
MEETING NOTES

JULY 10, 1997

COLUMBIA RIVER OFFSHORE DISPOSAL SITE WORKSHOP

Meeting Summary

Introduction

On July 10, 1997 the U.S. Army Corps of Engineers, Portland District (Corps) convened a meeting at the Corps offices to discuss offshore disposal options for the Mouth of the Columbia River (MCR) and the Columbia River Channel Deepening Projects. The purpose of this meeting was to establish a working group to assist in identifying the *best* long-term offshore disposal options for these projects. Representatives from state, local, and federal agencies were in attendance, as were individuals representing the crab fishing industry. Twenty-nine individuals registered at the meeting. An attendance list is attached. A neutral facilitator, Valerie Lee of Environment International, led the meeting and notes of the proceedings were recorded by co-facilitator Margaret Merrens.

Opening Remarks

Kim Larson from the Corps' Environmental Branch opened the meeting with an explanation of the workshop's purpose. He encouraged the participants to be involved in the process of identifying and evaluating sites for long term offshore disposal. He explained that the process of selecting sites is one of the line-items in the complete study of a management plan for dredged materials from the Columbia River. The sites are to be used by both the channel deepening and existing operation and maintenance (O&M) projects.

Facilitators Introduced

Kim introduced facilitators Valerie Lee and Margaret Merrens to the participants. Valerie explained that her role as a facilitator is as a neutral party to assist the group in identifying common ground. She will encourage participants to raise and discuss issues and help to formulate a process for the identification of appropriate offshore disposal sites.

I. Presentations

Existing Offshore Disposal Sites & Physical Concerns

Rod Moritz from the Corps presented an overview of existing disposal sites and a summary of the physical processes, at the mouth of the river, which have influenced and shall continue to influence the selection of disposal sites. Rod presented a series of overhead projections as explained below. Attached please find copies of the overheads. They have been numbered for ease of reference.

Figure 1. Map of the MCR

Rod explained that the ~~Zone of Siting Feasibility (ZSF) for O&M materials dredged at the mouth of the Columbia River navigation project~~ encompasses an area between river mile (RM) 3 and RM (-3). ~~The ZSF is indicated on the map with a dashed semi-circle.~~ Rod explained that approximately 5 million cubic yards of material is dredged from the MCR annually to maintain the channel at its current depth.

Figure 2. Map of Disposal Sites

Dredged material from MCR O&M is currently placed in four disposal sites: Sites A, B, E, and F. The dashed lines on the map signify 1977 interim sites whereas the bold lines signify the permanent boundaries of each site as designated in 1983.

Figure 3. MCR Regional Bathymetry and USACE ODMS Locations

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This computer generated diagram depicts regional bathymetry in the region of the MCR. Rod explained that mounding has occurred over the years at the location of the disposal sites. Mounding is most pronounced at Site B.

Figure 4. Regional Bathymetry for MCR - 1994 Approach Survey

Rod emphasized the need to maintain a clear navigational approach to the river. This map shows the extent of the mounding at all sites in 1994. Sites B and A are areas of concern. Navigational hazards are created by increased wave action created by shoals around these sites.

Figure 5. Comparison of Bathymetry in 1985 and 1994.

Substantial changes in bathymetry have occurred between 1985 and 1994.

Figure 6. MCR Wave Analysis Results for 16 Second Wave Period

This figure depicts the change in wave action that has occurred at mounding locations. Rod explained that behind each mound, wave conditions have changed significantly, as much as 60 - 80% at Sites A & B.

Figure 7. ODMDS Management

Rod explained that the management of ocean disposal sites has changed dramatically since 1945 and this has greatly influenced the occurrence of mounding. Prior to 1977, dredged sediment was disposed of within loosely defined dumping grounds. Material was broadly dispersed and little accumulation or mounding occurred. Between 1977 and 1986, four sites received interim status as offshore dredged material disposal sites (ODMDSS) and controlled dumping was initiated. Dredged sediments were placed in these confined sites; however, little dispersion occurred and mounds began to form. The sites received final EPA approval as designated sites in 1983. From 1986 to the present, these disposal sites are still used, despite mounding. In 1992 incremental site expansion was initiated to reduce mounding without success.

Figure 1. Map of the MCR

Rod concluded by describing a process by which new ocean disposal sites might be evaluated. An overlay method, devised by the Corps and used for past site selections, has the capacity to evaluate several conditions simultaneously and assist with the identification of areas of least impact. An overlay evaluation might consider the following factors: physical data (bathymetry and wave action), navigational issues (shipping channels, towboat lanes), two different ZSFs (one with a 4.5 mile radius from RM -1 offshore and another with a 13 mile radius from RM 0), fishing areas (crab fishing, bottom trawling), and biological considerations (sediment types and benthic data). The overlay process would be used to identify sites for both the MCR O&M and Channel Deepening projects.

Overview of Site Designation Process and Laws

John Malek, USEPA Region 10, provided an overview of the site designation process and the laws directly influencing the process.

Figure 8. Marine Protection, Research and Sanctuaries Act (MPRSA)

John provided an overview of the requirements of the MPRSA of 1972. Title I, the ocean dumping component, is the primary focus of today's meeting. Within Title I, the most relevant sections are 102, 103, 104, and 106. Section 102, provides authority for the EPA to issue permits for the transportation of material (other than dredged material) for the purpose of dumping it into ocean waters and to designate sites for disposal. Section 103 provides the Corps with the capacity to issue permits for the transportation of dredged material for ocean disposal and, under certain circumstances, to select interim disposal sites when the use of sites under § 102 is infeasible. Section 105 specifies the enforcement capacity of the EPA. Section 106 explains the relationship of MPRSA to other laws. Title II, deals with comprehensive research on ocean dumping. Title III deals with the designation of National Marine

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Sanctuaries.

Figure 9. MPRSA

John explained that MPRSA prevents against the dumping of "material" in ocean waters without a permit. No permit may be issued if the dumping will "unreasonably degrade or endanger" human health, welfare, or the marine environment. The Corps may not issue a permit that does not meet EPA Criteria (*see Handout 1- Eleven Specific Factors for Ocean Disposal Selection*) unless they certify there is no economically feasible alternative.

Figure 10. Federal Water Pollution Control Act of 1972 (CWA)

John reviewed the major components of the CWA. The primary sections of concern for the participants are §§ 401, 402, 403, and 404. Section 401 focuses on water quality certification requirements. Section 402 addresses National Pollution Discharge Elimination System Permits (NPDES permits) for point sources. Due to an overlap in water law (the CWA and MPRSA), Congress has clarified the law. When a party has a NPDES permit, they need not obtain an ocean dumping permit. Section 403 of the CWA addresses ocean discharge criteria for NPDES permits. Section 404 addresses requirements for the issuance of permits by the Corps for the discharge of dredge or fill material into navigable waters.

Figure 11. Geographical Jurisdictions of the MPRSA and CWA

John summarized the jurisdictional boundaries of the MPRSA and the CWA. The CWA covers all inland waters, as well as coastal waters out to 3 nautical miles (the territorial sea) for the issuance of Section 404 permits for material placed for fill. The MPRSA covers the transportation and disposal of dredged material in the territorial sea and in the contiguous zone or ocean.

Figure 12. MPRSA/CWA Differences

John described the primary differences between the MPRSA and the CWA. The left hand column refers to MPRSA requirements, and the right column refers to CWA requirements. *Please refer to Handout 1.* In addition, John identified other differences between the laws. Under the ocean dumping provisions of MPRSA there is a specific requirement for the designation of disposal sites. Sites need not be designated under the CWA. The CWA is a delegable program, but MPRSA is strictly a Federal program (Federally enforced). The ocean dumping may be restricted by International Conventions (treaties).

Figure 13. Water Resources Development Act of 1992 (WRDA)

John explained that WRDA is the funding mechanism for Corps projects. MPRSA has been amended a number of times since 1988. These amendments have often been attached as riders to WRDA amendments. In 1992, the amendments were specific to sediments. In summary, the 1992 amendments: (1) directed the EPA and the Corps to share a contaminated sediments task force - this task force has met once, (2) ordered that a nationwide contaminated sediment survey be done - this survey is soon to be released, (3) clarified EPA's "concurrency role" in Corps MPRSA 103 permits, (4) clarified state requirements and federal exemptions under MPRSA - the president may exempt some dredge projects from certain requirements, (5) required the use of site management plans - after January 1997 all ocean dumping sites must have site management plans, (6) declared that Corps 103 permits are not to exceed 5 years, but there is an option for extension, (7) authorized the beneficial use of dredged material through cost-sharing with non-federal parties, (8) authorized a Corps contaminated sediment study and reevaluation of regulations.

Figure 14. MPRSA - Corps and EPA Roles and Responsibilities

Under MPRSA, the EPA and Corps have clearly distinct roles. Under sections 102, 103, and 105, the EPA is responsible for the final designation of disposal sites, for the issuance of permits for material other than dredged material, for developing ocean dumping criteria (5 general, 11 specific, *see Handout 1*), for performing independent evaluations of the effects of dredged material permits, and for assessing penalties for violations of permits. Under

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section 103, the Corps is responsible for the issuance of permits for transportation of dredged material for ocean dumping, and the selection of disposal sites when EPA disposal sites are unavailable (5 year limit).

Figure 15. EPA Regulatory Role Under MPRSA

John explained that it is the EPA's role to develop ocean dumping criteria in consultation with the Corps. These criteria are used in evaluating permit applications and when designating disposal sites. *See Handout 1.* MPRSA requires the EPA to consider several factors when developing the criteria. These factors are: (1) the need for dredging, (2) effect on human health and welfare, (3) effect on fish, wildlife, and shorelines, (4) effect on marine ecosystems, (5) persistence and permanence of effects, (6) effect of dumping particular volumes and concentrations, (7) effect of alternate uses of the ocean, (8) if feasible, to designate sites beyond the continental shelf - John indicated that this was generally not feasible.

Figure 16. Prohibited Materials Under MPRSA

John identified 6 different categories of materials that are prohibited (no ocean dumping allowable) under MPRSA. *See Handout 1.*

Figure 17. Basic Regulatory Approach Under MPRSA

The basic regulatory approach under MPRSA has three key steps; (1) site designation (usually the EPA), (2) issuance of permits (EPA or Corps), and (3) site management and monitoring (EPA, Corps and Coast Guard).

Figure 18. Site Designation under MPRSA

In general sites may be designated by the EPA if: (1) they comply with EPA ocean dumping criteria, (2) the designation follows Federal rule-making requirements, and (3) an Environment Impact Statement (EIS) has been properly prepared. The Corps is directed to use EPA-designated sites to the extent feasible, but may select a dredge material disposal site if there is no feasible EPA-designated site.

Figure 19. Actual Practice of Site Designation

With existing projects, the Corps will prepare a Site Evaluation Report (SER) and then request a Site Designation action from the EPA. For a new project, the Corps and the EPA will work together to prepare an EIS for the project (the EPA may assist with preparation or simply adopt the EIS). A site designation will ultimately depend upon Congressional authorization of the project. The time-frame for the process is as follows: (1) prepare a draft Rule/EIS - each have a 45-day public comment period, (2) consider comments and prepare a Final EIS - allow for a 30 day no-action period, (3) issue a Final Rule - the rule will become effective 30 days from publication.

How NEPA fits into the Site Designation Process

To compliment John's discussion, Steve Stevens from the Corps discussed the framework of the National Environmental Policy Act (NEPA) and explained how MPRSA fits within the NEPA framework.

Figure 20. NEPA and Other Laws of Consideration

Steve explained that, although nearly 20 different laws may influence the NEPA process, there are four primary laws which must be considered when preparing an EIS. These laws are (1) the Clean Water Act (CWA), (2) the Coastal Zone Management Act (CZMA), (3) the Marine Protection Research and Sanctuaries Act (MPRSA), and the Endangered Species Act (ESA).

Figure 21. MPRSA: Sections 102 and 103

Two sections of the MPRSA deal specifically with the selection and use of ocean disposal sites. Section 103 addresses the joint EPA/Corps process for the designation of interim disposal sites. This is the process the EPA and

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Corps just completed with respect to designating interim sites for the purpose of continued O&M at the MCR. Section 102, however, addresses the process used for EPA permanent site selection. The purpose of today's meeting is to initiate a Section 102 process for the selection of permanent sites for both the MCR O&M (will replace the interim sites) and Channel Deepening projects.

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Figure 22. Timeline

Steve explained that schedule for selecting sites is driven by the timeline of the Channel Deepening Project. The EIS Scoping was concluded in November 1994, the Draft EIS will go out for public review in October 1998, the Final EIS will go out for public review in June of 1999, the Record of Decision (ROD) is scheduled to be issued in the 2nd quarter of 2000, and the EPA Final Rule should be out in the 1st quarter of 2001.

Description of Zone of Siting Feasibility and Constraints

Jon Gornick from the Corps provided a description of the ZSF and the constraints influencing its outer boundary.

Current and Predicted Dredge Amounts

- O&M dredge quantities at the MCR equal 4.5 million cubic yards annually
- Construction and O&M from upriver locations (RM 9-28) is estimated to be 17 million cubic yards over 20 years
- Dredge Material Management Study (DMMS) quantities (RM 6-28 to the ocean) are estimated to be 3.5 million cubic yards over 20 years

Zone of Siting Feasibility (ZSF)

~~The ZSF for the MCR exists~~ MCR project is between RM 3 and RM (-3). ~~The ZSF for the MCR has an approximate 4.5 mile radius from RM (-0) (-1).~~ This distance is a ship-travel distance, not necessarily as the crow flies. Three constraints influence the location of this ZSF: (1) the channel can only be maintained by a hopper dredge, (2) only two hopper dredges capable of dredging at the MCR are currently available to the Corps, and (3) the time available for dredging is limited by weather conditions to April through October, bearing in mind that April and October are typically unreliable due to adverse and shoaling doesn't become a problem until July.

Jon explained that these factors are considered, together with the quantity of material to be dredged, when determining the limiting distance of the ZSF. The present 4.5 mile radius was estimated to be the maximum distance that a hopper dredge could go to dispose of sediments and still maintain the project.

The Hopper Dredge

The hopper dredges the Corps utilize are ocean going dredges with two arms that are lowered to the bottom of the channel. The sand and water slurry is sent to the hopper and when filled it is carried offshore for disposal. With optimal weather conditions, it takes approximately 55 minutes to travel to and from the disposal site. Filling takes between 1 and 1.5 hours. Thus, the full cycle takes about 2.5 hours to complete. It is estimated that a load could range between 3200 - 4500 cubic yards of sediment based on the type of hopper used. If adverse weather conditions exist, however, the hopper cannot dredge to project depth and the load will be smaller. The Corps expressed concern over the availability of low cost contractors. Lately bids for similar projects in Coos Bay have all been over government estimates. Jon indicated he would investigate Dale Beasley's belief that three new, 6000 yard hopper barges were under construction on the West Coast.

An Expanded ZSF

Jon explained that as part of the Channel Deepening study (DMMS) the Corps is investigating the option of a second ZSF to allow for 13 mile offshore hauls of dredged sediments associated with the Channel Deepening Project. Jon explained that clamshell dredges would be used to dredge sediments between RM 6 and RM 28 and then the material would be barged offshore in an ocean going vessel. The constraints of this expanded ZSF are as follows: (1) currently only three large clamshell dredges exist on the West Coast, one of which is undergoing bankruptcy proceedings, (2) the workload for these dredges ranges from San Diego to Alaska and availability is in question, and (3) dredging is limited by weather to April through October.

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Discussion of the Overlay Process

Kim Larson provided an overview of the overlay process the Corps has used to evaluate siting options for several other projects. Kim indicated that 4 or 5 different project reports, utilizing the overlay process, are currently available for review at the Corps by anyone interested. The overlay process consists of the creation of several maps to overlay on the ZSF. Each map would consider a separate issue of concern, such as, biological, physical, or archaeological parameters and provide insight as to areas of importance with respect to each parameter. When all the maps and parameters are combined and placed over the ZSF, areas of lesser importance (gaps) can be identified as potential sites for disposal. Kim encouraged the participants to consider the use of the overlay process to help them identify offshore disposal sites where there will be the least amount of likely impact.

Kim indicated that the Corps has a pre-established towboat lane overlay map. He encouraged the participants to contribute to the development of additional maps. Kim noted that all users/parameters will be given equal consideration at the outset, but at some point a weighting process may be necessary to assist with the site selection. It is the obligation of the participants to develop maps that are highly specific which have the capacity of relaying areas of special concern. Arbitrary lines which draw no distinction between areas of general importance versus critical importance will not be as helpful.

Discussion of Physical Characteristics

Rod Moritz presented a discussion of the physical characteristics present at the mouth of the river. Five overhead figures were presented at the meeting. Five other figures are attached to this packet. These were not discussed at the meeting, but are believed are relevant and helpful.

Figure 23. MCR ODMDs Physical Environment

Currently the physical environment at the MCR is influenced by several factors. Dredging and dredged sediment disposal takes place through the use of Hopper Dredges. Four to five million cubic yards of fine-medium grained sand is dredged from the channel and placed in selected disposal sites. The seabed is composed of fine sand with localized mud deposits. Wave height is often substantial. Average annual height is 7 feet, average wave is over a period of 10 seconds, but winter storm waves average 30 feet with wave period over a period of 18 seconds and greater. Currents vary with proximity to the river entrance but can reach 6 feet per second in certain areas.

Figure 24. Map of Columbia River ODMDs: Indicating Helicopter Transect Lines for Evaluating Currents

Rod explained that the Corps has ongoing studies to assist with the improvement of disposal site management practices. The map shows the inshore to outshore transect lines used by helicopters to study currents to the north and south of the channel and in and around disposal Site B. Wave, current, and temperature data exist for three locations around Sites B and E. Two additional sampling locations will soon be established at Site B and one will be established at Site E. In addition, the results of a study indicating the distribution of mud over a 4-year period are available. Such data may be helpful in identifying the presence of unique features during the overlay process.

Figure 25. Predicting Dredged Material Behavior - Sediment Fate Processes and Models

Rod provided a review of three sediment transport models the Corps uses to predict the behavior of dredged material placed in open water. The first of the models is intended to predict the *short term fate* of sediments during disposal. It allows the modeler to predict the bathymetric distribution of dredged material as it flows through the water column and the impact the material has on the seabed. This model is based on a vessel load per a dump. The

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second model predicts the *long-term fate* of sediment days to years after disposal. This model simulates changes to bathymetric features due to sediment transport which may occur as a result of wave and current action. The third model is designed to predict *multiple-dump fate* of sediments. This model combines the features of the other two models to predict changes in bathymetry at an ODMDS resulting from a series of dumps over as much as a year.

Figure 26. ODMDS Management: Coupling of Site Monitoring and Prediction Results

Rod emphasized that models provide the Corps with a systematic management tool for offshore disposal sites. It is Rod's opinion that they are fairly robust and reliable. The models can be used to determine the best location for a disposal site and to correct disposal problems from year to year as they occur.

Figure 27. Comparison at Site B of 1994 Site Conditions and Modeled Site Conditions

The first contour map in this figure depicts the actual bathymetric condition of site B in 1994. Using the modeling tools described above, the Corps simulated the bathymetric condition of Site B based on data from 1985 and estimates of dumping behavior between 1985 and 1993. The second contour map shows the results of this simulation. Rod pointed out the similarity between the two contour maps. He also indicated that had this technology been available in 1985, the Corps may have predicted the mounding, and may not have used the Site B so extensively.

Discussion of Existing Biological Information Available

Kim Larson, Corps of Engineers, and Danil Hancock of the Oceanographic Institute of Oregon presented information regarding existing biological information. Danil will analyze this data and assist with the creation of an overlay map to indicate the location of valuable biological resources.

Overview of Existing Data

Kim indicated that the site designation process is several years old and much biological data is available as a result of Corps studies related to earlier projects. A series of reports includes: (1) a 1972 pilot study off the MCR identifying mammals, fish, and other marine organisms, (2) an evaluation of benthic invertebrates as indicator species off the MCR, and (3) results of experimental dumping, evaluating the recolonization of benthic invertebrates over time. Kim also indicated that Dale Beasley of the Columbia River Crab Fishers Association (CRCFA) has agreed to assist with a survey of CRCFA boats to obtain information from crabbers as to their fishing habits. Questions may include where they currently fish, where legally they feel they can fish, whether they fish in current disposal areas, and whether they feel the disposal areas affect their take. Dale has already provided the Corps with a map of the coastal area with a grid overlay that will be included with the survey. This grid will be used to assist the crabbers/fishers with the identification of fishing sites. *See Handout 2 - Map and Grid for Survey*

Danil reported that the review of data would be an ongoing process. *See Handout 3 - Summary of Available Information*. He indicated that all taxonomy research dating back to 1973 has been done by the same individuals (NMFS and Howard Jones), lending consistency to the data. Much of the research utilizes proper sampling methods. Danil will seek to find common denominators of all the sampling results so as to make a comparison study.

Danil will investigate both the density of invertebrates and sediment composition over time to identify areas of high productivity. When questioned as to why his focus would be on benthic invertebrates and not higher tropic organisms, Danil indicated that data was minimal on higher tropic organisms, since they are highly mobile and difficult to study. Furthermore, it is difficult to identify trends of larger organisms over time, and little capacity to gain statistical validity of the data due to temporal displacement and seasonal changes in distribution. As a result, most of the available data deals with benthic invertebrates. They are highly stable and have limited mobility, but

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they also mirror the sediments. A change in grain size and organic composition of the sediments will impact the species composition. There is a high correlation between benthic communities, including shrimp and organisms preyed upon by pelagic fish, and sediments. It is Danil's opinion that an evaluation of benthic communities is the best means for assisting with the identification of ecologically acceptable disposal sites.

Danil presented three maps of the MCR indicating sampling locations for benthic invertebrates and fish. For benthic invertebrates there may be as many as 5000 grab samples available due to the fact that replicate samples were taken at most locations. The fish sampling has been sparse. Danil believes that the best source for further fish information is through the fishermen and crabbers.

Danil requested the participants to contribute any and all fish or benthic data to Kim Larson. ODFW may have ground-fish logbooks for Danil to review. They may be as many as 20,000 ground-fishers using the MCR area. Dale Beasley suggested that Danil look at the logbooks prior to 1985 and after 1990 to evaluate changes in the fishery. He cautioned that information on juveniles would not be in the logbook. Steve Barry, WDFW, encouraged the Corps to collect the names of fishers in the area and hold a meeting to collect further information. This should include the small-boat fishers that may no longer be in business, as well as current fishers.

II. Facilitated Discussions

Valerie Lee, a facilitator from Environment International, led the afternoon session of discussions. The goal for these discussions was two-fold: (1) to elicit reactions and comments from the participants regarding the morning presentations, and (2) to discuss and agree upon a process for investigating and identifying the best long-term offshore disposal options.

Reactions and Comments

General comments and responses were as follows:

[1] Dave Fox/ODFW: commented that the information presented in the morning was helpful. It provided a good summary of the law, existing data, resources, etc.

[2] Rollie Montagne/Port of Portland: wished to know how the information would come together and what would the final end product would look like.

Responses: Laura Hicks/COE: indicated that she would present the full process by which this information would be evaluated later in the afternoon. In brief, the Corps would like to have the participants provide input and technical expertise into the overlay process. Committees will be established to develop overlay maps. The participants will then be encouraged to meet back to discuss the complete set of overlays. Laura would like to have as many people involved in the process at the outset.

[3] Rick Vining/WDOE: wished to know which studies would be included in the Corps' long-term management plan.

[4] Ben Meyer/NMFS: asked why this site selection process must be tied to the 2001 time-frame

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established for the Channel Deepening Project. He wished to know if the information (a site selection) could be used immediately or if they were obligated to wait for 5 years before a new site could be used. Rollie Montagne/Port of Portland: asked if it was feasible for a site to be selected by 1998.

Responses: Eric Braun/COE: indicated that a final EPA site designation requires the Corps to adhere to the NEPA EIS process. Anything else would be a mere MPRSA Section 103 site selection (interim site) and not a final designation.

Laura Hicks/COE: in response to Ben, Laura indicated that the Corps must adhere to the current EIS schedule for the Channel Deepening Project. Two windows of opportunity exist for the gathering of public input and comment, October 1997 and October 1998. In response to Rollie, Laura indicated she had no intent to speed up the process unless the participants ask for it.

John Malek/EPA: commented that a site designation could not be made on a FONSI alone and that an EIS was required. John questioned the Corps' capacity to prepare for the site selection prior to the October 1997 EIS date.

Dale Beasley/CRCFA: indicated that it would be at least October before the Corps could obtain information from the crab fishermen.

[5] Bob Burkle/WDFW: indicated he would like to see the potential beneficial uses of the dredged material investigated further, ie. habitat restoration, beach nourishment. He indicated he had recently submitted a methodology to the Corps for the use of dredged materials at the Peacock Spit/Bensen Beach area for snowy plover, razor clam habitat restoration.

[6] Bob Burkle/WDFW: would also like to see an investigation of the topographic changes to the area to determine which areas might be eroding or acceding. According to Bob, the Seattle District Corps of Engineers has a methodology in place for studying erosion that has been used in Grays Harbor.

Response to [5] and [6]: Eric Braun/COE: responded that the Corps has additional project authorities that would allow for the beneficial use of dredged materials, but such use would require cost-sharing with a local, non-federal entity. An EIS may be required to evaluate such an action. If it were technically feasible, it is the Corps' preference and goal to use the dredged material rather than dump it.

Laura Hicks/COE: there may be opportunities to investigate this issue within the Corps' planning authority for ecosystem restoration. The contribution from a non-federal entity must be 35% of the cost of the project.

Christine Valentine/CREST: indicated she was not opposed of the beneficial use of sediments at shore locations, but ocean sites will still be necessary. The Oregon experience with beach nourishment has been that this is merely a one-time a year event and of limited value.

[7] Dave Fox/ODFW: would like to see information collected regarding impacts from thin layer disposal versus pin-point disposal. In addition, Dave would like to see the Corps investigate or locate investigations regarding burial effects to juvenile and soft-shell crabs. This could be done in a lab. He

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knows of at least one study that was done on adult crabs.

Responses: Christine Valentine/CREST: indicated that the State of Oregon once requested reports from other states regarding this issue.

Corps: believes that such information has been assimilated by Dr. Susan Riese from the Mobile District.

[8] Edith Beasley/CRCFA: asked for a clarification of what is meant by "Abroad-based disposal" How many inches deep? What is the spatial extent of the dump? What is the thickness over what area?

Response: Rod Moritz/COE: Since 1992, the Corps has initiated a dumping scheme to ensure that dumping will be broad-based. The Corps has divided the existing dumping sites into cells and each dump is carefully tracked and initiated within a specific cell. Originally these cells were 2000 x 2000 feet, but they are now down to 500 x 500 feet. The footprint for a single dump may extend 13 acres from the starting point. The deepest portion of the dump (6 inches of accumulation) will be at the point where the dump was initiated. As the apron extends, however, the sand becomes thinner and thinner. The next dump is then initiated where the former apron ended.

Dave Fox/ODFW: would like to see a full dispersion and depth analysis done by the Corps in the event that 2 inches of sediment could make a difference.

Danil Hancock: indicated that dredging and offshore disposal offshore was taking place long before we had these models to tell us where to dump; yet, there were no mounding problems before we began to pinpoint the dumps. Consequently, Danil believes, that thin layer (broad-based dispersal) will be a better option for a site management plan.

Discussion of the Overlay Process

Laura Hicks presented the Corps' proposal for the overlay process and Valerie solicited comments on it.

Proposed Process:

[1] Mark Siipola/COE and John Malek/EPA will serve as coordinators for the overall ocean dumping site selection process. They will develop a timeline for the process.

[2] Subgroups will be created to address issue areas. General issue areas (and sub-issues) will include, but are not necessarily limited to:

- a. Fisheries: bottom fishing, clamming, crabbing, recreational/sport fishing
- b. Biological Resources: invertebrates, shellfish, fish distribution, marine mammals
- c. Physical Processes: waves, currents, sediment movement, bathymetry
- d. Navigation/Operation: tow boat lanes, deep draft approach, safety considerations
- e. Cultural Resources: shipwrecks, other

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[3] A Corps coordinator will be assigned to each issue area. The following people will serve as discussion and meeting coordinators for the production of overlay maps.

- a. Fisheries: Kim Larson
- b. Biological Resources: Kim Larson
- c. Physical Processes: Rod Moritz
- d. Jon Gornick: Navigation/Operation
- e. Lynda Walker: Cultural Resources

[4] Over the next couple of months, subgroups will meet to discuss and create overlay maps for each sub-issue within each general issue area. Each subgroup will work within the time-frame established by Mark Siipola and John Malek.

[5] The subgroups will then meet back together, with any other interested parties, to overlay all the maps and to discuss options for offshore disposal sites. The goal is to select disposal sites with the least impact.

See Handout 4 - Overlay Process.

Comments:

[1] State Water Quality Certification Requirements

Rick Vining/WDOE: expressed concern over issues that the WDOE requested the Corps to address by April 1998. In connection with the recently completed selection of interim disposal sites, the WDOE issued a one year water quality certificate. With this letter of certification came a request for the Corps to investigate several issues. Rick wishes to have the Corps address these issues within the context of the current site selection process. He would like to see the following issues addressed:

- (a.) Crab resources and crab habitat
- (b.) Beneficial uses of sediments vs. Disposal
- (c.) Pinpoint disposal vs. Dispersed disposal (thin layer), including the biological capacity of an area to recover once disposal is made

Dave Fox/ODFW: indicated that his agency also issued the a water quality certificate for the interim sites. Dave indicated that ODFW just requires that some action be taken on the issues identified (similar to those of the WDOE) or an intent or indication that the process of investigation is going forward.

Steve Stevens/COE: responded that it is the Corps' intent to address the concerns of the States of Oregon and Washington in the current site selection process.

Ben Meyer/NMFS: clarified that regardless of the Corps' continuation with the overlay process, they are obligated to respond to the WA and OR issues surrounding the designation of temporary sites by Spring of 1998.

[2] A Streamlined Process for Site Designation

Ben Meyer/NMFS: commented that his agency would like to see the permanent site designation process sped up. He would like to see a site designation piggy-backed to the Corps' 1998 Draft EIS for the Channel Deepening Project, so as to proceed with final designations of offshore disposal sites prior to

COLUMBIA RIVER OFFSHORE DISPOSAL SITE WORKSHOP

2001. If this occurred, then the new sites could take the place of the interim sites and be used for O&M immediately. This would result in only two seasons of dumping at the interim sites instead of five. Then, upon approval of the Channel Deepening Project the sites would be in place for disposal.

Steve Stevens/COE: asked John Malek if the EPA would be willing to proceed with the site designation process in the manner that Ben has outlined.

John Malek/EPA: responded that the agencies would need to agree on the selected sites. If all were in agreement then it may be possible to proceed with the 1998 Draft EIS time-frame; however, if the agencies are not in agreement, the EPA will not approve a streamlined process.

Rollie Montagne/Port of Portland: added that the group could apply all the functional requirements of the law and have these sites approved prior to 2001 if, as a group, they could come to agreement prior to October 1998.

[3] Investigation of Other Issues or Sub-issues in the Overlay Process

Dale Beasley/CRCFA: would like to see the Corps evaluate the impacts of site selection on small businesses, ie. economic impacts. Dale indicated that this was an important issue that held significant weight for him. The small-boat salmon fishery has already been lost, and Dale does not wish to see the crab fishery lost as well.

Kim Larson/COE: responded that incorporated in the regulations for site selection (40 CFR ' 228.6) are eleven specific factors that must be considered prior to site designation. Among these factors, is a requirement that the Corps consider the potential for interference with shipping, fishing, recreation, mineral extraction, desalination, shellfish culture, areas of special scientific importance and other legitimate uses of the ocean. *See Number 8 on Handout 1.* It was Kim's impression that Dale's concerns would be addressed through this process.

Laura Hicks/COE: suggested that this issue might be addressed upon reconvening with the completed overlay maps. If it becomes necessary to weight certain factors, economic issues could be given greater weight.

Edith Beasley/CRCFA: encouraged the Corps to thoroughly evaluate the possibility of extending the ZSF. Edith has specific concerns about continued use of Site B which appears to be the only feasible place to dump within the 4.5 mile ZSF.

[4] Scheduling

Ed Manary/WDFW: asked the Corps for the time-frame for completing the overlay maps.

Kim Larson/COE: explained that he wished to move immediately to set up meetings for the subgroups. He wished to have all the overlay maps completed by October, except perhaps the fisheries maps which may need to wait for the fishermen to return in October.

Dale Beasley/CRCFA: encouraged the Corps to go ahead and collect addresses of fishermen from license records and to send the surveys right away. He indicated that some crab fishers will be back before the end of the month while others will return later.

COLUMBIA RIVER OFFSHORE DISPOSAL SITE WORKSHOP

Ben Meyer/NMFS: encouraged the Corps to send a press release to alert the fishers that they were doing a mailing and to encourage those who have not received the survey to contact the Corps directly.

Tentative Time-frame for Discussion:

- July-August: Subgroup Meetings
1. Identify participants
 2. Meet/ identify ground rules/identify studies
 3. Group analysis of information
 4. Create the overlay maps
 5. Create a report to explain the map
- July-October:
1. Survey of crabbers
 2. Press release regarding the survey
 3. Interviews with crabbers
- October: Meeting with Crabbers
- November: Reports for all overlay maps due
- Jan - March: Convene all participants for meetings to discuss final site selection options

III. Conclusion

The participants agreed to participate in further meetings and to contribute to the development of overlay maps subgroup meetings. Subgroups were created as follows:

Working Groups for the Overlay Process

Group 1 - Fisheries

Group Coordinator - Kim Larson/COE
Ben Meyer/NMFS
CREST
Dave Fox/ODFW
Danil Hancock/ Oceanographic Institute of OR
Dale Beasley/CRCFA
Edith Beasley/CRCFA
Diane Perry/CRCC
Steve Barry/WDFW
WDOE
Kathi Larson/USFWS

Group 2 - Biological Resources

Group Coordinator - Kim Larson/COE
Ben Meyer/NMFS

CREST
Dave Fox/ODFW
Danil Hancock/ Oceanographic Institute of OR
Dale Beasley/CRCFA
Edith Beasley/CRCFA
Steve Barry/WDFW
WDOE
Kathi Larson/USFWS

Group 3 - Physical Processes

Group Coordinator - Rod Moritz
Ben Meyer/NMFS
Danil Hancock/Oceanographic Institute of OR
Dale Beasley/CRCFA
Edith Beasley/CRCFA
Steve Barry/WDFW
WDOE
Bob Burkle/WDFW
Kathi Larson/USFWS

COLUMBIA RIVER OFFSHORE DISPOSAL SITE WORKSHOP

Ports

Diane Perry/CRCC

Rod Moritz/COE

WDOE

Ports

Group 4 - Navigation/Operation

Group Coordinator - Jon Gornick/COE

Dale Beasley/CRCFA

Edith Beasley/CRCFA

Other Potential Members: Coast Guard, Tow Boaters,
CR Bar Pilots, Port of Astoria

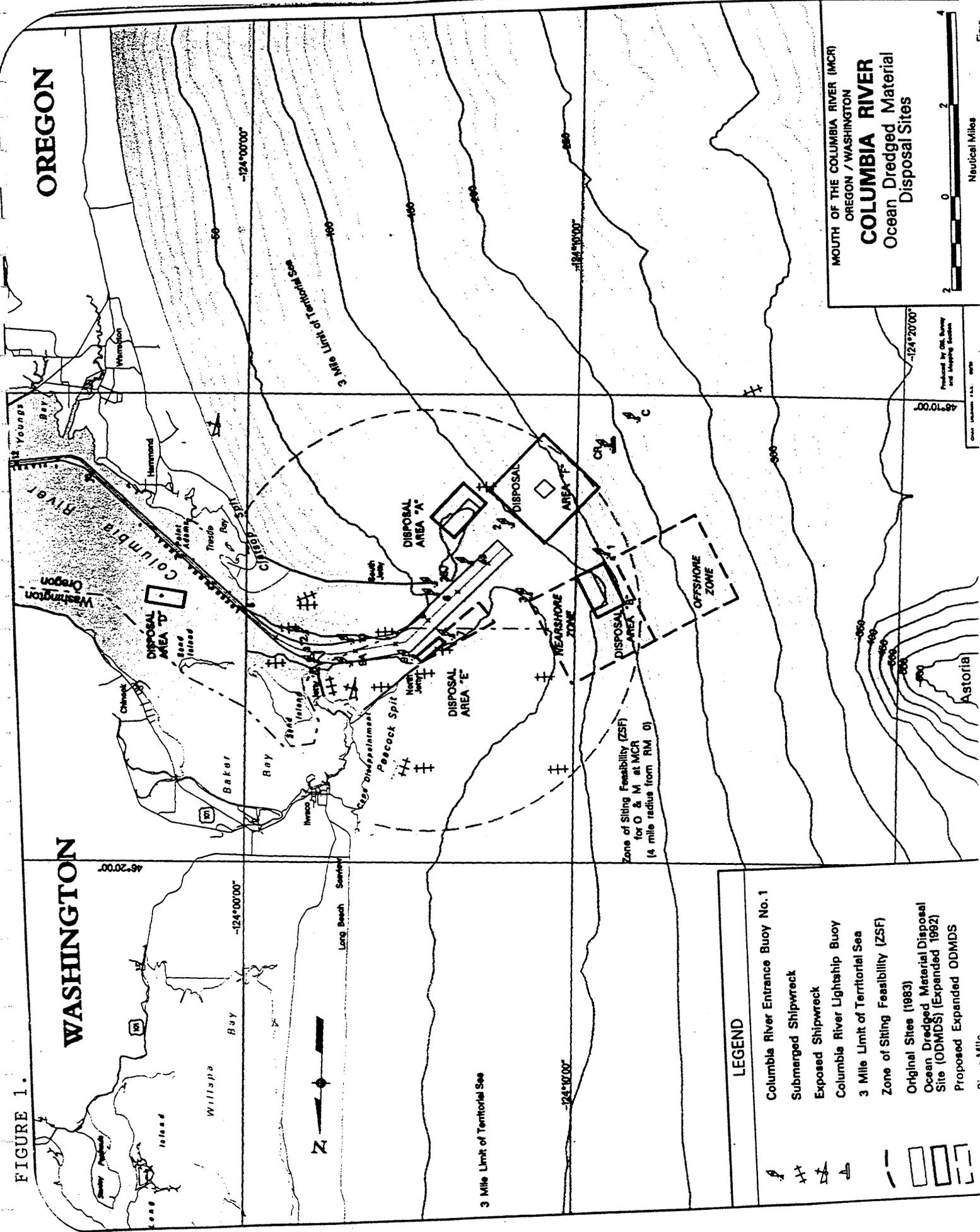
Group 5 - Cultural Resources

Group Coordinator - Lynda Walker

Ed Manary/WDFW

Groups 1 and 2 agreed to meet during the week of July 21 to begin the overlay process. Rod Moritz suggested that Group 3 meet on the same day as Groups 1 and 2, immediately before or after the other meetings. Laura Hicks assigned Wednesday, October 22, 1997 as the date for the next meeting of all the participants.

FIGURE 1.



WASHINGTON

OREGON

MOUTH OF THE COLUMBIA RIVER (MCR)
 OREGON / WASHINGTON
COLUMBIA RIVER
 Ocean Dredged Material
 Disposal Sites

Produced by O&M Survey
 and Mapping Section

Neautical Miles

LEGEND

-  Columbia River Entrance Buoy No. 1
-  Submerged Shipwreck
-  Exposed Shipwreck
-  Columbia River Lightship Buoy
-  3 Mile Limit of Territorial Sea
-  Zone of Sitting Feasibility (ZSF)
-  Original Site (1983)
-  Ocean Dredged Material Disposal Site (ODMDS) (Expanded 1992)
-  Proposed Expanded ODMDS

3 Mile Limit of Territorial Sea

Zone of Sitting Feasibility (ZSF)
 for O & M at MCR
 (4 mile radius from RM 0)

Astoria

46°20'00"

-124°00'00"

-124°30'00"

46°10'00"

-124°20'00"

-124°00'00"

-124°30'00"

3 Mile Limit of Territorial Sea



Long Beach

Saunders

Peacock Spit

North Jetty

South Jetty

Bay

Baker

Willapa

Island

Chinook

Wasco

Bay

Hammond

Tredos Bay

Youngs Bay

Washington

Oregon

Columbia River

3 Mile Limit of Territorial Sea

DISPOSAL AREA "A"

DISPOSAL AREA "B"

DISPOSAL AREA "C"

DISPOSAL AREA "D"

DISPOSAL AREA "E"

DISPOSAL AREA "F"

NEARSHORE ZONE

OFFSHORE ZONE

400

600

800

1000

1200

1400

1600

1800

2000

2200

2400

2600

2800

3000

3200

3400

3600

3800

4000

4200

4400

4600

4800

5000

5200

5400

5600

5800

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42600

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44800

45000

45200

Disposal Sites

FIGURE 2.

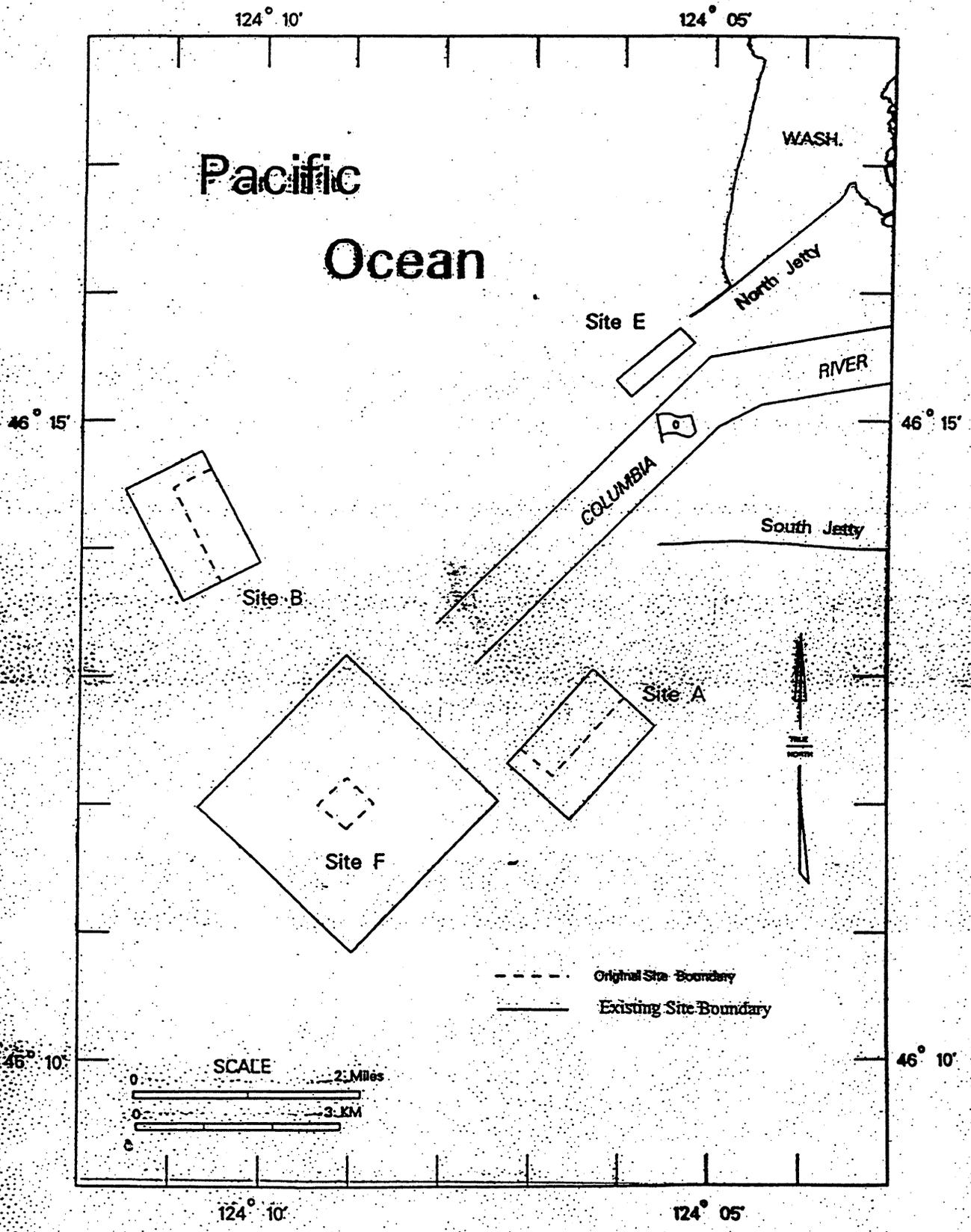


Figure 2. Mouth of the Columbia River - ocean dredged material disposal sites (ODMDS).

FIGURE 4.

MOUTH OF COLUMBIA RIVER

Regional Bathymetry and USACE ODMDS Locations

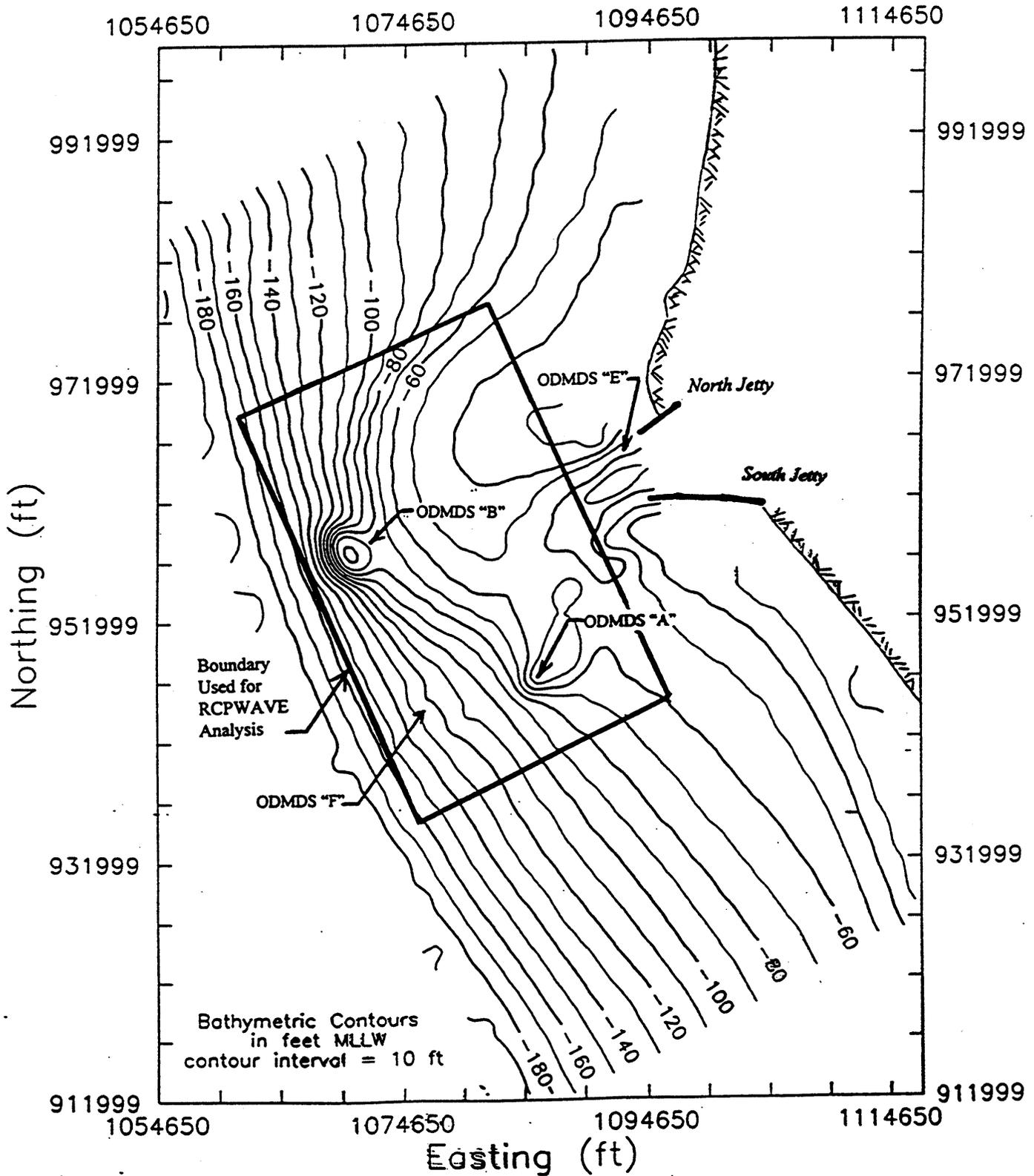


Figure 3. Regional bathymetry for MCR - 1994 approach survey

FIGURE 5.

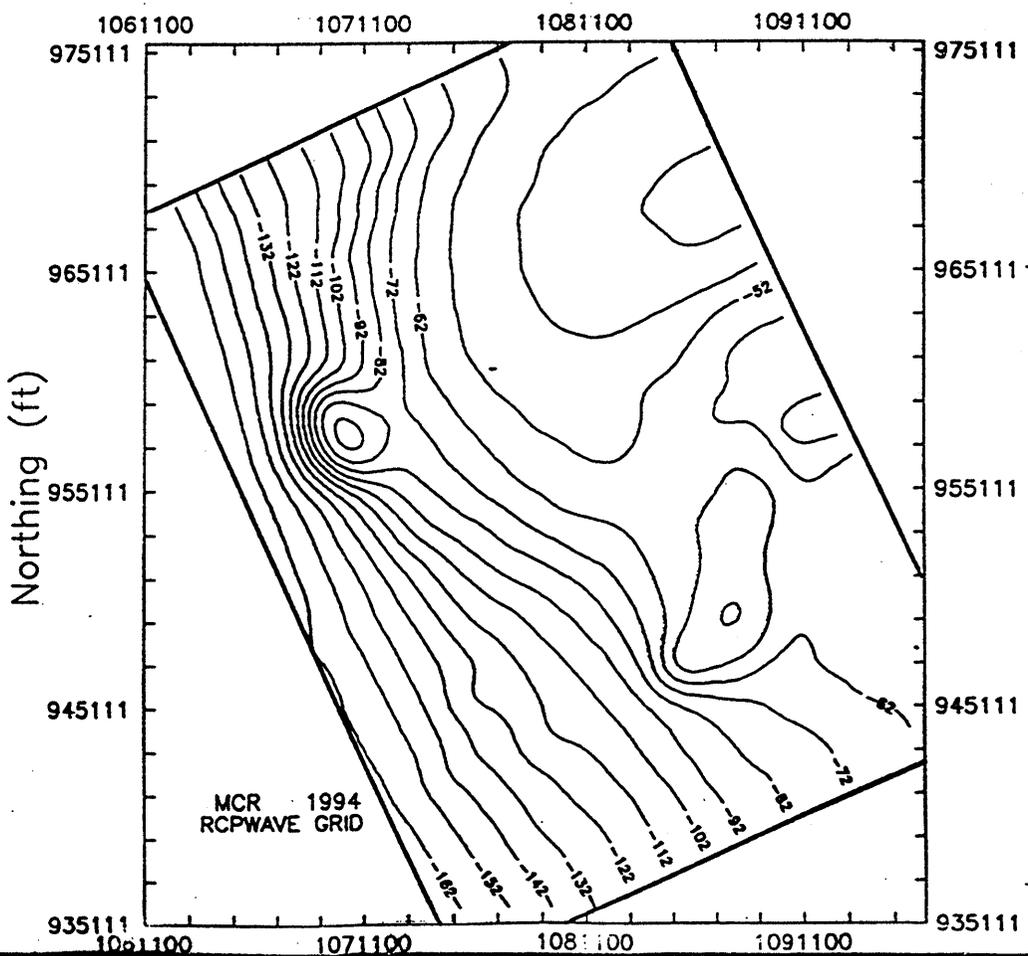
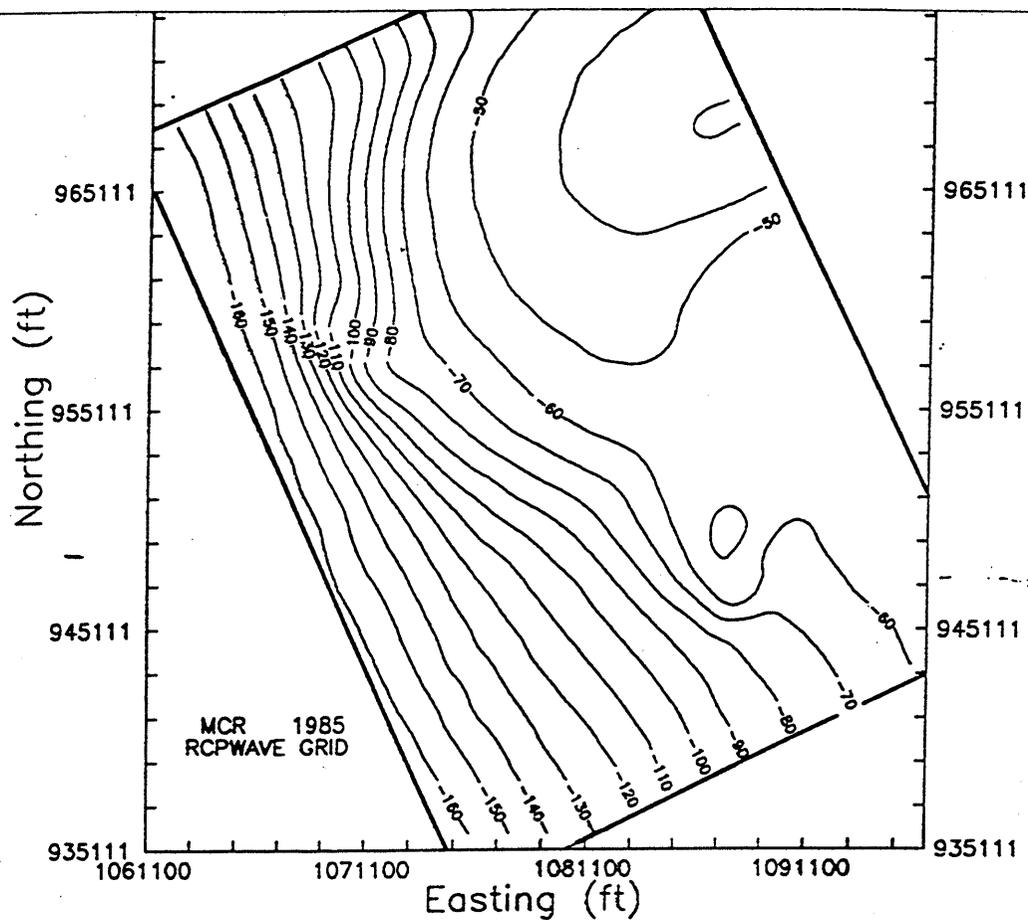


FIGURE 7.

ODMDS MANAGEMENT

Modern Ocean Disposal of Dredged Sediment at MCR: Changes in Site Management = Changes in Site Response

1945 – 1977: Dredged sediment placed within loosely defined “dump sites”
Much dispersion during uncontrolled dumping – little accumulation

1977 – 1986: “Dump sites” receive interim status as **ODMDSs**, dredged sediment is placed within **confined sites – controlled dumping**. Sites believed to be moderately dispersive. Split-hull hopper dredges are used. Pin-point dumping results in little dispersion. **Mounds begin to form**. EPA final approval of MCR ODMDSs.

1986 – Present: Continued use of split-hull dredges, point disposal, and accurate navigation act to rapidly **build large mounds within small ODMDSs**. Incremental site expansion futile. Larger site expansions proposed.

Consider using very large ODMDSs and mimicking pre-1977 conditions

FIGURE 8.

Marine Protection, Research And Sanctuaries Act of 1972

Title I - Ocean Dumping

Section 102 - Environmental Protection Agency Permits

Section 103 - Corps of Engineers Permits

Section 105 - Enforcement

Section 106 - Relationship to Other Laws

Title II - Comprehensive Research on Ocean Dumping

Title III - National Marine Sanctuaries

FIGURE 9.

Marine Protection, Research and Sanctuaries Act of 1972

Protects against dumping of "*material*" in ocean waters
without a permit (Corps or EPA).

No permit may be issued if the dumping will "*unreasonably
degrade or endanger*" human health, welfare, or the marine
environment.

Corps may not issue a permit that doesn't meet EPA Criteria
unless they certify there is no economically feasible alternative.

FIGURE 10.

Federal Water Pollution Control Act of 1972 (Clean Water Act)

- Section 301 - Effluent Limitations
- Section 303 - Water Quality Standards and Implementation Plans
- Section 313 - Federal Facilities Pollution Control
- Section 401 - Water Quality Certification
- Section 402 - National Pollution Discharge Elimination System
- Section 403 - Ocean Discharge Criteria
- Section 404 - Permits for Dredged or Fill Material
- Section 405 - Disposal of Sewage Sludge

FIGURE 11.

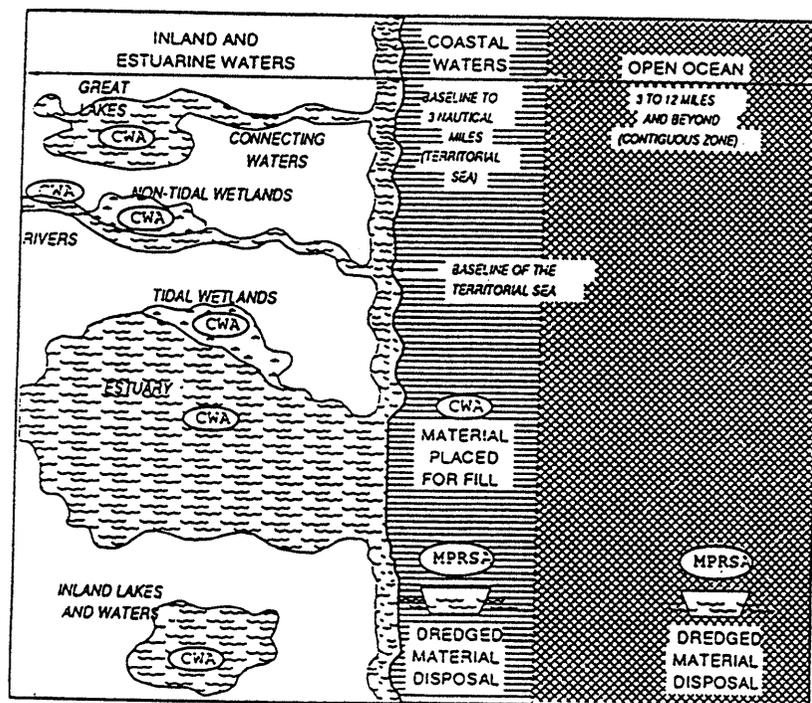


Figure 1-1. Geographical Jurisdictions of the MPRSA and CWA

FIGURE 12.

MPRSA/CWA Differences

- Water Quality Criteria
- Mixing Specified
- Exclusions Restricted
- Reference Comparison
- Bioassay Comparison
- Trace Contaminants
- No Physical Isolation
- 1977 Regulations
- Water Quality Standards
- Mxing Variable
- Exclusions Broad
- Disposal Comparison (?)
- Bioassays Optional
- No Trace Contaminants
- Physical Isolation
- 1975 Regulations

FIGURE 13.

Water Resources Development Act of 1992

SUMMARY OF PROVISIONS

- Contaminated Sediments Task Force
- Contaminated Sediments Survey = National Sediment Inventory
- EPA's concurrence role in Corps 103 Permits
- State Requirements and Federal Exemptions clarified
- Site Management Plans required: January 1995, 1997
- Site Designation Deadline: January 1997
- Corps permits not to exceed 5 years, option for extension
- Beneficial uses of Dredged Material authorized with cost sharing
- Corps: Contaminated Sediments study & DM laws/policies study

FIGURE 14.

Marine Protection, Research and Sanctuaries Act of 1972

Environmental Protection Agency

- Section 102, 103, 105
 - Designation of Disposal Sites.
 - Permits for dumping material other than Dredged Material.
 - Develop Ocean Dumping Criteria (5 General; 11 Specific).
 - Perform Independent Evaluation of effects of Dredged Material permits.
 - Assess penalties for violations.

Corps of Engineers

- Section 103
 - Permits for transportation of dredged material for ocean dumping.
 - Selection of disposal sites when EPA sites are unavailable.

FIGURE 15.

EPA Regulatory Role Under MPRSA

EPA develops ocean dumping Criteria in consultation with the Corps to be used in evaluating permit applications and when designating disposal sites.

The Statute specified factors to be considered by EPA in developing the Criteria:

- Need for dredging
- Effect on human health and welfare
- Effect on fish, wildlife, shorelines
- Effect on marine ecosystems
- Persistence and permanence of effects
- Effect of dumping particular volumes and concentrations
- Effect on alternate uses of the ocean
- Designate sites beyond continental shelf, wherever feasible

FIGURE 16.

Prohibited Materials Under MPRSA

- Radiological, chemical, biological warfare agents
- Low and high level radioactive waste
- Medical wastes
- Sewage sludge
- Industrial wastes
- Material insufficiently described in terms of their compositions and properties to permit application of the Criteria

FIGURE 17.

Basic Regulatory Approach Under MPRSA

Three primary control mechanisms: (1) Site designations, (2) permitting, and (3) site management and monitoring

In general, EPA first designates the site, then the permit authorizing use of the site (by EPA or Corps) is issued.

Site management and monitoring of dredged material disposal sites are shared.

- Enforcement authority (civil administrative) vested in EPA
- Authority to revoke/suspend DM permits vested in Corps
- Coast Guard charged with surveillance and other activities

FIGURE 18.

Site Designation Under MPRSA

Statute allows EPA to designate areas in the ocean suitable for dumping; such areas must comply with Criteria.

Designation takes form of amendment to ocean dumping regulations site list (ie, Federal Register rulemaking).

EPA's voluntary EIS policy requires that an EIS be prepared for all site designations.

Corps is directed to use EPA-designated sites to the extent feasible when selecting dumping locations.

Corps may select a site for DM disposal if there is no feasible EPA-designated site.

FIGURE 19.

Site Designation Under MPRSA Actual Practice

Existing Projects:

Corps identifies Need, prepares Site Evaluation Report (SER), requests Site Designation action from EPA.

New Projects:

Corps (& EPA) identify Need, prepare EIS. Site Designation may depend on authorization of project.

EPA prepares/adopts EIS

Draft EIS → Draft Rule (45 days public comment)

Final EIS (30 days no action)

Final Rule (effective 30 days from publication)

FIGURE 20.

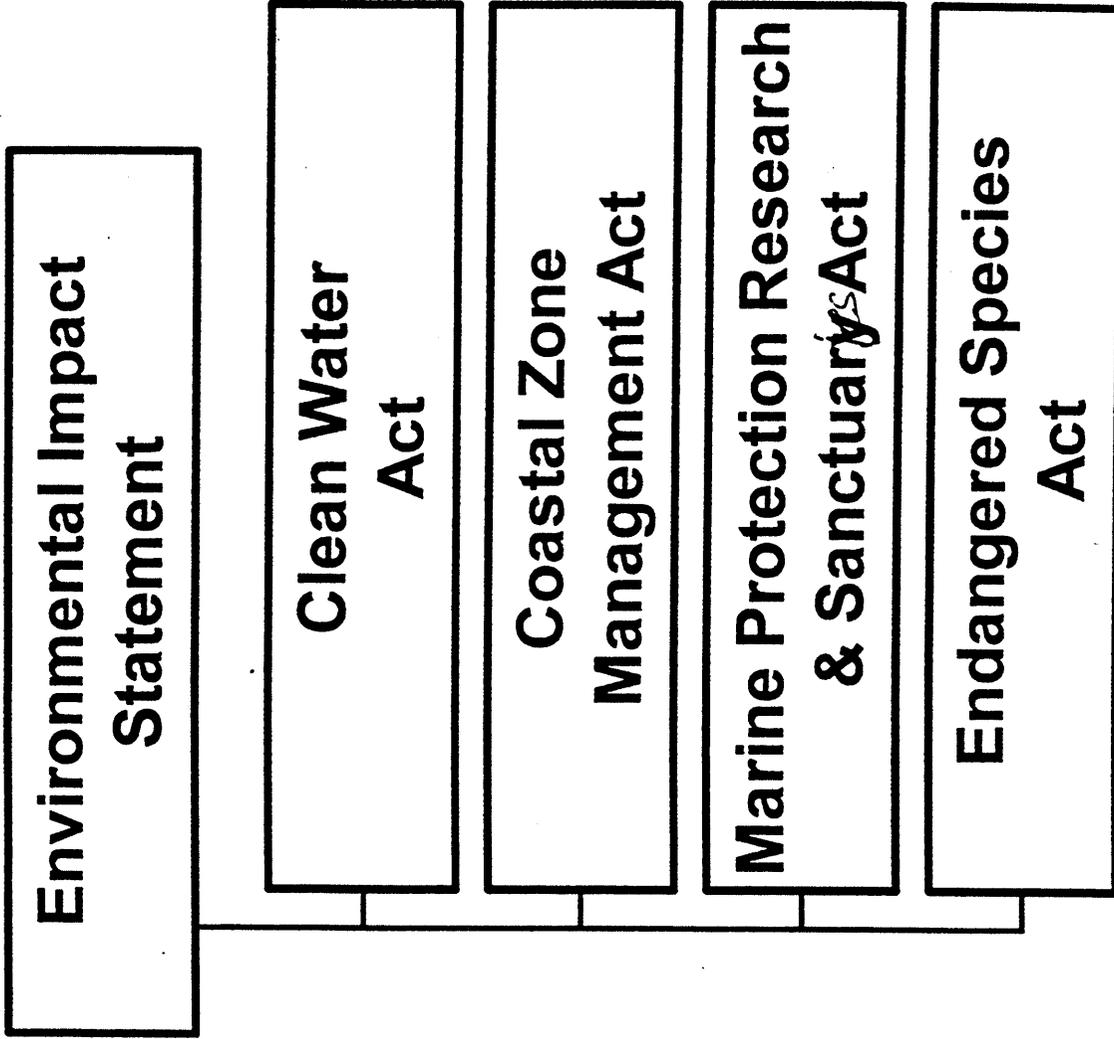


FIGURE 21.

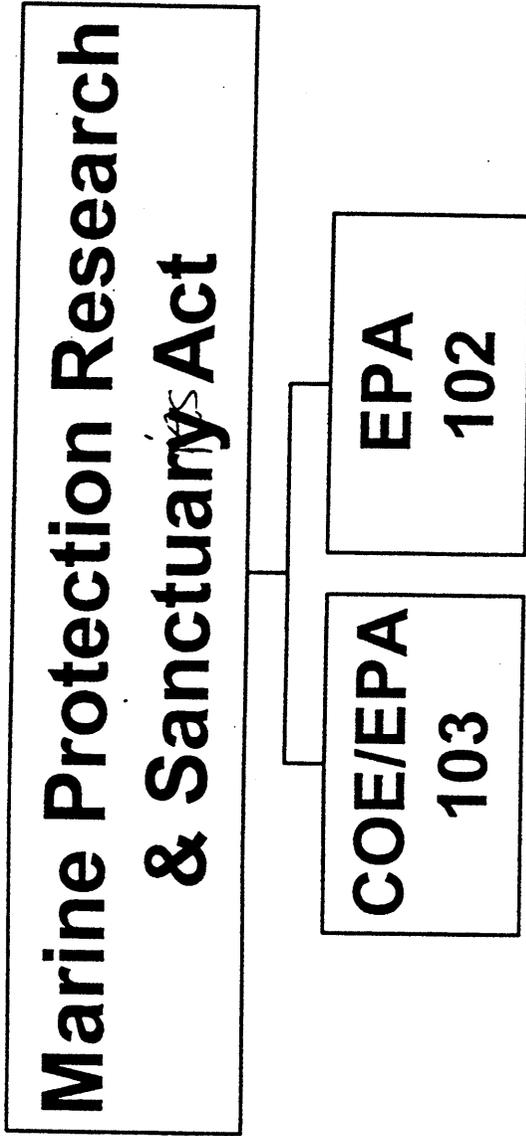


FIGURE 22.

Timeline

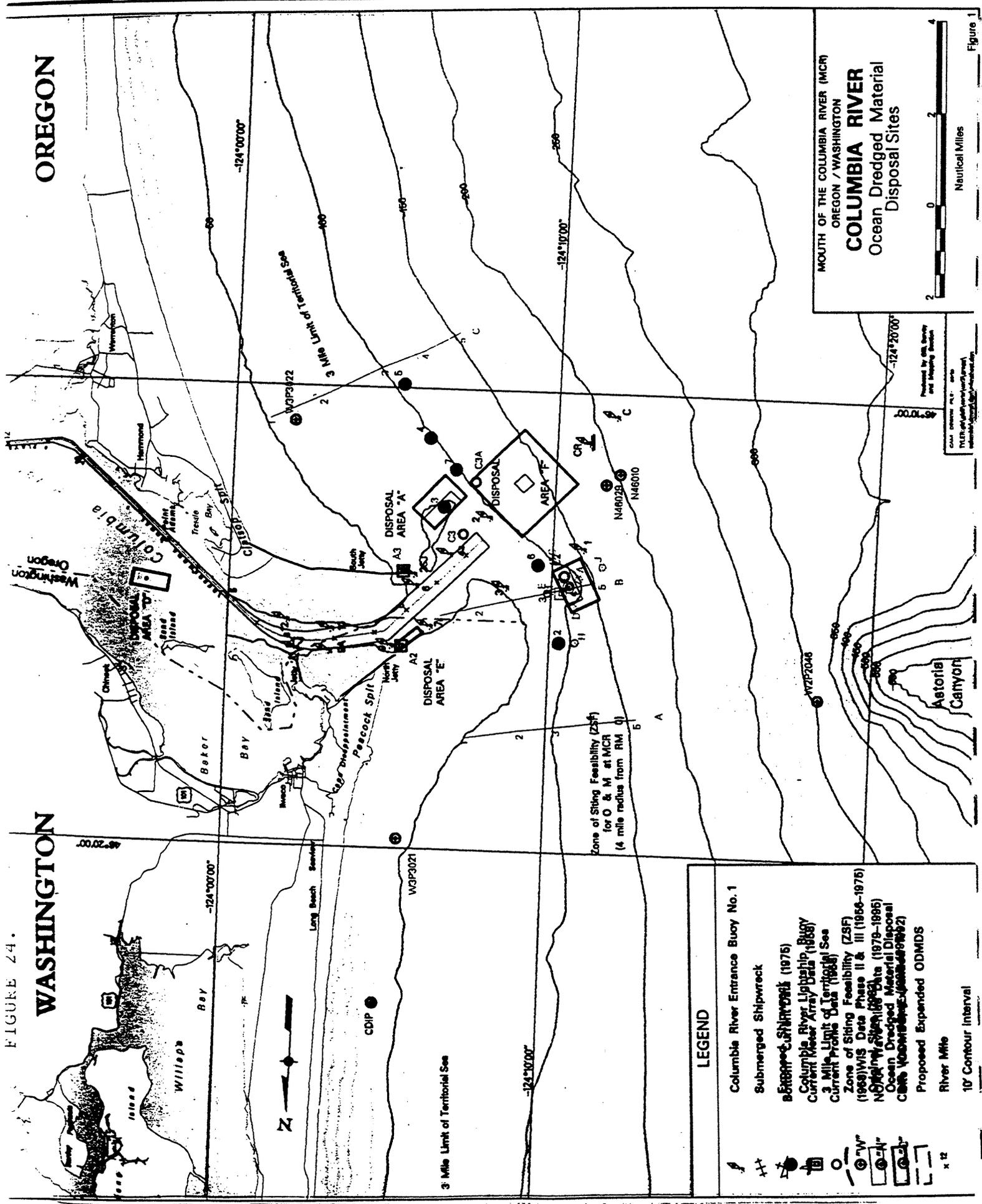
- EIS Scoping Nov 1994
- Draft EIS Public Riview Oct 1998
- Final EIS Public Review Jun 1999
- Record of Decision 2nd Qu 2000
- EPA Final Rule 1st Qu 2001

FIGURE 23.

MCR ODMDS PHYSICAL ENVIRONMENT

- Dredging and Dredged Sediment Disposal Performed by Hopper Dredges
- 4 – 5 million cy/yr of fine-medium Sand Dredged from Channel and Placed into ODMDSs ($D_{50} = 0.18$ to 0.25):
 - Site A = 800,000 cy/yr, Site B = 1.8 M cy/yr
 - Site E = 700,000 cy/yr, Site F = 900,000 cy/yr
- Seabed is fine Sand with Some Localized Silt Deposits (“mud holes”)
- Annual Average Wave Height = 7 ft, average annual wave period = 10 sec
winter storm waves = 30 ft high, 18 sec period
- Currents vary substantially with proximity to river Entrance:
Mean currents range from 0.5 ft/sec to 6 ft/sec

FIGURE 24.



OREGON

WASHINGTON

MOUTH OF THE COLUMBIA RIVER (MCR)
 OREGON / WASHINGTON
COLUMBIA RIVER
 Ocean Dredged Material
 Disposal Sites

Nautical Miles

Figure 1

LEGEND

- Columbia River Entrance Buoy No. 1
- Submerged Shipwreck
- Expended ODMDS (1975)
- Columbia River Lightship Buggy Current Meter Array Data (1988)
- 3 Mile Limit of Territorial Sea
- Current Profile Data (1985)
- Zone of Siting Feasibility (ZSF) (1989) VES Data Phase II & III (1988-1975)
- NOAA Hydrographic Data (1979-1986)
- Ocean Dredged Material Disposal Cells Washington (1985-1987)
- Proposed Expended ODMDS
- River Mile
- 10' Contour Interval

x 12

PREDICTING DREDGED MATERIAL BEHAVIOR
when placed in open water

SEDIMENT FATE PROCESSES
and
MODELS

Short-Term FATE: During disposal - Minutes to hours

Predicts the bathymetric distribution of dredged material as it has passed through the water column and impacts the seabed, on an individual "dump" (disposal vessel load) basis.

The model accounts for various disposal vessel, water column, and material parameters.

Long-Term FATE: After Disposal - days to years

Simulates morphological changes of bathymetric features due to sediment transport arising from the interaction of waves and currents.

The model accounts for waves, currents, tidal, and material parameters.

Multiple-Dump FATE: During and after disposal - minutes to years

Predicts the bathymetry at an ODMDS resulting from a series of "dumps" and simulates long-term change of the resultant bathymetry.

MDFATE uses components of STFATE and LTFATE to simulate a disposal operation which could extend over a year and consist of hundreds of "dumps".

ODMDS MANAGEMENT

Coupling of Site Monitoring and Prediction Results = Management Synergy

- At best, annual monitoring of active ODMDSs will show results of a disposal operation "after the fact".

Post-disposal surveys: can be used to prevent REPEATING a previous disposal oversight (mistake).

- Predicting dredged material behavior, *before* actually conducting a given disposal operation, can give foresight to "what if" questions:

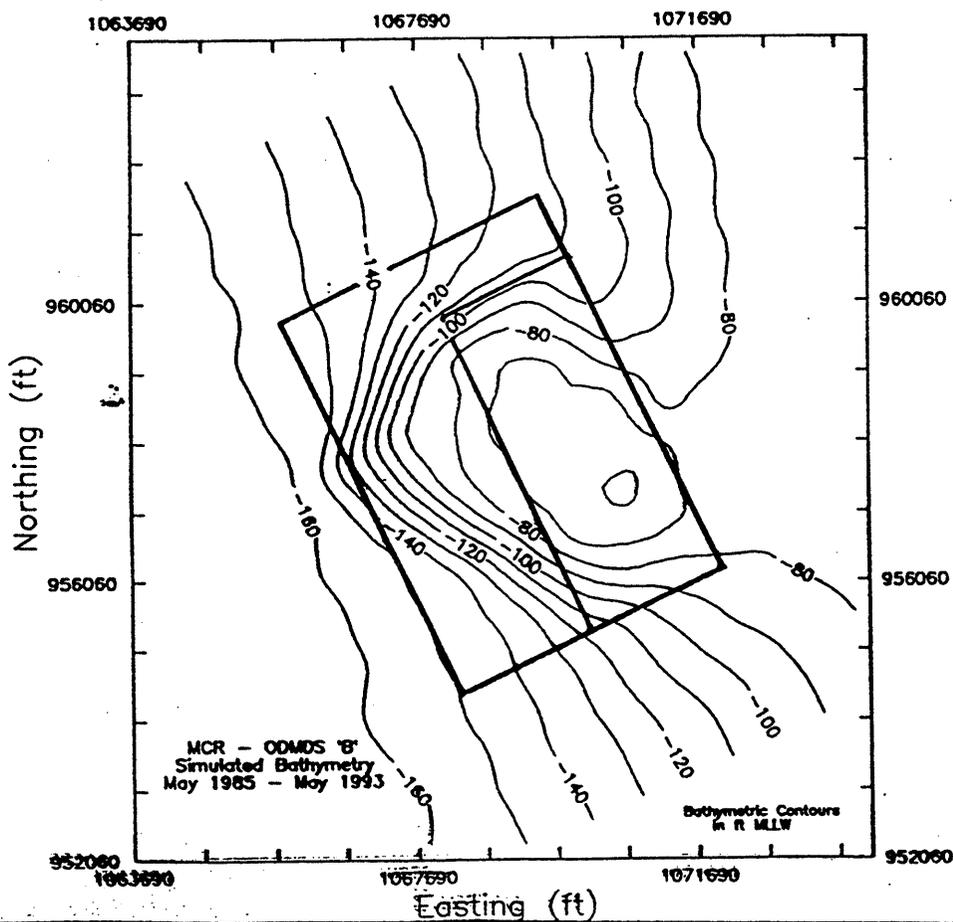
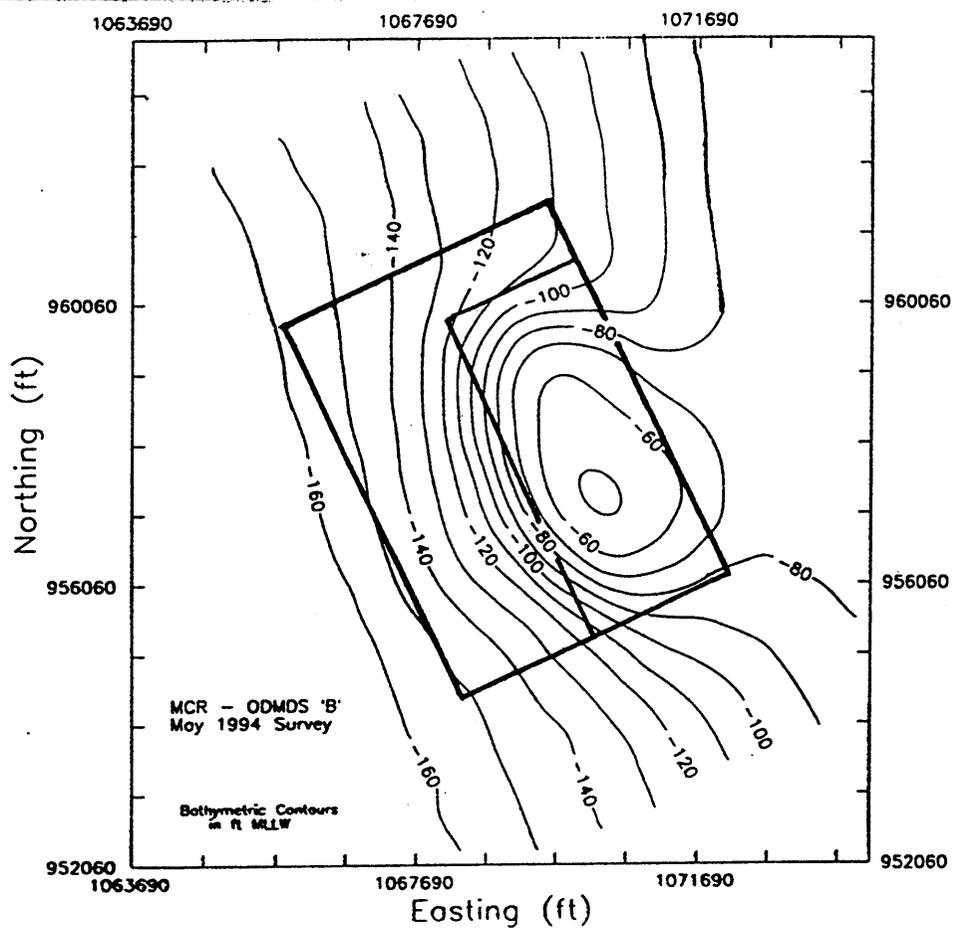
MDFATE Prediction: Determine in advance, if a proposed disposal operation will meet management requirements.

- Use *site monitoring* and *MDFATE predictions* together:

Perform site monitoring - Use the data to verify/improve MDFATE prediction.

Perform MDFATE prediction - Use predicted results to optimize disposal operation and "tailor" site monitoring to address suspected "hot spots".

FIGURE 27.



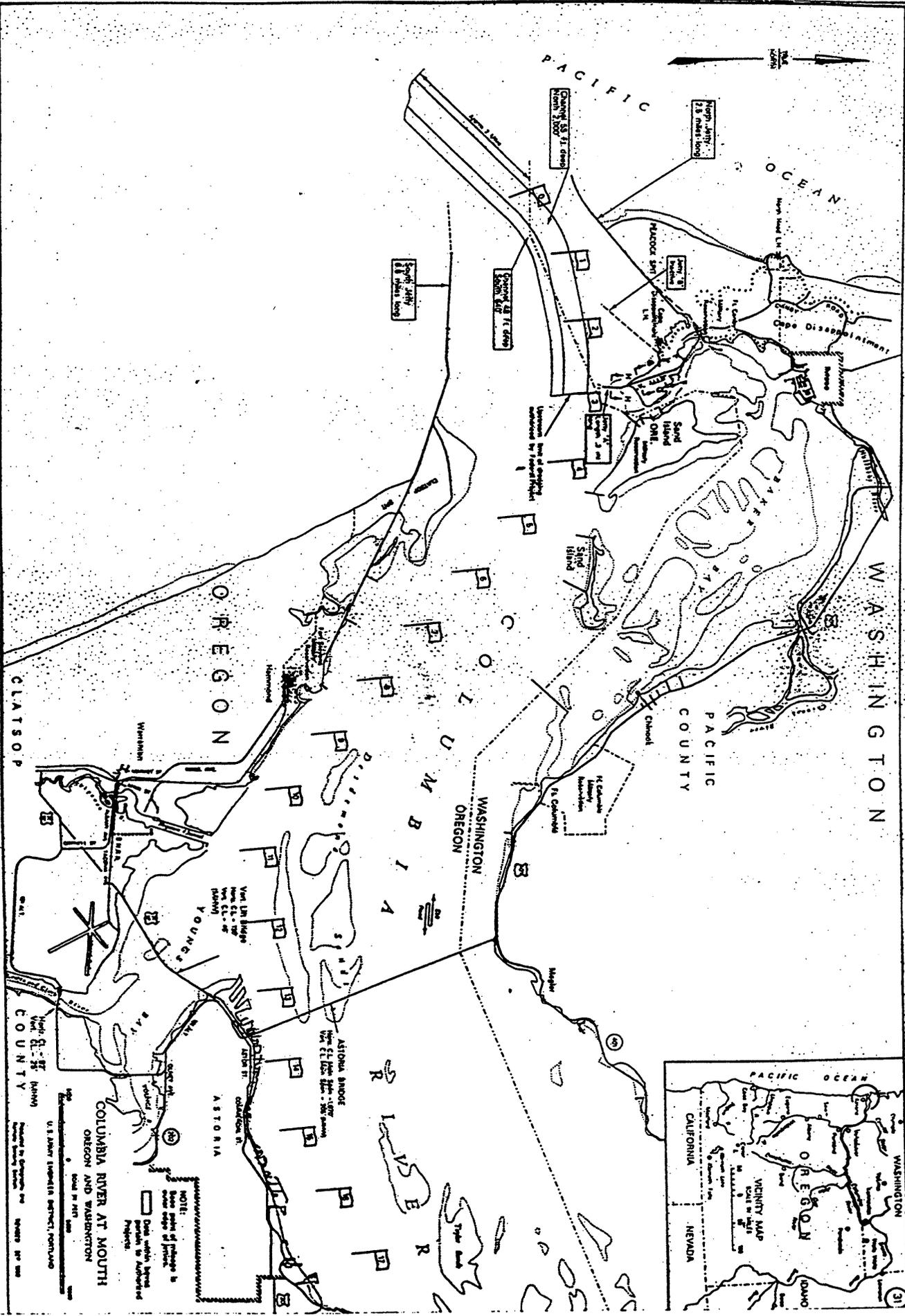
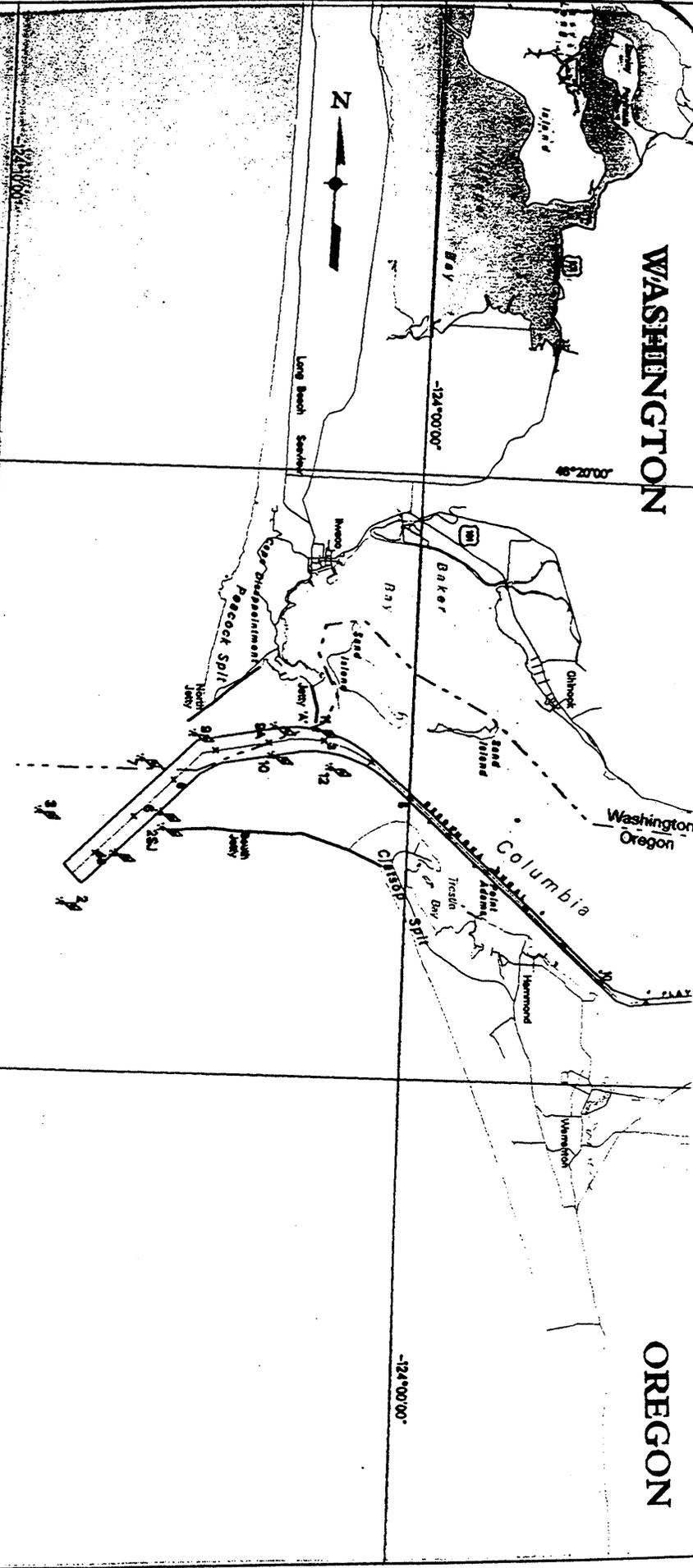


Figure 1. Mouth of the Columbia River project map

On Island Road Since 1880's - Now Rd Done 25'

WASHINGTON

OREGON



LEGEND

- Columbia River Entrance Buoys
- River Mile

46°10'00"

46°20'00"

-124°00'00"

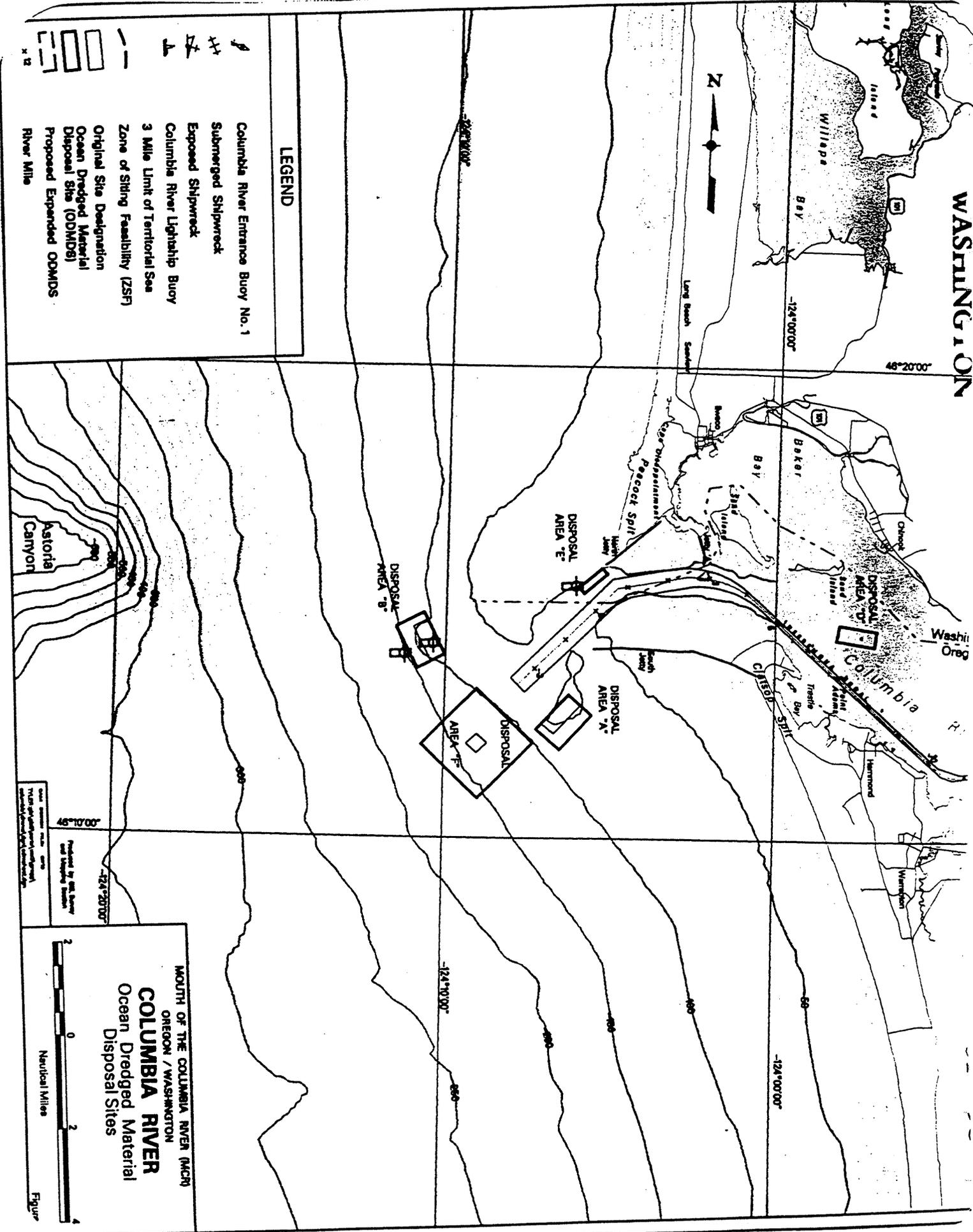
-124°20'00"

MOUTH OF THE COLUMBIA RIVER (MCR)
 OREGON / WASHINGTON
COLUMBIA RIVER
 Ocean Dredged Material
 Disposal Sites



Figure 1

WASHINGTON



LEGEND

-  Columbia River Entrance Buoy No. 1
-  Submerged Shipwreck
-  Exposed Shipwreck
-  Columbia River Lightship Buoy
-  3 Mile Limit of Territorial Sea
-  Zone of Siting Feasibility (ZSF)
-  Original Site Designation
-  Ocean Dredged Material Disposal Site (ODMDS)
-  Proposed Expanded ODMDS
-  River Mile

MOUTH OF THE COLUMBIA RIVER (MCR)
 OREGON / WASHINGTON
COLUMBIA RIVER
 Ocean Dredged Material
 Disposal Sites



Map prepared by the Bureau of Ocean Energy Management, U.S. Department of the Interior, and the U.S. Geological Survey.

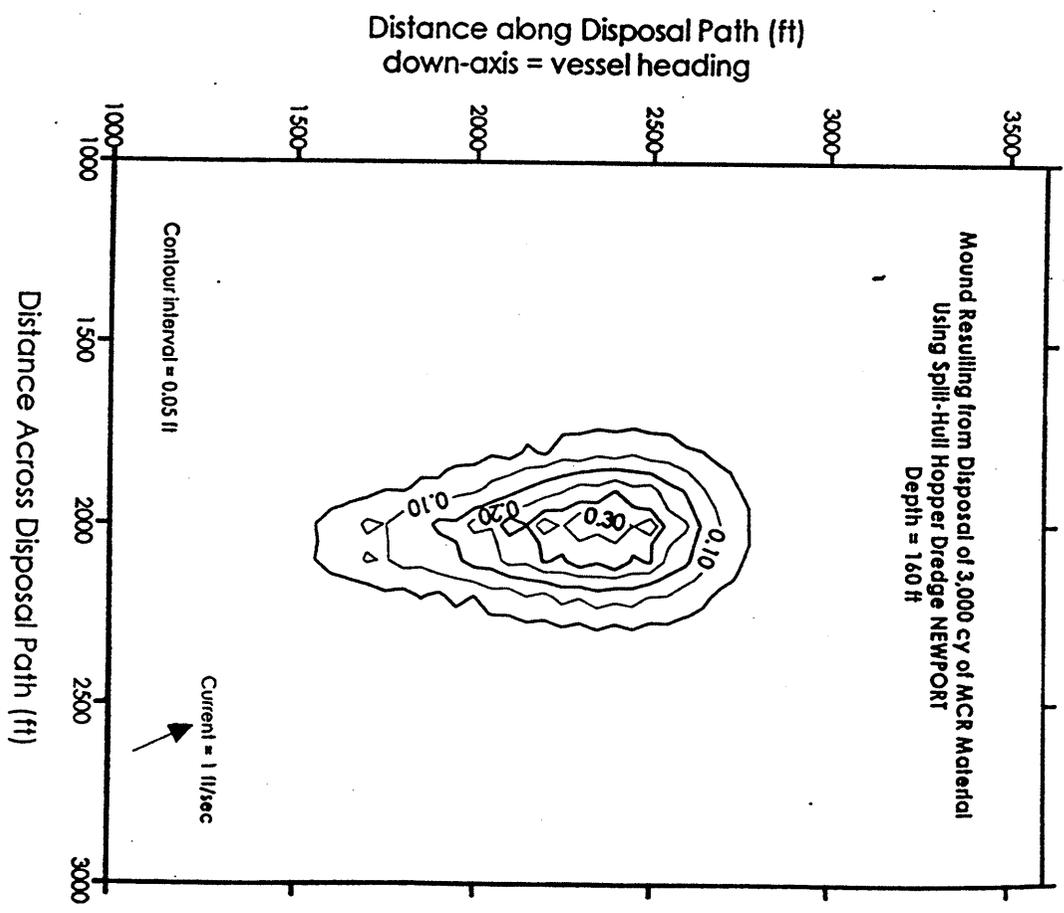
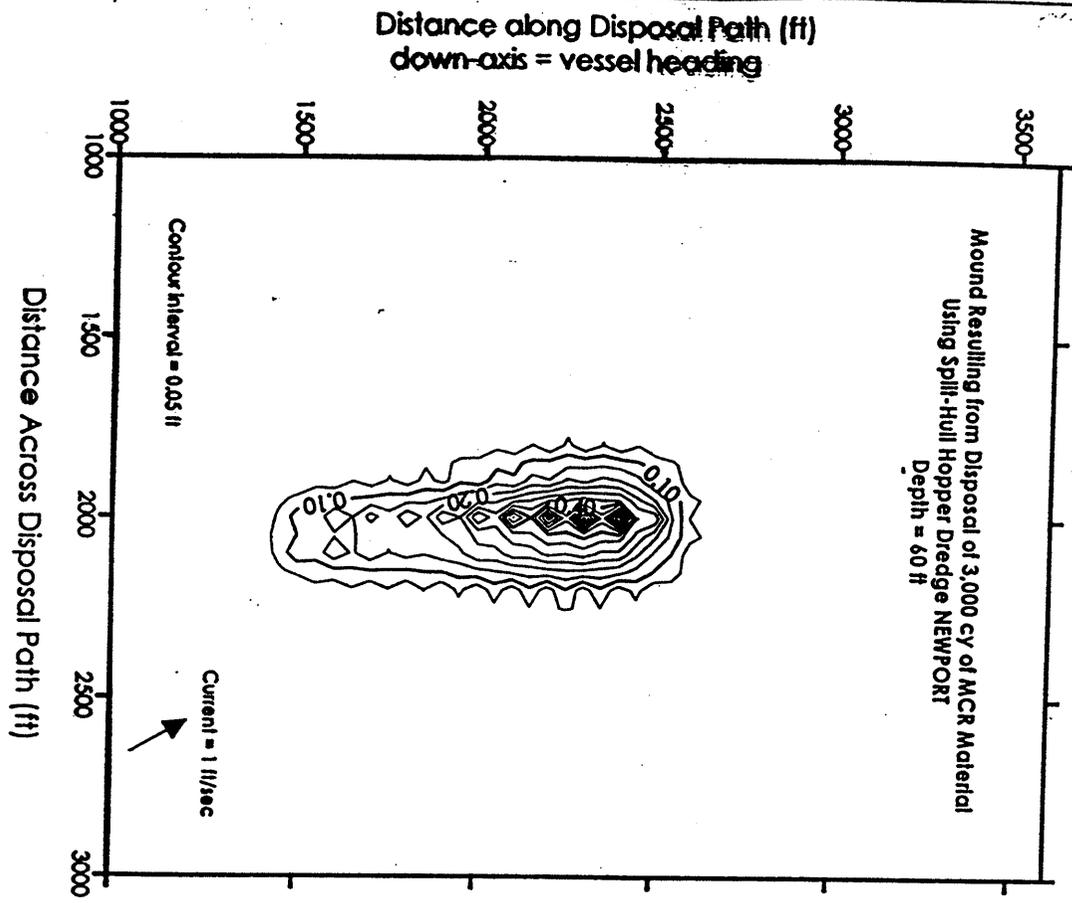
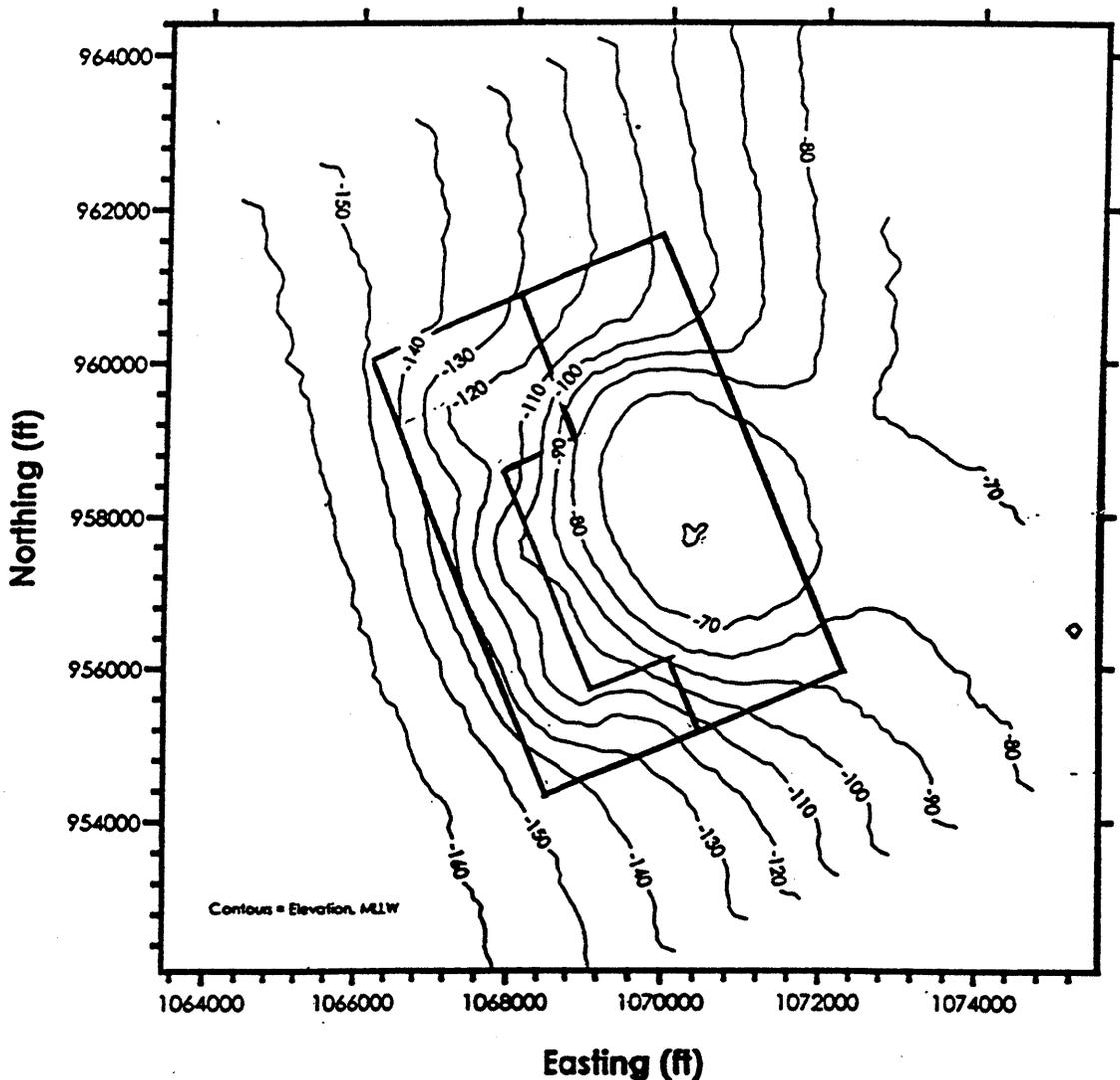


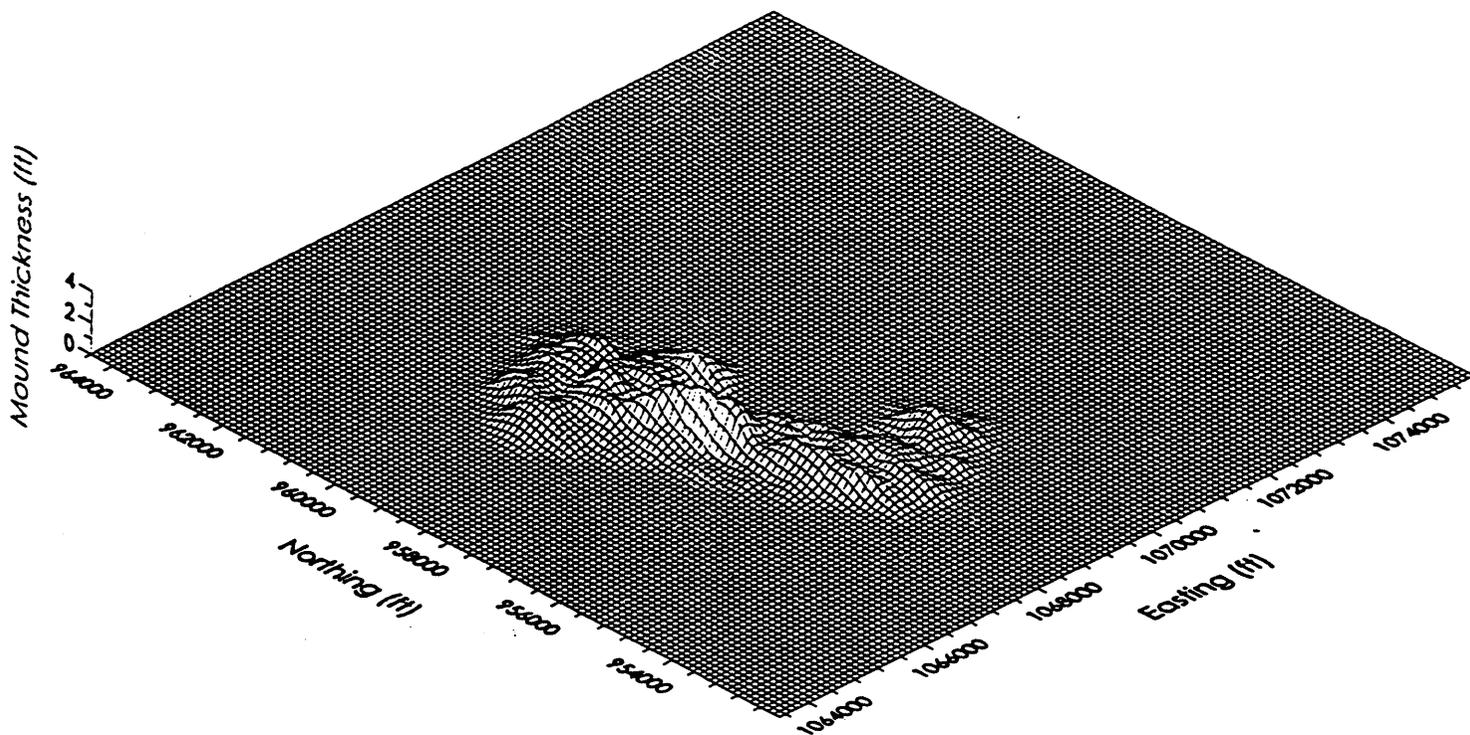
Figure 24. Predicted Footprint for Mound Resulting from One Dump by the Dredge Newport. Left Caption Applies for Dredged Material Placement in 60-foot Water Depth. Right Caption is for Placement in 160-foot Depth.

MCR ODMS B
May 1997: Prior to 1997 Dredged Material Disposal



1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18		
19	20		
21	22		
23	24		
25	26		
27	28		
29	30	31	32
33	34	35	36

Predicted Dredged Material Accumulation
ODMDS B: After 600,000 CY Placed in Western Half of Site
FY 1997 Disposal: According to 36-cell Placement Control Plan



SUMMARY OF SEDIMENT FATE MODELING AND HINDCAST RESULTS

- Areal Extent of Simulation = 2,000 ft x 5,000 ft (original ODMDS boundaries)
- Number of Years Simulated = 1985 - 1994 = 9 Years
- Total Number of Dumps Simulated = 5,801
- Types of Hopper Dredges Used & Percentage of Use:
 - Multiple Bottom Door = 53%
 - Split-Hull = 47%
- Assumed Placement Techniques:
 - Government Dredges Distributed Material Uniformly In ODMDS
 - Contractor Dredges Placed Material Randomly About Specific Dump Coordinates
- Total Volume Simulated (Placed) = 22.02 Million Cubic Yards
- Volume Modeled on Bottom = 21.2 Million Cubic Yards
- Net Volume Accounted for (Survey Differences) = 16.13 Million Cubic Yards

SUGGESTED TOPICS FOR FATE MODEL IMPROVEMENTS

Factors Affecting Mound Shape

- Positioning control of dredges during dredged material placement
- Currents (tidal and residual)
- Transport due to waves (non-closure of wave orbit at seabed)
- Difference in volume on seabed (simulated vs. actual)

Factors Affecting Actual Volume of Dredged Material on Bottom vs. Placed

- Concentration of solids in dredge
- Suspended transport (may be occurring) vs. bedload transport (modeled for sands)
- Depositional void ratio and longterm changes (consolidation via waves)

TABLE 1
ELEVEN SPECIFIC FACTORS FOR OCEAN DISPOSAL SITE SELECTION
(40 CFR 228.6)

1. Geographical position, depth of water, bottom topography, and distance from coast.
2. Location in relation to breeding, spawning, nursery feeding, or passage areas of living resources in adult or juvenile phases.
3. Location in relation to beaches or other amenity areas.
4. Types and quantities of wastes proposed to be disposed of and proposed methods of release, including methods of packaging the waste, if any.
5. Feasibility of surveillance and monitoring.
6. Dispersal, horizontal transport, and vertical mixing characteristics of the area, including prevailing current velocity, if any.
7. Existence and effects of present or previous discharges and dumping in the area (including cumulative effects).
8. Interference with shipping, fishing, recreation, mineral extraction, desalination, shellfish culture, areas of special scientific importance and other legitimate uses of the ocean.
9. Existing water quality and ecology of the site, as determined by available data or by trend assessment or baseline surveys.
10. Potential for the development or recruitment of nuisance species within the disposal site.
11. Existence at or in close proximity to the site of any significant natural or cultural features of historical importance.

TABLE 2
GENERAL CRITERIA FOR THE SELECTION OF
OCEAN DISPOSAL SITES
(40 CFR 228.5)

- a. The dumping of material into the ocean will be permitted only at sites or in areas selected to minimize the interference of disposal activities with other activities in the marine environment, particularly avoiding areas of existing fisheries or shellfisheries, and regions of heavy commercial or recreational navigation.
- b. Locations and boundaries of disposal sites will be chosen so that temporary perturbations in water quality or other environmental conditions during initial mixing caused by disposal operations anywhere within the site can be expected to be reduced to normal ambient seawater levels or to undetectable contaminant concentrations or effects before reaching any beach, shoreline, marine sanctuary, or known geographically limited fishery or shellfishery.
- c. If at any time during or after disposal site evaluation studies, it is determined that existing disposal sites presently approved on an interim basis for ocean dumping do not meet criteria for site selection set forth in Section 228.5-228.6, the use of such sites will be terminated as soon as suitable alternative disposal sites can be designated.
- d. The sizes of ocean disposal sites will be limited in order to localize for identification and control any immediate adverse impacts and to permit the implementation of effective monitoring and surveillance programs to prevent adverse, long-range impacts. The size, configuration, and location of any disposal site will be determined as a part of the disposal site evaluation or designation study.
- e. EPA will, wherever feasible, designate ocean dumping sites beyond the edge of the continental shelf and other such sites that have been historically used.

BENTHIC INVERTEBRATES OFF THE MOUTH OF THE COLUMBIA RIVER

-by-

Danil Hancock

Oceanographic Institute of Oregon

The purpose of the project is to collate and summarize the existing benthic invertebrate knowledge from the region offshore of the mouth of the Columbia River and then to evaluate these data to assist in selecting options for future disposal sites.

The benthos consists of those organisms which live on or in the bottom substrate and consist primarily of polychaete worms, crustaceans, and clams which provide an important food source for higher trophic forms (i.e. fish and crabs). Since benthic infauna tend to be less mobile than the epifauna they generally provide a more reliable indication of the productivity of a bottom region than would be gained by sampling of fish or crab which tend to move about. Sediments are known to be very important to marine invertebrate populations.

Benthic studies for selection or monitoring of disposal site activities have been undertaken in the region offshore of the mouth of the Columbia River since early 1997. Although the scope and focus of the individual studies have been different, and somewhat different methodologies have been used in the individual studies, the general information on species content and sediments appears to be comparable for some community parameters.

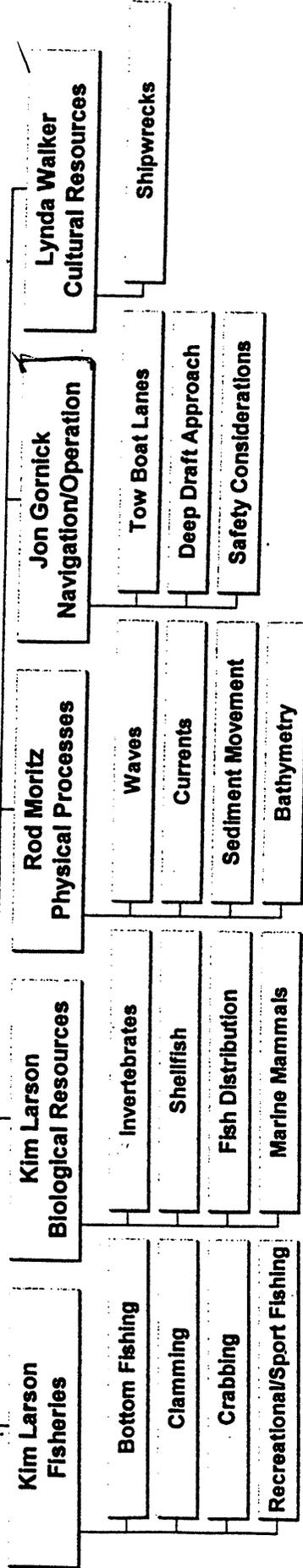
My review of the information indicates that the existing information can be collated and summarized and displayed using Graphic Information System. (Arch infor, Archview)

To date we have:

- Been able to locate the individual studies which have been conducted off MCR.
- Reviewed and evaluated pertinent information in these data sets.
- Held discussions with scientists involved in the original studies.
- Received from the District base overlay GIS map files including much of the coverage's of the sediment information.
- Located all of the individual sampling sites for the entire data sets for benthic invertebrates and sediments.
- Extracted and developed GIS coverage's for all of the sample location information (latitude and longitude & depth) from the existing data sets.
- Verified the sediment information we received.
- Developed GIS sediment coverage's from earlier studies
- Developed GIS benthic invertebrate coverage's for density
- Developed GIS coverage for the limited amount of crab and fish data.
- Generated some draft plots of various coverages for discussion purposes

Overlay Process

Mark Silpola; COE, John Malek; EPA
Ocean Dumping Coordinator



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