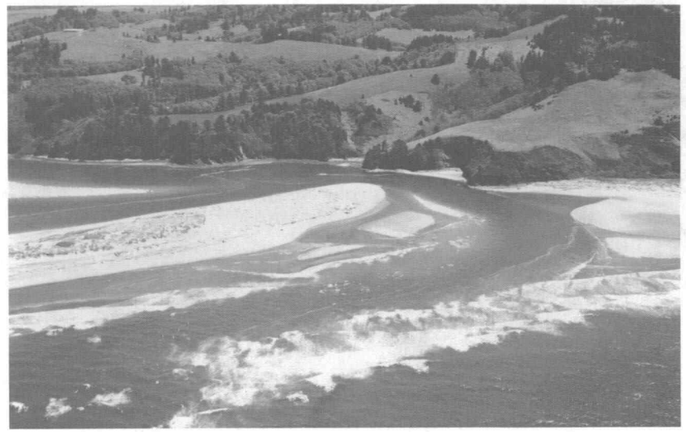
Tidal flat sediments vary from fine muds to cobbles. Shallow water depths, and therefore maximum light and warm temperatures, often result in extensive algae blooms in the spring and summer, when many flats could be classified as intertidal aquatic beds.

Benthic organisms in tideflats are specially adapted to sediment sizes and the temperatures and exposure of an intertidal environment. So activities which alter sediment characteristics or tidal elevations can be expected to influence benthic communities. Filling and dredging represent the most obvious threats to flat habitats. Flats have historically been filled to extend the area of level upland available for shoreland development in estuaries.

Low-tide grounding of logs stored on intertidal flats and shores has decimated benthic populations. Bark and wood debris near log storage sites can adversely affect water quality. Sewage, fish wastes, or other organic pollutants discharged over flats may also accumulate in the sediments and reduce oxygen levels. Consequently, large numbers of invertebrates that are indicative of degraded habitats colonize these areas, and species diversity decreases.

In some estuaries, logging activities in the upper watershed have tremendously increased the rate of sedimentation. Tillamook Bay has been rapidly filled since the area was first settled. This has greatly increased the acreage of flats and decreased the area of subtidal habitat.

Cockle, gaper, butter, littleneck and softshell clams and mud and ghost shrimp are frequently associated with Oregon mud and sand flats. Recreational clamming is popular in these areas during low tides, particularly in the spring and summer. Bottom-feeding fishes graze over flats during high tide. Great blue heron, great egret and a variety of shorebirds feed in the shallows as the tides recede.



Beach/bar (2.4)

Beach and bar habitats are dynamic environments subject to strong water currents in the form of tides, waves and river flow. They always have less than 30 percent vegetative cover. Bars occur within estuaries as elongated ridges of coarse sand, cobble, or gravel, and are bordered by water on at least two sides. In Oregon, bars form during summer at the mouths of smaller blind estuaries and, in some cases, prevent marine water from entering the estuaries. Shifting bars also occur near the mouths of larger estuaries or in upper riverine sections. Because bars continually shift with the currents, colonization is limited to rapidly burrowing and opportunistic species, including molluscs, crustaceans, and polychaetes.

Shallow intertidal bars may extend as spits from shores near the mouths of estuaries. In larger systems, these may be periodically dredged to provide a navigable channel into the estuary. Gravel removal operations have occurred on bars in the riverine sections of a few south coast estuaries.

Tidal marsh (2.5)

Tidal marshes are characterized by rooted herbaceous or woody hydrophytes that grow between lower high tide and the line of nonaquatic vegetation. These can be divided into four major subclasses: high and low salt marsh in marine and brackish areas, and fresh and shrub marshes beyond saltwater influence. Composition of these marsh communities varies with tidal elevation, sediment types, and salinity regime.

Marshes are an important habitat for invertebrates, waterfowl, small terrestrial mammals, and insects. Detritus-feeding snails, scavenging crabs, and a variety of amphipods and other invertebrates seek the food and/or protection of marshes. The well-defined channels of high marshes are heavily used by juvenile Dungeness crab and a variety of small fishes. In some areas, they may provide important rearing habitat for juvenile chinook salmon. Marshes also provide resting and feeding areas for large populations of migrating waterfowl.

Salt marshes have been ranked among the most productive ecosystems in the world. Plant producers in salt marshes include marsh grasses, macroalgae entwined among the grass stems, microalgae on the mud surface, and phytoplankton in the water column. Organic material and nutrients stored by marsh producers are consumed directly, or transferred to other portions of the estuary as detritus.

Estuarine marshes are important sediment traps that reduce the frequency of dredging required for navigation. They help to stabilize the shore, dissipate flood waters, and protect shoreland property from storms. Marshes also filter and process nitrates, phosphates, and other wastes, thus providing a pollution buffer between adjacent upland activities and the estuary.

Tremendous areas of Oregon marsh have been diked to create upland for pasture and other uses. Such diking has greatly reduced estuarine integrity and productivity. Extensive diking has resulted in altered marsh community composition, channelized estuarine water courses, reduced productive intertidal surface area, and restricted transport of organic materials and nutrients to and from the estuary. Construction of causeways and roadbeds has had identical results. Filling for shoreland development has sacrificed huge expanses of marsh in many Oregon estuaries.

CHAPTER FOUR

COASTWIDE SUMMARY

COASTWIDE SUMMARY OF OREGON'S ESTUARY PLANS

Oregon has 21 major estuaries and 15 minor estuaries totalling approximately 133,000 acres. This amounts to roughly two-tenths (0.2) of 1 percent of the land area of the state. Compared to other coastal states, Oregon has very little estuarine area. The size of Oregon's estuaries is a result of the state's geology. Oregon's estuarine area is limited because of its relatively steep coastal shoreline.

The amount of development in and around each of Oregon's estuaries varies. Three estuaries have been relatively intensively developed for commerce and navigation. The Columbia River, Coos Bay, and Yaquina Bay all support major port operations. These ports are a vital link in the flow of goods to and from Oregon and are critical to the state's economic well-being.

Eight other estuaries have been developed less intensively for commerce or navigation. These shallow draft development estuaries have maintained jetties and channels to support commercial and recreational fishing and boating, and some commerce and related activities like boat building or fish processing. While these estuaries are less intensely developed than the three deep draft estuaries, they are nonetheless important to the coastal economy.

Several other estuaries have towns along their shores, but only limited alterations to the estuary. These estuaries usually support some recreational boating and fishing but mostly these estuaries are undeveloped. Still others have been almost untouched by surrounding human development.

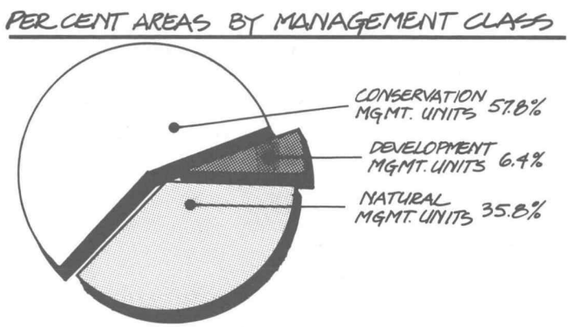
Generic Zoning Categories

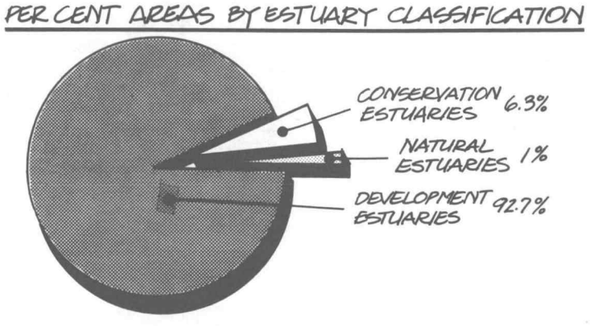
Despite great similarities, each city and county on the coast uses different plan designations and zones. The maps and tables in Chapter Five show these official plan and zoning designations used by local governments. The generic codes used below have been developed to allow coastwide summaries and to allow comparison between plans for different estuaries.

Management Unit Summary

Each of Oregon's estuaries is divided into a series of management units. The chart at right shows the distribution of the three different types of management units in each estuary and within the four different overall estuary classifications.

Not every estuary contains each type of management unit. While development estuaries contain all three types of management units, conservation estuaries have only conservation and natural management units, and natural estuaries have only natural management units. These limits are required by the Goal-based overall estuary classification. The overall classification adopted by LCDC generally reflects the extent of development which has occurred in each estuary. For example, Coos Bay has been extensively altered to provide for water-oriented development, while Salmon River and Sand Lake appear much as they did 100 years ago.





Overall Classification vs. Management Unit

The chart at right illustrates the difference between the overall classification system and management unit designations within estuaries. Although 92.7 percent Oregon's estuarine lands are within estuaries designated for development, over 86 percent of those estuaries are designated as natural or conservation management units. In fact, only 8,405.4 acres, or 6.4 percent of Oregon's estuaries, are within development management units. The largest single category is conservation management units—some 76,200 acres, or about 58 percent of Oregon's estuaries, are designated for conservation. The remaining 47,200 acres (36 percent) of Oregon's estuaries are in natural management units.

AREA OF MANAGEMENT UNIT TYPES IN OREGON ESTUARIES

ESTUARY TYPE/NAME	TOTAL AREA		MANAGEMENT UNIT TYPES: NATURAL		CONSERVATION		DEVELOPMENT	
	ACRES	PERCENT	ACRES	PERCENT	ACRES	PERCENT	ACRES	PERCENT
TOTAL	131844.5	100.0%	47217.5	100%	76221.6	100%	8405.4	100%
Portion of Total		100.0%		35.81%		57.81%		6.38%
DEVELOPMENT	122163.4	92.7%	39697.5	84%	74060.5	97%	8405.4	100%
Deep Draft	98461.3	74.7%	26845.7	57%	65077.7	85%	6537.9	78%
COLUMBIA	80811.8	61.3%	16557.7	35%	61283.8	80%	2970.3	35%
YAQUINA BAY	4349.0	3.3%	2036.7	4%	1301.1	2%	1011.2	12%
COOS BAY	13300.5	10.1%	8251.3	17%	2492.8	3%	2556.4	30%
Shallow Draft	23702.1	18.0%	12851.8	27%	8982.8	12%	1867.5	22%
NEHALEM BAY	2749.0	2.1%	1610.6	3%	951.7	1%	186.7	2%
TILLAMOOK BAY	9216.3	7.0%	4762.7	10%	4320.7	6%	132.9	2%
SIUSLAW RIVER	3060.4	2.3%	1485.2	3%	1466.3	2%	108.9	1%
UMPQUA RIVER	6543.6	5.0%	4340.2	9%	1057.4	1%	1146.0	14%
COQUILLE RIVER	1081.7	0.8%	532.8	1%	433.1	1%	115.8	1%
ROGUE RIVER	880.0	0.7%	115.6	0%	642.8	1%	121.6	1%
CHETCO RIVER	171.1	0.1%	4.7	0%	110.8	0%	55.6	1%
CONSERVATION	8345.8	6.3%	6184.7	13%	2161.1	3%	–	–
NECANICUM RIVER	450.8	0.3%	19.3	0%	431.5	1%	–	–
NETARTS BAY	2742.9	2.1%	2391.3	5%	351.6	0%	–	–
NESTUCCA BAY	1175.6	0.9%	821.5	2%	354.1	0%	–	–
SILETZ BAY	1460.6	1.1%	1109.5	2%	351.1	0%	–	–
ALSEA BAY	2515.9	1.9%	1843.1	4%	672.8	1%	–	–
NATURAL	1335.3	1.0%	1335.3	3%	–	–	–	–
SAND LAKE	897.4	0.7%	897.4	2%	–	–	–	–
SALMON RIVER	437.9	0.3%	437.9	1%	–	–	–	–

AREA OF SHORELAND ZONING SURROUNDING EACH ESTUARY
(IN ACRES)

ESTUARY BY CLASS	TOTAL SHORELAND AREA	FOREST F	FARM USE FU	FARM/ FOREST FF	RECREATION REC	RURAL RESIDEN- TIAL RR	URBAN RESIDEN- TIAL UR	COMMERCIAL C	INDUS- TRIAL I	WATER DEPENDENT /RELATED WDR	PUBLIC PUB	CONSERVA- TION CON
TOTAL ACREAGE	51382.0	5404.7	12568.2	878.8	5990.2	4054.3	4389.7	1576.6	3022.0	3387.9	1352.8	8756.8
DEVELOPMENT	41494.2	4626.6	10484.2	818.7	4267.7	2855.8	1653.3	891.5	2865.2	3336.4	938.0	8756.8
Deep Draft	21233.2	1100.7	5271.7	550.5	2038.9	2125.6	896.6	455.9	2466.4	2692.2	45.8	3588.9
COLUMBIA RIVER	11762.1	209.6	3951.3	237.9	355.3	774.6	485.5	345.7	1117.3	866.2	-	3418.7
YAQUINA BAY	1721.3	365.3	123.8	-	-	288.5	126.1	46.2	247.3	331.6	45.8	146.7
COOS BAY	7749.8	525.8	1196.6	312.6	1683.6	1062.5	285.0	64.0	1101.8	1494.4	-	23.5
Shallow Draft	20261.0	3525.9	5212.5	268.2	2228.8	730.2	756.7	435.6	398.8	644.2	892.2	5167.9
NEHALEM BAY	3020.2	83.5	1329.9	11.1	1126.0	253.0	98.3	29.4	9.0	80.0	-	-
TILLAMOOK BAY	5280.0	2313.8	884.3	149.7	1022.8	81.0	346.3	248.2	67.6	92.7	70.6	3.0
SIUSLAW RIVER	3648.4	994.5	1304.3	-	-	250.1	243.7	14.4	46.6	203.5	5.6	585.7
UMPQUA RIVER	6414.9	83.7	732.0	87.5	-	-	-	73.1	103.6	206.6	758.5	4369.9
COQUILLE RIVER	726.6	50.4	247.0	-	55.7	11.5	42.1	5.0	80.4	12.2	17.2	205.1
ROGUE RIVER	993.2	-	715.0	18.0	24.3	111.5	-	13.7	35.1	31.1	40.3	4.2
CHETCO RIVER	177.7	-	-	1.9	-	23.1	26.3	51.8	56.5	18.1	-	-
CONSERVATION	8026.4	332.0	1597.1	15.9	1309.9	761.5	2736.4	650.5	156.8	51.5	414.8	-
NECANICUM RIVER	2579.6	-	6.6	-	179.7	117.9	1532.5	264.3	156.8	-	321.8	-
NETARTS BAY	964.0	15.2	-	2.5	607.1	160.6	151.6	12.9	-	14.1	-	-
NESTUCCA RIVER	1420.7	22.8	671.3	13.4	523.1	20.0	114.2	55.9	-	-	-	-
SILETZ BAY	1753.9	84.7	656.1	-	-	363.9	454.9	179.3	-	15.0	-	-
ALSEA BAY	1308.2	209.3	263.1	-	-	99.1	483.2	138.1	-	22.4	93.0	-
NATURAL	1861.4	446.1	486.9	44.2	412.6	437.0	-	34.6	-	-	-	-
SAND LAKE	806.1	217.9	54.8	44.2	388.1	101.1	-	-	-	-	-	-
SALMON RIVER	1055.3	228.2	432.1	-	24.5	335.9	-	34.6	-	-	-	-

Shoreland Zoning

Lands surrounding Oregon's estuaries are used for a great variety of purposes. Correspondingly, the zoning of these lands allows for a variety of uses. Compounding this variety is the fact that each of the twenty-nine cities and counties charged with planning for shorelands has its own unique set of plan and zone designations. The chart at left is a compilation of local zones into eleven categories. Although these generic groupings do not reflect the nuances of local zoning, they provide a general indication of the uses allowed.

Several of the zoning categories correspond to Statewide Planning Goal requirements. Forest lands (F) are generally lands covered by Statewide Planning Goal 4 (Forest Lands). Lands within the the farm use category (FU) are usually lands subject to Goal 3 (Agricultural Lands). Lands within the rural residential category are typically lands where local government has adopted a built and committed exception to allow continued development. The other generic categories reflect the zoning categories used by most cities and counties. A matrix showing how individual zones relate to the categories shown here is included in the Appendix.

Shoreland zoning illustrates the setting which surrounds each of our estuaries. Farm and forest lands, and state parks and other open space lands make up the bulk of land around estuaries. They comprise about 39,000 acres, or 76 percent of estuarine shorelands. Lands zoned for more intense development, including commercial, industrial, urban residential, and water-dependent/related uses, cover only about 12,376 acres, or 24 percent, of the estuarine shoreline.

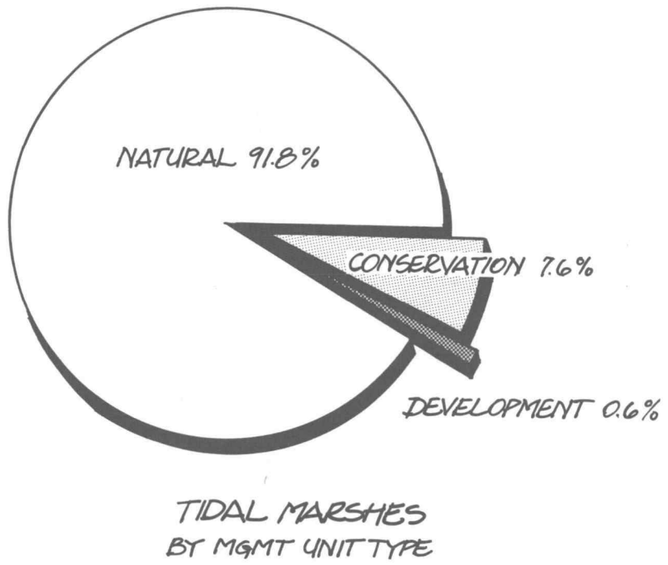
Shoreland development is not always a good indicator of estuarine development. For example, the Necanicum River is by far the estuary with the most urbanized shoreline — 99 percent of the shoreline is within the Gearhart and Seaside urban growth boundaries. Yet the Necanicum is a conservation estuary, and the plan for the estuary anticipates very little additional development. By contrast, the Coos Bay estuary, which is designated for development, also has extensive shoreland areas that are zoned for farming, forestry, and other rural uses.

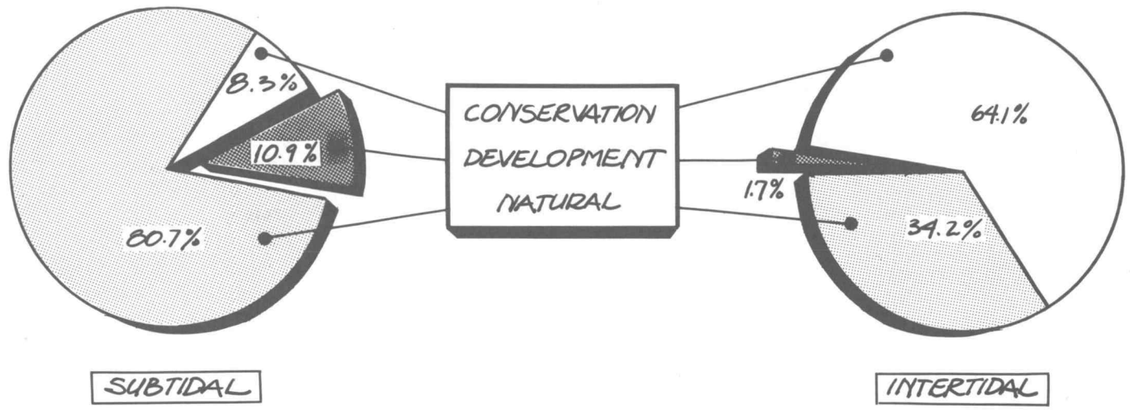
HABITAT DISTRIBUTION BY MANAGEMENT UNIT TYPE

This table shows the distribution of different habitats by both the type of management unit and the overall estuary classification. Note that management units are the individual zones within each estuary. Estuary classification is the overall designation for the entire estuary. As noted above, the types of management units permitted in an estuary depend on its overall classification.

HABITAT CLASS DISTRIBUTION BY MANAGEMENT UNIT TYPE
(Area in Acres)

MANAGEMENT UNIT TYPE/ Estuary Class	TOTAL AREA	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach and Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	131844.5	66938.8	66324.5	63.7	550.6	64905.7	1754.0	30852.6	8693.6	4071.9	19533.6
NATURAL UNITS	47217.5	5585.7	5244.2	4.4	337.1	41631.8	821.4	12605.4	7115.0	3161.9	17928.1
Natural	1335.3	237.4	209.2	-	28.2	1097.9	7.3	266.9	113.3	9.0	701.4
Conservation	6184.7	404.8	364.8	-	40.0	5779.9	48.4	2441.6	2143.2	12.3	1134.4
Development	39697.5	4943.5	4670.2	4.4	268.9	34754.0	765.7	9896.9	4858.5	3140.6	16092.3
CONSERVATION UNITS	76221.6	54025.9	53805.5	44.4	176.0	22195.7	708.8	17783.7	1337.8	855.1	1492.3
Conservation	2161.1	1483.8	1476.9	-	6.9	677.3	81.9	275.9	37.8	117.1	164.6
Development	74060.5	52542.1	52328.6	44.4	169.1	21518.4	626.9	17525.8	1300.0	738.0	1327.7
DEVELOPMENT UNITS											
Development	8405.4	7327.2	7274.8	14.9	37.5	1078.2	223.8	445.5	240.8	54.9	113.2





Tidal Marshes by Management Unit Type

Literally thousands of acres of tidal marsh have been diked, filled, or otherwise altered and removed from estuaries. Reversing this trend is a major purpose of estuary planning. The chart above indicates that only 113.2 acres, or less than 0.6 percent of our existing tidal marshes, are designated for future development. Of the remainder, some 91.8 percent is designated for preservation in natural management units, with 7.6 percent in conservation management units.

Tidal Regime of Management Units

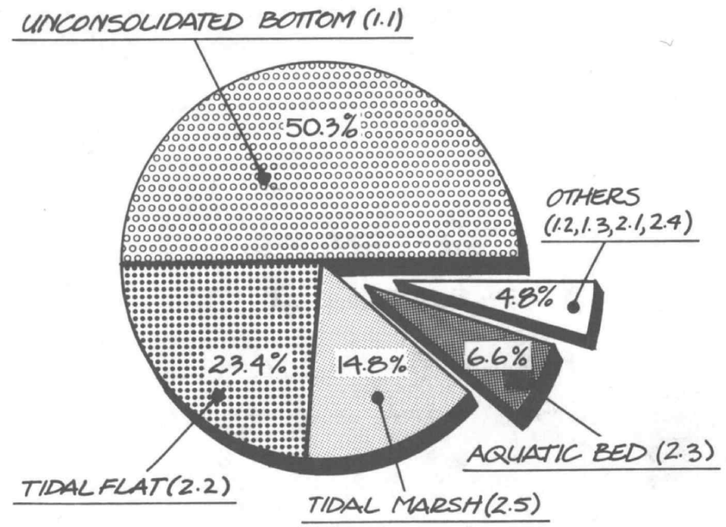
Each type of management unit includes a distinct mixture of habitats. Natural management units are principally intertidal areas. Sixty-four percent of intertidal lands, or some 42,000 acres, are in natural management units. Conservation management units are a more balanced mix of intertidal and subtidal, while development management units are principally subtidal lands. This indicates that shallower areas are generally more productive and sensitive to alterations, while deeper areas are more suited to development.

ESTUARINE HABITAT CLASS DISTRIBUTION BY ESTUARY
(Area in Acres)

ESTUARY CLASS/NAME	Total Area Of All Estuarine Habitat Units	SUBTIDAL 1.	Unconsolidated Bottom 1.1	Rock Bottom 1.2	Aquatic Bed 1.3	INTERTIDAL 2.	Shore 2.1	Flat 2.2	Aquatic Bed 2.3	Beach/ Bar 2.4	Tidal Marsh 2.5
TOTAL	131844.5	66938.8	66269.9	63.7	605.2	64905.7	1754.0	30834.6	8693.6	4071.9	19551.6
DEVELOPMENT ESTUARIES	122163.4	64812.8	64219.0	63.7	530.1	57350.6	1616.4	27850.2	6399.3	3933.5	17551.2
Deep Draft	98461.3	55296.2	54937.5	54.9	303.8	43165.1	972.8	21644.6	2874.5	3819.4	13853.8
COLUMBIA RIVER	80811.8	47914.8	47864.1	50.7	-	32897.0	86.9	17539.5	-	3764.3	11506.3
YAQUINA BAY	4349.0	2003.1	1948.3	4.2	50.6	2345.9	194.9	612.3	917.7	-	621.0
COOS BAY	13300.5	5378.3	5125.1	-	253.2	7922.2	691.0	3492.8	1956.8	55.1	1726.5
Shallow Draft	23702.1	9516.6	9281.5	8.8	226.3	14185.5	643.6	6205.6	3524.8	114.1	3697.4
NEHALEM BAY	2749.0	1000.9	991.0	-	9.9	1748.1	157.5	400.7	641.9	23.4	524.6
TILLAMOOK BAY	9216.3	2123.1	2082.3	-	40.8	7093.2	113.2	4113.1	1982.5	-	884.4
SIUSLAW RIVER	3060.4	1441.6	1426.5	8.8	6.3	1618.8	134.6	358.0	331.6	30.5	764.1
UMPQUA RIVER	6543.6	3748.4	3748.4	-	-	2795.2	123.6	1021.6	400.1	49.1	1200.8
COQUILLE RIVER	1081.7	475.5	475.5	-	-	606.2	79.4	149.3	102.5	-	275.0
ROGUE RIVER	880.0	574.7	557.8	-	16.9	305.3	29.2	160.2	60.4	11.1	44.4
CHETCO RIVER	171.1	152.4	54.6	-	97.8	18.7	6.1	2.7	5.8	-	4.1
CONSERVATION ESTUARIES	8345.8	1888.6	1841.7	0.0	46.9	6457.2	130.3	2717.5	2181.0	129.4	1299.0
NECANICUM RIVER	450.8	179.1	179.1	-	-	271.7	16.4	117.8	4.1	1.4	132.0
NETARTS BAY	2742.9	337.5	334.3	-	3.2	2405.4	27.9	1090.2	954.4	104.9	228.0
NESTUCCA BAY	1175.6	311.2	298.6	-	12.6	864.4	27.6	383.3	229.8	19.1	204.6
SILETZ BAY	1460.6	326.4	300.9	-	25.5	1134.2	14.5	411.1	434.4	-	274.2
ALSEA BAY	2515.9	734.4	728.8	-	5.6	1781.5	43.9	715.1	558.3	4.0	460.2
NATURAL ESTUARIES	1335.3	237.4	209.2	0.0	28.2	1097.9	7.3	266.9	113.3	9.0	701.4
SAND LAKE	897.4	139.5	113.7	-	25.8	757.9	2.1	253.2	39.8	-	462.8
SALMON RIVER	437.9	97.9	95.5	-	2.4	340.0	5.2	13.7	73.5	9.0	238.6

HABITAT DISTRIBUTION BY ESTUARY

The diversity of Oregon's estuaries is best indicated by the mix of habitats in each estuary. This mixture is a reflection of the differences in geologic, tidal, riverine, and other forces that shape estuaries.



Proportions of Major Habitat Types In Oregon Estuaries

Unconsolidated bottoms, tidal flats, and tidal marshes make up most habitats in Oregon's estuaries. Together these three habitats total almost 117,000 acres, or some 88 percent of Oregon's estuaries. The chart above illustrates the relative proportions of these four habitat types in each of the major estuaries, and indicates that each of Oregon's estuaries is a unique combination of habitats.

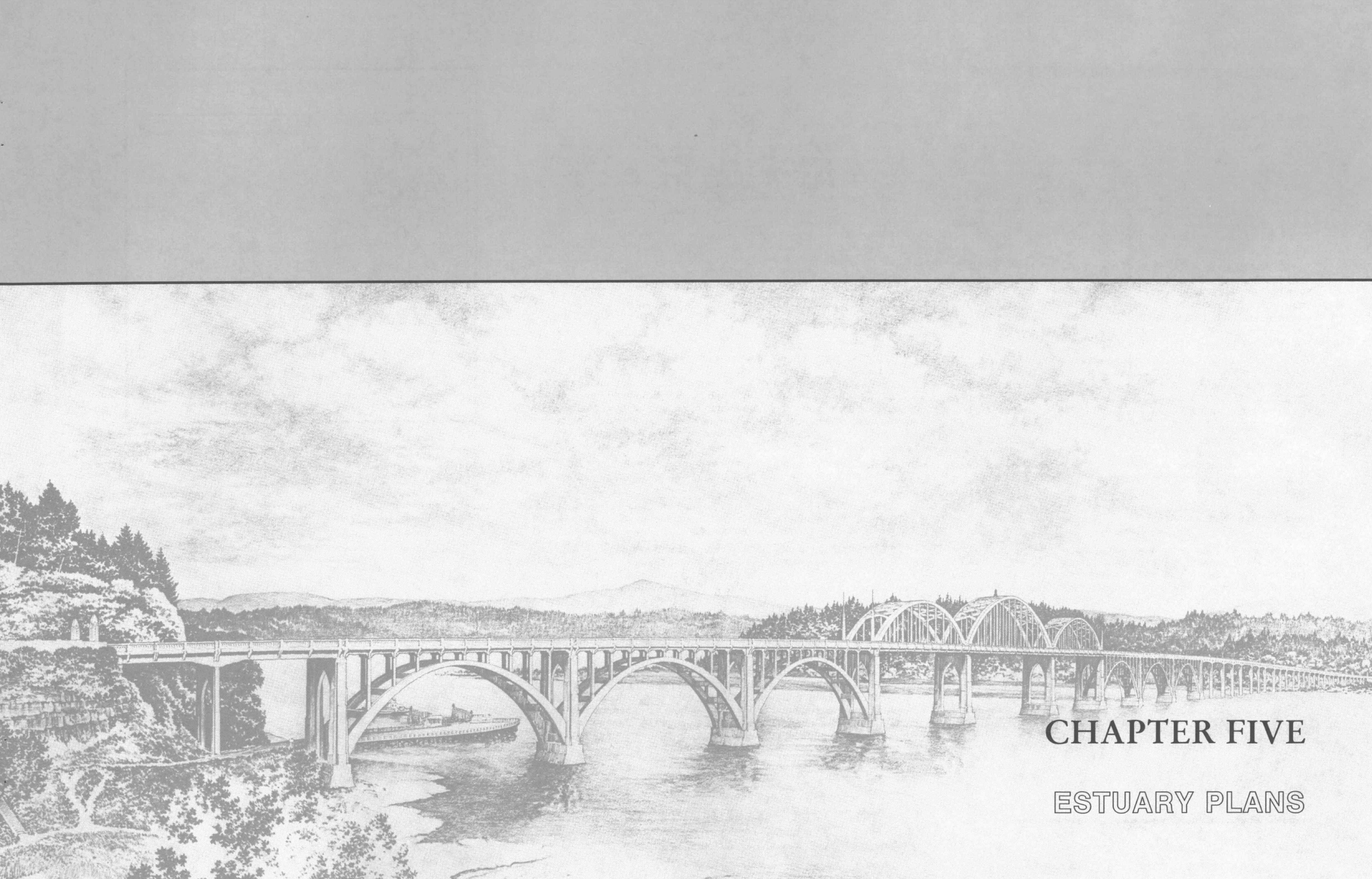
ESTUARY HABITAT BY SUBCLASS

The ODFW habitat classification system identifies eight basic classes of estuarine habitat. However, for researchers and others it is both possible and helpful to further distinguish different kinds of habitat within each classification. To do this, ODFW'S classification system includes a total of fifty subclasses. These subclasses enable a fuller understanding of the great diversity between different types of habitats, even within these broad classifications.

HABITAT SUBCLASS SUMMARY FOR ALL MAPPED MAJOR ESTUARIES IN OREGON
(Area in Acres)

HABITAT CLASS/ Code	Subclass	TOTAL AREA	AREA IN EN	AREA IN EC	AREA IN ED	PERCENT ESTUARIES IN SUBCLASS
	ALL HABITATS	131844.5	47217.5	76221.6	8405.4	100.000%
1.	SUBTIDAL HABITATS	66938.8	5585.7	54025.9	7327.2	50.771%
1.1	UNCONSOLIDATED BOTTOM	66324.5	5244.2	53805.5	7274.8	50.305%
1.1	Unspecified Type	14480.5	3846.5	6954.9	3679.1	10.983%
1.1.1	Sand	46228.0	1129.4	42167.3	2931.3	35.063%
1.1.2	Sand/Mud (Mixed)	5354.1	268.2	4539.0	546.9	4.061%
1.1.3	Mud	56.3	-	41.1	15.2	0.043%
1.1.4	Shell	41.7	-	16.7	25.0	0.032%
1.1.6	Cobble/Gravel	163.9	0.1	86.5	22.7	0.124%
1.2	ROCK BOTTOM	63.7	4.4	44.4	14.9	0.048%
1.2	Unspecified	50.7	-	-	6.3	0.038%
1.2.7	Boulder	4.2	-	-	4.2	0.003%
1.2.8	Bedrock	8.8	4.4	-	4.4	0.007%
1.3	AQUATIC BED	550.6	337.1	176.0	37.5	0.418%
1.3	Aquatic Bed	5.0	-	0.7	4.3	0.004%
1.3.9	Seagrass Bed	273.6	217.7	36.4	19.5	0.208%
1.3.9(2)	Seagrass on Sand/Mud	40.8	39.9	0.9	-	0.031%
1.3.10	Algal Bed	116.5	76.4	26.4	13.7	0.088%
1.3.10(6)	Algal Bed on Cobble/Gravel	112.3	0.7	111.6	-	0.085%
1.3.10(7)	Algal Bed on Boulder	2.4	2.4	-	-	0.002%
2.	INTERTIDAL HABITATS	64905.7	41631.8	22195.7	1078.2	49.229%

HABITAT CLASS/ Code	Subclass	TOTAL AREA	AREA IN EN	AREA IN EC	AREA IN ED	PERCENT ESTUARIES IN SUBCLASS
2.1	SHORE	1754.0	821.4	708.8	223.8	1.330%
2.1	Unspecified Type	321.6	80.7	226.7	14.2	0.244%
2.1.1	Sand	662.8	408.0	155.9	98.9	0.503%
2.1.2	Sand/Mud (Mixed)	202.0	93.1	104.0	4.9	0.153%
2.1.3	Mud	317.1	156.5	90.5	70.1	0.241%
2.1.5	Wood Debris/Organic	52.4	19.3	29.7	3.4	0.040%
2.1.6	Cobble/Gravel	81.8	44.9	30.0	6.0	0.062%
2.1.7	Boulder	76.7	8.6	46.8	21.3	0.058%
2.1.8	Bedrock	39.6	10.3	24.3	5.0	0.030%
2.2	FLAT	30852.6	12605.4	17801.7	445.5	23.401%
2.2	Flat	1161.8	880.2	227.4	54.2	0.881%
2.2.1	Sand	10194.8	3019.4	7158.0	17.4	7.732%
2.2.2	Sand/Mud (Mixed)	15922.0	5706.7	9917.3	298.7	12.076%
2.2.3	Mud	3382.4	2930.9	375.6	75.9	2.565%
2.2.5	Wood Debris/Organic	8.6	8.6	-	-	0.007%
2.2.6	Cobble/Gravel	183.0	59.6	123.4	-	0.139%
2.3	AQUATIC BED	8693.6	7115.0	1337.8	240.8	6.594%
2.3	Unspecified Type	413.4	307.1	27.6	78.7	0.314%
2.3.9	Seagrass	2539.1	2186.2	300.3	52.6	1.926%
2.3.9(1)	Seagrass on Sand	153.8	153.8	-	-	0.117%
2.3.9(2)	Seagrass on Sand/Mud	1876.5	1185.5	650.3	40.7	1.423%
2.3.9(3)	Seagrass on Mud	704.2	644.5	43.0	16.7	0.534%
2.3.9/10	Seagrass/Algal Mixed	840.5	753.6	74.6	12.3	0.637%
2.3.9/10(2)	Mixed Bed on Sand/Mud	258.8	244.5	-	14.3	0.196%
2.3.9/10(3)	Mixed Bed on Mud	36.7	32.7	4.0	-	0.028%
2.3.9/10(5)	Mixed Bed on Wood/Organics	8.4	8.4	-	-	0.006%
2.3.9/10(6)	Mixed Bed on Cobble/Gravel	37.5	36.9	0.6	-	0.028%
2.3.10	Algal	911.1	855.0	46.4	9.7	0.691%
2.3.10(1)	Algal on Sand	130.7	117.7	13.0	-	0.099%
2.3.10(2)	Algal on Sand/Mud	308.6	288.3	9.8	10.5	0.234%
2.3.10(3)	Algal on Mud	159.0	82.6	76.4	-	0.121%
2.3.10(6)	Algal on Cobble/Gravel	172.9	117.8	54.4	0.7	0.131%
2.3.10(7)	Algal on Boulder	28.9	24.2	3.4	1.3	0.022%
2.3.10(8)	Algal on Bedrock	113.5	76.2	34.0	3.3	0.086%
2.4	BEACH/BAR	4071.9	3161.9	855.1	54.9	3.088%
2.4	Unspecified Type	2.0	-	2.0	-	0.002
2.4.1	Sand	4045.3	3138.2	852.2	54.9	3.068%
2.4.2	Sand/Mud Mixed	8.2	8.2	-	-	0.006%
2.4.3	Mud	15.5	15.5	-	-	0.012%
2.4.6	Cobble/Gravel	0.9	-	0.9	-	0.001%
2.5	TIDAL MARSH	19533.6	17928.1	1492.3	113.2	14.816%
2.5	Unspecified Marsh	394.1	289.6	91.9	12.6	0.299%
2.5.11	Low Salt Marsh	2807.1	2517.1	233.3	56.7	2.129%
2.5.12	High Salt Marsh	6074.8	5543.3	505.4	26.1	4.608%
2.5.13	Fresh Marsh	5866.0	5546.3	301.9	17.8	4.449%
2.5.14	Shrub Marsh	4391.6	4031.8	359.8	-	3.331%



CHAPTER FIVE

ESTUARY PLANS

INDIVIDUAL ESTUARY MANAGEMENT PLANS

Map Sources and Methods

Base maps were prepared by the Division of State Lands in 1972 and 1973 using aerial photographs from the U.S.Geological Survey (USGS EROS Data Center, NASA). These base maps were used in 1978 and 1979 by the Oregon Department of Fish and Wildlife in its mapping of estuarine habitats as part of DLCD's estuary inventory project. ODFW used aerial photography, published studies, and some onsite investigation to prepare its maps of estuarine habitats. Estuary and shoreland planning designations were compiled from local plans in 1986-87 by DLCD.

Neither the DSL base nor ODFW study cover the Columbia River estuary. The base map for this area is a 1″ = 1000′ map prepared by the Columbia River Estuary Data Development Project (CREDDP) in 1983. Habitat information for the Columbia River was prepared by staff of the Columbia River Estuary Study Task Force (CREST) in 1985. CREST compiled various CREDDP studies, converted data to the ODFW habitat classification, and prepared the habitat map provided here.

Comprehensive plan and habitat maps were digitized by the Oregon Department of Energy in 1986 and 1987 using an ARC/INFO Geographic Information System. Full scale maps (usually at 1″ = 1000′) were photographically reduced to fit the format of this document, and are produced at varying scales.

Digitized maps were reviewed by DOE and DLCD staff to identify inconsistencies and digitizing errors. The most common inconsistency was disagreement between the ODFW Habitat Map and the local plan maps in establishing the location of the estuary shoreline. DLCD staff reviewed aerial photographs, plan documents, and consulted with local planners to resolve inconsistencies.

Areal Figures

The estimates provided here are based on the habitat mapping done by ODFW and estuary plans. ODFW's mapping and estuary plans generally reflect the definition of estuary in Goal 16 and similar regulatory definitions in state and federal law. Basically, the estuary extends upland to the line of nonaquatic vegetation or to mean higher high water (mhhw). It is important to note that the mapping and estimates provided here only cover the portion of each estuary shown on the map. The maps leave out the upriver portion of many estuaries, where tidal influence extends several miles upriver. As a result, the figures presented here slightly underestimate the actual area of each estuary.

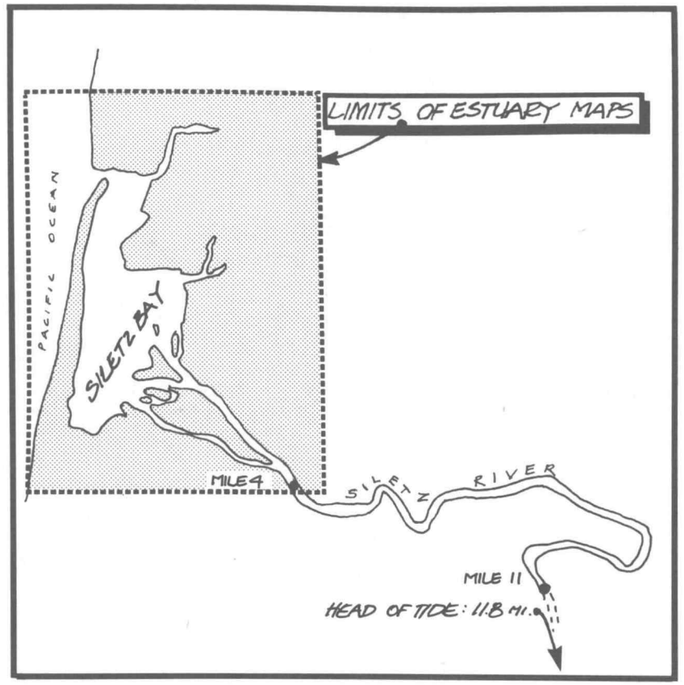
Previous estimates of the size of Oregon's estuaries have used varying definitions, techniques, or data and, consequently, have arrived at different results. The most comprehensive and widely used estimates are those published by the Division of State Lands (DSL) in 1973 in its publication *Oregon Estuaries*. The estimates presented here vary from DSL's figures. The reason is that DSL calculated the landward limit of the estuary at the mean high water (mhw) level, which is the upland extent of the state's ownership interest in submerged and submersible lands. This definition leaves out extensive areas of tidal marsh which are covered by estuary plans and state and federal wetland laws. The figures presented in the estuary plan book include this larger area (i.e., up to mean higher high water or the line of nonaquatic vegetation) and are, consequently, somewhat different than DSL's figures.

Map Accuracy

These maps are intended as a general guide to adopted estuary plans. They are most useful for overall estuarine assessment, evaluation, comparison, and as a general guide to planning and zoning of specific sites. Although great effort has been made to faithfully reflect the adopted local plans, there are some unavoidable differences between the maps shown here and the current official zoning maps. The maps should be used for site-specific interpretations on a very cautious basis for several reasons:

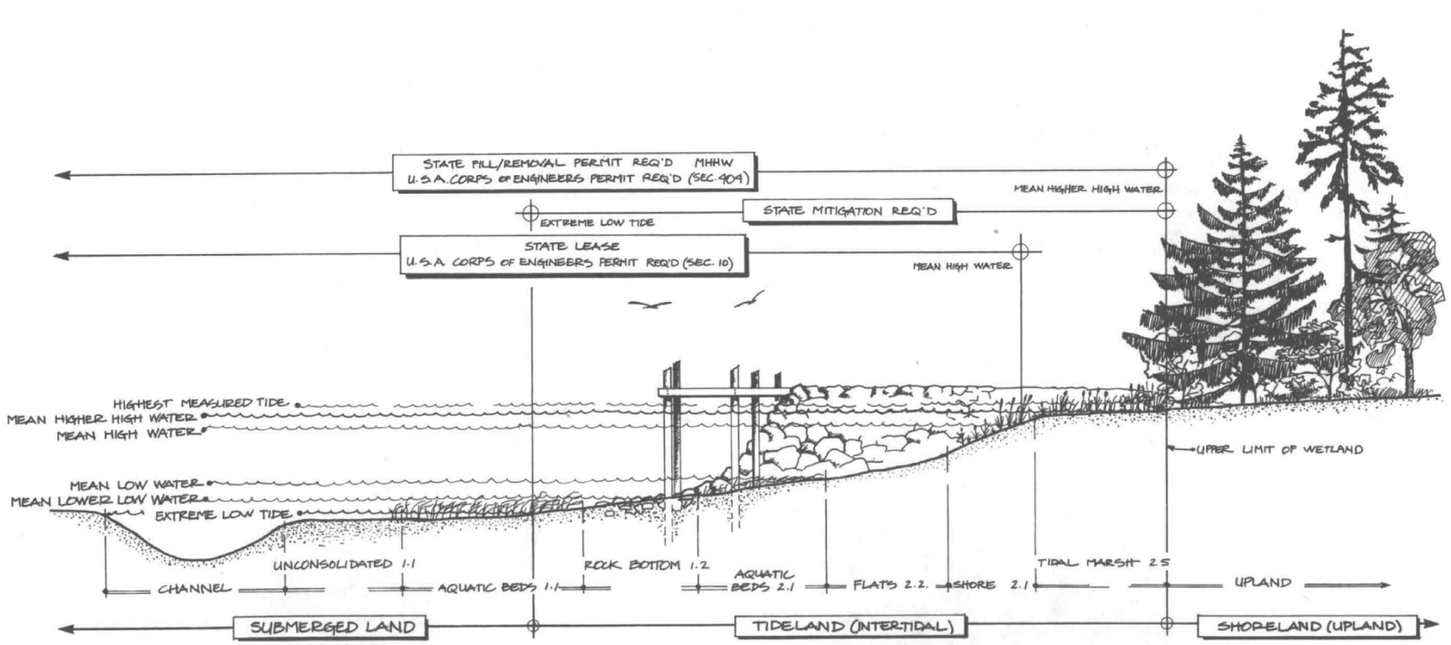
1. Planning and zoning designations are occasionally amended. The mapping here generally reflects planning and zoning as it was acknowledged by LCDC.
2. The scale of the base maps is large. Even where the original mapping is precise, a number of the mapped features are so small that the scale of mapping makes some error possible.
3. Media transfer of map data inevitably involves some minute variation between the base map and the digitized map. Lines on a map plotted at a scale of 1″ = 1000 feet are approximately 20 feet wide on the map. Consequently, even a slightly off-center copy can result in some variation.
4. The base map is dated and, despite updates by ODFW and local governments, may not have kept pace with natural movement of estuarine boundaries. Estuaries are dynamic systems that have and will continue to change in response to natural processes.

The location of the estuarine shoreline on these maps is not intended to describe the limits of local (or state or federal) jurisdiction over wetlands. Wetland mapping in most local plans is necessarily generalized. Determining the exact extent of estuarine influence often requires onsite investigation. For this reason, users of these maps are encouraged to contact relevant local, state and federal agencies to determine the precise location of zoning or other regulatory boundaries.



Map Limits

The maps presented in the Estuary Plan book cover the major part of each estuary. As this map of Siletz Bay and the Siletz River shows, most but not all of the estuary is shown on the map. Estuary and shoreland plans extend upriver to the head of tide, which in the case of the Siletz River is some 14 river miles upstream of the upper limits of the mapping presented here.



Estuary Boundaries

A great variety of terms are used to define and differentiate various parts of the estuary from one another. The terms presented on this chart are important to understanding the location of various habitats as well as the jurisdiction of various agencies charged with wetland planning and regulation.

ESTUARY PLAN MAPS

SHORELAND ZONING SUMMARY

Total Shoreland Area: 11762.3 acres
(Only includes shorelands on the Oregon side of the estuary)

CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		3263.8	27.7	
C2	Highway Commercial	162.6	1.4	5.0
C3	Marine Commercial	29.3	0.2	0.9
C4	Tourist Commercial	63.5	0.5	1.9
EB	East Bank Skipanon	219.5	1.9	6.7
GC	General Commercial	34.0	0.3	1.0
HI	Heavy Industrial	11.9	0.1	0.4
I-1	Light Industrial	62.8	0.5	1.9
I-2	General Industrial	95.5	0.8	2.9
I-3	Water Dependent Industrial	216.0	1.8	6.6
I-4	Airport Development	610.8	5.2	18.7
MI	Marine Industrial	20.3	0.2	0.6
OPR	Open Space, Parks & Rec.	44.4	0.4	1.4
R-H	High Density Residential	30.8	0.3	0.9
R10	Low Density Residential	298.3	2.5	9.1
R10/GM	Low Density Residential	156.4	1.3	4.8
RC	Recreation Commercial	55.6	0.5	1.7
RD	Rural Development	248.7	2.1	7.6
RM	Recreation Management	165.7	1.4	5.1
RM1	Recreation Management	37.8	0.3	1.2
S1	Marine Industrial	212.3	1.8	6.5
S2	General Development	234.9	2.0	7.2
S3	Limited Development	24.8	0.2	0.8
S5	Natural	88.4	0.8	2.7
SC	Shorelands Conservation	5.6	0.0	0.2
TPM	Tongue Point Mediated	133.9	1.1	4.1
RURAL		8498.3	72.3	
AF-20	Agriculture Forestry 20	237.9	2.0	2.8
CS	Conservation Shoreland	2002.8	17.0	23.6
EFU	Exclusive Farm Use	3951.3	33.6	46.5
F-38	Forestry-38	82.5	0.7	1.0
F80	Forestry 80	127.1	1.1	1.5
GC	General Commercial	0.7	0.0	0.0
GI	General Industrial	37.0	0.3	0.4
I-1	Light Industrial	17.6	0.1	0.2
I-2	General Industrial	22.0	0.2	0.3
MI	Marine Industrial	64.2	0.5	0.8
NS	Natural Shorelands	1321.9	11.2	15.6
OPR	Open Space Park Recreation	102.5	0.9	1.2
RA1	Residential Agriculture 1	266.2	2.3	3.1
RA2	Residential Agriculture 2	43.1	0.4	0.5
RA5	Residential Agriculture 5	181.5	1.5	2.1
RM	Recreation Management	4.9	0.0	0.1
SFR1	Single Family Residential	35.1	0.3	0.4

Fort Stevens and various sloughs account for approximately 313 acres. These areas were not included in this analysis because they were not coded as shoreland on the base map. The other shoreland report includes these areas.

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	80811.8	47914.8	47864.1	50.7	0.0	32897.0	86.9	17539.5	0.0	3764.3	11506.3
NATURAL	16557.7	970.1	970.1	0.0	0.0	15587.6	0.0	1870.2	0.0	3085.3	10632.1
A4 8	354.3	203.0	203.0	-	-	151.3	-	151.3	-	-	-
AN 8	623.0	31.7	31.7	-	-	591.3	-	50.3	-	-	541.0
AN 9	248.5	0.0	-	-	-	248.5	-	-	-	-	248.5
AN 10	9566.8	51.6	51.6	-	-	9515.2	-	365.0	-	-	9150.2
AN 11	3235.8	0.0	-	-	-	3235.8	-	-	-	3085.3	150.5
AN 12	331.1	0.0	-	-	-	331.1	-	7.6	-	-	323.5
WA3 3	200.2	0.0	-	-	-	200.2	-	144.3	-	-	55.9
WA3 8	1993.1	683.8	683.8	-	-	1309.3	-	1151.7	-	-	157.6
WA4 4	4.9	0.0	-	-	-	4.9	-	-	-	-	4.9
CONSERVATION	61283.8	44051.1	44006.7	44.4	0.0	17232.7	86.9	15609.2	0.0	679.0	857.6
A2 6	22.6	22.6	22.6	-	-	0.0	-	-	-	-	-
A3 0	6.8	0.0	-	-	-	6.8	6.8	-	-	-	-
A3 5	456.9	406.0	380.3	25.7	-	50.9	-	50.9	-	-	-
A3 6	1796.7	1658.1	1639.4	18.7	-	138.6	1.5	117.2	-	-	19.9
A3 8	89.6	34.3	34.3	-	-	55.3	-	55.3	-	-	-
AC1 10	244.6	0.0	-	-	-	244.6	-	-	-	-	244.6
AC2 0	24499.2	21210.0	21210.0	-	-	3289.2	-	3152.1	-	137.1	-
AC2 8	2149.5	699.9	699.9	-	-	1449.6	55.0	1075.9	-	-	318.7
AC2 10	26965.1	16314.0	16314.0	-	-	10651.1	-	10406.0	-	-	245.1
AC2 12	4783.1	3506.0	3506.0	-	-	1277.1	-	732.3	-	541.9	2.9
HAC 2	58.8	58.8	58.8	-	-	0.0	-	-	-	-	-
WA2 3	182.6	141.4	141.4	-	-	41.2	23.6	17.6	-	-	-
WA2 4	28.3	0.0	-	-	-	28.3	-	1.9	-	-	26.4
DEVELOPMENT	2970.3	2893.6	2887.3	6.3	0.0	76.7	0.0	60.1	0.0	0.0	16.6
A1 5	85.1	83.6	77.3	6.3	-	1.5	-	1.5	-	-	-
A1 6	115.3	98.5	98.5	-	-	16.8	-	15.2	-	-	1.6
A1 7	36.5	36.5	36.5	-	-	0.0	-	-	-	-	-
A1 8	152.3	138.2	138.2	-	-	14.1	-	14.1	-	-	-
AD 0	1.3	1.3	1.3	-	-	0.0	-	-	-	-	-
AC 1	2267.8	2267.8	2267.8	-	-	0.0	-	-	-	-	-
AS 8	72.6	59.3	59.3	-	-	13.3	-	13.3	-	-	-
AD 10	2.3	0.0	-	-	-	2.3	-	2.3	-	-	-
HAD 2	44.0	30.3	30.3	-	-	13.7	-	13.7	-	-	-
WA1 3	23.5	23.5	23.5	-	-	0.0	-	-	-	-	-
WA1 4	169.6	154.6	154.6	-	-	15.0	-	-	-	-	15.0

HABITAT SUMMARY

HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC	ACRES IN ED
ALL HABITATS		80811.8	100.000%	16557.7	61283.8	2970.3
UNCONSOLIDATED BOTTOM						
1.1	Unspecified	93.8	0.116%	-	93.8	-
1.1.1	Sand	44023.2	54.476%	764.8	40688.9	2569.5
1.1.2	Sand/Mud (Mixed)	3747.1	4.637%	205.3	3224.0	317.8
ROCK BOTTOM						
1.2	Unspecified	50.7	0.063%	-	44.4	6.3
SHORE						
2.1	Shore	23.6	0.029%	-	23.6	-
2.1.2	Sand/Mud (Mixed)	55.0	0.068%	-	55.0	-
2.1.7	Boulder	8.3	0.010%	-	8.3	-
FLAT						
2.2	Flat	74.5	0.092%	8.2	66.3	-
2.2.1	Sand	7135.3	8.830%	331.4	6800.1	3.8
2.2.2	Sand/Mud (Mixed)	10248.7	12.682%	1530.6	8661.8	56.3
2.2.3	Mud	81.0	0.100%	-	81.0	-
BEACH/BAR						
2.4.1	Sand	3764.3	4.658%	3085.3	679.0	-
2.4.6	Cobble/Gravel	-	0.000%	-	-	-
TIDAL MARSH						
2.5.11	Low Salt Marsh	989.9	1.225%	865.4	107.9	16.6
2.5.12	High Salt Marsh	498.4	0.617%	345.7	152.7	-
2.5.13	Fresh Marsh	5727.9	7.088%	5482.1	245.8	-
2.5.14	Shrub Marsh	4290.1	5.309%	3938.9	351.2	-

SPECIAL SHORELAND SITES

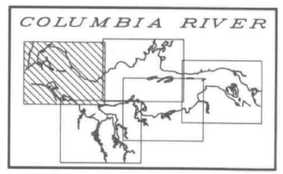
CODE	NAME/Comments	Capacity (Cubic Yards)	Size (Acres)	Zone
DREDGED MATERIAL DISPOSAL SITES				
DMD 11E	ESTUARY 5-YEAR CAPACITY	550,000	--	ED
DMD 13	SMALL BOAT BASIN	46,000	3.0	C2
DMD 14	ENTRANCE CHANNEL	52,000	3.5	C2
DMD 25S	NE KING AVE	1,850,000	115.0	WDR
DMD 33	LEWIS & CLARK RIVER (For maintenance dredging of CZ boom/raft areas.)	210,000	13.0	--
DMD 46	SVENSEN ISLAND	1,100,000	144.0	--
DMD 78	BRADWOOD	625,000	39.0	--
PRIORITY II SITES				
DMD 19S	FORT STEVENS HWY 1	306,000	19.0	--
DMD 20AS	WARRENTON LUMBER	56,000	3.5	--
DMD 20S	SEWAGE LAGOON	516,000	32.0	--
DMD 21S	FORT STEVENS HWY 2	290,000	18.0	--
DMD 22S	NE 1ST ST	306,000	19.0	--
DMD 23S	(Unnamed Site)	2,400,000	150.0	--
DMD 24S	(Unnamed Site)	1,000,000	67.0	--
DMD 26S	(Unnamed Site)	209,000	13.0	--
DMD 27S	(Unnamed Site)	145,000	9.0	--
DMD 44	JOHN DAY RIVER (RM 39)	720,000	45.0	--
DMD 90	WESTPORT (RM 43)	112,000	70.0	--
MITIGATION AND RESTORATION SITES				
MIT 13	ASTORIA AIRPORT Construct new dike upland of old dike; Remove old dike.		18.0	--
MIT 41	SVENSEN ISLAND Reconstruct cross dike; breach existing dike at 200 foot intervals.		149.0	EFU-38
MIT 6	SWASH LAKE Excavate dunes and open tidal channels to enlarge marsh.		40.0	CS
MIT 9	HOLBROOK SLOUGH Breach dike after constructing new dike adjacent to railroad bed.		37.0	I3

WATER-DEPENDENT DEVELOPMENT SITES

WDD A1	SOUTH ASTORIA Two parcels fronting Young's Bay. Access to Hwy 202.	8.0	S1
WDD A2	PORT OF ASTORIA Size does not include 31.5 acres of water. Access to rail, main channel and US 30. About half vacant.	58.5	S1
WDD A3	ASTORIA PLYWOOD CORP Adjacent to water-dependent mill.	6.0	--
WDD A4	EAST MOORING BASIN Adjacent to basin. Rail, channel & highway access.	12.0	S1
WDD A5	TONGUE POINT 70 acres of developable water area.	143.0	TPM
WDD H1	HAMMOND BOAT BASIN 2.5 acres are developed. Remainder reserved for boat basin related development.	49.5	C2
WDD H2	HAMMOND 4 acres developed. Site reserved for marine industries and supporting uses.	11.0	I1
WDD W1	EAST BANK SKIPANON RIVER Reserved for large scale water dependent use.	172.0	EB
WDD W2	WEST BANK SKIPANON RIVER 97 acres existing mill site. 12.2 acres undeveloped.	109.0	I3
WDD W3	TANSY POINT Reserved for large water-dependent use.	109.5	I3

COLUMBIA RIVER

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING



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BAKER BAY

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ILWACO

Cape Disappointment

Peacock Spit

Sand Island

WASHINGTON
OREGON

CHINOOK

Scarboro Hill

Chinook Point

McGOWAN

MEGLER

PACIFIC OCEAN

Cleatsop Spit

TRESTLE BAY

HAMMOND

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12AC2

11 AN

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AN

CS

NS

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RM

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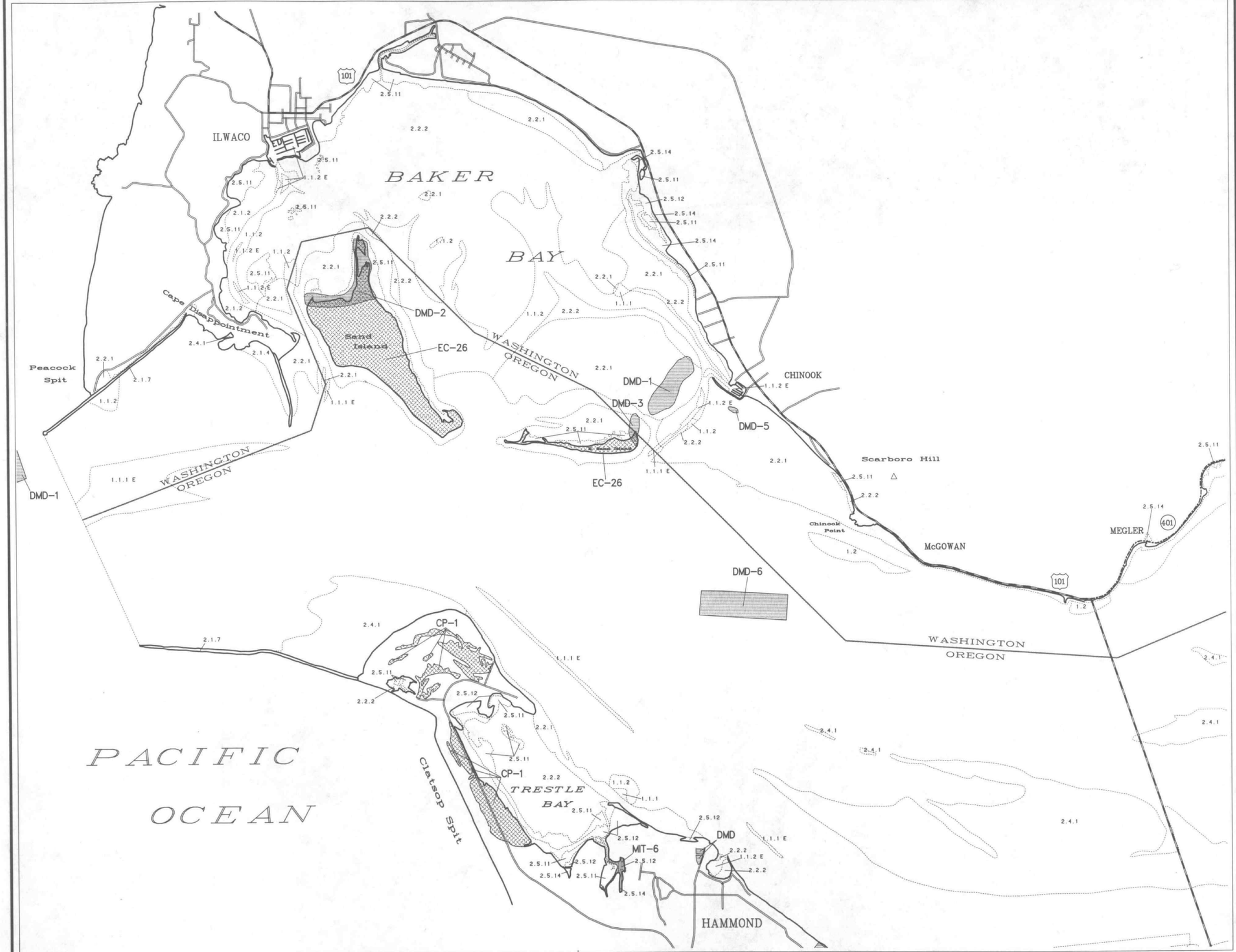
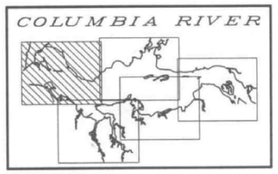
COLUMBIA RIVER

ESTUARINE HABITATS & PROTECTED SITES





COLUMBIA RIVER

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING

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YOUNGS BAY
ALDER COVE
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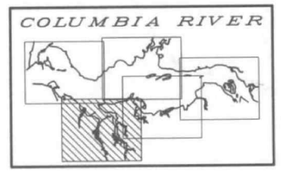
COLUMBIA RIVER

ESTUARINE HABITATS & PROTECTED SITES



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ODOE GEOGRAPHIC INFORMATION SERVICES

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WARRENTON
ASTORIA
YOUNGS BAY
ALDER COVE
ASTORIA COLUMN
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DMD-2
DMD-3
DMD-4
DMD-5
DMD-6
DMD-7
DMD
MIT-9
MIT-13
MIT-19
MIT-20
MIT-23
MIT-24
MIT-25
MIT-26
MIT-29
MIT-30
MIT-31
MIT-32
MIT-33
LY-22
HAB-LY22
H-EC28(1)
H-EC28(2)
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101
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202

COLUMBIA RIVER

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING

OREGON

COLUMBIA RIVER

GRAYS BAY

EC2

EC2

EC2

WASHINGTON
OREGON

WASHINGTON
OREGON

WASHINGTON
OREGON

KNAPPTON

ALTOONA

401

403

4

Rocky Point

Grays Point

Portuguese Point

Pigeon Bluff

Harrington Point

Rice Island

Miller Sands

Tongue Point

Mott Island

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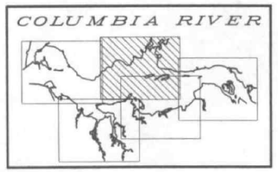
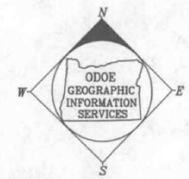
COLUMBIA RIVER

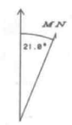
ESTUARINE HABITATS & PROTECTED SITES





COLUMBIA RIVER

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING



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EC2
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Miller Sands
Tongue Point
Mott Island
Lois Island
Svenson Island
SVENSEN
KNAPPA
01AD
06A3
07A-1
S1
S2
S3
S5
TPM
09AN
RA1
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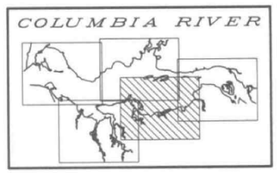
COLUMBIA RIVER

ESTUARINE HABITATS & PROTECTED SITES



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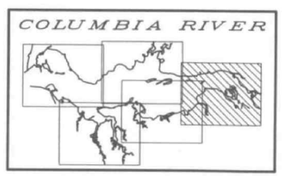
COLUMBIA RIVER

ESTUARINE MANAGEMENT UNITS
& SHORELAND ZONING



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OREGON
EC2
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EFU
Aldrich Point
Tenasillahe Island
BROWNSMEAD
CLIFTON
AF-20
RA5
10AD
M1
BRADWOOD
STUDY AREA LIMIT
CATHLAMET
NS
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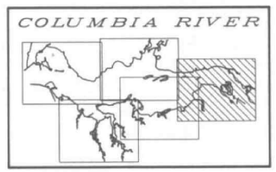
COLUMBIA RIVER

ESTUARINE HABITATS & PROTECTED SITES



DMD-4
DMD-5
DMD-6
DMD-7
DMD-8
DMD-9
DMD-10
DMD-11
DMD-14
DMD-15
DMD-16
DMD-17
DMD-19
H-EC26
H-EC29(3)
H-EC30
H-EC30
HAB-EC31
HAB-EC31
HAB-EC34
WASHINGTON
OREGON
WASHINGTON
OREGON
Tenasillahe Island
SKAMOKOWA
BROWNSMEAD
CLIFTON
BRADWOOD
CATHLAMET
KNAPPA
STUDY AREA LIMIT
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ODOE GEOGRAPHIC INFORMATION SERVICES

SHORELAND ZONING SUMMARY

Total Shoreland Area: 2414.4 acres

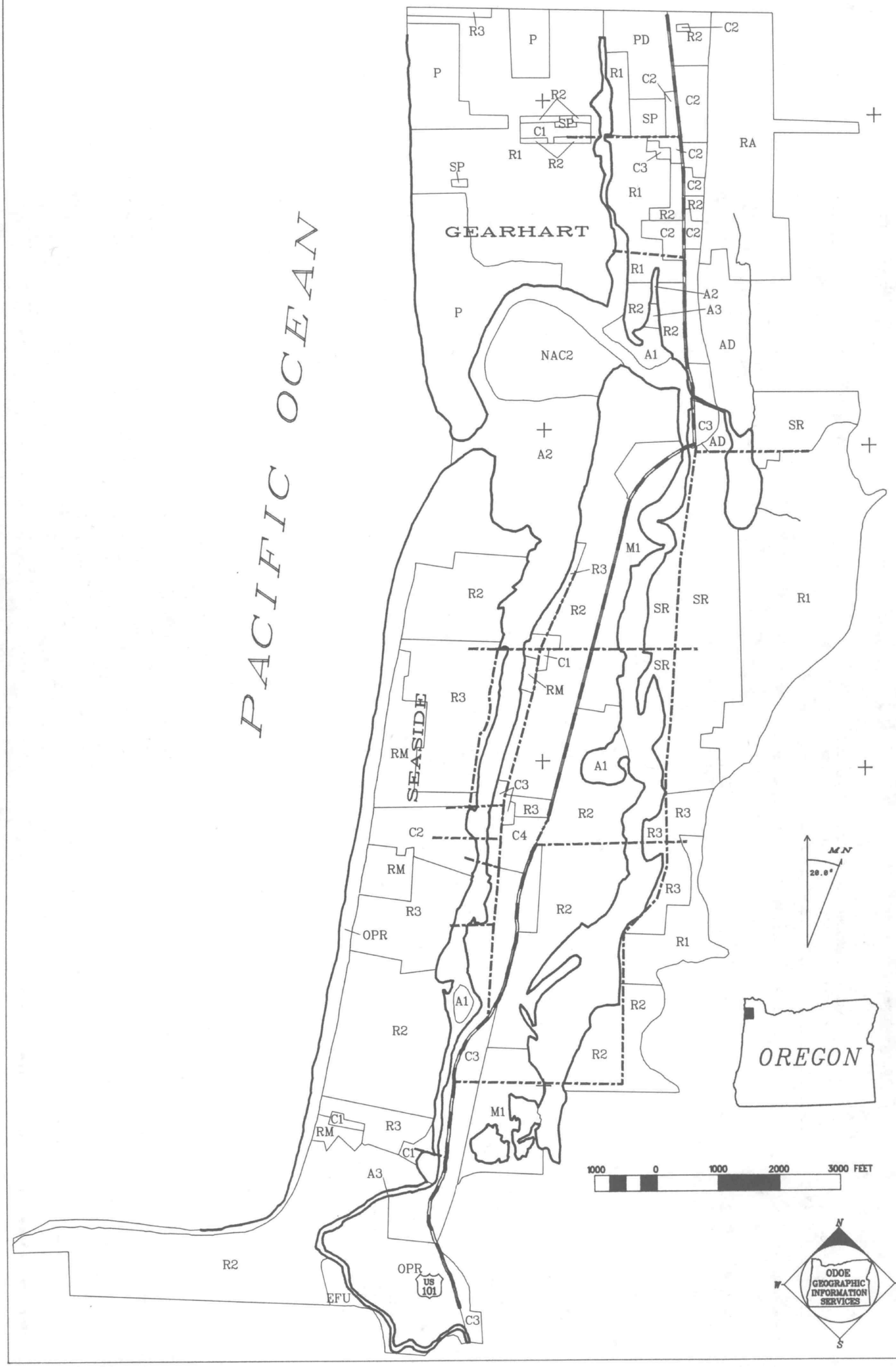
CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		2410.7	99.8	
AD	Airport Development	46.9	1.9	1.9
C1	Neighborhood Commercial	16.5	0.7	0.7
C2	Resort Commercial	67.3	2.8	2.8
C3	General Commercial	107.3	4.4	4.5
C4	Central Commercial	15.7	0.7	0.7
EFU	Exclusive Farm Use	6.6	0.3	0.3
M1	Industrial	101.9	4.2	4.2
OPR	Open Space, Parks & Recreation	179.7	7.4	7.5
P	Parks and Open Space	150.8	6.2	6.3
PD	Recreation Commercial Planned Development	28.7	1.2	1.2
R1	Residential Low Density	483.6	20.0	20.1
R2	Residential Medium Density	652.4	27.0	27.1
R3	Residential High Density	189.2	7.8	7.8
RA	Rural Agriculture	117.9	4.9	4.9
RM	Resort Motel	57.5	2.4	2.4
SP	Semi-Public	10.1	0.4	0.4
SR	Suburban Residential	178.6	7.4	7.4
RURAL		3.7	0.2	
EFU	Exclusive Farm Use	3.7	0.2	100.0

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	450.8	179.1	179.1	0.0	0.0	271.7	16.4	117.8	4.1	1.4	132.0
NATURAL											
A 1	19.3	0.0	-	-	-	19.3	1.0	-	-	-	18.3
CONSERVATION	431.5	179.1	179.1	-	-	252.4	15.4	117.8	4.1	1.4	113.7
A 2	360.5	168.8	168.8	-	-	191.7	15.4	58.8	4.1	1.4	112.0
A 3	12.0	10.3	10.3	-	-	1.7	-	-	-	-	1.7
NAC 2	59.0	0.0	-	-	-	59.0	-	59.0	-	-	-

NECANICUM RIVER

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING



HABITAT SUMMARY

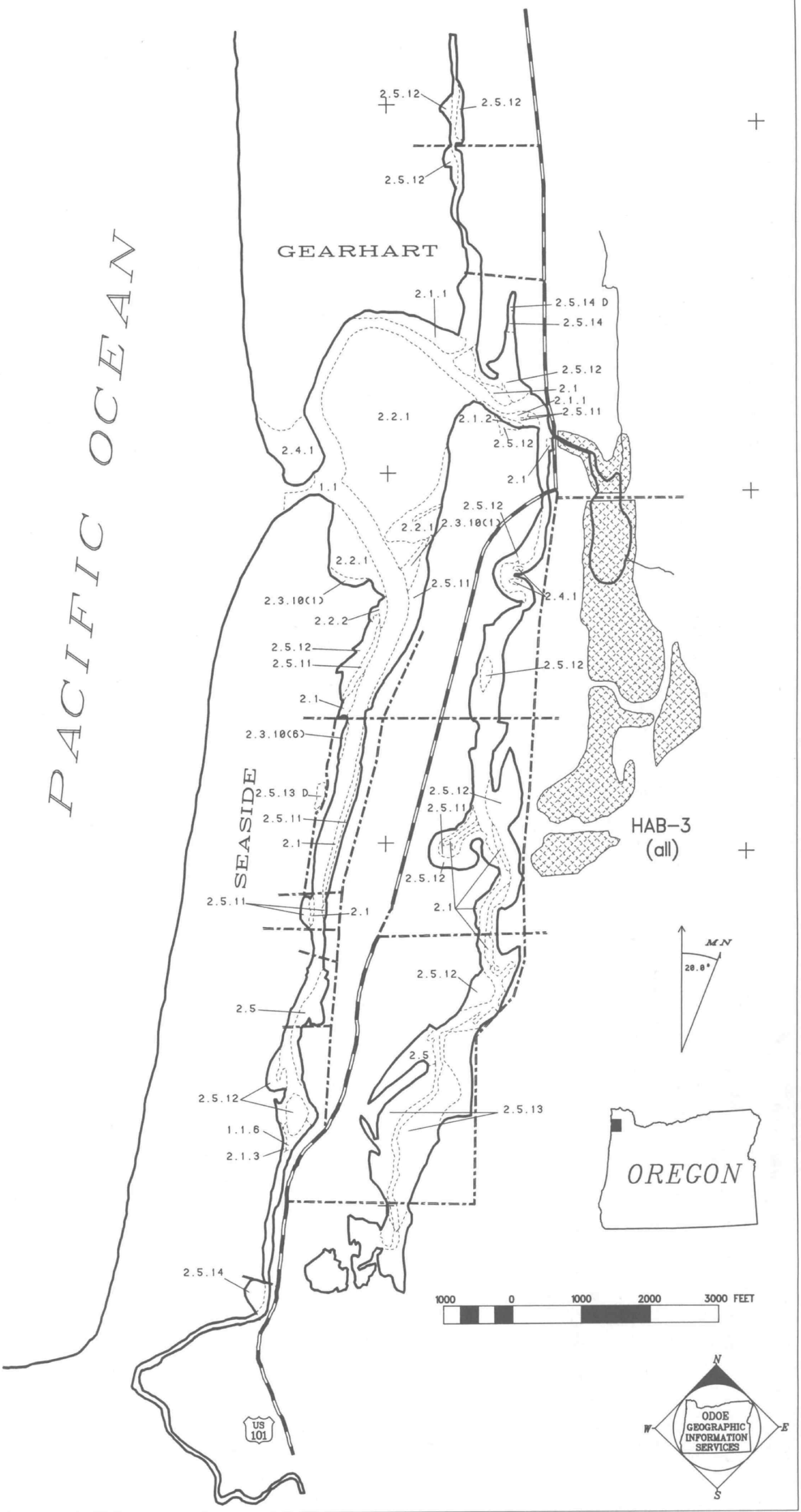
HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC
ALL HABITATS		450.8	100.0%	19.3	431.5
UNCONSOLIDATED BOTTOM					
1.1	Unspecified Type	177.6	39.4%	0.0	177.6
1.1.6	Cobble/Gravel	1.5	0.3%	0.0	1.5
SHORE					
2.1	Unspecified Type	13.2	2.9%	1.0	12.2
2.1.1	Sand	2.2	0.5%	0.0	2.2
2.1.2	Sand/Mud (Mixed)	0.5	0.1%	0.0	0.5
2.1.3	Mud	0.5	0.1%	0.0	0.5
FLAT					
2.2.1	Sand	116.4	25.8%	0.0	116.4
2.2.2	Sand/Mud (Mixed)	1.4	0.3%	0.0	1.4
AQUATIC BED					
2.3.10(1)	Algae on Sand	3.4	0.8%	0.0	3.4
2.3.10(6)	" on Cobble/Gravel	0.7	0.2%	0.0	0.7
BEACH/BAR					
2.4.1	Sand	1.4	0.3%	0.0	1.4
TIDAL MARSH					
2.5.11	Low Salt Marsh	16.5	3.7%	2.6	13.9
2.5.12	High Salt Marsh	77.9	17.3%	15.7	62.2
2.5.13	Fresh Marsh	34.6	7.7%	0.0	34.6
2.5.14	Shrub Marsh	3.0	0.7%	0.0	3.0

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Size	Zone
SIGNIFICANT HABITAT SITE			
HAB 3	STANLEY LAKE Wetland waterfowl habitat; coho spawning area; warmwater fish.	67.0	A3

NECANICUM RIVER

ESTUARINE HABITATS & PROTECTED SITES



SHORELAND ZONING SUMMARY

Total Shoreland Area: 3016.2 acres

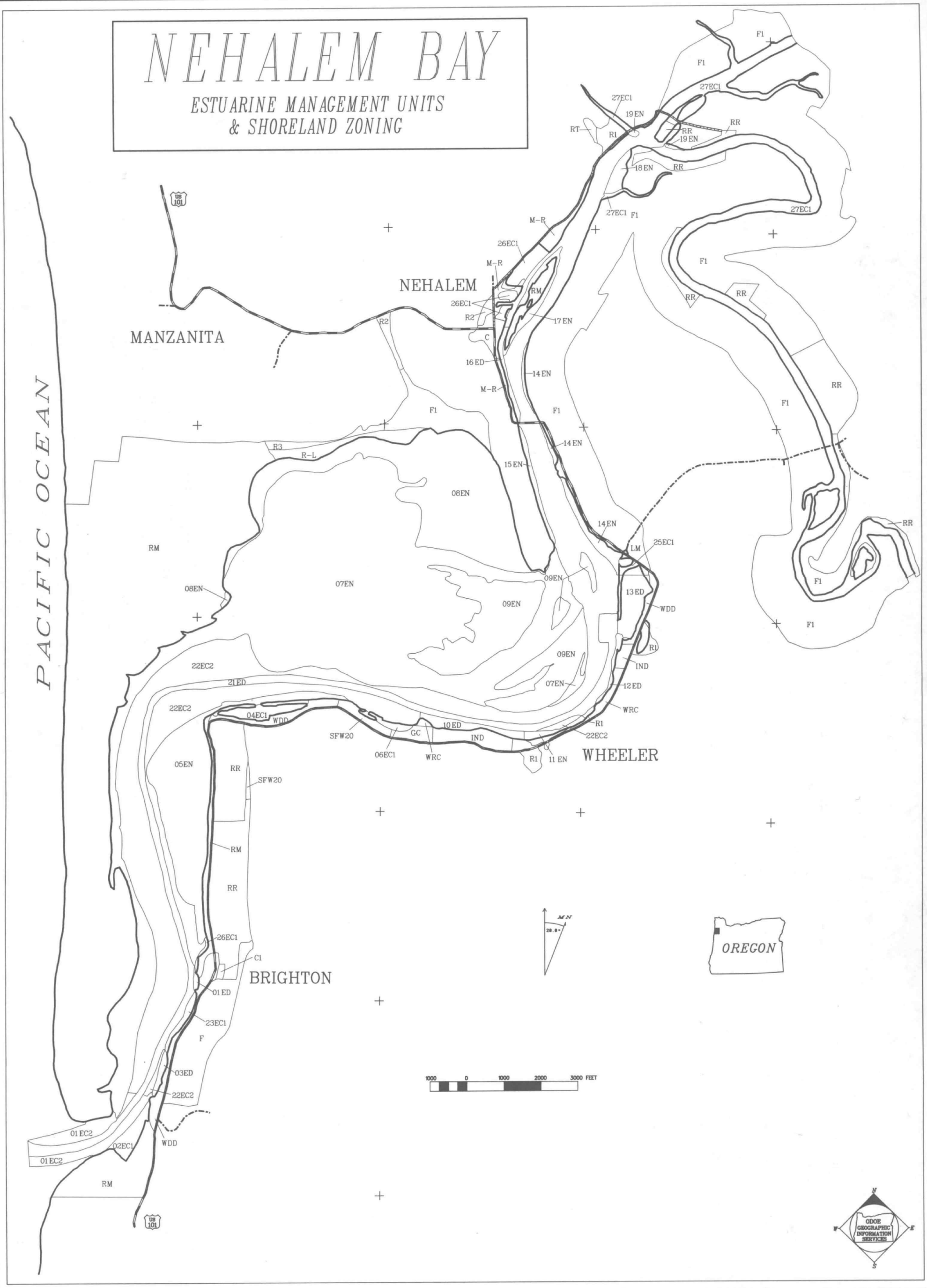
CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		155.3	5.2	
C	Commercial	13.8	0.5	8.9
GC	General Commercial	8.6	0.3	5.6
IND	Water Related Industrial	25.7	0.9	16.5
M-R	Marine Residential	20.6	0.7	13.3
R-L	Low Density Residential	24.0	0.8	15.5
R1	Residential Type 1	30.0	1.0	19.3
R2	Residential Type 2	10.9	0.4	7.0
R3	High Density Urban Res	10.0	0.3	6.4
RT	Residential - Trailer	2.8	0.1	1.8
WRC	Water-Related Commercial	8.9	0.3	5.7
RURAL		2860.9	94.8	
C	Commercial	0.3	0.0	0.0
C1	Neighborhood Commercial	1.7	0.1	0.1
F	Forest	83.5	2.8	2.9
F1	Farm (Exclusive Farm Use)	1329.9	44.1	46.5
LM	Light Industrial	9.0	0.3	0.3
M-R	Marine Residential	0.5	0.0	0.0
RM	Recreation Management	1126.0	37.3	39.4
RR	Rural Residential	253.3	8.4	8.9
SFW20	Small Farm or Woodlot - 20	11.1	0.4	0.4
WDD	Water Dependent Development	45.4	1.5	1.6

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	2749.0	1000.9	991.0	0.0	9.9	1748.1	157.5	400.7	641.9	23.4	524.6
NATURAL	1610.6	18.1	11.8	0.0	6.3	1592.5	117.3	385.9	627.1	0.0	462.2
EN 5	153.7	11.4	5.1	-	6.3	142.3	3.1	101.9	37.3	-	-
EN 7	940.9	0.0	-	-	-	940.9	82.9	284.0	512.1	-	61.9
EN 8	263.9	0.0	-	-	-	263.9	-	-	72.9	-	191.0
EN 9	192.7	0.0	-	-	-	192.7	-	-	-	-	192.7
EN 11	5.3	0.0	-	-	-	5.3	2.7	-	1.6	-	1.0
EN 14	19.5	6.2	6.2	-	-	13.3	8.8	-	3.2	-	1.3
EN 15	8.9	0.0	-	-	-	8.9	8.9	-	-	-	-
EN 17	15.1	0.0	-	-	-	15.1	10.6	-	-	-	4.5
EN 18	8.7	0.0	-	-	-	8.7	-	-	-	-	8.7
EN 19	1.9	0.5	0.5	-	-	1.4	0.3	-	-	-	1.1
CONSERVATION	951.7	837.4	833.8	0.0	3.6	114.3	32.2	14.0	8.4	23.4	36.3
EC1 2	13.9	0.0	-	-	-	13.9	-	11.9	1.2	-	0.8
EC1 4	13.6	0.0	-	-	-	13.6	-	-	-	-	13.6
EC1 6	1.0	0.0	-	-	-	1.0	-	-	-	-	1.0
EC1 23	5.6	3.6	-	-	3.6	2.0	-	-	2.0	-	-
EC1 25	2.2	0.0	-	-	-	2.2	-	-	-	-	2.2
EC1 26	14.3	0.0	-	-	-	14.3	-	-	1.6	-	12.7
EC1 27	216.2	199.0	199.0	-	-	17.2	11.9	2.1	-	-	3.2
EC2 1	42.3	16.9	16.9	-	-	25.4	4.9	-	2.2	18.3	-
EC2 22	642.6	617.9	617.9	-	-	24.7	15.4	-	1.4	5.1	2.8
DEVELOPMENT	186.7	145.4	145.4	0.0	0.0	41.3	8.0	0.8	6.4	0.0	26.1
ED 1	1.4	1.4	1.4	-	-	-	-	-	-	-	-
ED 3	4.1	2.4	2.4	-	-	1.7	1.0	-	0.7	-	-
ED 10	13.0	3.4	3.4	-	-	9.6	6.6	-	2.0	-	1.0
ED 12	5.7	0.0	-	-	-	5.7	-	-	3.7	-	2.0
ED 13	24.1	0.2	0.2	-	-	23.9	-	0.8	-	-	23.1
ED 16	6.8	6.8	6.8	-	-	0.0	-	-	-	-	-
ED 21	131.6	131.2	131.2	-	-	0.4	0.4	-	-	-	-

NEHALEM BAY

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING



HABITAT SUMMARY

HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC	ACRES IN ED
ALL HABITATS		2749.0	100.0%	1610.6	951.7	186.7
UNCONSOLIDATED BOTTOM						
1.1	Unspecified Type	991.0	36.0%	11.8	833.8	145.4
AQUATIC BED						
1.3.9	Seagrass	9.9	0.4%	6.3	3.6	0.0
SHORE						
2.1	Unspecified Type	12.5	0.5%	0.3	12.2	0.0
2.1.1	Sand	77.1	2.8%	77.1	0.0	0.0
2.1.2	Sand/Mud (Mixed)	35.4	1.3%	32.6	2.8	0.0
2.1.3	Mud	18.5	0.7%	5.8	6.1	6.6
2.1.5	Wood Debris/Organic	7.4	0.3%	0.8	6.2	0.4
2.1.6	Cobble/Gravel	0.7	0.0%	0.7	0.0	0.0
2.1.7	Boulder	5.9	0.2%	0.0	4.9	1.0
FLAT						
2.2	Unspecified Type	2.9	0.1%	0.0	2.1	0.8
2.2.1	Sand	317.0	11.5%	305.1	11.9	0.0
2.2.2	Sand/Mud (Mixed)	76.0	2.8%	76.0	0.0	0.0
2.2.6	Cobble/Gravel	4.8	0.2%	4.8	0.0	0.0
AQUATIC BED						
2.3.9	Seagrass	223.3	8.1%	217.4	1.4	4.5
2.3.9(1)	Seagrass on Sand	1.2	0.0%	1.2	0.0	0.0
2.3.9(3)	Seagrass on Mud	1.2	0.0%	0.0	0.0	1.2
2.3.9/10	Seagrass/Algae	330.8	12.0%	330.8	0.0	0.0
2.3.10	Algae	57.9	2.1%	57.9	0.0	0.0
2.3.10(1)	Algae on Sand	6.8	0.2%	6.8	0.0	0.0
2.3.10(6)	" on Cobble/Gravel	16.1	0.6%	11.8	3.6	0.7
2.3.10(7)	" on Boulder	4.6	0.2%	1.2	3.4	0.0
BEACH/BAR						
2.4.1	Sand	23.4	0.9%	0.0	23.4	0.0
TIDAL MARSH						
2.5	Unspecified Type	3.2	0.1%	0.0	3.2	0.0
2.5.11	Low Salt Marsh	213.6	7.8%	184.0	18.5	11.1
2.5.12	High Salt Marsh	295.4	10.7%	278.2	2.2	15.0
2.5.14	Shrub Marsh	12.4	0.5%	0.0	12.4	0.0

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Capacity (Cubic Yards)	Size	Zone
DREDGED MATERIAL DISPOSAL SITES				
DMD 1	SOUTH JETTY	225,000	27.5	RM
DMD 14A	BOAT RAMP	83,080	5.4	F1
	Unmapped. Probably Filled to Capacity			
DMD 15A	NTCSD	330,750	22.1	F1
	Not mapped.			
DMD 2	NEDONNA BEACH	160,000	25.0	RM
DMD 23	STATE PARK AIR STRIP	629,000	65.0	RM
	Not mapped.			
DMD 24	STATE PARK CAMPGROUND	510,000	53.0	RM
	Not mapped.			
DMD 25	STATE PARK MIDDLE	250,000	26.0	RM
DMD 26	STATE PARK SOUTH	290,000	30.0	RM
DMD 4	ED'S MOORAGE	8,500	1.8	WDD
	Not mapped.			
SIGNIFICANT HABITAT SITES				
HAB 5	WETLAND		0.0	F1
	Large forested wetland, Unmapped.			
HAB 6	PIGEON		0.0	RL
	Pigeon watering area. Also in Tillamook County jurisdiction, zoned F-1. Unmapped.			
HAB 7	PLOVER		0.0	RM
	Snowy plover nesting habitat. Unmapped.			
MITIGATION AND RESTORATION SITES				
MIT 1	DEAN POINT		10.0	EN
	Breach dike to create high salt marsh.			
MIT 2	WHEELER		4.2	
	Breach dike to create high salt marsh.			
MIT 2	WHEELER		8.0	R-1
MIT 3	MCCOY'S MARSH		5.8	25 EC1
	Breach dike to create high salt marsh.			
MIT 4	ALDER CREEK		38.3	F-1
	Remove tidegates and regrade pasture to create intertidal marsh.			
MIT 7	NEHALEM SPIT		22.0	RM
	Grade and remove logs at mouth of inlet to increase tidal flows.			
WATER DEPENDENT DEVELOPMENT SITES				
WDD 10	JETTY FISHERY		0.0	WDD
	Recreational Moorage			
DD 5	BOTTS MARSH		20.0	WDD
	Marina, aquaculture, water-dependent industry.			
WDD 8	FISHERY POINT		0.0	WDD
	Aquaculture			
WDD 9	BRIGHTON MOORAGE			WDD
	Recreational Moorage.			

NEHALEM BAY

ESTUARINE HABITATS & PROTECTED SITES

PACIFIC OCEAN

NEHALEM

MANZANITA

WHEELER

BRIGHTON

MIT-1(4)
MIT-1(1)
MIT-1(3)
MIT-1(2)
MIT-1(7)
DMD-1(25)
DMD-1(26)
DMD-1(1)
DMD-1(2)

2.5.11 2.5 2.2 2.1 2.5.11 2.1 2.5.12 2.5.14 2.1.5 2.1.6 2.5.11 2.1 2.5.12 2.1.2 2.5 D 2.1.2 2.1.2 2.1 2.1 2.1.3 2.1.6 2.3.9 2.5.11 2.3.10 2.3.9/10 2.3.9 2.5.12 2.3.10 2.5.12 2.1.2 2.3.10(6) 2.5 D 2.3.10 2.3.9/10 2.5.12 2.2.6 2.5.11 2.2 2.5.12 2.5.12 2.3.9 2.1.5 2.2.2 2.5.12 2.5.11 2.3.9 2.2.1 2.5.11 2.5.12 2.3.10 2.3.9/10 2.3.9 2.3.9 2.1.2 1.1 1.3.9 2.3.9 2.5.11 2.3.9 2.3.9(3) 2.1.3 2.5.11 2.3.10(1) 2.4.1 2.5.11 2.1.3 2.3.9 2.2.1 2.3.10(6) 2.3.9(1) 2.3.9 2.3.10(1) 2.3.10(6) 2.2.1 2.3.9 1.3.9 2.1.1 1.3.9 2.3.10(6) 2.3.10(7) 2.1.7 2.3.10(7) 2.1.7 2.4.1 2.5.11 2.2.1 2.3.10(7)

1000 0 1000 2000 3000 FEET

MN 20.6°

OREGON

N W E S ODOE GEOGRAPHIC INFORMATION SERVICES

SHORELAND ZONING SUMMARY

Total Shoreland Area: 5480.0 acres

CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		775.4	14.1	
CC	Commercial Central	71.2	1.3	9.2
CH	Commercial Highway	125.0	2.3	16.1
F	Forest	17.1	0.3	2.2
F1	Farm (Exclusive Farm Use)	54.9	1.0	7.1
I-1	General Industrial	27.0	0.5	3.5
I-L	Industrial - Light	32.5	0.6	4.2
O	Open Space	3.0	0.1	0.4
PUB	Public Facilities	37.3	0.7	4.8
R-O	Resource Open Space	152.8	2.8	19.7
R1	Medium Density Residential	159.7	2.9	20.6
SFW20	Small Farm or Woodlot - 20	3.9	0.1	0.5
WD1	Water Dependent Dev. I	56.7	1.0	7.3
WD2	Water Dependent Dev. II	34.2	0.6	4.4
RURAL		4704.6	85.9	
C1	Neighborhood Commercial	5.0	0.1	0.1
C2	Community Commercial	47.0	0.9	1.0
F	Forest	2296.7	41.9	48.8
F1	Farm (Exclusive Farm Use)	829.4	15.1	17.6
LM	Light Industry	4.6	0.1	0.1
M1	General Industry	3.5	0.1	0.1
PUB	Public Facilities	33.3	0.6	0.7
R1	Low Density Urban Res.	19.8	0.4	0.4
R2	Medium Density Urban Res.	10.0	0.2	0.2
R3	High Density Urban Res.	4.0	0.1	0.1
RM	Recreation Management	1022.8	18.7	21.7
RR2	Rural Residential - 2	81.0	5.1	6.0
SFW10	Small Farm or Woodlot - 10	13.3	0.2	0.3
SFW20	Small Farm or Woodlot - 20	132.5	2.4	2.8
WDD	Water Dependent Development	1.8	0.0	0.0

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	9216.3	2123.1	2082.3	0.0	40.8	7093.2	113.2	4113.1	1982.5	0.0	884.4
NATURAL	4762.7	103.3	63.4	0.0	39.9	4659.4	53.4	2710.8	1048.2	0.0	847.0
EN 1	19.5	0.0	-	-	-	19.5	-	10.3	-	-	9.2
EN 4	54.6	0.0	-	-	-	54.6	20.6	16.0	18.0	-	-
EN 5	20.3	0.0	-	-	-	20.3	11.1	-	7.7	-	1.5
EN 8	185.4	0.0	-	-	-	185.4	-	74.9	86.7	-	23.8
EN 12	773.3	28.1	28.1	-	-	745.2	21.7	343.1	360.7	-	19.7
EN 15	340.8	0.0	-	-	-	340.8	-	333.1	7.7	-	-
EN 17	473.7	27.2	-	-	27.2	446.5	-	308.6	137.9	-	-
EN 18	15.7	0.0	-	-	-	15.7	-	-	-	-	15.7
EN 19	556.2	12.7	-	-	12.7	543.5	-	451.1	92.4	-	-
EN 22	74.0	0.0	-	-	-	74.0	-	33.5	40.5	-	-
EN 24	55.2	0.0	-	-	-	55.2	-	55.2	-	-	-
EN 27	813.3	24.1	24.1	-	-	789.2	-	601.6	42.0	-	145.6
EN 28	29.6	0.0	-	-	-	29.6	-	-	-	-	29.6
EN 30	972.8	11.2	11.2	-	-	961.6	-	463.1	254.6	-	243.9
EN 34	283.9	0.0	-	-	-	283.9	-	-	-	-	283.9
EN 37	31.3	0.0	-	-	-	31.3	-	20.3	-	-	11.0
EN 39	63.1	0.0	-	-	-	63.1	-	-	-	-	63.1
					0.0						
CONSERVATION	4320.7	1942.2	1941.3	0.0	0.9	2378.5	59.8	1376.2	905.1	0.0	37.4
EC1 6	25.6	4.0	4.0	-	-	21.6	-	16.8	4.8	-	-
EC1 8	7.6	7.6	7.6	-	-	0.0	-	-	-	-	-
EC1 9	15.8	0.0	-	-	-	15.8	-	-	-	-	15.8
EC1 10	3.5	3.5	3.5	-	-	0.0	-	-	-	-	-
EC1 13	88.6	76.7	76.7	-	-	11.9	-	9.7	2.2	-	-
EC1 20	30.0	30.0	30.0	-	-	0.0	-	-	-	-	-
EC1 21	21.8	0.0	-	-	-	21.8	-	-	21.8	-	-
EC1 29	188.4	187.1	187.1	-	-	1.3	-	-	-	-	1.3
EC1 31	9.3	9.3	9.3	-	-	0.0	-	-	-	-	-
EC1 32	4.6	4.6	4.6	-	-	0.0	-	-	-	-	-
EC1 33	15.1	15.1	15.1	-	-	0.0	-	-	-	-	-
EC1 35	68.4	68.4	68.4	-	-	0.0	-	-	-	-	-
EC1 36	17.7	17.7	17.7	-	-	0.0	-	-	-	-	-
EC1 38	41.3	1.2	1.2	-	-	40.1	34.6	2.7	1.1	-	1.7
EC1 40	81.5	51.1	51.1	-	-	30.4	21.2	-	-	-	9.2
EC1 43	34.8	34.8	34.8	-	-	0.0	-	-	-	-	-
EC1 44	7.0	7.0	7.0	-	-	0.0	-	-	-	-	-
EC2 2	379.2	371.7	371.7	-	-	7.5	0.1	7.4	-	-	-
EC2 7	36.3	10.3	10.3	-	-	26.0	-	21.8	4.2	-	-
EC2 11	4.3	0.2	0.2	-	-	4.1	-	1.8	2.3	-	-
EC2 14	1026.9	982.3	982.1	-	0.2	44.6	3.9	38.9	1.8	-	-
ECA 25	2213.0	59.6	58.9	-	0.7	2153.4	-	1277.1	866.9	-	9.4
DEVELOPMENT	132.9	77.6	77.6	0.0	0.0	55.3	0.0	26.1	29.2	0.0	0.0
ED 3	102.5	77.6	77.6	-	-	24.9	-	9.3	15.6	-	-
ED 23	30.4	0.0	-	-	-	30.4	-	16.8	13.6	-	-

TILLAMOOK BAY

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING

PACIFIC OCEAN

BARVIEW

GARIBALDI

KINCHELOE POINT

BAY CITY

IDAVILLE

CAPE MEARES

TILLAMOOK

HATHAWAY SLOUGH

OREGON

RM
R2
C1
01 EN
F
RR
R3
C2
R1
02 EC2
09 EC1
07 EC2
I-1
LM
F1
10 EC1
08 EN
08 EC1
WD2
WD1
04 EN
06 EC1
03 ED
11 EC2
05 EN
SFW20
15 EN
17 EN
22 EN
21 EC1
S1
S2
23 ED
18 EN
12 EN
13 EC1
19 EN
20 EC1
25 ECA
30 EN
S3
28 EN
24 EN
29 EC1
31 EC1
14 EC2
26 EN
27 EN
33 EC1
34 EN
35 EC1
37 EN
38 EC1
39 EN
40 EC1
43 EC1
41 EC1
42 EC1
44 EC1
WDD
C2
M1
CH
PUB
R-O
I-L
R7.5
CC
SFW10
1000 0 1000 2000 3000 FEET

HABITAT SUMMARY

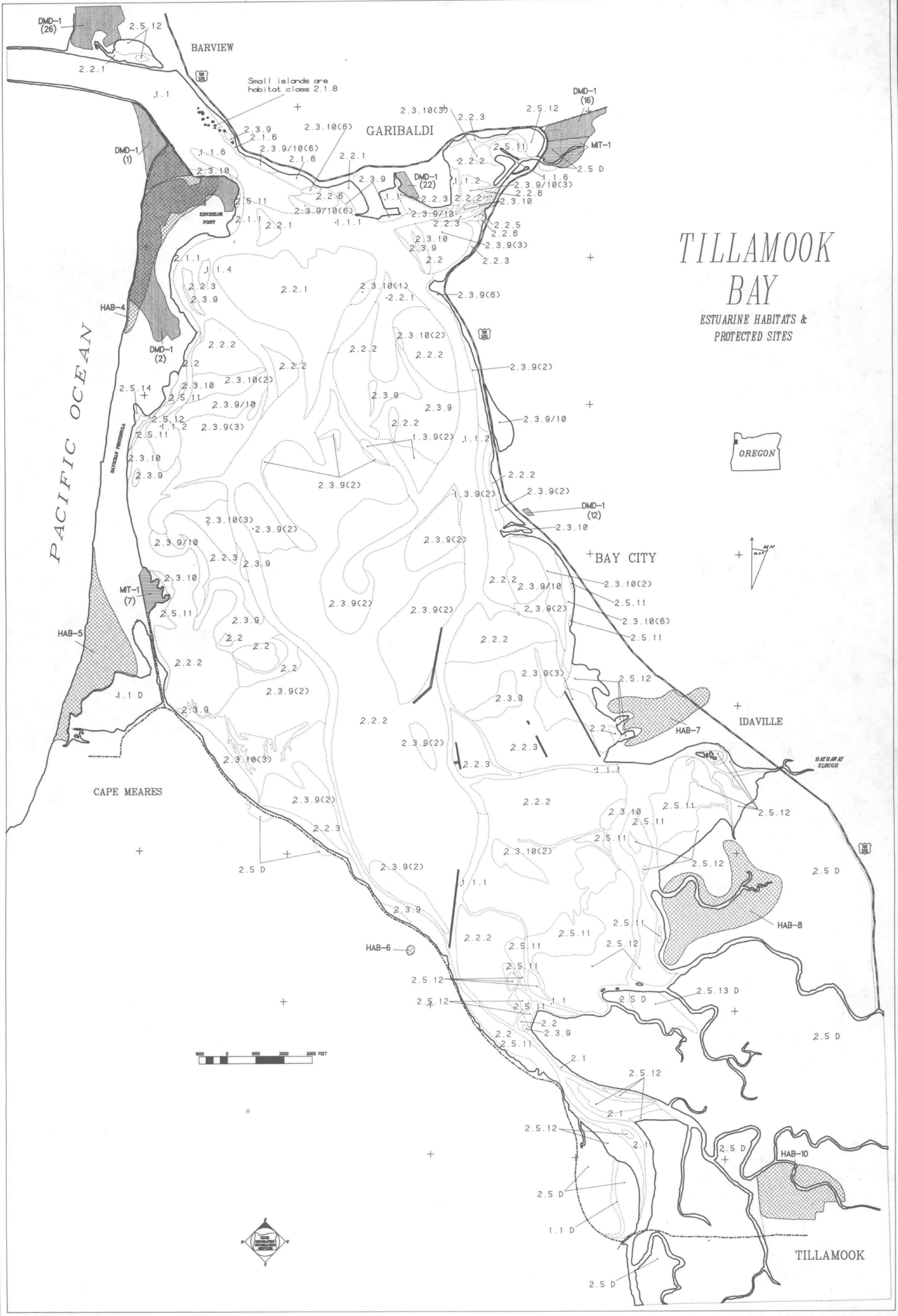
HABITAT CLASS/ CODE	SUBCLASS	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC	ACRES IN ED
ALL HABITATS		9216.3	100.0%	4762.7	4320.7	132.9
UNCONSOLIDATED BOTTOM						
1.1	Unspecified Type	811.6	8.8%	17.9	751.0	42.7
1.1.1	Sand	540.5	5.9%	28.5	477.1	34.9
1.1.2	Sand/Mud (Mixed)	698.8	7.6%	17.0	681.8	-
1.1.4	Shell	7.1	0.1%	-	7.1	-
1.1.6	Cobble/Gravel	24.3	0.3%	-	24.3	-
AQUATIC BED						
1.3.9(2)	Seagrass on Sand/Mud	40.8	0.4%	39.9	0.9	-
SHORE						
2.1	Unspecified Type	59.7	0.6%	-	59.7	-
2.1.1	Sand	32.8	0.4%	32.8	-	-
2.1.6	Cobble/Gravel	20.5	0.2%	20.5	-	-
2.1.8	Bedrock	0.2	0.0%	0.1	0.1	-
FLAT						
2.2	Unspecified Type	149.1	1.6%	52.5	94.4	2.2
2.2.1	Sand Flat	449.7	4.9%	418.1	31.6	-
2.2.2	Sand/Mud (Mixed)	2991.2	32.5%	1804.3	1170.1	16.8
2.2.3	Mud	501.4	5.4%	414.2	80.1	7.1
2.2.5	Wood Debris/Organic	1.0	0.0%	1.0	-	-
2.2.6	Cobble/Gravel	20.7	0.2%	20.7	-	-
AQUATIC BED						
2.3.9	Seagrass	282.7	3.1%	181.1	98.1	3.5
2.3.9(2)	Seagrass on Sand/Mud	884.9	9.6%	236.3	645.1	3.5
2.3.9(3)	Seagrass on Mud	317.6	3.4%	283.6	30.3	3.7
2.3.9/10	Seagrass/Algae	169.4	1.8%	116.4	44.9	8.1
2.3.9/10(3)	" on Mud	15.5	0.2%	11.5	4.0	-
2.3.9/10(6)	" on Cobble/Gravel	13.4	0.1%	13.4	-	-
2.3.10	Algae	46.1	0.5%	35.2	6.3	4.6
2.3.10(1)	Algae on Sand	37.6	0.4%	37.6	-	-
2.3.10(2)	" on Sand/Mud	93.0	1.0%	87.2	-	5.8
2.3.10(3)	" on Mud	93.1	1.0%	16.7	76.4	-
2.3.10(6)	" on Cobble/Gravel	29.2	0.3%	29.2	-	-
TIDAL MARSH						
2.5.11	Low Salt Marsh	322.7	3.5%	311.7	11.0	-
2.5.12	High Salt Marsh	558.4	6.1%	532.0	26.4	-
2.5.14	Shrub Marsh	3.3	0.0%	3.3	-	-

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Size (In Acres)	Zone
DREDGED MATERIAL DISPOSAL SITES	Capacity(Cubic Yards)		
DMD 1	SOUTH JETTY Snowy plover habitat	1,064,000	110.0 RM
DMD 12	PATTERSON CREEK	44,000	2.7 HI
DMD 16	MIAMI RIVER	220,000	17.2 F1
DMD 2	SOUTH JETTY Snowy plover, Bald Eagle, Rare Plant	968,000	275.0 RM
DMD 22	GARIBALDI BOAT BASIN	54,000	6.8 WD1
DMD 26	BARVIEW	306,000	38.0 RM
DMD 5	MEMALOOSE POINT Not mapped.	800	0.2 WDD
SIGNIFICANT HABITAT SITES			
HAB 10	HOQUARTEN SLOUGH Large forested freshwater wetland.		105.0 O/F1
HAB 4	BAYOCEAN SPIT Snowy plover nesting; rare plant.		155.0 RM
HAB 5	CAPE MEARES LAKE Snowy Plover Nesting Area.		135.0 RM
HAB 6	EAGLE'S NEST Bald Eagle Nest.		1.5 F
HAB 7	KILCHES POINT Forested freshwater wetland and significant pigeon watering hole.		82.0 SFW20
HAB 8	SQUEEDUNK SLOUGH Large forested freshwater wetland.		180.0 F1
MITIGATION AND RESTORATION SITES			
MIT 1	MIAMI COVE Breach dike to create high intertidal marsh.		17.0 F1
MIT 7	BAYOCEAN SPIT Grade to create intertidal flat.		25.0 RM
WATER-DEPENDENT DEVELOPMENT SITES			
WDD 17	COUNTY BOAT LAUNCH		1.0 WDD
WDD 18	OLSEN OYSTER Oyster Production		1.0 WDD
WDD 19	SMITH SITE Moorage		1.0 WDD
WDD 20	PACIFIC PINES MARINA		2.0 WDD
WDD 21	BIG BARN MARINA		2.0 WDD
WDD G5	GARIBALDI BOAT BASIN Industrial, Commercial, Recreational Marina.		15.0 WDI
WDD G6/8	OLD MILL MARINA		30.0 WD1

TILLAMOOK BAY

ESTUARINE HABITATS & PROTECTED SITES



SHORELAND ZONING SUMMARY

Total Shorelands Area: 964.1 acres

CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		164.6	17.1	
C1	Neighborhood Commercial	12.9	1.3	7.8
R2	Medium Density Urban Residential	30.8	3.2	18.7
R2-PD	Medium Density Residential - Planned Development	71.4	7.4	43.4
R3	High Density Urban Residential	42.7	4.4	26.0
RMH	Residential Mobile Home	6.7	0.7	4.1
RURAL		799.5	82.9	
F	Forest	15.2	1.6	1.9
RM	Recreation Management	607.1	63.0	75.9
RR	Rural Residential	160.6	16.7	20.1
SFW10	Small Farm or Woodlot 10	2.5	0.3	0.3
WDD	Water Dependent Development	14.1	1.5	1.8

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	2742.9	337.5	334.3	0.0	3.2	2405.4	27.9	1090.2	954.4	104.9	228.0
NATURAL	2391.3	159.8	157.6	0.0	2.2	2231.5	3.3	1053.5	950.8	-	223.9
EN 4	2.0	0.0	-	-	-	2.0	-	-	2.0	-	-
EN 6	12.8	0.0	-	-	-	12.8	3.3	-	9.5	-	-
EN 10	115.7	0.0	-	-	-	115.7	-	114.4	1.3	-	-
EN 13	24.1	0.0	-	-	-	24.1	-	11.4	12.7	-	-
EN 16	179.0	57.0	57.0	-	-	122.0	-	119.8	2.2	-	-
EN 17	14.4	0.0	-	-	-	14.4	-	13.7	0.7	-	-
EN 18	35.8	3.1	3.1	-	-	32.7	-	28.1	-	-	4.6
EN 19	23.5	2.5	0.3	-	2.2	21.0	-	-	21.0	-	-
EN 20	85.5	38.7	38.7	-	-	46.8	-	45.8	-	-	1.0
EN 22	4.0	0.0	-	-	-	4.0	-	-	-	-	4.0
EN 23	126.7	0.0	-	-	-	126.7	-	126.7	-	-	-
EN 24	1056.4	31.1	31.1	-	-	1025.3	-	132.6	892.7	-	-
EN 25	1.0	0.0	-	-	-	1.0	-	-	-	-	1.0
EN 26	109.2	0.0	-	-	-	109.2	-	-	-	-	109.2
EN 27	97.8	0.0	-	-	-	97.8	-	97.8	-	-	-
EN 28	104.1	0.0	-	-	-	104.1	-	-	-	-	104.1
EN 29	399.3	27.4	27.4	-	-	371.9	-	363.2	8.7	-	-
CONSERVATION	351.6	177.7	176.7	0.0	1.0	173.9	24.6	36.7	3.6	104.9	4.1
EC1 1	161.7	135.4	135.4	-	-	26.3	-	20.4	-	5.9	-
EC1 2	97.0	0.0	-	-	-	97.0	-	-	-	97.0	-
EC1 3	17.8	2.3	2.3	-	-	15.5	-	13.5	-	2.0	-
EC1 5	28.2	0.0	-	-	-	28.2	24.6	-	3.6	-	-
EC1 7	23.5	23.5	22.5	-	1.0	0.0	-	-	-	-	-
EC1 11	8.3	8.3	8.3	-	-	0.0	-	-	-	-	-
EC1 21	4.1	0.0	-	-	-	4.1	-	-	-	-	4.1
EC2 8	8.2	8.2	8.2	-	-	0.0	-	-	-	-	-
EC2 12	2.8	0.0	-	-	-	2.8	-	2.8	-	-	-

NETARTS BAY

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING

PACIFIC OCEAN

NETARTS

FALL CREEK

RICE CREEK

YAGER CREEK

UNNAMED CREEK

WHISKEY CREEK

R2-PD
01 EC1
R3
06 EN
04 EN
C1
05 EC1
02 EC1
R2
R3
07 EC1
03 EC1
R3
C1
08 EC2
03 EC1
11 EC1
RMH
12 EC2
10 EN
13 EN
RR
14 EC1
RM
28 EN
WDD
14 EC1
RR
29 EN
F
16 EN
RR
15 EC1
17 EN
19 EN
15 EC1
20 EN
F
18 EN
21 EC1
F
SFW10
RR
20 EN
24 EN
WDD
22 EN
RR
27 EN
25 EN
RM
23 EN
RR
26 EN

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OREGON

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ODOE GEOGRAPHIC INFORMATION SERVICES

HABITAT SUMMARY

HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC
ALL HABITATS		2742.9	100.0%	2391.3	351.6
UNCONSOLIDATED BOTTOM					
1.1.1	Sand	295.3	10.8%	157.6	137.7
1.1.3	Mud	3.1	0.1%	-	3.1
1.1.6	Cobble/Gravel	35.9	1.3%	-	35.9
AQUATIC BED					
1.3.9	Seagrass	3.2	0.1%	2.2	1.0
SHORE					
2.1.1	Sand	22.4	0.8%	3.3	19.1
2.1.6	Cobble/Gravel	5.5	0.2%	-	5.5
FLAT					
2.2.1	Sand	717.2	26.1%	716.7	0.5
2.2.2	Sand/Mud (Mixed)	223.6	8.2%	187.4	36.2
2.2.3	Mud	149.4	5.4%	149.4	-
AQUATIC BED					
2.3.9	Seagrass	47.2	1.7%	47.2	-
2.3.9(2)	Seagrass on Sand/Mud	544.5	19.9%	544.5	-
2.3.9(3)	Seagrass on Mud	345.4	12.6%	345.4	-
2.3.10	Algae	2.2	0.1%	2.2	-
2.3.10(6)	" on Cobble/Gravel	15.1	0.6%	11.5	3.6
BEACH/BAR					
2.4.1	Sand	104.9	3.8%	-	104.9
TIDAL MARSH					
2.5.11	Low Salt Marsh	12.9	0.5%	12.9	-
2.5.12	High Salt Marsh	215.1	7.8%	211.0	4.1

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Size	Zone
SIGNIFICANT HABITAT SITE			
HAB 1	NETARTS SPIT Snowy Plover Nesting Area and Harbor Seal Haul-out.	340.0	RM
WATER DEPENDENT DEVELOPMENT SITES			
WDD 27	HANSON OYSTERS Oyster Hatchery	0.0	WDD
WDD 28	WHISKEY CREEK Salmon Hatchery	0.0	WDD

NETARTS BAY

ESTUARINE HABITATS & PROTECTED SITES

PACIFIC OCEAN

NETARTS

FALL CREEK

RICE CREEK

YAGER CREEK

UNNAMED CREEK

WHISKEY CREEK

HAB

OREGON

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ODOE GEOGRAPHIC INFORMATION SERVICES

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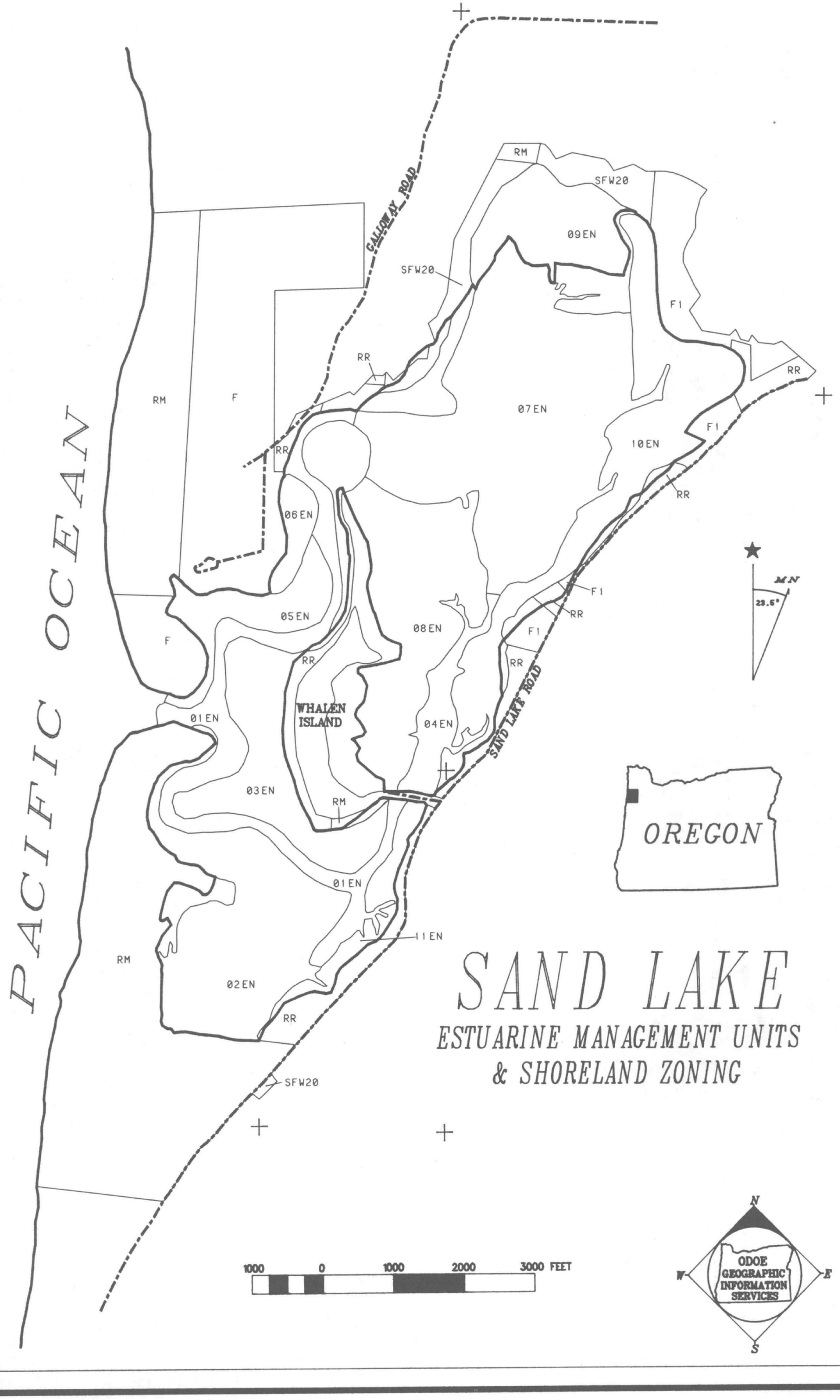
SHORELAND ZONING SUMMARY

Total Shoreland Area: 806.1 acres

CLASS/Code	Zone	Area In Acres	% Shore	% Class
RURAL		806.1	100.0	
F	Forest	217.9	27.0	27.0
F1	Farm (Exclusive Farm Use	54.8	6.8	6.8
RM	Recreation Management	388.1	48.2	48.2
RR	Rural Residential	101.1	12.5	12.5
SFW20	Small Farm or Woodlot - 20	44.2	5.5	5.5

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Uncon-solida-ted Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	897.4	139.5	113.7	0.0	25.8	757.9	2.1	253.2	39.8	0.0	462.8
NATURAL											
EN 1	77.9	62.6	45.4	-	17.2	15.3	0.5	14.3	-	-	0.5
EN 2	134.8	2.2	2.2	-	-	132.6	1.6	66.4	31.3	-	33.3
EN 3	95.4	9.8	9.1	-	0.7	85.6	-	79.2	5.9	-	0.5
EN 4	26.0	12.9	5.0	-	7.9	13.1	-	8.1	1.6	-	3.4
EN 5	38.0	3.2	3.2	-	-	34.8	-	34.8	-	-	-
EN 6	14.1	2.3	2.3	-	-	11.8	-	0.6	-	-	11.2
EN 7	231.2	43.6	43.6	-	-	187.6	-	47.6	-	-	140.0
EN 8	110.8	0.0	-	-	-	110.8	-	-	-	-	110.8
EN 9	32.3	2.9	2.9	-	-	29.4	-	-	-	-	29.4
EN 10	115.2	0.0	-	-	-	115.2	-	-	-	-	115.2
EN 11	21.7	0.0	-	-	-	21.7	-	2.2	1.0	-	18.5


PACIFIC OCEAN
GALLOWAY ROAD
SAND LAKE ROAD
WHALEN ISLAND
RM
F
SFW20
09EN
F1
RR
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OREGON
SAND LAKE
ESTUARINE MANAGEMENT UNITS
& SHORELAND ZONING
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SERVICES

HABITAT SUMMARY

HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY
ALL HABITATS		897.4	100.0%
UNCONSOLIDATED BOTTOM			
1.1	Unspecified Type	100.4	11.2%
1.1.1	Sand	13.3	1.5%
AQUATIC BED			
1.3.9	Seagrass	25.1	2.8%
1.3.10(6)	" on Cobble/Gravel	0.7	0.1%
SHORE			
2.1.1	Sand	2.1	0.2%
FLAT			
2.2	Unspecified Type	75.7	8.4%
2.2.1	Sand	176.8	19.7%
2.2.3	Mud	0.7	0.1%
AQUATIC BED			
2.3.9	Seagrass	25.9	2.9%
2.3.9/10	Seagrass/Algae	12.8	1.4%
2.3.10(6)	" on Cobble/Gravel	1.1	0.1%
TIDAL MARSH			
2.5.11	Low Salt Marsh	128.6	14.3%
2.5.12	High Salt Marsh	334.2	37.2%

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Size	Zone
SIGNIFICANT HABITAT SITES			
HAB 3	SAND LAKE CAMPGROUND	0.0	RM/F
	Snowy Plover Nesting Habitat.		
HAB 4	BELTZ FARM SPIT	0.0	RM
	Snowy Plover Nesting Habitat.	0.0	RM
HAB 5	BELTZ FARM WETLAND	0.0	RM
	Freshwater Wetland.		
WATER-DEPENDENT DEVELOPMENT SITE			
WDD 34	KETA SALMON FACILITY	0.0	--
	Salmon Hatchery		

SAND LAKE

ESTUARINE HABITATS & PROTECTED SITES

PACIFIC OCEAN

GALLOWAY ROAD

SAND LAKE ROAD

WHALEN ISLAND

HAB-3

HAB-4

HAB-5

1.1 D
2.5 D
2.5 D
1.1
2.2
2.5.12
2.5.11
2.5 D
2.5.12
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2.5 D
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2.3.9
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2.5.12
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2.3.9
2.3.9/10
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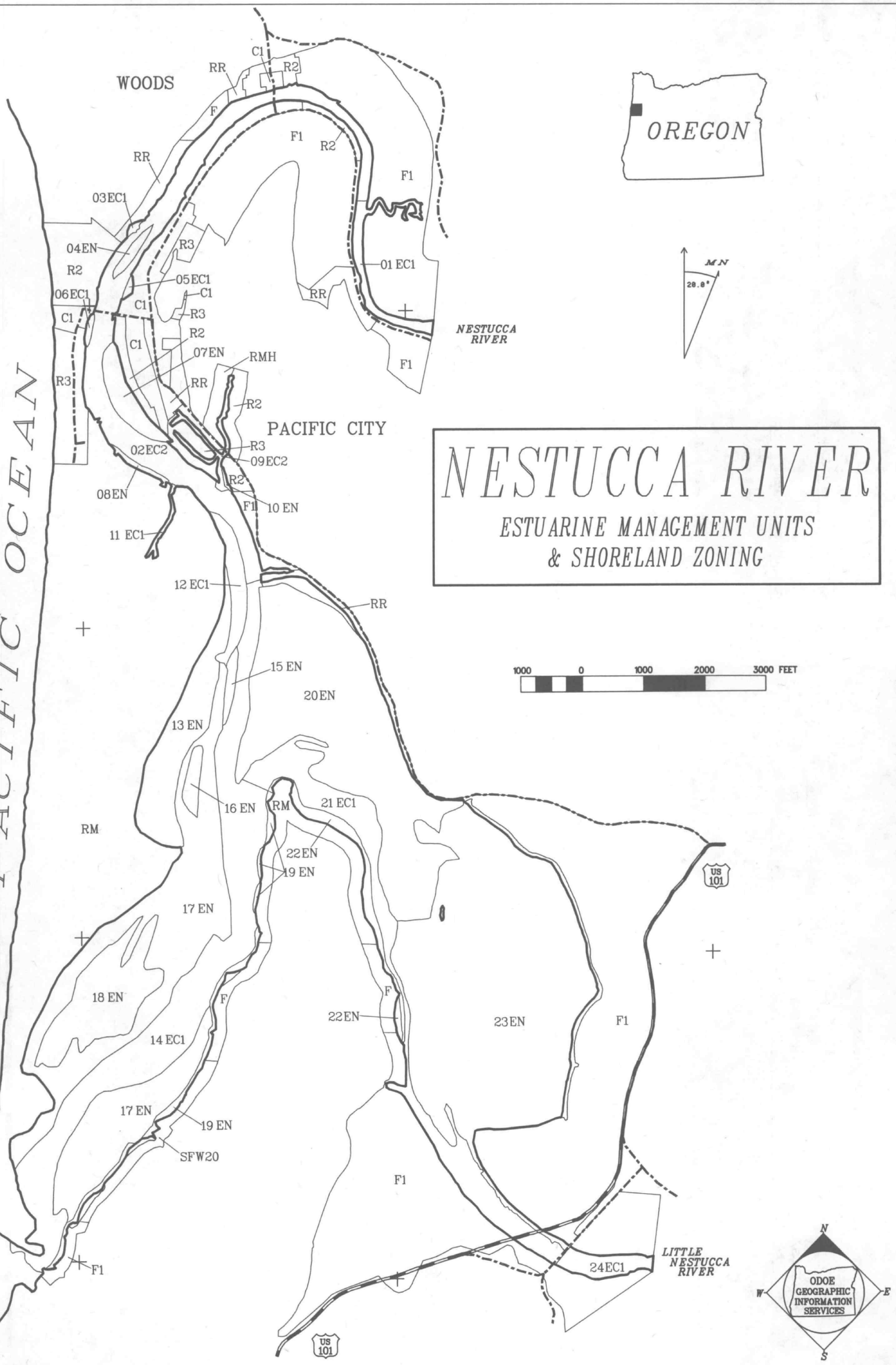
SHORELAND ZONING SUMMARY

Total Shoreland Area: 1450.8 acres

CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		195.5	13.5	
C1	Neighborhood Commercial	55.9	3.9	28.6
F1	Farm (Exclusive Farm Use)	6.6	0.5	3.4
R2	Medium Density Urban Residential	58.3	4.0	29.8
R3	High Density Urban Residential	49.0	3.4	25.1
RMH	Residential - Mobile Home	6.9	0.5	3.5
RR	Rural Residential	18.9	1.3	9.7
RURAL		1255.2	86.5	
F	Forest	22.8	1.6	1.8
F1	Farm (Exclusive Farm Use)	674.7	46.5	53.8
RM	Recreation Management	523.1	36.1	41.7
RR2	Rural Residential - 2	1.1	1.5	1.7
SFW20	Small Farm or Woodlot 20	13.4	0.9	1.1

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL 1.	Unconsolidated Bottom 1.1	Rock Bottom 1.2	Aquatic Bed 1.3	INTERTIDAL 2.	Shore 2.1	Flat 2.2	Aquatic Bed 2.3	Beach/ Bar 2.4	Tidal Marsh 2.5
TOTAL	1175.6	311.2	298.6	0.0	12.6	864.4	27.6	383.3	229.8	19.1	204.6
NATURAL	821.5	50.1	37.5	0.0	12.6	771.4	0.7	334.8	229.8	8.3	197.8
EN 4	3.1	3.1	-	-	3.1	0.0	-	-	-	-	-
EN 7	13.5	0.0	-	-	-	13.5	-	3.3	-	-	10.2
EN 8	2.1	0.0	-	-	-	2.1	-	-	2.1	-	-
EN 10	0.5	0.0	-	-	-	0.5	-	-	-	-	0.5
EN 13	48.0	0.0	-	-	-	48.0	-	3.2	6.1	-	38.7
EN 15	3.6	0.0	-	-	-	3.6	-	-	3.6	-	-
EN 16	5.5	0.0	-	-	-	5.5	-	-	-	-	5.5
EN 17	185.3	30.1	30.1	-	-	155.2	-	135.9	10.5	8.3	0.5
EN 18	50.2	0.0	-	-	-	50.2	-	4.2	46.0	-	-
EN 19	14.1	0.8	-	-	0.8	13.3	0.7	-	11.3	-	1.3
EN 20	186.3	2.7	2.7	-	-	183.6	-	80.7	20.6	-	82.3
EN 22	14.4	8.7	-	-	8.7	5.7	-	-	0.4	-	5.3
EN 23	294.9	4.7	4.7	-	-	290.2	-	107.5	129.2	-	53.5
CONSERVATION	354.1	261.1	261.1	0.0	0.0	93.0	26.9	48.5	0.0	10.8	6.8
EC1 1	12.7	12.7	12.7	-	-	0.0	-	-	-	-	-
EC1 3	0.7	0.0	-	-	-	0.7	-	-	-	-	0.7
EC1 5	0.9	0.0	-	-	-	0.9	-	-	-	-	0.9
EC1 6	1.2	0.0	-	-	-	1.2	-	-	-	-	1.2
EC1 11	2.1	0.0	-	-	-	2.1	-	2.1	-	-	-
EC1 12	13.4	0.0	-	-	-	13.4	9.5	-	-	-	3.9
EC1 14	140.6	95.2	95.2	-	-	45.4	1.6	35.8	-	8.0	-
EC1 21	72.4	57.9	57.9	-	-	14.5	7.5	7.0	-	-	-
EC1 24	11.3	7.8	7.8	-	-	3.5	3.5	-	-	-	-
EC2 2	92.2	81.0	81.0	-	-	11.2	4.8	3.6	-	2.8	-
EC2 9	6.6	6.5	6.5	-	-	0.1	-	-	-	-	0.1


WOODS
PACIFIC CITY
PACIFIC OCEAN
NESTUCCA RIVER
LITTLE NESTUCCA RIVER
OREGON
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NESTUCCA RIVER
ESTUARINE MANAGEMENT UNITS
& SHORELAND ZONING
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US 101
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SFW20
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24EC1

HABITAT SUMMARY

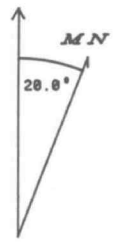
HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC
ALL HABITATS		1175.6	100.0%	821.5	354.1
UNCONSOLIDATED BOTTOM					
1.1	Unspecified Type	298.6	25.4%	37.5	261.1
AQUATIC BED					
1.3.9	Seagrass	9.5	0.8%	9.5	-
1.3.10	Algae	3.1	0.3%	3.1	-
SHORE					
2.1	Unspecified Type	4.1	0.3%	-	4.1
2.1.1	Sand	15.1	1.3%	0.7	14.4
2.1.7	Boulder	8.4	0.7%	-	8.4
FLAT					
2.2	Unspecified Type	82.9	7.1%	82.9	-
2.2.1	Sand	287.8	24.5%	239.3	48.5
2.2.2	Sand/Mud (Mixed)	12.6	1.1%	12.6	-
AQUATIC BED					
2.3.9	Seagrass	30.6	2.6%	30.6	-
2.3.9/10	Seagrass/Algae	16.7	1.4%	16.7	-
2.3.10	Algae	112.9	9.6%	112.9	-
2.3.10(1)	Algae on Sand	66.2	5.6%	66.2	-
2.3.10(6)	" on Cobble/Gravel	2.1	0.2%	2.1	-
2.3.10(7)	" on Boulder	1.3	0.1%	1.3	-
BEACH/BAR					
2.4.1	Sand	19.1	1.6%	8.3	10.8
TIDAL MARSH					
2.5	Unspecified Type	0.1	0.0%	-	0.1
2.5.11	Low Salt Marsh	59.8	5.1%	57.7	2.1
2.5.12	High Salt Marsh	144.7	12.3%	140.1	4.6

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Size	Zone
SIGNIFICANT HABITAT SITES			
HAB 5	NESTUCCA SPIT STATE PARK Snowy Plover Nesting Area.	40.0	RM
HAB 6	CANNERY POINT Eagle Roosting Area.	1.0	RM
WATER-DEPENDENT DEVELOPMENT SITE			
WDD 40	NESTUCCA SPIT STATE PARK Boat Ramp.	--	RM

NESTUCCA RIVER

ESTUARINE HABITATS & PROTECTED SITES



WOODS

PACIFIC CITY

PACIFIC OCEAN

NESTUCCA RIVER

LITTLE NESTUCCA RIVER

Small habitats in this area are 2.5.11 unless marked otherwise

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HAB-6

HAB-5

US 101

2.5 D
2.5.12
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2.5.12
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SHORELAND ZONING SUMMARY

Total Shoreland Area: 1255.2 acres

CLASS/Code	Zone	Area In Acres	% Shore	% Class
RURAL		1255.2	100.0	
AC-20	Agricultural Conservation 20	8.6	16.6	16.6
AC-40	Agricultural Conservation 40	423.5	33.7	33.7
C1	Retail Commercial	5.4	0.4	0.4
CT	Tourist Commercial	29.2	2.3	2.3
R1	Residential Zone - R-1	15.5	1.2	1.2
RM	Recreation Management[1]	24.5	1.9	1.9
RR5	Rural Residential - 5	320.4	25.5	25.5
TC	Timber Conservation	228.2	18.2	18.2

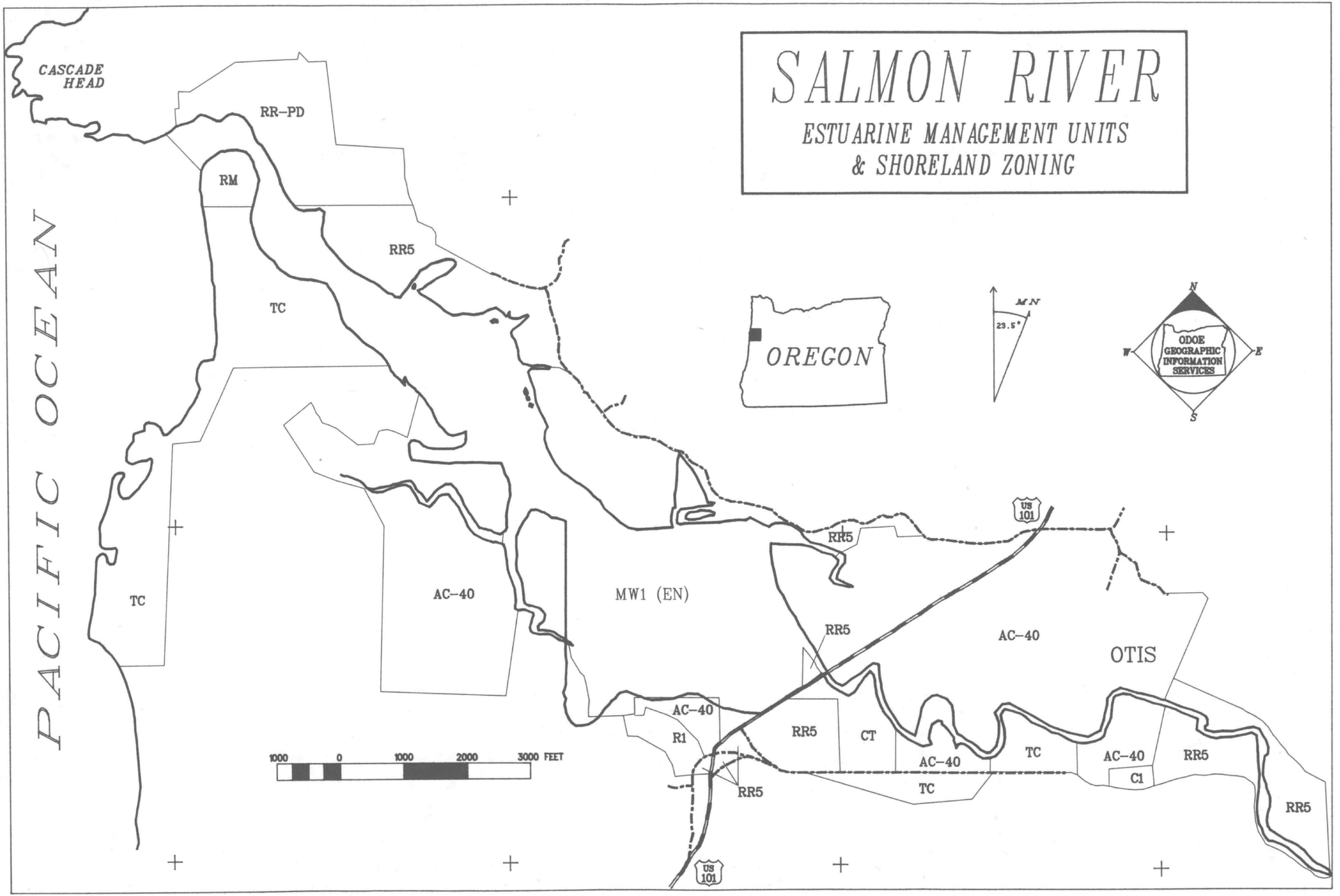
[1] Recreation Management (RM) is a Tillamook County zoning district.

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.0	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	437.9	97.9	95.5	0.0	2.4	340.0	5.2	13.7	73.5	9.0	238.6
NATURAL											
MW 1	437.9	97.9	95.5	-	2.4	340.0	5.2	13.7	73.5	9.0	238.6

SALMON RIVER

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING



HABITAT SUMMARY

HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY
ALL HABITATS		437.9	100.0%
UNCONSOLIDATED BOTTOM			
1.1.1	Sand	95.5	21.8%
AQUATIC BED			
1.3.10(7)	Algae on Boulders	2.4	0.5%
SHORE			
2.1	Unspecified Type	4.3	1.0%
2.1.8	Bedrock	0.9	0.2%
FLAT			
2.2	Unspecified Type	10.5	2.4%
2.2.1	Sand	3.2	0.7%
AQUATIC BED			
2.3.9	Seagrass	7.3	1.7%
2.3.9(1)	Seagrass on Sand	3.9	0.9%
2.3.9/10	Seagrass/Algae	1.5	0.3%
2.3.10	Algae	37.7	8.6%
2.3.10(1)	Algae on Sand	3.5	0.8%
2.3.10(7)	Algae on Boulders	19.6	4.5%
BEACH/BAR			
2.4.1	Sand	9	2.1%
TIDAL MARSH			
2.5.11	Low Salt Marsh	12.8	2.9%
2.5.12	High Salt Marsh	225.8	51.6%

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Size	Zone
SIGNIFICANT HABITAT SITES			
HAB 29	ROWDY CREEK MARSHES Forested and shrub-dominated wetlands.	16.0	AC40/MW1
HAB 30D	COON LAKE Coastal Lake.	0.0	TC
MITIGATION AND RESTORATION SITES			
MIT 1	BOAT RAMP Remove Dike. Not Mapped.	9.5	RR 5
MIT 4	US 101 Remove Dike. Not Mapped.	30.0	RM
WATER-DEPENDENT DEVELOPMENT SITE			
WDD 1	KNIGHT COUNTY PARK Recreational Access	0.0	PF

SALMON RIVER

ESTUARINE HABITATS & PROTECTED SITES

CASCADE HEAD

PACIFIC OCEAN

2.3.10(7)
2.5.12 D
2.3.10
1.3.10(7)
2.4.1
2.4.1
2.5.11
2.2.1
2.3.9(1)
2.5.12 D
2.1.8
2.5.12
2.5 D
2.3.10(1)
2.3.9(10)
2.3.10(7)
MIT-1
2.5.11
2.5.12
2.3.10
2.5.11
2.5.12
2.5.12 D
2.5 D
2.5.12 D
2.5.12
2.3.9
1.1.1
HAB
HAB
2.2
2.3.9
2.3.9
2.5.12 D
2.5.12 D
2.5 D
2.5.12
2.5 D
OTIS
2.1
2.5 D
MIT-4

US 101
US 101

1000 0 1000 2000 3000 FEET

OREGON

MN
23.5°

N
W
E
S
ODOE GEOGRAPHIC INFORMATION SERVICES

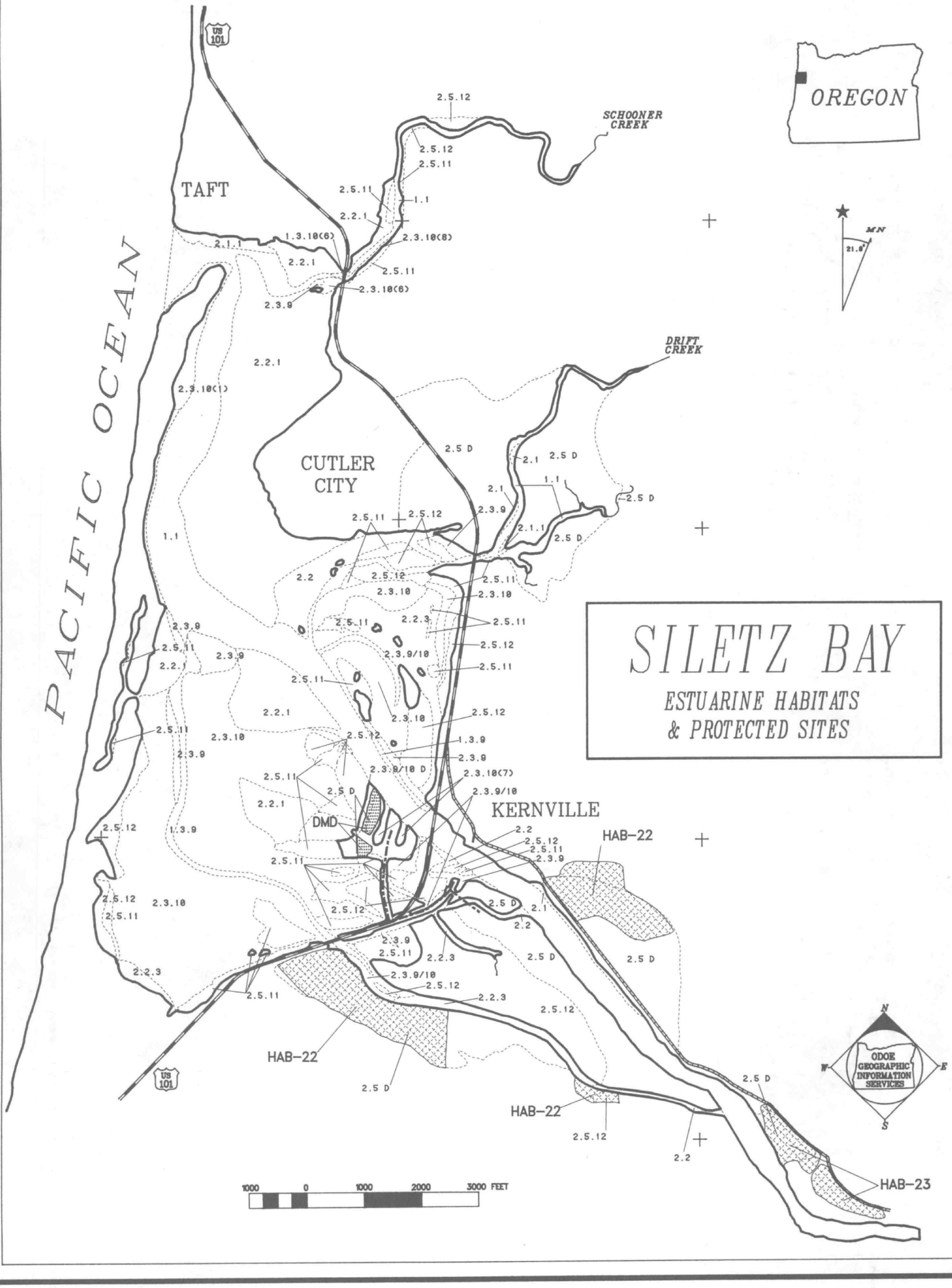
SHORELAND ZONING SUMMARY

Total Shoreland Area: 1753.8 acres

CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		602.3	34.3	
GC	General Commercial	88.0	5.0	14.6
R5	Residential, High Density	113.0	6.4	18.8
R7.5	Residential, Med. Density	341.9	19.5	56.8
RC	Recreation Commercial	59.4	3.4	9.9
RURAL		1151.5	65.7	
AC-20	Agriculture Conservation 20	89.6	5.1	7.8
AC-40	Agriculture Conservation 40	566.5	32.3	49.2
GC	General Commercial	7.8	0.4	0.7
MP	Planned Marine	15.0	0.9	1.3
PD	Planned Development	233.4	13.3	20.3
R1	Residential R-1	3.4	0.2	0.3
R7.5	Residential - Medium Density	21.9	1.2	1.9
RC	Recreation Commercial	24.1	1.4	2.1
RR1-2	Rural Residential 1-2	105.2	6.0	9.1
TC	Timber Conservation	84.7	4.8	7.4

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	1460.6	326.4	300.9	0.0	25.5	1134.2	14.5	411.1	434.4	0.0	274.2
NATURAL	1109.5	32.8	10.7	0.0	22.1	1076.7	0.0	387.7	420.5	0.0	268.5
EN 3	419.2	10.0	9.7	-	0.3	409.2	-	285.3	65.8	-	58.1
EN 5	690.3	22.8	1.0	-	21.8	667.5	-	102.4	354.7	-	210.4
CONSERVATION	351.1	293.6	290.2	0.0	3.4	57.5	14.5	23.4	13.9	0.0	5.7
EC 1	203.7	171.4	168.4	-	3.0	32.3	7.8	14.7	9.8	-	-
EC 2	26.2	15.1	14.9	-	0.2	11.1	-	5.0	1.2	-	4.9
EC 4	21.7	19.0	18.8	-	0.2	2.7	2.4	-	-	-	0.3
EC 6	99.2	87.8	87.8	-	-	11.4	4.3	3.7	2.9	-	0.5

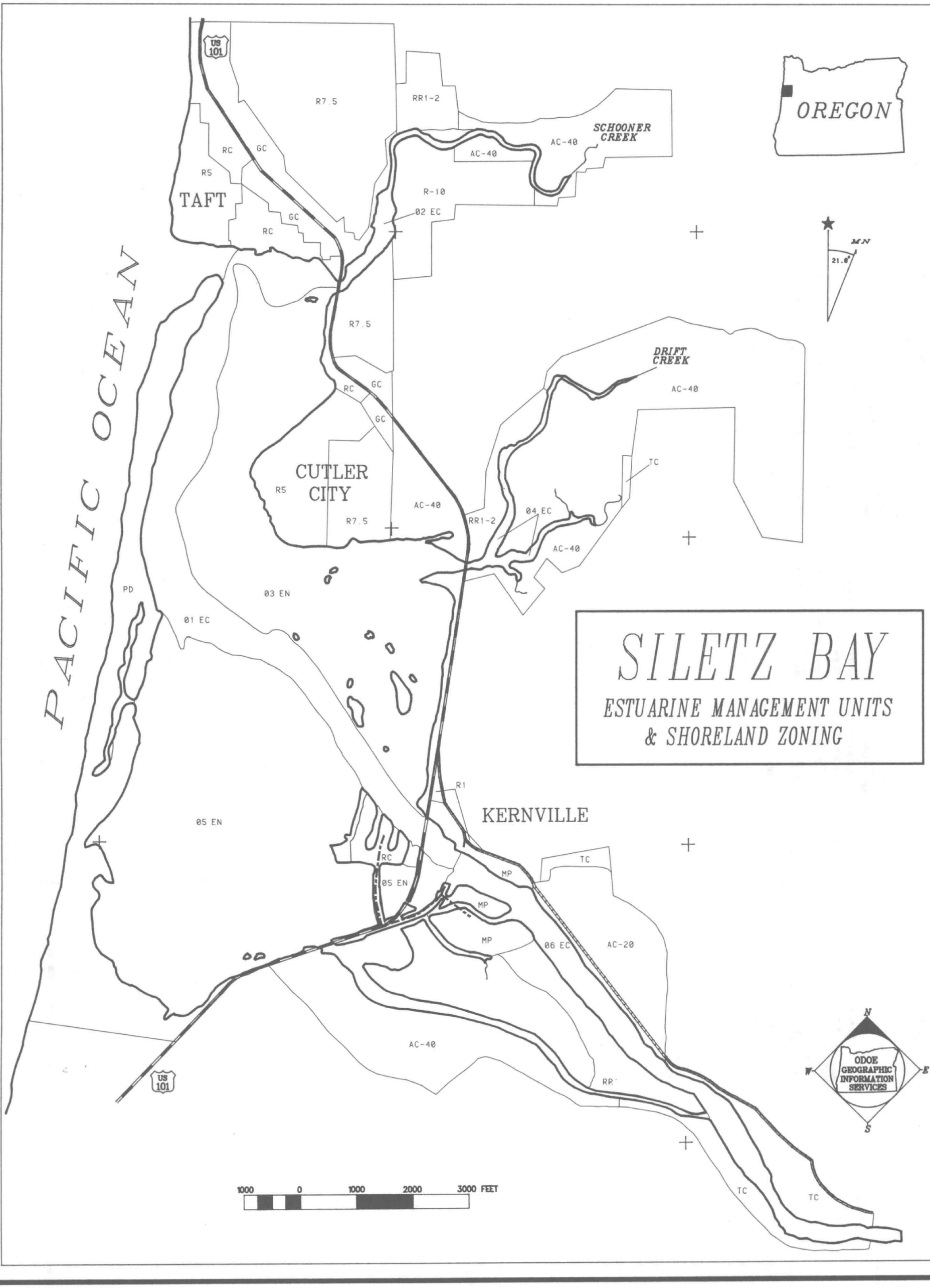

OREGON
MN
21.8°
SCHOONER CREEK
DRIFT CREEK
TAFT
CUTLER CITY
KERNVILLE
PACIFIC OCEAN
US 101
DMD
HAB-22
HAB-23
SILETZ BAY
ESTUARINE HABITATS
& PROTECTED SITES
ODOE GEOGRAPHIC INFORMATION SERVICES
N
S
E
W
1000 0 1000 2000 3000 FEET

ESTUARINE HABITAT SUMMARY

HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC
ALL HABITATS		1460.6	100.0%	1109.5	351.1
UNCONSOLIDATED BOTTOM					
1.1	Unspecified Type	300.9	20.6%	10.7	290.2
AQUATIC BED					
1.3.9	Seagrass	24.8	1.7%	22.1	2.7
1.3.10(6)	" on Cobble/Gravel	0.7	0.0%	-	0.7
SHORE					
2.1	Unspecified Type	6.0	0.4%	-	6.0
2.1.1	Sand	8.5	0.6%	-	8.5
FLAT					
2.2	Unspecified Type	42.7	2.9%	37.5	5.2
2.2.1	Sand	301.1	20.6%	282.9	18.2
2.2.3	Mud	67.3	4.6%	67.3	0.0
AQUATIC BED					
2.3.9	Seagrass	31.5	2.2%	28.6	2.9
2.3.9/10	Seagrass/Algae	16.6	1.1%	16.6	0.0
2.3.10	Algae	373.7	25.6%	373.5	0.2
2.3.10(1)	Algae on Sand	9.6	0.7%	-	9.6
2.3.10(6)	" on Cobble/Gravel	1.8	0.1%	1.8	0.0
2.3.10(8)	" on Bedrock	1.2	0.1%	-	1.2
TIDAL MARSH					
2.5.11	Low Salt Marsh	87.5	6.0%	84.9	2.6
2.5.12	High Salt Marsh	186.7	12.8%	183.6	3.1

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Capacity (Cubic Yards)	Size	Zone
DREDGED MATERIAL DISPOSAL SITES				
DMD 1	SILETZ KEYS #1 Needs to be diked prior to utilization.	10,000	3.5	RC
DMD 2	SILETZ KEYS #2 Site is diked.	5,000	1.5	RC
SIGNIFICANT HABITAT SITES				
HAB 21	OUTER SILETZ SPIT Snowy Plover nesting area. Not Mapped.		0.0	PD
HAB 22	MILLPORT SLOUGH Marsh Habitat and pigeon watering areas.		115.0	AC20/40
HAB 23	FUN RIVER WETLANDS Unmapped Freshwater wetland. Some areas filled for residences		0.0	TC
MITIGATION AND RESTORATION SITES				
MIT 1	MILLPORT SLOUGH/HAB 22 Remove tidegate at west end and remove or breach dikes at east end. Same area as HAB-22. Not mapped as miigation site.		115.0	AC-40
WATER-DEPENDENT DEVELOPMENT SITES				
WDD 1	KERNVILLE Moorage.		0.0	MP
WDD 2	MILLPORT SLOUGH River access.		0.0	MP
WDD 3	CHINOOK BEND Marina; not mapped.		0.0	MP


US 101
R7.5
RR1-2
SCHOONER CREEK
AC-40
RC
GC
R5
TAFT
R-10
02 EC
OREGON
MN
21.6°
PACIFIC OCEAN
DRIFT CREEK
CUTLER CITY
TC
04 EC
PD
03 EN
01 EC
SILETZ BAY
ESTUARINE MANAGEMENT UNITS
& SHORELAND ZONING
R1
KERNVILLE
05 EN
MP
06 EC
AC-20
ODOE
GEOGRAPHIC
INFORMATION
SERVICES
N
S
E
W
1000 0 1000 2000 3000 FEET

SHORELAND ZONING SUMMARY

Total Shoreland Area: 1861.0 acres

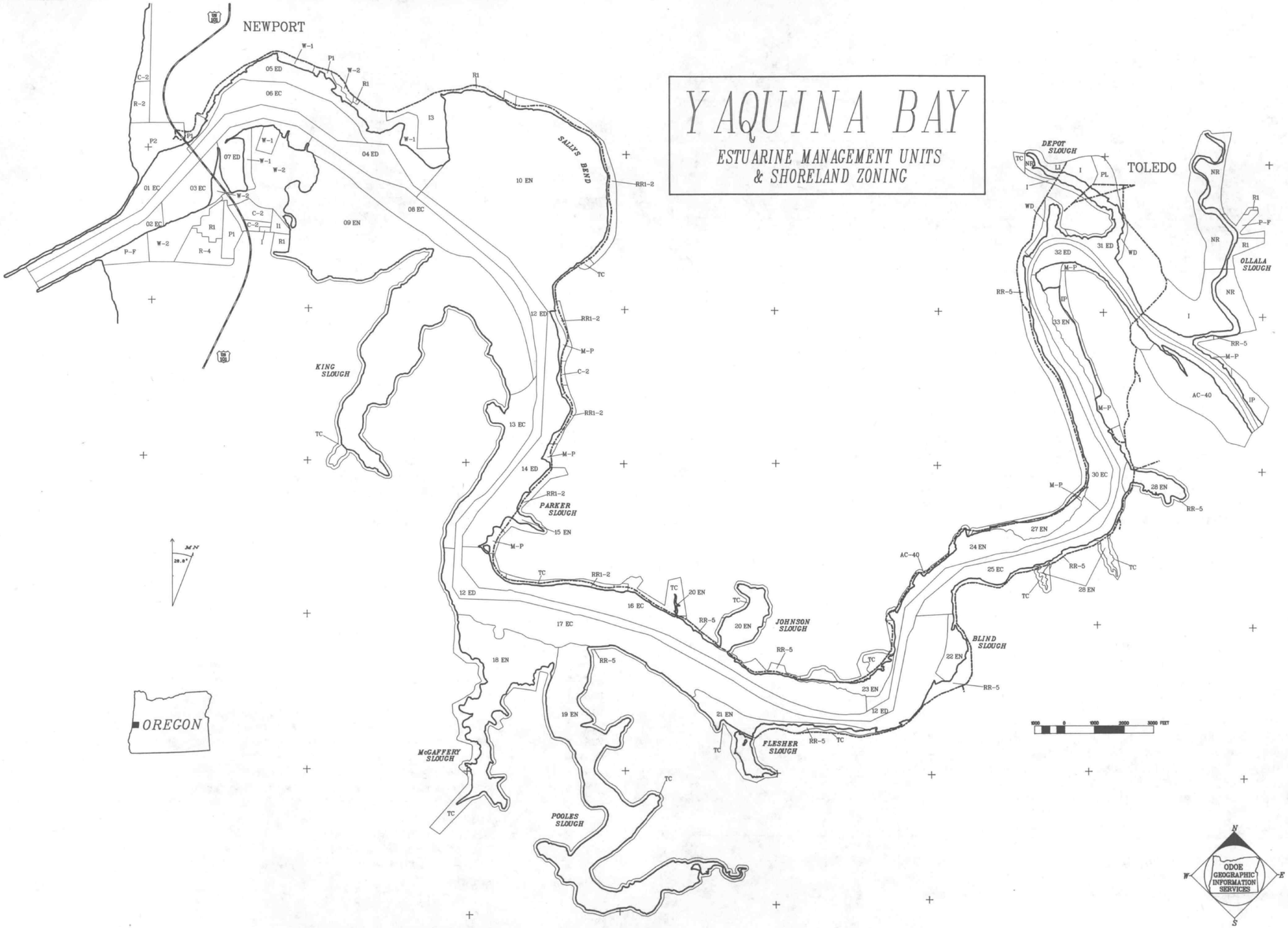
CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		1013.1	54.4	
C-2	General Commercial	43.2	2.3	4.3
I	Industrial	186.9	10.0	18.4
I1	Light Industrial	7.3	0.4	0.7
I3	Heavy Industrial/Office Commercial	45.9	2.5	4.5
IP	Planned Industrial	29.1	1.6	2.9
LI	Light Industrial	7.2	0.4	0.7
M-P	Planned Marine	28.8	1.5	2.8
NR	Natural Resource	119.1	6.4	11.8
P-F	Public Facilities	38.7	2.1	3.8
P1	Public Buildings & Structures	33.4	1.8	3.3
P2	Public Recreation	62.1	3.3	6.1
PL	Public Lands	12.4	0.7	1.2
R-2	Low Density Residential	19.7	1.1	1.9
R-4	High Density Residential	32.6	1.8	3.2
R1	Low Density Residential	64.5	3.5	6.4
RR-5	Rural Residential - 5	9.3	0.5	0.9
W-1/WD	Water Dependent	91.8	4.9	9.1
W-2	Water Related	163.0	8.8	16.1
WD	Water Dependent	8.3	1.0	1.8
RURAL		847.9	45.6	
AC-40	Agriculture Conservation 40	123.8	6.7	14.6
C-2	General Commercial	3.0	0.2	0.4
M-P	Planned Marine	39.7	2.1	4.7
NR	Natural Resource	27.6	1.5	3.3
R1	Residential Zone R-1	4.4	0.2	0.5
RR-5	Rural Residential 5	173.1	9.3	20.4
RR1-2	Rural Residential 1-2	111.0	6.0	13.1
TC	Timber Conservation	365.3	19.6	43.1

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	4349.0	2003.1	1948.3	4.2	50.6	2345.9	194.9	612.3	917.7	0.0	621.0
NATURAL	2036.7	198.9	167.8	0.0	31.1	1837.8	37.9	502.7	705.8	0.0	591.4
EN 9	602.3	21.2	16.3	-	4.9	581.1	-	236.3	258.2	-	86.6
EN 10	635.5	68.4	42.6	-	25.8	567.1	-	163.5	394.6	-	9.0
EN 15	0.1	0.0	-	-	-	0.1	-	0.1	-	-	-
EN 18	168.7	0.0	-	-	-	168.7	-	46.6	6.7	-	115.4
EN 19	327.3	67.6	67.2	-	0.4	259.7	12.2	23.2	0.1	-	224.2
EN 20	47.0	0.0	-	-	-	47.0	0.9	16.1	-	-	30.0
EN 21	39.4	8.8	8.8	-	-	30.6	7.9	-	8.0	-	14.7
EN 22	19.2	0.0	-	-	-	19.2	-	-	0.2	-	19.0
EN 23	23.8	0.0	-	-	-	23.8	-	2.7	3.1	-	18.0
EN 24	100.7	30.4	30.4	-	-	70.3	15.0	14.2	33.3	-	7.8
EN 27	30.3	0.0	-	-	-	30.3	-	-	-	-	30.3
EN 28	7.0	2.5	2.5	-	-	4.5	1.9	-	1.6	-	1.0
EN 33	35.4	0.0	-	-	-	35.4	-	-	-	-	35.4
CONSERVATION	1301.1	899.2	882.7	-	16.5	401.9	113.0	64.2	198.5	0.0	26.2
EC 1	65.3	36.9	35.8	-	1.1	28.4	0.5	-	27.9	-	-
EC 2	39.8	38.8	38.8	-	-	1.0	1.0	-	-	-	-
EC 3	56.5	36.2	36.2	-	-	20.3	4.6	7.6	8.1	-	-
EC 6	108.6	83.5	83.5	-	-	25.1	5.7	-	19.4	-	-
EC 8	132.3	73.1	64.1	-	9.0	59.2	-	9.5	49.7	-	-
EC 13	89.1	67.4	67.4	-	-	21.7	5.2	-	10.3	-	6.2
EC 16	221.9	177.1	177.1	-	-	44.8	30.0	-	14.8	-	-
EC 17	371.1	266.3	259.9	-	6.4	104.8	21.4	19.4	49.3	-	14.7
EC 25	140.0	88.1	88.1	-	-	51.9	34.7	5.4	7.4	-	4.4
EC 30	76.5	31.8	31.8	-	-	44.7	9.9	22.3	11.6	-	0.9
DEVELOPMENT	1011.2	905.0	897.8	4.2	3.0	106.2	44.0	45.4	13.4	0.0	3.4
ED 4	165.2	165.2	161.0	4.2	-	0.0	-	-	-	-	-
ED 5	113.5	90.4	87.7	-	2.7	23.1	12.0	1.6	9.5	-	-
ED 7	55.8	48.7	48.7	-	-	7.1	-	5.7	1.4	-	-
ED 12	373.3	372.0	371.7	-	0.3	1.3	-	0.2	0.9	-	0.2
ED 14	131.5	114.2	114.2	-	-	17.3	8.8	6.9	1.6	-	-
ED 31	111.4	93.8	93.8	-	-	17.6	10.6	5.3	-	-	1.7
ED 32	60.5	20.7	20.7	-	-	39.8	12.6	25.7	-	-	1.5

YAQUINA BAY

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING



HABITAT SUMMARY

HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC	ACRES IN ED
ALL HABITATS		4349.0	100.0%	2036.7	1301.1	1011.2
UNCONSOLIDATED BOTTOM						
1.1	Unspecified Type	786.6	18.1%	108.9	324.1	353.6
1.1.1	Sand	537.8	12.4%	21.5	258.8	257.5
1.1.2	Sand/Mud (Mixed)	512.4	11.8%	37.4	245.9	229.1
1.1.3	Mud	53.2	1.2%	-	38.0	15.2
1.1.4	Shell	34.6	0.8%	-	9.6	25.0
1.1.6	Cobble/Gravel	23.7	0.5%	-	6.3	17.4
ROCK BOTTOM						
1.2.7	Boulder	4.2	0.1%	-	-	4.2
AQUATIC BED						
1.3.9	Seagrass	44.7	1.0%	29.0	15.4	0.3
1.3.10	Algae	5.9	0.1%	2.1	1.1	2.7
SHORE						
2.1	Unspecified Type	78.8	1.8%	25.8	40.7	12.3
2.1.1	Sand	6.0	0.1%	-	5.1	0.9
2.1.2	Sand/Mud (Mixed)	7.6	0.2%	-	7.6	-
2.1.3	Mud	56.0	1.3%	6.1	21.9	28.0
2.1.5	Wood Debris/Organic	23.5	0.5%	-	23.5	-
2.1.6	Cobble/Gravel	15.2	0.3%	6.0	9.2	-
2.1.7	Boulder	3.4	0.1%	-	2.3	1.1
2.1.8	Bedrock	4.4	0.1%	-	2.7	1.7
FLAT						
2.2	Unspecified Type	264.4	6.1%	199.5	25.2	39.7
2.2.1	Sand	60.5	1.4%	37.7	17.1	5.7
2.2.2	Sand/Mud (Mixed)	111.1	2.6%	111.1	-	-
2.2.3	Mud	176.3	4.1%	154.4	21.9	-
AQUATIC BED						
2.3.9	Seagrass	525.1	12.1%	377.6	137.4	10.1
2.3.9/10	Seagrass/Algae	152.4	3.5%	136.9	14.1	1.4
2.3.10	Algae	125.4	2.9%	106.3	19.1	-
2.3.10(3)	Algal on Mud	65.9	1.5%	65.9	-	-
2.3.10(6)	" on Cobble/Gravel	18.6	0.4%	18.6	-	-
2.3.10(7)	" on Boulder	1.8	0.0%	0.5	-	1.3
2.3.10(8)	" on Bedrock	28.5	0.7%	-	27.9	0.6
TIDAL MARSH						
2.5.11	Low Salt Marsh	143.8	3.3%	136.1	5.1	2.6
2.5.12	High Salt Marsh	475.3	10.9%	453.4	21.1	0.8
2.5.13	Fresh Marsh	1.9	0.0%	1.9	-	-

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Capacity (Cubic Yards)	Size (In Acres)	Zone
DREDGED MATERIAL DISPOSAL SITES				
DMD 10	RIVERBEND MOORAGE Site locates south of moorage.	6,200	1.2	MP
DMD 12	NEWPORT PACIFIC	26,000	1.9	MW
DMD 17	TOLEDO AIRPORT WEST	66,000	12.0	MP
DMD 18	TOLEDO AIRPORT EAST	25,000	1.6	RR5
DMD 19	TOLEDO	68,000	5.0	MP
DMD 2	SOUTH BEACH MARINA	25,000	5.0	W2
DMD 20	DEPOT SLOUGH Site is partly owned by Georgia-Pacific.	80,000	10.0	I
DMD 22	OLALLA CREEK	110,000	14.0	NR
DMD 4	MARINE SCIENCE CENTER	30,000	1.0	W2
DMD 5	NEWPORT DOCKS Site includes an undesignated DMD area zoned MU-5 which has an approximate capacity of 30,000 c.y.	20,000	4.0	W1
DMD 9	RIVERBEND MOORAGE Site located east of the road.	16,200	1.4	MP

SIGNIFICANT HABITAT SITES

HAB 13	NORTH BAY WETLANDS Five small freshwater wetlands closely associated with the estuary.	16.0	TC
HAB 14	POOLE'S SLOUGH Non-tidal marsh, riparian forest.	6.0	TC

MITIGATION AND RESTORATION SITES

(Mitigation and Restoration sites are not shown on maps. See the Unmapped Sites section in the Appendix for a listing of mitigation and restoration sites in Yaquina Bay.)

WATER-DEPENDENT DEVELOPMENT SITES

WDD 2	COQUILLE POINT (Bay Access)	0.0	MP
WDD 3	CRITESER MOORAGE	0.0	MP
WDD 4	TOLEDO AIRPORT (Boat Launch)	11.0	MP
WDD 5	ST. CLAIR PROPERTY (River Access)	0.0	MP
WDD A	NEWPORT BOAT BASIN	0.0	W1
WDD A	TROYER BOAT WORKS	1.0	WD
WDD B	MCLEAN POINT (Sunset Terminals)	0.0	W1
WDD B/C	TOKYO SLOUGH (Industrial/Mill Operations)	7.5	WD
WDD C	MARINE SCIENCE CENTER	0.0	W1
WDD D	PORT DOCK	4.0	PL
WDD E	FIEBER FARM (Moorage)	7.0	--
WDD G	EASTSIDE (Boatworks)	3.0	--
WDD J	TRANSSHIPMENT POINT (Barge/Rail Transshipment)	4.0	WD
WDD K	ROBERTS MILL	1.0	WD

YAQUINA BAY

ESTUARINE HABITATS & PROTECTED SITES

PACIFIC OCEAN

NEWPORT

TOLEDO

DMD-2

DMD-4

DMD-5

DMD-9&10

DMD-12

DMD-17

DMD-18

DMD-19

DMD-20

DMD-22

HAB-13

HAB-14

KING SLOUGH

PARKER SLOUGH

SALLY'S BEND

BOONE SLOUGH

NUTE SLOUGH

JOHNSON SLOUGH

BLIND SLOUGH

FLESHER SLOUGH

McGAFFERY SLOUGH

POOLES SLOUGH

DEPOT SLOUGH

OLLALA SLOUGH

OREGON

MN 20.8°

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ODOE GEOGRAPHIC INFORMATION SERVICES

SHORELAND ZONING SUMMARY

Total Shoreland Area: 1308.3 acres

CLASS/Code	Zone	Area In Acres	%Shore	%Class
URBAN		654.6	50.0	
C-1	Retail Commercial	68.5	5.2	10.5
C-2	General Commercial	15.1	1.2	2.3
C-T	Tourist Commercial	54.5	4.2	8.3
M-P	Planned Marine & Recreation	8.2	0.6	1.2
PF	Public Facilities	24.9	1.9	3.8
R-2	Residential R-2	26.6	2.0	4.1
R-3	Residential R-3	34.5	2.6	5.3
R-4	Residential R-4	22.7	1.7	3.5
R1	Residential R-1	136.9	10.5	20.9
R1-A	Residential R-1A	262.7	20.1	40.1
RURAL		653.7	50.0	
AC-20	Agricultural Conservation	50.6	3.9	7.7
AC-40	Agricultural Conservation	212.5	16.2	32.5
M-P	Planned Marine	14.2	1.1	2.2
PF	Public Facilities	68.1	5.2	10.4
R1	Residential Zone R-1	43.5	3.3	6.7
R1-A	Residential Zone R-1-A	1.0	0.1	0.2
RR-2	Rural Residential 1-2	7.6	0.6	1.2
RR-5	Rural Residential 5	47.0	3.6	7.2
TC	Timber Conservation	209.3	16.0	32.0

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Uncon-solida-ted Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	2515.9	734.4	728.8	0.0	5.6	1781.5	43.9	715.1	558.3	4.0	460.2
NATURAL	1843.1	162.1	159.0	0.0	3.1	1681.0	43.4	665.6	542.1	4.0	425.9
EN 2	39.4	0.7	0.7	-	-	38.7	24.2	1.0	9.5	4.0	-
EN 3	161.2	0.3	0.3	-	-	160.9	-	158.2	2.7	-	-
EN 4	18.6	0.0	-	-	-	18.6	-	4.4	-	-	14.2
EN 5	1522.4	156.3	153.2	-	3.1	1366.1	1.2	461.4	525.7	-	377.8
EN 7	9.4	0.0	-	-	-	9.4	-	6.0	-	-	3.4
EN 8	92.1	4.8	4.8	-	-	87.3	18.0	34.6	4.2	-	30.5
CONSERVATION	672.8	572.3	569.8	0.0	2.5	100.5	0.5	49.5	16.2	0.0	34.3
EC 1	208.9	180.0	180.0	-	-	28.9	-	28.0	0.9	-	-
EC 6	406.0	354.5	352.0	-	2.5	51.5	0.5	21.5	15.3	-	14.2
EC 9	57.9	37.8	37.8	-	-	20.1	-	-	-	-	20.1

ALSEA BAY

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING

PACIFIC OCEAN

WALDPORT

McKINNEYS SLOUGH

LINT SLOUGH

ECKMAN SLOUGH

DRIFT CREEK

01EC 02EN 03EN 04EN 05EN 06EC 07EN 08EN 09EC

R-2 R1-A R1 PF C-T C-1 M-P R-3 R-4 RR-5 AC-20 AC-40 TC

US 101

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OREGON

ODOE GEOGRAPHIC INFORMATION SERVICES

HABITAT SUMMARY

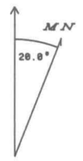
HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC
ALL HABITATS		2515.9	100.0%	1843.1	672.8
UNCONSOLIDATED BOTTOM					
1.1	Unspecified Type	727.1	28.9%	158.9	568.2
1.1.6	Cobble/Gravel	1.7	0.1%	0.1	1.6
AQUATIC BED					
1.3.9	Seagrass	5.6	0.2%	3.1	2.5
SHORE					
2.1	Unspecified Type	18.9	0.8%	18.8	0.1
2.1.1	Sand	17.6	0.7%	17.6	-
2.1.2	Sand/Mud (Mixed)	0.8	0.0%	0.4	0.4
2.1.6	Cobble/Gravel	6.6	0.3%	6.6	-
FLAT					
2.2	Unspecified Type	159.2	6.3%	151.9	7.3
2.2.1	Sand	347.1	13.8%	304.9	42.2
2.2.2	Sand/Mud (Mixed)	70.7	2.8%	70.7	-
2.2.3	Mud	138.1	5.5%	138.1	-
AQUATIC BED					
2.3	Unspecified Type	31.4	1.2%	31.4	-
2.3.9	Seagrass	64.7	2.6%	62.3	2.4
2.3.9(2)	Seagrass on Sand/Mud	100.3	4.0%	100.3	-
2.3.9/10(2)	Seagrass & Algae, Sand/Mud	156.1	6.2%	156.1	-
2.3.10	Algae	19.6	0.8%	19.6	-
2.3.10(2)	Algae on Sand/Mud	171.3	6.8%	167.5	3.8
2.3.10(6)	Algae on Cobble/Gravel	14.9	0.6%	4.9	10.0
BEACH/BAR					
2.4.1	Sand	4.0	0.2%	4.0	-
TIDAL MARSH					
2.5.11	Low Salt Marsh	57.4	2.3%	52.9	4.5
2.5.12	High Salt Marsh	402.8	16.0%	373	29.8

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Capacity (Cubic Yards)	Size (Acres)	Zone
DREDGED MATERIAL DISPOSAL SITES				
DMD 1	KING SILVER MOORAGE	50,000	6.1	MP
DMD 2	FISHIN' HOLE MARINA	6,000	2.7	MP
SIGNIFICANT HABITAT SITES				
HAB 4	LINT SLOUGH Impounded coastal lake.		46.5	TC
HAB 5	ECKMAN SLOUGH Impounded coastal lake.		70.0	8EN
MITIGATION AND RESTORATION SITES				
MIT 1	LINT SLOUGH Remove dam and tidegate.		11.4	4 EN
MIT 5	BARCLAY MEADOWS Remove or breach dikes. Not mapped.		70.0	AC-40
WATER-DEPENDENT DEVELOPMENT SITES				
WDD 1	BAYSHORE PARK Wayside/ Launch		--	PF
WDD 2	ALSEA BAY MARINAS Recreational Access		--	MP
WDD 3	KITTEL SITE Suitablle for water-dependent use. Not mapped.		--	MP
WDD 4	TAYLOR'S LANDING Recreational Access. Not mapped.		--	MP
WDD 5	KOZY KOVE MARINA Recreational moorage. Not mapped.		--	MP
WDD 6	PORT DOCKS Backup land for port activities.		2.0	MP
WDD 7	MCKINLEY MARINA Reserved for waterfront development.		3.0	MP

ALSEA BAY

ESTUARINE HABITATS & PROTECTED SITES



PACIFIC OCEAN

US 101

WALDPORT

MIT-1

HAB-4

HAB-5

LINT SLOUGH

McKINNEYS SLOUGH

ECKMAN SLOUGH

DRIFT CREEK

DMD-1

DMD-2

1.1.6 1.1 1.1 D 1.3.9 2.1 2.1.1 2.1.2 2.1.3 2.1.6 2.2 2.2.1 2.2.2 2.2.3 2.3 2.3.9 2.3.9/10 2.3.9/10(2) 2.3.10 2.3.10(2) 2.3.10(6) 2.4.1 2.5 D 2.5.11 2.5.12 2.5.12 D

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ODOE GEOGRAPHIC INFORMATION SERVICES

SHORELAND ZONING SUMMARY

Total Shoreland Area: 3651.0 acres

CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		476.0	13.0	
C	Commercial District	2.5	0.1	0.5
F-2	Impacted Forest Lands	10.2	0.3	2.1
H	Highway District	3.2	0.1	0.7
M	Marine District	190.7	5.2	40.1
OS	Open Space District	12.9	0.4	2.7
RA	Suburban Residential	39.8	1.1	8.4
RM	Multiple Family Residential	1.1	0.0	0.2
RR	Restricted Residential	74.6	2.0	15.7
RS	Single Family Residential	128.2	3.5	26.9
WF	Waterfront District	12.8	0.4	2.7
RURAL		3175.0	87.0	
C-R	Rural Commercial	6.4	0.2	0.2
CR/H	Rural Commercial/ Historic	2.3	0.1	0.1
E-25	Exclusive Farm Use - 25	1304.3	35.7	41.1
F-1	Nonimpacted Forest Lands	338.9	9.3	10.7
F-2	Impacted Forest Lands	645.4	17.7	20.3
M-2	Light Industrial	0.8	0.0	0.0
M-3	Heavy Industrial	38.6	1.1	1.2
NR	Natural Resource	572.8	15.7	18.0
PF	Public Facility	5.6	0.2	0.2
RR-2	Rural Residential 2	89.4	2.4	2.8
RR-5	Rural Residential 5	160.7	4.4	5.1

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	3060.4	1441.6	1426.5	8.8	6.3	1618.8	134.6	358.0	331.6	30.5	764.1
NATURAL	1485.2	99.9	89.7	4.4	5.8	1385.3	27.7	311.8	311.5	14.0	720.3
EN C	52.7	20.5	13.5	4.4	2.6	32.2	7.8	5.5	4.9	14.0	-
EN D	46.1	0.0	-	-	-	46.1	3.5	38.3	4.3	-	-
EN G	296.2	3.6	0.4	-	3.2	292.6	0.8	73.4	125.8	-	92.6
EN H	225.6	2.7	2.7	-	-	222.9	8.2	47.3	16.0	-	151.4
EN I	746.7	62.0	62.0	-	-	684.7	5.8	147.3	154.1	-	377.5
EN J	7.6	0.0	-	-	-	7.6	-	-	6.4	-	1.2
EN K	0.8	0.8	0.8	-	-	0.0	-	-	-	-	-
EN L	2.6	0.0	-	-	-	2.6	1.6	-	-	-	1.0
EN M	42.4	0.0	-	-	-	42.4	-	-	-	-	42.4
EN N	64.5	10.3	10.3	-	-	54.2	-	-	-	-	54.2
CONSERVATION	1466.3	1257.4	1256.9	0.0	0.5	208.9	100.8	42.8	10.7	16.2	38.4
EC A	12.6	0.0	-	-	-	12.6	12.6	-	-	-	-
EC B	18.0	0.0	-	-	-	18.0	-	-	-	-	18.0
EC O	530.5	481.1	481.1	-	-	49.4	30.0	7.9	-	11.5	-
EC P	491.8	413.2	412.7	-	0.5	78.6	34.7	27.8	8.5	4.7	2.9
EC Q	413.4	363.1	363.1	-	-	50.3	23.5	7.1	2.2	-	17.5
DEVELOPMENT	108.9	84.3	79.9	4.4	0.0	24.6	6.1	3.4	9.4	0.3	5.4
ED E	25.3	21.1	16.7	4.4	-	4.2	3.1	-	-	-	1.1
ED F	83.6	63.2	63.2	-	-	20.4	3.0	3.4	9.4	0.3	4.3

SIUSLAW RIVER

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING

PACIFIC OCEAN

NRC 01 M
EC A
NRC 01 OS
EC B
EC A
NRC 01 RS
EN C
NRC 01 RA
EN D
NRC 34 NR
NRC 01 RS
MD 02 M
ED E
RD 03 RS
SNA 33 NR
EC O
RD 03 RR
FLORENCE
NRC 06 E-25
NRC 07 F-2
EC Q
NRC 07 E-25
NRC 07 F-2
NRC 06 E-25
NORTH FORK
NRC 07 E-25
NRC 07 NR
SNA 08 NR
NRC 06 NE
NRC 06 F-2
EN H
EN H
NRC 06 RR-5
NRC 09 F-2
EN G
NRC 06 RR-5
NRC 09 PF
MD 10 M-3
NRC 05 H
NRC 05 RM
NRC 05 F-2
EN G
EN G
NRC 05 C
EC O
EC P
EN I
MD 04 WF
MD 04 M
ED F
RD 32 RR-2
RD 32 F-2
RD 32 M-2
RD 32 C-R
GLENADA
NRC 26 F-2
NRC 26 F-1
NRC 26 F-1
SNA 31 F-1
SOUTH INLET
NRC 26 RR-5
NRC 26 F-2
MD 11 M-3
NRC 13 F-2
MD 11 CR/H
NRC 12 F-2
MD 11 F-2
EN L
NRC 12 RR-5
EN K
MD 11 CR/H
NRC 09 F-2
MD 11 M-3
CUSHMAN
NRC 09 RR-5
EN J
NRC 30 E-25
NRC 26 F-1
NRC 13 F-1
NRC 13 F-1
NRC 13 E-25
EN M
EN M
NRC 26 E-25
EN M
NRC 26 E-25
NRC 26 F-1
NRC 15 F-1
NRC 26 F-2
NRC 27 RR-5
RD 28 RR-5
EN N
NRC 15 RR-5
EN N
NRC 26 F-1
NRC 29 E-25
NRC 14 RR-5
MD 14 C-R
MD 14 RR-5
EC Q
MD 14 M-3
MD 14 RR-5
NRC 26 E-25
NRC 13 RR-5
EC Q
NRC 13 F-2
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ODOE GEOGRAPHIC INFORMATION SERVICES

HABITAT SUMMARY

HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC	ACRES IN ED
ALL HABITATS		3060.4	100.0%	1485.2	1466.3	108.9
UNCONSOLIDATED BOTTOM						
1.1	Unspecified Type	346.5	11.3%	63.8	264.8	17.9
1.1.1	Sand	682.1	22.3%	20.6	604.8	56.7
1.1.2	Sand/Mud (Mixed)	392.6	12.8%	5.3	387.3	-
1.1.6	Cobble/Gravel	5.3	0.2%	-	-	5.3
ROCK BOTTOM						
1.2.8	Bedrock	8.8	0.3%	4.4	-	4.4
AQUATIC BED						
1.3.9	Seagrass	6.3	0.2%	5.8	0.5	-
SHORE						
2.1	Unspecified Type	18.9	0.6%	6.2	12.7	-
2.1.1	Sand	51.2	1.7%	-	48.2	3.0
2.1.2	Sand/Mud (Mixed)	22.7	0.7%	8.4	14.3	-
2.1.3	Mud	4.6	0.2%	1.8	2.8	-
2.1.6	Cobble/Gravel	0.9	0.0%	-	0.9	-
2.1.7	Boulder	22.0	0.7%	6.8	15.2	-
2.1.8	Bedrock	14.3	0.5%	4.5	6.7	3.1
FLAT						
2.2	Unspecified Type	21.9	0.7%	18.7	3.2	-
2.2.1	Sand	140.0	4.6%	83.3	53.3	3.4
2.2.2	Sand/Mud (Mixed)	79.8	2.6%	75.9	3.9	-
2.2.3	Mud	134.3	4.4%	133.9	0.4	-
AQUATIC BED						
2.3	Unspecified Type	1.5	0.0%	-	1.5	-
2.3.9	Seagrass	242.8	7.9%	226.1	7.3	9.4
2.3.9/10	Seagrass/Algae	67.5	2.2%	65.6	1.9	-
2.3.10	Algae	16.2	0.5%	16.2	-	-
2.3.10(1)	" on Sand	3.6	0.1%	3.6	-	-
BEACH/BAR						
2.4.1	Sand	30.5	1.0%	14.0	16.2	0.3
TIDAL MARSH						
2.5	Unspecified Type	4.7	0.2%	4.7	-	-
2.5.11	Low Salt Marsh	57.8	1.9%	49.3	7.4	1.1
2.5.12	High Salt Marsh	683.6	22.3%	666.3	13.0	4.3

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Capacity (Cubic Yards)	Size (In Acres)	Zone
DREDGED MATERIAL DISPOSAL SITES				
DMD 1	NORTH JETTY	80,000	8.5	/NRC
DMD 12	COUNTY LANDFILL	42,200	2.6	M
DMD 14	FLORENCE TREATMENT PLANT WEST	22,700	3.0	RR
DMD 15	FLORENCE TREATMENT PLANT SOUTH	59,400	4.5	RR
	Other tax lots owned by the Port of Siuslaw.			
DMD 16	BAY BRIDGE MARINA	7,400	2.5	RR
DMD 19	WATERLAND STORAGE	50,000	8.5	M
DMD 1A	SOUTH JETTY	70,000	7.5	NR/NRC
DMD 2	NORTH JETTY ROAD LOCATED SOUTH OF THE ROAD	185,000	12.5	NRC
DMD 22	JOHNSON ROCK	130,000	9.0	M3
DMD 23	MURPHY MILL	10,400	2.5	M3
DMD 25	CUSHMAN 1	970,000	18.0	E25
DMD 25A	CUSHMAN 2	970,000	70.0	F1
DMD 27	CUSHMAN 3	160,400	10.5	F2
DMD 3	NORTH JETTY ROAD LOCATED NORTH OF ROAD	105,000	9.5	/NRC
DMD 31	MIDWAY DOCK	16,370	2.5	M3
DMD 32	MIDWAY DOCKS EAST	9,300	2.5	RR5
DMD 34	WEST OF DUNCAN SLOUGH BRIDGE	43,500	5.4	E25
DMD 35	DUNCAN ISLAND MIDDLE	26,700	2.8	F2
DMD 36	DUNCAN ISLAND NORTH	36,300	5.6	F2
DMD 8	DUNES	3,465,000	143.2	NR
SIGNIFICANT HABITAT SITES (All unmapped)				
HAB 1	HERON ROOKERY (100 nests)		--	F
HAB 2	EAGLE NEST Identified in County's plan by section only.		--	F
HAB 3	OSPREY HABITAT		--	--
HAB 4	BAND-TAILED PIGEON WATERING AREA		--	--
MITIGATION AND RESTORATION SITES				
MIT 1	NORTH FORK ISLANDS Remove sand to create intertidal or subtidal environment.		58.0	EN-G
WATER-DEPENDENT DEVELOPMENT SITES				
WDD 1	SIUSLAW PACIFIC MOORAGE		--	M
WDD 2	FLORENCE WATERFRONT Moorage, Marina DMD site, relate commmercial uses.		--	WF/M
WDD 3	JOHNSON'S ROCK PRODUCTS Barge transhipment point.		--	M3
WDD 4	MIDWAY ROCK Water-dependent commercial and industrial.		--	M3

SIUSLAW RIVER

ESTUARINE HABITATS & PROTECTED SITES

PACIFIC OCEAN

DMD–1
DMD–2
DMD–3
DMD–1A
DMD–12
DMD–8
DMD–14
DMD–15
DMD–16
DMD–19
DMD–22
DMD–23
DMD–25
DMD–25A
DMD–27
DMD–31
DMD–32
DMD–34
DMD–35
DMD–36
MIT–1
HAB

FLORENCE
GLENADA
CUSHMAN
NORTH FORK
SOUTH INLET

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INFORMATION
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SHORELAND ZONING SUMMARY

Total Shoreland Area: 6456.3 acres

CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		671.8	10.4	
AR	Agricultural Resource	31.7	0.5	4.7
C	Commercial	38.4	0.1	1.2
CS	Urban Conservation Shoreland	476.6	7.4	70.9
FG	Forestry Grazing	49.6	0.8	7.4
M-1	Light Industrial	1.3	0.0	0.2
M-2	Industrial	4.9	0.1	0.7
M3	Marine Industrial	90.0	1.4	13.4
TC	Tourist Commercial	9.3	0.1	1.4
RURAL		5784.5	89.6	
RCS	Rural Conserv. Shoreland	3893.3	60.3	67.3
CT,TC	Tourist Commercial	25.4	0.4	0.4
FF	Farm Forest	87.5	1.4	1.5
FG	Exclusive Farm Use - Grazing	682.4	10.6	11.8
M-1	Light Industrial	90.3	1.4	1.6
M-3	Heavy Industrial	7.1	0.1	0.1
MC	Marine Commercial	67.4	1.0	1.2
MRI	Marine Industrial	4.0	0.1	0.1
PR	Public Reserve	758.5	11.7	13.1
RWDS	Rural Water Dependent Shore.	114.7	1.8	2.0
TR	Timberland Resource	52.0	0.8	0.9
WDI	Water Dependent Industrial	1.9	0.0	0.0

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	6543.6	3748.4	3748.4	0.0	0.0	2795.2	123.6	1021.6	400.1	49.1	1200.8
NATURAL	4340.2	1946.8	1946.8	0.0	0.0	2393.4	42.4	904.0	356.3	0.0	1090.7
EN 0	115.3	67.2	67.2	-	-	48.1	4.8	8.4	-	-	34.9
EN 4	3216.0	1683.8	1683.8	-	-	1532.2	17.4	759.5	350.3	-	405.0
EN 8	218.8	71.8	71.8	-	-	147.0	20.2	49.1	6.0	-	71.7
EN 11	74.0	34.1	34.1	-	-	39.9	-	-	-	-	39.9
EN 12	355.1	0.0	-	-	-	355.1	-	77.6	-	-	277.5
EN 14	361.0	89.9	89.9	-	-	271.1	-	9.4	-	-	261.7
CONSERVATION	1057.4	817.1	817.1	0.0	0.0	240.3	52.9	91.8	8.1	0.0	87.5
EC 0	76.7	49.4	49.4	-	-	27.3	3.9	-	-	-	23.4
EC 1	94.4	76.7	76.7	-	-	17.7	9.9	7.8	-	-	-
EC 2	52.0	33.1	33.1	-	-	18.9	6.2	5.8	6.9	-	-
EC 7	4.2	0.0	-	-	-	4.2	-	-	-	-	4.2
EC 9	60.4	38.0	38.0	-	-	22.4	2.0	20.4	-	-	-
EC 10	42.9	16.4	16.4	-	-	26.5	1.6	20.3	-	-	4.6
EC 11	286.9	221.3	221.3	-	-	65.6	9.6	23.6	-	-	32.4
EC 13	439.9	382.2	382.2	-	-	57.7	19.7	13.9	1.2	-	22.9
DEVELOPMENT	1146.0	984.5	984.5	0.0	0.0	161.5	28.3	25.8	35.7	49.1	22.6
ED 0	50.4	47.9	47.9	-	-	2.5	0.7	1.8	-	-	-
ED 1	395.9	336.3	336.3	-	-	59.6	21.0	-	-	38.6	-
ED 3	480.4	456.4	456.4	-	-	24.0	0.6	11.2	1.7	10.5	-
ED 5	132.7	67.3	67.3	-	-	65.4	0.1	11.6	31.3	-	22.4
ED 7	33.2	31.6	31.6	-	-	1.6	-	-	1.4	-	0.2
ED 13	19.4	18.1	18.1	-	-	1.3	-	-	1.3	-	-
MRI 0	34.0	26.9	26.9	-	-	7.1	5.9	1.2	-	-	-

UMPQUA RIVER

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING

PACIFIC OCEAN

RS PR

04 EN

RCS

05 ED

US 101

GARDINER

04 EN

RS FG

RCS

AR

00 ED

HENDERSON COVE

DOUBLE COVE POINT

HUNT COVE

CS

MACEY COVE

JERDEN COVE

03 ED

RCS

PR

MC

WDI

PR

MRI

WINCHESTER BAY

MC

01 ED

02 EC

MC

15 ED

PR

01 ED

01 EC

01 ED

01 EC

RS PR

1500 0 1500 3000 4500 FEET

MN

20.0°

OREGON

RCFF

HUDSON SLOUGH

RCCT

RCTR

RCM-3

RCFF

11 EN

FRANTZ CREEK

RCCT

RCFF

11 EN

11 EC

RCFG

RCFF

RCFG

RC FG

SMITH RIVER

RC FG

RCS

RS M-1

RS FG

11 EC

10 EC

13 EC

09 EC

04 EN

07 ED

BOLON

RWDS ISLAND

08 EN

PR

00 EN

08 ED

07 EC

13 ED

00 EC

07 ED

13 EC

USM3

USM3

00 EC

CS

CS

M-2

M-1

US M3

M-2

REDSPORT

USC3

CS

CS

CS

00 EC

14 EN

SCHOLFIELD CREEK

TC

13 EC

RS FG

RCS

TC

RCS

BUTLER CREEK

12 EN

RC FG

RS TO

12 EN

ODOE GEOGRAPHIC INFORMATION SERVICES

N

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E

S

HABITAT SUMMARY

HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC	ACRES IN ED
ALL HABITATS		6543.6	100.0%	4340.2	1057.4	1146.0
UNCONSOLIDATED BOTTOM						
1.1	Unspecified Type	3748.4	57.3%	1946.8	817.1	984.5
SHORE						
2.1	Unspecified Type	21.3	0.3%	-	19.4	1.9
2.1.1	Sand	4.6	0.1%	-	4.3	0.3
2.1.3	Mud	45.1	0.7%	25.0	13.5	6.6
2.1.5	Wood Debris/Organic	14.7	0.2%	14.7	-	-
2.1.6	Cobble/Gravel	4.6	0.1%	-	3.9	0.7
2.1.7	Boulder	24.4	0.4%	-	5.6	18.8
2.1.8	Bedrock	8.9	0.1%	2.7	6.2	-
FLAT						
2.2	Unspecified Type	77.6	1.2%	77.6	-	-
2.2.1	Sand	31.1	0.5%	17.5	13.6	-
2.2.2	Sand/Mud (Mixed)	708.2	10.8%	704.9	-	3.3
2.2.3	Mud	204.7	3.1%	104.0	78.2	22.5
AQUATIC BED						
2.3.9	Seagrass	164.5	2.5%	157.6	6.9	-
2.3.9(1)	Seagrass on Sand	32	0.5%	32.0	-	-
2.3.9(2)	Seagrass on Sand/Mud	160.1	2.4%	138.9	-	21.2
2.3.9(3)	Seagrass on Mud	12.3	0.2%	0.5	-	11.8
2.3.10(8)	Seagrass on Bedrock	31.2	0.5%	27.3	1.2	2.7
BEACH/BAR						
2.4.1	Sand	49.1	0.8%	-	-	49.1
TIDAL MARSH						
2.5	Unspecified Type	102.4	1.6%	74.2	28.2	-
2.5.11	Low Salt Marsh	110.6	1.7%	94.0	-	16.6
2.5.12	High Salt Marsh	841	12.9%	781.1	53.9	6
2.5.13	Fresh Marsh	51.8	0.8%	51.8	-	-
2.5.14	Shrub Marsh	95	1.5%	89.6	5.4	-

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Capacity (In Cubic Yards)	Size (In Acres)	Zone
DREDGED MATERIAL DISPOSAL SITES				
DMD 1	SALMON HARBOR	105,000	50.0	MC/PR
DMD 2	INTERNATIONAL PAPER #1	41,500	2.5	M3
DMD 3	INTERNATIONAL PAPER #2	39,000	4.0	M3
DMD 4	LEED'S ISLAND	1,130,000	70.0	UWD
DMD 5	BOLON ISLAND #1	141,000	6.0	M3
DMD 6	BOLON ISLAND #2	25,800	4.0	M3
DMD 7	OTTER SLOUGH	80,666	5.0	FG
DMD 8	CHAMPION MILL	310,000	16.0	M2
DMD 9	BRAINARD CREEK	60,000	14.0	FG
DMD 11	IN BAY	--	25.0	ED
	In-water disposal site.	Capacity unknown.		
SIGNIFICANT HABITAT SITES				
HAB 1	SCHOLFIELD CREEK WETLAND		525.0	14EN
HAB 11	BUTLER CREEK WETLAND		260.0	12EN
HAB 12	PROVIDENCE CREEK WETLAND		165.0	CS
HAB 13	FRANZ CREEK WETLAND		48.0	TR
HAB 14	HUDSON SLOUGH WETLAND		85.0	11EN/FF
HAB 5	WINCHESTER CREEK WETLAND		40.0	CS
HAB 8	SMITH RIVER		28.0	RCFG
HAB 8	SMITH RIVER		--	FG
HAB 8	OTTER SLOUGH WETLAND		--	
MITIGATION AND RESTORATION SITES				
MIT I	PROVIDENCE CREEK Remove tidegates.		55.0	CS
MIT II	WEST MOUTH SCHOLFIELD Lower elevation and create tidal channels.		6.3	CS
MIT III	PURDY ISLAND Lower elevation and create tidal channels.		3.1	FG
MIT IV	SCOTT'S SWAMP Install larger culverts or replace dike with causeway.		14.2	EC
MIT V	STEAMBOAT ISLAND Move dredge spoils to upland site.		14.5	8 EN
WATER-DEPENDENT DEVELOPMENT SITES				
WDD 1	LEEDS ISLAND		25.0	AR
WDD 2	COHO MARINA		5.0	C3
WDD 3	MCINTOSH SLOUGH SOUTH (Industrial site)		15.0	M3
WDD 4	MCINTOSH SLOUGH NORTH		15.0	M3
WDD 5	REEDSPORT WATERFRONT WEST (Industrial)		25.0	M3
WDD 6	REEDSPORT WATERFRONT EAST (Small-scale industry)		15.0	M3
WDD 7	GARDINER (Marina and industry)		82.0	M3
WDD 8	SALMON HARBOR (Commercial moorage and industry)		67.0	M3/MC

UMPQUA RIVER

ESTUARINE HABITATS & PROTECTED SITES

PACIFIC OCEAN

GARDINER

REEDSPORT

WINCHESTER BAY

HENDERSON COVE

DOUBLE CORE POINT

HUNT COVE

MACEY COVE

JERDEN COVE

HUDSON SLOUGH

FRANTZ CREEK

SMITH RIVER

BOLON ISLAND

BUTLER CREEK

SCHOLFIELD CREEK

DMD-1 DMD-2 DMD-3 DMD-4 DMD-5 DMD-6 DMD-7 DMD-8 DMD-9 DMD-12 DMD-13

MIT-1 MIT-2 MIT-3 MIT-4 MIT-5

HAB-1 HAB-5 HAB-8 HAB-11 HAB-12 HAB-13 HAB-14

US 101

1500 0 1500 3000 4500 FEET

M N 20.8°

OREGON

N W E S

ODOE GEOGRAPHIC INFORMATION SERVICES

SHORELAND ZONING SUMMARY

Total Shoreland Area: 7836.9 acres

CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		1274.7	16.3	
AZ	Airport	32.5	0.4	2.6
C-1	Central Commercial (CB)	14.0	0.2	1.1
C-2	General Commercial (CB)	22.1	0.3	1.7
C-G	General Commercial (NB)	10.1	0.1	0.8
CD-5	Controlled Development	15.3	0.2	1.2
CS	Conservation Shorelands	23.5	0.3	1.8
I-C	Industrial Commercial	38.1	0.5	3.0
I-W	Waterfront Industrial	105.8	1.3	8.3
IND	Industrial	194.7	2.5	15.3
MH	Heavy Industrial	185.2	2.4	14.5
ML	Light Industrial	32.7	0.4	2.6
PI	Planned Industrial	126.5	1.6	9.9
PI-SD	Planned Ind - Spoils Disp	162.0	2.1	12.7
R-2	Single Family & Duplex Res	1.5	0.0	0.1
R-7	Single Family Residential	6.0	0.1	0.5
R-7.5	Restricted Residential	13.3	0.2	1.0
RR-5	Rural Residential	3.9	0.0	0.3
RW	Restricted Waterfront Res	17.9	0.2	1.4
UR-1	Urban Residential 1	146.4	1.9	11.5
UR-2	Urban Residential 2	96.0	1.2	7.5
RURAL		6562.2	83.7	
EFU-10	Exclusive Farm Use - 10	42.5	0.5	0.6
EFU-20	Exclusive Farm Use - 20	1154.1	14.7	17.6
F-160	Forest - 160*	510.6	6.5	7.8
F-40	Forest - 40*	15.2	0.2	0.2
FF-40	Farm-Forest 40*	212.4	2.7	3.2
IND	Industrial	330.1	4.2	5.0
RC	Rural Center	2.5	0.0	0.0
REC	Recreation Management	1683.6	21.5	25.7
RR-1	Rural Residential - 1	1.7	0.0	0.0
RR-2	Rural Residential - 2	577.2	7.4	8.8
RR-5	Rural Residential - 5	271.6	3.5	4.1
SW-10	Small Woodlot - 10*	312.6	4.0	4.8
WD	Water Dependent Development Shorelands	1388.6	17.7	21.2

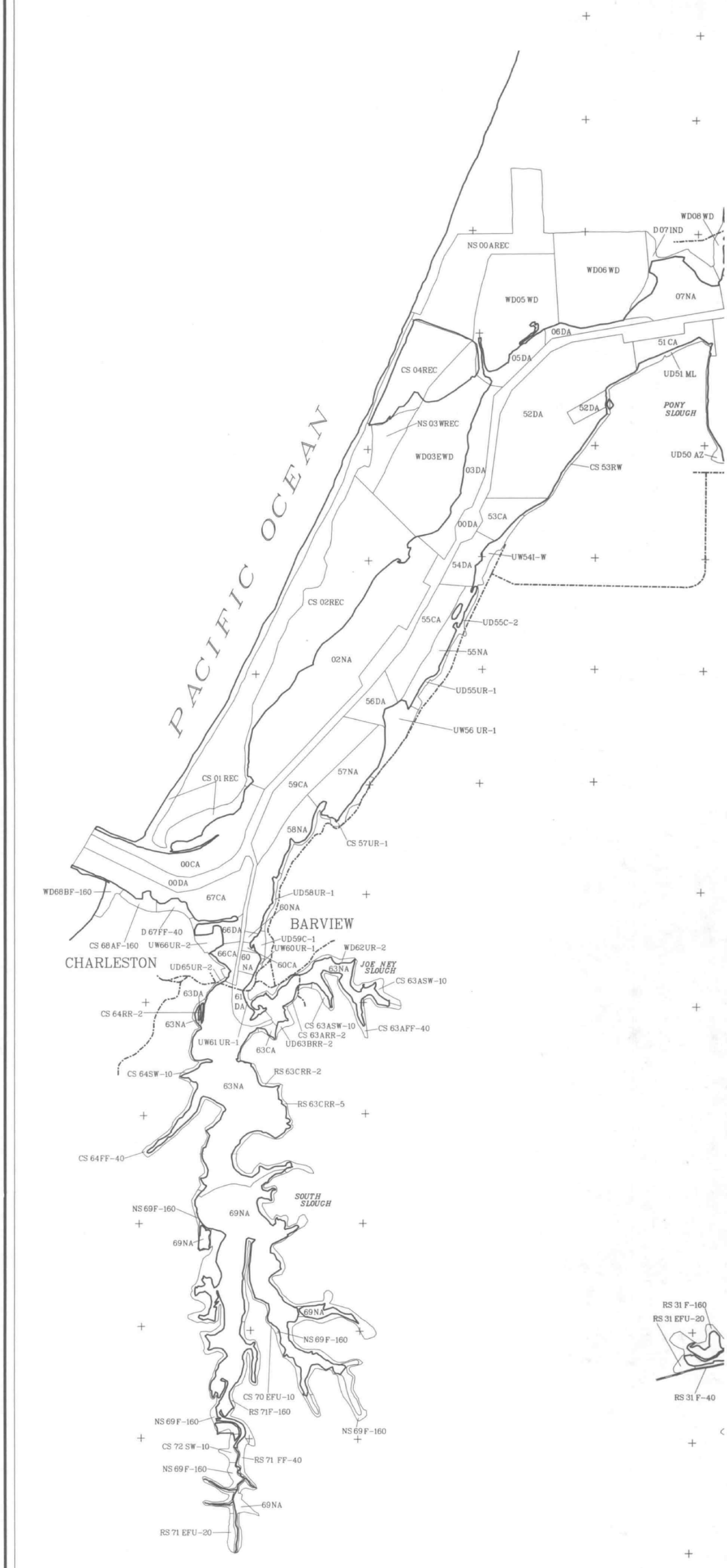
*Plan amendments have replaced these zoning districts with a combination of farm and forest zones with no minimum lot size.

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	13300.5	5378.3	5125.1	0.0	253.2	7922.2	691.0	3492.8	1956.8	55.1	1726.5
NATURAL	8251.3	1580.0	1398.0	0.0	182.0	6671.3	443.9	3040.2	1701.4	41.3	1444.5
NA 2	693.0	273.7	273.7	-	-	419.3	118.7	107.7	177.8	-	15.1
NA 7	182.6	70.7	70.7	-	-	111.9	1.5	54.3	38.8	-	17.3
NA 10	423.7	56.0	56.0	-	-	367.7	19.0	135.5	89.3	-	123.9
NA 11	662.2	98.5	98.5	-	-	563.7	3.0	294.4	163.2	15.5	87.6
NA 13	828.5	324.7	324.6	-	0.1	503.8	1.4	218.4	273.1	8.2	2.7
NA 14	28.0	1.6	1.6	-	-	26.4	3.5	17.1	-	-	5.8
NA 15	808.9	105.6	100.1	-	5.5	703.3	24.0	302.8	339.1	-	37.4
NA 17	363.7	27.9	27.9	-	-	335.8	28.3	169.6	44.5	-	93.4
NA 21	30.4	0.0	-	-	-	30.4	5.2	-	3.9	-	21.3
NA 24	162.1	2.2	2.2	-	-	159.9	-	82.5	16.0	-	61.4
NA 25	398.5	64.8	58.6	-	6.2	333.7	14.9	27.4	1.9	-	289.5
NA 29	51.8	0.6	0.6	-	-	51.2	-	38.5	-	-	12.7
NA 31	397.6	94.5	94.5	-	-	303.1	23.6	-	60.5	-	219.0
NA 39	24.5	0.0	-	-	-	24.5	-	-	-	-	24.5
NA 45	1171.7	148.1	145.1	-	3.0	1023.6	98.7	670.7	87.6	-	166.6
NA 50	313.4	33.7	32.0	-	1.7	279.7	-	191.7	39.3	-	48.7
NA 55	84.1	0.7	0.7	-	-	83.4	0.8	60.1	16.8	-	5.7
NA 57	154.2	4.2	-	-	4.2	150.0	4.1	55.8	81.0	-	9.1
NA 58	151.5	84.1	21.0	-	63.1	67.4	2.6	8.9	55.9	-	-
NA 60	26.3	8.2	2.3	-	5.9	18.1	-	9.5	6.8	-	1.8
NA 63	662.8	137.8	70.1	-	67.7	525.0	17.5	271.1	117.8	17.6	101.0
NA 69	631.8	42.4	17.8	-	24.6	589.4	77.1	324.2	88.1	-	100.0

WEST COOS BAY

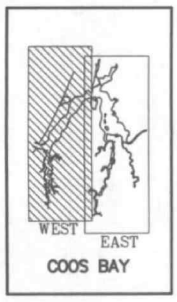
ESTUARINE MANAGEMENT UNITS
& SHORELAND ZONING

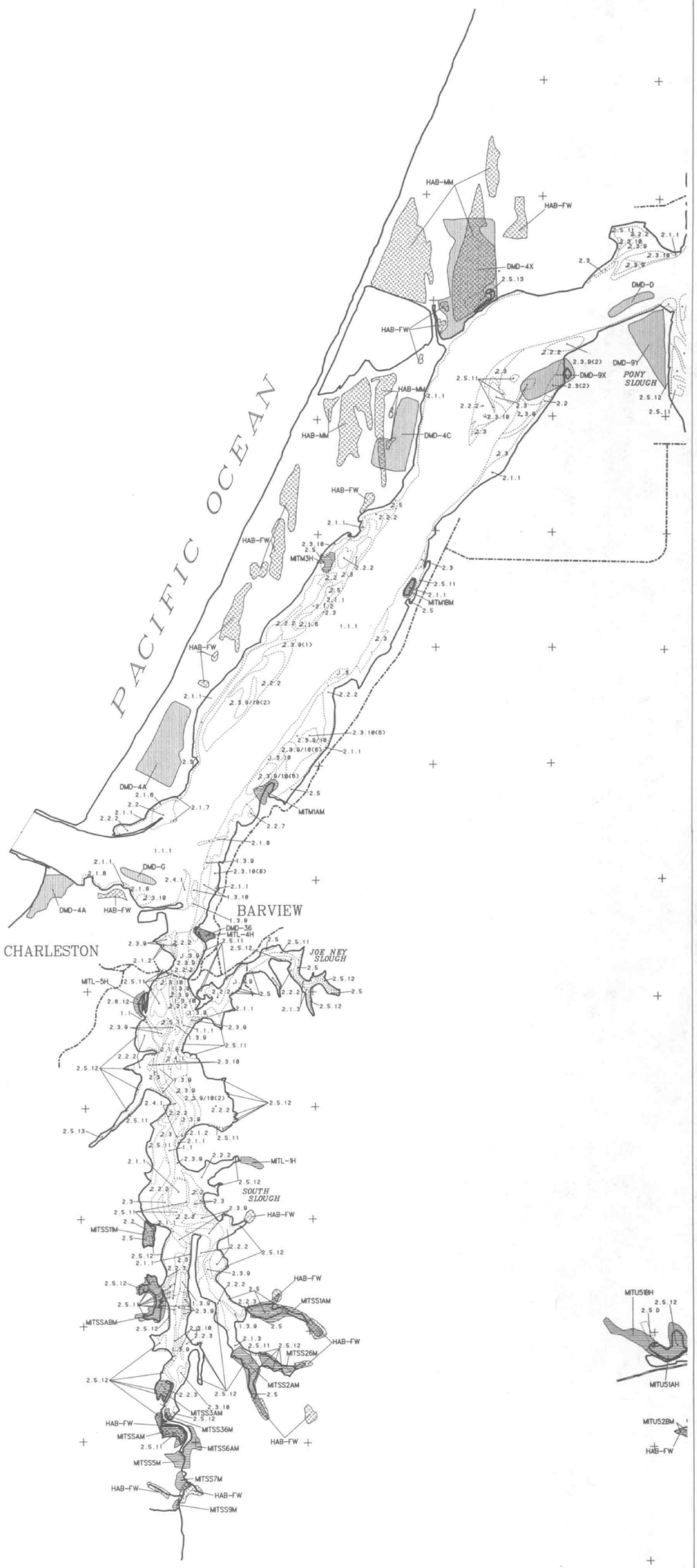


CONSERVATION	2492.8	1814.2	1777.5	0.0	36.7	678.6	130.0	176.5	117.3	11.3	243.5
CA 0	224.2	172.4	172.4	-	-	51.8	10.5	36.8	4.5	-	-
CA 8	20.0	3.3	3.3	-	-	16.7	12.3	-	4.4	-	-
CA 12	6.5	1.2	1.2	-	-	5.3	-	3.3	0.2	-	1.8
CA 16	16.5	11.4	11.4	-	-	5.1	0.8	0.9	3.4	-	-
CA 19	85.5	16.8	16.8	-	-	68.7	9.4	-	-	-	59.3
CA 21	666.7	497.6	497.6	-	-	169.1	15.1	54.4	45.0	-	54.6
CA 26	141.3	116.6	116.6	-	-	24.7	-	21.9	2.7	-	0.1
CA 30	293.8	161.3	161.1	-	0.2	132.5	43.7	1.0	-	-	87.8
CA 38	88.4	42.7	42.7	-	-	45.7	8.2	-	-	-	37.5
CA 45	59.8	59.8	59.8	-	-	0.0	-	-	-	-	-
CA 48	74.0	34.0	34.0	-	-	40.0	-	28.9	10.1	-	1.0
CA 51	76.8	60.7	60.7	-	-	16.1	-	10.5	5.6	-	-
CA 53	80.5	62.4	62.4	-	-	18.1	16.5	-	1.6	-	-
CA 55	153.8	138.0	137.3	-	0.7	15.8	-	7.5	8.3	-	-
CA 59	232.6	216.9	191.6	-	25.3	15.7	-	0.7	15.0	-	-
CA 60	5.3	1.0	0.3	-	0.7	4.3	-	1.3	3.0	-	-
CA 63	6.7	0.5	-	-	0.5	6.2	-	4.8	-	-	1.4
CA 66	29.3	12.3	3.0	-	9.3	17.0	5.3	4.5	7.2	-	-
CA 67	231.1	205.3	205.3	-	-	25.8	8.2	-	6.3	11.3	-
DEVELOPMENT	2556.4	1984.1	1949.6	0.0	34.5	572.3	117.1	276.1	138.1	2.5	38.5
DA 0	1036.5	999.9	991.4	-	8.5	36.6	1.7	29.5	5.1	0.3	-
DA 3	162.3	120.0	120.0	-	-	42.3	27.6	5.5	2.6	-	6.6
DA 5	62.9	41.3	41.3	-	-	21.6	21.6	-	-	-	-
DA 6	40.5	37.4	37.4	-	-	3.1	3.1	-	-	-	-
DA 20	2.9	2.9	2.9	-	-	0.0	-	-	-	-	-
DA 27	60.6	18.5	18.5	-	-	42.1	-	33.7	3.4	-	5.0
DA 28	108.6	68.5	68.5	-	-	40.1	20.6	0.8	-	-	18.7
DA 43	12.1	2.5	2.5	-	-	9.6	8.6	-	-	-	1.0
DA 44	99.5	98.5	98.5	-	-	1.0	1.0	-	-	-	-
DA 46	17.0	17.0	17.0	-	-	0.0	-	-	-	-	-
DA 47	19.6	19.1	19.1	-	-	0.5	-	0.5	-	-	-
DA 52	707.1	377.5	377.5	-	-	329.6	25.5	180.6	119.2	-	4.3
DA 54	72.9	64.1	64.1	-	-	8.8	7.4	-	1.4	-	-
DA 56	70.3	54.0	44.8	-	9.2	16.3	-	13.5	2.8	-	-
DA 61	48.0	29.5	12.7	-	16.8	18.5	-	12.0	3.6	-	2.9
DA 63	2.2	2.2	2.2	-	-	0.0	-	-	-	-	-
DA 66	33.4	31.2	31.2	-	-	2.2	-	-	-	2.2	-

WEST COOS BAY

ESTUARINE HABITATS & PROTECTED SITES





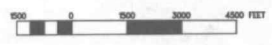
SPECIAL SHORELAND SITES

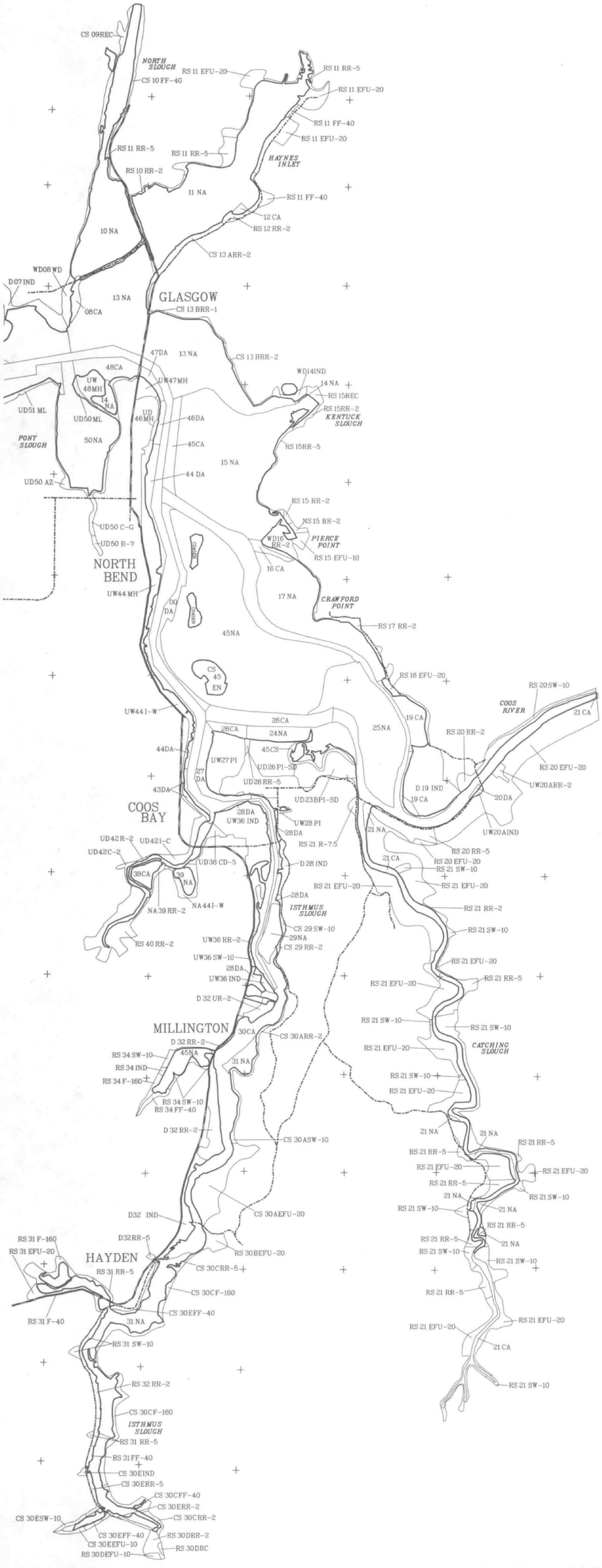
CODE	NAME/Comments	Capacity (Cubic Yards)	Size (Acres)	Zone
DREDGED MATERIAL DISPOSAL SITES				
DMD 15A	EAST BAY DRIVE	200,000	15.0	CS
DMD 18A	MIDDLE ISLAND	250,000	35.0	CS
DMD 18B	SOUTH ISLAND	300,000	20.0	CS
DMD 19B	EASTSIDE	3,800,000	120.0	B
DMD 1B	BASTENDORFF BEACH	240,000	30.0	WD
DMD 25	LOWER ISTHMUS EAST	1,300,000	82.0	B
DMD 25A	LOWER ISTHMUS WEST	920,000	38.0	D
DMD 30B	CHRISTENSEN'S RANCH	696,000	36.0	RS
DMD 3B	BARVIEW WAYSIDE	50,000	5.0	UW
DMD 4C	NORTH SPIT 2	290,000	92.0	--
DMD 4X	HENDERSON MARSH	2,000,000	150.0	WD
DMD 9X	AIRPORT EXTENSION	1,000,000	32.0	DA
DMD 9Y	AIRPORT INTERIOR	336,000	30.0	--
DMD BAY D	INBAY AIRPORT	--	18.3	DA
	Capacity unspecified. Determined on project basis..			
DMD BAY G	INBAY COOS HEAD	--	12.5	DA
	Unspecified capacity. Determined on project basis.			
DMD BEACH	NORTH SPIT		--	--
	Undetermined capacify. Site is on beach.			
SIGNIFICANT HABITAT SITES				
HAB 1	HENDERSON MARSH		160.0	CON
	Freshwater marsh and swamp; Aquifer recharge.			
HAB 2	TREATMENT LAGOON NORTH		200.0	--
	Deflation plain marsh.			
HAB 3	TREATMENT LAGOON SOUTH		250.0	--
	Deflation plain marsh.			
HAB 4	PONY SLOUGH		60.0	--
	Major marsh.			
HAB 5	DREDGE SPOILS		--	--
	Snowy plover nesting area.			
HAB 6	HUNGRYMAN COVE		--	--
	Great Blue Heron rookery.			
HAB 7	CATCHING SLOUGH		--	--
	Great Blue Heron rookery.			

CODE	NAME/Comments	Size (Acres)	Zone
MITIGATION AND RESTORATION SITES			
MIT L1	OXFORD WAY RD.	6.0	NA
	Breach or remove dike.		
MIT L4	ACROSS FROM CHARLESTON BASIN	5.5	WDR
	Remove sand to create marsh beside channel.		
MIT L5	LOWER SOUTH SLOUGH	5.4	CS
	Remove dike.		
MIT M5	SPOILS ISLANDS	22.3	CS
	Lower elevation to promote tidal flushing.		
MIT U12	LILIENTHAL BOOM SITE	36.0	RS
	Breach dike and remove tidegates.		
MIT U16A	NORTH OF CHRISTIANSON'S RANCH	3.7	RS
	Remove tidegate and breach berm.		
MIT U30B	SUMNER ROAD	4.8	RS
	Breach dike.		
MIT U31	CATCHING SLOUGH	2.7	NA
	Enlarge breaches.		
MIT U44	ISTHMUS SLOUGH	20.0	RS
	Remove tidegate and breach berm.		
MIT U51A	DAVIS SLOUGH	24.0	NA
	Breach or remove dikes and/or tidegate.		
MIT U51B	DAVIS SLOUGH	16.0	RS
	Remove tidegates.		
MIT U59A	COALBANK SLOUGH	25.0	NA
	Replace or add culvert.		
MIT U59B	COALBANK SLOUGH	35.0	NA
	Breach berm.		

EAST COOS BAY

ESTUARINE MANAGEMENT UNITS
& SHORELAND ZONING





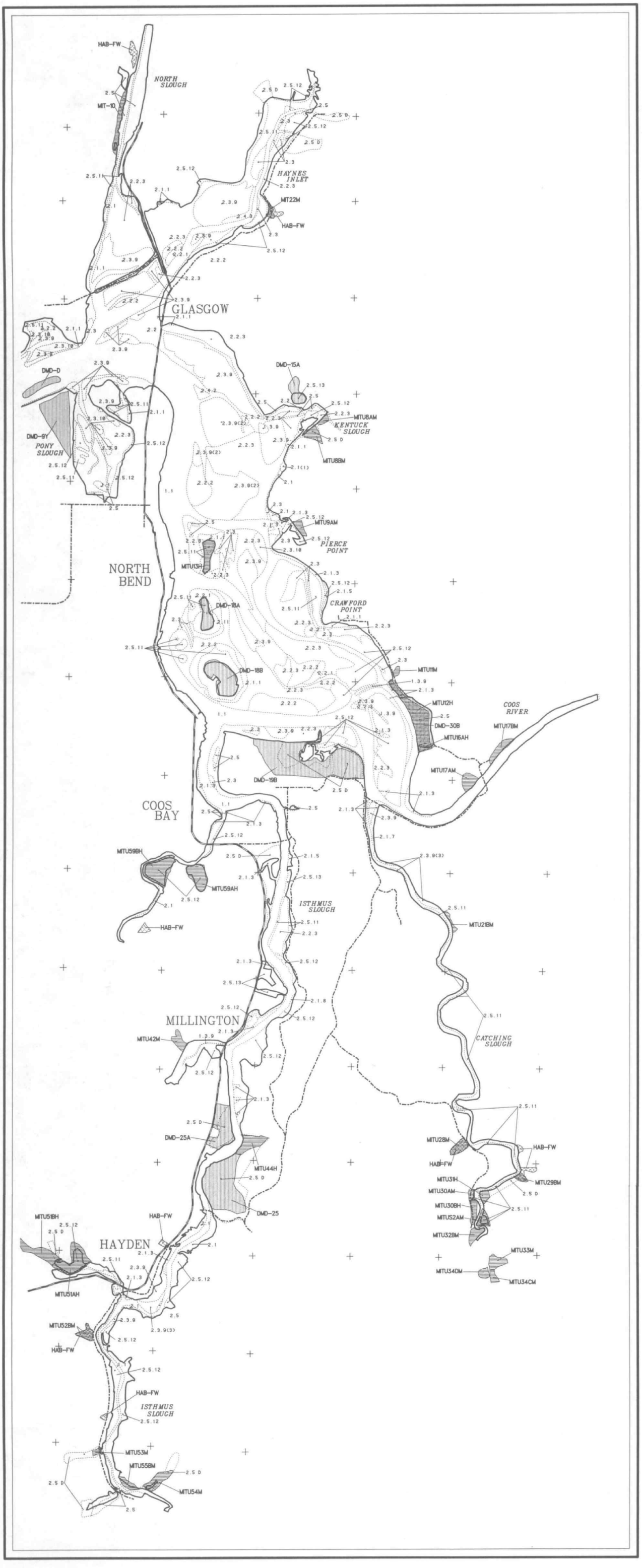
CODE	NAME/Comments	Size (Acres)	Zone
WATER-DEPENDENT DEVELOPMENT SITES			
WDD 115	JETTY SITE 68B Jetty maintenance and recreation access.	--	WD
WDD 120	NORTH SLOUGH Aquaculture and access.	--	8 WD
WDD 164	UPPER BAY Barge loading for jetty rock.	--	14 WD
WDD 176	PIERCE POINT Log handling and storage.	--	16 WD
WDD 231	HARBOR TUG AND BARGE Tug and barge facilities.	--	20A WD
WDD 237	COOS/MILLICOMA SITE Barge loading.	--	20B WD
WDD 243	ALLEGANY Log loading and handling.	--	20C WD
WDD 249	DELLWOOD Log loading and handling.	--	20D WD
WDD 268	ISTHMUS SLOUGH Expand existing industrial and commercial uses.	--	28D I
WDD 318	MILLINGTON Water-dependent industry.	--	36 UW
WDD 337	SOUTH SLOUGH Recreation.	--	60 UW
WDD 346	HANSEN'S LANDING	--	61 UW
WDD 36	LOWER BAY-NORTH SPIT Industry, commerce.	--	3E WD
WDD 384	CHARLESTON Urban water-dependent uses.	--	66 UW
WDD 48	HENDERSON MARSH Heavy industry.	--	5 WD
WDD 61	LOWER BAY SHORELINE Industry and water access.	--	6 WD
WDD 83	LOWER BAY Deep-water access.	--	56 UW

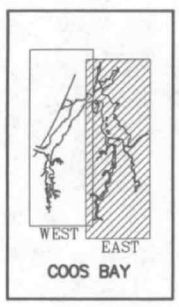
HABITAT SUMMARY

HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC	ACRES IN ED
ALL HABITATS		13300.5	100.0%	8251.3	2492.8	2556.4
Unconsolidated Bottom						
1.1	Unspecified Type	5084.8	38.2%	1370.4	1777.5	1936.9
1.1.1	Sand	40.3	0.3%	27.6	0.0	12.7
Aquatic Bed						
1.3	Unspecified Type	5.0	0.0%	0.0	0.7	4.3
1.3.9	Seagrass	144.5	1.1%	114.6	10.7	19.2
1.3.10	Algae	149.5	1.1%	67.4	25.3	11.0
Shore						
2.1	Unspecified Type	59.5	0.4%	24.3	35.2	0.0
2.1.1	Sand	390.3	2.9%	269.0	36.1	85.2
2.1.2	Sand/Mud (Mixed)	21.9	0.2%	16.6	5.3	0.0
2.1.3	Mud	186.0	1.4%	117.8	39.3	28.9
2.1.5	Wood Debris/Organic	6.8	0.1%	3.8	0.0	3.0
2.1.6	Cobble/Gravel	11.9	0.1%	8.5	3.4	0.0
2.1.7	Boulder	3.9	0.0%	1.8	2.1	0.0
2.1.8	Bedrock	10.7	0.1%	2.1	8.6	0.0
Flat						
2.2	Unspecified Type	198.7	1.5%	165.2	22.0	11.5
2.2.1	Sand	86.6	0.7%	82.1	0.0	4.5
2.2.2	Sand/Mud (Mixed)	1282.4	9.6%	1024.8	40.5	217.1
2.2.3	Mud	1925.1	14.5%	1768.1	114.0	43.0
Aquatic Bed						
2.3	Unspecified Type	380.5	2.9%	275.7	26.1	78.7
2.3.9	Seagrass	882.6	6.6%	819.4	38.1	25.1
2.3.9(1)	Seagrass on Sand	16.4	0.1%	16.4	0.0	0.0
2.3.9(2)	Seagrass on Sand/Mud	287.0	2.2%	265.8	5.2	16.0
2.3.9(3)	Seagrass on Mud	27.7	0.2%	15.0	12.7	0.0
2.3.9/10	Seagrass/Algae	72.8	0.5%	56.3	13.7	2.8
2.3.9/10(2)	" on Sand/Mud	102.7	0.8%	88.4	0.0	14.3
2.3.9/10(6)	" on Cobble/Gravel	24.1	0.2%	23.5	0.6	0.0
2.3.10	Algae	102.9	0.8%	83.8	17.9	1.2
2.3.10(6)	" on Cobble/Gravel	8.2	0.1%	8.2	0.0	0.0
2.3.10(8)	" on Bedrock	51.9	0.4%	48.9	3.0	0.0
Beach/Bar						
2.4.1	Sand	31.4	0.2%	17.6	11.3	2.5
2.4.2	Sand/Mud	8.2	0.1%	8.2	0.0	0.0
2.4.3	Mud	15.5	0.1%	15.5	0.0	0.0
Tidal Marsh						
2.5	Unspecified Type	269.9	2.0%	198.0	59.3	12.6
2.5.11	Low Salt Marsh	431.1	3.2%	375.5	47.5	8.1
2.5.12	High Salt Marsh	997.5	7.5%	866.2	131.3	0.0
2.5.13	Fresh Marsh	28.0	0.2%	4.8	5.4	17.8

EAST COOS BAY

ESTUARINE HABITATS & PROTECTED SITES





1500 0 1500 3000 4500 FEET

SHORELAND ZONING SUMMARY

Total Shoreland Area: 726.5acres

CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		164.3	22.6	
C-3	Marine Commercial	12.2	1.7	7.4
CD-2	Controlled Development - 2	42.1	5.82	5.6
GC	General Commercial*	5.0	0.7	3.0
HI	Heavy Industrial	36.8	5.1	22.4
NR	Natural Resource Management	47.8	6.6	29.1
OS	Open Space*	3.2	0.4	1.9
PF	Public Facilities & Parks	17.2	2.41	0.5
RURAL		562.2	77.4	
EFU	Exclusive Farm Use	231.7	31.9	41.2
EFU-10	Exclusive Farm Use - 10	15.3	2.1	2.7
F	Forest	50.4	6.9	9.0
IND	Industrial	43.6	6.0	7.7
NR	Natural Resource Mgmt	154.1	21.2	27.4
REC	Recreation Management	55.7	7.7	9.9
RR-2	Rural Residential - 2	11.5	1.6	2.0

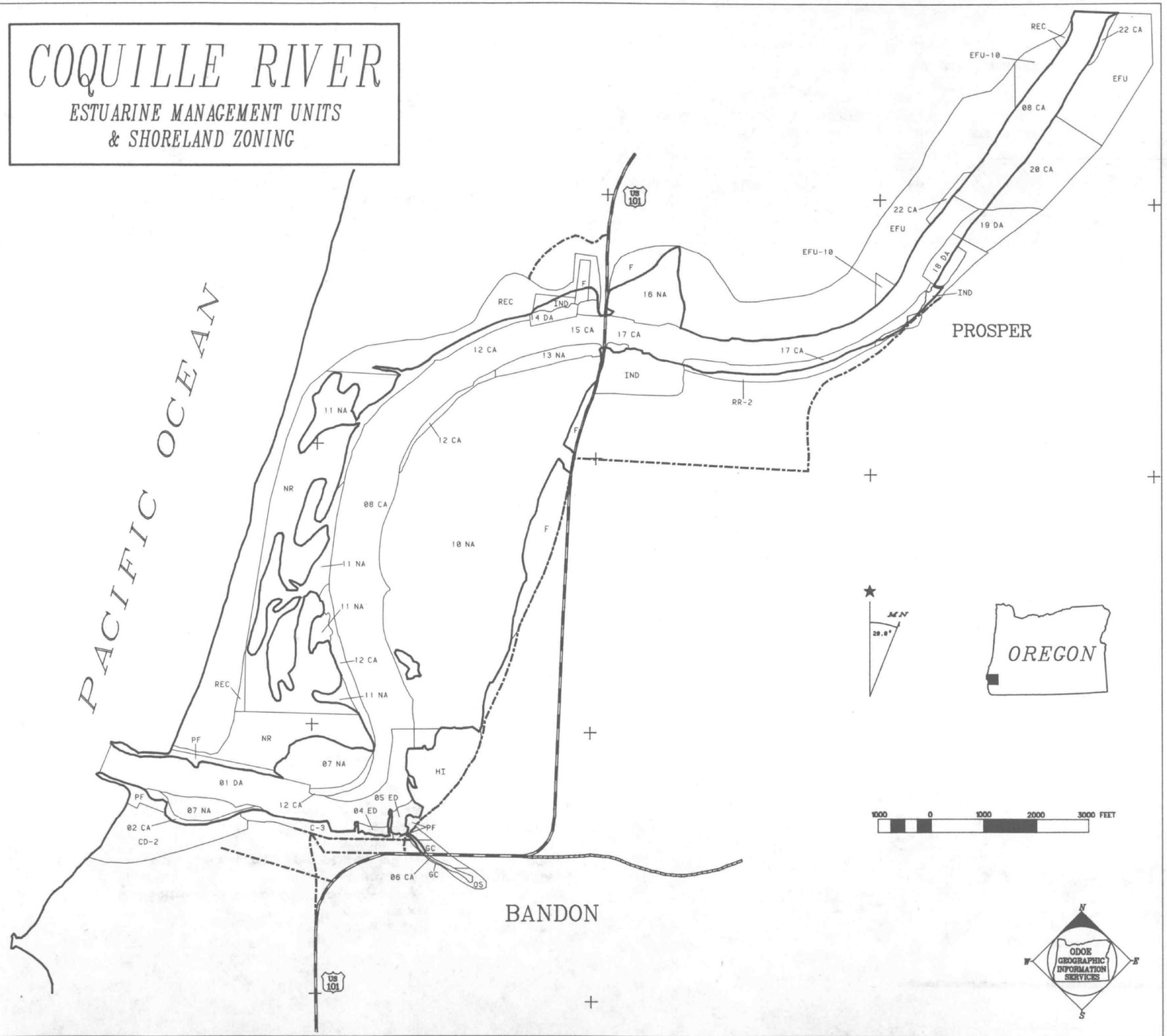
*GC and OS are plan designations. The corresponding zoning districts are General Commercial (C-2) and Natural Resources and Open Space (NR), respectively.

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	1081.7	475.5	475.5	0.0	0.0	606.2	79.4	149.3	102.5	0.0	275
NATURAL	532.8	3.8	3.8	0.0	0.0	529	34.7	138.3	83.3	0.0	272.7
NA 7	41.5	-	-	-	-	41.5	-	31.0	10.5	-	-
NA 10	384.5	3.5	3.5	-	-	381.0	19.6	95.6	63.2	-	202.6
NA 11	63.3	-	-	-	-	63.3	4.7	11.7	4.5	-	42.4
NA 13	11.9	-	-	-	-	11.9	8.4	-	3.5	-	-
NA 16	31.6	0.3	0.3	-	-	31.3	2.0	-	1.6	-	27.7
CONSERVATION	433.1	368.2	368.2	0.0	0.0	64.9	40.4	8.3	14.5	0.0	1.7
CA 2	5.1	-	-	-	-	5.1	-	3.7	1.4	-	-
CA 6	0.8	0.8	0.8	-	-	0.0	-	-	-	-	-
CA 8	365.1	355.7	355.7	-	-	9.4	6.0	-	3.4	-	-
CA 12	39.6	-	-	-	-	39.6	27.9	4.6	6.9	-	0.2
CA 15	2.5	-	-	-	-	2.5	0.6	-	0.4	-	1.5
CA 17	20.0	11.7	11.7	-	-	8.3	5.9	-	2.4	-	-
DEVELOPMENT	115.8	103.5	103.5	0.0	0.0	12.3	4.3	2.7	4.7	0.0	0.6
DA 1	94.9	94.5	94.5	-	-	0.4	0.4	-	-	-	-
DA 14	4.9	1.9	1.9	-	-	3.0	1.5	-	0.9	-	0.6
DA 18	6.1	4.7	4.7	-	-	1.4	1.4	-	-	-	-
DA 19	2.7	1.7	1.7	-	-	1.0	1.0	-	-	-	-
ED 4	2.1	-	-	-	-	2.1	-	2.1	-	-	-
ED 5	5.1	0.7	0.7	-	-	4.4	-	0.6	3.8	-	-

COQUILLE RIVER

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING



HABITAT SUMMARY

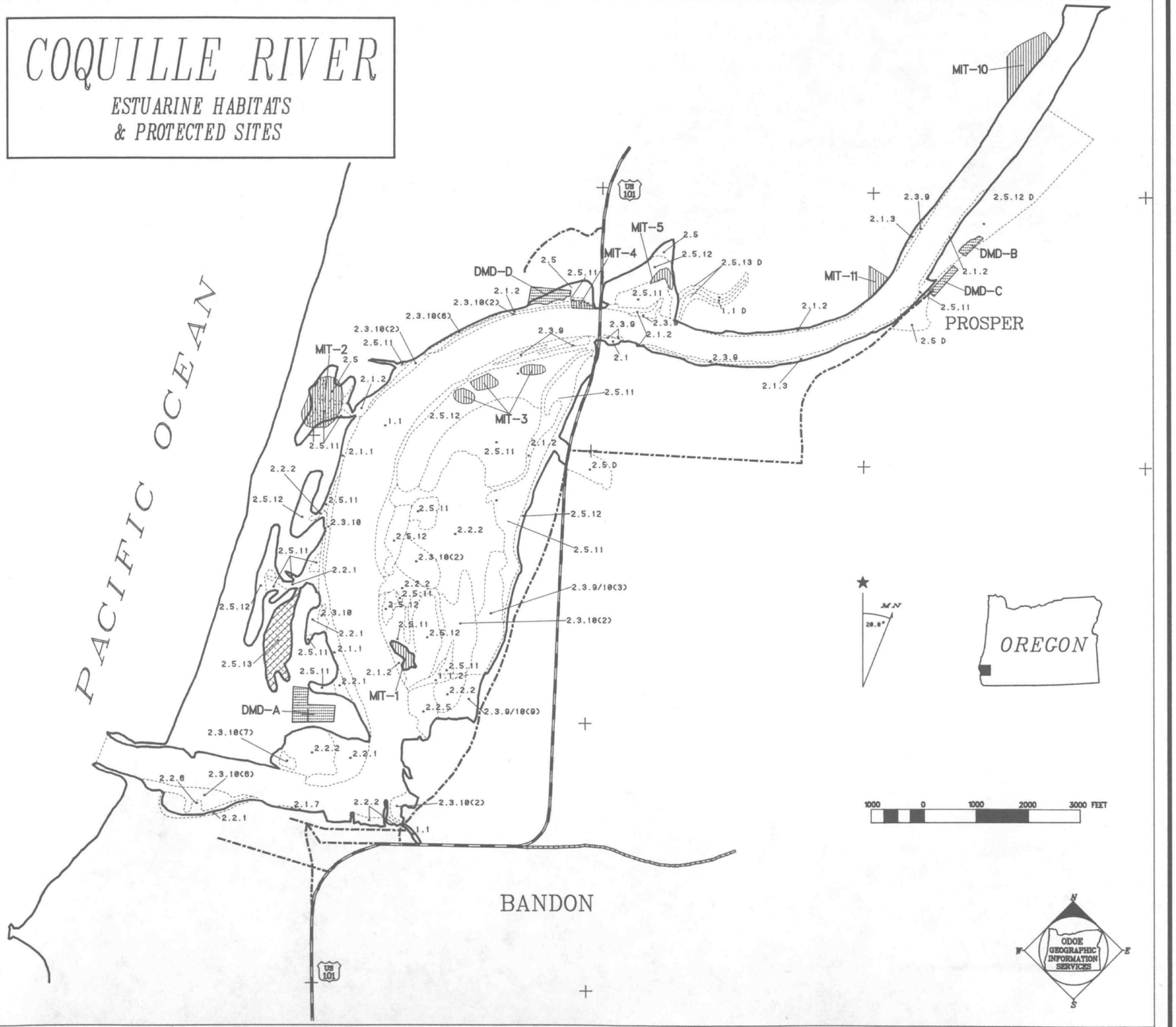
HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC	ACRES IN ED
ALL HABITATS		1081.7	100.0%	532.8	433.1	115.8
UNCONSOLIDATED BOTTOM						
1.1	Unspecified Type	472.3	43.7%	0.6	368.2	103.5
1.1.2	Sand/Mud (Mixed)	3.2	0.3%	3.2	-	-
SHORE						
2.1	Unspecified Type	0.8	0.1%	-	0.8	-
2.1.1	Sand	16.8	1.6%	1.7	15.1	-
2.1.2	Sand/Mud (Mixed)	55.0	5.1%	33.0	18.1	3.9
2.1.3	Mud	6.4	0.6%	-	6.4	-
2.1.7	Boulder	0.4	0.0%	-	-	0.4
FLAT						
2.2.1	Sand	25.0	2.3%	20.4	4.6	-
2.2.2	Sand/Mud (Mixed)	110.2	10.2%	107.5	-	2.7
2.2.5	Wood Debris/Organic	7.6	0.7%	7.6	-	-
2.2.6	Cobble/Gravel	6.5	0.6%	2.8	3.7	-
AQUATIC BED						
2.3.9	Seagrass	10.9	1.0%	5.1	5.8	-
2.3.9/10(3)	" on Mud	21.2	2.0%	21.2	-	-
2.3.9/10(5)	" on Wood/Organic	8.4	0.8%	8.4	-	-
2.3.10	Algae	4.5	0.4%	4.5	-	-
2.3.10(2)	" on Sand/Mud	44.3	4.1%	33.6	6.0	4.7
2.3.10(6)	" on Cobble/Gravel	11.6	1.1%	8.9	2.7	-
2.3.10(7)	" on Boulder	1.6	0.1%	1.6	-	-
TIDAL MARSH						
2.5	Unspecified Type	13.8	1.3%	12.7	1.1	-
2.5.11	Low Salt Marsh	129.2	11.9%	128.0	0.6	0.6
2.5.12	High Salt Marsh	132.0	12.2%	132.0	-	-

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Capacity (Cubic Yards)	Size (Acres)	Zone
DREDGED MATERIAL DISPOSAL SITES				
DMD A	NORTH SPIT	100,000	10.0	NR
DMD B	PROSPER 1	108,000	2.0	IND
DMD C	PROSPER 2	8,000	3.0	IND
DMD D	GEORGIA PACIFIC	--	7.0	IND
The following sites are not presently needed for specific dredging projects but are designated for water-dependent use and could accomodate spoil disposal.				
DMD E	MOORE MILL	--	--	
DMD F	FERRY CREEK	--	10.0	
SIGNIFICANT HABITAT SITE				
HAB 1	FRESHWATER WETLANDS		16.5	11 NA
MITIGATION AND RESTORATION SITES				
MIT 1	DREDGE SPOIL ISLAND Grade to create high salt marsh.		3.0	10 NA
MIT 10	Unnamed site Remove dike and grade to create salt marsh.		12.0	EFU-10
MIT 11	PROSPER Create channel and salt marsh.		4.0	EFU-10
MIT 2	NORTH SPIT		13.5	11 NA
MIT 3	DREDGE SPOIL ISLANDS Scalp to create salt marsh.		12.0	10NA
MIT 4	US 101 WEST		1.2	15 CA
MIT 5	US 101 EAST		2.0	16 NA
MIT 8	Unnamed site. Remove bank to create high salt marsh. Not mapped.		1.5	
MIT 9	RANDOLPH SLOUGH Construct tidal channel. Not mapped.		6.0	--
WATER-DEPENDENT DEVELOPMENT SITES				
WDD 14	BULLARDS DOCK Small bulk-loading facility.		--	IND
WDD 20	PROSPER Boatbuilding.		--	IND
WDD 3	BANDON WATERFRONT (Marina)		--	C3
WDD 40	RIVERTON Small-scale industry. Not mapped.		--	IND
WDD 8	MOORE MILL		--	HI
WDR 16	ROGGE MILL		--	IND

COQUILLE RIVER

ESTUARINE HABITATS & PROTECTED SITES



SHORELAND ZONING SUMMARY

Total Shoreland Area: 1094.8 acres

CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		136.9	12.5	
6MA	Marine Activity	14.0	1.3	10.2
7PF	Public Facility	40.3	3.7	29.4
8CN	Beaches & Dunes Conservation	4.2	0.4	3.1
C-1	Commercial Light	5.0	0.5	3.6
FG-40	Forest Grazing	57.0	5.2	41.6
MA	Marine Activity	16.5	1.5	12.0
RURAL		957.9	87.5	
6MA	Marine Activity	0.6	0.1	0.1
FG-10	Forest Grazing - 10	18.0	1.6	1.9
FG-40	Forest Grazing - 40	658.9	60.2	68.8
M1	Industrial	35.9	12.4	14.2
R-1	Residential - 1	46.5	4.2	4.9
RC	Rural Commercial	8.7	0.8	0.9
RCR	Recreational Commercial-Residential	24.3	2.2	2.5
RR-1	Rural Residential - 1	65.0	5.9	6.8

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Unconsolidated Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	880.0	574.7	557.8	0.0	16.9	305.3	29.2	160.2	60.4	11.1	44.4
NATURAL	115.6	18.8	18.8	0.0	0.0	96.8	7.9	33.0	24.9	-	31.0
EN 1	16.5	8.0	8.0	-	-	8.5	3.3	0.8	-	-	4.4
EN 2	32.5	0.3	0.3	-	-	32.2	-	13.9	11.4	-	6.9
EN 3	52.1	6.2	6.2	-	-	45.9	4.6	17.4	13.5	-	10.4
EN 4	14.5	4.3	4.3	-	-	10.2	-	0.9	-	-	9.3
CONSERVATION											
EC 1	642.8	461.3	444.4	-	16.9	181.5	6.3	122.1	31.6	8.1	13.4
DEVELOPMENT											
ED 1	121.6	94.6	94.6	-	-	27.0	15.0	5.1	3.9	3.0	-

ROGUE RIVER

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING

PACIFIC OCEAN

US 101

WEDDERBURN

GOLD BEACH

EDSON CREEK

SAUNDERS CREEK

FLOOD CREEK

INDIAN CREEK

FG-40
R-1
01EC
M
RCR
RR-1
04EN
FG-10
03EN
02EN
MA
C-1
RC
01EN
01ED
7PF
6MA
8CN

1000 0 1000 2000 3000 FEET

MN
20.6°

OREGON

ODOE GEOGRAPHIC INFORMATION SERVICES

HABITAT SUMMARY

HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC	ACRES IN ED
ALL HABITATS		880.0	100.0%	115.6	642.8	121.6
UNCONSOLIDATED BOTTOM						
1.1	Unspecified Type	540.9	61.5%	18.8	427.5	94.6
1.1.6	Cobble/Gravel	16.9	1.9%	-	16.9	-
AQUATIC BED						
1.3.10(6)	Algae on Cobble/Gravel	16.9	1.9%	-	16.9	-
SHORE						
2.1.1	Sand	16.1	1.8%	3.7	2.9	9.5
2.1.2	Sand/Mud (Mixed)	3.1	0.4%	2.1	-	1.0
2.1.6	Cobble/Gravel	10.0	1.1%	2.1	3.4	4.5
FLAT						
2.2	Unspecified Type	1.7	0.2%	-	1.7	-
2.2.2	Sand/Mud (Mixed)	5.4	0.6%	0.9	2.7	1.8
2.2.3	Mud	4.1	0.5%	0.8	-	3.3
2.2.6	Cobble/Gravel	149.0	16.9%	31.3	117.7	-
AQUATIC BED						
2.3.10	Algae	12.0	1.4%	5.2	2.9	3.9
2.3.10(6)	" on Cobble/Gravel	48.4	5.5%	19.7	28.7	-
BEACH/BAR						
2.4	Unspecified Type	2.0	0.2%	-	2.0	-
2.4.1	Sand	8.2	0.9%	-	5.2	3.0
2.4.6	Cobble/Gravel	0.9	0.1%	-	0.9	-
TIDAL MARSH						
2.5.11	Low Salt Marsh	32.9	3.7%	20.7	12.2	-
2.5.12	High Salt Marsh	6.0	0.7%	5.0	1.0	-
2.5.13	Fresh Marsh	5.3	0.6%	5.3	-	-
2.5.14	Shrub Marsh	0.2	0.0%	-	0.2	-

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Capacity (Cubic Yards)	Size (In Acres)	Zone
DREDGED MATERIAL DISPOSAL SITES				
DMD 1	NORTH JETTY UPLAND	--	7.0	CN
DMD 2	SOUTH JETTY UPLAND	--	1.5	7PF
DMD 3	SOUTH JETTY SURF ZONE Not mapped.	--	--	CN
DMD 4	SOUTH BOAT BASIN	--	--	7PF
DMD 5	WEST BOAT BASIN Not mapped.	--	--	6MA
MITIGATION AND RESTORATION SITE				
MIT 1	EAST BOAT BASIN		--	EN
WATER-DEPENDENT DEVELOPMENT SITES				
WDD 1	SAUSE BROTHERS Marina		--	6MA
WDD 2	COAST GUARD STATION		--	6MA

ROGUE RIVER

ESTUARINE HABITATS & PROTECTED SITES

PACIFIC OCEAN

US 101

EDSON CREEK

SAUNDERS CREEK

FLOOD CREEK

INDIAN CREEK

WEDDERBURN

GOLD BEACH

DMD-1

DMD-2

MIT-1

Points indicate intertidal gravel marsh.

1.1.6 1.1 2.2.6 2.4.6 2.5.14 J.1 2.5 2.2 2.4 2.5 2.3.10(6) 2.1.1 2.1.2 2.1.6 2.2.1 2.2.2 2.2.3 2.3.10 2.5.11 2.5.12 2.5.13 J.1.6 1.3.10(6)

MN 20.8°

OREGON

1000 0 1000 2000 3000 FEET

N W E S

ODOE GEOGRAPHIC INFORMATION SERVICES

SHORELAND ZONING SUMMARY

Total Shoreland Area: 177.7 acres

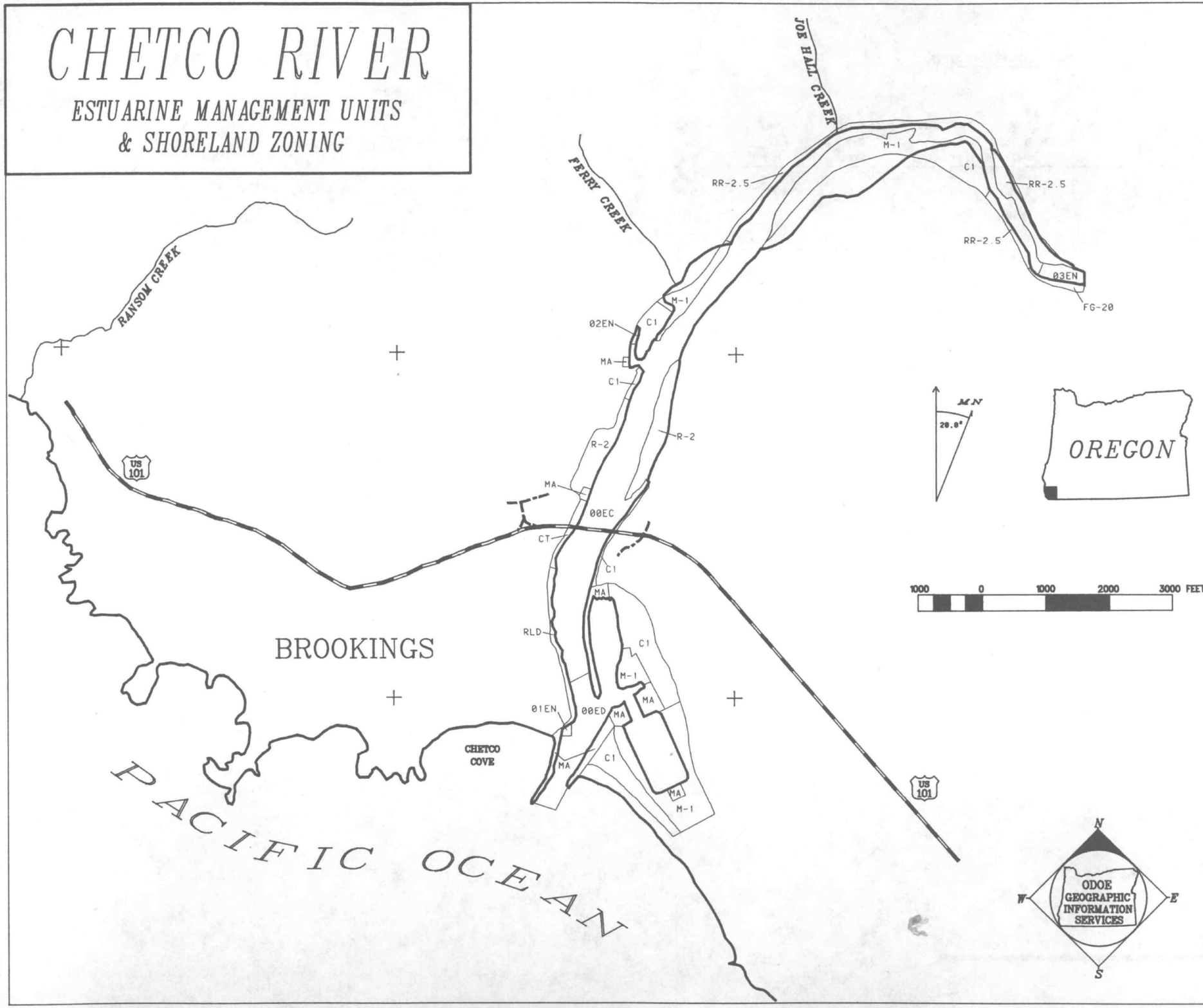
CLASS/Code	Zone	Area In Acres	% Shore	% Class
URBAN		109.0	61.4	
C1	Commercial Light	36.6	20.6	33.6
CT	Commercial Tourist	2.6	1.5	2.4
M-1	Industrial	26.3	14.8	24.2
MA	Marine Activity	17.3	9.7	15.8
R-2	Residential 2	21.3	12.0	19.5
RLD	Residential Low Density	5.0	2.8	4.6
RURAL		68.7	38.6	
C1	Commercial Light	12.6	7.1	18.3
FG-20	Forest Grazing 20	1.9	1.1	2.8
M-1	Industrial	30.2	17.0	44.0
MA	Marine Activity	0.8	0.5	1.2
RR-2.5	Rural Residential 2.5	23.1	13.0	33.7

HABITAT CLASS BY MANAGEMENT UNIT
(Area in Acres)

MANAGEMENT CLASS AND UNIT	Total Area	SUBTIDAL	Uncon-solida-ted Bottom	Rock Bottom	Aquatic Bed	INTERTIDAL	Shore	Flat	Aquatic Bed	Beach/ Bar	Tidal Marsh
		1.	1.1	1.2	1.3	2.	2.1	2.2	2.3	2.4	2.5
TOTAL	171.1	152.4	0.0	0.0	152.4	18.7	6.1	2.7	5.8	0.0	4.1
NATURAL	4.7	3.8	0.0	0.0	3.8	0.9	0.5	0.0	0.0	0.0	0.4
EN 1	0.5	0.0	-	-	-	0.5	0.5	-	-	-	0.0
EN 2	0.4	0.0	-	-	-	0.4	-	-	-	-	0.4
EN 3	3.8	3.8	-	-	3.8	0.0	-	-	-	-	0.0
CONSERVATION											
EC 0	110.8	94.0	-	-	94.0	16.8	4.6	2.7	5.8	-	3.7
DEVELOPMENT											
ED 0	55.6	54.6	54.6	-	-	1.0	1.0	-	-	-	0.0

CHETCO RIVER

ESTUARINE MANAGEMENT UNITS & SHORELAND ZONING



HABITAT SUMMARY

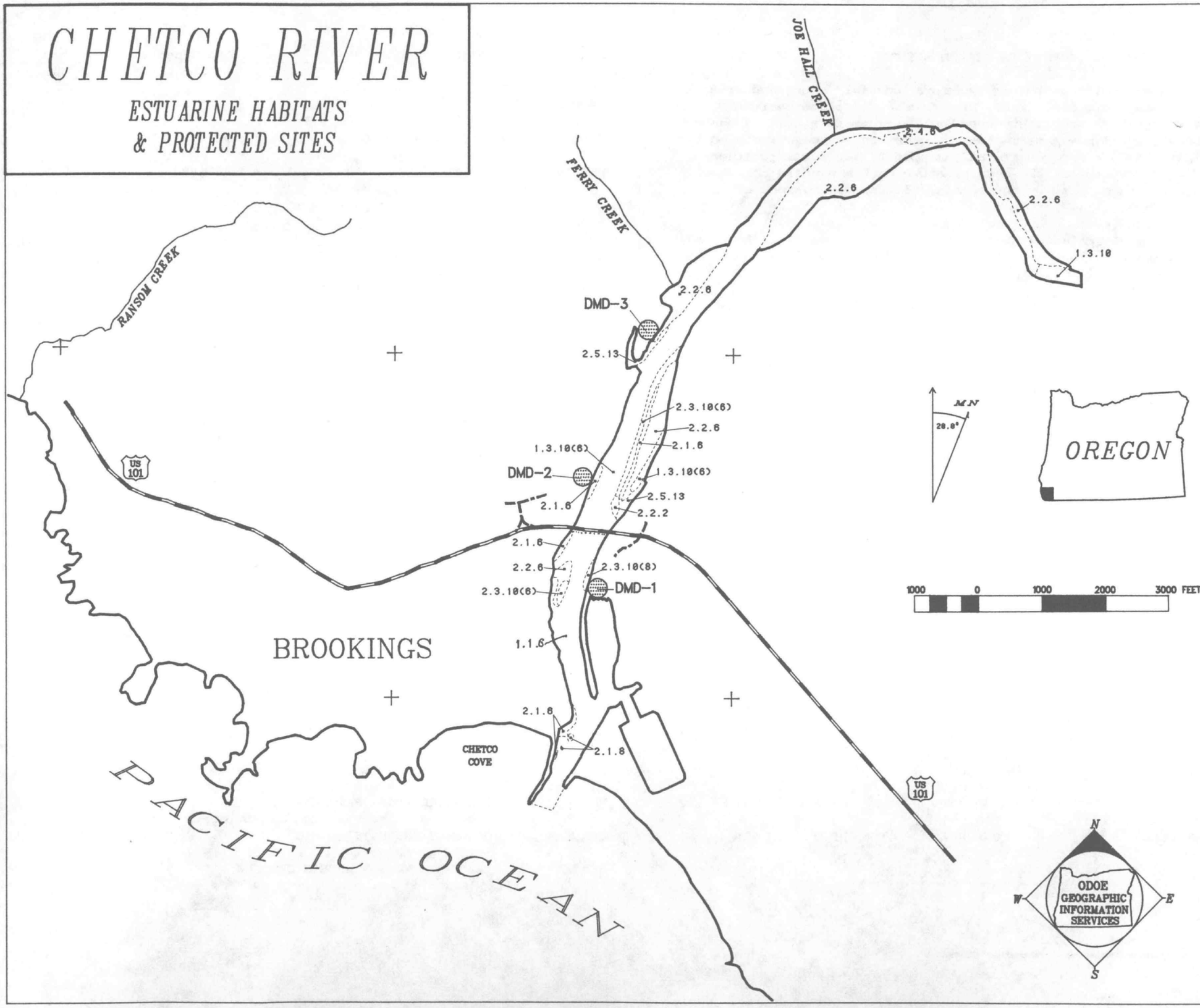
HABITAT CLASS/ Code	Subclass	AREA IN ACRES	PERCENT OF ESTUARY	ACRES IN EN	ACRES IN EC	ACRES IN ED
ALL HABITATS		171.1	100.0%	4.7	110.8	55.6
UNCONSOLIDATED BOTTOM						
1.1.6	Cobble/Gravel	54.6	31.9%	-	-	54.6
AQUATIC BED						
1.3.10	Algae	3.8	2.2%	3.8	-	0
1.3.10(6)	Algae on Cobble/Gravel	94.0	54.9%	-	94.0	0
SHORE						
2.1.6	Cobble/Gravel	5.9	3.4%	0.5	4.6	0.8
2.1.8	Bedrock	0.2	0.1%	-	-	0.2
FLAT						
2.2.2	Sand/Mud (Mixed)	0.7	0.4%	-	0.7	0
2.2.6	Cobble/Gravel	2.0	1.2%	-	2.0	0
AQUATIC BED						
2.3.10(6)	Algae on Cobble/Gravel	5.1	3.0%	-	5.1	0
2.3.10(8)	Algae on Bedrock	0.7	0.4%	-	0.7	0
TIDAL MARSH						
2.5.13	Fresh Marsh	4.1	2.4%	0.4	3.7	0

SPECIAL SHORELAND SITES

CODE	NAME/Comments	Capacity (Cubic Yards)	Size (In Acres)	Zone
DREDGED MATERIAL DISPOSAL SITES				
DMD 1	BOAT BASIN 1 (ESWD 2)	--	1.7	MA
DMD 2	ESWD 6	--	1.5	MA
DMD 3	ESWD 7	--	1.7	MA
WATER-DEPENDENT DEVELOPMENT SITES				
WDD 1	DIKE Angler access.		--	6MA
WDD 2	SPORTBOAT BASIN East end only. Boat ramp.		--	6MA
WDD 3	PORT OF BROOKINGS Commercial fishing service.		2.5	6MA
WDD 4	MARINE TRAVELLIFT Marina.		--	6MA
WDD 5	COAST GUARD STATION		3.0	6MA
WDD 6	KEMP SITE Sport boat moorage.		10.0	6MA
WDD 7	SNUG HARBOR Tourist marina.		14.0	6MA

CHETCO RIVER

ESTUARINE HABITATS & PROTECTED SITES



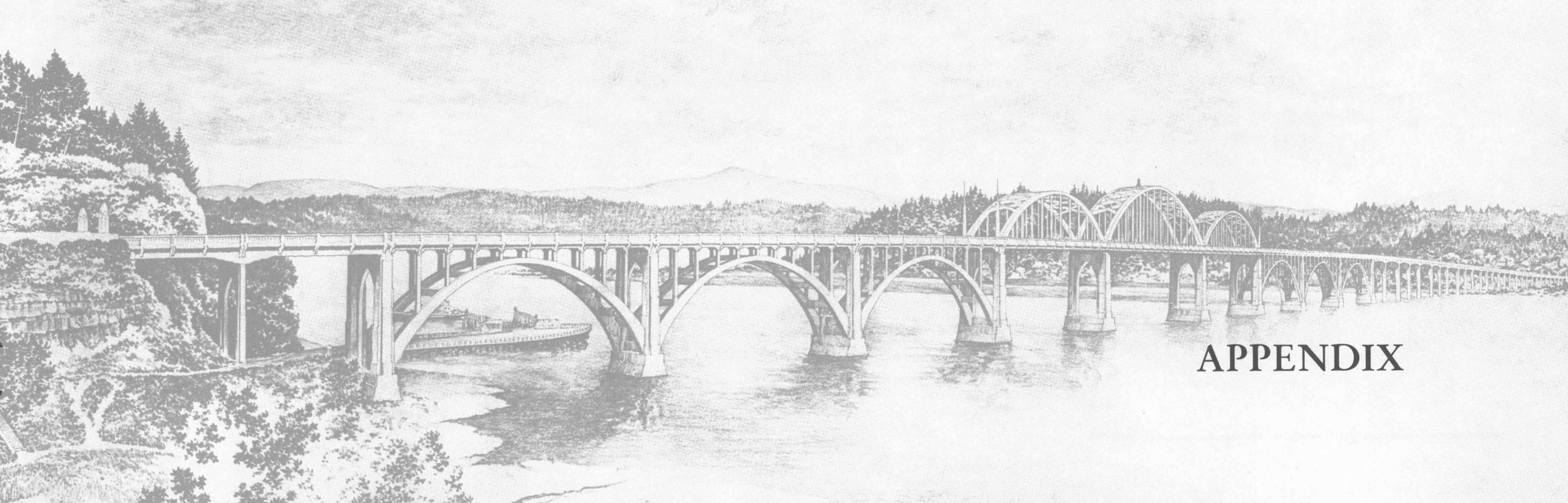
UNMAPPED SPECIAL SHORELAND SITES

Tables for the individual estuaries list four types of "special" shoreland sites. These include dredged material disposal sites, significant shoreland habitats, mitigation and restoration sites, and water dependent development sites. A number of the sites designated by local governments are not shown on the maps included in this book. Some of the sites are not specifically mapped by the local government, and many are upriver of the portion of the estuary shown on the maps in this book. For a number of sites definite mapping of the special site simply was not available.

For three estuaries (Yaquina Bay, Siuslaw River Estuary and Umpqua River Estuary) there was not sufficient space to list all of the unmapped sites with the maps. Information on those sites is included below.

CODE	NAME/Comments	DMD Capacity (Cubic Yards)	Size (In Acres)	Zone
COLUMBIA RIVER				
Priority II Dredged Material Disposal Sites				
DMD 19S	FORT STEVENS HWY 1	306,000	19.0	--
DMD 20AS	WARRENTON LUMBER	56,000	3.5	--
DMD 20S	SEWAGE LAGOON	516,000	32.0	--
DMD 21S	FORT STEVENS HWY 2	290,000	18.0	--
DMD 22S	NE 1ST ST	306,000	19.0	--
DMD 23S	(Unnamed Site)	2,400,000	150.0	--
DMD 24S	(Unnamed Site)	1,000,000	67.0	--
DMD 26S	(Unnamed Site)	209,000	13.0	--
DMD 27S	(Unnamed Site)	145,000	9.0	--
DMD 44	JOHN DAY RIVER (RM 39)	720,000	45.0	--
DMD 90	WESTPORT (RM 43)	112,000	70.0	--
SIUSLAW RIVER				
Dredged Material Disposal Sites				
DMD 37	DAVIDSON MILL	187,500	16.6	--
DMD 38	PERRIN'S LANDING	20,000	1.0	F
DMD 39	PERRIN'S LANDING SOUTH	375,000	29.2	E-25
DMD 40	DAVIDSON MILL	23,500	2.9	I
DMD 42	DAVIDSON MILL	225,000	14.0	FU
DMD 43	RUSSEL'S MARINA	420,000	35.0	F
DMD 44	US PLYWOOD	180,000	23.0	FU
DMD 45	MAPLETON	38,900	3.0	I
DMD 47	DAVIDSON MILL	13,600	1.7	F
DMD 48	DAVIDSON MILL	275,000	22.0	RR

CODE	NAME/Comments	DMD Capacity (Cubic Yards)	Size (In Acres)	Zone
UMPQUA RIVER				
Dredged Material Disposal Site				
DMD 10	SMITH RIVER Located at RM 16.	45,000	9.0	F
Significant Habitat Sites				
HAB 9	BRAYNARD CREEK WETLAND		--	
HAB 15	DEANS CREEK WETLAND		--	
HAB 16	HINSDALE RANCH WETLAND		--	
YAQUINA BAY				
Dredged Material Disposal Sites				
DMD 11	SINNHUBER	37,000	2.2	TC
DMD 15	BOONE SLOUGH	15,000	1.0	AC40
DMD 16	BOONE SLOUGH	100,000	12.4	AC40
DMD 19A	TOKYO SLOUGH	40,000	7.4	MP
DMD 23	PUBLISHER'S PAPER	100,000	12.5	IP
DMD 7	COQUILLE POINT	30,000	7.5	MP
Significant Habitat Site				
HAB 15	BOONE AND NUTE SLOUGHS Extensive waterfowl habitat.		400.0	TC
Mitigation and Restoration Sites				
MIT 13	PUBLISHER'S Create additional breaches or remove dike.		0.0	
MIT 15	FLESHER SLOUGH Bridge or increase culvert size.		15.0	MW
MIT 2	HUSS PROPERTY Remove tidegate.		3.0	
MIT 3	BLACKBERRY HILL Enlarge culvert.		3.0	MW
MIT 4	REINOEHL TROUT HATCHERY Enlarge culvert or install bridge.		2.5	
MIT 5	SHERMAN PROPERTY Enlarge culvert.		2.0	MW
MIT 6/7	LOWER BOONE'S & NUTE'S SLOUGHS Remove dikes.		600.0	FU



APPENDIX

FOR FURTHER INFORMATION ABOUT ESTUARY PLANS

The information presented in the Estuary Plan Book is a general summary of the requirements of locally adopted plans. In addition, local plans are occasionally amended. Detailed, up-to-date information about specific requirements of a particular plan are available from individual city and county planning offices. All counties have a planning department with one or more fulltime staff. Except where indicated, cities also have professional planners, although many cities rely on their county or a regional planning agency for assistance in implementing their estuary plan.

Copies of the comprehensive plans and implementing ordinances are also maintained by the Department of Land Conservation and Development at both its main office in Salem and its coastal field office in Newport. In addition, the Department of Fish and Wildlife and Division of State Lands can also provide important information for interpreting and applying plan policies.

Columbia River Estuary

CREST
P.O. Box 175
Astoria 97103
325-0435

Clatsop County
Box 179
Astoria 97103
325-8611

Astoria
1095 Duane Street
Astoria, 97103
325-5821

Warrenton
Box 250
Warrenton 97146
861-2233

Hammond[7]
Box 161
Hammond 97121
861-2712

Necanicum River Estuary

Clatsop-Tillamook
Intergovernmental Council
Box 488
Cannon Beach 97110
436-1156

Gearhart
Drawer D
Gearhart 97138
738-5501

Seaside
851 Broadway
Seaside 97138
738-5511

Nehalem Bay

Tillamook County
201 Laurel Avenue
Tillamook 97401
842-3408

Nehalem[8]
Box 144
Nehalem 97131
368-5627

Wheeler[8]
Box 177
Wheeler 97147
368-5767

Tillamook Bay

Tillamook County
(see address above)

Garibaldi[8]
Box 708
Garibaldi 97118
322-3327

Bay City[8]
Box 307
Bay City 97107
377-2288

Tillamook City
210 Laurel Avenue
Tillamook 97141
842-3443

Netarts Bay, Sand Lake, and Nestucca River Estuary

Tillamook County
201 Laurel Avenue
Tillamook 97401
842-3408

Salmon River Estuary

Lincoln County
210 SW 2nd Street
Newport 97365
265-6611

Siletz River Estuary

Lincoln County
210 SW 2nd Street
Newport 97365
265-6611

Lincoln City
Box 50
Lincoln City 97367
996-2151

Yaquina Bay

Lincoln County
210 SW 2nd
Newport 97365
265-6611

Newport
810 SW Alder
Newport 97365
265-5331

Toledo
Box 220
Toledo 97391
336-2247

Alsea Bay

Lincoln County
210 SW 2nd
Newport 97365
265-6611

Waldport[9]
City Hall
Box K
Waldport 97394
563-3561

Siuslaw River Estuary

Lane County
128 East 8th Avenue
Eugene 97401
687-3958

Florence
Box 340
Florence 97439
997-3436

Umpqua and Smith River Estuary

Douglas County
Courthouse Annex #2
205 SE Jackson St.
Roseburg 97470
673-1111

Reedsport
451 Winchester Ave.
Reedsport 97467
271-3603

Coos Bay

Coos County
Courthouse Annex
290 N. Central
Coquille 97423
396-3121 Ex. 210

City of Coos Bay
500 Central
Coos Bay 97420
269-8919

North Bend
Box B
North Bend 97459
756-0405

Coquille River Estuary

Coos County
Courthouse Annex
290 N. Central
Coquille 97423
396-3121

Bandon
Box 67
Bandon 97411
347-2437

Rogue River Estuary

Curry County
Box 746
Gold Beach 97444
247-7054

Gold Beach
Box 747
Gold Beach 97444
247-7029

Chetco River

Curry County
Box 746
Gold Beach 97444
247-7054

Brookings
898 Elk Drive
Brookings 97415
469-2163

Department of Land Conservation and Development

1175 Court St. NE
Salem 97310
373-0050

313 SW 2nd
Suite B
Newport 97365
265-8869

Division of State Lands

1600 State St.
Salem 97310
378-3805

Department of Fish and Wildlife

Environmental Management Section
506 SW Mill
Portland 97208
229-5680

Marine Science Drive
Bldg. 3
Newport 97365
867-4741

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[7] The Town of Hammond does not have a professional planner. Technical assistance for plan implementation is provided by both CREST and the Clatsop-Tillamook Intergovernmental Council (CTIC).

[8] Nehalem, Wheeler, Garibaldi, and Bay City do not have professional planners. These cities and the City of Tillamook generally rely on Tillamook County to implement their estuary plans.

[9] Waldport does not have a professional planner. The city relies on Lincoln County for estuary plan implementation.

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No. 2. Natural Resources of Sand Lake Estuary.
No. 3. Natural Resources of Nestucca Estuary.
No. 4. Natural Resources of Siletz Estuary.
No. 5. Natural Resources of Umpqua Estuary.
No. 6. Natural Resources of Coos Bay Estuary.
No. 7. Natural Resources of Coquille Estuary.
No. 8. Natural Resources of Rogue Estuary.
No. 9. Natural Resources of Chetco Estuary.

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_____ 1974. Estuarine Resources of the Oregon Coast.

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GLOSSARY[10]

AMPHIPODS. A large group of small crustaceans with a laterally compressed body (as the sand flea).

BASAL. Relating to, situated at, or forming the base.

BENTHIC. Relating to the bottom of a body of water; includes the substrate and the water within one meter of the substrate.

BENTHIC. Living on or within the bottom sediments in water bodies.

BIOMASS. The total mass of all living matter within a specified area or volume.

BRACKISH. Fresh water mixed with a small amount of salt water.

BRIDGE CROSSINGS. The portion of a bridge spanning a waterway not including supporting structures or fill located in the waterway or adjacent wetlands.

BRIDGE CROSSING SUPPORT STRUCTURES. Piers, piling, and similar structures necessary to support a bridge span, but not including fill for causeways or approaches.

COASTAL ZONE. The area lying between the Washington border on the north to the California border on the south, bounded on the west by the extent of the state's jurisdiction, and in the east by the crest of the coastal mountain range, with the exception of: (a)The Umpqua River basin, where the coastal zone shall extend to Scottsburg; (b)The Rogue River basin, where the coastal zone shall extend to Agness; (c)The Columbia River basin, where the coastal zone shall extend to the downstream end of Puget Island.

CONSERVE. To manage in a manner which avoids wasteful or destructive uses and provides for future availability.

DETRITUS. Material in various stages of microbial decomposition which represents a potential energy source to consumer organisms.

DEVELOP. To bring about growth or availability; to construct or alter a structure, to conduct a mining operation, to make a physical change in the use or appearance of land, to divide land into parcels, or to create or terminate rights to access.

DEVELOPMENT. The act, process or result of developing.

EPIPHYTE. A plant that relies on another plant for mechanical support but not nutrients.

ESTUARY. A body of water that is semi-enclosed by land, connected with the open ocean, and within which salt water is usually diluted by freshwater derived from the land. The estuary includes: (a) estuarine water; (b) tidelands; (c) tidal marshes; and (d) submerged lands. Estuaries extend upstream to the head of the tidewater, except for the Columbia River Estuary, which by definition is considered to extend to the western edge of Puget Island.

ESTUARINE ENHANCEMENT. An action which results in a long-term improvement of existing estuarine functional characteristics and processes that is not the result of a creation or restoration action.

[10] Adapted from the Statewide Planning Goals, USFWS 1980, and Webster's New Collegiate Dictionary.

FILL. The placement by man of sand, sediment, or other material, usually in submerged lands or wetlands, to create new uplands or raise the elevation of land.

HYDROPHYTE. A perennial vascular aquatic plant that has its overwintering buds under water; a plant growing in water or in soil too waterlogged for most plants to survive.

HOLDFAST. A part by which an organism attaches itself to a flat surface.

INTERTIDAL. ODFW and DSL define intertidal lands as submersible lands extending from extreme low water (ELW), which is approximately 3 feet less than mean lower low water (MLLW), to mean higher high water (MHHW) or the line of nonaquatic vegetation, whichever is higher. The maps in the Estuary Plan Book use this definition. Goal 16 defines intertidal as between the levels of mean lower low tide (MLLT) and mean higher high tide (MHHT).

MANAGEMENT UNIT. A discrete geographic area, defined by biophysical characteristics and features, within which particular uses and activities are promoted, encouraged, protected, or enhanced, and others are discouraged, restricted, or prohibited.

MINOR NAVIGATIONAL IMPROVEMENTS. Alterations necessary to provide water access to existing or permitted uses in conservation management units, including dredging for access channels and for maintaining existing navigation, but excluding fill and in-water navigational structures other than floating breakwaters or similar permeable wave barriers.

MITIGATION. The creation, restoration, or enhancement of an estuarine area to maintain the functional characteristics and processes of the estuary, such as its natural biological productivity, habitats, species diversity, unique features and water quality (ORS 541.626).

OCCDC. Oregon Coastal Conservation and Development Commission, created by ORS 191; existed from 1971 to 1975. Its work is continued by LCDC.

OCEAN FLOODING. The flooding of lowland areas by salt water owing to tidal action, storm surge or tsunamis (seismic sea waves). Landforms subject to ocean flooding include beaches, marshes, coastal lowlands, and low lying interdune areas. Areas of ocean flooding are mapped by the Federal Emergency Management Agency (FEMA). Ocean flooding includes areas of velocity flooding and associated shallow marine flooding.

PHYTOPLANKTON. Suspended aquatic organisms which do not require a solid substrate or attachment and which are able to photosynthesize.

POLYCHAETE. A class (Polychaeta) of chiefly marine worms usually with paired segmental appendages.

PRESERVE. To save from change or loss and reserve for a special purpose.

PROTECT. Save or shield from loss, destruction, or injury or for future intended use.

RECREATION. Any experience voluntarily engaged in largely during leisure (discretionary time) from which the individual derives satisfaction.

Coastal Recreation occurs in offshore ocean waters, estuaries, and streams, along beaches and bluffs and in adjacent shorelands. It includes a variety of activities, from swimming, scuba diving, boating, fishing, hunting, and use of dune buggies, shell collecting, painting, wildlife observation, and sight-seeing to coastal resorts and water-oriented restaurants.

Low-Intensity Recreation does not require developed facilities and can be accommodated without change to the area or resource. For example, boating, hunting, hiking, wildlife photography and beach or shore activities can be low-intensity recreation.

High-Intensity Recreation uses specially built facilities, or occurs in such density or form that it requires or results in a modification of the area or resource. Campgrounds, golf courses, public beaches and marinas are examples of high-intensity recreation.

RESTORE. Revitalizing, returning, or replacing original attributes and amenities, such as natural biological productivity, aesthetic, and cultural resources, which have been diminished or lost by past alternations, activities, or catastrophic events. For the purposes of Goal 16, estuarine restoration means to revitalize or reestablish functional characteristics and processes of the estuary diminished or lost by past alterations, activities, or catastrophic events. A restored area must be a shallow subtidal or an intertidal or tidal marsh area after alteration work is performed, and may not have been a functioning part of the estuarine system when alteration work began.

Active Restoration involves the use of specific positive remedial actions, such as removing fills, installing water treatment facilities, or rebuilding deteriorated urban waterfront areas.

Passive Restoration is the use of natural processes, sequences, and timing, which occurs after the removal or reduction of adverse stresses, without other specific positive remedial action.

RIPARIAN. Of, pertaining to, or situated on the edge of a body of water.

RIPRAP. A layer, facing, or protective mound of stones randomly placed to prevent erosion, scour or sloughing of a structure or embankment; also, the stone so used. In local usage, the similar use of other hard material, such as concrete rubble, is also frequently included as riprap.

RURAL LAND. Rural lands are those which are outside the urban growth boundary and are: (a) Non-urban agricultural, forest or open space lands; or (b) Other lands suitable for sparse settlement, small farms or acreage homesites with no or hardly any public services and which are not suitable, necessary or intended for urban use.

SESSILE. Attached directly by the base, not raised upon a stalk or peduncle. Also, permanently attached or established.

SHORELINE. The boundary line between a body of water and the land, measured on tidal waters at mean higher high water and on non-tidal waterways at the ordinary high-water mark.

SIGNIFICANT HABITAT AREAS. A land or water area where sustaining the natural resource characteristics is important or essential to the production and maintenance of aquatic life or wildlife populations.

SUBSTRATE. The medium upon which an organism lives and grows; the surface of the land or the bottom of a body of water.

SUBTIDAL. Below the level of mean lower low tide (MLLT).

TEMPORARY ALTERATION. Dredging, filling, or another estuarine alteration occurring over a specified short period of time which is needed to facilitate a use allowed by an acknowledged plan. Temporary alterations may not be for more than three years and the affected area must be restored to its previous condition. Temporary alterations include: (a) Alterations necessary for federally authorized navigation projects (e.g., access to dredged material disposal sites by barge or pipeline and staging areas or dredging for jetty maintenance); (b) Alterations to establish mitigation sites, alterations for bridge construction or repair, and for drilling or other exploratory operations; and (c) Minor structures (such as blinds) necessary for research and educational observation.

TIDAL MARSH. Wetlands from lower high water (LHW) inland to the line of nonaquatic vegetation.

URBAN LAND. Urban areas are those places which must have an incorporated city. Such areas may include lands adjacent to and outside the incorporated city and may also: (a) Have concentrations of persons who generally reside and work in the area; or (b) Have supporting public facilities and services.

URBANIZABLE LAND. Urbanizable lands are those lands within the urban growth boundary and which are identified and (a) Determined to be necessary and suitable for future urban uses; (b) Can be served by urban services and facilities; and (c) Are needed for the expansion of an urban area.

WATER-DEPENDENT. A use or activity which can be carried out only on, in, or adjacent to water areas because the use requires access to the water body for water-borne transportation, recreation, energy production, or source of water.

WATER-ORIENTED. A use whose attraction to the public is enhanced by a view of, or access to, coastal waters.

WATER-RELATED. Uses which are not directly dependent upon access to a water body, but which provide goods or services that are directly associated with water-dependent land or waterway use, and which, if not located adjacent to water, would result in a public loss of quality in the goods or services offered. Except as necessary for water-related uses or facilities, residences, parking lots, spoil and dump sites, roads and highways, restaurants, businesses, factories and trailer parks are not generally considered dependent on or related to water location needs.

WETLANDS. Land areas where excess water is the dominant factor determining the nature of soil development and the types of plant and animal communities living at the soil surface. Wetland soils retain sufficient moisture to support aquatic or semi-aquatic plant life. In marine and estuarine areas, wetlands are bounded at the lower extreme by extreme low water; in freshwater areas by a depth of six feet. The areas below wetlands are submerged lands.

ZONATION. Distribution of kinds of organisms in biogeographic zones.

GENERIC ZONING MATRIX

In order to compile coastwide information on estuary and shoreland zoning, it has been necessary to develop a set of generic categories to classify all of the different local zoning districts. The matrix provided below is a series of general classifications which have been used for this purpose. The charts in Chapter Four are based on this matrix.

The zones of each city or county with management responsibility for either estuary or shorelands have been listed according to general type of zone. The lists reflect those zones existing at the time of publication, some of which did not exist at the time the plan was acknowledged. Not all of the listed zones are shown on the areas mapped in this publication.

There are three generic estuary management units corresponding to Goal 16 requirements for management units. The eleven generic shoreland zones reflect the different types of land use designations typically used in shorelands or required by the Statewide Planning Goals. The names and the labels used on the tables below and in Chapter Four are as follows:

Estuary Management Unit Types:

EN	- Estuary Natural
EC	- Estuary Conservation
ED	- Estuary Development

Shoreland Zone Types:

F	- Forest
FU	- Exclusive Farm Use
FF	- Farm/Forest
REC	- Recreation
RR	- Rural Residential
UR	- Urban Residential
C	- Commercial
I	- Industrial
WDR	- Water Dependent Development
PUB	- Public Lands
CON	- Conservation

CLATSOP COUNTY ESTUARIES

COLUMBIA RIVER ESTUARY

	Estuary			Shoreland										
Zone Types	EN	EC	ED	F	FU	FF	REC	RR	UR	C	I	WDR	PUB	CON
City of Warrenton	A3	A2	A1	—	—	—	—	R40 RD	RM R10 R20	C1 C2 C4	I1 I2 I4	EB I3 C3 IM	—	—
Town of Hammond	—	AC	AD	—	—	—	RO	—	R10 R6 R5 RH	C1 C2	I1 I2	—	—	SC
City of Astoria	A4	A3	A1 A2	—	—	—	—	—	R1 R2 R3	C1 C2 C3 C4	S2 S3	S1 TPM	—	S4 S5
Clatsop County	AN	AC1 AC2	AD	F80 F38	EFU38	AF20	OPR RM	RA1 RA2 RA5 SFR1 RSA/SFR RSA/MFR	—	GC NC TC	LI HI MR	M1	—	CS NS NU

NECANICUM RIVER

	Estuary			Shoreland										
Zone Types	EN	EC	ED	F	FU	FF	REC	RR	UR	C	I	WDR	PUB	CON
City of Seaside	A1	A2	—	—	EFU	—	OPR	—	R1 R2 R3 SR	RM C1 C2 C3 C4	M1 AD	—	—	A3 ADI
City of Gearhart	A1	A2	—	—	—	—	P	RA	R1 R2 R3 RCPD	C1 C2 C3	—	—	P/SP	BAD
Clatsop County	—	NAC2	—	—	—	—	—	—	—	—	—	—	—	—

TILLAMOOK COUNTY ESTUARIES

NEHALEM BAY

	Estuary			Shoreland										
Zone Types	EN	EC	ED	F	FU	FF	REC	RR	UR	C	I	WDR	PUB	CON
Tillamook County	EN	EC1 EC2 ECA	ED	F	F1	SFW10 SFW20	RM	RR	R1 R2 R3 RMH	C1 C2	LM M1	WDD	—	—
City of Wheeler	—	*	—	—	—	—	—	—	R1 R2	GC	—	IND WRC	P	—
City of Nehalem	—	*	—	—	—	—	—	—	RM RL MR RT	C	—	—	P	—

TILLAMOOK BAY

Tillamook County	EN	EC1 EC2 ECA	ED	F	F1	SFW10 SFW20	RM	RR	R1 R2 R3 RMH	C1 C2	LM M1	WDD	—	—
City of Tillamook	—	*	—	—	—	—	O	—	RO R5 R7.5	CH CC	IL IG	—	—	O
City of Bay City	—	*	—	—	—	—	—	—	H1 M1 L1	—	S2	—	S1	—
City of Garibaldi	—	*	—	—	—	—	—	—	R1	C	I1	WD1 WD2	—	—

NETARTS BAY, SAND LAKE, AND NESTUCCA BAY

Tillamook County	EN	EC1 EC2 ECA	ED	F	F1	SFW10 SFW20	RM	RR	R1 R2 R3 RMH	C1 C2	LM M1	WDD	—	—

Cities in Tillamook County use Tillamook County management unit designations.

LINCOLN COUNTY ESTUARIES

	Estuary			Shoreland										
Zone Types	EN	EC	ED	F	FU	FF	REC	RR	UR	C	I	WDR	PUB	CON
SALMON RIVER														
Lincoln County	MW #	MW #	MW #	TC	AC	—	PF	RR5	R1	C1 CT	IP	MP	PF	—
SILETZ BAY														
Lincoln County	MW #	MW #	MW #	TC	AC	—	PF	RR1 RR2	R1	C1	IP	MP	PF	—
Lincoln City	—	—	—	—	—	—	—	—	R10 R7.5 R5	PC GC RC	PI	—	—	EQ
YAQUINA BAY														
Lincoln County	MW #	MW #	MW #	TC	AC	—	PF	RR1 RR2 RR5	R4 R3 R2 R1A R1	C1 C2 CT	IP	MP	PF	—
Toledo	—	—	—	—	—	—	—	—	RS RG	C	I LI	WD	PL	NR
Newport	—	—	—	—	—	—	P2	—	R1 R2 R3 R4 MH	C1 C2 C3	I1 I2 I3	W1 W2	P1	P3
ALSEA BAY														
Lincoln County	MW #	MW #	MW #	TC	AC	—	PF	RR1 RR2 RR5	R4 R3 R2 R1A R1	C1 C2 CT	IP	MP	PF	—
Waldport	—	—	—	—	—	—	—	—	R1 R2 R3 R4	C1 C2	IP I1	MP	—	PF

All Lincoln County estuary management units are designated "Marine Waterway" (MW) with a distinguishing number. The maps in this book show use the generic classifications to allow distinction between types of management units on the map.

SIUSLAW RIVER ESTUARY

	Estuary			Shoreland										
Zone types	EN	EC	ED	F	FU	FF	REC	RR	UR	C	I	WDR	PUB	CON
Lane County	NE	CE	DE	F1 F2	E	ML	PR	RR	RA RG	C1 C2 C3 CR	M1 M2 M3	—	PF	NR
(Estuary management units are given letter labels, and shoreland units numbers.)														
City of Florence	NE	CE	DE	—	—	—	—	—	RR RS RMH RM	C H NC	LI AD	M WF	—	OS

UMPQUA RIVER ESTUARY

	Estuary			Shoreland										
Zone Types	EN	EC	ED	F	FU	FF	REC	RR	UR	C	I	WDR	PUB	CON
Douglas County	EN	EC	ED	TR	FG FC	FF AW	—	5R RR 1R	RS R1 R2 R3	C1 C2 C3 CT	M1 M2 M3	MC MRI MR	WI	CS
(Douglas County also employs twenty different overlay zones that are not listed here.)														
City of Reedsport	EN	EC	ED	—	—	AR	—	—	RA R1 R2	C1 C2	M1 M2	M3 C3	PL	CS

COOS COUNTY ESTUARIES

COOS BAY

	Estuary			Shoreland										
Zone Types	EN	EC	ED	F	FU	FF	REC	RR	US	C	I	WDR	PUB	CON
Coos County	NA	CA	DA	F	EFU EFU10	—	REC	RR2 RR5 RC	UR1 UR2 URM	CD5 CD10 C1	IND	—	—	NR SS MES
(Coos County utilizes management units for both estuaries and shorelands. The maps of Coos Bay in this book show estuary management unit numbers but not shoreland management unit numbers.)														
City of Coos Bay	—	—	—	—	—	—	—	—	R1 R2 R3 R4P R5 RW	C1 C2 MP	IC	WI I1	QP1 QP3	QP2
City of Eastside	—	—	—	—	—	—	—	—	R7.5 RM5	C R/C	PI PI/ SD	—	PF	B
(Eastside is now a part of the City of Coos Bay, but original Eastside zones still apply.)														
City of North Bend	—	—	—	—	—	—	—	—	R5 R6 R7 R10 RM RT	CC CL CG	ML MH AZ	—	—	—

COQUILLE RIVER ESTUARY

	Estuary			Shoreland										
Zone Types	EN	EC	ED	F	FU	FF	REC	RR	US	C	I	WDR	PUB	CON
City of Bandon	W	W	W	—	—	—	—	—	R MHR CD1 CD2	C1 C2 GC	LI HI	C3	PF	NR
Coos County	NA	CA	DA	F	EFU EFU10	—	REC	RR2 RR5 RC	UR1 UR2 URM	CD5 CD10 C1	IND	—	—	NR SS MES

CURRY COUNTY ESTUARIES

ROGUE RIVER

	Estuary			Shoreland										
Zone Types	EN	EC	ED	F	FU	FF	REC	RR	UR	C	I	WDR	PUB	CON
Curry County	ER1	ER2	ER3	T	EFU	FG AFD	RCR	RR	R1 R2 R3	RC C1 C2	M	MA	PF	CN
City of Gold Beach	9ER1	9ER2	9ER3	—	—	—	—	—	1R 2R 3R	4C	5I	6MA	7PF	8CN 10SO

CHETCO RIVER

	Estuary			Shoreland										
Zone Types	EN	EC	ED	F	FU	FF	REC	RR	UR	C	I	WDR	PUB	CON
Curry County	ER1	ER2	ER3	T	EFU	FG AFD	RCR	RR	R1 R2 R3	RC C1 C2	M	MA	PF	CN
City of Brookings	—	—	—	—	—	—	—	— RHD	RLD RMD R-MH	CT CG	ML MG	—	P/OS	—

- 2. INTERTIDAL
  - 2.5 Tidal Marsh
    - 2.5.14 Shrub
    - 2.5.13 Fresh Marsh
    - 2.5.12 High Salt Marsh
    - 2.5.11 Low Salt Marsh
  - 2.4 Beach Bar
    - 2.4.6 Cobble/Gravel
    - 2.4.1 Sand
  - 2.3 Aquatic Bed
    - 2.3.10 Algal
    - 2.3.9 Seagrasses
  - 2.2 Flat
    - 2.2.6 Cobble/Gravel
    - 2.2.5 Wood Debris/Organic
    - 2.2.4 Shell
    - 2.2.3 Mud
    - 2.2.2 Sand/Mud (mixed)
    - 2.2.1 Sand
  - 2.1 Shore
    - 2.1.8 Bedrock
    - 2.1.7 Boulder
    - 2.1.6 Cobble/Gravel
    - 2.1.5 Wood Debris/Organic
    - 2.1.4 Shell
    - 2.1.3 Mud
    - 2.1.2 Sand/Mud (mixed)
    - 2.1.1 Sand
- 1. SUBTIDAL
  - 1.3 Aquatic Bed
    - 1.3.10 Algal
    - 1.3.9 Seagrasses
  - 1.2 Rock Bottom
    - 1.2.8 Bedrock
    - 1.2.7 Boulder
  - 1.1 Unconsolidated Bottom
    - 1.1.6 Cobble/Gravel
    - 1.1.5 Wood Debris/Organic
    - 1.1.4 Shell
    - 1.1.3 Mud
    - 1.1.2 Sand/Mud (mixed)
    - 1.1.1 Sand

2.5.13 — *Habitat Subclass* (refer to Habitat key for specific type)

Significant Shoreland Habitat

Dredged Material Disposal Site

OR — *Mitigation Site*

U.S. Highway 101

State Highways

OR — *Improved Roads* (includes city streets & county roads)

Public Land Survey (township corner marks)

Monument Site