LETTERS FROM STATE AGENCIES

JOHN A. KITZHABER, M.D.
GOVERNOR

September 12, 2002

Colonel Richard W. Hobernicht
U.S. Army Corps of Engineers, Portland District
CENWP-EM-E Attn: Robert Willis
P.O. Box 2946
Portland OR 97208-2946

Dear Colonel Hobernicht:

Thank you for the opportunity to comment on the *U.S. Army Corps of Engineers' Draft Supplemental Integrated Feasibility Report and Environmental Impact Statement* (SDEIS) for the Lower Columbia River Channel Improvement Project. I continue to support the proposed channel deepening project provided that environmental issues raised by the state and others are sufficiently addressed by the Corps in the Final Supplemental Environmental Impact Statement (FSEIS).

The Columbia River navigation channel is important to the state's economic health, serving as a significant conduit for international trade. Deepening the channel to accommodate fully loaded new-generation deep-draft vessels would continue the Port of Portland's role as a vibrant regional port that makes the world market accessible to the goods grown and manufactured throughout this region. We have more than a thousand growers and manufacturers in this region who rely on the Columbia River channel as an affordable means to reach global markets. In rural areas, the project will help keep transportation costs down for growers of agricultural products and makers of export goods.

S-1

However, in considering the deepening project, we must maintain our important environmental standards to protect fish, wildlife and water quality. Given Endangered Species Act listings and Clean Water Act concerns, it is imperative to ensure the project minimizes and mitigates potential impacts to native salmonids and water quality.

Attached you will find comments from several state agencies. There are several key concerns that need to be addressed in the FSEIS.

First, the project must be implemented in a manner that is consistent with local, state and federal requirements. This includes federal requirements that are implemented by state agencies.

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Corps of Engineers Response

S-1. Comments noted.

Corps of Engineers Response

Second, the Corps must maximize opportunities for the beneficial use of dredged sand, and avoid disposal that adversely impacts offshore and estuarine habitat. In addition, the Corps must carefully consider the project's potential impacts on sediment transport within the Columbia River estuary to ensure the littoral system is managed in an effective and sustainable manner.

Third, the adaptive management process for the project must be open and transparent. At a minimum, state agencies having interest and expertise in the estuary should be included in the adaptive management framework. Any decisions to change the project through this process should be considered publicly, and include input from interested stakeholders.

Lastly, support from the state is dependent on the Corps appropriately addressing agency concerns specified in the attachment to this letter. Oregon's state agencies are prepared to work with the Corps to resolve issues identified in the comments.

S-1

Not all state agencies with an interest in the project are commenting on the DSEIS. The Department of Environmental Quality (DEQ) and Department of Land Conservation and Development (DLCD) will not comment due to their upcoming reviews of the proposed deepening project under the Clean Water Act and Coastal Zone Management Act. As you know, DEQ and DLCD are working with the Corps and sponsoring ports toward commencement of the state's public review processes for the project. The review processes for both agencies will include public hearings and comment opportunities. In addition, other state agencies, some of which are submitting comments as part of this document, will participate in and comment on the state review processes conducted by DEQ and DLCD.

Thank you again for the opportunity to comment on the SDEIS. I look forward to working with the Corps to make this project one that provides economic benefits and maintains the environmental health of the Lower Columbia River.

Sincerely,

John A. Kitzhaber, M.D.

JAK/NR/sm

Attachment

Oregon Department of Fish and Wildlife (ODFW)

SUMMARY OF COMMENTS

The Oregon Department of Fish and Wildlife's (ODFW) Intejurisdictional Fisheries staff, Habitat Division, and Marine Resources Program have reviewed the US Army Corps of Engineers' (Corps) Draft Supplemental Integrated Feasibility Report and Enviorunental Impact Statement for the Columbia River Channel Improvement Project (DSEIS). This letter serves as ODFW's response to the DSEIS concerning both river dredging and disposal options and ocean disposal issues. ODFW reserves the right to provide additional comments as part of the state's review of coastal zone management certification and water quality certification.

The Department provided comments on the Draft Environmental Impact Statement (DEIS) through the State of Oregon's DEIS response in February 1999. ODFW also commented on the Final Environmental Impact Statement (FEIS) through the State of Oregon's FEIS response in November 1999. We continue to have comments and concerns relative to the project. ODFW's major points of concern with the project continue to be offshore disposal site issues, threatened and endangered species effects, timing, mitigation for offshore and estuarine impacts, and additional information needs. In addition, the Department has serious concerns with two of the restoration/DMD sites proposed for the first time in the DSEIS. Finally, ODFW believes that it is critical for state agencies to be involved with the adaptive management framework proposed by the Corps.

S-2

The project area is situated within federally designated critical habitat for Snake River sockeye and chinook salmon. Dredging will occur in the Lower Columbia River where steelhead, chum, and chinook are also listed as threatened under the federal Endangered Species Act. Willamette River chinook and steelhead are also listed as threatened. In addition there are a number of state-listed endangered, threatened, and sensitive species in the project area including Lower Columbia River coho which are not currently federally listed.

While the Corps has addressed a number of issues raised in our prior comments, such as removal of all wetland dredged material disposal sites in Oregon and smelt sampling studies, ODFW continues to have a number of serious concerns with the proposal. We continue to be concerned that impacts to several of the important resources in the river have not been adequately addressed. While we support the work that has been done so far on sturgeon, ODFW believes there are still unanswered questions regarding the entrainment impacts on sturgeon mortality and disposal impacts on sturgeon rearing habitat. If the current telemetry study indicates that dredging and/or disposal would have adverse effects on these resources, ODFW requests that appropriate mitigation actions be developed including avoidance, minimization and compensation.

In addition, we continue to have serious concerns with the proposed offshore management of dredged material disposal (DMD). We summarize the ocean disposal

Corps of Engineers Response

S-2. Comments noted.

S-3. After further consultation with ODFW, the Final SEIS is revised to specifically address Lower Columbia River coho salmon. The Corps has added a discussion of Lower Columbia River coho to the revised Coastal Zone Management Consistency Determination (Volume 2, Exhibit F).

In addition to the species listed under the Endangered Species Act that were the subject of consultation with USFWS and NOAA Fisheries, the State of Oregon has requested that the Corps include Lower Columbia River native coho salmon listed as endangered under the State's ESA. Coho spawn in small, relatively low gradient tributaries in the lower Columbia River. Juveniles rear in these tributaries for two years before migrating to the ocean. Adult coho return to spawn as three year olds. Lower Columbia River coho are predominately of hatchery origin, with only the Clackamas and Sandy Rivers still having wild runs. Most of the coho juveniles in the channel improvement project area are of hatchery origin and are released from mainstream and tributary hatcheries as smolts. Coho juveniles are considered stream type since most of their rearing occurs in the tributary areas. Consequently, the analysis of the impacts to federally listed stocks with stream type juveniles by the channel improvement project consultation would apply for coho as well. In addition, all the monitoring and restoration actions proposed for the federally listed stocks would be beneficial for juvenile coho as well. Adult coho return in the same time frame as federally listed stocks of adult fall chinook and would use the same habitat. Consequently, the assessment done for adult fall chinook would be applicable for coho. As a result, the Biological Assessment and Biological Opinion prepared for the channel improvement project for the federally listed stocks in the Columbia River is considered adequate for the assessment of impacts to Lower Columbia River coho.

issues below. Specific comments on the offshore portions of the DSEIS are addressed in Attachment A.

State Endangered Species Act

In our prior comments on the FEIS, the Department addressed the issue that the Oregon Fish and Wildlife Commission had listed Lower Columbia River coho as an endangered species under the State Endangered Species Act (ESA) (July, 1999 Commission meeting). This was the first time the Commission had listed a species since the State ESA was significantly amended in 1995. The statute now requires that the state adopt survival guidelines when a species is listed. In addition, the statute has a new requirement for state incidental take permits for state-listed threatened and endangered species (ORS 496.172(4). State incidental take permits are not needed for species covered by a federal consultation. The only state-listed species that is not also federally listed is the Lower Columbia River coho which was not addressed in the Biological Opinion by the National Marine Fisheries Service. The state definition of take is different than the federal definition. The state definition is *"Take " means to kill or obtain possession or control of any wildlife.* The USACE needs to address the standards for an incidental take permit for Lower Columbia River coho potentially affected by the channel deepening and disposal actions. The standard for issuance of an incidental take permit is that the take will not adversely impact the long-term conservation of the species or its habitat. (ORS 635-100-0170(l).

S-3

As we mentioned in our previous correspondence, survival guidelines are defined as quantifiable and measurable guidelines that the commission considers necessary to ensure the survival of individual members of the species. State Land Owning or Managing Agencies such as the Division of State Lands (DSL) need to determine whether an action proposed on state land is consistent with the survival guidelines. If the agency determines that the proposed action has the potential to violate the survival guidelines, it must notify ODFW. ODFW then has 90 days to recommend reasonable and prudent alternatives, if any, to the proposed action which are consistent with the guidelines. The submerged and submersible lands in the Columbia River, as well as many of the islands in the Columbia River, are state lands managed by DSL.

The most relevant standard in the survival guidelines for Lower Columbia River coho is that actions shall be avoided that cause a violation of water quality standards established by the Oregon Department of Environmental Quality. To be consistent with the survival guidelines for Lower Columbia River coho then, the project must meet state water quality standards. We will not know if the project meets state water quality standards until the Department of Environmental Quality completes its 401 Water Quality Certification process later this year.

Timing Issues

The Oregon Department of Fish and Wildlife has "Timing of In-Water Work to Protect Fish and Wildlife Resources" that permit applicants are typically required to adhere to by the regulatory
S-4 agencies. Activities within the designated Columbia River navigation channel have usually not been required to meet the Department's timing guidelines. The Corps however, is proposing a number of activities outside of the navigation channel including flow-lane disposal. Any

Corps of Engineers Response

S-3 (con't). In that assessment the Corps and Services developed a conceptual model of the Lower Columbia River ecosystem relationships that are significant for salmonids. This model also applies to Lower Columbia River coho. Because the habitat requirements of adult salmonids are limited in the lower Columbia River, the model focuses on juvenile salmonids. The conceptual model incorporates the best available science for adult and juvenile salmonids. The basic habitat-forming processes-physical forces of the ocean and river-create the conditions that define habitats. The habitat types, in turn, provide an opportunity for the primary plant production that gives rise to complicated food webs. All of these pathways combine to influence the growth and survival and, ultimately, the production and ocean entry of juvenile salmonids moving through the lower Columbia River.

The conceptual model also demonstrates that the project complies with the Survival Guidelines in ORC 635-100-135. Specifically, the analysis demonstrates that the project should not degrade water quality, reduce stream flows, affect gravel in spawning areas, adversely affect riparian habitat, or impair fish migration. The ESA analysis, including the conceptual model, also demonstrates that the project and any incidental take associated with it will not adversely impact the long term conservation of Lower Columbia River coho or its habitat, or significantly decrease the likelihood that the fish will recover. The ESA analysis also demonstrates that the Project complies with the Survival Guidelines in ORC 635-100-135.

Although none of the changes identified in the conceptual model from the channel improvement project are believed to have a measurable effect on existing habitat types, the Corps is proposing to implement compliance measures to ensure effects will be minimized and will also monitor to confirm this conclusion. In addition, proposed ecosystem restoration and research actions will benefit Lower Columbia River coho. Based on the above, the project will not have a significant effect on native Lower Columbia River coho.

Specifically, through the Section 401 water quality certification process, which is currently underway, the state will obtain reasonable assurance that the project will not violate state water quality standards.

S-4. As indicated and coordinated through the ESA consultation process the following in-water timing restriction have been agreed to by both the NOAA Fisheries and USFWS as protective of aquatic species. These restrictions, in conjunction with the best management practices (as described in the Biological Assessment and Opinions) for dredging and disposal, minimize impacts to species of concern including state species of concern.

Corps of Engineers Response

S-4 (con't).

Dredging Timing

Construction Features	Type of Dredging	Timing
Navigation channel, including overdepth and overwidth dredging at depths greater than 20 feet	Hopper Pipeline Mechanical excavation	No timing windows No timing windows No timing windows
Turning basins at depths greater than 20 feet	Hopper Pipeline	No timing windows No timing windows
Rock removal with blasting	Mechanical excavation	November 1 to February 28
Rock removal at depths greater than 20 feet	Mechanical excavation	No timing windows
Berths	Mechanical excavation	November 1 to February 28
Ecosystem Restoration Features		
Lois Island Embayment Habitat Restoration	Mechanical excavation Pipeline Hopper	No timing window for material placed in the temp. construction sump at CRM 18-20. Pipeline dredging of material from the temp. construction sump will occur in the November to February in-water work window.
Purple Loosestrife Control Program		July 1 – Oct 31 (no dredging required; represents application timeframe)
Miller/Pillar Habitat Restoration	Pipeline	No timing windows
Tenasillahe Island Interim Restoration[1] (Tidegate/Inlet Improvements)	Mechanical excavation	July 1 – September 15
Tidegate Retrofits for Salmonid Passage	Mechanical excavation	July 1 – September 15
Walker/Lord and Hump/Fisher Islands Improved Embayment Circulation	Mechanical excavation	July 1 – September 15
Cottonwood/Howard Island Proposal[2] Columbian White-Tailed Deer Introduction	Not Applicable	No timing window (no dredging required)
Tenasillahe Island Long-Term Restorations[3] (Dike Breach)	Mechanical excavation	July 1 – September 15
Bachelor Slough Restoration[4]	Pipeline	July 1 – September 15
Shillapoo Lake Restoration[5]	Mechanical excavation	July 1 – Sept 15 (in-water work only); balance of work behind flood control levees and thus no timing window
Mitigation Action		
Martin Island Embayment	Pipeline	No timing window

All flowlane disposal, as mentioned in your comment, is typically done in the channel or channel margins in water depths of 50-65 feet. No timing restrictions are used for maintenance dredging. The reason for the ongoing exclusion from the in-water work period for the channel work is that it occurs at a depth below 20 feet, which is the depth that salmon commonly migrate.

activities outside of the navigation channel should be conducted within the Department's timing guidelines. The in-water work timing for the Columbia River is November 1 - February 28. The
S-4 Department understands that the Corps will be continuing studies on sturgeon and crab in order to minimize the effects of dredging on these species. The results of these studies will need to result in timing of dredging operations that minimize impacts to these resources.

Off-Shore Disposal Issues

The Department continues to have significant concerns with the proposed offshore
S-5 disposal site management. The main issues with marine disposal are the task force, the size of the site, the lack of adequate biological characterization of site, and the lack of mitigation. These concerns are outlined in more detail in Attachment A.

Proposed Restoration/DMD Sites

The DSEIS contains a proposal for 2 significant new restoration/dredged material disposal actions in the Columbia River estuary. The Department has serious concerns with the Lois-Mott Island proposal and the Miller-Pillar Rock pile dike proposal. ODFW
S-6 understands that the Corps, NMFS and USFWS developed these restoration actions. The state of Oregon however, was not consulted in the development of these options and we have serious questions as to their actual restoration value in addition to their impacts on existing natural resources.

The proposed fill at Lois-Mott Island is for 357 acres. It is proposed in an area adjacent to the Tongue Point site for a net pen and select area fishery for coho and chinook salmon that has received substantial funding from the Department since 1995. The site of the
S-7 proposed fill is the main area used by fishers in the terminal fishery. We are concerned that the proposal would destroy the fishery all together. The Tongue Point fishery is part of a joint Oregon-Washington strategy to maintain adequate fishing opportunities for the commercial fishing industry in the Columbia River. The proposed restoration site is also a rearing area for sturgeon and a popular sport fishing location for sturgeon.

The second proposal at Millar-Pillar would essentially unite Miller Sands and Rice Island and would consist of 234 acres of fill. The Department is concerned with this proposal for a number of reasons. First, the state, Corps and other federal agencies are already trying to deal with a significant bird predation issue created by the existing dredge material islands at Rice Island and other locations. We do not believe that it is appropriate to add dredged material to these artificially created islands, further
S-8 exacerbating the bird predation problem. In addition, the proposal would basically split the river flow in two. There is a biological value in the current water exchange between Jim Crow Sands and Miller Sands. There are two tongues of water that go around Jim Crow Sands. The proposed dredged material disposal would substantially reduce this flow. If the water flow is eliminated between Miller Sands and Jim Crow Sands, ODFW is concerned that the Oregon side of the channel will fill in. This is an important commercial fishing area as well.

Corps of Engineers Response

S-4 (con't). As long as the dredge discharge is kept below 20 feet, impacts are expected to be minimal. Flow lane disposal in off channel areas that are as deep or deeper than the main channel should also have a minimal effect on salmon. Studies conducted to date have been used to develop the restrictions in the above table. Additional research on sturgeon will be used to manage disposal operations to minimize impact to sturgeon and their habitat, including potential scheduling of disposal operations. Additional information regarding entrainment of crab during dredging operations has been incorporated into Exhibit K-4. This information confirms that the impacts to crab should be small.

S-5. General comment noted; specific comments are addressed under S-12 through S-30.

S-6. Lois Island embayment and Miller-Pillar ecosystem restoration features were initially discussed and conceptually developed in 1997 with a multiple agency team, which included ODFW representatives during the course of the Lower Columbia River Restoration meetings. All of the ecosystem restoration features described in the 1999 Final IFR/EIS, as well as Lois Island embayment and Miller-Pillar, were a direct outcome of these interagency meetings. The Miller-Pillar ecosystem restoration feature was circulated and comments addressed in our October 1998 Draft IFR/EIS. Miller-Pillar was not included in the 1999 Final IFR/EIS due to NOAA Fisheries concerns regarding avian predators utilizing the pile dikes associated with the feature. NOAA Fisheries concluded that with resolution of the avian predation problems (cormorants perching on pile dikes and foraging on juvenile salmonids), their concern over implementation of Miller-Pillar feature would be negated (Ben Meyer, personal communication NOAA Fisheries). The Corps, through use of avian excluders placed on pilings and spreaders, which are pile dike features used by perching cormorants, has resolved this issue to the satisfaction of NOAA Fisheries.

The Oregon Department of Land Conservation and Development' December 1, 1999 review of our 1999 CZMA determination specifically requested estuarine restoration actions be included in the proposed project. The State of Oregon was contacted as it related to the zoning for the sites and the Corps had conversations with DLCD prior to including these restoration sites as part of the ESA consultation. Further, the Corps and the sponsor ports held a briefing for the State of Oregon on these actions after the release of the Biological Assessment on January 28, 2002. Specific State of Oregon concerns related to the Lois Island embayment and Miller/Pillar ecosystem restoration features are addressed in subsequent responses.

S-7. The Federal Government disagrees that the proposed restoration would destroy the fishery. The proposed ecosystem restoration feature, as revised, is separated from the Tongue Point net-pen site by greater than approximately 3,000 feet at the nearest point. The restoration feature will impact part of the area established for the select area fishery (terminal) for coho and Chinook salmon. We will first address area extent of the ecosystem restoration feature relative to the select area fishery at Tongue Point and potential impact to the net rearing pens where the juvenile salmonids are raised. The total acreage base for the select area fishery (SAF) is approximately 1,032 acres. As initially proposed, the 357-acre restoration feature would impact 35 percent of the acreage base for the select area fishery (SAF) at Tongue Point. The Corps' revised proposal to develop tidal marsh habitat in Lois Island embayment would utilize 191 acres or 19% of the Tongue Point SAF acreage base (3% of the 6 lower Columbia River SAF sites). Tidal marsh habitat development (fill) would start along the northern edge of the embayment and proceed southward in a relatively uniform manner.

Corps of Engineers Response

S-7 (con't). A large, open embayment comprising a substantial portion (81%) of the SAF acreage base would remain post-restoration for terminal fishers. The remaining acreage base (841 acres) would still be substantially larger than four of the 6 SAFs established in the lower Columbia River. The South Channel (432 acres), Blind Slough/Knappa Slough (700 acres), Steamboat Slough (73 acres) and Deep River (190 acres) SAFs are all narrow, linear fishing zones. Thus, the remaining acreage in the Tongue Point SAF is more than adequate to support a terminal fishery.

The net pens are currently located at the dock at South Tongue Point. We estimated that the distance from the net pens to the southernmost extent of our original restoration proposal was 1,250 feet. The revised proposal would result in a separation distance of approximately 3,000 feet. Dredged material to be placed at Lois Island embayment is medium sand with some fine and coarse-grained sand that is suitable for unconfined in-water disposal (1999 Final IFR/EIS; Section 2.5.1). There are no contaminant issues associated with the material to be placed. The sandy dredged material will settle rapidly in place and turbid water associated with placement will be localized around the discharge point. Thus, the Federal Government anticipates no affect to juvenile salmonids raised in pens at the South Tongue Point dock.

The most popular location for the sturgeon sport fishery in the general project area lies north of Mott Island and east of Tongue Point, outside our proposed restoration site. The temporary sump location alongside the navigation channel, from which material would be pumped to the embayment, lies immediately north of the most popular sturgeon fishing area. Occasional use of the embayment for sturgeon fishing does occur but the "popular sport fishing location for sturgeon" lies outside the restoration area. We concur that juvenile sturgeon rearing occurs in the embayment. Restoration of tidal marsh habitat would ultimately increase detrital export to the estuary providing more food for benthic invertebrates and in turn benefiting white sturgeon. Any habitat restoration action will result in benefits to some species and detriments to others. While the Lois Island restoration feature may have impacts to other species, including white sturgeon, the results are expected to be beneficial to endangered juvenile salmonids as well as other fish and wildlife resources over the long-term.

S-8. The comment that the Miller/Pillar ecosystem restoration feature "… would essentially unite Miller Sands and Rice Island …" is incorrect. The Miller/Pillar feature would physically begin approximately 600 feet upstream of Miller Sands Spit, channel-ward of the marsh at the upstream tip of Miller Sands Island. The feature would extend upstream to a point approximately 1,750 feet downstream of Pillar Rock Island. The location of the Miller/Pillar feature, south of the navigation channel at CRM 25-26.5 is approximately 4 miles upstream of Rice Island at CRM 21-22.5 that lies north of the navigation channel. The state's comment that it is inappropriate to add dredged material to Rice, Miller Sands Spit and Pillar Rock given the significant bird predation issue created by the existing dredged material islands in the estuary is based on a misunderstanding of the proposal. As revised to respond to comments on the Draft SEIS (Section 4.8.6.3), the Miller/Pillar ecosystem restoration feature will restore tidal marsh and intertidal flats habitat in a naturally erosive area. The restored tidal marsh and intertidal flats habitat would be inundated daily by tidal action. Thus, the ecosystem restoration feature, in addition to not being connected to Miller Sands, Rice or Pillar Rock Islands, would represent a tidal marsh and intertidal flats habitat.

The Department is also concerned that the proposed restoration actions are not truly restoring habitat types that have been the most severely impacted in the estuary. According to the excellent 1983 CREST document, *Changes in Columbia River Estuary*
S-9 *Habitat Types Over the Past Century* by Duncan Thomas, tidal marshes (- 43.1%) and spruce swamps (- 76.8%) are the habitats that have been the most adversely affected over the past 100 years. Shallow water and flats have actually increased by over 10%. In fact every estuarine habitat type has experienced a loss except shallow water and flats.

In addition, ODFW is concerned that the Lois-Mott Island proposal does not restore the historic nature of the estuary. The historic nature of Lois and Mott Islands was that they
S-10 were not islands at all. They are dredge spoil islands. True restoration for these sites would be to remove the existing dredge material, not to add additional dredge material. While we are not proposing that the Corps remove Lois and Mott Islands, we do not believe it is appropriate to call filling of the existing embayment restoration.

The Department is also very concerned with the magnitude of the restoration projects being proposed by the Corps. We do not believe it is prudent to proceed with projects of
S-11 this size without significant pre and post monitoring to ensure that the project is truly providing a biological benefit. We believe it would be more prudent to create pilot projects first to determine if the proposals are appropriate.

Corps of Engineers Response

S-8 (con't). The restoration feature would not provide nesting habitat for Caspian terns or other bird species and would not exacerbate the bird predation problem. Pilings and spreaders comprising the pile dikes would be fitted with bird excluders that the Corps has placed on most estuary pile dikes since 2000. These excluders have been effective in keeping cormorants off the pile dikes.

Third, the state contends that the feature would basically split the river flow in two and eliminate the river flow between Miller Sands and Jim Crow Sands. This remark is inaccurate. The major source of river flow into Cathlamet Bay in this vicinity is Woody Island Channel immediately upstream of Pillar Rock Island. The Corps' field data collected in the proposed Miller/Pillar pile dike field indicates that flows in the vicinity are primarily directed downstream (west) rather than south between the islands.

The Corps' two-dimensional current model from the navigation channel to south of the restoration feature also supports the flow direction and indicates only slight changes would occur post-construction of the pile dike field. No infill of the Oregon side of the channel would occur due to implementation of this feature. The proposed feature would render about 14% of the 1,629-acre Miller Sands Drift unsuitable for future commercial gill net fishery use, while the remaining 86% would remain suitable for commercial fishing purposes.

S-9. The Federal Government agrees that tidal swamp and tidal marsh habitat have been the most severely impacted in the estuary. Tidal swamp and tidal marsh habitats, however, were primarily lost via establishment of diking districts and the subsequent construction of dikes to allow conversion of former tidal lands for agricultural, industrial and/or urban purposes. These lands are virtually unavailable for restoration to tidal marsh and swamp as they are held in multiple-party private ownerships. Thus, our restoration course of action was predicated upon availability of lands for restoration purposes targeting lands already in public ownership. The Tenasillahe Island long-term restoration feature would restore about 1,778 of tidal marsh habitat and represents the best potential action for tidal marsh restoration in the Columbia River estuary. While this proposal is constrained for implementation by USFWS management objectives for Columbian white-tailed deer, it is a significant contribution to the Columbia River estuary.

To address the state's and other similar comments about types of habitats to be restored, the Corps will modify the Lois Island embayment and Miller-Pillar ecosystem restoration features. Rather than attempt to mimic the historic bathymetry of these locations, the Corps will place fill material to an elevation of approximately +6.6 feet MLLW in order to develop tidal marsh habitat. This will reduce the acreage targeted for restoration purposes to approximately 191 acres of tidal marsh habitat at Lois Island embayment. These features would provide for restoration of tidal marsh habitat, a focal point for restoration efforts by the multiple parties addressing estuarine habitat restoration.

Attainment of tidal marsh habitat on dredged material at Lois Island embayment is achievable as evidenced by existing tidal marsh habitat that has developed on the interior borders of Lois and Mott Islands and at South Tongue Point, lands formed by deposition of sandy dredged material. Tidal marsh formation around Miller Sands Island, the interior shores of Miller Sands Spit (in part) and the south shoreline of Pillar Rock Island are additional examples of tidal marsh development associated with dredged material islands.

Corps of Engineers Response

S-10. The goal of restoration is to restore historic habitat functions and values, not to restore predevelopment features at the entire Lois Island embayment location. The consultation determined that these restoration features would return lost functions and values that would benefit listed salmon species. The historical habitat loss at the present Lois Island embayment not only involved the formation of Lois and Mott Island and South Tongue Point from dredged material but the dredging of that material from the intertidal marsh, mudflat and shallow subtidal habitats that formerly comprised the Lois Island embayment area. The Corps' initial restoration proposal was to restore the historical bathymetry of the Lois Island embayment, for which we have records. Our modified restoration proposal, in response to S-9 and other similar comments, is to restore tidal marsh habitat at Lois Island embayment. The Corps recognizes that this represents only partial restoration of the total area impacted at this specific location. Removal of Lois and Mott Island, and even South Tongue Point does indeed represent another restoration option at this location. However, the extensive intertidal marsh and riparian forest associated with these islands represents important habitat for listed Columbia River salmonid ESUs plus important habitat for other fish and wildlife resources, including bald eagles, another listed species. Thus, the Corps did not consider removal of these islands and the Corps does not concur that such an action would be beneficial in the estuary.

S-11. As discussed in response to S-9, the Corps has revised the proposed action at Lois Embayment and at Miller/Pillar to focus on restoration of tidal marsh habitat. There are numerous examples of successful tidal marsh establishment on dredged material in the Columbia River estuary (response S-9). In addition, the proposed action at Lois Embayment has been significantly reduced in size and the Miller/Pillar action will be conducted one cell at a time to assess results before proceeding further. These projects are proposed as part of a restoration and research actions from the Endangered Species consultation with NOAA Fisheries and USFWS, and therefore include a range of monitoring actions to be conducted in concert with restoration. Given the proposed revisions to the restoration actions, the successes with similar actions elsewhere in the estuary, and the proposed monitoring, the Corps believes it is prudent to implement these restoration features in conjunction with the channel improvement project. By doing so, it allows the Corps to take advantage of its authorities, willing sponsors, available cost-sharing dollars, and materials and equipment required to construct these features which otherwise would be difficult to obtain.

Attachment A

***Supplemental* EIS 7/2002**
Ocean Disposal and Marine Resource Concerns

The Oregon Department of Fish and Wildlife (ODFW), Marine Resources Program has reviewed the *draft Supplemental Integrated Feasibility Report and Environmental Impact Statement* (DSEIS) (Corps, July 2002). ODFW has provided comments to the Corps on ocean disposal and marine resource concerns at MCR on several occasions over the past 5 years. We provided written comments on the DEIS, FEIS, MCR Ocean Disposal Site Management and Monitoring Plan, Batelle's Dungeness Crab/Flatfish Burial Study, and Crab Entrainment Technical
S-12 Memorandum. Additionally, ODFW has given direct input on all marine issues of concern through the Ocean Disposal Task Force process. Despite these efforts, our concerns receive little or no response from the Corps and appear to not receive consideration in Corps decisions on ocean disposal and related issues. Our comments in this letter reflect this issue. The lack of consideration from the Corps perpetuates the ongoing skepticism in the EIS process and the Ocean Disposal Task Force.

This section provides ODFW's comments on the Draft Supplemental EIS (DSEIS) as it relates to marine resources and issues. We also take this opportunity to reiterate our concerns on issues that have yet to be addressed to the satisfaction of this agency.

<u>*Deep Water Ocean Disposal Site:*</u>

The overall size of the proposed Deep Water Ocean Disposal Site continues to be of concern to ODFW. The size becomes more excessive with the addition of other disposal options. The Deep Water Site is now twice as large as needed for the volume of material that will actually be disposed there. The Corps' original areal calculation of the Deep Water site was based on a disposal volume of 225mcy, but the actual disposal volume is less than half because most of the material will go to other disposal sites. ODFW has repeatedly requested that the size of the proposed site be adjusted (reduced) to account for other disposal options. However, the Corps contends that the site must be large enough to accommodate the full 225 mcy in the event that all *other* disposal options are eliminated. ODFW strongly disagrees with this rationale. It is highly
S-13 unlikely that *all other* sites would be eliminated. The Deep Water Site should be the minimal size necessary to accommodate the amount of material *actually* going to the site, and not be sized for its potential as a sink hole for the Channel Deepening and other dredging projects. Furthermore, the site must be "manageable" in terms of being able to detect and respond to adverse impacts caused by disposal. MPRSA, Section 102/Sec. 228.5(d) states: "*The size of ocean disposal sites will be limited in order to localize for identification and control any immediate adverse impacts and permit the implementation of effective monitoring and surveillance programs to prevent adverse long-range impacts."* The Corps has often stated they lack the funds to do detailed baseline studies and can only do limited studies to address specific concerns. This further supports scaling back the site to a more manageable size.

Corps of Engineers Response

S-12. Specific comments are addressed in S-13 through S-30, and we request that the reviewer also see the response to F-2. The Federal Government disagrees with ODFW characterization of the coordination on the Ocean Disposal element to date. The Corps and USEPA have jointly and separately coordinated with ODFW throughout the IFR/EIS study process leading to identification of the Shallow Water and Deep Water Sites as candidates for formal designation by USEPA in the 1999 Final IFR/EIS. The USEPA is the responsible agency for designation and administration of Ocean Dumping sites under the Marine Protection, Research, and Sanctuaries Act of 1972, as amended (also referred to as the Ocean Dumping Act). The Corps is the primary user of those sites, here off the Columbia River, and elsewhere throughout the Nation. The Corps coordinates its project-level efforts (e.g., MCR and Columbia River which involve use of *designated* (a USEPA 102 action) or *selected* (a Corps 103 action) ocean sites with ODFW. Previous ODFW comments have been given serious consideration by the two agencies.

This is to clarify the role of the Final SEIS with regard to site designation. The Final SEIS serves to supplement the *Final Integrated Feasibility Report and Environmental Impact Statement* (1999 Final IFR/EIS) by documenting additional information, environmental analysis, and project modifications resulting from consultation under Section 7 of the ESA; to update the disposal plan; to update the project economics; and to comply with NEPA requirements and with the Washington State Environmental Policy Act (SEPA) without changing the elements of the1999 Final IFR/EIS related to the Ocean Dredged Material Disposal Sites designation which will be completed by USEPA. With regard to ocean site designation, additional environmental information (e.g., baseline characterizations) has been generated, which the Final SEIS discloses (see Exhibit N). The Final SEIS discussed new project alternatives, which include identification and evaluation of restoration elements as the preferred disposal alternative for river material that had been identified in the1999 Final IFR/EIS for ocean disposal. Under the revised plan discussed in this Final SEIS, construction of the restoration sites would preclude ocean disposal of any of the river channel dredged material from the initial construction as well as the first 20 years of maintenance (O&M). If these restoration features are not fully implemented, the channel project material would be disposed at USEPA-designated ocean sites. The need for ocean dredged material disposal site designations remains fundamentally unchanged by the Final SEIS and will proceed as discussed in the1999 Final IFR/EIS to formal rulemaking by USEPA. The primary need for new ocean sites is driven by maintenance of a separate Corps project, the Mouth of the Columbia River navigation channel.

S-13. The Federal Government disagrees that it did not consider ODFW's concerns regarding ocean disposal. The ocean dredged material disposal site selection process and resulting configuration on the Deep Water Site and Shallow Water Site is documented in Appendix H, Volumes I, II, and III. The ODFW was an active participant in the site selection process and contributed much to the final site design. We disagree with ODFW's interpretation of federal regulation. The rationale for sizing of the Deep Water Site is documented in the 1999 Final IFR/EIS, and anticipates that the Shallow Water Site and North Jetty (a 404) Site will continue to exist and be used (see also response to S-14). The Deep Water Site was planned primarily for material from the MCR project as the channel improvement project was expected to only generate a relatively small volume to be disposed in the ocean and that mainly generated during the two years of initial construction. The determination of "need" and appropriate "size" to meet that need is the responsibility of the USEPA, the agency with statutory authority for designation and administration of ocean sites.

For several years, expanded Site E (proposed as the "Shallow Water Site") has accommodated and will continue to accommodate, a substantial amount of the annual maintenance dredging volume (2.1 - 3.7 mcy). There is no justification to assume that this capacity would decrease to zero. Additionally, the Corps proposes two new restoration projects, Miller-Pillar and Lois-Mott Island Embayment, which will reduce ocean disposal by another 14 mcy. Though these projects
S-14 are of concern to ODFW and may result in their elimination, we also recognize that the Corps may use these sites. If this is the case, there will be14 mcy *less* material dumped in the Deep Water Site. The decision on the restoration projects will likely be decided prior to final designation of the Deep Water Site, thus allowing time to adjust the size of the site prior to designation. Is there any reason the Corps and EPA would not use this information in the final size determination of the site?

The North Jetty Site is another disposal option with an annual capacity of 100,000 -500,000 cy. In total, the volume of material destined for ocean sites other than the Deep Water Site is between 2.6 and 4.2 mcy per year (130 - 210 mcy over 50 years), or between 58 and 93 percent of all ocean-going dredge material. That percentage will further with the two restoration projects. We can think of no justification for maintaining the Deep Water Site at 9,000 acres
S-15 (4,000 acres internal). The correct response is to reevaluate the total area needed for the Deep Water Site with actual disposal volumes. Another lingering uncertainty is the depth to which dredge material can safely be mounded in 200-300 feet water without causing unsafe wave activity. The Corps determined 40 feet to be the maximum depth accumulation, but verification is warranted. ODFW respectfully requests that the Corps' seek verification of the minimum size requirement of the Deep Water Site by an independent source with engineering expertise, such as an engineering firm or academic institution.

The DSEIS needs correcting on its reference to the selection of the Deep Water Site. The current proposed configuration of the site was not selected by the taskforce. On the contrary, the area chosen by the taskforce as the Deep Water Site was magnitudes smaller than the current site. The Corps enlarged the site several times following the taskforce site selection process. The Corps
S-16 should phrase their statements to reflect the actual process that took place. The DSEIS also states that the site was selected for minimal impacts to the resources. This was somewhat the case when the site was the smaller site proposed by the taskforce, though impacts were still expected. The current size could very likely have greater impacts, based simply on its overall size. For the Corps to state that this massive site will have minimal impact without the data to support this is speculative at best.

Section 4.4.3.10 Management and Monitoring Plan:

The DSEIS states that it will follow an "adaptive management approach" to monitoring and use of the Deep Water Site by coordinating management plans with state agencies. The DSEIS is vague and brief about what this actually entails and ODFW seeks further explanation. ODFW is
S-17 not confident the Corps will seek and incorporate input from state agencies and stakeholders on actual management and monitoring plans. Our concern is based on the fact that ODFW's written comments on the draft and final MCR Ocean Disposal Site Management and Monitoring Plan (MMP) had little if any bearing on the final document.

Corps of Engineers Response

S-13 (con't). The planning scenario and volume calculations that ODFW refers to were developed jointly by the Corps and USEPA. The Federal Government has repeatedly expressed the fact that the existence of an ocean site does not mandate its use. Used to the maximum (essentially the scenario described), site capacity would be exhausted in approximately 20 years. Used less, the life of the site is expected to be more, perhaps much more, than the 20-year estimate. From a Federal perspective, a continuing need for ocean disposal capacity exists at mouth of the Columbia River. Both the Corps and USEPA believe that the site is manageable.

As described elsewhere, beneficial use of dredged material to create habitat for endangered salmonids has become the Corps' preferred alternative for channel improvements in the lower 29 miles of the Columbia River. The USEPA concurs with that preferred alternative use of channel improvements material. Construction of the Millar-Pillar and Lois Island embayment ecosystem restoration features would use dredged materials from initial construction and 20 years of maintenance that otherwise would have been taken to the ocean for the channel improvement project only. Changes to the project do not reduce the necessity for conservatively sized ocean disposal sites as described in the preceding paragraph. In the event dredge material from the channel project did go to the ocean, the material would be discharged into a site designated under Section 102 (if USEPA's action is complete) or selected under Section 103 of the Ocean Dumping Act. Such discharge would be in accordance with the then-current Site Management and Monitoring Plan (SMMP). At this point in time, we fully anticipate that ocean disposal sites will have been designated under Section 102.

S-14. The Federal Government agrees with these general observations. Continued use of the Shallow Water Site was considered in the evaluation of need and size of the Deep Water Site as described in our response to the previous comment (S-13). With regard to the new preferred alternative to use the channel improvements material for the restoration projects that volume amounts to approximately 6% of the site capacity. This would increase the potential life of the Deep Water Site by several years for the MCR project. It does not, however, significantly alter either the need for the site or the size.

S-15. See responses to S-13 and S-14. The Deep Water Site has been sized for 50 years of planned use. The capacities in both the North Jetty Site and the Shallow Water Site are based on dynamic characteristics of the ocean, scouring material from the sites annually, to restore capacity for the next dredging season. Considering the uncertainty surrounding the exact capacity that would be available in any given year, the Deep Water Site has been conservatively sized to receive all material dredged from the MCR if necessary. The Corps and USEPA possess the necessary expertise to determine the maximum depth accumulation. Verification by an outside expert is not warranted. If the North Jetty Site as well as the Shallow Water Site are used to their fullest capacity, then the amount of material being placed in the Deep Water Site would be reduced and the overall mound within the Deep Water Site would also be reduced over the 50-year time period. From USEPA's perspective, there is no time limit associated with the volume placed. The total site capacity remains as stated in the 1999 Final IFR/EIS, Appendix H.

Corps of Engineers Response

S-16. Selection of the Shallow Water and Deep Water Sites as candidate sites to be proposed for designation was a governmental decision made by the USEPA and Corps, the responsible agency and primary user. The involvement of the designation Working Group (particularly the intense negotiations following the Draft IFR/EIS that is thoroughly documented in Appendix H of the 1999 Final IFR/EIS) was a critical component in the Federal Government's selection of alternatives. The Deep Water Site represents a significant reduction in the size and location from the originally proposed North and South disposal sites. The conservative assumptions used to size the Deep Water Site during this process remain unchanged (see responses to S-13, S-14, and S-15). Sections of the Deep Water Site are expected to never be directly disposed upon and therefore not impacted, i.e., the identified buffer zone. The present design allows dredged material management flexibility within the site, where a site too small limits management to the point of non-management as was our experience with Sites A and B. As described in Appendix H, the internal 4,293 acres (disposal zone) is designed to contain the disposed dredged material on the bottom. To achieve this level of placement accuracy, a more restricted "drop zone" in the Deep Water Site will be defined for each use, thereby minimizing the disposal footprint to as small an area as possible. The result of such a small footprint is that the direct impact on that small footprint is maximized for that individual disposal event. This was explained to the taskforce (which included ODFW). Point-location placement within the site on any given year would be monitored. As the site is used over time, a mound of sediment would build over the inner disposal zone, but also over an extended period of time, thereby ameliorating any immediate, annual disposal effects. The extensive work done to evaluate alternatives with resource agencies and stakeholder groups through the site selection process led to the Government's decision selecting the Deep Water and Shallow Water Sites for proposed designation and refinement of the SMMP. Subsequent to the 1999 Final IFR/EIS, physical and biological baseline studies have been conducted at both the Shallow Water and Deep Water sites. This work is included in this Final SEIS and has generally confirmed the Government's assumptions from the 1999 Final IFR/EIS and provides additional basis for designation, future use and management of the sites.

S-17. Both the Shallow Water and Deep Water Sites were originally selected for proposed designation and if designated will be managed by the USEPA to minimize impacts to the maximum extent practicable. The USEPA, as part of the site designation process, will provide the opportunity for further review of the SMMP for the two sites and will make revisions as required. The SMMP will specify a review schedule for revisiting and potential revision of the SMMP. Presently, the frequency is not less than 10 years after adoption of the initial plan, and then at least every 10 years thereafter. A SMMP works in concert with annual monitoring, data review, and expert recommendations, and public participation as is required by law. We anticipate the ODFW would be a participant in these reviews as well as annual site-use reviews. Annual site-specific use is determined by the Corps and USEPA based upon actual site conditions and disposal needs. The Corps already hosts annual dredging workshops as part of their O&M Program.

If the "adaptive management approach" is to be based on the MMP, it will not succeed. The MMP has two major problems: 1) The MMP is not an actual site management plan. It is not site specific. It is a generic outline for a plan. Federal law requires the management plan to be site-specific, 2) The MMP is designed to not detect impacts until they are highly magnified. The "triggers" for detecting impacts in the model require a large change in bathymetry before the Corps will do any monitoring. In addition, "monitoring" as defined in the MMP refers only to
S-17 physical changes, not biological. This is a very critical and deleterious distinction. Without ongoing biological monitoring, environmental impacts would be profound before ever being detected. The current MMP has no biological basis and will not help the Corps avoid impacts. To be effective, the "adaptive management approach" should include a site-specific management and monitoring plan for each MCR ocean disposal site with focus on the key biological resources. We encourage the Corps to take a *sincere* "partnership approach" to this process by giving equal weight to state and other stakeholders in all decisions on management and monitoring. Additional ODFW comments on the MMP are in our written comments to the DEIS, the FEIS and the MMP.

Monitoring and Baseline Information:

For any monitoring plan to be effective, it must have sufficient baseline information of the biological resources. This includes distribution and relative abundance of important species that inhabit the sites. Because of the natural variation in marine populations and the marine environment, baseline sampling must occur with enough frequency to minimize the variability and yield results with statistical validity. In other words, sampling must occur multiple times
S-18 within a season, during all seasons, and for multiple years. We have stressed this in all previous comments to the Corps, yet the baseline studies designed for the new ocean disposal sites include only one week of sampling in July 2002 and one week in spring 2003. This level of sampling is not adequate to determine abundance. It will not allow managers to predict or avoid resource impacts. The sampling design lacks the statistical rigor needed to produce appropriate confidence in these data. Additional sampling days should be added throughout 2002 and 2003. We request that the Corps solicit further discussion on sampling design with ODFW and other interested taskforce participants.

Section 6.6.1.2 / Dungeness Crab Sampling:

The DSEIS states that impacts to Dungeness crab at the Deep Water Site will be minimal because channel maintenance material would not be placed there for 10 years. The statement implies that no impacts will occur there for 10 years. The DSEIS fails to mention that the Corps intends to use the Deep Water Site for MCR maintenance material in 2003 and, if the habitat
S-19 restoration projects are not used then that material will also go to the Deep Water Site. The DSEIS also states that prior to using the Deep Water Site, the Corps will conduct thorough studies to quantify crab. We question how the Corps defines "thorough" (see previous section). One week of biological sampling over two seasons is not adequate for measuring seasonal distribution and abundance of a highly sporadic species in a dynamic environment. What is required is sampling over multiple seasons (years) to see the range in the population. Years of crab landings have shown the population to be sporadic, but over time, the range in the population becomes more apparent. If 2002 is a low abundance year for crab, it will

Corps of Engineers Response

S-17 (con't). There are different statutory directives for our respective levels of government that govern the approach to evaluating resource impacts at ocean dredged material disposal sites. The Federal Government understands that ODFW is working to manage all marine resources within their jurisdiction and is concerned about individual localized impacts. Under the Ocean Dumping Act, the USEPA and Corps assess impacts at the population level of particular species. Traditionally, the Federal Government assumes that most of the non-mobile benthic organisms living in the specific area of the immediate disposal placement will be destroyed. Because of this, biological monitoring is not conducted immediately following disposal. Based on numerous studies at in-water disposal sites around the nation, many organisms, and particularly mobile organisms like crabs and lobsters, survive the disposal event. Even for non-mobile organisms, recolonization of the disposal footprint is relatively rapid. To that end, we believe that the predicted biological effects of ocean disposal at the two sites have been adequately characterized and disclosed and that those effects are minimal and acceptable. The Federal Government has taken a sincere approach in seeking, receiving and fully considering the concerns and opinions of state agencies, stakeholders, and other members of the public.

S-18. The biological information presently being gathered, along with the previous biological information collected off the mouth of the Columbia River by the USEPA and Corps, as well as other federal agencies and academic institutions, is expected to establish an adequate baseline for monitoring and management of the ocean disposal sites selected to be proposed for designation. It is not generally the purpose of designation surveys by themselves to provide the basis (baseline) for any future site monitoring, but rather to provide a picture of existing conditions at the time of the survey to meet the statutory requirements of the MPRSA and its implementing regulations for site designation. Designation surveys are conducted for the primary purpose of identifying and minimizing conflicts with other uses of the ocean to select and designate a disposal site, and should not be confused with trend assessment surveys or monitoring surveys used to assess the extent and trends of environmental effects which assist in the management of a site. Timing, duration, and number of samples for the biological surveys used in the 1999 Final IFR/EIS are consistent with federal site designation guidance. Additional baseline information has been collected since 1999 and presented to interested agencies, stakeholders, and disclosed through this Final SEIS, Exhibit N.

S-19. The statement refers to marine impacts resulting from the channel improvement project, which is the substantial focus of the Final SEIS, not the MCR project or ocean site designation (see response to F-2). If the two estuary restoration features are fully implemented ocean disposal will not be used for any material from construction of the channel improvement project and for the first 20 years of maintenance dredging. The Final SEIS fully discloses that in the event these restoration features are not fully implemented, then ocean disposal as described in the 1999 Final IFR/EIS will be used. The Federal Government did not intend to imply that under the channel improvement project's preferred option, the MCR project would not use ocean disposal sites; however, the 1999 Final IFR/EIS analyzed those impacts. In addition, the actual statement in the Draft SEIS is, "The Corps is further investigating the distribution and abundance of crabs and benthic organisms at the Deep Water Ocean Disposal Site." The sentence should have noted that USEPA is participating in this effort.

underestimate the population, likewise, if it is a high abundance year, it will overestimate the population. Additionally, if the objective is to quantify crab density at the Disposal Site, the population must be compared to the larger MCR area to determine its relative importance. One season of sampling at the Deep Water Site will tell us nothing about crab population levels, contrary to what the DSEIS claims.

Section 6 6.1.2 / Reference to Batelle Crab Burial Study

ODFW must once again address the Batelle pilot crab burial study entitled, "*Effects of Sand Accumulation on Juvenile Flatfish and Soft-Shelled Dungeness Crab",* because it continues to be misrepresented by the Corps and others who reference Corps documents. ODFW provided comments on the study at the time the report was released and in responses to the DEIS and FEIS, though these comments seem to have no bearing on the Corps' continued reference to the study. First off, this was indeed a pilot study and as such, results of any pilot study are to be used only for refining sampling methods and developing a more complete study. Pilot studies are not used for drawing final conclusions or the basis of decisions. Secondly, ODFW and others echoed the author's warnings that the study had several shortcomings and was inconclusive. In spite of several opinions, the Corps continues to present the results of the study as definitive and bases its
S-20 decisions about impacts on the pilot study. Not only does the Corps overstate the study's reliability, they also misinterpret the information. The authors also warned that the study could *not* be applied to a larger population of crabs, yet the Corps does exactly that in the DSEIS. The Corps conclusions on the study are invalid without the data to support them and should be removed from the DSEIS and other related Corps documents, as we have advised in every written response.

Also in error is the statement in the DSEIS that *"direct and indirect mechanisms"* were "*...thoroughly evaluated relative to the potential for impacts at the Deep water Ocean Disposal Site...*". This statement is blatantly false. The Corps' misuse of the pilot study not only weakens the Corps' credibility, but also is an insult to the scientists and authors involved. Once again, ODFW requests that the Corps retract erroneous and exaggerated references to the Crab Study in the *final* Supplemental EIS.

Exhibit K: Dungeness Crab Entrainment Study and Technical Memorandum:

ODFW was surprised to learn that the Corps and the ports had initiated the Crab Focus group with the state of Washington to examine dredging impacts to Dungeness crabs. According to the Corps and the ports, Oregon was not included in the group because the purpose was to address Washington's SEPA requirements. While this may be the case, Oregon's concerns for
S-21 Dungeness crab are no less significant and must also be addressed. Moreover, most of the dredging impact issues occur on Oregon's side of the river. It is the Corps' responsibility to see that all affected parties are adequately involved. The fact that the technical memorandum produced from the Crab Focus group elaborates so extensively on ocean disposal issues is more reason to include Oregon in the process. We appreciate the Corps' and the ports' willingness to now include Oregon. Due to our late inclusion, however we are not as familiar with the work in progress, so our comments are somewhat limited in breadth and depth.

Corps of Engineers Response

S-19 (con't). In the instance of Dungeness crab, the Federal Government determined that the impact to the relevant crab population from ocean disposal is likely minimal. The Corps and USEPA based this conclusion on the fact that crabs are widely distributed throughout the coastal area, and that neither the Deep Water nor the Shallow Water Sites appear to provide any unique habitat for crabs. Dungeness crab populations do not appear to be declining based on landing data. Individual crabs could be killed during disposal. This loss of individuals should not significantly impact population structure or dynamics. See the Final SEIS, Exhibit K-4.

The Deep Water Site was originally selected because it did not contain unique habit for Dungeness crab and its location resulted in the least conflict with the commercial crab fishery in the Washington and Oregon region around the Columbia River. Although there is likely to be a minimal impact to crabs, a more detailed research study of crab population and density in and around the site is not necessary for designation. A baseline assessment is required under MPRSA and the second of two seasons of data collection were completed this year. The information developed will be used in revising the SMMP.

S-20. Nowhere in the 1999 Final IFR/EIS or SEIS did the USEPA or Corps use the information from the crab burial study as definitive. In fact, on page 6-23 of the Final IFR/EIS it specifically states that the study is "preliminary" and also that, "The tests were limited, and additional tests would be necessary to fully define this impact." This paragraph goes on to state that, "Disposal at the ocean disposal site would result in the mortality of the benthic organisms and some of the crabs and fish that are in the disposal location," a statement that is supported by the available information. Though the burial study is not directly referenced in the SEIS (your comment indicated that it was), the SEIS does describe the potential impact to the Dungeness crab populations and other organisms by disposal in the Deep Water Site. The SEIS states, "Disposal of dredged material at the Deep Water Site has the potential to impact Dungeness crab and other biological resources by direct or indirect mechanisms. These include burial, turbidity, dissolved oxygen reduction and habitat alteration." The mechanisms are then thoroughly evaluated using existing information. Consequently, the Federal Government takes strong exception to your use of the words "blatantly false" to express your point. Nowhere in any of the documents for this project has the Federal Government ever tried to dismiss the impacts to Dungeness crabs by either dredging or disposal. The Federal Government repeatedly stated that Dungeness crab populations will be impacted by dredging and disposal operations. The crab burial study information has only been used as an indication that some crabs may be able to dig out and survive, particularly in the thinner layer material as would occur at the Deep Water Site. Based on the Federal Government's national experience with other bottom feeding species (e.g. lobster, blue crab) and the available information for the Pacific Ocean off of the Columbia River, the Federal Government has concluded that using the ocean disposal sites will not significantly impact crab populations in the Washington and Oregon region around the Columbia River.

S-21. The ODFW neglected to include in their comment that the Corps and the ports fully intended to discuss and get input from the State of Oregon and had communicated with the designated Oregon point of contact on numerous occasions. As the Corps has stated on numerous occasions, the Corps recognizes and acknowledges this issue as having regional importance. ODFW's comment also should note that it has been involved in all meetings of the workgroup since June 10, 2002. This has included meetings on June 26, July 19, October 17, October 28, October 29, November 13, November 21, and November 26, 2002. Finally, ODFW's comment in S-29 indicates that it supports the direction the workgroup is going.

ODFW provided written comments to the Corps on the June 9, 2002 Technical Memorandum. The memorandum in the DSEIS, dated June 10, 2002, does not reflect these comments.

S-21 However, we were assured by the Corps and Pacific International Engineering (PIE) at the Crab Focus meeting on September 5, 2002, that ours and others comments would be incorporated in the updated Technical Memorandum for the final SEIS. The comments provided below respond to the written technical memo of June 9, 2002.

ODFW Comments to June 9 Technical Memorandum:

S-22 1) The Technical Memorandum: "*Impacts of the Columbia River Channel Improvement Project Dredging on Dungeness Crabs (Cancer magister)"* is a draft document and should be so stated on the title page and wherever it is referenced in the DSEIS. The memorandum should also include the name of the consultant and authors who wrote the report, for future reference of the report.

S-23 2) The entrainment study summarized in the report is a pilot study, with the primary purpose of examining methods to estimate crab entrainment and gathering data needed to design a more complete study. The results of any pilot study are to be used only for refining sampling methods and developing a more complete study. The title of the memorandum is misleading. Until the study is complete, the title and introduction need to emphasize that it is an examination of modeling techniques to determine entrainment and that it includes a pilot study. It would be inappropriate to use any entrainment estimates reported in the pilot study for developing avoidance measures or mitigation plans. Only the more complete study planned for the future can provide the necessary information. The title also needs to indicate that the study's scope is on entrainment due to dredging in the Columbia River estuary and river and *not* a study on ocean disposal.

S-24 3) Examination of impacts to crabs should include the full spectrum of dredging and disposal actions from both maintenance and channel deepening. Although this impact study is a good start, the Corps needs to conduct entrainment studies at MCR and crab burial studies at the Shallow Water Site and the Deep Water Site.

S-25 4) Section 3.3: The DIM model applied with Grays Harbor entrainment rates was used to conclude that no further entrainment work would be needed upriver of Flavel Bar. The same section states that entrainment rates measured in Grays Harbor are much lower than those in the Columbia and are "... not appropriate for the Columbia River...". Table 10 shows that the entrainment rate for 1+ crabs can be two orders of magnitude higher in the Columbia than Grays Harbor. It is premature to draw conclusions on the upriver limit of crab impacts until more data are gathered on Columbia River entrainment rates.

S-26 5) Section 4.3: Pearson and Williams (2002) extrapolated the pilot study data to determine the loss of crab to the crab fishery, albeit, as an example. Nevertheless, this is an inappropriate and dangerous application of the data. Dangerous because other pilot studies, such as the crab burial study, have been routinely misused throughout the EIS process.

Corps of Engineers Response

S-22 to S-28. Comments noted. Material initially presented in the Technical Memorandum has been revised based on the development of a statistical methodology and the 2002 crab entrainment research, and this information is presented in Exhibit K-4 to the Final SEIS.

Corps of Engineers Response

S-27 6) Section 5: There are statements that conclude dredging impacts would be minimal based on the habitat and DIM models. As pointed out in comments 3, through 5 above, it is not appropriate to base conclusive statements about impacts on these models.

7) Section 6: This section mentions disposal options at various sites, but focuses primarily on the Deep Water Site. This section is merely a reiteration of the 1999 FEIS and provides no new information regarding resource information or disposal impacts. We do not see the value in presenting this section or its relevance to the entrainment study, which is the sole objective of the Crab Focus Group. This section reiterates the Corps' claim that disposal impact mechanisms have been "*thoroughly evaluated"* at the Deep Water Site. Not only is the Technical Memorandum at fault for not referencing the original source of the information (i.e., the Batelle Crab study), but for stating false information.

S-28

The Technical Memorandum makes other speculative and unsubstantiated statements that are lifted directly out of the FEIS. At the very least, PIE should eliminate discussions for which they have no direct experience. This would include all references to disposal impacts on marine organisms at the Deep Water Site and elsewhere at MCR, discussions about the abundance of crabs at the Deep Water site, and reference to the site selection process. This section lacks credibility by mimicking speculations of the FEIS. PIE should review its sources of information more thoroughly to avoid supporting and making unsubstantiated claims.

The final sentences in this section are beyond the scope of this technical memorandum and the work being conducted by PIE: "*The results [summer 2002 field sampling] would be used to verify the conclusions of this technical memorandum with regard to the potential for impacts to crab due to disposal of dredged material at the DWS."* The implication that PIE can develop conclusions about disposal impacts to crabs at the Deep Water Site based on no *actual* work of their own, but on a summary of speculations and pilot study data is inappropriate. The statement should be deleted from the technical memorandum.

S-29. Comments noted.

ODFW Comments on Crab Entrainment information provided at the Sept. 5 meeting:

S-29 ODFW is pleased to learn that the entrainment model will apply actual entrainment data collected during dredging and at several areas to be dredged. The study seems to apply sound, statistical approaches to study design and analysis. This will provide a good estimate of entrainment rates for determining potential impacts to Dungeness crab at the different sites, and will help set a dredging schedule that should minimizes impacts. If it is determined that entrainment is significant and unavoidable, mitigation measures will be necessary to offset the loss to the resource.

Ocean Disposal Taskforce:

S-30 At the June Taskforce meeting, the Corps proposed that the Ocean Taskforce expand its coverage of issues to include estuarine and riverine portions of the River. ODFW does not support this proposal. Expanding the taskforce's coverage into the river will dilute attention to

ocean issues. The Corps has devoted little time to the taskforce these past two years and progress on marine issues has been very slow to non-existent. Furthermore, adding freshwater or estuarine issues to the process will be asking participants with marine interests and expertise to address issues that may be out of their realm. For example, the Corps asked the taskforce to consider the decision of whether to use the Deep Water Site or the two newly proposed in-river restoration projects. This is clearly beyond the scope of the ocean taskforce since the taskforce has had no involvement with the restoration projects and has never addressed riverine issues. It would be irresponsible to assume that the taskforce is the appropriate forum for such a decision. ODFW is of the opinion that the ocean disposal taskforce should stay focused on its original intent of dealing with marine issues. That is not to say that the Corps should not consider a separate forum to deal with riverine issues.

As the taskforce attempts to redefine its purpose and usefulness, it is important to recall its original purpose. The following comments were provided by ODFW in response to the FEIS and are still applicable:

S-30

"ODFW agreed to the Deep Water Site under the condition that an inter-agency task force would be formed and would be instrumental in the management of the site. The main objective of the taskforce is to minimize impacts to resources within the site through assisting in the management and monitoring decisions regarding disposal operations and to help determine special studies that better educate us about impacts and ways to reduce them..... the FEIS lacks a clear commitment of long-term support for the taskforce, and lacks information about the taskforce's level of participation in the decision making process. ODFW expects the taskforce to be fairly integrated into the decision making process with respect to disposal locations, techniques, volumes, baseline studies, and monitoring studies. The M&M Plan needs to describe how the taskforce will participate in these decisions, and how much weight will be given to taskforce recommendations on management and monitoring. There also needs to be a clear commitment from the Corps to retain and fund the taskforce over the long-term.

"The M&M plan states that the EPA and Corps will coordinate management decisions and make determinations about impacts between themselves and then inform the taskforce of those decisions. In our acceptance of the Deep Water Site, we understood that the taskforce would be involved in these decisions from the beginning. According to the FEIS, some decisions about site use have already been made. Of greatest concern to ODFW is the decision to use the southwest corner of the site during the first year of site authorization. ODFW was not involved in this decision, nor is it on record in the Working Group meeting minutes. The site will need to be adequately characterized for habitat and species composition prior to making decisions about disposal locations, seasonal restrictions, and other management decisions. The taskforce will need to be an integral part of such decisions."

As a final comment, it cannot be overstressed that the success of the ocean taskforce and the resolution of marine resource issues depends on the Corps' willingness to take on a partnership approach by incorporating state agency and stakeholder opinion in decisions related to ocean

Corps of Engineers Response

S-30. The management and monitoring of ocean dredged material disposal sites are a federal responsibility shared between the USEPA and the Corps. Delegation of that responsibility as suggested is not possible. The Ocean Task Force is not a decision making body and was never proposed as such. In the Management and Monitoring Plan (MMP) included as Exhibit H, in Appendix H of the 1999 Final IFR/EIS, the Corps and USEPA noted that they would "seek input from a taskforce consisting of regulatory agencies and other stakeholders, for the **management and monitoring** of the MCR disposal sites" (page H-4). The emphasized words set out the scope of the task force. The Federal Government held the first meeting of the Ocean Dredged Material Taskforce on April 13, 2000 and presented the charge and scope to the task force at that time. The Federal Government has been able to use some of the input from the task force to design and scope baseline studies; however, the task force has spent much of its meeting time attempting to reopen selection of the disposal sites. That issue is beyond the scope of the task force.

The Federal Government recognizes that issues associated with dredging and dredged material/sediment management are important to the states and a variety of stakeholders. A number of initiatives reflect this, including the CCMP for the lower Columbia River estuary, the Lower Columbia River Estuary Program, the Corps' Regional Sand Management initiative, and the USEPA and Corps formation of the Northwest Regional Dredging Team (RDT) earlier this year. The Federal Government recognizes that a forum is needed to address the many issues of dredging and dredged material/sediment management, but has concluded that the Ocean Dredged Material Taskforce is not the proper forum for that discussion.

The current task force will be disbanded and discussions are underway to consider a new forum. It is hoped that the State of Oregon will be an active, valued participant in this new forum. The membership, purpose, goal, and geographic extent of the new forum is being examined and configured. As stated by ODFW, there are issues "clearly beyond the scope of the ocean taskforce."

disposal. Decisions should be by consensus, and not solely by the Corps. The Corps should solidify their commitment to the taskforce through an MOU that includes a mechanism for
S-30 accountability on all issues brought forth in the process. Any deviation the Corps takes from taskforce decisions should be fully explained with an opportunity for review and discussion prior to any final decision.

Thank you for the opportunity to comment and we look forward to the Corps' response on the issues raised in this letter.

Division of State Lands

The Division of State Lands (Division) offers the following comments on the Corps of Engineers (Corps) DEIS for the Channel Deepening project.

1. The Division is concerned about cumulative effects of channel deepening not addressed
S-31 in the DEIS: the number of non-Corps dredging projects that will occur to make side channels as deep as the main navigation channel. The Division has already had several inquiries about the permit requirements for such projects.

2. No dredged material should be disposed of in wetlands, in riparian inclusions, or early successional habitat. Wetlands provide important ecosystem functions beyond wildlife
S-32 habitat, including stormwater filtration and flood control. Historically, most of the riparian wetlands in the Lower Columbia River have been filled, or diked and drained. Current emphasis should be on reversing this trend. We recommend that full wetland delineations be conducted on all sites with potential wetland impacts.

3. The bed and banks of the Lower Columbia River are state owned. The sale of any dredged material or other use of that material as an "article of commerce" is subject to royalty payments to the Division. The Corps has worked with the Division to notify
S-33 adjacent landowners of the royalty requirements. However, the Division is willing to consider alternative royalty approaches such as credit back against the State of Oregon cost share for the channel deepening project to encourage economic use of dredged the materials.

4. As shown on map of Reach 7, river mile 3 through 29, most of Rice Island is within and owned by the State of Oregon and its designation should reflect that fact. CREST has approved conceptive idea to remove the existing material from Rice Island to address the
S-34 existing Caspian Tem problem on the island.

   To be consistent with those efforts, further intergovernmental effort to address the long term use and management of this site as a dredge spoil site must occur.

The Division has sold 80 acres of the Rainier Industrial site (0 through 64.8) for industrial
S-35 development. However, the Division has surveyed a new site for disposal of material adjacent to this site.

Corps of Engineers Response

S-31. The Corps and USEPA are not sure what side channels are being referred to in the comment. The areas that are required to accommodate the ships forecasted to call on the Columbia River have been identified in the 1999 Final IFR/EIS, the Draft and Final SEIS, and the ESA consultation. Information available to the Corps indicates that only certain berths along the Columbia River will require deepening to benefit from the channel improvement project (Final IFR/EIS and SEIS at Section 4.6.3). The potential effects of deepening these berths, and deepening the side channels that provide access to these berths, are addressed in the Final IFR/EIS and SEIS at Section 6.9. The Corps is not aware of other channels that are planned for deepening at this time. However, should additional side channel deepening occur in the future, its effects would likely be similar to the effects discussed in Section 6.9 of the Final IFR/EIS and Final SEIS. Further, any such deepening would be subject to independent review under NEPA, the Clean Water Act, and the ESA with either specific authorization or specific Army Corps of Engineers' permits.

S-32. Selection of dredged material disposal sites was an intensive multi-year process that relied upon numerous evaluation criteria, including identification of wetland habitats and avoidance of wetland impacts, where possible. It entailed interagency coordination and development of an associated wildlife mitigation plan to address and compensate for wildlife habitat losses, including wetland habitat. This detailed analysis of disposal sites minimized the losses of wetland, riparian, and agricultural lands habitat. Not all habitats could be avoided, thus the development of a wildlife mitigation plan. We are well aware of wetland functions and historical habitat losses in the lower Columbia River. Our proposed disposal plan took these factors and information into account. Further, our wildlife mitigation plan emphasized wetland and riparian forest development although these habitats incurred minimal acreage (wetland fill associated with the preferred option is only approximately 16 acres, all of which is in Washington). The ecosystem restoration features developed during the ESA reconsultation process will lead to additional wetland habitat (tidal marsh) restoration. No wetland habitat delineation will occur for this project. The USFWS's Habitat Evaluation Procedures, which analyses habitat quantity and quality through use of representative target species, was used to evaluate losses in habitat value, including wetland habitats.

S-33. Comment noted.

S-34. The designation of W-21.0 for Rice Island has long standing and simply reflects that the disposal site lies to the Washington side of the navigation channel. A change in designation at this point in time would likely only result in confusion. The Federal Government is working with the Caspian Tern Working Group in an effort to address Caspian tern management in the estuary and elsewhere in the western United States. Should a viable plan be developed for export of sand from Rice Island, the Corps will lend assistance to attain that objective. We have met with entities seeking to use sand from Rice Island and will lend comparable assistance in the future.

S-35. It appears that the comment refers to the gypsum plant developed just downstream of the Lewis and Clark Bridge. The gypsum plant was built on an old disposal site designated O-65.7, not on the currently proposed site O-64.8. Please inform us if this assumption is incorrect. Our designated disposal site, O-64.8, occurs near the downstream end of Dibblee Point. We understand that a DSL-licensed operator borrows sand from the location for commercial sale. Our intent is to work cooperatively with DSL to use the disposal site for navigation channel materials and to allow sand borrow operations, dependent upon periodic replenishment by dredged material disposal, to continue operations.

Department of Geology and Minerals (DOGAMI)

Thank you for the opportunity to comment on the U.S. Army Corps of Engineers "Columbia River Channel Improvement Project, Draft Supplemental Integrated Feasibility Report and Environmental Impact Statement." The comments provided below refer specifically to a technical memorandum entitled "Columbia River 43-ft Navigation Channel Deepening Sedimentation Impact Analysis" contained in the Supplemental Integrated Feasibility Report. Furthermore, the material presented in this letter represents the view held by the Oregon Department of Geology and Mineral Industries, and does not necessarily reflect the view held by the State of Oregon.

We would first like to commend your agencies efforts in compiling the information provided in the document, particularly the holistic approach used to integrate the changes that have occurred in the river, lower estuary region, the MCR, and the adjacent coastal beaches.

The Columbia River Estuary is an extremely complex littoral system that historically has contributed significant quantities of sediment to the PNW coasts of Washington and Oregon. The supply of sediment to the coast however, has been dramatically altered as a result of a variety of anthropogenic effects, including:

S-36

- The construction of jetties at the estuary mouth has essentially controlled the natural migration of the bay mouth, resulted in deeper channels, and has caused a broader, shallower intertidal region to form within the estuary;
- The construction of pile dikes along upriver channels have been used to control flow velocities and sedimentation patterns;
- The construction of 11 major and over 200 smaller dams in the Columbia and Willamette River watersheds have effectively reduced the supply of sand to coastal beaches. The U.S. Army Corps of Engineers (USACE) has indicated that the effects of dam construction effectively eliminated the supply of sand to the coast;
- A reduction in the peak Columbia River flow statistics over the past 60 years, which is likely to have reduced the river's ability to transport sediment, particularly out of the lower estuary. These effects have been greatest following the construction of several of the largest reservoirs in the 1960s; and,
- Dredging and disposal practices.

To this we should include:

- Climate effects such as those associated with the El Nino Southern Oscillation phenomena, the Pacific Decadal Oscillation, and the apparent long-term decrease in river discharge in the Columbia River.

The combined effect of these changes has been to significantly alter the overall stability of the estuary-coast littoral system during historical time-scales.

After reviewing the sediment transport technical memorandum, several areas of concern still remain, particularly some of the conclusions reached concerning cause and effect along the river

Corps of Engineers Response

S-36. The Corps also recognized the importance of the five anthropogenic actions identified here by DOGAMI and they are addressed in detail in Exhibit J of the SEIS. Their impacts on the Columbia River and littoral system sediment budgets were found to range from large for the MCR jetties and flow regulation, to insignificant for pile dikes. The climate phenomena of El Nino and Pacific Decadal Oscillation are mentioned in Exhibit J, but are not emphasized because they are beyond the influence of the project.

The Corps disagrees that there is a fundamental gap in the understanding of sediment transport in the river or estuary. The channel improvement project has presented a comprehensive series of sedimentation analyses that include the 1999 Final IFR/EIS, the June 2001 SEI workshop on sedimentation, the 2001 BA for endangered fish, and finally Exhibit J of the 2002 SEIS. These analyses have been based on the abundant available data on the Columbia River and years of professional experience with the Columbia River hydraulics and sedimentation. The 1999 Final IFR/EIS provides a complete description of existing sedimentation, including sediment transport and the navigation channel shoaling processes. The SEI workshop and the 2001 BA explain the existing system and the potential sedimentation impacts from the 43-foot deepening, with an emphasis on the estuary. Exhibit J of the SEIS provides a comprehensive review of sediment processes and trends in the Columbia River, estuary and coast since the late 1800s, with the emphasis on the past and potential future changes to the sediment budget. The SEI expert panel affirmed the reliability of the Corps' sedimentation analyses when they found the Corps adequately understood the physical processes of the river and estuary, including flow alterations, dredging volumes, suspended sediment and bathymetry changes.

channel, estuary, MCR, and the adjacent coastal response. More importantly, it is quite clear that there remain fundamental gaps in our understanding, including those of the U.S Army Corps of Engineers, of cause and effect in the Columbia River, particularly the transport of sediment along
S-36 the river, sediment transport pathways and residence times between the river and lower estuary region, and the net exchange of sediment between the lower estuary and the coast. These deficiencies make it extremely difficult to mange the Columbia River/coast system in an effective and sustainable manner.

Listed below are a variety of issues:

1. Page 2, 2nd para: "However, the jetties caused a large discharge of sand from the MCR and vicinity, to the ocean. The sand eroded from the inlet and south flank of the inlet following jetty construction has deposited in the outer delta, on Peacock Spit, and the shorelines along Long Beach, Washington, and Clatsop Plains, Oregon."

S-37

   There is no question that a significant amount of sediment was redistributed along the beaches of Washington and Oregon during and after the construction of the Columbia River jetties. It is well accepted in the scientific literature that these changes were directly related to jetty construction, which effectively concentrated river and tidal flows within a much smaller area, and led to the scouring out of the inlet throat (Locket 1963). Thus, the erosion of sediment adjacent to and within the inlet, and offshore from the Columbia River reflected a massive redistribution of sediment along the coast. However, it is also evident from the recent work of Gelfenbaum et al. (2001) that these sediments have been almost fully absorbed into the coastal system. The question thus remains, what will happen along the Washington coast when this massive redistribution of sediment is fully absorbed by the coastal system? It seems intuitive that unless Columbia River sediments are able to reach the coast in sufficient quantities, as it did prior to jetty construction and the control of river flows, it is quite likely that parts of the Washington and Oregon coasts will undergo significant erosion in the future. In addition, these processes may be further enhanced through rising sea level, both eustatic and coseismic (from subduction zone earthquakes). Neither of these latter effects has been raised in the technical memorandum.

2. Page 2, 3rd para: "However, past dredging and channel modifications upstream of RM 40 have not measurably altered the available sand supply or sand transport in the river."

S-38

   Based on the information available in the sediment transport technical memorandum, it is apparent that past dredging and channel modification effects upstream of RM 40 has never been adequately assessed.

3. Page 5, 2nd para: "Global scale climate variations that reduced streamflows were the primary cause of the decline in sand transport between the 1800's and 1972."

S-39

   This statement completely ignores the role of major dam construction and the impact impoundment has had on sediment supply in the Columbia River. Dam construction commenced with the Bonneville dam in 1937, with several other dams having been

Corps of Engineers Responses

S-37. The Corps and DOGAMI appear to be in agreement over the significance of the MCR jetties on coastal sediment processes over the last 100 years. The Corps also agrees that a question remains as to what will happen when this massive redistribution of sediment is fully absorbed by the coastal system. Natural sedimentation processes shaped the coast and continental shelf of the Columbia River littoral cell over the previous 10,000 years. The MCR jetties caused localized changes in hydraulics (concentrated tidal flows and altered wave patterns) that resulted in the displacement of 800 mcy of sand. The distribution pattern of the MCR sand differed significantly from that of the natural system, with deposition initially concentrated offshore of the jetties and not spread out along the coast and continental shelf. Natural littoral forces are still working to redistribute that sand along both the Oregon and Washington coasts.

As documented in Exhibit J, there has been a natural, long-term decline in the Columbia River sediment yields to the coast; rates fell from a 10,000-year average of 15 mcy/yr to 7 mcy/yr during 1868-1926. More important to littoral processes is the decline in sand yield from the river, caused by both natural and human influences. Of the 15-mcy/yr 10,000 year average sediment yield to the coast, over three-fourths (11 mcy/yr) is estimated to have been sand. By 1868-1926, the average sand yield had declined to just over 2 mcy/yr primarily due to natural reductions in sand transport in the river and estuary. The sand yields declined to an average of 1 mcy/yr 1927-1958, due largely to climate variations and to a lesser extent, water resource development in the upper basin. Sand yields are probably even lower now because of the effects of flow regulation by upstream reservoirs that became effective in 1973. As explained in Exhibit J, those reductions in sand yields to the coast are all related to changes in Columbia River streamflows and have not been significantly impacted by past navigation channel actions, dredging, disposal, or pile dikes. The proposed 43-foot navigation channel also will not significantly impact future sediment yields to the coast. Sand yields can only return to pre-1900 levels if the large spring freshets, with high peak discharges and large flow volumes, are restored to the Columbia River, and even then the sand yields would be only 20% of the average 11 mcy/yr sand yields that existed during the 10,000 year formation of the littoral system. The long-term climate changes and upstream water resource development for flood control, irrigation and hydropower, mentioned in Exhibit J of the SEIS, make the restoration of large spring freshets impractical. Sea level rise and subduction zone earthquakes are outside of the control or influence of the proposed project and thus were not covered in the SEIS.

S-38. The Corps disagrees with the comment. Over the past 70 years, the Corps has built up a great deal of knowledge and a sound understanding of the sedimentation processes of the Columbia River. The effects of dredging and channel modifications upstream of CRM 40 have been assessed numerous times, including the following reports that are referenced in Exhibit J of the SEIS; Hickson 1930 and 1961; Locket 1963; USACE 1986, 1987, 1999, and 2001; and Eriksen and Gray 1991. The Corps also has conducted special studies that have contributed to our knowledge but were not cited in the SEIS. Those studies include Design Memorandums for the 40-foot channel dredging and pile dike construction 1963-1968; Studies to Control Shoaling of the Navigation Channel, Lower Columbia River 1985; Maintenance Improvement Review 1988; Dobelbower Groins Monitoring 1988; and Sand Wave Removal Test 1994. As noted above, in response S-36, the SEI expert panel affirmed the Corps' knowledge and understanding of the Columbia River in 2001.

constructed shortly after. To our knowledge, the effects of dams in impounding sand transported down the Columbia River has never been adequately assessed. Furthermore, the above statement ignores the role of dredging, which has removed substantial quantities of sediment from the system. Indeed, there appears to be no comprehensive
S-39 assessment of the effects of dredging on sediment supply. Finally, in a report concerned with sediment transport and sediment budgets, it is surprising that there is very little discussion of how these sediments have been disposed of historically or more recently. It is acknowledged by scientists that the removal or disruption of the supply of sediments from a fluvial system to the coast can have significant adverse effects on the stability of the coastal system.

4. Page 9, 3rd para: "The project also will not reduce the abundant sand supply available in the riverbed within the project area."

As discussed in the Oregon Department of Geology and Mineral Industries technical note "Columbia River Littoral Cell - Technical Implications of Channel Deepening and Dredge Disposal" concerns could be raised over the loss of sediments associated with channel deepening, channel maintenance, and MCR dredging. In particular, there is evidence to suggest that although sediment does not leave the estuary in large enough quantities to supply the coast, sand does come into the estuary from the offshore ocean environment (Lockett, 1963; Sherwood and others, 1990; USCE, 1999). These sediments are transported in on the flood tide, and over time accumulate in the main channel and elsewhere. Thus, any extraction of sand adjacent to the river mouth and navigation
S-40 channel does constitute a net loss of sand from the coastal system since it continues to deplete sand from an already starved coastal system. Because of the lack of information on the volumes of sand that enters and leaves the estuary through the mouth of the Columbia River, this is probably one of the main reasons why further studies should be undertaken to better understand the transport hydrodynamics adjacent to the river mouth. Furthermore, although a 3 ft deepening of the Columbia River may not significantly influence the ability of the river to transport sediments under the present regime of controlled river flows as contended by the U.S. Army Corps of Engineers, the cumulative impact of pile dikes and channel deepening over the years from 25 ft, 30 ft, 35 ft and the current 40 ft channel has significantly altered the hydrodynamics of the system. Whatever decision is made concerning the channel deepening project, it would be prudent that a carefully planned monitoring program be established on the Columbia River to properly assess cause and effect.

<u>The following comments refer specifically to the material contained in Appendix A:</u>

5. Page 4, 3rd para: Further discussion is required concerning the temporal variability in river flows. In particular, it would be beneficial to discuss the temporal effect of the
S-41 Pacific Decadal Oscillation (PDO), which may account for the reduced sediment transport volumes that occurred during the warm PDO phases between 1925 - 1946, and 1976 - 1996.

Corps of Engineers Response

S-39. This comment refers to a paragraph that is part of a summary of the sedimentation analysis presented in Appendix A of Exhibit J. The impact of Columbia River dams on flow regulation and thus on sand transport are acknowledged two sentences later in the same paragraph. The effects of climate changes, dams, and dredging and disposal are examined in detail in Appendix A. Figure 2 of Appendix A clearly shows the decline in sand transport that occurred before the construction of the Columbia River dams. The question of how much sand is being impounded by the dams is irrelevant to assessing the potential sedimentation impacts of the proposed 43-ft channel. As explained in the 1999 Final IFR/EIS, the 2001 BA and Appendix A, there are ample sand sources downstream of Bonneville dam to maintain the sand supply for the Columbia's sand transport for many hundreds of years. The Final IFR/EIS notes that there is as much as 100 mcy of sand just in the river's active sand wave zone downstream of CRM 106. The sand wave zone is only the top 4-8 feet of the riverbed's alluvial sand deposits that range from 100 feet deep near Portland/Vancouver to 400 feet deep in the estuary. Where dredging removes sand, it will expose the underlying sand to the river's hydraulic forces and that sand will then become part of the active sand transport system. In areas requiring frequent maintenance dredging this will eventually result in a 3-foot deeper increment of sand being incorporated into the active sand transport system than would occur without the proposed 3-foot deepening. Sand from upstream of the proposed project and the newly exposed sand will maintain the Columbia River's sand supply for the foreseeable future.

Disposal practices have varied with both time and location over the past 100 years, with some river locations utilizing in-water, shoreline, and upland disposal, depending on the conditions at the time of dredging. As noted in discussions about disposal practices in Appendix A, a complete description of historical disposal practices is impossible because many older disposal locations were not recorded. Disposal practices during the last 20 years have been recorded and the important characteristics of those practices are described in the 1999 Final IFR/EIS and Appendix A. The disposal plan for the 43-foot channel is described in the Final IFR/EIS, SEIS and the BA. As in the past, future disposal practices can be expected to vary depending on site conditions, such as volume of shoaling, dredging equipment available, disposal sites available, and environmental restrictions.

The Corps recognizes the potential for the removal or disruption of sand supply to the coast to affect the stability of the coastal system. However, as the reviewer noted earlier (comment S-37) a sudden injection of sand can also upset the stability of the coastal system. Over the past 100 years, the Columbia River littoral cell has experienced an abrupt increase in sand supply caused by the MCR jetties and a gradual decline to sand discharge from the river system because of natural and anthropogenic changes in the river's flows. The Columbia River littoral system is very likely still adjusting to both those events and may continue to do so for many more years. As described in the Final IFR/EIS, BA, and SEIS, the proposed 43-foot project is not expected to alter the river's sand discharges and therefore will not significantly impact the littoral system.

Corps of Engineers Response

S-40. The Corps is in general agreement with the comment on the following points; some sand is discharged from the estuary to the coast, sand enters the estuary from the MCR, sand enters during flood tides, and sand entering the estuary from MCR does accumulate in the estuary. It also appears to the Corps that the recent sand discharges from the estuary to the coast may not be sufficient to maintain a stable littoral system. As discussed in Appendix A, the Corps is uncertain about the source of sand entering the estuary from the MCR because the available studies of this very complex area provide differing results as to the movement of sand through the MCR. The source may be localized in or just upstream of the MCR or it could be a combination of local and littoral sources. As discussed below, this uncertainty does not affect the Corps' conclusion regarding the project's impacts because the Corps' modeling and other analysis indicates that regardless of the source of sand entering the estuary, the Project will not affect the mechanisms of transport. Appendix A describes the pathways for sand entering the estuary from the MCR as being through the North Channel, with sand accumulation occurring in the North Channel and on Desdemona Sands, not in the main (South) channel as claimed by the reviewer. As explained in the impacts discussion of Exhibit J, the proposed 43-foot channel does not involve deepening the MCR, the North Channel, or the main (South) channel downstream of RM 5, and hydraulic modeling does not indicate any hydraulic changes in those areas. For these reasons the Corps does not foresee the 43-foot channel causing any changes in the movement of sand into or out of the estuary or through MCR, or in the areas of accumulation of that sand.

The Corps does not agree that the extraction of sand from the navigation channel, upriver or in the estuary, will impact the coastal system in the predictable future. Approximately 63 mcy is forecast to be removed from the river (CRM 40-106) and disposed of upland during the first 20 years of the proposed project. As explained in the Final IFR/EIS, BA, and Exhibit J of the SEIS, the removal of this material will not reduce the available sand supply or the river's sand transport capacity, and thus will not alter the river's sand yield to the estuary. In the estuary (downstream of CRM 40) the disposal plan is similar to past practices. Only 10 mcy are planned for upland disposal in the estuary. Approximately 7 mcy dredged between CRM 20-30 would go upland at Rice and Pillar Rock islands and about 3 mcy would be placed on Welch and Tenasillahe islands. Approximately 6 mcy would be placed as in-water fill at each of the two ecosystem restoration sites (Lois Island and Miller-Pillar). The remainder of the dredged sand, about 30 mcy, would be placed back in-water by means of flowlane and shoreline disposal, minimizing the extraction of sand from the estuary and keeping disposal in the active sand transport system. During channel maintenance, sand dredged from CRM 5-13 will be placed in flowlane sites downstream of CRM 5, keeping the sand in the active transport zone and moving that sand closer to the MCR.

Comparing the 10 mcy of estuary upland disposal to the Sherwood et al (1984) estimates of approximately 2,000 mcy of accommodation space in the estuary shows the insignificance of this upland disposal volume. Thus the proposed upland disposal (extraction) is not likely to alter the estimated 800 years that it may take to fill the estuary. It should be noted that there is an additional 3,000 mcy of accommodation space in the entrance and that 7,700 years are estimated to be required to fill the combined estuary and entrance volumes. The Corps has agreed to conduct a bank-to-bank bathymetric survey of the estuary prior to construction and to perform annual bathymetric surveys in and adjacent to the navigation channel. Those surveys will provide an update of overall estuary sedimentation and monitor the predicted channel response to the 3-foot deepening.

6. Page 6, 2nd para: "The Corps (USACE, 1999) estimated the current average suspended bed material (sand) transport into the Columbia River is only between 0.2 and 0.6 mcy/yr".

S-42

It would be useful if the location where this was determined were included in the text.

7. Page 8, 2nd para: "They also found that sediment was not generally accumulating in the main stem reservoirs because of scour by high discharges."

S-43

This statement is not very clear. Does the statement imply that sediment has not been accumulating within specific river transport reaches? Or does it suggest that sediment is not accumulating behind the main Columbia River reservoirs?

8. Page 8, 2nd para: "Shoaling in the navigation channel through the river and estuary is primarily the result of convergence of bedload transport paths and sand wave development (USACE, 1999). This process goes on continuously, but occurs more rapidly during river discharges over 300,000 cfs. This shoaling is more a redistribution of bed sediment, rather than accumulation of sediment, since it does not change the volume of material in a river reach."

S-44

I assume you mean that sediment is constantly moving through the river reaches. However, what is the ultimate source of these sediments? The sand must be coming from somewhere. Is sand getting through the dams? Is all of the sand from tributaries between dams?

9. Page 13, 2nd para: "However, there are no bathymetric difference studies for the Columbia River upstream of RM 48."

S-45

For a river system as important as the Columbia River, it is quite surprising that there has been never been an attempt to quantify changes in the volume of sediment upstream of RM48. In terms of the effective management of the Columbia River fluvial system, this is a major oversight, particularly in terms of assessing the sediment budget of the river.

10. Page 21 2nd para: "As Table 3 shows, the only estimate of river channel volume changes is Hickson's (1961) 140-mcy of erosion between Bonneville and the estuary, between 1920 and 1960."

S-46

Has this area continued to erode?

11. Page 21 3rd para: "Therefore, the riverbed upstream of RM 48 has not been a net supplier of sand to the estuary or ocean."

S-47

Given the 205 million cubic yards of sediment dredged between RM40 and RM105, and the relatively low flows associated with the Columbia River (and hence low sediment transport potential) it is of no great surprise that this region is unable to supply sediments to the estuary, except in times of high discharge. Thus, the above statement would appear

Corps of Engineers Response

S-41. The influence of climate variation on the river's hydrology and sand transport is acknowledged and references are provided in Exhibit J for anyone interested in more information on the Pacific Decadal Oscillation (PDO) or El Nino/La Nina cycles. The reviewer refers to the 1925-46 and 1976-96 periods as having reduced sediment volumes. The 1947-75 average of 3.8 mcy/yr is less than half of the 1879-1904 average of 8.8 mcy/yr. Sand transport in 1976-96 was substantially influenced by upstream flow regulation. It must also be recognized that the effects of any future high river flows also will be moderated by flow regulation from the current upstream reservoir system. The focus of Exhibit J is the Columbia River's sediment budget; the temporal variations in that budget and contributing factors, both natural and anthropogenic, are clearly described in the text.

S-42. This estimate would generally apply to the river between CRM 40 and CRM 125.

S-43. The statement in question summarizes Whetten et al. (1969) findings concerning sediment accumulation behind main stem dams. It has been rewritten in the revised Exhibit J to say: "Whetten et al. (1969) found that sediment was not generally accumulating in the main stem Columbia River reservoirs because sediment was being scoured from those reservoirs during high flows."

S-44. Sand sources are described on p. 8 of Appendix A of Exhibit J in the SEIS. The ultimate source of Columbia River sand is the Cascade Mountains. Currently, there may be some sand moving downstream through Bonneville Dam, but the main sand sources include tributaries downstream of Bonneville Dam, such as the Sandy and Cowlitz Rivers, and the riverbed of the Columbia River itself where sand is estimated to be 100 to 400 feet deep. Bedload particles have been estimated to travel only several hundred feet per year in the Columbia River. Thus the sand source of most navigation channel shoaling is the riverbed adjacent to and a short distance upstream of the shoal location.

S-45. While knowing the historic volume changes upstream of CRM 48 would be interesting, they are not necessary for effective management of the river. As explained in responses S-36 and S-38, the Corps has developed a sound understanding of the Columbia's current sand transport, geomorphology, and dredging and disposal practices. This understanding supports the conclusion that sand volumes changes upriver of CRM 48 are not an important factor in determining the project's impacts on accretion or erosion in the estuary, the mouth or along the coast. The Corps also continuously surveys the river channel to monitor shoaling. That knowledge and monitoring allow us to effectively maintain the existing navigation channel and to evaluate potential impacts for the proposed 43-foot channel.

S-46. This paragraph in Exhibit J is clarified in the Final SEIS. The 140-mcy had not eroded in the normal sense, but had been transported as bedload into the nearby navigation channel and then dredged and removed from the river. That shoaling process still continues, but the resulting riverbed volume changes depend on the disposal method used at each site. Where in-water and shoreline disposal have dominated, the volume changes are slight. Where disposal has been primarily upland, there has been a reduction in the riverbed volume. Combinations of those disposal methods are used at most shoaling locations upstream of CRM 40. Typical riverbed changes related to navigation development from 1909 to the present are shown on Figure 13 of Appendix A of Exhibit J.

to be a misrepresentation of the available evidence, which is acknowledged to be limited, and cannot be concluded as such.

12. Page 39 1st para: "As can be seen in Table 5, there is a large volume imbalance within the MCR area. The total unaccounted for loss of material amounts to 247 mcy, between the amount of sediment being supplied from the Columbia River (138 mcy) and an apparent loss of sediment (- 109 mcy) in the areas surrounding MCR. Some of this sediment could be accounted for in the amount of sediment dredged from the entrance channel, but that only amounts to about 6 mcy for the entire period. The material may have moved into areas further north and south along the coast, areas still within the CRLC but that are not accounted for in Table 5. The volume changes further offshore are also difficult to evaluate due to lack of sufficient survey data."

S-48

As discussed in the Oregon Department of Geology and Mineral Industries technical note "Columbia River Littoral Cell - Technical Implications of Channel Deepening and Dredge Disposal", the ongoing erosion of sediment immediately adjacent to the Columbia River mouth, inlet, and offshore from the Clatsop plains, reinforces the conclusion that the Columbia River littoral system is starved of sediment. For this to occur, there must have been a major change in the sediment budget of the Columbia River/coast system. Such adjustments can only come about through changes in the process environment, or as a result of disruption in the supply of sediment to the coast. Although scientists have documented apparent increases in the wave heights offshore from the coasts of Washington and Oregon, modeling efforts as part of the Southwest Washington Coastal Erosion Study have indicated that this effect results in only minor adjustments in the stability of the system (Kaminsky pers. comm., 2002). Thus, the erosion of these areas is much more likely to be related to a general decrease in the supply of sediments from the Columbia River to the coast.

13. Page 40 1st para: "The hydrologic analysis of Bottom et al. (2001) indicates that because of regional climate trends, annual runoff tended to be below normal between 1927 and 1944 and then returned to a more normal pattern for 1945-58."

S-49

These changes are directly correlated with warm phases of the PDO cycle. See earlier note.

14. Page 40 2nd para: "Other than the effects due to streamflow changes, the upstream
S-50 reservoirs did not noticeably affect sand transport or supply."

What evidence is there that points to this conclusion?

15. Page 44 2nd para: "From the transport paths and sediment vollune changes it is also possible to make an estimate of the volwne of sand that may have entered the estuary from the ocean. Both UC-B and Locket indicate sand moves upstream in the north
S-51 channel but not in the south channel in the vicinity of RM 4-5. The reports also show that the landward movement terminates around Desdemona Sands. Therefore, if there were any inflow of sand from the MCR, it would be part of the 24-mcy accumulation on

Corps of Engineers Response

S-47. The Corps believes the statement is a reasonable conclusion based on the line of reasoning presented in the text of the Final SEIS, Exhibit J, Appendix A. The text acknowledges that there are not enough data to calculate an exact answer, thus the need to present the alternative hypotheses that are argued in the referenced paragraph and the next. The analysis utilizes the best available data and the Corps' understanding of river processes to reach the stated conclusion. The reviewer did not offer an alternative conclusion.

S-48. The characterization of the Columbia's littoral system as sediment starved, conflicts with the recent findings of Gelfenbaum et al. (2001) that since 1926 there has been a net accumulation of sediment. The Clatsop Plain inner shelf and offshore areas certainly show consistent decreases in volume that suggest sediment-starved conditions. However, erosion in the MCR and South Flank areas may very well still be in response to the hydraulic disturbance caused by the MCR jetty construction. Kaminsky (2000) notes that it is difficult to determine if those areas are yet approaching equilibrium with the jetty perturbation of the early 1900s.

Appendix A of the SEIS describes reductions in the Columbia River's sand yields to the coast that have occurred over time scales of 10s to 1,000s of years. Those reductions may contribute to the observed sediment volume decreases on the Clatsop Plain offshore area, but other possible causes should not be overlooked. The Columbia River littoral cell sediment erosion and accretion appears to be driven by far more complex physical processes than the comment suggests. Other potential causes of current sediment trends include increased wave heights (mentioned, but dismissed by the reviewer), the still active sediment system response the MCR jetties (noted by the reviewer in comment S-37), sea level change, and large-scale climate variations such as El Nino/La Nina events.

S-49. See response to S-41.

S-50. The referenced paragraph is a summary of the results of the report by Whetten et al (1969). They examined the Columbia River basin sediment processes and reported on sources, impacts of dams, and downstream transport. The work by Sherwood et al (1990) and Bottom et al (2001) also conclude that the dams have not altered sand supply. Those authors used sand transport relationships developed from measured data for the Columbia River near Vancouver from 1964-70, to hindcast sand transport from 1879 to 1999. If the dams had altered the available supply of sand, a single sand transport-river discharge relationship could not be used for the entire time period. In reference to the difference in sand transport between the 1868-1934 and 1958-1981 time periods, Sherwood et al concluded, "The dramatic decrease in estimated sediment supply to the estuary is clearly related to the decrease in peak riverflow caused by regulation." While the Corps does not believe that regulation caused all the 1958-81 decrease, we do agree that the reduction in sand supply to the estuary was caused by the decrease in peak riverflow.

S-51. The text of the referenced paragraph has been revised to explain that it is based on the theories of mass balance and that converging transport pathways will terminate in an area of sediment accumulation. The available information from UC-B (1936) and Locket (1967) come from the beginning and end of the time period and present consistent sand pathways. The volume changes come from Sherwood et al (1984). The pathways and volume changes represent net sediment movement over time. While the conclusion is not without qualifications, it is reasonable based on the best available information.

Desdemona Sand. As described above, the 19 mcy of sand eroded from the north channel, mid-estuary shoal, Grays Bay, and Brix Bay was the likely source of much of that accumulation. The additional 5 mcy of sand accumulated on Desdemona Sand could
S-51 have come from the river, the MCR, or the ocean. Based on Lockett's conclusions that there was ocean sand moving upstream in the north channel, that additional 5 mcy would have come from the MCR or ocean. This amounts to an average annual sand inflow from the MCR of less than 0.2 mcy/yr."

This paragraph is speculative and should be revised to acknowledge the inferences made.

Neither the Draft Supplemental Integrated Feasibility Report and Environmental Impact Statement nor the technical memorandum on sediment transport provide any recommendations to address many of the technical deficiencies acknowledged by the U.S. Army Corps of Engineers throughout the document. As managers of the Columbia River, this deficiency reflects a serious oversight by the U.S. Army Corps of Engineers.
Several options were presented at a recent workshop on sand transport held in Portland on June 10th 2002. Two options presented at the meeting included:

- A comprehensive bank-to-bank survey of the lower estuary region;
- Installation of 3 monitoring stations to quantify river velocity and temperature.

It is imperative that these proposed efforts be explicitly stated in the final document. However, we would recommend the inclusion of the following:

S-52

(1) The bank-to-bank survey is provided as a baseline survey. Given many of the acknowledged gaps in our understanding of the Columbia River, particularly the issue of sediment budgets, it would be prudent to undertake additional follow-up surveys to assess morphological changes in the river.
(2) Although the installation of monitoring stations in the Columbia River is a good idea, the proposed system would essentially ignore sediment transport. In light of the virtual absence of sediment transport measurements in the Columbia River, it is essential that state-of-the-art instrumentation be installed to properly address deficiencies in our understanding of sediment transport dynamics throughout the river/estuary environment. As noted by Jay and Naik (200), it is anomalous that sediment transport is not regularly measured on a river as important as the Columbia River.
(3) Given the complete lack of knowledge on changes in the volumes of sand upstream of RM 40, it would be prudent for a complete bank-to-bank survey to be undertaken upstream of RM 40.

Finally, the sediment transport document contends that there is no real sediment (sand) issue associated with the Columbia River. As noted in our agency's technical note "Columbia River
S-53 Littoral Cell - Technical Implications of Channel Deepening and Dredge Disposal" this argument is based on two positions to which counter-arguments are offered in the present environment of insufficient data:

Corps of Engineers Response

S-52. The channel improvement project has presented a comprehensive series of sedimentation analyses that include the 1999 Final IFR/EIS, the June 2001 SEI workshop on sedimentation, the 2001 BA for endangered fish, and finally Exhibit J of the SEIS. These analyses have been based on the abundant available data on the Columbia River (Exhibit J references 37 reports and papers on sedimentation) and years of professional experience with the Columbia River hydraulics and sedimentation. The SEI expert panel affirmed the reliability of the Corps' sedimentation analyses when they found the Corps adequately understood the physical processes of the river and estuary, including flow alterations, dredging volumes, suspended sediment and bathymetry changes. The Corps agrees there are gaps in historical data that limit the sediment analyses presented in the Final IFR/EIS, BA and SEIS. However, the analyses presented in these documents accurately portray sediment behavior and hydraulics in the riverine environment.

The commenter's statement that the Draft SEIS does not include recommendations to address uncertainties is inaccurate and surprising given the many discussions with the state on this point. The monitoring actions, including those for sedimentation, are described in Table S6-5, p. 6-43, of the SEIS. The sediment related monitoring actions include three hydraulic monitoring stations in the estuary, annual reporting of dredging volumes, and main channel bathymetric surveys. The hydraulic monitoring stations are being installed to validate the results of the hydraulic modeling that there would be no measurable hydraulic changes caused by the proposed 43-foot channel. Annual dredging volumes can be used to assess bedload movement and the O&M dredging forecast. This annual review allows the Corps to track the actual volumes of dredge materials against its projections. This comparison will provide one indication of the accuracy of the Corps analysis as presented in Exhibit J. Significant increases in volumes in the estuary above that projected would be one performance criteria that could be tracked and used together with other information to determine if there is an unexpected impact.

The proposed project also includes main channel bathymetric surveys to monitor the predicted riverbed responses to the deeper channel. The main channel surveys approach bank-to-bank coverage upstream of CRM 48 as requested by the reviewer and will be sufficient to monitor river responses along the navigation channel. Specifically, the survey results may be reviewed to determine the pattern of sand accumulation or depletion in the areas being surveyed. The monitoring results could also be used to plan adaptive management strategies if unexpected sediment impacts are found.

A bank-to-bank bathymetric survey of the estuary was agreed to as part of the ecosystem research actions in the BA. That survey will provide the data needed to update the volume change analysis conducted by Sherwood et al. (1984) on a consistent time scale (1935, 1958, 1982 and then 2003). The need for additional bank-to-bank bathymetric surveys will depend on future research priorities. The planned bank-to-bank bathymetric survey of the estuary will be included in the SEIS. Together these monitoring and data collection measures provide effective tools for monitoring the project's impacts and determining if unexpected patterns of accretion or erosion are incurring.

- Position One: Because the present system cannot discharge sand to the coastal environment, the future extraction of more sediment as a result of the channel deepening project and ongoing maintenance is justified. Such actions according to this concept would not affect the amount of sediment present in the coastal system because sand does not get out of the estuary.

  Counter argument: While this may be the case under the present conditions, it has certainly never been the case historically. This is a circular argument that overlooks significant additional considerations as seen below. Furthermore, channel deepening and maintenance dredging adjacent to the river mouth and in the estuary may in fact enhance the estuary's contemporary role as a sink for beach sand.

S-53

- Position Two: There are considerable volumes of sand within the river and lower estuary that are unlikely to run out in the foreseeable future. The removal of the volumes of material touted for the channel deepening project and for its ongoing maintenance is negligible compared with the overall volume of sand stored in the Columbia River and its estuary.

  Counter argument: The volume of sediment contained in the Columbia River system is undeniably enormous. However, sediment available for transport remains a finite resource particularly in a fluvial system as extensively modified as the Columbia River, with its many dams and existing flow regulations. Furthermore, although the depth of sand contained in the river may be large, not all of this material is available for transport. This is because the present fluvial system is striving to reach some form of equilibrium state, or grade elevation, that has been imposed on it over the course of the past 5 - 6000 years in response to a slowing of the post-glacial sea level rise. Thus, the bulk of the sediment contained in the Columbia River channel is essentially held in storage, and will remain so unless there is a sudden change in mean sea level, or a dramatic increase in river discharge. Furthermore, as previously noted concerns could be raised over the loss of sediments associated with channel deepening, channel maintenance, and MCR dredging, since these are the sediments that are available for transport under the present regime. Given many of the uncertainties in the sediment budget presented as part of the technical memorandum, and those identified as part of the Southwest Washington Coastal Erosion Study, every effort should be made to better quantify and assess the transport of sediment throughout the Columbia River system.

References:

Gelfenbaum, G., M.C. Buijsman, C.R. Sherwood, H.R. Moritz, and A.E. Gibbs, 2001, *Coastal Evolution and Sediment Budget at the Mouth of the Columbia River, USA,* 4th International Conference on Coastal Dynamics, Lund, Sweden.

Jay, D.A. and P. Naik, 2000, *Climate Effects on Columbia River Sediment Transport,* USGS Open File Report 00-439, Southwest Washington Coastal Erosion Workshop Report 1999, edited by G. Gelfenbaum and G. Kaminsky.

Corps of Engineers Response

S-52 (con't). It should be noted that the Columbia River system imposes inherent limitations on a perfect understanding of sediment transport. The reasons for this are; suspended sediment concentrations are low, average annual sediment transport is small, bedload moves predominately during flows over 300,000 cfs and is difficult to measure, there is a wide range in river discharges and large freshets are infrequent, the estuary is large and contains a variety of bathymetric and hydraulic environments (such as Cathlamet Bay, the North and South channels, the inter-tidal flats, and near the entrance), and the hydraulic conditions at the MCR are complex and hazardous to work in when sand transport is likely the highest (high tidal or river discharges and/or high wave conditions). To measure sediment transport throughout the Columbia River, estuary, and MCR system would require a very large annual monitoring effort, for an extended period of years to cover the wide range of special and temporal variations in the system. As discussed below, such an effort is not appropriate or necessary for this project.

The level of future sediment monitoring necessary in the Columbia River and estuary depends on the issues to be addressed. The Corps, in cooperation with NOAA Fisheries and USFWS, identified a monitoring plan to confirm the expected impacts from the proposed project and provide a base for adaptive management, if necessary. This plan addresses the impacts that have been identified and provides a mechanism for responding to new information.

The development of a precise sediment budget for the entire system is a major undertaking that is outside normal Corps authority and beyond what is necessary for this project. However, the Corps' Regional Sediment Management (RSM) program may offer an opportunity to address some of the broader sediment concerns expressed by the reviewer. The RSM is a national initiative based on the recognition of the regional implications of dredging and other activities in the littoral zone. RSM treats sand as a resource and applies a regional (rather than project) perspective to managing sand in coastal, estuarine, and riverine systems. The RSM program encourages collaborative partnerships among stakeholders.

S-53. The two "positions" outlined by the reviewer suggest a misunderstanding of the Corps' sediment impact analysis. Position one is not a position advocated by the Corps in the 1999 Final IFR/EIS, BA, or SEIS. The Corps' analysis (documented in detail in Exhibit J) concludes that sand moves in both directions in the MCR and that the volumes of sand moving are small. It has also been the Corps' position that the proposed 43-foot channel would not significantly alter the sand yield to the estuary or the coast. The 43-foot channel would not enhance the estuary's role as a sink for coastal sands in the foreseeable future, as explained in Exhibit J and in response to comment S-40.

Position two addresses only one aspect (supply) of the sediment system. The Corps' arguments supporting our conclusion that there will be no significant changes to the sediment or sand budgets are based on there being insignificant or no measurable changes to the systems transport capacity or sand supply. The Corps recognizes that not all the sand in the Columbia River's bed will be available for transport, but as explained in response to comment S-39, only a small fraction of that sand is needed to maintain the sand supply. The comment seems to confuse sand supply with sand transport potential. The sand on or just below the surface of the riverbed represents the available sand supply. How much of that sand may be in transport over any given time depends on the river's discharge and resulting sand transport potential. As has been stated in responses to your comments S-36 through S-52, the Corps believes it has adequately assessed the proposed 43-foot channel's potential sedimentation impacts to the river, estuary, and coast.

Lockett, J.B., 1963. Phenomena affecting improvement of the lower Columbia estuary and entrance. Federal Interagency Sedimentation Conference, Jackson, Mississippi, U.S. Department of Agriculture, 626-668.

Oregon Economic & Community Development Department

The Oregon Economic and Community Development Department has reviewed the US Army Corps of Engineers' Supplemental Integrated Feasibility Report for Channel Improvements and Environmental Impact Statement (SEIS). The Oregon Economic and Community Development Department supports deepening the Columbia River channel to 43 feet as proposed in the SEIS. We offer the following comments concerning the economic impacts of this proposal.

Maintaining economically competitive ports on the Columbia River is a key to Oregon's economy remaining competitive in a global market. The Columbia River serves as a vital trade corridor for Oregon's manufactured goods and agricultural commodities as well as a large share of the nation's grain exports. In 1997, approximately 30 million metric tons of cargo valued at $13 billion moved through the lower Columbia River ports. This is due in part to the lower
S-54 Columbia River providing the shortest route to Asian markets for exports. Asian markets not only receive the majority of the waterborne trade from the West Coast, but have also served as a critical component of Oregon's economic growth during this decade. The Oregon Economic and Community Development Department believes it is necessary to maintain a strong and direct link to Asian and international markets in order to ensure Oregon's current and future economic health and diversity.

The Oregon Economic and Community Development Department supports the analysis and conclusion of the SEIS and the restated reports. The reports document that over time there has been growth in the level of waterborne commerce on the Columbia River. With this growth we have seen an increase in the average vessel size due in part to the efficiency gains for shippers using larger, deeper draft vessels to transport bulk items such as grain as well as containerized goods. Without deepening the channel, these vessels cannot come into Portland fully loaded, thus making the Columbia River ports less competitive. This creates market pressure to utilize California and Puget Sound ports, increasing the costs of shipping cargo to and from Oregon. If the Columbia River channel is not deepened, Oregon companies will probably lose business to other locations with lower transportation costs and Oregon consumers will simply have to pay more.

Corps of Engineers Response

S-54. Comment acknowledged.

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Sept 15, 2002

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RE: Comments on Draft Supplemental Environmental Impact Statement for Columbia River Channel Improvement Project

Dear Mr. Willis and Ms. Grigg,

Thank you for the opportunity to comment on the Columbia River Channel Improvement Project Draft Supplemental Integrated Feasibility Report and Environmental Impact Statement (DSEIS).

In our prior communications, including the September 29, 2000 letters denying section 401 water quality certification and consistency with Washington's coastal zone management program, Department of Ecology (Ecology) has raised a number of concerns. Our understanding is that this DSEIS was prepared, in part, to respond to those concerns. We also understand that considerable effort was focused on other topics, including salmon listed under the Endangered Species Act.

S-55

We would like to thank the Ports and the Corps for the significant work over the past year to address the concerns of Ecology and other state agencies. This DSEIS marks a "check point" in that effort. The ongoing process to address the issues of concern has included numerous focus meetings and the production of technical memoranda which are attached in an appendix to the DSEIS. Our comments today are part of that ongoing dialogue.

Ecology has already provided input (written and verbal) on many of the issues. These comments will provide an update on Ecology's view of the issues, particularly those topics for which information was developed too late for Ecology to provide input prior to the publication of the DSEIS. Additionally, we will try to summarize previous statements

Corps of Engineers Response

S-55. Comment noted. The scope and purpose of the SEIS is further explained in our response at F-2. Detailed responses to Ecology's comments are below.

Corps of Engineers Response

that still remain relevant. Our detailed comments are attached. We hope that our concerns will be addressed and integrated into the final SEIS.

If you have questions, comments, or concerns, please contact me at bmcf461@ecy.wa.gov or 360 407 6976.

Sincerely,

Brenden McFarland
Environmental Coordination Section Manager
Shorelands and Environmental Assistance Program

attachment: detailed comments

cc (via email):
Laura Hicks, Army Corps of Engineers, Portland District
Dianne Perry, Port of Portland
John Malek, EPA
Carol Jolly, Governor Locke's Office
Gary Cooper, WA DNR
Bob Burkle, WA DFW
Steve Manlow, WA DFW
Bill Jolly, WA Department of Parks and Recreation
Mike DeSimone. Pacific County
Tom Byler, Governor Kitzhaber's Office
Russell Harding, OR DEQ
Christine Valentine, OR DCLD
Jonathan Allan, OR DOGAMI
Dave Hunt, Channel Coalition
Matt Van Ness, CREST
Dale Beasley, CRCFA
Peter Huhtala, CDOG
Tracey McKenzie, PIE
Kristin Rich, PIE

Department of Ecology's
Detailed Comments on the Draft Supplemental Environmental Impact Statement for the Columbia River Channel Improvement Project

Ecology's detailed comments are organized under the following headings:

- Aquatic Resources (including crab, sturgeon, and other organisms)
- Wetlands
- Sand Management and Sedimentation
- Shoreline and Coastal Zone Management

While these subjects are used as topical headings, the material ties to our 401 and CZM decisions. All the topics covered were previously cited in our September 29, 2000 letters denying 401 certification and CZM consistency. The material in the final supplemental EIS (including response to comments) is a tool that will help inform our permit decsionmaking.

We want to make it clear that we are appreciative of the progress made towards addressing the issues we raised previously. Depending on the issue, the amount of progress varies. For example, we are appreciative of the measures taken to assess the impacts on crab from entrainment, yet we would like to see more work on mitigating for those impacts. Additionally, we would like to see more work on the disposal impacts and habitat alteration impacts to crabs. Other topics also reflect this balance of progress versus remaining issues to address.

S-56

The introduction of an adaptive management approach may hold the best prospect of addressing Ecology concerns on many of the issues. For some issues there is uncertainty associated with the topic (such as crab and sand management), yet acquisition of information cannot be accomplished within a short time frame. In order for Ecology to make decisions in the short-term, we will need to outline in greater detail future studies planned and determine appropriate actions in response to potential outcomes of such studies. Additionally, Ecology would need to formalize an adaptive management agreement that requires future decisions in order to provide the assurances necessary for more immediate permit decisions.

In order to put in place an adaptive management approach, we would need to have a discussion on how best to deal with overlaps between Ecology concerns and elements of the adaptive management approach involving federal agencies resulting from the ESA reconsultation process. For Ecology permitting needs, we cannot necessarily rely on an agreement between the federal agencies that would exclude our agency from review and approval of study plans, reports, and decisions about resulting actions.

We look forward to response to our comments and are interested in ongoing discussion to resolve the remaining issues.

Corps of Engineers Response

S-56. The Corps concurs that an adaptive management approach is likely the best approach in dealing with several of the issues that still have some level of concern with your agency. It is the Corps' intent to have a separate process from the ESA adaptive management process for the state issues related to water quality and coastal zone authorities, since the issues with the states are much broader. This process has been proposed and recently discussed with WDOE, ODEQ, ODLCD, and USEPA as an adaptive management process to deal with 401 and CZMA concerns with both states and to discuss both the channel improvement project and the Mouth of the Columbia River project from a regulatory perspective.

Aquatic Resources (including crab, sturgeon, and other organisms)

The comments in this section focus on issues related to marine and freshwater aquatic resources particularly Dungeness crab, Sturgeon, Smelt and their essential habitat. The comments take into account the Technical Memoranda included in Appendix K of the Draft SEIS and discussions of the Crab Technical Focus group including information presented on September 5, 2002 that have not yet been incorporated into the Draft SEIS.

S-57

Ecology recognizes the applicant's efforts toward addressing many of the issues raised in the 401 denial and CZM consistency letter regarding potential impacts to Dungeness crabs, Sturgeon and Smelt through the recently conducted and in progress studies. Findings from these studies will provide useful information on the magnitude of direct entrainment impacts, indirect impacts to some aspects of habitat change, and disposal impacts. Much of this information however will not be available prior to permit decision deadlines. A framework explicitly detailing how results of these 'studies in progress' will address the existing concerns and be interpreted to inform project management decisions should be included in the final SEIS.

The comments below on this topic include a table organizing Ecology's concerns and expectations followed by comments focusing on the crab technical memorandum.

Corps of Engineers Response

S-57 (includes responses to table). The table provided is unclear as to how the Department would have expectations shown in column 7 in the table without completing the management decisions specified as incomplete in column 6 of the table. In addition, most of the issues discussed in column 5 have been resolved and the studies are either completed or underway. Baseline studies for the proposed ocean disposal sites were completed and the information is disclosed as part of the Final SEIS, Exhibit N. As noted in the response to F-2 assessments for sites designation are contained in the 1999 Final IFR/EIS.

Crab impacts from entrainment 1, bullet 1: This task has been completed except for the final salinity versus abundance model using data collected in 2002. Please see information provided in the Final SEIS, Exhibit K-4.

Crab impacts from entrainment 1, bullet 2: The Corps is funding three additional hydraulic monitoring stations in the estuary. These stations, in addition to the rest of the CORIE monitoring network, collect real time data for both flow and salinity. This information will be used to the extent practicable to schedule dredging for the construction of the project, to minimize impacts to crabs. It may not be possible to schedule the dredges for the O&M program. O&M dredging is performed after the spring freshet and when shoaling infringes on the authorized channel depth, usually during the summer.

Crab impacts from entrainment 1, bullet 3: The Corps will continue to avoid and minimize entrainment impacts to Dungeness crab to the maximum extent practicable.

Crab impacts from disposal, bullet 1 to 3: The preferred option for dredged material disposal during channel improvement project construction for CRM 3-30 would be to place it in a temporary construction sump between CRM 18-20 for subsequent construction of the Lois Island ecosystem restoration feature rather than ocean disposal. All data collected to date indicates no crab occur at that Lois Island location based on its low salinity. Consequently, there is no need to develop a statistically robust experimental design or mitigation for construction disposal. There is a potential to impact crabs with O&M flowlane disposal downstream of CRM 5. This flowlane area is small compared to the estuarine area (CRM 15 to mouth, bank to bank) inhabited by Dungeness crab. The project flowlane disposal increment compared to the existing condition is small. Baseline studies for the proposed ocean disposal sites were completed and the information is disclosed as part of the Final SEIS, Exhibit N. Assessments for site designation are contained in the 1999 Final IFR/EIS.

Crab impacts 3, bullet 1-3: A bank-to-bank bathymetric survey will be obtained prior to construction of the deepened channel. Up-to-date bathymetry was used in the salinity models for the navigation and main channels where the potential impacts are expected to occur. The oldest bathymetry used in the models was for those areas outside of the main channel. The modeling results presented in the 1999 Final IFR/EIS and the 2001 BA indicate that hydraulic and salinity changes range from none to very slight for areas away from the navigation channel. Updating the models' bathymetry may result in slightly different base condition results, but would not alter the with-project impact levels. The existing model results provide the level of understanding of the estuary's hydrodynamics necessary to judge the project's potential impacts to circulation, salinity, temperature, and the ETM. The SEI expert panel confirmed the adequacy of the hydrodynamic modeling during the BA consultation.

Sturgeon impacts 4, bullet 1: This information is provided in the Final SEIS, Exhibit K-1.

The table below organizes Ecology's concerns, the measure(s) being implemented to address the concern, the technical issues and management decisions that remain incompletely addressed, and what still needs to be included in the final SEIS.

Issue Number	Issue	supporting documents	Applicant's response	Technical analysis remaining incomplete	Management decisions remaining incomplete	Ecology's expectations
Crab impacts						
1	Direct impacts to crab from entrainment	DEIS letter 1999 FEIS letter 1999 401 letter CZM letter attachment Outstanding issues8/10/01 letter	• Existing information compiled and analyzed. • Entrainment Study designed then reviewed by state agencies. • Sampling begun in lower Columbia River (CR) in March and June and planned to continue through October 2002	• Validation of salinity/crab relationship in CR through concurrent sampling of salinity during entrainment sampling. • Further sampling upriver in Upper Sands, Tongue Point Crossing and Miller Sands Channel • Verification of dredge volume sampled (flow meter) • Estimate of total crab entrained through construction of deeper channel and 20 yrs maintenance dredging. • Estimate of crab abundance and entrainment under various flow conditions.	• Determination of the level of impact that triggers the need for, type, and extent of mitigation has not been discussed.	• Continue gathering entrainment data further upstream, analyze data to establish salinity/crab relationship. Run model with high and low flow salinity distribution patterns (using newly collected bathymetry data- see issue no. 3) to estimate number of crabs entrained. • Monitor flow and salinity to determine (on an annual basis) dredging windows to avoid and minimize impacts to crab. • Determine mitigation requirements in cooperation with state resource agencies.
2	Direct impacts to crab from disposal	DEIS letter 1999 FEIS letter 1999 401 letter CZM letter attachment Outstanding issues8/10/01 letter	• Burial study included in FEIS 1999 • Proposed baseline study of Deep Water Site	• Results of the study presented in the 1999 FEIS did not provide reasonable assurance that crabs would not be impacted from burial or suspended sediment. • Information is lacking on temporal and spatial crab abundance and distribution at potential disposal sites	• Preferred disposal alternatives cannot be legitimately selected lacking information on relative level of impacts. • Determination of the level of impact that triggers the need for, type, and extent of mitigation has not been discussed.	• A statistically robust experimental design to assess these potential impacts should be outlined then made available for review and comments (*before* any sampling begins) by state resource agencies. • Crab populations should be sampled and characterized for all potential disposal sites and monitored post disposal • Determine mitigation requirements in cooperation with state resource agencies.

Issue Number	Issue	supporting documents	Applicant's response	Technical analysis remaining incomplete	Management decisions remaining incomplete	Ecology's expectations
3	Indirect impacts to crab through habitat alteration	DEIS letter 1999 FEIS letter 1999 401 letter CZM letter attachment Outstanding issues8/10/01 letter Comments on 2001 BA	• Salinity/entrainment relationship investigated in the entrainment study; salinity is being concurrently measured with entrainment samples and at CORIE monitoring stations. • A bank-to-bank pre-construction survey is planned	• Model predictions of changes to the distribution of salinity, temperature and turbidity maximum resulting from channel construction and 20 yrs of maintenance needs to be assessed with up to date bathymetric data. Potential changes to crab distribution and vulnerability to impacts from dredging or disposal must be assessed.	• An adequate understanding of the existing physical conditions is required before potential impacts from channel deepening and maintenance can be assessed	• Complete bank-to-bank survey and re-run CORIE model with new bathymetric data. Apply pre and post channel construction scenarios to predict distributions of salinity, temperature and turbidity maximum. • Monitor bathymetric changes in highly dynamic areas and entire bathymetry at pre determined time interval and re-run model • Determine avoidance, minimization and if necessary mitigation requirements in cooperation with state resource agencies.
sturgeon impacts						
4	Direct impacts to sturgeon from flow lane disposal	DEIS letter 1999 FEIS letter 1999 401 letter CZM letter F&W 6/26/02 Tech memo comments	• Compilation of existing information • Study initiated to assess sturgeon distribution and abundance	• Tagging studies to monitor sturgeon movement in these sites before and during disposal • Assessment of whether sites are important rearing areas for sturgeon	• Assessment of habitat use is necessary to determine potential impacts	• Development of a matrix detailing the potential for adverse direct impacts to sturgeon based upon what is learned from the studies. • Specific mitigation measures must be determined in cooperation with the state agencies • A monitoring plan to continually assess impacts that may result from maintenance disposal must be developed in cooperation with the state agencies.

Issue Number	Issue	supporting documents	Applicant's response	Technical analysis remaining incomplete	Management decisions remaining incomplete	Ecology's expectations
5	Indirect impacts to sturgeon through habitat	DEIS letter 1999 FEIS letter 1999 401 letter CZM letter F&W 6/26/02 Tech memo comments	1. Study initiated to assess abundance, distribution and type of prey species sturgeon rely on.	• Diet analysis from stomach content sampling and comparison to benthic sampling at these sites	• Assessment of whether benthic invertebrates in these deep instream sites are important prey species	• Development of a matrix detailing the potential for adverse impacts to prey species based upon what learned from the studies. • Specific mitigation measures must be determined in cooperation with the state agencies
Biological impacts from physical changes in the estuary						
6	Biological impacts from physical changes to the estuary	DEIS letter 1999 FEIS letter 1999 401 letter CZM letter attachment Mar 2001 letter	Applicant refers to findings from the SEI independent science panel.	• Impacts to benthic invertebrates and their habitats requires a thorough assessment, particularly since they have a fundamental position near the base of the foodweb. Such a review should include referencing information when available regarding ranges of physical habitat parameters, recolonization rates, and species assemblages pre and post dredging	• When physical changes are considered with respect to habitat requirements of the benthic species avoidance, minimization and/or mitigation measures can be properly assessed.	• Develop a monitoring plan that incorporates CORIE data collection to continually evaluate range of parameters benthic species are exposed to throughout the duration of the channel construction and maintenance.

The comments below (in this section) are an edited version of those submitted to the applicant on June 26, 2002 pertaining to the Technical Memorandum (now included in Appendix K of the Draft Supplemental EIS) entitled: *The impacts of the Columbia River Channel Improvement Project Dredging and Disposal on Dungeness Crabs (Cancer magister).* The edits reflect Ecology's understanding of the status of these concerns following discussions at the September 5th 2002 Crab Focus Group.

S-58

Section 2, final paragraph
Although changes in level of impact from existing entrainment due to O&M may not be significant, the entire impact associated with maintenance dredging must be addressed to determine whether impacts are significant. *Ecology acknowledges the applicant's intent to address of impacts of the entire maintenance volume at the September 5th 2002 Crab Focus Group meeting and expects this to be incorporated into the final SEIS document.*

Section 3.1, final paragraph
Application of DIM to entire maintenance dredge volumes, not just incremental maintenance dredge volumes must be addressed. *Ecology acknowledges the applicant's*
S-59 *intent to address of impacts of the entire maintenance volume at the September 5th 2002 Crab Focus Group meeting and expects this to be incorporated into the final SEIS document*

Section 3.3, paragraph 1
The conclusion that no additional crab sampling or dredge entrainment sampling appears warranted in Upper Sands, Tongue Point Crossing and Miller Sands Channel is
S-60 unreasonable. *Ecology acknowledges the applicant's intent to sample further upstream in theses areas expressed at the September 5th 2002 Crab Focus Group meeting and expects this to be incorporated into the final SEIS document.*

Section 4.3, final paragraph
Ecology requires information on Dungeness crab population abundance and impacts (both direct and indirect) from dredging and disposal. With accurate information a plan
S-61 for avoidance, minimization, and, if necessary, mitigation can be developed. A comparison of the number of crabs entrained to the total number of crabs harvested is not, ultimately, the single issue of concern.

Section 5.1, paragraph 1
The crab/salinity model was developed from Grays Harbor data. Verifying this relationship with entrainment data compared with CORIE stations in the Columbia River is desirable. Assuming this relationship holds for the Columbia River, following
S-62 construction and maintenance the salinity distribution is predicted to change, with the maximum intrusion moving upstream. This prediction will 1) need to be assessed with model runs using new bank to bank bathymetry and verified with post project bathymetry and 2) Evaluate any changes to the salinity distribution with respect to crabs. Further intrusion of the salinity wedge is likely to drive the distribution of crabs further upstream and increase the area where crabs are vulnerable to entrainment. Although the absolute

Corps of Engineers Response

S-57 (con't).

Sturgeon impacts 4, bullet 2: Avoidance and minimization has been discussed in a multi-agency group including representatives from WDOE, WDFW, ODFW, USFWS, and NOAA Fisheries. Preliminary agreement has been reached for this approach outlined in the Final SEIS, Exhibit K-1.

Sturgeon impacts 4, bullet 3: The matrix under development does not contain a long-term monitoring study. Impacts to sturgeon will be minimized to the extent practicable through avoidance and timing of dredging actions during project O&M.

Sturgeon impacts 5, bullet 1: This information has been collected and analyzed and is presented in the Final SEIS, Exhibit K-1.

Sturgeon impacts 5, bullet 2: Avoidance and minimization has been discussed in a multi-agency group including representatives from WDOE, WDFW, ODFW, USFWS, and NOAA Fisheries. Preliminary agreement has been reached for this approach outlined in the Final SEIS, Exhibit K-1.

Biological impacts from physical change in the estuary 6, bullet 1: The Corps is committed to fund, for 7 years, 3 hydraulic monitoring stations in the estuary. As we have discussed with representatives from your agency on November 6, 2002, the Corps will use annual navigation channel bathymetric survey data to assess any potential for changes to the physical environment within the estuary and then assess whether additional data collection is warranted.

S-58. Comments and statements about the entrainment study at the September 5, 2002 meeting are noted and agreed to.

S-59. See response S-58.

S-60. See response S-58.

S-61. Concur, additional information is added to the Final SEIS from the 2002 crab research and modeling efforts.

S-62. Additional information is provided in the Final SEIS on the crab entrainment data collected in the summer of 2002. This includes further refinement of the crab/salinity model using additional CORIE data. The small change in upstream salinity predicted for the channel improvement project is not expected to have a significant impact on upstream crab distribution compared to what occurs now due to normal flow and tidal variations. In upstream areas, crabs occur primarily in the deeper channel areas because this is where salinities are highest. Recent main channel bathymetry was used to predict salinity changes. New bank-to-bank bathymetry will not aid in the prediction of salinity changes in the deeper channel areas. Both the CORIE and WES models are highly reliable in predicting salinity changes in the channel areas where the existing information on bathymetry is very good. The bank-to-bank survey would only be useful in refining existing conditions in the shallow water areas where crabs do normally not occur because of the low salinity, and the predicted salinity changes are very small.

number of crabs may be small on an annual basis, the impacts over the life of the projects may be significant. This needs to be addressed in the impact assessment.

Section 5.1, paragraph 3
S-63 Sampling also needs to occur further upstream of Flavel Bar, especially during the summer and fall and in low flow conditions to accurately assess potential entrainment impacts. *Ecology acknowledges the applicant's intent to sample further upstream in theses areas at the September 5th 2002 Crab Focus Group meeting and expects this to be incorporated into the final EIS document.*

Section 5.2, paragraph 1
S-64 Evidence supporting the assertion that "...these organisms are expected to recolonize the dredged areas and the habitat is expected to recover quickly" must be cited. If supporting evidence cannot be found, such claims should be removed and this should be noted as an issue that will be addressed either through monitoring of benthic invertebrate populations, monitoring relevant habitat indicators, or a combination of these.

Section 5.3, conclusion
S-65 It is inaccurate to use the phrase "are not expected to be measurable" if any crabs at all are entrained. The number entrained may be insignificant based on some defined level of significance but is still measurable. The determination of significance needs to be defined in coordination with the state agencies responsible for protecting the resource.

Section 6.1, paragraph 1
S-66 SEIS must address not only impacts due to construction of the deepened channel but also maintenance. A worse case scenario indicates 16 mcy being placed in the Deep Water Site (7 mcy from construction, 9 from maintenance over 20 yr life of project). *Ecology acknowledges the applicant's initiation of baseline biological characterization of the deepwater site and intent to examine burial impacts through further study at the September 5th 2002 Crab Focus Group meeting and expects this to be incorporated into the final EIS document.*

Section 6.3, final paragraph
S-67 Evidence supporting the assertion that "The habitat alteration is expected to have essentially no adverse impact on crab populations in this area" must be cited. If supporting evidence cannot be found, such claims should be removed and this should be noted as an issue that will be addressed either through monitoring of benthic invertebrate populations, monitoring relevant habitat indicators, or a combination of these.

Corps of Engineers Response

S-63. As discussed at the September 5th Crab focus group meeting, samples have recently been taken upstream of Flavel Bar (CRM 10-14) at Miller Sands (CRM 24) during periods of low flow when salinity was highest and crabs would be expected to occur. The results of this sampling are included in the Final SEIS.

S-64. The reference used for this statement is Nightingale, B. and C. Simenstad, 2001, *Dredging Activities: Marine Issues*. This report is a white paper submitted to Washington Department of Fish and Wildlife, Washington Department of Ecology and Washington Department of Transportation, July 13, 2001. Within the above document, several studies are referenced that support our statement that recolonization of the dredged area by benthos is expected to occur quickly. Specifically:

- McCabe et al. (1996) reported no significant effect of clamshell dredging on the standing crop of benthic invertebrates in the Wahkiakum County Ferry Channel. They reported that benthos in slumping channel walls may have contributed to the rapid recolonization.
- Rapid recolonization (substantial recovery in 3 months) was also attributed to benthos in slumping channel walls in an estuary in South Carolina (Van Dolah et al. 1984).
- Richardson et al. (1977) reported that invertebrates recruiting from surrounding areas could facilitate recolonization.

McCabe, G.T., S.A. Hinton, and R.L. Emmett. 1996. Benthic invertebrates and sediment characteristics in Wahkiakum County Ferry Channel, Washington before and after dredging. Coastal zone estuarine studies. Northwest Fisheries Science Center, National Marine Fisheries Service, Seattle, WA.

Richardson, M.D., A.G. Carey, and W.A. Colgate. 1977. Aquatic disposal field investigations Columbia River disposal site, Oregon. Appendix C: the effects of dredged material disposal on benthic assemblages. Report to U.S. Army Corps of Engineers, Waterways Expt. Station, Vicksburg, MS.

Van Dolah, R.F., D.R. Dalder, and D.M. Knott. 1984. Effects of dredging and open-water disposal on benthic macroinvertebrates in a South Carolina estuary. Estuaries 7: 28-37.

S-65. The Final SEIS has been revised to include additional data on crabs entrained. See Exhibit K-4.

S-66. See responses to F-2 and S-57.

S-67. The full statement is, "The habitat alteration is expected to have essentially no adverse impact on crab populations in the area because the deposited material falls within the range of material that is suitable for this species and the prey they consume."

Wetlands

These comments are specific to the Draft Wetlands Mitigation Plan (June 24, 2002), Appendix 2, Volume 2, of the Draft Supplemental Integrated Feasibility Report and Environmental Impact Statement. These comments should be considered Ecology's opinion on the Project's impacts to wetlands from the upland disposal of dredged material and the mitigation of those impacts. Where appropriate, specific page numbers are provided; some comments are more general in nature and do not reference a specific statement in the Plan.

Page 8 – Please note that Ecology staff have not yet given approval that the proposed mitigation actions will compensate for impacts to wetlands resulting from this project. We have agreed that the mitigation approach (i.e., large, focused mitigation actions) and locations are appropriate, but have concerns over the proposed construction and implementation of the plan. In recent discussions with the Corps and the Ports, Ecology and WDFW agreed to drop the requirement for additional HEP analysis with the understanding that the sites in the proposed mitigation plan, including the entire area of Martin Island and Woodland Bottoms, would not be reduced based on alterations to the scope of the project.

Any ambiguity over the use of the embayment or uncertainty over the undefined 80 acres of upland must be addressed. An appropriate contingency should be identified in case the applicant is ultimately unable to fill in the 32 acre freshwater embayment on Martin Island. Final approval from Ecology will include a limit on any additional dredge material being placed on Martin Island.

S-68

Most of our remaining concerns center on the specific design elements of the proposed plan. There is no specific description of construction actions related to mitigation; e.g., the elevation, location and extent of berm construction and excavation, water control structures, other excavation and fill, and any other construction related activity or impact. The final mitigation plan must include a description of pre and post-project conditions.

No slope should be graded to steeper than 5:1 in the buffers or 10:1 in the wetlands.

Monitoring needs to be extended for a 10-year period. Five monitoring events within that period should be adequate; i.e., years 1, 3, 5, 7, 10. An as-built report will be required in addition to the follow-up monitoring.

Performance standards are not necessarily reflected in the monitoring requirements; e.g., amphibian egg masses. However, care should be taken that performance standards are reasonable and are within the influence of the applicant; e.g., using the presence of amphibian egg masses as a standard of success after five years may not be as practical as ensuring the appropriate vegetation is in place for egg attachment.

The Monitoring Plan (Table 2) needs to be combined with Table 3 so the Interim Performance Standards are linked to monitoring methods and schedules. These standards

Corps of Engineers Response

S-67 (con't). As indicated in the recolonization studies mentioned in comment S-68, any habitat impacted will quickly reestablish itself and still be useable to Dungeness crabs. Another study from the White Paper substantiates this and is listed below:

Hinton et al. (1992) found there to be an increase in benthos densities after disposal in June 1989, when measured in June 1990. Although a slight decrease in productivity was assumed to be probable during disposal and shortly after, successful recolonization occurred by June 1990.

Hinton, S.A., R.L. Emmett, and G.T. McCabe. 1992. Benthic invertebrates, demersal fishes and sediment characteristics at and adjacent to ocean dredge material Disposal Site F, offshore from the Columbia River, June 1989-1990.

S-68. The Corps convened a meeting with State and Federal resource agencies and Cowlitz County on December 2, 2002 to resolve concerns raised by the agencies and the county regarding wildlife mitigation. Specifically, the agencies and the county addressed concerns over construction and implementation of the proposed mitigation efforts at Martin Island and Woodland Bottoms, including the concerns raised by the County under its Shoreline Master Program regarding recreational use and filling of the Martin Island lagoon for wildlife mitigation purposes.

As a result of this meeting, the Corps now proposes to fill only 16 acres of the embayment for wildlife mitigation purposes. Because the Corps has reduced habitat impacts, including wetland habitat impacts, since publication of the 1999 Final IFR/EIS, a minor reduction in wetland mitigation acreage is warranted. The mitigation ratio for wetland habitat will still be greater than 12:1 after this reduction of 16 acres.

Regarding the rest of the mitigation on Martin Island, the Corps is not including the 80-acre parcel once proposed as a disposal site in the wildlife mitigation development plan.

For Woodland Bottoms, the Corps proposes to breach the levees that contain Burris Creek and allow that stream to flood over the wetland mitigation acres. This will provide for a more natural hydrologic regime for the wetland habitat, an objective of WDOE, WDFW and Cowlitz County for this location.

Regarding the specific description of construction actions related to mitigation, these would be accomplished during Plans and Specifications when the final mitigation plan will be completed. The sponsor ports have not acquired these lands to date but will be required to do so by the Corps upon their signing of the Project Cooperation Agreement, a legally binding contract.

The Corps will extend the monitoring period to 10-years after construction with five monitoring periods during that timeframe as suggested in your comment. An as-built report can also be developed and provided.

We will combine the Monitoring Plan (Table 2) with Table 3 such that the Interim Performance Standards are linked to the monitoring methods and schedule.

are more objective and may be more appropriate than some of those given in Table 1. Generally, those standards with measurable criteria (e.g., survival rates of planted material) are preferable as performance standards than those that rely on anecdotal observations (e.g., presence of nesting birds). This information is useful and should be included in the monitoring reports, but should not be considered a standard by which to measure the success of the project.

S-69. Page 32, Table 3, an interim performance standard for Martin Island is "surface water present during normal tidal cycles." This standard lacks the necessary specificity to determine if compliance has been achieved. More specific information needs to be provided in terms of the expected hydroperiod of this wetland. This and other performance standards should be presented in terms of wetland function. In other words, what is the targeted wetland function associated with this mitigation action and how will the performance standard track that function?

S-70. Page 15 - "Provide a more diverse aggregate of habitat types" is given as a design objective. This can be accomplished in part through the development of "micro habitat" features such as excavating channels and other depressions (such as behind root wads), and creating upland mounds and other undulating features. This level of design detail has not been provided, but will be required in a final mitigation plan.

S-71. Page 15 – A permanent deed restriction must be placed on the mitigation sites, in addition to title to the land. A landowner and responsible party must be identified. For example, an agreement with the WDFW which includes a permanent restriction on the use of the land as a natural area and the understanding that the habitat elements of the mitigation plan will be maintained in perpetuity. It will also be necessary to identify the responsible party for mitigation follow-up. As the applicant, the Ports will bear that responsibility unless another party is identified. That party will have the legal responsibility to fulfill the conditions of the 401 Certification regarding mitigation actions.

S-72 It is stated on page 27 that wetland functions will be assessed using Ecology's *Methods for Assessing Wetland Functions on Riverine and Depressional Wetlands in the Lowlands of Western Washington* (1999). However, there is no indication of when and for what purpose this assessment would occur. This assessment should occur as part of the baseline study, prior to mitigation action, as well as being a component of post construction monitoring; perhaps at years 5 and 10. This will present all parties with information that will be useful for this project and future mitigation proposals.

Baseline monitoring must be done as soon as possible. There are statements concerning assumptions about existing and proposed hydrology, elevation, surface contours, and vegetation communities that can not be confirmed without an understanding of existing conditions. Understanding existing conditions will provide more certainty regarding anticipated hydrologic conditions (i.e., the extent, frequency, depth, and duration of inundation) resulting from mitigation actions.

Corps of Engineers Response

S-69. The basis for our wetland mitigation element of the Wildlife Mitigation Plan was the USFWS's Habitat Evaluation Procedures (HEP) that analyzed habitat quantity and quality over time. The WDOE was a partner in the wildlife mitigation planning process. The objective for Martin Island embayment was development of intertidal marsh habitat utilizing the surveyed elevation of adjacent, existing intertidal marsh to accomplish the objective. Given the proper elevation from the adjacent intertidal marsh habitat, we will then attain a hydro-period identical to established marsh habitat. The WDOE's requirement for more specific information on expected hydro-period is, therefore, unnecessary.

S-70. WDOE's desire for development of "micro-habitat" in the Martin Island embayment can be accomplished relatively simply during site construction. The desired elements can be, and typically are, described in the final mitigation plan with design detail completed during plans and specifications.

S-71. While the sponsor port will hold the title to the property, the Corps is the applicant for 401 certification. Accordingly, the Corps will require the sponsor ports, through the Project Cooperation Agreement, to place permanent deed restrictions on mitigation property after acquiring it. Deed restrictions will ensure use of the land as a natural area and ensure that the habitat elements will be maintained in perpetuity. The Corps is coordinating with WDFW to determine if they will accept the role as the responsible party for long-term maintenance of the mitigation sites.

S-72. Your suggestion for wetland function assessment as a baseline and post-construction monitoring effort (years 5 and 10) will be implemented. Baseline monitoring to determine existing conditions will be accomplished during Plans and Specifications when the sponsor port has acquired these mitigation lands.

The Corps is aware of Ecology's concern that mitigation activities should be targeted to develop naturally functioning and self-sustaining systems. And we reiterate that the Woodland Bottoms site lies behind main flood control dikes, which makes development of a natural, and self-sustaining wetland system difficult. During the Plans and Specifications phase, the Corps will present a proposal regarding the Woodland Bottoms wetland mitigation element directed toward development of a naturally functioning, self-sustaining wetland to the extent practicable given existing conditions.

Ecology's uncertainty over the long-term commitment to funding ongoing active management of the mitigation sites is unfounded. The Corps has established that it can set up a trust fund in which a lump sum is placed to cover projected mitigation O&M costs for the project life. That information has been provided to Ecology at several interagency meetings as our preferred method to assure that the site management agency, assumed to be WDFW, will have adequate funding to manage the site.

Ecology staff has expressed significant concerns in the past over the proposed mitigation construction methods; we continue hold the view that mitigation activities should be targeted to developing a naturally functioning and self sustaining system. The use of water control devices perpetuates the need for active management which is contrary to the goal of ecosystem restoration. A healthy wetland exists in a state of dynamic equilibrium, fluctuating through periods of drought and flood, as animal and plant
S-72 populations seek out that point where they can survive and thrive. The use of water control structures prevents this natural fluctuation from occurring, holds the wetland at an artificial point in its development, and creates an ongoing need for more management. We would like to see the Corps and Ports explore construction options that avoid structures or facilities that will require regular and routine maintenance. This may be accomplished, among other methods, through a series of step pools or excavation to develop the same area of seasonal impoundment. This should help reduce costs over time as well. There is considerable uncertainty in our minds over the long-term commitment to funding ongoing active management of a mitigation site. The potential sustainability of the site with little or no active management will provide greater assurance that compliance with state water quality requirements will be met.

As stated in the mitigation plan, no planting of wetland vegetation is planned for Woodland Bottoms or the Martin Island embayment or excavated wetland. Success standards of 20% cover the first year, 40% by year 3 and 70% by year 5 are proposed. At the same time, a standard of 20% cover of invasive species has been established as a
S-73 maximum threshold. The likelihood of meeting these standards will be dependant on the hydrologic conditions that are achieved through the mitigation actions, the existing seed bank, and the opportunity for new colonizers. Understanding those possibilities will be greatly enhanced with good baseline information. Specific contingencies should be identified as appropriate responses to potential development scenarios at the mitigation sites.

The embayment at Martin Island is proposed to be capped with material excavated from upland areas on the Island. Care should be taken that potential problems with invasive plant species are not exasperated by this action. Soils placed near the perimeter of the
S-74 embayment may be at elevations that are suitable for the germination and growth of species such as Reed Canarygrass (*Phalaris arundinacea*) and Purple Loosestrife (*Lythrum salicaria*), especially if the surface is going to be exposed for extended periods due to tidal fluctuations. Soil from areas with infestations of invasive species should not be used where there is a likelihood of continued survival.

Corps of Engineers Response

S-73. The Corps believes that attainment of the proper site elevation is the key to development of intertidal marsh habitat at Martin Island. Site elevation will mimic that of immediately adjacent, existing intertidal marsh habitat, thus assuring proper hydrologic conditions. The adjacent and upstream intertidal marsh plant communities will provide sufficient plant propagules to establish a viable marsh plant community at the Martin Island lagoon mitigation site.

As discussed at the December 2002 interagency meeting, the Corps proposes to breach the levees at Woodland Bottoms that contain Burris Creek and allow that stream to flood over the wetland mitigation acres. This will provide for a more natural hydrologic regime for the wetland habitat, an objective of WDOE, WDFW and Cowlitz County for this location. The Corps believe that wetland plant seeds in the soil seed bank will provide adequate source material for marsh plant community development at Woodland Bottoms. We have implemented test plots in the Salmon Creek (Vancouver, WA) watershed that have demonstrated amply that seeds in the soil seed bank will propagate and populate these wetland development sites given exposure and water. Exhibit K-8, Part II, has been revised to include contingencies to address native and non-native wetland plant establishment in the wetland mitigation units.

S-74. The final site elevation for Martin Island embayment will be based upon the surveyed elevation of immediately adjacent intertidal marsh that occurs below the zone where reed canarygrass is observed to be established. We believe that elevation control is the critical factor regarding establishment of an intertidal marsh plant community. Reed canarygrass seeds, and those of other invasive plants, will be transported to the site by the Columbia River and wildlife that use the site. That is the simple reality of an ecosystem already compromised by these species. Regardless of what actions are taken to control/minimize invasive species, it must be recognized that they are pervasive in the ecosystem and they can be expected to occur at this mitigation site.

Sand Management and Sedimentation Issues

Introduction

In review of all the available data and literature it has become evident that the cumulative affect of human intervention has converted the Columbia River estuary from a source of sand to the littoral cell to a sink of sand that draws in and accumulates sand from the coastal zone. The proposed channel deepening project and proposed 20-yr dredged material disposal plan enhances the capacity of the estuary to function as a sink for coastal sand, thus maintaining, and likely increasing, erosion along the beaches of Washington and Oregon. Not only does this erosion cause the loss of public and private land, infrastructure and resources, the erosion also actively undermines the very stability of a fundamental federal navigation facility – the Columbia River jetties. Until there is a radical shift in dredged material disposal practices whereby dredged sand is kept within the active transport system and is managed in a way to reduce the losses of coastal sand into the estuary, the maintenance of the Columbia River navigation project will come at the cost of deterioration of these federal, state and local amenities.

S-75

The proposed dredged material management plan of extracting 3.5 to 8.75 times more sand from the river and estuarine system than can naturally be replenished by the river is contrary to the Corps own regional sediment management objectives of managing dredged material as a finite resource and restoring and maintaining coasts as balanced natural systems. The Portland District Corps position that that the lower Columbia River and estuary has an abundant supply of sand is no justification for removing huge quantities of sand from its active transport system and contributing to the net loss of sand in the coastal zone. The fact that the Columbia River valley contains an enormous volume of sand does not mean that this sand is available for transport to the coastal zone. On the contrary, the Corps own analyses suggest that the proposed project will increase the length of salinity intrusion in the navigation channel, thus decreasing the downstream transport of river sand and increasing the capacity of the estuary to accommodate sand from the coastal zone.

In summary, the proposed channel deepening project and 20-yr dredged material disposal plan exacerbates the deficit of sand supply to and within the coastal zone. The impact violates basic policies of sustaining Washington coastal resources and communities.

The Coastal Sand Deficit

The proposed project is not only a navigation channel improvement/deepening plan, but also a 20-yr dredging and dredged material disposal plan. Regardless of the channel

S-76 improvement/deepening aspect of this project, the Corps has proposed a substantial change in sediment management practices, one that removes substantially more sand from the river and estuarine system than previous practices. This proposed change in management practice conflicts with common goals of Regional Sediment Management to

Corps of Engineers Response

S-75. This comment introduces an assortment of sand management issues without consideration of the interrelationships between sedimentation processes, or the physical and temporal scales of those processes. The comment does not appear to recognize the injection of nearly 800 mcy of sand into the coastal system following construction of the MCR jetties or the coastal systems roughly 100-year reaction to that injection of sand. Coastal erosion is referred to as a problem without acknowledging that the Southwest Washington Coastal Erosion Study found that for over 100 years, the Washington shoreline for 12 miles to the north of the MCR has been prograding and accreting sand. The statement that the estuary has become a sink for coastal sand is inconsistent with evidence that indicates the estuary has been and can still be both a source and sink for coastal sand depending on seasonal weather and/or hydrologic conditions.

The bottom line concern of WDOE is that the proposed project "exacerbates the deficit of sand supply to and within the coastal zone." The Corps has recognized this concern and it is addressed in a holistic evaluation of sedimentation and sedimentation impacts in Exhibit J of the 2002 SEIS. That evaluation does not support WDOE's conclusion. Specific WDOE sedimentation concerns and the Corps' responses are presented in S-76 through S-97.

S-76. The Corps is proposing some changes in disposal practices that will place more sand in upland disposal sites. Approximately 63 mcy is forecast to be removed from the river and disposed of upland during the first 20 years of the proposed project from upstream of the estuary (CRM 40). Most of the new upland sites are upstream of CRM 75 (all are upstream of CRM 43) and many are beneficial use sites. As explained in the 1999 Final IFR/EIS, BA, and Exhibit J of the SEIS, this change in upstream disposal is not expected to alter the river's sand delivery to the estuary, downstream of CRM 40. Where dredging removes sand from the riverbed, the underlying sand is exposed to the river currents and will become part of the active sand transport system. Thus, there is no meaningful reduction in the sand supply. The timing and rate of transport of the exposed sand will vary depending on the river conditions, just as it would for the riverbed sands without dredging. Most maintenance dredging occurs in the summer when river flows are low, so transport may not occur until the winter, or even spring, when the river flow and sand transport increases. The removal of sand upstream of CRM 40 should have no impact on coastal erosion.

In the estuary (downstream of CRM 40) the proposed disposal plan is similar to past practices, except for the addition of the ecosystem restoration sites. Only 10 mcy during the first 20 years of maintenance is planned for upland disposal. About 7 mcy to be dredged from CRM 20-30 would go upland on Rice and Pillar Rock Islands. Over 2 mcy would be placed upland on Tenasillahe Island near CRM 38. The two ecosystem restoration sites, Lois Island and Miller-Pillar, will each receive approximately 6 mcy placed as in-water fill. The remainder of the dredged sand, about 30 mcy over 20 years, would be placed back in-water at flowlane and shoreline sites. During channel maintenance, nearly 10 mcy of sand dredged from CRM 5-13 will be placed in flowlane sites downstream of CRM 5, keeping the sand in the active transport zone and moving that sand closer to the MCR. This disposal plan minimizes the extraction of sand from the estuary, while meeting other important regional economic and environmental goals. Again, Exhibit J documents that there should be no significant sedimentation impacts to the estuary as a result of this disposal plan.

retain dredged material within active zones of sediment transport, and to enhance the natural functioning of coastal systems.

The Corps has claimed that the Columbia River has an unlimited sand supply and the removal of material from construction and maintenance of the navigation project will not effect the available sand supply to the coast. This claim is based on the assumption and preliminary model results that suggest there will be no significant change in tidal or fluvial hydraulics to affect a change in sediment transport. Yet the Corps BA (p. 6-57 states that "…alteration of the channel bathymetry, resulting from dredging and flowlane
S-77 disposal, has the potential to change the relative balance between the freshwater velocities and ocean tidal forces." Furthermore, the Corps FEIS states that "tidal forces have established a pattern of sediment transport within the Columbia River Estuary, which is responsible for the fact that river sediments in transport close to the bottom are inhibited in their passage to the ocean. These forces also introduce ocean sediments into the estuary throughout the length of the salinity intrusion. As a consequence, bottom sediments from the ocean as well as from the upland areas are gradually filling the estuary."

The Corps apparently misses several key points in regard to sand supply to the coast:

1. The net extraction of sand from the river and estuary through dredging disposal practices results in a decrease in the overall volume of sand in those systems. Due to
S-78 flow regulation and up-river dredging, the sand that is removed from the estuary can not be replenished by the river in the absence of a catastrophic, unmitigated event such as an extreme flood or debris flow from a volcanic eruption.

2. A decrease in sand volume in the estuary increases the accommodation space of the
S-79 estuary to accumulate sand and maintains the estuary as an effective trap for fluvial and marine sediment.

3. An enormous supply of sand in the river does not equate to any sand supply to the coast. As noted by Allan and Beaulieu (2002), "The volume of sediment contained in the Columbia River system is undeniably enormous. However, sediment available for transport remains a finite resource particularly in a fluvial system as extensively modified as the Columbia River, with its many dams and existing flow regulations. Furthermore, although the depth of sand contained in the river may be large, not all of
S-80 this material is available for transport. This is because the present fluvial system is striving to reach some form of equilibrium state, or grade elevation, that has been imposed on it over the course of the past 5 – 6000 years in response to a slowing of the post-glacial sea level rise. Thus, the bulk of the sediment contained in the Columbia River channel is essentially held in storage, and will remain so unless there is a sudden change in mean sea level, or a dramatic increase in river discharge. Furthermore, as previously noted concerns could be raised over the loss of sediments associated with channel deepening, channel maintenance, and MCR dredging, since these are the sediments that are available for transport under the present regime.

Corps of Engineers Response

S-77. The Corps' judgment that the proposed project will not significantly affect sand supply to the coast is based on our comprehensive evaluation of the Columbia River system's hydraulics and sedimentation processes. The two independent, three-dimensional hydrodynamic model studies that showed minimal impacts to estuary hydraulics provided important information, but are only part of the overall evaluation presented in the 1999 Final IFR/EIS, BA, and SEIS. In reference to the reviewer's two quotes from Corps documents; the first is simply an introductory statement recognizing the potential for change, which the BA analysis demonstrated would be negligible. The second quote is a very brief summary of processes that are described in detail in Exhibit J of the SEIS.

S-78. The Corps has acknowledged that the removal of sand from the river and estuary reduces the overall volume of sand in the riverbed. However, it is critical to place this reduction in context, as sand beds hundreds of feet thick will remain after completion of the proposed dredging. The expected reductions in riverbed sand volumes will not measurably impact sand transport in the river or estuary. In addition, the Corps' disposal plan aims to minimize sand removal from the estuary while also accomplishing other important goals, such as safe navigation and ecosystem restoration. As described in Exhibit J, changes in the Columbia River's hydrology, caused by both climate variations and flow regulation, have reduced the sand inflow from the river to the estuary to around 1 mcy/yr under current conditions, but it has not stopped.

S-79. As noted in response to comment S-76, the proposed disposal plan only removes 10 mcy from the estuary over the first 20 years of the project. That volume is approximately the same volume as would be removed from the estuary for maintenance of the 40-foot channel, without construction of the 43-foot channel. The remaining 42 mcy of disposal will be placed in-water at ecosystem restoration, shoreline, and flowlane sites. Comparing the 10 mcy of upland disposal to the Sherwood et al. (1984) estimates of the volume of accommodation space, approximately 2,000 mcy in the estuary and 3,000 mcy in the entrance (includes the MCR, Baker Bay, Youngs Bay, Desdemona Sands, and the lower reaches of the North and South channels) shows how insignificant this upland disposal volume is in the context of the estuary environment. The proposed upland disposal (extraction) is small by comparison to the accommodation space available for sand and is not likely to alter the estimated 800 to 7,700 years that it may take to fill the estuary and MCR.

WDOE's sediment comments indicate a special concern about increased accommodation space for coastal sands in the estuary. As the Corps has described in Exhibit J of the SEIS, coastal sands have been and are expected to continue accumulating in the North Channel and Desdemona Sands area downstream of CRM 15. The only removal of sands from downstream of CRM 15 is the 3 mcy that would be moved to the Lois Island restoration site during construction. This 3 mcy would come from the South Channel where sand movement is dominated by river processes so there would be no immediate impact on coastal sand accumulation in the North Channel and Desdemona Sands. In the longer term, coastal sand could eventually fill the over 400 mcy of accommodation space Sherwood et al. (1984) estimated for the North Channel and Desdemona Sands. This fill space has nothing to do with and is not affected by the project because the dynamic hydraulics in the North and South channels of the estuary function in different ways. Based on a continuation of the average fill rates for those areas from 1935-58 from Sherwood et al. (1984), it would require approximately 900 years to fill this space. If coastal sand accumulation spreads to other areas of the lower estuary, the accommodation space expands substantially to nearly 3,000 mcy. The removal of 3 mcy would not significantly alter the accommodation space available to coastal sands, now or in the foreseeable future.

S-80. See our response to the DOGAMI comment S-53.

Given many of the uncertainties in the sediment budget presented as part of the technical memorandum, and those identified as part of the Southwest Washington Coastal Erosion Study, every effort should be made to better quantify and assess the transport of sediment throughout the Columbia River system."

4. A change in hydraulics is not required to result in a greater loss of sand from the coast to the estuary. On the contrary, increasing the salinity intrusion (a Corps-stated
S-81 impact of this project) increases the distance over which littoral sand can be transported upstream as bedload, enhancing the sink capacity of the estuary for littoral sand. The overall effect of this change is to decrease the littoral availability of fluvial sand supply and increase the littoral sand supply from the coast to the estuary.

5. Regardless of the extent of additional impacts caused by the deepening project, a review of recent studies suggest that even maintaining the status quo (existing
S-82 disposal practices) would cause impacts and would need to be modified as an adaptive management measure. Because historical dredging has exceeded inflow of fluvial sand in all by six years since 1910 is no justification to continue this practice in the future.

6. The utilization of dredged sand from the Columbia River navigation project is one of the few viable options for reducing erosion in the Columbia River littoral cell and
S-83 offsetting the losses of coastal sand to the estuary caused by the construction and maintenance of this project. The key issue here is that sand removed from the estuary could and should be used to restore sand supply to the littoral cell, particularly in light of contribution of the project itself to the coastal sand deficit.

7. The Corps recent change in proposal (as described in the BA) to avoid deepwater ocean disposal of dredged sand within the first 10 years of the project by placing sand in the Lois embayment and Miller-Pillar pile dike sites is not a significant improvement in dredged material management (from a coastal erosion perspective). The use of these sites effectively removes sand from the active transport system. Moreover, the use of these sites results in extracting a large quantity of sand from the
S-84 lower estuary (some, if not most of which has been deposited from inflow from the coastal zone) and moving it upstream of Tongue Point, further upstream than even the extent of downstream fluvial bedload transport and up-river oriented bedforms found during low-flows. Therefore, the use of these sites reduces the fluvial supply of sand to the lower estuary, likely extracts sand that recently originated from the coastal zone, and increases the capacity of the lower estuary to continue to fill with sand from the coastal zone.

8. Although the Corps agrees that if the estuary were to fill to capacity, then more sand would be supplied to the coast, the Corps position that it would take a long time until
S-85 the estuary is filled is no justification to continue removing more than 3.5 times the amount of fluvial supply, enhancing the sink capacity of the estuary and the deficit of coastal sand.

Corps of Engineers Response

S-81. The Corps disagrees with the reviewer. The Corps believes hydraulic changes, from the proposed project or other sources, would be required to produce a greater loss of sand from the coast to the estuary. Sand transport processes are not the same as those for salinity transport; there must be strong currents to move sand, while salinity can diffuse in still water. The hydrodynamic modeling of low flow conditions predicted the proposed 43-foot channel would cause only slight increases in salinity intrusion in the South Channel, on the order of 1 ppt or less between CRM 10-30, and bottom velocity changes of –0.1 to 0.2 fps in the same reach. Changes of these magnitudes, limited to the South Channel under low flow conditions, are not expected to have a measurable impact on the predominately downstream sand transport through the South Channel to the MCR. Furthermore, the models predicted fundamentally no changes in salinity or velocities in the MCR, the reach that controls the movement of sand into and out of the estuary, thus there should be no change in the rates of sand transport into or out of the estuary from the 43-foot project.

S-82. The Corps cannot respond to this comment because there are no indications of what impacts or what recent studies are being referred to in the comment.

S-83. As has been explained in the 1999 Final IFR/EIS, BA, SEIS, and in responses to other WDOE comments, sand removal from the estuary has been minimized and the proposed project is not expected to impact coastal sand supplies. In particular, maintenance dredging between CRM 5-13 will dispose of sand in-water downstream of CRM 5, moving that sand closer to the coast and keeping it in the active sand transport system.

S-84. See responses to comments S-76 and S-79.

S-85. See responses to comments S-76 and S-79.

Findings of the DSEIS and Exhibit J

The draft document "Columbia River 43-ft Navigation Channel Deepening Sedimentation Impacts Analysis" (Exhibit J) prepared by Portland District Corps of Engineers, June 2002, appears to be an initial substantive attempt by the Corps of Engineers review historical changes and quantify sedimentation processes throughout the river, estuary, and coastal system. However, the report does not effectively evaluate the potential impacts of the proposed 43-ft channel deepening project. Instead, the report reviews historical data and literature to construct an interpretation of sedimentary processes in the system over the last century. Thus, while the compilation of historical information is commendable, a meaningful evaluation of project impacts is still lacking.

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The report makes many statements and draws conclusions that appear to be unsupported by the available data. For example, on page 21 of the report it states "The detailed data on riverbed volume changes, sand transport rates, and disposal placement, necessary to calculate the sand behavior in this reach does not exist. It is therefore necessary to draw conclusions about sediment processes from theory and the limited data that is available." While the engineering profession may require decision-making in the absence of complete data, an important distinction must be made when conducting an assessment of environmental impacts. In making objective and scientifically-defensible environmental assessments with insufficient data, often the best professional practice is limited to drawing hypotheses, not conclusions. When conclusions must be drawn from limited data, scientists define parameters upon which their findings are supported, similar to professional engineers who incorporate factors of safety in order that there are reasonable assurances that the safety, health, and welfare of the public are protected. This report contains many "conclusive findings" that appear to either lack the appropriate parameters upon which these findings apply and are supported, or they lack the appropriate margins of safety necessary to assure that the welfare of the public is protected. We do not agree that the available data is interpreted correctly and there is no proposed action to address the uncertainties on issues related to the sediment budget in the report.

A few major "conclusive findings" are made that warrant specific mention here:

1. The report asserts that "past dredging and channel modifications have not measurably altered sand supply or sand transport in the river or estuary". Yet, the report appropriately acknowledges that "Dredging has exceeded sand transport in all but seven years since 1910, and four of those years were prior to completion of the 35-ft channel". The tables included in the report indicate that dredging has played a major

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role in the sediment budget for most of a century. Furthermore, because sand discharge has been reduced due to flow regulation and irrigation, the influence of dredging has increased over the last 30 years. The Corps has previously stated that there will be lower future maintenance dredging levels due to the removal of the sand from the system that will reduce re-handling. This change in practice certainly constitutes a change in the sand budget, relative to the current situation. The Corps seems to ignore evidence that the net removal of sand from the system appears to be a practice that has been initiated only within the last 2 decades. Sherwood et al. (1990)

Corps of Engineers Response

S-86. The Corps disagrees with the reviewer's remark that the statements and conclusions in Exhibit J are unsupported by the available data. These analyses have been based on a wide range of available data on the Columbia River and years of professional experience with the Columbia River hydraulics and sedimentation. The 1999 Final IFR/EIS provides a complete description of existing sedimentation, including sediment transport and the navigation channel shoaling processes. The SEI workshop and the 2001 BA explain the existing system and the potential sedimentation impacts from the proposed 43-foot channel, with an emphasis on the estuary. Exhibit J of the SEIS provides a comprehensive review of sediment processes and trends in the Columbia River and estuary since the late 1800s with the emphasis on the past and potential future changes to the sediment budget. The SEI expert panel affirmed the reliability of the Corps' sedimentation analyses when they found the Corps adequately understood the physical processes of the river and estuary, including flow alterations, dredging volumes, suspended sediment and bathymetry changes.

The statement that there are no proposed actions to address uncertainties is incorrect. The Corps has proposed monitoring actions to measure predicted environmental impacts, including those for sedimentation that allow the Corps to evaluate its conclusions on an ongoing basis. Those actions are described in Table S6-5, p. 6-43, of the SEIS. The sediment related monitoring actions include three hydraulic monitoring stations in the estuary, annual reporting of dredging volumes, and main channel bathymetric surveys. The hydraulic monitoring stations are being installed to confirm the results of the hydraulic modeling that no measurable hydraulic changes are expected from the proposed 43-foot channel. Annual dredging volumes can be used to assess bedload movement and the O&M dredging forecast. The main channel bathymetric surveys are to monitor the predicted riverbed responses to the deeper navigation channel. The main channel surveys approach bank-to-bank coverage upstream of CRM 48 and will be sufficient to monitor riverbed responses along the navigation channel. The monitoring results can also be used to plan adaptive management strategies if unexpected sediment impacts are found.

A bank-to-bank bathymetric survey of the estuary was agreed to as part of the ecosystem research actions in the BA. That survey will provide the data needed to update the volume change analysis conducted by Sherwood et al. (1984) on a consistent time scale (1935, 1958, 1982 and then 2003). The need for additional bank-to-bank bathymetric surveys will depend on future research priorities. That action will be listed in Table S4-7 of the SEIS when the table is added to the text.

S-87. The Corps' did not include the sand volume changes in the riverbed in our sediment budget because neither the riverbed volumes nor the upland disposal volumes are available. This does not represent a major shortcoming since that sand was simply moved from storage in the riverbed to storage on shore. The resulting changes in the depths and shape of the river channel were outlined in Exhibit J of the SEIS. It is the Corps' expectation that placing future dredged material upland will lower the riverbed enough that bedload transport can proceed without interfering with the navigation depths and thus reduce future maintenance dredging. As the WDOE reviewer has noted in comment S-80, not all the sand in the Columbia River system is available to supply the sand transport system, much of it is held in long-term storage in the riverbed. As explained below, the available sand supply in the riverbed is actually only a surface layer directly exposed to the river's currents.

Suspended sand is picked up by the river and carried along in the water column at near the average speed of the river. The Columbia River has attained its suspended sand transport capacity before it reaches the project area. The primary sources for the suspended sand are the Columbia's riverbed between Vancouver and Bonneville Dam, and tributary streams, especially the Sandy River. The suspended transport occurs under most flow conditions with the rate dependent on the river discharge.

suggests that 49.3 - 100 Mm^3 has been disposed in upland sites since 1939. Over a period of 50 years, this amount is approximately 1.5 Mm^3/yr. Gelfenbaum *et al*. (1999) estimates that the river supply of sand during 1935-1958 was 2.6 Mm^3/yr suggesting the annual upland disposal of sand at that time was less than the annual supply.

S-87

2. The report asserts that "The project will not reduce the abundant sand supply available in the riverbed within the project area". At the same time, the Corps claims that the total sand transport is 0.4-1.0 million cubic yards per year (mcy/yr) and proposes to remove 70 mcy of sand from the Columbia River within the next 20 years, an equivalent rate of 3.5 mcy/yr. Therefore, the proposed project would remove 3.5 to 8.75 times the amount of sand transported in the river on an annual basis. This net extraction of sand from the system reduces the volume of sand in the system and increases the capacity of the estuary to trap sand, and reduces the potential sand supply to the coast.

3. The report asserts that "Deepening of the navigation channel will not alter the sand transport through the MCR nor the sediment budget of the littoral cell". Dredging at MCR and the navigation channel in the lower estuary has clearly already altered this
S-88 balance. As noted by Allan and Beaulieu (2002) "any extraction of sand adjacent to the river mouth and navigational channel does constitute a net loss of sand from the coastal system since it continues to deplete sand from an already starved coastal system." To determine the degree to which further alteration of the balance would occur requires detailed data collection, analyses and modeling studies.

4. The report asserts that "There will continue to be…a small net discharge of sand from the estuary to the MCR." This statement is not supported by the available data and contradicts other statements made in the FEIS without providing any evidence. This assertion also directly contradicts statements made by the Portland District Corps of
S-89 Engineers that the effects of dam construction and flow regulation have eliminated the supply of sand to the coast. In addition, the Corps study on sediment trend analysis (McLaren and Hill, 2001) concluded that "the results of the STA clearly show that the nearshore shelves and beaches on both sides of the Columbia river mouth are sediment starved."

5. The report states that "…past dredging and channel modifications upstream of RM 40 have not measurably altered the available sand supply or sand transport in the river." Yet the Corps provides no evidence that the effects upstream of RM 40 has ever been
S-90 adequately assessed. On the contrary, the Corps acknowledges that "…there are no bathymetric difference studies for the Columbia River upstream of RM 48." And at the same time the Corps claims that "…the riverbed upstream of RM 48 has not been a net supplier of sand to the estuary or ocean." These statements are contradictory and unsupported by available evidence.

6. The report states that "Global scale climate variations that reduced streamflows were
S-91 the primary cause of the decline in sand transport between the 1800's and 1972." As pointed out by Allan and Beaulieu (2002) "This statement completely ignores the

Corps of Engineers Response

S-87 (con't). As the suspended sand is carried through the river there is an active exchange process between the water column and the riverbed, some sand settles to the riverbed and other sand is eroded from the bed surface and enters the water column. This exchange process is referred to as dynamic equilibrium. Where the river enters the estuary, CRM 40, the suspended sand transport (the volume of sand moving in suspension) is the same as at the upstream end of the project. The sources for suspended sand exiting the river to the estuary are the riverbed upstream of Vancouver, the riverbed through the river reach, tributaries upstream of Vancouver, and tributaries in the river reach. Because the river maintains a dynamic equilibrium, suspended sand does not contribute measurably to navigation channel shoaling, and dredging and disposal do not alter suspended sand transport.

Bedload is a layer of sand a few grains thick that is rolling and bouncing along on the surface of the riverbed. Bedload moves much slower than the suspended sand because the bottom velocity is less than the river's average velocity and because of the friction between sand grains and the bed surface. Bedload transport rates also depend on flow conditions and the rate increases rapidly when river discharges exceed 300,000 cfs. Bedload sand grains move intermittently and usually only for short distances, traveling on the order of hundreds of feet per year in the Columbia River. The source for bedload is therefore the surface of the riverbed in the immediate vicinity of the transport. Bedload influences, and in turn is influenced by, the shape of the riverbed. Bedload forms the sand waves found on the surface of the Columbia's riverbed. The side-slopes of the riverbed help determine the local direction of bedload transport.

Overall, the Columbia River's bedload transport appears to be at, or at least near, dynamic equilibrium in the project area; the amount entering the river reach at CRM 106 is not discernibly different from the amount leaving at CRM 40. However, because bedload is a localized process, site-specific currents and bed topography, can simultaneously produce areas of erosion, accretion, and dynamic equilibrium across the riverbed at any given location. Bedload accretion caused by local riverbed topography is the primary cause of shoaling in the navigation channel. Most of the sand dredged from navigation shoals is in at least temporary storage; only the surface layer would be part of the bedload transport. Dredging does not alter the bedload transport because after dredging a new surface layer is exposed and it then becomes part of the bedload transport.

S-88. See responses to comments S-76 and S-79.

S-89. The Corps agrees that the referenced statement is not supported by available evidence. The direction of the small net movement of sand cannot be identified at this time.

The McLaren and Hill (2001) study provides some important information about sand transport near the MCR, but it is not a definitive study and must be considered along with the remainder of the information available. As they note in their report, not all their findings would agree with the results of other studies. Their findings of sediment starved beaches needs to be reconciled with Gelfenbaum et al. (2001) finding of sediment accumulation along both Clatsop and Long Beach and Kaminsky's (2000) finding of shoreline progradation in the same areas. McLaren and Hill (2001) also found no landward sand transport into the estuary from the MCR, a finding that is inconsistent with the results of earlier studies as described in Exhibit J of the SEIS.

S-90. The Corps finds nothing contradictory in the three statements quoted by the reviewer. Our response to comment S-87 provides additional clarification to the arguments in Exhibit J supporting the validity of the first statement. We believe the third statement is a reasonable conclusion based on the analysis presented in the text of Exhibit J preceding the statement.

role of major dam construction and the impact impoundment has had on sediment supply in the Columbia River. Dam construction commenced with the Bonneville dam in 1937, with several other dams having been constructed shortly after. To our knowledge, the effects of dams in impounding sand transported down the Columbia River has never been adequately assessed. Furthermore, the above statement ignores
S-91 the role of dredging, which has removed substantial quantities of sediment from the system. Indeed, there appears to be no comprehensive assessment of the effects of dredging on sediment supply. Finally, in a report concerned with sediment transport and sediment budgets, it is surprising that there is very little discussion of how these sediments have been disposed of historically or more recently. It is acknowledged by scientists that the removal or disruption of sediment supply form a fluvial system that supplies a coast, can have significant adverse effects on the stability of the coastal system."

Other issues:

The past removal of sand to the uplands has been underestimated. In addition to the MCR and main navigation channel projects, there were a number of navigation projects in the estuary that required dredging: Skipanon River channel, Baker Bay channel, Ilwaco, and Chinook. In addition, Mott and Lois Islands were created, the Tongue Point Seaplane base area was filled, and downtown Astoria was filled ca. 1921 after fire destroyed the original downtown (built on pilings). There are also major fills around Puget Island and Tenasillahe Island. Other fills are located near the Port of Astoria and west of Tongue Point (inside the railroad tracks). Early in the 20th Century, Longview
S-92 was also filled. Also, numerous dikes in the system contain sand that has been permanently removed from the system. Whether or not this removal of sand was associated with the Federal navigation project, these sand extractions are part of the historical record affecting the sand budget, and need to be acknowledged in a report of this nature that attempts to review the historical influences on Columbia River sedimentation.

The related potential impacts on salmon habitat need to clarified. The Corps has consistently stated that: a) most dredged material comes from re-distribution of sediment already in the system (i.e., dredging is uncorrelated with supply), and b) removal of sand from the system will eventually cause a reduction in maintenance dredging. If these arguments are correct, then this seems to require that degradation of shallow water areas is a prerequisite to reducing the supply of sand into the channel.

Measures to Reduce Impacts

The report provides no recommendations to deal with many of the uncertainties regarding
S-93 the impacts of the project on the coastal sand budget. Ecology has the following recommendations in this regard:

Corps of Engineers Response

S-90 (con't). The second statement is part of the text that acknowledges that there is not enough data to calculate an exact answer; thus, the need to present alternative hypotheses that are examined in this paragraph and the next. The analyses utilize the best available data and the Corps' understanding of river processes to reach the stated conclusion. The reviewer did not offer an alternative conclusion.

S-91. See the response to the DOGAMI comment S-39.

S-92. The Corps acknowledges that other dredging and disposal actions have occurred in the Columbia River and estuary during historic times. It was not our intent to provide a complete history of all dredging and disposal actions, but only those central to evaluating the potential sediment impacts of the proposed 43-foot federal navigation channel.

The BA goes to great lengths to evaluate the expected impacts to salmon and their habitat. The potential impacts to shallow water salmon habitat are thoroughly addressed in the BA. The conclusions of the BA have been affirmed by NOAA Fisheries in their biological opinion for this project.

1. The Corps of Engineers should propose dredge material disposal sites that keep sand in the active transport zone of the lower estuary and coastal systems with the specific objective of augmenting (rather than diminishing) the sand supply to the coastal zone. The use of new disposal sites should be monitored to assess the effectiveness of sand feeding to the littoral cell.

2. In order for the project to become consistent with Washington's CZMP, a plan is needed to eliminate or significantly reduce the loss of sand to the littoral cell to avoid coastal erosion impacts. The plan should identify specific appropriate measures by which coastal erosion is avoided, minimized and/or mitigated.

3. The Corps of Engineers should lead and financially support a partnership with states of Oregon and Washington on Regional Sediment Management. The RSM effort should include a comprehensive regional systems management plan for the conservation of sand and other coastal resources in the river, estuary and littoral zone as well as shoreline prediction models based on regional sediment budgets.

S-93

4. The Corps should commit to data collection and development of models that would assist in the study of sand transport through and within the estuary and littoral cell.

5. The Corps should work in conjunction with the Ecology and the USGS to assess the probable effects of the navigation project on estuarine and coastal shoreline configurations within the Columbia River littoral cell.

6. The Corps should also commit to mitigate, through replenishment, any sand deficit that is caused by the deepening project, including construction and maintenance.

7. The Corps should investigate other options of enhancing the sediment supply to the estuary and coast, such as releasing sediment trapped behind sediment retention structures.

The report makes no mention of any realistic monitoring plan. Bathymetry data is identified in the Corps Biological Assessment to be collected only once, and most monitoring for other purposes ends within 7 years. A monitoring effort should be designed that lasts the duration of the project, and regularly assess changes in sand transport (import, export and storage in the estuary, to the degree possible), sediment properties (e.g., texture), suspended sediment and Estuarine Turbidity Maximum (ETM) properties, salinity, temperature, and stratification.

S-94

As a prerequisite to implementing a successful monitoring program, Ecology has previously recommended that that the Corps develop a project management plan that:

1. Explicitly states project performance criteria such as avoiding a net loss of littoral sand volume by influx to the estuary. Project performance criteria are essential to enable review and evaluation of the project relative to the explicitly stated

Corps of Engineers Response

S-93. Responses are provided below for each numbered comment.

1. As described in responses to comments S-76 and S-79, the Corps has proposed a disposal plan that returns most sand dredged in the estuary back to the active transport zone. The proposed plan is similar to existing disposal practices in the estuary. The Corps has the ability to make changes to that plan if the State of Washington would be willing to obtain the environmental clearances and pay all incremental costs. The new disposal sites in the proposed disposal plan are contained upland sites upstream of CRM 43 and two ecosystem restoration in-water fill sites in the estuary. The new sites are not intended to contribute sand to the littoral system, so there is no need to monitor their effectiveness toward that goal.

2. See S-93 #1 above.

3. The Corps supports the initiation of a Regional Sediment Management (RSM) study. The scope of that study will depend on funding and regional priorities.

4. This action should be considered for inclusion in a RSM study.

5. This action should be considered for inclusion in a RSM study.

6. The Corps' analysis concludes that the proposed 43-foot channel project is unlikely to cause a sand deficit on the Washington coast. Therefore, no mitigation is necessary. Adaptive management actions will monitor and address any unexpected problem caused by the project.

7. Enhancing the sand supply to the estuary and coast is a different objective and has no relevance to assessing the potential impacts from the proposed project. The Corps has the ability to make changes to the proposed disposal plan, such as transporting riverine sands to the estuary or coast, if the State of Washington would be willing to obtain the environmental clearances and pay all incremental costs.

The Corps does not believe that releasing sand from behind retention structures would increase supply to the estuary or coast. However, it could have severe consequences for Washington citizens living downstream of the Toutle River Sediment Retention Structure, or those living or working near Columbia River shoreline fills protected by pile dikes.

Another way to enhance sand supply to the estuary and coast would be to return to the high discharge spring freshets such as those that existed in the late 1800s. The Corps does not believe this is a viable option because of the enormous impacts higher flows would have on irrigation, hydropower, and flood damages throughout the entire Columbia River Basin.

S-94. An explanation of the Corps' hydraulics and sediment monitoring plan is given in response to DOGAMI comment S-52. As discussed in that response these measures provide an effective approach to monitoring the project's performance against the expected impacts and should be used instead of the approach recommended below by WDOE.

1. This is an unreasonable performance criterion because there is not a sufficient baseline for comparison. The only estimate for sand influx to the estuary is the 0.2 mcy/yr between 1927-58 presented by the Corps in Exhibit J. This estimate was arrived at based on a mass balance of sand over the entire time period. There are no data available to give any indication of under what hydraulic conditions that sand influx occurred and whether the rate was increasing or decreasing with time.

performance criteria.

2. Identifies adaptive management responses and corrective actions for situations where project performance criteria are not achieved.

S-94

3. Commits to implementing adaptive management responses, *including corrective actions if project performance criteria are not achieved*, and

4. Institutes adaptive management measures to balance any net loss of sand resources or net loss of the productive capacity of fish and shellfish habitat.

Ecology has previously recommended a monitoring plan designed to detect and assess possible impacts due to the deepening and/or subsequent maintenance of the deepened channel. This plan included short-term data collection and monitoring to be carried out to adequately document the pre-and post-project construction phase and to determine any initial system responses to the construction phase, as well as a long-term data collection and monitoring to document project maintenance practices and determine longer term responses to both construction and maintenance activities.

The Monitoring Program should include as a minimum the following baseline data sets:

1. A baseline collection of estuary bathymetric (seafloor/riverbed) survey and topographic (inter-tidal beach/shoreline) survey information, and should be completed prior to initiation of channel deepening. These surveys and data collection shall meet or exceed the resolution of the 1958 and 1982 bathymetric surveys. The baseline survey shall cover bank-to-bank of the estuary from River Mile 3-40.

S-95

2. Sediment trend analyses and/or tracer studies of the lower Columbia River and estuary should be conducted (prior to or concurrently with project construction) within the estuary from River Mile 3-40 to determine sediment transport patterns and flux estimates.

3. Prior to project construction, controlled aerial photographs (1:24,000 scale or better resolution) should be collected of shorelines extending from 10 km north and south of the ocean coast adjacent to the MCR, and from the MCR to River Mile 40, including the north and south banks of the estuary and all island shorelines.

The Monitoring Program should include as a minimum the following monitoring activities within the first 5 years of initiation of construction:

1. Bathymetric surveys from River Mile 3-18 of the same resolution of the baseline survey should be carried out on an annual basis within the first two years after completion of construction.

Corps of Engineers Response

S-94 (con't).

1 (con't). The estimated influx may have been a continuation of the sand movement initiated by the MCR jetties or it may have been related to climate conditions during that time. Reduced river discharges may have caused a change in the relative balance between tidal and riverine forces that could cause an increase in the influx of sand from the MCR. Without knowing how those large hydraulic forces influence the sand influx, there is no way to determine the cause of any variations in sand influx that might be observed.

2. No impacts are reasonably anticipated and monitoring will occur to verify the analyses. The proposed adaptive management process would evaluate this information and respond to any unexpected project related impacts.

3. Adaptive management actions can be identified and implemented in response to unexpected project related impacts.

4. See #3 above.

S-95. Responses are provided below for each numbered comment.

1. The Corps has committed in the BA and SEIS to conduct the recommended survey.

2. As outlined in Exhibit J of the SEIS, several investigators have studied sand transport patterns in the estuary. Those studies have defined accretion and bedload transport patterns that have remained essentially unchanged since the 1930s. The Corps does not agree that expending limited federal resources to evaluate an unchanged condition is either needed or prudent.

3. The Corps' proposed monitoring plan focuses on the navigation channel where sedimentation impacts are more likely to occur. Riverbed changes are expected to start at the dredged areas and slowly migrate outward from the navigation channel. The degree of impacts is anticipated to be greatest in the navigation channel and to diminish with distance away from the channel. The Corps' channel surveys will measure these changes as they occur and will be able to identify any unexpected riverbed changes. No shoreline changes are expected along the coast. In the estuary, the proposed project is not expected to cause erosion of the estuary mainland or island shorelines, except at a few sandy beach areas immediately adjacent to the navigation channel, such as the Miller Sands and Skamokawa shoreline disposal sites. Controlled aerial photographs of such a large area of the coast and estuary, where no potential impacts have been identified or are expected, is not an appropriate expenditure for this project.

1. The Corps has committed to continue annual bathymetric surveys of the riverbed adjacent to the navigation channel. Those surveys typically extend out to shallow water and should be adequate to identify any unexpected estuary responses to the proposed 43-foot channel as explained in response to S-56. We do not believe surveys of shallow water areas further away from the channel are justified at this time because adjustments from deepening are likely to first occur near the channel. If unexpected impacts are observed along the navigation channel, an expanded survey area could be considered as part of an adaptive management action.

2. Beach profiles shall be surveyed at 1 km increments along the beaches 10 km north and south of the MCR on an annual basis for the first 10 years of the project.

3. During year 5 of the project, a bathymetric survey from River Mile 3-18 of identical resolution of the baseline survey should be performed.

S-95

4. During year 5 of the project, controlled aerial photography (1:24,000 scale or better resolution) should be collected of shorelines extending from 10 km north and south of the ocean coast adjacent to the MCR, and from the MCR to River Mile 18, including the north and south banks of the estuary and all island shorelines.

5. Within six months of completion of the above activities, reports should be generated including the results of the bathymetric surveys, aerial photographs, volumes of construction and maintenance dredging in the channel, and available information on river flow and sediment transport.

The Monitoring Program should include as a minimum the following long term monitoring activities within the following 15 years of initiation of construction:

1. Continue the collection of beach profiles at 1 km increments along the beaches 10 km north and south of the MCR on an annual basis for years 5-10 of the project.

S-96

2. A bank-to-bank upper estuary bathymetry survey between RM 18-40 of identical resolution to the baseline survey shall be conducted at year 10 of the project.

3. A bank-to-bank estuary bathymetry survey between RM 3-40 of identical resolution to the baseline survey shall be conducted at year 20 of the project.

4. During year 20 of the project, controlled aerial photography (1:24,000 scale or better resolution) should be collected of shorelines extending from 10 km north and south of the ocean coast adjacent to the MCR, and from the MCR to River Mile 18, including the north and south banks of the estuary and all island shorelines.

Summary of Environmental Impact

The proposed project contributes to the deficit of sand in the Columbia River littoral cell. Columbia River sand is needed to maintain the beaches between Point Grenville, Washington and Tillamook Head, Oregon. Due to human intervention, predominately associated with construction of dams, jetties and navigation channels, and dredging

S-97 disposal practices, the natural supply of Columbia River sand appears to have been effectively diminished to the point that the estuary has become a net sink (as opposed to a source) of sand for the littoral cell. The proposed project exacerbates this problem by removing sand from the system via both upland disposal and other in-water sites that remove sand from active transport in the river and estuary. The amount of sand removed greatly exceeds the amount of sand that can enter the river, estuarine and coastal system from the tributaries and upland drainage basin.

Corps of Engineers Response

S-95 (con't).

2. No potential impacts to coastal beaches have been identified; therefore there is no justification for conducting beach profile surveys as part of this project. As noted by Kaminsky (2000) it is difficult to determine if the prograding shorelines of the Columbia River littoral cell are approaching equilibrium following the perturbation caused by the MCR jetty construction, or if reduced sand supply from the Columbia River, climate changes, and/or sea-level rise are influencing shoreline behavior. If the influences of those very large-scale physical factors cannot be determined, any shoreline impacts from the insignificantly small changes that the proposed project might unexpectedly cause in littoral sand supply would not be discernable from the proposed beach profile surveys and aerial photography.

3. See #1 immediately above.

4. See #3 immediately above.

5. The Corps will report our monitoring results as stated in the SEIS.

S-96. Future monitoring for the project should be designed in response to any observed impacts as part of the adaptive management program. If no unexpected impacts are found in the first few years, there would be no reason to continue for 20 years.

S-97. WDOE's comment does not define the physical or temporal scales of coastal processes or the impacts they are claiming the proposed project may produce. When WDOE refers to a "sand deficit" in the littoral cell, it is unclear if they are referring to less sand being supplied from the river than occurred over the past 10,000 years or in the late 1800s, or the 270 mcy loss of sand from the Clatsop Plain inner shelf and offshore areas, or the dissipation of the sand supplied by the construction of the MCR jetties. As explained in Exhibit J, results from the Southwest Washington Coastal Erosion Study found the shorelines of Long Beach on the Washington coast are accreting and prograding. WDOE's reference to a "sand deficit" is inconsistent with the observed accretion.

In referring to reduced sand yield from the river, WDOE cites dams, MCR jetties, navigation channels, and dredging and disposal practices, and chose to ignore the effects of climate changes over both historic and geologic time scales. The Corps and others have documented a reduction in sand transport because of flow regulation by dams. But rather than reduce sand to the coast, the MCR jetties injected 800 mcy of sand into the littoral system. On the other hand, no one has been able to identify a single effect to the coast from nearly 100 years of navigation channels, and the associated dredging and disposal practices in the river. Yet WDOE claims the proposed 3-foot deepening "will exacerbate this problem".

Sand is a critical and declining resource to the beaches of southwest Washington and, to the maximum extent practicable, all dredged sand should be kept within the river, estuary, and littoral system. Sand dredged from the river navigation channel should be disposed of at in-water sites or at beach nourishment sites to avoid the net removal of river and littoral sand. All sand dredged from the estuary and the mouth of the Columbia River (MCR) should be disposed of in ways that mitigate for sand deficits attributable to flow regulation and the erosion effects attributable to the net removal of littoral sand via other dredging practices. All riverine and ocean disposal should be conducted in a manner that avoids, or minimizes and mitigates for biological impacts as well as coastal erosion.

S-97

Ecology has previously determined that the impact to sand movement and availability from the proposed dredging and disposal is not consistent with the requirements or intent of the Shoreline Management Act and our State's Coastal Zone Management Program. There has been a severe lack of progress on these issues since that original determination. Although deepening of the Columbia River can be an acceptable form of development, the project proposal does not adequately define impacts to sand movement and availability within the Columbia River littoral cell, the result of these impacts to coastal communities and shorelines of the state, nor does the proposal provide for mitigation of the proposal's impact to sand related resources. The Corps of Engineers must work with state, local, and federal agencies to resolve regional sediment management issues, with a specific goal of keeping the dredged sand in the littoral system by disposing of dredged sand in the river or along the coast shallower than 60 feet.

References

Allan, J., and J. Beaulieu, 2002. RE: Sediment transport technical memorandum, letter to Ms. Laura Hicks dated June 26, 2220, 9 p.

Gelfenbaum, G., C.R. Sherwood, C.D. Peterson, G.M. Kaminsky, M.C. Buijsman, D.C. Twichell, P. Ruggiero, A.E. Gibbs and C. Reed, 1999. The Columbia River cell: A sediment budget overview: Proceedings of Coastal Sediments '99, Hauppauge, Long Island, New York, American Society of Civil Engineers: 1660-1675.

McLaren, P. and S. Hill, 2001. A sediment trend analysis (STA®) and an acoustic bottom classification (ABC) in the mouth of the Columbia River: Implications to dredge disposal operations and coastal erosion: Geosea® Consulting (Canada) Ltd, Brentwood Bay, BC, Canada: 20.

Sherwood, C.R., D.A. Jay, R.B. Harvey, P. Hamilton and C.A. Simenstad, 1990. Historical changes in the Columbia River Estuary: Progress in Oceanography, 25: 299-352.

Corps of Engineers Response

S-97 (con't). In the estuary (downstream of CRM 40) the proposed disposal plan is similar to past practices, except for the addition of the ecosystem restoration sites. Only 10 mcy during the first 20 years of maintenance is planned for upland disposal. About 7 mcy to be dredged from CRM 20-30 would go upland on Rice and Pillar Rock islands. Over 2 mcy would be placed upland on Tenasillahe Island. The two ecosystem restoration sites, Lois Island and Miller-Pillar, will each receive approximately 6 mcy placed as in-water fill. The remainder of the dredged sand, about 30 mcy over 20 years, would be placed back in-water at flowlane and shoreline sites. During channel maintenance, nearly 10 mcy of sand dredged from CRM 5-13 will be placed in flowlane sites downstream of CRM 5, keeping the sand in the active transport zone and moving that sand closer to the MCR. This disposal plan minimizes the extraction of sand from the estuary, while meeting other important regional economic and environmental goals. Again, Exhibit J documents that there should be no significant sedimentation impacts to the estuary or coast as a result of this disposal plan.

As WDOE is aware, the Corps and USEPA have been working very closely with local, state, and federal interests since 1995 to identify an acceptable disposal plan. The Corps believes that the disposal plans for the river and estuary satisfy a broad range of factors and interests such as beneficial use of dredged material, regional ecosystem goals, minimization of project impacts to fish and wildlife (including endangered species), safe navigation, and also avoid impacts to the littoral sand supply. Under the latest disposal plan if the ecosystem restoration features at Lois Island embayment and Miller-Pillar are fully implemented, ocean disposal of river or estuary sands is not necessary during construction and the first 20 years of maintenance of the proposed channel improvement project.

Since 1993, the Federal Government has proposed a variety of ocean disposal options, for both the channel improvements and the MCR projects, including disposal in coastal waters less than 60 feet deep to keep sand in the littoral drift. Much of that history is documented in the 1999 Final IFR/EIS, Appendix H. The position of the Federal Government with regard to the ocean disposal element remains unaltered (see response to F-2). It is expected that the Shallow Water and Deep Water Sites will be designated by the USEPA in 2003, and that the primary user would be the Corps' MCR project. Both the USEPA and Corps have policies encouraging beneficial use of dredged material. If alternate uses of dredged material are identified and found compliant with federal laws and regulations, including considerations of cost, then such alternatives likely would have priority over ocean disposal. The Corps has the ability to take advantage of nearshore or beach placement options if the State of Washington would be willing to obtain the environmental clearances and pay all incremental costs.

Shoreline and Coastal Zone Management

The following are comment on the technical memorandum titled: "Consistency with Local Shoreline Master Programs".

Many of these comments were provided verbally in discussions held with local governments, Port sponsors and Pacific International Engineering. We are reiterating those comments which are most substantive.

1. Page 2, Section 3, 2nd paragraph and Page 3, Section 3.1.1, first paragraph. Shoreline jurisdiction is not limited to "within 200 feet of the shoreline". Most counties include the extent of the 100 year floodplain in shoreline jurisdiction. This could be clarified by saying "all Project elements occurring within shoreline jurisdiction".

2. Page 3, Section 3.1.1, last paragraph indicates evaluation will be "in the following order:" but then moves on to Section 3.1.2. Either delete this paragraph or provide the outline.

S-98

3. Page 3, Section 3.1 should also include a discussion of Conditional Use Permit criteria.

4. Page 5, Upland Dredged Material Disposal – the location of the disposal sites is mixed up. Fazio and adjacent to Fazio are in Clark County. The three new sites listed are not associated with any jurisdiction. Is this an all-inclusive list of disposal sites proposed within the State of Washington? If not it should be made clear. It might be more helpful to refer to a table listing all sites proposed for construction and maintenance, particularly since the next paragraph discusses a maintenance-only site.

5. Page 5, Restoration Activities. This paragraph should clearly identify which activities will occur within Washington State and which are located in Oregon.

6. Page 6, Section 4.1.2 (1). It is difficult to assess whether the proposed ecosystem restoration activities will be consistent with local shoreline master programs (SMPs) and the Shorelines of Statewide Significance (SSWS) Criteria because there is minimal information on how these restorations will be accomplished. In general, not all "restoration projects" are appropriate nor are they all automatically consistent with the Shoreline Management Act and the underlying SMPs. It is dependent on the activities required in order to accomplish the restoration.

7. Page 6, 3rd paragraph. Please cite sources of data used here and elsewhere within the body of the consistency analysis, and in all the Technical Memoranda for that matter. Don't assume the reader is well versed in the entire project and in all the various reports.

8. Page 9, Section 4.1.3 (2) – Ecology disagrees with the statement that dredging is a normal public use of the shoreline. In general, we consider normal public uses to include navigation, fishing, recreation, and other traditional uses (see Volume 1, Shoreline

Corps of Engineers Response

S-98. Comment noted. The Final SEIS, Exhibits E, F and K-9 have been revised.

Administrator's Manual, Shoreline Management Guidebook, Second Edition 1994). While dredging may facilitate navigation for those ships with deep drafts, it is not a normal public use.

Wahkiakum County

9. Page 11, Section 4.2.2, 2nd and 3rd paragraphs – The fact that the Department of Ecology issued Coastal Zone Consistency determinations for the maintenance dredging project is not a justification, nor
does it determine coastal consistency for the proposed construction of a 43-foot channel. These statements should be deleted.

10. Pages 11-13 list the proposed disposal sites within Wahkiakum County. All disposal sites need to obtain the appropriate shoreline permit(s) from the County prior to use (whether for construction or maintenance) for this project. This includes those sites which have been or are being used for maintenance of the existing channel if work (temporary or permanent) within shoreline jurisdiction meets the definition of substantial development. This commitment, which has been made verbally by the sponsor Ports, should be stated in writing.

S-99

11. Page 14 Mining/Mineral Extraction – Ecology disagrees with the statement that the resale of dredged materials does not constitute mining because it does not naturally occur at the site. In fact, the material is removed from the river in close proximity to the location at which it is then resold (removal for economic use of sands from a bed beneath an aquatic area). Presumably some quantity of material, over and above that necessary for the beach nourishment is placed on the site to allow for the resale to occur.
12. Page 14 Commercial (Sand Resale) Activities – Ecology disagrees with the statement that because the resale of sand is promoted by a public agency it does not qualify as a commercial activity in the SMP. In fact, the stockpiling of material for the purposes of commercial resale requires a current, valid shoreline permit.

13. Page 16 Section 4.2.5.2.1 (1)(c) –Only dredging associated with restoration activities occurring within Wahkiakum County should be cited here. In fact, most of this paragraph should be stricken as much of what is stated is not applicable. The dredging is to deepen the navigation channel, not for restoration purposes.

14. Page 17 Section 4.2.5.2.1 (3)—The written analysis fails to address the biological productivity issue.

15. Page 17 Section 4.2.5.2.1 (4) – The project should comply with this requirement, and in addition, there must be a written commitment by the sponsors to obtain all applicable shoreline permits for all activities within shoreline jurisdiction associated with the disposal of dredged material. The Corps must acknowledge that sites will not be used until such time as all appropriate shoreline permits have been obtained for all activities within shoreline jurisdiction associated with the disposal of dredged material.

S-99. Comment noted. The Final SEIS, Exhibits E, F and K-9 have been revised.

16. Page 17 Section 4.2.5.2.1 (6)—Adverse effects are not limited to impacts to salmonids or crabs. Please address project related impacts to water quality, aquatic vegetation, other wildlife, and other shoreline resources including upland impacts.
17. Page 17 Section 4.2.5.2.1—Regulation #7 was omitted. This is the regulation that states "New project dredging in Conservation aquatic areas shall be limited to shallow draft navigation or access channels." This regulation should be included and discussed in this evaluation.

18. Page 17 Section 4.2.5.2.2 (1)—This is another area, of a number in the document, where the analysis is limited to salmonids and other in-water species. In fact, the Shoreline Management Act and the SMP are much broader in scope. The response needs to be much more comprehensive in terms of the overall ecological systems and natural resources of the Columbia River. This comment applies to all areas as appropriate.

S-99

19. Pages 18-19 Section 4.2.5.3.1 (1)—The CREST Dredged Material Disposal Plan (DMDP) is referenced. Confirmation of the appropriate version of the DMDP is necessary.

20. Page 21 Section 4.2.5.3.1 (9) (a)—The analysis is not responsive to the stated regulation.

21. Page 22 Section 4.2.5.3.1 (12) (a)—While the disposal site itself is located outside shoreline jurisdiction the pipes to get the material to the site are not.

22. Page 23 Section 4.2.5.3.1 (14)—There is no response to this regulation included in the analysis.

23. Page 24 Section 4.2.5.4.1 (4)—Resale stockpile locations need to be shown on the site plans submitted in the shoreline permit application necessary to continue this activity at this location.

24. Page 25 Section 4.2.5.5.1—In order to be consistent this site must have a valid shoreline permit in place authorizing the placement of materials for the purpose of resale.

Pacific County

25. Page 32 Section 4.3.4 (12)(c)—In order to issue a CZM determination for this project, which includes the use of the Deepwater Ocean Disposal site, impacts will have

S-100

to be assessed. Ecology disagrees with the proposition that because potential use is in the future, any impact is remote and speculative. If this site is to be included in our CZM determination, a more definitive answer regarding impacts, or lack of impacts, is necessary.

Corps of Engineers Response

S-100. The 1999 Final IFR/EIS analyzes impacts at the Deep Water Site. Additional information regarding this site is included in the Final SEIS.

Corps of Engineers Response

Clark County

S-101

26. Pages 36-44 Section 4.4—Clark County is not included in Washington's Coastal Zone. However there must be a written commitment by the local sponsors to obtain the applicable shoreline permits. These permits are required for all activities within shoreline jurisdiction associated with the disposal of dredged material. Upland sites can not be used for dredge material disposal (construction or maintenance) until such time as all appropriate shoreline permits have been obtained for all activities within shoreline jurisdiction.

S-101. Comment noted. The Final SEIS, Exhibits E, F and K-9 have been revised.

Cowlitz County

S-102

27. Pages 45-62 Section 4.5—Cowlitz County is not included in Washington's Coastal Zone. However there must be a written commitment by the local sponsors to obtain the applicable shoreline permits. These permits are required for all activities within shoreline jurisdiction associated with the disposal of dredged material. Upland sites can not be used for dredge material disposal (construction or maintenance) until such time as all appropriate shoreline permits have been obtained for all activities within shoreline jurisdiction.

S-102. Comment noted. The Final SEIS, Exhibits E, F and K-9 have been revised.

28. Page 48 Martin Island and Woodland Bottoms mitigation sites—Both mitigation sites are located within shoreline jurisdiction. Development of these mitigation sites requires all appropriate shoreline permits. Development of mitigation sites for impacts associated with a project are not considered an exempt activity under the Shoreline Management Act.

29. Page 48 Martin Island—The placement of dredge spoils within the 34-acre embayment is proposed in order to create wetland/intertidal marsh. However this mitigation proposal will likely have adverse impacts to an existing recreational use of waters of the state. There has been no discussion regarding the potential impact to this existing use by boaters nor is there any proposal to avoid, minimize or mitigate for this impact. This needs to be addressed.

30. Page 61 Public Access—See comment above.

City of Vancouver

S-103

31. Pages 73-74 Policy 81, Regulation 245—The Vancouver Shoreline Master Program has a strict prohibition on speculative landfill. In light of the Port of Vancouver's long range development plan for the Gateway parcels, including Parcel 3, it must be clearly stated in the shoreline permit that the proposed site is dedicated to dredge disposal during the life of the project. Any alternative use of the site will required additional shoreline permitting.

S-103. Comment noted. The Final SEIS, Exhibits E, F and K-9 have been revised.

Other Comments

S-104 The DSEIS should note all the federal, state, and local permits, approvals, and licenses necessary to accomplish the project. This includes disposal sites as well.

[end of Ecology comments on the Columbia River Deepening DSEIS]

Corps of Engineers Response

S-104. Comment noted. The Final SEIS, Exhibits E, F and K-9 have been revised.

State of Washington
Department of Fish and Wildlife
2108 Grand Blvd. Vancouver WA 98661 (360) 696-6211

September 12, 2002

U.S. Army Corps of Engineers, Portland District
ATTN: Robert Willis, Chief, Environmental Resources Branch
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Port of Longview
ATTN: Judy Grigg
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Longview, WA 98632-7739

Subject: Draft Supplemental Integrated Feasibility Report and Environmental Impact Statement for the Columbia River Channel Improvement Project

Dear Mr. Willis and Ms. Grigg:

S-105 The Washington State Department of Fish and Wildlife (WDFW) has reviewed the *Draft Supplemental Integrated Feasibility Report (IFR) and Environmental Impact Statement (EIS)* for the Columbia River Channel Improvement Project. These reports document changes in the channel improvement project that have resulted from consultation under the federal Endangered Species Act, and also contain supplemental information requested by the States of Washington and Oregon in relation to the Coastal Zone Management Act, the Clean Water Act, and the State Environmental Policy Act (SEPA). Specific information is provided that documents the updated disposal plan; the updated resource information on smelt, white sturgeon, fish stranding, Dungeness crab and sediment transport; and the ecosystem restoration features intended to restore habitat conditions on the Lower Columbia River. WDFW appreciates and recognizes the applicant's efforts toward addressing many of the concerns raised by WDFW and the other resource agencies.

WDFW offers the following comments pertaining to the proposed modifications to the channel improvement project. These comments should be considered as supplemental to our previous comments, and are intended to reflect project modifications related to the above-referenced issues. WDFW may provide additional comments as the environmental review process progresses.

Corps of Engineers Response

S-105. Comment noted.

Corps of Engineers Response

WILDLIFE AND WETLAND MITIGATION

Wildlife mitigation for the channel improvement project addresses disposal impacts associated with upland habitats (including agricultural lands), riparian forest habitats, and wetland habitats. The wildlife mitigation plan relied heavily on the Habitat Evaluation Procedures (HEP) methodology to assess project-related wildlife impacts and mitigation attainment levels. An interagency mitigation team (WDFW, Oregon Department of Fish and Wildlife, Washington Department of Ecology, Corps of Engineers, and U.S. Fish and Wildlife Service) was formed to assist with the HEP process and determine mitigation levels. As noted in our previous correspondence (January 25, 1999 letter), because of inconsistencies and inaccuracies in the HEP process, resources agencies recommended reanalysis of the HEP data, or that the mitigation efforts be expanded to provide a "full mitigation" plan that ensures habitat impacts are adequately addressed. The Corps of Engineers opted to complete the HEP analysis in accordance with resource agency recommendations, and formed an agency workgroup to assist with resolution of the mitigation issues.

S-106

The supplemental IFR/EIS indicates that disposal of dredged material would adversely affect approximately 171.4 acres of agricultural land, 50 acres of riparian woodlands, and 15.4 acres of wetlands. These acreages represent a substantial reduction in habitat impacts over the previous proposal, largely because of the following changes :

- Reduction in impacts to riparian forest from 67 acres to 50 acres due to reduced disposal at Lord Island (O-63.5).
- Reduction in impacts to agricultural land from 200.4 acres to 171.4 acres due to reduced disposal at the Gateway site (W-101).
- Reduction in impacts to wetlands from 20.4 to 15.4 acres due to reduction in the Mr. Solo disposal site resulting from mapping corrections.

The agreed upon strategy for mitigating disposal site impacts is to develop and/or restore large, contiguous and functional blocks of wildlife habitat. Instead of replacement in-kind for habitats impacted, emphasis was placed on mitigation actions directed toward the development of wetland and riparian forest. In Washington, mitigation actions would take place on approximately 378 acres at Martin Island (W-80), and 284 acres at Woodland bottoms, near the City of Woodland. Mitigation in Oregon would take place on the Webb site, a 190-acre parcel situated near Westport.

Riparian habitat restoration includes the development and restoration of 212 acres of riparian habitat, or 4.4 times the impact acreage. Wetland habitat mitigation would include restoration
S-107 and development of 209 acres of wetland habitat, which is over 10 times the acreage impacted. As noted during the August 30, 2002 workgroup meeting in Longview, given the reductions in impact acreage, WDFW concurs that the current wildlife mitigation proposal would adequately mitigate for disposal impacts, subject to the following:

S-106. Comment noted.

S-107. The preliminary mitigation agreement (Corps, WDFW and WDOE) was discussed with the attending members of the interagency wildlife mitigation team (WDOE, USFWS, and the Corps) in a December 2002 meeting. The results from that meeting are discussed in response S-68 and in the Final SEIS, Exhibits K-5 and K-8. The Corps is confident that the wildlife mitigation plan, as revised, is more than adequate.

Corps of Engineers Response

- The acreage of the Martin Island and Woodland Bottom mitigation sites is not reduced based on alterations to the project scope. All of Martin Island is secured for wildlife mitigation, including the 79.55 acre pasture at the upstream end of the Island (Figure 9, July 2002 Draft Supplemental IFR/EIS). No dredged material disposal should take place on Martin Island, with the exception of placement to create emergent marsh habitat within the Island embayment (approximately 34 acres).

S-107

- Mitigation plan deficiencies are adequately addressed, as discussed on Page 11 and 12 of WDFW's January 25, 1999 Integrated Feasibility Report and EIS comment letter, and the Washington State Department of Ecology's June 25, 2002 comments on the draft *Wildlife and Wetland Mitigation Technical Memorandum*.

If commitments are provided to secure the wildlife mitigation sites, and the above-referenced deficiencies are addressed, WDFW believes it would not be necessary to complete the HEP analysis as originally recommended.

WHITE STURGEON

Disposal of dredged material is proposed at three flowlane sites that are known to support white sturgeon. WDFW's primary concerns relating to disposal impacts include both direct loss of sturgeon, and losses of food resources upon which sturgeon depend. Flowlane disposal has the potential to bury sturgeon that are not capable of avoiding the material, and may also cover benthic invertebrates or other organic material that sturgeon use as a food supply. Loss of this food supply may reduce the long-term value of these areas as feeding and rearing areas for sturgeon.

In response to concerns raised by WDFW, ODFW, and the U.S. Fish and Wildlife Service, the Corps of Engineers agreed to fund studies to determine sturgeon abundance and distribution in the deeper areas of the lower Columbia River, and their feeding habitats and behavior in these deeper areas by using an acoustic telemetry study. Specific objectives of the studies include identifying potential impacts of disposal activities, as well as determination of mitigation measures for addressing impacts.

S-108

Studies on disposal impacts to white sturgeon are incomplete, and the degree to which sturgeon rely upon deep-water disposal sites, or whether these sites are important food producing or rearing areas for sturgeon, is largely unknown. Study results to date, however, do verify that white sturgeon are present at all three potential flowlane disposal sites sampled.

The draft supplemental IFR/EIS indicates that if after all the studies are completed, it is concluded that deep-water disposal would adversely impact sturgeon, then measures to avoid or minimize impacts would be implemented. However, given the aggressive permitting timeline being pursued, studies will not be completed prior to the necessary permitting decisions. The

S-108. Comment noted. Based on discussions with WDFW and other resource agencies, the Final SEIS includes a sturgeon mitigation plan. See Exhibit K-1.

Corps of Engineers Response

State agencies' ability to secure adequate mitigation once permits are issued will be seriously compromised, and irretrievable resource losses could result.

In previous discussions and correspondence, WDFW requested that the COE and project sponsors prepare a mitigation strategy that identifies, 1) potential adverse impacts to sturgeon based on various study outcomes, and 2) specific mitigation measures to address these impacts
S-109 (e.g., no-net-loss of fish life and productive habitat). This approach would provide the regulatory agencies with more certainty that impacts would be adequately mitigated. However, this has not yet been done. A mitigation strategy identifying how sturgeon and sturgeon habitat impacts will be adequately and fully mitigated should be included in the final SEIS.

S-109. The Corps concurs. A mitigation strategy for sturgeon has been developed and is incorporated in the Final SEIS. The Corps waited to develop the strategy until some of the preliminary results from the sturgeon tagging study were available.

SMELT

Primary agency concerns regarding potential adverse impacts to smelt (eulachon) from the channel deepening project include disposal in spawning areas, direct dredging in spawning areas, and sedimentation. In response to agency concerns, studies were undertaken to provide additional information on smelt. The main objectives of the study were to: (1) determine the presence or absence of smelt egg deposition areas in the navigation channel to assess the importance of channel spawning areas to the overall production of smelt; (2) determine distribution and abundance of larval migrants within and adjacent to the navigation channel to assess the potential for entrainment during dredging operations; and (3) determine if any measures were necessary to minimize the potential effects of dredging to the overall smelt population. These studies were funded by COE and were conducted by WDFW and ODFW staff.

S-110

The following assessments of the potential impacts of channel deepening operations on smelt were based on the results of the field studies:

- Given the large numbers of larvae and their distribution across the river channel and through the water column, and the relatively small areas within which dredging will occur as a percentage of this total, it is unlikely that dredging associated with channel deepening would have a significant impact (through entrainment) on the outmigrating larval population

- Dredging associated with the Channel Improvement Project is unlikely to directly impact smelt spawning areas because the dynamic nature of the bottom within reaches to be dredged would not provide a stable enough substrate that would allow an adhesive smelt egg to incubate for 30 days.

- Smelt eggs incubating in near-shore areas in the proximity of dredging activities may be affected if these activities alter flow patterns or increase sedimentation. However, Hydraulic models indicate dredging will not significantly alter the river's flow patterns.

WDFW concurs with the key study findings. These studies indicate that dredging activities are not expected to adversely affect smelt populations through entrainment, disturbance to spawning

S-110. Comments noted. The study results from the ODFW/WDFW are included in the Final SEIS in Exhibit K-2.

areas, or loss of incubating eggs. Disposal is generally not a concern since in-water disposal sites are downstream of important smelt spawning areas. These reports also suggest that timing or equipment limitations are not necessary to reduce adverse impacts to smelt populations.

FISH STRANDING

The Draft SEIS technical memorandum on fish stranding concludes that the project "is not expected to produce either a direct or an indirect effect on stranding of young salmonids". This conclusion is based largely on the Sustainable Ecosystems Institute (SEI) analysis of the stranding issue, which indicated that little, if any, change in ship wave size is expected to occur from the project. This analysis predicted that the blockage ratio of a 43-foot draft vessel in a deepened channel would only be 1% to 5% higher than that of a 40-foot draft vessel in a 40-foot channel. For smaller ships, a 1% to 5% decrease in blockage ratio was predicted. The report concluded that while 43-foot vessels may generate slightly larger wakes than now occur, this would be offset by most ships producing smaller wakes, resulting in negligible impacts overall. The Biological Assessment (BA) and technical memorandum also reference a 1992-93 NMFS study that concluded fish stranding is not a significant problem.

S-111

The conclusion that increased stranding from larger ships would be offset by decreased stranding from smaller vessels seems to be based on the assumption that stranding rates are approximately equal for these two types of vessels. However, observations by the Washington Department of Fisheries (Bauersfeld, 1977) suggest that most stranding results from large, rather than small, vessels. Bauersfeld found that small boats, such as pleasure craft and tugboats, did not strand fish. Larger ships, on the other hand, produced large waves and extensive uprush that usually resulted in juvenile fish stranding. Stranding rates for ships with a draft greater than 25 feet were also found to be 6 times greater than ships with a lesser draft. These observations suggest that stranding from smaller vessels is currently not a significant problem. Any reduction in wake from smaller vessels may therefore not contribute to reduced fish stranding, and would not offset the anticipated increase in stranding from larger vessels. The proposed channel deepening would likely result in a net increase in juvenile stranding from increased shipwake.

The technical memo references a NMFS study (Hinton and Emmett, 1994) that suggests fish stranding is currently not a significant problem. A WDFW review of the NMFS study identified significant problems with the sampling methodology (e.g., site selection, lack of night
S-112 monitoring, etc.) that make results unreliable at best. In particular, the absence of monitoring during the night, which is the time period during which most stranding occurs (Bauersfeld, 1977), would suggest that the 1994 NMFS data does not accurately reflect the scope of stranding impacts.

A second study referenced in the memo, conducted by the Washington Department of Fisheries (Bauersfeld, 1977), demonstrated that significant stranding and mortality results from large
S-113 vessel shipwake. During this study, WDF estimated that over 150,000 juvenile salmonids, mostly Chinook, were stranded on five sites that were monitored. Extrapolation of study results to the remainder Columbia River would suggest that, potentially, millions of juvenile fish are currently being stranded every year. These impacts remain unmitigated. Given the potential

Corps of Engineers Response

S-111 to S-115. Comments on stranding noted. Though we disagree with your analysis that there will be a net increase in stranding with the channel improvement project, we have agreed to fund a research program to further identify the causes of stranding and monitor stranding levels after the project is completed. A pilot study on stranding was conducted at three sites during both day and nighttime periods in 2002. The study results are included in the final report that has recently been provided to your agency. An interagency team is developing the scope of the studies planned for implementation next year. It is anticipated that your agency will continue to be involved with this process. The Corps also concurs with the concept of developing a mitigation strategy as prescribed by the terms and conditions of the Biological Opinion (cited below) for potential fish stranding impacts. This strategy has been incorporated into the Final SEIS. The Corps has also previously explained that the Project includes a number of restoration measures that will restore lost functions and values. These project components include tide gate retrofits, circulation enhancement, and habitat restoration. The project as a whole (navigation and restoration) increases the productive capacity of the Columbia River and does not cause a net-loss in productive capacity as suggested by the comment.

Include language from terms and conditions:

a. The Corps shall minimize effects from stranding through the following actions:

i. Develop and implement a stranding study to be developed in conjunction with NOAA Fisheries, USFWS, the Ports, and appropriate state agencies. The stranding study will evaluate parameters that influence stranding. Potential factors include: cross-sectional area, velocity, water level, bank configuration, location along river, slope of bank, ship traffic past site, and type, size, draft, and speed of vessel. To the extent appropriate, the Corps will integrate this study with efforts related to implementation of the September 15, 1999, Biological Opinion on the operation and maintenance dredging from John Day Dam to the Mouth of the Columbia.

ii. The scope of the stranding plan shall include an identified scope including goals, milestones for completion, check-in points, triggers for management change (i.e, management decision points that include specific metrics), and sampling/testing protocols to be developed in coordination with NOAA Fisheries.

iii. The results of the stranding plan shall be used to develop a plan to minimize and/or eliminate fish stranding. The stranding minimization plan, as it applies to ship traffic will be provided to the U.S. Coast Guard, for use in their regulation of river traffic, and to the adaptive management team for consideration during the adaptive management process.

number of individual fish involved, even a modest increase (e.g., 1% to 5%) in stranding would have significant adverse impacts to salmonid populations.

S-114 The technical memo "action plan" calls for establishment of a monitoring plan and program for assessing fish stranding impacts related to the project. In addition, the May 20, 2002 Biological Opinion for the project (Section 12.5, 3 h) includes provisions for developing and implementing a stranding study, as well as implementing an adaptive management process for reviewing results and identifying mitigation measures. These documents reference measures to "avoid and minimize" impacts, but there are no commitments for compensatory mitigation for unavoidable impacts. While WDFW supports the proposed monitoring and adaptive management, this approach leaves a great deal of uncertainty with regard to mitigation commitments.

S-115 Mitigation for fish stranding impacts should include an up-front commitment, in the final SEIS, that all unavoidable fish stranding impacts associated with this project will be fully mitigated, in accordance with the standard Washington State mitigation sequencing (e.g., avoidance, minimization, reduction, compensation, etc.). This would include compensatory mitigation for all unavoidable losses of fish life from stranding impacts. Losses should be established based on extrapolation from stranding studies. Potential compensatory mitigation actions could include habitat restoration activities (e.g., large woody debris placement, channel improvements, riparian habitat restoration, etc.) in tributary streams designed to replace, through increased habitat capacity, those fish lost from shipwake stranding. Mitigation also take into account losses that accrue throughout the entire life of the project.

CRAB

Columbia River Deepening and Associated Disposal in the Estuarine and Marine Areas

S-116 In the marine area of the project we have two major concerns that we feel are inadequately addressed and mitigated in the Columbia River Deepening EIS: Deepening and incremental maintenance dredging of the estuarine portion of the project, and disposal of dredged material in the marine environment. We are specifically concerned about the impacts to Dungeness crab from these activities, because they are a very important animal, commercially and recreationally, because they are the source of the principle prey item (crab spawn) of sub-adult chinook and coho salmon, and because they are an indicator organism dependant upon habitats critical to many of the other productive species that would be negatively impacted by the same activities.

Dredging:

S-117 Dredging entrains and kills Dungeness crabs, which are likely found as far upstream as favorable salinity allows them to feed, rear, and migrate. Entrainment of these crabs during both construction and incremental maintenance of the constructed area needs to be mitigated, by utilizing avoidance measures and by using proven habitat enhancement methods to replace those crabs unavoidably entrained and killed. Fortunately for the Portland District, the Seattle District has dealt successfully with these issues in the 1989 Grays Harbor Navigation Improvement Project EIS, and ongoing coordination and refinement of mitigation measures agreed to in this

Corps of Engineers Response

S-111 to S-115 (con't).

iv. The stranding study design shall be submitted to NOAA Fisheries by December 15, 2002, for approval.

v. The stranding study shall be implemented by April 2003.

vi. The results of the stranding study, including management recommendations to minimize stranding, shall be presented at the adaptive management team meeting (January, 2004). Management recommendations shall be reviewed by the Adaptive Management Team and implemented where feasible.

vii. The stranding study will be repeated two years following construction of the deeper channel.

viii. Post construction stranding studies will be evaluated by the Adaptive Management Team.

S-116. The Federal Government disagrees that impacts to crabs have been inadequately addressed and mitigated. Additional crab information has been collected since 1999 and presented to interested agencies, stakeholders, and disclosed through this Final SEIS, Exhibit N. See responses F-2, S-19 to S-28, and S-117 to S-131.

EIS has culminated in the September 1998 Revised Crab Mitigation Strategy Agreement, found on the web at: http://www.nws.usace.army.mil/ers/reposit/Revised_Crab_Strategy.pdf . This document, signed by all of the participating regulatory agencies and the Seattle District Engineer, outlines in detail the methods for avoiding, minimizing, calculating, and mitigating crab impacts. While timing and numbers of crabs in the Columbia estuary likely differ from

S-117 those in Grays Harbor, investigations utilizing the protocol outlined in the Strategy, coupled with existing data from past crab investigations in the Columbia, could easily be utilized to enumerate these differences and develop a successful Columbia River strategy. Most of the work has been done, so adoption of the framework of this strategy into the EIS should be simple and straightforward. To facilitate this, we recommend that the Portland District biological team work closely with the Seattle District, who should be able to easily explain the Strategy and it's implications.

There are concerns with entrainment of Dungeness crab specific to the Columbia River that need to be addressed. Sampling effort needs to be expended to identify the extent of areal and seasonal utilization of the estuarine portion of the navigation channel by crabs, so that dredging can be directed to areas of seasonal low abundance, as it is in Grays Harbor. This is particularly important in the lower reaches of the Columbia that are proposed for deepening, as the historical crab data we have from this portion of the Columbia was mostly collected using gear that has questionable efficacy for capturing crabs - the McCabe et. al. balloon shrimp trawl data. This data, when compared with data collected using the most efficient gear of all, the entrainment sampler, produces wild underestimates of crab abundance. Therefore, WDFW supports the use of the entrainment sampler on the Essayons and the use of the latest version of the Dredge Impact Model (DIM), as outlined in the June 9, 2002 Technical Memorandum and as appended in the

S-118 September 5, 2002 presentation of "Entrainment of Crab in the Columbia River Estuary: June 2002 Measurements and Status of Summer 2002 Measurements". Sufficient sampling needs to be conducted in all reaches up to Grays Bay, in all dredged areas of the channel where Dungeness crab could be found, specifically in Lower Desdemona, Upper Desdemona, Flavel Bar, Upper Sands, and Tongue Point Crossing. This data needs to be paired with tidal and salinity data collected at the time of sampling, and referenced to real-time salinity data, tides, and flows that are continuously being collected at reference stations. Enough data over enough range of tidal and flow conditions will produce an accurate picture of where crabs are and when they are there, in relationship to real-time salinity, tide, and river flow. It is important that entrainment sampling be conducted over the next several years at every dredging opportunity, preferably round the clock and in every other load every time the Essayons dredges the channel in any reach where crabs could remotely be found. The sampling schedule and protocol outlined in the September 5 presentation is excellent. Sampling needs to continue for the number of years necessary to capture both normal and unusual annual variations in flow and salinity.

Ultimately, this data will be used to produce a predictive model that can use real-time river flow, tidal, and salinity data as the predictive parameter, which can then be used to schedule dredging

S-119 during conditions that predict nearly zero crab impacts in each location. Avoidance of entrainment needs to be the first goal, and we are confident that this can be done with a scheduling agreement similar to that arrived at in the Grays Harbor Strategy. If this is not always possible, however, due to unpredictable conditions like drought or unusual and dangerous

Corps of Engineers Response

SS-117 to SS-119. The situation cited for the Seattle District's Grays Harbor project is not directly applicable to the Columbia River. Coordination and discussions are occurring with the Northwestern Division as well as the Seattle District. The Final SEIS has been revised to provide additional information pertaining to crab entrainment and adult equivalent losses to the commercial crab fishery. The Corps' determination of impacts indicates a pilot study to verify shell plot technology is not warranted. See 6.6.1.2 and Exhibit K-4.

sediment accumulations that have to be removed during times of favorable salinity for crabs, entrainment of crabs can be dramatically reduced by the use of a clamshell dredge, and this tool should be utilized to the greatest extent possible for construction and maintenance of the channel in estuarine areas where it is practical to do so. After minimizing impacts to the extent possible, the use of the DIM to calculate impacts, and either replacement of crabs using shellplot
S-119 technology as outlined in the Strategy, or further reductions of existing impacts by avoidance of dredging during productive periods that exceed the take of crab projected in the incremental dredged portion, could be utilized for mitigation. After minimizing impacts to the extent possible, use of the DIM to calculate impacts, and either replacement of crabs using shell placed in intertidal areas as outlined in the Grays Harbor Strategy, or further reductions of existing impacts by avoidance of dredging during productive periods that exceed the take of crab in the incremental dredged portion, could be utilized for mitigation. WDFW recommends that the Corps consider a pilot study be conducted as soon as possible to verify whether shell plot technology is feasible in intertidal areas of Baker Bay near the estuary mouth.

One aspect of the September 5th proposal differs from the way crab are enumerated in the Grays Harbor Strategy, and is concerning to WDFW. We would prefer that crab impacts be enumerated and tracked as 2+ age crab and not converted to Lost Recruits to the commercial fishery as proposed in the Modified DIM (slide 7 in the presentation). This is a problematic way to depict losses for several reasons. First, it overlooks the recreational fishery, which is allowed to take crabs at a smaller size and a younger age - many 3+ age crab are taken in this fishery - and like many recreational harvest activities, value to the economy from each organism taken is around 15 times greater for those taken recreationally than those taken commercially. Second, it overlooks the fact that Dungeness crab are capable of reproduction at 2+, and contribute significantly to both population vigor and production of prey items for other important animals,
S-120 especially salmon, at this age. In today's managed population, almost all of the male crabs reproduce at 2+ and contribute almost all of the gametes necessary for fertilization of females, as almost every 3 and 4 year old male is taken in the commercial or recreational fishery every year. Third, there is additional unnecessary variance around the mean generated from additional survival calculations. There is already too much variance in the survival rate projection from 0+ to 2+ to establish acceptable confidence limits around the mean, and when this is added to the variance from sampling we soon get into the realm of unsupportable approximations. Finally, converting impacts to lost recruits is disingenuous, as it makes the impact look small compared to the impact of the commercial fishery. This is, however, a fishery that is highly selective and nearly perfect from a management standpoint, as it impacts only males that are completely surplus to reproductive needs, and it removes large specimens that both compete with and cannibalize smaller crabs, thus actually enhancing survival and increasing production of the population in general. Dredging, by contrast, removes all ages and sexes indiscriminately, which is totally detrimental to the population. So for these reasons the best way to depict this impact is to calculate it in terms of lost 2+ crab, as is done in the Grays Harbor Strategy, and we request that this be done in the Columbia version also.

Corps of Engineers Response

S-120. The Corps concurs with this comment. The Final SEIS and appended crab report now contain an analysis using 2+ crabs loses.

Disposal:

S-121 Identification of suitable disposal sites for dredged material in the marine environment, especially in the context of coordinating disposal of dredged MCR sediments, has been the subject of considerable effort by the Corps, resource agencies, environmental groups, and fishermen's associations for several years now. We are encouraged to see the proposal in the revised EIS to dispose of construction sediments in the Lois Island embayment, to convert this artificially deepened area back to productive shallow water habitat, and are supportive of this beneficial use idea. Still we are very disappointed to see that the designation of a new deep water site, for ultimate disposal beginning in 10 years of many millions of cubic yards of incremental maintenance material, is still being proposed. This purposefully proposes placing coarse sediment in heavily fished areas, in productive areas of finer grain sediment, and in areas where it will never enter the littoral drift process. We are further discouraged and confounded by the Corps insistence upon implementing a habitat assessment plan for this site, developed without meaningful input by State agencies and others with interests, that falls far short of being able to even provide the simplest data that we would need to evaluate the project and develop crab mitigation, as it proposes to utilize the same balloon shrimp trawl as a sampling tool that has proven to be inadequate in estimating crab abundance in the river. At the very least the use of the calibrated plumb staff beam trawl using the techniques developed by Armstrong, et. al., so that statistically significant data on crab densities could be acquired, should have been proposed. Moreover, this plan to waste sand in deep water completely fails to recognize that beneficial uses for this sediment exist that are critical to developing long-term solutions for management of erosion on the Washington Coast.

S-122 But what is particularly confounding to us is the dismissal of the one idea that has come out of this process in a favorable light by all participants: Beneficial use for erosion control at Benson Beach. The statement was made in the EIS that a separate project sponsor for Benson Beach is required. We do not agree with this statement, as this is essentially another beach nourishment site, and the deepening project, which includes beach nourishment already at many sites along the river, is already being co-sponsored by the Corps and seven lower Columbia River ports. With feasibility assured by the success of the pilot project conducted this year, which demonstrated among other things that disposal times including pumpout may well be close to the same for a load disposed at Benson Beach as a load disposed by bottom dumping in the proposed deep water site much further away from the dredging area, we feel that this sponsorship should be extended to disposal on Benson Beach of incremental maintenance material to the maximum feasible amount, based upon site capacity and safe disposal windows. Beneficial use at Benson Beach is one of the only ways that these sediments can be utilized in a manner consistent with all of the input received by the Corps. Put simply, disposal by nourishing Benson Beach makes virtually all of the disposal problems go away.

S-123 We realize that it is likely not feasible to dispose of all the sediment all of the time at Benson Beach, particularly when the maintenance of the MCR reach is added to the annual disposal requirement. A limited in-water disposal site near to the project area will likely be necessary. Fortunately, continued use of sites C and E is agreeable to most of the coordinators of MCR disposal issues. We are in favor of the continued use of Site E to the maximum extent practical,

Corps of Engineers Response

S-121 to S-123. The Federal Government disagrees with the reviewers' comments regarding the decision to designate ocean disposal sites. See the 1999 Final IFR/EIS, Appendix H, for the record of that process. The proposed channel improvement project will not impact the marine environment as stated. The WDFW's endorsement of the Lois Island embayment beneficial use site is noted. Much of the discussion provided by WDFW is related to the MCR, which is not a part of the revision to the proposed channel improvement project. A copy of WDFW's comments has been delivered to the MCR Project Manager and to USEPA.

Placement of dredged material at Benson Beach is not part of the recommended plan for the channel improvement project, nor does it constitute a viable alternative to ocean disposal except on a limited, year-by-year basis (see the 1999 Final IFR/EIS). The Federal Government disagrees with the statement that placement of material at "Benson Beach would make virtually all the disposal problems go away." Use of Benson Beach has issues regarding feasibility, construction and performance. The Corps, USEPA, and other entities began in 2002 evaluating the actual placement of dredged material at Benson Beach and will continue to do so based on the availability of funding. If individuals or entities would like material placed at any site, that entity is required to pay the incremental cost for such an action. When material was placed at Benson Beach in 2002 from the MCR project, non-federal entities paid the incremental difference in cost compared to the Corps least cost plan for disposal of dredged materials. Generally, if an alternative disposal option is offered that has all appropriate approvals and is less expensive than the Federal plan, dredged material would be provided.

In the 1999 Final IFR/EIS, the Federal Government stated a preference to use the Shallow Water Site because the evidence indicates that much of the material placed there remains in the littoral system. At the time of the 1999 Final IFR/EIS, the capacity of the Shallow Water Site was unknown. Monitoring of material disposed in Expanded Site E (a combined 103/102 site) since 1997 has provided the Federal Government with valuable information. That information, other available information, and modeling studies are expected to clarify the site's capacity, which would allow the Federal Government to better manage ocean disposed dredged material. A second site to accommodate material that could not be placed in the North Jetty or Shallow Water sites was determined to be necessary.

tempered with timing restrictions to avoid the high concentrations of soft shelled crab observed in the area late in the summer. While we would prefer that use of Site E be curtailed after the end of July, to protect the high numbers of soft shelled crab that use the area after their summer molt, however, the agreements on timing and use of the site worked out with CRCFA are acceptable to WDFW, and should be incorporated into both the EIS and MCR certification.

There are still concerns with burial of Dungeness crab that need to be addressed. The recent Corps study referenced in the EIS is by no means complete or conclusive, and is replete with many shortcomings in experimental design, but preliminarily one thing is becoming clear: If a crab has buried up in the normal course of avoiding wave energy, currents, or predation; or to molt, shelter it's eggs if female, or simply to rest between feedings, and this crab is covered by disposed sediments, it dies, as it is unable to dig out of these sediments. This is particularly a
S-124. problem for soft shelled crabs, which when buried appear unable to escape as little as 4 inches of sediments, but is likely a contributor to mortality in any crab, as has been observed in other studies. We do not know how much of a crab's life is spent buried. However, this could easily be determined by observations of crabs in the wild or in aquaria designed to emulate the natural environment, and would be a worthwhile pursuit in conjunction with the burial study. We do know now that disposal kills buried crabs, and that disposal in areas containing high concentrations of crabs, particularly soft crabs, needs to be avoided. Crabs that are not avoided and are killed need to be mitigated by replacement using shellplots as outlined in the Strategy, or by utilizing other avoidance techniques. Monitoring of crab abundance and condition on the disposal site needs to be conducted to estimate mitigation requirements.

Disposal at Benson Beach, or any other upland or beach nourishment site, does have one drawback compared to in-water disposal, and that is the likelihood that all crabs entrained while dredging will be killed. This may be offset somewhat by the lack of crabs, or any other critical resources or habitats, on this rapidly eroding beach, but is still a concern. Again, avoidance by use of clamshell and timing needs to be employed, but there are other measures to reduce entrainment that are necessary to consider. First, direct pumpout of dredged material from the barge or hopper will prevent entrainment of more crabs that may be in a re-handling area. This is the method employed in Grays Harbor, and the method successfully employed in the pilot
S-125 project. Unlike other jetty systems, much of the North Jetty of the Columbia is located behind a natural headland. There are spruce trees and other upland vegetation that are actually trying to grow on top of the jetty fairly near it's waterward end, something never seen on jetties elsewhere. Historically, vessels are reported to have successfully sought shelter from severe storms behind the jetty next to Cape Disappointment. Perhaps there is enough shelter here to allow the installation of a permanent discharge line, possibly mounted on piling, with a flexible coupler that could withstand some wave energy when hooked up to the barge or dredge during most conditions encountered in the summer, when dredging is usually performed. Analysis of the information produced by the pilot study will likely produce significant improvements in the feasibility of direct pumpout of large quantities of material. The goal needs to be development of a long term and cost effective program to ensure that Benson Beach gets nourished to the maximum extent practicable every year.

Corps of Engineers Response

S-124. As has been stated several times in the past, we recognize and concur with the statements that the burial study done by Pacific Northwest National Laboratories was a pilot study to determine the feasibility of getting crabs to molt in the laboratory and evaluate crab and juvenile flatfish response to burial by dredged material. The Corps and USEPA recognize the limitations of the tests as indicated in the final report and never represented the results as a definitive assessment of disposal impacts on crabs, but merely an indication. Additional tests, implemented under the MCR project, have been in the planning stages and may be implemented this year if funds are available. Pacific Northwest National Laboratories has submitted a draft proposal for an additional disposal impact assessment. This proposal will be shared with interested agency representatives when it is further along in its development. Any studies conducted by the Corps or USEPA for MCR or the ocean disposal sites will be coordinated. Under the preferred plan presented in the Final SEIS, the Corps does not intend to use ocean disposal for the channel improvement project during construction and the first 20 years of maintenance.

S-125 to S-131. Benson Beach disposal is addressed in responses S-121 to S123. The WDFW presents many new and novel ideas regarding the long-term approach to dredge material disposal. The various scenarios are put forth without reference to engineering, environmental, and economic studies that have been conducted. The Corps and USEPA would be interested in any data or sources that would provide sufficient information to further assess these ideas. For example, more information would be required to assess the economics and efficiency of surplus Skagit yarders or high lead logging equipment with huge dragline bucket to move large amounts of sand over the North Jetty. The Corps and USEPA embrace and are committed to the concept of beneficial use of dredged material and will continue wherever possible to pursue such options. As explained in responses S-121 through S-123, if non-federal entities are willing to sponsor and pay for incremental costs, the Federal Government will consider your experimental concepts.

In-water disposal in a re-handling site, such as Site C, also referred to as the "dumping ground", adjacent to the jetty that was recently re-authorized for disposal, may ultimately prove more practical, as material could be stored there during adverse conditions and transferred onto Benson Beach at a later date. However, re-handling may be dangerous for crabs which may unavoidably enter the re-handling area, maybe in seasonal high abundance, especially if a suction type dredge is used to re-handle the material. Crab entrainment may be minimized by the use of mechanical re-handling equipment, such as a dragline located in uplands on the north side of the jetty. There

S-125 are large number of surplus Skagit yarders and similar brands of high lead logging equipment designed for harvesting old growth timber that have no use it today's small log harvests, that could potentially be equipped with a huge dragline bucket that could move large amounts of sand over the jetty efficiently. This tool would also allow some entrained crabs to escape the re-handling area after disposal, and may ultimately, if practical, result in the least mortality and mitigation of any disposal method. If a suction type dredge proves the only feasible tool, and if it appears that wave state may preclude the use of a standard floating pipeline dredge, it still may be possible to utilize this method by mounting a land-based plant in a caisson or other type of gated structure on the landward side of the jetty, to allow material to be re-handled through the jetty to reduce head while protecting the plant.

Another tool that is worth considering is the Punaise ("thumbtack") dredge. This could be installed in Site C and dredges could dispose material over it. Since the intake is several feet underneath the bed, entrained crabs may be able to escape the area, and be much less likely to find their way into the dredged material, although this would need to be studied. Discharge

S-126 would then occur at Benson Beach, probably over but possibly even through the jetty, which could be equipped with a gate or other passage to reduce discharge head and increase efficiency. Whatever method is selected, some crabs unavoidably entrained would be killed, but since practical methods have been developed to mitigate these impacts, these crabs could be replaced without permanent harm to the resource.

An option less favorable to the crab resource and the fishermen that depend on this resource, but one that likely could be accomplished with no net loss to resource productivity with appropriate timing and mitigation measures, is the construction of nearshore erosion control berms north of Peacock Spit. This would need to be accomplished after the commercial crab fishing season has ended for the year, in late August or September, and would need to be permitted through the 404

S-127 process. Areas could be identified that are coarse grained and well within the erosion zone, likely minus 30 or landward, that could be investigated for crab utilization and used for pinpoint disposal along a contour line, with the understanding that the crab mortality that occurred would be mitigated using shellplots as outlined in the Strategy. These berms could easily and cost effectively be built with a hopper dredge, as they have been offshore of Grays Harbor, and if successful would provide cost effective relief of disposal site capacity problems.

Further possibilities for beneficial use also exist. As mentioned previously, coastal erosion is becoming an increasingly serious issue in Washington, and was the recent subject of a 5 year

S-128 joint USGS/DOE study that you are likely aware of. It is also the subject of several multi-million dollar erosion control projects, an inter-agency task force convened at the request of the

Corps of Engineers Response

Governor, a sand management workgroup involving the Portland District and a beneficial use workgroup involving the Seattle District, and the subject of considerably state and federal legislative interest.

S-129 For example, during the development of the Ocean Shores Coastal Erosion Management EIS a presentation was made, by one of the coastal engineers from the Department of Ecology involved in the coastal erosion study, about the results of modeling the North Coast drift cell, using the Unibest model from Delft Hydraulics. The results of modeling indicated that an average of approximately 220,000 cubic yards of sand needed to be added to this drift cell per year to keep the shoreline in position. The sand from upriver reaches that is proposed in the EIS to be loaded on barges and transported to the ocean for disposal would be ideal for this purpose. This sand could be disposed in the nearshore are with minimal impacts, as sediment analysis has indicated that areas near the Grays Harbor jetties are gravelly and not fine grained as they are near the Columbia, so are not as productive for crabs or crab fishermen. Beam trawling has confirmed the lack of crabs or other organisms in nearshore areas south of the South Jetty, and similar work north of the North Jetty could be conducted to confirm this also. Delivery to the beach could be accomplished by disposal in the very nearshore area, perhaps in as little as 20 feet of water, by swinging the barge toward shore on a long tow line, releasing the sediment just outside of the breakers. Some novel ideas, such as combining regular barging of wood chips from Grays Harbor to the Columbia with a backhaul of sand to the Grays Harbor area, were proposed during the Ocean Shores EIS process and are definitely worth considering.

S-130 Presently, all of the suitable material dredged in Grays Harbor is utilized for both nearshore and beach nourishment in Half Moon Bay, to protect Westport. The breach fill, constructed of sand that was mined in an emergency effort to re-connect the South Jetty to the mainland, has just required augmentation this past year. Interest has also been expressed in using sand to nourish Whitcomb Flats, a critical habitat area in the Harbor that is presently eroding. Finally, of course, there is the identified need in for sand in Ocean Shores. There is not nearly enough sand dredged in Grays Harbor to meet even a few of these needs. Transport of Columbia River sand to Grays Harbor, for any of these purposes, should be considered. The Seattle District of the Corps, which is now obligated to nourish Half Moon Bay to prevent exposure of the recently constructed revetment protecting the Westport sewage treatment plant, should cooperate with the Portland District in actively seeking ways to facilitate this.

S-131 Further ideas that merit consideration are disposal off of the highly erosive area of Washaway Beach, an option favored by fishermen and one sure to receive support from beleaguered North Cove property owners and their government representatives. Also, the spits off of the Shoalwater Indian Reservation have begun to erode alarmingly in recent years, requiring a hard armoring solution that has caused considerable loss of wetlands, and a nearshore beneficial use site has been designated and is presently used for all the suitable sand dredged from Federal maintenance projects in Willapa Bay. This would be an ideal area to transport and dispose of barged sediment during calm weather. These options would require separate project sponsorship, but if practical means can be found to accomplish these and other beneficial uses, and if the benefits outweigh the costs of other erosion control projects, these ideas should be considered. The Corps is obligated to seek beneficial uses for dredged material first, and exhaust all of these uses before

disposal is considered. Nowhere else in the country, other than in the Pacific Northwest, is this valuable sand allowed to be wasted. It should not be done so here, especially to the detriment of critical habitat and the resources supported by this habitat.

To summarize:

1. Adopt and utilize the ***September 1998 Revised Crab Mitigation Strategy Agreement,*** modified as necessary to fit Columbia River Estuary conditions**.**

2. Investigate crab densities using the entrainment sampler in all dredged areas suspected to have sufficient salinity for crab utilization.

3. Develop a salinity/flow based timing and density matrix by reach and utilize to avoid times of high densities of crab.

4. Utilize mechanical dredging to limit entrainment of crabs and fish.

5. Mitigate for crabs unavoidably entrained during construction and in the incremental portion of subsequent maintenance dredged material, using shellplots in Baker Bay as outlined in the Strategy. Work with WDFW to investigate feasibility of crab enhancement in Baker Bay.

S-132

6. Investigate crab densities using the calibrated plumb staff beam trawl and techniques developed by Armstrong, et. al., to characterize crab densities, age class, and condition in disposal sites.

7. Continue research on burial impacts to Dungeness crab, including observational research in the wild or in aquaria that emulates wild conditions to determine the amount of time spent buried by various classes and ages of soft and hard shell condition crab.

8. Ensure that the maximum amount of sand gets placed on Benson Beach.

9. Work with the fishing community and resource agencies to try to find some feasible way of constructing nearshore erosion control beach feeder berms north of Peacock Spit, using a hopper dredge similar to the way they are constructed in Grays Harbor, landward of the area typically fished for crab, after the crab season has ended for the year, and with mitigation for disposal impacts on softshell crab that may be in the area.

10. Do not designate the deep water disposal site, retain site F for any very limited deep water disposal needs.

11. If the deep water site is designated anyway to satisfy EPA mandates, do not use it.

12. Continue using site C and site E for material disposal beyond that used on Benson Beach.

Corps of Engineers Response

S-132. Responses are provided to your numbered paragraphs.

1. Once the information from the entrainment study is available and the crab abundance versus salinity model is completed we will develop a dredging schedule that will minimize impacts. This information will be developed in concert with the state agencies.

2. This information has been gathered in the summer and fall of 2002. Though not all bars where sampled the bars sampled bracketed the range where crabs would be expected to found. Sampling was conducted during low flow when salinities were high enough for crabs to be present. This information can be extrapolated to the other intermediate bars.

3. Concur. Walt Pearson of Pacific NW Laboratories is doing this action under contract to Portland District. For minimization measures see response S-117 to S-119.

4. Mechanical dredges cannot be used effectively or safely in the lower Columbia River main navigation channel because they must be anchored or fixed in a given location. Adverse weather and wave conditions and vessel traffic make it extremely difficult and unreliable to mechanically dredge in this type of area. A hopper dredge is much more effective since it is fairly easy for the dredge to accommodate large vessel traffic because of its mobility. In addition there is no information to support the conclusion that a mechanical dredge would entrain less fish and crabs in this habitat than a hydraulic dredge.

5. See responses S-117 to S-119.

6. The Corps and USEPA have conducted baseline crab studies of the ocean disposal sites using an otter trawl. The USEPA, Corps, and its contractor (Jack Word, MEC Analytical Services) believe that this method provides comparable results to a plumb staff beam trawl.

7. See response S-124.

8. See responses S-121-123.

9. This suggestion is outside the scope of the channel improvement project. If the State of Washington is willing to sponsor and pay for incremental costs, the Corps will consider your experimental concepts.

10. Under the preferred plan in the Final SEIS, the Corps does not intend to use ocean disposal for the channel improvement project during construction and for the first 20 years of maintenance. With regard to Site F, the Corps does not have the authority to designate ocean dredged material disposal sites except under limited Section 103 selection authority. By 2003, disposal options for the MCR project will revert to the USEPA designated 1,800 by 1,800-foot portion of Site F. This specific area is too small, is already mounded, and has not been used for a number of years. Further use of Site F was determined to be not in compliance with the ocean dumping criteria.

13. Commit to pursuit of beneficial use of all sand from channel construction or maintenance activities that is proposed to be barged to the ocean, including but not limited to direct placement on Benson Beach or immediately offshore, nearshore placement off Washaway Beach, nearshore placement in Willapa Bay at the Shoalwater Indian Reservation Beneficial Use Site, onshore placement at the SR 105 project, nearshore or onshore placement at Westport, nearshore or onshore placement at Ocean Shores, and nearshore placement on Whitcomb Flats in Grays Harbor.

The bottom line for WDFW is that the project by law has to meet the requirements of no net loss of productive capacity of fish and shellfish habitat. The key to accomplishing this is to develop and work within the framework of a crab mitigation strategy. Conservation of sand in the littoral system is also essential - offshore disposal of sediment as proposed in the EIS would exacerbate
S-133 erosion problems due to sediment starvation along the Washington coast, to the tune of multi-millions of dollars in habitat loss for fish, wildlife, and humans. In the past 10 years nearly 100 million dollars has been spent by the Federal government to control erosion and mitigate damages to the jetty system and public infrastructure in Grays Harbor and Pacific Counties, all caused by starvation of sediment as identified in the coastal erosion study. We encourage the Portland Corps to take all necessary steps to avoid, minimize, and mitigate these impacts.

Thank you for the opportunity to provide these comments and recommendations. WDFW appreciates the efforts made by the project sponsors and COE to address resource concerns, and we look forward to working with you to bring resolution to these issues. Please feel free to
S-134 Regional Habitat Program Manager Steve Manlow at (360) 906-6731 if you have any questions regarding upland disposal, smelt, sturgeon and fish stranding issues. To discuss issues in the marine area of this project, please contact Bob Burkle, Assistant Region 6 Habitat Program Manager, at (360) 249-1217, e-mail burklblb@dfw.wa.gov.

Sincerely,

Lee Van Tussenbrook
Regional Director Regional Habitat Program Manager

Cc: Peter Birch, WDFW
Sue Patnude, WDFW
Loree Randall, DOE
Patty Snow, ODFW
Kathi Larson, USFWS Portland
Ben Meyer, NMFS

Corps of Engineers Response

S-132 (con't).

10 (con't). Disposal in recent years has been in the 103-expanded site F originally selected in 1993. As explained to the Working Group during the designation studies, to the taskforce following completion of the 1999 Final IFR/EIS, and to WDFW staff and management several times over the years, the authorized 10-year allowance of the 103 sites expanded in 1993 will expire and no further extension is allowed under federal law. The USEPA intends to de-designate the four existing 102 sites and designate the Deep Water Site and Shallow Water Site.

11. See previous response. Designation does not mandate use. If the Deep Water Site is used, it will be used in accordance with the final SMMP.

12. See responses to 8 and 10 above (S-121-123). With regards to your comment, there is no Site C associated with the Columbia River.

13. See response 8 and 10 above (S-121-123). Dredged material from the project, including construction and maintenance, has been identified for beneficial use within the Columbia River estuary. The Corps and USEPA are committed to the pursuit of beneficial uses whenever possible. If new beneficial uses are identified that require environmental review and permit not previously covered the non-federal entity will be responsible for all incremental costs for planning and construction.

S-133. The analyses conducted for the channel improvement project (smelt, sturgeon, juvenile salmon stranding, and crabs) supports the conclusions that construction of the project will not result in a net-loss of productive habitat. As noted in responses S-111 to S-115, the project, including its restoration components, adds productive habitat capacity for salmonids. The analysis of dredge entrainment indicates that impacts to the crab population are small and will be further minimized by management decisions. Crab entrainment research has shown that crabs reoccupy dredged areas soon after dredging, indicating that there is no change in the suitability of the habitat. This fact supports the conclusion that dredging does not affect productive capacity of the habitat.

S-134. Comment noted.

WASHINGTON STATE DEPARTMENT OF
Natural Resources

DOUG SUTHERLAND
Commissioner of Public Lands

September 12, 2002

US Army Corps of Engineers, Portland District
CENWP-PM-E ATTN: Robert Willis
P.O. Box 2946
Portland, Oregon 97208-2946

Port of Longview (SEPA)
ATTN: Judy Grigg
P.O. Box 1258
Longview, Washington 98632-7739

RE: Washington Department of Natural Resources Comments on the Columbia River Channel Improvement Project, Draft Supplemental Integrated Feasibility Report and Environmental Statement

Dear Ms. Grigg and Mr. Willis:

The Washington State Department of Natural Resources (DNR) appreciates the willingness of the Corps of Engineers (Corps) and the sponsors of the proposed Columbia River deepening to maintain a productive dialogue on the issues surrounding this proposal. We understand that a proposal of this scale requires coordination and communication with a highly diverse constellation of stakeholders.

DNR has identified elements of the deepening proposal that have the potential to adversely impact state owned aquatic lands (SOAL). As stewards of the land, we are obligated to ensure that any proposal is designed and implemented in a manner that causes the least impact. By statute, however, the DNR's management authority of SOAL is primarily proprietary - rather than regulatory - in nature. In essence, our agency is charged with a fiduciary responsibility to act on behalf of the
S-135 citizens of Washington to ensure that their SOAL is being put to its highest and best use, consistent with capturing and maximizing economic benefits derived from the use of those lands. But, DNR also recognizes that the long-term economic viability of SOAL is intrinsically tied to the long-term environmental sustainability of those same lands. Lands that are not protected from environmental damage represent not only a loss to all of us who find that environmental protection has its own intrinsic value, but also a loss in terms of their economic value.

Historically, Columbia River dredging practices have had a very significant adverse impact on Washington's SOAL. The deposit of dredge materials on our Columbia River tidelands has in many places along the river completely buried them and converted them into uplands. Not only has this affected the ecology of the River, it has caused significant management problems to DNR. Ownership boundaries for SOAL were determined at the time of statehood in 1889, and those boundaries are more or less fixed (with some exceptions). When SOAL is inundated by dredge materials it becomes extremely difficult for our agency to determine our ownership boundaries. Moreover, private property owners, real estate agents, and local governments are often not aware that

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Corps of Engineers Response

S-135. The Federal Government appreciates your agency's efforts to thoroughly review the Draft SEIS for the proposed project. The Corps and USEPA also appreciate your taking the time to meet to clarify your comments and to work through the issues and concerns that arose regarding project use of state owned lands and resources.

the land with upland characteristics that they are building houses on, selling, or platting, is actually SOAL that has been buried beneath dredge material. Two examples of this are Puget Island, and Willow Grove. Both of these areas are now so extensively developed with properties that are in essence trespassing on SOAL that it will require enormous expense to resolve our boundaries, to negotiate leases, and to develop public use and access plans.

S-135

We expect that any new proposals for dredging in the Columbia River will be sensitive to the impacts that such proposals have on SOAL and upon the agencies who manage them. Unless the Corps and the project sponsors are committed to providing timely information to DNR when dredging activities are being conducted, we believe that SOAL will continue to be adversely impacted. We appreciate the efforts that have been extended thus far to develop a Technical Memorandum that will clarify the duties of the Corps, the sponsors, dredging contractors, and recipients of dredge materials. It is our expectation that the implementation of the Technical Memorandum will provide real time information when and where specific dredging activities are occurring, the volume of material being dredged, and who the recipient of the material is. We also expect that the Technical Memorandum will be incorporated into any new dredging contracts so that there can be no confusion about DNR's expectations concerning the placement and subsequent use of dredge materials.

An important component of the deepening proposal is the Corps' reliance on the authority provided by The Navigational Servitude. DNR recognizes that since this proposal is intended to aid in commerce and navigation and has federal backing that The Navigational Servitude does apply. However, DNR's position is that The Navigational Servitude does not provide a blanket exemption
S-136 from this agency's rules and procedures, insofar as they are reasonable and capable of being accomplished. For this reason, as this deepening proposal is further developed, we expect that DNR's statutory authority to enter into agreements for the use of SOAL will be honored, and that the design of the proposal as well as the funding to implement the proposal, will anticipate the requirements of our agency.

Following are the specific concerns of DNR that we believe should be addressed as this proposal is developed:

1. DNR requires a use authorization for mitigation projects that either use state-owned dredge materials for private projects, or which encumber SOAL. Mitigation projects require
S-137 a lease from DNR. The annual payment on the lease is determined by the value of the materials being used, or the value of the land being encumbered, whichever is more appropriate. We expect that the cost of such mitigation proposals will be taken into account.

2. While the SEIS distinguishes between "restoration" projects and "mitigation" projects, by DNR's standards all the proposed projects are mitigation projects. Since each of the projects has been proposed in connection with obtaining approval of the deepening
S-138 proposal as a whole, and since each of the projects has been incorporated into the review of NMFS, Ecology, and other reviewing agencies, we consider these proposed projects to be mitigation. Therefore, any of the restoration or mitigation proposals that either use or encumber SOAL will be required to obtain a use authorization from DNR.

Corps of Engineers Response

S-136. The Corps is committed to working closely with WDNR as this project moves forward. We will find a mutually agreeable way to use the state owned aquatic lands identified in the project. As the Corps advances further into plans and specifications for the proposed project features, we will be in regular contact with WDNR regarding those features that involve your property, including state owned aquatic lands, royalties for dredged material, and fees and or easements pertaining to the use of WDNR property.

S-137. The Corps discussed mitigation actions and ecosystem restoration features with representatives from WDNR. The Corps views mitigation and restoration as distinctly different actions. Mitigation actions are required to compensate for project related impacts. They are cost shared 75%-25% with the sponsor ports. The mitigation lands must be purchased in fee title and secured for perpetuity. If the mitigation properties are not available through a willing seller arrangement, the ports will be directed by the Corps to condemn the property. The navigation portion of the channel improvement project contains a wildlife mitigation plan that incorporates mitigation for wetland impacts that will result from upland disposal activities. The mitigation sites identified in the State of Washington occur at Martin Island and Woodland Bottoms. Wetlands mitigation at Martin Island will involve use of materials dredged as part of the channel improvement project for fill in the embayment. While Martin Island is currently privately owned, it will, at the time mitigation is conducted, be owned by the non-federal sponsors. Because the mitigation is necessary for implementation of the channel improvement project, use of the dredged materials for mitigation is use for a public purpose and no royalty should be charged for such use. RCW 79.90.150.

The Federal Government respectfully disagreed with WDNR's characterization of the proposed restoration actions as "mitigation" and believes that this definitional matter has been resolved.

Restoration actions are not related to project impacts and are being undertaken voluntarily under existing Corps' authorities. The Corps' intent is to restore partially those ecosystem elements subject to substantial historical habitat losses and/or to aid in the recover of ESA species, including various salmonid ESUs. These actions are cost shared 65%-35% with the non-federal sponsors. Restoration lands do not need to be purchased in fee title. Restoration projects do not need to be in place for perpetuity although they are envisioned to be in place long-term. Property for ecosystem restoration features will not be condemned in order to achieve the restoration.

S-138. Based upon our interagency meeting and discussions of the proposed project with your staff, we believe that WDNR understands the difference in the Corps' use of mitigation and restoration. We will be working closely with your staff to define each location where the state has ownership and will jointly decide the proper real estate instrument to encumber your land for each location.

3. DNR would like to see what plans are in place in case any of the restoration or
S-139 mitigation proposals is not implemented. Presumably, the biological opinion from NMFS was based upon the actual implementation of all the mitigation proposals.

4. DNR believes that the Corps and the project sponsors should attempt to find more opportunities to put the dredge materials to beneficial uses. Flow lane disposal should only be used when there are beneficial effects on the river system. In some stretches of the river
S-140 flow lane disposal appears to have been proposed simply as a least cost method of disposal, in spite of the fact that the same materials must be dredged over and over again as they migrate downriver. The short-term higher cost of upland disposal must be weighed against the repeated costs associated with flow lane disposal.

5. Page 3 -16, Section 3.4 (revised) Future Port Development - Port of Vancouver, Gateway development. A statement is made that dredged material from this project is one potential, cost effective source of material for the development, but that other sources are also available in sufficient quantities and at acceptable costs to accomplish the Gateway development objectives.

S-141

The Department has not been asked to approve the use of any dredged material for the development of the Gateway project, nor have we been given any information on how much material will be needed or where it will be used. The Revised Code of Washington (RCW) Chapter 79.90 Section 150 requires that the user obtain prior written approval for removal and use. It further states that material used for another use or moved off the disposal site may require the payment of a royalty to the State. Since the Port of Vancouver has not discussed this matter with the Department, and therefore doesn't know whether they will have to pay a royalty or not, it seems presumptuous to say they can find a like amount of material at acceptable costs. What figures and volumes were used to determine this? Where would the other material come from?

Additionally, the size of Gateway 3, W-101.0 varies. Table 1 on page 2 of Exhibit K in the Technical Memorandum for Consistency with Local Critical Areas Ordinances lists a disposal volume of 2.8 million cubic yards on 64.5 acres. Table S4-7, Page 4-37 lists no
S-142 volume and 39.7 acres. Page 6-14, Section 6.2.3.1 *(revised)* Upland Disposal states that "About 17 acres of riparian habitat was protected from loss and agricultural land at Gateway 3 (W-101.0) was reduced from 69 to 40 acres." Page 8-4, Section 8.7.1 (*new*) Disposal Plan Modifications, states "Disposal Site W- 101. 0, Gateway Parcel 3 requires modification so as to reflect a reduced acreage requirement change from 97.0 to 52.0 acres."

The department feels that there needs to be a list or table showing an accurate, final acreage of each disposal site and the volume expected to be placed there.

6. Page 4-24, Section 4.8.6.2 (*new*) Purple Loosestrife Control Program states that the
S-143 herbicide Rodeo will be used during the active growing season (June to October) not during the suggested in water period of Nov 1 to Feb 28.

Corps of Engineers Response

S-139. The mitigation actions will be implemented even if it requires condemnation of the property involved. Changes to the ecosystem restoration features will be coordinated with USFWS, NOAA Fisheries, and the USEPA.

S-140. The Corps has thoroughly examined disposal requirements for the channel improvement project and proposes to use a combination of upland, in-water (including two restoration features and one wildlife mitigation action) and shoreline disposal sites to accomplish the action. Upland disposal is the primary disposal practice used during construction. In-water (flowlane) disposal is sparingly used. Approximately 6.2 mcy of construction material dredged between CRM 3-30 would be beneficially used at Lois Island embayment for ecosystem restoration purposes. Only one shoreline disposal site (Sand Island; O-86.2) would be used during construction.

The Corps and USEPA have made a concerted effort during the feasibility phase for this project to minimize the re-handling of dredged material in the navigation channel. The use of upland disposal sites was emphasized as reflected in the proposed disposal plan. The ESA consultation and interagency discussions led to reemphasis of the use of dredged material in a beneficial manner for ecosystem restoration features at Lois Island embayment and Miller/Pillar. Some flowlane disposal will occur with project implementation. The Corps and USEPA also notes that flowlane disposal is consistent with the State of Washington's strong encouragement to keep sand in the river system.

S-141. The Gateway project referenced in your letter is not related to the federal action. The Corps has requested the Port of Vancouver to send you all information regarding the Gateway 3 proposal.

S-142. The Final SEIS contains a table with the proposed final acreages and heights of disposal sites.

S-143. The application of Rodeo within the State of Washington is covered by the WDOE General NPDES permit and approved for use in the estuary. Application of Rodeo to purple loosestrife will be per label instructions. Specifically, application will be during or immediately after flowering is initiated and continue to early fall. Mix ratios and other application factors will comply with the label requirements for aquatic application. The non-federal sponsors will comply with the provisions of the General NPDES permit including the procedural requirement pertaining to notice of application. A specific permit application for purple loosestrife control will be made to the State of Washington in order to comply with the general NPDES permit already issued by the WDOE. Compliance with the terms of the state's NPDES permit should "insure no damage for contamination of state-owned aquatic lands." This restoration feature, therefore, should result in no significant impact to the environment. This combined NEPA/SEPA Final SEIS constitutes SEPA compliance regarding the purple loosestrife program and other restoration features.

Although it makes sense to apply the herbicide during the purple loosestrife growing season is this an approved time and use according to the label? If so, will the program be reviewed through the Washington SEPA process and/or other environmental review to ensure no damage or contamination of state owned aquatic lands occurs?

S-144 7. Page 8-7, Section 8.7.3.5 (*new*) Cottonwood-Howard Islands White-tailed Deer Introduction. There are numerous ownership questions on this site. How will ownership boundaries in this area be determined? Will there be a legal survey?

S-145 There is also a statement that "one of the private ownerships also owns 60 acres of adjacent tidelands to Howard Island and good real estate practice will require purchase of "fee title" interest in those tidelands in conjunction with the acquisition of the upland acreage." Are these true tidelands or are they accretions with upland characteristics to the tidelands sold by the State? If so RCW 79.94.3 10 states that any accretions to sold tidelands remain in state ownership. If this were the case this area would need to be treated as the other areas owned by the State of Washington.

S-146 Why does the Corps consider placing White-tailed deer on the island to be restoration and what criteria does the Corps use to determine mitigation vs. restoration? Was this species on the island in the past or is this an expansion? Is there a population of Black-tailed deer on the island and if so what will be done with them? The Department feels that placing white-tailed deer on the island fits the state criteria for mitigation and our policy is we must charge for any mitigation using state aquatic resources or land.

S-147 8. Page 8-8, Section 8.7.3.6 (*new*) Bachelor Slough Restoration. In Section 4.8.6 a statement is made that this restoration project is being implemented under Section 7(a) (1) of the ESA. Within Section 8.7.3.6 a statement is made that this project will only happen if the sediment sampling does not show contamination. If there is contamination is an alternative site required?

S-148 A statement is also made that the Corps will exercise navigational servitude for all R/W below the ordinary high water mark needed for dredging the slough. Why work with the State of Washington in other areas they own but use this method for dredging the slough and then in the same section state that a "no cost Cooperative Agreement" can be used for restoration within the 6 acres of state owned land along the slough? Additionally, the Corps states that a "short term dredged material disposal easement can be used for disposal on the 17 acre state owned site and that after disposal is complete US Fish and Wildlife Service can use that site to plant trees, etc for riparian restoration. What type agreement will be used for this and how does the Corps or Sponsors know this is an approved use for the site? Again, the Department would consider this use and the sites on USFWS land to be mitigation and be required to charge for the use.

S-149 Last, where will material from any maintenance dredging be placed if the other planned disposal sites are used for riparian restoration?

Corps of Engineers Response

S-144. Ownership boundaries on Howard/Cottonwood Island will be obtained through a survey to establish property ownership. The Corps, in conjunction with the sponsor ports, will share all necessary information obtained on these islands with WDNR to assist in defining state owned properties. The sponsor ports are required to obtain lands, easements, rights-of-way, relocations and disposal sites for the entire proposed action. They must conduct and complete thorough legal surveys, title searches and other real estate legal requirements to establish ownerships and property boundaries.

S-145. The Corps will be working in cooperation with your agency to define the ownership on Howard Island. The Corps understands the issue of accreted lands and the implication it has regarding state ownership. As surveys are conducted and completed, the Corps will share the information with WDNR staff to sort out the precise ownership on the island.

The sponsor ports will be tasked with determining the true property owners and property boundaries for lands required for project purposes. The Corps, in cooperation with the sponsor ports, will share this information with WDNR. Cooperatively, we will come to a consensus on property ownerships and ensure that the proper real estate instruments are established and implemented.

S-146. The Corps views placing Columbian white-tailed deer (CWTD) on Howard/Cottonwood Island to be an element of a bigger restoration action resulting from the ESA consultation and in cooperation with USFWS. If the CWTD is delisted, then the main flood control dikes around Tenasillahee Island could be breached allowing for natural restoration of tidal marsh habitat beneficial to a diverse array of fish and wildlife resources. CWTD were historically distributed along the Columbia River from near Astoria to The Dalles, Oregon (USFWS, 1976, Columbian White-tailed Deer Recovery Plan). This would have included Howard/Cottonwood Island. There are Columbian black-tailed deer on these islands presently. No management action by the Corps or sponsor ports is proposed for Columbian black-tailed deer.

The restoration feature for CWTD reintroduction at Cottonwood/Howard Island was derived during the ESA consultation. It is an action the Corps will undertake under Section 7(a)(1) of the ESA. Implementation of restoration features is not mandatory, but voluntary and thus is distinctly different from mitigation efforts which are mandatory. The restoration features are not linked to our wildlife mitigation efforts which were derived in a separate process and address direct impacts to wildlife and their habitat, including wetland habitat, from upland disposal actions.

Historically, CWTD inhabited riparian habitat along the Columbia River with animals reported as far upstream as The Dalles (USFWS, 1976, Columbian White-tailed Deer Recovery Plan). Thus, translocation of CWTD to Cottonwood/Howard Island is considered a reintroduction. Black-tailed deer are present on the island. Management of black-tailed deer on Cottonwood/Howard Island will be left to the USFWS and WDFW who are working cooperatively on a similar reintroduction downstream of Longview at Fisher Island. The Corps and sponsor ports will fund specific elements of the reintroduction effort at Howard/Cottonwood Island but will not participate in a management capacity.

9. Page 8, Exhibit J, 43 ft. Channel Deepening Sedimentation Impacts. Paragraph 2 mentions degradation of riverbed near deeper dredge cuts as bedload is deflected down the cut slopes and into the navigation channel. Paragraph 3 states that "sideslope adjustments
S-150 may extend to the shoreline around RM's 22, 42-46, 72, 76, 86, and 99." Given the complaints already voiced by some landowners and users in these areas, especially RM 42-46, how will the Corps and Sponsors handle future complaints, how will property damage be handled, and how will the States of Oregon and Washington be protected if lawsuits are filed concerning this erosion?

Although these sites have been used in the past for dredged material disposal, some of them haven't been used in a number of years. Have these erosion areas been characterized and/or
S-151 tested for contamination?

These impacts and questions need to be addressed in more depth in Section 6.2.2.4 (*new*) Accretion/Erosion also.

Thank you again for the opportunity to comment, and we look forward to working with the Corps and the project sponsors. If you have any questions, please contact me at (360) 767-7005 or by e-mail at gary.cooper@wadnr.gov.

Sincerely,

Gary Cooper

Gary Cooper
Assistant Region Manager
South/Central District

cc: Channel Improvement Project file
Dianne Perry, Oregon, Washington Ports
Laura Hicks, Project Manager, Army Corps of Engineers, Portland District
Ken O'Holleran, Port of Longview
Lanny Cawley, Port of Kalama
Brendan McFarland, Washington Department of Ecology
Bill Jolly, Washington Department of State Parks
Bob Burkle, Washington Department of Fish & Wildlife
Steve Manlow, Washington Department of Fish & Wildlife
Larry Paulson, Executive Director, Port of Vancouver
Fran McNair, Aquatics Region Manager
Loren Stem, Aquatic Division Manager
Robert Brenner, DMMP Coordinator, Aquatic Resources Division
Nancy Lopez, South/Central Aquatic Coordinator

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Corps of Engineers Response

S-147. The Bachelor Slough restoration feature is contingent upon the sediment to be dredged from the slough testing clean of contaminants. If the sediments do not pass contaminant screening criteria, the restoration action will be dropped and no alternative will replace it. Because this is a restoration action and not a mitigation action it is not necessary to off set project impacts.

No alternative site or action is required if sediments in Bachelor Slough are determined to be too contaminated for dredging and/or disposal based upon existing federal/state criteria established for sediments.

S-148. After meeting and discussing the proposed project with your staff, the Corps believes that WDNR understands the difference in the Corps' definitions of mitigation and restoration. The Corps will work closely with WDNR staff to jointly decide the proper real estate instrument for your property at Bachelor Slough.

S-149. There is no additional dredging proposed at Bachelor Slough in conjunction with the Corps proposed ecosystem restoration plan.

For the Bachelor Slough restoration feature, the Corps and ports will only conduct the initial dredging action and associated riparian forest development. Future O&M dredging of Bachelor Slough, if required, will be the responsibility of the USFWS.

S-150. The side slope adjustment is anticipated to occur in discrete localized areas. Theses areas were created by dredged material and are not part the historic natural bank line.

S-151. The material has been tested following the procedures in the DMEF (to which the WDNR is a signatory agency) and the material from the navigation channel is clean, medium grained sand with some fine and coarse grain sand. The material placed on shoreline disposal sites originated from the navigation channel, and therefore is also clean sand. Thousands of sediment samples have been collected and tested from a number of locations in the river for various reasons and projects. Some of these studies may be located in the areas described. There are no plans to conduct additional testing in these areas unless specific information can be provided that would establish a reason to believe that contamination may be present. As a member of the Regional Management Team for the DMEF, WDNR would be participating in any re-characterizations.

Corps of Engineers Response

Oregon
STATE BOARD OF AGRICULTURE

September 23, 2002

Bill Wyatt, Executive Director
Port of Portland
P.O. Box 3529
Portland, OR 97208

Dear Director Wyatt:

S-152 The State Board of Agriculture is writing for two purposes. First, we want to reiterate our support for the channel deepening of the Columbia River necessary to maintain Oregon's competitive shipping ability through our port system. A copy of a resolution passed by the Board last year stating this official position is enclosed.

S-153 Second, we would like to seek your response regarding issues related to dredge materials that will arise from this project. At a recent Board meeting we were provided information from Matt Van Ess, Director of the Columbia River Estuary Task Force, about the impacts of depositing dredge materials around the mouth of the Columbia River near Astoria. The concerns, as explained to the Board, include potential impacts on drift net fishing of salmon and other species in a location where recovery efforts are on-going through net-pen raised and released fish, as well as potential impacts on crab habitat. This group isn't directly opposed to the channel deepening, but they do continue to have deep concerns about where the dredging material is placed. Further, we heard concerns about "least cost disposal" that mandates dredge sand be dumped back into the river, which will simply continue to wash back into the channel and increase the cost of future channel maintenance.

S-154 We would be interested in knowing the Port's position and actions to minimize such impacts on the fishing industry around the mouth of the Columbia River and the long-term costs of river channel maintenance from in-river depositing of dredge materials.

Thank you for your response.

Sincerely,

Clint Smith

Clint Smith, Chair
Oregon State Board of Agriculture

Cc: Dave Hunt, Executive Director, Columbia River Channel Coalition
Col. Richard W. Hobernicht, Army Corps of Engineers

635 Capitol Street NE
Salem, OR 97310-0110

S-152. Your agency support is acknowledged.

S-153. See responses S-9 to S-11.

S-154. The Port of Portland discussed these issues with the Board of Agriculture at their December 11, 2002 meeting.

State Department of Agriculture
Hermiston, Oregon

State Board of Agriculture
September 12 & 13, 2001

ACTION ITEM: COLUMBIA RIVER DREDGING

RESOLUTION NO.: 222

Therefore, be it resolved that the Oregon Board of Agriculture supports the Port of Portland's proposal to dredge a section of the lower Columbia River.

Be it further resolved that the Board encourages the Port's continued efforts to work with local landowners on land use issues.

ACTION:

Moved By: Rick Gustafson

Seconded By: Reid Saito

Action Taken: Motion passed unanimously by roll call vote.