

Attachment D

Biological Baseline Study

Deep Water Site

And

Crab Abundance Study

Shallow Water Site

By

MEC Analytical Systems, SAIC, and EHI

Funded By

EPA, Region 10 and USACE, Portland District

2002

SCOPE OF WORK

1. PROJECT DESCRIPTION.

Portland District is working with the Environmental Protection Agency in their process of designating two ocean disposal sites off the mouth of the Columbia River. While the sites can be used by other entities or individuals, (through the Corps Regulatory permitting process) for dredged material disposal, the sites would primarily be used by the Corps for disposal of material dredged from the entrance channel to the Columbia River. One of the sites, the Deep Water Site, is new and was selected after a several year process with federal and states agencies as well as interested private groups. The site was selected using existing information and was located in an area that the group felt would be least impacting to the resources and fisheries in the area as well as having a capacity for the 50 year planning life of the disposal action. The site is located approximately 10 miles offshore of the Columbia River mouth in water depths of 200-300 feet. The second site is an expansion of a historic site (Site E) at the tip of the Columbia River north jetty. It is doubled in size to the west and is now referred to as the Shallow Water Site. It is a highly erosive area that is generally believed to be unproductive except for possibly Dungeness crabs in the late summer. It is located in water depths of 40-80 feet in an extremely high energy environment. A limited amount of biological and sediment sampling has been done at the deep water site¹. Results of this study has indicated that the site has moderately high benthic productive and is primarily fine grained sand. No previous sampling has been done at the shallow water site. A detailed description of the site selection process and available data is provided in Appendix H, Vol.1 and 2 to the Final Environmental Impact Statement for the Columbia River Channel Improvement Project which has been added to the CD for Solicitation DACW57-02-R-0010, Environmental Studies at Two Ocean Disposal Sites Off the Mouth of the Columbia River.

2. CONTRACTOR REQUIREMENTS

The contractor will be required to design an acceptable biological baseline study, conduct the study and prepare a final report that describes the study, the method of analysis and the final results. A comparison of these study results to previous studies in the area will also be required. This comparison will be used to assess the uniqueness of the site compared to rest of the coastal area. The proposed requirement will be issued by Request for Proposal, subject to availability of funds. The potential award date will be late spring to early summer in order that the sampling can begin in June of this year. Two seasons of sampling are envisioned, one in early summer and one in the late fall. The data analysis and report preparation will be completed by March 2003.

3. STUDY DESIGN CONSIDERATIONS.

It is envisioned that the study will be designed to adequately characterize the disposal sites from both a physical and biological standpoint. The study will involve an adequate physical and biological sampling of the sites. The data gathered will be used to establish baseline conditions as required by the site designation process so that a management and monitoring program can be developed. Sampling methodology as well as location and distribution of stations will be the responsibility of the contractor to design and recommend in the proposal. The sampling plan should be statistically credible as well as comparable with previous studies done in the area.

1. Hinton, S.A. 1998. Benthic infauna and sediment characteristics offshore from the Columbia River, October/November 1995 and June 1996. National Marine Fisheries Service, Seattle, WA

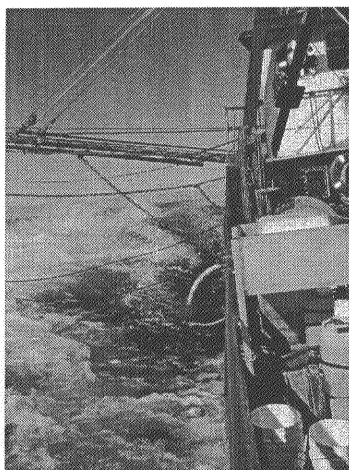
¹ Hinton, S.A. 1998. Benthic infauna and sediment characteristics offshore from the Columbia River, October/November 1995 and June 1996. National Marine Fisheries Service, Seattle, WA

Methodologies should also be compatible with the "Revised Procedural Guide for Designation Surveys of Ocean Dredged Material Disposal Sites" Tech Report D-90-8, Water ways Experiment Station, Corps of Engineers, Vicksburg MS. <http://www.wes.army.mil/el/dots/pdfs/trd90-8/preface.pdf>. The contractor can propose other methodologies but sufficient justification must be provided to insure statistical validity as well as comparability with historic data. Collection of data on Dungeness crab populations will be particularly suitable to innovative approaches. Data will be analyzed using recognized statistical techniques to adequately describe the populations of organisms at the site. Finally the study should be designed in a manner that the results can be compared to previous studies and an overall assessment of how the site fits into the coastal community. An evaluation will be done of pelagic fish, in particular juvenile salmonids' use at water column over disposal sites.

MCR Ocean Disposal Sites

Preliminary Results on July 2002 Survey

MEC Analytical Systems, SAIC and EHI



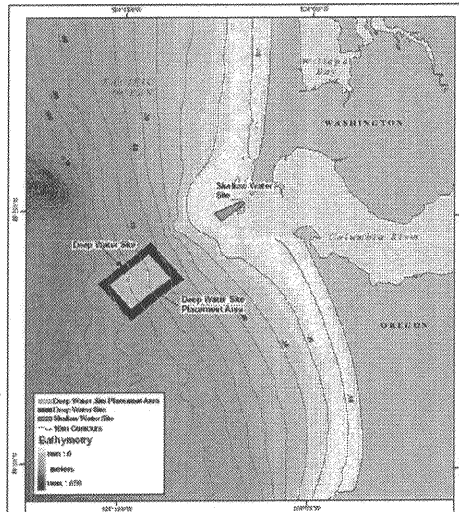
Presentation Objectives

- Overview of study objectives
- Overview of planned and accomplished sampling activities
- Preliminary data results
- Brief summary of September survey



Study Objectives

- Evaluate The **RELATIVE** Abundance Of Fishery And Ecological Resources **WITHIN AND BETWEEN** Alternative Disposal Sites.



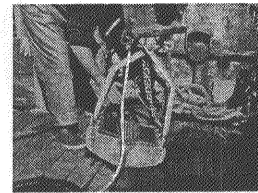
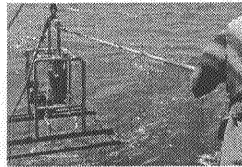
SAMPLING OBJECTIVES SHALLOW WATER DISPOSAL SITE

- Trappable Dungeness Crab Assessment Using Modified Commercial Crab Pots
- Demersal Fish and Invertebrate Assessment Using a Modified Willis Otter Trawl.

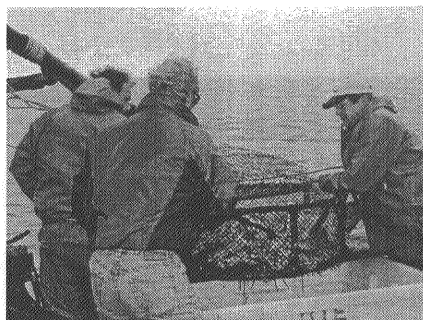


SAMPLING OBJECTIVES DEEP WATER DISPOSAL SITE

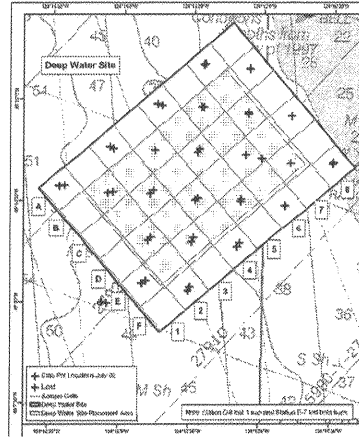
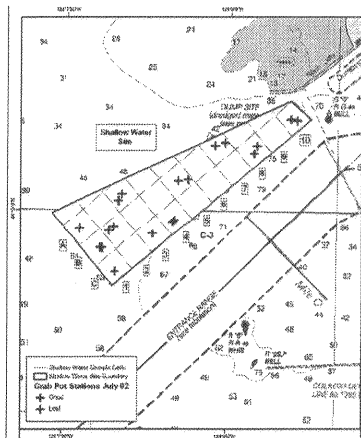
- Trappable Dungeness Crab Assessment Using Modified Commercial Crab Pots
- Demersal Fish and Invertebrate Assessment Using a Modified Willis Otter Trawl
- Distinguish Benthic Habitat Types Using Sediment Profile Imaging (SPI)
- Compare Benthic Community Structure and Function Within Deep Water Habitat Types Using Benthic Grab Samplers (Modified Double Van Veen Grabs)



MODIFIED COMMERCIAL CRAB POT SURVEYS



CRAB POT SURVEY LOCATIONS



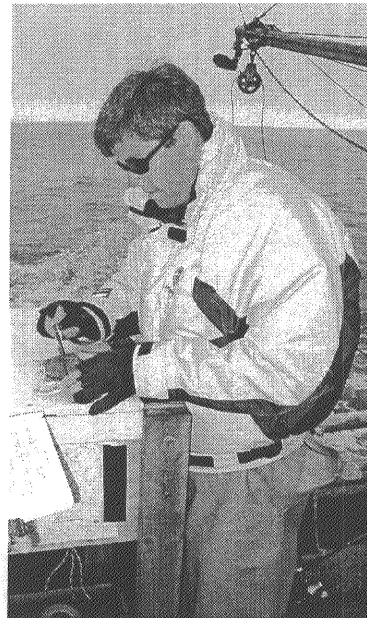
CRAB POT DATA SUMMARY

Shallow Water Site

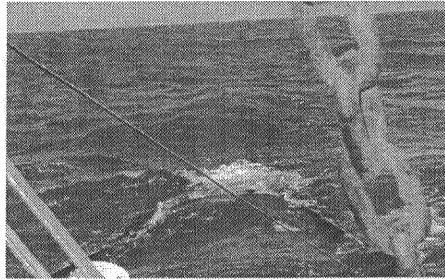
- <77 Crab/24 hour soak
- 18/22 deployments recovered
- 451 crab recovered = ~25/pot/24 h soak
- Average carapace length = 5.1 inch
- Majority were female (~75%) and < legal size
- Majority were relatively soft (merus deflection with slight pressure)

Deep Water Site

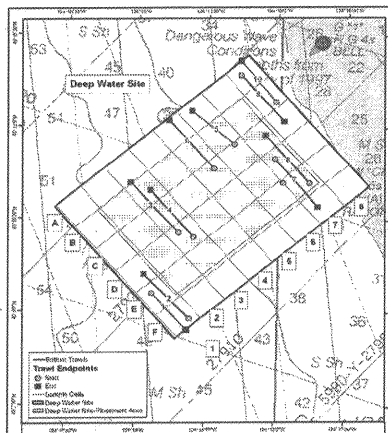
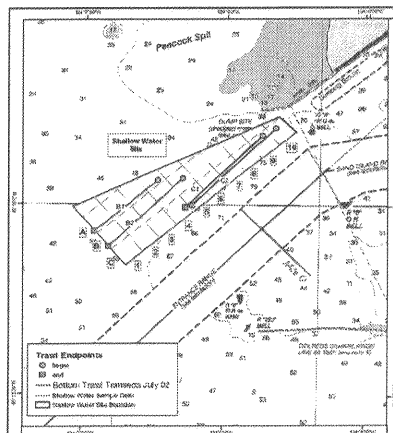
- <10 crab in one 24 hour soak
- 46/48 deployments recovered
- 82 crab recovered = <2/pot/24 h soak
- Average carapace length = 5.5 inch
- Majority were female (~80%)
- Majority were hard
- **Deep water crab were harder and larger on average but much fewer (>10-fold)**



MODIFIED OTTER TRAWL SURVEYS

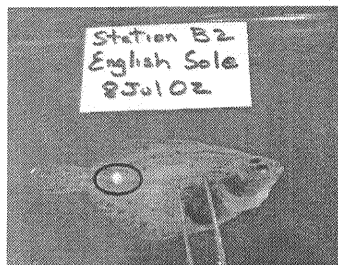
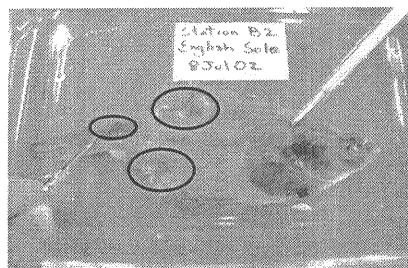


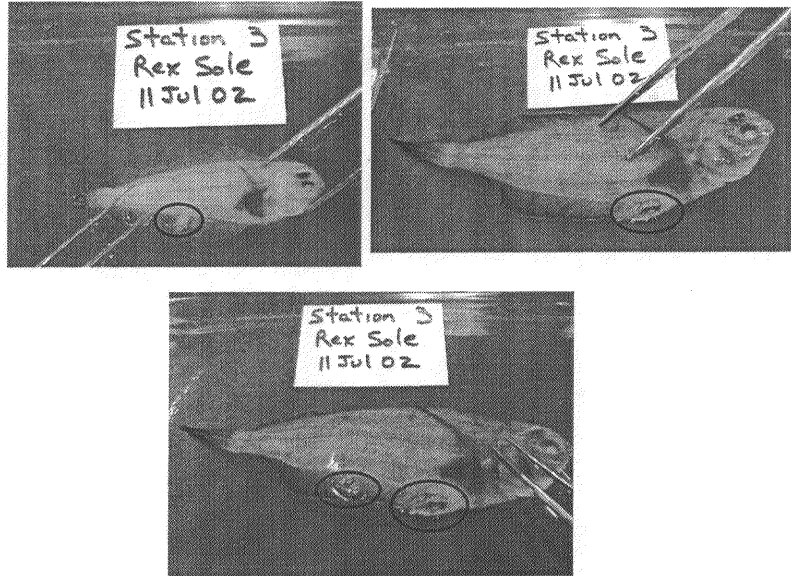
MODIFIED OTTER TRAWL SURVEYS



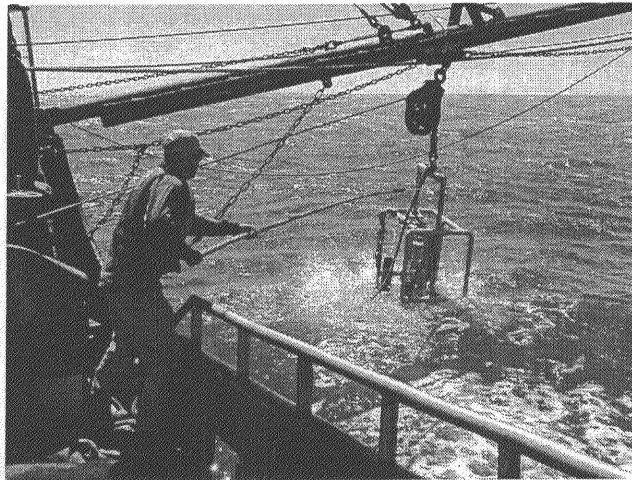
MODIFIED OTTER TRAWL SUMMARY OF SURVEYS

- **Shallow Water Disposal Site – (Round Fish and Crab)**
 - **No. Species** – 1-14 fish, 1-5 of invertebrates
 - Dominant type of species – round fish, shrimp
 - **Abundance** – 5-762 fish; 82-149 invertebrates
 - Most abundant – Tom Cod (<228)/Eulachon (<356); Crangon nigrocauda (<149)
 - **Biomass** - <1-78 kg fish; < 50 kg of inverts
 - Highest biomass – Big Skate (<48 kg); Dungeness Crab (< 50 kg-estimated)
 - **Diversity** – 0-1.96 Margalef fish;
 - English Sole with **tumors** (~10%)
- **Deep Water Disposal Site - (Flatfish and echinoderms)**
 - **No Species** – 5-11 fish; 5-12 inverts
 - Dominant type of species – flatfish/starfish; shrimp; anemones
 - **Abundance** – 43-1179 fish; 12-110 inverts
 - Most abundant – Pacific Sandab (<1072) or Rex Sole (<168); Crangon spp (<89); Luidia (<37); Metridium (<20)
 - **Biomass** – 2-52 kg fish; <5kg inverts
 - Highest biomass – Pacific Sandab (<34kg); Metridium/Pycnopodia/Rathbunaster (<1.5kg)
 - **Diversity** – 1.4 – 1.8 Margalef fish;
 - Rex Sole with **tumors** (~15%)

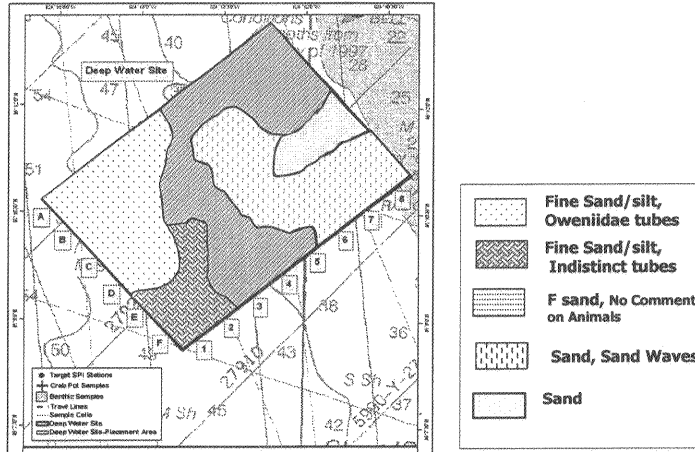




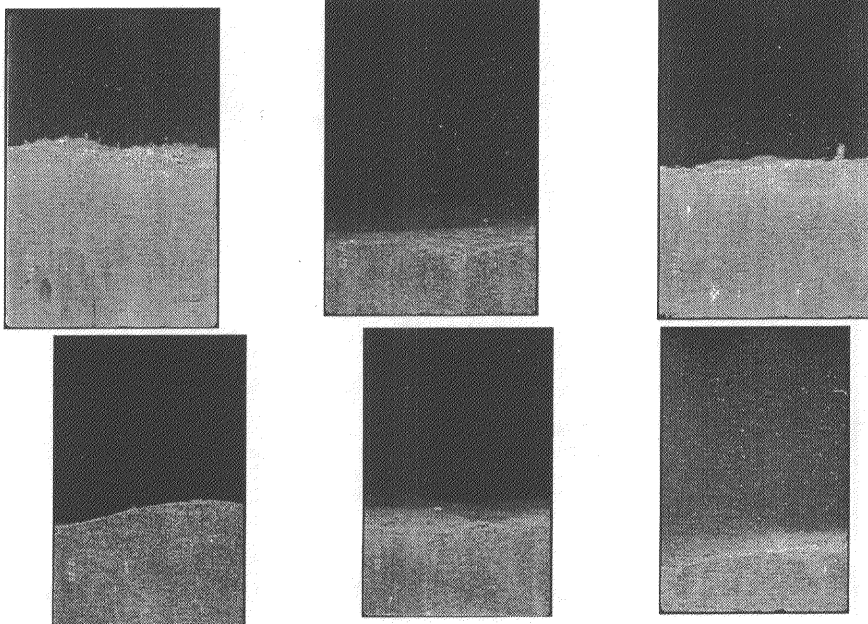
BENTHIC HABITAT TYPES USING
SEDIMENT PROFILE IMAGING (SPI)



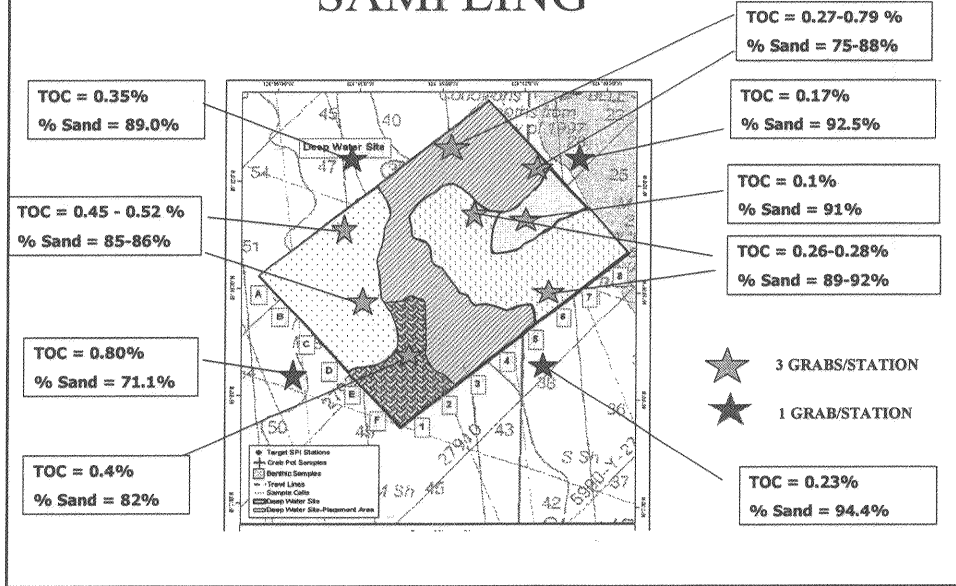
BENTHIC HABITAT TYPES USING SEDIMENT PROFILE IMAGING (SPI)



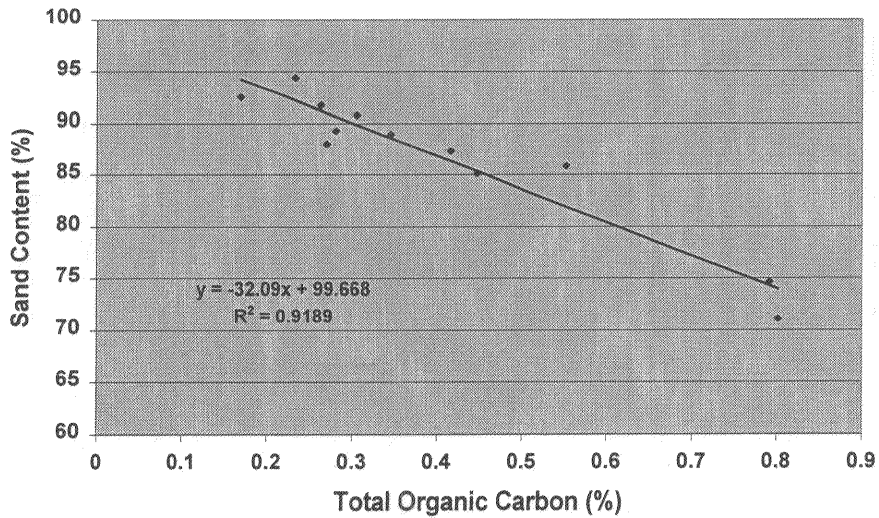
SPI COMMUNITY TYPES



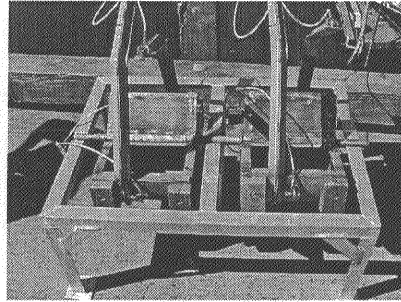
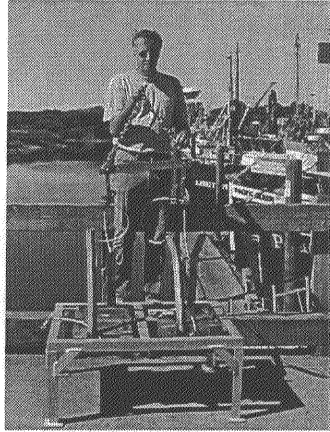
SPI SELECTION FOR BENTHIC SAMPLING



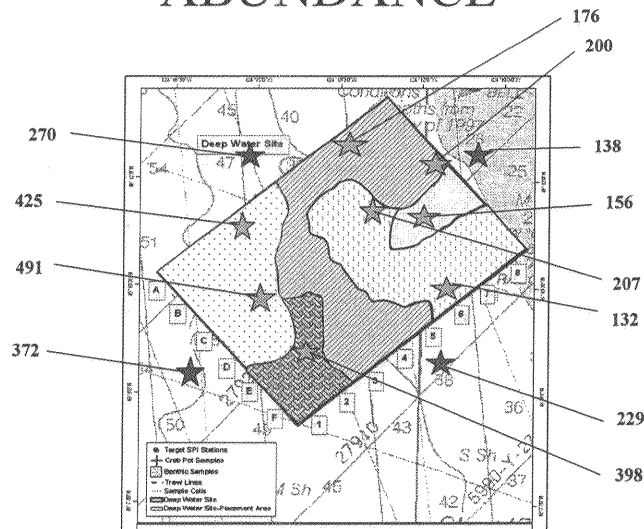
Relationships of Sediment characteristics



BENTHIC INFAUNA



BENTHIC INFAUNA ABUNDANCE



Relationship of Sediment Characteristics to Benthic Infauna

