
MEETING NOTES
OCTOBER 22-23, 1997

Introduction

On October 22, 1997, the U.S. Army Corps of Engineers, Portland District (Corps) convened a meeting at the Port of Astoria Offices to discuss offshore disposal options for the dredged material from Mouth of the Columbia River (MCR) and the Columbia River Channel Deepening Projects. The purpose of this meeting was to review and discuss overlay maps created from information gathered at previous meetings for the purpose of identifying candidate sites for offshore disposal. Representatives from state, local, and federal agencies were in attendance, as were individuals representing crab, oyster, and trawl fishing industries. Twenty-five individuals registered on the first day of 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.

Facilitator's Introduction

Valerie Lee explained that her role as a facilitator is as a neutral party to assist the group in identifying common ground. She stated that she would encourage the participants to reach consensus on issues where possible. Valerie opened the meeting by outlining a proposed agenda. She also introduced co-facilitator Margaret Merrens. No changes were made to the draft agenda.

Opening Remarks

Kim L opened the meeting by explaining how he and other individuals from the Corps had recently reviewed the minutes from past meetings in order to identify questions and issues raised by participants. It was the intent of the Corps to address any unanswered questions at this meeting. Kim explained that Eric Braun would address navigational issues, he would respond to biological questions, and Danil Hancock would briefly address any questions with regard to benthic studies.

Operational Issues

Eric B stated that he would review issues pertaining to operations; it is the Operations Division that has responsibility for day to day maintenance at the MCR. Eric stated that he would address several questions raised at the July 10 meeting, including:

1. Existence of 3 new 6,000 cy Hopper Barges
2. The Expanded Zone of Siting Feasibility (ZSF)
3. A Complete History of Corps' Dredging Activity
4. The Corps Response to 1997 Water Quality
5. Mariner Notice - Did it go Out?

Hopper Barges: Eric stated that the Corps had checked with the local dredging companies (Manson and Dutra) about the availability of new barges. Two new barges are under construction. Neither could be used for dredging at the entrance of the MCR, but they could be used further upstream in the channel.

Consideration of an Expanded ZSF: Eric explained that the ZSF is a management tool to limit study effort to only those areas which would meet project needs. The ZSF allows the Corps to meet the operational needs of a project. Under certain circumstances, the Corps would be willing to consider going outside a designated ZSF, so long as project needs can still be met and, most importantly, the Corps can still maintain navigation and safety in the channel. Eric stated that the ZSF is not a hard and fast line. If the Corps has the capacity to dispose of more material close to shore, then it may be possible to select sites outside of 4.5 miles as well.

History of Dredging: Eric explained that a handout had been distributed at the last Working Group 3 meeting that provided a complete history of the Corps' dredging activity since 1955. He distributed the handout again together with a bar graph depicting disposal between 1977 and 1987. Eric explained how variable river flow and conditions had led to variability in the volume of material dredged each year. On average, approximately 4 million cu. yds. of material has been dredged per year between 1990-1996. Eric explained how dredging averages also may vary as a result of other demands for dredging outside of the Columbia River channel. He stated that 3 major deepening events have occurred - a 40 foot entrance completed in 1918, a 48 foot entrance completed in 1957, and a 55/48 foot entrance completed in 1984.

COE Response to 1997 Water Quality Certificate Requirements: Eric explained that many of the concerns/requests raised in the 1997 Water Quality Letter from state agencies were currently being addressed in these ongoing workshops.

Notice to Mariners: A question had been raised about whether a Notice to Mariners had ever gone out with regards to this season's maintenance dredging. Eric explained that such a notice had been distributed on or about July 15, 1997.

Edith B stated that Jon Gornick, when describing the ZSF at the first meeting, had explained that 4.5 miles was the maximum distance the Corps could go with the hopper dredge. She asked for clarification on Eric's statement that the ZSF is more flexible.

Eric B confirmed that the ZSF is flexible, but such flexibility is based on economic considerations including dredge availability year to year. He reiterated that in order to go outside the ZSF, increased disposal must take place within the ZSF as well.

There was a discussion about the manner in which dredging can occur. Through a series of questions and answers the participants learned the following:

- A dredge averages a speed of 6-10 knots when under way. When a dredge like the *Essayons* is disposing it slows down to just a couple of knots.
- Dredge speed is limited by safety considerations when the doors are open for when the doors are open the dredge is at risk.
- John M. pointed out that in the past dredges had gone out and opened their doors as fast as possible in order to get material out within the designated site. Now, however, with the availability of slightly larger sites and a desire to avoid mounding, dredges certainly have the capability to open slowly, increasing the disposal time and the size of the footprint with less accumulation. John stated that in Puget Sound dredges have been able to open slowly while placing a cap over contaminated sediments. He explained that in Puget Sound they have sought to achieve minimum discharges, taking as much time as 1 hour.
- Eric B explained that where a management plan is developed for a site, yes, the method of disposal would be in the contract. He explained that no such management plan currently exists, and it would increase costs.
- Eric B explained that cells were used in Site B to prevent pinpoint disposal and further build up of material. Disposal was initiated within designated cells as was explained at an earlier meeting. Given the quantity of material and space the Corps had to deal with in Site B, however, there was no opportunity to conduct thin layer

disposal there. He also explained that the Corps did not use Site F this season, but had they, disposal would have been occurred in cells as well.

Bob asked if the barges which might be used for the channel deepening project were self-propelled. Eric B answered no, but the hopper dredges are self-propelled. He also explained that the barges do not have suction equipment on them, and this is why they would not be appropriate for use at the MCR. Eric B also explained that the combination of suction dredges with barges is a combination only possible up river.

Benthic/Biological Issues

Danil Hancock (OIO) responded to issues and questions raised in previous meetings. He asked if all the participants had obtained his report. He explained that the new, updated version had all the pages correctly collated. He explained that Susan Hinton from the national marine Fisheries Service (NMFS) was here today. She is the author/co-author on most of the information that Danil has presented and she could assist with questions the group may have.

Danil explained that at the last meeting of Working Groups 1&2 he had been requested to use the benthic invertebrate data he had collated to produce an overlay map incorporating the data from all sampling stations on one map. Danil presented a map depicting sampling locations. He explained that 5 or so replicate samples had been collected at many of the stations. He explained that he gathered information for each sampling point to depict the number of benthic invertebrates per meter squared for each location. This information was then transferred to a geographic information system (GIS) where they were able to take the data set, and lump all the information together into a visual display (overlay). Danil explained that this method enabled them to evaluate outlier data points, and eliminate them where appropriate.

Danil stated that each study was run individually, producing several contour lines indicating differing concentrations of benthic invertebrates. He explained that the contour lines depict the following concentrations:

Red = lowest concentrations	0-500 individuals/m ²
Blue = middle concentrations	500-2000 indiv/m ²
Green = highest concentrations	>2000 indiv/m ²

Danil stated that the overlay depicts a summation of all of the information available to him. Concentrations are indicated by contour in exactly the same way that a depth would be depicted. He explained that this type of presentation provides a "big picture" of density based on the 1973-1994 data.

Danil H explained that "both;" the green lines in the disposal Site F indicates high density of invertebrates and multiple contours indicate multiple studies. He indicated that some smoothing of data had occurred to eliminate outliers.

Kim L pointed out that all green lines represent high densities. But many green lines (concentration) does not mean more density, it merely means more sampling in areas.

In response to questions about the accuracy of results, Danil H remarked that he felt the overlay provided a good picture of what is actually going on off the MCR, based on his understanding of the science.

Bob Burkle asked for confirmation that the contour line itself was the only confirmed density and the area inside the line may have a completely different density. Kim L responded yes; it is the line which represents density. Kim acknowledged that this can be confusing, and pointed out that green stations represent areas of high density and areas of which the group should be aware .

Steve B stated that he had raised (in a previous meeting) a concern about the timing of disposal and the obtaining of different sampling results based on the time of collection.

Danil H stated that he responded to this concern in his report and can provide information as to which samples were taken before, after, and during disposal.

Kim L stated that most of the Site F data, for example, was taken after disposal was initiated. Results showed high rates of population rejuvenation after disposal.

Diane P asked for more information regarding population patterns following disposal. Danil H responded that following a disposal event, original populations lower and opportunistic species strengthen, original species then return and if given time will increase to higher densities were originally found. Dale B asked how long it takes for this pattern to occur; first, to reach the opportunistic phase and second, to reestablish original species. Danil H stated that he could not give an exact estimate (since studies occur quarterly and not daily) but could provide a ballpark figure. He estimated that an area would return to reference levels (original population) in about 17 months.

Mark Siipola provided background information to the Site F studies. He stated that 2 million cubic yards of Tongue Point material was placed on Site F in 1989. A baseline study was conducted in June 1989 and the disposal/ dump occurred in September. Six months following the disposal, there were greater densities of organisms in the disposal area than in surrounding area. He also pointed out that although the whole area saw a population increase that year, Site F saw a doubling in populations.

Mark S stated that they found polychaetes present everywhere in their studies. They recolonized the area first and were then replaced by more sessile organisms. He stated that the increase occurred everywhere out there; eight additional studies found new species, not just at disposal areas, but coastal wide.

Kim L explained that there have been a fair number of recolonization studies done elsewhere with the same results, without the influence of recolonization by incidental species like at the MCR. Recolonization occurred in 6-7 months in other areas.

In response to a question regarding whether there was species composition recovery or just density in a 6 month period, John M explained that immediately after disposal, opportunistic species take over, then these winnow out within a year to 17 months giving way to original species composition and densities. This has been proven to occur in areas of disturbance, whether by dredging or disposal.

Arlene M asked whether there would be any recovery of species if site disposal occurs and then occurs again prior to 17 months, as within a 12 month time frame. John Malek responded that generally, if disposal or dredging occurs at a virgin site and is then left alone, it will follow this cycle. He stated that on the east coast dredged sites are some of the most productive areas, but management of a site is key to maintaining levels of production.

Mark S stated that if disturbance to an area occurs year after year, it would have less recovery than if left alone. The Tongue Point area showed recovery in 6 months with greater species composition and concentrations.

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Dale B asked if there was evidence of a difference in the maturity level of what returns to a site. Mark S responded that most species are mobile and there is no evidence of more or less adult species.

Susan H explained that most of these organisms probably reproduce one to two times per year, so both adults and juveniles will be present. There should be no difference between a site versus the area outside of a site.

Bob B stated that this was different from the disturbance trends seen after a clearcut. He asked if the correlation, described in Danil's report, between shallow areas and low productivity could be demonstrated on the overlay map.

Danil H explained that general trends are obvious - with less density inshore. He stated that the map does not depict density changes by season or year though.

Jim N asked why Site A had not come back. It was his opinion that there was nothing on it, no crabs or anything else.

Kim L was not aware if the Corps had conducted similar monitoring on disposal Site A.

Danil H said that one thing to keep in mind is that the rate of sediment turnover is an ecological term. Whether by storm or dredging, etc. (it could be a natural process or man-made) there is a system in place. When the system is used to disturbance events, it has the capacity to recover. Danil explained that this is exactly what can be seen occurring off the MCR. The MCR is a complex system with the capacity to recover, but if the physical structure is changed by mounding, waves might increase and thus disturbance on bottom might remain constant. This may result in changes to species composition in an area, but Danil stated he could not be sure that this was happening at Site A.

Ben M explained that recolonization is also dependent upon the mounding system and offshore nature of a site. He stated that until conditions occur to bring organisms offshore to the new sediments and environment it may take awhile to recolonize the area.

Kathi L pointed out that the green lines (indicating higher densities of organisms) near Site A may have been taken prior to mounding.

Danil H explained that the data on the overlay goes through 1994, and he was not aware when Site A was used last. Mark S added that the outer third of Site A had been used recently.

Danil H asked how long it had been since crabs were present at Site A. Jim N explained that it had been 2 years since he had seen crabs at the Site.

Steve B asked Danil to explain the red line encircling area F. He asked what might be inferred by this line, whether it was a random occurrence or had some biological explanation. Danil H answered that it was difficult to say exactly why this phenomenon was occurring. He stated that high densities of organisms in Site F may be due to the fact that fine sediments have been disposed there, and perhaps prior to dumping the densities were all lower.

Mark S explained that some sites have had more intensive sampling than others and this affects how averages look. He explained that Site F might have more red lines, or look all red (indicating medium densities) if some of the extra data points were taken out.

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Kim L told the group that the overlays would be copied and distributed, but not immediately.

BREAK

After the break discussion resumed regarding the overlay presented by Danil Hancock.

Edith B asked if Danil was comfortable with the overlay that was produced from the data he had collected. Danil H responded that the overlay was consistent with other studies, as he understand them, with his report and with his initial GIS reports. He summarized the trends as follows: densities generally increase as you go offshore; there are some lower densities to the north; and the mudhole has high densities. He stated that he did not see anything that did not fit.

Edith B asked for an explanation of the crab data for sites A and B. She stated that the benthic data showed increased levels of organisms at these sites, yet it was her opinion that crab densities were low. Danil H explained that he could not answer or respond to why crab densities might be low since he was not a crab expert.

Danil H explained that that none of the studies he reviewed address thin layer disposal. He stated that thin layer disposal has not been studied off of the MCR, nor has it been mandated.

Eric B explained that thin layer disposal has not been used yet, since the Corps has been confined to the existing sites. Mark S added that the Portland District has not been able to operate using thin layer disposal. He explained that the Mobile District's use of thin layer disposal and the Rees' Study were mandated by Congress and that the Rees' study provided a good analysis of thin layer disposal.

John M added that some of the concepts behind thin layer disposal came from a realization that there appeared to be less impact to the outer edges of east coast disposal areas.

There was a series of questions and answers surrounding the issue of what happens after disposal or natural disturbance. Danil H explained, in response to comments made, that he did not consider the species that recolonize after disturbance "trash species"; they are merely opportunistic. Opportunistic species enter and take over after a disturbance. This is called succession. As in the case of forest succession, these species are not considered weeds, but opportunistic species that enter to prepare a site for eventual levels and ecosystems. Mark S explained that the opportunistic species are not nuisance species, nor are they exotic or new to the area; they are always out there.

Danil H explained that when a new habitat can be created by a dredging event or natural events such as ripcurrents or tsunamis a re-colonization event occurs in that habitat. Flatfish, for example, enter in larval form, lingcod by migration, etc.

Edith B stated that while ocean currents might whip up in winter, they do not occur during the molting season. Danil H stated that strong ocean currents or storms might occur at anytime of the year and can be a natural means by which habitat is changed.

Edith B responded no, that she had a discrepancy in opinion about this, and she believed that big storms did not occur during the summer.

Steve B asked Danil where he might recommend placing a site based on the information he had reviewed. Danil H answered that it was not his job to select a site, but instead to provide information to the group for their use. He stated that he had pointed out where benthic densities were highest, but he would not necessarily recommend avoiding these areas altogether, since studies have proven that species will recover after a disposal event.

Dale B asked Danil if he had constructed an overlay with shading, or if this was it. Kim L explained that shading would not work for this particular overlay, since the data was restricted to specific contours and areas within contours might have different densities.

Danil H, going back to his previous statement, said that he could tell the group about areas he might avoid, such as the mud hole where Dale finds wood chips etc., or at the confluence of currents etc., but that site selection should be a consideration of all overlays.

Additional Biological Issues

Discussion turned to Kim Larson who presented further information pertaining to fishery and biological issues. He summarized the issues he would cover. Most of which were raised as questions by participants in earlier meetings.

1. Burial effects to juvenile and softshells
2. Crab Resources and Crab Habitat
3. Biological Recovery of Area After Disposal
4. How Benthics Correlate with Crab Data
5. Impacts of Site Selection to Small Business

Kim indicated that he had been asked to explain how benthic information correlates with crab data. He stated that scientists involved in biological studies understand that crabs migrate to where food is, but whether or not there is a correlation between crab numbers and benthic productivity, he could not say. He stated that this could likely be assumed, but has not been verified by any model. He remarked that both Danil and Arlene have contributed information on this topic, and it is a joint contention that benthic information represents areas of high productivity and crabs might be included in this representation.

A question had been asked if the Corps would be evaluating the impact of site selection to small businesses. Kim deferred to John Malek from the EPA to answer this question.

John M stated that general socio-economic impacts would certainly be considered during the EIS process. The EPA would also look at small business impacts as is required by NEPA.

Edith B asked if this process had begun and if there was preliminary information available to her. John M stated that the Corps has the lead on this evaluation but the EPA will assist. He explained that some of the information would be released for public review in October 1998. Laura H said that a socio-economic study would be addressed in a general way in the SEIS when it is released.

Edith B asked if Laura could provide her with an idea where the data and information comes from for such a study and how the evaluation works. Laura H answered no, that this was not her area of expertise.

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With respect to a question regarding the capacity of species to recover after disposal, Kim stated that this issue had been thoroughly discussed and explained by Danil and others earlier in the day. He also encouraged the participants to read Danil's report which relays the same information.

With respect to crab resources and habitats, Kim stated that the Corps has obtained and will continue to collect information on this issue and has decided to co-sponsor and fund studies to evaluate potential disposal impacts to softshell crabs.

Kim went on to explain that he had been asked to show a video from a former study that was intended to look at burial effects to adult crabs. He explained that the video would not show any effect to softshell crabs, and that such impacts would have to wait for the Spring study they would conduct. He added that some of the information in the Mobile/Rees' study would suggest that softshell crabs might survive though.

Kim explained that the soft-shell crab study would entail collecting crabs off the MCR this winter and shipping them to the Scripps laboratory in La Jolla. There they would get them to molt and immediately put sand on top of them, simulating differing disposal methods and depth levels. Kim remarked that he had originally talked to crabbers about the option of collecting soft-shell crabs (as opposed to hard shell crabs), but he had learned from the crabbers that they typically do not get crabs that had just molted in their pots.

In response to a question by Dale B, Kim L explained that the study would use different sized crabs.

Arlene M asked if there would be a written study design available. Kim L said yes, although the design was quite simple. He stated that there would be a complete scope of work in writing. He also added that Scripps has several tanks and the capacity to alter tank temperature to encourage molting.

The group then gathered around a television to view a video of another study conducted at Scripps which was intended to evaluate the impacts of disposal on adult crabs.

Kim explained that the study was intended to evaluate impacts in the hopper, but could be used to represent disposal conditions. He stated that the Corps conducted sampling over four different seasons and results showed that young of the year (YOY) crabs up to 50 mls. were not significantly impacted, but those that were 3-4 inches across showed greater mortality. He added that only a small percentage of very large crabs were sampled as they tended to avoid the dredge or were not in channel where they were dredging.

He explained that a small scale model of the Essayons hopper was built at Scripps. Live crabs and sand were introduced to the hopper/tanks from above the tanks in three different groupings - at the beginning, middle, and end of the filling process. After the filling process they dug down to determine where the crabs were distributed - on the bottom, middle, or top of the sand or in the overflow water. Kim explained that the YOY stayed fairly evenly distributed on top of the sand continually digging out.

Explaining the study design further, Kim explained that it took 30 minutes for the sand to go up 24 inches.

Doug pointed out that the study focused on hardshell crabs, yet actual dredging occurs when the crabs are in their soft-shell phase during the summer.

Dick S asked whether the scale of flow from the hopper dredge was different from that in the study. Kim L explained that the purpose of the study was not to provide crab survival rates in the hopper. Kim stated that a separate study was conducted for that purpose where crabs were placed in a test device that simulated conditions at the bottom of the hopper. The test was done for three hours, the maximum amount of time crabs would be in the hopper. Kim also explained that the grain size of the sand used in this study was slightly smaller than dredged material.

Dick S stated that he would likely question any studies conducted done in a lab. He stated that he was familiar with oyster studies that showed differences occurring between labs and the natural ocean environment.

Kim L stated that the crabs do not know where they are, whether in a lab or in a dredge; all they know is that it is a hostile environment and sand is dumping on top of them. Kim explained that the study showed that the smaller crabs had an easier time digging out of the sand.

Kathi L stated that this study did not show the impacts of dredging. Kim L confirmed that the study was meant to show what happens to crabs in the hopper.

Dick S expressed his concern that the study does not reflect what actually happens in hopper. He added that it was still his belief that test situations are different from real world situations, and variables such as shipping could have an impact on crab behavior.

Kim L said that he did not agree with Dick and that he felt that these crabs were behaving in the same manner as they would in any hostile environment. Kim L also explained that the flow was similar to that seen in a dredge hopper.

Arlene M said it was her understanding that this particular study does not have the capacity to determine impacts to softshells, but a new study, designed now, would have this capacity.

Dick S stated that if the dredged sites are going to be in least destructive areas, and the group's desire is to have the least possible damage occur to the smallest populations, and the crabbers wish for the least amount of damage to occur to softshells, then the Corps needs to go out and sample to determine where the highest population concentrations are located. Dick explained that with the current situation crabs have disappeared from sites. He told the group that a laboratory study will give some information, but not all the information.

Val L asked Dick Sheldon if he thought that the group might be able to design a laboratory study to *help* investigate impacts to crabs.

Dick S deferred to Steve Barry of the WDFW for the answer. Steve B responded yes.

Dick S asked how this information would be applied. He stated that the fishermen had been asking the Corps for 10-12 years to address the issue of impacts and concentrations. He said he did not see how such a study would solve the fishermen's problem of taking an economic hit as the result of others. He asked what would the study find out, that some crabs will die and some will not? He stated that this can already be predicted. He continued: when dealing with the YOY crabs it may be different, but molting occurs at many different times in a short period and do these crabs have the capacity to recover? He explained that the large crabs molt much more often. He stated that all that the crabbers ask is that the Corps find a site where the least amount of damage to the fishery will occur.

Kim L asked Dick Sheldon if he was supportive of the study and its purpose to determine impacts to softshell crabs at disposal sites.

Dick S explained that the study looks at half of the issue. He stated that there are two elements of the process which may impact crabs, the dredging and the dumping. He

stated that he probably could not accept the study as the authority on impacts, but would agree that it would be helpful.

Steve B stated that he would agree that the issue Dick raises leads to the question of what are the research priorities. Steve explained that if there is agreement as to where the softshells exist, and if there is agreement that these areas can be avoided, then a study may not be necessary. It may be a different study that should be developed.

This led to a discussion about the promise of thin layer disposal to avoid impacts. Dick S stated that thin layer disposal may be "a good attempt at it." But the problem with thin layer disposal, as he sees, is that the use of the government dredge (*Essayons*) is limited.

Kim L responded that the Corps has the capacity to adjust the contractor dredge output. John M added that all of the thin layer spreading done in Puget Sound has been done by contractor dredge.

LUNCH

Valerie Lee (EI-facilitator) opened the afternoon session by explaining that she would like to return to the study discussion and research efforts that took place in the morning, but in the interest of adhering to the agenda, she would reserve this discussion for later. The discussion then focused on the review and acceptance of GIS overlays.

Kim Larson (Corps) led the discussion and presented several different overlay maps for the group to discuss. The name of the overlay is indicated by italics below.

Adult Crab Fishing Areas _

Kim L asked for input from any crabbers who were not present at the last working group meeting to comment on the overlay.

Jim N stated that the overlay looked okay to him. He remarked that the map depicted the areas of highest crab concentrations, but not necessarily the areas fished by crabbers. He stated that the Oregon crabbers fish the whole area to the south of the channel.

Edith B asked why the Oregon side of the map said "high concentrations fishing" and the Washington side did not. A discussion of a term acceptable to the crabbers ensued.

Dale B stated that Oregon does not have a seasonal focus, whereas Washington does. Dick S responded that fishing also occurs everywhere on the Washington side, but it is focused during different times of the season on different areas as a result of weather or sea conditions.

Kim L asked if they might assume that the whole area on the Washington side has crabs and if they might draw an outer line depicting this to be consistent with a similar line on the Oregon side.

Darrel said yes, that it should be represented that Washington crabbers have a broader area in which they fish as well. Dick S said that he recalls that when drawing those areas, that they were roughly defined, and not so exact. Dale B said he would like to see a July-August 15 or July-September 15 season drawn in an area roughly between the existing ones. Joe stated that it was his belief that this would be the last year with an August 15 closure and that it was his sense that the closure would be much earlier next year.

Kim L drew a line broadly around much of the Washington waters to denote an area for Washington crab fishing.

Dick S stated his opinion that the previously drawn circles pretty well depict areas of high concentrations of crabs in Washington. Edith B made a request that the high concentration areas be extended to the "new red line." Dale B drew in a July-September 15 crabbing season area on the Washington side of the map.

Kim L, at the request of Edith Beasley (CRCFA), wrote the words "WA Crab Fishing" to describe the large area he had drawn around Washington State waters. He also wrote the words "WA High Concentrations" in all three of the high concentrations areas drawn by Washington crabbers at the last meeting. Kim then asked Jim Nichols (O...) if he could better define the Oregon fishing area.

Jim N pointed to an area where Oregon crabbers lay most of their lines from December through July. Kim L drew a circle around the area and wrote the words "December-July" to depict an Oregon area of high crab concentrations.

Edith B asked if other crabbers wished to block out the old dumping Sites B and A. Dick S responded no, don't bother.

At this point, Kim Larson (Corps) asked if each participant could come to consensus that the map properly depicted adult crab fishing areas, both broadly and specifically.

Consensus Opinion: All participants agreed they were comfortable with what had been drawn on the map, and the map properly depicted areas of high crab concentrations and broader crab fishing areas.

Softshell Crabs

Kim L displayed a map depicting concentrations of softshell crabs, as outlined by several crabbers at the last working group meeting. Kim explained that the map displayed regions of softshell crabs in Washington waters; he asked Jim Nichols if he could define where softshell crabs concentrate in Oregon waters.

Jim N stated that softshell crabs are everywhere.

Darryl explained that the whole area represented seasonal differences in softshell crabs; he cautioned that where crabbing occurs is not necessarily where the softshells exist.

Jim N stated that he did not know enough about the whole Oregon region to make a statement about seasonality. He said he could, however, indicate where softshell crabs are in mid-June.

Dick S said that Jim's concerns were similar to those that were part of a discussion in the October working group meeting in Portland. Dick acknowledged that softshell crabs can be found everywhere, but highest concentrations are also identifiable.

Jim N then drew a line on the Oregon side of the map to identify "highest concentrations of softshell crabs between June and September."

Kim L stated that Jim's line would represent highest concentrations of softshell crabs during a particular season, yet it was recognized that they actually exist everywhere.

Dale B explained that these lines represent where crabbers fish and where they place their effort, yet most actually know that this boundary is delineated by the inside tow lane and the first of May opening.

Bill added that the crabbers are forced to move out of the 30-40 fathoms region at this time or risk the loss of equipment in the tow lanes.

Steve B stated that based on fishermen knowledge, the maps depict what is known about softshell crab concentrations, but he cautioned that this does not represent what may be in the tow boat lanes.

Kim L remarked that the other option would be to indicate that all of the area is a softshell region, but then the specificity of the concentration areas would be lost. He explained that specificity is more valuable for the overlay process.

Steve B stated that he thought the whole area up to **Northhead** was an intense area of softshell crab concentration and he would incorporate the tow boat lanes. Steve then drew a dotted red line on the map to indicate a broader area of softshell crab distribution between July 1 and October 15.

Consensus Opinion: All participants agreed to add a red dotted line (Steve's line) to depict a broader area of softshell crab distribution between July 1 and October 15. All participants agreed that the map properly depicted areas of general distribution (Steve's line) and highest concentrations of softshell crab.

Juvenile Flatfish Areas

Kim L presented an overlay showing areas of concentration for juvenile flatfish. He stated that it was based on information obtained from crabbers and flatfish studies. The map depicts three concentric circles representing varying concentration levels of fish: gray, dark gray, and black (highest concentration). The circles were drawn based on information obtained from trawling catches where large numbers of juveniles were caught. They were also drawn based on flatfish studies introduced by Arlene Merems (ODFW).

Arlene M stated that she had additional information to provide from Mark Wilkins in Seattle. Kim and Arlene reviewed and discussed the new information to determine data similarities. Arlene requested that Kim add a couple of small circles to represent the new data.

Kim L added a few very small black circles to the map at Arlene's request. Kim then made the proposal that the group use the original information as primary information and the new circles as secondary in the event that a site appears in such a region.

Consensus Opinion: The participants agreed that the three concentric circles would be considered as primary information to depict juvenile flatfish concentrations and that the new areas (Arlene's small circles) would be used as secondary information to investigate in the event that a site was placed in the same region.

Black Cod/Red Rock Fish Area

Consensus Opinion: All participants agreed to use the overlay depicting black cod and red rock fishing in Astoria Canyon.

Razor Clams

Kim L explained that the information obtained for this particular overlay was obtained from Dave Fox (ODFW) and Steve Barry (WDFW). The map shows two areas in varying shades of gray; the highest concentrations of clams are inshore but decreasing numbers are observed with greater distance from shore. Kim stated that the data ended at depths of approximately 200 feet.

Various crabbers confirmed that they frequently collected clams in their pots at depths of 15-22 fathoms. Rare was the instance of clams caught at greater depths; although, Dale Beasley (CRCFA) stated that he had once caught clams at 55 fathoms.

Steve B stated that he would alter the map slightly to reflect a beach area on the Washington side where no clams exist. He then drew on the map to highlight this region.

Consensus Opinion: The participants agreed that the overlay properly depicted areas of highest razor clam concentrations (subject to Steve Barry's alteration).

Groundfish Trawl Starting Points

Kim Larson presented an overlay depicting groundfish trawl starting points. He explained that the data obtained for this overlay had been collected by ODFW. Bands of gray were drawn to represent areas (starting points) where trawls have caught > 200 lbs. of fish. Kim explained that they had hoped to properly represent trawl areas, but the information available was based only on trawl starting points.

Consensus Opinion: The participants agreed that the map properly depicted areas of concentrations of trawl catches based on trawl starting points.

Recreational Salmon Fishing Areas

Kim Larson presented a map depicting an area presently regulated and closed to salmon fishing by state authorities. Kim stated that he had obtained the boundaries for the closure area from Kurt Melcher at ODFW.

Consensus Opinion: The participants agreed to consider and use the map properly depicting a recreational salmon area as defined by ODFW.

Fishing Navigation Routes

Kim Larson stated that the navigation route overlay was based on information obtained from Washington crabbers at the last working group meeting. He asked Jim Nichols for further input.

Jim Nichols stated that the map looked fine.

Consensus Opinion: The participants agreed on the navigation overlay. _

Sediment Types

Kim Larson explained that this overlay was based on benthic invertebrate and sediment conducted since 1989. Kim stated that Susan Hinton (NMFS) had contributed to many of the studies. Lines on the map depicted different sediment types including silt, very fine sand, fine sand, and fine-medium grained sand.

Sediment Contours

Kim Larson presented a map depicting percent (%) fines of sand as a result of 1992 and 1996 averages.

Dale B. stated that he would like to see another overlay with sediment dispersal identified.

Bob Burkle stated that he thought that averages blurred the findings.

A decision was made to set the overlay aside until Rod Moritz arrived to discuss/describe it further.

Shipwrecks

Kim Larson explained that the shipwreck overlay was based on archeological information obtained by the Corps. Kim stated that the archeologists consulted would like to see these areas buried to preserve them from poachers and further deterioration.

Laura Hicks said she would recommend considering the archaeological sites as beneficial use areas. Since the sites do not fit within the definition of areas to avoid (as is depicted in other overlays), Laura would recommend holding the archaeological overlay out for awhile and using it for the purpose of identifying a beneficial use project.

Ben Meyer (NMFS) asked to have the archaeological overlay left in; he stated that it should be part of the process and may provide information for a swing vote on marginal areas.

Consensus Opinion: The participants agreed to consider the archaeological overlay as part of the complete overlay process.

BREAK

Following a break, the group reconvened to discuss a framework by which they would arrange and review the overlays. It was pointed out that some of the overlays were shaded while others were not. Kim Larson stated that the group might first analyze the maps with colored lines and then move to the maps depicting areas of gray. Names of all the overlays were written on the blackboard and then prioritized. Ben Meyer (NMFS) made a suggestion that biological overlays be given greater weight, since disposal would likely have a more immediate impact on these resources.

- The following overlays were selected for this group: softshell crabs, benthic invertebrates, juvenile flatfish, sediment type, recreational salmon, adult crabs, razor clams.
- A second group of overlays, those with potential economic impacts, was selected for a second tier of review. The economic group included the following overlays: fishing navigation routes, groundfish trawl fishing, blackcod/rockfish fisheries, adult crabs, razor clams.

Valerie Lee (EI-facilitator) suggested that the group begin to cluster and evaluate the overlays. She also encouraged participants to begin to consider areas for candidate sites. Discussion was informal and several comments and suggestions were made.

Bob B. remarked that the existing dumping Site B appears to be a bad area for disposal. He suggested the group consider Benson Beach, expanded Site E, and the Clatsop Spit area.

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Dale B recommended two candidate sites: Benson Beach and the south side of Astoria canyon.

Kathi Larson (USFWS) and Ben Meyer (NMFS) responded that they have no existing biological information for the area out near Astoria Canyon and could not consider such a site.

Eric Braun (Corps) responded that only under ideal circumstances could the Corps get a hopper dredge inside 30 feet, and the *Essayon* generally won't go in less than 40 feet.

Kathi L expressed her preference to look inside of 6 miles where data is available. She stated that Danil's data shows that deeper areas are more productive and less impacted by waves and offshore currents that would serve to disperse sand. She said that sites need to be selected inshore -- inside of 40 fathoms.

Eric B explained that the inshore benthos would recover faster as well since it is a more adaptable to an active environment.

Several participants expressed an interest in having more time to informally review the overlays. The group separated for over an hour to discuss overlays and to engage in smaller group discussions. When the group returned an initial candidate site, in the shape of a skirt, had been selected by a group of individuals.

Dick S explained to the group how the "skirt" site had been selected. He said that it had been selected with crabber concerns in mind and discussion of many others. He explained that the site was outside of the softshell concentration areas and outside of transportation areas.

Edith B commented that an EIS back in 1983 had identified areas to the north of the channel as being more productive than areas to the south. She said she would like to see an area selected in the south.

Dick S said this site was consistent with what he had proposed to the Corps two months ago. He explained that this was the only available open spot. He stated that the site they selected was likely to be more productive than going further south, but the towboat lanes were further south and it was his impression that they could not use the towboat lanes.

Darrel stated that he would also like to see more than one area selected in order to provide a fall-back site for disposal in the event that softshell crabs move into another area.

Dale B said he would hate to pick a site today without considering all factors more thoroughly. He said this appeared to be better than the other sites, but he would like to see an overlay created from the crab surveys to depict where fishermen catch the greatest percentage of crabs. Dale drew a new overlay depicting information from the fishermen surveys, most crabs were caught in Areas D and B. Dale pointed out that more than 4 Oregon fishermen (as was relayed by Kim Larson) had contributed to the survey, since many fishermen living in Washington also fish in Oregon.

Kim L asked if the crabbers/resource agencies would consider this overlay a good representation of where crabbers catch.

Dale B said that he felt that the information provided "good data" indicative of where people crab and make catches. He said he would consider it as a candidate site.

Steve Barry and Bob Burkle (WDFW) stated that the site was consistent with what they might recommend as a backup site, but they would still like to see further sites selected inshore.

Rick Vining (WDOE) said he could consider the skirt site as a candidate site.

Kathi L said it had areas of high benthic activity, but she would still consider it.

Arlene M expressed concern with the fact that the skirt site overlaps with juvenile flatfish areas. It was her preference to narrow the site until they could obtain impacts data on juvenile fish. Arlene agreed to recommend the site, pending the collection of impacts data to juvenile flatfish during the LaJolla study.

John M explained that a candidate site is not a definitive site, but a site that may need narrowing or fine tuning after further biological studies. He also stated that further delineation would likely occur in a site management plan. He emphasized that the EPA would not allow for the selection of a site until all factors are properly considered.

Ben Meyer stated that the skirt site had potential as a candidate site. But that he was in agreement with John and Arlene regarding the possibility for future research and juvenile studies. Ben stated that such information (research results) could potentially open up more areas. He encouraged the Corps and EPA to address all issues raised by the fishermen and to entertain the use of management schemes for all selected sites.

Kim L explained that there would be later meetings to discuss management options such as thin layer disposal.

John M also stated that he would consider the skirt site as a candidate site.

Consensus Opinion: All participants agreed to consider the site introduced by Dick Sheldon (skirt site) as a candidate site.

Valerie Lee asked the group for comments on expanded Site E as a candidate site.

Dick S stated that he would need more information regarding Site E's potential for sand dispersal. He said he had no problem with the site, but further information was necessary to convince other fishermen of site's utility.

Rick V stated that Washington will consider Site E a site until better ones are found.

Bob B said he would like to see Site E used for the disposal of a couple million yards per year. He said he liked Site E as a primary site.

Steve B said he liked the expanded Site E with continued monitoring.

John M clarified that Site E, depicted by the old small box, currently exists as a permanent site. It is the expanded site E, which was created as a temporary site under MPRSA 103, which has the potential for consideration as a candidate site. The old site will stay a site unless it is delisted in the strict legal sense of the term.

Dale B stated that he would accept a certain amount of disposal in Site E so long as monitoring of accumulation occurs to the north and west of the site. He would encourage the Corps to stop disposal in Site E, in the event accumulation occurs until the area has

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an opportunity to diminish again. He would also like to see the Corps cease all disposal when the softshells arrive in the site during the latter part of the season. He stated that Site E was a "potential site with appropriate management." He added that he is comfortable with the site as long as safety is emphasized.

Darrel stated that he would go along with Dale's recommendations to stress safety, management, and monitoring at Site E and would then recommend it as a candidate site.

Kathi Larson (USFWS), Ben Meyer (NMFS), and Arlene Merems (ODFW) would all recommend expanded Site E as a candidate site with continued monitoring.

Consensus Opinion: All participants agreed to consider expanded Site E as a candidate site for disposal.

Final comments were made by several participants:

Arlene M requested copies of the overlays in order to solicit further comments from others at ODFW. She also suggested that it may be helpful to project the overlays during the next meeting in Portland.

Ben Meyer said that he could not make the meeting tomorrow and encouraged the group to select another candidate site. He explained that the expand Site E has limited capacity, and although the skirt site has potential, he would like to see another site tucked in closer.

John M explained that the EPA needs to consider which of the current sites to keep as sites and which to delist. Some sites, such as Site A are not currently in use, but must remain as Sites if monitoring is to continue. John explained that the EPA is trapped in legal requirements and funding problems - when sites are delisted - monitoring must be limited at that site.

Dick S said he had an interest in delisting some sites.

Dale B stated that delisting should not remove the Corps' responsibility to monitor.

John M responded that that is not what Congress says.

Laura H asked John if money could be set aside to monitor a site.

John M answered yes, that is exactly what happens at Site A.

Dale B said this gets back to what he has said in the past, that he has no legal opinion and needs outside council to tell him what is required and what is not. He said he would like to see delisting occur if monitoring could be arranged.

Bob Burkle asked how many of the participants would be in favor of having done to site B what has been done to site A.

Darryl said yes, if this means that the Corps retains monitoring responsibilities.

Dale B said the potential for reuse of Site B scares him.

John M ended by acknowledging that he understood the fears and concerns of Dale and the others.

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Meeting Participants - Day 1

Participant Name	Organization	Phone/Email
Rick Vining	WDOE	(360) 407-6944
Bob Burkle	WDFW	(360) 249-1217
Steve Barry	WDFW	(360) 249-1203
Kim Trimpert	CREST	(503) 325-0435
James Nichols	ODCC	(503) 861-3404
Darrel Potter	WFOA	(360) 642-2794
Doug Westerlund	Crabber	(503) 325-1358
Dick Sheldon	Northern Fish and Oyster	(360) 665-4886
Arlene Merems	ODFW	(541) 867-0300 x246
Mike DeSimone	Pacific County, WA	(360) 642-9382
Diane Perry	CRCC	(503) 285-6343
Dale Beasley	Col. River Crab Fishers Assoc.	(360) 642-3942
Edith Beasley	CRCFA	(360) 642-3942
William H. Rhodes	CRCFA	(360) 777-8551
Danil R. Hancock	OIO	(360) 735-8082
Kathi Larson	USFWS	(503) 231-6179
Ben Meyer	NMFS	(503) 230-5425
Susan Hinton	NMFS	(503) 861-1818
Laura Hicks	COE	(503) 808-4705
Eric Braun	COE	(503) 808-4348
Mark Siipola	COE	(503) 808-4855
Kim Larson	COE	(503) 808-4776
John Malek	EPA	(206) 553-1286
Margaret (Peg) Merrens	Environment International	(206) 525-3362
Valerie Lee	Environment International	(206) 525-3362

Day 2

Opening Remarks/Introductions

Rod Moritz began day 2 with a discussion regarding physical processes at the MCR. Rod stated that he would first readdress issues and questions raised by individuals in the past two Working Group 3 meetings. The following questions/issues were raised at the July meeting:

1. Beneficial use of Material - Peacock Spit & Benson Beach
2. Information on Thin Layer Disposal
 - a. Inches deep
 - b. Spatial extent
 - c. Thickness over area
3. Can 5 M cubic yards of material be placed annually within 4.5 miles of the MCR?

The following questions were raised at the August meeting:

1. Where is the Sand from Site E Going?
2. Survey information at Site E
3. Was disposal in Site E done in cells?

Disposal History at the MCR

Rod presented a handout summarizing the past 40 years of dredge disposal history at the MCR. He pointed out that 1997 was a light year for total material disposed at sites over the last 15 years. He stated that in 1997 the Corps pulled way back on the amount disposed of in Site B.

As a side note, Rod indicated that he had gone back to compare Columbia River flows with amounts of volume dredged from the river over these years. He stated that he discovered a high degree of overlap between high flow years in the Columbia River and low dredging amounts.

Bob Burkle (WDFW) asked if there was an anomaly peak in the total amount dredged and disposed between 1985-1989. He asked if this might be related to the Mt. St. Helens eruption.

Rod Moritz (Corps) stated that the channel was deepened during this period and was completed in 1984.

Laura Hicks (Corps) said that this might explain an increase in disposal volume. She stated that sloughing occurs after a deepening event and dredged volumes naturally increase.

Ed Manary (WDFW) asked if this could also have happened around 1956.

Rod Moritz (Corps) said that 1957 the 48' entrance channel was completed. He stated that there had been three major deepening events in the entrance channel one in 1918 to 40', the one in 1956, and in 1984 to the tiered 55'/48' channel.

John Malek (EPA) remarked that prior to 1977 ocean disposal had been permitted in general areas, much like a 404 permit, but there were no "designated sites" as they are known today.

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Bob Burkle (WDFW) raised a question regarding the high volume of disposal material in the mid 1970s.

Rod Moritz (Corps) stated that higher volumes in the mid 1970s might be indicative of low flow years on the river.

Bob Burkle (WDFW) agreed with Rod and remarked that 1977 had been a drought year.

Rod presented results from a recent complete bathymetric survey and pointed out changes that have occurred to bathymetry over the past several years. Much of this information had been presented at the last Working Group 3 meeting and was presented again for purposes of review and clarification.

June 1985 Bathymetric Survey

- In 1977, the Corps was forced to dispose into small sites.
- As a result, by 1985 slight mounding was occurring in the old Site B, as well as the old Site A.

August 1997 Bathymetric Survey

- Appreciable mounding is apparent in Site B and some in Site A.
- The Corps began using Site F in late 1980s as a result of mounding in Sites A and B.
- Mounding also occurred in Site F.
- This was followed by the realization that small sites were causing the mounding problems.

Bathymetric Differences Between 1985-1997

- This overhead compares the 1985 and 1997 approach surveys.
- Mounding is again obvious in Site B.
- Site A shows contours of accumulation as well as erosion in the center; Site A has not been used for awhile and natural processes are beginning to erode it.
- Site F also shows some mounding.
- Site E is eroding much faster than any of the other sites. The southwest end shows only erosion; a 10 foot erosion contour indicates that this area has eroded 10 feet or greater between 1985 and 1997.

Bob Burkle (WDFW) asked if Site A had been dredged by the Corps.

Rod Moritz (Corps) responded that the top of Site B had been dredged, but not Site A.

Edith Beasley (CRCFA) stated that Rod had told her at the last meeting that a 5 foot change, contour label could mean as much as a 10 foot change. She asked him to explain.

Rod Moritz (Corps) stated that a 5 foot change contour could also mean 7 or even 10 feet of change. He explained that a contour may not indicate the upper (or lower) limit of change which has occurred in a specific area. He stated that differenced approach surveys provide a big picture view of erosion and accumulation only.

Eric Braun (Corps) clarified that the contours on these particular maps typically indicate 5 foot increments of bathymetric change. Between the 5 and the 10 contour will be changes of 6, 7, 8, and 9 feet. But where a contour has reached a limit and another does

not exist, then amounts beyond that contour could be greater (or less) than the elevation indicated by the contour.

Rod Moritz (Corps) reiterated that differences between approach surveys shows general bathymetric (seabed elevation) changes. Specific site surveys must be used to get accurate changes in, seabed elevation.

Edith Beasley (CRCFA) asked if the maps might be redrawn to depict the disposal sites as they exist today, i.e. the old small sites as well as the current expanded sites.

Rod Moritz (Corps) stated that he would consider doing this. He also stated that the Corps would be producing a feasibility study report and this survey would be included and further explained in the study.

1985-1994 Bathymetric Differences

- Site F shows a little change in bathymetry. Twelve feet of accumulation in an area of Site F are not reflected here but are reflected on the site specific survey.
- Regarding erosion at Site E: during this period the Columbia River flow was generally low and therefore erosion is unlikely a result of river flow.
- Erosion and accumulation patterns are important to understand when considering the use of a site in the future.
- A natural process of erosion is helpful. Materials are unlikely to accumulate anywhere erosion is evident at Site E. There may be some accumulation to the north of the site though.

Edith Beasley (CRCFA) asked if patterns of accumulation would be evident on an approach survey.

Rod Moritz (Corps) responded that a site specific survey would be necessary to show details of accumulation and erosion. An approach survey would only provide a big picture pattern of change in an area.

Bob Burkle (WDFW) remarked about the large amount of dredged material that was placed at Site E between 1985 and 1994. He stated that it was quite amazing that there was any erosion at all at Site E during this time.

Rod Moritz (Corps) referring to the 1994 - 1997 site specific survey differences, stated that erosion, both man made and natural was evident on Site B. He reminded the group that in 1994, the Corps removed 600,000 cu. yd. of material from Site B, but the overall erosion was greater than this amount.

Rod Moritz (Corps) pointed out that Site A was off limits to disposal since 1994. The erosion apparent there, between 1994-1997, all was due to natural causes.

Rod Moritz (Corps) stated that Site E was breaking even in terms of volume change of the seabed during this time. Amounts disposed were eroding away and were not accumulating to the north since erosion was evident there as well.

Eric Braun (Corps) clarified that if materials were going north, then they were going beyond the extent of these surveys.

1985-1997 Bathymetric Differences Superimposed on a Large Map of the MCR

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- A five foot minus change line and circle of erosion is evident around Site E.

Wave Amplification Between 1985 and 1997

- Mounding between these years affected wave amplification.
- Mounding has resulted in waves breaking at Site B or wave amplification behind Site B.
- Any wave amplification at Site E is likely a result of mounding at Site B.
- Such results show a reason why mounds should not be created.
- Mounding causes incoming waves to shoal and wrap around, causing amplification problems.

Dale Beasley (CRCFA) asked if the maps presented by the Corps might be edited to reflect bouys and latitude and longitude to assist the average person with orientation. He also encouraged the Corps to add clarification to the maps to enable the average person to read the contour lines.

Rod Moritz (Corps) stated that these were details he would try to work out. He stated that he could appreciate the need for clarification, but his software was somewhat limited. He stated that GIS had greater capability than the software used to produce these overheads.

Eric Braun (Corps) reiterated that the surveys are accurate at the contour points but data in between the contours is interpolated.

John Malek (EPA) stated that this would be very clearly explained in the report referred to above by Rod.

Edith Beasley (CRCFA) again expressed concern for the fact that a 5 foot change contour might actually mean 10 which is a two-fold difference.

Rod Moritz (Corps) reiterated that the sole purpose of the approach surveys and change analysis was to show patterns of general change.

Ed Manary (WDFW) confirmed his understanding that the surveys show general change and stated that some change will signal a need for further investigation such as site specific surveys.

Arlene Merems (ODFW) added that the Corps has site specific maps for all of the sites. She encouraged Rod to show them.

Bob Burkle (WDFW) remarked that the Seattle District Corps had developed excellent maps depicting general areas of change in color, perhaps with better software. He encouraged Rod to spread out the time intervals to reflect more years. It was Bob's opinion that this might serve to filter out "noise" and to predict trends better. He encouraged Rod to look at 5, 10, 15, 20 year intervals and to consult with Seattle regarding their software to see if it provides greater capabilities.

Rod Moritz (Corps) explained that he had focused on data from 1985 on because it was the most reliable. He said that approach surveys prior to 1985 were filled with gaps primarily due to patchy surveys - a result of poor weather conditions. He stated that he would reevaluate the data though.

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Ed Manary (WDFW) asked when the Corps (the surveys) first began to pick up the erosion occurring around Site E.

John Malek (EPA) provided some background. He stated that prior to 1989 the Corps thought all was going fine at the disposal sites. Around 1989 the crabbers alerted the Corps about wave amplification and navigational changes occurring in the region. This caused the Corps to reevaluate the sites and to put greater emphasis on collecting data after 1989.

Ed Manary (WDFW) asked if there had been continuous erosion occurring every year around Site A. He also asked whether the flows of the Columbia River might exacerbate this erosion.

Bob Burkle (WDFW) stated that he thought the CREST Report of the early 1980s had impact data. He stated that the CREST report would be worthwhile evaluating. He thought the report might offer further bathymetric data and provide a sense of erosion trends near Site E.

Rod Moritz (Corps), in response to Ed, stated that during the last 50 years the trend around Site E had actually been one of accumulation. It is only recently that Site E has begun to erode. He added that it might be helpful to go back to prior time periods to verify these trends though.

Bob Burkle (WDFW) stated that it would be very important to identify the behavior of the natural system and to attempt to approach that again.

Rod went on to present the site specific information, reflective of "true" bathymetric changes, in which several participants had expressed an interest.

Site A Bathymetric Differences: 1981-1995

- Approximately 20 million cubic yards was placed in Site A between 1981 and 1995.
- In 1995, sections of Site A were 25 feet higher than they had been in 1981; this was not the highest the mound had been since some erosion had occurred during this period as well.
- The surrounding (outside) bathymetric change is approximately zero.

Susan Hinton (NMFS) asked if the volume of the mound at Site A was equivalent to the amount dumped there.

Rod Moritz (Corps) stated no, less material exists at Site A than what has been dumped; some has naturally eroded.

Site B Bathymetric Differences: Fall 1981-Spring 1997

- Site B is 55 feet higher today than it was in 1981.
- The map shows new lobes developing in the western half of Site B (1992 expanded boundary).
- Expansion occurred in 1992 and dumping began in 1993 in specific cells within the expanded portion (western half) of the site.
- The top of the Site B mound was lopped off in 1994; natural erosion has also occurred; man made erosion accounts for the removal of about 600,000 cubic yards or 6-10 feet from the mound.

- Prior to the dredging event, the highest point was 48 feet below water surface; after dredging the mound was between 55 and 60 below the surface.
- Through more careful site management, the Corps hopes never to repeat another dredging event like that at Site B.

Dale Beasley (CRCFA) remarked that he thought water depth was actually closer to 42-43 feet at one point prior to dredging.

Map with the original boundaries 1990-1997 of Site E

- This map shows the area to the southwest where erosion is occurring.
- Most of the original Site E is actually eroding; there is very little accumulation.
- A very high density survey was used making the information quite accurate.
- Accumulation is the order of 1 foot during this time frame.

Site F Bathymetric Differences: Fall 1981-Summer 1992

- Dumping formally began at Site F in 1989.
- Accumulation varies from 8-10 feet; one part may be about 12 feet high.
- A close look was taken to determine how high Site F could be mounded without contributing to wave amplification.
- Currently, the southeast half of the site has reached capacity; the northwest half is the only part of the site that can be used now.
- Some space remains in Site F (8-10 million cubic yards in the northwestern half); approximately 2 dumping seasons remain. In addition, Site A is off bounds and Site B is nearly out room.

Mark Siipola (Corps) stated that the highest point in Site F within the southeastern half of the site is a result of dumping materials from Tongue Point there in 1989. This material has not moved since it was placed there. The fine grained silt taken from Tongue Point is now covered with courser grained sands, yet the originally dumped materials have not actually moved.

John Malek (EPA) pointed out that pinpoint dumping in the tiny area of old Site F has likely contributed to accumulation and failure to erode. In hindsight, this form of management is inappropriate.

Rod Moritz (Corps) pointed out when water depth is large waves and currents do not have the capacity to move materials off a mound.

Dale Beasley (CRCFA) asked if the materials from Tongue Point had been contaminated.

John Malek (EPA) responded that the disposal material was tested and passed with flying colors.

Edith Beasley (Corps) asked if the material would have passed today's more rigid standards.

John Malek (EPA) stated that at the time of testing the Northwest's standards were more stringent than the rest of the country's. Today, as a result, they have not changed appreciably and the Tongue Point materials would still pass with flying colors.

Steve Barry (WDFW) asked why the Tongue Point materials did not disperse.

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John Malek (EPA) stated that it was originally thought that currents would carry away the material, but this did not happen. In addition, the silt retained its density and did not disperse.

Mark Siipola (Corps) clarified that even though the Corps had dredged 2 million cubic yards from Tongue Point, not all was currently in Site F and some has dispersed or consolidated.

John Malek (EPA) confirmed that 200-300,000 cubic yards had dispersed during disposal

BREAK

After the break, Rod returned to focus on Site E. He indicated that he would respond to questions regarding how to use Site E, whether material placed at Site E might dispersed further north to benefit the littoral zone, and whether materials might be put to beneficial use on Benson Beach.

Map of May 1997 Survey of expanded Site E

- Three bathymetric surveys have been taken at Site E between May and August 1997.
- The Corps stopped placing sand there on August 28, just after the last survey.

Site E Bathymetric Differences: May 1997-August 1997

- Early in the 1997 season, all material was placed in the old Site E (the northeastern portion of the expanded site); accumulation ranged between 3-4 feet.
- After July some material was deposited in the expanded Site E.
- The site has the capacity to be mounded to 6 feet before waves become a problem; amounts deposited presently do not create a wave problem.
- Wave amplification information illustrates the importance of monitoring and spreading materials out more.
- Two to three feet of erosion has occurred at the northwest end of Site E; a small amount of erosion is occurring further offshore of Site E as well.

Rod stated that the Corps is interested in tracking where the material from Site E is going. The Corps does not wish to see it return to the navigation channel, nor does it wish to see further mounding. Rod indicated that the Corps has Site E and the navigation channel covered well with respect to surveys. The area lacking is that to the north. Rod stated that the area to the north would be a worthwhile area to survey. He also pointed out that Site E is the only site at the Mouth of the Columbia River where the Corps/agencies can hope to use disposal for beneficial use if it disperses into the littoral zone. It seems to be the only site dispersing materials in such a manner.

Darrel Potter (WFOA) asked the Corps to investigate the area to the west of Site E as well.

John Malek (EPA) responded okay.

Rod Moritz (Corps) stated that the surveys will be used to help determine where the materials should be placed. He asked the participants where they would like to see the Corps survey.

Bill Rhodes (CRCFA) responded that he would like to see the Corps expand a survey ½ mile to the north of Site B.

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Dale Beasley (CRCFA) stated that he would like to see the Corps survey for 2 miles north beyond Site B. He also stated that the transect distance of 2000 feet was too long.

Darrel Potter (WFOA) would like to see the Corps survey to the northwest of Site E for 4 miles.

Rod drew a trapezoid on the map to encapsulate the suggestions of Darrel and Dale.

Eric Braun (Corps) stated that the Corps can expand their survey but will need to determine the extent of expansion based on capacity factors.

Bill Rhodes (CRCFA) stated his preference for 2 annual surveys.

Mark Siipola (Corps) stated that Spring and Fall surveys are typically conducted for the mouth of the Columbia River. He stated that more have been added as a result of concerns over Site E mounding. The offshore surveys are at 2000 foot intervals and the detailed surveys are in 500 foot intervals. Mark would suggest using a 500 foot transect size for an initial investigation of any new survey area.

Bill Rhodes (CRCFA) remarked that this sounded good.

Dale Beasley (CRCFA) stated that he was not sure the 500 foot transects were necessary, but the detail might be nice for the initial survey.

Eric Braun (Corps) confirmed that shorter transects were necessary to gather detail.

Dale Beasley (CRCFA) asked if the Corps could increase the inside edge (along the shoreline) to address the concerns of Washington State as well.

Eric Braun (Corps) stated that the Corps will attempt what is possible, but weather and wave conditions control the shoreside extent of the survey.

Darrel Potter (WFOA) asked if shoaling on Peacock Spit and erosion on Benson Beach might be related to the breaking down of the north jetty.

Steve Barry (WDFW) asked Rod if this theory squared with patterns of erosion and oceanographic trends.

Rod Moritz (Corps) stated that he could not say for sure, but if the jetty is cut back the water will want to cut the corner and erosion would be likely to occur.

Bob Burkle (WDFW) remarked that the beach was eroding faster than the jetty.

Rick Vining (WDOE) asked if the Corps was planning another 1997 survey to examine the effects of the end of the dumping season.

Rod Moritz (Corps) stated that weather and boat problems had thusfar prevented another survey.

Bob Burkle (WDFW) asked how long it takes to conduct a survey.

Eric Braun (Corps) stated that a survey takes most of a day.

Darrel Potter (WFOA) remarked that even an hour of time spent on the shoal would be worthwhile.

Bob Burkle (WDFW) asked if the fishers and crabbers might be able to contribute to the collection of data.

Dale Beasley (CRCFA) responded that he had recorded soundings for such purpose as early as May this year. He stated that recording depth in increments is possible, but since crabbers and fishers do not run regular lines the soundings are not very helpful. Dale remarked that he had about 150 readings at this time. He stated that he has found the Corps' 60 feet contour to be very accurate.

August 1997-May 1995 Differences

- A four foot accumulation feature is apparent in the old Site E; this is approaching the six foot maximum.
- If the same feature is present next season, then no dumping should occur in that region of the site.

Edith Beasley (CRCFA) stated her preference for having the map shown depict the total amount dumped on the site as had been done on a previously shown map.

Rod Moritz (Corps) responded that he would add the amount to the map.

Bob Burkle (WDFW) asked when it was that the Corps placed the last amount of dredged material on the old Site E prior to the May 1995 survey. He remarked that he thought the site could have reasonably clean at the time of the survey.

John Malek (EPA) asked if Rod had survey data available for Site E between 1985 and 1997.

Rod Moritz (Corps) stated that data was sparse since it was not until 1989 that Site E was perceived as a potential problem.

John Malek (EPA) thought it might be useful to use spotty data to establish a baseline condition for the site. He also encouraged Rod to look at shorter time periods to establish accumulation periods.

Bob Burkle (WDFW) pointed out that longer time frames tend to "level-out" the information.

Rod Moritz (Corps) stated that these were good ideas that he would try to implement.

Erosion Chart

- This is a snap shot of a winter storm with 20 foot waves.
- The area around Peacock Spit shows a highly active area with much movement of material.
- The surf zone is also very active but is too close to land for disposal.
- The only feasible active spot for disposal is Site E.

Dale Beasley (CRCFA) asked if Rod had obtained any OSU wave data information.

Rod Moritz (Corps) stated that the Corps had recently picked up its instruments and some of them were broken. He was not sure if the data had been analyzed. He stated that a fourth tripod would be used at some point to collect additional data.

Dale Beasley (CRCFA) encouraged the Corps to get out information about the tripod beacons out to the fishing fleet. He said he was not aware of any lights or reflective tape on the beacons he had seen. He was concerned of the danger they presented during an ebb tide. He would like to see a notice distributed indicating exact latitudes and longitudes.

Rod Moritz (Corps) stated that a notice to mariners had gone out for the beacons.

Darrel Potter (WFOA) stated that the notice did not provide exact positions for the beacons.

Rod Moritz (Corps) reminded the group that a fourth beacon would be provided by the Corps and EPA and the group could provide insight as to its position.

Benson Beach

Rod stated that there are two ways to consider placement of dredged material in the littoral zone: nearshore or onshore (beneficial use). Nearshore disposal is currently conducted at Site E. Benson Beach is being investigated as an onshore site but needs further evaluation of its costs and benefits.

The following is known about the Benson Beach option:

- The Corps cannot dredge and dispose from a point offshore; the waters are too rough.
- The Corps cannot get inshore but could dump near the north jetty; on the old charts the spot is called the dumping grounds and is at the "root" of the north near the old Site C dumping ground.
- A sediment trap and sand by-passing plant would need to be created at this site; the sand would then be picked up and transported to Benson Beach.

Concerns with this operation:

- A survey conducted in the late 1980s along the north jetty found high densities of young of the year (YOY) crab in the dumping area/sediment sump area. This information was based on more than one survey. In April and May, the YOY crabs come inshore in large numbers and are gone by September. This overlaps with the dredging season which is from July through October.

Darrel Potter (WFOA) asked if the Corps had the capacity to pump directly from the hopper to the beach, eliminating the intermediate by-passing plant.

Rod Moritz (Corps) acknowledged that this was a good idea but the hoppers they use are constrained by a limited timeframe/season by which they can work.

Eric Braun (Corps) stated that pumping generally takes 2-3 hours; mooring at a buoy would be necessary - this would add an estimated \$ 1.2 million to the overall cost of the project; a 5 minute disposal time would be expanded to 2-3 hours; all of these factors greatly increase the costs associated with dumping.

Bob Burkle (WDFW) remarked that the Seattle District had disposed of about 200,000 cubic yards at South Beach; Seattle determined that on beach disposal is twice as

expensive as regular dredging and disposal. He pointed out his belief that the Portland Corps would actually save dredge travel time (the time of streaming out and in to an offshore dumping site) by selecting an onshore dumping site.

Eric Braun (Corps) expressed his opinion that the distance between the MCR dredging area and the beach appears to be about the same as the distance to the current offshore sites.

Bob Burkle (WDFW) stated that in Willapa Bay the dredge *Yaquina* had been equipped with a side casting nozzle which had the capacity to shoot material up to 100 yards.

John Malek (EPA) warned that the *Yaquina's* side casting capacity may actually be less than claimed; he stated that such claims were made by those who also broke the dredge. John indicated that many things were allowed in Willapa Bay which may never be allowed again.

Eric Braun (Corps) stated that a full hopper cannot sidecast to empty itself, the *Yaquina* cannot dredge at the MCR, and the *Essayons* cannot side cast.

Arlene Merems (ODFW) asked what was to prevent sand from a dumping operation from cutting away at the rocks near the jetty (if it moves down), scouring the rocks, and disrupting the fishery that occurs at the north side of the jetty. She stated that many fishers would be unhappy about such prospects.

Mark Siipola (Corps) remarked that he had been directly involved in a hopper dredge operation at Miami Beach, Florida, where 3 million cubic yards was pumped directly to the beach with a contract pipeline dredge. He stated that this project cost about \$25 million dollars in the early 1980's, and this might give the group a ballpark sense about expected costs.

Bob Burkle (WDFW) stated that the Miami Beach project includes the cost of dredging as well as dumping. He stated his belief that a Benson Beach project is more comparable with the Newport situation which is more along the lines of 585,000 cu yards.

Ed Manary (WDFW) reminded the participants that the Benson Beach project would require a nonfederal sponsor.

Laura Hicks (Corps) asked about the chances that the State of Washington might contribute.

Bob Burkle (WDFW) stated that such chance was next to none but slightly more likely if the project were for purposes of mitigation for the deepening project or beneficial use. He stated that the razor clam biologists might be able to assist with funding arguments. He also stated that perhaps the Ports might be of assistance.

Laura Hicks (Corps) reminded Bob that the MCR is a specific authorized project, and he'd be asking sponsors of one project to sponsor another.

Rod continued his discussion.

- A determination of the fate of material on the beach must be considered. The placing of 3-5 million cubic yards on the beach would not be easy; a mountain of sediment would require spreading; it would eventually be eroded by tides and would enter the littoral system, but would not necessarily all go north. Material would most likely will move offshore and find

an equilibrium depth where it may sit (Peacock Spit likely) until it moves off under storm conditions. The dredged material has a different grain size than the beach grain size and will therefore readily move off the beach to other areas.

Bob Burkle (WDFW) asked how the current erosion rate at Peacock Spit might change if material is returned to Benson Beach.

Rod Moritz (Corps) stated that they could try to put material there to find out.

Dale Beasley (CRCFA) remarked that Benson Beach has some of the highest iron content in the area. He stated that the sands are very heavy, the area is basically an iron deposit, and he would expect the higher density grains may actually be larger in grain size than other areas.

Rod Moritz (Corps) stated a need for significant studies to determine the fate of material, the costs associated with a project and a non-federal sponsor for any placement project.

Steve Barry (WDFW) asked about jetty monitoring.

Eric Braun (Corps) indicated that jetty monitoring is typically routine; when reports come in and risk is seen then they are evaluated.

Steve Barry (WDFW) remarked that the Gray's Harbor jetty was still standing, yet a breach was occurring.

John Malek (EPA) suggested that Corps members present at this meeting relate a message to other Corps individuals regarding the north jetty's potential problems.

LUNCH

Rod Moritz (Corps) continued his discussion regarding physical overlay information.

Sediment Data - Percent Fines

- The mud content on this overlay is indicated by color (5, 10, and 15% fines).
- The overlay shows where sediments are distributed off the MCR
- The overlay represents two years of data (1994 and 1996).

1977 Sediment Chart

- This chart represents average grain size off the MCR; this is different than percent fines.
- Fines in 1977 correspond very well with fines in 1997.
- Generally, the flow of the river plume appears to be to the northwest out of the entrance channel.
- The material in the channel is more coarse and can be associated with coarser material at the disposal sites.

Bob Burkle (WDFW) remarked that new sediment profile data may be available from the USGS. He was aware of a recent USGS side-scan sonar survey; he thought this data was collected for the area off the MCR. The data might provide information on individual rocks, mud flats, and substrate type; Bob encouraged the Corps to obtain the information.

Dale Beasley (CRCFA) stated that George Kaminsky (WDOE) might have information on how to obtain the data.

Rod Moritz (Corps) stated that he would call and investigate the USGS information. He added that what is hat is underneath the sediment is just as important as the sediment itself. Either one or both characterize bottom sediments.

Rod remarked that awhile back someone had asked about the capability of placing 5 million cubic yards of material for 20 years (100 million yds³ total) within 4.5 miles from the MCR. Rod displayed a map to indicate where materials could be placed within 4.5 miles; he qualified that these areas were not disposal areas (proposed or otherwise) just calculation areas. He went on to explain what volume of sediments could be placed within the 4.5 mile area over a 20 year period. He explained that if the shoal area could be utilized and weather would allow the boats to could get in and out, the Corps could fit approximately 300 million yds³ in the 4.5 mile zone over 20 years, and if the zone of siting was expanded out to 8 or 9 miles, it could accommodate 326 million yds³.

Return to Previous Issues

Valerie Lee (EI-facilitator) invited the group to revisit issues left unresolved from the earlier discussions. She explained that much work had been done the previous day to introduce and explain a soft-shelled crab study the Corps and EPA would sponsor at the Scripps Institute in LaJolla, CA. Participants had agreed that such a study would be helpful, but the Corps had requested further input as to study components and research needs of the participants.

Kim Larson (Corps) stated that the Corps had designed a study to evaluate the mortality of soft-shelled crabs as a result of placing varying amounts of sediments on them when they have just molted. He stated that the NMFS would collect the crabs in their hard phase, the crabs would be transported to the lab, placed into 60 or so individual tanks, and the tanks would be gradually warmed in the spring to influence molting. At the point at which molting begins, sand will be placed on the crabs in varying depths and using varying methods (shaking, dumping etc.) to determine potential impacts.

Jim Nichols (ODCC) asked what would be the result if the laboratory test results came back with no impacts, but when dumping begins impacts are apparent.

Kim Larson (Corps) stated that we had originally intended to do this study on board a crab boat using soft shelled crabs collected in the crab pots. Dale Beasley, however, had indicated that they would not be capturing the soft shelled crabs after they had just molted, when they are most vulnerable, in the pots since they bury in the sand until they start to harden up. They catch them after they come out of sand and start to feed again. Kim indicated that after hearing this he had talked to Steve Barry about the chance of getting crabs to molt in a aquarium so we could conduct the burial tests right after they molted. Steve said that he had observed them molting in an aquarium and thought this approach would work.

Arlene Merems (ODFW) stated that Jim's point was a good one. She then remarked that impacts also could be apparent in the lab (as a result of temperature changes, etc.), which would not show up in a non-laboratory situation.

Bob Burkle (WDFW) would like to see the study refined to ensure the crabs molt in sediments representing percent fines in which they naturally occur. He would also like to ensure that the sands dumped on the crabs are the same as those dumped by the dredge.

Kim Larson (Corps) stated that industrially available sediment would be used and selected to represent adequate grain size.

Jim Nichols (ODCC) asked if dredges would conduct thin layer or pin-point dumping at future sites.

This question led to a discussion regarding / readdressing methods of disposal available to the Corps. Rod Moritz (Corps) highlighted the following points:

- Two types of dredges are currently used at the mouth of the Columbia River.
- The difference between the two is how materials are released.
- One is a split hull where the whole hull cracks and opens at one time. This dredge typically releases quickly, since it is built to maximize profit. However, a split-hull dredge can also be operated to open slowly and release more gradually.
- The *Newport* is a split-hull dredge. A typical load is about 3,000 yds³ and takes five minutes to empty the hopper completely. For reference, a dump truck holds approximately 8,000 cubic yards.
- Another type of dredge has a series of bottom doors on the hull bottom that are opened sequentially. Typically each door is opened individually to unload its contents, and then additional doors are opened as the dredge moves along.
- The *Essayons* is a multiple bottom door dredge.

Kim Larson (Corps) pointed out that the dredge uses water to help dislodge sand as it dumps, as a result the sand never dumps all at one time.

Rod Moritz (Corps) stated that the sand and water mix does not dump as a smooth and consistent slurry, but instead comes out in clumps.

Footprints of the Essayons and Newport

- Please Note: the *Essayons* is a multiple door dredge; there is a mistake on the overhead.
- 6000 yards is the rated operating capacity, but each load at the MCR is typically 4,500 yds³.
- The contours are in terms of feet.
- Since the *Essayons* doors open sequentially, the footprint is more uniform and consistent.
- When the *Newport*, a splithull dredge, opens its hull the first slug dumps out and this is where the deepest part of the mound is created; the *Newport* creates a higher mound than the *Essayons*.

John Malek (EPA) stated that adjustments can be made to dredge speed and the rate at which the doors open on a contract dredge; this has been done in Puget sound during a sediment capping project.

Edith Beasley (CRCFA) asked for clarification on overheads and graphs that were provided at the prior meeting. She stated that there were discrepancies between what a graph and contour stated with respect to depths of mounds created by each of the dredges in 60 feet of water.

Rod M stated that the graph provides information as to the absolute maximum height of a mound, whereas the contour depicts aerial distribution of sand and is more representative of a dump. Rod indicated that the chart would not be used for management of a site, but the graph would be used since it is a more conservative estimate of the dump. Rod said that although this is not thin layer disposal, it is representative of the Corps' current practices.

Mark Siipola (Corps) explained that thin layer disposal could be depicted by taking a footprint of the *Essayons* and repeating it (through disposal) to the left and right, i.e. by shifting disposal slightly, rather than placing each dump on top of the other. He

explained that in the past the Corps has had to follow the same line, as a result of site size limitations, and this had led to build up.

John Malek (EPA) explained that thin layer disposal also meant/required an extension of the total area of site.

Ed Manary (WDFW) remarked that the width of the prints should be narrowed and the length of the dump lengthened.

Bob Burkle (WDFW) stated that if the crab study provides a rate at which crabs could survive could survive, then the Corps may be able to replicate such a depth.

Jim Nichols (ODCC) asked which type of thin layer disposal would be considered for the new sites - thin layer disposal per dump or thin layer disposal over a broad area.

Eric Braun (Corps) answered that it has not been decided which to use.

Arlene Merems (ODFW) asked if the Corps or EPA had an idea how much surface area would be necessary based for thin layer disposal.

John Malek (EPA) responded no.

Bob Burkle (WDFW) asked how long the dumps took in Puget Sound using a sprinkling technique.

John Malek (EPA) stated that they took anywhere from 7 to 65 minutes to complete.

Ed Manary (WDFW) stated that by one definition, the practice out there now could be thin layer, if there was capacity to expand a site to use more area.

Jim Nichols (ODCC) said he was skeptical that the Corps contractor would actually use the thin layer technique, since it is not economical and takes more time to accomplish.

Eric Braun (Corps) stated that the contractor must follow a work plan (contract) or will not get paid. He stated that costs are still a concern, and the Corps will try to create a management plan to take account for costs.

John Malek (EPA) explained the use of a monitoring system that has been used on the east coast. The system records GP data and has the capacity to be read at the EPA or Corps offices, where immediate shut down can be ordered. He said they have never required a key to unlock or unload a dump, but at certain sites they have required that the contractor call the coast guard for locations (accurate to 1-2 feet) prior to releasing a dump—used in Puget Sound.

The group revisited discussions regarding study design from Day 1.

Arlene Merems (ODFW) said she would like to see the inclusion of a juvenile flat fish study as well.

Kim Larson (Corps) said this could be done.

Bob Burkle (WDFW) asked if the study might evaluate impacts to benthic invertebrates, particularly ones that might become prey to a newly emerged softshell.

Kim Larson (Corps) responded that there wasn't any way to do that in a laboratory setting. He said the amount and quantity of benthic invertebrates could not be replicated.

Kim Larson (Corps) reminded the group that a thin layer study was available. He said that the report distributed was merely a summary report and there were 2 other large volumes available. He suggested that those interested could use/borrow the report or pay a copying cost. He also said that the Corps was committed to trying to get Susan Rees to speak at a future site management meeting.

Kim Larson (Corps) said he would like to know if the fishermen would be accepting of a study result. He stated that since the crabbers originally asked the question as to what would be the impact to softshell crabs, he wondered how they felt the study would answer their question.

Dale Beasley (CRCFA) said the study would have some value to him. He expected that there would be a level at which all would die and all might live. He said there would always be some reservations about the study though.

Edith Beasley (CRCFA) stated that there will always be some variables from the real world that cannot be replicated in a lab, and it seems like the Corps will be forcing molting like one might force bulbs.

Steve Barry (WDFW) said he would like to reemphasize what Dale said—that there will always be some questions.

Susan Hinton (NMFS) stated that the study would provide valuable information as to how to minimize impacts.

Kim Larson (Corps) emphasized that the Corps was not trying to a prove point that there would be no impacts, but instead was trying to determine what the impacts might be.

Ed Manary (WDFW) summarized that he was hearing favor for the study, that an available study design would be helpful, and that the results would be helpful to provide answers to site management but would not provide all the answers.

Darrel Potter (WFOA) stated that the information would be helpful and it would provide more than what is currently available.

Ed Manary (WDFW) asked Kim Larson about the timeframe for the study.

Kim Larson (Corps) said that it would be next Spring before they could begin putting any results together.

Ed Manary (WDFW) asked if the Corps or others had any experience getting crabs to molt.

Darrel Potter (WFOA) suggested that the Corps watch the barometric pressure when conducting the study. he suggested doing the study during a steady barometric period. he stated that a quick change in pressure can cause the crabs to "sand-in. He said he observed this in San Francisco when the barometer was quickly changing.

Dale Beasley (CRCFA) asked again if the crabs would be of all sizes.

Kim Larson (Corps) said yes. He also said that the study would be filmed.

Laura Hicks (Corps) extended another invitation to members of the CRCFA/WFOA to go down to LaJolla. She said the Corps could pay the expenses for one individual to observe.

Dale Beasley (CRCFA) declined

Darrel Potter (WFOA) remarked that the WFOA has members in San Diego who could come to observe. He suggested that the Corps contact John Lagrange a fish biologist /commercial fisherman (crabber) who lives in that area. Darryl said that he would be seeing John at an upcoming meeting and would tell him about the study.

As a final comment, Valerie Lee (EI-facilitator) asked the participants to contact Kim with study design questions or Laura Hicks for details or interest on going down to observe the study.

Additional Issues

Valerie then asked if there were other issues or needs that individuals wished to raise.

Dale B stated that it would be helpful to add an overlay depicting the winter overflow of the river--- or plumes from the river.

Susan Hinton indicated that Oregon State might have this information available.

Kim Larson stated that this information varies year to year and has significant daily variability.

Jim N said that the tide rip can be seen with great reliability day to day.

Several participants asked about the value of such an overlay. They wished to know what new information the overlay would provide.

Dale B said that it could be used as an additional tool.

Edith Beasley said that tidal outflow areas show high areas of nutrients.

Rick Vining stated that this was a silt plume, and cautioned that plumes have been known to have no productivity or nutrients at all.

Steve B asked how much does the plume line up with the outflow area.

Susan Hinton stated that the prevailing currents, the Columbia River discharges and silt are all related.

Dale B stated that where the Columbia River outflow hits the ocean water there is a drop out zone for nutrients. He stated that this very rarely occurred beyond the 46' 10 line. He stated that within the towlane area it is fairly regular each day where the fresh water hits the ocean water.

Susan Hinton added that the interchange occurs at varying depths as well; it is sometimes on the surface, sometimes not.

The group discussed the need for an overlay of this interchange zone.

Susan Hinton (NMFS) suggested that perhaps the crabber's interest in this overlay was related to a potential food source for crabs. She said that she felt that the same information was already contained in the sediment data overlay. Susan stated that she could make a copy of another study depicting the same information and make it available to the group to review.

Dale B said that if such information was available and synonymous with the sediment data than that would suffice, but he would await Susan's information.

Bob Burkle said that concentration/densities of juveniles was still a concern for him. He stated that he would like to see a site selected after using the best collection gear to study it. He indicated that he had seen a beam trawl used for collection purposes in Grays Harbor.

Steve B said that sidescan sonar could be used with a beam trawl.

Susan Hinton stated that a beam trawl works fairly well to stir up the top layer of the bottom sediments, but a couple of other net designs do the same thing. She also said that these collection methods would have problems in 250 feet of water.

Bob Burkle stated that a modified crab pot might be used to collect juveniles, but this would need refinement.

Dale B agreed that the modified pot needed refinement.

Kim Larson reminded the group that the disposal sites would be selected using existing data and information.

Bob Burkle went on to describe a Westport study that required 1 trawl a month, and 5 tows if possible on each tide. He said that there was a size cut off for reportable crabs and other species specified in the study. During the times that crabs are expected crabs— Bob said they require 2 trawls per month to estimate how many crabs are there during both dredging and disposal. This information helps to make decisions as to where to require mitigation. He said the design is not perfect, but the impact on the fishery has been negligible.

Rick Vining said that they were not proposing a 2-3 years study at all.

Steve B said that this would be a site evaluation only.

John M pointed out that mitigation at Gray's Harbor is for the purpose of dredging only and not disposal.

The Washington agencies and the crabbers concluded that it was their general sense that such a study was not needed now but may be needed later.

John Malek said it was EPA's contention that they were not needed now nor would they be needed later.

Further Selection of Candidate Sites

The group took an hour to review the maps to identify additional candidate disposal sites. Discussion then ensued as to the attributes of each site and the possibility of recommending each site as a candidate site.

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WDOE site - Rick's Site

Rick Vining explained that he selected his site as a means of having an offshore site to compliment expanded Site E. He said he avoided the trawl fishery and the mud hole. Because of the depth of the water, Rick would prefer to see thin layer disposal used at this site. He acknowledged that it might also be used for point disposal, depending upon the results of the LaJolla study.

No consensus was made with respect to this particular site. Some participants were comfortable with the site, pending further information on softshell crabs and juvenile flatfish from LaJolla.

Dale B stated that he was uncomfortable with so much area selected for one site.

Edith Beasley stated that she was concerned about the potential impact to soft shell crabs.

Darrel Potter stated that he was uncomfortable with such a large area where so much fishing takes place.

Jim Nichols stated that the area passes through the middle of softshell concentrations and he was not comfortable with thin layer disposal.

Arlene M pointed out that selection as a candidate site did not necessarily mean the whole site would be selected. She asked the crabbers if this would make a difference in their opinions.

John M stated that the idea of a candidate site is to look at an area and to select a part or all of it. He cautioned that areas not selected as candidate sites would not be further evaluated.

Dale B stated that there was an area that he thought he might be able to live with, but he was not willing to disclose it yet.

Valerie Lee suggested that Dale look over the overlays and call the Corps with further suggestions.

WDFW Sites - Bob's Sites

Bob Burkle (WDFW) introduced several different options for candidate sites.

1. Expanded E
2. Peacock Spit/Benson Beach
3. The Shale Pile to be used possibly as a mitigation site. He had the same experience as the fishermen that this site was a wasteland of oily shale; that it was not productive; there was no kelp growing on it. He said he had consulted with Dale and Dick the day before and that there were no fish or crabs at the site. Bob suggested that the site be covered with sand to provide a productive mitigation site.

Eric Braun (Corps) said the site could be considered as a beneficial use site, but not as a mitigation site since there is no established requirement for mitigation.

The Shale Pile

Darrel Potter (WFOA) asked for consensus on the shale site as a candidate site.

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Consensus Point: It was agreed that the shale pile should be investigated as a candidate site, so long as it is not a unique environment and does not overlap with the mud hole.

The Skirt Site

With respect to the skirt site, no changes were made to the previous day's recommendation to recommend the site pending further information about juvenile flatfish. Edith Beasley added that she would pass on her recommendation of the site, as she was still concerned about potential impacts to soft shell crabs.

Expanded Site E

Consensus Point: All participants agreed that the expanded Site E was a good candidate site, so long as monitoring was continued both at the site and to the north and west of the site.

Several participants suggested that the Corps also incorporate as part of its management plan decisions to cease dumping if the seafloor level raises 10% above that of a baseline level, and when softshell crabs arrive in the site later in the season.

WDFW Site - Steve's Site

Steve Barry explained that he chose to have a site completely within the 80 foot contour in order to avoid the possibility of mounding. He selected an area in the near shore drift zone which avoided the mud hole. He qualified that his site was pending a determination that there would be no impact to soft shell crabs. Steve also supported continued use of expanded Site E.

Various comments were circulated with respect to this particular site, but most participants agreed that they could not cast an opinion on the site until the LaJolla studies came back.

Concluding Remarks

Laura Hicks (Corps) said that it was fair to say that the information was in no state to be put into a November Draft EIS. She also said it was fair to say that the participants were in need of Kim Larson's information from LaJolla prior to getting information into the 1998 EIS.

Eric Braun (Corps) added that there was certainly no time to make the EIS process for next year's dredging contract. He said that the Corps would be looking at expanded sites E, F, and B for the next season, since these were the only sites currently available. He added that both Site A and the old Site B have been closed to disposal by the EPA.

Meeting Participants - Day 2

Participant Name	Organization	Phone/Email
Rick Vining	WDOE	(360) 407-6944
Ed Manary	WDFW	(360) 902-2231
Bob Burkle	WDFW	(360) 249-1217
Steve Barry	WDFW	(360) 249-1203
Kim Trimpert	CREST	(503) 325-0435

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