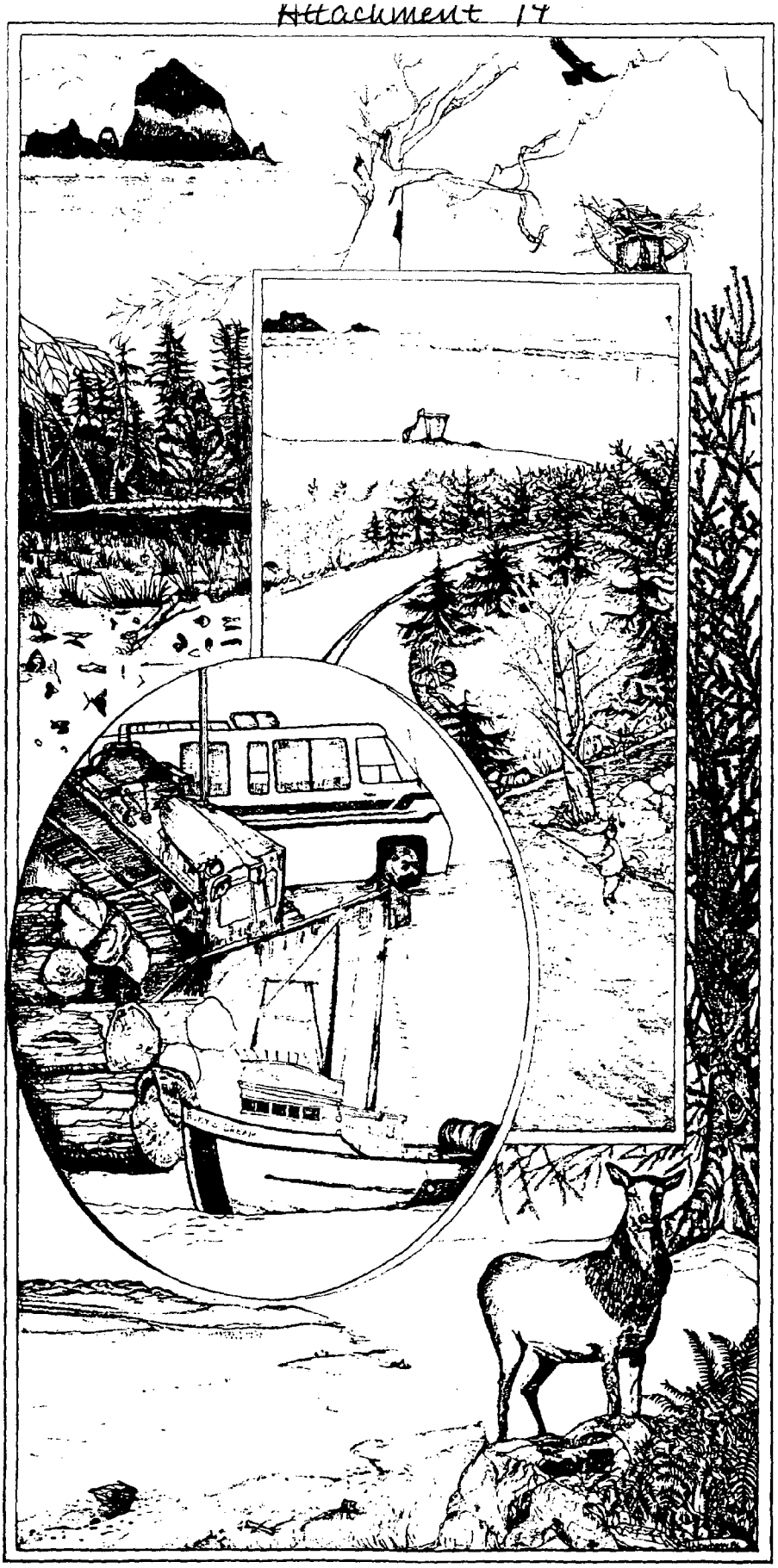
Attachment 17



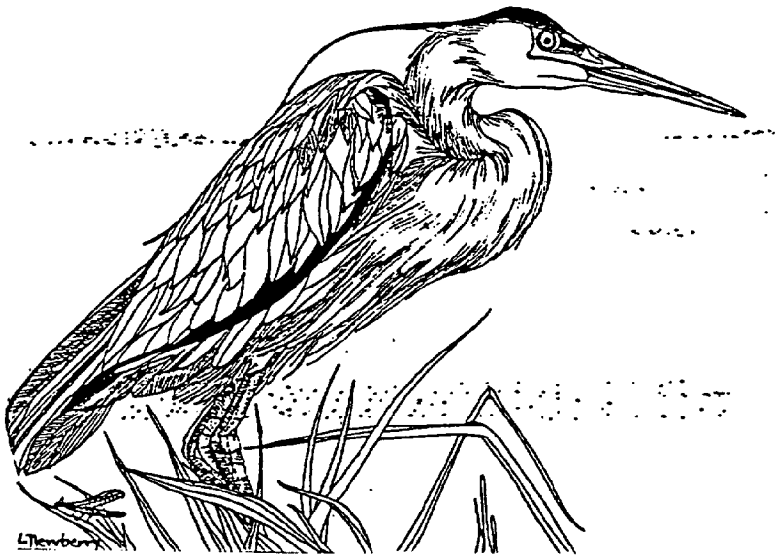
RESOURCE ACCESS

Bringing the Interactive Elements of the Coastal Zone to the Classroom

EDUCATORS GUIDE

TO

RESOURCE ACCESS



Linking the Classroom to the Coastal Zone

GEN0 , E36x 1987

US Department of Commerce
NOAA Coastal Services Center Library
2234 South Hobson Avenue
Charleston, SC 29405-2413

US Department of Commerce
NOAA Coastal Services Center Library
2234 South Hobson Avenue
Charleston, SC 29405-2413

RESOURCE ACCESS
For
EDUCATORS

Produced by

E-3 Awareness Educational Development Group
1987

PROJECT MANAGER & AUTHOR — Neal Maine

PROJECT GRAPHICS & AUTHOR — Linda Newberry

PROJECT ADMINISTRATOR — David Fox

The RESOURCE ACCESS PROJECT was financially aided through a grant from The Oregon Department of Land Conservation and Development with funds obtained from the National Oceanic and Atmospheric Administration, and appropriated for Section 306 of the Coastal Zone Management Act of 1972, with the support of the Columbia River Estuary Task Force and the schools of Clatsop County.

TABLE OF CONTENTS

Introduction. 1

Model Study Programs. 5
- Planning Goals 6
- Estuaries. 12
- Coastal Shorelands 20
- Beaches and Dunes 27
- Ocean Resources. 36

Concept Development. 43

Resource Management &
Land Use Planning Policies 49

Case Studies 57

Resource Sites 69

Habitat Sites 74

Local Resource People 78

Evaluation 86

Selected Environmental &
Land Use Publications Bibliograpy. 1-63

Resources Persons Guide to Working
With Educators. . . . . .Separate Publication

INTRODUCTION

TO

RESOURCE ACCESS

The **Land Use Planning Process** in Oregon has generated a wealth of knowledge, community involvement, and comprehensive plans for lands, resources, and economic direction. This process is linked to the subjects offered in schools of this state and needs to be effectively included in the curriculums in the integrated way that is displayed in the comprehensive plans of communities. Educators can play a significant role in helping to prepare young citizens for their increasingly important role in the land use decision-making process.

The coastal region of Oregon has political, economic and ecological factors that are on a collision course. This demands the most of its citizens in problem-solving skills and communication. The **RESOURCE ACCESS PROJECT** is dedicated to helping educators gain access to specific local materials and support systems necessary to provide leadership in preparing citizens for "Life in the Coastal Zone." The intent of this project is to release the creative and professional talents of educators.

The **RESOURCE ACCESS PROJECT** has set the following goals:

- To develop methods of access for the educational community to existing environmental resources, land use planning and resource management materials.
- To improve the quality of natural resource education on the coast by providing effective utilization of these materials by educators and an integration of this information into the natural science and social studies curricula.
- To prepare citizens for participation in local land use planning, problem-solving, decision-making and value judgements, related to the coastal zone.

The **goals** of the **RESOURCE ACCESS PROJECT** will be reached in part by the use of the following:

MODEL STUDY PROGRAMS have been developed to demonstrate the use of the Oregon Land Use Planning and Coastal GOALS in reaching educational goals and as models for teacher-developed materials.

CONCEPT DEVELOPMENT is proposed as one vehicle that will help in implementing a District or classroom program.

PLANNING POLICIES describe some of the more important support materials that can be useful to educators.

CASE STUDIES are included for educators to use in the preparation of their own materials.

LOCAL PUBLICATIONS that can be useful to classroom teachers have been inventoried.

RESOURCE SITES have been inventoried as a beginning point for teachers' continued development.

RESOURCE PEOPLE have been listed as a beginning point for teachers' continued development.

RESOURCE PERSONS GUIDE has been developed to promote cooperative efforts with educators.

SLIDES SHOWS on **RESOURCE ACCESS** and Coastal Resources have been developed to illustrate the Resource Access concept.

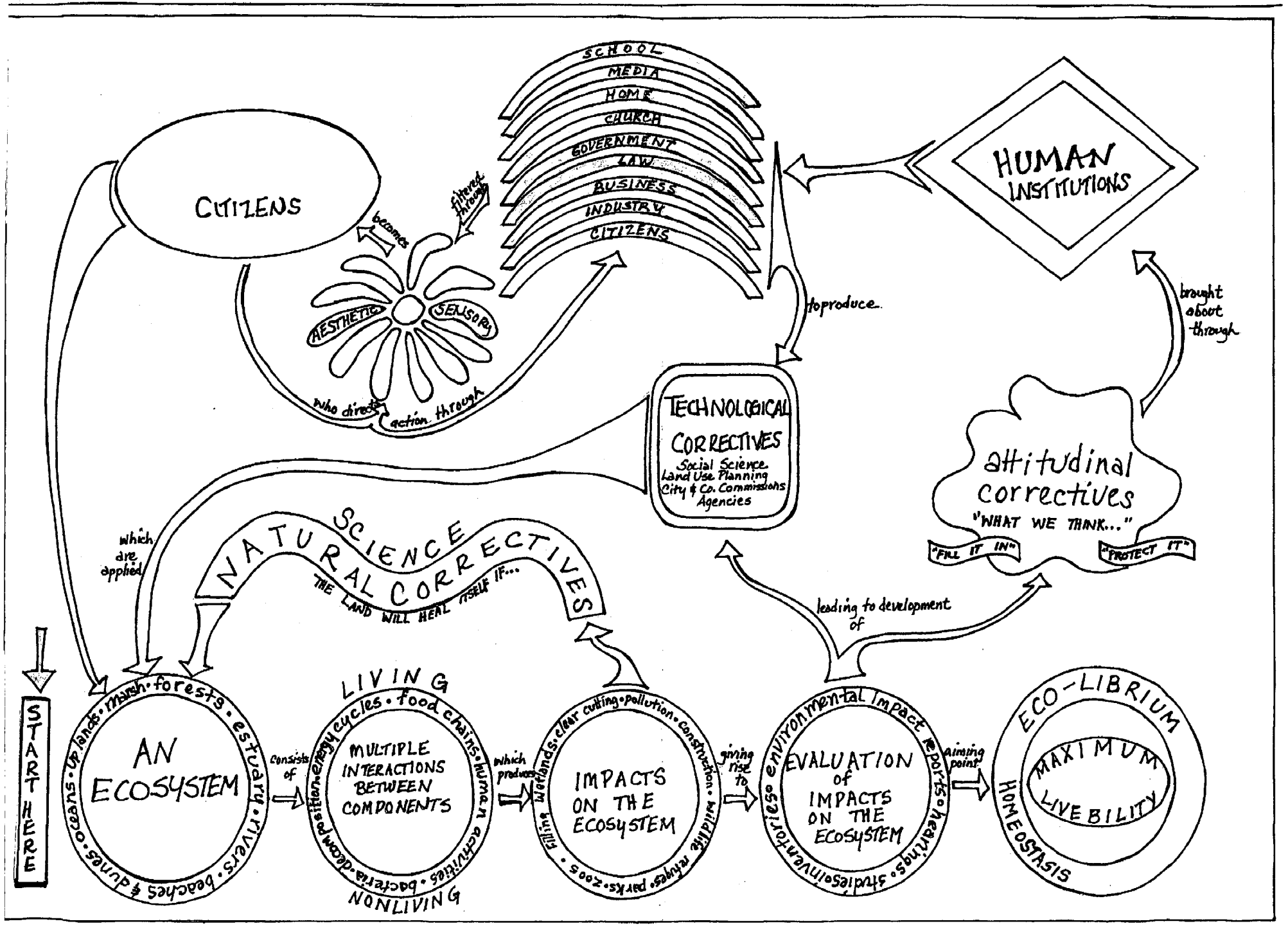
NOTE: Teachers should consider **Oregon's Statewide Planning Goals** and **City** and **County COMPREHENSIVE PLANS** as companion documents to this educator's Guide.

A FRAMEWORK FOR THINKING ABOUT THE COASTAL ZONE

The following diagram is an attempt to provide a ***visual chart*** of the framework that has been used to guide the design of the RESOURCE ACCESS PROJECT. Although there is no perfect way to demonstrate the interactive nature of this process, there is value in attempting to **model** for reference, how this process appears to function.

In addition, the variety of elements used in the planning process can be linked to the various phases of this framework. For instance, although **inventories** attempt to define the type of **ecosystem** under consideration, none of these **ecosystems** operate in isolation; rather there is interaction between a variety of **physical** and **biological laws** and with other **ecosystems**. At the same time, **human ecology** can create known **impacts on the systems**, thus setting the stage for **correctives** that are implemented through the **planning process**. These **correctives** may take the form of **technological** or **attitudinal adjustments**. Just what these **adjustments** are and how they will be implemented is left to be mediated in the **public forum**.

Each of the products developed for this Project are an attempt to illustrate the variety of elements displayed on the chart, and the way in which school subjects have bearing upon this process.


START HERE
AN ECOSYSTEM
uplands • marsh • forests • estuary • rivers • beaches & dunes • oceans
consists of
MULTIPLE INTERACTIONS BETWEEN COMPONENTS
LIVING
cycles • food chains • human activities • bacteria • decomposition • energy
NONLIVING
which produces
IMPACTS ON THE ECOSYSTEM
wetlands • clear cutting • pollution • construction • wildlife refuges • parks • zoos • filling
giving rise to
EVALUATION of IMPACTS ON THE ECOSYSTEM
environmental impact reports • studies • hearings
aiming point
ECO-LIBRIUM
MAXIMUM LIVEBILITY
HOMEOSTASIS
leading to development of
attitudinal correctives
"WHAT WE THINK..."
"FILL IT IN"
"PROTECT IT"
brought about through
HUMAN INSTITUTIONS
to produce
SCHOOL
MEDIA
HOME
CHURCH
GOVERNMENT
LAW
BUSINESS
INDUSTRY
CITIZENS
TECHNOLOGICAL CORRECTIVES
Social Science
Land Use Planning
City & Co. Commissions
Agencies
which are applied
SCIENCE
NATURAL CORRECTIVES
THE LAND WILL HEAL ITSELF IF...
CITIZENS
filtered through
becomes
AESTHETIC
SENSORY
who directs action through

MODEL STUDY PROGRAMS

RESOURCE ACCESS

STUDY PROGRAMS FOR THE COASTAL ZONE

INTRODUCTION

The **STUDY PROGRAMS** have been developed as a **model** to be used by educators as a guide for the generation of their own materials. If students are to be provided with local, concrete experiences, classroom teachers, district personnel, and local resource managers must help develop site-specific support materials that will link textbooks, local resources, planning, and the interdisciplinary nature of our society more effectively to the school experience.

The school district goals ask educators to provide such leadership, but in many cases the resources and the background materials are not readily available to the classroom teacher, although they are adundant in the broader community. This project is an effort to provide more support to the classroom educators and school districts to effectively convert local materials and resources into usable classroom products and student experiences.

Nationally published textbooks typically provide generic models for their text, but almost always lack specifics about local settings. These **STUDY PROGRAMS** will model how more effective learning opportunities can result for students by having access to local resource materials and using them for instruction and concept development.

SELECTING DISTRICT GOALS FOR UNIT DEVELOPMENT

School district goals speak to the broadest hoped-for gains by students passing through our educational institutions, and can serve as useful organizers to implement the **RESOURCE ACCESS** concept. The goals at the district level do not identify specific subject matter connections, but point the direction for the end result of the student experience in a given district. For the most part, these goals address the continuing citizenship development of young people. Often school is viewed as the place where young people are in a training program to ***become*** citizens, to qualify for the adult world. The **RESOURCE ACCESS** program accepts the citizenship of students in school, and provides opportunities for them to participate in the citizenship process at their level of development.

SAMPLE DISTRICT GOALS:

*The STUDENT will understand and exercise their rights and responsibilities of citizenship.
*The STUDENT will develop an awareness and understanding of the balance beween man and his environment.

LINKING PROGRAM GOALS: (SS) Social Studies and (S) Science

*(SS) STUDENTS will have an awareness of values, personal and societal.
*(S) STUDENTS will value science as a way of learning and communicating about self, others and the environment.
*(S) STUDENTS will be able to use scientific problem solving and inquiry processess.
*(SS) STUDENTS will be able to participate in societal activities as individuals, learners, family members, citizens, producers and consumers.

Linking school program goals will more accurately portray the interactive nature of life in the coastal zone.

STUDY MODEL # 1

STATEWIDE PLANNING

1. PLANNING GOALS

Introduction

Planning in Oregon presently drives the basic process of decision-making for the citizens of this state. Although at some point in the past, educational institutions may have been asking students how **they** think the state and their communities should be planned, that phase in the process does not now exist. The issue today is the important role that education can play in helping to prepare young citizens for evolving active roles using decisions made during the past 10 years of the planning process in Oregon. It is also important to provide personal experience with the process; a mandate has provided for this in the Oregon Statewide Planning Program under **Goal 1: "CITIZEN INVOLVEMENT."**

On the surface, Oregon's **Land Use Planning Program** might appear to be the sole responsibility of a discipline historically called "social studies." While most of the leadership for this discipline should be placed in this category, it is the investigation of the relationships between other areas of study, i.e. physical science, geography, natural science and citizenship development, that is most in need of leadership from the educational community. Providing leadership in the demonstration of the ways that these disciplines interact, rather than solely transferring the historical reservoir of content knowledge to the student, is valuable to young citizen development.

Such interactive opportunities are critical if citizens, young and old, are not to be cut off from access to the system that determines the fate of resources within the land use planning process. Lack of knowledge about how this process works and lack of opportunities to participate in it, can have the potential of isolating citizens from the process as it was designed, with the Oregon tradition of active citizen involvement.

Because the theme of this "EDUCATORS GUIDE TO RESOURCE ACCESS" has a focus on Coastal Goals, there will only be a short review of the other Goals. They are not less important, but they address more of a statewide basis, whereas the Coastal Goals speak specifically to the "coastal fringe" of Oregon.

Each of the Goals has two important parts: the **"Goal"** section sets out the state framework and has the force of the law; the **"Guidelines"** are not mandated by law, and this section contains suggested courses of action, but not required ones. All of the goals are adopted as administrative rules in accordance with Oregon law.

II. BACKGROUND RESOURCE INFORMATION

The Goals can be organized into four broad categories, and are to be achieved through local comprehensive planning. Those Plans have been completed in all coastal communities. The following review is not intended to be comprehensive, but rather to communicate the legal requirements of the Goals, with examples of Guidelines that can be useful in reaching the Goals.

The first group of Goals identifies the planning process:

GOAL 1: CITIZEN INVOLVEMENT-To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process.

GUIDELINE A2: Universities, colleges, community colleges, secondary and primary educational institutions and other agencies and institutions with interest+s in land use planning are asked to provide information on land use education to citizens, as well as to develop and offer courses in land use education which provide for a diversity of educational backgrounds in land use planning.

GOAL 2: LAND USE PLANNING-To establish a land use planning process and policy framework as a basis for all decisions and actions related to use for land, and to assure an adequate, factual base for such decisions and actions.

GUIDELINE C1 suggests that inventories and other forms of data are needed as the basis for the policies and other decisions set forth in the Plan. This factual base should include data on natural resources, man-made structures and utilities, population and economic characteristics of the area, and the roles and responsibilities of government units.

The second group of Goals includes the conservation goals:

GOAL 3: AGRICULTURAL LANDS-To preserve and maintain agricultural lands.

GUIDELINE A2 proposes that plans providing for the preservation and maintenance of farm land for farm use should consider as a major determinant the carrying capacity of the air, land, and water resources of the planning area. The land conservation and development actions provided for by such plans should not exceed the carrying capacity of such resources.

GOAL 4: FOREST LANDS-To conserve forest lands for forest uses.

GUIDELINE A1 asks that forest lands be inventoried so as to provide for the preservation of such lands for forest uses.

GOAL 5: OPEN SPACES, SCENIC AND HISTORIC AREAS, AND NATURAL RESOURCES-To conserve open space and protect natural and scenic resources.

GUIDELINE A5 recommends that the National Register of Historic Places and the recommendations of the State Advisory Committee on Historic Preservation should be utilized in designating historic sites.

GOAL 6: AIR, WATER AND LAND RESOURCES QUALITY-To maintain and improve the quality of the air, water and land resources of the state.

GUIDELINE A1 recommends that plans should designate alternative areas suitable for use in controlling pollution including, but not limited to, waste water treatment plants, solid waste disposal sites, and sludge disposal sites.

GOAL 7: AREAS SUBJECT TO NATURAL DISASTERS AND HAZARDS-To protect life and property from natural disasters and hazards.

GUIDELINE A5 proposes that planning for known areas of natural disasters and hazards should include an evaluation of the beneficial impact on natural resources and the environment from letting such events naturally reoccur.

GOAL 8: RECREATIONAL NEEDS-To satisfy the recreational needs of the citizens of the state and visitors, and where appropriate, to provide the siting of necessary recreational facilities including destination resorts.

GUIDELINE A2 suggests that an inventory of recreation opportunities should be made based upon adequate research and an analysis of the resources in the planning area which are available to meet recreational needs.

GOAL 9: ECONOMY OF THE STATE-To diversify and improve the economy of the state.

GUIDELINE A3 asks that plans should designate the type and level of public facilities and services appropriate to support the degree of economic development being proposed.

The third group of Goals includes those relating to development:

GOAL 10: HOUSING-To provide for the housing needs of citizens of the state.

GUIDELINE A2 suggests that plans should be developed in a manner that insures the provision of appropriate types and amounts of land within urban growth boundaries. Such lands should be necessary and suitable for housing that meets the housing needs of households of all income levels.

GOAL 11: PUBLIC FACILITIES AND SERVICES-To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a framework for urban and rural development.

GUIDELINE A3 asks that public facilities and services for rural areas should be provided at levels appropriate for rural use only and should not support urban uses.

GOAL 12: TRANSPORTATION-To provide and encourage a safe, convenient and economic transportation system.

GUIDELINE A2 proposes that no major transportation facility should be planned or developed outside urban boundaries on Class I or II agricultural land, as defined by the U.S. Soil Conservation Service unless no feasible alternative exists.

GOAL 13: ENERGY CONSERVATION-To conserve energy.

GUIDELINE A2 encourages that the allocation of land and uses permitted on the land should seek to minimize the depletion of non-renewable sources of energy.

GOAL 14: URBANIZATION-To provide for an orderly and efficient transition from rural to urban land use.

GUIDELINE A1 proposes that plans should designate sufficient amounts of urbanization land to accommodate the need for further urban expansion, taking into account (1) the growth policy of the area, (2) population needs, by the year 2000, (3) the carrying capacity of the planning area, and (4) open space and recreational needs.

GOAL 15: WILLAMETTE RIVER GREENWAY-To protect, conserve, enhance and maintain the natural, scenic, historical, agricultural, economic and recreational qualities of lands along the Willamette River as the Willamette River Greenway.

NOTE: this Goal has special considerations and the 1985 OREGON'S STATEWIDE PLANNING GOALS should be reviewed for details.

The balance of the Goals include the four Goals that deal with Oregon's coastal resources, and will be developed as separate Study Programs.

To Teacher Users: the preceeding review is intended to list only in general terms the planning goals for Oregon. The 1985 OREGON'S PLANNING GOALS should be considered an essential part of the RESOURCE ACCESS and used as a companion document.

II. EDUCATIONAL PROGRAMS

The State-wide GOALS have attempted to take the values that are described in the **PLANNING GOALS** and link those to the management plans that best represent the local conditions and still provide direction for **citizen's views.** At this point in Oregon's history, learning about how the **GOALS** work, and the role citizens have in the process is vital in the educational scheme. The necessity of weaving the social studies and science components of the process into student sutdies is vital to the long range success of planning in Oregon.

Values that have been developed at the local level can be promoted by **Goals** and **Policies** and **Zoning** in response to **GOAL 8, RECREATION.**

EXAMPLES
City of Astoria

GOAL: The City of Astoria will work to encourage waterfront parks.

POLICIES: Improved access to the Columbia River and to Youngs Bay for residents and visitors alike has been a long-standing public need. The City Planning Commission, Parks Department, and other city agencies will actively participate in cooperative measures to institute such access through concepts like the "People Places" System.

ZONING: Recreational uses in waterfront areas shall take maximum advantage of their proximity to the water by providing for water access points, water viewing areas and structure design compatible with the aesthetic qualities of the waterfront location. Parking areas shall be located as far away from the shoreline as feasible.

ACTIVITY DEVELOPMENT

The goal of **ACTIVITY DEVELOPMENT** in the **RESOURCE ACCESS PROJECT** is to look for the major ***concepts*** that the instructor would like to link to things happening in the local environment. The ***concepts*** are selected from social studies and science, and then are linked to the social demonstration of the understanding of that concept, and eventually, to its application, after being mediated in the larger community.

If the local character of **ACTIVITY DEVELOPMENT** is to be demonstrated, it is necessary for instructors to plan on developing their own activities. This may demand a bit of time, but the payoff is high and the quality of learning and personal experience for students, using their own "place," can be improved.

Theme: "Citizen Involvement in Land Use Decisions"

Goals:

SOCIAL STUDIES

Citizens of all ages need opportunities to participate in societal activities as individuals and in groups.

SCIENCE

Technical information generated using science processes is useful in the decision-making process.

STUDENT BACKGROUND:

The very first of the planning goals in Oregon deals with **CITIZEN INVOLVEMENT**. Every effort has been made to insure that all citizens have access to the planning process. **GOAL 1** has set out a process by which County and City governing bodies must insure the involvement of local citizens. This process is designed to have a wide cross-section of affected citizens participating in all phases of the planning process.

Much of the planning process has occurred; now the task falls to understanding the process by which it came about, and the ways that citizens can continue to be involved with, and gain access to the system. If the planning process is to remain strong in Oregon, secondary and primary schools must provide opportunities for involvement and experience by students in planning related activities.

STUDENT INSTRUCTIONS:

Using the sheet provided by the teacher, **cut out** each of the Goals set out in Oregon's Statewide Planning Goals (1985). When all have been cut out, **think about** how you would arrange them on a large sheet of paper. **Which ones** would go on the top; **which ones** would connect; **where would** you connect the ones that are important to you? **Put the ones** you think are most important at the top.

After you have placed them in a pattern that you think is one that works for you, **tape them down** to a large piece of paper. If you need to add connecting lines, do so. When you have completed the project, **compare yours** to others in the class. **Have a** small group discussion about the way you decided to organize the project.

OREGON'S STATEWIDE PLANNING GOALS

CITIZEN INVOLVEMENT

LAND USE PLANNING

AGRICULTURAL LANDS

ESTUARINE RESOURCES

OCEAN RESOURCES

ECONOMY OF THE STATE

HOUSING

OPEN SPACE, SCENIC AND HISTORIC AREAS, & NATURAL RESOURCES

FOREST LANDS

AIR, WATER, AND LAND RESOURCE QUALITY

TRANSPORTATION

ENERGY CONSERVATION

URBANIZATION

BEACHES AND DUNES

PUBLIC FACILITIES & SERVICES

RECREATIONAL NEEDS

AREAS SUBJECT TO NATURAL DISASTERS AND HAZARDS

WILLAMETTE RIVER GREENWAY

STUDY MODEL # 2

ESTUARIES

I. PLANNING AND ESTUARIES

The Oregon **STATEWIDE PLANNING GOALS AND GUIDELINES** have identified the importance of estuaries to Oregon and its citizens. **GOAL 16** is dedicated to the effective use and protection of the natural resources and developmental values of estuary systems. In this, the overall goal asks citizens in part 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 where appropriate restore the long-term environmental, economic, and social values, diversity and benefits of Oregon's estuaries."

"Comprehensive management programs to achieve these objectives shall be developed by appropriate local, state, and federal agencies for all estuaries."

"Comprehensive plans and activities for each estuary shall provide for appropriate uses. Estuary plans and activities shall protect the estuarine ecosystem, including its natural biological productivity, habitat, diversity, unique features and water quality."

NOTE: the preceding parts of GOAL 16 represent only a small part of the Goal; it should be read in its entirety to gather its full meaning.

II. BACKGROUND RESOURCE INFORMATION

Estuaries have long been an important reservoir in which natural systems occur. Estuary systems thrive on the dynamics of the mixing of fresh and salt water. They provide excellent sites for the production of organic materials, special habitats for the life cycles of marine species, open shores for the growth of vegetation, and a variety of other important ecological characteristics.

The availability and access to these resources have made them important gathering sites for humans during the history of the Pacific Northwest. Dating from their use by Native Americans to modern day shipping and fishing practices, humans have long depended upon the bounty of the estuary system. During the early use of estuaries and their shorelines, natural controls and limited technological development maintained the integrity of the estuary. As increased use and technology continued, it became increasingly difficult to maintain this integrity through natural controls. It became clear that some form of control needed to be instituted to maintain the dynamics of the estuary system. **What** about our local estuaries, the Columbia, the Necanicum, and Ecola, is *so* important, that large scale restrictions need to be imposed for their protection?

THE NATURE OF ESTUARIES IN CLATSOP COUNTY

Local estuaries provide the all-important link between ocean water and river systems. The waters of streams and rivers are an expression of the energy activity on the land and the accumulation of many of the products of the land. The rivers and streams are the life-lines of the estuaries. As a result, the net interaction between the freshwater and the marine water produces one of the most unique and interesting habitats in the area. It is in this isolated mixture of freshwater and marine water where special environments are produced. Highly adapted organisms that can cope with these conditions are found in local estuaries.

The nature of the relationship between freshwater and saltwater is often used to classify estuarine systems. The degree of mixing, or the lack of it, has been used in Clatsop County to identify the character of the estuary. "Mixing" refers to the dilution of saltwater and freshwater in the estuary. Saltwater is brought in by the tides and freshwater flows from the rivers and streams. Because of a number of physical factors, such as the magnitude of freshwater inflows and the shape of the estuary, the proportions of fresh-to-salt water can vary widely. The Necanicum Estuary falls into the classification of a "partially mixed system."

One problem with the classification of estuaries by a salinity structure is that a given estuary may be partially-mixed during one season and vertically well-mixed during another. It is also possible for different cross-sections of an estuary to belong to different classes. Again nature is rarely simple. The Columbia River is a classic example of this complexity. Under high flow conditions, the Columbia River tends to be highly stratified, particularly upstream from the mouth, but it apparently does not become a salt-wedge because of strong tidal mixing. The surface water at the mouth usually remains slightly saline. This suggests a partially-mixed state, except at the end of ebb tide during high flow conditions, when salt penetration is found only along the bottom in the lower 2-5 miles of the river. Under low flow conditions, the estuary is "partially-mixed."

Clatsop estuary systems have had varying amounts of study; the **Columbia River** is represented by a wealth of information. For specific information, the reader is referred to the *Columbia River Estuary Inventory* materials at the CREST library. For the **Necanicum Estuary**, please see the "Necanicum Estuary Inventory." **Ecola Creek** has been inventoried as a part of the planning process; please see the Cannon Beach COMPREHENSIVE PLAN. (***for more information see:*** THE RESOURCE ACCESS INVENTORY).

ESTUARINE MARSHES

The tidal marsh wetlands of estuaries in Clatsop County are composed of those communities of vascular aquatic and semi-aquatic vegetation rooted in poorly drained, poorly aerated soil, which contains varying concentrations of salt occurring from lower high water, inland to the line of non-aquatic vegetation. (O.C.C. & D.C., 1974)

The vital role that estuarine wetlands play in the natural cycle of the estuary has only been recently realized to the degree that management programs have been instituted to protect this resource. Because estuaries are far more productive than most other types of habitats, and that productivity is of direct benefit to man, planning programs and management policies have become increasingly important.

The most vital link in the food chain in this aquatic environment is the marsh plant, which processes solar energy in the presence of chlorophyll, carbon dioxide and water to produce carbon compounds. In this process the marsh plants assimilate and convert phosphorous and nitrogen into compounds that are necessary for many of the estuary organisms. The success of these photosynthetic plants in converting sunlight into stored chemical energy determines the productivity of the estuary marshes and the eventual productivity of the entire system.

Much of the organic debris resulting from this plant decay is maintained within the estuary and becomes the foundation for the energy cycle. (i.e.: In an intertidal salt marsh, little of the living plant materials are consumed by herbivores, and most is used by detritus-feeders and decomposers.) The decay is a result of bacteria colonization which significantly increases the protein content of the original particle.

This brief summary in no way describes the intricacies of food cycles in estuaries. It is used here only to demonstrate the role of the marsh plants and their significance as the base of the food pyramid in the form of decaying organic matter.

FISH AND WILDLIFE HABITAT

In addition to these energy factors, the marsh plays a role as an important habitat for a number of animals. It provides important habitat for raccoons, mink, otter and a number of other small animals. One of the most critical roles, and least obvious to the layperson, that the marsh plays, is during the high tide cycle in providing habitat for fishes. This is especially true for anadromous fishes, such as coho salmon, chinook and steelhead trout during their downstream migration. As the salmon spends a period of time in the estuary before their migration to the sea, the daily flood of large areas of low marsh is critical to their survival. The marsh fringe provides protection and important food in the form of small aquatic animals.

Of equal importance is the number of marine fishes and other organisms that migrate from the ocean to spawn in protected waters. Some have suggested that more than half of the coastal fish species depend upon estuaries to complete their life cycle.

Marsh habitats are important to both migrant and resident birds. The marsh provides habitat for the nesting cycle, and is important for food and cover to many local and migrant species.

WATER QUALITY CONTROL

Wetland vegetation can play an important role in providing stability to shorelands by protecting them from the erosive forces of heavy winter runoff and storm-driven tides. At the same time, they help control the rate of runoff by reducing its velocity. Because of the marsh substrate, wetlands are also critical in storing water during low water periods.

Within certain limits, wetlands and associated marsh plants can play an important role as natural purifying agents of the water. As long as the surface areas of marshes are maintained, they have a tremendous potential for absorbing nitrogen and phosphorous from sewage. Each wetland has a limited capacity though, and to exceed it would deplete the oxygen needed for a balanced ecological system. Coastal rivers already carry a large supply of oxygen-depleting nutrients; therefore, the "use potential" of the marshes as water purifying agents must be balanced with their ability to handle the peak loads. The **Ecola Creek Estuary** has a small marsh area; the **Necanicum** has a limited marsh area, because of filling over the years, and the **Columbia River Estuary** marshes have been significantly reduced because of diking practices.

RECREATIONAL VALUE

Marshes can withstand **limited** impact and do not recover well from inappropriate use. They have recreational value to the hunter, fisherman, the nature enthusiast and photographer. In considering the uses of marsh areas, serious consideration should be given to the nature of the recreational use, so that it does not cause irreversible damage to the marsh and wetlands.

An important value that is often addressed in urban areas is the aethetic value of marshes, and the regarding of the psychological value of wetlands/marshes as "open spaces" and natural areas.

BOTTOM DWELLING ORGANISMS

The bottom sediments provide habitat for a large and important group of organisms that make up the **benthos**. These organisms range in size from microscopic plants and animals to large animals, such as clams and ghost shrimp. Each of these organisms play an important role in the estuary ecosystem. Bacteria is of particular importance in the decomposition cycle. Small worms and a variety of mud-dwelling organisms make up another important group in the benthic system. The larger, more conspicuous organisms that can be seen with the unaided eye make up the balance of the fauna of the benthos. Crabs, shrimp, clams, polychaete worms, barnacles and mussels are a few representatives of this group.

Of particular importance is the interrelationship between a number of the benthic invertebrates and the estuarine fishes. Utilization of benthic invertebrates as a major food supply is vital, in particular, to the downstream migrating salmon juveniles that spend an important part of their life cycle in this habitat.

WATER COLUMN ORGANISMS

Water column planktonic organisms include those that are weak swimmers and are at the mercy of the water movement. This group includes the **bacterioplankton** (bacteria), **phytoplankton** (plants), and **zooplankton** (animals).

Plankton plays an important role in the food web of the estuaries and during specific times of the year marine plankton becomes the major component of the estuary plankton. The variables that affect their growth and reproduction are extensive and are beyond the scope of this discussion. It should be noted that physical and biological factors are vital to the success of these organisms in maintaining a viable ecological setting for the maintenance of estuary life. Alterations to **any** of the physical or biological constituents greatly affects plankton ecology.

III. EDUCATIONAL PROGRAMS

The State-wide Goals have attempted to take the values that were briefly discussed, and link those to management plans that best represent the local conditions and still provide the necessary protection for the **estuary** systems. At this point in Oregon's history, learning about estuaries, without the link of pertinent management policies and laws, will not contribute to our students' full understanding of the opportunities to participate in the process or to understand the way in which science is mediated in the public forum. The necessity of weaving the social studies and science components of the students' studies becomes obvious, as the relationships between inventories of **estuaries** and protection and use policies are displayed.

At the local level, the day-to-day management of an **estuary** is guided by management policies designed to protect those values ascribed to **estuary systems**.

EXAMPLES

Necanicum Estuary

GOAL 1: To maintain all identified marsh areas in their natural, productive condition.

POLICY: As a conservation estuary, the Necanicum shall be managed so as to protect its natural resource values primarily. Permitted uses or activities in the estuary that result in significant alteration, including filling, dredging, rip-rap, road building and similar activities shall not be carried out in salt marshes or associated freshwater wetlands.

POLICY: Uses or activities that do result in alteration of estuarine areas shall be permitted only in areas of existing alteration. The Necanicum River in the vicinity of downtown Seaside, other than its marshes, is generally considered capable of sustaining development; whereas the upper Necanicum, the Neawanna, and the Neacoxie estuary areas are not.

Columbia River Estuary

CLATSOP COUNTY PLANNING POLICIES
Youngs Bay, Astoria

Log Storage: Log storage in the Lewis and Clark Youngs Rivers should continue to be allowed at all existing sites, even in those instance where it is a non-conforming use in a Natural area. However, no new log storage sites should be allowed in Natural areas or in wetlands, where the logs would rest on the bottom at low tide.

Columbia River Estuary

Shallow draft ports and marinas play a significant economic role in the Columbia River Estuary. Since marine construction usually involves major alteration of estuary shorelines and aquatic areas, it is important that marinas be sited, designed, constructed and expanded such that adverse impacts to the estuarine environment and other shoreline uses are minimized.

NOTE: The Columbia River Estuary is so large that a decade of serious planning has generated thousands of pages of planning research documents. The examples here are used only to demonstrate the linkage between resource evaluation and the planning process for school programs.

ACTIVITY DEVELOPMENT

The goal of **ACTIVITY DEVELOPMENT** in the **RESOURCE ACCESS PROJECT** is to look for the major ***concepts*** that the instructor would like to link to things happening in the local environment. The ***concepts*** are selected from social studies and science, and then are linked to the social demonstration of the understanding of that concept,and eventually, to its application after being mediated in the larger community.

If the local character of **ACTIVITY DEVELOPMENT** is to be demonstrated, it is necessary for instructors to plan on developing their own activities. This may demand a bit of time, but the payoff is high and the quality of learning and personal experience for students, with their own "place," can be improved.

Theme: "Estuary Management"

Goals:

SOCIAL STUDIES

Estuaries must be managed in such a way as to protect marsh systems, and still allow community development.

SCIENCE

Marsh areas of the estuary are critical to the energy cycle.

STUDENT BACKGROUND:

Plants found in estuary wetlands are very important to the health of an estuary. In order to protect the plants from damage, we must develop measures (ways) to protect them. To know what rules to make, we need to know more about how the marsh plants live.

Certain plants like to live in special places where they get covered by water **some** of the time, but **not all** of the time. One of the main events in the daily life of the estuary is the rise and fall of the tides. If we can find out where the tide falls, and where the special places are that plants like, we can use this to help make plans or guidelines to protect wetland areas.

STUDENT INSTRUCTIONS:

1. Using the following **tide chart** for your information, ***make a dot*** indicating the tide level, straight up from the appropriate time (on the lower part of the chart). This will tell you how high, or low the tide is, at that particular hour. The first one has been placed for you. ***Continue doing the same*** all the way across the page. When all of the dots have been placed ***connect*** them with a gentle curved line. This will show you the **TIDE CYCLE** for one lunar day (since tides are caused by the moon, we have to think about how long it takes the moon to get around the earth.)

TIDE CHART

1:00 am	8.2 ft.	1:00 pm	3.0 ft.
2:00 am	6.1 ft.	2:00 pm	2.2 ft.
3:00 am	5.0 ft.	3:00 pm	3.4 ft.
4:00 am	4.5 ft.	4:00 pm	5.5 ft.
5:00 am	5.0 ft.	5:00 pm	8.5 ft.
6:00 am	7.1 ft.	6:00 pm	8.8 ft.
7:00 am	8.7 ft.	7:00 pm	9.0 ft.
8:00 am	9.8 ft.	8:00 pm	8.8 ft.
9:00 am	10.2 ft.	9:00 pm	8.1 ft.
10:00 am	9.8 ft.	10:00 pm	7.4 ft.
11:00 am	8.2 ft.	11:00 pm	6.2 ft.
12:00 am	5.5 ft.	12:00 pm	4.5 ft.
		1:00 pm	3.6 ft.

2. Studies have shown that estuary plants like to live in the tide ranges shown below. ***Draw a line*** showing the area within the tidal range that the plants like to live. ***Color them*** according to the following color scheme:

ALGAE - blue
LYNGBY'S SEDGE - green
ARROW GRASS - yellow
PACIFIC SILVERWEED - gray

NAME: **ALGAE**
Ulva 4 ft. to 5.5 ft.

NAME: **LYNGBY'S SEDGE**
5 ft. to 9 ft.

NAME: **ARROW GRASS**
6.5 ft. to 9.5 ft.

NAME: **PACIFIC SILVERWEED**
9.0 ft. to 11.5 ft.

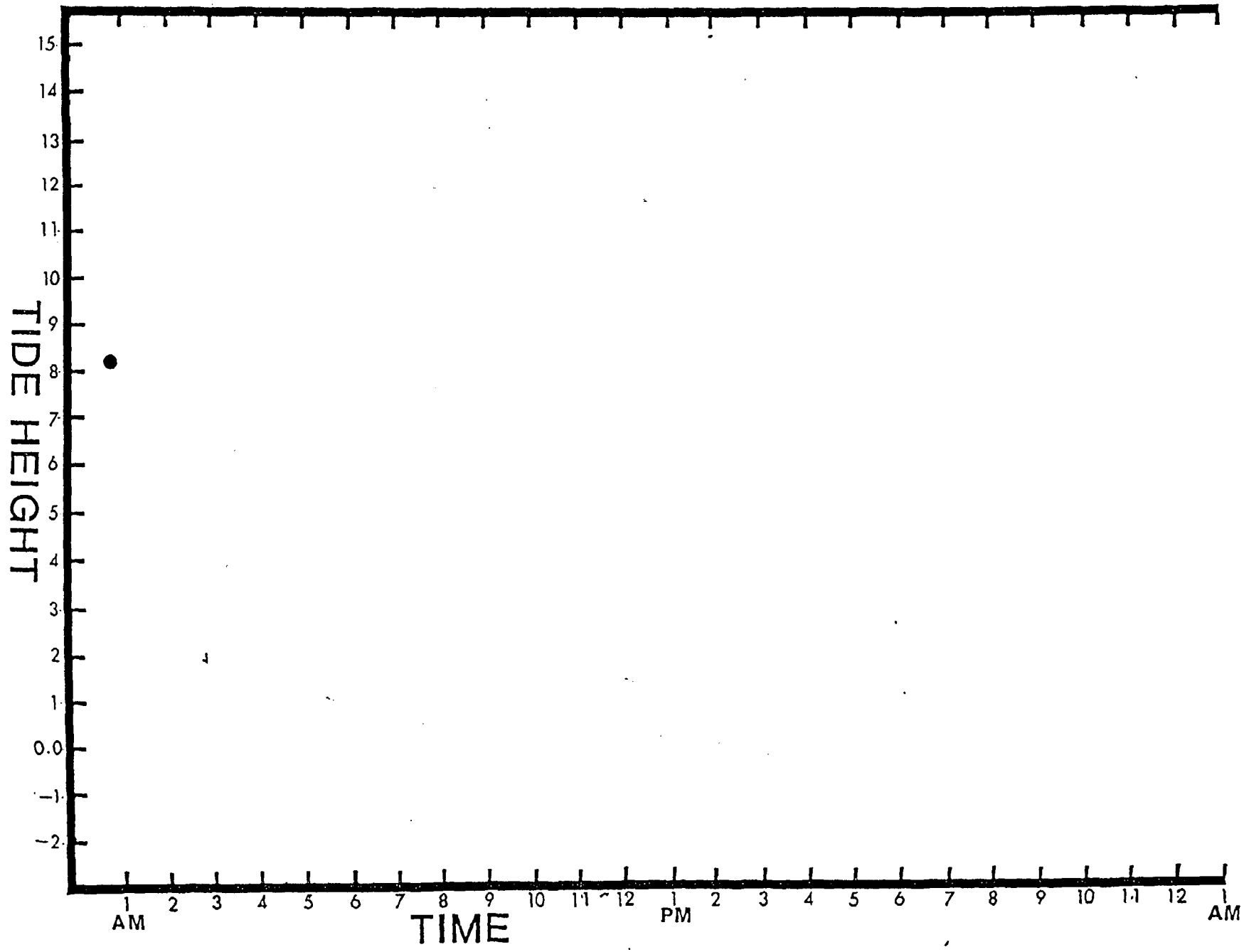
3. • Using your completed chart, ***make a red line*** where you think it would not be a good idea to cover over the plants with fill.

   • ***Draw a brown line*** where you think it would not be a good idea to dig out the estuary.

   • ***Make a list*** of the type of activities that would not damage the marsh. (for example: bird watching from a raised viewing platform.)

   • ***Write*** rules that you think would give your marsh complete protection.

PLANNING CHART



STUDY MODEL # 3

COASTAL SHORELANDS

I. PLANNING AND SHORELANDS

One of the most obvious characteristics of the coastal setting is the preponderance of shorelands associated with water systems. The shorelands may take shape as stream and river banks, intertidal areas, shorelands around estuaries, or the many lakes and wetlands systems found in coastal settings. In addition, the presence of the described resources create the settings often valued by society because of their aesthetic or scenic quality, including the unique headlands that take shape at the coastal interface. At the same time, the interface systems of coastal regions produce a variety of geologically unstable conditions. Adding to the unique qualities and values of these natural resources the need to protect historical and archaeological sites in coastal areas, makes the management and protection of coastal shorelands important and challenging to the planning process. This is a challenge, as these lands provide both the environmental and economic values that must be mediated in the public forum.

Coastal shorelands are identified as "land contiguous with the ocean, estuaries, and coastal lakes." **Goal 17 asks coastal communities in part to:**

> "conserve, protect, where appropriate, develop and where appropriate restore the resources and benefits of all coastal shorelands, recognizing their value for protection and maintenance of water quality, fish and wildlife habitat, water-dependent uses, economic resources and recreation and aesthetics. The management of these shoreland areas shall be compatible with the characteristics of the adjacent coastal waters; and
>
> reduce the hazard to human life and property, and the adverse effects upon water quality and fish and wildlife habitat, resulting from the use and enjoyment of Oregon's coastal shorelands."

II. BACKGROUND RESOURCE INFORMATION

COASTAL SHORELANDS AS WETLANDS

The variety and values of wetlands in Clatsop County, along with the forests, may be the counties most important resource, although in many ways a hidden one. Unlike the forests that are most obvious and directly linked to the historical view of resources, the wetlands of the county are subtle and so fused with the coastal landscape that their values are often overlooked; in turn their values are often displayed in secondary ways with the support of more directly observable resources. Thus wetlands values often must be linked to secondary benefits to display their values.

A challenging task has been to create a definition of wetlands that most will agree upon. Although there are a number of legal definitions that were developed for agency management, most will agree that:

> **a wetlands is a "land where water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil and on its surface."** (Our Nations Wetlands, 1978).

Thus in Clatsop County wetlands are represented by freshwater marshes, swamps, estuarine marshes, bogs, streams, river and lake borders, and forested wetlands. **See GOAL 17 for a more specific description of Coastal Shorelands.**

WETLANDS: SOCIAL AND ECONOMIC VALUES

A full discussion of the values of wetlands exceeds the scope of this teachers guide, but must be considered an important part of any communication about natural resources. The values of resources are often assigned and given their values by the existing social system. In the case of many of the values related to the social and economic criteria of wetlands, there is often the opportunity to ascribe some dollar savings or financial profit.

The value of wetlands in reducing or greatly limiting flooding, storm damage, and controlling erosion can often be directly related to financial savings and reduced burdens on local residents. With this, water supply and groundwater recharge, harvesting of natural products, and stock grazing often gain general acceptance when related to economic systems. Many of the regulations in comprehensive plans relating to wetlands attempt to protect wetlands and wetlands systems as they relate to these values.

The actual harvest of natural products from wetlands and associated uplands are often the most valued by the social setting. The harvest may come in the form of timber products from wetlands or adjacents lands, fish and shellfish products, cranberries, and in many places direct grazing by livestock. In addition, fur-bearing mammal harvest is almost exclusively from animals that depend upon wetlands. In this case the furs are given economic value because of their harvest values.

The direct use of wetlands for recreational activities such as hunting and fishing has a long been valued by the public. Waterfowl hunting has been one of the most popular and often the most supported value assigned to wetlands. Most other recreation in wetlands is non-consumptive and comes in the form of hiking, nature observation, photography, and boating. The aesthetic value of wetlands is very difficult to place a dollar value on, but even without a dollar assignment, such values are more and more in demand by the public.

WETLANDS AND ENVIRONMENTAL QUALITY

Wetlands play an increasingly important role in maintaining quality environments, both for aquatic and non-aquatic settings. Although an indicator of problems that may be occurring on more upland environments, wetlands have the potential to help in maintaining water quality or in some cases improving degraded waters.

Wetlands have the potential to remove nutrients, often in the form of nitrogen and phosphorus, from flooding waters for plant growth. There are limits to this process and each wetlands system must be considered to have individual capacities. Because of the capacity of wetlands to remove waste, the City of Cannon Beach has been actively pumping waste water from their treatment plant into a local wetlands during summer peak times. This system has been very efficient in lowering the biological oxygen demand and removing coliform bacteria.

The valuable role wetlands can and do play in reducing turbidity of flooding waters has recently been added to the growing list of "wetland values." This capacity can be a valuable asset in reducing siltation of ports, harbors, and river reservoirs. This is especially true of salt marsh creek banks where increased stands of vegetation slow the velocity of water causing sediment to drop out. This not only improves water quality, but becomes a nutrient trap, which leads to higher plant productivity.

The productivity of wetlands is legendary among those who study natural systems. With this process, wetland plants convert solar energy into plant matter and produce large supplies of oxygen as a by-product. This biomass, better know as food, becomes available in the green stage, to a host of both aquatic and terrestrial animals, large and small. The direct use of plants at this stage is limited; the real value of the "aquatic farm" comes when the plant material begins to decay and takes the form of **detritus**: small particulate materials that cycle through wetlands systems and form the base of the aquatic food web, which in turn support larger consumers, including commercial fishes.

FISH AND WILDLIFE VALUES

Fish and wildlife values are often the more visible aspect of wetlands, and are often used as the most marketable resource to the general population. Many of these values are related to the use by people of wetlands and associated waters for fishing and hunting uses, both commercial and recreational.

Waterfowl use of wetlands is very high and has been instrumental in gaining support from user groups to protect wetlands for feeding, nesting, and overwintering habitat. Waterfowl use is most notably linked to wetlands; these habitats are very important for nesting, feeding, and resting areas for both migratory and resident birds. As important are the riparian areas around wetlands which provide valuable cover, nesting, and feeding.

Within the hundreds of wetlands areas in the coastal shorelands of Clatsop County all of these values are present. The values of wetlands include the continued use by a host of mammals linked to the wetlands. In Clatsop County this includes muskrats, beaver, otter, nutria, mink, raccoon, skunk and weasels. In addition, there are a large variety of amphibians and other animals that depend upon wetlands.

EDUCATIONAL VALUES OF WETLANDS

Wetlands offer abundant opportunity for use in educational programs. Many of the major social studies and science concepts are very evident in association with wetland and upland fringes. This ecosystem has a very special appeal to people because of the magic ingredient **water**. With water, exciting and interesting things are often happening; systems are seldom static, and yearly cycles produce unique and interesting observations.

Almost all of the wetland biological habitat of prime importance is inventories, with limited descriptions, in a County report **SIGNIFICANT SHORELAND AND WETLAND HABITATS IN THE CLATSOP PLAINS** by Duncan Thomas.

SHORELANDS OF EXCEPTIONAL AESTHETIC OR SCENIC QUALITY

Although difficult to ascribe dollar values to, coastal headlands, beaches and active dunes are considered to be of high value in the planning process because of the quality that is derived from their association with coastal waters. These values are related to visual and aesthetic qualities often associated with "views" provided by such resources. The planning process set out to provide protection for such resources; resources that many considered to be a part of the **public domain**.

In Clatsop County, Tillamook Head and Oswald West State Park are considered important headlands. In association with these headlands are the off-shore rock islands that are included in the Oregon Islands Wilderness Areas, and are managed by the U.S. Fish and Wildlife.

With coastal headlands comes the potential of "adjacent areas of geologic instability" that may be active. The Clatsop County planning materials describes them as "geologic hazard areas which are caused by the action of a coastal water body, or have the potential to adversely impact a coastal water body. Geologic hazard areas which are caused by the action of a coastal water body include rapidly or slowly retrograding coastlines, and areas where wave erosion is undercutting headlands and terraces, causing shoreline retreat. Geologic hazard areas with potentioal to impact a coastal water body include active and inactive landslides and faults, and landslide topography."

Many of these areas are described in detail in **A Field Inventory of Geologic Hazards From Silver Point to Cove Beach, Clatsop County, Oregon**, and **Environmental Geology of the Coastal Region of Tillamook and Clatsop Counties**. *See* BIBLIOGRAPHY.

III. EDUCATIONAL PROGRAMS

The State-wide GOALS have attempted to take the values that were briefly discussed, and to link those to management plans that best represent the local conditions and still provide the necessary protection for the coastal shorelands. At this point in Oregon's history, learning about **COASTAL SHORELANDS**, without the link to pertinent management policies and laws, will not contribute to young citizen's full understanding of the opportunities to participate in the process, or to an understanding of the way in which science is mediated in the public forum. The necessity of weaving the social studies and science components of the students' studies becomes obvious, as the relationships between inventories of **SHORELANDS** and protection and use policies are developed.

At the local level, the day-to-day management of **SHORELANDS** is guided by management policies designed to protect those values ascribed to them.

EXAMPLES

City of Warrenton

GOAL: To minimize the impact of a high water table, shallow flooding and other limitations on development, and both recognize and protect the unique environmental, economic and social values of Columbia River waters, wetlands, and shorelands.

POLICY: ***Middle Skipanon River*** --Freshwater wetland areas of particular natural resource and habitat value should be protected to the extent possible during the development of the Skipanon River below the dam and the entire area east of the Skipanon.

ZONING: ***Aquatic Development Zone-(A-1)***--This zone identifies aquatic areas that have been judged suitable to accommodate navigational uses and other water-dependent uses. Use controls will be exercized to minimize damage to the estuarine ecosystem. Physical alteration of certain aquatic areas and shorelands may be altered to meet the needs of water-dependent uses.

ACTIVITY DEVELOPMENT

The goal of **ACTIVITY DEVELOPMENT** in the **RESOURCE ACCESS PROJECT** is to look for the major ***concepts*** that the instructor would like to link to things happening in the local environment. The ***concepts*** are selected from social studies and science, and then are linked to the social demonstration of the understanding of that concept, and eventually, to its application, after being mediated in the larger community.

If the local character of **ACTIVITY DEVELOPMENT** is to be demonstrated, it is necessary for instructors to plan on developing their own activities. This may demand a bit of time, but the payoff is high and the quality of learning and personal experience for students, using their own "place," can be improved.

Theme: "Zoning--Calling It Like It Is?"

Goals:

Social Studies

Students will be able to understand and apply generalizations and interdisciplinary concepts drawn from the various social sciences.

Science

Students will be able to apply technology to expanding their sense of the school environment, and adapting to it.

STUDENT BACKGROUND:

One of the ways local communities have organized their land use plans is through a process called "zoning." With this, communities inventory the land and water systems and make decisions about how that land/water should be used. In response to the **SHORELANDS GOAL**, cities and counties set up aquatic zones. For example, in Warrenton, the City Plan states that:

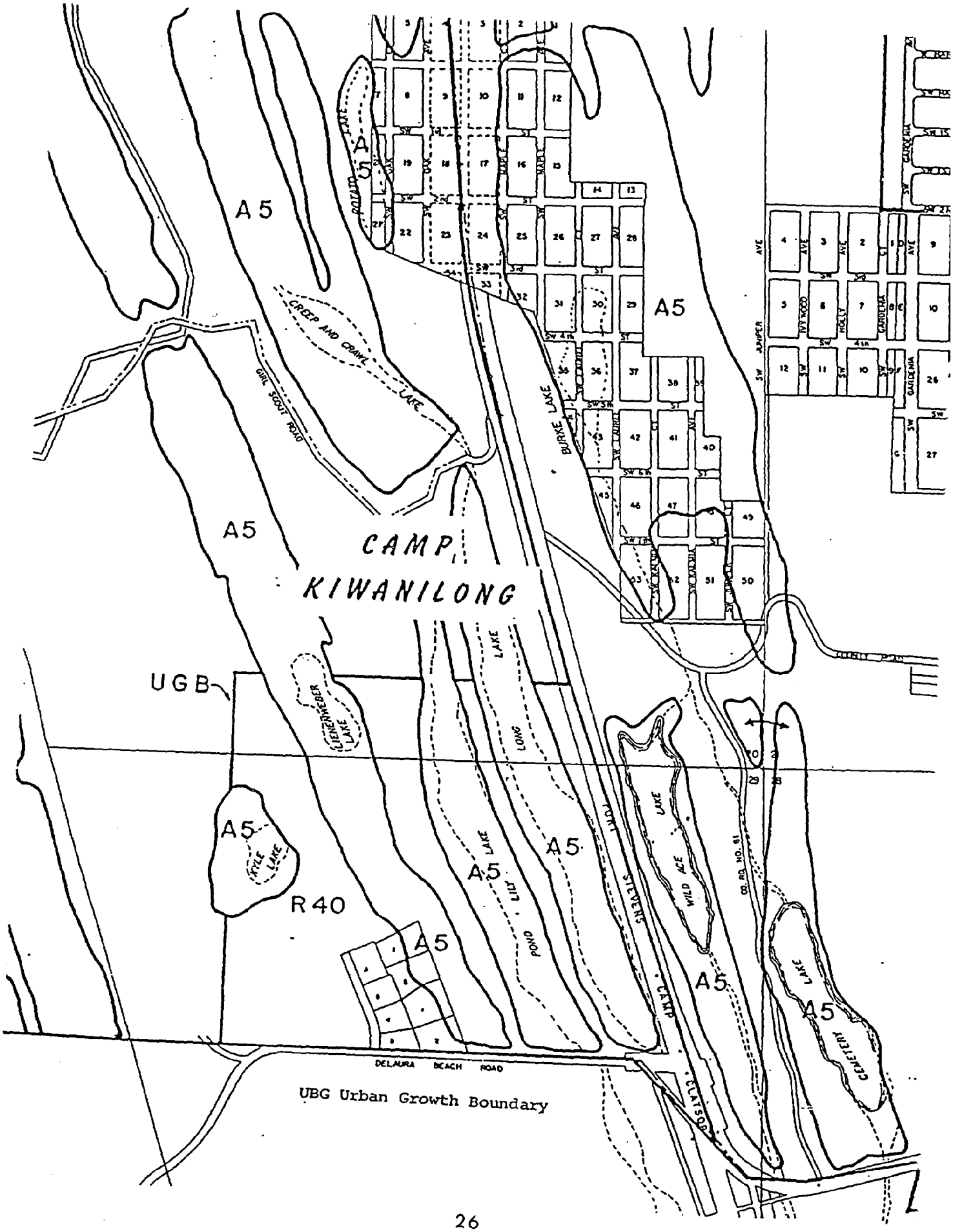
> "the purpose of the Coastal Lake and Freshwater Wetlands Zone is to assure the conservation of important shoreland and wetland biological habits and conserve examples of different natural ecosystems types in the Clatsop Plains to assure a diversity of species and ecological relationships."

This zone is called **A-5**, and can be found on the map of freshwater wetlands.

STUDENT INSTRUCTIONS:

You will be visiting a site that includes many areas zoned **A-5**. The trip will be taking you to sites in and around Camp Kiwanilong, much of which falls into the "aquatic zone." During your field work you should:

- Make a list of the types of activities you think should be allowed in this zone.
- Make a list of the types of activities you think should be allowed on the uplands near the aquatic znoes.
- Look for the characteristics that would make you think that this is an aquatic zone.
- When you return from the field survey, compare your list with the actual "allowed uses" in this zone, and those that might be allowed with "special conditions." **SEE: City of Warrenton COMPREHENSIVE PLAN.**



UBG Urban Growth Boundary

STUDY MODEL #4

BEACHES AND DUNES

I. PLANNING AND BEACHES AND DUNES

The very essence of what most consider to be the "coast" is represented by beaches and dunes. This narrow band of quality environment is treasured by many, both locals and visitors. Although most look upon this resource for mostly utilitarian reasons, it also represents the single line of defense from the effects of the near ocean system. The beach system, in concert with ocean actions, can best be described as "friend and foe."

The economic link of local beaches and their access represent much of what people consider to be the basis of the tourist industry. The variety of recreation that is carried out in the beach and dune setting are wide-ranging, and are available to diverse interests. The very nature of the beach and dune system allows for selection of recreational activities ranging from personal and commercial harvest of razor clams, to fishing, beach driving, and extensive passive uses.

Planning public law at the state and local level has been extensive; the least of which is the laws which affirm the public's right to use the beach, and to have access to it. Local conditions have generated the need for complete development of **GOAL 18** and the necessary requirements. Planning at the local level as been in response to the state Goals, which ask citizens to:

> "conserve, protect, where appropriate develop, and where appropriate restore the resources and benefits of coastal beach and dune areas; and
>
> to reduce the hazard to human life and property from natural or man-induced actions associated with these areas."

II. BACKGROUND RESOURCE INFORMATION

The interactive processes at work on Clatsop Beaches are complex and have received limited study. The dynamics of having a resource that is constantly on the move, from water or wind activity creates a very special habitat in terms of management and detailed understanding. Thus, the management must in some way be consistent with the best that is known about this process.

In Clatsop County the complete morphology of local beaches and dunes has been extensively modified down through history, thus producing an almost complete new local beach and dune system. Historically the areas around the mouth of the Columbia River have been represented by a prograding shoreline as a result of the tremendous loads of sediments carried by the river. That system is now represented by extensive

artificial development of parallel dune systems, with imported plant species that stabilize dunes rapidly, and by major modification of the Columbia River mouth by jetty construction, which alters the way in which the sand and currents are delivered to the local beaches. With the stabilization of the dunes, the historical broad, flat beaches have also been reduced to the point where normal high tide reaches very near the primary dune faces.

PHYSICAL FEATURES OF BEACHES

Once a sand supply has been placed in the long shore current, it is available to be delivered to the beaches by wind-driven waves. In the case of the Clatsop beaches, this material is derived from the basalts of the Coast Range and the Cascades. This material is made up of extensive amounts of quartz, which is responsible for creating beaches that are somewhat rare around the world; ones that are wide, flat, and often very hard. The particles of sand on the Clatsop beaches are generally consistent in their make-up, with the exception of a high concentration of heavy black iron-based sands falling out near the mouth of the river, and concentrating in the northern 3 miles of the Clatsop beaches.

Physical processes working on the beach face move the sand grains one-by-one in a variety of dynamic ways. The new movement of currents, north in the winter (The Davidson Current), and south in the summer (The California Current), cause sand to be moved in a north and south direction. Although the net movement is north, and often goes un-noticed by the casual observer, sand is constantly on the move either alongshore or off-and-on shore. Waves approach the beach, and receed at a slight angle; this film of water carries with it sand particles that move short distances with each wave approach and backwash. With this movement, water and microcurrents set up a slow grain migration along the beach.

In addition to the north/south movement of sand, wave patterns also move sand onto and off of the beach. The large winter waves cut the upper beach (berm) away, and transport the sand off shore, creating offshore "bars." The more gentle summer waves migrate the sand supply back onto the beach. Although often imperceptible, the vertical height may change as much as 7'-8' during the yearly cycle.

Although beaches are generally ideal for absorbing the energy of the waves, when their fragile nature is out-of-sink with the ocean processes, beach and dune erosion can occur. This process can occur very rapidly and needs only a small toe-hold on the beach, or access to upper beaches and dunes to create major impacts in short periods of time. The most recent example of this was the exposure of a beach/dune system on the south side of the Necanicum River, in December 1983. In this case, a shift in the river mouth provided access to winter storm waves to the upper beaches, causing active erosion, and major threats to a number of houses on the primary dune. Extensive rock fill, and a timely shift in the river mouth avoided major property damage. Such beachfront protective structures and their placement fall under the guidelines of the Land Use Planning Process.

GOAL 18, GUIDELINE D: In developing structures that might excessively reduce the sand supply or interrupt the longshore transport or littoral drift,the developer should investigate, and where possible, provide methods of sand by-pass. (an example)

BEACH ECOLOGY

The very unstable nature of sandy beaches reduces the plant and animal population to a few select creatures that are able to cope with such harsh living conditions. Other than microscopic plants, such as diatoms, no large plants have adapted to this habitat, and there are only a few special animals that have adapted to it. The constant movement of sand, the rise and fall of the tides, and the lack of stable food supplies combine to produce this rigorous environment.

Only one large animal, the **razor clam**, has been successful in colonizing the beaches of Clatsop County. In fact, to most, it is the symbol of the open beach and all that it means. The "**razor**" has adapted by being able to effectively use its large foot to move vertically on the open beach, and thus maintain its body below the sand surface. It extends its neck to the surface to effectively pull water, filled with single celled plants, into its body cavity, and through its digestive system. The food supply is single-celled plants, diatoms, that are endemic to the surf zone. The population of surf diatoms often become so dense in the early spring that they may give the appearance of an oil spill. Although the location and population of "**razors**" is variable, they are one of the most sought after organisms in all of Clatsop County.

The rest of the "in sand" population consists of a variety of small worms, one large green worm called ***Nephtys***, a small sand shrimp, a variety of small crustaceans, and one very special crab, the **mole crab**. On the surface of the sandy beach you may also find the **Olive Snail** skimming over the surface. Its large foot allows it to hang on to the sand and to burrow along its surface. One of the most abundant organisms, the beach hopper can be found along the driftline in the vacinity of decaying algae drift.

All of these organisms live together in such a way as to produce a successful interactive population that includes predators and prey. Almost all of the necessary organic energy to maintain this population must be delivered to the habitat by the nearshore ocean, because this system lacks any major food products.

Other than the interaction within the sand, the only other organisms that effectively use the beach system are the migratory and resident **shore birds**. Highly adapted beaks allow probing shorebirds to feed upon the interstitial organisms found between the sand grains. The most obvious of these shorebirds is the **Sanderling**, who use a "stitching" action to successfully work the sandy beaches for food.

A small wintering population of about 1500 **Sanderlings** brave violent winter storms to probe the sands for subsurface organisms. This population may reach into the thousands during the migratory movements in May, as the birds make refueling stops on the Clatsop beaches.

Birds that have been captured on Clatsop Beaches and banded have been resighted in such far away places as islands off the Atlantic coast, in Peru, in Chile, and on the Galapagos Islands. Clatsop beaches are of special importance to **Sanderlings** and a variety of other shorebirds, because the beaches are one of only a few sites that provide habitat that groups of shorebirds can successfully exploit on their long journeys to their nesting grounds near the Arctic Circle.

GOAL 18, GUIDELINE A, Inventories: Local governments are asked to begin inventories of a variety of resources, one of which is: **5. Areas of Significant Biological Importance.**

BEACH USES

By far the most popular use of the Clatsop beaches are by recreational users. The variety of uses range from intensive use by clam diggers, to passive uses by day-use picnickers. The beaches, with the effect of daily tides, can withstand heavy passive use. In Clatsop County, some beaches are open to vehicles (northern areas), thus putting high access for recreational use at the disposal of many. Wood cutters and beachcombers make up another important part of beach users. In areas closed to vehicle traffic, foot traffic, hiking, bike riding, horseback riding, and kite flying are important activities.

PHYSICAL FEATURES OF DUNES

Sand dunes represent the result of sand delivered by the ocean system to the beach, and serve as the wind blown sand supply for the dune system. Prograding dunes have a long history of formation in the local area as a result of the massive sand supply coming from the Columbia River. The sand dunes of Clatsop County in the Clatsop Plains area are most recent deposits of fine and medium grained quartz with lesser amounts of feldspar, magnetite, and mica fragments. The sand deposits range in depth from 100 to 400 feet deep. The dune systems we see in this area are less that 5000 years old, and have become stabilized only recently.

The interaction between the variety of winds migrating from the southwest and the northwest over the yearly cycle, the moisture content of the sands, and the physical changes in the height of wind-blown sands which produce barriers, interact to produce the setting for selective invasion by highly adapted plant species. These conditions produce the self-perpetuating processes of dune formation, more-or-less parallel to the beach.

Active dune stabilization projects in the 1930's directly accelerated this process by erecting artificial barriers to begin the rapid development of primary dune systems that in effect weakened the wind systems effect on sand movement and thus resulted in deposition and dune height increase. The introduction of an exotic, **European Beach Grass** is almost the entire story of the most recent dune formation. The introduction of this grass brought about major environmental changes that include exaggerated foredunes and deflation plains, sand-starved inland dunes, and temporarily prograded beaches. Any changes in the dune plant cover has the potential of producing a "blow out," a condition in which dunes continue their general morphology, producing coastal erosion or inland march of dunes.

SAND DUNE ECOLOGY

The ecology of sand dunes has been studied to a general degree with the greatest focus placed upon plant species and their regimes. Plants that are able to withstand the rigors of the dune environment are in direct opposition to the always present winds and thus exert immediate influence on the normal upland mobility of dune systems. Others in the open beach system exert their influence as individuals. It is the combined mass of a population, and eventually a community, that begins to modify the character of dune systems.

The structural influence of local flora begins immediately by protecting the surface layer of sands from attack by the winds, and as such reduces the sediment transport inland. In the immediate shore area, perennial species that establish dense populations through maximum growth and vigor, create major fallout of sand particles, and drastically reduce the sand migration. The long-term affect of this vegetation pattern is

to alter the texture and composition of the sediments. With dune stabilization by plant groups, soil begins to form. As such, the structure of the dune masses, which owe their existence to the deposition of sand, modifies the drainage, and in turn produces different habitat. Thus new plant communities, and different soils, are formed.

The new dune contours establish habitat that limits the types of vegetation that can grow successfully. Convex surfaces of dunes drain rapidly and are colonized by drought resistant plants. Concave areas, barely above the water table, are inhabited by semi-aquatic and aquatic species, thus forming deflation plains. This process normally occurs very slowly and is limited to a small group of forbs and grasses that are specially adapted to, and dependent upon these habitats.

The Clatsop dune system can be viewed as having the following major geomorphic plant units:

THE LITTORAL UNIT: The area between low tide and the toe of the first distinct dune ridge. Two plants represent this unit, **AMERICAN SEAROCKET** and less frequent, **YELLOW ABRONIA.**

THE DUNE GRASS UNIT: The first ridge of vegetated sand paralleling the beach above high tide makes up the foredune zone. This dune grass unit typically includes **EUROPEAN BEACHGRASS** and **AMERICAN DUNEGRASS.**

THE PARALLEL RIDGE: Although not as common in dune systems in Clatsop County, this unit is similar to, and often associated with, the fordune, and occurs behind that zone. It may also include hummock formations and includes some of the same plant species as the foredune.

THE DEFLATION PLAIN UNIT: This is a low wide zone that forms in the lee of the dune grass unit. The surface is often level and near the local water table. It is covered with water in the winter months. Plants represented in the wettest areas make up a sedge community, including **CAREX SEDGE, PACIFIC SILVERWEED, CREEPING BUTTERCUP** and **BEACH WILLOW.**

DRY MEADOW/RIDGE UNIT: This system occurs landward of the deflation plain on, and along, the back dunes where the drainage is good and sand has been stabilized. Plant populations often include **SEASIDE LUPINE, GRAY BEACH PEA,**

THRIFT, and **BEACH STRAWBERRY,** with scattered individual **SHORE PINE** and **SITKA SPRUCE.**

SHRUB/PIONEER FOREST UNIT: This is the last system of the local dune system and is quite stable in the local setting. The plants are represented by taller and more dense stands of **SHORE PINE** and **SITKA SPRUCE.** It is also common to find **ALDER** and **CRAB APPLE.**

NOTE: Many species have been introduced to the dune system and have altered the ecology. The most invasive are **SCOTCH BROOM, GORSE, EUROPEAN BEACHGRASS,** and **SEAROCKET.**

Although little is known about the ecology of the animals of the dune systems, there are significant numbers. The larger animals include a variety of mice and voles. A bird species, the **WESTERN SNOWY PLOVER** is threatened on the local beaches and has had some local study, (ANDERSON, MAINE, 1983). The extensive loss of habitat with dune stabilization may be related to its population decline.

Large populations of invertebrate animals use the surface and subsurface of dune systems. One study identified over 40 species of bees using a dune system in the sand dunes of Humboldt Bay, California. Older stabilized dunes that are made up of grassland and meadow also include the rare **OREGON SILVERSPOT BUTTERFLY**. This organism has been located in 4 different dune systems in Clatsop County, (HAMMOND AND MCCORKLE, 1986).

DUNE USERS

Dunes have had a long history of use by Native Americans and early settlers. Many of the first towns were established at river mouths, bays or on sand plains. Lewis and Clark in 1806 described the Clatsop Plains as "prairie" (COOPER, 1958, p. 174). Thus small farms used these older dune systems for grazing. Overgrazing quickly destroyed the plant cover and rejuvenation of sand migration occurred.

The most popular use of dune systems in Clatsop County in recent years has been for urban expansion. The interest in visual and physical access to beaches and dunes has been high with both large and small development occurring in close proximity to dune systems. The rapid accretion has left the early dune ridge development well back from the primary dune today, although there is renewed interest in development along the more recent primary dunes. With this development, extensive use of aquifers located under the Clatsop Plains dune system has occurred.

Other use and possible uses that may be of concern to dune system stability include: filling of deflation plains, extensive foot path and vehicle trail systems, installation of septic tanks, introduction of non-indigenous plants, pumping of ground water, removal of dune cover, and leveling of sand dunes.

III. EDUCATIONAL PROGRAMS

The State-wide Goals have attempted to take the values that were briefly discussed, and to link those to management plans that best represent the local conditions and still provide the necessary protection for **BEACHES AND DUNES**. At this point in Oregon's history, learning about **BEACH AND DUNES** without the link of pertinent management policies and laws, will not contribute to young citizen's full understanding of the opportunities to participate in the process, or to an understanding of the way in which science is mediated in the public forum. The necessity of weaving the social studies and science components of the students' studies becomes obvious, as the relationships between inventories of **BEACHES AND DUNES** and protection and use policies are developed.

At the local level, the day-to-day management of **BEACHES AND DUNES** is guided by management policies designed to protect those values ascribed to them.

EXAMPLES

City of Gearhart

GOAL: To manage, and to support the Oregon Department of Transportation in its management of beaches, dunes, shorelands, and estuaries, in such a way as to enhance the local economy, the Coastal Environment, and the quality of life.

POLICIES: Removal of vegetation during construction in any sand area shall be kept to the minimum required for building placement or other valid purposes. Removal of vegetation should not occur more than 30 days prior to grading or construction. Permanent revegetation shall be started on the site as soon as practical after construction, final grading or utility placement. Storage of sand and other materials should not suffocate the vegetation.

ZONING: ***PARKS AND OPEN SPACE***--Areas of publicly dedicated Park and Open Space and other privately owned areas are not available for development because of building restrictions, including but not limited to, an Overlay Zone, that prohibits development, or septic limitations.

ACTIVITY DEVELOPMENT

The goal of **ACTIVITY DEVELOPMENT** in the **RESOURCE ACCESS PROJECT** is to look for the major ***concepts*** that the instructor would like to link to things happening in the local environment. The ***concepts*** are selected from social studies and science, and then are linked to the social demonstration of the understanding of that concept, and eventually, to its application, after being mediated in the larger community.

If the local character of **ACTIVITY DEVELOPMENT** is to be demonstrated, it is necessary for instructors to plan on developing their own activities. This may demand a bit of time, but the payoff is high and the quality of learning and personal experience for students, using their own "place," can be improved.

Theme: "Clatsop Beaches Connect To The World"

Goals:

SOCIAL STUDIES

Students will be able to actively participate in one project related to planned management of a local resource.

SCIENCE

Students will value science as a way of learning and communicating about the self, others and the environment.

STUDENT BACKGROUND:

The small bird that many of you have seen playing tag with the ocean waves is a bird with world-wide connections. The **sanderlings**, seen on the local beaches during the winter months, are a ***wintering*** population; surveys have shown **that** group to include about 1400 birds. The large number of **sanderlings** on the beach in the ***spring*** and ***fall*** are a part of a migratory population that make important food-gathering stops on Clatsop Beaches on their way to breeding grounds near the Canadian Arctic.

Birds that have been captured in mist nets at a special roost site on the local beaches have been banded with special color-coded bands so that they can be easily seen. Some of these birds have been resighted in far away places. Two birds were seen on Monomoy Island off of Massachusetts in the fall migration only four months after they were banded on these local beaches. One bird was seen in Peru, one in Chile, and recently, one was observed on the Galapagos Islands. Banded birds have also been seen along the entire U.S. coast from southern California to Washington.

The sanderlings only feed in very special beach-type habitats, and the number of feeding sites is limited along the west coast of North and South America. In order to insure that these special habitats are protected, a "Sister Reserve Network" has been proposed by the World Wildlife Fund. This would include all of the important sites and would demand cooperation between all of the countries involved.

STUDENT INSTRUCTIONS:

Using a map of North and South American, **locate** where birds that were **banded** on the local beaches have been resighted. After you have completed marking the sights also **locate** the important **feeding areas** used by these birds in their migration.

FEEDING AREA: Mejillones Bay, Chile
Paracas Peninsula, Peru
Panama Bay, Panama
San Francisco Bay, California
Humboldt Bay, California
Oregon Dunes National Seashore Reserve
Clatsop Beaches
Long Beach, Leadbetter Pt., and Willapa Bay, Washington
Grays Harbor, Washington
Copper River Delta, Alaska
Central Canadian High Arctic (breeding grounds)

After you have completed marking the important migration feeding sights, figure out **how far** the **sanderlings** must fly to get to the breeding grounds if they winter in Chile.

- Using the map you have made, work with a small group to figure out some ideas about how to protect the migratory route of the **sanderlings** with the countries involved.

- Find out what type of protectin policies the local beaches have, to protect the wintering population and the feeding of the migratory population.

- Try and arrange a field trip to see the wintering population and watch their feeding.

STUDY MODEL # 5

OCEAN RESOURCES

I. PLANNING AND NEARSHORE OCEAN

The very size and lack of understanding of the dynamics of the nearshore ocean and continental shelf causes the general concepts of land use planning to be stretched to their limits. The nearshore ocean has been of general interest to residents of this County down through history because of the link to resource use, mainly fishery products. With the advent of other uses, mainly discussion about mining sulfide chimmeys from the Gorda Ridge area, (off our coast), and removal of subsurface deposits of minerals, (zinc, copper and lead), interest has increased.

The nearshore ocean plays an increasingly important role in the economic picture. Commercial and recreational fishing is of major concern to many local residents, as is the important link of nearshore water with the ecology of marine species. The importance of this ecology ranges from the all-important upwelling cycles which bring deeper, colder, oxygen-depleted oceanic water loaded with nutrients and dissolved Co2 to the surface to begin many of the food webs related to salmon ecology, to preserving water quality for the migration of Gray Whales.

Recent discoveries of exploitable minerals within the U.S. 200 mile **Exclusive Economic Zone** coupled with the Interior Department's assumption of authority over such minerals, suggest some position of adversarial relations with coastal states such as Oregon (HILDRETH, 1986). Such relationships are also predicated by the lack of extensive consultation rights for minerals, in contrast to such existing rights regarding to oil and gas development in offshore waters. In the past, these relationships have been guided by the National Environmental Policy Act (NEPA), Outer Continental Shelf Lands Act (OCSLA), and Coastal Zone Management Act (CZMA).

It has been suggested that the power of the Secretary of the Interior to require Environmental Impact Statements (EIS) for offshore leases may, with proper guidelines in the EIS development, help make these Statements serve as a type of *permit process* that can cause federal agencies to provide political stages on which citizens, (and state and local governments) may take active roles.

With the increasingly important role the State will play in management of and participation in policies, Oregon's **GOAL 19, OCEAN RESOURCES** asks citizens to:

> "conserve the long-term values, benefits, and natural resources of the nearshore ocean and the continental shelf."
>
> "All local, state, and federal plans, policies, projects, and activities which affect the territorial sea shall be developed, managed and conducted to maintain, and where appropriate, enhance and restore, the long-term benefits derived from the nearshore oceanic resources of Oregon. Since renewable ocean resources and uses, such as food production, water quality, navigation, recreation, and aesthetic enjoyment, will provide greater long-term benefits with renewable resources, such plans and activities shall give clear priority to the proper management and protection of renewable resources."

II. BACKGROUND RESOURCE INFORMATION

OCEAN RESOURCES

A general review of **OCEAN RESOURCES** can hardly be done without being struck by the interrelationships that are displayed in discussing this resource. Review may begin with an economic, political, social, or ecological base, but can only be moved a short distance before powerful reciprocal influences begin to appear.

One of the most obvious physical events in the Pacific Northwest is the weather, with all of the wind, rain, temperature variation, cloud cover, and seasonal variations. The surface waters of the coastal regions play an important part in the bank deposits in Astoria. Continuing with this discussion, as the sun shines in the summer months and warms the ocean's upper layers, each layer expands slightly, and becomes less dense than the layer below it. This results in a stabilized water column with layers that neither rise nor sink. Summer winds also tend to be somewhat more gentle, helping to maintain this stability. Conditions can become such that algae near the surface uses all of the local nutrients, with no replacement from below.

As the waters begin to cool in the fall and winds increase, vertical mixing as a result of storms, brings up nutrients in relatively shallow waters. An increase occurs in productivity in the early spring producing "blooms" of plankton from the enriched waters. The equally important process known as "upwelling" makes a major contribution to the productivity cycle. Oceanic currents, the shape of the sea floor and continental slope, and alongshore winds cause waters to move upward on a slant. These waters are normally nutrient-laden, and spark productivity cycles. This process is directly linked to productivity of phytoplankton, zooplankton, feed fish, and salmon survival. This, in the end, determines the success of local troller and gillnet fishermen, and has important impacts on the local economy.

Although the trend has been to teach about and to learn about the nature of these phenomena as separate subjects, the interrelationships between them, and how they operate can make more profound contributions to citizenship development and participation.

We can also see this direct relationship to the stability of coastal waters that become enriched with nitrate during winter storms and spring terrestrial runoff. The surf diatoms that show rapid growth cycles in winter months in the presence of the active surf zone are directly linked to the razor clam population and growth success. The success of the razor clams can be attributed to the abundant and almost continuously available algal food supply in active surf waters. This is the exclusive food of the "razor" and the local economy, is to a degree, dependent upon the razor clam population and the number of visitors that come to the area for successful clam digging.

All obvious and less obvious cycles and interrelationships are also tied to systems such as these. It becomes increasingly important that citizens have opportunities to become aware of such events in response to planning goals that are linked to "renewable resources."

III. EDUCATIONAL PROGRAMS

The State-wide GOALS have attempted to take the values that were briefly discussed, and link those to management plans that best represent the local conditions and still provide the necessary protection for **OCEAN RESOURCES**. So many levels of management exist that local entities have included materials in their COMPREHENSIVE PLANS that support the fulfillment of the broader management perspective at the federal, regional and state level.

EXAMPLES

City of Gearhart

GOAL: To cooperate with appropriate state and federal agencies in conserving the long term values, benefits and natural resources of the near-shore ocean and the continental shelf.

POLICIES: Cooperation with the Oregon Department of Fish and Wildlife in continued management of the razor clams, and the encouragement of wise commercial and recreational utilization of ocean resources as a benefit to the local economy..

ACTIVITY DEVELOPMENT

The goal of **ACTIVITY DEVELOPMENT** in the **RESOURCE ACCESS PROJECT** is to look for the major ***concepts*** that the instructor would like to link to things happening in the local environment. The ***concepts*** are selected from social studies and science, and then are linked to the social demonstration of the understanding of that concept, and eventually, to its application, after being mediated in the larger community.

If the local character of **ACTIVITY DEVELOPMENT** is to be demonstrated, it is necessary for instructors to plan on developing their own activities. This may demand a bit of time, but the payoff is high and the quality of learning and personal experience for students, using their own "place," can be improved.

Theme: "New Waves in the Ocean"

Goals:

SOCIAL STUDIES

Student will understand that many social, political, economic, physical and biological considerations are involved in management decisions.

SCIENCE

Student will explore the physical and biological processes necessary for developing resource management plans.

STUDENT BACKGROUND:

The complexity of understanding the ocean system and the ways we can use the resource effectively is one of the major challenges for the future. The activity by the federal government through the Department of the Interior, to begin federal lease sales of areas off our coast has prompted interest and questions about our ability to manage this resource. In addition, there are many players in the game, adding to the complexity of the decision-making process. On the one hand, there is a perceived need to gain access to gas, oil, and ocean minerals; at the same time, there is a critical concern about the possible environmental impacts on other natural resources. How will these conflicts and the varied interests be represented in the public process?

STUDENT INSTRUCTIONS:

Using materials supplied by your teacher, **build** a chart showing as many of the benefits and concerns as you can, for such activities as the gas, oil, and deep sea mining that is being proposed off the California and Oregon coasts. When the class has completed their charts, **build** a class list from everyone's list. Then, as a group, **write** some guidelines that you think would help manage such activities. When you have completed your guidelines, **compare** them with the ones that have been developed in GOAL 19 on OCEAN RESOURCE permits.

TEXTBOOK SPINOFF
The RESOURCE ACCESS Application

Textbooks often do an effective job of organizing some of the major concepts to be considered in social studies and science. Seldom do they provide for, or make the linkages between, local examples in a context that is useful or meaningful to teachers and students. The **RESOURCE ACCESS PROJECT** attempts to supplement classroom teacher efforts with access to the necessary support materials, and the local examples that will lend more credibility to textbook examples.

Teacher Guides often ask educators to find local examples, or contact a useful resource person. The **INVENTORY/BIBLIOGRAPHY** of local publications and their location, coupled with the **GUIDE** to local resource people will help educators improve the learning opportunities for their students.

The following example from Holt, Rinehart and Winston, **Social Studies - COMMUNITIES**, 1986, page 173, a discussion of "**conservation**", ***can serve as an illustration:***

"Another problem for San Francisco was dirty water or WATER POLLUTION, in the bay. Industries dumped chemicals and waste materials into the water. These things are harmful to fish--and to people.

In the 1960's, citizens began to form groups to make some changes. They wanted to have laws passed to protect San Francisco's natural resources. Citizen groups were able to get laws passed to stop the dumping. Thousands of acres of land were set aside as parks and wildlife areas. The preservation and protection of natural resources is called CONSERVATION. Conservation is one way San Francisco has begun to solve one of its problems."

Student experience with this description may have some value for reading and comprehension, but much more effective learning opportunities could be created by looking up in the Warrenton COMPREHENSIVE PLAN how water pollution is controlled in the Warrenton Watershed, or by reviewing any other local city or county planning document; **and** wouldn't it be nice to have a map of the watershed to add a sense of place to the classroom learning environment? Since this is the only contact students will have with the concept of "conservation," in this **whole book**, knowing where the conservation zones are in the special estuary **your** students live near would also be helpful. In addition, the guidelines for dumping things, or storing them, in local waters of the estuary or streams are also spelled out in local county and city plans. Being able to find the support materials to extend lessons is a valuable resource to classroom teachers, and adds a touch of reality for the students.

ACCESS to, and **USE** of these materials is one of the goals of the **RESOURCE ACCESS PROJECT**.

CURRICULUM MATERIALS

PLANNING GOALS

Educating Our Future. A Local Government Curriculum For Grades 1-2. City of LaGrande, and the LaGrande Public Schools.

Land Use Planning, Kendal/Hunt Publishing Company, Dubuque, Iowa.

Planning Sacramento: Views of Students and Parents, Urban Planning for Children and Youth, P.O. Box 60273, Sacramento, CA 95860.

ESTUARIES

Marshes, Estuaries and Wetlands, Pacific Science Center, 200 Second Avenue North, Seattle, WA 98109.

The Estuary Study Program, South Slough Estuarine Sanctuary, P.O. Box 5417, Charleston, OR 97420.

The Estuary: An Ecosystem and a Resource, South Slough Estuarine Sanctuary, P.O. Box 5417, Charleston, OR 97420.

Columbia's Gateway: A History of the Columbia River Estuary to 1920, CREST, Federal Building, Astoria, OR 97103.

COASTAL SHORELANDS

Rivers and Streams, Habitat Pac, U.S. Fish & Wildlife Service.

Freshwater Marsh, Habitat Pac, U.S. Fish & Wildlife Service.

Wetlands Conservation and Use, Issue Pac, U.S. Fish & Wildlife Service.

"Wading Into Wetlands," **Nature Scope**, National Wildlife Federation, 1412 Sixteenth St., N.W., Washington, D.C. 20036.

CLEARING Magazine, "Special Issue on Wetlands," **No. 37**, 1985, Environmental Education Project, P.O. Box 751, Portland, OR 97207.

Discover Wetlands, Elementary Curriculum, Department of Ecology, Mail Stop PV-11, Olympia, WA 98504.

Hanging On To The Wetlands, David E. Newton and Irwin Slesnick, Western Washingtion University, Bellingham, WA 98225.

Clean Water, Streams and Fish, Marine Science Center, Newport, OR 97365.

BEACHES AND DUNES

Beaches, and **Beach Profiles and Transects**, Pacific Science Center, 200 Second Avenue North, Seattle, WA 98109.

OCEAN RESOURCES

Animals of the Sea and Wetlands, Alaska Sea Grant College Program, University of Alaska, Fairbanks, Alaska.

Energy From The Sea and **Tools of Oceanography**, Marine Education Project, Pacific Science Center, 200 Second Avenue North, Seattle, WA 98109.

GENERAL

Endangered Species, Issue Pac, U.S. Fish & Wildlife Service.

We Can Help, Environmental Education Activities, Jenny Publishing Company, Inc., 57 Queen Avenue South, Minneapolis, Minnesota, 55405.

Students, Structures, Spaces: Activities in the Built Environment, Aase Eriksen and Marjorie Wintermute, Addison-Wesley Publishing Co., Menlo Park, CA 1983.

Water, Water, Everywhere: Marine Education in Oregon, Marine Science Center, Newport, OR 97365.

Elementary Curriculum: **The Beach Book, The Pond Book, The Creek Book, The Estuary Book**, and **The Lake Book**, Western Education Development Group, University of British Columbia, Vancouver, BC V6T1W5.

Project Wild: Aquatic Supplement, Salina Star Route, Boulder, Colorado 80302.

CONCEPT DEVELOPMENT

RESOURCE ACCESS

CITIZENSHIP AND CONCEPT DEVELOPMENT

INTRODUCTION

In a position paper from the National Council for the Social Studies, the editor wrote "one factor gives promise of unifying the social studies, that factor is citizenship education." At the same time, the National Association of Biology Teachers were selecting a theme for their national convention of "The Biological and Social Sciences: Education for Citizenship." With this, there is a sense that **Citizenship Education** is so powerful and so pervasive as to provide a confluence of direction and purpose for teachers of both social studies and science. Not only can this improve the **citizenship** development of our students, it can provide opportunities for the subject matter specialist to model the roles of each in the social context for which we are preparing our students.

Technology and what we know about ecological processes and the application of that knowledge has slowly removed the distance between the social studies and sciences. At the present time science, and the very technology it generates, is played out in a social setting. Within the spectrum of society, people experience science in a social setting, a setting that often is filled with issues that arise out of the application of technology in the social, political, and economic status.

With this in mind, some suggest that we need an integrated interdisciplinary approach, in our teaching of **citizenship**; that instruction and experience in **citizenship development** should be a purposeful task, not just what falls out as a result of random instruction, as the sum total of all the present school subjects. Such an approach could provide: information on the scientific components of a problem and the various effects of different solutions, an understanding of ways to evaluate risks and benefits, and opportunities for students to make value judgements. Many suggest that certain basic understandings are best learned when contact areas are brought together in studying the critical issues.

Topics such as energy, land use, forest management, endangered species, watershed management and resource use are only a few of the social issues of the day that depend upon the scientific community to generate the necessary background to aid in the community decision-making process. How that information is used is played out in the broader social setting, which many times helps to establish the foundation for planning documents and sets up local and state policies and laws. Understanding this process and being able to actively participate in it, is a vital issue for educators in Oregon today.

It would have been difficult for Jefferson (1820) to have even guessed at this unique link between social studies and science when he wrote:

"I know of no safe depository of the ultimate powers of society but the people themselves. And if we think them not enlightened enough to exercise their control with a whole discretion, the remedy is not to take it from them, but to inform their discretion."

At this point in Oregon history there may be no other topic that embodies the "safe depository" of this power more than the process set out in community **Comprehensive Plans**. These **Plans** describe in some detail social, economic, and ecological considerations and the use of lands and resources at the local level. This process demands and guarantees the involvement of citizens of all ages. It also provides the opportunity for educators to display citizenship roles and to generate experiences for demonstrating the interconnectedness of so many of the disciplines being offered in public schools.

CONCEPT DEVELOPMENT

If educators are to be successful in helping young citizens to be active participants in the land use planning process, then there must be an effective vehicle; a system that reaches across the common boundaries of subject matter and curriculum structure. This process accurately presents the role of the many varied disciplines by individual educators. The goal is easy for many to identify "**citizenship education;**" the methods may be less clear. One option considered to be valid by its common use in curriculums, state and local, is the development of "**concepts**" that are important to student development.

Even though the term **concept** has been used extensively in the educational community, little has been done to actively present educational opportunities for young citizens to understand the nature of **concept development** or to get agreement among educators as to what it is that is being called a **concept**. **Concepts** such as those found in the State Social Studies Guide-- **Planned Management, Liveability, Natural Resources, Public-Private,** and **Scarcity** can only be developed effectively if there is some agreement about their meanings. In the same context, **concepts** from the State Science Framework such as **Model, Population,** and **Significance** must have some common agreement and instructional methodology if they are to be used effectively to develop **concepts** in schools. Finding common ground between these two areas is critical if young citizens are to effectively understand land use planning in Oregon and thus become active participants.

Questions from the ***Student Activities*** in a widely used book, **THE PACIFIC NORTHWEST: Past, Present and Future,** Chapter 13, "Natural Resources From Land and Sea" illustrate the diversity of what some consider to be **concepts.** In the section "Understanding Concepts," students are aked to respond to: "What are the most valuable types of shellfish?" or "Which industry employs the greatest number of people?" It would be difficult for teachers or students to know what **concept** was being developed with such a rote response. At the same time, the land use planning GOAL that is designed to consider **Estuarine Resources** asks us to "recognize and protect the unique environmental, economic and social values of each estuary and associated wetlands." This GOAL is based on the premise that we have a "**model**" of how the unique environmental, economic and social values work. Thus, the **concept** of "**model,**" and in this case, the use of this **concept** in explaining estuaries has been used to develop specific guidelines and laws. Some of the laws are designed to protect marsh plants such as Lyngby's Sedge, because the present **model** being used for estuaries identifies the marsh plants as being vital to estuary productivity and the eventual imput of these plants as detritus into the estuary system.

Along with this, the value of having some agreement about our understanding of the **concept** of "**model**" becomes important. First some agreement about the term "**concept**" is important. Two popular definitions that will serve us well in this "introductory guide to concept development" are:

> "concepts are organizers for classes of events or objects," (COX, 1986)
>
> and
>
> "concepts are regularities in events or objects designated by some sign or symbol," (NOVAK, 1979).

We, infact invent **concepts**, assign a language label or symbol to them, and later attempt to teach them to our children. Most agree that **concepts** are usually given a language label of one or two-word descriptors. This is all somewhat straight forward when those labels are of real things, like a tree. Only a few contacts with the object called "tree" and even very young children have it down. If we want to move to something a little more profound, we can begin to include **propositions**, specific relationships between two or more **concepts**, and add "green" to the labeling process, and come up with "trees are green."

Things begin to get a bit more complicated when we depend almost totally on invented or abstract **concepts** to explain events or objects. There is also some common agreement that **concepts** are not taught, but that they come about through a personal development process. Thus, it is worth thinking about knowledge being ***constructed*** rather than individuals ***discovering*** knowledge. That **construction process** begins with our observation of events or objects through the **concepts** we already possess. This gives great hope to the classroom educator, for **concept development** does not occur by chance, but can be a planned part of the curriculum. This also implies that meaningful learning, (as contrasted with rote learning), must be related by individuals to relevant **concepts** and **propositions** they already know, whereas in rote learning new knowledge may be acquired by verbatim memorization and arbitrarily incorporated into a person's knowledge structure without interacting with what is already there. (NOVAK, 1979)

If, in fact, CITIZENSHIP EDUCATION is one of the major goals of school programs, there must be some general consensus about the **concept** of "citizenship." For the sake of discussion, let us say that this **concept** is:

> "the relationship between the individual and the institutions of society. Citizenship roles exist within all levels of human society, from the school community, to the nation and to the world. Societies have rules, authorities, and enforcement powers to promote appropriate behavior. Citizens of a democratic society have both rights as individuals guaranteed by law, as well as responsibilities within society. The viability of a democratic society depends upon the active and informed participation of its citizens."

Needless to say, this is a powerful and pervasive **concept**; one that can hardly be left to a single discipline. The land use process in Oregon, and at the local level, provides many of the opportunities that are laid out in this **concept**. Opportunities abound for educators to design methods of personal contact for young citizens and activities for guided experience.

Coupled with **concepts** that often are related to science, but have far broader meaning, unique curriculum designs can emerge. The **concept** of "**model**" has been used to describe the present status of estuarine planning in the local area. If we look at one definition of "**model**:"

> "as more or less tentative, man-made schemes or structures which seem to correspond to real "things" or phenomena. These invented representations have both explanatory and predictive power." (COX, 1986)

As such these representations provide us with workable tools from the scientific community that can, and are used to develop very specific statements. In this case, having some general understanding of how complex interactions occur in estuaries, helps in setting guidelines that will be mediated in the public forum, and be expressed in local Comprehensive Plans. This development cycle demonstrates the important link between Social Studies and Science.

CONCEPT MAPS

If **concepts** are to be used effectively in planning school experiences and curriculum for young citizens, then some workable day-to-day vehicle must be available to the classroom teacher. One system that have been successful is a tool called "**concept mapping.**" This device can be helpful in representing the conceptual structure of a discipline, or a segment of a discipline, in two dimensions. The more traditional linear, one dimensional approach has been the organizational outline. Although this has some organizational value, **concept maps** appear to better match the more hierarchical pattern associated with **concept development.** As such, **concept maps** should be hierarchical, with the more general, more inclusive **concepts** at the top of the map, and progressively more specific, less inclusive **concepts** arranged below them. Not only do **concept maps** show great promise for **concept development**, they may be very useful planning tools for the classroon teacher, thus giving us a way to externalize **concepts** and **propositions**.

Concept maps also have the potential for bringing expanded meaning to field programs by helping to provide a framework for bringing potential meaning to observations. Following is an example that can be used for a student trip to Hug Point State Park, to observe some of the local geology, a sort of intellectual road map. **SEE FIGURE 1.*

One of the first steps in preparation of a **concept map** is to identify the major class /school **concepts.** This can be greatly influenced by the individual map constructor, but written definitions about major school **concepts** will be very helpful. Once chosen, the **concepts** provide the major framework for the map. It is important to proceed from the most general to the specific. With the completed map, specific instructional decisions can be made, including: what advance organizers the students will need, what activities to do, what disciplines will be represented, etc. **SEE FIGURE 2.*

NOTE: Using **concepts** as the basis of educational planning is a relatively new educational tool and the preceeding material treats this approach in only the most preliminary way. The most active development is presently going on with the Northwest Evaluation Association in cooperation with the Oregon Department of Education and the Science Specialist, Ray Thiess. Extensive work is also going on by David Cox, Science Education Instructor at Portland State.

Additional specifics are developed in greater detail in the following references:

Novak, Joseph, **A Theory of Education**, Cornell University, 1979.

Novak, Joseph, and D. Bob Gowin, **Learning How To Learn**, Cambridge University Press, 1984.

CONCEPT MAP

FOR HUG POINT STATE PARK

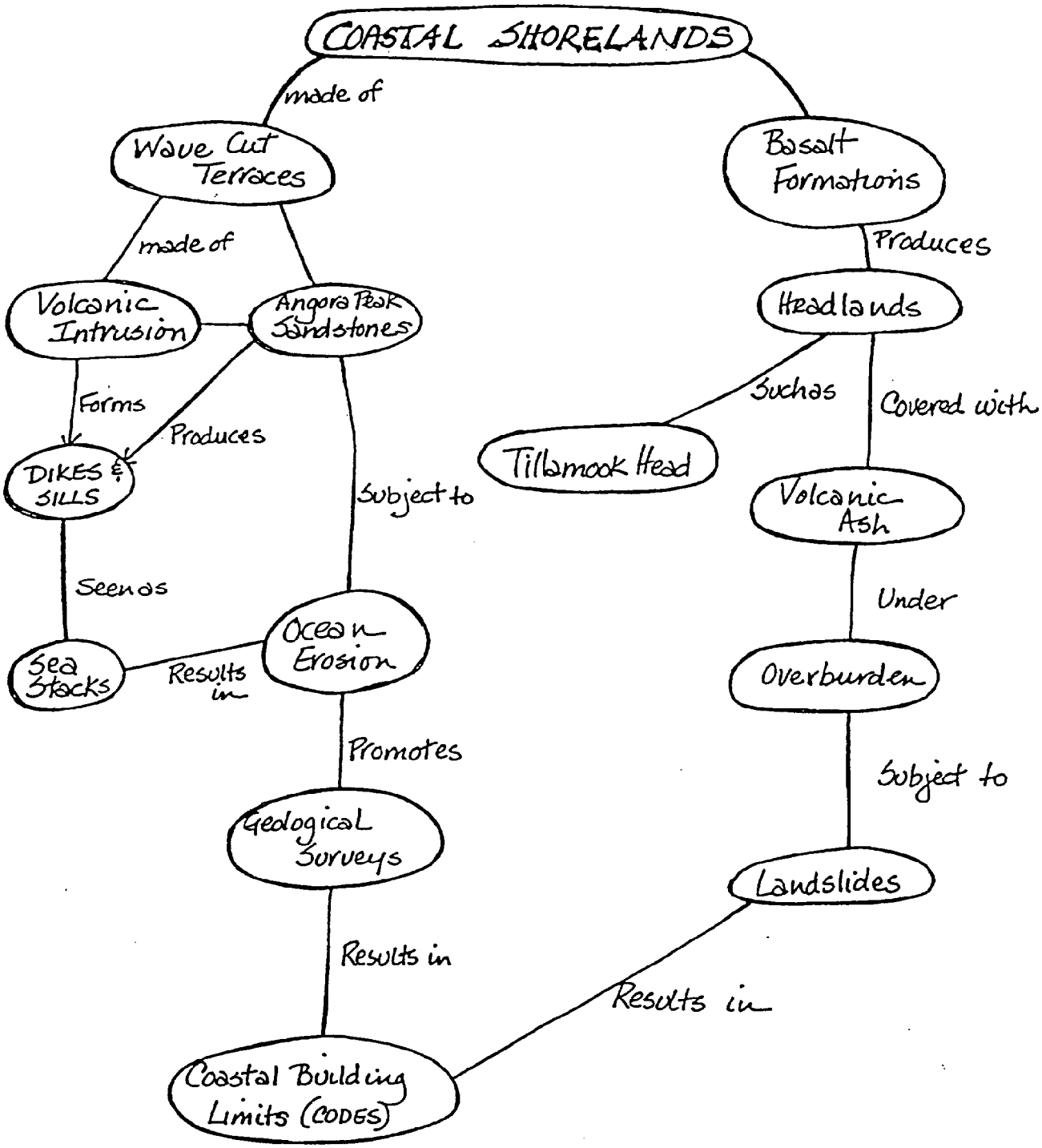


FIGURE 1

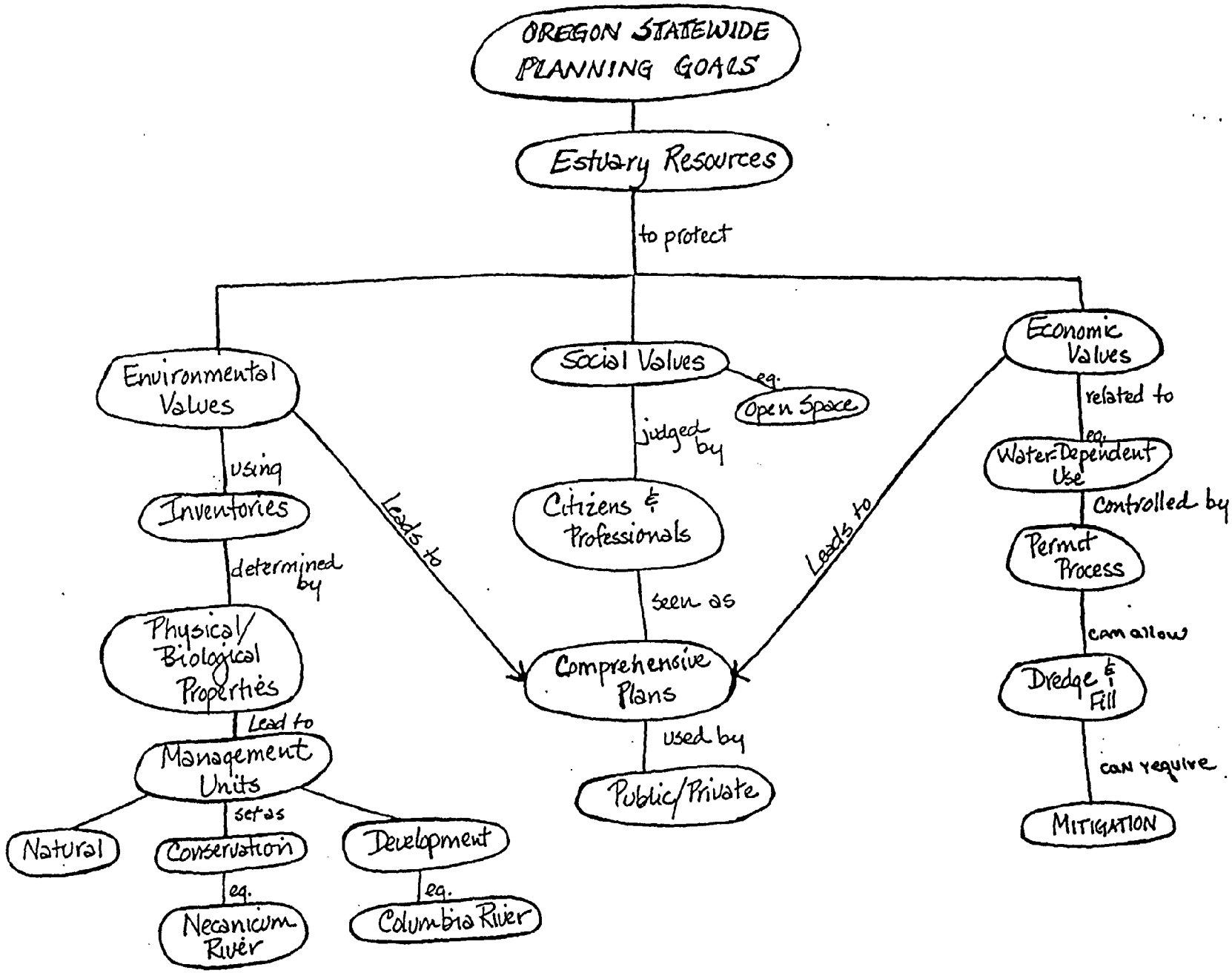

OREGON STATEWIDE PLANNING GOALS
Estuary Resources
to protect
Environmental Values
Social Values
Economic Values
using
Inventories
determined by
Physical/ Biological Properties
Lead to
Management Units
set as
Natural
Conservation
Development
eg.
Necanicum River
eg.
Columbia River
Leads to
judged by
Citizens & Professionals
seen as
Comprehensive Plans
used by
Public/Private
Leads to
eg.
Open Space
related to
eg.
Water-Dependent Use
Controlled by
Permit Process
can allow
Dredge & Fill
can require
MITIGATION

FIGURE 2

RESOURCE MANAGEMENT

AND

LAND USE PLANNING POLICIES

RESOURCE ACCESS

RESOURCE MANAGEMENT and LAND USE PLANNING POLICIES

INTRODUCTION

The following summaries are of important **coastal management documents** that have been developed over the years. Many of these management programs are very extensive and include laws and policies that are important to coastal residents. This section should be useful for educators in the preparation of student projects, student activities, and in preparation for presentations by resource people.

COASTAL ZONE MANAGEMENT ACT (1972)

The object of the **CZMA** is "to preserve, protect, develop and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations."

To insure the management of future development, Congress established a cooperative state/federal program of **coastal zone management**. Under this scheme, individual coastal states, including the Great Lakes states, receive advice and funding to develop plans for managing coastal development from the National Oceanic and Atmospheric Administration's Office of Ocean and Coastal Resource Management. Once these plans meet national standards, the **Coastal Zone Management Office** approves the state's plan and provides partial funding for its implementation. As further inducement to coastal states to develop plans for coastal development and conservation, the federal government pledged that any activities conducted, sponsored, or permitted by federal agenciess would be consistent with the state management plan.

In developing its plan, a state is required to define its coastal boundaries, develop a means for determining permissible activities in the coast zone, inventory and designate areas of particular concern for protection or development, and provide the legal authority to regulate land and water uses and to resolve conflicts among competing uses.

Oregon and Washington at the present time have approved plans. In Oregon, this program is administered under *Coastal Programs, Department of Land Conservation and Development* (1175 Court Street, NE, Salem, Oregon 97310.)

FISHERY CONSERVATION AND MANAGEMENT ACT (1976)

With passage of the **Fishery Conservation and Management Act** in 1976, the United States claimed jurisidction over living marine resources, including marine mammals, within 200 miles of its coast. The federal government is responsible for the management of domestic and foreign fisheries occurring within the **Fishery Conservation Zone. The FCZ** includes water beyond state waters out to 200 miles; with few exceptions, state waters extend from the shoreline out 3 miles.

The FCMA attempts to provide a framework in which U.S. fisheries can be developed without depleting fish populations. The Act directs the Secretary of Commerce to develop **Fishery Management Plans** for commercial fisheries located in the **FCZ**. The Secretary is to rely upon draft **FMPs** developed by the appropriate **Regional Fishery Management Council**. Among other things, **FMPs** must:

1. prevent overfishing and assure an optimum yield from each fishery;

2. make decisions based on the best scientific evidence available.

About 40% of the total fish catch in U.S. waters occurs within state waters. With few exceptions, the **FCMA** recognizes the exclusive authority of the states to regulate fishing within their territorial waters. States may try to coordinate their management of shared fisheries.

MANAGEMENT OF FOREIGN FISHERIES: Under the **FCMA**, any nation wishing to fish in U.S. waters must enter into a **Governing International Fishery Agreement.** Unless Congress disapproves a **GIFA**, this agreement provides the framework in which a foreign nation is given the privilege of fishing in U.S. waters.

Foreign fishermen may fish in the U.S. **FCZ** only after obtaining a permit from the Secretary of Commerce. Foreign fishermen are allocated that part of the overall quota for a fishery that cannot be used by domestic fishermen and must comply with any special conditions the Secretary decides are necessary. Foreign fishermen must also pay for U.S. observers, who monitor their fishing and the incidental capture of other species, such as Dall's porpoise and seabirds in the Alaskan salmon gillnet fishery.

ENDANGERED SPECIES ACT

When one considers the number of endangered species in the local region, the U.S. **Endangered Species Act** becomes a very significant piece of legislation for local residents. This **Act** touches the lives of many, either knowingly or unknowingly. Decisions about habitat and the obligation under the law are very extensive and must be considered in all activities that may bring development in the local area in conflict with the organisms and their habitats.

One of the most important elements of this legislation is the general policy of the federal government to not engage in activities that will jeopardize the continued existence of species protected by the Act. When linked to other provisions for the protection and recovery of endangered and threatened species, the **Endangered Species Act** is an impressive commitment to the conservation of individual species and biological diversity.

The preamble to the **Endangered Species Act** of 1973 set the basic tone of the **Act** with the following, holding that endangered and threatened species of fish, wildlife, and plants "are of aesthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people." This **Act** created a national program that involves the federal government, states, conservation organizations, individual citizens, business and industry, and foreign governments in a cooperative effort.

The "**Endangered Species List**" is created by a formal "rule-making" procedure followed by the U.S. Fish & Wildlife Service. The "rule-making" establishes a process by which regulations are proposed and later adopted, which have the effect of law, and apply to all U.S. residents. With the "rule-making," the list is published in the FEDERAL REGISTER, a daily Government publication, and after a suitable period for public comment, and possible revision, the list is published as a final rule. Endangered or threatened species are placed on the list, reclassified, or deleted through this process.

The suggestion of the addition of a species to be listed comes from a variety of sources. When the evidence meets the criteria for Federal protection, the Service publishes a proposal to list the species. At this, and every other stage of the process, the public, state authorities, and other interested parties are encouraged to comment and to attend any public meeting held on the proposal. If warranted, the species is then officially classified as "endangered" or "threatened." By law then, it cannot be harmed, pursued, hunted, transported or traded in interstate or foreign commerce without special permission.

The 1973 **Act** provides protection for what is called "**critical habitat**"--the areas of land, water, and air space an endangered or threatened species needs for survival. This "**critical habitat**" could include breeding sites, cover and shelter, and surrounding habitat that gives room for normal population growth and behavior. The main threat to critical habitat is its destruction and modification by uncontrolled land and water development. Because the Federal government often is involved in a great deal of development, the law requires all federal agencies to ensure that their actions do not threaten the existence of a listed species, or adversely affect its critical habitat.

MARINE MAMMALS PROTECTION ACT

The Secretary of the Department of Commerce is primarily responsible for implementation of the **Act** for most marine species, including all whales and other species of the order Cetacea, all species of the order Pinnipedia, (other than walruses), all species of marine fish, and marine invertebrates. The *National Marine Fisheries Service's* **Office of Protected Species and Habitat Conservation** is charged with carrying out the **Endangered Species Program** of the Department of Commerce.

Prior to 1972, protection and management of most marine mammals rested with the states. In response to the need for more consistent management and greater recovery efforts, the **Marine Mammal Protection Act (MMPA)** transferred management authority to the federal government in 1972. With the adoption of this **Act**, many expressed concern that federal preemption of authority to manage marine mammals resulted in too much protection and not enough management. During the reauthorization of the **MMPA**, Oregon stressed that marine mammals are important natural resources for the states and that they should be used wisely and managed to prevent conflicts with fisheries. The 1981 amendments addressed the state's complaints by providing provisions to return management to the state.

The State's management will apply only to areas within the state's jurisdiction (up to 3 miles offshore), and the federal government will maintain authority to regulate certain kinds of taking of marine mammals. ("take" is defined in the **MMPA** as "...to harass, hunt, capture or kill...any marine mammal.") Even after management authority has been returned to the state, no taking of marine mammals can occur until the state makes a formal determination, based on a public hearing record, that the population of the particular species would not be reduced below its OPTIMUM SUSTAINABLE POPULATION by the proposed level of taking.

PUBLIC TRUST DOCTRINE

The development of the **Public Trust Doctrine** in the United States has its roots in English law and its early use was to protect navigational access and tidelands. The ownership of tidelands became the foundation of the English public trust doctrine. Its basic theory was that when the ownership of the lands over which the tide ebbs and flows was the Crown's, the Monarch held title **in trust** for the public and for public use; this use was mainly navigational, and for commerce and fishing.

Although no single document or act passed by Congress is the **Public Trust Doctrine**, the **Rivers and Harbors Act** of 1899 may best symbolize this concept. The original purpose of the **Rivers and Harbors Acts** (1890 and 1899) was to prevent obstructions to navigation, particularly by states, which had been free to act in this area as they pleased, absent from federal legislation.

Thus following the American Revolution, the **Public Trust Doctrine** in the United Stated developed through decisions of state and federal courts. The trustees of the **public trust** in the United States are the sovereign people of each individual state. At the time of the Revolution, the King of England, with his sovereignty, held dominion and property in navigable waters and the lands underlying navigable waters, as a **public trust.** With the Revolution, the people of each state then became sovereign, succeeding to the sovereignty of the King. Each state developed its own **public trust** rules. These rules varied from state to state, and from the English rules; the development was generally towards more liberal rules, in favor of the **public trust.**

No other resource in Oregon demonstrates the unique development of the **Public Trust Doctrine** better than the way in which the beaches of Oregon are held in such trust. Through a long series of unique and interesting court cases and legal conflicts, in 1913 the Oregon legislature unequivocally declared the entire Pacific shore of the state, "between ordinary high tide and extreme low tide" (except as theretofore disposed of) to be "a public highway" and "forever. . .open as such to the public." This statute established "forever" public ownership of 326 miles of the total 362 miles of the Oregon coast from the Columbia River to the California border. While nationally, only 4% of 82,240 miles of ocean shore is available for public recreation, in Oregon 90% of the beaches are in public status. Although there have been a number of updates to the beach ownership concept which guarantee to the public, through prescriptive rights, access to the beach, including the dry sand areas, this ownership continues to remain in the **public trust.** All of the ocean beaches of Clatsop County are held in the **public trust.**

Thousands of court cases testing the public trust of beaches and other resources in Oregon have occurred and have helped shape the very liberal **Public Trust Doctrine** that we have today.

REFERENCES:

Brokaw, Dennis, and Wesley Marx: The Pacific Shore, E.P. Dutton and Co., Inc. 1974.

Althaus, Helen F., Attorney, Public Trust Rights, U.S. Dept. of the Interior, 1978.

EXCLUSIVE ECONOMIC ZONE

Dutch lawyer, Hugo DeGroot enunciated the doctrine of "mare liberum" or "freedom of the seas," under which no nation could rightfully claim ownership of any part of the ocean. Until recently this doctine has held true. In 1793, the United States claimed ownership of a zone extending from the shoreline out three miles.

In 1945, President Harry Truman proclaimed U.S. jurisdiction over the continental shelf, which was then regarded as ending at a depth of 200 meters. This did not alter the internationally recognized right of foreign ships to navigate freely outside the three-mile territorial seas.

As fishing vessels were able to fish more efficiently and for longer periods of time, pressure increased to have the U.S. claim jurisdication over living marine resources within 200 miles of the coast. Thus in 1976, Congress passed the **Fishery Conservation and Management Act**, thus establishing a **Fishery Conservation Zone.**

During this time the Third United Nations Conference on the **Law of the Sea** was meeting. In addition to other things, negotiations recognized as customary international law the right of countries to declare **Exclusive Economic Zones** off their shores. With this they were given rights to exploitation of seabed mineral resources and living marine resources.

The LOS **Treaty** established certain rights, jurisdictions, and duties that a nation may claim in establishing an EEZ. These include:

1. Exploration, exploitation, conservation, and management of living and nonliving natural resources of the **Exclusive Economic Zones**, including the production of energy from water, currents, and winds.
2. Establishment and use of artificial islands, installations, and structures.
3. Marine scientific research.
4. Protection and preservation of the marine environment.
5. Other internationally lawful uses of the sea.

The United States did not sign the **Law of the Sea Treaty**, but accepted the 200 mile EEZ provision. President Reagan, on March 10, 1983 proclaimed the **Exclusive Economic Zone** of the United States to extend 200 nautical miles from the shores of the United States. In 1982, under President Reagan, during the review process of the **Law of the Sea Treaty**, a number of parts of the draft **Treaty** were found to be not acceptable. Most of the concerns related to deep seabed mining and its conditions. When it appeared to U.S. negotiators that the compromises reached during the Eleventh Session did not fully meet President Reagan's goals, it was demanded that the Conference abandon its consensus decision-making procedures for a vote; the U. S. then voted against the draft. Following a review of this decision, the President announced on July 9, 1982, that the United States would not sign the **Treaty**.

NORTHWEST POWER PLANNING COUNCIL

A long history of assaults on the Columbia River Basin and its water resources has been documented from the days of the earliest settlers in the 1800's. After a long series of legal battles, conflicts on Indian Treaty rights, continued declines in salmon runs, impacts from over-fishing, poor logging practices, grazing and farming practices causing erosion of the land, and a host of other negative resource impacts, the 28 dams of the Federal Columbia River Power System pushed the resource to the wall.

With action in the 1970's by federal fishery agencies considering whether to designate certain upriver runs as "threatened" or "endangered," thus invoking the **Endangered Species Act**, attention was turned to the **Northwest Power Bill** being considered by Congress. With powerful leadership from Michigan Congressman John D. Dingell, chairman of the key House Commerce Committee, the **Northwest Power Bill** was enacted into law.

The Northwest Power Act of 1980 gave equal weight to fish and power interests and directed that the Columbia River and its tributaries be treated as a ***system***. Thus, in 1982 the **Northwest Power Planning Council** created the **Columbia River Basin Fish and Wildlife Program**. This program may well represent the biggest effort in the nation to save a natural resource.

One of the stipulations of the **Act** is regarding funding. In order for the funding to be used from the Bonneville Power Administration's power rates, the need for protection and restoration of fish and wildlife and their habitiats must relate to damage caused by the hydropower system. Ratepayers should not have to pay for damages inflicted by other causes, such as poor forestry practices or agricultural methods in the watershed. The program also has to strike a balance between fish protection and electrical power, so that the region is assured an economical and reliable power supply.

While everyone from the various interest groups and the four states involved agreed that something needed to be done for fish and wildlife, there was little coordination among these entities. The program developed by the **Northwest Power Planning Council** brought these interests together to achieve ***seven key objectives:***

- To help juvenile anadromous fish downstream to the ocean.
- To improve survival once the fish arrive in the ocean.
- To help the returning adult fish upstream to spawn.
- To augment natural propagation.
- To protect and restore resident fish (those fish that do not travel to the ocean).
- To restore wildlife whose habitats have been inundated by the dams.
- To assure careful planning of future hydropower projects.*

The program is designed to be flexible and to take into account new developments and technologies. New amendment recommendations are currently under consideration and will be incorporated into the program in the future.

*from the **Northwest Planning Council** 1984 Report of the Columbia River Basin Fish & Wildlife Program.

POLICIES RELATING TO REMOVAL AND FILL IN WATERS OF THE UNITED STATES

Section 10 of the **River and Harbor Act of 1899** gives the authority to the U.S. Army Corps. of Engineers to regulate obstruction to navigable waters. Dredging, filling, placement of structures and bank stabilization are all regulated. Structures under this Act include such things as marinas, piers, wharfs, floats, intake pipes, outfall pipes, pilings, bulkheads, boat ramps, dredging, marine railways, dolphins, fills, overhead transmission lines, etc.

SECTION 404 of the **Clean Water Act** regulates disposal of dredged or fill material in "waters of the United States." Much broader than navigable waters, **SECTION 404** covers traditionally navigable waters, tributary streams, and wetlands. **SECTION 404** wetlands are areas with sufficient water to support vegetation adapted to life in saturated soils; these include forested and shrub swamps, bogs, marshes, and similar areas.

Oregon also has **REMOVAL/FILL permit laws** for removal from a waterway of **50 cubic yards or more** of material from one location in any calendar year, or the filling of a waterway with **50 cubic yards or more** of material at any one location at any time. This law is administered by the **Division of State Lands (DSL)**. The DSL has a joint permit application with the Corps of Engineers, since most development activities require both a state and a federal permit. The exception to this is that the state does not require permits for in-water structures, such as piers or pilings. ("Obtaining Permits for Waterway Development", OSU Extension)

In addition to removal/fill permit laws, Oregon rules call for **ESTUARINE MITIGATION**. In this case, mitigation:

> "means 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 and species diversity, unique features, and water quality." (ORS 541.626)

A comprehensive program devoted to the art of mitigation is connected to the **404 SECTION**, and is administered by the **Division of State Lands.**

Of increasing importance is the **402 SECTION** of the **Clean Water Act.** The objective of this **Act** is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. It goes on to say that it is in the National goals that the discharge of pollutants into the navigable waters be eliminated by 1985.

402 deals with the regulation and administration of National Pollutant Discharge Elimination permits.

REFERENCES:

- SECTION 402 Handbook, Guidelines for Screening National Pollutant Discharge Elimination System Permits, U.S. Fish and Wildlife Service.

- Estuarine Mitigation, The Oregon Process, The Division of State Lands.

- Administrative Rules for Oregon's Removal/Fill Permit Program.

RESOURCE ACCESS

CASE STUDIES

INTRODUCTION

CASE STUDIES on local land use decisions have been prepared as background on and models of the nature of the interactive processes that occur in the coastal zone. Because of the variety of resources and density of occurrence, few activities can be proposed in the coastal zone that do not need special consideration for final approval. In mose cases the planning process is in place that will direct development activity, although in some cases, there are development projects that occurred during some stage of the land use planning process that fell between the cracks, and thus created more-than-usual conflict and confusion.

These **CASE STUDIES** are being presented to better illustrate how critical it is for educators to present to the students the opportunity to **experience** and **model** the way in which local resources are considered in the broader social, political, economic, and ecological processes of our communities. As students generally have academic exposure to topical elements in a variety of courses, it is proposed that the opportunity to learn about the way these elements interact and are mediated in society, better displays the day-to-day real world. Although elements of basic subject matter offered in schools are included in most land use issues within our society, they are seldom, if rarely, considered in isolation, as math, social studies, science, etc.

Using local, teacher developed CASE STUDIES will help present alternatives to the many "generic" examples used in other materials, and hopefully will improve the quality of citizen preparation in school settings.

The **CASE STUDIES** that have been selected are not meant to be used for specific instruction for classroom programs, although they have some potential in that respect. Their real purpose is to serve as **models** for local educators to follow in developing their own examples of "**case studies**" that are occurring at the time of instruction, in **their** local community. These examples can provide opportunities for students to participate in the process, or to follow, with instructional leadership, the elements that develop. A **CASE STUDY** can serve as a general outline in organizing the classroom and field activities for students. Educators, in looking for those opportunities for their students to participate in the process, must consider the **student's** stage of citizenship development.

NOTE: It is not the intent of the CASE STUDIES to present a complete chronological history of each example, but to highlight the major issues that illustrate the interactive nature of the CASE STUDIES under discussion, and the laws and policies designed to protect natural resources.

CASE STUDY # 1

LAND USE ISSUE: Wetlands and Goal 17

Trails End Development
Seaside, Oregon

PROJECT DESCRIPTION

Activity began in 1980 to convert an existing area of 270 acres of land and water into a facility that would include an RV campground, horse riding facilities, recreation areas, and some permanent housing. This development was presented to the City of Seaside following the planning guidelines laid out in the city planning process. At the initial stage of the development some of the property fell within the jurisdiction of Clatsop County and some under the guidelines of the City.

In order to create the necessary flat surface area needed for the road access, trailer parking, and support facilities, approximately 25 acres, of what was to later be determined as wetlands, was filled. (*see:* wetlands description, RESOURCE MANAGEMENT AND LAND USE POLICIES section.) The area that was filled is a portion of the "Stanley Lake Wetlands." As the filling occurred, a variety of individuals made limited protest about the activity, but were assured of the legality of the activity by the City and the attorneys of the developers. The economic benefit of the development to the local residents and the community were documented and communicated to the citizens.

Although active dialogue occurred between those for and against the development in individual letters, comments at City Planning Commission meetings, and to state and federal agencies, the first official action occurred in April of 1981. At that time an official of the Corps of Engineers, Portland office, visited the site and determined that the fill activities were in wetlands that fall under Corps regulatory authority. With this determination, a Corps "**Cease and Desist Order**" was issued, on June 12, 1981.

With the "**Cease and Desist Order,**" a complete **wetlands evaluation** and **mapping study** was ordered. A Corps of Engineers' wetlands specialist completed a thorough determination of the wetlands boundary through **vegetation evaluation, soil sampling** and the consideration of **historical records.** With the evaluation, plant species that could be considered *indicator species* of wetlands habitat were inventoried and used for mapping the wetlands boundary. In addition, the possible impacts of the fill activity were determined by the field biologist. This field activity occurred to determine if the filling had damaged the resources of the citizens of the United States, and if, held in public trust, a Corps permit would be required.

In Oregon, the State laws that govern **fill and removal** are administered by the Oregon Division of State Lands (DSL). On March 25, 1981, DSL notified the developers that a permit was required under Oregon law for activities in the wetlands of Stanley Lake. Since the fill had already occurred, it was determined that an **After-the-Fact Fill Permit** would be required. At the same time, the developers were instructed that "there shall be no further filling in wetlands prior to the issuance of a State Fill Permit from the Division of State Lands."

Up to this point most of the focus was on the federal and state regulations that may have been violated. Paralleling this activity, the City of Seaside was also in the process of getting an approved COMPREHENSIVE PLAN, (*see:* RESOURCE MANAGEMENT AND LAND USE POLICIES section), from the Land Conservation and Development Commission (LCDC). This meant that activities that were proposed, or were on-going, within the City Limits, must also meet the criteria set out in the **State Land Use Goals and Guidelines.** Serious disagreement developed about the way in which an **After-the-Fact Fill Permit** could be approved and still meet the **Goal 17 Guidelines** of LCDC. (This was a long-term point of conflict and confusion for the City of Seaside, and continued almost all of the way through the process.)

NOTE: Goal 17 requirements state that major marshes and significant wildlife habitat be protected for their natural values.

With the application by the developer for an **After-the-Fact Fill Permit** the developer was also ordered to prepare a plan to replace habitat lost to the 67,000 cubic yards of fill placed in the "waters of the United States." On April 4, 1983, a **Public Notice** of a **Permit Application** for a **Clean Water Act, Section 404 Hearing** occurred in the City of Seaside. At that point, the public review that is guaranteed by the **Public Trust Doctrine** was made available to the public. Hours of testimony was taken by the Corps from a variety of individuals. The testimony ranged from those who had invested their money in the RV campsite membership, public officials speaking to the economic value of the development, adjacent land owners who felt they had been impacted by the fill, Oregon environmental groups, individuals defending the wildlife values of wetlands, and others who for reasons of their own, spoke for or against the approval of the permit.

After evaluation of the application and review of the public testimony, an **After-the-Fact Permit** that included the necessary mitigation for resources lost was denied by the Division of State Lands. The **Mitigation Plan** in general called for the creation of 17 acres of new wetlands and a variety of other restoration projects to compensate for lost wetlands and resources. The denial prompted a **Contested Case Hearing Request**, which was granted. The **Contested Case Hearing** was held in Seaside on January 18 & 19, 1987. A Hearings Officer conducted the hearing to review why the application for an **After-the-Fact Permit** should be allowed for the Trails End Development. Economic benefits, violations of the developers rights, resource damage and loss, and regulatory factors associated with this project were reviewed. As a result of the **Contested Hearing**, the Director of the Division of State Lands stated that "The prior decision of the Division of State Lands is reversed in part, and the permit is granted, as modified by and described in Appendix 1." (Appendix 1, **Mitigation Plan**)

This decision left the City of Seaside with the task of getting their COMPREHENSIVE PLAN approved through the **Exceptions Process**, which would in effect, attempt to deal with the **Goal 17 (Coastal Shorelands)** requirements.

A variety of attempts were made by the City of Seaside to meet this requirement, but all were refused by LCDC. During this period of time, LTD (now know as Trails End Development), filled suit against LCDC of the State of Oregon. In this suit, the legality of the City of Seaside's **Exception Process** to bring their COMPREHENSIVE PLAN in compliance was defended as a legal method for use. The Court of Appeals of the State of Oregon found in favor of LCDC in this case. The case was then appealed in the Supreme Court of the State of Oregon. The petitioners' case was denied, and it was found that the **Exception Process** proposed for **Goal 17** did not comply with the goals.

Although an element not normally infused into the complexities of land use debates, the Trails End Development filed for **Reorganization Protection**, and the project was sent into bankruptcy. Even though this may have little effect on the final administration of the law, it does leave the determination of ownership of the property and facilities in some doubt.

On October 23, 1986, the Director of LCDC proposed that the alternatives available appeared to rest with DSL. It was stated that LCDC has no enforcement power, and that enforcement is the responsibility of the DSL. With that, the Director of DSL issued an **Enforcement Order** on January 30, 1987 requiring the restoration work described in an updated version of the **Mitigation Plan**. The **Restoration Order** identified that the work "shall be conducted between June 1 and October 31, 1987," and that failure to comply with the terms of the final order may result in a civil penalty of up to $10,000 per day.

No request for a hearing on the **Proposed Order** was received by DSL by February 19, 1987; thus the Director issued **Findings of Fact, Ultimate Findings of Fact, Conclusions of Law**, and a **Final Order to Restore**, with the **Final Order** being that Trails End owners must complete the work on-site.

DISCLAIMER: The preceeding description is not an attempt to report and discuss all activities and associated factors involved in the complicated process of land use. From the records that were available to the editors, every attempt was made to portray an accurate and unbiased description of the cycle of events in this land use issue. The preceeding materials were prepared for educational use only, and should not be used in any other setting than those set forth in the description of the educational environment for the RESOURCE ACCESS PROJECT.

SUMMARY

Social, Political, Economic, Physical and Biological Considerations

SOCIAL: A variety of social mechanisms come into play when controvery over land use springs up in communities. The basic freedoms of the United States are fundamental to many of the discussions on land use, and the restrictive nature of local, state, and federal laws dealing with resource use and protection. Questions about individual rights and the rights of the public can be hotly debated when controversy brings these apparent "fundamental rights" into the public forum. The historical pattern of land use in this case was discussed by many in the immediate vicinity of the proposed development. In addition, there was concern by many living in the area of the development, as to why they could not carry on fill activity on their lands if local development was allowed to fill wetlands.

The complexity of this particular case left many scratching their heads, trying to keep up with all of the events. Many members of the community were not prepared to deal with the legal landslide that resulted from the wetlands violations. As a result, much of the action was viewed within the context of government bureaucracy.

POLITICAL: Many of the activities of the described project occurred through the agents of the community: the local planning commission, state agencies, federal agencies, and independent special interest groups. Because of this, special knowledge was vital to successful participation in the process. The multiple interactions between the living and non-living system produced impacts on the ecosystem, thus giving rise to

an evaluation of those impacts. This led to technological correctives that are generated through the political and legal system of society. (**Senate Bill 100** set up the fundamental process of land use in Oregon.) With technological correctives, there are efforts to parallel attitudinal correctives. In this case, a variety of the institutions of society were used to explain the values of wetlands, defend the laws to protect wetlands, and inform private citizens of wetlands values.

The legal system became the vehicle for pursuing resolution to the conflicts that resulted between the variety of players in this wetlands violation.

ECONOMIC: The Seaside area is well known for its visitor potential and is sensitive to the demands for facilities to meet the needs of a variety of visitors. A proposed RV facility could be very beneficial to the community; an economic forecast demonstrated its potential to generate significant economic benefit to the area, economic infusion that would be quite stable and that would continue to provide economic benefit over time. The prospect of an additional permanent housing development would generate increased property tax benefits to the community.

The development represents an investment of approximately 5 million dollars in land purchases and 1.3 million in construction of publicly owned facilities such as water, sewer and power, as well as the payroll to local employees.

PHYSICAL: The geography of the land represents a typical pattern of flat plains at the base of unstable coastal foothills. Steep gradients in the associated area have produced small valleys that generate significant runoff during winter rains. These streams provide the water supply for the flood plain. At the same time, the broad, open plain serves as storage area for water during winter stream pulsing. The water hydrology in the area is such that alteration in one area can bring significant changes in the water regime in other areas. One of the major concerns during the project development was the reported flooding that resulted to associated lands because of the wetlands fill and road construction.

BIOLOGICAL: Wetlands are considered to be of paramount importance to the biological integrity of the coastal shorelands, and provide habitat for a variety of organisms that depend upon the wetlands for food, cover, and use as a part of their reproductive cycles. This area was determined to have a variety of birds, mammals, and fishes that depend upon the diversity of vegetation of the Stanley Lake wetlands for survival. Wetlands in this area are considered to be important as interconnective links between estuary water and upland streams and habitat. Coho salmon and steelhead trout were found to be a part of this wetland system.

These biological factors are very significant because they are used in the determination of the wetlands condition and in establishing the wetlands boundary. Plant inventories are used in helping to make the final decisions about wetlands, as described in the wetlands determination definitions for both the Corps and the U.S. Fish & Wildlife Service.

REFERENCES:

•Preliminary Findings of Fact and Evidentiary Rulings, Contested Case Hearing, Carlotta Sorenson, Jan. 18, 19, 1984, Seaside, Oregon.

•Transcript of Public Hearing, Corps of Engineers, Aug. 3, 1983. Permit Application, Trails End Development, Seaside, Oregon.

•City of Seaside COMPREHENSIVE PLAN.

•Classification of Wetlands and Deepwater Habitats of the United States. USFWS, 1979.

CASE STUDY # 2

LAND USE ISSUE: Endangered Species and Goals 5 & 18

Highlands Development
Gearhart, Oregon

PROJECT DESCRIPTION

A subdivision project that would take advantage of a secondary dune system north of Gearhart begin working its way through the planning process in 1986. With the premium on "ocean views" and a coastal setting, developers designed a 260 acre project that included 98 luxury homes, to be used primarily as summer residences, and an equestrian center. Access to the project was to be from Highway 101 on the east side of the project.

The subdivision was to be constructed on dunes that had been stabilized within the last 40 years through local Soil Conservation projects, and on a series of older dunes. Although the area used to be open sand with broad flat plains, parallel dune construction in the 1930's created conditions for the construction of primary dunes that developed into secondary dunes with interdunal valleys. These dunes were artificially stabilized with the planting of European Beach Grass and eventually were replanted with coastal pine trees. Approximately 1/3 of the proposed project fell within this area type. The balance of the project was to be constructed on much older dune systems that had built naturally and presently contained vegetation that is more typical of the interior dune systems found on the Clatsop Plains. The newer dune system had experienced little impact during the last 40 years, while the older dune system had been used to graze cattle for the past 30 years or more.

The Marshall Development Co. of Wilsonville, Oregon in conjunction with the Longford-Hamilton Corp. of Aloha, Oregon, planned the project for owner John Hammons, of Springfield, Missouri. The proposed project fell within the urban growth boundary of the City of Gearhart, but was also ruled upon by the County Planning Commission. This situation demanded that the development meet the guidelines of the Gearhart Comprehensive Plan, and also gain final approval from the County planning group.

This project met with limited controversy during the planning hearings and discussions with the County Planning Commission and the Gearhart Planning Commission. Concern over water issues and the removal of dune cover were minor issues, but were points that could be resolved. With few exceptions, local community members saw the project as an inevitable use of the prime development site, and the County saw it as a contribution to the overall assets of the area.

In July, 1986 a representative of the U.S. Fish & Wildlife Service, (USFWS), notified the County Planning Commission and the developer that an endangered species, the **Oregon Silverspot Butterfly** (**Speyeria serene hippolyta**) was located on a major portion of the proposed development. Under the **Endangered Species Act**, USFWS is authorized to ensure that the habitat and population of an endangered species is maintained. The **Act** also makes the killing or taking of endangered or threatened species by anyone, illegal. **The Silverspot Butterfly** is found only in Oregon in special habitat along the coastal zone.

A preliminary survey in 1982 indicated a population of unknown size of **Silverspots** on the old dune area that was to become part of the project site (Hammond and McCorkle, 1982). A direct link between this organism and a single species of violets, **Viola adunca** has been established; the violets are generally found only on the older grassland-type dunes. This single species of violet is the food plant of the butterfly larva.

One of the most unusual aspects about the **Silverspots** living on the Clatsop Plains is the strong migratory dispersion of the adults. As in other populations found along the coast, adult butterflies appear to emerge over a long time period lasting from late July through September. However, adults completely abandon the grassland breeding habitat during most of August and gather in forest shelterbelt areas. Hammond and McCorkle identified "the primary area of breeding habitat as being found just north of Gearhart, Oregon. Exact boundaries of the habitat are the Gearhart Golf Course on the south, Neacoxie Creek on the east, the Surf Pines road on the north, and the Pacific Ocean beach on the west. The Del Rey Beach road dissects this habitat in the center." The proposed development site also has the all important shelterbelt of spruce trees along the border of Neacoxie Creek.

"The most important area of breeding habitat are open grasslands and pastures that extend from the Del Rey Beach Road south to the Gearhart Golf Course." (Hammond and McCorkle, 1985)

With the description of the breeding habitat also being the description for a major portion of the project, alternate plans were necessary to comply with the provisions of the **Act**. The road that was to enter from Highway 101, which would cut through the critical habitat was changed to an access located off the Del Rey Beach Road. The equestrian center that had originally been planned for the development, was replaced by an 18 hole golf course (eventually reduced to 9 holes), and redesigned to not encroach on the **Silverspot** habitat. Five building sites were also removed from the development project.

As of June, 1987, the project development is continuing as adjusted in consideration of the **Endangered Species Act**. The golf course has been completed and houses are being constructed on lots within the development. A preliminary document, **A PROPOSAL TO INVESTIGATE MITIGATION ALTERNATIVES FOR SILVERSPOT BUTTERFLY CONSERVATION ON CLATSOP PLAINS** has been prepared by the Highlands development group. Preliminary meetings among agencies have occurred to determine a possible **recovery plan** for the **Silverspot**, as it relates to habitat found on private lands in the Clatsop Plains area.

SUMMARY

Social, Political, Economic, Physical and Biological Considerations

SOCIAL: One of the major considerations when projects are proposed to communities is that it will change the way things have been. In this case, the area in question, for all practical purposes, had been open to public access. People would walk through the area at will, and the area had been used by ORV owners for years. An Oregon State Wayside is nearby, with a public beach access, which made the area appear to be open to the public. Duck hunters used the area along Neacoxie for access, and hikers entered the area freely.

As NO TRESSPASSING signs appeared, there was a threat to the "status quo." When the entry road had to be changed to the Del Rey Beach Road, the developers asked for the road name to be changed to "Highlands Road" to better link up the development project. This prompted letters-to-the-eidtor and petitions from local residents protesting the preceived *invasion* by "outsiders." When the announcement about the **Silverspot Butterfly** was made public, some became hopeful that the endangered species status could be used to stop the project.

POLITICAL: The location of this project outside the City limits of the Gearhart community, but within the urban growth boundary created a situation in which the development plans had to meet the conditions of the Gearhart Comprehensive Plan, **and** also be presented and ruled upon by the County Planning Commission. This left the developer in the position of trying to satisfy two public planning groups. Opinions ranged from a County Commissioner who was quoted as saying, after the announcement of the order for the developer to comply with the **Endangered Species Act**, "This is the most ridiculous damn thing I ever heard of, you know what you've got to do now is go butterfly hunting," to a position of the Gearhart Planning Commision that all requirements of the Zoning Ordinances and the Comprehensive Plan must be met. The late entry of the **Endangered Species Office** into the planning process was of concern to many, even though the developer said that he is "sensitive" to the **Endangered Species'** needs. The presence of the **Silverspot**, and other resident wildlife, including deer, beaver and herons, enhance the site's natural beauty.

The marketing materials now contain information about the **endangered Silverspot**, and a "threatened" shorebird that might be found nearby on the beach, the Snowy Plover, as selling points for the lots in the Highlands of Gearhart project.

ECONOMIC: Development of beach front property with high-value homes has apparent property tax value to the County. Developments such as this rate high in the assessment process and can increase the revenue generating pool in a County that is hard pressed to collect the funds necessary to maintain County services at levels that many perceive as reasonable. Services are provided by the City of Gearhart and create some additional cost, but at the same time increase revenues to the City.

PHYSICAL: The physical landscape of the area is undulating dunes with ridges and valleys. The substrate is entirely sand, left from dune formations that started at the foothills to the east thousands of years ago. Lacking a sewer system for the area, high ridges away from surface water, and a sand base for septic drain fields, are significant factors in making this project feasible.

The development of two additional dune ridges over the last 40 years between the project, public beaches and the ocean are important factors in providing usable uplands for the Clatsop Beach development. The sand base is also very attractive because of the low site preparation cost, although special attention needs to be given to removing cover from dunes and exposing the sands to wind activity. (Clatsop County Beaches and Dunes GOAL 18).

BIOLOGICAL: Contrary to first impressions, dune systems have their own complex ecological system including a large variety of plants and a somewhat lesser suite of animals. Introduction of a variety of non-native species into the coastal dune communities has changed the ecological and geological patterns significantly during the last century. European Beach Grass has created parallel dunes that are eventually stabilized by American Dune grasses.

The introduction of Scotch Broom has invaded the older dune systems on the site and eliminated the historical open grassland systems of dunes. The significant breeding habitat of the **Silverspot** is on one of the few remaining open field systems in the area, thus creating habitat for the all-important violet used by the butterfly larva in completing the **Silverspot** life cycle. Continued grazing by cattle and horses over the years has helped preserve this habitat. With the removal of livestock, many fear that Scotch Broom will invade the area and eliminate the grassy habitat needed by the violet.

There is also concern that the management of the associated golf course will demand the use of herbicides and pesticides that could find their way into the immediate biological systems.

CASE STUDY #3

LAND USE ISSUE: Estuary Fill and Goal 16

PORT OF ASTORIA
ASTORIA, OREGON

PROJECT DESCRIPTION

The Port of Astoria is a public body dedicated to facilitating commerce and trade through port activity and thus increasing the economic base of the local port district. The base of operation is located at the Port Docks in Astoria, where the Port has office facilities, cargo loading and unloading, and provides anchorage facilities for cargo ships.

The Port of Astoria has had a long history of operation and over the years has handled a variety of cargoes. As economic and trade pictures have changed over the years the main operations of the Port have dealt extensively with loading logs from local markets. As markets have changed, the demand for export of dry logs to China has expanded, and there is a need for more land-based storage. The historical log storage has been in log rafts in bays of nearby waters. Vessel draft problems in China and the lessened desirability of water-stained logs demanded attention by the Port Commission to resolve the dry storage problem.

The development of a long-term improvement plan determined that the first phase should be changes to Pier 1. This plan determined facility changes needed to try to reverse the declining share of the log export business, as well as to diversify the pier's cargo options. Present conditions would not allow adequate handling of dry log exports and water-to-ship loading at the same time.

Improvement of the dock face, loading ramps, and mooring facilities were started, as well as efforts to obtain the necessary permits to fill estuary water adjacent to Pier 1. In this case, the fill request was asking for approval of a fill on **Public Trust Lands**, administered by the **Oregon Division of State Lands**. In order to gain full approval for the fill, it was necessary for the Port to meet the following regulatory requirements:

- Obtain a City of Astoria **Land Use Permit**.
- Obtain a **Water Quality Certification** from the **Oregon Department of Environmental Quality**.
- Obtain a **Fill/Removal Permit** from the **Division of State Lands**.
- Obtain a **Corps. of Engineers SECTION 10** and **SECTION 404 Permit**.

The Port of Astoria did, in fact, apply for such permits and asked that approval be given to "fill approximately 4.1 acres of intertidal and subtidal area, east of Pier One and west of the West Mooring Basin in Astoria, Oregon, for the purpose of a water-dependent port terminal facility. The 4.1 acre fill area is required for expansion of water-dependent development uplands at Pier One to provide for efficient high volume marshalling and loading of heavy cargo in conjunction with recent improvements to the north face of Pier One. Existing aquatic area will be filled with clean sand material to a finished elevation of approximately 16 feet above mean sea level. The shoreline of the finished fill area will be protected with clean rip rap material from the toe of the fill to the top of the finished bankline."

With this application the Port was attempting to meet the requirements of the permit process by demonstrating:

- that the development was water-dependent.
- the need for the fill.
- that the impacts on resources and adjacent uses would be acceptable.
- how mitigation for lost estuarine habitat would occur.

At the September 1984 hearing on the **City Permit**, the Thunderbird Hotel objected because the fill and port activity would adversely impact the view from the Hotel, setting the stage for an issue that would attempt to resolve **Port development in an industrial zone vs. views of a tourist-oriented facility**. In April of 1985 the Thunderbird appealed the City's Permit decision through the **Land Use Board of Appeals (LUBA)**. **LUBA** ruled to uphold the City's decision on the permit. This decision was then taken to the **Oregon Court of Appeals. The Appeals Court** upheld the **LUBA** decision. During January-August, 1985 negotiations between the Port, the State of Oregon, and the Thunderbird Hotel, a compromise was reached on a reduced fill that would leave some water area in front of the Hotel's west wing, and preserve some view. In October, 1985, the **State Permit** was issued. Final federal approval was held up due to mitigation concerns.

A long series of mitigation actions and proposals were suggested by the Port with limited approval by the federal agencies and agreement by the State. Some mitigation activity occurred at the Astoria Airport, but federal agencies still required mitigation for the subtidal part of the fill. Mitigation plans were developed for **wetlands creation** at the Alderbrook area in Astoria. This included public meetings and hearings to develop a plan suitable to local residents. The federal agency accepted the plans but the State objected because they had already issued the permit, and felt that subtidal mitigation should not be required. The State **Division of State Lands**, held up the mitigation at Alderbrook because they own the lands, and have an interest in preserving it as an industrial zone.

In April, 1986, a federal permit was issued with pending mitigation. In June of 1987 preliminary filling has occurred at Pier One, and the mitigation is still not finalized.

SUMMARY

Social, Political, Economic, Physical and Biological Considerations

SOCIAL: The lower river has always been considered to have great potential for port development. A location near the mouth of the River is an ever-increasing consideration as cost of vessel operation increases. Such development as proposed by the Port of Astoria for cargo storage and handling would seem to be in the best interest of the City of Astoria, and the surrounding communities. During the hearing and application process for fill permits, no one from the local community spoke against the project.

The rights of a public body to develop, and the rights of a private corporation to maintain status quo on leased land owned by the Port, tested the values-and-rights system within the community structure.

POLITICAL: The use of appeals to test land use decisions is a part of the system that is important to the success of the process. In the wake of the appeals process the opportunity for negotiation to resolve a conflict brought about resolution to the differences between the Port and the commercial business. This resulted in a new fill configuration and a resolution to the Port's needs. At the same time, a variety of efforts were made by the Port to gain acceptable mitigation for the federal agencies. Although no final resolution resulted, a permit was granted, and mitigation options have been presented, and will eventually occur.

ECONOMIC: The efforts of the Port were to try and preserve some portion of its rapidly shrinking share of the market for log exports. At this point in time, Port officials are on a "survival plan" to try and maintain the present level of operations, and the resulting economic benefits to the community. With the opportunity to slightly increase the sales of export logs by having dry marshalling and loading areas, motivation was high to move through the permit process as rapidly as possible to gain some economic advantage.

The opportunity to generate funds through it's tax base, or to use Port revenues was also at issue, and the Port chose to fund the project from it's revenues.

PHYSICAL: The fact that much of the City of Astoria presently sits upon fill demonstrates the lack of an adequate level of back-up land for Port development. With a Hotel located on the only prime Port development land left, new land for Port expansion falls to fill activity.

BIOLOGICAL: Although the biological considerations were generally considered a less important topic during this process, any activity that reduces the estuary surface has impacts. In this case, most concern was directed towards the loss of benthic surface as it relates to fish feeding. Major impacts had already influenced the biological productivity of this area. Thus, mitigation may in some ways increase the total productivity of the greater system of the lower estuary.

CASE STUDIES Preparation Model

To Instructors: The following outline is a ***guide*** in the preparation of **CASE STUDIES** to be used as an instructional tool for your classroom. Teachers should feel free to modify it in any way that will better meet their needs. Although case studies have been extensively used in educational settings, often in the form of simulations, the intent here is to provide support for educators to prepare their own special "**local**" materials. Generic simulations are excellent in developing the skills necessary for effective involvement in citizen roles, but they lack the reality of the local day-to-day nature of community activity.

Instructors should not feel compelled to use only case study examples that involve issues or controversy. There are many excellent examples of land use and community action that in the process of following the local and state policies move along smoothly and have excellent potential for case study development.

CASE STUDIES should be developed to illustrate the following principles:

- Land and water are finite natural resources that provide the main habitat for all of the living world including humans.

- Many social, political, economic, physical, and biological considerations are involved in land use decisions.

- Land and water are used for many different purposes. If land and water are used for one purpose, its use for other purposes is limited.

- Land use planning is a dynamic process that involves trade-offs among concerned individuals. There is no "PERFECT" land use plan that will meet the needs of everyone.

CASE STUDY Descriptions

Be selective in the ones you choose for development, making sure that they link up to curriculum goals for your district. Time is a major consideration and your effort to collect the background materials you will need should start well in advance of your project. Grade level use is a major consideration, but development should not be confined to only upper grades. The **COMMUNITIES** focus of many districts for third grade provides an open invitation for some carefully developed case studies. The introduction of U.S. Government in fifth grade would fall short of the mark without some experience and consideration of citizens and land use. Secondary curriculums should receive extensive development in State and Local Government, Biology, Geography, or another curriculum area determined by local districts.

Care must be taken by the instructor to maintain balance in the preparation of the materials. Many times case studies will be selected in which personal feelings are present. The intent of the case studies is to present real community activity, demonstrate access citizens have to the system and how feelings (bias) are linked to a variety of citizens personal interest. Some would say that the lesson was done well if the students completed the unit and did not know the specific view of the instructor. Your own situation and classroom management style will be your best guide on how to proceed.

INSTRUCTORS OUTLINE
TO
CASE STUDY PREPARATION

CASE STUDY Title:
Date of Action:
Associated Planning Goals:

Description of CASE STUDY

Case Studies should be developed to illustrate the following principles:

- Land and water are finite natural resources that provide the main habitat for the natural world including humans.
- Society considers the many social, political, economic, physical, and biological factors in land use decisions.
- Land and water function in the natural processes in many different ways: these functions can be changed by land and water conversions. If land and water are used for one purpose, its use for other purposes is limited.
- The dynamics of land use involves trade-offs among members of the participating community. There is no PERFECT land use plan that will meet the needs of everyone.

NOTE: Complete files on locally selected case studies can normally be found in city, county, or regional planning offices.

CASE STUDY SUMMARY

SOCIAL:

POLITICAL:

ECONOMIC:

PHYSICAL:

BIOLOGICAL:

Related School District and Program Goals

Related Text Reference (Social Studies and/or Science)

Student Activities (To be determined by instructor. SEE Curriculum Reference Section.)

RESOURCE SITES

It is the intent of the development of the RESOURCE SITE section of the Guide to help educators to begin the process of finding and developing learning sites for field programs. It is valuable for students of all ages to have first-hand experience with their resources in such a way that they begin to develop a sense of ownership, and thus a feeling of responsibility. Sites should be chosen carefully so that they meet the goals of the learning sequence that is occurring in the school setting.

There has been no attempt to review all of the sites; the goal is to help educators start to build their own special list of learning sites that will best meet the character of their classroom and school. The City and County Comprehensive Plan **Background Reports** include excellent materials about many other sites.

RESOURCE No. 10

Site Name Ecola State Park **Location** Tillamook Head
3 **Miles from** Cannon Beach

Things to See Outstanding intertidal areas

General Information

	Yes	No		Yes	No
Restrooms	✓		Picnic Area	✓	
Bus Parking	✓		Interpretive Info.		✓
Special Use Permission		✓	Map Codes		

Special Observations sea lions, seals, marine birds, evidence of most recent landslide.

Special Notes: Many dangerous rocks and cliffs in area. 20 minutes each way should be allowed for hike to intertidal area. Check TIDE TABLES.

RESOURCE No. 11

Site Name Hug Pt. State Park **Location** South County
5 **Miles from** Cannon Beach – south

Things to See

General Information

	Yes	No		Yes	No
Restrooms	✓		Picnic Area	✓	
Bus Parking	✓		Interpretive Info.	✓	
Special Use Permission		✓	Map Codes		

Special Observations Dikes and sills in Sandstone, Sea Caves and early day road cut around Hug Point.

Special Notes: Detailed information on the Hug Point Geology is available from the State Geology Dept. in their OreBin Publication.

RESOURCE No. 12

Site Name Oswald West State Park **Location**
9 **Miles from** south from Cannon Beach.

Things to See The North end of the beach is the remnant of a turbidite dike and contain many trace fossils.

General Information

	Yes	No		Yes	No
Restrooms	✓		Picnic Area	✓	
Bus Parking	✓		Interpretive Info.		✓
Special Use Permission		✓	Map Codes		

Special Observations One of the better examples of the coastal forest, including Giant Red Cedars.

Special Notes:

RESOURCE No. 7

Site Name Saddle Mtn. State Park **Location** Coast Range.

20 **Miles from** Seaside on the Sunset Highway

Things to See Geological formations, wildflowers, wildlife.

General Information

	Yes	No		Yes	No
Restrooms	✓		**Picnic Area**	✓	
Bus Parking	✓		**Interpretive Info.**		✓
Special Use Permission		✓	**Map Codes**		

Special Observations Basalt dikes and outcroppings (outcroppings of Astoria Formation with Marine fossils.

Special Notes: The hike up this mountain is very strenuous, and special planning should occur for students under Jr. High age.

RESOURCE No. 8

Site Name Jewell Wildlife Meadows **Location** Jewell, OR

2 **Miles from** Jewell

Things to See Large herds of ELK

General Information

	Yes	No		Yes	No
Restrooms	✓		**Picnic Area**	✓	
Bus Parking	✓		**Interpretive Info.**	✓	
Special Use Permission		✓	**Map Codes**		

Special Observations Management of wildlife in association with farming and forest interests.

Special Notes: Call to confirm the visit, and find out about the most recent ELK activity. (755-2264)

RESOURCE No. 9

Site Name White Tail Deer Refuge **Location** North side of Lower Columbia

2 **Miles from** West of Cathlamet, WA on State Hwy. #4

Things to See Endangered White Tail Deer; outstanding marshes

General Information

	Yes	No		Yes	No
Restrooms		✓	**Picnic Area**		✓
Bus Parking	✓		**Interpretive Info.**	✓	
Special Use Permission	✓		**Map Codes**		

Special Observations Diking on Puget Island; Deer in field on Island; possible Bald Eagle sitings.

Special Notes: Contact – Refuge Manager (206) 795-3915. It is necessary to take the ferry from WESTPORT, OR. Check for schedule.

RESOURCE No. 4

Site
Name Camp Kiwanilong **Location**
2 **Miles from** Warrenton on Ridge Rd.

Things to See Indian pipe, sundew, sphagnum bogs, iron oxide pan lake.

General Information

	Yes	No		Yes	No
Restrooms	✓		Picnic Area	✓	
Bus Parking	✓		Interpretive Info.	✓	
Special Use Permission	✓		Map Codes		

Special Observations arrangements can be made for over-night stays.

Special Notes: Camp Kiwanilong offers outstanding sites for study of all the major habitats found in the Coastal Zone. Contact the Camp Ranger (861-2933) well in advance of your trip.

RESOURCE No. 2

Site
Name Necanicum Estuary Park **Location** in Seaside
.1 **Miles from** Seaside High School, west side

Things to See Most of the major benthic animals of Oregon estuaries.

General Information

	Yes	No		Yes	No
Restrooms		✓	Picnic Area		✓
Bus Parking	✓		Interpretive Info.	✓	
Special Use Permission		✓	Map Codes		

Special Observations

Special Notes: Excellent site for study of all aspects of Estuarine Ecology. The Necanicum Estuary Inventory and the Estuary Management Draft will be very useful.

RESOURCE No.

Site
Name **Location**
Miles from

Things to See

General Information

	Yes	No		Yes	No
Restrooms			Picnic Area		
Bus Parking			Interpretive Info.		
Special Use Permission			Map Codes		

Special Observations

Special Notes:

RESOURCE No________

Site
Name________________________Location______________________________
_____Miles from____

Things to See____
____

General Information

	Yes	No		Yes	No
Restrooms	___	___	Picnic Area	___	___
Bus Parking	___	___	Interpretive Info.	___	___
Special Use Permission	___	___	Map Codes________________		

Special Observations____
____

Special Notes:

●●

RESOURCE No________

Site
Name________________________Location______________________________
_____Miles from____

Things to See____
____

General Information

	Yes	No		Yes	No
Restrooms	___	___	Picnic Area	___	___
Bus Parking	___	___	Interpretive Info.	___	___
Special Use Permission	___	___	Map Codes________________		

Special Observations____
____

Special Notes:

●●

RESOURCE No________

Site
Name________________________Location______________________________
_____Miles from____

Things to See____
____

General Information

	Yes	No		Yes	No
Restrooms	___	___	Picnic Area	___	___
Bus Parking	___	___	Interpretive Info.	___	___
Special Use Permission	___	___	Map Codes________________		

Special Observations____
____

Special Notes:

TO BE USED AS A MASTER

HABITAT No. 1

Site Name Salt Marsh **Location** South Jetty

2 **Miles from** Fort Stevens State Park at Parking Lot C.

Things to See Salt marsh plants with very distinct zonation between various species.

General Information

	Yes	No		Yes	No
Restrooms	✓		Picnic Area		✓
Bus Parking	✓		Interpretive Info.		✓
Special Use Permission		✓	Map Codes		

Special Observations This is also a very good area for spring and fall migrating shorebirds.

Special Notes: A small break in the South Jetty allows salt water to flow into this area during high water. It can be muddy at times; you should have knee boots to work the area effectively.

HABITAT No. 2

Site Name Salt Marsh **Location** Necanicum Estuary - Seaside

.1 **Miles from** Seaside High School

Things to See An excellent example of estuary salt marsh; also includes very accessible mud flats.

General Information

	Yes	No		Yes	No
Restrooms		✓	Picnic Area		✓
Bus Parking	✓		Interpretive Info.	✓	
Special Use Permission		✓	Map Codes		

Special Observations

Special Notes: Seaside High School students are developing an Estuary Park that is available to the public. Contact Seaside School Science Dept. for information.

HABITAT No. 3

Site Name Deflation Plains **Location** Fort Stevens - Peter Iredale

1 **Miles from** Peter Iredale Rd. - to the South

Things to See This area is one of the largest undeveloped areas (600 acres) of dunes and deflation plains in the County.

General Information

	Yes	No		Yes	No
Restrooms	✓		Picnic Area		✓
Bus Parking	✓		Interpretive Info.		✓
Special Use Permission		✓	Map Codes		

Special Observations Well-defined examples of deflation plain ecology.

Special Notes: This area can have extensive standing water during winter and spring.

HABITAT No. 4

Site Name Wetlands **Location** Camp Kiwanilong
2 **Miles from** Warrenton on Ridge Road

Things to See Old Growth Sitka Spruce forest, Conservation Corps Arboretum, extensive nature trails

General Information

	Yes	No		Yes	No
Restrooms	✓		**Picnic Area**	✓	
Bus Parking	✓		**Interpretive Info.**	✓	
Special Use Permission	✓		**Map Codes**		

Special Observations a number of wetland types, ranging from marshes to bogs, are accessible here.

Special Notes: Users need to make contact with the Camp Ranger, (861-2933), well in advance of visit.

HABITAT No. 5

Site Name Lake-Wetlands **Location** Cullaby Lake
7 **Miles from** Astoria

Things to See Development of beaches on wetlands; shoreline use topics; wetlands along shoreline

General Information

	Yes	No		Yes	No
Restrooms	✓		**Picnic Area**	✓	
Bus Parking	✓		**Interpretive Info.**		✓
Special Use Permission		✓	**Map Codes**		

Special Observations Old growth SITKA SPRUCE; in the fall, look for the endangered Silver Spot Butterfly along Park Rd.

Special Notes:
The Park "Master Plan and Background Report" is available at the County Planning Dept.

HABITAT No. 4

Site Name OLD Dunes **Location** Camp Kiwanilong
2 **Miles from** Warrenton on Ridge Rd.

Things to See Old stabilized dunes from the 1930's shoreline project; plants of shorepines

General Information

	Yes	No		Yes	No
Restrooms	✓		**Picnic Area**	✓	
Bus Parking	✓		**Interpretive Info.**		
Special Use Permission	✓		**Map Codes**		

Special Observations

Special Notes: Examples are located on hike from Camp to the Beach – Contact Ranger (861-2933) for information on Camp use.

HABITAT No. 3

Site Name Sand Dunes **Location** Fort Stevens State Park

1 **Miles from** Park Headquarters – Near Peter Iredale Rd.

Things to See Outstanding examples of developing foredune and stabilized dune valleys and secondary dunes.

General Information

	Yes	No		Yes	No
Restrooms	✓		Picnic Area		✓
Bus Parking	✓		Interpretive Info.		✓
Special Use Permission		✓	Map Codes		

Special Observations

Special Notes: The impact of the European Beach Grass is very evident in this area; Windy days with airborne sands make field programs difficult in this area; plan for morning trips when the winds are down.

HABITAT No. 3

Site Name Beaches **Location** Fort Stevens State Park

1 **Miles from** Park Headquarters

Things to See Sandy beaches in this area contain high volume of iron particles.

General Information

	Yes	No		Yes	No
Restrooms	✓		Picnic Area		✓
Bus Parking	✓		Interpretive Info.		✓
Special Use Permission		✓	Map Codes		

Special Observations From September to May large numbers of Sanderlings may be observed in this area.

Special Notes: Special attention should be paid to students on drift logs during high water.

HABITAT No. 6

Site Name Rocky Intertidal **Location** Haystack Rock – Cannon Beach

Miles from

Things to See Nesting marine birds, outstanding examples of tidepools and marine animals.

General Information

	Yes	No		Yes	No
Restrooms	✓		Picnic Area		✓
Bus Parking	✓		Interpretive Info.	✓	
Special Use Permission		✓	Map Codes		

Special Observations Marine algae, hermit crabs, tidepool fish and tidepool animals.

Special Notes: City Restrooms are available at Bus Parking area near City Hall. Excellent interpretive material is available at City Hall. Binoculars are very helpful for bird observations

CHECK TIDE TABL

HABITAT No____________
Site
Name____________________Location______________________________
_____Miles from____

Things to See____
____

General Information

	Yes	No		Yes	No
Restrooms	___	___	Picnic Area	___	___
Bus Parking	___	___	Interpretive Info.	___	___
Special Use Permission	___	___	Map Codes________		

Special Observations____
____

Special Notes:

••

HABITAT No____________
Site
Name____________________Location______________________________
_____Miles from____

Things to See____
____

General Information

	Yes	No		Yes	No
Restrooms	___	___	Picnic Area	___	___
Bus Parking	___	___	Interpretive Info.	___	___
Special Use Permission	___	___	Map Codes________		

Special Observations____
____

Special Notes:

••

HABITAT No____________
Site
Name____________________Location______________________________
_____Miles from____

Things to See____
____

General Information

	Yes	No		Yes	No
Restrooms	___	___	Picnic Area	___	___
Bus Parking	___	___	Interpretive Info.	___	___
Special Use Permission	___	___	Map Codes________		

Special Observations____
____

Special Notes:

TO BE USED AS A MASTER

LOCAL RESOURCE PEOPLE

RESOURCE ACCESS

RESOURCE PEOPLE

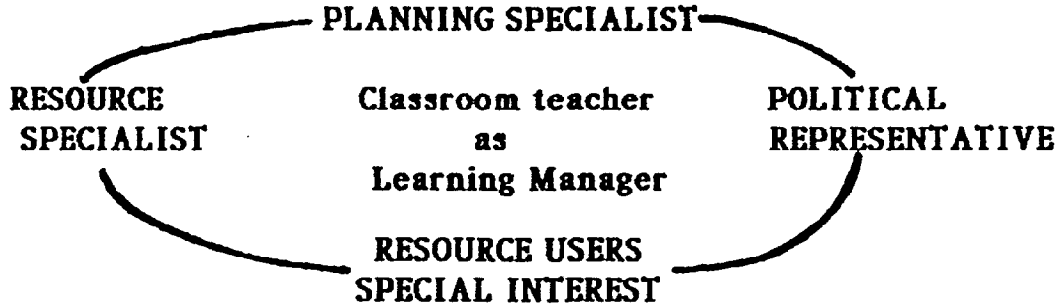
INTRODUCTION

Effective use of **resource people** is critical to providing students with the special insight that can come from individuals working directly with a specific resource. The listing of **Resource People** is intended to improve the quality of the experience for the students and to help establish a more effective short-term partnership between the educator and the resource specialist, and other select individuals.

With the focus on **citizenship development** and the way in which school experience contributes to the on-going growth of student citizenship, a broad-based approach to effective use of **resource people** is critical. Because of the obvious link resource managers, planners, and agency people have to this process, it is easy to miss the importance of having private citizens, business, industry, and special interest groups represented in the plan for using **resource people**. Effective use of this group helps demonstrate the **access** individuals have to the planning process, how different views originate, and the important role private citizens and groups play in this process. If issues are at the center of exposing students to **resource people**, many times the opportunity to discuss and review the way in which individuals and groups gained **access** to become active participants in the process is most valuable. This may, in the end, be far more important to citizenship development than the specific issue or content taught about a resource.

It is incumbent upon the educator to insure that a well balanced program is planned. Public officials and resource managers are very available and can be listed; others will be less obvious and must be found through the efforts of the classroom teacher. Often agency people and public officials can provide suggestions about possible contacts. For example, fishermen, citizen advocates and special interest people. Educators can be most effective if they continue to build their own **resource persons** file.

••PROPOSED PLANNING GUIDE••



NOTE: **Resource people** who are listed are busy people and should be used only in planned programs where their time and contribution is maximized. Although the information may be interesting, the use of **resource people** to just "talk" to students has limited educational value.

RESOURCE PEOPLE
Teachers File

INTEREST/JOB Resource Specialist
Name Jerry Black Title Corps Field Rep.
Affliation U.S. Army Corps of Engineers
Address Rt.5 Box 30 Maritime City Astoria, OR 97103
Phone 325-1135 Resource Speciality 404 Removal/Fill, Wetlands Management, Permits

INTEREST/JOB Resource Specialist
Name Rich Fensak Title Education Director
Affliation Columbia River Maritime Museum
Address 1792 Marine Dr. City Astoria, OR 97103
Phone 325-2323 Resource Speciality Maritime history, Whaling.

INTEREST/JOB Resource Specialist
Name Jim Good Title Marine Resource Specialist
Affliation Sea Grant
Address School of Oceanography Oregon State University City Corvallis, OR
Phone 754-3771 Resource Speciality
marine resources, coastal planning, permits

INTEREST/JOB Resource Specialist
Name Clyde Harrison Title
Affliation National Marine Fisheries - Enforcement
Address Federal Building City Astoria, OR 97103
Phone 325-5934 Resource Speciality Fisheries, enforcement, foreign fishing

INTEREST/JOB Resource Specialist
Name Linda Duff Title Information Specialist
Affliation OREGON DUNES
Address 855 Highway Ave. City Reedsport, OR 97467
Phone 271-3611 Resource Speciality Sand dunes

RESOURCE PEOPLE
Teachers File

INTEREST/JOB Resource Manager
Name Jim Hill Title Hatchery Manager
Affliation Clatsop Economic Development Committee
Address 230 36th ST. City Astoria, OR 97103
Phone 861-3846 Resource Speciality Salmon, hatchery management

---

INTEREST/JOB Resource Manager
Name Terry Link Title Shell Fish Biologist
Affliation Oregon Dept. of Fish & Wildlife
Address 53 Portway City Astoria, OR 97103
Phone 325-2462 Resource Speciality Razor clams, shell fish, ocean resources, intertidal animals.

INTEREST/JOB Resource Manager
Name Walt Weber Title Biologist
Affliation Oregon Dept. of Fish & Wildlife
Address 619 Beerman Crk. Rd. City Seaside, OR 97138
Phone 738-7066 Resource Speciality Wildlife, waterfowl, land use planning

---

INTEREST/JOB Resource Manager
Name Joe Pesek Title Non-Game Biologist
Affliation Oregon Dept. of Fish & Wildlife
Address 17330 S.E. Evelyn St. City Clackamas, OR 97105
Phone 657-2058 Resource Speciality Non-game Wildlife, Bald Eagles

---

INTEREST/JOB Resource Manager
Name Rick Klump Title Salmon + Trout Enhancement Program Biologist (STEP)
Affliation Oregon Dept. of Fish & Wildlife
Address 4909 Third St. City Tillamook, OR 97141
Phone 842-2741 Resource Speciality Salmon, stream ecology, salmon + trout enhancement.

RESOURCE PEOPLE
Teachers File

INTEREST/JOB Resource Manager
Name Bill Nealeigh Title Hatchery Manager
Affiliation Oregon Dept. of Fish & Wildlife
Address Hwy. 53 City:
Phone 368-5670 Resource Speciality Salmon, hatchery operations

---

INTEREST/JOB Resource Manager
Name Roy Lowe Title Coastal Biologist
Affiliation U.S. Fish & Wildlife Service
Address Marine Science Center City Newport, OR 97365
Phone 867-3011 Resource Speciality Marine birds, Marine mammals, coastal resources

---

INTEREST/JOB Resource Manager
Name Bob McConnell Title Researcher
Affiliation National Marine Fisheries Service
Address City Hammond, OR
Phone 861-1818 Resource Speciality Columbia River Research, ocean fishes

---

INTEREST/JOB Resource Specialist
Name Jim Bergeron Title Marine Extension Agent
Affiliation OSU Seafood Labs
Address 250 36th City Astoria OR 97103
Phone 325-4531 Resource Speciality Marine Related topics, ocean fishing

---

INTEREST/JOB Resource Specialist
Name Don Leach Title Soil Conservation Agent
Affiliation U.S. Soil Conservation Service
Address Federal Building City Astoria, OR 97103
Phone 325-4571 Resource Speciality Sand dunes, dune stabilization, dune ecology, clatsop county soils.

RESOURCE PEOPLE
Teachers File

INTEREST/JOB Environmental Education
Name Neal Maine Title Resource Teacher
Affliation Seaside Schools
Address 1801 S. Franklin City Seaside, OR 97138
Phone 738-5591 Resource Speciality coastal resources, curriculum development

INTEREST/JOB Environmental Education
Name Linda Newberry Title Naturalist
Affliation Haystack Rock Awareness Program, City of Cannon Beach
Address P.O. Box 368 City Cannon Beach OR 97110
Phone 436-1581 Resource Speciality Natural history, Volunteer programs.

INTEREST/JOB Environmental Education
Name Bill Hastie Title Aquatic Education
Affliation Oregon Dept. of Fish & Wildlife
Address P.O. Box 59 City Portland, OR 97207
Phone 229-5427 Resource Speciality Marine education, educational materials, aquatic education

INTEREST/JOB Environmental Education
Name Vicki Osis Title Marine Education Specialist
Affliation Sea Grant
Address Marine Science Center City Newport, OR 97365
Phone 867-4661 Resource Speciality Coastal resources, curriculum materials

INTEREST/JOB Environmental Education
Name Larry Beutler Title Editor CLEARING Magazine
Affliation Environmental Education Project
Address P.O. Box 751 City Portland, OR 97207
Phone 229-4721 TOLL FREE: 1-800-322-3326 Resource Speciality Resource people, resource programs

RESOURCE PEOPLE
Teachers File

INTEREST/JOB Planner
Name Curt Schneider Title Planning Director
Affliation Clatsop County Planning Dept.
Address Court house 749 Commercial St. City Astoria, OR 97103
Phone 325-8611 Resource Speciality Land use, planning, Clatsop County resources

---

INTEREST/JOB Resource Specialist
Name David Fox Title Director
Affliation Columbia River Estuary Study Taskforce (CREST)
Address 750 Commercial, Fed. Bld. Rm 214 City Astoria OR 97103
Phone 325-0435 Resource Speciality Columbia River estuary, nat. res. and dev., planning, mitigation

---

INTEREST/JOB Planner
Name Paul Benoit Title Planning & Economic Dev.
Affliation City of Astoria
Address 1095 Duane City Astoria, OR 97103
Phone 325-5821 Resource Speciality Land Use Planning, Water front development, economic development

---

INTEREST/JOB Planner
Name Dick Pearson Title City Planner
Affliation City of Seaside
Address 851 Broadway City Seaside, OR 97103
Phone 738-5511 Resource Speciality Land Use Planning, Urban renewal, permits

---

INTEREST/JOB Planner
Name Rainmar Bartl Title Planner
Affliation Clatsop - Tillamook Intergovernmental Council
Address 116 E. Division City Cannon Beach OR 97110
Phone 436-1156 Resource Speciality planning

RESOURCE PEOPLE
Teachers File

INTEREST/JOB Planner
Name Mike Morgan Title Planner
Affliation Clatsop-Tillamook Intergovernmental Council
Address 116 E. Division City Cannon Beach OR 97110
Phone 436-1156 Resource Speciality planning

INTEREST/JOB Resource Specialist
Name Duncan Law Title Professor Emeritis
Affliation Oregon State University Seafoods Lab.
Address 250 36th City Astoria OR 97103
Phone 325-4531 Resource Speciality Aquaculture, Student Research, Seafood Processing

---

INTEREST/JOB Resource Specialist
Name Dr. David Crawford Title Director
Affliation Oregon State University Seafoods Lab
Address 250 36th City Astoria, OR 97103
Phone 325-4531 Resource Speciality Seafood Research

INTEREST/JOB Economic Development
Name Margaret Forbes Title Executive Secretary
Affliation Clatsop Economic Development Commission
Address 1 Portway Suite 102 City Astoria OR 97103
Phone 325-4521 Resource Speciality Special Economic Development Projects

---

INTEREST/JOB
Name Title
Affliation
Address City
Phone Resource Speciality

RESOURCE PEOPLE
Teachers File

INTEREST/JOB_____
Name_____Title_____
Affliation_____
Address_____City_____
Phone_____Resource Speciality_____

INTEREST/JOB_____
Name_____Title_____
Affliation_____
Address_____City_____
Phone_____Resource Speciality_____

INTEREST/JOB_____
Name_____Title_____
Affliation_____
Address_____City_____
Phone_____Resource Speciality_____

INTEREST/JOB_____
Name_____Title_____
Affliation_____
Address_____City_____
Phone_____Resource Speciality_____

INTEREST/JOB_____
Name_____Title_____
Affliation_____
Address_____City_____
Phone_____Resource Speciality_____

TO BE USED AS A MASTER

RESOURCE ACCESS
EDUCATORS SURVEY

NAME_____**(optional) SCHOOL**_____

GRADE_____ **or SUBJECT**_____

I presently offer a **land use/resource type unit:**

That lasts:
_____one week or less
_____two weeks or more

That focuses on:
_____Citizenship development
_____Economics and resources
_____Issues
_____Other

Connected to the following subjects:
_____Geography
_____Social Studies
_____Science
_____State and Local Government
_____Other_____

Content & examples used come from:
_____Text materials
_____Local published materials
_____My own materials
_____State and Land Use Planning Goals

This unit includes:
_____ No field work
_____A single field activity
_____Extensive field work
_____School ground work only

The following **resource/planning information** would be helpful to me as a classroom teacher:_____

I could use the following **A.V. Materials**_____on the following **topics:**_____

I would find **local published materials** most useful in the following **format:**

_____Bound teacher materials
_____Individual kits
_____Loose leaf notebook

I would be interested in **team teaching and/or interdisciplinary teaching techniques:**

_____Generally
_____Might attend a local workshop
_____One of my areas of special interest

Other **suggestions/interests/comments:**_____

•••

RESOURCE ACCESS

EVALUATION

Materials for this project have been developed to allow the greatest flexibility possible for the classroom teacher. All of the sections may be used, or teachers may select to use one or more of them. Please evaluate the effectiveness of the various sections.

SECTION TITLE	Subject Connections	Projects, Lessons, Activities Developed	Overall Value: Comments Recommendations for Additions
MODEL STUDY PROGRAMS			
CONCEPT DEVELOPMENT			
RESOURCE POLICIES			
CASE STUDIES			
RESOURCE LISTINGS			
BIBLIOGRAPHY			

CONCEPT MAPPING AS A TOOL FOR EVALUATION

Using a more integrated approach to planning for **student learning**, it is important to have **evaluation methods** that explore the **present** level of understanding in students and the **change** in that level after instruction. The development of **concept maps** by students helps the instructor focus more on the **qualities of learning** and **affected change** in student conceptual frameworks **vs.** the **selective questioning schemes** that have been used to evaluate student learning in the past. Since research shows that at best only about 50 percent of variation in measures of achievement is predicted by any achievement measure or set of measures, over months or up to a year or two, (NOVAK, 1984), little will be lost in exploring other options. If other ways of assessing future success, (for instance: the number of patents awarded to engineers), are used, then the correlation between school performance and achievement falls to nearly zero. (NOVAK, 1984).

If concept maps developed by students are to be used to evaluate learning in such a way that points, scores, or letter grades are to be assigned, it would be useful for instructors to look for the following qualities:

HIERARCHICAL STRUCTURE: Does the student map begin with broad, inclusive concepts and then lead to more specific, less inclusive concepts? There are no "right" answers in this organization, but this format can effectively demonstrate the student's **conceptual framework.** The focus here is on the **relationships** that students perceive. Looking for hierarchical structure allows relatively easy assessment by the teacher.

PROGRESSIVE DIFFERENTIATION: The degree to which concepts have gained greater meaning for students as new relationships, (propositional links), are acquired, can give instructors useful feedback about what is being learned, and how it is being incorporated into the student's operational framework. Evaluation of student-developed maps can be relatively precise indicators of the degree of differentiation.

Evaluating **concept maps** using this criteria may allow instructors to develop some point schemes for ranking student work. Low numbers can be assigned to the top of the map where we would expect to find the broad, inclusive concepts, with progressively greater numbers assigned to the display of more precise concepts and their relationships. The greatest value is in using **concept mapping** to get feedback from students about the effectiveness of instruction. The degree of incorporation of new concepts with the concepts the students presently have in place, is important, as well as making visual, in some way, the misconceptions with which students may be operating. This technique lacks some of the self-serving precision that has been used in the past, but does offer areas worth exploring as methods of improving student learning as a cooperative effort with their instructors.

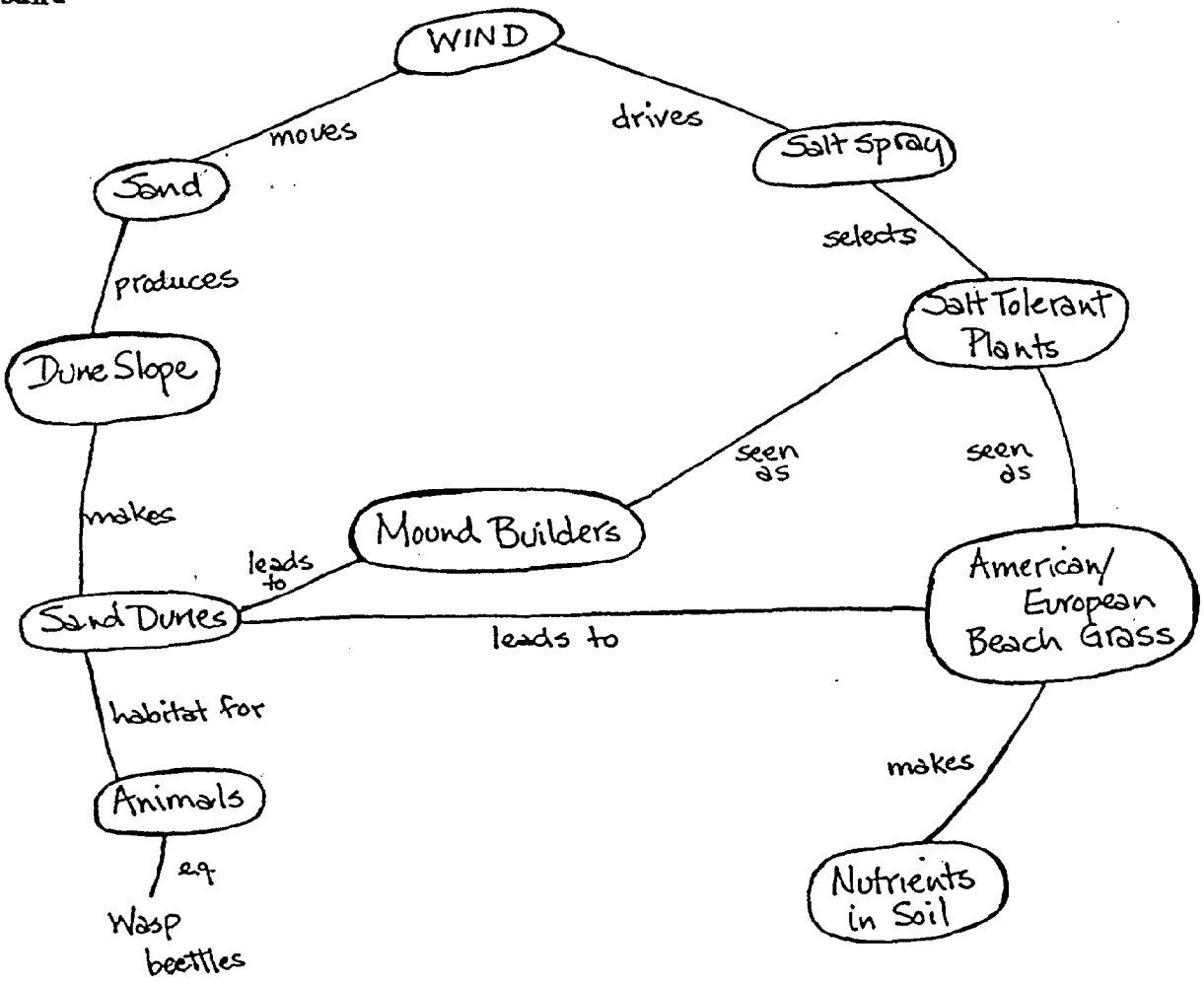
Sample CONCEPTS Format for Student Evaluation

AREA OF STUDY_____ Name_____

CONCEPT List:

sand dunes
American Dune Grass
European Dune Grass
mound builders
slope
salt tolerant plants
nutrients in soil
salt spray
wind
animals
sand

CONCEPT MAP



RESOURCE ACCESS

INVENTORY OF MATERIALS

Clatsop County

TABLE OF CONTENTS

Introduction 2

Classification System 3

Commonly Used Acronyms 5

The Inventory:

CREST 6

CLATSOP COUNTY PLANNING 34

CTIC 43

SOIL CONSERVATION SERVICE 47

SEASIDE SCHOOL DISTRICT CURRICULUM LIBRARY 49

LEWIS & CLARK NATIONAL WILDLIFE REFUGE-USFWS 51

ODFW 54

CITY OF ASTORIA 56

CITY OF CANNON BEACH 60

TOWN OF HAMMOND & CITY OF WARRENTON 61

JEWELL 62

CITY OF SEASIDE 63

RESOURCE ACCESS

INVENTORY OF MATERIALS

Clatsop County

The following is a selected annotatated bibliography and listing of resource materials available in the county. Included are books, research papers, publications, maps, charts, pertinent land use and natural resource laws, plans and guidelines. As some of the publications, etc. are in several of the offices listed, when looking for a specific resource, be sure to check your local office first.

The classification system is a modified version of the one used at the CREST library. The resources are classified as to usabililty, i.e., h (high), m (medium), or l (low). Each section is prefaced with the location of the materials (office), and a description of how to find the needed materials within that office (only the CREST library is actually indexed with this classification system).

The Classification System

B Bibliographies/Compendiums

D *Development*
- Dd - Dredging/Dredge material disposal/Filling
- De - Energy
  - De 100 - Power plants, planning, facilities siting
  - De 200 - OCS oil and gas
  - De 300 - Oil spills
  - De 400 - Coal
- Di - Industry
- Dj - Jetties/Dikes/Navigational improvements
- Dp - Ports and harbors
- Dt - Transportation/Shipping/Navigation

E Estuaries/Rivers
- Eb - Biological studies
- Eg - Geology/Sedimentation
- Em - Mitigation
- Ew - Wetlands

FG Field Guides (in CREST library these are listed under topic)

L Legal
- Lf - Federal
  - Lf100 - Statutes, cases, rules, guidelines
  - Lf200 - Interpretation, discussion, handbooks
  - Lf300 - Permits
- Lor - Oregon
  - Lor100 - State-wide statutes, rules, etc.
  - Lor200 - Local ordinances
  - Lor300- Permits

M Miscellaneous
- Mc - General collections
- Mg - General reference
- Mh - History
- Mn - Natural hazards

O Oceans
- Oc - Continental shelf/Nearshore
- Os - Shoreline

P **Plans/ Inventories/Studies/Impact Statements/Land Use**

- Pm - Methods and techniques
- Pa - Agencies
- Pc - Coastal Zone Management
- Pg - Guidelines and standards

P **Plans/Inventories/Studies/Impact Statements/Land Use**

Geographical plans and inventories, etc.:

- Pr - Regional
  - Pr 1- Columbia River and tributaries
  - CREDDP & Pr200 - Columbia River Estuary and bi-state (to Portland)
- Por - Oregon
  - Por100 - Statewide
  - Por200 - Coastal regions
  - Por300 - Columbia River Estuary areas
    - Por300 - Rivers and Bays
    - Por 301 - Clatsop County
    - Por 302 - Sections of county
    - Por 306 - Port of Astoria
  - Por400 - Other areas in Oregon

R Resources

- Rf - Fisheries
  - Rf100 - Management/Economics/Migration
  - Rf200 - Biological studies
  - Rf300 - Statistical reports
- Rg - Wildlife
  - Rg100 - Management
  - Rg200 - Biological studies
- Rv - Vegetation
- Rw - Water
  - Rw100 - Management
  - Rw200 - Quality
  - Rw300 - Resources

Commonly Used Acronyms

CREDDP: Columbia River Estuary Data Development Program.

CREST: Columbia River Estuary Study Taskforce.

CTIC: Clatsop-Tillamook Intergovernmental Council.

DLCD: Dept. of Land & Conservation Development (staff).

DSL: Division of State Lands.

EIR/EIS: Environmental Impact Report/Environmental Impact Statement.

EPA: Environmental Protection Agency.

LCDC: Land Conservation & Development Commission.

NOAA: National Oceanic & Atmospheric Administration.

ODEQ: Oregon Department of Environmental Quality.

ODFW: Oregon Department of Fish & Wildlife.

SCS: Soil Conservation Service.

USFWS: U.S. Fish & Wildlife Service (The Service).

CREST

The Columbia River Estuary Study Taskforce (CREST), is an organization of cities, counties and port districts along the Columbia River Estuary. CREST has developed a regional program to simplify the planning process for local governments, improve the area's economy, and to conserve the estuary's natural resources. The CREST office and library is located on the 3rd floor of the Post Office building in Astoria. The library is on a card-file system.

BIBLIOGRAPHIES

Dd Allen, Kenneth and Joe Hardy.
Impacts of Navigational Dredging on Fish and Wildlife: A Literature Review, U.S. Fish and Wildlife Service.

B CREDDP.
A Literature Survey of the Columbia River Estuary , vols. 1 & 2. Annotated Bibliography.

De B Ellinger, Elaine and George Snyder.
"An Annotated Bibliography of the Effects of Dredged and Dredge Disposal on Aquatic Organisms in the Pacific Northwest," NOAA.

B Fowler, Timms and Arlys Bernard.
Beach and Dune Planning and Management: An Annotated Bibliography, Oregon Coastal Zone Management Association, Inc., 1979.

B Leedy, Daniel.
An Annotated Bibliography on Planning and Management for Urban-Suburban Wildlife , U.S. Fish and Wildlife Service.

Categories include urban environment, effects of urbanization on wildlife, wildlife values, planning and management aspects, and research and education in this area.

B,E Morgan, J. B. and R.L. Holton.
A Bibliography of Estuarine Research in Oregon, 1977, OSU Sea Grant.

B Morgan, John B., et al.
An Annotated Bibliography of the Columbia River Estuary. Oregon Estuarine Research Council, 1979.

Useful, shows where the publications are available.

B Morgan, John B.
A Guided Bibliography of Coastal Salt Marsh Literature with Special Reference to the Pacific Northwest Region, Oregon State University.

B OSU Marine Science Center.
A Bibliography of Information and Current Research on Beaches and Dunes in Oregon and Washington.

DEVELOPMENT

Dredging, Dredge material disposal, filling

Dd Ellifrit, Nancy J.
L A Detailed Report on Biological Resources Impacted by the Proposed Navigation Channel Deepening of the Columbia River at the Mouth, 1982, USFWS.

A description of the area, the project, and the resources evaluation, from USFWS' point of view.

Dd Garbisch Jr., E. W.
H "Marsh Establishment on Dredged Materials in Oregon Estuaries," U.S. Army Corps. of Engineers, 1977.

A description of marsh establishment feasibility , methodology, locations, designs, and possible sites in Oregon.

See Por 306: "Port of Astoria: Dredged Material Disposal/Restoration Mitigation Plan."

There is a vast amount of information on dredging under the U.S. Army Corps. of Engineers' "Dredged Material Research Program" as well as other publications, such as successional plant patterns and animals in upland disposal areas, upland and wetland habitat development on dredged materials, etc.

DEVELOPMENT

Energy

De Blahm, Theodore, et al.
M Columbia River Oil Spill Study, June-July 1978, E.P.A. 78-D-X-0390.

A study to determine oil spill impacts on aquatic organisms from the June 1978 spill near Portland, Oregon.

De L Blomberg, George, Duncan Thomas, and Michael DeLapa.
Energy Related Development in the Columbia River Estuary : Potential, Impacts and Mitigation, CREST.

Information for identification and mitigation of impacts associated with energy-related development in the Columbia River Estuary; potential for energy related development, and facility sites.

De M Fore, Paul L., ed.
Proceedings of the 1977 Oil Spill Response Workshop, National Coastal Ecosystems Team Biological Services Program, USFWS, FWS/OBS/77-24, Sept. 1977.

Workshop on oil spills: the Service's responsibilities, current information on biological impacts on wildlife, techniques for minimizing impacts, and other agency roles in responding to oil spills.

De H Sutherland, Bruce.
Oil Spill Protection Plan for the Natural Resources of the Lower Columbia and Willamette Rivers, DLCD and ODEQ, 1979.

Impacts of oil on the Columbia River system, cleanup action recommendations by habitat, physical processes and their effects on oil spills, including maps, charts and wildlife information. Very usable information.

De H Power Planning Committee, Pacific Northwest Basins Commission, July 1978.
"Power Planning Organization in the Pacific Northwest."

Listing and description of Federal and State agencies, inter-utility/agency organizations and other pertinent organizations.

De M U.S. Coast Guard Marine Safety Station.
Oil and Hazardous Substance Contingency Plan, vols. 1-4, January 1984.

Includes State of Oregon Emergency Operation Plan, agency responsibilities and capabilities, "emergency response guidebook," Astoria area information ("vulnerable resources"), including companies, equipment, service organizations for cleanup purposes.

De H U. S. E.P.A.
Oil Spills and Spills of Hazardous Substances, Washington, D.C.

Descriptions of significant spill incidents and the mechanisms of how to deal with them.

De L U. S. Department of the Interior, U.S. Fish and Wildlife Service.
"Oil and Hazardous Substances in the Environment."

A fact sheet from USFWS about hazardous substances in the environment.

DEVELOPMENT

Coal

De 400 M Legislative Committee on Trade and Economic Development.
"An Assessment of EXPORTING COAL FROM OREGON," 1981.

De 400 H Lower Columbia River Development Task Force.
"Opportunities for Export of Coal From the Lower Columbia River," 1981.

An examination of the feasibility of developing a major coal export terminal near the mouth of the Columbia River, and recommendations for Federal action beneficial to terminal development and inland transportation of coal to terminal.

De 400 M State of Oregon Division of State Lands.
"Feasibility Study for Coal Export Facility at Tongue Point," Dept. of Energy.

See Por 300:
"Impacts of the Proposed COLUMBIA RIVER Coal export Channel..."

DEVELOPMENT

Jetties

Dj H Ellifrit, Nancy J.
A Detailed Report on the Major Rehabilitation, South Jetty Columbia River at the Mouth, USFWS, 1982.

A report on the impacts on fish and wildlife resources of proposed (now completed), rehabilitation of the South Jetty; possibly useful for a case study.

Dj H R.E. Hickson and F. W. Rodolf
History of Columbia River Jetties, Port District, U. S. Army Corps., 1950, pgs. 283-298.

Dj H Komar, Paul D., J. R. Lizarraga-Arciniaga, and Thomas A. Terich.
"Oregon Coast Shoreline Changes Due to Jetties," Journal of the Waterways, Harbors and Coastal Engineering Division; Oregon Coastal Changes, 1976, pgs. 13-30.

DEVELOPMENT

Transportation

Dt Oregon State University Extension Marine Advisory Program.
H "A Guide to Oregon's Commercial Fishing Vessels," 1981.

Good pictoral depiction of fishing vessels of the River.

ESTUARIES

Geology

Eg Allen, John and Robert Van Atta.
M Geologic Field Guide to the Northwest Oregon Coast, 1964.

Outdated, but good historical information.

Eg Baldwin, Ewart M.
H Geology of Oregon, University of Oregon.

A useful guide to the geological processes that have occurred in Oregon.

See POR 200: "Environmental Geology..."

ESTUARIES

Mitigation

Em Gonor, J.J.
M "An Evaluation of the Ecological Basis in Mitigation Requirements in Oregon Statewide Estuarine Resources Planning."

Research oriented, but useful for in-depth understanding of the mitigation process.

Em Hamilton, Stanley.
M "Estuarine Mitigation: The Oregon Process," Division of State Lands, State of Oregon.

An explanation of the mitigation process in Oregon, according to DSL.

Em Thomas, Duncan, Michael DeLappa, and David Fox.
H "Columbia River Estuary Mitigation Policy Paper," CREST, 1982.

Research information including statutes, Oregon and Federal laws, and planning information for mitigation on the Columbia River Estuary.

Em U.S. Fish and Wildlife Service.
H "U.S. Fish and Wildlife Service Mitigation Policy," 1981.

Mitigation policy according to the Service.

There are many reports and research papers relating to the Columbia River Estuary, such as "Sediment Transport and Diffusion," studies on salinity, plankton, benthic organisms, etc. that are useful to find specific information on the River, and numerous reports and publications on the Port of Astoria and its activities, ie. revitalization, recreation, industry; some of these are general, and some specific to the Columbia River.

ESTUARIES

Wetlands

Ew Cowardin, Lewis, et al.
H Classification of Wetlands and Deep Water Habitats of the US, USFWS.

USFWS classification that is the basis for the Service's decision making processes regarding wetland issues.

Ew CREDDP Publications: see the end of CREST section for listing.

Ew Fox, David, et al.
H THE COLUMBIA RIVER ESTUARY ATLAS of Physical & Biological Characteristics, CREDDP, 1984.

Probably one of the most useful documents available. A comprehensive compilation of findings including a description of the Estuary, the physical characteristics: circulation, salinity, sediments, primary producers (phytoplankton, benthic primary producers, tidal marshes & swamps), inverterates (zooplankton, benthic infauna, epibenthic organisms), fish, birds, mammals, & a synthesis of regions and habitat types. On a large scale, with full-color maps and charts.

Ew Frenkel, Robt. E.
M Transition Zone Vegetation Between Intertidal Marsh and Uplands in Oregon and Washington, EPA, Dept. of Geology, OSU, 1978.

Research document full of information pertinent to the subject.

Ew Greeson, Phillip, John Clark, and Judith Clark, editors.
H Wetland Functions and Values: The State of Our Understanding-Proceedings of the National Symposium on Wetlands, American Water Resources Association, 1978.

A review of the state of knowledge on values of wetlands in the U.S., translating these functions into social, health, welfare and safety issues. Good background for case studies.

Ew Horwitz, Elinor L.
H Our Nation's Wetlands: An Interagency Task Force Report,
A very good overview of wetlands information, including definitions, functions, and economics related to wetlands; good color photos and charts; generalized, not specific to area.

Ew Josselyn, Michael.
H Wetland Restorationand Enhancement in California, Cal. Sea Grant Program, 1982.

Much useful information about wetlands/marshes and how they function, as well as restoration and enhancement information.

Ew Lewis, James C. and Elaine W. Bunce, editors.
M Rehabilitation and Creation of Selected Coastal Habitats: Proceedings of a Workshop, USFWS, FWS/OBS-80/27, 1980.

Includes: "Salt Marsh Creation in the Pacific Northwest," an article about an area between Tongue Point and Astoria, "Sand Dune Habitat Creation on the Pacific Coast," and other articles about marsh restoration in this area.

Ew Lonard, Robert, et al.
M "Technical Report: Analysis of Methodologies Used for the Assessment of Wetlands Values," Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station, 1981.

An assessment of methodologies in wetland issues.

Ew Oregon State University Extension Service.
H "Obtaining Permits for Waterway Development," 1982, OSU Extension Sea Grant.

Describes ownership and regulations on waterways, and the relationships between local, state and federal governments in the permit process in waterway development.

Ew Phillips, Ronald.
H The Ecology of Eelgrass Meadows in the Pacific Northwest: A Community Profile, USFWS Biological Services, FWS/OBS-84/24, 1984.

A synthesis of information on the structure, biology, and function of eelgrass meadows in the Pacific Northwest and their interrelationships with adjacent communities in the estuarine environment; includes management considerations.

Ew U.S. Army Corps of Engineers.
Lf "Wetlands Protection: The Regulatory Role of the U.S. Army Corps of
M Engineers."

An article, including case studies; useful to show Corps' role in wetland issues.

Ew U.S. Army Corps of Engineers.
M "Preliminary Guide to Wetlands of the West Coast States," 1978.

The Corps' guide to wetland habitats, including 404 Permit regulations.

Ew U.S. Fish and Wildlife Service.
H "Wetlands Plant List," November 1980.

Ew U.S. Fish and Wildlife Service.
H Wetlands of the United States, U.S. Dept. of the Interior, USFWS Circular 39.

USFWS' view of wetlands, including the 20 Wetland Types that the Service uses for classification of wetlands, and land use decisions; useful when interpreting the Service's viewpoint on issues.

Ew Wentz, W. Alan.
H Wetlands Values and Management, USFWS and EPA.

General description of wetlands values and management; good for general asethetics of wetland values

Ew Zedler, Joy B.
H The Ecology of Southern California Coastal Salt Marshes: A Community Profile, USFWS Biological Services, FWS/OBS-81/54, 1982.

A complete analysis of subject including the physiographic setting, vascular plant vegetation, algal mats, comparative roles of each, salt marsh animals, and management considerations. Useful restoration information.

FIELD GUIDES

Ew
H
Clark, Lewis J.
Wildflowers of the Sea Coast in the Pacific Northwest, Gray's Publishing Limited, Sidney, British Columbia, Canada, 1974.

Very good field guide with color photos of area's shoreline flowers.

Ew
H
Mason, Herbert L.
A Flora of the Marshes of California,

A definitive vegetation key to the wetlands of California, applicable to the PNW.

Mg
H
Munz, Philip.
Shore Wildflowers of California, Oregon and Washington, UC Press, 1964.

Comprehensive plant key for these areas.

Rg
200
H
Robbins, Chandler S., et al.
A Guide to Field Identification BIRDS of North America, Golden Press.

A standard field guide.

Mg
H
Wiedemann, Dennis, and Smith.
Plants of the Oregon Coastal Dunes, OSU Bookstore.

A good field guide for this area.

Ew
H
Weinmann, Fred, et al.
Wetland Plants of the Pacific Northwest, U.S. Army Corps of Engineers, 1984.

Field guide with excellent color photos, including USFWS Inventory classification system, cross sectionals, and wetland habitat descriptions.

LEGAL

Federal

Statutes, cases, rules, guidelines

Lf
100
H
Althaus, Helen F.
Public Trust Rights, 1978, USFWS.

Includes early history, public trust in the 20th Century, developments and expansion, summaries of status in particular states (Oregon included).

Lf 100 H
Division of State Lands.
"Removal - Fill Law," O.R.S. 5410605-541.695 and 541.990.
"Removal or Filling Scenic Waterways," O.R.S. 390.805-390.835, 390.905 & 390.925.

Lf 100 M
Review of Section 404 Discharge of Dredged or Fill Material Guideline, Sept. 1978, EPA.

Lf 100 H
U.S. E.P.A.
"404 Mitigation Policy."

Established EPA Region 10 policy on mitigating adverse environmental impact of projects under 404.

Lf 100 M
U.S. Army Corps. of Engineers PERMIT PROGRAM: A Guide to Applicants.

A laypersons guide to applying for a Corps. permit.

Lf 100 M
Tait, Howard D.
Section 402 Handbook, Guidelines for Screening National Pollutant Discharge Elimination System Permits, USFWS, 1984.

Lf 100
State Coastal Management Programs: Development and Approval, 1978, Dept. of Commerce, NOAA.

Lf 100 M
California & Oregon Coastal Zone Management Program Approvals: NEPA Process.

Lf 100 M
State of Oregon Coastal Management Program, Final E.I.S., U.S. Dept. of Commerce, NOAA.

Lf 100 H
Endangered Species Act, 1983. Clean Air Act, 1970, EPA.

Clean Water Act of 1977, Public Law 95-217.

Deepwater Port Act of 1974.

Coastal Zone Management Act of 1972.

Marine Mammals Protection Act, 1974, US Dept. of Commerce, National Marine Fisheries Service.

LEGAL

Oregon
State-Wide Statutes, rules, etc.

Lor 100 H — CREST.
"CREST State and Federal Guideline Notebook."

A compilation of information about topics including : Aquatic Management Area, National Marine Fisheries Service Permit, EPA Guidelines of Disposal Sites for Dredged or Fill Material.

Lor 100 M — Local Government Relations Division, State of Oregon, OSU Extension.
Oregon Land Use Legislation, 1973.

Volume 1: analysis; Volume 2: enacted bills.

Lor 100 M — Richard Ragatz Assoc., Inc.
Comprehensive Plan Monitoring: Guidelines and Resources for Oregon Communities, for Dept. of Land and Conservation Development, 1983.

Includes the role of monitoring in comprehensive planning processes, monitoring data needs, sources, components and procedures, application of the monitoring system, and automated approaches to comprehensive plan monitoring.

LEGAL

Oregon
Local Ordinances

Lor 200 H — Dept. of Land and Conservation Development.
Oregon Coastal Management Program, 1976.

Document includes components and substantive elements, processes for implementing OCMP, and authorities and organizations involved in such programs.

Lor 200 H — Smith, Scott, editor.
A Mitigation Plan for the Columbia River Estuary, CREST, 1983.

Lor 200 H CREST.
"CREST Mediation Materials," 1981.

A compilation of materials relating to a mediation process involving multiple agencies that addressed disputed issues about 7 sites in the Columbia River Estuary Region Management Plan; landmark decisions were made regarding land use issues as a result of this process. Materials include:

-Estuary overview (CREST Plan Overview, Ecological Background, DLCD Estuarine Economic Planning)
-Site descriptions.

Lor 200 H CLATSOP COUNTY COMPREHENSIVE PLAN.

See "City of Jewell," for elements of the Plan.

Lor 200 H COMPREHENSIVE PLANS: Astoria, Hammond, Warrenton.

MISCELLANEOUS

General Reference

Mg H Ricketts, Edward F. and Jack Calvin.
Between Pacific Tides, Stanford University Press.

Excellent reference on the intertidal, open coast, bay and estuary systems; very readable and interesting, with good illustrations.

Mg H U.S. Fish and Wildlife Service.
"Endangered and Threatened Wildlife and Plants." 1984.

Listing of endangered and threatened wildlife and plants of the U.S.

MISCELLANEOUS

History

Mh H Museum of Natural History, University of Oregon.
"The Salmon Fishers: Native Life on the Columbia at the Time of Lewis and Clark, Ideas and Activities for Educators," 1982.

Information and activities for teachers and students on topic.

Mh Phebus, George and Robert Drucker:
H "Archeological Investigations of the Northern Oregon Coast," 1973.

Brief summary of the Smithsonian sponsored excavations in the Seaside area. Possible use for case studies.

MISCELLANEOUS

Natural Hazards

Mn Marston, Linda M.
H "Coastal Natural Hazard Information for Property Owners, Sellers, and Prospective Buyers in the Pacific Northwest," OSU Marine Science Center, 1980.

Good information pertaining to land use; useful for case study information.

OCEANS

Shoreline

Os Osis, Laimons.
H A Guide to Oregon's Rocky Intertidal Areas, Marine Science Center, Newport, Oregon.

Excellent color photos in identification section.

Os Twenhofel, W. H.
M "Mineralogical and Physical Composition of the Sands of the Oregon Coast...",1946.

Very old, but useful information on the sands of Oregon.

Continental Shelf/Nearshore

Oc Hanna, Susan, et al. editors.
H Conflict in Use of Ocean Resources, OSU Sea Grant, 1980.

Collection of papers about ocean resources and conflicts in usage.

Oc Parmeter, Tish and Robert Bailey.
H The Oregon OCEANBOOK, Dept. of Land Conservation and Development Commission, 1985.

"An introduction to the Pacific Ocean off Oregon including its physical setting and living marine resources;" excellent with good black and white pictures for reproduction.

PLANS/INVENTORIES/STUDIES/IMPACT STATEMENTS/ LAND USE

Methods and techniques

Pm Lamb, Benton, ed.
H "Guidelines for Preparing Expert Testimony in Water Management Decisions Related to Instream Flow Issues," USFWS/OBS-79-37.

Practical guide for non-legal persons regarding what to expect when involved in litigation.

Pm Solnit, Albert.
H The Job of the Planning Commissioner. A Guide to Citizen Participation in Local Planning, US Berkeley, 1974.

Accessible information for citizens "volunteering to help solve local problems."

PLANS/etc.

Agencies

Pa CREST.
H Government Agency Roles and Responsibilities. 1977.

Includes Oregon agencies, regional, Washington, and Federal. Inventory of the authorities that operate in the Columbia River Estuary area, including the roles and functions of each with respect to the types of activities that occur in the estuary or along its shoreline; inabling legislation, legal authorities, responsibilities and coordination functions of each agency also discussed.

Pa Department of Environmental Protection.
H DEQ Handbook for Environmental Quality. Elements of Oregon Comprehensive Land Use Policy. 1978.

This guide is intended to help city and county planners write and review local comprehensive land use plans.

Pa Dept. of Land and Conservation Development.
H Planner's Guide to State and Federal Agencies.

Pa Dept. of Land and Conservation Development.
H Information Source Catalog.

A description of technical information available from State and Federal agencies.

PLANS/etc.

United States

Pu
H
Pease, James and S. Reid Schuller.
Inventory of Land Use Educational Materials, OSU Extension Service Special Report 470, 1976.

PLANS/etc.

Regional

Pr
200
H
Garcia, John, et al.
"Energy Related Use Conflicts For The Columbia River Estuary, vol. 1," USFWS.

Inventory of species of concern, site-specific conflicts, planning, policy and regulatory processes, fish-wildlife oriented management and mitigation, generic energy facility oriented management and mitigation, facility operation.

Pr
200
H
Seaman, Margaret H., ed.
"Columbia River Estuary Inventory of Physical, Biological and Cultural Characteristics."

Information about and descriptions of physical alterations in the estuary in relation to dredging, dikes, levees, jetties and pile dikes, roadways and causeways.

PLANS/etc.

Oregon
Statewide

Por
100
H
Clatsop-Tillamook Intergovernmental Council.
Oregon Land Use Law Handbook, 1978.

Handbook for local officials and other interested persons regarding land use issues.

Por
100
H
Dept. of Land and Conservation Development.
Oregon Land Use Statutes:
Chapter 197: Comprehensive Planning Coordination.
Chapter 215: County Planning Zoning, Housing Codes.
Chapter 227: City Planning and Zoning.
Oregon Statutes Relating to Comprehensive Land Use Planning, City, County & State, 1975.

Por 100 M — Oregon State Department of Forestry.
Forest Practices Officer's Handbook, Northwest Oregon Region, 1976.

Designed for field use by Forest Practice's Officer and contains the laws, rules, guidances and references for this Act.

Por 100 H — Oyala, James W.
State of Oregon Laws Relating to Public Ports, 1979.

Lists the laws relating to the use of ports.

PLANS/etc.

Coastal Region

Por 200 M — Beaulieu, John.
Environmental Geology of Inland Tillamook and Clatsop Counties, Bulletin 79, State of Oregon.

Outdated, but good geologic information and photos, including maps.

Por 200 M — Garcia, John, et al.
Energy Related Use Conflicts for the Columbia River Estuary Draft, vols. 1-2.

Extensive information on projection of energy development; a literature review of impacts of such on estuarine systems; an ecosystem modeling of energy related development; species of concern listing; site-specific conflicts and management.

Por 200 M — NOAA.
State of Oregon Coastal Management Program Final EIS, U.S, Dept. of Commerce.

Por 200 H — Oregon Coastal Zone Management Association, Inc.
Reports on the following topics:

Background on Beach and Dune Planning
- An Introduction to Beach and Dune Physical and Biological Processes.
- Beach and Dune Planning and Management on the Oregon Coast: A summary of State-of-the-Arts.

Beach and Dune Identification
- A System of Classifying and Identifying Oregon's Coastal Beaches and Dunes.
- Physical and Biological Considerations.
- Physical Processes and Geologic Hazards on the Oregon Coast.
- Critical Species and Habitats of Oregon's Coastal Beaches and Dunes.

Por 200 H — Oregon Coastal Zone Management Association, Inc. continued:

Management Considerations

Dune Groundwater Planning and Management Considerations for the Oregon Coast.

Sand Removal Planning and Management Considerations for the Oregon Coast.

Oregon's Coastal Beaches and Dunes: Uses, Impacts and Management Considerations.

Dune Stabilization and Restoration: Methods and Criteria.

Implementation Techniques

Beach and Dune Implementation Techniques: Findings-of-Fact.

Beach and Dune Implementation Techniques: Site Investigation Reports.

Beach and Dune Implementation Techniques: Model Ordinance.

Annotated Bibliography

Beach and Dune Planning and Management: An Annotated Bibliography.

Educational Materials

Slide Show: "Managing Oregon's Beach and Dunes."

Brochure: "Planning and Managing Oregon's Coastal Beaches and Dunes."

Por 200 H — Oregon DEQ.
State-Wide Water Quality Management Plan, 1976.

Includes needs and proposed actions for individual river basins in Oregon.

Por 200 M — Pacific Fishery Management Council.
"Proposed Plan for Managing the 1983 Salmon Fisheries Off the Coasts of California, Oregon, and Washington: An Amendment to the 'Fishery Management Plan for Commercial and Recreational Salmon Fisheries of the Coasts of WA, OR and CA Commencing 1978,'" 1983, Draft Plan.

Descriptions of management problems and objectives, fisheries in 1982, and ocean management of salmon 1983.

Por 200 H — Sanderson, R.B. , M.V. Shulters, and D. A. Curtiss.
Lakes of Oregon, Clatsop, Columbia, and Tillamook Counties, U.S. Dept. of Interior.

Geological survey; identification with photos, location, description of area, use, "remarks." *see Por 400.

Por 200 H — USDA.
Beaches and Dunes of the Oregon Coast, USDA Soil Conservation Service, Oregon Coastal Conservation and Development Commission, 1975.

Outdated, but good information with photos.

Por 200 H — U.S. Fish and Wildlife Service.
Pacific Coast Ecological Inventory, User's Guide and Information Base, Biological Services Program, FWS/OBS-81/30, 1981.

Por 200 M — Washington State Dept. of Game.
"Marine Mammal--Fisheries Investigations on the Columbia River and Adjacent Waters, 1980, " 1981.

Por 200 H — Water Resources Research Institute.
Aquaculture: A Modern Fish Tale, 1979, OSU.

Topics include: prospects for aquaculture, State and Federal activities, salmon ranching, fish health management, oyster and salmon production, channel catfish in geothermal water, aquaculture in solar greenhouses, and economic issues.

Por 200 H — Clatsop-Tillamook Intergovernmental Council.
"A Summary Report on the Status of Planning in Clatsop and Tillamook Counties."

Dated, though useful to show past planning processes.

PLANS/etc.

Oregon

Columbia River Estuary areas: Rivers and Bays

Por 300 H — CREDDP.
Bathymetric Atlas of the Columbia River Estuary, 1983.

Collection of maps from several hydrographic studies, provides overview of sediment accretion and erosion patterns within the estuary, and facilitates interpretation of slow, large-scale changes in the estuary floor.

Por 300 H — Fox, David.
"Columbia River Estuary Dredged Material Management Plan," CREST, 1986.

A plan to establish policies and standards for regulating dredging and disposal in the estuary and to identify an adequate number of sites with sufficient capacity for a 20 year period. Very current information; good for possible case study.

Por 300 H — Hamilton, Stanley.
"Estuarine Mitigation: The Oregon Process," 1984.

Administrative rules for estuarine mitigation in Oregon estuaries; includes Oregon Mitigation Law.

Por 300 M — Log Storage Effects Contractor D-2.1.
"The Status of Knowledge on the Effects of Log Storage on the Columbia River Estuary," 1981.

Information on the effects of log storage, specifically: 1) destruction of benthic and emergent plant habitat, 2) potential toxicity of leachates to fish or other aquatic organisms, 3) decreased oxygen, increased hydrogen sulphide, increased color, and increased total volatile solids; contains an annotated bibliography.

Por 300 H — McColgin, Ian, editor.
Columbia River Estuary Regional Management Plan, CREST, 1979.

Plan includes regional policies, management system and development standards, land and water use plans, dredged material management plan, restoration and mitigation plans; currently under revision by CREST.

Por 7300 M — McIntire, C. David.
"The Diatom Flora As A Salinity Indicator in the Columbia River Estuary," U.S. Army Corps. of Engineers, 1981.

A research report; an example of the numerous research reports in the library.

Por 300 H — The Nature Conservancy.
Oregon Natural Areas: Ecological Needs, Candidate Areas, Protection Programs, Clatsop County, 1977.

While outdated, has useful information that was the basis for much of what is in place now; includes inventory and some site reports, and the Oregon Land Protection Programs.

Por 300 H — Oregon Dept. of Fish and Wildlife.
Habitat Classification and Inventory Methods for the Management of Oregon Estuaries, vol. 1, for Dept. of Land and Conservation Development.

Technical assistance to local staffs in fulfilling requirement of LCDC Estuarine Resources Goal.

Por 300 M — Oregon Department of Fish and Wildlife.
"Status Report: Columbia River Fish Runs and Fisheries, 1957-1975."

Information on historical background, fisheries, and run status and harvest by season and species; useful, written for public use.

Por 300 H — Seaman, Margaret H.
Columbia River Estuary Inventory of Physical, Biological and Cultural Characteristics, 1977.

Comprehensive compilation of information that includes the physical, environmental, biological, historical and cultural aspects of the region; includes annotated bibliography on each major topic; used in conjunction with the CREST Atlas.

Por 300 M — Sims, Carl W.
"Migrational Characteristics of Juvenile Fall Chinook Salmon, in the Columbia River Estuary," 1979, National Marine Fisheries Service.

A study of migrational and behavioral characteristics of juvenile fall chinook salmon. (An example of many such research papers on the fish/fishing industry of the area, that are available in the library.)

Por 300 M — Thomas, Duncan W.
"The Vascular Flora of the Columbia River Estuary," 1982.

A research paper on the vascular flora of the first 40 miles of the River.

Por 300 H — U.S. Army Corps. of Engineers.
Inventory of Riparian Habitats and Associated Wildlife Along Columbia and Snake Rivers, vols. 1-2b.

Vol. 1-summary; Vol. 2a-Lower Columbia River region;Vol. 2b-Lower Columbia River maps. A comprehensive compilation of materials. Survey covers from the mouth of the Columbia to mile 79.

Por 300 H — U.S. Fish and Wildlife Service.
"Impacts of the Proposed COLUMBIA RIVER Coal Export Channel on Fish and Wildlife Resources," Fish and Wildlife Coordination Act Report, Region One, 1986.

USFWS position on proposed alterations for Columbia River coal export channel based on impacts on fish and wildlife resources.

PLANS/etc.

Oregon
Columbia River Estuary areas: Clatsop County

Por 301 H — Bartl, Rainmar, and Mike Morgan.
An Economic Evaluation of the Columbia River Estuary, 1981.

Por 301 M — Clatsop County Ordinance. Clatsop County Land and Water Development and Use.

Por 301 H — Clatsop County Planning Department. Environmental Plan of the Clatsop Plains, Citizens Advisory Commission, OSU Extension Service, 1974.

Por 301 H — Hansen, D.T. and B.L. Harris. Natural Environment: Environmental Geology of the Clatsop Plains, 1974.

Por 301 H — Hansen, D.T. and B. L. Harris Natural Environment: Soils of the Clatsop Plains, 1974.

Por 301 H — B.L. Harris, and D.T. Hansen. Land Use on the Clatsop Plains, Past and Present, 1974.

Por 301 M — Kidby, Harold, et al. "Erosion and Accretion Along Clatsop Spit," 1965.

Old, but could be useful historically, and for a case study.

Por 301 M — The Nature Conservancy. Clatsop County Inventory of Natural Areas on Private Lands, 1974.

Old but useful information; describes habitats and inventories species.

Por 301 H — Soil Conservation Service. General Soil Map with Soil Interpretations for Land Use Planning, Clatsop County, Oregon, 1973.

Por 301 H — Stockham, John. Natural Environment: Biological Inventory of the Clatsop Plains, 1974.

Por 301 M — Sweet, Randy. Carrying Capacity of the Clatsop Plains Sand-Dune Aquifer, 1977.

Por 301 M — Sweet, Edwards and Assoc., Inc.
Clatsop Plains Ground Water Protection Plan, Ground Water Evaluation Report, 1981.

Technical study with maps.

Por 301 H — Thomas, Duncan.
"Significant Shoreland and Wetland Habitats in the Clatsop Plains and the Columbia Floodplain of Clatsop County, Oregon," 1982.

Por 301 M — Tolle, Timothy.
Natural Environment: Hydrography of the Clatsop Plains, 1974.

PLANS/etc.

Oregon
Columbia River Estuary areas: Sections of County

Por 302 H — Maine, Neal.
Necanicum Estuary Inventory, Dept. of Land and Conservation Development, 1979.

Por 302 H — Necanicum Estuary Committee and Clatsop/Tillamook Intergovernmental Council.
"The Necanicum Estuary Plan," 1979.

PLANS/etc.

Oregon
Columbia River Estuary areas: Port of Astoria

Por 306 H — League of Women Voters.
Know Your Port: A Look At The Port of Astoria, 1977.

Includes history, laws governing ports, policy, management and administration, longshoremen information, port operations, fiscal matters, economic benefits, information on the channel and the bar, and the outlook for the Port.

Por 306 M — Port of Astoria.
"Clatsop County Airport Master Plan," 1975.

Por 306 M — Port of Astoria.
"The Port of Astoria: Present Trends and Future Developments."

A report including information on the setting, "institutional parameters" of future Port actions, historical analysis of cargo movements, environmental characteristics and constraints of sites for expansion.

Por 306 — Port of Astoria Planning Department.
"Port of Astoria: Dredged Material Disposal/Restoration Mitigation Plan."

Other Areas of Oregon

Por 400 H — Johnson, Daniel M. , R.R. Petersen, and D.R. Lycan.
Atlas of Oregon Lakes, OSU Press, 1985.

A comprehensive survey of the lakes of Oregon, with photos and data.

RESOURCES

Fisheries

Rf 100 M — Dept. of Land and Conservation Development.
"Oregon Coastal Zone Fishery Management Analysis," 1979.

A comprehensive survey of fish resources, the fishing industry, the economics, management, and future development of the same.

Rf 100 H — Government of Canada.
Stream Enhancement Guide, 1980.

Clearly written and illustrated guide to subject with a short section on the improvements for public access and education.

Rf 100 M — National Fisherman, pub.
The American Fisheries Directory and Reference Book, 1978.

A listing of agencies, state, local, federal and international as well as other pertinent information displayed on charts.

Rf 100 M — Pacific Fishery Management Council.
Fishery Management Plan and Supplemental Environmental Impact Statement for the Washington, Oregon, and California Groundfish Fishery, 1982.

Comprehensive management plan for groundfish.

Final Framework Amendment for Managing the Ocean Salmon Fisheries Off the Coasts of Washington, Oregon and California Commencing 1985.

An amendment of Plan.

The 7th Draft Amendment, August 1986.

Rf 100 — Pacific Fishery Management Council.
"Final Environmental Impact Statement and Fishery Management Plan for Commercial and Recreational Salmon Fisheries Off the Coasts of Washington, Oregon, and California Commencing in 1978, U. S. Dept. of Commerce.

Rf 100 H — Pacific Northwest River Basins Commission.
Agencies, Organizations and Interests Affecting Columbia River Anadromous Fish, 1980.

A compilation of regulatory and nonregulatory agencies involved with anadromous fisheries management in the Pacific Northwest.

RESOURCES

Wildlife Management

Rg 100 H — Columbia White-Tailed Deer Recovery Team.
"Columbia White-Tailed Deer Recovery Plan," USFWS, 1976.

Rg 100 M — U.S. Dept. of Interior.
"E.I.S. Proposed Additions To and Operation of The Columbian White-Tailed Deer National Wildlife Refuge, Oregon, Washington," 1973.

Rg 100 M U.S. Fish and Wildlife Service.
"Concept Plan for Waterfowl Wintering Habitat Preservation, Washington, Oregon Coasts," 1979.

Descriptions of waterfowl population, habitat descriptions, threats and associated problems and impacts of perservation efforts (proposed and actual).

RESOURCES

Wildlife

Biological Studies

Rg 200 M Batchelder, H. P. and J. J. Gonor.
"Population Characteristics of the Intertidal Green Sea Anemone, ***Anthopleura xanthogrammica*** on the Oregon Coast," OSU Sea Grant, pg. 235-245.

Rg 200 M Crawford, John A. and Geoffrey L. Dorsey.
"An Evaluation of Avian Communities on Dredged Materials and Undisturbed Island Habitats," 1980.

Research paper on subject on 4 islands in the Lower Columbia River; useful for case study concerning dredged materials.

Rg 200 H Lincoln, Frederick.
Migration of Birds, Circular 16, USFWS, 1979.

Laypersons guide to bird migration.

Rg 200 M McMahon, Ellen.
"A Survey of Great Blue Heron Rookeries of the Oregon Coast," OSU.

A student research paper on subject.

Rg 200 M Murphy, Michael and James Hall.
"Varied Effects of Clear-cut Logging on Predators and Their Habitat in Small Streams of the Cascade Mountains, Oregon," Can. J. Fish. Aquat. Sci. 38:137-1145.

There are many books, reports, and articles on fisheries and fish and how they relate to economics, resource management and use.

RESOURCES

Vegetation

Rv Phillips, Ronald C.
M The Ecology of Eelgrass Meadows in the Pacific Northwest: A Community Profile.
H USFWS, 1984.

Water

Rw EG and G Washington Analytical Services Center, Inc.
100 "Handbook of Federal Systems and Services for Marine Pollution Data and
H Information, for NOAA," 1983.

Describes characteristics of Federal systems and services identified as having data or information relevant to marine pollution or other "man-induced perturbations" to the marine environment.

Rw U.S. Dept. of Commerce.
100 National Marine Sanctuary Program, Program Development Plan, National
M Oceanic and Atmospheric Administration, 1982.

Discusses this program and its goals; includes site identification criteria.

Rw U.S. Fish and Wildlife Service.
100 "The Public Trust Doctrine, Instream Flows and Resources," 1980.
M

A discussion of water resource management including the Federal and State role, the water allocation process and instream flows, water rights, and implementation of the public trust doctrine.

There are many articles, research papers, reports on water quality in the Columbia River basin, such as "Meeting Water Quality Objectives on State and Private Forest Lands Through the Oregon Forest Practices Act," as well as on all of the other topics listed above. For more information on any of these subjects, please refer to the CREST library card file.

H **CREDDP Publications.**
The following is a listing of the major CREDDP publications available at CREST:

Tidal Marsh Plant Production of the Columbia River Estuary.

Benthic Primary Production of the Columbia River Estuary.

Water Column Primary Production of the Columbia River Estuary.

CREDDP Publications continued:

Zooplankton and Larval Fishes of the Columbia River Estuary.

Benthic Infauna of the Columbia River Estuary.

Epibenthic Organisms of the Columbia River Estuary.

Fishes of the Columbia River Estuary.

Avifauna of the Columbia River Estuary.

Key Mammals of the Columbia River Estuary.

Sedimentary Processes & Environments of the Columbia River Estuary.

Circulatory Processes of the Columbia River Estuary.

Hydrodynamic Modeling in the Columbia River Estuary.

The Dynamics of the Columbia River Estuarine Ecosystem.

Index to CREDDP Data.

*Guide to the Use of CREDDP Information for Environmental Assessments.

*Bathymetric Atlas of the Columbia River Estuary.

*Changes in Columbia River Estuary Habitat Types Over the Past Century.

*Columbia's Gateway.

*Literature Survey of the Columbia River Estuary.

Also available:

Abstracts of Major CREDDP Publications.: **INCLUDING:**

Annotated Bibliography of Other CREDDP Products: Publications, Maps and Related Materials, Reference Collections and Unprocessed Samples.

Columbia River Estuary Data Development Program Sampling Site Maps.

*especially interesting and useful documents.

CREST MAPS/CHARTS

There are many maps and charts available to look at in the CREST library. There is no definite catalogue system. The following is a listing of some of the most pertinent maps available there.

Zoning Maps: Hammond, Astoria, Warrenton, Clatsop County.

National Wetlands: Clatsop Plains Shoreland Inventory, USFWS, National Wetlands Inventory.

Navigation Charts.

Bathymetric maps: different dates.

Aerial photos: estuary area only; several scales and dates.

USFWS Pacific Coast Ecological Inventory Maps, 1981.

USGS Quadrangle maps of estuary area.

Flood Maps: Flood Insurance Rate maps; more detailed work maps; 100 year flood planning.

CREDDP Base maps: 6 scales; shows tidal wetlands, bathymetry, land forms.

Detailed maps of specific areas within the County.

COUNTY PLANNING OFFICE

These resources can be found in the office of the County Planner, Curt Schneider. The offices are in the County Courthouse in downtown Astoria. There is no definite system of classification; the CREST system has been used here.

DEVELOPMENT

Energy

De 200 M — Heineke, Thomas.
Natural Resource Base and Physical Characteristics of the Proposed Offshore Oil Platform Fabrication Site Warrenton, Oregon, 1976.

ESTUARIES

Biological Studies

Eb M — Oregon Coastal Conservation and Development Commission.
Estuarine Resources of the Oregon Coast, 1974.

Descriptions and definitions of estuaries, "natural functions," human uses, individual estuaries, and management concepts.

ESTUARIES

Collections/General

Ec M — Division of State Lands.
Ownership of Oregon Estuaries, 1974.

Map format showing primary ownership in state; very general and old, but useful to show who generally "owns" the estuaries.

ESTUARIES

Geology/Sedimentation

Eg H — Ross, Martin.
A Field Investigation of Geology: Handbook from Silver Point to Cove Beach, Clatsop County, Oregon.

An investigation performed for the Clatsop Co. Dept. of Planning and Development.

Eg H Rankin, David.
Holocene Geologic History of the Clatsop Plains Foredune Ridge Complex, 1983.

Thesis on the geologic history from 3500 years BP to the present.

ESTUARIES

Legal
Federal

Lf H Dept. of Land and Conservation Development.
Planner's Guide to State and Federal Agencies.

A useful, descriptive guide to agencies concerned with land use policies, the environment, and economics.

Legal
Oregon

Lor 100 L State of Oregon, Intergovernmental Relations Division.
1978 Permit Inventory of State Requirements for Developers/or Activities on Specific Sites.

Lists by agency, permits required for specific activities.

Lor 200 H CLATSOP COUNTY COMPREHENSIVE PLAN.

See "City of Jewell" for listing of elements of the Plan.

Lor 200 H Bureau of Governmental Research.
Local Government in Oregon, U. of O., 1969.

Includes the legal framework of local government, financing local government, intergovernmental relations, and local governmental organization. Old, but good information on how Oregon government works.

Lor 300 H Oregon Department of Energy.
Guide to Oregon's Environmental Permits for Biomass Energy Projects, 1984.

Why a permit is required, when it applies, what it entails, and who to contact for assistance. (Biomass projects include energy from wood residue, solid waste, crop residues, manure, grain, forest plantations.)

MISCELLANEOUS

History

Mh H — Beckham, Stephen.
Historical and Archaelogical Resources of the Oregon Coastal Zone, 1974.

PLANS/INVENTORIES/STUDIES/IMPACT STATEMENTS/LAND USE

Oregon

Por 100 H — Bureau of Governmental Research and Services.
Community Planning in Oregon: A List of Publications, U. of O. 1978.

Provides reference to descriptive and analytical data and information available about communities and substate regions in Oregon. Lists publications on community planning and development activities.

Por 100 H — Clatsop-Tillamook Intergovernmental Council.
Oregon Land Use Law: A Guide for Planning Commissioners, 1975.

A brief overview on the 3 most important judicial and legislative decisions in the State, and how those decisions relate to land use.

Por 100 M — Oregon Dept. of Economic Development, DLCD, U.S. Maritime Administration.
Oregon Ports Study, 1980.

Includes a summary of port facility inventories, transportation infrastucture serving the ports, waterborne trade, commerce forecasts, port capacity, economic impact of port, development options and recommendations.

Por 100 H — State Land Board, Natural Heritage Advisory Committee.
Oregon Natural Heritage Plan, 1981.

Includes priorities and criteria for conservation, natural resources of Oregon, special species, techniques for conserving natural heritage (agencies, acts, program).

PLANS/ETC.

Oregon
Coastal Regions

Por 200 H — Oregon Coastal Zone Management Association, Inc.
Beaches and Dunes Handbook for the Oregon Coast.

Beach and dune planning and management, processes, identification, physical and biological considerations, management consideration, implementation techniques, and annotated bibliography.

Por 200 M — State of Oregon.
Environmental Geology of Inland Tillamook and Clatsop Counties, Oregon, 1973.

Geological maps of these counties.

Por 200 M — State Soil and Water Conservation Commission.
Oregon Coastal Management Program: Shoreline Erosion Management Policies and Procedures, vols. 1-3, 1978.

Includes shoreline erosion management, the Oregon Coastal Management Program, and an evaluation of the accomplishments and improvements needed.

Por 200 — U.S. Army Corps. of Engineers.
Shore Protection Manual, vols. 1-2.

PLANS/ETC.

Oregon
Columbia River Estuary areas

Por 301 H — Alaback, Paul and Robert Frenkel.
Preserve Analysis of Saddle Mountain, 1978, Oregon Natural Areas Preserves Advisory Committee, State Lands Board.

Por 301 M — "Arch Cape Water Study," Design and Review Board.

Por 301 — Ehinger Jr., Paul.
Clatsop-Tillamook Solid Waste Management Plan, for CTIC, 1974.

Por 301 M — Environmental Plan of the Clatsop Plains.

Plans put together for various areas by citizen advisory committees, as the beginning of Comprehensive Plans.

Por 301 H — Frenkel, Robert and William Copeland.
Preserve Analysis of Onion Peak, 1979, Oregon Natural Areas Preserve Advisory Committee, State Lands Board.

Por 301 M — "Master Plan of Fort Clatsop National Memorial," 1964.

Por 301 M — Morgan, Mike and Jeff McKey.
An Environmental Plan of SW Clatsop County, Western Interstate Commission for Higher Education, 1974.

Por 301 H — Nature Conservancy.
Clatsop County Inventory of Natural Areas on Private Lands, 1974.

Includes inventories, maps, zones.

Por 301 H — Oregon State Parks and Recreation, Dept. of Transportation.
Fort Stevens State Park Master Plan.

Por 301 M — Palmer, Leonard.
"Stability of Coastal Dunes, Clatsop County, Oregon," 1978.

Por 301 M — STRAAM Engineers, Inc.
Sewer System Evaluation Survey, City of Seaside Oregon, 1979.

Por 301 M — Sweet, Edwards and Associates, Inc.
Clatsop Plains Ground Water Protection Plan Monitoring Data Base, 1981.

Clatsop Plains Ground Water Protection Plan: Ground Water Evaluation Report.

Beck, R.W. and Assiciates.
Clatsop Plains Ground Water Protection Plan: Summary Report & Assessment, 1982.

Results of a study initiated to protect the Clatsop Plains aquifer from adverse water quality impacts through the development of a plan, and to provide information to aid in the selection of alternative wastewater disposal methods.

Por 301 H — Taylor, Doug and Warren Kinispel.
"Fish and Wildlife Habitat Protection Plan for Clatsop County," 1976, ODFW to Clatsop County Division of Planning and Development.

A report prepared to help with comprehensive land use planning.

Por 301 H — Thomas, Duncan.
Ecola Creek Estuary Inventory.

Done as part of the planning for the Cannon Beach Comprehensive Plan.

Por 301 H — Thomas, Duncan.
"Significant Shoreland and Wetland Habitats in the Clatsop Plains."

Includes the Columbia River plains, the Clatsop Plains, and the Ecola Creek wetland.

Por 304 M — Beck, R.W. and Association.
City of Gearhart Wastewater Facilities Planning Study, 1979.

RESOURCES

Wildlife

Biological studies

Rg 200 H — USDA, Forest Service.
Draft Supplement to EIS for Amendment to the PN Regional Guide: Vol. 1-Spotted Owl Guidelines, Vol. 2-Appendices.

Rg 200 H — USDA,Forest Service.
"Silver Spot Butterfly: Ecological Investigation Report," USFW.

"Silver Spot Butterfly: Recovery Plan," 1982, (being revised).
"Field Survey Results, 1982 and 1985."

Rg 200 H — USFWS.
"Recovery Plan: Peregrine Falcon.
: Aleutian Canada Goose.
: Columbia White-Tailed Deer."

RESOURCES

Vegetation

Rv M Crown Zellerbach Corp.
"Environmental Guide: Northwest Timber Operations," 1971.

Old, but shows the timber industry's view; includes policy statement, environmental goals, individual responsibilities, permits required, road building, logging, water transportation and storage of logs, soils, scarification, forestry chemicals, aesthetics, fish conservation.

Rv H Meinke, Robert.
Threatened and Endangered Vascular Plants of Oregon: An Illustrated Guide, USFWS.

Rv H ODFW.
"Riparian Habitat Technical Task Force Report Final Report to the State Forester and Director, Fish and Wildlife," 1985.

Defines riparian ecosystem and its parts, explores aquatic wildlife and timber resource considerations within streamside areas; includes recommendations, habitat considerations/riparian ecosystem, harvesting operations in relationship to riparian ecosystems.

Rv H Siddall, Kenton L. Chambers, David Wagner.
Rare, Threatened and Endangered Vascular Plants In Oregon, Oregon Natural Areas Preserves Advisory Committee, State Lands Board, 1979.

CLATSOP COUNTY MAPS/CHARTS

The County maps are in the office, with no apparent catalogue system. The following is a partial listing of pertinent items.

Clatsop County Inventory maps.

Zoning maps.

CREST base maps.

Columbia River maps.

Necanicum Estuary.

Ecola Creek Estuary.

All non-estuarine shorelands, lakes, floodplains, significant natural resources.

"Active, Conditional Stable, Stable Dunes," by Leonard Palmer.

Aerial photos Columbia River Estuary, Coastal Strip.

The County has many other maps including:

1. soils: black and white aerial photos at a scale of 1:12000, delineating different soil types, with a key describing briefly each soil type. Covers entire County, updated in 1983.

2. flood plain: printed maps showing 100 year floodplain, 500 year floodplain, 100 year floodplain elevations (NGVD) and floodway boundaries; all at a scale of 1"=1000'. Covers coastal velocity zone and most major rivers, with some exceptions.

3. wetlands: black and white photocontour maps with a mylar overlay showing "significant" freshwater wetlands. Each wetland is classified according to the taxonomy developed by the USFWS. A written description of each distinct wetland is also included. Covers area from Clatsop Spit to Tillamook Head (Duncan Thomas, 1982).

   Mylar maps of the Columbia River estuary upriver to the west end of Puget Island at 1"=1000' showing type of marsh, and including roads, property lines, section corners, some zoning. Also includes fairly detailed written descriptions of wetland and shoreline habitats (CREST).

MAPS continued:

4. **geology**: description of coastal slide and erosion areas from Cannon Beach to Clatsop-Tillamook County line on black and white aerial photos at a scale of 1"=200'. (Martin Ross Report).

5. **groundwater**: detailed groundwater information for the Clatsop Plains aquafir. Several maps at various scales; 5 vols. of printed information.

6. **population**: annual population figures for cities and the County back to 1968, less frequently back to 1900. (PSU, Census Bureau).

7. **historic**: locational information for various historic sites in the unincorporated county.

CLATSOP-TILLAMOOK INTERGOVERNMENTAL COUNCIL

CTIC is an association of governments composed of 2 counties and the cities therein Two planners, Mike Morgan and Rainmar Bartl provide services to these cities and counties. CTIC is supported by City contributions and State and Federal funds. The CTIC office is located in Cannon Beach; there is no catalogue system for resources there.

BIBLIOGRAPHIES

B Land Conservation and Development Commission Bibliography, 1975.

A bibliography of issues concerning land use.

LEGAL

Oregon

State-wide statues, rules, etc.

Lor 100 H Bureau of Governmental Research and Service, U. of O.
State Agency Coordination.

Each state agency's plan for how they interface in land use decisions for LCDC. Not as useful as could be as these agencies do not necessarily do what they say they do.

Lor 100 M U.S. Dept. of the Interior, BLM.
Wilderness Inventory Oregon and Washington, 1980.

The final intensive inventory decisions on wilderness areas. (There are no "wilderness areas" in Clatsop County.)

Local ordinances

Lor 200 H COMPREHENSIVE PLANS and ZONING ORDINANCES for all cities in County.

Only available to the public to look at in the office.

PLANS/INVENTORIES/STUDIES/IMPACT STATEMENTS/LAND USE

Oregon
Statewide

Por 100 H — Bureau of Governmental Research and Service.
Land Use Procedures and Practices in Oregon, U. of O., 1985.

Describes local governmental land use decision-making processes and presents some examples of forms and documents used in management.

Por 100 H — Bureau of Governmental Research and Service.
Videotape: "Oregon's Land Use Program."

Discusses 3 types of land use decisions.

Por 100 H — Department of Environmental Quality.
Oregon's Statewide Assessment of Nonpoint Source Problems, 1978.

Text and many maps: streambank erosion, sedimentation, excessive debris, water withdrawals, elevated water temperatures, nuisance algae or aquatic plant growths, composite of nonpoint source problems, erosion potential, sediment yields.

Por 100 H — Department of Land and Conservation Development.
A Citizen Involvement Handbook.

Citizen involvement responsibilities, programs, and techniques.

Por 100 H — OSU Extension Service.
Inventory of Land-Use Educational Materials, 1978.

Coastal Regions

Por 200 M — Sanderson, John.
Oregon Coastal Zone Wind Data Inventory: Final Report, Oregon Dept. of Energy, 1983.

Inventory of wind measurement data for the Oregon coastal zone.

Por 200 M — State Soil and Water Conservation Commission.
Inventory: Oregon Coastal Shoreline Erosion, 1978.

Includes bibliography, site studies, processes and historic patterns, determination of erosion/sedimentation areas and erosion rates.

Por 200 H — U.S. Dept. of Housing & Urban Development, & Federal Emergency Management Agency.
Design & Construction Manual for Residential Building in Coast High Hazard Areas, Federal Insurance Administration.

A useful book addressing coastal erosion, site design recommendations, structural design recommendations, design considerations, construction costs.

PLANS/ETC.

Columbia River Estuary areas: Clatsop County

Por 301 M — City of Cannon Beach.
"Procedural Guide for Developing Your Cannon Beach Property."

Discusses responsibilities of the City, County and the owner in land development.

Por 301 H — City of Cannon Beach.
"An Exception to Permit an Artificial Marsh Wastewater Treatment System in the Elk Creek Estuary," a part of the Comprehensive Plan.

Por 301 H — Kramer, Chin and Mayo Inc.
Development and Evaluation of Wetlands/Marsh Wastewater Treatment System, City of Cannon Beach Facilities Plan Addendum No. 2.

Includes conclusions and recommendations, site conditions, archaelogical survey, resource agency concerns, vegetation and wildlife surveys, etc.

Por 301 H — Morgan, Mike and Dennis Rittenback.
Cannon Beach Comprehensive Plan Background Report, CTIC, 1979.

Includes information on population and land use, natural resources, air and water quality, geologic hazards, openspace, parks and recreation, economy, housing, public facilities and services, transportation, energy conservation, and Shorelands and Estuary Inventories.

CTIC

Por 301 M

U.S. Dept. of Housing and Urban Development.
Flood Insurance Study, City of Cannon Beach, 1977.

Analysis of area studies, management applications and insurance applications.

SOIL CONSERVATION SERVICE

Don Leach is the Soil Conservation Service's Engineer. The information is county-wide; most of what is available here is through Don Leach, and not catalogued in any way.

Examples of what are available:

SLIDESHOWS: "Soil Development of Clatsop County," for students 9-10 yrs.
H "For Lands Sake Keep It Under Cover," stability of sand dunes info.
Tape-County Natural Resources.

SURVEYS:

H "Clatsop County Soil Survey," including maps and manuscript. Can be used in classrooms with aids, showing students the textures of different soils, how to make maps, etc.

Clatsop Dunes Restoration Project: photographic information.

Aerial Photos from 1935-1980.

Transperancies, pictures on "Soils," " Man and Conservation of Soils," " Critical Soil Issues for the Future."

Dikes: maps, photos, other information available from Don Leach.

Information about the Food and Security Act 1985: provides regulation for farmers/landowners--govt. assistance, cost-sharing, loans, dependent upon specific regulations on wetlands.

Permit information--Soil District reviews permits in the case of landfills, pilings, tidegates, repair of dikes; floating housing; location of dikes.

Bank Erosion of River, photos.

Natural Resources: urban land, farm land, road systems.
Erosion of Streams, Prime and Important Farm Land Soil Survey, Road Erosion Data, Natural Survey on Erosion and Protection (data printout), Dike Maintenance Survey 1983, Streambank Erosion Survey, Waste Management Survey 1984 (farms).
Oregon Soil and Water Conservation Needs Inventory, 1971, USDA.

Basic Statistics 1977 Natural Resources Inventory: includes land capability, surface area, small water areas, floodprone areas, irrigated land, conservation needs, sheet and rill erosion, prime farmland, potential for new cropland, wind erosion in Great Plains States, soil quality, crop productions. This is on a Federal level, then each state does its own inventory, based on this one.

SEASIDE SCHOOL DISTRICT CURRICULUM LIBRARY

School District 10's offices in Seaside is the location of this library, in the office of Neal Maine, the Curriculum Specialist for the district. There is no catalogue system to these books.

PLANS/INVENTORIES/STUDIES/IMPACT STATEMENTS/LAND USE

Oregon
Statewide

Por 100 H — Marshall, David.
Oregon Nongame Wildlife Management Plan, ODFW, 1986.

Describes the role of ODFW and other organizations in management of resources, Oregon's vertebrate nongame wildlife resources in terms of species numbers, distribution, populations where known, habitats, problems, maintenance, and "who is to do what." Includes goals & objectives, and a 5-year operational plan. Describes responsible Federal authorities and acts relating to subject; has statewide as well as specific descriptions.

Oregon
Coastal regions

Por 200 H — US Forest Service, Pacific Northwest Region.
Landforms of the Oregon Dunes, Siuslaw National Forest, DRAFT.

Short vignettes about 26 dune landforms and wildlife habitats, including a bibliography. Topics are: geology, beach, foredune, hummocks-wet & dry, deflation plain, transverse dunes, oblique dunes, parabola dunes, tree islands, transition forest, wind, water, plants and wildlife. Each section has a black and white drawing of subject, and includes photos, drawings and charts.

Oregon
Clatsop County

Por 301 H — Rankin, David Karl.
Holocene Geologic History of the Clatsop Plains Foredune Ridge Complex, Thesis for Master of Science, Geology, PSU, 1983.

Investigates origin and development of Clatsop Plains; describes landforms and desposits of area; investigates field indicators of past processes affecting coastal propagation; through carbon 14 dating evaluates rates of coastal propagation and history of relative sea level changes; includes useful photos, charts, and references.

Por 301 H — Sweet, H. Randy.
Carrying Capacity of the Clatsop Plains Sand Dune Aquifer, A Report to the Clatsop County Commissioners and OEQ Commissioners, 1977.

Delineates long-term ground water supply reserve needs and area(s), on-site disposal densities in specific areas which will not cause "unacceptable degradation" of ground water and/or surface waters, and outlines methodology and final analysis. This assisted in the establishment of a ground water quality monitoring program.

Oregon
Other areas in Oregon

Por 400 H — Wiedemann, Alfred.
The Ecology of Pacific Northwest Coastal Sand Dunes: A Community Profile, USFWS Biological Services, 1984.

The Pacific Coast from Cape Flattery, WA to Cape Mendocine, CA; the environmental settings (emphasizing factors involved in shaping dune landscapes); classification of dune forms; history of dune processes and possible future course of events; plant communities of the dunes; wildlife habitats of dunes; human impact emphasizing management problems; includes list of dune areas, and characteristic plants and animals.

LEWIS & CLARK NATIONAL WILDLIFE REFUGE - USFWS

The following is an annotated bibliography of references available at the Lewis & Clark National Wildlife Refuge. The Refuge is located in Cathlamet, WA, and information can be obtained by contacting the Refuge manager.

ESTUARIES

Biological Studies

Eb Peters, Carl F., et al.
H Colonial Nesting Sea and Wading Bird Use of Estuarine Islands in the Pacific Northwest. Technical Report D-78-17, 1978. Dredged Material Research Program, U.S. Army Waterways Experiment Station, P.O. Box 631, Vicksburg, MS 39180.

East Sand Island is one of 23 natural and dredged material islands studied to establish the relationships between plant communities and use by colonial nesting waterbirds. This report also describes two great blue heron nesting colonies on Columbia River islands upstream of the estuary.

Eb Tabor, James E.
H Inventory of Riparian Habitats and Associated Wildlife Along the Columbia River, 2 vols., U.S. Army Corps., North Pacific Division, 1976.

Volume IIA contains the narrative and Volume IIB contains the maps.

Wetlands

Ew Seliskar, Dennis M. and John L. Gallagher.
H The Ecology of Tidal Marshes of the Pacific Northwest Coast: A Community Profile, USFWS, Division of Biological Services, 1983. FWS/OBS-82/32.

Describes the structure and function of Pacific Northwest tidal marshes. Chapters 1 & 2 discuss the development of coastal wetlands and the physical and chemical environment in which organisms live. Chapter 3 looks at the biotic communities of tidal marshes; Chapter 4 focuses on ecological interactions within tidal marshes; Chapter 5 discusses management practices.

Ew Simestad, Charles A.
H The Ecology of Estuarine Channels of the Pacific Northwest Coast: A Community Profile. USFWS, Division of Biological Services, 1983. FWS/OBS-83/05.

Describes physical and biological components and processes, and explains ecological structure and function of estuarine channels. Final chapter integrates information into discussion of management considerations.

Oceans

Os Lewis, James C. and Elain W. Bunce, eds.
H Rehabilitation and Creation of Selected Coastal Habitats: Proceedings of a Workshop. USFWS, Biological Services Program, 1980. FWS/OBS-80/27.

Resources
Wildlife

Rg Buckley, P.A. and F. G. Buckley.
100 Guidelines for Protection and Management of Colonially Nesting Waterbirds.
H North Atlantic Regional Office, National Park Service, 1976.

Although it focuses on Atlantic and Gulf Coasts, the protection and management needs and recommendations have much in common with the Pacific Northwest.

Rg Davison, Michael A.
100 Columbian White-tailed Deer Status and Potential On Off-Refuge Habitat.
M Wildlife Management Division, Washington Dept. of Game, 1979.

Results of a survey of Columbia River islands in Washington for presence of Columbia white-tailed deer.

Rg USFWS.
100 Concept Plan for Waterfowl Wintering Habitat Preservation: Washington and
H Oregon Coasts. 1979.

Describes a proposed wetlands preservation program using funds generated by the sale of Federal Migratory Bird Hunting and Conservation Stamps (Duck Stamps). Plan describes wetland areas, their importance to waterfowl populations, and threats to their preservation.

Rg Gavin, Thomas A., et al.
200 Population Characteristics, Spatial Organization, and Natural Mortality in the
H Columbian White-tailed Deer. Wildlife Monograph No. 91, The Wildlife Society.

Rg 200 H Landin, Mary C.
A Selected Bibliography of the Life Requirements of Colonial Nesting Waterbirds and Their Relationships to Dredged Material Islands, Technical Report D-78-5, 1978, Dredged Materials Research Program, Army Waterways Experiment Station.

Rg 200 H Maser, Chris, et al.
Natural History of Oregon Coast Mammals, Technical Report PNW-133, U.S. Forest Service, 1981.

Detailed information on biology, habitats and life histories of 96 species of mammals; includes extensive bibliography.

Rg 200 M Spencer, Donald A.
Wintering of the Migrant Bald Eagle in the Lower 48 States, National Agricultural Chemicals Assn., Wa., D.C., 1976.

Summary of reports from hundreds of observers regarding locations and behavior during winter.

Rg 200 H USFWS.
Revised Columbian White-tailed Deer Recovery Plan. Prepared in cooperation with the Columbian White-tailed Deer Recovery Team. Fish & Wildlife Reference Service, Unit J.

The objective of the plan is to secure the species within its historical range, protect its habitat, and delist the species from the Endangered Species List.

OREGON DEPARTMENT OF FISH AND WILDLIFE

Offices are in Astoria, at the Port; the staff includes: Terry Link, shellfish; Larry Hreha, pelagic fish; and Dave Douglas, groundfish. This office is concerned almost solely with fish resources and fisheries; very little useful resource information is available, in reference form, although there is extremely useful knowledge amongst biologist there.

RESOURCES

Fisheries
Management/Economics/Migration

Rf 100 M Pacific Fishery Management Commission.
Groundfish Management Plan 1985.

Status of Pacific Coast Groundfish Fishery and Recommendations for Management in 1985.

Updated yearly.

Status of the Pacific Coast Groundfish Fishery Through 1986 and Recommended Acceptable Biological Catches for 1987.

Summary of the year, with charts and data in WA, OR, and CA.

Fishery Management Plan and Environmental Impact Statement for the Pink Shrimp Fishery Off WA, OR and CA. 1980.

RESOURCES

Fisheries
Statistical Reports

Rf 300 Majors, Anthony and Forrest Miller.
Summary of 1985 North Pacific Albacore Fishery Data, 1986, Southwest Fisheries Center.

Data is collected locally from ODFW and other agencies, then compiled to create this summary. Includes charts, descriptions, etc. to help fishermen know where to fish each season, according to statistical data.

Rf 300 L ODFW, Fish Division.
Information Reports Number 85-6: "The 1984 Oregon Shrimp Fishery."

Includes information on the catch, market conditions, groundfish catch, regulations, shrimp assessment, charts.

Rf 300 L Pacific Marine Fisheries Commission.
Annual Report of the Pacific Fisheries Commission.

Fisheries statistics for OR, WA, Alaska, CA, Idaho from local data.

Rf 300 L State of Oregon, US Army Corps., NOAA.
1971 Columbia River Estuary Resource Use Study: A Study in Resource Use.

This is an example of one of the series of publications including information on the estuaries all down the coast.

CITY OF ASTORIA

Information listed is from the Planning Office of Paul Benoit in City Hall.

DEVELOPMENT

Energy: OCS Oil and Gas; Oil Spills

De
200
M
U.S. Dept. of Interior, E.P.A.
Onshore Impacts of Outer Continental Shelf Oil and Gas Development, I & II.
Resource and Land Investigations Program, 1977.

Includes policy development, local industrial and development programs, impact assessment, land use and development controls, as well as other publications relating to offshore oil and gas development.

De
300
H
Sutherland, Bruce.
Oil Spill Protection Plan for the Natural Resources of the Lower Columbia and Willamette River, DLCD and ODEQ, 1979.

Impacts of oil on the Columbia River system, cleanup action recommendations by habitat, physical processes and their effects on oil spills, including maps, charts and wildlife information. Very usable information.

DEVELOPMENT

Industry

Di
M
Amax Pacific Aluminum Corporation.
Environmental Impact Assessment: Aluminum Reduction Plant, Warrenton, Oregon, 1974.

Master Development Plan, Community Impact Analysis I.

While these documents are old, if "Alumax" comes back, they will be very useful background information.

Di
M
"Clatsop County Industrial Sites, 1983."

Includes Seaside, Warrenton, Astoria and East County; maps and site identification and locations, including site information, development regulations and standards, environmental constraints, utilities, and transportation accessibility.

DEVELOPMENT

Navigational Improvements

Dj U.S. Army Corps of Engineers.
M Draft Interim Feasibility Report and Draft EIS: Columbia River at the Mouth, Oregon and Washington, Navigation Channel Improvement, 1983.

Includes resources and economy of the area, problems and needs, "formulating a plan," the plan, the economics of this plan, implementation, review by other federal agencies; shows what components go into such a plan.

Transportation

Dt Port of Astoria, Parametrix, Inc.
M Clatsop County Airport Master Plan 1979-2000.

Includes inventory of site, plans, forecasts, schedules and cost estimates. Useful if land use issues occur that relate to this area.

Ports and Harbors

Dp State of Oregon.
H Oregon Ports Study 1980.

Summary of Port facilities inventory, transportation infrastructure, waterborne trade of Oregon Ports, factors influencing waterborne trade, cargo forecasts, Port facility capacity, future land needs, economic impact, impact of coastal zone management, summary and recommendations.

PLANS/INVENTORIES/STUDIES/IMPACT STATEMENT/LAND USE

Guideline and Standards

Pg Bureau of Governmental Research and Service, U. of Oregon.
H Oregon Land Use Planning CASE STUDIES, 1984.

Could be very useful as an example of "case studies" in land use decisions.

Pg H Draft Administrative Rules for Estuarine Mitigation in Oregon Estuaries, 1982.

Includes Oregon Mitigation Law, rules, objectives, and the strategies for implementation, illustrated resource habitat classification system, resource comparison, mitigation policy, bibliographies, salinity maps and records; very useful.

PLANS/ETC.

Oregon: Astoria

Por 305 H COMPREHENSIVE PLAN.

The original COMPREHENSIVE PLAN is out-dated, but has yearly updates in "The Astoria Code." Due to be redone 1987. Copies available: $5.00.

Por 305 H ZONING ORDINANCE.

Outdated, due for updating. Copies available: $10.00

All Permit Files are open to the public.

MAPS

The maps are located in the "map" room, and are marked for easy selection.

Old maps of Astoria

Downtown Plan

Topographical map at 200' scale (available for purchase)

Aerial photographs

Public works old maps

Sewage, Water lines, etc. showing locations

Planning and Street maps

Smith Point

Columbia River Bridges

Surveys, grades, sewers, and drains

Monuments

Streets

Structures

Waterfront with harbor lines

Columbia River-general

County Zoning

Traffic Flow, Parking, City Shops

Flood Insurance Study maps

Elevation

Downtown

many uncatalogued maps

CITY OF CANNON BEACH

This information is at the Cannon Beach City Hall in the Building and Planning Office.

COMPREHENSIVE PLAN: being updated; copies-$1.00, (be sure to ask for the accompanying maps that are not included).

ZONING ORDINANCE: being updated; copies-$4.50.

BACKGROUND REPORT-COMPREHENSIVE PLAN: current; background, base information for developing the Comprehensive Plan and the Zoning Ordinance. Includes inventories of the natural resources of the area.

1980 CENSUS: demographic information on the area.

MAPS

Maps are available as a part of the COMPREHENSIVE PLAN. You must ask for them separately from the COMPREHENSIVE PLAN.

Other maps available: Zoning, estuary and shorelands, forested areas, geological hazards, flood zones, streets, bikepaths, city limits, urban growth boundary, etc.

CITY OF HAMMOND & CITY OF WARRENTON

Information for these cities can be found in the Clatsop County Planning Department Office, and possibly CTIC. There is no separate source of information for these cities. This information includes COMPREHENSIVE PLANS & ZONING ORDINANCES, when available.

JEWELL

Information for Jewell is available at the Clatsop County Planning Office, as a part of the County COMPREHENSIVE PLAN.

CITY OF SEASIDE

The following listing can be found in the City of Seaside Offices in City Hall.

COMPREHENSIVE PLAN: current; available to look at, or for purchase for $5.00.

BACKGROUND REPORT for COMPREHENSIVE PLAN: available to use, not for purchase.

NECANICUM ESTUARY REPORT: Neal Maine. Inventory of this estuary.

FINDINGS: "Necanicum Riverfront Park Floodway Findings and Mitigation Plan."
"Broadway Park Dredging Plan."
"Trails End Resort" information in File form.

PLAN: "Sand Dune Grading Plan."

MAPS: for use in City offices
-Color aerial map of entire area
-Sections of City (aerials), large scale, 1"-100"

US Department of Commerce
NOAA Coastal Services Center Library
2234 South Hobson Avenue
Charleston, SC 29405-2413

RESOURCE ACCESS

NOAA COASTAL SERVICES CTR LIBRARY
3 6668 14111543 8