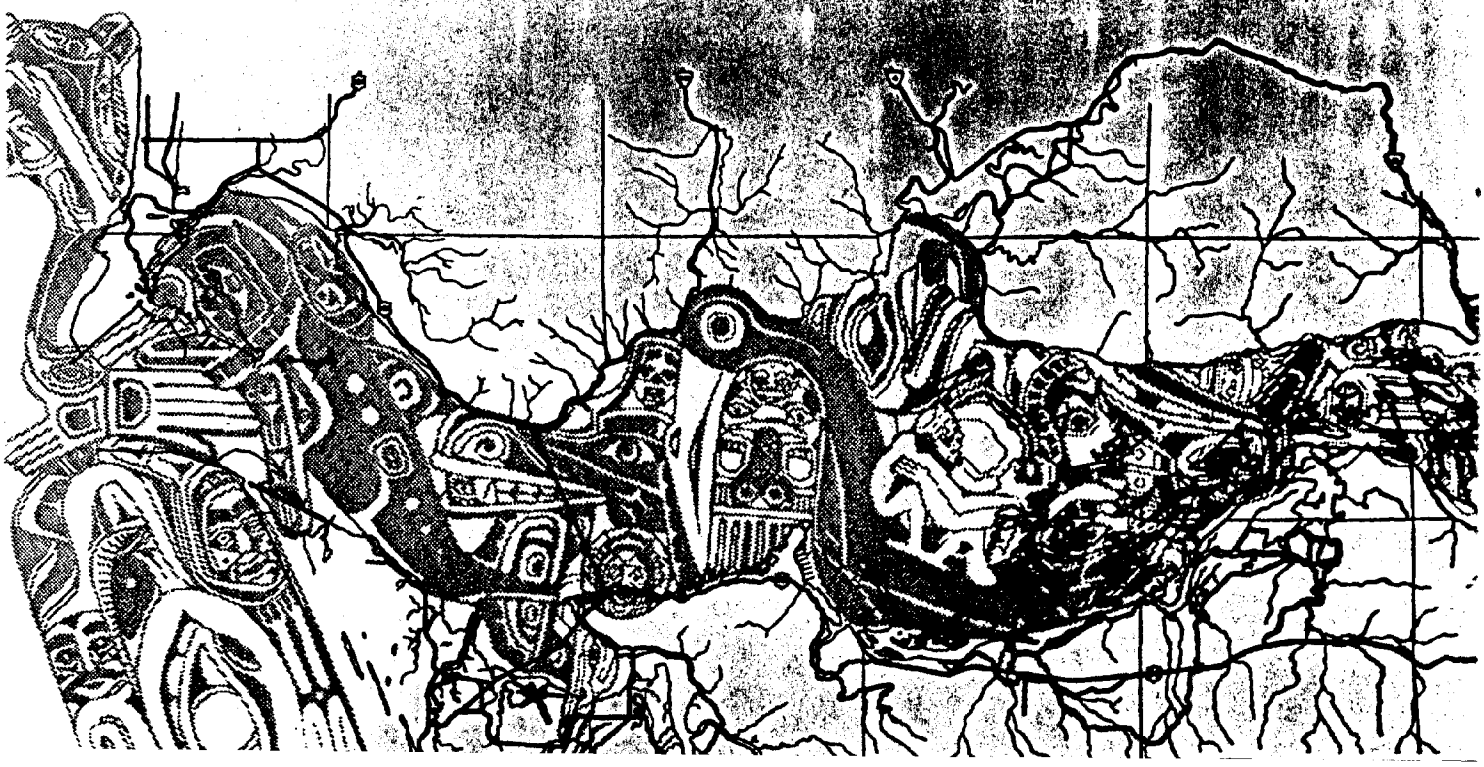
COLUMBIA RIVER ESTUARY REGIONAL MANAGEMENT PLAN



COLUMBIA RIVER ESTUARY
REGIONAL MANAGEMENT PLAN

Adopted June 1979 by the
Columbia River Estuary Study Taskforce

Prepared under the supervision of
James W. Good, CREST Director 1976-'79

Ian McColgin, Editor

Property of CSC Library

U.S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

HD1695. C73 C7 1979
9850144
FEB 12 1981

Preparation of this document was financially aided through grants from the Oregon Land Conservation and Development Commission and the Washington State Department of Ecology with funds obtained from the National Oceanic and Atmospheric Administration, and appropriated for Sections 305 and 306, respectively, of the Coastal Zone Management Act of 1972.

COVER AND MAPS

River Spirits, by Gayle McKennon, is based on traditional Northwest Indian motifs. This graphic is projected on a map of the estuary. All maps in this *Plan* were drawn by Walt Lindstrom.

Typesetting and printing by
Consolidated Printing & Stationery, Inc.
Astoria, Oregon

CONTENTS

PART I
BACKGROUND

11. PURPOSE OF THE PLAN ..... I - 1
12. CONTENT AND USE OF THE DOCUMENT ..... I - 2
13. ORGANIZATIONAL STRUCTURE ..... I - 3
14. PLANNING ISSUES, PROBLEMS AND NEEDS ..... I - 5
15. INVENTORY OF PHYSICAL, BIOLOGICAL AND CULTURAL CHARACTERISTICS ..... I - 7

PART II
REGIONAL POLICIES

20. CREST GOALS ..... II - 1

21. ECONOMIC DEVELOPMENT POLICIES ..... II - 2
21.10 Fisheries ..... II - 2
21.20 Deep Water Navigation, Ports and Industrial Development ..... II - 2
21.30 Shallow Draft Ports and Marinas ..... II - 3
21.40 Recreation and Tourism ..... II - 3
21.50 Forestry and Forest Products Industry ..... II - 3

22. RESOURCE PROTECTION POLICIES ..... II - 4
22.10 Energy Facilities ..... II - 4
22.20 Significant Areas ..... II - 4
22.30 Water Quality Maintenance ..... II - 4
22.40 Wildlife Habitat ..... II - 5
22.50 Restoration ..... II - 5
22.60 Mitigation ..... II - 6

23. LAND AND WATER USE POLICIES ..... II - 7
23.10 Residential, Commercial and Industrial Development ..... II - 7
23.20 Agriculture ..... II - 7
23.30 Land Transportation Systems ..... II - 7
23.40 Mining and Mineral Extraction ..... II - 8
23.50 Public Access ..... II - 8
23.60 Shoreland Hazard Areas ..... II - 8

24. LAND AND WATER ACTIVITY POLICIES ..... II - 9
24.10 Dredging and Dredged Material Disposal ..... II - 9
24.20 Dredged Material Disposal Site Selection ..... II - 9
24.30 Estuarine Construction ..... II - 10
24.40 Filling Estuarine Waters and Wetlands ..... II - 10
24.50 Diking ..... II - 10

25. INTERGOVERNMENTAL COORDINATION AND PUBLIC EDUCATION POLICIES ..... II - 11
25.10 Local Intergovernmental Coordination ..... II - 11
25.20 State and Federal Consistency ..... II - 11
25.30 Development Evaluation, Permit Information, and Permit Review ..... II - 11
25.40 Scientific Research and Planning ..... II - 12
25.50 Public Education ..... II - 12

PART III
MANAGEMENT SYSTEM AND DEVELOPMENT STANDARDS

30. PLAN ELEMENTS ..... III - 1

31. CLASSIFICATION SYSTEM FOR LAND AND WATER USES ..... III - 2
31.10 Aquatic Area Designations ..... III - 2
31.20 Shoreland Designations ..... III - 3

32. DEFINITIONS ..... III - 4

33. DEVELOPMENT STANDARDS ..... III - 5
Table 33-1, Aquatic Area Permitted Uses/Activities ..... III - 6
Table 33-2, Shorelands Permitted Uses/Activities ..... III - 7
33.01 Agriculture ..... III - 9
33.02 Airports ..... III - 9
33.03 Aquaculture ..... III - 9
33.04 Commercial Uses ..... III - 10
33.05 Docks and Moorage ..... III - 11
33.06 Industrial and Port Facilities ..... III - 11
33.07 Land Transportation Facilities ..... III - 12
33.08 Log Dump/Sort Area (in-water) ..... III - 13
33.09 Log Storage (in-water) ..... III - 13
33.10 Log Storage/Sorting Yard (dry land) ..... III - 13
33.11 Marinas ..... III - 14
33.12 Mining/Mineral Extraction ..... III - 14
33.13 Navigational Structures ..... III - 15
33.14 Recreation Uses ..... III - 15
33.15 Residential Uses ..... III - 16
33.16 Restoration/Resource Enhancement ..... III - 17
33.17 Solid Waste Disposal ..... III - 17
33.18 Timber Propagation/Harvesting ..... III - 17
33.19 Utilities ..... III - 18
33.20 Bankline or Stream Alteration ..... III - 18
33.21 Dikes ..... III - 19
33.22 Dredging ..... III - 19
33.23 Dredged Material Disposal ..... III - 20
33.24 Excavation - Creation of New Water Surface Area ..... III - 22
33.25 Fill ..... III - 22
33.26 Piling/Dolphin Installation ..... III - 23
33.27 Shoreline Stabilization ..... III - 23

34. THE MANAGEMENT SYSTEM AND DEVELOPMENT STANDARDS IN LOCAL ORDINANCES ... III - 25
34.10 Oregon ..... III - 25
34.20 Washington ..... III - 25

PART IV
LAND AND WATER USE PLAN

40. BACKGROUND AND SUMMARY ..... IV - 3

41. LOWER RIVER AND ISLANDS ..... IV - 9

41.01 Mouth of Columbia River ..... IV - 11
41.02 Estuary Channels ..... IV - 13
41.03 Estuary Sands ..... IV - 14
41.04 River Channels ..... IV - 15
41.05 Snag Islands ..... IV - 16
41.06 Cathlamet Bay ..... IV - 17
41.07 Upper Marsh Islands ..... IV - 17
41.08 Tenasillahe Island ..... IV - 18
41.09 Fort Stevens State Park ..... IV - 19

42. YOUNGS BAY - ASTORIA ..... IV - 21

42.01 Hammond ..... IV - 23
42.02 Tansy Point - Alder Cove ..... IV - 26
42.03 North Warrenton ..... IV - 27
42.04 Upper Skipanon River ..... IV - 30
42.05 Middle Skipanon River ..... IV - 32
42.06 Mouth of Skipanon River ..... IV - 34
42.07 Youngs Bay ..... IV - 38
42.08 Airport ..... IV - 42
42.09 Lewis and Clark River ..... IV - 44
42.10 Miles Crossing ..... IV - 46
42.11 Youngs River ..... IV - 48
42.12 South Astoria ..... IV - 51
42.13 Port of Astoria ..... IV - 52
42.14 Downtown Astoria Waterfront ..... IV - 54
42.15 Uppertown - Alderbrook ..... IV - 56
42.16 Tongue Point ..... IV - 58
42.17 Lois and Mott Islands ..... IV - 62

43. EASTERN CLATSOP ..... IV - 63

43.01 John Day River ..... IV - 67
43.02 John Day Point - Settlers Point ..... IV - 69
43.03 Settlers Point East to Ivy Station ..... IV - 70
43.04 Svensen Island ..... IV - 72
43.05 Ivy Station - Big Creek ..... IV - 73
43.06 Big Creek - Little Creek ..... IV - 74
43.07 Fertile Valley ..... IV - 76
43.08 Mouth of Blind Slough ..... IV - 77
43.09 Gnat Creek ..... IV - 79
43.10 Brownsmead ..... IV - 80
43.11 Clifton Channel ..... IV - 82
43.12 Bradwood ..... IV - 83
43.13 Wauna/Westport ..... IV - 84

44. WAHKIAKUM ..... IV - 87

44.01 Puget Island ..... IV - 90
44.02 Eastern Wahkiakum County ..... IV - 92
44.03 Cathlamet and White-tailed Deer Refuge ..... IV - 94
44.04 Skomokawa to Three Tree Point ..... IV - 97
44.05 Three Tree Point to Harrington Point ..... IV - 99
44.06 Grays Bay and Tributaries ..... IV - 101

45. BAKER BAY ..... IV - 105

45.01 Knappton/Frankfort ..... IV - 107
45.02 McGowan ..... IV - 109
45.03 Chinook ..... IV - 110
45.04 Chinook River ..... IV - 112
45.05 Baker Bay ..... IV - 114
45.06 Wallacut River ..... IV - 117
45.07 Ilwaco ..... IV - 118
45.08 Fort Canby North ..... IV - 120
45.09 Cape Disappointment ..... IV - 121

PART V

DREDGED MATERIAL MANAGEMENT PLAN

50. SUMMARY AND PLAN DEVELOPMENT ..... V - 2

51. POLICIES AND STANDARDS ..... V - 3

52. DREDGING TECHNOLOGY AND COSTS ..... V - 7

53. DREDGING DISPOSAL OPTIONS ..... V - 9

54. IMPLEMENTATION AND SHORELAND DMD SITE MANAGEMENT ..... V - 12

55. ESTUARY-WIDE PROJECTS ..... V - 14
55.10 Corps of Engineers Projects ..... V - 14
55.11 Columbia River at the Mouth ..... V - 14
55.12 Lower Columbia River Estuary ..... V - 14
55.13 Upper Columbia River Estuary ..... V - 15
55.20 Private Projects ..... V - 17

56. BAKER BAY PROJECTS ..... V - 17
56.10 Baker Bay West Channel ..... V - 17
56.20 Chinook Channel ..... V - 18
56.30 Future Projects ..... V - 19
56.40 Port of Ilwaco ..... V - 19
56.50 Port of Chinook ..... V - 20

57. YOUNGS BAY - ASTORIA PROJECTS ..... V - 21
57.10 Hammond Channel ..... V - 21
57.20 Hammond Boat Basin ..... V - 21
57.30 Tansy Point ..... V - 22
57.40 Skipanon Channel ..... V - 22
57.50 Warrenton ..... V - 22
57.60 Youngs Bay and River ..... V - 24
57.70 Astoria Turning Basin ..... V - 24
57.80 Port of Astoria ..... V - 24
57.90 Tongue Point ..... V - 25

58. UPPER ESTUARY PROJECTS ..... V - 26
58.10 Grays Bay ..... V - 26
58.20 Skomokawa ..... V - 27
58.30 Price Island ..... V - 28
58.40 Cathlamet ..... V - 28
58.50 Puget Island ..... V - 28
58.60 Bradwood ..... V - 29
58.70 Wauna-Westport ..... V - 29

59. DREDGED MATERIAL DISPOSAL SITES ..... V - 30
59.10 Ocean Sites ..... V - 30
59.20 Estuary Sites ..... V - 30
59.30 Flow-Lane Sites ..... V - 31
59.40 Beach Nourishment Sites ..... V - 31
59.50 Shoreland Sites ..... V - 33

PART VI

RESTORATION AND MITIGATION PLAN

61. BACKGROUND ..... VI - 2
State and Federal Programs ..... VI - 2
Relationship of Restoration and Mitigation ..... VI - 3

62. RESTORATION POLICIES ..... VI - 3

63. MITIGATION POLICIES ..... VI - 4

64. TECHNICAL CONSIDERATIONS FOR MITIGATION ..... VI - 5
The Scientific Basis for Mitigation ..... VI - 5
Ecological Significance of Physical Properties ..... VI - 6
Salinity and Temperature Regime ..... VI - 6
Substrate Type ..... VI - 6
Tidal Exposure ..... VI - 7
Slope and Area ..... VI - 7
Current Velocity and Pattern ..... VI - 7
Orientation to Solar Radiation ..... VI - 7
Annual Submergence Time ..... VI - 7
Biological Productivity ..... VI - 8
Habitat and Species Diversity ..... VI - 8

SUMMARY TABLE ..... VI - 8

65. POTENTIAL RESTORATION/RESOURCE ENHANCEMENT PROJECTS ..... VI - 10
Marsh Restoration - Creation Sites ..... VI - 10
Shoal Area Restoration ..... VI - 14
Eroded Shoreline Restoration Sites ..... VI - 15
Shoreland Vegetation ..... VI - 16
Pile Dike or Piling Removal ..... VI - 16
Fisheries Enhancement ..... VI - 16

66. MITIGATION NEEDS ..... VI - 18
66.10 Hammond ..... VI - 18
66.20 Middle Skipanon ..... VI - 18
66.30 Mouth of the Skipanon ..... VI - 18
66.40 Youngs Bay ..... VI - 19
66.50 Port of Astoria ..... VI - 19
66.60 Uppertown Alderbrook ..... VI - 20
66.70 Tongue Point ..... VI - 20

67. IMPLEMENTATION ..... VI - 20
67.10 The Mitigation Process ..... VI - 20
67.20 Mitigation Plan Content ..... VI - 21
67.30 Mitigation Bank ..... VI - 22
67.40 Mitigation Site Reservation ..... VI - 23

PART VII

PLAN IMPLEMENTATION

71. LOCAL GOVERNMENTS ..... VII - 2
Washington ..... VII - 2
Oregon ..... VII - 3

72. STATE AGENCIES ..... VII - 4
Washington ..... VII - 4
Oregon ..... VII - 4

73. FEDERAL AGENCIES ..... VII - 4
Federal Consistency ..... VII - 4
Excluded Federal Lands ..... VII - 5

74. INTERGOVERNMENTAL COORDINATION ..... VII - 6
Local Coordination ..... VII - 6
Local-State-Federal Coordination ..... VII - 7

75. ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURES ..... VII - 8
Local Environmental Impact Assessments - Washington ..... VII - 8
Local Environmental Impact Assessments - Oregon ..... VII - 8
State Environmental Impact Assessments - Washington ..... VII - 8
State Environmental Impact Assessments - Oregon ..... VII - 9
Federal Environmental Impact Assessments ..... VII - 9

76. PLAN REVIEW AND AMENDMENT PROCESS ..... VII - 9
Scheduled Biennial Review and Amendment ..... VII - 9
Scheduled Six Year Review and Update ..... VII - 9
Unscheduled Reviews and Updates ..... VII - 9

77. COLUMBIA RIVER ESTUARY DATA DEVELOPMENT PROGRAM ..... VII - 10

78. COLUMBIA RIVER ESTUARY INFORMATION CENTER ..... VII - 11

79. AGENCY ROLES AND RESPONSIBILITIES ..... VII - 12

PART VIII

APPENDICES

APPENDIX A, SELECTED GLOSSARY ..... VIII - 3
APPENDIX B, OREGON GOAL EXCEPTIONS ..... VIII - 7
APPENDIX C, CREST CHARTERS ..... VIII - 21
APPENDIX D, CREST PROGRAM PARTICIPATION ..... VIII - 24
APPENDIX E, STATE AND FEDERAL TECHNICAL ADVISORY COMMITTEES ..... VIII - 25
APPENDIX F, HISTORY OF STATE AND FEDERAL AGENCY INVOLVEMENT IN PLAN DEVELOPMENT ..... VIII - 27
APPENDIX G, CREST CHRONOLOGY OF MAJOR EVENTS ..... VIII - 28

PART I

BACKGROUND

11. PURPOSE OF THE PLAN ..... I - 1
12. CONTENT AND USE OF THE DOCUMENT ..... I - 2
13. ORGANIZATIONAL STRUCTURE ..... I - 3
14. PLANNING ISSUES, PROBLEMS AND NEEDS ..... I - 5
15. INVENTORY OF PHYSICAL, BIOLOGICAL AND CULTURAL CHARACTERISTICS ..... I - 7



- Ann Myers, Compleat Photographer

11. PURPOSE OF THE PLAN

The Columbia River Estuary Regional Management Plan is the culmination of 4½ years of planning by the Columbia River Estuary Study Taskforce (CREST), local jurisdictions, state and federal agencies, and concerned citizens. Impetus for developing the plan came from growing conflicts over use and development of estuarine areas. Responding to the need to preserve rapidly dwindling natural resources, particularly in coastal areas, state legislatures and the federal Congress passed new environmental protection laws which drastically changed the ground rules for development, to the confusion of ports and the private sector. The regional plan was also in response to state coastal zone management programs and federal funding under the 1972 Coastal Zone Management Act. The needs for better management data, long term protection to critical natural resource areas, and channel development all contributed to the planning program.

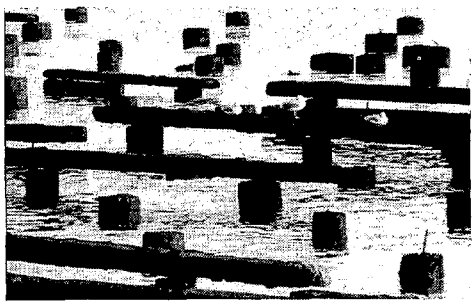
12. CONTENT AND USE OF THE DOCUMENT

The **Columbia River Estuary Regional Management Plan** expresses decisions of the CREST Council on estuarine management issues. The plan has no legal authority except as it is implemented by local governments in revised local comprehensive plans (Oregon) and amended local Shoreline Management Master Programs (Washington). Also, the decisions in the plan do not supercede or negate other management and regulatory authorities, except to the extent provided in state and federal consistency procedures.

PART I BACKGROUND — explains how the plan may be used, how public and private interests were involved in developing the plan, what issues and problems were central in developing the plan, and how inventory and other information were used in the planning process.

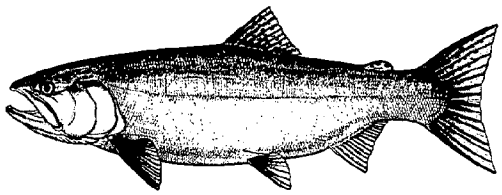
PART II REGIONAL POLICIES — developed early in the CREST program, served as guidelines for detailed land and water use decisions and as a framework for the development standards which will be used in local ordinances. The regional policies will be incorporated into local plans and used as general guidelines for land and water actions.

PART III MANAGEMENT SYSTEM AND DEVELOPMENT STANDARDS — defines the different land and water use designations that were used in the *Land and Water Use Plan*. Designations range from ***Natural*** to ***Development*** and can be converted into "shoreline environments" for Washington shoreline management programs and "zones" for Oregon local ordinances. This part of the plan has detailed development standards for 19 categories of uses (residential, commercial, etc.) and 8 categories of activities (dredging, filling, etc.) which will also be incorporated into local ordinances. State and federal agencies will apply the standards through state and federal consistency procedures.



-John Atkinson

Oncorhynchus kisutch Coho Salmon



- Ron Pittard - Searep Studio, courtesy Clatsop County

PART IV LAND AND WATER USE PLAN — contains the decisions about how aquatic and shoreland areas are to be used in the future. Land and water use designations will be used in local plans and ordinances to define where various uses and activities can occur. Special policies about resources that need special protection or how development should proceed are also included here. State and federal consistency procedures will be used to implement the plan at these governmental levels.

PART V DREDGED MATERIAL MANAGEMENT PLAN — describes the location and procedures for use of dredged material disposal sites. Dredging needs over the next 20 years were estimated and sites located to handle disposal of the material. Procedures for local jurisdictions to reserve sites for future dredged material disposal uses are also in this part of the plan. Local governments will incorporate these procedures into their plans, protect sites from other uses, and state and federal consistency procedures will apply at those levels.

PART VI RESTORATION AND MITIGATION PLAN — includes potential restoration projects, possible development project mitigation needs, and a process to determine mitigation plans for specific developments. Local governments must incorporate mitigation procedures into their plans and protect potential sites from other uses. State and federal consistency procedures will apply where appropriate.

PART VII IMPLEMENTATION — describes in detail how the plan will be used by local, state and federal agencies. Procedures for intergovernmental coordination, the functions of the restructured CREST organization, environmental impact assessment procedures, a plan review and amendment process, a description of the on-going estuary research program and the Columbia River Estuary Information Center are all covered in this part of the plan. These implementation procedures will be used at all governmental levels.

APPENDICES — provide a glossary, LCDC Goal exceptions, details on how the plan was developed, who was involved, and how the work program was organized and funded.

13. ORGANIZATIONAL STRUCTURE

The development of the **Columbia River Estuary Regional Management Plan** has been brought about through the combined efforts of local governments, concerned citizens, state and federal agencies, industry, and environmental groups. Formal decision-making authority rested with the local CREST Council, but the real work and development of the plan was carried out by working committees which included representatives from all interests. While a consensus was not reached on all issues, the decentralized organizational structure for planning was such that the concerns and viewpoints of all interests were thoroughly considered. A sincere effort was made to balance the sometimes conflicting needs to preserve dwindling natural resources and provide the opportunity for economic growth and stability.

Local CREST organization

In 1974, a series of organizational meetings were held to discuss establishment of an organization of local Washington and Oregon governments to spearhead development of a comprehensive estuary plan and provide local impetus for a major research program to learn more about the estuary and promote wise management.

At the beginning of 1975, the Columbia River Estuary Study Taskforce (CREST) was established under the authority of ORS 190 (Oregon Intergovernmental Coordination Act) and RCW 34.39 (Washington Interlocal Cooperation Act). A Charter and Agreement was developed (cf. Appendix C) and 10 local governments joined in the effort.

Washington	Oregon
City of Cathlamet	City of Astoria
Port of Ilwaco	Port of Astoria
Town of Ilwaco	Clatsop County
Pacific County	Town of Hammond
Wahkiakum County	City of Warrenton

The CREST Council, made up of delegates and alternates from each local member government (cf Appendix D), was the policy- and decision-making body for development of the **Columbia River Estuary Regional Management Plan**. The CREST staff, which included a land use planner, two oceanographers, a fisheries biologist and support staff (cf. Appendix D), was responsible to the CREST Council for development of the work program and coordination of the planning process. The CREST work program and funding provided to develop the plan are outlined in Appendix E.

Coordination of the CREST planning with local planning commissions and governing bodies was through extensive staff level contact, staff attendance at regular local government meetings to give progress reports and solicit comments, and through CREST Council meetings. This contact was particularly intense during the conflict resolution period.

To assure proper implementation of the plan, to provide technical assistance and information to local governments and to provide active support for the on-going estuary research program, CREST was restructured and reestablished as a new organization effective July 1, 1979. The functions of the organization are detailed in Part VII of this plan; the new Charter and Agreement is part of Appendix C.

Citizen Involvement

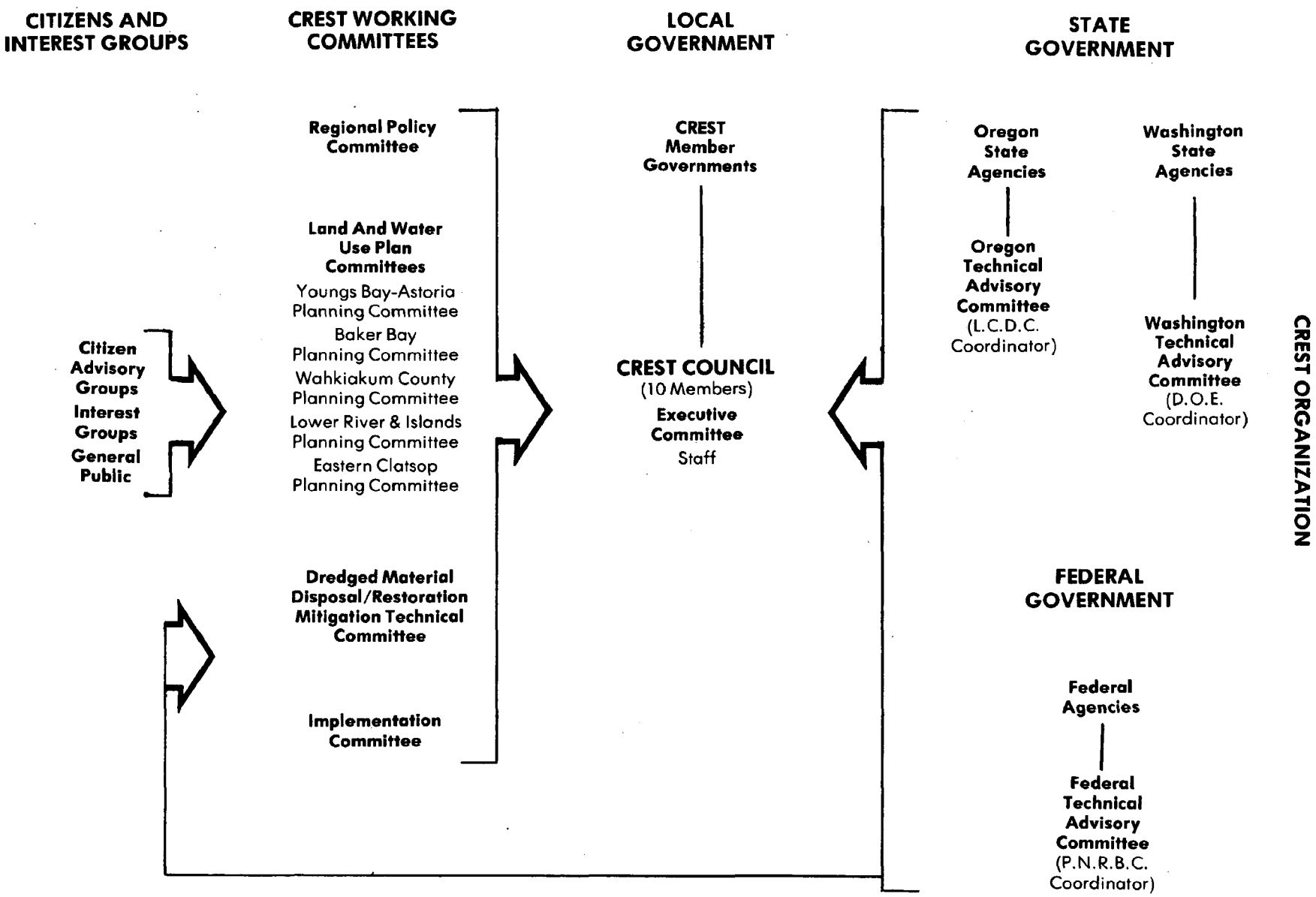
The decentralized CREST planning process provided the citizens of the estuary area with the opportunity to play a significant role in making plan decisions. The working committees appointed by the CREST Council to develop plan recommendations were composed primarily of public-minded private citizens.

In both Washington and Oregon, news media and other publicity helped solicit interested people to serve on planning committees.

In Oregon, existing city and county citizen involvement committees were also involved in plan development, as well as detailed plan review and conflict resolution. This resulted in a high level of coordination between CREST and local jurisdictions throughout the process. Numerous public meetings were held to review draft policies, plans and implementation measures with interested citizens, and copies of material were always available. In an effort to reach as many people as possible, CREST made presentations on draft plan material to service clubs, granges, environmental groups and other organizations. Radio talk shows, public attitude questionnaires and news media were used to promote communication. The result of this active program of citizen involvement is that the public is well informed about what CREST has done. There is a high level of plan acceptance in the local area, and many are aware that CREST is not just a toothpaste or motel.

State and Federal Agency Coordination

State and federal agencies play important management, regulatory and development roles in the estuary, particularly for fish and wildlife management, water quality maintenance, and construction and maintenance of navigation channels and structures. The two states also own and manage the majority of estuarine bedlands and tidelands in the public interest. Two National Wildlife Refuges make up nearly one third of the entire estuary. These important roles made it essential to prescribe a key role for state and federal agencies in development of the estuary plan. Acceptance and implementation through state and federal consistency is a key factor in the usefulness of the plan. When CREST was established in early 1975, state and federal technical advisory committees (TAC's) were established. Persons who served on these committees are listed in Appendix E. These committees were coordinated by the representatives from the Department of Ecology (for Washington State agencies), the Department of Land Conservation and Development (for Oregon State agencies), and the Pacific Northwest River Basins Commission (for federal agencies).


CITIZENS AND INTEREST GROUPS
CREST WORKING COMMITTEES
LOCAL GOVERNMENT
STATE GOVERNMENT
Regional Policy Committee
Land And Water Use Plan Committees
Youngs Bay-Astoria Planning Committee
Baker Bay Planning Committee
Wahkiakum County Planning Committee
Lower River & Islands Planning Committee
Eastern Clatsop Planning Committee
Citizen Advisory Groups
Interest Groups
General Public
Dredged Material Disposal/Restoration Mitigation Technical Committee
Implementation Committee
CREST Member Governments
CREST COUNCIL
(10 Members)
Executive Committee
Staff
Oregon State Agencies
Oregon Technical Advisory Committee
(L.C.D.C. Coordinator)
Washington State Agencies
Washington Technical Advisory Committee
(D.O.E. Coordinator)
FEDERAL GOVERNMENT
Federal Agencies
Federal Technical Advisory Committee
(P.N.R.B.C. Coordinator)
CREST ORGANIZATION

While the development of the CREST program was directed at the local level, the active involvement of state and federal agencies (particularly those managing natural resources) throughout the planning process figured largely in the content and orientation of the plan. As outlined in the CREST Phase I report, major functions of these advisory committees were to:

- Review (and consensus on) each element of the planning program;
- Provide consultation and assistance in the formulation of plan policies;
- Provide technical support;
- Communicate agency concerns, needs and interests to CREST;
- Where appropriate, provide to CREST explanations of existing agency policies and procedures;
- Identify and resolve interagency conflicts.

These functions were carried out through regular individual contact between CREST staff and agency representatives; periodic full TAC meetings to review CREST work on a particular step in the planning process; review and comment on draft policies and planning documents; direct participation on planning committees and special opportunities for agency representatives to explain agency policies and concerns to local citizen planning groups; and direct participation in conflict resolution meetings. Agency representatives were also notified of regular CREST meetings which would interest them.

The details of agency participation in the development of regional policies, land and water use plans, dredged material disposal and restoration/mitigation plans and implementation measures are found in Appendix E.

14. PLANNING ISSUES PROBLEMS AND NEEDS

The major issue in the estuarine area reflects the general national concern for balancing conservation of the quality of the natural environment with continued economic development and full economic use of the resources available. In the Columbia River estuary area, this is most often experienced as inability to obtain adequate information for making good decisions supporting preservation, development, or a balance between them.

At the outset of the CREST program, an attempt was made to define the specific issues that should be addressed. Through a series of interviews and workshops, a list of issues, problems and needs was compiled. These are outlined below and have been addressed in the plan through policies, land and water use decisions, and implementation measures. Further, the estuary research program (cf. 77) is designed to provide new data on biological, physical, chemical, and sediment processes that will result in more informed decision making.

Four major categories of issues or problems emerged: economy/land and water use; fish and wildlife/biological/chemical; physical alterations and hydraulics; political/resource management fragmentation.

Economy - Land and Water Use Problems

Economic Base Has Shown Little Growth Since 1950 and Is Not Well Balanced.

Major resource based industries — forestry, fishing, agriculture — are seasonal, are unable to realize growth potential.

Tourism is highly seasonal, and tourist potential, including maritime history, historic sites, etc., has not been realized.

Astoria is the only major port on the estuary and, although growing, finds its full foreign trade and barge traffic potential hampered by inability to obtain space for expansion. Deepwater port potential has not been conclusively determined.

Large industrial processing plant proposals such as AMAX, which could add a significant number of permanent jobs to the employment base, immediately raise environmental concerns.

Astoria's tax base is not large enough to support needed public facilities and services. In other localities, the tax base potential is not fully utilized.

Differing opinions, both inside and outside the local area, on the value of economic growth to the area need to be resolved.

The Area Has Not Identified or Designated Suitable and Adequate Sites for Industrial and Economic Base Expansion.

Lack of suitable level land areas is a problem in specific locations such as Astoria, east of Astoria, and along the Washington shore.

Filling tidelands is now largely discontinued because of environmental considerations, thus foreclosing use of some potential sites.

A new master plan of Clatsop airport will be needed to identify industrial development potential on adjacent lands there.

The Tongue Point reserve fleet site appears to have potential, but no use has yet been found.

Environmental problems prevent use of possible sites on tributary streams.

Determination of Compatibility of a Variety of Land Uses and Coordination of Land Use Developments Does Not Occur.

The most appropriate uses of waterfront land such as those needing water access have not been established through zoning or other regulation.

The impact of recreation homes and second homes is not well documented.

Location, size and number of marina developments, particularly on the Washington shore, could adversely affect other resource values.

The Area's Non-Water Transportation Network Is Inadequate for Economic Expansion.

Highway 30 east from Astoria to Fern Hill is inadequate, particularly for trucks, and is dangerous under night or rainy driving conditions.

North shore highway improvement could eliminate other shoreline uses.

Only one rail line is available to the area, on the Oregon side. No passenger service is available.

Clatsop airport use is minimal and service is inadequate.

Some Public Facilities Are Inadequate to Support Development.

Poorly located sanitary landfills leach into streams.

Domestic water supplies are inadequate in some localities.

Fish and Wildlife - Biological-Chemical Problems

For Some Species, Such as Dungeness Crab, Production and Harvest Does Not Equal Previous Years; For Others, Production Potential or Efficiency Is Not Fully Realized.

Hatchery and natural spawning area problems, especially from logging practices, inhibit production enhancement.

Crab harvest varies greatly from one year to another for unknown reasons.

The potential for natural production of chum and pink salmon from small streams is not utilized.

More information is needed to adequately evaluate changes in the food chain caused by people and development.

Total aquaculture potential has not been determined.

Present sports, commercial and Indian harvesting methods may not be the best for maintenance and enhancement of the salmon and steelhead runs.

The Biology and Chemistry of the Columbia River Estuarine System Is Not Fully Enough Understood to Determine Whether Management of Alteration Programs Will Be Detrimental or Beneficial.

Public opinion demands that estuarine alterations be supported by best scientific data.

Good data on estuarine productivity are either lacking or have not been made readily available.

An inventory of all estuarine resources has never been completed.

Biological and chemical effects of Columbia River plume on associated areas such as Willapa Bay are not well known or documented.

Adverse Effects Are Experienced from Industrial and Other Effluents Discharged to the River.

Pulp and paper mills discharge into the river. Heated effluent plume can be avoided by upstream migrating mature fish but not always by downstream immature migrants. Heat plumes may also cause death in a fish distressed by supersaturation. Careless handling of logs can result in unwanted woodchips in the river.

Willamette River water quality at discharge to Columbia is questioned, particularly at low-flow periods.

The effects of airborne effluents not known.

Log storage in water produces acid, reduces dissolved oxygen, and the long-term accumulation of bark and organic material may lead to a sludge build-up and fouling of the sediments, all of which may harm aquatic organisms.

Some local sewage disposal systems are inadequate and need to be corrected.

Wildlife Management and Enhancement Programs Are Incomplete.

Non-native rodents, such as nutria, which are destroying needed grass and willow vegetation on the river sand islands should be exterminated.

Important "nursery" areas for wildlife species are not fully identified and protected.

Refuge management may favor single-use concepts without adequate consideration of feasible multiple-use potentials.

Physical Effects - Alterations

The Effects of Channel Dredging Are Repeatedly Cited as a Major Problem.

The full effects of the pile dikes are not always anticipated; some are adverse, such as shoaling two or three miles away. Commercial fishing drift rights can be especially affected by this.

The best control of flow with channel stabilization to result in the least bottom sand movement and the least sand bar buildup is not known.

Spoil disposal is a major part of the dredging problem. Adverse effects should be minimized by use as a resource on dry land to improve development sites or deepwater disposal which will not affect the river or fish life adversely.

Channel dredging may have contributed to Hammond Beach erosion.

The quality of dredged material is important. In some industrial locations, it may contain toxic solids which require careful disposal location.

Sand Movement and Shoaling Problems Are Numerous.

Port of Astoria slips have a continual siltation problem, the actual cause of which has not been identified.

Port of Ilwaco-Baker Bay, now mostly shallow, used to have good, deep water.

Adverse effects of Megler Bridge are not known.

Sand accretion-depletion takes place as a result of north and south entrance jetties. Blowing sand contributes to these problems.

Best Method of Responding to Flood and Other Flow Conditions Are Not Agreed Upon.

Areas for river to "spread" should be left. Dikes should be set back.

Existing lowland protective dikes are deteriorating, may not be well located, and may lack economic justification.

Possible effects of flood and power peaking regulation, irrigation, and withdrawals upstream need to be understood.

Sedimentation Problems and Effects Are Diverse.

Youngs Bay, Baker Bay and Grays Bay portions of the estuary are filling quite rapidly.

Sedimentation and other watershed management problems in tributary streams with particularly adverse effects at confluence with Columbia are caused in part by upstream logging, road-building, etc.

Log Storage Has Adverse Effects.

Logs on the bottom will cause shoaling.

Log rafts break up during flooding conditions and cause damage to structures along the river and interfere with gillnet fish drifts.

Dry storage close to tributary streams causes drainage and other problems.

Sinker logs on bottom and logs resting on bottom when tide is out reduce or eliminate biologic productivity of those beds.

Shading effect is adverse to biologic regimes in water below.

Wave Action of Ocean-Going Vessels Adversely Affects Wildlife, Beaches and Other Recreational Activity and Causes Some Shoreline Erosion. Beach "Drift" from Logging Waste, Slash, etc., Gets into Tributary Streams. Slide and Slump Areas are Problem Areas to Be Avoided.

Political - Resource Management Fragmentation

There Is No System to Assign Management Responsibility for Program Implementation Measures to Appropriate Levels of Government and Agencies.

Presently, a locality is inundated with control agencies operating independently.

Opportunities for local control are continually minimized, but should be maximized.

No System Exists for Recording and Tabulating Local Citizen Attitudes Toward Estuarine Resource Management.

Credibility of recommendations will depend on quality of scientific information base supporting them.

Adequate reporting to the public is needed during any study program.

Current Planning and Study Programs are Fragmented.

Timing of studies is important.

Funding for agency participation is often minimal or lacking.

Continuing direct contact with interested local officials and citizens in study areas was not done in the past, yet is essential for support and implementation.

15. INVENTORY OF PHYSICAL, BIOLOGICAL AND CULTURAL CHARACTERISTICS

The major companion document of this plan is the *Columbia River Estuary Inventory of Physical, Biological and Cultural Characteristics,* compiled by CREST and published in June, 1977. The purpose of the *Inventory* was to collect published and unpublished data about the estuary into a single document, with analysis and organization that would be useful in the planning process and in future managing of estuarine resources. The *Inventory* contains 400 pages of text, numerous tables of data and more than 50 maps depicting physical process and biological resources. Inventory data was used extensively throughout the planning process, particularly as it relates to specific geographic locations and proposed uses. Summaries of inventory data for each geographic subarea of the estuary are provided in the *Land and Water Use Plan* (cf. Part IV).

PART II
REGIONAL POLICIES

20. CREST GOALS ..... II - 1

21. ECONOMIC DEVELOPMENT POLICIES ..... II - 2
21.10 Fisheries ..... II - 2
21.20 Deep Water Navigation, Ports and Industrial Development ..... II - 2
21.30 Shallow Draft Ports and Marinas ..... II - 3
21.40 Recreation and Tourism ..... II - 3
21.50 Forestry and Forest Products Industry ..... II - 3

22. RESOURCE PROTECTION POLICIES ..... II - 4
22.10 Energy Facilities ..... II - 4
22.20 Significant Areas ..... II - 4
22.30 Water Quality Maintenance ..... II - 4
22.40 Wildlife Habitat ..... II - 5
22.50 Restoration ..... II - 5
22.60 Mitigation ..... II - 6

23. LAND AND WATER USE POLICIES ..... II - 7
23.10 Residential, Commercial and Industrial Development ..... II - 7
23.20 Agriculture ..... II - 7
23.30 Land Transportation Systems ..... II - 7
23.40 Mining and Mineral Extraction ..... II - 8
23.50 Public Access ..... II - 8
23.60 Shoreland Hazard Areas ..... II - 8

24. LAND AND WATER ACTIVITY POLICIES ..... II - 9
24.10 Dredging and Dredged Material Disposal ..... II - 9
24.20 Dredged Material Disposal Site Selection ..... II - 9
24.30 Estuarine Construction ..... II - 10
24.40 Filling Estuarine Waters and Wetlands ..... II - 10
24.50 Diking ..... II - 10

25. INTERGOVERNMENTAL COORDINATION AND PUBLIC EDUCATION POLICIES ..... II - 11
25.10 Local Intergovernmental Coordination ..... II - 11
25.20 State and Federal Consistency ..... II - 11
25.30 Development Evaluation, Permit Information, and Permit Review ..... II - 11
25.40 Scientific Research and Planning ..... II - 12
25.50 Public Education ..... II - 12

20. CREST GOALS

—To improve and diversify the economy of the area

—To reconcile conflicting uses of estuarine resources

—To protect and enhance natural resource values of the estuary

—To improve estuarine resource management through intergovernmental communication and coordination at local, state and federal levels

—To increase public understanding of the natural value of the estuary and its usefulness to people

The CREST goals were used to develop regional policies which in turn served as a guide for developing the *Columbia River Estuary Land and Water Use Plan*. The *Regional Policies* listed below are a refinement of CREST's earlier policies. They provide a framework for the *Development Standards* (Part III) and are the over all policy statements for the *Columbia River Estuary Land and Water Use Plan* (Part IV).

The *Regional Policies* have been divided into five groups: economic development, resource protection, uses, activities, and intergovernmental coordination and public education.

21. ECONOMIC DEVELOPMENT POLICIES

21.10 FISHERIES

Columbia River Basin anadromous fish resources have played a major role in the cultural development of the estuary area. The dramatic decrease in natural and hatchery runs of these fish is partially the result of habitat destruction or degradation caused by man. The advent of the 200 mile limit has allowed diversification in the fishing industry, but enhancement efforts have not maintained the salmon fisheries.

21.11 Areas should be reserved that will provide for adequate dock and moorage space for present and anticipated future commercial and sports vessels and for fish processing, boat repair, cold storage and other support facilities.

21.12 Traditional fishing areas should be protected when dredging, filling, pile driving, constructing pile dikes or rock jetties, or other disruptive instream activities are permitted.

21.13 Wise management of fishery resources and maintenance of reproductive stocks is strongly supported.

21.14 Minimum tributary stream flows necessary to maintain aquatic life should be set. In those streams where private water rights preclude maintenance of minimum flows, and where low flows interfere with fish migrations, state water quality management programs should include provisions for both the purchase of private water rights and construction of small impoundments on tributaries to maintain minimum flows. Other impoundments on tributary streams are discouraged, unless provision is made for protecting the fishery resource before construction. The use of Columbia River water or ground water for industrial purposes and ground water for municipal purposes is encouraged over use of tributary stream waters.

21.15 Maintenance of existing, favorable anadromous fish habitat through establishment of protective stream corridors and control of potentially harmful watershed activities is strongly supported.

21.16 Tributary streams in the estuary should be evaluated to determine the potential for future artificial and natural fish production. Where feasible, hatchery production should be increased and damaged stream habitat should be restored. Tax incentives or other renumeration for landowners who maintain or enhance salmon or steelhead streams on their own property should be encouraged.

21.17 Estuary fish-food production and resting areas, such as shallow submerged lands, wetlands and marshes should be preserved. The use of adjacent shorelands should be controlled to protect these vital links in anadromous fish life cycles. Migration routes should not be obstructed.

21.18 Fish enhancement programs of local, state and federal groups are strongly supported. Special consideration should be given to restoration of the chum salmon runs.

21.20 DEEP-WATER NAVIGATION, PORTS AND INDUSTRIAL DEVELOPMENT

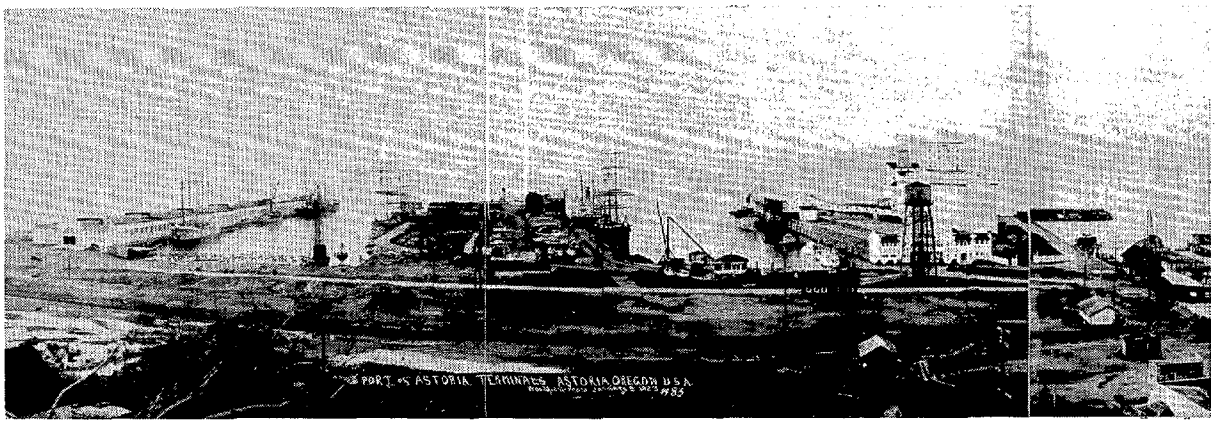
As the gateway to the Columbia and Snake River system of ports, the location of the Columbia River estuary favors significantly increased port development in future years.

21.21 Development and improvement of existing port sites is encouraged prior to development of new port sites.

21.22 Port improvement, expansion and modernization will require some filling or dredging of presently undeveloped areas. Biological productivity and habitat values should be given due consideration in designing and constructing port facilities.

21.23 Shorelands with the characteristics of adjacent deep-water access, adequate rail or road access and sufficient backup land should be reserved for future deep-water port development, giving due consideration to existing uses.

21.24 Port development needs should be evaluated and plans developed in light of projected long-term statewide, Pacific Northwest and national needs.



Port of Astoria Photo

21.30 SHALLOW-DRAFT PORTS AND MARINAS

Shallow-draft ports and marinas play a significant economic role in the Columbia River estuary. Since marina construction usually involves major alterations of estuary shorelines, it is important that marinas be sited, designed, constructed and expanded with care for the estuarine environment and for other shoreline uses.

21.31 New marinas should be constructed only when existing marinas are inadequate or cannot be expanded to meet the demand. Marina sites should be located in or adjacent to areas of extensive boat usage and in areas capable of providing the necessary services to support the marina. These services include access roads or streets, adequate upland parking, trailer storage areas, water and sewer service, and power supplies. The feasibility of dry boat moorage should be considered in the design of new, expanded or remodeled marina facilities.

21.32 Marina development and expansion will require some filling and/or dredging or presently undeveloped areas. Biological productivity and habitat values should be given due consideration in designing marina facilities.

21.33 Proliferation of individual, single-purpose piers and mooring facilities is discouraged, in favor of public or private community port facilities.

21.34 Provision should be made for adequate flushing/water circulation to ensure maintenance of water quality in design of marina facilities.

21.35 Navigational access in the estuary and its tributaries should be maintained in light of expected future demand of recreational boating and sports and commercial fishing. Peripheral channels, streams and sloughs should not be closed to navigation. Provision should be made for dredging areas traditionally used for access to fishing grounds and moorage.

21.40 RECREATION AND TOURISM

Boating, fishing, hunting, hiking and nature enjoyment are essential to the lifestyle of Lower Columbia area residents and to the tourist industry.

21.41 The natural resources on which these activities are based should be conserved and enhanced.

21.42 Consistent with demand, natural resource values, private property rights and the need for other, more intensive development:

- Local, state and federal agencies are encouraged to use their authority and resources to provide recreational facilities and maximum opportunity for public access to the estuary, and
- Expansion and new development of tourist facilities is encouraged.

21.50 FORESTRY AND FOREST PRODUCTS INDUSTRY

The forest lands of southwest Washington and northwest Oregon are among the more productive commercial forests in the world, and the forest products industry has been a major contributor to the economy of the Columbia River estuary.

21.51 Continued management of commercial forest lands for the production of forest products is strongly encouraged. Continuation and expansion of related forest product industries are also supported, consistent with the maintenance of air and water quality.

21.52 Locally grown forest products should be processed in the estuary area. Appropriate shoreland areas should be reserved for siting water dependent and water related facilities.

21.53 Existing state Forest Practices Acts and other relevant state and federal regulations should be strictly enforced to preserve water quality, spawning areas and riparian habitat. Appropriate measures should be taken in all road building, site preparation, timber harvest, slash burning, fertilization and pest control to minimize runoff of pollutants, solar heating of stream waters, mass soil movement, surface erosion and extreme fluctuations in stream flow.

21.54 Water storage and transport of logs are supported as energy-efficient and economically necessary uses of estuarine and tributary waters. New log storage sites should be situated in areas where the adverse effects on water quality will be minimized, where navigation will not be impaired, and where estuarine productivity and wildlife habitat will not be unduly disrupted. No new log storage should be allowed where logs and booms would rest on the bottom at low water. Easy let-down facilities and banding are strongly encouraged at all log dump sites. The compatibility of log storage sites with other estuarine uses should be examined on a case-by-case basis. Alternative land and water log storage sites should be found in cases where conflicts cannot be resolved.

21.55 The drift and snag material problem should be dealt with through:

- Efficient management of timber inventories, the establishment of time limits on water storage of log rafts and the bundling of logs to minimize the occurrence of "sinker logs",
- Land disposal of sinker logs removed from the estuary, and
- Location of new log storage sites away from potential conflict areas, such as gillnet fish drifts.

21.56 Tax and other incentives for restoration of stream habitat that has been damaged should be provided.

22. RESOURCE PROTECTION POLICIES

22.10 ENERGY FACILITIES

The Columbia River estuary area, because of its deep-water access and large freshwater supply, has potential for development of petroleum support and processing industries, thermal power plants and other energy facilities. There are also serious limitations to development and operation of energy-related facilities on the estuary, due to its dynamic physical character, its valuable natural resources, and the resource-based industries it supports.

22.11 Petroleum product storage, transport and processing industries proposed for an estuary location and industries requiring the transport of hazardous substances through the estuary will be evaluated by CREST and local governments. Such facilities should not be constructed unless it can be demonstrated that:

- The plant will be compatible with the area;
- Alternate locations not affecting the estuary are not feasible;
- Economic, fiscal and growth impacts will be favorable; and
- Safety and hazard risks (including explosion, fire, spillage, and potential air or water pollution), adverse effects on fish and wildlife resources, and other land and water environmental impacts will be minimized.

22.12 Local support for or opposition to the development of upriver energy facilities or other industrial facilities that require transport of petroleum products or other hazardous substances through the estuary will be considered by CREST and local governments on the basis of the potential impacts identified above.

22.13 Petroleum spill containment and clean-up equipment should be located in the estuary area. This equipment should be capable of controlling a large spill in hydraulically-active areas of the estuary. The U.S. Coast Guard tanker inspection program should be vigorously pursued to keep unsafe tankers out of coastal waters.

22.14 The states of Oregon and Washington should work together to develop joint policies for the Columbia River concerning petroleum product supply, transport and processing facilities and thermal power plants. Local governments should be consulted in this matter.

22.15 Although licensing is controlled by state governments, development of thermal power plants in the estuary area is discouraged due to the potential for direct environmental impacts, the lack of long-term nuclear waste storage facilities, and the indirect impacts of industrial expansion and rapid urban growth. When a thermal power plant is proposed in the estuary area, CREST, local governments and citizens should be consulted concerning the advisability of construction in the area and design of the facility. Adverse impacts should be minimized.

22.16 CREST supports energy conservation and the development of environmentally sound alternate energy sources. Possible energy sources such as solar power, wind power and wood by-products should be investigated.

22.20 SIGNIFICANT AREAS: NATURAL, SCIENTIFIC, SCENIC, HISTORICAL, CULTURAL AND ARCHAEOLOGICAL

The estuary has certain unique natural features which in turn have influenced archaeological, historical and cultural development, and these features, once destroyed, can never be replaced:

22.21 Open space and significant areas for wildlife habitat and human study, interpretation and enjoyment should be preserved, except where development is indicated in the local Comprehensive Plan or Shoreline Program.

22.22 Significant natural and scientific areas and scenic views should be set aside for preservation and managed so as to protect the unique characteristics of the area.

22.23 Known or newly discovered archaeological sites in areas where construction is intended should be formally excavated or preserved intact in accordance with state and federal laws.

22.24 Historical buildings and cultural landmarks under threat of demolition should be examined to see if they can be moved, restored, or preserved by public or private means.

22.25 The potential for restoration and re-creation of historical waterfront areas should be investigated.

22.30 WATER QUALITY MAINTENANCE

Estuarine water quality is vital to estuarine productivity, the fishing industry, recreation and tourism. Estuarine water quality is a result of activities taking place upstream, as well as in the estuary itself.

22.31 Wastes from such non-point sources as forest lands, road building, agricultural lands, natural stream bank erosion, and urban runoff should be identified and a program developed for their control. This is the most important, least understood and most difficult to control estuarine water quality problem.

22.32 Adequate municipal waste treatment of those domestic and industrial wastes that enter municipal sewer systems should be provided.

22.33 Treatment of industrial wastes released directly into the river and estuary should be improved. Industrial wastes should be more adequately characterized and effluent standards upgraded in accordance with the Federal Water Pollution Control Act. Provision should be made for cooling of thermal

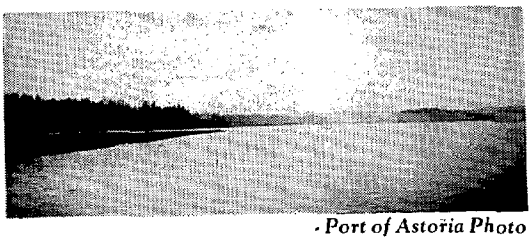
effluents before they are returned to the river. Reclamation and re-use of waste water should be considered in the design and construction of new industrial facilities.

22.34 Waste discharges to tributary streams, enclosed bays and sloughs should be eliminated where possible.

22.35 Fish processing wastes are a special category of industrial wastes. The environmental and economic advantages and disadvantages of releasing these wastes to the estuary require investigation to determine if legislative changes should be sought to allow such disposal.

22.36 A minimum streamflow should be established for each season for the Columbia River. Consumptive uses should not be allowed to decrease Columbia River flow below the set levels. The late summer low flow period is particularly critical for fishery resources. The effects of decreasing the spring and winter flow maximums on sedimentation processes and on fishery resources require further research and appropriate action.

22.37 Facilities for the public dumping of oil and emptying of holding tanks by all vessels should be provided in convenient places so that these wastes will not be dumped in the river.



Port of Astoria Photo

22.40 WILDLIFE HABITAT

Substantial destruction of natural habitat in the Columbia River estuary area has been caused by such factors as dredging, filling, diking, urban development, the pressure of recreational activities, logging and agriculture.

22.41 Significant areas of all types of ecosystems in the Columbia River estuary should be protected from development.

22.42 The habitat of rare and endangered species should be protected.

22.43 New development should be designed and constructed so as to:

- Maintain wherever possible a natural, vegetative buffer strip along wetlands and rivers and streams, and
- Minimize the alteration of land and vegetation, and
- Preserve open space, including agricultural and forest lands.

22.44 To avoid erosion problems and disruption of wildlife habitat, the use of off-road vehicles should be strictly regulated.

22.50 RESTORATION

The Columbia River estuary has been substantially altered over the past century to provide for navigation, shoreline development and agriculture. Upriver dams and watershed activities have also contributed significantly to changes in the natural functioning of the estuary. While it is not possible or desirable to return the estuary to its pre-nineteenth century condition, restoration or creation of certain habitat and cultural values is an important estuary management objective.

22.51 Overall Restoration Policy

All restoration projects should serve to revitalize, return, replace or otherwise improve the estuarine ecosystem or highly-valued cultural characteristics.

Examples include restoration of natural biological productivity, fish or wildlife habitat, or aesthetic, cultural and historic resources which have been diminished or lost by past alterations, activities or catastrophic events.

In selecting projects, priority should be given to those projects which provide substantial public benefits and which restore the habitat types, resources or amenities which are in shortest supply as compared to past abundance. Particular emphasis should be given to aquatic and riparian habitat restoration.

22.52 Habitat Creation Through Dredged Material Disposal

Disposal of dredged material in water and wetland areas for the specific purpose of creating shallow water, intertidal, or island areas is strongly discouraged, because this practice contributes to the downward trend of available aquatic habitat.

Habitat creation through upland plantings on existing dredged material islands is encouraged to provide wildlife habitat.

Marsh plantings on existing intertidal areas should continue to be evaluated and considered as a habitat creation technique.

22.53 Diked Lands Restoration

Restoration of marginal and unused low-lying diked areas to estuarine wetland is encouraged; active restoration to provide potential for diverse habitat (e.g. mudflat and marsh) as well as passive restoration are encouraged. If loss of productive farmland or significant wildlife habitat would occur, breaching of dikes is strongly discouraged. Except through public condemnation procedures, removal of dikes protecting private lands shall not occur without the expressed consent of the landowner. Incentives should be provided to private landowners who restore diked areas to aquatic production.

22.54 Restoration of Shoaled Areas

Estuary areas that have shoaled or filled at an unnaturally high rate, resulting in loss of a particular type of aquatic habitat or loss of traditionally navigable areas, should be restored to historic conditions as practical. Passive measures are preferred, but active measures or a combination may be required. All such projects should be carefully evaluated to ensure potential ecological, economic and social benefits to man and natural resources outweigh potential losses.

22.55 Removal of Old Pilings and Structures

Old piling, navigational structures and buildings which are a hazard to navigation, contribute to excessive shoaling, or pose a danger to life and property should be removed. Prior to any such removal, however, costs and benefits should be evaluated, including the potential for erosion or sedimentation caused by removal, the biological habitat value and probable life of the structure, and the historic and scenic value.

22.56 Erosion Area Restoration

Where feasible, areas with erosion problems should be vegetated with marsh and shoreland planting to establish a natural buffer against erosion. Beach nourishment should be used to restore historic shoreline configurations where feasible. Structural solutions should be used as a last resort to protect life and property.

22.57 Shoreland Revegetation

Shoreland and especially riparian areas where vegetation has been removed for timber harvest or urban development should be revegetated as soon as possible. Areas of existing shoreline development should be considered for revegetation for both aesthetic, biological and bank stabilization values.

22.58 Restoration of Deteriorated Urban Waterfronts

Redevelopment of deteriorated urban waterfront areas is strongly encouraged. Development should be water oriented, public access should be preserved, and recreational facilities should be improved, where possible. While priority should be given along the waterfront to water dependent and water related uses, provision may also be needed for other uses. Renovation and repair of historic buildings is highly desirable; removal of deteriorated structures and pilings may be appropriate.

22.60 MITIGATION

Necessary new development projects in the Columbia River estuary will have adverse environmental impacts, regardless of how carefully the projects are designed and constructed. The adverse effects of such development can be mitigated by the restoration or enhancement of other estuarine areas.

22.61 Mitigation for Dredging, Filling or Diking Tidal Marsh or Intertidal Areas

The following policies fulfill the requirements of Oregon law. While Washington state law does not specifically require mitigation for dredge and fill activities in intertidal or tidal marsh areas, the following policies are strongly encouraged. Alternative forms of mitigation in Washington, including preservation, compensation and resource enhancement, are also encouraged.

- Adverse impacts to estuarine resources resulting from dredge, fill or dredged material disposal activities (public or private) permitted in intertidal or tidal marsh areas shall be mitigated by creation, restoration or enhancement of estuarine areas. Such mitigation shall improve or maintain the functional characteristics and processes of the estuary, such as its natural biological productivity, habitats and species diversity, unique features and water quality. The cost of mitigation shall be included as part of project cost analysis.

- Actions exempted from the mitigation requirement above include:
  - —Removal or filling of less than 50 cubic yards of material or when an Oregon State Removal and Fill Permit is not otherwise required;
  - —Filling for repair and maintenance of existing functional dikes when there is negligible physical or biological damage to tidal marsh or intertidal areas;
  - —Riprap to allow protection of an existing bank line with clean, durable erosion resistent material provided that the need for riprap protection is demonstrated and that this need cannot be met with natural vegetation, and no appreciable increase in existing upland occurs;
  - —Filling for repair and maintenance of existing roads when there is negligible physical or biological damage to tidal marsh or intertidal areas;
  - —Dredging or filling required as part of an estuarine resource creation, restoration or enhancement project agreed to by local, state and federal agencies; and
  - —Other proposed projects or activities where, upon determination of the Oregon Division of State Lands, the proposed alteration would have negligible physical, biological and water quality impacts.

- Actions not considered as mitigation under Oregon Land Conservation and Development Commission (LCDC) Goal Number 16 include the transfer of ownership of estuarine lands, including wetlands and submersible lands, to public ownership; the dedication of estuarine lands for certain natural uses; and the provision of funds for research.

22.62 Mitigation for Dredging, Filling or Otherwise Degrading Biologically Productive Subtidal Areas

Dredging, filling or other activities or alterations which significantly degrade or destroy biologically productive subtidal areas should be mitigated by restoration, habitat creation, enhancement or other appropriate means.

22.63 Mitigation for Degradation or Destruction of Critical Wildlife Habitat

Mitigation for significant alterations which would degrade or destroy critical habitat for endangered or threatened species, or other wildlife, shall be required through restoration, resource enhancement, preservation, or financial compensation. Mitigation for loss of other valuable wildlife habitat, such as freshwater marshes, spruce swamps and old growth forest is encouraged.

22.64 Mitigation Sites

While a range of actions may be taken to satisfy mitigation requirements, mitigation sites or projects should be preferentially evaluated as follows:

- Areas in close proximity to the development site

with physical characteristics such that when restored, the area will develop a similar quality and quantity of plant and animal life and perform similar ecological functions;
- Areas in other parts of the estuary that meet the above physical and biological criteria;
- Areas or resources in shortest supply as compared to past abundance, particularly tidal marshes and the salmon resource.

Estuarine alterations for development in one state can be mitigated through restoration or other actions in the other state.

Because estuarine tidal marshes and flats are ecologically diverse, it may be impossible to create or restore a single site with the same mixture of ecosystem components as are present at the site to be altered. In such cases, more than one mitigation site may be required. All important ecological features of the development site should be created or restored elsewhere within the estuary, whether separately or together.

23. LAND AND WATER USE POLICIES

23.10 RESIDENTIAL, COMMERCIAL AND INDUSTRIAL DEVELOPMENT

Uses of the estuary are concentrated at its shoreline, resulting in conflicts and degradation of natural shoreline values. While much of the undeveloped or marginally developed shoreland and the adjacent wetlands and waters have important natural values that should be preserved, there are some areas where development is both appropriate and desirable.

23.11 General priorities for use of these shorelands and adjacent aquatic areas are:

(1) Uses which maintain the integrity of the estuary
(2) Water dependent uses
(3) Water related uses
(4) Non-water related uses that do not degrade estuarine resources or unalterably commit shorelands to intensive use
(5) Non-water related uses that permanently alter shorelands, or estuarine resources, upon a showing of public need.

Non-water related or marginal use may be preferred if:
- Further water dependent use of the shoreline would overly congest small waterways;
- Water dependent or related use would result in extensive negative impacts on adjacent estuarine wetlands and waters; or
- The proposed use is part of an overall plan for restoration of an historic waterfront to promote tourism and community development.

23.12 Where non-water dependent residential, commercial or industrial development exists on ***Water Dependent Shorelands***, local governments should encourage gradual transition of shorelines to water dependent uses through land use controls, taxes, or other incentives for property owners.

23.13 Residential, commercial and industrial shoreland developments should be designed and constructed to minimize adverse environmental impacts, promote visual attractiveness and provide appropriate visitor facilities and public access to the water. Clustering of residential, commercial and industrial uses is preferred over scattered development in order to preserve the natural values of riparian vegetation and wildlife and to provide maximum open space.

23.20 AGRICULTURE

Agriculture is the most extensive use of the estuary shorelands. While some of this agricultural land is highly fertile, most of it is diked tideland subject to the 100 year flood. These diked tidelands also have other limitations on development.

23.21 Continued agricultural use of productive agricultural lands should be encouraged, and conversion to more intensive, non-agricultural use strongly discouraged. Exceptions to this include development within established urban growth boundaries and non-intensive uses of general public benefit, such as public access and recreation.

23.22 Development of new crops to increase productivity of agricultural shorelands is encouraged.

23.23 Damage to the estuarine ecosystem resulting from agricultural non-point source pollution should be prevented.

23.24 In undiked areas, the maintenance of sufficiently wide, natural, vegetative buffer strips along streambanks is strongly encouraged to serve as bank stabilization and as a natural filter for runoff.

23.25 Laws requiring adequate maintenance of existing dikes and tidegates to prevent flooding and erosion of agricultural lands should be observed and enforced.

23.30 LAND TRANSPORTATION SYSTEMS

Although shipping is the most important form of transportation in the estuary area, road and rail transport are also vital to the local economy. Steep topography has encouraged construction of most land transportation corridors on shorelands or fill in the estuary. The impact of these alterations has been high.

23.31 Land transportation systems should be maintained and improved to support existing urban areas, to allow use of the major development sites indicated in the Land and Water Use Plan, and to support rural and recreational uses.

23.32 New land transportation systems shall not be located so as to eliminate or render useless ***Water Dependent*** Shorelands. New transportation systems should be located and designed to direct urban expansion toward areas identified as suitable for development, and not toward rural areas. Existing systems and right of ways should be used to the degree possible.

23.33 New land transportation systems should be designed and located to take advantage of the natural topography and to cause minimum disruption of the shoreline area. They should be located on uplands whenever possible. They shall not be located in aquatic areas except where bridge crossings are needed or where no feasible shoreland or upland route exists.

23.34 Scenic areas with public roadways should provide for safe pedestrian and nonmotorized vehicle travel. Provision shall be made for sufficient viewpoints, rest areas and picnic areas along public shorelines. Extensive loops or spurs of old highways with high aesthetic qualities shall be kept in service as pleasure bypass routes, especially where main highways, paralleling the old highway, must carry large traffic volumes at high speeds.

23.35 Maintenance of roads and railroads and maintenance or replacement of bridges shall be allowed, regardless of the designation of the area through which the road or railroad passes.

23.40 MINING AND MINERAL EXTRACTION

Sand, gravel and minerals are valuable resources. In some instances, the only locally available source of these materials is from wetlands and submerged lands. However, their removal can result in erosion of adjacent land and the shifting of sediments in the removal areas, causing negative economic and environmental effects.

23.41 On the basis of an environmental impact assessment, adequate protection must be provided for adjacent shoreline property and fishery and other living resources, including protection against sediment and silt production.

23.42 Approved projects must specify and use mining technology which minimizes the potential damage to estuarine resources, in conformance with the Washington State Surface Mining Act or Oregon State Reclamation of Mined Lands Act.

23.43 Extraction of gravel, minerals and construction sand from estuary tributaries should be permitted only when these resources are not otherwise locally available. The material should be taken from the least biologically sensitive parts of the stream.

23.50 PUBLIC ACCESS TO THE ESTUARY AND ITS SHORELINE

Public access to the shoreline and adjacent intertidal areas is sanctioned by law and custom. Probable future population growth and urban development will increase the demand for public access, while decreasing its availability.

23.51 Federal, state and local actions in the estuary area should provide for maintenance and improvement of public access to water for all people, consistent with legitimate shoreland uses and the need for protection of the estuary from overuse. Public purchase of lands or scenic easements may be necessary or desirable in some instances.

23.52 Special provision is needed in urban areas to preserve remaining open space and improve the public access to the water through restoration of historic waterfronts, and construction of other public facilities.

23.53 Where major shoreline developments are allowed, they should not, singly or in combination with other developments in the area, exclude the public from shoreline access to areas traditionally used for fishing, hunting or other shoreline activities.

23.54 The private use of privately owned shorelands is legitimate and must be protected against encroachment. Compensation of land owners for the cost of preventing or repairing damages occasioned by public access may be necessary in some cases.

23.55 The establishment of foot and bicycle paths along shoreline bluffs and other shorelands should be investigated. Such paths should not impair fish and wildlife habitat or interfere unduly with agriculture or other shoreland uses. Purchase of easements from property owners may be necessary.

23.56 Publicly owned shorelands with water access that are declared surplus and have significant scenic or recreational value should in most cases remain in public hands. They should not be sold or traded without a local public hearing to determine the advisability of the sale or trade. Publicly owned tidelands should remain in public ownership.

23.57 Public access to publicly owned shorelands (e.g. public street ends) should be maintained and improved whenever possible, consistent with authorized use.

23.58 Public access to scenic views and significant areas should be provided in a manner consistent with the nature of the area.

23.59 Special consideration should be given to making areas of the estuary available to the elderly, handicapped and physically disabled.

23.60 SHORELAND HAZARD AREAS

Natural hazards affecting the shorelands of the estuary include flooding (by abnormally high tides, river discharge or combination), wind, wave action, erosion, storm surges, tsunamis, weak foundation soils and earth and rock fall. Development in hazard areas without proper safeguards subjects people and property to needless dangers and costs taxpayers money in relief after damage occurs.

23.61 Development in areas subject to the above hazards is generally discouraged and, when proposed, shall be protected from the hazard.

23.62 Shoreland and aquatic development should be evaluated prior to construction to ensure that they will not create or worsen hazards elsewhere.

23.63 Measures will be taken to discourage reconstruction of structures in hazard areas, which have been damaged or destroyed.

24.10 DREDGING AND DREDGED MATERIAL DISPOSAL

Dredging and dredged material disposal are activities of estuary-wide significance that may involve several planning jurisdictions, are necessary for the economic health of the region, and can have major impacts on the estuarine environment.

24.11 Dredging should be for the purpose of maintaining, improving and establishing navigation channels and access to water dependent facilities. Dredging and dredged material disposal should disturb the minimum area necessary for the project and should be conducted so as to protect or enhance wetlands and other estuarine resources.

24.12 Loss of productive habitat and other environmental damage should be minimized by the location, design and construction of both facilities requiring dredging and sites for dredged material disposal. Disposal of dredged materials shall be at an approved site where the biological productivity and physical characteristics are appropriate to receive the material. Dredged materials shall not be placed in productive habitat unless part of an approved development project. Shoreland disposal should enhance or be compatible with the final use of the land. Except for flow-lane disposal and beach nourishment, in-water disposal inside the estuary may be substituted for ocean disposal only when sea or weather conditions pose a hazard to the dredging vessel.

24.13 Adverse hydraulic effects from dredging and disposal, such as over-channelization, destabilization of fine-textured sediments, erosion, siltation, increased flood hazard, and undesirable circulation changes, shall be avoided.

24.14 The timing of dredging and disposal operations shall be coordinated with state and federal resource agencies, local governments, and private interests to protect marine productivity, minimize interference with fishing, and insure proper flushing.

24.15 The effects of both initial and subsequent maintenance dredging shall be considered prior to approval of new dredging projects. New projects should not be approved unless adequate disposal sites are available for both the initial and any future maintenance dredging.

24.16* Dredging as a source of material may be permitted if no alternative source is feasible and the dredging site is of low biological productivity or for dike maintenance if no alternative source is available and environmental damage is minimized.

24.20 DREDGED MATERIAL DISPOSAL SITE SELECTION

More material is dredged from the Columbia River estuary than can be used constructively, shorelines have been altered and new land areas have been created by deposition of dredged materials, and the shoreland capacity for dredged material disposal will be exhausted in the next twenty years. Identification of dredged material disposal sites is an estuary-wide concern.

24.21 Dredged material disposal sites should be designated for their final use with a ***Development*** overlay for disposal use and should be managed for the benefit of the final use, the public, and the estuarine environment.

24.22 Shoreland disposal sites should be selected for the conformity of the final use, after deposition of dredged materials, to the comprehensive plan or shoreline management plan.

Emphasis should be placed on sites where:

- Materials may be stockpiled for future use;
- The land use designation is already ***Development;***
- Materials will help restore degraded habitat;
- The final development or recreational use will benefit from deposition of dredged materials; or
- toxic or polluted materials will present minimal health and environmental hazards.

Sites with significant agricultural, habitat, scenic, recreational, archaeological, or historical values and sites where the present intensity or type of use is inconsistent with dredged material disposal should be avoided.

Engineering factors to be considered in site selection should include: size and capacity of the site; dredging method; distance from dredging operations; elevation; and the costs of site acquisition, preparation and revegetation.

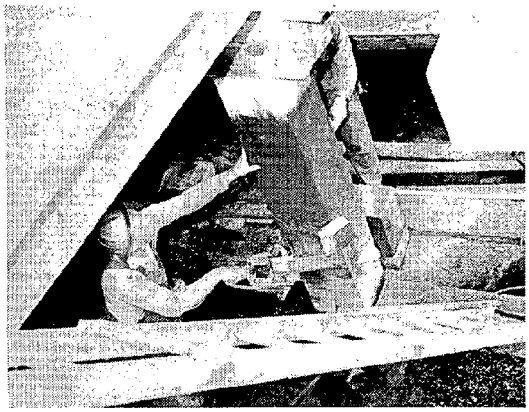
24.23 Approved shoreland disposal sites should be given either a high, medium, or low priority on the basis of site suitability as specified in 24.22 above. High priority sites should not be developed until their use for dredged material disposal is completed. Development of medium priority sites may be delayed if use of the site for dredged material disposal can occur within an acceptable period and such use prior to development is in the public interest. Low priority sites may be used for dredged material disposal, but will not be reserved for that use.

24.24 In-water disposal sites should be chosen on the basis of low benthic productivity and the low degree of adverse hydraulic effects from the use. Long-term use of disposal sites within the estuary should be permitted only when no alternative exists and the bio-physical impacts are minimal.

24.25 Flow-lane disposal sites should be shown able to transport sediment downstream without excessive shoaling, interference with commercial or sports fishing, undesirable hydraulic effects, or adverse effects on benthic productivity.

24.26 Beach nourishment sites should be selected to offset the effects of active erosion, but should not be used to create new beach or land areas.

* Oregon LCDC Coastal Shorelands Goal 17 exception required (cf Appendix B)



Port of Astoria Photo

24.30 ESTUARINE CONSTRUCTION: PILING/DOLPHIN INSTALLATION, SHORELINE STABILIZATION AND NAVIGATIONAL STRUCTURES

Certain structures must be placed in the estuary, in support of water dependent uses, to influence the movement of the water or to prevent shoreline erosion. Adverse effects of these activities and uses should be minimized as much as possible.

24.31 Piling and dolphin installation should normally be allowed only in support of water dependent or water related uses and, in special cases, for other uses. Occupation of water surface in productive areas should be minimized.

24.32 Proper management of existing streamside vegetation is the preferred method of shoreline stabilization, followed by planting of vegetation. Where vegetative protection is inappropriate (because of high erosion rate, the use of the site or other factors) structural means such as riprap, pile dikes, groins or bulkheading may be used.

24.33 Where structural erosion control is necessary, the choice between riprap and pile dike or groin placement for erosion control shall be considered on an individual basis. Factors to be considered include, but are not limited to:

- Type of sediments in the area;
- Effects on wildlife habitat;
- Uses of lands and waters adjacent to the bank;
- Effects on fishing areas;
- Effects on aquatic habitat;
- Relative effectiveness of the various structures;
- Engineering feasibility;
- Cost; and
- Erosion, flooding and sedimentation of adjacent areas.

Bulkheading should only be used in developed areas.

24.34 Navigational structures, such as breakwaters, jetties, groins, pile dikes and fills, are major alterations of the estuary with long-term biological and physical effects. An impact assessment should be prepared before construction. Alteration of the estuary should be minimized, estuarine productivity maintained, and effects on fish runs and fisheries minimized.

24.40 FILLING OF ESTUARINE WATERS AND WETLANDS

The Columbia River estuary has lost more than 15% of its volume in the last century. The surface area, particularly the area of vegetated wetlands, has also decreased at an unnaturally rapid rate.

24.41 Loss of estuarine surface area and volume should be avoided in the selection of development and dredged material disposal sites, and the design of navigational structures.

24.42 Fill and dredged material shall not be placed in productive subtidal, intertidal or tidal marsh areas or areas that support important benthic communities unless part of an approved development project. Aquatic areas where fill may be placed for approved projects are designated in the *Land and Water Use Plan* (Part IV). For a fill to be permitted, it must fulfill a demonstrated public need and support a water dependent use for which no feasible upland site exists. Adverse impacts on estuarine habitat, diversity, aesthetics, water quality and recreational resources shall be minimized.

24.43 When water dependent or related facilities must be placed in aquatic areas, construction of the facility on piling is preferred over construction on fill whenever feasible.

24.50 DIKING OF ESTUARINE WETLANDS AND SHORELANDS

To provide continued flood protection for urban and agricultural lands in the estuary area, dikes should be maintained and improved. Construction of new dikes, particularly in tideland and wetland areas must be carefully evaluated to avoid increasing flood and erosion potential downstream, and to avoid destructive effects on the estuarine ecosystem. Therefore:

24.51 New diking of tidelands and wetlands will be allowed only:

- As part of an approved fill project; or
- As temporary flood protection in the interest of safety and welfare of the public.

24.52* Dike maintenance by means other than dredging is encouraged. Dredging of shallow, biologically productive areas adjacent to dikes as a source of material for dike maintenance shall be permitted if:

- Alternative sources of material are unavailable or not economically feasible;
- The removal of material will not leave potholes where juvenile salmon and other fishes might be stranded at low water; and
- Other disruption of tidal flats and marshes is minimized.

24.53 Breaching or removal of dikes may be allowed as part of a restoration or mitigation project. Productive agricultural land and significant wildlife habitat should not be lost.

* Oregon LCDC Estuarine Resources Goal 16 exception required (cf Appendix B)

25.10 LOCAL INTERGOVERNMENTAL COORDINATION

CREST provides local governments in Washington and Oregon a forum for communication and cooperation in planning and development activities of regional scope and importance. Local governments recognize the mutual benefits of such coordination and the expanded role it provides to local government in estuary decision-making.

On behalf of member governments, CREST will:

25.11 Provide continued planning assistance to member agencies upon request to and approval by the CREST council, review local comprehensive plans and shoreline management master programs, and make recommendations which will result in coordination and conformance with the *Columbia River Estuary Regional Management Plan;*

25.12 Provide technical information and assistance to member and other agencies for *Columbia River Estuary Regional Management Plan* implementation;

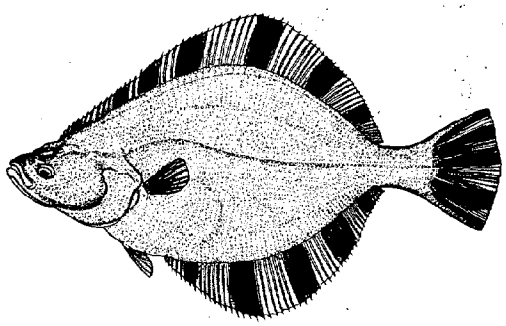
25.13 For member agencies and other local interests, act as local liaison to the Pacific Northwest River Basins Commission as they conduct the six-year Columbia River Estuary Data Development Program;

25.14 Evaluate state and federal estuary activities, programs, developments and project impact assessments that may affect local governments and report results to concerned jurisdictions;

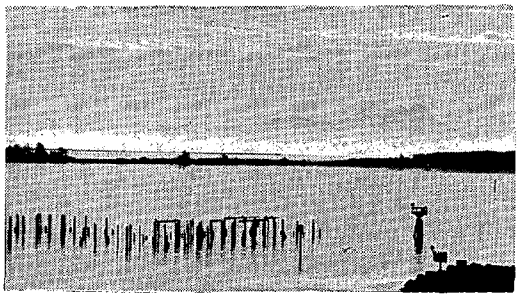
25.15 Coordinate with local, state and federal agencies on estuary development, research, regulation, project impact assessment and plan review and update;

25.16 Establish and operate a Columbia River Estuary Information Center and provide library information searches, permit information, and other services to the public, planners, and state and federal managers and researchers.

Paltichthys Stellalus Starry Flounder



- Ron Pittard - Searep Studio, courtesy Clatsop County



- John Atkinson

25.20 STATE AND FEDERAL CONSISTENCY IN THE COLUMBIA RIVER ESTUARY AREA

The Columbia River estuary plan is part of Washington's and Oregon's Coastal Zone Management Programs. The plan is implemented through Shoreline Management Master Plans and local comprehensive plans, respectively. Direct state and federal activities and state and federally funded or permitted activities in the estuary area shall be consistent with the regional policies, development standards, and land and water use designations and policies in the plan.

Further details for consistency of local, state and federal agency activities in the estuary are set forth in Section VII of the plan.

25.30 DEVELOPMENT EVALUATION, PERMIT INFORMATION AND PERMIT REVIEW

Development occurring in the estuary or on its shorelands produces impacts of varying type and degree. Permits for developments are required at the local level in Washington for significant development, construction, or other activities affecting the estuarine environment. State and federal permits are required for in-water construction, dredging, filling, waste discharge and numerous other activities. These permits are mandated by law and allow each particular government agency to carry out its responsibility to control or limit negative economic and environmental effects. However, the proliferation of permits and other requirements and the lack of knowledge about them adds substantial cost and time delays to development projects.

CREST will provide information and assistance about development project permit requirements at the local, state and federal level. Information to be provided may include: environmental and legal constraints, ways to minimize or mitigate the impacts of the project, and general policies of agencies that will review the project. The intent of this policy is to facilitate understanding and use of existing permit processes. Review by CREST is not mandatory.

25.40 SCIENTIFIC RESEARCH AND PLANNING IN ESTUARINE AREAS

Much important scientific research, funded by the Pacific Northwest River Basins Commission's Columbia River Estuary Data Development Program and other sources, will be conducted by state and federal agencies, universities, consultants and individuals during the next decade. State and federal agencies periodically develop special-purpose plans for the area which effect local planning and decision-making.

25.41 To ensure local coordination and to provide useful information for local estuary management decisions, all agencies, consultants, university personnel and private individuals conducting research or developing plans should:

- Contact CREST and the local jurisdictions concerned during the project-planning stage, to outline the research or planning objectives and schedule, and the means of reporting project results; and
- Ensure that the results are conveyed as quickly as possible to local government agencies. Researchers are requested to provide reports in clear and simple language.

25.42 CREST will:

- Keep a file of completed, on-going and proposed research or planning programs that are important or useful to local governments in the estuary area.
- Work with the Columbia River Estuary Data Development Program through its Technical Advisory Committee.

25.50 PUBLIC EDUCATION

Public knowledge of the value of estuarine resources and their importance to the local economy could be dramatically improved through a program of education and public information. CREST and local governments, in cooperation with state and federal agencies, educational institutions and private groups should:

25.51 Encourage development of practical educational courses, extension education programs, science fairs, library and museum displays relating to the Columbia River estuary and the marine sciences in general;

25.52 Encourage the establishment of major oceanographic research and educational facilities in the area;

25.53 Maintain and expand the CREST library;

25.54 Encourage the Corps of Engineers to locate its hydraulic model of the Columbia River estuary in the local area.



Walt Lindstrom

PART III
MANAGEMENT SYSTEM AND DEVELOPMENT STANDARDS

30. PLAN ELEMENTS ..... III - 1

31. CLASSIFICATION SYSTEM FOR LAND AND WATER USES ..... III - 2
31.10 Aquatic Area Designations ..... III - 2
31.20 Shoreland Designations ..... III - 3

32. DEFINITIONS ..... III - 4

33. DEVELOPMENT STANDARDS ..... III - 5
Table 33-1, Aquatic Area Permitted Uses/Activities ..... III - 6
Table 33-2, Shorelands Permitted Uses/Activities ..... III - 7
33.01 Agriculture ..... III - 9
33.02 Airports ..... III - 9
33.03 Aquaculture ..... III - 9
33.04 Commercial Uses ..... III - 10
33.05 Docks and Moorage ..... III - 11
33.06 Industrial and Port Facilities ..... III - 11
33.07 Land Transportation Facilities ..... III - 12
33.08 Log Dump/Sort Area (in-water) ..... III - 13
33.09 Log Storage (in-water) ..... III - 13
33.10 Log Storage/Sorting Yard (dry land) ..... III - 13
33.11 Marinas ..... III - 14
33.12 Mining/Mineral Extraction ..... III - 14
33.13 Navigational Structures ..... III - 15
33.14 Recreation Uses ..... III - 15
33.15 Residential Uses ..... III - 16
33.16 Restoration/Resource Enhancement ..... III - 17
33.17 Solid Waste Disposal ..... III - 17
33.18 Timber Propagation/Harvesting ..... III - 17
33.19 Utilities ..... III - 18
33.20 Bankline or Stream Alteration ..... III - 18
33.21 Dikes ..... III - 19
33.22 Dredging ..... III - 19
33.23 Dredged Material Disposal ..... III - 20
33.24 Excavation - Creation of New Water Surface Area ..... III - 22
33.25 Fill ..... III - 22
33.26 Piling/Dolphin Installation ..... III - 23
33.27 Shoreline Stabilization ..... III - 23

34. THE MANAGEMENT SYSTEM AND DEVELOPMENT STANDARDS IN LOCAL ORDINANCES ... III - 25
34.10 Oregon ..... III - 25
34.20 Washington ..... III - 25

30. Two elements provide the framework for developing and implementing the Columbia River Estuary Regional Management Plan. The *Classification System* defines nine land and water use designations with differing management objectives. The *Development Standards* provide detailed guidelines for meeting these management objectives consistent with CREST goals and regional policies (cf PART II).

31. CLASSIFICATION SYSTEM FOR LAND AND WATER USES

The CREST land and water use classification system was developed from two basic premises.

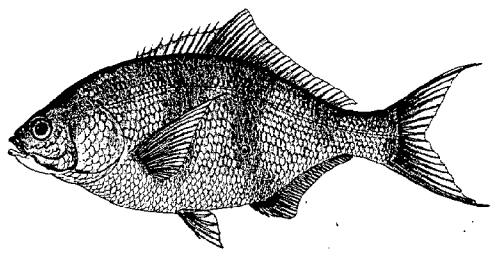
First, aquatic and shoreland areas, by their very nature, require different management approaches. Even where the management objectives are similar, aquatic areas serve different purposes and sustain different development impacts than shorelands. This concept is fundamental to state and federal management and regulatory programs, and has, for aquatic areas, a historical basis in the public trust doctrine.

Second, aquatic and shoreland areas in the Columbia River estuary exhibit a wide range of natural and human features which require different types of management. Areas with significant natural resource values need protection from human disturbance, while other areas with present or potential use for agriculture, timber production, recreation, water related industry, or port development should be reserved for such uses.

The CREST land and water use classification system separates *aquatic* from *shoreland* areas and defines management designations for each area. These designations provide for uses and activities ranging from preservation to intensive development and are generally consistent with Oregon and Washington coastal zone management programs.

Local jurisdictions may modify the classification system's terms as they implement the Regional Management Plan through comprehensive plan or shoreline management amendments. For example, Washington jurisdictions may use the term *urban* in place of the *development* designation in the CREST system. Such changes do not alter the intent or definitions of the designations.

Rhacochilus vacca Pile Perch



- Ron Pittard - Searep Studio, courtesy Clatsop County

31.10 AQUATIC AREA DESIGNATIONS

Aquatic areas include the tidal waters and wetlands of the estuary and non-tidal sloughs, streams, lakes, and wetlands within the shoreland planning boundary. The lands underlying the waters are also included.

The upper limit of aquatic areas is the line of non-aquatic vegetation or, where such a line cannot be accurately determined, Mean Higher High Water (MHHW) in tidal areas or Ordinary High Water (OHW) in non-tidal areas.

Aquatic areas can be divided into wetlands, the upper portion of the aquatic zone, and waters, the lower portion. Wetlands and waters adjoining at Extreme Low Water (ELW) in tidal areas [about three feet below Mean Lower Low Water (MLLW), or Columbia River Datum above Altoona on the Washington shore], or at a water depth of six feet relative to Ordinary Low Water (OLW) in non-tidal areas.

Natural Aquatic areas are managed for resource protection, preservation and restoration, with severe restrictions on the intensity and types of uses. ***Natural Aquatic*** areas may include tidal marshes and mud-sand flats that, because of a combination of factors such as size, biological productivity and habitat value, play a vital role in the functioning of the estuarine ecosystem. ***Natural Aquatic*** areas may also include ecologically important subtidal areas.

Conservation Aquatic areas are managed for low to moderate intensities of use, with emphasis on maintaining the flow of aquatic resource and recreational benefits. Minor alterations may be permitted in conjunction with approved uses. ***Conservation Aquatic*** areas may include open water portions of the estuary and valuable tidal marshes and mud-sand flats of lesser biological significance than those in the ***Natural*** category.

Rural Aquatic areas are managed for resource conservation and uses associated with agriculture and rural recreation. ***Rural Aquatic*** areas may include non-tidal sloughs, lakes, and other waters associated with rural uses and activities such as farming.

Development Aquatic areas are managed for navigation and other water dependent uses, consistent with the need to minimize damage to the estuarine ecosystem. Some water related and other uses may be permitted. ***Development Aquatic*** areas may include: areas suitable for deep or shallow draft navigation, including shipping and access channels or turning basins; dredged material disposal sites and mining or mineral extraction areas; and areas adjacent to developed or developable shorelines which may need to be altered to provide navigational access or create new land areas for water dependent uses.

31.20 SHORELAND DESIGNATIONS

Shoreland areas include forest, cliffs, steep topography, diked farm and urban lands along the estuary and the tidal reaches of the estuary tributaries, and shoreline areas suitable or already developed for water dependent uses.

Shorelands of the estuary extend horizontally from the upper edge of Aquatic areas (cf 31.10) landward to the boundary between tideland soils and upland soils, or landward 200 feet, whichever is greater. In areas suitable for intensive development or already developed, however, urban features such as a railroad or highway may be used to mark the inland shoreland boundary.

Natural Shoreland areas are managed for resource protection, preservation, restoration and recreation, with severe restrictions on the intensity and types of uses. ***Natural Shoreland*** areas may include unique or highly valuable vegetative or wildlife habitat and critical habitat for endangered or threatened species where a less restrictive designation would not provide adequate protection.

Conservation Shorelands are managed for timber production, control of non-point source pollution, wildlife, recreation, and other human uses of low to moderate intensity. ***Conservation Shorelands*** may include commercial forest lands, areas subject to severe flooding or other hazards, scenic recreation areas, and certain public shoreline areas.

Rural Shorelands are managed for agriculture, timber production, recreation, and other rural uses and activities. ***Rural Shorelands*** may include areas for exclusive farm use, areas for rural low density residential or other uses associated with agriculture, forest management, or rural service areas.

Development Shorelands are managed for a wide range of water dependent, water related, and other uses. ***Development Shorelands*** may include areas presently developed or suitable for residential, commercial, industrial, or recreational development. Most such areas are within urban growth boundaries of existing towns or cities, but may include other development centers.

Water Dependent Development Shorelands are managed for water dependent uses, with water related and other uses allowed only upon satisfaction of standards which require a showing of need, direct association with water dependent uses, and provision of public access to the waterfront. ***Water Dependent Development Shorelands*** include areas of high potential for water dependent recreational, commercial, or industrial development, by virtue of their proximity to deep or shallow draft navigation channels, existence of sufficient back-up land for heavy industrial or port uses, potential for aquaculture, or potential for recreation and scenic enjoyment of the waterfront.



- Port of Astoria Photo

32. DEFINITIONS

Use is the end to which a land or water area is ultimately employed. A use often involves the placement of structures or facilities for industry, commerce, habitation, or recreation. An *accessory use* is a use incidental and subordinate to the main use of the property and located on the same lot or parcel as the main use.

Activity is any action taken either in conjunction with a use or to make a use possible. Activities do not in and of themselves result in a specific use. Several activities — dredging, piling, fill — may be undertaken for a single use — a port facility. Most activities may take place in conjunction with a variety of uses.

Water Dependent uses and activities can only be carried out on, in or adjacent to water. The water location or access must be needed for either:

- **Water-borne transportation** - navigation, moorage, fueling and servicing ships or boats, terminal and transfer facilities, resource and material receiving and shipping; or
- **Recreation** - swimming, boating, fishing, hunting, viewing, and walking; or
- **A source of water** - for energy production, cooling industrial equipment or wastewater, industrial processes, and aquaculture operations.

Water Related uses and activities are consistent with other water dependent development criteria but do not require direct water access. A use is water related if:

- It provides goods or services that are directly associated with water dependent uses, such as supplying materials or services to, or using products of water dependent uses; and
- Location other than adjacent to the water would result in a public loss of quality in the goods and services offered, considering the economic, social, and environmental consequences of the use.

Permitted with Standards (PS) uses and activities may be undertaken subject to:

— The general requirement that the use or activity be designed and conducted in a manner that will minimize, so far as practical, any resultant damage to both the ecosystems of affected aquatic and shoreland areas and the public's use of the water; and

— The standards set forth in this document; and

— Applicable local, state, and federal permits and regulations.

Conditional (C) uses and activities are permitted only on an individual basis if the applicant can show over all conformity with the Comprehensive Plan (Oregon) or RCW 90.58.020 (Washington).

Uses classified as conditional may be authorized provided that the applicant can show that:

- The proposed use will be consistent with the Comprehensive Plan (Oregon) or RCW 90.58.020 (Washington) and the management objectives of the land and water use designations; and
- The proposed use will not interfere with normal public use of public shorelines; and
- The proposed use of the site and design of the project will be compatible with other permitted uses within the area; and
- The proposed use will cause no unreasonably adverse effects to aquatic or shoreland areas; and
- The public interest will suffer no substantial detrimental effect.

Uses which are not classified or set forth in the applicable ordinance (Oregon) or master program (Washington) may be authorized as conditional uses provided that the applicant can meet the criteria in 32.61 above [and WAC 173-14-140 (1) in Washington].

Conditional uses should be allowed in circumstances where denial would result in thwarting policies in this document and the Comprehensive Plan (Oregon) or RCW 90.58.020 (Washington).

In granting conditional uses, consideration shall be given to the cumulative impact of additional requests for like actions in the area. The total effect of all conditional uses shall remain consistent with the policies of the Comprehensive Plan (Oregon) or RCW 90.58.020 (Washington).

Local governments may impose, in addition to those standards set forth in the applicable ordinance, additional conditions necessary to protect estuarine, shoreland or upland areas.

Not Permitted (N) uses and activities may not occur in the specified area. No exceptions can be made.

Variance procedures are local government actions strictly limited to relief to specific bulk, dimensional or performance standards set forth in the applicable implementing ordinance. A variance may be granted only where extraordinary or unique circumstances relating to the property would cause strict implementation of the ordinance to impose unnecessary hardships on the applicant or would thwart the policies set forth in this document and the Comprehensive Plan (Oregon) or RCW 90.58.020 (Washington).

33. DEVELOPMENT STANDARDS

CREST provided a detailed permitted use matrix to planning committees to help them apply the classification system to lands and waters in their regions. This matrix has been translated into simplified *Permitted Use Tables* (Tables 33-1, 33-2 below) and the *Development Standards* for each use and activity.

Permitted and conditional uses and development standards were largely based on the Washington Shoreline Management Act guidelines and the sections of the Oregon Land Conservation and Development Commission (LCDC) Estuarine Resources Goal (Number 16) and Coastal Shorelands Goal (Number 17) dealing with uses and use priorities.

Estuarine aquatic and shoreland areas are closely related; often the use of one area directly affects the other. These standards reflect this close association. For example, most use standards for ***Development Aquatic*** areas also apply to ***Water Dependent Development Shorelands.***

In certain instances, the Oregon Land Conservation and Development Commission goal standards do not fit local conditions and cannot be applied. The need for goal exceptions is noted in the standards and the actual exceptions are discussed in Appendix B.



Judy Byrd - courtesy Compleat Photographer

TABLE 33-1
AQUATIC AREA PERMITTED USES/ACTIVITIES

USES	NATURAL	CONSERVATION	RURAL	DEVELOPMENT
AIRPORTS (33.02)	N	N	N	C
AQUACULTURE (33.03)	C	PS	PS	PS
COMMERCIAL (33.04)	N	C	C	PS
DOCKS & MOORAGE (33.05)	N	C(OR)/PS(WA)	C(OR)/PS(WA)	PS
INDUSTRIAL & PORT FACILITIES (33.06)	N	C	C	PS
LAND TRANSPORTATION FACILITIES (33.07)	N	C	C	C
LOG DUMP/SORT AREA (in water) (33.08)	N	N	N(OR)/C(WA)	C
LOG STORAGE (in water) (33.09)	N(OR)/C(WA)	PS	PS(OR)/C(WA)	PS
MARINAS (33.11)	N	N	C	PS
MINING/MINERAL EXTRACTION (33.12)	N	C	C	C
NAVIGATIONAL STRUCTURES (33.13)	N	C	C	C
RECREATION (33.14)	C	PS	PS	PS
RESIDENTIAL (33.15)	N	N(OR)/C(WA)	N(OR)/C(WA)	C
RESTORATION/RESOURCE ENHANCEMENT (33.16)	C	C	C	C
TIMBER PROPAGATION/HARVESTING (33.18)	N	C	C	PS
UTILITIES (33.19)	N	C	C	C
ACTIVITIES				
BANKLINE OR STREAM ALTERATION (33.20)	N	C	C	PS
DIKES (33.21)				
New Construction	N	C	C	PS
Repair, Maintenance	PS	PS	PS	PS
DREDGING (33.22)				
New	N	C	C(OR)/PS(WA)	PS
Maintenance	C	C	PS	PS
To Obtain Fill	N	C	C	PS
DREDGED MATERIAL DISPOSAL (33.23)	N	C	C	PS
FILL (33.25)	N	C	C	PS
PILING/DOLPHIN INSTALLATION (33.26)	N	C	PS	PS
SHORELINE STABILIZATION (33.27)				
Vegetative	PS	PS	PS	PS
Rip-rap	C	PS	PS	PS
Bulkheads	N	C	C	PS

TABLE 33-2
SHORELANDS PERMITTED USES/ACTIVITIES

USES	NATURAL	CONSERVATION	RURAL	DEVELOPMENT	WATER DEPENDENT DEVELOPMENT
AGRICULTURE (33.01)	N	PS	PS	PS	C
AIRPORTS (33.02)	N	N	PS	PS	N
AQUACULTURE (33.03)	N	PS	PS	PS	PS
COMMERCIAL (33.04)	N	C	PS(OR)/C(WA)	PS	PS
DOCKS AND MOORAGE (33.05)	N	C	PS	PS	PS
INDUSTRIAL & PORT FACILITIES (33.06)	N	N(OR)/C(WA)	C	PS	PS
LAND TRANSPORTATION FACILITIES (33.07)	N	C	PS	PS	PS
LOG STORAGE/SORTING YARD (land) (33.10)	N	C	PS	PS	C
MARINAS (33.11)	N	N	PS	PS	PS
MINING/MINERAL EXTRACTION (33.12)	N	C	C	C	C
RECREATION (33.14)	C	PS	PS	PS	PS
RESIDENTIAL (33.15)	N	PS	PS	PS	C
RESTORATION/RESOURCE ENHANCEMENT (33.16)	C	C	C	C	C
SOLID WASTE DISPOSAL (33.17)	N	N	C	C	C
TIMBER PROPAGATION/HARVESTING (33.18)	C	PS	PS	PS	PS
UTILITIES (33.19)	N	C	C	C(OR)/PS(WA)	C
ACTIVITIES					
BANKLINE OR STREAM ALTERATION (33.20)	N	C	C	C	PS
DIKES (33.21)					
New Construction	N	C	PS	PS	PS
Maintenance/Repair	PS	PS	PS	PS	PS
DREDGED MATERIAL DISPOSAL (33.23)	N	C	PS	PS	PS
EXCAVATION to create new water surface (33.24)	N	C	PS	PS	PS
FILL (33.25)	N	C	PS	PS	PS
SHORELINE STABILIZATION (33.27)					
Vegetative	PS	PS	PS	PS	PS
Rip-rap	C	PS	PS	PS	PS
Bulkheads	N	C	PS	PS	PS

33.01 AGRICULTURE - Raising and harvesting crops or livestock using acceptable farming practices, and structures or facilities relating to these uses.

AREA	STANDARDS
Conservation Shorelands (PS)	33.0101 - 33.0104, 33.0106
Rural Shorelands (PS)	33.0101 - 33.0104
Development Shorelands (PS)	33.0101 - 33.0105
Water Dependent Development Shorelands (C)	33.0101 - 33.0105

33.0101 Tillage and drainage practices should minimize sedimentation and control surface water runoff of animal wastes and excess fertilizers, herbicides and pesticides. Pesticides and herbicides shall be applied so as to minimize the amount that is lost to the aquatic environment.

33.0102 In undiked areas bordering bodies of water, a buffer strip of permanent vegetation shall be maintained between cultivated or pasture areas and the water body, so as to filter surface runoff and retard sedimentation.

33.0103 Feed lots or other confinement lots for livestock shall be:

- Located at least 100 feet from streams or other water bodies;
- Away from hillsides leading directly to streams;
- Outside the 100-year floodplain; and
- Located so as to protect ground water supplies.

33.0104 Dikes, tidegates and drainage systems shall be kept in good working order.

33.0105 On ***Development*** and ***Water Dependent Development Shorelands***, agriculture uses shall be undeveloped and low intensity to reserve these areas for intensive residential, commercial or industrial use, as appropriate.

33.0106 On ***Conservation Shorelands***, agricultural uses shall be low intensity and consistent with maintenance of the forest resource and recreational values of these lands.

33.02 AIRPORTS - Terminal stations for aircraft passenger and cargo operations; include runways, towers and associated structures.

AREA	STANDARDS
Development Aquatic (C)	All
Rural Shorelands (PS)	All
Development Shorelands (PS)	All

33.0201 Existing airport facilities shall be utilized or expanded to the extent possible before new facilities may be approved.

33.0202 Airports and associated facilities shall be located away from migratory bird flyways and heavily used habitat for resident waterfowl or other birds, in the interest of air safety and wildlife conservation.

33.0203 Airport facilities shall not be allowed on new fill land.

33.03 AQUACULTURE - Raising, feeding, planting, and harvesting fish and shellfish, and associated facilities necessary for the use.

AREA	STANDARDS
Natural Aquatic (C)	33.0301 - 33.0309
Conservation Aquatic (PS)	33.0301 - 33.0308
Rural Aquatic (PS)	33.0301 - 33.0308, 33.0311
Development Aquatic (PS)	33.0301 - 33.0308
Conservation Shorelands (PS)	33.0301 - 33.0308, 33.0310
Rural Shorelands (PS)	33.0301 - 33.0308, 33.0311
Development Shorelands (C)	33.0301 - 33.0308

33.0301 Structures and activities associated with an aquaculture operation shall not unduly interfere with navigation.

33.0302 Water diversion or other shoreline structures shall be located so as not to unduly interfere with public shoreline access. Public access to the facility shall be provided consistent with safety and security considerations.

33.0303 Aquaculture facilities shall be constructed to blend in with and not detract from the aesthetic qualities of the area. In developed areas, views from upland property shall be given consideration in facility design.

33.0304 Water diversion structures or manmade spawning channels shall be constructed so as to maintain minimum required stream flows for aquatic life in the adjacent streams.

33.0305 The potential impacts of introducing a new fish or shellfish species (or race within a species) shall be carefully evaluated in light of existing aquatic life and potential fish and shellfish production in the stream, estuary and ocean.

33.0306 Aquaculture facilities shall be located far enough from sanitary sewer outfalls to prevent any potential health hazard.

33.0307 Water discharged from the facility shall meet all federal and state water quality standards and any conditions attached to a waste discharge permit.

33.0308 Operation of a private salmon hatchery requires a permit from the Oregon Department of Fish and Wildlife or the Washington State Department of Fisheries.

33.0309 Aquaculture operations in ***Natural Aquatic*** areas shall be low intensity, undeveloped (no struc-

tures), and consistent with protection of natural values.

33.0310 Aquaculture operations in ***Conservation Shoreland*** areas shall be located not to interfere with normal forest management practices or recreational uses.

33.0311 Aquaculture operations in ***Rural*** areas shall be located so as not to interfere with normal agricultural operations or recreational use.

33.04 COMMERCIAL USES - Privately-owned or operated facility or place of business open to the public for sale of goods or services. Examples include: restaurants, taverns, hotels, motels, offices, personal services, retail stores, recreational vehicle parks, and campgrounds. Outdoor advertising, signs and billboards are subject to the standards set forth here. Public facilities offering similar goods or services should also meet these standards.

AREA	STANDARDS
Conservation Aquatic (C)	33.0401 - 33.0406, 33.0410
Rural Aquatic (C)	33.0401 - 33.0406, 33.0410
Development Aquatic (PS)	33.0401 - 33.0406, 33.0411 - 33.0413
Conservation Shorelands (C)	33.0401 - 33.0405, 33.0407, 33.0408, 33.0414
Rural Shorelands (PS-OR) (C-WA)	33.0401 - 33.0405, 33.0407, 33.0409
Development Shorelands (PS)	33.0401 - 33.0405, 33.0407, 33.0408
Water Dependent Development Shorelands (PS)	33.0401 - 33.0405, 33.0411, 33.0412

33.0401 Uses that are not water dependent shall not preclude or unduly conflict with existing, proposed, or probable future water dependent use on the site or in the vicinity.

33.0402 Uses shall be aesthetically compatible with their waterfront location and architecturally related to any adjacent historic or scenic structures or areas.

33.0403 Sign placement shall not impair visual access to the water. When feasible, signs shall be constructed against existing buildings to minimize visual obstructions of the shoreline and water bodies. Off-premise outdoor advertising signs shall not be allowed in aquatic areas.

33.0404 Preservation, placement or replacement of riparian vegetation in shoreline areas where it would enhance visual attractiveness or assist in bank stabilization may be required.

33.0405 Parking facilities shall not be located over the water or on the immediate shoreline, except where parking elsewhere is rendered impractical by topography or constitutes a severe economic hardship to the commercial enterprise, in which case it shall remain as far landward as feasible.

33.0406 Commercial uses situated on floating structures shall be located to be protected against currents and wave action and not to rest on the bottom at low water.

33.0407 When the proposed use is situated directly on the waterfront, significant public access shall be provided, such as waterfront seating, walkways, wharves, street furniture, or similar facilities.

33.0408 Uses other than water related should be set back 30 feet from the high water mark, and riparian vegetation should be protected.

33.0409 In ***Rural Shorelands,*** a commercial use shall be permitted only upon a finding that it satisfies a need that cannot be accommodated on shorelands designated for more intensive development. It shall be located so as not to interfere with normal agricultural practices in adjacent areas.

33.0410 In ***Conservation and Rural Aquatic*** areas, only low intensity water dependent or temporary commercial uses with minimal adverse environmental impacts may be permitted.

33.0411 In ***Development Aquatic*** areas or ***Water Dependent Development Shorelands,*** water dependent uses shall have the highest priority. Other uses may be allowed if the project satisfies 33.0401 and the applicant presents evidence that either:

(1) The use is water related and is not to be situated on new fill in an aquatic area;

(2) The use shares an existing structure, such as a wharf or pier, with a water dependent use, and the combination results in a multiple-use facility;

(3) The project provides significant public access or recreation uses through the provision of waterfront seating, walkways, piers, street furniture, or similar facilities; or

(4) The use is temporary, with minimal permanent capital investment, and, in such cases, the temporary use permit will be valid only for a specified period, not to exceed one year.

33.0412 Where a use is permitted under 33.0411 (1-2) above, public access shall be provided as described in 33.0411 (3) above.

33.0413 In ***Development Aquatic*** areas, uses that are not water dependent shall be located either on a floating structure or pilings, or shall not increase the need for fill, if in association with a water-dependent use located on fill.

33.0414 In ***Conservation Shorelands,*** a commercial use may be permitted only upon a finding that it satisfies a need that cannot be accommodated on shorelands designated for more intensive development. It shall be low intensity and not conflict with forest management or recreational uses in the area.

33.05 DOCKS AND MOORAGE - A pier or secured float or floats for boat tie-up or other water use, often associated with a specific land use on the adjacent shoreland, such as a residence, a group of residences, a commercial use or light industrial facility. Small commercial moorages (less than 25 berths) with minimal shoreside services and no solid breakwater are included in this category. Floathouses, which are used for boat storage, net-drying and similar purposes, must also meet these requirements (cf. 33.11 MARINAS).

AREA	STANDARDS
Conservation Aquatic (C-OR) (PS-WA)	All
Rural Aquatic (C-OR) (PS-WA)	All
Development Aquatic (PS)	All
Conservation Shoreland (C)	All
Rural Shorelands (PS)	All
Development Shorelands (PS)	All
Water Dependent Development Shorelands (PS)	All

33.0501 Where a private individual dock or moorage is proposed, the applicant shall provide evidence that alternative moorage sites such as nearby marinas, community docks or mooring buoys are not available, are impractical, or will not satisfy the need. Only one boat dock or moorage area shall be permitted for each waterfront residence, subdivision or other use.

33.0502 The applicant shall provide evidence that the size of the dock or moorage is the minimum necessary to fulfill the purpose.

33.0503 Open moorages are preferred over covered or enclosed moorages, except in connection with a commercial or industrial use where shelter is necessary for repair and maintenance of vessels and associated equipment, such as fishing nets, etc.

33.0504 Open pile piers or secured floats shall be used for dock construction.

33.0505 Piers and floats shall extend no further out into the water than necessary to provide navigational access. Conflicts with other water surface uses, such as commercial fishing, recreational boating and log rafting, shall be minimized.

33.0506 Floats in tidally influenced areas shall be located such that they do not rest on the bottom at low water.

33.0507 Docks and moorages shall be designed so that adverse hydraulic effects at the site and in adjacent areas are minimized.

33.06 INDUSTRIAL AND PORT FACILITIES - Public or private use of land or structures for manufacturing, processing, deep water port development, and energy generation facilities. (Standards for marinas, docks, and piers are provided in 33.05 and 33.27.)

AREA	STANDARDS
Conservation Aquatic (C)	33.0601 - 33.0605, 33.0607, 33.0608, 33.0611, 33.0615
Rural Aquatic (C)	33.0601 - 33.0609, 33.0613, 33.0614
Development Aquatic (PS)	33.0601 - 33.0611
Conservation Shorelands (C-WA)	33.0601 - 33.0609, 33.0612 - 33.
Rural Shorelands (C)	33.0601 - 33.0609, 33.0612 - 33.0614
Development Shorelands (PS)	33.0601 - 33.0607, 33.0609, 33.0612, 33.0613
Water Dependent Development Shorelands (PS)	33.0601 - 33.0613

33.0601 Uses that are not water dependent shall not preclude or unduly conflict with existing, proposed, or probable future water dependent use on the site or in the vicinity.

33.0602 The placement of facilities shall take into account the impact on views and vistas from adjacent roads or residential areas. Facilities which have a decidedly negative impact shall provide for buffering, screening or other design features to protect the views or vistas.

33.0603 Facilities to treat and dispose of waste water, and to prevent and clean-up spills and dispose of toxic materials or petroleum shall be provided as necessary.

33.0604 The applicant shall present evidence that the industrial or port facility will be designed and constructed to minimize adverse effects on navigation, water and air quality, sedimentation rates and patterns, fish rearing or spawning areas, fish migration routes, important vegetative habitat, land transportation routes and traffic patterns, public services and facilities, and existing land uses.

33.0605 Where the proposed industrial use borders aquatic areas designated for resource protection or conservation, the applicant shall show that measures to be taken will reduce adverse impacts on such adjacent areas to a level consistent with their resource protection or conservation use.

33.0606 Facilities should be designed to permit public viewing of the waterfront and/or operations from viewpoints which would not interfere with industrial operations. Public access to the shoreline and water, consistent with security and safety, shall be provided.

33.0607 Parking facilities shall not be located over water or on the immediate shoreline, except where parking elsewhere is rendered impractical by topo-

graphy or constitutes a severe economic hardship, in which cases it shall remain as far landward as feasible.

33.0608 Industrial uses on floating structures shall be protected against currents and waves, and be located so as not to rest on the bottom at low water.

33.0609 Energy facilities will be located and constructed according to the standards of the Oregon Energy Facility Siting Council or Washington Thermal Power Plant Siting Law (RCW 80.50). The states preempt the regulation, certification and siting of thermal power plants.

33.0610* In ***Development Aquatic*** and ***Water Dependent Development Shoreland*** areas water dependent uses shall have the highest priority. Other uses may be allowed if the project satisfies 33.0601 and the applicant presents evidence that either:

(1) The use is water related and is not to be situated on new fill in an aquatic area; or

(2) The use shares an existing structure, such as a wharf or pier, with a water dependent use, and the combination results in a multiple-use facility; or

(3) The use is temporary, with minimal permanent capital investment, in such cases, the shoreline permit will be valid only for a specified period, not to exceed one year.

33.0611 Multipurpose and cooperative use of proposed moorage, parking, cargo handling and storage facilities should be undertaken where feasible. When new facilities are proposed, the applicant shall show that existing facilities in the area cannot be utilized. New facilities should be designed to provide for cooperative use as feasible.

33.0612 The design and construction of water dependent or water related industrial and port facilities shall consider the need to protect or enhance riparian vegetation for bank stabilization, wildlife habitat maintenance, water quality, or a visual and noise buffer. Except where direct access to water is required for wharves, piers, docks, or water intake or discharge facilities, protection or enhancement of riparian vegetation may be required.

33.0613 Uses which are not water related shall be set back 30 feet from the shoreline and riparian vegetation protected in this setback.

33.0614 In ***Rural Shorelands*** an industrial use shall be permitted only upon a finding that it satisfies a need that cannot be met on shorelands designated for more intensive development. It shall be located so as not to interfere unduly with normal agricultural or associated uses in adjacent areas.

33.0615 In ***Conservation Aquatic*** areas, only low intensity water dependent or temporary industrial uses with minimal adverse environmental impacts shall be permitted.

33.07 LAND TRANSPORTATION FACILITIES

- Highways, railroads, bridges and associated structures and signs which provide for land transportation of motorized and/or nonmotorized vehicles (excluding logging roads).

AREA	STANDARDS
Conservation Aquatic (C)	All
Rural Aquatic (C)	All
Development Aquatic (C)	All
Conservation Shorelands (C)	All
Rural Shorelands (PS)	All
Development Shorelands (PS)	All
Water Dependent Development Shorelands (PS)	All

33.0701 Land transportation facilities shall not be located in aquatic areas except where bridge crossings are needed or where no feasible alternative shoreland or upland route exists. Careful consideration should be given to potential adverse hydraulic effects. Undesirable changes in shoaling, erosion and flood elevations shall be avoided.

33.0702 The design and location of highways, railroads and bridges should take advantage of the natural topography to cause minimum disruption of the shoreline area. Causeways across aquatic areas shall not be permitted.

33.0703 The applicant shall provide to the planning commission an evaluation of the impacts of proposed rail or highway facilities on land use patterns, energy use, air and water quality, estuarine habitat, functions and processes, existing transportation facilities, and physical/visual access. The benefits of the location of new or expanded routes shall be weighed against the costs of relocating housing, businesses and public facilities. Routes shall be selected which preserve public access and avoid separation of high intensity use areas (such as downstream commercial centers) from the waterfront.

33.0704 New land transportation routes shall not degrade the development potential of ***Water Dependent Development Shorelands.***

33.0705 Public roadways in scenic areas shall provide for safe pedestrian and non-motorized vehicle travel, and for sufficient viewpoints, rest areas and picnic areas along the public shorelines.

33.0706 Maintenance of existing roads and railroads and maintenance and improvement of existing bridges shall be permitted, regardless of the designation of the area they pass through.

33.08 LOG DUMP/SORT AREA (in-water) -

An area to transfer logs to or from the land to water, normally associated with log storage/sort yards, log booming or processing/shipping facilities where rafts are built or dismantled.

AREA	STANDARDS
Rural Aquatic (C) (WA only)	All
Development Aquatic (C)	All

33.0801 Easy-let-down facilities shall be used to transfer logs from land to water. Free-fall log dumps are not permitted.

33.0802 The best practicable bark and wood debris controls shall be used.

33.0803 Other pertinent standards in the Oregon Environmental Quality Commission's Program and Policy for "Log Handling in Oregon's Public Waters" (October 24, 1975) apply in Oregon. Pertinent standards in the Washington Department of Natural Resources Special Provisions for booming and rafting leases shall apply to Washington State owned aquatic areas.

33.09 LOG STORAGE (in-water) - The use of water surface area to store commercial logs in rafts until ready for market.

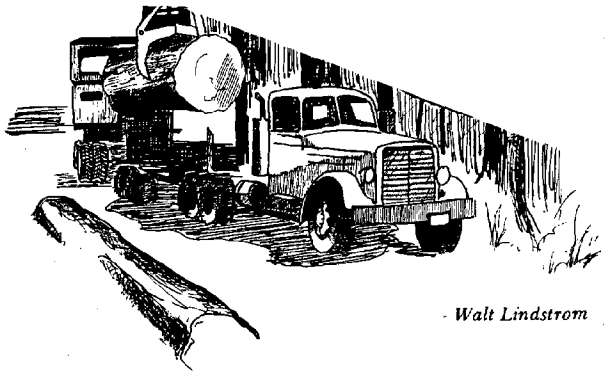
AREA	STANDARDS
Natural Aquatic (C-WA)	All
Conservation Aquatic (PS)	All
Rural Aquatic (PS)	All
Development Aquatic (PS)	All

33.0901 New log storage areas will be located such that logs will not go aground on tidal flats at low water.

33.0902 New log storage areas will be located in areas where conflicts with traditional and active gillnet fish drifts are minimized.

33.0903 Log storage areas shall be located where water quality degradation is minimized. Good flushing characteristics should exist at the site.

33.0904 Other pertinent standards in the Oregon Environmental Quality Commission's Program and Policy for "Log Handling in Oregon's Public Waters" (October 24, 1975) shall apply in Oregon. Relevant Washington Department of Natural Resources Special Provisions for booming and rafting leases shall apply to Washington State owned aquatic areas.



- *Walt Lindstrom*



- *Port of Astoria Photo*

33.10 LOG STORAGE/SORTING YARD (dry land) - An area where logs are gathered from surrounding harvest areas, weighed, sorted for species, size and quality, and stored until ready for transfer to water storage areas or to market.

AREA	STANDARDS
Conservation Shoreland (C)	33.1001 - 33.1004
Rural Shoreland (PS)	33.1001 - 33.1003, 33.1005
Development Shoreland (PS)	33.1001 - 33.1003
Water Dependent Development Shorelands (C)	33.1001 - 33.1003, 33.1006

33.1001 Storage facilities adjacent to waterways shall be designed, constructed and operated to control leachates and prevent the loss of bark, chips, sawdust and other wood debris into public waters.

33.1002 Unpaved storage yards underlain by permeable soils shall have at least a four foot separation between the ground surface and the winter water table.

33.1003 Other pertinent standards in the Oregon Environmental Quality Commission's Program and Policy for "Log Handling in Oregon's Public Waters" (October 24, 1975) apply in Oregon.

33.1004 In ***Conservation Shoreland*** areas, storage and sorting facilities should be located so as not to interfere with non-forestry uses of these areas, such as recreation.

33.1005 In ***Rural Shoreland*** areas, storage and sorting facilities shall be located so as not to interfere with rural residential uses, normal farming operations and recreation.

33.1006 On ***Water Dependent Development Shorelands,*** storage and sorting facilities shall not preclude or unduly conflict with existing, proposed or probable future water dependent uses on the site or in the vicinity, unless the dry sort yard is itself an essential part of a water-dependent facility.

33.11 MARINAS - Facilities which provide moorage, launching, storage, supplies and a variety of services for recreational, commercial fishing and charter fishing vessels. They are differentiated from docks/moorages (33.05) by a marina's larger scale, the provision of significant landside services and/or the use of a solid breakwater (rock, bulkheading, etc.).

AREA	STANDARDS
Rural Aquatic (C)	33.1101 - 33.1110, 33.1111 (WA)
Development Aquatic (PS)	33.1101 - 33.1109, 33.1111 (WA)
Rural Shorelands (PS)	33.1101 - 33.1110, 33.1111 (WA)
Development Shorelands (PS)	33.1101 - 33.1109, 33.1111 (WA)
Water Dependent Development Shorelands (PS)	33.1101 - 33.1109, 33.1111 (WA)

33.1101 The applicant shall provide evidence that existing marina facilities are inadequate to meet the demand and that existing facilities cannot feasibly be expanded.

33.1102 Marina facilities shall be designed and constructed to minimize negative impacts on navigation, water and air quality, sedimentation rates and patterns, fish rearing or migration routes, important sediment-dwelling organisms, birds, other wildlife, tidal marshes and other important vegetative habitat. Effects on traffic patterns, parking facilities, noise levels and uses in adjacent shoreland and aquatic areas shall be considered.

33.1103 Flushing and water circulation adequate to maintain ambient water quality shall be provided by design or artificial means. A calculated flushing time shall be presented as evidence that this standard has been met.

33.1104 The amount of water surface occupied shall be the minimum required to meet the need. In this regard, new facilities shall make maximum feasible use of dry boat moorage on shoreland areas.

33.1105 Means for preventing oil, fuels and other contaminants from entering the water shall be provided. Equipment shall be available on-site for clean-up of accidental spills of contaminants. Sewage and fish wastes shall not be discharged directly into the water.

33.1106 Marina facilities should provide for maximum public access and recreation use, consistent with safety and security considerations. Walkways, seating, fishing areas and similar facilities should be provided.

33.1107 Open moorages are encouraged over covered or enclosed moorages, except in connection with a commercial or industrial use where shelter is necessary for repair and maintenance of vessels and associated equipment, such as fishing nets.

33.1108 New marina facilities shall be located in areas where there is natural or manmade protection from wind, waves, tidal currents and surge, storms, strong prevailing winds and passing ship wakes. Marinas should be located or designed in a manner which will not adversely affect the natural processes of erosion, littoral drift and/or beach accretion.

33.1109 Parking facilities shall remain outside the shoreline area, except where parking elsewhere is rendered impractical by topography or constitutes a severe economic hardship, in which exceptional cases it shall remain as far from the ordinary high water mark as feasible.

33.1110 Marinas in ***Rural Aquatic*** and ***Shoreland*** areas shall be designed to minimize interference with agriculture and other rural uses.

33.1111 The 1971 revision of "Criteria Governing the Design of Marinas for Protection of Fish and Shellfish Resources" by the Washington State Department of Fisheries shall be used in design of the facility (adjusted to local tidal levels) in Washington.

33.12 MINING/MINERAL EXTRACTION — The removal for economic use of minerals, petroleum resources, sands, gravels or other naturally occurring materials from the shorelands and/or the bed beneath an aquatic area.

AREA	STANDARDS
Conservation Aquatic (C)	All
Rural Aquatic (C)	All
Development Aquatic (C)	All
Conservation Shorelands (C)	33.1201 - 33.1206
Rural Shorelands (C)	33.1201 - 33.1206
Development Shorelands (C)	33.1201 - 33.1206
Water Dependent Development Shorelands (C)	33.1201 - 33.1206

33.1201 The operator of a surface mine shall present to the local government one copy each of a state-approved surface mining plan and reclamation plan.

33.1202 The impacts on fish feeding, spawning and nursery areas, fish transit and migration, bird and wildlife habitat, riparian vegetation, water quality (dissolved oxygen, turbidity and other relevant factors), shoaling and erosion of nearby areas, circulation, and other relevant factors shall be evaluated and minimized.

33.1203 Petroleum extraction and drilling operations shall not be allowed in aquatic areas. Petroleum may, however, be extracted from beneath aquatic areas using equipment located on adjacent shorelands or uplands, according to the rules set forth by the Department of Geology and Mineral Industries. Petroleum exploration (not including exploratory drilling) is permitted in shorelands and aquatic areas, subject to state standards.

33.1204 Unless part of an approved fill project, spoils and stockpiles should be placed beyond the reach of high water and in such a manner that sediment will not enter or return to the waterway.

33.1205 Riparian vegetation shall be retained to the degree possible. Disturbed shoreline areas shall be

revegetated.

33.1206 Waste-water handling facilities must meet state and federal water quality standards and be adequate to prevent damage to in-stream water quality.

33.1207 Mining or mineral extraction should not occur in productive, shallow sub-tidal areas, tidal flats, or tidal marshes, as determined by the State Removal/Fill Permit and Corps of Engineers permit processes. Where mining or mineral extraction in such aquatic areas is necessary because no feasible upland sites exist, the activity should occur in areas of sandy bottom sediments, where biological productivity is low and unwanted shoaling has occurred.

33.1208 If the project is planned for aquatic areas, the applicant shall present evidence to explain why the project cannot be carried out on land. Mining/mineral extraction is not permitted in tidal marshes, and productive tidal flats and subtidal areas.

33.13 NAVIGATIONAL STRUCTURES - Pile dikes, groins, fills, jetties and breakwaters that are installed to help maintain navigation channels, control erosion or protect marinas and harbors by controlling water flow, wave action and sand movement.

Pile dikes are flow control structures that are used primarily in river systems and are made of closely spaced piling connected by timbers; usually they are perpendicular to the shore. They are constructed to increase scour in the navigation channel and/or control shoreline erosion by interrupting sand transport and encouraging sedimentation in the sheltered lee of the pile dike. A single pile dike is unusual; they are generally constructed in groups.

Groins are analogous to pile dikes, but are constructed from rocks and can withstand rougher wave condition than pile dikes. Groins are often used on beaches where they exert a strong influence on sand transport and extend from the backshore seaward across the beach.

Jetties are the largest of all navigational structures, are made of rock or concrete, and are used to stabilize the channel and improve the scour at the mouth of an estuary. They must be able to withstand extreme wave conditions and may alter longshore sand transport for many miles along the coast.

Breakwaters may be a floating structure or made of rock, steel, concrete, or piling. They are used to protect harbors and marinas against waves and currents.

Fills - Aquatic areas are sometimes filled as a means of controlling flows. Fills are often placed between pile dikes.

AREA	STANDARDS
Conservation Aquatic (C)	All
Rural Aquatic (C)	33.1301 - 33.1305
Development Aquatic (C)	33.1301 - 33.1305

33.1301 Impacts of navigational structures shall be considered before deciding whether to allow the use, including the structures' capacity for changing currents, sedimentation, erosion, sediment movement by waves and currents, and flushing characteristics; capacity for damaging aquatic habitat and fishery resources; aesthetic impact; interference with navigation; occupation of water surface; and other relevant factors. Effects on long-shore sand transport on beaches and in the river are especially important and should be evaluated carefully. Adverse impacts shall be minimized by both design and construction.

33.1302 Jetties, groins and rock breakwaters shall be constructed of clean, non-erodable land materials. The size of the material shall be appropriate for existing wave, tide and current conditions. In-stream gravels shall not be used. Sound engineering practices and state and federal agency standards shall be followed.

33.1303 Pile dikes shall be installed in accordance with the standards for piling/dolphin installation (33.26).

33.1304 Fills shall be installed in accordance with the standards on fills (33.25).

33.1305 Floating breakwaters are preferred over the solid, rip-rapped, or rock type, when feasible, to maintain fish habitat and sand movement. Solid breakwaters should be constructed only where they can be designed to minimize detrimental effects on sand movement and water circulation.

33.1306 In ***Conservation Aquatic*** areas, only minor navigational structures that require no major estuarine alterations may be allowed.

33.14 RECREATION USES - Uses not otherwise specified in the Permitted Use/Activity Tables which help provide the opportunity for enjoyable active or passive leisure-time activities. Examples include public parks, waysides, fishing piers, boat launches, foot paths and bike trails, swimming areas and amusement parks.

AREA	STANDARDS
Natural Aquatic (C)	33.1401 - 13.1405
Conservation Aquatic (PS)	33.1401 - 33.1404, 33.1406
Rural Aquatic (PS)	33.1401 - 33.1404, 33.1407
Development Aquatic (PS)	33.1401 - 33.1404, 33.1408
Natural Shoreland (C)	33.1401 - 33.1405
Conservation Shoreland (PS)	33.1401 - 33.1404, 33.1406
Rural Shoreland (PS)	33.1401 - 33.1404, 33.1407
Development Shoreland (PS)	33.1401 - 33.1404
Water Dependent Development Shoreland (PS)	33.1401 - 33.1404, 33.1408

33.1401 Recreation 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 from the shoreline as feasible.

33.1402 Recreational access to the water along publicly owned shorelines shall be maintained to the maximum extent possible, consistent with safety and resource conservation needs.

33.1403 Recreational water access points provided in connection with private commercial development shall be open to public use, except where security and safety considerations are overriding.

33.1404 Recreational facilities shall be designed to minimize adverse effects on surface or ground water quality. The adverse effects of storm runoff from parking lots shall be given special attention.

33.1405 Recreation uses of ***Natural Aquatic*** and ***Shoreland*** areas shall be undeveloped and low intensity. Permanent structures, dredging, filling, piling and other alterations are not permitted; temporary structures may be allowed, consistent with maintenance of natural resource and aesthetic values.

33.1406 Recreation uses of ***Conservation Aquatic*** and ***Shoreland*** areas shall be of low to moderate intensity and located so as not to interfere with normal forest management practices or natural resource protection of aquatic areas.

33.1407 Recreation uses of ***Rural Aquatic*** and ***Shoreland*** areas shall be located so as not to interfere with normal agricultural practices or substantially degrade natural resource production of aquatic areas. Public access may be restricted as necessary to protect flood control structures and prevent trespass on private land.

33.1408 Recreation uses of ***Development Aquatic*** and ***Water Dependent Development Shoreland*** areas shall be water dependent and located so as not to interfere unduly with industrial uses of these areas.

33.15 RESIDENTIAL USES - Development of land and structures for human occupancy as living quarters. This category includes single and multi-family dwellings, subdivisions, mobile homes and mobile home parks, and planned unit developments.

AREA	STANDARDS
Conservation Aquatic (C-WA)	33.1502 - 33.1507
Rural Aquatic (C-WA)	33.1502 - 33.1507
Development Aquatic (C)	33.1502 - 33.1507, (OR)
Conservation Shorelands (PS)	33.1501 - 33.1506, 33.1508
Rural Shorelands (PS)	33.1501 - 33.1506, 33.1509
Development Shorelands (PS)	33.1501 - 33.1506
Water Dependent Development Shorelands (C)	33.1501 - 33.1506, 33.1510

33.1501 The basic shoreline setback for residential structures and associated parking shall be 30 feet as measured from the aquatic-shoreland boundary. Where erosion or flood hazard exists, the required setback will be determined on a case-by-case basis with appropriate hazard protection required. If the applicant can demonstrate that existing structures on adjoining lots infringe on the 30-foot setback, the setback may be determined by the building line common to the adjacent existing structures, but no setback may be less than 10 feet without a variance.

33.1502 Removal of existing vegetation along the stream or river bank shall not be permitted except as necessary for property access or placement of residential structures. Consistent with maintaining a stable shoreline, provision for limited removal or replacement of vegetation may be made to increase livability or provide a view of the water. Applicants, particularly for subdivisions, will show how they plan to preserve and/or replace shoreline vegetation.

33.1503 Storm drainage systems shall be separated from sewage disposal systems. Sewage disposal systems shall be designed so that water quality of adjacent coastal waters will not be impaired.

33.1504 Subdivisions, mobile home parks and planned unit developments shall be designed so as to protect and compliment the aesthetic character of the shorelands and adjacent aquatic areas (as viewed from the water or shorelands).

33.1505 Unless it can be demonstrated that adequate public access exists in the area, subdivisions, mobile home parks and planned unit developments shall provide for public pedestrian access to the shoreline within the development.

33.1506 When only a shoreland area is being developed, adjacent aquatic areas shall not be used to compute lot area or density.

33.1507 Residential uses in ***Oregon Development Aquatic*** areas shall be limited to accessory uses and multi-family residences with marina facilities. Multi-family residences shall not preclude or unduly conflict with existing, proposed, or probable future water dependent use on the site or in the vicinity. Residences shall not be located on new fill in aquatic areas.

Only floating residences shall be allowed in ***Washington Aquatic*** areas; they shall be located in accordance with the standards for Docks/Moorages and Piling/Dolphin Installation. They shall not be located over productive fish feeding areas or in a location inconsistent with the intent of the shoreline environment designation. Residential development over water and on fill shall not be permitted.

33.1508 On ***Conservation Shorelands***, no subdivisions or major or minor partitions may be allowed. Single-family residences may be allowed only upon a finding that the housing satisfies a need that cannot be met on shorelands designated for more intensive development, shall be low density, and shall be located so as not to interfere with normal forest

management practices.

33.1509 On ***Rural Shorelands***, residences, residential subdivisions, and major or minor partitions may be allowed only upon a finding that the housing satisfies a need that cannot be met on shorelands designated for more intensive development, shall be low density, and shall be located so as not to interfere with normal agricultural use and practices on adjacent parcels of land.

33.1510 Residential uses in ***Water Dependent Development Shorelands*** shall be allowed only as an accessory use.

33.16 RESTORATION/RESOURCE ENHANCEMENT - Replacing or restoring original attributes or amenities such as natural biological productivity and aesthetic or cultural resources which have been diminished or lost by past alterations, activities or catastrophic events. ***Active Restoration*** involves the use of specific remedial actions such as removing dikes or fills, installing water treatment facilities, or rebuilding or removing deteriorated urban waterfront areas. ***Passive Restoration*** is the use of natural processes, sequences or timing to bring about restoration after the removal or reduction of adverse stresses. ***Resource Enhancement*** is the use of artificial or natural means to improve the quantity or quality of a specific resource.

AREA	STANDARDS
Natural Aquatic (C)	All
Conservation Aquatic (C)	All
Rural Aquatic (C)	All
Development Aquatic (C)	All
Natural Shorelands (C)	All
Conservation Shorelands (C)	All
Rural Shorelands (C)	All
Development Shorelands (C)	All
Water Dependent Development Shorelands (C)	All

33.1601 Policies set forth in the Restoration and Mitigation Plan should be consulted in evaluation of individual restoration/resource enhancement projects.

33.1602 Restoration/resource enhancement in ***Development Aquatic***, ***Development Shoreland*** or ***Water Dependent Development Shoreland*** should be undertaken only if it is likely that the project will not conflict with or be destroyed by existing or subsequent development.

33.1603 A proposal for restoration or resource enhancement shall be accompanied by an analysis of possible adverse effects on: circulation and current patterns; shoaling or erosion; water quality; existing habitat and natural resource values; and feeding and migration of juvenile salmon, other fishes, and aquatic organisms. Such effects shall be minimized.

33.1604 The applicant shall establish that the beneficial effects of a restoration or resource enhancement project outweigh the direct and indirect project costs. Benefits shall include those benefits related to a development project if the restoration or resource enhancement is undertaken as mitigation of other adverse effects of the project. For diked tideland restoration, costs should include costs associated with the loss of agricultural land.

33.17 SOLID WASTE DISPOSAL - The deposition of municipal or industrial solid waste on shorelands.

AREA	STANDARDS
Rural Shorelands (C)	All
Development Shorelands (C)	All
Water Dependent Development Shorelands (C)	All

33.1701 Solid waste disposal on shorelands shall be allowed only when an upland location is not feasible, and as part of the preparation of the site for an allowed or conditionally allowed shoreland development. Sites shall be consistent with the approved solid waste disposal plan.

33.1702 Solid waste material shall not be deposited in marshes, wetlands, or other aquatic areas. Solid waste deposited in a shoreland disposal site shall be strictly confined to the site.

33.1703 All relevant state and federal air quality, water quality and solid waste disposal regulations shall be adhered to. Leaching of harmful substances into ground and surface waters shall be avoided, and public health and safety protected.

33.1704 Aesthetic impacts of the solid waste disposal shall be minimized by screening the site with natural or planted vegetation.

33.18 TIMBER PROPAGATION/HARVESTING - Planting, growing, thinning, harvesting, etc. of trees for commercial purposes. Logging road construction is also covered by these standards.

AREA	STANDARDS
Conservation Aquatic (C)	33.1801, 33.1802
Rural Aquatic (C)	33.1801, 33.1802
Development Aquatic (PS)	33.1801
Natural Shorelands (C)	33.1801, 33.1803
Conservation Shorelands (PS)	33.1801
Rural Shorelands (PS)	33.1801
Development Shorelands (PS)	33.1801
Water Dependent Development Shorelands (PS)	33.1801

33.1801 Forest practices and road building will be in accord with the rules established under the Oregon State Forest Practices Act administered by the Department of Forestry, or the Washington State Forest Practices Acts administered by the Department of Natural Resources.

33.1802 In ***Conservation and Rural Aquatic*** areas (primarily Sitka Spruce swamps), the Department of Forestry and local government shall allow only selective commercial timber cutting of no more than thirty percent of the merchantable trees in any ten

year period of time: PROVIDED, that other timber harvesting methods may be permitted in those limited instances where the topography, soil conditions or silviculture practices necessary for regeneration make selective logging ecologically detrimental: and PROVIDED FURTHER, that clear cutting of timber which is solely incidental to the preparation of land for other uses authorized by these standards may be permitted. Disruption of drainage patterns, wildlife habitat and aquatic values shall be minimized, and logging roads and heavy equipment shall not be permitted in aquatic areas.

33.1803 In ***Natural Shoreland*** areas, timber harvesting shall only be conducted when necessary for low intensity, undeveloped recreation facilities such as trails.

33.19 UTILITIES - Public service structures such as: towers, facilities and major lines for communication and power transmission; waste water treatment plants; storm water and treated waste water outfalls (including industrial); and major water, sewer and gas lines.

AREA	STANDARDS
Conservation Aquatic (C)	All
Rural Aquatic (C)	All
Development Aquatic (C)	All
Conservation Shorelands (C)	All
Rural Shorelands (C)	All
Development Shorelands (C-OR) (PS-WA)	All
Water Dependent Development Shorelands (C)	All

33.1901 Electrical or communication transmission lines shall be located underground, unless not economically feasible. Overhead electrical and communication transmission lines shall not unduly interfere with migratory bird flyways and significant habitat of resident waterfowl, birds of prey and other birds.

33.1902 Utilities shall not be located on new fill land unless part of an otherwise approved project and no other alternative exists.

33.1903 Above-ground utilities shall be designed to have the least adverse effect on visual and other aesthetic characteristics of the area. Interference with public uses and public access to the estuary shall be minimized.

33.1904 Effluents from point-source discharges shall meet all applicable state and federal water and air quality standards.

33.1905 After installation or maintenance is completed, disturbed stream banks shall be stabilized (see Bank Stabilization Standards 33.27).

33.1906 Utilities for residences are not considered a conditional use and shall be permitted wherever residences are permitted.

33.20 BANKLINE OR STREAM ALTERATION- Realignment of a stream bank or the entire stream, either within or without its normal high water boundaries.

AREA	STANDARDS
Conservation Aquatic (C)	33.2001 - 33.2004
Rural Aquatic (C)	33.2001 - 33.2004
Development Aquatic (PS)	33.2001 - 33.2004
Conservation Shorelands (C)	33.2001 - 33.2003, 33.2005
Rural Shorelands (C)	33.2001 - 33.2003, 33.2005
Development Shorelands (C)	33.2001 - 33.2003, 33.2005
Water Dependent Development Shorelands (PS)	33.2001 - 33.2003, 33.2005

33.2001 Adverse impacts on fish spawning, feeding, migration and transit, wildlife habitat, riparian vegetation, circulation patterns, salinity intrusion, water quality, sediment movement and distribution, erosion and shoaling of nearby areas and other estuarine processes, habitats and functions shall be evaluated and minimized.

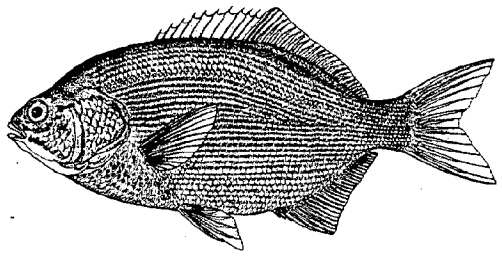
33.2002 An altered water course shall meander and maintain stream surface area as feasible. Alteration of sloughs, oxbows and marshes shall be minimized.

33.2003 Alignments should make maximum use of natural or existing deep water channels, but should not create pockets of stagnant water or other undesirable hydraulic conditions.

33.2004 In-stream dredging shall be conducted according to the Dredging Standards (33.22).

33.2005 Standards 33.2402 - 33.2408 set forth under Excavation (creation of new water surface area) shall apply.

Embiotoca lateralis Striped Seaperch



- Ron Pittard - Searep Studio, courtesy Clatsop County

33.21 DIKES - Structures designed and built to prevent inundation of a parcel of land by water. A dike is considered new when placed on an area which: 1) has never previously been diked, or 2) has previously been diked, but all or a substantial part of the area is subject to daily inundation and tidal marsh has been established. Maintenance and repair refer to: 1) existing serviceable dikes (including those that allow some seasonal inundation), and 2) those that have been damaged by flooding, erosion, tide gate failure, etc., but where reversion to tidal marsh has not yet occurred, except in drainage ways.

AREA	STANDARDS
New Dikes:	
Conservation Aquatic (C)	All
Rural Aquatic (C)	All
Development Aquatic (PS)	All
Conservation Shorelands (C)	All
Rural Shorelands (PS)	All
Development Shorelands (PS)	All
Water Dependent Development Shorelands (PS)	All
Dike Maintenance and Repair:	
Natural Aquatic (PS)	All
Conservation Aquatic (PS)	All
Rural Aquatic (PS)	All
Development Aquatic (PS)	All
Natural Shorelands (PS)	All
Conservation Shorelands (PS)	All
Rural Shorelands (PS)	All
Development Shorelands (PS)	All
Water Dependent Development Shorelands (PS)	All

33.2101 The outside face of the dike shall be suitably protected to prevent erosion, as part of any new dike construction or maintenance of existing dikes. All standards for shoreline stabilization shall be met, as applicable (cf 33.20). However, trees, brush, and shrubs should not be planted.

33.2102 Minor dredging as a source of material for dike maintenance shall be allowed only when economically feasible upland sources of material are not available (cf Dredging Standards 33.22).

33.2103 Good engineering practices shall be followed in dike maintenance, repair and construction. State and federal agency regulations apply.

33.2104 When new dikes are placed as flood protection, they should be placed on the shorelands and not in aquatic areas (including marshes or other wetlands). New diking of aquatic areas will be subject to the standards for fill (cf Fill, 33.25).

33.2105 New dike alignment and configuration shall be such as to cause no increase in erosion or shoaling in adjacent areas and no appreciable increase in back water elevation. Channelization of the waterway should be avoided.

33.2106 Emergency repair to existing dikes is permitted, consistent with other requirements of these standards, subject to the rules set forth by the Oregon Division of State Lands or the Washington Departments of Fish and Game, and the U.S. Army Corps of Engineers.

33.22 DREDGING - The removal of sediment or other material from a stream, river, estuary or other aquatic area for the purpose of deepening a navigation channel, mooring basin or other navigational areas, or obtaining fill material.

AREA	STANDARDS
New Projects:	
Conservation Aquatic (C)	33.2201 - 33.2210, 33.2213
Rural Aquatic (C-OR) (PS-WA)	33.2201 - 33.2210, 33.2213
Development Aquatic (PS)	33.2201 - 33.2210
Maintenance of Projects:	
Natural Aquatic (C)	33.2201 - 33.2212
Conservation Aquatic (C)	33.2201 - 33.2212
Rural Aquatic (PS)	33.2201 - 33.2212
Development Aquatic (PS)	33.2201 - 33.2212
Obtaining Fill Material:	
Conservation Aquatic (C)	33.2201 - 33.2212
Rural Aquatic (C)	33.2201 - 33.2212
Development Aquatic (PS)	33.2201 - 33.2212

33.2201 Dredging in aquatic areas shall be permitted only:

(1) For navigation or navigational access; or

(2) In conjunction with a permitted or conditionally permitted water dependent use of waters or adjacent shorelands for which there is a demonstrated public need and for which no feasible alternative exists; or

(3) As part of an approved restoration project; or

(4) As a source of material, as per standard 33.2208 below, or for mining or mineral extraction, as provided in the Mining and Mineral Extraction standards (33.12); or

(5) For dike maintenance, as provided in 33.2102, 33.2211, and 33.2212.

(6) In conjunction with a permitted or conditionally permitted bridge (33.07), for which there is a public need and no other feasible sites or routes exist.

33.2202 When dredging is permitted, the dredging shall be the minimum necessary to accomplish the proposed use.

33.2203 Erosion, sedimentation, increased flood hazard and other undesirable changes in circulation shall be avoided in dredging and the disposal of dredged material. Tidal marshes, tidal flats and

other wetlands should not be adversely affected. The applicant may be required to demonstrate the absence of adverse effects by correlation of field data and mathematical models or the Corps of Engineers' model.

33.2204 Bottom sediments and pore water in the dredging and disposal areas shall be adequately characterized by the applicant before the operation begins. Information that may be required includes, as appropriate: particle size distribution, organic content, nutrients, sulfides, oxygen and heavy metals, benthic studies or other tests. This requirement may be waived for clean Columbia River sands and gravels.

33.2205 The timing of dredging and disposal shall be coordinated with state and federal resource agencies, local governments and private interests to ensure adequate protection of biological productivity (fish runs, spawning, benthic productivity, wildlife, etc.) and to minimize interference with fishing activities. In general, disposal should occur during periods of adequate river flow to aid flushing of suspended sediments and downstream transport of dredged material reaching the bottom.

33.2206 Adverse short-term effects of dredging and disposal such as turbidity, release of nutrients, heavy metals, sulfides, organic material or toxic substances, dissolved oxygen depletion, disruption of the food chain, loss of benthic productivity, and disturbance of fish runs and important localized biological communities shall be minimized.

33.2207 All relevant state and federal water quality standards shall be met by dredging and dredged material disposal activities.

33.2208* Dredging as a source of material for fill or construction should not occur in productive, shallow sub-tidal areas, tidal flats, or tidal marshes. When dredging as a source of material is necessary, because feasible upland sources of material are absent, dredging should occur in areas of sandy bottom sediments, where biological productivity is low and unwanted shoaling has occurred.

33.2209 Destabilization of fine-textured sediments, erosion and siltation in areas adjacent to the dredging project and other undesirable changes in circulation patterns, such as a substantial reduction of flushing time, shall be avoided.

33.2210 In the evaluation of any dredging project during the permit process, the adverse effects of both the initial dredging and subsequent maintenance dredging must be considered.

33.2211* In all aquatic areas, minor dredging may be permitted to the minimal extent necessary to open drainage channels from tide boxes out to deeper water.

33.2212* In all aquatic areas, dredging of shallow biologically productive areas adjacent to dikes as a source of material for dike maintenance may be allowed upon the applicant's demonstration that:

(1) Alternative sources of material are not available or are not economically feasible; and

(2) The dredging method selected will not leave potholes where juvenile salmon and other fish might be stranded at low water; and

(3) Other disruption of tidal flats and tidal marshes is minimized.

33.2213 New navigation project dredging in ***Conservation*** and ***Rural Aquatic*** areas may be allowed only for minor navigational improvements and limited to shallow draft. Such dredging shall not result in major alteration to the estuarine ecosystem.

* Oregon Land Conservation and Development Commission Estuarine Resources Goal 16 Exceptions required (cf Appendix B)

33.23 DREDGED MATERIAL DISPOSAL

- The deposition of dredged material in aquatic areas or shorelands. Methods include land disposal, in water disposal, in water disposal to create land, beach nourishment, flow-lane disposal, ocean disposal, and other in water disposal.

In-water disposal is the deposition of dredged material in a body of water.

Flow-lane disposal is the in water deposition of dredged material in or adjacent to the maintained navigation channel and within the natural channel or the slopes adjacent to the natural channel. The purpose is to avoid permanent deposition and allow the material to continue downstream.

Ocean disposal is the deposition of dredged material in the ocean.

Land disposal is the deposition of dredged material on land.

Beach nourishment is the deposition of dredged material in shoreline areas where active erosion is occurring, as a way of preventing further erosion of the bankline. It is not a way of creating new land or beaches where beaches have not previously existed.

AREA	STANDARDS
Conservation Aquatic (C)	33.2301 - 33.2308
Rural Aquatic (C)	33.2301 - 33.2306, 33.2308
Development Aquatic (PS)	33.2301 - 33.2306, 33.2308
Conservation Shorelands (C)	33.2301 - 33.2302, 33.2307 - 33.2312
Rural Shorelands (PS)	33.2301 - 33.2302, 33.2307 - 33.2312
Development Shorelands (PS)	33.2301 - 33.2302, 33.2307 - 33.2312
Water Dependent Development Shorelands (PS)	33.2301 - 33.2302, 33.2307 - 33.2312

33.2301 Selection of dredged material disposal sites shall be in accord with the Dredged Material Disposal Plan, Site Selection and Use Priorities, 53.

33.2302 Standards 33.2202 - 33.2207, Dredging, apply.

33.2303 With regard to in-water disposal in the river, estuary and ocean:

(1) Consideration shall be given to the need for the proposed disposal, the availability and desirability of alternate sites and methods of disposal that might be less damaging to the environment. No site should be used if insufficient sediment type and benthic population data are available to provide a general idea of the biological value of the site.

(2) The size and chemical characteristics of the dredged material should be compared with those of the disposal site, and consideration should be given to matching the dredged material to the capabilities of the site.

(3) In-water disposal requires either a water quality certification or a short-term exemption. Dredged material disposal shall not be permitted in the vicinity of a public water supply intake.

33.2304 Flow-lane disposal shall be conducted so that:

(1) The material is not deposited upstream from the dredging site. Disposal should not occur under fresh water flow and tidal conditions where the predominant sediment transport at a site is upriver.

(2) Use of the disposal site does not interfere with fishing activities by causing major changes in the circulation patterns or bottom configurations of the disposal site.

33.2305 Ocean disposal shall be conducted so that:

(1) The amount of material deposited at a site is compatible with the benthic populations and other uses of the area.

(2) Interference with sport and commercial fishing is minimized.

(3) Disposal is strictly confined to the designated disposal sites.

33.2306 Except for flow-lane disposal and beach nourishment, deposition inside the estuary should be substituted for ocean disposal only when sea or weather conditions are a hazard to safe navigation for the dredging vessel.

33.2307 In ***Conservation Aquatic*** areas, only sites designated in the Dredged Material Management Plan may be used for disposal.

33.2308 Beach nourishment shall be conducted so that:

(1) Erosion or deposition downstream from the disposal site does not occur. Particular care must be taken that erosion of the dredged material does not smother marsh or other shallow productive areas.

(2) The volume and frequency of dredged material disposal is such as to maintain a stable beach profile, as nearly as possible. Dredged material shall be graded at a uniform slope and contoured to reduce cove and peninsula formation, to minimize juvenile fish stranding.

33.2309 For land disposal:

(1) Proper diversion of surface discharge must be provided to maintain the integrity of the natural streams, wetlands and drainageways. Leaching of disposal runoff into the waterway must be controlled and all disposal runoff water must enter the waterway through an outfall at a location that minimizes circulation and flushing. Underground springs and aquifers must be identified and protected.

(2) Dikes shall be well constructed and large enough to encourage proper "ponding" and to prevent the return of solids into the waterway or estuary. Ponds should be designed to maintain at least one foot of standing water at all times to further encourage proper settling. Weirs should have proper crest heights.

33.2310 Disposal should be compatible with the intended land surface use after disposal. Disposal of dredged material should occur on the smallest possible land area consistent with Standard 33.2312 below, in order to minimize the quantity of land that is disturbed. Clearing of land should occur in stages only as needed. Reuse of existing disposal sites is preferred to the creation of new sites in order to minimize the total land area covered by disposal material. It may, however, be desirable to clear and fill an entire site at one time, if the site will be used for development immediately after filling.

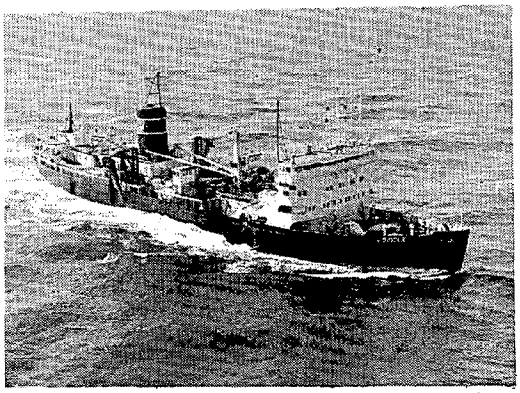
33.2311 Where appropriate, revegetation of land disposal sites should occur as soon as possible, in order to retard wind erosion and to restore wildlife habitat value of the site. Native species should be used; the Soil Conservation Service (SCS) and the SCS Inter-Agency Seeding Manual should be consulted. Efforts should be made to minimize the time necessary to achieve leaching of salts from the soils. Revegetation of areas that will be reused is strongly encouraged, to help prevent erosion before reuse.

33.2312 Height and Slope requirements: The final height and slope after each use of a land dredged material site should be such that:

(1) The site does not enlarge itself by sluffing and erosion at the expense of adjacent aquatic areas.

(2) Loss of material from the site during storms and freshets is minimized.

(3) Interference with the view from nearby residences, scenic viewpoints and parks is avoided.



Official Corps of Engineers Photo

33.24 EXCAVATION - Creation of New Water Surface Area - Excavation of shorelands that create new water surface directly connected to other tidal or non-tidal waters. The most common examples are creation of moorage space or fish ponds from dry land. Normal agriculture and timber practices are exempt from these standards. Drainage ditches are subject to these standards only in those cases where tidal or stream waters enter the drainage ditch on a routine basis.

AREA	STANDARDS
Conservation Shorelands (C)	All
Rural Shorelands (PS)	All
Development Shorelands (PS)	All
Water Dependent Development Shorelands (PS)	All

33.2401 Creation of new water surface area shall be allowed only for navigation, other water-dependent use, or restoration. Adverse impacts on flushing time, erosion of or shoaling in adjacent shores and waters, or dissolved oxygen levels, water quality or estuarine habitat, processes and functions shall be evaluated and minimized.

33.2402 Interference with existing navigation shall be minimized.

33.2403 Existing riparian vegetation shall be protected to the extent possible and the new bankline shall be stabilized against erosion in an appropriate manner, preferably by vegetative stabilization before the new water body is connected to existing water bodies (see Shoreline Stabilization Standards (33.27).

33.2404 Excavation of as much as is practical of the new water body shall be completed before it is connected to existing water bodies.

33.2405 The excavation shall not be permitted if toxic substances or other pollutants will leach into the water as a result of the excavation.

33.2406 Material generated by the excavation shall be deposited on land in an appropriate manner (see Dredged Material Disposal Standards 33.2301, 33.2307 - 33.2312).

33.2407 Excavation to create new water area should not destroy valuable shoreland wildlife habitat, or result in stream channelization.

33.2408 Existing public access shall not be reduced, and increased public access to the water and recreational opportunities as part of the project are encouraged.

33.25 FILL - The placement by man of sediment or other material (excluding solid waste) in an aquatic area to create new shorelands or on shorelands to raise the elevation of the land.

AREA	STANDARDS
Conservation Aquatic (C)	All
Rural Aquatic (C)	All
Development Aquatic (PS)	All
Conservation Shorelands (C)	33.2501 - 33.2503
Rural Shorelands (PS)	33.2501 - 33.2503
Development Shorelands (PS)	33.2501 - 33.2503
Water Dependent Development Shorelands (PS)	33.2501 - 33.2503

33.2501 Fills shall be permitted only after it is established that adverse impacts on navigation, estuarine habitat, processes and functions, water circulation and sedimentation patterns, water quality and recreational activities will be minimized.

33.2502 A fill shall be the minimum necessary to accomplish the proposed use.

33.2503 Where existing public access is reduced, suitable public access as part of the development project shall be provided.

33.2504 Fill in aquatic areas shall be permitted only:

(1) In conjunction with a permitted or conditionally permitted water dependent use for which there is a demonstrated public need and for which no feasible upland sites exist;

(2) In conjunction with a permitted or conditionally permitted bridge, for which there is a public need and where no feasible upland sites or routes exist; or

(3) As part of an approved restoration project.

33.2505 A fill in an aquatic area shall be surrounded by dikes that are appropriately stabilized (see standards for Shoreline Stabilization [33.27]). Fills in shoreland areas shall also be contained by dikes; these dikes shall be stabilized appropriately if they abut on a body of water. Disposal behind the dikes shall proceed according to Dredging Standards 33.2204 - 33.2207 and Dredged Material Disposal Standards 33.2309 and 33.2310.

33.2506 Aquatic areas shall not be used for sanitary landfills or the disposal of solid waste.



- *Port of Astoria Photo*

33.26 PILING/DOLPHIN INSTALLATION - The driving of wood, concrete or steel piling into the bottom in aquatic areas to support piers or docks, structures, moored floating structures, vessels or log rafts or for other purposes. A dolphin is a group of pilings held together by steel cable and used for mooring vessels, log rafts or floating structures.

AREA	STANDARDS
Conservation Aquatic (C)	All
Rural Aquatic (PS)	All
Development Aquatic (PS)	All

33.2601 Piling/dolphin installation shall be permitted only in conjunction with an allowed or conditional use for which no feasible upland sites exist.

33.2602 Piling/dolphin installation shall be the minimum necessary to accomplish the proposed use.

33.2602 Piling/dolphin installation shall be permitted only after the applicant has established that adverse impacts on navigation, estuarine habitat, processes and functions, water circulation and sedimentation patterns, water quality, and recreational activities will be minimized.

33.2604 The piling or dolphin and its placement shall meet all applicable state and federal engineering standards.

33.27 SHORELINE STABILIZATION - The protection of the banks of tidal or non-tidal stream, river or estuarine waters by vegetative or structural means.

AREA	STANDARDS
Vegetative (non-structural) stabilization:	
Natural Aquatic (PS)	33.2701 - 33.2704, 33.2712
Conservation Aquatic (PS)	33.2701 - 33.2704, 33.2712
Rural Aquatic (PS)	33.2701 - 33.2704, 33.2712
Development Aquatic (PS)	33.2701 - 33.2704, 33.2712
Natural Shorelands (PS)	33.2701 - 33.2704, 33.2712
Conservation Shorelands (PS)	33.2701 - 33.2704, 33.2712
Rural Shorelands (PS)	33.2701 - 33.2704, 33.2712
Development Shorelands (PS)	33.2701 - 33.2704, 33.2712
Water Dependent Development Shorelands (PS)	33.2701 - 33.2704, 33.2712
Riprap:	
Natural Aquatic (C)	33.2705 - 33.2710, 33.2712
Conservation Aquatic (PS)	33.2706 - 33.2710, 33.2712
Rural Aquatic (PS)	33.2706 - 33.2710, 33.2712
Development Aquatic (PS)	33.2706 - 33.2710, 33.2712
Natural Shorelands (C)	33.2705 - 33.2710, 33.2712
Conservation Shorelands (PS)	33.2706 - 33.2710, 33.2712
Rural Shorelands (PS)	33.2706 - 33.2710, 33.2712
Development Shorelands (PS)	33.2706 - 33.2710, 33.2712
Water Dependent Development Shorelands (PS)	33.2706 - 33.2710, 33.2712
Bulkheads:	
Conservation Aquatic (C)	33.2707 - 33.2712, 33.2713 (WA)
Rural Aquatic (C)	33.2707 - 33.2712, 33.2713 (WA)
Development Aquatic (PS)	33.2707 - 33.2712, 33.2713 (WA)
Conservation Shorelands (C)	33.2707 - 33.2712, 33.2713 (WA)
Rural Shorelands (PS)	33.2707 - 33.2712, 33.2713 (WA)
Development Shorelands (PS)	33.2707 - 33.2712, 33.2713 (WA)
Water Dependent Development Shorelands (PS)	33.2707 - 33.2712, 33.2713 (WA)

33.2701 Plant species shall be selected that provide suitable stabilization and value for wildlife. Trees, shrubs and grasses native to the area are preferred.

33.2702 The applicant shall present justification for the necessity and feasibility for use of a bank with a slope greater than 2:1 (horizontal to vertical).

33.2703 The area to be revegetated should be protected from excessive livestock grazing or other activities that would hinder plant development.

33.2704 Additional requirements will have to be met for stabilization of the outer face of a dike (see standards for dikes [33.21]).

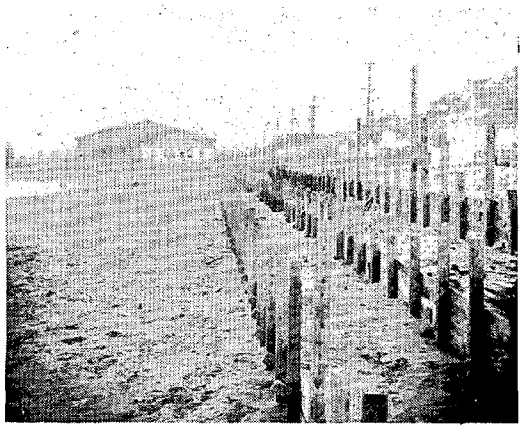
33.2705 Rip-rap in ***Natural Aquatic*** and ***Shoreland*** areas shall be allowed only if needed to protect existing uses, unique natural resources, historical or archaeological sites, and if other land use management measures or non-structural shoreline stabilization measures are inadequate. Adverse impacts on water currents, erosion and shoaling patterns shall be minimized.

33.2706 Good engineering and construction practices shall be used in the placement of rip-rap, with regard to slope, size, composition and quality of material, excavation of the toe trench, placement of a gravel fill blanket and operation of equipment in the water. State and federal agency regulations should be consulted in this regard.

33.2707 Shoreline protection measures shall not restrict existing public access to public shorelines.

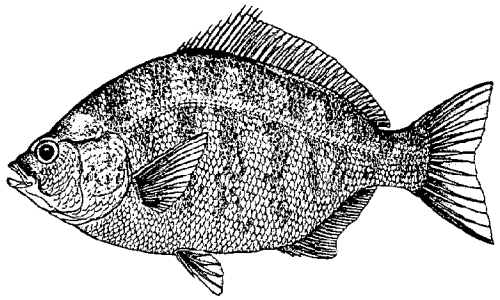
33.2708 Shoreline protection measures should be designed to minimize their impacts on the aesthetic qualities of the shoreline.

33.2709 Bankline protection is not in itself a way to increase land surface area. Where an avulsion has occurred, fill may be used to restore the previous bankline, so long as the corrective action is initiated within one year of the date of the avulsion. Any extension of the bankline into traditional aquatic areas shall be subject to the standards for fill. Disruption of tidal marsh, tidal flat and productive subtidal areas shall be minimized.



- *Port of Astoria Photo*

Amphistichus rhodoterus Redtail Surfperch



- *Ron Pittard - Searep Studio, courtesy Clatsop County*

33.2710 Construction of shoreline protection measures shall be coordinated with state and federal agencies and local interests to minimize the effects on aquatic resources and habitats. Relevant state and federal water quality standards shall be met. Stream channelization should be avoided.

33.2711 Bulkheads shall be designed and constructed in such a manner so that they will not result in adverse effects (such as erosion, shoaling, reflection of wave energy or interference with sand transport) on adjacent shoreline areas. State and federal agency regulations concerning construction in water shall be adhered to.

33.2712 Emergency repair to shoreline stabilization facilities is permitted, not withstanding the other regulations in these standards, subject to those standards imposed by the Oregon Division of State Lands and the U.S. Army Corps of Engineers.

33.2713 In Washington, construction of a normal protective bulkhead common to a single family dwelling is exempted from the requirement for a Shoreline Substantial Development Permit. The conditional use procedure is waived for these bulkheads in all environments. However, its design must meet the standards enumerated above. Common to a single family dwelling residence shall mean that the residence is existing or will be built within six months after placement of the bulkhead.

34.

THE MANAGEMENT SYSTEM AND DEVELOPMENT STANDARDS

IN LOCAL ORDINANCES

34.10 OREGON

Oregon jurisdictions will utilize Tables 33-1, Aquatic Areas Permitted Uses/Activities, and 33-2, Shorelands Permitted Uses/Activities, and the Development Standards (Section 33 above) to update ordinances which implement the comprehensive plan. Implementing ordinances vary among jurisdictions, depending on other plan needs and administrative capabilities. Thus, the CREST Management System and Development Standards will be used in a variety of ways.

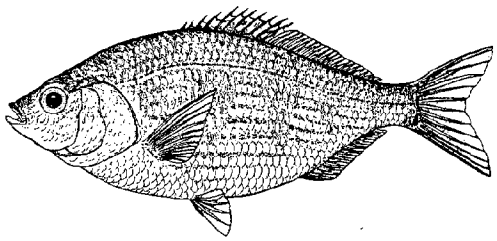
The land and water use designations established by CREST can be implemented directly as zones, subdivided into more than one zone for a given designation, or combined with other zones. Certain use categories may be disaggregated and standards expanded by individual jurisdictions to meet their needs. CREST recommends that uses be directly controlled through traditional land use procedures (local permits) and activities controlled with special ordinance procedures that provide for local review and consistency findings on state and federal permits. This minimizes duplication of local, state and federal permits.

Activities listed on the Permitted Uses/Activities Tables 33-1 and 33-2 have corresponding state and federal permits which must be consistent with the local plan and implementing ordinances. All activities except vegetative shoreline stabilization, bulkhead shoreline stabilization (where not also filling) and piling/dolphin installation are regulated at the state level under the Oregon State Removal/Fill Law (ORS 541.605 to 541.695). Federal permits from the Corps of Engineers (Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act) are required for all the activities listed except vegetative bank stabilization. Local application of ordinance standards for these activities should be through the local consistency review of the appropriate state and/or federal permit.

Certain uses, such as energy facility siting, salmon hatcheries and drilling for oil, gas or geothermal energy, also require a state permit where local plan and ordinance consistency review would be required, in addition to the local land use permit. It should also be noted that any given project may be required to meet the standards for several use/activity categories. A marina (use) where dredging (activity), filling (activity), and piling installation (activity) is required serves as an example; standards from each category apply.

General procedures for consistency review of state and federal permits are outlined under Federal Consistency in Implementation, Part VII, 73.20, Coordination with the Department of Land Conservation and Development, the Oregon Division of State Lands, the Army Corps of Engineers, and other state permit-granting agencies will be necessary to make this system work. The proposed system is consistent with the Land Conservation and Development Commission administrative rule on State Permit Consistency and LCDC-adopted Federal Consistency procedures.

Cymatogaster aggregata Shiner Perch



- Ron Pittard - Searep Studio, courtesy Clatsop County

34.20 WASHINGTON

Washington jurisdiction will utilize the Permitted Use/Activity Tables (Tables 33-1 and 33-2) and the Development Standards (Section 33 above) to update regulations in their Shoreline Management Master Programs. Existing regulations vary among counties and cities and the CREST material will help standardize regulations for all areas along the Columbia River Estuary. The existing regulations are also more complete and thorough for some uses; appropriate detail from those regulations should be retained.

The revised regulations will be the basis for decisions on local Substantial Shoreline Development Permits and Conditional Use Permits. Where there is a corresponding federal license or permit, the local permit decisions will be used as the basis of the Department of Ecology's federal consistency determination. Hydraulics permits, issued by the Departments of Game and Fisheries, must also be obtained for many of the activities listed in the standards. This process has been operating for several years.

PART IV

LAND AND WATER USE PLAN

40. BACKGROUND AND SUMMARY ..... IV - 3

41. LOWER RIVER AND ISLANDS ..... IV - 9

41.01 Mouth of Columbia River ..... IV - 11
41.02 Estuary Channels ..... IV - 13
41.03 Estuary Sands ..... IV - 14
41.04 River Channels ..... IV - 15
41.05 Snag Islands ..... IV - 16
41.06 Cathlamet Bay ..... IV - 17
41.07 Upper Marsh Islands ..... IV - 17
41.08 Tenasillahe Island ..... IV - 18
41.09 Fort Stevens State Park ..... IV - 19

42. YOUNGS BAY - ASTORIA ..... IV - 21

42.01 Hammond ..... IV - 23
42.02 Tansy Point - Alder Cove ..... IV - 26
42.03 North Warrenton ..... IV - 27
42.04 Upper Skipanon River ..... IV - 30
42.05 Middle Skipanon River ..... IV - 32
42.06 Mouth of Skipanon River ..... IV - 34
42.07 Youngs Bay ..... IV - 38
42.08 Airport ..... IV - 42
42.09 Lewis and Clark River ..... IV - 44
42.10 Miles Crossing ..... IV - 46
42.11 Youngs River ..... IV - 48
42.12 South Astoria ..... IV - 51
42.13 Port of Astoria ..... IV - 52
42.14 Downtown Astoria Waterfront ..... IV - 54
42.15 Uppertown - Alderbrook ..... IV - 56
42.16 Tongue Point ..... IV - 58
42.17 Lois and Mott Islands ..... IV - 62

43. EASTERN CLATSOP ..... IV - 63

43.01 John Day River ..... IV - 67
43.02 John Day Point - Settlers Point ..... IV - 69
43.03 Settlers Point East to Ivy Station ..... IV - 70
43.04 Svensen Island ..... IV - 72
43.05 Ivy Station - Big Creek ..... IV - 73
43.06 Big Creek - Little Creek ..... IV - 74
43.07 Fertile Valley ..... IV - 76
43.08 Mouth of Blind Slough ..... IV - 77
43.09 Gnat Creek ..... IV - 79
43.10 Brownsmead ..... IV - 80
43.11 Clifton Channel ..... IV - 82
43.12 Bradwood ..... IV - 83
43.13 Wauna/Westport ..... IV - 84

44. WAHKIAKUM ..... IV - 87

44.01 Puget Island ..... IV - 90
44.02 Eastern Wahkiakum County ..... IV - 92
44.03 Cathlamet and White-tailed Deer Refuge ..... IV - 94
44.04 Skomokawa to Three Tree Point ..... IV - 97
44.05 Three Tree Point to Harrington Point ..... IV - 99
44.06 Grays Bay and Tributaries ..... IV - 101

45. BAKER BAY ..... IV - 105

45.01 Knappton/Frankfort ..... IV - 107
45.02 McGowan ..... IV - 109
45.03 Chinook ..... IV - 110
45.04 Chinook River ..... IV - 112
45.05 Baker Bay ..... IV - 114
45.06 Wallacut River ..... IV - 117
45.07 Ilwaco ..... IV - 118
45.08 Fort Canby North ..... IV - 120
45.09 Cape Disappointment ..... IV - 121

40. BACKGROUND AND SUMMARY

A plan for the use of estuary shoreland and water areas was an optional work task when the CREST program was established in early 1975. In mid-1976, the **Land and Water Use Plan** was made the central focus of the CREST work program because most conflicts dealt with specific land and water use issues and because local jurisdictions were required to respond to state coastal management program requirements.

THE ESTUARY PLANNING AREA

The Columbia River estuary planning area includes aquatic areas and shorelands from the 3-mile limit offshore, upstream to the end of Clatsop County in Oregon (RM 45) and Wahkiakum County in Washington (RM 53). All tributary streams to the head of tide and adjacent shorelands are part of the estuary planning area.

The estuary is divided into five planning areas and 54 subareas. Both biophysical and jurisdictional information were used in establishing planning boundaries. A precise geographic definition is given in the introductory section of each planning area or subarea. Technical definitions of aquatic areas and shorelands are found in 31.10 and 31.20 respectively.

THE PLANNING PROCESS

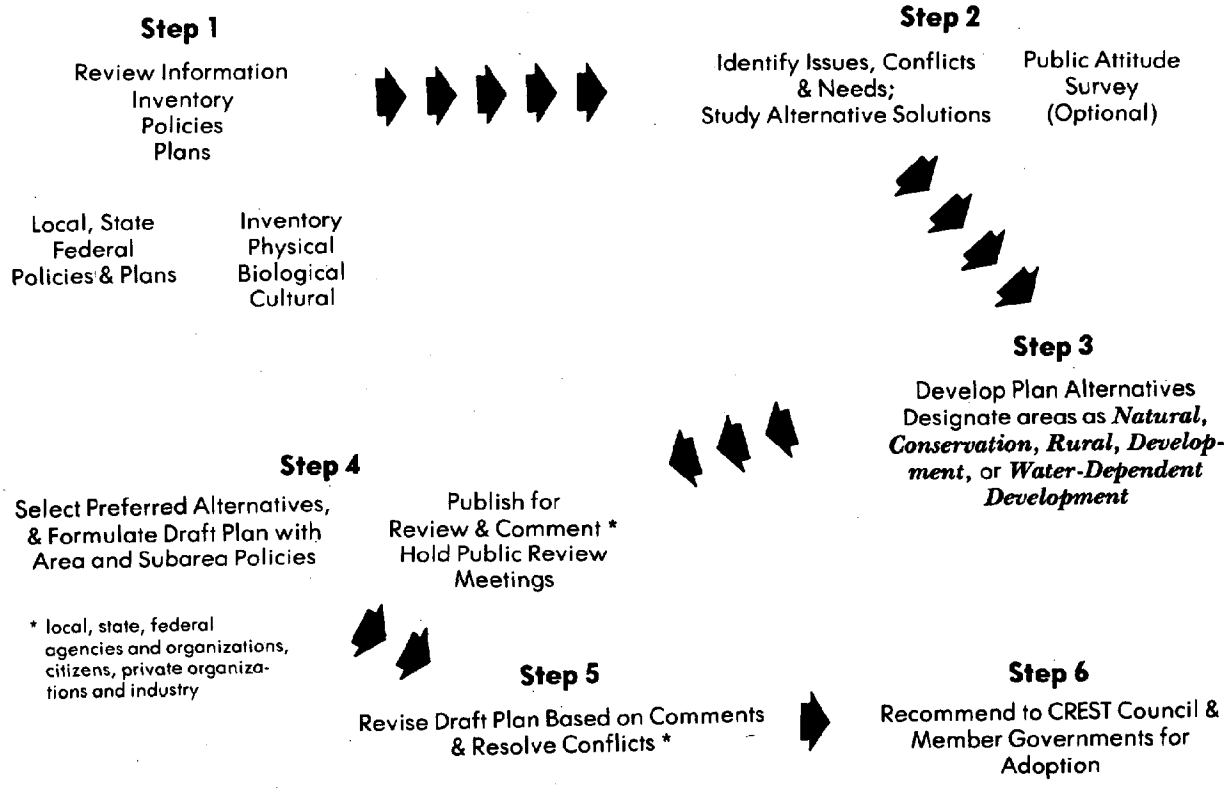
CREST defined its land and water use planning process and established roles for local governments, citizens, state and federal agencies in December, 1976. With minor variations, the same basic planning process was followed for each area. An area planning committee was selected (cf. Appendix D for committee members), an educational phase conducted, a draft plan developed, public and agency review conducted and conflicts resolved.

A conflict resolution period extending from December, 1978 to June, 1979 provided the opportunity to resolve disagreements over plan policies and area use designations. Conflicts were defined as a substantive disagreement with a draft plan policy or area use designation (type of designation or specific boundaries) which was identified by a private individual, group of citizens, local government, state or federal agency, or business or industrial concern. Comments on the draft plans were used to identify these conflicts.

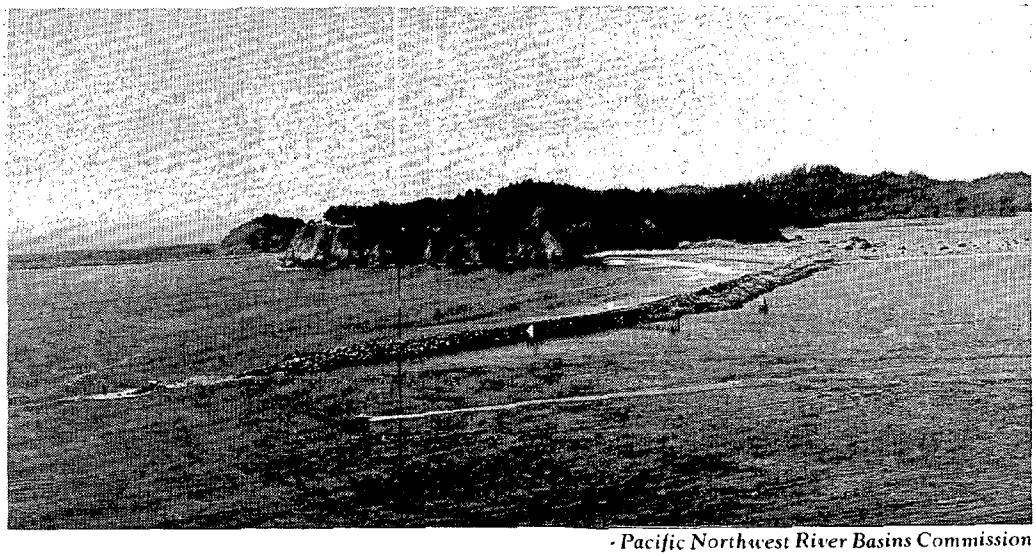
Many conflicts were resolved by CREST working with local jurisdictions and the dissenting party.

Major conflicts over areas that might be subject to

LAND AND WATER USE PLANNING PROCESS



development pressures in the future required special meetings. Two all-day conflict resolution sessions were held to work on conflicts in Astoria and Warrenton. One day sessions were held for Eastern Clatsop County, Baker Bay and Wahkiakum County. A final conflict resolution meeting to discuss the regional balance of development and preservation was also held. Where a consensus on a given issue could not be achieved, the CREST Council made a decision, generally in favor of what the local jurisdiction desired. Major conflicts where a consensus was not achieved included residential development at Tansy Point (cf. 42.02), the potential for estuarine alterations on both spits at the mouth of the Skipanon (cf. 42.06), the extent of potential development at Tongue Point (cf. 42.16), dredged material disposal at Westport (cf. 43.13), the potential development of forested wetlands west of Cathlamet (cf. 44.03) and the potential for deep water port development at Price Island (cf. 44.03). Should conflicts in these or other areas continue to be pursued by agencies, local governments or others, the decision on each issue will rest with the Oregon Land Conservation and Development Commission as they consider acknowledgement of local comprehensive plans or with the Washington Department of Ecology as they consider approval of shoreline management program amendments.



Pacific Northwest River Basins Commission

PLAN OVERVIEW AND CUMULATIVE IMPACTS

The Columbia River Estuary Regional Management Plan is a detailed plan for the use, protection and development of estuarine and adjacent shoreland resources. The plan provides policies, development standards, and land and water use designations which will give long term protection to ninety three percent of estuarine waters and wetlands, while providing the opportunity for marine related expansion of the regional economy. The plan also identifies and protects important shoreland forest, agriculture and recreation resources while providing appropriate areas for future industrial, commercial and residential development. Areas to place dredged material and restoration projects are included.

The aquatic portion of the planning area includes approximately 120,600 acres of deep water areas, tidal marsh, mud and sand flats, sloughs and tidal reaches of tributary streams. This aquatic area is divided into 78,000 acres of waters (areas deeper than -3' MLLW) and 42,600 acres of wetlands (areas from -3' MLLW up to the line of non-aquatic vegetation).

The water areas of the estuary are important habitat for phytoplankton, zooplankton, and fishes. The channels are the primary upstream migration route for adult salmon and steelhead returning to spawn and the sandy bottom is valuable habitat for epibenthic fishes, shrimp and other aquatic life. Water areas are important for commercial gillnet and recreational fishing and serve a vital log transport and storage function for the forest products industry. Deep and shallow draft channels that require periodic maintenance dredging and navigational structures such as jetties and pile dikes are the major development features in water areas. Approximately ninety one percent, 70,700 acres, of the water area of the estuary is designated ***Conservation*** to provide for utilization of fishery and other resources and to allow other low intensity water oriented uses. Less than one percent is ***Natural*** and less than one percent is ***Rural.*** Approximately nine percent, 7,000 acres, of the water area of the estuary is ***Development***, mostly in the main ship channel, existing side channels and turning basins. Portions of these areas are periodically dredged to maintain navigability. Water areas where new dredging and limited filling might occur include the entrance to the Skipanon River, Tongue Point and Wauna/Westport. In-water dredged material disposal sites, designated ***Development*** for that purpose only, are mostly related to maintenance of the main ship channel.

The 42,600 acres of wetlands in the Columbia River estuary consist mostly of highly productive freshwater tidal marshes, shrub and forested wetlands, fine sediment flats of Baker Bay, Youngs Bay, Grays Bay and Cathlamet Bay, and the mid-estuary sand flats. These diverse wetlands are vital components of the estuarine ecosystem. The marshes account for a large proportion of estuary primary plant production and food for organisms higher on the food chain. The marshes, shrub and spruce swamps are also highly valuable habitat for many varieties of fish, waterfowl, other birds, small mammals, big game and many less conspicuous animals. The marshes and mudflats play critical roles in recycling of nutrients and minerals in the estuary's ecosystem. Mud and sand flats in protected areas harbor dense populations of amphipods, copepods, worms, small clams and other bottom dwelling organisms, many of which play an important role in feeding large numbers of downstream migrant juvenile salmon making the transition to marine life. Other juvenile and small fishes also find food and shelter in wetland areas.

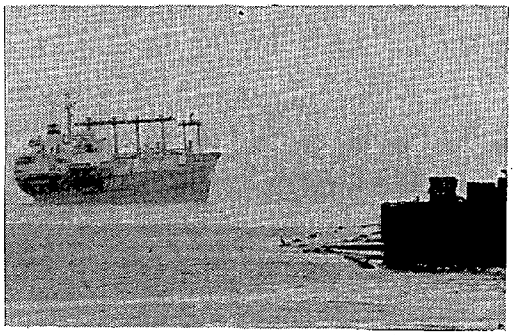
Approximately eighty five percent of the wetland areas of the estuary are designated ***Natural*** and will receive the highest level of resource protection. An additional twelve percent of wetland areas are ***Conservation,*** where only small scale alterations might be permitted under certain conditions. Of the remaining wetlands, 599 acres (1.4%) are designated ***Rural*** (mostly associated with agriculture activities) and 680 acres (1.6%) are designated ***Development.***

The wetlands and waters designated ***Development*** will be the only portions of the estuary where major alterations such as dredging and filling will be permitted. The ***Development*** designations are provided for navigation and other water dependent uses such as ports, marinas and recreation facilities. However, the designations do not imply that dredging, filling or other alterations will automatically be permitted. Specific proposals for water dependent development must meet all requirements of the local, state and federal permit processes.

Seven areas have potential for deep water port or industrial development in the estuary planning area. These include Tansy Point (cf. 42.02), the east and west spits of the Skipanon (cf. 42.06), existing and proposed port facilities at Smith Point in Astoria (cf. 42.13), Tongue Point (cf. 42.16), Price Island (cf. 44.03), Bradwood (cf. 43.12), and Wauna/Westport (cf. 43.13).

"I see in you the estuary that enlarges and spreads itself grandly as it pours in the great sea."

WALT WHITMAN



John Atkinson

Shallow draft oriented development may occur at Ilwaco (cf. 45.07), Chinook (cf. 45.08), Hammond (cf. 42.01), the Skipanon River (cf. 42.05, 42.06), Lewis and Clark River (cf. 42.09), Youngs Bay and River (cf. 42.07, 42.11), Grays Bay (cf. 44.06), Skamokawa (cf. 44.04), and the Elochoman Slough (cf. 44.03). Natural shallow draft channels exist throughout the estuary.

There are more than 54,000 acres of shoreland area surrounding the estuary. Much of this is low-lying diked marsh area with tideland soils, once productive estuarine tidal marshes. Now used primarily as pasture for beef and dairy cattle, these areas are designated ***Rural*** and include about 24,600 acres, forty five percent of the total shoreland area. Approximately 4.2% of shorelands are designated ***Natural*** and over forty percent are ***Conservation. Natural Shorelands*** will be preserved for wildlife and low intensity recreation, while ***Conservation Shorelands*** will be used for timber production, recreation and wildlife management. The remaining ten percent of shoreland areas are set aside for intensive development. Almost 3500 acres (6.4%) are designated ***Development*** to provide for a mixture of residential, commercial and industrial needs. 1950 acres (3.6%) are ***Water Dependent Development Shorelands*** and will be reserved for water-dependent uses through application of zoning criteria.

The most intensively developed areas in the estuary are in the Astoria-Warrenton region. With rail and highway transportation access, public facilities, water access, and existing development, this area has the greatest potential for growth, particularly that which is oriented toward the river and its deep and shallow draft channels. Other centers of potential development include Ilwaco, Chinook, Hammond, Cathlamet and Westport.

The cumulative impacts of potential alterations provided for in the *Columbia River Estuary Regional Management* plan are difficult to assess because specific projects are not supported or opposed in this plan. However, the plan restricts major alterations to very limited areas and protects vital estuarine resources. Adequate options to mitigate the adverse impacts of dredging and filling wetlands in Oregon are also available. While dredged material disposal sites appear adequate to handle foreseeable needs, disposal options will become a limiting factor of expansion of marine related development, both in the estuary and upriver to Portland.

CUMULATIVE SURFACE AREAS OF PLANNING DESIGNATIONS

CREST PLANNING REGION

DESIGNATION	WATERS		WETLANDS		SHORELANDS	
	Acres	% Waters	Acres	% Wetlands	Acres	% Shorelands
NATURAL	88	0.1%	36,016	84.6%	2,259	4.2%
CONSERVATION	70,719	90.7%	5,269	12.4%	21,790	40.3%
RURAL	208	0.3%	599	1.4%	24,604	45.5%
DEVELOPMENT	7,039	9.0%	680	1.6%	3,455	6.4%
WATER DEPEND-END DEV.					1,950	3.6%
TOTAL	78,054		42,564		54,058	
% of 174,676 Acres in Region		44.7%		24.4%		30.9%

41. LOWER RIVER AND ISLANDS

DESIGNATION	WATERS		WETLANDS		SHORELANDS	
	Acres	% Waters	Acres	% Wetlands	Acres	% Shorelands
NATURAL			23,343	100%	341	2.5%
CONSERVATION	52,690	92.3%			13,078	97.5%
RURAL						
DEVELOPMENT	4,413	7.7%				
WATER DEPEND-ENT DEV.						
TOTAL	57,103		23,343		13,419	
% of 93,865 Acres in 41.		60.8%		24.9%		14.3%

42. YOUNGS BAY — ASTORIA

DESIGNATION	WATERS		WETLANDS		SHORELANDS	
	Acres	% Waters	Acres	% Wetlands	Acres	% Shorelands
NATURAL	18	0.3%	2,461	56.6%	120	1.3%
CONSERVATION	3,458	64.6%	1,527	35.1%	604	6.4%
RURAL	127	2.4%			6,180	65.3%
DEVELOPMENT	1,754	32.7%	361	8.3%	1,677	17.7%
WATER DEPEND-ENT DEV.					886	9.4%
TOTAL	5,357		4,349		9.467	
% of 19,168 Acres in 42.		27.9%		22.7%		49.4%

43. EASTERN CLATSOP

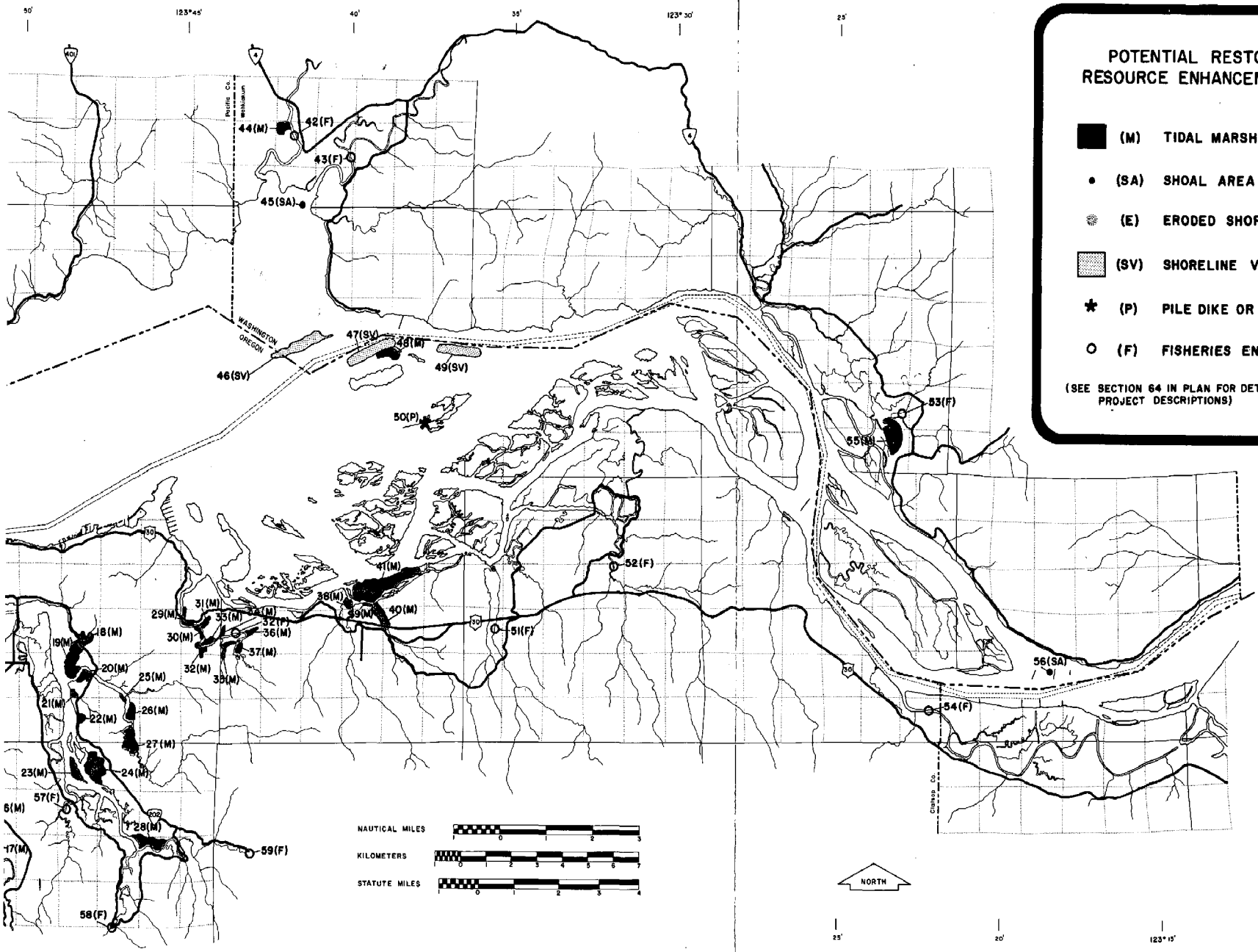
DESIGNATION	WATERS		WETLANDS		SHORELANDS	
	Acres	% Acres	Acres	% Wetlands	Acres	% Shorelands
NATURAL	70	3.5%	518	17.9%		
CONSERVATION	1,813	90.6%	1,851	63.9%	1,244	23.1%
RURAL			452	15.6%	3,470	64.4%
DEVELOPMENT	119	5.9%	76	2.6%		
WATER DEPEND-ENT DEV.					672	12.5%
TOTAL	2002		2,897		5,386	
% of 10,285 Acres in 43.		19.5%		28.2%		52.4%

44. WAHKIAKUM

DESIGNATION	WATERS		WETLANDS		SHORELANDS	
	Acres	% Waters	Acres	% Wetlands	Acres	% Shorelands
NATURAL			2,140	67.1%	1,655	9.1%
CONSERVATION	9,022	94.0%	1,025	32.2%	4,363	24.0%
RURAL	81	0.8%			10,574	58.6%
DEVELOPMENT	493	5.2%	22	0.7%	1,180	6.5%
WATER DEPEND-ENT DEV.					341	1.9%
TOTAL	9,596		3,187		18,113	
% of 30,896 Acres in 44.		30.8%		10.3%		58.4%

45. BAKER BAY

DESIGNATION	WATERS		WETLANDS		SHORELANDS	
	Acres	% Waters	Acres	% Wetlands	Acres	% Shorelands
NATURAL			7,554	86.0%	143	1.9%
CONSERVATION	3,736	93.5%	866	10.0%	2,501	32.6%
RURAL			147	1.7%	4,380	57.1%
DEVELOPMENT	260	6.5%	221	2.5%	598	7.8%
WATER DEPEND-ENT DEV.					51	0.7%
TOTAL	3,996		8,788		7,673	
% of 20,457 Acres in 45.		19.5%		43.0%		37.5%



POTENTIAL RESTORATION AND RESOURCE ENHANCEMENT PROJECTS

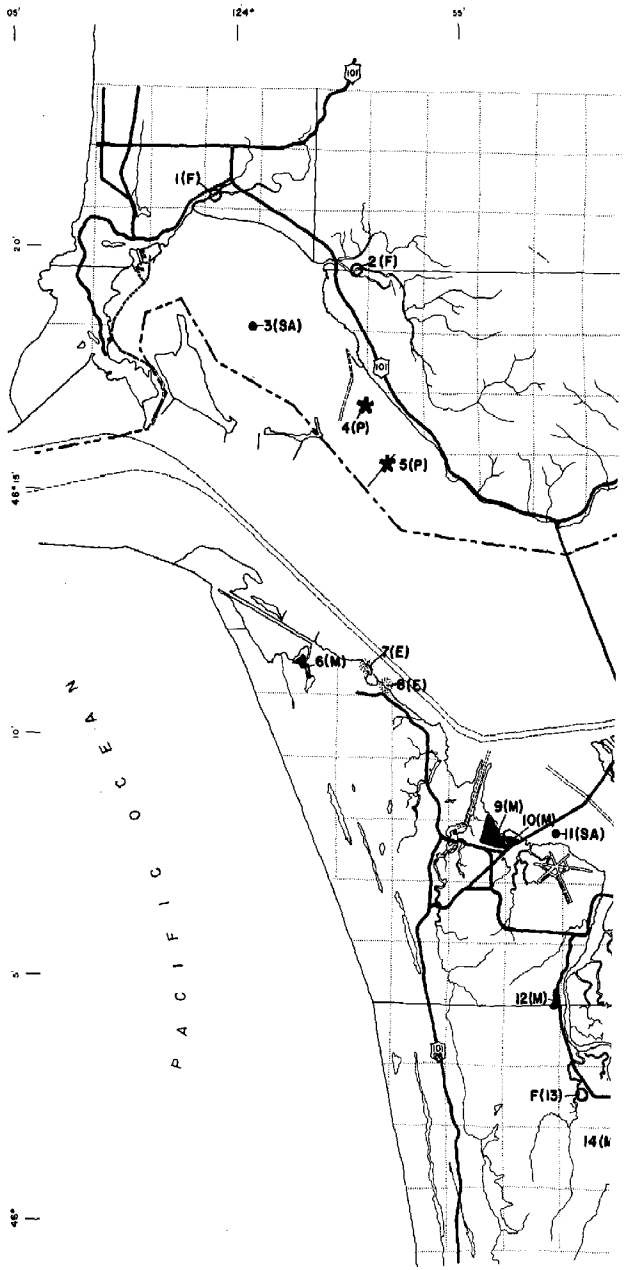
- (M) TIDAL MARSH RESTORATION
- (SA) SHOAL AREA RESTORATION
- (E) ERODED SHORELINE RESTORATION
- (SV) SHORELINE VEGETATION
- (P) PILE DIKE OR PILING REMOVAL
- (F) FISHERIES ENHANCEMENT

(SEE SECTION 64 IN PLAN FOR DETAILS OF SITE OR PROJECT DESCRIPTIONS)

CREST

COLUMBIA RIVER ESTUARY STUDY TASK FORCE

FIGURE


05'
124°
55'
20'
15'
10'
5'
45°
101
1(F)
2(F)
3(SA)
4(P)
5(P)
6(M)
7(E)
8(E)
9(M)
10(M)
11(SA)
12(M)
F(13)
14(M
PACIFIC OCEAN

41. LOWER RIVER AND ISLANDS PLAN

THE PLANNING AREA

The Lower River and Islands planning area extends from the offshore three-mile limit to the upstream end of Tenasillahe Island and includes most of the aquatic areas of the estuary. The only shorelands are at Fort Stevens State Park, on Tenasillahe Island and on several dredged material disposal islands. The main navigation channel of the Columbia River, the lower, mid and upper estuary sand flats, the expansive tidal marshes and forested wetlands of Cathlamet Bay, and the intricate network of deep and shallow channels are major parts of this planning area. Much of this area is included in the 35,000 acre Lewis and Clark National Wildlife Refuge and a portion of the Columbian White-tailed Deer National Wildlife Refuge. Detailed descriptions of aquatic and shoreland features are given in each subarea plan.

With the exception of small areas along the eastern water portion of Pacific County and along the western water portions of Wahkiakum County, the entire planning area is within the State of Oregon.

The great majority of the area is under the local planning and regulatory authority of Clatsop County. Small portions of Pacific and Wahkiakum Counties are included in the northern fringe, and small portions of Hammond, Warrenton and Astoria are included on the southern edge of the area between river miles 7 and 18. State and federal agencies play the most significant management and regulatory role in this planning area.

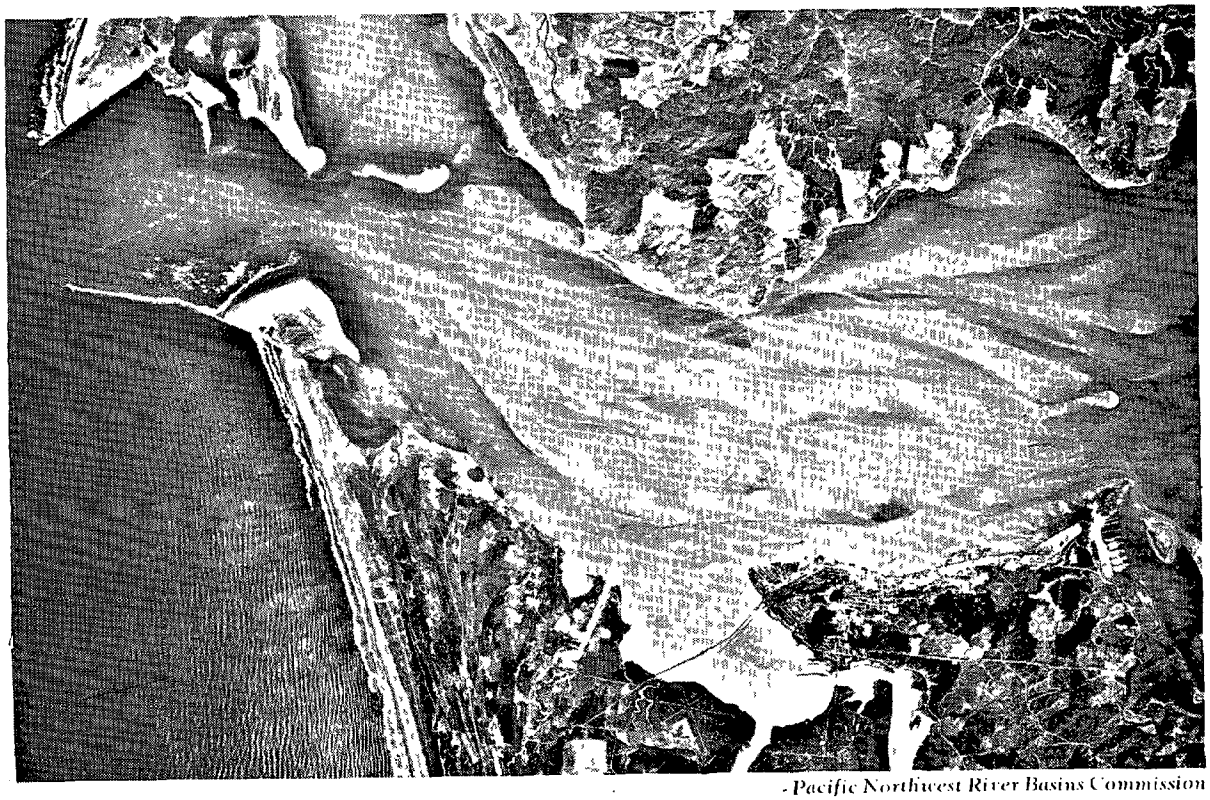
MAJOR ISSUES AND DECISIONS

Major issues, identified through responses to a widely-distributed questionnaire, included navigation-related issues such as dredging, dredged material disposal, shoaling and erosion, the effects of log storage on water quality and commercial fishing areas, management, public access and recreational use of the wildlife refuges, and the impacts of development upriver and in adjacent planning areas. These issues are addressed by a variety of regional (cf Section II), area and subarea policies.

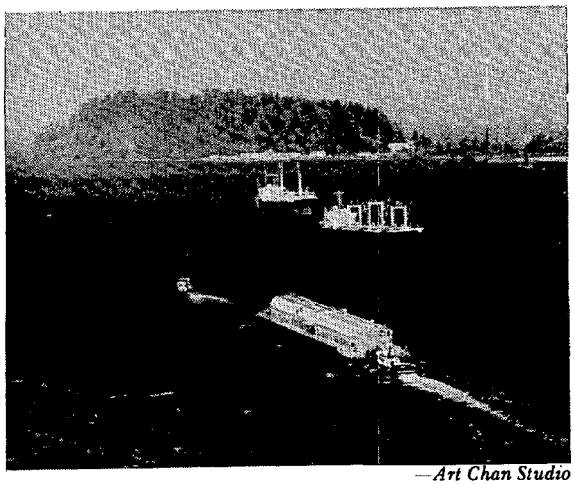
The most important feature of this planning area is the almost complete absence of developed or developable shorelines. Waters and wetlands predominate and, with the exception of Youngs, Baker and Grays Bays, this management unit contains most of the aquatic areas of the estuary.

The *Lower River and Islands Plan* provides for natural resource protection, particularly in Fort Stevens State Park and the Lewis and Clark and Columbian White-tailed Deer National Wildlife Refuges. Recreation and public access to these areas and the maintenance and improvement of navigational projects in the river also have received a high priority in this plan.

Wetland areas (including tidal marshes, forested wetlands and tidal flats) are designated ***Natural,*** unless the past history, existing uses or designations of adjacent areas renders this in appropriate. This designation complies with the statement in the Oregon Estuarine Resources Goal (Number 16) that



-Pacific Northwest River Basins Commission



—Art Chan Studio

the ***Natural*** "areas shall include, at a minimum, all major tracts of salt marsh, tideflats, and seagrass and algae beds." The term "salt marsh" is specifically interpreted here to include the tidal marshes of the Columbia River, even though salt water may be absent during part of all of the year. This designation is also consistent with the Washington State Shoreline Management Act requirements to preserve the natural character of the shorelines, and to protect the ecology and resources of the shoreline by leaving areas that contain a unique or fragile natural resource undeveloped, and by restricting or prohibiting public access to areas which cannot be maintained in a natural condition under human use.

Water areas, except the navigation channels, dredged material disposal sites and sites adjacent to major shoreland developments, are classified ***Conservation.*** The purposes of ***Conservation*** areas in both states are long-term use of renewable resources, recreation, aesthetic enjoyment and ecosystem support. The ***Conservation*** designation is consistent with boating, commercial and recreational fishing, and navigational use not requiring major alterations.

Navigation channels are designated ***Development,*** consistent with the Oregon Estuarine Resources Goal and the Washington Shoreline Management Act guidelines. Designation of dredged material disposal sites is according to the long-term use of each site. In-water dredged material disposal sites were designated ***Conservation*** with a ***Development*** overlay for dredged material disposal. This is consistent with the specific requirements of the Estuarine Resources Goal that "navigation channels (and) sub-tidal areas for in-water disposal of dredged material" be designated ***Development.*** All the land disposal sites designated in this management unit are in the wildlife refuges and were therefore designated ***Conservation*** with a ***Development*** overlay for dredged material disposal, to indicate that major development should not occur in these areas after completion of dredged material disposal.

The shorelands included in Fort Stevens State Park are designated according to present and proposed recreational use and the need for resource protection. Tenasillahe Island is designated ***Conservation,*** consistent with refuge management activities.

AREA POLICIES

1. Public Access, Refuge Management, and Preservation of Wildlife Habitat

Additional shoreline access points in the areas adjacent to the Lewis and Clark Wildlife Refuge and Tenasillahe Island portion of the Columbian Whitetailed Deer Refuge should be considered and reviewed on the basis of their impacts on the site and the refuge. Existing access points should be maintained and improved consistent with refuge management.

Except in the area noted above, additional public access points should be developed consistent with recreational and commercial demands and needs.

Existing hunting and fishing shacks in the wildlife refuges may continue to be used by the present owner, but may not be sold. New shacks may not be built. Eventually, all shacks will be removed. This is in accord with U.S. Fish and Wildlife Service refuge management policy.

2. Off-Road Vehicles

Off-road and all-terrain vehicles are permitted only in those areas specifically designated for their use. This policy is particularly applicable to the Clatsop Spit area, where damage to dune and wetland vegetation has been a chronic problem.

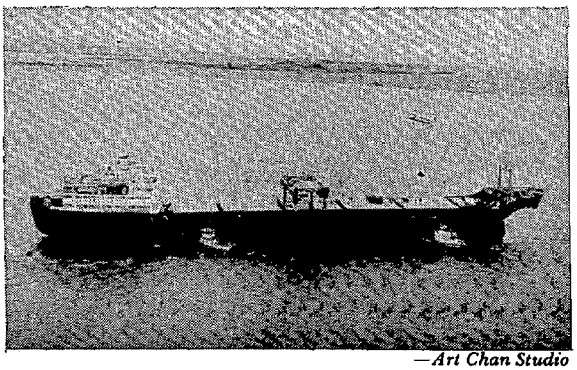
3. Log Storage

Existing log storage in wetland sites (aquatic areas less than 3 feet below MLLW) may continue, unless there is evidence that more than nominal damage to aquatic life or water quality is occurring, in which case they should be phased out. Log storage sites in wetland areas and those requiring maintenance dredging should be the first to be phased out, if the demand for log storage sites decreases. New log storage sites in wetlands will not be permitted.

Maintenance dredging of existing log storage sites and replacement of pilings and dolphins is permitted. Research on the effects of log storage in the Columbia River is strongly encouraged.

4. Dredged Material Disposal at Area D and Tansy Point

The Area D and Tansy Point in-water dredged material disposal sites should be used only when weather and sea conditions render the use of disposal sites outside the Columbia River mouth hazardous.



—Art Chan Studio

41.01 MOUTH OF THE COLUMBIA RIVER

General Description

This subarea includes the North and South Jetties, the offshore waters west to the Columbia River Lightship (see attached map) and the estuary between the North and South Jetties and upstream to a line connecting Jetty A and Clatsop Spit (RM 3). It does not, however, include Clatsop Spit, Jetty A, the ocean beaches or other land areas. The subarea extends seaward of the three mile limit (state and county line) to the Columbia Lightship, to encompass productive areas outside the mouth of the estuary and Corps of Engineers dredged material disposal sites. Local governments have no regulatory authority outside the three mile limit, but these productive fishing grounds and the dredged material disposal sites there concern local governments. The subarea includes parts of both Clatsop and Pacific Counties.

Aquatic Features

The Mouth of the Columbia River (MCR) is the most physically dynamic area of the estuary. Tidal currents, fresh water flow, wind-driven currents, estuarine (density-driven) currents, waves, and coastal currents are all important. Currents and wave action combine to make navigation notoriously difficult. The sediment is almost entirely fine sand inside the mouth and in the adjacent offshore area. Some silt is found further offshore and to the south of the South Jetty. Outside the mouth, sediment is transported by wind-driven currents and waves. Large storms capable of moving sand in suspension transport most of the sediment. The dominant direction of sediment transport is north. From the bar inward, however, tidal, estuarine and river flow effects become much more important. Upstream bottom currents bring sand into the estuary from the ocean during low-flow periods. Sand transport is seaward during high-flow periods. The overall yearly balance and the effect of storms are not known. The geometry of the area has been extensively altered by the installation of jetties and continued dredging.

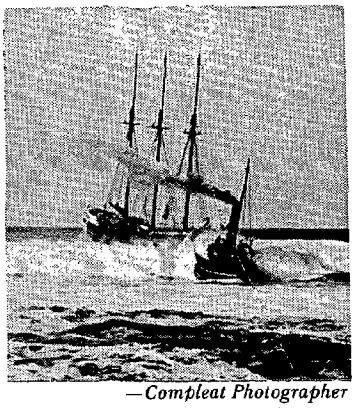
Important commercial crab and shrimp fisheries are located outside the mouth, while the recreational crab fishing is important inside the jetties. The densities of other sampled benthic invertebrates are not high. Many fish species use the area for migration, and important sports and troll salmon fisheries exist. Important shore fisheries are located on Jetty Sands and the North and South Jetties. Primary (phytoplankton) and secondary (zooplankton) productivity is very high in this area and seaward of it for several miles - the highest plankton productivity in the entire estuary.

Shoreland Features

The only shorelands are the North and South Jetties, which are constructed of rock and rubble mound.

Human Use

The MCR area contains the downstream end of the authorized navigation channel (48 feet deep and 1/2 mile wide to RM 3 and 40 feet deep and 600 feet wide upstream from that point). The channel is stabilized by the South Jetty, the North Jetty and Jetty A, and maintained by hopper dredge. The average amount dredged from MCR is about 5 to 6 million cubic yards per year, but is widely variable. The offshore disposal sites (areas A, B, E and F) are in the outer portions of this area. Two in-water estuary sites (area D and Tansy Point in the Estuary Channels subarea) are also used. Recreational use of the waters by small boats is high, and the view from the North or South Jetties or Cape Disappointment is spectacular. Commercial fishing use is intensive throughout the year.



—Compleat Photographer

Issues and Findings

The Corps of Engineers is currently studying the feasibility of deepening the entrance channel from 48 feet to 55 or 60 feet, repairing the existing jetties and constructing a new Jetty B parallel to and seaward of Jetty A. There is also the possibility of new or additional hopper dredge disposal sites. The desirability and cost-effectiveness of a deeper channel, the utility of the proposed Jetty B, and the disposal of dredged material in this highly productive area with its important fisheries are all at issue.

Peacock Spit has accreted north of the North Jetty and is part of Fort Canby State Park. In recent years, the spit has experienced erosion and Washington State Parks desires maximum disposal of dredged material at Area E, since this may feed the beach at Peacock Spit and retard erosion. The desirability of extensive disposal at Area E needs to be evaluated, particularly as it may affect the productive crab fishery in the area.

Aquatic Designations

All aquatic areas are ***Conservation,*** except dredged material disposal sites A, B, E and F, which are ***Development*** for that purpose only, and the navigation channel, which is ***Development.***

Shoreland Designations

The North and South Jetties* are designated ***Water Dependent Development.***

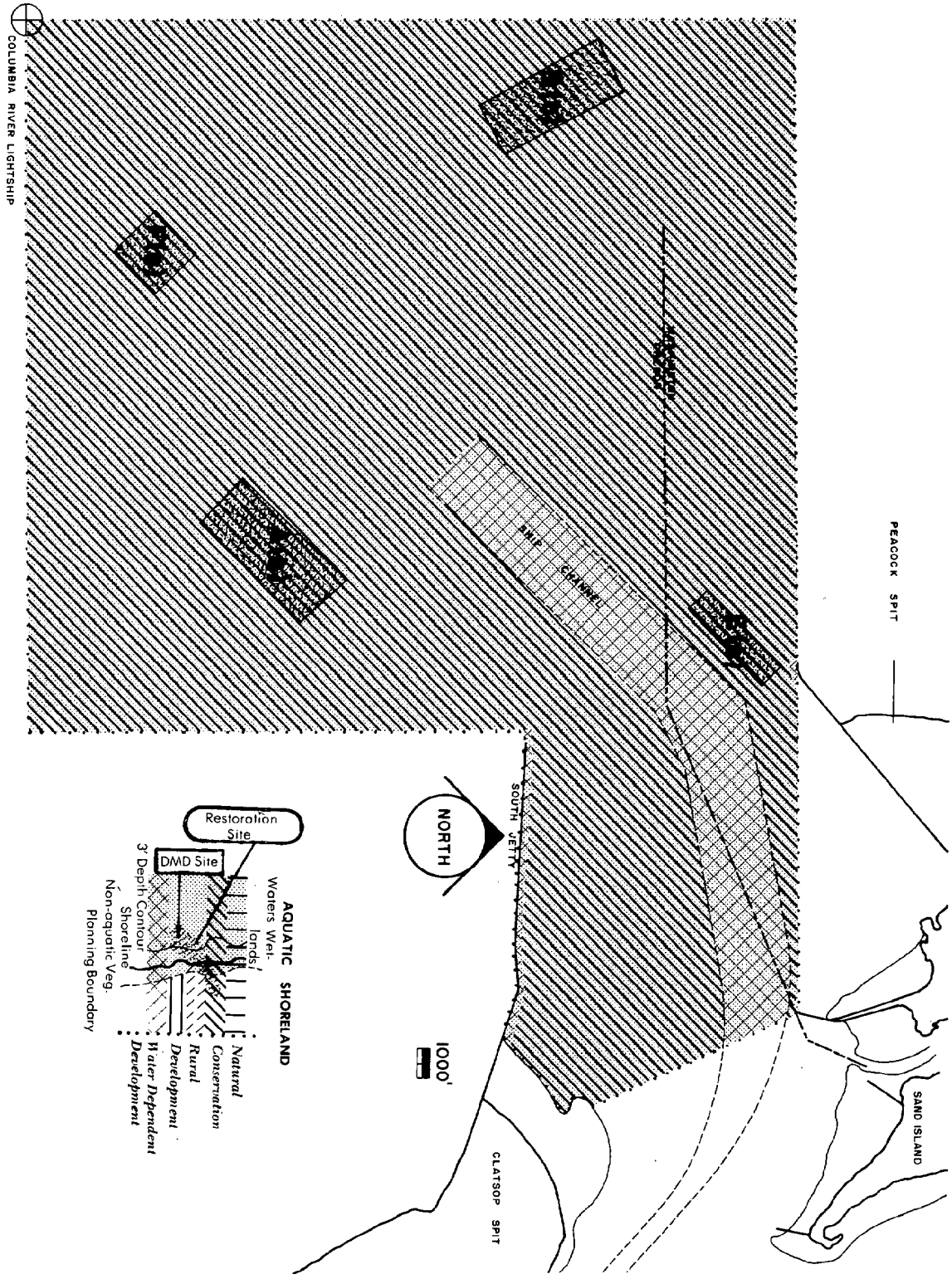
Dredged Material Disposal

There are four dredged material disposal sites in this subarea (Areas A, B, E and F). All are used for disposal of material from the Columbia River entrance channel and the lower river channel.

* Only part of the North and South Jetties are in this subarea. The rest of the North Jetty is in the Cape Disappointment subarea (45.09) and the South Jetty is discussed in the Fort Stevens subarea (41.09).

MOUTH OF THE COLUMBIA RIVER

SUBAREA 41.01



41.02 ESTUARY CHANNELS

General Description

This subarea includes the deep water portions (greater than 20 feet to 40 feet) of the estuary from Jetty A (RM 3) to the upper end of Rice Island (RM 22.5). These are the channels and the adjacent slopes. The subarea is not restricted to the authorized navigation channel, but includes the flow lanes of both the north and south channels. There are no wetland or shoreland areas. The jurisdictions in this subarea include Clatsop and Pacific Counties, the Cities of Astoria and Warrenton, and the Town of Hammond.

Aquatic Features

The limits of this area are approximately defined by the normal limits of salinity intrusion on high tide. Salt water does not normally penetrate beyond the upper end of Rice Island (although it has been observed as far upstream as Pillar Rock under unusually low flow conditions) and is usually seen along the bottom at least to Clatsop Spit (although the estuary may be entirely fresh on an ebb tide under high flow). Salt and fresh water mix (except under very high flow conditions) throughout this subarea.

Because of the very strong river flow, the channels contain sand almost exclusively and some dredging is required. The fine sediments (silts and clays) accumulate in the bays, and fine coarse sand accumulates on the estuary sand flats. The estuary has lost about 15% of its volume in the last century, largely in the flats and not in the continually dredged channels.

Under low flow conditions of less than 150,000 cfs, sediment transport is upstream in the south channel below Tongue Point and in the north channel below the Astoria Bridge. Net transport is downstream in the channel above Harrington Point under almost all flow conditions. The null zone or point of zero net sediment transport fluctuates from about Harrington Point to Clatsop Spit. Sediment transport may be in the downstream direction all the way to mouth under very high flow conditions, but present freshet levels are not sufficient to carry out to sea the sediment that enters from the ocean and the river during most of the year.

Benthic (bottom) productivity in these deep channels and slope areas is not high. However, the null zone effect allows an accumulation of particulate matter, and primary (algal) productivity is seasonally high, though probably lower than outside the mouth. The important species of estuary phytoplankton are almost all river (fresh water) forms, whereas the species in the offshore areas are coastal plankton common in the upwelling areas along the coast. There are characteristic estuarine zooplankton (animals) that feed on the phytoplankton and on particulate debris in the water. The estuarine populations of both phyto- and zooplankton are inherently unstable. Strong tides or a freshet can push the entire population of plankton out to sea and the populations may remain depressed for some time afterward; physical factors predominantly determine population levels. The estuary channels are extremely important as migration routes for anadromous fish.

Human Use

Navigation and associated dredging are the most prominent human activities in the ship channel, and dredged material disposal at selected sites. Waste disposal, principally from fish processing, is a lesser use. There are also gillnet drifts in and around the north and south channels and recreational fishing for salmon and sturgeon are important. Recreational crabbing occurs off Hammond and the Sand Islands.

Issues and Findings

In water disposal of dredged material is a major issue. Approximately 1.2 million cubic yards of dredged material are removed from this reach each year. Approximately 630,000 cubic yards of material (most originating from the river channels upstream from the estuary) are placed in the Harrington Point Sump by hopper dredge each year, and eventually placed by pipeline dredge on Rice Island (in the Estuary Sands subarea, 45.03). Between 700,000 and 1,000,000 cubic yards of material is deposited in Area D; this total has been declining and may be much smaller in the future. Use of the Tansy Point site is minor and irregular.

The overall filling trend in the estuary was discussed under Aquatic Features. The fate of the dredged material deposited in estuary disposal sites is a major concern. Much of the material may stay in the estuary, reentering channels or building up shoals in bays and flats marginal to the channels. Material placed in Area D, for example, may end up in Baker Bay, increasing the already severe shoaling and access channel maintenance problems there.

Aquatic Designations

The classification for the main navigational channel, the access channel to Tongue Point, the Port of Astoria Turning Basin, and mouth of the Skipanon River is ***Development.*** Other areas are ***Conservation.*** Designated dredged material disposal sites are ***Development*** for that purpose only and otherwise ***Conservation.***

Subarea Policy

The continued use of the Tansy Point site and Area D should occur (as per inter-agency agreement) only when weather and sea conditions render the use of disposal areas outside the mouth hazardous. New in-water sites in the estuary may be designated in the future and that use of Area D and Tansy Point may be discontinued within the next few years.

Dredged Material Disposal

There are three existing in water dredged material disposal sites in this area: Area D, opposite Little Sand Island; 15(E), Tansy Point (RM 9); and 54(E), Harrington Point Sump (RM 22). All are used for Corps of Engineers hopper dredge disposal of material from the main navigation channel. Material from the outer reach of the Chinook Channel has also been placed in Area D. Several experimental in water disposal sites are also in this subarea. (cf Dredged Material Management 55, 59.)

41.03 ESTUARY SANDS



—*Compleat Photographer*

General Description

This subarea includes the extensive mid-estuary sand flats between RM 6 and RM 24 and the adjacent slopes. These are Desdemona and Taylor Sands, the Tongue Point Bar and other unnamed sands, the largest of which extends west and north from Rice Island into Grays Bay. Rice Island, a dredged material island, is also included. Some sands are bare at mid-tide, while the slopes extend down to 30 feet in some areas. A shallow channel is used by fishermen and tugs to cross from the north channel to the south channel near the Astoria-Megler Bridge. There are other minor channels and two small areas of bare sand. Rice Island is high enough to be classified as shorelands. Vegetation is absent, or nearly absent, from all shoreland areas. Rice Island and adjacent water areas are part of the Lewis and Clark National Wildlife Refuge. This subarea includes portions of Clatsop, Pacific and Wahkiakum Counties.

Aquatic Features

These sands have accreted rapidly since the construction of the jetties at the mouth and the dams on the river. In contrast to the fine sediments found on flats in Youngs, Grays and Baker Bay, the mid-estuary sands consist largely of fine to coarse sand. Much of the loss of volume of the estuary (15% in the last century) has occurred in this area. The reason for this accumulation is unclear, but it is apparently related to the increased salinity intrusion and the decrease in fresh water flow during the freshets. Sediment transport patterns in the area are unknown. Probably accretion occurs from both upstream and downstream. The sands are exposed to wind, waves, ship wash and river currents and, judging from the coarse texture of the sediments, the energy level is high.

Phytoplankton and zooplankton productivity is seasonally high (cf 41.02 - Estuary Channels), and benthic algal productivity on the sands may be significant but has not been studied. Populations of benthic animals living in the sediments are low to moderate when compared to Baker Bay or Youngs Bay because both the sediment type and the exposure to the elements are less favorable. Use by epibenthic animals (starry flounder, sand shrimp, mysids and dungeness crabs) is high. Downstream migrant salmon may feed and rest on these sands. The sands are also important as a seal haul-out area and as feeding and resting areas for gulls and other birds.

Human Use

Human use includes gillnet drifts along the margins of the sands and in the minor channels between the sand bars, recreational boating, and small boat and tug navigation across the river. Dredging and dredged material disposal have occurred on and around various sands in the past and the sands were used for horse seining and fish traps when such activities were legal. The only area currently being used for dredged material disposal is Rice Island, an entirely man-made island installed for the dual purposes of flow control and dredged material disposal.

Issues and Findings

A major issue in this subarea is the recent dramatic increase in seal populations and the impact on the gillnet fishery. Prior to enactment of the Marine Mammal Protection Act in 1972, seals were kept under control by harrassment and occasional shooting. Now protected, they have increased in numbers and boldness. This issue is outside the scope of this plan and research is being undertaken to determine if active management is required.

Potential uses of the sand flats include dredged material disposal, recreation, aquaculture, restoration, and even urban development. Part of Rice Island could be developed for a park, after dredged material disposal is completed. However, the Oregon part of Rice Island is in the Lewis and Clark National Wildlife Refuge and development would have to be consistent with refuge management.

Aquatic Designations

Water areas are ***Conservation;*** tidal flats and wetland above -3 feet MLLW are ***Natural.*** This prevents all major alterations to the wetlands, though active restoration is allowed as a conditional use. Active restoration might include deepening some areas, constructing protective berms, and marsh planting.

Shoreland Designations

Rice Island is ***Conservation.*** This is consistent with future dredged material disposal, refuge management, and any future recreational use. The other small sand flats above MHHW are ***Natural.***

Dredged Material Disposal

Rice Island, 55(S) (RM 22) is the only dredged material disposal site in this subarea. Material from Rice Island Sump is pipelined to the island. Stabilization of the island with vegetative plantings is desirable.

Restoration and Resource Enhancement

Rice Island has been created by disposal of dredged material and some revegetation has occurred naturally. Acceleration of this process by planting vegetation native to the area is proposed to enhance bird and other wildlife values. (46[SV], cf Restoration and Mitigation, 65.)

41.04 RIVER CHANNELS

General Description

This subarea includes the deep water (greater than 20 feet to 40 feet) portions of the main river channel and adjacent slopes upstream from Harrington Point (RM 22.5) to the eastern end of Wahkiakum County (RM 52). The authorized navigation channel is contained within this subarea, but side channels are not included. There are no wetlands or shorelands. Some water areas are part of the Lewis and Clark National Wildlife Refuge. Parts of Wahkiakum and Clatsop Counties are in the subarea.

Aquatic Features

While tides and tidal currents are important in this reach, fresh water flow increasingly dominates the circulation patterns toward the eastern end. Salinity intrusion extends only to Pillar Rock, even under low flow (less than 100,000 cfs). Flood tide currents may not be observable under high flow conditions, and the 100-year flood level rises sharply in the upstream direction. Sediments in the channel and slopes are largely medium to coarse sand, with some gravel. Compacted finer sediments are found in some scour holes. The transport of sand and gravel as bedload is almost entirely downstream. Some sand will also move in suspension under freshet conditions. Finer material (silts and clays) moves downstream in suspension.

Benthic productivity in these channels and slopes is probably not high because of the active sediment transport and ship wake disturbances. The phytoplankton in this reach are largely an extension of the riverine plankton coming downstream. These channel areas have seasonally high primary (phytoplankton) production in the spring. However, the nutrients are soon exhausted by production further upstream. Since salt water is absent in this reach, there is no nutrient enrichment by marine waters. The role of the extensive marshes in providing nutrients to support the phytoplankton productivity in this area remains to be investigated. The zooplankton are also primarily fresh water forms. Peak populations are related to phytoplankton populations and to warm water temperatures that occur in the late summer.

The river channels are important to fish species primarily as migration routes, though sturgeon also feed extensively in the channel areas. Adult salmon, steelhead, smelt, shad and eulachon migrate up the river channels to spawn. Juvenile sub-yearling salmonids (fall chinook and chum) tend to concentrate in beach and mudflat areas, whereas the yearling salmonids (coho, spring and summer chinook, sockeye, steelhead and cutthroat) migrate down the main channels.

Human Use

The primary human uses of the river channels are navigation, dredging and dredged material disposal, commercial and sports fishing and (to a lesser degree) waste disposal. The main navigation channel passes through this area from end to end. Dredging is required at 16 separate bars, with an average (1973-77) of 1.9 million cubic yards removed annually by pipeline and 1.2 million cubic yards by hopper dredge. In water disposal occurs at the Harrington Point Sump (for re-handling) and at several flow lane disposal sites. Numerous pile dikes exist. Gillnet drifts exist along the edge of and in the main navigation channels. Commercial sturgeon longlining, sports fishing and pleasure boating also occur.

Issues and Findings

The primary isues in the area center around the problem of dredged material disposal and navigational improvements (e.g. pile dikes). Deepening the channel to Portland has been discussed but presently does not appear feasible. Flow-lane disposal may either increase or decrease the passage of fish through an area. Changes in bottom contours may make an area difficult to fish. Pipeline dredging operations occur during a fishing season, and may make it impossible to fish certain areas. Any disposal operation may affect migrating fish, and installation of pile dikes (e.g. in the Brookfield reach) may permanently close a drift. Dredging of the deeper channel areas has probably accelerated shoaling in side channels used by fishermen and recreational boaters.

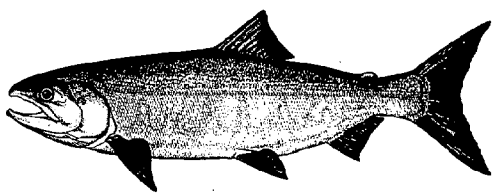
The transport of petroleum products and hazardous products is also an issue. No major transfer facilities, pipelines or refineries have been proposed for the estuary area; all proposals call for shipment of petroleum through the estuary and river channels to upstream locations.

Aquatic Designations

The main navigation channel is classified ***Development.*** In-water dredged material disposal sites are ***Development*** for that purpose only, and ***Conservation*** otherwise. All other areas are ***Conservation.***

Dredged Material Disposal

There are six flow-lane disposal sites [59(F), 68(F), 73(F), 81(F), 95(F), 97(F)] in this subarea, in or adjacent to the channel. The sites are at river miles 26, 34, 37, 40, 46 and 50. They are used to dispose of clean sand material from channel dredging. The sites are chosen because of their scour characteristics which keep the material moving in a downstream direction. Other sites may be selected as more research on the fate of material placed in flow-lane sites becomes available. (cf Dredged Material Management 55, 59.)



- Ron Pittard - Searep Studio, courtesy Clatsop County

41.05 SNAG ISLANDS

General Description

This subarea includes dredged material islands (Miller Sands and Jim Crow Sands), tidal marsh (around the Snag Island Jetty and Miller Sands), the Woody Island Channel, exposed sand bars south and west of Woody Island Channel, and various subsidiary channels. The entire subarea is within the Lewis and Clark National Wildlife Refuge and Clatsop County.

Aquatic Features

Very little is known concerning the circulation in the area. Some salinity intrusion probably occurs south and west of Miller Sands under low flow conditions, but data are absent. Plankton and zooplankton have been discussed in Estuary Channels and River Channels subareas (41.02 and 41.04). Benthic populations on the bare sands at the west end of this area are probably similar to those at Taylor Sands (Estuary Sands subarea [41.03]). Small fresh water clams are more abundant here than further west. It seems likely that the marging of some of the smaller channels have accumulated sufficient fine material to support large benthic populations of fresh water species, especially adjacent to and in the marshes on Miller Sands and the Snag Islands but only limited data are available. Feeding by juvenile salmonids may be important and sturgeon probably feed in the deeper channels. Use of this area by migrant waterfowl, wading birds and shore birds is extensive. Nutria and muskrat are common.

The tidal marshes (sedge/bulrush) on the Snag Islands are low and have been established since the installation of the Snag Island Jetty (1880's). Those on Miller Sands grade from low to high marsh and are also of recent origin.

Shoreland Features

Grasslands, shrub and Willow/Cottonwood habitats are found on the upland portions of Miller Sands, and grasslands are found on Jim Crow Sands. Marsh and grass planting is under way as part of a Corps of Engineers research project on Miller Sands and as dredged material stabilization on Jim Crow Sands.

Human Use

Human use of this area includes navigational improvements, dredged material disposal, commercial and sports fishing, wildlife observation, hunting, and trapping.

Active disposal sites are located on Jim Crow Sands and Miller Sands. A new in water disposal site east of Jim Crow Sands was used for the first time in November, 1977. Gillnet drifts are found in Woody Island Channel and along the margins of the navigational channel.

The only intensive use is dredged material disposal. Nonetheless, it is hard to pick any feature of the area (except perhaps Pillar Rock) that has not been created or radically altered by man in the last century. The main navigation channel (the Cordell Channel) passed through what is now Snag Island. This channel was closed off by the Snag Island Jetty. North Island (north of Seal Island) was formerly much larger but was eroded away as the Woody Island Channel shifted to the south. Extensive dredging of the Tongue Point crossing and the channel reach above Harrington Point resulted in the creation of the unnamed sands southeast of Woody Island Channel, Miller Sands, Jim Crow Sands, and Rice Island.

Issues and Findings

The primary issues in the area are: dredged material disposal versus shallow water and wetland habitat; ownership disputes between county, state and federal governments; and public access. No active management is practiced except in the dredged material disposal areas. Active revegetation is carried out on Miller Sands and Jim Crow Sands. Ownership of most aquatic and shoreland parcels is claimed by at least two governmental units, and there is one private ownership claim. The U.S. Fish and Wildlife Service owns large parts of the refuge and manages those areas it does not own through operating agreements with the county and state governments. These agreements have not prevented disagreements, in certain instances, as to how the area should be managed; e.g. whether dredged material disposal should be allowed.

This area is relatively distant from all boat launching ramps, thus the hunting and sport fishing use of this area is probably less than in some other subareas. All areas except Miller Sands are open to hunting and trapping. Future use of Miller Sands and Pillar Rock Island is an issue of concern. Public access on the wildlife refuge is discussed in the Cathlamet Bay subarea (41.06).

Aquatic Designations

The wetlands surrounding Snag Island Jetty, the unnamed sands southeast of Woody Island Channel, and the wetlands north of Green Island are ***Natural***. The waters are all designated ***Conservation***.

Shoreland Designations

Miller Sands and Jim Crow Sands are classified ***Conservation***.

Dredged Material Disposal

There are two active dredged material disposal sites in this subarea, one at Miller Sands [56(B)] ane one at Jim Crow Sands [60(B)]. Both are upland/beach nourishment sites used for disposal of material from the main navigation channel. (cf Dredged Material Management 55, 59.)

Restoration and Resource Enhancement

Both Miller Sands [47(SV)] and Jim Crow Sands [48(SV)] are shoreland areas where vegetation has been planted to enhance wildlife values. Miller Sands has also been an experimental marsh creation site for the Corps of Engineers. Removal of the Snag Island Jetty [50(P)] has been proposed since it no longer serves its original purpose (cf Restoration and Mitigation 65).

41.06 CATHLAMET BAY

General Description

This subarea includes Green, Grassy, Russian, Seal, McGregor and unnamed marsh islands, sand and mud flats, and North, South, Prairie and other subsidiary channels. It extends from near Tongue Point (RM 19) to RM 25. Brush and trees are, for the most part, absent from these islands. The entire area is in the Lewis and Clark Refuge and Clatsop County. No shorelands are present.

Aquatic Features

Little specific information is available with regard to physical circulation. Salinity intrusion is known to occur along the bottom in North Channel as far as McGregor Island. The marshes are probably expanding, judging from old charts. Installation of the Green Island dike prior to 1890 and the creation of Lois and Mott Islands from the dredging of the Tongue Point Basin (1939 to 1949) have stabilized Green Island and generally accelerated marsh formation, though erosion has occurred in some areas.

The available information concerning phytoplankton and zooplankton productivity has been discussed in Estuary Channels and River channels subareas (41.02 and 41.04). Only one benthic station is available, from the mudflats south of Russian Island. The population of fresh water forms was very high. Presumably this is true for many of the other mud and sand flats in this area.

Green, Grassy and unnamed (RM 21 to 23) islands are all tidal marsh. The dominant vegetation types in the lowest areas are bulrushes and rushes. Sedges predominate on the higher parts. Russian and Seal Islands are somewhat older and contain typical high marsh plant communities. Waterfowl, wading and shore bird use is high. There are extensive nutria and muskrat populations.

Adult and juvenile salmonids and other anadromous fish migrate through this area. Juvenile salmonids probably feed in the sand and mudflats, but this has not been confirmed in this area. Sturgeon feed in the deeper channels. There is some warm water resident fish usage.

Human Use

Human use of this area includes sports and commercial fishing, log storage and transport, hunting and fishing shacks, hunting, trapping, and wildlife observation. None of these could be classified as intensive.

Issues and Findings

Issues in this area include log storage in wetland areas, the presence of hunting and fishing shacks, public access, and ownership questions. The log storage in wetland areas is opposed by resource agencies, because of adverse effects on benthic organisms when the logs rest on the bottom (mf Lower River and Islands Policies, 41).

The tidal flats and marshes of Cathlamet Bay are highly productive, integral parts of the estuarine ecosystem. Their inclusion in the Lewis and Clark National Wildlife Refuge provides needed protection for fish and wildlife resources in the area.

Aquatic Designations

All marshes and tidal flats (except existing log storage sites) are ***Natural.*** Water areas and log storage sites in wetlands are classified ***Conservation.***

41.07 UPPER MARSH ISLANDS

General Description

This diverse group of marsh islands and interconnecting channels extends from Minaker Island (RM 26) to Welch Island (RM 35). The subarea includes Minaker, Karlson, Marsh, Brush, Horseshoe, Woody, Tronson, Quinns, Goose, Grassy, Fitzpatrick and Welch Islands. Large sections of these islands are brushy or wooded, with high tidal marsh in the lower areas. Sand and mudflats also occur. There are no shorelands, now that the dikes on Karlson Island are breached. The entire area is in the Lewis and Clark National Wildlife Refuge and Clatsop County.

Aquatic Features

No specific information is available concerning the physical circulation of the area. Salinity intrusion is rare or totally absent. The available information on phytoplankton and zooplankton populations is presented in the Estuary Channels and River Channels subareas (41.02 and 41.04). Benthic populations of freshwater forms are high at some stations in the smaller sloughs. Salmon smolts are known to be abundant north of Horseshoe Island and probably congregate in other areas as well. Use by sturgeon and warm water fish probably occurs. There is a large blue heron rookery on Karlson Island and raptors may be seen on the islands with large trees. Wading bird, shore bird and migrant waterfowl use is high. Nutria, beaver and muskrat are common.

Most of Minaker Island is high marsh, with willow in a few areas. Karlson Island is more complex. About one-fourth of the island was diked, but the dikes have breached and much of this area is returning to tidal marsh. The western end of the

island is undisturbed tidal marsh. The rest of the island is willow and two, three and four species mixture of alder, Sitka spruce, western red cedar and cottonwood. Brush and Horseshoe Islands are largely high marsh with some willow. Marsh Island is mostly willow with some high marsh, cottonwood and spruce. Woody Island is covered by a four-species mixture of trees with high marsh in lower areas. There is some willow on Quinns and Tronson Islands and some emerging marsh on Goose, Grassy and Quinns Islands. Fitzpatrick Island is dominated by high marsh and willows and has a dredged material disposal site on the western end. Welch Island is covered with high sedge marsh, cottonwood and willow. Dredged material has been deposited along the northern shore to protect against erosion.

Human Use

Human use of the area includes log storage and transport, small boat navigation, sports and commercial fishing, hunting and fishing houses, hunting, trapping, and wildlife observation.

Issues and Findings

Public access, log storage, hunting and fishing houses, and ownership disputes are issues, just as they are in other areas of the refuge. The main access point is Aldrich Point, and these islands probably receive more use than islands more distant from a launching ramp. Karlson Island (formerly diked part) is closed to all public use. Welch Island is subject to seasonal access regulations. Otherwise, the islands are open to the public, but access is difficult. Lower River and Islands Policies deal with public access, log storage and hunting and fishing houses (cf 41).

Aquatic Designations

The marsh and tideflat areas and the formerly diked area on Karlson Island are ***Natural.*** The water areas are ***Conservation.*** The waters between the Knappa docks and Eddy Point and south of Karlson Island are also classified ***Natural,*** because of the habitat and fishery value of adjacent Big Creek.

41.08 TENASILLAHE ISLAND

General Description

This subarea extends from Multnomah Slough (RM 35), which separates Welch and Tenasillahe Islands, to the pile dike (RM 38) at the upstream end of Tenasillahe Island, and includes waters to the south side of the Main Channel and to the opposite shore of Clifton Channel. Most of the perimeter of Tenasillahe Island is forested wetland, the remainder inside the dike is pastureland. The tidegate washed out in 1975 but has been repaired. The island is part of the Columbian White-tailed Deer National Wildlife Refuge and the entire subarea is in Clatsop County.

Aquatic Features

No specific information is available concerning the physical circulation of the area. Salinity intrusion is absent. The available information on phytoplankton and zooplankton is presented in the River Channels subarea (41.04). Benthic organisms, including amphipods, worms and small clams, are probably abundant in shallow water areas and in Multnomah Slough, although no data are available. Juvenile salmon migrate downstream along the shoreline. There is some tidal marsh along Multnomah Slough and on the small island at the upstream end of Tenasillahe Island.

Shoreland Features

The island serves as a wintering area for birds of the Pacific flyway, such as whistling swan, Canadian geese, mallards and other waterfowl. Shorebird use is high on the sandy upstream end of the island; hawks and bald eagles are often seen. The island is managed to protect the Columbian White-tailed deer, an endangered species. Nutria, beaver, and muskrat are the other common mammals. Cattle grazing is used to aid in management of the area for the white-tailed deer. Erosion problems exist both along the Clifton Channel and the Main Channel side of the island. Upland vegetation other than grasses is largely alder, willow, cottonwood, and spruce trees.

Human Use

Human use of the area includes log storage and transport, small boat navigation, sports and commercial fishing, and wildlife observation. There is a log storage area along Clifton Channel and commercial fishing areas along both the Clifton and Main Channel sides of Tenasillahe Island. There is very restricted public access to the island; however, a private duck hunting club has access during certain periods of the year to an area near Multnomah Slough.

Issues and Findings

Log storage and public access are issues, as they are in the Cathlamet Bay and Upper Marsh Islands subareas (41.06 and 41.07); the same Lower River and Islands policies apply (cf 41). Development potential is low in this intensely managed part of the white-tailed deer refuge.

Aquatic Designations

The waters of the Main and Clifton Channels are classified ***Conservation.*** A beach nourishment disposal site on the north shore and the beach nourishment site behind the pile dikes at the upstream end are ***Development*** for purposes of dredged material disposal only, and otherwise ***Conservation.*** The wa-

ters of Multnomah Slough and other wetlands are ***Natural,*** except along Clifton Channel, where log storage sites are ***Conservation,*** and at the U.S. Fish and Wildlife Service boat dock, which is ***Conservation.***

Shoreland Designations

The adopted classification of the dikes and diked area of Tenasillahe Island is ***Conservation.*** The rest of the island is ***Natural.***

Dredged Material Disposal

Three sites are present. One site on the north shore is designated for dike maintenance [71(D)]. A second site just upstream is a beach nourishment (erosion control) site outside the dike [72(B)]. The third site is also a beach nourishment site, behind the pile dikes at the upstream end of the island [77(B)]. (cf Dredged Material Management 55, 59.)

41.09 FORT STEVENS STATE PARK

General Description

This subarea consists of the northern part of Fort Stevens State Park and includes Clatsop Spit, the embayment behind the spit known as Trestle Bay, and the adjacent shorelands southeast to the Hammond town limits. This subarea contains aquatic areas and shorelands and is entirely within Clatsop County.

Aquatic Features

The northwest face of Clatsop Spit is a sandy beach area, with significant wave energy impinging upon it. The northeast face of the spit, also a beach area, is an area of high erosion and strong currents. The wetlands of Trestle Bay are tidal marsh (dominated by Lyngby's sedge, common reed, creeping bentgrass and Pacific Silverweed) and sand/mudflats. The marshes are cut by deep tidal channels, one of which, on the southeast margin, leads inland to Swash Lake, another area is dominated by tidal marsh. Trestle Bay is cut by a trestle and a jetty, the latter of which is overtopped regularly by tidal waters. While there are no data, benthic productivity in the inner flats is expected to be quite high because of the sheltered nature of the area and adjacent marsh productivity. Benthic productivity on the outer flats is moderate. The benthic productivity may make Trestle Bay an important nursery area for downstream migrant salmon, but no data are available. There is also a small tidal salt marsh on Clatsop Spit adjacent to the observation tower. It is covered by high salinity tidal waters coming directly in under the jetty from the ocean.

Shoreland Features

The shorelands of Clatsop Spit are rolling foredunes, running transversely from southwest to northeast, and stabilized by European beachgrass. Coastal strawberry, early hairgrass, scotch broom and coast pine are also present. These species also characterize the shoreland vegetation along Trestle Bay; other shrubs, some willow, and alder are also present. The shorelands up to Hammond are river beach, rock rip-rap (original starting point of south jetty) and some shrub begetation. The subarea has significant bird and wildlife values, including nesting sites for the snowy plover. Trestle Bay is important for waterfowl, wading birds, shorebirds and raptors, as well as deer, nutria, mink, beaver, raccoon and opossum.

Human Use

Intensity of human use in the Fort Stevens subarea varies from high to low. Most use centers around the community of Fort Stevens and the three parking lot areas on Clatsop Spit and includes sightseeing, bicycling, hiking, beachcombing, nature observation, and jetty and beach angling. Drift logs are used for firewood. There is also some illegal off-road use of the area by four-wheel drive vehicles, even in the salt marsh adjacent to the observation tower.

Issues and Findings

Development and potential of the area is restricted to recreation and historic preservation. The Clatsop Spit area is already developed as far as it is intended to be. The old gun batteries of Point Adams area between Swash Lake and Hammond are suggested for "major development" in the Oregon State Parks Fort Stevens Master Plan, including parking and battery restoration.

Erosion problems along Jetty Sands and on Clatsop Spit, just south of the South Jetty, use of the area by four-wheel drive vehicles, removal of beach logs, and the possibility of ocean waves breaching the spit south of the jetty are issues of concern. While some structural control over erosion south of the jetty may eventually be required, non-structural means of erosion control are more suitable in a state park.

Aquatic Designations

Trestle Bay and its wetlands are designated ***Natural,*** as is the wetland-salt marsh area on Clatsop Spit. Other aquatic areas are ***Conservation.***

Shoreland Designations

Parts of Clatsop Spit are designated ***Natural,*** with the remainder as ***Conservation.*** The three developed parking areas are considered to be consistent with the ***Conservation*** designation. The south jetty is classified as ***Water Dependent Development*** from Point Adams to its outer end. The shoreland area from Hammond northwest to Swash Lake is ***Conservation.***

Subarea Policy

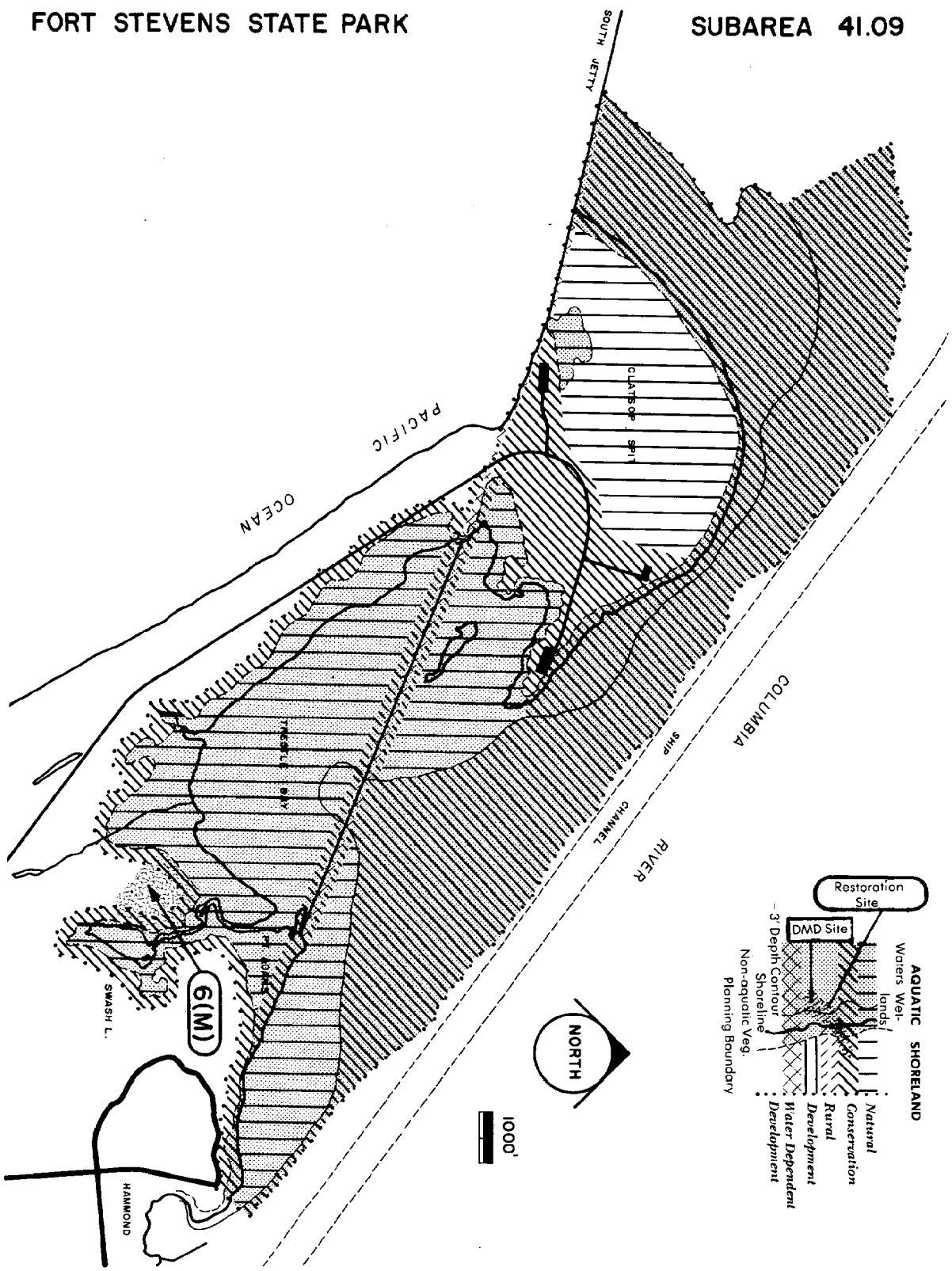
Off-road vehicles should not be permitted on dune or wetland areas in the park and shall not traverse the ***Natural*** wetland-salt marsh on Clatsop Spit.

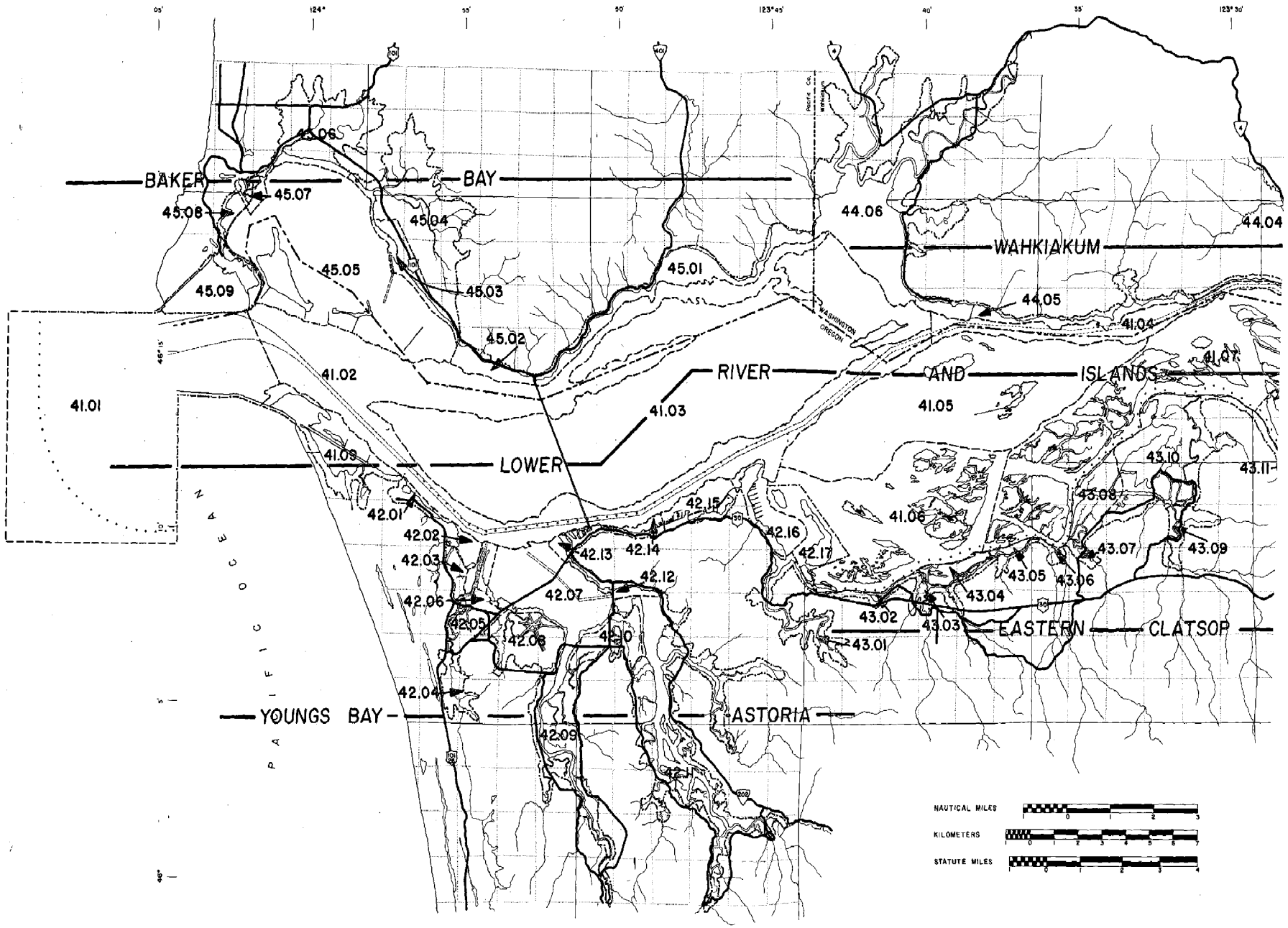
Restoration and Resource Enhancement

There is one marsh creation project in this subarea adjacent to Swash Lake [6(M)]. Lowering the dune area adjacent to the wetlands and plantings to develop a marsh is proposed (cf Restoration and Mitigation 65).

FORT STEVENS STATE PARK

SUBAREA 41.09





BAKER BAY
WAHKIAKUM
RIVER AND ISLANDS
LOWER
EASTERN CLATSOP
YOUNGS BAY
ASTORIA
PACIFIC OCEAN
WASHINGTON
OREGON
Pacific Co.
Wahkiakum
45.01
45.02
45.03
45.04
45.05
45.06
45.07
45.08
45.09
44.04
44.05
44.06
41.01
41.02
41.03
41.04
41.05
41.06
41.07
41.09
42.01
42.02
42.03
42.04
42.05
42.06
42.07
42.08
42.09
42.10
42.11
42.12
42.13
42.14
42.15
42.16
42.17
43.01
43.02
43.03
43.04
43.05
43.06
43.07
43.08
43.09
43.10
43.11
NAUTICAL MILES
KILOMETERS
STATUTE MILES

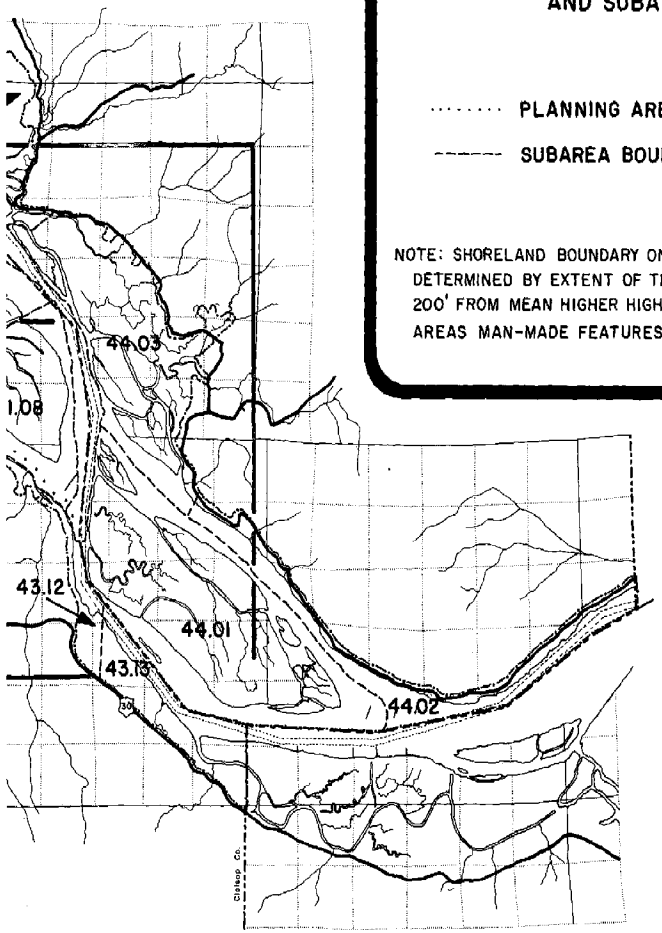
COLUMBIA RIVER ESTUARY LAND AND WATER USE PLAN

INDEX TO PLANNING AREAS AND SUBAREAS

..... PLANNING AREA BOUNDARIES

------ SUBAREA BOUNDARIES

NOTE: SHORELAND BOUNDARY ON UPLAND SIDE DETERMINED BY EXTENT OF TIDELAND SOILS OR 200' FROM MEAN HIGHER HIGH WATER; IN URBAN AREAS MAN-MADE FEATURES WERE USED.



CREST
COLUMBIA RIVER ESTUARY STUDY TASK FORCE

FIGURE

42. YOUNGS BAY-ASTORIA PLAN

THE PLANNING AREA

The Youngs Bay-Astoria planning area includes the most intensively developed aquatic and shoreland areas in the estuary region. Potential for new development is high. The area also has important aquatic resources; Youngs Bay and the basin around Tongue Point are both highly productive aquatic environments. Shorelands in Hammond, Warrenton and Astoria are included in this planning area, as are the diked tidelands up the tributaries of Youngs Bay.

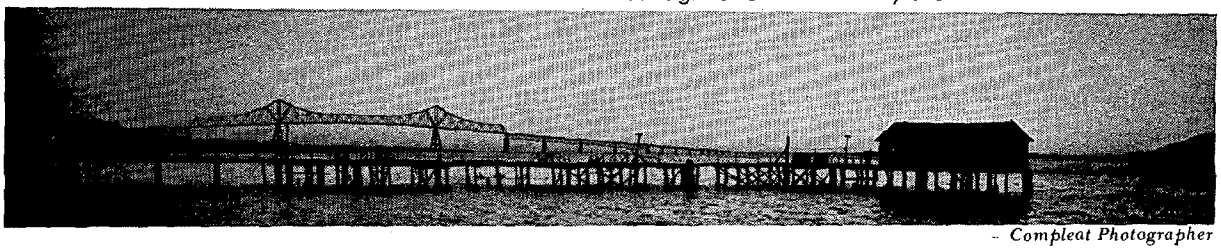
The establishment of the boundaries for the Youngs Bay-Astoria planning area was based on evaluation of potential shoreland hazards, important shoreland habitat areas, areas needed for urban water oriented development, and scenic resources. The planning area extends from Tongue Point (including Lois and Mott Islands) west to Point Adams and includes the waters of Youngs Bay and tributary streams to the head of tide. The water boundary on the river side extends from John Day Point around Lois and Mott Islands, around Tongue Point to join with the in-water Astoria city limits. It follows the 40 foot depth contour to Point Adams. The shorelands boundary is 200 feet inland from MHHW or the edge of tideland soils in areas where they occur. This criterion applies around Youngs Bay and up all tributary streams including the Youngs, Walluski, Lewis and Clark, and Skipanon Rivers. At Tongue Point, the shoreland includes all flat lands and the Point itself. From the eastern city limits of Astoria, the shoreland boundary extends westward along sewage lagoons, includes floodplain area in Alderbrook, connects with Leif Erickson and Marine Drive, and runs along the railroad at some points west to Hamburg Street. It then turns southeast along old U.S. 101 (West Marine Drive) to its junction with Oregon Highway 202. The boundary then follows this highway to its juncture with tideland soils, which extend up the aforementioned tributary streams and around Youngs Bay. From Tansy Point west, tideland soils give way to sand dune soil types. The shoreland boundary in this area is the main highway connecting Warrenton and Hammond to Fort Stevens. Planning, management and regulatory jurisdictions include Clatsop County, the Cities of Astoria and Warrenton, the Town of Hammond, the Port of Astoria, and Oregon state and federal agencies.

MAJOR ISSUES AND DECISIONS

Resource protection versus maximizing development potential is the overriding issue throughout the Youngs Bay-Astoria planning area. This was confirmed in the public attitude survey conducted as part of the planning process. How much shoreland area should be set aside for water dependent development and how much aquatic area might need to be altered to support that development? The need for flat land to expand its industrial base was a major issue for the City of Astoria. Residential development from Tansy Point to Hammond was a major issue, because of the conflict with potential deep draft shipping development. Development along the Skipanon River was also a major point of contention. Log storage, transportation facilities, dike maintenance, public access, and the shoaling of Youngs Bay and its tributary streams were also issues of importance. These issues are addressed by regional (cf Section II), area and subarea policies, as well as other decisions in the plan.

From Youngs Bay to Astoria is the major population center and most intensively developed area in the estuary. This is due in part to historical patterns of rail, highway and deep water channel development. Plan designations reflect this. In urban areas, shorelands are mostly ***Development*** or ***Water Dependent Development,*** to provide for existing or proposed residential, commercial or industrial uses. Major portions of shoreland and adjacent aquatic areas have been set aside for water dependent use. Areas with potential for port or industrial development requiring deep draft ship access include Tansy Point, both the east and west spits at the mouth of the Skipanon River, the existing port facilities at Smith Point (Port of Astoria), and Tongue Point. Areas for shallow draft marinas and other development include the Hammond Mooring Basin, the areas north and south of the new Skipanon River Bridge in Warrenton, areas along the Lewis and Clark River and Youngs River and Bay, the west and east mooring basins in Astoria, and other waterfront areas of Astoria. Numerous dredged material disposal and potential mitigation sites have been identified.

Despite the overall development orientation of the Youngs Bay-Astoria area as compared to other estuary areas, most of the biologically important tidal marshes and flats, and subtidal areas have been given protective ***Natural*** or ***Conservation*** designations. Shorelands in areas outside urban growth boundaries are ***Rural*** or ***Conservation,*** to provide for agricultural or forestry uses.



Compleat Photographer

AREA POLICIES

1. Log Storage

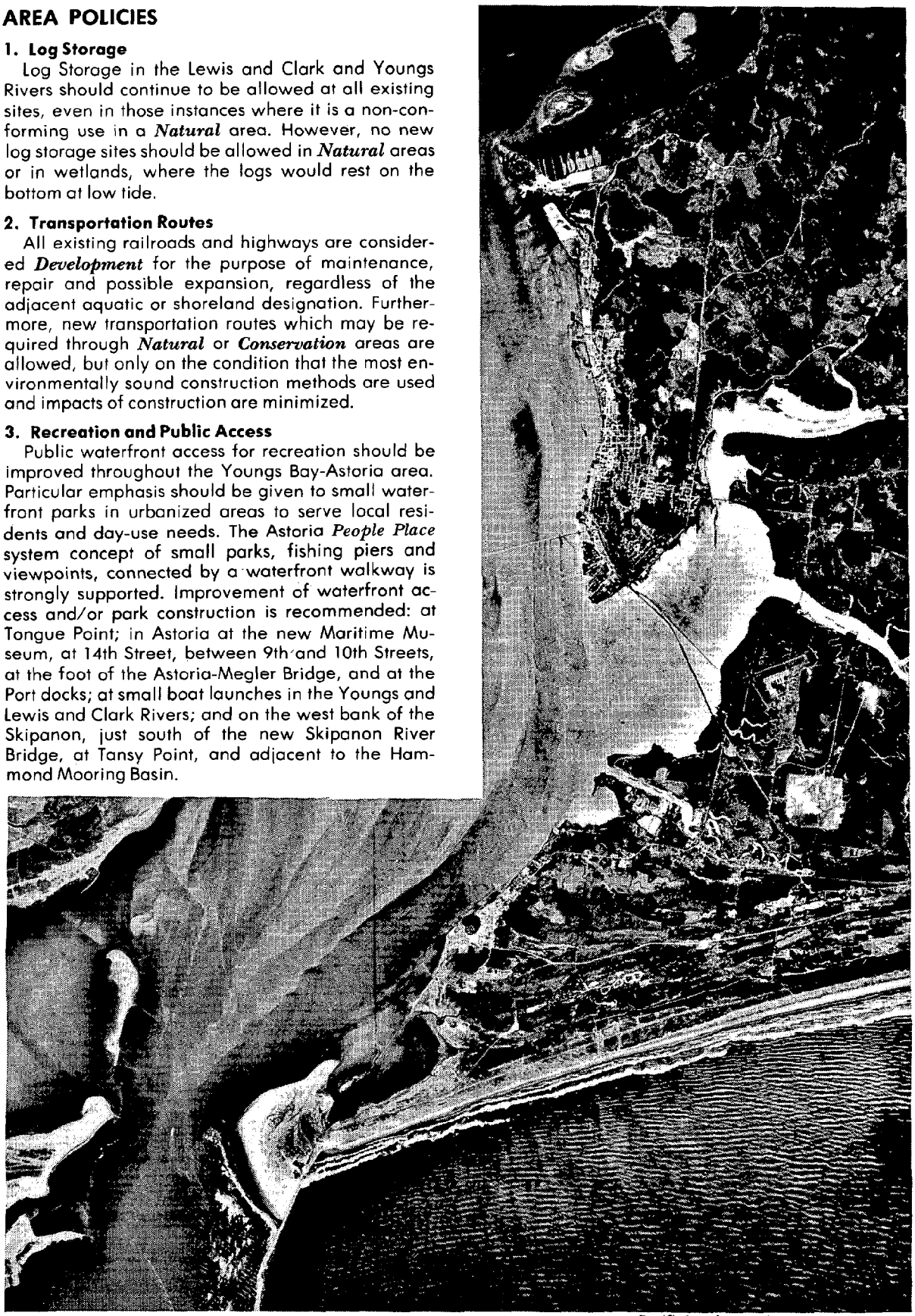
Log Storage in the Lewis and Clark and Youngs Rivers should continue to be allowed at all existing sites, even in those instances where it is a non-conforming use in a ***Natural*** area. However, no new log storage sites should be allowed in ***Natural*** areas or in wetlands, where the logs would rest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

2. Transportation Routes

All existing railroads and highways are considered ***Development*** for the purpose of maintenance, repair and possible expansion, regardless of the adjacent aquatic or shoreland designation. Furthermore, new transportation routes which may be required through ***Natural*** or ***Conservation*** areas are allowed, but only on the condition that the most environmentally sound construction methods are used and impacts of construction are minimized.

3. Recreation and Public Access

Public waterfront access for recreation should be improved throughout the Youngs Bay-Astoria area. Particular emphasis should be given to small waterfront parks in urbanized areas to serve local residents and day-use needs. The Astoria *People Place* system concept of small parks, fishing piers and viewpoints, connected by a waterfront walkway is strongly supported. Improvement of waterfront access and/or park construction is recommended: at Tongue Point; in Astoria at the new Maritime Museum, at 14th Street, between 9th and 10th Streets, at the foot of the Astoria-Megler Bridge, and at the Port docks; at small boat launches in the Youngs and Lewis and Clark Rivers; and on the west bank of the Skipanon, just south of the new Skipanon River Bridge, at Tansy Point, and adjacent to the Hammond Mooring Basin.



– *Pacific Northwest River Basins Commission*

42.01 HAMMOND

General Description

This subarea includes aquatic area and shorelands within the Town of Hammond and its urban growth boundary. The boundaries are the town limits on the east, the 40 foot depth contour on the north, the Fort Stevens Highway on the south, and the urban growth boundary on the west. The subarea is entirely within the Town of Hammond. A small portion of the Town of Hammond in the Columbia River, between the 40 foot depth contour and the northern town limits, is included in Estuary Channels - 41.02.

Aquatic Features

Aquatic areas include the Hammond Mooring Basin, the beach, and adjacent waters of the Columbia River out to the 40 foot contour. Deep water of highly variable salinity is close to shore in this reach. River bottom material is primarily sand; finer materials are kept suspended by strong currents, waves and ship wakes. With such coarse sediments, benthic productivity is not particularly high, but there is substantial fish usage, particularly as a migration route for salmonids.

The south jetty begins just west of the Hammond Mooring Basin, but is much deteriorated and erosion is actively occurring inside the jetty. Erosion is also a severe problem from just east of the boat basin to the railroad. From this point east to the town limits the bank is rip-rapped and there is one pile dike perpendicular to the shoreline to help control erosion. Review of navigation charts published over the last 40 years indicates that naturally occurring deep water in this reach (up to 60 feet) is moving closer to shore. Both boat docks extending into the river provide evidence of this; they have had increasing problems with erosion and loss of piling. In contrast, there is a severe shoaling problem in the mooring basin. This problem has increased since protective breakwaters have been constructed. Sediments in the basin range from sand at the entrance to fine sand, silt and clays inside.

Shoreland Features

The Hammond shorelands are relatively high areas of sandy soils (Westport fine sand) influenced both by the river and the ocean. Some areas of sandy dredged material and Clatsop silty clay loam are also found. Wildlife and bird use is low, except along the shoreline and the spruce/alder vegetated area west of Lake Drive, adjacent to Fort Stevens State Park.

Human Use

Residential, commercial, industrial and recreational uses coexist along the Hammond waterfront. The railroad runs along the shore from Tansy Point past Bioproducts, Inc. and ends at the Alaska Packers, Inc. plant. Residences and the National Marine Fisheries Service Research Station are the other developed features of the waterfront east of the mooring basin. The sand beach between the mooring basin and Alaska Packers is undeveloped and used for beachcombing. The shoreline west of the mooring basin is a popular viewpoint and is readily accessible by car. The main commercial area is located several blocks south of the mooring basin. The mooring basin and adjacent shorelands are not yet fully utilized. Because of the view and close access to the river, the recreational and aesthetic value of these shorelands is high. Land ownership is a mixture of private, corporate and federal.



- Ron Pittard - Searep Studio, courtesy Clatsop County

Issues and Findings

The major conflict in this area is between the very high water dependent development potential along the river front and continued residential and recreational uses of the area. The privately owned lands between Alaska Packers and the National Marine Fisheries Service Field Station might be used for either purpose. The other major issue is how to capitalize on the potential of the mooring basin to stimulate the economy of the town. Associated with this is the need for adequate dredged material disposal sites. Finally, recreational and aquatic research areas should be protected.

In the Lower Columbia River Ports Region Study (Oregon Department of Transportation, 1975), the Columbia River shoreline between Tansy Point and the Hammond Mooring Basin has been identified as one of the few areas between Portland and the river mouth with excellent potential for the development of water dependent industry. Other studies have come to this same conclusion. Factors contributing to this potential include:

- Proximity to the main ship channel and river mouth (River Mile 7-9);
- Deep water close to shore, minimizing the need to dredge for navigational access;
- Railroad access; and
- Relatively low density of present use and substan- vacant areas.

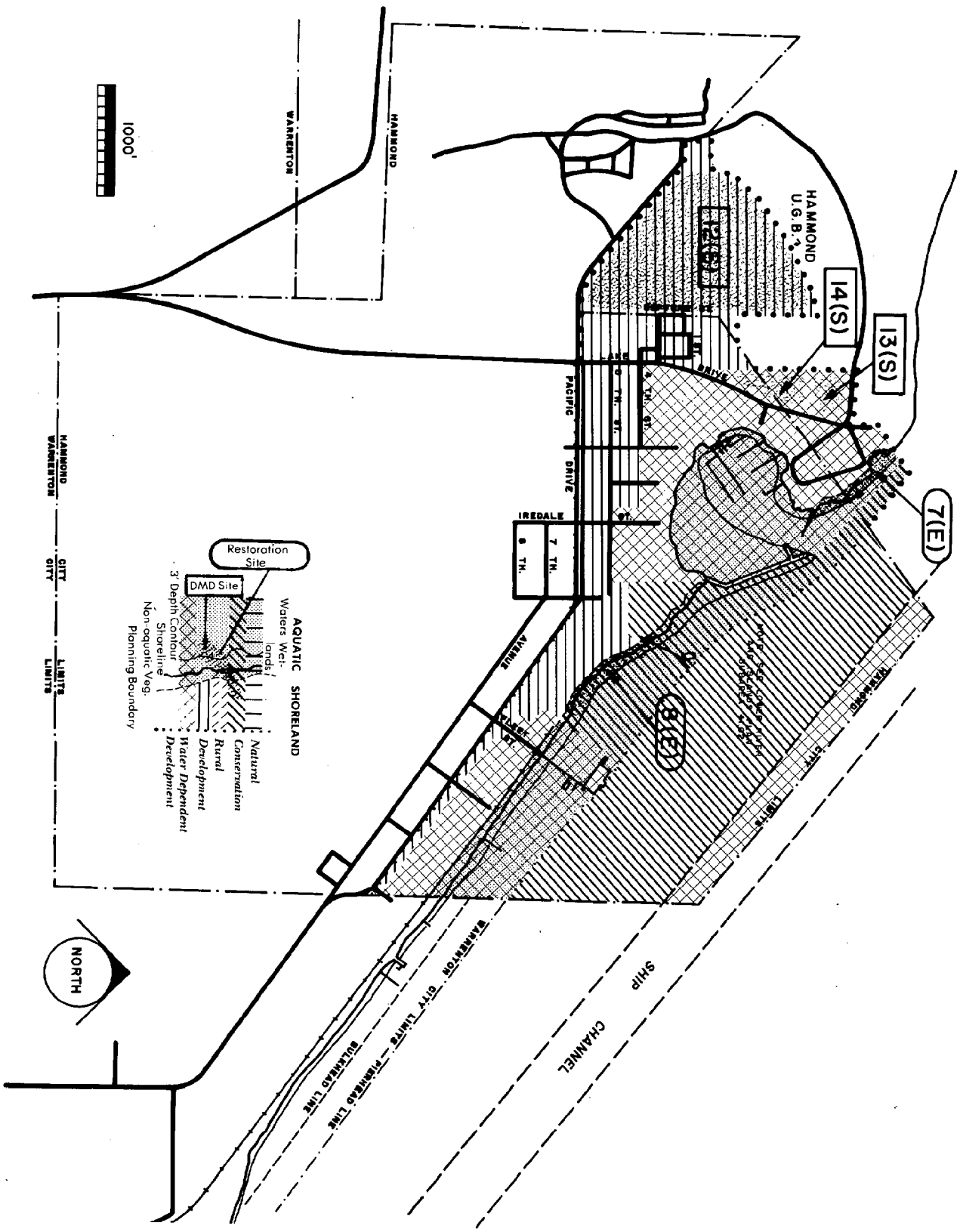
Development potential is somewhat diminished by:

- Strong river currents which are presently causing substantial shoreline erosion problems and which make the construction of docks and piers more difficult; and
- Existing residential use of the area.

This development potential justifies the designation of the area east of Alaska Packers as ***Water Dependent Development*** (this designation also continues eastward into Warrenton providing a large length of shoreline for water oriented development). The designation prevents new residential development in the area and provides for future industrial tax base expansion.

The CREST marina study (1978) showed a demand for 800-900 new moorages in the estuary area with a 6-7% increase in demand each year. The Hammond Boat Basin, with only 178 berths and less than half the basin developed, has excellent potential to absorb part of this demand for growth. Its proximity

HAMMOND SUBAREA 42.01



to the river mouth fishing grounds, its location adjacent to a large state park, the extensive area of undeveloped land around the basin, and the minimal estuarine alterations (dredge and fill) necessary to accomplish such expansion, combine to make this a very high priority area for marina expansion.

A dredged material disposal site for boat basin expansion and subsequent maintenance dredging is needed. The large area west of the present town limits is proposed for recreational facilities to support boat basin and town development, back-up parking facilities and other marina-related facilities. These uses would be facilitated by dredged material disposal and thus justifies a ***Development*** designation for the area.

The need for the central commercial and residential core of the town to remain in those uses justifies a ***Development*** designation. Undeveloped areas to the south have relatively poor development potential because of soils, high water table, etc. Lots fronting Pacific Drive between the eastern city limits and Fleet Street will have sewer access in the future and are suitable for residential use without filling or other substantial site preparation.

The National Marine Fisheries Service Research Station shorelands adjacent to the beach, the beach itself east to Alaska Packers and the adjacent waters are important town recreational or aquatic research areas. These values are preserved by the ***Conservation*** designation.

Aquatic Designations

From the town limits on the east to and including the Alaska Packers facility, the aquatic area from the shoreline out to the 40 foot depth contour is designated ***Development.*** From Alaska Packers west to the urban growth boundary, the aquatic area from the high water mark out to the 40 foot depth contour is designated ***Conservation,*** except on the west side of the mooring basin, which is ***Development*** from the shoreline out to the 20 foot contour. The mooring basin is designated ***Development.*** The aquatic area outside the 40 foot depth contour is ***Conservation*** out to the channel, which is designated ***Development*** (see Estuary Channels [41.02] for details.

Shoreland Designations

From the town line on the east to and including the property of Alaska Packers, Inc., the shoreland is designated ***Water Dependent Development,*** except for a 100 foot deep strip north of Pacific Drive, which is ***Development.*** From Alaska Packers west to the east edge of the National Marine Fisheries Service research facility, the shorelands are ***Development,*** except for the northern, undeveloped portion of the research station, which is ***Conservation.*** The shoreland area surrounding the mooring basin is ***Water Dependent Development,*** bounded on the west by Lake Drive and the urban growth boundray, on the south by 4th Street (Kindred Park Addition), or 5th Street (New Astoria Addition). The remainder of the shorelands to the south and west are designated ***Development.***

Subarea Policies

1. The shoreland area between the eastern town line and the westernmost property line of Alaska Packers is designated ***Water Dependent Development.*** In order to minimize the impacts on existing residences and preserve the unique potential of the area, the following policies apply:
   - Notwithstanding the fact that these residences are a nonconforming use, in the event of complete destruction by fire or other disaster, the residences may be rebuilt.
   - As feasible, new industrial development should be located so as to efficiently utilize the area and minimize conflicts with existing residences.
   - Fills in the aquatic portions of this subarea shall be allowed only in conjunction with bulkheading or quay construction along the present shoreline; no substantial parcels of new land shall be created.

2. The ***Water Dependent Development*** area around the boat basin leased from the Corps of Engineers (north of 3rd Street) shall be carefully controlled for water dependent uses which support boat basin operation. The ***Water Dependent Development*** area south of 3rd Street (to 4th or 5th Street, as indicated on the map) is also needed for water-oriented uses, but zoning in this area may also allow for other commercial uses such as motels, hotels, restaurants, etc., if they can demonstrate they provide a needed service for users of the boat basin. Existing residences may be maintained or rebuilt, as in Policy 1. above.

Dredged Material Disposal Sites

Three shoreland dredged material disposal sites are located in this subarea. All relate to dredging associated with the Hammond Mooring Basin. Two of the sites are currently used by the Corps for channel maintenance [13(S)] and the Town for basin maintenance [14(S)]. The third site is for projected basin expansion [12(S)]. (cf Dredged Material Management 57.30, 59.)

Restoration and Resource Enhancement

Two eroded shoreline restoration sites are in this subarea. The first [7(E)] is located just west of the boat basin. The shoreline has eroded in this area more than 50 feet landward from the jetty, which was the original shoreline. Restoration would involve use of dredged material from the boat basin entrance to restore the original shoreline, more effective rip-rap and development of a small waterfront park. This scenic viewpoint already gets significant use, but continues to erode away.

The second site [8(E)] is located between Alaska Packers and the boat basin, where up to 50 feet has eroded away. Restoration of the original shoreline is proposed using coarse, sandy dredged material from basin entrance maintenance or by pipeline dredging from the adjacent channel. (cf Restoration and Mitigation 65.)

Mitigation Needs

Expansion of the Hammond Mooring Basin could involve dredging of 10-15 acres of productive intertidal flats on the east side of the basin. Some restoration, habitat creation or resource enhancement actions to mitigate the impacts of this dredging may be required. Since there are no sites in the immediate area for restoration of equivalent habitat, the site at Swash Lake (Fort Stevens) or sites in Youngs Bay should be utilized. (cf Restoration and Mitigation, 66.10.)

42.02 TANSY POINT/ALDER COVE

General Description

This subarea lies entirely within the City of Warrenton. It includes aquatic areas in Alder Cove, Tansy Creek, and the Columbia River out to the 40 foot depth contour, and shorelands adjacent to the Columbia River and south to Tansy Creek. The western boundary is the Warrenton city limits. The southern boundary is Fort Stevens Highway, Tansy Creek and the dike around Alder Cove.

Aquatic Features

The aquatic features of this area include the Columbia River beach front, the river out to the 40 foot depth contour, and the wetlands of Alder Cove and Tansy Creek. Deep water of highly variable salinity is close to shore along the Tansy Point reach. River bottom material is primarily coarse sand; finer materials are kept suspended by strong currents, waves and ship wakes. With such coarse sediments, benthic productivity is not particularly high from Tansy Point west, but there is substantial fish usage, particularly as a migration route for juvenile salmonids.

Erosion is occurring on the west spit of the Skipanon peninsula adjacent to this subarea and just south of Tansy Point in Alder Cove. From Tansy Point west to the city limits, two pile dikes and riprap help retard shoreline erosion.

The Alder Cove wetlands become more protected toward the south; sediments are progressively finer and extensive marshes fringe the cove outside the dike. The marsh area on the east side of the cove, a small portion of which is in the Mouth of the Skipanon subarea (42.06), has developed since the construction of the Skipanon peninsulas in the 1930's. The biology of Alder Cove is similar to Youngs Bay, of which it was once part. Salinities are somewhat higher in Alder Cove, however, since it is closer to the ocean and has no major tributaries. Benthic populations are very high, particularly amphipods, and the area gets extensive use by downstream migrant juvenile salmon and other fishes. The area also supports many waterfowl, shorebirds, and other wildlife [cf aquatic features for Youngs Bay (42.07)].



Shoreland Features

Along the Columbia River, shorelands are relatively high in elevation and soils are Westport fine sand and fill. South and west of the Fort Stevens Highway and adjacent to Tansy Creek, the shorelands are low and poorly drained silty clay loams. The shoreline from Tansy Point west is rip-rapped to retard erosion.

Because of the scenic view and the immediate access to the river, the aesthetic and recreational value of the Tansy Point area is very high. Portions of the area are undeveloped and support wildlife.

Human Use

Low density residential, recreational and industrial uses all occur on the shoreland and aquatic areas of Tansy Point. The major industries are Bioproducts, Inc. and the Pacific Shrimp Packing Plant. There are residences and vacant land between Tansy Point and the western city limits. Ownership is largely private, corporate or City of Warrenton. The railroad runs along the shoreline through this subarea.

The marshes of Alder Cove receive some scientific research and hunting use, and the Warrenton sewage lagoon effluent drains into the Cove. Otherwise, human use of Alder Cove is minimal. The Port of Astoria owns tidelands outside the dike on the south and west sides. Warrenton Lumber Company owns tidelands adjacent to the peninsula on the west bank of the Skipanon River.

Issues and Findings

Alder Cove tidal marshes and flats are widely recognized as a unique area. The Nature Conservancy has identified it as a potential natural area, because of its value to fish and wildlife and its historical use as a scientific research area. The existing and potential development adjacent to the Cove, and the secondary sewage treatment effluent discharged into the Cove degrade its natural values somewhat.

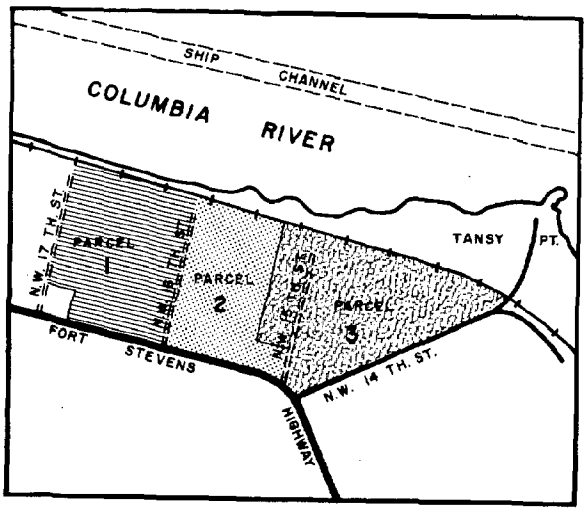
Tansy Point has several unique features which make it especially suited for water dependent development. The Lower Columbia River Ports Region Study, prepared by the Oregon Department of Transportation in 1975, and the 1977 Port of Astoria Master Plan identify the Tansy Point area as important to reserve for port development. It is adjacent to the main ship channel. Water depths very close to shore are 50 feet or more, and the area is naturally scoured. However, the strong tidal currents which produce this scour effect represent a possible disadvantage for mooring ships. According to Columbia River bar pilots, however, this is not a serious problem. Historically, the area (Town of Flavel) was used for passenger steamship docking. Because of the natural scour and deep water, initial and main-

tenance dredging would be significantly less than most other potential deep draft ship development sites, particularly if the moorage were not directly adjacent to the shoreline. The proximity of this site to the ocean and the excellent condition of the 40 foot channel downstream mean that the site is one of few locations where, by judicious use of tides for bar crossing, vessels drawing in excess of 40 feet could be accommodated. As such, the site could provide the required mooring capability for economically shipping or receiving liquid or dry bulks in vessel sizes significantly greater than those using other port sites on the Columbia River or the State of Oregon.

The Tansy Point area has rail and highway access, but these apparent advantages may actually be disadvantages from a regional perspective. Significant development at Tansy Point, combined with other potential industrial development in Warrenton, may require rail or highway improvements across Youngs Bay. For example, if construction of a second rail line across Youngs Bay to support development in Warrenton is needed, it could have a significant impact on the Youngs Bay ecosystem.

The Tansy Point area also has potential for residential development. The area will soon be sewered, there is already low density housing west toward the city limits, and the park-like waterfront setting is aesthetically very desirable. Use of at least a portion of the area for residences would not preclude marine industrial development at Tansy Point and south to Tansy Creek, although it would limit its extent. There is also a significant portion of the City's shorelines set aside for marine industrial development along the Skipanon Waterway; the need for additional marine industrial area at Tansy Point is debatable.

Complicating the issue of marine industrial development versus a mixture of residential and marine industrial use of Tansy Point are deed restrictions on three parcels of land (16 acres total) deeded to the City of Warrenton by Eben and Nancy Carruthers. According to the deed restrictions, parcel number one may only be used for single family dwellings and necessary outbuildings. Parcel number two is to be specifically set aside for park purposes. The third parcel is allowed to have these uses or certain marine and tourist oriented businesses. Parcels two and three may not be sold by the city. If the city uses the land for purposes other than stipulated in the deed restrictions, the land will revert to the former owners. Designation of parcel number one as ***Development Shoreland*** to allow for residential development, however, requires an exception to the Land Conservation and Development Commission Coastal Shorelands (number 17) Goal (cf Appendix B).



Aquatic Designations

The aquatic area along the Columbia River from the western city limits to Tansy Point is designated ***Development***, out to the pierhead line. East of Tansy Point the water area is ***Conservation***. The wetlands south of the ***Conservation*** waters are designated ***Natural***, except for a 50 foot ***Conservation*** buffer area extending outward from the line of non-aquatic vegetation and a wider ***Conservation*** area at the southern end of Alder Cove where effluent from the sewage ponds is discharged.

Shoreland Designations

All of the shorelands in this subarea are designated ***Water Dependent Development***, except for parcel number one of the area deeded to the City of Warrenton by the Carruthers, which is designated ***Development*** to allow residential use.

Subarea Policies

1. Notwithstanding the fact that residences within the ***Water Dependent Development*** shorelands of this subarea are a nonconforming use, in the event of their destruction by fire or other disaster reconstruction may be allowed.

2. A water-oriented park site at least 3.5 acres in size shall be set aside in the city-owned shoreland area between N.W. 17th and N.W. 15th Streets.

3. The ***Natural*** tideflats and marshes of Alder Cove shall be protected from alterations. Such protection, however, should not preclude intensive development of the adjacent ***Water Dependent Development*** or ***Development Shorelands*** nor necessary dike maintenance. The vegetative ***Conservation*** buffer shall be preserved between Alder Cove and adjacent developed areas.

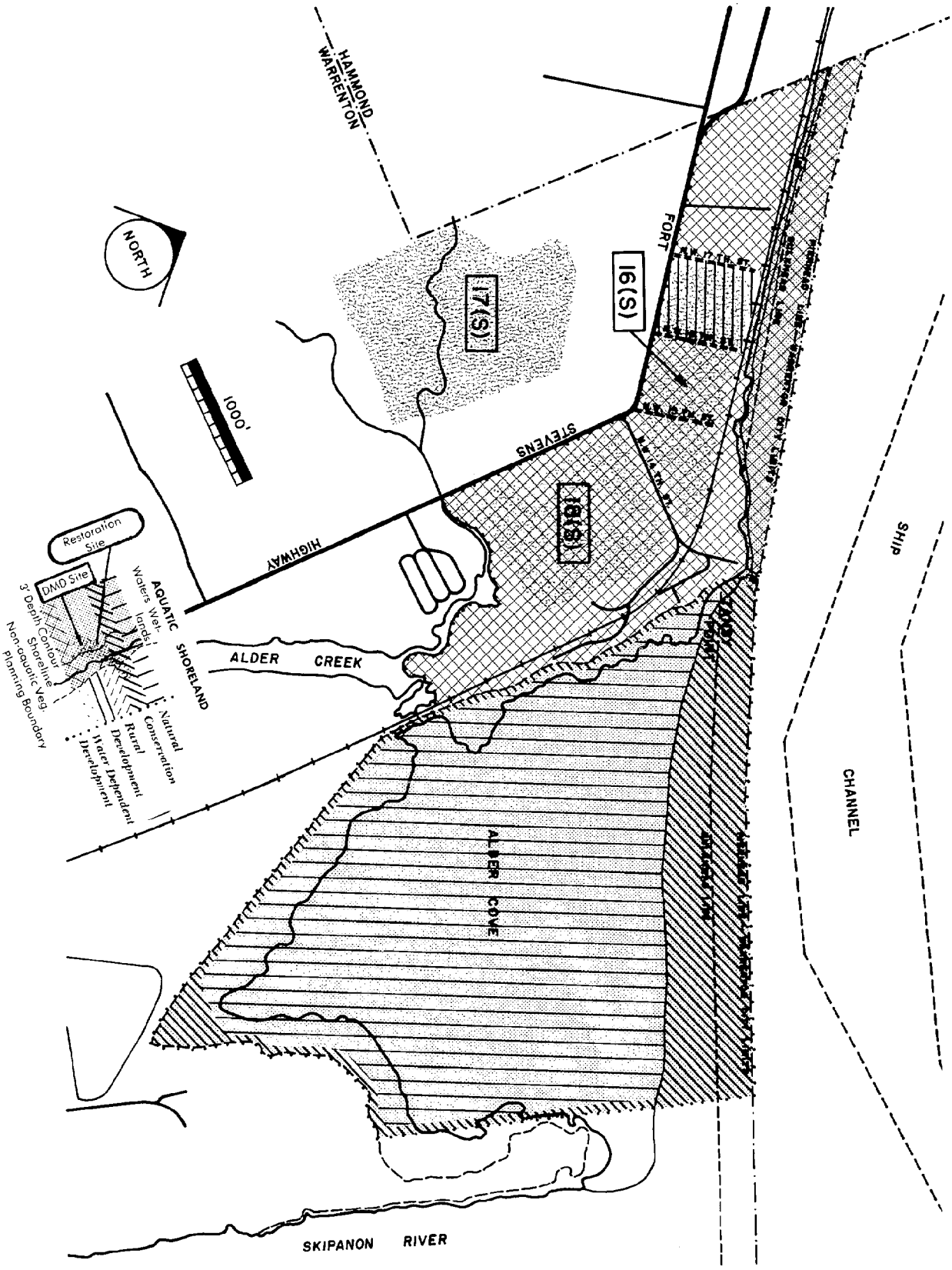
4. Large-scale fills are not appropriate in the ***Development Aquatic*** portions of this subarea; filling shall be allowed only for bulkheading or quay construction along the present shoreline; no substantial parcels of new land shall be created.

Dredged Material Disposal

There are three dredged material disposal sites in this subarea, 16(S) located on the point itself, 18(S) south of Tansy Point to Tansy Creek, and 17(S) southwest of Tansy Point across Fort Stevens Highway. All three sites are associated with potential dredging at Tansy Point, but their capacity significantly exceeds the amount of material to be generated (cf Dredged material Management, 57.40, 59).

TANSY POINT / ALDER COVE

SUBAREA 42.02



42.03 NORTH WARRENTON

General Description

This subarea is entirely shorelands, except for Alder Creek and the Warrenton sewage lagoons. It is bounded by Tansy Creek on the north, the dike adjacent to Alder Cove on the northeast, N.E. Skipanon Drive on the east, and the Fort Stevens Highway on the south and west. It includes rural, residential and commercial areas.

Aquatic Features

Alder Creek has a tidegate near its mouth. Little is known of its aquatic productivity. The Warrenton sewage lagoons empty into Alder Cove. They receive considerable bird usage and populations of aquatic organisms are probably high.

Shoreland Features

The area is low, marshy, diked land with the exception of low hills south of the sewage lagoons. Much of the area is either forested (alder, spruce) or agricultural land of moderate value. Wildlife use of forested and pasture areas is probably considerable, particularly in the areas adjacent to Alder Cove. The primary development hazard is flooding; however, only the lowest areas between Alder and Tansy Creeks are in the floodplain. The dike is maintained by the City of Warrenton.

Human Use

Residential and rural uses predominate except immediately adjacent to downtown Warrenton, where there is some commercial development. The Warren House on Skipanon Drive is a State Historical Landmark. There is a recreational vehicle park adjacent to Tansy Creek. Immediately adjacent to this subarea on the east is the Warrenton Lumber Company plant. The railroad runs north-south through the subarea and road access is provided by the Fort Stevens Highway. Land ownership is private and corporate. Utilities are provided by the city, but not all of the subarea is sewered.

Issues and Findings

The subarea does not have navigational access to the Columbia River or the Skipanon. The parcel between the dike and the railroad and to the north and west of the sewage lagoons has recently been acquired by the Warrenton Lumber Company for possible expansion of their facilities. Other areas have considerable potential for residential development, except perhaps the low-lying lands between Alder and Tansy Creeks that are in the floodplain.

Aquatic Designations

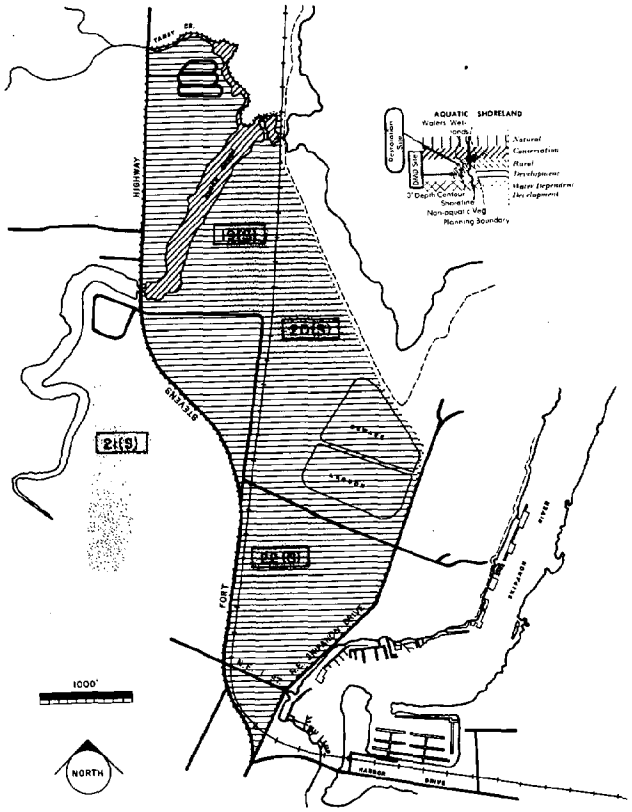
Alder Creek is designated ***Conservation.***

Shoreland Designations

All of the shorelands in this subarea are designated ***Development.***

Subarea Policy

Widening and strengthening of the dike shall be allowed as necessary to provide for its use by heavy vehicles.



Dredged Material Disposal

Three dredged material disposal sites [19(S), 20(S), 22(S)] are located in this subarea and a fourth [21(S)] to the west of the subarea boundary (not in the shorelands area). All four sites are proposed for use in conjunction with maintenance of Skipanon River dredging projects. A primary concern for disposal will be the nature of the sediments and their potential to support structures for residential, commercial or industrial use. (cf Dredged Material Management Plan 57.50, 59.)

42.04 UPPER SKIPANON RIVER

General Description

This subarea includes portions of Warrenton and Clatsop County. It is bounded on the north by U.S. Highway 101, and follows the Skipanon River and several small tributaries southward to the extent of tideland soils. Although it is predominantly rural with parcels of agricultural and timber lands, a portion of the old AMAX industrial site is included. Portions of the area east of the Skipanon River outside the present Warrenton city limits are inside the Warrenton Urban Growth Boundary.

Aquatic Features

The characteristics of the Skipanon River above the 8th Street dam are discussed in 42.05 (Middle Skipanon River).

Shoreland Features

This is a rural area with some agricultural land and moderate timber values. Wildlife habitat is excellent along the river with thick strands of riparian-wetland vegetation. The area is low and poorly drained. Flow control dams have reduced but not eliminated the flood hazard. There is some residential use of the area. Warrenton High School and several commercial establishments are located on higher ground west of the river in the northern portion of the subarea.

Human Use

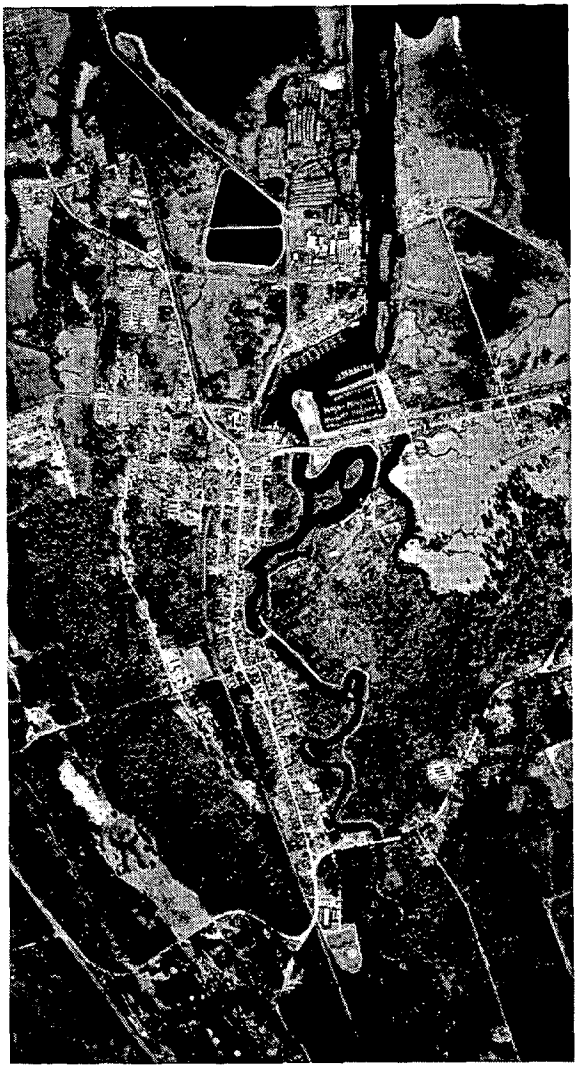
The major uses are agricultural, timber harvesting, rural housing and hunting. Cranberry bogs are present in some low-lying areas. The area is not sewered and city water is available only along Dolphin Road, east of the river. U.S. Highway 101 and several county roads and bridges provide access to the lands west of the river.

Issues and Findings

Development potential is generally low except along the right-of-way of the proposed U.S. Highway 101 realignment and in the small portion of the subarea which is part of the AMAX industrial site. Within the present Warrenton city limits there are residential and commercial uses and the High School. East of the Skipanon River, the proposed Urban Growth Boundary includes the AMAX industrial property. Water quality is a problem in the Skipanon River; industrial development in the area should be designed so as not to contribute to this problem. The remainder of the subarea has low development potential. Low-intensity uses which do not degrade the freshwater wetland values along the river are appropriate.

Aquatic Designations

The Skipanon River and its tributaries within this subarea are designated ***Conservation***, except for those aquatic areas which fall within the boundaries of the industrial site, which are designated ***Development***.

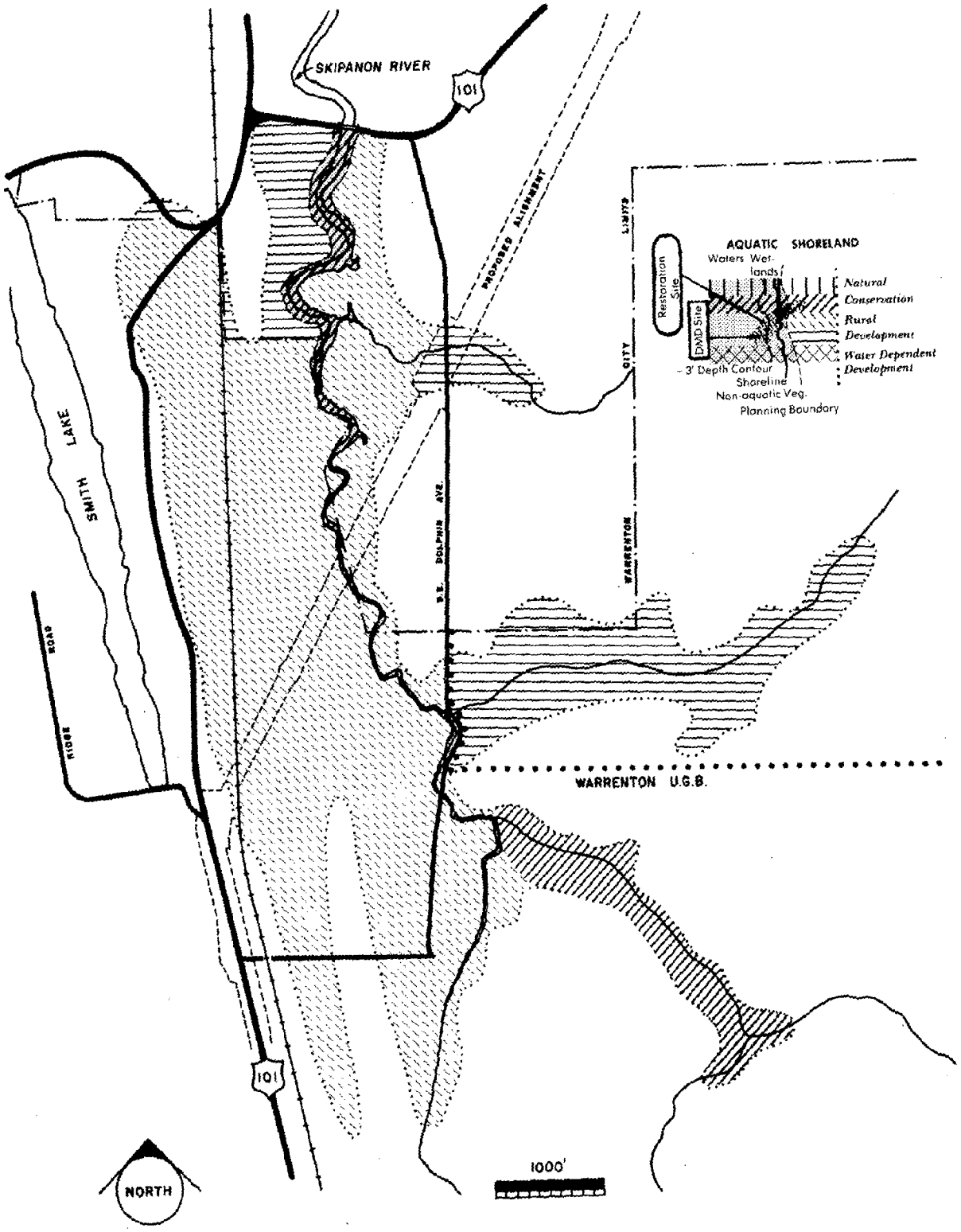


Shoreland Designations

West of the Skipanon River, shorelands within the Warrenton city limits are designated ***Development;*** the remaining shorelands are designated ***Rural.*** East of the Skipanon River, shorelands within the industrial site are designated ***Development;*** the remaining shorelands are designated ***Rural*** except for the area south of the industrial site, which is designated ***Conservation*** for forestry use.

Subarea Policy

Notwithstanding the ***Development*** designation for aquatic areas within the industrial site and the ***Conservation*** designation for forested shorelands to the south, development in and adjacent to those creeks and logging shall be carried out so as to minimize stream sedimentation and preserve riparian vegetation and water quality.


SKIPANON RIVER
101
PROPOSED ALIGNMENT
CITY LIMITS
AQUATIC SHORELAND
Waters
Wet-lands
Restoration Site
DMD Site
Natural Conservation
Rural Development
Water Dependent Development
-3' Depth Contour
Shoreline
Non-aquatic Veg.
Planning Boundary
SMITH LAKE
RIDGE ROAD
S.E. DOLPHIN AVE.
WARRENTON
WARRENTON U.G.B.
101
NORTH
1000'

42.05 MIDDLE SKIPANON RIVER

General Description

This subarea contains shorelands of the City of Warrenton on both sides of the Skipanon River, diked marshes east of the Skipanon, and the aquatic areas of the river itself between the Harbor Street Bridge and Highway 101. Although parts of downtown Warrenton and a major shopping center are included, the subarea is largely vacant land, residential or low density commercial and light industrial. The entire subarea lies within the present Warrenton city limits.

Aquatic Features

The average fresh water flow of the Skipanon River is only about 50 cfs. The circulation in the reach below the 8th Street dam (River Mile 2.6) is therefore dominated by tidal currents, and the flushing is poor (flushing time: 10 to 38 days).

Flows in the river above the 8th Street dam are influenced by natural variations and the two dams further upstream. Flushing time is estimated at 12 to 40 days. Water quality in the Skipanon River below the dam ranges from poor to moderate. During late summer, low flow periods, severe depletion of dissolved oxygen has been observed. Water quality is degraded by industrial wastes, boat traffic, fish wastes and non-point sources. Water quality above the dam is somewhat better, but peat soils in some tributary sloughs deplete dissolved oxygen.

In addition to the dams, the river channel itself has been considerably altered. The channel has been straightened just above the Harbor Street Bridge, creating a second island. The old Skipanon Slough has been entirely severed from the river by construction of the boat basin. The connection to Cullaby Lake is an artificial channel.

Because of its small drainage area, water quality limitations and the dams, the Skipanon River is not a major fisheries resource, though small wild runs of coho and sea-run cutthroat trout have been observed. Despite large amounts of bark chips and anoxic sediments in some areas, benthic and water column productivities are fair to moderate in some locations. Sediments below the dam are almost entirely contributed by the Columbia River and timber operations. Sediments above the dam are derived from the Skipanon River drainage basin.

Extensive diked wetlands are found to the east of the Skipanon River. There are also wetlands along the river itself, including the two major islands.

Shoreland Features

Virtually this entire subarea consists of low, poorly-drained silty clay loams protected by dikes along both sides of the Skipanon River and along Youngs Bay and Alder Cove. The subarea is almost entirely within the floodplain. Dikes are maintained by the City of Warrenton.

The CREST planning area to the west of the Skipanon River takes in only a 200-foot strip inland along the shoreline. This is a residential and commercial area.

Much of the shoreland east of the Skipanon River is seasonally wetland, covered by shrubs, spruce and other trees. Wildlife and bird habitat values are high in some portions. Some lands close to Harbor Drive and U.S. Highway 101 are agricultural. Lands outside the dike are heavily vegetated and marshy in some locations.

Human Use

Lands west of the Skipanon are in residential and commercial uses. The wetlands east of the river are largely vacant and without road access or utilities. Residential, commercial, agricultural and light industrial uses are scattered along Harbor Drive and U.S. Highway 101, which provide highway access. The railroad runs along Harbor Drive, just outside this subarea. Water and sewer are available only along the major roads. Timber value is low, but there is some prime farmland. Zoning is Residential, Commercial and light Industrial. Land ownership is mostly private, much in large holdings, with some public and corporate.

Issues and Findings

East of the Skipanon River the development potential is limited by the flood hazard, poor soils and the lack of a sewer system. Any portion of the area that could be filled with dredged or other material could be developed, however,

The Skipanon River south of the Harbor Street Bridge has significant potential for the development of marinas for recreational boats if the facilities can be designed to minimize further degradation of water quality. The CREST Marina Study (1978) showed an unfilled demand of 800 to 900 moorages in the estuary. Demand is increasing at a rate of 6% to 7% per year. This shortage of moorages affects both recreational boaters and commercial fishing vessels. Construction of marina facilities above the Harbor Street Bridge would provide badly needed moorages for recreational boating and enable some of the moorage facilities north of the bridge to convert from recreational to larger commercial fishing vessel use. The 8th Street dam prevents the possibility of water oriented development upstream at this time.

Resource agencies have noted both the water quality problems in the Skipanon River and some habitat values of the islands and marsh areas. If water quality can be protected, the development potential of this area in the middle of the City of Warrenton, however, could be pursued.

Aquatic Designations

The Skipanon River is designated ***Development*** from the Harbor Street Bridge to the 8th Street dam. The remaining aquatic portions of this subarea are designated ***Conservation***.

Shoreland Designations

All of the shorelands of this subarea are designated ***Development***.

Subarea Policies

1. Development along the shoreline of the Skipanon River between Harbor Drive and 8th Street shall include a Tourist/Commercial mixture of water dependent, water related and other uses.

2. 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.

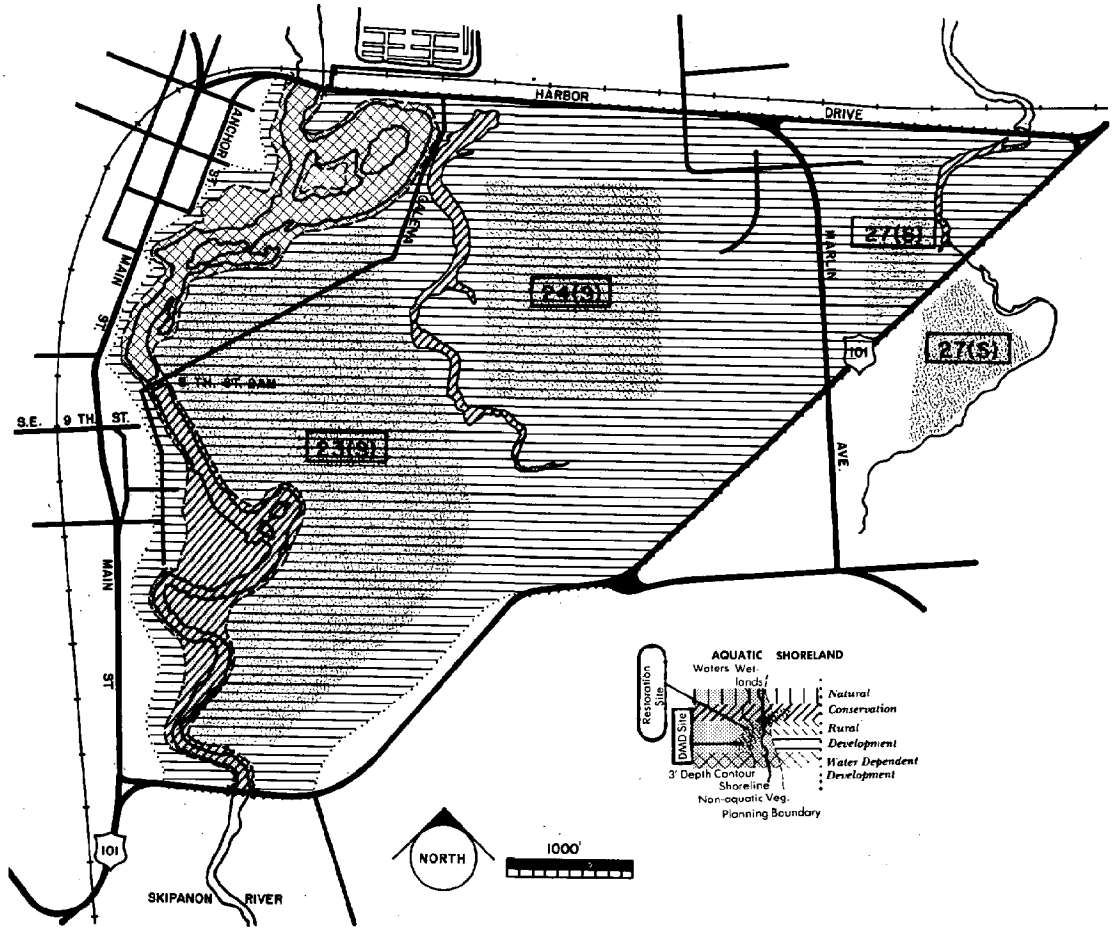
3. The water quality impacts of development in the Middle Skipanon will be evaluated prior to approval of projects, particularly in the area between the 8th Street dam and the Harbor Street Bridge. Alterations which have a decidedly negative water quality impact or result in a decrease in the flushing rate will not normally be permitted.

Dredged Material Disposal

Two large dredged material disposal sites are in this subarea; one just east of the Skipanon [23(S)], north and south of the dam, and one further to the east across a slough [24(S)]. Both sites have potential use for dredging projects in the Skipanon, both above and below the Harbor Street Bridge. Additionally, there is a small site associated with possible projects on the Skipanon [26(S)]. (cf Dredged Material Management Plan 57.10, 57.50, 59.)

Mitigation Needs

The ***Development*** designation of the aquatic areas between the Harbor Street Bridge and the 8th Street dam provides for uses which may require dredging of intertidal areas and possibly limited filling. Detailed proposals are not available, but mitigation will be required for dredging and filling of intertidal and tidal marsh areas. (cf Restoration and Mitigation, 66.20.)



42.06 MOUTH OF THE SKIPANON RIVER

General Description

This subarea contains the filled and diked shorelands north of Harbor Drive and east of Skipanon Drive, the Skipanon River from the Harbor Street Bridge to its mouth, and adjacent Columbia River waters out to the navigation channel. Parts of downtown Warrenton are also included. The subarea lies entirely within the present Warrenton city limits.

Aquatic Features

The mouth of the Skipanon River was originally low and marshy. The river channel has been widened and deepened and several tributary sloughs closed off. The Skipanon Peninsulas were created by fill during the late 1920's-1930's. These large fills have severed Alder Cove from Youngs Bay and caused the Skipanon River to empty into the main channel of the Columbia River, rather than into Youngs Bay. The Warrenton Mooring Basin was created from land by dredging. The aquatic features of Youngs Bay and Alder Cove have been described under 42.07 and 42.02, respectively.

The 8th Street dam effectively divides the Skipanon River into two bodies of water. Except during the winter months, fresh water flow in the Skipanon River is low (average flow 50 cfs), and Columbia River water and ocean water are the main water masses observed below the 8th Street dam. Salinity intrusion occurs here whenever salinity is present in the adjacent Columbia River waters. Despite the low fresh water flow, strong vertical differences in salinity occur during the fall, and bottom waters may become stagnant. Dissolved oxygen levels well below state and federal standards have been observed, but are probably infrequent and moderately high numbers of benthic organisms have been found in some areas. Inorganic sediments are largely of Columbia River origin. Near the mouth of the river, the sediments are largely clean sand. The proportion of fine material, organic matter and wood debris increases in the upriver direction. Anoxic bottom sediments occur in the developed area below the bridge. Flushing times and fish runs in the Skipanon River have been discussed under 42.05.

The shallow areas of sandy substrate north of the Skipanon River spits are similar to adjacent areas in Youngs Bay and Alder Cove. Such areas have low to moderate numbers of benthic organisms, but receive considerable usage by fish and large invertebrates, such as shrimp and crab. Deeper areas adjacent to the main navigation channel are less productive for bethos. These areas are described under 41.02.

The authorized navigation project in the Skipanon River is 30 feet deep and 200 feet wide from the Columbia River Channel to the railroad bridge and 6 feet deep and 40 feet wide for 4500 feet upstream from the railroad bridge. Also included is the 12 foot deep mooring basin and a 30 foot deep turning basin just north of the mooring basin. The channel above the bridge has never been dredged and the 8th Street dam precludes access to the last 0.3 miles of authorized channel. Since ocean going ships do not presently use the Skipanon River, the channel is maintained at a depth of between 14 and 20 feet by hopper dredge (disposal in-water at Tansy Point). Small amounts of material were removed in 1975 and 1979. Because the sediments near the bridges are highly organic and may contain toxic substances, dredging in this reach requires land or ocean disposal.

Included in this subarea are portions of the marshes and tide flats west and north of the west spit and east and north of the east spit. These marshes and tide flats are similar to other nearby flats and marshes in Youngs Bay and Alder Cove. Their characteristics are described under 42.07.

Shoreland Features

Most land in this subarea is agricultural (grazing) or developed (commercial and industrial). Soils are sandy fill or Coquille-Tidal Marsh (fresh) - Clatsop Association. All of this subarea east of the Skipanon River is in the floodplain, except for an area of fill part of the way out the east spit. Wildlife values are low to moderate.

Human Use

Commercial and industrial uses are dominant in this subarea. There is some grazing and a few houses along Harbor Drive. In addition to the Warrenton Mooring Basin, there are several other marinas, a charter boat operation, two fish processors that release wastes into the river, and one condominium complex with another under construction. Warrenton Lumber Company, the largest industry in the city, sorts logs in-water and stores them on both sides of the navigation channel. The only industry presently using the east spit is a cement plant. As befits the industrial nature of the area, ownership is largely Port, County or corporate. The agricultural value of the area is low and there is no commercial timber.

Highway access is provided by Harbor Drive and Skipanon Drive. The railroad runs along the southern border of this subarea. Access to both the Skipanon and Columbia Rivers is available from the spits. Access to the Columbia River has not been developed, however, and would require dredging, filling or piering out to deep water.

The marshes on Alder Cove and Youngs Bay adjacent to this parcel receive recreational use for hunting.

Issues and Findings

Land use planning for the mouth of the Skipanon River must come to terms with the direct and substantial conflicts between resource protection and industrial development. The area contains both industrial sites of great value and significant natural resource values. Both peninsulas of the Skipanon River are especially suitable for water dependent industry. There are sizeable parcels of vacant land in both public and corporate ownership. The adjacent Skipanon River has an authorized deep draft channel. The main navigation channel of the Columbia

River is immediately accessible. There is railroad access.

The three adjacent aquatic areas here contain important natural resource values (see Aquatic Features of 42.02, 42.06, and 42.07). Scientific studies have shown that both Alder Cove and Youngs Bay make significant contributions to the fisheries resource, particularly salmon.

The east peninsula of the Skipanon River has been intensively studied for its development potential and the impacts of development on natural resource values. In connection with a proposed oil rig fabrication facility on this, an environmental impact statement and a mitigation study have been completed.

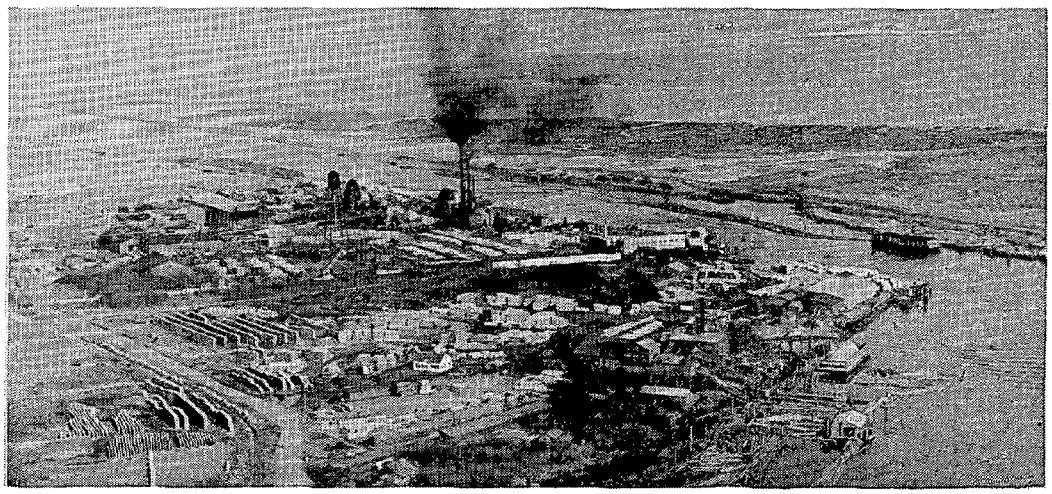
The west peninsula of the Skipanon River is presently occupied by Warrenton Lumber Company. This largest employer in the City of Warrenton has continued to make substantial investments in its facilities. The Company has expansion plans which would involve the development of a two-berth log and lumber shipping facility on the Skipanon River. At the present time the Company's products are moved by truck through downtown Warrenton to the Port of Astoria for shipment. Development of a ship loading facility on the Skipanon would result in substantial cost savings to the Company and would also bring about a reduction in truck traffic through downtown Warrenton.

A log and lumber loading facility requires approximately twenty acres of "back-up" area next to the ship berths. This area must be directly adjacent to the loading dock in order to avoid double handling of logs and lumber. Such double handling would not be economically feasible. A wide back-up area of shallow depth would be the most desirable since a larger number of logs can be stored closer to the vessels, thus reducing haul distances, equipment requirements and, consequently, costs. As a length of approximately 1500 feet would be required for berthing two ships, the twenty acre requirement would result in a depth of 580 feet for the back-up area.

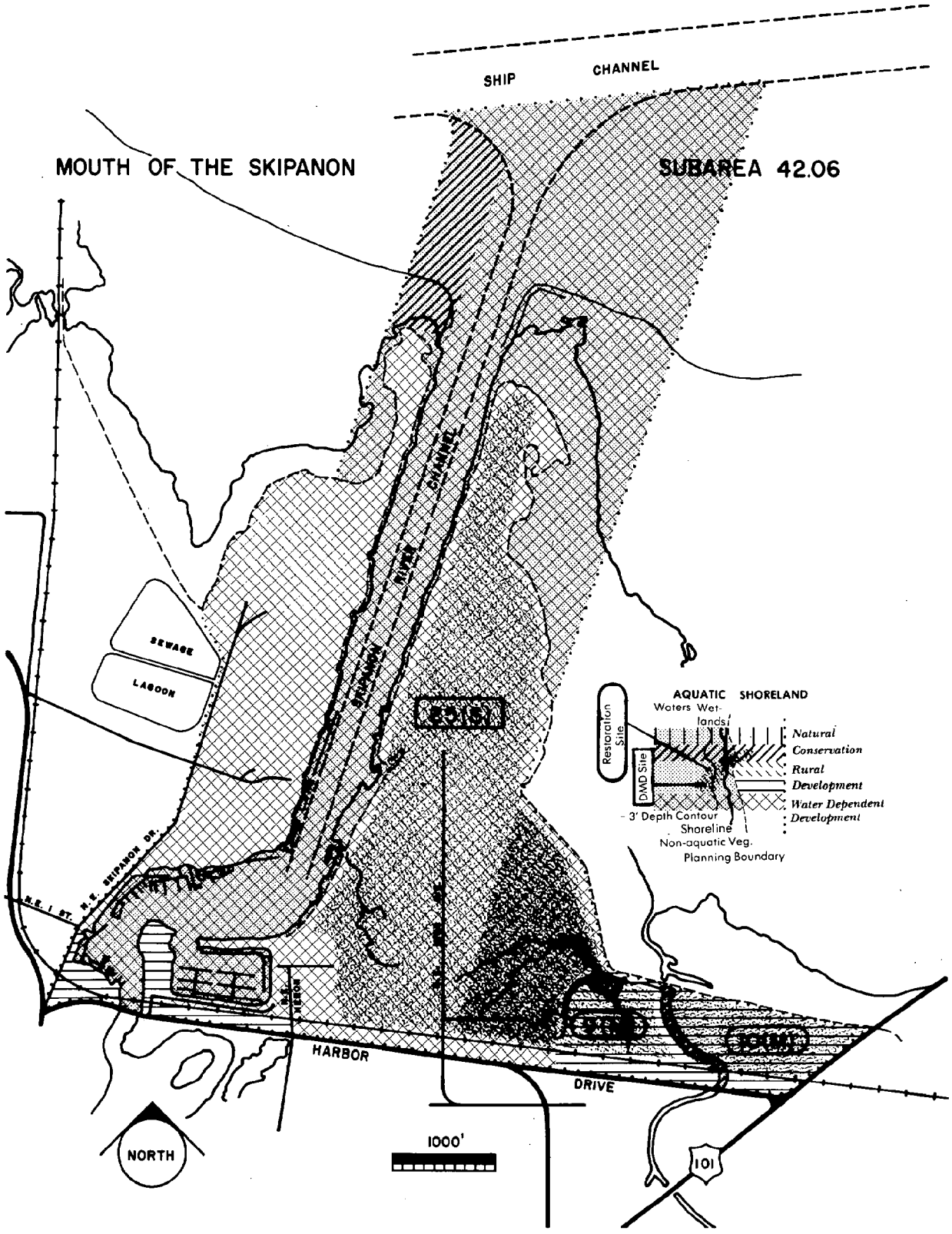
The construction of a shipping facility and back-up area on the west peninsula would have some impact upon the valuable wetlands of Alder Cove. Locating the 580 x 1500' area immediately north of the present facilities would impact approximately 7.8 acres of marsh area. 4.2 acres would be below Mean High Water (MHW) and 3.6 acres would be above MHW. The total of 7.8 acres of 10.4% of the approximately 75 acres of marsh in Alder Cove. By locating the facility directly on the Harbor Line and as far south as possible, these figures represent the minimum possible impacts on Alder Cove.

Practical alternatives to construction of the log and lumber loading facility do not exist. The natural resource values of adjacent Alder Cove require that the facility be designed to minimize impacts on the Cove. Economics require that the facility be constructed immediately adjacent to the existing Company operations. The long-term economic viability of Warrenton's largest employer requires that the Company find an alternative to the costly transportation and double handling which result from the present practice of transporting products to Astoria for shipment. A log and lumber loading facility on the Skipanon adjacent to present operations with an adequate back-up area designed to minimize harmful effects on Alder Cove is the only feasible choice.

The west peninsula of the Skipanon River also has significant potential for extra deep draft access directly on the Columbia River. Natural 40' water depths occur about 1500' from the end of the peninsula. There is ample space for manuevering and docking large ships. The proximity of this site to the ocean and the excellent condition of the 40' channel downstream mean that the site is one of few locations where, by judicious use of tides, vessels drawing in excess of 40' could be accommodated. As such, the site could provide the required mooring capability for economically shipping or receiving liquid or dry bulks in vessel sizes significantly greater than those using other port sites on the Columbia River or in Oregon. Very few alternatives sites for extra deep draft shipping in bulk cargoes are available. The east bank of the Skipanon, a possible alternative, may be committed to other



Port of Astoria Photo


MOUTH OF THE SKIPANON
SUBAREA 42.06
SHIP CHANNEL
SKIPANON RIVER CHANNEL
SEWAGE LAGOON
N.E. 1 ST.
N.E. SKIPANON DR.
HARBOR DRIVE
NORTH
1000'
101
AQUATIC
SHORELAND
Waters
Wet-lands
Restoration Site
DMD Site
Natural
Conservation
Rural
Development
Water Dependent
Development
3' Depth Contour
Shoreline
Non-aquatic Veg.
Planning Boundary

uses. The Tansy Point area is an additional alternative but is subject to controversy over deed restrictions on important portions of the area.

An extra deep draft bulk shipping facility could be built on the west peninsula of the Skipanon without requiring any dredging or filling of shallow productive areas. Vacant back-up land is available west and north of the Warrenton sewer lagoons (see 42.03). An elevated conveyor-belt operation could be constructed on piling without making additional encroachments on Alder Cove.

The City of Warrenton has proposed a second mooring basin, just north of the present mooring basin, to be excavated from shorelands.

Further development in this subarea raises questions of water quality in the Skipanon River. Water quality in the Skipanon River is marginal during summer months. Would increased dredging, river traffic, storm runoff and boat moorage coupled with decreased flushing caused by enlarging the channel result in significantly poorer water quality?

There are also land and water traffic problems. The surface area of the Skipanon River is quite limited. How much can the small boat traffic be increased without causing congestion problems and interfering with industrial operations? Highway traffic congestion is already a problem in downtown Warrenton; more industrial development at the mouth of the Skipanon River may increase traffic congestion there and on U.S. Highway 101. Increased small boat moorage would also increase congestion and result in a need for additional parking spaces. Industrial and commercial development of these areas will also have a significant impact on truck and rail traffic through the City of Astoria, where congestion is already severe during much of the year.

Exceptions to the LCDC Estuarine Resources Goal, Number 16, are required for designation of aquatic areas west of the west Skipanon peninsula, at the Warrenton Lumber Company site, and east and north of the east Skipanon peninsula at the Brown and Root site. (cf Appendix B.)

Aquatic Designations

Below the Harbor Street Bridge, the Skipanon River out to the main Columbia River channel is designated ***Development.*** Holbrook Slough and the west fork of Holbrook Slough are designated ***Conservation.*** East of the east peninsula, the aquatic area which lies within 1500 feet of MHHW on the east shoreline of the Skipanon River and out to the main navigation channel is designated ***Development.*** West of the west peninsula the aquatic area which lies within 580 feet of the Harbor Line on the west shoreline of the Skipanon River is designated ***Development*** north to MHW and ***Conservation*** from MHW out to the channel.

Shoreland Designations

The small peninsula directly to the west of the Warrenton Boat Basin which extends northward into the Skipanon River from the railroad track is designated ***Development.*** To the east of this spit up to N.E. Heron, the land between the railroad tracks and Harbor Drive is ***Development.*** The shoreland east of the west fork of Holbrook Slough is also designated ***Development.*** The remaining shoreland in this subarea is designated ***Water Dependent Development.***

Subarea Policies

1. Development of shorelands and adjacent aquatic areas on the east and west peninsulas of the Skipanon River shall be carried out so as to minimize adverse environmental impacts on productive tidal marshes, mud-sand flats, wildlife, fisheries and other important natural values of Youngs Bay and Alder Cove. Site planning shall include provision for vegetative buffers and other means for shielding the developed areas from adjacent marshes and flats.

2. In the ***Water Dependent Development*** area on the west peninsula of the Skipanon River, existing and new uses which are associated with wood processing and handling shall be allowed.

3. The ***Development*** designations for aquatic areas along both sides of the Skipanon are provided to accommodate future water-dependent uses. However, the designations do not create the presumption that dredging, filling or other alterations will be permitted automatically. Specific proposals for water-dependent development must: be justified in terms of available alternatives, public need and economic benefits; minimize adverse impacts on water quality and natural habitat; and meet other requirements of the permit processes.

Dredged Material Disposal

In this subarea there is one dredged material disposal site located on the east bank of the Skipanon [25(S)]. This large site could be used for disposal of material associated with Skipanon River projects, construction of a second Warrenton Boat Basin or development on the Columbia River side of the peninsula. (cf Dredged Material Management Plan 57.50, 59.)

Restoration and Resource Enhancement

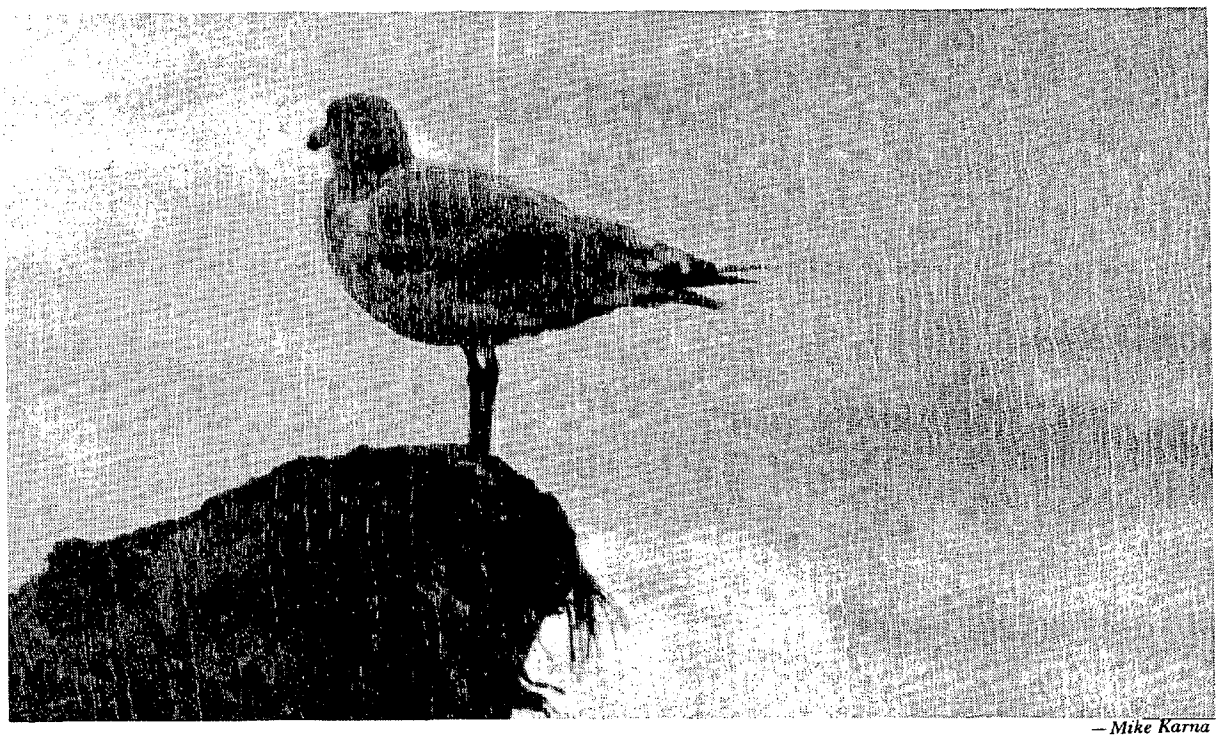
Two potential marsh mitigation sites are located in this subarea; one to the east of Holbrook Slough [10(M)]; and one to the west [9(M)]. Restoration to aquatic productivity would require construction of a new dike north of the railroad, breaching of the existing dikes and dredging necessary draining channels. (cf Restoration and Mitigation 65.)

Mitigation Needs

The proposed Pacific Fabricators, Inc. oil rig fabrication facility on the east peninsula of the Skipanon will impact about 118 acres of marshes and mud-sand flats for which the Division of State Lands will require mitigation. Other projects which might be proposed for this area would require mitigation for dredging or filling intertidal or tidal marsh areas. Restoration sites adjacent to the property east and west of Holbrook Slough should be considered for mitigation use, as well as sites up the Youngs or Lewis and Clark Rivers.

On the west bank of the Skipanon, the plan describes a potential project of Warrenton Lumber Company which may involve filling a small area of tidal marsh in Alder Cove. Such filling, if permitted, would require mitigation by restoring or creating another tidal marsh to compensate for the loss. Sites at Swash Lake (near the Columbia River mouth), on Youngs Bay, or up the Youngs or Lewis and Clark Rivers, should be considered as possible mitigation sites. (cf Restoration and Mitigation 66.30.)

42.07 YOUNGS BAY



—Mike Karna

General Description

Youngs Bay is one of the more biologically productive parts of the estuary. This subarea extends from the old U.S. Highway 101 Bridges over the Youngs River and the Lewis and Clark River to the 30-foot contour in the Columbia River. It includes large fringing marshes and tideflats. The boundary of the subarea follows the MHHW mark along the Astoria waterfront and the dike line elsewhere, except adjacent to the Port of Astoria and the proposed Brown and Root site. No shorelands are included. Warrenton, Astoria and Clatsop County all have jurisdiction in the Bay.

Aquatic Features

Because of numerous development proposals, Youngs Bay is the most intensively studied bay of the estuary. Like the rest of the Astoria waterfront, the area has been considerably altered by human activity. The most important physical alterations have been timber cutting in tributary watersheds with resulting sedimentation, the diking of tidal marshes and spruce swamps, the filling of shallow areas, and the alteration of the hydraulics of the bay by channels, fills and causeways. Youngs Bay originally extended from Tansy Point to Smith Point, but the peninsulas at the mouth of the Skipanon River have completely separated Alder Cove from Youngs Bay, though the systems remain similar in their biology. The strongest effects on the bay's hydraulics have been exerted by the Skipanon peninsulas, the fills at Smith Point (Port of Astoria piers) and the two causeways. The new Highway 101 causeway in particular has caused a marked reduction in currents and wave action in the interior of Youngs Bay. There has been extensive shoaling.

It is much harder to evaluate biological changes in Youngs Bay. There has been a very large loss of tidal marsh and open water habitats and perhaps a gain in mud/sand flats. There has been a very large loss of spawning habitat in tributary streams, runs of fall chinook and steelhead are greatly reduced, and the chum runs are virtually extinct. It is not possible to determine changes in the nutrient supply to the bay or changes in benthic populations or planktonic productivity.

Tides in Youngs Bay and tributary streams are of the standing wave type. Thus, the tidal range increases somewhat from the port docks (8.0 feet) to the tidal reaches of the tributary streams (8.6 or 8.7 feet). High water is nearly simultaneous throughout the system and occurs at slack water. This type of tide is typical of shallow bays but atypical of the Columbia River estuary.

Three basic water masses contribute to the circulation in Youngs Bay: Columbia River fresh water, tributary fresh water and marine water. Fresh water flow in the Columbia River is greatest during the spring freshet in June; winter freshets also occur. Youngs Bay tributary flow is strongest in December and January, when local rainfall is at a maximum. Intrusion of saline marine water is governed primarily by Columbia River flow and secondarily by tributary flow. Salinites in Youngs Bay rarely exceed 10 to 15 0/00, even in the fall. Under these conditions, the vertical salinity differences are pronounced and salinity may intrude upriver along the bottom as far as the upstream end of Haven Island in the Youngs River and river mile 5 in the Lewis and Clark River. During high flow periods for either the Columbia River or Youngs Bay tributaries, salinity is absent or nearly absent from Youngs Bay.

Current patterns in Youngs Bay are too complicated to be easily described. Eddies and stagnant areas prevail in the shallow, wetland areas. Stronger currents are found in the deep areas. Currents are highly variable, depending on winds, tides, freshwater flow and salinity intrusion.

Water quality is generally excellent in Youngs Bay; no serious pollutant sources are present and the flushing is excellent. Flushing times for the bay itself have been estimated to vary from 1 to 2 days, depending on tide and freshwater flow conditions. The flushing time of the tributaries below the head of tide is considerably slower; 3.3 to 16 days for the Lewis and Clark River and 2.3 to 7.8 days for the Youngs River. Water quality in some smaller tributaries and sloughs such as the Little Walluski River is definitely less favorable because of the poor flushing.

Close to and above tidewater, coarse sediments are carried as bedload by tributary streams. Below tidewater, bedload sand transport probably occurs only under flood conditions. Suspended fine sediment settles out in the lower reaches of the tributary streams and on the tidal flats. The sediments in the channel and the deeper parts of the bay are coarser than those in the lower reaches of the tributaries, reflecting the influence of Columbia River sediments. Sediments outside the causeway are almost entirely Columbia River sediments, except on the tidal flats between the Skipanon River and the causeway, where some Youngs Bay tributary material is found.

Youngs Bay appears to experience alternating periods of sedimentation and erosion, with variations occurring on time scales from storm events and seasons to years and decades. Sedimentation predominates (average rate throughout bay 1 cm/yr) and most strongly so in the shallow areas (up to 6 cm/yr). These observations are confirmed by the historical changes over the last century.

The authorized channel in Youngs Bay is 10 feet deep and 150 feet wide from deep water in the Columbia River to the upstream end of Haven Island (river mile 8). The authorized channel in the Lewis and Clark River was never dredged and the authorization has expired. The Youngs River Channel was last dredged in 1967.

The most ubiquitous marsh plants in Youngs Bay are cattails, bulrush and sedge. Most of the tidal marshes of Youngs Bay have, however, been filled or diked. Valuable fringing marshes remain at Dagget Point, along the entire south and west sides of the bay and at the entrance to the Lewis and Clark River. Because of the shoaling occurring in Youngs Bay, it is likely that the fringing marshes will continue to grow. High primary production by plankton (single-celled algae living in the water column) is also likely. Fresh water diatoms are the most common forms. Although there are no dominant, characteristically-estuarine types of phytoplankton in this estuary, there are characteristic types of estuarine zooplankton that are extremely abundant seasonally.

The mud and sand flats of Youngs Bay are among the more productive areas of the estuary for benthic (bottom dwelling) animals. These animals may live in the bottom sediments or just above the sediments. The variety, productivity and number of such organisms depend on such factors as sediment type, salinity, exposure to waves and currents, biological interactions and disturbance by man. Salinity and sediment type are the most important factors. Shallow, protected areas, such as Alder Cove, Cathlamet Bay and Youngs Bay, that have intermediate salinity and mixed sand and mud sediments are the most productive.

The organism of greatest interest has been the amphipod *Corophium salmonis*, because it is an important food for downstream migrant salmon (for fall chinook in particular), and because it plays an important role in the estuarine food chain. Populations of this small shrimp-like organism are used as an indicator to judge the value of tidal flats, though no quantitative relationship between population and productivity has been established. *Corophium salmonis* is the dominant benthic organism (in numbers and biomass) found in most areas of Youngs Bay. While this organism is found in many parts of the estuary, Youngs Bay is one of the richer areas and is known to be an important feeding area for juvenile salmon, starry flounder, longfin smelt, sculpin and other fish species.

Salmon and trout are the most important commercial species found in Youngs Bay. Adult fall chinook enter the estuary during late August, are most abundant in early September, and spawn by late September or October. The Klaskanine Hatchery, the South Fork of the Klaskanine River and the Lewis and Clark River support the most important runs in the Youngs Bay watersheds. Most juvenile fall chinook migrate to sea from March to November as subyearlings. During migration, they frequent shallow areas and river margins rather than deep channels. *Corophium* is their most important food in the estuary during spring and summer.

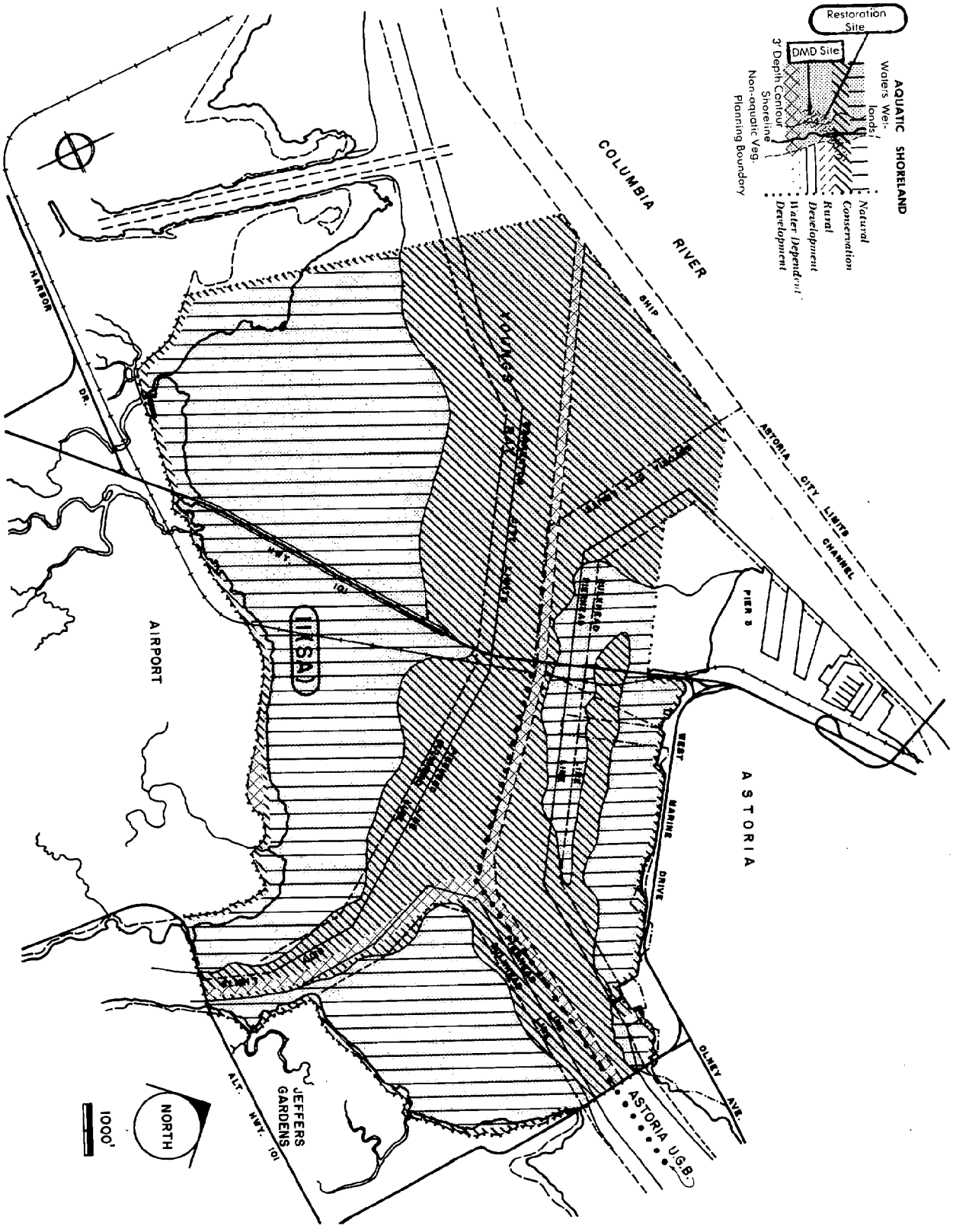
Adult coho salmon run during late summer and fall and are fished in Youngs Bay. The Klaskanine Hatchery, the Klaskanine River, the Youngs River and the Lewis and Clark River all support runs. Most juvenile coho go to sea as yearlings in May. Their diet in the estuary is thought to consist of *Corophium*, small fish and insects. They tend to migrate more quickly and in deeper water than the fall chinook.

Chum salmon were formerly very abundant in Youngs Bay, but are now nearly extinct. The adults return late in the season and spawn closer to tidewater than is the case with other salmon. The juveniles migrate earlier than other salmon (March to May) and eat *Corophium* and other benthic organisms.

Cutthroat trout are in Youngs Bay and tributary streams in all seasons, but are most numerous during the spawning season (December to January). There are runs in the Lewis and Clark River and possibly other streams, but no hatchery program. Winter steelhead return between November and March. Runs are supported by the Klaskanine Hatchery, the Klaskanine River, the Youngs River and the Lewis and Clark River. Juveniles of both cutthroat and steelhead may spend several years in the river before migrating to sea.

YOUNGS BAY

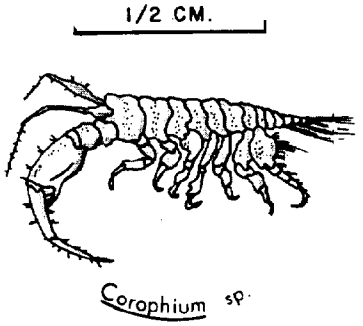
SUBAREA 42.07



Shad spawn in Youngs Bay tributaries, starry flounder and longfin smelt use the bay as a nursery and numerous other fishes use the bay as a feeding area.

Because of the loss of upriver salmon habitat, the estuary tributaries and Youngs Bay in particular will probably play an increasinly important role in salmon propagation in future years. In addition to the state hatchery program, Astoria fishermen have started their own fishrearing program, with ponds on Tucker Creek.

While the lower estuary is not as heavily used by waterfowl as the upper estuary, the marshes and flats support significant populations of both resident and migratory waterfowl. Wading birds such as blue herons, shorebirds, gulls, colonial nesting birds, gamebirds and other varieties are found along the shoreline.



Shoreland Features

There are no shorelands in this subarea.

Human Use

The primary uses are boating, sports fishing, commercial fishing, log transport and channel maintenance.

Issues and Findings

Youngs Bay is surrounded by Warrenton and Astoria. Several recent land use disputes have centered around fills in Youngs Bay or uses of nearby shorelands that might have polluted the bay. Prime industrial sites on Youngs Bay shorelands include the area west of Pier 3, the east peninsula of the Skipanon River (the Brown and Root site), and the Astoria Airport. These sites could be made larger by filling productive shallow areas. Dredging an entrance channel into the Lewis and Clark River was authorized, but was not economically feasible. This project and maintenance dredging of the authorized channel in Youngs River will probably be suggested in the future. The use of the bay and tributaries for fish propagation will probably also increase.

Major limitations on development surrounding the bay include the impacts of each development, the cumulative effects of all developments, and limited land transportation west of Youngs Bay. Navigational access to the Youngs Bay shorelines is limited by fringing tidal marshes, shallow water and the high shoaling rate. Commercial use of the bay in the near future will probably be limited to log transport and fishing. Recreational boating and fishing will probably increase.

The old PP&L power plant facility has the potential for development of either water dependent or other uses of moderate size. Water access to the site could be development with minimal impacts on aquatic productivity.

The Port of Astoria is developing a Master Plan for the airport, which is adjacent to Youngs Bay. The dike adjacent to the runway designated for an instrument landing system intrudes into the clear zone of that runway (cf 55.08) and may need to be moved waterward. This would involve removal of spruce and other vegetation from approximately one acre outside the present dike. This activity would be a fill for an other than water dependent use and will require an exception to the Estuarine Resources Goal, Number 16 (cf Appendix B).

Aquatic Designations

The navigation channels are designated ***Development.*** A small wetland spruce swamp outside the dike adjacent to the airport is designated ***Development*** to permit realignment of the dike, which presently intrudes into the clear zone of the runway designated for an instrument landing system. The mud flats, tidal flats, and fringing marshes are designated ***Natural,*** except for an 80 foot ***Conservation*** buffer adjacent to the shoreland and a ***Conservation*** area adjacent to the old PP&L facility. The remaining aquatic areas are designated ***Conservation.***

Subarea Policies

1. Dredging of shallow biologically productive areas adjacent to dikes as a source of material for dike maintenance shall be allowed upon a demonstration that:
   - Alternative sources of material are not available or are not economically feasible;
   - The dredging method selected will not leave potholes where juvenile salmon and other fishes might be stranded at low water; and
   - Other disruption of tidal flats and tidal marshes is minimized.

2. Minor dredging shall be permitted in all areas where necessary to open drainage channels from tide boxes to deeper water to assure efficient operation of the drainage system.

3. Subject to conditional use procedures, shallow-draft water access may be developed at the old PP&L facility.

Restoration and Resource Enhancement

The shoal area south of the Youngs Bay Bridge causeway [11(SA)] has been proposed as a restoration site (cf Restoration and Mitigation 65). Restoration would consist of drainage culverts through the causeway to promote better tidal circulation and thus decrease the sedimentation rate in that part of Youngs Bay.

Mitigation Needs

If the relocation of the dike adjacent to the airport is approved, it is likely that mitigation of adverse effects from that project will be required. The mitigation could involve restoration or creation of similar habitat elsewhere in the estuary; sites in Youngs Bay, the Youngs River, or Lewis and Clark River should be considered. (cf Restoration and Mitigation, 66.40.)

42.08 AIRPORT AND VICINITY

General Description

This subarea consists of diked shorelands that are part of or adjacent to the Port of Astoria Airport. The subarea is bounded by the dikeline on the north and east, U.S. Highway 101 on the northwest, old U.S. Highway 101 on the east and the planning area boundary (tideland soils) on the south. The subarea lies within the present Warrenton city limits, except for an area south of the Airport under Clatsop County's jurisdiction.

Aquatic Features

The only aquatic areas in this subarea are diked sloughs and marshes. Because of peat soils, the oxygen levels in some of these sloughs may be low during the summer months. Fish and benthic populations have not been sampled, but presumably there are low to moderate benthic populations and some warm-water fish. These sloughs and marshes are used by waterfowl, shore, marsh and songbirds for nesting, resting and feeding. Vegetation in low areas includes sedge, cattail, bulrush, and grasses.

Shoreland Features

The entire subarea is protected by dikes. With the exception of filled areas at the airport, the entire subarea is in the 100-year floodplain. Portions of the airport fill are within the 500-year floodplain. The soils are fill material, Coquille-Tidal Marsh (fresh) - Clatsop Association, and Walluski-Knappa Association.

Vegetation in the higher areas includes alder, willow and Sitka spruce with a dense understory of blackberry. Cleared areas are used for grazing. The area has a high wildlife value, because of the mixture of habitats and limited human access.

Human Use

The major human uses are agriculture, rural housing (adjacent to highways), recreation, light industry, and the airport. Agricultural suitability is poor to moderate; the major agricultural use is grazing. Timber values are very low except for small isolated areas.

Transportation access is provided by new and old U.S. Highway 101. Although the railroad runs through this subarea, it is effectively cut off from the airport by the runways and the sloughs. Only the land along the new highway can be said to have rail access. Because of the dike access problem and shallow water, there is no navigationally useful water access to the airport. Water and sewer are provided by the City of Warrenton. The primary recreational use is for hunting.

Issues and Findings

The Clatsop County Airport is a valuable asset to the area. The Oregon Department of Transportation has strongly recommended that regulatory measures be taken to protect present and future air operations. These measures should provide for airport related uses and should prevent encroachment by residential and other people-intensive uses. The City of Warrenton is developing an airport overlay zone to reserve the airport for appropriate uses and protect it from urban encroachment.

The Airport Master Plan is being developed by the Port of Astoria. The Port is planning to develop a portion of the airport property as a light industrial park, despite constraints such as location in the floodplain and soils with low load-bearing capacity. The Port would like to fill much of the area with dredged material, but the distance from the sources is too great.

The Port of Astoria is also studying the possibility of installing an Instrument Landing System to allow use by U.S. Coast Guard Falcon jets. Regulations and standards of the Federal Aviation Administration may require moving one section of dike to create a sufficient clear zone. Dike relocation could impact a small wetland habitat in Youngs Bay (cf 42.07) and require an exception to the LCDC Estuarine Resources Goal, Number 16.

Aquatic Designations

The creeks and sloughs are designated ***Conservation.***

Shoreland Designations

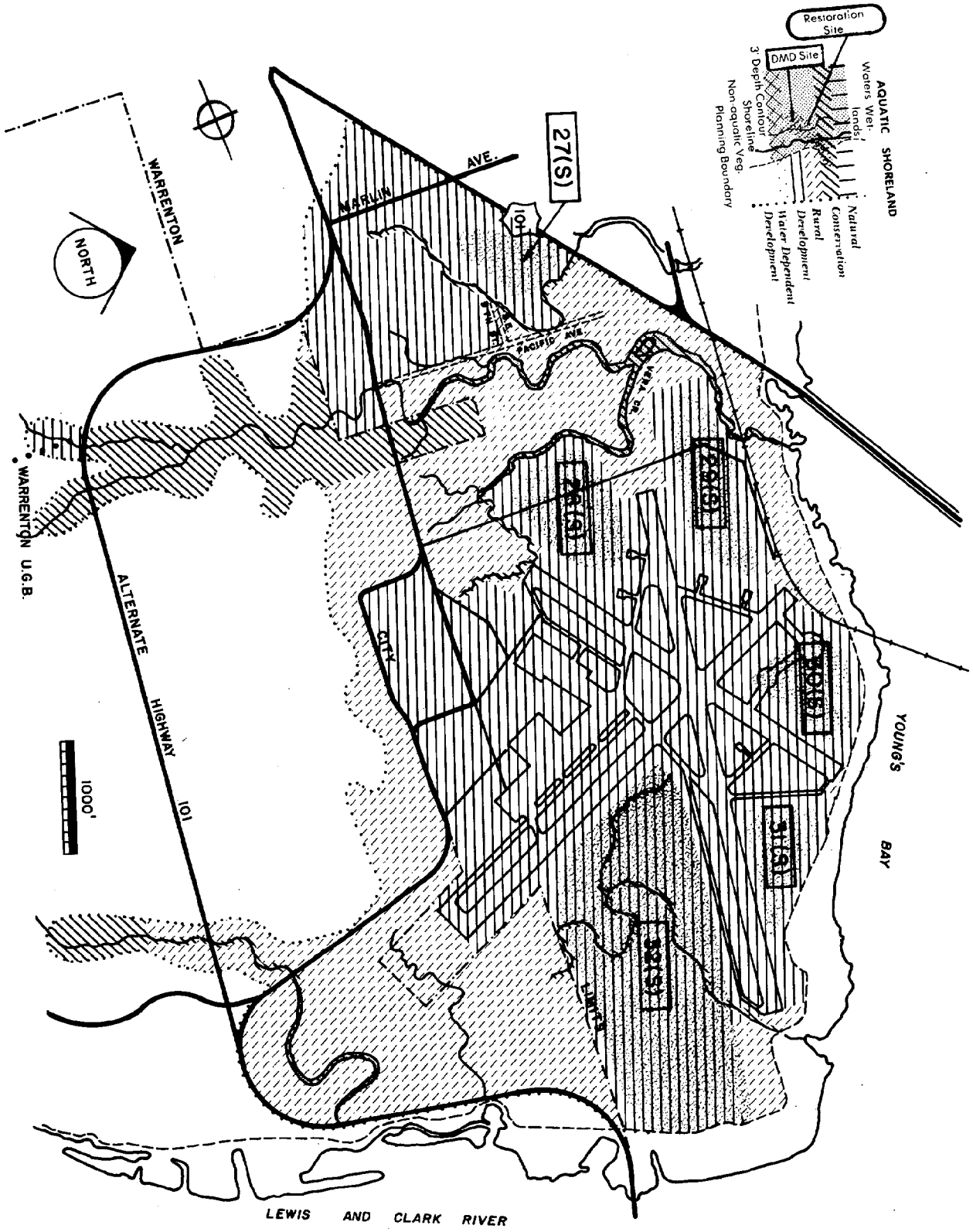
The shoreland north of the railroad is designated ***Rural.*** East of Vera Creek, the shoreland within the Warrenton city limits is designated ***Development.*** Agricultural areas outside the Warrenton city limits are designated ***Rural*** and a small forested area is ***Conservation.*** West of Vera Creek to S.E. Pacific Avenue and Holbrook Slough is designated ***Rural.*** All clear zones at the ends of the airport runways are designated ***Rural.*** The remainder of the subarea west to U.S. Highway 101 is designated ***Development.***

Dredged Material Disposal

There is one site [27(S)] associated with projects on the Skipanon.

There are five dredged material disposal sites in this subarea [28(S)-32(S)] which are located on airport property. The Port of Astoria desires to fill these areas to make them more suitable for industrial development.

Except for the Youngs Bay Channel, active or proposed dredging projects are too far from these sites to make their use economically feasible. (cf Dredged Material Management Plan 57.10, 57.50, 59.)


Restoration Site
DMD Site
3' Depth Contour
Shoreline
Non-aquatic Veg.
Planning Boundary
AQUATIC SHORELAND
Waters Wet-lands
Natural Conservation
Rural Development
Water Dependent Development
WARRENTON
NORTH
WARLIN AVE.
27(S)
101
PACIFIC AVE.
26(S)
28(S)
30(S)
31(S)
32(S)
CITY LIMITS
WARRENTON U.G.B.
ALTERNATE HIGHWAY 101
1000'
YOUNG'S BAY
LEWIS AND CLARK RIVER

42.09 LEWIS AND CLARK RIVER

General Description

This subarea includes the aquatic and shoreland areas above U.S. Highway 101 (alternate) bridge to the extent of tideland soils. The shoreland north of Jeffers Slough is excluded (see 42.10, Miles Crossing). On the west bank the shoreland west of old Highway 101 is excluded (see 42.08, Airport). The entire subarea is under Clatsop County's jurisdiction.

Aquatic Features

The tides, circulation, sedimentation patterns and aquatic life of the Lewis and Clark River system have been discussed under subarea 42.07, Youngs Bay. The average freshwater flow of the Lewis and Clark River is about 250 cfs; some water is diverted from this river basin to the water system of the City of Warrenton. Tidal influence extends under low flow conditions to about RM 11.

Important tidal marshes remain along the west bank near the mouth (RM 1.8 to 3.5) and adjacent to Fort Clatsop National Memorial (RM 4). Numerous small and fringing marshes remain. Diked, freshwater marshes have not been fully inventoried. Bird use of the river and marshes for feeding and nesting is moderate, though not as high as in Cathlamet Bay and other areas further upriver.

Shoreland Features

Most shorelands in this reach are low, diked lands in the 100-year floodplain. Soils are of the Coquille-Tidal Marsh (fresh) - Clatsop and Walluski-Knappa Associations. The soils are fair to good for agricultural use. Most of the land is or has been in agricultural production. There is little commercially valuable timber, but adjacent uplands are highly productive timberland. Wildlife values are high; deer, elk, and small mammals are found.

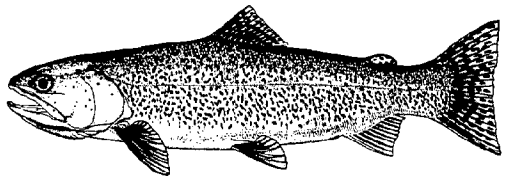
Human Use

The important land uses are agriculture (largely grazing), rural housing, and the Crown Zellerbach log dump. Highway access is provided by U.S. Highway 101 (alternate) and county roads. Water is private or provided by the Lewis and Clark Water District. There is no sewer system. The scenic value of the river is high. The Fort Clatsop National Memorial commemorates the winter headquarters of the Lewis and Clark Expedition. There are several public access points for fishermen. The major human uses of the waters are fishing, log sorting, storage and transport, and recreational boating. There are two active diking districts in the subarea; most dikes are maintained by barge-mounted dragline.

Issues and Findings

There is very little development potential because of the flood hazard, poor transportation network and distance from developed areas. Some housing development may occur on adjacent upland areas.

Significant issues in this subarea include the location of Exclusive Farm Use Zones and water related issues such as the preservation of diked freshwater wetlands, log storage in wetland areas where logs may go aground at low water, and the



- Ron Pittard - Searep Studio, courtesy Clatsop County

dredging of shallow productive areas for fill material to maintain dikes. Dredging of the Lewis and Clark River Connecting Channel (10 feet deep and 150 feet wide) was at one time authorized, but has since been de-authorized. However, private dredging regularly occurs in the river.

Maintenance of fresh water flow and water quality during summer minimum flow periods is important for continuation and enhancement of fish runs. There is potentially a conflict between public water supply and the need to maintain minimum stream flows.

This subarea includes hundreds of acres of farmland and many residences which are dependent upon an extensive diking and drainage system for protection from flooding. The maintenance of this system is the responsibility of local diking districts which have limited funds. In some instances the only economically feasible source of material for dike maintenance is the river bottom sediments outside the dike.

Lands behind the dikes are drained by a system of tide boxes. For the tide boxes to function effectively, the area outside the dike in front of the tide boxes must remain low enough so that water will move through the tide boxes and drain into the river at low tide. Because of substantial shoaling in some areas, limited dredging of tide box drainage channels is necessary.

Aquatic Designations

The river channel is designated ***Development*** from the bridge to the upstream end of the Crown Zellerbach log booming area. Adjacent to the ***Water Dependent Development*** Shoreland (42.10, Miles Crossing) south of the U.S. Highway 101 (alternate) bridge and including the mouth of Jeffers Slough, the aquatic area from the shoreline out to the channel is designated ***Development.*** Diked sloughs are designated ***Rural.*** The remaining water areas are designated ***Conservation.***

Shoreland Designations

The Crown Zellerbach log dump is designated ***Development.*** The Fort Clatsop National Memorial and a small forested shoreland area are designated ***Conservation.*** The remaining shoreland is designated ***Rural.***

Subarea Policies

1. Existing log storage areas should be inventoried to determine where logs rest on the bottom at low water. Use of these areas should be minimized and phased-out as new sites adequate to meet industry needs are provided.

2. Dredging of shallow biologically productive areas adjacent to dikes as a source of material for dike maintenance shall be allowed upon a demonstration that:

- Alternative sources of material are not available or are not economically feasible;
- The dredging method selected will not leave potholes where juvenile salmon and other fishes might be stranded at low water; and
- Other disruption of tidal flats and tidal marshes is minimized.

3. Minor dredging shall be permitted in all areas where necessary to open drainage channels from tide boxes out to deeper water to assure efficient operation of the drainage system.

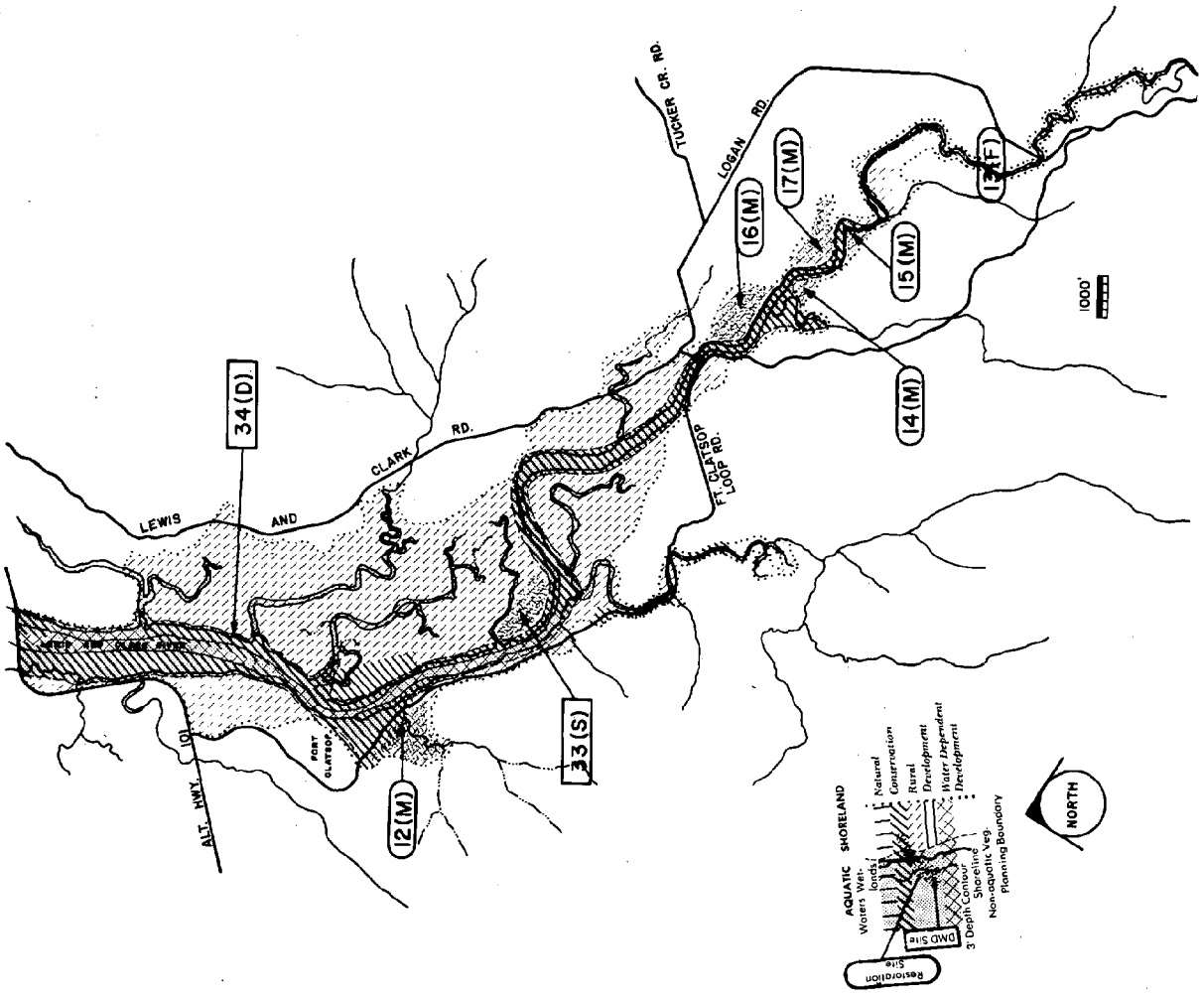
Dredged Material Disposal

There is a site [33(S)] associated with Crown Zellerbach's log sorting operation, and possible dike sites are considered under 34(D).

Restoration and Resource Enhancement

Enhancement of depleted fish runs through construction of fish rearing ponds has been proposed for unspecified locations along the Lewis and Clark River. Fish runs, particularly chum salmon, could be expanded significantly.

Five potential marsh mitigation sites are located in this subarea along the river [12(M), 14(M), 15(M), 16(M), 17(M)]. All areas are presently diked. Restoration would consist of dike breaching or removing tidegates. A careful evaluation of agricultural vs. aquatic resource values should be made prior to considering these areas for restoration. (cf Restoration and Mitigation, 65.)



42.10 MILES CROSSING

General Description

This shoreland area covers the northern tip of the peninsula between the Youngs River and Lewis and Clark River. It consists of low, diked land in agricultural, residential, commercial and light industrial uses. Present jurisdiction is by Clatsop County. The area is not included in Astoria's Urban Growth Boundary although future inclusion is a possibility (see subarea policy below).

Aquatic Features

The only aquatic areas in this subarea are diked sloughs. Some of these sloughs have moderate waterfowl habitat value, and some may harbor warm-water game fish. The sloughs are the major collections for drainage of the low-lying diked lands in this area.

Shoreland Features

These shorelands, except for the causeway fill for the U.S. Highway 101 (alternate) Bridge over the Youngs River, are diked. The area is entirely within the 100-year floodplain, with the exception of the highway and some lands north and west of the highway that are in the 500-year floodplain. Dike maintenance by the diking districts is described by the Corps of Engineers as generally adequate. Areas on both rivers have been rip-rapped by the Corps of Engineers in the last decade to protect against erosion.

Soils are of the Coquille-Tidal Marsh (fresh) - Clatsop Association and topography is flat. Because the land is very low, the agricultural suitability is fair to moderate, and there is no timber of commercial value.

Human Use

The major agricultural use is grazing. Other land uses include rural and low-density residential housing, commercial uses and light industry. The only water-related uses are the AMCO Shipyard on the Lewis and Clark River and boat construction at the mouth of Cook Slough on the Hess property. Commercial and industrial uses are concentrated along U.S. Highway 101 (alternate), which has access to Warrenton and Astoria. County roads provide access to nearby rural areas.

There is no sewer system, and septic tank suitability is very poor. It is unlikely that permission could be obtained to discharge sewage into Youngs Bay. Therefore, sewering the area would require connection to the Warrenton or Astoria sewer systems. Water is provided by two water districts.

Water and marsh areas adjacent to this subarea are used for hunting, fishing, boating and trapping. Some shoreline views are scenic.

Issues and Findings

The planning process has included extensive discussion as to whether major portions of this subarea should be included in Astoria's Urban Growth Boundary. The City and some commercial interests favored inclusion. A large majority of area residents who voiced their opinion were opposed. A decision was made not to include the area. Future inclusion is possible (see subarea policy below).

The area has significant development potential due to its proximity to Astoria and the availability of significant portions of flat land. This potential is constrained, however, by the lack of sewers, flood hazard, and poor soil suitability. Water oriented development is feasible only along the Lewis and Clark River.

This subarea includes hundreds of acres of Exclusive Farm Use land and many residences which are dependent upon an extensive diking and drainage system for protection from flooding. The maintenance of this system is the responsibility of local diking districts which have limited funds. In some instances the only economically feasible source of material for dike maintenance is the river bottom sediments outside the dike.

Lands behind the dikes are drained by a system of tide boxes. For the tide boxes to function effectively, the area outside the dike in front of the tide boxes must remain low enough so that water will move through the tide boxes and drain into the river at low tide. Because of substantial shoaling in some areas, limited dredging of tide box drainage channels is necessary.

Aquatic Designations

Dike sloughs, the only aquatic portions of this subarea, are all designated ***Rural.***

Shoreland Designations

All of the shorelands of this subarea are designated ***Rural,*** except for the existing industrial zone on the east bank of the Lewis and Clark River which is designated ***Water Dependent Development,*** and the existing industrial zone between U.S. Highway 101 (alternate) and Nowlens Slough, which is designated ***Development.***

Subarea Policies

1. The ***Rural*** designation in the Miles Crossing area recognizes that there are no plans to include this area in the Astoria Urban Growth Boundary (UGB) at this time. However, there are commitments between the County and City to reconsider the UGB issue during future review and update of plans. In the meantime, the nature and intensity of new uses should be consistent with the ***Rural*** designation and availability of public services.

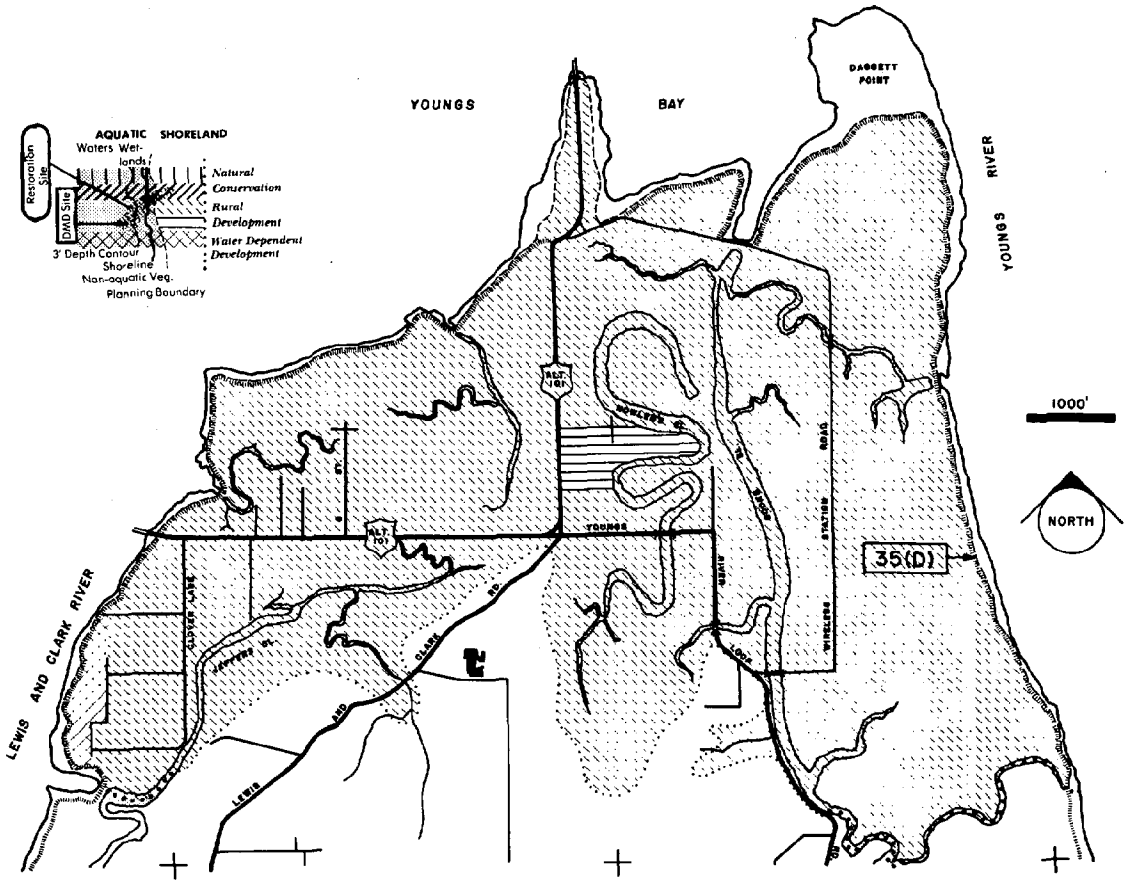
2. Dredging of shallow biologically productive areas adjacent to dikes as a source of material for dike maintenance shall be allowed upon a demonstration that:

- Alternative sources of material are not available or are not economically feasible;
- The dredging method selected will not leave potholes where juvenile salmon and other fishes might be stranded at low water; and
- Other disruption of tidal flats and tidal marshes is minimized.

3. Minor dredging shall be permitted in all areas where necessary to open drainage channels from tide boxes out to deeper water to assure efficient operation of the drainage system.

Dredged Material Disposal

The dike on the Youngs River side of this subarea is designated as a dredged material disposal site [35(D)]. Material would have to be barged in and placed on the dike with a clamshell.



42.11 YOUNGS RIVER

General Description

This subarea includes the aquatic and shoreland areas of Youngs River above the U.S. Highway 101 (alternate) bridge to the extent of tideland soils. On the west side of the river, the shoreland north of Millers Slough is not included. (cf 42.10, Miles Crossing.) The boundary of this subarea with South Astoria, 42.12, is the pierhead line from the bridge to the point where the Astoria city limits intersect with the Youngs River shoreline. The subarea is entirely under Clatsop County's jurisdiction. A very small aquatic portion of the subarea between the pierhead line and the center of the authorized channel is within the City of Astoria's proposed Urban Growth Boundary.

Aquatic Features

The tides, circulation, sedimentation patterns, navigational channel and aquatic life of the Youngs River system have been discussed under 42.07, Youngs Bay. The average fresh water flow of the Youngs River is about 600 cfs at the mouth. Tidal influence extends under low flow conditions to Youngs River Falls (RM 13), which is a significant scenic attraction. The falls cut off any possibility of anadromous fish spawning in a large part of the Youngs River watershed. The largest remaining tidal marshes are Fry and Grant Islands, between RM 7 and 8, and Cooperage Slough, at RM 9. Most areas that were historically marsh have been diked. Numerous small and fringing marshes remain. Diked, freshwater marshes have not been fully inventoried. Bird use of the river and marshes for feeding and nesting is moderate, though not as high as in Cathlamet Bay and other areas upriver.

Shoreland Features

Most shorelands in this reach are low, diked lands in the 100-year floodplain. Soils are of the Coquille-Tidal Marsh (fresh) - Clatsop, Walluski-Knappa, and the Nehalem Associations. The soils are fair to good for agricultural use. Most of the land is or has been in agricultural production. There is some commercially valuable timber and adjacent uplands are highly productive timberland. Wildlife values are high; deer, elk, coyote and small mammals are found.

Human Use

The important land uses are agriculture (both grazing and crops) and rural housing. Highway access is provided by State Highway 202 and county roads. Water is private or provided by three water districts; there is no sewer system, except at the old naval hospital. The scenic value of the river is high. There is a County Park at Youngs River Falls and there are several undeveloped access points for fishermen.

The major human uses of water areas are fishing, log storage and transport, and recreational boating. There is one active diking district and one defunct diking district on the Youngs and Klaskanine Rivers; most dikes throughout the area are maintained by barge-mounted dragline.

Issues and Findings

There is little development potential, because of the flood hazard, poor transportation network and distance from developed areas. Housing developments may occur on adjacent upland areas. The old naval hospital site (the Drucker Property) is on high ground near the intersection of the Youngs and Walluski Rivers, has water and sewer systems, and could be developed. Increased residential use in the Youngs River area is likely.

Significant issues in this subarea include the location of Exclusive Farm Use Zones and the possible extension of the Astoria Urban Growth Boundary. Water related issues include the preservation of diked, freshwater wetlands, log storage in wetland areas where logs may go aground at low water, and the dredging of shallow productive areas for fill material to maintain dikes.

This subarea includes hundreds of acres of farmland and many residences which are dependent upon an extensive diking and drainage system for protection from flooding. The maintenance of this system is the responsibility of local diking districts which have limited funds. In some instances the only economically feasible source of material for dike maintenance is the river bottom sediments outside the dike.

Lands behind the dikes are drained by a system of tide boxes. For the tide boxes to function effectively, the area outside the dike in front of the tide boxes must remain low enough so that water will move through the tide boxes and drain into the river at low tide. Because of substantial shoaling in some areas, limited dredging of tide box drainage channels is necessary.

A boat construction facility is located immediately adjacent to the tide box at the mouth of Cook Slough. This facility was built and utilized for the construction of wooden fishing vessels in the 1930's and 1940's. Following a period of inactivity, steel-hulled fishing vessels are presently being built at this location. Extensive shoaling in this area has substantially reduced water depths in the area, however, and launching the vessels is extremely difficult. Vessels can be only partially completed (bare hull and house) before launching in order that their draft is minimized. Even under these circumstances, all launching activities must occur at high tide.

The dredging of a "pothole" in the area would allow vessels to be launched in a safe manner and would permit the vessels to be moored at this location while the final outfitting takes place. Movement out to the main river channel could then occur at high tide. Continued shoaling of this area, however, could result in shallow water depths which would not allow the movement of these vessels (drafts of approximately 9 feet) out to the river channel even on the highest tides. Under those circumstances a plan amendment to permit limited dredging for ingress and egress to the area would be appropriate.

The Youngs River subarea contains significant natural values which should be protected. Except for extensive diking, people have changed this environ-

ment to a lesser extent than other portions of the estuary. There is a substantial local and state investment in fisheries enhancement. The state operated a fish hatchery on the Klaskanine River and the Clatsop Economic Development Committee operated fish rearing ponds near Tucker Creek. Expansion of these fish-rearing efforts is being planned. The construction of a fish ladder at Youngs River Falls and the use of the area for mitigation sites could result in development of the river as an extremely valuable fisheries resource.

Aquatic Designations

The authorized navigation channel in Youngs River is designated ***Development*** to the foot of 11th Street. Aquatic areas inside the diked sloughs are designated ***Rural.*** The following aquatic areas are designated ***Natural:*** Cooperage Slough, Grant Island, Fry Island, and the tidal flats downstream of the Walluski River on both sides of the river including Dagget Point. An 80 foot ***Conservation*** aquatic buffer is provided between the ***Natural*** tide flats and the ***Rural*** shoreland. Cooks Slough is designated ***Natural*** outside the tidegate except for a ***Conservation*** designation for the area adjacent to the Hess boat construction facility. The remaining aquatic areas of this subarea are designated ***Conservation.***

Shoreland Designations

Shorelands in this subarea used for agriculture and associated uses are designated ***Rural.*** Areas along the upper tidal reaches of the Walluski, Klaskanine, and Youngs River, and shorelands used primarily for timber production are designated ***Conservation.***

Subarea Policies

1. Existing log storage areas should be inventoried to determine where logs rest on the bottom at low water. Use of these areas should be minimized and phased-out as new sites adequate to meet industry needs are provided.

2. Dredging of shallow biologically productive areas adjacent to dikes as a source of material for dike maintenance shall be allowed upon a demonstration that:

- Alternative sources of material are not available or are not economically feasible;
- The dredging method selected will not leave potholes where juvenile salmon and other fishes might be stranded at low water; and
- Other disruption of tidal flats and tidal marshes is minimized.

3. Minor dredging shall be permitted in all areas where necessary to open drainage channels from tide boxes out to deeper water to assure efficient operation of the drainage system.

4. To protect present investments and the future potential of the fisheries resource of the Youngs River, new development in the area shall be carried out so as to preserve water quality, biological productivity, and other factors which contribute to fisheries production.

Dredged Material Disposal

There are two areas at the mouth of the Walluski River where dredged material disposal is suggested for dike maintenance [35(D)]. Material would be barged to the sites and offloaded by clamshell. This type of disposal may also be useful for other areas where dikes protect low-lying agricultural lands.

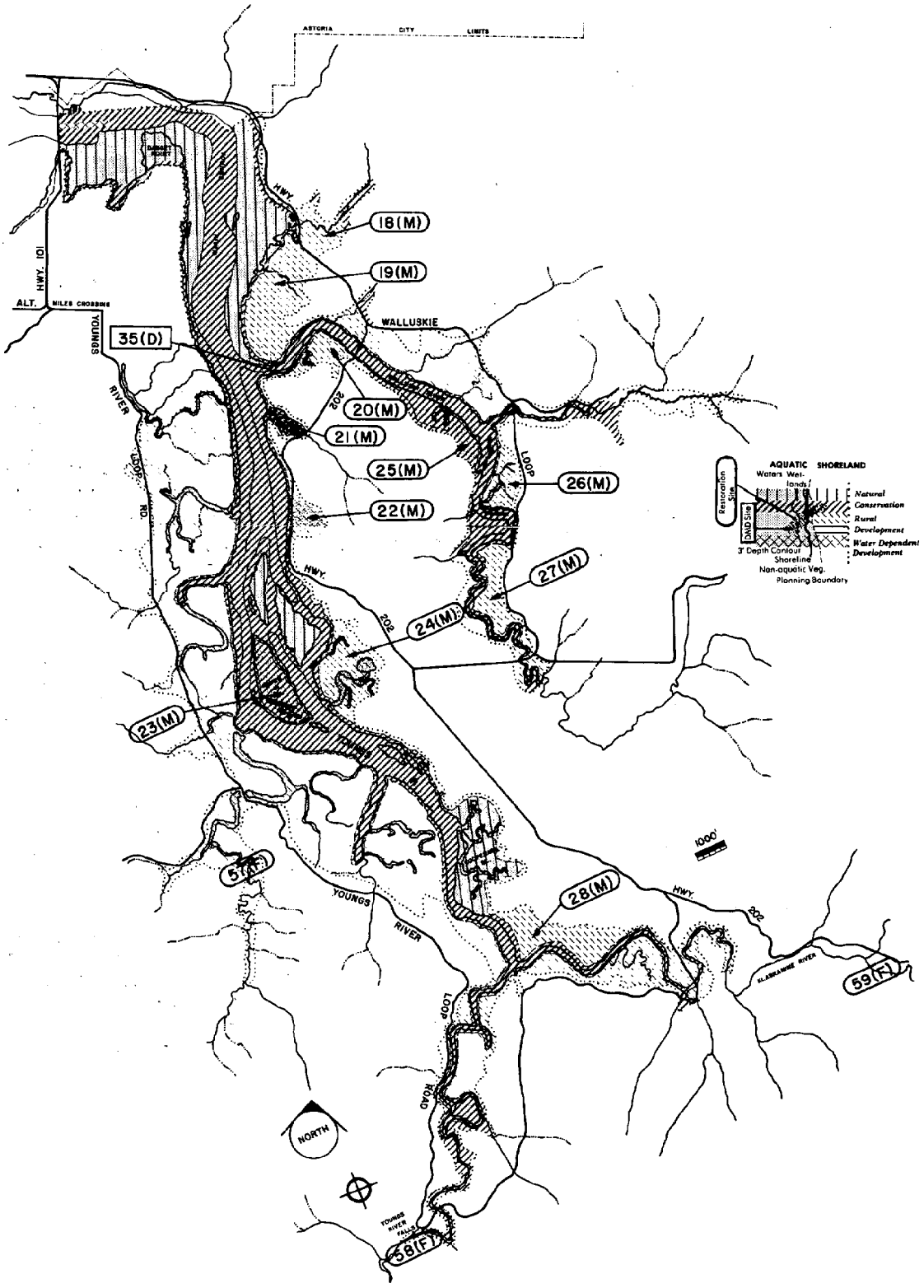
Restoration and Resource Enhancement

A fish ladder has been proposed for the Youngs River Falls. Such a facility would open up the upper Youngs River Basin to anadromous fishes. The costs versus benefits, particularly the impacts on the native fishery, need to be carefully evaluated.

Construction of additional fish-rearing ponds to supplement existing natural and hatchery production has been proposed to enhance fishery resources. The chum salmon populations have been severely depleted; chum, coho and chinook salmon runs could all be expanded.

An earth-filled dam on the North Fork of the Klaskanine River would provide water storage to supplement river flow during low discharge periods. This would benefit the state hatchery on the river and provide more water for natural runs as well.

Eleven potential marsh mitigation sites have been identified in this subarea. These areas are presently diked and restoration would involve removing dikes or opening tidegates, to allow the areas to revert to tidal marshes. Prior to considering an area for restoration, a careful evaluation of agricultural vs. aquatic resource values should be made. (cf Restoration and Mitigation, 65.)


ASTORIA CITY LIMITS
HWY. 101
ALT.
YOUNGS RIVER LOOP RD.
HWY. 202
WALLUSKIE
YOUNGS RIVER LOOP ROAD
YOUNGS RIVER FALLS
NORTH
1000'
18(M)
19(M)
35(D)
20(M)
21(M)
25(M)
22(M)
26(M)
27(M)
24(M)
23(M)
51(F)
28(M)
59(F)
58(F)
AQUATIC SHORELAND
Waters Wet-lands
Restoration Site
DMD Site
3' Depth Contour
Shoreline
Non-aquatic Veg.
Planning Boundary
Natural
Conservation
Rural
Development
Water Dependent Development

42.12 SOUTH ASTORIA

General Description

This subarea covers the north shore of Youngs Bay between the new Youngs Bay bridge and the junction of the Astoria city limits with the shoreline. West of the old Youngs Bay bridge only the shorelands are a part of the subarea. East of the old Youngs Bay bridge the shorelands and the aquatic area out to the Pierhead Line are included. The shoreline boundary follows alternate U.S. Highway 101 east to its junction with 5th Street, then east parallel to Olney Avenue to 7th Street, then north to Olney Avenue, then east on Olney Avenue (or the 100-year floodplain, whichever is further inland).

Most of the subarea lies within the present city limits and the proposed Urban Growth Boundary of the City of Astoria. Some aquatic areas in the eastern portion of the subarea are under Clatsop County's jurisdiction.

Aquatic Features

The physical and biological properties of the Youngs River/Youngs Bay system are described under Youngs Bay (42.07) and Youngs River (42.11). The reach between the old highway bridge and the Tidepoint Dock is the only part of the South Astoria waterfront with access to deep water. Depths in the Youngs River Channel adjacent to this reach range from 20 to 50 feet. Water oriented facilities include the Bumblebee Shipyard, the Astoria Yacht Club piers, the Tidepoint Dock and several smaller piers and docks.

Most of the shoreline of this subarea is rip-rapped. Fringing marshes are generally found outside the rip-rap.

Shoreland Features

The shorelands of this subarea are a narrow band of developed land between the water and Marine Drive/Highway 202. Soils are fill material and Coquille-Tidal Marsh (fresh) - Clatsop Association. Wildlife values are minimal, because most of the surface is paved and the shoreline is rip-rapped.

Human Use

Residential, commercial and industrial uses are found on these shorelands. The water oriented uses include the Bumblebee Shipyard, Astoria Yacht Club, boat moorage, and sand and gravel off-loading.

Issues and Findings

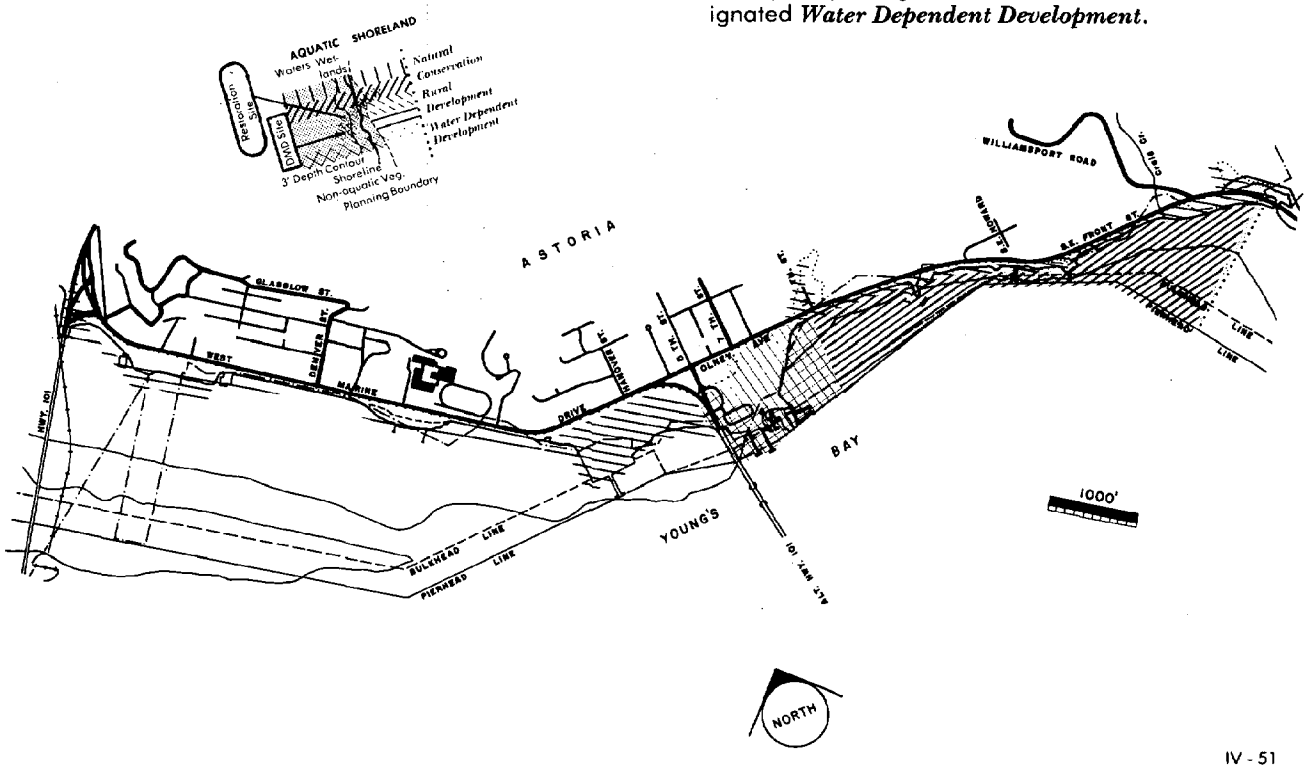
Most suitable sites in this subarea are already developed. The only industrial sites contain the Bumblebee Shipyard and the old unused PP&L plant. Some dredging would be required adjacent to the PP&L site to provide access to the Youngs Bay Channel. Though there is deep water close to shore between the old highway bridge and the Tidepoint Dock, little backup land is available. Since fills in the Youngs River/Youngs Bay system would conflict with the high natural values of the area, development potential is low.

Aquatic Designations

East of the old Youngs Bay bridge, the water area out to the pierhead line is designated ***Development*** to 11th Street and ***Conservation*** east to the subarea boundary.

Shoreland Designations

The shoreland of this subarea is designated ***Development***, except for the area between the old Youngs Bay bridge and 11th Street, which is designated ***Water Dependent Development***.



42.13 PORT OF ASTORIA

General Description

This subarea includes shorelands and aquatic areas along the Astoria waterfront between the Astoria-Megler Bridge and the Youngs Bay Causeway. The Port of Astoria piers, the West End Mooring Basin, the Thunderbird Motel complex and the Barbey Cannery Buildings are included in this subarea. The area west of the Port of Astoria Pier 3 has been proposed for major port development.

Aquatic Features

The aquatic areas of this subarea extend from the shore out to the pierhead line east of the Port of Astoria piers. North of the Port piers and area designated for development, the subarea extends out to the south side of the navigation channel. The western boundary extends northwest from the western end of Youngs Bay causeway fill.

There are several distinct aquatic environments. The deep water (greater than 30 feet) areas between the navigation channel and the piers are scoured by currents and contain coarse sediments. Benthic productivity is relatively low, though fish migrate along the piers. The shallower waters in the pier slips, in the West End Mooring Basin and between the bridge and mooring basin generally contain finer sediments which may be polluted, depending on the type and intensity of use. Benthic productivity is probably low in the most disturbed areas, but may be moderate elsewhere. West of Pier 3, there is a large tract of mud and sand flats. This area has been studied in some detail because of the proposed port fill. Because of the two projections of fill (the causeway and the existing filled area west of the Port), currents in this area are slight and the main energy sources are the winds and waves. Populations of benthic amphipods are very high, and use by juvenile salmon is believed to be intense. Resource agencies have consistently opposed development of this site, because of the aquatic productivity.

Salinity in this area is highly variable. Under the highest flow conditions, salinity is absent at all stages of the tide. Under most flow conditions, salinity is present along the bottom during most of the tidal cycle and at the surface during part of the tidal cycle. Variations of up to 20 to 25 0/00 during tidal cycle are possible.

One of the results of the frequent salinity intrusions, vertical salinity differences, and the mixing between fresh and salt water that occurs during the tidal cycle is the deposition of silts and clays in quiet areas such as port slips and marinas. Sedimentation rates of up to 4-6 feet per year occur in the port slips. Some of this material is bark and other debris from log rafting.

Facilities constructed on piling in this subarea include Port of Astoria Piers 1 and 2 (including a grain elevator, offices, fish processing facilities and storage space), part of the Thunderbird Motel complex and the Barbey Packing Plant. Pier 3 is part of piling and part on fill. The West End Mooring Basin has facilities for 412 boats.

Shoreland Features

This subarea includes a narrow strip of shorelands between the Burlington Northern Railroad and the water. West of Hamburg Street, the shorelands extend to West Marine Drive. Virtually all the shorelands in this area have been created by filling aquatic areas. The area is entirely urban and largely paved. There are 26 acres of vacant land west of Pier 3. Part of this site has recently been paved to provide a container yard.

Human Use

The Port of Astoria, the West End Mooring Basin, the Barbey Packing Plant and the Thunderbird Motel are the major facilities located in this subarea. There are also several warehouses and a tank farm located on Port-owned property. The railroad and U.S. Highway 101 are adjacent to this subarea.

Issues and Findings

The Port of Astoria has experienced difficulty in assembling a property of marketable size near its existing facilities. There are 26 acres west of Pier 3, 11 of which were recently paved as a cargo storage yard, using state economic development funds. A permit has been obtained to build a 600 foot Pier 4 extending along the pierhead line west of Pier 3. There are 37 acres of Port property in this subarea that are not presently in use.

Additional lands might be obtained by filling between one or both of the pier slips, by removing warehouses or the tank farm, or by filling west of Pier 3. Extensive filling has been strongly opposed by resource agencies. A permit for an 80 acre fill west of Pier 3 was refused in 1976 after a long and costly fight.

The tidal flats west of Pier 3 are a valuable natural resource. Benthic animals are abundant and the area gets substantial use for feeding by salmon migrating downstream and by other fishes. This is discussed more extensively in the Youngs Bay subarea (cf 42.07). These tidal flats are also an attractive development site, being adjacent to both the main ship channel and existing Port facilities.

The adopted designation west of Pier 3 represents a compromise which protects the bulk of the valuable intertidal habitat while providing the potential for construction of a Pier 4 and back-up area. The ***Development*** designation will require an exception to the Land Conservation and Development Commission Estuarine Resources Goal, Number 16 (cf Appendix B).

Several sites in this subarea have been proposed as *People Places* for the City of Astoria, including one beneath the Astoria-Megler Bridge and one west of Pier 3. The site west of Pier 3 conflicts with the Port's development plans. Issues related to public access are discussed under Downtown Astoria Waterfront (cf 42.14).

Aquatic Designations

A 15 acre area west of Pier 3 is designated ***Development.*** This area extends along the pierhead line 1500 feet west of the east tip of Pier 3. The remainder of the aquatic area west of Pier 3 is designated ***Natural*** with the exception of a 50 foot wide ***Conservation*** buffer between the ***Development*** and ***Natural*** areas.

The aquatic area to the north of the existing slips from Pier 1 west, including the proposed Pier 4 out to the main ship channel, is designated ***Development*** to provide for a turning basin. East of Pier 1, the aquatic area from the shoreline to the pierhead line is designated ***Development.***

Shoreland Designations

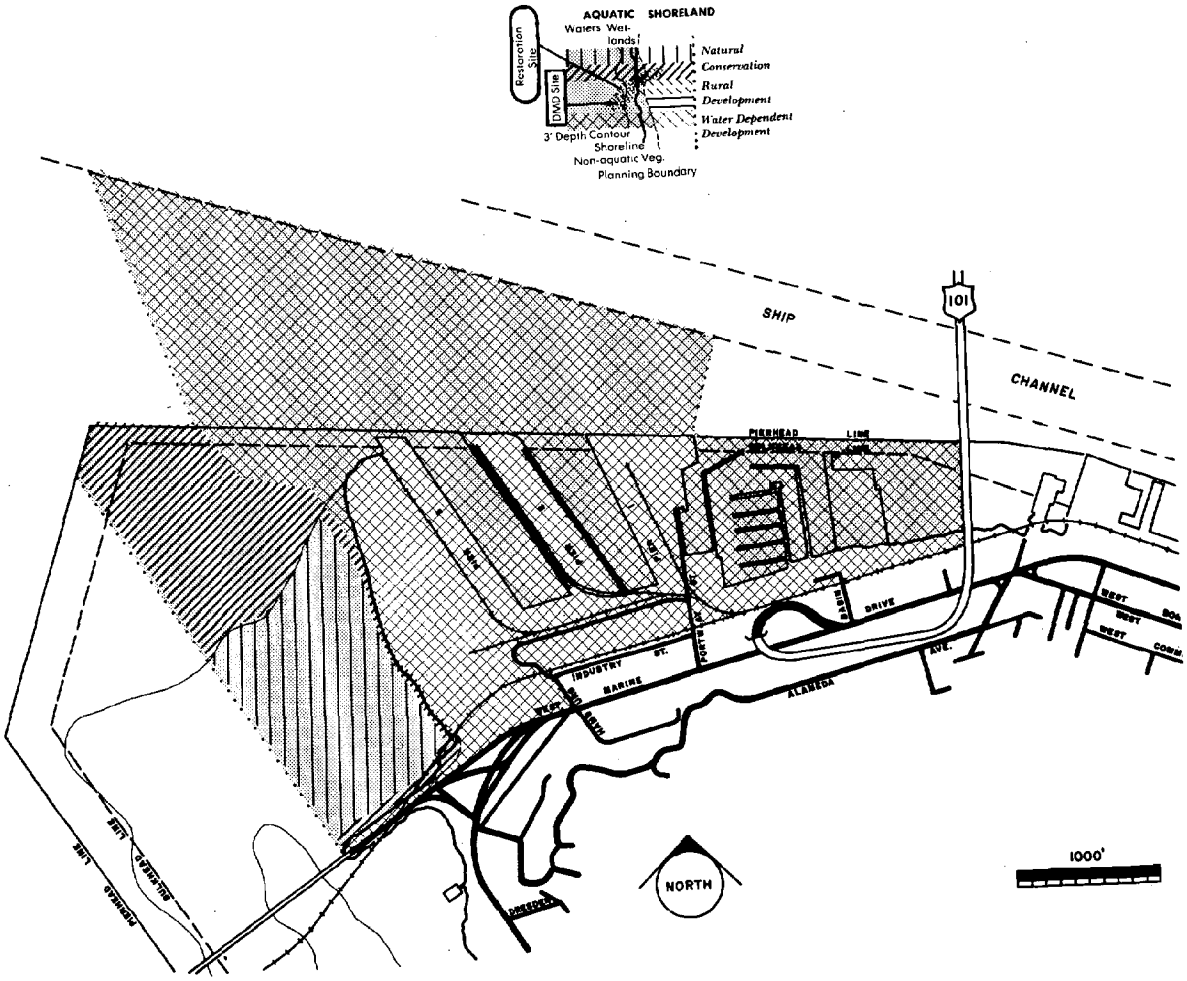
All shorelands in this subarea are designated ***Water Dependent Development.***

Subarea Policy

The ***Development*** designation for aquatic areas west and northwest of Pier 3 is provided to accommodate a future pier, turning basin, and back-up area for water dependent uses. However, the designation does not create the presumption that dredging, filling or other alterations will be permitted automatically. Specific proposals for water dependent development must be justified in terms of available alternatives, demonstrated public needs and economic benefits; minimize adverse impacts on water quality and natural habitat; and meet other requirements of the permit processes.

Mitigation Needs

Mitigation of the adverse effects of dredging or filling the intertidal area west of Pier 3 may be required. Because there are no potential restoration or habitat creation sites in the immediate vicinity, sites in other portions of Youngs Bay or up the Youngs River should be considered first. (cf Restoration and Mitigation, 66.50.)



42.14 DOWNTOWN ASTORIA WATERFRONT

General Description

This subarea includes shorelands and aquatic areas within the City of Astoria between the Astoria-Megler Bridge and 29th Street. The waterward boundary is the 30 foot depth contour, or the pierhead line, whichever is farther waterward. The upland boundary is Industry Street east from the Astoria-Megler Bridge to Columbia Street, south on Columbia Street to Marine Drive, east on Marine Drive until it joins with Astor Street, east on Astor Street to 10th Street, north on 10th Street to the top of the rip-rap, east along the top of the rip-rap or the railroad (whichever is farther inland) to 14th Street, where the boundary rejoins and follows Marine Drive east to 29th Street.

Aquatic Features

The Astoria waterfront is adjacent to the main ship channel in this reach. Water depths at the pierhead line are generally in excess of 30 feet and range to 80 feet. Currents are strong and sediments coarse, except in protected areas. The circulation and sedimentation patterns, biological productivity, and navigational use of the adjacent main channel are discussed under Estuary Channels (41.02). The benthic productivity of this subarea is probably low in most locations because of the strong currents and intensive development. There are numerous piers, some abandoned structures and old pilings.

Shoreland Features

Virtually all of the shorelands in this subarea are former aquatic areas filled with sandy dredged material. There is little vegetation and no wildlife habitat. The shorelands are not in the floodplain.

Human Use

This is an industrial and commercial area, with few residences. Many uses are water dependent or related, including fish unloading and processing, boat and tug moorage, the bar pilot office, the Astoria Plywood Mill, petroleum off-loading, marine equipment suppliers, and the Astoria Maritime Museum. There is also a proposed marina-condominium complex for which permits have been obtained. The Pier 11 complex of shops and a restaurant is focused on the water. There is also a large American Can Company plant. Several former fish processing plants are now abandoned. In some cases, new structures could be built on the old pilings. In other instances, the pilings are a barrier to development.

Rail and water access is excellent. However, U.S. Highway 30 runs down Marine Drive and traffic congestion is a serious problem. All utilities are provided by the City of Astoria. The foot of 9th Street and several other street ends are popular public water access points. The view of the Columbia River and the waterfront from the higher areas of Astoria is very scenic.

Issues and Findings

The marine development potential of this area is limited, despite the adjacent shipping channel and deep water, because there is little undeveloped backup land. An increasing number of stores, offices and light industrial concerns that are not water-oriented have located in this subarea in recent years. Although there are some waterfront areas which presently contain strictly water-dependent uses, there is a general desire by the City to permit a mixture of uses. Tourist facilities, redevelopment of old canneries and fish processing facilities are the most likely new water-oriented uses. Light industry such as boat building might also locate in this subarea. Other large-scale water-dependent and industrial uses, it is felt, may conflict with tourist oriented businesses because of public safety, security, road and rail traffic, and aesthetic concerns.

Public access to the waterfront is presently available via numerous publicly-owned street ends and some vacant waterfront lands. However, development of publicly-owned sites to provide good public access to the waterfront will require a considerable investment. A number of Astoria's proposed *People Places* are also in this reach, and the *People Places* concept suggests a pedestrian pathway along the entire waterfront.

Aquatic Designations

Along the entire length of this subarea the aquatic area is designated ***Development*** out to the pierhead line, then ***Conservation*** on out to the main ship channel which is designated ***Development.***

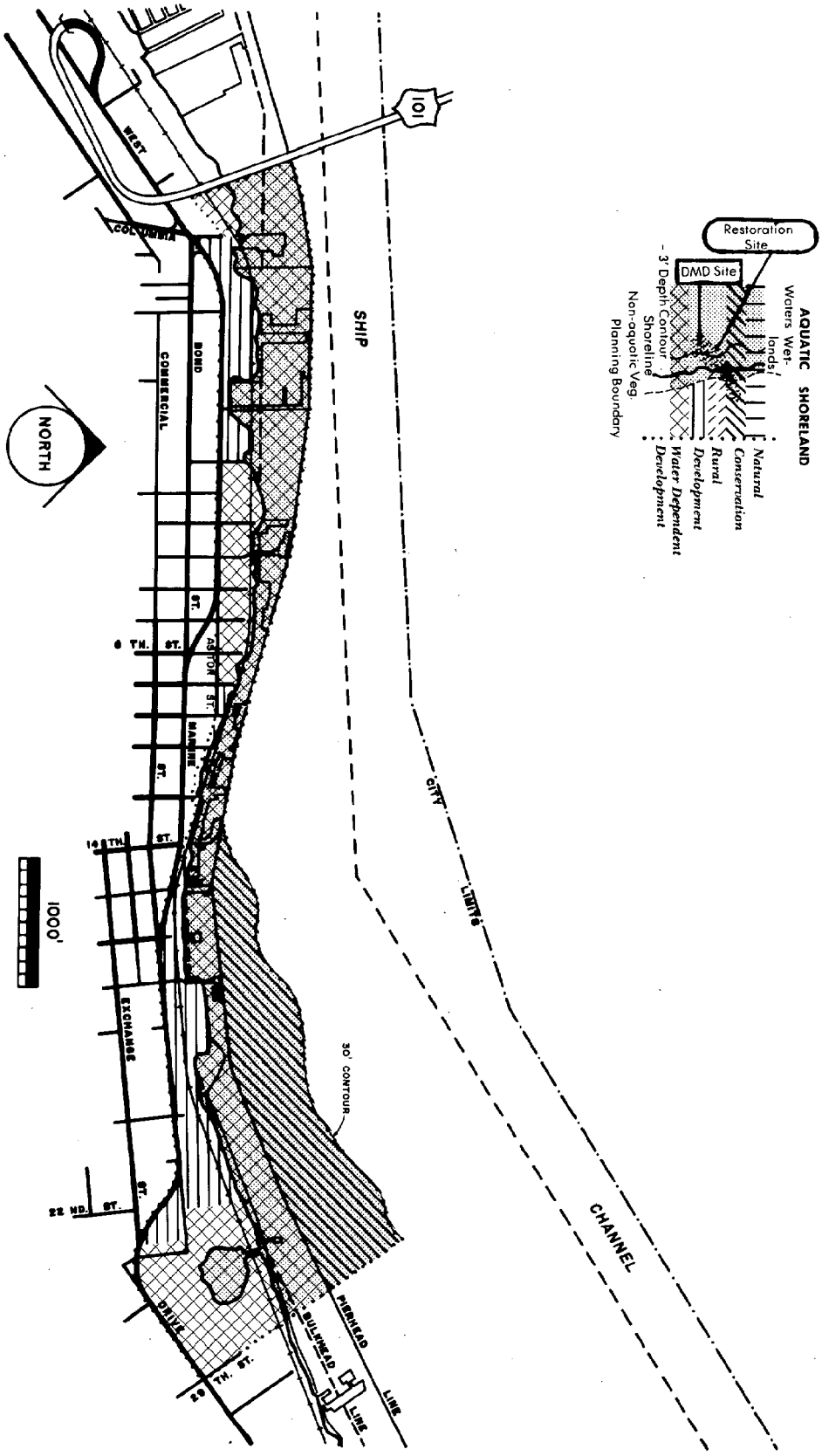
Shoreland Designations

The shoreland designations from west to east are: from Astoria-Megler Bridge to Columbia Street is ***Water Dependent Development;*** from Columbia Street to 2nd Street is ***Development;*** from 2nd Street to 10th Street is ***Water Dependent Development;*** from 10th Street to the western boundary of the Astoria Plywood Corporation is ***Development*** (the eastern boundary of this ***Development*** area extends from the shoreline at 22nd Street north to Commercial Street, thence east 1/2 block, thence north between the Plywood Corp. offices and the Nehalem Valley Motor Freight facilities to Marine Drive); and from the above described boundary east to the subarea boundary is designated ***Water Dependent Development*** (includes Astoria Plywood Corporation).

Subarea Policy

Public access to this area of the Astoria waterfront is strongly encouraged at street ends, at areas designated in the Astoria *People Places* conceptual plan and at private commercial developments. The foot of 14th Street, the area between 9th and 10th Streets and the Maritime Museum area should be given highest priority in implementing waterfront park plans.

DOWNTOWN ASTORIA WATERFRONT SUBAREA 42.14



42.15 UPPERTOWN/ALDERBROOK

General Description

This subarea contains shorelands and aquatic areas in eastern Astoria. The waterward boundary is the 30 foot depth contour. The western boundary is 29th Street. The upland boundary extends eastward from 29th Street on Marine Drive/Leif Erickson Drive to 44th Street, north to the 200 foot boundary or the 100 year floodplain, whichever is farther inland, east to 53rd Street, north to Alder Street, then east along Alder Street and continuing straight east to the city limits. The eastern boundary follows the city limits.

Aquatic Features

There are three different aquatic environments in this subarea: open water less than 30 feet deep, protected shallow areas in the mooring basin and behind the railroad causeway fills, and the Astoria Sewage Lagoons.

Currents are less severe in this reach than further west because the main channel is further from shore. The East End Mooring Basin, however, has a severe surge problem under storm conditions.

Definite information concerning sediment types and benthic populations is not available. It is likely that the area has some fine sediments mixed with sand in the shallow areas outside the causeway and that benthic populations are at least moderately high. The tideflats and shallow waters of Alderbrook Cove behind the railroad causeway are quite sheltered and appear to contain predominantly fine sediments. A small marsh area is on the western edge of this cove. Benthic productivity is not known but is likely to be moderate to high. Because of the nutrient supply, the aquatic productivity of the sewage lagoons is probably high. Birds use these aquatic areas and also the sewage lagoons.

Shoreland Features

Most of the shorelands in this subarea are the result of filling former aquatic areas with sandy dredged material. Only a small part of Alderbrook and the Astoria sewage lagoons (and surrounding fill areas) are within the 100-year floodplain. Since most of the subarea is industrial, commercial or residential, vegetation and wildlife values are minimal. There are no forest or agricultural lands.

Human Use

Considerable construction occurred in this subarea between the plywood mill and the East End Mooring Basin in the last decade. The new building includes city shops and light industries. Water oriented uses include fish receiving and processing facilities, net racks and the East End Mooring Basin. Most of the former canneries are abandoned and no new water-oriented facilities have been constructed in the last decade. There is a trailer court adjacent to the East End Mooring Basin. The East End Mooring Basin and its small area of backup land remain largely undeveloped. Surge prevents use of the East End Mooring Basin by all but the largest vessels, and even they are not secure during a storm.

This subarea has city water, sewer, and road access from Highway 30. The railroad runs along the shoreline.

Alderbrook is the only residential area of Astoria that has immediate frontage on the water. It contains a number of nineteenth century houses and has a quiet attractiveness not found elsewhere along the waterfront.

Issues and Findings

The shorelands in this subarea do not have direct access to deep water. The ship channel is 2000 to 4000 feet from the shoreline, though several ship anchorages are south of the channel. Shallow draft boat access is available throughout the area but low tides uncover substantial flats. Rock piles from old ship ballast and rock ledges further limit access. Most boat traffic is concentrated around the East End Mooring Basin, which is underutilized at present.

The Port of Astoria has requested the Corps of Engineers to study possible improvements to the East End Mooring Basin breakwaters that would correct the surge problem now experienced. Eliminating the surge would open the basin to a large number of vessels and increase the need for dredging and for back-up land to support basin operations. Vacant shorelands should be reserved for support uses.

Most of the subarea shorelands are already developed and there are no large vacant parcels. Between 35th and 41st Streets, however, is mostly vacant and has the potential to support water dependent and water related uses associated with the boat basin.

There was a disagreement over the most appropriate use of Alderbrook Cove and its immediate shoreland. The Draft Plan included a ***Water Dependent Development*** designation for the aquatic and shoreland areas east of the East End Mooring Basin all the way to 46th Street. The western portion of Alderbrook Cove was identified as a potential site for filling and dredged material disposal. Objections to these provisions were raised by several resource agencies and a petition strongly opposing further development of the area was signed by approximately 50 neighborhood residents.

Aquatic Designations

From 29th Street to 41st Street the aquatic area is designated ***Development*** to the pierhead line, except at the East End Mooring Basin where the designation corresponds to the outer boundary of the pier. East of 41st Street, the aquatic area is designated ***Conservation***. In the event of future need, a navigation channel of appropriate depth and width from the main ship channel in to the Coast Guard facilities on the west side of Tongue Point may be constructed (cf 42.16).

Shoreland Designations

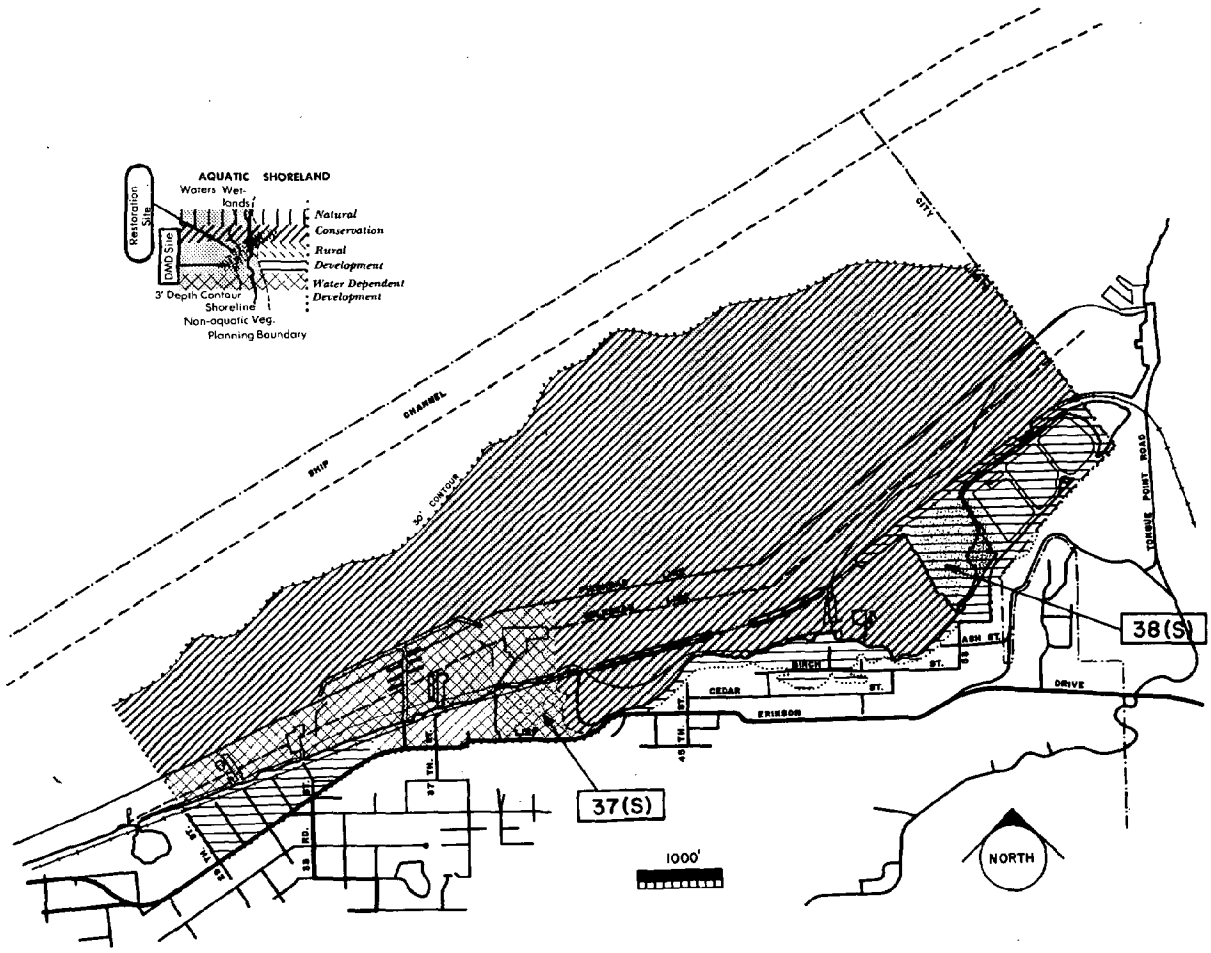
All of the shorelands in this subarea are designated ***Development,*** except for the area from 35th Street to 41st Street which is designated ***Water Dependent Development.***

Dredged Material Disposal

There are two dredged material disposal sites in this subarea, one east [38(S)] and one west [37(S)] of Alderbrook Cove. Both sites are proposed for use in conjunction with potential dredging for an expanded, improved East End Mooring Basin. These sites could also be used for sediments from the West End Mooring Basin expansion, but that would require costly barge transport and off-loading. (cf Dredged Material Disposal Plan 57.60, 59.)

Mitigation Needs

Expansion of the East End Mooring Basin may include dredging of intertidal sand-mud flats close to shore. Such dredging could involve up to five acres and require mitigation. Because there are no restoration or resource enhancement sites in this area, sites in the Youngs River system or John Day River should be considered first. (cf Restoration and Mitigation, 66.60.)



42.16 TONGUE POINT AND VICINITY

General Description

This large and diverse subarea covers both shorelands and aquatic areas between the tip of Tongue Point on the north, the mouth of the John Day River on the south, the Coast Guard Basin on the west, and the MARAD Basin on the east. It includes the former Tongue Point Naval Station and the Tongue Point Job Corps Center. Present jurisdiction is by Clatsop County, although the area is included in the Astoria Urban Growth Boundary (UGB). The Port of Astoria has great interest in the area.

Aquatic Features

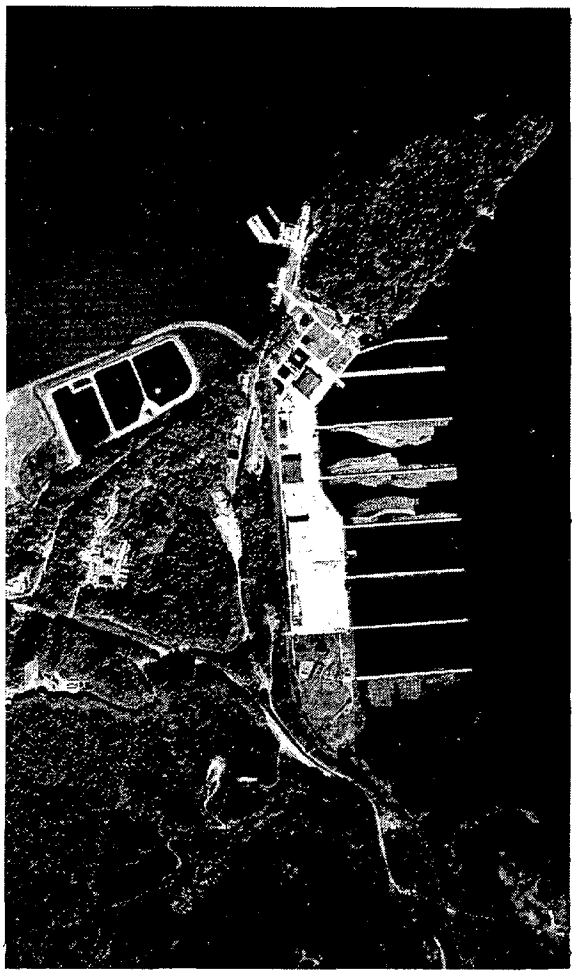
The aquatic areas include the access channel to Tongue Point from the Columbia River, the naval station piers, the MARAD Basin, the tidal flats and marshes adjacent to the Corps of Engineers Field Office, and water areas west and north of Tongue Point and the Coast Guard piers. This subarea does not include wetlands adjacent to Mott and Lois Islands.

This is one of the more highly altered areas of the estuary, though time has disguised the scope of the alterations. Prior to 1939, the area between the mouth of the John Day River and Tongue Point was an area of shallow waters, tidal flats and marshes. The railroad track marked the approximate shoreline east of the "neck" of Tongue Point, except on the west side of the mouth of the John Day River, where the railroad track cut off a shallow embayment. The present Mott and Lois Islands were tidelands or waters up to 15 feet deep. The entrance channel required dredging, and the MARAD Basin was dredged in 1950 from tidal flats and shallow waters. Even the neck of Tongue Point was narrower. Virtually all of the low-lying, flat lands of the present Tongue Point and Corps of Engineers facilities have been created by fill.

The waters off the tip of Tongue Point have very strong currents; the tidal currents that fill and empty the MARAD Basin and Cathlamet Bay rejoin the main ship channel just north of Tongue Point, where there is a scour hole in excess of 160 feet deep. The depths in the entrance channel shoal from 40 feet at the mouth to about 25 feet east of the finger piers. The MARAD Basin is generally between 20 and 26 feet deep. Depths between the finger piers are generally less than 20 feet.

Salinity intrusion into the Tongue Point basin is less frequent than along the Astoria waterfront. The surface waters are fresh, except under very low river flow conditions. Some salinity intrusion along the bottom probably occurs at high tide under low to moderate river flow levels.

Sediments at the outer end of the entrance channel are primarily sands, gravels or hard clay. Finer sediments prevail in the MARAD Basin and adjacent to the finger piers. Organic content is fairly high in some areas, and the layer of navy grey paint in the MARAD Basin may cause the sediments to be polluted, according to EPA standards. Basin on bathymetric surveys and core studies, the average sedimentation rate in the MARAD Basin is 4-6 cm/yr (about 2 in/yr) at the present depth of 20-26 feet. Because salinity intrusion is less frequent, the Tongue Point area should experience slower shoaling rates than similarly protected areas along the Astoria waterfront.



Results from benthic studies of the Tongue Point area by the National Marine Fisheries Service have not been published, but preliminary indications are that the benthic populations (are presumably the benthic productivity) are very high, except in the more dynamic areas off the tip of Tongue Point. The more abundant organisms include copepods (up to 80,000/square meter), oligochaetes (up to 40,000/square meter), and amphipods (up to 18,500/square meter). The MARAD Basin and other parts of this subarea are popular for sturgeon sport fishing. The use of the area by downstream migrant juvenile salmon is significant, based on recent beach seining by the U.S. Fish and Wildlife Service. The aquatic habitat value of the area should be considered very high. Migratory bird use of the MARAD Basin and the adjacent islands of the Lewis and Clark National Wildlife Refuge is high.

Shoreland Features

The shorelands of this subarea are along the western margin. From north to south, they include the steep, forested slopes of Tongue Point itself, the relatively flat developed area occupied by the Coast Guard station and the former naval base, and the parcel containing the Corps of Engineers field station.

Almost all of the flat lands of this subarea are the result of filling of former aquatic areas with dredged material. Tongue Point proper, though honeycombed with munitions storage bunkers, still contains old growth timber. There is at least one bald eagle nest located there. The basalt rock of the point must also be considered a resource. The rock is of high quality and its location directly adjacent to the water enhances its attractiveness, because of low transportation costs.

Deer and many small mammals are found in the wooded parts of Tongue Point and on Mott and Lois Islands.

Human Use

The Navy obtained over 400 acres in the vicinity of Tongue Point in 1921. It was not until 1940 that construction was actually started on the naval base. The base was operated until the early 1960's. Since 1965, a part of the former naval base has housed the Job Corps Training Center. The Coast Guard Base has been in operation continuously since prior to 1890. The MARAD Basin was dredged in 1950 and used to store the reserve fleet. Five of the finger piers are presently used for log storage and sorting. Another pier is used by the Corps of Engineers.

The rocky uplands contain old growth timber, and its aesthetic and recreational value as a river access point is very high. Its profile, as seen from other locations, is also very striking. A road has been built around the periphery and some quarrying has been done on the west side of the point.

The facilities included in the former naval base include eight finger piers constructed on concrete piles, several hangars, and about 35 acres of pavement. The area is served by the Burlington Northern Railroad, which runs through the site, and by U.S. Highway 30. There is also a sewage plant on the site, but it is antiquated.

The parcel of land north and east of the railroad tracks and south of the finger piers is presently used only by the Corps of Engineers.

Ownership of parts of the former naval base, including the developed area, is disputed between the state and federal governments. The U.S. Fish and Wildlife Service claims ownership of Lois Island and adjacent tidelands. The state claims ownership of those submerged lands and tidelands that were filled and for which deeds were not obtained. Thus, ownership of part of Lois Island and the adjacent tidelands is in part disputed by the state. The state owns Mott Island. The General Services Administration is in the process of declaring surplus five of the finger piers and 55 acres of the land area.

Issues and Findings

The Tongue Point subarea contains one of the most important and difficult conflicts between natural resource values and development potential in the Columbia River Estuary. Upland portions contain old growth timber. Nearby residents report sitings of bald eagles and the location of at least one nest. The area has exceptional value for water oriented recreation. The point also contains basalt rock of excellent quality located close to the water. This rock could be quarried at relatively low cost and easily barged up or down river.

The marsh, wetland and shallow water areas east of Tongue Point and south to the mouth of the John Day River have significant natural resources, although the biological data base is incomplete at this time. Unpublished research results indicate that counts of amphipods, copepods, and other organisms important as food sources for juvenile salmon, are equal or greater than those in the most productive portions of Youngs Bay, Grays Bay and Alder Cove. Resource agencies are strongly opposed to development south of the existing finger piers at Tongue Point.

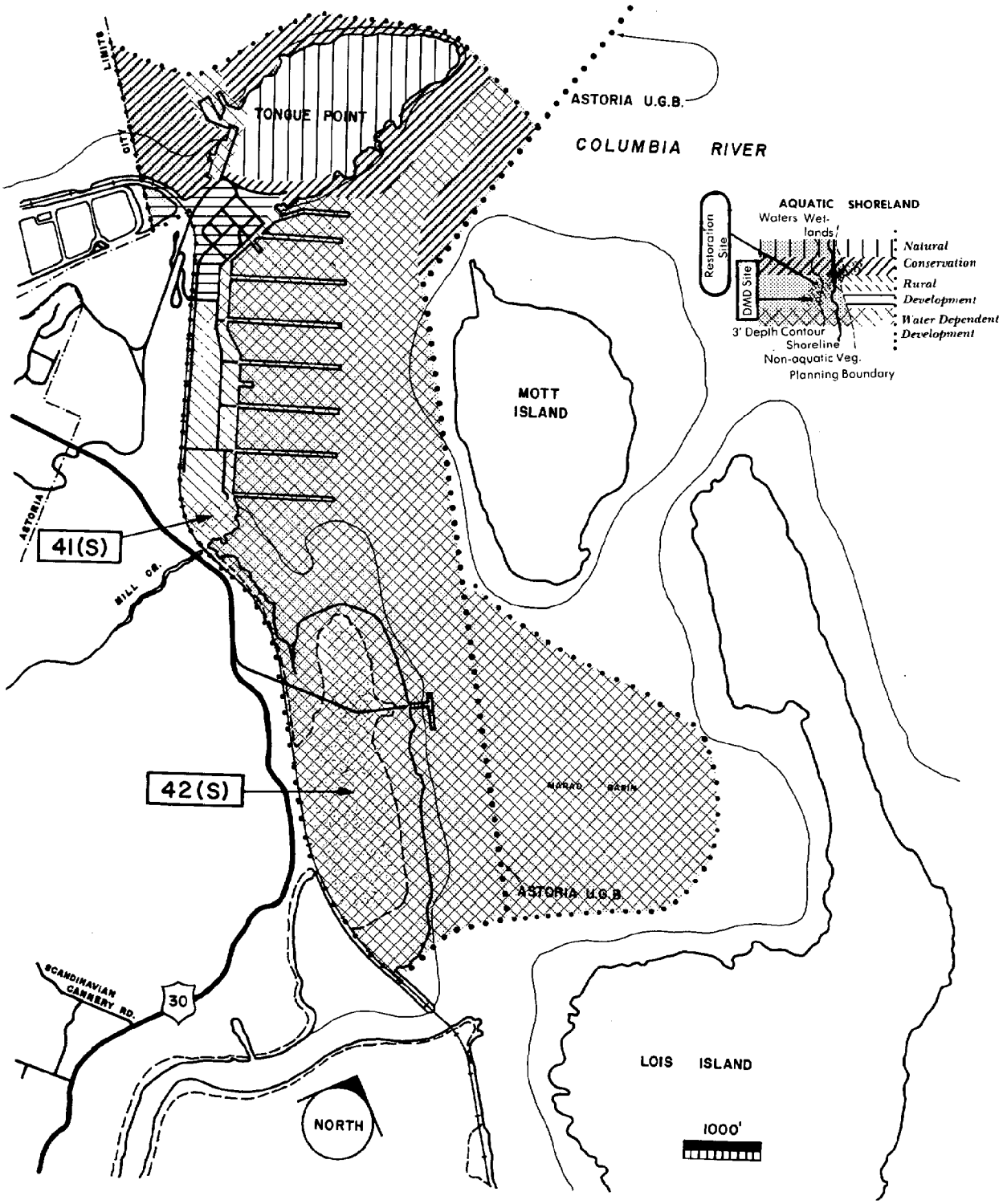
The development potential of the area around the finger piers and south to the mouth of the John Day River is exceptionally high. There is excellent access to the main navigation channel at River Mile 18. There are eight existing finger piers and approximately 400 acres of sheltered water area with depths of at least 20 feet. Shoaling rates appear to be significantly lower than at other estuarine locations. The area contains large amounts of vacant land. With some filling, up to 400 acres of land could be made available for development. There is excellent access to rail and highway transportation. The site's location east of Astoria means that major development could take place without aggravating the already severe traffic congestion in downtown Astoria. The topographical features of the area provide excellent protection from winds and waves.

International political and economic trends contribute substantially to the development potential of Tongue Point. The shift in control over the Panama Canal and increasing size of ocean-going ships (too large for the Canal) have led international shipping interests to pursue the concept of a "land bridge" across the United States. Very large container vessels can economically load and off-load cargoes at coastal ports which are connected by a rail link. Tongue Point appears to be a desirable west coast terminal for such an operation. Since the large capacity container handling cranes are sensitive to high winds, the sheltered east side of Tongue Point is highly attractive. Container operations, in order to be economically feasible, require large amounts of land area. Since land areas at other west coast ports are largely committed to other uses, the potential availability of up to 400 acres for development at Tongue Point is a highly valuable asset.

The City of Astoria suffers from a severe shortage of undeveloped industrial sites. The city's steep

TONGUE POINT

SUBAREA 42.16



topography and peninsular location place severe limits on industrial expansion. There are no available industrial sites of more than 10 acres. The major motivation and justification for inclusion of the Tongue Point area in Astoria's Urban Growth Boundary (UGB) was this shortage of industrial land within the existing city limits.

The General Services Administration (GSA) has declared five finger piers and 55 acres of adjacent shoreland to be surplus federal land. The Port of Astoria has long expressed interest in obtaining this land and the state, which also claims ownership to a large portion of the surplus land, is assisting the Port by negotiating with the federal government. More recently, the Port has expressed interest in the land south of the finger piers. A 36 acre parcel immediately to the south was declared excess by the Department of Labor, and the GSA transferred the parcel to the U.S. Fish and Wildlife Service for inclusion in the adjacent Lewis and Clark National Wildlife Refuge. Such action would seriously hinder the development potential of the Tongue Point area and would be inconsistent with its ***Development Aquatic*** designation. Protests of this action by numerous public officials led to a U.S. Fish and Wildlife Service decision to give up title to the land and return it to the GSA. When the land is declared excess, the State of Oregon, on behalf of the Port of Astoria, may be able to obtain title to the land.

The Corps of Engineers owns the old MARAD base and shorelands further to the south where they maintain a small field office and dock. The U.S. Fish and Wildlife Service has also given up its intention to acquire this area, should the Corps ever declare the property surplus. Inclusion of this area in the wildlife refuge would also be inconsistent with the ***Development Aquatic*** and ***Water Dependent Development Shoreland*** designations for the area.

The Coast Guard facility located on the west side of Tongue Point has been in continuous use since prior to 1890. Water depths are such that dredging has been needed only in the immediate vicinity of the piers. In the event larger, deeper draft vessels are assigned to the facility, however, dredging an access channel (see Uppertown/Alderbrook - 42.15) may become necessary.

Designation of the intertidal and tidal marsh areas south of the finger piers to the John Day River requires an exception to the Estuarine Resources Goal (cf Appendix B).

Aquatic Designations

The aquatic area included in the Coast Guard base is designated ***Development***. East of Tongue Point all of the aquatic area is designated ***Development***, except the area north of the northernmost finger pier where only the access channel is ***Development*** (see Subarea Policies below). The remaining aquatic areas are ***Conservation***.

Shoreland Designations

The tip of Tongue Point is designated ***Natural***, except for the Coast Guard base, which is designated ***Water Dependent Development***, and the Job Corps Center which is designated ***Development***. A fifty foot wide ***Conservation*** buffer separates the Job Corps Center from the ***Natural*** portions of the point. The remaining shorelands are designated ***Water Dependent Development***.

Subarea Policies

1. The area around the finger piers is the preferred area for development at Tongue Point. Due to high resource values in the southern portion, development at Tongue Point shall occur first in the northern portion. Development of the southern portion shall take place only after full utilization of the northern portion and upon a demonstration that the unique development potential of the area will be fully utilized.

2. The exact location, width and depth of the navigational access channel from the main ship channel of the Columbia River into the MARAD Basin shall be determined through engineering studies as a part of the permit application process.

3. The ***Development*** designation for aquatic areas east and south of Tongue Point are provided to accommodate future water dependent uses. However, the designations do not create the presumption that dredging, filling or other alterations will automatically be permitted. Specific proposals for water dependent development must: be justified in terms of available alternatives, public need and economic benefits; minimize adverse impacts on water quality and natural habitat; and meet other requirements of the permit processes.

Dredged Material Disposal

Two shoreland disposal sites are in this subarea [41(S), 42(S)], as well as potential development sites which could use dredged material as fill. There are also two sites in the John Day subarea (cf 43.01) and one disposal site in the Lois and Mott Islands subarea (cf 42.17) that relate to dredging activities at Tongue Point. (cf Dredged Material Management Plan, 57.70, 59.)

Mitigation Needs

Development of the area north of the southernmost finger pier will not involve dredging or filling of intertidal or tidal marsh area and therefore not require mitigation under the LCDC Estuarine Resources Goal, Number 16. However, the subtidal area between the pier slips has good benthic productivity and gets substantial fish usage. Because of this, the Division of State Lands may require mitigation, should a permit be granted to fill this subtidal area.

The ***Development*** area from the south of the finger piers to the John Day River includes 135 acres of shoreland and 80 acres of aquatic area, of which about 65 acres are intertidal or tidal marsh. Dredging or filling a portion or all of these 65 acres will require mitigation. Additional mitigation may be required for subtidal areas or shorelands involved in any development proposal.

Restoration sites up the John Day River and east at Svensen Island should be considered for mitigation of Tongue Point development. (cf Restoration and Mitigation 66.70.)

42.17 LOIS AND MOTT ISLANDS

General Description

This subarea includes the two dredged material islands created by dredged material during the construction of Tongue Point Naval Base and the MARAD Basin (1939-49), the adjacent wetlands, and the channel between. The subarea is in the Lewis and Clark Wildlife Refuge and Clatsop County.

Aquatic and Shoreland Features

Lois and Mott Islands are surrounded by tidal marsh, are wooded (willow, alder) around the fringes and grass-covered in the interior. Bird and wildlife values are high. The water and wetland portions of this subarea are protected and very productive; the populations of benthic invertebrates are very high.

Human Use

Human use includes recreation boating, beachcombing, sports fishing, hunting, trapping and wildlife observation. None of these uses is intensive.

Issues and Findings

There is some potential for port related development on Lois and Mott Islands; however, since the two islands have no utilities or land transportation and are in the wildlife refuge, the only likely use is dredged material disposal. Mott Island and the northern lobe of Lois Island are within one mile of the Tongue Point entrance channel. The rest of Lois Island is adjacent to the MARAD Basin and within reach of dredging that might occur at the Corps of Engineers site south of Tongue Point. Low intensity recreational facilities might also be provided on the upland portion of these islands.

Both Mott and Lois Islands are within the wildlife refuge and the habitat value of the upland areas for birds and wildlife is high. The U.S. Fish and Wildlife Service has indicated that they will oppose use of the area for dredged material disposal. Recreational fishing and boating may conflict with port development in the Tongue Point area. Public access may also be an issue.

Aquatic Designations

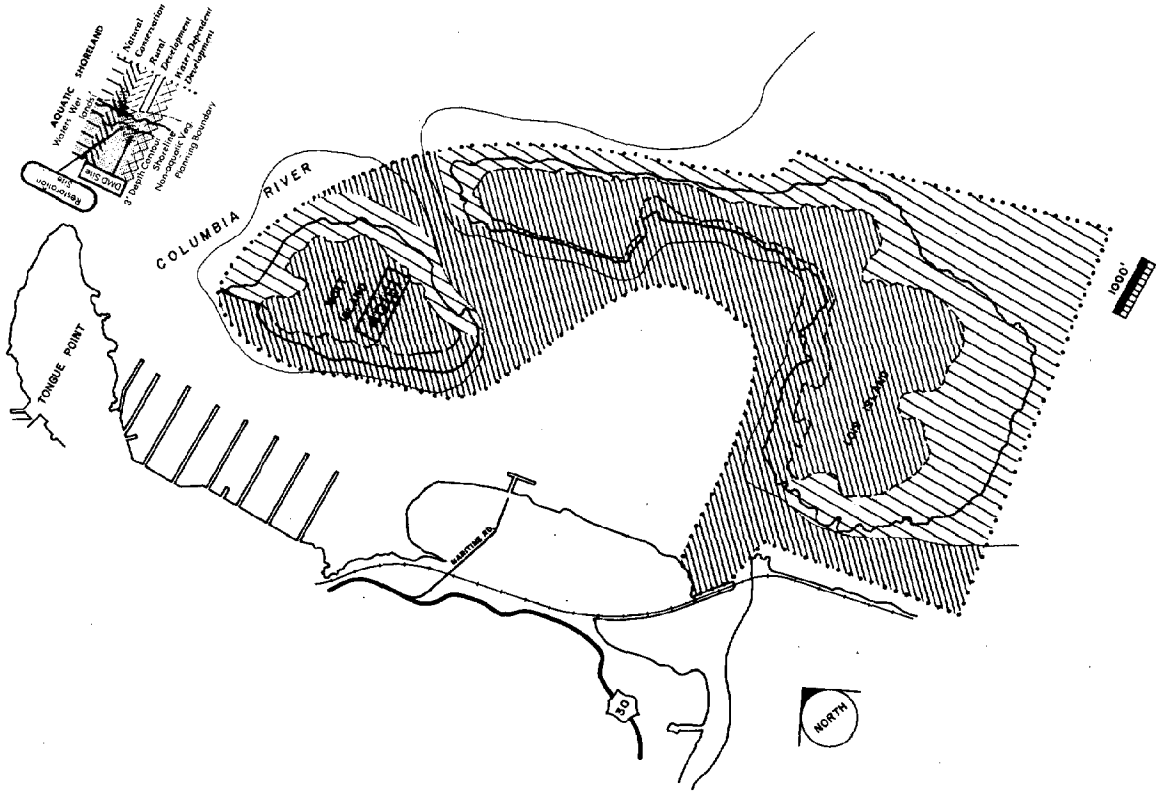
The wetland and water areas east of both islands and south of Lois Island are designated ***Natural.*** The remaining aquatic areas are designated ***Conservation.***

Shoreland Designations

All shoreland in this subarea is designated ***Conservation.***

Dredged Material Disposal

The shoreland portion of Mott Island is designated as a dredged material disposal site [40(S)] in conjunction with possible future dredging at Tongue Point. The amount of dredging for initial construction of a deep draft channel into Tongue Point and the availability of other sites for disposal will determine whether this site would be used for initial or maintenance disposal. The site may not be needed for many years. (cf Dredged Material Management Plan 57.70, 59.)



43. EASTERN CLATSOP PLAN

THE PLANNING AREA

The establishment of the planning area boundary for the Eastern Clatsop area was based on evaluation of potential shoreland hazards, important shoreland habitat areas, areas needed for water oriented development and scenic resources. The Eastern Clatsop planning area extends from the eastern border of Clatsop County west to the mouth of the John Day River. The shorelands boundary is 200 feet inland from MHHW, or the edge of tideland soils in areas where they occur. The water boundary is the state line or the wildlife refuge boundary as appropriate. The upstream limit of estuarine waters is defined as tidewater. Streams included are the John Day River, Mary's Creek, Bear Creek, Big and Little Creeks, Gnat Creek, Plympton Creek, and all other streams eastward to the border of Clatsop County. Planning, management and regulatory jurisdictions include Clatsop County, the Port of Astoria, State of Oregon, and federal agencies.

MAJOR ISSUES AND DECISIONS

Major issues included fish and wildlife protection, the need for development areas along the river, maintenance of agricultural lands, recreational water access to the river, and the use of navigable waters for houseboats, float houses and private docking facilities. During the conflict resolution process, the designation of undeveloped wetlands as ***Conservation*** rather than ***Natural*** became an issue, except at Big Creek, where the ***Natural*** designation of the privately owned spruce swamp has resulted in serious disagreements. Restoration of dikes long in disrepair has also emerged as a significant issue. These issues are addressed either through regional policies (cf Section II), area or subarea policies, and other plan provisions.

The western portion of the Eastern Clatsop planning area is rural, with little intensive development. The plan designations reflect this. Low-lying farmlands are designated ***Rural***, aquatic areas are ***Conservation*** or ***Natural***, and forested shorelands are ***Conservation*** to provide for forest management. This western area has no deep water access and commercial fishing, fish production at hatcheries, and recreational use of sloughs and adjacent wildlife refuge areas are important.

The eastern end of this planning area is adjacent to the main Columbia River ship channel and has rail and highway access. A small potential waterfront development site exists at Bradwood. Major development, existing and planned, is provided for in the Wauna/Westport area. Along the waterfront, shorelands are designated for ***Water Dependent Development*** and river access is provided for. Controversy exists over how much area should be developed, versus protected. Dredged material disposal on wetland areas is a major issue near Westport. This area is one of six estuary development sites along the Columbia River which offer significant potential for use by vessels requiring deep draft access to the shoreline.

AREA POLICIES

1. Recreational Access to the Estuary

Clatsop County has emphasized its great recreational resources by developing parks and picnic areas, boat launch sites, and beach access points throughout the Columbia River estuary. To meet the needs of hunters, fishermen, and boaters in the Eastern Clatsop County area, boat launch sites are presently located at the John Day River, Aldrich Point and Westport. Other access points providing recreation for the public are at Bradley Wayside and at Tongue Point. Generally, public access to the river is adequate with some potential for improvement, although limited. Foot and/or bicycle paths along shoreline bluffs would be appropriate if they would not impair fish and wildlife habitat or interfere with agricultural use. Boat landings, docks and scenic viewpoints would also be appropriate if privately owned shorelands are protected from encroachment. Additional locations for public recreational access or expansion of existing facilities should be jointly considered by interested state agencies and the County to assess local needs and to protect the environment. The Aldrich Point boat launch facility, however, except for general maintenance requirements, should be adequate for many generations. The current facility consists of one boat lane on one acre of land at the terminus of a long, narrow winding country road that passes through some of the best dairy land in the County. Typical of a country road are the numerous cattle crossings, playing children and slow vehicles. Additional use of the facility could destroy the rural lifestyle of the area. In addition, to the east, along the railroad tracks, an eagle's nest has been cited. The Nature Conservancy has suggested protecting this area in order to attract as many eagles to the point as possible.

The Eastern Clatsop Planning Committee recognizes the importance of providing public access to the Columbia River and its tributaries and sloughs. But, because of the area's natural environment for wildlife and the desire to protect areas from overuse and potential damage and in consideration of the rural nature of the area, these access points should be limited.

In consideration of expansion of existing or new potential locations, a public hearing should be held to assess the needs of the area and the following standards should be met:

- Access from the U.S. Highway 30 must be appropriately located and designed to provide for safe exit from and entry to the highway by large motor homes and vehicles pulling trailers.
- State or County roads connecting U.S. Highway 30 with access points must be capable of handling the types and volumes of traffic that such a facility would create.
- The impacts of site development and the resulting traffic upon local residential areas shall be carefully considered. The County will reject proposals which will have undue impacts on local citizens.

- Before any overnight facilities are established at any public or private parks, consideration should be given to their impact on the area (i.e. streams, tributaries, sewage disposal, garbage, roads). These facilities, if they are developed, should be self-supporting and aesthetically pleasing.

2. Eagles

Eagles should be given full protection because the eagle is the national symbol of freedom, is an endangered species with only 708 breeding pairs in the lower 48 United States and only a few known pairs in Clatsop County, and is part of the eco-system of the Columbia River estuary with migrating eagles from Alaska wintering in Clatsop County. A five acre buffer area around trees containing nests should be protected from logging operations, so that the nest is not subject to blowdown as it might be under existing regulations.

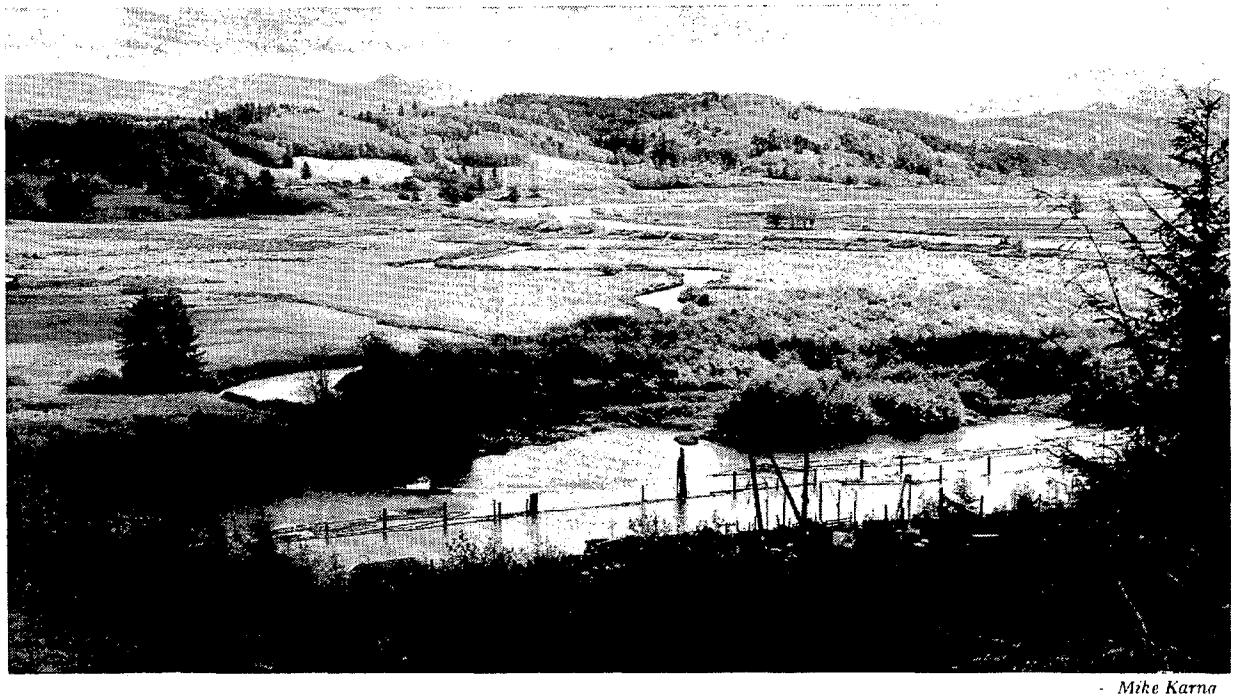
3. Filling of Shallow Waters and Wetlands

The contribution of shallow water areas, fresh water marshes, and wetlands to the biological productivity of the Columbia River estuary is significant. The indiscriminate filling of such areas is discouraged. However, to develop the areas designated for ***Development,*** dredging and filling may be necessary. Potential development areas on both sides of the Columbia River should be surveyed. Those requiring the least amount of fill in shallow estuarine waters, fresh water marshes or wetlands, should be ranked first and those requiring the most fill be ranked last. Using additional requirements such as economic factors and the needs and goals of a given area, those areas ranked first on the list should be developed first.

4. Fishing Industry

Fishing is a traditional industry and lifestyle in the Columbia River estuary area and has been an important part of the history and development of Clatsop County. It remains a major factor in the economy. Columbia River salmon are internationally acclaimed and the loss of the fishing industry would mean a loss of identity for this area.

- Boat houses, net floats and associated fisheries-related facilities should be allowed in waters designated ***Conservation.***
- Logging practices in the Columbia River drainage area should be strictly enforced as outlined in the Forest Practices Act to maintain a high degree of water quality.
- Industrial development permitted along the Columbia River and its tributaries should be compatible with the fishing industry. In particular, any waste water returned to the river or its tributaries should meet or exceed the quality of the surrounding river water.
- Recognizing the possible harmful effects of log storage to the fisheries, the timber industry is encouraged to find alternatives to water storage of logs.
- Dredging and filling of wetlands and water areas should be minimized.
- Additional oil tanker traffic on the Columbia River is discouraged. New oil port facilities present a hazard to the fishing industry.
- Because of the importance of the Gnat Creek and Big Creek Hatcheries, activities or development that could be detrimental to their water quality are discouraged in these creeks or the waters into which they drain.
- Steps to increase native or hatchery runs on Plympton Creek, Little Creek, Mary's Creek, Ferris Creek, Bear Creek or the John Day River are encouraged.



Mike Karna

5. Houseboats and Floathouses

Residential use of protected waterways is a way of life in the Columbia River estuary area. In eastern Clatsop County, the John Day River and the Svensen Island area are historical moorage areas for residential floathouses.

Existing houseboats and floathouses should be allowed to continue. However, expansion of this activity should not occur. Current regulations of the Oregon Department of Environmental Quality concerning sewage disposal indicate that additional houseboats and floathouses are unlikely. In addition, these residences block navigable waters which could otherwise be used by the public.

6. Industrial Development

Continued economic development in Northeast Clatsop County is essential for the well-being and livelihood of the people who have lived here and who wish to live here.

To promote environmentally sound development consistent with maintaining the unique character of the area, the following are encouraged:

- Timber production, which is highly suited because of rainfall and soils;
- Forest products industries, to locally process local timber;
- Waterways and ports, for energy efficient transportation of goods and minimization of the need for overland transfer of products;
- Production of fish by both hatchery and natural means, to more fully utilize ocean resources and provide for their local commercial and sports harvest.

7. Natural Areas

Natural areas in the Columbia River estuary provide habitat for wildlife including eagles, great blue heron, waterfowl, deer, and elk; maintain an aesthetically beautiful area, basically unaltered by man; preserve areas of unique or valuable vegetation; and preserve areas of historical significance for future generations.



Compleat Photographer

Natural areas are necessary to maintain a healthy balance with development and to maintain the existing quality of life in this area, and should be given full protection to ensure their preservation.

8. Nuclear Power Plant Siting

Although the Oregon Nuclear and Thermal Energy Council designated eastern Clatsop County as being unsuitable for the siting of a nuclear power plant, the Washington Public Power Supply System listed a site adjacent to the Brownsmead area as one of the twelve sites they are considering.

Construction of nuclear power plant and the storage of radioactive waste should not occur in northeast Clatsop County because:

- —Potential adverse impacts in the fishing industry due to changes in the water temperature when cooling water is returned to the river and from construction impacts on the streams;
- —Effect of low level radiation on adjacent agricultural practices, particularly the dairy industry;
- —Lack of facilities in the United States for long-term storage of radioactive waste;
- —Safety factors which include the possibility of accidents and natural catastrophies as well as the long term risk of continued radioactivity at a site after a plant is shut down.

9. Agriculture

The low-lying areas adjacent to the Columbia River estuary (in particular the Brownsmead area) have the most potential for agricultural development in Clatsop County. They produce excellent forage to support the dairy industry and are noted for quality peas and corn. These agricultural lands should be protected for their agricultural value.

These same areas are also important feeding, resting, and nesting areas for migrant waterfowl. At least three herds of elk graze in the area. Many furbearers are trapped each winter from the sloughs. To preserve this important agricultural and wildlife area:

- The diked lands of Brownsmead should be designated for exclusive agricultural use (EFU zone. This would discourage housing developments, subdivision of farms into small uneconomical units, and would keep property taxes low thus encouraging farmers to make long term plans and investments.
- The Forest Practices Act should be strictly enforced in all watersheds that drain into agricultural lands. Poor drainage is a major problem in low-lying farm areas. Strict implementation of the Forest Practices Act would help keep siltation of sloughs and drainage ditches to a minimum.
- Cleaning of sloughs and ditches and dike maintenance should be allowed under the supervision of the local diking districts and in cooperation with the Clatsop Soil and Water Conservation District.
- Trapping of furbearers should be encouraged to minimize crop and dike damage.

43.01 JOHN DAY RIVER

General Description

This area includes the John Day River from its mouth to the head of tide, and the adjacent shorelands for a distance of 200 feet from mean higher high water (MHHW) or the extent of tideland soils, whichever is greatest.

Aquatic Features

While the types of fish present in the John Day are varied, the numbers are not large. During the fall, there are cutthroat trout, some coho salmon, and maybe a small number of Chum salmon. During May and June, there is a substantial run of American Shad which spawn around the head of tide. Other species which occur throughout the year are carp, largemouth bass, crappie, yellow perch, catfish, and other rough fish.

A large tidal marsh area has developed at the mouth of the river on the west side, south of the railroad fill. Other wetland marsh areas exist upstream along the river bank.

Water depths are a relatively shallow 4 to 12 feet. While the river is considered navigable for a distance of three miles, there is no authorized channel project. River flow from the small drainage basin is low, particularly in the summer. There is minimal sediment transport, and flushing is slow. There is little salt water intrusion, except during very low Columbia River flow periods. The aquatic ecosystem of the John Day River is thus freshwater is nature.

Shoreland Features

The shorelands are predominantly diked tidelands used for low intensity agriculture. There are also small forested shoreland areas. The shorelands have moderate wildlife value. Deer and elk, along with smaller wildlife, frequent the area and several bald eagle nests have been located in adjacent upland areas.

Shoreland soils are the Coquille-Tidal Marsh (fresh)-Tolovana Association. These lowlands have high flooding potential (most of the area is within the 100 year floodplain), relatively high ground water level, and moderate agricultural stability.

Some dikes along the river are low or in poor condition and erosion and undercutting of the dikes is a significant problem.

Human Use

Existing land and water use includes agriculture, forestry, shoreland residences, houseboats, and recreation. To protect low-lying shoreland areas, there are dikes and fourteen tidegates located along the river. Adjacent land uses are mostly related to forestry.

Ownership is mostly private with some county, state and corporate owners. There is a newly-improved public boat launching ramp on county land near the mouth of the river. There are also numerous private docks along the river. Access to the area is by water from the Tongue Point Basin and by road from Highway 30.

Issues and Findings

There is little potential for new development on the John Day River and its low-lying shorelands. The river itself is relatively narrow and shallow. Increased river traffic would conflict with existing houseboat uses and worsen the stream-bank erosion problem. The shorelands, being either low and flood-prone or steep and unsuitable for intensive development, also offer little potential for expanded use. Factors which could improve development potential in the future would be the use of low areas for disposal of dredged material and possible relocation of U.S. Highway 30.

Water quality and navigational access concerns related to existing houseboats may become a more significant issue in the future. State policies on tideland leasing, water quality standards and the area policy in this plan will prevent expansion of this residential use.

Another issue is dike maintenance and erosion control using materials dredged from the river. State and federal resource agencies discourage this practice.

The tidal marsh-mudflat areas just inside the river mouth are very shallow, are flooded on every tide, have significant fish and wildlife values, are publicly owned, and have little potential for any development activities. It is in the public interest to protect these natural resource values.

The low intensity recreational uses of the river, the fishery resources and wildlife values should be protected while providing for limited developed uses.

Aquatic Designations

The large freshwater tidal marsh and mudflat just inside the mouth of the John Day River, to the west of the river channel, is designated ***Natural.*** The remaining water and wetland areas to the head of tide are designated ***Conservation.***

Shoreland Designations

All shorelands in this subarea are designated ***Rural.***

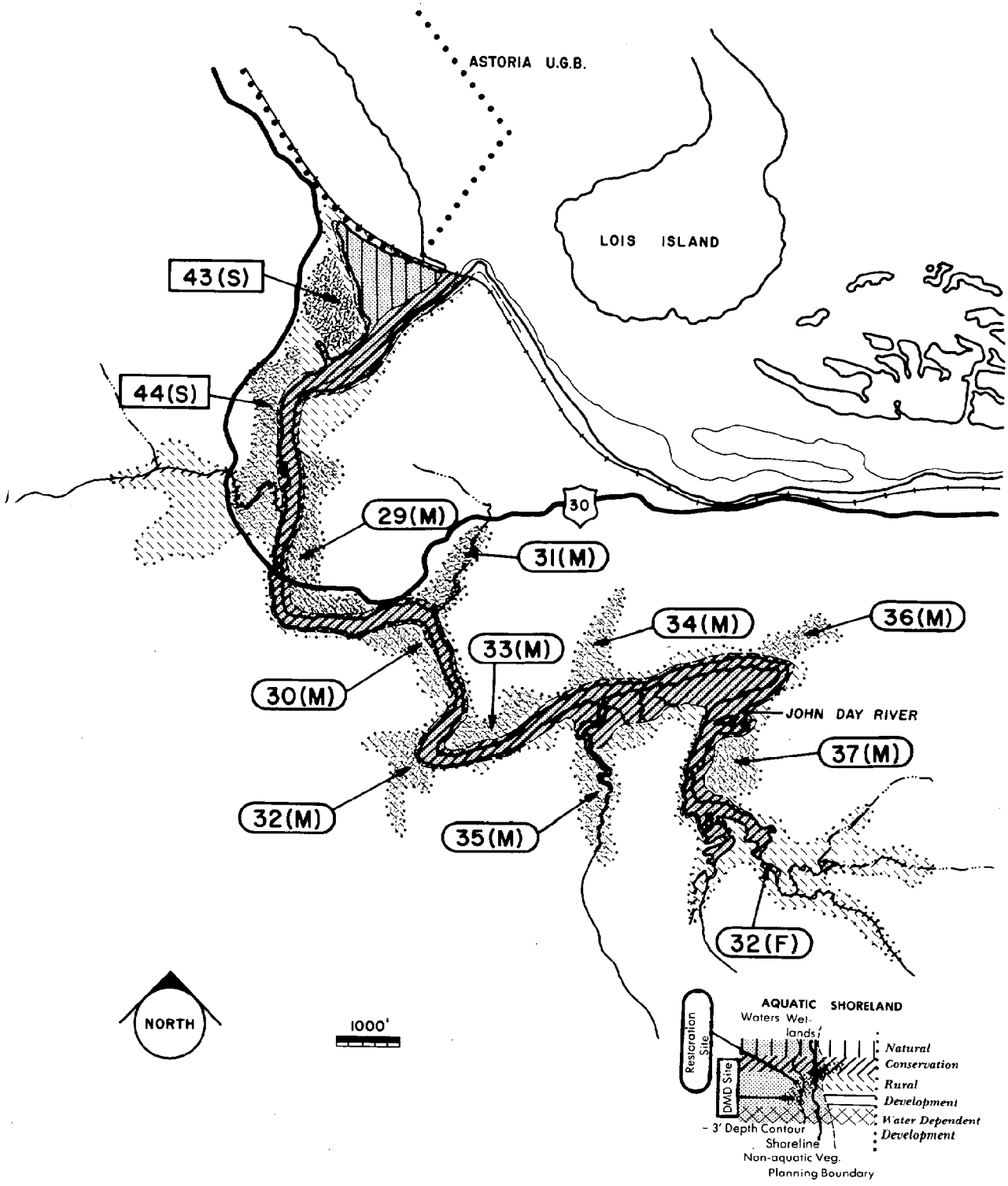
Dredged Material Disposal

There are two shoreland disposal sites [43(S), 44(S)] on the west banks of the John Day River, both associated with possible future development at Tongue Point. Both sites are low priority because of existing uses and distance from Tongue Point (cf Dredged Material Management, 57.70, 59).

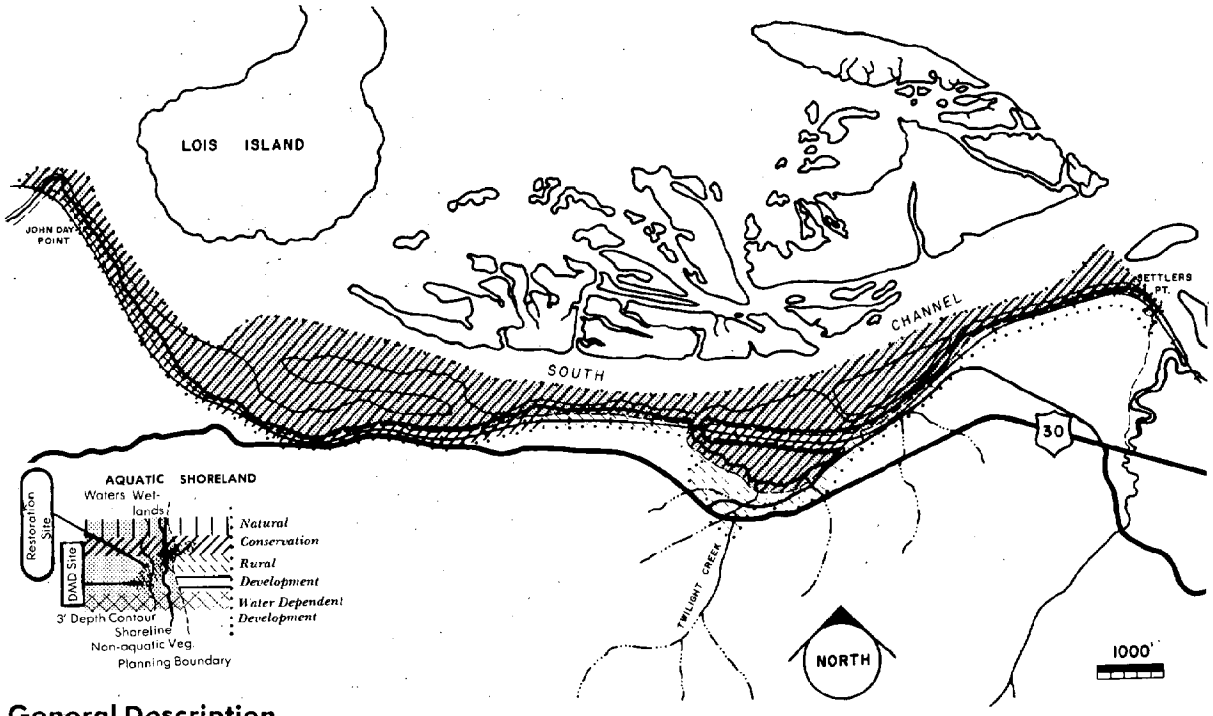
Restoration and Resource Enhancement

The diked tideland areas (shorelands) along the John Day River were once productive parts of the aquatic ecosystem, providing valuable habitat for waterfowl and other wildlife. These wetlands also produced large quantities of plant growth, much of which helped support the base of the aquatic food chain. It may be appropriate at some time in the future to breach existing dikes in one or more of these areas, to help restore some aquatic produc-

tivity. Such "restoration" would require the owner's approval, and the advisability of such action would be evaluated against the lost agricultural or other values. Nine areas, [29(M) 37(M)] are suggested as potential restoration areas. Future land uses in these areas would be limited to undeveloped or low intensity uses such as agriculture, so as not to preclude the potential for restoration use. The John Day River is also singled out for potential fishery enhancement [32(F)]. (cf Restoration and Mitigation 65.)



43.02 JOHN DAY POINT - SETTLERS POINT



General Description

This area includes shorelands 200 feet back from Mean Higher High Water (MMHW) and the waters and wetlands out to the refuge boundary, except in the marsh area where Twilight Creek drains into the Columbia River. The western boundary is John Day Point and the eastern boundary is Settlers Point. The area is predominantly forested and rural in nature.

Aquatic Features

There are fringing tidal marshes adjacent to the railroad along much of the shoreline. Dominant vegetation includes sedge, bulrush, marsh horsetail, common cattail, Pacific water parsley, and many other species. Tidal flats adjacent to marshes are productive for benthic algae, bacteria, microscopic invertebrates and larger invertebrates such as small clams, worms, and amphipods which characterize freshwater areas of the estuary. The tidal range at Settlers Point is 6.3 feet (as compared to 6.5 feet at Tongue Point) and the diurnal range is 8.0 feet (8.2 feet at Tongue Point). Salinity intrusion may occur in this area but has not been documented. The area is well-flushed.

Shoreland Features

Soils in this area include the Tolovana and the Walluski-Knappa Associations. Flood potential is low and there is a seasonally high water table. The soils have a very low suitability for agriculture. Soil movement hazards are present to the west of Twilight Creek. While the movement is not rapid, it is present almost every winter, intruding on U.S. Highway 30.

Shoreland vegetation is characterized by shrub willow, alder, Sitka spruce, and Douglas fir. Wildlife in the area includes blacktail deer, elk, and small mammals. Furbearers such as nutria and bear may be present.

Human Use

Existing uses in the area are forestry and scattered residential uses. The railroad runs along the shoreline. There is also in-water log storage east of Twilight Creek. There is a mixture of state and private ownership, with minor holdings by the county. Physical access to the water is limited to private shoreline structures.

Issues and Findings

There is limited development potential in the area. Some expansion of residential uses at Settlers Point may occur in the future.

The tidal marshes at the mouth of Twilight Creek have been intensively studied and are a valuable natural resource. The marshes are primarily in private ownership and are managed for waterfowl hunting by a local club. There are several small docks and walkways giving access to tidal channels cut in the marshes. Low intensity recreation is the dominant use of these marshes. Continued need for maintenance and possible improvement of docks and duck shacks is expected. Demand for recreation facilities requiring major alterations, however, is not expected.

Aquatic Designations

All aquatic areas, including waters, tidal flats and marshes are designated ***Conservation***.

Shoreland Designations

Shoreland areas in private ownership are designated ***Rural*** to provide for potential residential use. Other shorelands are ***Conservation***.

43.03 SETTLERS POINT EAST TO IVY STATION

General Description

This area, entirely south of Svensen Island, includes the lowland areas of Mary's, Bear, and Ferris Creeks, the waters of the creeks to the the approximate head of tide, and a 200 foot strip of shoreland east of Ferris Creek to the Ivy Station area. It also includes the water and wetland area to the middle of the channel between Svensen Island and the shoreland.

Aquatic Features

The wetland areas at the mouths of Mary's, Bear and Ferris Creeks were at one time diked and in agricultural use. Dikes and tidegates have fallen into disrepair or have been purposely breached. At Mary's and Bear Creeks, the wetland area influenced by tidal waters (6.5 foot diurnal tidal range) has completely reverted to tidal marsh vegetation, including sedges, bulrush and cattail. At Ferris Creek, there has been some establishment of wetland vegetation, but the area seems slightly higher and drier. The upper tidal reaches of all three streams and fringes along the marshes are forested and shrub wetlands, with Sitka spruce, willow and some alder.

Mary's, Bear and Ferris Creeks have small wild runs of cutthroat trout, steelhead, and coho and chum salmon; coho from state hatcheries have been placed in Bear Creek. Wildlife values of the wetland areas and adjacent flats north of the railroad are high. Deer, elk, bear, aquatic and terrestrial furbearers, waterfowl, raptors, including bald eagles, and other wildlife use the area.

Shoreland Features

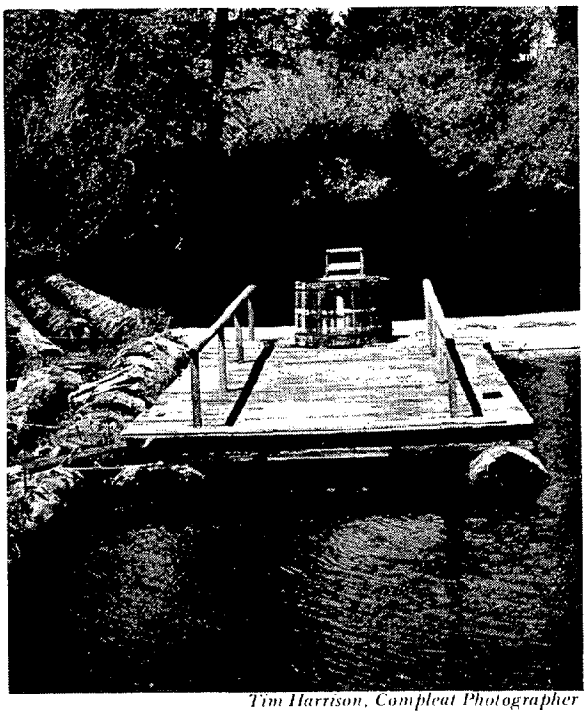
The soils in the area are primarily of the Coquille-Tidal Marsh (fresh)-Clatsop Association. These soils are characterized by a potential for flooding, a relatively high seasonal water table, and a low slope. Agricultural suitability is moderate, a class IV soil. East of Ferris Creek, the area adjacent to the planning area is much steeper (Walluski-Knappa Soil Association). Wildlife values of the shoreland area are similar to the other wetland areas, with deer, elk, bear, and small furbearers frequenting the area.

Human Use

Intensity of human use is low in all wetland areas. Adjacent shorelands are used for rural residences, agriculture and some forestry. The shoreland and formerly diked wetlands are privately owned, except for a county-owned parcel on the west bank of Mary's Creek. Crown Zellerbach owns land south of U.S. Highway 30 on Mary's Creek. The watersheds have been logged and some areas replanted.

Issues and Findings

The major issue in this area is whether or not the formerly diked wetlands can be re-diked and placed into agricultural or other use. According to state and local policy, once areas have substantially reverted to wetland vegetation, repairing dikes and tide



Tim Harrison, Compleat Photographer

boxes is considered new diking. New dikes are permitted if the purpose is to provide for water dependent uses. New diking of wetlands for agricultural use would not be permitted. Proposals for restoring abandoned dikes on Mary's Creek and Ferris Creek have been made.

Aquatic Designations

All aquatic areas are ***Conservation***, except for ***Rural*** designations for: the wetland south of the railroad on the east and west banks of Mary's Creek; the lake adjacent to Bear Creek south of U.S. Highway 30; and the wetlands along the entire east bank of Ferris Creek and a portion along the west bank.

Shoreland Designations

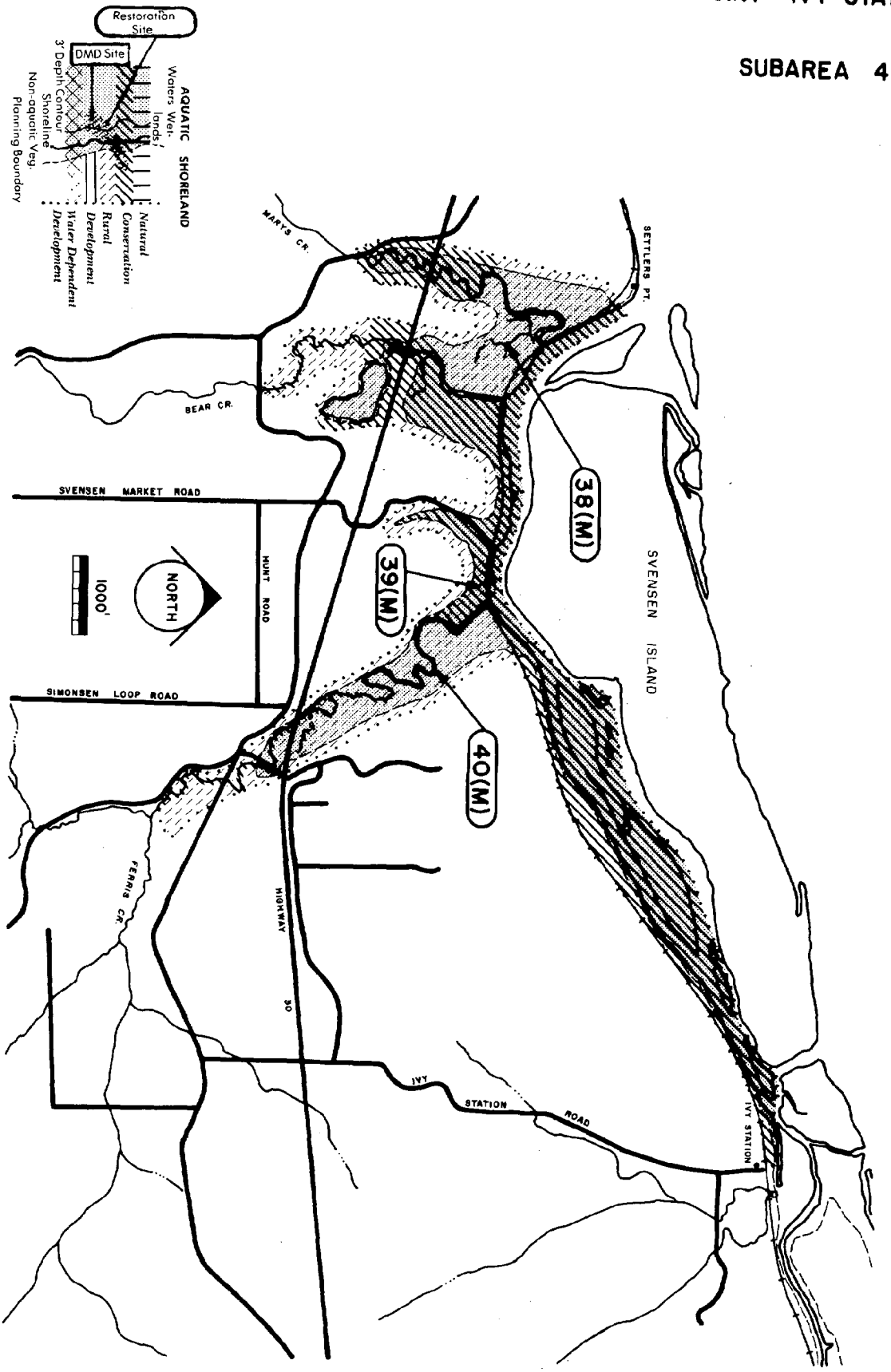
Rural shorelands include those north of U.S. Highway 30 along Mary's and Bear Creeks, shorelands in agriculture use south of U.S. Highway 30 along Bear Creek, and shorelands from Bear Creek east to and including Ferris Creek shorelands. All other shoreland areas are ***Conservation***.

Restoration and Resource Enhancement

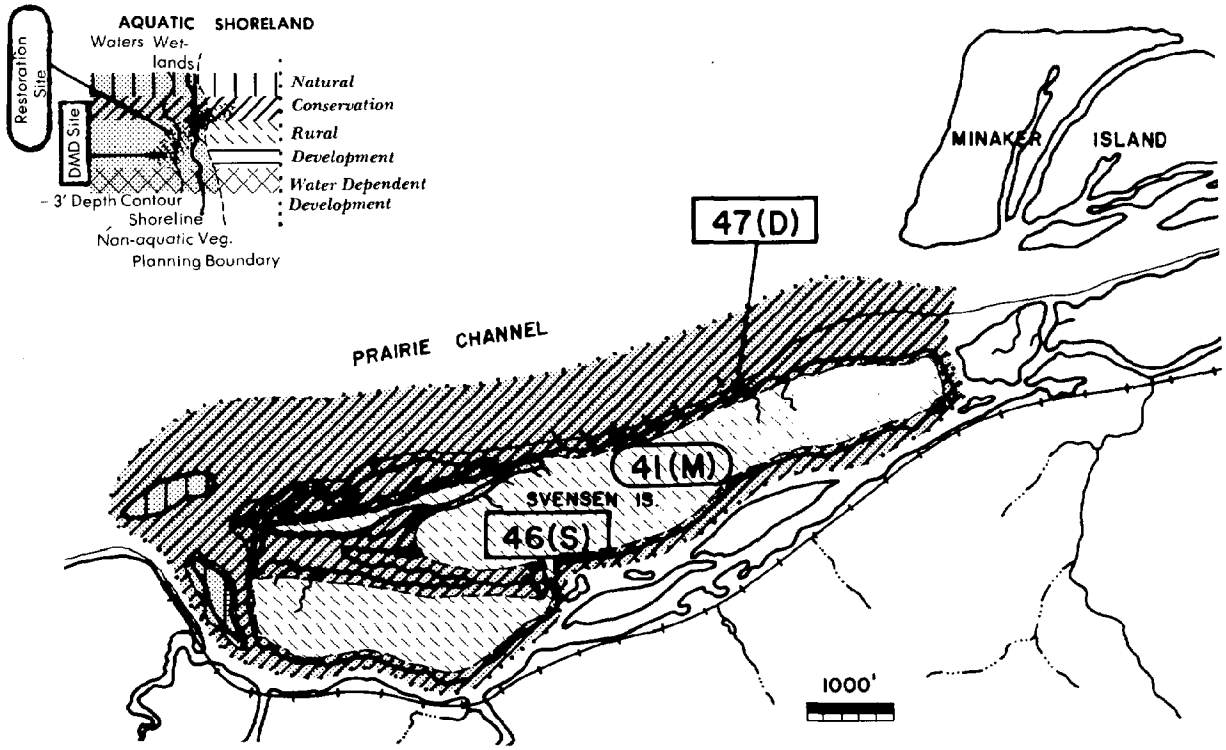
The wetland areas at Mary's Creek, and east and west of Ferris Creek are identified as possible restoration sites [38(M), 39(M)]. These areas are in different stages of reverting to tidal marsh or forested wetland. Removal of dikes to improve tidal exchange is proposed to enhance wetland values and provide for more export of plant material to the estuary (cf Restoration amd Mitigation Plan, 65).

SETTLERS POINT – IVY STATION

SUBAREA 43.03



43.04 SVENSEN ISLAND



General Description

This subarea includes the diked Svensen Island and aquatic areas adjacent to the island. The island is connected to the mainland by a small bridge.

Aquatic Features

Svensen Island is surrounded by tidal marshes which are dominated by sedge, bulrush and cattails. The undiked area is good habitat for aquatic and semi-aquatic animals including beaver, nutria, muskrat, and waterfowl. The productivity of adjacent tidal flats is likely to be moderate to high.

Fish found in the area include warm water species such as bass, crappie, suckers and carp. Sturgeon may also be present, particularly in the deep water areas north of the island. Juvenile salmon use of the area has not been studied, but this area, close to Big Creek (hatchery site), probably gets extensive use by feeding smolts.

Shoreland Features

The soils on Svensen Island are of the Coquille-Tidal Marsh (fresh)-Clatsop Association. These soils have a low slope, are subject to flooding, and have a seasonally high water table. These class III or IV soils are also moderately suitable for agriculture.

Much of the island is diked farmland used as pasture. The island is divided in half on the west by a shrubby wetland area with a small pond. The island is good wildlife habitat and is frequented by deer and small terrestrial mammals.

The diked portion of the island is in two large private ownerships. Aquatic area ownerships are a mixture of state, county and private.

Issues and Findings

Svensen Island dikes on the north side of the island have experienced problems with erosion. A series of pile dikes to retard erosion have been placed near the center of the island. Material to maintain the dikes is difficult to obtain.

Portions of the diked land used for agriculture are poorly drained and common rush is a dominant vegetation on much of the island. The wetlands inside the dike are protected from tidal flooding by a series of tidegates.

Aquatic Designations

The tideflat area and marsh island west of Svensen Island are ***Natural***. Other aquatic areas, including wetlands inside the dikes, are ***Conservation***.

Shoreland Designations

All shorelands are designated ***Rural***, including dikes and the land area they protect.

Dredged Material Disposal

The dikes on the west and north sides of Svensen Island are designated as dike maintenance disposal sites [47(D)] and the Port of Astoria is conducting some disposal on farmland [46(S)].

Restoration and Resource Enhancement

The entire Svensen Island is designated as a marsh restoration site [41(M)]. It is quite low and would be expected to revert to tidal marsh if the dikes were breached. All or a portion could be restored to aquatic productivity (cf Restoration and Mitigation, 65).

43.05 IVY STATION - BIG CREEK

General Description

This subarea includes tideland soils in the Ivy Station area and a 200 foot strip of shoreland extending to the Big Creek area. Also included are extensive wetlands to the east of Svensen Island, on Calendar Island and south of Calendar Slough. This latter area also includes a small portion of shorelands in the Ivy Station area.

Aquatic Features

Tidal marshes surround Calendar Island and fringe the shoreline along the mainland north of the railroad. These marshes are similar in composition to others in the area; sedges, bulrushes and cattails predominate. Use by wildlife is significant. Fishery values in the area are high. Thousands of juvenile salmon smolt are released from the hatchery at Big Creek and no doubt use the tidal flats for feeding and to avoid predators. Warm water fishes are also common in the area.

Shoreland Features

The soils in this portion of the planning area are primarily the Coquille-Tidal Marsh (fresh)-Clatsop Association. These soils are typical of the lowlands adjacent to the estuary and are characterized by a low slope, high flood potential, and a high seasonal water table. There are no hazards except for tidal flooding in low-lying areas. The shoreland area at Ivy Station is diked pastureland and has a tidegate at the mouth of the creek.

Shoreland vegetation in this stretch includes cottonwood, Sitka spruce, and shrub willow. Wildlife in the area includes deer, elk, waterfowl, and many small mammals and furbearers. The Nature Conservancy has identified a bald eagle nest in the Ivy Station area.

Human Use

Agriculture and forestry are predominant uses, along with rural residences. North of Calendar Island, there are log storage areas.

Issues and Findings

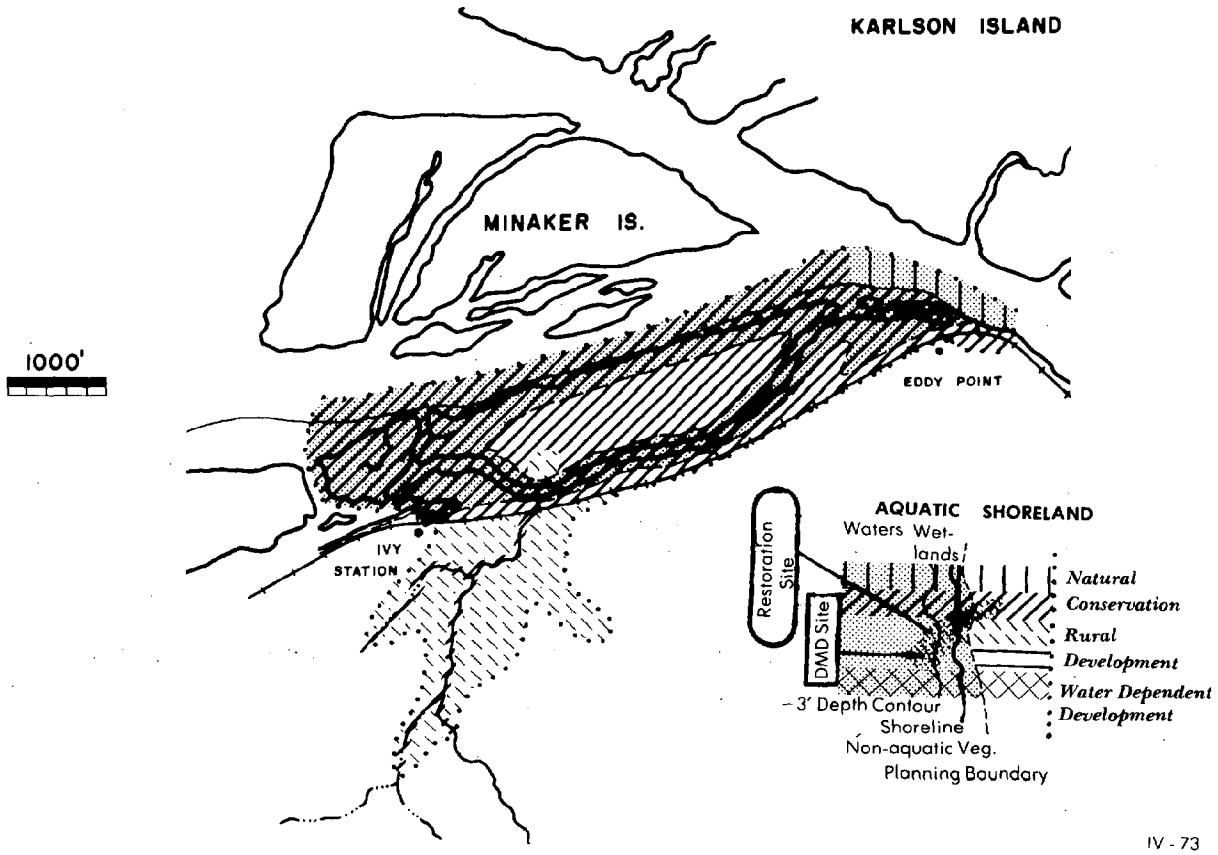
There is little development potential in this subarea; existing uses are likely to continue. No major issues have been identified. Diked shorelands at Ivy Station are in private ownership. Other shorelands are either in state or corporate (boise Cascade) ownership. Aquatic areas are primarily in state ownership, with some private.

Aquatic Designations

All aquatic areas are ***Conservation***, except the water area east of Eddy Point, which is designated ***Natural.***

Shoreland Designations

The shorelands at Ivy Station are ***Rural,*** as is a small privately-owned portion of Calendar Island. The remainder of island shorelands are ***Conservation.***



43.06 BIG CREEK - LITTLE CREEK

General Description

This subarea extends east from Eddy Point to just short of Knappa dock and includes adjacent waters and shorelands of Knappa Slough, and the spruce swamp and tideland soil shorelands at the mouths of Big and Little Creeks.

Aquatic Features

Big and Little Creeks, a large tidal spruce swamp at the mouth of the creeks, and Knappa Slough are all prominent aquatic features of this subarea. Natural resource values are high, particularly for fisheries.

A state salmon hatchery on Big Creek released six million fall Chinook salmon, 800,000 coho, 40,000 chum and 50,000 steelhead in 1978. The stream occasionally has a run of lamprey and has a wild population of cutthroat trout. Little Creek fish runs are primarily strays from Big Creek. Angler pressure is heavy on Big Creek. The drainage basin of Big Creek is 39 square miles. Creek discharges range from 21 cubic feet per second (cfs) to 538 cfs.

The approximately 125 acre tidal spruce swamp at the mouth of the creeks is undisturbed Sitka spruce forest, dominated by large, open-growth form of Sitka spruce and some red alder, vine maple, salmonberry, skunk cabbage, sedges and water-parsley. A variety of other wetland plants are also present. The daily tidal range in the swamp is approximately 6 feet in lower reaches. There is no intrusion of saltwater into this portion of the estuary, even on lowest river flows. Wildlife is diverse and rich, including owls, ducks, other waterfowl, blue heron, bald eagles, deer, raccoon, beaver, squirrels, muskrat, and nutria.

Shoreland Features

The primary soil in this area is the Coquille-Tidal Marsh (fresh)-Clatsop Association. Portions of Little Creek flow through a group of soils known as the Nehalem Association. Many of the characteristics are similar, but the primary difference is the agricultural suitability: the Nehalem Association is mostly Class II soils, while the other is Class III and IV. The primary hazard in the area is the potential of flooding of the creeks, which also occurs upstream of tidal areas.

Wildlife values of the shorelands are similar to the wetlands with deer, elk, and furbearers frequenting the area.

Human Use

Agriculture on shorelands in the upper portion of the subarea is the most intensive human use. There is forestry on adjacent shorelands and recreational use of Big Creek is important further upstream. Little Creek is the source of water for the Wickiup Water District and one of several sources of water for the City of Astoria.

Issues and Findings

The major issue in this area is the need for protection of the old growth spruce swamp at the mouth of Big and Little Creeks versus private land use. The area has been inventoried by the Nature Conservancy and, based on the natural values described above, recommended for protection. Most of the spruce swamp is in a single corporate ownership (Boise Cascade), with a small portion in private farm ownership near the upper tidal reaches between the two streams. Both landowners vigorously object to a protective land use designation which would prevent their use of the area for forestry or agriculture.

The waters of Knappa Slough adjacent to Big and Little Creeks are important holding areas for adult anadromous fishes prior to ascending the streams to spawning grounds and the hatchery. This area should be protected from competing uses.

The Knappa Slough area also has significant historical and archaeological value. The shoreline of the slough was the site of an Indian village. The present Knappa Dock is also the first landing site of the Lewis and Clark expedition in Clatsop County.

The Knappa dock area, midway between public water access points on the John Day River and at Aldrich Point, has been proposed by the Oregon Department of Fish and Wildlife as a possible public boat launch site. Because of the inability of local roads to handle increased traffic and impacts on area residents and lifestyle, this has been opposed by local residents. This public access issue is addressed in an overall Eastern Clatsop policy (cf 43).

Aquatic Designations

The entire spruce swamp, portions of Big and Little Creeks running through the swamp, and adjacent waters of Knappa Slough are designated ***Natural***. The wetland area north of the railroad at Eddy Point on the west is designated ***Conservation***.

Shoreland Designations

Shorelands from Eddy Point east to the spruce swamp and shorelands along the western and eastern edges of the swamp in forestry use are designated ***Conservation***. Areas in agricultural use south of the spruce swamp are ***Rural***.

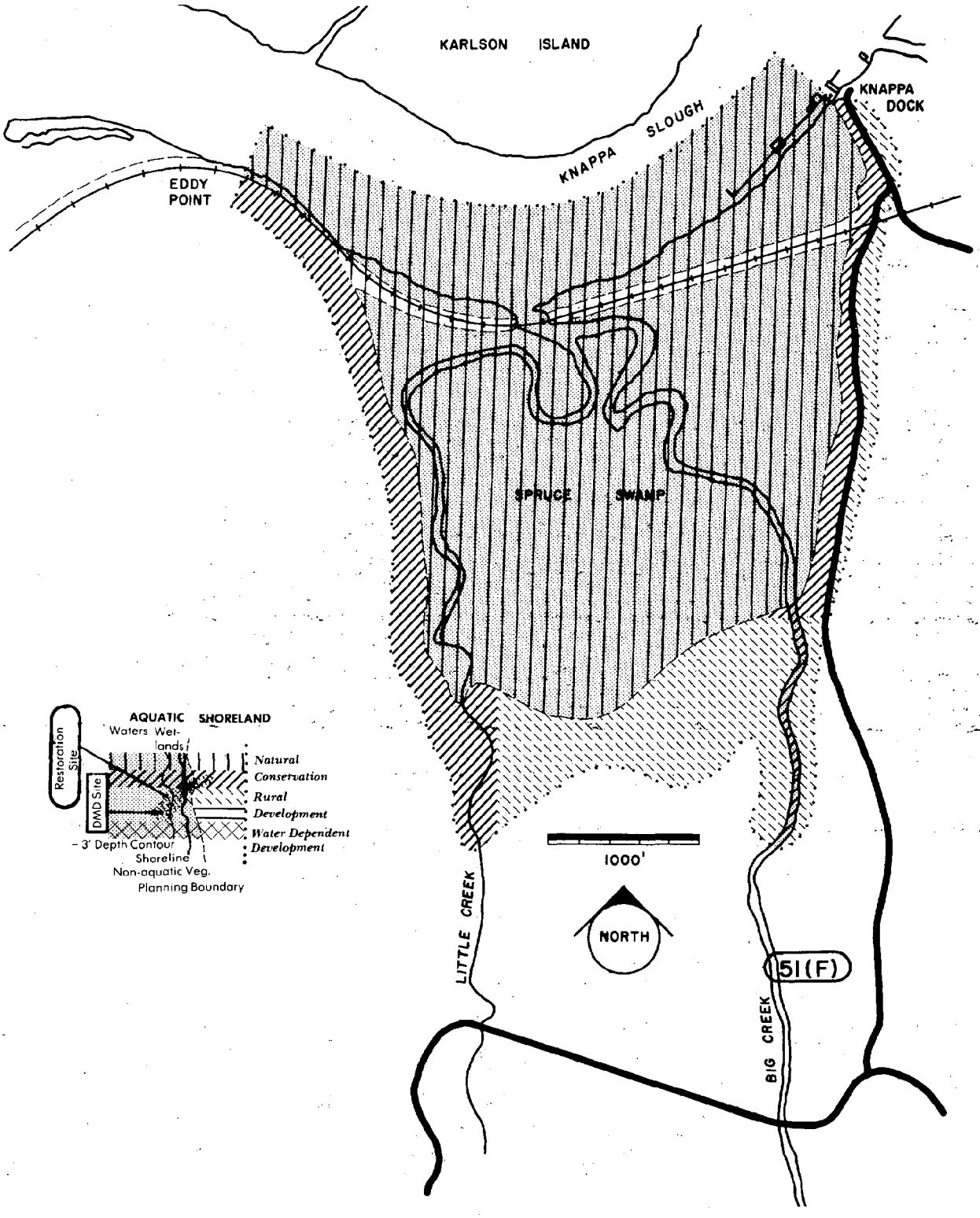
Subarea Policy

The ***Natural*** designation of the Big Creek spruce swamp recognizes the unique natural fish and wildlife values of this area. However, such a designation should not limit logging of adjacent shoreland and upland areas in accordance with the Oregon Forest Practices Act, and should not impede construction of a log sorting yard or similar support facilities on the uplands adjacent to the swamp.

Restoration and Resource Enhancement

Big and Little Creeks are recommended for projects that will enhance their already significant value for fisheries (cf Restoration and Mitigation Plan, 65).

BIG CREEK- LITTLE CREEK
SUBAREA 43.06



43.07 FERTILE VALLEY

General Description

This small subarea includes diked lands along Fertile Valley Creek, a portion of Knappa Slough and Knappa dock. Governmental jurisdiction is by Clatsop County.

Aquatic Features

The natural resource characteristics of Knappa Slough are discussed in the Big Creek-Little Creek subarea (cf 43.06). Fertile Valley Creek is diked with a tidegate near its mouth where it joins Warren Slough. The area is a private waterfowl reserve and receives significant wildlife use. Ducks and geese are common and nesting areas have been provided. No fishery information is available on Fertile Valley Creek, but warm water fish are probably common.

Shoreland Features

Soils in the Fertile Valley area include the Coquille Tidal Marsh (fresh)-Clatsop Association on the lower portion of the waterway and the Walluski-Knappa Association on the remainder. The two associations have similar characteristics except the latter has less flooding potential and is better suited for agricultural practices (Class II and III soils). Shoreland vegetation consists of grasses and forest. Wildlife of the preserve is significant.

Human Use

Agriculture and rural residential uses occur within the diked area. There are private water access points in both sloughs. Ownership is mostly private, with some corporate.

Issues and Findings

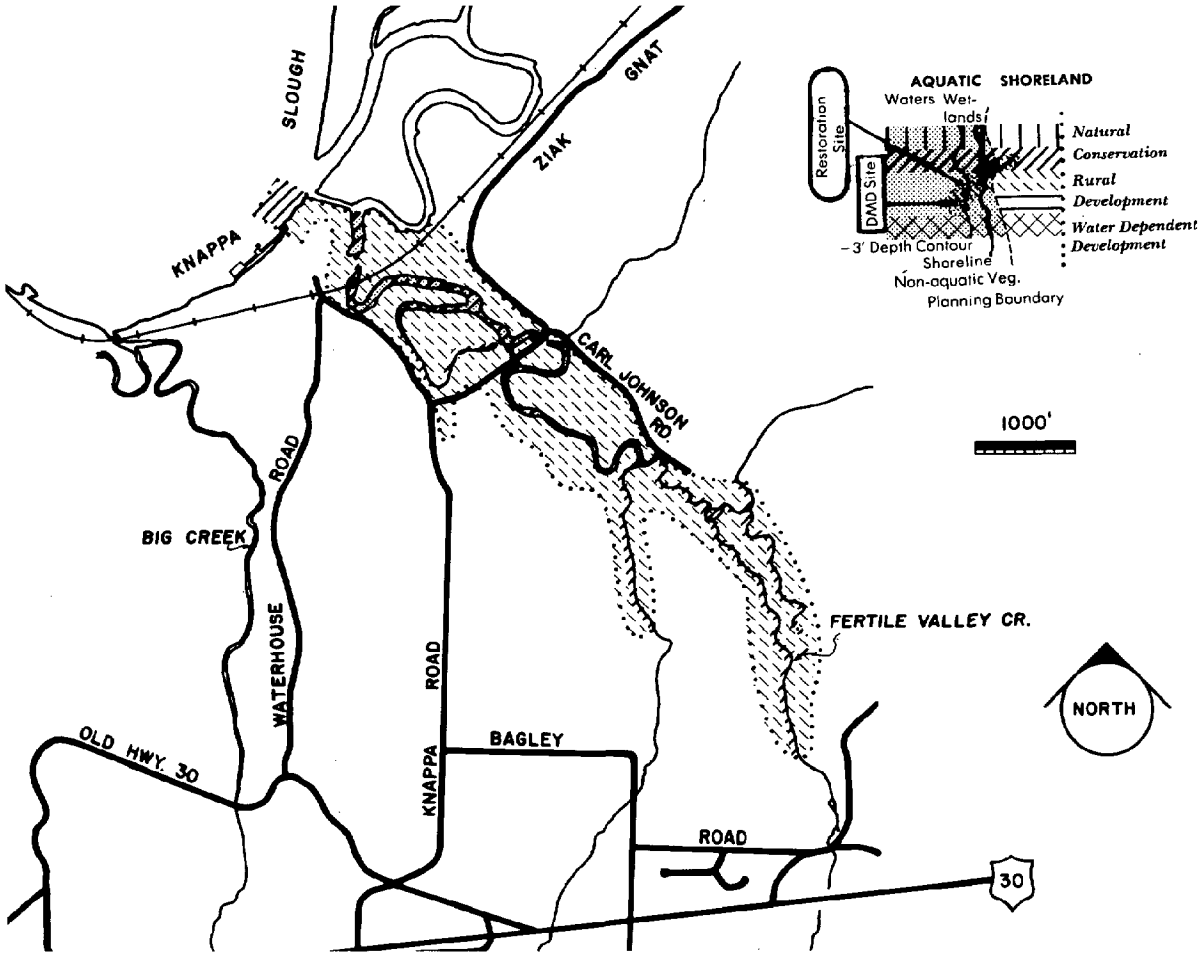
Development potential in the area is limited by land and soil characteristics. The area also has poor transportation access and no public facilities. There are no major land use issues, except for public access in the Knappa Dock area. This access issue was discussed in the Big Creek subarea (cf 43.06) and addressed by an overall Eastern Clatsop policy (cf 43. Policy 1).

Aquatic Designations

Knappa Slough, Fertile Valley Creek, and associated wetlands are ***Conservation.***

Shoreland Designations

All shorelands are designated ***Rural.***



43.08 MOUTH OF BLIND SLOUGH

General Description

This subarea includes the mouth of Blind Slough to the railroad bridge, extensive marsh, shrub and forested wetlands north and south of Blind Slough, Warren Slough, and portions of Knappa Slough and Prairie Channel. Governmental jurisdiction is by Clatsop County.

Aquatic Features

The freshwater wetland areas north and south of Blind Slough are some of the largest, undisturbed tidal spruce and shrub swamps along the shoreline of the estuary. Natural resource values are high. The areas have not been extensively studied but the vegetation and wildlife use is probably similar to the Big Creek area (cf 43.05). Sitka spruce, willow and alder make up the overstory with low wetland vegetation as an understory. The area is prime habitat for waterfowl, great blue heron, bald eagles, beaver, muskrat, nutria, and raccoon.

Fisheries are important in the area. There are large populations of warm water fishes including yellow perch and bass. Blind Slough is the navigation route for juvenile steelhead released upstream at Gnat Creek Fish Hatchery. The small sloughs are probably used for feeding by downstream migrant juvenile salmon from Big Creek and areas up the Columbia River.

Knappa Slough has been inventoried by the Nature Conservancy, and its tidelands, fringing marshes and riparian vegetation are described as valuable fish and wildlife habitat.

Shoreland Features

The only shorelands in this area are the strip along Ziak-Gnat Creek Road. Southeast of the road, the hill land is forested with Douglas fir and hemlock. The area is managed for forestry use.

Human Use

Blind Slough and Knappa Slough are used extensively for storage and transport of logs. Warren Slough has numerous houseboats, used mainly for recreation. Fishing and boating are popular in the area, with a boating access point just upstream at Aldrich Point. There is little human use of the vegetated wetlands, which increases their value to wildlife.

Issues and Findings

The bulk of the wetlands north and south of Blind Slough are owned by Western Transportation Company, with the remainder in a small private ownership. The soils are regularly inundated by fresh tidal waters, resulting in low value, small timber. There are no plans to log the area. Drainage is complex, with many small sloughs and channels. The tidal range is approximately 7.0 feet and there is no salt water intrusion this far upriver. These undisturbed wetlands have high natural values and need protection.

Blind Slough, Prairie Channel and Knappa Slough are among the more important log storage areas in the estuary. Water quality is good, the water is deep enough so that grounding at low water is not a problem, and there are no gillnet fish drifts in the area.

Aquatic Designations

The privately-owned portion of the wetland south of Blind Slough, and the flats and small marsh islands trailing south of the tip of the wetland north of Blind Slough are designated ***Natural.*** The remainder of the wetlands and waters are ***Conservation.***

Shoreland Designations

The only shoreland area, along Ziak-Gnat Creek Road is designated ***Conservation.***

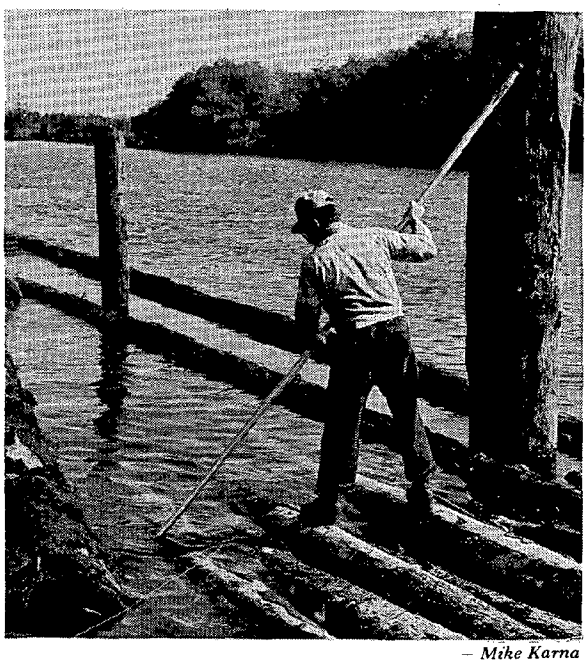
Subarea Policies

1. The ***Natural*** designation on the privately owned portion of wetland south of Blind Slough expressly provides for construction of a single residence at some future time on a piece of higher ground near the railroad. The residence would provide for a caretaker of the area, which is intended as a wildlife preserve.

2. Maintenance and possible expansion of log storage activities in Blind Slough are provided for in this plan. This area is well protected from winds and river currents, has relatively deep water and is one of the most important log storage areas in the estuary. The ***Conservation*** designation of the adjacent spruce swamps at the mouth of Blind Slough are intended to provide for protection of the natural vegetation and wildlife values, while not limiting adjacent log storage and transport activities. Logging in the swamp area shall not be permitted.

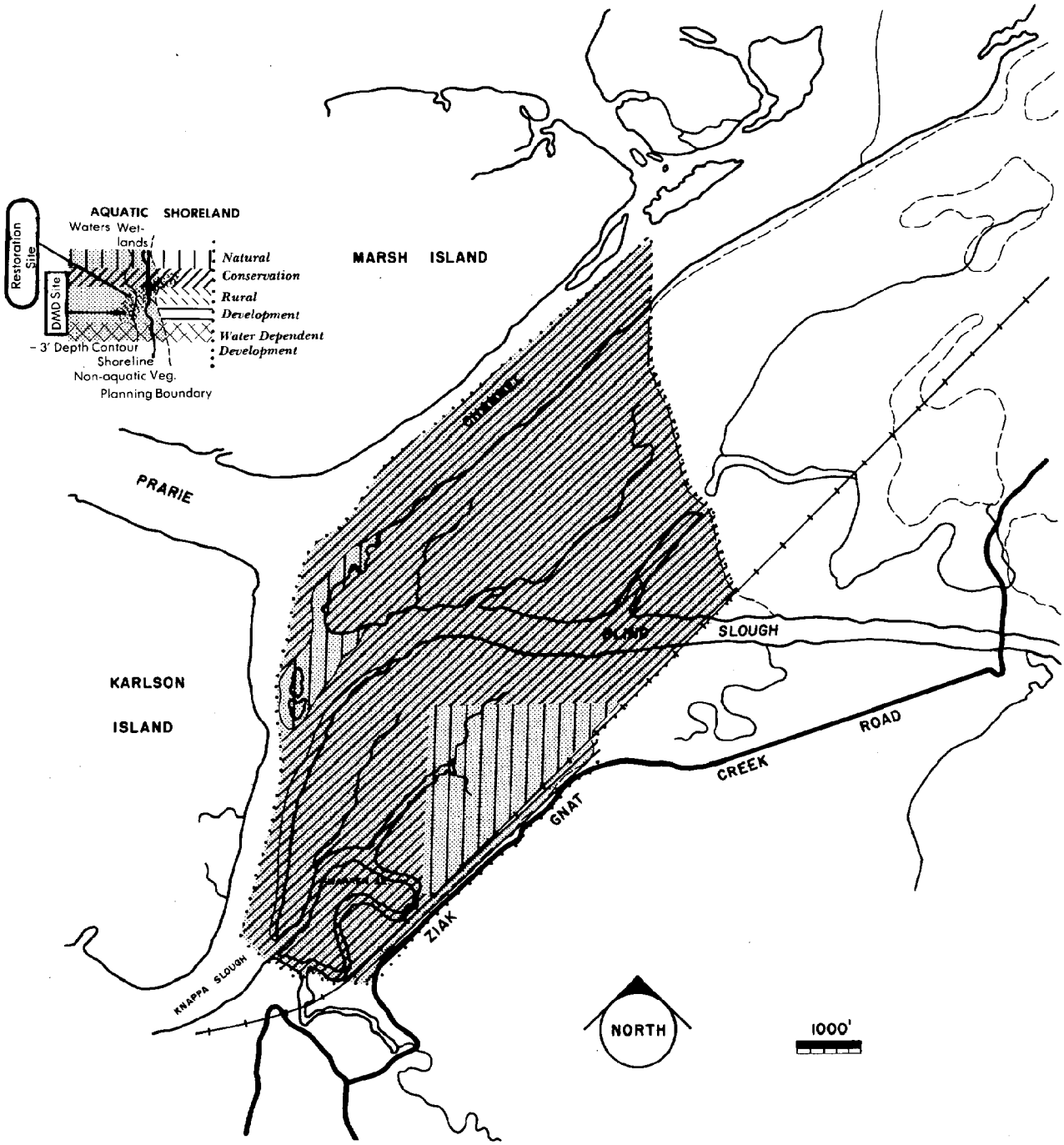
Dredged Material Disposal

All dredging operations associated with dikes in Blind Slough are included in site 64(D).



– Mike Karna

MOUTH OF BLIND SLOUGH SUBAREA 43.08



43.09 GNAT CREEK

General Description

This subarea includes Gnat Creek, wetlands along the creek, and diked farm land to the east of the creek. Governmental jurisdiction is by Clatsop County.

Aquatic Features

The fisheries value of the Gnat Creek area is very high. The Gnat Creek Fish Hatchery supports steelhead sport fishing in the creek. Most of the fish raised at the hatchery are transported and released at other streams in Oregon. Gnat Creek also supports a good run of fall Chinook, and some coho, cutthroat, and chum. The stream has good angler access.

The lands adjacent to Gnat Creek are wetlands subject to tidal inundation, though there is no salt water intrusion. While there are some forested areas with willow and spruce, most vegetation is shrub and marsh plants. Wildlife value of this area is high, particularly for small mammals, waterfowl, marsh birds and great blue herons.

Shoreland Features

The soil association in this portion of the management unit is the Coquille-Tidal Marsh (fresh)-Clatsop Association. The shorelands are leased farmland or forested, and wildlife in this area includes deer, elk, and small mammals. Some of the areas behind dikes are low and could be classified as freshwater wetlands.

Human Use

The primary use of Gnat Creek is for recreational fishing. Shorelands are used for agriculture and there are some rural residences.

Issues and Findings

Gnat Creek, with its wetlands, riparian vegetation and important fishery, needs protection from major alterations. Some of the wetlands are formerly diked areas, but no dike restoration has been suggested. Some pressure exists for installation of private docks. The recreation value of the stream for sport fishing is high.

Shoreland and wetland ownership is mostly private, with a state-owned area near the upper reach of tidal influence.

Aquatic Designations

Gnat Creek and adjacent wetlands are classified ***Conservation***. The wetlands within the diked farmland east of Gnat Creek are ***Rural***.

Shoreland Designations

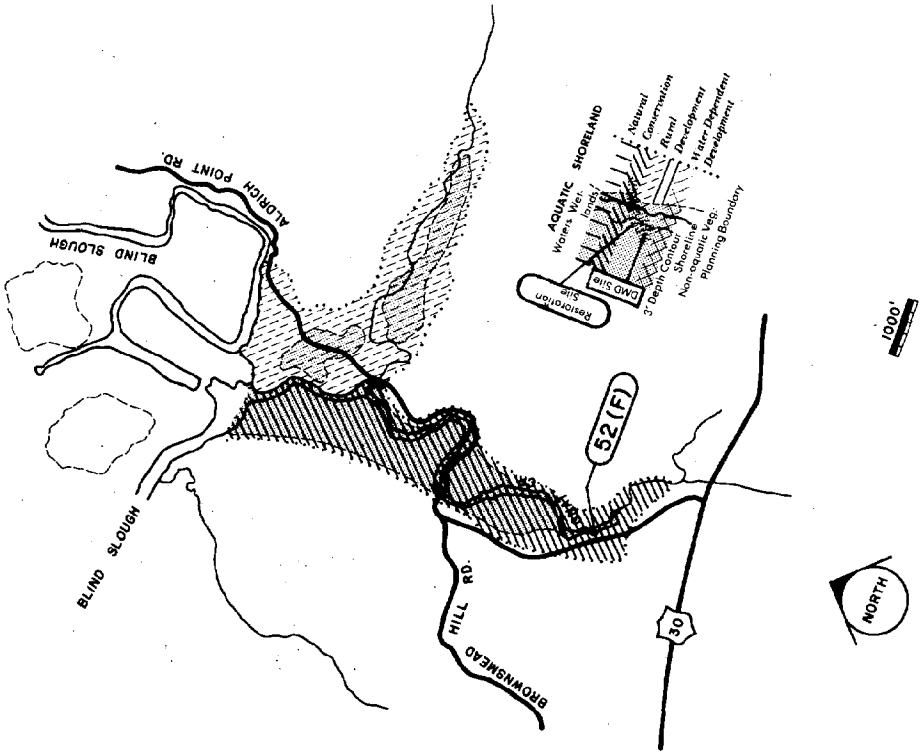
Shorelands adjacent to Gnat Creek wetlands are ***Conservation***, except for the diked farmland east of Gnat Creek, which is ***Rural***.

Subarea Policy

The ***Conservation*** designation along Gnat Creek provides for low intensity uses. However, each project for docks, moorages or other alteration must be carefully evaluated. Projects which along or in combination with past alterations have a detrimental impact on fishery values shall not be permitted.

Restoration and Resource Enhancement

Gnat Creek is recommended for projects that will enhance its already high value for fisheries (cf Restoration and Mitigation, 65).



43.10 BROWNSMEAD

General Description

The Brownsmead subarea includes all of the lands behind the Brownsmead dikes, all sloughs and wetlands behind the dikes, Blind Slough from the railroad bridge to Gnat Creek, and Prairie Channel waters and wetlands fronting the subarea. Governmental jurisdiction is by Clatsop County.

Aquatic Features

Blind Slough is the main migration route for steelhead produced at the Gnat Creek Hatchery. There is a population of warm water game fish such as bass, crappie, and perch in Brownsmead Slough. Other sloughs also have good populations of warm water fishes.

Several fresh water wetlands have been identified in the Brownsmead area. Most have been cleared, have little wetland vegetation, and are now used for grazing. At one time, all of the shorelands in this subarea were tidal marsh or swamp. The tidal marshes and flats along Prairie Channel have not been studied, but are probably similar to those on the adjacent islands. These areas are very productive and valuable for fish and wildlife.

Shoreland Features

The Class III and IV soil types in this area are of the Coquille-Tidal Marsh (fresh)-Clatsop Association. There are large areas of peat and organic soils, and freshwater wetland. The lowlands are protected by dikes and five tidegates.

The diked lowlands and small forested areas both have moderate wildlife value. Deer and elk use the area along with waterfowl and small mammals.

Human Use

Existing uses include farming and rural residences. A portion of Blind Slough is used for log storage. Ownership is entirely private except for small parcels in state and county ownership, and a portion owned by Western Transportation Company adjacent to their other holdings outside the dike. Recreational use of the water area is moderate.

There are several water access points. Private docks are located mainly on Blind Slough. There is a public boat launching facility at Aldrich Point, which gets extensive use, particularly in the summer.

Issues and Findings

The Brownsmead area, according to the U.S. Soil Conservation Service, is the best agricultural land in Clatsop County. Most of the area is used as pasture land, but corn, peas, beans and other crops are also grown. The area is in the exclusive farm use zone (EFU) adopted by Clatsop County. As such, it will be protected for this use.

The public boat launching facility at Aldrich Point is a source of conflict in the area. Local residents do not want the facility expanded because the traffic generated by the facility already causes problems during peak use periods. The County government operates the facility and has plans for improving the boat launch. This issue is addressed in the overall Eastern Clatsop policies.

A major issue in this area is the potential development of a nuclear power plant in the area to the south of Blind Slough. While most of the site is outside the CREST planning area, extensive impacts would occur in the Brownsmead area. The site is one of twelve potential sites in the Pacific Northwest. Washington Public Power Supply System is currently evaluating these sites to reduce the number to four, from which the final site selection will be made. The Brownsmead site is currently ranked 9th. This is addressed in the overall Eastern Clatsop policies.

Aquatic Designations

All sloughs, and waters and wetlands outside dikes are designated ***Conservation***, except for the tidal flats adjacent to the eastward bend in Prairie Channel, which are ***Natural***. Wetlands within the dikes are designated ***Rural***.

Shoreland Designations

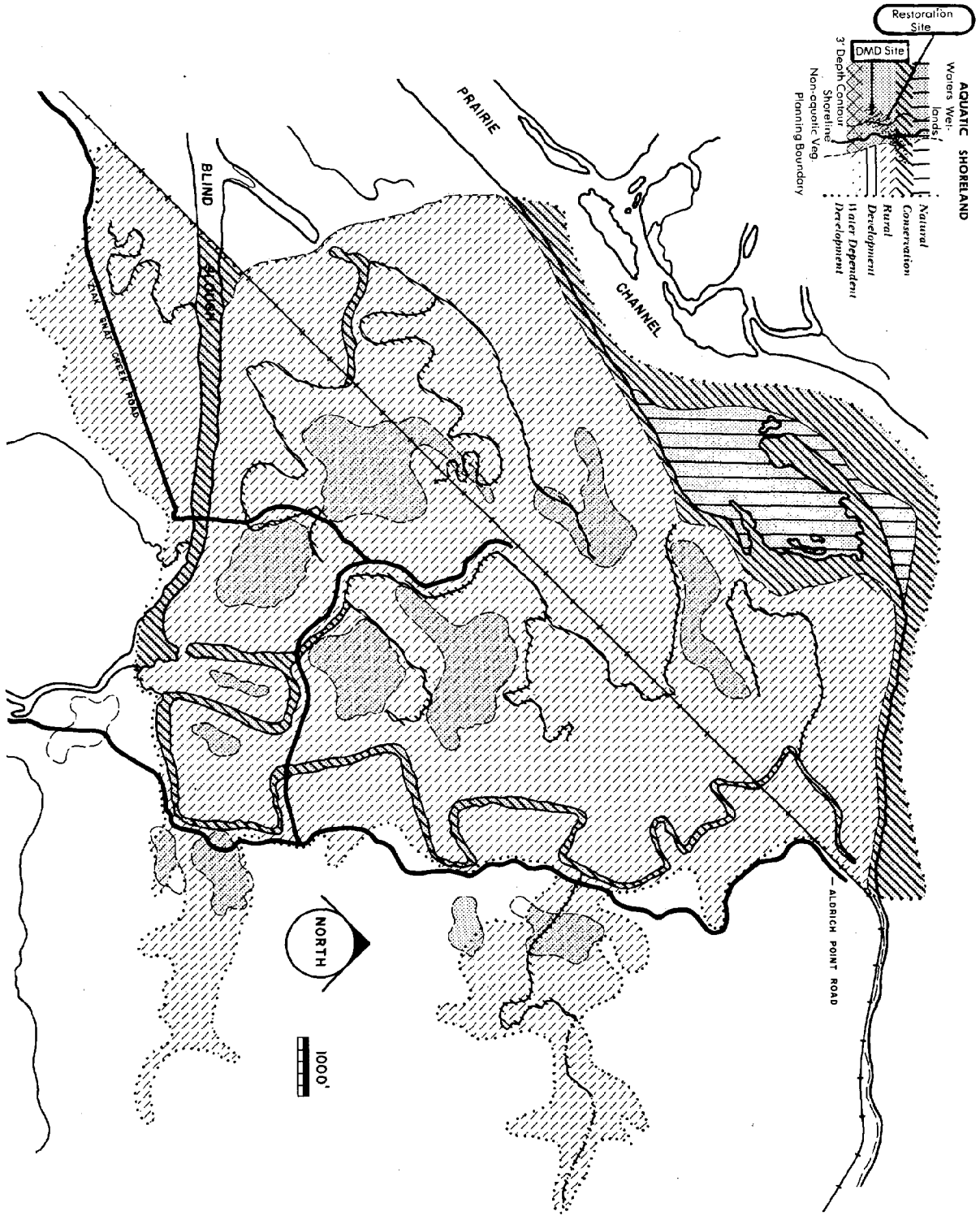
All shorelands are designated ***Rural***.

Dredged Material Disposal

The outer dikes adjacent to water areas are good sites for disposal of material suitable for dike maintenance, [64(D)].



—Karen Damron


Restoration Site
DMD Site
3' Depth Contour
Shoreline
Non-aquatic Veg.
Planning Boundary
AQUATIC
Waters
Wet-lands
SHORELAND
Natural
Conservation
Rural
Development
Water Dependent
Development
PRAIRIE
CHANNEL
BLIND
SLOUGH
CLAM SHAT CREEK ROAD
ALDRICH POINT ROAD
NORTH
1000'

43.11 CLIFTON CHANNEL

General Description

This subarea consists of a strip 200 feet inland measured horizontally from Mean Higher High Water (MHHW), but does not include a small area of tideland soils which begins just south of Quinns Island where the shoreline turns south and an area of geological instability adjacent to Clifton Channel. The area does include the Columbia River to the refuge boundary. Governmental jurisdiction is by Clatsop County.

Aquatic Features

Freshwater flow becomes increasingly dominant over tidal circulation in this reach of the river. Salt water intrusion is absent, flood currents are weak, and ebb current is strong. Clifton Channel is relatively shallow in some areas, deep in others. Sediments range from sand to silt and clay in shallow areas.

Juvenile salmon migrate along the shorelines of this subarea and it is a migration route for adult salmon returning to upstream spawning areas. Small fringing tidal marshes serve as habitat for small mammals and waterfowl.

Shoreland Features

Most of the shorelands in this subarea are steep, heavily forested and subject to landslide hazards, particularly adjacent to Clifton Channel. Vegetation on these shorelands and adjacent uplands is mostly Douglas fir and hemlock. Small pockets of tideland soils occur along Clifton Channel, vegetated with conifers, alder and willow. Wildlife using shore and uplands include deer, elk, bear and smaller animals. A bald eagle nest is located near Aldrich Point.

Human Use

Forestry and some residential use occur in this area. The old fishing community of Clifton is still occupied by several families and is used as a staging area for fishing the Clifton Channel gillnet fish drifts. Extensive log storage sites are located across the channel adjacent to Tenasillahe Island and are a source of conflict.

Issues and Findings

Potential for increased development is limited by topography, transportation access and available land. Existing low intensity uses are likely to continue or be abandoned.

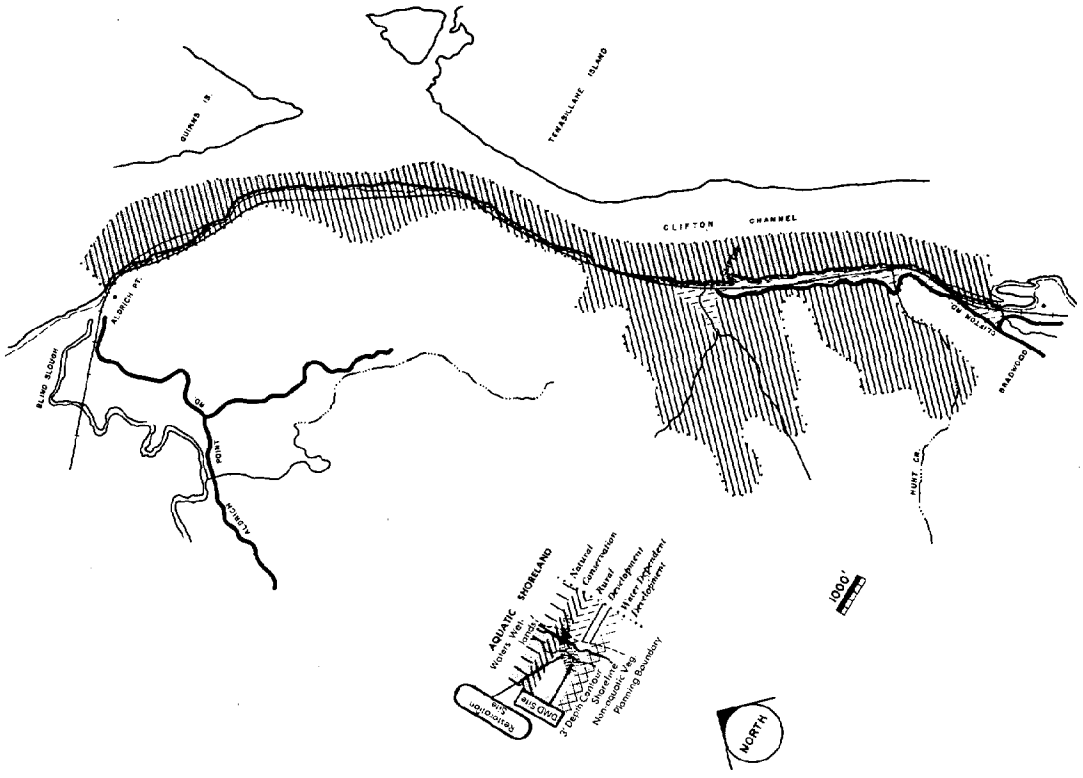
The fish drifts in this area are very productive, but are hampered by drifts and snag material. Most of these obstructions are sinker logs from log rafts stored across the channel. Occasional broken log bundles also cause serious problems, resulting in lost fishing time and expensive snag removal from drifts. This issue is dealt with in the Regional Policies (cf 43. Policy 4) and local fishermen are working with Crown Zellerbach to alleviate the problem.

Aquatic Designations

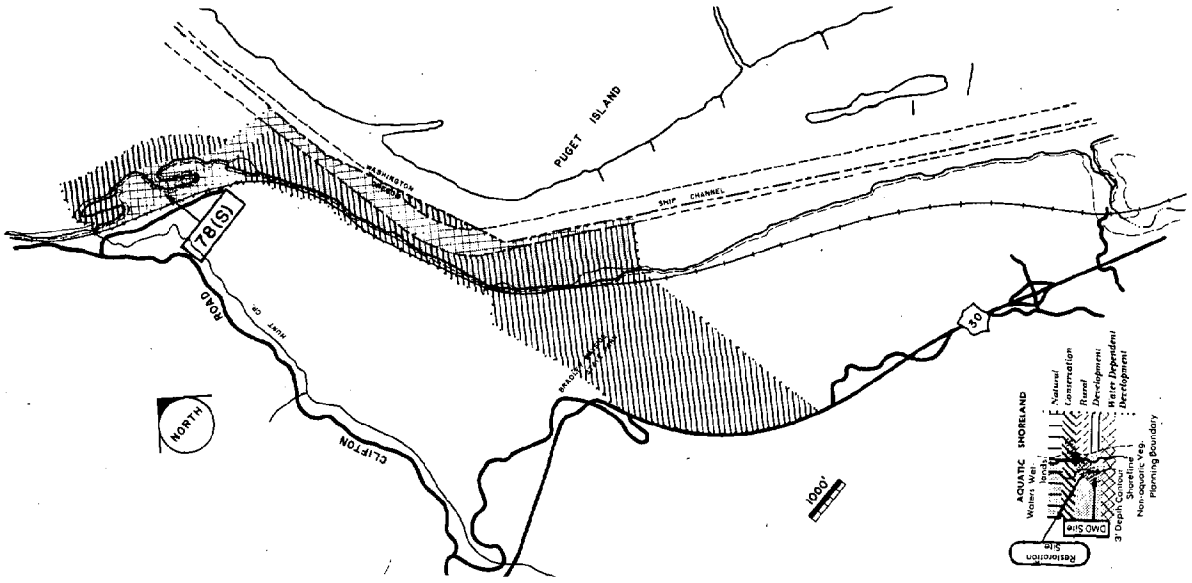
All aquatic areas along Clifton Channel are designated ***Conservation.***

Shoreland Designations

Shoreland areas in forestry use or hazard areas are designated ***Conservation.*** The developed area at Clifton, southeast to Bradwood, is designated ***Rural.***



43.12 BRADWOOD



General Description

This area includes a former industrial area at Bradwood, a stretch of steep forested shoreline to the east, where the planning area goes either 200 feet inland or to the extent of geological instability, and portions of the Columbia River. Crown Zellerbach's Wauna Mill is not included (cf 43.13 - Westport). Governmental jurisdiction is by Clatsop County.

Aquatic Features

The fishing in this area is good with good angler access. This is on a major migration route for salmon (both adult and juvenile) and steelhead. Also present are shad, smelt, and starry flounder. Bugby Hole is very deep and good for sturgeon. Major gillnet drifts are maintained in this area.

There are only minor wetlands in this stretch of the river, the largest being a tidal marsh adjacent to the Bradwood industrial site. This marsh is habitat for marsh birds, small mammals, and a resting area for migrating waterfowl.

Shoreland Features

The soils in this subarea include the Hembre-Klickitat Association (30%-60% slope) in the Bradwood area, and the Astoria-Hembre-Klickitat Association (3%-30% slope). The industrial area at Bradwood has been filled.

The vegetation on the Bradwood Cliffs is mostly Douglas fir and hemlock. This serves as habitat for deer, elk, bear, small mammals and furbearers, and birds.

The Nature Conservancy has identified the Bradwood Cliffs old growth (150-180 years) Douglas fir stand as a unique area.

Human Use

The Bradwood industrial site is not currently used. The shoreline area between Bradwood and Wauna is forested. Bradwood is privately owned.

There are private access points to the river in this reach. River use includes sport fishing, commercial fish drifts, and commercial ship and barge traffic.

Issues and Findings

The Bradwood industrial site offers excellent potential for small to medium sized water dependent industrial development. There is deep water close to shore, some available vacant land, and railroad access. There are constraints to development, however, including poor highway access and the proximity of the wildlife refuge. Large scale development involving extensive dredging or filling would not be appropriate.

Aquatic Designations

At Bradwood the embayment and a channel out to the main ship channel are designated ***Development.*** The remaining aquatic portions of this subarea are designated ***Conservation,*** except where the ***Development*** ship channel cuts into the subarea.

Shoreland Designations

At Bradwood the entire fill area and the shoreland back to the railroad is designated ***Water Dependent Development.*** The remaining shorelands of this subarea are designated ***Conservation.***

Subarea Policy

Development activities at Bradwood shall be of small or moderate scale, not involving extensive filling to create new land areas.

Dredged Material Disposal

There is a dredged material disposal site [78(S)] at Bradwood which has been used in the past for disposal of material dredged from the ship channel. With proper site preparation, this site has additional capacity for material dredged from the Puget Island bar. Such disposal will also enhance development potential of the site (cf Dredged Material Management, 58.60, 59).

43.13 WAUNA/WESTPORT

General Description

This subarea includes the major development sites owned by Crown Zellerbach and Warrenton Lumber Company: Crown's existing Wauna Mill, Driscoll Slough, Westport Slough, the unincorporated town of Westport, and a private recreational home development east of Westport Slough. Jurisdiction is by Clatsop County.

Aquatic Features

The Columbia River portion of this subarea is a major migration route for salmon (both adult and juvenile) and steelhead. Also present are shad, smelt and starry flounder. Westport Slough supports several warm water species. Plympton Creek has an excellent run of fall chinook (mostly strays from Big Creek), some steelhead, coho, cutthroat, and chum. The mean tidal range at Wauna (RM 42) is 5.2 feet and the diurnal range is 6.4 feet. The 100-year flood level (relative to MSL) is 10.5 feet at Wauna and 11.0 feet at Westport. There is deep water close to shore throughout most of the subarea.

Wetlands in this area include those around the peninsula and the area behind the Crown Zellerbach and Warrenton Lumber Company properties. The north edge of the peninsula is sand. The remainder is cottonwood and willow. The area behind the corporate property is mostly shrub willow, Sitka spruce, and cottonwood. This entire area serves as habitat for deer, elk, small mammals and birds. There is a small population of the endangered Columbian White-tailed Deer.

Shoreland Features

The soils in this area are of the Sauvie-Peat Association. These soils have a low slope, a high flood potential, and a high seasonal water table. They are moderately suitable for agricultural activities (Class IV). Parts of the property just east of Driscoll Slough and the northern portion of the peninsula have been filled.

Shoreland vegetation includes shrubs, spruce, cottonwood, and grasses for pasture. Wildlife is similar to the wetlands with deer, elk, possibly an occasional bear, small mammals, and birds.

Hazards include landslide topography adjacent to the Wauna Mill site and across U.S. Highway 30.

There are four Corps of Engineers designated dredged material disposal sites in this subarea. Two overlap the Crown Zellerbach and Dant and Russell property (0-42.0, 0-43.0); one is in front of the River Ranch development area (0-44.0), and there is one at Wauna (0-40.8).

Human Use

The Wauna Mill site is heavily developed. There are vacant lands east of Driscoll Slough, a ferry landing and access point on Westport Slough, grazing on the diked land and the southern part of the peninsula, and residential use on the northern portion of the peninsula. Ownership on the mainland portions of this subarea is almost entirely corporate.

Issues and Findings

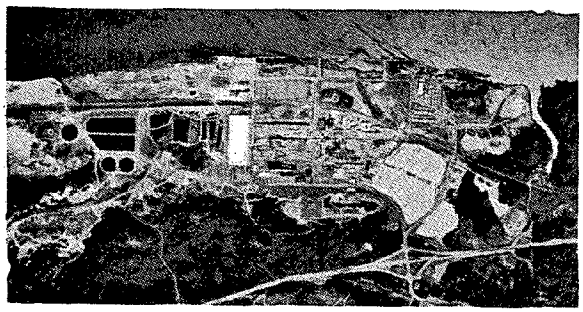
This subarea contains both a high degree of development potential and substantial wetland habitat. With excellent accessibility to the main navigation channel of the Columbia River, the large vacant areas owned by Crown Zellerbach and Warrenton Lumber Company have excellent potential for water dependent industrial development. Crown Zellerbach owns approximately 500,000 acres of surrounding timber land. Warrenton Lumber Company is in a position to purchase, process and ship the large amounts of second growth timber which will be harvested from the area of the Tillamook Burn in the next ten to fifteen years. Both firms contemplate the development of extensive wood processing facilities in this subarea.

Significant portions of this subarea are low-lying with considerable wetland habitat value. This is especially true of the area between the railroad and the highway. North of the railroad there are some areas of wetland and a strip of mature riparian vegetation along the west bank of Westport Slough. The area east and north of the town of Westport, however, has been designated by the U.S. Fish and Wildlife Service as critical habitat for the endangered Columbia White-tailed deer.

The planning process involved extensive discussion of the conflict between the habitat values and economic development potential of the area. Resource agencies have agreed that the area has unique development potential but note that the good natural resource values can and should be protected, consistent with development of the area. Development interests have responded that within the very limited areas which are suitable for intensive development, undue restrictions should be avoided.

The portion of Driscoll Slough between the railroad and the river is a water and wetland area which has received considerable attention. Resource agency representatives have noted the habitat values, the need to preserve water quality, and the fact that riparian vegetation can be protected without unduly restricting development of adjacent land. A ***Conservation*** designation would provide such protection while allowing the construction on pilings and minor dredging and filling, which may be necessary for development. Crown Zellerbach, in response, has noted that extensive portions of Driscoll Slough south of the railroad which they own are protected by the ***Conservation*** designation. Within the boundaries of the recognized development area, they argue, it is reasonable to ask for a ***Development*** designation in order to allow for flexibility and full utilization of the potential of the area. If water quality and riparian vegetation are of concern, they contend appropriate policy language can be included.

Additional wetland area is found north of the railroad on property which is designated ***Development***, and owned by Warrenton Lumber Company. Consideration of the degree of protection for these areas



will be most appropriate during the permit process.

The riparian vegetation along the west bank of Westport Slough has been an issue. Resource agencies have requested protection of this valuable habitat. Residential property owners across Westport Slough have requested that protection be provided from noise and other impacts of development on the Warrenton Lumber Company property.

Dredged material disposal on the Warrenton Lumber Company property has also been an issue. This area includes the Westport Bar shoal in the main ship channel. Large quantities of sand must be removed from this shoal each year in order to maintain required depths. The availability of this excellent fill material coincides with the needs of Warrenton Lumber Company to prepare their land for development and substantial amounts of material have already been deposited. Disagreement, however, has arisen over continued filling that may impact wetland habitat and the riparian vegetation along Westport Slough.

The northern shoreland portion of the peninsula was designated ***Development*** in the draft plan. However, ***Rural*** is a more appropriate designation, given the lack of sewers in the area and the moderate housing density. Portions of the shorelands and wetlands on the peninsula are considered critical habitat for the Columbian White-tailed deer and are to remain undeveloped as part of the zone change agreement with the River Ranch developers.

The shorelands east of Westport are diked lands owned by Crown Zellerbach. There are no immediate development plans and the property will probably remain leased for grazing. Future development might include a sorting yard that would use part of the property. Should this development occur, consideration should be given to the area's use by the Columbian White-tailed deer and also the proximity of the property to the community of Westport.

An additional issue concerns the development of a sewage treatment facility for the Westport area, as required by the Oregon Department of Environmental Quality. All of the alternative sites are within this planning subarea and are not now in public ownership.

Aquatic Designations

All aquatic portions of this subarea are designated ***Development***, except as follows: that portion of Driscoll Slough which lies south of the railroad is designated ***Conservation;*** portions of the Columbia River which lie east of the western tip of the peninsula are designated ***Conservation***, except for the main ship channel; Westport Slough, where adjacent to diked lands, is designated ***Conservation;*** the Columbia River, west of the Wauna Mill site, is ***Conservation***, except for the ship channel.

Shoreland Designations

The shoreland area owned by Crown Zellerbach and Warrenton Lumber Company from the shoreline to the railroad tracks and east to the diked lands is designated ***Water Dependent Development.*** The forested shorelands between U.S. Highway 30 and the railroad tracks on the east of Driscoll Slough, or U.S. Highway 30 and the Wauna Mill site west of Driscoll Slough, are designated ***Conservation.*** East of Driscoll Slough, shorelands between the railroad and U.S. Highway 30 are ***Development.*** The diked lands to the east of the town of Westport are designated ***Rural***, as is residential development on the peninsula.

Subarea Policies

1. Development on lands adjacent to Driscoll Slough shall be carried out in a way that will minimize alteration of existing wetlands and riparian vegetation, degradation of water quality and stream sedimentation. Filling or other removal of vegetation for construction of a bridge or other transportation access across the slough shall be the minimum necessary to accomplish the project.

2. Except where direct access to water is required for wharves, docks or piers, riparian vegetation along Westport Slough shall be protected for bank stabilization, wildlife habitat, water quality, and a visual and noise buffer.

3. The Aquatic ***Development*** designations in this subarea do not create the presumption that dredging, filling, or other alterations will automatically be permitted. Specific development proposals must: be justified in terms of available alternatives, public needs and economic benefits; minimize adverse impacts on water quality and natural habitat; and meet other requirements of the permit processes.

Dredged Material Disposal

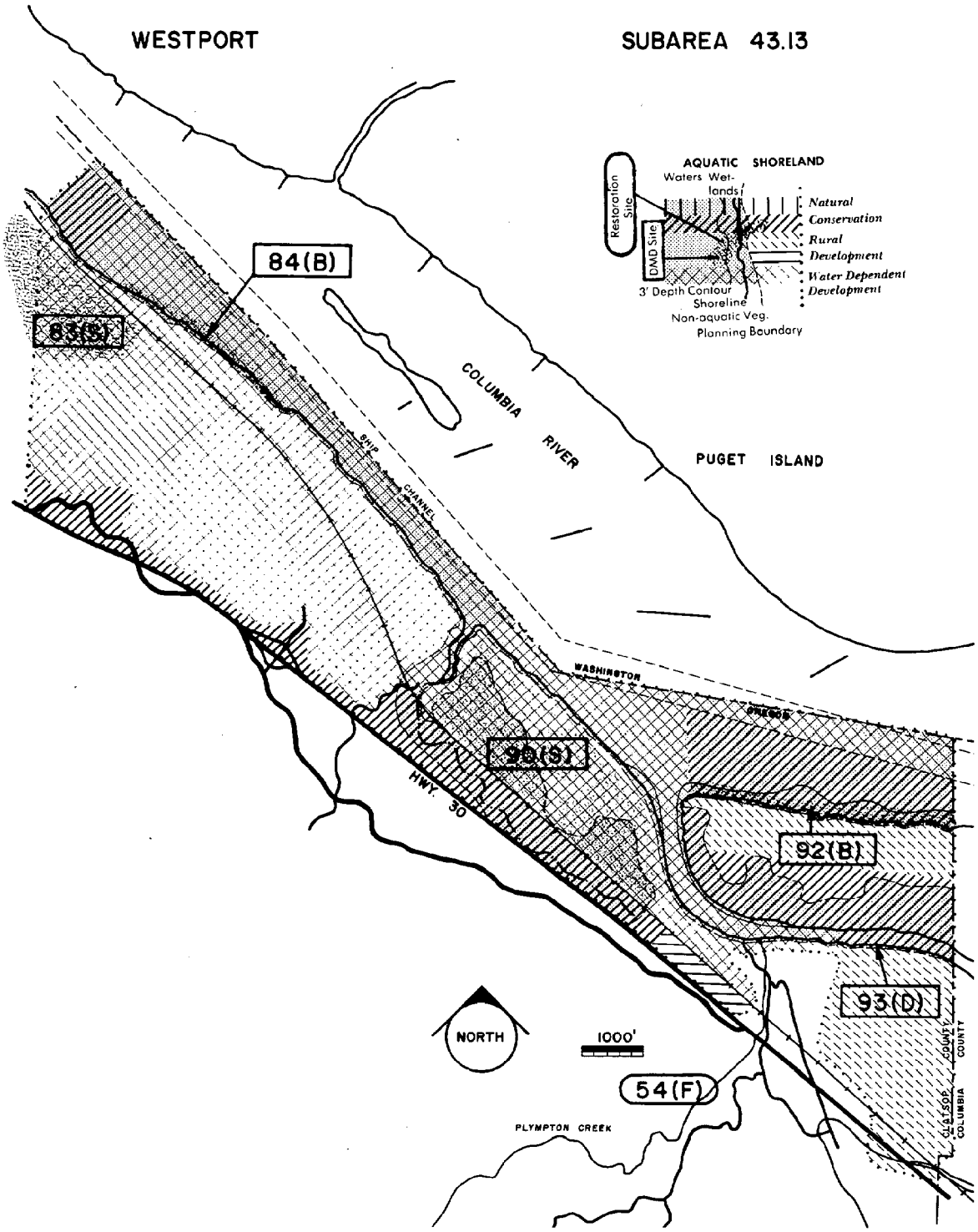
There are two large land disposal sites in this subarea, one northwest of the Wauna Mill site [83(S)] and one east of Driscoll Slough [90(S)]. The latter site is subject to controversy. The Crown Zellerbach portion of the site, including wetlands, has recently (1979) been covered with dredged material. The eastern portion of this site is owned by Warrenton Lumber Company, and a portion of this site is also wetland. A phased fill proposal suggested by Warrenton Lumber Company is provided for in this plan. However, wetland values and its use by Columbia White-tailed deer should be determined.

Two beach nourishment sites are also in this subarea. Both have been in use by the Corps of Engineers and have additional capacity. This first [84(B)] is just west of the Wauna Mill site and the second [92(B)] is north of the peninsula separated from the mainland by Westport Slough.

Site 93(D) covers dike maintenance in Westport Slough.

Restoration and Resource Enhancement

Plympton Creek has excellent fishery values and increased potential. There has been a periodic water quality problem due to raw sewage and sewage effluent draining into the creek. Plympton Creek is recommended for fisheries enhancement projects to improve water quality and stream habitat values (cf Restoration and Mitigation, 65).


WESTPORT
SUBAREA 43.13
AQUATIC SHORELAND
Waters
Wet-lands
Restoration Site
DMD Site
Natural
Conservation
Rural
Development
Water Dependent Development
3' Depth Contour
Shoreline
Non-aquatic Veg.
Planning Boundary
84(B)
83(S)
COLUMBIA RIVER
PUGET ISLAND
SHIP CHANNEL
WASHINGTON
OREGON
90(S)
HWY. 30
92(B)
93(D)
NORTH
1000'
54(F)
PLYMPTON CREEK
CLATSOP COUNTY
COLUMBIA COUNTY

44. WAHKIAKUM PLAN

THE PLANNING AREA

The Wahkiakum planning area boundary is based on a combination of the county and state border lines, shoreland and wetland habitat areas, and soil type. The planning area includes all the Columbia River shoreline in Wahkiakum County. The shoreland boundary is the upland extent of tideland soils (Ocosta Soils for Wahkiakum County) where they exist or 200 feet inland from the line of non-aquatic vegetation or Mean Higher Higher Water (MHHW), where such soils do not exist. It should be noted, however, that only the shoreland area 200 feet from the shoreline is under local permit jurisdiction as provided by the Shoreline Management Act. Shoreland areas outside this 200 foot boundary, but still within the tideland soil planning areas could be regulated by some other means such as zoning, if Wahkiakum County chose to do so.

The water boundary is the 40 foot depth contour west of Puget Island and the state line to the east. Major tributary streams in this area include the Elochoman River, Skamokawa Creek, Jim Crow Creek, Crooked Creek, Grays River, and Deep River. Islands in this area include Puget and Little Islands and neighboring smaller islands, Hunting Islands, Price Island, Pillar Rock, and a small portion of the upstream end of Rice Island. Large portions of Eden Valley, Grays River valley and Deep River valley are also included in this area. Planning, management, and regulatory jurisdictions include Wahkiakum County, the City of Cathlamet, Port Districts 1 and 2, Washington State, and federal agencies.

MAJOR ISSUES AND DECISIONS

Planning issues were determined by solicitation of ideas and viewpoints of individuals and organizations representing farmers, diking districts, forest products, commercial fishing, shoreland and tideland owners, parks, other industrial interests, and state and federal agencies. Seven major issues were identified and addressed by a variety of regional (cf Section II), area and subarea policies:

- —Navigation related problems (dredging, dredged material disposal, channel maintenance);
- —Shoaling, erosion, and other physical changes and alterations;
- —Impacts of major developments (nuclear power plant, oil terminal, oil and gas exploration);
- —Ownership disputes between the State and private landowners over beachfront, tidal and subtidal areas;
- —Dike maintenance and bulkheading;
- — The impact of commercial timber harvesting on fisheries production;
- — Commercial fishing, salmon enhancement projects, and private aquaculture.

Wahkiakum County is a rural, sparsely populated county which has not experienced intense industrial or urban development. Most of the low-lying diked lands are former tidelands or forested wetlands now used for agriculture. Most of the county's population of 3600, and its industrial development, is located close to the Columbia River. With the exception of portions of Cathlamet and Skamokawa, and the towns of Rosburg and Grays River, most population centers fall within the planning boundaries of this plan. The number of county residents is increasing slowly, although the population of the Grays River-Deep River area is decreasing. Most county residents enjoy their rural lifestyle, and this plan is an expression of their wishes as interpreted by the Wahkiakum County Estuary Advisory Committee. This plan is an attempt to set aside adequate areas for future development while preserving the agricultural and natural resource base in Wahkiakum County.

The following general principles have guided designation of the waters, wetlands, and shorelands; details are provided under each subarea.

Wetland areas (including tidal marsh, forested wetlands and tidal flats) are designated ***Natural,*** unless the past history, existing uses or designation of adjacent areas renders this inappropriate. This designation is also consistent with the Washington State Shoreline Management Act requirements to preserve the natural character of the shorelines, and to protect the ecology and resources of the shoreline by leaving undeveloped areas that contain a unique or fragile natural resource, and restricting or prohibiting public access to areas which cannot be maintained in a natural condition under human use.

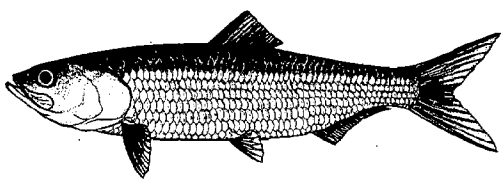
Water areas except the navigation channels and those adjacent to major shoreland developments are designated ***Conservation.*** This designation provides for long-term use of renewable resources, recreation, is consistent with boating, commercial and recreational fishing, and navigational use not requiring major physical alterations.

Agricultural lands and rural residential areas are classified ***Rural.***

Authorized navigation channels and those areas proposed for major alteration are designated ***Development.***

Those current industrial and urban development sites and areas for their possible future expansion are designated as ***Development.***

For Wahkiakum County to develop economically, the transportation systems and facilities should be upgraded. All roads are designated the same as the surrounding areas, recognizing the need to maintain, repair, and possibly expand the roads, regardless of the designation.



- Ron Pittard - Searep Studio, courtesy Clatsop County

AREA POLICIES

1. Navigational Improvements

Navigational access for shallow draft commercial and recreational vessels is very important to the county's economy. Shallow draft channels are essential for the continued operation of these vessels. There are at the present time numerous shoaling problems in Wahkiakum County which need to be solved.

- The Corps of Engineers should study the feasibility and effects of removing the pile dikes at the upstream end of Puget Island. The goal of this removal would be improved circulation and depth in Cathlamet Channel.
- The U.S. Coast Guard should improve the channel markers in the navigation channel in Grays Bay and into Deep River and Grays River. At the present time, this channel is poorly marked and difficult to follow in many places.
- The following congressionally authorized projects should be maintained to a depth adequate for traditional shallow draft vessels:
  - —the Cathlamet Channel from the Puget Island Bridge to its junction with the main channel;
  - —the channel from Cathlamet up Elochoman Slough;
  - —the channels at the entrance to Skamokawa and into Steamboat Slough;
  - —the channel into Deep River.
- Serious consideration should be given to new dredging:
  - —for the continuation of a small boat navigation channel at the entrance to Netrack Slough at Puget Island;
  - —at the entrance to Jackson Slough at Puget Island;
  - —at Hunters Point near Cathlamet;
  - —in Brooks Slough by Skamokawa;
  - —in the area from Brookfield east to Three Tree Point north of the Brookfield pile dikes;
  - —in the north channel running from Grays Point toward Harrington Point; and
  - —at the entrance to Welcome Slough.
- The Corps of Engineers and Wahkiakum County's Flood Control District are encouraged to develop an appropriate location and dimensions for the Grays River Channel.
- Consideration should be given to dredging the mouth of Grove Slough as needed to maintain proper drainage and flood protection of diked land on Puget Island.
- Ship speeds should be reduced in the following reaches in order to prevent damage to shoreline structures and reduce shoreline erosion at Skamokawa Bar, Puget Island Bar, Wauna and Driscoll, and Westport Bar.



- National Fisherman

2. Dredged Material Disposal

A large part of the county shoreline lies adjacent to the main navigation channel. As a result, there is a continuing need to find dredged material disposal sites. This is especially true of the area around Puget Island. A long range plan for disposal of dredged material is needed.

As a means of finding additional upland disposal sites, the possibility of transferring the ownership of the material to the upland party receiving it should be investigated.

Dredged material disposal in shoreland areas should be carried out so as not to impair the scenic view of the local residents. Prior to disposal of dredged material at in-water sites, coordination between the county and local fishermen should occur to avoid conflicts. Material should not be placed in maintained gillnet fish drift areas.

3. Marsh and Tideflat Conservation

Tideflats and tidal marshes provide food and shelter for waterfowl, invertebrates, and fish. These areas provide nutrients to the estuarine ecosystem and produce large amounts of feed for fish and other wildlife. Juvenile salmon, in particular, are very dependent upon the food produced in these marsh and tideflat areas. Because of this relationship between these shallow areas and salmon, and the importance of fishing to Wahkiakum County's economy, tideflats and tidal marshes should be conserved.

4. Fisheries

Fishing is a traditionall important industry in Wahkiakum County. There is substantial local concern both about recent drastic decreases in salmon production and about the ways in which governmental agencies are seeking to increase the production.

- An environmental impact statement should be required prior to any action taken by any local, state or federal agency attempting to replace any native fish stock or species with other than native stock or species. Any such actions should be closely coordinated with Wahkiakum County and at least one public hearing regarding the proposed action should be held in the County. The impact statement should at a minimum address how the timing of the run will affect commercial and sport harvest and hatchery schedules; what the ocean migration pattern will be and how this will affect other races, species or stock of salmonids; and whether hatchery practices regarding size and weight of juveniles upon release will affect the commercial and sport harvest.
- To promote economic diversity, multiple use of County watersheds should be encouraged. To this end, forested watersheds which drain into the Columbia River estuary should be managed to allow maximum fish production. This can be achieved in part by following the Forest Practices Act. Stream improvement projects such as gravel cleaning and obstruction removal which aid fish production are also strongly encouraged.

- Non-commercial, non-profit projects such as the chum salmon enhancement program being carried out by local commercial fishermen and the Washington Department of Fisheries are strongly encouraged.
- Dredging activities should not occur in commercial fish drift areas during a fishing season.
- The County should prepare a map of commercial fishing areas in the County and a register of county fishermen using each of these areas.

5. Wildlife

Wahkiakum County provides good habitat for many species of game animals and waterfowl, and provides critically important areas in the lowlands around Cathlamet for the endangered Columbian White-tailed deer. Areas of undisturbed vegetation are important to wildlife; such strips of vegetation should be left along waterways and roads where practical. State health and Department of Agriculture regulations concerning the application of herbicides and pesticides should be carefully followed. The permit process should include consideration of fish and wildlife needs such as nesting, feeding and resting areas.

6. Dike Maintenance

Dike maintenance is a very important activity in Wahkiakum County protecting lives, property and most of the valuable farmland. Any activity, structure or vegetation which decreases the integrity of a dike is strongly discouraged. Tide boxes, drainage channels, and dikes should be maintained to allow for continued drainage and flood protection of diked lands.

7. Bulkheading

While rip-rapping may be an environmentally preferable bank protection method, bulkheading should be allowed in certain areas. In particular, bulkheads should be allowed in Bernie and Welcome Sloughs around Puget Island. Bulkheads, if constructed, should be allowed waterward of the mean higher high water mark, and should follow a uniform line.

8. Shoreline Development

Intensive industrial development should occur only in ***Development*** designated areas. To preserve the natural character of undeveloped shorelines, areas where development currently exists should be fully utilized before allowing intensive development to extend into other areas.

9. Oil and Gas Exploration

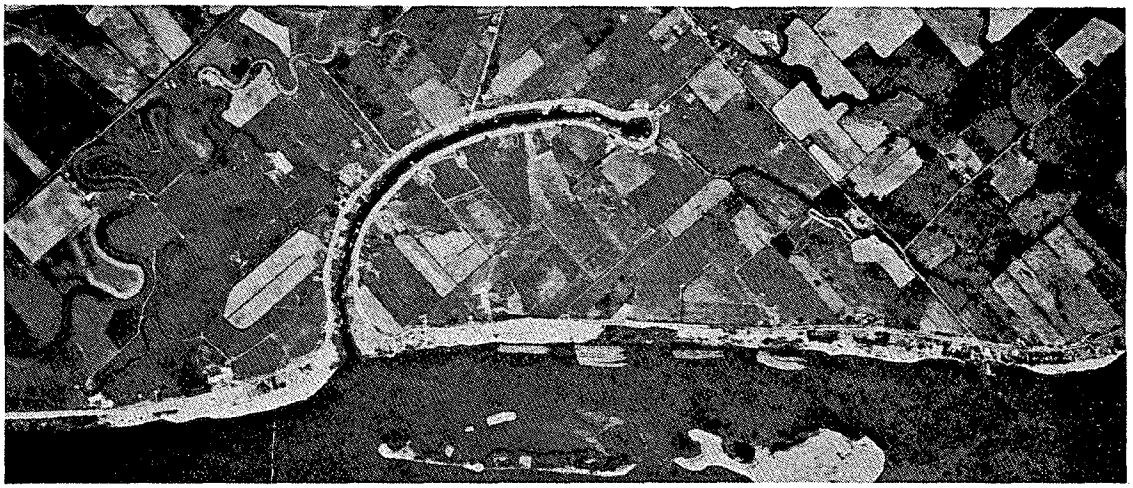
Large areas of private and state-owned uplands and tidelands, and state-owned bedlands in Wahkiakum County have been leased for oil and gas exploration. Oil and gas exploration should be allowed if it can be accomplished without harm to human health, and fish and wildlife habitat. Exploration should be closely coordinated with County officials.

10. Petroleum Products Transport

There are already large columes of petroleum products being shipped on the Columbia River, and there have been large accidental releases of these materials into the river. There is a major new crude oil shipping terminal proposed for Port Westward, Oregon, immediately upriver from Wahkiakum County. Wahkiakum County could suffer damage from a major spill, or from chronic spills. A petroleum spill risk analysis for the Columbia River should be completed by the U.S. Coast Guard as soon as possible. Modern petroleum spill clean-up equipment sufficient to contain a large spill should be located in the estuary as well as upriver.

11. Hazardous Materials

The transportation and handling of materials which are potentially hazardous to human health should be closely coordinated with the state and local officials responsible for the protection of the health and safety of local area residents.



44.01 PUGET ISLAND

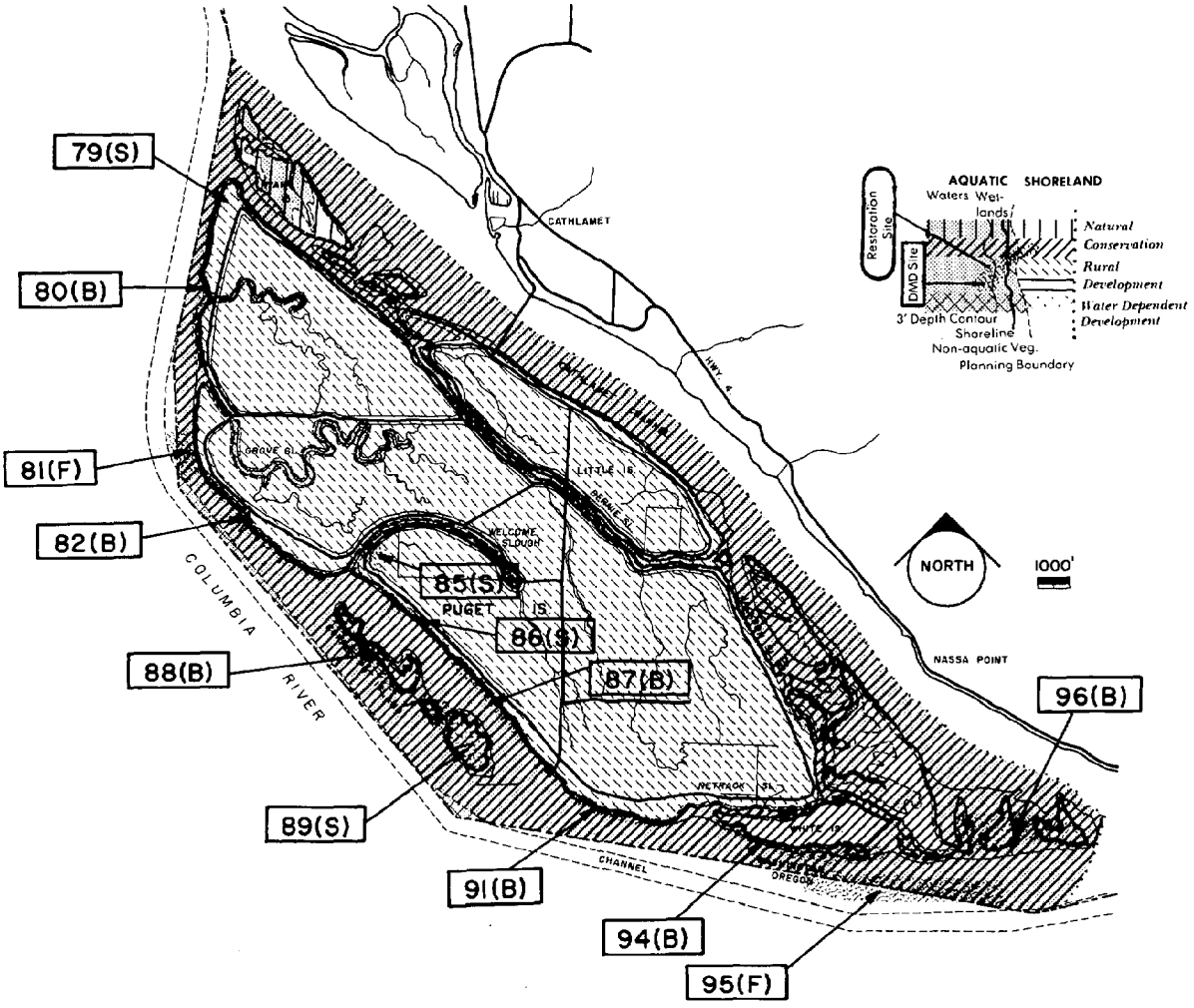
General Description

This area includes Puget and Little Islands, Coffee Pot Island, Ryan Island, and associated small islands and marshy areas adjacent to the larger islands. The area also includes water out to the state line and to the mid-line of the Cathlamet Channel. Puget and Little Islands are former marsh areas which have been diked and drained for agricultural use. The small adjacent islands are undiked, uninhabited, and are used mostly for recreational hunting and fishing. This subarea is under the jurisdiction of Wahkiakum County.

Aquatic Features

Freshwater flow becomes increasingly dominant over tidal circulation in this reach of the river. Saltwater intrusion is absent. Flood tide currents are weak; ebb currents are considerably stronger. The river carries sand and gravel along the bottom of the channel, generally downstream, with silt and clay in suspension. This reach of river requires extensive dredging and has been extensively altered by pile dikes and other flow control structures.

At one time, nearly all of the land areas of this subarea were marsh. The only marsh areas left are at the upstream end of Puget Island, the downstream end of Little Island, most of Ryan Island, and small adjacent islands. These marshes and the invertebrate organisms living on the beaches and the bottom of sloughs and channels in this subarea have not been well studied. It is likely that both the marshes and farmland make a significant contribution to aquatic productivity by providing nutrients which wash into the river. Juvenile salmon migrate along the shorelines of this subarea, and are especially abundant along the sandy beaches at the upstream end of Puget Island and are also found in Bernie Slough and the lower end of Welcome Slough. Adult salmon migrate along both sides of Puget Island. In the warmer water slough areas, there are populations of rough fish and spiny rayed game fish.



Shoreland Features

The soils in this subarea have been deposited by the river, and are of the Ocosta type. The vegetation in agricultural areas is mostly grass and row crops, and in other areas is a mixture of willow, alder, and cottonwood. The area provides habitat for the endangered Columbian White-tailed deer, muskrat, nutria, opossums, and other, Migratory birds are common in the area, and many, including the whistling swan, winter here. Brown Island has a small heron rookery. The shallows adjacent to the marshes provide good habitat for shore and wading birds. The entire area lies within the floodplain of the Columbia River. Most private residences are located on or adjacent to the main dike on Puget or Little Islands.

Human Use

The existing uses of Puget and Little Islands are agricultural, mostly dairy, in the interior and rural residential along and waterward of the main ring dike. Housing is particularly concentrated along Bernie, Welcome and Jackson Sloughs, and the Sunny Sands area along the south side of Puget Island. There are a number of small businesses located on the islands' interiors, as well as a number of small boat building and repair yards. Ownership is primarily private, although there is a large section of state ownership (Department of Natural Resources) on Puget Island, and state ownership (Department of Game) on White Island. There are public shoreline fishing areas on the west and south sides of Puget Island. In water log storage areas are present on the north side of Little and Ryan Islands and the south side of Puget Island. There are also a number of commercial fishing areas in Cathlamet Channel, in the main navigation channel, and in the area between Coffee Pot and Puget Islands.

Issues and Findings

Dairy farming is traditional on these islands, and there is also potential for other types of agriculture. Residential development is occurring, but its expansion is hindered by road access, utility constraints and floodplain hazard. Industrial development is hindered by similar constraints. Sand from maintenance dredging of the main navigation channel could be used as fill to enhance development sites. If dredging were to occur at the entrances of sloughs around the islands, shoreline residential development would become more attractive to people owning boats.

Some areas of conflict are the bulkhead permit problems in Bernie and Welcome Sloughs, Diking District-Corps of Engineers policies on dike maintenance, public access to public beaches and White Island, ownership disputes between Department of Natural Resources and private owners over tideland and former shoreland, and dredged material disposal practices on and adjacent to Puget Island.

Most of the subarea and the small low islands provide fish and wildlife habitat and recreational opportunities. The small islands, with the possible exception of Coffee Pot Island, are unsuitable for development because of their low elevation and flood hazard. Lands in private ownership, for the most part, have not been designated ***Natural*** because this designation might be interpreted as "taking" away the use options of the owner. A ***Conservation*** designation with ***Development*** overlay for actively used dredged spoil areas allows for their continued use and at the same time represents the appropriate level of use when the site has reached total capacity.

Puget Island, Little Island and the bordering aquatic area are heavily affected by agricultural and residential activities. There is a need to accommodate such activities as dredging to allow continued use of these areas for single family residential development.

There are no comprehensive plan or zoning designations. The entire shoreline of the area is considered a "Shoreline of Statewide Significance" under Washington's Shoreline Management Act.

Aquatic Designations

Wetland portions of Ryan Island that are publicly owned are designated ***Natural.*** East of the Puget Island Bridge, a 50 foot ***Rural*** aquatic designation is applied along the perimeter of Little and Puget Islands around the eastern end of Puget Island ending at the downriver end of White Island. Welcome Slough and Bernie Slough are designated ***Rural.*** The main Columbia River navigation channel is designated ***Development.*** All remaining aquatic portions of this subarea are designated ***Conservation.*** Dredged material disposal sites in aquatic areas are ***Development*** for purposes of disposal only, and ***Conservation*** otherwise.

Shoreland Designations

The publicly owned shorelands of Ryan Island are designated ***Natural.*** The shorelands of Puget and Little Islands are designated ***Rural.*** All remaining shorelands of this subarea are designated ***Conservation.***

Dredged Material Disposal

There are seven beach nourishment sites [80(B), 82(B), 87(B), 88(B), 91(B), 94(B), 96(B),], four shoreland disposal sites [79(S), 85(S), 86(S), 89(S)], and two flow-lane disposal sites [81(F), 95(F)] in this subarea. All are connected with maintenance dredging of the main navigation channel. Hydraulic pipeline is used for placement of dredged material on shoreland and beach nourishment sites. Hopper dredged material is placed at flow-lane sites. The site at the upriver end of Puget Island [96(B)] is subject to controversy because erosion and flow diversion is believed to cause shoaling in Cathlamet Channel (cf Dredged Material Management, 55.10, 59).

Restoration and Resource Enhancement

Cathlamet Channel has shoaled considerably over the past several decades, owing in part to flow control pile dikes placed at the upper end of Puget Island. To restore the shoaled area, removal of one or more of the pile dikes to increase flow through Cathlamet Channel has been suggested [56(SA)]. (cf Restoration and Mitigation, 65.)

44.02 EASTERN WAHKIAKUM COUNTY

General Description

This area includes aquatic areas and shoreland from the eastern boundary of Wahkiakum County to the Puget Island Bridge. The area has generally steep topography; there are no tideland soils. Consequently, the planning boundary extends from 200 feet landward of the Mean Higher High Water line, waterward out into the Columbia River to the State line, or to the center of Cathlamet Channel. This area is within Wahkiakum County's jurisdiction, except for a small portion of the City of Cathlamet just east of the Puget Island Bridge.

Aquatic Features

This area is upriver of the zone of saltwater intrusion but is still subject to tidal action. The freshwater flow becomes more and more dominant upstream and results in a decreased tidal range and weak flood tide currents. As a result of sediment build-up, dredging is necessary at three different areas in the main navigation channel adjacent to this subarea. The reach needing the most dredging is Upper Westport Bar.

Aquatic productivity in the area from the county line to Cathlamet is supported mainly by microscopic zooplankton (animal) and phytoplankton (plant). The plankton populations are very unstable because a large part of the population can be pushed out to sea by strong freshets. There are no significant areas of mudflat or marsh in this subarea. Populations of bottom dwelling animals other than fish are poorly known, but are probably low.

All the commercially important anadromous fishes can be found passing through this area, both adults and juveniles. Near shore areas are especially important to juvenile fall chinook and chum salmon, and starry flounder.

Shoreland Features

This section of the Wahkiakum County shoreline is characterized by a steep topography of rocky bluffs vegetated by forest. The uplands provide habitat for deer and other upland game.

Human Use

Human use in much of this area is limited by the steep and often unstable topography and poor shoreline access. The heaviest human activity is concentrated at County Line Park, two small residential areas near Cape Horn, and along State Highway 4, which sometimes follows the shoreline. Shoreline ownership is mostly private, with some corporate ownership. County Line Park is a day-use facility for picnicking, swimming, and fishing. There are commercial salmon and smelt fishing areas in the river through this area, limited in water log storage at Nassa Point, and a rock pit with water access close to Cathlamet.

Issues and Findings

Development potential in most of the area is severely limited by the steep and unstable topography, utility constraints, and the occasional closures of State Highway 4 east to Longview. Industrial activity will probably continue to be limited to minor timber harvest and the commercial rock pit. In-water development will probably continue to be associated with the maintenance of the main navigation channel and limited log storage.

The few conflicts in this subarea are related to navigation. There is a former dredge spoil site at Flandersville which is thought to contribute to the shoaling of Cathlamet Channel. For this reason, the County Commission will no longer grant a permit for the continued use of this site for dredged material disposal.

The ***Development Shoreland*** classifications for the Eagle Cliff-County Line Park, Cape Horn-Flandersville and the Nassa Point to Puget Island Bridge areas will provide for the increasing use of these areas for intense recreation or housing developments.

The shoreland from the Nassa Point area to the Puget Island Bridge is mostly steep cliffs with a moderately flat bench on top. The area within Cathlamet is currently used for housing, and housing should be the continued use of this area as well as the rest of the ***Development Shoreland*** area. It is scenic and has road access. The exception to this is the currently used commercial rock pit with river and road access.

This area has no comprehensive plan or zoning designations. All of the shoreline is a "Shoreline of Statewide Significance".

Aquatic Designations

The main navigation channel of the Columbia River is designated ***Development***. All remaining aquatic portions of this subarea are designated ***Conservation***.

Shoreland Designations

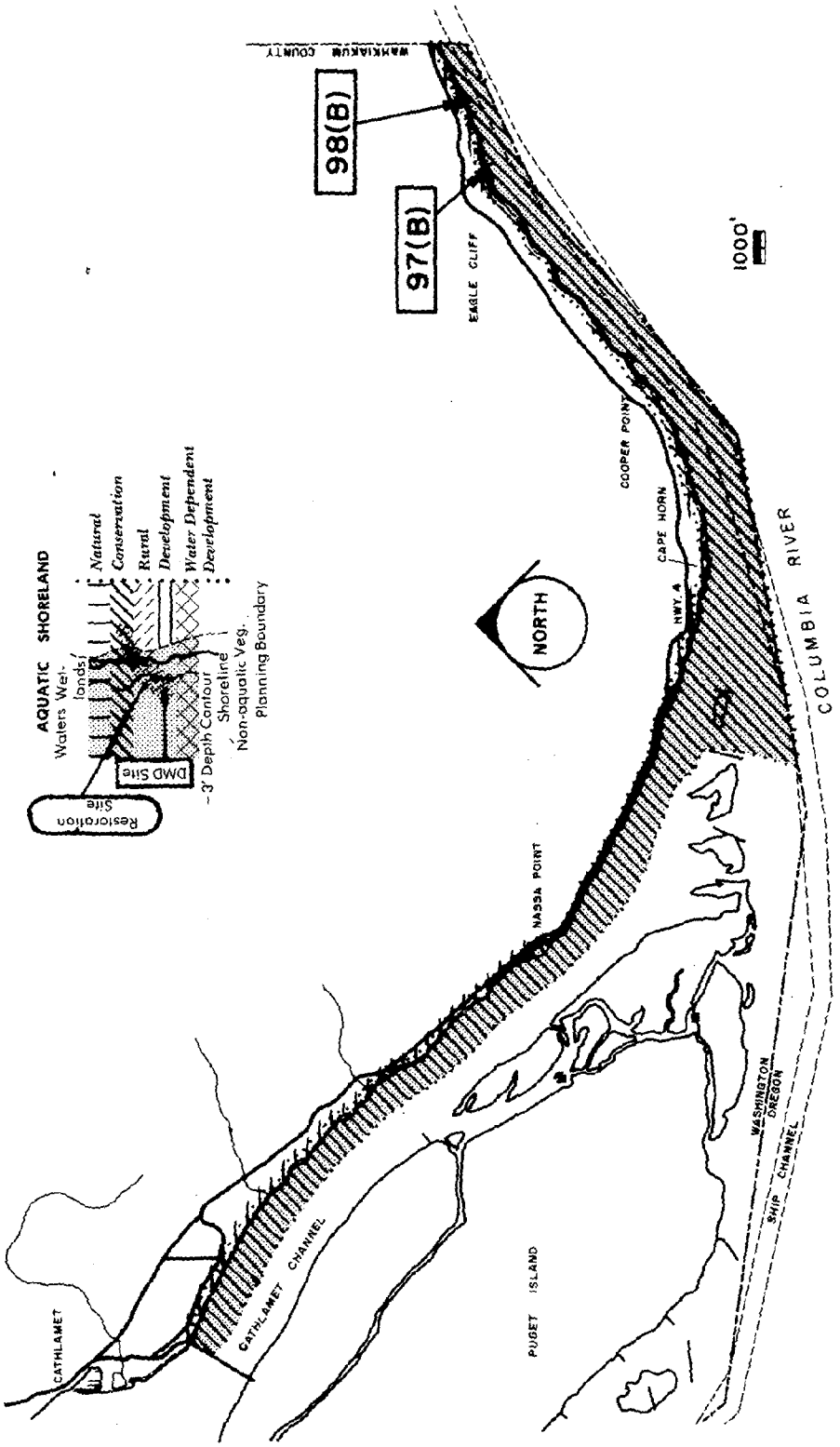
The shoreline is designated ***Conservation*** from Eagle Cliff to Waterford, and from approximately one-half mile west of Cape Horn to approximately one mile east of Nassa Point. The remainder of the shoreline in this subarea is designated ***Development***.

Dredged Material Disposal

Shoreline dredge disposal sites from the county line to Cathlamet include Cape Horn, the old Waterford Cannery site, Eagle Cliff, and County Line Park. There are two beach nourishment dredged material disposal sites in this subarea. The first, 97(B), is located just east of Eagle Cliff and the second, 98(B), is less than a mile further to the east at County Line Park. Both sites are associated with maintenance of the 40 foot navigation channel (cf Dredged Material Management, 55.10, 59).

EASTERN WAHKIAKUM COUNTY

SUBAREA 44.02



44.03 CATHLAMET AND WHITE-TAILED DEER REFUGE

General Description

This subarea extends from the Puget Island Bridge to the downstream end of Price Island. The Cathlamet vicinity has the largest concentration of industry, commerce, and housing in the County. The Crown Zellerbach log sorting yard and log storage areas are the largest in the County. Most of the Hunting Island, Price Island, and the agricultural land north of Cathlamet and west of State Highway 4 are in the Columbian White-tailed Deer National Wildlife Refuge. Water areas to the mid-line of Cathlamet Channel and to the State line are also included. Both Wahkiakum County and the City of Cathlamet have jurisdiction in this subarea.

Aquatic Features

The Elochoman Slough/Marina and protecting breakwater are part of an authorized project in Elochoman Slough which includes a 100 feet wide by 10 feet deep channel for 1.5 miles above the sewage lagoon, and a turning basin. The mooring basin is maintained at a 6 foot depth with a 50 foot wide entrance.

There are extensive log storage and handling activities, and maintenance dredging in Elochoman Slough in conjunction with the Crown Zellerbach sorting yard. Water quality and benthic habitat in Elochoman Slough are markedly affected by log storage and handling. Decomposing bark creates low oxygen conditions near the bottom and sludge worms are the major bottom dweller.

A Corps of Engineers authorized channel in Cathlamet Channel is 300 feet wide by 10 feet deep and roughly follows the mid-line of the channel from its origin at the 40 foot channel to the Puget Island Bridge.

Steamboat Slough behind Price Island also has log storage areas but there are no low oxygen reports. Bottom dwellers here as well as most other areas of this subarea include sludge worms, clams and insect larvae.

There are significant marsh areas on the Hunting Islands, an island at the mouth of the Elochoman River, and at the downriver end of Elochoman Slough. Although these marshes have not been studied, it is likely that they contain high populations of food organisms important to juvenile fishes, wading shorebirds, and migrating waterfowl. The plants form an important base for further estuarine productivity. These marshes may play an important role in the early life of salmon and trout produced in the Elochoman River and other tributaries.

The Elochoman River is a major producer of hatchery salmon and trout, and receives substantial sport fishing pressure. All the commercially important anadromous fishes can be found passing through this subarea from Cathlamet to Price Island. Near shore areas are particularly important to juvenile fall chinook and chum salmon, and juvenile starry flounder.

There is an extensive area of willow and alder wetland east of the mouth of the Elochoman River. This is an undiked area, subject to tidal influence, that was previously forested with spruce. It is privately owned.

Shoreland Features

The shoreland in this section goes from a steep rock bluff at the Puget Island Bridge, to low wet areas of diked tideland. Hunting Islands are undiked and have wet areas of willow and alder, and forests of upland trees. These islands and Price Island are critical habitat for the Columbian White-tailed deer, an endangered species. They also support populations of beaver, muskrat, nutria, hawks and eagles, shore and wading birds, and migrating waterfowl. The islands are largely unaltered except for dredged material disposal sites.

Much of the mainland is part of the Wildlife Refuge and is former agricultural land. The area east of Highway 4 and north of the Elochoman River, and north and east of Brooks Slough is still in agricultural production. The land east of Highway 4, north of Elochoman Road, and south of the Slochoman River is a large, wet, previously forested area not yet in commercial use. Another undeveloped tract is between the Crown Zellerbach sorting yard and the Elochoman River, west of Highway 4. This undiked area is heavily wooded with spruce and alder.

There are former dredged material disposal sites on Hunting Islands and the mainland along Elochoman Slough through the Crown Zellerbach facility, at the downriver mouth of Elochoman Slough on the mainland, and on the riverward side of Price Island shorelands. The Columbia River is shifting northward and eroding this part of Price Island.

Human Use

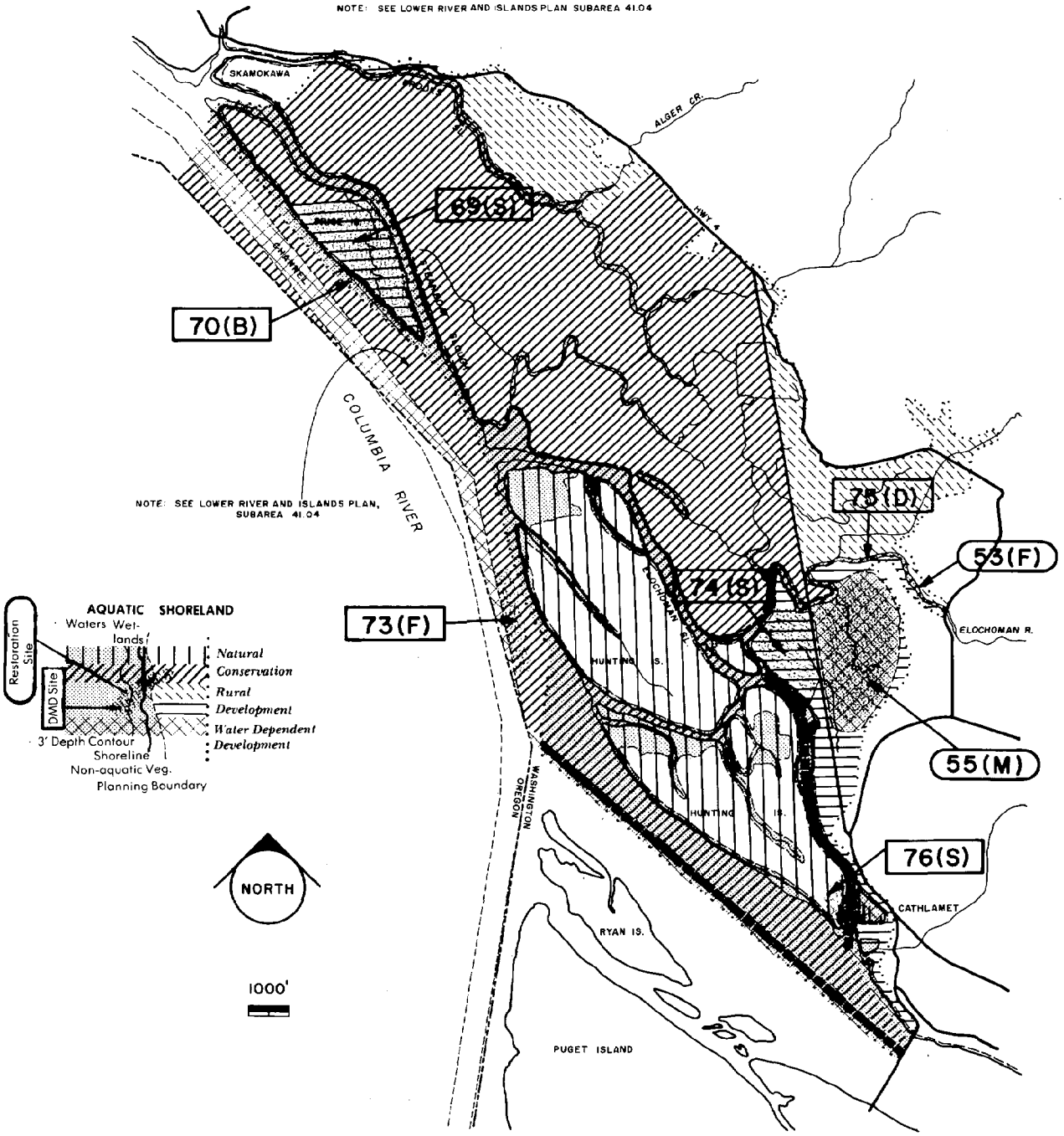
Intensive human use occurs almost entirely in the Cathlamet-Elochoman Slough area. Cathlamet is the county's main developed water access point. The Elochoman Slough Marina offers waterborne visitors a safe harbor and pleasant place to visit, and may help to attract people to Cathlamet. Most of the city is built on a hill and is not included in this planning area.

The Crown Zellerbach sorting yard is the major water related industry in this part of the county. The current site and Elochoman Slough have been used by the company for decades and the shoreland has been highly modified by this use. The forested area north of the sorting yard is a possible expansion area for the sorting yard.

There is an area of tideland soil east across the road from the sorting yard which is used for machine and truck shops. The previously forested wetland to the east of the sorting yard complex is privately owned and is seasonally grazed by cattle. The lands east of State Highway 4 and north of the Elochoman River are currently in private farmlands as is a parcel outside the Refuge boundary north and east of Brooks Slough.

The land west of Highway 4 and north of the Elochoman River was formerly mostly in agricultural use but is now owned and managed by the U.S. Fish

CATHLAMET & WHITE TAILED DEER REFUGE SUBAREA 44.03



and Wildlife Service as the Columbian White-tailed Deer National Wildlife Refuge. This land generally is kept in pasture. The Refuge also owns most of Hunting Islands which are maintained in a natural state. Price Island has three-way ownership between the County, the Refuge, and the State of Washington, and is in a natural state except for a dredged material disposal site.

There are a number of very valuable commercial salmon fishing locations in this subarea.

Issues and Findings

Development potential is quite high along the Cathlamet waterfront and up the landward side of Elochoman Slough to the small slough at the north end of the Crown Zellerbach sorting yard. These areas are served by maintained navigation channels and an existing network of roads. The lands north and east across Highway 4 would require extensive modification prior to use as development sites. The county-owned half of Price Island has the potential for a deep water port facility. However, extensive site modification would be necessary. Poor road and bridge access would hinder development. Flood control measures may also be necessary.

Lands currently in agricultural use have the potential for residential or industrial development.

Because of the population density, there are more conflicts in this subarea than others in the Wahkiakum unit. One conflict of use involves Price Island. The island has been identified as critical habitat for the endangered Columbian White-tailed deer by the U.S. Fish and Wildlife Service, and for that use should be managed in a near natural state. The U.S. Fish and Wildlife Service owns the downriver end of the island; the County owns the upriver end; the State of Washington owns a very tiny parcel along Steamboat Slough. The county would like to develop their half into a port facility, which is potentially incompatible with the Refuge concept of habitat preservation.

Another conflict concerns the nuclear power plant proposed by the Washington Public Power Supply System (WPPSS). According to those plans, the operation would affect this planning area in at least three ways. First, agriculture will be allowed to continue in the vicinity of the plant (the exact location is unknown), however, occupied housing will be discontinued within the "exclusion radius" of approximately 4000 feet. Secondly, cooling water lines will run to the Columbia River. The location of these lines and the effects of the heated water plumes on fish production and migration are presently unknown. Finally, a large unloading facility would be constructed by WPPSS at the mouth of the Elochoman River in order to accommodate large elements of the nuclear plant which must be barged in.

Most shoreland designations should remain as they appear in the Shoreline Management Master Program. The Wildlife Refuge, former agricultural land, was classified ***Conservation*** at the request of the Refuge Manager (federal lands technically are not included in the Washington Coastal Zone Program). The agricultural lands in this subarea should be designated ***Rural*** because of their present and predicted future farm use.

Aquatic Designations

The aquatic portions of the Hunting Islands are designated ***Natural,*** except for the wetland along Elochoman Slough adjacent to the Crown Zellerbach sorting yard. Nelson Creek is designated ***Rural.***

The following aquatic areas are designated ***Development:*** the main Columbia River Navigation channel; the navigation channel in Cathlamet Channel; a 200 foot wide aquatic area along the shoreline in front of Cathlamet extending from the Puget Island bridge to the tip of Hunting Island; the Elochoman Slough from Cathlamet to the Elochoman River; and the aquatic area around the upriver half of Price Island to the 40 foot contour on the Columbia River side and to the middle of Steamboat Slough.

The remaining aquatic areas are designated ***Conservation.***

Shoreland Designations

Hunting Islands and the unnamed island at the junction of Elochoman Slough and Elochoman River are designated ***Natural.*** The shorelands east of State Highway 4 and north of the Elochoman River, and the shorelands north and east of the Refuge between Brooks Slough and State Highway 4 are designated ***Rural.*** The shoreland from the Puget Island bridge north along Elochoman Slough and on the south side of the Elochoman River to the planning boundary and the upriver half of Price Island owned by Wahkiakum County are designated ***Development.*** The remaining shorelands are designated ***Conservation.***

Subarea Policy

Notwithstanding the ***Development*** designation for the shoreland south of the Elochoman River, uses and activities along the immediate southern shoreline of the river shall be required to recognize and protect the fisheries values of the River.

Dredged Material Disposal

There are six dredged material disposal sites in this subarea. Site 76(S) on the south tip of Hunting Islands is associated with maintenance dredging of the Elochoman Slough Marina and the Elochoman Slough channel. Site 74(S), upstream of the log sorting yard on Elochoman Slough, is a potential site for disposal of material from the channel in the slough. Site 75(D) is a general dike maintenance site for areas along the lower Elochoman River. Site 73(F) is a ship channel flow lane disposal site adjacent to Hunting Islands. Site 69(S) is a potential shoreland disposal site, should Price Island be developed for port or other purposes. Site 70(B) is a beach nourishment disposal site on the channel side of Price Island (cf Dredged Material Management, 55.10, 58.40, 59).

Restoration and Resource Enhancement

Two potential sites are in this subarea. The low-lying abandoned diked area on the Elochoman River is suggested as a possible wetland restoration site, 55(M). The Elochoman River, with two state-operated fish hatcheries, is suggested for projects [13(F)] which would enhance its already high value for fisheries (cf Restoration and Mitigation, 65).

44.04 SKAMOKAWA TO THREE TREE POINT

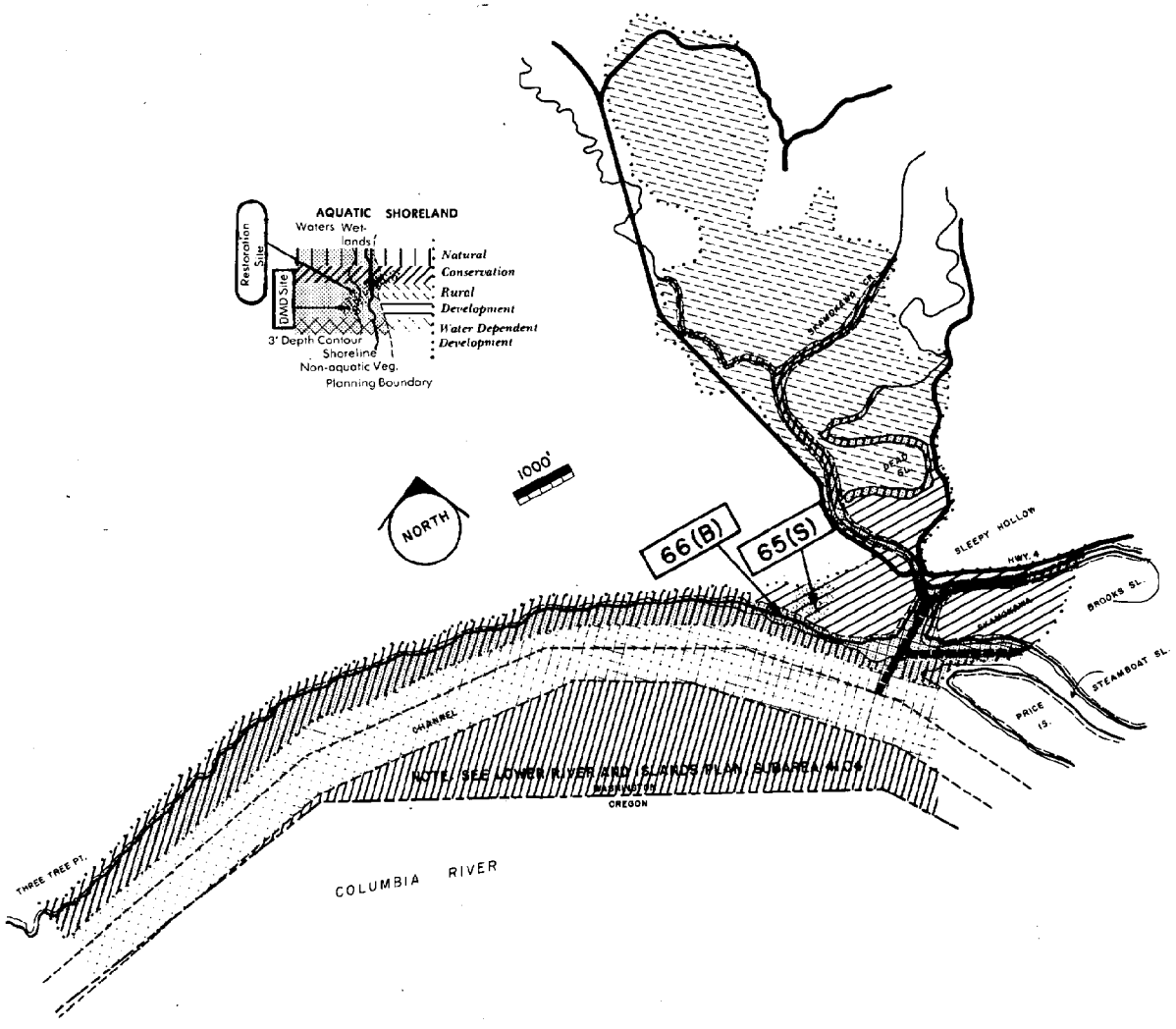
General Description

This subarea extends from the northern boundary of the Columbian White-tailed Deer National Wildlife Refuge to Three Tree Point and includes the town of Skamokawa and some agricultural lands behind Skamokawa. The town of Skamokawa is a water oriented community, and provides essential services to many fishermen. The lands west of Skamokawa are mostly inaccessible by road and unpopulated. Jurisdiction is by Wahkiakum County.

Aquatic Features

The water quality of the area is not reported, although it is probably not as good in the sloughs as in the main river. There is no information on the freshwater flow of Skamokawa Creek, or of the benthic organisms in the creek or main river. Dead Slough is the former channel of Skamokawa Creek, and has poor water quality. Skamokawa Creek is, periodically, a major producer of salmon, particularly fall chinook. Its potential for increased production is quite good if there are some controls on water quality. Brooks Slough has a population of warm water rough fish and game fish. The Columbia River is quite deep through this area as it attempts to migrate northward; consequently there are few shallow water feeding areas for juvenile salmon.

The Corps of Engineers has three authorized projects in this subarea; one is the 40 foot navigation channel. Another was authorized in 1919 for a chan-



nel 6.5 feet deep, and 75 feet wide from the mouth of Skamokawa Creek to the town of Skamokawa. This project extends up Skamokawa Creek approximately to the State Highway 4 bridge, and up Brooks Slough approximately to the Brooks Slough Bridge. Until 1974, the common method of maintaining this channel was by pipeline dredge with disposal along both banks of the creek. The current and probable future method of maintenance dredging is by propwash agitation by the Sandwick. The third project was authorized in 1930 but has never been carried out. This project provided for a channel 24 feet deep, 150 feet wide, and 2,640 feet long in Skamokawa (Steamboat) Slough. A 250 foot square by 24 foot deep turning basin was the upstream limit of the project at mile 0.5, Winters Wharf.

Shoreland Features

The shoreland in this subarea is low and bounded by steep topography around Skamokawa. It is very scenic from Skamokawa to Three Tree Point. This western portion is very scenic. The eastern portion of this subarea provides critical habitat for the Columbian White-tailed deer. Bear, black-tail deer, and other upland species occur as well as muskrat, nutria, and migratory waterfowl. Hazards from flood waters exist in low areas, and landslide topography occurs in the area west of Skamokawa. The land behind Skamokawa is used for farming and is mostly diked tideland.

The Skamokawa Park, now being developed, has received large amounts of dredge spoil from the maintenance of the 40 foot navigation channel. The beach commonly erodes and is used as a beach nourishment disposal site. The banks of Skamokawa Creek at its entrance are former disposal sites.

Human Use

Human use is concentrated most heavily around the small town of Skamokawa. The town starts at approximately the Washington Department of Game boat launch on the north bank of Brooks Slough and continues west.

There are a number of houses along the Slough, along the north side of State Highway 4, and on the tip of the peninsula formed by Brooks and Steamboat Sloughs. There are a few small businesses and some waterfront net drying racks at the junction of Brooks Slough and Skamokawa Creek. On the west bank of Skamokawa Creek are a few houses and a rock pit. Many of the houses along Brooks Slough and Skamokawa Creek have floats or boat houses attached to support fishing activities. Both water bodies allow the passage of very shallow draft vessels. Low bridges and shallow depths limit the access of larger vessels. The parcel of land between Skamokawa Creek Bridge and Dead Slough is used for housing.

On the west bank of the mouth of Skamokawa Creek, Port District #2 is developing Skamokawa Park on the old school property. The park beach is used for recreational fishing. There is also an Indian archaeological site adjacent to the old school grounds and Park.

The lands between the Park and Three Tree Point have a mixture of individual and corporate ownership. In the past, local people bought land along the right-of-way of a proposed railroad that was never constructed. This is a very steep, scenic, but uninhabited area with poor public access. Parts of it are in commercial timber production. The tip of Three Tree Point is owned by the Federal Government.

Commercial gillnet drifts occur all along the Columbia River in this subarea.

Issues and Findings

Future development may be mostly the tourist use of the proposed Skamokawa Park. Visitors will need increased public services and lodging. The tip of the peninsula formed by Brooks and Steamboat Sloughs and west of the county road has potential for shallow water port development. There is currently some private housing in the area. Skamokawa is a small village and will probably experience only slight growth. The rural area behind Skamokawa is low and diked and, in its present form, is unsuitable for more intense development.

Skamokawa Creek and Brooks Slough have been classified ***Development*** because there is extensive navigational use, and some housing and small businesses along these water bodies. State and Federal resource agencies have expressed concern over this designation for the mouths and lower reaches of salmon spawning streams.

The West Fork of Skamokawa Creek and Skamokawa Creek from Dead Slough north are classified ***Conservation*** to help protect the valuable salmon resource returning to this area. With proper watershed practices and good water quality, there is good salmon production potential in this stream.

Aquatic Designations

Dead Slough is designated ***Rural.***

The following aquatic areas are designated ***Development:*** Brooks Slough west of the Washington Department of Game boat launch; Skamokawa Creek south of its junction with Dead Slough; and the authorized navigation channels in Skamokawa Creek, Steamboat Slough and the Columbia River.

The remaining aquatic portions of this subarea are designated ***Conservation.***

Shoreland Designations

The shorelands north of Dead Slough and Sleepy Hollow to the planning boundary are designated ***Rural.*** The shorelands along the north bank of Brooks Slough to the western boundary of Skamokawa Park are designated ***Development*** as are the shorelands west of the refuge boundary on the peninsula formed by Brooks and Steamboat Sloughs. The remaining shorelands of this subarea are designated ***Conservation.***

Dredged Material Disposal

There are three dredged material disposal sites in this subarea. Site 65(S) is on the west bank of the mouth of Skamokawa Creek that has long been used for disposal of sand from the ship channel. Plans exist to develop a portion of the site as a park. Site 66(B) is a beach nourishment site adjacent to the shoreland disposal area. Site 67(D) is a general dike maintenance site along Skamokawa Creek (cf Dredged Material Management, 55.10, 58.20, 59.40, 59.50).

44.05 THREE TREE POINT TO HARRINGTON POINT

General Description

This area includes the Brookfield log handling facility, the small communities of Pillar Rock and Altoona, and the lands between. Much of this land has a steep scenic topography, is remote and sparsely populated, and is used for commercial timber production. There are numerous old cannery buildings at Pillar Rock and Altoona now used by commercial fishermen for storage. Jurisdiction is by Wahkiakum County.

Aquatic Features

During low flow conditions, saltwater is found on the bottom of the Columbia River up to Pillar Rock. The water quality in this area is usually quite good. Jim Crow Creek enters the Columbia River at Brookfield, but there is no information on its flow. It drains a large area of commercial timberland, and may provide limited spawning habitat for coho and chum salmon. An extensive shallow area at the mouth of Jim Crow Creek is the result of heavy stream siltation.

The Columbia River is quite deep through this area with few shallow water feeding areas for juvenile salmon. The available food for juvenile salmon in this reach consist primarily of the large zooplankton.

There is only one area of marsh in this subarea, just downriver from Three Tree Point. It has not been studied, and is practically inaccessible except by boat. It is probable that the vegetation is largely sedge and bulrush, with a landward border of willow. There is an old dredge spoil site just downstream from Jim Crow Point that has the potential for marsh creation.

There are in water log storage areas by Brookfield.

The 40 foot navigation channel runs along the state line, and is maintained by dredging and by pile dikes at Brookfield and Altoona.

Shoreland Features

The shoreline topography is generally steep and unsuitable for most activities other than timber production and private residences. Tideland soils occur only in the Brookfield area around the mouth of Jim Crow Creek. This area is largely in timber production.

There are a number of dredge spoil sites along this reach, some still in use. There is continuing discussion whether or not the Brookfield dikes cause downstream shoreline erosion, such as at Elliott Point. Between Jim Crow Point and Elliott Point, there are three small beach nourishment areas occasionally requiring dredge spoil.

Wildlife in this area is largely upland species such as deer, bear and upland birds.

Human Use

Most of the area is used for waterborne commerce, timber production or rural residences. This area is sparsely populated; most people live at Pillar Rock, Altoona or between Pillar Rock and Elliott Point. Lands adjacent to the planning area are mostly corporate owned and are in timber production. Within the planning area, ownership is mostly corporate and individual. The shoreline from Three Tree Point to Brookfield, and Jim Crow Point to Pillar Rock is inaccessible by road. Brookfield is only accessible via corporation road. Public road access ends at Pillar Rock.

Few industrial sites in this subarea are actively used. Crown Zellerbach has a log handling facility just west of the mouth of Jim Crow Creek. A pier mounted crane is used to load logs into the water for transportation. Just upstream from Jim Crow Creek is a rock pit which is no longer in use. There used to be major salmon canneries at Pillar Rock and Altoona, but they have been closed for many years. The cannery sites now are used for boat moorage, net drying racks, and equipment storage. In the river, there are a number of commercial gillnet fishing drifts, and some sturgeon fishing.

Issues and Findings

The potential for development in this area is limited by poor transportation access, limited public facilities, and landslide topography. Brookfield, with deep water access, logging road access, and some backup land, has some potential for increased and diversified industrial development. The abandoned rock pit at Brookfield could be reopened. The fish producing capacity of Jim Crow Creek could be improved. Altoona has been discussed as a possible port site because of its access to deep water, but the road system connecting Altoona with markets to the north and east is poor. Some consider that a new road connecting Grays River with Pe Ell is necessary before this port development could occur. The tourist potential in this area is untapped. This area has no comprehensive plan or zoning designations. The shoreline is a "Shoreline of Statewide Significance".

There are two main areas where the designations differ from those found in the County Shoreline Management Master Program. The Brookfield area is changed from ***Rural*** to ***Development,*** and the area from Pillar Rock to just east of Elliott Point is changed from ***Conservation*** to ***Rural.***

Aquatic Designations

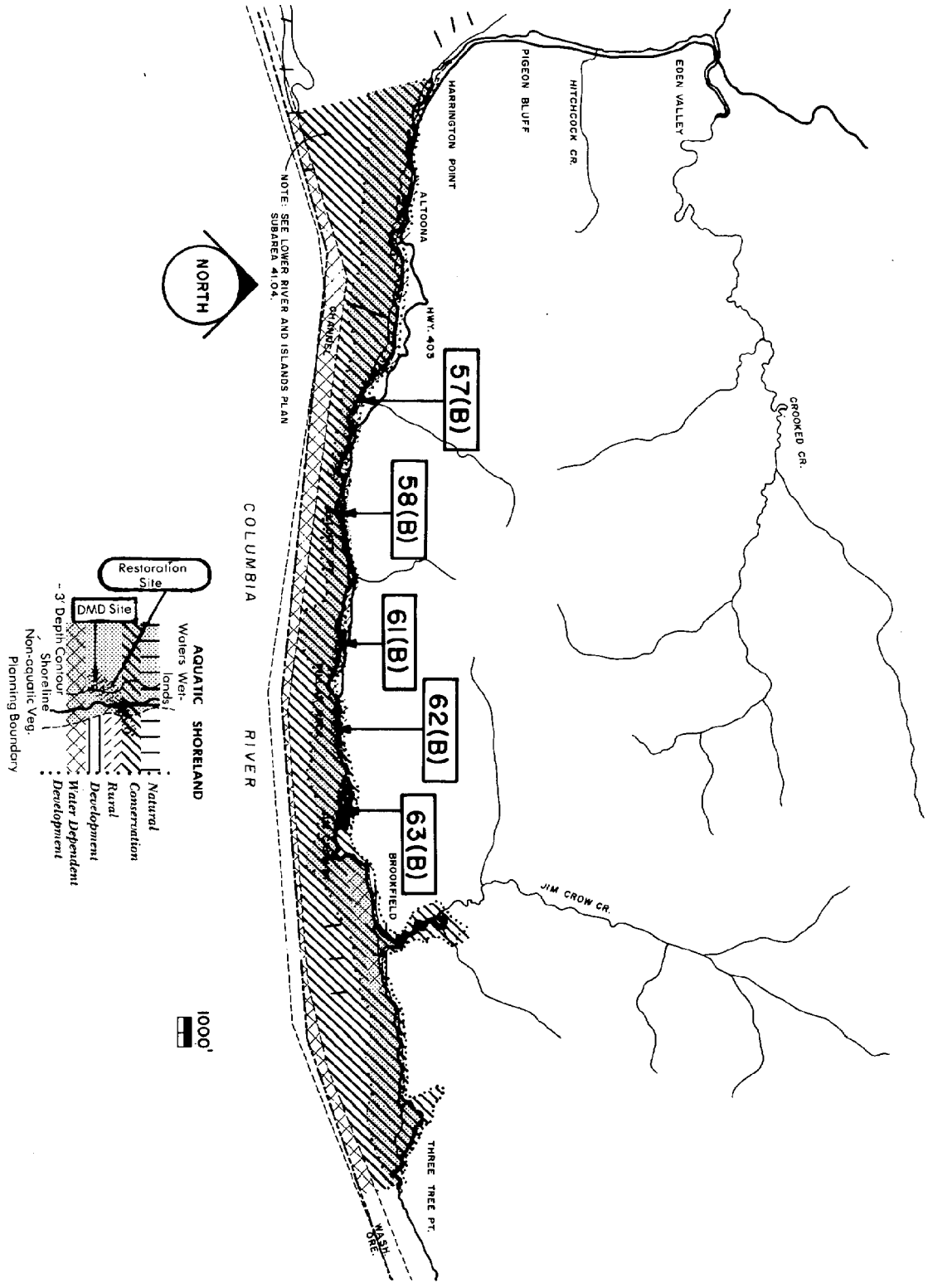
The aquatic area adjacent to the ***Development*** shoreland around the mouth of Jim Crow Creek is designated ***Development*** out to the 20 foot contour. The main Columbia River navigation channel is also designated ***Development.*** The remaining aquatic portions of this subarea are designated ***Conservation.***

Shoreland Designations

The shoreland from the eastern boundary of the Pillar Rock community to Harrington Point is designated ***Rural.*** The shoreland from the eastern boundary of the abandoned rock pit upriver from Brookfield to the western boundary of Brookfield is designated ***Development.*** The remaining shoreland in this subarea is designated ***Conservation.***

Dredged Material Disposal

There are five beach nourishment disposal sites along this stretch of the Columbia River shoreline. The sites, 57(B), 58(B), 61(B), 62(B), and 63(B), are all associated with dredging of the 40 foot navigation channel. (cf 55.10, 59.40.)



44.06 GRAYS BAY AND TRIBUTARIES

General Description

This subarea extends from the state line through Grays Bay and up Grays and Deep Rivers and Eden Valley to the extent of tideland soil, including the town of Deep River and part of the Campbell Creek valley. In the Grays River valley, the area goes to about halfway between the towns of Rosburg and Grays River, not including either town, and partially up the Seal River valley north of State Highway 4. The low lying lands in Eden Valley are also included to a point approximately one and one-half miles upstream from the mouth of Crooked Creek. The river valleys are used primarily for agriculture on diked tidelands, and are sparsely populated. There are extensive freshwater marshes and tideflats in Grays Bay. Jurisdiction is by Wahkiakum County.

Aquatic Features

The Corps of Engineers has two authorized projects in this area. Deep River has an authorized channel eight feet deep and 60 feet wide, extending from the mouth to the town of Deep River. The project was completed in 1928, and if maintenance dredging becomes necessary the spoils will be placed along the river banks. This channel is used mainly for log raft transportation. A project for Grays River was authorized in 1907 and provided for removal of obstructions from the river channel and banks for a distance of eight miles upstream from the mouth. The project was completed in 1909 and no further maintenance is anticipated.

The water quality of Deep River and Grays Bay is not reported. Because of extensive log storage and sorting in Deep River, its water quality may not be as good as Grays River, which is Class A from the mouth to the falls and Class AA from the falls to the headwaters.

There is some indication that the sediment load in Grays River is much higher now than in pre-logging days, and that this is contributing to the shoaling of Grays Bay. Another cause of shoaling may be the slower Columbia River flows through Grays Bay due to the dams and the pile dikes at Altoona and Rice Island. The sediment in Grays Bay is largely sand and sandy silt.

The fisheries production potential for this area is quite good, including Deep River. Historically, the Grays River system supported very large runs of chum salmon and some coho, fall chinook and steelhead. Now, much of the former spawning habitat is unusable and most salmon are spawned at the Grays River Hatchery. Local commercial fishermen operate a small scale chum enhancement project on a Grays River tributary. There may be limited chum and coho spawning in Crooked Creek.

The Grays Bay area has the second largest concentration of tidal marsh in the estuary, approximately 1,449 acres. Vegetation grows from the shoreline to far out in the bay, and provides critical habitat and nutrients. Migrating waterfowl and shorebirds extensively use Grays Bay.

Bottom dwelling invertebrates in this area are poorly studied. The available data indicate that Grays Bay is an area rich in this type of animal life, and is one of the more valuable areas in the estuary. These small animals are used for food by juvenile salmon and other fishes. The mixing of fresh and salt water provides a highly productive environment.

Shoreland Features

The shoreland vegetation is largely agricultural, but there are forested areas. The agricultural lands are generally diked tidelands. These lands provide wildlife habitat for migrating waterfowl, black-tail deer, elk, bear, and smaller furbearers such as muskrat and nutria. Pigeon Bluff, on the east shore of Grays Bay, is very important habitat for wild band-tailed pigeons because of mineral-rich water there.

All the lands in this subarea are within the 100-year floodplain. Flooding occurs nearly every winter which is particularly serious in the lower valleys, Deep River and Grays River. Heavy rains coinciding with storm tides and high winds cause dike breaching, road washouts, and flooding of farms and buildings, presenting a considerable hazard to lowland residents. The flooding is thought to be worsened and made more frequent by the shallow, debris filled channel of Grays River. At the mouth, a bar develops which acts as a dam behind which flood waters deepen and overtop the dikes.

Human Use

This area is mostly agricultural (hay and dairying), with the wetlands used for recreational hunting. Parts of Grays River and Grays Bay are used for commercial and sport salmon fishing and some sturgeon fishing. The adjacent uplands on the east and west side of Grays Bay and up Deep River are mostly in timber production. Road access is from the Ocean Beach Highway (State Highway 4). Public services are available at the small towns of Grays River, Rosburg, and Deep River.

Industry is limited to small logging companies, custom sawmills, and the large Weyerhaeuser sorting yard and associated log handling equipment along Deep River. There is extensive in water log storage in Deep River. Log rafting and sorting areas, a truck repair yard, and main line log haul road lie immediately adjacent to the town of Deep River; both the river and the town are historically associated with the timber industry.

There is a Department of Game boat access at the Rosburg bridge on Grays River. There are two structures on the National Register of Historic Landmarks: the Grays River Covered Bridge, and the Deep River Pioneer Lutheran Church.

Issues and Findings

The development of land areas will be based largely on transportation, marketing agricultural products, and flood protection. Agricultural and low-lying forest areas probably will remain so, perhaps with some increasing residential use, because they are unsuitable for more intensive use in their present condition. Industrial development will most likely be related to wood products in the Deep River area. The

Weyerhaeuser sorting yard may expand north and east; small operations may expand further downstream along Deep River; log handling and storage operations may expand along the town of Deep River.

There is a proposed dredging project for Grays River which would provide a channel 50 feet wide by 8 feet deep from the Rosburg bridge downstream through Grays Bay to a junction with the Deep River channel. If this channel project were completed, the agricultural lands in Grays River could be used more profitably, and light industry and tourist trade might develop.

There is an unresolved conflict between timber production and salmon enhancement. If this conflict could be solved, the county and its citizens would be in a better economic situation, having two major industries instead of just one.

A small "black sands" mining lease in Grays Bay is due to expire in 1981. This would be surface mining to remove certain minerals. The Washington Department of Natural Resources recently has leased large state owned portions of Grays Bay for oil and gas exploration. There are similar leases for the rest of the county shoreline east to Puget Island, and west to the mouth of the Columbia River.

For most of the shorelands in this subarea, the current (and logical future) use is agriculture. However, the forested area on the west side of the mouth of Grays River is very low and undiked and would be suitable for agricultural use only after extensive modification.

Those areas along Deep River designated as ***Development*** include existing industrial sites, areas where new facilities are currently being constructed, areas for expansion of existing industrial facilities, and a few homes. Other land parcels in this area are leased for farming, but represent industrial expansion areas. The town of Deep River and the adjoining log handling facility have a history of intensive use, as does the main line log road and shops to the north of town. Some of the land west of the main line road is leased for agriculture but represents a possible industrial expansion site. The triangular shaped piece of land across from the town of Deep River also has the potential for industrial expansion.

A significant aspect of the plan in this subarea is the recognition of the natural resource value of the tideflats and tidal marshes in Grays Bay and the protection provided.

Aquatic Designations

The wetlands of Grays Bay are designated ***Natural***, except for a 50 foot buffer strip along the shoreline which is designated ***Conservation***.

Hitchcock Creek is designated ***Rural*** as is Campbell Creek downstream to its junction with Lassila Creek.

The following aquatic areas are designated ***Development:*** the authorized Deep River channel from Rocky Point to the town of Deep River; the proposed channel for Grays River from the Rosburg Bridge downstream to its junction with the Deep River channel; the waters of Deep River between the town and the triangular shoreland parcel across from the town; and the water between the channel and the ***Development*** shoreland.

The remaining aquatic portion of this subarea is designated ***Conservation***.

Shoreland Designations

The following areas are classified ***Rural:*** the shorelands of Hitchcock Creek; the shorelands of Eden Valley; the shorelands of Grays River Valley except on the west bank at the mouth; the shorelands on the west bank of Grays Bay and Deep River up to the log handling facility on the downstream edge of Deep River; the shorelands from Miller Point up the east bank of Deep River approximately 3/4 of a mile; the shorelands between the Weyerhaeuser sorting yard and the State Highway 4-Deep River Bridge, except as otherwise noted; the shorelands north of the State Highway 4-Deep River Bridge to the town of Deep River, except as otherwise noted; and the shorelands from the town of Deep River up both forks of Deep River to the planning boundary, except as otherwise noted.

The following areas are classified ***Development:*** the town of Deep River and adjoining log handling facility, a triangular shoreland parcel across from the town of Deep River; the shoreland north of the town of Deep River along the Crown Zellerbach main line log road and west to the planning boundary; and the shoreland along the east bank of Deep River from a point approximately 3/4 of a mile from Millers Point upstream to where the unnamed slough turns east on the Weyerhaeuser property between the sorting yard and the State Highway 4-Deep River Bridge.

The remaining shorelands of this subarea are designated ***Conservation***.

Subarea Policies

1. Notwithstanding the ***Natural*** and ***Conservation*** designations in Grays Bay, the construction of a channel or channels for flood control and navigational access in the bay shall be permitted as agreed to by Wahkiakum County and the U.S. Army Corps of Engineers.

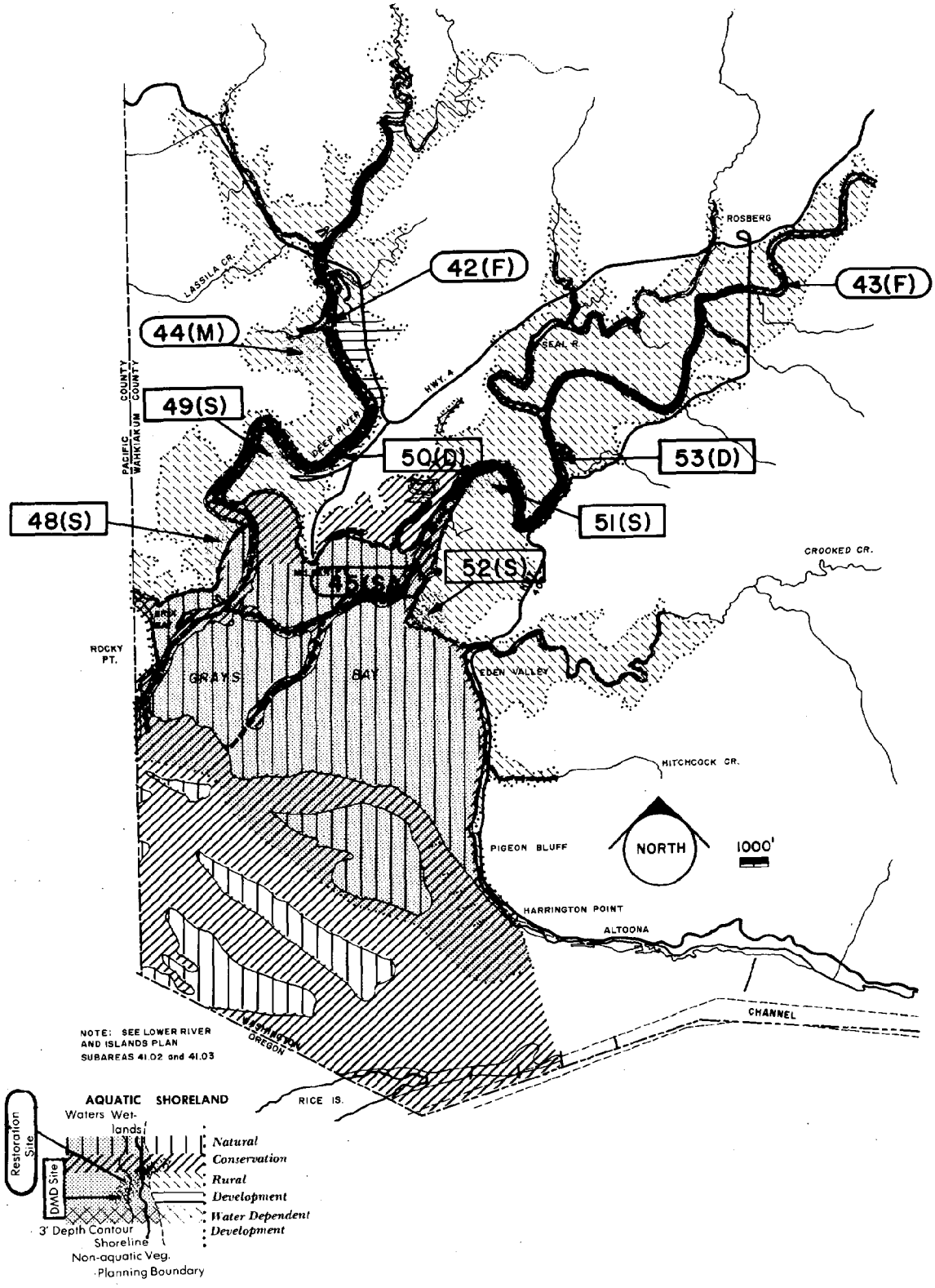
2. In areas where either the bottom contour or water fluctuations are such that a dock of more than 50 feet in length is required to obtain sufficient water depth for moorage purposes, docks may extend beyond the 50 foot buffer strip.

Dredged Material Disposal

There are six dredged material disposal sites. Sites 48(S) and 49(S) are potential shoreland sites to be used in conjunction with maintenance of the channel in Deep River. Site 50(D) is for general dike maintenance along Deep River. Sites 51(S) and 52(S) are potential shoreland sites to be used in conjunction with possible new dredging in Grays Bay or River. Site 53(D) is a general dike maintenance site associated with the same potential dredging (cf Dredged Material Management, 58.10, 59.50.)

Restoration and Resource Enhancement

Both Deep River [42(F)] and Grays River [43(F)] are recommended for fisheries enhancement projects which would increase their resource value. Dredging of Grays River would remove the accumulation of silt which may impede upriver migration. Stream habitat improvement upstream is also needed. Removal of the shoal area at the mouth of Grays River [45(SA)] would improve both navigation and fish access. Site (M) is a potential marsh restoration site on the west bank of Deep River. This low-lying diked land could be returned to aquatic productivity by breaching the dike (cf Restoration and Mitigation, 65.).



45. BAKER BAY PLAN

THE PLANNING AREA

The Baker Bay planning area encompasses the entire bay, shorelands around the bay, Big and Little Sand Islands, and shoreland and water areas extending eastward to the Pacific County line. The planning area includes the low-lying shorelands up the Chinook and Wallacut Rivers, which have tideland soils. Along steep or other shorelines where no tideland soils are present, the shoreland boundary extends 200 feet inland from MHHW, or is based on some human feature, such as a road. The water boundary extends from the tip of the North Jetty to the tip of Jetty "A", along the 30 foot contour eastward to the county line. Planning, management and regulatory jurisdictions include the Town and Port of Ilwaco, Port of Chinook, Pacific County, Clatsop County, Washington and Oregon state agencies, and federal agencies.

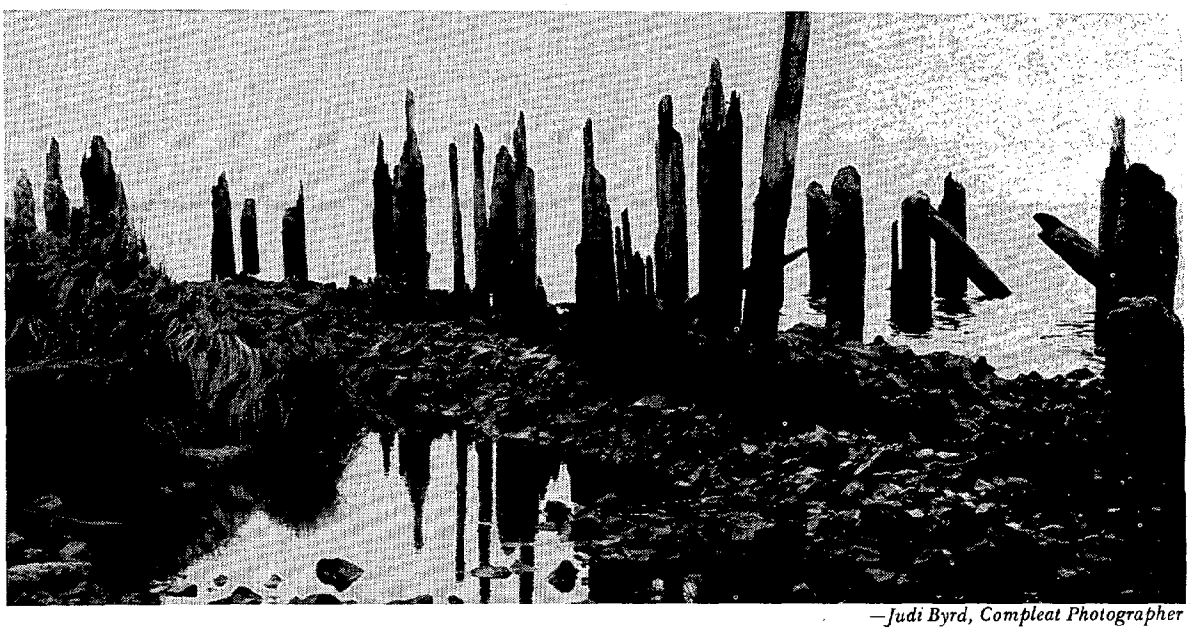
MAJOR ISSUES AND DECISIONS

The shoaling problem in Baker Bay and its impacts on navigation and the viability of the Ports of Ilwaco and Chinook is the overriding issue in this planning area. Public access to the shoreline, location of dredged material disposal sites, the protection of natural habitat, both in aquatic areas and on shorelands, and the potential impacts of mining and mineral extraction were also key issues. These issues are addressed by regional (cf Section II), area and subarea policies, as well as other plan provisions.

The Baker Bay plan attempts to provide adequate area for future development needs while conserving and protecting the natural resource base so important to the local economy.

Historically, the Baker Bay area has not been a center for development in the estuary region. Fishing, fish processing and tourism are the most important economic activities. The area has several geographic disadvantages for heavy industrial development. It lacks rail access, direct access to the deep-draft shipping channel, and suitable air and highway access. It also has a small, undiversified workforce and only a small local market area for goods. However, areas are needed to provide for modest expansion of both the Ports of Ilwaco and Chinook. The channels through Baker Bay to both ports and aquatic areas adjacent to the ports are thus designated ***Development;*** adjacent shorelands are designated ***Water Dependent Development.*** Dredged material disposal sites to provide for maintenance and possible expansion or relocation of channels are identified in the plan. Adequate shoreland area for residential and other development is also provided in the plan, while agricultural and hazard areas are protected with ***Rural*** or ***Conservation*** designations.

Baker Bay is biologically a very important part of the Columbia River estuary. The bay is fringed by several hundred acres of tidal marsh, whose plant production helps provide the base of the aquatic food chain. Great numbers of bottom-dwelling invertebrate animals are found in the fine sandy sediments of the bay. Sand shrimp and juvenile Dungeness crab are very numerous at certain times of the year. Many finfish also use the shallow bay area, including juvenile starry flounder and juvenile salmon. Waterfowl also make extensive use of Baker Bay, particularly the Sand Island area, where there are gull and Caspian tern rookeries. Other wildlife also make extensive use of shoreline areas around the bay. Protection of these natural resource values is provided for in the plan by designation of tidal marshes and shallow wetland areas as ***Natural.*** Shallow subtidal areas and other aquatic areas (excluding authorized navigation channels) are designated ***Conservation.*** Many shoreland areas are also given protective designations.



—Judi Byrd, Compleat Photographer

AREA POLICIES

1. Regional Economy

Chinook and Ilwaco are the two centers of economic and social activity on Baker Bay. The economic and social viability of both communities should be enhanced by maintaining and improving the Ports of Ilwaco and Chinook and by supporting the tourist and fishing industries.

2. Port Development in Baker Bay

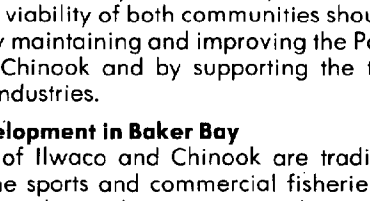
The Ports of Ilwaco and Chinook are traditional centers of the sports and commercial fisheries. Because of this tradition, the proximity to the mouth of the river, the existing port and fish processing facilities, and the absence of any other port facilities on the Washington side near the mouth of the river, the two ports are favorably situated to take advantage of the increased off-shore fisheries brought about by the 200-mile limit. To take advantage of these off-shore fisheries, both ports will require improved facilities. These may include deeper and wider channels, berths for larger boats, improved shore facilities, sewage treatment, and approved dredged material disposal sites. Realignment of either or both channels may be necessary. Because of the scarcity of land disposal sites, hopper dredging is the preferred means of channel maintenance for the clean sands at the outer ends of the two channels.

In addition to the commercial off-shore fishing boats, both ports should continue to cater to charter boats and recreational fishermen and should pursue off-loading facilities for barged aggregate. However, when new barge off-loading facilities are proposed, consideration should be given to the possibility of centralizing these facilities at one location.

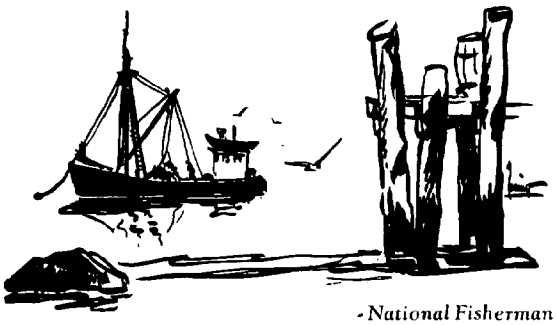
3. Baker Bay as a Hydraulic System

The evidence indicates that Baker Bay is shoaling more rapidly than is normal in the life of an estuary. This process should be reversed. Baker Bay will be most productive to the community if it remains open water rather than an area of ever-increasing tidal flats and tidal marshes. To deal with this urgent problem and maintain Baker Bay as a biologically and economically productive system:

- All agencies with responsibility for Baker Bay should cooperate to investigate how the biological and hydraulic systems of the bay function. Without this understanding, the shoaling problem cannot be corrected.
- The navigational structures in the bay and in the river adjacent to the bay should be designed to reduce shoaling in the bay and help maintain the Ilwaco and Chinook Channels, as well as the main navigation channel. Specifically, the Chinook Jetty should re removed, and other structures in the area should be evaluated for their effectiveness.
- Channels and navigation structures should not interfere with the sand transport system from Chinook Point to the western end of Big Sand Island. Presently there are two openings in this barrier: the breach between the two Sand Islands and the Chinook Channel. Probably one of these gaps should be closed and navigational access provided through the remaining gap.
- Dredged material disposal in area D should be minimized. Other in-water areas, that do not have adverse effects on Baker Bay, should be found.



- National Fisherman



- National Fisherman

4. Public Access to the Shoreline

The Columbia River shoreline of Pacific County is a shoreline of statewide significance, with a major state highway and county roads along most of its length. Improved public access to the Baker Bay shoreline should be provided for the use of local residents as well as tourists. One or more new day-use facilities would be appropriate along the part of the shoreline with road access; foot trails are encouraged elsewhere.

5. Protection of Natural Habitat

Baker Bay is fringed by several hundred acres of tidal marsh. Great numbers of bottom-dwelling invertegrate animals are found in the fine sandy and silty sediments of the bay. Many finfish use the shallow bay area. Waterfowl also make extensive use of Baker Bay, particularly the Sand Island area. However, research to date about the role of Baker Bay in the aquatic ecosystem is relatively sparse. More complete biological surveys and an understanding of inter-relationships between groups of organisms are needed.

Due to the limited scientific information concerning Baker Bay, it is prudent to restrict activity in potentially productive areas at this time. Should further investigation show that an area is not productive, it would then be appropriate to consider more intensive activities.

6. Mining and Mineral Extraction

Although the possibilities exist of finding valuable minerals in Baker Bay wetlands and submerged lands, that future demand could make such a project economically feasible, and that additional advances in technology may significantly reduce adverse environmental impact, mining and mineral extraction should not be encouraged at this time.

45.01 KNAPPTON/FRANKFORT

General Description

This subarea includes shoreland and aquatic areas east from the Astoria-Megler bridge to the Pacific-Wahkiakum County line. Jurisdiction is by Pacific county.

Aquatic Features

Fish in the area include salmon and sturgeon and other species. The north channel adjacent to this subarea is a migration route for salmon. Primary and secondary plankton production in the water column is seasonally high.

There are a few marshes and tideflats in the embayments between Knappton and Rocky Point and several shallow areas have been cut off by the highway causeways. Circulation is vigorous and flushing excellent, except in the shallow areas cut off by the highway, where it is poor. The shoreline is exposed to wind and wave erosion and has been rip-rapped extensively.

Shoreland Features

Shorelands are mostly forested down to the shoreline. Elk, deer, bear, and bald eagles are relatively common in this area. The soils in this subarea are mostly bunker soils with high slope. There are limited Nuby soils and filled lands that are subject to flooding.

Human Use

Existing land and water uses include rural residential, commercial and sport fishing, pleasure boating, and forest management. Adjacent upland land use is forest management with small rural areas.

Ownership of the shorelands is mostly by timber companies with some private and state (Frankfort) holdings. Tidelands are in private hands, except near Portugese Point where the Washington State Department of Natural Resources manages those owned by the state.

Issues and Findings

There is no development pressure at this time. In the future, there could be increased demand for shoreline access from both the shorelands and water. Conflicts in this area relate to timber management. Logging to the shoreline may increase sedimentation to the estuary and displace wildlife, including bald eagle nests.

Two areas that have potential for recreational access are identified in this subarea. The first is an outcropping on the west end of Hungry Harbor. The second is the boat ramp at the old saw mill site at Knappton.

A shoreline trail from Knappton to the old town of Frankfort would provide low-intensity access to a long stretch of shoreline. Easements or outright purchase of private property would be needed for this project.

Aquatic Designations

Except as otherwise noted, the wetland portions of this subarea are designated ***Natural*** and the water



areas are ***Conservation.*** From Knappton to Grays Point and from Portugese Point to the northeastern boundary of the vacated plat of Grays-Frankfort, a 50 foot ***Conservation Aquatic*** buffer is applied to the immediate shoreline.

Shoreland Designations

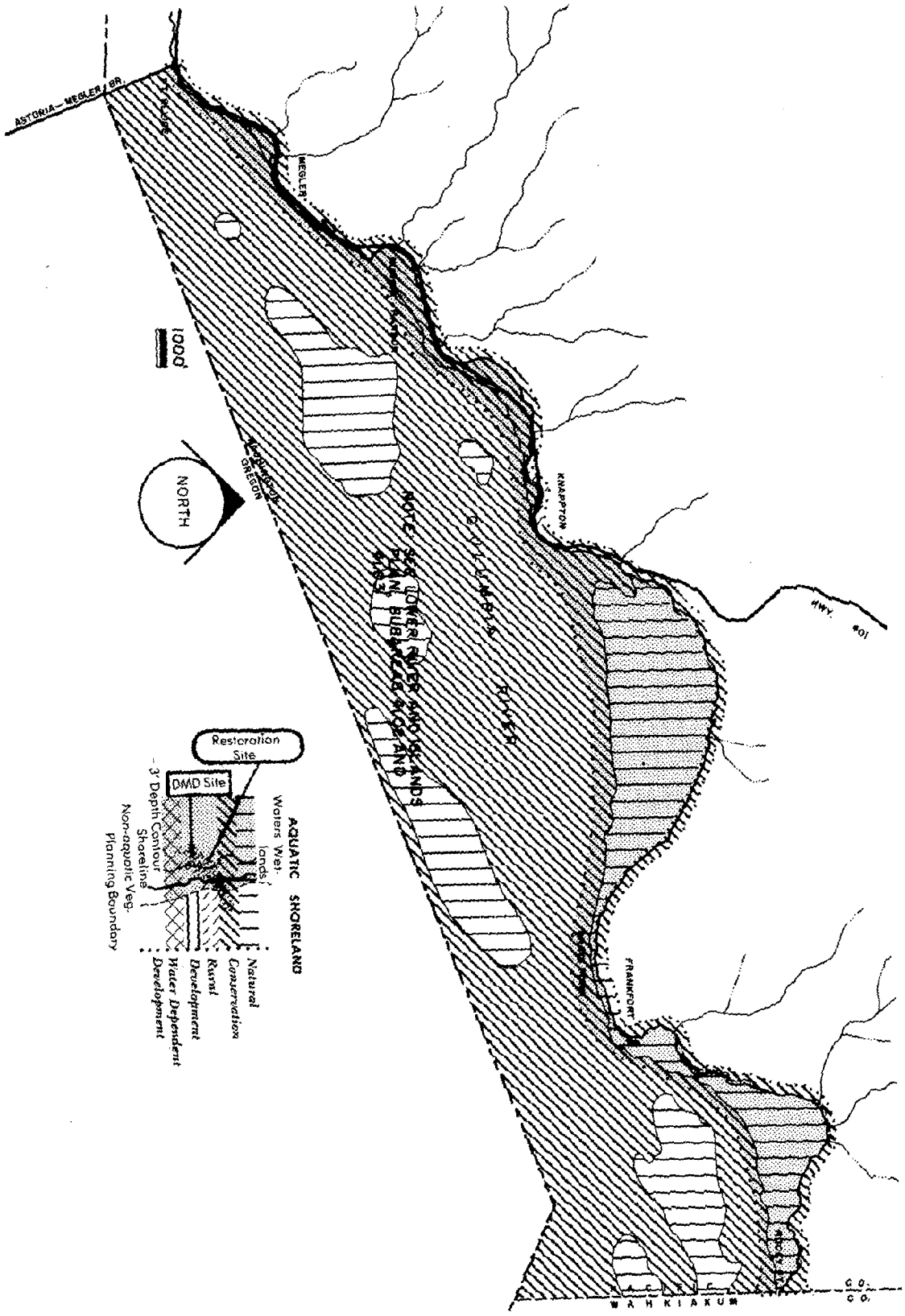
The shorelands are designated ***Conservation,*** except for a ***Rural*** designation for the area of residential development at Knappton and a ***Natural*** designation for the state-owned lands from Portugese Point west to, but not including, the old quarry near Frankfort.

Subarea Policy

This subarea has excellent potential for public recreational access. The boat launching ramp at the old saw mill site at Knappton should be improved and maintained with adequate parking for cars and trailers. Also, the feasibility of developing a shoreline trail from Knappton to the old town of Frankfort should be investigated. This would provide low-intensity access to a long stretch of shoreline.

KNAPPTON – FRANKFURT

SUBAREA 45.01



45.02 MCGOWAN

General Description

This subarea includes shoreland and aquatic areas from the Astoria-Megler bridge west to include Chinook Point. Most of Fort Columbia State Park is included. The area is under the jurisdiction of Pacific County.

Aquatic Features

Aquatic areas include shorefront beaches and water areas along the north channel of the Columbia River. Water depths range to 50 feet along the channel and the slope to the beach is relatively steep. The beach is composed of coarse, sandy sediments with gravel and larger rock. Tidal currents are strong along this reach of the river and flushing action rapid.

These aquatic areas support varieties of fish, shellfish plankton and other aquatic animals, including salmon, sturgeon, starry flounder and juvenile crab. Benthic populations are probably low to moderate, owing to the swift currents and coarse sediments. There are small fringes of marsh vegetation along the more protected portions of the beach.

Shoreland Features

Shorelands include a narrow fringe of steep forested land and some flat land around McGowan. Bunker and Stasop soils predominate in the steep area, with Ocosta soils on the flat areas. Wildlife values of the shorelands are moderate but the highway running along the shoreline creates a barrier between aquatic and upland areas. Deer, elk, bear, bald eagle, hawks, waterfowl, small mammals and other wildlife are relatively common in the area.

Shoreland hazards include possible slides in steep areas and erosion of the river shoreline, which is riprapped to retard erosion.

Human Use

U.S. Highway 101, running along the shoreline, is the most predominant developed feature in this subarea. Land and water uses include commercial and sport fishing, recreational boating, forest management, and Fort Columbia State Park. Adjacent uses are the developed area at Chinook and additional timber production and fishing.

Tidelands are nearly all in private ownership, except for state owned areas around Chinook Point. Shoreland ownership is private around McGowan and corporate in the forested portions. The beach in this area gets some recreational use at low tide for beachcombing and walking. Parking is very limited, however, with off-road spaces for only two or three vehicles.

Issues and Findings

There is little development pressure or potential in this area. Very little buildable land exists, except around McGowan. Development constraints such as a high water table limit development there.

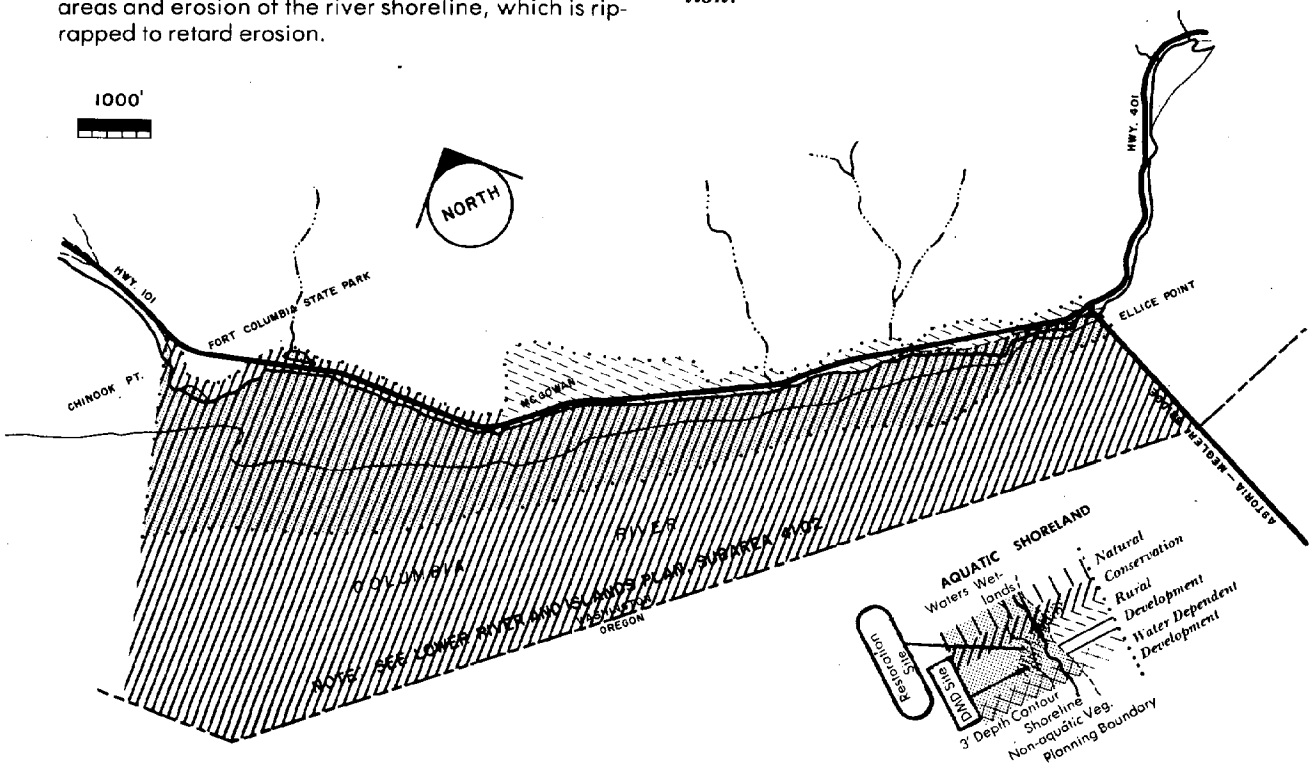
Fort Columbia State Park is a historical and recreational resource of value to the area. Improvement of its facilities, consistent with maintaining the natural, scenic character, will enhance these values.

Aquatic Designations

All aquatic portions of this subarea are designated ***Conservation.***

Shoreland Designations

The flat tideland (Ocosta) soil areas at McGowan and to the east of McGowan are designated ***Rural.*** The remaining shorelands are designated ***Conservation.***



45.03 CHINOOK

General Description

This subarea includes the unincorporated town of Chinook and adjacent aquatic areas of Baker Bay. A special district, the Port of Chinook, is included. Jurisdiction is by Pacific County.

Aquatic Features

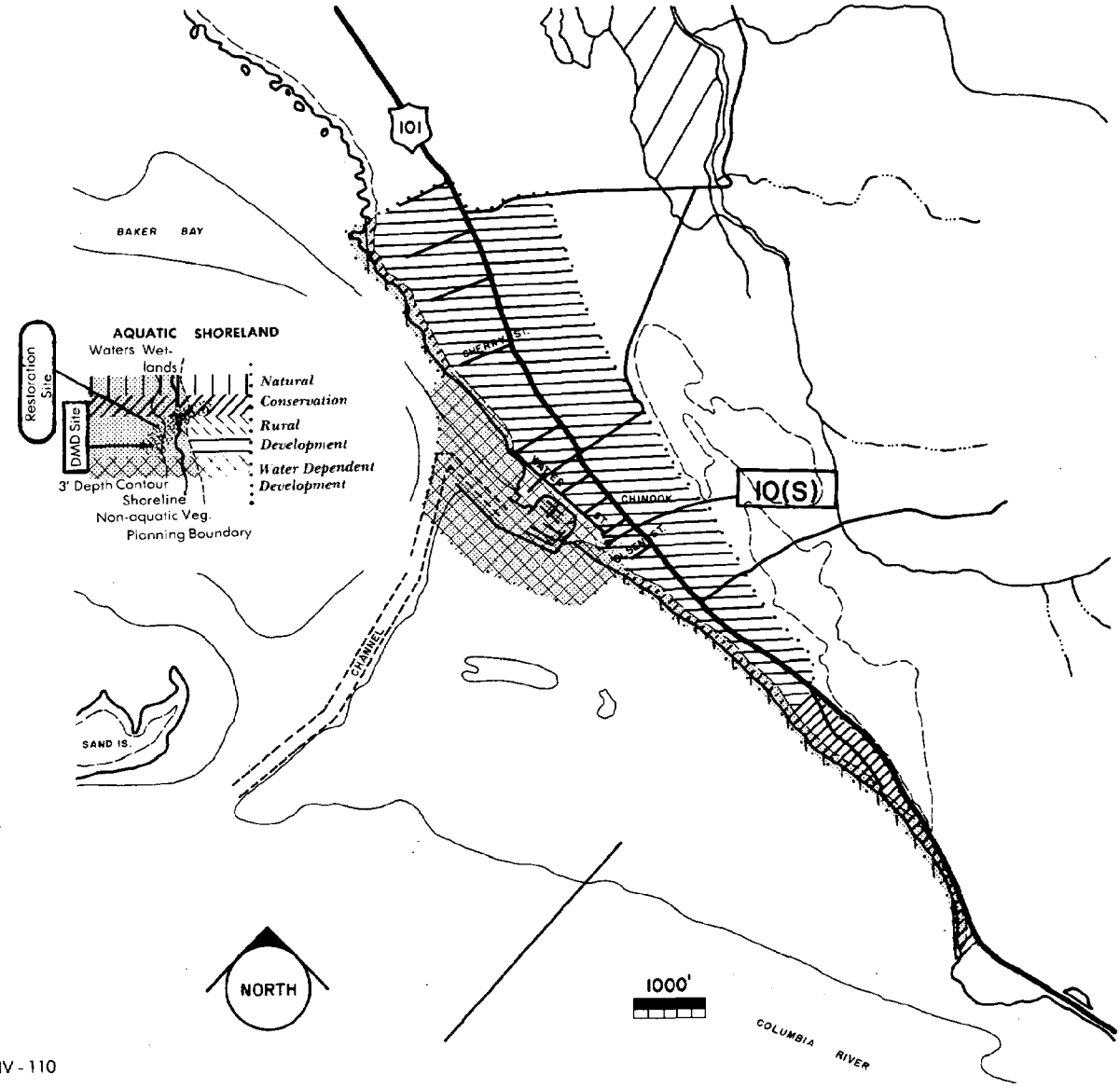
Fish support value is moderate to high in this area. Wetland vegetation to the west of the mooring basin provides primary production and marsh habitat. Tidal flats and subtidal areas have high benthic production. Oligochaetes (worms) and clams are particularly abundant. A sandy beach exists east of the basin to the eastern boundary of this subarea. A large tract of freshwater wetlands north of the town of Chinook has developed as a result of beaver dams, siltation of the Chinook River and installation of the tidegate near the river mouth.

Aquatic areas are extremely shallow except for the navigation channel. The authorized channel into the basin is 10 feet deep and 150 feet wide. Water circulation is dependent on winds and tides, and patterns are poorly known. Flushing is also dependent on winds and tides and is fairly good, except in the basin. Water quality in the basin area fluctuates seasonally depending on the amount of fish wastes and boat traffic.

Shoreland Features

Soils in this subarea include Westport and Yaquina associations, and filled land with low slope. The filled area is to the east of the basin and much of it is a stockpile site for dredged material disposal. These soils have a high potential for flooding and erosion and a seasonally high water table.

Wildlife value of the shorelands is moderate behind Chinook. Deer, beaver, and other small mammals inhabit the area.



Human Use

The unincorporated town of Chinook and the Port of Chinook dominate this area. Residential, commercial, and industrial uses predominate, with boat moorage, navigation, and dredged material disposal associated with port operations. Tideland ownership is a mixture of private and state. Shoreland ownership is mostly private and the Port of Chinook. The Port of Chinook moorage facility is the third largest in the estuary, with a capacity of 323 vessels.

Issues and Findings

The Port of Chinook has significant potential for expansion. The CREST Marina Study (1978) found substantial unfilled demand for both recreational and commercial fishing vessel moorage. The new 200 mile economic zone has stimulated additional demand for moorage for larger commercial fishing vessels. The Port's short-range plans call for additional moorage facilities within the existing basin. Long-range plans include an expanded basin, additional services and facilities, and a potential barge unloading area.

Although the nature and extent of the navigational access problems in Baker Bay have received careful attention during the CREST planning process, the scientific research and engineering studies necessary to solve these problems are beyond the scope of this plan. Accordingly, this plan provides for the future resolution of these problems without determining the exact measures which may be necessary. The relevant maps which are a part of this plan include dashed lines which indicate possible future channel realignments. The exact locations and sizes of those channels should be determined as a result of the necessary studies and cooperation among the various interested parties.

The planning process has included extensive discussion of the appropriate areas for Port expansion. The draft plan provided for expansion only to the west of the existing facilities. After consideration of the natural resource values and other factors, the expansion area was reduced on the west and some area was added to the east.

Severe shoaling problems throughout Baker Bay (see 45.05, Baker Bay) are threatening the navigation channel into the Port of Chinook. Dredging to maintain the channel has become increasingly expensive and more frequently necessary. The disposal of dredged material is a growing problem. The viability of the third largest mooring basin in the estuary is threatened.

The conversion of Chinook Park to overnight use has resulted in heavy use by tourists and complaints from local residents that they can no longer enjoy the park. There is a need for day-use facilities at the park.

Aquatic Designations

The existing navigation channel is designated ***Development.*** In the event that a realignment of the channel is agreed to, the new channel is also designated ***Development*** by this plan. The present facilities and future expansion plans of the Port of Chinook are accommodated by a ***Development*** designation for the area between Olsen Street and Cherry Street. West of the existing basin, the southern boundary of this designation is the channel (authorized and natural). In front of and east of the existing basin, the southern boundary of the development designation is a line 600 feet south of the existing breakwater.

The remaining aquatic portions of the subarea are designated ***Natural*** where there are wetlands, and ***Conservation*** for water areas. Where ***Natural*** wetlands abut ***Development*** aquatic areas, a 50 foot ***Conservation*** buffer is applied.

Shoreland Designations

East of Chinook Park the shorelands are designated ***Conservation.*** West of Chinook Park the shorelands are designated ***Development,*** except for the area of Port owned property south of Water Street, which is designated ***Water Dependent Development.***

Subarea Policies

1. Expansion of the Port of Chinook and its entrance channel should be done in such a way as to minimize damage to the aquatic productivity, maintain water quality and flushing, and to avoid aggravating the shoaling problems of the bay.

2. The ***Development Aquatic*** area east of the present Port facilities should be designated and utilized as a dredged material disposal site.

3. The ***Development*** designations, which are provided to accommodate potential future expansion of the Port, do not automatically create the presumption that dredging, filling or other alterations will automatically result. Specific proposals for Port expansion will have to be justified in terms of available alternatives, water quality impacts, economic benefits, and other requirements of the permit process.

4. Day-use-only facilities should be developed at Chinook Park so that both tourists and residents may enjoy the park. This may require some reduction in the size of existing camping facilities.

5. This plan recognizes and provides remedies for the navigational access problems in Baker Bay. The local governmental bodies, relevant agencies and interested parties shall continue to pursue the resolution of those problems. Approved channel realignments and/or improvements shall be permitted notwithstanding the environmental designations of this plan.

Dredged Material Disposal

There is a single dredged material disposal site in this subarea [10(S)], related to dredging projects at the Port of Chinook. The site, adjacent to and east of the Port of Chinook is primarily a stockpile for basin maintenance. This site should be expanded into the ***Development*** aquatic area as needed. (cf Dredged Material Management 56.20, 59.50.)

45.04 CHINOOK RIVER

General Description

This subarea covers the drainage basin of the Chinook River and includes the tideland soils, fringing marshes along Baker Bay, and the waters and wetlands of the river. Jurisdiction is by Pacific County.

Aquatic Features

The fisheries resource consists mostly of warm water fish in the Chinook River and its tributaries and salmon raised at the Sea Resources hatchery. A significant fringing tidal marsh borders this area along Baker Bay. Other wetlands exist up the Chinook River along the river bank. Water depths are shallow in the Chinook River. The river is navigable by small boats for most of its length. River discharge is controlled by a tidegate at U.S. Highway 101.

Shoreland Features

Shorelands in this subarea consist of tideland soils with a low slope. These soils are of the Ocosta, Westport, Yaquina, and Rennie associations. High erosion and flood potentials exist. The shorelands are mostly cleared of timber for agricultural use with limited forest acreage. The Ocosta and Rennie soils are excellent agricultural soils (Classes III and IV). Deer and elk, along with smaller animals, frequent the area. The tidegate at Highway 101 was installed to help prevent floods, but the area still has potential problems with flooding.

Human Use

Existing uses include agriculture, rural housing, recreation, and an industrial site at the mouth of the Chinook River. The facilities on this industrial site, which are connected with the proposed mining of "black sands", are presently unused, although the equipment is maintained. This area receives recreational usage by hunters and those who enjoy watching wildlife.

Ownership is mostly private in this subarea with some small corporate and state holdings in the eastern portion. The fringing marsh is either privately or state owned. The present zoning ordinznces designate portions of this subarea for agriculture, general development, residential, and industrial.

Issues and Findings

There is little pressure for additional development in this area. The potential does exist, however, for industrial and residential development. Mineral leases exist below mean high tide (MHT) on both public and private tidelands. The existing industrial area, although not currently used, is somewhat incompatible with adjacent trailer parks and rural housing.

The peninsula at the mouth of the Chinook River between Highway 101 and Baker Bay has potential as a possible park or waterfront access point. This location would offer both visual and physical access to Baker Bay and the large wetland area directly adjacent.

Aquatic Designations

The nontidal freshwater wetlands behind Chinook that are not state owned are designated ***Rural.*** The state owned wetlands and the remaining aquatic areas of the Chinook River are designated ***Conservation.*** The fringing marshes along Baker Bay are ***Natural,*** except for a 50 foot ***Conservation*** buffer strip along the shoreline.

Shoreland Designations

The privately owned areas of tideland soils used for agriculture to the east of Highway 101 are designated ***Rural.*** The state-owned land east of Highway 101 is designated ***Conservation.*** West of Highway 101, the shorelands are ***Rural,*** except for the existing industrial site which is designated ***Development.***

Dredged Material Disposal

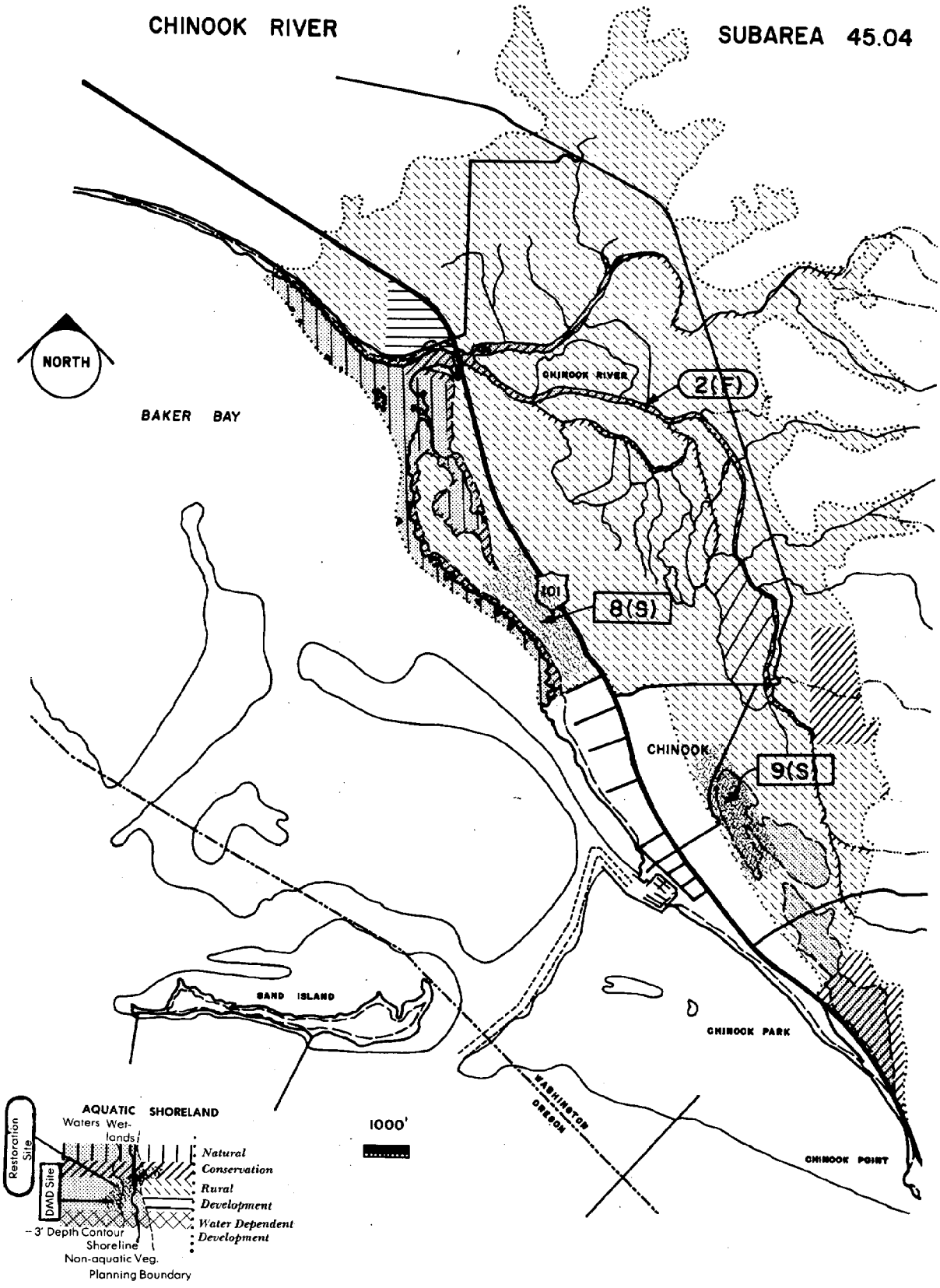
There are two dredged material disposal sites in this subarea, both related to dredging at the Port of Chinook. The first site [9(S)] is located in a low area behind (northeast) Chinook and would be used for disposal of material from channel or boat basin expansion and subsequent maintenance dredging. The second site [8(S)] is an alternate site for the same purpose, but is environmentally and economically less acceptable. (cf Dredged Material Management, 56.20, 59.50.)

Restoration and Resource Enhancement

Siltation of the Chinook River has reduced historical runs of anadromous fish that use this river. A 1963 study by the Soil Conservation Service recommended dredging the river to improve drainage. Such dredging would also enhance fisheries in the river, particularly for salmon returning to the Sea Resources Hatchery [2(F)]. (cf Restoration and Mitigation, 65.)



—Compleat Photographer


CHINOOK RIVER
SUBAREA 45.04
NORTH
BAKER BAY
CHINOOK RIVER
2(F)
101
8(S)
CHINOOK
9(S)
SAND ISLAND
CHINOOK PARK
WASHINGTON
OREGON
CHINOOK POINT
1000'
AQUATIC
SHORELAND
Waters
Wet-lands
Restoration Site
DMD Site
Natural
Conservation
Rural
Development
Water Dependent
Development
-3' Depth Contour
Shoreline
Non-aquatic Veg.
Planning Boundary

45.05 BAKER BAY

General Description

This subarea includes the aquatic areas of Baker Bay and the Sand Islands. It is bounded by the west side of the Baker Bay west channel to the west, by the fringing marshes and the in-water limits of designated ***Development*** areas at Chinook and Ilwaco to the north, by Chinook Point on the east, and by the 30 foot depth contour to the south. The Sand Islands are the only shorelands in this subarea. Portions of the subarea are in the State of Oregon. Jurisdiction is by Pacific County (Washington) and Clatsop County (Oregon).

Aquatic Features

The Baker Bay hydraulic system is complex and poorly understood. Prior to construction of the south jetty in the 1890's, Baker Bay was an open water environment, very exposed to winds and waves. Sheltered anchorage and deep water were provided only at and behind Cape Disappointment; most of the bay was navigable. Construction of the south and north jetties caused Middle Sands to move northward to form Sand Island, which reached very nearly its present shape by 1910; it continued to move northward for another 30 years. The area between Chinook Point and Chinook has always been shallow, but, like the rest of the bay, this area has shoaled considerably.

Following the construction of the Chinook Jetty (pile dike) and the Sand Island dikes in the 1930's, Sand Island began to erode and breached several times. The present gap between the islands appeared in the early 1940's and has gradually become the dominant entrance, through which most of the tidal exchange occurs. This process may have been accelerated by the construction of Jetty A in 1939.

There is a sand transport system that extends from Chinook Point to the seaward end of Big Sand Island. There are two gaps, the Chinook Channel and the breach between the islands. Sand transport east of Chinook Channel is toward the mouth of the river, judging from shoaling on the east side of the Chinook Channel and erosion along Little Sand Island to the west. The transport along Big and Little Sand Islands is not unidirectional. During storms, it is upstream, while river currents cause downstream transport. This pattern is complicated by the pile dikes. Some sand may also be transported into the bay through the gaps.

The existence of the three entrances makes the circulation of the bay very complex and the maintenance of navigation channels difficult. Because the breach in the islands is the major entrance, the scouring action in the navigation channels is comparatively weak. As the understanding of the bay improves, realignment of the channels through the gap may occur.

The interior of the bay has also changed greatly. Sediments were probably sandy prior to 1900, but as the bay has become more protected, widespread shoaling occurred; the material in the bay ranges from sands in the channels to mixed sands, silts and clays on the flats in the northern part of the bay. The bar extending west from Chinook Point is hard sand. Much of the sedimentation of fine material probably results from the flocculation of the silts and clays carried by the fresh river water as this water is diluted by saline sea water. This shoaling mechanism probably was not operative before the increase in salinity caused by the maintenance of the Columbia River entrance channel at a depth of 48 feet (as opposed to the natural depth of 20 to 30).

Baker Bay has changed from an exposed, fresh water environment with (presumably) sandy sediments to a more protected, more saline one with mixed sandy and muddy sediments. Almost nothing is known of the earlier biology of Baker Bay, except that it was filled with upstream migrant salmon — the fish traps were very profitable. Probably the benthic populations were very different 50 or 100 years ago.

Presently, fish support values in this subarea are high. Primary production is very high in the water column and in the low, immature marshes around Sand Island and the adjacent fringing marshes. A *Salicornia* (pickleweed) marsh has formed on the northern side of the small portion of Sand Island. Other large marshes have formed around the large Sand Island, and the marshes throughout the bay appear to be expanding as the bay shoals. Secondary production is probably also very high with clams, polychaetes, oligocheotes, crab, and sand shrimp. Fish found in this area include juvenile salmon, juvenile starry flounder, juvenile Dungeness crab and others.

There are three authorized navigation channels into Baker Bay. These channels are discussed in detail in the Dredged Material Management section (cf 56). Expansion plans are discussed under Chinook (45.03) and Ilwaco (45.07) subareas. The Chinook Channel extends 1.3 miles from the Columbia River to the Chinook Basin. It is authorized at 10 feet deep and 150 feet wide. Shoaling problems are severe; the worst shoal encroaches from Chinook Point to the east, opposite Little Sand Island.

The Baker Bay West Channel follows a circuitous course from Jetty A to the Port of Ilwaco. The first half mile of the authorized channel is 10 feet deep and 200 feet wide; the remaining 2.7 miles to the port is 10 feet deep and 150 feet wide. The channel has a moderate shoaling problem, with the worst shoals at the outer end and at the final turn into Ilwaco. The Baker Bay East Channel, from Little Sand Island to Ilwaco, is not presently maintained.

Shoreland Features

The Sand Islands have a moderate wildlife value as a nesting and resting area for gulls and Caspian terns. The most important area is the eastern end of Little Sand Island. The central, brushy part of Big Sand Island is more important than the rest of the island.

BAKER BAY

SUBAREA 45.05

Human Use

The shorelands of the large Sand Island have limited pasture value. There is a grazing lease with the Corps of Engineers. There are three active dredged material sites: the northern portion of the large island, the eastern portion of the small island (which is filled nearly to capacity), and beach nourishment along the south shore of the small island. Aquatic uses include crabbing, fishing, and boating.

Alterations are extensive in Baker Bay. Several thousand pilings from the old fish traps remain. The Chinook Jetty and the pile dikes along the southern shore of the islands were built to direct the flow of the river to the main navigation channel and prevent erosion of the islands. Also, the southern shore of Little Sand Island was rip-rapped. The remains of the pier and the railroad bed used to unload the material remain on Little Sand Island.

Tidelands are owned by the States of Oregon and Washington. Sand Island is owned by the federal government. Many of the Washington tidelands have had mineral, and oil and gas rights leased.

Issues and Findings

Use conflicts in this subarea include the impacts on aquatic and terrestrial habitat of dredging, dredged material disposal, and proposed black sands mining. The eastern portion of the small Sand Island has been inventoried as a nesting area for Caspian terns. This area has also been used as a disposal site for maintenance dredging of the Chinook Channel; it is now filled to capacity. The northwest corner of Big Sand Island has been used for disposal and other parts of the island are designated for disposal.

Although the nature and extent of the navigational access problems in Baker Bay have received careful attention during the CREST planning process, the scientific research and engineering studies necessary to solve these problems are beyond the scope of this plan. Accordingly, this plan provides for the future resolution of these problems without determining the exact measures. The relevant maps which are a part of this plan include dashed lines which indicate possible future channel realignments. The actual locations and sizes of those channels should be determined as a result of the necessary studies and cooperation among the various interested parties.

The mineral rights to most of Baker Bay have been leased for black sands mining. This mining would have unknown impacts on the hydraulics and the biological productivity of the bay.

Aquatic Designations

The tidal flat areas of the bay are designated ***Natural.*** The water areas are designated ***Conservation,*** except for the two navigation channels which are designated ***Development.*** (cf 45.03 and 45.07 for a detailed discussion of plan provisions for the navigation channels.) Four possible channel realignments are provided for:

- Shortening the Baker Bay West Channel into Ilwaco by eliminating the westward meander;
- Relocating the Baker Bay West Channel to the gap between the Sand Islands and thence west along the old Baker Bay East Channel to the Ilwaco Basin;
- Relocating the Chinook Channel through the gap between the Sand Islands and thence east along the old Baker Bay East Channel to the existing channel;
- Modification of the pile dikes or channel realignment may also be required at the outer end of the Ilwaco Channel because of the large shoal encroaching on the channel from Jetty A; no specific alteration is shown on the plan map.

Shoreland Designations

The shorelands of the Sand Islands are designated ***Conservation.***

Subarea Policies

1. Channel realignments must be justified in terms of hydraulics, sand transport and impacts on maintenance dredging.

2. No more dredged material disposal should occur on the uplands of Little Sand Island. Beach nourishment is also discouraged, because the material may contribute to shoaling in Baker Bay.

3. Upland disposal on Big Sand Island should be confined to the smallest possible area; disposal sites should be revegetated; upland habitat values should be preserved; and grazing should not be permitted.

4. The marshes north of the Sand Islands should be protected.

5. The local governmental bodies, relevant agencies and interested parties shall continue to pursue the resolution of the navigational access problems in Baker Bay. Approved channel realignments and/or improvements shall be permitted notwithstanding the environmental designations of this plan.

Dredged Material Disposal

There are three dredged material disposal sites in this area, all on Big Sand Island. The first site [3(S)] on the northwest corner of the island has been used for disposal in the past. The second site [4(S)] is just south of 3(S) and should be used when the capacity of 3(S) is exhausted. The third site [5(S)] is on the southeast side of the island. All three sites are associated with maintenance, expansion or realignment of the Baker Bay West Channel into the Port of Ilwaco. (cf Dredged Material Disposal 55.10, 56, 59.50.)

Restoration and Resource Enhancement

There are three identified restoration projects in Baker Bay. The first [4(P)] is removal of the many old pilings that are relics of fish traps. The second [5(P)] is removal of the Chinook Jetty (pile dike). Both structures are thought to contribute to shoaling problems in Baker Bay, but careful consideration of the hydraulic effects of removal will be needed prior to action. The third project [11(SA)] is restoration of former depths through active or passive removal of shoal areas. Closing the gap between the two Sand Islands is one possibility. The history of the shoaling problems these three restoration projects address is outlined in Aquatic Features above and in the Restoration and Mitigation Plan, 65).

45.06 WALLACUT RIVER

General Description

This subarea covers the drainage basin of the Wallacut River between the Ilwaco and Chinook River subareas (45.07 and 45.04). It includes the tideland soils around the Wallacut River, the aquatic areas of the river, and the fringing marsh adjacent to these shorelands along Baker Bay. Jurisdiction is by Pacific County.

Aquatic Features

The fisheries resource consists mostly of warm water fish in the Wallacut River and its tributaries. An extensive fringing marsh borders this area of Baker Bay. Other wetland areas exist up the Wallacut River along the river bank. Water depths in the river are relatively shallow. River flow is controlled by a tidegate about a mile from the mouth and is significantly affected by the amount of vegetation in the water.

Shoreland Features

Most shorelands in this subarea consist of tideland soils with a low slope. These soils are the Ocosta, Westport, Yaquina, and Rennie associations. Additional soil characteristics are high erosion and flood potentials. The area of high slope to the west of the river is made up of Lytell soils.

The shorelands are mostly cleared of timber for agricultural use with limited acreage left in forest. The Ocosta and Rennie soils are excellent agricultural soils (Classes III and IV). Deer and elk, along with smaller animals, frequent the area. Hazards in this area are limited to potential flooding.

Human Use

Existing uses include agriculture, suburban and rural housing and trailer parks. The primary residential area is the Vandalia development, which is being built to the north and west of the airfield. The tideland soils are used extensively for agriculture. Remnants of dikes remain along the Wallacut River, but are no longer maintained.

Ownership is private and corporate. Existing zoning is for agriculture, general development, and residential. Mineral leases exist below mean high tide (MHT) in the tidelands.

Issues and Findings

This subarea has significant development potential and growth pressure from the adjacent Town of Ilwaco. Development plans for the Vandalia subdivision call for moderately high density housing on the peninsula area to the west of the airport. Areas immediately east of Ilwaco have a moderate to steep slope; development should proceed cautiously in order to avoid erosion and slides.

Aquatic Designations

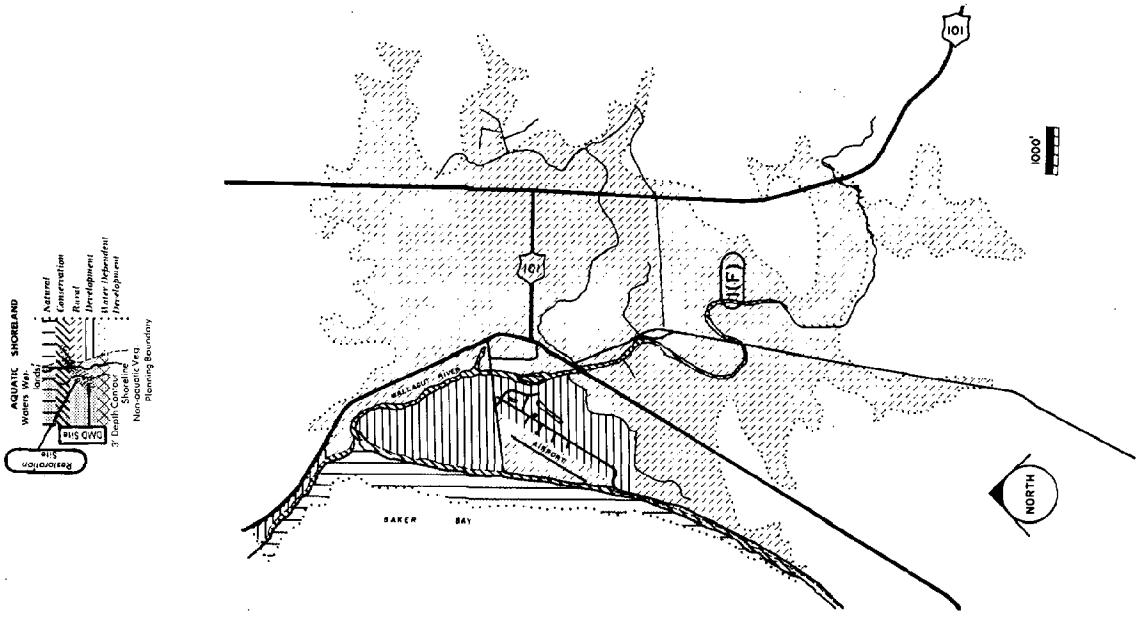
The Wallacut River is designated ***Conservation*** as is a 50 foot buffer strip along the immediate Baker Bay shoreline. The remaining aquatic areas are designated ***Natural.***

Shoreland Designations

The area between Yellow Bluff in Ilwaco and the beginning of the tideland soils is designated ***Development,*** as is the area encompassing the Port Vandalia subdivision. The remaining shorelands are ***Rural.***

Restoration and Resource Enhancement

The Wallacut River has silted in and historical fish runs have been virtually eliminated. Dredging the river mouth and upstream areas is proposed as a fisheries enhancement project [1(F)]. The stream could support chum salmon and possibly other species if restored to former conditions. (cf Restoration and Mitigation 65.)



45.07 ILWACO

General Description

This subarea includes that portion of the Town of Ilwaco which is subject to the Shoreline Management Act, including the Port of Ilwaco. The town exercises jurisdiction over the area.

Aquatic Features

The port moorage area has little value for fisheries. However, the areas outside the breakwater could be moderate to high in productivity, however, not as high as in undisturbed areas. Tidal marshes have developed on each side of the port's breakwaters, in part because of the deposition of dredged material. The one on the east extends from the breakwater to Yellow Bluff. On the west, the marsh merges with the remainder of the fringing marsh to the south and west.

Water depths are extremely shallow except for the boat basin and authorized channel, which is maintained to a depth of 10 feet and a width of 150 feet. Water circulation is limited inside the basin with water quality being affected by heavy traffic, sewage, and fish wastes.

Shoreland Features

The shorelands are heavily developed within the port area with moorage and service facilities, boat repair and storage, commercial activities and offices. On either side of the port are residences. The town park is located at the base of Yellow Bluff. There is little bird and wildlife value due to the developed nature of the area. Adjacent areas have moderate habitat value for small animals. Soils in the port area consist entirely of fill material.

Human Use

Existing land and water uses are dominated by the Port of Ilwaco. Activities include moorage (1,000 berths), commercial and industrial operations, offices, and boating. On either side of the port, there are residential uses of the shorelands. Aquatic areas are undeveloped.

There is a mixture of tideland ownership, including the Port of Ilwaco, State of Washington, and private individuals. Shorelands are either port or privately owned.

Town of Ilwaco zoning in this area consists of a commercial zone (the port area) and a residential zone to the southwest and east. The shoreline management designation is Urban, except for the water area east of the port, which is Conservancy.

Issues and Findings

The Port of Ilwaco has significant potential for expansion. The CREST Marina Study (1978) found substantial unfilled demand for both recreational and commercial fishing vessel moorage. The new 200 mile economic zone has stimulated additional demand for moorages for larger commercial fishing vessels. The Port of Ilwaco is ideally situated, close to the mouth of the river, to accommodate this demand.

The existing channel into the Port of Ilwaco is 10 feet deep and 150 feet wide and follows a meandering course. Under certain conditions it is navigationally difficult, especially for larger vessels. Groundings are common. The Port of Ilwaco has applied to the U.S. Army Corps of Engineers to study channel improvements under Section 107 of the Rivers and Harbors Act.

Although the nature and extent of the navigational access problems in Baker Bay have received careful attention during the CREST planning process, the scientific research and engineering studies necessary to solve these problems are beyond the scope of this plan. Accordingly, this plan provides for the future resolution of these problems without determining the exact measures which may be necessary. The relevant maps which are a part of this plan include dashed lines which indicate possible future channel realignments. The exact locations and sizes of those channels should be determined as a result of the necessary studies and cooperation among the various interested parties.

Aquatic Designations

The navigational access channel and areas of possible approved future realignment of that channel are designated ***Development.*** The aquatic area fronting the Port of Ilwaco between the Port's property lines and out to the state line is designated ***Development.*** The tidal marshes on the east side of this subarea are ***Natural,*** except for a 50 foot ***Conservation*** buffer along the shoreline and along the edge of the ***Development*** area at the Port.

Shoreland Designations

The shoreland area is designated ***Development,*** except for the fill land at the Port of Ilwaco, which is ***Water Dependent Development.***

Subarea Policies

1. Port of Ilwaco and its entrance channel expansion should be done so as to minimize damage to the aquatic productivity, maintain water quality and flushing, and avoid aggravating the shoaling problem of the Bay. Before any further aquatic areas are filled, existing land areas should be fully utilized and economically feasible upland alternatives exhausted. Dry boat moorage should be considered as an alternative to basin expansion.

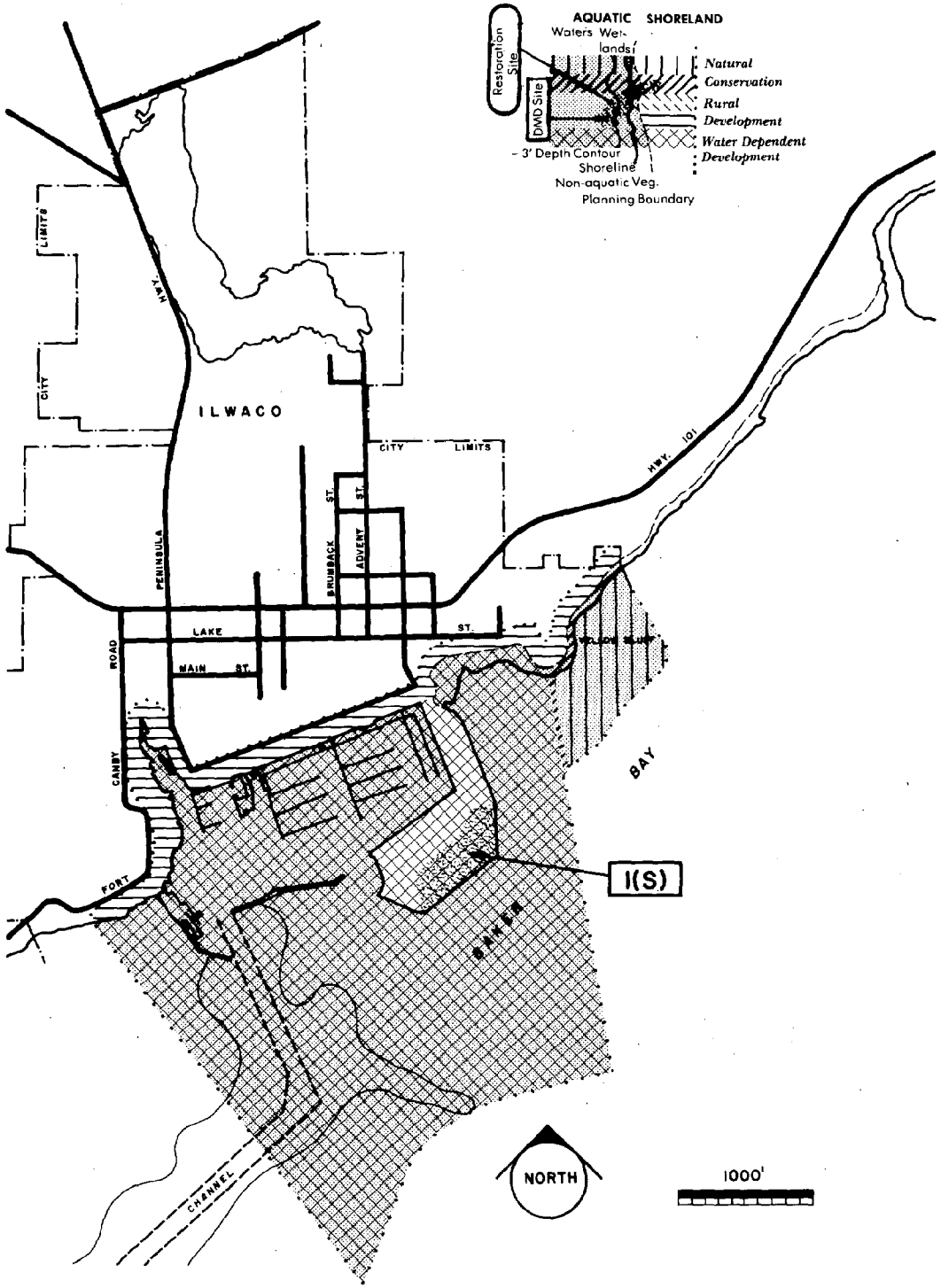
2. Unless a suitable upland disposal site can be found, the port should consider maintaining a stockpile site so that material from the mooring basin and inner channel can be rehandled.

3. The ***Development Aquatic*** designations which are provided to accommodate potential future expansion of the Port do not automatically create the presumption that dredging, filling or other alternations will automatically result. Specific proposals for Port expansion must be justified in terms of available alternatives, water quality impacts and economic benefits, and must meet other requirements of the permit process.

4. This plan recognizes and suggests remedies for the navigational access problems in Baker Bay. Local governmental bodies, relevant agencies and interested parties shall continue to pursue the resolution of those problems. Approved channel realignments and/or improvements shall be permitted notwithstanding the environmental designations of this plan.

Dredged Material Disposal

There is one dredged material disposal site in this subarea [1(S)], located at the Port of Ilwaco on fill land. The site is used as a stockpile for basin and entrance channel maintenance material. (cf Dredged Material Management, 56.40, 59.50.)



45.08 FORT CANBY NORTH

General Description

This subarea includes the shorelands from the northern boundary of the state park boat launch ramp to the Ilwaco city limits. The in-water boundary is the western edge of the entrance channel. Jurisdiction is by Pacific County.

Aquatic Features

Fish support values in this subarea are probably high, though data are lacking. Primary production is high along the shoreline marshes, while secondary production is high in the flats. Extensive sedge and bulrush marshes have developed in the smaller embayments in this subarea and have been intensively studied. Water depths are extremely shallow between the marshes and the channel. The physical and biological processes of Baker Bay have been discussed under 45.05.

Shoreland Features

Shorelands include forested areas inland to the limit of Shoreline Management jurisdiction. Bird and wildlife values are high and include deer and smaller furbearers. Soils in this area are Yaquina and Zenker associations, and slopes are moderate to steep. Some very old forest exists along the shoreline, predominantly Sitka spruce.

Human Use

Existing land and water uses include boating, fishing, and housing. Adjacent uses include forest management, park development, Coast Guard residences and operations, and the developed area in Ilwaco. Tidelands are owned by the Department of Natural Resources or State Parks. The shorelands are owned by the state and federal governments.

Aquatic Designations

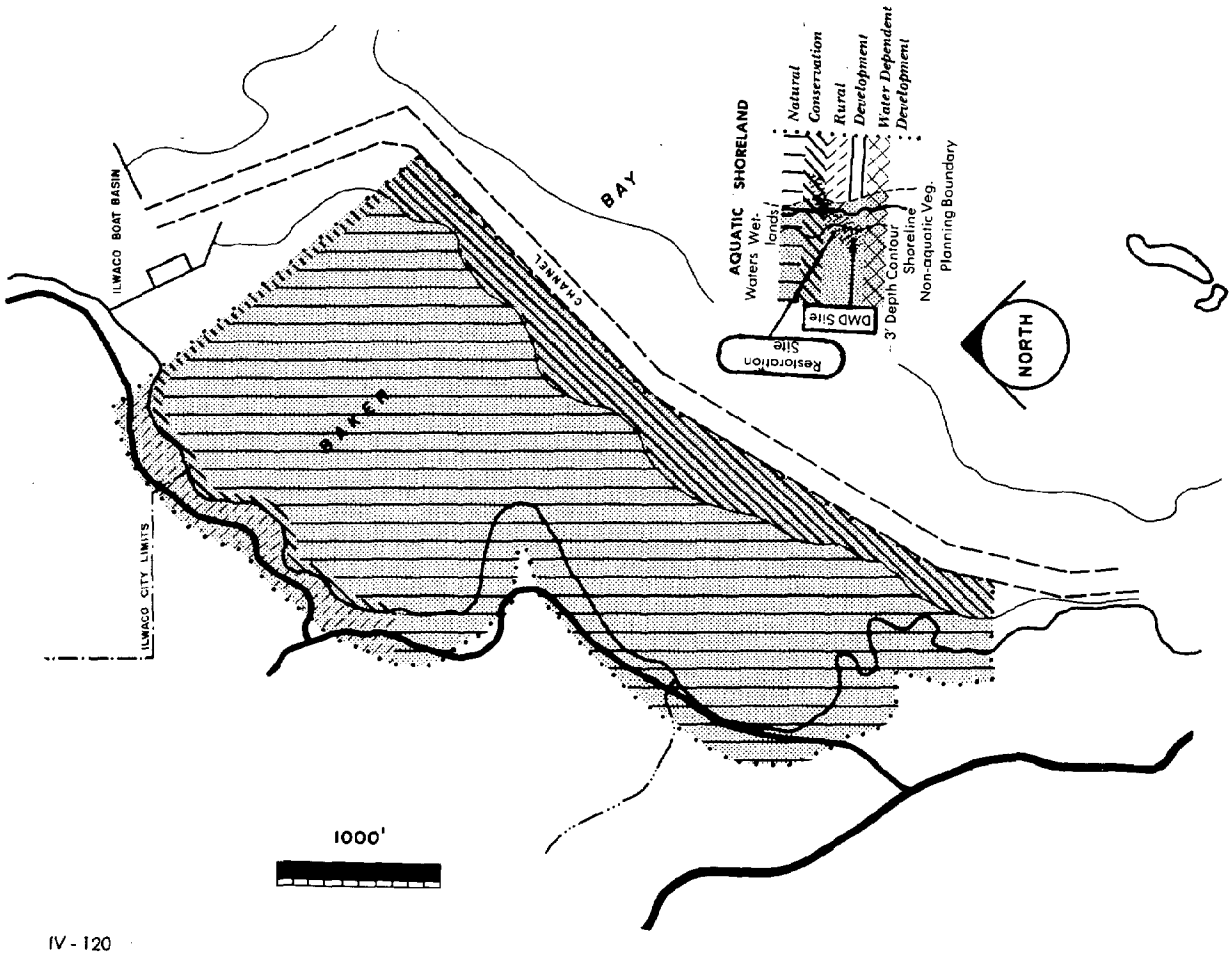
Wetland areas, including marshes and tidal flats, are designated ***Natural***, with a 50 foot ***Conservation*** buffer abutting the shore, in areas where the shore is privately owned, and adjacent to the ***Development*** area in the adjacent Ilwaco subarea. Water areas up to the edge of the channel are ***Conservation***.

Shoreland Designations

The shoreland designations in this area are ***Natural*** in the undeveloped portion of the state park north of the boat launch ramp; and ***Rural*** north to the city limits of Ilwaco.

Subarea Policy

The existing loop trail should be extended along the shoreline to the Town of Ilwaco.



45.09 CAPE DISAPPOINTMENT

General Description

This subarea extends from the tip of the North Jetty, east to the western side of the entrance channel. The shoreland area, all of which is in Fort Canby State Park or the Coast Guard Base, includes 200 feet of Benson Beach north of the jetty, all of Cape Disappointment, the accreted lands to the east of Jetty A, and the shorelands of Baker Bay north to the northern boundary of the state park boat launch. Aquatic areas include portions of Baker Bay west of the navigation channel between Jetty A and the northern boundary of the subarea; the waters between Jetty A and the North Jetty in the main Columbia River; minor sloughs and wetlands behind the North Jetty. Jurisdiction is by Pacific County.

Aquatic Features

Plankton populations, benthic production and fish support values are high, both in Baker Bay and in the Columbia River portions of the subarea. Recreational and commercial crabbing is popular south and west of Cape Disappointment; recreational fishing is popular off the North Jetty.

Water depth ranges from tidal flats east of Jetty A to more than 60 feet off the tip of Jetty A. The Columbia River side of this subarea is extremely dynamic; currents are strong, wave action is significant, sediments are coarse, and the water is deep. This area is adjacent to the main entrance channel and small boats sometimes run along the North Jetty for protection. The Baker Bay side of the channel is much less dynamic, being protected by Jetty A and Cape Disappointment. Sediments become progressively finer to the north along the channel, though they are still largely sand in this subarea. There is a severe shoaling problem in the outer part of the Baker Bay West Channel, just inside Jetty A. The Baker Bay parts of this subarea are further described under 45.05.

Shoreland Features

Shorelands include beach areas (Benson Beach), the rocky promontories of Cape Disappointment, and accreted land east of Jetty A. Wildlife value is high in the state park area for deer and smaller fur-bearing animals. On the cliffs, gulls, pelagic cormosants and other marine birds predominate. Soil associations include dune land (north of North Jetty and east of Jetty A) and Umbric Dyetrochrepts (on Cape Disappointment). There is a potential flooding and erosion hazard on the dune land. Uplands are steep and rocky.

Human Use

This subarea is entirely in public ownership. The State of Washington owns the state park and the federal government owns Cape Disappointment. Existing land and water uses include fishing, boating, shipping, state park recreational activities, and a Coast Guard rescue facility which includes both operations and housing.

Issues and Findings

The Coast Guard has indicated that it is considering expanding its dock facility at its present location. This project may involve limited filling and placement of piling. Other potential developments would depend on future plans in the state park. Provision has been made for expansion of parking facilities at the North Jetty.

Aquatic Designations

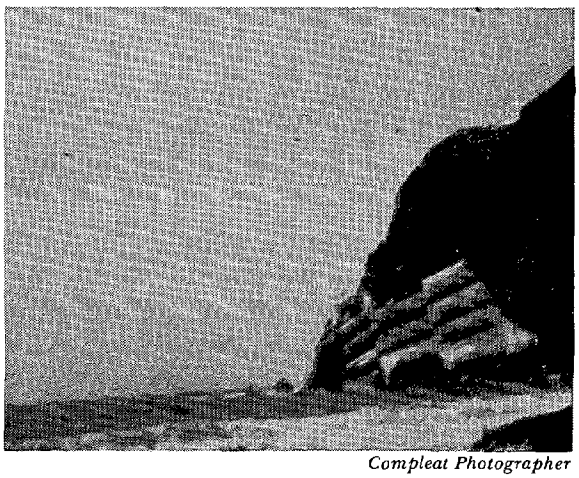
The rocky intertidal areas of Cape Disappointment have been classified ***Natural***, the Coast Guard pier and waters between the shore and channel and within 50 feet on either side of the Coast Guard pier have been classified ***Development*** to provide for maintenance and improvement of the present facilities, and all other aquatic areas have been classified ***Conservation.***

Shoreland Designations

The North Jetty, Jetty A, the developed parts of the Coast Guard base, the Cape Disappointment lighthouse, the Lewis and Clark Interpretive Center, the boat launch, and the state park concession stands are designated ***Development.*** The outermost state park parking lot is designated ***Conservation*** and should not be expanded. The second parking lot is designated ***Development*** with an expanded area to accommodate future demand. Designated ***Conservation*** are the low-lying areas east of the headland and Jetty A, the lands north of the North Jetty, the other low-lying undeveloped parts of Fort Canby State Park, and the 50 foot buffer strips surrounding ***Development*** areas. Other state and federally owned land at Cape Disappointment, including the rocky bluffs on the south and east, and the old growth forested areas are designated ***Natural.***

Dredged Material Disposal

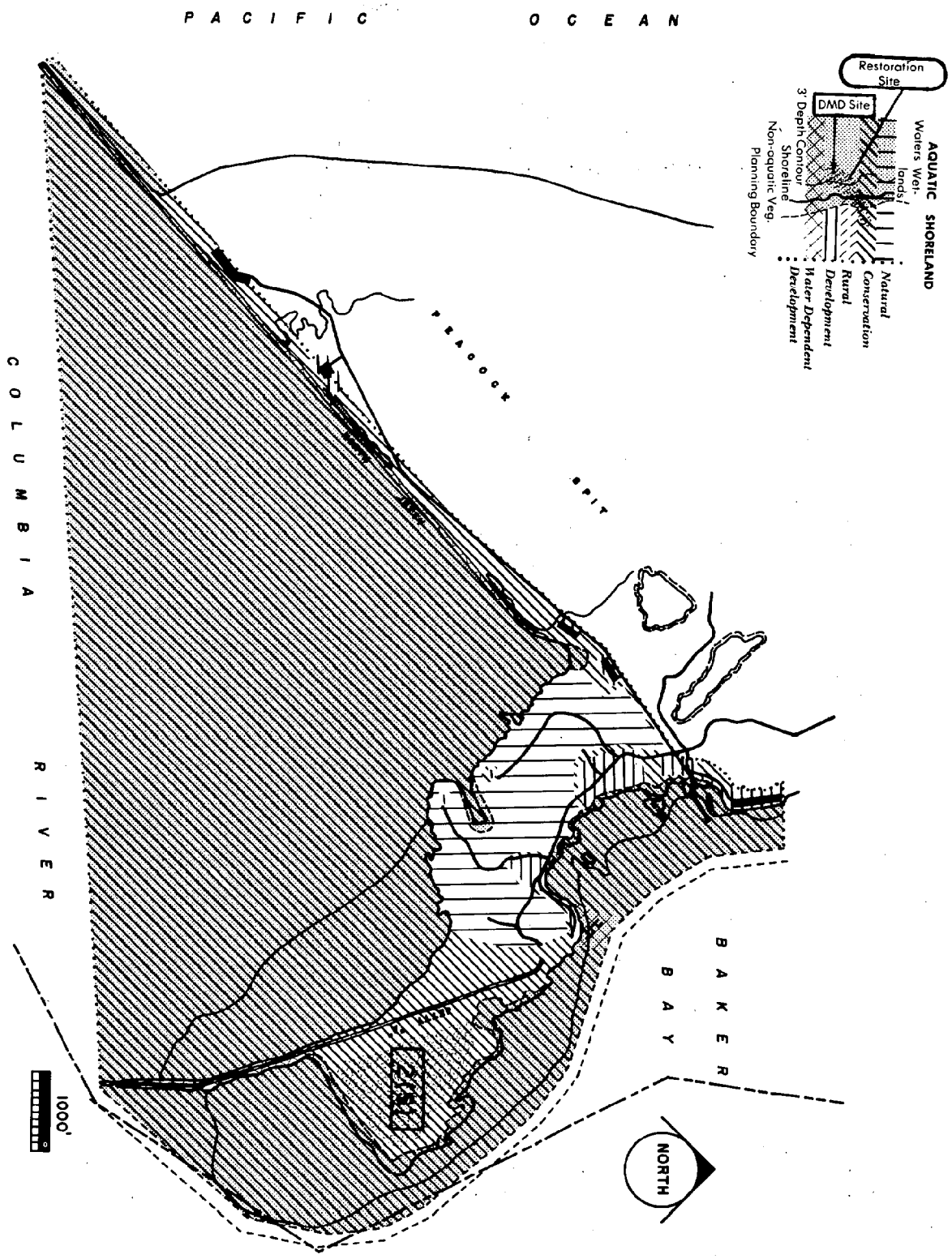
There is one dredged material disposal site in this subarea, east of Jetty A, south of Cape Disappointment [2(S)]. The site could be used to deposit material from maintenance dredging of the Ilwaco Channel or expansion or relocation of the channel. (cf Dredged Material Management, 56.10, 59.50.)



Compleat Photographer

CAPE DISAPPOINTMENT

SUBAREA 45.09



PART V

DREDGED MATERIAL MANAGEMENT PLAN

50. SUMMARY AND PLAN DEVELOPMENT ..... V - 2

51. POLICIES AND STANDARDS ..... V - 3

52. DREDGING TECHNOLOGY AND COSTS ..... V - 7

53. DREDGING DISPOSAL OPTIONS ..... V - 9

54. IMPLEMENTATION AND SHORELAND DMD SITE MANAGEMENT ..... V - 12

55. ESTUARY-WIDE PROJECTS ..... V - 14
55.10 Corps of Engineers Projects ..... V - 14
55.11 Columbia River at the Mouth ..... V - 14
55.12 Lower Columbia River Estuary ..... V - 14
55.13 Upper Columbia River Estuary ..... V - 15
55.20 Private Projects ..... V - 17

56. BAKER BAY PROJECTS ..... V - 17
56.10 Baker Bay West Channel ..... V - 17
56.20 Chinook Channel ..... V - 18
56.30 Future Projects ..... V - 19
56.40 Port of Ilwaco ..... V - 19
56.50 Port of Chinook ..... V - 20

57. YOUNGS BAY - ASTORIA PROJECTS ..... V - 21
57.10 Hammond Channel ..... V - 21
57.20 Hammond Boat Basin ..... V - 21
57.30 Tansy Point ..... V - 22
57.40 Skipanon Channel ..... V - 22
57.50 Warrenton ..... V - 22
57.60 Youngs Bay and River ..... V - 24
57.70 Astoria Turning Basin ..... V - 24
57.80 Port of Astoria ..... V - 24
57.90 Tongue Point ..... V - 25

58. UPPER ESTUARY PROJECTS ..... V - 26
58.10 Grays Bay ..... V - 26
58.20 Skomokawa ..... V - 27
58.30 Price Island ..... V - 28
58.40 Cathlamet ..... V - 28
58.50 Puget Island ..... V - 28
58.60 Bradwood ..... V - 29
58.70 Wauna-Westport ..... V - 29

59. DREDGED MATERIAL DISPOSAL SITES ..... V - 30
59.10 Ocean Sites ..... V - 30
59.20 Estuary Sites ..... V - 30
59.30 Flow-Lane Sites ..... V - 31
59.40 Beach Nourishment Sites ..... V - 31
59.50 Shoreland Sites ..... V - 33

50. SUMMARY AND PLAN DEVELOPMENT

Purpose

More material is dredged from the Columbia River estuary than can be used constructively and shoreland disposal sites will be exhausted or developed during the next twenty years. All dredging occurs within certain economic and environmental constraints. Suitable disposal options are needed for both new project and maintenance dredging, and placement of dredged material on a site should be compatible with its proposed final use.

The *Dredged Material Management Plan* consists of three major parts. Section 51 consists of dredging, disposal and site selection policies and standards, section 52 describes dredging technology and costs, section 53 describes disposal options, and section 54 discusses implementation. The plan describes the major dredging projects in the Columbia River estuary with an analysis of disposal options (55-58). Finally, section 59 lists designated dredged material disposal (DMD) sites. Project and DMD site descriptions are cross-referenced with each other and with the *Land and Water Use Plan* (Part IV).

The objectives of the *Dredged Material Management Plan* are to:

- Provide policies and standards for dredging and dredged material disposal that will minimize damage to wetlands and other estuarine resources;
- Describe environmentally, technically and economically acceptable disposal sites for expected dredging during the next twenty years; and
- Coordinate dredged material disposal use with other uses designated in the *Columbia River Estuary Land and Water Use Plan.*

Critical Issues

Over the twenty-year horizon of this plan, increasing reliance will be placed on ocean disposal of dredged materials. Even within the planning horizon, five areas will have difficulty finding shoreland disposal sites unless regional dredged material management develops resources and cooperation that are now only conceptual.

Of the large private projects, the Brusco work at Cathlamet Channel has shoreland site capacity for eight more years.

Warrenton has adequate DMD site capacity but use of those sites for Skipanon related dredging, as indicated in this plan, may preclude development because the fine sediments are too unstable.

Tongue Point development has adequate DMD capacity only if nearly half the dredged material can be used as fill during the construction. If the facilities are built largely on pilings, four million cubic yards disposal capacity will need to be found.

Disposal sites for Grays Bay projects are all priority two and have nearly half a million cubic yards capacity less than will be required.

Projects at Skamokowa Creek, Brooks Slough and Steamboat Slough use the same shoreland site and will exceed its capacity by eighty six percent, though this situation is mitigated somewhat by beach nourishment options for the Brooks Slough work.

The *Dredged Material Management Plan* meets these issues through its implementation process: Shoreland DMD site use should be coordinated to facilitate development and provide for sediments that cannot be disposed of in-water.

Plan Development

Development of the *Dredged Material Management Plan* involved two distinct phases: dredging and dredged material disposal (DMD) policies and standards; and dredged material disposal site selection.

Dredging and disposal practices were developed from existing state and federal regulations as they relate to the Columbia River estuary area. The dredging and disposal policies and standards allow for maintenance, improvement and establishment of navigation channels and water dependent development while protecting wetlands and other important estuarine natural resources. These practices are coordinated with the *Columbia River Estuary Land and Water Use Plan* (cf. Part IV) so that dredging and disposal operations are consistent with existing and projected development.

Draft policies and standards were developed by a technical subcommittee involved in planning for the Lower River and Islands area. This committee, composed of representatives from state and federal natural resource agencies, the Corps of Engineers, local ports and other dredging interests, participated in workshops on February 1-2, 1978 and May 2-3, 1978, and published draft policies in the Lower River and Islands Plan. The plan was published for review and comment in July, 1978 and based on comments, was revised and placed in a different format.

For dredged material disposal sites, the first consideration was to identify all possible in-water and reusable sites. Whether the site is flowlane, beach nourishment, or ocean disposal, the major issues are environmental and technical: Will the site allow for disposal of dredged material without adverse consequences? Next, shoreland sites were identified, and it was soon apparent that sites that would meet environmental and economic standards are not of sufficient capacity to provide for disposal needs over the next 20 years. The major issues with shoreland sites were economic feasibility, environmental damage, compatibility with existing and planned use, ownership and site protection.

The first regional coordination for dredged material disposal had occurred through cooperation between the Corps of Engineers and state and federal resource agencies and resulted in the DMD sites identified in the Corps' 1975 EIS on the Columbia River 40 Foot Channel. An April 1977 CREST workshop evaluated potential DMD areas and restoration/mitigation areas and the results were published in the CREST *Columbia River Estuary Inventory*. The most important result of this

workshop was the development of environmental, economic and engineering criteria for site selection.

The Lower River and Islands Technical Committee began initial site selection work for the main ship channel in 1978. In November, 1978, the Committee conducted a workshop and did field evaluation of some potential DMD sites in the Youngs Bay-Astoria area. Washington sites were reviewed at a March, 1979 workshop, where a refined list of Oregon sites was also presented. The Draft Dredged Material Management Plan was released for agency and public review on May 1, 1979 and another technical committee workshop was held on that date.

The final Draft DMMP was prepared from the May 1979 TAC workshop. This draft was mailed to all individuals, local officials, and state and federal agency representatives who had participated or expressed an interest in the planning process. All affected property owners were notified by mail. After comments had been evaluated and appropriate changes made, the CREST Council formally adopted the Draft DMMP in June, 1979.

51. POLICIES AND STANDARDS

51.10 Dredging and Dredged Material Disposal Policies

Dredging and dredged material disposal are activities of estuary-wide significance that may involve several planning jurisdictions, are necessary for the economic health of the region, and can have major impacts on the estuarine environment.

51.11 Dredging should be for the purpose of maintaining, improving and establishing navigation channels and access to water dependent facilities. Dredging and dredged material disposal should disturb the minimum area necessary for the project and should be conducted so as to protect or enhance wetlands and other estuarine resources.

51.12 Loss of productive habitat and other environmental damage should be minimized by the location, design and construction of both facilities requiring dredging and sites for dredged material disposal. Disposal of dredged materials shall be at an approved site where the biological productivity and physical characteristics are appropriate to receive the material. Dredged materials shall not be placed in productive habitat unless part of an approved development project. Shoreland disposal should enhance or be compatible with the final use of the land. Except for flow-lane disposal and beach nourishment, in-water disposal inside the estuary may be substituted for ocean disposal only when sea or weather conditions pose a hazard to the dredging vessel.

51.13 Adverse hydraulic effects from dredging and disposal, such as over-channelization, destabilization of fine-textured sediments, erosion, siltation, increased flood hazard, and undesirable circulation changes, shall be avoided.

51.14 The timing of dredging and disposal operations shall be coordinated with state and federal resource agencies, local governments, and private interests to protect marine productivity, minimize interference with fishing, and insure proper flushing.

51.15 The effects of both initial and subsequent maintenance dredging shall be considered prior to approval of new dredging projects. New projects should not be approved unless adequate disposal sites are available for both the initial and any future maintenance dredging.

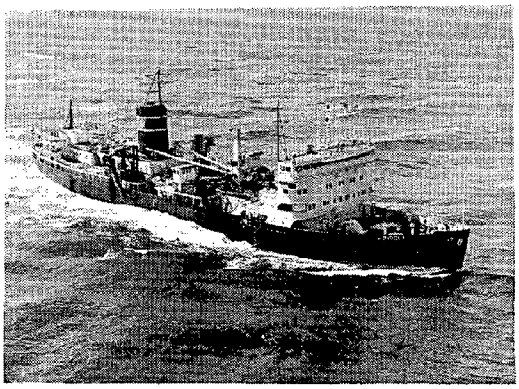
51.16* Dredging as a source of material may be permitted if no alternative source is feasible and the dredging site is of low biological productivity or for dike maintenance if no alternative source is available and environmental damage is minimized.

* Oregon LCDC Coastal Shorelands Goal 17 exception required (cf Appendix B)

51.20 Dredged Material Disposal Site Selection Policies

More material is dredged from the Columbia River estuary than can be used constructively, shorelines have been altered and new land areas have been created by deposition of dredged materials, and the shoreland capacity for dredged material disposal will be exhausted in the next twenty years. Identification of dredged material disposal sites is an estuary-wide concern.

51.21 Dredged material disposal sites should be designated for their final use with a ***Development*** overlay for disposal use and should be managed for the benefit of the final use, the public, and the estuarine environment.



Official Corps of Engineers Photo

51.22 Shoreland disposal sites should be selected for the conformity of the final use, after deposition of dredged materials, to the comprehensive plan or shoreline management plan.

Emphasis should be placed on sites where:

- Materials may be stockpiled for future use;
- The land use designation is already ***Development;***
- Materials will help restore degraded habitat;
- The final development or recreational use will benefit from deposition of dredged materials; or
- toxic or polluted materials will present minimal health and environmental hazards.

Sites with significant agricultural, habitat, scenic, recreational, archaeological, or historical values and sites where the present intensity or type of use is inconsistent with dredged material disposal should be avoided.

Engineering factors to be considered in site selection should include: size and capacity of the site; dredging method; distance from dredging operations; elevation; and the costs of site acquisition, preparation and revegetation.

51.23 Approved shoreland disposal sites should be given either a high, medium, or low priority on the basis of site suitability as specified in 24.22 above. High priority sites should not be developed until their use for dredged material disposal is completed. Development of medium priority sites may be delayed if use of the site for dredged material disposal can occur within an acceptable period and such use prior to development is in the public interest. Low priority sites may be used for dredged material disposal, but will not be reserved for that use.

51.24 In-water disposal sites should be chosen on the basis of low benthic productivity and the low degree of adverse hydraulic effects from the use. Long-term use of disposal sites within the estuary should be permitted only when no alternative exists and the bio-physical impacts are minimal.

51.25 Flow-lane disposal sites should be shown able to transport sediment downstream without excessive shoaling, interference with commercial or sports fishing, undesirable hydraulic effects, or adverse effects on benthic productivity.

51.26 Beach nourishment sites should be selected to offset the effects of active erosion, but should not be used to create new beach or land areas.



- National Fisherman

51.30 Dredging Standards

The removal of sediment or other material from a stream, river, estuary or other aquatic area for the purpose of deepening a navigation channel, mooring basin or other navigational areas, or obtaining fill material.

AREA	STANDARDS
New Projects:	
Conservation Aquatic (C)	51.3001 - 51.3010, 51.3013
Rural Aquatic (C-OR) (PS-WA)	51.3001 - 51.3010, 51.3013
Development Aquatic (PS)	51.3001 - 51.3010
Maintenance of Projects:	
Natural Aquatic (C)	51.3001 - 51.3012
Conservation Aquatic (C)	51.3001 - 51.3012
Rural Aquatic (PS)	51.3001 - 51.3012
Development Aquatic (PS)	51.3001 - 51.3012
Obtaining Fill Material:	
Conservation Aquatic (C)	51.3001 - 51.3012
Rural Aquatic (C)	51.3001 - 51.3012
Development Aquatic (PS)	51.3001 - 51.3012

51.3001 Dredging in aquatic areas shall be permitted only:

(1) For navigation or navigational access; or

(2) In conjunction with a permitted or conditionally permitted water dependent use of waters or adjacent shorelands for which there is a demonstrated public need and for which no feasible alternative exists; or

(3) As part of an approved restoration project; or

(4) As a source of material, as per standard 51.3008 below, or for mining or mineral extraction, as provided in the Mining and Mineral Extraction standards (33.12); or

(5) For dike maintenance, as provided in 33.2102, 51.3011, and 51.3012.

(6) In conjunction with a permitted or conditionally permitted bridge (33.07), for which there is a public need and no other feasible sites or routes exist.

51.3002 When dredging is permitted, the dredging shall be the minimum necessary to accomplish the proposed use.

51.3003 Erosion, sedimentation, increased flood hazard and other undesirable changes in circulation shall be avoided in dredging and the disposal of dredged material. Tidal marshes, tidal flats and other wetlands should not be adversely affected. The applicant may be required to demonstrate the absence of adverse effects by correlation of field data and mathematical models or the Corps of Engineers' model.

51.3004 Bottom sediments and pore water in the dredging and disposal areas shall be adequately characterized by the applicant before the operation begins. Information that may be required includes, as appropriate: particle size distribution, organic content, nutrients, sulfides, oxygen and heavy

metals, benthic studies or other tests. This requirement may be waived for clean Columbia River sands and gravels.

51.3005 The timing of dredging and disposal shall be coordinated with state and federal resource agencies, local governments and private interests to ensure adequate protection of biological productivity (fish runs, spawning, benthic productivity, wildlife, etc.) and to minimize interference with fishing activities. In general, disposal should occur during periods of adequate river flow to aid flushing of suspended sediments and downstream transport of dredged material reaching the bottom.

51.3006 Adverse short-term effects of dredging and disposal such as turbidity, release of nutrients, heavy metals, sulfides, organic material or toxic substances, dissolved oxygen depletion, disruption of the food chain, loss of benthic productivity, and disturbance of fish runs and important localized biological communities shall be minimized.

51.3007 All relevant state and federal water quality standards shall be met by dredging and dredged material disposal activities.

51.3008* Dredging as a source of material for fill or construction should not occur in productive, shallow sub-tidal areas, tidal flats, or tidal marshes. When dredging as a source of material is necessary, because feasible upland sources of material are absent, dredging should occur in areas of sandy bottom sediments, where biological productivity is low and unwanted shoaling has occurred.

51.3009 Destabilization of fine-textured sediments, erosion and siltation in areas adjacent to the dredging project and other undesirable changes in circulation patterns, such as a substantial reduction of flushing time, shall be avoided.

51.3010 In the evaluation of any dredging project during the permit process, the adverse effects of both the initial dredging and subsequent maintenance dredging must be considered.

51.3011* In all aquatic areas, minor dredging may be permitted to the minimal extent necessary to open drainage channels from tide boxes out to deeper water.

51.3012* In all aquatic areas, dredging of shallow biologically productive areas adjacent to dikes as a source of material for dike maintenance may be allowed upon the applicant's demonstration that:

(1) Alternative sources of material are not available or are not economically feasible; and

(2) The dredging method selected will not leave potholes where juvenile salmon and other fish might be stranded at low water; and

(3) Other disruption of tidal flats and tidal marshes is minimized.

51.3013 New navigation project dredging in ***Conservation*** and ***Rural Aquatic*** areas may be allowed only for minor navigational improvements and limited to shallow draft. Such dredging shall not result in major alteration to the estuarine ecosystem.

* Oregon Land Conservation and Development Commission Estuarine Resources Goal 16 Exceptions required (cf Appendix B)

51.40 Dredged Material Disposal Standards

The deposition of dredged material in aquatic areas or shorelands. Methods include land disposal, in water disposal, in water disposal to create land, beach nourishment, flow-lane disposal, ocean disposal, and other in water disposal.

In-water disposal is the deposition of dredged material in a body of water.

Flow-lane disposal is the in water deposition of dredged material in or adjacent to the maintained navigation channel and within the natural channel or the slopes adjacent to the natural channel. The purpose is to avoid permanent deposition and allow the material to continue downstream.

Ocean disposal is the deposition of dredged material in the ocean.

Land disposal is the deposition of dredged material on land.

Beach nourishment is the deposition of dredged material in shoreline areas where active erosion is occurring, as a way of preventing further erosion of the bankline. It is not a way of creating new land or beaches where beaches have not previously existed.

AREA	STANDARDS
Conservation Aquatic (C)	51.4001 - 51.4008
Rural Aquatic (C)	51.4001 - 51.4006, 51.4008
Development Aquatic (PS)	51.4001 - 51.4006, 51.4008
Conservation Shorelands (C)	51.4001 - 51.4002, 51.4007 - 51.4012
Rural Shorelands (PS)	51.4001 - 51.4002, 51.4007 - 51.4012
Development Shorelands (PS)	51.4001 - 51.4002, 51.4007 - 51.4012
Water Dependent Development Shorelands (PS)	51.4001 - 51.4002, 51.4007 - 51.4012

51.4001 Selection of dredged material disposal sites shall be in accord with the Dredged Material Disposal Plan, Site Selection and Use Priorities, 53.

51.4002 Standards 51.4002 - 51.4007, Dredging, apply.

51.4003 With regard to in-water disposal in the river, estuary and ocean:

(1) Consideration shall be given to the need for the proposed disposal, the availability and desirability of alternate sites and methods of disposal that might be less damaging to the environment. No site should be used if insufficient sediment type and benthic population data are available to provide a general idea of the biological value of the site.

(2) The size and chemical characteristics of the dredged material should be compared with those of the disposal site, and consideration should be given to matching the dredged material to the capabilities of the site.

(3) In-water disposal requires either a water quality certification or a short-term exemption. Dredged

material disposal shall not be permitted in the vicinity of a public water supply intake.

51.4004 Flow-lane disposal shall be conducted so that:

(1) The material is not deposited upstream from the dredging site. Disposal should not occur under fresh water flow and tidal conditions where the predominant sediment transport at a site is upriver.

(2) Use of the disposal site does not interfere with fishing activities by causing major changes in the circulation patterns or bottom configurations of the disposal site.

51.4005 Ocean disposal shall be conducted so that:

(1) The amount of material deposited at a site is compatible with the benthic populations and other uses of the area.

(2) Interference with sport and commercial fishing is minimized.

(3) Disposal is strictly confined to the designated disposal sites.

51.4006 Except for flow-lane disposal and beach nourishment, deposition inside the estuary should be substituted for ocean disposal only when sea or weather conditions are a hazard to safe navigation for the dredging vessel.

51.4007 In ***Conservation Aquatic*** areas, only sites designated in the Dredged Material Management Plan may be used for disposal.

51.4008 Beach nourishment shall be conducted so that:

(1) Erosion or deposition downstream from the disposal site does not occur. Particular care must be taken that erosion of the dredged material does not smother marsh or other shallow productive areas.

(2) The volume and frequency of dredged material disposal is such as to maintain a stable beach profile, as nearly as possible. Dredged material shall be graded at a uniform slope and contoured to reduce cove and peninsula formation, to minimize juvenile fish stranding.

51.4009 For land disposal:

(1) Proper diversion of surface discharge must be provided to maintain the integrity of the natural streams, wetlands and drainageways. Leaching of disposal runoff into the waterway must be controlled and all disposal runoff water must enter the waterway through an outfall at a location that minimizes circulation and flushing. Underground springs and aquifers must be identified and protected.

(2) Dikes shall be well constructed and large enough to encourage proper "ponding" and to prevent the return of solids into the waterway or estuary. Ponds should be designed to maintain at least one foot of standing water at all times to further encourage proper settling. Weirs should have proper crest heights.

51.4010 Disposal should be compatible with the intended land surface use after disposal. Disposal of dredged material should occur on the smallest possible land area consistent with Standard 33.2312 below, in order to minimize the quantity of land that is disturbed. Clearing of land should occur in stages only as needed. Reuse of existing disposal sites is preferred to the creation of new sites in order to minimize the total land area covered by disposal material. It may, however, be desirable to clear and fill an entire site at one time, if the site will be used for development immediately after filling.

51.4011 Where appropriate, revegetation of land disposal sites should occur as soon as possible, in order to retard wind erosion and to restore wildlife habitat value of the site. Native species should be used; the Soil Conservation Service (SCS) and the SCS Inter-Agency Seeding Manual should be consulted. Efforts should be made to minimize the time necessary to achieve leaching of salts from the soils. Revegetation of areas that will be reused is strongly encouraged, to help prevent erosion before reuse.

51.4012 Height and Slope requirements: The final height and slope after each use of a land dredged material site should be such that:

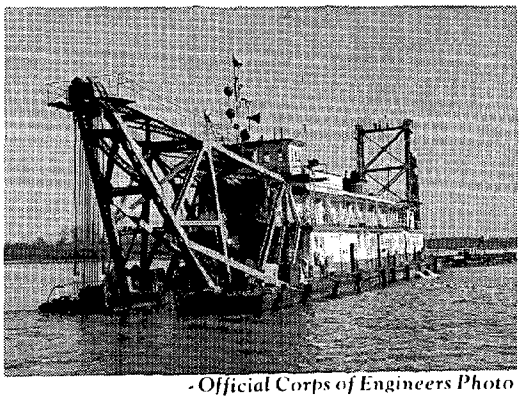
(1) The site does not enlarge itself by sluffing and erosion at the expense of adjacent aquatic areas.

(2) Loss of material from the site during storms and freshets is minimized.

(3) Interference with the view from nearby residences, scenic viewpoints and parks is avoided.

52. DREDGING TECHNOLOGY AND COSTS

Dredges available in the Pacific Northwest today include pipeline dredges, seagoing hopper dredges, clamshell and barge, or land based equipment such as drag line and back hoe. Pipeline and hopper dredges are commonly used by the U.S. Army Corps of Engineers. Clamshell and barge equipment is commonly involved in port and private dredging jobs; their design is not specific to the dredging industry. Consideration for use of land based equipment and subsequent job costs can best be achieved through individual discussions with local contractor representatives that own and operate that equipment. The discussion of relative costs for pipeline, hopper and clamshell dredging does not include the cost of disposal site preparation.

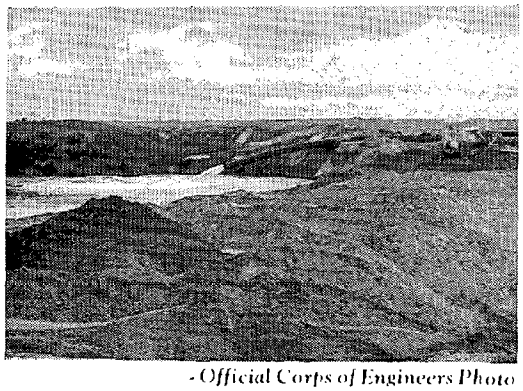


- *Official Corps of Engineers Photo*

Pipeline Dredges

Pipeline dredging plans have been developed specifically for dredging of bed sediments from the nation's waterways. Pipeline dredges usually consist of a large centrifugal pump mounted on a non-propelled, specially designed barge. Bottom materials are pumped up through a large diameter suction pipe to the barge, and then on to the disposal area through a pipeline network. The end of the suction pipe is equipped with a revolving cutter-head that breaks up the bottom material for easier transport. The suction pipe with cutter-head is lowered to the desired depth by a large hinged ladder controlled by cables, that extend forward from the bow of the barge. The cutter-head is turned by a shaft that extends down the ladder and is powered by a motor on the barge. The pipeline network is floated on pontoons, extending as far as 4,000 feet to the disposal site. Greater distances can be attained through the use of booster pumps.

Pipeline dredges are towed to the dredge site, and the pipeline is assembled. During operation, the dredge is held in position by anchors, swing lines, and spuds. Spuds are long, steel shafts that pass through openings in the barge and can be raised and lowered independently. When the barge is in position, the spuds are dropped and anchors are placed on each side. Swing lines attached to the anchors can then be tightened or loosened to swing the bow and cutter-head back and forth in a small arc. During dredging, only one spud is placed at a time, thus allowing the dredge to move forward, as it swings back and forth. Dredging can be almost continuous, except for changes in anchor positions and addition of pipeline sections.



- *Official Corps of Engineers Photo*

The major limitation of the pipeline dredge is that disposal areas must be relatively close to the dredging operations. The main advantage is the large volume of material that can be dredged in a short period of time.

The Corps of Engineers currently operates only one pipeline dredge in the estuary, the *Oregon*. This dredge can move 2,000 to 3,000 cubic yards of material an hour. It has a maximum dredging depth of 85 feet and a minimum dredging depth of 12 feet. There are also commercial pipeline dredges available in the region.

Pipeline dredges are typically classified by the diameter of their discharge pipeline. Dredges available in the Pacific Northwest range from a minimum size of 8 inches to a maximum of 30 inches. Pumping distance and production capability of the pipeline dredges is directly related to pipeline diameter; larger diameter yields greater discharge distances and higher production capability.

Production Capabilities

The effects of pipeline size, length and dredge horsepower prevent consideration of dredge production in the form of a simple multiplication factor. The Corps of Engineers devised a table that lists the production rate for each size dredge for three critical pipe lengths based on pumping free flowing sand (South Atlantic Division Circular 1130-2-1, February 4, 1975). A minor revision to the Corps of Engineer's production rates has been made based on consultant experience.

Dredge Size	Length	CY/ HR	Length	CY/ HR	Length (WITH Booster)	CY/ HR
8"	1500	180	2500	100	3000	150
12"	2500	270	4500	180	7500	240
16"	3500	500	6000	330	10000	445
20"	4000	800	7000	520	11500	780
24"	5000	1200	7500	780	14500	1060
30"	6500	1800	10500	1170	17000	1590

These production rates are modified by the bank factor, material factor, and booster factor when booster pump is required.

The speed of the dredge's advance (fleeting) may control production when the bank or cut height is less than the cutterhead diameter. In general, maintenance dredging activity will have shallow bank heights with a bank factor less than 1.0, while new work activity will have deep bank heights and a bank factor approaching 1.1.

The dredgeability of the material also impacts upon production rate. The production capabilities table (p. V - 7) was based on free flowing Columbia River sands and the factor for sand material is 1.0. Finer sediments are given a value greater than 1.0 and rock or shale materials have a factor less than 1.0.

The operation of an additional pumping plant in the discharge line will create operation problems. These problems tend to decrease production and are in general more severe at the start of a job, then decreasing after a prolonged dredging operation time.

No other production control factors were considered necessary for this analysis. Actual bid estimates, however, should take into account narrow channel design, debris and subsequent pump clearings, changing plan location on job, minor operating repairs, and numerous other factors that would tend to decrease net production time.

Cost Factors for Pipeline Dredging

The dredging industry has made large capital investments in recent years toward technical improvement of dredging equipment and those investments have provided better numerical information on pipeline plant capabilities. The U.S. Army Corps of Engineers has attempted to take advantage of that information to standardize their dredging estimation procedures on a nationwide level. An Engineering Regulation, ER 1110-2-1300, dated February 15, 1978, provides a "cookbook" approach to assist the District offices in preparing government estimates involving pipeline dredging. The following discussion incorporates the Corps approach and provides local factors to improve on the more general nationwide aspect.

This plan will not provide a detailed cost estimate suitable for contract bid purposes, but does provide general data and a relative value to use in comparison of alternate disposal sites and dredging plant. The presentation assumes that a budget cost estimate is necessary, with early project decisions or alternatives still to be made.

The numerical values in the Pipeline Dredging Relative Costs table compares costs for pumping distances and various dredge sizes, assuming other factors are constant. With this table, two or more disposal sites at varied distances from the dredging can be compared. The table also suggests the pumping distance capability of the various sized pipelines.

When the production rates are established for various pipeline lengths, assumptions must be made for the amount of material to be dredged. This table was based on a one time average dredging project quantity ranging from 60,000 cubic yards to 310,000 cubic yards in the Lower Columbia River vicinity. Substantially higher dredging quantities will tend to cause the relative cost factor range of Table 3 to decrease, or in other words to cause all values to approach 1.0.

Mobilization and demobilization of the dredging plant is a major fixed cost that is independent of the quantities to be dredged. Thus, mobilization costs have a greater impact on small projects. It was assumed that the dredge plant would be moved onto the project from Portland, and would not require an ocean tow. The plant rental cost is a function of dredge and attendant plant time required to move the project quantity at the established production rate. Labor cost for the operation of the dredge and attendant plant is a function of the time required to remove the project quantity at the established production rate. There are two types of costs associated with pipeline. One is for the placement of shore pipe and is typically given in dollars per foot. The second is for wear and tear on the pipeline and is given in dollars per cubic yard pumped.

PIPELINE DREDGING RELATIVE COSTS

Dredge Size	Pumping Distance	Relative Cost	
		Maintenance	New Work
8"	1,500	0.765	0.66
	2,500	1.225	0.945
	4,000 w/booster	1.15	0.895
12"	2,500	0.81	0.815
	4,500	1.06	0.99
	7,500 w/booster	1.175	1.035
16"	3,500	1.04	0.91
	6,000	1.355	1.17
	10,000 w/booster	1.465	1.19
20"	4,000	0.955	0.82
	7,000	1.24	1.025
	12,000 w/booster	1.36	1.08
24"	5,000	0.985	0.82
	7,500	1.245	1.00
	14,500 w/booster	1.40	1.08
30"	6,000	0.965	0.785
	10,500	1.205	0.945
	17,000 w/booster	1.41	1.085

Hopper and Clamshell Dredges

Sea-going hopper dredges and clamshell with barge provide an alternative mode to pipeline dredging. At this time there are no privately owned hopper dredges available for private contract dredging work. However, private contractor ownership of hopper dredge plants may occur in the near future.

Present use of hopper dredges and barges suggest that they are not suitable for use with shoreland disposal sites. No pump ashore facilities exist for the west coast hopper dredge fleet. Clamshell equipment could be used to rehandle materials from a barge to an upland site, but this has not been standard due to economics and acceptable alternative dredging methods.

The production rate for clamshell with barge is based on the *Fisher* work at the Astoria Turning Basin, 1976. Production rate for the hopper dredge is based on the *Biddle* values provided in *Study of Maintenance Dredging at Coastal Entrances,* U.S. Army Corps of Engineers, December, 1973. These production rates occur when dredging free flowing Columbia River sands, and must be modified when dredging other types of sediments.

The dredgeability of the material, as with the pipeline dredge, affects production rate. In general, the hopper dredge will not load as well with finer sediments because the overflow will carry fines, that have settling rates slower than sand, out of the hopper. It will take longer for the hopper dredge to load and subsequently will reduce the production rate. A clamshell, however, can overload in fine sediments on each grab and subsequently increase production. Neither clamshell nor hopper dredge is as effective in hardpan or rock.

A hopper dredge equipped with hydraulic pump and trailing dragheads can out-produce a clamshell while at the dredging site. The hopper dredge must leave the dredging site to dispose of its loaded sediments. Thus the total production rate is decreased by the time to and from the disposal site. A clamshell can continue to dredge material into one barge while a second barge is travelling to the disposal site, releasing sediments and returning to the dredge site. A two barge disposal operation where each barge has 2000 cubic yards capacity or greater can have an approximate 200 mile run to the disposal site, and still return before the second barge is filled. For this analysis, an approximate 17 to 18 mile haul is the break-even point on relative costs for hopper dredge versus a clamshell with two 2000 cubic yard disposal barges.

In general, mobilization costs for hopper or clamshell equipment would be less than for a pipeline dredge because less attendant plant is required, and equipment set-up at the site is quicker.

Shoreland disposal sites are possible but require double pumping or rehandling of the sediments. The cycle time for a hopper dredge is increased by the time to pump sediments ashore, plus the time to dock and hook up pump ashore equipment. Haul distance for a clamshell with 2 barge operation is effectively reduced by a factor of 50% and cost for a second clamshell to rehandle material at the disposal site is added.

The relative cost factors for sea-going hopper dredge or clamshell with barge equipment below are directly related to the pipeline dredging costs.

CLAMSHELL AND HOPPER DREDGE RELATIVE COSTS

Type of Dredge	Distance to Disposal Site	Relative Cost
Clamshell	Up to 20 miles	2.02
Hopper Dredge	2 miles	0.77
	10 miles	1.70
	20 miles	2.73

Overdredging

Overdredging takes into consideration the capability of any dredge plant to control its dredge depth. While working on the water surface, a dredge operator in the Lower Columbia Region cannot see the bed surface, and the water surface elevation fluctuates due to tidal and river flow change. When excavation is accomplished by hydraulic pipeline cutterhead with digging spuds in contact with the bed, some control is provided that is not obtainable from a barge mounted clamshell, or a trailing suction hopper dredge. Shore side equipment, such as a Pnuema or Oozer dredge lowered from the dock, has an even better control of actual dredging depth because their work platform is at a fixed elevation. Still, the operator cannot see the bed surface and must rely on remote measurements such as lead line or fathometer sounding to assure all materials have been removed.

Experience suggests that control from dockside equipment is limited to a one foot overdredge elevation; from cutterhead barge with spuds to a two foot overdredge elevation; and for clamshell mounted barges and trailing suction hopper dredges to approximately three feet.

53. DREDGING DISPOSAL OPTIONS

98 dredged material disposal (DMD) sites are identified in this plan. The 52 shoreland sites are the most valuable because materials may be stockpiled for reuse, sites can be improved for projected development, and toxic or polluted materials can be safely isolated from the environment. However, these sites will be either developed or filled to capacity during the next twenty years, and increasing reliance will need to be placed on other alternatives.

Fine, clay-like material is excellent for use in repairing and maintaining dikes. This plan has identified general areas where dikes could be improved using DMD. However, use of these dike sites is dependent on proximity to dredging projects or water access for transfer from barges. Clean coarse fill can be used for beach nourishment; 22 sites have been identified where the effects of beach erosion can be off-set by the deposition of dredged materials.

Certain sediments can simply be dispersed by tidal, river and ocean currents. Flow-lane disposal is used by the Corps for nearly one third of the navigation channel dredging in the upper estuary. Within the estuary and in the ocean, dredged materials have also been placed where they will not reenter

the channel or where dispersal is relatively slow. Estuary disposal sites, where there is strong ebb and flood tidal flow, presents a much more complex hydraulic problem and need careful evaluation to ensure their use does not worsen shoaling problems in marginal bays or other areas. The hydraulic dynamics at ocean sites are also complex and need careful physical and biological analysis to ensure adverse effects are minimized.

Each type of DMD site has its own advantages and disadvantages. Economics generally favor sites close to the dredging. Shoreland sites are generally superior if the material must be isolated from the environment. Flow-lane and beach nourishment sites are often most convenient, while ocean disposal has the advantage of removing the material from the estuary altogether. However, shoreland sites have a finite capacity, flow-lane, estuary and beach nourishment sites can contribute to shoaling in other areas, and ocean disposal may be too expensive for certain projects.

Environmental Considerations

The dredging and disposal policies call for minimal disturbance of the DMD site and region consistent with minimizing adverse environmental and hydraulic impacts. The disposal standards specifically protect tidal marshes, tidal flats, wetlands, and other valuable habitat which, in the context of using an approved DMD site, means that the biological productivity of areas adjacent to the DMD site should not be affected. The standards also require that undesirable circulation changes be minimized. To meet these goals, the standards require the applicant for a dredging permit to show that the bottom sediments and pore water at the DMD site have been adequately characterized, deposition of particular sediments will be compatible with materials already present, and short term effects such as turbidity and pollution will be minimized. These performance standards apply to all types of DMD sites.

Shoreland Sites

The major factors controlling choice of a shoreland site are cost, land use and availability. Increased distance from the dredging operation and extensive site preparation both increase costs. The sediment to be deposited must be suitable for the future use of the site: for example, fine sediments will not produce stable land for industrial development while coarse sands will not enhance productive farmland or be useful for dike maintenance.

The principal engineering consideration is the degree of confinement that the site and the proposed deposition will require. The Corps of Engineers has developed specific guidelines for designing containment areas at the DMD site which both maximize the site's capacity and control effluent quality. The guidelines address such technical issues as possible geochemical changes after DMD use that cause release of contaminants and effective dewatering of the sediments. In general, diking around the DMD site offers maximum confinement while berming, the creation of low mounds of sediment during deposition, may suffice for certain sediments. A brief discussion of environmental and engineering considerations accompanies each shoreland site description (cf 59.50).

Dike Disposal

DMD on dikes may prove cost-effective for the combined goals of dike maintenance and disposal of otherwise unused, fine-sediment dredged materials. The major environmental consideration is that the material be deposed in such a way that it not slough into productive aquatic areas. The major engineering issues would be effective dewatering of the sediments and careful dike stabilization, preferably through revegetation, after DMD use. Given the locations of existing dikes, it is not expected that this will become a major disposal option. Potential dike DMD areas are included in this plan to facilitate communication between dredging contractors and dike owners.

Beach Nourishment

Beach nourishment poses few environmental or engineering problems at the approved sites. Generally, beach sites are suitable for coarse sandy sediments similar to sediments already at the beaches. Benthic and shoreland productivity are generally low and beaches return to normal rapidly after DMD use, if clean channel sands are disposed. Beaches are migration routes for juvenile fish. Sites should not be left so flat that fish could strand. Because deposition is largely on shore, turbidity is not usually a problem but, for a discussion of in-water disposal issues, see *In-water Disposal - Flow-lane, Estuary and Ocean Sites,* below. At all sites in this plan, hydraulic pipeline equipment would be used, and site preparation is minimal. Beach nourishment sites may require some revegetation and adjacent sensitive or productive areas may require protection against movement of the deposed sediments. Where such issues have been identified, they are noted in the beach nourishment site descriptions (cf 59.40). DMD use should be coordinated with adjacent property owners.

In-water Disposal - Flow-lane, Estuary and Ocean Sites

In either the estuary or the ocean, a site may be chosen for long term storage of material, as in a sump, or for hydraulic redistribution. In the river, flow-lane disposal assumes that material will be transported downstream. In the estuary or ocean, more complex hydraulics exist and site specific and model studies are needed to determine the fate of dredged materials which is deposited.

In-water sites are not contained by dikes or berms. They are selected because of the suspended and bottom sediment transport characteristics of the waterway and the water and sediment quality of the dredged material. The difference between a questionable and an acceptable in-water site is dependent on both physical and biological factors. The *Columbia River Estuary Inventory of Physical, Biological and Cultural Characteristics* includes an excellent discussion of suspended sediment (section 208.3) and bottom sediment (section 208.4) transport.

The source of suspended sediment in a river is normally the slow erosion of lands in the river basin. This material is carried in suspension by the turbulance and differential shear stresses in the vertical water column. Very high current velocities can carry sand, silts and clay particles in suspension. Suspended load content will increase with increasing river flow, which result in higher current velocities and water levels, which erode banks, lift finer, lighter sediments into suspension, and provide a greater capacity for suspended sediment transport. In the estuary, the river widens dramatically, causing reduced net downstream current velocities which result in a decrease in downstream transport capacity, with heavier sediments settling out to cause shoals.

The suspended sediment load conditions in the Columbia River estuary are particularly complex because flows change rapidly under the influence of rains, storms and winds, upstream river reservoir regulation, and tidal variations; the cross section of the estuary also varies greatly. Thus, the travel distance of sediment particles after they have been released from a dredge or barge is not constant with sediment size alone. The river stage, tide stage, and site location all affect the in-water disposal results and averages of measured flow characteristics over a period of weeks must be applied to predict the fate of disposed sediments.

Bedload is the material moving along the bottom of the streambed and not in suspension. The lighter of these materials may "saltate" or jump from the bed for short distances but do not remain in suspension.

The sediment characteristics of the dredged material and the bed material must be determined, including the sediment grain diameter and physical and water quality characteristics. Water velocity values and directions must be established to allow calculation of sediment movement while in suspended transport. The number of measurements is dependent on the depth of the disposal site and depth of dredged materials at time of release into the waterway.

Knowledge of bottom topography prior to disposal is also very important in the analysis of impacts from in-water disposal. Completion of a detailed hydrographic survey prior to velocity measurement and sediment sampling at the disposal site is important. The survey helps establish probable flow lanes for the water currents, predominant movement of bedload and other geomorphological aspects. The fathometer tracings can also reveal the size and bed forms that exist, such as the sand waves. Use of the side scan sonar system further enhances the total picture of the bed and allows improved theoretical computation of bedload transport.

In-water disposal poses controversial environmental issues, many of which center around water quality, turbidity, and the tolerance of benthic organisms to rapid sedimentation. These issues must be dealt with on a site specific basis during the permit process, and the burden of proof is on the project applicant to show that adverse effects will be minimized.

Clean sediments pose minimal water quality problems and even sediments with heavy metals or other toxins may not release contaminants to the water. However, the release of organics and nutrients from sediments may cause local toxic effects and the depletion of available oxygen.

Turbidity is a concern in that it diminishes recreational values. Turbidity may also be a sign of water quality problems because the swirling sediments offer a greater opportunity for release of toxins. Finally, turbidity can be a sign that the sediments will not settle properly and may dispose as a fluid-mud layer that may be very detrimental to benthic organisms. While some studies indicate that turbidity does little environmental harm to adult organisms, the impacts on juveniles is detrimental and impacts associated with turbidity have led resource agencies to regulate it carefully. Dredge operators are able to comply with these regulations without excessive cost.

The smothering effect upon benthic organisms depends upon the animal species, the depth of burial, and the type of sediment. At approved sites, where benthic productivity is low and organisms are adapted to a sandy bottom environment, deposition of sandy sediments does little long term damage to populations beyond the larval stage. The larval stage of most organisms is seasonal and proper timing should minimize this effect.

The other major effect on benthic populations is the degree to which the populations can absorb contaminants, leading either to poisoning of the species or directing the contaminants into the food chain. Unfortunately there are no clear trends and bioassys are often necessary for case by case evaluation.

The lower Columbia River reach is virtually blanketed by gillnet fishing drifts. These drifts are cleared of snags prior to the fishing season which normally occurs during the months of August through November. Other conflicts include fish migration, rough winter water conditions in the lower reaches and high velocity flows in May and June. Resource agencies restrict in-water disposal during fish migrations. Gillnet fishermen attempt to restrict site use during snagging - July and August - and during the fishing seasons, August through November.

Winter weather seriously limits ocean and lower reach use from November through February, while high reiver discharge limits the entire reach use during May and June. Disposal timing recommendations must be carefully coordinated after site selection and quantity calculations are made.

The acceptable sites, as determined by research information available, must be in water depths of approximately 25 feet minimum to 50 feet maximum. Shallower depths have greater fisheries use, less sediment transport and related biological stress in general, while deeper depths are energy holes with deposited sediments often transported out too fast, causing navigation or biological problems elsewhere. The slope of both bed and disposed sediment must be sufficiently gradual to prevent excessive transport. The sites must also be in or near the main

river flow, having predominant downstream movement, thus avoiding back channel deposition.

Materials should be placed in a site downstream from the dredging location. Controlled placement by pipeline, hopper dredge or hopper barge, or by barge and clamshell could be acceptable.

Sediments that have less than 10% fines (silts and clays) are usually acceptable for in-water disposal. Smaller grain sizes will cause increased turbidity, generally have higher organics, will not move by bedload transport, and will tend not to settle.

54. IMPLEMENTATION AND SHORELAND DMD SITE MANAGEMENT

The key to full implementation of this *Dredged Material Management Plan* is the management of the shoreland DMD sites by local jurisdictions. This section discusses the actions that local jurisdictions will need to take in zoning and comprehensive plans or coastal zone management programs. The first part deals with actions required for DMD site designations and some aspects of the management responsibilities. The second section explains site priorities while the third discusses the various techniques that might be used to reserve sites for DMD use. The last part sketches local jurisdiction review procedures that might affect DMD sites.

DMD Site Designations

In the *Columbia River Estuary Land and Water Use Plan* (Part IV), all aquatic DMD sites are either in an area designated for development or are designated with a ***Development*** overlay for the purpose of DMD use only. On shorelands, DMD sites are given a land use designation consistent with their proposed eventual use. Site use procedures and standards should be incorporated into zoning ordinances.

It is important that local jurisdictions designate all acceptable DMD sites listed in this plan because the absence of the designation may allow development to occur before any DMD use. It is also important that local jurisdictions have a process for adding DMD sites which are not currently foreseen. For example, much farm land could benefit from deposition of appropriate sediments and certain sites where development is permitted could be improved by DMD use. Instances of this sort could be handled by special DMD siting procedures in the zoning ordinance.

The general management responsibility of a local jurisdiction for its DMD sites is to prevent preemptory uses of the site prior to DMD use. This responsibility is fulfilled through the implementation of ordinance procedures discussed here and the review procedures discussed at the end of this section. The local jurisdiction may also bear some financial responsibility for DMD use: the Corps of Engineers has a stated, though often waived, policy requiring that the agency sponsoring a dredging project pay for DMD site preparation. Actual payment depends on how much a particular site is needed and how much the deposition would benefit the site property owner.

Site Priorities

In this plan, sites have been ranked with one of three priorities. Priority 1 sites are essential to meet current dredging needs and should be reserved for DMD use. Priority 2 sites are necessary to meet current and the more probable projected dredging needs, but their importance may or may not justify efforts to reserve them. Priority 3 sites may be required in the future as long range development proposals are made, but the need for these sites has a low priority and they should not be reserved from other uses unless a more firm need develops.

Local jurisdictions should adopt a priority system into their ordinance procedures, such that a higher priority site will be utilized before a lower priority site and development proposals for priority 1 and 2 sites can be temporarily frozen, if necessary, to permit DMD use or site acquisition (cf *Local Jurisdiction Review Opportunities*, below).

DMD Site Reservation Techniques

Practicality and zoning will protect many of the DMD sites identified in this plan: some sites cannot be developed at all without fill and all priority sites in this plan have property owner cooperation. However, ownership and development plans can change and it may be necessary to take some action to ensure DMD use at a given site prior to some preemptory use.

Local jurisdictions can reserve the use of shoreland sites until DMD use is completed through land use controls, property acquisition, easements, purchase of development rights, condemnation, and property exchanges. In the case of private dredging projects for which disposal would be on private land, it may be appropriate for the dredging applicant and site owner to work out whatever agreement is to their mutual benefit. No federal or state programs which might fund DMD site acquisition have been identified and this financial responsibility remains with the dredging applicant, but local jurisdictions can provide assistance to ensure best use of DMD sites. For this reason, the following discussion is primarily from the perspective of a local jurisdiction with land use planning authority. Several of the site reservation techniques, however, may be used by port districts and private parties.

Land Use Controls — Local jurisdictions may use a combination of special zoning and limited freezing of development proposals to reserve DMD sites for DMD use.

Any use other than dredged material disposal should be designated as conditional for high priority DMD sites. The conditional use standards should require the developer to show either that the proposed use is compatible with future DMD use or that the costs and benefits (including environmental, economic, social, and regional dredged material management considerations) clearly establish a greater public benefit from development than from reservation for DMD use.

A limited freeze on development proposals can be used to modify the burden of proof for a preemptive use of priority 2 DMD sites. Thus, the development could be permitted if no dredging interest acts to acquire use of the site within a specified time, either ninety or one hundred and eighty days.

No land use controls are recommended for reservation of priority 3 sites.

Easements — The property owner may enter into an easement agreement whereby the right to place dredging materials on the land is granted to some other party. The property owner retains full use and ownership rights and specifies conditions for DMD use. Easements are most applicable where the property owner either desires fill to enhance development potential or has no objection. Because the owner retains control and because DMD use may financially benefit the owner, easements are often obtained at little or no cost.

Purchase of Development Rights — Property ownership carries with it certain development rights that are transferrable on either a temporary or permanent basis. Purchase of development rights for some definite term would make it economically feasible for certain property owners to forego development until after DMD is completed.

Fee Purchase — Purchase of the DMD site is more expensive than an easement but may entail several advantages. Some of the shoreland sites identified in this plan will not receive DMD use for some years and the current owner may be unwilling to wait that long before developing the site. If a local jurisdiction (or private dredging party) simply purchases the land, it can resell after DMD use. Local jurisdictions could make use of a revolving fund to purchase DMD sites that would otherwise be lost to DMD use, with resale of specific parcels supplementing the fund for further acquisitions. Use of public bonds and other techniques may be necessary to finance the increased front-end costs of this method. If purchases are combined with easements, purchase of development rights, and land use controls, the amount of property that must be purchased can be minimized.

Property Exchange — In some instances, a local jurisdiction or dregding party may acquire DMD sites through an exchange of property with the DMD site owner.

Local Jurisdiction Review

There are three situations where a local jurisdiction must review dredging or disposal issues: dredging within the jurisdiction, disposal within the jurisdiction, or a development proposal for a designated DMD site. The first two occur in the normal state and federal permit processes and may be together or separated. Local land use permits will be required for the third situation.

Dredging Permit Review — Local jurisdictions must have a procedure to review dredging operations that occur within their boundaries (cf. Federal Consistency, section 73). At the local level, review is for consistency of the dredging and the final use with the local comprehensive plan policies and standards.

Disposal, Dredging Permit Review — Even where the dredging occurs outside the jurisdiction, disposal may be a concern to the local jurisdiction. In addition to reviewing for consistency, the local jurisdiction should be able to encourage early use of DMD sites that for some reason should be used first. The basic tools for this action include using the site priority system to evaluate complete consistency of the proposal, and negotiation with the dredging permit applicant.

Development Proposals — A property owner may elect to apply for a zoning action or building permit at any time, and there may be no zoning or code objection but for the fact that the site should be used for DMD first. In such circumstances, local jurisdictions could freeze any action on the property for a specified period (e.g. 90 or 180 days) during which time relevant agencies could negotiate for DMD use of the site. If such negotiations are not brought to a conclusion within the specified time, then the original application would proceed through normal channels.

A second option for local jurisdictions could be through a limitation on the site's property taxes, as is already provided through Sections 5 and 6 or ORS 308.370 dealing with Exclusive Farm Use Zones and the concept of a frozen assessed valuation as provided in Urban Renewal Areas under ORS 457. While the legal precedent is clear, specific enabling legislation may be necessary before local jurisdictions can take such actions on DMD sites.

REGIONAL COORDINATION

The importance of regional dredged material management stems from three significant problems:

—Disposal in one jurisdiction may affect other jurisdictions;

—Dredging projects and their related disposal sites are not always within the same jurisdiction; and

—Disposal sites for projects within a jurisdiction may prove unsuitable.

For example, Warrenton appears to have DMD capacity to meet foreseeable needs from Skipanon dredging. However, the silts from the Skipanon might, if deposed without added coarse sediments on the designated sites, preclude planned industrial development. Warrenton's DMD capacity can only be considered adequate if a mechanism insures that Warrenton's fine sediments can be suitably deposed and stabile coarse sediments can be found for planned development.

This mechanism must be regional because it is

unlikely that one jurisdiction will find another single jurisdiction with exactly complimentary needs. The role for CREST described in *Intergovernmental Coordination, 74,* provides for this regional dredged material management.

The second aspect of regional coordination will be to develop facilities that are too expensive for single jurisdictions. For example, mobile pump-ashore facilities could facilitate use of coarse sediments now deposed at sea and could make possible the use of shoreland sites which are not included in this plan because they are too far from the river for current methods.

55. ESTUARY-WIDE PROJECTS

55.10 Corps of Engineers Projects

The U.S. Army Corps of Engineers, Portland District, maintains the entrance channel to the mouth of the Columbia River and a navigation channel upstream to Vancouver. An attempt to engineer a self-scouring channel has been partially successful. Flow control structures such as pile dikes and channel islands have been extensively used throughout the Columbia River. The arrangement of pile dikes attempts to restrict and direct natural flow within maintained portions of the channel. Maintenance of existing channel islands and beaches also contributes to decreased dredging operations.

Pile dikes and related structures do not, however, fully control shoaling of the navigation channel; sediment and hydraulic conditions cause deposition of material where it presents a hazard to navigation and must be removed. The following table summarizes past maintenance, and indicates the annual volume of material removed from the navigation channel is 10 million cubic yards. Three regions require annual removal and cause associated problems:

—the mouth of the Columbia River, where an average of 5.8 million cubic yards (cy) has been removed annually,

—the lower Columbia River estuary to Rice Island, where 1 million cy have been removed annually, and

—the upper Columbia River estuary, east of Puget Island, where 3.2 million cy have been removed annually.

55.11 Columbia River at the Mouth (MCR)

The Corps' project provides a channel 48 feet deep and one-half mile wide over the ocean bar, secured by two converging rubble mound jetties, a spur jetty (Jetty B) on the north shore, and by maintenance dredging. Jetty B has not been constructed; Jetty A was constructed in 1939 along with rehabilitation of the north jetty.

A proposal to deepen the entrance bar is presently under study by the Portland District of the Corps. A 53-foot maintained depth is quite likely to be provided for future vessel traffic.

Typically, shoaling occurs between river mile −1.0 and river mile +2.0. Annually, quantities removed average 6 million cubic yards. Even this amount does not maintain full project depth year-round, because of rapid infill rates. The Portland District removed 9.2 million cubic yards in 1977 to obtain project dimensions and provide extra overdepth dredging to maintain project depths for a 3-5 year period.

The entrance dredging is performed by trailing draghead hopper dredges, which use in-water disposal sites where depths are greater than 25 feet. The majority of sediments are disposed at ocean sites A, B, E, F and G, with some disposal as estuary site D.

MCR dredging activities will probably not require upland disposal sites, because open ocean conditions require use of hopper dredge equipment. Pumping ashore from hopper dredges is used on the East Coast, because the fine-bed sediments are often polluted. The materials at the MCR site are clean sands and do not require pumping ashore to avoid pollution. Unless an economic demand for material offsets the additional cost realized by pumping ashore, pumping will probably not be used during the 20-year study time.

The Corps attempts to determine optimum sites for estuary disposal through its MCR hydraulic/mathematical model at Vicksburg. Several experimental sites are being studied for various bio-physical parameters related to in-water disposal. Continued in-water disposal is to be expected, based on open channel research.

55.12 Lower Columbia River Estuary

The Corps project provides a channel 40 feet deep and 600 feet wide from the mouth of the Columbia River to Vancouver, Washington. Included in the authorized project are a number of side channels and projects discussed later.

The portion of the channel upstream to about Rice Island is distinct from the rest of the channel within the CREST region for several reasons. At about this point, which varies with river level and tidal stage, downstream flow conditions change, and the transport of sedimentary material is affected. Most port and other development projects are also concentrated in this lower reach of the estuary. Incremental impacts of dredging and development from far upstream combine with existing local use of the estuary to magnify problems and conflicts.

In this part of the estuary, channel material is usually dredged by trailing suction hopper dredge, with in-water disposal at the Harrington Point Sump, estuary area D, Tansy Point (limited use), or in ocean sites A, B, E and F. Site G is used on an experimental basis and the Corps has proposed a site H. Recent discussions with the Corps, CREST and resource

agencies have resulted in temporary termination of the Tansy Point disposal site and restricted use of Area D. The Astoria Turning Basin was constructed by clamshell and barge, with disposal at sea. Area D was used when the bar was impassable because of weather and wave conditions.

55.13 Upper Columbia River Estuary

Upstream of Rice Island, the 40 foot navigation channel closely parallels the Wahkiakum County shoreline. An average annual volume of 3.2 million cubic yards of material is removed from this reach, causing significant present and even more significant long-term implications for dredged material management. Upland disposal options, historically acceptable, are decreasing as available land is diverted to other uses. Accordingly, in-water disposal options have increased in importance. Most upland disposal sites fall under jurisdictions discussed elsewhere. Rice Island, Miller Sands and Jim Crow Sands are traditional Corps disposal sites.

The Upper Reach flow-lane disposal operations and dredging are performed by both pipeline and hopper dredges at selected sites adjacent to the navigation channel and at Harrington Point Sump. Flow-lane disposal has, by general agreement, been limited to reaches upstream of Rice Island and to the Harrington Point Sump, until model studies can evaluate the transport rate for bed sediments in reaches of the lower estuary.

The Corps' hopper dredges presently carry materials from Tongue Point upstream to Harrington Point and may soon begin bringing material downstream from the upper estuary. This material would be rehandled by pipeline during the month of June and placed on Rice Island [DMD 55(S)]. This would result in enlarging Rice Island approximately 20% over the next 20 years.

The Corps anticipates future maintenance will use the identified upland sites and in-water flow lane sites but some question on use of estuary sites downstream of Harrington Point remains, which may not be answered even when model studies are completed. As long as bed sediments are clean heavy sands as presently exist, in-water disposal is a natural option. Environmental costs for this alternative, however, need more consideration. Nonetheless, private contractors are preparing for future dredging assignments requiring clamshell dredges with bottom dump barges and trailing draghead hopper dredge equipment.

COLUMBIA RIVER MAIN NAVIGATION CHANNEL

MOUTH AND LOWER ESTUARY

Project	Volume Dredged	DMD Sites*
Columbia River Bar/Clatsop Shoal RM −1.5 to −1.0 and −0.2 to 2.6	5,800,000 cy/yr	**A, B, E,** F, G, H, 6(E), 7(E), **D**
Desdemonia Shoals RM 5.0 to 7.8	368,000 cy/yr	**D, E,** 11(E), 15(E)
Flavel/Astoria Shoal RM 11.3 to 11.6 and 12.5 to 12.6	373,000 cy/yr	**D,** 11(E), 36(E), 15(E), **54(E)**
Upper Sands RM 16.3 to 16.6	293,000 cy/yr	**D, 54(E),** 39(E)
Tongue Point Shoal RM 18.7 to 19.1	233,000 cy/yr	39(E), **54(E)**

*Sites in boldface are the primarily used sites for the project.

Project	Volume Dredged	DMD Sites
UPPER ESTUARY - Hopper Disposal		
Lower Miller Sands Bar RM 21.4 to 22.5	158,000 cy/yr	54(E)
Upper Miller Sands Bar RM 23.5 to 24.6	106,000 cy/yr	54(E)
Lower Pillar Rock Bar RM 25.0 to 26.0	138,000 cy/yr	59(F)
Upper Pillar Rock Bar RM 26.4 to 27.9	143,000 cy/yr	59(F)
Lower Brookfield Bar RM 28.7 to 29.7	88,000 cy/yr	59(F)
Upper Brookfield Bar RM 31.4 to 32.2	115,000 cy/yr	59(F)
Welch Island Bar RM 32.6 to 34.0	68,000 cy/yr	68(F)
Skamokawa Bar RM 35.0 to 35.9	56,000 cy/yr	58(F)
Puget Island Bar RM 37.4 to 38.7	200,000 cy/yr	73(F)
Wauna Bar RM 40.5 to 41.5	52,000 cy/yr	73(F), 81(F)
Lower Westport Bar RM 42.0 to 43.3	None	81(F), 95(F)
UPPER ESTUARY - Pipeline Disposal		
Lower Miller Sands Bar RM 21.4 to 22.5	413,000 cy/yr	55(S), 56(B)
Upper Miller Sands Bar RM 23.5 to 24.6	147,000 cy/yr	56(B)
Lower Pillar Rock Bar RM 25.0 to 26.0	13,000 cy/yr	57(B), 58(B), 61(B), 60(B)
Upper Pillar Rock Bar RM 26.4 to 27.9	134,000 cy/yr	60(B), 61(B), 62(B), 63(B)
Lower Brookfield RM 28.7 to 29.7	39,000 cy/yr	63(B)
Upper Brookfield RM 31.4 to 32.2	53,000 cy/yr	No site at present
Welch Island Bar RM 32.6 to 34.0	82,000 cy/yr	66(B), 65(S), 70(B)
Skamokawa Bar RM 35.0 to 35.9	None	70(B), 71(D)
Puget Island Bar RM 37.4 to 38.7	54,000 cy/yr	71(D), 72(B), 77(B), 78(S), 79(S), 80(B)
Wauna Bar RM 40.5 to 41.5	92,000 cy/yr	83(S), 84(B), 88(B), 82(B), 86(S), 87(B)
Lower Westport Bar RM 42.0 to 43.3	156,000 cy/yr	87(B), 91(B), 88(B), 82(B), 86(S), 87(B)
Middle Westport Bar RM 44.4 to 45.4	326,000 cy/yr	91(B), 94(B), 92(B)

55.20 Private Projects

Throughout the Columbia River estuary, numerous private parties dredge and dispose of dredged material. Private property owners with waterfront property may want better boat access or a new dock, and there is an occasional need for bank protection requiring replacement of eroding shorelines or inadequate dikes. Less frequently, a private developer proposes a more extensive project requiring a larger amount of dredging or disposal. Certain private interests require periodic dredging to provide access for boats necessary for their business.

Because of the large number and diverse nature of these projects, little would be gained by describing each one. Recurring dredging activity is listed here.

PRIVATE PROJECTS

		DMD Sites		
Project	**Amount Dredged**	**Number**	**Capacity**	**Priority**
Crown Zellerbach Lewis and Clark River	10,000 cy/yr 50,000 cy/5 yr 200,000 cy/20 yr	33(S)	256,000 cy/10′	1
Barbey Packing Company (Astoria)	2,000 cy/yr 10,000 cy/5 yr 40,000 cy/20 yr	46(S)	2,000,000 cy/3′	1
Coast Guard Dock (Astoria)	2,000 cy/yr 10,000 cy/5 yr 40,000 cy/20 yr	46(S)	2,000,000 cy/3′	1
Crown Zellerbach (Deep River)	3,000 cy/yr 15,000 cy/5 yr 60,000 cy/20 yr			
Crown Zellerbach (Elochoman Slough)	2,000 cy/yr 10,000 cy/5 yr 40,000 cy/20 yr	74(S) 76(S)	1,440,000 cy/10′ 320,000 cy/10′	2 1
Brusco Cathlamet Channel	40,000 cy/yr 200,000 cy/5 yr 800,000 cy/20 yr	76(S)	320,000 cy/10′	1
Crown Zellerbach (Wauna)	3,900 cy/yr 19,500 cy/5 yr 78,000 cy/20 yr	90(S)	2,720,000 cy/10′	1

56. BAKER BAY PROJECTS

Baker Bay projects include the Corps of Engineers maintained channels at Ilwaco and Chinook, the ports of Ilwaco and Chinook projects, and two future development possibilities in Baker Bay itself. Included in the discussion of existing projects are future channel or basin improvement projects.

The two long-range development possibilities evident at this time both have potential for extensive dredging and associated material disposal. A potential mineral extraction operation, not specifically located at one site in Baker Bay, and future navigation channels are as shown for discussion only. Serious future consideration of either project will require more extensive study and planning. (cf 45. Policies 3, 6; 45.03; 45.05; 45.07)

56.10 Baker Bay West Channel

A navigation channel 10 feet x 200 feet is authorized from the entrance at Sand Island for a distance of .5 miles, then is reduced to a 10 foot x 150 foot channel for 2.5 miles to the Port of Ilwaco. This channel also provides access for the Coast Guard at Cape Disappointment and for a public boat ramp at Fort Canby. There is significant shoaling at the entrance to the channel, at Cape Disappointment Shoal, and at the final approach to the Port of Ilwaco at Ilwaco Shoal. Little maintenance has been necessary in recent years for much of the West Channel between these two shoals.

The Coast Guard Station at Cape Disappointment requires navigational access in the Ilwaco West Channel from the entrance at Sand Island to a point almost two miles north in the present channel. Periodic maintenance dredging for existing moorage and new construction dredging will be

required. This should have a minimal effect upon Baker Bay and continued use of this facility is a public benefit. The Coast Guard has lease rights to the land area east of Jetty A. Part of this area has some potential for use as a disposal site. Coordination with the Coast Guard should limit serious objections to such use. Any future plans for the Ilwaco West Channel must take into account the Coast Guard facility and its operational needs.

Several dredging techniques have been used to maintain the West Channel, with varying success. Propwash agitation has been used regularly throughout the entire length of the channel to remove specific shoaling problems. The severity of the Cape Disappointment Shoaling has necessitated occasional use of hopper dredging. The Ilwaco Shoal has been maintained by pipeline dredge. The Cape Disappointment material is clean sand suitable for in-water disposal, but the Ilwaco Shoal consists of nonpolluted silty material requiring upland disposal. The material between the two shoals has not been sufficiently characterized to determine the best method of disposal.

The Corps is studying ways to improve navigational access to the Port of Ilwaco. Possible improvements include reducing shoaling at the channel entrance, realigning the entrance, widening and deepening the remainder of the existing channel, and dredging a straighter channel to replace the inner two miles of channel; this last option needing extra consideration, in light of the need for continued access to the Coast Guard and Fort Canby facilities. The only alternative within the $2 million cost ceiling of a Section 107 project is improvement of the old channel to 300 feet x 16 feet for the first mile and to 150 feet x 14 feet for the remaining distance.

Improved access in the Baker Bay West Channel will require extensive modifications to the entrance channel and related structures. Project dimensions will probably be increased, regardless of whether a new channel is authorized, resulting in increased annual maintenance. Large quantities of dredged material will require upland disposal for any major channel improvements; upland sites will continue to be needed for maintenance of the Ilwaco Shoal area. Future channel maintenance by hopper dredge would require in-water disposal at existing or new sites. Continued maintenance of the mid-channel by propwash agitation will need review as information on the hydraulic system of Baker Bay becomes available or when channel improvements are made.

BAKER BAY WEST CHANNEL

		DMD Sites		
Project	**Amount Dredged**	**Number**	**Capacity**	**Priority**
Mid-Channel Shoals	20,000 cy/yr	E(O)	Ocean Disposal	
	100,000 cy/5 yr			
	400,000 cy/20 yr			
Ilwaco Shoal	10,000 cy/yr	3(S)	360,000 cy/10'	1
RM 2.9 to 3.1	50,000 cy/5 yr	4(S)	1,280,000 cy/10'	1
	200,000 cy/20 yr	5(S)	1,520,000 cy/10'	3
Cape D Shoal	20,000 cy/yr	E(O)	Ocean Disposal	
RM 3.0 to 4.0	100,000 cy/5 yr	D(E)	Estuary Disposal	
	400,000 cy/20 yr	2(S)	500,000 cy/10'	2
		3(S)	360,000 cy/10'	
Channel Improvement		4(S)	1,280,000 cy/10'	1
16' outer channel	665,000 cy/5 yr	2(S)	500,000 cy/10'	2
14' inner channel		5(S)	1,520,000 cy/10'	3
Channel realignment		E(O)	Ocean Disposal	3

56.20 Chinook Channel

A navigation channel 10 feet x 150 feet is authorized from deep water near the east end of Sand Island for a distance of two miles to the Port of Chinook mooring basin. Extensive shoaling throughout the channel requires frequent removal activity. Contract pipeline dredge has been used for three out of the past four years for parts or all of the channel. Propwash agitation by the "Salvage Chief" was tried with limited success in the channel outside the port breakwater in 1976 and 1977. A limited amount of hopper dredging occurred in the outer mile of channel near the entrance at Sand Island.

Channel material from the entrance at Sand Island to mile 1.1. is clean sand and silty sand suitable for in-water disposal. The channel material from mile 1.1 to the boat basin is slightly polluted silty sand and silt requiring upland disposal. Presently, the Corps plans to maintain the outer 1.1 miles with the "Pacific", with disposal in area "D".

Some increase in project dimensions will probably occur, especially if hopper dredging becomes the standard maintenance option for the outer mile of channel. Similar depths probably cannot be maintained for the inner mile without periodic dredging by clamshell and barge or pipeline. The extensive

shoals on the east and west sides of the channel, coupled with a cross-current, make maintenance operations hazardous. Removal of the Chinook Jetty to help restore circulation in Baker Bay could change the present shoaling patterns in Chinook Channel.

Area "D" is presently needed for maintenance of the Chinook Channel. An upland disposal site would be required in the near future, if navigational access is to be maintained to the Port of Chinook.

CHINOOK CHANNEL

Project	Volume Dredged	DMD Sites Number	Capacity	Priority
Inner Channel	45,000 cy/yr	9(S)	1,600,000 cy/10'	2
RM 1.1 to Basin	225,000 cy/5 yr 900,000 cy/20 yr	8(S)	1,250,000 cy/10'	3
Outer Channel	20,000 cy/yr	D(E)	Estuary Disposal	
RM 0 to 1.1	100,000 cy/5 yr 400,000 cy/20 yr			
Deepening Channel to 16'	230,000 cy/20 yr	9(S)	1,600,000 cy/10'	2
		8(S)	1,250,000 cy/10'	3
		D(E)	Estuary Disposal	

56.30 Future Projects

Beach Mining, Incorporated is a mineral processing venture interested in commercially valuable "black sands" deposits in Baker Bay and other areas. According to the Washington Department of Natural Resources (DNR), a mining contract has been in effect since 1968. Under DNR regulations, a royalty of $2.50 per acre, per year, plus $2.50 per acre, per year of development work is required to maintain the contract. The contract life of 20 years will expire in 1988; it is expected that Beach Mining, Inc. will seek the necessary permits to begin production before that time.

"Black sands" mining is essentially a strip-mining operation, where sediments are dredged, minerals extracted, and sediments returned to the bay. Such an operation would not be allowed under the policies and standards concerning dredging and in-water disposal adopted by CREST.

New channels could provide better access to existing ports and decreased maintenance dredging. The Corps of Engineers is studying the present channels for possible future improvements; local interests want better access and the Corps wants to decrease its maintenance dredging problems. Dredging new public navigation channels would require a thorough study to determine the appropriate management options. CREST has identified potential upland disposal sites suitable to retain fine-grained or polluted sediments, should this be necessary. Sites 3(S), 4(S), and 5(S) on Sand Island are adjacent to the potential Ilwaco channel and site 5(S) is also close to the "new" Chinook channel. All three sites are within reach of pipeline disposal from the "new" Chinook channel.

56.40 Port of Ilwaco

The Port of Ilwaco operates a mooring basin, served by the Baker Bay West Channel, that provides berths for 1000 private, commercial and charter boats. During peak seasonal use, 1300 to 1500 boats use the port facilities daily; several hundred boats are on a waiting list for permanent moorage. Three fish processors at Ilwaco are served by a growing number and variety of commercial craft. The Port's proximity to the mouth of the Columbia River makes it attractive.

The presently authorized basin at Ilwaco is 1200 feet long by 650 feet wide with depths to 14 feet. This basin was last dredged to these dimensions in 1974, and no maintenance has been needed since. A disposal site on the southeast corner was used in construction of the 1974 expansion and again in 1976 for dredging of the channel entrance to the Port. The Port has received a favorable report by the Corps on the feasibility of improving the Baker Bay Port West Channel. The Port is also seeking assistance in planning for expansion of port facilities to accommodate an expected increase in numbers and sizes of boats calling at Ilwaco.

Expansion of the mooring basin at Ilwaco is somewhat limited by environmental constraints to the area south of the existing breakwater. Expansion would require relocation of the breakwater and extensive dredging. A study of the environmental impacts associated with such work and ways of mitigating those impacts would also be required. Other improvements feasible or necessary would include dry storage for small craft and restructuring of present moorages to accommodate larger fishing craft.

Disposal needs at the Port of Ilwaco relate to improvements within the existing basin and new construction dredging outside the present breakwater. Material in both areas is silty, requiring shoreland disposal; the basin material may also be polluted,

requiring complete retention by dikes. The existing diked disposal site at the port should be studied for reuse, as it would be an economical site for disposal of mooring basin dredged material deposited by small pipeline or clamshell. New construction dredging would require more extensive disposal, which would need to be addressed in any plan the Port of Ilwaco develops. The only existing site for such material is a previously used site on Sand Island, almost 7000 feet away.

Dredging and Disposal Needs - Ilwaco

Project	Volume Dredged	DMD Sites Number*	Capacity	Priority
Basin	10,000 cy/5 yr 40,000 cy/20 yr	1(S)	240,000 cy/20 yr	1
Basin Expansion	350,000 cy/20 yr	**3(S)**	360,000 cy	1
		4(S)	1,280,000 cy	1
		5(S)	1,520,000 cy	2
		1(S)	240,000 cy	1

*Boldface indicates preferred sites

56.50 Port of Chinook

The Port of Chinook operates a mooring basin, served by the Chinook Channel, and provides berths for 323 commercial fishing and recreational craft. Use of the moorage is seasonal, with heaviest use during summer months and the gillnet seasons. The Chinook Packing Company operates a fish receiving station and cannery adjacent to the Port. Chinook is the third largest port in the CREST area and provides access both to the mouth of the Columbia River and the northern side of the estuary.

The authorized basin at Chinook is 500 feet by 590 feet, with depths to 18 feet. The Port has a small hydraulic dredge used to remove up to 20,000 cubic yards of material from the mooring basin annually. A retention site for disposal of this dredged material is located at the southern end of the port, with access for removal of material for local reuse. The Port would like to expand the basin but must first resolve maintenance problems plaguing the Chinook Channel. Expansion of the mooring basin at Chinook is limited on the east by the present disposal area and extensive shoaling. To the west are the Chinook and Bumble Bee facilities and a fringing tidal marsh adjacent to the maintained channel inside the breakwater. Expansion would probably involve relocating all or part of the present breakwater into the waters south of the Port. Expansion of the Port would also increase demand for associated services, particularly sewage treatment.

The present disposal site appears adequate for maintaining the mooring basin, provided there is a local demand for the material deposited there. Due to the rapid shoaling of the Chinook Channel for most of its length, a need exists for extensive shoreland disposal capacity. The Corps has exhausted presently available land sites and now looks to the Port and town to provide alternatives. Pending availability of such sites, the Corps plans to use the hopper dredge "Pacific".

Dredging and Disposal Needs - Chinook

Project	Volume Dredged	DMD Sites Site Number	Capacity	Priority
Basin	20,000 cy/yr	10(S)	20,000 cy/use	1
	100,000 cy/5 yr 400,000 cy/20 yr	9(S)	1,600,000 cy	2

57. YOUNGS BAY-ASTORIA PROJECTS

57.10 Hammond Channel

The Corps maintains an entrance channel from the Columbia River into the boat basin at Hammond. This 10 foot by 100 foot channel is maintained by pipeline dredge, with upland disposal at site . Annual dredging is not necessary; approximately 15,000 cubic yards are removed every 3 to 5 years.

		DMD Sites		
Project	**Amount Dredged**	**Site Number**	**Capacity**	**Priority**
Hammond Boat Basin	15,000 cy/5 yr	13(S)	48,000 cy/10'	1
Entrance	60,000 cy/20 yr	12(S)	480,000 cy/10'	2

57.20 Hammond Boat Basin

Dredging for the Hammond Boat Basin includes the Corps maintained entrance and the basin dredging maintained by the Town of Hammond. Entrance dredging amounts to 3,000 cubic yards per year, while dredging of the basin involves 8,000 cubic yards per year. Total annual dredging for the Hammond Boat Basin is 11,000 cubic yards per year, or a total of 220,000 cubic yards for the 20 year planning period. The Mooring Basin is 170 berths, most with electricity and water, and are available for charter and recreational vessels only.

Expansion plans at the Hammond Mooring Basin include development to the east side of the Mooring Basin for small craft moorage, which would require approximately 250,000 cubic yards of construction dredged material and increase annual maintenance dredging by an estimated 5,000 cubic yards. The second phase of construction would include development north of the present gas dock for small craft moorage, which would involve construction dredging of 20,000 cubic yards. Construction of both the eastern section of the basin and the northern portion of the basin would bring total moorages to 600 to 700 berths.

The dredging site is too confined for easy access by hopper dredge; ocean disposal would be by ocean going barge utilizing a bucket dredge for the entrance channel and slips. Ocean disposal would cost substantially more than hydraulic pipeline disposal, and would require that sediments and lead and other heavy metals concentrations be within prescribed non-polluting limits.

Three potential disposal sites are associated with Hammond Mooring Basin, including the existing disposal site, which can be used again. The total dredging needs exceed the disposal capacity locally available. Options to provide needed capacity are: (1) disposal at sea, especially for construction dredging, and (2) filling disposal sites to a greater depth (20 feet).

Hammond

		DMD Sites		
Project	**Amount Dredged**	**Site Number**	**Capacity**	**Priority**
Basin	8,000 cy/yr	14(S)	48,000 cy @ 10'	1
Maintenance	40,000 cy/5 yr 160,000 cy/20 yr	12(S)	480,000 cy @ 10'	2
East Basin Expansion and maintenance	250,000 cy/5 yr 160,000 cy/20 yr	12(S)	480,000 cy @ 10'	2
South Basin Expansion and maintenance	17,500 cy/5 yr 32,500 cy/20 yr	12(S)	480,000 cy @ 10'	2
North Basin Expansion and maintenance	20,000 cy/20 yr	12(S)	480,000 cy @ 10'	2

57.30 Tansy Point

No waterfront development now exists at Tansy Point, but the Tansy Point area has been identified as a potential site for long-term development of a deep water facility. Development plans include construction of a ship berthing facility and supporting shore facilities. Full development of the Tansy Point area would require about 250,000 cubic yards of construction dredged material. Once construction dredging were completed, very little maintenance dredging would be required. Twenty year disposal needs for the Tansy Point area would be about 265,000 cubic yards.

Tansy Point dredged material could quite easily be hopper dredged and disposed of at sea. Construction dredged material should be clean sand suitable for ocean disposal. Disposal in-water in the estuary would be dependent on the outcome of on-going studies.

Three potential disposal sites are associated with the potential Tansy Point development [16(S), 17(S), 18(S)]. These sites could also be used for pipeline dredging from the Skipanon Peninsula. The identified disposal sites have capacity of 1,344,000 cy.

57.40 Skipanon Channel

The Skipanon waterway is an authorized channel two miles long, 30 feet deep, and 200 feet wide from the Columbia River to the railroad bridge. Recent dredging of the waterway has been accomplished by the hopper dredge "Pacific" at the river mouth to maintain a 16 to 18 foot channel depth. The dredge removed 110,000 cubic yards per year from 1972 through 1976. Disposal from hopper dredging was in the Columbia River adjacent to Tansy Point. Maintenance dredging of the Skipanon waterway will require continued annual removal of at least 110,000 cubic yards. The Corps presently plans a pipeline dredging operation during 1979 that would require over 200,000 cubic yards of shoreland disposal. Shoreland disposal of an additional 200,000 cubic yards will be needed for the next 20 years of dredging.

Hopper dredge disposal of entrance shoal sands at the Tansy Point site has been temporarily discontinued. This site and other estuarine in-water sites are being analyzed for eventual fate of sediments and for estuarine resource impacts. Disposal of clean sediments from the Skipanon waterway can be placed at sea by ocean going barges or hopper dredges. Materials from construction dredging will most likely be placed on land. Material from the Skipanon waterway is predominantly fine sediment upstream from the mouth and is generally considered unacceptable for in-water disposal. Dredging after the initial construction dredging may be able to utilize in-water disposal. Using in-water disposal sites would require sediment analysis and extensive coordination with Federal and state resource agencies.

The land disposal sites associated with the Skipanon waterway can meet the 20 year disposal needs. Not all of these sites will be required, since some of the construction dredging for Pacific Fabricators and other developments will be used for site development.

Land disposal sites adjacent to the airport are generally too great a distance for pipeline dredged material disposal. One major site in this area has been identified for stockpiling of material to be utilized for dike maintenance. The remaining sites are identified because of the probability of future development in the Warrenton area.

Youngs Bay - Astoria Corps Projects

		DMD Sites		
Project	**Amount Dredged**	**Site Number**	**Capacity**	**Priority**
Skipanon Channel entrance	110,000 cy/yr	E(O)	Ocean Disposal	1
	550,000 cy/5 yr	15(E)	Estuary Disposal	3
	2,200,000 cy/20 yr	11(E)	Estuary Disposal	3
		36(E)	Estuary Disposal	3
Skipanon Channel (inner channel)	200,000 cy/5 yr	23(S)	2,016,000 cy/10'	1
	400,000 cy/20 yr	25(S)	2,080,000 cy/10'	1
		20(S)	384,000 cy/10'	2
		22(S)	240,000 cy/10'	2
		19(S)	240,000 cy/10'	3
		20(S)	384,000 cy/10'	3
		21(S)	288,000 cy/10'	3
		24(S)	1,120,000 cy/10'	3
		26(S)	208,000 cy/10'	3
		27(S)	144,000 cy/10'	3

57.50 Warrenton

The City of Warrenton maintains a boat basin on the east bank of the Skipanon, near the bridge. Access is via the Corps-maintained channel in the Skipanon, which is authorized to a depth of 30 feet. The mooring basin provides over 300 berths for vessels up to 100 feet in length. Maintenance dredging has not been a problem in the mooring basin, but shoaling in the Skipanon Channel has reduced depths to less than 30 feet. Present plans are for extensive dredging by the Corps sometime in 1979, which would require shoreland disposal of over

200,000 cubic yards of fine, polluted sediment. Within a 20 year time frame, an additional 200,000 cubic yards of similar sediment would need shoreland disposal (cf 57.40; but note that cy/yr estimates are averages).

A wide variety of construction projects could dramatically increase dredging demands in the Skipanon waterway. The City of Warrenton has requested channel maintenance upstream to the bridge to a depth of 20 feet to provide for recreational/commercial vessel traffic ("20' Channel/Bridge"). Pacific Fabricators has proposed dredging adjacent to their bulkhead and an entrance channel to the east bank, and Warrenton Lumber Company is evaluating their need for dredging for ship berthing at the northern end of the west side of the Skipanon.

Twenty year projections for all projects indicate a total dredging demand of 6 million cubic yards.

Currently, hopper dredge disposal of entrance shoal sands at Tansy Point has been temporarily discontinued. This site and other estuarine in-water sites are being analyzed for eventual fate of sediments and resource impacts.

Disposal of clean sediments from the Skipanon waterway can be placed at sea by ocean going barges or hopper dredged. Construction dredging would most likely be required to be placed on land. Material from the Skipanon waterway is predominantly fine sediments upstream from the mouth and is generally considered unacceptable for in-water disposal. These sediments may also prove unsuitable for construction fill unless mixed with coarse sediments. Future dredging after the initial construction dredging may be able to utilize in-water disposal. The option of utilizing in-water disposal sites would require sediment analysis and extensive coordination with Federal and state regulatory agencies.

Land disposal sites adjacent to the airport are generally too great a distance for pipeline dredged material disposal. One major site in this area has been identified for stockpiling of material to be utilized for dike maintenance. Future maintenance of the authorized channel in Youngs Bay may require use of one of the airport sites.

Warrenton

Project	Amount Dredged	DMD Sites: Site Number	DMD Sites: Capacity	DMD Sites: Priority
Boat Basin and Turning Basin Expansion and maintenance	Maintenance minimal Expansion data not available	25(S)	2,080,000 cy @ 10'	1
		23(S)	2,016,000 cy @ 10'	1
		20(S)	384,000 cy @ 10'	2
		22(S)	240,000 cy @ 10'	2
		19(S)	240,000 cy @ 10'	3
		21(S)	288,000 cy @ 10'	3
		24(S)	1,120,000 cy @ 10'	3
		26(S)	208,000 cy @ 10'	3
		27(S)	144,000 cy @ 10'	3
20' Channel/Bridge	300,000 cy construction 100,000 cy/yr 500,000 cy/5 yr 2,300,000 cy/20 yr	25(S)	2,080,000 cy @ 10'	1
		23(S)	2,016,000 cy @ 10'	1
		20(S)	384,000 cy @ 10'	2
		22(S)	240,000 cy @ 10'	2
		19(S)	240,000 cy @ 10'	3
		21(S)	288,000 cy @ 10'	3
		24(S)	1,120,000 cy @ 10'	3
		26(S)	208,000 cy @ 10'	3
		27(S)	144,000 cy @ 10'	3
East Bank Development (Brown & Root)	500,000 cy construction 86,000 cy/yr 430,000 cy/5 yr 2,220,000 cy/20 yr		Ocean Disposal and construction fill	
Warrenton Lumber Company development	200,000 cy construction 75,000 cy/yr 375,000 cy/5 yr 1,700,000 cy/20 yr	25(S)	2,080,000 cy @ 10'	1
		23(S)	2,016,000 cy @ 10'	1
		20(S)	384,000 cy @ 10'	2
		22(S)	240,000 cy @ 10'	2
		19(S)	240,000 cy @ 10'	3
		21(S)	288,000 cy @ 10'	3
		24(S)	1,120,000 cy @ 10'	3
		26(S)	208,000 cy @ 10'	3
		27(S)	144,000 cy @ 10'	3

Warrenton (cont.)

Project	Amount Dredged	Site Number	Capacity	Priority
Lewis and Clark entrance channel	Unknown	32(S)	2,000,000 cy @ 10′	2
		31(S)	384,000 cy @ 10′	3
		30(S)	176,000 cy @ 10′	3
		33(S)	256,000 cy @ 10′	1
Youngs River/Bay	50,000 cy/20 yr	32(S)	2,000,000 cy @ 10′	2
		31(S)	384,000 cy @ 10′	3
		30(S)	176,000 cy @ 10′	3
Middle Skipanon development	100,000 cy estimate	23(S)	2,016,000 cy @ 10′	1
		24(S)	1,120,000 cy @ 10′	3
		26(S)	208,000 cy @ 10′	3
		27(S)	144,000 cy @ 10′	3

57.60 Youngs Bay and River

The authorized project provides a channel 10 feet deep and 150 feet wide from the Columbia River to the foot of Haven Island (2½ miles across Youngs Bay and 4 miles in Youngs River). A project modification under Section 107 was approved in 1970 to provide a channel in Lewis and Clark River but was never constructed. The project was last dredged in 1967 by pipeline, removing 47,003 cubic yards. Prior to that, the project was last dredged in 1939. Material was disposed in the bay by end dump from the discharge pipeline.

The Portland District has a recent request from Bumble Bee Seafoods for maintenance dredging in the Youngs River. Surveys obtained by the Corps indicate a minor shoal, with 9-foot soundings at approximate river mile 2.0 up to 2.3, giving a calculated quantity of 8000 cubic yards to be removed. Normal Corps procedures would be to not dredge this channel until a predominant 8-foot or 7-foot sounding existed, since smaller vessels utilize the tide and do not require the full 10-foot depth. However, a recent trend to larger fishing vessels with greater draft could revise this approach. The remainder of the channel, up to river mile 3.0, is 10 or more feet deep and should not require future maintenance.

DMD Sites

Project	Amount Dredged	Site Number	Capacity	Priority
Youngs Bay/River and Lewis and Clark River Entrance	50,000 cy/20 yr	32(S)	2,000,000 cy/10′	2
		28(S)	448,000 cy/10′	3
		29(S)	640,000 cy/10′	3
		30(S)	176,000 cy/10′	3
		31(S)	384,000 cy/10′	3

57.70 Astoria Turning Basin

As part of the authorized navigation channel, the Corps maintains an 800 feet by 4250 feet by 40 feet turning basin adjacent to the Port of Astoria, which is dredged as needed and in conjunction with hopper dredge operations using in-water disposal. Approximately 100,000 cubic yards of sediment are removed annually from the turning basin.

57.80 Port of Astoria

Three major project areas along the Astoria waterfront require maintenance dredging: Port of Astoria pier slips; Fisherman's Dock and Marina Boat Basin; and East End Mooring Basin. Port of Astoria pier slips require annual maintenance of approximately 115,000 cubic yards. The Port recently installed a "Ventrovac" air bubbler system to decrease shoaling at the port slips. This system has been installed on a trial basis, with hopes of substantially reducing the required maintenance dredging. The Port may also experiment with flow-lane disposal just beyond the channel. The Fisherman's Dock and Marina Mooring Basin is dredged about twice a decade. The East End Mooring Basin has never been maintained. Current shoaling conditions of the East End Mooring Basin impair mooring use.

Sediments found in the mooring basin and pier slips are fine grained (50% greater silt and clay) sediments often affected by adjacent use. Sediments generally contain high concentrations of oil and grease, high nitrogen, and have a high chemical oxygen demand (COD), enough so that sediments are often classified as polluted. Thus, disposal of mooring basin and pier slip material will often need to be placed on shoreland sites. In the past, dredging of the pier slips and mooring basin has utilized both shoreland sites and ocean disposal. Material from the pier slips is reported to make good agricultural topsoil.

The Astoria waterfront is the site of most current maintenance dredging demand in the Astoria area. Any additional development of waterfront facilities will increase the demand for construction dredging.

Plans for expanding Fisherman's Dock and Marina would require construction dredging totalling 80,000 cubic yards and would increase the maintenance dredging by an estimated 1500 cubic yards annually. Plans for increasing mooring capacity at the East End Basin would require substantial redesign of the breakwater and substantial construction dredging (100,000 cubic yards estimated). Maintenance dredging would probably be needed after reconstruction.

Major reconstruction of the Port of Astoria pier slips is planned within 20 years. About 150,000 cubic yards of dredging would be needed to expand Pier 4, which would result in further increased maintenance dredging demands. Over the 20 year time horizon, total dredging needs for the Astoria waterfront area could approach 3 million cubic yards. The majority of the total dredging need results from expanded construction and maintenance of that construction. The estimates of maintenance needs are conservative and do not take into consideration the potential for decreased maintenance due to the bubbler system installed by the Port.

Dredged material from the Astoria waterfront is not easily taken to sea. Dredging the port slips, marina basin and mooring areas for seafood processors is generally conducted by small pipeline dredges or bucket dredges that remove the material to barges or shoreland disposal sites. Material accumulated in the port slips, mooring basin, and moorage areas for seafood companies may include fine sediments and contaminants that would require land disposal. Flow-lane disposal in the estuary is not likely but may be possible, depending upon the outcome of ongoing studies. Hauling dredged material to sea for ocean disposal is a more expensive possibility.

Two potential disposal sites are associated with the Astoria waterfront area, both of which can be used for pipeline dredging in the East End Mooring Basin. The identified disposal sites do not have capacity for the increased dredging needs of the port slips or marina, and the developed nature of the Astoria waterfront precludes establishment of other disposal sites in the immediate vicinity.

Land disposal of dredged material from the Astoria waterfront will require barging to an acceptable shoreland disposal site elsewhere or pumping (with booster pumps) to an acceptable land disposal site. The alternative to land disposal sites may be disposal of certain approved materials at in-water ocean sites. Disposal of fine grained material from waterfront areas will be a chronic problem to the Port of Astoria. Development plans at present port slips and future plans at Tongue Point will need close coordination to provide long range solutions to maintenance needs.

Astoria

		DMD Sites		
Project	**Amount Dredged**	**Site Number**	**Capacity**	**Priority**
Port of Astoria slips maintenance	121,000 cy/yr		Ocean Disposal	
	605,000 cy/5 yr	46(S)	2,000,000 cy @ 3'	1
	2,420,000 cy/20 yr			
Fisherman's Dock and Marina	4,000 cy/yr		Ocean Disposal	
	20,000 cy/5 yr	38(S)	240,000 cy @ 10'	2
	80,000 cy/20 yr	46(S)	2,000,000 cy @ 3'	1
	100,000 cy expansion			
East End Basin	100,000 cy/5 yr	37(S)	112,000 cy @ 10'	2
	175,000 cy/20 yr	38(S)	240,000 cy @ 10'	2
		46(S)	2,000,000 cy @ 3'	1
Pier 4 construction	250,000 cy/20 yr		Ocean Disposal	
		36(E)	Estuary Disposal	
		15(E)	Estuary Disposal	
		39(E)	Estuary Disposal	

57.90 Tongue Point

The Tongue Point area has received close scrutiny by the Port of Astoria as a potential development site. The Port of Astoria plans to acquire the property from the General Services Administration and develop it as a container yard. Development would require substantial construction dredging. Construction dredging for the first phase would be between about 2.8 and 3.8 million cubic yards. Second phase construction dredging is estimated at about 3 million cubic yards. The maintenance dredging requirement associated with development at Tongue Point would be studied as engineering design proceeds.

Sediment borings in the MARAD Basin indicate 4½ to 5 feet of fine grained material overlying Columbia River sands. Surface material is dark and shows indications of paint chips and contaminants from past use of the basin as a mooring area for Navy vessels. Disposal of the material dredged from Tongue Point may be required to be placed on-land to prevent water quality degradation.

Development plans for the Tongue Point area foresee substantial areas of fill being required to complete development potentials. The use of construction dredged material for fill will decrease the

requirement for sites to dispose of dredged material within the area. Specific site development plans and environmental studies will lead to better estimates of construction and maintenance dredging and associated disposal needs.

As has been repeatedly emphasized throughout the dredged material management planning process, development plans for specific projects or sites should take a regional approach. In the case of Tongue Point, the potential value of a relatively low-maintenance deep water port should be compared to the value of existing port facilities. Current disposal problems are well documented and will probably increase in severity with expansion of the present Port of Astoria facilities.

Tongue Point

		DMD Sites		
Project	**Amount Dredged**	**Site Number**	**Capacity**	**Priority**
250' x 40' channel	1,000,000 cy construction 27,000 cy/yr 1,540,000 cy/20 yr	40(S)	1,920,000 cy @ 20'	1
		Pier slips	4,000,000 cy	2
		41(S)	128,000 cy @ 10'	1
		42(S)	1,240,000 cy @ 10'	2
		43(S)	480,000 cy @ 10'	3
		44(S)	720,000 cy @ 10'	3
			Ocean Disposal	
400' x 40' channel	2,470,000 cy construction 38,000 cy/yr 3,230,000 cy/20 yr	40(S)	1,920,000 cy @ 20'	1
		Pier slips	4,000,000 cy	2
		41(S)	128,000 cy @ 10'	1
		42(S)	1,240,000 cy @ 10'	2
		43(S)	480,000 cy @ 10'	3
		44(S)	720,000 cy @ 10'	3
			Ocean Disposal	
250' Channel/Turning Basin	2,800,000 cy construction 26,000 cy/yr 3,320,000 cy/20 yr	40(S)	1,920,000 cy @ 20'	1
		Pier slips	4,000,000 cy	2
		41(S)	128,000 cy @ 10'	1
		42(S)	1,240,000 cy @ 10'	2
		43(S)	480,000 cy @ 10'	3
		44(S)	720,000 cy @ 10'	3
			Ocean Disposal	

58. UPPER ESTUARY PROJECTS

58.10 Grays Bay

In Grays Bay, authorized projects consist of a channel in Deep River and hazard removal in Grays River. The Deep River Channel was completed in 1928, providing a channel 8 feet by 100 feet at the mouth and 8 feet by 60 feet to the town of Deep River at river mile 6. The Grays River project was completed in 1909, removing obstructions from the channel and banks from the mouth to the town of Grays River at river mile 8.

In Deep River, the channel depth is still 8 feet to river mile 2.25 and log rafts move at least to river mile 4. The last Corps condition survey was 1975. In Grays River, the channel is 2 feet or shallower to river mile 6.5. Heavy siltation at the mouth and obstructions in the channel limit navigational access and increase flood potential. Additionally, access to the main ship channel about 3 miles distant is limited by poorly marked natural channels and shallow depths in Grays Bay.

Wahkiakum County's Port District Two is petitioning the Corps concerning Grays River dredging. Grays River dredging is not authorized, however, and it may be several years before any decision is made. Some channel improvement can be expected, however, within 20 years. Dredging an 8 foot by 100 foot channel in Grays River to river mile 1 would generate about 350,000 cubic yards. An 8 foot by 60 foot channel to the town of Grays River would remove about 240,000 cubic yards more.

Increasing the depth by 6 feet from the mouth of Deep River to Rocky Point would require removing about 1,000,000 cubic yards of material. Completing the authorized channel in Deep River would probably require removing about 400,000 cubic yards.

Completion of the Deep River channel could occur within the next five years, if there is local demand. Authorizing and completing a channel in Grays River or Grays Bay is less likely to occur in five years, but is a possibility within 20 years. Most of the channel

dredging in the rivers would probably be done by clamshell and barge, clamshell with bank disposal, or small pipeline.

The projects would require DMD capacity of 1,990,000 cy. The plan identifies 6 DMD sites with a combined capacity of 1,500,000 cy.

Grays Bay

Project	Amount Dredged	DMD Sites: Site Number	DMD Sites: Capacity	DMD Sites: Priority
Deep River	400,000 cy/5 yr	48(S)	240,000 cy @ 10'	2
	400,000 cy/20 yr	49(S)	320,000 cy @ 10'	2
		50(D)	150,000 cy	
Grays River entrance	350,000 cy/5 yr	51(S)	320,000 cy @ 10'	2
	350,000 cy/20 yr	52(S)	320,000 cy @ 10'	2
		53(D)	150,000 cy	
Grays River channel	240,000 cy/20 yr	51(S)	320,000 cy @ 10'	2
		52(S)	320,000 cy @ 10'	2
		53(D)	150,000 cy	
Grays Bay	1,000,000 cy/20 yr	48(S)	240,000 cy @ 10'	2
		52(S)	320,000 cy @ 10'	2
		50(D)	150,000 cy	
		53(D)	150,000 cy	

58.20 Skamokawa

At Skamokawa, the channel 6.5' x 75' x 1600' is maintained to Brooks Slough. An authorized channel 24' x 160' x 2640' in Steamboat Slough was never dredged. The channel to Brooks Slough has been maintained by the "Sandwick" (prop-wash dredge) since 1974, and a controlling depth of two feet was last reported. The "Sandwick" is estimated to redistribute about 10,000 cubic yards annually. The channel in Steamboat Slough has never been dredged, and the project has been recommended for deauthorization.

Port District Two of Wahkiakum County is petitioning the Corps regarding dredging in Brooks Slough. With the planned Skamokawa Park and increasing private and recreational use of the area, some channel improvement seems likely within five years. The channel in Steamboat Slough does not appear to be a probable development within the next five years, but may be viable within a 20 year perspective. A minimum improvement of the authorized channel to Brooks Slough would require removing about 40,000 cubic yards requiring disposal. An improvement of the channel in Steamboat Slough for shallow draft use would probably require 88,000 cubic yards of dredged material disposal.

Clean sand material from Brooks Slough would be welcomed by local interests. The Skamokawa Park site was filled by main channel maintenance and a future stockpile site is being leased west of the park. Fine grained or polluted sediments would need a portion of the existing stockpile site for retention for a sufficient period for dewatering.

Skamokawa

Project	Amount Dredged	DMD Sites: Site Number	DMD Sites: Capacity	DMD Sites: Priority
Skamokawa Creek Channel	10,000 cy/yr 50,000 cy/5 yr 200,000 cy/20 yr	65(S)	176,000 cy @ 10'	1
Brooks Slough improvement	40,000 cy/5 yr	65(S)	176,000 cy @ 10'	1
	40,000 cy/20 yr	66(B)	Beach Nourishment	
Steamboat Slough	88,000 cy/20 yr	65(S)	176,000 cy @ 10'	1
South End of Price Island port development	minimal	69(S)	1,200,000 cy @ 10'	2

58.30 Price Island

Price Island has been a source of conflict over potential development of the county owned upriver end. The remained of the upland and the adjacent mainland are administered by the U.S. Fish and Wildlife Service as critical habitat for Columbian White-tailed deer. Before being obtained by the U.S. Fish and Wildlife Service, a portion of the downriver end of Price Island was used for disposal by the Corps of Engineers. This part of the island is also adjacent to the potential channel in Steamboat Slough.

Price Island is undeveloped and has no land access. Deep water along the Columbia River is due, in part, to active erosion of the shoreline. This deep water access is what Wahkiakum County wishes to exploit. Because of the nature of the conflict, there is little certainty that the proposed deep water facility will materialize. In light of the past dredged material disposal and proximity to Skamokawa, it would appear more logical to negotiate a development site at the downriver end of Price Island.

58.40 Cathlamet

An authorized channel 10' x 300' is maintained from the Columbia River near the downriver end of Puget Island to Elochoman Slough; also authorized are a marina at Cathlamet on Elochoman Slough, a channel 10' x 100' for 1.5 miles up Elochoman Slough, a large log-handling facility up Elochoman Slough, and an active dredging permit in Cathlamet Channel upstream from the Puget Island bridge. Depths are considered adequate in Cathlamet Channel, and no maintenance dredging has been recently needed. The Corps has not dredged in Elochoman Slough since before 1964, with the exception of that required for construction of Elochoman Marina. The extreme upriver end of Cathlamet Channel (near the east end of Brown Island) has experienced shoaling believed related to pile dikes and in-water disposal from the main navigation channel.

No development plans exist in the Cathlamet area that would require dredging or disposal. Local interests have expressed a desire to improve navigation access to Cathlamet Channel at the upriver end of Brown Island. Further study of this shoaling will indicate action necessary to alleviate the problem; some dredging may be required. Continued development by private interests in Elochoman Slough can be expected. The existing marina is being improved but will probably not be expanded. Some new dredging will probably occur in Elochoman Slough.

Dredging in Cathlamet Channel will probably produce clean sand, but sediments in Elochoman Slough are fine grained and probably polluted. A previously used disposal area on the tip of Hunting Island would be sufficient to accommodate anticipated upland disposal needs in Elochoman Slough. Present commercial use of dredged material from Cathlamet Channel would indicate constructive use could be made of any dredged material from future dredging at the upriver end of Cathlamet Channel. Future disposal by the Corps of Engineers at the upriver end of Brown Island may alleviate the present shoaling problem.

Cathlamet

		DMD Sites		
Project	**Amount Dredged**	**Site Number**	**Capacity**	**Priority**
Elochoman Marina	minimal	74(S)	1,440,000 cy @ 10'	2
		76(S)	320,000 cy @ 10'	1
Elochoman Slough improvement	20,000 cy/5 yr	74(S)	1,440,000 cy @ 10'	2
at entrance	20,000 cy/20 yr	76(S)	320,000 cy @ 10'	1
Cathlamet Channel	unknown	76(S)	320,000 cy @ 10'	1

58.50 Puget Island

An extensive dike improvement project is underway on Puget Island, using stockpiled dredged material from Corps channel maintenance. Channel maintenance material has been deposited along the shoreline on the Columbia River side of Puget Island in the past, resulting in wide beaches. Several pile dikes upriver of Brown Island have had adjacent in-water disposal and dredged material has been deposited on Brown and White Islands.

Housing and other future development will probably be concentrated along the southwestern shoreline (Sunny Sands, Welcome Slough, Bernie Slough, and Jackson Slough). Beach nourishment for Sunny Sands and the area west of Welcome Slough will probably be necessary as erosion occurs and property owners require it. These sloughs and Grove and Net Rack Sloughs are poorly maintained for boating and drainage, and will probably require some future maintenance dredging. Local interests

have petitioned the Corps for dredging at Welcome, Jackson and Bernie Sloughs.

Future local dredging projects on Puget Island will require feasibility studies, probably under the Corps of Engineers Section 107 authority. The amounts of dredged material will probably be small enough to be utilized by adjacent landowners benefitting from the dredging. Only in Welcome Slough is the material likely to pose a disposal problem due to pollution and needed upland disposal. A potential site is available, but neither the magnitude of the present problem nor future remedies can be addressed without further study.

DMD Sites

Project	Amount Dredged	Site Number	Capacity	Priority
Welcome Slough development	unknown	85(S)	160,000	2

58.60 Bradwood

No active development exists at the Bradwood area. The site was used as a mill, with a large wharf for shipping lumber. The wharf is not serviceable at the present time. A portion of the site has been used in the past for disposal of channel maintenance materials.

Development potential of the Bradwood site has been identified by the Port of Astoria and the State Department of Transportation. Development is not believed to involve substantial dredging, but recent investigations into development suitability and requirements for the site have not been made, and estimates of construction or maintenance dredging volumes are not available.

Dredged material from the Bradwood area could possibly utilize flow lane disposal, depending on the type of material to be dredged and approval by state and federal agencies. Three potential disposal sites exist. Two have been used in the past for channel maintenance disposal.

DMD Sites

Project	Amount Dredged	Site Number	Capacity	Priority
Port of Astoria development	not substantial	78(S)	450,000 cy	2

58.70 Wauna-Westport

Currently, a wood processing facility at Wauna extends west from Driscoll Slough, with an authorized 28' x 200' x 3500' channel in Westport Slough that has not been maintained since 1966. The Puget Island-Westport Ferry operates out of Westport Slough. A private residential development is located on part of the property east of Westport Slough.

Some potential for industrial development exists along the entire area from Westport Slough to the Bradley cliffs. Crown Zellerbach will probably expand to the east and west boundaries of their property. Warrenton Lumber Company, on the west side of Westport Slough, plans to develop a wood processing facility, with ship access to both the Columbia River and Westport Slough.

Little dredging would be required for most future development, but a significant amount of filling would occur. Potential disposal sites are related to Corps maintenance dredging. Future use as development sites would depend upon resolution of conflicts over resource values and dredged material disposal. Beach nourishment east of Westport Slough would also depend upon maintenance dredging needs and owner acceptability. The land disposal sites in East Clatsop County do not have the capacity to meet the 20-year dredging requirements for Corps projects. There is no available capacity for new construction dredging. Flow lane disposal could possibly alleviate the land disposal requirement for East Clatsop County, if further study so indicates.

DMD Sites

Project	Amount Dredged	Site Number	Capacity	Priority
Westport Slough	not maintained	90(S)	2,720,000 cy	1
Waterfront development	not substantial	90(S)	2,720,000 cy	1
		83(S)	1,120,000 cy	2

59. DREDGED MATERIAL DISPOSAL SITES

59.10 OCEAN SITES

Location 46°12'38"N, 124°06'30"W @ RM −2.5
Size 5000' x 2000'
Depth 65'
Biological Density Moderate
Sediment Transport Some Clatsop Spit Beach Nourishment, most stabile.
(cf 41.01, 55.11)

DISPOSAL SITE B — OCEAN
Location 46°14'10"N, 124°10'30"W @ RM −4.0
Size 5000' x 2000'
Depth 110'
Biological Density Moderate
Sediment Transport Northerly, parallel to coast
(cf 41.01, 55.11)

DISPOSAL SITE E — Ocean
Location 46°15'27"N, 124° 5'37"W @ RM 0.5
Size 4000' x 1000'
Depth 60' - 70'
Biological Density Low
Sediment Transport Stabile during summer; During winter, some material goes westward with natural sediment to the outer tidal delta while the remainder moves northeast, either over Peacock Spit to the northern beaches or behind the North Jetty.
(cf 41.01, 55.11)

DISPOSAL SITE F — Ocean
Location 46°12'00"N, 124°09'00"W @ RM - 4.5
Size 1800' x 1800'
Depth 125'
(cf 41.01, 55.11)

DISPOSAL SITE G — Ocean
Location 46°11'30"N, 124°06'00"W @ RM 3.5
Size 3000' x 6000'
Depth 80'
(cf 41.01, 55.11)

DISPOSAL SITE H — Ocean
Location 46°14'30"N, 124°08'30"W
Size 4200' x 4200'
Depth 40'
(cf 41.01, 55.11)

59.20 ESTUARY SITES

6(E) - Estuary (CoE "Jetty A")
Location 46°15'40"N, 124°02'23"W @ RM 2.9
Size 1600' x 1000'
Depth 100'
Related Projects Main Navigation Channel: Clatsop Shoal (RM −0.2 - 2.6); Outer Shoal (RM −1.5 - −1.0)
Comments Large scour hole; can accept both coarse and fine sediments

7(E) - Estuary (CoE "Sand Island")
Location 46°15'43"N, 124°01'22"W @ RM 3.5
Size 900' x 300'
Depth 40'
Related Projects Main Navigation Channel: Clatsop Shoal (RM −0.2 - 2.6); Outer Shoal (RM −1.5 - −1.0)

D - Estuary (CoE "D")
Location 46°14'27"N, 123°57'00"W @ RM
Size 5000' x 2000'
Depth 38'
Relative Biological Density Moderate
Sediment Transport fines towards Baker Bay
Access Good
Traffic Density Low
Related Projects Used in place of ocean disposal for many projects when bar conditions are rough.

11(E) - Estuary (CoE "Point Adams")
Location 46°12'45"N, 123°56'30"W @ RM 8.5
Size 900' x 300'
Depth 25'
Related Projects Main Navigation Channel: L. Desdemona Shoal (RM 5.0 - 7.8); U. Desdemona Shoal (RM 8.7 - 9.4); Flavel/Astoria Shoal (RM 11.3 - 11.6, 12.5 - 12.6). Also Skipanon Channel Entrance and Astoria Turning Basin.

15(E) - Estuary (CoE "Tansy Point" ÷ CLT-10.0-IW)
Location 46°11'40"N, 123°55'30"W @ RM 10.0
Size 1500' x 700'
Depth 45'
Relative Biological Density Moderate
Sediment Transport Downstream with probable channel return near Hammond.
Access Good
Traffic Density Moderate, but high during charter season.
Related Projects Main Navigation Channel: U. Desdemona Shoal (RM 8.7 - 9.4). Also Skipanon Channel Entrance, Astoria Turning Basin, and Pier 4 construction.

36(E) - Esturay (CoE "Bridge")
Location 46°11'47"N, 123°51'30"W @ RM 13.2
Size 2100' x 900'
Depth 60' - 70'
Related Projects Main Navigation Channel: Flavel Shoal (RM 11.3 - 11.6). Also Skipanon Channel Entrance, Astoria Turning Basin, and Pier 4 construction.

39(E) - Estuary (CoE "Tongue Point")
Location 46°12'55"N, 123°45'40"W @ RM 18.0
Size 1800' x 900'
Depth 100'
Relative Biological Density Moderate
Related Projects Main Navigation Channel: Tongue Point Shoal (RM 18.7 - 19.1) U. Sands Shoal (RM 16.3 - 16.6). Also Astoria Turning Basin and Pier 4 construction.

54(E) - Estuary (CoE "Harrington Point Sump", # CLH-21-IW)
Location 46°14'30"N, 123°42'30"W @ RM 21.0
Size 8400' x 450'
Depth 41'
Relative Biological Density Moderate
Sediment Transport Downstream
Access Good
Traffic Density Low
Related Projects Main Navigation Channel: Tongue Point Shoal (RM 18.7 - 19.1); U. Sands Shoal (RM 16.3 - 16.6); L. Miller Sands Bar (RM 21.4 - 22.5); U. Miller Sands Bar (RM 23.5 - 24.6); Flavel/Astoria Shoal (RM 11.3 - 11.6, 12.5 - 12.6).

59.30 FLOW-LANE SITES

59(F) - Flow-Lane (CoE # RM26IW)
Location 46°15'17"N, 123°36'45"W @ RM 26
Size 4000' x 800'
Depth 30'
Related Project Main navigation channel: L. Pillar Rock Bar (RM 25.0 - 26.0); U. Pillar Rock Bar (RM 26.4 - 27.9); L. Brookfield Bar (RM 28.7 - 29.7)
(cf 41.04, 55.13)

68(F) - Flow-lane (CoE # RM34IW)
Location 46°15'21"N, 123°27'10"W @ RM 34
Size 750' x 3000'
Depth 40'
Related Project Main Navigation Channel: Welch Island Bar (RM 32.6 - 34.0); Skamokawa Bar (RM 35.0 - 35.9).
(cf 41.04, 55.13)

73(F) - Flow-lane (CoE # RM37IW)
Location 46°13'46"N, 123°25'25"W @ RM 37
Size 750' x 2400'
Depth 65'
Related Project Main Navigation Channel: Puget Island Bar (RM 37.4 - 38.7); Wauna Bar (RM 40.5 - 41.5)
(cf 41.03, 41.04, 55.13)

81(F) - Flow-lane (CoE # RM40IW)
Location 46°10'55"N, 123°25'32"W @ RM 40
Size 300' x 1000'
Depth 35'
Related Project Main Navigation Channel: Wauna Bar (RM 40.5 - 41.5)
(cf 41.01, 41.04, 55.13)

95(F) - Flow-lane (CoE # RM46IW)
Location 46°68'40"N, 123°20'00"W @ RM 46
Size 750' x 6500'
Depth 25'
Related Project Main Navigation Channel: U. Westport Bar (RM 46.8 - 48.4); Eureka Bar (RM 51.4 - 52.0)
(cf 41.01, 41.04, 55.13)

59.40 BEACH NOURISHMENT SITES

56(B) - Beach Nourishment (CoE #0.23.5)
Location RM 23.5, Miller Sands, 1600' to L. Miller Sands Bar, 800' to U. Miller Sands Bar
Size 120 acres
Ownership Federal, wildlife refuge
Designation *Conservation*
Current Use Wildlife Refuge
Future Use Wildlife Refuge
Related Projects 40' navigation channel - Upper Miller Sands Bar (RM 23.5 to 24.6)
Bio-Physical Description Horseshoe shaped estuary sand islans; northern dogleg active DMD site; flat sandy spit, less than 20 feet high with a shallow area separating it from the southern island; experimental marsh habitat creation at the eastern end; population of bird species; tidal marsh habitat.
Environmental Concerns Protect existing island by periodic beach nourishment; future habitat experimentation may be appropriate; without periodic replenishment this sand spit will probably be breached by wind and water erosion adversely affecting protected interior tidal marsh.
(cf 41.05, 55.13)

57(B) - Beach Nourishment
Location RM 25, Near Altoona, Washington; 1300' to L. Pillar Rock Bar
Size 18 acres
Ownership Private
Designation *Conservation*
Current Use Recreation
Future Use Recreation
Related Projects 40' navigation channel - Lower Pillar Rock Bar (RM 25.0 to 26.0)
Bio-Physical Description Estuary sand beach bordered by steep forested upland; beach approximately 1700 feet long and 400 feet at widest point; estuary beaches support planktonic forms which support a variety of juvenile and adult fish species.
(cf 44.05, 55.13)

58(B) - Beach Nourishment
Location RM 26, Elliott Point, 1000' to L. Pillar Rock Bar
Size 4 acres
Ownership Private
Designation *Conservation*
Current Use Recreation
Future Use Recreation
Related Projects 40' navigation channel - L. Pillar Rock Bar (RM 25.0 to 26.0)
Bio-Physical Description Eroding estuary sand beach bordered by a rocky shoreland and woody area; approximately 2000' long with some DMD at west end and less than 100 feet of beach and vegetation between river and road; mature trees adjacent to road north of site with little vegetation on the site itself.
(cf 44.05, 55.13)

60(B) - Beach Nourishment (CoE # 0.27.2)
Location RM 27.2, Jim Crow Sands (Pillar Rock Island), 900 feet to U. Pillar Rock Bar
Size 70 acres
Ownership Federal
Designation *Conservation*
Current Use Wildlife Refuge
Future Use Wildlife Refuge
Related Projects 40' navigation channel - U. Pillar Rock Bar (RM 26.4 to 27.9), Lower Pillar Rock Bar (RM 25.0 to 26.0)
Bio-Physical Description Estuary sand island one mile long and 800' at widest point; a few trees on the western half along with scattered grasses and shrubs; the eastern half revegetated with grass and shows good cover.
(cf 41.05, 55.13)

61(B) - Beach Nourishment (CoE # W.26.8)
Location RM 26.5, Elliott Point, 1500' to U. Pillar Rock Bar
Size 4 acres
Ownership Private
Designation *Conservation*
Current Use Recreation
Future Use Recreation
Related Projects 40' navigation channel - Upper Pillar Rock Bar (RM 26.4 to 27.9), Lower Pillar Rock Bar (RM 25.0 to 26.0)
Bio-Physical Description Estuary sand beach less than 50' wide for 1600', widening to almost 200' at the eastern end (where past disposal has occurred); from 50 to 200 feet of vegetation between beach and road; mature trees adjacent to road; little vegetation on the beach.
(cf 44.05, 55.13)

62(B) - Beach Nourishment
Location RM 27.1, Pillar Rock, 1500' to U. Pillar Rock Bar (RM 26.5 to 28.0)
Size 4 acres
Ownership Private
Designation *Conservation*
Current Use Recreation
Future Use Recreation
Related Projects 40' navigation channel - Upper Pillar Rock Bar (RM 26.5 to 28.0)
Bio-Physical Description Gravelly estuary beach 1000 feet west of cannery; approximately 250' wide within 100 feet of road; mature trees along roadside; little vegetation on site.
(cf 44.05, 55.13)

63(B) - Beach Nourishment (CoE # W.28.2)
Location RM 28.2, Jim Crow Point, 2000' to U. Pillar Rock Bar
Ownership Private
Designation *Conservation*
Current Use Recreation
Future Use Recreation
Related Projects 40' navigation channel - U. Pillar Rock Bar (RM 26.5 to 28.0), Lower Brookfield Bar (RM 28.7 to 29.7)
Bio-Physical Description Sand and gravel beach extending from Jim Crow Point 2000' west; western half about 100' wide and eastern half about 250' at widest point where past DMD has occurred; mature trees and some vegetation on western end; mostly bare beach on remainder of site.
(cf 44.05, 55.13)

66(B) - Beach Nourishment (CoE # W.33.4)
Location RM 33.4, Skamokawa, 800' to Welch Island Bar, 400' to entrance to Brooks Slough
Size 5 acres
Ownership Port District #2, Wahkiakum County
Designation *Development*
Current Use DMD Site
Future Use Park
Related Projects 40' navigation channel - Welch Island Bar (RM 32.6 to 34.0) and Brooks Slough improvement
Bio-Physical Description DMD site on west bank of entrance to Skamokawa/Brooks Sloughs; dredged sand fills about 1300' along the river extending almost 1000' back toward the highway; trees and undergrowth on both east and west sides of the site with no vegetation on site.
(cf 44.04, 55.13)

70(B) - Beach Nourishment (CoE # W.34.4)
Location RM 34.5, Price Island, 1500' to Skamokawa Bar
Size 5 acres
Ownership Wahkiakum County
Designation Conflict
Related Projects 40' navigation channel - Skamokawa Bar (RM 35.0 to 35.9), Welch Island Bar (RM 32.6 to 34.0)
Bio-Physical Description Unaltered low area with small creek draining into Steamboat Slough; extensive forest cover with large stands of tall trees; supports population of bird species, small mammals and terrestrial furbearers; wetland area.
(cf 44.03, 55.13)

72(B) - Beach Nourishment (CoE # 0.36.8)
Location RM 36.8, beach on S.E. side of Tenasillahe Island, 900 yds to main ship channel
Size 10 acres
Ownership Federal
Designation *Conservation*
Current Use Wildlife Refuge
Future Use Wildlife Refuge
Related Projects 40' navigation channel - Puget Island Bar (RM 37.4 to 38.7)
Bio-Physical Description Eroding shoreline; predominantly sand beach, intertidal flats outside an existing dike; beach probably supports planktonic forms which support a variety of juvenile and adult fish species; valuable fishing drift located in the river along this area.
(cf 41.08, 55.13)
Comments The main concern with this area is that the commercial fishing drift along side be protected.

77(B) - Beach Nourishment (CoE # 0.38.3)
Location RM 38.3, south tip of Tenasillahe Island, .3 miles from main ship channel
Size 10 acres
Ownership Federal
Designation *Conservation*
Current Use Recreation and DMD
Future Use Recreation and DMD
Related Projects 40' navigation channel - Puget Island Bar (RM 37.4 to 38.7)
Bio-Physical Description Southern part behind the existing pile dike is a broad sand beach with a steep, eroding slope on the channel side; area to the north is lower and partially submerged; major portion of the island to the south is channel sand with little wildlife value; northern and western portions are tidal marsh with a few willow trees.
Environmental Concerns After each disposal the area may be seeded for water fowl winter feed increasing water fowl habitat area.
Comments This disposal site is currently used and is accepted (with certain restrictions) by permit agencies. Area has conflicts with wildlife people — that whole area was once a DMD site.
(cf 41.08, 55.13)

80(B) - Beach Nourishment (CoE # W.38.7)
Location RM 38.7, north tip of Puget Island, 100 yards from main ship channel
Size 20 acres
Ownership Private
Designation *Development*
Current Use Recreation and DMD
Future Use Recreation and DMD
Related Projects 40' navigation channel - Puget Island Bar (RM 37.4 to 38.7)
Bio-Physical Description River beach outside the road dike around Puget Island; predominantly channel sand dredged material; DMD stockpile site by Wahkiakum County at the northern end; some mature trees and shrubs located along the east side of the beach above the high water level and also in some spots along the beach.
Environmental Concerns New sand should not encroach into waterway and existing vegetation should be maintained.
(cf 44.01, 55.13)

82(B) - Beach Nourishment (CoE # W.40.9)
Location RM 40.9, north of Welcome Slough, 200 yards from main ship channel
Size 30 acres
Ownership Private
Designation *Conservation*
Current Use Recreation and DMD
Future Use Recreation and DMD
Related Projects 40' navigation channel - Wauna Bar (RM 40.5 to 41.5)
Bio-Physical Description A river beach outside the road dike around Puget Island; predominantly sand; small temporary stockpile site located in the southern portion; material currently used for dike maintenance purposes on Puget Island; sport fishing site; some small spots of large trees.
(cf 44.01, 55.13)

84(B) - Beach Nourishment (CoE # 0.40.8)
Location RM 40.9, immediately downstream from the Wauna Mill.
Size 3500 by 500 feet
Ownership Private
Designation *Development*
Current Use DMD
Future Use DMD, Development
Related Projects 40' navigation channel - Wauna Bar (RM 40.5 to 41.5)
Bio-Physical Description DMD site; continuous erosion of shoreline; no vegetation.
(cf 43.13, 55.13)

87(B) - Beach Nourishment (CoE # W.41.8)
Location , beach south of Welcome Slough, ¾ mile from main ship channel
Size 5 acres
Ownership Private (disputed with State)
Designation *Development*
Related Projects 40' navigation channel - Wauna Bar (RM 40.5 to 41.5) and Lower Westport Bar (RM 42.0 to 43.3)
Bio-Physical Description Sand beach outside road dike around Puget Island; predominantly sand with occasional clumps of large trees along beach.
(cf 44.01, 55.13)
Comments Major concerns with this area are controlling the material, not allowing encroachment into water, and retaining existing woody vegetation. Access from main channel dredging is limited by Coffee Pot Island and may prohibit future beach nourishment.

88(B) - Beach Nourishment (CoE # W.41.3)
Location RM 41.3, north Coffee Pot Island
Size 6 acres
Ownership Private
Designation *Conservation*
Related Projects 40' navigation channel - Wauna Bar (RM 40.5 to 41.5) and Lower Westport Bar (RM 42.0 to 43.3)
Bio-Physical Description Estuary sand island; low and flat; Coffee Pot Island has been used extensively for DMD; predominantly willow and large trees; sand beaches along the southern perimeter; woody area supports small mammals and foraging bird species.
(cf 44.01, 55.13)

91(B) - Beach Nourishment (CoE # W.43.8)
Location RM 43.8, E. Sunny Sands or Pancake Point, 600 yards from main ship channel
Size 20 acres
Ownership Private (disputed with State)
Designation *Conservation*
Related Projects 40' navigation channel - Lower Westport Bar (RM 42.0 to 43.3) and Middle Westport Bar (RM 44.4 to 45.4)
Bio-Physical Description River beach outside the road dike around Puget Island; predominantly sand beach with a steep, eroding bankline; numerous private homes adjoin the beach outside of the protective dike; sport fishing areas are located along the beach.
(cf 44.01, 55.13)

92 (B) - Beach Nourishment (CoE # 0.44.4)
Location RM 44.0, 250 yards from main ship channel
Size 50 acres
Ownership Private
Designation *Conservation*
Current Use Beach Nourishment; DMD
Related Projects 40' navigation channel, Middle Westport Bar (RM 44.4 to 45.5)
Bio-Physical Description Low-flat sand beach outside dike; eroding.
(cf 43.13, 55.13)

94(B) - Beach Nourishment (CoE # W.45.0)
Location RM 45.0, White Island, 700 yards from main ship channel
Size 40 acres
Ownership State
Designation *Conservation*
Related Projects 40' navigation channel - M. Westport Bar (RM 44.4 to 45.4)
Bio-Physical Description Beach along river side of estuary sand island; low and flat.
(cf 44.01, 55.13)

96(B) - Beach Nourishment (CoE # W.46.3, W.46.0)
Location RM 47.1, east of site 55 on south tip of Puget Island, 600 yards from main ship channel
RM 46.3, south tip of Puget Island, 650 yards from main ship channel
Size 139 acres
Ownership State
Designation *Conservation*
Current Use Flow Control
Future Use Flow Control
Related Projects 40' navigation channel - Westport Bar (RM 45.7 to 46.7) and U. Westport Bar (46.8 to 48.4) and Cathlamet Channel
Bio-Physical Description Sand island in river used for flow controls; low and flat; little wildlife value; beach along river side of estuary sand island.
Comments There are conflicts over flow-control and shoaling in Cathlamet Channel; local interests want the gaps filled.
(cf 44.01, 55.13)

97(B) - Beach Nourishment (CoE # W.51.3)
Location RM 51.0, County Line Park, 1000' to Eureka Bar and 2500' to Lower Eureka Bar
Size 12 acres
Ownership Private
Designation *Conservation*
Current Use Recreation
Future Use Recreation
Related Projects 40' navigation channel - Eureka Bar (RM 51.4 to 52.0) and L. Eureka Bar (RM 49.9 to 50.5)
Bio-Physical Description Estuary sand beach west of County Line Park; private residences adjacent to beach; upland slope increases to the west; scattered vegetation, predominantly beach grass, located on beach; forested slopes bordering on the north and west sides.
(cf 44.02, 55.13)

98(B) - Beach Nourishment (CoE # W.51.3)
Location RM 51.3, County Line Park, 600' to Eureka Bar
Size 2 acres
Ownership Wahkiakum County
Designation *Conservation*
Current Use Recreation
Future Use Recreation
Related Projects 40' navigation channel - Eureka Bar (RM 51.4 to 52.0)
Bio-Physical Description Narrow river sand beach adjacent to a park site protected by rip-rap; small drainage channel at eastern end of site; site is between two pile dikes and is an eroding area; no existing vegetation.
(cf 44.02, 55.13)

59.50 SHORELAND SITES

1(S) - Shoreland **Priority 1**
Location Baker Bay at Port of Ilwaco, adjacent to Port and Ilwaco Shoal
Size 8 acres
Ownership Port of Ilwaco
Capacity Stockpile for reuse, can handle 12,000/yr or 240,000/20 yr
Designation *Water Dependent Development*
Current Use DMD stockpile site
Final Use Port development
Related Project Port of Ilwaco basin and entrance maintenance
Bio-Physical Description Present sand DMD site; retention areas next to breakwater on south and east sides; some development adjacent to basin; sand area with sparse grasses and little habitat value.
Engineering Present acceptable DMD site; reevaluate routing of effluent material to minimize impacts to surrounding area; a portion should be reserved for reuse.
Environmental Concerns If disposal is contained to existing area no adverse environmental impacts expected.
Comments Future development plans may conflict with use of this site, but continued upland disposal is important for basin and entrance maintenance. Future development of site may mean relocation of this stockpile to another site.
(cf 45.07, 56.40)

2(S) - Shoreland **Priority 2**
Location RM 2.7 just southeast of Cape Disappointment, East of Jetty A, 2200 feet to Cape D Shoal, 4000 feet to Mid-Channel Shoals, 7500 feet to Ilwaco Shoal
Size 30 acres
Ownership Federal
Capacity 500,000 cy at 10 feet
Designation *Conservation*
Current Use Limited DMD use
Related Projects Baker Bay West Channel - new channel alignment or improvement, Cape D Shoal (RM 3.0-4.0).
Bio-Physical Description Generally flat, sandy area with no authorized public access; southern shoreline has steep eroding beach; northeast beach has a low slope; upland dunes sparsely vegetated with dune grasses; low intensity use by foraging birds.
Engineering Hydraulic pipeline dredging /disposal; no site preparation if clean channel sand material; retention berm needed for finer or less clean material; only existing upland area should be used for DMD; revegetation should occur following DMD.
Environmental Concerns No substantial environmental impact from DMD because there is little important habitat at this site.
Comments Revegetation and landscaping after DMD would enhance environmental attributes and public use potential. The use of this site will depend upon a change in the current dredging practices or a change in the channel. If it became feasible to pipeline dredge the Cape D Shoal or if a new channel were to be dredged into Baker Bay, this site would be useful.
(cf 45.09, 56.10)

3(S) - Shoreland **Priority 1**

Location RM 3.0, Sand Island, 1000 feet to Cape D Shoal, 6500 feet to Ilwaco Shoal, 5000 feet to Mid-Channel Shoals.
Size 23 acres
Capacity 360,000 cy at 10 feet
720,000 cy at 20 feet
Ownership Federal
Designation *Conservation*
Current Use Active DMD Site
Final Use Wildlife habitat
Related Projects Baker Bay West Channel - Cape D Shoal (RM 3-4), Ilwaco Shoal (RM 2.9-3.1), Port of Ilwaco Basin expansion.
Bio-Physical Description Dunes area with densely vegetated shoreland bordering the east side; active DMD site surrounded by containment berm; some shrubs and fairly dense dune grass cover; possibly some foraging birds.
Engineering Hydraulic pipeline dredging/disposal; possible maintenance or heightening of existing berm necessary before new disposal operation.
Environmental Concerns Tidal marsh bordering northern edge and upland habitats on the east need protection; area should be revegetated; loss of beach grass and shrubs will occur; no other substantial environmental impacts.
Comments Possibility of habitat improvement by landscaping after use of the site is exhausted. Addition of finer material to the sandy upland dune area has enhanced ground cover.
(cf 45.05, 55.10, 56.)

4(S) - Shoreland **Priority 1**

Location RM 3.3, Sand Island, 1000 feet to Cape D Shoal, 5000 feet to Mid-Channel Shoals, 6500 feet to Ilwaco Shoal
Size 80 acres
Capacity 1,280,000 cy at 10 feet
2,620,000 cy at 20 feet
Ownership Federal
Designation *Conservation*
Current Use limited DMD use
Final Use DMD, then wildlife habitat
Related Projects Baker Bay West Channel - Cape D Shoal (.3-.4), Ilwaco Shoal (RM 2.9-3.1), new channel alignment, Port of Ilwaco Basin expansion
Bio-Physical Description Flat, sandy dune area extending south to an eroding area onshore from two pile dikes at the entrance to Ilwaco Channel; dune grasses; less vegetated than Site 3(S); supports small mammals and foraging birds.
Engineering Hydraulic pipeline dredging/disposal; containment berm should enclose area with return flow routed to protect habitat on the east and the tidal marsh to the north; limited DMD use due to access.
Environmental Concerns Loss of present grass and shrub cover should not cause significant environmental impact; should be revegetated.
Comments Best site for present maintenance for channel if pipeline disposal is needed, and for any new channel alignment or modification. Indications are that landscaping and revegetation would substantially enhance future use by wildlife.
(cf 45.05, 55.10, 56.)

5(S) - Shoreland **Priority 2**

Location RM 4.0, Sand Island
Size 95 acres
Capacity 1,520,000 cy at 10 feet
3,040,000 cy at 20 feet
Ownership Federal
Designation *Conservation*
Current Use Wildlife habitat
Final Use DMD, then wildlife habitat
Related Projects Baker Bay West Channel, Cape D Shoal (RM 3.0-4.0), Ilwaco Shoal (RM 2.9-3.1), channel improvement or realignment, Port of Ilwaco Basin expansion.
Bio-Physical Description Open dune area on southeast side of Sand Island; relatively low and flat with high wind erosion potential; sparsely vegetated with grass and has been overgrazed by cattle; gorse dominates western part of the site and grass-forb over rest of the site; tidal marsh exists along eastern side; low wildlife value.
Engineering Hydraulic pipeline dredging/disposal; berming required; careful control of routing of effluent material to avoid impact to nearly tidal marsh; channel sand and silt material; present use is minimal.
Environmental Concerns Loss of gorse and grass-forb; no other substantial environmental impacts.
Comments This site should be considered if the existing gap in Sand Island is used for a realignment channel into Chinook or Ilwaco. Due to the greater distance to possible dredging areas, this site is included only for future study.
(cf 45.05, 55.10, 56.)

8(S) - Shoreland **Priority 3**

Location RM 6.0, northwest of Chinook, 4000 feet to Port of Chinook, 5200 feet to Baker Shoal (Chinook Channel)
Size 80 acres
Capacity 1,250,000 cy at 10 feet
Ownership Private (Gile Investment Co.)
Designation *Rural*
Current Use Open space
Final Use Agriculture or rural development
Related Projects Chinook Channel; inner channel and channel expansion.
Bio-Physical Description Low, wet shoreland area west of highway; several drainage canals from highway to Baker Bay; small upland berm parallel and next to river is 5 feet higher than rest of site; residential area between port and this DMD site; part of area is forested wetland, predominantly alder to the south, mixing with Sitka spruce to the north; fringing tidal marsh along Baker Bay; supports large population of bird species, small mammals, and terrestrial furbearers.
Engineering Hydraulic pipeline dredging/disposal; should be bermed and cross diked into smaller portions for periodic use; extensive clearing required; routing of effluent material carefully controlled to protect tidal marsh to the north and water quality of Baker Bay; DMD use dependent on owners plans.
Environmental Concerns Loss of substantial forested wetland and wildlife habitat would occur.
Comments This area will probably be logged in the near future. Distance and access from present dredging operations pose some problems. If fine material is disposed of at this site, the area could be suitable for pasture land (but not structures for a number of years after operation).
(cf 45.04, 56.20)

9(S) - Shoreland **Priority 2**

Location RM 7.0, Chinook, 3000 feet to Port of Chinook, 4000 feet to Baker Shoal
Size 100 acres
Capacity 1,600,000 cy at 10 feet
Ownership Private
Designation *Rural*
Current Use Vacant/Wildlife Habitat
Final Use Agriculture
Related Projects Chinook Channel, inner channel and channel expansion; Port of Chinook Basin.
Bio-Physical Description Low, seasonally wet shoreland area northeast of Chinook; drainage canal along road on the west side, Chinook River on the east; portion if forested freshwater wetland; most has been logged and semi-cleared; shrubland composed of alder saplings, elderberry and Indian peach.
Engineering Hydraulic pipeline dredging/disposal; berming and cross diking required to allow for periodic filling; small amount of clearing required; routing of effluent material must be carefully controlled to protect surrounding area and Chinook River water quality; fine sediment from Chinook Channel to be disposed of at this site.
Environmental Concerns Loss of potential forest land and habitat for bird species, small mammals and terrestrial furbearers; major concerns are filling in wet areas and loss of riparian habitat.
Comments Tidegate on Chinook River limits tidal influence on wetlands. Protection of existing wetland or other valuable habitats must be balanced with need for port existence. Timing and sequence of use of this site should be coordinated with local interests.

10(S) - Shoreland **Priority 1**

Location RM 7, Port of Chinook, adjacent to Port.
Size 3 acres
Capacity 20,000 cy/use
Ownership Port of Chinook
Designation *Development*
Current Use DMD stockpile
Final Use DMD stockpile
Related Project Port of Chinook Basin maintenance.
Bio-Physical Description Existing DMD site with surrounding dikes and drainage into Baker Bay; little vegetation, only sparse grass, mostly on dikes.
Engineering Hydraulic pipeline dredging/disposal; silt with some contaminants; preservation of site for stockpile and reuse should be considered.
Environmental Concerns Very little environmental value associated with site; no environmental impact.
Comments Reuse of this site can occur as rapidly as the material is transported away. Existing site is acceptable to resource agencies.
(cf 45.03, 56.50)

12(S) - Shoreland **Priority 2**

Location West of existing DMD site at Hammond Boat Basin.
Size 30 acres
Capacity 480,000 cy at 10 feet
Ownership Federal
Designation *Development*
Current Use Natural area
Future Use Ft. Stevens Park parking lot
Related Project Hammond Boat Basin expansion and maintenance.
Bio-Physical Description Forested lowland on sandy substrate; relatively flat; bordered on east by disposal site for Hammond Mooring Basin **[14(S)]** and on west by residential development; dominated by red alder 50 feet high; understory of Hooker's willow and Pacific willow at 35 feet; occasional Sitka spruce; subcanopy of salmon berry, trailing blackberry, and twinberry; Lyngbey's sedge and occasional sword fern at ground level; supports large population of bird species, small mammals and terrestrial furbearers, reptiles, and amphibians.
Engineering Hydraulic pipeline dredging/disposal; minimize visual obstruction to Fort Stevens; vegetate perimeter; requires berming with interior diking, depending on boat basin sediments, return flow should pass through basin.
Environmental Concerns Disposal will produce substantial impacts on previously undisturbed area; significant impact on wildlife; minimal effects on regional biota; possible effects on Swash Lake and other habitat if diking and set-back not adequate; requires coordination with DEQ and ODFW in both placement and timing.
Comments Substantial biological value of site should preclude its use for maintenance dredging; it may be needed for development of Hammond Boat Basin. The current designation for open space could be compatible with DMD use if there is adequate revegetation and site design.
(cf 42.01, 57)

13(S) - Shoreland **Priority 1**

Location West of Hammond Boat Basin, north of 14(S).
Size 3 acres
Capacity 48,000 cy at 10 feet.
Ownership Federal
Designation *Water Dependent Development*
Current Use DMD Site
Future Use DMD Stockpile or high spot
Related Project Hammond Boat Basin maintenance (Corps entrance channel).
Bio-Physical Description Generally flat with sandy soils; DMD site revegetated as 14(S).
Engineering Pipeline or clamshell dredging/disposal; requires berming for pipeline operations; sufficiently close to Hammond Boat Basin for bucket dredging for dewatering channels will need close attention.
Environmental Concerns Minor loss of foraging habitat for birds and small mammals.
Comments The existing DMD site is not fully utilized and could be used to establish high spot for separation of the Basin from Fort Stevens State Park. The site should be used for Basin maintenance dredging.
(cf 42.01, 57)

14(S) - Shoreland **Priority 1**

Location West of Hammond Boat Basin including current DMD site and area to the immediate south.
Size 3 acres
Capacity 48,000 cy
Ownership Federal, leased to Hammond
Designation *Water Dependent Development*
Current Use DMD Site
Final Use DMD Stockpile or high spot
Related Project Hammond Boat Basin maintenance (Town of Hammond)
Bio-Physical Description Northern portion is DMD site; remainder lightly vegetated; flat with sandy soils; DMD site revegetated with salt grass and herbaceous species; disturbed area dominated by Scotch broom; some small mammals and birds.
Engineering Pipeline or clamshell dredging/disposal; requires berming for pipeline operations; removal of existing disposal material for use elsewhere is being considered; dike, berm, weir, and land discharge design to be developed.
Environmental Concerns No substantial impacts; site should be revegetated to stabilize sides and prevent wind erosion.
Comments The existing site is not fully utilized. The final use and landscaping of highspot need planning. This site should be used for maintenance dredging.
(cf 42.01, 57.20)

16(S) - Shoreland **Priority 2**

Location Between Burlington NOrthern Railroad and N.W. Warrenton Drive north of 14th Street in Warrenton.
Size 18 acres
Capacity 144,000 cy at 5 feet
Ownership City of Warrenton (Mr. E.H. Carruthers has deeded to City of Warrenton with deed restrictions)
Designation *Development* and *Water Dependent Development*
Current Use Vacant
Final Use Residential/commercial/industrial/park
Related Project Potential dredging for deep draft ship access adjacent to Tansy Point.
Bio-Physical Description Interdunal area between two sand ridges utilized by the railroad and highway; appears to have been disturbed in the past; dominated by Scotch broom and beachgrass; supports small mammals and foraging birds.
Engineering Hydraulic pipeline or bucket dredging/disposal; requires containment and nondestructive effluent discharge location; discharge into Alder Cove should be prohibited.
Environmental Concerns Minimal effects from disposal of clean materials; some habitat loss; Alder Cove will require protection.
Comments The site could be used if Tansy Point were developed for any purpose.
(cf 42.02, 57.30)

17(S) - Shoreland **Priority 3**

Location Bounded on east by Gardenia Street, on south by N.W. 11th Street, and on north by N.W. Warrenton Avenue, in Warrenton.
Size 50 acres
Capacity 800,000 cy at 10 feet
Ownership Private parcels
Designation *Development*
Current Use Agriculture
Final Use Residential
Related Project Potential dredging for deep draft ship access adjacent to Tansy Point.
Bio-Physical Description Relatively flat; drained by Tansy Creek through the center of the site; class IV loamy fine sand soils; pastured with bentgrass and other species; Tansy Creek surrounded by strip of alder; small population of wildlife, small mammals and birds.
Engineering Hydraulic pipeline dredging/disposal; requires cross diking and berming to protect Tansy Creek and subdrainages; discharge should be controlled such that effluent entering Tansy Creek will not degrade water quality on Alder Cove or Tansy Creek.
Environmental Concerns Minor reduction in county open pasture habitat; contamination of Tansy Creek and Alder Slough should be prevented by cooperation with DEQ, USFW, EPA, and NMFS.
Comments DMD use should be dependent on a demonstrated need for Port development and the unfeasibility of ocean disposal. This site is adequate for DMD use from Tansy Point. Disposal should utilize small portions sequentially.
(cf 42.02, 57.30)

18(S) - Shoreland **Priority 2**

Location South of N.W. 14th Street, west of N.W. Warrenton Street, in Warrenton.
Size 25 acres
Capacity 400,000 cy at 10 feet
Ownership County and private
Designation *Water Dependent Development*
Current Use Vacant/residential
Final Use Residential or water related development
Related Project Potential dredging for deep draft ship access adjacent to Tansy Point.
Bio-Physical Description Flat with sandy materials; drains south to Tansy Creek with no permanent channels; dominated by alder with understory of beachgrass and ferns; some open grass meadows.
Engineering Hydraulic pipeline dredging/disposal; requires clearing and diking to prevent discharge into Tansy Creek; discharge must be routed to Columbia River across the railroad lines.
Environmental Concerns Loss of bird, small mammal and terrestrial furbearer habitat; small disruption of area alder habitat; degradation of water quality in Tansy Creek, Alder Creek and Alder Slough areas will be unacceptable, but could be prevented by effluent routing.
Comments This is a priority site for DMD related to Tansy Point development and can be used for foreseeable maintenance dredging.
(cf 42.02, 57.30)

19(S) - Shoreland **Priority 3**

Location East of Alder Creek, west of railroad track.
Size 15 acres
Capacity 240,000 cy at 10 feet
Ownership Private
Designation *Development*
Current Use Undeveloped
Final Use Residential
Related Projects Skipanon inner channel; Warrenton Boat/Turning Basin maintenance and expansion; 20' channel above bridge; Warrenton Lumber Company development.
Bio-Physical Description Drainage along east side; relatively flat, loamy fine sands with highly organic surface soils; southern portion riparian alder and willow, with isolated Sitka spruce; northern portion lowland meadow with alder, willow and Scotch broom; use by terrestrial furbearers, deer, small mammals and song birds; abundant population of rodents would support high use by raptors and other predators.
Engineering Hydraulic pipeline dredging/disposal; requires berming; effluent controls must be constructed to protect Alder Creek; requires clearing; buffer between site and Alder Slough necessary; berm and fill heights should be designed to create no visual obstruction or otherwise detract from Alder Slough area.
Environmental Concerns Loss of habitat for furbearers and small mammals; protect water quality in Alder Slough by proper design and buffer strip.
(cf 42.03, 57.40, 57.50)

20(S) - Shoreland **Priority 2**

Location Between Alder Slough on the northeast and the railroad on the west; north of the expansion area for Warrenton sewage lagoon.
Size 24 acres
Capacity 384,000 cy at 10 feet
Ownership Dant and Russell Company
Designation *Development*
Current Use Vacant land
Final Use Industrial
Related Projects Warrenton Boat/Turning Basin maintenance and expansion; Skipanon inner channel; 20' channel above bridge; Warrenton Lumber Company development.
Bio-Physical Description Relatively flat with no developed surface drainage; separated from Alder Slough by berm to north and east and railroad dike on west; loamy fine soils with high organic materials in surface soils; northern portion primarily riparian alder and willow, isolated Sitka Spruce; southern portion predominantly lowland meadow with alder, willow and Scotch broom invading; terrestrial furbearers, deer, small mammals and song bird usage; abundant rodents would support use by raptors and other predators.
Engineering Hydraulic pipeline dredging/disposal; needs berming, construction of effluent controls to protect Alder Creek, clearing; maintain buffer between site and Alder Slough; design berm and fill height to create no visual obstruction or other detraction from Alder Slough area.
Environmental Concerns Primary concerns are water quality and visual impact on Alder Slough; some habitat loss.
Comments Filling prior to development will enhance the final use of the site, and the site has been identified in the draft EIS for Pacific Fabricators' facility to handle channel dredged material from a 20 foot channel in the Skipanon.
(cf 42.03, 57.40, 57.50)

21(S) - Shoreland **Priority 3**

Location Borders Alder Slough; bounded by N.W. First Avenue on the south and N.W. Fifth Avenue on the north.
Size 18 acres
Capacity 288,000 cy at 10 feet
Ownership Private
Designation *Development*
Current Use Vacant land
Final Use Residential
Related Projects Skipanon inner channel; Warrenton Boat/Turning Basin maintenance and expansion; 20' channel above bridge; Warrenton Lumber Company development.
Bio-Physical Description Low and flat; surface drainage into Alder Creek on the west; southern portion cleared; southern half is pasture with fescue, bent grass, and other pasture species; northern portion predominantly alder forest; disturbed by road construction and four-wheel drive vehicles; wide variety of terrestrial furbearers, small mammals and birds.
Engineering Hydraulic pipeline dredging/disposal; requires clearing of forested portion, berming, and measures to identify and protect Alder Creek wetland areas.
Environmental Concerns Loss of habitat; Alder Creek water quality; adjacent wetlands; problems could be minimized by substantial setback and effluent disposal rerouted to the Skipanon.
Comments High elevation fills would be incompatible with residential development. Distance from dredging area creates problems, including crossing a major highway. Site should be used only if ocean disposal is not available.
(cf 42.03, 57.40, 57.50)

22(S) - Shoreland **Priority 2**

Location South of 5th Street and west of N.E. Skipanon Drive in Warrenton; bounded on north by railroad.
Size 15 acres
Capacity 240,000 cy at 10 feet
Ownership Private
Designation *Development*
Current Use Pasture
Final Use Industrial/commercial/residential
Related Projects Skipanon inner channel; Warrenton Boat/Turning Basin maintenance and expansion; 20' channel above bridge; Warrenton Lumber Company development.
Bio-Physical Description Relatively flat pastureland with an open drainage along the west border; grass, clover and other pasture species; small mammals; specialty crop of artichokes.
Engineering Hydraulic pipeline dredging/disposal; requires berming.
Environmental Concerns DMD use would preclude current agriculture; some habitat loss.
Comments While proximity to the Skipanon waterway is desirable, other sites are available and DMD use of this site would eliminate agricultural operations.
(cf 42.03, 57.40, 57.50)

23(S) - Shoreland **Priority 1**

Location Between the Skipanon waterway and tributary to the Skipanon waterway north of the Oregon Coast Highway and south of S.E. 6th Street in Warrenton.
Size 128 acres
Capacity 2,016,000 cy at 10 feet
Ownership Private
Designation *Development*
Current Use Vacant
Final Use Tourist Commercial/residential development
Related Projects Skipanon inner channel; Warrenton Boat/Turning Basin maintenance and expansion; 20' channel above bridge; Warrenton Lumber Company development.
Bio-Physical Description Low silty loam; diked; northern portion is shrubland covered by grasses, willow and Scotch broom; southern half predominately forested wetland dominated by red alder and an understory of willows and sedges.
Engineering Hydraulic pipeline dredging/disposal; little site preparation required; construction of weir for outfall; clearing in southern portion; diking along northeast and southern portions to protect wetland areas.
Environmental Concerns Filling fresh water forested wetland in southern portion would be major loss; DMD should be restricted to northern portion where impacts are minimal; buffering to protect wetlands.
Comments DMD use would create an area suitable for residential development, after the material has settled. DMD use of the southern portion would require permits and would involve substantial environmental impacts. Only the northern portion should be used and close cooperation with ODFW, EPA, USFWS, etc. should be maintained to ensure acceptable procedures.
(cf 42.05, 57.40, 57.50)

24(S) - Shoreland **Priority 3**

Location Bounded on east by Kings Avenue, on south by S.E. 11th Street, on west by Skipanon Slough in Warrenton.
Size 70 acres
Capacity 1,120,000 cy at 10 feet
Ownership Private
Designation *Development*
Current Use Agriculture
Final Use Commercial and residential
Related Project Skipanon inner channel; Warrenton Boat/Turning Basin maintenance and expansion; 20' channel above bridge; Warrenton Lumber Company development.
Bio-Physical Description Flat; two minor drainages into Skipanon Slough; silty clay loams; diked on west; some residential development to north and northeast; pasture vegetation and fresh water diked marshlands; buttercup, common rush, bent grass, and fescue grasses dominate; use by small mammals and predators; amphibians and reptiles in diked marshlands.
Engineering Hydraulic pipeline dredging/disposal; DMD use will require water quality protection for Skipanon Slough, a pipeline crossing for Harbor Drive, and diking.
Environmental Concerns Loss of habitat and agricultural lands.
Comments At least the western portion could be used for future DMD use.
(cf 42.05, 57.40, 57.50)

25(S) - Shoreland **Priority 1**
(reevaluate boundaries)

Location North of Harbor Drive; bisected by King Avenue; in Warrenton.
Size 130 acres
Capacity 2,080,000 cy at 10 feet
Ownership Port of Astoria
Designation *Water Dependent Development*
Current Use Limited industrial, residential and agriculture
Final Use Industrial
Related Projects Warrenton Boat/Turning Basin maintenance and expansion; 20' channel above bridge; Skipanon inner channel; Warrenton Lumber Company development.
Bio-Physical Description The upland areas and diked marshlands of the Pacific Fabricators' site west of Holbrook Slough; generally low; sand fill material and diked tidal marsh; adjacent to the Skipanon Channel; drains into Skipanon Peninsula directly and into Youngs Bay through Holbrook Slough; upland pastures with sandy soils supporting grass, clover, and other herbaceous species; diked marshland contains common rush, buttercup, bent grass, etc.; use by amphibians, reptiles, birds; supports a population of short-eared owls and marsh hawks.
Engineering Hydraulic pipeline or bucket dredging/disposal; requires berming to protect Holbrook Slough; overflow weirs; existing dikes should contain DM.
Environmental Concerns Minimal habitat loss; need to protect water quality and riparian vegetation along Holbrook Slough.
(cf 42.06, 57.40, 57.50)

26(S) - Shoreland **Priority 3**

Location North of Oregon Coast Highway, west of Youngs Bay Plaza, east of Marlin Avenue, south of Harbor Drive, in Warrenton.
Size 13 acres
Capacity 208,000 cy at 10 feet
Ownership Private
Designation *Development*
Current Use Agriculture
Final Use Commercial
Related Projects Skipanon inner channel; Warrenton Boat/Turning Basin maintenance and expansion; 20' channel above bridge; Warrenton Lumber Company development.
Bio-Physical Description Flat diked pasture with silty clay loam soils; some surface drainage in the north; pasture land with bent grass, fescue, etc., some common rush and herbaceous plants; alder and elderberry shrubs occur on southern portion; use by birds and small mammals.
Engineering Hydraulic pipeline dredging/disposal; requires berming, diking, and effluent weirs.
Environmental Concerns Minimal impacts expected if Holbrook Slough is protected from effluents; isolated pastureland surrounded by development with minimal habitat value.
Comments DMD use should be coordinated with rehabilitation plan to allow settling time prior to commercial development and to ensure that the final height is appropriate.
(cf 42.05, 57.40, 57.50)

27(S) - Shoreland **Priority 3**

Location South of Oregon Coast Highway, west of Holbrook Slough, in Warrenton.
Size 9 acres
Capacity 144,000 cy at 10 feet
Ownership Private
Designation *Development*
Current Use Agriculture
Final Use Commercial
Related Projects Skipanon inner channel; Warrenton Boat/Turning Basin maintenance and expansion; 20' channel above bridge; Warrenton Lumber Company development.
Bio-Physical Description Low, flat, with silty clay soils; drained by a small slough into Holbrook Slough; diked marsh dominated by common rush, bent grass, fescue, buttercup, etc.; use by small mammals, reptiles, amphibians, and birds.
Engineering Hydraulic pipeline dredging/disposal; requires berming and weir construction for effluent discharge; pipeline would cross both Harbor Drive and the Oregon Coast Highway.
Environmental Concerns Habitat loss; minimal water quality impacts because Holbrook Slough is a highly manipulated waterway; appropriate diking and weir development can control sediment.
Comments This site is a low priority because the multiple highway crossings make DMD use expensive. Fill for development of this area could be brought in from sources other than dredging.
(cf 42.08, 57.40, 57.50)

28(S) - Shoreland **Priority 3**

Location Southwestern portion of Clatsop County Airport
Size 28 acres
Capacity 448,000 cy at 10 feet
Ownership Port of Astoria
Designation *Development*
Current Use Agriculture/shrub
Final Use Airport related development
Bio-Physical Description Diked pastureland; pasture species of grasses, clover, etc.; supports small mammal and bird populations.
Engineering Dredging/disposal problematic: hydraulic pipeline with booster pumps and perhaps barging bucket dredged material (5 mile round trip); requires berming; very expensive to place materials here.
Environmental Concerns Loss of pastureland.
Comments Use for maintenance DMD is not practical. This site would be appropriate for DM stockpile for dike maintenance. Site is adjacent to the Astoria Highway and would allow access by trucks throughout the lowland areas of the Lewis and Clark Valley.
(cf 42.08)

29(S) - Shoreland **Priority 3**

Location Northwest portion of Clatsop County Airport
Size 40 acres
Capacity 640,000 cy at 10 feet
Ownership Port of Astoria
Designation *Development Shoreland*
Current Use Agriculture/shrub
Final Use Airport related development
Bio-Physical Description Western and southern areas are pastureland; northern and eastern areas are lowland; surrounded by dikes; drainage channel along northern dike into Youngs Bay; lowland portion if shrubbery of willow, Scotch broom, and small alder and grasses; supports populations of deer, terrestrial furbearers, small mammals, and birds.
Engineering Dredging/disposal problematic: hydraulic pipeline with booster pumps or 5 mile round trip barging bucket dredged material; requires berming, and clearing of northern and eastern portions.
Environmental Concerns Loss of deer, terrestrial furbearer, small mammal, and bird habitats; some loss of pastureland.
Comments As in Site 28(S), the major problems are economic. It will be very expensive to place dredged materials here. DMD use from maintenance dredging is not practical.
(cf 42.08)

30(S) - Shoreland **Priority 3**
Location Northern area of Clatsop County Airport
Size 11 acres
Capacity 176,000 cy at 10 feet
Ownership Port of Astoria
Designation *Development*
Current Use Vacant land/shrub
Final Use Airport related development
Related Project Youngs Bay/River and Lewis and Clark River entrance.
Bio-Physical Description flat diked lowland; drainage into Youngs Bay; forested with alder; understory of shrubs and grassy ground cover; supports populations of deer, terrestrial furbearers, small mammals, and birds.
Engineering Dredging/disposal problematic: hydraulic pipeline may need booster pumps; 5 mile round trip for barging bucket dredged materials; requires clearing and berming.
Environmental Concerns Loss of habitat.
Comments DMD use of this site is compatible with expanding commercial use of airport property if appropriate settling time is allowed. Use for maintenance dredging is probably too expensive.
(cf 42.08, 57.60)

31(S) - Shoreland **Priority 3**
Location Northeast section of Clatsop County Airport
Size 24 acres
Capacity 384,000 cy at 10 feet
Ownership Port of Astoria
Designation *Development*
Current Use Vacant land/shrub
Final Use Commercial - airport
Related Project Youngs Bay/River and Lewis and Clark River entrance.
Bio-Physical Description Lowland; diked along northern side; drainage channels into Youngs Bay; forested with alder; understory of shrubs and grassy ground cover; supports populations of deer, terrestrial furbearers, small mammals, and birds.
Engineering Dredging/disposal problematic: hydraulic pipeline would require booster pumps; 5 mile round trip for barged bucket dredged materials; requires clearing and berming.
Environmental Concerns Loss of habitat.
Comments Use of this site for disposal from maintenance dredging is probably not feasible, due to cost. Placement of fill here would be compatible with expanding commercial uses of airport½

Comments Use of this site for disposal from maintenance dredging is probably not feasible, due to cost. Placement of fill-here would be compatible with expanding commercial uses of airport property.
(cf 42.08, 57.60)

32(S) - Shoreland **Priority 2**
Location Eastern portion of Clatsop County Airport.
Size 125 acres
Capacity 2,000,000 cy at 10 feet
Ownership Port of Astoria
Designation *Development*
Current Use Vacant/some agriculture
Final Use Airport related development
Related Project Lewis and Clark River development or channel maintenance, Port of Astoria Slips; Youngs Bay/River.
Bio-Physical Description Lowland with dike along eastern side; many drainage channels to tide box which drains into Youngs Bay; forested with alder; understory of shrubs and grassy ground cover; spruce stand in eastern portion; marsh grass-buttercup meadow in southern portion; supports populations of deer, terrestrial furbearers, and small mammals.
Engineering Dredging/disposal problematic: hydraulic pipeline would require booster pumps; 5 mile round trip for barged-in bucket dredged material from Port of Astoria; requires clearing and berming; site should be divided and the Spruce Stand should be avoided.
Environmental Concerns Loss of habitat.
Comments Use of this site for disposal from maintenance dredging is probably not feasible, due to cost. Placement of fill here would be compatible with expanding commercial uses of airport property.
(cf 42.08, 57.60)

33(S) - Shoreland **Priority 1**
Location Lewis and Clark River, RM 7, east bank.
Size 16 acres
Capacity 256,000 cy at 10 feet
Ownership Private
Designation *Rural*
Current Use Dredged disposal site
Final Use Agriculture
Related Projects Crown Zellerbach log dump and Lewis and Clark River dredging.
Bio-Physical Description Low, flat; pasture beyond disposal site; dike along river and around disposal area.
Engineering Clamshell or hydraulic pipeline dredging/disposal; berming needs to be maintained to prevent overflow on adjacent farm land.
Environmental Concerns Minimal environmental value; area has been used for disposal in the past; little environmental impact.
(cf 42.09, 55.20, 57.60)

37(S) - Shoreland **Priority 2**
Location Astoria waterfront (RM 16); east of the East End Mooring Basin, in Astoria.
Size 7 acres
Capacity 112,000 cy at 10 feet
Ownership Private (Bumble Bee Seafoods)
Designation *Water Dependent Development*
Current Use Undeveloped
Final Use Marine Commercial, industrial
Related Project East End Mooring Basin
Bio-Physical Description Undeveloped low area created by sand fill on the Astoria waterfront; one structure on northeast corner; little natural vegetation or biological value.
Engineering Hydraulic pipeline dredging/disposal; requires berming, development of outflow weir, and cross-diking to protect effluent discharge water quality.
Environmental Concerns Minimal impacts expected if water quality is maintained.
Comments Careful engineering would protect surrounding properties from DMD use and water quality along the Columbia River waterfront. Filling could facilitate future commercial or industrial uses if the design and fill are , appropriate.
(cf 42.15, 57.80)

38(S) - Shoreland **Priority 2**
Location Astoria waterfront (RM 17); at west end of Astoria sewage lagoons.
Size 15 acres
Capacity 240,000 cy at 10 feet
Ownership City of Astoria
Designation *Development*
Current Use Undeveloped
Final Use Industrial
Related Projects East End Mooring Basin; West End Mooring Basin (Fisherman's Dock and Marina); Coast Guard slips at Tongue Point.
Bio-Physical Description Has been filled; flat; sparse vegetation of grasses and a few shrubs.
Engineering Clamshell or hydraulic pipeline dredging/disposal; requires berming for hydraulic pipeline.
Environmental Concerns Minor impacts expected if water quality can be protected.
Comments DMD use would be compatible with eventual industrial use if appropriate settling time is allowed. This site should be reserved for DMD use.
(cf 42.15, 57.80)

40(S) - Shoreland **Priority 1**
Location Mott Island east of Tongue Point.
Size 60 acres
Capacity 1,920,000 cy at 10 feet
Ownership State of Oregon
Designation *Conservation*
Current Use Wildlife refuge
Final Use Wildlife refuge
Related Project Tongue Point development.
Bio-Physical Description Fairly flat lowland island created by DMD; drainage channels into Columbia; forested with alder and willow; ground cover of sedges and other herbaceous plants; shady grassland in center; utilized by a variety of wildlife species including deer, terrestrial furbearers, small mammals, and a wide variety of birds.
Engineering Hydraulic pipeline or bucket dredge dredging/disposal; requires clearing and diking.
Environmental Concerns Substantial habitat loss; water quality could be managed by appropriate diking; habitat could be restored if site is revegetated after DMD use.
Comments Site would be needed if Port development occurs at Tongue Point and other locations to place dredged material are not available. Site may be needed for future maintenance dredging disposal, even if not used for initial construction disposal.
(cf 42.17, 57.70)

41(S) - Shoreland **Priority 1**
Location South end of Tongue Point slips on an abandoned athletic field and trash dump.
Size 8 acres
Capacity 128,000 cy at 10 feet
Ownership Federal (surplus)
Designation *Water Dependent Development*
Current Use Undeveloped
Final Use Marine Industrial
Related Project Tongue Point development.
Bio-Physical Description A fill area; shoreward edge of rubble and debris; two minor buildings; vegetated with mixture of broom, fescue and rye grass; supports a variety of small mammals, foraging birds, and raptors; no high biological values.
Engineering Hydraulic pipeline or bucket dredge dredging/disposal; requires diking for hydraulic pipeline and removal of existing structures; care in location of outfall in construction of effluent weir.
Environmental Concerns Minimal impacts expected if water quality is maintained.
Comments This site should receive such DMD use if it can absorb prior to other uses but development is tied to development of the Tongue Point Basin.
(cf 42.16, 57.70)

42(S) - Shoreland **Priority 2**
Location South of Tongue Point, north of mouth of John Day River.
Size 77 acres
Capacity 1,240,000 cy at 10 feet
Ownership Federal (Corps of Engineers)
Designation *Water Dependent Development*
Current Use Wildlife habitat/Corps field office
Final Use Marine Industrial development
Related Project Tongue Point development
Bio-Physical Description Fill land created by dredging of MARAD Basin; higher at center; drainage from domed area to surrounding tidal flats; dense growth of alder and willow with grassy openings on higher portion; supports a wide variety of birds, small mammals, terrestrial furbearers, and deer; high habitat values.
Engineering Hydraulic pipeline dredging/disposal; requires clearing and diking.
Environmental Concerns Substantial loss of valuable habitat; these values could be recouped after disposal unless the area is developed.
Comments Clarification with owner would be necessary prior to any DMD use.
(cf 42.16, 57.50)

43(S) - Shoreland **Priority 3**
Location On west entrance of the John Day River.
Size 30 acres
Capacity 480,000 cy at 10 feet, or 960,000 cy at 20 feet
Ownership Clatsop County
Designation *Rural*
Current Use Forested habitat
Final Use Residential or park
Related Project Tongue Point development.
Bio-Physical Description Low diked area-

Bio-Physical Description Low diked area; fine grained soils; forested with alder; understory of willow; ground cover of sedges and other herbaceous plants; use by variety of wildlife species including terrestrial furbearers, small mammals, and a wide variety of birds.
Engineering Hydraulic pipeline dredging/disposal; requires clearing, weir construction and development of water discharge; pipeline would cross railroad.
Environmental Concerns Loss of habitat.
Comments DMD use would be compatible with residential development but would not be compatible with possible Clatsop County plans for park development. Any use of this site would be expensive. The site should be a low priority for DMD use.
(cf 43.01, 57.50)

44(S) - Shoreland **Priority 3**
Location Borders U.S. Highway 30 and the west bank of the John Day River.
Size 45 acres
Capacity 720,000 cy at 10 feet
Ownership Federal and Private
Designation *Rural*
Current Use Agriculture and residential
Final Use Agriculture or residential
Related Project Tongue Point development.
Bio-Physical Description Diked pastureland; relatively flat; houses on highway side; diked internal drainage channels; bent grass, fescue, buttercup and other herbaceous species; small forested area of willow and alder at center of site; supports populations of small mammals, foraging birds and raptors.
Engineering Hydraulic pipeline dredging/disposal; requires diking to protect residences and clearing of forested area; buffer along John Day River; pipeline access across railroad tracks.
Environmental Concerns Loss of willow-alder habitat; protection of riparian vegetation along John Day River is critical; DMD use would cause substantial change in water storage capacity of pastures and would change agricultural use.
Comments The site is approximately 2 miles from the dredging area for Tongue Point development. Use of the site would involve expenses in pipeline lay-out and land acquisition from private owners. Title for DMD use would be difficult to obtain. Existing farm use effectively precludes DMD use.
(cf 43.01, 57.70)

46(S) - Shoreland **Priority 1**
Location Svensen Island
Size 400 acres
Capacity 2,000,000 cy at 3 feet (includes ditch)
Ownership Robert Reed, Charles Haglund
Designation *Rural* and *Conservation*
Current Use Pasture and open space
Final Use Pasture and open space
Related Projects Port of Astoria slips; Fisherman's Dock and Marina; East End Mooring Basin; Coast Guard slips.
Bio-Physical Description Low, flat; silt, clay loam soils; high water table; pasture and open space with area of willow; diked along perimeter; road along southern part of island.
Engineering Clamshell and bucket dredging/clamshell, bucket and pipeline disposal; easy barge access occurs only in N.W. side of island; other parts of island are accessible by small barges at high tide; this has already been done on the S.E. side of the island; pipelining material from barges is also possible; much of the material would have to be spread out by bulldozer once disposed.
Environmental Concerns The dredged material needed here is fine silts and clays; temporary displacement of pasture grasses would occur; DMD could improve agricultural value of land and would reduce the flood hazard of the island; natural resource values would not be heavily affected.
Comments Dredged material is currently being disposed of on the N.W. side of the island and has been in the past. Owners are eager to accept DMD on their property. Of special concern is

Comments Dredged material is currently being disposed of on the N.W. side of the island and has been in the past. Owners are eager to accept DMD on their property. Of special concern is a ditch just behind the north island dike, which needs to be filled to insure stability of the dike (0.5 miles long, 20 feet wide, and 4 feet deep).
(cf 43.03, 55.20, 57.60)

48(S) - Shoreland **Priority 2**
Location Deep River RM 1.0, Deep River Channel from Grays Bay, on west bank of Deep River.
Size 15 acres
Capacity 240,000 cy at 10 feet
Ownership Private
Designation *Rural*
Current Use Agriculture
Final Use Agriculture
Related Projects Grays Bay and Deep River.
Bio-Physical Description Flat, low diked farmland with steep slopes to northwest; residences adjacent and several farm structures on site; mostly pasture grassland with forested area to northwest and tidal marsh outside dike; small populations of small mammals and birds.
Engineering Hydraulic pipeline or clamshell dredging/disposal; requires diking around western and southern borders and controlled routing of effluent to protect farm area to west and water quality of Deep River.
Environmental Concerns Temporary loss of farm land until resettling; possible change in agricultural use; depending on nature of fill.
(cf 44.06, 58.10)

49(S) - Shoreland **Priority 2**
Location Deep River RM 2.0 on south bank.
Size 20 acres
Capacity 320,000 cy at 10 feet
Ownership Private
Designation *Development*
Current Use Vacant/agriculture
Final Use Agriculture
Related Project Deep River Channel.
Bio-Physical Description Flat, low grassland with occasional areas of shrubs, sedge and alder; supports small mammals and foraging birds.
Engineering Hydraulic pipeline or clamshell dredging/disposal; requires diking and drainage construction to Deep River to minimize impacts on adjacent areas and protect water quality.
Environmental Concerns Temporary loss of grassland habitat.
Comments Deposition of fines would limit development but raising the land would enhance flood protection. Stockpile use for dike maintenance is feasible.
(cf 44.06, 58.10)

51(S) - Shoreland **Priority 2**
Location Grays River RM 1.5
Size 20 acres
Capacity 320,000 cy at 10 feet
Ownership Private
Designation *Rural*
Current Use Agriculture
Final Use Agriculture
Related Project Grays River Channel and entrance.
Bio-Physical Description Diked farmland in broad bend of Grays River; low, level, with farm activity and residences adjacent; cultivated farmland.
Engineering Hydraulic pipeline or clamshell dredging/disposal; requires diking on southern side and effluent control to minimize water quality impacts.
Environmental Concerns Temporary loss of farmland.
Comments Channel dredging and dike construction and repair throughout the Grays River valley would improve flood protection.
(cf 44.06, 58.10)

52(S) - Shoreland **Priority 2**
Location Grays River RM 0, on east bank.
Size 20 acres
Capacity 320,000 cy at 10 feet
Ownership Private
Designation *Rural*
Current Use Agriculture
Final Use Agriculture
Related Project Grays River/Bay
Bio-Physical Description Low, level diked farmland; adjacent residences; grassland with trees and shrubs along dike; supports small mammals, birds, and farm animals.
Engineering Hydraulic pipeline dredging/disposal; requires diking along northeast border and effluent controls to protect Grays River and Bay water quality.
Environmental Concerns Minimal impacts on wildlife; DMD use would take land out of agricultural use or change type of agriculture.
Comments Use of this site depends upon other DMD site options for disposal of material from potential Grays River/Bay projects.
(cf 44.06, 58.10)

55(S) - Shoreland **Priority 1**
Location RM 21.0, Rice Island, 1500 feet to Miller Sands Bar and Harrington Point Sump.
Size 215 acres
Capacity 3,440,000 cy at 10 feet;
6,800,000 cy at 20 feet
Ownership Clatsop County (extreme eastern end in Wahkiakum County, Washington)
Designation *Conservation*
Current Use Dredged material disposal
Final Use DMD use (possible habitat area for waterfowl)
Related Projects 40 foot navigation channel; Harrington Point Sump [RM 21, Site 54(E)]; Lower Miller Sands Bar (RM 21.4 - 22.5).
Bio-Physical Description Flat, estuary sand island; currently active DMD site; elevations near 30 feet in some places; scattered vegetation, mainly beach grasses and occasional shrubs; supports population of bird species; beaches support planktonic forms which support variety of juvenile and adult fish species.
Engineering Hydraulic pipeline dredging/disposal; further site preparation

Engineering Hydraulic pipeline dredging/disposal; further site preparation not required; disposal area should be revegetated after each disposal; expansion of Rice Island required to meet future disposal needs.
Environmental Concerns Expansion of the island to accommodate future dredging needs will impact the surrounding water area.
Comments Major concerns are revegetation after disposal and expansion into water area. Unless an alternative disposal site (flow-lane or sump) is found, Rice Island will need to expand.
(cf 41.03, 55.12)

65(S) - Shoreland **Priority 1**
Location RM 33.4, Skamokawa, 800 feet to Welch Island Bar, 400 feet to Skamokawa Creek Channel, on west bank of Skamokawa/Brooks Sloughs entrance.
Size 11 acres
Capacity 176,000 cy at 10 feet
Ownership Leased from Boise-Cascade to Port District #2, Wahkiakum County.
Designation *Development*
Current Use DMD stockpile
Final Use Park
Related Project Welch Island Bar; Skamokawa Creek Channel; Brooks Slough improvement; Steamboat Slough.
Bio-Physical Description Dredged sand fills for about 1300 feet along the river and almost 1000 feet back towards highway; stockpile site along northwest margin; forested area along west boundary; river beach along south; few trees; little wildlife and resource value.
Engineering Hydraulic pipeline dredging/disposal; site preparation minimal due to former use as DMD site; site berm and weir construction would be necessary.
Environmental Concerns Expansion of existing site to the west may encroach on forested wetland area. Existing site has little vegetation and few natural resource concerns. Stranding of juvenile salmonids on adjacent beach may be a problem.
Comments The site is needed for maintenance dredging but continued DMD use conflicts with park development. Wahkiakum County needs a stockpile site in this area. Development plans and disposal options require greater coordination, but area has excellent recreational development potential.
(cf 44.04, 55.10, 58.20)

69(S) - Shoreland **Priority 3**
Location RM 34.5, Price Island, 1500 feet to Skamokawa Bar.
Size 75 acres
Capacity 1,200,000 cy at 10 feet
2,400,000 cy at 20 feet
Ownership Wahkiakum County
Designation *Development*
Current Use unaltered
Final Use Port development
Related Project Wahkiakum County port development (southeast end of Price Island).
Bio-Physical Description Presently unaltered low area with small creek draining into Steamboat Slough; extensive forest cover with large stands of tall trees; supports large population of bird species, small mammals and terrestrial furbearers; wetland area.
Engineering Hydraulic pipeline dredging/disposal; extensive clearing necessary; berming to provide containment; route effluent material to protect adjacent land on island.
Environmental Concerns Surrounded by wildlife refuge and *Conservation* land and water; significant impact on the wildlife resources should disposal occur.
Comments This site would offer deep water access for future Wahkiakum County port development, but has no land transportation access. Beach nourishment for protection against erosion is possible.
(cf 44.03, 58.40)

74(S) - Shoreland **Priority 2**
Location Elochoman River, 5500 feet to Elochoman Marina, north of log sorting and storage yard.
Size 90 acres
Capacity 1,440,000 cy at 10 feet
Ownership Private
Designation *Development*
Current Use Forested low shoreland
Final Use Industrial
Related Projects Elochoman Slough, log sorting yard expansion and maintenance.
Bio-Physical Description Low flat land, seasonally very wet, undiked and unaltered; forested area with large willow, cottonwood trees, and occasional spruce; supports large population of bird species, small mammals, and terrestrial furbearers.
Engineering Hydraulic pipeline dredging/disposal; requires extensive clearing, berming, and cross diking to accommodate small amounts of material at different times; DMD use should be coordinated with developers; DMD of fines would limit some development.
Environmental Concerns Significant impact on wildlife resources.
Comments Site could be used for disposal of material from Elochoman Slough and expansion of the log sorting yard.
(cf 44.03, 55.20, 58.40)

76(S) - Shoreland **Priority 1**
Location South tip of Hunting Island on *Elochoman Slough at Cathlamet.*
Size 20 acres
Capacity 320,000 cy at 10 feet
Ownership Federal
Designation *Natural*
Current Use Wildlife Refuge/former DMD site
Final Use Wildlife Refuge
Related Projects Elochoman Slough/Marina and Cathlamet Channel.
Bio-Physical Description Forested lowland seasonally wet; large spruce, cottonwood trees and willow; supports large populations of bird species, small mammals, and terrestrial furbearers; adjoins Columbian White-tailed Deer Refuge.
Engineering Hydraulic pipeline dredging/disposal; requires extensive clearing and berming.
Environmental Concerns Significant wildlife impacts should be minimized; adjoining refuge areas should be protected.
Comments This is the most feasible site for the Cathlamet-Elochoman Slough area. Site 74(S) is less feasible economically and more objectionable environmentally. Small area has been used as a disposal site for material from Elochoman Slough and Marina.
(cf 44.03, 55.20, 58.40)

78(S) - Shoreland (Corps 0-38.7) **Priority 2**
Location Portion of Bradwood north of railroad tracks.
Size 28 acres
Capacity 450,000 cy at 10 feet
Ownership Private (Starker Forests)
Designation *Water Dependent Development*
Current Use Previous DMD site/vacant
Final Use Commercial or industrial
Related Projects Puget Island Bar, Bradwood port development.
Bio-Physical Description Approximately 3-foot high berm around the edge; railroad tracks and drainage ditch along southwest edge; open site filled with Columbia River sand; no drainage developed; effluent has drained into log pond to the southeast; few weedy plant species on the sand fill; willow and alder fringe on west, south and east sides; little wildlife use.
Engineering Hydraulic pipeline dredging/disposal; requires berming on northwest side to prevent effluent discharge.
Environmental Concerns No impacts expected.
Comments DMD use would involve development opportunity and the site should be used for disposal from Puget Island Bar dredging.
(cf 43.12, 58.60)

79(S) - Shoreland (Corps W-38.7)

Priority 1
Location RM 38.7, North tip of Puget Island, 100 yards from main ship channel.
Size 8 acres
Capacity 128,000 cy at 10 feet
Ownership Wahkiakum County
Designation *Rural* and *Conservation*
Current Use DMD stockpile
Final Use DMD Stockpile
Related Project Puget Island Bar.
Bio-Physical Description River beach outside road dike around Puget Island; predominately channel sand dredged material; stockpile for Wahkiakum County use at northern end; aquatic area supports planktonic forms which are used by fishes.
Engineering Hydraulic pipeline dredging/disposal; requires clean channel sands and effluent controls; new materials should not encroach on waterway or existing vegetation.
Environmental Concerns Impacts are temporary; area gets minimal wildlife use.
(cf 44.01, 55.10)

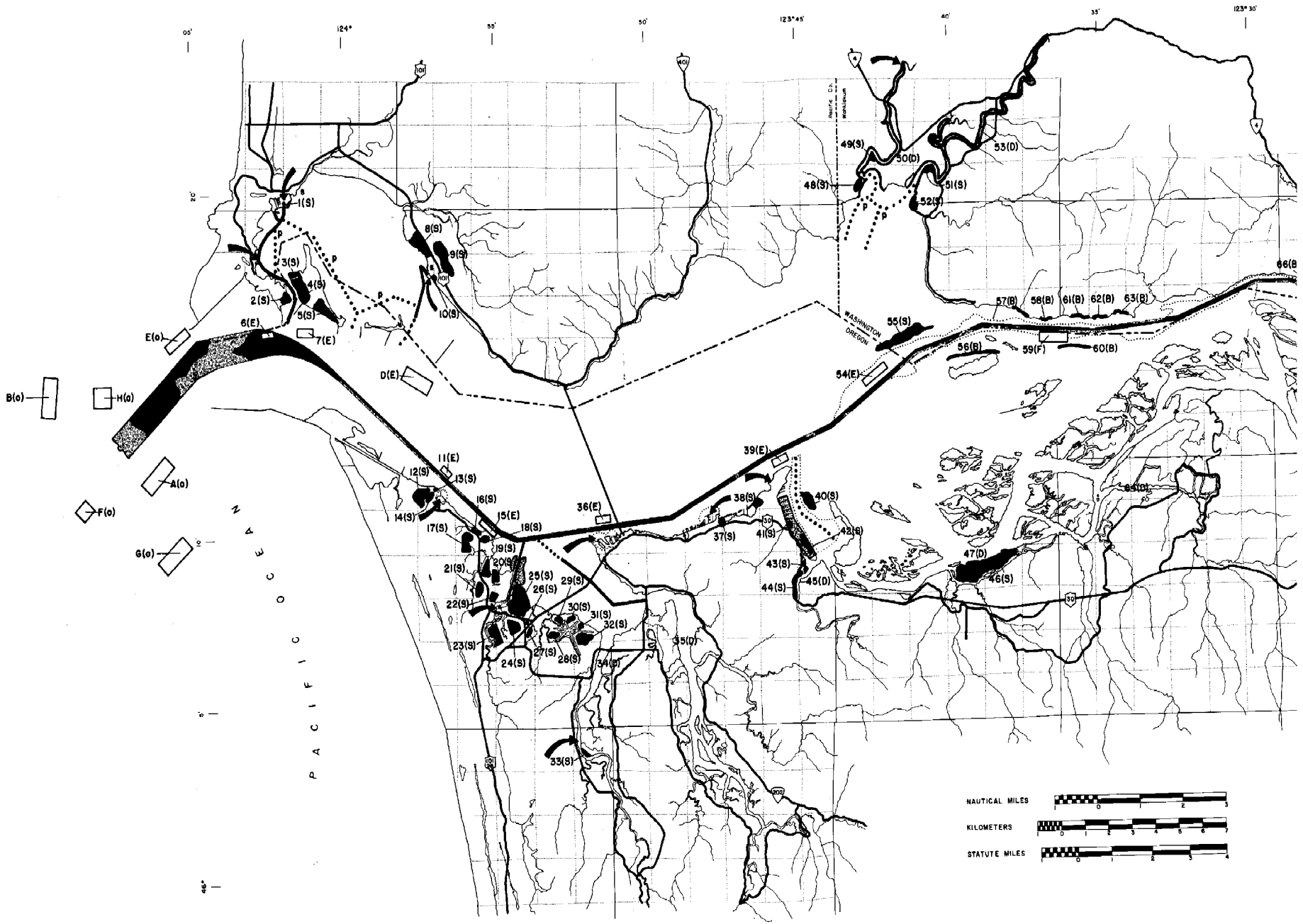
83(S) - Shoreland **Priority 2**
Location North of Wauna, adjacent to Bradley Park
Size 70 acres
Capacity 1,120,000 cy at 10 feet
Ownership State of Oregon and Private (Crown Zellerbach)
Designation *Water Dependent Development* Shoreland
Current Use Vacant, wildlife habitat
Final Use Industrial
Related Project Wauna Bar; Wauna/Westport waterfront development
Bio-Physical Description Flat sandy soil area, little drainage, heavily vegetated; dominated by alder with Douglas fir and Sitka spruce; understory includes willow, salmonberry, elderberry and ground cover of herbaceous species; use by wide variety of birds, small mammals, terrestrial furbearers, and deer.
Engineering Hydraulic pipeline dredging/disposal; requires clearing and diking.
Environmental Concerns DMD use would substantially decrease biological values of site and result in habitat loss for big game mammals, furbearers, small mammals, and birds.
Comments A small portion of this site has already been used for DMD. The site could be used for placement of channel maintenance material and filling should be phased with development of the entire Wauna area.
(cf 43.13, 58.70)

85(S) - Shoreland **Priority 2**
Location RM 41.27, 50 yards south of Welcome Slough.
Size 10 acres
Capacity 160,000 cy at 10 feet
Ownership Private
Designation *Rural*
Current Use Pasture
Final Use Agriculture
Related Project Welcome Slough development.
Bio-Physical Description Flat lowland inside dike surrounding Puget Island; eastern perimeter bordered by pasture land with remainder bordered by the road dike; pasture grasses; small populations of small mammals and birds.
Engineering Hydraulic pipeline or clamshell dredging/disposal; requires diking along eastern edge; return flow should be routed through Welcome Slough and not affect adjacent pasture lands; site adequate for silts and clays.
Environmental Concerns Impacts of loss of *habitat and pasture would be temporary.*
Comments This site would be important if Welcome Slough is developed.
(cf 44.01, 55.10)

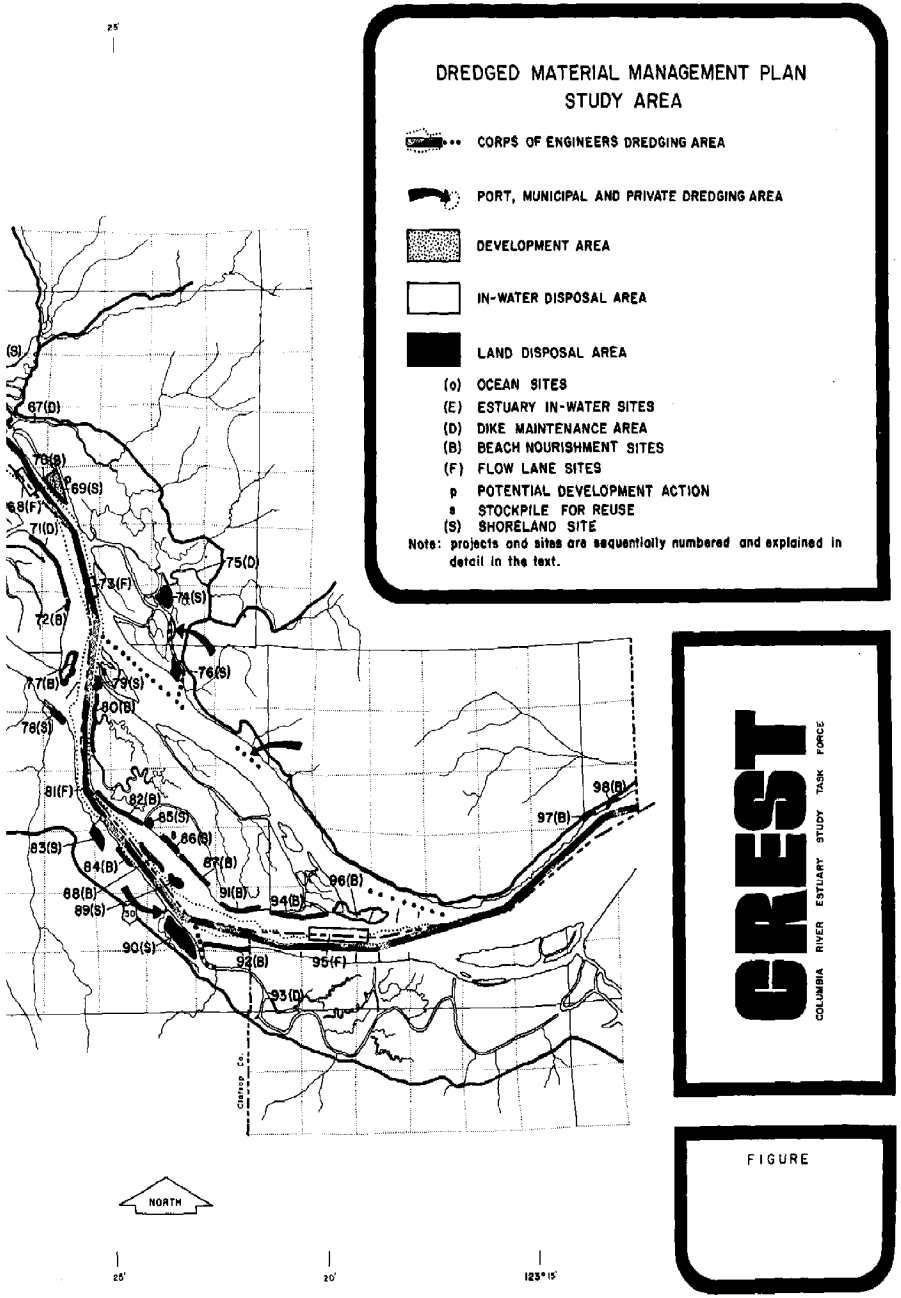
86(S) - Shoreland **Priority 1**
Location RM 42.4, beach south of Welcome Slough, ¾ mile from main ship channel.
Size 15 acres
Capacity 240,000 cy at 10 feet
Ownership Wahkiakum County
Designation *Rural*
Current Use DMD Stockpile
Final Use DMD Stockpile
Related Project Wauna Bar
Bio-Physical Description DMD stockpile outside road dike around Puget Island east of Welcome Slough; little vegetation and wildlife use; low habitat value.
Engineering Hydraulic pipeline dredging/disposal; no problems.
Environmental Concerns Assuming DMD of clean channel sands, the beach will return to productivity shortly after DMD use; site should be confined to prevent encroachment into the water or woody areas.
Comments There is some dispute over ownership and public access between upland property owners and the state. Access from the main channel dredging area is limited by Coffee Pot Island and may preclude future beach nourishment DMD operations.
(cf 44.01, 55.10)

89(S) - Shoreland (Corps W-42.5)
Location RM 42.5, South Coffee Pot Island, 300 yards from main ship channel.
Size 33 acres
Capacity 528,000 cy at 10 feet
Ownership Federal
Designation *Conservation*
Current Use Wildlife habitat/vacant
Final Use Wildlife habitat
Related Project Lower Westport Bar
Bio-Physical Description Estuary sand island; low and flat; created more recently than northern island and not yet stabilized; predominately sand; some willows and a few large trees on north side; little wildlife value in open sand area.
Engineering Hydraulic pipeline dredging/disposal; materials should be clean channel sands; site should not encroach on wooded area; area should be seeded after each use to stabilize sand from wind erosion and provide winter waterfowl feeding.
Environmental Concerns DMD use would have minimal impacts and stabilization and vegetation could enhance wildlife values.
Comments Any enlargement or attempt to link the two islands by in water disposal should be carefully evaluated for negative environmental impacts.
(cf 44.01, 55.10)

90(S) - Shoreland **Priority 1**
(Corps 0-42.9 and 0-43.0)
Location West of Westport Slough between the entrance of Driscoll Slough and Westport Slough; bounded on south by railroad right of way and east by small slough draining into Westport Slough.
Size 170 acres
Capacity 2,720,000 cy at 10 feet
Ownership Private (Crown Zellerbach, Warrenton Lumber Company)
Designation *Water Dependent Development*
Current Use Past DMD use/vacant
Final Use Industrial
Related Project Lower Westport Bar; Westport Slough and Wauna/Westport waterfront development (Crown Zellerbach and Wauna Mill).
Bio-Physical Description Partially filled with channel sand on western part (Crown Zellerbach); undisturbed portion characterized by spruce, willow, and alder forest; southern portion dominated by willows with skunk cabbage and sedge understory; use by wide variety of bird species, small mammals; terrestrial furbearers, and deer.
Engineering Hydraulic pipeline dredging/disposal; requires clearing and berming; berming should be as high as feasible for proposed development; site should be confined to prevent extension into wetlands and undisturbed vegetation beyond the small slough that flows into Westport Slough between the mouth of Plympton Creek and the mouth of Westport Slough; materials and timing should be coordinated with developers.
Environmental Concerns Impacts of DMD use on previously disturbed area are minimal, but the site should be confined.
Comments Extensive previous DMD use limits future use but this site could be used for maintenance dredging until the surface has been raised sufficiently for industrial development.
(cf 43.13, 56.20, 58.70)



PACIFIC OCEAN
WASHINGTON
OREGON
Pacific Co.
Wahkiakum
NAUTICAL MILES
KILOMETERS
STATUTE MILES



CREST

COLUMBIA RIVER ESTUARY STUDY TASK FORCE

FIGURE

SECTION VI

RESTORATION AND MITIGATION PLAN

61. BACKGROUND ..... VI - 2
State and Federal Programs ..... VI - 2
Relationship of Restoration and Mitigation ..... VI - 3

62. RESTORATION POLICIES ..... VI - 3

63. MITIGATION POLICIES ..... VI - 4

64. TECHNICAL CONSIDERATIONS FOR MITIGATION ..... VI - 5
The Scientific Basis for Mitigation ..... VI - 5
Ecological Significance of Physical Properties ..... VI - 6
Salinity and Temperature Regime ..... VI - 6
Substrate Type ..... VI - 6
Tidal Exposure ..... VI - 7
Slope and Area ..... VI - 7
Current Velocity and Pattern ..... VI - 7
Orientation to Solar Radiation ..... VI - 7
Annual Submergence Time ..... VI - 7
Biological Productivity ..... VI - 8
Habitat and Species Diversity ..... VI - 8

SUMMARY TABLE ..... VI - 8

65. POTENTIAL RESTORATION/RESOURCE ENHANCEMENT PROJECTS ..... VI - 10
Marsh Restoration - Creation Sites ..... VI - 10
Shoal Area Restoration ..... VI - 14
Eroded Shoreline Restoration Sites ..... VI - 15
Shoreland Vegetation ..... VI - 16
Pile Dike or Piling Removal ..... VI - 16
Fisheries Enhancement ..... VI - 16

66. MITIGATION NEEDS ..... VI - 18
66.10 Hammond ..... VI - 18
66.20 Middle Skipanon ..... VI - 18
66.30 Mouth of the Skipanon ..... VI - 18
66.40 Youngs Bay ..... VI - 19
66.50 Port of Astoria ..... VI - 19
66.60 Uppertown Alderbrook ..... VI - 20
66.70 Tongue Point ..... VI - 20

67. IMPLEMENTATION ..... VI - 20
67.10 The Mitigation Process ..... VI - 20
67.20 Mitigation Plan Content ..... VI - 21
67.30 Mitigation Bank ..... VI - 22
67.40 Mitigation Site Reservation ..... VI - 23

61. This section of the Regional Management Plan contains policies for restoring the natural and cultural values of the estuary area, and outlines procedures for mitigating the adverse impacts of new development in estuarine areas. Potential restoration and resource enhancement projects are described, along with suggestions to implement restoration and mitigation provisions of the plan.

STATE AND FEDERAL PROGRAMS

The Washington Shoreline Management Act (1971) guidelines for local programs include a plan element for restoration activities. Specifically, the guidelines suggest restoration of blighted areas and abandoned or dilapidated structures to a natural or useful condition. On-site mitigation of shoreline developments by control and modification of site design to meet performance or other standards is also a high shoreline management priority. Additionally, the Washington Departments of Game and Fisheries, which administer the hydraulics permit program, coordinate closely with counterpart federal agencies in seeking off-site mitigation or compensation for adverse impacts of estuarine alterations.

The Oregon Coastal Management Program and the Land Conservation and Development Commission (LCDC) Estuarine Resources Goal (No. 16) have explicit requirements concerning restoration. The Implementation Requirement (7) states:

> "State and federal agencies shall assist local government in identifying areas for restoration. Restoration is appropriate in areas where activities have adversely affected some aspect of the estuarine system, and where it would contribute to a greater achievement of the objective of this goal. Appropriate sites include areas of heavy erosion or sedimentation, degraded fish and wildlife habitat, anadromous fish spawning areas, abandoned diked estuarine marsh areas, and areas where water quality restricts the use of estuarine waters for fish and shellfish harvest and production, or for human recreation."

Development project mitigation is addressed in the Goal 16 Implementation Requirement (4):

> "Adverse impacts to estuarine resources resulting from dredge or fill activities permitted in intertidal or tidal marsh areas shall be mitigated by creation, restoration or enhancement of an estuarine area(s). The objective shall be to improve or maintain the functional characteristics and processes of the estuary, such as its natural biological productivity, habitats and species diversity, unique features and water quality." *

In addition, the LCDC Coastal Shorelands Goal (No. 17), Implementation Requirement (3) states:

> "Local government, with assistance from state and federal agencies, shall identify coastal shoreland areas which may be used to fulfill the mitigation requirement of the Estuarine Resources Goal. These areas shall be protected from new uses and activities which would prevent their ultimate restoration or addition to the estuarine ecosystems."

* New language recommended to LCDC by the Mitigation Taskforce

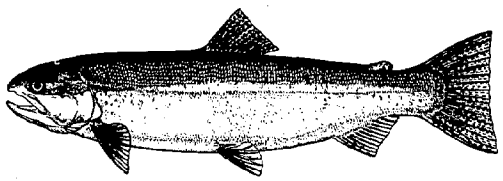
The Oregon Removal-Fill Law (ORS 541.605 - 541.695) provides the Division of State Lands (DSL) with the authority to require mitigation for dredging or filling waters of the state. For estuarine areas, DSL must require mitigation for any permitted alteration of intertidal and tidal marsh areas as outlined in the LCDC Estuarine Resources Goal. The DSL may also require additional mitigation for alteration of productive subtidal areas. Certain projects (cf. Mitigation policies, 63.10), are routinely exempted from these requirements because of their minimal impact on the estuary. The DSL coordinates its permit issuance and mitigation requirements with the Oregon Department of Fish and Wildlife, other state agencies, and federal agencies. The DSL is the lead state agency in review of federal Clean Water Act, Section 404, and Rivers and Harbors Act, Section 10, permits for filling, dredging and other alterations. The Corps of Engineers, which administers these federal programs, will generally not issue permits without the concurrence of the state.

Federal agencies, particularly the U.S. Fish and Wildlife Service, the U.S. Environmental Protection Agency and the National Marine Fisheries Service, also seek mitigation and compensation for federally constructed, funded or permitted estuary development activities which destroy or degrade natural resources. The Fish and Wildlife Coordination Act (1934), the Endangered Species Act (1975), and agency policies and regulations provide a basis for their decisions, which are implemented primarily through conditions on Corps of Engineers permits for dredging, filling or other alterations. The basic policies of these agencies are:

- Prevent natural resource losses, if possible,
- Recommend site plan modifications which will lessen the impact of the proposed action, and
- Require a mitigation plan for replacement or compensation of unavoidable losses.

In addition, the Corps of Engineers, under Section 150 of the Water Resource Development Act (1976) and Section III of the Rivers and Harbors Act (1968), provides funding for mitigating the adverse impacts of federal navigation projects.

Salmo gairdneri Steelhead



- Ron Pittard - Searep Studio, courtesy Clatsop County

RELATIONSHIP OF RESTORATION AND MITIGATION

Restoration focuses on restoring prior or original attributes of the estuary that were lost as a result of *past* alterations, activities or catastrophic events. Examples of restoration projects include: removing fills; lowering dredge spoil islands; marsh creation; shoreland vegetation planting for erosion control or re-establishment of buffer area; installing water treatment facilities; breaching abandoned or marginal dikes around low-lying diked areas; removing old piling or structures; dredging and construction measures to re-establish former depths or shoreline configurations, circulation and flushing patterns of an area of the estuary; and rebuilding deteriorated urban waterfronts.

Mitigation, particularly in Oregon where the requirements are explicit, focuses on lessening the adverse impacts of *proposed* dredging and filling, rather than past alterations.

Restoration and mitigation are connected in that certain restoration actions would mitigate adverse development impacts. For example, restoration of an abandoned diked marsh to full aquatic productivity by breaching the dike would normally be acceptable mitigation for filling a tidal marsh in some other area for water dependent development. However, restoring a shoreline to its original configuration by filling would not be suitable to mitigate adverse environmental impacts elsewhere because one major problem in the estuary is the loss of aquatic area.

OBJECTIVES

Objectives and policies for restoration and mitigation were developed by a technical planning committee with representatives from key state and federal agencies, local ports, industry and special interest groups. The policies were widely distributed, reviewed and comments considered in revising the policies. Recent work of the Oregon Land Conservation and Development Commission's Mitigation Taskforce has also been utilized in policy revisions.

The objectives for restoration and mitigation efforts in the Columbia River Estuary area are:

- To restore and enhance the natural productivity and functioning of the Columbia River estuary ecosystem for the benefit of people and the natural resources on which they depend.
- To reverse historic trends of aquatic and riparian habitat loss, and the rapid filling of the estuary.
- To restore cultural and historic resources and values of shoreline areas for the benefit and enjoyment of people.
- To provide for complete and reasonable mitigation of the adverse impacts of estuary development on aquatic and terrestrial ecosystems.

62. RESTORATION POLICIES

(These policies may also be found at 22.50)

The Columbia River estuary has been substantially altered over the past century to provide for navigation, shoreline development and agriculture. Upriver dams and watershed activities have also contributed significantly to changes in the natural functioning of the estuary. While it is not possible or desirable to return the estuary to its pre-nineteenth century condition, restoration or creation of certain habitat and cultural values is an important estuary management objective.

62.10 Overall Restoration Policy

All restoration projects should serve to revitalize, return, replace or otherwise improve the estuarine ecosystem or highly-valued cultural characteristics.

Examples include restoration of natural biological productivity, fish or wildlife habitat, or aesthetic, cultural and historic resources which have been diminished or lost by past alterations, activities or catastrophic events.

In selecting projects, priority should be given to those projects which provide substantial public benefits and which restore the habitat types, resources or amenities which are in shortest supply as compared to past abundance. Particular emphasis should be given to aquatic and riparian habitat restoration.

62.20 Habitat Creation Through Dredged Material Disposal

Disposal of dredged material in water and wetland areas for the specific purpose of creating shallow water, intertidal, or island areas is strongly discouraged because this practice contributes to the downward trend of available aquatic habitat.

Habitat creation through upland plantings on existing dredged material islands is encouraged to provide wildlife habitat.

Marsh plantings on existing intertidal areas should continue to be evaluated and considered as a habitat creation technique.

62.30 Diked Lands Restoration

Restoration of marginal and unused low-lying diked areas to estuarine wetland is encouraged; active restoration to provide potential for diverse habitat (e.g. mudflat and marsh) as well as passive restoration are encouraged. If loss of productive farmland or significant wildlife habitat would occur, breaching of dikes is strongly discouraged. Except through public condemnation procedures, removal of dikes protecting private lands shall not occur without the expressed consent of the landowner. Incentives should be provided to private landowners who restore diked areas to aquatic production.

62.40 Restoration of Shoaled Areas

Estuary areas that have shoaled or filled at an unnaturally high rate, resulting in loss of a particular type of aquatic habitat or loss of traditionally navigable areas, should be restored to historic conditions as practical. Passive measures are preferred, but active measures or a combination may be required. All such projects should be carefully evaluated to ensure potential ecological, economic and social benefits to man and natural resources outweigh potential losses.

62.50 Removal of Old Pilings and Structures

Old piling, navigational structures and buildings which are a hazard to navigation, contribute to excessive shoaling, or pose a danger to life and property should be removed. Prior to any such removal, however, costs and benefits should be evaluated, including the potential for erosion or sedimentation caused by removal, the biological habitat value and probable life of the structure, and the historic and scenic value.

62.60 Erosion Area Restoration

Where feasible, areas with erosion problems should be vegetated with marsh and shoreland planting to establish a natural buffer against erosion. Beach nourishment should be used to restore historic shoreline configurations where feasible. Structural solutions should be used as a last resort to protect life and property.

62.70 Shoreland Revegetation

Shoreland and especially riparian areas where vegetation has been removed for timber harvest or urban development should be revegetated as soon as possible. Areas of existing shoreline development should be considered for revegetation for both aesthetic, biological and bank stabilization values.

62.80 Restoration of Deteriorated Urban Waterfronts

Redevelopment of deteriorated urban waterfront areas is strongly encouraged. Development should be water oriented, public access should be preserved, and recreational facilities should be improved, where possible. While priority should be given along the waterfront to water dependent and water related uses, provision may also be needed for other uses. Renovation and repair of historic buildings is highly desirable; removal of deteriorated structures and pilings may be appropriate.

63. MITIGATION POLICIES

(These policies may also be found at 22.60)

Necessary new development projects in the Columbia River estuary will have adverse environmental impacts, regardless of how carefully the projects are designed and constructed. The adverse effects of such development can be mitigated by the restoration or enhancement of other estuarine areas.

63.10 Mitigation for Dredging, Filling or Diking Tidal Marsh or Intertidal Areas

The following policies fulfill the requirements of Oregon law. While Washington state law does not specifically require mitigation for dredge and fill activities in intertidal or tidal marsh areas, the following policies are strongly encouraged. Alternative forms of mitigation in Washington, including preservation, compensation and resource enhancement, are also encouraged.

- Adverse impacts to estuarine resources resulting from dredge, fill or dredged material disposal activities (public or private) permitted in intertidal or tidal marsh areas shall be mitigated by creation, restoration or enhancement of estuarine areas. Such mitigation shall improve or maintain the functional characteristics and processes of the estuary, such as its natural biological productivity, habitats and species diversity, unique features and water quality. The cost of mitigation shall be included as part of project cost analysis.

- Actions exempted from the mitigation requirement above include:
  - —Removal or filling of less than 50 cubic yards of material or when an Oregon State Removal and Fill Permit is not otherwise required;
  - —Filling for repair and maintenance of existing functional dikes when there is negligible physical or biological damage to tidal marsh or intertidal areas;
  - —Riprap to allow protection of an existing bank line with clean, durable erosion resistent material provided that the need for riprap protection is demonstrated and that this need cannot be met with natural vegetation, and no appreciable increase in existing upland occurs;
  - —Filling for repair and maintenance of existing roads when there is negligible physical or biological damage to tidal marsh or intertidal areas;
  - —Dredging or filling required as part of an estuarine resource creation, restoration or enhancement project agreed to by local, state and federal agencies; and
  - —Other proposed projects or activities where, upon determination of the Oregon Division of State Lands, the proposed alteration would have negligible physical, biological and water quality impacts.

- Actions not considered as mitigation under Oregon Land Conservation and Development Commission (LCDC) Goal Number 16 include the transfer of ownership of estuarine lands, including wetlands and submersible lands, to public ownership; the dedication of estuarine lands for certain natural uses; and the provision of funds for research.

63.20 Mitigation for Dredging, Filling or Otherwise Degrading Biologically Productive Subtidal Areas

Dredging, filling or other activities or alterations which significantly degrade or destroy biologically productive subtidal areas should be mitigated by restoration, habitat creation, enhancement or other appropriate means.

63.30 Mitigation for Degradation or Destruction of Critical Wildlife Habitat

Mitigation for significant alterations which would degrade or destroy critical habitat for endangered or threatened species, or other wildlife, shall be required through restoration, resource enhancement, preservation, or financial compensation. Mitigation for loss of other valuable wildlife habitat, such as freshwater marshes, spruce swamps and old growth forest is encouraged.

63.40 Mitigation Sites

While a range of actions may be taken to satisfy mitigation requirements, mitigation sites or projects should be preferentially evaluated as follows:

- Areas in close proximity to the development site with physical characteristics such that when restored, the area will develop a similar quality and quantity of plant and animal life and perform similar ecological functions;
- Areas in other parts of the estuary that meet the above physical and biological criteria;
- Areas or resources in shortest supply as compared to past abundance, particularly tidal marshes and the salmon resource.

Estuarine alterations for development in one state can be mitigated through restoration or other actions in the other state.

Because estuarine tidal marshes and flats are ecologically diverse, it may be impossible to create or restore a single site with the same mixture of ecosystem components as are present at the site to be altered. In such cases, more than one mitigation site may be required. All important ecological features of the development site should be created or restored elsewhere within the estuary, whether separately or together.

64. TECHNICAL CONSIDERATIONS FOR MITIGATION

THE SCIENTIFIC BASIS FOR MITIGATION

The requirement that environmental damage in one area be mitigated by environmentally constructive acts in another area is a resource management tool based on the scientific concept of an ecosystem. An ecosystem is an interacting system of organisms and their physical environment within a definable area. The most important set of interactions between the parts of an ecosystem is the flow of energy and materials — the food chain. In an ecosystem, organisms have functional roles as groups of ecologically similar species, the exchange of matter and energy is flexible, and the whole system has some capacity for self-adjustment and dynamic stability.

The idea of an ecosystem is not a testable scientific law; it is a descriptive concept about how the natural world is organized into integrated units. As such, it provides a framework for fitting human activities into the natural order. In the past, areas were often managed for the benefit of one species that had particular value to people. For example, certain game preserves raised a large number of deer in nearly domestic conditions to provide for the hunting season, the habitat was modified for the convenience of people, and other species were either accidentally diminished through the loss of habitat or were destroyed because they were predators. However, experience has shown that the natural order is far too complex for this approach: the managed species may exceed the carrying capacity of the land; and the loss of other species from the ecosystem may lead to unexpected loss of the managed species and other undesirable changes, such as flooding. For this reason, an ecosystem approach has replaced the single species approach in natural resources management ranging from fisheries to forests.

The Oregon Estuarine Resources Goal emphasizes ecosystem features with the statement that the objective of mitigation is to improve or maintain the functional characteristics and processes of the estuary, such as its natural biological productivity, habitat and species diversity, unique features, and water quality.

In estuaries, the biotic components of the ecosystem are grouped into such functional categories as primary producers, decomposers, epifaunal or infaunal herbivores, detritivores, and predators. The physical components of the system are identified as fixed and dissolved plant nutrients, organic detritus supply, surface area available for light reception, tidal flow features, bottom sediment types, annual salinity and temperature regimes, and other factors. The ecological viewpoint has the advantages of identifying major processes and components of the system and simplifying the enormous natural complexity. This systemic view has some disadvantages; the identity of individual species is downplayed, as are some minor processes which may be considered important to man by other criteria.

The ideal estuarine management tool would have all relevant data on component species and functional categories as well as restoration and management unit plans incorporated into an accurate estuarine ecosystem model. Simulations of proposed alterations would then predict their adverse effects on the system and prescribe mitigation actions to compensate for them while fulfilling comprehensive plan objectives. However, we lack detailed quantitative knowledge of Columbia River estuary ecosystem components and their interactions. An alternative is to prevent adverse, unpredictable, and irreversible trends or changes in estuarine natural systems by maintaining as much of the existing systems as possible even if the function, relative importance or even existence of the component parts are not fully known.

Some alterations of the estuarine ecosystem must take place to support desired economic growth. To protect the ecosystem, mitigation sites or projects to compensate for the adverse effects of these alterations will be selected preferentially as follows (cf 63.40):

- Areas in close proximity to the development site with physical characteristics such that, when restored, the area will develop a similar quality and quantity of plant and animal life and perform similar ecological functions;
- Areas in other parts of the estuary that meet the above physical and biological criteria;
- Areas or resources in shortest supply as compared to past abundance.

It is impossible to predict accurately how a site used for mitigation will develop biologically and whether or not the resources adversely affected by an estuarine alteration will actually be replaced. The best predictions can be made for mitigation sites very near the altered site because proximate areas are the most likely to develop into the same habitat type as that at the altered site, and in time may produce a nearly identical community with the same relation to the rest of the estuarine system.

When it is necessary to use mitigation sites away from the development site, exact site comparisons are not possible, but physical and biological characteristics of the development region can be compared to other regions where potential mitigation sites exist. The choice of actual mitigation sites would be based on the degree of ecological similarity to the development site.

It may be impossible to achieve exact mitigation nearby or away from the development site. In such cases, habitats or resources made scarce by past removals may be restored or created. While such sites may not have the same ecological qualities as those lost at the development site, their use for mitigation recognizes that the different but important functions they provide to the ecosystem enhances or restores the system as a whole. The implied policy is that return to the estuary of areas once withdrawn for one use (e.g. agriculture) may be a condition for withdrawal of another for development now considered a greater economic or social priority (e.g. port development). This forms a link between ecological considerations in restoration and mitigation and the other aspects of the plan.



-John Atkinson

ECOLOGICAL SIGNIFICANCE OF PHYSICAL PROPERTIES

Salinity and Temperature Regime

Salinity is the measure of dissolved salts in sea water. Most organisms are limited in their upstream distribution in the estuary by their tolerance to lowered salinity. A few fish can range from sea water salinities near the estuary mouth to fresh river water conditions far into the upper reaches of the system, but most animals and plants cannot. Consequently, the annual range of salinity conditions determines the areas which a species can occupy in the estuary when other habitat requirements are met. The seasonal salinity and temperature ranges for a site describe major habitat features. The immensely variable freshwater flow of the Columbia River plays a significant role in determining both. Similarity of temperature and salinity regimes at two sites indicate that similar biota will be present, if other conditions such as sediment types do not differ.

Substrate Type

The physical nature of the bottom materials has little meaning unless it is considerably qualified. Solid versus unconsolidated substrate is the major dichotomy. Little solid intertidal substrate exists in the Columbia River estuary and much of it is artificial, such as jetties, groins, bank riprap and pilings. These tend to increase with development. Most estuarine substrates are sedimentary types varying in composition of particle types and sizes, non-living organic matter content, and chemical features. Sediment types have distinctive patterns of distribution; tidelands in the shallow bays, sloughs, and tidal marshes are mostly composed of fine silt and clays, while sandy sediment types tend to predominate in the channel and slope areas and mid-estuary flats.

Most estuarine organisms of sedimentary habitats are relatively substrate specific, requiring limited range of sediments. Each of these has a characteristic biotic community associated with it, depending where it is located in the salinity gradient of the estuary. Substrate characteristics are ot similar importance to temperature and salinity in defining similar ecological conditions.

Tidal Exposure

Tidal exposure refers to the frequency and duration of exposure to the air of a given tidal level. The higher tidal levels of the marsh community are flooded for relatively short and infrequent times, periodically undergoing many days without tidal flooding. Mid-tide levels are covered and exposed by tides daily, in complex rhythms of frequency and duration while the lowest tide levels are infrequently exposed for short durations, and go long periods without exposure. Intertidal organisms respond to the resulting varied conditions by occupying limited portions of the tidal range, often with distinct upper and lower boundaries. Even on a fairly uniform substrate, the intertidal community is distinctly zoned. Only sites which extend through the same tidal range, and consequently have a similar tidal exposure regime, have similar communities, even if other habitat features of salinity and substrate are the same. In both individual mitigation actions and in overall planning, consideration must be given to providing comparable areas of comparable tidal elevations, at one or several mitigation sites, to those lost at development sites.

Slope and Area

The angle of slope of tidelands determines the total area available at different tidal heights, consequently the quantities of different ecological components present in a defined area. This characteristic must be considered with tidal elevation. Because the slope establishes the area of tideland between tidal elevations, it could be discarded as a separate consideration in favor of areal distribution at different tidal elevations. The slight slope of estuarine tidelands results in relatively large areas of land at different tidal heights from mid-tidal to highest tidal levels. At lower tide levels, slope often changes and drops more steeply to subtidal channel depths. Different tidal levels have different ecological characteristics. The differing amounts of area at different tidal levels of a development site require separate consideration in quantifying mitigation actions. It may be more practical to consider the major ecological values of different tidal levels separately and seek a compensation method for each among the available options of creation and restoration in different areas when no one site provides all the required features.

Current Velocity and Pattern

The major estuarine currents over tidelands are of tidal origin and consequently have changing characteristics of speed, duration and direction. Tidal current patterns over tidelands are strongly influenced by topographic and other features both within and outside tidelands, and it is very difficult to identify details of critical ecological significance. Tidelands bordering channels have distinct flow patterns and velocities. The ecological significance of tidal currents derives from their transport of materials to and from tidelands, linking them physically to the rest of the system. Currents transport sediment particles, and the maximum current velocity over a tidal area will influence sediment characteristics, thus indirectly influencing community composition. Those ecological features directly affected by currents can be measured in other ways, and it is unlikely that the details of current flow over one site can be found at another and still less likely that they could be adequately predicted before a mitigation site was created or restored.

Orientation to Solar Radiation

The slope of estuarine tidelands is so slight over large areas that they may be considered virtually flat with respect to their orientation to the sun and thus show no differences from place to place in this property. Only when intertidal areas have appreciably steep slopes do their orientations to the sun affect light penetration, heating or drying.

Annual Submergence Time

The "Annual Submergence Method" was developed as a mitigation tool by Dr. J. J. Gonor of Oregon State University. It was accepted and used as an important criterion by the Oregon Division of State Lands (DSL) in the case of the proposed North Bend Airport fill in Coos Bay. This method, when strictly applied, would equate areas by equalizing their surface area - time submerged relations. It is a simple method to integrate several important ecological concepts into a simple figure. For the Columbia River estuary, it probably has more validity and usefulness for tidal marsh mitigation than sand-mud flats.

Dr. Gonor's assumptions in using the method are:

- The ecological value of primary and secondary productivity of tidal waters over intertidal lands at high tide is sufficiently high to rank it among the high priority features sought in mitigation compensation.
- The major features to be equalized between two intertidal areas to secure the above priority benefit are providing equal *times* and *water surface area* for heat and light reception and heat exchange with the atmosphere.
- Intertidal heat and light reception is important to the estuary ecosystem as a whole because tidal exchange spreads its effects.
- The present form of the method assumes the values above are achieved by any equivalent area of tidal water over a wide range of depth and therefore volume differences. This method emphasizes different features from a related tidal prism concept. It does not entirely provide an equal volume over an equal area for an equal time.

Additional assumptions that increase the Annual Submergence Time method's acceptability for marsh lands include:

- Zonation of marsh vegetative communities is directly tied to land elevation.
- Detrital export of marsh primary production increases as submergence time increases.

The formula for calculating annual submergence time is: Tidal Inundation frequency x area x 365 days = Annual submergence time in acre days.

BIOLOGICAL PRODUCTIVITY

Natural biological productivity can be estimated and used in comparing the biological potential of sites. It also could be used as one measure in determining the area required at a mitigation site for it to be ecologically equivalent to a development site. Biological productivity is the rate at which organic matter is produced in a system or some component of it. Of paramount importance for maintaining ecosystem functions is net primary production, the photosynthetic production by plants of organic substances in excess of their maintenance needs. Primary production is expressed as the rate at which energy or carbon is fixed by plants into organic material, per unit area. Since net primary production by plants fixes the amount of energy flowing through the rest of the biotic community, conserving or increasing this base is important for maintaining estuarine systems.

Secondary productivity is also an important ecosystem feature; it refers to the rate at which consumers, at higher levels in estuarine food webs, store energy. Because a great deal of data and analysis are required to estimate secondary productivity, it is not a useful tool in determining mitigation needs.

Standing crop, which is the number of weight of organisms present at any one given time, can be a useful measure in mitigation. Standing crop is not the same as productivity, but is a measure of the production held in reserve. This storage is a key factor in stabilizing the estuarine ecosystem in that it provides a food and energy reserve for times of the year when productivity is low. Maintenance of major storage components, such as tidal marshes and mudflats, is an important mitigation objective.

HABITAT AND SPECIES DIVERSITY CONSIDERATIONS

Maintaining diversity, which is the number of different habitats or species in a given area, is an important ecosystem maintenance objective. Habitat refers to the place occupied by a distinct community, such as a tidal marsh. Habitat also can refer to the place where one would go to look for a particular organism. Habitats may thus be quite specific or general. For mitigation purposes, habitats should be considered in the more general sense, though specific species, such as those which play key food chain roles or are rare or endangered, may be very important. In mitigation actions, attention should be given to maintaining the mixture of habitats and species.

SUMMARY TABLE

Marsh Restoration/Creation

Site Number	Location	Comments
6 (M)	Swash Lake/Trestle Bay	dune excavation (1-20 acres)
9 (M)	Holbrook Slough - west	construct new dike/ breach old (68 acres)
10 (M)	Holbrook Slough - east	construct new dike/ breach old (20 acres)
12 (M)	Fort Clatsop - Lewis & Clark River	remove tidegate (30 acres)
14 (M)	West Bank - Lewis & Clark River (RM 5.3)	breach dike (11 acres)
15 (M)	West Bank - Lewis & Clark River (RM 5.9)	breach dike (13 acres)
16 (M)	East Bank - Lewis & Clark River (RM 4.9)	breach dike (30 acres)
17 (M)	East Bank - Lewis & Clark River (RM 5.7)	breach dike (20 acres)
18 (M)	Youngs River (RM 4.4)	open tidegate (40 acres)
19 (M)	Youngs River (RM 5.2)	breach dike (135 acres)
20 (M)	Youngs River/Walluski	breach dike (35 acres)
21 (M)	Youngs River (RM 5.8)	restore/open dikes (20 acres)
22 (M)	Youngs River (RM 6.3)	open tidegate (32 acres)
23 (M)	Haven Island (RM 7.5)	log/breach dikes (60 acres)
24 (M)	Youngs River (RM 7.5)	breach dike (90 acres)
25 (M)	Walluski River	breach dikes (20 acres)
26 (M)	Walluski River	breach dikes (40 acres)
27 (M)	Walluski River	breach dikes (60 acres)
28 (M)	Klaskanine River	breach dikes (100 acres)
29 (M)	John Day River	breach dikes (34 acres)
30 (M)	John Day River	breach dikes (23 acres)
31 (M)	John Day River	breach dikes (28 acres)
32 (M)	John Day River	breach dikes (15 acres)
33 (M)	John Day River	breach dikes (21 acres)
34 (M)	John Day River	breach dikes (20 acres)

Site Number	Location	Comments
35 (M)	John Day River	breach dikes (17 acres)
36 (M)	John Day River	breach dikes (7 acres)
37 (M)	John Day River	breach dikes (25 acres)
38 (M)	Svensen - Marys Creek	restore/improve (25 acres)
39 (M)	Svensen - Ferris Creek	vegetate/remove dike (10 acres)
40 (M)	Svensen - Ferris Creek	dikes in disrepair (51 acres)
41 (M)	Svensen Island	breach dikes (350 acres)
44 (M)	Deep River	breach dike (45 acres)
48 (M)	Columbia - Miller Sands (RM 23.5)	marsh creation/planting/ Corps of Engineers
55 (M)	Elochoman River	breach dike (200 acres)

Shoal Area Restoration

Site Number	Location	Comments
3 (SA)	Baker Bay - Sand Islands	close gap between islands
11 (SA)	Youngs Bay - south of causeway	breach/bridge causeway
45 (SA)	Grays Bay/River	dredge channel, mouth/ flood control
56 (SA)	Cathlamet Channel - upstream end	close gap between dredged material islands

Eroded Shoreline Restoration

Site Number	Location	Comments
7 (E)	Hammond	fill/riprap/park
8 (E)	Hammond	fill/beach nourishment

Shoreland Vegetation

Site Number	Location	Comments
46 (SV)	Rice Island (RM 21)	dredged material/vegetative stabilization
47 (SV)	Miller Sands (RM 23.5)	dredged material/vegetative stabilization
49 (SV)	Jim Crow Sands (RM 27.1)	dredged material/vegetative stabilization

Pile Dike or Piling Removal

Site Number	Location	Comments
4 (P)	Baker Bay	old piling/navigation hazard/ fish traps
5 (P)	Baker Bay - Chinook Jetty	pile dike removal
50 (P)	Snag Island Jetty	pile dike/early channel

Fisheries Enhancement

Site Number	Location	Comments
1 (F)	Wallacut River - Baker Bay	habitat improvement
2 (F)	Chinook River - Baker Bay	habitat improvement/fish propagation
13 (F)	Lewis & Clark River	habitat enhance/fish propagation
32 (F)	John Day River - Clatsop	fish/shellfish improvement
42 (F)	Deep River - Wahkiakum	habitat improvement
43 (F)	Grays River - Wahkiakum	fish propagation - chum/dredge
51 (F)	Big Creek - East Clatsop	habitat improvement/propagation
52 (F)	Gnat Creek - East Clatsop	habitat improvement/propagation
53 (F)	Elochoman River	habitat improvement/propagation
54 (F)	Westport Slough	fisheries enhancement
57 (F)	Youngs River	habitat enhance/fish propagation
58 (F)	Youngs River Falls	fish ladder
59 (F)	Upper Klaskanine River	low flow water storage

65. POTENTIAL RESTORATION/RESOURCE ENHANCEMENT PROJECTS

MARSH RESTORATION — CREATION SITES

6 (M) — MARSH CREATION

Site Description

Location: Swash Lake/Trestle Bay, south of Clatsop Spit at the river mouth

Size: 1 - 20 acres

Biophysical Characteristics: Accreted shoreland area contingous to the tidal marshes of Trestle Bay and Swash Lake; consists of stabilized sand dunes which provide a rolling landscape. Area at one time was a sandy beach at the river mouth; the dunes were built up after construction of the south jetty. Vegetation is primarily coast pine, scotchbroom, salal and other low shrubs and ground covers, such as wild strawberry. The dune area gets substantial use by wildlife, including deer, raptors and other birds, small mammals and reptiles.

Land Use - Plan Designation: Area is part of Fort Stevens State Park; designated ***Conservation Shoreland*** in CREST/County plan for recreation uses.

Ownership: Federal (Corps of Engineers) - leased to the State of Oregon.

Restoration Action

Expand the size of the Swash Lake/Trestle Bay marshes by excavating the adjacent sand dunes to the intertidal level, opening up drainage channels into existing marsh channels. Plant native marsh plants or allow natural marsh colonization of the area. Excavate dune material used to fill in dune troughs and stabilize with beach grass and scotchbroom. One or more marsh areas of variable size could be created at this general location.

Biological Potential/Impacts

Lowering the dune area to the intertidal level and constructing drainage sloughs will likely allow colonization of flora and fauna found in adjacent areas of similar elevation and topography. These are ecologically important areas. The adjacent tidal marsh has been extensively studied. It grades from a low sandy marsh to a high mature marsh. Sedges, bullrushes, arrowgrass, bentgrass, silverweed and some low-salinity tolerant species are found in this essentially freshwater marsh. The biology of the sloughs and drainage channels has not been studied, but the area would be expected to have high numbers of benthic invertebrates and receive extensive use by many varieties of fishes.

These tidal marshes and adjacent flats and sloughs get extensive use by waterfowl and other wildlife; any new marsh area created should proportionately increase its potential to support wildlife. Considering the extent of protected dune habitat to the south, loss of terrestrial area natural values is probably small in comparison to potential aquatic habitat gains.

9 (M) — MARSH RESTORATION

Site Description

Location: Warrenton, on Youngs Bay, east of proposed Pacific Fabricators site, west of Holbrook Slough.

Size: 67.6 acres (7.6 acres of slough)

Biophysical Characteristics: Diked marshland in the 7'-9' range above MLLW, with a network of drainage sloughs which empty into Holbrook Slough. Salinity of adjacent estuarine waters ranges from 0 - 10 °/oo, the tidal range is 8.6' and annual submergence time is 2190 acre-days. Vegetation is mixture of pasture grasses and tussock. The area gets some use by cattle, small mammals and foraging birds. Wildlife value is low.

Land Use - Plan Designation: Area is designated as ***Water Dependent Development Shoreland*** and also as a potential dredged material disposal site. The site should be reserved for either DMD use or as a restoration site. Use for either will require evaluation of the competing use.

Ownership: Port of Astoria

Restoration Action

Construct 2000 feet of new dike adjacent to railroad and on northwest side of Holbrook Slough. After appropriate stabilizing period, breach existing dike at 200' intervals and completely open existing drainage channels out to open water of Youngs Bay. Approximate restoration cost would be $350,000, exclusive of land value.

Biological Potential/Impacts

Based on proximity to proposed Youngs Bay development sites, tidal exposure, salinity and the protected location, it is expected that a highly productive brackish water tidal marsh will develop, and include sedges (*Carex* sp.) bulrushes (Scirpus spp.) and cattail (Typla sp.) plus other wetland vegetative species. Wildlife use by waterfowl, shorebirds and waders, and aquatic furbearers would increase significantly. The open slough area created would likely have very high benthic productivity, similar to adjacent Youngs Bay tidal flats. Fish usage, including juvenile salmon, is also expected to be high.

10 (M) — MARSH CREATION

Site Description

Location: Warrenton, on Youngs Bay, southeast of Holbrook Slough

Size: 4.25 acres of slough and 15.3 acres of land - total 19.55 acres

Biophysical Characteristics: Diked marshland in the 8' - 9' range above MLLW. Drained by Holbrook Slough. Salinity of adjacent estuarine waters ranges from 0 - 10 °/oo, tidal range is 8.6' and annual submergence time is 219 acre-days. Area is presently used to grow hay and gets extensive use by small mammals. Use by other wildlife is low to moderate. Warm water fishes are found in Holbrook Slough.

Land Use - Plan Designation: Area in agriculture use and designated ***Development Shoreland.***

Ownership: Port of Astoria

Restoration Action

Construct 1500 feet of new dike adjacent to railroad and U.S. Highway 101. Breach dike and open Holbrook Slough to Youngs Bay. Approximate cost of restoration would be $225,000.

Biological Potential/Impacts

A marsh intermediate between a high transition marsh and cattail-bulrush marsh could be created, including common rush (*Juncus effusus*), a variety of grasses and herbaceous plants, cattail, bulrush and sedge. Wildlife use by waterfowl, small mammals, aquatic furbearers, wading birds and shorebirds would increase significantly. Holbrook Slough would likely have high benthic productivity and receive significant use by fish.

12 (M) — MARSH RESTORATION

Site Description

Location: Lewis and Clark River - south of Fort Clatsop National Memorial.

Size: 27 acres low; 16 acres high, 3 acres drainage slough

Biophysical Characteristics: Diked freshwater tidal marsh, a 16-acre portion higher of which is used for grazing farm animals; remainder has partly reverted to a freshwater marsh. There is little intrusion of salt water in this reach of the river, even during low flows. The diurnal tidal range is 8.7 feet and the annual submergence time is about 2858 acre-days for the lower north portion and 350 acre-days for the higher south portion. The area is separated from the river by a road and has a single tidegate for drainage.

Land Use - Plan Designation: Agriculture-*Rural*
Ownership: Private (Miller)

Restoration Action

Restoration would involve permanent opening of tidegate and subsequent flooding. The road could be relocated to the west but such action would substantially increase project cost.

Biological Potential/Impact

The area to the north is already a partly developed marsh, and restoration would provide full tidal action to the area. The high freshwater marsh would be similar to adjacent marshes and contain sedges, bulrush, cattail, Pacific water-parsley, Pacific silverweed and other freshwater aquatic species. The area to the south, being higher, would probably revert to brushy riparian vegetation such as willow, blackberry, alder and others. Wildlife use of the area would probably increase, with waterfowl, small mammals and aquatic furbearers predominant. The road would act as a dike and influence wildlife use in a negative way.

14 (M) — MARSH RESTORATION

Site Description

Location: Lewis and Clark River (RM 5.3), west bank
Size: 11 acres
Biophysical Characteristics: Diked freshwater tidal marsh, presently used for pastureland with grasses predominating. Has direct connection with river. Dike is low and not well maintained. Diurnal tidal range is 8.7 feet, submergence time is 642 acre-days, average elevation is about 7.0 feet above MLLW, and no salinity intrusion occurs in the area.
Land Use - Plan Designation: Agriculture - *Rural*
Ownership: Private (Tagg)

Restoration Action

Breach dike, construct a natural drainage pattern.

Biological Potential/Impacts

Area would add 11 acres of high freshwater marsh to the aquatic ecosystem, while removing the same area from agricultural productivity. Marsh species which would invade the restored area include sedges, bulrushes and cattails. Wildlife use would increase significantly.

15 (M) — MARSH RESTORATION

Site Description

Location: Lewis and Clark River (RM 5.9), west bank
Size: 13 acres
Biophysical Characteristics: Diked freshwater tidal marsh, presently used for pastureland with grasses predominating. Has direct connection with river. Dike is low and not well maintained. Diurnal tidal range is 8.7 feet, submergence time is 759 acre-days, elevation is about 7.0 feet above MLLW, and no salinity intrusion occurs in the area.
Land Use - Plan Designation: Agriculture - *Rural*
Ownership: Private (Tagg)

Restoration Action

Breach dike, construct a natural drainage pattern.

Biological Potential/Impacts

Area would add 13 acres of high freshwater marsh to the aquatic ecosystem, while removing the same area from agricultural productivity. Marsh species which would invade the restored area include sedges, bulrushes and cattails. Wildlife use would increase significantly.

16 (M) — MARSH RESTORATION

Site Description

Location: Lewis and Clark River (RM 4.9), east bank
Size: 30 acres
Biophysical Characteristics: Diked freshwater tidal marsh, presently used as pastureland with grasses predominating. Dike is in fair to poor condition. Diurnal tidal range is 8.7 feet, average elevation 7.5 feet MLLW, annual submergence time 1095 acre-days, and no salinity intrusion occurs.
Land Use - Plan Designation: Agriculture - *Rural*
Ownership: Private (Grant)

Restoration Action

Breach dike and reconstruct natural drainage pattern.

Biological Potential/Impacts

Area would add 30 acres of high freshwater tidal marsh to the aquatic ecosystem, while removing the same amount of area from agricultural productivity. Marsh species which would invade the restored area include sedges, bulrushes, and cattails. Wildlife use would increase significantly.

17 (M) — MARSH RESTORATION

Site Description

Location: Lewis and Clark River (RM 5.7), east bank
Size: 20 acres
Biophysical Characteristics: Diked freshwater tidal marsh, presently used as pastureland with grasses predominating. Dike is in fair to poor condition. Diurnal tidal range is 8.7 feet, average elevation 7.5 feet MLLW, annual submergence time 730 acre-days and no salinity intrusion occurs.
Land Use - Plan Designation: Agriculture - *Rural*
Ownership: Private (Schneider)

Restoration Action

Breach dike and reconstruct natural drainage pattern.

Biological Potential/Impacts

Area would add 20 acres of high freshwater tidal marsh to the aquatic ecosystem, while removing the same amount of area from agricultural productivity. Marsh species which would invade the restored area include sedges, bulrushes and cattails. Wildlife use would increase significantly.

18 (M) — MARSH RESTORATION

Site Description

Location: Youngs River (RM 4.4), east bank
Size: 40 acres
Biophysical Characteristics: Diked former freshwater tidal marsh separated from the river by Highway 202; tidegate drains the area which is well managed pastureland used by farm animals. Small creek runs through the primary drainage channel. Diurnal tidal range in region is 8.6 feet, average land elevation about 8.0 feet MLLW, submergence time about 1022 acre-days and occasional salinity intrusion occurs (0 - 10 °/oo) at low Columbia River flows.
Land Use - Plan Designation: Agriculture - *Rural*
Ownership: Private (Linehan)

Restoration Action

The land area may need to be lowered in some areas; the tidegate would be removed to provide regular tidal action. Natural drainage patterns could be constructed.

Biological Potential/Impacts

Area would add 40 acres of high freshwater tidal marsh to the aquatic ecosystem, while removing the same amount of area from agricultural productivity. Marsh species which would invade the restored area include sedges, bulrushes and cattails. Wildlife use would increase significantly.

19 (M) — MARSH RESTORATION

Site Description

Location: Youngs River (RM 5.2)/Walluski River Junction (north shore)
Size: 135 acres
Biophysical Characteristics: Large, diked former freshwater tidal marsh, presently operated as a 250 cow dairy farm. Area is well-managed pastureland; dikes are in good condition. Diurnal tidal range is 8.6 feet, average elevation is 7.0 feet MLLW and submergence time is 7884 acre-days, and some salinity intrusion occurs at low Columbia/Youngs River flows.
Land Use - Plan Designation: Agriculture - *Rural*
Ownership: Private (Lee)

Restoration Action

Breach dikes and reconstruct natural drainage patterns.

Biological Potential/Impacts

A large, productive freshwater tidal marsh could be developed if this area is restored. However, a productive, well-managed dairy farm operation would be eliminated. The area, if restored, would be invaded by sedges, cattails, bulrushes and many other marsh species which were probably present prior to diking. Wildlife use and use of sloughs by fishes could be high. The marsh productivity would have a favorable impact on the Youngs River/Bay ecosystem.

20 (M) — MARSH CREATION

Site Description

Location: Youngs River/Walluski River Junction, south shore

Size: 35 acres

Biophysical Characteristics: Diked, freshwater tidal marsh, presently used as pastureland to graze farm animals. Area is fair to well managed, but dike is low and sometimes overtopped by high tidal waters. Tidal range is 8.6 feet, average elevation 7.0 feet MLLW, annual submergence time is about 2044 acre-days, and little salt water intrusion occurs, except during very low river flows.

Land Use - Plan Designation: Agriculture - ***Rural***

Ownership: Private (Lee/Henry)

Restoration Action

Breach dike at frequent intervals, create drainage channels following land contours. Tidal waters would be contained by the existing road fill and adjacent hill land. No new dike construction would be needed.

Biological Potential/Impacts

Area would add 35 acres of high freshwater tidal marsh to the aquatic ecosystem, while removing the same amount of area from agricultural productivity. Marsh species which would invade the restored area include sedges, bulrushes and cattails. Wildlife use would increase significantly. This area has natural forested buffers on each upland side, except for a small area along the highway.

21 (M) — MARSH RESTORATION

Site Description

Location: Youngs River (RM 5.8), east bank

Size: 20 acres

Biophysical Characteristics: Dikes in this area are in disrepair and the tidegate is open. Area has largely reverted to high, freshwater tidal marsh. No agricultural use is made of the area. Diurnal tide range is 8.6 feet, average elevation about 7.5 feet, annual submergence about 1168 acre-days, and salinity intrusion occurs only during very low river flows.

Land Use - Plan Designation: Open space - ***Conservation Aquatic***

Ownership: Private

Restoration Action

Remove large areas of dike to promote better circulation and flushing action. This area, since partially restored, is not acceptable for use as a mitigation site. It is a useful site for analysis of how restored areas might redevelop as tidal marshes.

Biological Potential/Impacts

More complete removal of dike will promote better flushing and export of detrital material from the marsh. Since the area is already marsh wetland, no unfavorable land use impacts will be caused.

22 (M) — MARSH RESTORATION

Site Description

Location: Youngs River (RM 6.3), east bank

Size: 32 acres

Biophysical Characteristics: Diked freshwater tidal marsh, presently used as pastureland with grasses predominating. Dike is Highway 202 which is low in this area, but well riprapped. Diurnal tidal range is 8.6 feet, average elevation 7.5 feet MLLW, submergence time 1068 acre-days and little salinity intrusion occurs, except during very low river flows. One house is located on the property.

Land Use - Plan Designation: Agriculture - ***Rural***

Ownership: Private (Ordway)

Restoration Action

Permanently open tidegate and allow tidal flooding. The area where the house is located would have to be cross diked to prevent flooding.

Biological Potential/Impact

Area would add 32 acres of high freshwater tidal marsh to aquatic ecosystem, while removing the same amount of area from agricultural productivity. Marsh species which would invade the restored area include sedges, bulrushes and cattails. Wildlife use would increase significantly.

23 (M) — MARSH RESTORATION

Site Description

Location: Haven Island in Youngs River (RM 7.5)

Size: 60 acres (55 acres land, 5 acres slough)

Biophysical Characteristics: Diked island used in past to graze cattle, presently not used. Area has some alder, cottonwood and spruce, but is largely grass. Diurnal tidal range is about 8.6 feet, elevations are 5 - 7 feet MLLW, and annual submergence time about 5822 acre-days. Little salt water intrusion occurs this far up the Youngs River, except during extreme low flows.

Land Use - Plan Designation: Open space - ***Conservation***

Ownership: Private (M. Nygaard)

Restoration Action

Log off all timber, remove brush, remove tidegate and breach dikes at frequent intervals.

Biological Potential/Impacts

This island is slightly lower than the adjacent Grant and Frye Islands, which have well developed high freshwater tidal marshes. Bulrushes, sedges, cattails and other characteristic species could be expected to rapidly colonize the area, if restored. Wildlife use, particularly because it is an island, free from human influence and domestic animals, would be high. Fish would use the slough areas. This is a valuable and high priority site for mitigation use.

24 (M) — MARSH RESTORATION

Site Description

Location: Youngs River (RM 7.5), east bank

Size: 90 acres (80 acres land, 10 acres slough)

Biophysical Characteristics: Diked former freshwater tidal marsh, presently used as pasture for farm animals. The dike is in excellent condition and recently riprapped by the Corps of Engineers. The farms are well managed. Diurnal tidal range is 8.6 feet, average elevation is 6.5 feet MLLW, annual submergence time is 2044 acre-days and little salinity intrusion occurs, except during extreme low river flows.

Land Use - Plan Designation: Agriculture - ***Rural***

Ownership: Private (Burkholder, Cathcart, Henningsen and Bjork)

Restoration Action

Remove tidegates and breach dike at frequent intervals to allow free exchange of water. Completely open all sloughs to the river.

Biological Potential/Impacts

Area would add 80 acres of high freshwater tidal marsh and 10 acres of tidal slough to the aquatic ecosystem, while removing the same amount of area for agricultural productivity. Marsh species which would invade the restored area include sedges, bulrushes and cattails. Wildlife use would increase significantly. The slough areas would get substantial fish usage. This site is not a high priority site however, because of the intensive management for agriculture and the past and recent investment in dike and drainage improvements.

25 (M) — 26(M) — 27 (M) — MARSH RESTORATION

Site Description

Location: Upper Walluski River (3 sites)

Sizes: 25 (M) - 20 acres
26 (M) - 40 acres
27 (M) - 60 acres

Biophysical Characteristics: All three sites are diked former high freshwater tidal marshes and presently used for pasturing farm animals. Elevations are in the 6 - 8 foot range, diurnal tidal range is about 8.6 feet and no salt water intrusion occurs. Vegetation are primarily pasture grasses. Site 25 (M) is managed in fair condition, Site 26 (M) in fair condition and Site 27 (M) in good condition.

Land Use - Plan Designation: 25 (M) - Agriculture - ***Conservation***; 26 (M) - Agriculture - ***Rural***; 27 (M) - Agriculture - ***Rural***

Ownership: 25 (M): Private (Coe)
26 (M): Private (Elliot)
27 (M): Private (several owners)

Restoration Action

Breach dikes at frequent intervals; reconstruct natural drainage patterns.

Biological Potential/Impacts

These areas would add 20, 40 and 60 acres, respectively, of high freshwater tidal marsh to the aquatic ecosystem, while removing the same amounts of area from agricultural productivity. Marsh species which would invade the restored areas include sedges, bulrushes and cattails. Wildlife use would increase significantly.

28 (M) — MARSH RESTORATION

Site Description

Location: Klaskanine River
Size: 100 acres
Biophysical Description: Diked, former presently used as pasture-land, with some timber. Dike is in fair condition but land is not well-managed for agriculture use. Diurnal tidal range is 8.6 feet, average elevation is about 6 - 7 feet MLLW, annual submergence time is 8760 acre-days, and no salt water intrusion occurs.
Land Use - Plan Designation: Agriculture - ***Rural***
Ownership: Private (Belford/Keyes)

Restoration Action

Breach dike at frequent intervals and reconstruct natural drainage pattern.

Biological Potential/Impacts

Area would add 100 acres of high freshwater tidal marsh to the aquatic ecosystem, while removing the same amount of area from agricultural productivity. Marsh species which would invade the restored area include sedges, bulrushes and cattails. Wildlife use would increase significantly.

29 (M) Through 37 (M) — MARSH RESTORATION

Site Description

Location: John Day River
Size/Ownership: 29 (M): 34 acres/Private (V. Carlson)
30 (M): 23 acres/Private (W. Erp)
31 (M): 38 acres/Private (Haglund)
32 (M): 15 acres/Private (H. Allen)
33 (M): 21 acres/Private
34 (M): 20 acres/Private (Larson/Lundsman)
35 (M): 17 acres/Private (Nyman)
36 (M): 7 acres/Private
37 (M): 25 acres/Private (Rodgers)
Biophysical Characteristics: Diked, former high freshwater marsh areas, presently used for low intensity agriculture, pasture grasses are dominant. Dikes are in fair to poor condition due to low height and erosion along the outside banks. Diurnal tidal range is 8.2 feet, there is no salt water intrusion, and land elevations are in the 6' to 8' range. The areas get some wildlife use by small mammals, deer and elk.
Land Use - Plan Designation: Agriculture - ***Rural***

Restoration Action

Breach dikes of selected site(s) at frequent intervals, reconstruct natural drainage patterns, remove tidegates.

Biological Potential/Impacts

Areas restored would be added back to the aquatic ecosystem, but would remove farmland from agricultural productivity. The marshes that would develop would likely be similar to those near the river mouth, which are dominated by bulrushes, cattails and sedges, as well as many other species. The areas would contribute primary productivity to the estuary and would also get increased wildlife use, mostly aquatic furbearers and waterfowl.

38 (M) — MARSH RESTORATION

Site Description

Location: Svensen, between Mary's Creek and Bear Creek
Size: 25 acres
Biophysical Characteristics: The dikes in this area have been in disrepair for years and the tidegate is not working. The area has largely reverted to high freshwater tidal marsh consisting of bulrushes, cattails, sedges and many other marsh plants. The diurnal tidal range in the area is 8.0 feet, and elevations are estimated to be in the 6-9 feet MLLW range. No salt water intrudes in this part of the river.
Land Use - Plan Designation: Open space - ***Rural Aquatic***
Ownership: Private (C. Gifford)

Restoration Action

Remove large areas of the existing dike to promote better flushing action and circulation. Since this area is already a tidal marsh, it would not be acceptable for use as a mitigation site. It is useful as an example of how other sites in this region suitable for restoration might revert to aquatic productivity.

Biological Potential/Impacts

More complete removal of the dike will promote better flushing and export of detrital material produced by the marsh. The landowner desires to repair the dike and bring the area back into agricultural production, raising a serious conflict.

39 (M) — MARSH RESTORATION

Site Description

Location: Svensen, west of Ferris Creek
Size: 10 acres
Biophysical Characteristics: Low-lying diked area vegetated with willow, alder and scattered spruce. Diurnal tidal range in the area is 8.0 feet and land elevation estimated to be in 7-9 feet MLLW range. No salt water intrudes in this part of the river.
Land Use - Plan Designation: Open space - ***Conservation***
Ownership: Private (Truax/other)

Restoration Action

Breach dike and allow area to be subject to full tidal action.

Biological Potential/Impacts

Existing vegetation will be replaced by more characteristic wetland species such as sedges, bulrushes and cattails. Since the land is not in use, there should be no unfavorable land use impacts. Wildlife use will change to more aquatic species. This site is useful habitat in its present state and is therefore not a high priority site for restoration.

40 (M) — MARSH RESTORATION

Site Description

Location: Svensen - Ferris Creek
Size: 51 acres
Biophysical Characteristics: The dikes in this area have been in disrepair for several years and portions of the area have reverted to tidal marsh. Higher portions are still in pasture grasses. The diurnal tidal range is 8.0 feet and elevations range from 7-10 feet MLLW. No salt water intrusion occurs in this area of the river.
Land Use - Plan Designation: Open space - ***Rural Aquatic/Shoreland***
Ownership: Private (M. Mowe/R. Tykila)

Restoration Action

Remove areas of dike still intact to promote better circulation and flushing action.

Biological Potential/Impacts

More complete removal of the dike will promote better flushing of detrital material into the estuary. The landowners, however, desire to repair the dike and use the land for agriculture.

41 (M) — MARSH RESTORATION

Site Description

Location: Svensen Island
Size: 300 acres land, 50 acres slough
Biophysical Characteristics: Diked, former high freshwater tidal marsh, presently in agricultural use for pasturing cattle. Diurnal tidal range in this area is about 8.0 feet, and elevations range from 6-9 feet MLLW. No salt water intrusion occurs in this area of the river.
Land Use - Plan Designation: Agriculture - ***Rural***
Ownership: Private (C. Haglund, eastern 130 acres; R. Reed, western 220 acres)

Restoration Action

Breach dikes and remove tidegates. All or a portion could be restored by constructing cross dikes.

Biological Potential/Impacts

This area would add up to 300 acres of high freshwater tidal marsh to the aquatic ecosystem, while removing the same amount of area from agricultural productivity. Marsh species which would invade the restored area include sedges, bulrushes, and cattails. Wildlife use would increase significantly. This area is also designated as a dredged material disposal site, both shoreland and dike maintenance.

44 (M) — MARSH RESTORATION

Site Description

Location: Deep River
Size: 45 acres
Biophysical Characteristics: Diked, former freshwater tidal marsh, presently used for agriculture. Vegetation is grasses with large amount of tussock, indicating poor drainage. Condition of the dike is not known. The diurnal tidal range is approximately 8.0 feet and there is no salinity intrusion. Land elevation is in the 6-9 feet MLLW range.
Land Use - Plan Designation: Agriculture - *Rural*
Ownership: Private

Restoration Action

Breach dikes and remove tidegates. The road on the west side of the area would need to be built up if the entire area were restored. Otherwise a cross dike would need to be constructed.

Biological Potential/Impacts

Up to 45 acres of high freshwater tidal marsh could be added to the aquatic ecosystem by restoring this area. Typical marsh species that would invade include bulrushes, cattails and sedges. Wildlife use by aquatic furbearers, waterfowl and other aquatic animals would increase significantly.

48 (M) — MARSH CREATION

Site Description

Location: Miller Sands, adjacent to Columbia River ship channel (RM 23.5)
Size: 20 acres plus (2 acres)
Biophysical Characteristics: On the inside of the Miller Sands dredged material disposal site, marsh plantings of sedges, bentgrass and other types have been made. This marsh creation project has been directed by the Corps of Engineers Waterways Experiment Station in Vicksburg, Mississippi.
Land Use - Plan Designation: Open space - *Conservation*
Ownership: Conflicting state/federal claims

Restoration Action

Continued experimental marsh planting.

Biological Potential/Impacts

Marsh creation on existing dredged material islands is encouraged by policies of this plan. Increased primary productivity and new wildlife habitat are the chief benefits.

55 (M) — MARSH RESTORATION

Site Description

Location: Elochoman River near Cathlamet
Size: 140 acres
Biophysical Characteristics: Low-lying wetland area diked on the Elochoman River side but open to tidal waters through culverts under the road to the west. The diurnal tidal range is approximately 6 feet in this area, and no salt water intrusion occurs. Vegetation on the site consists of alder, willow and some spruce as well as marsh wetland vegetation.
Land Use - Plan Designation: Open space - *Development Aquatic*
Ownership: Private (Doumit)

Restoration Action

Breach dike on Elochoman River side to provide for more complete tidal exchange.

Biological Potential/Impacts

More complete tidal exchange will result in a gradual conversion of terrestrial to semi-aquatic to aquatic vegetation, depending primarily on elevation. Wildlife use, which is high in any event, would change to more aquatic species. More complete restoration, however, would conflict with development planned for the area, which is close to Cathlamet.

SHOAL AREA RESTORATION

3 (SA) — SHOAL AREA RESTORATION

Location Baker Bay

Background

Baker Bay has considerably shoaled since the turn of the century. The shoaling has been caused by a variety of factors including construction of the North and South Columbia River Jetties and subsequent northward migration of Sand Islands; construction of hundreds of fish traps which reduced circulation in the bay; construction of the Chinook Jetty (pile dike); and 2 other changes. In the gap between Big and Little Sand Islands, there has been a reversed process of intense scouring; most tidal water is exchanged through this gap. A more complete discussion of historical shoaling patterns is shown in the Land and Water Use Plan (cf. Baker Bay, 45.05).

Restoration Action

Extensive dredging and/or closing of the breach between Big and Little Sand Islands are proposed as possible restoration measures. The latter seems more and more realistic since the tidal scouring seems to be continually deepening the area. In fact, encouraging the scouring process and possibly rerouting the Ilwaco and Chinook Channels through the gap may eventually become desirable. Further research is needed on the hydraulics and biology of Baker Bay before action is taken to alter the shoaling problems in the bay. Other related restoration projects include removal of old fish traps 4(P) and removal of the Chinook Jetty 5(P).

11 (SA) — SHOAL AREA RESTORATION

Location Youngs Bay, behind the U.S. Highway 101 Causeway

Background

In 1964, the new Youngs Bay Bridge was constructed, including nearly a mile of filled causeway. This fill greatly reduced near shore currents and has resulted in an increased shoaling rate (2-4 cm/yr). The difference in elevations east and west of the causeway are easily observed at any low tide.

Restoration Action

Removal of the entire causeway and replacement by a bridge on piling would be the most desirable in terms of improving circulation, but cost would likely far outweigh any benefits gained. As an alternative, culverts could be installed at various locations to increase circulation and flushing and to decrease sedimentation. Prior to such action, a hydraulic model should be used to determine potential beneficial, as well as detrimental effects of culverting.

45 (SA) — SHOAL AREA RESTORATION

Location Grays Bay and River

Background

Grays Bay, like other marginal bays of the estuary, has shoaled considerably over the past several decades. This has been due to diversion of Columbia River flow southwest into the main ship channel toward Tongue Point, decreased river and tidal currents and increased sediment loads coming down Deep and Grays Rivers. At the mouth of the Grays River, a bar has developed and the lower reaches of the stream have shoaled excessively. The result has been that existing channels have not been able to carry the flow during high water periods, resulting in lowland flooding, traditionally navigable areas are also no longer useable. Fish migration is also impaired at times.

Restoration Action

Dredging and maintaining a channel in the Grays River and Grays Bay is proposed to alleviate the above problems. Several of the principal causes of shoaling are not likely to decrease appreciably and a technological solution (dredging) to the above problems is probably necessary.

56 (SA) — SHOAL AREA RESTORATION

Location West end of Cathlamet Channel (RM 46)

Background

At the upriver end of Puget Island, a series of pile dikes have been installed to divert river flow into the ship channel and away from Cathlamet channel. Additionally, the area between the pile dikes

have been and will continue to be used to dispose of dredged material from the main ship channel [dredged material disposal site 96 (B), cf. 44.01]. The material placed there in a series of small islands has migrated into Cathlamet Channel, reducing navigability of certain areas. The reduced currents through the channel also result in increased sedimentation because less material remains in suspension. Sloughs bordering the north side of Puget Island have shoaled considerably.

Restoration Action

Complete restoration would require removal of the pile dikes and dredged material islands. This action would likely increase maintenance dredging needs for the 40' ship channel. A less dramatic and recommended course of action would be to plug the holes between the pile dikes, creating a single spit upstream from Puget Island. Flows through Cathlamet Channel would still be reduced, but less dredged material deposited there would enter the channel. Shoaling should be somewhat reduced.

ERODED SHORELINE RESTORATION SITES

7(E)—ERODED SHORELINE RESTORATION

Site Description

Location: The shoreline just west of the Hammond Boat Basin entrance

Size: approximately 1000' x 60' (average width)

Biophysical Characteristics: Intertidal beach on the inside of deteriorated riprap which was the starting point of the original South Jetty. Area has gently sloping gradient from approximately +10' MLLW to +5' MLLW. The area to be restored is a sandy beach with some invading marsh vegetation in the area between the present shoreline and the jetty line. Because of coarse substrate, benthic productivity is probably low.

Land Use - Plan Designation: Area is an exceptional viewpoint and is used extensively by local people and tourists; road access and limited parking is available; area proposed for restoration is designated ***Development Aquatic*** and the adjacent shoreland is designated ***Water Dependent Development.***

Ownership: Federal (Corps of Engineers), leased to the Town of Hammond

Restoration Action

Dredged material from the Hammond Boat Basin entrance dredging would be used to fill the 1000 x 60 foot gap between the jetty and the present shoreline. The jetty on the outer side would be built up and reinforced to protect the new shoreline. The new shoreline would be vegetated and developed by the Town of Hammond as a waterfront park, associated with the Boat Basin.

Biological Potential/Impacts

Restoration of the former shoreline will create about 1½ acres of new shoreland, covering over about 1 acre of sandy beach and ½ acre of invading marsh vegetation. Further erosion of the present shoreline will be prevented.

8(E)—ERODED SHORELINE RESTORATION

Site Description

Location: The shoreline west of Alaska Packers

Size: approximately 1000' x 50'

Biophysical Characteristics: Intertidal beach with a moderate slope. The beach has coarse sediments and benthic productivity is probably low. The shallow area immediately offshore is a seaward migration route for juvenile salmon.

Land Use - Plan Designation: Open space - ***Conservation Aquatic***

Ownership: Private (shore); State (below MHW)

Restoration Action

Dredged material from the Hammond Boat Basin entrance channel dredging of from direct pipeline dredging from the adjacent deep water area would be used to restore the shoreline configuration to what it was prior to recent erosion. Realistically, the shoreline would need to be riprapped to retard further erosion. Alternatively, it could be used as a periodic beach nourishment dredged material disposal site.

Biological Potential/Impacts

Restoration of the original shoreline will restore about 1½ acres of shoreland, if it is stabilized. Riprapping the shoreline will be expensive and stabilization may require that one or more pile dikes be constructed to further retard erosion. The deep channel adjacent to this shoreline is migrating slowly to the south and has been since at least the 1930's. This natural process is probably worsened by maintenance of the ship channel in this reach of the river. The biological impacts of the restoration action would not be great, but the physical effects would generally be beneficial economically. Further erosion will endanger existing piers, private upland property and homes, and possibly the Hammond Boat Basin, if the erosion cut behind the east end of the breakwater.

SHORELAND VEGETATION

There are several sites along the ship channel where islands have been created by the disposal of dredged material. Stabilization of these islands by planting vegetation to prevent erosion and provide wildlife habitat is encouraged by CREST policy (cf. 62.20). Three primary sites are identified for this activity:

46 (SV) - RICE ISLAND (RM 21)

An active disposal site, Rice Island is relatively high in comparison to other areas. Selecting vegetation for this area will require taking the lower depth of water table into account. Some natural vegetation is starting to take hold on certain areas of the island, but this process could be much accelerated.

47 (SV) - MILLER SANDS (RM 23.5)

Just upstream from Rice Island, but on the south side of the ship channel, Miller Sands is an active beach nourishment disposal site. Both upland and marsh planting have been conducted successfully on the island, which is in the shape of a horseshoe, but open at the top. Continued experimental work and eventual full vegetation of the site is recommended.

49 (SV) - JIM CROW SANDS (RM 27.1)

Another beach nourishment disposal site, Jim Crow Sands has been the subject of an intensive experimental upland vegetation project conducted by the Corps of Engineers and Soil Conservation Service. The experimental plantings have been largely successful, have attracted large numbers of waterfowl and other birds and have resulted in stabilization of large areas of the sands.

PILE DIKE OR PILING REMOVAL

There are thousands of pilings which are relics of fish traps, docks, piers, fish processing facilities and other structures along the waterfronts of both Washington and Oregon. Many of these are harmless and are aesthetically pleasing reminders of earlier days along the waterfront. Some, however, present serious navigation hazards and contribute to serious shoaling problems.

Pile dikes to control shoreline erosion or to channel river water in a direction which will help stabilize the ship channel and help in self-scouring are numerous in the estuary area. Most do their job effectively, but some are believed to be principal contributors to undesirable shoaling away from the ship channel.

4 (P) - BAKER BAY - Abandoned Pilings

The remains of hundreds of abandoned fish traps in Baker Bay are contributing to the severe shoaling problem there and represent a navigation hazard which annually takes its share of small boats. Systematic inventory and removal of these pilings is needed to correct these problems. The adverse impacts are expected to be minimal, but high cost is a key consideration. More details on shoaling in Baker Bay are contained in the Land and Water Use Plan (cf 45.04) and Shoal Area Restoration (cf 64.30).

5 (P) - CHINOOK JETTY (pile dike)

The 3500 foot long flow control structure is believed to be a major cause of shoaling problems in Baker Bay, particularly the east end including Chinook Channel. It is recommended that the jetty be removed and monitoring occur to see if improved scouring occurs. More details on shoaling in Baker Bay are noted above.

50 (P) - SNAG ISLAND JETTY - CATHLAMET BAY

The Snag Island Jetty was installed in the 1880's to help maintain the ship channel which at that time was adjacent to the island. Since that function is no longer appropriate, possible removal of the jetty should be evaluated.

FISHERIES ENHANCEMENT

The Columbia River and estuary tributary streams have experienced dramatic decreases in the production of trout and Chinook, Coho and Chum salmon over the past several decades. These decreases have been due to a combination of factors including dam construction, overfishing, logging in watersheds, and other degradation of stream and estuarine habitat. Chum salmon runs in particular, have been decimated. This is thought to be largely caused by logging operations silting in the areas just above tidewater where Chum salmon spawn. Currents are generally too sluggish in this area of streams to remove the silt.

Fishery enhancement projects to improve habitat and supplement existing or former fish runs is encouraged by CREST policy (cf. 21.10) and would be appropriate for many estuary tributaries. Examples of fishery enhancement projects include regravelling of streams to provide improved spawning habitat; removal or bypass of obstructions, such as old tidegates, dams or waterfalls; construction of salmon-rearing ponds to provide a greater capacity for artificial replacement of lost fish stocks; work with state hatchery programs and lumber companies to improve stream habitat and water quality.

Each of the major tributary streams on the estuary is listed for potential fishery enhancement. Specific comments related to these streams are given below.

1 (F) - WALLACUT RIVER

The Wallacut River is heavily silted in and historic fish runs have essentially been eliminated. Chum and other salmon might be restored in the stream if the stream were dredged, areas near tidewater regravelled, and obstructions to fish passage by-passed or removed. More careful management of watershed streamside vegetation will help reduce the siltation problem.

2 (F) - CHINOOK RIVER

Siltation of the Chinook River has reduced the historically good runs of anadromous fish that used the river. Because of the Sea Resources Hatchery on the stream, however, fish runs have been kept alive. Dredging to improve fish passage and removal or bypass of obstructions would improve the salmon fishery potential. Regravelling silted in areas and subsequent stream management practices to minimize further silting are also recommended.

13 (F) - LEWIS AND CLARK RIVER

The Lewis and Clark River has runs of Chinook and Coho salmon, steelhead and sea run cutthroat trout. The river used to have an excellent Chum salmon run but, as in other coastal streams, they have been severely depleted. Sea run cutthroat trout also have declined in numbers because of a shortage of habitat. There is a severe problem with low river flows in the upper river during August and September. The City of Warrenton uses some of the river water for municipal needs.

The Oregon Department of Fish and Wildlife and National Marine Fisheries Service are both experimenting with reviving the natural runs of Coho and cutthroat trout by planting them in various stream areas and tributaries of the Lewis and Clark River. Construction of rearing ponds and extensive artificial propagation of fish would conflict with these efforts and probably will not be permitted in the near future. Better management of stream sedimentation and water quality related to watershed tree-growing operations will help improve habitat for all fish species and be particularly helpful in the effort to reestablish self-sustaining runs.

42 (F) - DEEP RIVER /
43 (F) - GRAYS RIVER

Historically the Grays Bay system supported large runs of Chum salmon, and some Coho, fall Chinook and steelhead. Now, much of the former spawning habitat is unusable because of watershed logging practices, and most salmon are raised at the Grays River hatchery. Local fishermen operate a small scale Chum salmon enhancement project on a tributary of the Grays River.

Fishery enhancement on the Deep River and Grays River should start with more effective management of stream sedimentation and water quality related to tree-growing operations. On Grays River, a holding pond (such as the proposed Raistakka pond) should be constructed, both as a rearing pond for juvenile fish and a holding pond for returning adult fall Chinook. Dredging the silt in stream mouth should also be evaluated. An evaluation needs to be made of current fish rearing practices which have resulted in reduced runs and smaller Coho salmon on the Grays River. These apparently detrimental practices include substitution of the "Cowlitz Coho" in this and other state hatcheries and genetic manipulation caused by the taking of salmon eggs from only certain time frames of the returning runs. Additional citizen input is needed in managing the Grays River fishery.

51 (F) - BIG CREEK

Big Creek is the location of an important state fish hatchery. The stream and hatchery produce large run of Chinook salmon, some Coho, steelhead cutthroat trout and some Chum salmon. The stream is well managed for control of stream sedimentation, but areas at or just above tidewater could be regravelled to improve habitat. Water quality should be strictly controlled, particularly non-point sources related to watershed tree-growing operations.

52 (F) - GNAT CREEK

Gnat Creek has a good run of steelhead and cutthroat trout. Careful management of stream sedimentation and water quality as it related to tree-growing operations in the watershed will maintain and improve habitat in the stream itself and maintain a flow of clean, pure water to the state fish hatchery.

53 (F) - ELOCHOMAN RIVER

The Elochoman has a state salmon hatchery (Department of Fisheries) which produces Coho and Chinook salmon. Bear Creek, a tributary of the Elochoman well below the salmon hatchery, has a state trout hatchery (Department of Game), which produces cutthroat trout and steelhead. Coordination of these runs with regard to timing of releases to prevent interspecific predation is important in managing fisheries on this stream.

Fisheries can be enhanced by better management of stream sedimentation and water quality related to tree-growing operations. Maintenance of stream-side vegetative buffers in downstream areas which might be developed in the future is also important.

54 (F) - WESTPORT SLOUGH - PLYMPTON CREEK

Plympton Creek, which drains into Westport Slough at the ferry landing, has an excellent run of Chinook salmon and a small run of Chum. However, the stream has a problem with drainage of sewage from Westport into the stream. Installation of planned sewers should correct this problem. Other measures are needed, however, to control water quality and stream sedimentation in the watershed.

57 (F) - YOUNGS RIVER

The Clatsop Economic Development Committee operates the Youngs Bay Salmon Enhancement Program, which is in its third year of operation. The project includes two salmon rearing ponds on Tucker Creek on the Vandervelt Property. The program is being conducted with assistance from Oregon Department of Fish and Wildlife fish hatcheries on Big Creek and the Klaskanine River, state grants, and contributions from local organizations, businesses and individuals.

Expansion plans include construction of a third rearing pond on the South Fork of the Klaskanine River. Other work to improve stream habitats also has excellent potential in this river system. When fishery enhancement is used as complete or partial mitigation for the adverse effects of estuarine alteration, it should be accomplished through the existing Youngs Bay Salmon Enhancement Program.

58 (F) - FISH LADDER - YOUNGS RIVER FALLS

The 65' Youngs River Falls provides an effective barrier to anadromous passage. Construction of a fish ladder around the falls on the south side of the stream would open up many miles of potential spawning habitat for salmon and trout. The potential for runs establishing themselves on a self-sustaining basis is difficult to estimate, but upstream areas could be planted with fish on a regular basis.

Using proven fish ladder technology (stairstep series of rectangular reinforced concrete boxes) with an estimated cost of $4000 - $6000 per vertical foot, the 65' falls could be scaled for a cost of $260,000 to $300,000. One possible conflict is that the City of Astoria has water rights on the river and has long range plans to construct a dam just above the falls.

59 (F) - KLASKANINE RIVER - WATER IMPOUNDMENT

River flow on the North Fork of the Klaskanine River in August and September is often reduced below minimum levels necessary to support fish, other aquatic life and state fish hatchery operations. A dam project on the river was proposed in 1969 by the Clatsop Water Resources Committee to correct this problem, which still exists. An earth-filled dam could be designed to provide 1200 acre feet of additional water to the stream and the fish hatchery during low flow periods.

66. MITIGATION NEEDS

The Oregon Land Conservation and Development Commission's Estuary Resources Goal (No. 16) requires that adverse impacts of dredge or fill activities permitted in intertidal or tidal marsh areas be mitigated by creation, restoration or enhancement of another estuary area. Mitigation for adverse impacts to other areas or resources, such as subtidal habitat, riparian habitat, or upland areas, may also be required to meet CREST mitigation policies or other state and federal regulations.

Mitigation needs are outlined through reference to the appropriate subarea in the Land and Water Use Plan (cf. Part IV). Adverse impacts of dredge or fill actions in subareas other than those discussed may also require mitigation, but, for the areas listed below, a clear need exists to provide mitigation by restoring, creating or enhancing other estuarine areas. Exemptions to the mitigation requirements are listed in policy 63.10.

66.10 HAMMOND SUBAREA (cf. 42.01)

Potential Development Action/Impacts

The Hammond Mooring Basin has potential for significant expansion within the existing breakwaters. However approximately 9.5 acres of the area is intertidal mudflat, which, according to limited data, is a productive benthic environment. Higley and Holton, in their 1976 study of benthic organisms done for the Port of Astoria, found an average of more than 27,600 organisms per square meter at two sample sites within the boat basin. Of these, more than 5400 were polychuetes (highest density of any area studied), 7500 were amphipods and 12,800 were oligochetes. Expansion of the boat basin would require dredging of a portion of this area to approximately -10' MLLW. Annual or biannial maintenance dredging would probably be needed. The intertidal habitat would be exchanged for a deeper aquatic habitat which will periodically be disturbed, and overall productivity would drop somewhat.

Potential Mitigation Sites/Projects

There are no potential mitigation sites in the immediate vicinity of the Hammond Boat Basin. The site at Swash Lake [6(M)] or sites in the Youngs Bay, Lewis and Clark River or Youngs River should be considered as possible alternatives. If a mitigation bank (cf. 67.30) exists when this boat basin expansion takes place, consideration should be given to its use for this project.

66.20 - MIDDLE SKIPANON SUBAREA (cf. 42.05)

Potential Development Action/Impacts

The *Development* designation for the aquatic area between the Harbor Street Bridge on the north to the 8th Street dam on the south provides for uses which may require dredging of intertidal areas as well as limited filling. The area includes approximately 19 acres of freshwater tidal marsh and intertidal mudflats. The subtidal areas are shallow. While the area flushes slowly and is subject to potential water quality problems if intensively developed, the area is presently relatively productive with good water quality. The area is used by warmwater and estuary fishes, as well as cutthroat trout and Coho salmon. Benthic organisms, epifauna and plankton are relatively abundant in this area.

Dredging, filling, and subsequent marina or other development may cause water quality degradation and reduce plant and animal productivity.

Potential Mitigation Sites/Projects

The middle Skipanon area is very similar in habitat types to the Youngs or Lewis and Clark River areas. Sites in either of these areas should be considered as potential mitigation projects for dredging or filling in the middle Skipanon subarea. Depending on the extent of alterations, consideration should also be given to use of the mitigation bank (cf. 67.30), when established.

66.30 - MOUTH OF THE SKIPANON SUBAREA (cf. 42.06)

66.31 - WEST SKIPANON SPIT - ALDER COVE

Potential Development Action/Impacts

The Land and Water Use Plan for this subarea describes a potential project of Warrenton Lumber Company which may involve filling of approximately 7.8 acres of tidal marsh in Alder Cove. This marsh grades from a high brackish water marsh to a sedge-bulrush-cattail marsh, with many characteristic aquatic plants. This area is part of the 75 acre marsh which fringes Alder Cove. Filling the site, should it be permitted, would permanently change the area from a productive aquatic environment to an upland industrial site.

Potential Mitigation Sites/Projects

The Alder Cove marsh, despite its proximity to the river mouth, is still basically a freshwater marsh, based on the dominant aquatic vegetation. Some salt marsh species are present, particularly later in the summer, when river flow diminishes and intruding salt water becomes a more dominant factor. Potential marsh mitigation sites include Swash Lake [6(M)], and sites in Youngs Bay, Youngs River and the Lewis and Clark River. A more detailed analysis of plant communities and their salt or fresh water nature would be useful in helping determine what type of marsh should be created or restored.

66.32 - EAST SKIPANON SPIT

Potential Development Action/Impacts

East and north of the east spit of the Skipanon River, 47 acres of tidal marsh and 45 acres of intertidal sand-mudflats are designated ***Development Aquatic*** and are subject to possible dredging or filling actions. The Pacific Fabricators, Inc. proposed oil rig fabrication facility would have filled or dredged this area, as well as an additional 25 acres of subtidal area for which the Oregon Division of State Lands required mitigation. The specific habitats affected included:

	Habitat Type	Elevation	Area (approx.)
AREA 1:	Transition marsh	(+8′ to +13 MLLW)	36.55 acres (fill)
AREA 2:	Cattail-bulrush marsh	(+5″ to +10′)	10.79 acres (fill)
AREA 3:	Sand-mud Flat — Youngs Bay/Col. River	(+10′ to −15′)	36.98 acres (fill)
AREA 4:	Sand-mud Flats-Skipanon	(0 to +10′)	11.15 acres (fill)
AREA 5:	Sand-mud Flats/Slope — North Skipanon	(+10′ to −20′)	7.25 acres (dredged)
AREA 6:	Sand-mud Flat/Slope — Skipanon	(0′ to −15′)	15.45 acres (dredged)
		TOTAL	118.17 acres

Potential Mitigation Sites/Projects

CREST prepared a draft mitigation plan for the Pacific Fabricators project that never was used. The project has been shelved until the market for oil rigs becomes more favorable. However, should this or some similar development project be permitted, some combination of the following sites or projects might serve as adequate mitigation: marsh recreation westof Holbrook Slough [9(M)], east of Holbrook Slough [10(M)], lower Walluski [20(M)], Youngs River [24(M)], and Haven Island [23(M)]; fish ladder at Youngs River Falls [58(F)]; and fish enhancement in the Youngs River area [57(F)].

66.40 - YOUNGS BAY SUBAREA (cf. 42.07)

Potential Development Action/Impacts

The dike adjacent to the Clatsop County Airport runway, designated for an instrument landing system, intrudes into the clear zone of that runway and may need to be moved waterward. The wetland outside the dike is relatively high and vegetated with spruce, alder and various aquatic species of plants. Moving the dike would require removal of trees and other vegetation and would affect approximately one acre of wetland.

Potential Mitigation Sites/Projects

Any marsh restoration site in the Youngs Bay, Youngs River or Lewis and Clark River might provide acceptable mitigation for loss of this high spruce swamp area adjacent to the dike. If the mitigation bank is established, this project, because it involves only one acre of wetland, should be considered first. Because of the minimal impact on the Youngs Bay ecosystem and the public benefits associated with the project, a waiver from the Division of State Lands may also be possible.

66.50 - PORT OF ASTORIA SUBAREA (cf. 42.13)

Potential Development Action/Impacts

A 15 acre area west of Pier 3, 3 acres of which are intertidal sand flats, is designated ***Development Aquatic.*** This area is less biologically productive than the more protected sand flat area to the south, but still has high numbers of benthic organisms and gets substantial use by downstream migrant juvenile salmon and other fishes. Filling the intertidal area will permanently remove it from aquatic productivity and require mitigation.

Potential Mitigation Sites/Projects

There are no sand flat mitigation sites per se available; however, many of the marsh restoration sites include creation of slough and mudflat areas and these could be used as a substitute. Such areas would likely be equal in benthic productivity and get substantial fish usage. Support of fishery enhancement efforts in the Youngs River system also might be appropriate mitigation.

66.60 - UPPERTOWN - ALDERBROOK SUBAREA (cf. 42.15)

Potential Development Project/Impacts

The East End Mooring Basin is considerably shoaled adjacent to the shoreline. Expansion of the basin would require dredging up to five acres of intertidal mudflats that, based on other areas with similar sediments and salinity, are relatively productive biologically. Dredging, construction of docks and moorages, and subsequent use by fishing and other vessels will change the nature of the aquatic habitat and likely result in lower biological productivity.

Potential Mitigation Sites/Projects

There are no mudflat mitigation sites in this plan; however, many of the marsh mitigation sites in the Youngs Bay system or John Day River also could be constructed so as to provide mudflat area, as well as marsh, by lowering a portion of the diked marsh. Such a small dredging project might also be qualified to use the mitigation bank, once established.

66.70 - TONGUE POINT SUBAREA (cf. 42.16)

Potential Development Action/Impacts

Development of the area north of the southern finger pier will not involve dredging or filling of intertidal or tidal marsh area and therefore not require mitigation under the LCDC Estuarine Resources Goal, Number 16. However, the subtidal area between the pier slips has high benthic productivity and gets substantial fish usage. Because of this, the Division of State Lands may require mitigation, should a permit be granted to fill this subtidal area.

The ***Development Aquatic*** area from the south of the finger piers to the John Day River includes 135 acres of shoreland and 80 acres of aquatic area, of which about 65 acres are intertidal or tidal marsh. Dredging or filling a portion or all of these 65 acres will require mitigation. Additional mitigation may be required for subtidal areas or shorelands involved in any development proposal.

Potential Mitigation Sites/Projects

There are nine marsh/slough restoration sites along the John Day River [29(M) through 37 (M)] which could serve as potential mitigation sites for marshes and flats which might be filled or dredged in the area south of the Tongue Point piers. A portion of the Svensen Island site [41(M)] might also be suitable for mitigation at Tongue Point. Sites up the Youngs or Lewis and Clark Rivers also could develop similar characteristics to the Tongue Point marshes, even though they are not in the same region of the estuary.

67. IMPLEMENTATION

67.10 The Mitigation Process

As outlined in the mitigation policies (cf 63.10), the State of Oregon requires that the adverse impacts of dredging or filling intertidal or tidal marsh areas be mitigated by restoration, creation or enhancement of an estuarine area. The mitigation procedures outlined here address that specific requirement and can be used to specify additional mitigation needed for any type of development project, whether in Oregon or Washington.

The most important aspect of this mitigation procedure is that it operates entirely within the framework of the existing state and federal permit processes for dredging and filling. Local, state and federal agencies all play a role in these permit processes and therefore will participate in mitigation decisions. Implementation of this mitigation procedure will require an agreement between the Corps of Engineers and the Oregon Division of State Lands. The procedure calls for these two agencies to modify their permit processes and to address mitigation needs when evaluating environmental impacts.

In addition to the agencies which administer state and federal permit programs, the following agencies play important advisory roles in the mitigation process:

Federal - U.S. Fish and Wildlife Service
National Marine Fisheries Service
U.S. Environmental Protection Agency

State - Oregon Department of Land Conservation and Development
Oregon Department of Fish and Wildlife
Oregon Department of Environmental Quality

Local - Affected general purpose government(s)/port district(s)
Affected Regional Council of Governments

(cf 79. Agency Roles and Responsibilities)

For major actions with significant environmental impacts, the draft Environmental Impact Statement (EIS) should be used to detail mitigation needs and options. The final EIS should detail the actual miti-

gation plan. For projects not requiring a federal EIS, a separate mitigation plan must be prepared as part of the permit process.

Step I. **Permit Application**

The applicant applies for an Oregon Removal-Fill permit and a U.S. Army Corps of Engineers permit. In the application, information is provided on the extent of dredging and filling of intertidal or tidal marsh areas.

Step II. **Preliminary Mitigation Needs Determination**

The Director, Division of State Lands (DSL), based on information provided by the applicant, makes a preliminary determination as to whether or not mitigation will be required. This information is relayed to the Corps of Engineers, other concerned agencies and the permit applicant.

Step III. **Public Notices**

The Division of State Lands and Corps of Engineers publish public notices on the project, including the DSL determination of mitigation needs. The Corps of Engineers, based on a preliminary environmental assessment, also publishes notice of whether or not an Environmental Impact Statement (EIS) will be required.

Step IV. **Permit Review and Public Hearing**

The public and local, state and federal agencies comment on the permit application and provide recommendations on mitigation and on whether or not an EIS is needed. A public hearing is required if an interested party makes a legitimate request for one.

Step V. **Applicant Prepares Draft EIS or, if an EIS Is Not Required, a Mitigation Plan**

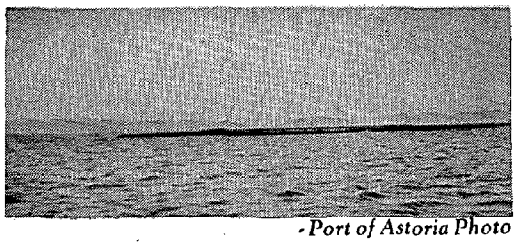
The draft EIS or mitigation plan shall include a detailed description of development site's physical and biological features and ecological functions and potential mitigation site(s) and the physical and biological characteristics of the region(s) in which the site(s) are located. The level of detail should be consistent with the scope of the project and the significance of its adverse impacts. For small projects, the mitigation bank (cf 67.30), when established, should be considered as a first alternative.

Step VI. **Draft EIS or Mitigation Plan is Published for Review and Comment**

The Corps of Engineers is the lead agency for dissemination of EIS's while the Division of State Lands disseminates Mitigation Plans.

Step VII. **Final Mitigation Decision**

Based on the Draft EIS or Mitigation Plan comments and subsequent project modifications to minimize impacts, the DSL will decide whether or not to issue a state permit, and what mitigation alternative is necessary. The Corps of Engineers then decides whether or not to issue the federal permit, publishes a Final EIS, if a draft has been prepared, and details the final mitigation decision in the EIS.



Port of Astoria Photo

67.20 Mitigation Plan Content

The following information should be provided in the mitigation plan for a development project, and incorporated into the draft Environmental Impact Statement (EIS), if one is required.

67.21 The Development Site

The extent of dredge and fill and what specific habitat types are affected (sand or mud flat, high tidal marsh, etc.) should be outlined. For each habitat type affected by dredge or fill, the following should be detailed:

Physical Description - Size of the area, listed by tidal elevations; the sediment types; the annual hydrographic regime (tides and tidal currents, river flow, salinity, temperature) and the extent of variations of these features in the region of the site. Annual submergence time should also be calculated since it integrates several of these features into one numerical value.

Biological Communities Description - Plant and animal species present; the abundance, areal extent and estimated seasonal variation of the most numerous or important species; and the biological differences with tidal elevation in the region of the site. The biological variation may be useful in defining acceptable limits of variation at the mitigation site.

Ecological Functions Assessment - The net export of primary biological productivity should be evaluated based on the structure of plant communities, their areal extent, known productivity rates and export information. Estimates of secondary productivity should also be made, if data are available. Use of affected habitats by large invertebrates and fishes as nursery, feeding and migration areas should be determined. The bottom surface area available for remineralization of plant nutrients can be obtained from the physical description.

Development Project Impacts - Both direct and indirect physical and biological impacts can be obtained by relating the type and extent of projected alterations to the known physical and biological characteristics and ecological functions of the site and region. Direct and immediate impacts are more easily assessed, but indirect, long term impacts may often be more significant. Long term impacts should therefore be given a high priority. For example, hydraulic effects of estuarine alterations may result in erosion and shoaling elsewhere, indirectly altering more habitat than the actual dredge or fill operation.

67.22 Potential Mitigation Sites and Region

Physical and biological characteristics and ecological functions of potential mitigation sites should be described for existing and projected conditions. This "before and after" description allows a calculation of natural resource costs and benefits of the mitigative action. The existing characteristics and values can be obtained from direct measurements or available data; projected characteristics must be estimated by evaluation of the characteristics and functions of areas already in a natural state in the same region of the estuary. If, for example, a dike is to be breached to restore a tidal marsh, the type of plant communities expected to recolonize the area can be estimated by studying existing nearby tidal marshes of similar elevation. For each mitigation site or project the following should be outlined:

Site or Project Description - The site or project description should include physical, biological and ecological function information similar to that provided for the development site. Any historical information on the former condition of an area should be included here as well as an indication of present use and human alterations.

Restoration, Creation or Resource Enhancement Action - The details of how the mitigation action will be carried out should be presented. This includes detailed plans, engineering and cost.

Biological Potential - A projection of the biological communities and natural resources that should develop at the site and how restored area or resource will mitigate the adverse effects of the development.

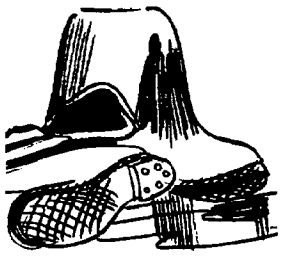
67.23 Mitigation Plan Alternatives

Alternative sites or projects or combinations thereof which will satisfy the mitigation needs for a development project should be outlined. Each alternative mitigation plan should discuss in appropriate detail how it addresses the adverse impacts of the development project.

67.30 Mitigation Bank

Mitigation requirements apply to small, medium and large projects. The development of independent mitigation proposals for the small projects may prove unworkable both because separate sites available to mitigate small projects (e.g. a one-acre fill) are few, if they exist at all, and because small project developers (small ports, private businesses, etc.) generally do not have the technical expertise or financial capability to undertake development of an independent mitigation project. If mitigation is to be accomplished for these small projects, which otherwise meet the permit criteria, a procedure to make it feasible is needed. The "mitigation bank" serves this purpose.

The mitigation bank will consist of areas restored to estuarine productivity (or created) in advance of their use for development project mitigation. Such areas will ideally have a mixture of habitat types (sand-mud flats, salt and freshwater marsh, eelgrass



NATIONAL FISHERMAN

beds, etc.) which might be needed in the future to mitigate for impacts of anticipated development. Small developers will draw upon the bank for the amount of mitigation required. Requirements for in-kind mitigation will necessarily be more flexible for such projects. The actual dollar cost to the developer will depend on the original cost per acre of the restoration project. These funds will be used to purchase future areas for restoration to maintain the bank. Initial funding for a mitigation bank could come from a variety of sources, such as state/federal coastal zone management, Pacific Northwest Regional Commission technical assistance, and local contributions.

The mitigation bank, when established, should be administered by the Port of Astoria, with advice from CREST and its state and federal Technical Advisory Committee (TAC). The Port's broad powers of land acquisition and development make it the most logical mitigation bank administrator. Any permit applicant may request use of the mitigation bank. CREST and the TAC will review requests to determine if the bank should be used or if a separate mitigation proposal is justified. The project's size, the ecological value of the site lost, and the technical capability of the developer are factors that will be considered. CREST will work with its TAC to determine objective criteria for use of the bank once it has been established.

The mitigation bank should be established as soon as possible. The Port of Astoria, CREST and the CREST Technical Advisory Committee (TAC) should meet to review candidate sites and initiate site acquisition by obtaining options to purchase. A demonstration grant should be sought from the Oregon Land Conservation and Development Committee to design the mitigation bank project, including post-restoration monitoring. Funding should then be sought from the Pacific Northwest Regional Commission and other sources to purchase the land and restore it to the estuarine ecosystem.

The mitigation bank will be self-sustaining. Users of the bank will purchase the acreage needed at a proportioned cost equal to the cost of the project. For example, a 50-acre mitigation bank might cost $100,000 to purchase and restore. An individual needing 5 acres of mitigation will be required to pay $10,000 to the mitigation bank fund (one-tenth of the project cost). These funds will be invested by the Port of Astoria until the mitigation bank has been used and a second area to be restored has been found. This process will continue and provide a self-sustaining mitigation bank, ready for immediate use.

67.40 Mitigation Site Reservation

Mitigation of adverse development impacts will be a means to carry out restoration, habitat creation, or resource enhancement projects identified in Section 65. Restoration sites with the best potential for mitigation use are the diked tidelands of the estuary. These and other potential mitigation sites should be given protection to prevent intensive development which would preclude their possible future use for mitigation. There are different actions which can be taken by local governments to reserve shoreland areas for possible use as mitigation sites.

Land Use Control

Potential shoreland mitigation sites are designated ***Conservation*** or ***Rural*** in the **Columbia River Estuary Regional Management Plan.** Rural Shoreland areas should be further protected by Clatsop County with an exclusive farm use (EFU) designation. When an EFU area is proposed for use as a mitigation site, a balancing of agricultural value vs. potential aquatic value will be required to determine if the site is acceptable. This should be carried out through a map amendment to the comprehensive plan and zoning ordinance (e.g. Rural EFU to Conservation). For agricultural land to be used for mitigation, the landowner must be willing to sell the property to the party carrying out the mitigation project. Shoreland areas designated ***Conservation*** are partly protected from intensive development by regulations for that land use category.

Limited Term Freeze

Even with normal planning regulations, a property owner may elect to apply for a zoning action or building permit at any time. Such action could occur prior to the need to use the property as a mitigation site and could therefore commit the site to a permanent use prematurely if the application were approved. Under such circumstances, the jurisdiction could elect, at the time of application, to freeze any action on the property for a specified period (e.g. 90 or 180 days) during which time the Port of Astoria or other appropriate agency could negotiate for the acquisition of the property or its use rights. If no such negotiations were undertaken or completed during this period, the original application would proceed through normal procedures.

Site Acquisition

General purpose governments, Port of Astoria or private developers have the option of purchasing outright potential mitigation sites. This has the advantage of ensuring availability of an acceptable mitigation site, should development requiring mitigation occur in the future. Prior to use for mitigation, sites could be leased for agriculture or another low intensity use.

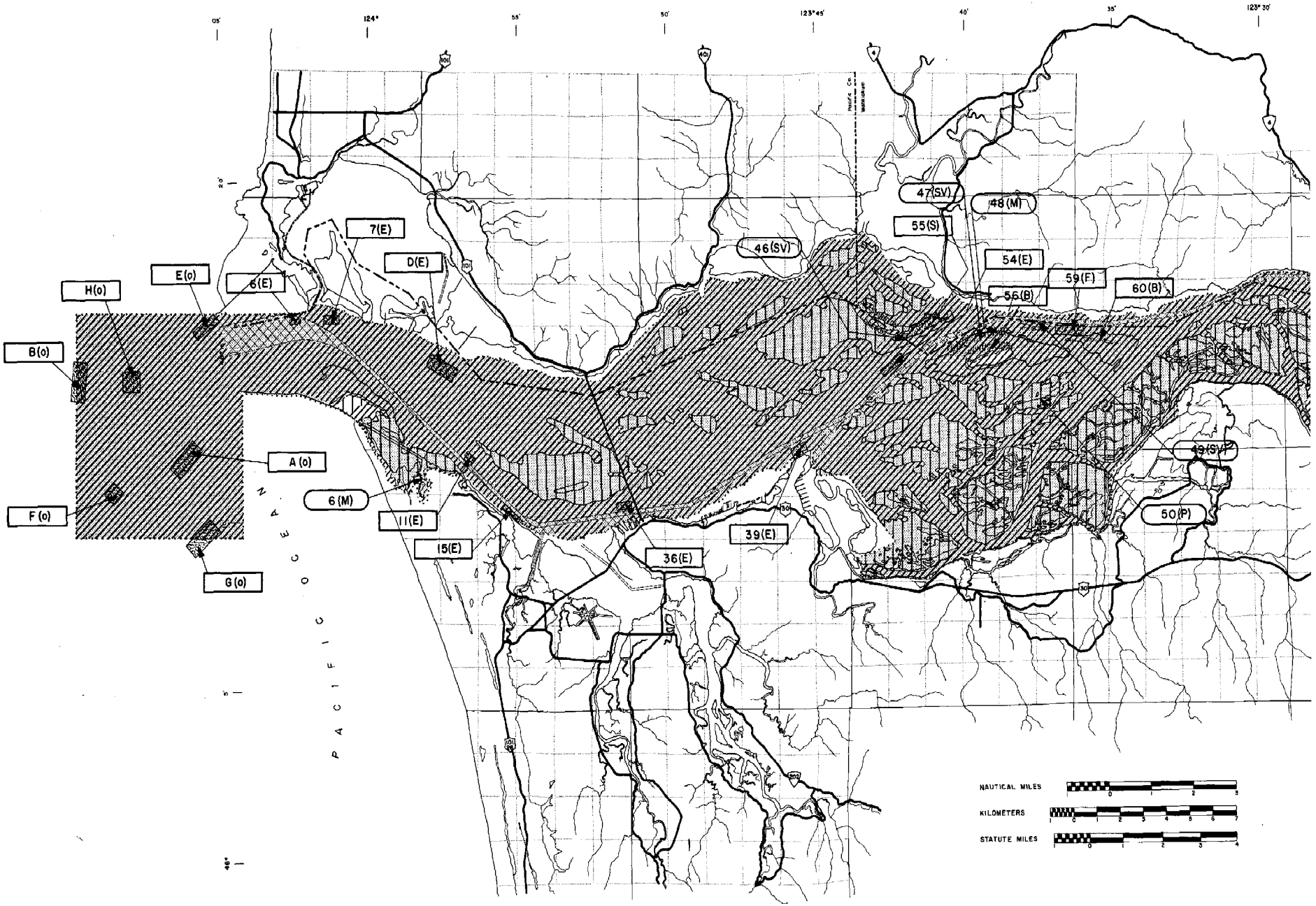
Property Exchange

In some instances, general purpose governments, port districts or other developers may wish to obtain mitigation sites through the exchange of property. This method would prove feasible if other land is owned which would be useful to the owner of the mitigation site.

Tax Limitation

When the use of a proposed site is implemented by means other than site acquisition, the issue of property taxation must be resolved. If use of a privately owned site prohibits the land owner from making full use of the site, the question remains: Should the property owner carry the tax burden? To deal with this question, it may be possible to defer or fix the taxes on the property over a limited period of time. Such a concept could be done through means similar to the "special assessment" provisions of Section 5 and 6 of ORS 308.370 dealing with Exclusive Farm Use Zones or under concepts of a "frozen assessed valuation" as provided for in Urban Renewal Areas under ORS 457. While the legal precedent for such tax actions is clear, the specific enabling authority may not exist for the jurisdictions to take such actions on mitigation sites. Jurisdictions should aggressively pursue the establishment of such authority either through interpretation of its current authority or through new legislation.

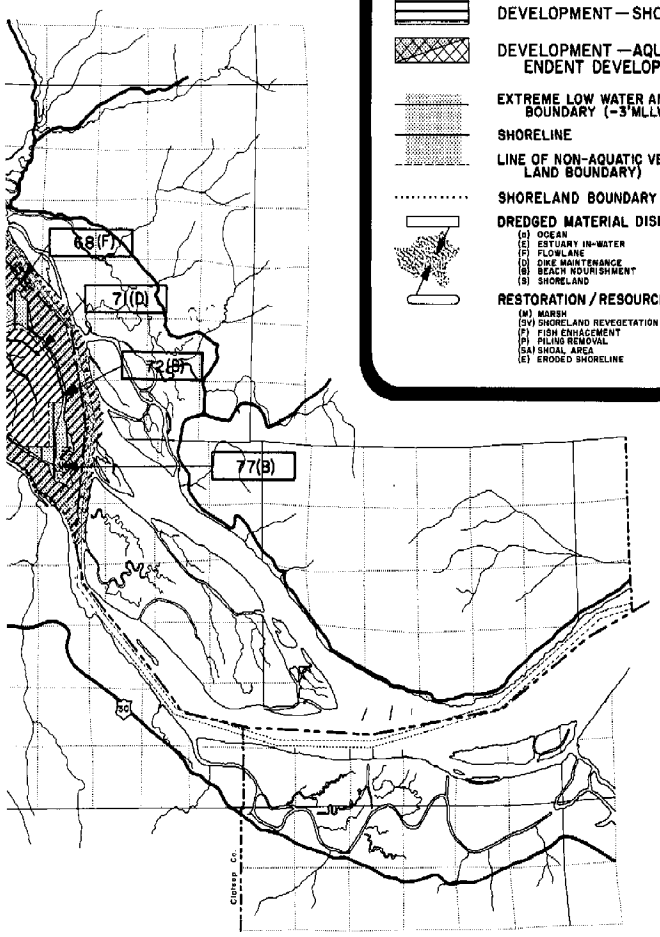
If it is not possible to implement tax actions, the Port of Astoria should be prepared to negotiate tax payments for those sites on which use is restricted until their ultimate use is determined.



05'
124°
55'
50'
123°45'
40'
35'
123°30'
20'
5'
46°
Pacific Co.
Wahkiakum
PACIFIC OCEAN
H(o)
E(o)
6(E)
7(E)
D(E)
B(o)
A(o)
F(o)
G(o)
6(M)
11(E)
15(E)
36(E)
39(E)
46(SV)
47(SV)
48(M)
55(S)
54(E)
56(B)
59(F)
60(B)
49(SV)
50(P)
NAUTICAL MILES
KILOMETERS
STATUTE MILES

LOWER RIVER & ISLANDS PLAN

- NATURAL—AQUATIC OR SHORELAND
- CONSERVATION—AQUATIC OR SHORELAND
- RURAL—AQUATIC OR SHORELAND
- DEVELOPMENT—SHORELAND
- DEVELOPMENT—AQUATIC OR WATER DEPENDENT DEVELOPMENT SHORELANDS
- EXTREME LOW WATER AND WATER WETLAND BOUNDARY (-3'MLLW)
- SHORELINE
- LINE OF NON-AQUATIC VEGETATION (AQUATIC SHORELAND BOUNDARY)
- SHORELAND BOUNDARY WITH UPLAND
- DREDGED MATERIAL DISPOSAL SITES
  - (o) OCEAN
  - (E) ESTUARY IN-WATER
  - (F) FLOWLANE
  - (D) DIKE MAINTENANCE
  - (B) BEACH NOURISHMENT
  - (S) SHORELAND
- RESTORATION / RESOURCE ENHANCEMENT
  - (M) MARSH
  - (SV) SHORELAND REVEGETATION
  - (F) FISH ENHAGEMENT
  - (P) PILING REMOVAL
  - (SA) SHOAL AREA
  - (E) ERODED SHORELINE



GREST

COLUMBIA RIVER ESTUARY STUDY TASK FORCE

FIGURE

PART VII

PLAN IMPLEMENTATION

71. LOCAL GOVERNMENTS ..... VII - 2
Washington ..... VII - 2
Oregon ..... VII - 3

72. STATE AGENCIES ..... VII - 4
Washington ..... VII - 4
Oregon ..... VII - 4

73. FEDERAL AGENCIES ..... VII - 4
Federal Consistency ..... VII - 4
Excluded Federal Lands ..... VII - 5

74. INTERGOVERNMENTAL COORDINATION ..... VII - 6
Local Coordination ..... VII - 6
Local-State-Federal Coordination ..... VII - 7

75. ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURES ..... VII - 8
Local Environmental Impact Assessments - Washington ..... VII - 8
Local Environmental Impact Assessments - Oregon ..... VII - 8
State Environmental Impact Assessments - Washington ..... VII - 8
State Environmental Impact Assessments - Oregon ..... VII - 9
Federal Environmental Impact Assessments ..... VII - 9

76. PLAN REVIEW AND AMENDMENT PROCESS ..... VII - 9
Scheduled Biennial Review and Amendment ..... VII - 9
Scheduled Six Year Review and Update ..... VII - 9
Unscheduled Reviews and Updates ..... VII - 9

77. COLUMBIA RIVER ESTUARY DATA DEVELOPMENT PROGRAM ..... VII - 10

78. COLUMBIA RIVER ESTUARY INFORMATION CENTER ..... VII - 11

79. AGENCY ROLES AND RESPONSIBILITIES ..... VII - 12
Oregon ..... VII - 12
Cities ..... VII - 12
Clatsop County ..... VII - 12
Port of Astoria ..... VII - 12
Clatsop County Economic Development Committee ..... VII - 13
Clatsop-Tillamook Intergovernmental Council ..... VII - 13
Land Conservation and Development Commission ..... VII - 13
Department of Environmental Quality ..... VII - 14
Water Resources Department ..... VII - 14
Department of Fish and Wildlife ..... VII - 15
Department of Transportation ..... VII - 15
Economic Development Commission ..... VII - 15
State Land Board and Division of State Lands ..... VII - 16
Intergovernmental Coordination Division ..... VII - 16
Department of Energy and Energy Facility Siting Council ..... VII - 16
State Marine Board ..... VII - 16
Washington ..... VII - 17
Cities ..... VII - 17
Counties (Pacific, Wahkiakum) ..... VII - 17
Port Authorities ..... VII - 17
Councils of Government ..... VII - 17
Department of Ecology ..... VII - 18
Planning and Community Affairs Agency ..... VII - 19
Office of Program Planning and Fiscal Management ..... VII - 19

Parks and Recreation Commission ..... VII - 19
Interagency Committee for Outdoor Recreation ..... VII - 19
Highway Commission ..... VII - 19
Department of Fisheries ..... VII - 20
Department of Game ..... VII - 20
Department of Natural Resources ..... VII - 20
Regional ..... VII - 20
Co-Pac and North Coast Resource Conservation and Development Committees ..... VII - 20
Columbia River Estuary Study Taskforce ..... VII - 20
Pacific Northwest Regional Commission ..... VII - 20
Pacific Northwest River Basins Commission ..... VII - 21
Federal ..... VII - 21
Corps of Engineers ..... VII - 21
NOAA and Office of Coastal Zone Management ..... VII - 22
National Marine Fisheries Service ..... VII - 22
Bureau of Land Management ..... VII - 22
Bureau of Outdoor Recreation ..... VII - 22
U.S. Fish and Wildlife Service ..... VII - 22
Environmental Protection Agency ..... VII - 23
Water Resources Council ..... VII - 23
Coast Guard ..... VII - 23
Forest Service ..... VII - 24
Soil Conservation Service ..... VII - 24

71. LOCAL GOVERNMENTS

The Columbia River Estuary Regional Management Plan will be implemented at the local level by each jurisdiction as an update to Shoreline Management Master Programs (Washington) or as part of revised comprehensive plans and ordinances (Oregon).

WASHINGTON

In Washington, local jurisdictions have existing Shoreline Management Master Programs (SMMP) in place. The Regional Management Plan will be used to update these programs; aquatic areas will be managed separately from shoreland areas, dredged material disposal/restoration will be added, and other policies and regulations will be integrated into the local programs.

Pacific County and Ilwaco

The shorelines of the Columbia River are geographically separate from other areas of Pacific County regulated under the Shoreline Management Act. The Columbia River shorelines are also "shorelines of statewide significance". Because of the geographic uniqueness of the area and the desire to have consistent policies and regulations in the Columbia River estuary area, Pacific County has elected to integrate the Regional Management Plan into their SMMP as a separate Columbia River segment. Since the Town of Ilwaco shorelines are all on the Columbia River, the Regional Management Plan will completely replace their existing SMMP. The SMMP's will include all of the regional portions of the Regional Management Plan, with site-specific emphasis on the Baker Bay Area Plan. Completion of the SMMP amendment process to integrate the Regional Management Plan is expected by Fall, 1979.

The administration of the SMMP's will continue to be the responsibility of Pacific County or Ilwaco, using existing procedures. Local regulation will occur through the Substantial Shoreline Development Permit, issued by the appropriate jurisdiction. CREST will provide technical assistance to help prepare or evaluate permit requests, or implement other portions of the plan, such as dredged material disposal.

Wahkiakum County and Cathlamet

All of Wahkiakum County's "shorelines of statewide significance" and portions of other shorelines fall within the CREST planning area. As a result, Wahkiakum County has elected to completely review and revise their existing Shoreline Management Master Program (SMMP), integrating the Regional Management Plan provisions. Except for certain portions, such as the dredged material disposal plan, the integration process, which started in February, 1979, will be completed by September, 1979. Subsequent revisions will incorporate other material as necessary. For the geographic area under their jurisdiction, the City of Cathlamet will use the same SMMP regulations as Wahkiakum County. Administration of the SMMP's, just as in Pacific County, will be the responsibility of the local jurisdiction.

OREGON

In Oregon, each jurisdiction is in the process of updating its local comprehensive plan to comply with the Land Conservation and Development Commission statewide planning goals. CREST was given regional planning responsibility to address the Estuarine Resources Goal (Number 16) and the Coastal Shorelands Goal (Number 17) in the Columbia River Estuary area. Implementation of the Regional Management Plan will occur by integration of estuary and shoreland provisions into the overall comprehensive plans for each jurisdiction. Each jurisdiction's plan will also address LCDC Goals (as applicable) for agricultural lands; forest lands; open space, scenic and historic areas, and natural resources; air, water and land resources quality; areas subject to natural disasters and hazards; recreation needs; economy of the state; housing; public facilities and services; transportation; energy conservation; urbanization; beaches and dunes; ocean resources. The Regional Management Plan addresses many of these subjects as they relate to estuary and shoreland areas, but not always in sufficient detail.

For each Oregon jurisdiction, CREST will provide "coastal implementation" assistance, including information and assistance to potential permit applicants, helping local governments evaluate estuary and shoreland development projects, helping make federal/state consistency determinations, and locating dredged material disposal and restoration-mitigation sites.

Clatsop County

Portions of the Baker Bay, Youngs Bay-Astoria and Lower River and Islands planning areas and all of the Eastern Clatsop planning area lie within Clatsop County. Estuary-shoreland planning was closely coordinated with the county to provide for integration into their overall comprehensive plan. Regional policies and other estuary-wide plan provisions will be incorporated into the county-wide plan elements. The small area of Baker Bay lying within Clatsop County is being combined with the Lower River and Islands area to form a "community plan" for that large region of the estuary. Unincorporated portions of the Youngs Bay-Astoria planning area fall into the County's Lewis and Clark region; estuary-shoreland plan provisions are being incorporated into the "community plan" for that region. Finally, CREST's Eastern Clatsop planning area is wholly within the County's Northeast region, and the community plan for that region includes estuary-shoreland provisions. Dredged material disposal and restoration sites will also be incorporated. The permitted use/activity tables and development standards will be incorporated into the County zoning ordinance. Clatsop County's LCDC goal compliance date is December 31, 1979. CREST will provide "coastal implementation" assistance to Clatsop County for both the Columbia River and Necanicum estuaries.

City of Astoria

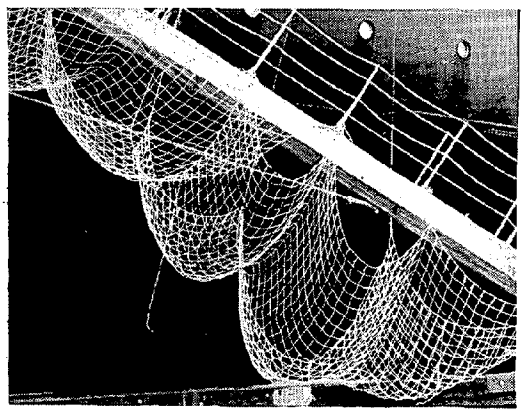
Estuary and shoreland areas inside Astoria and its urban growth boundary lie entirely within CREST's Youngs Bay-Astoria planning area. Astoria adopted its revised comprehensive plan in June, 1979, including all Regional Management Plan provisions except dredged material disposal and restoration-mitigation. These will be incorporated by Fall, 1979. The zoning ordinance includes shoreland and aquatic area zones and standards directly corresponding to CREST's land and water use classification system and development standards. The City will rely on CREST for "coastal implementation" assistance.

City of Warrenton

Warrenton shoreland and estuary areas, which comprise a large portion of the city, lie entirely within the Youngs Bay-Astoria planning area. Warrenton's LCDC goal compliance date is October 1, 1979; they are in the process of completing development of the overall comprehensive plan and are directly incorporating provisions of the Regional Management Plan. Warrenton's zoning ordinance will include marine commercial and marine industrial shoreland zones and aquatic development, conservation and natural zones with development standards taken from the Regional Management Plan. CREST will provide "coastal implementation" assistance to Warrenton for the estuary area.

Town of Hammond

Hammond estuary and shoreland areas lie within the Youngs Bay-Astoria planning area. Hammond's LCDC goal compliance date is October 1, 1979. Zones and ordinance standards, as they relate to the Regional Management Plan, will be similar to Warrenton. CREST will provide "coastal implementation" assistance to the Town of Hammond for estuary areas.



-John Atkinson

72. STATE AGENCIES

State agencies will implement the Columbia River Estuary Regional Management Plan through their individual management, permit and license authority, and permit review procedures.

Washington

The Columbia River Estuary Regional Management Plan will be incorporated into local shoreline management master programs by amendment of existing programs. After approval by the Department of Ecology (DOE), state agency actions must be consistent with these amended shoreline policies and regulations. Other state statutory requirements, such as "hydraulics permit approvals", are also required, but cannot be issued if the local substantial shoreline development or conditional use permit is denied.

The DOE is the state agency most involved in implementation of coastal zone management at the state level. The DOE reviews and has appeal authority on all substantial shoreline development permits and must approve all shoreline conditional use permits issued by local governments. The DOE also is the agency responsible for commenting on the consistency of federal actions in the coastal zone.

Oregon

After incorporation of the Columbia River Estuary Regional Management Plan into local comprehensive plans and ordinances and subsequent plan acknowledgement by the Land Conservation and Development Commission (LCDC), state agency actions must be consistent with the local plan. However, projects which would alter the estuarine environment, thus requiring a state permit under other statutes, would also have to comply with criteria established by those statutes and their implementing rules. The permit most affected will be that issued for fill or removal (ORS 541.605-541.695) by the Division of State Lands. Other affected permits are listed in LCDC's State Permit Consistency Rule. Permits inconsistent with the local plan must be denied by the state agency concerned. Permits consistent with the plan may be approved or denied, depending on conformance with other state statute or rule criteria. Other state actions must also be consistent with the local comprehensive plan.

73. FEDERAL AGENCIES

Federal agencies will implement the Columbia River Estuary Regional Management Plan through their individual management and development activities, permit and license authority, and permit review procedures.

Federal Consistency

The Columbia River Estuary Regional Management Plan, when incorporated into local comprehensive plans or shoreline management master programs and acknowledged by the Land Conservation and Development Commission in Oregon or by the Department of Ecology in Washington, will become part of each state's approved coastal management program. Federal consistency provisions of the Federal Coastal Zone Management Act of 1972 (Section 307) will then require that federal actions be consistent with approved state coastal zone management programs. Actions for which the federal agencies will make the consistency determination include direct federal development or other direct actions, federal applications for licenses and permits, and actions outside the coastal zone that significantly affect the coastal zone. Actions for which the state or local government makes the consistency decision include federal licenses and permits, and federal assistance.

The specific types of federal activities, federal assistance and federal licenses and permits which are subject to the federal consistency provisions are detailed in Washington and Oregon Coastal Zone Management programs, along with procedural guidelines.

The largest proportion of federal consistency decisions in the Columbia River estuary area will be for Corps of Engineers Section 10 (Rivers and Harbors Act) and Section 404 (Clean Water Act) permits required for dredging and dredged material disposal, filling or construction in water or wetland areas. The Environmental Protection Agency, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service each are required to review applications for these permits to assure compliance with certain provisions of the Clean Water Act, the Fish and Wildlife Coordination Act, and other federal environmental protection laws. If these agencies object to a project because it conflicts with federal laws or implementing regulations, the Corps of Engineers asks the applicant to work out the problems with these agencies. If they cannot, the permit may be denied.

As noted, federal consistency decisions on federal licenses and permits are made by the state. In Washington, the Department of Ecology (DOE) is the responsible agency for consistency determinations. Since virtually all site-specific Corps permits require

a counterpart permit under the local Shoreline Management Master Program, DOE uses the local permit decision as the initial basis for the federal consistency determination. No new procedures are needed to tie local governments into the federal consistency decision-making process. Federal permits inconsistent with the local Shoreline Management Master Program will be denied. For actions consistent with the program, permits may be approved or denied, depending on conformance with other federal laws and regulations. The Environmental Protection Agency has made a particular point of this by noting that consistency with the coastal zone management program does not automatically lead to issuance of a Clean Water Act, Section 404 permit. Consistency with a broad-based plan, such as the Columbia River Estuary Regional Management Plan, is a fundementally different determination than the case-by-case procedures and site-specific findings required to issue a 404 permit. The coastal planning process that incorporates Section 404 (b)(1) guidelines for discharge of dredged or fill material will streamline and expedite the permit process.

The above principles are incorporated into policies, plans and procedures of the Columbia River Estuary Regional Management Plan.

In Oregon, the consistency of most federal licenses and permits is determined by the same process used for determining consistency of state permits. A finding of consistency for a state permit (e.g. Oregon removal/fill permit vs. Corps Section 10/404 permit) becomes, in effect, a finding of consistency for the counterpart federal permit. Acknowledged local comprehensive plans are the basis of the state consistency, and hence, federal consistency decision. Actions inconsistent with local comprehensive plans and implementing ordinances will be denied. When federal permit actions are consistent with local plans, permits may be approved or denied, depending on conformance with other federal laws and regulations.

Local governments in Oregon will be involved in the state and corresponding federal permit and license consistency process by review of applications against their local ordinance standards. These standards will be based on the CREST Permitted Use/Activity Tables (Tables 33-1 and 33-2) and Development Standards for activities (cf 33.20 and 33.27). The review process should be simple and having the following general steps:

— County Coordinator and the local jurisdiction(s) concerned receive the permit public notice.

— County Coordinator determines responsibility for consistency review; if only a single jurisdiction is affected, that jurisdiction conducts the review; if more than one jurisdiction is affected, the consistency review is conducted by the County Coordinator, with advice of concerned jurisdictions.

— Consistency review against the comprehensive plan, the zoning map and development standards is made; if more than one use or activity is associated with a given permit application, it will be reviewed against all applicable standards.

— Results of the consistency review are reviewed by the appropriate planning commission(s) and a consistency finding made; a project may be consistent, conditionally consistent, or inconsistent with local plans and ordinances.

- A finding of *consistency* means that the project is consistent in all respects and that development standards have been met.
- A finding of *conditional consistency* means that the project may be consistent pending conformance with specified development standards. More information or redesign of the project may be required.
- A finding of *inconsistency* means that the project is not consistent with comprehensive plan policies or zoning ordinances. The appropriate policies, development standards or other reasons will be specified.

— The consistency finding is outlined in a letter and forwarded to the permit applicant, the Department of Land Conservation and Development, the appropriate local, state and federal agencies, and other affected parties. Notification of the need for a local permit, if any, will be included.



National Fisherman

Excluded Federal Lands

According to Section 304(a) of the Federal Coastal Zone Management Act, "...Excluded from the coastal zone are lands the use of which is by law subject solely to the discretion of or which is held in trust by the Federal Government, its officers or agents...."

On August 10, 1976, the United States Department of Justice issued an opinion concluding, "...the exclusionary clause excludes all lands owned by the United States from the definition of the Coastal Zone...."

A subsequent request by the National Oceanic and Atmospheric Administration for further clarification resulted in an informal opinion which forms the basis for the language now incorporated in the Coastal Zone Management Association Section 306 regulations:

> "....States must exclude from their coastal management zone those lands owned, leased, held in trust or whose use is otherwise by law subject solely to the discretion of the Federal Government, its officers or agents."

Under this broad interpretation, a significant portion of aquatic and shoreland areas in the Columbia River estuary region are technically not included in the Regional Management Plan. However, federal agencies have cooperated fully in the planning process in order to develop a geographically complete plan. This is viewed as appropriate for a relatively small geographic area with such a dynamic environment. Actions in one part of the estuary, federal lands or not, often have a significant impact on other estuarine or shoreland areas.

74. INTERGOVERNMENTAL COORDINATION

The Columbia River Estuary Regional Management Plan will be implemented at the local level by each individual jurisdiction as part of comprehensive plans and ordinances (Oregon) or as an update to Shoreline Management Master Programs (Washington). State and Federal agencies will implement the plan through their individual management, permit and license authority and permit review authority, supplemented by state and federal consistency procedures for coastal zone management. However, local, state and federal agencies have overlapping regulatory responsibilities and authorities, and this sometimes results in confusion, unnecessary delays and frustration, particularly at the local level, where technical staff support to participate in the estuary decision-making level process is lacking. This problem was a major one identified at the outset of the CREST program.

CREST appointed an Implementation Committee to study this coordination problem. Their objective was to recommend an intergovernmental structure which would provide for a more efficient, streamlined decision-making process in which local governments play a significant, influential role. This section describes the approach to local coordination among estuary-area governments and among local, state and federal governmental levels.

Local Coordination

The Columbia River Estuary Study Taskforce (CREST) operated between January 1, 1975 and June 30, 1979 as a bistate local planning agency. Its primary objective was to develop a coordinated, regional management plan for the estuary and its shorelines. Based on the recommendation of its Implementation Committee, CREST was reestablished on July 1, 1979 as a separate, chartered, local intergovernmental organization. All general purpose governments (counties, cities, and towns) and port districts in the estuary area are eligible for membership.

The purposes of the new CREST organization are: to enable member agencies jointly to implement the Columbia River Estuary Regional Management Plan; to enable the elected officials of the member agencies to jointly identify issues and needs which are regional in scope, achieve concurrence for cooperative actions, plan, approve and recommend governmental action related to the conservation and development of the natural, economic and human resources of the Columbia River estuary area; and to improve communication and cooperation of member agencies in the Columbia River estuary area, and to promote maximum efficiency and economy in governmental operations.

The responsibilities and functions of the new CREST organization are to:

- Provide continued planning assistance to member agencies upon request to and approved by the Council;
- Review local comprehensive plans and shoreline management master programs and make recommendations which will result in coordination of such plans and programs and conformance with the Columbia River Estuary Regional Management Plan;
- Provide technical information and assistance to member and other agencies for Columbia River Estuary Regional Management Plan implementation;
- Act, for member agencies and other local interests, as local liaison to the Pacific Northwest River Basins Commission as they conduct the six-year Columbia River Estuary Data Development Program and, for this and other estuary research programs, act as a pipeline for local research needs and communication of results.
- Evaluate state and federal estuary activities, programs, developments, and project impact assessments that may affect local governments and report results to concerned jurisdictions;
- Coordinate with local, state and federal agencies on estuary development, research, regulation, project impact assessment, and plan review and update; organize and conduct periodic meetings of all such agencies in the interest of cooperative management;
- Establish and operate a Columbia River Estuary Information Center and provide library information searches, permit information, and other services to the public, planners, and state and federal managers and researchers.

Local governments eligible for membership in the CREST implementation organization include:

OREGON	WASHINGTON
Clatsop County	Pacific County
City of Astoria	Town of Ilwaco
City of Warrenton	Port of Ilwaco
Town of Hammond	Port of Chinook
Port of Astoria	*Wahkiakum County
	*City of Cathlamet
	Wahkiakum Port District #1
	Wahkiakum Port District #2

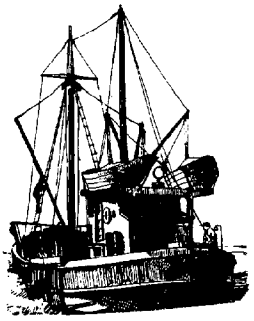
* These jurisdictions have indicated that they do not wish to participate as a member of CREST; they retain eligibility for future membership.

Local-State-Federal Coordination

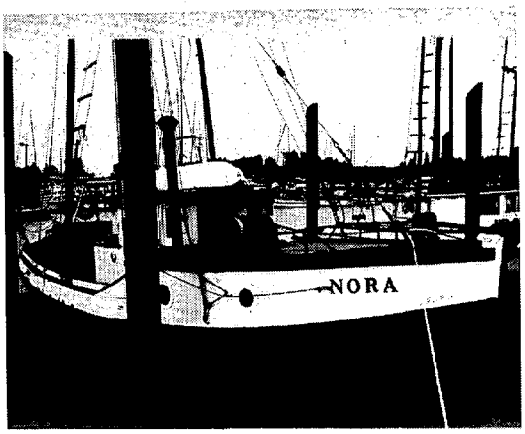
Local governments, through the CREST organization, have provided for coordination with state and federal agencies on estuary issues. Using the existing Technical Advisory Committees (TAC) for Washington State, Oregon State and federal agencies, a cooperative management process is to be utilized to promote communication and coordinated decision-making. The local, state and federal agencies involved in periodic coordination meetings will depend on the issue, problem or subject to the addressed. Local-state-federal coordination functions include:

- when disagreements over regulatory functions occur, serving as a forum for discussion and resolution of problems;
- serving as a forum for discussion of problems related to environmental impact assessments and for information-sharing about impacts of specific projects;
- serving as a forum for periodic review and update of the Columbia River Estuary Regional Management Plan, working with individual jurisdictions as updates are needed;
- helping formulate research needs and serving as a forum for communication of research results;
- using the Columbia River Estuary Information Center to communicate state and federal interests, concerns and programs to local government and the general public, the center will also serve as the focal point for local-state-federal coordination.

State and federal agencies that will participate with local governments in cooperative management of the Columbia River estuary include:



- *National Fisherman*



- *John Atkinson*

FEDERAL

* *Pacific Northwest River Basins Commission*

Department of the Army
*Corps of Engineers

* *Department of the Interior*
Bureau of Land Management
*U.S. Fish and Wildlife Service
National Park Service
U.S. Geological Survey
Heritage Conservation and Recreation Service

Department of Agriculture
U.S. Soil Conservation Service
U.S. Forest Service

Department of Commerce
*National Marine Fisheries Service
Economic Development Administration

* *Environmental Protection Agency*

OREGON

*Department of Land Conservation and Development
Department of Economic Development
*Division of State Lands
*Department of Fish and Wildlife
Department of Forestry
Department of Geologic and Mineral Industries
State Marine Board
Department of Transportation
*Department of Environmental Quality
Department of Energy
Intergovernmental Relations Division

WASHINGTON

*Department of Ecology
*Department of Fisheries
*Department of Game
Department of Parks and Recreation
Office of Planning and Community Development
Highway Administration
*Department of Natural Resources
Interagency Committee for Outdoor Recreation

* primary estuary management, regulatory or research agencies

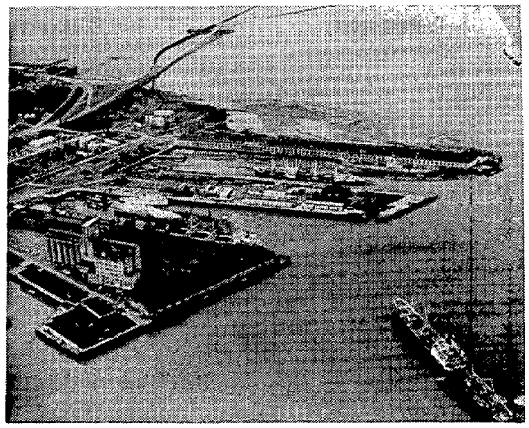
75. ENVIRONMENTAL IMPACT ASSESSMENT PROCEDURES

For all development projects, a permit applicant must provide agencies with the information necessary to assess project impacts and determine how the project measures up against applicable standards. The nature and extent of information required depends on the type of permit required (local, state and/or federal), and the potential for environmental impacts. Impact Assessment requirements at the local, state and federal level are discussed below.

Local Environmental Impact Assessments - Washington

The "substantial shoreline development permit" is the regulatory mechanism local governments in Washington use to control development activity along and in the estuary. For each permit, the local government concerned (county or city), in cooperation with the applicant, must fill out the "environmental checklist" required under guidelines which implement the State Environmental Policy Act (SEPA). Specific information needs or potential effects to be evaluated may also be specified in development standards for a given use or activity. The local government then determines whether the action has a significant or insignificant environmental impact. If significant, an environmental impact statement (EIS) is required. If insignificant, a "negative declaration" is issued.

Every project which requires a shoreline permit must thus be evaluated for potential environmental impacts. This initial assessment will generally be accomplished by local staff members. If an EIS is required, the permit applicant generally must supply the detailed information required.



Port of Astoria Photo

Local Environmental Impact Assessments - Oregon

Oregon does not have a counterpart to Washington's SEPA. At the local level, impact assessment, when accomplished, is generally an informal process designed to evaluate a project against development standards in an ordinance. For estuarine projects, however, the Estuarine Resources Goal (Number 16) requires that "actions which would potentially alter the estuarine ecosystem shall be preceded by a clear demonstration of the impacts of the proposed alteration, and a demonstration of the public's need and gain which warrant such modification or loss." If a local government has exclusive permit authority for an estuarine development, that government has lead responsibility for preparing the required impact assessment. However, most estuarine projects are regulated or reviewed in some manner by all government levels, local, state and federal.

For projects requiring removal or fill permits under ORS 541.605 to 541.695, the Division of State Lands is delegated lead responsibility for preparation and distribution for the required impact assessment. Federal environmental assessments, routinely prepared for Corps of Engineers Section 10 or 404 permits, may be substituted if distributed with the permit notice. The assessment required for a project need not be lengthy or complex, but it should enable reviewers to gain a clear understanding of problems to be expected. It should include information on:

—the type and extent of alterations expected;

—the expected impacts of the proposed alteration on estuarine habitat, water quality, fish and wildlife resources, recreation, aesthetics, navigation, and other existing and potential uses of the estuary; the development standards for the use and activities proposed;

—the methods which could be used to minimize adverse impacts, including mitigation if appropriate.

State Environmental Impact Assessments - Washington

The State Environmental Policy Act (SEPA) applies to state agency shoreline actions (permit or license issuance, direct development, etc.) as well as local actions discussed earlier. Normally, a local shoreline permit and environmental impact checklist (and EIS, if necessary) also are required for such projects. When this is the case, the local impact assessment is substituted for one that might be required at the state level. If not, the lead state agency must comply with the SEPA procedures.

State Environmental Impact Assessments - Oregon

The only specific impact assessment required at the state level is that outlined in the LCDC Estuarine Resources Goal (Number 16), described above. For removal or fill actions requiring a state permit, the Division of State Lands has lead agency responsibility for preparation of the required environmental assessment. Where state agency actions involve estuarine alterations and a permit, that agency will be responsible for preparing the required assessment.

Federal Environmental Impact Assessments

The National Environmental Policy Act of 1969 requires preparation of an environmental impact statement (EIS) for federal actions which are "major" and "significantly affect the quality of the human environment". In the estuary area, these actions relate primarily to permit and license decisions by the Corps of Engineers, the Coast Guard and others.

Using the Corps of Engineers Section 10 or 404 permit action as an example, an "environmental assessment" is prepared on every project for which there is a permit application. Based on this assessment, the Corps makes a determination as to whether a full EIS is required and publishes this determination in its public notice on the project. If a more detailed impact assessment is shown to be necessary, the Corps of Engineers requires the applicant to provide them with the information necessary to prepare a Draft EIS. It must include detailed information on:

- the environmental impact of the proposed action,
- any adverse environmental effects which cannot be avoided should the proposal be implemented,
- alternatives to the proposed action,
- the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
- any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

These statements are comprehensive and often take a year or more to prepare. The Draft EIS, when issued, has a mandatory 60-day review period prior to a Final EIS being issued. For controversial projects, this 60-day period may extend many months while disagreements are worked out. A permit cannot be issued until a Final EIS is produced. Work may commence on a project 30 days after release of a Final EIS.

76. PLAN REVIEW AND AMENDMENT PROCESS

Periodic review and, if necessary, amendment of the Columbia River Estuary Regional Management Plan or portions of it are essential to maintain flexibility to changing situations and to respond to new information that is available. Each local government will continue to exercise its responsibility and authority to review and, if necessary, amend its plan. In Washington, local governments must submit amendments to the Department of Ecology for approval. For Oregon areas, local plan amendments do not require state review and approval, though amendments do have to conform to Statewide Goals.

In the estuary area, because of the mixture of private, local, state and federal proprietory, regulatory and management interests, it is important that the plan review and amendment process be a cooperative one where citizen and governmental agency views on proposed changes can be considered and a consensus achieved. CREST will continue to maintain its intergovernmental coordination structure through which local plan or program amendments that would affect the Regional Management Plan can be coordinated. Updates to the Regional Management Plan or local plans and programs may be minor refinements or major amendments and may be the result of scheduled or unscheduled reviews. The procedures and timing for scheduled and unscheduled Regional Management Plan review and amendment are outlined below. A biennial cycle for reviews and a six-year cycle for major reviews is established.

Scheduled Biennial Review and Amendment

Local plans, and the Columbia River Estuary Regional Management Plan on which they are based, are to be reviewed every two years by each local, state and federal agency concerned. Local governments will initiate this process. Proposed changes in policies, land and water use designations and regulations should be recommended as necessary. Public and agency coordination meetings will be held if significant changes are proposed. A major objective will be to achieve a consensus on plan changes. At a minimum, such a process will ensure all viewpoints are considered.

Scheduled Six Year Review and Update

A major plan review will be scheduled every six years, in place of the biennial review. It will include a systematic review of policies, regulations, and plans, and a review of new information as it relates to each geographic region of the estuary. Citizen involvement and local, state and federal agency workshops would be used to effect this review. New data from the Columbia River Estuary Data Development Program and other research will also be used in this process.

Unscheduled Reviews and Updates

On occasion, it may be necessary to review and update provisions of a local plan out of the scheduled cycle. In such a case, a public notice and process similar to that for biennial scheduled review and update will be used.

77. COLUMBIA RIVER ESTUARY DATA DEVELOPMENT PROGRAM

One of the primary objectives of the organizers of the Columbia River Estuary Study Taskforce (CREST) was to foster a major estuary research program to collect data needed for more informed decision-making. Because of this local interest and concern, the Governors of the States of Oregon and Washington requested in 1974 that the Pacific Northwest River Basins Commission (PNRBC) undertake a study of the estuary. The Commission accepted the challenge and, with the assistance of federal agency representatives and CREST, prepared in June 1976, a "Proposal to Study" (PTS). The PTS outlined the need for and purposes of an estuary study, how such a study would be organized and managed, and an estimated budget. This proposal was submitted to the U.S. Water Resources Council as part of the PNRBC total program budget request for FY 1978, along with the endorsements of the Governors of the two states and CREST. The study did not receive individual authorization, however, until FY 1979. Authorization for the $6,204,000 six-year Columbia River Estuary Data Development Program was provided by Public Law 89-90 and first-year funds in the amount of $828,900 appropriated by Public Law 95-482 in October 1978. The PNRBC's FY 1980 budget request seeks an appropriation of $991,000.

The purpose of the Data Development Program is twofold: to increase understanding of the estuary, and to provide information in a form suitable for use when making land/water management decisions. The program is being managed by the Pacific Northwest River Basins Commission. Program participants are those agencies, entities, and interests which have demonstrated expertise in particular technical subjects.

A detailed Plan of Study prepared for the Data Development Program is based on the following criteria: 1) the estuary will be viewed as an interdependent system; 2) the program will use and expand present agency activities, not supplant them; 3) the focus will be on the biological and physical processes of the estuary; little emphasis would be placed on land resource, social or economic studies; 4) contractors will be selected on the basis of their qualifications and the merits of their proposed research; and 5) data will be developed to both understand the estuary system and assist management of the estuary.

The estuary is defined for the purposes of the research program as the area extending from the offshore bar to Columbia River Mile 46, the eastern tip of Puget Island. The program generally will be limited to the area below high water and will include the estuarine islands and adjacent wetlands.

The research program will deal with the food chain and its internal energy transfers; energy, salt, water, sediment, nutrient and particulate budgets will be used to summarize the physical environment and its relationship to the biological environment. Within this context, key management needs are identified in the form of research questions.

To assure that the program neets the needs of those who manage the estuary, an Estuary Program Subcommittee of the Program Committee has been established. To monitor the technical progress of the program and its contractors, a Technical Advisory Committee has been designated. Local needs will be reflected by a Citizen Advisory Committee and CREST. Each of these bodies will work through the Program Manager. Annual evaluations of the program will provide the opportunity for redirection of activities to meet changing management requirements or additional data needs.

The program will be accomplished in seven phases over a six-year period. These include program planning, contracting, implementation, three continuation phases, and summation. To undertake these activities, a mix of federal/state, university, and private contractors, or individual efforts is proposed. Each contractor will be reviewed annually and his efforts modified on the basis of performance and the availability of funds. The outputs of the program will include technical reports for each work element, "summaries" for decision-makers, an annual report which outlines program progress and results, and a series of conferences and special reports for technical and lay audiences.

The research data collected should allow estuary decision-makers to better address the following management questions:

— How important is the estuary to juvenile salmonids (which species and runs)? What is the "carrying capacity" of the estuary for juvenile salmonids and what are the limiting factors? This question requires research into juvenile salmonid migration patterns, residence time and feeding habits, as well as research into the distribution and production of important invertebrates at the lower trophic levels of the food chain. Careful evaluation of existing work, published and unpubilshed, is needed to avoid duplication of effort.

— What have been and what will be the effects of large-scale estuarine changes and alterations on the estuary as a whole and on peripheral areas? Changes such as jetties, channels, pile dikes, growth of mid-estuary sand flats, increased salinity intrusion, shoaling, etc. should be evaluated with regard to short and long term implications for salinity, current and mixing patterms, sediment distribution transport and shoaling patterns, estuarine habitats, key estuarine species, and navigational use of the estuary. What predictive capabilities should be developed to deal with future large-scale alterations?

— What is the importance of the estuary's tidal marshes to estuarine food chains? For fish and wildlife habitat and feeding? For flood and erosion control, water quality, sediment entrapment, etc.? What has been the long-term impact of diking and filling a large proportion of the estuary's tidal marshes?

— What is the importance of upriver and ocean nutrient and particulate inputs to estuarine food chains?

— How are salinity, currents, mixing processes, sediment transport, shoaling patterns, anadromous fish transit and feeding, marsh productivity and benthic habitats influenced by the fresh water flow cycle? What have been the effects of the managed flow cycle? What would be the effects of future water withdrawals on the estuary? Should seasonal minimum flows be established to protect important ecological patterns or influence sediment movement? What predictive capabilities are needed?

— What are the key plant and animal species that play a crucial role in the estuarine food chain? That are particularly vulnerable or sensitive to disturbances and can therefore be used as indicators of system's health? That are particularly important for management of the estuary? What is the life cycle, habitat requirements, and ecological interactions of each?

— What is the distribution of the major benthic, marsh and shoreland habitats? How important is each to fish, birds and wildlife?

— How should main and peripheral channel dredging and dredged material disposal be managed?

— How important is the estuary to other (non-salmonid) commercial and noncommercial finfish and shellfish as a nursery, spawning ground, feeding area and transit path? Which species should be considered key species to the estuary? Which species are currently underutilized, and where could sports and commercial fisheries be developed?

— What are the mechanisms causing shoaling and erosion in bays, sloughs, side channels, marinas, etc.? What are the effects of large scale estuarine alterations (channels, jetties, etc.) on peripheral areas? What are the effects of direct alterations to the peripheral areas? What predictive capabilities are needed?

— What are the effects of non-point sources such as agricultural and forestry activities on the river, estuary and tributary streams? Some industrial sources may also require consideration.

— What are the important physical, biological and chemical processes occurring in the fine sediments? What are the effects of dredging and log storage and transport on water quality, sediment chemistry and benthic populations?

— What are the competitive and predator-prey interactions of wild fish and hatchery fish in the estuary and tributary streams?

— How can better wave and tidal current predictions be produced that take into account fresh water flow levels?

— What exotic species (e.g. nutria, warm-water fish, *Corbicula*) have been introduced? What changes have occurred as a result? How should they be managed?

— Which bird species play an important role in the estuarine food chain? Which habitats are most important for resident and migrant waterfowl, shore birds, wading birds, raptors, etc.? Which habitats are most important for wildlife?

78. COLUMBIA RIVER ESTUARY INFORMATION CENTER

CREST will formally establish an Estuary Information Center in Astoria, Oregon in September 1979 to serve the special information needs of local officials, planners, estuarine scientists, state and federal managers, and the general public. Information services have been provided throughout the CREST planning program on an informal basis. Formally establishing the center and advertising available information services will increase its usefulness to the local area.

The Estuary Information Center will operate as a satellite library to the Northwest Coastal Information Center (NCIC) in Newport, Oregon. The NCIC serves both Washington and Oregon, and will provide local area users with access to a national network of information sources.

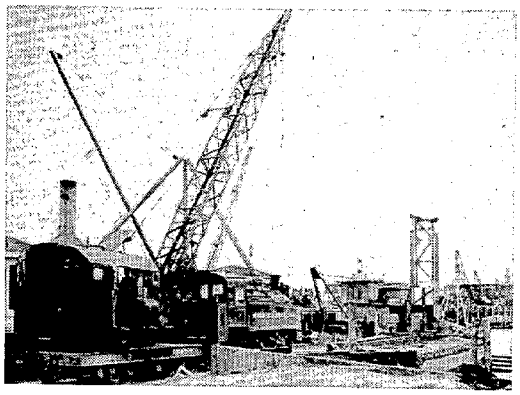
Functions of the Columbia River Estuary Information Center will be to:

- maintain and operate a satellite library to the Northwest Coastal Information Center.
- provide information services and literature searches to local officials, planners, state and federal managers, and scientists.
- cut "red tape" in the permit process by providing, in one location, accurate information on required local, state and federal permits for development projects in the estuary.
- collect and disseminate useful information in a quarterly estuary newsletter to keep the public and others informed about important estuary issues, meetings and conferences.
- develop an outreach estuary educational program, working with local schools, libraries, Sea Grant, news media and others.

79. AGENCY ROLES AND RESPONSIBILITIES

This inventory of federal, state, regional and local governmental authorities which operate in the Columbia River estuary area describes the roles and functions of each agency with respect to activities that occur in the estuary or along its shoreline. Enabling legislation, legal authorities, responsibilities and coordination functions of each agency are also discussed.

The federal Coastal Zone Management Act, 1972, Washington's Shoreline Management Act (RCW 90.58) and Oregon's land and water use planning law (ORS 197) are attempts to integrate management of coastal water, wetland and shoreland areas. In the Columbia River estuary, these laws provide a basis for the development of a coordinated plan for the Columbia River estuary and its shorelands. Washington and Oregon both give local government the authority to initiate and implement estuary planning. To be successful, the plan must be supported locally and be consistent with state and federal policy.



Port of Astoria Photo

Planning and regulation of activities in the estuary area are a complex interplay of federal, state and local proprietary and regulatory rights. Conflict and confusion may result where all three levels of government interact.

OREGON

CITIES

General planning powers of cities are defined under ORS 227.230 "City Planning and Zoning Authority."

Comprehensive planning and zoning constitute the major mechanisms for controlling land uses along the estuary. Although recent years have seen a growth in the state's interest and control over this authority, planning and zoning are still largely decided at the local level; Senate Bill 100 and LCDC Coastal Goals have established guidelines for local governments to follow during the development of their comprehensive plans. Recent court decisions have altered the historical relationship between the Comprehensive Plan and the Zoning Ordinance, in that zoning must adhere to comprehensive plans.

The cities have authority to establish subdivision controls under ORS 92.042 and, like zoning, the subdivision ordinance must adhere to the adopted comprehensive plan. The cities also have general planning powers in such areas as performance standards for industry, regulating air and water emissions, alterations of water bodies by filling or construction, and protecting lands through landscaping and restrictive uses.

CLATSOP COUNTY

Under ORS Title 215 and associated subchapters, counties in Oregon have roughly the same zoning and subdivision authority as cities. Unlike cities, however, counties must prepare comprehensive plans and must zone. This regulation ties in with the county's role in the SB 100 planning process where the counties play a coordinating role with jurisdictions inside county boundaries.

Additionally, counties play a major role in the planning and construction of utilities. This has in the past, been mainly limited to road construction and maintenance, but can be extended to include water and sewer services.

PORT OF ASTORIA

The Port of Astoria operates and functions under ORS Chapter 777 and its various subchapters, which regulate port activities in Oregon. The ports, under this chapter, are authorized to:

- Acquire, develop and manage lands for future industrial parks;
- Develop and operate industrial parks;
- Make channel and basin improvements and regulate navigation consistent with federal and state regulations such as Oregon's Fill and Removal Law (ORS 541.605 to 541.655), and the Corps of Engineers' sections 10 and 404 permit program;
- Develop and manage marinas;
- Own and operate railroad terminals and build and operate rail lines between water facilities and common carriers;
- Distribute water for urban uses.

CLATSOP COUNTY ECONOMIC DEVELOPMENT COMMITTEE

The Clatsop County Economic Development Committee (CCEDC) serves as an aid and advisory unit for the Economic Development Commission, created under ORS Chapter 184. Under subchapter 184.030, the CCEDC is given the responsibility of developing an overall economic development program (OEDP) for Clatsop County and serves as the County's guide for enhancing its economic conditions.

The program will be reviewed for approval by the Federal Economic Development Administration, in relationship to possible future federal funding of local public improvement projects. It must conform to guidelines established by the Office of Economic Development of the Department of Commerce, which requires that the program (OEDP) proposals have broad community support and that the program show relationship to other plans for the local area involved.

CLATSOP-TILLAMOOK INTERGOVERNMENTAL COUNCIL

CTIC is a council of governments within Clatsop and Tillamook Counties authorized under ORS Chapter 190 and associated subchapters. The member governments are represented by elected officials at its meetings. Its purposes are:

- To enable the elected officials to jointly identify problems and to make planning decisions on matters such as public health, safety and welfare, transportation, parks and recreation, water and sewer facilities, and education.
- To attain a greater degree of intergovernmental cooperation and communication in dealing with issues such as urban growth.
- To pool resources to get greater economy of governmental dollars.

The staff of CTIC performs a number of functions to assist local government. They are presently helping to coordinate planning as called for under SB100, and they also perform routine planning assistance to some of the member governments.

Another important function of CTIC, which ties into their role of coordinating local planning activities, is their A-95 review authority as outlined in the Office of Management & Budget Circular No. A-95 (Revised). The A-95 name comes from a circular from the federal Office of Management and Budget describing the rules and regulations they have promulgated to provide cooperation between federal, state and local governments in the evaluation, review and coordination of Federal assistance programs and projects. Under this process, CTIC is described as a "regional clearinghouse" and is authorized to notify affected parties and local jurisdictions of proposed federal projects or federal assistance projects within their jurisdiction, and seek public comments on the proposals. CTIC studies the proposals and evaluates them from the standpoint of fulfilling planning objectives of the area, environmental impacts, wise use of natural resources and appropriate land use. Items that are reviewed in this manner include agricultural and economic development; flood control; small navigation projects; air, water and land quality; education; health, social and rehabilitation services; housing and urban development; outdoor recreation; law enforcement; manpower administration; transportation; and water resources planning.

LAND CONSERVATION & DEVELOPMENT COMMISSION & DLCD

Oregon's 1973 Land Use Act (Senate Bill 100) created the Land Conservation and Development Commission (LCDC) and its administrative arm, the Department of Land Conservation and Development (DLCD), which implements the Commission's policies. The Act charged LCDC with the responsibility for developing statewide Goals and Guidelines for coordinated comprehensive planning and related actions of all levels of government. (ORS 197.230)

The Act requires that each city and county develop a coordinated comprehensive plan, zoning, and subdivision ordinances which are in conformance with the adopted Goals and Guidelines. State agency and special district plans and actions must also conform with the Goals and local comprehensive plans.

Other functions of LCDC as set forth under SB 100 are to:

- Review plans for conformance with statewide Goals;
- Hear and resolve appeals regarding possible conflicts of plans or actions with statewide Goals;
- Issue permits for activities of statewide significance;
- Recommend to the legislature areas to be designated as areas of critical concern and plans for the management of those areas;
- Coordinate planning efforts of state agencies to assure conformance with statewide Goals and local comprehensive plans; and
- Insure citizen involvement in all phases of the process.

Goals and Guidelines

To guide comprehensive planning, the 1973 Act directed LCDC to adopt planning Goals and Guidelines which carry the full authority of the State to achieve the purposes of the Act. Guidelines are suggested directions that would aid in achieving the mandated Goals. They are intended to be instructive, directional, and positive; but they do not limit governments to a single course of action when some other course would achieve the same result. The Goals and Guidelines are to be used by state and federal agencies, cities, counties, and special districts in preparing, adopting, revising, and implementing comprehensive plans. The Goals, and the

process for identifying, developing, approving, and implementing these Goals, form the foundation for Oregon's land use management activities, as well as for compliance with the requirements of the Coastal Zone Management Act.

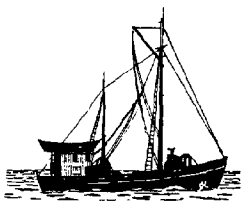
In December, 1974, LCDC adopted 14 planning Goals and supporting Guidelines which apply to the entire state. The first two goals are procedural and refer to citizen involvement and land use planning. The remaining Goals address specific resource elements or uses: agricultural and forest lands; open spaces, scenic and historic areas, and natural resources; air, water, and land resources quality; areas subject to natural disasters and hazards; recreational needs; economy of the State; housing; public facilities and services; transportation; energy conservation; and urbanization. These Goals apply to all areas of the State, including the coast. In 1975, a fifteenth goals was adopted that pertained only to the Willamette Greenway.

In December, 1976, four additional planning goals were adopted that relate specifically to the coastal area. These goals supplement the original fourteen goals by addressing, with greater specificity, the particular needs and problems of the Oregon coast. The coastal goals address estuarine resources, coastal shorelands, beaches and dunes, and ocean resources. The coastal goals and guidelines form the basis for compliance with two requirements of the Coastal Zone Management Act of 1972, establishing priorities of use for areas within the coastal zone, and identifying areas of particular concern.

Coordinated Comprehensive Plans

Senate Bill 100 sets forth as legislative policy the necessity for properly prepared and coordinated comprehensive plans. These comprehensive plans, which are expressions of public policy, establish the basis for specific local government rules, regulations, and ordinances, which must be consistent with and designated to implement the individual plans. Procedures exist for reviewing and, as necessary, revising the comprehensive plans to keep them consistent with the changing needs and desires of the public.

The completed plan will serve as the single, common basis for decisions regarding conservation and development in that area. In order for plans to be adequately coordinated and considered complete, city, county, state and federal agency, and special district plans and interests must be incorporated into and be consistent with the comprehensive plans.



- National Fisherman

DEPARTMENT OF ENVIRONMENTAL QUALITY

The Department of Environmental Quality has the responsibility for regulating the following areas of ORS Chapters: (ORS Ch. 454) Sewage Treatment and Disposal Systems; (ORS Ch. 459) Solid Waste Control; (ORS Ch. 467) Noise Control; and (ORS Ch. 468) Air and Water Quality.

DEQ regulates environmental quality concerns through a Permit System which sets forth the criteria of conditions by which "point sources" of pollution (air, water, solid waste, noise and sewage pollution) are to meet state standards. The Department also plays a role in the state's review of Corps of Engineers permit requests.

WATER RESOURCES DEPARTMENT

The Water Resources Department consists of the Water Policy Review Board, the Water Resources Director and employees or assistants.

The Water Policy Review Board is composed of seven (7) members appointed by the Governor, under ORS Chapter 536. One (1) member is appointed from each of the four (4) federal congressional districts and three (3) members from the state at large. ORS Ch. 536 also establishes the Board's responsibility for establishing the State of Oregon's water program.

Under the various .subchapters of ORS Ch. 536, the Board has the following responsibilities and areas of authority:

- Develop policy statements, plans and programs, for all water resources of the state;
- Designate exact land areas in the policy statement as Flood Plan Areas for future reservoir sites;
- Distribute policy statements to all affected state agencies and organizations before the policy is approved by the Board;
- Classify water as to highest and best use and quantity of use, enforce laws concerning loss of water rights and prescribe preferences for particular future uses;
- Promulgate rights to withdraw unappropriated waters from appropriation. Establish procedures and conditions for withdrawal of water from appropriation.

Under ORS Chapters 536, 537, 538 and 539 and associated subchapters, the Board is responsible for the appropriation and adjudications of ground water as well as the determination of water rights initiated prior to the February 24, 1909, law requiring a permit to appropriate water.

ORS Chapter 540 and associated subchapters authorizes the Board to provide for changes in use of water, the transfer and abandonment of water rights, and the responsibility for the protection of existing water rights.

The Water Resources Department under ORS Chapter 537 is responsible for preparing and administering Well Contractor's License Exams, Well Drilling Machine Operator's License Exams and for receiving and reviewing Well Log Records from any person constructing or altering wells within the State. A copy of such log shall be received by the Department within 30 days of completion of the construction or alteration.

ORS Chapters 540 & 542 provides the Department with the authority and responsibility for the supervision over construction of all dams in Oregon for the assurance of their safety. Also, the Department is authorized to make surveys, investigations and prepare plans, specifications, estimates and other data necessary to accomplish the purposes of the Watershed Protection and Flood Prevention Act.

The Water Resources Department Director, under ORS Chapter 537 has the responsibility to initiate proceedings for the determination of a critical ground water area on his own motion, discretion, or upon receipt of petition, whenever he finds that the ground water level, supply or purity is below accepted standards.

The Director shall issue an Order defining the Critical Ground Water Area Boundaries and control provisions closing the area to further development and ground water use.

DEPARTMENT OF FISH AND WILDLIFE

Under ORS 496.012, the Department is directed to manage, propagate and research fish and wildlife to provide the optimum recreational and aesthetic benefits for present and future generations of the citizens of the state. In addition, the new Department has assumed the duties of the old Fish Commission to conduct research and, where appropriate, manage fishes of Oregon.

Most of this Department's input in controlling activities in Oregon's estuaries is achieved by providing concerns and recommendations to those state and federal agencies that do have statutory authority to regulate activities. For example, the Division of State Lands regulates fill and removal, the Department of Environmental Quality regulates water quality, the Water Resources Department regulates water uses, the Land Conservation and Development Commission, cities and counties regulate land use, and Corps of Engineers regulates fill, removal and structures. These agencies, by law, must coordinate their decisions with the Department and for the most part, consider their recommendations in making decisions. In the administration of the state's fill and removal law, the Department's recommendation is most often the state's position, as finalized by the Division of State Lands.

DEPARTMENT OF TRANSPORTATION

The D.O.T. has the responsibility and authority as outlined in ORS Chapter 184.610 to develop and maintain a state transportation policy and a comprehensive, long-range plan for a multimodal transportation system for the state, which encompasses economic efficiency, growth, safety and environmental quality. The plan shall include, but not be limited to, aviation, highways, mass transit, pipelines, ports, rails & waterways. The Transportation Commission has the responsibility to coordinate and administer such programs. It is the recipient of all federal funds paid to or to be paid to the state to provide the programs and services assigned to the Department.

DOT, Parks and Recreation Division, is empowered to purchase, develop and manage state parks. It is the overseer of the state's network of parks, waysides, access points, botanical gardens, etc. It provides areas for recreation as well as research and preservation of historic sites and unique natural areas.

ECONOMIC DEVELOPMENT COMMISSION

Under ORS Chapter 184 and associated subchapters, the Commission is authorized to:

- Establish a comprehensive policy and plan for the balanced economic and community development of the State of Oregon which will preserve and enhance all facets of Oregon's economy and environment and which will give particular recognition to the needs, problems and resources of the rural and under-developed areas of the state.
- Define priorities necessary to implement this policy and plan, and proceed with the immediate implementation thereof.

The Department of Economic Development is to act as the state's official liaison agency between persons interested in locating industrial or business firms in the state and to coordinate authority that the Department is serving as state coordinator for the Clatsop Counties Overall Economic Development Program planning.

Recent legislation has transferred the Ports Division to the Department of Economic Development. This division is established to be the state-wide coordinating, planning and research agency for all ports and port authorities in this state to insure the most orderly, efficient and economical development of the state port system.

Syngnathus griseolineatus Bay Pipefish



- Ron Pittard - Searep Studio, courtesy Clatsop County

STATE LAND BOARD AND DIVISION OF STATE LANDS

The State Land Board and their administrative agency, the Division of State Lands, are authorized under ORS Titles 274 and 541 and associated subchapters.

The State Land Board, composed of the Governor, the Secretary of State and the Treasurer, act for the State as owners and stewards of the submerged and submersible lands of all navigable streams and lakes in this state now existing or which may have been in existence in 1859 when the state was admitted to the Union, or at any time since admission, which have not become vested in any person.

Under the authority of ORS Title 274 the State Land Board also receives compensation for private use of the waterway. Uses subject to royalty fees or leasing include sand and gravel royalties, oil and gas leasing and general waterway surface-use leasing.

The Division of State Lands, under ORS 541 and associated subchapters, has permit authority for fill and removal of 50 cubic yards or more of material in waterways up to the line of non-aquatic vegetation, (the Fill and Removal Law). The law stresses that the navigational, recreational and biological aspects of waterways, under which the Division has the responsibility to coordinate the State Resource Agency's review of the Corps of Engineers permit application for any alteration and construction activities in navigable waters, maintain priority of consideration.

INTERGOVERNMENTAL COORDINATION DIVISION

Under ORS Title 190 and associated subchapters, the Intergovernmental Relations Division of the Executive Department has been designated the coordinating authority of the State's "one-stop" permit system and to serve as the "State Clearinghouse" in the A-95 review and comment process. The "one-step" system has three essential elements:

- A central information service for state permits, licenses, fees or certifications.
- An optional one-step review. Rather than contacting state agencies independently, an applicant may, instead, get in touch with the Division. Anyone needing two or more state permits for a new project may submit a master application, which the division will circulate to all state permit-issuing agencies for comment. After 30 days, the division will forward to the applicant the specific permit application and regulations for required permits.
- If hearings are required, both the applicant and the agencies may ask for a consolidated hearing.

This program coordintaes all the regulatory programs of the state, which distinguishes it from the Washington Master Application Program which deals only with Environmental programs.

DEPARTMENT OF ENERGY and ENERGY FACILITY SITING COUNCIL

The Oregon State Department of Energy and Energy Facility Siting Council were created under ORS Chapters 469.030 and 469.450.

The Department of Energy operates under the supervision of the director who is appointed by the Governor, subject to confirmation by the Senate, and serves at the pleasure of the Governor. The Department's responsibilities include: collecting data on energy resources; providing information to the public about energy problems and methods of conserving energy resources; research; serving as a clearing house for energy research; preparing contingent energy programs to include all forms of energy not otherwise provided (pursuant to ORS 757.710 and 757.720); maintaining an inventory of energy research projects in Oregon; and compiling and analyzing energy statistics, data and information.

The Energy Facility Siting Council consists of seven public members, appointed by the Governor and confirmed by the Senate. The Council's major duties are to:

- Conduct and prepare studies, investigations, research and programs relating to all aspects of site selection;
- Conduct public hearings for the purpose of designating sites for energy facilities;
- Adopt safety standards and promulgate rules for operation of all thermal power plants and nuclear installations;
- Establish programs for monitoring the environmental and ecological effects of the construction and operation of thermal power plants and nuclear installations.

The Council also has jurisdiction over transmission lines, pipelines, power plants and shore facilities for energy raw materials.

STATE MARINE BOARD

The Oregon State Marine Board has the responsibility for enforcing all laws pertaining to the use of watercraft used, or capable of being used, as a means of transportation on the water, as outlined in ORS Chapter 488.011, excluding: airplanes capable of landing on the water; foreign boats operating temporarily in the waters of this State; a boat owned and operated by the United States, a state, or an entity or political subdivision of the United States or a state, except recreational public vessels; and any other vessel exempted by law.

The board is also responsible under ORS Chapter 488-875 for the distribution of funds foi boating facilities and establishing priorities on applications, based on water pollution controls and general enhancement of the water quality.

CITIES

Cities are general purpose units of government and carry out the duties usually associated with such public corporations, including activities related to public safety, public transportation, utilities, parks and recreation, public works, enforcement of building regulations, and planning. Cities are empowered to undertake planning activities including the establishment of zoning regulations through their general police powers under the state constitution, RCW Chapter 35.63 relating to municipal planning commissions, and provisions within individual city charters. Cities are also allowed to join regional planning organizations and may establish boards of adjustment.

Cities have the same authority granted to counties under the Shoreline Management Act of 1971. None of the cities in Washington that border the estuary have used this authority.

COUNTIES (PACIFIC, WAHKIAKUM)

Pacific and Wahkiakum Counties are political subdivisions of the State of Washington. As general purpose units of government, they can carry out the duties usually associated with such public corporations, including activities related to public safety, public transportation, utilities, parks and recreation, public works, enforcement of building regulations and planning.

County authority under the Shoreline Management Act, the State Environmental Policy Act, the Environmental Coordination Procedures Act are discussed under the Department of Ecology.

The State's Planning Enabling Act (RCW Chapter 36.70) provides for the appointment of county planning commissions and boards of adjustment and sets forth requirements and grant authority for long-range planning and environmental controls. Planning commissions, once created, are required to prepare a comprehensive plan consisting of at least a land use element and a circulation element, with appropriate supporting documents, which are to be submitted to the county legislative body by law, though in most counties, commission recommendations are accepted in about 90 percent of the cases. The Planning Enabling Act also authorizes counties to establish certain land use controls, the most important of which are zoning ordinances.

Pacific County has zoned its lands that border the Pacific Ocean, the Columbia River, and Willapa Bay. The balance of that county is unzoned. Wahkiakum County is not zoned.

PORT AUTHORITIES

Ports are authorized under RCW Chapter 53.08, to promote maritime commerce. The Public Port District Act, since its inception, has been expanded to permit activities ranging from industrial development to marinas for recreational boating to airports.

A port district is an autonomous unity of local government (defined as a municipal corporation by statute) governed by a board of commissioners. Port districts are created by a vote of the people in the area to be served.

Funds to support activities are derived from operating revenues (leases, tariff fees, landing fees, docking charges, etc.), property taxes, and general obligation and revenue bonds.

COUNCILS OF GOVERNMENT

The Pacific County Regional Planning Council has, among its members, three CREST member governments; Pacific County, the City of Ilwaco and the Port of Ilwaco.

The Cowlitz-Wahkiakum Governmental Conference has two CREST members, the City of Cathlamet and Wahkiakum County.

Within the authority of RCW 36.64.080 regional planning agencies can provide planning coordination among local units of government, develop regional plans, provide specific planning assistance to member governments, and meet the objectives of various federal laws and regulations relating to interlocal planning and coordination. For example, Cowlitz-Wahkiakum Governmental Conference is presently assisting Wahkiakum County in preparing a comprehensive plan.

These regional councils of government serve as local "clearinghouses" in the A-95 review process. As such, it is their responsibility to circulate requests for federal assistance to their members and solicit their review and comments.

Besides participating actively in the A-95 review process, regional councils also provide the framework for the development or comprehensive regional plans as well as area-wide plans for such things as water and waste management, parks and recreation, and transportation.

DEPARTMENT OF ECOLOGY

The DOE is composed of the consolidated transferred authorities of three state agencies — Water Pollution Control Commission, Department of Water Resources and the Air Pollution Control Board and the solid waste program of the Department of Health. This consolidation vests in the Department responsibility for programs in three areas: 1. water resources (Act of 1971; 2. water pollution control (Act of 1973); and 3. air quality (Washington Clean Air Act of 1973). Since its formation, the DOE has been given two additional major functions—shoreline management and responsibility for the administration of the State Environmental Policy Act. These functions are discussed below:

Water Resources: Concerns are the allocation of surface and ground water rights; weather modification certificates and permits; adjudication of water rights; reclamation project funding; flood control; preparation of a state water plan; water rights claims registrations; establishment of minimum flows and levels in lakes and streams; and inspection of dams for safety.

Water Pollution Control: Program handles waste discharge permits for industrial and commercial operations; sewage drainage basin planning; pollution control tax credits for industries; certification and disbursement of state and federal funds for local sewage treatment projects; regulatory orders, civil penalties and damage claims; surveillance and monitoring; and oil spill investigation and clean-up.

Air Quality Control: Establishes and enforces air purity standards; provides technical training; and coordinates regional, state and federal programs from a technical and financial standpoint.

State Environmental Policy Act (SEPA): This act is patterned after the National Environmental Policy Act (NEPA). SEPA outlines a systematic and interdisciplinary approach to studying and evaluating proposed actions. This approach is required of all state agencies prior to undertaking actions that may have impacts upon man's environment. SEPA's goal is to stop further independent actions by different agencies, each of which has a different mission, and require that they work together toward the accomplishment of both their own missions and environmental protection and enhancement.

Under the SEPA approach, an environmental impact statement is to be prepared for every recommendation or report on proposals for legislation and for "other major actions significantly affecting the quality of the environment." The information contained in those statements is to include: 1) the environmental impact of the proposed action; 2) any unavoidable adverse environmental effects; 3) alternatives to the proposed action; 4) relationships between local short-term uses of the environment, and maintenance and enhancement of long-term productivity; and 5) any irreversible and irretrievable commitments of resources that would be involved if the proposed action were to be implemented (RCW 43.21C.030[2] [C]).

Nothing in SEPA diminishes or alters an agency's authority to implement action. It merely requires the SEPA process of study and evaluation take place prior to such action.

Shoreline Management: The Shoreline Management Act of 1971 requires and defines a planning program and a regulatory permit system, both of which are initiated at the local level under state guidance. The planning program for each local government consists of a comprehensive shoreline inventory and a master program for the regulation of shoreline uses. The inventory covers existing land and water uses, generalized ownership patterns, and natural shoreline characteristics. The master program utilizes the inventory information and is essentially a comprehensive land use plan with a distinct environmental orientation. The master program includes basic goals and objectives, the designation of all shoreline areas into a categorization system, and specific regulatory language. The entire planning function is conducted in conformance with guidelines prepared and adopted by the Department of Ecology (DOE). The resulting local master programs are subject to state review and approval and are then adopted as state regulations. The regulatory permit system is overseen by a state administrative appellate body created for the purpose by the Act.

The management program established in the Shoreline Management Act applies to all "shorelines of the state," including both "shorelines" and "shorelines of statewide significance." In a nutshell, the Act applies to all marine water areas of the state, to streams with a mean annual flow of 20 cubic feet per second or more, and to lakes larger than 20 acres. It also applies to adjacent land areas extending landward 200 feet from the ordinary high water mark and to all marshes, bogs, swamps, floodways, river deltas, and floodplains associated with water bodies subject to the Act.

Environmental Coordination Procedures Act: The Environmental Coordination Procedures Act was passed in 1973 to simplify procedures by giving an applicant for certain environmental permits the option of submitting a Master Application form for certain environmental permits. If an applicant elects to take advantage of this service, the Department of Ecology will act as a permit coordinator and will assist from the beginning through final disposition of the application.

Upon receipt of the application, the Department of Ecology will distribute copies to the appropriate state agencies. Concerned agencies must then respond within 15 days to the DOE, who will notify them regarding agency requirements and will provide the necessary forms.

If one or more of the agencies involved should decide that a public hearing is required, only one public hearing will be held for all involved agencies.

The DOE incorporates all agency decisions into one document which incorporates the final decision of all agencies.

The Master Application approach is especially useful to the applicant who is unfamiliar with state regulations.

PLANNING AND COMMUNITY AFFAIRS AGENCY

Under RCW 43.63A, the Planning and Community Affairs Agency has been charged with responsibility for preparing a:

> "State comprehensive plan as the state's long-range public declaration of intent in developmental policy, for programming its facilities and services and for guidance of private activities and public programs at all levels of government."

The elements of this plan include: "transportation, scenic highways, public facilities, recreation, open spaces, natural resources, patterns of urban and rural development, and quality of the natural and manmade environment" (RCW 43.63A.070). No regulatory powers were provided under this statute. The PCAA was also given responsibility for assisting local governments in their planning and for encouraging coordination of local planning programs with each other.

OFFICE OF PROGRAM PLANNING & FISCAL MANAGEMENT

The Office of Program Planning and Fiscal Management has been given broad authority (under RCW 43.41) including many of the same planning functions as the Planning & Community Affairs Agency. Both have been granted comprehensive planning powers, although the legislation is ambiguous about which of these agencies has precisely what powers.

OPP&FM has been granted authority to perform "comprehensive planning functions and processes necessary or advisable for state program planning and development." Although the act establishing OPP&FM does not specify the elements of the comprehensive plan, it has since been interpreted to grant the following functions to OPP&FM: 1) preparation of general physical plans with respect to the pattern and intensity of land use, 2) programming of capital improvements, 3) coordination of related governmental plans, 4) inter-governmental coordination, and 5) preparation of regulatory and administrative measures to support the above.

OPP&FM is the state's A-95 clearinghouse for state agency applications for federal assistance grants.

PARKS AND RECREATION COMMISSION

The Commission's functions under RCW 43.51 are to supervise and regulate state parks and parkways, make recommendations concerning additions to the system, and study and coordinate the various park/recreation functions exercised by state agencies.

The Commission may select and acquire lands for park purposes. The Commission also has jurisdiction over certain tidelands and trust lands as well as historic properties.

Although the Commission plans the use and acquisition of park and recreational lands, local and federal park operations are left outside their scope.

INTERAGENCY COMMITTEE FOR OUTDOOR RECREATION

The Interagency Committee for Outdoor Recreation (IAC) was established by favorable passage of the Marine Recreation Land Act of 1964 (Initiation 215, Chapter 5, Laws of 1965, RCW 43.99).

The membership of the Committee which was established by the 1964 legislation and amended in 1971, consists of twelve members, including five (5) citizen members who are appointed by the Governor for three year terms, and the directors of the following seven (7) state agencies: The Departments of Commerce and Economic Development, Ecology, Fisheries, Game, Highways, Natural Resources and the Parks and Recreation Commission. By law, the chairman of the committee must be one of the citizen committee members.

The Committee administers designated state and recreation funds provided under RCW 43.99 for eligible state agencies, local political sub-divisions, and Indian tribes for the acquisition and development of outdoor recreation and facilities. The Committee also acts as the state coordinator with the U.S. Department of the Interior, Bureau of Outdoor Recreation, to administer funds allotted to the state from the Federal Land and Water Conservation Fund.

In addition, the Committee has the responsibility and authority to prepare, maintain and update the Statewide Comprehensive Outdoor Recreation and Open Space Plan (SCORP). The Statewide plan is comprehensive in nature and covers all levels of government authorized to provide outdoor recreation opportunities. This includes, insofar as possible, all recreation factors of statewide and local significance, both public and private. The plan provides a total framework to which the specific needs and projected plans of both state and local recreation agencies can be related.

HIGHWAY COMMISSION

The five-member Highway Commission has complete authority within RCW Title 47 over the state-designated highways.

The Department of Highways is headed by a director who is appointed by the Commission. The Department is responsible for the planning, construction, and maintenance of the state's highway system. For administrative purposes, the Department's operations are divided into seven districts.

Only those roads designated by the state legislature are to be a part of the state's highway system. Roads outside incorporated cities and towns which are not included by the legislature as part of the state highway system are county roads and are administered and maintained by the county in which the road is located.

DEPARTMENT OF FISHERIES

In 1932, under RCW Title 75, the State of Washington separated its agencies dealing with food fish and game fish. The Department of Fisheries was thereby created to protect, propagate and manage fish resources in the waters of the state and offshore waters, with a goal of having stocks retain their capacity to produce at the highest levels. The Department manages 139 species of fish, including shellfish. The annual gross product value from the harvest of these species amounts to $100 million.

The Department is organized into seven divisions: Administrative services, Management and research, Engineering and construction, Hatcheries, Fisheries patrol and enforcement, Stream improvement, and Program planning and coordination.

The director is empowered to set rules and regulations to control the commercial and sports harvest and protect stocks. The long range goal is to make available to the people of Washington the maximum economic, recreational and aesthetic use and benefit of the food fish resources of the state.

Specific goals of the Department include: 1) Management of recreational fisheries in such a way that the current rates of fishing success continue for an expanding population; 2) Provision of a continuing supply of salmon, marine fish and shellfish in order to provide an adequate livelihood for those engaged in commercial fishing and related activities; and 3) Provision for the increased participation of Indian fisheries in the commercial fish harvest.

DEPARTMENT OF GAME

The Washington Department of Game (WDG) is charged by state statute, RCW Title 77, with preserving, protecting and perpetuating wildlife and game fish resources of the state. The Department is also involved through Fish and Wildlife Coordination Act, Federal Power Act, National Environmental Policy Act, Coastal Zone Management Act, State Environmental Policy Act, Shorelines Management Act, Hydraulics Approval Act, and other laws and regulations in planning, coordination and occasionally regulation of most activities listed as impacting the estuary.

DEPARTMENT OF NATURAL RESOURCES

The Washington State Department of Natural Resources is administered by the Commissioner of Public Lands, an elected official, and operates under the guidance of the Board of Natural Resources.

Under RCW 43.30, the Department was created to manage all state-owned lands, including one million acres of state tide and shore lands, harbor areas and beds of navigable waters. Under its governmental function the Department protects state, federal and private forest land from fire and insect infestations, promotes maximum forest growth, polices the transportation of logs in navigable waters, promotes techniques of surveying and mapping, promotes use of mineral resources and provides for outdoor recreation on state lands.

Marine lands are considered a public trust to be managed for the maximum public benefit. Revenue is not necessarily the prime management tool.

REGIONAL

CO-PAC & NORTH COAST RESOURCE CONSERVATION & DEVELOPMENT COMMITTEES

Resource Conservation and Development projects are locally initiated efforts to provide improved use and conservation of natural resources. The make-up of RC&D committees varies from place to place, but generally they encompass an area of two or more counties and have a membership of elected and appointed officials, with interested citizens serving on resource committees.

The USDA Soil Conservation Service has been given administration responsibility for initiating and directing the RC&D projects. An RC&D can provide technical, financial, and loan assistance for resource conservation and development activities that have community benefits. Project measures are initiated, reviewed or promoted by RC&D Resource Committees.

COLUMBIA RIVER ESTUARY STUDY TASKFORCE (CREST)

The CREST role is completely explained in sections 74 and 76-78 above. The major planning role in each area consists of assisting local jurisdictions implement the *Regional Management Plan*, developing plan revisions, and providing technical assistance. CREST's implementation role involves assisting local jurisdictions and developers: CREST has no funding or regulatory role.

PACIFIC NORTHWEST REGIONAL COMMISSION

The Pacific Northwest Regional Commission (PNRC) is one of the seven multi-state Commissions established and funded pursuant to Title V of the Public Works and Economic Development Act of 1965, as amended. The Commission is a Federal/State partnership whose purpose is to initiate, coordinate and implement Regional plans and programs

to improve the overall economic well-being of the three-state area of Idaho, Oregon and Washington.

The PNRC consists of four members: The three Governors of Idaho, Oregon and Washington, who represent the interest of their respective states, and a Federal Representative appointed by the President.

Since its inception on December 11, 1972, the PNRC has focused its development efforts on: energy, forest productivity, tourism trade expansion and natural resource development. The Commission seeks to enhance the economic well-being and quality of life of the people of the Pacific Northwest.

PACIFIC NORTHWEST RIVER BASINS COMMISSION

The River Basin Commission is a Federal Interstate Compact organization established by Executive Order of the President in 1967 (79 Stat. 244, 42 USC 1962 et seq) under authority in the Water Resources Planning Act of 1965. The jurisdiction of the Commission is generally the area within Oregon, Washington, Idaho, Montana and Wyoming that drains into the Columbia River system and the coastal drainages of Oregon and Washington. Its members are made up of representatives from the above states, as well as representatives from a number of federal agencies concerned with water and related resources development.

The Commission's authority, granted under the Water Resources Planning Act is to:

- Coordinate federal, state, interstate, local, and non-governmental plans for water and related resource development within its jurisdiction;
- Prepare a coordinated plan for water and related resource development;
- Recommend long-range prioities for the collection and analysis of basic data and for investigation, planning and construction of projects; and
- Foster and undertake water and related land resources studies as needed.

The Commission at its meeting on December 4, 1975, adopted a report describing its future role as follows:

- Continued service as a form for energy planning, including assistance to the Energy Research and Development Administration and its consultants;
- Assistance in the determination of instream flows and development of control measures and the coordination of activities of various interests and studies to arrive at an agreed-upon plan and follow-up for implementation;
- Coordination of land use studies involving urban growth pressures, land area requirements, determination of key areas for regulation, development of alternative growth patterns and others;
- Coordination among various entities involved in water quality management;
- Provide an interface between studies of fisheries and follow through to insure that a comprehensive management plan for the anadromous fishery of the Columbia River and tributaries is developed and implemented, a plan which does not now exist;
- Coordination and assistance in forming interim management plans for the Columbia River estuary which would be followed by studies leading to a more complete management program to be refined and updated in subsequent years;
- Coordination of Canadian-United States water problems of the Okanogan-Methow, Kootenai and Flathead River Basins;
- Coordination of recreation master planning activities providing, among others, for the use and management of public lands and resources on Columbia River, following the theme "Stewards of the River," a concept which recognizes the river's diverse cultural, historical, geological, aesthetic and recreational values;
- Submission of a priorities report beginning in 1977, using the comprehensive, coordinated joint plan and state water plans as a basis.

FEDERAL

CORPS OF ENGINEERS
Department of Army

Activities undertaken by the Corps of Engineers can be broadly classified as: a) engineering responsibilities, like construction, operation, maintenance of levees, harbors and waterways, and the removal of sunken vessels and floating debris endangering navigation; b) regulatory functions; and c) research and planning activities such as conducting flood plain information studies, predicting flood occurrences, and planning for regional water resources management. The Corps serves as the federal government's primary regulatory agency, under the River and Harbor Act of 1899, Sec. 10, in the use and development of the navigable waters of the United States. It issues permits to private parties and public agencies to fill, dredge, or build in, on, over, or beneath navigable waters. Corps approval is also required for the transport of dredged material for the purpose of dumping into ocean waters.

Under administrative procedures established by the Corps in compliance with the Federal Water Pollution Control Act, applicants must obtain all re-

quired state approvals prior to the final granting of Section 10 or Section 404 permits. These approvals include the state water quality, certification called for under Section 404 of the FWPCA and will include certification that projects meet requirements of the state's coastal zone management program. The only exceptions are in the case of special national interests or when a state does not act in a timely manner in conducting its review.

NOAA & OFFICE OF COASTAL ZONE MANAGEMENT
Dept. of Commerce

In Public Law 92-583, Congress designed a method to stimulate state leadership in planning and management of the coastal zone. The Act encourages a new partnership among various levels of government, through which each may exercise its unique management capabilities.

The law is administered by the Secretary of Commerce, who determines whether federal approval, when sought by a state, should be given to that state's management plan. Responsibility for implementing the Act is delegated to the Commerce Department's National Oceanic and Atmospheric Administration. Within NOAA, this is carried out by the Office of Coastal Zone Management.

Three types of grants are offered under the Act. The first two, under Section 305 and Section 306, deal with planning and management. The third grant can be used to set up estuarine sanctuaries as natural field laboratories to be used for education and research. Oregon anticipates completing its Coastal Zone Management Program under Section 305 by late spring or summer of this year. Washington has completed its work under Section 305 and has received federal approval of its Coastal Zone Management Program.

Approval of the Section 305 CZM programs is an important step for the states. The Act directs federal agencies to adapt their activities within a state to be consistent to the "maximum extent practicable" with the state's intentions, as set out in an approved management program. Furthermore, it qualifies the states to receive Section 306 grants, which are presumed to have a higher level of funding.

NATIONAL MARINE FISHERIES SERVICE
Department of Commerce

Major responsibilities of the NMFS are to help the fishermen through fisheries research, analysis of economic aspects of fisheries operations and rates and the development of new methods for improving fish.

Title 16, Chapter 9, U. S. C. authorizes the NMFS under direction of the National Oceanic and Atmospheric Administration to engage in a number of programs that directly affect the Columbia River Estuary. Their Columbia River Fisheries Development Program is designed to restore and enhance runs of salmon and steelhead in the Columbia which have been affected by dam construction.

In addition, NMFS routinely advises the Corps of Engineers on permits for dredging, bank stabilization programs and other alterations and constructions covered by the Corps Section 10 permit authority.

BUREAU OF LAND MANAGEMENT
Dept. of Interior

Under Public Law 94-597 (90 Stat. 2743), the Bureau of Land Management is responsible for the management of the national lands and their resources. It also administers the mineral resources connected with acquired lands and submerged lands of the Outer Continental Shelf.

Resources managed and leased by the Bureau include timber, minerals, geothermal energy, wildlife habitat, livestock forage, recreation and cultural values, and open space. The Bureau also manages watersheds to protect soil and enhance water quality; develops recreational opportunities on national resource lands; and makes land available through sale to individuals, organizations, local governments, and other federal agencies when such transfer is in the public interest.

BUREAU OF OUTDOOR RECREATION
Dept. of Interior

As outlined in 16 U.S.C. No. 4602, the Bureau is responsible for coordination and development of effective programs relating to outdoor recreation. The bureau carries out most of the responsibilities delegated to the Secretary of the Interior under the Land and Water Conservation Fund Act of 1965, as amended. Under that Act, the Bureau administers a program of financial assistance grants to states and their political subdivisions for comprehensive planning, land acquisition of federal lands and water areas for recreational purposes; and the Bureau participates directly in the planning, coordination, and establishment of uniform policies relating to recreation and fish and wildlife benefits and costs of federal multi-purpose water resource projects.

Under the National Environmental Policy Act, the Bureau reviews federal actions having an impact on outdoor recreation.

U.S. FISH & WILDLIFE SERVICE
Department of Interior

As outlined in the Fish and Wildlife Act of 1956 (70 Stat. 1119), the Fish and Wildlife Service is responsible for the protection of wild birds, mammals (except certain marine mammals), inland sport fisheries, and for conducting specific fishery research activities. The Fish and Wildlife Service guides the conservation, development, and management of the nation's fish and wildlife resources and administers a national program which provides

opportunities to the American public to understand, appreciate, and wisely use these resources. Extensive coastal zone involvement is required of the Fish and Wildlife Service in order to manage wildlife refuges and process Corps of Engineers and related permits.

In the Columbia River Estuary area, the Fish and Wildlife's Bureau of Sport Fisheries and Wildlife manages two refuges, the lewis and Clark National Wildlife Refuge and the Columbian White-Tailed Deer National Wildlife Refuge.

The U.S. Fish and Wildlife Service is the principal agency through which the Federal Government carries out its responsibilities for conserving the nation's wild birds, mammals and fish for the enjoyment of all people.

Under the Fish and Wildlife Act of 1956, and the Fish and Wildlife Coordination Act of 1934, the Service has direct responsibility for migratory birds, and indirect responsibility for resident fish and other wildlife. The primary responsibility for management of resident wildlife species rests with the states. Under these acts, the Service is also responsible for the wild birds, mammals (except certain marine mammals), sport fishing and for conducting specific fishery and wildlife research activities, management of wildlife refuges, processing Corps of Engineers and other agency permits, and coordinate fish and wildlife aspects of Federal water resource projects and activities.

Under the Endangered Species Act, the Fish and Wildlife Service is responsible for the conservation and enhancement of certain species of animals, plants and their habitats. The Fish and Wildlife Service manages two refuges within the Columbia River Estuary area; the Lewis and Clark National Wildlife Refuge, and the Columbian White-tailed Deer National Wildlife Refuge.

The Fish and Wildlife Service also works under the following additional acts pertinent to the Columbia River Estuary Area: Estuary Protection Act; Migratory Bird Treaty Act; the Anadromous Fish Conservation Act; Coastal Zone Management Act of 1972; National Environmental Policy Act; the Water Resources Planning Act; and the Federal Water Pollution Control Act of 1972.

ENVIRONMENTAL PROTECTION AGENCY
Executive Branch

The Environmental Protection Agency was created by Executive Order 1170 in 1970 under the National Environmental Policy Act of 1969 to permit coordinated and effective governmental action on behalf of the environment. EPA endeavors to abate and control pollution systematically, by proper integration of a variety of research, monitoring, standard setting, and enforcement activities. As a complement to its other activities, EPA coordinates and supports research and antipollution activities by state and local governments, private and public groups, individuals, and educational institutions. EPA also reinforces efforts among other federal agencies with respect to the impact of their operations on the environment, and it is specifically charged with making public its written comments on environmental impact statements.

EPA is active in the following areas:

Air and waste management: This includes development of national programs, technical policies, and regulations for air pollution control; development of national standards for air quality, emission standards for new stationary sources, and emission standards for hazardous pollutants; technical direction support, and evaluation of regional air activities; and provision of training in the field of air pollution control.

Water and hazardous materials: The function of this program includes development of national programs, technical policies, and regulations for water pollution control and water supply; water quality standard and effluent guidelines development; technical direction, support and evaluation of regional water activities; development of programs for technical assistance and technology transfer; and provision of training in the field of water quality. The activities include regulation of pesticides.

WATER RESOURCES COUNCIL
Executive Branch

The Water Resources Council was established under Statute No. 244, 42 U.S.C. et seq. om 1962, to maintain a continuing study of the adequacy of supplies of water necessary to meet the requirements in each water resource region in the United States to coordinate the relationship of regional or river basin plans and programs to the requirements of larger regions of the nation and check for the adequacy of administrative and statutory means for the coordination of the water and related land resources policies and programs of the several federal agencies. The Counsil also reviews the plans of the river basin commissions and transmits these plans with its recommendations to the President for review and his transmittal to Congress. The Council administers a program of federal financial grants to states to aid them in comprehensive water and related land resource planning.

COAST GUARD
Department of Transportation

The Coast Guard was transferred from the Treasury Department to the Department of Transportation under Public Law 89-670 (80 STAT. 931) on October 15, 1966, but is also a branch of the Armed Forces and operates as a part of the Navy in time of war or when the President directs. The Coast Guard enforces or assists in the enforcement of all federal laws upon the high seas and waters subject to U.S. jurisdiction; promulgates and enforces regulations for the promotion of water safety; assists in the enforcement of water pollution and oil spill regulations; develops, maintains, and operates aids to maritime navigation, ice-breaking facilities, and rescue facilities; and maintains a readiness to func-

tion as a specialized service in the Navy in time of war.

The Coast Guard, for example, would play a major role in the areas of safety and water pollution control if out-of-service tankers are stored in the Lois Island, Tongue Point Basin.

FOREST SERVICE
Department of Agriculture

The U.S. Forest Service has the Federal responsibility for national leadership in "forestry". This responsibility is derived from two acts: The Creative Act of 1891 (86 Stat. 1103; 16 USC 471) which established the authority for the President of the United States to set aside public lands as public reservations and; The Organic Administration Act of 1897 (30 Stat. 34, as amended; 16 USC 473-478, 479-482, 551) which established authority for the Secretary of Agriculture to manage the National Forests.

Although there are more than 140 Federal laws defining various Forest Service authorities, the two most recent legislative acts that significantly affect Forest Service programs for State and Private Forests are: (1) The Forest and Rangeland Renewable Resources Planning Act (RPA), (PL 93-378, 1974) which provides for long-range planning in managing the Nation's renewable resource. It requires the Secretary of Agriculture to make a periodic assessment of forest and rangeland resources; public and private. It calls for Forest Service Programs to meet future needs; (2) The National Forest Management Act, (P.L. 94-588, 1976) amends RPA; and specifies certain National Forest Management direction, emphasizes research and cooperation with state and local governments and private landowners. Under this mandate the Forest Service can provide funds and technical assistance to private owners. The Forest Service also provides active technical assistance through RC&D (Rural Conservation and Development) programs.

SOIL CONSERVATION SERVICE
Department of Agriculture

The Soil Conservation Service (SCS) was established by the Soil Conservation Act of 1935 to provide for the protection of land resources against soil erosion and for other related purposes.

SCS is responsible for developing and carrying out a national program of conservation of soil, water and related resources. Programs administered by SCS include basic soil and water conservation, watershed protection, flood prevention, cooperative river basin surveys and investigations, Great Plains Conservation, resource conservation and development, and others as assigned by the Secretary of Agriculture.

PART VIII

APPENDICES

APPENDIX A,	SELECTED GLOSSARY	VIII - 3
APPENDIX B,	OREGON GOAL EXCEPTIONS	VIII - 7
APPENDIX C,	CREST CHARTERS	VIII - 21
APPENDIX D,	CREST PROGRAM PARTICIPATION	VIII - 24
APPENDIX E,	STATE AND FEDERAL TECHNICAL ADVISORY COMMITTEES	VIII - 25
APPENDIX F,	HISTORY OF STATE AND FEDERAL AGENCY INVOLVEMENT IN PLAN DEVELOPMENT	VIII - 27
APPENDIX G,	CREST CHRONOLOGY OF MAJOR EVENTS	VIII - 28

APPENDIX A

SELECTED GLOSSARY

(Please note that land and water use designations, classification terms, and all uses and activities covered by this plan are defined in Part III, Sections 31, 32, and 33 respectively. Agencies which play a role in the estuary are defined in Part VII, Section 79).

A

accretion The build-up of land along a beach or shore by natural processes.
advection A local change in a system that occurs in the presence of a current; as sediment transport, salinity intrusion, etc.
aerobic Life processes that require the presence of oxygen. (opp. anerobic)
algae Small plants (usually microscopic) living in ocean, estuary and river water. Algae use sunlight, carbon dioxide, and other inorganic nutrients to produce plant tissue and they are the basis of aquatic productivity.
anadromous Organisms that migrate from the ocean to lower salinity waters to spawn.
aquifer An underground area containing water.
archaeological resources Districts, sites, buildings, structures, and artifacts with material evidence of prehistoric human life and culture. (cf historical resource)
avulsion Rapid erosion of shoreland by storm waves.

B

beach Zone of unconsolidated material extending landward from the low water line to the seaward edge of shoreland vegetation.
beach nourishment Deposition of dredged material to offset shoreland erosion.
bed-load Sand, gravel, or heavy rock fragments that move along the bed of a stream.
benthic Pertaining to organisms occurring at or on the bottom of a body of water.
berm The nearly level barrier shoreward of the face of a beach; a long mound of sediment formed to contain dredged material at a disposal site.
biological potential The ecological characteristics and functions that an area serves or could develop after restoration, habitat creation, or enhancement.

C

canopy The treetop zone in a forest where light is not a limiting factor.
carrying capacity The ability of an ecosystem to support organisms.
channels The deeper areas of the river and estuary that carry most of the flow.
chart datum Datum to which sounding refer. (cf Columbia River Datum, datum, soundings)
clean dredged material Material collected from a dredging project and are uncontaminated according to EPA standards; may include resources such as sand and gravel.
Columbia River Datum Datum established at low water and low flow in 1911 and used for engineering purposes. (cf datum)
community A group of plants and animals occupying a habitat and having close interactions, especially through food chains and webs.
compensate To take an appropriate and counterbalancing action to offset environmental damage caused by a development project or activity.
comprehensive plan A legal document often in the form of a map and accompanying text adopted by the local legislative body.
conserve To manage a resource in a manner which avoids wasteful or destructive uses and provides for future availability.
contour Line on a chart or map connecting land points of equal elevation.
consumer An organism that eats other organisms as a source of energy and nutrients; includes herbivores, carnivores, omnivores.
converter An organism that cannot make its own food, but relies on other organisms (producers or other converters) or their remains for its energy and nutrients.
CREST Planning Area The water and submerged lands of the Columbia River estuary and its tributary streams to tidewater, the associated tidelands, wetlands, and shorelands within Pacific and Wahkiakum Counties in Washington and within Clatsop County in Oregon.
current A horizontal movement of water.

D

data (pl.) Set of facts. (cf datum)
datum (sl.) A fact; a numerical or geometrical quantity that serves as a reference for other quantities. (cf chart datum, Columbia River Datum, datum)
decomposer An organism that breaks down dead plants (litter), dead animals (carrion), or their feces or remains into simpler parts for its nutrition.
deep-water port A port area with a draft of more than 22 feet.
depth curve Line on a chart or map, like a contour, that connects aquatic points of equal depth.

detritus All types of biogenic material in various stages of microbial decomposition. Detritus is an energy source to consumer organisms.
dike A wall or mound built around a low-lying area to prevent flooding or to contain dredged material.
diversity Species richness; the number of separate species living in a specified area.
dominant Having a major role in a community, as of plants or animals, because of number, size, or activity.
dredged material Material removed from submerged lands or wetlands by dredge.
dredged material disposal Disposal of dredged material on land, in the water or at sea.
dredging Removal of earth from the bottom of a body of water, usually for the purpose of deepening a navigational channel or obtaining bottom materials.

E

ecosystem The living and non-living components of the environment which interact or function together, including plant and animal organisms, the physical environment, and the energy systems in which they exist. All the components of an ecosystem are interrelated.
ebb current Movement of tidal current away from shore or downstream.
ebb tide Low tide.
effluent A discharge of pollutants into the environment.
elutriate The water and dissolved substances that are contained between the grains in a sample of dredged material, after free water has been removed from the material.
energy regime The range and variability of tidal, current, wave and wind energy that impinges upon an area over a given period of time. High energy estuarine areas are characterized by coarse sediments, sparse vegetation and lower biological productivity. Low energy estuarine areas are characterized by medium to fine-grained sediments, emergent vegetation and higher biological productivity.
epifauna Aquatic animals living on the surface of bottom sediments.
erosion The removal of soil or sediments by wind or water.
estuary A body of water semi-enclosed by land, connecting with the open ocean, and within which salt water is diluted by freshwater derived from the land.
Estuary Area The water and submerged lands of the Columbia River estuary and its tributary streams, the associated tidelands, wetlands, shorelands and tributary watersheds within Pacific and Wahkiakum Counties in Washington and within Clatsop County in Oregon.
eutrophic Nutrient-rich; characteristic of old or polluted lakes, supporting high biological production.

F

fathom Common unit of depth equal to 6 feet or 1.83 metres.
fill Material such as sand, soil, gravel or rock used for the creation of a beach or dry upland by deposition of the materials into a shoreland or water area.
fixation The process in which gaseous substances, especially nitrogen, are removed from the atmosphere and incorporated into organisms.
flats Intertidal and shallow subtidal areas with low slopes and current velocities, often productive with relatively fine sediments.
flocculation A lumping together of suspended colloidal clay-sized material into a fluffy, slow-settling precipitate. Flocculation occurs in estuaries where fresh and salt water are mixed.
floodplain The area adjoining a stream, tidal estuary or coast that is subject to regional flooding. **A regional (100-year) flood** is a standard statistical calculation used by engineers to determine the probability of severe flooding. It represents the largest flood which has a one-percent chance of occurring in any one year in an area as a result of periods of higher than normal rainfall or streamflows, extremely high tides, high winds, rapid snowmelt, natural stream blockages, tsunamis, or combinations thereof.
flow-lane The natural channel and the slopes adjacent to the natural channel, including the navigation channel.
flow-lane disposal Disposal of dredged material in the flow lane, in a location where the prevailing sediment transport is in a downstream direction.
flushing time The length of time required to remove an introduced pollutant from a body of water through tidal or fresh water flow.
food chain A linear sequence of predators and prey.
food web A model showing nutritional interrelationships of the organisms in a community and depicting the web-like interconnections of numerous food chains; a road map of who eats whom; a complex network of pathways by which energy moves within a biotic community, from producers through all the interconnecting trophic levels of consumers.

H

habitat The place where an organism lives; the place occupied by an entire community, such as a freshwater tidal marsh community.
habitat creation To bring into existence at a particular location a new aquatic or terrestrial habitat.
habitat enhancement To raise the biological value and desirability of a habitat or natural resource.
herbivore An organism that gets its nutrition by eating green plant material; grazer; primary consumer.
historical resource Those districts, sites, buildings, structures, and artifacts which have a relationship to events or conditions of the human past. (cf archaeological resources)

hopper dredge Sea-going dredge with storage capacity for dredged material aboard. Disposal is usually at a distance from the dredging site.

I

infauna Aquatic animals living beneath the surface of the bottom sediments.
intertidal The area between Mean Lower Low Water and Mean Higher High Water.
invertebrates Animals that do not possess a backbone.
in-water disposal The disposal of dredged material in the estuary, river or ocean.

L

land disposal Dumping dredged material on upland areas or on shorelands behind a dike.
limiting factors Ecosystem characteristics, such as availability of light, nutrients, food, habitat and space which limit species diversity or abundance.

M

marsh A low-lying wetland characterized by emergent vegetation such as typha which is predominantly herbaceous. (cf swamp.)
Mean High Water The average height of all high waters over a 19-year period.
Mean Higher High Water The average height of the higher high waters over a 19-year period.
Mean Low Water The average height of all low waters over a 19-year period.
Mean Lower Low Water The average height of the lower low waters over a 19-year period.
mitigate To alleviate the negative impacts of a particular action.

N

navigation channel The authorized channel(s), maintained by the Corps of Engineers.
null zone The area in an estuary where bottom flood and ebb currents are nearly balanced; generally an area of sedimentation.
nutrients Inorganic substances such as nitrates, phosphates and carbon dioxide used by plants to produce organic matter during photosynthesis.

O

open space Land used for agricultural or forestry uses, and any other land area that would, if preserved in its present use: conserve and enhance natural or scenic resources; protect air or stream or water supply; promote conservation of soils, wetlands, beaches or tidal marshes; and accomplish other ends as set out in Oregon State-wide Planning Goal #5.
over-channelization Diversion of flow from shallow areas into the main channel by dredging, pile dikes or other means to the degree that circulation is markedly decreased and sedimentation increased in the shallow areas.
overlay (as used in this Plan) A ***Development*** designation applied to an aquatic or shoreland area that permits dredged material disposal. The basic designation for the area defines all other permitted uses and activities.

P

phytoplankton Planktonic plants (see algae)
pile dike A partial barrier to water flow, constructed of wooden piling, that is designed to direct river flow in a particular direction. They are commonly erected perpendicular to the shore.
pipeline dredge A suction dredge that pumps the dredged material to the disposal site by pipeline.
plankton Organisms that live in the water and whose horizontal movement is controlled by the water; may be plants (phytoplankton), animals (zooplankton) or bacteria.
polluted dredged material Dredged material containing toxic substances or excessive amounts of organic matter.
preserve To protect natural resources or habitat from harm or destruction, usually by setting aside a particular area for limited use.
primary productivity The rate at which producers, such as marsh plants and microscopic phytoplankton, manufacture plant tissue from simple inorganic substances and sunlight.
productive areas Those areas that are above average in biological productivity at the primary, secondary or higher levels in the food chain.
public access A means of physical approach to and along the shoreline available to the general public.
public gain The net gain from combined economic, social, and environmental effects which accrue to the public because of a use or activity and its subsequent resulting effects.

R

restore To revitalize or bring back to a former or original condition features which have been diminished or lost by past alterations, activities, or catastrophic events.
- **active restoration** Use of specific positive remedial actions to bring about restoration.
- **passive restoration** Use of natural processes, sequences or timing, or removal or reduction of adverse stresses.

riparian habitat The ecosystem pertaining to or situated on the bank of a river or other body of water (excluding the ocean).
riprap A layer, facing, or protective mound of stones randomly placed to prevent erosion, scour or sloughing of a structure of embankment; also, the stone so used. In local usage, the similar use of other hard material, such as concrete rubble, is frequently included as riprap.

S

salinity intrusion The movement of salty ocean water into an estuary along the bottom. The water is then mixed vertically into the overlying, fresher river water by the circulation in the estuary.
salinity regime The range and variability of salt content in estuarine waters over a given period of time at a particular location.
salmonid A fish of the family salmonidae; includes the salmons, trouts, chars, and whitefishes.
salt marsh A marsh in which the water is salty or brackish, with salinity greater than fresh water but less than sea water, and containing halophytic vegetation.
secondary productivity The rate at which consumers, such as zooplankton, fish and people manufacture animal tissue (thus storing energy) through feeding on plants or other animals.
sediment The organic and inorganic particulate materials that cover the bottom of the river and estuary, including gravel, sand, silt and clay.
sediment transport The movement of sediment along the bottom (bed load) or suspended in the water (suspended load)
shallow water port A port area with draft less than 22 feet.
shorelands The area adjacent to the estuary and its tributary streams and wetlands. The lower boundary of the shoreland is the line of non-aquatic vegetation, or in cases where this cannot be defined, Mean Higher High Water. The upper boundary is the landward extent of tidally influenced soils (those deposited by Columbia River water), or in the absence of tidally influenced soils, 200 feet inland from Mean Higher High Water or the line of non-aquatic vegetation. Shorelands extend upstream in estuary tributaries to tidewater. Exceptions to this definition may be defined during the planning process.
shoreline The boundary between shorelands and water. Wetlands may extend shoreward of the shoreline.
significant areas An area of more than local significance; so designated because it possesses important natural, scientific, historical, cultural and/or archaeological resources.
siltation Sedimentation; the desposition of sediment in an area.
species diversity The number of different plant or animal species in a given area.
standing crop The number or weight (biomass) of individuals (plants or animals) present at any given time in a given area; a measure of the balance between production, predation and decomposition; should not be confused with productivity.
stockpile The temporary storage of dredged material prior to its use for some definite purpose.
submerged lands Lands normally covered by water; lands below Mean Low Water (Oregon); Lands below Extreme Low Water (Washington).
submersible lands Lands between Mean Low Water and Mean High Water (Oregon) or between Extreme Low Water, and Mean High Water (Washington).
sub-tidal Below Mean Lower Low Water (MLLW).
swamp A wetland characterized by predominantly woody vegetation. (compare . . . marsh.)

T

textural characteristics Surface properties, as the size distribution, the mean size, the median size, the sorting (standard deviation), and skewness (asymmetry).
tidal marsh Emergent wetlands from the line of non-aquatic vegetation down to the end of vegetated flats, which is approximately the Lower High Water (LHW) level.
tidegate A structure designed to allow drainage of diked areas while preventing their inundation by the tides.
tidelands Submersible lands.
toxic substances Materials that interfere with normal biological functions of one or more species; including pesticides, herbicides, heavy metals, organics, and other substances.
turbidity The content of suspended particles in the water.

W

water dependent A use or activity which can be carried out only on, in, or adjacent to water areas because the use requires access to the water body for transportation, recreation, energy production, or source of water.
water related Uses which are not directly dependent upon access to a water body, but which provide goods and services that are directly associated with water dependent uses, and which, if not located adjacent to water, would result in public loss of quality in the goods or services offered.
waters The overlaying water and the submerged lands located below Extreme Low Water in a tidally-influenced body and below −6 feet relative to Ordinary Low Water in non-tidal bodies.
wetlands The overlying water and lands where tidal water determines the nature of soil development and the types of plant and animal communities living at the soil surface. Wetland soils retain sufficient moisture to support aquatic or semi-aquatic plant life. In marine and estuarine areas, wetlands are bounded at the lower extreme by Extreme Low Water, in fresh-water areas, by the depth of 6 feet. Lands below wetlands are submerged lands. The shoreward boundary of wetlands is the line of non-aquatic vegetation, or in areas where this line cannot be defined, Mean Higher High Water.

APPENDIX B

OREGON GOAL EXCEPTIONS

81. GOAL 16 EXCEPTION TO ALLOW DREDGING FOR CERTAIN NON-WATER DEPENDENT USES

81.10 DESCRIPTION

The Estuarine Resources Goal #16 requires that dredging in estuaries be only for navigation or other water dependent uses. The goal can be applied except in three instances:

- When clean sand fill material is needed for shoreland construction activities and no economically feasible alternative exists;
- When the material is needed for dike maintenance and other sources are not economically feasible, damage is minimized, etc.;
- When the area in front of tide boxes or gates has shoaled in preventing proper operation of the tidegate and the associated land drainage network behind the dikes.

All such dredging activities will be evaluated on a case-by-case basis.

81.20 NEED

81.21 Clean fill material with good load bearing capacity is needed to raise shoreland development areas above the 100 year flood level, thereby reducing potential hazards to life and property. Much of the area designated for residential, commercial or industrial development in the CREST plan is in the floodplain. In some cases, alternative sources of fill material may be prohibitively expensive or not feasible because of site access limitations.

81.22 Dikes protect approximately 20,000 acres of shoreland which otherwise would be inundated periodically by tidal and river waters. These dikes protect most of the farmland in the estuary area, much of which is zoned exclusive farm use (EFU), as well as certain areas of urban development in Warrenton, Miles Crossing and elsewhere. Constructed early in this century, nearly all of these dikes are below Corps of Engineers standards. Many are in need of maintenance and some are in total disrepair. Winter floods regularly overtop some dikes and sometimes tidegates and areas of dikes have been ripped out. Regular maintenance of dikes and upgrading of certain areas is needed. Access to dikes on the land side is sometimes poor and suitable fill material from upland sources is sometimes not available.

81.23 The elevation of wetland areas in front of tidegates must be such that the tidegate can operate properly and the areas must have drainage channels away from the tidegate. Shoaling sometimes creates bars, preventing the proper operation of tidegates, and making the entire drainage network of ditches and sloughs behind dikes disfunctional. Dredging shoal areas in front of tidegates is needed to keep these drainage systems in good working order and protect life and property in areas served by dikes.

81.30 ALTERNATIVES

Alternatives to dredging as a source of material for fill or dike maintenance are upland material or dredged material from an authorized dredging project at the time of dredging for clearing of shoaled areas in front of tidegates. **Both alternative sources of material for fill or dike maintenance are preferred alternatives to dredging for the material.** In all cases, an applicant will have to show that these alternative sources are not available or not economically feasible.

Fill material must have an adequate load bearing capacity for buildings and other proposed structures. Coarse sand or gravel makes good fill for construction and is available at certain upland sources such as gravel pits and stockpiles of dredged material. Clean sand dredged from the deep channel areas of the river also makes excellent fill material for construction. This sandy material does not make for productive agricultural land, however, because of a lack of organic material, nutrients and inability to hold sufficient water to nourish vegetation.

Material to maintain dikes should normally be fine clay and silts which compact or stick together preventing erosion by tidal waters and rain. Sandy material, even when stabilized by vegetation and rip-rap, tends to be more erodible. Sources of fine, compactable material for dike maintenance are often available from upland sources, often at a more economically feasible cost and should be used. However, dredging of fines from adjacent mud flats is sometimes the only feasible alternative, and is the proper consistency for dike maintenance.

81.40 ENVIRONMENTAL CONSEQUENCES

81.41 *Fill for Construction,* the removal of coarse sandy material from channel or shoal areas of the river, has few adverse environmental effects. Few benthic dwellers inhabit areas of coarse sediments because currents and sediment transport create an unstable environment. Consequently, few benthic organisms are disturbed, though a pipeline suction dredge probably draws in some fish and invertebrates. Since filling and overall shoaling in the estuary is occurring at an abnormally high rate,

removal of the less productive sandy sediments and depositing in shoreland areas may actually have a favorable impact in that this filling trend is retarded. Filling of low shoreland areas and subsequent development may result in loss of agricultural land, wildlife habitat and have environmental impacts attendant with urbanization.

81.42 *Dike Maintenance* dredging of shallow, often productive areas adjacent to dikes may have significant adverse environmental effects on aquatic life. Periodic dredging of certain of these areas will destroy benthic dwellers such as amphipods and copepods. These areas are important to small fish and juvenile salmon as feeding and resting areas. Dredging may leave potholes where these fish could be stranded at low water (dredging standards minimize this) and turbidity and release of toxics and organics caused by dredging will spread the adverse effects away from the immediate dredged area. Temporary water quality degradation will occur and it will be difficult to control effluent from the material placed on dikes. Fringing tidal marshes, where present, will be disturbed by barge clam shell or dragline dredging. Removal of sediment from shoaled areas will have the favorable impact of removing sediment from the river and its tributaries, which are shoaling at a more rapid rate than might naturally be expected.

81.43 *Tidegate Channels* requiring dredging will usually be in areas of fine sediments. Impacts will be similar to those for dike maintenance above, though creation of an exit channel will ensure fish standing is minimized.

81.50 SOCIO-ECONOMIC CONSEQUENCES

81.51 Shoreland development on fill material obtained from dredging (or other sources) will be protected from flood hazards. Where such fill is on agricultural land, productivity will be lost.

81.52 Maintenance of dikes and tidegate drainage will protect existing investments in agriculture and urban development in low-lying areas. Exclusive farm use resource lands will be protected. Dredging for this purpose will in some cases allow maintenance to be economically feasible, where it would not be otherwise. Flood control will be provided.

81.60 ENERGY CONSEQUENCES

When dredging is more economically feasible for dike maintenance or as a source of fill for construction, the primary savings is likely to be in fuel costs for truck or other transportation. Since fossil fuels are a non-renewable resource, energy use impact will be favorable.

81.70 COMPATIBILITY

81.71 Dredging from channel areas as a source of fill material does not have a significant impact on other uses since it is temporary and has few environmental impacts. Navigation may temporarily be impaired. Placement of the dredged material on specific shoreland areas may or may not be compatible with adjacent uses and must be evaluated individually.

81.72 Dredging shallow, productive areas for dike maintenance and tidegate drainage will be incompatible with aquatic resource areas, often designated ***Conservation*** or ***Natural.*** The low frequency, periodic nature of this dredging, however, does not create a serious problem in most areas. Dike maintenance and tidegate drainage are not only compatible, but essential for protection of agricultural and urban developed areas protected by dikes.

82. GOAL 17 EXCEPTION TO ALLOW RESIDENTIAL DEVELOPMENT NORTH SIDE OF NW WARRENTON DRIVE (cf 42.02)

82.10 DESCRIPTION

An 8-acre area on the north side of NW Warrenton Drive, in close proximity to the Columbia River will be designated for single-family residential use. The western boundary (NW 17th) of this parcel is about 1500 feet to the east of the Warrenton/Hammond city limit line and the eastern boundary (NW 16th) is about 1500 feet to the west of Tansy Point. In order to allow for non-water-dependent residential use, an exception is taken to the Goal #17 (coastal shorelands) requirement that shorelands in urban and urbanizable areas especially suited for water dependent use shall be protected for water dependent recreational, commercial and industrial uses.

82.20 NEED

82.21 The city of Warrenton recognizes the need to maintain the diverse environmental, economic and social values of the Columbia River shorelands. Adequate shoreland areas for water dependent commercial and industrial uses should be reserved, but social values, such as the aesthetic and scenic qualities of the waterfront, must be recognized and protected as well. A blending of land uses will maintain and utilize the diverse values of these coastal shorelands.

82.22 The proposed action would promote a diversity of uses along the Columbia River waterfront and prevent the monotony of continuous industrial development along the entire Columbia shoreline from Hammond to Tansy Point.

82.23 There is not a need to reserve additional lands within the city for water dependent commercial or industrial development. A sufficient amount of land has been reserved for these uses. (cf 82.50)

82.24 The parcel provides a superb site for a small scale residential development. The land is composed of solid foundation soils with a sufficient elevation to allow development without filling. As soon as construction is completed on a planned sanitary sewer line along NW Warrenton Drive, complete municipal services will be available to the site. Residences could utilize the property's scenic riverfront view of the Columbia River.

82.25 The combined qualities of this site make it unique to the residential land stock within Warrenton. Most residential land within the city is flat, low land with natural development limitations, such as high-surface water levels, weak foundation soils, or locations within designated flood plain areas. The limited stable dune ridges near the city center have been extensively developed.

82.26 The property would add flexibility to the local housing by providing residential sites suitable for higher quality dwellings.

82.30 ALTERNATIVES

82.31 There are other lands along the Columbia riverfront to the immediate east and west that have similar characteristics to the involved parcel. Both of these alternative sites would also require a goal exception to allow non-water-dependent use. The land to the west has been reserved for marine industrial uses due in part to the existence of functioning industrial uses. The property to the east has been reserved for water dependent uses to allow for a waterfront park and for future development at Tansy Point.

82.32 There are no other potential residential sites within the city with the combined scenic attraction, soil-bearing capacity and public facility characteristics that are found at the involved site. Some dune ridge areas to the west of the present city center would provide solid foundation soils and an attractive residential setting for these would be sensitive to disturbances in vegetative cover and would have limited access to developed public facility systems.

82.40 ENVIRONMENTAL CONSEQUENCES

82.41 The action would result in minimal environmental impact. The involved land is not an environmentally sensitive area, but is a relatively high, level, well-drained site, covered with scattered underbrush and trees.

82.42 The potential for future adverse environmental impacts from development on the site would be greater for an industrial use than for a residential use.

82.50 SOCIO-ECONOMIC CONSEQUENCES

82.51 The action would make an additional eight acres available for residential development within the city of Warrenton. The site could be developed to accommodate 15 to 25 single-family residences.

82.52 The action would not significantly affect the total amount of land within the city available for water dependent commercial and/or industrial use. The involved property has an area of about eight acres with 560 feet of frontage on the Burlington Northern Railroad right-of-way, which adjoins the Columbia River. The city has taken action to reserve over 400 acres of land within the city for water dependent commercial and industrial use. These ***Water Dependent Development*** shorelands include almost four miles of frontage adjoining deep draft channels along the Columbia and Skipanon Rivers. The city also has designated additional commercial lands adjoining the Skipanon River within a tourist commercial zone with the intent of encouraging a mixture of water dependent and water oriented commercial uses. Through these actions, the city has reserved ample land for potential water dependent uses.

82.53 The proposed residential use would not restrict industrial development to the east at Tansy Point. A proposed waterfront park site adjoining the involved property to the east will form the western boundary for any future Tansy Point industrial development. The involved residential site is separated by a park from the industrial site to the east. The city has designated more than 30 acres to the south of NW 14th, which can be combined with approximately 20 acres to the north to create a 50-plus-acre contiguous industrial tract at Tansy Point with access to the Columbia River channel.

82.54 The proposed designation will provide for a refreshing mixture of residential, park and water oriented industrial uses along Warrenton's Columbia River waterfront. This mixture would represent the only non-industrial use along Warrenton's extensive Columbia River, Youngs Bay and Lewis & Clark River waterfront areas.

82.60 ENERGY CONSEQUENCES

Since the involved site is served by existing municipal streets and water lines, and will soon have access to the sanitary sewer system, development would be timely and would require no major public facility extensions. Potential development would be more energy-efficient than other developments which would require facility extensions.

82.70 COMPATIBILITY

82.71 The proposed residential usage would be compatible with the existing pattern of development to the immediate west. This area has been developed with a mixture of single-family residential dwellings interspersed with a low profile industrial machine shop use.

82.72 The proposed residential usage would blend in well with the anticipated waterfront park to the immediate east. The park would provide a natural buffer between any future development at Tansy Point and the involved residential area.

83. GOALS 16 AND 17 EXCEPTIONS TO ALLOW INDUSTRIAL DEVELOPMENT

SKIPANON RIVER WEST BANK (cf 42.06)

83.10 DESCRIPTION

A 7.8-acre area on the west side of the west peninsula of the Skipanon River will be designated ***Development Aquatic*** to allow for future water dependent uses. The area is being considered by the Warrenton Lumber Company as a back-up site which would be utilized if the company constructs a deep draft docking facility along the west bank of the Skipanon. An exception is taken to the Goal #16 (Estuarine Resources) requirement that major salt marshes and tidal flats be designated ***Natural*** and to the Goal #17 (Coastal Shorelands) requirement that major marshes and significant wildlife habitat areas be protected in accordance with their natural values.

83.20 NEED

83.21 The *Beeman Report* (December 1978) states that 20 acres of back-up land is the minimum necessary for the support of a log loading dock facility. In order to provide a 20-acre back-up site (with rough dimensions of 480' x 1500') alteration of the involved 7.8 acres would be required.

83.22 A loading facility at the mill site would result in considerable cost savings to the company.

83.23 The Warrenton Lumber Company is the largest employer in the city of Warrenton.

83.24 While other parts of Oregon will have declining timber production, the northwest coast area will have as much as a 22% increase over present production by the year 2000 AD *(Beuter Report of 1976)* and additional shipping facilities are needed to handle the increase.

83.25 There would be less congestion in the City of Warrenton from log and lumber trucks which presently haul to the Port of Astoria, less need for water-log loading and storage, and fewer delays on the Youngs Bay Bridge from the proposed dock and back-up facility.

83.26 CREST regional policies 21.20 and 23.10 are met by the proposal.

83.27 The Columbia River estuary, including the Skipanon River, is classified as "deep draft development." Portions of LCDC Goal #16, requiring designation of certain areas for development and the second priority of use encouraging water dependent uses in estuaries so classified, are met. The fill would be for a water dependent use. The portion of LCDC Goal #17, dealing with the requirement that shorelands within urban areas especially suited for water dependent industrial and commercial uses be protected, is met.

83.30 ALTERNATIVES

83.31 *Port of Astoria docks (Smith Point)* - Currently logs and lumber from Warrenton Lumber mill are transported to the Port of Astoria docks for shipment. The availability and usefulness of the port facility will be diminished or curtailed in the future because of siltation of the pier slips, anticipated demand on these facilities, and changes in competitive patterns confronted by log and lumber producers.

83.32 *Tongue Point* - The existing facilities at Tongue Point provide a sheltered docking area which has been used for limited log storage purposes. However, a combination of factors severely restrict the potential of this site as a log and lumber shipment facility. the Port of Astoria is presently attempting to acquire a large portion of this site for the expressed purpose of developing a container handling facility. The port acquisition attempts have been complicated by state and federal ownership conflicts. Further, extensive dredging would be required to provide a channel depth which would be adequate to accommodate log handling vessels. Additional negative factors which must be considered are the distance increases both for ships from the Pacific Ocean and for trucks from the Warrenton mill site. Use of the Tongue Point facility would require truck transport of logs and lumber through the commercial center of Astoria.

83.40 ENVIRONMENTAL CONSEQUENCES

83.41 There will be a loss of primary marsh detrital export from approximately 4.2 acres of marsh below mean high water and 3.6 acres above mean high water, a total of 7.8 acres out of the 75 acres of marsh in Alder Cove and 11,457 acres of marsh in the Columbia River estuary.

83.42 There will be some undetermined impact on production on several species of plankton and benthic invertebrates in Alder Cove as well as some effect on salmon smolt, white and green sturgeon, juvenile starry flounder, anchovy and herring.

83.43 Some wildlife habitat will be lost through loss of cover for feeding shoreland birds and water fowl.

83.44 There will be a need to dispose of dredge spoil from the basin (75,000 c.y. annually) and from the Skipanon channel maintenance.

83.45 Less water-log loading and transportation will result in better water quality.

83.46 The air and noise pollution levels associated with the diesel truck transport of logs and lumber from the mill to port docks would be lessened if the materials were shipped direct from the mill site.

83.50 SOCIO-ECONOMIC CONSEQUENCES

83.51 Twenty acres of back-up land will be provided for future water dependent industrial use.

83.52 A Skipanon River loading facility would result in a cost saving to the Warrenton Lumber Company. On the basis of figures provided in the *Beeman Report* on port facilities, an income potential of $1.24 million as projected against an annual cost of $900,000 yields a net economic benefit of $360,000 from construction of facility under present prices and costs.

83.53 The present economic advantages of the facility will increase.

83.54 The west bank development site is a unique resource and one of very few potential deep draft port sites along the Columbia. This site, along with other potential sites, represents unrealized resources for Warrenton's economy, as well as that of the state and nation.

83.55 The employment multiplier of 1.8788 (OCC&DC, *Economic Survey of the Coastal Zone*, Nov. 1974, p. J-5) and the fact that $1.00 spent in lumber production yields $1.2599 in direct and indirect effects on the economy (CREST *Inventory*, June 1977, p. 404-17), mean a significant impact on the economy of the city if the mill and auxiliary operations are not maintained as a viable economic entity.

83.56 There will be a need to maintain the Skipanon Channel at a 30-foot depth.

83.57 It is not economically feasible to locate the back-up area elsewhere because double handling of logs and lumber would be required.

83.58 The Warrenton Lumber Company site will be maintained in a competitive position, thus avoiding the phasing out of the mill and possible loss of 135 mill jobs as well as 62 woods jobs. There would be an increased activity from the dock facility.

83.59 Additional water dependent industrial development along the west bank of the Skipanon would allow for a greater use of the Skipanon River waterway. In past years, the city has expended significant funds to improve and upgrade this waterway. Indirectly, the involved use would represent a continuation of the city's past commitment to the development of the Skipanon waterway.

83.60 ENERGY CONSEQUENCES

83.61 "Bringing the ship to the origin point of the cargo is the most energy-efficient solution." *(Beeman Report*, page 24).

83.62 There would be a reduction of truck hauls from the mill site to the present Port of Astoria loading area.

83.70 COMPATIBILITY

83.71 The proposed designation would be compatible with the existing mill site operations to the south, the deep draft Skipanon River channel and the proposed marine industrial development on the east bank of the Skipanon.

83.72 Post fill improvement techniques, such as the planting of natural vegetation along the western edge of the back-up area, will enhance the compatibility of future uses with the adjoining marsh to the west.

83.73 The buffer requirements of the conservation area between Alder Cove and the development area will aid compatibility.

83.74 There will be a minimum loss of estuarine habitat (7.8 acres) compared with the 75-acre area of Alder Cove marsh and the 11,457 acres of major tidal marsh in the Columbia River estuary.

83.75 The back-up area will have little effect on circulation and flushing in Alder Cove because the fill is relatively small compared to the side of the cove and is above MLLW.

84. GOAL 16 EXCEPTION TO ALLOW INDUSTRIAL DEVELOPMENT SKIPANON EAST BANK ALONG YOUNGS BAY (cf 42.06)

84.10 DESCRIPTION

A 77 acre acre in the vicinity of the eastern peninsula of the Skipanon River is designated ***Development Aquatic.*** This area includes 36 acres of transition marsh, 11 acres of cattail bulrush, and 30 acres of intertidal sand-mud flats. To allow a ***Development Aquatic*** designation, an exception is being taken to the state estuarine resources goal requirement that major tracts of salt marshes and tide flats be designated ***Natural.***

84.20 NEED

84.21 A ***Development Aquatic*** designation is required for the development of a steel structure fabrication yard which would construct offshore oil and gas production platforms. Such a fabrication yard has been proposed by Pacific Fabricators, Inc. The Oregon Division of State Lands is ready to issue a removal/fill permit upon submission of an adequate mitigation plan.

84.22 The proposed fabrication yard requires alterations in aquatic areas for: construction of a graving dock for fabrication of large, extremely heavy platforms; providing adequate navigational access to the graving dock; construction of skidways for fabrication of smaller platforms; building dikes and bulkheads; and undertaking other development associated with the facility.

84.23 The Skipanon River's eastern peninsula is one of only six sites in the lower 50 miles of the Columbia River having significant potential for deeper draft navigational access. If not used for the proposed fabrication yard, the peninsula would be highly desirable for wood processing, fish processing, and a variety of other water dependent uses. Many of these uses would also require some alterations in nearby aquatic areas.

84.24 Use of the eastern peninsula for water dependent development is consistent with the deep draft development estuary designation given to the Columbia River estuary by the state, the state coastal shorelands goal requirement that shorelands in urban areas suitable for water dependent uses are protected for such uses, and Columbia River Estuary Study Taskforce (CREST) regional policies. The state estuarine resources goal indicates that aquatic development areas need to be designated in deep draft development estuaries in order to provide for navigation and water dependent uses.

84.25 Advantages of the eastern peninsula for water dependent industrial uses include the relatively short distance to the mouth of the Columbia River, close proximity to the Columbia River Channel, extensive frontage along the Skipanon Channel, direct access to the Burlington Northern Railroad, good access to U.S. Highway 101 via another arterial street (East Harbor Drive), large size of the industrially zoned area, soils with few development limitations on the northern portion of property, fairly level topography, consolidated land ownership pattern, and the undeveloped nature of most of the property.

84.30 ALTERNATIVES

84.31 *Steel structure fabrication yard* alternative sites were discussed in the draft environmental impact statement for the Pacific Fabricators, Inc. facility. Only one site—the Skipanon River's eastern peninsula—met all the site selection criteria. Other locations considered were Anacortes, Washington; Everett, Washington; Port Angeles, Washington; Grays Harbor, Washington; Port Townsend, Washington; and Coos Bay, Oregon. Among the problems found for one or more of the locations were: insufficient acreage, a need for excessive amounts of fill, and the long term nature of an existing lease.

84.32 *Other water dependent uses requiring deep draft navigational access* could also use this site. The Skipanon River's eastern peninsula is one of only six sites in the lower 50 miles of the Columbia River with significant potential for deep draft navigational access. The other five sites are: the Skipanon River's western peninsula, Tansy Point, Smith Point (Port of Astoria docks, Astoria), Tongue Point (near Astoria), and an area east of Driscoll Slough (near Westport).

All six of these sites should probably be considered scarce resources and reserved primarily for water dependent uses. Each can satisfy some of the region's waterfront industrial needs because each has unique advantages. The Skipanon River's eastern peninsula is more suitable than:

- —the western peninsula or Smith Point for new industries requiring large acreages;
- —Tansy Point for water dependent uses that rely substantially on intercity truck or railroad transportation or uses that need waterfront locations protected from strong currents;
- —Tongue Point for industries utilizing extra deep draft ships; and
- —the area east of Driscoll Slough for water dependent uses needing a wide range of urban services or close proximity to a large supply of housing for employees.

84.40 ENVIRONMENTAL CONSEQUENCES

84.41 *Transition Marsh* - This 36 acre area is 8'-13' above MLLW, dominated by common rush and grasses, and used by domestic cattle. Wildlife value is low to moderate, some plant material is exported to the estuary by occasional higher tides, and the area provides a buffer area between more intensively developed upland and lower tidal marshes and flats. Filling will totally alter this area and remove it from the aquatic system. Natural habitat value and productivity, while low, will be completely lost.

84.42 *Cattail - Bulrush Marsh* - This 10 acre area is in the 5'-10' above MLLW elevation range, is well flushed by daily tides, is dominated by cattail, bulrush and sedges, and has high wildlife value and use for feeding, resting and nesting. Fish usage (feeding, migration route, spawning) along the edge of the marsh fronting the water is likely high at high tide, based on beach seining of adjacent tidal flats. Juvenile salmon, shiner perch and surf smelt are abundant. Vegetation production is moderate to high. Bulrush produce 609 grams per square meter per year of dry matter with 80% export and sedge, 1746 grams per square meter per year with 100% export in similar Nehalem marshes. The marsh also provides an erosion buffer for upland and assists in maintenance of good water quality by removing excess nutrients from water. Development could completely alter this area, removing it from the aquatic ecosystem. Productivity, habitat value and other ecosystem benefits could be lost. Loss of feeding area for juvenile salmon would have economic as well as ecological significance, but there is not enough data to assess this with any degree of confidence.

84.43 *Sand-mud flat along Youngs Bay* - This 30 acre area is in the +10' to MLLW elevation range, overlying waters are low salinity (0-5 parts per thousand), flushing is excellent, sediments fine sand, benthic productivity moderate to low, epibenthic populations high (mysids, shrimp) and the area is a relatively high energy zone. The area provides habitat for bottom dwellers and many species of

fish (notably juvenile salmon) relatively sheltered fish nursery area (though not as important as most other more sheltered areas of Youngs Bay), and a shallow area migration route along Youngs Bay and Columbia River for juvenile salmon.

Development may interrupt the shallow fish migration route and divert small fish into deeper water as they head down stream. Any dredging north of the site will compound this impact. Feeding and nursery functions may be lost or degraded. Sediment dwelling organisms may lose habitat while mobile organisms (fish, epibenthos) could be displaced.

Physical alterations may cause shoaling of areas adjacent to the site, with possible additional loss of sand-mudflat to invading marsh plants. Use of area for shorebirds, waders and waterfowl will be nullified for the most part by alteration of the shallow areas. These animals will be displaced to other locations.

84.44 *Dredged Material Disposal* - There will be a need to dispose of dredged material from alterations near the end of the peninsula, in Youngs Bay, and in the Skipanon River—including Skipanon Channel maintenance. (Potential disposal sites have been located. cf 57.50)

84.50 SOCIO-ECONOMIC CONSEQUENCES

84.51 *Steel Structure Fabrication Yard*

- The facility will have an operational labor force of approximately 1,030 of which about 75 percent or 773 employees are expected to be in-migrants*.
- Expenditures resulting from plant activities will stimulate the hiring of about 824 workers by other sectors of the area's economy of which about 60 percent or 494 are expected to be in-migrants*.
- The area's population will increase by approximately 3,459 of which almost 35 percent or approximately 1,210 people are expected to live in Warrenton*.
- The plant will have an annual payroll of at least $17 million, spend about $3.5 million annually in the area for materials and supplies, and have an assessed value which may amount to $100 million.
- There will be greater diversity in the area's economy, high seasonal unemployment rates will decrease, and per capita earnings will increase.

* Temporary increases will result from the hiring of workers to construct the fabrication yard.

84.52 *Water Dependent Uses Requiring Deep Draft Navigation Access*

- Use of the site for these water dependent uses will generate considerable economic returns for other sectors of the economy.
- The assessed valuation of property in the area will be substantially increased.
- New or expanded community facilities and services will be needed and housing prices may increase.
- Fewer high school graduates and other residents will need to leave the area to find work.
- A wider variety of goods and services will be available to area residents.
- The rural character of the area will be diminished.
- There will probably be a need to maintain the Skipanon Channel at greater depths.

84.60 ENERGY CONSEQUENCES

84.61 Construction of offshore oil and gas production platforms will help the United States achieve energy self-sufficiency.

84.62 The property's proximity to the mouth of the Columbia River will reduce energy use for certain types of shipping activities.

84.63 The location of the site near the population center of the area will reduce energy consumption by workers.

84.64 Local energy use will be increased some by traffic congestion resulting from industrial use of the property.

84.70 COMPATIBILITY WITH NEARBY USES

84.71 Alterations permitted in the area for which an exception is being taken, as indicated by the subarea policies, must be carried out in a manner which minimizes adverse environmental impacts on productive tidal marshes, mud-sand flats, wildlife, fisheries, and other important natural resources, and complies with restrictive zoning ordinance standards.

84.72 Aqautic areas to the north are associated with the Columbia River Channel and are classified ***Development Aquatic.***

84.73 Aquatic areas to the west are associated with the Skipanon Channel and are classified ***Development Aquatic.***

84.74 Nearby portions of the Skipanon River's eastern peninsula are ***Water Dependent Development*** Shorelands and are included in the marine industrial district.

85. GOAL 16 EXCEPTION TO ALLOW DIKE REALIGNMENT

AIRPORT (cf 42.08)

85.10 DESCRIPTION

An area to the immediate east of runway 25 will be designated ***Development Aquatic*** to allow for the relocation of a flood control dike along Youngs Bay. The dike relocation project will remova approximately eight acres of forested tidal swamp. An exception is taken to Goal #16 of Estuarine Resources to permit the filling of an estuarine area for the accommodation of a non-water-dependent use.

85.20 NEED

85.21 The dike relocation is one element in an improvement project which will provide an Instrument Landing System (ILS) for the Clatsop County Airport.

85.22 The need for this airport improvement project is identified in the preliminary Clatsop County Airport master plan prepared by Parametrix, Inc. for the Port of Astoria.

85.23 An ILS system provides electronic guidance to an aircraft with sufficient accuracy to allow the aircraft to make a precision approach to a runway in extreme weather conditions. The ILS is composed of a sophisticated electronic guidance system and a series of guidance approach lights. The dike relocation is required to insure proper functioning of the electronic guidance system and to provide an increased primary surface area for safety.

85.24 Provision of the ILS will allow for all-weather use of the airport. This is required by the U.S. Coast Guard for the landing of their HU-25 jet aircraft which will be used for monitoring fishing activities and possible oil discharges within the 200-mile limit. Instrument landings for general and commercial aviation will be facilitated.

85.30 ALTERNATIVES

85.31 Two options were considered in the airport master plan involving the placement of the ILS on Runway 7-25.

- Placement of the ILS improvements along Runway 7-25 at a distance of 714 feet to the east was judged to have a greater environmental impact because it would have required a greater amount of dike relocation work and would have eliminated 28 acres of forested tidal swamp.
- Placement of the ILS improvements along Runway 7-25 at a distance of 586 feet to the west would require a 600-foot extension the west end of the existing runway, which would interfere with an existing slough system. The runway extension would displace 22 acres of pasture land and create associated habitat losses.

85.32 The master plan reviewed the option of placing the ILS on Runway 13-31. This option was rejected because the ILS lighting improvements could not be feasibly placed to the north of this runway due to interference of railroad tracks and the ILS could not be shifted to the south along this runway without closure of the airport's other two runways.

85.33 The "no ILS improvement" option would result in continued restrictive use of the Clatsop County Airport. Without the ILS improvements, the Coast Guard would not be allowed to pursue its plans to locate the HU-25 jet aircraft at the Astoria air base. This option would also limit future general and commercial aviation use of the airport.

85.40 ENVIRONMENTAL CONSEQUENCES

85.41 The ***Development Aquatic*** designation is intended to accommodate the relocation of 1000 feet of flood control diking and the associated filling of eight acres of forested tidal swamp.

85.42 The forested tidal swamp area loss will reduce the total estuarine area which contributes detrital export to the estuary. The detrital material is part of the food supply for the lower members of the food web. A minor decrease of food particulate to the benthic invertebrates could result, which may affect the resident and transitory fish by altering the food ecosystem but should not be significant.

85.43 The forested tidal swamp also provides food and shelter for many aquatic and terrestrial species of wildlife. Species affected by the area loss could include aquatic furbearers, waterfowl and numerous other species of birds.

85.44 The ILS improvements, of which the dike modification is an element, would lead to increased air traffic activity at the airport which, in turn, would create indirect noise impact upon the city of Warrenton and surrounding areas. Wildlife use of the area would also be adversely affected by the increased noise.

85.45 The dike relocation activity would most likely involve a single-action environmental alteration. Once this relocation is completed, only normal maintenance activities are anticipated.

85.46 The chosen scheme for the installation of the ILS improvements will have lesser environmental impact than other alternatives.

85.50 SOCIO-ECONOMIC CONSEQUENCES

85.51 Without acceptance of the 8-acre fill, the Port of Astoria would be unable to complete the ILS improvements proposed in the Parametrix master plan, and the airport would be unable to handle the Coast Guard HU-25 jets. The local economy would not realize the potential positive employment and economic spin-off that would result from the increased activity at the Coast Guard air base. Future prospects for the continued use of the air base as a

helicopter base could be endangered if the airport were unable to accommodate the HU-25 jets. The existing helicopter air station operates with a crew of 21 officers and 95 enlisted personnel.

85.52 The proposed ILS improvements, including the dike relocation and associated fill, would provide for a more intensive utilization of an existing transportation facility. The existing airport facilities should be viewed as a public asset with a potential for expansion in areas such as commercial and passenger service. Minor improvements, such as the installation of an ILS, could open the door for greater use of the airport. Airport improvements could also lead to increased development of airport-related industries at the Port of Astoria's industrial park.

85.53 The potential socio-economic benefits which could result from improvements at the Clatsop County airport would affect the City of Warrenton, the City of Astoria, the County of Clatsop and the entire North Oregon coastal region. The airport is the only facility of its size and potential on the north coast. Its location, in close proximity to the population centers of the area, would allow for maximum private and public use. A national interest is also involved, since the proposed improvement work would directly accommodate the federal enforcement of the 200-mile fishing zone.

85.60 ENERGY CONSEQUENCES

85.61 One of the factors which was considered by the Coast Guard in its selection of the Clatsop County Airport as a potential HU-25 jet base was its central location along the Pacific Ocean coastline. The location provides for timely dispatching of aircraft and also results in substantial fuel savings as compared to inland airports or airports located on the extreme north or south coast.

85.62 The chosen ILS improvement option is the most adaptable alternative to the existing airport facilities. It will not require energy consumptive improvements such as runway extension paving.

85.70 COMPATIBILITY

85.71 There are no other intensive uses in the immediate vicinity of the proposed dike relocation. The area adjoins Youngs Bay to the north and the Lewis and Clark River to the east. Land areas to the south and west are devoted to airport open space.

85.72 There are indirect use impacts which can be tied to increased air traffic use of the airport. Increased air traffic will result in proportional increases in noise levels, airway congestion and accident potential.

85.73 Controls on dike relocation and filling methods could be utilized to reduce environmental impacts. Techniques such as vegetative replanting or buffering could be used to minimize impacts upon adjoining wildlife habitat areas.

86. GOAL 16 EXCEPTION TO ALLOW PORT EXPANSION WEST OF PORT OF ASTORIA PIER 3 (cf 42.13)

86.10 DESCRIPTION

Approximately 2 acres of intertidal sand flat west of the Port of Astoria Pier 3 is designated ***Development Aquatic*** to allow for port expansion. This area is part of the productive sand-mud flats of Youngs Bay. An exception to allow this designation is being taken to the Estuarine Resources Goal 16 requirement that major tidal flats be designated ***Natural.***

86.20 NEED

86.21 Thirteen acres of subtidal area north to the pierhead line have been designated ***Development Aquatic*** in addition to the two acres of this exception. This area slopes rapidly to depths of thirty to thirty-five feet at the pierhead line and is the location of a proposed Pier 4. The adjacent deep water out to the ship channel is also ***Development Aquatic*** to provide for pier access and westward expansion of the existing turning basin.

The two acres of tidal flats need to be ***Development*** to provide for an adequate connection between Pier 4 and the land. These two acres, combined with the thirteen acre area to the north, will provide a working area adjacent to the proposed pier. An additional twenty six acres of vacant land (eleven acres are a paved cargo storage yard) exist west of Pier 3; approximately eleven more acres of port land might be available as backup area for Pier 4; and a total of approximately fifty-two acres, including Pier 4, could be made available for new shipping activities.

86.22 With the potential for two berths and about fifty acres of backup land, the existing port area has the potential to attract a small scale container cargo or bulk operation. This diversification is essential to maintain the economic viability of the Port of Astoria. Log exports, the current mainstay of port income, are likely to phase out in the near future. Many port and longshore jobs would be lost if log exports cease and diversification has not occurred.

86.23 The exact requirements of a new shipping facility west of Pier 3 are difficult to determine. The size and location of the proposed Pier 4, the engineering requirements for pier access, and the cargo storage needs will all contribute to the design decision, which will be made through the federal and

state permit processes. The ***Development Aquatic*** designation of the two acre tidal flat and adjacent subtidal area provides needed flexibility for designing the port facility while protecting the large sand-mud flats to the west.

86.24 According to the *Lower Columbia River Ports Region Study* (Oregon Department of Transportation, 1975), the existing port facility in Astoria and the area west of Pier 3 is one of only six sites in the lower fifty miles of the Columbia River which has potential for water dependent development with deep-draft navigational access.

86.25 Advantages of this site include:

- Immediate access to the deep draft ship channel;
- Close proximity to the river mouth (RM 12);
- Existing port facilities to support new development;
- Some available backup land, 11 acres of which are newly paved cargo storage yard;
- Access to railroad, US Highway 101 to the south, and US Highway 30 to the east.

86.26 Disadvantages of the site include:

- Potential for minor impact on adjacent natural resources and possible interference with migration routes and feeding area for downstream migrant salmon;
- Development is limited by the size of the backup area;
- Development which increases rail or truck traffic will worsen the already serious traffic congestion in downtown Astoria;
- The potential for shoaling problems at the proposed Pier 4 is great, particularly if present patterns are disrupted by fill. However, certain designs might lessen shoaling at the existing pier slips. Costly hydraulic studies of alternative designs may be needed.

86.30 ALTERNATIVES

86.31 *Expansion to the proposed 80 acre area west of Pier 3* area would increase the development potential for the existing port facility and would resolve (by using as construction fill) the dredged material disposal problems in the port slips. However, additional wetlands and productive tidal flats would be taken out of aquatic productivity, with significant impacts on juvenile salmon and other fishes; a larger facility would increase traffic congestion in the port area and downtown Astoria; and the alterations could cause major shoaling problems in Youngs Bay.

86.32 *Tansy Point* (cf 82.) is closer to the river mouth (RM 9), less dredging may be required, and little or no fill would be needed. However, a deed restriction prevents all but residential use on a portion of the site and land transportation must pass through both Astoria and Warrenton, as well as over Youngs Bay.

86.33 *East Bank of the Skipanon* is closer to the river mouth (RM 11) and has more available land (200 acres) but extensive dredging or filling might be required for Columbia River access and land transportation must pass through Astoria and over Youngs Bay.

86.34 *Tongue Point* has more backup land, existing (though antiquated) port facilities, protection from wind and waves, and good land transportation to the east. However, Tongue Point is further from the river mouth (RM 18), property ownership remains an issue, shallow water will require extensive dredging and filling (some in productive intertidal and subtidal areas), proximity to the Lewis and Clark National Wildlife Refuge may cause development to interfere with existing wildlife use, and recreational fishing of the area may be reduced.

86.35 *Westport* has more land (225 acres), excellent rail and highway access, and is closer to market areas and north-south transportation routes. However, Westport is further from the river mouth (RM 43), development may require filling of freshwater wetlands, private owners have other plans for the site (paper mill expansion and lumber mill), and the potential for adverse impacts on the white-tailed deer population is unclear.

86.36 *Other upriver sites* include Port Westward, Longview, Rainier, St. Helens, Vancouver, and Portland. Actual site availability is not considered in this plan. In general these areas offer well-developed transportation and proximity to major distribution centers. However, their great distance from the river mouth would place future constraints on either the river channel or the size of skips, and increased river activity over a greater distance increases the risk of oil spills and collisions.

86.40 ENVIRONMENTAL CONSEQUENCES

86.41 The whole CREST planning area contains 42,564 acres of wetlands, of which 31,500 are sand or mud flats and 11,000 are tidal marsh. The 680 acres of this wetland area which are designated ***Development Aquatic*** are 1.6% of the total wetlands and the 2 acres for which this exception is written are about 0.0005% of the area's wetlands. From a regional perspective, the impacts of development at this site appear small. The impact on fisheries would be higher than this simple proportionate loss of wetlands.

86.42 Based on studies undertaken by the Port of Astoria in connection with their earlier proposal to fill 80 acres west of Pier 3, the 2 acre development area is highly productive for the amphipod *Corophium* and other bottom dwellers. *Corophium* is a primary food item for downstream migrant juvenile salmon, which have been collected in large numbers near the site. Filling or other alterations would remove a small portion of this important fish feeding area from aquatic production.

86.43 Filling or other alteration of areas west of Pier 3 may cause shoaling or erosion in other areas because of changed hydraulic conditions. The effect on sand transport from Youngs Bay around Smith Point may create shoaling at the proposed Pier 4 site. Dredging may also cause unforeseen shoaling or

erosion. Changes of habitat type caused by shoaling or erosion may increase or decrease productivity and the potential effects will require careful evaluation.

86.44 Impacts on air and water quality are expected to be small and difficult to measure. The effects are largely dependent on the type of facility developed.

86.45 Adverse impacts on wildlife are expected to be minimal. The 2 acre wetland is used by shorebirds, wading birds, and gulls, but the small area involved will not greatly affect wildlife use. Increased activity and noise on the site, once developed, may displace species sensitive to human activity.

86.50 SOCIO-ECONOMIC CONSEQUENCES

86.51 *Economics and employment* will be improved. A new port facility on this site will create new port and longshore jobs in the Astoria area. For every direct job created, at least one service job will be created. The Port of Astoria will become more economically viable and increased income will allow improvement of other facilities, including boat basins. Development on this site will provide a return on the one million dollar investment in the eleven acre cargo storage yard west of Pier 3. The Port will become less reliant on the shaky log-export market. Development of this site also ties in well with the approved six hundred foot Pier 4 proposal. Only a proportion of these favorable impacts can be ascribed to the exception area.

86.52 *Housing and public facilities* can accommodate this growth. The City of Astoria Comprehensive Plan makes provision for the new demand on housing and public facilities that would be caused by this development.

86.53 *Historical and archaeological sites* will not be affected: none have been identified in the area.

86.54 *Transportation* impacts will be negative in that congestion in downtown Astoria would be worsened and rail traffic through Astoria would be increased.

86.55 *Recreation and public access* will be either unaffected or improved. Existing access to the site is poor and recreational use is low. There are no recreational clam beds in the area. With proper design (as in the Astoria People Place Plan), public access could be provided for observation of port operations.

86.60 ENERGY CONSEQUENCES

The site's proximity to the mouth of the Columbia River will reduce energy use for certain upriver shipping. Ship turn-around time will be reduced. Development at this site will make maximum use of existing facilities, thus reducing energy consumption associated with construction.

86.70 COMPATIBILITY WITH NEARBY USES

86.71 Location of a new port facility at this site would be highly compatible with existing port operations to the immediate east. Noise impacts might create some problems for residents of nearby homes overlooking Smith Point. Transportation problems through the city create an additional incompatibility. To the north, the turning basin and main ship channel are compatible with new port operations. The proposed limited development west of Pier 3 would be incompatible with maintaining the natural resources of Youngs Bay. However, a ***Conservation Aquatic*** buffer zone is provided in the *Land and Water Use Plan.*

86.72 Any alterations carried out in the exception area must conform with the city comprehensive plan policies and zoning ordinance standards, and state and federal regulations. Review of any development proposal against these criteria during the permit process will ensure that adverse consequences are minimized. Before any alterations could occur, an impact assessment would be required.

87. GOAL 16 EXCEPTION TO ALLOW PORT DEVELOPMENT SOUTHERN PORTION OF TONGUE POINT (cf 42.16)

87.10 DESCRIPTION

A 180 acre area south of the existing piers at Tongue Point and west of the MARAD Basin is designated ***Development Aquatic***. This area consists of 100 acres of tidal marsh and 80 acres of mud flats. To allow an aquatic development designation, an exception is being taken to the Estuarine Resources Goal requirement that major tracts of salt marsh and tide flats be designated for inclusion in natural management units.

87.20 NEED

87.21 This area, along with the nothern portion of Tongue Point, can provide a total of 415 acres of land area to be used in conjunction with deep-draft port activities. The primary use of the land created would be for a container storage and handling yard used as part of the "land bridge" concept of cargo movement. The idea of a land bridge is to provide a link between Pacific, Atlantic and Gulf ports by rail. Ocean going cargo would be shipped to and from the East, West or Gulf Coast, transported by rail to another seaboard, and then loaded onto ships for transport to its final destination. This concept is

becoming more attractive economically because ships being currently designed will be wider than the 104 foot Panama Canal limit. The large volumes of cargo movement will necessitate adequate sized storage areas. Because of the rapid expansion of container shipping volume on the west coast in recent years, the number of sites large enough to accommodate the volume of cargo is very limited.

The exact nature of the need will be influenced by volumes of future shipping, changes in foreign markets, changes in technology, the useful life of the Panama Canal, the continuance of the trend to larger and less maneuverable ships, and economic conditions in the United States. Thus, proposed Port of Astoria development of the whole Tongue Point area is phased. The area for which an exception is being taken is in Phase II. Development of Phase II will occur only "after full utilization of the northern portion and upon a demonstration that the unique development potential of the area will be fully utilized."

87.22 According to *The Lower Columbia River Ports Region Study* Tongue Point is one of only six sites in the lower 50 miles of the Columbia River which has potential for water dependent development requiring deep draft navigational access.

87.23 Advantages of Tongue Point as a site for water dependent industrial or port development include: proximity to the Columbia River's 40 foot channel; proximity to the mouth of the river (RM 18); existing port facilities; natural depths of 20-30 feet; large amount of existing or potential backup land; lower probable shoaling rates than other estuarine locations; access to rail and highway transportation; location to the east of Astoria with minimal impact of rail and truck traffic on the city; protection from high winds and waves; anchorage space; and dredge material disposal sites in close proximity.

87.24 Disadvantages of Tongue Point as a site for water dependent industrial or port development include: filling of productive tidal marsh and mud flat areas; loss of productive fish habitat; proximity to a major wildlife refuge; impact on recreational fishing opportunities, particularly sturgeon fishing; time involved in clearing ownership questions.

87.30 ALTERNATIVES

87.31 *Sites in Astoria:* The major alternative site in Astoria is the existing Port facility, consisting of approximately 50 acres. Advantages of the site are: less dredging and filling required; proximity to river channel; closer to the river mouth (RM 13); rail and highway facilities available; and existing port facilities. Disadvantages of the site are: inadequate land area for a major facility; and cargo would have to be moved through Astoria by rail or truck.

87.32 *Tansy Point* advantages are: proximity to the river mouth; little dredging required; and limited impact on estuary, small amount of filling required. Disadvantages are: deed restriction prohibiting all but residential use on a portion of the site; rail and truck traffic would pass through Warrenton and Astoria and over Youngs Bay; greater exposure during adverse weather, wave and tital current conditions; no barge or ship lay-up in close proximity; and limited size (approximately 115 acres).

87.33 *East Bank of the Skipanon River* advantages are: less initial dredging may be required; closer to river mouth (RM 11); existing ownership is clear and the site is available for development; and up to 300 acres (200 shoreland and 100 development aquatic) of land available. Disadvantages are: no barge or ship lay-up in close proximity; greater exposure to adverse wind conditions; extensive filling required; and rail and truck traffic would pass through Astoria.

87.34 *Westport* advantages are: deep water access; 225 acres of shoreland and ***Development Aquatic*** area; adequate rail and highway access; available lay-up area at Westport Slough; and ownership clear. Disadvantages are: filling of fresh water wetlands; distance up river (RM 43); property not presently in port ownership; and potential adverse impact on white-tail deer population.

87.35 *Price Island* - the advantage of this site is its existing deep water-draft, up to 70 feet. Disadvantages are: no rail and highway access; distance from major market hubs; limited back-up land (75 acres); and distance from the river mouth (RM 34).

87.36 *Upriver Sites* - This group of sites includes: Port Westward, Longview, Portland, Rainier, Vancouver and St. Helens. Available sites in these areas have been subject to much less analysis than previous sites. As a group their advantages include well developed transportation and proximity to a major manufacturing and distribution center in Portland. The disadvantages of these sites are: distance from the river mouth; possible future constraints of river channel on size of ships; and increased risk of accidents and oil spills.

87.37 *Others* - Major coastal port facilities exist at Grays Harbor, Coos Bay, San Francisco/Oakland, Los Angeles/Long Beach. Alternative sites in these locations were not analyzed.

87.40 ENVIRONMENTAL CONSEQUENCES

87.41 There are a total of 42,564 acres of wetlands, consisting of 31,500 acres of mudflats and 11,000 acres of tidal marsh, within the CREST planning area. 680 acres are proposed for a development designation by the CREST plan, 1.6% of the total wetland area. The 180 acres for which the exception is being taken are about four tenths of one percent of the total wetland area.

87.42 Development could result in the loss of up to 100 acres of fresh-water tidal marsh consisting of sedges, bulrushes and cattails, resulting in a loss of primary biological productivity, wildlife habitat, detrital export, and favorable water filtration.

87.43 Development could result in a loss of up to 80 acres of tidal flats. Tidal flats provide feeding and resting areas for juvenile salmon and other fishes, as well as for shorebirds and wading birds. The results of recent research indicate that the number of am-

phipods, copepods, and other organisms important as food sources for juvenile salmon, are equal or greater than those in the most productive portions of Youngs Bay, Grays Bay and Alder Cove. Tidal flats also play an important role in the recycling of minerals and nutrients.

87.44 All of Cathlamet Bay is an important feeding area for juvenile salmon from the Big Creek hatchery. A recent study by the U.S. Fish and Wildlife Service found that fish from the Big Creek hatchery and upriver salmon use this area. Alteration would remove a portion of this feeding area. The MARAD Basin and other portions of this area are popular for sturgeon sports fishing. Dredging, in association with development, will have an unknown impact on this fishery. However, according to local sources, previous dredging of the MARAD Basin did not substantially affect fishing activity.

87.45 Alteration will result in a loss of wildlife habitat for wading birds, shoreland birds and waterfowl. Migratory bird and wintering waterfowl use of the MARAD Basin, which is presently high, will be affected to an undetermined extent. There may also be an impact on waterfowl use of the Lewis and Clark National Wildlife Refuge, though to a lesser degree, than in the MARAD Basin because of the buffer created by Lois and Mott Islands.

There is an inactive eagle nest on the west side of Tongue Point. The adjacent area is designated ***Natural.*** The exception area is about one mile from the nest. 400 feet is the recommended buffer used by the U.S. Fish and Wildlife Service for protection of eagle nests from logging practices. Two active eagle nests have been identified by the Nature Conservancy on the upper John Day River. These nests are several miles distant. During a survey of the lower Columbia River in the winter of 1978, 18-20 eagles were sighted at the downstream end of the Lewis and Clark Wildlife Refuge. Overall, port activity may displace some present eagle activities in the area.

87.46 Air quality impacts associated with container shipping operations are minimal. Present air quality is excellent. The small increase in air pollution should not exceed allowable increments under the region's Class II status.

87.47 Port activity will lead to increased risks of oil spills. Oil spills would have a major impact on adjacent fish and wildlife habitat. Location of oil spill containment equipment on site should lessen the potential for widespread impacts.

87.48 Filling will modify circulation patterns slightly. Because existing tidal currents are relatively low in velocity, it is not anticipated that filling or piling construction will result in significant erosion or shoaling in other areas.

87.49 Development for port activity will result in additional dredging. Dredging will result in the alteration and disruption of the existing aquatic habitat. Disposal of dredged material will disturb shoreland vegetative habitats.

87.50 SOCIO-ECONOMIC CONSEQUENCES

87.51 The impact of the proposed container facility on the economy of Astoria and Clatsop County was analyzed using the 1978 Clatsop County Input-Output Model. Full development of the Tongue Point area could create 200 direct jobs and 243 indirect jobs and a direct and indirect monetary impact of 21.5 million dollars annually. Only a portion of these impacts can be ascribed to the exception area.

87.52 The city's comprehensive plan makes provision for the demand on housing and public facilities that a port development of this magnitude would require.

87.53 No historical or archaeological sites have been identified.

87.54 Full development of the Tongue Point facility would require improvement of the rail line east to Portland. Potential need for a second track is uncertain.

87.55 Existing sports fishing, canoeing, small pleasure boating and bird watching activities would be displaced. Public access to this area is presently poor, except via the John Day River. With proper port facility design, public access to the immediate area could be enhanced.

87.56 Port activity will increase the amount of noise. Because of its location, impacts on residential areas should be minimal. Noise may displace present eagle activity in the area.

87.60 ENERGY CONSEQUENCES

The site's proximity to the mouth of the Columbia River will reduce the energy use for certain types of shipping activities.

87.70 COMPATIBILITY

87.71 The aquatic area and the shoreland areas to the north are designated ***Development*** and ***Water Dependent Development*** respectively. These designations are similar to those for the exception area.

87.72 Lois and Mott Islands are to the esat of the exception area. Both are in the Lewis and Clark National Wildlife Refuge. The western portions of these islands have been designated ***Conservation,*** to serve as a natural vegetative buffer and to allow for limited dredged material disposal on Mott Island. The operation of a major port facility within a mile of these islands could disrupt, and to some extent displace, wildlife use. These islands would buffer the effect of port activities on the remainder of the wildlife refuge, much of which is ***Natural,*** including the eastern edge of both islands.

87.73 The area to the west of Highway 101 is designated rural residential in the draft Clatsop County plan. Major port development will affect the present rural character of this area.

87.74 Any alterations carried out in the exception area will have to conform to city comprehensive plan policies, zoning ordinance standards, and state and federal agency regulations. Review of the proposal against against these criteria during the permit processes will insure adverse effects are minimized. Before any alterations could occur, an impact assessment is required by the planning goals.

APPENDIX C

CREST CHARTERS

CHARTER AND AGREEMENT

COLUMBIA RIVER ESTUARY STUDY TASKFORCE (CREST)

1979-80

This Charter and Agreement is made pursuant to Oregon Revised Statutes, Chapter 190 and the Revised Code of Washington, Chapter 39.34, and entered into this 1st day of July, 1979, by and between the member agencies that adopted the attached resolution.

1. Definitions:

1.1 Council: The group of persons (Delegates or Alternates) appointed by the member agencies vested with the responsibility of the management of the affairs of CREST and the formation of policy.

1.2 Executive Committee: The five member administrative group composed of four officers of the Council and the past chairman. The Executive Committee is vested with the responsibility for the daily supervision of the administration of CREST, and for other executive or administrative duties as assigned.

1.3 Member Agencies: The local governmental entities that belong to CREST.

1.4 Delegates and Alternates: The persons selected by each member agency to serve at the pleasure of the member agency as a representive on the CREST Council.

1.5 Estuary Area: The estuary area is defined as the water and submerged lands of the Columbia River estuary and its tributary streams, the associated tidelands, wetlands, shorelands and tributary watersheds within Pacific and Wahkiakum Counties in Washington and within Clatsop County in Oregon.

2. Establishment: The Columbia River Estuary Study Taskforce, hereinafter referred to as CREST, is hereby continued by agreement among its member agencies.

3. Nature of Agreement: CREST operated between January 1, 1975 and June 30, 1979 as a bistate local planning agency. Its primary objective was to develop a coordinated, regional management plan for the estuary and its shorelines. This amended Charter and Agreement is entered into by cities, counties and port districts in the estuary area in recognition of the special need for continued local coordination and communication on estuary issues as the management plan is implemented, through local comprehensive plans in Oregon and Shoreline Management Master Programs in Washington.

3.1 Nothing contained in this Charter and Agreement shall authorize CREST to intervene in matters which are basically within the domestic jurisdiction of any member agency without its consent.

3.2 This Charter and Agreement and all actions of CREST shall be within the framework of the laws of the States of Oregon and Washington and their subdivisions.

3.3 The actions of any committee or group authorized by this Charter and Agreement are of an advisory nature and not binding on any member agency of CREST without the member agency's approval and consent.

3.4 All member agencies, in order to insure to each of them the rights and benefits resulting from membership, shall fulfill in good faith the obligations assumed by them in accordance with this Charter and Agreement.

4. Purpose: The purposes of this Charter and Agreement are:

4.1 To enable the member agencies jointly to carry out the Columbia River Estuary Regional Management Plan.

4.2 To enable the elected officials of the member agencies jointly to identify issues and needs which are regional in scope, achieve concurrence for cooperative actions, plan, approve and recommend governmental action related to the conservation and development of the natural, economic and human resources of the Columbia River estuary area.

4.3 To improve communication and cooperation of member agencies in the Columbia River estuary area, and to promote maximum efficiency and economy in governmental operations.

5. Membership:

5.1 General purpose governments and port district in the estuary area shall be eligible for membership in CREST.

5.2 The governing body of any eligible local government entity may attain membership by adopting a resolution approving this Charter and Agreement.

5.3 Each member agency shall be entitled to a Delegate and Alternate on the Council. The Delegate from each member agency shall be selected from and designated by its elected governing body. The Alternate shall be selected and designated in the same manner but may be either an elected or appointed official representing that member agency. All representatives will serve at the pleasure of the member agency's governing body.

6. Meetings:

6.1 A regular meeting of the full Council shall be held at least once each month unless otherwise designated by the Chairman; the Executive Committee shall meet once or as necessary.

6.2 All meetings of the Council shall be in compliance with Oregon and Washington rules and regulations on public meetings.

7. Procedures and Voting:

7.1 The Council shall elect officers as listed in Paragraph 8.1. New officers shall be elected at the first regular Council meeting of the calendar year, to serve until replaced. Officers will be elected by secret ballot from the voting representatives.

7.2 Each voting member agency of CREST shall have one vote to be exercised by its Delegate.

7.3 Alternates shall each have one vote in the absence of the Delegate.

7.4 Decisions of the Council on procedures to be followed by CREST with regard to the conduct of its business shall be made by an affirmative majority vote of a quorum. A quorum shall be a simple majority of Delegates or Alternates from member agencies in good standing.

7.5 Decisions of CREST which involve recommendations for assessment or expenditure of funds or which involve financial agreement between two or more member agencies shall require an affirmative majority vote of the Delegates or Alternates from the member agencies of CREST.

7.6 The rules of parliamentary procedure comprised in Robert's Rules of Order shall govern CREST deliberations. The Chairman may discuss business under consideration without relinquishing the gavel.

8. Officers:

8.1 There shall be a Chairman, Vice Chairman, Secretary and Treasurer. The Chairman, Vice Chairman, Secretary and Treasurer shall be Delegate members of the Council.

8.2 Duties of the Chairman: The Chairman shall preside at all meetings of the Council, call meetings of the Council and create committees and appoint persons to serve on such committees at the pleasure of the Council. The Chairman shall be authorized to represent the Council in contractual or administrative matters. The Chairman shall be entitled to vote on all matters before the Council.

8.3 Duties of Vice Chairman: The Vice Chairman shall assume the duties of the Chairman in his absence.

8.4 Duties of the Secretary: The Secretary shall be responsible for maintaining minutes of the proceedings of the Council.

8.5 Duties of the Treasurer: The Treasurer shall keep an accurate record of the financial position of CREST. The Treasurer shall submit a financial report to the Council on request. He/She shall preside at meetings in the absence of the Chairman and Vice Chairman.

9. Permanent Committees:

9.1 Executive Committee: The Executive Committee shall provide supervision of CREST staff and shall see that the orders and policies are duly and properly carried out by staff and the Executive Director. The Executive Committee shall supplement the Council management of CREST during the periods between the Council meetings and advise and assist the Executive Director in the management of CREST. The Executive Committee shall have such additional duties, responsibilities and limitations as assigned by the Council and as stipulated by this Charter and Agreement.

9.2 Citizen Committee: The Citizen Committee will make recommendations to the Council on development issues of regional significance, on action plans to address regional problems, on estuary information and research needs, and on other matters. Representatives to the Citizen Committee shall be appointed by CREST member agencies.

10. Functions and Duties: CREST may have the following functions and duties subject to provisions contained in Sections 3.3 and 7.5.

10.1 Provide continued planning assistance to member agencies upon request to and approved by the Council. Review local comprehensive plans and shoreline management master programs and make recommendations which will result in coordination of such plans and programs and conformance with the Columbia River Estuary Regional Management Plan.

10.2 Provide technical information and assistance to member and other agencies for Columbia River Estuary Regional Management Plan implementation.

10.3 For member agencies and other local interests, act as local liason to the Pacific Northwest River Basins Commission as they conduct the six-year Columbia River Estuary Data Development Program. For this and other estuary research programs, act as a pipeline for local research needs and communication of results.

10.4 Evaluate state and federal estuary activities, programs, developments and project impact assessments that may affect local governments and report results to concerned jurisdictions.

10.5 Coordinate with local, state and federal agencies on estuary development, research, regulation, project impact assessment and plan review and update. Organize and conduct periodic meetings of all such agencies in the interest of cooperative management.

10.6 Establish and operate a Columbia River Estuary Information Center and provide library information searches, permit information, and other services to the public, planners, and state and federal managers and researchers.

11. Powers: The Council acting on behalf of CREST may have the power subject to provisions contained in Sections 3.3 and 7.5 as follows:

11.1 To enter into agreements with the United States of America, State of Oregon, State of Washington or any subdivision or agency of either, or any municipal corporation for the purpose of obtaining financial aid or other participation in attaining the objectives and purposes of CREST.

11.2 To enter into contractual relationships with private agencies or firms.

11.3 Adopt a budget indicating the anticipated receipts and expenditures of CREST.

11.4 To seek and accept grants, gifts, loans, and donations in the name of CREST, a member agency or other public or quasipublic agencies.

11.5 To designate a member agency as fiscal agent, which agent shall with consent, provide financial, purchasing, personnel and other auxiliary services to CREST and which shall account to CREST.

11.6 To make, adopt, and amend by-laws consistent with this Charter and Agreement.

11.7 To employ staff, retain consultants, or obtain the personal services of individuals or employees of other agencies.

11.8 To terminate committees appointed by the Chairman and to discharge committee members and advise the Chairman of new appointments.

11.9 To take such actions as are necessary to enable CREST to carry out its functions and duties.

12. Staff: The Council shall appoint an Executive Director who shall administer the business of CREST. He shall employ such staff as the Council shall authorize.

13. Duration and Termination:

13.1 This Charter and Agreement shall continue and remain in full force and CREST shall not be dissolved unless by a majority vote of the member agencies constituting the participating member agencies provided, however, that any such dissolution shall not become effective until such time as any contracts to which CREST is a party have been fully performed or are no longer in effect. In the event of such dissolution, all assets on hand shall be distributed to the member agencies in proportion to their contributions for the acquisition of such assets.

13.2 Any member agency may withdraw as a participating member agency in CREST under this Charter and Agreement by submitting written notice to the Council at least three months prior to the effective date of its intended withdrawal.

13.3 In the event of withdrawal by a member agency, the Council shall determine the portion of CREST's assets, if any, to which the withdrawing member agency shall be entitled. Any indebtedness incurred by CREST on behalf of a member agency which is withdrawing shall remain an obligation of that member agency.

14. Amendments: This Charter and Agreement may be amended by a majority affirmative vote of member governments. The CREST Council will approve proposed amendments. Written notice of proposed amendments, including its full text, must be submitted to each member government of CREST for their review and approval.

CHARTER AND AGREEMENT
COLUMBIA RIVER ESTUARY STUDY TASK-FORCE

This Charter and Agreement is made and entered into this 22nd Day of Sept., 1976, by and between the member agencies that adopted the following resolution.

1.0 Definitions.

1.1 Council: The group of persons (Delegates or Alternates) appointed by the member agencies vested with the responsibility for the management of the affairs of CREST and the formation of policy.

1.2 Executive Committee: The five member administrative group composed of four officers of the Council and the past chairman. The Executive Committee is vested with the responsibility for the daily supervision of the administration of CREST, and for other executive or administrative duties as assigned.

1.3 Steering Committee: The Steering Committee is composed of the Executive Committee and four appointed citizens, who shall guide and review the development of the Columbia River Estuary Management Program.

1.4 Member Agencies: The local governmental entities that belong to CREST.

1.5 Delegates and Alternates: The persons selected by each member agency to serve at the pleasure of the member agency as a representative on the CREST Council.

2.0 Establishment. The Columbia River Estuary Study Task-force, hereinafter referred to as CREST, is hereby established by agreement among its member agencies.

3.0 Nature of Agreement. The member agencies hereby recognize the need to jointly plan for facilities, utilities and services of an area wide or multi agency nature within the Columbia River estuary, in order to strengthen local governments and better serve the public. The member agencies also recognize the need to inform each other of proposals, plans, developments and operations which have an area wide effect; and hereby agree to bring all such to the attention of CREST for its review and recommendation.

3.1 Nothing contained in this Charter and Agreement shall authorize CREST to intervene in matters which are basically within the domestic jurisdiction of any member agency without its consent.

3.2 This Charter and Agreement and all actions of CREST shall be within the framework of the laws of the States of Oregon and Washington and their subdivisions.

3.3 The actions of any committee or group authorized by this Charter and Agreement are of an advisory nature and not binding on any member agency of CREST without the member agency's approval and consent.

3.4 All member agencies, in order to insure to each of them the rights and benefits resulting from membership, shall fulfill in good faith the obligations assumed by them in accordance with this Charter and Agreement.

4.0 Purpose. The purposes of this Charter and Agreement are:

4.1 To enable member agencies to jointly develop a coordinated management plan for the Columbia River estuary.

4.2 To enable the elected officials of the member agencies to jointly identify issues and needs which are regional in scope, achieve concurrence for cooperative actions, plan, approve and recommend governmental action in areas of governmental concern related to the conservation, development, utilization and modification of the natural, economic and human resources of the Columbia River estuary area.

4.3 To improve communication and cooperation of member agencies in the Columbia River estuary area, and to promote maximum efficiency and economy in governmental operations.

5.0 Membership.

5.1 The following local governmental entities shall be eligible for membership in CREST: Clatsop County, Wahkiakum County, the Cities of Astoria and Warrenton, the Towns of Cathlamet, Hammond and Ilwaco, the Port of Astoria. One member agency shall be designated from the port districts of Pacific and Wahkiakum Counties.

5.2 The governing body of any eligible local government entity may attain membership by adopting a resolution approving this Charter and Agreement.

5.3 Each member agency shall be entitled to a Delegate and Alternate on the Council. The Delegate from each member agency shall be selected from and designated by its elected governing body. The Alternate shall be selected and designated in the same manner but may be either an elected or appointed official representing that member agency. All representatives will serve at the pleasure of the member agency's governing body.

6.0 Meetings.

6.1 A regular meeting of the Council shall be held once each month unless otherwise designated by the Chairman.

6.2 All meetings of the Council shall be in compliance with Oregon and Washington rules and regulations on public meetings.

7.0 Procedures and Voting.

7.1 The Council shall elect officers as listed in Paragraph 8.1. The officers shall be elected at the first regular Council meeting of the calendar year, to serve until replaced. Officers will be elected by secret ballot from the voting representatives. No person shall serve more than two consecutive terms in the office of Chairman or Vice Chairman.

7.2 Each voting member agency of CREST shall have one vote to be exercised by its Delegate.

7.3 Alternates shall each have one vote in the absence of the Delegate.

7.4 Decisions of the Council on procedures to be followed by CREST with regard to the conduct of its business shall be made by an affirmative majority vote of a quorum. A quorum shall be no less than three Delegates or Alternates from member agencies of CREST in good standing.

7.5 Decisions of the Council which involve recommendations for planning studies or the implementation of plans or which involve agreements between member agencies shall require an affirmative majority vote of the representatives from the member agencies of CREST including an affirmative vote by Delegates or Alternates who represent the affected member agency or agencies.

7.6 Decisions of CREST which involve recommendations for assessment or expenditure of funds or which involve financial agreement between two or more member agencies shall require an affirmative majority vote of the Delegates or Alternates from the member agencies of CREST, including an affirmative vote by Delegates and Alternates who represent the affected member agency or agencies.

7.7 The rules of parliamentary procedure comprised in Robert's Rules of Order shall govern CREST deliberations. The Chairman may discuss business under consideration without relinquishing the gavel.

8.0 Officers.

8.1 There shall be a Chairman, Vice Chairman, Secretary and Treasurer. The Chairman, Vice Chairman, Secretary and Treasurer shall be regular voting members of the Council.

8.2 Duties of the Chairman - The Chairman shall preside at all meetings of the Council, call meetings of the Council and create committees and appoint persons to serve on such committees at the pleasure of the Council. The Chairman shall be entitled to vote on all matters before the Council.

8.3 Duties of Vice Chairman - The Vice Chairman shall assume the duties of the Chairman in his absence.

8.4 Duties of the Secretary - The Secretary shall be responsible for maintaining minutes of the proceedings of the Council.

8.5 Duties of Treasurer - The Treasurer shall keep an accurate record of the financial position of CREST. The Treasurer shall submit a financial report to the Council on request. He/She shall preside at meetings in the absence of the Chairman and Vice Chairman.

9.0 Permanent Committees.

9.1 Executive Committee - The Executive Committee shall provide supervision of CREST staff and shall see that the orders and policies are duly and properly carried out by staff and the Executive Director. The Executive Committee shall supplement the Council management of CREST during the periods between the Council meetings and advise and assist the Executive Director in the management of CREST.

The Executive Committee shall have such additional duties, responsibilities and limitations as assigned by the Council and as stipulated by this Charter and Agreement.

9.2 Steering Committee - The Steering Committee shall provide guidance and direction to the CREST program. The Steering Committee shall forward its recommendations for action to the CREST Council or Executive Committee as appropriate. Citizen members will be appointed by the CREST Chairman and serve at the pleasure of the Council until replaced.

10.0 Functions and Duties.

CREST may have the following functions and duties subject to provisions contained in Sections 7.5 and 7.6.

10.1 Upon request, and in cooperation with other advisory agencies, commissions, and boards, CREST may:

A. Initiate, conduct or cause to be conducted, planning studies of area wide or multi agency significance

B. Prepare or have prepared, and adopt, comprehensive plans, programs, or policies pertaining to multi agency or area wide facilities, utilities, and services; and prepare and adopt plans, policies, and programs recommending the governmental and organizational devices or structures necessary for conservation and development of the resources of the Columbia River estuary.

C. Prepare, adopt, and recommend policies and programs to alleviate area wide problems.

D. Prepare and propose policies, resolutions, ordinances, codes, laws, and regulations for submission to public and private agencies for their consideration.

10.2 Render advice and technical assistance to public and private agencies and citizens.

10.3 Review public and private agency policies, programs, and projects of an area wide or multi agency nature with respect to consistency with adopted policies, programs or plans.

10.4 Review the plans, programs and planning activities of individual agencies and governments within the Columbia River estuary and make recommendations which will result in the coordination of such plans, programs and planning activities in conformity to adopted policies, plans and programs.

11.0 Powers. The Coun cil acting on behalf of CREST may have the power subject to provisions contained in Section 7.5 and 7.6 as follows:

11.1 To enter into agreements with the United States of America, State of Oregon, State of Washington or any subdivision or agency of either, or any municipal corporation for the purpose of obtaining financial aid or other participation in attaining the objectives and purposes of CREST.

11.2 To enter into contractual relationships with private agencies or firms.

11.3 Adopt a budget indicating the anticipated receipts and expenditures of CREST.

11.4 To seek and accept grants, gifts, loans and donations in the name of CREST, a member agency or other public or quasi-public agencies.

11.5 To designate a member agency as fiscal agent, which agent shall with consent, provide financial purchasing, personnel and other auxiliary services to CREST and which shall account to CREST.

11.6 To make, adopt and amend bylaws consistent with this Charter and Agreement.

11.7 To employ staff, retain consultants or obtain the personal services of individuals or employees of other agencies.

11.8 To terminate committees appointed by the Chairman and to discharge committee members and advise the Chairman of new appointments.

11.9 To take such other actions as are necessary to enable CREST to carry out its functions and duties.

12.0 Staff. The Council shall appoint an Executive Director who shall administer the business of CREST. He shall employ such staff as the Council shall authorize.

13.0 Duration and Termination.

13.1 This Charter and Agreement shall continue and remain in full force and CREST shall not be dissolved unless by a majority vote of the member agencies constituting the participating member agencies provided, however, that any such dissolution shall not become effective until such time as any contract to which CREST is a party have been fully performed or are no longer in effect. In the event of such dissolution, all assets on hand shall be distributed to the member agencies in proportion to their contributions for the acquisition of such assets.

13.2 Any member agency may withdraw as a participating member agency in CREST under this Charter and Agreement by submitting written notice to the Council at least three months prior to the effective date of its intended withdrawal.

13.3 In the event of withdrawal by a member agency the Council shall determine the portion of CREST's assets, if any, to which the withdrawing member agency shall be entitled. Any indebtedness incurred by CREST on behalf of a member agency which is withdrawing shall remain an obligation of that member agency provided that such indebtedness received the affirmative vote of the member agency on behalf of which the indebtedness was incurred at the time the obligation was incurred, and is evidenced by written agreement or memorandum.

14.0 CREST shall complete its mission and dissolve on or before June 30, 1978.

15.0 Amendments. This Charter and Agreement may be amended by a majority affirmative vote of member governments. The CREST Council will approve proposed amendments. Written notice of proposed amendments, including its full text, must be submitted to each member government of CREST who shall respond within 30 days.

(PLEASE NOTE: SIGNATURES NOT NECESSARY, RESOLUTIONS ATTACHED.)

APPENDIX D

CREST PROGRAM PARTICIPATION

CREST COUNCIL MEMBERS

	Delegates	Alternates
Clatsop County	Dave Megrath Lyle Ordway Orvo Nikula ('79)	Hiram Johnson Don Corkill
City of Astoria	Bob Chopping ('77)	Jean Hallaux
City of Warrenton	Rod Gramson Della Wilson Hugh Mason	Fred Andrus Don Lampi
Town of Hammond	Richard Carruthers ('75) Chuck Marlow	Gail Hocchalter Richard Carruthers
Port of Astoria	Al Rissman Henry Desler	Gail Packard Brook Robin Harry Utti
Wahkiakum County	Robert Torppa ('76) Walter Kandoll	Bill Canham Leon Almer
City of Cathlamet	William Anderson William Schwarze	George Doumit
Pacific County	Eldred Penttila ('78)	Bill Crossman
Town of Ilwaco	Gerald Faddis Toby Beard	Patrick Schenk
Port of Ilwaco	John Pulli Frank Heer	Bob Petersen

Year served as Chairman of Council listed after Delegates name.

REGIONAL POLICY COMMITTEE

Jean Hallaux, Astoria
Jim Bergeron, Astoria
Gail Packard, Astoria
Christine Stricklin, Warrenton
Fred Andrus, Warrenton
Lyle Ordway, Clatsop County
Ernie Jager, Raymond
Andrea Gilbertson, Cathlamet
Irene Martin, Skamokawa
Bob Peterson, Ilwaco
John Wolcott, Seaside

LAND AND WATER USE PLANNING COMMITTEES

YOUNGS BAY-ASTORIA COMMITTEE

Don Morden, Astoria
Gail Collins, Astoria
Bob Urbrand, Astoria
John Altstadt, Astoria
Martin West, Astoria
Don Leach, U.S. Soil Conservation Service
Don Edy, Astoria
Marsh Hoffman, Astoria
Colleen Simonsen, Hammond
Luella Kerr, Warrenton
Jack Marincovich, Astoria
Warren Knispel, Oregon Department of Fish and Wildlife
Herb Palmberg, Warrenton
David Pratt, Clatsop County

BAKER BAY COMMITTEE MEMBERS

Bob Bell, Ilwaco
Toby Beard, Ilwaco
Glenn Eager, Chinook
Frank Heer, Ilwaco
Jim Hilderman, Seaview
Ralph Jones, Washington State Parks
Carolyn Glenn, Long Beach
Mel Lebeck, Chinook
Sandy Lipovsky, National Marine Fisheries Service
Rev. John Mann, Seaview
Bob Petersen, Ilwaco
Ann Saari, Ilwaco
Clyde Sayce, Washington Department of Fisheries

[An underlined name or year designates the Chairman]

NORTHEAST CLATSOP COUNTY COMMITTEE MEMBERS

Wally Erp, Astoria
Helen Lahti, Astoria
Max Kelly, Astoria
Stu & Judy McIntyre, Astoria
Gary Johansen, Astoria
Cheryl Johnson, Astoria
Evelyn Mason, Astoria
John Wall, Westport
Jim Van Osdol, Astoria
Burt Zurcher, Astoria
Jim Cadd, Astoria
Lisett Haglund, Astoria
Ed Johnson, Astoria
Dick Skipper, Oregon Department of Forestry
Del Warren, Department of Fish and Wildlife

WAHKIAKUM COUNTY COMMITTEE MEMBERS

Earl Moore, Cathlamet
Hugh Null, U.S. Fish and Wildlife Service
Irene Martin, Skamokawa
Bernie Cossette, Washington Department of Fisheries
Al Thayer, Cathlamet
Mel Souvenir, Cathlamet
Ruth E. Hall, Skamokawa
John Elliott, Rosburg
Dale Rhoades, Cathlamet
Tom Irving, Cathlamet
Walter Kandoll, Naselle
Bob Bacon, Cathlamet
Ladean Peek, Cathlamet
Veryl Chamberlain, Grays River
John Hendrickson, Cathlamet
Wayne Carrell, Rosburg
Russell Clark, Naselle
Bill Schwarze, Cathlamet
Walter Kato, Deep River

LOWER RIVER AND ISLANDS PLANNING COMMITTEE

Paul Benson, Pacific Northwest River Basins Commission

Dredging and Dredged Material Disposal Subcommittee
Harry Utti, Port of Astoria
Bob Bell, Pacific County
Mel Souvenir, Wahkiakum County
Stan Hamilton, Oregon Division of State Lands
Floyd Shelton, Oregon Department of Economic Development
Brent Forsberg, Oregon Department of Fish & Wildlife
Doug Magoon, Washington Department of Natural Resources
Jack Howerton, Washington Department of Game
Ron Lee, Environmental Protection Agency
Nancy Ellifrit, U.S. Fish & Wildlife Service
Bob Watson, Alternate, U.S. Fish & Wildlife Service
Greg Hartman, Corps of Engineers
Bob Dodge, Alternate, Corps of Engineers
Jim McAvoy, Columbia River Bar Pilots
Hank Nieni, Columbia River Fishermen's Protective Union

Fisheries Subcommittee
Jim Bergeron, Marine Extension Agent
Jim Lauman, Oregon Department of Fish & Wildlife
Clyde Sayce, Washington Department of Fisheries
Sally Cramer, National Marine Fisheries Service
Doug DeHart, Corps of Engineers
Jim Athern, Alternate, Corps of Engineers
Rex Pollitt, Columbia River Pilots
John Wolcott, Crown Zellerbach Corporation
Roger Shearer, Trollers
Jack Harrell, Charter Boat Operator
Roy Takalo, Columbia River Fishermen's Protective Union
George Potter, Clatsop Environmental Council

Restoration and Mitigation Subcommittee
Bob Peterson, Port of Ilwaco
Brook Robin, Port of Astoria
Jim Lauman, Department of Fish & Wildlife
Gary Gustafson, Land Conservation & Development Commission
Stan Hamilton, Oregon Division of State Lands
Miriam Laukers, Washington Department of Ecology
Jack Howerton, Washington Department of Game
Don Peterson, Washington Department of Ecology
Bob Moulton, Corps of Engineers
Nancy Ellifrit, U.S. Fish & Wildlife Service
Don Leach, U.S. Soil Conservation Service
Chuck Walters, National Marine Fisheries Service
Don Morden, BioProducts, Inc.
Jack Harrell, Charter Boat Operators
Roger Shearer, Trollers
George Potter, Clatsop Environmental Council
Bernice Barr, Willapa Hills Audubon Society

Refuge Management, Public Access and Recreation Subcommittee
Don Corkill, Clatsop County
Tom Hal:, Wahkiakum County
Jean Hallaux, City of Astoria
Alan Cook, Oregon State Parks
Dave Heiser, Washington State Parks
Hugh Null, U.S. Fish & Wildlife Service
Chuck Mason, Corps of Engineers
Gene Drais, Heritage Conservation Service
Russ Bristow, Hunters/Trappers
Dave Hughes, Sport fisherman

IMPLEMENTATION COMMITTEE MEMBERS

Gail Collins, Astoria
Orvo Nikula, Astoria
Micky Schulbach, Astoria
Dick Carruthers, Warrenton
Jean McKinney, Astoria
Dorothy Riekkola, Astoria
Martin West, Astoria
Jean Hallaux, Astoria
Toby Beard, Ilwaco
Frank Heer, Ilwaco
Eldred Penttila, Long Beach
Ann Saari, Ilwaco
Bob Bacon, Cathlamet
Walter Kandoll, Naselle
Bob Torppa, Grays River
Gary Gustafson, Department of Land Conservation and Development
Miriam Laukers/Joe Williams, Department of Ecology

DREDGED MATERIAL DISPOSAL/RESTORATION AND MITIGATION

Technical Advisory Committee

Agency Representatives:

Federal: Army Corps of Engineers - Chuck Galloway
E.P.A. - Ron Lee
U.S. Fish & Wildlife Service - Nancy Ellifrit
NMFS - Chuck Walters
SCS - Don Leach, Oregon
Greg Fischer, Washington

Oregon: DSL - Stan Hamilton
ODF&W - Jim Lauman
DLCD - Gary Gustafson
DEQ - Bruce Sutherland

Washington: DNR - Bob Flye
DoG - Jack Howerton
Bob Ziegler
DoF - Clyde Sayce
DOE - Gary Hanson
Howard Steeley

Local Representatives:

Port of Astoria - Brook Robin
Harry Utti

Port of Ilwaco - Bob Petersen

Port of Chinook - Glenn Eager

Wahkiakum County - John Hendrickson
(Irene Martin, Secretary)
Bob Bacon

Diking Districts: Deep River - Carlton Appelo
L. Grays River - Wayne Carrell
Skamokawa - Elmer Ingleson or
Lester Cook
Wildlife Refuge - Hugh Null
Puget Island - Tom Irving or
Gordon Olman or
Bob Busk
Lewis and Clark River - John Shepard
Youngs River - Micky Schulbach
Westport - Ed Johnson

CREST STAFF MEMBERS

John Perry	7/75 - 4/76
Jan Stewart	1/75 - 2/75
Betty Hucheson	1/75 -10/75
Bruce De Young	1/75 - 9/75
Ruth Newman	10/75 -12/75
Shelly Bartlett	1/76 - 2/76
Jim Good	2/76 - 6/79
Judy Crosby	6/76 - 2/78
Bob Blanchard	8/76 -10/78
David Jay	9/76 - 5/79
Kurt Buchanan	10/77 - 9/78
Magdalena Cristobal	7/77 - 6/78
Barbara Chipman	4/77 - 5/77
Donna Sue Mansfield	2/78 - 6/79
Margaret Seaman	3/77 - 4/78
Dale Deason	4/78 - 6/79
Kim Maree Johannessen	7/78 - 6/79
Steve Chesser	12/78 - 6/79

PROFESSIONAL SERVICES

Pacific Northwest River Basins Commission
Bob Holton, OSU
Paul Benson
Wilsey & Ham Planning Consultants
George "Strider" Potter
Dana McKinney
Norman Kujala
Paul Torian
Valerie Lingg
Michael Frazier
Walter Lindstrom
Marcia Benad
Dennis Berry
Ian McColgin

APPENDIX E

STATE AND FEDERAL

TECHNICAL ADVISORY COMMITTEES

WASHINGTON TECHNICAL ADVISORY COMMITTEE

DEPARTMENT OF ECOLOGY
Joe Williams, TAC Coordinator
Miriam Laukers

DEPARTMENT OF NATURAL RESOURCES
Doug Magoon
Jack Shero
Bob Flye

DEPARTMENT OF FISHERIES
Mary Lou Mills
Gene Deschamps
Clyde Sayce

DEPARTMENT OF GAME
Jack Howerton

PARKS AND RECREATION
Dave Heiser

PLANNING AND COMMUNITY AFFAIRS AGENCY, formerly OFFICE OF COMMUNITY DEVELOPMENT
Bert Baron

INTERAGENCY COMMITTEE FOR OUTDOOR RECREATION
Jerry Pelton
Greg Lovelady

DEPARTMENT OF TRANSPORTATION
Leroy Anderson

OREGON TECHNICAL ADVISORY COMMITTEE

DEPARTMENT OF LAND CONSERVATION AND DEVELOPMENT
Gary Gustafson - TAC Coordinator
Neal Coenen
Clarence Parker

DEPARTMENT OF FORESTRY
Bill Dryden
Chet Reed

DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
John Beaulieu

STATE MARINE BOARD
Dan Stack
Waldo Ohmart

DEPARTMENT OF WATER RESOURCES
Neil Peterson
Doug Bennett

DEPARTMENT OF ENVIRONMENTAL QUALITY
Bruce Sutherland

DIVISION OF STATE LANDS
Stan Hamilton

DEPARTMENT OF TRANSPORTATION
Don Thurston
Paul Norris

STATE PARKS DIVISION
Allan Cook
Bob Franklin

DEPARTMENT OF ENERGY
Dave Philbrick

DEPARTMENT OF FISH AND WILDLIFE
Jim Lauman

DEPARTMENT OF ECONOMIC DEVELOPMENT
Floyd Shelton

CREST FEDERAL TECHNICAL ADVISORY COMMITTEE

PACIFIC NORTHWEST RIVER BASINS COMMISSION
Paul Benson (through June, 1978) - TAC Coordinator
Jack Johnson

DEPARTMENT OF ARMY
Corps of Engineers
Ken Johnson
Jerry Hadley
Gail Gronewald

DEPARTMENT OF COMMERCE
National Marine Fisheries Service
Charles Walters
Sally Cramer
Jim Shelton

Economic Development Administration
Tom Current

DEPARTMENT OF INTERIOR
Ken Fulcher
George Van Janten

U.S. Fish and Wildlife Service
Nancy Ellifrit
Ron Weaver
Jay Watson

U.S. Geological Survey
Dave Harris

Heritage Conservation and Recreation Service
Kelly Cash
Gene Drais

National Park Service
Edwin Arnold
Peter Klindt

Bureau of Land Management
Art Oakley
Robert Borovicka

DEPARTMENT OF AGRICULTURE
Bill Coffield
John Issacson

Soil Conservation Service
Robert Corthell
Maurice Jernstadt

U.S. Forest Service
John Nunan

DEPARTMENT OF ENERGY
Bonneville Power Administration
Arthur Evans

ENVIRONMENTAL PROTECTION AGENCY
Duane Karna
Ron Lee

DEPARTMENT OF TRANSPORTATION
U.S. Coast Guard
CDR. G. A. Pennington

APPENDIX F

HISTORY OF STATE AND FEDERAL AGENCY INVOLVEMENT IN PLAN DEVELOPMENT

Jan., 1975 - June, 1979

Federal Office of
Coastal Zone Management

State of Washington
Dept. of Ecology
CZM 306 Funds in Regional Planning grants, no local match

State of Oregon
Land Conservation & Devel.
CZM 305 & 306 Funds -
At least 33% local in-kind match for 305 and at least 20% local in-kind match for 306

CREST		CREST	
FY 77 (July through June)	20,000	1/75-6/79	30,000
FY 78 (July through June)	55,000	7/75-12/75	17,819
FY 79 (July through June)	50,000	1/76-6/76	19,167
		6/76-12/76	30,000
		1/77-6/77	30,000
		FY 78	81,804
		FY 79	90,250
	125,000		299,040

LOCAL MATCHING FUNDS

FY 75	15,000
FY 76	39,800
FY 77	25,700
FY 78	20,451
FY 79	22,420
TOTAL	123,371

HISTORY OF STATE AND FEDERAL AGENCY INVOLVEMENT IN PLAN DEVELOPMENT

REGIONAL POLICY DEVELOPMENT

°December 8, 1975 - Agency representatives participated in a workshop to identify policy needs for the estuary.

°Local Committee selected to develop policies; CREST requested each agency to provide to the committee agency policies for review and resource material (August 31, 1976 TAC meeting).

°October 19, 1976 TAC meeting - reiterated request for assistance in providing agency policies to CREST for use in draft policy development (for those agencies who had not responded).

°April 7, 1977 TAC meeting to review draft regional policies and answer agency questions on draft which had been mailed earlier. Requested all agency comments as soon as possible.

°Used agency comments on draft policies to revise policies.

°Submitted revised policies to CREST Council for adoption as "interim estuary management guidelines" in July, 1977. Subsequently forwarded to agencies for formal review with request to forward information concerning any conflicts with agency policy.

°Fall, 1978 - Requested agencies to review policies and report any problems or conflicts (there will also be a local review).

°Spring, 1979 - Revised policies as necessary for inclusion in final plan; no significant conflicts with agencies existed.

LAND AND WATER USE PLAN

°October 19, 1976 Tac meeting - Held agency workshop to identify planning subareas of the estuary, including criteria for establishing shoreland, wetland, water, and upstream boundaries.

°November - Mailed agencies draft report on planning subarea identification and planning methodology, requested detailed review and comment. This report also outlined the actual role state and federal agencies would have in development of the plans. Agency recommendations at previous TAC meeting and written comments on draft provided the major content of this final report, which was adopted by the CREST Council in December, 1976.

°February, 1977 - Held TAC workshop to develop a "Land and Water Area/Environment Classification System" and an associated "permitted use/activities matrix". Use/activity standards were also discussed. Agency recommendations provided the major content of these planning tools, which were published in April, 1977 for another round of reviews.

Youngs Bay-Astoria Unit

°January, 1977 - Locally-based agency representatives appointed to local planning committee (Federal Soil Conservation Service Conservationist and Oregon Fish and Wildlife Field Biologist).

°February-March, 1977 - Several agencies make information presentations to local planning committees (National Marine Fisheries Service, Oregon Division of State Lands).

°April 7, 1977 Tac meeting - Report on planning process.

°June 29, 1977 - Published plan map alternatives, for this area, with request to state/federal agencies to review and comment on what they wanted to see in a draft plan.

°July 14, 1977 TAC meeting - Held in Astoria, agency representatives were asked to present their ideas and recommendations to the local planning committee. Detailed comments and explicit map recommendations were given by several agencies; others failed to respond.

°November, 1977 - Based on alternatives comments, draft plan produced and published for public and agency review. At TAC meeting on November 17, 1977 presented draft plan to state/federal agencies. Comments were received through January 19, 1978.

°January 10, 1978 - TAC meeting to review detailed agency concerns over draft plan. Agency involvement, plan organization and format, implementation issues and issue and site-specific concerns were expressed.

°Spring, 1978 - Comments were reviewed, summarized and work began on resolving conflicts which were not site or issue-specific. This information was used to reorganize plan document format and modify the planning process for subsequent plans to provide for more direct agency input.

°State and Federal agencies who communicated disagreements over provisions of the plan were directly involved in the conflict resolution phase of the CREST land and water use planning process. Meetings were held February 14, 1979 to discuss Tongue Point/Astoria conflicts and March, 1979 to resolve Warrenton-Hammond area conflicts. Some conflicts were resolved, but agreements could not be reached on several areas.

Baker Bay Unit

°July, 1977 - Committee selected included locally-based representatives from several stated and federal agencies (National Marine Fisheries Service, Washington Department of Fisheries, Washington State Parks).

°November 17, 1977 - TAC meeting - status report on progress with Baker Bay planning.

°February 16, 1978 - TAC meeting - Held with Washington state and federal agencies, along with the Office of Coastal Zone Management representatives to introduce the draft. Two month review and comment period established.

°State and federal agencies who expressed disagreement with draft plan provisions were directly involved in conflict resolution, held April 17, 1979. All conflicts were resolved in this case.

Lower River and Islands Unit

°Committee selected by CREST Council in December, 1977 - included representatives from all key state and federal resource agencies.

°February 8, 1977 - Two-day workshop to start planning work. Policy development sessions for dredged material disposal, restoration and mitigation, fisheries and recreation held. Agency representatives directly involved.

°May 2-3, 1978 - Two-day workshop to develop draft plan and draft policies; agency representatives directly involved.

°October, 1978 - Draft plan released for public and agency review - comments from agencies dealt primarily with policies on dredged material disposal and restoration/mitigation which were addressed during further planning in these efforts. No significant land and water use conflicts were identified.

Wahkiakum County Unit

°December, 1977 - Selected local planning advisory committee which included USFWS Wildlife Refuge Manager and Washington Department of Fisheries fish hatchery manager.

°March-May, 1978 - Agency presentation of concerns and needs given to committee, included federal agencies (Corps, USFWS, NMFS) and state agencies (DNR, DOE, DG, DF, State Parks).

°October, 1978 - Draft plan released for agency review and comment - numerous problems identified.

°May 16, 1978 - Conflicts resolution session held in Skamokawa, Washington. Several issues were resolved but several were left outstanding.

Eastern Clatsop County Unit

°Committee selected in January, 1978. Included members from Oregon Department of Fish and Wildlife and Oregon Department of Forestry.

°March-May, 1978 - State and federal agencies made presentations to the local planning committee on their concerns, needs and policies.

°September, 1978 - TAC meeting will be held to present the draft plan to agencies and allow them to determine conflicts prior to public distribution. Opportunity will be provided for agencies to meet with the planning committee directly if desired.

°September, 1978 - Draft plan published for agency review and comment; numerous minor conflicts and one major conflict noted.

°June 5, 1979 - Conflict resolution meeting with agencies held; some resolution of issues regarding Wauna/Westport area made - other issues resolved to satisfaction of agencies.

DREDGED MATERIAL DISPOSAL AND RESTORATION/MITIGATION PLAN

°April 21, 1977 - State and Federal agency workshop to make a preliminary identification of potential dredged material disposal and restoration sites using physical, biological and economic criteria. Corps of Engineers provided substantial assistance in putting on this workshop.

°Using Lower River and Islands Unit subcommittees (February-May, 1978), developed a policy base for dredging and dredged material disposal and restoration/mitigation which are published as an appendix to the Lower River and Islands Draft Plan (all key agencies were directly involved).

°November, 1978 - Workshop with Oregon and federal agencies to inspect potential dredged material disposal and restoration sites in the Youngs Bay area.

°March, 1979 - Major workshop with full technical committee to review Oregon and Washington DMD sites.

°May 1, 1979 - Draft DMD plan released for agency and public review - state and federal TAC workshop to review the draft.

°Conflict resolution meetings - DMD sites were reviewed and considered at each of the conflict meetings held for the Land and Water Use Plan.

IMPLEMENTATION

°The TAC coordinators from WDOE, ODLCD and PNRBC were appointed as members of the CREST Implementation Committee in February, 1978. All key resource agencies receive all mailings and invitations to participate in monthly committee meetings. Several have done so.

°July, 1978 - Agencies received report on "Intergovernmental Coordination Alternatives" for interlocal and local-state-federal coordination along with a questionnaire soliciting their recommendations.

°June-July, 1978 - Agency representatives interviewed by CREST staff and/or Consultant hired by CREST to develop use/activity standards to be associated with the land and water use plan. Agency policies and regulations used heavily in development of recommended CREST standards.

°December, 1978 - Agency comments considered heavily in decision to establish a local-state-federal coordination mechanism to help implement the plan.

°Spring, 1979 - Agencies invited to participate in Implementation Committee meetings to review and evaluate development standards. Agencies participating included WDOE and ODLCD.

APPENDIX G

CREST CHRONOLOGY OF MAJOR EVENTS

1974 - Series of organizational meetings to discuss local participation and forum for an estuary study.
- States were encouraging such a study and asked the Pacific Northwest River Basins Commission to coordinate federal participation and put together a research program for federal funding.

late 1974 - Framework for a local organization established - the Columbia River Estuary Study Taskforce (CREST) - a "Charter and Agreement" developed and adopted by 10 local jurisdictions:

Washington	City of Cathlamet
	Wahkiakum County
	Pacific County
	Port of Ilwaco
	Town of Ilwaco
Oregon	City of Astoria
	City of Warrenton
	Town of Hammond
	Clatsop County
	Port of Astoria

January, 1975 - Hired a local study coordinator - received CZM funding from Oregon LCDC to develop a planning program.

Spring, 1975 - Hired a consultant, Wilsey and Hamm, to put together a work program for a CREST study.

September, 1975 - CREST Phase I Report published - established a Phase II and III work program for policy development, research and data development, etc.

February-June, 1976 - Conflicts in the local organization, withdrawal by Clatsop County/Port of Astoria - eventually rejoin and presently are two of most supportive members.

June, 1976 - Program reorganized to focus on both policy and a land and water area plan that would allocate certain areas for protection and others for different levels of development.

December, 1976 - A management plan framework and a detailed planning process adopted by CREST - planning begins in the Youngs Bay-Astoria area.

September, 1976 - Draft plan for Youngs Bay-Astoria area published for local, state and federal review.

July, 1976-October, 1977 - Draft plans for other areas of the estuary - Baker Bay, Lower River and Islands, Eastern Clatsop and Wahkiakum County developed by local citizen advisory committees.

July, 1977 - Columbia River Estuary Regional Policies developed, reviewed in draft form and adopted by CREST Council as "interim management guidelines" and "plan development guidelines" - subsequently used as basis for CREST comment on Corps and state fill/dredging permits as well as other major estuary development projects.

June, 1978 - Columbia River Estuary Data Development Program (the research program sponsored by the Pacific Northwest River Basins Commission as a support for CREST planning) receives Congressional authorization and FY 79 appropriation of $829,000.

July, 1978 - CREST extends its "sunset provision" for planning to July, 1979.

September, 1978 - CREST's Implementation Committee recommends establishment of (1) a permanent local estuary management organization, and (2) execution of a local-state-federal "cooperative management agreement" - CREST Council adopts recommendations after thorough local government review. State and federal agencies concur with recommendations.

January, 1979 - CREST "Conflict Resolution" process begins with objective of local-state-federal concurrence on policies, land and water use plans, and development standards for uses and activities; CREST continues work on a Dredged Material Disposal plan and Restoration/Mitigation Plan.

June 1979 - CREST will publish a final report including:

1. Regional Policies
2. Land and water use plans
3. Development standards for permitted/conditional uses
4. Dredged Material Disposal Plan
5. Restoration/Mitigation Plan
6. Future Intergovernmental Coordination structure
7. Plan review and update procedures

July, 1979 - CREST follow-on organization starts operation and will assist local governments in program implementation through technical assistance.

NOAA COASTAL SERVICES CENTER LIBRARY
3 6668 00001 1512