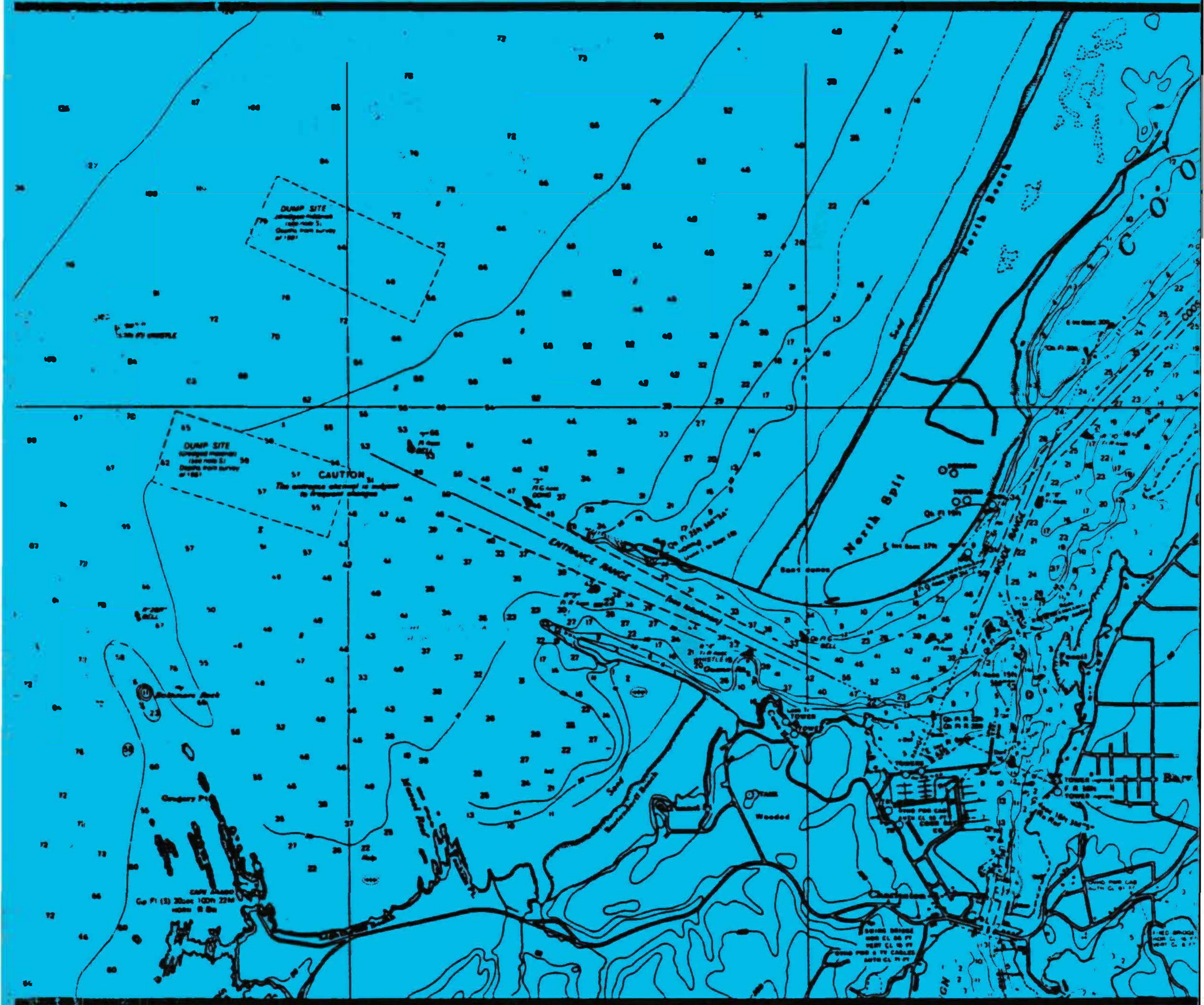
COOS BAY, OREGON DREDGED MATERIAL DISPOSAL SITE DESIGNATION

FINAL ENVIRONMENTAL IMPACT STATEMENT



US Army Corps of Engineers
Portland District

United States
Environmental Protection Agency
Office of Marine and Estuarine Protection
Marine Operations Division
Washington, D.C. 20460

841R86002

FINAL

ENVIRONMENTAL IMPACT STATEMENT

FOR

COOS BAY, OREGON DREDGED MATERIAL

DISPOSAL SITE DESIGNATION

U.S. ENVIRONMENTAL PROTECTION AGENCY

OFFICE OF MARINE AND ESTUARINE PROTECTION

WASHINGTON, DC 20460

PREFACE

This document was prepared by the Corps of Engineers (COE), Portland District, with assistance and cooperation from Environmental Protection Agency (EPA) Region X. Region X provided technical assistance in the drafting and reviewed drafts of this document. The document was submitted for further review and approval by EPA Headquarters.

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SUMMARY SHEET
ENVIRONMENTAL IMPACT STATEMENT
COOS BAY DREDGED MATERIAL DISPOSAL SITES

( ) Draft
(x) Final
( ) Supplement to Draft

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF MARINE AND ESTUARINE PROTECTION

1. Type of Action

(x) Administrative/Regulatory Action
( ) Legislative Action

2. Background

Except for this summary sheet, this Environmental Impact Statement (EIS) was prepared by the Portland District, U.S. Army Corps of Engineers (CE) in cooperation with Region X, Environmental Protection Agency (EPA). It has been reviewed by Region X, EPA and approved by the EPA office of Marine and Estuarine Protection. The EIS is being issued by the Office of Marine and Estuarine Protection, Office of Water, EPA as part of its responsibilities under the Consent Agreement with the National Wildlife Federation.

3. Brief Description of the Action and Purpose.

The proposed action described in this EIS is the final designation of two interim designated Ocean Dredged Material Disposal Sites (ODMDS) and the designation of a new ODMDS off Coos Bay, Oregon. The two finally designated existing ODMDSs would be used for the disposal of large grained sediments (dredged material) while the new site further offshore would be used for the disposal of finer sediments with higher volatile solids content. The purpose of the action is to provide environmentally acceptable areas for the disposal of dredged material, in compliance with the EPA Ocean Dumping Regulations and Criteria.

4. Summary of Major Beneficial and Adverse Environmental and Other Impacts.

The principle beneficial effect is the provision of designated environmentally acceptable ocean areas for the disposal of dredged material. Planning for dredged material disposal is enhanced since permanently designated ocean disposal sites are available for comparison with other dredged material disposal alternatives. An adverse impact will result from burial and loss of some bottom organisms within the sites. Burial of bottom organisms outside the site boundaries should not occur. Other adverse environmental effects such as mounding, changes in sediment texture, and disturbance of demersal fish, will be temporary, minor and restricted to the sites.

5. Major Alternatives Considered.

The alternatives considered in the site evaluation studies and presented in this EIS were: (1) no action; (2) final designation of the interim designated sites and one new site; and (3) alternative locations for a new ocean disposal site.

6. Comments on the Draft EIS were requested from the following:

Federal Agencies and Offices

Council on Environmental Quality
Department of Commerce
  National Oceanic and Atmospheric Administration (NOAA)
  National Marine Fisheries Service
  Maritime Administration
Department of Defense
  Army Corps of Engineers
Department of Health, Education, and Welfare
Department of Interior
  Fish and Wildlife Service
  Bureau of Outdoor Recreation
  Bureau of Land Management
  Geological Survey
Department of Transportation
  Coast Guard
Water Resources Council
National Science Foundation

State and Municipalities

State of Oregon
City of Coos Bay
Coos County

Private Organizations

American Littoral Society
Audubon Society
Center for Law and Social Policy
Environmental Defense Fund, Inc.
National Academy of Sciences
National Wildlife Federation
Sierra Club
Water Pollution Control Federation

Academic/Research Institutions

Oregon State University

7. The Final statement was officially filed with the Director, Office of Federal Activities, EPA.

8. Comments on the Final EIS are due 30 days from the date of EPA's publication of Notice of Availability in the Federal Register which is expected to be FEB 7 1986.

Comments should be addressed to:

Paul Pan, Chief
Environmental Analysis Branch
Marine Operations Division (WH-556M)
Office of Marine and Estuarine Protection
Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

Copies of the Final EIS may be obtained from:

Environmental Analysis Branch
Marine Operations Division (WH-556M)
Office of Marine and Estuarine Protection
Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

The Final Statement may be reviewed at the following locations:

Environmental Protection Agency
Public Information Reference Unit, Room 204 (Rear)
401 M Street, SW
Washington, DC 20460

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

Portland District
U.S. Army Corps of Engineers
319 SW Pine
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ENVIRONMENTAL IMPACT STATEMENT

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INTRODUCTION

The proposed action addressed in this Environmental Impact Statement (EIS) is final designation of ocean dredged material disposal sites (ODMDS) in the vicinity of Coos Bay, Oregon. The purpose of the site designation process is to identify environmentally acceptable offshore sites for the disposal of dredged material from Coos Bay and vicinity, and to avoid or minimize adverse impacts especially in areas valuable to critical resources. A site designated for continuing use is subject to restrictions listed in 40 CRF 220-229 (Ocean Dumping Regulations). These restrictions include an in-depth environmental review of any proposed disposal activity. Designation in itself does not result in disposal of dredged material. A separate evaluation of the suitability of dredged material for ocean disposal is undertaken for each proposed site. However, ocean disposal cannot be considered in the absence of a designated site. In addition, monitoring of these sites will be performed as described in Section 4.5 of this EIS.

This EIS presents information in regard to the acceptability of the ODMDS proposed for final designation. The evaluations only compare ocean disposal sites and do not consider comparisons with other disposal options such as upland or in-bay. Upland or in-bay evaluations are conducted for each Section 103 permit disposal as required by the ocean dumping regulations. Present Corps procedures satisfy Section 103 requirements by routinely evaluating dredged material sediments on a 3 to 5 year basis.

The primary data bases for this EIS were disposal site evaluation and monitoring studies conducted by Oregon State University (OSU) under contract to the Corps of Engineers, Portland District (Corps). Additional data were obtained from a reconnaissance survey conducted by Interstate Electronics Corporation (IEC) under contract to the Environmental Protection Agency (EPA).

The OSU study was initiated in January 1979 and field work was completed in September 1983. The study was conducted in 5 phases.

Phase I was a 12-month baseline study of the physical, chemical and biological conditions of the nearshore area off Coos Bay (an area of approximately 7,500 x 4,000 meters, extending out to the 40 meter contour and including Interim Ocean Disposal sites E and F) and of the Coos Bay channel from River Mile (RM) 15 to the entrance. The purpose of the Phase I studies was to provide information that could be used to select candidate sites for detailed evaluation during Phases II and III. The criteria used in selecting candidate sites were:

a. Physical and chemical similarity (compatibility) of dredged material and site sediment type:

b. Avoidance of impacts on unique or valued biological communities; and,

c. Minimization of onshore transport of fine sediments.

Since the sediments from above RM 12 of Coos River were determined to be incompatible with sediments of the Phase I ocean study site, a need existed to conduct detailed studies at sites located further offshore. Therefore, Phase

II and III studies were conducted between April 1980 and June 1981 in an area of approximately 5,000 x 3,500 meters, and at depths ranging from 40 to 120 meters, which provided additional baseline data for final site designation.

Phase IV and V studies were initiated in July 1981 and field work was completed in September 1983. Copies of the final report are available from the Portland District. These studies investigated the effects of a 1981 test disposal at site H (53-66 meter depths) during and immediately following disposal and re-investigated the site during 1982 and 1983, to document post disposal effects.

The EIS is being prepared in accordance with the requirements of the Marine Protection, Research and Sanctuaries Act of 1972 (MPRSA), the EPA, Ocean Dumping Regulations and Criteria, 1977 (40 CFR 220-229), and other applicable Federal environmental legislation. The EIS is also prepared in accordance with EPA's voluntary policy for preparing an EIS for each site designation to fulfill the requirements of the National Environmental Policy Act of 1969 (NEPA) (39 FR 16186, May 7, 1974).

The criteria used to assess the acceptability of proposed ODMDS near Coos Bay were those established under Section 102 (a) of MPRSA and outlined in 40 CFR Parts 228.5 and 228.6. The 11 specific criteria established by EPA under 40 CFR 228.6 are included in Section 2 of this EIS for the comparison of alternative sites.

Although the action to be addressed in this EIS is ocean disposal site designation, the impact evaluation addresses the effects of disposal at or near the proposed sites. The primary use of the sites, in addition to Section 103 disposal permit activities, is anticipated to be disposal of material dredged from the Coos Bay navigation channel. As a result, the studies mentioned above and the EIS were based on the types and quantities of material dredged from the channel and adjacent areas. The sediments found in Coos Bay can be classified into the following three basic types:

1) Type 1 - Predominantly clean sand of marine origin typical of sediments from below Coos Bay river mile (RM) 12.

2) Type 2 - Finer-grained sand and silt containing some volatile solids typical of sediments from between Coos Bay RM's 12 and 14.

3) Type 3 - Highly organic fine material (6 to 20 percent volatile solids) typical of sediments from above Coos Bay RM 14.

These three types of sediments are representative of the types of sediments found throughout the estuary.

I. PURPOSE AND NEED

1.1 PURPOSE

The purpose of final ocean disposal site designation is to identify sites for the disposal of dredged material from the Coos Bay, Oregon vicinity, in accordance with the criteria established by EPA under Section 102 of the MPRSA (See Section 2). On the basis of these criteria, ocean disposal sites can thus be described as areas within the ocean where various physical, chemical, and biological impacts will be accepted. Use of the sites would be for disposal of material dredged for operation and maintenance of the Federally authorized navigation project at Coos Bay, and for disposal of dredged material from other dredging projects authorized in accordance with Section 103 of the MPRSA.

1.2 NEED

Coos Bay is a major center of commerce and industry for the State of Oregon. Within the Coos Bay Region, approximately 50 percent of the 20,000 available jobs are directly or indirectly dependent on shipping activities. In 1980, the volume of trade through Coos Bay was more than 6 million tons. The total number of deep draft vessels using Coos Bay during 1980 was 333. Consequently, maintenance of the navigation channel to authorized depths is critical to keeping the harbor open and sustaining these vital components of the state and local economy.

Approximately 1.5 million cubic yards of sedimentary materials enter Coos Bay annually from the Coos River and adjoining sloughs, and through the Coos Bay entrance channel. The Corps is responsible for planning and conducting the necessary maintenance dredging and disposal operations for the Coos Bay navigation system to its authorized depth. This requires that sediments be removed from the entrance channel and lower reaches annually and from the upper channel (above RM 12) every two to four years. The need for ocean disposal sites has become more critical in recent years as suitable upland disposal sites around Coos Bay are limited and most of these within economical distance to the channel have been filled to capacity. (Coos Bay Estuary Management Plan, Coos County, 1983; Personal Communication, Nancy Case, COE Operations Division, 1985).

EPA designated two sites off the mouth of Coos Bay in 1977 for interim use pending final site designation. Use of these interim-designated sites has been essential to the Corps' compliance with the MPRSA and its ability to carry out its statutory responsibility for maintaining the nation's navigable waterways. To continue these responsibilities it is essential that environmentally acceptable ocean disposal sites be identified, evaluated, and permanently designated for continued use.

II ALTERNATIVES COMPARISON

2.1 INTRODUCTION

This section discusses the alternative ocean disposal sites considered, including those considered but eliminated from further study, and no action; describes the sites considered with references to the specific criteria for evaluating ocean disposal sites required by MPRSA; provides an impact comparison of the alternative sites based upon their potential use; and outlines the preferred site designations.

Although the purpose of this EIS is to provide information necessary to evaluate proposed sites for ocean disposal of dredged material at Coos Bay, Oregon, it should be understood that site designation in itself does not result in disposal of dredged material. The site designation process is a statutory requirement which defines ocean areas where disposal of acceptable material may be considered. Actual disposal in these sites can occur only after the requirement of separate evaluations are met. Thus the availability of a designated ocean disposal site is a prerequisite for approval of actual disposal in the ocean.

Section 2.6 presents information comparing the alternative sites using the 11 specific MPRSA site selection criteria. The MPRSA criteria evaluates the relative merits of the sites; however, this format does not lend itself to comparing impacts at the various sites based on their potential use. Section 2.7 provides such a comparison to illustrate the consequences of disposing different materials at the alternative sites. Section 2.8 describes the preferred action.

2.2 ALTERNATIVES CONSIDERED

Several potential ocean disposal sites have been identified during the various studies conducted for offshore disposal at Coos Bay and during preparation of this EIS (see Figure 2.1). These are: (a) the two interim-designated sites, (Sites E and F), located near the 10 fathom (18 m.) contour; (b) Site H located near the 30 fathom (55 m.) contour; (c) Adjusted Site H located near the 25 fathom contour; (d) Site G located at approximately 50 fathoms (91 m.); (e) a continental slope alternative at about 200 fathoms (364 m.); (f) combinations of the above; and (g) no action (upland disposal sites would need to be located).

Sites E and F were considered since they are the sites approved by EPA in 1977 to be used on an interim basis pending final site designation. The location and dimensions of these sites were selected based upon reasonable distance from the Coos Bay entrance, depth of water, biological conditions, historical use, estimated amount and type of dredged material and the desire to keep sand in the littoral transport system (personal communication, Robert Hopman, Corps, North Pacific Division, 1985). Sites G and H were considered since they are areas with bottom sediments similar to the finer materials dredged from above RM 12 in Coos Bay. Adjusted Site H was selected as an alternative to Site H to avoid impacts to a previously used scallop bed. In addition, use of these sites reduces the potential for return of incompatible sediments to the estuary or beaches. The deepwater site was selected because EPA site selection criteria requires that a continental slope site be considered.

Ocean disposal effects were considered by evaluating the potential disposal of three types of sediments from the Coos Bay area. These were the clean sands of marine origin found from the Coos Bay Entrance to RM 12 of Coos Bay (referred to herein as Type 1 material), material from above RM 14 characterized by relatively fine grain size and relatively high organic solids contents (Type 3 material) and material from between RM's 12 and 14 that is intermediate in character between Type 1 and Type 3 material. This latter material is referred to as Type 2 material.

2.3 ALTERNATIVES ELIMINATED FROM FURTHER STUDY

2.3.1 Continental Slope Alternative

The deepwater site has been eliminated from further study for the following reasons:

(a) The relatively clean (predominantly sand) sediments dredged from Coos Bay do not warrant selection of a site a greater distance from shore than is required to comply with MPRSA and related criteria.

(b) The transport cost associated with disposal at this distance would be extremely high and not economically justifiable compared to sites located closer to shore (see Section 4.).

(c) Site sampling and testing costs, and post-disposal monitoring costs, would likewise be extremely high due to distance from shore and depth of water.

2.3.2 No-Action Alternative

The No-action alternative would be to refrain from designating an ocean site, or sites, for the disposal of dredged material from Coos Bay. Existing sites E&F were designated on an interim basis. The interim designation was scheduled to expire on 31 January 1985, but has been extended to 31 December 1988.

By taking no action, these sites would not receive a final designation, nor would an alternative ocean disposal site be designated. Consequently, an EPA recommended ocean disposal site would not be available in the area after 31 December 1988. In addition, there would be no disposal site suitable for the material from above RM 12. The option of ocean disposal of dredged material would be eliminated.

Type 1 material consists of clean sand and is acceptable for ocean disposal and has historically been disposed of at ocean sites. The expense of locating and acquiring adequate upland disposal sites is not justified. Current upland disposal sites have limited capacity for Type 2 material and no capacity for Type 3 material. Therefore, without ocean disposal the authorized channel depths at Coos Bay could not be adequately maintained.

(Note: Upland disposal alternatives will be considered when each disposal action is evaluated according to the Section 103 permit requirements.)

2.4 ALTERNATIVES CONSIDERED IN DETAIL

The two interim sites (Site E and F), the 30-fathom site (Site H), the 25-fathom site (adjusted Site H) and the 50-fathom site (Site G), each appear viable and have been considered in detail. These sites have therefore been selected for evaluation using the selection criteria established by the MPRSA.

2.5 COMPARISON OF ALTERNATIVES USING MPRSA SITE SELECTION CRITERIA

This section presents information on sites E, F, G, H, and adjusted site H relative to each of the 11 specific MPRSA site selection criteria. Each of the sites are evaluated, where appropriate, for disposal of Type 1, 2, and 3 dredged material. The information and analysis contained in this section was summarized from the more detailed information in Sections 3 and 4. A summary comparision chart is provided in Table 2.1. Please note that although sections 3 and 4 do not specifically refer to adjusted site H, the data and analyses prepared by OSU and presented in these sections cover an extensive offshore area which includes adjusted site H.

2.5.1 Geographic Location

Sites E and F are located approximately 1.5 statute miles offshore of the entrance to Coos Bay at depths of 10 and 12 fathoms, respectively. Adjusted Site H is located approximately 3.1 miles offshore at a depth of 25 fathoms. Site H is approximately 3.7 miles offshore at a depth of 30 fathoms and site G is located about 5 miles offshore at a depth of 50 fathoms. General locations of these sites are shown in figure 2.1 and coordinates are given in table 3.1.

2.5.2 Distance from Important Resource Areas

Breeding, spawning, rearing of marine organisms, and passage of commercially important marine species occurs at all sites studied. In addition, a scallop bed is located between the 40 and 52 fathom contours. Species diversity and abundance of benthic invertebrates were directly related to water depth and sediment characteristics within the Coos Bay offshore disposal study area (Section 3). As depth increased and average sediment size became finer, species diversity and abundance of benthic organisms increased. Sites E and F were characterized by benthic species adapted to high wave energy environments. Seasonal variability of benthic species was large. In contrast, site G had a large number of filter feeding bivalves indicative of a less dynamic environment. The benthic fauna of site G was the most diverse and had the largest numbers of individuals of the areas studied. Site H had species common to both the shallow (10 fathoms) and deeper sites (50 fathoms). Much seasonal variation in diversity and abundance was observed for the benthic community at site H. The benthic fauna of adjusted site H is most similar to sites E and F.

2.5.3 Distance From Beaches

Sites E and F are each located within 1.8 miles of a beach, adjusted site H is within 2.8 miles, site H is within 3.7 miles and site G is within 5.2 miles of a beach. The proximity of sites E & F to the beaches, coupled with the frequency of onshore transport and seasonal ocean currents parallel to the coast, contribute to a potential for onshore transport from these two sites.

Because of the increasing depths, distance from shore, and frequency of offshore currents, onshore transport of sediments from sites H, adjusted H, and G is less likely and dispersion would distribute type 2 and 3 sediments predominately offshore. The fraction of material moving onshore would not reach detectable volumes.

2.5.4 Types and Quantities of Material to be Disposed

As described in the preface to this EIS, there are three basic types of sediments from Coos Bay being proposed for ocean disposal. Type 1 sediments from Coos Bay entrance to RM 12 are predominantly clean sand of marine origin. Median grain size is relatively constant at 0.2-0.3mm and volatile solid content varies between 0.1 and 2.0 percent. Approximately 1.3 million cubic yards of this material are dredged annually. The second category of sediment (Type 2) lies between RM's 12 and 14. Median size here varies between 0.02 and 0.2mm and volatile solids content varies from 2 to 10 percent. Approximately 200,000 cubic yards of material are dredged every two to four years in this area. Type 3 material (above RM 14) is highly organic, varying in median grain size from 0.006 to 0.02mm and from 6 to 20 percent volatile solids. Less than 200,000 cubic yards of this material is dredged every two to four years.

Future dredged material volumes may exceed present volumes if the navigational safety of the channel necessitates expanded dredging efforts or if other dredged material is disposed at the site. Any materials disposed at the sites must be within the capacity of the sites and must comply with EPA dredged material criteria in Part 227.13 subpart B of the Ocean Dumping Regulations (40 CFR 220 to 229).

It is anticipated that the dredged material will continue to be transported by hopper dredge equipped with a subsurface release mechanism. However, other means of transportation and release, consistent with the environmental requirements of the sites, may be utilized. None of the dredged material will be packaged in any manner.

2.5.5 Feasibility of Surveillance and Monitoring

Surveillance of sites E, F, H, adjusted H, and G can be made from shore facilities or vessels. Approaches to the estuary entrance, including Sites E and F are currently surveyed annually by the Corps with detailed bathymetric maps made available to the public. The surveyed area can be expanded to include site H. Surveillance during heavy weather conditions is expected to be unnecessary since heavy weather curtails ocean disposal operations.

2.5.6 Dispersal, Horizontal Transport, and Vertical Mixing Characteristics of Area

All Sites: Average currents in the region generally flow parallel to bathymetric contours with downslope components predominating over upslope components near the bottom. Local current strength and direction, however, reflect the variability of local winds. Since weather conditions restrict ocean disposal operations to the period April through November, the predominant direction of transport of materials suspended in the water column will be southward at 10 to 30 cm/s in the vicinity of sites E, F, H and G. Northerly transport may occur at these sites in late fall. Current strength and direction of currents at these sites are highly variable in spring and fall. Sediments reaching the bottom would experience resuspension and spreading. Local currents at all sites can resuspend finer Type 3 materials year round. The coarser sediment Type 1 and 2 would be mobile year round near sites E and F. These coarse sediments would have some bedload movement in the vicinity of site H during the dredging season but resuspension during the remainder of the year would be limited to major storm events. These sediments would be stable year round in the vicinity of site G.

Sites E and F: All sediments disposed of at these sites would be rapidly reworked by strong tidal and surface-wave generated currents. Winter reworking would be especially intense, resulting in the erasure of any mounding and the distribution of coarser size fractions over the tidal delta. Finer size fractions would be transported with the mean currents. During the disposal season, there would be a greater tendency for shoreward transport of fines from site F than from site E where downslope transport predominates due to effects of shoreline configuration. Strong upslope transport, however, can occur at site E during late fall and winter.

Sites H, adjusted H, and G: The areal impact of disposal at sites adjusted H, H and G increases in proportion to depths doubling approximately every 20 fathoms. However, thickness would be substantially less and larger fractions of the dredged material would be initially suspended in the water column at the deeper sites. Type 3 sediments would be mobile at each site year round but only the finer fractions of Type 3 sediments would be mobile at site G. Mobilization of the coarser sediments at sites H and adjusted H would occur primarily during summer and winter storm periods.

Dredged material mound height per 100,000 cy of Type 3 sediments reaching the bottom of sites adjusted H, H and G would be measured in inches, with subsequent erosion occuring more slowly than at sites E and F. Portions of the mounds at sites adjusted H, H and G would be covered by local sources of moving sediments (a natural capping phenomena). Thus mounds at these sites would endure longer than a mound at sites E and F.

2.5.7 Effects of Previous Disposals

Sites E and F: Previous disposal at these sites has averaged about 800,000 cubic yards of Type 1 sediments annually. There appear to be noticeable seaward bulges in the bathymetric contours of the tidal delta in the vicinities of sites E and F, but they have not been definitely attributed to disposal activity. There is some mounding at the sites following the dredging season, but this is normally erased by winter storm activity and no long-term bathymetric changes occur. The material deposited at sites E and F moves along the coast with the littoral drift system. Short term increases in the turbidity of the water column occur, but such an impact has been very minor considering the clean nature of the historically deposited materials. No significant biological impacts have been associated with this disposal.

Adjusted Site H: No previous disposal.

Site H: A test dump of approximately 52,000 cy of Type 3 material was made at site H during August 1981. Erosion as moving and capping of the dredged material with native sediments was evident in August 1982. Within 19 months of the test dump, the disposal mound had been erased or mixed beyond recognition with native sediments. No acute conditions were observed during disposal for temperature, salinity dissolved oxygen, pH, oxidation-reduction potential or turbidity. Borderline acute toxicity conditions of some water column examples were observed for ammonia-nitrogen, copper and manganese. These conditions were of short duration. Sediment samples obtained one year and 1.5 years after disposal showed a definite trend of return to background conditions. The benthic community was significantly depressed in the area of disposal impact immediately after disposal. A steady recovery to predisposal abundance levels was observed for the benthic community during the 19 months of the post dump monitoring, suggesting that the effects of dumping on the infauna were of short duration. (Sollitt, et.al 1983). These observations indicate that the benthic community has the capacity to recover to background conditions and that disposal of type 3 material on a 2- to 4-year cycle as proposed would not cause any long-term adverse impact.

Site G: No disposal has occurred at this site.

2.5.8 Interference with other uses of the ocean.

The only known commercial or recreational use of sites E, F, and adjusted site H is marine navigation. Disposal activities at these sites would have little effect on this use. Commercial fishing occurs in the vicinity of sites G and H but no significant impact would be anticipated. See Sections 3.4 and 4.4.3.

2.5.9 Existing Water Quality and Ecology.

Water quality analysis for surface and bottom water at all sites did not indicate an atypical or polluted condition for seawater of the Pacific Northwest, nor an atypical ecological condition. See Section 3. The ecology of the area is typical of most regions of the Oregon Coast. Distribution and abundance of pelagic fish is closely tied to the influence of the ocean currents, and the distribution and abundance of bottom dwelling organisms is tied to the character of bottom conditions. The group of greatest interest to this EIS is the benthic community since it is the group that would be most directly affected.

The abundance, diversity and species composition of the benthic community is tied to the character of bottom conditions. As water depth increases, sea floor currents and sediment grain size decrease while organic, chemical constituents, and biological abundance tend to increase. This relationship is well illustrated in the OSU Study. The benthic community in the near shore region had the lowest abundance and diversity of the sites studied. In addition, it was dominated by burrowing species and deposit or opportunistic feeders.

Much seasonal variation in distribution and abundance was observed of these species. This is to be expected in an environment characterized by major perturbations in sediment conditions due to high wave energy environments. This adaptation to adverse habitat conditions is however a desirable characteristic for proposing an area for ocean disposal.

In contrast, the region around site G was characterized by the most abundant and diverse benthic community of the sites investigated. The community was dominated by filter and surface feeders. This is to to be expected in a habitat with stable sediment conditions and sediments having a high content of finer materials and volatile solids.

The zone between the nearshore and site G can be classified as a physical and biological transition zone. Species composition in the shallow regions is most similar to that of the nearshore region and vice versa. Seasonal variation in abundance is high.

2.5.10 Potential for Nuisance Species.

The major component which would attract nuisance species is the organic material. The clean sand (type 1) disposed at sites E and F does not include this component. The material to be disposed at site H does contain organic material, but the O.S.U. studies have not demonstrated that nuisance species are attracted to disposal sites. The rapid incorporation of the dredged material with the native material further reduces the possibility of nuisance species becoming established at sites E, F or H.

2.5.11 Existence of Significant Natural or Cultural Features.

No known significant natural or cultural features exist at or near the alternative sites - see section 4.4.6 and Appendix C.

2.6 IMPACT COMPARISON OF DISPOSAL OPTIONS.

Four disposal options were considered for ocean dumping of dredged material at the alternative sites. These options were: 1) disposal of all types of dredged material at the interim sites E and F; 2) disposal of Type 1 material at sites E and F and disposal of Type 2 and 3 material at site G; 3) disposal of Type 1 material at sites E and F and disposal of Type 2 and 3 material at site H; and 4) disposal of Type 1 material at sites E and F and Type 2 and 3 material at adjusted site H (centroid at 25 fathoms).

The impacts associated with ocean disposal off Coos Bay, Oregon can be reduced to 5 general categories. These impact categories are 1) the volume of the material to be disposed, 2) the nature of the material, 3) the environmental (primarily benthic habitat) sensitivity of the site(s) considered, 4) the incremental increase in impacts over that associated with historical disposal options, and 5) the incremental increase in cost of disposal between sites.

Option 1. Disposal of all dredged material from Coos Bay at sites E and F.

These sites are located within 1.5 miles of the entrance to Coos Bay thus the cost of disposal of this option would be the lowest of the options considered. In addition there are no known features of environmental or historical significance in these two sites. These two sites are characterized by high energy bottom environments and benthic communities that have low species diversity and a high variance in seasonal abundance. These two sites are the least sensitive biological areas of the sites studied.

Disposal of type 1 material at sites E and F is acceptable because a) type 1 material is very similar to the native sediments in the areas, b) it meets all criteria of 40 CFR, 227.3(b) for ocean disposal without further testing and c) there is no record of significant impacts associated with historical disposal of type 1 material at these sites.

In addition disposal of type 1 material at any other site would result in long term bottom habitat changes. For these reasons disposal of type 1 material at sites other than E and F was not considered in the best public interest.

The disposal of either type 2 or 3 material at sites E and F is questionable since this material is physically and chemically dissimilar to the sediments of these sites. In addition there is the possibility that ammonia-nitrogen, copper and manganese levels may approach EPA standards of concern. High levels of turbidity could also result from disposal of type 2 and 3 materials at these sites. Toxicity conditions would be measured in hours but turbidity could be measured in days since the sediments would be continually reworked by the high energy bottom currents. The turbidity levels would temporarily degrade the esthetic environment.

Option 2. Disposal of type 1 material at sites E and F and types 2 and 3 material at site G.

The primary difference in effects of this option and those associated with option 1 is the incremental impacts to the benthic communities and differences in turbidity effects. Economic impacts should not be of major concern since the increase in cost of transporting type 2 and 3 material to site G rather than dumping it at sites E and F is 16% (see Figure 4.1). Because of the greater depth of water at site G the possibility of short term (hours) acute toxicity conditions is reduced. Turbidity will be reduced below standards within 4 hours of the dump. Disposal of type 2 and 3 material at this site would be unacceptable because a) the area is characterized by the most abundant, diverse, and stable benthic community of the sites studied, b) the site lies near the scallop bed located between 40 and 52 fathoms and the predominant northerly currents would possibly transport type 2 and 3 sediments into the bed, c) the site is within the zone of commercial fishing and d) the low rate of sediment erosion from the area would result in the development of mounds of dredged material at this site.

Although type 2 and 3 sediments are most similar, of the sites studied, to the bottom sediments of site G, they remain measurably different (see Figures 3.5 and 3.6). Disposal of these materials at site G, coupled with the slow erosion rate at this site and the large impact area that would result from disposal, may result in long term changes in the substrate habitat of the benthic community. This effect may alter the benthic community composition in this area. Thus benthic impacts would be both direct and indirect.

Option 3. Disposal of type 1 material at sites E and F and disposal of type 2 and 3 material at site H.

The primary differences between this option and options 1 or 2 are environmental effects. Economic impacts would not be significant since, the increase in cost of transporting type 2 and 3 material to site H rather than dumping it at sites E and F is 8% (see Table 4.1). Ammonia-nitrogen, copper and manganese effects would approach the standards of concern for short periods and turbidity conditions would dissipate within 4 hours of the dump (Sollitt et.al. 1983). These characteristics satisfy the economic and pollutant concerns of dumping type 2 and 3 material at this site.

Although type 2 and 3 material is dissimilar to the sediments of site H, this is the site the OSU study recommended for disposal of this material. Factors contributing to this recommendation are: a) material of concern would be diluted to levels below those allowed by EPA water quality criteria; b) the predominant downslope and north-south currents effectively preclude resuspended sediments from being transported shoreward; c) benthic impacts would be substantially less than if the material were disposed of at site G; d) the seasonal and spatial variation of benthic organisms observed at site H during the O.S.U. studies suggest that they are more tolerant to intermittent bottom disturbance than are species at site G or E and F and would recover more rapidly from the effects of disposal and; e) natural capping of the disposed material appears to occur at site H.

Although disposal of type 2 and 3 material at site H would appear acceptable, the western edge of the site was previously thought to lie near the southern boundary of the scallop fishery bed off Coos Bay. Resource agencies initially recommended (meeting of Oct. 4, 1983) that if site H is proposed for use that its location be adjusted so that a buffer region is established between its western edge and the 40 fathom contour. (The western edge of site H lies at 35 fathoms. The ocean bottom between 40 and 52 fathoms is the area that scallops were found in densities high enough to support a fishery). We developed the following option in response to these concerns.

Option 4. Disposal of type 1 material at sites E and F and type 2 and 3 material at the 25 fathom contour (adjusted site H).

This option was considered in an attempt to avoid potential disposal impacts on the scallop bed located between 40 and 52 fathoms. Use of adjusted site H would establish a buffer of approximately one nautical mile between the disposal site and the scallop bed. In addition, this adjustment could reduce benthic impacts since the site would be located in a zone with a benthic community characterized by lower species richness and abundance than at site H. However, benthic information regarding adjusted site H is limited; thus more information would have been needed to verify impact comparison. The benthic impacts of disposal of type 2 and 3 material in this area would be similar to those predicted for disposal of the same material at sites E and F. Disposal at this site would also resolve the concerns for aesthetic impacts in that downslope transport of material predominates at this location. The estimated increase in cost of disposal of type 2 and 3 material at this location is approximately 4% greater than the cost of disposal of the same material at site F.

2.7 PREFERRED DISPOSAL SITES AND DISPOSAL OPTIONS

Based upon our review of the available information and assessment of the relative impacts we recommend the designation of three sites off Coos Bay, Oregon for the disposal of dredged material. These sites are the interim disposal sites E and F, and site H with a centroid at approximately 31 fathoms. The coordinates of these proposed sites are given in Table 3.1. The locations of these sites are also illustrated in Figure 2.1. The recommended use of these sites is disposal of type 1 material at sites E and F and disposal of type 2 and 3 material at the site H location.

Both sites E and F are needed to maintain flexibility of disposal when currents change and to reduce sea keeping hazards to the dredges during periods of adverse weather conditions. Site H is needed to accommodate the finer type 2 and 3 material since it is not compatible with sites E and F.

The draft EIS recommended adjusted site H location as the preferred alternative for the disposal of type 2 and 3 materials, primarily to avoid impacts to the scallop bed. As a result of further information obtained after the publication of the draft EIS, and in consultation with affected Federal and State resource agencies at a January 9, 1985 meeting (Braun, 1985), site H is now recommended as the preferred location for disposal of these materials, based on consideration of the following points:

1. The scallop bed is located further from site H than it was originally believed to be;

2. No living scallops were found at site H and very few were found beyond the site in the general area of the scallop bed during the O.S.U. sampling. The Oregon Department of Fish and Wildlife (ODFW) has indicated that the scallop bed has been fished out (Rick Starr, ODFW, personal communication);

3. Sediments transported from site H are highly unlikely to move toward the scallop bed (Charles K. Sollitt, Oregon State University, personal communication);

4. The deeper water will significantly reduce bottom transport of material deposited at site H and;

5. Baseline data for monitoring at adjusted site H is lacking.

The dimensions of the sites are determined by the anticipated spreading pattern of material dumped from hopper dredges in relation to the time required for disposal. These areas are considered to be large enough to encompass the impact zone of disposal. Based upon the expected erosion and dispersal rates associated with bottom currents these dredged materials will be dispersed within 1 to 3 years.

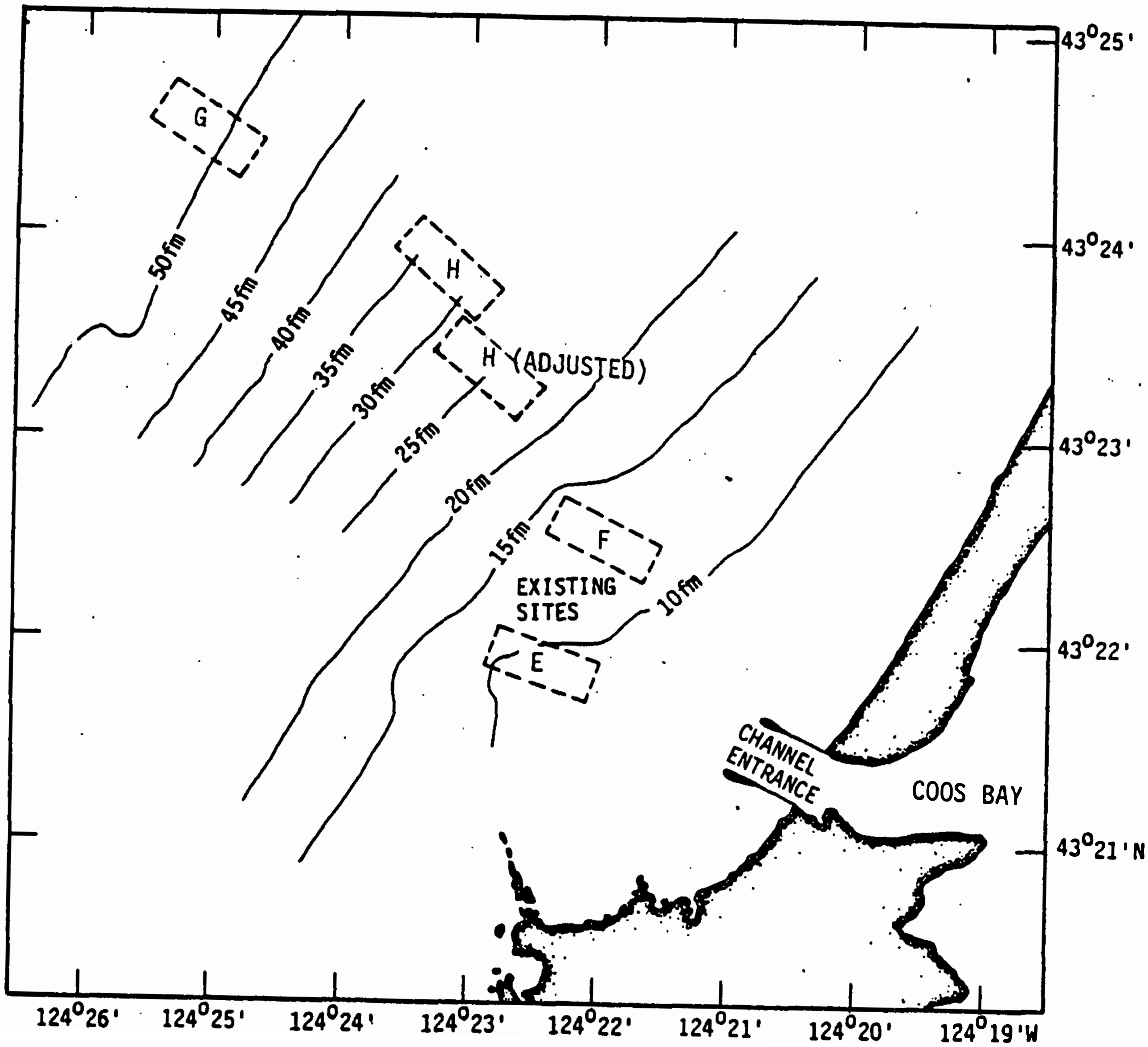


Figure 2.1 Alternative Disposal Sites Considered in Detail.

TABLE 2.1
SUMMARY COMPARISON OF ALTERNATIVE SITES USING MPRSA CRITERIA

Criteria as Listed in 40 CFR Ø228-6	E & F	G	H	Adjusted Site H
(1) Geographical Location	Within 1.5 n. miles of Coos Bay entrance. See Table 3.1 for centroid locations.	With 5.0 n. miles of Coos Bay entrance. See Table 3.1 for centroid location.	Within 3.7 n. miles of Coos Bay entrance. See Table 3.1 for centroid location.	Within 3.1 n. miles of Coos Bay Entrance. See Table 3.1 for centroid location.
(2) Location Relative to Important Resource Areas	Low density benthic community some breeding, feeding, rearing and passage of motile species over entire area. Little fishing activity.	Most abundant and diverse benthic community of sites studied. Depth corresponds to zone of increased fish activity. Near scallop bed.	Similar to E and F, but has a greater diversity of benthic species and some fishing activity occurs in area.	Similar to Site F.
(3) Distance from Beaches	Close to beaches (about 1.8 mi); onshore transport potential is likely.	Major sediment transport is downslope. Little opportunity for upslope transport, onshore transport or impact.	Major sediment transport is downslope. Little opportunity for onshore transport or impact.	Similar to Site H.
(4) Types & Quantities of Materials	Clean sands with average sediment size similar to bottom sediments. Approximately 1.3 million cy annually projected for Sites E & F.	Same as Site H.	Fine grained sands with high organic solids content. Approximately 400,000 cy from above RM 12 projected for area on a 2 to 4 year cycle.	Same as Site H.
(5) Surveillance and Monitoring	Surveillance and monitoring easy due to nearness to shore, shallowness of sites, and availability of historical data.	Monitoring would be more expensive than for other sites due to greater distance from shore and greater depths.	Similar to sites E and F.	Same as Site H.
(6) Dispersal, Horizontal transport, vertical mixing.	Rapid settling of sands. No persistent turbidity plume. Resuspension of material will be at a maximum during winter storms. Predominant transport direction will be southward at 10-30 cm/s. Sediments will be mobile year round due to high energy conditions.	Similar to that for Site H.	Similar to that for Sites E and F, except that downslope transport of bottom sediments predominate over upslope transport. Maximum depth averaged suspended sediment concentration expected 0.004 percent by volume.	Similar to Site H.
(7) Effects of Previous Disposal in Ocean	Some seaward expansion of river delta, no significant long term, effects on fauna of area.	No previous disposal here.	No acute conditions were observed during disposal for temperature, salinity, dissolved oxygen, pH, oxidation-reduction potential, or turbidity. No significant mounding was observed. The benthic community was significantly affected immediately after disposal but recovered to predisposal conditions after about 19 months.	No previous disposal.
(8) Interference with other uses of the ocean	No interferences recorded for interim disposal and none expected for future. Areas outside zones of commercial activity except navigation.	Area is within the zone of major commercial fishing and shellfish beds. No known mineral deposits in area.	Area is outside of major zone of commercial activity. Adjacent to shellfish beds. No known mineral deposits in area.	Similar to Sites E and F.
(9) Existing water quality and ecology	Water quality typical for seawater of the Pacific Northwest. Benthic community characterized by low abundance and diversity and adaption to unstable sediments.	Same as Sites E and F. Most abundant and diverse benthic community of sites studied.	Same as Sites E and F. Ecological transition zone between sites F and G.	Similar to Site F.
(10) Potential for nuisance species	Uncontaminated sand does not contain material which would attract nuisance species.	Same as for Site H.	No nuisance species expected.	Same as for Site H.
(11) Existence of significant natural or cultural features	No known features.	No known features.	No known features.	No known features.

III AFFECTED ENVIRONMENT

3.1 INTRODUCTION.

This section provides a detailed base description of the existing conditions in the areas that would be affected by ocean disposal of material dredged from Coos Bay, and a general description of the Coos Bay socio-economic environment. In addition, this section includes a detailed description of existing sediments typically found in Coos Bay. The primary information base for the physical and biological descriptions is from reports provided to the Corps of Engineers, Portland District (Corps) by Oregon State University (OSU) in compliance with requirements of "The Coos Bay Offshore Disposal Site Investigation", Contract Number DACW57-59-C0040. Chapter 3 tables and figures are included at the end of this section.

The Coos Bay Offshore Disposal Study was initiated in 1979. The study area encompassed the two interim disposal sites (E and F) at the 10 fathom (17-20 meter) and 12 fathom (20-26 meter) contours respectively, (site H) at the 30 fathom (53-66 meter) contour, adjusted site H at the 25 fathom (44-58 meter) contour and site G at the 50 (90-97 meter) fathom contour. Location descriptions of these sites are given in Table 3.1 and Figure 3.1. Please note that although this section does not specifically refer to adjusted site H, the data gathered by OSU and presented in this section covers an extenive offshore area which partially includes adjusted site H. In general, the physical and biological charateristices of adjusted site H represent a transition between sites F and H.

The study area was divided into two segments based upon depth. The area extending to the 40 meter contour is referred to as the nearshore area, which includes sites E and F, and is approximately 12 square miles in size (7,500 by 3,900 meters). The area extending from the 40 meter contour to the 120 meter contour is referred to as the offshore area. This area includes sites G, H and adjusted site H and is approximately 7 square miles in size (5,100 by 3,600 meters).

The nearshore and offshore study areas are approximately 36 and 23 times larger, respectively, than the area of the two interim disposal sites. This size of a study area provides the opportunity to not only describe the conditions at a proposed disposal site but also its immediate environs. This allows for a better interpretation of the possible effects and a greater flexibility in determining final site locations and sizes.

The OSU study proceeded in distinct phases designed to address the 11 specific and 5 general criteria required in the Federal Register and discussed in this EIS. The objective of the first phase was to obtain a comprehensive description of the physical, chemical, and biological conditions of the study area. The objective of the second phase of study was to concentrate on the collection of physical, chemical, and biological information in the vicinity of the ocean sites. This phase provided baseline data for the evaluation of the effects of a test disposal of dredged material. Results of test disposal monitoring are contained in phases four and five of the OSU study. Data was not collected at site E in the second phase since conditions at sites E and F were so similar. The data collected and analyzed by OSU during the period from February 1979 through September 1983 form the principal physical, chemical and biological information base of this EIS.

Interstate Electronics Corporation (IEC) under contract to EPA conducted a single survey of the Coos Bay interim ocean disposal sites and environs during 26 April to 1 May 1980. Data from the IEC Report of Field Survey (1982) is incorporated into the EIS where appropriate.

3.2 PHYSICAL ENVIRONMENT

3.2.1 Bathymetry of Disposal Site Area

The continental shelf off Coos Bay is some 22 km wide. Regional offshore bathymetric contours generally run northeast-southwest parallel to the coastline (Figure 3.2). Nearshore contours bulge seaward off the entrance to Coos Bay, reflecting the presence of the river delta, the disposal of dredged materials, and the Cape Arago landmass (Figures 3.1 and 3.2). The top of the foreslope of the river delta is at about 24 m and its base is at about 42 m, relative to mean lower low water. The two interim sites are located on the oceanward limits of the river delta and are clearly defined by seaward bulges in the foreslope contours to some 42 m depth. These bulges have not been definitely attributed to dredged material disposal. There is some mounding at the sites following the dredging season, but this is normally erased by winter storm activity and no long-term bathymetric changes occur. Sites G and H lie offshore of the influence of the river delta. The deepwater site lies on the continental slope some 30 km off the entrance to Coos Bay.

3.2.2 Disposal Area Sediments and Sediment Transport

Hancock et al (1981) and Nelson et al (1983) report that nearshore sediments to approximately 70 m depth are clean fine sands of marine origin with median grain diameters of 0.15 to 0.20 mm and less than 1.5 percent of volatile solids (Figures 3.3-3.6). The uniform nature of these highly mobile sands reflects the winnowing action of surface waves and tidal and wind-driven currents. Coarser sediments are found in the river delta to depths of about 42 m. These sediments have median grain diameters in excess of 0.20 mm, volatile solids concentrations are as low as 0.2 percent and owe their character to the combined influences of their nearness to the source of coarser river materials, strong ebb currents from the estuary, and the disposal of river and entrance materials during dredging operations. IEC (1982) reported similar findings. Volatile solids concentrations increase rapidly beyond the river delta to between 2 and 3 percent and gradually increase with increasing depth. Between the foreslope of the tidal delta and 70 m, the sediment is relatively uniform in grain size and volatile solids content. Below 70 m depth, grain size decreases and volatile solids concentrations continue to increase due to the decreasing influence of surface waves and ebb currents from the estuary entrance as depth increases. Mixed sand and mud covers the continental shelf in this region out to the shelf break at about 170 m. Muddy sediments cover the continental slope. (OSU, 1977, p. 17).

Figure 3.6 presents averaged median grain sizes and volatile solids percentages for three seasons of resampling at 5 stations in the vicinity of sites F, G, and H. The error bars indicate the standard deviation of station mean values relative to the overall mean. Also included are graphic boundaries that contain all sample medians for each site. The seasonally-averaged median grain sizes for the areas around sites F, H, and G are 0.26 mm, 0.16 mm, and 0.08 mm, respectively, and volatile solids average 0.53 percent, 1.06 percent, and 2.56 percent by weight. Winter sediments are somewhat more poorly sorted than average due to the presence of fines settled from discharged estuarine waters. The average volatile solids content at all sites is at a minimum in summer and at a maximum in winter with the contrast most clearly developed near site H. Spatial variability in volatile solids content is also highest near site H with the area near site F having least spatial variability. The greater seasonal and spatial changes in volatile solids near site H and various grain size statistics suggest that the area near site H experiences a greater variability in fine-grained material than the area around sites F or G. Site F and G sediments are more poorly sorted than sediments near site H. The variability near site F reflects the nature of the river delta sediments and possibly the effects of dredged material disposal. The variability near site G is in part due to the increasingly quiescent environment that allows a broader spectrum of grain sizes to settle out, and the periodic input of fine sands from shallower regions during periods of heavy wave action coupled with an offshore component of the current. The well sorted nature of material near site H is consistent with the nature of nearshore fine marine sands.

Hancock et al. (1981) performed detailed bulk sediment chemical analysis on offshore sediments. In general, both water and volatile solids fractions increase with distance from the estuary entrance. This correlates with decreasing grain size. Chemical concentrations in these offshore sediments are similar to those of the less contaminated lower estuary sediments and significantly lower than concentrations in upper estuary sediments.

Nelson et al. (1983) present detailed sediment chemical analyses for the three disposal sites F, G, and H (Table 3.6). Parameter levels are consistent within a site and obvious differences exist between sites. No chemical analysis at any site appeared atypical or indicative of a polluted condition. Site F sediments have higher solids content, lower volatile solids, and generally lower levels of all chemical parameters as compared to the other two sites. Volatile solids levels and most chemical parameter levels increase with depth and decreasing grain size such that site H has levels intermediate with sites F and G. Concentrations of copper, iron, lead, manganese, and zinc showed a strong inverse correlation with mean grain size.

3.2.3 Coos Bay Sediment and Sediment Transport

Sedimentation in Coos Bay channel has averaged about 1,300,000 cubic yards annually downstream of RM 12. Entrance sediments comprise some 800,000 cubic yards annually (60 percent of the total). Sedimentation upstream of RM 12 depends upon annual rainfall and runoff impacts on the local drainage basin (Louis Smith, COE, personal communication). Between RM's 12 and 14 some 289,000 cubic yards may accumulate in a given year. Sedimentation above RM 14 is more variable but may be as much as 164,000 cubic yards in a given year (see Table 3.2).

Estuarine sediments are predominantly clean fine sands of marine origin in the lower bay and navigation channel below RM 14 but become finer and more organic in the upper bay and in sloughs. Median grain size in the lower bay is relatively constant at 0.2-0.3 mm between the estuary entrance and the Coos River (Figures 3.5 and 3.7). Sediment above RM 14 (Type 3) is at least one order of magnitude finer - 0.02 to 0.006 mm. Volatile solids content increases from less than 1% at the estuary entrance to about 6-20% at river mile 15 in the Coos River (Figures 3.5 and 3.8). Type 3 sediment organic levels are up to five times the levels in the lower Coos River. The finer grain size and higher organic content of Type 3 sediments reflect the limited tidal exchange between sloughs and the estuary, the lack of significant inflows of fresh water in sloughs, the proximity of clearcut areas that act as sources of fines, and plentiful local sources of organics from log rafts, chip piles, etc. The tidally-induced currents in the main navigation channel are sufficiently strong to transport fine sediments in suspension, thereby maintaining relatively uniform grain size and low organic content over its length.

Hancock et al. (1981) conducted a detailed chemical analysis of sediments in and adjacent to the Coos Bay navigation channel (Figure 3.9). Both bulk sediment (Tables 3.3 - 3.5) and elutriate chemical (Appendix D) analyses were performed. With the exception of total sulfides, there was no apparent consistent chemical difference between sediment in the navigation channel and adjacent subaqueous sediments. The total sulfide level was higher in non-channel sediments, reflecting lower turnover rates in areas removed from the navigation channel (OSU, 1977b) but no free sulfides were detected. One non-channel sample from above RM 14 had elevated total concentrations of cadmium, lead, and zinc. Two other side-channel samples in the mid-estuary had detectable PCB concentrations. Elutriate test results were also generally comparable for adjacent and mid- channel samples. Cadmium was released from several samples in concentrations high enough to exceed EPA's 5 ng/ml criterion. Manganese concentrations from samples of Type 2 and Type 3 sediments were also above the 100 ng/ml maximum for shellfish protection (EPA 1976). Dilution by a factor of 35 would bring cadmium and manganese levels into compliance.

It is clear that the major chemical contamination occurs in the upper reaches of Coos Bay and in sloughs. As shown in Figure 3.8, total and volatile solids increase with distance from the estuary entrance. This correlates with a decrease in median grain size and reflects lower energy regimes for wave, tidal, and river flows in the upper estuary. In fact, nearly all chemical parameters increased as the sediments became finer. Type 3 sediments are clearly more polluted with total sulfides, reduced sulfides capacity, ammonia-nitrogen, oil and grease, petroleum hydrocarbons, and trace metals than are sediments from below RM 14. Figure 3.5 and Tables 3.3 to 3.5 from Hancock et al. (1981) detail sediment chemical characteristics.

Elutriate samples from navigation channel sediments did not exhibit the increase in bulk sediment chemical concentration with increasing distance from the entrance. In fact, there appeared to be a poor correlation between total sediment contaminant levels (Tables 3.3 - 3.5) and their solubility during resuspension as measured by the test (Appendix D).

3.2.4 Hydrography

Coastal waters off Coos Bay may be divided into three watermasses that have typical ranges of salinity and temperature (Conomos et al. 1972, Huyer and Smith 1977). These are the surface oceanic, subsurface oceanic, and Coos Bay watermasses. The subsurface watermass has salinities in excess of 33.4 ppt and temperatures below 8°C. It is overlain by the surface watermass which has salinities lower than 32 ppt and strong seasonal temperature changes of up to 6°C. The boundary between these watermasses is a strong vertical salinity gradient between 100 and 200 m depth. Winter cooling and wind-induced vertical mixing produce a uniform surface watermass of 6°C to depths of about 100 m. Summer warming may then develop a strong seasonal thermocline within the surface watermass which results in an intermediate temperature minimum near the top of the permanent salinity gradient. The Coos Bay watermass consists of the plume of lower salinity water that extends from the estuary mouth. Upwelling during the spring and summer brings subsurface water to the surface along oceanic "fronts" (surfaces defined by strong thermal and salinity gradients). The scale and duration of these events are extremely variable but upwelling keeps surface waters relatively cool (about 10°C) through the summer. With the cessation of upwelling in early fall, surface temperatures rise to 15°C, then decrease to 10°C in the winter. Bottom temperatures also decrease during the upwelling due to the upslope movement of subsurface waters to replace upwelling shelf water.

Turbidity within the water column maximizes near the bottom, at the top of the permanent pycnocline, and in the surface waters (Harlett, 1972). It has been postulated that bottom turbidity results from the resuspension of bottom sediments by surface and internal waves and from the downslope movement of turbid waters from the surf zone. The intermediate turbid layer results from materials settling from surface layers and from the surf zone. The Coos Bay watermass would also contribute turbid waters to surface layers during periods of high runoff as would dredged material disposal operations.

3.2.4.1 Currents and Tides

Coastal circulation reflects the combined influences of seasonally-reversing regional currents and winds, the tides, and other periodic phenomena. The California and Davidson currents determine seasonal transport along the Oregon coast (Sverdrup et al. 1942). The 500-km wide California current flows southward parallel to bathymetic contours over the entire Oregon continental shelf during the spring and summer with average speeds of 10 cm/s. Northerly and northwesterly winds reinforce this flow with maximum current strength in the spring. Strong vertical velocity gradients characterized the lower half of the flow (Huyer et. al. 1975). Under the influence of southeasterly winter winds, this shear layer expands upward and shoreward until northward flow results (Sobey 1977). Ultimately, this northward flow develops into the 150-km wide Davidson current that lies between the shore and the southerly flowing California current. Circulation over the continental shelf is now northward parallel to isobaths and currents are nearly uniform throughout the water column. Upwelling from February through July weakens and ultimately destroys the Davidson Current to some 200 m depth. Net transports above this depth is thereafter southward as an extension of the California current. The Davidson current persists below that depth on the outer continental shelf with speeds up to 20 cm/s and is probably responsible for the strong velocity gradients that develop in the deeper inner shelf waters in summer.

Detailed current measurements in the study area by Hancock et. al. (1981) and Nelson et. al. (1983) conform to the generalized circulation scheme just presented. Current strength and directional variability reflect the variability of local surface winds. Mid-water currents (those measured at one-third the depth) and near-bottom currents are generally between 10 and 20 cm/s in the vicinity of sites F, H, and G. Mid-depth summer median currents near site F are slightly stronger (20 to 30 cm/s) while median winter and spring currents near sites F and H may be between 30 to 60 cm/s. Comparable currents near site G are 20 to 30 cm/s.

Water transport is generally parallel to bathymetric contours although estuarine circulation and the shoreline configuration tend to produce significant onshore and offshore flow in the upper water column near sites E & F, and between site E and Cape Arago, respectively. Springtime upwelling may also be responsible for shoreward-directed mid-depth mean currents affecting the vicinity of site G and, presumably, site H. Near-bottom currents exhibit higher variability in direction than do mid-water currents but downslope flow components predominate over upslope flow. Downslope flow is clearly present near the bottom in summer along the toe of the river delta and between Cape Arago and site E. Strong downslope movement may also occur in the vicinity of site H throughout the winter and to a lesser extent in the vicinity of site G. Upslope flow can occur between Cape Arago and site E during spring upwelling or winter periods of strong northerly flow of the Davidson Current.

Annual and seasonal variations in atmospheric conditions determine the regional circulation just described. Superimposed upon this slowly-varying circulation are periodic currents due to the tides, inertial currents, internal waves, etc. While variations in wind speed and direction for periods longer than 2.5 days are reflected in surface currents, shorter period variations can give rise to inertial currents (Huyer and Patullo, 1972).

Inertial currents have periods of 17.4 hours and speeds up to 10 cm/s (Cutchin and Smith, 1973). Tidal curents with amplitudes of several tens of cm/s occur at periods of 12.4 and 24.8 hours. Other periodic circulation features include shelf or topographic (Rossby) waves that propagate northward with periods of 4.5 days and, possibly, southward with periods of 7.1 days. Internal waves of varying periods and wavelengths can propagate along the permanent and seasonal pycnoclines, causing short-term current oscillations in the order of an hour. When stratification abruptly decreases, as during upwelling events, internal waves become unstable and cause increased vertical mixing in the water column. It is also probable that breaking internal waves can cause sediment resuspension where the pycnocline intersects the continental shelf.

3.2.4.2 Surface Waves

The prevailing wave direction off Coos Bay is from the west. Summer waves approach from the west-northwest and littoral transport of beach sediments is to the south. During the remainder of the year, waves approach from the west and southwest driving littoral transport to the north. Significant wave heights - the average of the highest one-third of all waves - range from a little over 1 m during the summer to over 3.5 m in winter with corresponding changes in wave period. Detailed observations have shown that wave-induced currents average between 30 and 60 cm/s year-round in the study area (Hancock et al. 1981). Speeds up to 120 cm/s or more were observed during the winter.

3.2.4.3 Wind Direction and Speed

Prevailing winds are from the south-southeast in January, averaging 5.5 m/s, from the north-northeast for June through September at 5.2 m/s, and from the southeast at 4.6 m/s during the remaining months (Figure 3.10). Wind speeds and directions are most variable during March, April and September. Significant geomorphic effects of the Cape Arago headland and different methods of observation cause local wind statistics to differ significantly in direction and speed from observations at the offshore National Oceanic andAtmospheric Administration (NOAA) data buoy. Since the Coos Head records appear more similar to those of earlier observations (Duxbury et al., 1966), the Coos Head observations are considered more appropriate for the study of local processes (Hancock et al 1981). The NOAA buoy records are likewise more appropriate to open ocean studies of wind generated waves and currents.

3.2.4.4 Water Quality

Table 3.6 presents the results of water quality analyses for surface and bottom waters in the vicinity of sites F, G, and H for each of the four seasons (Nelson et al. 1983). Tests for heavy metals and pesticides did not indicate an atypical or polluted condition for any water sample. Salinities characteristic of the surface watermass were observed throughout the water column at all three sites in June 1980, at all but the bottom near site H in August and December 1980, and only in the surface for all sites in April 1981. The occurrence of higher salinities at the bottom in the vicinity of site H as compared to the vicinity of site G is unexplained for August and December 1980. The April 1981 samples imply recent upwelling while the June 1980 samples suggest the development of the surface watermass and the absence of upwelling.

3.3 BIOLOGICAL ENVIRONMENT

3.3.1 Introduction

OSU biological studies of the Coos Bay offshore study concentrated on sampling benthic invertebrates, epibenthic macro-invertebrates, and fish of the study area. Benthic invertebrates were sampled with a 0.096 square meter box core. Sediment samples were taken at the same time. Epibenthic invertebrates and fish were sampled with a Ballon-Otter Trawl and a one-meter beam trawl.

During the first phase of the study, box core sampling locations were randomly located throughout the study area in such a method as to comprehensively cover the area (Figure 3.11). Trawls were taken in a similar manner (Figure 3.12). During the second phase of the OSU study, box core sampling was concentrated in and about the location of the northern interim disposal site (site F) and two possible candidate disposal sites in the offshore area (including sites H and G)(Figure 3.13). Trawl sampling was also concentrated across and near the three study sites (Figure 3.13). Figure 3.14 illustrates the sampling locations established by IEC during April and May 1980.

3.3.2 Benthos

The distribution, abundance and species of benthic invertebrates in the study area were typical of habitats that vary from a coarse-grained sediment with high levels of bottom turbulence in nearshore areas, to a fine-grained/marine mud sediment region with a low level of bottom turbulence. A total of 321 benthic invertebrate species were collected in the study area, and their distribution is associated with the three major sediment patterns of the area.

The nearshore region (depths of 10 to 40 meters), as noted in previous sections, is characterized by high wave energy, high bottom turbulence and coarse-grained sands. Figures 3.15-3.18 illustrate seasonal dynamics of habitat charactertistics of the nearshore region. The benthic fauna in this region, while diverse, show a considerable degree of seasonal variation in abundance.

Dominant benthic invertebrates in the nearshore region during the first phase of the study were carnivorous snails (Olivella spp.), a clam (Tellina modesta) and several species of polychaete worms and amphipods. Figures 3.19 and 3.20 illustrate the variation in the distribution of carnivorous snails (Olivella) and the clam (Tellina modesta) between two sampling periods of the nearshore area. Similar seasonal variations were also observed for the other species mapped (see Hancock, et al., 1980).

Results of the Phase II benthic sampling in the nearshore region showed a low abundance and relatively high variation of polychaete, mollusc, and crustacean species between the five sampling stations in and about site F (Figures 3.21 to 3.23). These abundance patterns are consistent with the data collected in the nearshore area during the Phase I work. Figure 3.24 shows the benthic abundance at 9 stations of the nearshore as sampled by IEC in 1980 (IEC, 1982).

Hancock, et al, 1980, reports that the offshore region lying between the 45- and 65-meter contour is a transition zone for both faunal and sediment characteristics. This area has a high species diversity and a mix of sediment types from coarse to fine sands. Polychaete and mollusc species abundance during the second phase of the study were highly variable between the five sampling stations. This variability was strongly associated with sediment characteristics and location within the sampling area (Figures 3.21 and 3.22). In contrast, the five most abundant crustacean species did not vary greatly between the five sampling stations (Figure 3.23).

The sediments lying between the 70- and 120-meter contours are relatively stable. The sediment types in this area grade from fine sand to marine mud. The distribution of the abundant benthic species collected during the first phase of the study indicate a zonal distribution. (Figures 3.25 and 3.26).

These figures also illustrate a separation in abundance of animals between the 45- to 65-meter contour area and that for the 70- to 120-meter contour area. Similar zonal patterns were observed for other species (Hancock, et al., 1980).

Hancock, et al., 1980, reports that those patterns are likely the result of competition between sympatric species, affinities to sediment types, and, in some cases, to volatile solids distribution patterns.

Results of the Phase II benthic sampling in the vicinity of site G showed significant variation between stations for polychaete, bivalve, and crustacean species, but no significant variation for gastropod species (Figures 3.21 to 3.23). The more abundant benthic species in the area of site G differed from those near either site F or H. Total abundance of crustaceans in the site G vicinity was lower than the site H vicinity, but higher than that near site F. Species richness near site G was greater than that observed near sites F or H.

3.3.3 Epibenthos and Fisheries

Seventy-nine epibenthic invertebrates and fish species were collected by OSU during the period of April 1979 through May 1981 (see Hancock et al., 1980, and Nelson, et al., 1983). Fifty-two of these species were vertebrates and 17 were invertebrates. Epibenthic sampling during April 1979 through March 1980 was accomplished using a Ballon-Otter trawl. During the May 1980 through February 1983 period, a beam trawl was used.

Tables 3.7 and 3.8 show the most abundant epibenthic species and the number of species collected at various depths by OSU during 1979-1980 and 1980-1981. Fish were mostly "0" age class suggesting that the study area is used by these species as spawning and rearing areas. The absence of fish of older age classes, however, may reflect more trawl avoidance than absence of these fish in the area. The most common fish caught were flatfish (sanddabs and sole).

The number of species collected during each of the epibenthic sampling periods was relatively constant for all periods and depths sampled (Tables 3.7 and 3.8). Approximately twenty species were collected in each of four trawls during 1979 and 1980, and 25 to 30 species were collected in each of 15 trawls in 1980 to 1981. Because of the low number of individuals for most species, it is difficult to ascertain if there were real differences in use of areas by species.

Hancock, et al. (1980), indicates that the distribution of flatfish within the area may be the result of fish that recently settled out of the plankton in the nearshore area (inside the 40-meter contour) and movement out of the nearshore area as the fish increase in size. Hancock reports that the distribution of shrimp in the study area also reflects a seasonal movement pattern, with these animals moving back and forth between nearshore and offshore areas.

Because the OSU sampling methods did not sample for adult fish effectively, information collected by Oregon Department of Fish and Wildlife (ODFW) and published in the report Marine Resource Surveys on the Continental

Shelf Off Oregon, 1971-74 (ODFW, 1976) was used to determine the distribution of some species of commercial importance. According to this report, most of the commercially important species sampled were more abundant at depths greater than 100 fathoms (183 meters) off Coos Bay in September. The exceptions were rockfish, cod, and shrimp which are fished closer inshore. The scallop fishery that developed off Coos Bay was located between the 40 and 50 fathom contours with its southern extent near sites G and H.

3.3.4 Marine Mammals

A number of species of marine mammals occur in the oceanic area near the proposed disposal sites. Most of the species, such as the whales, dolphins and porpoises occur off Oregon only during migrations to and from feeding and breeding areas. Harbor seals and sea lions, however, are residents on the Oregon coast and one population is known from Coos Bay. (Maser, et al., 1981). A list of the marine mammals, their occurrence in Oregon, and their status under the Marine Mammal Protection Act is given in Table 3.9.

3.3.5 Endangered Species

A list of rare and endangered species in the vicintiy of the proposed disposal sites was requested from U.S. Fish and Wildlife Service (USFWS), Office of Endangered Species and the National Marine Fisheries Service (NMFS). No endangered species or their habitats were indicated for these sites in the letter from the USFWS. The NMFS, however, indicated that the Gray Whale may occur in the area. A biological assessment was prepared which concludes that the proposed action would have no impact on this endangered species. The USFWS and NMFS letters and the biological assessment are found in Appendix B.

3.4 SOCIO-ECONOMIC ENVIRONMENT

3.4.1. Introduction

Coos Bay, an estuary on the Oregon coast about 200 miles south of Columbia River, is the largest water-based exporter of forest products in the United States, by virtue of its natural harbor and its strategic location relative to timber stands along the southwest Oregon coast. This position has been achieved through extensive development of industrial processing and handling facilities around the bay, and through extensive publicly and privately financed improvements to the harbor. The wood products industry relies on waterborne transport both for local log movement and for export trade. The progressive deepening of the Coos Bay Navigation System over the years has permitted successful use of larger export vessels.

3.4.2 Local Economy

Lumber and wood products is by far the dominant basic sector in Coos County and the Coos Bay area. In 1979, it accounted for 20.1% of all employment, and 81% of manufacturing employment. The industry also accounts for approximately two-thirds of the county's basic employment and payrolls. Trucking, warehousing, and waterborne transportation in Coos Bay are primarily involved in handling forest products; the industry's share of the county's basic income exceeds 75% when these activities are included. These statistics clearly illustrate the dominance of the forest and timber processing industries in the Coos County economy. However, long term changes in the industry have placed it and the regional economy in a state of transition. Since 1960, there has been both absolute and relative declines in the county's lumber and wood products employment (CCDEIA, 1980). More recently, market fluctuations have resulted in mill closures and substantial layoffs; Coos County unemployment for January 1982 was reported by the Oregon State Employment Division to be 16.4%. Studies done on trends in the timber industry and its future generally indicate that there will be further declines in employment in this sector. Bueter estimates that job losses in Coos County resulting from a declining timber industry could range from 900-1100 jobs in the 1990's (Bueter, 1976).

Recognition of the potential for declines in timber employment have brought the focus of economic improvement efforts on diversification of products within the lumber industry and expansion/diversification within the area's other basic sectors. Currently the fishing industry is the second most important industry in the county. A good harbor, with relatively safe access during the adverse weather, and proximity to rich fishery resources, has contributed to Coos Bay fisheries development. Historically, Coos Bay has had the second highest landings in Oregon. In recent years, the harvesting and marketing of bottom fish and other previously underutilized species has served to overcome some of the traditional constraints of the industry. Given the new 200 mile fisheries jurisdiction, the large resource off of Coos Bay, and expanding markets for the harvest, expansion of this part of the industry may be expected to continue.

The Coos Bay estuary, in conjunction with port developments, harbor facilities, and improvements in inland waterways, has been primarily responsible for the County's oceanborne transportation and the related land-side trucking and warehousing, a large share of commercial fishing and fish and seafood processing, and some share of tourism. The natural waterway permits efficient movement and storage of economically important locally-handled bulk commodities. The port and related transportation facilities are a base for a large amount of local outputs to move into world markets. These facilities also facilitate the movement of such incoming commodities as sand, gravel and crushed rock, basic chemicals, distillate fuel oil, and gasoline.

Waterborne traffic in 1977 was 7,599,400 tons. Rafted logs and wood chips accounted for more than five million tons of the traffic. Other commodities included lumber, exported logs, and petroleum. The average annual traffic for the period of 1968-77 was 6,769,400 tons. More recent traffic has continued at about this level.

The major docks in Coos Bay are concentrated along the three to four mile eastern waterfront of Coos Bay/North Bend. New dock facilities are beginning to expand along the north spit. The dock facilities are primarily equipped to export forest products and secondarily are outfitted to receive petroleum imports. Twelve of the sixteen docks manage lumber and forest products. Five of the lumber docks are equipped to export wood chips; two handle wood chips exclusively. Four of the docks receive petroleum products -- two by barge and two by deep draft tankers. Only one dock, Central, handles general cargo, as well as forest products, on a regular basis. Large integrated forest products processing plants are situated next to many of these docks, particularly on the Coos Bay/North Bend waterfront.

3.4.3 Population

Coos County has the largest population of the coastal counties in Oregon. From 1910 through 1980 Coos County area has experienced yearly population growth. However, the percentage change in population growth has been declining since 1950.

Because of the Coos Bay area's dependence upon the building/lumber industries, and since the building/lumber industries have declined, the area population has declined to below 1980 levels (See Table 3.10).

3.4.4 State and Local Coastal Management Plans

Coos Bay is identified in the overall Oregon estuary classification as a deep-draft development estuary. As such, and as stipulated in Goal Number 16, Estuarine Resources, the Oregon Coastal Management Program (OCMP) recognizes that deep-draft port developments, navigation channels, and associated dredging and dredged material disposal are allowed and will continue. In addition, under Goal Number 19, Ocean Resources, the OCMP recognizes the need to "provide for suitable sites and practices for the open sea discharge of dredged materials which do not substantially interfere with or detract from the use of the continental shelf for fishing, navigation, or recreation, or from the long-term protection of natural resources."

The Coos County Comprehensive Plan, which has been locally adopted and is presently being reviewed for approval by The Oregon Department of Land Conservation and Development (DLCD), contains policy statements and estuary management plans for maintaining Coos Bay as a deep-draft development port. In keeping with these plans and policies, Coos County recognizes the need to utilize ocean sites for disposal of material dredged from the navigation channel system.

3.4.5 Navigation Improvements and Dredging Costs

The authorized Coos Bay Navigation project, modified by the River and Harbor Act of 1970, provides for two jetties at the entrance; an entrance channel 45 feet deep and 700 feet wide; a channel 35 feet deep and 300 feet wide to channel mile 9, and from there 35 feet deep and 400 feet wide to mile 15; and with turning basin and anchorage areas along the channel. Deepening of the channel from the entrance to mile 15 was completed several years earlier. Two jetties at the entrance were completed in 1928-29; the small-boat basin at Charleston was completed in 1956; and the south jetty was rehabilitated about 25 years ago. See Figure 3.27. The total Federal construction and maintenance costs through September 1978 was \$63,303,000--\$29,194,000 for construction, \$2,336,000 for jetty restoration, and \$31,773,000 for maintenance.

Average dredging quantities total about 1,500,000 cubic yards annually, and estimated in 1982 dollars, would cost about $2,100,000 for dredging and disposal. The disposal cost ranges from about $1.00 to $3.50 per cubic yard depending upon area dredged, type of equipment used, and upon disposal site. Average disposal cost would be about $1.40 per cubic yard. Presently, all of the material dredged from the entrance (about 800,000 cubic yards) is disposed of in the ocean, and most of the dredged materials from River Miles 2 to 12 are disposed of at in-water sites within the estuary. The Corps predicted that the upland disposal sites would be filled to design capacity within 5 to 10 years in the Channel Maintenance Dredging, Coos Bay, FEIS, prepared in 1976. Existing upland disposal areas adjacent to the channel have limited capacity for Type 2 material and the capacity for Type 3 material has been exhausted (personal communication, Nancy Case, COE Operations Division). Alternate disposal sites such as ocean disposal will be necessary to maintain the present navigation system.

3.4.6 Commercial and Recreational Activities in the Vicinity of the Disposal Sites

3.4.6.1 Commercial Fishing

The area offshore of Coos Bay is fished commercially for salmon, shrimp, crabs, bottom fish and scallops. Thirty-six million pounds of food fish were landed at Coos Bay in 1981 with a value of 14 million dollars.

Dungeness crab (Cancer Magister) fishing is done along most of the coast. Tanner crabs (Chinocetes sp.) are also taken incidentally. Crabs are usually fished from December to the middle of August with pots on sand or mud bottoms at depths of 50 to 300 meters. Most commercial vessels used in the crab fishery are also used in other fisheries (combination fishing boats). Approximately 1.3 million pounds of crabs were landed at Coos Bay in 1981.

The pink shrimp (Pandalus jordani) is the shrimp species commercially fished along the Oregon coast. They are usually taken during April through September by trawl over mud or sand bottoms at depths of 30-200 meters. Eight million pounds of shrimp were landed at Coos Bay in 1981.

The commercial ocean salmon fishery off Oregon is for chinook (Oncorhynchus tshawytscha) and coho (O. kisutch). Pink salmon (O. garbuscha) are also taken when they are available. One million pounds of salmon were landed at Coos Bay in 1981.

The bottom fish fishery off Oregon is for a number of fish that can be generally divided into 3 groups, flatfish (soles, flounder and halibut), rockfish, and round fish (ling cod, pacific cod, hake, and sable fish). Based upon distribution maps developed by the Oregon Department of Fish and Wildlife (ODFW) for groundfish (ODFW 1976) we concluded that the area within 6 miles of the mouth of Coos Bay had a relatively low abundance of groundfish. The highest abundance of commercial groundfish occurred at depths greater than 40 meters. Areas of high abundance of groundfish near Coos Bay were off Cape Arago, a cliff outcrop area just beyond site G, and an area 10-15 miles north of Coos Bay (ODFW, 1976.)

Distribution maps for salmon, crab, and shrimp along the Oregon Coast are also found in the ODFW report (ODFW, 1976).

In April 1981 a fishery for the Pacific coast weathervane scallop (Patinopectin caurinus) began in Oregon off Coos Bay. This fishery expanded rapidly, peaking by mid-June with 20 million pounds taken and 16.7 million landed at Oregon ports (7.5 million pounds at Coos Bay.) Oregon imposed a license moratorium in July 1981 and 145 vessels obtained permits. The catch fell off rapidly after July and by the end of 1981 only 5 vessels continued in the fishery. No live scallops were collected by OSU during the 1979-1981 sampling periods. Numerous shells were collected in the vicinity of site G in 1981. Hancock (personnal communication) believes that these shells are from the scallop fishing boats. Scallops were shelled aboard the vessels and the shells were dumped overboard. The scallop fishing beds off Coos Bay were located between the 40 and 50 fathom contours with its southern extent near sites G and H.

3.4.6.2 General Marine Recreation

Marine recreation in the coastal region of Coos Bay, and Oregon in general, is limited due to normally cool atmospheric and water conditions and severe winter weather. Fishing, clamming and beach-combing are the principal activities.

3.4.6.3 Shipping

As discussed in Section 3.4.2, an average of about 6.8 million tons of cargo enter and exit the Coos Bay port facilities annually (Port of Coos Bay, 1981). The Coos Bay region is a major source of lumber and wood chips for domestic and international commerce. During 1980, 333 deep draft vessels used Coos Bay facilites (Port of Coos Bay, Waterborne Statistics, 1980). The fishing industry is the second largest user of port facilities.

3.4.6.4 Oil and Gas Exploration and Mining

Continental shelf lease sale activities have not occurred on the Oregon shelf since 1964, and no oil or gas production occurs at present (1981). During 1964 and 1965 only a small number of exploratory wells were drilled, and only a portion of those were in the Coos Bay shelf region. The Oregon continental shelf is not included in the present (1981-1986) 5-year lease sale plan (USGS, 1981, personal communication). The earlier exploratory wells indicated the presence of hydrocarbons, but extensive exploration is necessary to more accurately determine the commercial production potential and the locations of such areas. It is very likely that exploration will eventually begin as studies of more favorable areas are completed. No mining or mineral extraction exists or is planned for the vicinity of the disposal sites.

3.4.7 Esthetics

The esthetics of the disposal site area is characterized by relatively clear ocean water, typical marine salt air smells, views of the relatively undisturbed shoreline, and intermittent sounds of breaking waves, buoy bells and horns, and seabirds. The nearby ocean beaches likewise present a pleasingatmosphere with clean sand, weathered driftwood, shorebirds, and breaking surf. Both areas represent high quality esthetic environments.

3.4.8 <u>Cultural Resources</u>

A review of the latest published version of the National Register of Historic Places and addenda shows that the alternative areas do not contain any registered properties or properties determined to be eligible for nomination to the National Register. A clearance letter from the State of Oregon Historic Preservation Office is included in Appendix C.

Table 3.1 LOCATION OF ALTERNATIVE DISPOSAL SITES FOR THE COOS BAY OFFSHORE DISPOSAL STUDY 1/

Site	$\bar{x}$ Depth (m)	Size (m)	Coordinates
E	17	1097 x 427	43°21'59"N, 124°22'45"W 43°21'48"N, 124°21'59"W 43°21'35"N, 124°22'05"W 43°21'46"N, 124°22'51"W
F	24	1097 x 427	43°22'44"N, 124°22'18"W 43°22'29"N, 124°21'34"W 43°22'16"N, 124°21'42"W 43°22'31"N, 124°22'26"W
H	55	1097 x 442	43°23'53"N, 124°22'48"W 43°23'42"N, 124°23'01"W 43°24'16"N, 124°23'26"W 43°24'05"N, 124°23'38"W
H (adjusted)	50	1097 x 442	43°23'13"N, 124°22'30"W 43°23'04"N, 124°22'42"W 43°23'36"N, 124°23'07"W 43°23'25"N, 124°23'19"W
G	93	1097 x 442	43°24'44"N, 124°25'15"W (centroid)

1/ Buoys will be placed at the center of sites E, F, and H to mark their locations.

Table 3.2. Sediment Accumulation Within Upper Coos Bay (cubic yards)

Period	Coos River RM 12 to RM 14	Isthmus Slough RM 14 to RM 15
5/80 to 10/80	121,000	149,000
10/80 to 10/81	194,000	21,000
10/81 to 10/82	289,000	164,000

Table 3.3 Chemical characteristics of Coos Bay sediments, May 1979 (from Hancock, et. al. 1981).

Station		Depth (cm)	Solids* (g/g)	VS (mg/g)	Tot.* S (ug/g)	RSC (ug/g)	O & G (ug/g)	NH_4^+-N (ug/g)	Chloro-Insect. (ng/g)	PCB (ng/l)	Cd (ug/l)	Cu (ug/l)	Fe (ug/l)	Mn (ug/l)	Pb (ug/l)	Zn (ng/l)
E1	5.5	00-20	0.86	BD	BD	295	BD	ND	BD	BD	1.2	2.1	5000	45	14	99
		20-60	ND	ND	ND	ND	ND	ND	0.3 DDT	≤ 2	ND	ND	ND	ND	ND	ND
E1s	5.5	00-20	0.80	ND	48	860	BD	0.5	ND	ND	2.5	2.9	4900	48	14	69
		20-51	0.82	BD	66	800	BD	0.5	ND	ND	1.5	3.0	5100	45	17	200
E2	7.5	00-20	0.85	40	BD	340	BD	0.3	ND	ND	0.8	ND	ND	ND	ND	ND
		20-60	0.82	BD	BD	480	BD	0.7	ND	ND	1.7	1.8	4600	56	12	20
E2s	7.5	00-20	0.84	BD	BD	176	BD	ND	BD	≤ 4.3	ND	ND	ND	ND	ND	ND
		20-60	0.81	29	BD	290	BD	ND	ND	ND	.7	.9	3200	54	8.6	12
E3	9.0	00-20	0.78	30	BD	530	BD	1.8	BD	BD	2.3	2.3	5600	44	14	45
		20-42	0.77	BD	33	480	BD	1.8	ND	ND	16	1.4	5300	45	5.2	48
E3s	9.0	00-20	0.80	BD	10	390	BD	1.3	ND	ND	1.1	2.9	6000	38	18	31
		20-60	0.76	63	130	420	147	14	ND	ND	1.1	3.9	8400	41	16	50
E4	11.0	00-20	0.80	BD	BD	410	BD	0.6	ND	ND	9.1	2.6	5500	33	12	71
		20-60	0.79	48	BD	350	BD	8.0	ND	ND	2.0	3.3	5800	46	14	65
E4s	11.0	00-20	0.70	59	BD	910	BD	0.05	BD	≤ 5(Ar1260)	0.9	2.7	9300	53	20	81
		20-60	0.76	39	30	760	BD	1.0		≤ 3	11	2.5	7500	46	13	38
E6	13.0	00-20	0.56	81	123	2180	540	28	BD	BD	4.6	13	19500	200	25	540
		20-60	0.61	59	221	2100	385	44	BD	BD	1.6	7.5	14100	190	15	67
E6s	13.0	00-20	0.66	56	1060	1610	282	24	BD	BD	1.5	4.7	10500	61	17	61
		20-60	0.72	50	10	460	144	12	0.5 DDT	BD	1.3	2.1	9200	57	10	49
E7	14.5	00-20	0.38	48	126	4500	ND	45	ND	ND	2.6	26	35300	330	32	290
		20-60	0.39	51	735	3100	1020	92	ND	ND	2.6	5.1	25400	240	26	180
E7s	14.5	00-20	0.49	102	1620	1900	1940	81	BD	BD	19	24	22700	173	45	780
		20-60	0.53	96	2220	2450	1680	90	ND	ND	30	17	17500	155	25	121
LLD				3	10		50		0.1	0.1						

Free sulfides were below detection (0.1 ug/g) in all samples

BD=below detection limit (LLD)
ND=no data available

Table 3.4 Chemical characteristics of Coos Bay sediments, October 1979 (from Hancock, et. al. 1981).

Station	River Mile	Depth (cm)	Solids (g/g)	VS (mg/g)	Tot. S (ug/g)	RSC (ug/g)	O & G (ug/g)	HC (ug/g)
E4	11.0	00-20	0.82	6	BD	560	BD	ND
		20-41	0.80	6	BD	350	BD	ND
E5	12.0	00-20	0.64	44	920	2570	440	ND
		20-60	0.59	65	590	3200	370	ND
E6	13.0	00-20	0.62	49	770	3020	370	ND
		20-60	0.55	94	400	3290	510	ND
E7	14.5	00-20	0.39	105	2150	4240	920	ND
		20-60	0.39	112	850	5110	900	ND
E8	13.8	00.20	0.62	57	400	2360	500	ND
		20-60	0.56	87	750	2655	680	350
E9	15.0	00-20	0.51	155	1600	4210	1600	ND
		20-48	0.41	147	2500	6220	2000	1200
LLD					10		50	

Metal Concentration (ug/g)

	As	Cd	Cu	Fe	Mn	Pb	Zn	Hg
E4	1.2	0.3	2.1	4590	35	5.2	12	.085
	2.0	1.3	2.3	3950	36	5.1	8.4	.125
E5	2.8	1.4	14	21600	105	21	69	.11
	3.4	1.7	17	24600	150	24	70	.12
E6	3.1	1.6	14	22300	117	21	70	.97
	2.9	1.8	23	29500	365	27	85	.2
E7	4.1	3.0	31	29600	142	40	121	.77
	7.7	2.5	33	36800	166	39	154	3.3
E8	1.8	1.5	11	17000	89	16	64	.63
	3.0	1.4	12	21000	125	22	61	.45
E9	5.1	2.3	25	25300	108	31	101	.45
	6.8	2.9	34	32100	164	45	128	.27

Tables 3.4 (Cont)

Pesticide Concentration, ng/g

	Aldrin	DDE	Dieldrin	DDD	DDT	PCB
E4	ND	ND	ND	ND	ND	ND
	BD	BD	BD	BD	BD	BD
E5	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND
E6	ND	ND	ND	ND	ND	ND
	0.2	BD	BD	BD	BD	BD
E7	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND
E8	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	ND
E9	ND	ND	ND	ND	ND	ND
	1.5	BD	BD	2.5	1.7	BD
LLD	0.1	0.1	0.1	0.1	0.1	1.0

Table 3.5 Chemical characteristics of Coos Bay sediments, March 1980 (from Hancock, et. al. 1981).

Station	River Mile	Depth (cm)	Solids (g/g)	VS (mg/g)	Tot. S (ug/g)	RSC (ug/g)	O & G (ug/g)	HC (ug/g)
E4	11.0	00-20	0.82	3	BD	77	BD	BD
		20-50	0.78	12	BD	1450	BD	BD
E5	12.0	00-20	0.59	48	480	2170	490	200
		20-60	0.70	26	430	1360	300	130
E6	13.0	00-20	0.52	63	690	1570	670	380
		20-60	0.54	64	540	3250	410	180
E7	14.5	00-20	0.38	93	790	3200	1050	670
		20-60	0.38	89	2080	4180	970	650
E8	13.8	00.20	0.60	47	215	1620	320	118
		20-60	0.57	61	600	2400	490	220
E9	15.0	00-20	0.33	199	470	3900	2800	1200
		20-48	0.31	200	1900	6500	1840	880
LLD					10		50	50

Pesticide Concentration, ng/g

	Aldrin	DDE	Dieldrin	DDD	DDT	PCB
E4	ND	ND	ND	ND	ND	ND
	<0.02	0.04	0.05	0.02	0.05	BD
E5	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	BD
E6	ND	ND	ND	ND	ND	ND
	0.7	0.13	ND	0.28	0.07	BD
E7	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	BD
E8	ND	ND	ND	ND	ND	ND
	ND	ND	ND	ND	ND	BD
E9	ND	ND	ND	ND	ND	BD
	BD	0.3	0.2	2.7	3.0	BD
LLD	0.02	0.02	0.02	0.02	0.02	0.1

Table 3.5 (Cont)

Metal Concentration (ug/g)

	As	Cd	Cu	Fe	Mn	Pb	Zn	Hg
E4	1.3	0.8	1.0	5000	31	3.4	12	.06
	1.2	1.8	2.8	5400	45	13	13	.09
E5	3.6	1.6	14	8500	131	19	77	.15
	2.4	1.1	5.4	10000	58	7.5	29	.04
E6	3.5	1.8	18	26900	150	25	110	.20
	6.1	1.7	18	24500	263	22	87	.39
E7	6.3	2.6	32	33900	209	37	124	.21
	9.5	2.4	29	35000	172	33	121	.45
E8	3.0	1.3	12	18600	102	16	67	.15
	3.7	1.6	17	23600	103	22	87	.12
E9	9.0	2.3	32	34100	203	38	123	.24
	10.6	3.1	34	38700	247	45	129	.39

Table 3.6 Chemical Analysis of Marine Waters at Offshore Sites F, G & H Coos Bay, Oregon
(From Nelson et.al. 1983)

Date	STATION	BOTTOM DEPTH (fathoms)	pH	SALINITY (mg/ml)	NH4-N (ug/ml)	TURBIDITY (NTU)	TSS (ug/ml)	VSS (ug/ml)	As (ug/ml)	Hg (ug/ml)
June 1980	F3B	13	7.85	32	BD	2.9	22	6	BD	ND
	F3T	13	8.00	30	BD	3.7	19	6	ND	BD
	G3B	50	7.70	33	0.10	7.0	52	12	ND	ND
	G3T	50	8.00	31	BD	3.6	26	8	ND	ND
	H3B	33	7.45	33	BD	6.0	27	7	ND	BD
	H3T	33	8.00	31	BD	1.2	26	8	BD	ND
August 1980	F3B	ND	7.70	33	BD	4.2	26	10	ND	BD
	F3T	ND	7.80	33	BD	2.0	23	8	BD	ND
	G3B	ND	7.60	33	BD	1.3	36	9	BD	ND
	G3T	ND	7.90	30	0.03	4.1	20	1	ND	ND
	H3B	ND	7.55	35	BD	2.6	23	8	BD	ND
	H3T	ND	7.70	32	BD	1.2	24	7	ND	BD
December 1980	F3B	13	7.70	33	BD	4.2	26	10	ND	BD
	F3T	13	7.80	33	0.01	2.0	23	8	BD	ND
	G3B	50	7.60	33	BD	1.3	36	9	BD	ND
	G3T	50	7.90	30	0.03	4.1	20	1	ND	ND
	H3B	33	7.55	35	BD	2.6	23	8	BD	ND
	H3T	33	7.70	32	BD	1.2	24	7	ND	BD
April 1981	F3B	13	7.50	35	BD	4.0	ND	ND	BD	ND
	F3T	13	7.50	31	BD	3.8	ND	ND	BD	BD
	G3B	50	7.60	35	BD	2.8	ND	ND	BD	BD
	G3T	50	7.60	32	BD	2.9	ND	ND	BD	ND
	H3B	33	7.50	35	BD	3.2	ND	ND	BD	ND
	H3T	33	ND	ND	BD	ND	ND	ND	BD	BD
LLD					0.03				0.04	0.05

Table 3.6 (Cont)

Date	STATION	METAL CONCENTRATION (ng/ml)						PESTICIDE CONCENTRATION (ng/ml)						
		Cd	Cu	Fe	Mn	Pb	Zn	Aldrin	DDE	Dieldrin	DDD	DDT	Ar1254	Ar1260
June 1980	F3B	ND	ND	ND	ND	ND	ND	0.010	BD	0.005	0.003	0.004	BD	BD
	F3T	1.60	14.00	6	18	3.50	0.50	0.004	BD	0.005	BD	0.010	BD	BD
	G3B	ND	ND	ND	ND	ND	ND	0.005	0.002	0.005	0.002	0.004	BD	BD
	G3T	ND	ND	ND	ND	ND	ND	0.001	0.002	BD	0.002	0.004	BD	BD
	H3B	1.80	8.60	33	14	3.50	7.00	0.005	BD	0.006	0.010	0.008	BD	BD
	H3T	ND	ND	6	5	ND	ND	BD	0.004	BD	0.003	BD	BD	BD
August 1980	F3B	1.40	11.20	18	16	5.00	2.50	0.001	0.001	BD	0.001	0.004	BD	BD
	F3T	ND	ND	ND	ND	ND	ND	0.002	BD	BD	BD	0.005	BD	BD
	G3B	ND	ND	ND	ND	ND	ND	0.001	BD	BD	0.002	0.001	BD	BD
	G3T	ND	ND	ND	ND	ND	ND	0.002	BD	0.001	0.001	BD	BD	BD
	H3B	ND	ND	69	112	ND	ND	0.001	BD	0.001	BD	0.003	BD	BD
	H3T	3.50	18.20	11	21	5.00	7.00	0.001	BD	BD	BD	0.002	BD	BD
December 1980	F3B	2.80	34.00	18	16	7.00	9.00	0.001	0.001	BD	0.001	0.004	BD	BD
	F3T	ND	ND	ND	ND	ND	ND	0.002	BD	BD	BD	0.005	BD	BD
	G3B	ND	ND	ND	ND	ND	ND	0.001	BD	BD	0.002	0.001	BD	BD
	G3T	2.50	28.80	ND	ND	7.00	7.50	0.002	BD	0.001	0.001	BD	BD	BD
	H3B	1.40	12.60	69	112	3.50	5.00	0.001	BD	0.001	BD	0.003	BD	BD
	H3T	3.10	13.00	11	21	7.00	18.50	0.001	BD	BD	BD	0.002	BD	BD
April 1981	F3B	ND	ND	ND	ND	ND	ND	BD	BD	ND	BD	BD	BD	BD
	F3T	1.30	9.70	14	18	3.50	18.50	BD	BD	ND	BD	0.002	BD	BD
	G3B	1.40	9.50	38	76	3.50	15.00	BD	BD	ND	BD	BD	BD	BD
	G3T	ND	ND	ND	ND	ND	ND	BD	0.001	ND	0.002	0.004	BD	BD
	H3B	2.20	12.50	ND	ND	2.70	79.00	BD	ND	BD	0.002	BD	BD	BD
	H3T	4.40	13.50	11	12	3.50	5.00	BD	ND	BD	BD	BD	BD	BD
	LLD							0.020	0.001		0.001	0.002	0.020	0.020

TABLE 3.7 Most abundant epibenthic species found at varying depths during the April 1979 to March 1980 epibenthic sampling period by Oregon State University, Coos Bay Offshore Disposal Study (Ballon-Otter trawl).

Depth (m.)	Species	Taxonomic Family	Number
10-19	Speckled Sanddab	(Pleuronectidae)	414
	Night Smelt	(Osmeridae)	294
	Northern Anchovy	(Engraulididae)	57
	Sand Sole	(Pleuronectidae)	45
	English Sole	(Pleuronectidae)	36
	Bay Pipefish	(Syngnathidae)	29
	Warty Poacher	(Agonidae)	28
	Pacific Tomcod	(Gadidae)	20

(Twenty-two species observed, of which 14 species were represented by less than six individuals each.)

20-29	Speckled Sanddab	(Pleuronectidae)	1,467
	English Sole	(Pleuronectidae)	193
	Pacific Tomcod	(Gadidae)	68
	Rockfish	(Scorpaenidae)	43

(Nineteen species observed, of which 13 species were represented by less than 14 individuals each.)

30-45	Speckled Sanddab	(Pleuronectidae)	2,259
	Hybrid Sole	(Pleuronectidae)	108
	Pacific Sanddab	(Pleuronectidae)	73
	Night Smelt	(Osmeridae)	59
	English Sole	(Pleuronectidae)	44
	Pacific Tomcod	(Gadidae)	26

(Twenty-two species observed, of which 16 species were represented by less than seven individuals each.)

Depth (m.)	Species	Taxonomic Family	Number
46-70	Speckled Sanddab	(Pleuronectidae)	369
	Pacific Sanddab	(Pleuronectidae)	322
	Pacific Tomcod	(Gadidae)	203
	English Sole	(Pleuronectidae)	177
	Pygmy Poacher	(Agonidae)	70
	Hybrid Sole	(Pleuronectidae)	32
	Dover Sole	(Pleuronectidae)	23

(Eighteen species observed, of which 11 species were represented by less than 12 individuals each.)

*75-120	Pacific Sanddab	(Pleuronectidae)	212
	Speckled Sanddab	(Pleuronectidae)	46
	Rockfish	(Scorpaenidae)	26
	Pacific Tomcod	(Gadidae)	21
	Rex Sole	(Pleuronectidae)	17

(Twelve species observed, of which 7 species were represented by less than 6 individuals each.)

* Results of two trawls. All other depths are results of four trawls each.

TABLE 3.8 Most abundant epibenthic species found near sites F, H, and G during the May 1980 through May 1981 epibenthic sampling period by Oregon State University, Coos Bay Offshore Disposal Study (15 trawls each site) (1-m beam trawl).

Depth (m.)	Species	Taxonomic Family	Number
20-40	Speckled Sanddab	(Pleuronectidae)	998
(Site F)	Brown Irish Lord	(Cottidae)	79
	Pacific Sanddab	(Pleuronectidae)	70
	English Sole	(Pleuronectidae)	63
	Cabezon	(Cottidae)	50
	Slim Sculpin	(Cottidae)	43
	Prickelbreast, Poacher	(Agonidae)	35

(Twenty-eight species observed of which there were less than 20 individuals each of 21 species.)

Depth (m.)	Species	Taxonomic Family	Number
45-70	Pacific Sanddab	(Pleuronectidae)	918
(Site H)	English Sole	(Pleuronectidae)	218
	Speckled Sanddab	(Pleuronectidae)	160
	Rockfish	(Scorpaenidae)	55
	Rex Sole	(Pleuronectidae)	31

(Twenty-five species were observed, of which there were less than 20 individuals each of 20 species.)

75-120	Pacific Sanddab	(Pleuronectidae)	754
(Site G)	Slender Sole	(Pleuronectidae)	463
	Slim Sculpin	(Cottidae)	403
	Rex Sole	(Pleuronectidae)	103
	Blackbelly Eelpout	(Zoascidae)	84
	Rockfish	(Scorpaenidae)	36
	Dover Sole	(Pleuronectidae)	34

(Thirty species observed, of which there were less than 20 individuals each of 23 species.)

Table 3.9 A list of the Marine Mammals occuring off the Oregon Coast and their status under the Marine Mammal Protection Act.

FAMILY AND SPECIES	COMMON NAME	PROTECTED	OCCURRENCE OFF OREGON
Balaenidae			
Eubalaena glacialis	North right whale	Yes (endangered)	Along Oregon coast in winter
Eschrichtiidae			
Eschrichtius robustus	Grey whale	No (endangered)	Along Oregon coast during Feb. to May while migrating to and from breeding and feeding grounds
Balaenopteridae			
Balaenoptera musculus	Blue whale	Yes	Off Oregon coast from late May to June and August to October
Balaenoptera physalus	Fin whale	Yes	Occur off Oregon May to September
Balaenoptera borealis	Sei whale	Yes	Summer to early fall
Balaenoptera acutorostrata	Minke whale	No	Late summer to fall
Megaptera novaeangliae	Humpback whale	Yes	April to October
Physeteridae	Sperm whale	Yes	Late summer to fall
Physeter catodon	Sperm whale	Yes	
Kogia breviceps	Pygmy Sperm whale	No	Very rare, one stranding
Ziphiidae	Beaked whale	No	Very rare, one stranding
Mesophodon stejnegeri	N.P. Beaked whale	No	Very rare, one stranding
Mesophodon carlhubbsi	Hubbs Beaked whale	No	Very rare, one stranding

TABLE 3.9 (Cont)

FAMILY AND SPECIES	COMMON NAME	PROTECTED	OCCURRENCE OFF OREGON
Ziphius cavirostris	Cuvier's Beaked whale	No	Rare, three strandings
Berardius bairdii	Giant Bottlenose whale	No	Uncommon June to Oct.
Delphinidae			
Globice phala macrorhynchus	Short-finned Pilot whale	No	Winter
Grampus griseus	Grampus dolphin	No	Uncommon, Spring to Summer
Orcinus orca	Killer whale	No	Winter
Pseudorca crassidens	Fabe Killer whale	No	Uncommon
Delphinum delphis	Common dolphin	No	Uncommon, Spring, Summer
Lissodelphis borealis	Northern right whale Dolphin	No	Rare, Spring to Summer
Stenella coeruleoalba	Striped Dolphin	No	Rare, three standings
Lagenorhynchus obliguidens	Pacific white sided Dolphin	No	Common throughout year
Phocoenidae			
Phocoenioides dalli	Dall's Porpoise	No	Common, throughout year
Phocoena phocoena	Harbor Porpoise	No	Common, throughout year
Mustelidae			
Enhydra lutris	Sea Otter	Yes	Rare, introduction program failed
Phocidae			

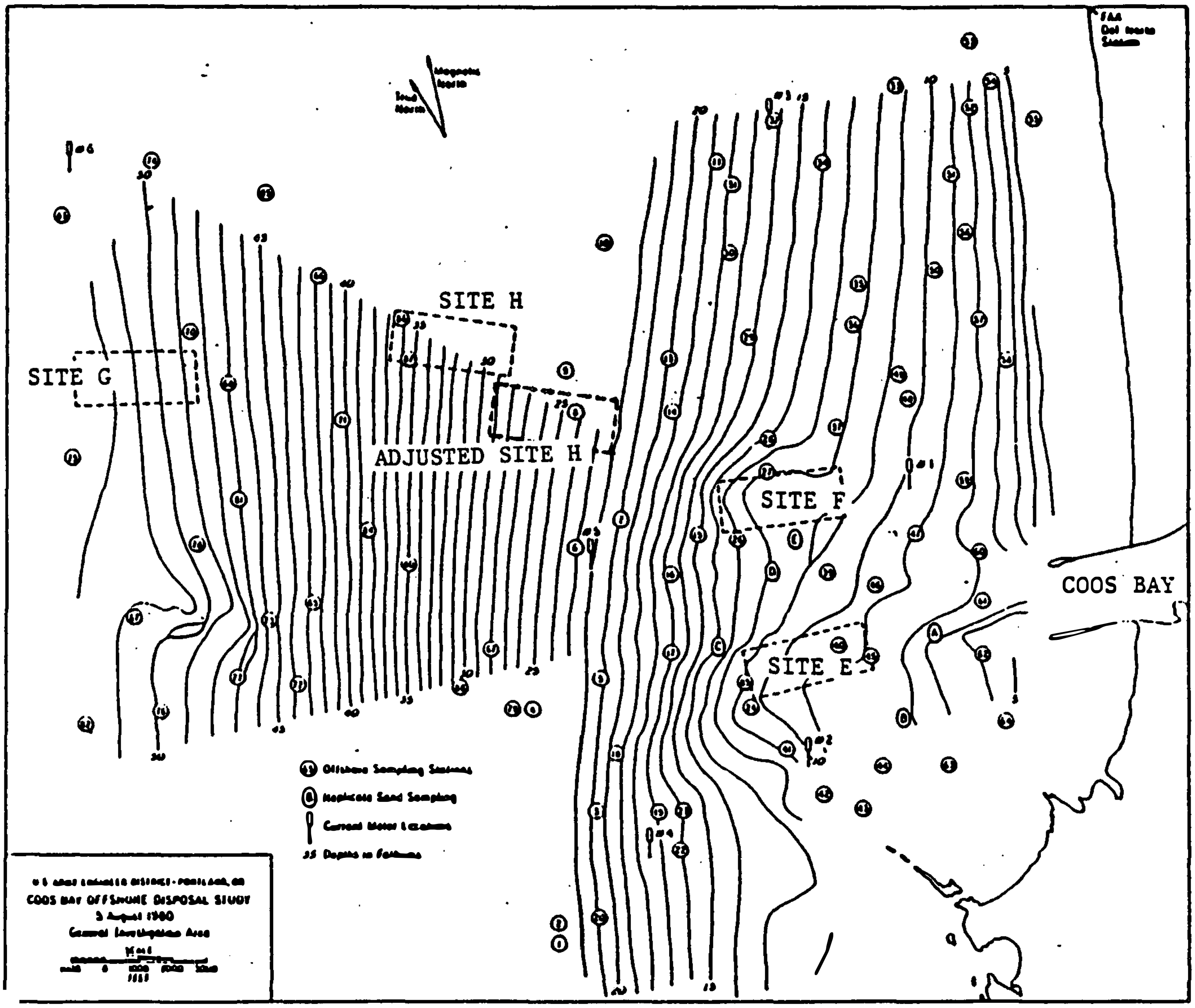
TABLE 3.9 (Cont)

FAMILY AND SPECIES	COMMON NAME	PROTECTED	OCCURRENCE OFF OREGON
Phoca vitulina	Harbor Seal	Yes	Common, 4,000 in Oregon
Phoca hispida	Ringed Seal	No	Rare, single sighting
Phoca fasciata	Ribbon Seal	No	Rare, single sighting
Mirounga augustirostis	Northern Elephant Seal	Yes	Rare
Otariidae			
Eumetopias jubatus	Steller Sea Lion	No	Common, 3,000 in Oregon
Zalophys californianus	California Sea Lion	No	Common, 3,500 in Oregon, population off Coos Bay
Callorhinus ursinus	Northern Fur Seal	No	Rare

TABLE 3.10 POPULATION OF COOS COUNTY 1981 AND 1982

	1981	1982	% Change
Coos County	63,300	61,750	-2.5
Coos Bay City	14,275	13,710	-4.0
North Bend City	9,670	9,320	-3.6

Source: Center for Population Research and Census, Portland State



igure 3.1 Offshore Coos Bay study area.

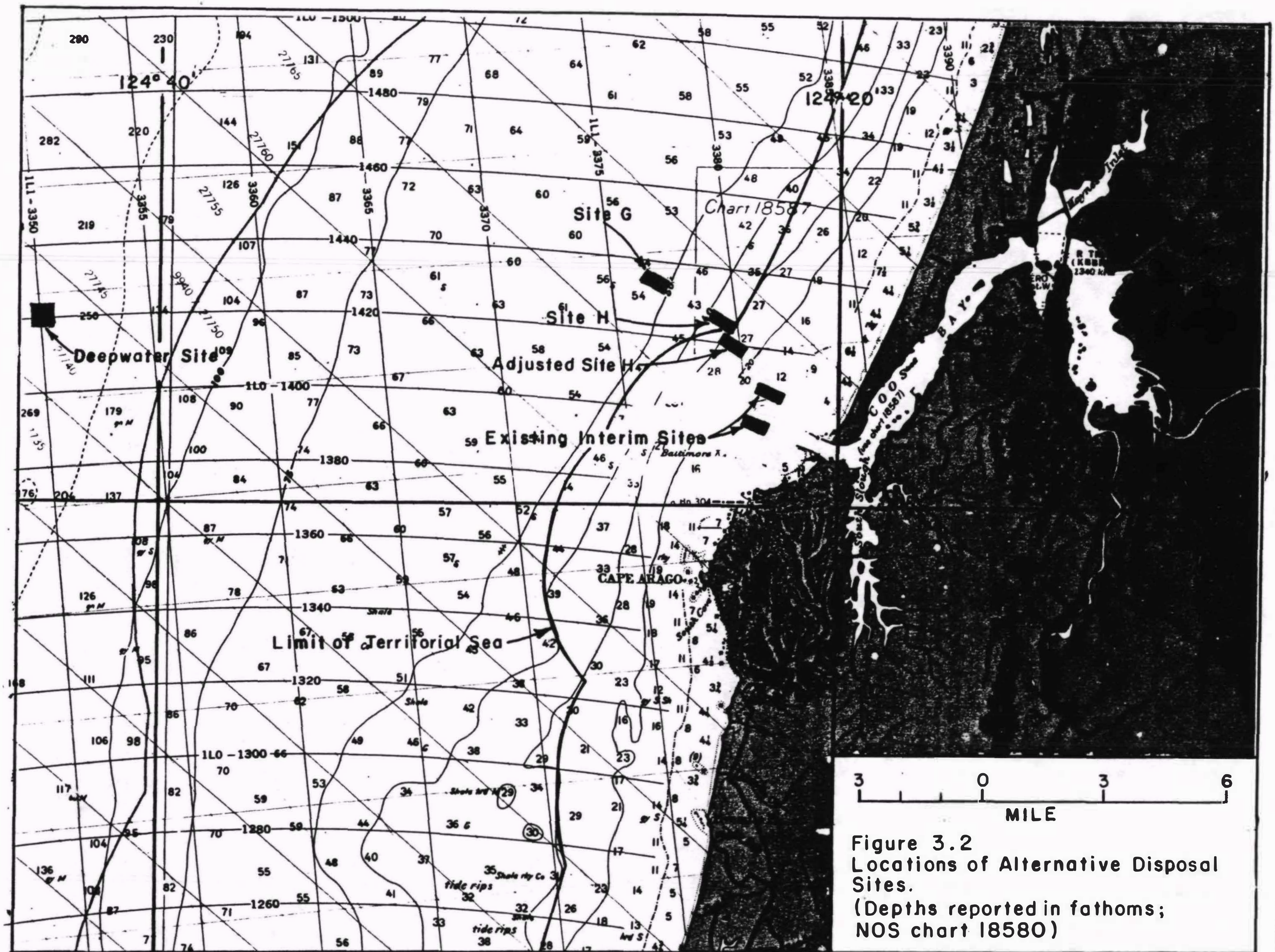


Figure 3.2
Locations of Alternative Disposal Sites.
(Depths reported in fathoms; NOS chart 18580)

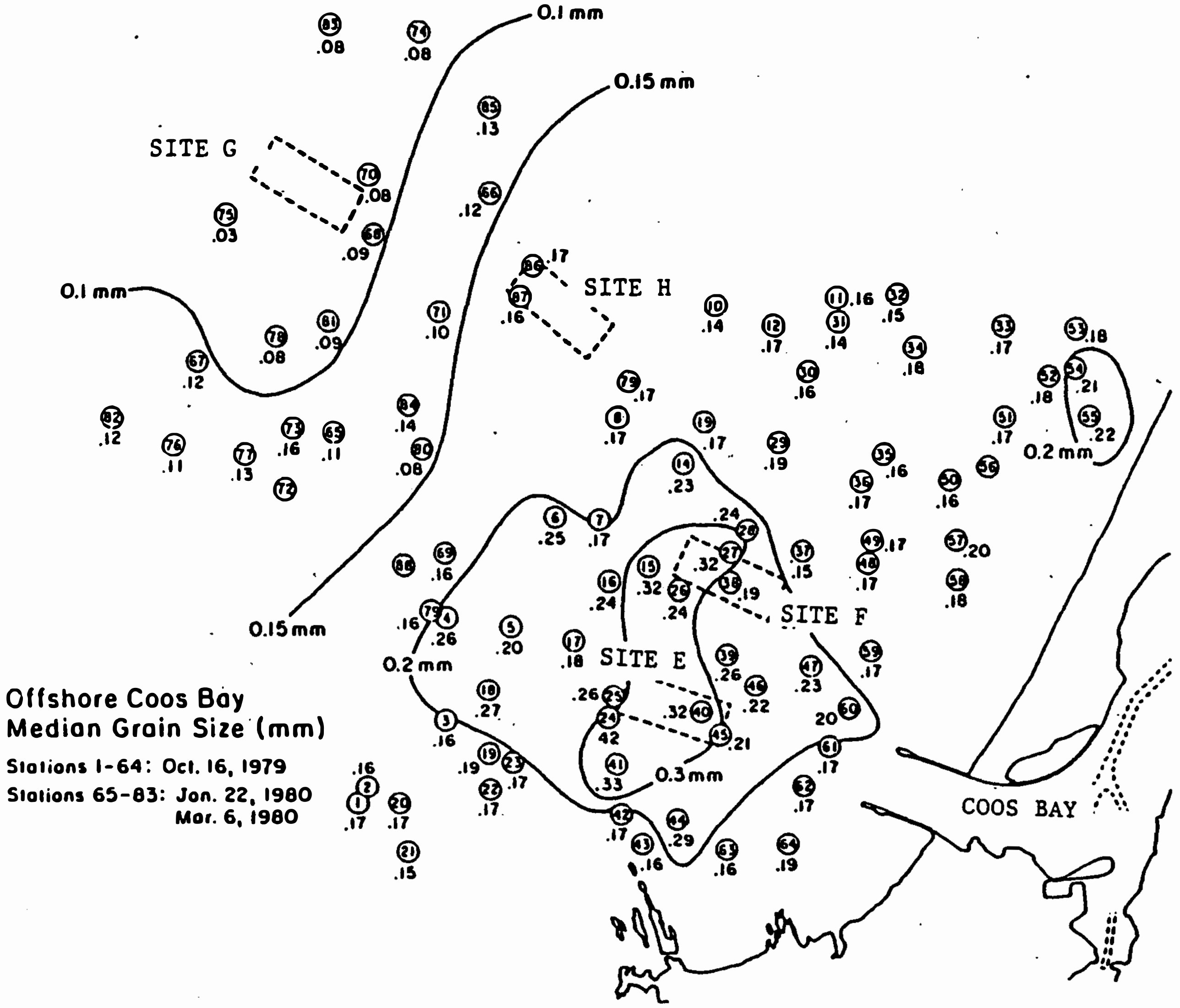


Figure 3.3 Extended offshore area median grain size distribution (Hancock, et al. 1981).

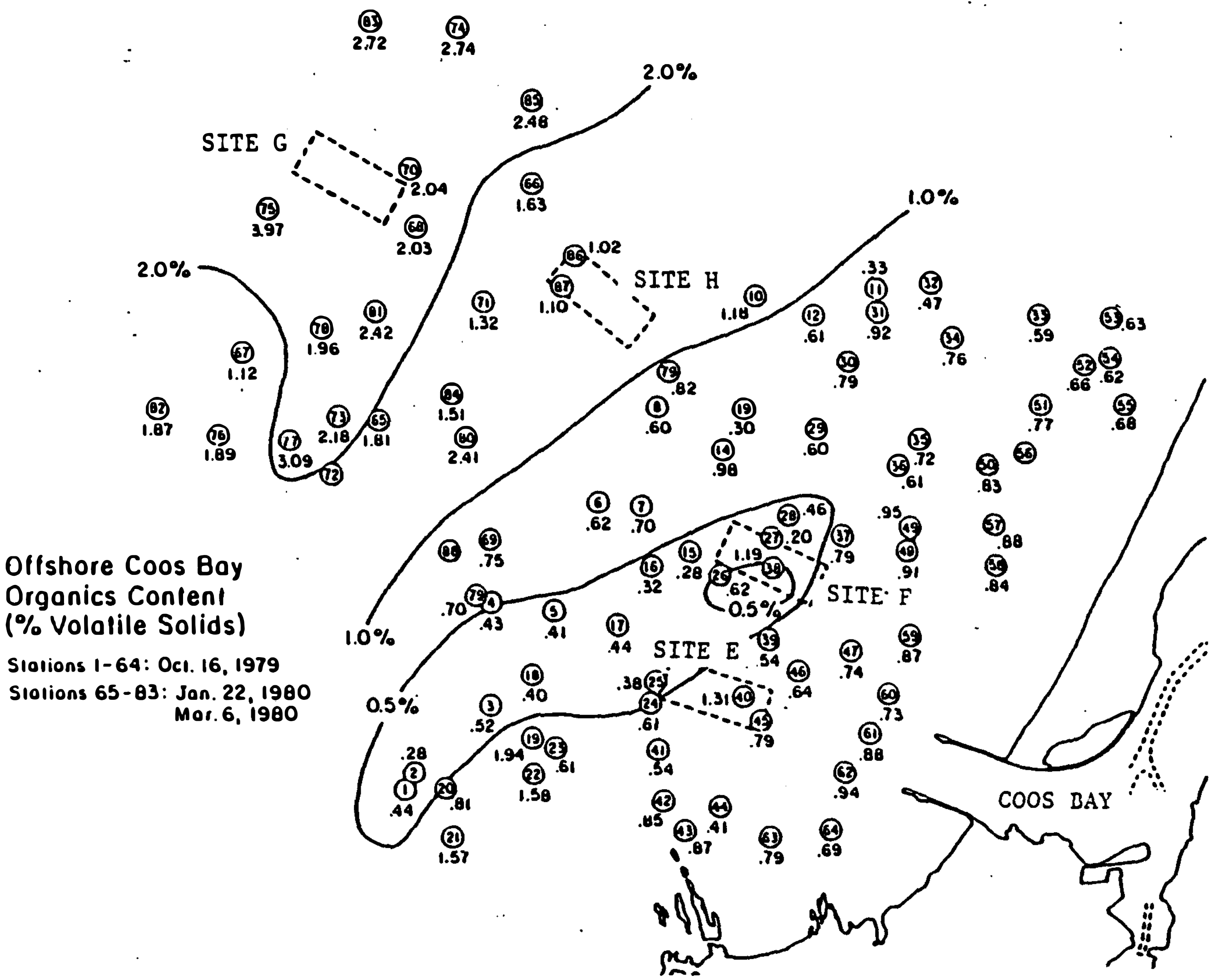


Figure 3.4 Extended offshore area volatile solids (Hancock, et al. 1981).

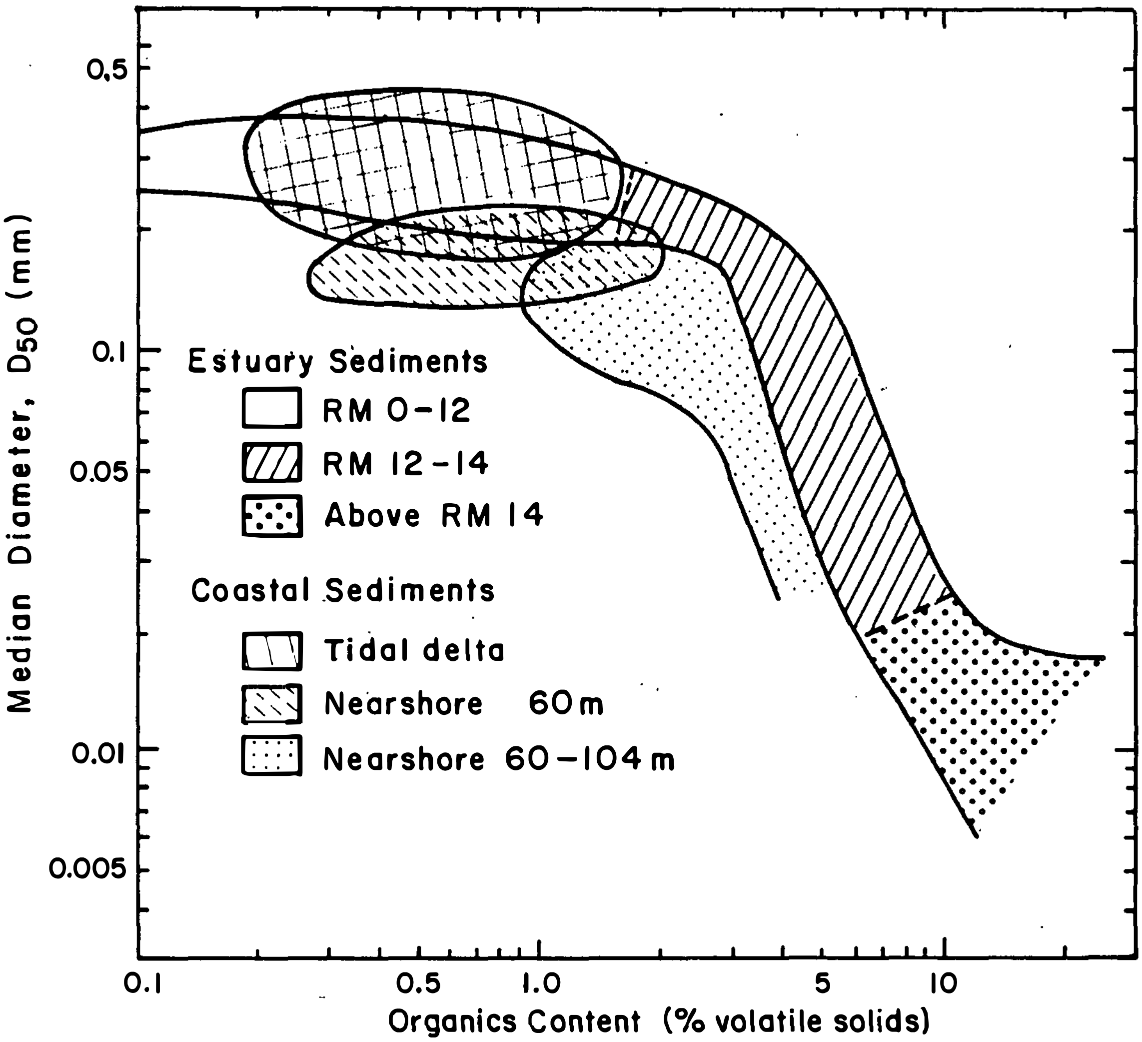


Figure 3.5 Median grain size vs. organics content in estuarine and coastal sediments (Hancock, et al. 1981).

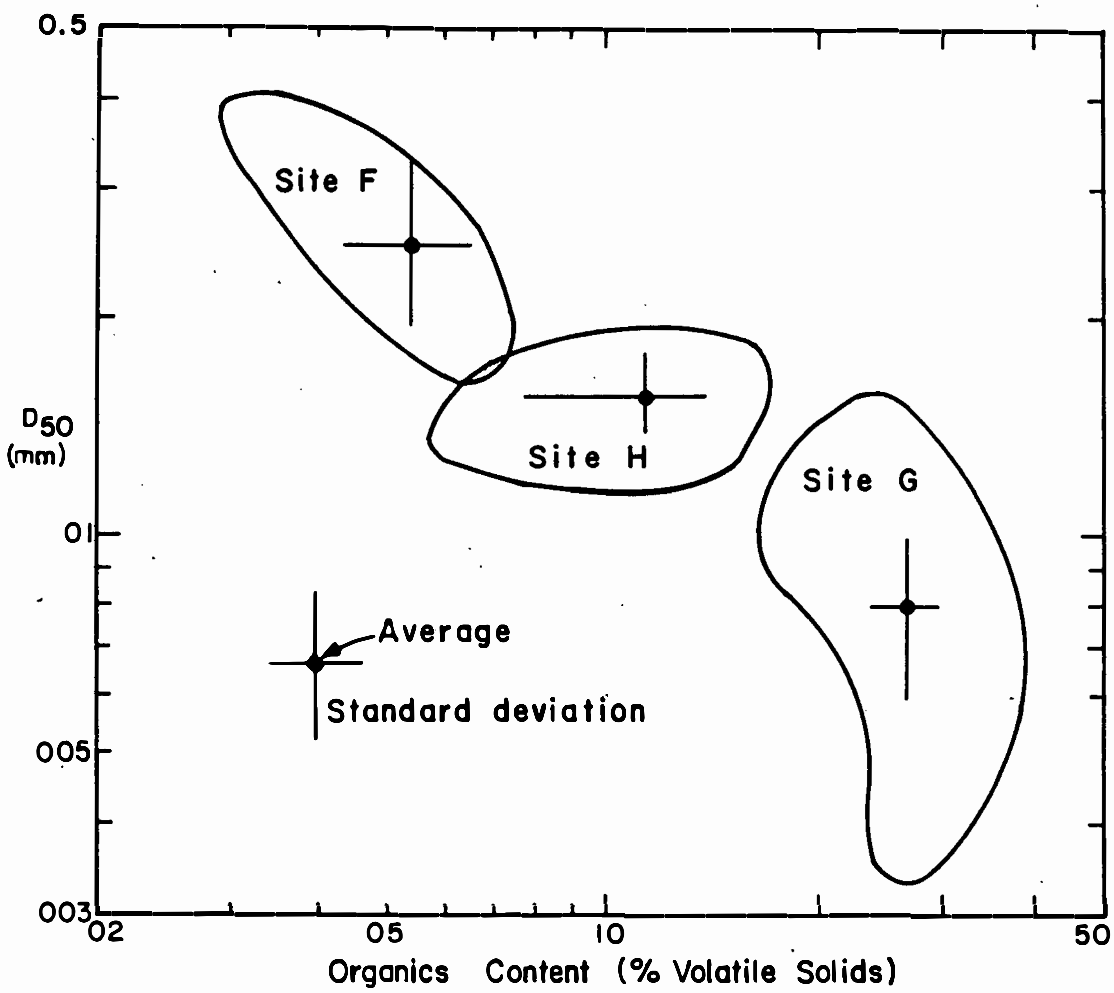


Figure 3.6 Median grain size vs. volatile solids with site average and standard deviation (after Nelson, et. al. 1983).

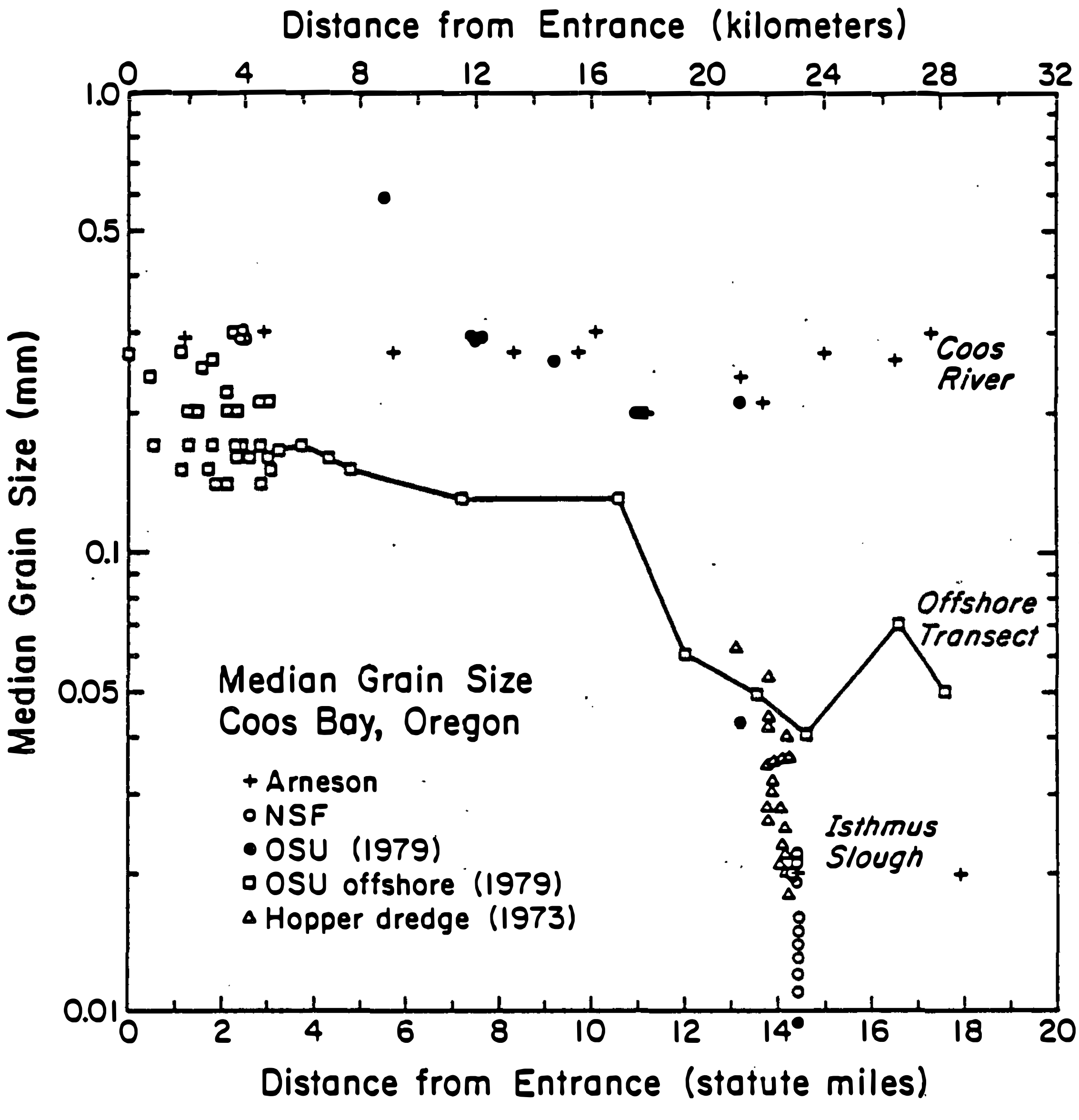


Figure 3.7 Median grain size related to distance from entrance (after Hancock, et al. 1981).

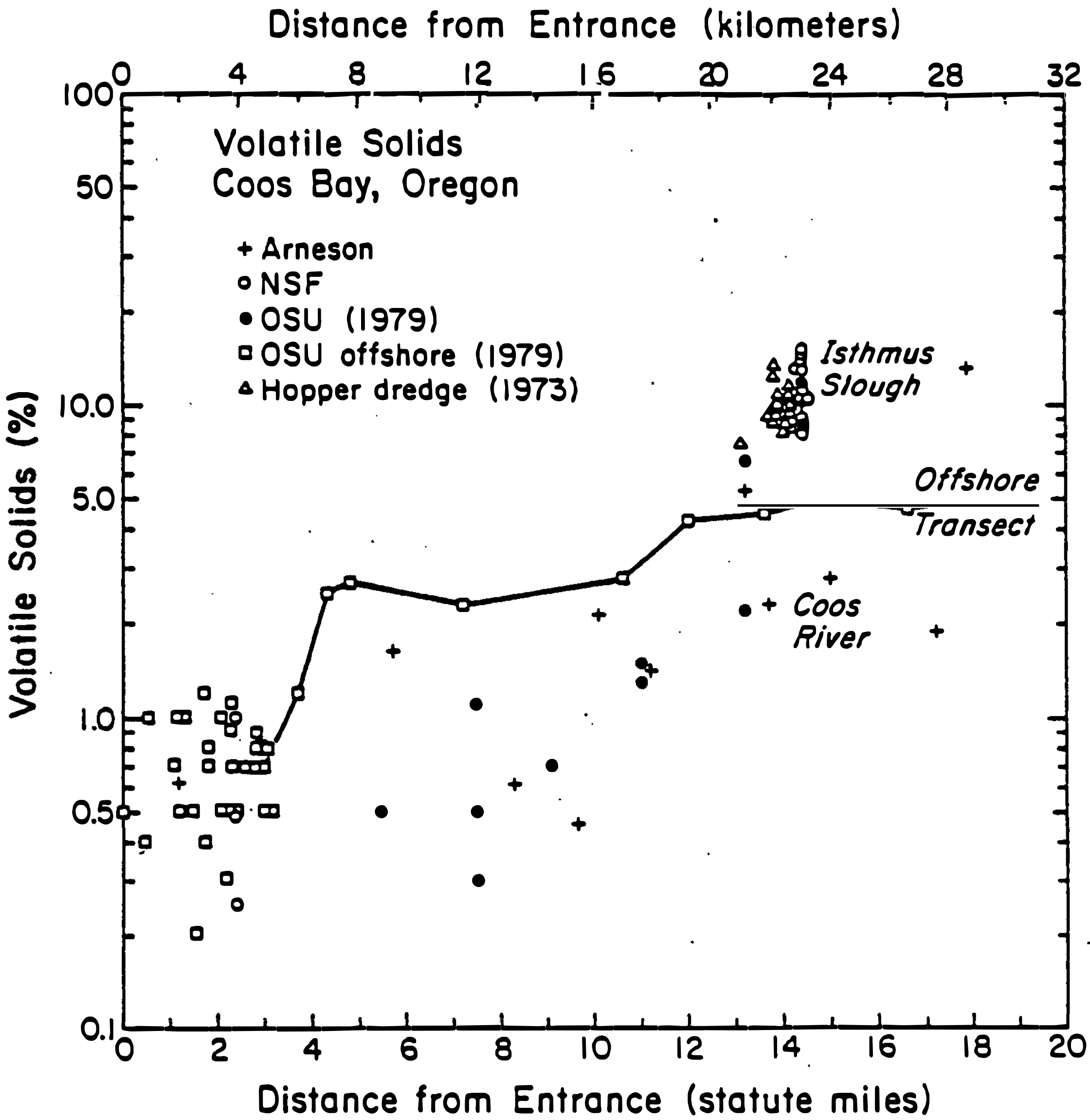


Figure 3.8 Volatile solids related to distance from entrance (Hancock, et al. 1981).

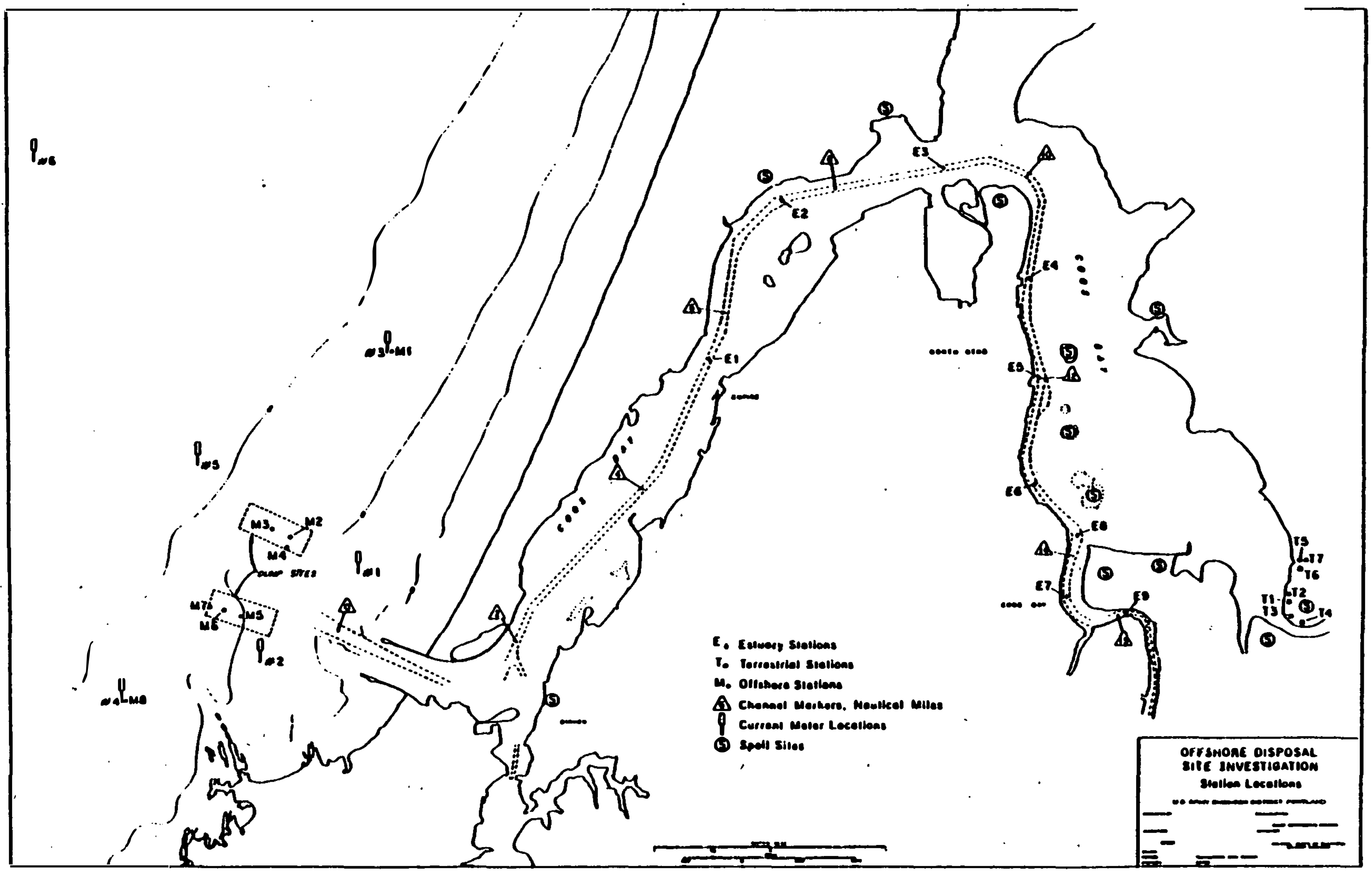


Figure 3.9 Coos Bay sediment sampling sites (Hancock, et. al. 1981).

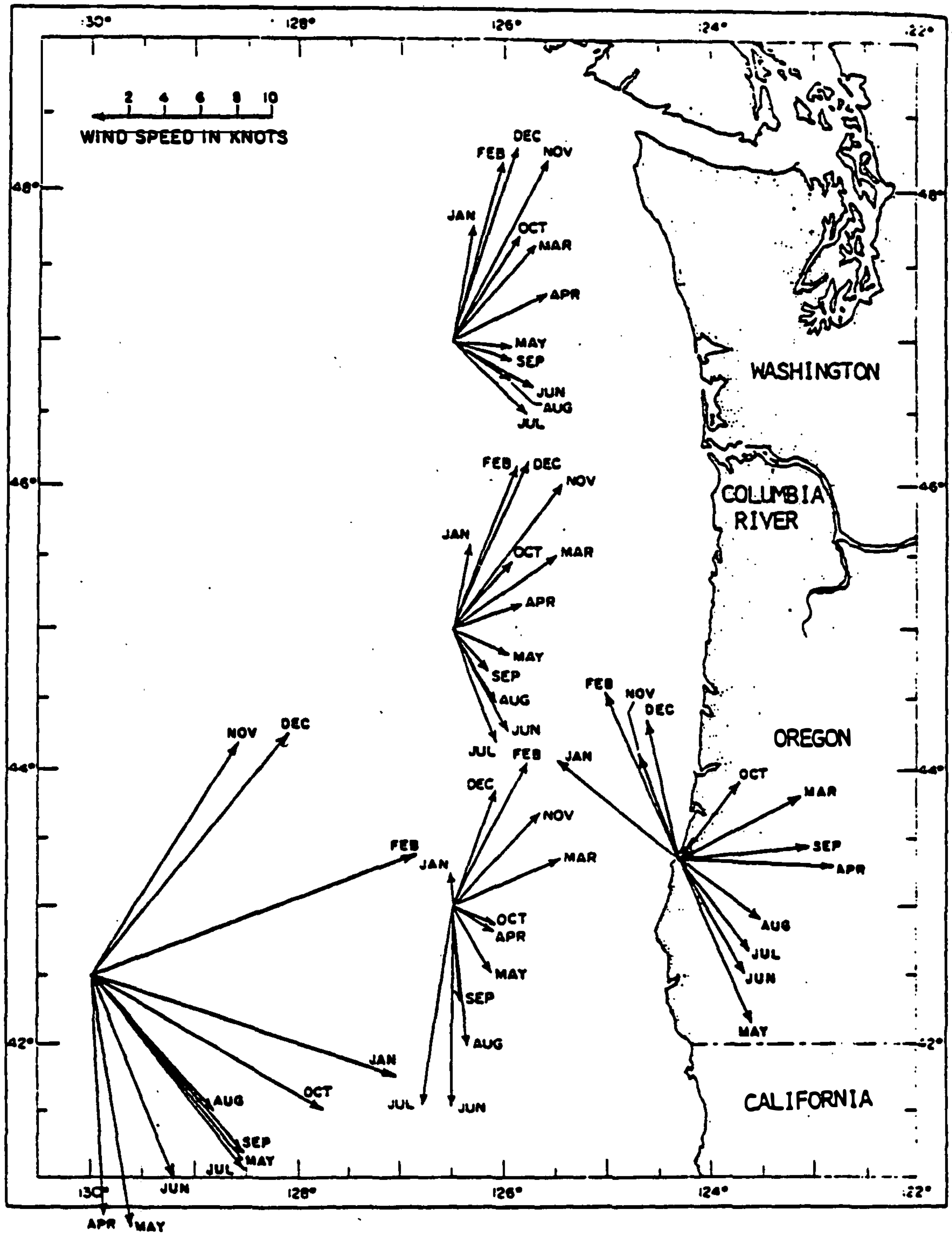


Figure 3.10 Monthly wind vectors observed at North Bend Airport and NOAA offshore data buoys.

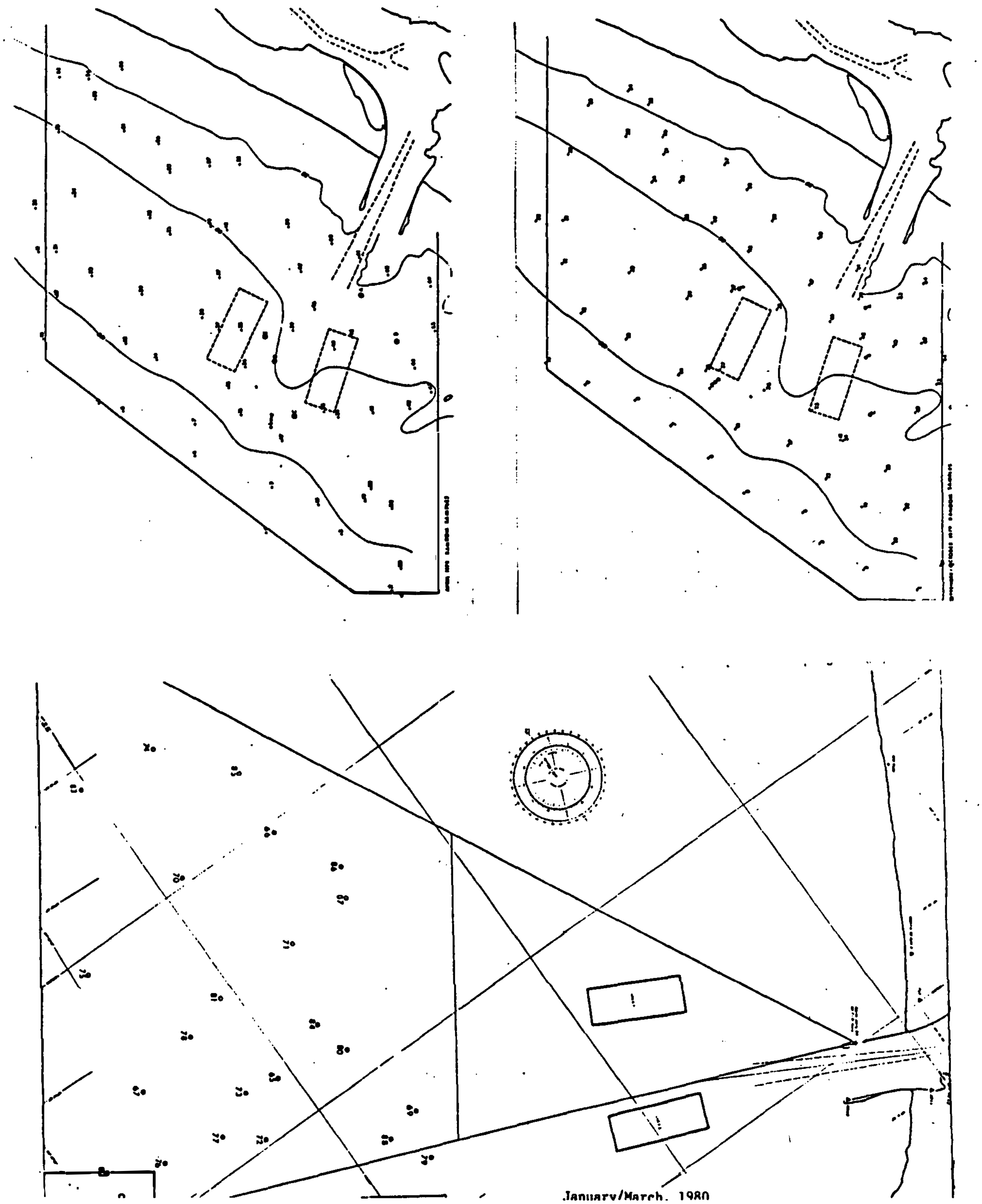


Figure 3.11 Core sampling stations - Phase I of Coos Bay Offshore Disposal Study (Hancock, et al. 1981).

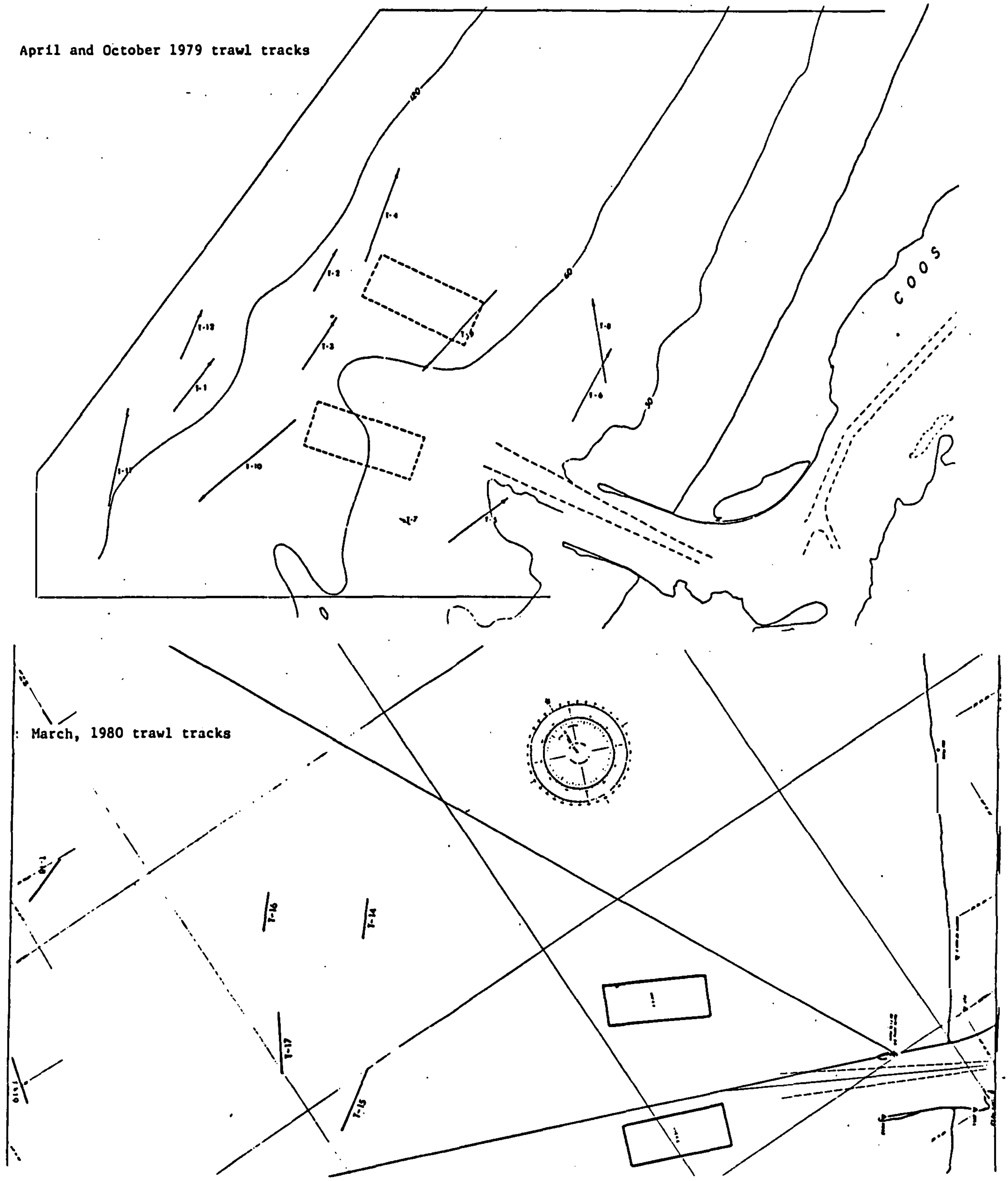


Figure 3.12 Trawl sampling locations - Phase I of Coos Bay Offshore Disposal Study (Hancock, et al. 1981).

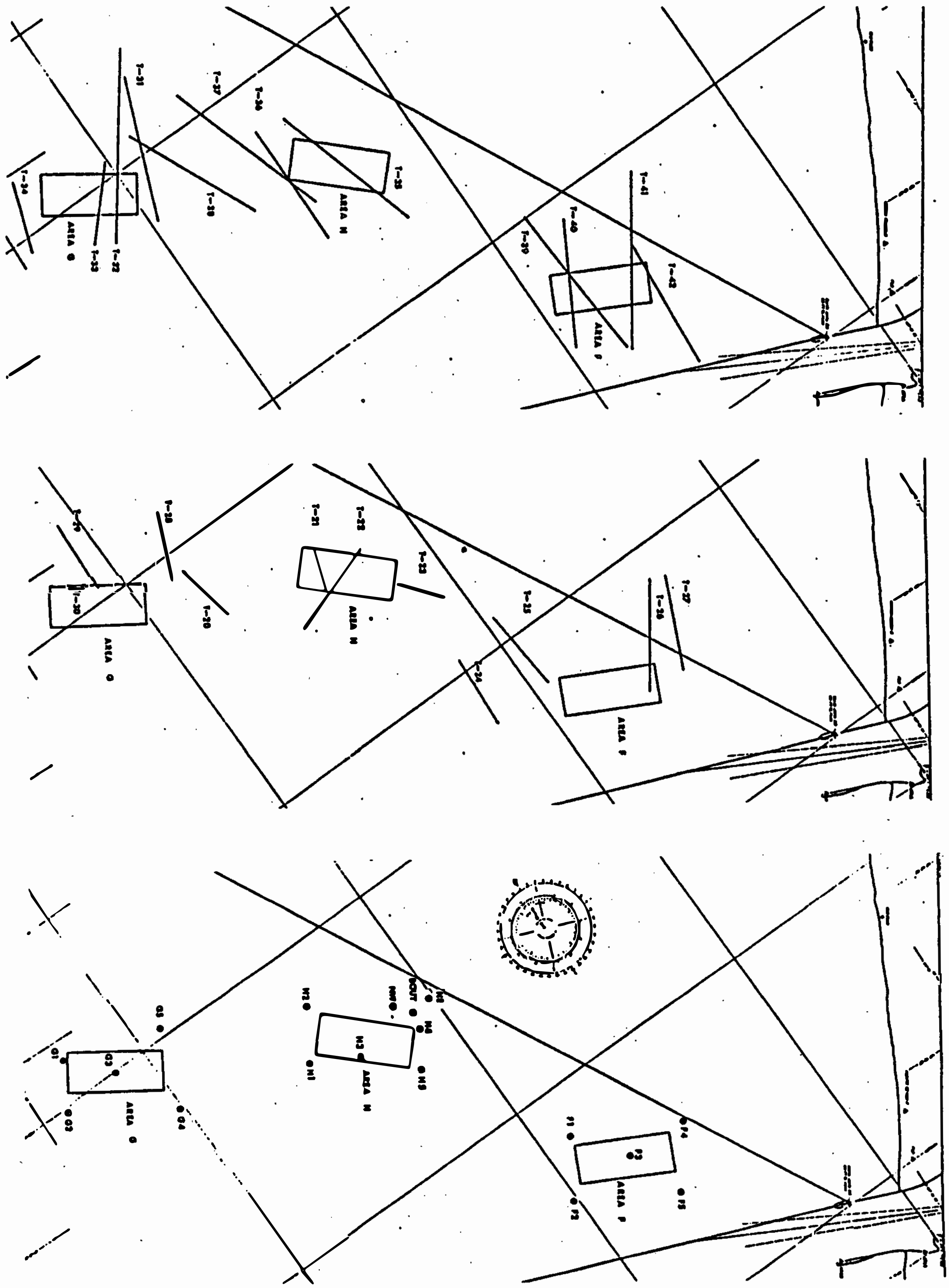


Figure 3.13 Core and trawl sampling locations - Phase II of Coos Bay Offshore Disposal Study (Nelson, et al. 1983).

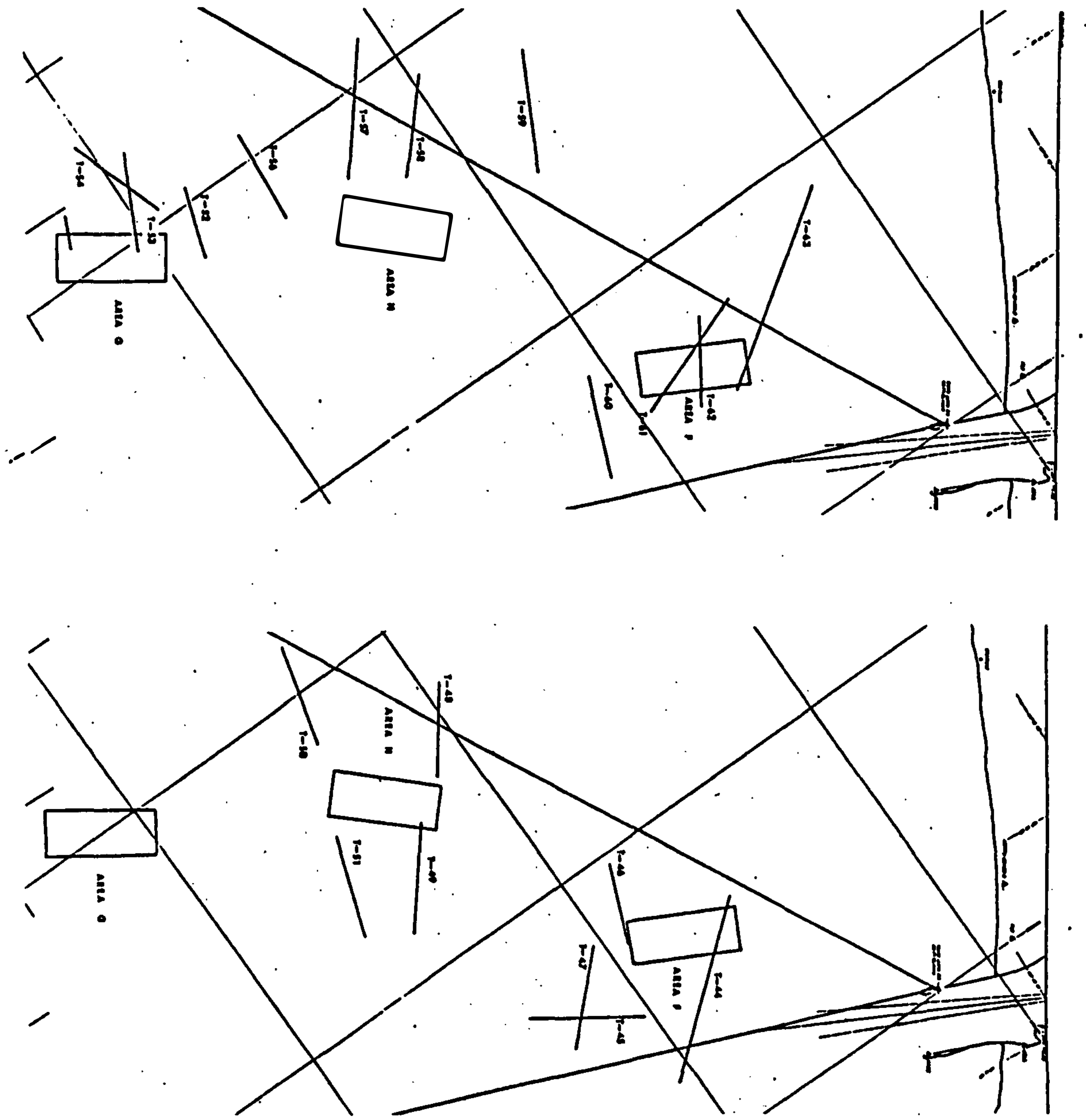


Figure 3.13 Continued

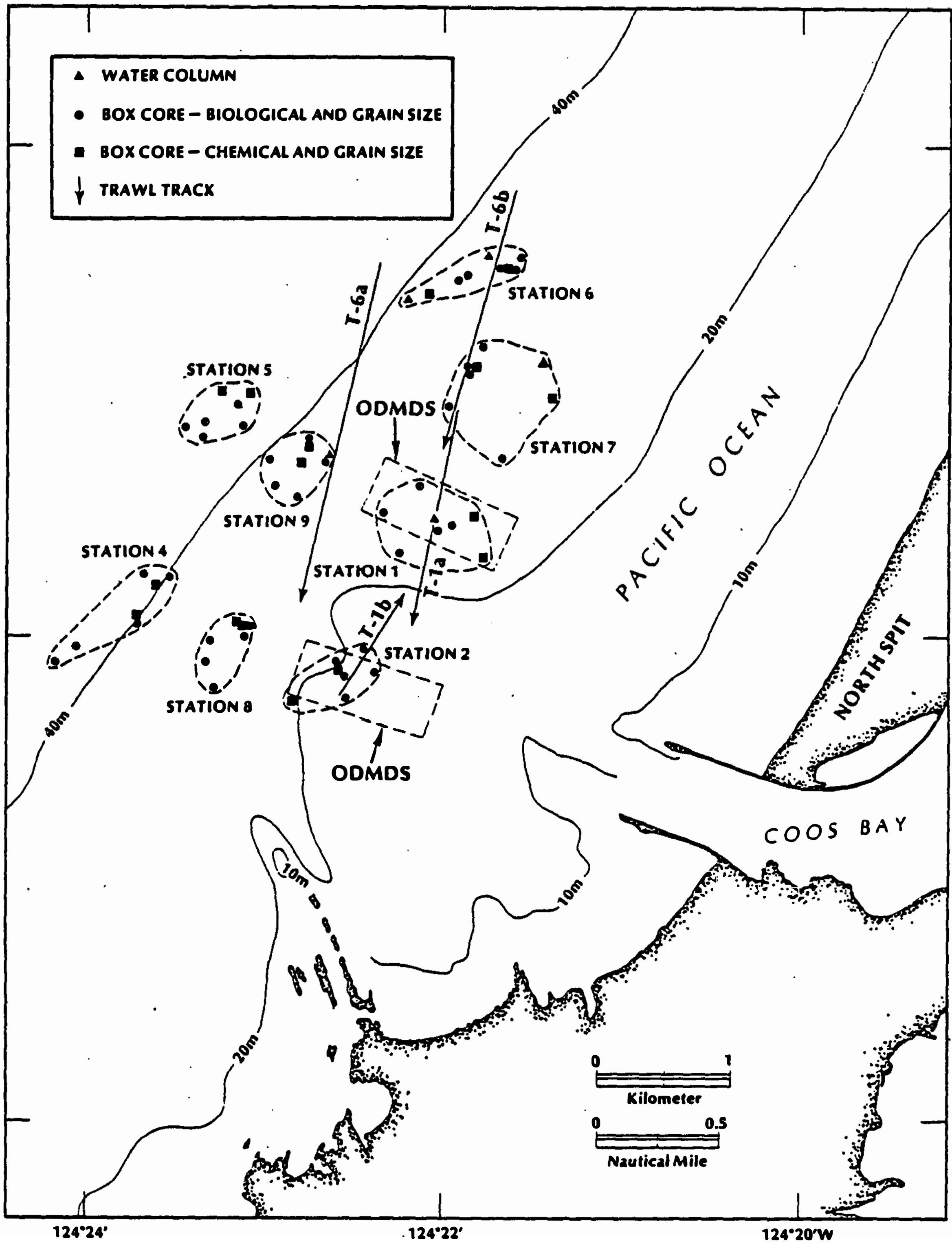


Figure 3.14 IEC survey locations (IEC, 1982).

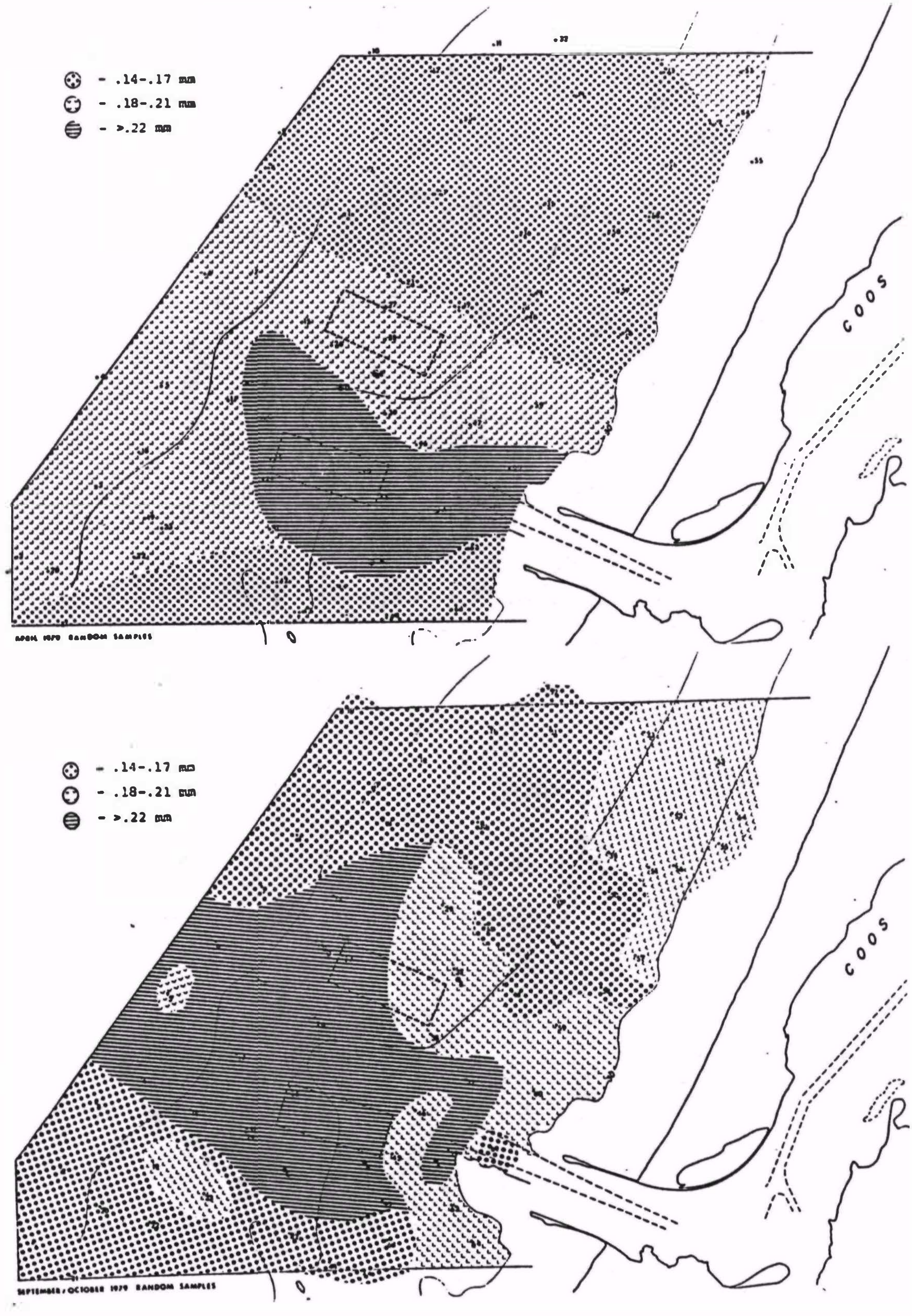


Figure 3.15 Distribution of sediment size; Cruise I & II, 1978 (from Hancock et al., 1981)

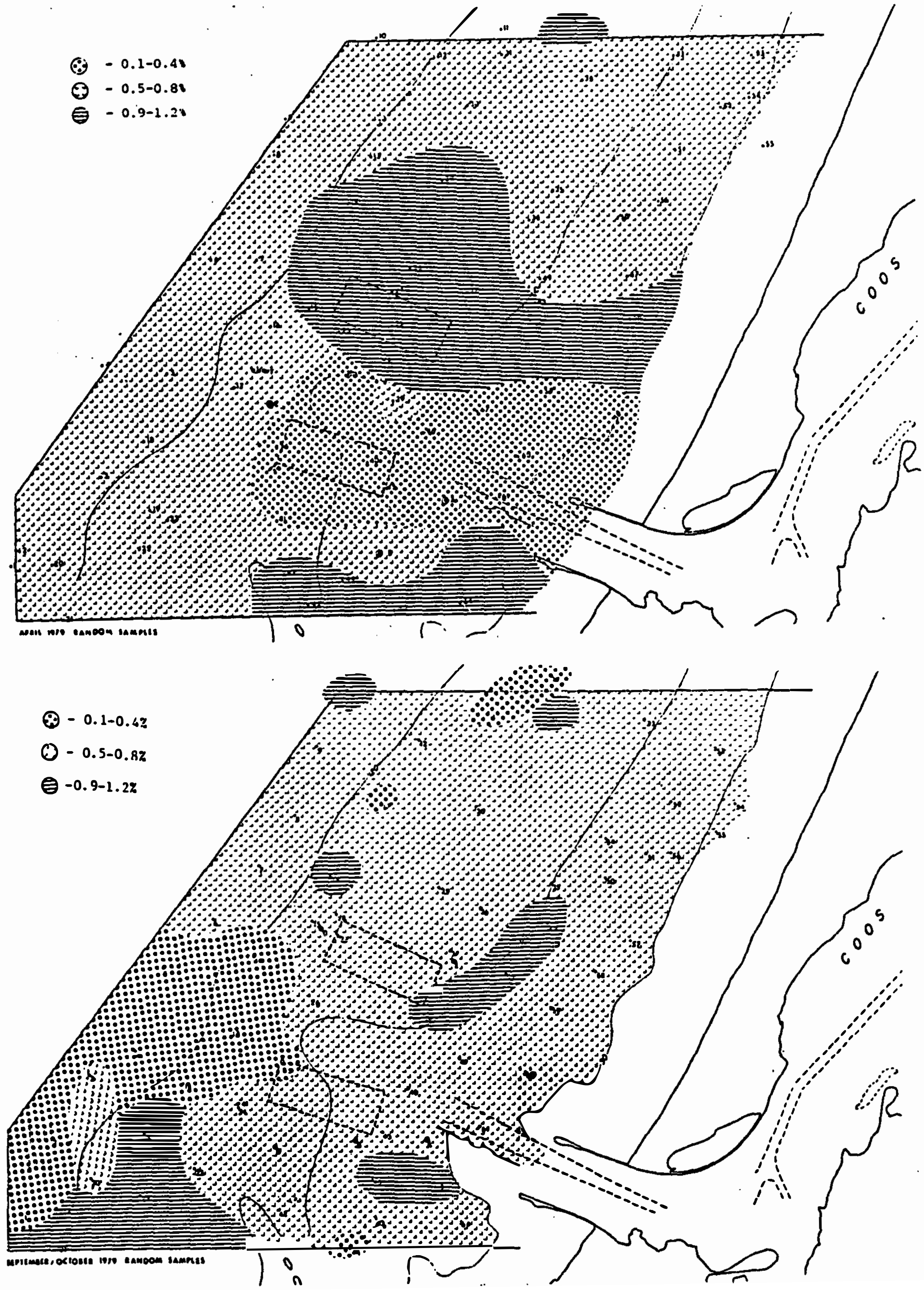


Figure 3.16 Distribution of volatile solids; Cruise I & II, 1979 (from Hancock et al., 1981)

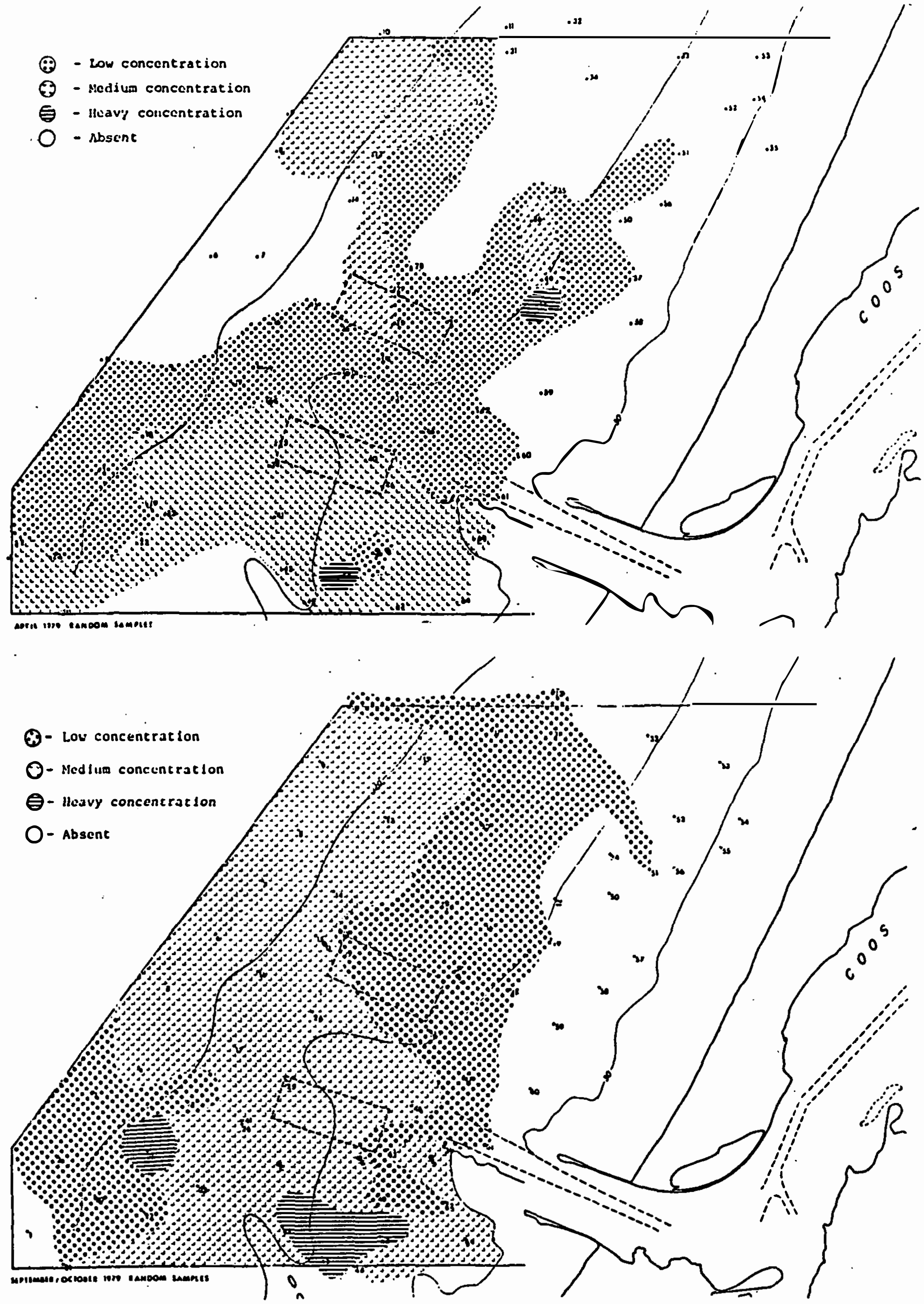


Figure 3.17 Distribution of wood chips; Cruise I & II, 1979 (from Hancock et al., 1981)

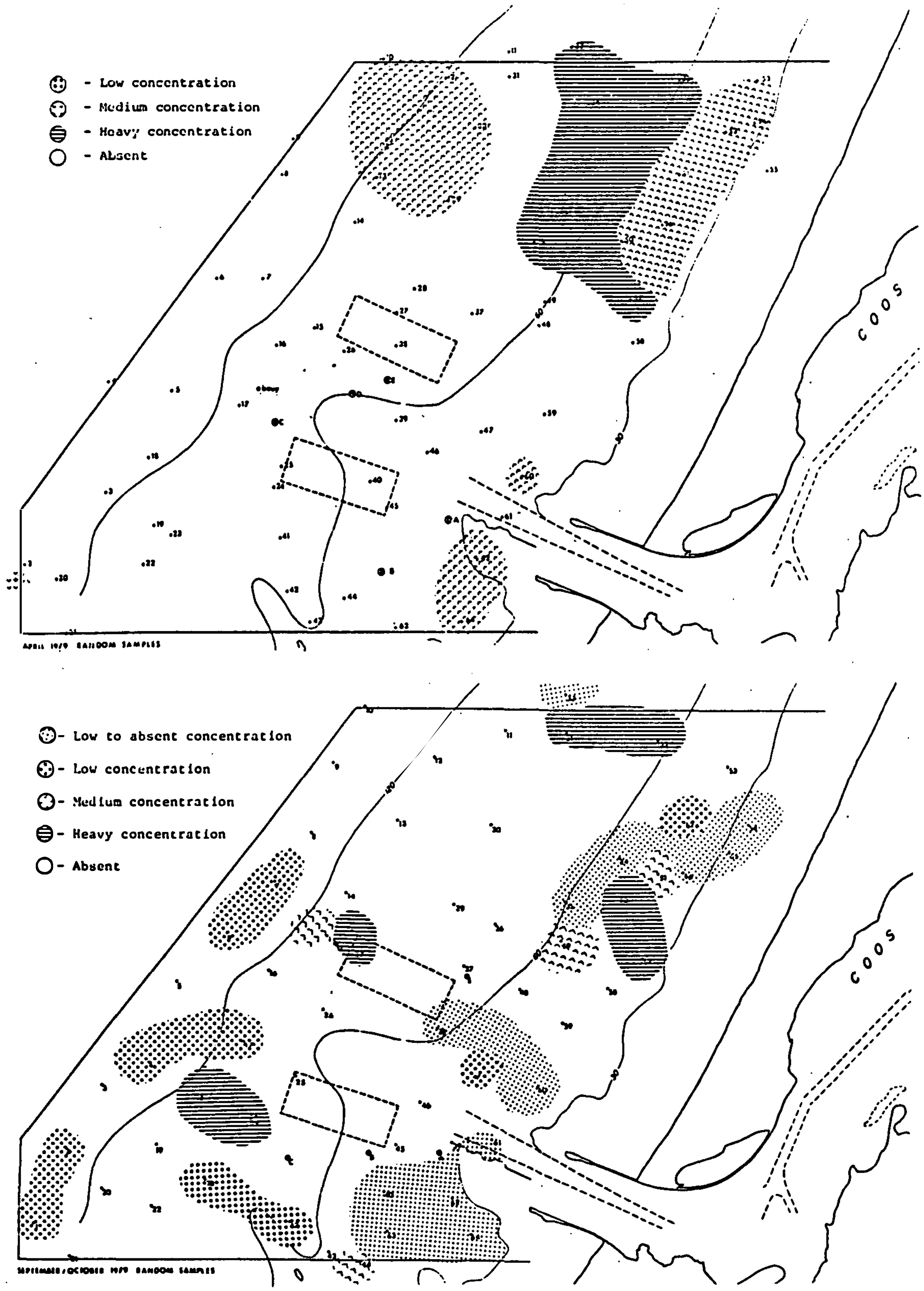


Figure 3.18 Distribution of shells; Cruise I & II, 1979 (from Hancock et al., 1981)

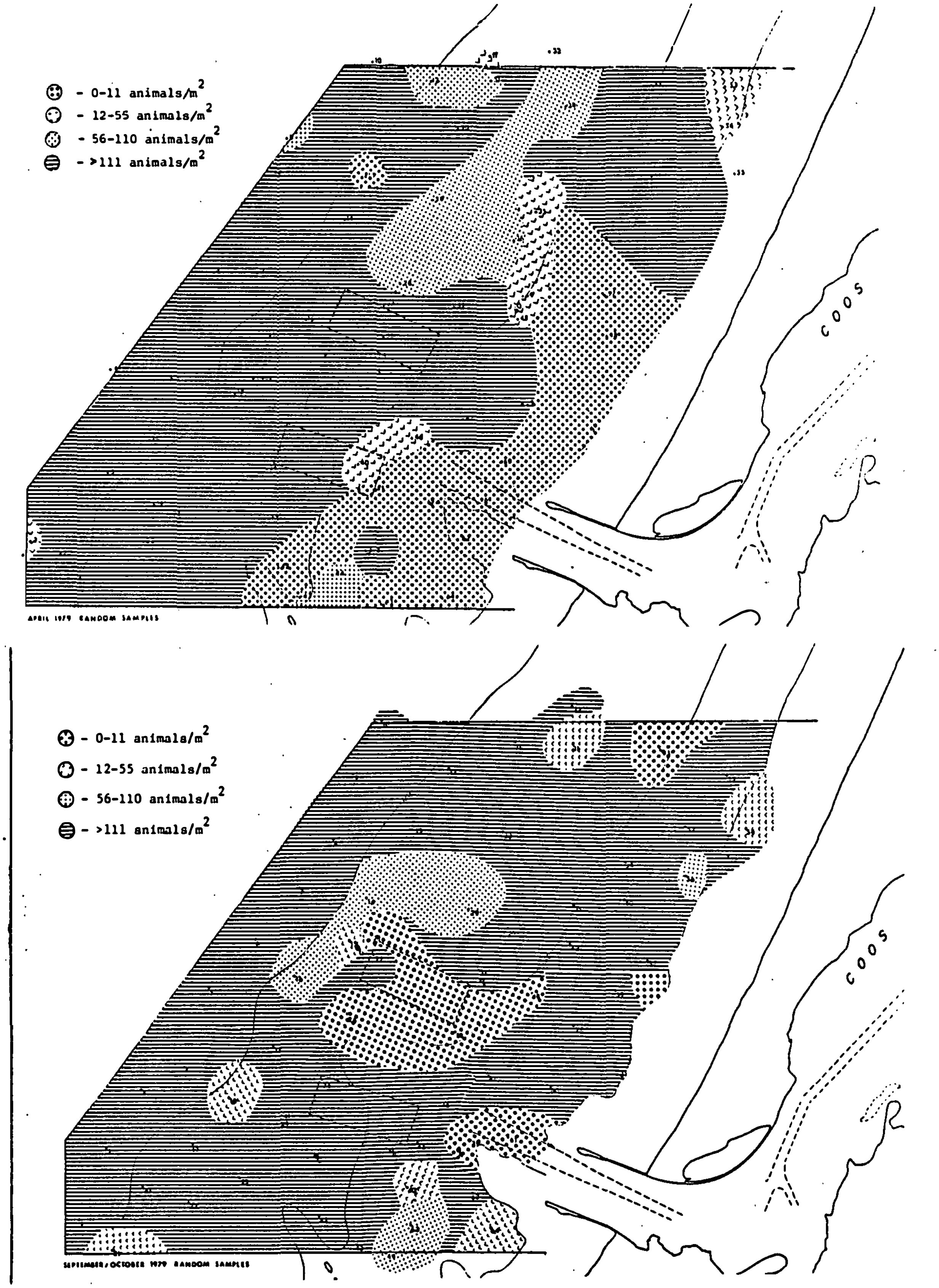


Figure 3.19 Distribution of the carnivorous snail Olivella. sp., in the nearshore region, April and September 1979 (from Hancock et al., 1981).

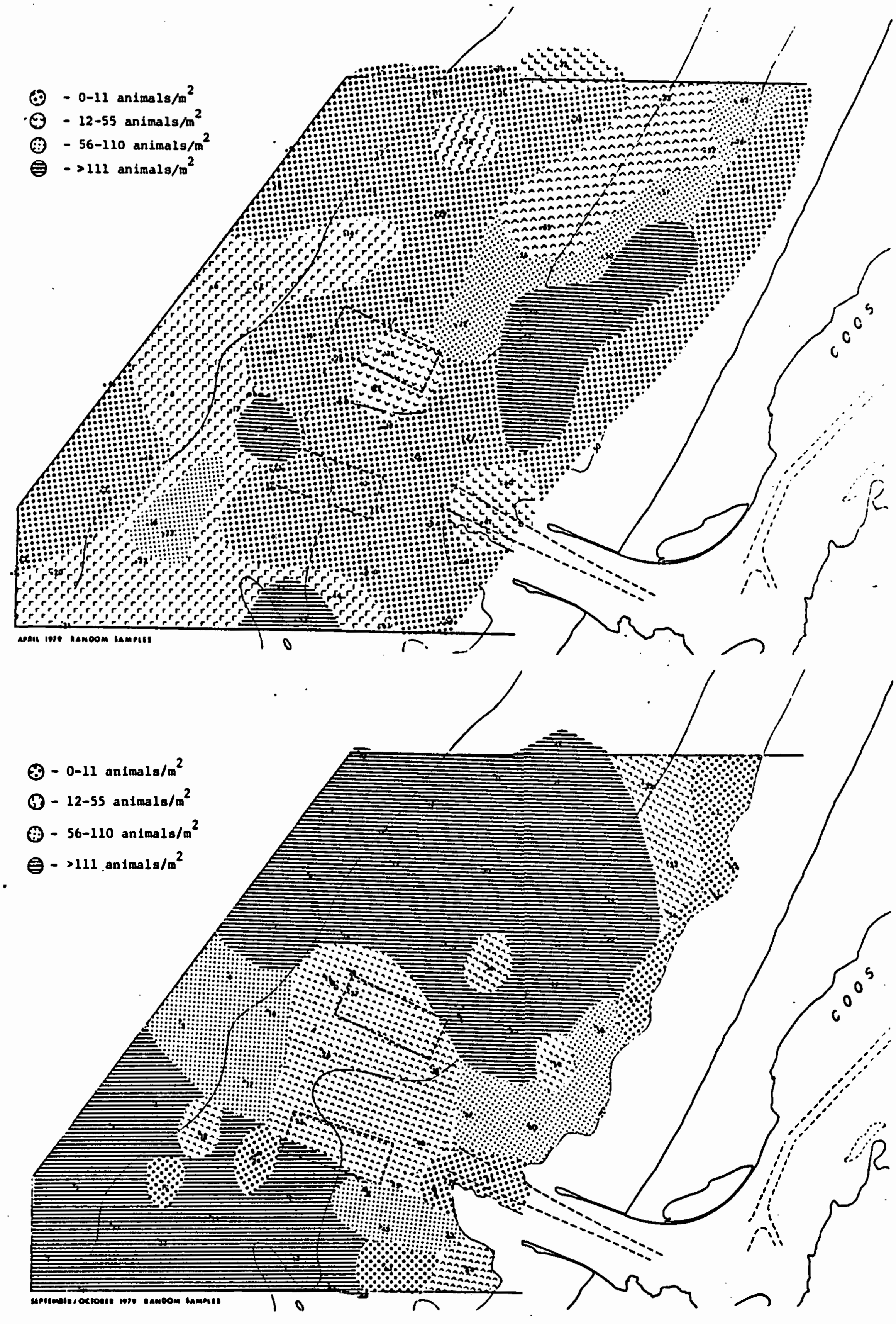


Figure 3.20 Distribution of the clam, <u>Tellina modesta</u>, in the nearshore region, April and September 1979 (from Hancock et al., 1981)

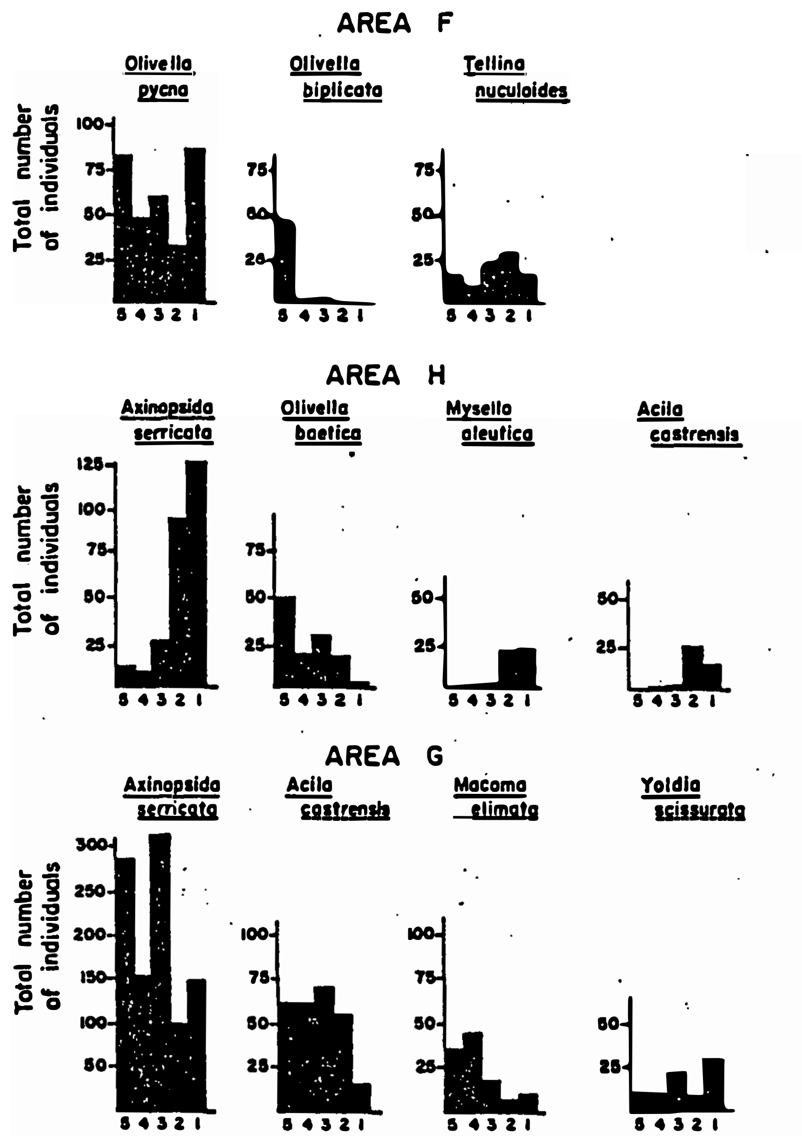


Figure 3.21 Spatial distribution of the most abundant mollusc species in areas F, H, and G; Cruise 4, May 1980

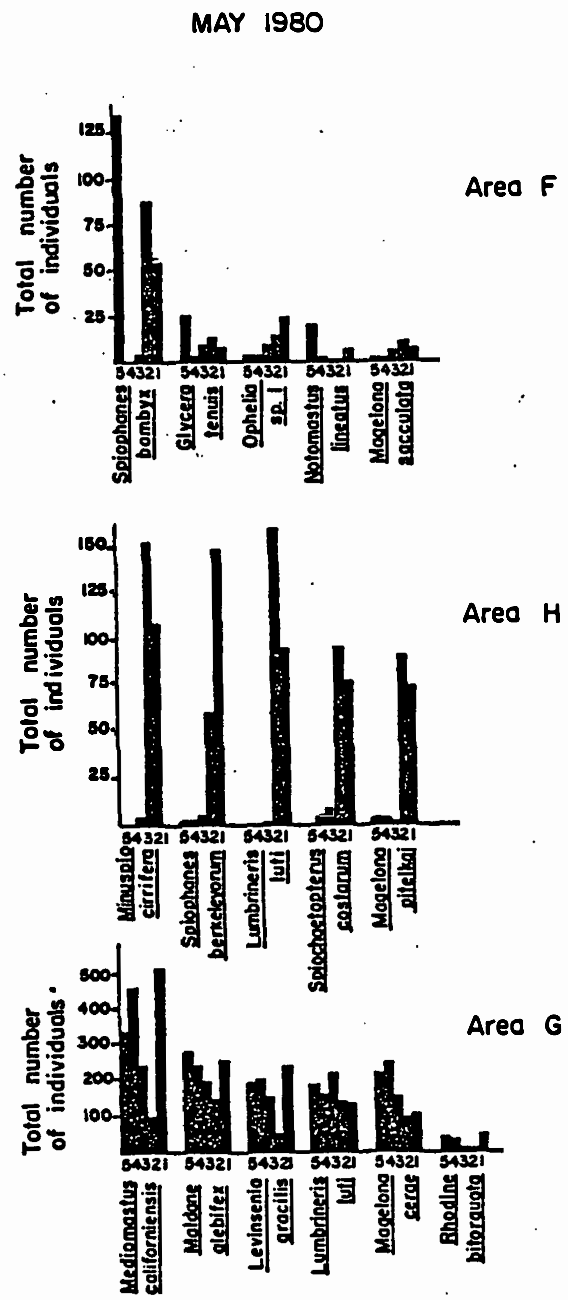


Figure 3.22 Spatial distribution of the most abundant polychaete species in areas F, H, and G; Cruise 4, May 1980

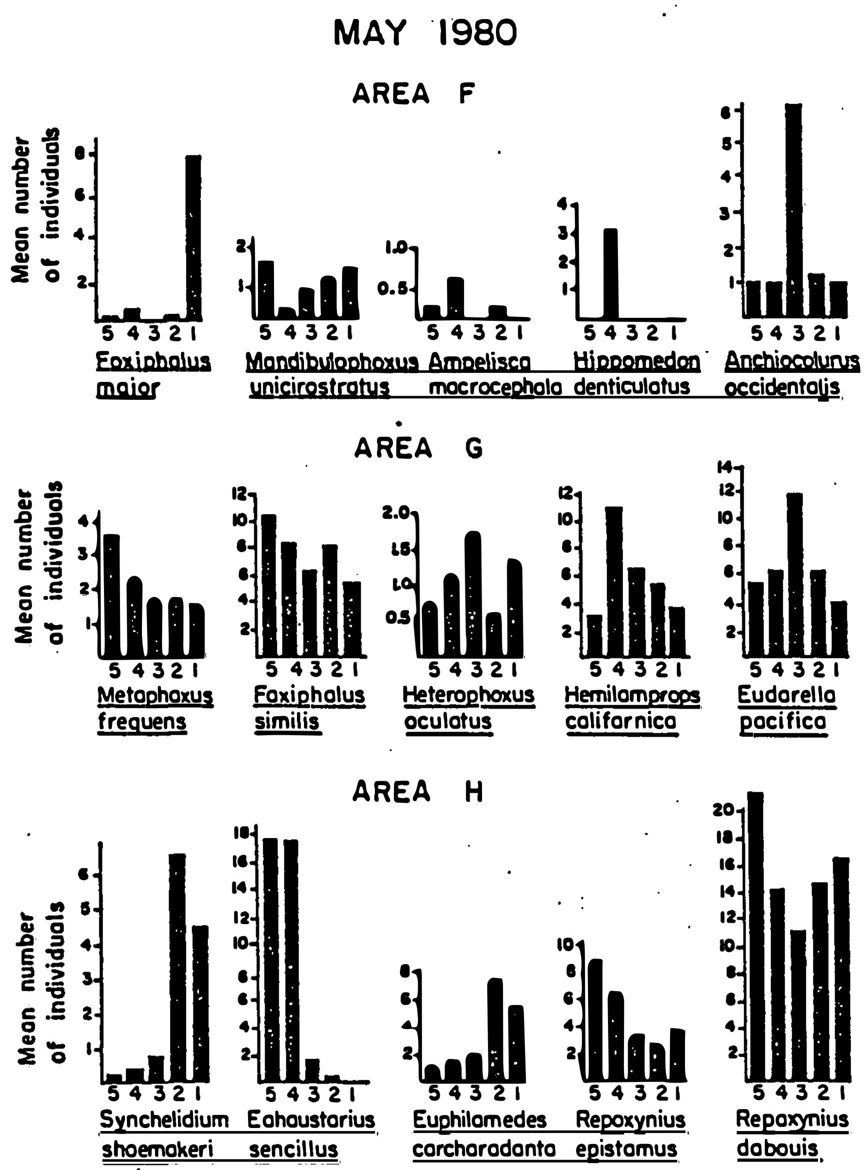


Figure 3.23 Spatial distribution of the five most abundant crustacean species in areas F, H, and G; Cruise 4, May 1980

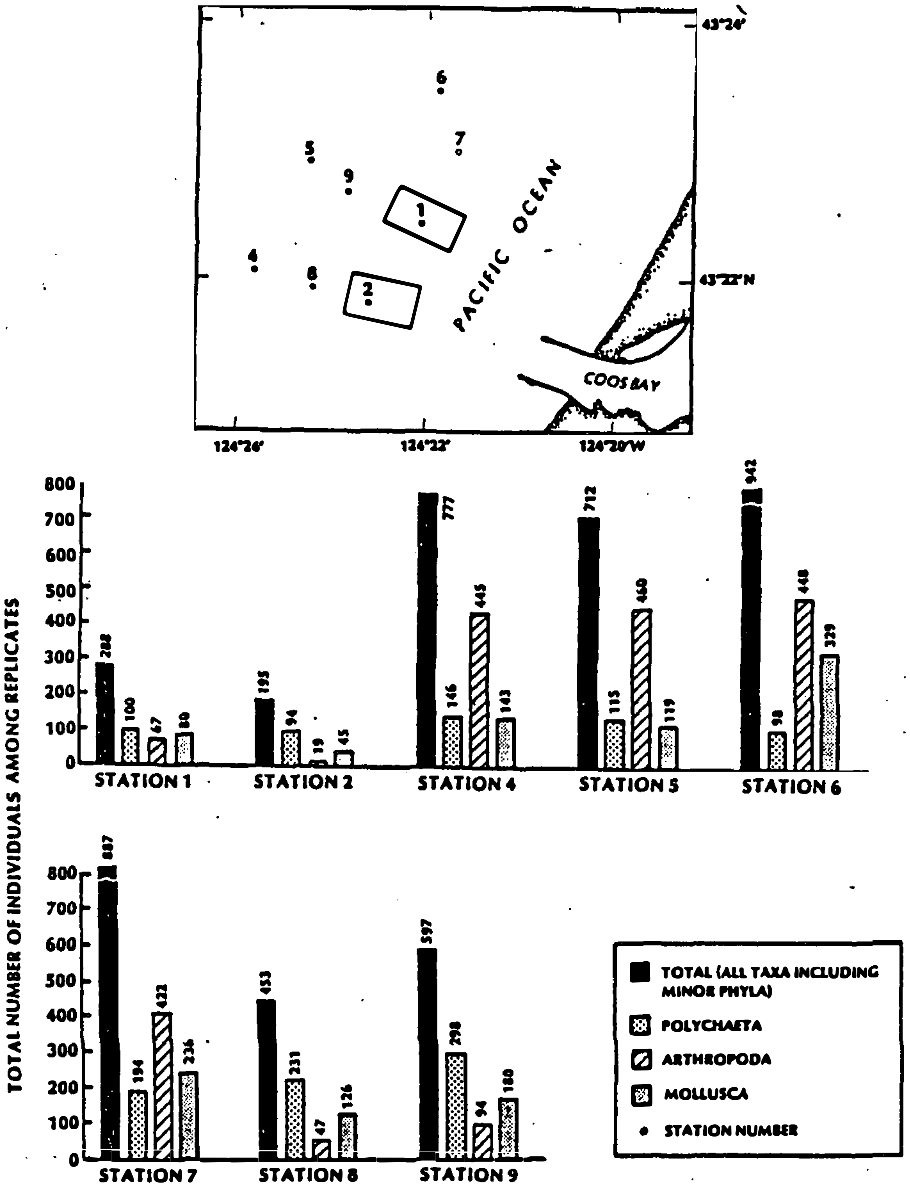
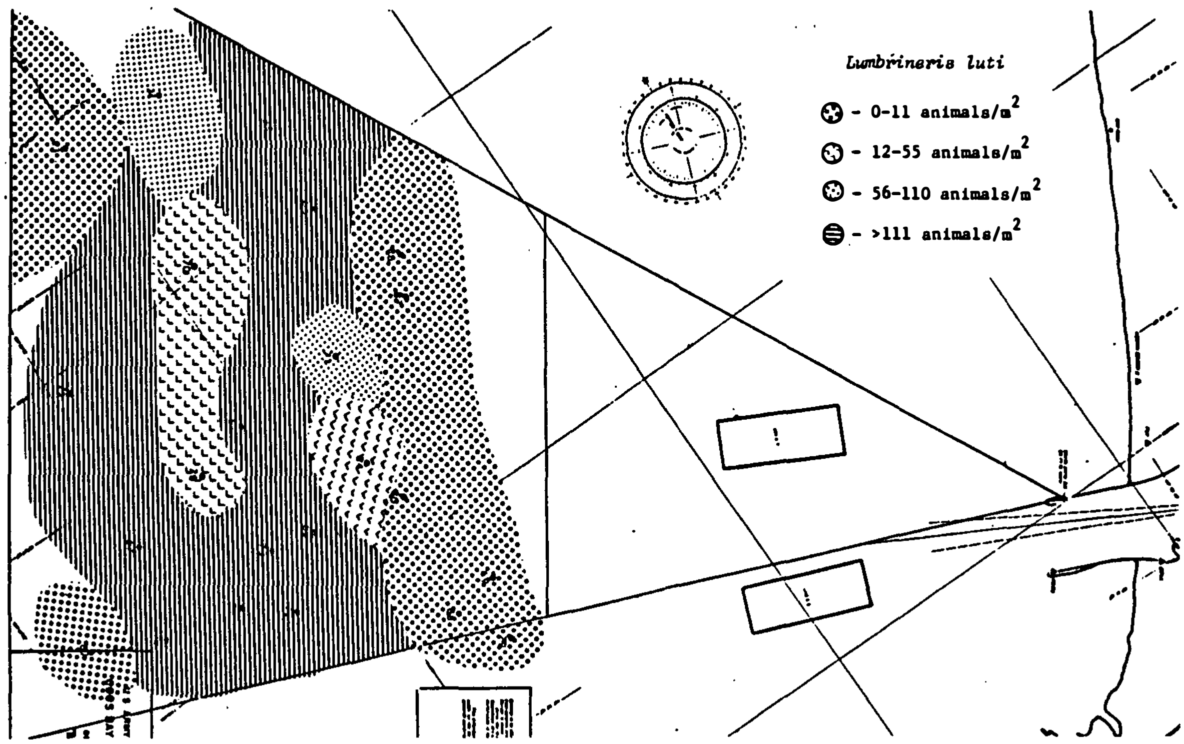


Figure 3.24 Total number of individuals collected by IEC at nearshore region (April-May 1980)



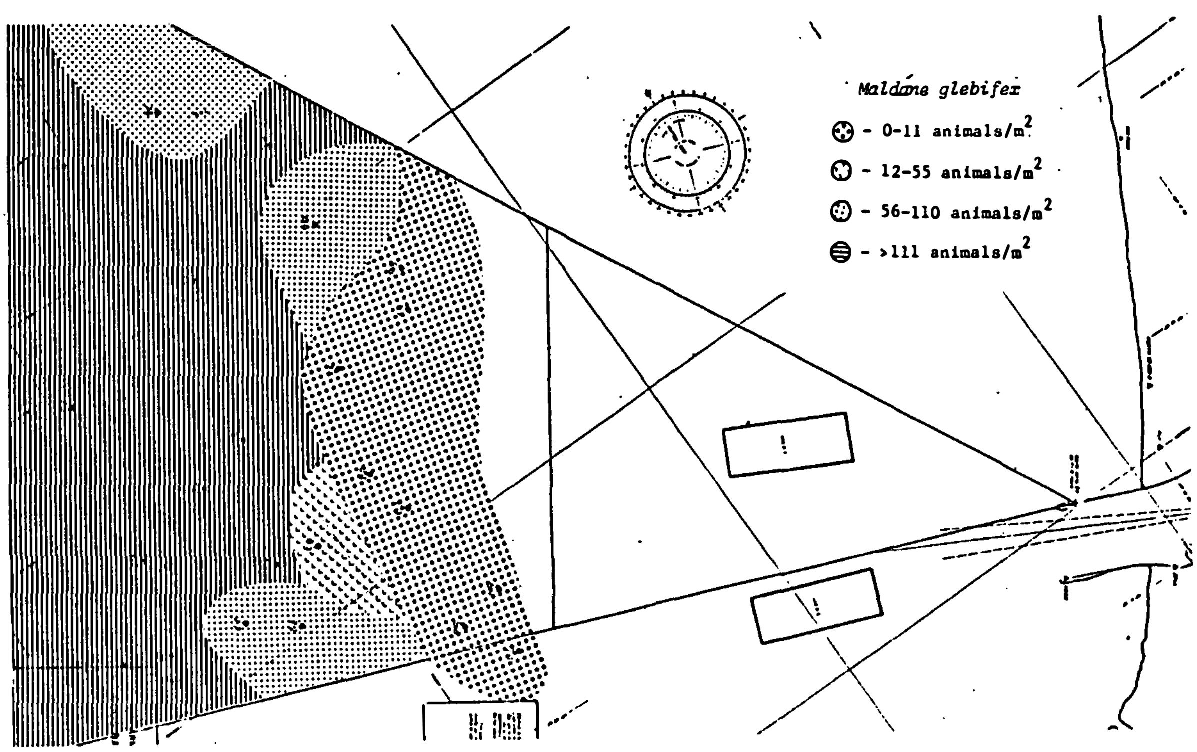


Figure 3.25 Distribution of Lumbrineris luti and Maldane glebifex; Cruise III, 1980 (from Hancock et al., 1981)

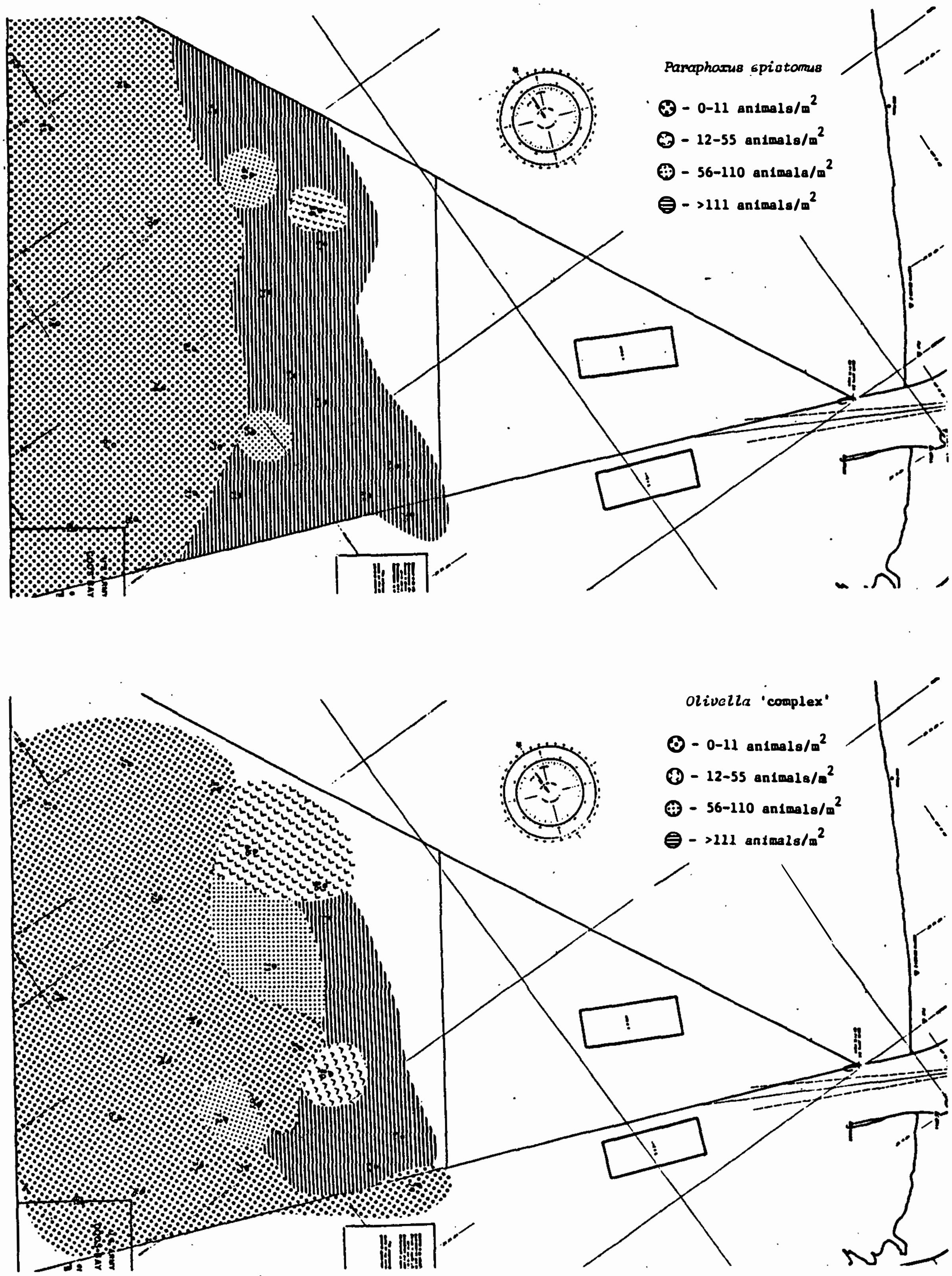
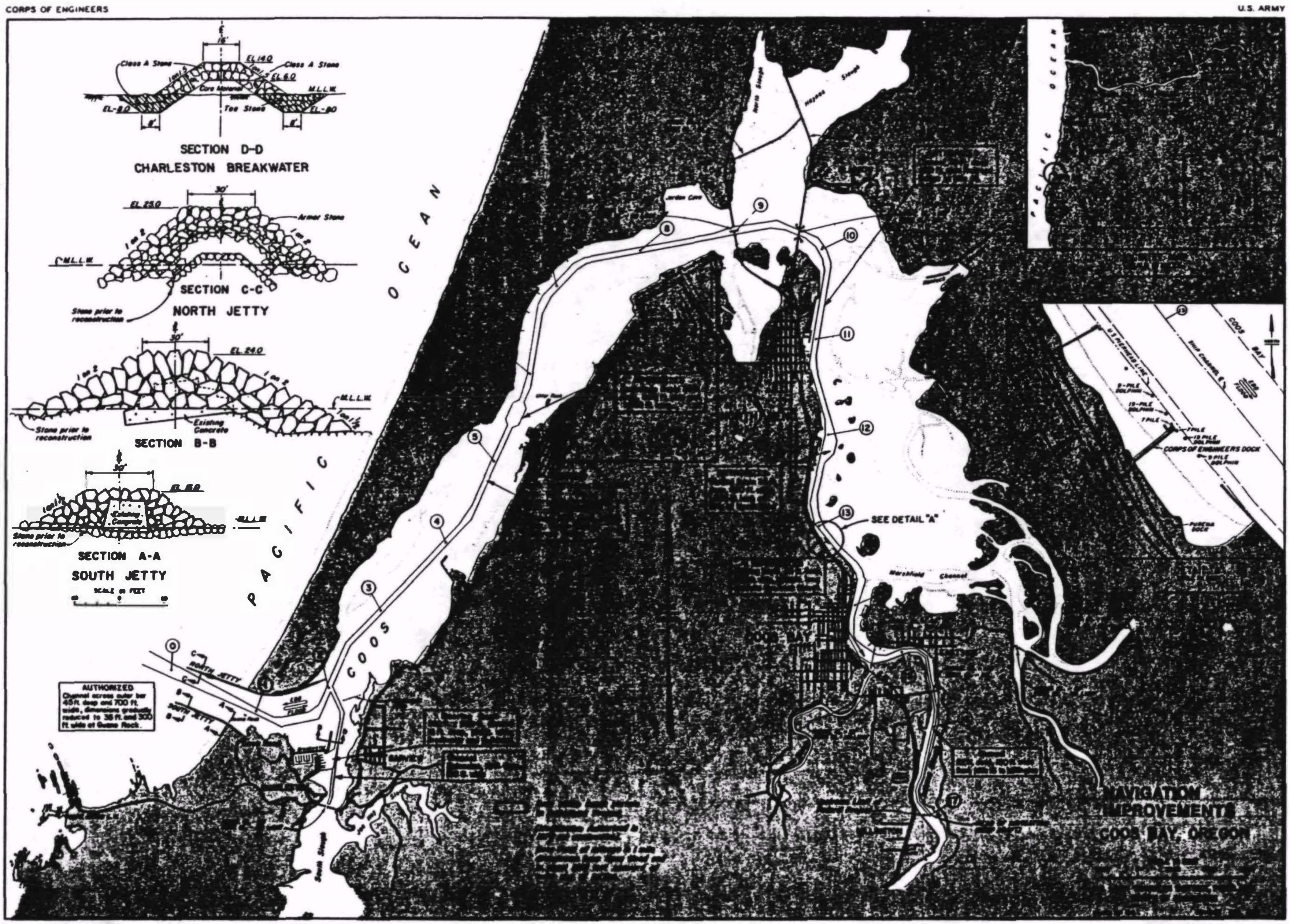


Figure 3.26 Distribution of Paraphoxus epistomus and Olivella sp.; Cruise III, 1980 (from Hancock et al., 1981)



CORPS OF ENGINEERS
U.S. ARMY
SECTION D-D
CHARLESTON BREAKWATER
SECTION C-C
NORTH JETTY
SECTION B-B
SECTION A-A
SOUTH JETTY
PACIFIC OCEAN
COOS BAY
SEE DETAIL "A"
NORTH JETTY
SOUTH JETTY
AUTHORIZED
Channel across outer bar 45 ft. deep and 700 ft. wide, dimensions gradually reduced to 35 ft. and 300 ft. wide at Guano Rock.
CORPS OF ENGINEERS DOCK
NAVIGATION IMPROVEMENTS
COOS BAY, OREGON

Figure 3.27

IV ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This section evaluates the environmental consequences of ocean disposal of: a) some 1.3 million cubic yards annually of Type 1 material (coarse-grained material from the entrance to RM 12), b) some 200,000 cubic yards on a two to four year cycle of Type 2 material (finer material like that found between RM's 12 and 14) and; c) some 200,000 cubic yards on a 2 to 4 year cycle of Type 3 material (fine-grained material like that found above RM 14). Physical and chemical descriptions of these sediments are found in Section 3. These materials represent the physical and chemical range of the most likely materials to be considered for ocean disposal from the Coos Bay area. Neither this section nor this EIS attempts to compare or evaluate impacts of upland or estuarine disposal. The effects analysis developed in this section provides the basis for evaluation and comparisons of the alternatives described in Section 2. Please note that although this section does not specifically refer to adjusted site H, the analysis prepared by OSU and presented in this section covers an extensive offshore area which includes adjusted site H.

4.2 PHYSICAL IMPACTS

4.2.1 Bathymetric Impacts

Disposal of Type 1 sediments at sites E and F would contribute to the natural progradation of the river delta. The finer size fractions would be winnowed from the sediments and transported offshore and alongshore by local mean currents. Some of the fines would also be transported onshore and back into the estuary by tidal currents. Some down-slope movement of suspended fine sediments may also occur in the turbid layer at the bottom but since ocean disposal is limited to the April through November period of south flowing mean currents, most transport of fines would be along contours to the south. Northward transport of fines can be expected during the period of the Davidson Current and winter storms that would completely rework and spread out the disposal mound. Net transport would be to the north as a result of this winter storm wave action. Disposal of Type 3 sediments at this site would increase local turbidity both in the short and long term since the majority of the disposed sediment would be unstable in the local energy regime. Increased turbidity levels would be encountered downstream of the disposal site and more fines can be expected to be transported back into the estuary.

Disposal of Coos Bay sediments at deeper sites (H, adjusted H, G, or continental slope) would produce longer-lived but broader bathymetric mounds since these sediments are coarser than the ambient sediment and the greater depth allows more spreading. The mound can be expected to slowly spread parallel to bathymetric contours. Type 3 sediments would be unstable at these sites, but resuspension and erosion of any bathymetric mound would be slower as depth increases since these processes depend on the influence of surface waves. Type 3 sediments would only be stable if disposed of on the muds of the continental slope. Dispersion of sediments during their fall through the water column at the continental slope site would spread the sediments so widely that no bathymetric buildup would be expected. Similar disposal of Type 2 and 3 sediments would produce permanent deposits but again the buildup would likely be minor.

Using a simplified but uncalibrated version of the Koh-Chang (1973) computerized dredged material dispersion model, Nelson et al. (1983) compared plume and bottom deposits at sites F, G, and H for sediments having median grain sizes of 0.015 mm, similar to Type 3 sediments. Under representative summer current conditions, the percentages of dredged material that reached the bottom were estimated to be about 50, 38, and 34 percent for sites F, H, and G, respectively. The model predicted a major fraction of the dredged material would remain suspended in the water column within one foot of the bottom. The maximum bottom deposit thickness was estimated at 23 cm (9.2 inches) per 100,000 dumped cubic yards at site F, 9 cm (3.6 inches) at site H, and 7 cm (2.7 inches) at site G. The areal impact on the bottom increases with increasing depth due to greater mixing during settling. Areal coverage at site H was about twice that for site F and at site G nearly four times as great, as that for site F. Coverage at the continental slope site was not assessed. Local erosion would quickly rework and erase any mound at site F. It is likely that any mound at sites H and G would erode more slowly and may be covered by mobile ambient sediments, further increasing the time required to erase a mound. Monitoring will be required at site H to insure sediment movement associated with dredged material disposal does not cause adverse environmental impact (Section 4.5). The numbers cited from this study are not exact but only indicate relative differences. A test dump consisting of approximately 52,000 cy of dredged material was disposed at site H in August 1981. After one year approximately 50 percent of the test material deposited at site H had been eroded away or covered up by natural bedload movement and after 18 months little remained of the test dump material (Sollitt 1983 pers. com.).

4.2.2 Sediment Distribution and Transport

Figures 3.5 and 3.6, Section 3, illustrate the natural variability of median grain size and volatile solids for sites F, H, and G, and for the three estuary sediment types. Type 1 sediments are physically and chemically compatible with sediments at site F. Site H sediments are slightly finer than these estuarine sediments and site G sediments are substantially finer and richer in volatile solids. Type 2 sediments are similar in median grain size to site G sediments but these ocean sediments have lower volatile solids. Type 3 sediments are not physically compatible with sediments of any of the three sites since it is very fine and rich in volatile solids. Compatibility for these fine sediments may be found in the mud faces on the upper continental slope.

Sediments that are finer than ambient sediments are expected to be more mobile than ambient sediments. The opposite is expected for coarser sediments. Consequently, all estuarine sediments can be expected to be mobile in the vicinity of site F while only Type 2 and 3 sediments would be mobile at site H. Type 2 sediments would be moderately mobile at site G while Type 3 sediments are mobile at all sites except at the continental slope site. Detailed current measurements by Hancock et al. (1981) support these generalities and suggest that the frequency of resuspension is relatively uniform during spring, summer, and possibly autumn but is significantly greater in winter. It also appears that the differences in resuspension frequency between sites F and H are greater than the differences between Sites H and G. Such generalities are in keeping with the seasonal characteristics of surface waves and their rapidly decreasing influence with increasing depth. Fine Type 1 sands may be expected to be mobilized 75 percent of the time in winter at site F and 30 percent of the time during the rest of the year. Resuspension at sites H and G may be 20 to 30 percent of the time in the winter and 10 and 25 percent during the remainder of the year. Little or no reworking of sediments is expected for the continental slope site. Type 3 sediments would be almost constantly erodible at site F in the winter and mobile in excess of 80 percent and 50 percent of the time at Sites H and G, respectively, during the winter, and in excess of 50 percent of the time for both sites during the rest of the year.

The direction of sediment transport is highly variable with both upslope and downslope transport occurring at all shelf sites during all seasons. Preliminary analysis of detailed near-bottom current measurements by Hancock et al. (1981) suggests that downslope transport is generally more frequent than upslope transport at all three sites and that this tendency is stronger for the non-cohesive fine sands than for Type 3 sediments.

Transport of fine sediment back into the estuary is likely to occur from site F. Onshore transport from the vicinity of sites H and G is less likely and dispersion would scatter the sediments to the point that detectable volumes of material would not reach the coastline. Sediments suspended in the water column are similarly more likely to impact the estuary and coastal shorelines with disposal of Type 3 material at site F.

4.2.3 Water Quality

Water quality impacts may be divided into physical and chemical aspects. Increased turbidity is the principal physical effect. Disposal of the clean Type 1 sands would produce a very local short term increase in water column turbidity which would quickly be dissipated by local currents at all sites under consideration. Reworking of materials in any bottom mound would produce longer term impacts. Reworking of sediments at site F is expected to occur during the dredging season while complete reworking at sites H and G may not be completed until the winter storm period. Consequently, resuspension of fines from site F can be expected to be strong and continuous following disposal, whereas deeper sites may have continual but weaker erosion of fines during the summer but rapid winnowing in the winter. No reworking of sediments would be expected for the continental slope site.

Nelson et al. (1983) applied an experimental version of the Koh-Chang (1973) computer model for dredged material plume dispersion of Type 3 sediments. While their results are yet to be verified, the study suggests that the disposal of 3,000 cubic yards of sediments under summer conditions could produce maximum vertically-averaged suspended sediment concentrations after one hour of 0.04 percent by volume at site F, 0.004 percent at site H, and 0.0001 percent at site G. These values represent dilutions by factors of 500; 5,000; and 200,000, respectively. These levels may be compared to summer field measurements by Plank and Pak (1973) off Newport. Averaging surface, mid-depth and bottom concentration for three stations less than 110 m deep yields volume concentrations between 0.05 percent and 0.12 percent. The lower figure is approximately equal to the model's highest-projected vertically-averaged concentration after one hour. Consequently, it may be assumed that disposal operations will, under worst case conditions, produce a local turbidity impact comparable to natural events.

Since the majority of chemical contaminants appear to correlate strongly with the finer size fractions, it is reasonable to assume that the dispersal of the chemical contaminants would be proportional to the dispersion of the fine fractions. The final report from preliminary estimates by Nelson et al (1983) suggested that between 50 and 75 percent of the sediment would remain in suspension when dumped and would be transported from the disposal sites by mean currents. This material would likely contain much of the chemical contaminants with dilution comparable to those just mentioned. Elutriate analyses (Hancock et al., 1981) indicate that only ammonium-nitrogen, manganese, and cadmium may be released to seawater in sufficient concentration to possibly exceed EPA water quality criteria. Considering the dilutions measured during the 1981 test dump, these concentrations would be well below the levels of concern prior to exceeding the boundaries established by the four hour mixing zone. In addition, no significant differences were observed between tests and controls of the bioassay tests conducted. Bioaccumulation in test animals was lower than but in proportion to the concentration of chemicals and metals in the sediments (Nelson et. al. 1983). The bioassay and bioaccumulation tests showed that the material is environmentally acceptable for ocean dumping.

4.3 BIOLOGICAL IMPACT

4.3.1 Epibenthos and Fisheries.

Since the majority of the material (87%) to be disposed can be classified as clean, non-toxic, inorganic materials, and since the epibenthic and fish fauna are mobile, we do not expect any measureable effect from ocean disposal of Coos Bay sediments in the amounts discussed in this EIS. The greatest impact to these organisms would be the loss of available food organisms due to the loss of benthic invertebrates. Reduction of these food resources may increase competition for food resources in other areas. This impact would reduce in proportion to the rate of recruitment.

4.3.2 Marine Mammals

Although a number of marine mammals are known to occur in the vicinity of the sites, it is unlikely due to their high mobility that they would be impacted by disposal operations at any of the alternative sites.

4.3.3 Rare and Endangered Species

According to a letter from the National Marine Fisheries Service, the Gray Whale occurs in the vicinity of the disposal sites. A biological assessment has been prepared which concludes that the site designation would not have an impact on the Gray whale. The NMFS letter and biological assessment are presented in Appendix B.

4.3.4 Benthos

Disposal of dredged material at any of the proposed sites would result in a loss of some of the benthic invertebrates at the site. This mortality may be direct or delayed. The rate of recruitment of a site by benthic invertebrates would depend upon the frequency of dumping and type of material disposed at a given site.

The nearshore sites (E and F) are the most biologically and physically dynamic of the proposed disposal areas. Bottom turbulence caused by river outflow and tidal and wave induced currents result in extensive sediment movement and dispersion of sediment types in this area.

Dominant benthic species of the nearshore marine environment are species that are highly motile or rapid burrowers. These species are (Spiaphanes bombyx) (Olivella pycna), (O. biphlienta), (Ophelia n. Sp.) and (Tellina nucoloides). In general, surface dwelling benthic species were present in very low numbers in the nearshore region or restricted to the deeper portions of the area. Many species groups consisted of juveniles recently settled out of the plankton. Hancock et al. (1980) found no significant post disposal effects on the biological community at sites E and F.

Based upon this information and considering the effects of previous disposal, disposal of Type 1 sediments would likely have only a short term impact on the benthic communities of sites E and F. The most immediate effect would be some mortality of benthic species in the impact zone with most burrowing benthic species surviving, depending upon their burrowing capabilities and the depth of the disposal mound. Based upon the low content of organic material and fines in Type 1 sediments (Figures 3.5 and 3.6), and the expected rapid dispersion rate of fines at sites E and F, we would not expect any measurable degree of mortality of filter feeding benthic species outside of the impact zone due to turbidity factors.

Disposal of Type 2 and 3 material, however would increase mortality of filter feeding benthic invertebrates at sites E and F. Although an increase in mortality due to turbidity factors may be expected, it is doubtful if this increase would be significant since (a) There are few filter feeding benthic species in the nearshore area; (b) suspended sediment values would be lower than that caused by natural events (see Section 4.1.3); and, (c) sediments would be rapidly dispersed or covered (Hancock et al., 1980, and Nelson et al., 1983).

Based on the above, effects of disposal at sites E and F would be short term and rapid recruitment would occur.

This assessment is based on: (a) no evidence of disposal impacts (Hancock et. al. 1980); (b) the high degree of seasonal variability in distribution of the nearshore species; (c) the adaptation of the dominant benthic species to a high energy environment; and, (d) plankton being the principal source of species recruitment for the surface benthic species.

The offshore zone, represented by site H, between the 45- and 65-meter contours, is a transition zone between the high energy nearshore and the deeper, more stable offshore area represented by site G. Sediment in this transition zone ranges from sand in the shallower areas to silt and clay in the deeper areas. This zone is represented by a high species diversity, high variation in numbers of individuals of a species across the area, and high seasonal variation in species distribution (Nelson, et al., 1983). The numbers of filter feeding and surface dwelling benthic species at site H are higher than that in the nearshore region.

In general, species distribution and abundance of benthic species in the transition zone is directly related to the distribution of sediment types. The shallow areas have a benthic fauna similar to the nearshore region and deeper areas have faunal characteristics more like site G. The filter feeding bivalves and scaphopods are almost exclusively limited to the mud sediments in the deeper regions. Polychaetes and gastropods tend to be limited to the sandy sediments of the shallower zones. Crustaceans were unevenly distributed across the area. Only two species, Repoxynius epistamus and R. debouis hadon were evenly distributed.

Disposal of material from the Coos Bay navigation channel in this transition zone would have varying effects depending upon the type of sediment disposed and the location of the disposal. Disposal of Type 1 material in the shallow sandy bottom area would have impacts similar to disposal of the same material at sites E and F. However, because there tends to be a higher number of species and individuals of species here than at sites E or F, the direct mortality would be greater. This impact would be primarily due to smothering with little mortality due to turbidity.

Although the disposal of Type 1 material in the shallow areas of the transition zone would have direct impacts similar to disposal of this material at sites E and F, there should also be additional long term impacts. These impacts would be due to disposal of coarse-grained material over fine-grained material. These changes in habitat may result in changes in the species composition of the area.

Disposal of Type 1 material in the deeper portions of the transition zone (site H) would result in the mortality of most organisms in the impact area and the change of habitat conditions from fine sands and muds to coarse sands. This change in habitat conditions could result in a change in benthic species distribution and abundance at the site.

Disposal of Type 2 materials into the transition zone (site H) would have similar effects. Because of the similarity of sediment types in the disposal material to that existing at site H, it is doubtful if there would be measurable long-term effects. This is because the fines and organic material would likely be rapidly transported further offshore. It is anticipated that some mortality of filter feeding species would occur due to turbidity factors. As indicated in Sections 4.2.2 and 4.2.3, turbidity impacts would be a short-term event. Reworking and transport of material downslope would be primarily limited to the winter storm period. Turbidity levels would likely be comparable to that occurring naturally.

Disposal of Type 3 material at site H area would also have similar effects. A larger area would be impacted, however, since the finer-grained materials would be transported downslope. A long term change in sediment type and habitat could occur at site H if Type 3 materials are routinely deposited there. Since net transport from site H has been shown to have a strong offshore component, movement of both fine and coarse material from site H should be offshore.

Site G, at depths of 70 to 120 meters with mud sediments, is the more stable and productive environment of the three sites for benthic infauna. Large numbers of mollusca, scaphopod, and crustacean species were present in the area. Filter feeding bivalves were the most abundant species here. The polychaete group, while numerous, varied significantly between sampling stations. Gastropod species were present, but in low numbers. The carnivorous snail (*Mitrella gouldi*) was the only gastropod that consistently exceeded 1 percent of the total molluscan numbers.

Disposal of any of the materials from Coos Bay at site G would result in the greatest biological impact of the three areas studied. Two factors contributing to this are the high numbers of species and individuals that occupy the area, and the large impact area that would result from disposal.

Disposal of Type 1 material would have the greatest biological impact of the three sediment types on site G due to: (a) Dissimilarity of disposal and bottom sediments, (b) burial of organisms less tolerant to smothering and recolonization, and (c) the low rate of sediment transport that could eventually change the species composition and productivity in the area if disposal occurs here.

Disposal of Type 2 material at site G, because of the similarity of sediment types, would likely have the least long-term biological impact of the three sediment types. The fauna, however, typically has an evolutionary history of stable sediment conditions and is therefore less adapted to recovery from initial disposal impacts.

Disposal of Type 3 material at site G would cause an immediate loss of existing benthic communities in the impact areas. Long-term disposal of this material at site G would alter the habitat character of the area. In addition, the high organic and volatile solids content of this material would result in a change in character of the bottom sediments. This could result in indirect mortality of existing species and a change in species composition.

In summary, disposal of any of the Coos Bay sediments at sites E and F would result in the least immediate impact on benthos of the three sites. The primary reasons for this are the dynamic physical environment, the similarity of the sediment types, the low abundance and species richness (relative to the other areas) and the adaptability of the existing benthic species to an unstable environment.

Disposal at site H of any Coos Bay sediments would have greater benthic impacts than at sites E or F. Although species diversity was high in this area there was also large seasonal variation in species abundance. This suggests that benthic recovery should be relatively rapid. Preliminary observations of the 1981 test dump support this assessment (Jones pers. comm. 1983).

Disposal of coarse-grained or highly organic materials at site H would modify sediment (habitat) characteristics of the area, and change species composition. Disposal of Type 2 and 3 material at site H may increase the abundance of species common to site G.

Disposal at site G would result in a greater loss of species and individuals than disposal at sites E, F, or H. In addition, disposal of coarse-grained sand or Type 3 material would result in long-term changes in habitat characteristics with a probable reduction in species diversity and abundance.

4.4 SOCIO-ECONOMIC IMPACTS

4.4.1 Local Area Economy

Maintenance of the Coos Bay navigation system is necessary to support Coos Bay's current economic base, maintain the area's important competitive advantage, and allow it to handle reasonable future expansion. Ocean disposal is important to the present channel maintenance program, and, as stated in Section 3, future navigation channel maintenance will depend upon ocean disposal. Without adequate channel depths, Coos Bay would possibly lose a large share of its export market and would have to absorb the high transfer costs to other ports. The ultimate result would be a significant adverse impact upon the local economy.

4.4.2 Analysis of Comparative Transfer Costs

Historically, only entrance channel sediments, averaging about 800,000 cubic yards annually, have been disposed at sea (sites E and F). Yet, because of the lack of upland and limited in-channel (used up to RM 12) sites, ocean disposal of all dredged material is considered in this analysis. The following channel reaches would be involved:[1/]

a. Entrance channel (RM 0.0 to 2.0), consisting of about 800,000 cubic yards annually of sand.

b. Lower channel (RM 2.0 to 12.0), consisting of about 500,000 cubic yards annually of sands, silts, and clays.

c. Upper channel (above RM 12.0), consisting of approximately 400,000 cubic yards on a two to four year cycle of fine sediments.

Available data and present conditions indicate that the following assumptions would be appropriate in this case: the average dredge cost would be $40,000 per 24-hour day, and it would take one hour to load the dredge; the dredge travels at 10 miles per hour, and holds 4,000 cubic yards; it would take 5 minutes to dump the dredge, and all dredged material would be dumped in one site only and the dredge will be operated 24 hours a day. For these estimates, base points to ocean sites were: Entrance channel at RM 1.0; Lower channel at RM 7.0; and Upper channel at RM 13.5.

Using these assumptions, Table 4.1 displays the comparative cost summaries for each of the alternative disposal sites.

The data presented in Table 4.1 shows that disposal costs are a direct function of the proportionate increase in distance needed to transport the material and the amount of material to be transported. For example, it is 24, 43 and 280 percent more expensive to dispose of the material from the entrance

1/ These figures were taken from U.S. Army Corps Engineers, Portland District, Coastal Projects Operation and Maintenance, 1982 (pages 84 through 94).

at sites H, G, and the continental shelf respectively than at sites E and F. Correspondingly it is 13, 31, and 156 percent more expensive to dispose of the material from the Lower Bay at sites H, G, and the continental shelf than at sites E or F. Similar cost increases for the upper bay material would be 8, 15, 108 percent, respectively.

If we assume that a 10 percent increase in costs is the level of significant economic difference then disposal of material from the entrance and lower bay is acceptable only at sites E and F. Correspondingly, there would be no significant difference in disposal costs of material from the upper bay between sites E, F, and H (Table 4.1).

Costs of disposing any of the Coos Bay material at the continental shelf location varies from 100 to 300 percent more expensive than disposal of the same kind and amount of material at sites E, F, or H (Table 4.1).

4.4.3 Commercial and Recreational Activites

Commercial and recreational activities would not be significantly affected by the proposed disposal site location and use. No gas, oil, or mineral exploration is anticipated in the vicinity of the disposal sites. As discussed in Section 4.3, commercial fishing activities would not be affected by the use of the disposal sites.

4.4.4 State and Local Coastal Management Plans

As stated in Section 3.4.4, the Oregon Coastal Management Program (OCMP) and the Coos County Comprehensive Plan recognize the need to provide for suitable offshore sites for disposal of dredged materials. The OCMP stipulates that the location of the sites and disposal practices must not substantially impact fishing, navigation, or recreation activities, or the natural resources of the continental shelf. The previous discussions on impacts of dredged material disposal in the proposed disposal sites (Sections 4.1 and 4.2) indicate that no substantial impacts on these uses or resources are anticipated.

A statement of consistency with the OCMP has been prepared and is included in Appendix A. The Oregon Land Conservation and Development Commission (LCDC) concurred with the consistency determination in the Draft EIS. A supplemental consistency determination has been requested from the LCDC because site H is now being proposed for the disposal of Type 2 and 3 materials instead of adjusted site H.

4.4.5 Esthetics

The esthetics of the disposal sites would be impacted primarily by short term turbidity during and after a disposal operation (See discussion in Section 4.2.3). Finer sediments would remain in suspension for longer periods and are more susceptible to resuspension by current and wave activity. Disposal of finer sediments at the nearshore sites would create more turbidity than disposal in the offshore area. Additional discussion of sediment suspension and transport is included in Section 4.2.2.

4.4.6 Cultural Resources

As stated in Section 3.4.8, no known significant cultural resources exist in the Coos Bay offshore area. Therefore, no cultural resources of historic or archeologic significance would be affected by the proposed site designations or resultant ocean dumping.

4.5 MITIGATION AND SITE MONITORING

Specific mitigation actions to offset disposal impacts have not been identified. Extensive monitoring of existing ocean disposal activities has been conducted to determine potential adverse impacts (see Section 3). These actions, designed to determine any adverse effects and/or minimize those effects, are considered mitigation actions.

Due to the unique compatability of type 1 material for sites E and F, monitoring will be limited to periodic bathymetric surveys. Bathymetric surveys will also be conducted at site H. In addition, a set of stations should be established around site H at which sediment samples are collected annually. Because of the characteristic difference in sediment size and volatile solids content between the dredged material and the disposal area, the presence of fine material or high volatile solids outside of site H could be used to indicate sediment movement. Plans for additional testing and/or corrective measures will be developed if movement outside of site H is discovered.

Monitoring at site H will begin with the first disposal action at the site in the fall of 1985. The future analysis of dredged material sediment on a 3 to 5 year cycle will help to identify any changes in contaminant levels.

4.6 ADVERSE ENVIRONMENTAL EFFECTS WHICH ARE UNAVOIDABLE

The permanent designation of ocean disposal sites at Coos Bay would allow continued disposal of dredged material in these sites with the following effects:

The bottom topography of the sites would be altered;

Disposal operations would create temporary turbidity in the vicinity of the disposal site(s);

Volatile solids and chemical contaminants found in upper bay sediments would temporarily impact water quality in the vicinity of the disposal site(s).

Benthic organisms would be smothered by disposal operations. Benthic habitat and associated communities would be altered by disposal activity perturbations and changes in bottom sediment;

Loss of benthic organisms would at least temporarily remove a food source for organisms higher in the food chain. However, since the disposal areas are small relative to the total area for the species, long-term impact on the food chain is not anticipated.

4.7 RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Disposal of dredged material in the proposed ocean sites would have a presently unquantifiable but apparently minor short- and long-term effect on the productivity of the marine environment. Use of the sites would have a long-term beneficial effect on the economy of Coos Bay and Coos County.

4.8 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

'ermanent designation of the proposed sites for disposal of dredged material ould commit the sites and their resources primarily to that use. Other uses uch as oil and gas exploration, and to varying degrees, mining, fishing, and se by certain aquatic species, would be precluded.

TABLE 4.1 COST* COMPARISON FOR DISPOSAL OF MATERIAL FROM THREE DIFFERENT LOCATIONS IN COOS BAY AT FOUR DIFFERENT OCEAN SITES

Dredging Location	Sites: E (1.5)**	F (1.5)**	H (3.5)**	G (5.0)**	Continental Shelf (24)
Entrance (RM 1.0, 800,000 cu. yd.)					
#24 hour work days	49	49	61	70	186
Estimated Cost (millions)	1.96	1.96	2.44	2.80	7.44
Lower Bay (RM 7.0, 500,000 cu. yd.)					
#24 hour work days	32	32	36	42	82
Estimated Cost (millions)	1.28	1.28	1.44	1.68	3.28
Upper Bay (RM 13.5, 400,000 cu. yd.)***					
#24 hour work days	26	26	28	30	54
Estimated Cost (millions)	1.04	1.04	1.12	1.20	2.16

* These costs are for comparison purposes only. Costs are based upon the assumptions outlined on pages IV-16.

** Statute miles from the entrance into Coos Bay.

*** Every 2 to 4 years.

V COORDINATION

5.1 General. Preparation of this EIS has been coordinated with interested Federal, State, and local agencies, and the public. A scoping letter was distributed on 30 September 1982.

The draft EIS was distributed for a 45-day public review on 9 September 1984. Comment letters were received from the following Federal, State and local government agencies. Copies of these comment letters are presented in Appendix E along with responses to those comments as required.

National Marine Fisheries Service
National Ocean Service
Oregon Department of Land Conservation and Development
U.S. Department of the Interior
U.S. Environmental Protection Agency, Region X
U.S. Department of Health and Human Services
U.S. Coast Guard
Coos County

VI LIST OF PREPARERS

Principal Authors	Experience:	Contribution to EIS
Steven J. Stevens BS, Landscape Architecture	Land use planning, EIS preparation (12 years)	Purpose and need, alternatives comparison, land use/CZM consistency, esthetics, EIS coordination
Thomas E. Morse BS, MS Wildlife Management Ph.D Ecology	Wildlife research bio, resource planner, biol. assessment (12 years)	Physical/biological description and assessment, alternatives comparison, study coordination.
William Boodt MS, Ph.D Economics	Industrial, regional and resource economic analysis feasibility and impact studies (22 years)	Socio-economic environment and impacts; cost analysis.
Patricia Hodge BA, MA Letters and Science Economics Specialist	Economics assistant/ regional economics (6 years)	Socio-economic environment; cost analysis.
David Askren BS Geology MS Oceanography MS Civil Engineering	Physical and geological oceanography (10 years) Coastal navigation project planning and maintenance (4 years)	Physical environment description and impacts assessement.
Kim Larson BS Zoology, MS Fishery Biology	Biological (fisheries) studies; environmental impact assessment (7 years)	Biological environment description and impacts assessment.
Robert A. Freed MA Anthropology	Archeological investigation and cultural resources management (8 years)	Cultural resources
Eric P. Braun BS Wildlife Management/ Biology	Environmental Impact Assessment (4 years)	EIS coordination and preparation

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APPENDIX A

OCMP CONSISTENCY STATEMENT

OREGON STATEWIDE GOALS	CONSISTENCY STATEMENT
1. CITIZEN INVOLVEMENT. To develop a citizen involvement program that insures the opportunity for citizens to be involved in all phases of the planning process.	The Corps has included citizens in the planning of this proposed porject through distribution of the EIS "scoping" letter. Citizens will have the additional opportunity to review and comment through the Draft EIS and and Final EIS review processes.
2. LAND USE PLANNING. To establish a land use planning process and policy framework as a basis for all decisions and to assure an adequate factual base for such decisions and actions.	Land use planning is a state and local function. The Corps has coordinated the site designation alternatives with all agencies that have planning responsibility for the affected area. The proposed project is conistent with Oregon's Coastal Management Program and other applicable statewide goals, the Coos County comprehesive plan and with the Coos Bay Estuary Management plan.
3. AGRICULTURAL LANDS. To preserve and aintain agricultural lands.	This goal is not applicable.
4. FOREST LAND. To Conserve forest lands for forest uses.	This goal is not applicable.
5. OPEN SPACES, SCENIC AND HISTORIC AREAS AND NATURAL RESOURCES. To conserve open space and protect natural and scenic resources.	There are no known historic and cultural resources in the area (see Appendix C). The proposed site designation and resulting ocean disposal would not detract from the area's scenic quality or significantly impact natural resouces.
6. AIR, WATER AND LAND RESOURCES. To maintain and improve the quality of the air, water, and land resources of the tate.	Turbidity would increase slightly above background levels during disposal operations. Any increase in turbidity would be temporary. The proposed action will not affect air and land resources.
7. AREAS SUBJECT TO NATURAL DISASTERS & HAZARDS. To protect life and property from natural disasters and hazards.	Ocean disposal would indirectly reduce risks of ship grounding in the entrance bar.
8. RECREATION NEEDS. To satisfy the recreational needs of the citizens of the state and visitors.	Recreation boating and sport fishing are expected to continue in the area with or without the proposed site designation.

OREGON STATEWIDE GOALS	CONSISTENCY STATEMENT
9. ECONOMY OF THE STATE. To diversify and improve the economy of the state.	Maintenance of the Coos Bay Navigation System is considered vitally important to local regional and state economic vitality. Ocean disposal site designation is an integral part of the navigation system maintenance plan.
10. HOUSING. To provide for housing needs of citizens of the State.	The proposed site designation would not affect local planning or implementation of plans which provide for the housing need of citizens.
11. PUBLIC FACILTIES AND SERVICES. To plan and develop a timely, orderly and efficient arrangement of public facilities and services to serve as a developoment	Facilities and services associated with the Coos Bay Navigation channel are already in place. Ocean disposal site designation would help insure the continued use of these facilities and services.
12. TRANSPORTATION. To provide and encourage a safe, convenient and economic transportation system.	The continued use of a safe convenient and economical water transportation system in Coos Bay is at least partially dependent upon the use of ocaen disposal sites for channel maintenance.
13. ENGERGY CONSERVATION. To conserve engergy.	The use of close-in disposal sites would provide for more efficient channel maintenance, resulting in net energy savings.
14. URBANIZATION. To provide for an orderly and effieicent transition from rural to urban land use.	Ocean disposal site designation is not expected to have any effect on the or patterns of urbanization.
15. WILLAMETTE RIVER GREENWAY. To protect, conserve, enhance and maintain the natural, scenic, historical, agricultural, economic and recreational qualities of lands along the Willamette River as the Willamete River Greenway.	Not applicable.

OREGON STATEWIDE GOALS	CONSISTENCY STATEMENT
16. ESTUARINE RESOURCES. To recognize and protect the unique environmental, economic and social values of each estuary and associated wetlands; and to protect, maintain, where appropriate develop and where appropriate restore the long-term environmental, economic and social values, diversity and benefits of Oregon's estuaries.	Ocean disposal site designation would help alleviate the need for disposal in or adjacent to the estuary. The proposed use of the ocean disposal sites would have no significant impact on estuarine resources.
17. COASTAL SHORELANDS. To conserve protect, where appropriate develop and where appropriate restore the resources and benefits of all coastal shorelands, recognizing thier value of protection and maintenance of water quality, fish and wildlife habitat, water-dependent uses, economic resources and recreation and esthetics. The management of these shoreland areas shall be compatible with the characteristics of the adjacent coastal waters; and to reduce the hazard to human life and property, and the adverse effects upon water quality and fish and wildlife habitat, resulting from the use and enjoyment of Oregon's coastal shorelands.	Ocean disposal site designation would help alleviate the need for disposal on coastal shorelands.
18. BEACHES AND DUNES. To conserve protect, where appropriate develop, and where appropriate restore the resources and beneifts of coastal beach and dune areas; and to reduce the hazard to human life and property from natural or man induced actions associated with these areas.	Dredged material disposed of at sites E and F may be carried ashore by wave-induced currents. The material deposited at these sites would be essentially clean and sand and would have a primarily positive effect of beach nourishment.

OREGON STATEWIDE GOALS	CONSISTENCY STATEMENT
19. OCEAN RESOURCES. To conserve the long-term values, benefits, and natural resources of the nearshore ocean and the continental shelf.	The general productivity of the area may be negatively affected due to continuous disposal of material from maintenance dredging. Benthic organisms at the sites would be impacted by smothering. No other natural resources are expected to be significantly affected by the disposal of dredged material.

APPENDIX B

ENDANGERED SPECIES COORDINATION

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Endangered Species
2625 Parkmont Lane S.W., B-2
Olympia, WA 98502

February 14, 1983

Mr. Richard N. Duncan
Chief, Fish and Wildlife Branch
Portland District, Corps of Engineers
P.O. Box 2946
Portland, Oregon 97208

Refer to: 1-3-83-SP-133

Dear Mr. Duncan:

This is in response to your letter, dated January 17, 1983, for information on listed and proposed endangered and threatened species which may be present within the area of the proposed Ocean Disposal Site(s) near Coos Bay, Oregon. Your request and this response are made pursuant to Section 7(c) of the Endangered Species Act of 1973, 16 U.S.C. 1531, et seq.

To the best of our present knowledge there are no listed or proposed species occurring within the area of the subject project. (See attachments) Should a species become officially listed or proposed before completion of your project, you will be required to reevaluate your agency's responsibilities under the Act. We appreciate your concern for endangered species and look forward to continued coordination with your agency.

Sincerely,

Jim A. Bottorff
Endangered Species Team Leader

Attachments

cc: RO (AFA-SE)
ES, Portland
ODFW, Non-Game Program

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CANDIDATE SPECIES THAT MAY OCCUR WITHIN THE AREA OF THE PROPOSED OCEAN DISPOSAL SITE(S) NEAR COOS BAY, OREGON
1-3-83-SP-133

LISTED:

None

PROPOSED:

None

CANDIDATE:

None

Attachment A

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Environmental & Technical Services Division
847 N.E. 19th Avenue, Suite 350
Portland, Oregon 97232-2279
(503) 230-5400

March 11, 1985 F/NWR5-418:AG

Richard N. Duncan
Chief, Fish and Wildlife Branch
Portland District Corps of Engineers
P.O. Box 2946
Portland, Oregon 97208

Dear Mr. Duncan:

This letter is in response to your request of February 27, 1985 for lists of threatened and endangered species under jurisdiction of the National Marine Fisheries Service (NMFS) that may be present in offshore dredge disposal sites at Yaquina and Coos Bays, Oregon.

The only listed species likely to occur in these areas is the gray whale, Eschrichtius robustus.

Sincerely,

Dale R. Evans

Dale R. Evans
Division Chief

COOS AND YAQUINA BAYS, OREGON
DREDGED MATERIAL DISPOSAL SITE DESIGNATION

BIOLOGICAL ASSESSMENT
GRAY WHALE

Coastal waters of Oregon serve as a migrational corridor for gray whales moving to and from their breeding, calving, and assembly areas off mainland Mexico-Baja California and their primary foraging areas in the Arctic (Sumich, 1984). Southward migration occurs in November-December with northbound migrants present from February-April. Recently, it has become apparent that summer occurrence of gray whales off the west coast of North America is more common than previously assumed (Sumich, 1984).

Gray whales summer along the Oregon Coast (Sumich, 1984). Over 1200 gray whale sightings were reported during a 1977-1980 study of gray whale occurrence off coastal Oregon by Sumich (1984). A 100 km section of coastline from the Siuslaw River to Government Point just north of Depoe Bay, appeared to be relatively important to gray whales as 60 percent of the 460 observations in 1977 occurred in that portion of the coastline (Sumich, 1984). The author noted that it was not determined if whales were more numerous or just easier to detect along that section of coast, than along other portions of the Oregon Coast. Sumich (1984) concentrated 1978 study efforts in the 100 km section from Siuslaw River to Government Point because of the higher incidence of sightings. His 1978 data indicated that gray whales were most commonly observed in the northern half of his study area; approximately Alsea River to Government Point which contrasted with 1977 results. Sumich (1984) reported a maximum observed occurrence of 0.2-0.3 whales/km of coastline for the 100 km study area for the 1977 and 1978 study years.

Most sightings of gray whales occurred within 500 m of shore (Sumich, 1984). Gray whales frequented surf or foam lines. Nearshore areas with silty sediments appear to be foraging areas for gray whales; presumably because of high amphipod populations in silty sediments (D. Hancock, USACE, pers. comm., 1985). Confirmation of foraging areas, prey populations, foraging substrate, and foraging strategy are necessary. Present tentative conclusions are based on foraging ecology of gray whales in their summer grounds in the Arctic and observed behavior and site use off Oregon. Sightings also occurred at distances 5-80 km offshore in water depths of 50-2700 m (Sumich, 1984); number of sightings was only 14 comprising 27 whales, however.

Site specific use by gray whales varied both daily and annually (Sumich, 1984), thus the period of maximum occurrence was undetectable. Additionally, weather, sea state, observer effort, the presence or absence of strategic observation points, and the unreliability of aerial counts due to the predominant occurrence of gray whales in surf and foam lines also contribute to the large variation in observed abundance. Because of these factors, Sumich considered his abundance estimate of 0.2-0.3 whales/km as conservative.

Sumich (1984) states that the primary activity of summer gray whales off the Oregon coast appears to be feeding. It is not known what the prey item(s) are. Benthic infauna, primarily gammarid amphipods, are the principal food items of gray whales in the Arctic. He speculated that the offshore sightings (14 occurrences) may indicate pelagic foraging by the species.

Sumich (1984) also determined size of gray whales whenever possible. His results indicated that calves and yearlings comprised a significantly greater proportion of the Oregon coast population than would be expected from a random sample of the population as a whole. His analysis of length data on gray whales larger than yearlings led to the conclusion that summer gray whales on the Oregon Coast are predominantly immature or atypically small mature animals. These animals may be shortening their migration due to insufficient energy reserves.

Advantages to gray whales discontinuing their migration and foraging along the Oregon coast may lie in the energetic savings associated with such behavior (Sumich, 1984). He concluded that the shallow, inshore waters of the Oregon coast should be considered as a supplementary summer feeding grounds. As a complete count of gray whales which summer off Oregon is unavailable, the proportion of the population which is present remains an unknown. However, it seems reasonable that only a small proportion of the population does exhibit this tendency to shorten their migration.

Disposal Site Information

Yaquina Bay - The proposed disposal site is located approximately 1.61 km offshore in approximately 15 m of water. Dimensions of the disposal area are approximately 1036 x 366 m or 38 hectares. The site is located in a tow boat lane, hence receives commercial boating traffic.

Recreational use, principally private and charter salmon fishing, also occurs in the disposal area during summer. Commercial fishing operations, primarily bottom fishing, salmon trolling, crabbing, and squid fishing are also present in the project area.

Dredged material disposal operations will occur generally from mid-April to mid-October with most dredging conducted from May to September. Dredging will require approximately two weeks for completion. Material disposed of will primarily be sandy sediments. The substrate of the disposal site is similar to that of the area dredged. Amphipod population levels are relatively low at the disposal site.

Coos Bay - Three sites (E,F, and H) are proposed for receipt of dredged material off Coos Bay, Oregon. Sites E and F are each approximately 1.61 km offshore and are located in 18-31 m of water. Site H is 5.8 km offshore in 55-67 m of water. Dimensions of all sites are similar; approximately 1097 x 427 m or 47 hectares.

Dredging will be completed in about one months time and will occur between mid-April and mid-October with most dreding generally occurring between May and September. Dredged material from the lower estuary is primarily clean fine sands of marine origin. Above RM 14, sediments are finer and contain more organic material. Sediments at disposal sites E, F, and H are also clean fine sands with grain size becoming progressivley smaller from the nearshore sites (E and F) to site H. Amphipod populations at the disposal sites are relatively low.

The disposal sites are located in areas which receive heavy sport and charter salmon fishing pressure. Commercial fishing operations for crab, salmon, squid, and bottom fish also occur in these areas.

Project Impacts

Gray whales occur in the project areas during distinct seasonal periods; fall and spring migration and summer. Disposal operations will have no effect on migrating gray whales as their is a distinct temporal difference in use of the sites (i.e. dredging occurs between the migratory periods). Migrant whales also would use the disposal areas only as a travel route.

Based on the limited information available on summer gray whales on the Oregon Coast, disposal operations should have no effect on this particular component of the population, either. Disposal locations are located offshore beyond the nearshore areas most commonly frequented by gray whales. Substrate composition of disposal locations is different than that in which gray whales are speculated to forage in along the Oregon Coast. Prey populations of the disposal locations are relatively low which suggests that they are unsuitable or at best marginally suitable for gray whale foraging. The disposal sites are relatively small which coupled with their low prey populations and distance offshore from apparent preferred foraging sites would result in minimal if any impact on forage availability for gray whales. The recreational and commercial fishing uses, in addition to commercial cargo traffic would preclude or reduce the probability of whale use of these sites, also.

Conclusion

We conclude, based upon the above analysis, that designation and use of the offshore disposal locations will have no effect to gray whales.

LITERATURE CITATION

Sumich, James L. 1984. Grey Whales Along the Oregon Coast in summer, 1977-1980. The Murrelet. 65:33-40.

APPENDIX C

LETTERS OF CLEARANCE

VICTOR ATIYEH
GOVERNOR

Department of Transportation
STATE HISTORIC PRESERVATION OFFICE
Parks and Recreation Division
525 TRADE STREET S.E., SALEM, OREGON 97310

Novmeber 16, 1982

DAVIS G MORIUCHI
PORTLAND DIST CORPS OF ENGINEERS
PO BOX 2946
PORTLAND OR 97208

Dear Mr. Moriuchi:

RE: Ocean Disposal
Coos Bay Area
Coos County

This letter is in response to your request for official comment from the State Historic Preservation Office regarding impact of your federally funded project on cultural resources.

After a careful review of your proposed project, our office can offer the following comments. We feel the area of the project is not of historic significance and since ground disturbance of previously undisturbed ground is minimal, this office feels that there will be no likely impact to archeological resources. We therefore feel no cultural resource surveys are required and that the project is in compliance with Public Law 89-665 and Executive Order 11593.

For further information regarding projects, contact Leland Gilsen, state preservation archeologist, at 378-5023.

Sincerely,

D.W. Powers III
Deputy SHPO

DWP/LG:kc

APPENDIX D

SEDIMENT ELUTRIATE ANALYSES
FROM
HANCOCK et.al. 1981

Table 3-5

Sediment Elutriate Analyses (May 1979)

Station	Depth (cm)	pH	$S^{=}$ (μg/ml)	NH_4^+-N (μg/ml)	TOC (μg/ml)	Chloro-Pesticides (ng/ml)	PCB (ng/ml)
E1	00-20	7.7	BD	ND	4.7	ND	ND
	20-60	7.6	BD	ND	4.4	ND	ND
E1s	00-20	7.6	BD	BD	4.2	ND	ND
	20-51	7.55	BD	BD	5.1	ND	ND
E2	00-20	7.6	BD	BD	3.1	BD	BD
	20-60	7.6	BD	0.14	4.2	ND	ND
E2s	00-20	7.5	BD	ND	4.0	ND	ND
	20-60	7.6	BD	ND	4.4	ND	ND
E3	00-20	7.65	BD	0.38	5.9	BD	BD
	20-42	7.6	BD	0.36	6.4	ND	ND
E3s	00-20	7.5		0.25	5.9	ND	ND
	20-60	7.6	BD	BD	7.1	ND	ND
E4	00-20	7.5	BD	0.1	4.0	BD	BD
	20-50	7.5	BD	BD	7.1	ND	ND
E4s	00-20	7.4	BD	BD	4.6	BD	BD
	20-60	7.4	BD	BD	5.2	BD	BD
E6	00-20	7.2	BD	3.7	12	BD	BD
	20-80	7.1	BD	5.0	6.9	0.007 DDE	ND
E6s	00-20	7.7	BD	3.9	9.7	ND	ND
	20-60	7.5	BD	2.0	12	BD	BD
E7	00-20	7.5	BD	3.9	10.8	BD	BD
	20-60	7.5	BD	6.5	49	BD	BD
E7s	00-20	7.4	BD	7.1	8.7	BD	BD
	20-60	7.1	BD	9.4	11.7	ND	ND
LLD			0.1	0.1		0.001	0.003

Note: Salinity = 26-28 mg/ml for all samples.

Table 3-5 (continued)

Sediment Elutriate Analyses (May 1979)

Station	Depth (cm)	Metal Concentration (ng/ml) Cd	Cu	Fe	Mn	Pb	Zn
E1	00-20	68	8.5	105	90	BD	65
	20-60	2.4	20.2	55	20	BD	59
E1s	00-20	80	14	10	55	BD	81
	20-51	15	17	60	30	5.5	53
E2	00-20	16	9.5	35	56	BD	97
	20-60	ND	ND	9	28	ND	14
E2s	00-20	4	10	BD	8	BD	75
	20-50	17	4	BD	10	2	71
E3	00-20	17	5	BD	40	5.6	57
	20-42	0.2	13	BD	26	2	55
E3s	00-20	5.2	20	60	11	BD	52
	20-60	15	10	10	63	BD	65
E4	00-20	0.6	12.3	2	22	2	85
	20-50	3.7	20.5	70	70	9	75
E4s	00-20	BD	21.6	7	43	BD	48
	20-60	0.6	24	15	70	6	48
E6	00-20	BD	9.5	2040	1200	2	ND
	20-80	BD	6	4840	665	BD	ND
E6s	00-20	14.6	15.3	BD	335	BD	114
	20-60	2.0	13.6	60	20	BD	114
E7	00-20	4.6	13.5	20	230	BD	118
	20-60	7.8	16	40	85	BD	75
E7s	00-20	BD	7	3550	1450	BD	3
	20-60	BD	4	3880	2720	BD	6
LLD		0.3		0.5		0.2	

Table 3-6

Sediment Elutriate Analysis (October 1979)

Station	Depth (cm)	pH	Sal. (mg/ml)	$S^{=}$ (µg/ml)	TOC (µg/ml)	NH_4^+-N (µg/ml)	Chloro-Insect. (ng/ml)	PCB (ng/ml)
E4	00-20	7.7	24	BD	11	BD	BD	BD
	20-41	7.5	25	BD	2	BD	ND	ND
E5	00-20	7.3	24	BD	8	5.0	BD	BD
	20-60	7.1	24	BD	10	9.1	BD	BD
E6	00-20	7.2	24	BD	12	6.8	BD	BD
	20-60	6.8	24	BD	15	18.0	BD	BD
E7	00-20	7.3	27	BD	15	7.0	BD	BD
	20-60	7.3	27	BD	22	16.0	BD	BD
E8	00-20	7.4	23	BD	15	4.6	BD	BD
	20-60	7.4	24	BD	8	7.8	BD	BD
E9	00-20	7.3	29	BD	4	5.3	BD	BD
	20-48	7.2	24	BD	12	19	BD	BD
	Seawater	7.5	27	BD	4	BD	BD	BD
	Blanks	7.5	26	BD	2	BD	BD	BD
		7.8	25	BD	5	BD	BD	BD
LLD				0.1		0.1	0.001	0.003

Table 3-6 (continued)

Sediment Elutriate Analyses (October 1979)

Station	Depth (cm)	As	Cd	Cu	Fe	Mn	Pb	Zn	Hg
		Metals Concentration (ng/ml)							
E4	00-20	ND	3	2.5	10	40	3	2	BD
	20-41	BD	2	2	20	20	2	2	1
E5	00-20	ND			1100	1600			BD
	20-60	ND			700	1300			BD
E6	00-20	ND	66	1	1900	960	3	23	2
	20-60	BD	57	1	6500	3300	2	29	3
E7	00-20	ND			1300	1300			BD
	20-60	ND			680	790			BD
E8	00-20	ND			690	160			BD
	20-60	ND			740	250			BD
E9	00-20	ND	8.5	0.5	500	980	3	18	BD
	20-48	BD	17	0.5	950	420	2	24	BD
Seawater Blank		BD	BD	BD	110	20	BD	BD	BD
LLD		20	0.3	0.3			0.2	0.1	0.5

Table 3-7

Sediment Elutriate Analyses (March 1980)

Station	Depth (cm)	pH	DO (μg/ml)	Sal. (mg/ml)	Turb. (NTV)	$S^=$ (μg/ml)	TOC (μg/ml)	NH_4-N (μg/ml)	AS (ng/ml)	Hg (ng/ml)
E4	00-20	ND	6.3	27	53	BD	5	0.1	ND	BD
	20-50	7.5	7.0	28	86	BD	5	0.4	BD	BD
E5	00-20	7.5	2.7	ND	83	BD	9	11	ND	BD
	20-60	ND	4.4	29	101	BD	5	7	ND	BD
E6	00-20	7.5	2.7	26	81	BD	9	11	ND	BD
	20-60	7.2	4.7	26	165	BD	11	11	BD	BD
E7	00-20	7.0	2.8	ND	120	BD	19	20	ND	BD
	20-60	7.2	2.5	28	66	BD	5	11	ND	BD
E8	00-20	7.3	3.4	28	107	BD	5	4	ND	BD
	20-60	7.4	3.0	28	115	BD	4	4	ND	BD
E9	00-20	7.4	5.6	28	56	BD	5	6	ND	BD
	20-60	7.7	5.4	ND	75	BD	5	4	BD	BD
Seawater Blank #1		7.7	7.9	26	1.8	BD	1	0.1	ND	BD
Seawater Blank #2		7.7	7.7	31	0.8	BD	4	0.3	BD	BD
LLD						0.1			20	0.5

Table 3-7 (continued)

Sediment Elutriate Analyses (March 1980)

Station	Depth (cm)	Pesticide Concentration (ng/ml) Aldrin	DDE	Dieldrin	DDD	DDT	PCB
E4	00-20	0.006	0.002	BD	0.03	0.009	BD
	20-41	0.004	0.005	BD	0.03	0.02	BD
E5	00-20	0.003	BD	BD	0.01	0.004	BD
	20-60	0.002	0.005	BD	0.02	0.02	BD
E6	00-20	0.007	BD	BD	0.02	BD	BD
	20-60	0.06	0.002	BD	0.02	0.01	BD
E7	00-20	0.003	BD	BD	0.015	0.009	BD
	20-60	0.016	0.0006	0.004	0.003	0.005	BD
E8	00-20	0.02	0.006	0.002	0.003	0.001	BD
	20-60	0.002	ND	BD	0.01	0.01	BD
E9	00-20	0.02	BD	BD	0.02	0.007	BD
	20-60	0.01	0.004	BD	0.03	0.01	BD
Seawater Blank #1		0.01	BD	ND	0.02	0.01	BD
Seawater Blank #2		BD	0.003	0.003	0.03	0.02	BD
Distilled Water Blank #1		ND	BD	0.004	0.006	0.01	BD
Distilled Water Blank #2		ND	BD	0.003	0.006	0.008	BD
LLD		0.001	0.001	0.001	0.002	0.003	0.003

APPENDIX E

COMMENTS AND RESPONSES

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D.C. 20230

OFFICE OF THE ADMINISTRATOR

November 2, 1984

11/7/84

Mr. Paul Pan
Chief, Environmental Analysis Branch
Office of Marine and Estuarine Protection
Environmental Protection Agency (WH-546)
401 M St., S.W.
Washington, DC 20460

Dear Mr. Pan:

This is in reference to your draft environmental impact statement for Coos Bay, Oregon dredged material disposal site designation draft environmental impact statement. Enclosed are comments from the National Oceanic and Atmospheric Administration.

We hope our comments will assist you. Thank you for giving us an opportunity to review the document. We would appreciate receiving four copies of the final environmental impact statement.

Sincerely,

David Cottingham for

Joyce M. Wood
Chief, Ecology and
Conservation Division

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
ENVIRONMENTAL & TECHNICAL SERVICES DIVISION
847 NE 19th AVENUE, SUITE 350
PORTLAND, OREGON 97232-2279
(503) 230-5400

October 29, 1984 F/NWR5

TO: F/PP2 - Joyce Wood

FROM: F/NWR5 - Dale R. Evans Dale R. Evans

SUBJECT: Draft Environmental Impact Statement - Coos Bay Dredged Material Ocean Disposal Site Designation, Oregon (DEIS 5408.12, May, 1984)

The proposed action described in the subject Draft Environmental Impact Statement (DEIS) is final designation of two interim ocean dredged material disposal sites and the designation of a new site off Coos Bay, Oregon. The two finally designated sites (Sites E and F) would be used for the disposal of large-grained dredge material, whereas the new site located further offshore (adjusted site H) would be used for the disposal of fine-grained sediments. The purpose of the proposed action is to provide environmentally acceptable areas for the disposal of dredge material.

General Comments

The National Marine Fisheries Service reviewed the subject DEIS and related supplemental information on which the DEIS was based. Our supplemental information review included the Phase I, II and III Interim Reports and the Phase IV-V Final Report. Based on available information, we believe the DEIS lacks sufficient environmental information on which to base an accurate evaluation of the potential adverse impacts of ocean dredge material disposal on the living marine resources of the newly designated site (adjusted site H). The DEIS does not clarify how baseline data and test

A meeting was held between the Portland District, Region X EPA, National Marine Fisheries Service and Oregon Department of Fish and Wildlife on 9 January 1985 in response to this comment. The agencies were presented with the available information about site H and adjusted H and asked which site they would prefer to see used. Based on the availability of baseline data and the information on the potential impacts to the scallop fishery presented in Section 2.8 of the EIS the resource agencies agreed that site H should be the preferred disposal site. The Final EIS has been changed to identify site H as the disposal site for type 2 and 3 materials.

disposal results pertaining to initial site H are applicable to adjusted site H. In the absence of site specific date, we cannot be assured that resource values at the new site are not comparable with those at initial site H. We recommend that supplemental baseline data be collected at adjusted site H. Following the collection of these data, a test disposal using the expected quantity and quality of dredge spoil material should be conducted. These new baseline and test disposal data should be analyzed and submitted for review as a supplement to the DEIS.

Specific Comments

2.6.7 Effects of Previous Disposals

Page II-10, paragraph 2. This section includes a brief discussion of an August, 1981 test disposal at initial site H. The DEIS states that the benthic community was significantly depressed in the area immediately after disposal. A steady recovery to pre-disposal abundance and diversity levels was observed based on post-disposal sampling twelve and eighteen months The test's study design proposed the disposal of 200,000 cubic yards of r . . organic materials (less than 0.02mm grain size) in the center of initial site H (Site H-3). However, only 60,000 cubic yards of material were subsequently used in the test. Further, spoil materials actually missed the study design disposal point and were placed northeast of site H-4. Subsequent post-disposal sediment samples taken shortly thereafter revealed the presence of spoil materials at only two of the five H-related sites. Neither the DEIS nor the study reports quantify the distance between sites (e.g. H-3 to H-4)

The actual dumping occurred slightly northeast of the proposed test disposal point, but was within 500 yards. Dredged material was observed in 3 of the 5 stations sampled following the test dump, providing sufficient information to characterize the impacts of the disposed material at site H. Since site H is now being proposed for disposal it is no longer necessary to apply the results at adjusted site H.

nor how far off target test dumping actually occurred. The authors of the final study report concluded that the test disposal did not simulate what would occur in a real dredge spoils disposal situation at that site. It is questionable whether the results of a misplaced test spoil disposal can be applied to another site, one mile shoreward, at which limited, if any, baseline information is available.

2.8 Preferred Disposal Sites and Disposal Options

Page II-19, Figure 2.1. In several instances the DEIS contains the statement "...although this section does not specifically refer to adjusted site H, the data gathered by OSU and presented in this section covers an extensive offshore area which includes adjusted site H." (Pages II-5, III-1, IV-1). According to the figure, the adjusted site may touch the southernmost boundary of initial site H (at approximately H-5). However, it appears that site specific baseline data have not been collected from the proposed disposal site.

Additional discussion of adjusted site H is no longer felt necessary since site H is now being proposed for disposal of fine materials.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Washington, D.C. 20230

N/MB21x6:VLS

TO: PP2 - Joyce M. Wood

FROM: N - Paul M. Wolff

SUBJECT: DEIS 8408.12 - Coos Bay Dredged Material Ocean Disposal Site Designation, Oregon (Environmental Protection Agency)

The subject statement has been reviewed within the areas of the National Ocean Service's (NOS) responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

Geodetic control survey monuments may be located in the proposed project area. If there is any planned activity which will disturb or destroy these monuments, NOS requires not less than 90 days' notification in advance of such activity in order to plan for their relocation. NOS recommends that funding for this project include the cost of any relocation required for NOS monuments. For further information about these monuments, please contact Mr. John Spencer, Chief, National Geodetic Information Branch (N/CG17), or Mr. Charles Novak, Chief, Network Maintenance Section (N/CG162), at 6001 Executive Boulevard, Rockville, Maryland 20852.

Geodetic control survey monuments are not located offshore and therefore will not be impacted by the proposed ocean disposal site designation.

The NOS Office of Ocean and Marine Assessment had a minor comment regarding the deepwater site being eliminated based upon consideration of Type 1 sediment only (page II-3). The use of this site for Type 2 and Type 3 sediments should be considered also, they state.

A discussion of the consideration of Type 2 and 3 materials has been added in the FEIS.

The Oregon Department of Land Conservation and Development is in agreement with the Federal consistency statements in this document according to the NOS Office of Ocean and Coastal Resource Management.

Department of Land Conservation and Development

1175 COURT STREET N.E., SALEM, OREGON 97310-0590 PHONE (503) 378-4926

VICTOR ATIYEH
GOVERNOR

M E M O R A N D U M

November 2, 1984

TO: Land Conservation and Development Commission

FROM: James F. Ross, Director

SUBJECT: FEDERAL CONSISTENCY REVIEW OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT, COOS BAY, OREGON DREDGED MATERIAL DISPOSAL SITE DESIGNATION

DATE RECEIVED: September 10, 1984

REVIEWER: Patricia Snow

I. REQUEST

The Environmental Protection Agency has requested that the Commission concur that the Draft Environmental Impact Statement for the Coos Bay Dredged Material Disposal Site Designation is consistent to the maximum extent practicable with Oregon's Coastal Management Program (OCMP).

II. SUMMARY OF RECOMMENDATIONS

Staff recommends that the Commission concur with the Department analysis that the DEIS is consistent with the OCMP.

III. BACKGROUND INFORMATION

The Delegation of Authority Rule, OAR 660-02-010(9), provides that responses to consistency determinations for federal activities requiring the preparation of an Environmental Impact Statement be referred to the LCDC for possible review. This referral must be made at least seven days before the Director's action is to take effect. Should two or more members of the LCDC request review, the implementation of the Director's action will be suspended pending this review. The Department normally makes its consistency determination at the time of the FEIS. However, EPA has requested that the Department concur at the DEIS phase for this project. Due

to the extensive research that provided background for the DMD site designations, the Department has agreed to this request. A supplemental consistency determination will be needed if the FEIS is different than the DEIS.

The federal activity under review is the final designation of two interim designated ocean dredged material disposal sites (ODMDS) and the designation of a new ODMDS off Coos Bay, Oregon. The two finally designated existing ODMDSs would be used for the disposal of large grained sediments while the new site further offshore would be for the disposal of finer sediments with higher volatile solids content.

IV. FINDINGS

The major component of the Oregon Coastal Management Program (OCMP) which is applicable to the project is Goal 19; the Ocean Resources Goal. Goal 19 requires that renewable ocean resources and uses be given clear priority over nonrenewable resources. Inventories developed for specific projects must be sufficient to describe the long-term impacts of the proposed action on resources and uses of the continental shelf and nearshore area. For dredged material disposal sites, the agency with jurisdiction must determine the impact of the proposed project and provide for suitable sites and practices for the open sea discharge of dredged materials which do not substantially interfere with the use of the continental shelf for fishing, navigation, recreation, or from long-term protection of renewable resources.

The primary data bases for the EIS were disposal site evaluation and monitoring studies conducted by OSU under contract to the Corps of Engineers. The study consisted of five phases. The first was a 12-month baseline study of the physical, chemical and biological conditions of the nearshore area off Coos Bay. This information was used to select candidate sites for detailed evaluation during Phases II and III. The criteria used in selecting candidate sites were:

A. Physical and chemical similarity of dredged material and site sediment type;

B. Avoidance of impacts on unique or valued biological communities; and

C. Minimization of onshore tranport of fine sediments.

Sediments from above RM 12 on the Coos River were determined to be incompatible with sediments of the Phase I ocean study site. Detailed studies had to be conducted at sites located further offshore. Phases II and III provided information for areas further offshore in an area of approximately 5,000 x 3,500 meters at depths ranging from 40 to 120 meters. Phases IV and V investigated the effects of a 1981 test disposal at site H (53-66 meter depths) during and following disposal. The site was re-investigated during 1982 and 1983 to document post disposal effects.

There are three basic types of sediment in Coos Bay. The types are:

1. Type 1 - Predominantly clean sand of marine origin typical of sediments from below Coos Bay river mile 12.

2. Type 2 - Finer grained sand and silt containing some volatile solids typical of sediments from between Coos Bay RM's 12 and 14.

3. Type 3 - Highly organic fine material (6 to 20 percent volatile solids) typical of sediments from above Coos Bay RM 14.

Several disposal alternatives were reviewed (see attached map). Sites E and F were EPA interim designated sites chosen for their distance from Coos Bay, depth of water, biological conditions, historical use and estimated amount and type of dredged material. They are located approximately 1.5 miles offshore. Sites G and H were considered since they were areas with similar bottom sediments to the materials dredged from above RM 12 in Coos Bay. They are located approximately 5 and 3.5 miles offshore, respectively. Adjusted Site H was selected as an alternative to Site H to avoid impacts to shellfish beds. It is located approximately 2.5 miles offshore. A deepwater site was selected to meet EPA site selection criteria.

Four disposal options were considered for ocean dumping of dredged material. These options were: (1) disposal of all types of dredged material at interim Sites E and F; (2) disposal of Type 1 material at Sites E and F and disposal of Type 1 and 2 material at Site G; (3) disposal of Type 1 material at Sites E and F and disposal of Types 1 and 2 material at Site H; and (4) disposal of Type 1 material at sites E and F and Type 2 and 3 material at adjusted Site H.

The effects of previous disposal at sites E and F indicates that no significant biological impacts have been associated with the disposal (II-10). At site H, the benthic community was significantly depressed in the area of disposal immediately after disposal. A steady recovery to predisposal abundance and density levels was observed during the 19 months of the post-dump monitoring (II-11).

Alternative 4 is identified as the preferred alternative. This option was selected because the sediment types would be the most compatible with the disposal sites. Type I material is very similar to the natural sediments at sites E and F (p. II-14). Disposal of this material at any other site would result in long-term bottom habitat changes. For these reasons disposal at

sites other than E and F was not considered in the public's best interest. The disposal of either Type 2 or 3 material at sites E and F was considered questionable as the material is physically and chemically dissimilar to the sediments at these sites. Disposal of Type 2 and 3 sediments at Site G was not the chosen alternative due to the slow erosion rate at G. It was felt that the disposal of these sediments at Site G would result in long-term changes to the substrate habitat of the benthic community (II-15). Adjusted site H was chosen as a result of resource agency concerns with the scallop beds located between 40 and 52 fathoms. The adjusted Site H is located at the 25 fathom contour, which will establish a buffer area of approximately one nautical mile between the disposal site and the scallop bed. The Department will request that a monitoring program be established for the first year of use of adjusted Site H.

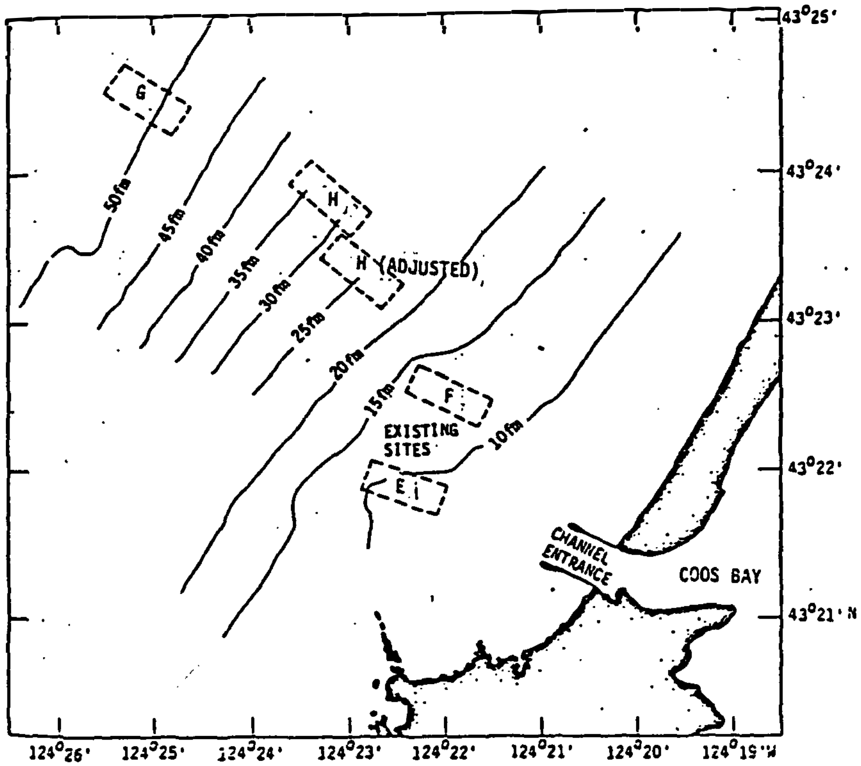
The DEIS addresses consistency of the proposed action with the OCMP and the Coos County plan (III-22; IV-A; Appendix A). The DEIS notes that Goal 19 requires that the location of the sites and disposal practices must not substantially impact fishing, navigation, or recreation activities, or the natural resources of the continental shelf. The DEIS states that the descriptions of impacts of dredged material disposal on the proposed sites indicate that no substantial impacts on these uses or resources are anticipated. No significant post disposal effects on the biological community at Sites E and F were found (IV-9). Disposal of Type I sediments at Sites E and F would likely have a short-term impact on the benthic communities. The DEIS states that due to the similarity of sediment types in the disposal material to that existing at Site H, it is doubtful that there would be measureable long-term effects (IV-12). Disposal of any materials from Coos Bay at Site G would result in the greatest biological impact of the three areas studied (IV-12). Disposal of any of the Coos Bay sediment at E and F would result in the least impact on benthos of the three sites. The main reasons for this are the unstable environment, the lower abundance and diversity of species and the adaptability of the existing benthic species to an unstable environment.

<u>Objections:</u> No formal objections to the DEIS have been received to date. The ODFW and USFWS support the proposed DMD sites (personal communication, November 2, 1984). The NMFS is concerned that test dumping did not occur on adjusted Site H. The Department concludes that adequate baseline data exists on adjusted Site H to designate it is a DMD site provided a monitoring program is established during the first year of use. The monitoring program will need to be developed in coordination with the state, USFWS, and NMFS. The new site was selected in response to resource agency concerns to avoid impacts on shellfish beds located between 40 and 52 fathoms.

<u>Conclusion:</u> The final designation of the two interim and the proposed dredged material offshore disposal sites is an action ~~directly affecting~~ the Oregon Coastal Management Zone. The Department concurs with the EPA determination that the DEIS and final designation of the three sites is consistent with the Oregon Coastal Management Program, including Goal 19. The DEIS establishes that the disposal of approved sediments at sites E, F and H will not have long-term impacts on the resources or uses of the area. The Department concurs that the alternative selected will have the least impact on the nearshore environment. Provided the FEIS does not vary from the DEIS, it will be consistent with the OCMP as well. If the designations in the FEIS are different than those in the DEIS, a supplemental consistency determination will be required.

JFR:PS:mg
13000/98

The Department of Land Conservation (LCDC) and Development has been informed that site H is now the preferred disposal site for type 2 and 3 materials EPA has requested a supplemental consistency determination from LCDC.



Alternative Disposal Sites Considered in Detail.

BEFORE THE
LAND CONSERVATION AND DEVELOPMENT COMMISSION
OF THE STATE OF OREGON

AN ORDER BY THE DEPARTMENT THAT THE DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE COOS BAY, OREGON, DREDGED MATERIAL DISPOSAL SITE DESIGNATION IS CONSISTENT WITH THE OREGON COASTAL MANAGEMENT PROGRAM.	)	84-FC-339 FINDINGS OF FACT, ULTIMATE FINDINGS OF FACTS, CONCLUSION OF LAW, ORDER AND NOTICE FOR OPPORTNITY FOR ADMINISTRATIVE AND JUDICIAL REVIEW.

1. Pursuant to the National Environment Policy Act of 1969, the Corps of Engineers and the Environmental Protection Agency did prepare an Environment Impact Statement describing the impacts of dredged material disposal sites offshore of the mouth of the Coos River. The DEIS was received by the Department of Land Conservation and Development from the EPA on September 10, 1984. Pursuant to Title 15, Code of Federal Regulations, Section 930.41, the Department of Land Conservation and Development is responding to the consistency determination as a federal action which directly affects Oregon's coastal zone.

2. Pursuant to Title 15, Code of Federal Regulations, Section 930.34, the Environmental Protection Agency did give proper notice directly to the Department of Land Conservation and Development in which the EPA did provide a consistency determination pursuant to Section 930.39 of the same title.

3. The Environmental Protection Agency did properly conclude that Goal 19 (Ocean Resources) is the applicable portion of the Oregon Coastal Management Program and governs the federal action in question. The EPA did demonstrate through findings compliance with the Statewide Planning Goal.

4. The Final Environmental Impact Statement for designation of Coos Bay offshore disposal sites will be consistent if it does not vary from the DEIS. If the document is changed, a supplemental consistency determination will be required.

5. A monitoring plan for adjusted Site H will need to be developed in conjunction with state and federal agencies for the first year of use.

ULTIMATE FINDINGS OF FACT

The DEIS for the Coos Bay, Oregon, Dredged Material Disposal Site Designation is to the maximum extent practicable consistent with the Oregon Coastal Management Program. The FEIS will also be consistent if it does not vary from the DEIS.

CONCLUSIONS OF LAW

The Department of Land Conservation and Development concurs with the consistency determination of the EPA that the DEIS for the Coos Bay, Oregon, Dredged Material Disposal Site Designation is to the maximum extent practicable with the Oregon Coastal Management Program according to the provisions of Title 15, Code of Federal Regulations, Section 930.41 and Section 307 of the Federal Coastal Zone Management Act of 1982 as amended. A supplemental consistency determination will be required if the FEIS varies from the DEIS. A monitoring plan will need to be developed for adjusted Site H.

The Department of Land Conservation (LCDC) and Development has been informed that site H is now the preferred disposal site for type 2 and 3 materials. EPA has requested a supplemental consistency determination from LCDC.

Site H is now being proposed for the disposal of type 2 and 3 material. A monitoring plan has been developed by the EPA Region X and the Portland District and is discussed in Section 4.5 of the FEIS.

Same as above.

ORDER

The three dredged material disposal sites designated in the DEIS may be used for dredged material disposal projects which meet EPA's ocean dumping regulations, 40 CFR Part 227. Use of adjusted Site H will also require a monitoring plan for the first year of use.

James F. Ross, Director
Department of Land Conservation
and Development

November 22, 1984
Date

NOTICE: Any person or agency adversely affected by or aggrieved by this order is entitled to judicial review. Judicial review of this order may be obtained by filing a petition for review within 60 days following the service of this order. Judicial review is pursuant to the provisions of Oregon Revised Statutes, Chapter 183, Section 484.

PS:mg
1305D/9B

Site H is now being proposed for the disposal of type 2 and 3 material. A monitoring plan has been developed by the EPA Region X and the Portland District and is discussed in Section 4.5 of the FEIS.

United States Department of the Interior
OFFICE OF THE SECRETARY
PACIFIC NORTHWEST REGION
500 N.E. Multnomah Street, Suite 1692, Portland, Oregon 97232

October 25, 1984

ER 84/1137

Mr. William C. Shilling
Criteria and Standards Division (WH-585)
Office of Water Regulations and Standards
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Dear Mr. Shilling:

The Department of the Interior has reviewed the draft environmental impact statement for designation of the Coos Bay Ocean Dredged Material Disposal Site Offshore Oregon. We have no objection to the proposed action. The following comments are for your consideration in preparing the final statement.

General Comments

While we do not object to the proposed action, please note that specific activities leading to the use of the proposed disposal site may require Federal permits from the U. S. Coast Guard and/or the U. S. Army Corps of Engineers. Such permits will be reviewed separately by the various agencies of the Department of the Interior to assess the impacts on resources under their jurisdiction. For example, the U. S. Fish and Wildlife Service, pursuant to the Fish and Wildlife Coordination Act (16 U.S.C. 661, et seq.), may object to or propose stipulations for future permits depending on how specific construction practices of the disposal site affect fish and wildlife resources in the area.

We recognize that other Federal permits may be required and that a Section 103 (Marine Protection, Research and Sanctuaries Act) evaluation will be required for each specific disposal action. Department of the Interior will be notified of these actions and given the opportunity for comment as required by law.

Specific Comments

Page II-14, paragraph 14, lines 6 and 7 - This states that turbidity is measured in days, whereas on page II-16, paragraph 2, line 6, it states that turbidity would dissipate within 4 hours. Which is correct?

Page II-14 refers to the impacts of disposing of type 2 and 3 materials at sites E and F where the fine material would be reworked by wave and current action. Page II-16 referers to the impacts at site H where the water is deeper and the wave and current actions would not continue to rework and resuspend the fine materials as they would at sites E and F.

Page IV-7, paragraph 2, line 2 - This states that 87 percent of the material to be dumped is organic material. Type 1 material, which comprises 87 percent of the total 1.5 million cubic yards to be dumped, is classified on page II-7 as being "clean sand of marine origin." This seems to be contradictory and should be clarified.

This was a typographical error and has been corrected to read "inorganic material."

Page IV-16, paragraph 3 - This paragraph gives the general specifications of the ~~dredging operations,~~ but does not state when the operations will commence, how many trips will be made per day on the average to the disposal sites, how many people will be employed in the operation, or how the operations will increase the vessel traffic in the area.

Thank you for the opportunity to comment on this DEIS. If you have any questions regarding these comments, please call me at (503) 231-6157.

Sincerely,

Charles S. Polityka

Charles S. Polityka
Regional Environmental Officer

cc:

Office of Environmental Project Review
Director, Minerals Management Service
Director, Fish and Wildlife Service
Regional Director, National Park Service
Director, Geological Survey
Chief, Western Field Operations Center, Bureau of Mines
State Director, Bureau of Land Management
Regional Director, Fish and Wildlife Service

The specifications given are identified as assumptions used to develop a cost estimate for transportation of dredged material to each of the alternative disposal sites. It is not appropriate to consider the other factors you have identified at this time as they will be evaluated, as required, when each disposal action is considered.

OCT 2 3 1984

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Coos Bay Dredged Material Ocean Disposal Site Designation Draft Environmental Impact Statement

Ron Lee, Acting Chief
Environmental Evaluation Branch

TO Chris Shilling, Chief
Ocean Dumping EIS Task Force

We have reviewed the referenced document and find that the recommendations made in our April 6, 1984, memorandum (see attached) have not been incorporated. We trust they will be included in the final EIS.

In addition to our previous comments, we have the following recommendations:

(1) Pg. II-3, first paragraph, last sentnece: the dredged material is Type 2 material, not Type 3.

This has been corrected in the FEIS.

(2) Pg. III-28 should be eliminated as it contains redundant information.

This has been corrected in the FEIS.

(3) Chapter III: Where feasible, all maps should include as many of the disposal sites as possible. For example, figures 3.3 and 3.4 (pgs. III-45 and III-46), should include adjusted site H.

Adding adjusted site H is no longer felt necessary since site H is now being proposed for disposal of fine materials.

(4) We appreciate the addition of explanatory sentences on pgs. III-1 and IV-1 concerning adjusted site H. While these statements constitute a good first step in incorporating adjusted site H into the EIS, we feel both chapters must be modified to more completely characterize the site and the likely environmental impacts associated with future dumping operations.

Additional discussion of adjusted site H is no longer felt necessary since site H is now being proposed for disposal of fine materials.

If you have any questions, please contact Mr. Gary Voerman of my staff at FTS 399-1448.

attachment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

APR 6 1984

Coos Bay Ocean Dredged Material
Disposal Site Draft EIS - Region 1u Approval

FROM Ernesta B. Barnes
Regional Administator

TO Mr. William C. Shilling, Chief
Ocean Dumping EIS Task Force

We have reviewed the Draft EIS for the Coos Bay Ocean Dredged Material Disposal Site designation. Our primary concern with this document is the lack of discussion relating to adjusted site H in Chapters 3 and 4. The Portland District Corps of Engineers has provided some camera ready corrected pages (attached) which incorporate language acceptable to us as an interim solution to this problem. We have been assured by the Portland District that more comprehensive changes will be made in the final EIS.

In addition, we are recommending several minor changes (see attachment) for inclusion in the final EIS. Due to the unnecessarily complex process for effecting change in this document, we feel the effort and delay required to make changes at this time would not be worth the gain in document quality. In the future, EPA should take upon itself the responsibility for making changes to any EIS for which it has issuing authority.

We recommend releasing the Draft EIS, as corrected by the Corps, to the public for review. The document provides an accurate assessment of the environmental impacts associated with ocean dumping at Coos Bay and demonstrates compliance with the general and specific ocean dumping criteria. The conclusions and recommendations are supported by a thorough research effort. The technical support documents are available for public review at the Corps' Portland District offices. We request at least one dozen copies of this document for our public review file.

It is our understanding that the Ocean Dumping Branch (EPA headquarters) will prepare a site management plan before final site designation. We request involvement of the following agencies in the development of that plan: Region 10 EPA; Portland District Corps of Engineers; USFWS-Portland office; National Marine Fisheries Service, Portland office; and the Oregon Department of Fish and Wildlife.

An agreement has been reached between EPA Region X and the Portland District Corps of Engineers concerning a general monitoring plan. This plan is discussed in Section 4.5 of the FEIS. Other management considerations will be addressed as specific disposal actions are considered.

If you have any questions, please contact Mr. Gary Voerman of my staff at FTS-399-1448.

cc: COE - Portland

attachments

EPA Form 1320-6 (Rev. 3-76)

Attachment

We recommend the following changes be made in the Draft EIS for the Coos Bay ODMDS:

1. Page xiii, Preface: Change the last sentence of the first paragraph to read something like: "In addition, monitoring of these sites will be required to assess the environmental impacts associated with dredged material disposal. A monitoring plan will be developed by EPA, in consultation with state and federal resource agencies, before final site designation."

The paragraph has been changed to state that monitoring will be performed and refer to the discussion of monitoring in Section 4.5. (Note: this paragraph is found on p. xxii in the Draft EIS.)

2. Page II-10. Effects of Previous Disposals: The total amount of dredged material deposited at sites E and F should be reported in the EIS. The EIS states that the disposal operations have produced "noticeable seaward bulges in the bathymetric contours....in the vicinities of these sites." Apparently on-site bathymetric changes have not been significant; however, the reason for designating an ocean dumping site is to provide an area within which the physical impacts of dredged material disposal are expected and acceptable. If previous disposal operations have resulted in material transport and mounding (and the attendant adverse environmental impacts) off site, perhaps sites E and F should be moved or dumping operations more closely monitored to assure maximum sediment deposition within the confines of the designated dumpsite. Some discussion of this issue should be included in the final EIS.

While there appear to be noticable seaward bulges in the bathymetric contours in the vicinity of sites E and F, they have not been definitely attributed to disposal activity. There is some mounding at the sites following the dredging season, but this is normally erased by winter storm activity and no long-term bathymetric changes occur. The material deposited at sites E and F then moves along the coast with the littoral drift system. Because the dredged material dumped at these sites consists of clean sand which is very similar to the native sediments, it will not produce any adverse environmental effects and could be beneficial for beach replenishment. Therefore, we see no problem with the sand being slowly transported out of the disposal sites.

3. Page II-10 to II-11: There are apparently contradictory statements made about impacts on the benthic community. These statements are: "The benthic community was significantly depressed in the area of disposal impacts immediately after disposal" and "No dump effects were observed for the infauna". These statements should be reconciled in the final EIS.

This has been corrected in the FEIS.

4. Page II-13, Impact Comparison of Disposal Options: Under disposal options 2 and 3, the types of material to be disposed of at sites G and H should be changed from types 1 and 2 to types 2 and 3.

This has been corrected in the FEIS.

5. Page II-14 and II-17, last paragraphs: It is not clear from this document how probable it is that the addition of volatile solids to the sediments of sites E, F and adjusted site H would enhance the benthic community. Has this occurred in the past? Is there any evidence that the benthic comunities in sites E and F are substantially different than adjacent off-site communities? A more thorough discussion of this issue should be provided in the final EIS.

This statement was based on the generalization that areas with finer bottom materials and higher levels of organic material appear to be more productive than areas with a coarse bottom. It has been deleted from the FEIS.

There was no evidence in the Phase I studies that the benthic communities were statistically different between sites E and F and adjacent areas.

6. Chapters III and IV, General: The OSU studies which provided the primary information base for this document were oriented toward sites E, F, G, and H. Adjusted site H was not considered until after completion of the technical reports. The Corps claims that the sampling schemes are general enough to allow a reasonable extrapolation of data to adjusted site H. This is possible but we should be prepared to defend this approach or conduct a separate sampling program for adjusted site H. Much will depend on the comments received by the public and resource agencies.

In any case, chapters III and IV must be updated in the final EIS to include a site description of and probable environmental impacts of dredged material disposal at adjusted site H.

In addition, all of the maps in Chapter III should have all proposed disposal sites located on them if possible. This will allow reviewers to more readily understand the basis of comparison among the disposal options.

Additional discussion of adjusted site H is no longer felt necessary since site H is now being proposed for disposal of fine material.

7. Page III-16, Last Paragraph: The term "species richness" should be defined.

Species richness is a component of species diversity and is expressed as a ratio between total species and total numbers of individuals present. (Odum, Eugene P. 1971. Fundamentals of Ecology. W.B. Saunders Company, Philadelphia, London, Toronto; 574 pp.)

8. Page III-24: The cited Corps study predicted that upland disposal sites would be filled to design capacity within 5 to 10 years. Since the study was conducted 8 years ago, it would seem appropriate to discuss its predictive powers. The final EIS should briefly discuss the capacity of remaining upland disposal sites.

The discussion of upland disposal site capacity has been updated.

9. Page IV-7, First Paragraph, Second Sentence: Add the term "EPA" just before "water quality criteria".

This change has been made in the FEIS.

10. Page IV-19, First Paragraph: Eliminate the last sentence. Change the second paragraph to read: "A site monitoring program will be established as ~~part of~~ the site management plan. The details of this program have not yet been developed, but will be put forward before final site designation. EPA is currently considering a monitoring scheme which provides for periodic sediment quality testing (physical and chemical) and site surveys to detect off-site sediment movement (using bathymetry and sediment traps). Recommendations for monitoring will be solicited from all interested parties."

EPA Region X and the Portland District have developed a monitoring plan. This plan is discussed in Section 4.5 of the FEIS.

11. Page IV-20, First Paragraph: Eliminate parenthetical phrase "(may or may not be adverse)". Last paragraph: Change first sentence to read "Disposal ~~of dredged material in proposed~~ ocean dumping sites would have presently unquantifiable but apparently minor short and long term effects on the productivity of the marine environment."

These changes have been made in the FEIS.

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
Atlanta GA 30333

October 9, 1984

Mr. William C. Shilling
Criteria and Standards Division (WH-585)
Office of Water Regulations and Standards
Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Dear Mr. Shilling:

We have completed our review of the Draft Environmental Impact Statement (EIS) for Coos Bay, Oregon, Dredged Material Disposal Site Designation. We are responding on behalf of the U.S. Public Health Service.

The only known commercial or recreational use of the three preferred sites (sites E, F, and adjusted site H) is marine navigation. Disposal activities should have little effect on this use. Sites E and F are "the least sensitive biological areas of the sites studied," and there is no record of significant impacts associated with historical disposal of type 1 material (material that is very similar to the native sediments in the area) at these sites. Two type 1 sites are apparently needed to reduce mounding and to maintain flexibility of disposal when currents change.

Our major concern involves the third site, adjusted site H, which will be used for disposal of type 2 and 3 material containing fine sediments in suspension and chemical contaminants found in upper bay sediments. Reported elutriate analyses indicate that only ammonium-nitrogen, manganese, and cadmium may be released to fresh seawater in sufficient concentration to "possibly exceed water quality criteria." Considering the dilution factor, it is stated that these concentrations would be well below the levels of concern prior to exceeding the boundaries of the established 4-hour mixing zone. Although impacts are expected to be temporary and minor, it is possible that future contamination could exceed recommended levels and become an important consideration. Therefore, we recommend that periodic monitoring be conducted at this site to determine if EPA sediment and water quality standards are met. A contingency mitigation plan should be developed for use in the event contamination reaches levels of concern after final designation of these disposal sites. This need is substantiated by Nelson et al (1983), whose preliminary estimates (page IV-6) suggest that between 50 and 75 percent of the finer size sediment would remain in suspension when dumped and would be transported from the disposal site by currents. This material would likely contain much of the potential contaminants, therefore, we believe monitoring efforts should be planned.

Site H is now being proposed for the disposal of type 2 and 3 materials. The contaminants are associated with the fine size sediments. The monitoring plan discussed in Section 4.5 of the FEIS would detect the movement of these fine materials outside of site H. If such movement is discovered, plans for additional testing and/or corrective measures will be developed. In addition, the periodic analysis of the dredged material sediments discussed on page xxii of the FEIS will identify any future changes in contaminant levels.

Thank you for the opportunity to review this Draft EIS. Please send us a copy of the Final EIS when it becomes available. If you have any questions concerning our comments, please contact Mr. Ken Holt at FTS 236-4161.

Sincerely yours,

Stephen Margolis

Stephen Margolis, Ph.D.
Chief, Environmental Affairs Group
Environmental Health Services Division
Center for Environmental Health

US Department of Transportation
United States Coast Guard

Commandant
United States Coast Guard

Washington, DC 20593
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Mr. William C. Shilling
Environmental Protection Agency
Office of Water Regulations and Standards
Criteria and Standards Division
401 M Street
Washington, D. C. 20460

Dear Mr. Shilling:

We have reviewed the Draft Environmental Impact Statement concerning the Coos Bay, Oregon, Dredged Materials Disposal Site Designation. We have no comments at this time.

We appreciate the opportunity to assist your efforts in the development of this documentation. We look forward to continued mutual cooperation and coordination of these projects.

Sincerely,

W M McGovern

W. M. McGOVERN
Chief, Environmental Compliance and Review Branch
Planning and Evaluation Staff
By direction of the Commandant

County of Coos

COOS COUNTY COURTHOUSE
Coquille, Oregon 97423
Phone: (503) 396-3121
Ext. [illegible], 225

BOARD OF COMMISSIONERS

Robert A. Emmett
Doc Stevenson
Jack L. Beebe, Sr.

September 19, 1984

William C. Shilling
Criteria and Standards Division (WH-585)
Office of Water Regulations and Standards
Environmental Protection Agency
401 M Street, SW
Washington, D.C. 20460

RE: Comments on "Coos Bay Dredged Material Ocean Disposal Site Designation Draft Environmental Impact Statement"

Dear Mr. Shilling:

Coos County supports the proposed action to designate ocean disposal sites for dredged material. Federal maintenance dredging of the navigation channel is absolutely vital to the economic well-being of the Coos Bay region. As the EIS correctly points out, roughly half of the region's 20,000 jobs are directly or indirectly dependent on shipping activities. Our economy continues to suffer through a prolonged economic recession, and would be devastated if maintenance dredging could not continue because of a lack of suitable disposal sites.

The Coos Bay Estuary Management Plan (CBEMP), which is the basis for all land and water use decisions, including upland and in-bay dredged material disposal, in the Coos Bay estuary region, has been "acknowledged" by the Oregon Land Conservation and Development Commission to be in compliance with its statewide goals and therefore with Oregon's approved Coastal Zone Management Program. As such, the CBEMP is the standard against which all affected projects must be measured for consistency. The project is consistent with the CBEMP because it provides for ocean disposal of dredged materials to supplement and replace the rapidly dwindling supply of upland disposal sites.

Sincerely,
COOS COUNTY BOARD OF COMMISSIONERS

Robert Emmett
Chairman

Absent
Commissioner

Doc Stevenson
Commissioner

Department of Land Conservation and Development

1175 COURT STREET N.E., SALEM, OREGON 97310-0590 PHONE (503) 378-4926

October 23, 1984

William C. Shilling
Criteria and Standards Division (WH-585)
Office of Water Regulations and Standards
Environmental Protection Agency
Washington, D.C. 10460

Dear Mr. Shilling:

I am requesting, pursuant to 15 CFR 930.71(b), a 15-day extension of review time for the Coos Bay, Oregon Dredged Material Disposal Site Designation determination of consistency with the Oregon Coastal Management Program. The new deadline would be November 9, 1984.

Sincerely,

James F. Ross
Director

JFR:PS:sp
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