# SHORELINE EROSION: AN ANNOTATED BIBLIOGRAPHY ON BEACHES AND DUNES

GB
454
.B3
S56
1978

COASTAL ZONE INFORMATION CENTER

# SHORELINE EROSION: AN ANNOTATED BIBLIOGRAPHY ON BEACHES AND DUNES

Prepared for the
Department of Land Conservation & Development

by the Oregon Coastal Zone Management Association

Property of CSC Library

This work was financially aided through a grant from the Office of Coastal Zone Management, National Oceanic & Atmospheric Administration administered by the Oregon Department of Land Conservation and Development. The grant funds were appropriated under the Coastal Zone Management Act of 1972, as amended.

GB454.B3 S56 1978
OCT 2 9 1991
U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

# SHORELINE EROSION: AN ANNOTATED BIBLIOGRAPHY ON BEACHES AND DUNES

## I. Steps Leading To the Beaches and Dunes Goal


Battelle Institute. 1973. Oregon: Areas of Environmental Concern. Batelle, Pacific Northwest Laboratories. Richland, Washington. 104 pp.

A "701"report initiated by the State Executive Department in 1972 to describe and depict Oregon's areas of environmental concern on a statewide basis.

Economic Consultants Oregon, Ltd. 1978. "State of Oregon Shorefront Access and Preservation Planning Process." Executive summary. State Department of Transportation, Parks and Recreation. Salem, Oregon. 15 pp.

This paper summarizes the major findings of the study of existing policies and programs for providing public access and protection to beaches and other coastal areas. This paper includes a section on "Areas Not Covered and Suggested Improvements."

Oregon Coastal Conservation and Development Commission. 1975. Progress Report. Oregon Coastal Conservation and Development Commission. Florence, Oregon. 209 pp.

A report presented to the Governor's Office to provide an accounting of the progress and scope of OCC and DC overall work program. Pages 43 to 62 cover the beaches and dunes resources and comprise the basic data from which Goal #18 Beaches and Dunes was derived.

Oregon Coastal Conservation and Development Commission. 1974. Visual Resource Analysis of the Oregon Coastal Zone. Prepared by Waller, Havens, and Erickson, Landscape Architects. Eugene, Oregon 135 pp.

It provides identification of and guidelines to preserve coastal environments of special significance.

Oregon Coastal Conservation and Development Commission. 1973. "Coastal Workshops." OCC & DC unpublished workshop input. Florence, Oregon.

Beaches and Dunes were one of four Coastal Zone topics discussed from which input was received from 8 citizen discussion groups.

Oregon Land Conservation and Development Commission. 1977. "Coastal Goals: Response to Concerns." Salem, Oregon. 4 pp.

An explanation of why the commission changed certain wording within the 4 coastal goals prior to adoption. The two changes to the beaches and dunes goal explains the change of the site investigation from a goal requirement to a guideline - replaced by mandated findings of fact and secondly the rewording to clearly prohibit residential, commercial or industrial development on active or wave overtopped or indirect foredunes.

Oregon Land Conservation and Development Commission. 1976. "Draft No. 3. Coastal Planning Goals and Guidelines." Land Conservation and Development Commission. Salem, Oregon. 20 pp.

The third and final draft of the coastal goals before their adoption on December 18, 1976, included the Beaches and Dunes Goal.

Oregon State Highway Department, State Parks and Recreation. 1966. Public Use Study: Oregon's Coastal Beaches. Salem, Oregon.

Provides information concerning recreational interests, significance and physical characteristics on 39 sections of beach. Noted as a preliminary and limited study it does provide some basic data and aerial photos of beach use in 1966.

U.S. Army Corps of Engineers. 1971. National Shoreline Study: Inventory Report Columbia - North Pacific Region Washington and Oregon. North Pacific Division. Portland, Oregon. 101 pp.

An inventory of the physical characteristics, historical changes, ownership, and shoreline uses are provided for the Washington and Oregon coast generally and by county. Many useful illustrated maps are included.

U.S. Army Corps of Engineers. 1974. Coastal Reconnaissance Study: Oregon and Washington. Portland District. Battelle Pacific Northwest Laboratories. Richland, Washington. 478 pp.

This is a reconnaissance level survey of 15 Oregon and Washington coastal projects to determine their potential recreation and conservation use. Characteristics of each site obtained related to recreation, wildlife, land use, open space, and historical and archeological values.

U.S. Department of Agriculture, Soil Conservation Service. 1975. Beaches and Dunes of the Oregon Coast. USDA/SCS. Portland, Oregon. 161 pp.

This study was produced for and with OCC & DC to provide resource data for land use decision making and for educational information concerning the beach and dune environment. Beach and dune landforms are explained and identified on aerial photos of the Oregon coast. Proposed management policies are presented.

## II. Introduction to Beach and Dune Systems

Barnes, R. K. S., ed. 1977. The Coastline. John Wiley and Sons, New York, N. Y. 356 pp.
A highly useful systematic examination of the ecology and physiography of coastal aquatic and terrestrial environments. Land use and management problems are highlighted.

Bascom, W. 1964. Waves and Beaches. Doubleday, Garden City, N.Y. 267 pp.
A basic introduction to the wave and beach processes from a west coast study that included Oregon.

Bird, E. C. F. 1969. Coasts. The MIT Press, Cambridge, Massachusetts. 246 pp.
The fourth and last volume of a series on landforms treating landforms as parts of systems in which the interacting processes are almost completely produced and altered by solar energy. Thus the coastal situation is viewed in terms of waves, currents and wind as agents in fashioning the coastal forms. Chapter V Beaches, Spits, and Barriers and Chapter VI Coastal Dunes give a general introduction to the morphology of these landforms.

Buckler, William R. 1978. Dune Type Inventory and Barrier Dune Classification Study of the Lake Michigan Shore. Preliminary Draft submitted to the Michigan Department of Natural Resources. 74 pp.
A dune morphology classification is developed for the Great Lakes and dune assemblages were mapped. The classification is based on the dune form, relief, orientation, and relationship to the underlying formation.

Bush, George. 1976. "Soils Management Services Report, Sand Lake Recreation Area." United States Department of Agriculture, Forest Service. Siuslaw National Forest, Hebo Ranger District. Corvallis, Oregon 16 pp.
Describes geo-environmental changes which have occurred at Sandlake in historic times. Management recommendations designed to enhance and protect the dunes and associated recreational facilities are offered.

Carefoot, Thomas. 1977. Pacific Seashores: A Guide to Intertidal Ecology. University of Washington Press, Seattle, Washington. 208 pp.
This work is a broad, well-illustrated guide to intertidal ecology. There is one generally useful section on sand dunes.

Cooper, W. S. 1958. Coastal Sand Dunes of Oregon and Washington. Geological Society of America Memoir 72. New York, N.Y. 169 pp.
Classic geomorphic description and interpretation of sand dune morphology evolution, and historic development in coastal Oregon and Washington. Also, subdivides Oregon coast into four geomorphically dissimilar sand dune regions.

Inman, Douglas L. and Birchard M. Bush. 1973. "The Coastal Challenge". Science. 181:20-32.
The article considers the coastal processes of currents, etc. and man's interference with the natural processes. Highlighted are shoreline stabilization, sand budget and transport.

Katz, Barbara A. and Stephen R. Gabriel. 1977. "Oregon's Ever-Changing Coastline." Extension Marine Advisory Program. 5G 35. Oregon State University. 7 pp.
This work provides a good non-technical introduction to the ocean shore processes.

Komar, Paul. 1976. Beach Processes and Sedimentation. Prentice-Hall, Inc., Englewood Cliffs, New Jersey. 429 pp.
A recent text that describes the physical processes of beaches and the resulting sedimentary deposits by a professor who studies the Pacific Coast.

Lund, Ernest H. 1971. "Coastal Land Forms Between Florence and Yachats, Oregon." The Ore Bin. State of Oregon. Department of Geology and Mineral Industries. 33(2)21-44.
The article provides an overview of the headland basalt structures and the differential erosion. Sand dunes are briefly mentioned.

Lund, Ernest H. 1973. "Oregon Coastal Dunes Between Coos Bay and Sea Lion Point." The Ore Bin. State of Oregon, Department of Geology and Mineral Resources. Portland, Oregon. 35(5)73-92.
This booklet offers a good, short overview of the sand dune types including useful photographs.

Lund, Ernest H. 1974. "Rock Units and Coastal Landforms Between Newport and Lincoln City, Oregon." The Ore Bin. State Of Oregon, Department of Geology and Mineral Industries. Portland, Oregon. 36(5)69-92.
This booklet offers a useful, short background on the land forms and basic geology including good photographs.

Ranwell, D. S. 1975. Ecology of Salt Marshes and Sand Dunes. Halsted Press, New York, N.Y. 258 pp.
This work is a detailed ecological study and considers management of both salt marshes and sand dunes. Sand dune management includes water extraction, species introduction, and other factors.

Ruef, Michael H. 1975. Coastal Sand Dunes Study: Pacific and Grays Harbor Counties, Washington. State Department of Ecology. Olympia, Washington. 31 pp.
A detailed study of Washington's coastal dunes that relates vegetation to the sand landforms; provides analysis on ocean-dune relationship; impacts of man; the natural areas; and suggests some management considerations.

Starr, Richard M., Richard A. Marston, and Madeline J. Hall. 1975. Department of Geography Resource Paper 7. Oregon State University. Corvallis, Oregon. 48 pp.
Coastal sand area types are placed in sensitivity classes. These classes are given performance standards to guide development. The specific study area is north of Florence and is mapped by sensitivity class.

Weideman, Alfred M., Dennis J. LaRea, and Frank H. Smith. 1974. Plants of the Oregon Coastal Dunes. Oregon State University Book Stores, Inc. Corvallis, Oregon. 117 pp.

A very useful work which includes a brief but highly informative introduction to the physical geography of Oregon's coastal dunes. The primary emphasis is on the key to and description of sand dune plants.

Zenkovick, V. P. 1962. Processes of Coastal Development. J. A. Steers, ed. Translated by D. G. Frey. Oliver and Boyd, London. 738 pp.

The most thorough discussion of shore processes found in any one single publication. The author adopts a wide regional approach to the subject. Chapter 12 Aeolian processes on Sea Coasts is concise and covers the literature as well as the worldwide variants of sand beaches and dunes.

## III. Beach and Dune Planning Considerations

### A. Sand Removal

Bernewitz, M. W. von. 1930. "Treatment and Sale of Black Sands." Information Circular 7000. U.S. Department of Interior. 21 pp.

The author provides background information on the nature of black sands and experiences in mining and processing it from several case studies.

Carter, George, Hal J. Kelly and E. W. Parsons. 1962. Industrial Silica Deposits of the Pacific Northwest. Information Circular No. 8112. U.S. Department of the Interior, Bureau of Mines. 57 pp.

An evaluation report of data derived from field and laboratory examinations of 82 silica deposits. The Coos Bay dune sands was one of 5 samples taken in Oregon. These sands were found to be not of high quality but could be used as a source for the manufacture of ceramic ware and amber container glass.

Carter, G. J., H. M. Harris and K. G. Strandbert. 1964. Beneficiation Studies of the Oregon Coastal Dune Sands for Use as Glass Sand. RI 6484. U.S. Bureau of Mines. 21 pp.

This study found the sand deposits in the Coos-Umpqua dunes area to be suited for foundry, sand blasting, filler, ceramic use, and for certain types of glass if properly treated.

Dasher, John, Foster Fraes and Alton Gabriel. 1942. "Mineral Dressing of Oregon Beach Sands, 1. Concentration of Chromite, Zircon, Garnet and Ilmenite." Report of Investigation 3668. U.S. Department of the Interior. 19 pp.

On the coast of SW Oregon, particularly in Coos and Carry Counties are numerous pockets of heavy sand that have been deposited on the back of old beaches. The investigation found certain levels of materials that could be extracted depending on the market demands.

Department of Civil Engineering. 1978. "Notes for Brainstorming Meeting on Coastal Aggregates." Oregon State University. Corvallis, Oregon. 21 pp.

A series of notes outlining the goals of a 3 year research project to study coastal aggregates. The goals as presented were: a. Identify promising marginal aggregates, b. Evaluate benefication methods, c. Develop specifications, and d. Establish economic limits for the use of these aggregates.

Magoon, Orville T., John C. Haugen, and Robert L. Sloan. 1972. "Coastal Sand Mining in Northern California, U.S.A." Proceedings of the 13th Coastal Engineering Conference. American Society of Civil Engineers. Vancouver, B.C. pp. 1571-1597.

This paper describes the history and character of sand mining in California. Noting that sand removal is significant at specific locations, the authors point out that the beaches represent a major recreational asset.

Stephenson, E. L. 1945. "Magnetometer Surveys on Black Sands of the Oregon Coast." R I 3814. U.S. Department of the Interior. 18 pp.

This investigation located deposits of black sands in Coos and Carry Counties, Oregon.

Sterrett, Chester K. 1958. "Industrial Silica for Pacific Northwest Industries." Resource Report No. 1. Raw Materials Survey, Inc. Portland, Oregon.

In a section of "Oregon Beach Sands" the report finds that no specific studies on beach sands as a source of industrial silica have been accomplished. It was noted however that no extensive deposits of pure white sands exist and with a low quartz content (40% with partial iron staining).

## B. Stabilization and Restoration Methods

Brown, Robert L., and A. L. Hafenrichter. 1962. "Stabilizing Sand Dunes on the Pacific Coast with Woody Plants." U.S. Department of Agriculture, Soil Conservation Service. Misc. Publication No. 892. 18 pp.

This describes the uses of woody plants as stabilizers, the planning required, and the species used for stabilization.

Georgia Department of Natural Resources. 1974. Methods for Beach and Sand Dune Protection. Conference Report. Georgia Department of Natural Resources. Atlanta, Georgia. 48 pp.

This is a collection of papers delivered during the conference that relate to three basic topics: The Natural Functioning of the Beach and Sand Dune System, Methods for Beach and Sand Dune Protection and Workshop Discussions and Recommendations. Overall worthwhile readings by experts and practioners but with a stress on East coast experiences.

Green, Diantha L. 1965. Developmental History of European Beachgrass (Ammophila arenaria) Plantings on the Oregon Coastal Sand Dunes. Oregon State University. 64 pp.
The development from initial planting to take over of natural species is discussed. Data on the plots studied south of Florence included various measurements of Ammophila, Pinus, Cytisus, Mnim, and the frequency of native species present.

Hafenrichter, A. L. 1967. "Lassoing the West's Rampaging Dunes." Outdoors USA. U.S. Department of Agriculture Yearbook. pp. 317-321.
A good introduction to the USDA Soil Conservation Service's dune stabilization program on the Pacific Coast that includes the Warrenton SCD project.

Illinois Department of Conservation. 1977. Illinois Beach State Park Duneland Vegetation Rehabilitation and Restoration Feasibility Study. CZM Program. Illinois Department of Conservation. Springfield, Illinois. 57 pp.
A study of existing duneland degradation and destruction with alternative policies to solve identified problems. Many problems identified are common to the Oregon coastal dunes and the proposed solutions may be of interest.

Knutson, Paul L. 1978. "Planting Guidelines for Dune Creation and Stabilization." Proceedings of Coastal Zone '78. Volume II. American Society of Civil Engineers. New York, N.Y. pp. 762-779.
Several west coast examples are given including the Clatsop Plains.

McLaughlin, Willard T., and Robert L. Brown. 1942. "Controlling Coastal Sand Dunes in the Pacific Northwest." U.S. Department of Agriculture. Circular No. 660. Washington, D.C.
This describes the various techniques and the background of the stabilization of the Clatsop Plains that started in 1935.

Oertel, George F., and James L. Harding. 1977. Sand Stabilization on the Dunes, Beach and Shoreface of a Historically Eroding Barrier Island; Wassaw Island Erosion Study Part III. Technical Report Series Number 77-3. Georgia Marine Science Center. University System of Georgia. Skidaway Island, Georgia. 46 pp.
This is a specific study of Wassaw Island, Georgia and the testing of three synthetic methods (snow fences, sand bags, and patches of beach straw) to modify the sediment budget of a historically eroding shore area.

Warren Dune Soil and Water Conservation District. 1966. Thirty-one Years of Progress, 1935-1966. Warrenton Dune Soil and Water Conservation District. Astoria, Oregon.
A pamphlet that outlines the history and progress of the sand dune management program with some very good before and after photographs.

Woodhouse, W. W., Jr., E.D. Seneca, and S. W. Broome. 1976. Ten Years of Development of Man-Initiated Coastal Barrier Dunes in North Carolina. Bulletin 453, NC Sea Grant Program Publication No. 77-01. North Carolina University Agricultural Experiment Station. Raleigh, North Carolina. 55 pp.

Development of dunes by planting various vegetation is described along with the results of such experiments. Dune grasses, American beachgrass and sea oats were used.

Woodhouse, W. W., Jr., and R. E. Hanes. 1967. Dune Stabilization with Vegetation on the Outer Bonks of North Carolina. Technical Memorandum No. 22. U.S. Coastal Engineering Research Center. Washington, D.C. 45 pp.

This memorandum provides results on experiments to develop a more effective revegetation program. Plant species and methods for planting are provided.

## C. Ground Water Drawn-down and Pollution

Brown, G. S. and R. C. Newcomb. 1963. Ground-Water Resources of the Coastal Sand-Dune Area North of Coos Bay, Oregon. USGS. Geological Survey Water Supply Paper 1619-D. U.S. Government Printing Office. Washington, D.C. 32 pp.

This report provides information on the hydrology of the sand dune aquifer north of Coos Bay, Oregon including water quality and water supply.

Frank, F. J. 1970. Ground Water Resources of the Clatsop Plains, Sand Dune Area, Clatsop County, Oregon. USGS Geological Survey water supply paper 1899-A. U.S. Government Printing Office, Washington, D.C. 41 pp.

This study provides a good picture of characteristics of the Clatsop aquifer; includes geohydrology, water quality and development problems.

Hampton, E. R. 1970. Ground Water in the Coastal Dune Area Near Florence, Oregon. USGS Geological Survey Water Supply Paper 1539-K. U.S. Government Printing Office, Washington, D.C. 36 pp.

This report examines the physical characteristics of the sand dune aquifer north of Florence, Oregon. Information on water quality and water supply are included.

Larson, Douglas W. 1974. A Water Quality Survey of Selected Coastal Lakes in the Sand Dune Region of Western Lane and Douglas Counties, 1972-1973. Final Report, Western Quality Studies. Oregon Department of Environmental Quality. Portland, Oregon. 152 pp.

A technical study of 13 coastal lakes to document existing limnological characters to establish a baseline for future planning and management.

Larson, Douglas William. 1970. "On Reconciling Lake Classification with the Evolution of Four Oligotrophic Lakes in Oregon." Unpublished Ph.D. Dissertation. Oregon State University. 135 pp.
This study considers the responses of four Oregon lakes, including Woahink Lake in coastal Lane County, to the ambient physical environment and cultural use interactions; accesses factor which encourage or inhibit eutrophication in each lake and; proposes an alternative, diagnostic lake classification system.

Robison, J. H. 1973. Hydrology of the Dunes Area North of Coos Bay, Oregon. U.S. Geological Survey. Portland, Oregon. 62 pp.
A detailed study of the hydrology of a 20 square mile area of dunes along the central Oregon coast. Within the study a analog model was used to analyze current and projected water levels.

Smith, David L. 1962. Lake and Stream Formation on Sand Dunes in the Florence District, Oregon. University of Oregon. 90 pp.
This study deals with the description and interpretation of lake and stream forms near Florence, Oregon.

Sweet, Randy H. 1977. Carrying Capacity of the Clatsop Plains Sand-Dune Aquifer. A report for the Clatsop County Commission and Oregon Environmental Quality Commission. Clatsop County, Oregon. 58 pp.
This study assesses the physical hydrogeological characteristics of the Clatsop Plains region. It examines the water quality aspects of this area and proposes management recommendations.

## D. Off-road Vehicles

Baldwin, Malcolm R., and Dan H. Stoddard, Jr. 1973. The Off-Road Vehicle and Environmental Quality. 2nd Edition. The Conservation Foundation. Washington, D.C. 61 pp.
Environmental concerns as well as other ORV problems are discussed and good recommendations are offered.

Bennett, Shaun. 1973. A Trail Rider's Guide to the Environment. American Motorcyclists Association. Westerville, Ohio. 60 pp.
The booklet is geared for the "biker" and is humorously illustrated pointing out responsible use is a must to preserve the use of motorcycles off-road. Environmental considerations are mentioned regarding soil and other elements.

Bess, Fred H. 1973. "The Effectiveness of Helmets for EAR Protection". Proceedings of the 1973 Snowmobile and Off the Road Vehicle Research Symposium. Donald F. Holecek, ed. Department of Parks and Recreation Resources Technical Report No. 9 (147-149). Michigan State University. 3 pp.
The potential hazards of ORV noise were mentioned and various helmet brands were tested. None were particularly effective.

Blodget, Bradford G. 1978. The Effect of Off-Road Vehicles on Least Terns and Other Shorebirds. National Park Service Cooperative Research Unit Report No. 26. University of Massachusetts. 79 pp.
It is a carefully conducted study specifically on Least Terns, and other shorebirds. The study took place in an area of extremely high ORV management.

Bury, Richard L., Robert C. Wendling, and Stephen McCool. 1976. Off-Road Recreation Vehicle - A Research Summary, 1969-1975. MP-1277 Texas Agriculture Expermiment Station, Texas A & M University. 84 pp.
This review is very useful to rapidly become oriented in ORV literature and problems. It covers all major areas.

California Department of Parks and Recreation. 1975. Pismo State Beach and Pismo Dunes State Vehicular Recreation Area -- General Development Plan and Resource Management Plan. Sacramento, California. 83 pp.
This plan is a good example of management of high use areas. Many ORV problems are considered.

California Department of Parks and Recreation. 1978. Off-Highway Vehicle Recreation in California. Sacramento, California. 96 pp.
A complete overview of the California system is provided. It serves as a good example of an off-road vehicle system.

Carter, James E. 1977. "Use of Off-Road Vehicles on Public Lands." U.S. Presidential Executive Order 11989. Government Printing Office, Washington, D.C. 1 p.
This order allows federal land managers to close an area to certain ORVs which is open if there are real or potential adverse environmental effects occurring from such vehicles.

Geological Society of America, the Committee on Environment and Public Policy. 1977. "Impacts and Management of Off-Road Vehicles." Boulder, Colorado. 8 pp.
This committee report offers a very good concise overview of ORV impacts on soil, wildlife, plants, and erosion. It provides management recommendations and is well-illustrated.

Godfrey, Paul J., Stephen P. Leatherman, and P. A. Buckley. 1978. "Impact of Off-Road Vehicles on Coastal Ecosystems." Coastal Zone '78 Symposium on Technical, Environmental, Socioeconomic and Regulatory Aspects of Coastal Zone Management, Volume II (581-600). American Society of Civil Engineers. New York, N.Y. 20 pp.
This summarizes the ORV effects on several coastal ecosystems and appears to be the most comprehensive research effort in that regard. It is very informative and serves to launch one into the specific studies it summarizes.

Harrison, Rob. 1973. "ORV Noise Effects and Measurements." Proceedings of the 1973 Snowmobile and Off the Road Vehicle Research Symposium. Donald F. Holecek, ed. Technical Report No. 9. Michigan State University. pp. 135-145.
ORV noise measurement techniques are discussed as are effects. ORV noise detectability is considered.

Lodico, Norma Jean. 1973. Environmental Effects of Off-Road Vehicles: A Review of the Literature. Bibliography Series No. 29. Office of Library Services. U.S. Department of the Interior. Washington, D.C. 112 pp.
This work is useful and shows areas of environmental concern. At the time it was published, the number of authoritative studies on ORV impacts was limited.

McCool, S. F., and J. N. Roggenbuck. 1974. Off-Road Vehicles and Public Lands: A Problem Analysis. Department of Forestry and Outdoor Recreation and Institute for the Study of Outdoor Recreation and Tourism. Utah State University. Logan, Utah. 109 pp.
This work comprehensively organizes the questions about ORVs to identify the areas most needing research. It provides a quick background to the multitude of ORV related problems.

McEwen, Douglas N. 1978. Turkey Bay Off-Road Vehicle Area at Land Between the Lakes: An Example of New Opportunities for Managers and Riders. Research Report Number 1. Department of Recreation. Southern Illinois University. 28 pp.
The work shows many examples of how to successfully plan and manage an ORV area.

Motorcycle Industry Council. 1978. 1978 Motorcycle Statistical Annual. Newport Beach, California. 46 pp.
It offers statistics on the motorcycle market, manufacturers, use, and ownership. Off-road use is considered.

Muntz, E. P., T. L. Deglow, and D. H. Campbell. 1972. "Public Lands and Off-Road Motorized Recreation." Environmental Engineering Programs Bulletin 100. School of Engineering. University of Southern California. 18 pp.
The area of disturbance for a trail biker and a hiker is quantified, compared, and related to the finite resource base.

Neidoroda, A. 1975. Geomorphological Effects on ORVs on Coastal Systems of Cape Cod, Massachusetts. National Park Service Cooperative Research Unit Report No. 17. University of Massachusetts. 100 pp.
The study considers the causes and results of ORV downslope sand transport. It suggests ways to limit such transport and ORV related erosion.

Nixon, Richard M. 1972. "Use of Off-Road Vehicles on the Public Lands." U.S. Presidential Order 11644. Government Printing Office, Washington, D.C. 2 pp.
The order required federal agencies to develop management plans for ORVs in their lands and consider several factors in doing so.

Oregon Department of Environmental Quality. 1978. DEQ Handbook for Environmental Quality Elements of Oregon Local Comprehensive Land Use Plans. Portland, Oregon. 28 pp.
The loose-leaf work provides background on noise restrictions that apply to ORVs.

Oregon Department of Transportation, Parks and Recreation Branch. 1977. Oregon Outdoor Recreation Needs Bulletin 1977. Technical Document III of the State Wide Comprehensive Outdoor Recreation Plan. Salem, Oregon. 183 pp.
This document considers the recreational statewide needs and includes ORV use. The figures on availability of trails are questionable, however, it does recognize ORV use.

Peine, John D. 1973. "Off-Road Vehicle Use in Tucson, Arizona." Proceedings of the 1973 Snowmobile and Off the Road Vehicle Research Symposium. Donald F. Holecek, ed. Department of Parks and Recreational Resources Technical Report No. 9 (9-33). Michigan State University. 202 pp.
The paper is based on Peine's unpublished thesis. It describes the ORV activity and develops a model for ORV preference.

Rasor, Robert. 1978. Five States Approaches to Trailbike Recreation Facilities and Their Management. American Motorcycle Association. Westerville, Ohio. 64 pp.
Different systems for trail bike areas are discussed and useful examples of management are provided. It shows trail bikes can be a manageable form of recreation. The Appendixes are very useful including the ORV legislation from the States of Washington and California.

Stebbins, Robert C. 1974. "Off-Road Vehicles and the Fragile Desert." American Biology Teacher. 36(5):294-304. 14 pp.

Stupay, Arthur M. 1971. "Growth of Powerized Vehicles in the 1970's." Proceedings of the 1971 Snowmobile and Off the Road Vehicle Research Symposium. Michael Chubb, ed. Technical Report No. 8. Michigan State University. 196 pp.
It provides a background on the growth of ORVs.

U.S. Department of Agriculture, Forest Service. 1976. "Travel Plan Off-Road Vehicle Use -- Siuslaw National Forest." Corvallis, Oregon. 4 pp. + maps.
It describes the various vehicle designations and operating conditions for each area open. The basis of these policies is mentioned.

U. S. Department of Interior, Bureau of Land Management. 1970. Operation ORVAC: Recommendations and Guidelines for the Management of Off-Road Vehicles on Public Domain Lands in California. Sacramento, California. 40 pp.
General guidelines are provided that are useful as is the approach to the ORV problem through an advisory council.

Visco, Christopher. 1977. "The Geomorphic Effects of Off-Road Vehicles on the Beach, Fire Island, New York." Unpublished M.A. thesis. State University of New York, Binghamton. 74 pp.
Describes how different factors relating to ORV travel on beaches, such as speed, affect the net amount of sediment moved down slope by vehicle tracks.

Washington Department of Natural Resources. 1976. "Operating All-Terrain Vehicles in the State of Washington." Olympia, Washington. 14 pp.
This is an informational booklet on the all-terrain program in Washington.

## E. Sand Movements--Erosion and Accretion

Beaulieu, John D. 1978. "Surfical Geologic Hazard Concepts for Oregon." The Ore Bin. State of Oregon. Department of Geology and Mineral Industries. Portland, Oregon. 40(3).

This article deals with hazards such as mass movement, slope erosion, flooding, stream erosion. It is a general introduction to such hazards.

Byne, John V. 1964. An Erosional Classification for the Northern Oregon Coast. American Association of Geographers Annals. 54:329-355.

The classification is based on the factors that have determined the slope of the coast (lithology, stratigraphy, and structure). Its benefits are a generalized nature, it can be mapped, and it may serve as a basis for future study.

Dickson, Samuel N., Carl L. Johannessen, and Bill Hanneson. 1961. Some Recent Physical Changes of the Oregon Coast. Department of Geography. University of Oregon. 151 pp.

The factors causing shoreline changes are discussed with the emphasis being on the historical changes of the beaches, nearby dunes, and estuaries since the time of white settlement. Vegetation changes are considered in this rather comprehensive work.

Flawn, Peter T. 1970. Environmental Geology: Conservation, Land-Use Planning, and Resource Management. Harper and Row, New York, N.Y. 313 pp.

A good introduction into planning rationales and the geologic system. The author specifically deals with the beaches and man's impacts at pp 55-58 and pp 177-178.

Komar, Paul and Thomas A. Terich. 1976. "Changes Due to Jetties at Tillamook Bay, Oregon." Proceedings 15th Coastal Engineering Conference. American Society of Civil Engineering. Chapter 104:1791-1811.

This paper explains the physical changes in the Bay ocean spit are the results of local rearrangement of the beach, not from a change in the net littoral drift.

Lincoln County Planning Department. 1978. Environmental Hazard Inventory Coastal Lincoln County, Oregon. RNKR Associates, Corvallis, Oregon 66 pp.

This geologic hazards report contains general discussions on Sand Areas (pp. 30-33), Sensitivity classes and Performance Standards (pp 40-45) along with a 6 page bibliography.

Lizarraga-Arciniega, J. R. and Paul D. Komar. 1975. Shoreline Changes Due to Jetty Construction on the Oregon Coast. Publication Number ORES4-T-75-004. Oregon State University Sea Grant College Program. Corvallis, Oregon. 85 pp.

All nine jetty systems on the coast are included except those on the Columbia River. The relationship between beach erosion and accreting, and jetty construction is discussed. A computer model is provided to simulate shoreline changes resulting from the Siuslaw jetties.

Phipps, John B. and John M. Smith. 1978. Pacific Ocean Beach Erosion and Accretion Report. Grays Harbor College. Aberdeen, Washington. 75 pp.
Historical shorelines of southwestern Washington are mapped, and the factors affecting erosion/accretion are considered in the light of a sand budget. A projected shoreline map is provided and dune management is discussed.

Rea, Campbell C. 1975. The Erosion of Siletz Spit, Oregon. MS Thesis. Oregon State University. 104 pp.
A paper viewing the history of erosion and accretion with comments on changes of the shoreline and sand budget. Recommendations for controlling erosion are presented.

Schatz, Clifford E., Herbert Curl, Jr., and Wayne V. Burt. 1964. "Tsunamis on the Oregon Coast." The Ore Bin. 26(12):231-232.
The article reviews the effects of the tsunami of 1964. It explains that the coast will probably be struck again and the estuaries are the areas most susceptable to damage.

State of Oregon. 1972. Environment Geology of the Coastal Region of Tillamook and Clatsop Counties, Oregon. Department of Geology and Mineral Industries Bulletin 74. Portland, Oregon. 164 pp.
A substantial geological background is provided along with geological hazards, mineral resources including sand and gravel, and engineering characteristics of the geological units.

State of Oregon. 1973. Environmental Geology of Lincoln County, Oregon. Department of Geology and Mineral Industries Bulletin 81. Portland, Oregon. 171 pp.
A substantial geological background is provided along with ground water, geological hazards, and mineral resources.

State of Oregon. 1974. Geologic Hazards Inventory of the Oregon Coastal Zone. Miscellaneous Paper 17. Department of Geology and Mineral Industries. Portland, Oregon. 94 pp.
This work provides a good comprehensive approach to geologic hazards. It describes eight major classes of hazards, provides a planning scheme and offers a useful bibliography.

State of Oregon. 1974. Environmental Geology of Coastal Lane County, Oregon. Department of Geology and Mineral Industries Bulletin 85. Portland, Oregon. 116 pp.
A geological background is provided along with geological hazards and a well-illustrated section on sand dunes within this work.

State of Oregon. 1975. Environmental Geology of Western Coos and Douglas Counties, Oregon. Department of Geology and Mineral Industries Bulletin 87. Portland, Oregon. 148 pp.
Engineering geology, mineral resources, geological hazards and the geology of estuaries is covered. Ground water and the black sands are considered briefly.

State Soil and Water Conservation Commission. 1978. Volume I: Inventory: Oregon Coastal Shoreline Erosion. Salem, Oregon. 109 pp.
A study of the shoreline erosion problem and related sources of information including an annotated bibliography. The processes and historic patterns are presented with a county by county approach.

Stembridge, J. E. 1976. Recent Shoreline Changes of the Oregon Coast. Accession No. ADA048436. National Technical Information Service, Springfield, Virginia 51 pp.
An analysis and classification of shoreline erosion along Oregon's pacific coastline based on earlier research for Ph.D. dissertation at University of Oregon.

Stembridge, James E., Jr. 1975. Shoreline Changes and Physiographic Hazards on the Oregon Coast. Department of Geography, University of Oregon. 202 pp.
This work provides an inventory, classification, and analysis of the changing and stable shorelines as well as the related real and potential hazards.

## IV. Beach and Dune Management Techniques

### A. Hazard Management

Coastal Zone Management. 1976. Natural Hazard Management in Coastal Areas. U.S. Department of Commerce, NOAA. Washington D.C. 286 pp.
A handbook geared to provide guidance and information to coastal planners and decision-makers on major natural hazards. The handbook presents the material as: Major Coastal Hazards, Problems and Recommendations, Hazard Management in the Coastal States, Annotated Bibliography, and a Directory of Selected Agencies.

Georgia Department of Natural Resources. 1975. Handbook: Building in the Coastal Environment. Atlanta, Georgia. 118 pp.
The handbook provides site specific guidelines including site analysis, planning/design, construction, and land exchange. The concepts are highly illustrated.

Jurgensen, K. M. 1976. Know Your Mud, Sand and Water: A Practical Guide to Coastal Development. Sea Grant Publication UNC-5G-76-01. 32 pp.
The ideas of coastal management developed in Ecological Determinants of Coastal Area Management, UNC Sea Grant, April, 1976, are presented in a simple, well illustrated booklet.

Kates, Robert W. 1978. Risk Assessment of Environmental Hazard. John Wiley & Sons, New York, N.Y. 112 pp.
A technical report that examines the present state of the art with respect to coping with environmental risks. Existing methods and modes of risk assessment along with the observed trends and attitudes in assessing environmental threat are presented.

State Soil and Water Conservation Commission. 1978. Volume II: Oregon Coastal Management Program: Shoreline Erosion Management Policies and Procedures. Salem, Oregon. 113 pp.

A description of the Oregon Coastal Zone Management program with a focus on management techniques for the shoreline erosion. An evaluation of the current program is given with suggestions for policy changes.

The Conservation Foundation. 1977. Physical Management of Coastal Floodplains: Guidelines for Hazards and Ecosystems Management. Council on Environmental Quality. Washington D.C. 179 pp.

A technical report that offers development and conservation guidelines for the following coastal areas: coastal watersheds, shoreland water systems, coastal floodlands, saltwater wetlands, bluffs, dunes, beaches, basin floor, and coastal waters.

U.S. Army Corps of Engineers. 1975. Shore Protection Manual Volume I. Second edition. U.S. Army Coastal Engineering Research Center, Fort Belvoir, Virginia. 508 pp.

This is the first volume of a three volume manual. It describes the physical environment of the coastal zone and discusses coastal engineering, wave mechanics, wave and water predictions, and littoral processes.

U.S. Army Corps of Engineers. 1977. Shore Protection Manual Volume II. Third edition. U.S. Army Coastal Engineering Research Center. Fort Belvoir, Virginia. 448 pp.

This volume of a three volume manual deals with planning and structural design in relation to the physical factors of Volume I. An example is provided.

U.S. Army Corps of Engineers. 1975. Shore Protection Manual Volume III. Second Edition. U.S. Army Coastal Engineering Research Center. Fort Belvoir, Virginia. 141 pp.

This volume of the three volume manual contains the appendixes (glossary, list of symbols, tables and plates, and subject index) for the first two volumes.

U.S. Army Corps of Engineers. 1966. Beach Erosion Control and Shore Protection Studies. Engineering Manual No. 1110-2-3300. Office of the Chief of Engineers, Washington, D.C.

This manual discusses the types of information needed to conduct beach erosion studies such as program development and data collection to serve as a basis for planning remedial measures.

United States Department of Housing and Urban Development. 1977. Elevated Structures/Reducing Flood Damage Through Building Design: A Guide Manual. HUD-FIA-184(2). Washington, D.C.

The manual provides background information on the National Flood Insurance Program and the hazards associated with building in the flood plain. It reviews the existing alternatives to house construction on raised foundations and offers performance criteria for such foundation systems.

## B. Considerations and Impacts

Alen, Ray, David Brower, B. J. Copeland, D. Frankenberg, and Francis Parker, ed. 1976. Ecological Determinants of Coastal Area Management Volume II. North Carolina State University. 392 pp.

A comprehensive work that covers both the Coastal Ecological Systems and Tools and Techniques for Coastal Area Management. While having a bias for the North Carolina situation this work does offer valuable insight into the application of many tools upon several coastal ecosystems.

Battelle Institute. 1971. Shoreland Management Guidelines to Grays Harbor Regional Planning Commission. Battelle Pacific Northwest, Richland, Washington. 95 pp.

A detailed study of the shorelands of Grays Harbor County, Washington, that described the natural systems, land-use activities and presented management guidelines including a checklist for shoreland policy decision.

Bella, David A. 1973. "Environmental Planning Methods." Coastal Zone Management Problems. A seminar conducted by the OSU Water Resources Institute. pp. 53-60.

Professor Bella presents an approach to CZM planning that places a high value on environmental variety. The key to this methods appears to be the preservation of future options enabling the management authority to adjust their problem in relationship to changing value systems and unanticipated environmental impacts.

Brahtz, J. F. Peel, ed. 1972. Coastal Zone Management: Multiple Use With Conservation. John Wiley and Sons, Inc, New York, N.Y. 351 pp.

This book addresses a wide range of resource uses, conflicts and problems of coastal zone management, each from the particular viewpoint of a specialist in one of the classical problem areas.

Bright, Donald B. 1973. "Local Land Use: Management Concepts and Problems." Proceedings of Coastal Zone Management and the Western States Future. William B. Merselis, ed. Marine Technology Society, Newport Beach, California. pp. 222-226.

The author presents 3 management concepts: ethical changes, land as a resource and a commodity, and a cross-matching scheme.

Brower, David, Dirk Frankenberg, and Francis Parker. 1976. Ecological Determinants of Coastal Area Management, Volume 1 -- An Overview. Sea Grant Publication UNC-SG-76-05. North Carolina State University. 133 pp.

The work analyzes the ecological processes of the barrier island system and lagoon-estuary system. Various management tools are provided to preserve the components of the two main systems.

Canter, Larry. 1977. Environmental Impact Assessment. McGraw-Hill Book Company, New York, N.Y. 331 pp.

An introductory text that presents a systematic approach to the prediction and assessment of impacts on the physical, chemical, biological, cultural and socioeconomic factors in the environment.

Dickert, Thomas and Jens Sorenson. 1978. Collaborative Land-Use Planning for the Coastal Zone: Volume I, A Process for Local Program Development. IURD Monograph No. 27. Institute of Urban and Regional Development, University of California-Berkeley. 120 pp.

Collaborative planning in this work is presented as a midpoint compromise between centralized and decentralized approaches in which state and local units of government work jointly to prepare and implement local, regional and state land use plans.

Dilton, Robert B., John L. Seymour, and G. C. Swanson. 1977. Coastal Resources Management: Beyond Bureaucracy and the Market. Lexington Books, Lexington, Mass. 196 pp.

An overview of the main issues involved in coastal zone management. The authors review current practices, future needs and describe several case histories. The main emphasis is on improved management for multiple use.

Harrison, Pete. 1977. Comments the Pressure for Shoreline Development: Spatial Concepts in Review. Coastal Zone Management Journal. 3(3):319-322.

The relationships between dispersed and concentrated shoreline development, environmental carrying capacity and public access are developed in a broad conceptual scheme.

Harvard University Graduate School of Design. 1967. Three Approaches to Environmental Resource Analysis. The Conservation Foundation. Washington, D.C. 102 pp.

An excellent view of 3 major approaches to environmental planning, included are the works of G. Angus Hills, Philip H. Lewis, Jr. and Ian L. McHarg. Although the work is dated, it is still a basic source and contains an annotated bibliography.

Hendler, Bruce. 1977. Caring for the Land: Environmental Principles for Site Design and Review. American Society of Planning Officials Report No. 328. Chicago, Illinois. 94 pp.

A generalized approach to planning is provided including environmental, site, and design considerations. It is a well-illustrated and useful overview to thoughtful development.

Hermon, Barbara A. 1975. "The Environmental Review Team." Planners Notebook. American Institute of Planners. Volume 5, No. 1. 6 pp.

A report on the history and methodology of an interdisciplinary environmental review team that was established in Eastern Connecticut in 1968 to assist local governments and developers in assessing the environmental impacts of proposed large scale projects.

Jain, R. K., L. V. Urban, and G. S. Stacey. 1977. Environmental Impact Analysis: A New Dimension in Decision-Making. Von Nostrand Reinhold Company, New York, N.Y. 330 pp.

A technical look at environmental impact statements that gives insight into how to determine which of 49 bio-physical and socio-economic factors may be affected by an given project. The authors present methods on how to identify and measure in advance impacts on these 49 attributes.

Louisiana Coastal Resources Program. 1976. A Process for Coastal Resources Management and Impact Assessment. Louisana State Planning Office, Baton Rouge, Louisiana. 72 pp.

The report is presented as a management handbook for elected and appointed officials, citizens and private sector interests to provide suggested methods of approaching some of the unique planning programs of the Louisiana coastal zone.

McEvoy III, James and Thomas Dietz, ed. 1977. Handbook for Environmental Planning: The Social Consequences of Environmental Change. John Wiley & Sons, New York, N.Y. 472 pp.

This book contains papers addressing the legislative and legal background of Environmental impact statements, as well as guidelines on how to address environmental impacts related to demography, land use, economics, transportation, sociocultural activities. Also included is a chapter on social impact information.

McHarg, Ian. 1972. "Best Shore Protection: Nature's Own Dunes." Civil Engineering--ASCE. pp. 66-70.

The author contends that construction along the beach should only occur where it will not endanger the coastal dune system.

"Attracted to the Ocean shore for recreation, man tends to build on or near the beach. He then tries to protect his investment with concrete shore-protection structures. But these structures often fail. A better way, the author contends, would be to use nature's own shore protection - the dunes. That is, permit construction only in locations where it will not endanger the shore dunes."

McHarg, Ian L. 1969. Design With Nature. Doubleday & Company, Garden City, New York, N.Y. 197 pp.

A classic work that by mixing scientific insight with constructive environmental design produces conservation and developmental guidelines. The second chapter "sea and survival" specifically addresses beach and dune situations.

Nassau-Suffolk Regional Planning Board. 1976. Integration of Regional Land Use Planning and Coastal Zone Science: A Guidebook for Planners. Nassau-Suffolk Regional Planning Board, Long Island, New York. 304 pp.

An integrated methodology combining 12 methods used by planners to analyze coastal environmental problems. Although the approach is applied to the Long Island situation the approach itself is transferable.

Owens, David W. and David J. Brower. 1976. Public Use of Coastal Beaches. University of North Carolina Sea Grant Publication. UNC-SG-76-08. Chapel Hill, North Carolina. 356 pp.

A comprehensive investigation of the issue of public access to coastal beaches in the U.S. that includes presentations on wet sands, acquisition and access issues as well as an annotated bibliography of book, articles and related court decisions.

Richardson, Dan K. 1976. The Cost of Environmental Protection: Regulating Housing Development in the Coastal Zone. Rutgers University, New Brunswick, New Jersey. 250 pp.

The author analyzes the impact of CZM regulations on housing development within an overview of the entire CZM scheme focusing on the New Jersey situation.

Runyon, Dean. 1977. "Tools for Community-Managed Impact Assessment." Journal of the American Institute of Planners. Volume 43, No. 2. pp. 125-134.
The author reviews 12 impact assessment techniques with comments on their application either singly or in combinations.

## C. Conflicts and Implementation

Clark, John. 1977. Coastal Ecosystem Management: A Technical Manual for the Conservation of Coastal Zone Resources. John Wiley and Sons, New York, N.Y. 928 pp.
Probably the best known book on the subject in which Clark analyzes coastal environment, identifies major conflicts providing suggested solutions and develops a complete management program with extensive references. Of particular interest are his Chapters on "Managing for Optimum Carrying Capacity" and "Guidelines and Standards for Coastal Projects."

Roberts, James M. and Cheryl Baxter. 1977. Managing Coastal Conflicts: A Paradigm of State Land Use Planning. Environmental Comment. Urban Land Institute.
A comparison of the various state level approaches with a suggestion with the majority of enforcement and control will likely rest with local jurisdictions rather than the state.

Roberts, William H. 1978. "Environmental Developmental Trade-Offs in the Coastal Zone." Proceedings of Coastal Zone '78. Volume IV. (pp. 2773-2790). American Society of Civil Engineers. New York, N.Y.
The author presents environmental and developmental functions in the planning process as mutually exclusive or conflicting (where a potential for accommodation or trade-off exists) in an approach to make CZM programs effective.

Schoenbaum, Thomas J. and Kenneth G. Silliman. 1976. Coastal Planning: The Designation and Management of Areas of Critical Environmental Concern. UNC-GG-76-09. University of North Carolina Sea Grant Publication.
This study reviews general legal limitations and suggests a process to designate and manage areas of particular environmental concern. Oregon's approach is included as are all states involved with such legislation.

Schoenbaum, Thomas J. and Ronald H. Rosenberg. 1976. The Legal Implementation of Coastal Zone Management: The North Carolina Model. Duke Law Journal Volume #1. pp. 1-37.
The authors review several policy areas that affect coastal management (planning, impact analysis, land use controls, permits, various tax programs, and government acquisition and ownership). Authors conclude that traditional land use legal tools are inadequate and that they should be enhanced by new techniques coupled with a strong intergovernmental cooperation strategy.

Sorensen, Jens C. 1971. A Framework for Identification and Control of Resource Degradation and Conflict in the Multiple Use of the Coastal Zone. MA Thesis. University of California, Berkeley. 50 pp.

A useful introductory work that provides an approach to the development of coastal planning policy. The paper is divided into 5 parts: (1) resource conflict and degradation, (2) development of an impact system framework, (3) description of the parts with #2, (4) applications of the framework, and (5) future needs to improve the framework.

Stockhom, John. 1974. Performance Standards: A Technique for Controlling Land Use. Extension Service Special Report 424. Oregon State University. 50 pp.

This paper examines performance standards as a land use control technique available to supplement or replace zoning for plan implementation.

Thurow, Charles, William Toner, and Duncan Erley. 1975. Performance Controls for Sensitive Lands: A Practical Guide for Local Administrators. ASPO Planning Advisory Service Report Nos. 307 & 308. ASPO: Chicago, Illinois. 156 pp.

This manual advocates the protection of environmentally sensitive areas (streams and creeks, aquifers, wetlands, woodlands, and hillsides) by using the police powers of local jurisdictions. Also provided are information on the importance of such areas, performance standards, examples of existing ordinances, and a list of technical assistance resources.

## V. General Information (Including Beaches and Dunes)

### A. CZM Issues

American Society of Civil Engineers. 1978. Coastal Zone '78, Proceedings of the Coastal Zone '78 Symposium. Volumes I - IV. New York, N.Y. 3091 pp.

This symposium proceedings contains 218 articles in 26 general subject areas (i.e., Coastal Ecosystems, Environmental Engineering, Impact Assessment Methodology, Coastal Hazards and Coast Processes, etc.).

Ketchum, Bostwick H., ed. 1972. "The Water's Edge Critical Problems of the Coastal Zone." Proceedings of the Coastal Zone Workshop. Woods Hole Oceanographic Institution. Massachusetts. 393 pp.

This work provides a good overall basic introduction to the many issues of CZM including several sections on beaches and dunes.

## B. CZM Bibliographies

Ditsworth, George R. 1966. Environmental Factors in Coastal and Estuarine Waters Bibliographic Series, Volume 1: Coast of Oregon. Pacific-Northwest Water Laboratory. Corvallis, Oregon. Federal Water Pollution Control Administration. 62 pp.

A bibliography pertaining to the marine waters indexed under; Marine Biology, Climate, Fisheries, Geology, Hydrology, Chemical and Physical Oceanography, and Bibliographies. Useful but somewhat dated.

Heikoff, Joseph M., ed. 1975. Shorelines and Beaches in Coastal Management: A Bibliography. Exchange Bibliography #876. Council of Planning Librarians. Monticello, Illinois. 63 pp.

An extensive bibliography with sources broken down into the following categories: Coastal Zone Managment (pp. 10-32), Physiography, Hydrography and Oceanography (pp. 32-37), Shorelines and Beaches (pp. 37-44), Wetlands and Estuaries (pp 44-48), Storms and the Shoreline (pp 48-50), Sedimentation, Dredging and Mining (pp. 51-54), Recreation (pp. 54-56), Power Plants and Energy (pp 56-57), Ports (pp 57-58), Legislation and Legal Aspects (pp 58-61) and U.S. Army Corps of Engineers Projects (pp 61-63).

Jenks, Bonnie, Jens Sorensen, and James Breadon. 1976. Coastal Zone Bibliography: Citations to Documents on Planning, Resource Management and Impact Assessment. 2nd edition. Sea Grant Publication No. 49. University of California Institute of Marine Resources. 161 pp.

A comprehensive, cross-referenced (by key-words) bibliography containing citations of 1701 documents, the great majority of which are monographs.

DATE DUE

GAYLORD No. 2333 PRINTED IN U.S.A.

NOAA COASTAL SERVICES CENTER LIBRARY

3 6668 14107 1904