PREFACE

This investigation of dredge material disposal sites along the Oregon coast was supported by funds from the Oregon Legislature, administered by the Ports Division, Oregon Economic Development Department, and the Planning Assistance to States Program (Section 22, Water Resources Development Act of 1974 as amended), administered by the Portland District, U.S. Army Corps of Engineers (COE). Don Mann, Manager of the Ports Division, needs to be recognized for his support for the investigation. Steve Perkins, Acting Chief of the Waterways Maintenance Section, Portland District was helpful in supporting the COE participation. Curt Loop, Marketing Specialist, Planning Branch, Portland District, administered the project for the COE.

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The investigation was prepared to assist in decision making. The authors' interpretations and recommendations should prove valuable for that purpose. However, neither the investigation sponsors, nor any person acting on their behalf makes any warranty of representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this document, or that the use of any information, apparatus, method, or process disclosed in this document may not infringe on privately owned rights.

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ABSTRACT

This study assessed the availability of dredged material disposal sites for 12 harbors and rivers along the Oregon Coast from the Nehalem River to the Chetco River. The assessment found that there is a functioning system of dredging and available sites in areas where navigation channels are regularly maintained by the U.S. Army Corps of Engineers (COE). The system of disposal sites matched to places where rivers and bays shoal exist because of the enormous effort and budget committed by the COE to secure sites and pay for expensive dredging operations. The system's sites are typically ocean locations, although some rivers have upland sites and a few have in-water sites.

The channels where COE have an active dredging maintenance program are generally in lower rivers of active ports. While navigation channels are congressionally authorized for dredging far upstream of some lower river ports, the COE spends their limited funds only on channels where waterborne commerce is occurring, has recently occurred, or there is a demonstrated indication that it will occur. In areas that do not meet this test, maintenance dredging has not recently taken place and the system of established disposal sites does not exist.

The study found that upland sites may be designated in local comprehensive plans and protected from development both within and beyond areas regularly maintained by the COE, but may not be available for a variety of reasons. Ownership, environmental considerations, or sites filled to capacity are the most frequent reasons that sites are unavailable.

This deficiency, when coupled with the uncertainty of federal funding for COE maintenance dredging, has far reaching effects. Reduced federal budgets will increase COE likelihood to further abandon Ports of lower waterborne commerce usage. Future diversified economic development of coastal communities will be adversely affected by this abandonment.

I. INTRODUCTION

A. Purpose

Cost effective management of dredged material is essential to the economic interests of coastal ports along the Oregon Coast.[1] Twelve harbors that include two deep water shipping ports meet the needs of pleasure craft, commercial fishing vessels, and ocean cargo vessels in this area.

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1. The Oregon Coast is defined to be inclusive of Nehalem River to the Chetco River. All harbors and channels that either have authorized COE maintenance dredging projects or have COE waterway improvements within this area are included in this definition. The Columbia River dredged material disposal sites are currently being investigated in two COE studies: Long Term Management Strategies for the Columbia River Estuary and Reconnaissance Study of Deepening the Columbia and Lower Willamette Federal Navigation Channels.

The twelve harbors are:

- Nehalem Bay
- Tillamook Bay and Bar
- Depoe Bay
- Yaquina Bay and River
- Alsea River
- Siuslaw River
- Umpqua River
- Coos Bay and River
- Coquille River
- Port Orford
- Rogue River
- Chetco River

Periodic dredging is necessary in most of these harbors and their access channels.[2] Dredge material disposal options are circumscribed by many factors, including regulatory requirements and restrictions, site availability, and feasibility, e.g. economic and non-economic constraints.

Dredging near the entrances to the harbors from the Pacific Ocean is usually accomplished by the COE using large hopper dredges and disposal at unconfined, open-water ocean sites. Channels and mooring basins distant from the Ocean require either in-water or upland disposal sites. The upland areas used in the past are often found to be filled to capacity, and because of environmental protection measures, new ones are becoming more difficult to secure. This study is an investigation about the availability of disposal sites to determine whether new initiatives are needed for dredge materials management.[3]

The investigation reviewed currently recognized sites in the dredged material disposal plans included in local comprehensive land use plans. Findings on availability referred to criteria for ownership, physical and environmental characteristics, regulatory approval status, remaining capacity, etc. The investigation used existing information about shoaling depths as compared to authorized navigation channel depths to show demand for sites. Background information about dredging technology, dredge material management, and disposal site regulatory requirements was also included in the investigation's report. In order to reduce the possibility that lack of sites will affect the future economic development of coastal communities, strategies were developed and roles and responsibilities were described.

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2. The investigation adopted a definition for dredged material to be any sediment that is removed from the underwater environment as a result of dredging operations and can include, for example, contaminated and uncontaminated silts, clay, gravel, boulders, and sand.
3. Dredged materials management is defined to be the disposal or re-use of such materials, including the regulatory, technical, environmental, and economic issues that affect the selection of disposal or re-use options.

The investigation's work scope had two elements.

Element 1

- Research all sites designated in dredged material disposal plans developed for local government comprehensive land use plans.
- Investigate through field visits the designated site attributes and prepare availability status reports.
- Assess other sites not mentioned in dredge material disposal plans, discovered through personal communication with local government officials and review of active dredging permits.
- Provide descriptions of dredging technology.
- Summarize investigations and explain any necessary, federal, state, and local legislative, policy, or work effort initiatives that are necessary to overcome availability problems.

Element 2

- Provide historical and most recent 5 year history of COE maintenance dredging activity.
- Assess demand for disposal sites considering COE maintenance dredging program requirements, assuming most cost effective approach for dredging in the reach and that a need exists for dredging to authorized project depths.
- Provide copies of active Section 404/10 permits for activities requiring dredging.
- Review cost implications of dredging techniques, acquiring disposal sites, testing sediment character, securing permits, and monitoring dredging operations.
- Describe regulatory requirements, permitting criteria, program rules, and other authorizations used in carrying out COE maintenance dredging responsibilities in Oregon; list regulatory, resource, coordinating, and cooperating agencies.
- Prepare list of all known and anticipated navigation improvement projects and list current studies in which the COE is sponsoring or participating that may affect the basis for determining future disposal site usage and selection.

B. Background

The waterways and marinas of the Oregon Coast require periodic dredging to continue the important economic and social benefits of deep and shallow draft waterborne commerce and recreational boating. The annual average cost to dredge the waterways incurred by the COE is $6,088,000.[4] However, the following table shows there would be a loss of $45.6 million in regional personal income in 1988 dollars to coastal counties at just the smaller harbors, if entrances and channels are not maintained by dredging.

Dredging has become very expensive due in part to the limited options for disposal of dredged material as well as the extended regulatory process required to obtain the necessary permits for disposal. Permitting is especially burdensome when concentrations of chemicals of concern are found in sediments. The most common option for dealing with contaminated dredged material is to confine it at the time of disposal. This option adds greatly to the cost for dredging.

Three basic disposal options are available for dredging. These include ocean, nearshore, and upland areas. Ocean sites are located in offshore deep-water areas. Unconfined open-water disposal occurs through free fall of released material to the bottom with no subsequent handling. Nearshore disposal sites can be diked aquatic areas with final surface elevation above the water line. Nearshore sites can also be similar to ocean sites whereby disposal is free fall of released material in locations that typically are scoured from natural channel hydraulics.[5] Upland disposal sites are areas on land entirely above the water line. They have usually been considered the most cost effective and environmentally preferred method for handling contaminated dredged material. However, some metal sulfides can oxidize to release heavy metals and sulfuric acid in runoff or leachate. If kept submerged, they remain chemically bound, hence making confined ocean and underwater nearshore sites safer.

The three options are further defined from the need to address sediment contamination levels that are unacceptable for unconfined or conventional disposal. Confined disposal involves follow-up capping with material unsuitable for unconfined open-water disposal or diking nearshore and upland sites. This reduces or eliminates the further distribution of the contaminated material into the environment.

An investigation was needed to inventory the availability of both nearshore and upland disposal sites.[6] Disposal sites along the Oregon coast have previously been inventoried for the purpose of completing comprehensive land use plans. Those plans include protecting the sites against

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4. The costs are calculated from the 1987-1991 five year period. Dredging costs have not been adjusted to current dollars in calculating five year averages. Costs are only for dredging and do not include management, monitoring, and administration costs of the maintenance dredging program.
5. Nearshore sites are also referred to as river in-water sites.
6. The OCZMA has recently sponsored two studies in lower estuaries (Coquille River and Tillamook Bay) to investigate the feasibility of in-water disposal during times of tidal action that would flush the sediments to the ocean. The U.S. Army Corps of Engineers also continues to research in-water sites as a method to lower operating costs of its hopper dredges.

TABLE 1
SUMMARY OF ESTIMATED REGIONAL AND NATIONAL ECONOMIC DEVELOPMENT LOSSES ASSOCIATED WITH DISCONTINUATION OF MAINTENANCE DREDGING AT SHALLOW DRAFT HARBORS ALONG THE OREGON COAST

Dredging Area	RED Losses	NED Losses
Tillamook Bay	$9,441,986	$1,297,095
Depoe Bay	1,399,107	654,246
Yaquina Bay and River	21,461,113	656,770
Siuslaw River	201,731	365,225
Umpqua River	4,356,403	1,929,622
Coquille River	57,581	2,574
Port Orford	1,531,839	365,755
Rogue River	181,945	107,889
Chetco River	6,999,365	1,246,007
Total	$45,631,070	$6,625,183

Source: Northwest Economics Associates. Economic Analysis of Benefits for Coastal Projects, and Economic Analysis of Benefits for Coastal Projects Authorized for Navigation Purposes. U.S. Army Corps of Engineers. January 1988.
Notes: RED and NED refer to regional and national economic development benefits, respectively.

other development until filled to capacity. The comprehensive land use planning effort resulted in cities and counties programming Dredged Material Disposal Plans (DMDP) in the late 1970's and early 1980's. Since then, sites have been filled to capacity and others may not be usable due to changes in permitting regulations and dredging technologies. Planned upland sites that are wetlands will have difficulty receiving fill permits without expensive mitigation usually requiring land acquisition not foreseen when the DMDP's were developed. New nearshore site permitting requires hydrological investigations and sites can receive only material evaluated for contaminants. New dredging projects, existing project maintenance dredging, and changes in dredging technology have superseded the need for other sites.

C. Report Contents

This report has six chapters, in addition to the Introduction Chapter, that present explanatory information about how dredging is accomplished, where disposal sites are located and used, and what strategies are recommended for dealing with availability problems. Chapter II describes the unit costs and equipment used to dredge along the Oregon coast. Chapter III describes generically the three different types of disposal options. Chapter IV explains the regulatory requirements for dredging. Maintenance dredging navigation projects done by the COE, local government, and the private sector are described in Chapter V. Chapter VI presents shoaling problems and the status of existing designated disposal sites. Recommendations about resolving dredge material disposal site availability problems is presented in Chapter VII.

A limited literature search was completed and references are shown in a bibliography chapter. Agency acronyms are identified in a glossary chapter.

II. DREDGING METHODS

A. Selection Criteria

The use of dredging equipment is required to remove sediment from the bay entrances, river shoal areas, and other channel areas such as ship or barge berths and boat basins. The choice of equipment is dependent on the site conditions, such as:

- Waterborne traffic conditions
- Ocean swell and current conditions
- Obstructions in dredging area (pilings, docks, etc.)
- Type of material to be moved (sediment size and presence of contaminants)
- Disposal options or requirements
- Budget
- Consideration of beneficial uses of dredged material
- Dredging site dimensions and restrictions
- Weather

Available methods commonly used along Oregon's coastal waterways include use of suction hopper dredges, hydraulic pipeline dredges, bucket equipment, and fluidizers. Dredging technology used elsewhere in the world includes sidecaster and other special purpose equipment. The COE does have sidecasting capability on some of its hopper dredges, including the *Yaquina* and there has been consideration for using it along the Oregon coast. Each type of dredge has characteristic efficiencies of operation, production, and cost under specific site situations which are detailed below.

Maintenance dredging at harbor entrances and lower river channels in Oregon is generally completed by hopper dredge, while hydraulic pipeline dredges or clamshell dredges are often used in the upper river channels. Any of the mentioned methods may be used for new construction, depending upon the constraints of the particular project and disposal options. Most of the private marina and industrial dredging is completed by bucket dredges or small pipelines. Some boat basins have been constructed by diking and using dry excavation equipment, such as the Bandon boat basin and Depoe Bay.

B. Technology Description

1. Hopper Dredge

A hopper dredge is a self-contained ocean-going vessel that is designed for both hydraulic dredging and the transportation of the dredged material to a placement area. Dredging is accomplished while the vessel is in motion and all dredged materials are placed in the hopper dredge until the hoppers are filled and the dredge is moved to another water area for disposal. Hopper dredges are self-contained and only when the technique of "overflowing" is being used is there any simultaneous discharge of materials at the dredging site. The overflowing process allows solids to concentrate or settle in the hopper while allowing the pumped water to return to the dredge site.

Dredging is accomplished through trailing suction pipes which are equipped with a broad draghead which feeds the materials into the pipes as they are dragged across the bottom. The vessel proceeds to the disposal site where the sediments are released through bottom gates or a split hull. Because of this process, hopper dredges are able to operate where sea conditions would make other methods of dredging impractical.

Some hopper dredges are equipped with pump ashore capability, but most of the time, material in the hoppers is dumped through the bottom of the ship to in-water disposal sites. There are two configurations for hopper dredges. The first has multiple hopper bins running the length of the vessel. While disposing, hopper doors must be opened in a sequence that insures stability of the vessel. The second type of hopper dredge uses a split hull design with a single large bin, which can be opened to rapidly discharge the entire load.

Their efficiencies are highest in sands and lower with fine grained sediments which do not settle as well in the hopper. Hopper dredge efficiency also decreases with long disposal runs, because they are unable to pump material while transiting. The efficiency of pumping decreases when the trailing heads cross trenches between shoals, breaking suction and introducing additional water into the load, which can resuspend sediments in the hopper. Efficiencies may drop to 50 percent of capacity. The two COE owned hopper dredges that work Oregon coast entrances are the *Yaquina* and the *Essayons*. Contract hopper dredges working on the Oregon coast include the *Padre Island*, the *Newport*, and the *Westport*. Other contract hoppers have worked here and could again in the future.

Hopper dredges are used primarily on the Oregon coast for maintenance dredging of the entrance bars and inner channels. The sandy material dredged in those locations is hauled directly to an offshore open ocean disposal site or in-bay sites. Due to weather and bar conditions, hopper dredging is generally completed during the months of April through October.

An average nationwide and industry combined (private and COE) cost in 1989 for hopper dredges is $3.10 per cy. This varies dramatically around the nation and from project to project due to the specific characteristics of the dredging project.

2. Hydraulic Pipeline Dredge

Commonly known as a pipeline dredge, this dredging method consists of a large centrifugal pump which is mounted on a specially designed floating platform. The lower end of the pipeline is equipped with a revolving cutterhead that breaks up the bottom materials so they can be drawn into the suction pipe. The cutterhead is lowered to the bottom on a large hinged ladder that extends forward from the front, or bow of the dredge. The cutterhead depth can be controlled by cables attached to the ladder. The pipeline, which extends from the dredge to the shore or to an area of water disposal, can be either submerged or floating. Newer plastic pipes may float without pontoons.

The pipeline dredge is held in position during dredging by anchors, swing lines, and spuds. Spuds are long piles that extend from masts near each corner of the stern of the dredge. Pipeline dredges come in a variety of sizes. Some are designed to be portable by truck or rail. Hydraulic pipeline dredges are identified by the diameter of the discharge line and generally are available from 8 to 30 inch sizes, generally 8-12" are used for smaller coastal projects. Smaller dredges may be obtained for shallow area work. Pipeline dredge discharge can be in-water or upland. A large pipeline dredge with a 24 to 30 inch diameter discharge pipe can typically pump approximately 5,000 feet without a booster. Pumping distance is dependent on a number of factors, including type of material and horsepower of pump. Use of booster pumps to increase pumping distance increases costs.

Confined disposal areas should be used to allow for adequate settling of solids. This is particularly important when dredging fine material and extra cells may be used to allow additional settling time. Discharge from the disposal area is typically back into the waterway. Unconfined disposal of sand is sometimes used for beach nourishment and/or erosion protection. Sands settle out quickly, causing little more than local turbidity. Because pipeline dredges move material by creating a slurry of 10-20 percent solids, they may not be the best choice for moving contaminated sediments, depending upon the type of contaminant and suitability of the disposal site. In some instances, pipeline dredges are used for dredging contaminated sediments because they can provide economical dredging and upland disposal, where suitable sites are available within a reasonable pumping distance.

The chief advantages of pipeline dredge use include: 1) movement of large volumes of material in a short period of time, and 2) simultaneous dredging and disposal operations. As with hopper dredges, its efficiency is based on maximizing the solids content of the transport slurry. Since the cutterhead works a vertical face in the shoal, the highest efficiencies are achieved when the size of the cutterhead is less than the vertical height of the shoal and when the cutterhead is maintained against the vertical face. A large hydraulic cutterhead would be very efficient in a project with a high bank and inefficient in a thin shoal maintenance project. Typical production rates for pipeline dredges in optimal conditions is 4,000 cy per day for 10 inch and 10,000 cy per day for 16 inch. A 20 inch diameter suction pipe is theoretically capable of removing about 15,000 cy of sediment per day. Pipeline dredges are in operation that can move 30,000 cy of sediment per day.

Major limitations to the use of pipeline dredges are as follows: 1) disposal areas must be relatively close to the dredging operations since costs escalate rapidly as pipeline length is increased beyond 5,000 feet (booster pumps and additional pipe is required), 2) pipeline dredges are unable to operate in open or rough water areas due to susceptibility to damage, high mobilization/demobilization costs, set up time, preparation of disposal site, etc., and 3) buried logs, large boulders and discarded wastes, such as cable, present serious obstacles to the operation of the impeller, 4) the anchoring cables and pipeline can present a temporary obstruction to navigation in confined channels, and 5) disposal sites must be large enough to accommodate the large quantity of water pumped with the sediments and allow adequate settling time.

A representative nationwide cost for pipeline dredges is $2.75, though it can vary greatly, depending on quantity, distance pumped, type, and nature and depth of material. All of the Oregon coast pipeline dredging is accomplished by private contractor dredges.

3. Bucket Dredge

The bucket dredge is well suited to working in confined areas provided there is enough room for attendant barges, and is therefore used in most of the small boat marinas and narrow channels along bays and rivers. They are not self-propelled, so they are not good for working in high traffic areas. Large bucket dredges can be more economical than hopper dredges when dredging fine grained sediments or forced to haul a long distance to disposal. The dredge can continue working filling one barge while another barge is transporting dredge material. Some situations would allow dredge material to be deposited directly to shore. By having the right combination of tugs and scows attendant to the crane, the dredge can work virtually continuously while the scows cycle to the dump. Bucket sizes range from 2-26 cubic yards. They are most economical when dredging small quantities. When quantities exceed several hundred thousand cubic yards, other methods are generally more economical, if suitable disposal sites are available.

Bucket dredges operate efficiently and minimize water quality problems as long as the dredged materials are firm and of medium to heavy grain size. Because consolidated materials come up practically in situ, buckets can also be effective in silts. They are often used in contaminated sediments for this reason. There is still turbidity, however, caused by lifting the bucket through the water. There are special buckets constructed to reduce loss of sediments from the bucket for use in contaminated sediments.

The bucket dredge is an anchored platform with a swinging boom and clamshell that lifts sediments mechanically rather than hydraulically. Horizontal movement of the dredge is achieved by swinging the platform on spuds or using anchor lines. Sometimes the platforms are self propelled barges. Others have tugs and barges provide the collection and transportation supporting system. Sometimes bucket dredges are marine cranes with a bucket available; primary usage may be devoted to other non-dredging construction tasks. Dredged material can either be placed in bottom dump barges that typically have up to 4,000 cy capacity, on deck barges, or directly onto trucks, if the dredge is operating close to shore. Deck barges require material rehandling, while bottom dump barges do not. The latter two of these techniques constitute rehandling of the material, but do allow transportation of the dredged materials to disposal sites some distance from the dredging location.

Two other types of bucket dredges are Sauerman and Dragline dredges. A Sauerman dredging operation uses a highline, a haulback line, and a deadman with pulleys to cast the bucket for dredging and retrieve it. Material dredged is deposited in front of the dredge to be carried away to the final disposal area by either scrapers or loaders and trucks. A dragline dredge has a bucket that is cast out by the crane operator and hauled back. The dragline can deposit material a crane-boom length away, where it is hauled away or worked by earth moving equipment back into the disposal area.

A special type of bucket dredge is the backhoe type. The disposal distance for backhoes is limited by the boom length, but if a backhoe is used in combination with dump scows or trucks, the disposal distance is virtually unlimited. Equipped with specialized buckets, backhoes can be used for many types of navigation project construction. Bucket dredges are also generally utilized for digging in gravel or rock, and for the removal of stumps and debris.

The available sizes for bucket dredges range from capacities of 2 to 26 cubic yards. The theoretical production rate is about 2,500 cy, 10,000 cy, or 15,000 cy per day for 5, 15, and 26 cy buckets, respectively.

A representative cost for maintenance dredging using bucket dredges is $2.00 to $6.50, depending on quantity, haul distance, barge requirements, and mobilization/demobilization costs. Private contractors accomplish dredging using this type of equipment along the Oregon coast. It typically includes placing material on an ocean-going barge and using ocean disposal sites.

4. Fluidizer Dredge

A fluidizer dredge is especially designed to work in sandy, swift current conditions. One system consists of a vessel which works downstream through the shoal. It advances by winching itself on large cables attached to anchors set outside the navigation channel until the desired depth and width is achieved. The sediments are agitated by propwash. Sediments are carried downstream by the river and tidal current.

Fixed system fluidizers have successfully been used in some locations. This equipment is submerged perforated pipes which pump water or air to suspend sediments to be moved by currents or gravity.

Determining a cost for fluidizers is difficult as project reporting does not always include the surveillance of before and after depth changes or volume moved for COE completed dredging. This is sometimes because fluidizers are working in areas subject to rapid sediment movement and infill which make measurement difficult.

All of the maintenance dredging using the fluidizer along the Oregon coast is accomplished by the COE using the *Sandwick*. Sometimes the COE fluidizer *Sandwick* works prior to the hopper dredges in order to give enough depth for their access to the channel.

III. DREDGED MATERIAL MANAGEMENT

It has become more difficult to dispose of dredged material or use it as fill. State and federal agencies have often interpreted the relevant laws differently and, as a result, disagreed about what are and what are not acceptable management options. These disagreements are most strident with respect to contaminated sediments which pose the greatest potential threat to the environment. Regulatory decisions concerning relatively clean dredged materials, on the other hand, are much less controversial because the potential negative impacts associated with managing those materials is greatly reduced. The specific disagreements concerning the management of dredged materials are discussed throughout the document and focus on a variety of issues including the methods used to assess the severity of sediment contamination, the use of "capping" for disposal of contaminated sediments, economic issues surrounding the selection of management options, and the different laws to determine where dredged materials can be disposed of or re-used.

Management of dredged materials must also be accepted by the public, where opposition has virtually foreclosed the use of certain options. For example, due to the strength of the not-in-my-backyard syndrome, it would probably be difficult to secure permits for a new upland site that could accept contaminated dredged materials. Furthermore, management options are usually circumscribed by financial considerations.

Despite the obstacles to managing dredged materials, the need for such management is clear. Over the next fifty years, approximately 15 million cubic yards of marine-dredged material, considering only the most recent five year averages, will be generated along the Oregon coast as a result of navigational and coastal development projects. The proponents of these projects, e.g. federal, state, and private interests, will have to find a means of managing the dredged materials in an environmentally sound and legally acceptable manner.

The available management options fall into three broad categories that are defined by the location in which they take place.[7] Dredged materials can be placed in the open ocean, the nearshore environment, or upland. The specific management options associated with each of these categories, e.g. placing the dredged material in a nearshore containment facility, are discussed below. Whatever option is selected, dredged materials management is a complex process that potentially involves many different actors including federal, state, and local agencies, elected representatives, and the public. This chapter explains the three options for handling dredged material.

A. Open Ocean

Ocean disposal sites are normally designated by the EPA on the authority granted to it by the Marine Protection, Research, and Sanctuaries Act (MPRSA), but sites can, under certain circumstances, be selected by the COE. Before ocean disposal is allowed, two criteria must be met. First, in line with the regulatory requirements of MPRSA, the project proponent must

7. Applicable sections of this chapter are from Dolin and Peterson (1991).

show that all practicable alternatives to ocean disposal have been explored and found unavailable or not feasible according to the regulatory guidelines. Once that criterion is met, the proponent must, also in accord with MPRSA, show that the marine-dredged material in question is physically, chemically, and biologically acceptable for ocean disposal. This acceptability determination is based on an evaluation of marine-dredged material that is prescribed by two complementary sets of testing protocols (EPA/COE 1991, EPA 1989). Together, these protocols require a three-tiered review process. Tier I is to review historical data and to determine if the material is likely to contain contaminants of concern as defined by MPRSA (contaminants of concern include organohalogen compounds, mercury and mercury compounds, and oil of any kind or form). Tier II is a chemical and physical evaluation of the dredged material, including a bulk sediment analysis and elutriate testing, and is often used to determine whether biological testing of the material is required. Tier III is the biological evaluation of the proposed dredged material. During Tier III analyses, two types of biological tests are used - bioaccumulation studies and bioassays on selected test organisms. The former determine whether the contaminants of concern are likely to be concentrated as they are passed up through higher levels of the food web, thereby posing potential health threats to organisms at those higher levels, including humans. Bioassays are intended to measure mortality and sub-lethal effects associated with the accumulation of contaminants in organisms. It is important to note that there is not universal agreement on the species that must be used for bioaccumulation and bioassay tests. Specifically, there is concern about the degree of sensitivity of the organisms presently used and whether they are representative of the uptake characteristics of benthic species normally found in and around disposal sites.

Even if the dredged material fails the testing protocols, there is still the possibility that it will be allowed to be disposed of in ocean waters. This depends on the ultimate status of capping as a viable containment/management strategy and other available management options.

B. Nearshore

Nearshore dredged material management options are those that take place in coastal or territorial waters, also referred to as 404 waters, or directly impact such waters. According to federal law, these waters include harbors, bays, estuaries, and those that extend up to three nautical miles offshore from the mean low tide mark. The management options available in nearshore waters include flow lane, subaqueous borrow pits, containment areas and islands, habitat creation, beach nourishment, and sidecasting.

Before any form of nearshore discharge of marine-dredged material is allowed, the project proponent must meet many regulatory requirements. The proponent must show that all practicable alternatives to nearshore disposal have been explored and found unavailable, not feasible, or would have a greater impact on the environment. The authority for this requirement can come from either MPRSA or the Clean Water Act (CWA). For disposal activities in nearshore waters, with the exception of estuaries and waters landward of the mean low water mark, it is MPRSA that requires the proponent to determine that other, practicable disposal alternatives are unavailable. For disposal activities in estuarine waters or waters landward of the low mean water mark and for fill activities in any nearshore waters, it is the

CWA that requires other alternatives to be explored and found wanting before discharging dredged material. The proponent must also show that the dredged material will be physically, chemically, and biologically acceptable for nearshore disposal. This acceptability determination is comprised of two parts. One part applies the three-tiered evaluation process described in the last section. The other part involves the issuance of a Water Quality Certificate from the ODEQ, which ensures that the proposed dredging and disposal operations will not violate applicable state water quality laws. In addition, there are other federal, state, and local laws that must be complied with before dredged material can be discharged in nearshore waters - the specific laws invoked depend upon the nature of the discharge activity.

1. Flow Lane

Flow lane disposal involves discharge of materials into in-river sites known to naturally scour during periods of tide change or high water conditions. The method is used where sediments, such as clean sand, are amenable to hydraulic dredging and have rapid settling rates, reducing the possibility of creating an extensive turbidity plume. Because flow lane disposal involves direct redeposition of dredged materials into the aquatic environment, it is not suitable for use in areas that contain contaminated sediments.

Flow lane disposal, which is a cheaper management option than transporting material across bars to open ocean sites, is used where channel maintenance and cost-effectiveness are especially important factors. Its advantages lie in eliminating long runs of discharge pipe, the fact that it is an entirely self-contained and mobile operation, and its low manpower requirements. A disadvantage is that benthic habitats may be buried by the discharged materials. Recolonization at these sites is relatively rapid due to the shallow depth of materials which are spread out over a large area.

2. Subaqueous Borrow Pits

Subaqueous borrow pits are created when sediments, usually sand and gravel, are mined from coastal areas such as harbors and bays. These pits may be shallow (a few feet) or quite deep (tens of feet) and can be anywhere from a few acres to many thousands of acres in size.

Disposing of clean material in subaqueous borrow pits is simply the filling of the pit. The pit is now an expanse of sediment that is level with the surrounding topography. Dredged material found to be unsuitable for open water disposal may still be placed in borrow pits if the material can be successfully capped, thereby keeping the contaminants from entering the water column or the food web (capped subaqueous borrow pits are also referred to as contained aquatic disposal sites). The viability of capping borrow pits located nearshore and in shallow water is less controversial than the capping of dredged material at relatively deep open ocean sites. This is largely because there are examples of successful capping operations at relatively shallow nearshore sites.

3. Containment Areas and Islands

As the name implies, the basic purpose of containment areas and islands is to contain dredged material in such a way that negative impacts on the environment are minimized. Containment areas and islands are also referred to as confined disposal facilities. This is done by filling in diked areas with dredged material to create a containment area off the end of an existing land mass or an artificial, containment island. In either case, once the dredged material is placed within the diked area, it is dewatered, usually over a period of years, to create dry land which can then be capped, if necessary, and used for a variety of beneficial purposes, including recreation, habitat creation, or as the foundation for development projects.

Containment areas and islands use a variety of designs to isolate dredged material from the surrounding environment. In some cases, an impermeable layer of clay or plastic is placed in the containment facility to prevent leaching. Other facilities are built upon relatively impermeable native materials, e.g. clay or densely packed sediment, that serve to restrict leaching. And still other facilities rely on the finer sediments of the dredged material itself to collect at the bottom and sides of the facility, thereby serving as a natural and, hopefully, impermeable barrier. Leachate control is not the only concern with respect to containment facilities. There is also a need to control the effluent that can escape over the top of the facility's sides and into the surrounding environment. Most containment facilities use either a weir or a treatment system to regulate the rate and composition of the effluent.

There are containment areas and islands throughout the country and they have been used for both contaminated and uncontaminated marine-dredged material disposal. For example, the Craney Island containment facility off the coast of Virginia has been in operation for over 40 years. And in Tennessee, the Presidents Island-Memphis Harbor Project used sandy dredged material to fill in a diked, 960 acre area that, in turn, became the foundation for over 70 businesses.

Containment facilities can be very expensive. A 1988 COE report estimated that the costs of constructing a 500 acre containment island ranged from a low $9.9 per cubic yard of storage capacity up to $34.7 per cubic yard (1987 dollars), depending on the type of facility (e.g., sand dike or sheet pile cofferdam), the volume of the facility (from 6.6 to 28.2 million cubic yards), and the level of treatment for the facility's effluent (Walski and Schaeffer, April 1988).

The costs of using containment facilities depend on both the operating and maintenance costs of the facility itself and the costs of transporting the dredged material to the facility. The operating and maintenance costs are highly variable and can easily run into the millions of dollars per year for large-scale containment areas or islands. The costs of transportation depend primarily on the location of the facilities vis-a-vis dredging operations. The closer the facility is to the dredging site, the lower the investment in moving the material; conversely, the further the barge has to travel, the higher the cost. If the dredging site and the facility are very near to one another, an additional cost saving can accrue by changing from the use of a mechanical dredge, e.g. a clamshell dredge or dragline, to a hydraulic dredge. Mechanical dredging and the subsequent barging of the dredged material to a facility is more expensive than hydraulic dredging in which the material can simply be "sucked" off the bottom and pumped directly into the facility. Hydraulic dredging can, however, create other problems, such as the need for a longer dewatering period because hydraulically dredged material has a much higher ratio of water to sediment than does mechanically dredged material.

One of the concerns about containment areas and islands has to do with the oxidation state of sediments and the mobility of contaminants. Dredged material may become aerated or oxygenated once it is placed in a containment facility. Unfortunately, in the oxygenated state many of the contaminants, e.g. trace metals, which were formerly bound to the sediment, become mobile. Special precautions, e.g. treatment, may have to be taken for contaminated sediments being placed in a containment facility. Another concern about containment areas and islands is the habitat they replace. This is especially important in light of the national policy of "no-net loss" of wetlands, for many nearshore containment facilities are built in wetland areas.

4. Habitat Creation

As indicated earlier, habitats can be a by-product of containment island or area creation. Habitat can also be created directly through the application of marine-dredged material to nearshore sites. For example, there are numerous instances in which marine-dredged material has been used to create wetlands and various underwater habitats, including reefs, oyster beds, and seagrass meadows.

A salt marsh constructed in South San Francisco Bay is one example of nearshore habitat creation. In the mid-1970's, the COE began filling part of a 100 acre saltwater evaporation pond with clay and associated materials that were dredged from a nearby location. With the fill in place, the COE began planting Pacific Cordgrass and pickleweeds which took hold and subsequently colonized adjacent unvegetated areas. Now the marsh is used by a variety of wildlife, especially shorebirds which feed in the shallows. Another good example is the Miller Sands Island in the Columbia River.

There are many issues that need to be considered in creating nearshore habitats. For example, the new habitat will invariably replace the habitat that was already there. Thus, it is necessary to balance the benefits gained from the new habitat against the lost benefits associated with the old habitat. Also, for the new habitat to be a permanent feature, it is essential that its stability be evaluated. This is done, in part, by assessing the energy conditions present at the site, e.g. wave action and tides, to determine if the created habitat can withstand them. If the new habitat is likely to be washed away by the next moderate storm, it probably shouldn't be built. In general, low energy areas are most suitable for habitat creation.

5. Beach Nourishment

Just as marine-dredged material can be put into some beneficial use in habitat creation, so too can it be beneficially used for beach nourishment. In this process, uncontaminated marine-dredged material is used to replace sand that has been washed offshore or downstream by winds and waves, thereby countering the effects of coastal and river erosion. The key to determining the appropriateness of marine-dredged material for beach nourishment is the nature of the material itself and its compatibility with the substrate found on the beach. Specifically, the biological, physical, and engineering characteristics of the dredged material should match, as closely as possible, the characteristics of the sand found on the beach. For example, only coarse-grained dredged material should be used as nourishment for a coarse-grained sand beach. Without such compatibility, beach nourishment activities will inevitably fail.

Compatible dredged material can be transported to the beach nourishment area by truck, split-hull hopper dredge, or by a hydraulic pipeline that leads directly from the dredging site to the nourishment area. In some cases, the dredged material is placed directly on the beach, while in other instances, it is placed slightly offshore where wave and current action will eventually carry it onto the beach. In certain circumstances, the dredged material will first be dewatered in a holding area before being placed on the beach.

The primary environmental impacts of beach nourishment operations are the direct destruction of organisms due to burial. In many cases, however, that which is initially destroyed by the placement of large quantities of dredged material on the beach is restored over time through recolonization. Experience has also shown that newly renourished beaches appear to be favored nesting places for some shore birds.

6. Sidecasting

Sidecasting is a hydraulic dredging technique that involves the discharge of dredged materials to one side of the channel without interruption of dredging operations. A specially equipped, self-propelled dredge is used for sidecasting, with a discharge pipe that can be swung 90 degrees to either side of the dredge. As sediments are removed from the channel bottom, they are immediately discharged and allowed to settle along one side of the newly dredged channel. The advantages and disadvantages are similar to flow lane disposal discussed above.

C. Upland

Upland management options include habitat creation, commercial re-use, and landfilling or landfill capping. Each of these options is potentially subject to a variety of federal, state, and local laws and regulations, and is further circumscribed by issues of feasibility, such as the availability of landfill space within the state and the difficulties and costs of transporting dredged material from the dredging site to the upland management area.

1. Habitat Creation

Marine-dredged material can be used to create a variety of upland habitats, including forested areas, freshwater wetlands, and meadows. Habitat creation in upland areas shares many characteristics with habitat creation in the nearshore environment (see previous discussion). For example, the creation of new habitat has to be weighed against the destruction of displaced habitat and the energy conditions at the site, e.g., winds and currents, must be factored into the habitat's design.

2. Commercial Reuse

Yet another beneficial use of marine-dredged material is commercial re-use. Dredged material can be used as the foundation for many projects, including shopping malls, residential buildings, roads, and airports. Indeed, there are even specific technologies that solidify and, when necessary, decontaminate dredged materials for use as building components. These technologies have been used in small scale pilot projects, but could potentially be used in larger projects.

Just as is the case with the use of dredged material for habitat creation, it is important to make sure that the material composition is compatible with the planned use. For example, silts, which comprise most of the dredged materials from urban harbors, do not provide good foundations for buildings. Another consideration, especially important when the dredged material is not clean, is the potential for contaminant leaching into the surrounding environment.

3. Landfilling and Landfill Capping

Landfilling and landfill capping may be unlikely use of dredge material along the Oregon coast because of few landfill sites being located in the proximity of dredge areas. It is described here in order to make the discussion of dredge material management as complete as possible.

Clean dredged material can be placed in a sanitary (non-hazardous waste) landfill or used as landfill cover for either a sanitary or a hazardous waste landfill. For sanitary landfills, clean, dredged material is used for two purposes. First, as a daily cover for the garbage that has been dumped and spread over the landfill during the day. The primary purpose of this daily cover, which is usually roughly 0.3 meters thick, is to prevent pathogens from being carried off-site by birds and rodents. The cover also serves as an odor barrier and a fire retardant. The other use of clean, dredged material at sanitary landfills is as a final cover or cap once the landfill reaches capacity and must be closed. Final cover is anywhere from 0.6 to 1.5 meters thick and must be able to support the vegetation that will be planted to improve the site's aesthetics and reduce erosion. The final cover also controls infiltration, percolation, and gas transfer between the landfill and the surrounding environment. The techniques for covering hazardous waste landfills with clean, dredged material are the same as those used in sanitary landfills, except the cover may have to be thicker and less permeable to percolation, infiltration, and gas transfer.

The placement of dredged material in or on landfills can be a very involved and expensive process. It is likely that the dredged material would have to be dewatered, so as to reduce its volume and make it easier to handle, before being transported to the site. Dewatering is usually accomplished by placing the dredged material in a containment area as a slurry where excess water runs off through weirs and is also removed through evaporation. It is important to note that the runoff from such containment areas may be contaminated and therefore need to be treated before being released to the surrounding environment. Another common dewatering practice, especially when fine-grained, clayey materials are concerned, is to construct underdrains within the containment area at the time it is built. The underdrains usually lead to a single drainage point where the effluent can be treated if necessary. Dewatering can be sped up by digging drainage trenches in the containment area and by using flocculants when fine-grained materials are involved. Before the former method can be used, however, the surface of the containment area must be stable enough to support the heavy equipment necessary to dig the trenches. Therefore, it is usually some time after the containment area is filled with the dredged material slurry before drainage trenches can be constructed. It may take up to two years for weirs, evaporation, and/or underdrains to dry out the slurry to the point where it can support the equipment's weight.

Even after dewatering, the dredged material may still be quite wet and may take up a lot of volume, making transportation difficult and expensive. Adding to this expense, at least in the case of landfilling, is the fee that the project proponent must pay before the landfill operator will accept the dredged material at the site. In the case of landfill capping, on the other hand, the landfill operator usually pays to have the dredged material brought to the site. Finally, before any dredged material makes its way to a landfill, a determination must be made that such disposal or use complies with the appropriate state hazardous and/or solid waste regulations, such as the ones that specify allowable salinity and heavy metal concentrations for materials disposed of at landfills.

There are other potential obstacles to upland disposal that go beyond regulatory compliance, cost, transportation, and the logistics of dewatering. First, there is the question of landfill availability. Finding a site to place the dredged material may be problematic. Second, even if space was found, it may not be accessible to the project proponent. The latter would have to get the permission of the landfill owner/operators before disposing of the material in this manner. Third, even if there were accepting owner/operators and a significant amount of available space, proponents of the upland disposal option for dredged material would have to compete with proponents of other projects who want to dispose of material at landfills or apply that material as landfill cover or capping. It may turn out that contaminated dredged material is last in line when it comes to the highly political allocation of upland disposal space. Finally, there is always the potential that public opposition will halt efforts to use landfills for marine-dredged material disposal, especially if the material is contaminated.

IV. REGULATORY REQUIREMENTS

A. Federal

There are many federal, state, and local laws and regulations that pertain to the management of marine-dredged material. At the federal level, the most important laws are the Rivers and Harbors Act of 1899 (33 U.S.C.A. 401 et seq), the Clean Water Act (CWA 33 U.S.C.A. 1251 et seq), the Marine Protection, Research, and Sanctuaries Act (MPRSA - also called the Ocean Dumping Act - 16 U.S.C.A. 1431 et seq), and the National Environmental Policy Act of 1969 (NEPA - 42 U.S.C.A. 4321 et seq). Table 2 describes the most important provisions of these and other federal laws and regulations.

The public interest for constructing and maintaining a federal navigation channel is determined at the time the channel is Congressionally authorized and funded, or approved under one of the Continuing Authorities programs. The public interest for private or other agency dredging activities, other than for Congressionally authorized navigation channels, is determined when a decision is made on a permit application under Section 10 of the River and Harbors Act of 1899 (and Section 404 of the Clean Water Act or Section 103 of the Marine Protection, Research and Sanctuaries Act if a discharge into a Water of the U.S. or ocean is requested). For the work performed by the Corps to construct or maintain a Congressionally authorized navigation channel, all of the required coordination and review procedures are followed with the exception of the final step of issuing a permit. Since the Corps is the permitting agency under these authorities, it is not required to issue itself a permit as the final step of the process.

Section 10 of the Rivers and Harbors Act of 1899 prohibits the alteration or obstruction of any navigable waters in the U.S. unless such activities are authorized by the COE through the issuance of a permit. The navigable waters of the U.S. include those that are subject to tidal action and/or those that are, have been in the past, or may be in the future, suitable for the purpose of interstate or foreign commerce. The COE is also responsible for issuing permits for virtually all dredged material discharge activities in U.S. coastal waters under the authority granted to it by Section 404 of the CWA and Section 103 of MPRSA. U.S. coastal waters include rivers, estuaries, and ocean waters extending up to 200 miles offshore.

The specific jurisdiction of the CWA and the MPRSA depends on the nature and location of the management activity. According to the most recent federal guidance on the subject, any disposal of dredged materials in ocean waters, which extend up to 200 miles offshore from mean low water, falls under the jurisdiction of MPRSA. Thus, a project proponent wanting to dispose of dredged material in ocean waters would have to obtain a Section 103 MPRSA permit from the COE before proceeding. Any discharge of dredged material into the territorial waters for the primary purpose of fill, e.g., beach nourishment or island creation, however, comes under the CWA's jurisdiction. Thus, project proponents seeking to conduct fill operations in the territorial waters must obtain a Section 404 CWA permit from the COE. This distinction between CWA and MPRSA jurisdiction does not hold in all situations. In cases where the COE determines that the materials proposed for discharge as fill into the territorial waters would not be adequately evaluated under the section 404 guidelines of the

TABLE 2
APPLICABLE FEDERAL LAWS AND REGULATORY REQUIREMENTS

Rivers and Harbors Act: Section 10
Section 10 prohibits the alteration or obstruction of any navigable waters in the U.S. unless such activities are authorized by the COE through the issuance of a permit.

National Environmental Policy Act

Projects are reviewed to determine if they are in compliance with the National Environmental Policy Act (NEPA). NEPA compliance is accomplished by the preparation and review of an Environmental Assessment (EA) or Environmental Impact Statement (EIS) and Finding of No Significant Impact (FONSI) or Record of Decision (ROD), respectively, depending on the significance of the action.

Clean Water Act: Section 404

Evaluations are prepared to address the water quality and other environmental effects of all non-ocean disposal activities. These evaluations pertain to in-water disposal and return water from upland disposal sites. The affected states review the 404 Evaluation and issue the Section 401 Water Quality Certification.

Marine Protection, Research, and Sanctuaries Act: Section 103

Evaluations are prepared as to source of material, sediment type and quality, and dredge quantities for activities involving the transportation of dredged material for ocean disposal. (Also known as "Ocean Dumping Act.")

Coastal Zone Management Act: Section 307

Determinations (brief reports addressing the applicable portions of local land use plans to the planned dredging/disposal activities) are prepared for projects occurring within a state's coastal zone or having an effect on the coastal zone. The affected states review the report and evaluate determinations for concurrence.

Fish and Wildlife Coordination Act

Operation and maintenance activities are reviewed on a periodic basis, or in conjunction with a Public Notice, by federal and state Fish and Wildlife Agencies to determine current project compatibility with Fish and Wildlife Resources and Programs.

Endangered Species Act

All activities are reviewed by the U.S. Fish and Wildlife Service and National Marine Fisheries Service to determine if any endangered species or their habitats may be affected. If any species or habitats are identified, a brief biological assessment is prepared, which is reviewed by these agencies. If no effect is determined, the agencies provide an Endangered Species Clearance Letter.

Cultural Resources Acts

There are five different acts pertaining to protection of cultural and archaeological resources. All activities are reviewed to determine potential effects on historical or archaeological resources. A report or letter is prepared describing the effects, or lack of effects, on cultural resources and is reviewed by the State Historic Preservation Officer (SHPO). If no effect is determined, the SHPO then issues the Clearance Letter.

TABLE 2 (continued)

Applicable Regulations

- 33 CFR PART 230 (ER-200-2-2). *Environmental Quality, Policy and Procedures for Implementing NEPA (Corps).* (Includes review and consultation requirements for applicable environmental laws)
- ER 1105-2-50. *Planning, Environmental Resources (Corps)*
  - Ch 2. Fish and Wildlife Considerations
  - Ch 3. Historic Preservation
  - Ch 4. Water Quality
- 40 CFR PARTS 1500-1508. *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act.* (CEQ)
- 40 CFR PART 230. *Guidelines for Specification of Disposal Sites for Dredged or Fill Material.* (EPA)
- 33 CFR PARTS 209, 335, 337, AND 338. *Final Rule for Federal Projects Involving the Disposal of Dredged Material into Waters of the U.S. or Ocean Waters.* (Corps)
- 40 CFR PARTS 220-229. *Environmental Protection Agency Ocean Dumping Regulations and Criteria.* (EPA) (These regulations implement MPRSA, 1972.)
- 36 CFR PART 800. *Advisory Council on Historic Preservation, Protection of Historic Properties.* (ACHP)
- 32 CFR PART 229. *Dept. of Defense, Archaeological Resources Protection Act of 1979, Final Uniform Regulations.* (DOD)
- 33 CFR Parts 320 through 330, Regulatory Programs of the Corps of Engineers; Final Rule, published November 13, 1986.

CWA, it may evaluate that material under the section 103 guidelines. Finally, dredged material discharge in estuarine waters, whether it be for the purposes of disposal or fill, falls under the jurisdiction of the CWA and requires a 404 permit from the COE.

The COE is not the only federal agency involved in the management of marine-dredged material. Using the siting criteria contained in section 102 of MPRSA, the EPA is responsible for designating dredged material disposal sites in ocean waters. If, however, there are no available EPA designated sites or those that are available cannot feasibly be used, the COE, applying the section 102 siting criteria, has the authority to select an ocean site for the disposal of dredged material. In addition to the authority given to it in Section 102, the EPA is responsible for reviewing all of the COE's dredging disposal permits. Should the EPA determine that such permits violate any federal laws or have an unacceptable impact on the environment, it can veto the issuance of the permits.

As for NEPA, it requires that all federal agencies proposing a project are required to evaluate and consider environmental effects of the project. An environmental assessment and Finding of No Significant Impact (FONSI) are used for routine projects with no "significant" impacts. Projects that may "significantly" affect the quality of the human environment have an Environmental Impact Statement (EIS) prepared. Guidelines for what must be included in the EIS have been developed by the CEQ, and are used by federal agencies for evaluation of the environmental, social, economic, historic, and archaeological impacts of a proposed project and its alternatives (which must include a "no-project" alternative). The COE is thus required to prepare an EIS for any project that will have a significant impact. The purpose of the EIS is to ensure that all relevant impacts of the proposed project and its alternatives will be considered early enough so that the minimization and mitigation of potential environmental impacts can be effectively addressed at the design stage, prior to the beginning of construction.

In certain circumstances, the NOAA may get involved in marine-dredged material management. Under Title III of MPRSA, NOAA is responsible for designating National Marine Sanctuaries. If such Sanctuaries encompass an ocean disposal site or if activities at a site outside the Sanctuary boundary negatively impact the resources or quality of the Sanctuary, then NOAA can exercise its regulatory authority and halt or restrict the use of the site.

Other federal agencies involved in marine-dredged material management include the NMFS, which is a division of NOAA, and the USFWS. Under the authority of a variety of laws, the NMFS is responsible for managing and conserving living marine resources, including endangered species, within the U.S. territorial waters. In this capacity, the NMFS reviews COE permits and the EPA designations of ocean dredged material disposal sites to ensure that the potential impacts of such actions on living marine resources are fully considered. Similarly, the USFWS is responsible for reviewing COE permits and the EPA designations to ensure that the potential impacts of such actions on fish and wildlife, especially in wetlands areas, are fully considered.

The level of evaluation or testing varies depending on the nature of the area and the sediments to be dredged and the anticipated disposal method and location. Coarse sediments in high energy areas removed from any known sources of pollutants (discharges or spills) generally do not require any chemical testing (they meet exclusionary requirements outlined in regulations). Fine grained sediments which often build up in quiet water areas are much more likely to bind with or contain contaminants, if they are available in the system, due to their physical and chemical (ionic) characteristics, especially when they have a high organic content. Therefore, additional chemical testing is generally required before dredging these sediments to help determine potential contaminant problems and identify the most suitable disposal practice. If contaminants are present, it may be necessary to conduct biological testing to predict potential environmental impacts of discharging the sediments into an aquatic environment. At Portland District, the level of testing is developed on a project specific basis, following a tiered testing approach based on known information and "reason to believe" contaminants may be present. Testing can be very expensive and require several months to get results when chemical and biological testing are required.

The Portland District normally evaluates sediments in the federal navigation channels it maintains every 5 years, performing physical testing and chemical and occasionally biological testing where appropriate. Testing is performed at infrequently dredged projects on an as needed basis. Most of the sediments dredged at the coastal projects, especially on the entrance bars, meets the exclusionary requirements under the CWA or MPRSA and do not require chemical or biological testing. Chemical testing has been conducted for several coastal projects. Biological testing has also been performed at some of these projects in the past. To date all sediments tested by Portland District at coastal projects have been found to be acceptable for in-water disposal with proper management techniques.

B. State and Local

At the state level there is an equally broad range of legal requirements pertaining to dredging management operations. The ODEQ is also responsible for issuing Water Quality Certificates under the authority of section 401 of the federal CWA (314 C.M.R. 9.00). That section requires any applicant for a federal permit or license to conduct any activity that might result in the discharge of pollutants into state wetlands or waterways (both inland and coastal) to obtain a certificate from the state indicating that the proposed discharge will not violate federal or state water quality standards. According to the ODEQ's Water Quality Certificate Program, the state's marine wetlands and waterways are those between mean high water and the limits of territorial waters. Similarly, the program defines pollutants to include silt, soil, hazardous contaminants, and fill. Thus, virtually any dredging project in the state's marine wetlands or waterways will require a Water Quality Certificate from the ODEQ. The disposal of dredged material beyond the territorial waters, however, does not require a Water Quality Certificate, unless such disposal activities would impact the state's wetlands or waterways.

The Oregon Removal and Fill Law administered by the DSL regulates removal and placement of fill material in waters of the State. The Removal-Fill Permit Program is designed to conserve, protect, and manage Oregon's water resources. The DSL has the responsibility to review applications and to make decisions on whether to issue or deny permits. In its review, the DSL obtains views of affected property owners, governmental agencies, and public interest groups. The policy is to work with applicants to assist in designing worthwhile projects which will have a minimum effect on water resources and adjacent properties. Enforcement of the law is the responsibility of the DSL.

Any activity that proposes removal, filling or alteration of more than 50 cubic yards of material within the bed or banks of the waters of the State requires a permit. Typical examples of projects requiring permits include gravel removal, dredging, gold mining, riprap placement, land reclamation, channel alteration or relocation, pipeline crossings, and construction of bulkheads. Waters of the State of Oregon means all natural waterways, including the Pacific Ocean, rivers, lakes, ponds, and wetlands. Large lakes and perennial rivers of Oregon are well known and clearly understood to be waters of the State of Oregon. However, less well-known waters, such as small natural ponds, intermittent streams, overflow channels, and wetlands are all subject to permit requirements of the Oregon Removal-Fill Law.

The Removal-Fill Permit requirements apply to the bankfull stage of rivers and lakes, the highest measured tide of tidelands, and the line of non-aquatic vegetation of wetlands. Jurisdiction extends across that area typically reached by water during high water stage, but not across the floodplain unless wetlands are present. On the Pacific Ocean coast, the Removal-Fill Law controls removal and fill oceanward of the highest measured tide or the upland vegetation line, whichever is higher.

A completed application is circulated by the DSL to the appropriate local governments, State and federal agencies, adjacent property owners, and interested citizens for review and comments. Comments received help the DSL to evaluate the proposed project against the requirements in law and administrative rules and to prepare operating conditions under which a project may be approved. The DSL's decision time from receipt of a completed application is 45 days for removal projects and 90 days for fill projects. The permit is denied or issued with conditions. Approval of the project by the appropriate local government planning office is necessary before a permit will be issued by the DSL. An applicant is wise to initiate the local approval process before applying for a Removal-Fill Permit.

Under the implementing regulations of the CZMA, each state with an approved coastal zone management program, such as Oregon, has the authority to review federal permitting, licensing, or funding actions or federally conducted activities in the coastal zone to determine whether they are consistent with the state's coastal policies. This is done in Oregon by the DLCD. If the proposed project is found to be consistent with state regulations and policies, the federal agency can proceed with its activity. However, if federal consistency is denied, the project cannot proceed unless the administrator of NOAA overturns the state's denial.

There are still other state laws and programs that could potentially apply to individual marine dredging projects. For example, upland disposal of non-hazardous dredged material in sanitary landfills must be approved by the ODEQ.

The review of dredging and dredged material disposal and fill projects is much less extensive at the local level as opposed to the state and federal levels. Proposed dredge operation plans are reviewed using the estuary management plans and DMDP contained in the local land use comprehensive plans. Estuary plans limit dredging areas to development management units and other certain prescribed circumstances. DMDP identify and protect acceptable disposal areas.

Local government ordinances can set out conditions deemed necessary to protect public interests, including fisheries habitat, land containing shellfish, water supplies, and wildlife habitats. The proposed dredging project may have to be approved by the planning commission subject to appeal to the governing council or board of county commissioners, the Oregon Land Use Board of Appeals, and ultimately the courts. Despite the more limited nature of local, as opposed to state or federal review of dredged materials management, local powers can nevertheless have a significant impact on many stages in the management process, including the selection of upland disposal options and on the use of dredged materials.

V. DREDGING PROJECTS

This chapter describes private sector and local government maintenance dredging projects, as well as the COE maintenance dredging program along the Oregon coast.[8] New waterway improvement projects that may require dredging or affect ongoing maintenance dredging programs are discussed in Chapter VI. Project specific mapping of maintenance dredging projects and disposal sites is shown in Chapter VI.

F. Siuslaw River

1. Description

The Siuslaw River project consists of two jetties, an 18' x 300' entrance channel, a 16' x 200' channel to Florence at rm 5.0, and a 12' deep x 150' wide channel continuing upstream to rm 16.5. At rm 15.8, the channel widens into a turning basin 12' deep x 300' wide x 500' wide. The project was originally authorized in 1910 with later modifications. Annual maintenance dredging is performed on the entrance bar with smaller amounts of dredging taking place on the inner channel at irregular intervals.

2. Maintenance

a. Siuslaw River Entrance

Shoaling at the entrance usually requires dredging to 20 to 22 feet to ensure the authorized depth of 18 feet between dredging operations. The entrance and south jetty shoals build during late winter and spring. The inside range and south turn shoals are affected more by river flood stages than by tidal action. A small hopper dredge removes material from the entrance shoals between April and October.

b. Siuslaw River

Shoaling occurs related to the river moving sand supplied by dunes. In addition, shoaling results from movement of the river's normal bed load.

The lower river, from rm 0.0 to the Highway 101 bridge near rm 4.8 has been dredged by the same hopper dredge that works the entrance bar. Rough seas can force that dredge inside the bar, giving it an opportunity to maintain the lower river channel. The same dredge can also work the shoal shown on Sheet 2. This reach is currently maintained to -12 feet mllw to accommodate existing traffic. Removing shoals above the highway bridge with a hopper dredge is possible, but the lack of in-water disposal sites makes this dredging impractical.

The channel above rm 5.0 requires infrequent maintenance. A pipeline dredge last cleared the shoals at rm 5.5 and 6.0 in 1981. No dredging has been performed above that point since

8. Applicable sections of this chapter are from COE (1991).

1976. Some shoaling occurs from rm 5.0 to rm 16.0, but it has remained fairly constant and is not limiting traffic.

3. Sediment

The sediment at the entrance is sand, with an average in-place density of 2,000 grams/liter. Sediment from the Siuslaw River near rm 1.0 is sand, with an average in-place density of 1,850 grams/liter. The project was last sampled about 1981 and found to be coarse-grained. An updated draft evaluation report is in progress, but there are no pollutant sources in the area to cause concern.

4. Disposal Areas

a. Siuslaw River Entrance

Sediment is deposited at the Siuslaw ocean site located approximately 1.2 miles seaward from the river entrance in an area with low traffic density.

Portland District has prepared a site evaluation report which recommends this site be relocated slightly further offshore. There are two proposed adjusted sites, one south of the channel and the other to the north. The site selection will be dependent on conditions of each potential site and the seasonal sediment transport patterns.

b. Siuslaw River

Material removed with a hopper dredge from the entrance and lower river is deposited in the ocean site. The sand in the Siuslaw River meets environmental requirements for either ocean or estuary disposal.

Upland disposal areas were used in 1981, but have only limited capacity remaining. Upland disposal sites in the vicinity of rm 5.0 and above are at a premium. No suitable upland disposal sites above rm 7.0 are currently available to the COE. If dredging becomes necessary, sites will have to be identified by the local sponsor and environmental evaluations and coordination carried out.

M. Summary of Recent Dredging Activity

Table 3 and Figures 1 and 2 show on a waterway specific basis the most recent five year averages of the cost and amounts dredged (excluding fluidizer dredging) for projects along the Oregon coast. The table and figures show that hopper dredging accounts for 72% of the dredging activity as measured by cost.

TABLE 3
COE MAINTENANCE DREDGING COST AND AMOUNTS DURING 1987-1991 FIVE YEAR PERIOD

Harbors and Waterways	Years	Annual Average	
		Cost	Amount
Nehalem Bay	0	0	0
Tillamook Bay and Bar	0	0	0
Tillamook Bay Boat Basin	1	157	35
Depoe Bay	2	41	8
Yaquina Bay & Harbor	5	864	347
South Beach Marina-Yaquina Bay	1	113	21
Yaquina River	0	0	0
Siuslaw River	5	243	122
Umpqua River	5	646	302
Winchester Bay @ Umpqua River	4	112	16
Smith River	0	0	0
Coos Bay	5	2,822	1,435
Coos and Millicoma Rivers	2	87	14
Charleston Channel	0	0	0
Coquille River	5	154	25
Port Orford	5	157	2
Rogue River	5	261	41
Gold Beach Boat Basin @ Rogue River	5	260	17
Chetco River	5	301	31
Total		$6,218	2,417

Harbors and Waterways	Five Year Summary							
	Annual Average		Contractor Dredge			COE Dredge		
	Years	Amount	Years	Amount	%	Years	Amount	%
Nehalem Bay	0	0	0	0		0	0	
Tillamook Bay and Bar	0	0	0	0		0	0	
Tillamook Bay Boat Basin	1	35	1	35	100%	0	0	0%
Depoe Bay	2	8	2	8	100%	0	0	0%
Yaquina Bay & Harbor	5	347	4	205	59%	5	142	41%
South Beach Marina-Yaquina Bay	1	21	1	21	100%	0	0	0%
Yaquina River	0	0	0	0		0	0	
Siuslaw River	5	122	1	20	16%	4	103	84%
Umpqua River	5	302	1	36	12%	5	266	88%
Winchester Bay @ Umpqua River	4	16	2	16	100%	2	0	0%
Smith River	0	0	0	0		0	0	
Coos Bay	5	1,435	5	788	55%	5	647	45%
Coos and Millicoma Rivers	2	14	2	14	100%	0	0	0%
Charleston Channel	0	0	0	0		0	0	
Coquille River	5	25	0	0	0%	5	25	100%
Port Orford	5	2	3	2	100%	5	0	0%
Rogue River	5	41	1	12	29%	4	29	71%
Gold Beach Boat Basin @ Rogue River	5	17	3	17	100%	4	0	0%
Chetco River	5	31	1	4	13%	5	27	87%
Total		2,417		1,177	47%		1,240	53%

Source: Portland District, U.S. Army Corps of Engineers.

Notes: 1. All figures in thousands.
2. Unit for amounts is thousands of cubic yards.
3. Average annual computation is based on only the years in which dredging occurred.
4. Contractor dredges include: Westport (H), Padre Is (H), Newport (H), Karen (P), Renegade (P), Nehalem (P), Jamison DB10 (C), Great Lakes #53 (C), McAmis (C), Dutra Marine (C). Corps dredges include: Yaquina (H), Essayons (H), and Sandwick (F). Dredges are either hopper (H), pipeline (P), clamshell and barge (C), or fluidizer (F).
5. The fluidizer Sandwick worked in some of the harbors and waterways. Dredging quantities are not provided because the nature of its operations does not require precise measurements.
6. Dredging costs have not been adjusted to real dollars in calculating annual averages.
7. Costs are only for dredging and do not include management, monitoring, and administration costs of the maintenance dredging program.

FIGURE 1
COE AVERAGE MAINTENANCE DREDGING COST AND AMOUNTS DURING 1987-1991 FIVE YEAR PERIOD

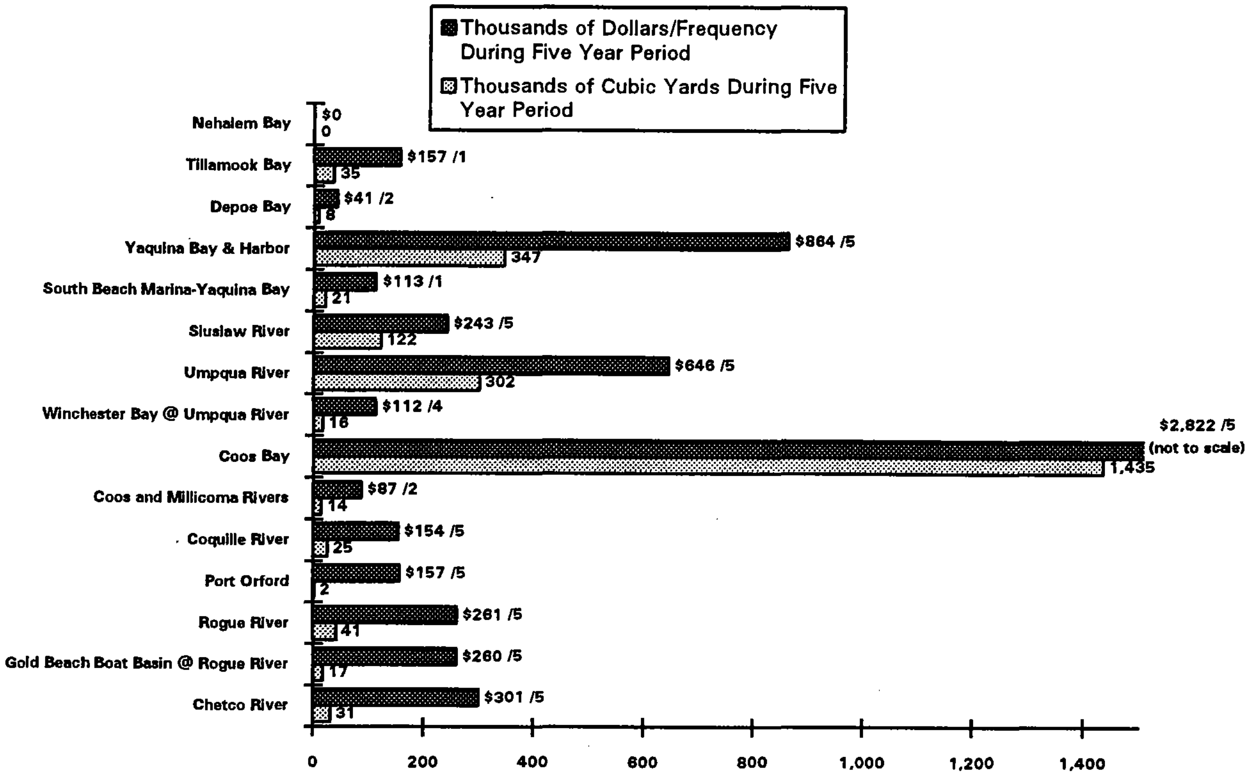
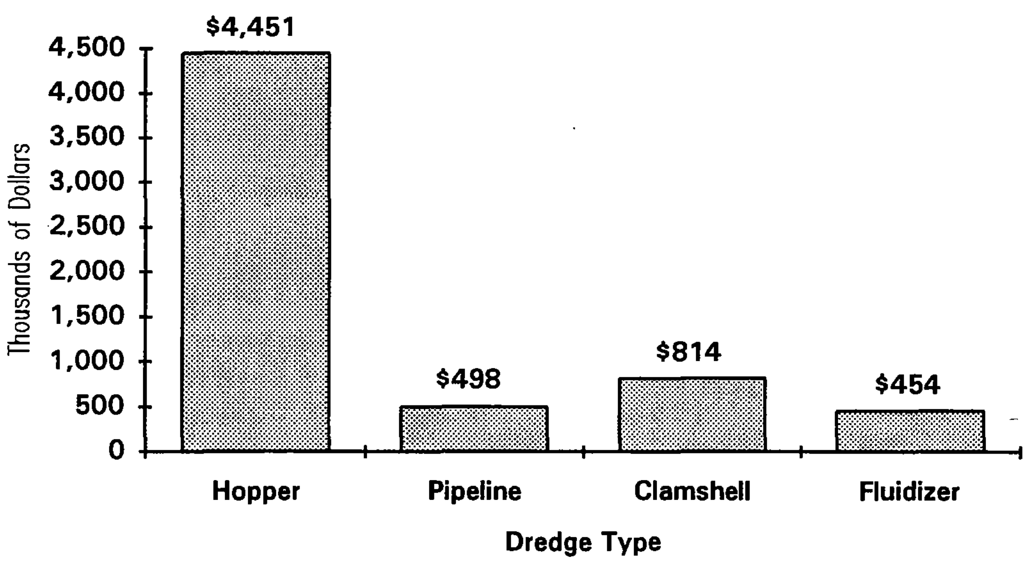
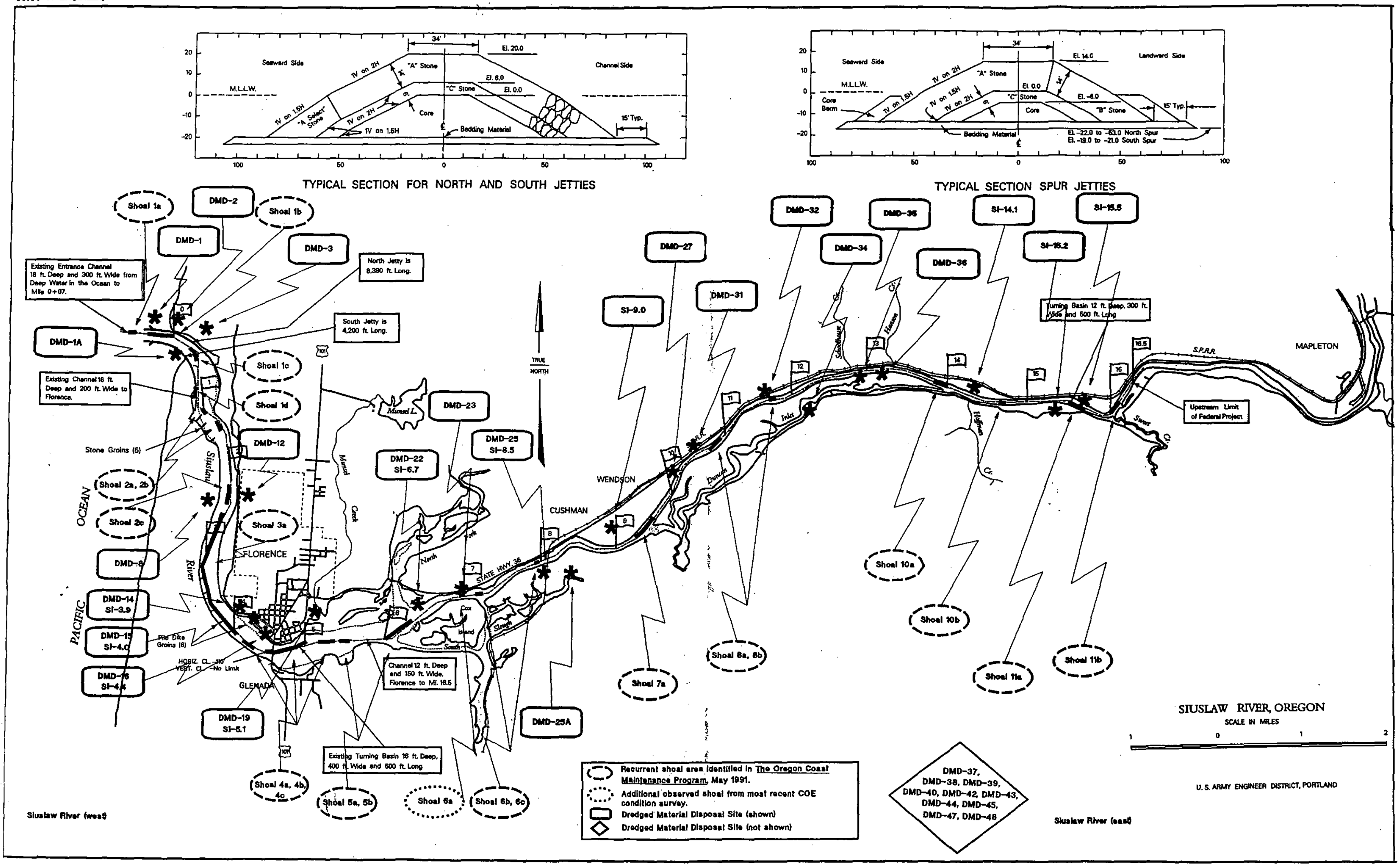


FIGURE 2
COE AVERAGE MAINTENANCE DREDGING COST BY EQUIPMENT TYPES DURING 1987-1991 FIVE YEAR PERIOD



Source: Portland District, U.S. Army Corps of Engineers.
Notes: 1. Columbia River excluded.
2. See Table 3 for other data qualifications.


TYPICAL SECTION FOR NORTH AND SOUTH JETTIES
Seaward Side
Channel Side
M.L.L.W.
"A" Stone
"C" Stone
"A Select" Stone
Core
Bedding Material
El. 20.0
El. 6.0
El. 0.0
1V on 2H
1V on 1.5H
15' Typ.
34'
TYPICAL SECTION SPUR JETTIES
Seaward Side
Landward Side
Core Berm
"B" Stone
El. 14.0
El. -6.0
El. -22.0 to -63.0 North Spur
El. -19.0 to -21.0 South Spur
Existing Entrance Channel 18 ft. Deep and 300 ft. Wide from Deep Water in the Ocean to Mile 0+07.
North Jetty is 8,390 ft. Long.
South Jetty is 4,200 ft. Long.
Existing Channel 16 ft. Deep and 200 ft. Wide to Florence.
Stone Groins (5)
Pile Dike Groins (6)
HORIZ. CL. -110
VERT. CL. -No Limit
Channel 12 ft. Deep and 150 ft. Wide. Florence to Mi. 16.5
Existing Turning Basin 16 ft. Deep, 400 ft. Wide and 600 ft. Long
Turning Basin 12 ft. Deep, 300 ft. Wide and 500 ft. Long
Upstream Limit of Federal Project
Shoal 1a
Shoal 1b
Shoal 1c
Shoal 1d
Shoal 2a, 2b
Shoal 2c
Shoal 3a
Shoal 4a, 4b, 4c
Shoal 5a, 5b
Shoal 6a
Shoal 6b, 6c
Shoal 7a
Shoal 8a, 8b
Shoal 10a
Shoal 10b
Shoal 11a
Shoal 11b
DMD-1
DMD-1A
DMD-2
DMD-3
DMD-8
DMD-12
DMD-14 SI-3.9
DMD-15 SI-4.0
DMD-16 SI-4.4
DMD-19 SI-5.1
DMD-22 SI-6.7
DMD-23
DMD-25 SI-8.5
DMD-25A
DMD-27
DMD-31
DMD-32
DMD-34
DMD-35
DMD-36
SI-9.0
SI-14.1
SI-15.2
SI-15.5
DMD-37, DMD-38, DMD-39, DMD-40, DMD-42, DMD-43, DMD-44, DMD-45, DMD-47, DMD-48
PACIFIC OCEAN
Siuslaw River
FLORENCE
GLENADA
CUSHMAN
WENDSON
MAPLETON
Munsel L.
Munsel Creek
North Fork
Cox Island
South Slough
STATE HWY. 36
S.P.R.R.
Duncan Inlet
Schoolhouse Cr.
Hanson Cr.
Hoffman Cr.
Sweet Cr.
TRUE NORTH
Recurrent shoal area identified in The Oregon Coast Maintenance Program, May 1991.
Additional observed shoal from most recent COE condition survey.
Dredged Material Disposal Site (shown)
Dredged Material Disposal Site (not shown)
SIUSLAW RIVER, OREGON
SCALE IN MILES
U. S. ARMY ENGINEER DISTRICT, PORTLAND
Siuslaw River (west)
Siuslaw River (east)

VI. STATUS OF DREDGE MATERIAL DISPOSAL SITES

A. Disposal Inventories

Field visits, text explanations from DMDP's, and in some cases special reports on dredging requirements were used to compile the following information about disposal site characteristics.

- Location and ownership (county, waterway, river mile, DMDP identifier, COE identifier)
- Physical characteristics (size, capacity, disposal methods)
- Environmental characteristics (wetland inventory designation, use, conflicts)
- Permit approval status (plan and zone, Section 404/10, Removal/Fill Law)
- Subjective availability determination (yes, no, suspect)
- Other comments

The list of sites is from those identified in the COE maintenance dredging program (COE 1991) or in the DMDP's. Appendix B shows the information acquired for each site.

B. Shoaling Occurrences

Shoaling occurrences were investigated along federally authorized project channels using two sources of information. The first source was the COE (1991) which identifies recurrent shoal areas. The second source was reviewing the most recent COE condition surveys. Calculations of quantities of material to be removed to attain authorized project dimensions were made. The actual or likely dredging technology and the actual or potential disposal sites were then assigned for each shoal occurrence. The quantity calculations and site assignments are shown in Tables 4 and 5.

C. Site Demand and Supply

6. Siuslaw River

a. Site Demand

Two new ocean disposal sites proposed due to concern that material may be moving back into entrance. Portland District prepared evaluation report recommending site designation, to be used by EPA for final site designation. Coast Guard has discussed facility dredging. No studies currently underway; harbor of refuge study is dormant. Dredging to Highway 101 Bridge accomplished by hopper with ocean disposal, when performed. Recent dredging has been limited to entrance bar.

b. Site Supply

Entrance:	COE uses ocean disposal. Although in-water disposal has been discussed, there is very limited opportunity for this type of disposal given river hydraulics.
DMD-1:	Beach site would have to be permitted.
DMD-3:	Elevation may preclude its use.
DMD-12:	Previous county landfill. Appears to have limited capacity.
DMD-15:	Limited size, Port letter 8-15-91 says not available due to filled to capacity.
DMD-19:	Port's site filled to capacity. Port would reserve for own dredging as a reuse site.
DMD-22:	The Port has mentioned other sites up North Fork. Private ownership.
DMD-23:	Small site in middle of development property. Not likely for pipeline, maybe clamshell offloading. Unlikely use because of ownership.
DMD-25:	Probable floodplain and wetlands. Large site that would make it attractive if available.
DMD-27:	Probable floodplain and wetlands. Large site that would make it attractive if available.
DMD-32:	Very small and in floodplain.
DMD-36:	Assumed to be too small.

D. Assessment of Site Availability

The reconciliation of disposal site demand and supply is shown on Table 6. Each discovered site is listed by name and identifier. If a site is potentially required, a quantity calculation summarized from Tables 4 and 5 is shown. If a potentially required site is suspect or is not available, a reason is shown. Table 7 tallies the number of sites that are required and are either suspect or not available. The difference is expressed as a deficiency rate and the deficiency amount. It was found that 40% of the sites that potentially could be required were not available.

TABLE 4
SHOALING WITHIN AREAS DREDGED BY THE COE MAINTENANCE DREDGING PROGRAM DURING THE YEARS 1987–1991

Waterway	Sheet Name or Project	COE Sheet	Study Ref.	Location (rm)	5 Year Annual Average	Frequ-ency	Actual or Likely Technology	Actual or Potential Disposal Site
Tillamook Bay and Bar	Tillamook Bay	2	a	3.0 – 3.2	35,000	1	Hopper/pipeline/clams	Ocean
Depoe Bay	Basin	1	a	0.2	8,000	2	Pipeline	DP–1 (Surf zone) [NA]
Depoe Bay	Basin	1	b	0.2			Pipeline	DP–1 (Surf zone) [NA]
Yaquina Bay and Harbor	Entrance	1	a	–0.8 – 0.0	347,000	5	Hopper	Ocean
Yaquina Bay and Harbor	Entrance	1	b	0.0 – 0.4			Hopper	Ocean
Yaquina Bay and Harbor	Harbor	2	a	1.5 – 1.7			Hopper	Ocean
Yaquina Bay and Harbor	Harbor (McLean Pt.)	2	c	2.1			Hopper	Ocean
Yaquina River	Weiser Point to Johnson Slough	1	a	6.5			Pipeline/clamshell	DMD 12
Yaquina River	Weiser Point to Johnson Slough	1	b	7.1			Pipeline/clamshell	DMD 12
Yaquina River	Weiser Point to Johnson Slough	1	c	7.2			Pipeline/clamshell	DMD 12
Yaquina River	Weiser Point to Johnson Slough	1	d	7.3			Pipeline/clamshell	DMD 12
Yaquina River	Flesher Slough to Nutes Slough	2	a	7.8			Pipeline/clamshell	DMD 12
Yaquina River	Flesher Slough to Nutes Slough	2	b	8.5			Pipeline/clamshell	DMD 12
Yaquina River	Flesher Slough to Nutes Slough	2	e	10.0			Pipeline/clamshell	DMD 18
Yaquina River	Amundson Slough to Toledo	3	a	10.6			Pipeline/clamshell	DMD 18
Yaquina River	Amundson Slough to Toledo	3	b	11.2			Pipeline/clamshell	DMD 18
Yaquina River	Amundson Slough to Toledo	3	c	12.0			Pipeline/clamshell	YR–13.0 [NA], DMD 19
Yaquina River	Amundson Slough to Toledo	3	d	12.5			Pipeline/clamshell	YR–13.0 [NA], DMD 19
Yaquina River	Amundson Slough to Toledo	3	e	12.7			Pipeline/clamshell	YR–13.0 [NA], DMD 19
Yaquina River	Amundson Slough to Toledo	3	f	12.9			Pipeline/clamshell	YR–13.0 [NA], DMD 19
Yaquina River	Amundson Slough to Toledo	3	g	13.2			Pipeline/clamshell	YR–13.0 [NA], DMD 19
Yaquina River	Amundson Slough to Toledo	3	h	13.4			Pipeline/clamshell	YR–13.0 [NA], DMD 19
Yaquina River	Butler Bridge to Mill Creek	4	a	14.0			Pipeline/clamshell	DMD 22
Siuslaw River	Entrance	1	a	(0.8)	122,000	5	Hopper	Ocean
Siuslaw River	Entrance	1	b	(0.5)			Hopper	Ocean
Siuslaw River	Entrance	1	c	0.3			Hopper	Ocean
Siuslaw River	Entrance	1	d	0.7			Hopper	Ocean
Siuslaw River	Cannery Hill Reach	2	a	1.0			Hopper	Ocean
Siuslaw River	Cannery Hill Reach	2	b	1.5			Hopper	Ocean
Siuslaw River	Cannery Hill Reach	2	c	2.2			Hopper	Ocean
Siuslaw River	Spruce Point Bend	3	a	2.5 – 4.1			Hopper	Ocean
Siuslaw River	Florence	4	a	4.2			Hopper	Ocean
Siuslaw River	Florence	4	b	5.0			Pipeline	DMD 19
Siuslaw River	Florence	4	c	5.5			Pipeline	DMD 19
Siuslaw River	North Fork Shoal	5	a	5.4			Pipeline	DMD 19
Siuslaw River	North Fork Shoal	5	b	6.3			Pipeline	DMD 22
Siuslaw River	Cushman	6	b	7.2			Pipeline	DMD 25
Siuslaw River	Cushman	6	c	8.1			Pipeline	DMD 25
Siuslaw River	Lower Duncan Inlet	7	a	9.6			Pipeline	DMD 27
Siuslaw River	Midway Dock	8	a	10.8			Pipeline	DMD 31
Siuslaw River	Midway Dock	8	b	11.5			Pipeline	DMD 32
Siuslaw River	Wolf Place	9					Pipeline	DMD 34
Siuslaw River	Thomas Shoal	10	a	13.8			Pipeline	DMD 36
Siuslaw River	Thomas Shoal	10	b	14.3			Pipeline	DMD 36
Siuslaw River	C & D Shoal	11	a	15.5			Pipeline	DMD 36
Siuslaw River	C & D Shoal	11	b	16.1			Pipeline	DMD 36

TABLE 4 (continued)
SHOALING WITHIN AREAS DREDGED BY THE COE MAINTENANCE DREDGING PROGRAM DURING THE YEARS 1987–1991

Waterway	Sheet Name or Project	COE Sheet	Study Ref.	Location (rm)	5 Year Annual Average	Frequency	Actual or Likely Technology	Actual or Potential Disposal Site
Umpqua River	Entrance	1	a	(1.1)	302,000	5	Hopper	Ocean
Umpqua River	Entrance	1	b	(0.8)			Hopper	Ocean
Umpqua River	Entrance	1	c	0.0			Hopper	Ocean
Umpqua River	Salmon Harbor Reach	2	a	1.2			Hopper	0.8 IW [NA]
Umpqua River	Salmon Harbor Reach	2	b	2.3			Hopper	0.8 IW [NA]
Umpqua River	Salmon Harbor Reach	2	c	2.8			Hopper	0.8 IW [NA]
Umpqua River	Salmon Harbor Reach	2	d	3.1			Hopper	0.8 IW [NA]
Umpqua River	Barretts Range	3	a	4.3			Hopper	0.8 IW [NA]
Umpqua River	Mile Six Bar	4	a	5.4			Hopper	6.8 IW, DMD-12
Umpqua River	Mile Six Bar	4	b	5.7			Hopper	6.8 IW, DMD-12
Umpqua River	Mile Six Bar	4	c	6.6			Hopper	6.8 IW, DMD-12
Umpqua River	Mile Six Bar	4	d	7.5			Hopper	6.8 IW, DMD-12
Umpqua River	Cannery Sands Gardiner Paper Mill	5	a	8.0			Hopper	8.9 IW, DMD-13
Umpqua River	Cannery Sands Main Reach	5	b	9.2			Hopper	6.8 IW, DMD-12
Umpqua River	Cannery Sands Main Reach	5	c	9.3			Hopper	6.8 IW, DMD-12
Umpqua River	Reedsport Reach	6	a	9.8			Hopper	8.9 IW, DMD-13
Umpqua River	Reedsport Reach	6	b	10.2			Hopper	8.9 IW, DMD-13
Umpqua River	Reedsport Reach	6	c	11.1			Pipeline	DMD 5/6
Umpqua River	Reedsport Reach	6	d	11.2			Pipeline	DMD 5/6
Umpqua River	Reedsport Reach	6	e	11.5			Pipeline	DMD 5/6
Umpqua River	Winchester Bay E. Basin Entr.	UM-1-	a	0.0	16,000	4	Clamshell/pipeline	0.8 IW or DNRA [NA]
Umpqua River	Winchester Bay W. Basin Entr.	UM-1-	b	0.0			Sandwick/clmshll/ppln	0.8 IW or DNRA [NA]
Smith River	Entrance to Butler Creek	1					Pipeline	DMD-5
Smith River	Butler Creek to Mile 2	2					Pipeline	DMD-5
Smith River	Frantz Creek to Smith River Bridge	3					Pipeline	DMD-7,9
Smith River	At Otter Slough	4					Pipeline	DMD-7,9
Smith River	Otter Slough – Abbott Slough	5					Pipeline	DMD-7,9
Coos Bay	Entrance Ranges	1	a	0.0	1,435,000	5	Hopper	Ocean
Coos Bay	Entrance Ranges	1	b	0.5			Hopper	Ocean
Coos Bay	Entrance Ranges	1	c	1.3			Hopper	Ocean or G
Coos Bay	Coos Bay Ranges	2	a	1.3			Hopper	Ocean or G
Coos Bay	Coos Bay Ranges	2	b	2.0			Hopper	Ocean or G
Coos Bay	Coos Bay Ranges	2	c	2.5			Hopper	Ocean or G
Coos Bay	Coos Bay Ranges	2	d	3.3			Hopper	Ocean or G
Coos Bay	Coos Bay and Empire Ranges	3	a	3.4			Hopper	Ocean or G
Coos Bay	Coos Bay and Empire Ranges	3	b	3.5			Hopper	Ocean or G
Coos Bay	Coos Bay and Empire Ranges	3	c	4.1			Hopper	Ocean or G
Coos Bay	Coos Bay and Empire Ranges	3	d	4.5			Hopper	Ocean or G
Coos Bay	Coos Bay and Empire Ranges	3	e	5.5			Hopper	Ocean or G
Coos Bay	Jarvis Ranges	4	a	6.0			Hopper	Ocean or G
Coos Bay	Jarvis Ranges	4	b	6.5			Hopper	Ocean or G
Coos Bay	Jarvis Ranges	4	c	7.0			Hopper	Ocean or G
Coos Bay	Jarvis Ranges	4	d	8.0			Hopper	Ocean or G or 8.4 IW
Coos Bay	North Bend Turn	5	a	8.3			Hopper	Ocean or G or 8.4 IW
Coos Bay	North Bend Turn	5	b	8.6			Hopper	Ocean or G or 8.4 IW
Coos Bay	North Bend Turn	5	c	9.5			Hopper	Ocean or G or 8.4 IW
Coos Bay	North Bend Ranges	6	a	10.5			Clamshell	Ocean or CB 8.4 IW
Coos Bay	North Bend Ranges	6	b	11.1			Clamshell	Ocean or CB 8.4 IW
Coos Bay	North Bend Ranges	6	c	12.0			Clamshell	Ocean or CB 8.4 IW
Coos Bay	Ferndale and Marshfield Ranges	7	a	12.9			Clamshell	Ocean or CB 8.4 IW
Coos Bay	Ferndale and Marshfield Ranges	7	b	12.8 – 15.1			Clamshell	Ocean or CB 8.4 IW

TABLE 4 (continued)
SHOALING WITHIN AREAS DREDGED BY THE COE MAINTENANCE DREDGING PROGRAM DURING THE YEARS 1987–1991

Waterway	Sheet Name or Project	COE Sheet	Study Ref.	Location (rm)	5 Year Annual Average	Frequency	Actual or Likely Technology	Actual or Potential Disposal Site
Coos Bay	Charleston Channel	CB–1–	a	0.3			Sandwick/hopper	Ocean or G
Coos Bay	Charleston Channel	CB–1–	b	0.7			Sandwick/hopper	Ocean or G
Coos Bay	Charleston Channel	CB–1–	c	1.2			Sandwick/hopper	Ocean or G
Coos River	Marshfield Channel Ranges	1					Pipeline	CR–3.0, DMD–30B
Coos River	Marshfield Channel	2	a	1.5			Pipeline	CR–3.0, DMD–30B
Coos River	Marshfield Channel to Graveyard Pt.	3	a	2.9			Pipeline	CR–3.0, DMD–30B
Coos River	Graveyard Pt. to Vogel Creek	4					Pipeline	CR–3.0, DMD–30B
Coos River	Vogel Creek to McCollum Road	5					Pipeline	CS–8.0
Coos River	McCollum Road to Daggetts Road	6					Pipeline	CS–8.0
Coos River	Daggetts Road to the Junction	7					Pipeline	CS–8.0
Coos River South Fork	Junction to Cemetery	1					Pipeline	CS–8.0
Coos River South Fork	Cemetery to Mile 3	2	a	1.7			Pipeline	CS–8.0
Coos River South Fork	Mile 3 to Rogers Creek	3	b	4.2			Pipeline	CS–8.0
Coos River South Fork	Mile 3 to Rogers Creek	3	c	4.4			Pipeline	CS–8.0
Coos River South Fork	Rogers Creek to Mile 5.8	4	a	5.8			Pipeline	CS–8.0
Coos River South Fork	Mile 5.8 to 7.0	5	a	6.7			Pipeline	CS–8.0
Coos River South Fork	Mile 5.8 to 7.0	5	b	6.0			Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	a	7.2	14,000	2	Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	b	7.3			Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	c	7.5			Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	d	7.8			Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	e	8.0			Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	f	8.7			Pipeline	CS–8.0
Millicoma River	Junction to Mile 1.8	1	a	0.1			Pipeline	CS–8.0
Millicoma River	Junction to Mile 1.8	1	b	0.2			Pipeline	CS–8.0
Millicoma River	Mile 1.8 to 2.8	2	a	2.5			Pipeline	CS–8.0
Millicoma River	Mile 2.8 to 3.8	3	a	2.8			Pipeline	CS–8.0
Millicoma River	Mile 3.8 to 6.25	4	a	5.5			Pipeline	CS–8.0
Millicoma River	Mile 3.8 to 6.25	4	b	6.0			Pipeline	CS–8.0
Millicoma River	Mile 6.25 to Allegany	5	a	7.7			Pipeline	CS–8.0
Millicoma River	Mile 6.25 to Allegany	5	b	8.2			Pipeline	CS–8.0
Coquille River	Entrance	CQ–1–	a	–0.2 – 0.6	25,000	5	Hopper	Ocean
Rogue River	Entrance and Turning Basin	RO–1–	a	–0.5 – 0.2	41,000	5	Hopper	Ocean
Rogue River	Small Boat Basin Access Channel	RO–1–	b	0.0	17,000	5	Pipeline	RO–0.2
Chetco River	Entrance and Barge Turning Basin	CH–1–	a	(0.1)	31,000	5	Hopper/clamshell	Ocean
Chetco River	Entrance and Barge Turning Basin	CH–1–	b	0.1			Hopper/clamshell	Ocean or Port property [NA]

Notes:

1. Shoaling information is from The Oregon Coast Maintenance Program, Portland District U.S. Army Corps of Engineers, May 1991. The shoaling areas are defined to be historic problem areas based on internal operational staff interviews. The disposal sites are the actual permitted sites used by the Corps in their maintenance dredging program.
2. The 5 year duration is 1987–1991.
3. Frequency is the number of years in the 5 year duration in which dredging actually occurred.
4. The dredging technology is the type of equipment that is actually used where dredging occurred or would likely be used if new areas were dredged.
5. The amount is the average annual cubic yards (not including material moved by the dredge *Sandwick)* the COE has dredged during the 5 year duration. The shading indicates the river miles over which the dredging occurred. If blank, then the assigned technology and disposal sites are the equipment and placement areas that would potentially be the most cost effective method for accomplishing dredging.
6. [NA] – Disposal site not designated in local comprehensive plans. However, disposal may be allowed, depending on zone designation and permits.

TABLE 5
SHOALING WITHIN COE AUTHORIZED PROJECT AREAS

Waterway	Sheet Name or Project	COE Sheet	Study Ref.	Location (rm)	Condition Survey Depths: Calculated Amount (cy)	Left Outside Quarter	Middle Half	Right Outside Quarter	Shoal Length	Date of Survey	Project Width	Project Depth	Actual or Likely Technology	Actual or Potential Disposal Site
Nehalem River	Approach	1				(no recent condition survey)								
Tillamook Bay and Bar	Entrance	1	a	0.0	0						50	18	Hopper	Ocean
Tillamook Bay and Bar	Tillamook Bay	2	a	3.0 – 3.2	0								Hopper/ppln/clmshll	Ocean
Tillamook Bay and Bar	Boat Basin Approach	2	b	2.0 – 3.0	0								Pipeline/clamshell	TLA2.0(UD),DMD–1(2)
Tillamook Bay and Bar	Turning Basin	2	c	3.0	108,333	6	12	8	1,300	7/1/91	500	12	Pipeline/clamshell	TLA2.0(UD),DMD–1(2)
Depoe Bay	Basin	1	a	0.2	3,789	7.9	8	6.8	80	8/11/89	550	8	Pipeline	DP–1 (Surf zone) [NA]
Depoe Bay	Basin	1	b	0.2	15,185	7.8	8	8	500	8/11/89	400	8	Pipeline	DP–1 (Surf zone) [NA]
Depoe Bay	Check Dam	1		0.2									Dragline	Upland
Yaquina Bay and Harbor	Entrance	1	a	–0.8 – 0.0	33,333	40	40	39	1,000	6/28/92	400	40	Hopper	Ocean
Yaquina Bay and Harbor	Entrance	1	b	0.0 – 0.4	53,333	30	30	30	2,400	6/28/92	300	30	Hopper	Ocean
Yaquina Bay and Harbor	Harbor	2	a	1.5 – 1.7	0				0	6/4/92			Hopper	Ocean
Yaquina Bay and Harbor	Harbor	2	b	1.7	2,500	30	30	29	100	6/4/92	300	30	Hopper	Ocean
Yaquina Bay and Harbor	Harbor (McLean Pt.)	2	c	2.1	108,889	30	30	30	1,400	6/4/92	1,050	30	Hopper	Ocean
Yaquina Bay and Harbor	S. Beach Marina Small Boat Basi	2	d	1.1	0								Pipeline	DMD–3
Yaquina Bay and Harbor	Mud Flats	3	a	2.9		(no recent condition survey)							Hopper	Ocean
Yaquina River	Weiser Point to Johnson Slough	1	a	6.5	0				0	4/16/91	150	10	Pipeline/clamshell	DMD–12
Yaquina River	Weiser Point to Johnson Slough	1	b	7.1	0	10	10	10	0	4/16/91	150	10	Pipeline/clamshell	DMD–12
Yaquina River	Weiser Point to Johnson Slough	1	c	7.2	2,083	10	9	10	150	4/16/91	150	10	Pipeline/clamshell	DMD–12
Yaquina River	Weiser Point to Johnson Slough	1	d	7.3	0	10	10	10	0	4/16/91	150	10	Pipeline/clamshell	DMD–12
Yaquina River	Flesher Slough to Nutes Slough	2	a	7.8	0	10	10	10	0	4/16/91	150	10	Pipeline/clamshell	DMD–12
Yaquina River	Flesher Slough to Nutes Slough	2	b	8.5	0	10	10	10	0	4/16/91	150	10	Pipeline/clamshell	DMD–12
Yaquina River	Flesher Slough to Nutes Slough	2	c	8.6	7,639	10	9	9	500	4/16/91	150	10	Pipeline/clamshell	DMD–12
Yaquina River	Flesher Slough to Nutes Slough	2	d	9.3	3,750	10	10	9	300	4/16/91	150	10	Pipeline/clamshell	DMD–18
Yaquina River	Flesher Slough to Nutes Slough	2	e	10.0	0	10	10	10	0	4/16/91	150	10	Pipeline/clamshell	DMD–18
Yaquina River	Amundson Slough to Toledo	3	a	10.6	0				0	4/24/91	150	10	Pipeline/clamshell	DMD–18
Yaquina River	Amundson Slough to Toledo	3	b	11.2	0				0	4/24/91	150	10	Pipeline/clamshell	DMD–18
Yaquina River	Amundson Slough to Toledo	3	c	12.0	0				0	4/24/91	150	10	Pipeline/clamshell	YR–13.0[NA], DMD–19
Yaquina River	Amundson Slough to Toledo	3	d	12.5	0				0	4/24/91	150	10	Pipeline/clamshell	YR–13.0[NA], DMD–19
Yaquina River	Amundson Slough to Toledo	3	e	12.7	0				0	4/24/91	150	10	Pipeline/clamshell	YR–13.0[NA], DMD–19
Yaquina River	Amundson Slough to Toledo	3	f	12.9	0				0	4/24/91	150	10	Pipeline/clamshell	YR–13.0[NA], DMD–19
Yaquina River	Amundson Slough to Toledo	3	g	13.2	0				0	4/24/91	150	10	Pipeline/clamshell	YR–13.0[NA], DMD–19
Yaquina River	Amundson Slough to Toledo	3	h	13.4	0				0	4/24/91	150	10	Pipeline/clamshell	YR–13.0[NA], DMD–19
Yaquina River	Butler Bridge to Mill Creek	4	a	14.0	7,500	10	10	9	600	12/9/70	150	10	Pipeline/clamshell	DMD–22
Yaquina River	Depot Slough	1		0.0	77,407	5	7	7	1,900	7/9/91	200	10	Pipeline/clamshell	DMD–20
Siuslaw River	Entrance	1	a	(0.8)	0	18	18	18	0	6/26/92	300	18	Hopper	Ocean
Siuslaw River	Entrance	1	b	(0.5)	33,333	18	18	16	1,200	6/26/92	300	18	Hopper	Ocean
Siuslaw River	Entrance	1	c	0.3	0	16	16	16	0	6/26/92	200	16	Hopper	Ocean
Siuslaw River	Entrance	1	d	0.7	10,000	16	16	15	600	6/26/92	200	16	Hopper	Ocean
Siuslaw River	Cannery Hill Reach	2	a	1.0	0				0	2/27/91	200	16	Hopper	Ocean
Siuslaw River	Cannery Hill Reach	2	b	1.5	0				0	2/27/91	200	16	Hopper	Ocean

TABLE 5 (continued)
SHOALING WITHIN COE AUTHORIZED PROJECT AREAS

Waterway	Sheet Name or Project	COE Sheet	Study Ref.	Location (rm)	Calculated Amount (cy)	Condition Survey Depths: Left Outside Quarter	Condition Survey Depths: Middle Half	Condition Survey Depths: Right Outside Quarter	Condition Survey Depths: Shoal Length	Condition Survey Depths: Date of Survey	Project Width	Project Depth	Actual or Likely Technology	Actual or Potential Disposal Site
Siuslaw River	Cannery Hill Reach	2	c	2.2	25,926	16	16	14	1,400	2/27/91	200	16	Hopper	Ocean
Siuslaw River	Spruce Point Bend	3	a	2.5 – 4.1	295,556	12	14	13	8,400	2/26/91	200	16	Hopper	Ocean
Siuslaw River	Florence	4	a	4.2	133,333	14	14	12	4,000	2/26/91	200	16	Hopper	Ocean
Siuslaw River	Florence	4	b	5.0	75,556	14	9	6	600	2/26/91	400	16	Pipeline	DMD–19
Siuslaw River	Florence	4	c	5.5	31,875	10.75	11	10.5	1,800	2/26/91	150	12	Pipeline	DMD–19
Siuslaw River	North Fork Shoal	5	a	5.4	2,222	12	12	12	200	1/23/90	150	12	Pipeline	DMD–19
Siuslaw River	North Fork Shoal	5	b	6.3	36,667	10.5	11	11.5	2,200	1/23/90	150	12	Pipeline	DMD–22
Siuslaw River	Cushman	6	a	7.0	1,806	12	10	11	100	1/23/90	150	12	Pipeline	DMD–23
Siuslaw River	Cushman	6	b	7.2	0				0	1/23/90	150	12	Pipeline	DMD–25
Siuslaw River	Cushman	6	c	8.1	0				0	1/23/90	150	12	Pipeline	DMD–25
Siuslaw River	Lower Duncan Inlet	7	a	9.6	3,750	11	12	12	300	1/22/90	150	12	Pipeline	DMD–27
Siuslaw River	Midway Dock	8	a	10.8	0				0	1/21/90	150	12	Pipeline	DMD–31
Siuslaw River	Midway Dock	8	b	11.5	0				0	1/21/90	150	12	Pipeline	DMD–32
Siuslaw River	Wolf Place	9			0				0	1/20/90	150	12	Pipeline	DMD–34
Siuslaw River	Thomas Shoal	10	a	13.8	34,722	11	11	10.5	2,000	1/19/90	150	12	Pipeline	DMD–36
Siuslaw River	Thomas Shoal	10	b	14.3	0				0	1/19/90	150	12	Pipeline	DMD–36
Siuslaw River	C & D Shoal	11	a	15.5	40,625	9.5	9	9	1,500	1/19/90	150	12	Pipeline	DMD–36
Siuslaw River	C & D Shoal	11	b	16.1	19,167	11	11	11.5	1,200	1/19/90	150	12	Pipeline	DMD–36
Umpqua River	Entrance	1	a	(1.1)	5,556	26	25	26	300	6/27/92	200	26	Hopper	Ocean
Umpqua River	Entrance	1	b	(0.8)	7,407	26	25	26	400	6/27/92	200	26	Hopper	Ocean
Umpqua River	Entrance	1	c	0.0	0				0	6/27/92	200	22	Hopper	Ocean
Umpqua River	Entrance	1	d	0.7	5,185	19	21.5	20	200	6/27/92	200	22	Hopper	Ocean
Umpqua River	Salmon Harbor Reach	2	a	1.2	1,852	22	21	22	100	5/14/92	200	22	Hopper	0.8 IW [NA]
Umpqua River	Salmon Harbor Reach	2	b	2.3	0				0	5/14/92	200	22	Hopper	0.8 IW [NA]
Umpqua River	Salmon Harbor Reach	2	c	2.8	926	21.5	21.5	21.5	50	5/14/92	200	22	Hopper	0.8 IW [NA]
Umpqua River	Salmon Harbor Reach	2	d	3.1	1,852	22	21	22	100	5/14/92	200	22	Hopper	0.8 IW [NA]
Umpqua River	Barretts Range	3	a	4.3	55,370	20	21	21	2,300	6/25/92	200	22	Hopper	0.8 IW [NA]
Umpqua River	Barretts Range	3	b	5.2	926	22	21	22	50	6/25/92	200	22	Hopper	0.8 IW [NA]
Umpqua River	Mile Six Bar	4	a	5.4	0				0	6/24/92	200	22	Hopper	6.8 IW, DMD–12
Umpqua River	Mile Six Bar	4	b	5.7	19,352	22	21.5	21.5	1,100	6/24/92	200	22	Hopper	6.8 IW, DMD–12
Umpqua River	Mile Six Bar	4	c	6.6	12,037	20	21	21	500	6/24/92	200	22	Hopper	6.8 IW, DMD–12
Umpqua River	Mile Six Bar	4	d	7.5	0				0	6/24/92	200	22	Hopper	6.8 IW, DMD–12
Umpqua River	Cannery Sands Gardiner Paper M	5	a	8.0	66,667	15	22	19	800	6/23/92	500	22	Hopper	8.9 IW, DMD–13
Umpqua River	Cannery Sands Main Reach	5	b	9.2	5,000	22	21.5	22	300	6/23/92	200	22	Hopper	6.8 IW, DMD–12
Umpqua River	Cannery Sands Main Reach	5	c	9.3	0				0	6/23/92	200	22	Hopper	6.8 IW, DMD–12
Umpqua River	Reedsport Reach	6	a	9.8	0				0	12/4/90	200	22	Hopper	8.9 IW, DMD–13
Umpqua River	Reedsport Reach	6	b	10.2	15,556	21.9	21.9	21.9	1,000	12/4/90	200	22	Hopper	8.9 IW, DMD–13
Umpqua River	Reedsport Reach	6	c	11.1	1,019	21	21	22	50	12/4/90	200	22	Pipeline	DMD 5/6
Umpqua River	Reedsport Reach	6	d	11.2	926	22	21	22	50	12/4/90	200	22	Pipeline	DMD 5/6

TABLE 5 (continued)
SHOALING WITHIN COE AUTHORIZED PROJECT AREAS

Waterway	Sheet Name or Project	COE Sheet	Study Ref.	Location (rm)	Calculated Amount (cy)	Condition Survey Depths: Left Outside Quarter	Middle Half	Right Outside Quarter	Shoal Length	Date of Survey	Project Width	Project Depth	Actual or Likely Technology	Actual or Potential Disposal Site
Umpqua River	Reedsport Reach	6	e	11.5	98,519	17	20	20	2,800	12/4/90	200	22	Pipeline	DMD 5/6
Umpqua River	Winchester Bay E. Basin Entr.	UM–1–	a	0.0	11,111	15	16	15	1,200	4/23/92	100	16	Clamshell/pipeline	0.8 IW or DNRA [NA]
Umpqua River	Winchester Bay W. Basin Entr.	UM–1–	b	0.0	10,000	15	16	16	1,200	4/23/92	100	16	Sandwick/clmshll/ppl	0.8 IW or DNRA [NA]
Smith River	Entrance to Butler Creek	1				(no recent condition surve			0	4/30/81			Pipeline	DMD–5
Smith River	Butler Creek to Mile 2	2				(no recent condition surve			0	5/6/81			Pipeline	DMD–5
Smith River	Frantz Creek to Smith River Bridg	3				(no recent condition surve			0	5/11/81			Pipeline	DMD–7,9
Smith River	At Otter Slough	4				(no recent condition surve			0	5/12/81			Pipeline	DMD–7,9
Smith River	Otter Slough – Abbott Slough	5				(no recent condition surve			0	12/14/78			Pipeline	DMD–7,9
Coos Bay	Entrance Ranges	1	a	0.0	140,000	44.9	44.9	44.9	3,000	6/16/92	600	45	Hopper	Ocean
Coos Bay	Entrance Ranges	1	b	0.5	0				0	6/16/92	300	35	Hopper	Ocean
Coos Bay	Entrance Ranges	1	c	1.3	0				0	6/16/92	300	35	Hopper	Ocean or G
Coos Bay	Coos Bay Ranges	2	a	1.3	0				0	3/12/92	300	35	Hopper	Ocean or G
Coos Bay	Coos Bay Ranges	2	b	2.0	0				0	3/12/92	300	35	Hopper	Ocean or G
Coos Bay	Coos Bay Ranges	2	c	2.5	1,528	35	35	32	50	3/12/92	300	35	Hopper	Ocean or G
Coos Bay	Coos Bay Ranges	2	d	3.3	0				0	3/12/92	300	35	Hopper	Ocean or G
Coos Bay	Coos Bay and Empire Ranges	3	a	3.4	0				0	6/17/92	300	35	Hopper	Ocean or G
Coos Bay	Coos Bay and Empire Ranges	3	b	3.5	0				0	6/17/92	300	35	Hopper	Ocean or G
Coos Bay	Coos Bay and Empire Ranges	3	c	4.1	0				0	6/17/92	300	35	Hopper	Ocean or G
Coos Bay	Coos Bay and Empire Ranges	3	d	4.5	0				0	6/17/92	300	35	Hopper	Ocean or G
Coos Bay	Coos Bay and Empire Ranges	3	e	5.5	0				0	6/17/92	300	35	Hopper	Ocean or G
Coos Bay	Jarvis Ranges	4	a	6.0	0				0	7/7/92	300	35	Hopper	Ocean or G
Coos Bay	Jarvis Ranges	4	b	6.5	0				0	7/7/92	300	35	Hopper	Ocean or G
Coos Bay	Jarvis Ranges	4	c	7.0	0				0	7/7/92	300	35	Hopper	Ocean or G
Coos Bay	Jarvis Ranges	4	d	8.0	0				0	7/7/92	300	35	Hopper	Ocean or G or 8.4 IW
Coos Bay	North Bend Turn	5	a	8.3	31,667	35	35	33.5	1,200	7/8/92	300	35	Hopper	Ocean or G or 8.4 IW
Coos Bay	North Bend Turn	5	b	8.6	0				0	7/8/92	300	35	Hopper	Ocean or G or 8.4 IW
Coos Bay	North Bend Turn	5	c	9.5	0				0	7/8/92	400	35	Hopper	Ocean or G or 8.4 IW
Coos Bay	North Bend Ranges	6	a	10.5	0				0	4/1/92	400	35	Clamshell	Ocean or CB 8.4 IW
Coos Bay	North Bend Ranges	6	b	11.1	0				0	4/1/92	400	35	Clamshell	Ocean or CB 8.4 IW
Coos Bay	North Bend Ranges	6	c	12.0	0				0	4/1/92	400	35	Clamshell	Ocean or CB 8.4 IW
Coos Bay	Ferndale and Marshfield Ranges	7	a	12.9	28,889	30	35	35	600	4/7/92	400	35	Clamshell	Ocean or CB 8.4 IW
Coos Bay	Ferndale and Marshfield Ranges	7	b	2.8 – 15.1	20,000	34	35	35	600	4/7/92	400	35	Clamshell	Ocean or CB 8.4 IW
Coos Bay	Charleston Channel	CB–1–	a	0.3	0				0	6/9/92	150	17	Sandwick/hopper	Ocean or G
Coos Bay	Charleston Channel	CB–1–	b	0.7	0				0	6/9/92	150	17	Sandwick/hopper	Ocean or G
Coos Bay	Charleston Channel	CB–1–	c	1.2	2,361	15	13	14	100	6/9/92	150	16	Sandwick/hopper	Ocean or G
Coos River	Marshfield Channel Ranges	1			0				0	4/26/90	50	5	Pipeline	CR–3.0, DMD–30B
Coos River	Marshfield Channel	2	a	1.5	0				0	4/26/90	50	5	Pipeline	CR–3.0, DMD–30B
Coos River	Marshfield Channel to Graveyard	3	a	2.9	0				0	4/24/90	50	5	Pipeline	CR–3.0, DMD–30B
Coos River	Graveyard Pt. to Vogel Creek	4			0				0	4/25/90	50	5	Pipeline	CR–3.0, DMD–30B
Coos River	Vogel Creek to McCollum Road	5			0				0	3/9/83	50	5	Pipeline	CS–8.0

TABLE 5 (continued)
SHOALING WITHIN COE AUTHORIZED PROJECT AREAS

					Condition Survey Depths									
Waterway	Sheet Name or Project	COE Sheet	Study Ref.	Location (rm)	Calculated Amount (cy)	Left Outside Quarter	Middle Half	Right Outside Quarter	Shoal Length	Date of Survey	Project Width	Project Depth	Actual or Likely Technology	Actual or Potential Disposal Site
Coos River	McCollum Road to Daggetts Road	6			0				0	4/26/90	50	5	Pipeline	CS–8.0
Coos River	Daggetts Road to the Junction	7			0				0	4/26/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Junction to Cemetery	1			0				0	4/12/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Cemetery to Mile 3	2	a	1.7	0				0	4/12/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Mile 3 to Rogers Creek	3	a	3.4	1,944	3.5	3.5	3.5	300	4/12/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Mile 3 to Rogers Creek	3	b	4.2	0				0	4/12/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Mile 3 to Rogers Creek	3	c	4.4	0				0	4/12/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Rogers Creek to Mile 5.8	4	a	5.8	0				0	4/12/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Mile 5.8 to 7.0	5	a	6.7	0				0	4/13/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Mile 5.8 to 7.0	5	b	6.0	5,556	4.5	4.5	4.5	1,200	4/13/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	a	7.2	0				0	4/13/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	b	7.3	0				0	4/13/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	c	7.5	0				0	4/13/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	d	7.8	1,667	4	4	4	300	4/13/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	e	8.0	1,111	4	4	4	200	4/13/90	50	5	Pipeline	CS–8.0
Coos River South Fork	Mile 7.0 to Dellwood	6	f	8.7	1,852	4.5	4.5	4.5	400	4/13/90	50	5	Pipeline	CS–8.0
Millicoma River	Junction to Mile 1.8	1	a	0.1	0				0	4/10/90	50	5	Pipeline	CS–8.0
Millicoma River	Junction to Mile 1.8	1	b	0.2	556	4	4	4	100	4/10/90	50	5	Pipeline	CS–8.0
Millicoma River	Mile 1.8 to 2.8	2	a	2.5	0				0	4/11/90	50	5	Pipeline	CS–8.0
Millicoma River	Mile 2.8 to 3.8	3	a	2.8	0				0	4/11/90	50	5	Pipeline	CS–8.0
Millicoma River	Mile 3.8 to 6.25	4	a	5.5	0				0	4/11/90	50	5	Pipeline	CS–8.0
Millicoma River	Mile 3.8 to 6.25	4	b	6.0	0				0	4/11/90	50	5	Pipeline	CS–8.0
Millicoma River	Mile 6.25 to Allegany	5	a	7.7	926	4.5	4.5	4.5	200	7/12/79	50	5	Pipeline	CS–8.0
Millicoma River	Mile 6.25 to Allegany	5	b	8.2	0				0	7/12/79	50	5	Pipeline	CS–8.0
Coquille River	Entrance	CQ–1–	a	–0.2 – 0.6	0				0	7/14/92		13	Hopper	Ocean
Port Orford		PO–1–	a	–	9,759	9	10	12	340	6/30/92	100	16	Sandwick/subm.pum	Beach
Rogue River	Entrance and Turning Basin	RO–1–	a	–0.5 – 0.2	91,667	10	12	11	2,200	7/21/92	300	13	Hopper	Ocean
Rogue River	Small Boat Basin Access Channel	RO–1–	b	0.0	0				0	7/21/92	100	10	Pipeline	RO–0.2
Chetco River	Entrance and Barge Turning Basi	CH–1–	a	(0.1)	1,000	14	14	13	100	7/1/92	120	14	Hopper	Ocean
Chetco River	Entrance and Barge Turning Basi	CH–1–	b	0.1	5,333	12	13	14	400	7/1/92	120	14	Hopper	Ocean
Chetco River	Entrance and Barge Turning Basi	CH–1–	c	0.1	3,556	10	13	12	200	7/1/92	120	14	Hopper	Ocean or Port property [NA]

Notes:

1. Condition Survey Depths are from The Oregon Coast Maintenance Program, Portland District U.S. Army Corps of Engineers, May 1991. The years of the condition surveys are the most recent available in 1992. Most waterways had condition surveys in the Spring 1992.
2. The calculated amount assumes a material removal cut line in the middle of the outside channel quarter and a two foot over dredge of project depth.
3. The dredging technology is the type of equipment that is actually used where dredging occurred or would likely be used if new areas were dredged.
4. The assigned technology and disposal sites are the equipment and placement areas that would potentially be the most cost effective method for accomplishing dredging. See text for description of disposal site availability.
5. [NA] – Disposal site not designated in local comprehensive plans. However, disposal may be allowed, depending on zone designation and permits.

TABLE 6
DISPOSAL SITE AVAILABILITY

Site Name	Site Identifier		Potentially	Reasons for Suspect or Not Available
	DMDP	COE	Required	
Nehalem Bay				
BOAT RAMP	DMD 14A			
SITE 14b				
ED'S MOORAGE	DMD 4			
SITE 5				
SITE 6				
SITE 7				
SITE 8				
SITE 9				
SITE 10				
SITE 11				
SITE 12a, 12b				
SITE 13				
NEDONNA BEACH	DMD 2			
SITE 3				
NTCSD	DMD 15A			
SITE 15b				
SITE 16				
SITE 17				
SITE 18				
SITE 19				
SITE 20				
SITE 21				
SOUTH JETTY	DMD 1			
STATE PARK AIR STRIP	DMD 23			
STATE PARK CAMPGROUND	DMD 24			
STATE PARK MIDDLE	DMD 25			
STATE PARK SOUTH	DMD 26			
SITE 27				
Unnamed.	DMD 1(1)			
Unnamed.	DMD 1(2)			
Unnamed.	DMD 1(26)			
Unnamed.	DMD 1(25)			
Tillamook Bay				
SITE 4				
MEMALOOSE POINT	DMD 5			
SITE 5B				
SITE 6				
SITE 7				
SITE 8				
SITE 9				
SITE 15				
SITE 17				
SITE 18				
SITE 24				
SITE 25A/25B				
SITE 3				
SITE 10				
SITE 10(a)				
SITE 11				
SITE 11(a)				
SITE 13				
SITE 14				
SITE 15(a)				
BARVIEW	DMD 1(26)			
SOUTH JETTY	DMD 1(1)			
KINCHELOE PT.	DMD 1(2)	TLA 2.0(UD)	108,333	
PATTERSON CREEK	DMD 1(12)			
GARIBALDI BOAT BASIN	DMD 1(22)	TM - 3.2		

TABLE 6 (continued)
DISPOSAL SITE AVAILABILITY

Site Name	Site Identifier DMDP	COE	Potentially Required	Reasons for Suspect or Not Available
BIG BARN MARINA		TM - 3.4		
MIAMI RIVER	DMD 1(16)			
Depoe Bay				
SURF ZONE		DP-1	18,974	
Yaquina Bay				
(ocean)			198,056	
BOONE SLOUGH	DMD 16			
BOONE SLOUGH	DMD 15			
COQUILLE POINT	DMD 7			
PUBLISHER'S PAPER	DMD 23			
SINNHUBER	DMD 11			
TOKYO SLOUGH	DMD 19A			
NEWPORT DOCKS	DMD 5			
SOUTH BEACH MARINA	DMD 2			
MARINE SCIENCE CENTER	DMD 4			
RIVERBEND MOORAGE	DMD 10			
RIVERBEND MOORAGE	DMD 9			
NEWPORT PACIFIC	DMD 12		9,722	Small, wetland, floodplain
TOLEDO AIRPORT EAST	DMD 18		3,750	
TOLEDO AIRPORT WEST	DMD 17			
DEPOT SLOUGH	DMD 20		77,407	
TOLEDO	DMD 19	YR - 13.0		
OLALLA CREEK	DMD 22	OS - 0.3	7,500	Wetlands
OS - 0.2				
Siletz Bay				
SILETZ KEYS #1	DMD 1			
SILETZ KEYS #2	DMD 2			
Unnamed.	DMD			
Alsea Bay				
KING SILVER MOORAGE	DMD 1			
FISHIN' HOLE MARINA	DMD 2			
Siuslaw River				
(ocean)			498,148	
DAVIDSON MILL	DMD 47			
DAVIDSON MILL	DMD 37			
DAVIDSON MILL	DMD 48			
DAVIDSON MILL	DMD 42			
DAVIDSON MILL	DMD 40			
MAPLETON	DMD 45			
PERRIN'S LANDING	DMD 38			
PERRIN'S LANDING SOUTH	DMD 39			
RUSSEL'S MARINA	DMD 43			
US PLYWOOD	DMD 44			
NORTH JETTY	DMD 1			
SOUTH JETTY	DMD 1A			
NORTH JETTY ROAD SOUTH	DMD 2			
NORTH JETTY ROAD NORTH	DMD 3			
COUNTY LANDFILL	DMD 12			
DUNES	DMD 8			
SITE 9				
SITE 10				
SI - 3.9				
FLORENCE TREATMENT PLANT WEST	DMD 14			
SI - 4.0				
FLORENCE TREATMENT PLANT SOUTH	DMD 15			
BAY BRIDGE MARINA	DMD 16			
SI - 4.4				
WATERLAND STORAGE	DMD 19	SI - 5.1	109,653	Filled to capacity; reuse only
JOHNSON ROCK	DMD 22	SI - 6.7	36,667	Private ownership

TABLE 6 (continued)
DISPOSAL SITE AVAILABILITY

Site Name	Site Identifier DMDP	COE	Potentially Required	Reasons for Suspect or Not Available
MURPHY MILL	DMD 23		1,806	Private ownership, small
CUSHMAN 1	DMD 25	SI - 9.0		
CUSHMAN 2	DMD 25A			
SITE 26				
CUSHMAN 3	DMD 27		3,750	Wetlands
SITE 30				
MIDWAY DOCK	DMD 31			
MIDWAY DOCKS EAST	DMD 32			
DUNCAN SLOUGH BRIDGE WEST	DMD 34			
DUNCAN ISLAND MIDDLE	DMD 35			
DUNCAN ISLAND NORTH	DMD 36		94,514	Small
SI - 14.1				
SI - 15.2				
SI - 15.5				
Umpqua River				
(ocean)			18,148	
(0.8 IW [NA])			82,037	
IN BAY	DMD 11			
SALMON HARBOR	DMD 1			
INTERNATIONAL PAPER #1	DMD 2	UM - 1.6 IW		
UM - 3.1 IW				
UM - 5.0 IW				
Unnamed.	DMD 12	UM - 6.8 IW	36,389	
Unnamed.	DMD 2			
INTERNATIONAL PAPER #2	DMD 3			
Unnamed.	DMD 13	UM - 8.9 IW	82,222	
LEED'S ISLAND	DMD 4			
BOLON ISLAND #1	DMD 5		50,231	Private, distance
BOLON ISLAND #2	DMD 6		50,231	Private, distance
CHAMPION MILL	DMD 8			
Smith River				
OTTER SLOUGH	DMD 7			
BRAINARD CREEK	DMD 9			
SMITH RIVER	DMD 10			
Coos Bay				
(ocean)			143,889	
BARVIEW WAYSIDE	DMD 3B			
BASTENDORFF BEACH	DMD 1B			
NORTH SPIT	DMD BEACH			
CR - 0.6				
CR - 0.8				
Unnamed.	DMD 4A			
INBAY COOS HEAD	DMD BAY G			
Unnamed.	DMD 36			
Unnamed.	DMD 4A			
CB - 6.2 IW				
NORTH SPIT 2	DMD 4C			
AIRPORT EXTENSION	DMD 9X			
HENDERSON MARSH	DMD 4X			
CB - 8.4 IW			80,556	
INBAY AIRPORT	DMD BAY D			
AIRPORT INTERIOR	DMD 9Y			
SITE 11B				
EAST BAY DRIVE	DMD 15A			
CB - 12.5				
MIDDLE ISLAND	DMD 18A			
CB - 13.5				
SOUTH ISLAND	DMD 18B			
CHRISTENSEN'S RANCH	DMD 30B			

TABLE 6 (continued)
DISPOSAL SITE AVAILABILITY

Site Name	Site Identifier DMDP	Site Identifier COE	Potentially Required	Reasons for Suspect or Not Available
CB - 14.0				
EASTSIDE	DMD 19B			
LOWER ISTHMUS WEST	DMD 25A			
LOWER ISTHMUS EAST	DMD 25			
Coos River				
CMR - 0.3				
CR - 0.6				
CR - 0.6				
CR - 0.8				
CR - 2.1				
CR - 3.0				
CB - 13.5				
CB - 14.0				
Millicoma River				
CS - 0.3				
CMR - 8.125				
Coos River South Fork				
CS - 0.3				
CM - 1.4				
CS - 1.6				
CS - 3.5				
CS - 6.0				
CS - 8.0			13,611	Filled, private
Coquille River				
FERRY CREEK	DMD F			
MOORE MILL	DMD E			
NORTH SPIT	DMD A			
GEORGIA PACIFIC	DMD D			
PROSPER 2	DMD C			
PROSPER 1	DMD B			
Port Orford				
(beach)			9,759	
Rogue River				
(ocean)			91,667	
RO - 0.2				
SOUTH BOAT BASIN	DMD 4			
SOUTH JETTY SURF ZONE	DMD 3			
WEST BOAT BASIN	DMD 5			
NORTH JETTY UPLAND	DMD 1			
SOUTH JETTY UPLAND	DMD 2			
Chetco River				
(ocean)			9,889	
BOAT BASIN 1 (ESWD 2)	DMD 1			
ESWD 6	DMD 2			
ESWD 7	DMD 3			

Source: Study.
Notes: 1. Only sites that are potentially required show quantity calculations.
2. Only sites that are either suspect or not available have reasons shown.

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GLOSSARY

Agencies

OCZMA	Oregon Coastal Zone Management Association
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
DLCD	Oregon Department of Land Conservation and Development
DSL	Oregon Division of State Lands
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
CEQ	President's Council on Environmental Quality
USFWS	U.S. Fish and Wildlife Service

Other

DMDP	Dredge Material Disposal Plans

APPENDIX A

COE MAINTENANCE DREDGING ACTIVITY DURING 1987-1991 FIVE YEAR PERIOD

APPENDIX A
COE MAINTENANCE DREDGING ACTIVITY DURING 1987-1991 FIVE YEAR PERIOD

NEHALEM BAY

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	===============	========	==========	0
88	===============	========	==========	0
89	===============	========	==========	0
90	===============	========	==========	0
91	===============	========	==========	0
		ANNUAL AVERAGE		0
		FIVE YEAR TOTAL		0

TILLAMOOK BAY

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	===============	========	==========	0
88	===============	========	==========	0
89	===============	========	==========	0
90	===============	========	==========	0
91	NEHALEM	P-12 in	ONTRACTO	34,644
		ANNUAL AVERAGE		34,644
		FIVE YEAR TOTAL		34,644

DEPOE BAY

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	KAREN	P-8 in	ONTRACTO	1,456
88	===============	========	==========	0
89	KAREN	P-8 in	ONTRACTO	14,033
90	===============	========	==========	0
91	===============	========	==========	0
		ANNUAL AVERAGE		7,745
		FIVE YEAR TOTAL		15,489

YAQUINA BAY & HARBOR

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	YAQUINA	H-825 cy	CORPS	192,362
87	WESTPORT	H-1,500 cy	ONTRACTO	350,586
88	YAQUINA	H-825 cy	CORPS	101,451
88	NEWPORT	H-4,000 cy	ONTRACTO	223,068
89	YAQUINA	H-825 cy	CORPS	57,296
89	PADRE IS	H-3,600 cy	ONTRACTO	276,511
90	YAQUINA	H-825 cy	CORPS	43,362
90	PADRE IS	H-3,600 cy	ONTRACTO	173,334
91	YAQUINA	H-825 cy	CORPS	316,956
		ANNUAL AVERAGE		346,985
		FIVE YEAR TOTAL		1,734,926

SOUTH BEACH MARINA-YAQUINA BAY

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	===============	========	===========	0
88	===============	========	===========	0
89	===============	========	===========	0
90	===============	========	===========	0
91	NEHALEM	P-12 in	CONTRACTOR	21,104
		ANNUAL AVERAGE		21,104
		FIVE YEAR TOTAL		21,104

SIUSLAW RIVER

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	YAQUINA	H-825 cy	CORPS	215,778
88	YAQUINA	H-825 cy	CORPS	114,465
89	YAQUINA	H-825 cy	CORPS	116,804
90	PADRE IS	H-3,600 cy	CONTRACTOR	99,120
91	YAQUINA	H-825 cy	CORPS	65,931
		ANNUAL AVERAGE		122,420
		FIVE YEAR TOTAL		612,098

UMPQUA RIVER

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	YAQUINA	H-825 cy	CORPS	407,184
88	YAQUINA	H-825 cy	CORPS	371,780
89	YAQUINA	H-825 cy	CORPS	210,009
90	YAQUINA	H-825 cy	CORPS	39,466
90	PADRE IS	H-3,600 cy	CONTRACTOR	180,285
91	YAQUINA	H-825 cy	CORPS	300,704
		ANNUAL AVERAGE		301,886
		FIVE YEAR TOTAL		1,509,428

WINCHESTER BAY @ UMPQUA RIVER

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	===============	========	===========	0
88	JAMISON DB10	C-5 cy	CONTRACTOR	34,109
89	McAmis	C-5 1/2 cy	CONTRACTOR	30,952
90	SANDWICK	F	CORPS	
91	SANDWICK	F	CORPS	
		ANNUAL AVERAGE		16,265
		FIVE YEAR TOTAL		65,061

COOS BAY

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	ANDWICK (Christn Ch	F	CORPS	
87	ESSAYONS	H-6,000 cy	CORPS	297,800
87	YAQUINA	H-825 cy	CORPS	280,192
87	PADRE IS	H-3,600 cy	ONTRACTO	775,781
88	ANDWICK (Christn Ch	F	CORPS	
88	ESSAYONS	H-6,000 cy	CORPS	226,800
88	YAQUINA	H-825 cy	CORPS	362,253
88	GREAT LKS-GL53	C-26 cy	ONTRACTO	692,691
88	NEWPORT	H-4,000 cy	ONTRACTO	475,163
89	ANDWICK (Christn Ch	F	CORPS	
89	YAQUINA	H-825 cy	CORPS	334,542
89	WESTPORT	H-1,500 cy	ONTRACTO	476,915
90	ANDWICK (Christn Ch	F	CORPS	
90	ESSAYONS	H-6,000 cy	CORPS	3,250
90	YAQUINA	H-825 cy	CORPS	402,545
90	PADRE IS	H-3,600 cy	ONTRACTO	350,322
90	GREAT LKS-GL53	C-26 cy	ONTRACTO	411,493
91	ESSAYONS	H-6,000 cy	CORPS	1,165,722
91	YAQUINA	H-825 cy	CORPS	162,771
91	ANDWICK (Christn Ch	F	CORPS	
91&92	DUTRA MARINE	C-24/C-9 cy	ONTRACTO	757,200
	ANNUAL AVERAGE			1,435,088
	FIVE YEAR TOTAL			7,175,440

COOS AND MILLICOMA RIVERS

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	===============	========	==========	0
88	KAREN	P-8 in	ONTRACTO	13,895
89	KAREN	P-8 in	ONTRACTO	14,042
90	===============	========	==========	0
91	===============	========	==========	0
	ANNUAL AVERAGE			13,969
	FIVE YEAR TOTAL			27,937

COQUILLE RIVER

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	YAQUINA	H-825 cy	CORPS	37,999
88	YAQUINA	H-825 cy	CORPS	15,405
89	YAQUINA	H-825 cy	CORPS	13,188
90	YAQUINA	H-825 cy	CORPS	31,812
91	YAQUINA	H-825 cy	CORPS	29,048
	ANNUAL AVERAGE			25,490
	FIVE YEAR TOTAL			127,452

PORT ORFORD

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	SANDWICK	F	CORPS	
87	NEHALEM	SUB-PMP	CONTRACTOR	3,800
88	SANDWICK	F	CORPS	
88	NEHALEM	SUB-PMP	CONTRACTOR	3,095
89	SANDWICK	F	CORPS	
89	NEHALEM	SUB-PMP	CONTRACTOR	1,420
90	SANDWICK	F	CORPS	
91	SANDWICK	F	CORPS	
	ANNUAL AVERAGE			1,663
	FIVE YEAR TOTAL			8,315

ROGUE RIVER

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	YAQUINA	H-825 cy	CORPS	31,531
88	YAQUINA	H-825 cy	CORPS	5,000
89	WESTPORT	H-1,500 cy	CONTRACTOR	59,997
90	YAQUINA	H-825 cy	CORPS	70,429
91	YAQUINA	H-825 cy	CORPS	37,049
91	SANDWICK	F	CORPS	
	ANNUAL AVERAGE			40,801
	FIVE YEAR TOTAL			204,006

GOLD BEACH BOAT BASIN @ ROGUE RIVER

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	SANDWICK	F	CORPS	
87	KAREN	P-8 in	CONTRACTOR	24,130
88	SANDWICK	F	CORPS	
88	KAREN	P-8 in	CONTRACTOR	31,424
89	RENEGADE	P-12 in	CONTRACTOR	30,414
90	SANDWICK (Boat Basin)	F	CORPS	
91	SANDWICK	F	CORPS	
	ANNUAL AVERAGE			17,194
	FIVE YEAR TOTAL			85,968

CHETCO RIVER

FY	DREDGE	TYPE DREDGE	AGENT	CUBIC YARDS
87	YAQUINA	H-825 cy	CORPS	15,164
88	YAQUINA	H-825 cy	CORPS	53,569
88	SANDWICK	F	CORPS	
89	Westport	H-1,500 cy	CONTRACTOR	20,041
89	SANDWICK	F	CORPS	
90	YAQUINA	H-825 cy	CORPS	36,756
90	SANDWICK	F	CORPS	
91	YAQUINA	H-825 cy	CORPS	31,481
91	SANDWICK	F	CORPS	
	ANNUAL AVERAGE			31,402
	FIVE YEAR TOTAL			157,011

APPENDIX B

DREDGE MATERIAL SITE INVENTORIES

Name: DAVIDSON MILL

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):**
DMDP Identifier: DMD 48 | **COE Identifier:** | **COE Sheet:**
Ownership: Sec. 9, Lots 200, 201, 202, 203, 204, 400 (T18, R11)

Physical Characteristics

Size (acres): 22.0 | **Fill Depth (feet):** 8 | **Capacity Remaining (cy):** 275,000
Method: pipeline, 8 to 16 inch

Environmental Characteristics

Wetlands:
Vegetation: pasture, brush, trees
Wildlife:
Conflicts:

Approval Status

Zone: Primary> RR | **Overlay>** | **Other:**
Plan: Rural residential

Comments

Unmapped special shoreland site.

Name: DAVIDSON MILL

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):**
DMDP Identifier: DMD 42 | **COE Identifier:** | **COE Sheet:**
Ownership: Sec. 8 and 9, Lots 700 and 701 (T18, R11)

Physical Characteristics

Size (acres): 14.0 | **Fill Depth (feet):** 10 | **Capacity Remaining (cy):** 225,000
Method: pipeline, 8 to 16 inch

Environmental Characteristics

Wetlands:
Vegetation: pasture
Wildlife:
Conflicts: previously part of floodplain

Approval Status

Zone: Primary> FU | **Overlay>** | **Other:**
Plan: Agriculture

Comments

Unmapped special shoreland site. Considered key.

Name: DAVIDSON MILL

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):**
DMDP Identifier: DMD 47 | **COE Identifier:** | **COE Sheet:**
Ownership: State Highway

Physical Characteristics

Size (acres): 1.7 | **Fill Depth (feet):** 5 | **Capacity Remaining (cy):** 13,600
Method: pipeline, 8 to 16 inch

Environmental Characteristics

Wetlands:
Vegetation: stripped during highway construction work
Wildlife:
Conflicts:

Approval Status

Zone: Primary> F | **Overlay>** | **Other:**
Plan: Natural Resource: Forest

Comments

Unmapped special shoreland site.

Name: DAVIDSON MILL

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	
DMDP Identifier:	DMD 37	**COE Identifier:**		**COE Sheet:**	
Ownership:	Sec. 7, Lots 600, 700 (T18, R11)				

Physical Characteristics

Size (acres):	16.6	**Fill Depth (feet):**	7	**Capacity Remaining (cy):**	187,500
Method:	pipeline, 8 to 16 inch				

Environmental Characteristics

Wetlands:
Vegetation: pastureland
Wildlife: waterfowl, including wood ducks
Conflicts:

Approval Status

Zone: Primary>	--	**Overlay>**		**Other:**
Plan:	Rural/Woodland/Grazing			

Comments

Unmapped special shoreland site. Well suited for local shoals.

Name: DAVIDSON MILL

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	
DMDP Identifier:	DMD 40	**COE Identifier:**		**COE Sheet:**	
Ownership:	Sec. 8, Lots 202 and 800 (T18, R11)				

Physical Characteristics

Size (acres):	2.9	**Fill Depth (feet):**	5	**Capacity Remaining (cy):**	23,500
Method:	pipeline, 8 to 16 inch				

Environmental Characteristics

Wetlands:
Vegetation: none
Wildlife: none
Conflicts:

Approval Status

Zone: Primary>	I	**Overlay>**		**Other:**
Plan:	Industrial			

Comments

Unmapped special shoreland site.

Name: MAPLETON

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	
DMDP Identifier:	DMD 45	**COE Identifier:**		**COE Sheet:**	
Ownership:	Sec. 2, Lots 1200, 1400, 1500, 1600 (T18, R11)				

Physical Characteristics

Size (acres):	3.0	**Fill Depth (feet):**	7	**Capacity Remaining (cy):**	38,900
Method:	pipeline, 8 to 16 inch, or bucket				

Environmental Characteristics

Wetlands:
Vegetation: shrubbery
Wildlife: perching birds, small mammals
Conflicts:

Approval Status

Zone: Primary>	I	**Overlay>**		**Other:**
Plan:	Industrial			

Comments

Unmapped special shoreland site.

Name: PERRIN'S LANDING

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):**
DMDP Identifier: DMD 38 | **COE Identifier:** | **COE Sheet:**
Ownership: Sec. 7, Lot 1100 (T18, R11)

Physical Characteristics

Size (acres): 1.0 | **Fill Depth (feet):** 12 | **Capacity Remaining (cy):** 20,000
Method: pipeline, 8 to 16 inch

Environmental Characteristics

Wetlands:
Vegetation: pasture, brush, blackberries
Wildlife:
Conflicts: chum hatchery must be preserved

Approval Status

Zone: Primary> F | **Overlay>** | **Other:**
Plan: Rural/Woodland/Grazing

Comments

Unmapped special shoreland site. Site 39 better suited.

Name: PERRIN'S LANDING SOUTH

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):**
DMDP Identifier: DMD 39 | **COE Identifier:** | **COE Sheet:**
Ownership: Sec. 7, Lots 100, 200, 1100, and 1301 (T18, R11)

Physical Characteristics

Size (acres): 29.2 | **Fill Depth (feet):** 8 | **Capacity Remaining (cy):** 375,000
Method: pipeline, 8 to 16 inch

Environmental Characteristics

Wetlands:
Vegetation: pasture, trees
Wildlife:
Conflicts:

Approval Status

Zone: Primary> E-25 | **Overlay>** | **Other:**
Plan: Agriculture

Comments

Unmapped special shoreland site.

Name: RUSSEL'S MARINA

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):**
DMDP Identifier: DMD 43 | **COE Identifier:** | **COE Sheet:**
Ownership: Sec. 10, Lot 1012 (T18, R11)

Physical Characteristics

Size (acres): 35.0 | **Fill Depth (feet):** 6 | **Capacity Remaining (cy):** 420,000
Method: pipeline, 8 to 16 inch

Environmental Characteristics

Wetlands:
Vegetation: pasture
Wildlife:
Conflicts: previously part of floodway

Approval Status

Zone: Primary> F | **Overlay>** | **Other:**
Plan: Natural Resource: Forest

Comments

Unmapped special shoreland site.

Name: SITE 10

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):**

DMDP Identifier: | **COE Identifier:** | **COE Sheet:**

Ownership: Lane County

Physical Characteristics

Size (acres): 3.3 | **Fill Depth (feet):** 10 | **Capacity Remaining (cy):** 53,000

Method: hydraulic pipeline, 24 to 27 inch

Environmental Characteristics

Wetlands:

Vegetation: open dune, very little

Wildlife:

Conflicts: open dune

Approval Status

Zone: Primary> | **Overlay>** | **Other:**

Plan: Urban Residential

Comments

Location: North of Siuslaw Pacific Marina, behind existing campground facilities.

Name: SITE 26

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):**

DMDP Identifier: | **COE Identifier:** | **COE Sheet:**

Ownership: Siuslaw River Jersey Farm (Sec. 20, Lot 600, T18S, R11E)

Physical Characteristics

Size (acres): 38.6 | **Fill Depth (feet):** 5 | **Capacity Remaining (cy):** 303,500

Method: pipeline, 24 to 27 inch

Environmental Characteristics

Wetlands:

Vegetation: pastureland

Wildlife: waterfowl

Conflicts: Disposal would eliminate waterfowl feeding and resting area; part of old floodplain

Approval Status

Zone: Primary> | **Overlay>** | **Other:**

Plan: Agriculture

Comments

Name: SITE 9

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):**

DMDP Identifier: | **COE Identifier:** | **COE Sheet:**

Ownership: Sec. 21, Lot 603

Physical Characteristics

Size (acres): 0.8 | **Fill Depth (feet):** 4 | **Capacity Remaining (cy):** 5,200

Method: bucket or clamshell

Environmental Characteristics

Wetlands:

Vegetation: none

Wildlife: none

Conflicts:

Approval Status

Zone: Primary> | **Overlay>** | **Other:**

Plan: Urban Residential

Comments

Location: Siuslaw Pacific Marina Site.

Name: US PLYWOOD

Location and Ownership

County: Lane **Waterway:** Siuslaw River **Location (rm):**
DMDP Identifier: DMD 44 **COE Identifier:** **COE Sheet:**
Ownership: Sec. 9, Lot 100 (T18, R11)

Physical Characteristics

Size (acres): 23.0 **Fill Depth (feet):** 5 **Capacity Remaining (cy):** 180,000
Method: pipeline, 8 to 16 inch

Environmental Characteristics

Wetlands:
Vegetation: pasture, riparian vegetation
Wildlife:
Conflicts: part of old floodplain

Approval Status

Zone: Primary> FU **Overlay>** **Other:**
Plan: Agriculture

Comments

Unmapped special shoreland site.

Name: NORTH JETTY

Location and Ownership

County: Lane **Waterway:** Siuslaw River **Location (rm):** 0.0
DMDP Identifier: DMD 1 **COE Identifier:** **COE Sheet:**
Ownership: State of Oregon

Physical Characteristics

Size (acres): 8.5 **Fill Depth (feet):** 6 **Capacity Remaining (cy):** 80,000
Method: pipeline, 24 to 27 inch

Environmental Characteristics

Wetlands: M2RSNr,M2USN,M2USP
Vegetation: none (open beach area)
Wildlife: fauna associated with sand substrate, Stellar's sea lions just off shore
Conflicts: sand (open beach)

Approval Status

Zone: Primary> /NRC **Overlay>** **Other:**
Plan: Special Study Area: No recommendation

Comments

Stellar's sea lions feed just off shore of this beach; impacts expected to be minimal during disposal operations.

Name: SOUTH JETTY

Location and Ownership

County: Lane **Waterway:** Siuslaw River **Location (rm):** 0.0
DMDP Identifier: DMD 1A **COE Identifier:** **COE Sheet:**
Ownership: State of Oregon

Physical Characteristics

Size (acres): 7.5 **Fill Depth (feet):** 6 **Capacity Remaining (cy):** 70,000
Method: hydraulic pipeline, 24 to 27 inch

Environmental Characteristics

Wetlands: M2USN,M2USP,M2RSNr
Vegetation: none (open beach area)
Wildlife: limited to benthic specialized in-fauna
Conflicts: coordinate with Dunes National Recreation Area; sand (open beach)

Approval Status

Zone: Primary> NR/NRC **Overlay>** **Other:**
Plan: Conservation, recreation, open space

Comments

Name: NORTH JETTY ROAD SOUTH

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	0.1
DMDP Identifier:	DMD 2	**COE Identifier:**		**COE Sheet:**	
Ownership:	State of Oregon				

Physical Characteristics

Size (acres):	12.5	**Fill Depth (feet):**		**Capacity Remaining (cy):**	185,000
Method:	hydraulic pipeline, 24 to 27 inch				

Environmental Characteristics

Wetlands: M2USN,M2USP,PSSC
Vegetation: European beach grass, scotch broom, shore pine
Wildlife: perching birds, small mammals
Conflicts: dunes

Approval Status

Zone: Primary> NRC **Overlay>** **Other:**
Plan: Special Study Area: No recommendation

Comments

Area is designated as a special study area.

Name: NORTH JETTY ROAD NORTH

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	0.3
DMDP Identifier:	DMD 3	**COE Identifier:**		**COE Sheet:**	
Ownership:	State of Oregon				

Physical Characteristics

Size (acres):	9.5	**Fill Depth (feet):**	7	**Capacity Remaining (cy):**	105,000
Method:	hydraulic pipeline, 24 to 27 inch				

Environmental Characteristics

Wetlands: PFOC,E2EMN
Vegetation: beach grass, lupine, shorepine
Wildlife:
Conflicts: dunes

Approval Status

Zone: Primary> /NRC **Overlay>** **Other:**
Plan: Special Study Area: No recommendation

Comments

Harbor of Refuge proposed for intertidal embayment south of disposal site.

Name: COUNTY LANDFILL

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	2.5
DMDP Identifier:	DMD 12	**COE Identifier:**		**COE Sheet:**	
Ownership:	Lane County				

Physical Characteristics

Size (acres):	2.6	**Fill Depth (feet):**	10	**Capacity Remaining (cy):**	42,200
Method:	hydraulic pipeline, 24 to 27 inch				

Environmental Characteristics

Wetlands: Upland
Vegetation: some
Wildlife: some
Conflicts:

Approval Status

Zone: Primary> M **Overlay>** **Other:**
Plan:

Comments

Possibility of using dredged material for landfill covering.

Name: DUNES

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):** 2.5
DMDP Identifier: DMD 8 | **COE Identifier:** | **COE Sheet:**
Ownership:

Physical Characteristics

Size (acres): 143.2 | **Fill Depth (feet):** | **Capacity Remaining (cy):** 3,465,000
Method:

Environmental Characteristics

Wetlands: E2USP
Vegetation:
Wildlife:
Conflicts:

Approval Status

Zone: Primary> NR | **Overlay>** | **Other:**
Plan:

Comments

Name: SI - 3.9

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):** 3.9
DMDP Identifier: | **COE Identifier:** | **COE Sheet:** 3, 4
Ownership:

Physical Characteristics

Size (acres): | **Fill Depth (feet):** | **Capacity Remaining (cy):**
Method:

Environmental Characteristics

Wetlands: E2EMN
Vegetation:
Wildlife:
Conflicts:

Approval Status

Zone: Primary> | **Overlay>** | **Other:**
Plan:

Comments

Name: FLORENCE TREATMENT PLANT WEST

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):** 4.0
DMDP Identifier: DMD 14 | **COE Identifier:** | **COE Sheet:**
Ownership: Port of Siuslaw/Private/County

Physical Characteristics

Size (acres): 3.0 | **Fill Depth (feet):** 4 | **Capacity Remaining (cy):** filled
Method: pipeline, 8 to 16 inch

Environmental Characteristics

Wetlands: E2EMN
Vegetation: beach grass, pines
Wildlife: limited
Conflicts: sand

Approval Status

Zone: Primary> RR | **Overlay>** | **Other:**
Plan:

Comments

Name: SI - 4.0

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	4
DMDP Identifier:		**COE Identifier:**		**COE Sheet:**	3, 4
Ownership:					

Physical Characteristics

Size (acres):		**Fill Depth (feet):**		**Capacity Remaining (cy):**	
Method:					

Environmental Characteristics

Wetlands: E2EMN
Vegetation:
Wildlife:
Conflicts:

Approval Status

Zone: Primary>		**Overlay>**		**Other:**	
Plan:					

Comments

Name: FLORENCE TREATMENT PLANT SOUTH

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	4.1
DMDP Identifier:	DMD 15	**COE Identifier:**		**COE Sheet:**	
Ownership:	Private/City of Florence/Port of Siuslaw				

Physical Characteristics

Size (acres):	4.5	**Fill Depth (feet):**	3	**Capacity Remaining (cy):**	filled
Method:	pipeline, 8 to 16 inch				

Environmental Characteristics

Wetlands: E1UBL,E2EMN
Vegetation: beach grass, pines
Wildlife: moderate
Conflicts:

Approval Status

Zone: Primary>	RR	**Overlay>**		**Other:**	
Plan:					

Comments

Other tax lots owned by the Port of Siuslaw.

Name: BAY BRIDGE MARINA

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	4.4
DMDP Identifier:	DMD 16	**COE Identifier:**		**COE Sheet:**	
Ownership:	Sec. 34, Lot 8200 (T18, R12)				

Physical Characteristics

Size (acres):	2.5	**Fill Depth (feet):**		**Capacity Remaining (cy):**	filled
Method:	hydraulic pipeline, 8 to 16 inch, or bucket/clamshell				

Environmental Characteristics

Wetlands: E2EMN
Vegetation: shrubs
Wildlife: mild use
Conflicts:

Approval Status

Zone: Primary>	RR	**Overlay>**		**Other:**	
Plan:					

Comments

Name: SI - 4.4

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	4.4
DMDP Identifier:		**COE Identifier:**		**COE Sheet:**	3, 4
Ownership:					

Physical Characteristics

Size (acres):		**Fill Depth (feet):**		**Capacity Remaining (cy):**	
Method:					

Environmental Characteristics

Wetlands: E2EMN
Vegetation:
Wildlife:
Conflicts:

Approval Status

Zone: Primary> **Overlay>** **Other:**
Plan:

Comments

Name: WATERLAND STORAGE

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	5.1
DMDP Identifier:	DMD 19	**COE Identifier:**	SI - 5.1	**COE Sheet:**	4
Ownership:	Sec. 35, Lot 3500 (T18, R12)				

Physical Characteristics

Size (acres):	8.5	**Fill Depth (feet):**	5	**Capacity Remaining (cy):**	reuse only
Method:	pipeline, 8 to 27 inch				

Environmental Characteristics

Wetlands: E2USM,E2EMN
Vegetation: beachgrass, peavine, scotch broom
Wildlife: small mammals, perching birds
Conflicts:

Approval Status

Zone: Primary> M **Overlay>** **Other:**
Plan:

Comments

Existing vegetation would be lost, fauna displaced.

Name: JOHNSON ROCK

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	6.7
DMDP Identifier:	DMD 22	**COE Identifier:**	SI - 6.7	**COE Sheet:**	5
Ownership:	Johnson Rock Products				

Physical Characteristics

Size (acres):	9.0	**Fill Depth (feet):**	9	**Capacity Remaining (cy):**	130,000
Method:	pipeline, 8 to 16 inch				

Environmental Characteristics

Wetlands: E2EMN,E2USM
Vegetation: none
Wildlife: none
Conflicts:

Approval Status

Zone: Primary> M3 **Overlay>** **Other:**
Plan: Industrial

Comments

Bordered by salt marsh, fresh water march, and river.

Name:	MURPHY MILL				
Location and Ownership					
County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	7.3
DMDP Identifier:	DMD 23	**COE Identifier:**		**COE Sheet:**	
Ownership:	Murphy Mill				
Physical Characteristics					
Size (acres):	2.5	**Fill Depth (feet):**	3	**Capacity Remaining (cy):**	10,400
Method:	pipeline, 8 to 16 inch, or bucket				
Environmental Characteristics					
Wetlands:	E2ABN,PEMR				
Vegetation:	none				
Wildlife:	none				
Conflicts:					
Approval Status					
Zone: Primary>	M3	**Overlay>**		**Other:**	
Plan:	Industrial				
Comments					

Name:	CUSHMAN 1				
Location and Ownership					
County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	8.2
DMDP Identifier:	DMD 25	**COE Identifier:**		**COE Sheet:**	7
Ownership:	Sec. 29, Lot 100 (T18S, R11E)				
Physical Characteristics					
Size (acres):	18.0	**Fill Depth (feet):**	10	**Capacity Remaining (cy):**	970,000
Method:	pipeline, 24 to 27 inch				
Environmental Characteristics					
Wetlands:	E2EMP,PEMCh,PABF,PEMAh				
Vegetation:	pastureland				
Wildlife:					
Conflicts:					
Approval Status					
Zone: Primary>	E25	**Overlay>**		**Other:**	
Plan:	Conservation, recreation, open space				
Comments					

Name:	CUSHMAN 2				
Location and Ownership					
County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	8.2
DMDP Identifier:	DMD 25A	**COE Identifier:**		**COE Sheet:**	6, 7
Ownership:					
Physical Characteristics					
Size (acres):	70.0	**Fill Depth (feet):**		**Capacity Remaining (cy):**	970,000
Method:					
Environmental Characteristics					
Wetlands:	PEMCh,PEMAh,E2EMN,E2ABN,E1UBL				
Vegetation:					
Wildlife:					
Conflicts:					
Approval Status					
Zone: Primary>	F1	**Overlay>**		**Other:**	
Plan:					
Comments					

Name: CUSHMAN 3

Location and Ownership

County: Lane **Waterway:** Siuslaw River **Location (rm):** 10.2
DMDP Identifier: DMD 27 **COE Identifier:** **COE Sheet:**
Ownership: Secs. 16 and 21, Lot 2402 (T18S, R11E)

Physical Characteristics

Size (acres): 10.5 **Fill Depth (feet):** 10 **Capacity Remaining (cy):** 160,400
Method: pipeline, 8 to 16 inch

Environmental Characteristics

Wetlands: PEMCh,PEMC
Vegetation: farmland, seasonal crops
Wildlife: limited mammal and bird use
Conflicts: old floodplain area, now diked

Approval Status

Zone: Primary> F2 **Overlay>** **Other:**
Plan: Agriculture

Comments

Name: MIDWAY DOCK

Location and Ownership

County: Lane **Waterway:** Siuslaw River **Location (rm):** 10.4
DMDP Identifier: DMD 31 **COE Identifier:** **COE Sheet:**
Ownership: Sec. 16 Lots 1100, 1201, 1300, 1500, 1600, 1700 (T18, R11)

Physical Characteristics

Size (acres): 2.5 **Fill Depth (feet):** 4 **Capacity Remaining (cy):** 16,370
Method: pipeline, 8 to 16 inch

Environmental Characteristics

Wetlands: PEMC
Vegetation: shrubs, alders, blackberries
Wildlife:
Conflicts:

Approval Status

Zone: Primary> M3 **Overlay>** **Other:**
Plan: Tourist Commercial

Comments

Name: SITE 30

Location and Ownership

County: Lane **Waterway:** Siuslaw River **Location (rm):** 11.0
DMDP Identifier: **COE Identifier:** **COE Sheet:**
Ownership: Sec. 15, Lot 1000 (T18S, R11W)

Physical Characteristics

Size (acres): 23.9 **Fill Depth (feet):** 10 **Capacity Remaining (cy):** 375,000
Method: pipeline, 8 to 27 inch

Environmental Characteristics

Wetlands:
Vegetation: pastureland
Wildlife: small birds, mammals, waterfowl
Conflicts: old floodplain area, now diked

Approval Status

Zone: Primary> **Overlay>** **Other:**
Plan: Conservation/Recreation/Open Space

Comments

A large project would warrant assistance from the Corps of Engineers.

Name: MIDWAY DOCKS EAST

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	11.6
DMDP Identifier:	DMD 32	**COE Identifier:**		**COE Sheet:**	
Ownership:	Sec. 10 Lot 400 (T18, R11)				

Physical Characteristics

Size (acres):	2.5	**Fill Depth (feet):**	5	**Capacity Remaining (cy):**	9,300
Method:	pipeline, 8 to 16 inch				

Environmental Characteristics

Wetlands: Upland
Vegetation: very little
Wildlife: very little
Conflicts:

Approval Status

Zone: Primary> RR5 **Overlay>** **Other:**
Plan: Natural Resource: Forest

Comments

Name: WEST OF DUNCAN SLOUGH BRIDGE

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	12.2
DMDP Identifier:	DMD 34	**COE Identifier:**		**COE Sheet:**	
Ownership:	Sec. 14, Lot 300 (T18, R11)				

Physical Characteristics

Size (acres):	5.4	**Fill Depth (feet):**	5	**Capacity Remaining (cy):**	43,500
Method:	pipeline, 8 to 16 inch				

Environmental Characteristics

Wetlands: PEMAh,E1UBL,E2EMN,PEMCh,E2USN,E2EMP
Vegetation: pastureland
Wildlife: limited
Conflicts:

Approval Status

Zone: Primary> E25 **Overlay>** **Other:**
Plan: Natural Resource: Forest

Comments

Potential water quality problems.

Name: DUNCAN ISLAND MIDDLE

Location and Ownership

County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	12.8
DMDP Identifier:	DMD 35	**COE Identifier:**		**COE Sheet:**	
Ownership:	Sec. 11, Lot 1400 (T18, R11)				

Physical Characteristics

Size (acres):	2.8	**Fill Depth (feet):**	6	**Capacity Remaining (cy):**	26,700
Method:	pipeline, 8 to 16 inch				

Environmental Characteristics

Wetlands: Upland
Vegetation: pastureland
Wildlife:
Conflicts:

Approval Status

Zone: Primary> F2 **Overlay>** **Other:**
Plan: Conservation/Recreation/Open Space

Comments

Bordered by wetlands.

Name:	DUNCAN ISLAND NORTH				
Location and Ownership					
County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	13.3
DMDP Identifier:	DMD 36	**COE Identifier:**		**COE Sheet:**	
Ownership:	Sec. 12 Lot 1400 (T18, R11)				
Physical Characteristics					
Size (acres):	5.6	**Fill Depth (feet):**	4	**Capacity Remaining (cy):**	36,300
Method:	pipeline, 8 to 16 inch, or bucket				
Environmental Characteristics					
Wetlands:	E1UBL				
Vegetation:	pastureland, riparian vegetation, trees				
Wildlife:					
Conflicts:					
Approval Status					
Zone: Primary>	F2	**Overlay>**		**Other:**	
Plan:	Conservation/Recreation/Open Space				
Comments					
Site 37 recommended to receive material from local shoals, as it is better suited.					

Name:	SI - 14.1				
Location and Ownership					
County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	14.1
DMDP Identifier:		**COE Identifier:**		**COE Sheet:**	10
Ownership:					
Physical Characteristics					
Size (acres):		**Fill Depth (feet):**		**Capacity Remaining (cy):**	
Method:					
Environmental Characteristics					
Wetlands:	E1UBL,E2EM5N				
Vegetation:					
Wildlife:					
Conflicts:					
Approval Status					
Zone: Primary>		**Overlay>**		**Other:**	
Plan:					
Comments					
Not in DMDP.					

Name:	SI - 15.2				
Location and Ownership					
County:	Lane	**Waterway:**	Siuslaw River	**Location (rm):**	15.2
DMDP Identifier:		**COE Identifier:**		**COE Sheet:**	11
Ownership:					
Physical Characteristics					
Size (acres):		**Fill Depth (feet):**		**Capacity Remaining (cy):**	
Method:					
Environmental Characteristics					
Wetlands:	E1UBL				
Vegetation:					
Wildlife:					
Conflicts:					
Approval Status					
Zone: Primary>		**Overlay>**		**Other:**	
Plan:					
Comments					
Not in DMDP.					

Name: SI - 15.5

Location and Ownership

County: Lane | **Waterway:** Siuslaw River | **Location (rm):** 15.5
DMDP Identifier: | **COE Identifier:** | **COE Sheet:** 11
Ownership:

Physical Characteristics

Size (acres): | **Fill Depth (feet):** | **Capacity Remaining (cy):**
Method:

Environmental Characteristics

Wetlands: E1UBL
Vegetation:
Wildlife:
Conflicts:

Approval Status

Zone: Primary> | **Overlay >** | **Other:**
Plan:

Comments

Not in DMDP.