



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, PORTLAND DISTRICT
PO BOX 2946
PORTLAND OR 97208-2946

REPLY TO
ATTENTION OF

Programs, Planning and
Project Management Division (1165-2-26a)

Mark Schneider
Perkins Coie
1201 Third Avenue, Suite 4800
Seattle, WA 98101-3099

Dear Mr. Schneider:

This letter is in response to your comment letter, dated February 28, 2003, with regards to the Final Supplemental Integrated Feasibility Report and Environmental Impact Statement for the Columbia River Channel Improvement Project.

Your concerns have been addressed in the attachment in a side-by-side format, Final SEIS and in responses to your earlier comments. The remainder have been addressed through the receipt of the 401 Water Quality Certification from the Department of Environmental Quality and Washington Department of Ecology (WDOE) the Coastal Zone Management (CZM) consistency determination from the Oregon Department of Land Conservation Division and WDOE, as well as through project modifications made as a result of those approvals (e.g., deletion of Miller-Pillar ecosystem restoration feature) and implementation of programs identified in those approvals (e.g., Regional Sediment Management). As you know, the State of Washington issued similar Water Quality and CZMA approvals. Copies of state approvals for Water Quality and CZM are available on the Corps' web site at <https://www.nwp.usace.army.mil/issues/CRCIP/pubs.htm>

Thank you for taking the time to comment on the Columbia River Channel Improvement Project.

Sincerely,

Robert E. Willis
Chief, Environmental Resources
Branch

Enclosure



1201 Third Avenue, Suite 4800
Seattle, WA 98101-3099
PHONE: 206.583.8888
FAX: 206.583.8500
www.perkinscoie.com

February 28, 2003

VIA EXPRESS MAIL AND E-MAIL

Colonel Richard Hobernicht
Commander
Army Corps of Engineers
US ACE-Portland
Attn: CENWP-PM-F (CRCIP)
P.O. BOX 2946
Portland, OR 97208-2946

Robert E. Willis
U.S. Army Corps of Engineers, Portland District
CENWP-EM-E ATTN: Robert Willis
Operations Division
P.O. Box 2946
Portland, OR 97208-2946

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

**Re: Comments on Final Supplemental Environmental Impact Statement for
Columbia River Channel Deepening Project**

Dear Col. Hobernicht, Mr. Willis and Ms. Grigg:

On behalf of the Columbia River Alliance for Nurturing the Environment (“CRANE”), this letter provides comments on the U.S. Army Corps of Engineers’ January 2003 Final Supplemental Integrated Feasibility Report and Environmental Impact Statement (“FSEIS”) for the Columbia River Channel Deepening Project. We believe that the FSEIS and the Biological Opinions on which it is based are legally, economically and scientifically flawed, and offer these comments to demonstrate that

Your comments are noted and detailed responses are provided below.

ANCHORAGE • BEIJING • BELLEVUE • BOISE • CHICAGO • DENVER • HONG KONG • LOS ANGELES
MENLO PARK • OLYMPIA • PORTLAND • SAN FRANCISCO • SEATTLE • WASHINGTON, D.C.
Perkins Coie LLP (Perkins Coie LLC in Illinois)

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 2

(a) the Biological Opinions do not meet the standard set forth under Section 7 of the Endangered Species Act and consultation should be withdrawn and reinitiated, and (b) the Corps should withdraw the FSEIS and reissue a revised FSEIS that remedies the deficiencies identified in this letter.

**I. THE FSEIS REPEATS ERRORS AND OVERSIGHTS
IN THE PROJECT'S EARLIER ENVIRONMENTAL REVIEW
DOCUMENTS**

The DSEIS repeats many of the same errors and oversights that appeared in the October 1998 Draft Environmental Impact Statement ("DEIS"), the August 1999 Final Environmental Impact Statement ("FEIS") and the July 2002 Draft Supplemental Integrated Feasibility Report and Environmental Impact Statement ("DSEIS"). In particular, the Corps' analysis continues to ignore the effects of significant interdependent and interrelated activities in its environmental and economic analyses. CRANE renews the objections and comments raised in Perkins Coie's letters on behalf of CRANE in response to the DSEIS and the Corps' applications to the States of Washington and Oregon for Water Quality Certification and Coastal Zone Consistency Determinations. & Correspondence from Perkins Coie to Col. Richard Hobernicht (Sept. 13, 2002) ("DSEIS Comment Letter"); Correspondence from Perkins Coie to Loree Randall (Jan. 15, 2003) and Correspondence from Perkins Coie to Russell Harding and Christine Valentine (Jan. 15, 2003) (collectively, "Water Quality and CZMA Comments"). In addition, CRANE renews the comments and objections raised by Perkins Coie on behalf of CRANE member Paul L. King, which commented upon the DEIS and FEIS. & Correspondence from Perkins Coie to Steve Stevens (Feb. 4, 1999) ("DEIS Comment Letter"); Correspondence from Perkins Coie to David B. Sanford, Jr. (Nov. 12, 1999) ("FEIS Comment Letter").

The bases for these objections and comments include, among other things, (a) CRANE'S continued concern that the impacts of the Corps' proposal for dredging and dredged spoil disposal on the Lower Columbia River ecosystem have not been adequately examined and considered, (b) the Corps' failure to adequately disclose and analyze the impacts of sponsor ports' use of the dredge spoils through interrelated and interdependent actions, (c) the Corps' continued inclusion of the Gateway 3 parcel as an upland disposal site, (d) the Corps continued failure to properly assess the benefits,

Your earlier comments are noted. They have previously been responded to and the issues raised in them are addressed in the Final SEIS. Again, detailed responses to specific comments identified in your February 23, 2003 letter are provided below.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 3

costs, and feasibility of the project, and (e) the Corps' continued failure to address comments related to the Channel Deepening Project's wetland, fish and wildlife impacts .

II. THE FSEIS IS FLAWED IN ITS REVIEW OF PROJECT-RELATED ENVIRONMENTAL AND ECONOMIC IMPACTS

In addition to reiterating its previous comments regarding the issues listed above in Section I, CRANE offers the following supplemental comments on the analysis provided in the FSEIS and related documents.

A. **The FSEIS's analysis of Project-related impacts suffers from significant methodological flaws, and misrepresents the body of knowledge about the affected ecosystem and the likely economic impacts of the Project.**

Although Sections B and C below provide more specific comments on the FSEIS's economic and biological aspects, respectively, CRANE offers the following preliminary observations that demonstrate the failings in Corps' overall approach to the FSEIS.

1. As discussed in detail in Section II(C), the Corps continues to mischaracterize the participation of Sustainable Ecosystems Institute ("SEI") in the development of Channel Deepening review documents. Throughout the FSEIS, the Corps suggests that SEI reviewed and approved of the Corps' approach in the FSEIS and DSEIS. See, e.g., FSEIS, at page 1-5. In fact, SEI has not endorsed the document nor did it "approve or disapprove" any analysis or policy action." See Correspondence from Dr. Steven Courtenay (Feb. 12, 2002) (attached as Exhibit 1).
2. The Corps has redesigned the Project to funnel dredged spoils to flowlane disposal and to Lois Island and Miller Pillar as a way to avoid ocean disposal for the first twenty years of the Project's life. See FSEIS, at page 1-7. The Corps admits that this plan is contingent upon the full implementation of the Lois Island and Miller Pillar restoration actions so that the Corps will have the necessary area to place dredged spoils it would otherwise dump in the ocean-an outcome which is less

Your comments in Section II cite a number of articles and studies. We have reviewed these citations in preparing the following responses. Where relevant and appropriate, discussion of and responses to specific studies are provided below.

A.1: The Corps disagrees with the commenter's statement. The Corps, NOAA Fisheries, and the USFWS retained the Sustainable Ecosystem Institute ("SEI") to determine and provide a clear statement of the best scientific and commercial data available, the need for any new studies, and the risk of proposed management alternatives. In addition, SEI was responsible to convene a panel of experts to assist the agencies in addressing specific scientific issues pertaining to the potential impact of the project on listed salmonid stocks. CRANE mischaracterizes the Corps' discussion in the FSEIS at 1-5.

A.2: We disagree with your characterization of "funneling" dredged spoils to flowlane disposal and to Lois Island and Miller Pillar as a way to avoid ocean disposal. Disposal at Lois Island is to create tidal marsh habitat to aid in the recovery of ESA stocks and to beneficially use dredged material. See our detailed response to your comment II.A.23. The State of Oregon has disallowed disposal at the Miller-Pillar ecosystem restoration feature; therefore no response is required for this site.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 4

than certain to occur. See FSEIS, at page 4-6 (“If the restoration features in the estuary are not fully implemented, then the alternative would be to dispose of material into USEPA-designated ocean sites as described in the 1999 Final IFR-EIS.”)

3. The Corps continues to exclude the costs of several restoration projects from the cost-benefit analysis for the Project despite the fact that the FSEIS includes the restoration projects in the study area (FSEIS, at page 2-1) and describes restoration as one of the goals of Channel Deepening. See FSEIS, at page 4-3 1 (noting that restoration features “are considered part of the project”). The Corps justifies the exclusion of the restoration projects with the claim that they are voluntary conservation measures that are implemented to satisfy ESA Section 7(a)(1) utilizing authorities or funding that is distinct from the Channel Deepening Project. However, it is evident that the Corps has included the restoration projects in the FSEIS to create the impression that the restoration will mitigate for the impacts of the Channel Deepening Project. The *Corps* has exploited this distinction to have it both ways; the restoration projects allegedly add no cost to the Project, but regulatory agencies perceive them to be mitigation for the Channel Deepening Project. For example, in Exhibit K-9 (Consistency with Washington Local Shoreline Master Programs), the Corps’ description of the Channel Deepening “Project” includes the ecosystem restoration projects to demonstrate that the Corps has satisfied the regulatory requirements of local shoreline master programs and critical areas ordinances under Washington law. See FSEIS, Exhibit K-9, Consistency with Washington Local Shoreline Master Programs, at page 9 [hereinafter “Shoreline Consistency Report”]. Likewise, the Washington Department of Natural Resources views the “restoration” projects as “mitigation” for Channel Deepening. FSEIS, Vol. 4, Comment Letters on the Draft SEIS and Corps Responses, at page State-70 [hereinafter “Response to Comments”]. Because the Corps relies on the restoration projects for regulatory approval of the Channel Deepening, the costs of those project features should also be included in the FSEIS’s cost-benefit analysis.
4. Despite the fact that the operations and maintenance of the Mouth of the Columbia River (“MCR”) and the 40-foot navigation channel have been separately reviewed and authorized in the past, (see FSEIS, at pages 2-1, 6-71), the fact remains that

A.3: Contrary to CRANE’s assertion, the FSEIS and the FEIS explicitly disclose the costs of the ecosystem restoration features. In accordance with Corps’ guidance, however, those costs are not included in the NED analysis.

The FSEIS and the FEIS both plainly describe the costs associated with the ecosystem restoration features. See FSEIS, Section 4.8.7, pp. 4-46 – 4-51 and Section 8.2, p. 8-1 (Table S8-1); see also FEIS, Section 4.8.5, p. 4-77 and Section 8.2, p. 8-1 (Table 8-1). In fact, the FSEIS contains a new subsection specifically to address the cost effectiveness and incremental cost analysis of the ecosystem restoration features. See FSEIS, Section 4.8.7, p. 4-46.

CRANE’s contention that ecosystem restoration features should be included in the NED analysis misconstrues the fact that ecosystem restoration activities are separate and distinct from the fish and wildlife mitigation actions. Mitigation actions “compensate for unavoidable adverse environmental impacts resulting from new project construction and operation.” See FEIS, Section 4.8, pp. 4-70. Ecosystem restoration activities “are separate studies that examine the condition of existing ecosystems, or portions thereof, and determine the feasibility of restoring degraded ecosystem structure, function, and dynamic processes to a more natural condition.” *Id.* As a result of its misunderstanding, CRANE mischaracterizes the Corps’ economic analysis obligations with respect to ecosystem restoration features.

According to the Principles and Guidelines, “[c]osts for features not required for project purposes, avoiding adverse effects, and/or mitigating fish and wildlife habitat losses are not project-related [National Economic Development (“NED”)] costs and should not be evaluated.” Principles and Guidelines, Section 2.12.4. As described in the FEIS, ecosystem restoration features are voluntary measures under Section 7(a)(1) of the Endangered Species Act and are not mitigation measures associated with the Project. As a result, ecosystem restoration costs are not NED costs as defined by the Corps’ Principles and Guidelines, so the Corps did not include them in its NED cost-benefit analysis. See FSEIS, Section 8.2, p. 8-1.

In contrast, the Project’s mitigation costs are included in the General Navigation Features and the NED analysis, because mitigation costs are NED costs. See FSEIS, Section 8.2, p. 8-1; see also Principles and Guidelines, Section 2.12.5(e) (defining fish and wildlife mitigation costs).

A-4: The comment confuses three distinct projects. Two of the projects – maintenance of the existing 40’ channel and maintenance of the separately authorized Mouth of the Columbia River – represent the current conditions, i.e., maintenance of previously constructed projects. The third – which is the subject of the FSEIS – is deepening of the inner channel from 40’ to 43’ and maintaining the 43’ channel once constructed. Further, once the 43’ channel is constructed, the 40’ channel project effectively ceases to exist.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 5

access to the Columbia River Channel must come through the MCR and a deeper navigation channel will be maintained using dredging practices and disposal sites in common with the maintenance of a 40-foot channel. As a result, these actions are interrelated and interdependent and must be considered with the effects of the proposed action in the same environmental review document. However, a comprehensive and clear review has not been presented for the Channel Deepening Project. To reduce the scale of the dredging effect, the Corps has segmented the action so that continued channel maintenance is portrayed as a baseline environmental condition implemented through the no action alternative.

The environmental documents describe the Project as construction and maintenance of the deepened channel, implementation of restoration projects and location of disposal sites for Channel Deepening and operation and maintenance of MCR and the 40-foot navigation channel. While this appears to encompass all dredging, the description of the action excludes the actual operation and maintenance dredging from the action and includes only the disposal sites. This thin distinction denies the decisionmaker and the public the opportunity to fully understand the scope of the proposed action together with interrelated and interdependent dredging actions.

The environmental impacts and costs under consideration are driven by the quantities of material that are dredged and the relative location of dredge disposal. The environmental documents dating from 1999 indicate that, ' under most optimistic assumptions, the total amount of dredge material that must be disposed of in the next 20 years either greatly exceeds the capacity of the disposal sites set forth in the FSEIS or requires more ocean disposal than the Corps has disclosed, or requires more maintenance-intensive flow-lane disposal that shifts costs from Channel Deepening to maintenance.

The 1999 NMFS biological opinion for channel maintenance indicates that MCR maintenance requires dredging of 4-5 mcy per year or a total of 80-100 mcy over 20 years. See generally National Marine Fisheries Service, Biological Opinion on Corps of Engineers' Columbia River Channel Operation and Maintenance Program (Sept. 15, 1999) (attached as Exhibit 2) [hereinafter "NMFS Channel

CRANE's comment confuses the relationship between the Columbia River Channel Improvement Project (CRCIP) and dredging the Mouth of the Columbia River Project (MCR). Congress separately authorized the MCR Project in July 1884, March 1905, September 1954, and July 1983. The MCR provides for a one-half mile wide channel across a bar; 55 feet deep for the outer most 2,000 feet, and 48 feet deep along the southern 640 feet, to be secured by two rubblemound jetties, spur jetty "A" on the north shore and by dredging. MCR dredging receives separate funding, ESA clearance, Clean Water Act Section 401 water quality certification and Coastal Zone Management Act concurrence.

MCR dredging is currently performed in conjunction with maintenance of the forty foot channel and would continue to be performed as part of maintaining a forty-three foot channel. *See* responses to prior Comments, Final SEIS, Volume 4, Stakeholders/Special Interests, pp.138, SS-232. In other words, MCR dredging will continue regardless of whether channel deepening occurs. As a result, the FSEIS includes a discussion of MCR dredging in the cumulative effects analysis. *See* Final SEIS, Section 6.12.2.1, p. 6-69. No change to the MCR project is necessary or planned to support the Channel Improvement Project.

Under the National Environmental Policy Act (NEPA) and Washington's State Environmental Policy Act (SEPA), the environmental documentation must disclose the impacts of the project under consideration – i.e., the deepening project and subsequent maintenance of the inner channel – relative to the current base condition. The on-going maintenance of both the MCR Project and the 40-foot inner channel are included and discussed in the FSEIS as it relates to the current condition. This was done as prescribed under NEPA and SEPA, not as a means to segment the project as suggested by the commenter. However, the disposal plan accounts for the entire inner channel dredging prism, which, for initial construction includes an increment attributable to current maintenance needs for the 40' channel as well as an increment attributable to new construction of the 43' channel. The disposal plan was also developed to accommodate volumes associated with future maintenance of the 43' channel.

The commenter is incorrect that the disposal plan has insufficient capacity to accommodate the dredged material forecasted for the 20-year planning horizon for the project. This is discussed in depth on pages 4-11 through 4-45 of the 1999 Final IFR/EIS.

CRANE asserts that the total amount of dredge material will exceed the capacity of the sites in the disposal plan, will require more ocean disposal sites, or will require more flow-lane disposal. CRANE p. 5. Contrary to this unsubstantiated assertion, the FEIS, FSEIS and Endangered Species Act review for the Channel Improvement Project all fully address dredging and disposal needs related to constructing and maintaining the forty-three foot channel. Moreover, CRANE does not seem to understand that the 20-year volumes of dredged material reported in the Corps documents reflect and include all future maintenance volumes for the 43-foot project. There is no separable maintenance volume for the 40-foot channel once the 43-foot channel is constructed. After construction, the 40-foot maintenance volume is accounted for in the total, 20-year, 43-foot maintenance volume. In addition, projected volumes for the project include advanced maintenance for both over-depth and over-width areas.

The FSEIS further explained the projected volumes of material to be dredged as part of the Channel Improvement Project. *See* pages 4-2 through 4-9. We agree with the reduced construction volumes the commenter listed from the 1999 FEIS and 2003 FSEIS. These volumes are reflected on page 1-8 of the FSEIS and the differences in the volumes are explained in the document. CRANE asserts that the disposal capacity is insufficient to maintain the project as proposed to be constructed. However, CRANE's comment reaches this conclusion by comparing disposal plan capacity for the channel improvement project with dredge volumes for both the channel improvement project and the MCR project. In other words, CRANE's comment ignores the disposal capacity associated with the MCR project's separate disposal plan. The table below provides the appropriate comparison – disposal plan capacity and dredge volumes for the channel improvement project only.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 6

Maintenance BiOp”]. This estimate is repeated in the FSEIS. See FSEIS, at page 6-69. The NMFS Channel Maintenance BiOp also indicates that channel maintenance for a 40-foot channel will require dredging of 4-6.5 mcy per year or a total of between 80 and 130 mcy over 20 years. According to the NMFS Channel Maintenance BiOp, the total need for maintenance dredging disposal over 20 years (exclusive of Channel Deepening construction and maintenance) is between 160 mcy and 230 mcy. The U.S. Fish and Wildlife Service (“USFWS”) 2002 Biological Opinion for Channel Deepening describes total maintenance dredging as the low point in this range or 160 mcy. Estimates provided in the Corps’ 2001 Channel Deepening Biological Assessment roughly correspond with this figure, describing the channel maintenance dredging quantity at 3 to 8 mcy per year for 20 years. It is reasonable to conclude, therefore, that MCR and navigation channel maintenance alone, without Channel Deepening, will require disposal sites with a capacity of at least 160 mcy, and probably more, over the next 20 years.

In addition to maintenance of MCR and the existing navigation channel, the disposal needs of the Channel Deepening must be satisfied. The 1999 FEIS indicated that construction phase of Channel Deepening, alone, would require disposal of at least 18.4 mcy of sediment. In the 2003 FSEIS, that figure is now 14.5 mcy, but it is unclear why 4 mcy disappeared. It is also unclear whether maintenance of the deepened channel adds to the total quantity of dredge spoils generated by maintenance of the existing channel and MCR. The FSEIS never tells the reviewer what that quantity would be and how it might or might not be distinguished from maintenance of the existing channel and MCR.

Assuming, conservatively, that Channel Deepening will add only 14.5 mcy to the Corps disposal needs, the total quantity of dredge spoils (construction and maintenance) that the Corps must accommodate over the next 20 years ranges from approximately 175 mcy to 245 mcy. Yet the FSEIS for the Project identifies a total disposal capacity for upland, flow lane, and “restoration” fills of only 105 mcy—far short of needed 175-245 mcy. It might be that the Corps will resort to ocean disposal to address part of this shortfall, but the Corps has indicated that ocean disposal will not be used during the first 20 years of the project. In the end, the Corps has not disclosed the total dredging and disposal activities and impacts

	Channel Improvement Project Disposal Site Capacity (not including ocean disposal)	Channel Improvement Construction Volume	Channel Improvement 20-year O&M dredging (not including construction volumes)	Total Channel Improvement 20-year Dredging Volume including construction
Volume (in million cubic yards)	At least 108	~15	~91	~106

2003 Final SEIS pages 4-4 and 4-5. See also FEIS at p. 4-13.

In sum, the commenter uses inappropriate comparisons to draw their conclusions and we disagree with their analysis. All dredging and disposal volumes associated with the project are fully disclosed in the FSEIS, and all dredging volumes are provided for in the disposal plan.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28,2003
Page 7

that will occur in the Lower Columbia River over the next 20 years. This violates the requirements of NEPA because it misleads the interested public and the authorizing agencies on a very significant metric by which to measure environmental impacts and economic costs for the Project.

For the same reason, ESA consultation on channel maintenance should be reinitiated under the terms of the NMFS Channel Maintenance BiOp. That opinion expires and requires reinitiation by its own terms in September 2004, or sooner if dredging will have effects not considered in the 1999 opinion. Under the Corps' proposed Channel Deepening, channel maintenance is expanded and utilizes disposal sites not previously considered by NMFS. Accordingly, consultation must address the combined effects of MCR and channel maintenance and Channel Deepening. The Corps continues to segment these portions of the Project unlawfully. CRANE incorporates by reference its comments on the Corps' most recent plans to maintain the MCR, which reiterate the interconnected and interdependent natures of these projects. See Correspondence from Perkins Coie to David C. Beach, P.E., et al. (Mar. 3,2003).

Lawful agency decision making and meaningful public participation require that the Corps fully disclose and consider the joint environmental effects and economic costs of not only the Channel Deepening construction and maintenance, but the continued maintenance of the 40-foot navigation channel and the MCR navigation channel. Without a comprehensive disclosure and description of these connected actions, it is nearly impossible for the decision-maker and the public to ascertain whether the Corps has properly assigned the costs and environmental effects of each project. Without full disclosure, it may be that the Corps has improperly shifted some costs of Channel Deepening to future MCR and channel maintenance costs. This could be done directly by assigning the wrong percentage of costs to Channel Deepening, or indirectly by using Channel Deepening dredge spoil disposal techniques that reduce costs for Channel Deepening, but increase costs for channel and MCR maintenance (e.g., flowlane disposal or restoration and upland disposal sites that erode and become future channel maintenance issues and costs). See Response to Comments, at page State-71 (State of Washington comments that flow lane disposal is simply least-cost disposal method with high

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 8

environmental impacts and deferred costs as sediments are repeatedly dredged). For example, the USFWS 2002 Biological Opinion for Channel Deepening describes “advanced maintenance dredging” as a practice that will occur during construction of the Channel Deepening, resulting in overdepth dredging to 48 feet as part of maintenance of a 40-foot navigation channel. See USFWS, Biological and Conference Opinion for Columbia River Channel Improvements Project, at page 9 (May 20, 2002). It is unclear whether the Corps considers advanced maintenance dredging as part of the no action alternative or the proposed action, and it is unclear whether the costs of “advanced maintenance dredging” were improperly excluded from the cost-benefit analysis for the Project even while such dredging is used to construct a 43-foot navigation channel.

5. The Corps continues to rely on the Adaptive Management Team (“AM,”) to determine whether future project modifications will be necessary without providing appropriate standards against which the AMT can measure project success or failure (see, e.g., FSEIS, at pages 4-12 (attainment of tidal marsh-intertidal flat habitat); 4-20 (bull trout critical habitat); 4-36 (Miller-Pillar restoration feature installation of final two pile dikes); 4-52-4-53 (ecosystem evaluation actions); 6- 18 (application of Rodeo® to purple loosestrife)), despite the fact that the purported “[e]mphasis on recovery o f . . . ESUs is now shifting to the lower Columbia River.” FSEIS, at page 4-53. As CRANE has commented in previous correspondence, the Corps and its cooperating agencies must set meaningful standards for Project success to inform adaptive management decisions if it is to achieve this crucial recovery.
6. In comments on the DSEIS, the Environmental Protection Agency called for more detail on how proposed monitoring will be used with adaptive management benchmarks and processes to trigger certain actions when and if the adverse effects of the Project are more severe than anticipated. Response to Comments, at page Federal-5. The Corps’ response reveals a major flaw in the public review process for the Project. The Corps assures EPA that a draft monitoring and adaptive management implementation plan has been sent to NMFS and USFWS for review. Remarkably, the Corps neglected to provide the implementation plan to other agencies and the interested public in the review process for the Project.

A.5: See the response regarding the adaptive management program at the beginning of Section II.C.

A.6: See the response regarding the adaptive management program at the beginning of Section II.C of this response. In addition, the Corps documents pertaining to Adaptive Management, including the implementation plan, were and remain available on the Corps website.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 9

7. The Corps continues to rely on conceptual modeling to conclude that likely Project impacts will be insignificant, despite the fact that the conceptual modeling they employ is not appropriate as a predictive device in these circumstances. See, e.g., FSEIS, at page 6-60 (“[T]he conceptual model also demonstrates that the project complies with the Survival Guidelines in ORC 635- 100- 13 5. Specifically, the analysis demonstrates that the project should not degrade water quality, reduce stream flows, affect gravel in spawning areas, or adversely affect riparian habitat.”). This issue is discussed in detail in Section II(C) below.
8. The Corps asserts that the “Shillapoo Lake restoration feature will substantially improve waterfowl and wildlife habitat management capabilities.” FSEIS, at page 4-25. Despite the involvement of Washington Department of Fish and Wildlife (“WDFW”) in the Shillapoo Lake restoration feature, questions exist as to the project’s overall benefit to habitat. A recent newspaper article notes that “the Corps, the National Marine Fisheries Service, the Natural Resources Conservation Service and the Lower Columbia Fish Recovery Board have all expressed misgivings about whether the Shillapoo Lake project is a true ‘restoration’ project and a good use of federal dollars” based on the project’s exclusion of salmon and steelhead. See Kathie Durbin, “State Wants to Revamp Lake Bed,” Vancouver Columbian (Nov. 2, 2002) <http://www.columbian.com/11022002/front_pa/330842.html> (attached as Exhibit 3). Based on these concerns, it appears that the Corps has overstated the likely benefits associated with the Shillapoo Lake restoration project.
9. The Corps proposes to limit monitoring of the fisheries surrounding Bachelor Slough to three years. FSEIS, at page 4-46. The DSEIS had allowed a five-year monitoring period. Despite consistent public and agency concern about the effects of restoration actions on Columbia River fisheries, the Corps offers no explanation for this cutback in commitment to monitoring.
10. The Corps has failed to consider the effects of the project on Green Sturgeon—a candidate species for listing under the ESA. 68 Fed. Reg. 4433 (Jan. 29, 2003) (attached as Exhibit 4). Green Sturgeon concentrate in large numbers in the Columbia River estuary during late summer when maintenance dredging occurs and Channel Deepening is planned. Id. at 4434. Most of the sturgeon

A.7: See the response regarding the conceptual model at the beginning of Section II.C.

A.8: We disagree that the FSEIS overstates the environmental benefits associated with the Shillapoo Lake ecosystem restoration feature. Our statement of benefits is consistent with the level of restoration proposed. The Shillapoo Lake restoration feature will substantially improve waterfowl and wildlife habitat. Water and vegetation management capabilities associated with the feature implementation are expected to provide improved water and forage conditions for these species assemblages. Under current conditions, WDFW is dependant upon agricultural crops grown in the lake bed for waterfowl forage and stored interior drainage during winter and early spring to supply water to the management area. Post restoration, the features will enhance WDFW’s management capabilities for year-round water supply and allow for management for moist soil and aquatic plant communities. The feature will not provide habitat or access/egress for fisheries resources, particularly salmonids, nor provide substantial detrital export to the Columbia River. The Corps and the Federal and State resource agencies have reached an agreement on the restoration feature at Shillapoo Lake and the FSEIS presents the agreed upon plan.

A.9: The commenter is correct in that the DSEIS stated a 5-year monitoring period, while the FSEIS states a 3-year monitoring period. The Ecosystem Restoration Feature (“ERF”) Implementation Plan lays out a 3-year monitoring period with monitoring to be implemented by the U.S. Fish and Wildlife Service. We believe that a three-year effort is sufficient to characterize the results of the restoration feature and provide a basis for future decisions. The reduction in monitoring was based on ensuring that monitoring costs did not exceed the cost of the feature. ERFs are voluntary actions to be implemented under Section 7(a)(1) of the Endangered Species Act. The Bachelor Slough feature was proposed by the U.S. Fish and Wildlife Service, Ridgefield NWR, who recommended the action based upon their best professional judgment and field experience. Monitoring efforts at Bachelor Slough have been coordinated with and approved by both the U.S. Fish and Wildlife Service and NOAA Fisheries through their review of the Implementation Plan, Terms and Conditions, Columbia River Channel Improvement Project. Monitoring reports, to include provision of recommendations on potential methods to improve the restoration feature, will be provided to NOAA Fisheries and the USFWS by December 1 of each monitoring year. Therefore, we believe that there is flexibility to the monitoring effort, should the results demonstrate the need for additional effort. The Implementation Plan can be viewed on the Corps online web page - crcd\Final Supplemental EIS\Implementation plan.

A.10: CRANE’s initial comment presumes that there will be substantial impacts to sturgeon habitat, behavior, or forage; however, data does not support this claim. Also, NOAA Fisheries has declined to list the green sturgeon as an endangered species. 68 Fed. Reg. 4433, 4441 (Jan 29, 2003). Although green sturgeon enter the Columbia River estuary, the implication that there are large concentrations only in the Columbia River estuary is unsupported by the data and mischaracterizes the information in the Federal Register that states that

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 10

concentrated in the Columbia River are young fish (which would be more susceptible to entrainment due to size and mobility), but mature sturgeon and even a ripe Green Sturgeon (ready to spawn) have been detected in the Lower Columbia. *Id.* Scientists believe that fish from all known breeding populations of sturgeon are found in the Columbia, making the entire species particularly vulnerable when there are impacts to large concentrations there in late summer.

The Corps offers no meaningful data or analysis on the effects that the Project will have on Green Sturgeon concentrated in the estuary. The Corps has not reviewed likely Project impacts on Green Sturgeon specifically, but merely asserts that its White Sturgeon analysis should be considered sufficient for both species. FSEIS, at pages 6-5, 6-22-6-23 (“Because green sturgeon occupy similar habitat to white sturgeon, and because they are thought to behave similarly, the conclusions of the studies regarding behavior of and potential effects on white sturgeon should apply equally to green sturgeon.”). Even assuming White Sturgeon were an acceptable substitute for Green Sturgeon, the Corps has no meaningful analysis of the effects of the project on White Sturgeon. Baseline studies regarding the use of likely disposal areas by White Sturgeon are not yet complete and specifically warn that they are not suitable to analyze the effects of the Project on sturgeon. FSEIS, Exhibit K-1, Evaluation Report White and Green Sturgeon (Revised), at page 3 [hereinafter “Sturgeon Report”]. Even if it were appropriate to rely on White Sturgeon data for information about likely effects on Green Sturgeon, in the absence of reliable baseline data or effects analysis, it is impossible to conclude with sufficient certainty that Channel Deepening is unlikely to affect sturgeon habitat. This is especially true where what little data the Corps can produce indicates that “some fish were in close proximity to the Dredge Oregon on several occasions.” *See* Sturgeon Report, at page 4. The Corps does not even approach the expectations of the State of Washington, Department of Ecology (“Ecology”), that the Corps develop a matrix of potential adverse impacts to sturgeon, specific mitigation measures and a monitoring plan to continually assess impacts on sturgeon. *See* Response to Comments, at page State-33.

11. The FSEIS discloses that loose rock will be removed by mechanical dredge at the Vancouver Bar and Vancouver turning basin, in addition to the Longview site.

large concentrations of green sturgeon enter three estuaries in Washington: “[G]reen sturgeon . . . are commonly observed . . . with particularly large concentrations entering the Columbia River estuary, Willapa Bay and Grays Harbor during the late summer.” 68 Fed. Reg. 4433, 4434. The Corps has learned that NOAA Fisheries has begun an acoustic tagging study of green sturgeon in Willapa Bay. The purpose of the study is to track sturgeon movement along the west coast. The Adaptive Management Team will review any relevant data from that study.

Available by-catch data from Oregon and Washington salmon fisheries suggest that the commenter’s conclusion that the estuary is concentrated with young fish is incorrect (Beamesderfer and Webb 2002). The by-catch data suggests exactly the opposite—that the fish are of larger size (Beamesderfer and Webb 2002). Further, NOAA Fisheries states that no green sturgeon spawn in the Columbia River. 68 Fed. Reg. 4433, 4434.

Green sturgeon are not widely distributed in the Columbia River, and, as noted above, do not spawn in the Columbia River. WDFW and ODFW’s sampling above RM 30 has not detected green sturgeon either at or above RM 30. See K-1 at page 8. ODFW and WDFW conducted systematic sampling (using setlines and gill nets) for sturgeon for two years and did not capture a green sturgeon. Ex. K-1 at 8, 10-11. The sampling occurred during summer, winter, and spring at three proposed in-water disposal sites at river miles (“RM”) 20.4 to 21.4 (Harrington Sump); RM 29.7 to 30.51 (Three Tree Point); and RM 71.02 – 72.5 (Carrolls Channel). The sampling occurred during the summer, when green sturgeon enter the Columbia River Estuary. Ex. K-1 at 8; 68 Fed. Reg. 4433, 4434.

The Corps has also conducted extensive entrainment sampling in the lower Columbia River and has not captured a green sturgeon during those studies. Sampling has occurred from the mouth of the Columbia River to approximately river mile 106. Larson (1993); R2 Resource Consultants, Inc. (1999), see 1999 IFR/FEIS, p 6-18. Again, the sampling occurred during summer, when green sturgeon are known to enter river. *Id.*, 68 Fed. Reg. 4433, 4434.

As the commenter acknowledges, the USGS has a study underway to assess the effects of dredging and disposal on white sturgeon using acoustic telemetry. The use of acoustic telemetry permits the researchers to continuously monitor sturgeon movements in real time. The USGS provided the Corps with a study status report on September 24, 2003. The USGS has collected significant amounts of data on the tagged fish because the telemetry system used was deployed for nearly 14 months. The USGS monitored sturgeon during two pipeline and one hopper dredge operations, the same type of dredges to be used for the Project. During dredging and disposal operations, the researchers observed fish near the dredges, and operations did not result in tagged fish leaving the area. To date, the impacts appear insignificant enough to not warrant monitoring. The researchers would have applied acoustic tags to green sturgeon had any been captured. The Corps intends to continue the acoustic telemetry studies during 2004 at the RM 5 disposal site, where there will be a greater opportunity to tag green sturgeon.

The commenter’s statement regarding the researcher’s observation of sturgeon near the Dredge Oregon was apparently taken out of context. It appears that the commenter believed that having fish in close proximity to the Dredge Oregon was detrimental. The intent of the study is to determine if fish exhibit an adverse reaction to dredging operations. The purpose of this statement in the USGS progress report was to convey that white sturgeon were still occupying habitats that were in close proximity to dredging operations while dredging was ongoing.

The USGS study will provide, and has begun to provide, the information CRANE seeks on Project effects on sturgeon behavior and habitat. This information will reveal how sturgeon use deep water habitat and their response to dredging and disposal actions. This will assist the Corps with how to modify dredging and disposal operations to minimize the impacts to sturgeon, if necessary. The studies and analysis will be completed before Project construction. Ecology’s comments on a monitoring program related to in-water disposal that used pinpoint disposal actions. Finally, the State of Washington has imposed mandatory compliance provisions in its

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 11

See FSEIS, at 6-6. To the best of our knowledge, the impacts of loose rock removal at these sites have not been analyzed in either the FSEIS or the previous environmental documents.

12. According to the FSEIS, “[w]ater quality effects for the channel improvement project would be similar to what is encountered during maintenance of the current channel.” FSEIS, at page 6-18. The FSEIS fails to discuss the impacts of disposal on aspects of water quality other than those for which the Columbia River is already water quality limited; in particular, we note that any increase in flowlane disposal will likely result in additional turbidity and suspension of sediment. These impacts to water quality must be addressed in the FSEIS.
13. The Corps concedes that proposed critical habitat areas for bull trout, including the Project area, “serve[] as migration corridor, provide[] foraging habitat, and [provide] an overwintering area for bull trout.” FSEIS, at page 4-20. Nevertheless, the Corps contends that reinitiation of consultation with USFWS regarding bull trout critical habitat is not necessary at this time because “based on the extensive analysis found in the Corps’ 2001 BA and the USFWS’s 2002 Biological Opinion, the project will not adversely modify or destroy critical habitat in the area.” FSEIS, at pages 6-57, 4-20. As CRANE has demonstrated in previous comments on the Project, the past environmental review has not sufficiently addressed the Project’s likely environmental impacts. As a result, it is inadequate for the Corps to promise merely to reinitiate consultation upon issuance of the final bull trout critical habitat rule. Based on this imminent designation of critical habitat, the Corps and USFWS should reinitiate consultation the Project’s likely effects on critical habitat for bull trout, as required under 50 C.F.R. 402.10(a).
14. The Corps continues to misrepresent the management recommendations in the Final Washington State Sandhill Crane Recovery Plan. See generally Washington Department of Fish and Wildlife, State of Washington Sandhill Crane Recovery Plan (June 2002) (“Sandhill Recovery Plan”). Sandhill cranes are listed endangered species in Washington. Despite the Corps’ contention that the Project is “consistent with the final plan” (FSEIS, at pages 6-59, 6-68), CRANE notes again that the Sandhill Recovery Plan specifically points to the deposition of

401 Water Quality Certification to mitigate specific impacts to sturgeon as revealed by the acoustic-tagging studies. See Washington State Department of Ecology Order No. #3-SEAHQ-5603, Section V.C at 13.

The Commenter implies that the studies’ “specifically warn that they are not suitable to analyze the effects of the Project on sturgeon.” The commenter’s implication is misleading. The ODFW/WDFW study described was designed to document the presence or absence of sturgeon in deep water areas (SEIS, Exhibit K-1 at p. 7). This study was not designed to research project effects on sturgeon. However, as the commenter is aware, (see CRANE comment C 44), the acoustic-tagging study conducted by USGS *is* studying the effects of dredging and disposal on sturgeon. This tagging study and the ability to monitor sturgeon behavior on a real time basis provide the basis for the adaptive management approach presented in the FSEIS and the 401 certifications.

In absence of any available behavioral or habitat information on green sturgeon, the Corps made a reasonable choice to use the white sturgeon as a proxy for green sturgeon. In other areas where information and data is missing or limited, scientists use surrogate species with similar life history strategies. For example, researchers in Mississippi are using the shovelnose sturgeon (*Scaphirhynchus platyrhynchus*) as a surrogate for research on the endangered pallid sturgeon (*Scaphirhynchus albus*). See Parsons, G. R., J.J. Hoover, and K. J. Killgore. *Effect of pectoral fin ray removal on station-holding ability of shovelnose sturgeon*. North American Journal of Fisheries Management, 23: 742-747 (2003).

A.11: The impacts of mechanical dredging of loose rock and other types of sediments to be removed by mechanical means are discussed in the 1999 IFR/EIS (see e.g., pages 4-10, 6-20 and 6-26) as well as the FSEIS (page 6-6) and 2001 Biological Assessment (pages 6-2 to 6-3).

A.12: Both the FEIS and the FSEIS discuss the effects of flowlane disposal on turbidity. See Section 6.3. Further, the project has not increased flowlane disposal from the amount currently performed for maintenance of the 40’ channel over a twenty year period. In addition, best management practices described in the FSEIS and conditions in the Washington State Department of Ecology (“Ecology”) 401 certification require that flowlane disposal occur 20 feet below the water’s surface to reduce impacts to juvenile salmonids. See FSEIS, Table S6-8; Washington State Department of Ecology, Order #03SEAHQ-5603, at 6 (June 23, 2003). Further, as discussed in the EIS and FSEIS, flowlane disposal will not create additional suspension of sediments because of the composition of dredged material. The dredged material from the navigation channel is clean, medium grained sand with some fine and coarse grain sand that will settle quickly and not increase suspended sediments.

A.13: The USFWS agrees with the Corps’ assessment that the evaluation done during the reconsultation process and the SEI workshops has already assessed potential impacts to bull trout habitat and therefore does not require any additional conferencing.

A.14: The Washington State Department of Fish and Wildlife’s (“WDFW”) Final Recovery Plan (“Final Recovery Plan”) for sandhill cranes does not directly address specific actions related to the Channel Improvement Project, such as the proposed Woodland Bottoms wildlife mitigation site and action. It does, however, state that habitat for the species needs to be secured:

Habitat also needs to be secured for migrant and wintering cranes in southwest Washington. Important habitat in the Vancouver area is threatened by development. For this flock, the Vancouver-to Woodland bottomlands is the only western Washington staging area and, including Sauvie Island Oregon, the only known traditional stopover site between southeastern Alaska stopover points and California wintering areas (Littlefield 1999a). The wintering birds there were thought to be part of a coastal segment of the Pacific Flyway Population of lesser sandhill cranes (Littlefield 1999a), but new data indicate they may be a population of Canadian sandhills (G. Ivey, pers. obs.). Little is known about the status of Canadian

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 12

Columbia River dredged spoils on the Port of Vancouver's Columbia Gateway properties as a significant threat to Sandhill Crane habitat. Sandhill Recovery Plan, at page 22. The Sandhill Recovery Plan states that

The lower Columbia bottomlands staging area is the only sandhill crane use-area in the United States adjacent to a major metropolitan area, and habitat will continue to be threatened. . . . Few, if any, alternate migrational stopover sites are available between northern California and southeastern Alaska for birds which migrate west of the Cascade Range. Habitat in the area needs to be protected if this crane flock is to survive.

Id. at 21. Nowhere in the Sandhill Recovery Plan is it suggested that development of Canada goose habitat in the Woodland Bottoms area would serve as sufficient enhancement to compensate for the loss of Sandhill Crane habitat on the Gateway properties, let alone that the enhancement "more than compensates for any impact" to the Gateway properties. Cf. FSEIS, Exhibit K-8, Consistency with Critical Areas Ordinances Including Wetland Mitigation Plan, at pages 10-11.

15. The Corps improperly determines that it is not necessary to update its Land Use section (Section 6.8.2) "because the new ecosystem restoration features and the revised disposal plan (with reduced dredging volumes, reduced rock removal volumes, reduced ocean disposal, reduced upland disposal site acreage, and reduced impacts on agricultural land, riparian habitat and wetland habitat) would have less impact on land use, air quality, noise, aesthetics, and cultural resources than would the alternatives analyzed in the 1999 Final IFR/EIS." FSEIS, at page 6-62. Despite the fact that overall volumes have been reduced, the Project proposed in the FSEIS differs in significant ways from that proposed in the FEIS. In particular, locations and methods of disposal have changed in ways that may impact land use decisions, and which require new analysis. The FSEIS should include a full discussion of land use options based upon these changes in the Project.
16. As CRANE commented in its DSEIS Comments, the Corps' HEP modeling is flawed in a number of significant ways. The DSEIS did, however, promise to "revise and update the HEP analysis by collecting data to represent all habitat

sandhills in the Pacific Flyway, but existing information suggests it is the smallest population and perhaps the most imperiled and the Ridgefield/Sauvie Island area is a critical staging area for this population. Securing sufficient habitat in Washington to support half the cranes that use the area (2,000 migrants and 500 winterers) is an interim objective. The amount of foraging habitat needed is unknown and roosting habitat availability needs further assessment. Migrant cranes stop for a few weeks, and a few hundred hectares of corn may be sufficient. Five hundred wintering birds may require 400 to a thousand ha depending on forage and roosting opportunities, and how it is managed. This objective should be revised as additional data becomes available on habitat needs. Final Recovery Plan at 29.

Woodland Bottoms is within the wintering-staging habitat range of the southwest Washington population (see Final Recovery Plan). The Corps' proposed actions would secure 284 acres of habitat that could be used by the species. Wildlife habitat development (wetland and agricultural) on the Woodland Bottoms mitigation lands would be compatible with sandhill crane habitat requirements and provide them foraging and/or loafing opportunities. Thus, the Corps' mitigation plan is consistent with the Final Recovery Plan and is sufficient to address any impacts that sandhill cranes may incur with use of the 40 acre W-101.0 disposal site (Gateway).

WDFW's Final Recovery Plan for sandhill cranes does not state that the dredged material from the Channel Improvement Project poses a significant threat to sandhill crane habitat:

The Port of Vancouver owns the 1,011 ac "Columbia Gateway" property. It is agricultural, woodland, and wetland, and perhaps 75% received a high level of use by cranes. The Port has prepared a master plan calling for development of >700 ac for industry and port facilities (Port of Vancouver 1998). The development would use fill, including dredged material from deepening of the Columbia River navigation channel by the U. S. Army Corps of Engineers, to raise the area above seasonal flooding. Final Recovery Plan at 22.

WDFW was simply reporting the nature of potential threats to sandhill cranes in their text and did not qualify the severity of the threat.

A.15: The FSEIS includes a full discussion of the land use issues associated with the project. This information is contained in Section 6.8.2 as well as in Exhibit F (*Coastal Zone Management Act Consistency*), and Exhibits K-8 and 9 (*Consistency with Critical Areas Ordinances Including Wetland Mitigation Plan, and Consistency with Washington Local Shoreline Master Programs*). Further, the Corps disagrees with the contention that locations and methods of disposal have changed in ways that may impact land use decisions, and which require new analysis. For example, the potential impact of disposal at Lois Mott on land use in Clatsop County was specifically discussed in the response to comments the County. *See* FSEIS, Volume 4, at County 1-5. Section 6.8.2 of the FSEIS adequately discusses the rationale for not updating this section.

A.16: After the publication of the DSEIS and FSEIS, the State of Washington's Department of Ecology published its 401 Water Quality Certification Order No. 03SEAHQ-5603 ("Order") detailing general and specific conditions for wildlife and mitigation measures. *See Order at 17-19.* The Corps and Sponsor Ports will incorporate these additional conditions to the mitigation plan. Added conditions include the requirement to purchase an additional 80 acres on Martin Island and subsequently develop it as riparian forest, plant dense, thorny shrubs to prevent unauthorized access to the island, and establish a more natural hydrologic regime at the Woodland Bottoms wetland mitigation site. *See Order at 20-21.* Therefore, through satisfaction of the State of Washington's concerns regarding the mitigation effort, the HEP reanalysis is no longer a requirement for the Corps and Sponsor Ports.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 13

types and reanalyze current and future conditions based on changes in individual habitat parameters” prior to completion of the pre-construction engineering and design phase. See DSEIS, at page 6-55. The FEIS appears to delete this passage, and there is no evidence that the HEP analysis has been revisited and updated. Compare FSEIS, at page 6-64. Issues related to HEP modeling are discussed at length in Section II(C) below.

17. The Corps continues to insist that the Channel Deepening will not have the effect of causing economic development, increased urbanization or port development even while the Corps and the sponsoring Ports justify the Project on the basis of expected economic development benefits. The Corps’ position conflicts with guidance and conclusions from EPA and NMFS. In comments on the DSEIS for Channel Deepening, EPA calls on the Corps to more fully explain how proposed dredging will “effect and encourage further developments of coastal ports and industrialization in the project area.” See Response to Comments, at page Federal-3. In 1999, when the Corps engaged in consultation with NMFS regarding maintenance of the 40-foot Columbia River Navigation Channel, NMFS determined that “increased industrialization is an indirect effect of the channel maintenance.” NMFS Channel Maintenance BiOp, at page 14. If maintenance of the existing navigation channel has the indirect effect of inducing economic development and industrialization, surely deepening of the channel and maintenance of the deeper channel will have the same effect. The Corps has not only overlooked these effects, but has purposefully attempted to ignore these effects.
18. The Corps continues to insist that the Port of Vancouver’s Gateway development project is an independent action. FSEIS, at page 3-16. Yet, it is also evident that the Gateway project will rely on 2.3 million cubic yards of dredge disposal by the Corps as fill for the Gateway project. CRANE has commented in detail on the Port of Vancouver’s DEIS for the Columbia Gateway development (“Gateway DEIS”). See Correspondence from Perkins Coie to Suzan Wallace (Oct. 11, 2002) (attached as Exhibit 5). Those comments are incorporated by reference, and take substantial issue with the FSEIS’s analysis of the likely cumulative impacts associated with the Gateway development—particularly the Corps’ assessment of impacts to aquatic and wildlife resources, including analysis of impacts to bald

A.17: The comment mischaracterizes the Project’s expected economic benefits. The purpose of the Project is to address existing problems with ship transit on the Columbia River. By deepening the channel, the Project will remove an existing draft constraint to allow for greater utilization of existing excess capacity on Columbia River vessels. The Project will allow existing traffic to utilize the Columbia River port system with greater efficiency and reduced cost. Trying to predict changes in shipper behaviors or responses to cargo movement given this new efficiency, as CRANE suggests in this comment, would be highly speculative and require a number of assumptions each of which would introduce significant uncertainty. The Corps selected a methodology that would minimize the need for such speculation. *See* Response to Comments II.B.1 and II.B.2.

According to the approved cost-reduction methodology employed by the Corps, the Project’s principal direct benefits result from “the reduction in transportation costs of quantities of the [commodity] that would move with and without the plan resulting from the proposed improvement.” Principles and Guidelines, Section 2.7.2(a). A more detailed discussion of the Corps’ cost-reduction methodology is provided in Response to Comments II.B.1. The Corps’ guidance specifically identifies transportation savings resulting “from the use of larger vessels [and] more efficient use of existing vessels...” Principles and Guidelines, Section 2.7.2. The Corps’ methodology for calculating economic benefits is not based on induced growth, rather it evaluates the transportation savings associated with greater efficiency and reduced costs. Thus, the Project’s economic benefits do not result from induced development growth.

Moreover, the FSEIS assumes that the project will not stimulate new development in competing Port areas. *See* FSEIS, Exhibit M, Revised Economic Analysis, pp. 43-45. This assumption is based on an analysis of competing ports and discussions with industry experts, including representatives from competing ports.

A.18: The Port of Vancouver’s Gateway development project is an independent action for the reasons described in the FSEIS at page 3-16. The Port of Vancouver, in their correspondence dated April 11, 2002 and incorporated into the addendum to the 2001 Biological Assessment, supports this determination. Also, the Port of Vancouver is not reliant upon the 2.3 mcy of dredged material as fill for the Gateway development. As detailed in the Port’s April, 2002 letter, the Port can obtain cost-effective fill material for its Gateway development from a number of sources other than the Channel Improvement Project. Further, the Corps’ assessment of impacts to bald eagles was presented in the Biological Assessment to the U.S. Fish and Wildlife Service and they concurred with our determination. Finally, the Corps addressed sandhill cranes adequately in the FSEIS (page 6-98).

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 14

eagles and Sandhill Cranes. See FSEIS, at pages 6-86, 6-96. At the outset, the Gateway development is not merely cumulative with the Channel Deepening Project, but is in fact interrelated and interdependent. As such, all impacts associated with the Columbia Gateway development should be disclosed and analyzed in the FSEIS; mere cumulative effects analysis is insufficient.

19. The Corps relies heavily on the Gateway DEIS for its conclusion that impacts associated with the Gateway development will not be significant. See FSEIS, at pages 6-97-6-99. In fact, the Port of Vancouver has decided to delay issuance of its FEIS well beyond the anticipated Spring 2003 timeframe in order to allow more time to study resources on the Gateway properties and respond to comments raised in response the DEIS. Based on the Gateway DEIS's deficiencies, it is not appropriate to conclude that "significant mitigation . . . will counterbalance or even outweigh any adverse effects" on wetlands (FSEIS, at page 6-97), salmon (FSEIS, at page 6-98), or Sandhill Cranes (FSEIS, at page 6-99), among other natural resources. As a result, the Corps' conclusions made in reliance on the Gateway DEIS are unsupported and untenable and should be withdrawn until appropriate effects analyses are undertaken. Furthermore, although the Corps has added cumulative effects analysis for the Port of Vancouver, it still ignores relevant cumulative effects that will attend other port development along the Columbia River. For all these reasons, the Corps is unwarranted in its conclusion that the incremental impacts of Channel Deepening will not be significant when considered along with all reasonably foreseeable cumulative impacts.
20. Washington's Department of Ecology has begun an extensive and necessary study to be performed by the National Academy of Scientists to discuss the best allocation of resources on the Columbia River. See Washington Department of Ecology, "Columbia River Regional Initiative" <<http://www.ecy.wa.us.gov/programs/wr/cr/crhome.html>> (accessed Jan. 10, 2003). Among other things, the National Academy of Sciences has been charged to "[r]eview and evaluate existing scientific data and analyses related to species listed under the Endangered Species Act in the Columbia River basin." The National Academies, "Water Resource Management, Instream Flows, and Salmon Survival in the Columbia River" <<http://www4.nationalacademies.org/webcr.nsf/5c50571a75df494485256a95007a091e/0726f>> (accessed Jan. 11, 2003). Based on

A.19: The cumulative impact analysis identifies impacts that are reasonably foreseeable from other projects in the action area. The Port of Vancouver's Draft Gateway EIS provides the most current and detailed information regarding potential impacts from that separate proposal. As CRANE notes, the Port of Vancouver is engaged in a formal SEPA process upon which CRANE has commented. The Corps has acknowledged the potential for future development in its cumulative impacts analysis as disclosed in the Port's documents and has therefore met the requirements of NEPA and SEPA. Further, if mitigation is required for the Port of Vancouver's development proposal, that mitigation will be covered through their SEPA and related permitting process.

A.20: The SEI panel convened by the Corps, NOAA Fisheries and the U.S. Fish and Wildlife Service addressed the potential impacts to listed salmonids (*see* response II. A. 1). The study referenced in the comment pertains to hydropower, water management and instream flows, all of which are outside the purview of the CRCIP. The Corps has evaluated all available information and results of future studies can be reviewed and assessed by the Adaptive Management Team for relevance to the project when or if conclusions become available.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 15

the deficiencies identified in the DSEIS Comments and Section II(A)(1) above, if the Corps obtains permits for and begins construction of the Channel Deepening prior to the completion of this study, the wide-ranging environmental and socio-economic impacts of Channel Deepening (e.g., destruction of long-standing fisheries, changing sediment transfer patterns, Channel Deepening-associated port development) will undercut and make obsolete the National Academy of Sciences' efforts. The FSEIS fails to mention any plans for coordination with this study, which will likely not only add to the baseline information available about the Columbia River, but also shape policy decisions related to the River's using biologically-based methods.

21. Exhibit I (Essential Fish Habitat) of the DSEIS provided that if squid spawning areas are found in a disposal site area, the Corps would have to adjust the location of the disposal site or place timing restrictions on its use. Compare DSEIS, Exhibit I, Essential Fish Habitat, at page 13, and FSEIS, Exhibit E, Essential Fish Habitat, at page 13. The Corps abandoned this habitat protection measure.
22. The Corps' own Eulachon and Sturgeon Studies team has provided formal comment stating their concern "that larval eulachon survival may be reduced by an increase in suspended particles," and notes that the "mortality rate or the magnitude of potential losses" from such suspended particles remains unknown. See FSEIS, Exhibit K-2, Evaluation Report Smelt (Revised), at page 2 [hereinafter "Smelt Report"]. Has the Corps adopted the Eulachon and Sturgeon Studies Team's suggested work windows to avoid smelt mortality?
23. The Project *Summary* and Final Recommendations associated with the Smelt Report are dated November 2002, before the Corps disclosed its change in the Project to avoid ocean disposal and rely more heavily on flowlane disposal. See Smelt Report, at page 6. The increased use of flowlane disposal alters the Eulachon and Sturgeon Studies team's conclusion that "[d]redging activities associated with channel deepening are not scheduled to occur in known areas of spawning concentrations"? Smelt Report, at page 11. The importance of this issue is compounded by the Eulachon and Sturgeon Studies team's admission that "[s]ampling limitations precluded determining the relative importance of the shipping channel as a migration corridor [for larval eulachon] relative to the rest of

A.21: Further evaluation of potential squid spawning areas indicated that it was highly unlikely that squid spawning would occur in the Project area. Consequently there was no need to consider this as a measure to minimize impacts. Should squid spawning occur in any Project disposal sites, it is still the Corps' policy to either adjust the location of the disposal site or place timing restrictions on its use.

A.22: The research indicated that the impacts from dredging and disposal in the navigation channel is not expected to have a significant effect on smelt spawning or rearing. However, as a conservative measure, we are adopting the report's recommendation to avoid the period of peak smelt spawning to further ensure minimal impact to smelt populations. In addition, both Oregon and Washington included conditions in their 401 certifications to further protect smelt during the period of peak out-migration. See, e.g., Washington 401 Certification at p. 14.

A.23: As noted in response II.A.22, the project, as conditioned by the States of Oregon and Washington, includes timing windows for certain activities to increase protection of smelt. In addition, the commenter mischaracterizes the Corps' documents. Using either the ocean disposal site or construction of the Lois Island Embayment ecosystem restoration feature will not increase the amount of flowlane disposal in the estuary.

The Corps' flowlane disposal actions as related to smelt spawning areas are consistent with the recommendations of Mr. Tom Riens, Research Project Leader, Eulachon and Sturgeon Studies, in his letter to the Corps dated January 9, 2003. Representatives from the Oregon Department of Fish and Wildlife, and the Washington State Department of Fish and Wildlife concurred with Mr. Riens' recommendations. See letter to Mr. Kim Larson, U.S. Army Corps of Engineers, from Mr. Tom Riens, January 9, 2003, FSEIS, Exhibit K-2, at 2-3.

The commenter misquotes page 11 of the smelt report. The report states that dredging activities are not scheduled to occur in areas with "high spawning concentrations" not simply concentrations as indicated. "The most realistic and reliable strategy for reducing impacts from other dredging operations would be to avoid areas of high spawning concentration." FSEIS, Exhibit K-2 at 11. Because no high spawning areas are located within the disposal area, the report stated that "No specific actions are recommended because it is unlikely that dredging activities associated with the channel deepening would have a significant impact on eulachon". *Id.*

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 16

the river.” Smelt Report, at page 15. The Eulachon and Sturgeon Studies team concludes that “[p]erhaps the most realistic and reliable strategy for reducing dredging related impacts to eulachon would be to avoid dredging in areas of high spawning concentration,”—an action that would admittedly “require more research on the annual variation in use of specific spawning areas.” Smelt Report, at page 28. In sum, it is clear from the Corps’ own consultants’ comments that (a) dredging poses a significant risk to smelt populations, and (b) insufficient baseline information exists to allow the Corps to make appropriate management decisions to avoid smelt habitat while dredging.

24. The Corps research on stranding remains incomplete. In particular, existing surveys have not “specifically evaluated early season stranding when smaller fish are present.” FSEIS, Exhibit K-3, Evaluation Report Fish Stranding (Revised), at page 29 [hereinafter “Stranding Report”]. The Stranding Report also admits that the Corps’ stranding analyses will remain incomplete until detailed presence/absence data is developed. Stranding Report, at page 3 1. Until this data is developed, it is impossible to reach meaningful conclusions about Project-related stranding rates. Id.
25. As noted in CRANE’S previous comments and in Section II(C) below, the Corps’ existing attempts at modeling remain inadequate. The Revised Dungeness Crab Report makes clear that “[m]ore elaboration of the crab distribution-salinity model, especially concerning salinity and the movements of 1+ crab, is needed to make final recommendations on dredge timing to minimize impacts.” FSEIS, Exhibit K-4, Evaluation Report Dungeness Crab (Revised), at page 2 [hereinafter “Crab Report”]. This conclusion demonstrates that (a) existing crab modeling efforts are admitted to be insufficient to inform management decisions, and (b) more complex models are needed in order to obtain the level of predictive power necessary to implement competent management decisions.
26. The Crab Report states that “[t]he Corps’ preferred option for ocean disposal involves no disposal of construction dredge material at the deep-water ocean disposal site (DWS), as well as no disposal of Incremental Maintenance (IM) dredge material at the DWS for the life of the project.” Crab Report, at page 5.

The second quote referred to in the comment is part of the sentence that describes the first year’s research. This research was abbreviated because of a late start and is not reflective of the entire study. This comment also justifies the additional research that has since been done.

The second part of the comment is referring to sections of the smelt report discussing dredging in general, and not dredging specifically related to the Channel Improvement Project. The research indicated that smelt spawning areas occur primarily near shore in the shallower areas, not in the main navigation channel. The recommendation you refer to minimizes the impacts in these off-channel areas, not in the main navigation channel. Finally, as noted at the outset, Project conditions imposed by the States of Washington and Oregon will minimize impacts to smelt and protect smelt spawning locations. *See, e.g.*, WADEQ Order No 03SEAHQ-5603 at page 14.

A.24: The stranding study referred to was a pilot study that was conducted in the summer of 2002. The pilot study was not intended to definitively answer the question on how stranding might change with a deeper channel. The study that will answer that question will begin before construction, and will be repeated after the channel is deepened as required under the terms and conditions of the federal Biological Opinions and the Washington water quality certification. *See, e.g.*, NOAA Fisheries May 20, 2002 Biological Opinion at Section 12.5.3.h (p. 95-96), and Washington Department of Ecology June 23, 2003 401 Certification at Section V.F (p. 15-16). The pilot study conducted in 2002 and an additional pilot study to be conducted in 2004 will be used to refine the methodologies of the final study. A multi-agency task force consisting of representatives from both Federal and state agencies will have input to the study design. Dr. Walt Pearson, Pacific Northwest National Laboratories and Dr. John Skalski head of statistics, School of Fisheries and Aquatic Sciences, the University of Washington, are preparing the study design.

The task force and adaptive management teams will review and evaluate results as the study progresses. Finally, the Washington 401 Water Quality Certification also requires the Corps to both conduct a rigorous study of fish standings and to mitigate any effects on fish stranding from Channel Improvement. 401 Certification at p. 15.

A.25: Dr. Walt Pearson developed the crab distribution / salinity model last year by using Columbia River data on salinity and flow, and crab distribution data collected from a statistically rigorous entrainment study that was designed by Dr. John Skalski.

Crane’s comment mischaracterizes the revised crab report. Nothing in the crab report indicates that the crab model is inadequate. What the crab report does suggest is that an appropriate model was developed specifically for use at this location that adequately analyzes impacts to crabs. The additional data will further refine the crab distribution versus salinity model Pearson and Skalski developed for the lower Columbia River and estuary. This additional data is needed for dredging in sand bars that are transitional between salt and freshwater, such as Flavel Bar. Further, both the Oregon and Washington 401 Water Quality Certifications require the Corps to collect this additional data at Desdemona Sands and Flavel Bar, along with several other conditions, to minimize impacts to crabs. *See*, Washington State Department of Ecology, Order No. # 03SEAHQ-5603, at 12; Oregon Department of Environmental Quality, 401 Water Quality Certification, at 6-7, June 23, 2003.

A.26: The Corps has fully evaluated the use of ocean disposal for material from the CRCIP and will utilize ocean disposal if necessary. Should the Corps elect to use the deep water site, it must comply with the conditions imposed under Oregon’s Department of Land Conservation and Development (“DLCD”) in its

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 17

We note, however, that even under the Corps' preferred alternative, maintenance dredge spoils will be dumped in the deep water site after year 20.

27. The Corps notes that “the only potential direct effects to crab habitat are from dredging the channel in the estuary, and from use of the estuarine flowlane disposal areas . . . and the DWS. . . .” Crab Report, at page 8. The effects to crabs of any shift to flowlane disposal have not been adequately addressed in the FSEIS.
28. The Corps admits that its conceptual model was designed to address ESA-related questions, and may not be adequate to address non-ESA species and habitats. Crab Report, at page 8 n.2 (“Because the model was developed to review impacts to salmon, there may be some components of the ecosystem that the model does not address. . . .”). Despite the Corps' contention that the conceptual model “provides the best available information regarding the lower Columbia River ecosystem and potential effects of the project” (Id.), this admission demonstrates that the Corps is not in possession of information that allows it to predict Project effects on non-ESA species with any degree of reliability. In addition, the Battelle Study, which is incorporated in the Crab Report, specifically notes that “an understanding of the ways in which Dungeness crab use the estuary and how that use may or may not expose them to dredging activity is needed.” Crab Report, at page 30. The Battelle Study goes on to note the lack of “appropriate site-specific data to evaluate the applicability of the Grays Harbor entrainment function,” as well as “data on crab density by size class and season.” Id. at page 33. Thus, all Corps consultants agree that current Dungeness crab use of the Project area is poorly understood and that further study is required in order to come to credible conclusions about the Project's likely effects on crab habitat.
29. Thus far, the Corps' efforts to obtain additional information about entrainment rates in the Columbia River have been lacking. The Crab Report's entrainment rates are based on sampling “conducted during the summer months of a single year,” where low numbers of 0+ crabs are attributed to the consultant's failure to sample in “May and early June when large numbers of the 0+ crab enter the lower estuary.” Crab Report, at page 54. The Corps has had years to institute studies that investigate critical stages of the crab life cycle, but they have failed to undertake the appropriate studies. This failure should not provide an excuse to

Coastal Zone Management Decision, dated June 23, 2003, and the Washington State Department of Ecology's 401 Water Quality Certification, also dated June 23, 2003. These mandatory conditions require additional data collection, monitoring, and coordination with the state agencies before the deep water site is used. See DLCDC Coastal Zone Management Decision at 13-14, WADEQ Order No. # 03SEAHQ-5603 at 9.

A.27: The Project does not involve a “shift to flowlane disposal” relative to the current maintenance program for the 40' channel, and the comment provides no basis for its assertion to the contrary. Further, the Corps' decision to dispose of dredged material in the ocean or at the Lois Island embayment ecosystem restoration feature will not change flowlane disposal in the estuary.

The Corps documents describe the siting of the deepwater site and impacts to the crabs and other organisms. The SEIS fully discussed the impacts of flowlane disposal in the estuary on crabs and other organisms.

A.28: Through the further studies described in response II.A.25, the Project will be able to further refine the crab distribution / salinity model to avoid and minimize effects to crab. Further, the commenter cites Exhibit K-4 out of context. Footnote 2 clearly states the conceptual model is the best available information regarding the lower Columbia River:

As discussed above, much of the conceptual model developed for the reconsultation process is relevant for understanding potential impacts to non-ESA listed species and their habitat. For example, the model's links between physical/chemical indicators and many biological indicators provide information regarding basic ecosystem functions that *are relevant to listed and non-listed species alike*. As Table S6-1 of the SEIS indicates, the model provides basic information regarding:

- Habitat-forming Processes (suspended sediment, bedload, woody debris, turbidity, salinity, accretion/erosion, bathymetry);
- Habitat Types (tidal marsh and swamp, shallow water and flats, water column);
- Habitat Primary Productivity (light, nutrients, imported and resident phytoplankton production, benthic algae production, tidal marsh and swamp production); and
- Food Web (deposit feeders, mobile macroinvertebrates, insects, suspension/deposit feeders, tidal marsh macrodetritus, resident microdetritus).

For example, if someone was interested in understanding the project's effects on tidal marsh and swamp, they could use the portion of the model that addresses habitat types. Similarly, a question regarding deposit feeders, mobile macroinvertebrates or insects could be answered by reviewing the model's discussion of those indicators. Because the model was developed to review impacts to salmon, there may be some components of the ecosystem that the model does not address; however, *the model provides the best available information* regarding the lower Columbia River ecosystem and potential effects of the project.

FSEIS, Exhibit K-4, at 8, n. 2.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 18

allow the Corps to proceed with dredging in the absence of reliable information about the Project's impacts on Dungeness crabs.

30. The Corps' Crab Report includes a study entitled "Estimated Entrainment of Dungeness Crab During Dredging for the Columbia River Channel Improvement Project." See Crab Report, at page 16 et seq. [hereinafter "Entrainment Study"]. The Entrainment Study includes a disclaimer providing that the none of the preparers or their employers make "any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed. . . ." *Id.* at page 17. This disclaimer must call into question the Corps' reliance on the Entrainment Study's findings.
31. CRANE reiterates its previous comments that the Corps has not adequately analyzed the Project's compliance with Critical Areas Ordinances ("CAOs"), particularly with regard to Vancouver CAOs. See generally FSEIS, Exhibit K-8, Consistency with Critical Areas Ordinances Including Wetland Mitigation Plan [hereinafter, "Critical Areas Report"]. The Critical Areas Report, like other sections of the FSEIS discussed above, is unduly dismissive of the Project's likely impact on Sandhill Cranes and their habitat. See Critical Area Report, at page 10. Although Vancouver's Habitat Ordinance is not yet finalized, the ordinance is scheduled for adoption in 2003. This ordinance will likely incorporate WDFW management recommendations for State-designated priority habitats and species, including the management recommendations in the Sandhill Recovery Plan; as a result, the Sandhill Recovery Plan and its management recommendations should be considered in the Corps' review of relevant CAO provisions. The Sandhill Recovery Plan makes clear that dredge spoil disposal and development of the Gateway properties presents a serious threat to Sandhill Crane survival (Sandhill Recovery Plan, at page 21); the Corps' listing of other nearby sites where Sandhill Cranes may be sighted does not undermine the particular importance of the Gateway habitat. The Corps has not, as requested by the U.S. EPA's comments, demonstrated that "habitat preservation activities at other locations in the project area will be sufficient for" Sandhill Cranes (see Response to Comments, at page Federal-6), but has merely asserted without substantiation that habitat

Finally, the Corps disagrees with the comment's characterization of the crab report as an admission that the conceptual model is inadequate to address non-ESA species and habitats. See the Corps' responses to comments II.A.25, II.A.29 and II.C.39, and the Corps response to CRANE's comments on the conceptual model at the beginning of section II.C.

A.29: The Corps has conducted entrainment research in the Columbia River estuary since the 1980's. The study done this year was designed to corroborate these earlier results and build on the four-year study done in the late 1980's. That study included sampling during the period from April to October. The results of the entrainment studies, several years data from NOAA Fisheries on crab abundance in the estuary, and the development of a dredge draghead excluder for use on Corps' and contractor's dredges, has provided us with a good understanding of the impacts to Dungeness crabs in the estuary from dredges and disposal in the estuary. In addition, as discussed previously, both Washington and Oregon require continued sampling for additional entrainment data to refine the distribution / salinity model and thereby support improved avoidance and minimization when dredging is necessary below RM 18. See, e.g., Washington 401 certification at 12.

A.30: The comment's suggestion that the disclaimer statement in the contractor's document somehow calls into question the validity of the data is unfounded. The quoted contract language is very typical in contracts of this type.

A.31: Consistency with the Critical Areas Ordinance ("CAO") requires compliance with ordinances that are adopted, not draft ordinances that are scheduled for adoption. The City of Vancouver has not adopted its new CAO ("Habitat Ordinance"), and will not do so until 2004. The commenter noted that the Habitat Ordinance "will likely incorporate WDFW management recommendations for State-designated priority habitats and species, including the habitat recommendations in the Sandhill Recovery Plan . . ." The commenters use of the term "will likely" reflects the speculative nature of attempting to evaluate compliance with proposed or pending ordinances.

However, as discussed in the Corps' Response to CRANE's Comments II. A. 14, the Channel Improvement Project's ("Project") proposed wildlife habitat mitigation plan at the Woodland Bottoms site strongly supports and is consistent with the Washington State Department of Fish and Wildlife's Final Sandhill Crane Recovery Plan ("Final Recovery Plan"), including many specific recovery strategies outlined in the plan. Therefore, incorporation of the Plan by the City of Vancouver would not change either the Project or the Corps' mitigation proposal.

The Corps' proposed wildlife habitat mitigation plan satisfies several of the Final Recovery Plan's objectives. For example, under Recovery Strategies and Tasks, the Final Recovery Plan calls for protection of sandhill crane use areas (areas through management agreements, conservation easements, and acquisition). See Final Recovery Plan at page 29, 31. The Sponsor Ports' purchase of the Woodland Bottoms property for wildlife mitigation purposes meets this goal. The Final Recovery Plan also specifically identifies that unprotected habitat in the Woodland Bottoms is a priority for protection—again, the Sponsor Ports' acquisition of the Woodland Bottoms property for wildlife mitigation purposes would provide this protection. See Final Recovery Plan at 29-30. The substantial wetland restoration component of the wildlife mitigation action at Woodland Bottoms would provide the necessary habitat requisites for sandhill cranes which would comply with sub-paragraph 3.3 of the Final Recovery Plan. Acquisition and management of the Woodland Bottoms property for wildlife mitigation also satisfies subsection 3.4 of the Final Recovery Plan. Finally, the Corps is considering sandhill cranes in the wetland planning for the Woodland Bottoms wildlife mitigation site, therefore satisfying sub-paragraph 3.7 of the Final Recovery Plan.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 19

enhancement at Woodland Bottoms will be more than adequate to compensate for habitat losses at the Gateway site.

32. Elevations reported throughout the Critical Areas Report have been changed from the ranges of MSL reported in the DSEIS to the mean CRDs employed in the FSEIS. See generally Critical Areas Report. This change obscures existing differentials in elevation, replacing that measurement with a near meaningless average.
33. The Corps notes that “[f]lowlane disposal sites are not specifically designated because they vary according to the condition of the channel and the techniques used by the contractor selected to perform the work.” Shoreline Consistency Report, at page 4. This indeterminacy means that it is impossible to accurately assess the likely impacts of flowlane disposal, including the likely impacts on Dungeness crab and smelt habitat. Increased reliance on flowlane disposal, therefore, leads to increased uncertainty about the Project’s impacts on the Columbia River and its already damaged estuary.
34. CRANE continues to disagree with the Corps’ conclusion that the restoration actions will “restore and improve the habitat of native species found in the lower Columbia River ecosystem.” See Shoreline Consistency Report, at page 5. CRANE’S previous comments on the proposed restoration actions and the Project’s consistency with local shoreline programs are discussed in detail in the DSEIS Comments’ and Water Quality and CZMA Comments and are incorporated by this reference. As noted by the State of Oregon, neither the Lois Island nor the Miller Sands “restoration” projects actually restore the Columbia River to desired spruce and tidal marsh conditions. Both projects occur adjacent to islands created by dredge spoils and neither project is likely to recreate natural estuary conditions that pre-date anthropogenic modifications of the estuary. Instead, the projects are likely to create additional mud flats, which are abundant in the estuary. Response to Comments, at page State-8.
35. The Corps argues that “the resale of dredged materials from the Skamokawa site is of material that does not naturally occur at that site and may not constitute mining.” Shoreline Consistency Report, at page 13. See also Shoreline

The Final Recovery Plan at page 22 presents a brief description of the Port of Vancouver’s proposed development action at the Gateway property, including the use of fill from the CRCIP, to raise the area above seasonal flooding. The description neither rated the impact of the Port’s action as a “serious threat” or otherwise, nor did it rate other actions in this wintering area for sandhill cranes that may bear on their presence and use. These would include WDFW’s pheasant hunting program during the peak of the fall migration for sandhill cranes that reduces their use of suitable habitat, habitat management actions by WDFW on their Shillapoo WMA, or the general conversion of agricultural uses from row crops to nursery crops, cottonwood plantations, non-use crops and small industrial, residential and/or public recreational development.

The Corps listed other sites in the general area to demonstrate that this small population of sandhill cranes occupies a fairly extensive geographic area, including substantial acreage (~19,500 acres) already set aside as National Wildlife Refuge or State Wildlife Management Areas with the potential for increased management actions focusing on sandhill cranes. EPA’s concerns for sandhill cranes were addressed on page 6-59 of the FSEIS.

A.32: The change in the datum used in the Critical Area Report (from MSL in the DSEIS to CRD in the FSEIS) was done to help add clarity and consistency with all other CRD references throughout our documentation. If MSL is an important reference point for the commenter, there are ready references available to help them with the conversion.

A.33: As stated in responses II.A.12 and II.A.27, the comment’s assumption that the Project has an “increased reliance on flowlane disposal” is inaccurate. Further, the Columbia River is a dynamic system. The physical make up of the Columbia’s riverbed is a collection of sand waves that migrate down the channel. Bottom conditions change on a regular basis as do appropriate locations for flow lane disposal sites. Consequently, designating a specific geographic area as a flowlane disposal site is not realistic because appropriate locations change with changing bottom conditions. The impacts, however, will be the same regardless of the change in location in a given reach.

Accordingly, impacts to Dungeness crab and smelt from flow lane disposal for construction and maintenance material are described in the Final SEIS. Potential impacts to crab and smelt are also addressed through avoidance and minimization requirements of the water quality certifications issued by both Washington and Oregon.

A.34: The Corps’ response to the State of Oregon’s concerns (Comment S-9, page State-8 in Volume 4, Comment Letters on the Draft SEIS and Corps Responses) was to modify the Lois Island and Miller-Pillar ecosystem restoration features to develop tidal marsh habitat rather than mimic historic bathymetry at these locations (shallow water flats) which represented the objective in the DSEIS. The State of Oregon and other commenters identified tidal marsh as a habitat that has incurred significant historical losses and should be the focus of restoration efforts in the Columbia River estuary. Therefore, the Corps responded to these commenters and revised its proposed restoration feature. Tidal marsh development would be attained at Lois Island embayment by the placement of dredged material to elevations that mimic those of adjacent tidal marsh reference sites. The State of Oregon has disallowed the Miller-Pillar ecosystem restoration feature. The goal of the Lois Island embayment ecosystem restoration feature is to restore historic habitat functions and values that have been lost throughout the estuary by activities such as diking and development, not to restore predevelopment features at the specific location of the Lois Island embayment restoration feature. Through the ESA consultation process it was determined by NOAA Fisheries, the U.S. Fish and Wildlife Service and the Corps that these restoration features would return lost functions and values that would benefit listed salmonid species.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 20

Consistency Report, at page 46 (reaching same conclusion for Cowlitz County sites). We agree with the opinion of the Ecology (see Response to Comments, at page State-5 1) that these activities clearly come under the rubric of mining, and are therefore subject to all related rules and regulations, including preparation of a reclamation plan. Compare Shoreline Consistency Report, at page 23 (“The Skamokawa resale site is not a mining site that will need to be reclaimed. Therefore, no reclamation plan should be necessary.”). Likewise, we agree with the Ecology’s determination that the resale of sand at the Port of Skamokawa 2 is a commercial activity, and must be conducted consistently with the State’s commercial resale provisions. & Shoreline Consistency Report, at page 14.

36. The Shoreline Consistency Report incorrectly notes that “[n]one of the disposal in Wahkiakum County has been substituted for ocean disposal.” Shoreline Consistency Report, at page 21. In fact, flowlane disposal will occur within Wahkiakum County, and that additional flowlane disposal will compensate for the delayed use of the ocean disposal site. See, e.g., FSEIS, at page 4-8, Table S4-2.
37. The Corps improperly segments the disposal of sand from later resale actions, even though its disposal plan is contingent upon such resale to provide sufficient capacity to receive projected dredge spoil volumes. & Shoreline Consistency Report, at pages 32 (listing resale activities as “not part of the Project”), 42 (planning for dumping of sand at the Reynolds Aluminum Plant and Port of Longview/International paper sites at volumes significantly in excess of capacity based upon anticipated resale).
38. The Corps concludes that the Project complies with fish and wildlife habitat standards set forth in the Vancouver Shoreline Management Master Plan (“VSMMP”). See Shoreline Consistency Report, at page 64. As noted above in Section II(A)(31), the FSEIS does not demonstrate that “proposed mitigation exceeds that required under local critical areas ordinances,” and understates a number of significant likely impacts to habitat. -
39. CRANE renews its objection to the Corps’ plans to dump dredge spoils on the Gateway site. Although the Corps states that “[t]he site avoids wetlands and their buffers” (Shoreline Consistency Report, at page 67), the inevitable and

A.35: The Shoreline Consistency Analysis evaluates the resale of dredged material for consistency with mining requirements, although the material does not naturally occur at the site. A reclamation plan is not required under chapter 78.44 RCW because the resale activity does not meet the definition of surface mining, or otherwise trigger this statute’s requirements.

RCW 78.44.031(7) defines “Minerals” as “clay, coal, gravel, industrial minerals, metallic substances, peat, sand, stone, topsoil, and any other similar solid material or substance to be *excavated from natural deposits* on or in the earth for commercial, industrial, or construction use.” The “natural deposits” of sand at Skamokawa and other resale sites is the Columbia River, not the resale sites. The act of removing the sands from the resale sites is not excavation from natural deposits and the sand, therefore, is not a “mineral” as defined by the Act.

The definition of “surface mining” excludes “excavations or grading used . . . [f]or the purpose of removing stockpiles.” RCW 78.44.031(17)(d). The activities at the resale sites are for the purpose of removing stock piles. The resale sites, therefore are not “surface mining” as defined by chapter 78.44 RCW. Because the resale sites are not “surface mines” reclamation is not required.

A.36: As noted in responses II.A.12, II.A.27 and II.A.33, the Project has not increased overall flowlane disposal. Flowlane disposal has always been part of the Project and would be necessary under each of the alternatives examined in the EIS and SEIS. Further, to the extent there were any use of flowlane disposal in lieu of ocean disposal, it would only occur near the river mouth, i.e., at CRM 5 and downstream, not in Wahkiakum County. See Final SEIS, Volume 4, at State p. 40 (response to comment S-76). The comment also incorrectly interprets the Wahkiakum County SMP which explicitly allows flowlane disposal to be substituted for ocean disposal. See page 56 of Wahkiakum County SMP.

A.37: The Draft SEIS analyzed resale activities and found them to be fully consistent with each SMP. See Draft SEIS at Exhibit K (Technical Memorandum – Consistency with Local Shoreline Master Programs). If CRANE’s contention is correct, the SEIS, including its draft, analyzed the issue of consistency of resale activities with policies in the various shoreline master programs.

A.38: The VSMMP standard provides that “when [significant impacts to fish and wildlife habitat] are unavoidable, they shall be minimized and otherwise mitigated.” Vancouver Shoreline Management Master Program (January, 1997) at p. 5-13. The FSEIS disagrees that impacts associated with disposal site W-101.0 (Gateway) will be significant, but provides the following information regarding efforts to avoid and minimize impacts at the site: “[the site] has been located 300 feet beyond the ordinary high water to avoid impacts to shoreline resources. The site has been reduced in size . . . to further reduce impacts to riparian habitat.” Final SEIS, Volume 2, Exhibit K-9 at 64. Exhibit K-8, page 11 also documents in considerable detail how the Wildlife Mitigation Plan for the project will replace lost agricultural lands with a combination of higher valued riparian and wetland habitats. The discussion explicitly notes that sandhill crane (the primary species of concern to CRANE) have been observed at the site and that the Wildlife Mitigation Plan provides for “securing lands and habitat development in Woodland Bottoms which is documented by WDFW in their Final Sandhill Crane Recovery Plan as land used by this crane population.” *Id.*; see also response II.A.31.

Losses in average annual habitat units (AAHU’s) for the disposal site W-101.0 (Gateway) were determined to be –28.7 AAHU’s (1999 FEIS, Appendix G, Addendum Table 3). Total losses in AAHU’s for the State of Washington were determined to be –352.9 AAHU’s and –445.3 AAHU’s for the entire project (*id.*). In contrast, wildlife mitigation actions in Washington were estimated to provide 515.7 AAHU’s of the 608.1 total AAHU’s identified for mitigation actions. The Woodland Bottoms wildlife mitigation site provided 291.9 AAHU’s or more than 80 percent of the AAHU losses estimated for Washington. Mitigation at Martin Island provided 223.8 AAHU’s or more than 60 percent of the AAHU losses estimated for Washington. Together, these two mitigation sites provide 146 percent of the AAHU’s lost due to project related actions in Washington.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 21

interconnected spreading of dredge spoils throughout the Gateway property will directly affect those wetlands and their buffers, and should be analyzed in the FSEIS for its consistency with the VSMMP, among other relevant regulations. The inevitability of this development is especially apparent given the Corps' contention that dumping of dredge spoils on the Gateway property does not constitute speculative fill. See Shoreline Consistency Report, at page 69.

40. The Corps' response to VSMMP Policy 80 fails to "assess the overall value of the landfill site in its present state versus the proposed shoreline use to be created," when in fact the existing value of the Gateway property is extremely high for wildlife habitat. See Shoreline Consistency Report, at page 67.
41. The Channel Deepening will contribute to the cumulative effects of the Federal Columbia River Power System ("FCRPS"), MCR maintenance and channel maintenance in depriving the Columbia River estuary of sediment. The Corps wrongly concludes that the Project has no effect on the export of sediment to the MCR. FSEIS, at page 6-73. Because of these combined effects, the estuary has become a sediment sink that captures sediment instead of supplying sediment to the Columbia River littoral cell. See Southwest Washington Coastal Erosion Study, <<http://www.csc.noaa.gov/beachmap/html/study.html>> (accessed 2/25/03) (attached as Exhibit 6) [hereinafter "Coastal Erosion Study"]; see also Response to Comments, Comments of the Washington State Department of Ecology, at pages State-40,44, 46; Response to Comments, Comments from the State of Oregon, at page State-24. This change in the natural processes at the mouth of the Columbia River has caused coastal erosion incidents in southwest Washington where coastal accretion once prevailed because of sediment supplied by the Columbia River. See Coastal Erosion Study.

Finally, it should be noted that an agreement recently entered into by CRANE, the Port of Vancouver and the Port of Portland provides significant protection to sandhill cranes in the vicinity of the Port of Vancouver's Gateway property, including the Project's disposal site W-101.0 (Gateway).

A.39: The Corps disagrees that dredge material from the channel will "inevitably" be spread throughout the Gateway property. The Port of Vancouver's proposed Gateway development is an entirely independent project that will need to comply with all applicable requirements, including those, such as the VSMMP, that may pertain to wetland fills. In addition, as noted above, CRANE and the Ports of Vancouver and Portland have recently signed an agreement that further protects the sandhill crane population.

A.40: The FSEIS "assesses the overall value of the landfill site in its present state versus the proposed shoreline use to be created" as required by policy 80. The HEP analysis performed by the interagency team specifically examined the habitat value of the Gateway disposal site. As explained in Exhibit K-8, the "wildlife mitigation plan for the project assessed the habitat value of the W-101.0 [Gateway] disposal site and more than compensates for any impact to it" by replacing agricultural land with higher value riparian and wetland habitat.

A.41: The Corps' analysis of sediment transport in the lower Columbia River concludes that the Channel Improvement Project "will not reduce the available sand supply and the expected hydraulic changes are too small to measurably alter sand transport or erosion/accretion in the river or estuary. Sediment transport and the sediment budget at the MCR are not likely to change by the proposed 43-foot navigation channel." Final SEIS, Exhibit J, pp. 2-3. Further, the cumulative effects analysis for the channel improvement project addresses the potential cumulative effects of the Project in light of other ongoing projects, such as maintenance of the MCR channel and operation of the Federal Columbia River Power System. Final SEIS at Section 6.12 (see esp. p. 6-94). Finally, conditions imposed by the states of Washington and Oregon through their water quality certifications require monitoring and adaptive management to confirm the Corps' conclusions regarding the absence of significant erosion/accretion impacts associated with the channel improvement project. *See, e.g.*, Washington 401 Certification at Section III.E (Ocean Disposal) and Section V.G (Sediment Budget/Habitat).

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 22

B. The Corps' economic analysis fails to follow either general economic principles or the guidelines developed by the Corps itself and is sufficiently flawed that the Corps has likely overstated Project benefits.

The Corps' economic analysis continues to ignore likely Project costs and overestimate its benefits. As detailed below, these flaws call into question the accuracy of the Corps' economic predictions.

1. **The FSEIS fails to apply sound principles of economic analysis to comply with the Corps' obligation to determine the Project's impacts on the national economy.** In order to determine that the Project is economically justifiable, the Corps must demonstrate, with reasonable certainty, that the Project, if implemented, would produce beneficial effects in the National Economic Development ("NED") account. "Beneficial effects in the NED account are increases in the economic value of the national output of goods and services. . . ." U. S. Water Resources Council, "Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies," at page 8 (Mar. 1983) [hereinafter "Guidelines for Implementation Studies"].

As discussed in detail below, the FSEIS fails to demonstrate that the proposed Project would yield such increases. Indeed, the Corps emphatically states that the U.S. economy will not change an iota as a result of the Project. Compared to the without-Project scenario, the same foreign-owned ships will call Columbia River ports and each will carry the same amount of cargo from these ports. Shippers will not, in response to the Project, alter their production levels or their shipping patterns. The Corps develops an estimate of transportation-cost savings that would be realized from the Project for the foreign-owned owners of the ocean-transport vessels, then calls this estimate into question by stating that, with the Project, the same ships would carry the same cargo as they would without it. Moreover, the Corps never attempts to quantify the amount of the savings passed from foreign vessel owners to U.S. shippers. Hence, it is impossible to determine from the FSEIS the extent to which the Project would generate increases in the economic value of the national output of goods and services.

B: The January 2003 Final Supplemental Integrated Feasibility Report and Environmental Impact Statement ("FSEIS"), prepared by the U.S. Army Corps of Engineers' ("Corps") and the Port of Longview, supplements the 1999 Final Integrated Feasibility Report and Environmental Impact Statement for the Columbia River Channel Improvement Project ("FEIS"). In the FSEIS, the Corps revised the economic analysis of the Channel Improvement Project ("Project") presented in the FEIS to reflect new information regarding project costs and benefits.

The revised economic analysis was part of the Corps' Limited Reevaluation of the FEIS to update the environmental analysis. A Limited Reevaluation "provides an evaluation of a specific portion of a plan under current policies, criteria and guidelines, and may be limited to economics, environmental effects or, in rare cases, project formulation." ER 1105-2-100(b)(2). The Corps is required to "include sufficient data to describe what was done in the previously approved document, what was done in the limited reevaluation, what differences there are and the reasons for the differences." ER 1105-2-100(b)(4)(a). Thus, the economic analysis in the FSEIS does not constitute an independent review, rather it supplements the larger, comprehensive evaluation contained in the FEIS, and the Corps' analysis, as contained in the FEIS and the FSEIS, provides an objective and reasoned assessment of *both* the costs and the benefits of the Project.

Because there are no prescribed regulatory procedures under the National Environmental Policy Act for presenting an economic analysis in an environmental impact statement, the Corps carefully scrutinized conflicting professional opinions as to the best way to conduct such an analysis. After this review, the Corps selected a methodology from those described in its guidance document that provided the clearest, most complete assessment of the Project's cost-benefit determination.

The FEIS, FSEIS, and the Corps' responses during public comment provide a clear explanation of the methodology the Corps used to make that determination. The Corps convened the Technical Review Panel in 2002 to conduct a rigorous, public review of the reasonableness of the Corps' methodology and its economic analysis regarding the Project's costs and benefits. The Corps made significant, substantive changes based on the Technical Review Panel's assessments. The Corps also identified and substantiated the assumptions and parameters related to the economic analysis, including forecasts of future conditions, evaluations of alternatives, and the risk and uncertainty assessments.

In its comments regarding the economic analysis, the Columbia River Alliance for Nurturing the Environment ("CRANE") disregards the fact that the economic analysis in the FSEIS was part of the Corps' Limited Reevaluation. In fact, CRANE's commentary frequently ignores relevant analyses of benefits, costs, and related issues in the FEIS (as well as the FSEIS). Again, the economic analysis provided in the FSEIS is not intended to duplicate the earlier work, rather it is intended as a supplement. The FEIS and FSEIS collectively present the Corps' economic analysis and, as a result, cannot be viewed as isolated reviews.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 23

Ignoring requests that it measure the Project's actual economic benefits to the national economy, the Corps steadfastly has asserted that it needs to show only that, under some circumstances, vessel owners—all of whom are foreign—would realize cost savings from carrying products shipped through Columbia River ports. Then, the Corps conducts the remainder of its analysis assuming that cost savings will not materialize, apparently in an effort to avoid having to examine the Project's spillover effects on other ports and elsewhere in the economy. The Corps presents data showing that vessels often leave port with loads lighter than those that would take full advantage of the existing channel, indicating that factors unrelated to channel depth often constrain loads, but the Corps nonetheless asserts that these constraints would be relaxed if the channel were deepened.

In short, the Corps asserts in the FSEIS that the full cost-savings that foreign vessel owners would realize under a special set of circumstances should be counted as an increase in the economic value of the national output of goods and services, even though it never demonstrates the probability that these circumstances would materialize or that the Project would have any impact at all on this value. To reach its conclusions, the FSEIS arbitrarily disregards fundamental principles of economic analysis as well as the Corps' own economic-analysis manual, contradictory information regarding this project, and comments on the DSEIS that questioned its arbitrary approach to this set of issues. As a consequence, the FSEIS fails to satisfy the economic test related to the NED account.

2. **The FSEIS arbitrarily disregards fundamental economic principles as well as the Corps' own economic analysis manuals.** The Corps has stated that the Columbia River ports operate within a "vigorous competitive environment." U. S. Army Corps of Engineers, "Corps of Engineers Response to Review Panel Comments," at page 7 (Jan. 13, 2003) [hereinafter "Response to Review Panel"]. In such an environment, the laws of economics tell us to expect sloping demand and supply curves. In a competitive market for transportation services, with sloping supply and demand curves, any reduction in transportation costs resulting from the Project should result in an increase in both the supply of and demand for

CRANE's comments also inaccurately describe the Corps' obligations and responsibilities regarding the economic analysis. CRANE mischaracterizes the Corps' policy and guidance documents, leading CRANE to the erroneous conclusion that certain procedures and analyses are mandated by these documents. The Corps' economic analysis of the Project is consistent with its primary guidance document, *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*, March 1983, ("Principles and Guidelines"), which articulates the national policy regarding how to conduct an economic analysis for projects like the Channel Improvement Project. Using the Principles and Guidelines as an analytical framework, the Corps made reasoned, professional determinations regarding the Project's economic analysis.

Many of CRANE's comments are premised on a misunderstanding of the Corps' methodology for evaluating benefits and conducting National Economic Development ("NED") analyses. This misunderstanding leads CRANE to the erroneous assumption that the Corps was required to use a particular methodology (e.g. a multi-port analysis) for calculating benefits. In fact, the Principles and Guidelines provide four different methodologies for evaluating the NED benefits of a deep-draft navigation project. The Corps selected the cost-reduction methodology for the Columbia River Improvement Project, because its planners and analysts determined it was the most relevant, conservative and defensible method for characterizing the Project's benefits. As described in more detail in the responses to CRANE's comments, the cost-reduction methodology was entirely appropriate under the circumstances because it minimized the need for undue assumptions and speculation.

In some cases, CRANE simply reiterates many of the same academic arguments it raised in its earlier commentary, including its comments on the Draft SEIS, because it disagrees with the Corps' professional judgments. As detailed below, the Corps gave competing opinions careful consideration and responded to all legitimate concerns. CRANE's commentary also ignores the fact that the federal regulation addressing cost-benefit analyses in environmental impact statements grants considerable discretion to the agency. *See* 40 C.F.R. § 1502.23. When making that determination, the Corps justifiably relied on the expertise of its own planners and analysts.

Finally, CRANE continually mischaracterizes the National Economic Development Procedures Manual: Overview Manual for Conducting National Economic Development Analysis ("Overview"). CRANE incorrectly identifies the Overview as the Corps' "technical manual governing economic analysis." *See, e.g.*, CRANE at page 24. In fact, the Overview "does not describe techniques for conducting [a National Economic Development] analysis." Overview p. 1. The Overview provides only a brief introduction to economic theory. The Overview specifically identifies the National Economic Development Procedures Manuals (i.e., the Principles and Guidelines) as the references for conducting economic analyses. *See* Overview p. 2. The Overview "is not intended to clarify the details of the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies*, March 1983." *Id.* The Overview is not the Corps' technical manual for conducting NED analyses. CRANE's consistent misstatements and assertions to the contrary are erroneous and misleading.

The Corps provided an extensive response to CRANE's earlier comments regarding the Project's economic analysis as presented in the Draft SEIS and incorporates those responses where applicable. *See* FSEIS, Volume 4, Responses to Comments SS 188 – 201 (pp.108-118). Although many of CRANE's comments on the FSEIS simply repeat the earlier comments, the Corps provides the following discussion for the sole purpose of providing as thorough and complete an explanation of the Corps' consideration of those comments as possible.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 24

transportation services. The Corps' own technical manual governing economic analyses explains how such a market should respond to the Channel Deepening Project:

Consider a navigation project that lowers the cost of transporting commodities by water. Deepening a coastal port or increasing capacity of a lock on the inland waterway could have this effect. In both cases, the result is a decrease in unit costs. . . . The result of the project would be to lower the costs of producing transportation services, thus shifting the supply curve to the right as shown. . . . An increase in total consumer and producer surplus results. . . . These are the project benefits. Producers and consumers realize increased surplus for the original tonnage moved as well as a surplus increase for the new tonnage moved. . . . For example, tonnage that could not move profitably at the price without the project, can now do so because of the increase in costs of providing the transportation service.

U.S. Army Corps of Engineers, Water Resources Support Center, Institute for Water Resources, "National Economic Development Procedures Manual: Overview Manual for Conducting National Economic Development Analysis," IWR Report 91-R-11, at pages 31-32 (Oct. 1991) (attached as Exhibit 7) [hereinafter "NED Procedures Manual"]. Furthermore, the NED Procedures Manual provides that "[d]emand is the maximum quantity of a good or service people are willing and able to pay to purchase at various prices. The 'Law of Demand' states that, all other things equal, if the price of a good goes up, the quantity purchased will go down, and vice versa." NED Procedures Manual, at page 12.

Thus, if the project truly were to produce \$18,806,000 of annual transportation-cost savings in a vigorously competitive market, as the FSEIS asserts, vessel owners would respond by increasing the supply of their services to shippers, and shippers should increase the amount of goods they ship through the Columbia River ports. The Corps' analysis in the FSEIS, however, is built on the agency's contradictory assertion that there will be no such response. Vessel owners will not increase their supply of services. "[T]he same vessels with the same capacities and design drafts will call Portland with or without deepening." Response to

B.1: The Principles and Guidelines proscribe the Corps' "procedure for measuring the beneficial contributions to national economic development (NED) associated with the deep draft navigation features of water resources plans and projects." Principles and Guidelines, Section 2.7.1. According to the Principles and Guidelines, the benefits associated with deep draft navigation projects are related to the "reduction in the value of resources required to transport commodities and the increase in the value of output for goods and services." *Id.* at 2.7.2. Examples of transportation savings arising from deep draft projects, include savings resulting from "the use of larger vessels, more efficient use of large vessels, more efficient use of existing vessels, reductions in transit time, lower cargo handling and tug assistance costs." *Id.* at 2.7.2.

The Principles and Guidelines provide four different methodologies for evaluating the NED benefits of a deep-draft navigation project: (1) cost reduction benefits; (2) shift of origin benefits; (3) shift of destination benefits; and (4) induced movement benefits. *Id.* at 2.7.2. Corps planners and analysts exercise discretion in selecting among these methodologies based on the specifics associated with a given project. In the case of the Columbia River Improvement Project, the Corps selected the cost reduction benefits methodology, because it determined, based on the professional judgments of its planners and analysts, that this approach was the most relevant, conservative and defensible method.

The cost-reduction benefits approach for calculating NED benefits compares the costs of the "with-project" condition with the costs of the existing or "without-project" condition. There are three separate models that can be used under this methodology. *Id.* at 2.7.4(i). The first model applies to situations where traffic involves the same commodity, the same origin-destination, and the same harbor. *Id.* at 2.7.4(i)(1). For reasons that will be explained below, the Corps selected this model. The second model applies to projects where the traffic has the same origin and destination, but shifts from one harbor to another harbor. *Id.* at 2.7.4(i)(2). The final model applies to projects where the traffic ships the same commodities from the same origin to the same destination, but introduces a new mode of transportation. *Id.* at 2.7.4(i)(3).

In the case of the Columbia River Channel Improvement Project, the Corps selected the cost-reduction benefits methodology, because it determined, based on the professional judgments of its planners and analysts, that this approach was the most relevant, conservative and defensible method for characterizing the benefits associated with the Project. Under the Corps' model, "the transportation benefit is the difference between the current and future transportation cost for the movement by the existing project (without-project condition) and the cost with the proposed improvement (with-project condition)." *Id.* at 2.7.4(i)(1).

Corps planners and analysts rejected the second model because it requires greater speculation. *See* Principles and Guidelines, Section 2.7.4(i)(2). In the Corps' professional judgment, the second model could have provided a higher estimate of the Project's benefits, because the model is premised on the assumption that the project will divert cargo from other ports. Corps planners determined that such an assumption is difficult to quantify and define in a defensible manner. The third model was not appropriate for the Project because it applies to situations where the mode of transportation will change during the transport of the commodities. *See* Principles and Guidelines, Section 2.7.4(i)(3). Corps analysts rejected this model, because it does not characterize accurately commodity transit on the Columbia River.

In this and other comments, CRANE argues that the Corps should exclude benefits related to cargo carried on foreign-flag vessels. The Principles and Guidelines, however, expressly state that the Corps should include vessel operating costs for foreign-flag vessels that are benefiting from the use of the improved waterway in the economic analysis. "To estimate transportation costs, [Corps planners should] obtain deep-draft vessel operating costs for various types and classes of foreign and United States flag vessels expected to benefit from using the proposed improvement." Principles and Guidelines, Section 2.7.4(d)(2). Further, the Corps is not required to allocate or segregate the cost savings between foreign and domestic interests. *See generally*, Principles and Guidelines, Section 2.7.4 (Evaluation procedures). Instead, the Principles and Guidelines make clear that Corps planners and analysts *must* include foreign-flag vessel operating costs in the NED calculations and the Corps' analysis was conducted in accordance with this guidance.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 25

Review Panel, at page 7. According to the Corps, demand will not vary with changes in shipping rates that materialize in response to the Project. Response to Review Panel, at page 3 (“The analysis does not assume that, if the channel is deepened, shippers will be more disposed to use Columbia River ports.”).

Nowhere does the FSEIS present any detailed economic analysis to back-up these assertions. It does not conduct a supply-demand analysis as outlined in the NED Procedures Manual. It does not apply the “Law of Demand” to analyze how price changes triggered by the Project would bring about a change in the behavior of any relevant party, and it further fails to trace these repercussions and their impacts on the NED account. It does not, for example, analyze the market for ocean transportation services at the Columbia River ports and estimate the elasticity of supply or the elasticity of demand for such services with respect to changes in price, then apply these to the changes in price that would result from the Project and develop quantitative estimates of how the market and the economy would be different with the Project than without it. Instead of conducting an analysis that compares the economy with the Project against what it would look like without it, the Corps assumes there would be no difference.

It similarly does not conduct a with-versus-without analysis of the market for ocean transportation services in the Pacific Northwest and along the West Coast. That is, it never estimates the sensitivity of this market to changes in transportation costs at the Columbia River ports that would result from the Project, and never develops quantitative estimates of how the Project would cause this market to be different.

In sum, by first proclaiming that the Project would be implemented in the context of vigorously competitive markets and estimating that the Project would generate substantial economic benefits, but then asserting that these benefits would not elicit any of the responses economic theory and the NED Procedures Manual say one should expect from the markets, the Corps has produced projections that can derive only from the Corps’ arbitrary assumptions that suspend generally accepted economic principles. The Corps’ analysis in the FSEIS violates some of the most basic of economic principles, and ignores its own technical manuals. Without a

This conclusion is bolstered by the Technical Review Panel’s finding that “[t]he Corps is under no compulsion to address the distribution of transportation cost savings... Accordingly, the panel members do not fault the authors of the analysis for focusing exclusively on transportation cost savings.” Summary Report of the Technical Review Process and Results (August 2002) p. 37. The inquiry suggested by CRANE is beyond the scope of an NED analysis.

CRANE argues that that the Corps assumes that vessels will no longer “light-load” in a deeper channel. This is an incorrect characterization of the Corps’s assumptions regarding vessels utilization. The FSEIS states “This revised analysis assumes that vessel efficiencies remain essentially the same with a channel deepening.” See FSEIS, Exhibit M, (Revised Economic Analysis) p. 36.

B.2: CRANE erroneously suggests that the Overview is the Corps’ technical manual describing how navigation projects should and must be evaluated. The Overview describes basic economic theory; it does not describe the Corps’ analytical method for conducting economic analyses. The Overview describes economic theory in an ideal, academic setting.

Moreover, the comment simply ignores provisions of the Overview that directly refute CRANE’s position regarding supply and demand methodology. The Overview makes clear that as a practical matter in most cases supply and demand cannot be measured for navigation projects. The Overview acknowledges that:

Estimating the area under a demand or supply curve can become a simple matter when the curves exist and prices and quantities are known. Unfortunately, in the case of water resource development, such is rarely the case. Deriving demand and supply curves can be difficult, costly, time consuming, or just plain impossible.

Overview p. 21. The Corps conducted its economic analysis in accordance with the Principles and Guidelines because it, not the Overview, is the guidance document that describes the Corps’ practices and procedures for addressing the realities of an economic analysis.

CRANE’s use of the passage from the Corps’ Response to the Review Panel is erroneous and misleading. CRANE pp. 24-5. First, CRANE mistakenly attributes the comment to the Corps as the basis for critiquing the economic analysis when CRANE states:

The Corps’ analysis in the FSEIS, however, is built on the agency’s contradictory assertion that there will be no such response. Vessel owners will not increase their supply of services. ‘[T]he same vessels with the same capacities and design drafts will call Portland with or without deepening.’ Response to Review Panel at Page 7.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 26

detailed market analysis justifying its assertions, the Corps' analysis is little, if anything, but arbitrary speculation.

3. **The FSEIS arbitrarily disregards information from the Corps and the Project's local sponsors that contradicts its economic findings.** To reach its conclusions, the Corps must overlook contradictory information presented in the FSEIS and comments from others on the DSEIS.

Thus, when it assumes that the same ships will call Columbia River ports and carry the same cargo, the Corps disregards its own statements to the contrary. The agency itself acknowledges that a reduction in transportation costs for marine vessels would induce vessel owners to increase their sales of services to shippers in the Pacific Northwest, noting that "it seems unlikely that deepening the channel will have a negative impact on Portland service frequency, rather it seems more likely that a deeper channel will lead to improved service in Portland due to improved vessel operating efficiencies."

Economic Analysis, at page 41 [hereinafter "Revised Economic Analysis"]. In support of this conclusion, the Corps offers lessons from history. When the channel was last deepened, the total amount of cargo shipped from Columbia River ports tripled, even as the capacity of those vessels increased, so that the number of vessel calls per year fell slightly. Thus, the Corps looks backward and tells us that vessel owners are responsive to changes in channel depth, then looks forward and tells us that they will be similarly responsive in the future. The Corps nevertheless fails to explain why, amid all this responsiveness, the FSEIS concludes that "the same vessels with the same capacities and design drafts will call Portland with or without deepening." Response to Review Panel, at page 7. FSEIS, Exhibit M, Revised

More important, the Corps never calculates the impact that this conclusion, and the other similar conclusions described below have on its calculations of the Project's impact on the NED account. Consequently, its calculations stem more from arbitrary, unsubstantiated assumptions than from a detailed, theoretically sound economic analysis.

The FSEIS also disregards the implications of the information the Corps provides

CRANE p. 24. In fact, the quote and conclusion is actually not from the Corps or the FSEIS. The comment is a remark from the Review Panel itself. The remark from which CRANE extracts the reference, as well as the Corps' response, is presented below in its entirety.

4. **Panel Comment. Container Fleet Assumptions.** The container shipping benefits analysis assumes that the composition of the containership fleet calling Portland will not change with channel deepening. In other words, the same vessels with the same capabilities and design drafts will call Portland with or without deepening. Panel members felt that there could be some tendency to use larger vessels if a deeper channel were available, and that there could be some undocumented potential benefits. The Corps assumption that the container fleet changes are the same "with project" and "without project" appears reasonable and conservative within existing Corps analysis. Panel members believe this issue should be analyzed as part of a broader, multi-port context, and subjected to thorough sensitivity analysis.

Corp Response. The Corps agrees that there is some potential for larger ships, particularly in the near term, when the Corps analysis predicts that there will still be 30% of the Portland cargo moving on 42' design draft vessels. The current service that uses those vessels did express that those could be replaced by larger vessels by 2007, and that sensitivity will be addressed in the final report.

Response to Review Panel p. 7. Much of CRANE's commentary regarding the economic analysis is based on this misattribution and, as a result, is flawed in that respect.

Second, CRANE's use of the Panel's remark is misleading because it ignores the relevant context. CRANE ignores the fact that the Panel's remark was made in a comment regarding container fleet assumptions and that the Panel concluded the Corps' assumption regarding container fleet changes was "reasonable and conservative". *Id.* In fact, the Panel noted that the Corps' assumption may result in "some undocumented potential benefits." *Id.*

Finally, despite CRANE's assertion to the contrary, the Corps did not arbitrarily disregard Panel Comments. The Corps specifically addressed the Panel's concerns in the FSEIS. *See, e.g.*, FSEIS, Exhibit M, Revised Economic Analysis, pp. 43-44 (an analysis of the Pacific Northwest container ports) and p. 45 (sensitivity analysis describing impact of the deployment of larger container ships).

B.3: In arguing that the FSEIS disregards information from the Corps, the comment mischaracterizes a Corps' illustration using the historical data and its expectation regarding how vessel owners will respond to increases in channel depth. The Review Panel expressed concern that decreased vessel calls would mean reduced level of service that could lead to lower cargo volumes. In response, the Corps provided historical information to show that "the greater utilization of the larger container vessels would have the effect of reducing the overall number of vessel calls to the Columbia River as cargo volumes increase over time. This is the same effect that was observed with the deepening of the channel from 35 feet to 40 feet." FSEIS, Exhibit M, Revised Economic Analysis, pp. 40-41. Contrary to CRANE's assertion, the Corps was not predicting a causal relationship between cargo growth and channel improvement, rather it was responding to the Review Panel's comment regarding reduced service frequency.

CRANE continues by inaccurately attributing a comment to the FSEIS that is in fact a comment made by the Review Panel. *See* Response to Comment II.B.2. CRANE asserts that "the FSEIS concludes that 'the same vessels with the same capacities and design drafts will call Portland with or without deepening.'" CRANE p. 26. CRANE relies on this misattribution and the mischaracterization described above to suggest that the Corps was required to conduct a multi-port analysis. CRANE p. 26. As discussed below, a multi-port analysis was neither required, nor appropriate under the methodology adopted by the Corps and, if performed, would require undue speculation.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 27

about the competitive nature of the market for transportation services in the Pacific Northwest. In such an environment, a reduction in costs and prices for ocean transportation services available at the Columbia River ports should induce shippers to divert to these ports cargo that otherwise would have gone through other ports. The FSEIS asserts that none of this will occur, and the arbitrariness of this assertion is discussed below in the section addressing multi-port issues.

The FSEIS also disregards comments from the Project's local sponsors and others regarding their perceptions of the Project's potential economic importance to the regional economy and their own operations. The Columbia River Channel Coalition of local sponsors and others in the region who support the Project strongly state their belief, and offer economic analyses that they claim support their position, that the economy will look substantially different with the Project than it would without it. See Columbia River Channel Coalition, "The Columbia River Channel Improvement Project," <<http://www.channeldeepening.com>> (accessed Feb. 18, 2003) ("The decision to deepen the Columbia River navigation channel will have a significant impact on the region's economy, jobs and the ability to conduct business in the global market. . . ."); Columbia River Channel Coalition, "Economics," <http://www.channeldeepening.com/channel_economic.asp> (accessed Feb. 18, 2003) ("Maintaining marine commerce by deepening the Columbia River Navigation Channel is critical to sustaining the region's trade-based economy."). Nonetheless, the Corps maintains in the FSEIS that the economy with the Project would be identical to what it would be without the Project.

In sum, the Corps has failed to explicitly address and reconcile significant, conflicting information in the FSEIS and to resolve the broad differences in expectations between itself and the local sponsors. This failure is indicative of the agency's failure to apply standard principles and tools of economic analysis to trace the Project's full, potential impacts on the economy and then sum these impacts to discern the costs and benefits for the NED account.

4. **The FSEIS summarily disregards comments on the DSEIS that questioned its arbitrary analytical approach.** During review of the DSEIS, both Ernie Niemi of

Finally, the Corps considered the statements by the Columbia River Channel Coalition CRANE identifies in its comment, but concluded that they do not contradict the Corps' position regarding the economic analysis. As dictated by the Principles and Guidelines, the Corps' economic analysis is based on a national perspective, rather than a local or regional perspective. See Principles and Guidelines, Section II – The Federal Objective, p. 1 ("The Federal objective of water and land resources planning is to contribute to *national economic development...*") (emphasis added).

B.4: As an initial matter, the Corps did not disregard comments made by either the Technical Review Panel or Ernie Niemi of ECONorthwest regarding a market sensitivity analysis. In fact, the FSEIS provided revised economic information regarding the Project specifically in response to those comments. See generally FSEIS, Section 3; see also Revised Economic Analysis, Exhibit M. For example, the Corps provided an analysis of the ratio between empty and full containers. Compare Response to Review Panel Comments, p. 6 and FSEIS, Revised Economic Analysis, Exhibit M, p. 46. The Corps similarly added a discussion regarding service implications of fewer vessels calls. FSEIS, Revised Economic Analysis, Exhibit M, p. 40. The Corps added a substantial discussion regarding competitor ports, as well as a sensitivity analysis of market share (capture rates) in direct response to Review Panel comments. FSEIS, Revised Economic Analysis, Exhibit M, pp. 43-45. CRANE simply ignores the new analysis and information that the Corps provided in the FSEIS in response to the comments received.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 28

ECONorthwest and the Corps' own Technical Review Panel explicitly raised questions about the Corps' failure to describe the sensitivity of different markets to the Project, trace the economy's response to it, and calculate the resulting costs and benefits; The FSEIS disregards these comments rather than providing a substantive response to them.

A reduction in prices for ocean-transportation services should induce shippers to increase their output and shipments to foreign customers, consistent with the "Law of Demand" described in the NED Procedures Manual. Although such a response might not materialize under unusual market conditions, this response must be expected in the "vigorous competitive environment" that the Corps says exists in the hinterland to the Columbia River ports. The Corps' NED Procedures Manual demonstrates, with graphic illustrations, how this response should occur. Thus, if the Project generates reductions in transportation costs for marine vessels and the owners of these vessels pass the savings to shippers in the Pacific Northwest, then the economic principles outlined in the NED Procedures Manual dictate that the Corps should anticipate that the shippers would respond by increasing their output and shipments.

- The Corps ignores issues raised in the Niemi Report regarding cost savings to foreign vessel owners. The FSEIS concedes that shippers would enjoy some savings associated with the Project. We have commented that ambiguities in the DSEIS left open the possibility that all the cost savings would remain with foreign vessel owners. The Corps responded that "[t]he assertion that all cost reductions would automatically go to vessel owners is inconsistent with market realities." See Response to Comments, at page Stakeholders/Special Interests-108. Hence, the Corps apparently believes that shippers would, in fact, receive some of the \$1 8,806,000 of estimated annual transportation-cost savings resulting from the Project.

But the Corps disregarded the linkage between its response to this comment and its response, or lack of response, to other, related comments. Extensive comments raised by Ernie Niemi in a critique of the DSEIS pointed out the importance of knowing just how much of the transportation-cost savings would

As discussed previously, the Corps is not required to allocate cost savings between shippers and vessel owners, foreign or domestic. See Response to Comment II.B.1. The Principles and Guidelines make clear that Corps planners and analysts *should* include foreign-flag vessel operating costs in the estimation of transportation costs and calculation of NED benefits.

CRANE's assertion that the Corps should have evaluated whether the Project will have a stimulus effect on grain exports is not supported by the relevant materials. See CRANE p. 30; see also Volume 4, DSEIS, Comment Letters on the Draft SEIS and Corps Responses, Stakeholders/Special Interests p.108. First, contrary to the comment, Niemi does incorrectly state that the Corps assumed that the project will stimulate exports. "Underlying the Corps' analysis is this important, but unstated assumption: all of the products—grains and containerized cargo—included in its analysis generate a benefit to the national economy when they are exported and, hence, the project would enhance these benefits by facilitating their export. A related assumption is that the inland transportation system and the Columbia River ports provide net benefits to the national economy, which the project would enhance *by stimulating traffic of this system and through these ports.*" Niemi p. 12 (emphasis added).

Second, CRANE's suggestion that the Corps should assume a stimulus in grain production and describe the impacts of this stimulus is premised on the same misunderstanding regarding the Corps' selected methodology. See CRANE p. 30. Contrary to CRANE's assertion, the Corps does not assume that the Project will stimulate grain or container exports, but instead uses the cost-reduction methodology described above. See Principles and Guidelines, Section 2.7.2(a) and Response to Comment II.B.1 and II.B.2. Benefits resulting from any stimulated commodity movements (e.g. stimulus in grain production) would fall under the induced movement benefits model as described in Section 2.7.2 (d) of the Principles and Guidelines. Corps analysts and planners, exercising the discretion allowed them by policy and guidance, did not use the induced movement methodology to estimate the Project benefits because this methodology would require substantial speculation.

In fact, the Corps specifically selected the cost-reduction benefits model because it could avoid the sort of speculative exercise that CRANE recommends in this comment. The Corps recognized that predicting a response in grain exports is difficult. Moreover, attempting to assign or quantify some benefit to that response is highly speculative. The Corps' treatment regarding grain exports is consistent with its adopted methodology.

CRANE also argues that the Corps should have explained the effect agricultural subsidies might have on the NED account. Yet, the consideration of wheat subsidies is only relevant to the extent that the project actually induces domestic wheat production beyond that which would have occurred without the project. See Principles and Guidelines, Section 2.7.2(d). Induced production is difficult to estimate, difficult to defend, and is typically considered to be speculative in nature. The Corps routinely considers the possibility of induced exports in its navigation projects, but typically finds that it is difficult to defend induced production. Further, an analysis of induced production is outside the scope of the cost-reduction methodology used in the analysis. Niemi's insistence that the project will increase domestic wheat production is unsupported, and his treatment of wheat subsidies is inconsistent with the methods of analysis presented for deep draft navigation projects.

CRANE's comments regarding the Benefits Review are addressed in subsequent responses.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 29

be passed to U.S. shippers, rather than remaining with vessel owners or, alternatively, being passed to the foreign purchasers of the products being shipped from the U.S. See ECONorthwest, “Ambiguities and Errors in the Corps of Engineers’ Economic Analysis of its Proposal to Deepen the Channel of the Lower Columbia River” (Sept. 2002) [hereinafter the “Niemi Report”]. The FSEIS, however, offers no response to this comment, i.e., it offers no quantitative estimate of the savings enjoyed by U.S. shippers. This failure indicates that the Corps has not even calculated the amount of transportation-cost savings realized by U.S. shippers and has not traced the Project’s impacts on affected markets. Thus, in one place the Corps asserts that it knows that “market realities” mean the foreign vessel owners will share with U.S. shippers the transportation-cost savings resulting from the Project, but then it is unable to demonstrate that it has estimated the extent of the sharing.

The Niemi Report also explained why knowing the amount of savings passed to U.S. shippers and their response can have important implications for the outcome of the Corps’ economic analysis. Agricultural products constitute most of the cargo associated with the purported transportation-cost savings that would result from the Project (all of the bulk cargo and most of the containerized cargo). The Niemi Report offered data from the U.S. Department of Agriculture showing that the prices farmers receive for agricultural products shipped through the Columbia River ports are less than their production costs. For example, every ton of wheat represents a net loss of \$50. This loss, in turn, constitutes a net reduction in the economic value of the national output of goods and services, and a reduction in the NED account.

Thus, economic principles indicate that any transportation-cost savings passed to U.S. shippers should induce them to increase output and, for most of the products shipped through the Columbia River ports, this increased output would cost more to produce than it is worth. The Corps’ NED Procedures Manual makes it clear that such outcomes should be considered a direct consequence of the Project and, hence, these NED reductions should be recognized in the FSEIS among the Project’s costs.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 30

- The Corps' responses to the Niemi Report's comments further illustrate its arbitrary disregard not only for the comments but for the underlying issues and economic principles. The Corps responds that "Niemi incorrectly states that the Corps has assumed that channel improvement will have a stimulus effect on grain exports." See Response to Comments, at page Stakeholders/Special Interests-108. This response misrepresents the comment in the Niemi Report, which did not say the Corps had assumed such a stimulus but instead observed that the Corps had not analyzed the issue. See Niemi Report, at page 12 ("The DSEIS offers no explanation of these costs or of the related, national economic impacts that would accompany the channel-deepening-project's stimulus to grain exports."). This criticism remains true. The Corps has conceded that shippers, including grain producers, will share the ocean transportation-cost savings stemming from the Project. The Corps' NED Procedures Manual describes the economic principles that indicate such savings should stimulate additional grain production. The Niemi Report offers evidence indicating that the additional grain production would reduce the NED account. Despite the weight of this evidence, the FSEIS still provides no explanation of the related costs and impacts on the national economy.
- The Corps refuses to analyze the effects of agricultural subsidies on the cost-benefit analysis, which are certain to impact the NED account. The Corps responds that "Niemi's suggestion that the Corps should perform an analysis on U.S. agricultural policies is inconsistent with Corps policy." See Response to Comments, at page Stakeholders/Special Interests-108. In addition, the Corps responds that "[t]he issue of agricultural subsidies and the impact of such subsidies are far outside the scope of this analysis. This issues would need to be addressed to Congress for consideration." Id., at page Stakeholders/Special Interests-111. These responses misrepresent and disregard the actual comments in the Niemi Report, which does not ask the Corps to comment on agricultural subsidies. Instead, the Niemi Report describes conditions under which the proposed Project could directly cause a reduction in the economic value of the national output of goods and services—the NED account—by stimulating additional production of agricultural products that are worth less than they cost to produce. That the production of these products also is

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 31

influenced by agricultural subsidies is immaterial to the Corps' obligation to consider the Project's impacts. If the Project directly would result in a reduction in the NED account, then the Corps' should measure it and include it in the economic analysis. The Corps' analysis already considers costs associated with the Project's impacts on other subsidized goods and services, such as diesel fuel and the contributions to the Project from subsidized local ports (see FSEIS, Exhibit L, Revised Cost Estimate Summary, at page 7); its decision to ignore costs associated with the Project's impacts on agricultural products is arbitrary.

In sum, the Niemi Report identified ambiguities in the Corps' reasoning regarding these questions: (1) What is the anticipated distribution of the transportation-cost savings stemming from the Project, and what portion of the estimated transportation-cost savings resulting from the Project will be enjoyed by U.S. shippers? (2) To what extent will U.S. shippers respond to these savings by increasing output? (3) What will be the impacts on other ports and related facilities?¹ (4) If the Corps continues to maintain that the savings will trigger a zero increase in output, what are the economic conditions that will keep the vigorously competitive market from increasing output, as predicted by generally accepted economic principles? (5) If, as the Corps asserts, the Project will induce zero change in the behavior of shippers and vessel owners, then how can it produce a real increase in the value of the goods and services produced by the national economy and a net benefit for the NED account? and (6) If the Corps concedes that the savings will directly trigger a non-zero increase in output, what will be the NED impacts? The Corps, in the FSEIS, has failed to answer these questions.

- The Corps fails to respond to critical issues raised by the Benefit Panel. The Benefit Panel of the Technical Review Panel ("Benefit Panel") also raised questions about internal inconsistencies in the Corps' analysis of the effects on

¹ Questions about the impacts on diversions of cargo from other ports are addressed below in Section II(B)(5).

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 32

supply and demand stemming from the transportation-cost savings resulting from the proposed project. generally Original Review Panel Comments and Benefit Review Team Opinions on Responses (Jan. 10, 2003) [hereinafter “Benefit Panel Comments”]. On the supply side of the market, for example, the Benefit Panel Comments point out the inconsistency in the Corps’ argument that the same number of ships would call Columbia River ports, even though the total amount of cargo would remain unchanged and the deeper channel would allow each ship to carry a larger load. “The revised analysis actually appears self-contradictory. . . . Since the analysis assumes no cargo growth, it is necessary to reduce frequency to obtain the benefits of scale economies and greater vessel utilization.” Benefit Panel Comments, at page 9 (emphasis in original).

In other words, the Benefit Panel was saying that, if, with the completion of the Project, the same ships would carry the same amount of cargo then the Project cannot reduce the costs of transporting the cargo. If it does not reduce the costs of transporting the cargo, the Project would not yield the economic benefits estimated by the Corps. The Project can produce benefits in only two ways: either a larger amount of cargo can be shipped on the same ships, which will be more heavily laden in the deeper channel, or the same amount of cargo can be shipped on a smaller number of ships, which will be more heavily laden in the deeper channel. Loading the same amount of cargo on the same ships, as the Corps assumes in its analysis, cannot yield economic benefits.

Nowhere in the FSEIS does the Corps come to grips with this “necessary” condition for the Corps to demonstrate that the Project will produce economic benefits. In its direct response to the Benefit Panel Comments, the Corps diverts attention from and, in the end, disregards the Benefit Panel’s concern by talking about related, though distinct issues. For example, the FSEIS addresses capacity constraints and vessel utilization: “Capacity. Some shippers are unable to ship their product through Portland due to capacity constraints. . . . This results in a high level of vessel utilization for carriers that choose to call Portland.” Response to Review Panel, at page 5. This analysis does not explain how a deeper channel would reduce the transportation costs of the

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 33

same ships carrying the same cargo. Indeed, the Corps' statement about capacity constraints reinforces the Corps' self-contradictory statements on this issue. If shippers cannot now ship through the Columbia River ports because of current capacity constraints, and if the Project would ease the constraints, then more cargo should flow. The FSEIS, however, arbitrarily forecloses this possibility.

5. **The FSEIS arbitrarily overlooks potential economic costs resulting from the proposed Project's impacts on other U.S. ports and related facilities.** The DSEIS failed to calculate the Project's impacts on other ports, instead asserting that the Project would stimulate no change in the flow of cargo to other ports or in the economic value of the national output of goods and services they produce. In response to the DSEIS, the Corps received comments urging it to correct this omission.
- “[T]he Corps has ventured into multi-port issues by considering Portland’s capture (from Tacoma) and benefits to non-Portland cargo (mostly from Tacoma). Moreover, the Corps has assumed there would be no cargo growth in large part to avoid a multi-port analysis, and that assumption leads to an inescapable analytic dilemma. . . .” Benefit Panel Comments, at page 3.
 - “Although apparently reasonable at the time, the absence of a multi-port analysis is no longer reasonable in light of recent information.” Benefit Panel Comments, at page 2.
 - “The document does not offer a multi-port, economic analysis of the project that explicitly traces how the project would affect the dynamics of the competition between the Port of Portland and its competitors.” Niemi Report, at page 40.

The FSEIS also does not contain a detailed, multi-port analysis. Hence, it provides a seriously incomplete picture of the Project's potential impacts on the NED account. Because the Corps has failed to demonstrate that it has fully analyzed all the Project's potential impacts, one cannot have confidence in the Corps' conclusion that the economic benefits of the proposed Project outweigh its costs.

B.5: Detailed responses to the issues summarized in this overview comment are provided in response II.B.6.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 34

Indeed, in the absence of a multi-port analysis, the available evidence supports the presumption that the reverse is true: the Project's costs outweigh the benefits and implementing the Project would diminish the NED account. The Corps' explanation for its failure to conduct a multi-port analysis is (a) based on faulty economic reasoning, (b) contradicted by evidence provided in the FSEIS, (c) inconsistent with the Corps' economic analysis manual, and (d) disregards or misconstrues comments on the DSEIS regarding this issue.²

6. **The Corps' failure to conduct a multi-port analysis is based on faulty economic reasoning and contradicted by evidence provided in the FSEIS.** The most thorough explanation of the Corps' reasoning for failing to conduct a multi-port analysis is offered not in the FSEIS but in the Corps' Response to Review Panel. In this document, the Corps asserts that a multi-port analysis is not needed because if it were conducted it would produce an estimate of the Project's benefits that is even higher than the estimate in the FSEIS: "[W]e would like to argue that a multi-port analysis would inevitably result in higher project benefits as compared to the current method of analysis." Response to Review Panel, at page 1.

The Corps' reasoning in support of this assertion, however, is more sleight-of-hand than economic analysis. A retracing of its argument reveals that the Corps has provided misleading information and made arbitrary decisions that are inappropriate, given the significance of the Project's potential negative impacts on

² In its discussions with the Benefit Panel, the Corps apparently revealed that the term, "multi-port analysis," has a specific meaning within the Corps' regulations. The Benefit Panel later clarified that it was not talking about these technical requirements of the Corps' regulations, but the analytical principle of looking at the Project's full ramifications. In economics jargon, the concern is that the Corps conducted only a partial-equilibrium analysis that drew a line around the Columbia River ports, froze the ships calling them and the cargo flowing through them, and then conducted a limited economic analysis within this line. In doing so, the Corps arbitrarily rejected the alternative of conducting a broader, more general equilibrium analysis, taking into account the Project's impacts on vessel owners, shippers, agricultural producers, other ports, and so forth. These comments use the term "multi-port analysis" in the same manner as the Benefit Review Panel intended namely, as shorthand to refer to the Corps' failure to conduct this broader analysis.

B.6: The Corps selected an analytical methodology that did not include a multi-port analysis, because: (1) it was not required by the Principles and Guidelines; (2) the Corps concluded that such an analysis would likely result in higher project benefits than the method selected and, as a result, the substantial expense of a multi-port analysis was not fiscally justifiable; and (3) conducting such an analysis would require assumptions likely to render the outcome overly speculative.

The Corps decided not to conduct an NED multi-port analysis for a number of reasons. First, the Principles and Guidelines do not require or even recommend a multi-port analysis for the methodology the Corps' used to calculate benefits. Under the Principles and Guidelines, Corps planners and analysts select a given model from the list provided based on an exercise of professional judgment. The Corps selected a model for calculating benefits that expects that the commodities will "move via a given harbor with or without the proposed improvement." Principles and Guidelines, Section 2.7.2(a)(1). The Corps does not conduct a multi-port analysis when it uses this analysis because the premise of the methodology is that commodities will travel through the same harbor with or without the project. The Corps exercised its discretion in electing not to conduct a multi-port analysis given the limited return and associated expense. As a result, the comment misses the mark because it mischaracterizes the Corps' methodology. See CRANE at page 35.

The second reason the Corps elected not to conduct a multi-port analysis is that it would have required significant speculation. CRANE argues that the Corps can only describe project benefits by predicting cargo shifts between ports based on the marginal changes of vessel operating costs. This approach ignores the speculative nature of such an exercise. The factors affecting the distribution of cargo between ports are numerous and highly complex. These factors include but are not limited to terminal capacity, carriers service levels, congestion in the port area, gate efficiency, connectivity to highway, rail, and barge, the availability of service to overseas destinations, shipper-carrier preference, the availability of backhaul cargos, and the quality and consistency of service, not only of ports and carriers, but of related transportation service providers such as cargo transloaders, consolidators, trucking companies, barge operators, etc. This method of benefit estimation is not mandated nor is it often performed due to the inherent difficulties in establishing a causal relationship between marginal changes in vessel operating costs and the changes in port market shares. Establishing this relationship is made especially difficult with regard to this Project because non-priced competition affects shipper behavior in the region. See Response Review Panel Comments (November 12, 2002), pp. 3-5. In other words, many other factors other than vessel operating costs influence cargo flow within the region. The Corps sought to avoid this speculative process by using a more conservative and defensible analytical method.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 35

other ports, related facilities, and others, and given the agency's obligation to provide a clear, thorough analysis of these impacts.

The Corps observes that “[t]here are two primary components of multi-port analysis: cargo volumes and transportation costs.” Response to Review Panel, at page 1. It then argues that its estimates of cargo volumes flowing through the Columbia River ports following the Project's completion is conservative and, hence, any increase in volumes would increase the Project's benefits. In other words, the Corps sees any increase in cargo flowing through the Columbia River ports solely as an economic benefit.

Such reasoning misses the point of a multi-port analysis. In a true multi-port analysis, the Corps would not stop after estimating the economic benefits that might materialize in the Columbia River area if the Project attracted to this area cargo that otherwise would have been exported from Puget Sound ports. Instead, it also would recognize that these benefits might materialize only because the shift imposes costs on the Puget Sound ports and other U.S. transportation facilities.

The net effect would be determined only through an empirical analysis that compares the benefits and costs on a multi-port scale. The Corps fails to conduct any empirical analysis, or even to consider the potential costs the project might impose on other ports and related facilities.

The Corps instead says the costs never will materialize, because the Project would not induce shippers to send cargo to Columbia River ports rather than to Puget Sound ports. The Corps offers no analysis of the kind required to support this conclusion, such as estimates of changes in prices resulting from the Project or estimates of the sensitivity of different parties—shippers, vessel owners, other ports, etc.—to changes in these prices.

To substantiate its assertion that there will be no diversions from other ports, the Corps offers two, separate, non-quantitative explanations. On the one hand, the Corps says the Project would not cause cargo to be diverted from Puget Sound ports because the reduction in ocean transportation rates brought about by the Project would be insufficient to outweigh the higher inland transportation costs of

A multi-port analysis is included in the other two models the Corps could have selected under the cost-reduction methodology. See Principles and Guidelines, Section 2.7.2(a)(2)-(3). The multi-port analysis is appropriate in these circumstances, because the models are premised on expectations that commodities will travel to different harbors or, alternatively, by a different mode. The Corps does not conduct a multi-port analysis when it uses the first model because there is no “other” harbor or mode to consider. Principles and Guidelines, Section 2.7.2(a)(1).

The Review Panel described a multi-port analysis more generally as a review of the Project's potential regional impacts. Yet, even under this more generic description the Review Panel “generally agreed that the results of a ‘multi-port analysis’ would be unlikely to tip the cost-benefit scales.” Benefits Review Panel Comments, January 10, 2003, (“Benefits Review Panel Comments”) p. 3. The Benefits Review Panel described the Corps as “understandably reluctant to invest substantial resources and time in an analysis that would not tip the cost-benefit balance.” Benefits Review Panel Comments p. 3.

CRANE's comments regarding the alleged negative effects on other ports reflects a fundamental misunderstanding of an NED analysis. The Principles and Guidelines prohibit the Corps from considering either positive or negative effects on regional economic development in its NED analysis. See Principles and Guidelines, Section 1.7.4 (describing the Regional Development Account) and Response to Comment II.B.8. The Corps does not consider regional effects in its NED analysis because an NED analysis measures the costs and benefits for the national economy, not regional costs and benefits.

CRANE's criticisms of the Corp's use of inland transportation cost data are unfounded. The inland rate information used by the Corps in its response to Panel comments are based on extensive interviews and surveys of individual shippers and transportation service providers and describe the marginal differences in rates between competing port areas. The methodology for the collection of the inland rate data is documented in an attached letter from the Port of Portland to the Corps. See Letter, Daly to Shenk, October 11, 2002.

CRANE inaccurately states that the Corps estimates that the project will reduce container ocean freight rates by 17 percent. The FSEIS projects a 17 percent reduction in *vessel operating costs*, not rates. The FSEIS makes no speculation as to whether the reduced costs would or would not translate into reduced rates.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 36

shipping cargo to Puget Sound rather than to Portland. See Response to Review Panel, at page 2 (“The difference in inland costs to and from the two port areas is so great that it far exceeds any reasonable estimate of vessel operating cost differences between the two areas. It is clear that, if a multi-port analysis showed any difference in volumes between the with-project and the without-project conditions, the benefits of the project could only increase relative to the current analysis.”).

This argument fails, however, because the Corps’ data on inland transportation costs are irrelevant and its underlying reasoning is specious. The Corps mixes apples and oranges when it compares the difference between relative inland transportation costs of shipping containerized cargo in the Puget Sound and Portland markets, and concludes that this difference is larger than the total ocean transportation cost. The data on inland transportation costs measure the *average* for all cargo shipped from a give sub-region of Portland’s hinterland to the two ports. To understand the Project’s impacts on shipping patterns, one must consider the *marginal* differences in inland transportation costs for individual shippers, and how these would be different, with- vs. without-the-Project. Even though, on average, it is cheaper for shippers in Portland’s hinterland to ship cargo to Portland, the marginal costs go the other direction for a considerable number of shippers and a large portion of the cargo. At some economic borderline between the two areas, the marginal costs are the same for shipping to Portland or to Puget Sound, and it is near this line that the two areas compete for cargo. The Corps presents a graph showing that, in 2000, almost 40 percent of the containerized cargo generated in Portland’s hinterland was exported through Puget Sound. See Response to Review Panel, at page 3.

Furthermore, the Corps concedes that shippers’ decisions are sensitive to changes in the sum of ocean rates plus inland rates. “For much of the agricultural and forestry products exports, the lowest total rate (inland+ocean) will dictate the route of choice.” Response to Review Panel, at page 4. If inland rates do not change—and the Corps offers no evidence that they would change in response to the Project—then *at the margin* shippers’ decisions must be sensitive to changes in ocean rates alone. The Corps estimates that the Project would lower ocean rates

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 37

for containers shipped through the Columbia River ports by at least 17 percent. See Revised Economic Analysis, at page 37 (“By 2008,....[p]er ton transportation costs shift from \$14.30 to \$11.83, a transportation cost savings of \$2.48 per short ton.”). Regardless of the average inland transportation costs, if they remain unchanged by the Project, then this reduction in ocean transportation costs on the Columbia River represents a marginal change in the total shipping costs and, hence, should induce shippers near the inter-port economic boundary to divert their cargo away from Puget Sound.

The Corps never conducts this marginal economic analysis nor does it describe its implications for the NED account. Consequently, its first explanation for its assumption that the Project would have no inter-port impacts has no substance.

Instead, the Corps brushes everything aside with its second explanation, an assertion that, as the Project lowers ocean transportation rates on the Columbia River it also would cause them to fall the same in Puget Sound. Hence, shippers would not see any change in the differential in the total (= inland + ocean) shipping rates and shippers would not change their preferences for Portland over Puget Sound. See Response to Review Panel, at pages 4, 5 (“It is expected that carriers in the Puget Sound will continue to be rate-competitive with Portland carriers.”); (“If there were a competitive response in the Puget Sound, it would likely occur within the realm of carrier rate competition, and would not constitute a [sic] real cost change.”).

Elsewhere, however, the Corps totally undermines the validity of this expectation. In response to a comment on the DSEIS raising the possibility that vessel owners calling Columbia River ports would keep for themselves the costs savings resulting from the Project, so that U.S. shippers would see none of the benefits, the Corps responded that such an outcome is precluded by “market realities” that leave owners of vessels in Puget Sound unable to lower their prices to offset any lowering of prices in the Columbia River. See Response to Comments, at pages Stakeholders/Special Interests- 108 (“In general, the container shipping industry is in a state of over-capacity, and U.S. exports are outnumbered by imports to such an extent as to lead to extremely marginal export rates. Rates are so low that

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 38

shippers are concerned about the viability of continued service.”); Stakeholders/Special Interests-111 (“[C]ontainer vessel owners are currently receiving extremely low margins, and westbound rates are so low that analysts are unsure that rates could possibly go lower.”).

In sum, the Corps has not offered a coherent chain of credible evidence to support its claims that (1) the Project would not divert cargo away from Puget Sound and other ports, and (2) if cargo were diverted, the Project’s benefits would be even greater than those the Corps has estimated in the FSEIS. Instead, the Corps has built its case on irrelevant data, and a self-contradictory line of reasoning that crumbles under scrutiny.

Thus, it seems reasonable to anticipate that the Project would result in cargo being diverted from Puget Sound and other ports, creating economic costs for them as it generates economic benefits in the Columbia River area. These costs would include, for example, the stranding of equipment and facilities at these ports, leaving them unused and reducing the value of the goods and services associated with them. Such reductions should be shown as costs in the NED account, but the accounting in the FSEIS shows no entry for them. Neither the Corps nor anyone else can judge the Project’s overall impact on the national economy absent an investigation of these costs. The Corps has not presented in the FSEIS the results from such an investigation and, hence, it has reached its economic conclusions based on its arbitrary assumption that these costs do not matter.

7. **The Corps’ failure to conduct a multi-port analysis is inconsistent with guidance documents produced by the agency, including its NED Procedures Manual.** The Corps is obligated to proceed with the Project only if it can demonstrate that it will increase the economic value of the national output of goods and services, consistent with protecting the nation’s environment, and pursuant to national environmental statutes, applicable executive orders, and other federal planning requirements. Federal law provides that “[i]n the case of any water resources project-related study authorized to be undertaken by the Secretary, the Secretary shall prepare a feasibility report Such feasibility report shall describe, *with reasonable certainty*, the economic, environmental, and social

B.7: The Corps adopted a methodology consistent with the Principles and Guidelines. As described in Response to Comments II.B.1, the Corps’ cost-reduction methodology is designed to measure benefits to the national economy, not regional benefits. In fact, CRANE’s suggestion to the contrary, that the Corps was required to conduct a multi-port analysis, is itself inconsistent with Corps guidance. See Response to Comments II.B.6 and II.B.9.

Moreover, CRANE’s support with respect to this position is of questionable value. CRANE states that the “Corps has in recent years recognized the reality that port-expansion projects in one place can impose costs on other ports, with an overall negative impact to the national economy.” CRANE p. 39. CRANE cites three passages from Corps documents. In two cases, however, these passages are used in a misleading manner, and in the third case the citation is incomplete and cannot be verified.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 39

benefits and detriments of the recommended plan and alternative plans considered by the Secretary. . . .” 33 U.S.C. § 2282(a) (emphasis added).

The Corps has produced numerous documents providing commentary, analysis, and guidance regarding this obligation. Comparing the FSEIS to these documents reveals that, by the agency’s own yardsticks, the Corps has not met its obligation. The Corps has in recent years recognized the reality that port-expansion projects in one place can impose costs on other ports, with an overall negative impact on the national economy.

- An analysis of dredging needs of the nation’s ports, prepared for the Corps’ Institute for Water Resources observed, “Planned terminal development in North America is currently 10.2 million TEUs, while growth in TEU traffic through 2005 is forecast at 7.8 million.” See Planning and Management Consultants, Ltd., “The National Dredging Needs Study of Ports and Harbors: Implications to Cost-Sharing of Federal Deep Draft Navigation Projects Due to Changes in the Maritime Industry,” at page 9 (May 2000) (internal citations omitted) (prepared for the U.S. Army Corps of Engineers, Institute for Water Resources).
- Port managers have warned that expanding the scope of the Corps’ nationwide channel deepening projects to more ports will, eventually, lead to negative economic returns on the taxpayer’s investment. This conclusion was reinforced in 1998 by the Corps’ Institute for Water Resources, which stated that, “[t]axpayers are paying for competing ports to expand their services, resulting in duplicative services offered within a geographic region.” Michael Grunwald, “A Race to the Bottom,” *Washington Post* (Sept. 12, 2000) <<http://www.washingtonpost.com>> (accessed Sept. 12, 2000).
- “Navigation improvement for channels and harbors are often extremely successful for regional development. . . . If the increased activity is simply a transfer from another harbor, . . . there is no real benefit to the nation. The multipoint emphasis in navigation project analysis arises largely from this concern that projects could do nothing but continuously reslice the same pie

CRANE’s citation to the National Dredging Needs Study (2000) does not address the issue in the manner claimed and the quote is taken out of context. As demonstrated by the full passage, the statistics quoted are actually used to commend ports on good planning:

In fact, ports in North America appear to be well positioned to meet increases in container throughput. . . . As demonstrated, ports in North America and Eastern Europe represent facilities where planned capacity is greater than expected throughput. Planned terminal development in North America is currently 10.2 million [twenty-foot equivalent units (“TEU”)], while growth in TEU traffic through 2005 is forecast at 7.8 million.

Planning and Management Consultants, Ltd., *The National Dredging Needs Study of Ports and Harbors—Implication to Cost Sharing of Federal Deep Draft Navigation Projects Due to Changes in the Maritime Industry*, (“National Dredging Needs Study”) (May 2000) p. 9. A full reading of the National Dredging Needs Study reveals that, in direct contradiction to CRANE’s claim, the study emphasizes the importance of port development on the nation’s economy. Notably, the study also found that “[a]lthough North American ports appear to be ahead of other major world ports in terms of infrastructure, harbor depths remain an obstacle. . . .” National Dredging Needs Study p. 9.

CRANE also cites a passage from a Washington Post article with a quote purported to come from a 1998 study by the Institute for Water Resources (“IWR”). The Washington Post article is available, however, no citation for the IWR study is provided. Due to the lack of context, it is impossible to respond to CRANE’s comment regarding this study.

Finally, CRANE repeats its mischaracterization of the Overview as the Corps’ guidance document. CRANE pp. 39-40. The Overview does not “require” or “demand” anything of the Corps, because the Overview “is not a policy manual.” Overview p. 1. The Overview “does not address any of the many plan formulation issues related to the NED principle. . . . it does not provide an economically rigorous treatment of the issues.” Overview p. 2. A detailed response to CRANE’s erroneous reference to the Overview is provided in Response to Comments II.B.1 and II.B.2.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 40

instead of increasing the size of the pie, if careful planning and analysis are not used.” NED Manual, at page 67 (internal citations omitted).

The FSEIS makes it clear that the Portland District of the Corps believes the proposed project will not increase the size of the pie. The Corps’ analysis is built on the assumptions that, with or without the Project, the same ships will make the same calls at Columbia River ports and provide the same services to shippers, who will ship the same goods. If the Project will, in fact, leave the pie unchanged, as the Corps asserts, the NED Procedures Manual requires that the agency demonstrate convincingly that the Project will do something other than merely reslice the pie, leaving the national economy worse off. The FSEIS has not satisfied this obligation. Rather than providing a multi-port analysis, or some substitute that constitutes “careful planning and analysis,” as demanded by the NED Procedures Manual, the Corps arbitrarily disregards the NED Procedures Manual’s requirements. In its place, the Corps substitutes an ad hoc, ex post cobbling together of irrelevant data and a line of reasoning that is contradicted by economic theory, comments and evidence offered in response to the DSEIS, and evidence contained in the FSEIS itself.

8. **The FSEIS also fails to follow Corps guidance requiring it to address the Project’s potential economic externalities, i.e., impacts on other ports and their derivative facilities.** The NED Procedures Manual makes it clear that the Corps is obligated to give full consideration to the Project’s spillover effects on others: “Many activities provide incidental benefits for people for whom they were not intended. Other activities indiscriminately impose incidental costs on others. These effects are called externalities. . . . Negative externalities make someone worse off without that person being compensated for the negative effect. . . . The NED principle requires that externalities be accounted for in order to assure efficient *allocation of resources.*” NED Procedures Manual, at pages 2 1-23 (emphasis added). Thus, the Project’s potential spillover effects on Puget Sound ports and other facilities constitute externalities for which the NED principle requires full accounting. The FSEIS fails to meet this requirement.

Yet another perspective comes from comparing the certainty with which the Portland District of the Corps has asserted that this Project will have no multi-port

B.8: CRANE asserts that the Corps failed to follow guidance requiring it to consider the Project’s “negative externalities” on Puget Sound ports and facilities. CRANE p. 40. In fact, CRANE’s comment ignores the Corps’ guidance regarding NED analysis and uses the term “externality” incorrectly. According to the Corps’ guidance, CRANE’s comment describes regional effects, rather than NED costs or project externalities.

CRANE’s comments describe regional effects that are addressed in the Regional Economic Development Account (“RED”), rather than the NED Account. The RED Account “registers changes in the distribution of regional economic activity that result from each alternative plan.” Principles and Guidelines, Section 1.7.4(a)(1). However, the Corps is not required to conduct an RED analysis – the “NED is the only required account.” Principles and Guidelines, Section 1.7.1(e). Moreover, when it conducts an NED analysis, the Corps is required to exclude regional effects (both benefits and costs) from its calculations. *See generally* Principles and Guidelines, Section 1.7.4 (describing Regional Economic Development Account) and Section 1.7.2 (describing National Economic Development Account).

CRANE’s comment also uses the term “externalities” incorrectly for purposes of an NED analysis. For example, if there was a shift of cargo from Puget Sound ports to Columbia River ports, this could cause a loss of employment or income at Puget Sound terminals. These are neither NED costs nor negative externalities, but are transfers within the RED account. Principles and Guidelines, Section 1.7.4(b)(2) (describing positive Regional Employment) and Section 1.7.4(c)(2) (describing negative).

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 41

effects with the larger agency's clear skepticism for such a position. "In recent years Corps' analysts have more and more recognized that U.S. export and import activity is a very competitive business. Commodity increases at one port often come at the cost of commodity decreases at another port. Market shares are constantly changing. *This fact cannot be denied in a complete analysis.*" U.S. Army Corps of Engineers, Water Resources Support Center, Institute for Water Resources, "Guidelines for Risk and Uncertainty Analysis in Water Resources Planning," IWR Report 92-R-1, at page 38 (Mar. 1992) (emphasis added) (attached as Exhibit 8) [hereinafter "Guidelines for Risk and Uncertainty"]. The Portland District of the Corps denies this fact, however, making assertions that reject even the possibility that the Project will exert any influence whatsoever on inter-port competition. See Response to Review Panel, at pages 3, 7.

Contrary to guidance from its manuals, the FSEIS fails to offer an appropriate economic analysis of the Project's marginal impacts and its potential negative externalities on Puget Sound ports, transportation facilities derivative to them, or others. Nowhere does the FSEIS trace the market power of shippers, foreign vessel owners and foreign purchasers of U.S. products shipped through Columbia River ports and, hence, the FSEIS offers no estimate of the extent to which transportation cost savings resulting from the Project will be shared among these groups. Nowhere does the FSEIS quantify the sensitivity of shippers' production and shipping decisions to their expected share of the transportation cost savings. Nowhere does the FSEIS trace the negative externalities, i.e., economic costs that would materialize if the shippers, in response to the Project, diverted cargo to Columbia River ports. Nowhere does the FSEIS analyze other potential externalities that reasonably should be expected to materialize from the Project's impacts on other components of the transportation system.

9. The Corps' failure to conduct a multi-port analysis is based on a disregard for and misconstruction of comments on the DSEIS regarding the necessity of conducting a multi-port analysis. The Corps' arguments for not conducting a multi-port analysis arbitrarily ignore issues and approaches raised in comments on the DSEIS. Specifically, the Corps merely restates the Benefit Panel's opinion that "[a]lthough apparently reasonable at the time, the absence of a multi-port

CRANE also mischaracterizes the Corps' position regarding port competition. *See* CRANE at page 41. The FSEIS acknowledges that "it is reasonable to consider the possibility that the capture rate could differ between the with-project and without-project conditions." FSEIS, Revised Economic Analysis, Exhibit M, p. 44; *see also* Response to Review Panel Comments (November 12, 2002) p. 3. In fact, the FSEIS provides an analysis of port competition and a sensitivity analysis showing project benefits under different market share outcomes. *See* FSEIS, pp. 43-45. The Corps' position is not that the project would have no effect on port competition or market shares, but that to base project benefits on such an effect would be speculative and problematic. Moreover, the Corps concluded that if the effect did occur, it would only increase overall project benefits. *See* Response to Review Panel Comments (November 12, 2002) pp. 1-2.

A detailed response to CRANE's mischaracterization of the Overview is provided in responses II.B and II.B.2.

B.9: The FSEIS does not misconstrue or disregard comments from the Benefit Panel regarding a multi-port analysis. As described below, the Corps thoroughly considered the Panel's comments and addressed the multi-port analysis issue in a complete and thoughtful manner.

CRANE's comment highlights an "analytical dilemma" common to deep-draft navigation studies and that the Review Panel discussed in some detail. The dilemma can be summarized this way:

- a. If cargo volume is unchanged in the with-project and with-out project condition, then the Corps must assume fewer vessel calls, at least in the short run, to realize the project's transportation cost savings benefit (i.e., lower per unit costs that result from loading more cargo on a ship in the with-project condition).
- b. If the number of vessel calls is reduced, however, the reduced service frequency could adversely affect cargo volumes.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 42

analysis is no longer reasonable in light of recent information.” Response to Review Panel, at page 3.

However, the Benefit Panel expanded its comment by describing the analytical dilemma the Corps had created by assuming that the proposed Project would not alter either the ships calling Columbia River ports or the cargo shipped through them. The dilemma manifests itself in this manner: if the same vessels would call and carry the same cargo, with or without the Project, the Project would not yield any economic benefits. To generate economic benefits, either the same vessels must carry additional cargo (generating transportation cost savings by taking advantage of the deeper draft) or fewer vessels must call to carry the same cargo as would be carried without the Project (similarly generating transportation-cost savings by taking advantage of the deeper draft).

The Corps’ response to these comments avoids the heart of the issue at hand. The Corps fails to present calculations resolving the inherent contradiction in its predictions that the same vessels can generate transportation cost savings by carrying the same amount of cargo at deeper drafts and greater amounts per vessel. Instead, the Corps waves its arms around data showing that the differential in the average inland transportation costs between Portland and Puget Sound is larger than the total ocean transportation cost. As explained above, this comparison is irrelevant to predicting the costs and benefits associated with the Project.

The Niemi Report, in a section titled “Spillover Effects on Other Ports,” also offers comments on the DSEIS, raising issues about the costs stemming from the Project that might materialize outside the Columbia River area: “The Corps . . . does not analyze the proposed project’s potential impacts on the competition between the Columbia River ports and their neighbors. It is clear, though, that there would be some competitive impacts, and, hence, a non-zero probability that at least some of the project’s benefits would come at the expense of spillover costs imposed on these other ports.” Niemi Report at page 38.

The FSEIS fails to respond to this section of the Niemi Report. Instead, in a response to a subsequent chapter, the Corps chooses to categorize concerns about

Stated differently, either the project will result in fewer vessel calls, or there will be the same number of vessel calls but the vessels will be underutilized. In either case, the result could be diminished project benefits.

One approach to this problem is to assume that there will be more cargo in the with-project condition than the without-project condition. The Benefit Review Panel preferred this method, because the members believed that a multi-port study would evaluate how much more cargo would be captured in the with-project condition. Benefit Review Panel Comments, p. 7 (Service Implications of Fewer Vessel Calls).

The Benefit Review Panel’s increased cargo/multi-port study approach, however, requires significant speculation. Such an approach would require Corps planners and analysts to describe the causal relationship between marginal changes in vessel operating costs and the changes in port market shares. Establishing this relationship is made especially difficult with regard to this Project given that non-priced competition affects shipper behavior in the region. Response Review Panel Comments (November 12, 2002), pp. 3-5. In other words, factors other than price influence cargo flow within the region. The Corps concluded that it could avoid this speculative process by resolving the analytical problem using an alternative analytical method.

Using the cost-reduction methodology adopted by the Corps, the FSEIS addresses the issue in two ways. First, the FSEIS assumes that the project will result in fewer vessels calls over the long-run, an assumption that is strongly supported by historical data. The immediate, short-term effect of the project, however, would not be to reduce vessel calls. Thus, in the period immediately following the project’s start, the service frequency for container vessel would be the same as the period immediately preceding the project’s start. It follows then that vessel utilization would decline in the period immediately after the project’s start because cargo tonnage would not have increased to match the increased vessel capacity afforded by the channel improvement. As a result, the FSEIS adjusts vessel utilization downwards for a one year period following the project start. FSEIS, Exhibit M, Revised Economic Analysis, p. 36. In response to the Review Panel’s suggestion, the FSEIS also includes a sensitivity analysis showing the affect on project benefit if the adjustment period is extended over a longer period of time. FSEIS, Exhibit M, Revised Economic Analysis, pp. 47-8.

The second way the FSEIS addresses the analytical problem is to consider the possibility that service frequency will suffer due to the project. If this were to occur, it would follow that Portland would be less successful in competing for regional container cargoes and its market share (capture rate) would decline. The FSEIS includes a sensitivity analysis for market shares demonstrating the effect on project benefits if capture rates are lower than projected in the base case. FSEIS, Exhibit M, Revised Economic Analysis, pp. 43-45. In these two ways the FSEIS resolves the analytical problem presented by holding the cargo volume constant in both project conditions.

Comments regarding impacts to other ports are addressed above. See response II.B.8.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 43

the inter-port, competitive impacts as issues of regional economic transfers that are inappropriate for examination in the FSEIS:

The Niemi report confuses regional with national benefits. . . . Niemi seems to have the opinion that the benefits of the Columbia River project are a result of increased port revenues at the Port of Portland, which should then be offset by decreased port revenues at the Puget Sound ports. This is not the case. The benefits of the project are based on transportation cost savings, rather than rate transfers.

See Response to Comments, at page Stakeholders/Special Interests-115. The Corps offers this and related responses even though the Niemi Report incorporated statements from the Institute for Water Resources (“IWR”) seconding the Niemi Report’s concerns. Thus, the Corps mischaracterized the straightforward language of the Niemi Report about “spillover costs imposed on other ports” as an issue regarding the rates and revenues of the different ports. Id. (emphasis added). This response indicates the Corps either does not understand or has simply failed to meet its obligation to investigate “spillover costs,” a widely recognized synonym for “negative externalities.”

The Corps also arbitrarily brushes aside similar concerns derived from a report by the Corps’ Institute for Water Resources and reported in the Niemi Report, responding that “[w]hile the general statement quoted from the IWR report is interesting, it does not apply in t h s regional context.” See Response to Comments, at page Stakeholders/Special Interests-115. The statement to which the Corps refers comes from the IWR, the Corps’ research arm, and highlighted the transportation system’s excess capacity regarding containerized traffic. This study raises the possibility that further increases in capacity, such as the Project, are not economically justifiable. The Corps offers no substantiation for its declaration that economic behaviors and conditions in this region make the IWR’s statement inapplicable.

The Corps compounded its mischaracterizations and arbitrary disregard for the economic concerns expressed in the Niemi Report by an expression of faulty economic reasoning. The Corps states that “[t]he Niemi report also fails to

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 44

recognize that the Corps benefit calculation assumes that the Puget Sound increases its market share in the Portland hinterland, which also makes the ‘stranded infrastructure’ argument moot.” See Response to Comments, at page Stakeholders/Special Interests-1 15. If, as the Corps assumes, the Puget Sound ports compete with Portland and would be able to capture cargo from Portland’s hinterland even with the Channel Deepening Project, it seems reasonable that the Puget Sound ports would capture even more cargo without the Project. After all, the Corps has avowed that a “vigorous competitive environment” exists. Thus, symmetry demands that the converse also seems reasonable: implementing the Project will, indeed, leave stranded investments at the Puget Sound ports and in the facilities derivative to them.

In reality, the Project’s impacts on the other ports and facilities are not issues that can be resolved by mere assertions. They are a empirical issues that can be evaluated only through a multi-port analysis, which the Corps has not conducted. Its failure to do so leaves the FSEIS inadequate to support any decision to implement the Project. The Corps’ responses to the Benefit Panel and the Niemi Report demonstrate that it has approached multi-port issues with scrambled reasoning, supporting our conclusion that the FSEIS’s economic analysis is seriously flawed. The Corps’ failure to address earlier comments regarding its obligation to complete a multi-port analysis reinforces the conclusion that the Corps’ analysis of the Project’s economic benefits and costs excludes arbitrarily the potential costs associated with the Project’s impacts on other ports. Without careful examination of these impacts and costs, there is no way of knowing if the Project, as proposed by the Corps, will come even close to the benefit-to-cost ratio reported in the FSEIS.

10. **The FSEIS fails to describe the full, potential, economic risks and uncertainties associated with the Project.** No one can predict the Project’s future economic impacts with certainty. To guard against the possibility of investing large sums of money in the Project only to find that the projected economic benefits are lower and the costs higher than expected, leaving the national economy worse off, the Corps is obligated to provide a full discussion of the various factors that might bring about such an outcome and describe the

B.10: Detailed responses to the issues summarized in this overview comment are provided in response B11.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 45

likelihood that, in actuality, the Project's benefits will not outweigh its costs.

The DSEIS's discussion of risks and uncertainties associated with the Project failed to meet this obligation. The Corps' discussion in the FSEIS remains inadequate. As argued throughout these comments, the Corps (1) arbitrarily disregards guidance provided by the Corps' own manuals on these topics, (2) mischaracterizes and disregards questions raised regarding its treatment of the Project's risks and uncertainties in the DSEIS, and (3) inappropriately passes to the Technical Review Panel the burden of the Corps' obligation to provide a thorough discussion of the potential uncertainties and risks associated with the Project.

11. **The Corps' discussion of uncertainties and risks in the FSEIS is inconsistent with guidance provided by the agency's Guidelines for Risk and Uncertainty.** The Corps introduces the "Risk and Uncertainty" section of the FSEIS with these statements: "While this analysis has attempted to present a most likely scenario, it is certain that things will happen that will be considered unlikely at the time of this analysis. *In no particular order, and without specifying specific numbers of upside or downside risks, some of the potential issues that could impact the benefits are: . . .*" See Revised Economic Analysis, at page 42 (emphasis added).

The Corps' presentation, as outlined by these statements is inconsistent with guidance provided by the Corps' own manual on risk and uncertainty. See generally Guidelines for Risk and Uncertainty. A summary statement in the Guidelines for Risk and Uncertainty says that consideration of risk must include an assessment of the probabilities associated with alternative possible outcomes: "Risk is defined as a situation where the decision maker knows all the alternatives available but each alternative has a number of possible outcomes. Thus, the decision maker no longer knows the outcome of each alternative. In this region, probabilities are assigned to each outcome." *Id.* at page 7. In contrast to this guidance, the Corps acknowledges in the FSEIS that its assessment of risk does not consider all the possible outcomes for various alternatives, and it does not assign probabilities to each outcome. Instead, the Corps considers only some of the possible outcomes and quantifies no probabilities.

B.11: CRANE's comment begins by mischaracterizing the Corps' duty to assess risk and uncertainty. The comment continues by completely ignoring the Risk and Uncertainty sections of the FEIS and the FSEIS. In some cases CRANE asserts the Corps did not conduct a particular inquiry when, in fact, it specifically included such analysis. In other instances, CRANE continues to confuse the FSEIS' limited role as the Limited Reevaluation.

As an initial matter, the Corps is not required to "consider all the possible outcomes for various alternatives" and "assign probabilities to each outcome." CRANE p. 45. The Principles and Guidelines explicitly state that "[u]ncertainty and variability are inherent in water resources planning." Principles and Guidelines, Section 1, Supplement 1, p. 15. CRANE also erroneously attributes the definition of "risk" to the Corps. The definition is actually a quote from Frank Knight's text *Risk, Uncertainty and Profit*. See U.S. Army Corps of Engineers, Guidelines for Risk and Uncertainty, Volume I, ("Guidelines for Risk and Uncertainty"), March 1992, p. 7. The Corps' definition of "risk" is as follows:

Risk: The potential for realization of unwanted, adverse consequences; estimation of risk usually based on the expected result of the conditional probability of the occurrence of event multiplied by the consequence of the event, given that it has occurred.

Guidelines for Risk and Uncertainty, at page 10. The Corps defines "uncertainty" as those situations "in which potential outcomes cannot be described in objectively known probability distributions." Principles and Guidelines, Section 1.4.13(c). The Knight quote is provided in the "Basic Concepts and Definitions" section and, as such does, not prescribe any obligation or requirement on the Corps' analysis.

Moreover, several of CRANE's comments were addressed initially in sections of the FEIS. For example, the first comment regarding the probability that cargo will be lower than the Corps' projection is addressed in the FEIS. FEIS, Appendix C, Section 9.1. The second comment contends the Corps failed to quantify the probability that Portland's capture of containers generated in its hinterland would be lower than projections. Yet, this issue was addressed in the FEIS. See FEIS, Appendix C, Section 9.1. The fourth comment reasserts these earlier comments and is erroneous for the same reasons.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 46

The Guidelines for Risk and Uncertainty also offer guidance about the scope of an assessment of risks and uncertainties, advising that the appropriate approach is to broaden rather than narrow the scope. Notably, “[i]t is the analyst’s job to identify, clarify, and quantify areas of risk and uncertainty wherever possible, especially for those pieces of information which have a substantial influence on either the choice of an alternative and/or its size and cost.” Guidelines for Risk and Uncertainty, at page 17. In contrast to this guidance, the Corps arbitrarily has not identified, clarified or quantified areas of risk and uncertainty as required. For example, the “Risk and Uncertainty” section of the FSEIS:

- Does not discuss the possibility, let alone quantify the probability, that bulk cargo will be lower than the Corps’ projections, lowering the Project’s benefits.
- Discusses the possibility, but does not quantify the probability, that Portland’s capture of containers generated in its hinterland will be lower than the Corps’ projections, and does not discuss the possibility that the production of containers in the hinterland will be lower than the Corps’ expectation, lowering the Project’s benefits.
- Does not discuss the possibility that the Project might be delayed, raising its costs relative to its benefits.
- Does not discuss the possibility or quantify the probability that cargo the Corps expects to move through Columbia River ports will, instead, move through other ports, lowering the Project’s benefits.
- Does not discuss the possibility or quantify the probability that the economy of the Pacific Northwest and the containerized cargo it produces will evolve, so that, instead of exporting low-value, high-density agricultural and forest products, it increasingly will export products with less density, lowering the Project’s benefits per container.
- Does not discuss the possibility or quantify the probability that changes in regional climate resulting in declining snowpack may reduce summer runoff

A number of CRANE’s comments relate to issues and analysis contained in the FSEIS. CRANE at page 46-49. For example, the comments regarding Portland’s capture of containers completely ignore the Corps’ sensitivity analyses. *See* FSEIS, Exhibit M, Revised Economic Analysis, pp. 43-45. Similarly, the Corps considered changes in the density of cargo and adjusted the economic analysis to reflect these trends. *See* FSEIS, Exhibit M, Revised Economic Analysis, p. 32. CRANE’s contention that the Corps failed to quantify the probability that the number of ships calling the Columbia River ports will be smaller than the projections is discussed in depth above. *See* response II.B.9.

CRANE suggests repeatedly that the Corps should have discussed the possibility or quantified the probability that global climate change would result in regional changes that would lower Project benefits. CRANE’s assertion ignores both Corps guidance and the realities of such a request. Corps planners and analysts recognize that “[m]ost risk and uncertainty aspects of projects *cannot* be characterized by probability distributions based on well established empirical data.” Principles and Guidelines, Section 1, Supplement 1, S2(f), p. 16. (emphasis added). The Corps’ obligation for addressing risk and uncertainty “is to characterize *to the extent possible* the different degrees of risk and uncertainty.” Principles and Guidelines, Section 1, Supplement 1, S2(a)(1), p. 15.

The Corps considered the consequences of including global climate change in the economic analysis, but concluded that it could not accurately or effectively characterize such consequences. The scientific community is struggling to even describe the regional, national, and international effects of global climate change. Asking the Corps to predict or forecast with any degree of certainty what impact those uncertain effects might have on the Project is beyond the scope of the NED analysis. The Corps sought to avoid such speculation, opting instead to characterize risk and uncertainty to the extent possible as dictated by the Principles and Guidelines and determined using the professional judgment of its planners and analysts.

Taken together, the risk and uncertainty sections of the FEIS and FSEIS provide a rigorous evaluation of significant factors affecting project benefits, including many of those identified in CRANE’s comment.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 47

and lower river levels so that ships cannot fully take advantage of the deeper channel, thus lowering the benefits from the Project.

- Does not discuss the possibility or quantify the probability that changes in regional climate may constrain the production of agricultural products to lower levels than the DRI-WEFA forecasts.
- Does not discuss the possibility or quantify the probability that adverse climate conditions may interact with human-caused impacts on aquatic habitat, increasing the severity of risk to salmon and other species, and increasing the costs the Corps and Project sponsors incur to establish and maintain the deeper channel and larger disposal sites.
- Does not discuss the possibility or quantify the probability that the different levels and distributions of the transportation-cost savings among U.S. shippers, foreign vessel owners, and foreign purchasers of U.S. goods, will materialize and trigger market behaviors different from the Corps' projections, resulting in fewer Project benefits.
- Does not discuss the possibility or quantify the probability that the number of ships calling Columbia River ports will be smaller than the Corps' projections, lowering levels of service and reducing the Project's benefits.
- Does not discuss extraordinary costs that might materialize outside the 15 percent contingency included in the cost estimate. These include higher costs for diesel, reflecting extraordinary price increases, and higher costs for remediation of hazardous wastes, if any materialize during the Project.

This list is not intended to be a comprehensive list of variables that the Corps has omitted from its "Risk and Uncertainty" section of the FSEIS. The complete list would include variables relating to costs, as well as benefits.

The Guidelines for Risk and Uncertainty also make clear the importance of not narrowing an economic analysis to a single scenario:

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 48

Planners should identify and consider multiple without-project conditions. The rationale for this is clear: we can not have the most probable future condition unless we have identified more than one possibility. Plan formulation may concentrate on the most probable condition but alternative scenarios should be carried forward in the planning process. A more robust plan can be formulated and selected by evaluating how various plans perform in alternative futures.

Guidelines for Risk and Uncertainty, at page 17. In contrast to this guidance, the FSEIS does not—indeed, cannot—evaluate how the Project performs in alternative futures because the FSEIS does not carry forward through the economic analysis alternative scenarios regarding the numerous variables that would define alternative futures. Thus, the Corps offers its “most likely” scenario without specifying other possible outcomes. The FSEIS, for example, does not define and then test the Project against alternative futures reflecting concurrent differences in these and other variables:

- The evolution of the Pacific Northwest’s economy and the products it ships.
- The volume and tonnage of each type of cargo shipped through Columbia River ports.
- The number of vessels calling Columbia River ports.
- The distribution of transportation—cost savings resulting from the project among foreign vessel owners, U.S. shippers, and foreign purchasers of U.S. products.
- The costs to and benefits for the national economy materializing from shippers’ response, in terms of their production and shipping decisions, to their share of the transportation—cost savings.
- The impacts on other ports and facilities derivative to them.
- The response to the Project of other ports and facilities derivative to them.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 49

- Environmental conditions and their impacts on the costs of establishing and maintaining the deeper channel and disposal sites.
- Regional climate and its impacts on the production of exportable goods, summer river levels, and vessel operations in the river.

In sum, the Corps has arbitrarily disregarded guidance in the agency's manual, which reflects generally accepted principles of risk analysis. Instead, it arbitrarily addresses just a few of the variables that generate risk and uncertainty about the Project's net benefits, and arbitrarily fails to offer any assessment of the probabilities associated with outcomes other than the Corps' "most likely" projection. It has not specified and tested the Project against any multi-variable scenario representing less favorable conditions than the "most likely" scenario. Clearly, under such less favorable conditions, the Project would have both higher costs and lower benefits. Furthermore, the Corps has not specified the probability that the "most likely" scenario will materialize, or even demonstrated that its "most likely" scenario is, in fact, just that. Thus, it is impossible for a decisionmaker or member of the public-or, indeed, the Corps itself-to know the degree of uncertainty associated with its economic projections and its benefit-to-cost ratio from reading the FSEIS.

12. **The Corps has arbitrarily mischaracterized and disregarded questions raised regarding its treatment of the Project's risks and uncertainties.** The Niemi Report raised numerous questions about the failure of the DSEIS to provide a complete, transparent, and unambiguous accounting of the risks and uncertainties that underlie the Corps' estimates of the Project's costs and benefits. In accordance with generally accepted principles of risk analysis, the Niemi Report further asked the Corps to evaluate not just the risks and uncertainties associated with a few variables individually but also of the cumulative risks and uncertainties associated with all of them. The FSEIS mischaracterizes and disregards these requests, setting aside questions about risks and uncertainties associated with individual variables and failing to provide an overall assessment of the cumulative risks and uncertainties from multiple variables.

The failure to describe cumulative risks is especially arbitrary and unresponsive to

B.12: CRANE's argument completely ignores the multiple factor sensitivity analyses provided in the Corps analysis. In fact, the FEIS includes an entire section dedicated to the type of analysis CRANE references in the comment. As described previously, CRANE's comment is apparently based on a fundamental misunderstanding of the FSEIS' role as Limited Reevaluation. The FSEIS is not the "most detailed stage of the Corps' analysis." CRANE, p.50. To the contrary, the detailed analysis is provided in the FEIS. A Limited Reevaluation Study "may be necessary if a significant period of time has elapsed or conditions have changed significantly since the feasibility study was completed." ER 1105-2-100(b). The FSEIS supplements the earlier work to the extent necessary. The vast majority of the Corps' analysis with regard to the cost-benefit analysis did not "change significantly" and, therefore, is not repeated or revisited in the FSEIS.

Within the context of a Limited Reevaluation, the FSEIS' Risk and Uncertainty Section is not intended to revisit the entire analysis. Corps planners and analysts have discretion to revisit only those sections of the analysis that would have the most impact on the cost-benefit determination and have changed since issuance of the FEIS. See ER 1105-2-100(b). Corps planners and analysts focused the Limited Reevaluation using the cost-reduction methodology as described in Corps guidance. According to the Principles and Guidelines, cargo volumes and vessel utilization are the two primary components that combine to produce the estimate of project benefits. See Principles and Guidelines, Section 2.7.4.

The Corps used these factors to identify those areas of analysis to be included in the FSEIS' Risk and Uncertainty Section. The analysis of risk and uncertainty in the FSEIS evaluated bulk vessel fleet, capture rate for containers, container vessel sizes, transit times for container vessels, ratio of empty to full containers, and the period of adjustment for vessel utilization because these areas are impacted by cargo volumes and/or vessel utilization. See FSEIS, Exhibit M, Revised Economic Analysis, pp. 42-48.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 50

comments provided on the DSEIS. As discussed throughout this section, the FSEIS fails to identify and consider alternative scenarios, and to evaluate the risks and uncertainties they create for the proposed Project. Instead, in the “Risk and Uncertainty” section of the FSEIS the Corps arbitrarily selects and discusses “*some* of the potential issues that could impact the [Project’s] benefits.” Revised Economic Analysis, at page 42 (emphasis added). The selection of these variables appears arbitrary: the Corps never explains the criteria it used to decide which of the issues warranted consideration and which did not. Furthermore, the Corps’ failure to identify and evaluate the cumulative risks and uncertainties associated with multiple variables is inconsistent with guidance provided by the agency’s own Guidelines on Risk and Uncertainty:

In general, more complex techniques are appropriate as planning proceeds from the initial development and the screening of alternatives to the analysis and presentation of the final set of alternative plans. For example, sensitivity analysis—testing the sensitivity of the outcome of project evaluation to variation in the magnitude of key parameters—may be most useful and applicable in the early stages of planning, when the concern is to understand single factors or relatively general multiple-factor relationships. *Multiple-factor sensitivity analysis, in which the joint effects or correlations among underlying parameters are studied in greater depth, may be more appropriate in the detailed analytic stage than in the screening stage.*

(1) Similarly, analysis of risk and uncertainty based on objective or subjective probability distributions would be more appropriate in the detailed analytic stage than in the early screening stage. Although hydrologic and economic probabilities may be used in the screening stage, *the full use of independent and joint probability distributions, possibly developed from computer simulation methods, to describe expected values and variances, is more appropriately reserved for the detailed stage.*

Guidelines for Risk and Uncertainty, at pages 77-78 (emphasis added). The FSEIS represents the final, most detailed stage of the Corps’ analysis. Nonetheless, and

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 51

in contrast to the guidance provided by the Guidelines for Risk and Uncertainty, the FSEIS is notable for its total lack of any “multi-factor sensitivity analysis” of the Project’s risks and uncertainties and its failure to use “joint probability distributions” to test the Corps’ estimate of the Project’s expected benefits against different assumptions regarding multiple variables simultaneously.

The Corps’ Guidelines for Risk and Uncertainty also makes it clear that there is no valid excuse for not conducting a sensitivity analysis that jointly looks at the uncertainties and risks associated with multiple variables:

Fleet composition is one of the least certain aspects of a deep draft project. While existing fleet composition is relatively easy to document, it is extremely difficult to project future fleet composition. Future fleet composition depends on technological trends such as wider beam, shallower draft vessels and a movement toward less labor-intensive loading and off-loading technologies. Changes in land-side technology, such as the advances in handling and moving container cargo, can be as important as changes in navigation technology for future fleet composition. Assumptions about future fleet composition go a long way toward determining transportation cost savings and cannot be overlooked as important sources of benefit uncertainty.

The future fleet depends on ever-changing itineraries of shipping lines, port development in foreign countries and competing American ports, excess supply or demand of shipping capacity, world commodity prices, and a complex host of other factors. With multiple forecasts being made for each of these factors comes cumulative uncertainty. When commodity forecasts are combined with forecasts of vessel size, the potential for compounding errors due to unrealized forecasts is not hard to imagine.

Vessel operating costs are another source of potential uncertainty. Deep draft vessel costs prepared by the Institute for Water Resources are subject to the same uncertainty and problems that inland waterway

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 52

vessel costs are. The nature of this uncertainty is generally neither understood by nor available to field personnel.

Guidelines for Risk and Uncertainty, at page 39. The FSEIS stands in sharp contrast to this discussion and prescriptive advice. Nowhere does it contain an analysis of the “potential for compounding errors” if the Corps’ forecasts regarding fleet composition, commodity forecasts, vessel operating costs and numerous other variables fail to materialize.

13. **In addition to the specific requirements of the Guidelines for Risk and Uncertainty, general standards of risk analysis dictate that the Corps’ should take a broad-not a narrow-approach in considering the possibility that multiple variables will concurrently fail to yield the benefits expected in the Corps’ benefits-to-costs ratio.** Here too, the FSEIS fails, repeatedly slamming the door on comments asking it to adopt this broad approach. For example, when the Niemi Report asked the Corps to investigate the possibility that the deeper channel might attract larger ships and create additional risk of collisions and other accidents, the Corps responded that the possibility is minimal or non-existent: “In fact, the Corps’ analysis assumes that vessels on the Columbia river are unlikely to significantly exceed the size of current vessels. . . . The Columbia River pilots have a very good safety record navigating these vessels on the river system and we do not expect this to change when the project is implemented.” See Response to Comments, at page Stakeholders/Special Interests- 1 12. The Corps never considers the possibility that these assumptions are incorrect, directly contradicting not only the guidance quoted above, but also specific instructions in the Guidelines for Risk and Uncertainty. See Guidelines for Risk and Uncertainty, at page 38 (“Because absolute safety can’t be guaranteed, risk-cost trade-offs should be part of any project design optimization. Assessment of in-channel collisions often entail low probability-high consequence event problems. If collisions have not occurred it may be difficult to extrapolate probabilities of their occurrence.”).
 Response to
14. **The FSEIS also is notable for failing to comply with another related directive from the Guidelines on Risk and Uncertainty that mandates presentation of forecasts using mean values with calculated distributions.** This directive, presented in outline format, warns against reliance on single numbers to represent

B.13: See Responses II.B.11, B.12, and B.14 for detailed discussion of risk and uncertainty. With regard to vessel collision, the Corps has addressed channel safety in Section 2 of the FEIS (page 2-10). The assertion made by Niemi that a deeper channel could result in larger vessels is questionable, and the assertion that larger vessels could lead to increased safety risks is unsupported. Currently, there are many 73,000+ dwt vessels operating on the river. These vessels have fresh water design drafts of 47 feet or more. It is unlikely that future vessels are going to get significantly larger than these vessels that are operating on the river today. Further, as noted in the FEIS, the Columbia River Pilots have a substantial record of safe operation of these large vessels, and what incidents have occurred on the river have had no relation to vessel size.

B.14: When it cites to the Guidelines for Risk and Uncertainty, CRANE completely ignores the introduction of the section, entitled “A Risk and Uncertainty Analysis Outline,” which states explicitly:

There is no formula for conducting a risk and uncertainty analysis. There are no set procedural steps to follow. There isn’t even a menu of issues, analytical procedures or decision making algorithms from which an analyst or decision maker can confidently choose. Each risk and uncertainty analysis is as unique as the problems presented, alternatives possible, and people involved.

Guidelines for Risk and Uncertainty p. 60. There are no “procedural steps” for the Corps to follow when conducting a risk and uncertainty analysis; there is no “formula”. Corps planners are expected to modify the outline cited by CRANE “to fit the requirements of specific projects.” Guidelines for Risk and Uncertainty p. 62.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 53

the forecast of future cargo amounts for each future year:

Risk and Uncertainty Management. . .

A. Identify key risk and uncertainty issues and the results of the analysis for the decisionmaker. . . .

4. Present forecasts, with project conditions, benefits, costs, and BCRs [benefit-cost-ratios] as mean values with calculated distributions, or as a range of values, instead of as single numbers.

Guidelines for Risk and Uncertainty, at page 62.

In preparing the FSEIS, the Corps did just what this directive tells it not to do. Consider, for example, its treatment of risks and uncertainties associated with its commodity-flow forecasts. These forecasts lie at the heart of the Corps' estimate of the Project's benefit-cost ratio and, hence, it is especially important that the Corps describe fully the likelihood that expected levels of commodity flows will not materialize and the Project will not yield the expected benefits for the national economy. Nonetheless, with respect to these forecasts, the FSEIS does not present benefit-cost-ratios as mean values with calculated distributions representing uncertainty in the forecasts. It does not present benefit-cost-ratios as a range of values. Instead, it presents a single benefit-cost-ratio based on a single forecast—which the Corps calls the “most likely” scenario-of future flows for each type of commodity. One has no way of knowing, for example, if the probability that the worst-case scenario-with markedly lower benefits and higher costs-will materialize is only one percent less than the probability that the most-likely scenario will materialize.

15. **The FSEIS mischaracterizes and disregards comments regarding individual sources of risks and uncertainties.** For example, the Niemi Report offers data from a report published by the Corps' IWR indicating that, all else being equal, delaying the Project four years would reduce the benefit-cost ratio in the DSEIS

As described above, CRANE's comment ignores the Corps' work in the FEIS that presented the forecasts using mean values with calculated distributions. See FEIS Appendix C, Section 9.1. The Corps also provided distributions of possible outcomes for key variables affecting the analysis. See Response II.B.12 for a further discussion of the Corps' sensitivity analyses (e.g., bulk vessel fleet, capture rate for containerize, container vessel sizes, transit times for container vessels, ratio of empty to full containers, and the period of adjustment for vessel utilization). See also FSEIS, Exhibit M, Revised Economic Analysis, pp. 42-48.

B.15: The Principles and Guidelines do not require the Corps to predict the congressional appropriation process and the possible consequences of delay. Predicting congressional decisions and the consequences of those decisions on the Project are simply beyond the scope of review. The Principles and Guidelines describe the general elements of risk and uncertainty that should be excluded from a Corps analysis:

(j) Adjustments to risk and uncertainty in project evaluation can be characterized as general or specific. General adjustments include the addition of a premium to the interest rate, overestimation of costs, underestimation of benefits, and limitations on the period of analysis. Such general adjustments are usually inappropriate for public investment decisions because they tend to obscure the different degrees of uncertainty in different aspects of projects and programs. Specific adjustments-including explicit assessments of different degrees of risk and uncertainty in specific aspects of a project or program and specific adjustments to them-are preferable.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 54

below 1.0. The Niemi Report also asks the Corps to incorporate this information in its sensitivity analysis, to reflect uncertainty inherent in the Project's timing.³ The Niemi Report observes that this uncertainty is not symmetrical, that is, the Project probably is less likely to be accelerated than delayed. The Corps' response brushes aside these concerns about how delay costs might affect the Project's benefit-to-cost ratio as speculation and asserts it has no obligation to describe delay costs for the American public in the FSEIS. See Response to Comments, at page Stakeholders/Special Interests-111 ("The Niemi report speculates about potential cost increases if funding is delayed. These concerns will be forwarded to Congress, as they are not appropriate to integrate into an economic analysis, but could be appropriate for Congress to consider, as national priorities are set.").

On its face, the Corps' assertion that it is "not appropriate" to integrate the effects of potential delays in its sensitivity analysis is absurd, arbitrary and inconsistent with the Corps' own guidelines. "It is the analyst's job to identify, clarify and quantify areas of risk and uncertainty wherever possible, especially for those pieces of information which have a substantial influence on either the choice of an alternative and/or its size and cost." Guidelines for Risk and Uncertainty, at page 17 (emphasis added). The Corps' refusal to integrate into the FSEIS the evidence cited in the Niemi Report indicates the agency arbitrarily decided not to "identify, clarify, and quantify areas of risk and uncertainty wherever possible." Moreover, despite the fact that data provided in the Niemi Report quotes from a report prepared by the Corps' own researchers, the Corps arbitrarily decided that delay costs-costs capable of reducing the benefit-cost ratio to zero-are not among "those pieces of information" that can exert a substantial influence on the Project's cost.

Principles and Guidelines, Section 2.j. Speculation about congressional priorities are 'general adjustments' that are inappropriate for public investment decisions. General speculation that Congress could choose to fund this particular project in any particular manner is not an adjustment related to any specific uncertainty in any element of the action.

The IWR report cited by Niemi makes a general observation that a year's delay can result in a penalty of more than 10 percent of project cost. The report does not indicate, however, that a four-year delay would reduce the benefit-to-cost ratio to less than 1.0 for the Project, as Niemi suggests. This is a conclusion reached by Niemi himself that is based on his own unsupported calculations, not the findings of the report. See The National Dredging Needs Study of Ports and Harbors-Implications to Cost-Sharing of Federal Deep Draft Navigation Projects Due to Changes in the Maritime Industry, IWR, May 2002 p. 9.

³ In fact, Project delay is quite likely, since it does not appear that federal funding for the Channel Deepening Project has been included in the President's budget. See Jim Barnett and Tom Detzel, "Budget Slaps BPA, Dredging Proposal," [OregonLive.com](http://www.oregonlive.com)<<http://www.oregonlive.com>> (accessed Feb. 4, 2003) (attached as Exhibit 9).

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 55

16. **The Corps also brushes aside comments in the Niemi Report pointing out that the DSEIS did not provide information regarding the risk of workers' injury and death associated with the Project.** The Niemi Report observes that if these risks are not fully reflected in the Corps' estimate of labor costs, the Corps has underestimated the Project's costs. The Corps responds that "[p]otential problems in the labor market with regard to adequate insurance coverage for on-the-job injuries are outside the scope of Corps analysis." Response to Comments, at page Stakeholders/Special Interests-112. This response mischaracterizes and disregards the substance of the comments in the Niemi Report, which did not ask the Corps to address "potential problems in the labor market," but instead asked the Corps to demonstrate that it has fully and appropriately estimated the Project's labor costs.

The Corps' position regarding labor costs also violates directives in its manual concerning this and other externalities. The NED Procedures Manual explicitly provides that "[n]egative externalities make someone worse off without that person being compensated for the negative effect. . . . The NED principle requires that externalities be accounted for in order to assure efficient allocation of resources." NED Procedures Manual, at pages 21-23 (emphasis in original). In this case, if wage rates do not account for the full costs of working on the Project, then any uncounted costs constitute an externality. The Niemi Report offered evidence indicating a high likelihood that such externalities are present. The Corps is obligated to determine if such costs exist and, if so, to quantify them.

17. **The Corps also mischaracterized and disregarded comments about factors outside the Corps' control that might affect the Project's ability to generate the expected level of economic benefits.** Among these are the on-going and expected changes in global and regional climates. The Niemi Report asked the Corps to evaluate the risks and uncertainties these changes generate for the Project and refers to studies estimating the extent to which global climate change will influence precipitation patterns and, hence, streamflows in the Columbia River Basin. The Niemi Report observes that these studies indicate climate change may affect the potential benefits produced by the Project by limiting the production of agricultural and other cargo shipped through Columbia River ports and by reducing summer flows in the river, so that vessels could not take full advantage of

B.16: The Corps has previously responded to Niemi's comments regarding risk of workers' injury and death associated with the Project. *See* Stakeholders/Special Interests, p. 112. Moreover, the Corps is instructed to "identify, clarify, and quantify areas of risk and uncertainty wherever possible, especially for those pieces of information which have a substantial influence on either the choice of an alternative and/or its size and cost." Guidelines for Risk and Uncertainty p. 17. However, the scope of Niemi's contention regarding labor costs makes it impossible for the Corps to clarify or quantify the associated risks.

To the extent this comment reiterates the earlier mischaracterization of the Overview, that issue is addressed above.

B.17: This issue is addressed in preceding sections. *See* Response to Comment II.B.11, B.12, and B.14.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 56

the deeper channel.

The DSEIS failed to consider these possibilities, and, in the FSEIS, the Corps dismisses them with sweeping arrogance, noting that “[t]he uncertainties associated with global climate change and any potential impacts to Pacific Northwest exports are so great that any integration of the assumption would be irresponsibly speculative.” See Response to Comments, at page Stakeholders/Special Interests-110. The arbitrariness of this statement is amazing, for it says that the uncertainties are so great that they are too trivial for the Corps to consider them in its analysis of risks and uncertainties. The Corps offers no substantiation for its dismissal of the studies’ projections of future climate change in the Columbia River Basin. It is the agency’s failure to consider climate change that is irresponsible when the evaluation of this Project looks out over the next 50 years, and when even recent evidence, offered by the Corps itself, indicates that low streamflows can reduce the River’s flow and limit the ability of vessels to take advantage of a deeper channel. See Revised Economic Analysis, at page 42 (“[D]uring the 2000 to 2001 period that was used to assess the bulk fleet, there were periods of time when vessel draft was restricted to a maximum of 38 or 39 feet due to shoaling and low water conditions.”).

18. **The Corps has inappropriately used the opinions of the Technical Review Panel as an excuse not to provide a complete and transparent accounting of the potential uncertainties and risks associated with the Project.** The Corps dismisses comments in the Niemi Report about the absence of a thorough analysis of uncertainties and risks associated with the Project, relying on opinions expressed by the Technical Review Panel to satisfy its analytical obligation. For example, the Corps offers as one response to comments the following statement: “The comment [from the Niemi Report] states that the commodity projections are overly optimistic and cause unjustified inflation of the Project benefits. A review panel of four independent economists came to a completely different opinion. According to the review panel, the Corps’ projections are not only reasonable, but are likely understating the benefits of the project.” See Response to Comments, at page Stakeholders/Special Interests-111.

B.18: The Corps addressed CRANE’s comment in the preceding Risk and Uncertainty sections. See Response to Comments II.B.11 – 14.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 57

The Corps' response demonstrates that the Corps has failed to meet its obligation to define alternative scenarios, carry them forward in the analysis, and test the Project against them to provide a thorough, transparent evaluation of the Project's risks and uncertainties. The Corps also misrepresents the substance of the Benefit Panel's statement.

With all respect due its members, the Technical Review Panel's opinions constitute just one piece of information about some of the Project's risks and uncertainties. The Technical Review Panel (1) openly ignores other risks and uncertainties, such as climate change, (2) fails to offer any statistical analysis of risks and uncertainties, and (3) never defines and evaluates alternative scenarios involving differences in multiple variables. Neither the Technical Review Panel nor its members have stated that the opinions presented by the Technical Review Panel constitute a full response to the Corps' obligations, as outlined in the Guidelines for Risk and Uncertainty. The Technical Review Panel has not been charged or allowed to respond-directly or otherwise-to detailed questions in the Niemi Report and other comments about the Corps' failure to demonstrate the statistical uncertainty in its projections. There is no evidence that they have even reviewed the comments prepared for the DSEIS.

Thus, by citing the Technical Review Panel's opinions as justification for the Corps' arbitrary conclusion that some risks and uncertainties do not exist or are immaterial, the Corps does no more than abdicate its obligation "to identify, clarify, and quantify areas of risk and uncertainty wherever possible, especially for those pieces of information which have a substantial influence" (see Guidelines for Risk and Uncertainty, at page 17) on the Corps' selection of the proposed Project as its preferred alternative and on its assessment of the Project's potential costs and benefits.

19. **By mischaracterizing and disregarding comments on its evaluation of risks and uncertainties associated with the Project, the Corps has inappropriately dismissed pieces of information identifying variables that can have a substantial influence on the Project's economic costs, benefits, and benefit-to-cost ratio.** In asking for clarification of the Corps' commodity-flow estimates, the

B.19: CRANE and Niemi argue that the Corps' commodity projections are analytically inconsistent and not sufficiently justified. CRANE pp. 57-58. Yet, both ignore the substantial body of work supporting the forecasts used by the FSEIS. The comments are apparently based solely on graphic material presented as part of an oral presentation by the BST Associates to the Technical Review Panel. CRANE and Niemi ignore the extensive body of analysis contained in *Commodity Flow Forecast Update and Lower Columbia River Cargo Forecast* (Commodity Flow Forecasts).¹

¹ The commenter incorrectly refers to DRI-WEFA/BST as the Corps contractor for FSEIS commodity projections. Although WEFA and BST Associates were contracted by the Corp to provide FEIS commodity projections, the FSEIS projections are derived from the *Commodity Flow Forecast Update And Lower Columbia River Cargo Forecast*. The Commodity Flow Forecast is a comprehensive multi-modal study of regional freight movements commissioned by Metro, Oregon Department of Transportation, Port of Portland, Port of Vancouver, and the Regional Transportation Council. This study was performed DRI-WEFA in association with BST Associates and Cambridge Systematics. The following Commodity Flow Forecast documents are relevant to the FSEIS commodity projections:

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 58

Niemi Report identified specific examples where the Corps' projections were analytically inconsistent: for instance, the projections, with no justification for the difference, sometimes appear linked to an entire 40-year period and sometimes to just the most recent few years. See Niemi Report, at pages 15-18, 39-43. The Niemi Report observed a pattern of choices that, absent explanation, might indicate the Corps chose relevant time periods to arbitrarily favor projections of higher future cargo flows. In addition, the Niemi Report asked for evidence that the Corps' projections were statistically reliable (highlighting examples where the DSEIS's projections seemed unjustified by the pattern of cargo flows in past years), as well as documentation of the ability of the Corps' forecasting models to replicate these past patterns. The Corps ignored these requests and issues.

20. **The Corps provides no documentation of the statistical reliability of its commodity-flow projections or of the level of confidence the public should have in its "most likely" projections or of the probability that future cargo flows will be less than these projections.** In effect, for each type of cargo, the Corps has offered historical data and future projections, and failed to demonstrate how the latter builds on the former. For example, the Corps' projection shows total export tonnage growing, when historical data show it has declined for more than a decade and, by 2000, was 25 percent below its peak level. Niemi Report, at page 6. Also, the Corps' projection shows wheat/barley exports growing, even though the historical record shows an absolute decline. Niemi Report, at page 17. Similar incongruities exist for other types of cargo, but the FSEIS provides no credible explanation for the discrepancies.
21. **When the Corps' contractor provided high and low bounds on its forecast for each commodity, the Corps arbitrarily chose an alternative in-between, sometimes the midpoint, sometimes not, with no analysis to justify its choice as the most likely scenario.** See generally Revised Economic Analysis. The midpoint would be the most likely only if the statistical analysis showed that the distribution of probabilities has a normal, or bell-shaped, pattern. Selecting something other than the midpoint would be justified only if statistical analysis showed an appropriate, non-normal distribution. Nowhere in the FSEIS does the Corps provide any statistical information justifying its commodity-forecast

- Lower Columbia River Marine Cargo Forecast, Task Report – Task 1 Literature Review, December 2001;
- Lower Columbia River Marine Cargo Forecast, Task Report – Task 2 Historical Trends (Revised), March 2002; and
- Lower Columbia River Marine Cargo Forecast, Task Report – Task 4 Low-High Forecast Final Report, July 2002.

Available at http://www.portofportlandor.com/Marine/MTMP/Key_Information.htm

Niemi incorrectly argues that the FSEIS forecasts do not consider or discuss factors such as structural changes in the economy, the transportation system, or the competitiveness of Columbia River ports. Contrary to these assertions, however, the *Commodity Flow Forecasts* discuss these topics in detail (i.e., international, national, and regional economic trends (pp. 1-20), changes to the transportation system affecting historical trends and future projections (pp. 40-44 containers, and pp. 80-84 grains), and analysis of port competitiveness in container cargo and grain shipping (pp. 36-37, 44, and 80-84)). Moreover, port competitiveness and market shares are described generally in many other sections of the *Commodity Flow* and are discussed further in the FSEIS.

Again ignoring the relevant analysis, and relying solely on graphic material provided during the oral presentation by BST Associates, CRANE, citing Niemi, argues "the Corps chose relevant time periods to arbitrarily favor projections of higher future cargo flows." (p. 58) A reading of *Commodity Flow* and supporting documentation shows this assertion is unfounded.

Niemi provides four examples taken from the BST Associates presentation graphics to support his assertions. See Niemi at pages 17-20. The first is a summary chart showing total Columbia River exports. Contrary to Niemi's suggestion, the forecast depicted in this chart is not a simple extrapolation of historical trends, either long-term or short-term. The total export projection is instead a roll-up of specific projections for each export commodity moving on the Columbia River. For each of these commodities, BST Associates employed a systematic forecast methodology that considered historical trends, overseas demand, production and supply, transportation constraints, including navigation, and other specific industry events and trends. See *Commodity Flow Forecasts* (breakbulk shipments (p. 50), logs (p. 56), wheat (p. 58), barley (p. 62), corn (p. 66), sorghum (p. 70), soybeans (p. 74), beet pulp pellets (p. 78), soda ash (p. 98), potash (p. 99), bentonite clay (p. 101), and containerized cargoes (p. 26)). The assertion that the export forecast is based on a gross extrapolation of an historical trend is inaccurate.

Niemi makes an unsubstantiated claim that the forecasts do not consider factors that may cause declines rather than growth in the future. Niemi, p. 18. In fact, *Commodity Flow Forecasts* discuss such factors in detail throughout the study (e.g., the impact of vessel size on container exports (p. 44), declines in the log industry (p. 56), supplier competition in the wheat export markets, (pp. 60-61), supplier competition in the corn markets (p. 69), price impacts on soybean exports (p. 76), feed grain competition with Puget Sound ports (pp. 83-84), and the effect of exchange rates on potash exports (p. 100)). Moreover, the very summary chart cited by Niemi shows a decline in volumes in the low forecast.

In the second example, Niemi replicates a graphic of coastwise cargo tonnage history and forecast and, again, incorrectly suggests that the projection is based on a simple extrapolation of recent history. First, this example is not pertinent to the FSEIS analysis because the FSEIS does not include benefits related to the shipment of coastwise cargo. Nevertheless, Niemi's critique is again flawed because it relies on a summary graphic and does not consider the substantial analysis of coastwise cargoes, which are primarily petroleum products, that support the forecast. See *Commodity Flow Forecasts* pp. 108-113. Again, however, the FSEIS does not include benefits related to coastwise cargo.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 59

selections. Indeed, the graphic data in the contractor's reports indicate distributions that are unlikely to provide a statistical basis for the Corps' selection of the most likely scenario. Instead, the most the Corps offers to substantiate its selection of the most likely scenario is a footnote reference to a conversation with a staff member from one of its contractor firms. Revised Economic Analysis, at page 31.

22. **The FSEIS's record is inconsistent with generally accepted standards of statistical forecasting, which, among other things, require calculating the level of confidence in a projection and using a forecasting model to look backward to see how well it would predict historical levels.** Despite a specific request in the Niemi Report to demonstrate such statistical evidence regarding its forecasts, the Corps ignored these standards totally, and instead relied on the Technical Review Panel for an assessment of its projections. See Response to Comments, at page Stakeholders/Special Interests-109 ("In order to provide confidence in the forecasts, a review panel consisting of four independent economists studies and commented on the analysis.").

There is no way to judge the validity of the Technical Review Panel's opinions, however, because neither the Corps nor the Technical Review Panel has offered evidence that the Technical Review Panel conducted any statistical analysis of the projections. The Technical Review Panel, of course, cannot guarantee that future commodity flows will fail to meet either its own expectations or the Corps' "most likely" projections. Thus, even when the Technical Review Panel's opinions, which are not based on a statistical analysis of risks, are taken at face value, the FSEIS fails to provide a quantification of this aspect of the risks and uncertainties inherent in the benefits associated with the Project. The same is true of other aspects of the Corps' analysis for which it claims the Technical Review Panel's opinion justifies the Corps' analytical lapses and findings.

23. **The disconnect between historical commodity flows and the Corps' projections is also inconsistent with the Corps' Guidelines for Risk and Uncertainty.** The Guidelines for Risk and Uncertainty observe that, if there were relevant historical

Niemi's third example is a summary chart of wheat and barley exports. Although this commodity is pertinent to the FSEIS projections, Niemi again fails to consider the relevant supporting documentation and analysis in formulating his critique. *See Commodity Flow Forecasts*, pp. 60-65, 80-93. Niemi incorrectly characterizes the trend in Columbia River wheat and barley exports as one of "persistent decline" when in fact the long-term trend has been growth marked by the dramatic fluctuations in volumes that are typical of the grain trade. Niemi's argument that the trend in wheat/barley exports in one of "absolute decline" is obtained by comparing a single past peak year versus a recent trough year. The factors affecting the variability in grain exports, such as exchange rates, demand fluctuations, supplier and port competition, and transportation rates, are fully considered and explained in the *Commodity Flow Forecasts*.

The fourth example cited by Niemi is the chart depicting the forecast for transpacific intermodal exports. Niemi incorrectly characterizes this as the forecast for "container exports" when, in fact, the chart addresses only intermodal exports and comprises a small segment of total exports. Further, although *Commodity Flow Forecasts* project growth in intermodal exports, the FSEIS adjusts the forecast downwards and projects no growth for intermodal exports to exclude interregional shifts of cargo. *See* FSEIS, Exhibit M, Revised Economic Analysis, p. 31. Thus, in the fourth example Niemi mistakenly identifies the forecast in question and fails to consider adjustments to the forecast in the FSEIS that render the critique irrelevant.

In sum, CRANE and Niemi's comments ignore the underlying work in both the FEIS and FSEIS. Having failed to acknowledge the substantial body of work supporting the FSEIS' forecasts, the comments regarding the Corps' commodity projections prove unconvincing.

B.20: The issues included in this comment are addressed in response II.B.19.

B.21: The Corps selected the FSEIS' forecast for containers after considering the methodology employed by DRI-WEFA and BST Associates to generate the *Commodity Flow Forecasts*. The *Commodity Flow Forecasts* that were developed to meet regional transportation planning needs, identified high and low forecasts but did not require the identification of a "most likely" forecast. It was therefore a matter of professional discretion for Corps analysts to derive a "most likely" forecast. Because the *Commodity Flow Forecasts* methodology was exceptionally conservative as compared to other forecast methodologies typically used, Corps analysts determined that a point slightly above the mid-point of the high and low DRI-WEFA/BST forecasts represented the most likely forecast. The basis of this decision is described in more detail below.

The forecast methodology commonly used in generating commodity projections of this type is to take an unconstrained, demand-driven forecast and surround it with a high and low forecast in which the most-likely forecast is the statistical mean (mid-point). In contrast, the *Commodity Flow Forecasts* used for this project modified this methodology and applied supply constraints to the demand driven forecasts for export cargoes. The application of the supply constraints, which included consideration of factors such as available acres of production and water supply, had the effect of substantially reducing projected export cargo volumes compared to an unconstrained forecast. Thus, although the use of a mid-point (0.50) is commonly applied to unconstrained demand driven forecasts to generate a most-likely forecast, it was the judgment of DRI-WEFA/BST Associates and Corps analysts that such an approach would be unreasonably conservative. Accordingly, given the methodology in which projections for containers had already been adjusted downwards to reflect supply constraints, DRI-WEFA/BST Associates and Corps analysts concluded that a 0.66 point provided a more realistic basis for the most-likely forecast. For a description of forecast methodology and the application of supply constraints to container export commodities, see *Commodity Flow Forecasts*, pp. 26-32.

B.22: CRANE's insistence that a particular statistical technique is required, or even valid, in the FSEIS is erroneous and unsupported by the Principles & Guidelines. As described, the Principles and Guidelines and the Corps' Risk and Uncertainty Guidelines specifically acknowledge that not all projections can or should be based on solely statistical models of previous exports.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 60

data exist, they should be employed using appropriate statistical methods to derive future projections.

Risk and uncertainty arise from measurement errors and from the underlying variability of complex natural, social, and economic situations. If the analyst is uncertain because the data are imperfect or the analytical tools crude, the plan is subject to measurement errors. Improved data and refined analytic techniques will obviously help minimize measurement errors. . . . The question for the analyst is whether the randomness can be described by some probability distribution. *If there is an historical data base that is applicable to the future, distributions can be described or approximated by objective techniques.*

Guidelines for Risk and Uncertainty, at page 76 (emphasis added). In this instance, there is no ambiguity about the historical data—the Corps knows exactly how much wheat, barley and other cargo was exported historically. If the Corps considers these data relevant to the projections, then it should show the statistical linkage and level of confidence it yields for each projection. If the Corps considers the historical record irrelevant, then it should explain why. As it stands, the FSEIS is silent on these issues. Hence, the FSEIS provides inadequate support for the Corps' benefit-to-cost ratio, and it is appropriate to conclude that the Corps' findings rest largely on its own arbitrary decisions and assumptions.

24. **Moreover, the Corps has misrepresented the Benefit Panel's comments, which did not give unqualified support for the Corps' analysis.** For example, the Benefit Panel's endorsement of the multi-port issues and commodity flows states, "[t]he Corps has not, in fact, resolved all the issues raised in the context of a multi-port analysis, but these issues would not appear to have a direct material effect on project justification." Benefit Panel Comments, at page 14. The first part of this statement makes it clear that the Benefit Panel has not been given full information about these issues, and offers its opinion about the apparent absence of a direct material effect on the analytical results, based on incomplete information. Indeed, the Benefit Panel goes on to state that "[a]s becomes apparent in subsequent comments and opinions . . . the assumptions and analytic steps the Corps has taken to avoid a multi-port analysis have created internal dilemmas and potential

Most risk and uncertainty aspects of projects cannot be characterized by probability distributions based on well-established empirical data. A first step in dealing with this problem is to describe why the project or specific aspects of it are uncertain, as well as the time periods in which different degrees of uncertainty are likely. A range of reasonably likely outcomes can then be described by using sensitivity analysis – the technique of varying assumptions as to alternative economic, demographic, environmental, and other factors, and examining the effects of these costs.

Principles and Guidelines, Section 2.f. As discussed in response II.B.2, B.4, B.8-9 and B.11-12, the Corps conducted sensitivity analysis as suggested in Section 2.f. Further, the Corps' Risk and Uncertainty Guidelines describe an array of potential forecasting techniques, including both qualitative and quantitative methods. *See* Guidelines for Risk and Uncertainty, vol. 1, Appendix G. The forecasts used in the FEIS and the updated Limited Reevaluation are a result of a combination of quantitative and qualitative elements. The Corps used specific elements of the forecasts for its sensitivity analysis.

B.23: The issues included in this comment are addressed in the answer to II.B.22.

B.24: A review of the Benefits Review Panel's commentary demonstrates that the Corps did not misrepresent the comments. *See generally* Benefits Review Panel Comments. Detailed responses to the "analytic dilemma" are provided above. *See, e.g.,* response II.B.9.

Finally, the last sentence in CRANE's comment does not reflect the Panel's assessment of the Corps' cost-benefit determination. CRANE p. 61. The reference relates to a specific technical issue. CRANE's comment erroneously suggests that this comment was a reflection of the Panel's overall assessment of the Corps' economic analysis.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 61

contradictions in the benefits analysis.” *Id.*, at page 4. The Benefit Panel later fleshes out the contradictions and dilemma:

In short, the assumption of no cargo growth leads to a situation where benefits can only be obtained at the cost of diminished service. This dilemma has not been resolved in the revised estimates analysis. . . . Other things being equal, reduced vessel calls would tend to shift cargo to other ports.

Id., at page 8. The Technical Review Panel is forced to conclude that “[a]lthough the panel recognizes the Corps’ efforts to examine the implications of different empty/load scenarios, the scenarios do not resolve the issue.” *Id.*, at page 7.

25. **Furthermore, the Corps has an obligation to go beyond its own “most likely” scenario, the Technical Review Panel’s opinion, and even a statistical analysis of the uncertainty inherent in its projections of future commodity flows.** It must explicitly consider the possibility that future commodity flows will fall far short of their projections. The Corps’ own Guidelines for Risk and Uncertainty demonstrate the folly of not doing so:

Commodity forecasts are, again, a major source of uncertainty. Recent experience teaches a valuable object lesson. During the energy crisis of the 1970s world demand for U.S. coal was booming. Many forecasters and port authorities thought this strong demand could go nowhere but up. History has proven the inaccuracy of forecasts and the volatility of world commodity markets. The gradual recognition of the increasing interdependence of the world’s national economies, growing concern with the “twin deficits problem” of our national debt and trade deficits present analysts with a substantial challenge. Discerning what these developments mean to world demand for U.S. goods and U.S. demand for imports is highly uncertain.

Guidelines for Risk and Uncertainty, at page 38.

B.25: Detailed responses to the issues summarized in this comment are provided in response II.B.11 through B.14.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 62

26. **In sum, the Corps fails to follow the guidance of its own internal manuals and fails to provide a direct and forthright response to substantive comments on the DSEIS that posed serious questions about the scope and accuracy of its evaluation of risks and uncertainties associated with the Project.** Thus, it is impossible to tell from the FSEIS how these risks and uncertainties affect the Project's benefits, costs and benefit-to-cost ratio. The Corps' failure to evaluate them should not be interpreted to mean that substantial risks and uncertainties do not exist or that the Corps or the Technical Review Panel have assessed them appropriately and demonstrated their insignificance. Instead, the Corps' discussion of the Project's risks and uncertainties is wholly inadequate to support a reasoned, informed decision to implement the Project.
27. The FSEIS arbitrarily fails to consider alternative plans that would make use of underutilized capacity at ports elsewhere and generate a larger benefit-to-cost ratio. The Corps is obligated to consider and weigh the Project against reasonable alternatives that might provide the same economic benefits at lower cost. Federal law requires that "[i]n the case of any water resources project-related study authorized to be undertaken by the Secretary, the Secretary shall prepare a feasibility report. . . . Such feasibility report *shall describe, with reasonable certainty*, the economic, environmental, and social benefits and detriments of the recommended plan and *alternative plans* considered by the Secretary. . . ." 33 U.S.C. § 2282(a) (emphasis added). The FSEIS fails to consider an alternative that would divert cargo from the Columbia River to Puget Sound, and new information provided by the Corps indicates that the net economic benefits of such an alternative very well could exceed those of the Project.

The Corps asserts in both the FSEIS and its responses to comments on the DSEIS its qualitative belief that the market for ocean transportation of goods from the Pacific Northwest is highly competitive. Many of the containerized goods, which represent the bulk of the economic benefits associated with the Project, can be shipped either through Portland or through Puget Sound. There is an economic boundary where the costs of going in one direction are equal to those of going in the other. Moving away from the boundary, a cost differential materializes—small at first—causing cargo to be sent in one direction rather than the other, but the

B.26: Detailed responses to the issues summarized in this comment are provided in response II.B.11 through B.14.

B.27: As an initial matter, CRANE's comment disregards the fact that the Corps conducted an alternatives analysis, which is included in the FEIS. *See* FEIS, Appendix C, pp. 3-8. The comment continues the misunderstanding of the FSEIS as the Limited Reevaluation and misrepresents the totality of information provided in the FEIS and FSEIS.

CRANE cites to numerous Review Panel comments and responses and makes several unsubstantiated assertions to continue the criticism that the Corps should have used a methodology that considered the diversion of cargo to other ports (i.e., a multi-port analysis). As discussed above, the Corps exercised its discretion in selecting a methodology among those provided in the Principles and Guidelines. A detailed response describing the Corps' methodology is provided above.

Moreover, the Corps comments cited do not support the position advocated by CRANE. CRANE misconstrues comments by the Corps regarding relative carrier capacity between Portland and the Puget Sound to argue that the Puget Sound port system is in a state of overcapacity. The Corps' comments do not address terminal capacity in the Puget Sound, as suggested by CRANE, but instead speak to carrier capacity. Thus, CRANE's argument that the Corps' comments support the notion that there is overcapacity in the Puget Sound port system and under capacity at Portland's terminal is based on a mischaracterization. Indeed, while Portland may have not have sufficient carrier capacity to meet demand, it has ample terminal capacity to meet projected demand for many years to come. The capacity for Terminal 6 is estimated at 778,000 twenty-foot equivalent units (TEUs) annually, while actual throughput in 2001 was only 278,000 TEUs. *See* FSEIS, Exhibit M, p. 33.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 63

highly competitive nature of the market means that a small change in costs could reverse its direction. The proposed deepening of the Columbia River channel would alter the costs of shipping goods via the deepened channel and, the Corps' assertion to the contrary notwithstanding, divert cargo from other ports. The Corps also has revealed, but only qualitatively, that Portland and the Puget Sound ports differ significantly in terms of their ability to accommodate additional cargo. "Some shippers are unable to ship their product through Portland due to capacity constraints. Some shippers are unable to ship their product through Portland due to capacity constraints. . . ." See Response to Review Panel, at page 5; Response to Comments, at page Stakeholders/Special Interests-108 ("In general, the container shipping industry is in a state of over-capacity. . . ."); Response to Review Panel, at page 4 ("The amount of capacity in the Puget Sound far exceeds the capacity in Portland. . . . The Corps' analysis reflects an expectation that Puget Sound carriers will continue to draw substantial amounts of cargo out of the Portland hinterland, and that Portland's capture rate will decline slightly over the period of analysis."); Response to Comments, at page Stakeholders/Special Interests-108 ("In general, the container shipping industry is in a state of over-capacity, and U.S. exports are outnumbered by imports to such an extent as to lead to extremely marginal export rates. Rates are so low that shippers are concerned about the viability of continued service."); Response to Comments, at page Stakeholders/Special Interests-111 ("[C]ontainer vessel owners are currently receiving extremely low margins, and westbound rates are so low that analysts are unsure that rates could possibly go lower.").

These statements have important implications. Transportation costs already are lower for cargo shipped through Puget Sound. Furthermore, the transportation system in Puget Sound has excess capacity, which in economic terms means that the marginal costs of increasing its use are zero or nearly so. In contrast, the transportation system in Portland has insufficient capacity relative to demand, which means that additional cargo can transit through the port only with significant marginal costs. The "vigorous" competition between Puget Sound and Portland for containerized cargo 'means that, at and near the margin, there may exist opportunities to divert cargo from Portland to Puget Sound at minimal cost to

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 64

the national economy.

Thus, the information newly provided by the Corps raises the possibility that the net benefits of the Project might be dominated by an alternative that diverts to Puget Sound (and, perhaps, other ports) some cargo that otherwise would go to Portland and the other Columbia River ports. The FSEIS fails to identify and analyze such an alternative. As argued throughout this Section, in failing to conduct a multi-port analysis, the Corps disregarded not only standard economic principles, but also guidance and directives from its own manuals and comments provided on the DSEIS. As a result, it appears that the Corps may have arbitrarily decided to avoid doing such an analysis, fearing that it would reveal that an alternative favoring Puget Sound ports is economically more favorable than deepening the Columbia River channel.

28. **The FSEIS reports that its economic calculations are based on an assumption that the price of diesel used in the Project will be \$0.90 per gallon.** See FSEIS, Exhibit L, Revised Cost Estimate Summary, at page 7 [hereinafter “Revised Cost Estimate Summary”]. Given the uncertainties of the world oil markets, it is prudent for the Corps’ analysis of risk and uncertainty to consider a scenario where diesel prices are markedly higher than \$0.90 per gallon.
29. **The FSEIS likely underestimates costs associated with possible remediation of hazardous waste.** The FSEIS acknowledges that the implementation of the Project may encounter costs associated with remediation of hazardous wastes, and says the cost estimate for coping with hazardous wastes is included as part of the contingencies for the overall cost estimate. Revised Cost Estimate *Summary*, at page 4. This contingency appears to be a percentage of baseline costs, which are based on the planning, estimation and design phase of the Project. In reality, though, if the Corps does encounter hazardous wastes, there is no reason to anticipate that the remediation costs will be any given percentage of planning, estimation and design costs. Given the reality that actual remediation costs can quickly balloon, it is prudent for the Corps’ analysis of risk and uncertainty to consider a scenario where remediation costs are markedly higher than the contingency amount.

B.28: Corps planners and analysts contacted suppliers to obtain quotes for diesel at the time the estimate was prepared. The Corps provided contingency factors to the bottom line estimates to cover the uncertainties associated with fuel pricing, as well as uncertainties with other pricing (and quantities) in the estimate. The Corps’ planners and analysts exercised their professional judgment in determining the contingency factors.

B.29: The comment ignores the fact that extensive sampling in the areas to be dredged does not reveal contaminants. See FEIS, Section 6.5 and FSEIS, Section 6.5. As a result, the likelihood of necessary remediation is extremely low.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 65

30. **The FSEIS fails to estimate costs associated with potential environmental damage that may materialize as a result of the Project.** Instead, it has asserted that because its environmental impacts will be “insignificant, minor, short-term, limited, and transitory” it is justified in omitting the costs of environmental damage from its cost estimates. Response to Comments, at page Stakeholders/Special Interests-111. Given the degree of uncertainty that exists regarding future environmental conditions and how they might interact with the Project, it is prudent for the Corps, in its analysis of risk and uncertainty, to consider a scenario where environmental costs are -n zero.
31. As noted above in Section II(A)(3), the FSEIS fails to include in its cost estimates the \$20 million costs associated with ecosystem restoration projects, asserting that these costs are not part of the Project. Given that the regulatory agencies reviewing the Project are relying upon ecosystem restoration projects as mitigations, these costs should be included in the analysis.
32. The FSEIS shows markedly lower costs for the Project, relative to the DSEIS, but has not fully explained the changes. In particular, it has not explained the apparent shift of costs from the construction phase to the maintenance costs during subsequent years. This shift has implications for the benefit-to-cost ratio because costs in future years are discounted to a smaller present value, thus increasing the ratio, all else being equal. Given the uncertainty about whether costs should be counted during the construction or the subsequent phases of the Project, it is prudent for the Corps, in its analysis of risk and uncertainty, to consider a scenario where these costs are included in the construction phase.
33. **The Corps ignores important negative externalities.** Under the Corps’ NED Procedures Manual, the Corps is required to incorporate the costs of negative externalities into the cost-benefit analysis for Channel Deepening. In the FEIS and again in the FSEIS, the Corps has concluded, incredibly, that the Channel Deepening will impose *absolutely no negative externality costs* on third parties. The Corps’ conclusion is contradicted by the likelihood that Channel Deepening will impose significant external costs on third parties that would materially alter the cost-benefit ratio had the costs been considered by the Corps.
- B.30:** The costs of extensive mitigation for known impacts on wetlands and other habitats are included in the Project costs. *See, e.g.*, FSEIS, Section 8.2, p. 8-1.
- B.31:** The costs of the ecosystem restoration features are described in the FSEIS in considerable detail. *See* FSEIS, Section 4.8.7, p. 4-46. Detailed responses to the issues summarized in this comment are provided in II.A.3.
- B.32:** We disagree that the costs of the project are unexplained. The costs are discussed thoroughly in the FSEIS.
- B.33:** The Corps disagrees that the Project will cause significant negative externalities. Specifically, as discussed elsewhere in this response, the Corps’ analysis concludes that the Project will not have significant adverse effects on fish populations. *See* Final SEIS at Sections 6.6.1.2 through 6.6.1.3 and 6.7.1.1 through 6.7.1.2 (pp. 6-27 through 6-30 and 6-34 through 6-54). The Corps’ analysis also concludes that the Project will not cause increased coastal erosion. *See* Final SEIS at Section 6.2.2.4 (pp. 6-12 through 6-14). In addition, to the extent that unanticipated negative impacts may occur as a result of the Project, conditions of the Washington and Oregon Clean Water Act and CZMA approvals provide for additional means of avoidance, minimization and mitigation. *See, e.g.*, Washington 401 Certification at Sections III.E, and V.B through G. While the Corps does not believe, based on its current analysis, that there will be significant unanticipated effects of the Project, the Corps’ has revised its cost estimates to include an additional contingency amount to cover any additional avoidance, minimization or mitigation efforts that may become necessary as a result of the conditions in the state approvals. *See* Project Summary Report (supporting documentation for Record of Decision), Cost Estimate section.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 66

First, it is admitted that the Project will adversely affect salmon, groundfish, crabs and other fisheries that have commercial and recreational value. See U.S. Army Corps of Engineers, Biological Assessment, Columbia River Channel Improvements Project, at page 10-1 (Dec. 28, 2001) (“potential for dredging and disposal operations to adversely affect listed species”); FSEIS, at page 4-2 1 (ecosystem restoration features are likely to adversely affect listed species); EFH Report (effect on essential fish habitat), Sturgeon Report (effect on sturgeon), Smelt Report (effect on smelt), Crab Report (effect on Dungeness crab); see also Response to Comments, Comments of the State of Oregon, at page State-6 (select and net pen fishery will be destroyed by Channel Deepening). Yet, the Corps makes no attempt to assign economic value to these costs and include them in its cost-benefit calculations.

Second, the Corps has not considered the significant costs the Project will impose through alteration of the Columbia River littoral cell, leading to intensified coastal erosion in Southwest Washington. Both the State of Oregon and the State of Washington recognized that Channel Deepening could intensify coastal erosion that has emerged in the last decade. &e Southwest Washington Coastal Erosion Study. Until recently, coastal Washington benefited from a long-term trend of accretion, but coastal erosion “hot spots” have caused significant damage since 1993. Washington Department of Ecology, “Kaminsky Report on Coastal Erosion,” <http://www.ecy.wa.gov/programs/sea/swces/products/publications/papers/kaminsky_tcs00.pdf> (Washington State has incurred nearly \$70 million in coastal erosion response costs since 1993). In reviewing the Corps’ sediment budget for the Lower Columbia River, Oregon and Washington recognized that the estuary has become a sink for sediment where, historically, it supplied sediment to the Columbia River littoral cell. See, e.g., Response to Comments, Comments of Washington Department of Ecology, at page State-40. The Channel Deepening Project intensifies this problem by removing more sediment each year than the Columbia River now transports into the estuary. See FSEIS, Exhibit J, Revised Columbia River Sediment Impacts Analysis, at page 19; Response to Comments, at page State-44 (each year, the Columbia River transports only two million cubic yards of sediment into the estuary). Construction and maintenance of the deeper channel removes sediment from the

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 67

system by placing dredge soils in upland sites or fixed restoration fills. Significantly, the Corps has now deferred use of ocean disposal sites as a last resort, further starving the Columbia littoral cell of sediment. The result is intensive coastal erosion events with “potential for hundreds of millions of dollars in damages.” Southwest Washington Coastal Erosion Study.

The State of Washington has asked the Corps to lead a regional effort to manage dredge material disposal sites to reverse coastal erosion and restore active sand transport from the Columbia River to the coastal littoral cell. Response to Comments, at page State-46. The Corps responded to the State’s comment by inviting the State to pay the incremental costs of a modified project that disposes of dredge materials in a way that mitigates coastal erosion and restores natural processes. Id. The Corps’ remark further verifies that coastal erosion has a direct cost when property is damaged, or a shadow cost that the Corps recognizes as the added cost of disposing dredge materials in a manner that sustains the Columbia littoral cell. Either way, the damage costs and the solution costs were not considered by the Corps in its cost-benefit and project feasibility analysis.

Under Corps’ guidance, this is precisely the sort of externalized cost that should be weighed in a cost-benefit analysis. NED Procedures Manual, at page 23 (providing example of flood control project that imposes negative externality costs by promoting flooding of third parties downstream). The Corps failed to consider coastal erosion costs of the Channel Deepening Project despite clear evidence that the Project contributes to the increasingly severe environmental consequence of changes to the Columbia River sediment budget.

For all the reasons stated in this Section, CRANE renews its objection to the Corps’ economic analysis for the Channel Deepening Project.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 68

C. The FSEIS fails to correct serious biological errors that appeared in the DSEIS, undermining the Corps' conclusions about the Project's likely effects on the Columbia River ecosystem.

Despite claims in the FSEIS to the contrary, the Corps presents little new scientific data to support its claims that the Project will have insignificant effects on the Columbia River ecosystem.

1. The Corps asserts that the restoration of benthic communities at the Miller-Pillar restoration site will occur within two years after the disturbance. FSEIS, at page 4-35. The Corps also attempts to justify the Miller-Pillar restoration by pointing to other locations where tidal marsh fringes have successfully established themselves. FSEIS, at page 4-35. These examples of success in establishment do not translate directly to success at the Miller-Pillar site because the Corps has merely assumed that successful sites and the Miller-Pillar site are the same in all characteristics, and furthermore ignores the fact that it has taken 60 to 80 years for these successful fringes to develop. Tidal marsh systems created in estuaries in British Columbia have proven to be far slower at achieving desired results than predicted, and in some cases have never achieved desired function. See, e.g., N.K. Dawe, et al., "Marsh Creation in a Northern Pacific Estuary: Is Thirteen Years of Monitoring Vegetation Dynamics Enough?," 4 *Conservation Ecology* 12, at <<http://www.consecol.org/vol4/iss2/art12>> (2000) (attached as Exhibit 10). Thus, it appears that the Corps' predictions for restoration of tidal fringe marshes assume the most favorable conditions, and are likely overly optimistic.
2. The Corps has delayed implementation of the final two pile dikes until "attainment of successful results and completion of the first two cells." FSEIS, page 4-36. As CRANE has noted in its previous comment letters, the Corps cannot judge the "attainment of successful results" in a project where no monitoring targets have been identified. In the absence of monitoring targets, the Corps cannot define success or failure. The Corps routinely holds its outside permittees to a standard that requires specific yearly and end of project monitoring standards, but fails to hold itself and its own projects to the same standards.

CORPS' INTRODUCTORY REMARKS TO SECTION ILC:

The Corps' Response to CRANE's comments related to the Conceptual Model:

CRANE has presented several comments on the Corps' conceptual model. The following is a general summary of CRANE's comments on the conceptual model that is followed by a more detailed response. CRANE's comments A-7, A-28, C-14, C-23, C-24, and C-28, generally criticize and mischaracterize the Corps' use of the conceptual model as a predictive model; comment C-13 cautions the Corps about using the River Continuum Concept for its conceptual model; comments C-23, C-25, and C-28 appear to address a lack of data underlying the conceptual model; comments C-23, C-24, and C-28 state CRANE's opinion that the Corps should have used a quantitative model rather than the conceptual model to model the Columbia River estuary; comment C-25 criticizes the conceptual model for not providing a sensitivity analysis; comment C-28 criticizes the Corps' use of best professional judgment. The following is the Corps' response to CRANE's comments on the conceptual model.

The conceptual model is "an ecosystems-based diagram that illustrates integrated physical and biological relationships for the lower Columbia River that relate to channel deepening" (http://sei.org/columbia/meet_process_summary.html). The conceptual model was proposed in response to the SEI Science Panel's suggestion that it would be helpful to present the ecological relationships in the estuary in a systematic framework. The model emphasizes juvenile salmonids in the Columbia River estuary because these fish were the focus of the SEI Workshops that were part of the NOAA Fisheries and USFWS reconsultation process. A conceptual model was chosen to model the complex factors and relationships affecting juvenile salmonids in the estuary, such as the food web, prey production and abundance, and salmonid vulnerability to predation, because the complexity of juvenile salmonids' use and dependence on the estuary make other types of modeling extremely complex and difficult, if not impossible. See 2001 BA, Appendix E.

The conceptual model was developed to organize the available science on the Columbia River estuary. The data and information on the estuary and river was found primarily in a variety of published and unpublished sources. The conceptual model was used to organize this data, to provide a simple diagram of the relationships among the various ecosystem components, and to highlight the important linkages among them. This organization provided two important benefits. First, it permitted federal agency representatives and the SEI Science Panel to see how the various components of the ecosystem connect and potentially how the Channel Improvement Project might affect the ecosystem. Second, it created an analytical framework that assisted the federal agency representatives to make informed decisions concerning Project effects, determine what levels of monitoring were required, and also provided a framework for the adaptive management program. The information and data sources, including descriptions of the studies underlying the conceptual model, are provided in Appendix E of the 2001 Biological Assessment ("BA"), at E-3 & 4.

Dr. Ron Thom, a nationally recognized expert in modeling and ecosystem restoration developed the conceptual model specifically for the Columbia River estuary using numerous peer-reviewed and non peer reviewed quantitative studies of the Columbia River. See 2001 Biological Assessment, Appendix E. For example, Dr. Thom used scientific literature specifically addressing conceptual models in Pacific Northwest estuaries, such as *An Ecological Characterization of the Pacific Northwest Coastal Region: Volume One—Conceptual Model and Volume Three—Characterization Atlas, Zone and Habitat Descriptions* (Proctor, et. al., 1980). Consequently, CRANE's criticisms related to Dr. Thom's reference to the River Continuum concept is not relevant to this model that was specifically designed for the Project and was based on pertinent regional data. See also responses to CRANE's previous comments at Final SEIS, Volume 4 at Stakeholders/Special Interests pp. 79-80.

The Corps and Services used the conceptual model exclusively as a tool to ensure that the various physical and biological parameters and their relationships were considered throughout the Corps' evaluation of project impacts. For instance, when re-evaluating the impacts to a particular species of salmon, agency biologists used the conceptual model to ensure that the relevant factors and their relationships, such as required habitat and prey base, were considered. Contrary to CRANE's comments, the agencies did not rely solely on the conceptual model to analyze the Project's impacts. For example, the Corps and Services used its Waterways Experiment Station ("WES") RMA-10 numerical model and the Oregon Health Sciences University/Oregon Graduate Institute, Eulerian-Lagrangian CIRCulation model to determine specific physical changes to salinity, depth, and velocity that the project might cause. Other information considered included the historical and existing status of the lower Columbia River ecosystem, numerical modeling of hydraulic parameters, salmonid estuarine ecology and sediments and sediment quality. See NOAA Fisheries 2002 BiOp at 43. Finally the agencies also used the professional expertise and experience of Corps and other agency biologists who have worked on the Columbia River ecosystem for most of their professional careers.

The Corps, NOAA Fisheries, USFWS and the SEI Science Panel understood that the conceptual model was never intended to make quantitative predictions: "*Courtney*: The conceptual model is exactly that; it's conceptual, heuristic. It allows you to think about processes in a systematic way. It's not predictive in the sense we can plug numbers into it and see where it's going to go." SEI Meeting Minutes, June 1, 2001 (http://sei.org/columbia/meet_process_summary.html). See also responses to previous CRANE comments at Final SEIS, Volume 4 at Stakeholders/Special Interests pp. 79-80, 94. The conceptual model, however, helped to clarify risks and uncertainties, guide the analysis of effects, and provided framework for an adaptive management program. *SEI Channel Deepening Project Review Process Summary* (http://sei.org/columbia/meet_process_summary.html).

CRANE's criticism that the model lacks sensitivity analysis is irrelevant because this model is not quantitatively predictive. The Corps' and Services' biologists years of experience working on the Columbia River provide the ability to weigh different factors.

CRANE also appears to question the Corps' biologists' and scientists' experience and professional expertise, and mischaracterizes the agencies' use of that experience and expertise. The Corps' in-house study team has extensive knowledge of the Columbia River and its issues. The team members are very familiar with a majority of the published and unpublished literature on the river, having either analyzed, conducted, written, or contracted for the studies underlying the literature, or drafting the literature themselves. Also, the team members have working relationships with many other local, state, and federal experts on the Columbia River with whom they can discuss issues and seek consensus. Finally, the Corps' team has among it nearly 100 years of experience working on the Columbia River and with operating dredging projects on the river. Team members' expertise and experience on the river is summarized below:

Name	Education	Years of Experience	Experience with Columbia
Geoff Dorsey	BS Wildlife Biology MS Wildlife Biology	20	Mr. Dorsey has spent most of his career working on wildlife management issues within Portland District and has extensive experience with wildlife resources and their habitats in the lower Columbia River. His experience includes estuarine bird populations and their habitat management, plus knowledge of riparian conditions and management along the Columbia. He has extensive experience with ESA-listed species in the lower Columbia River. He has worked on HEP evaluations for the Elk Creek Lake and Columbia River Channel Improvement Project involving multi-agency task forces.
Karl Eriksen	BS Environmental Resource Engineering MS Water Resource Engineering MS Hydraulic and Coastal Engineering	24	Mr. Eriksen has spent a large part of his career at Portland District working on Columbia River sediment issues. His specialties involve sedimentation patterns in the Columbia River. He has extensive experience in designing dredging programs and conducting modeling studies of physical properties.
Jon Gornick	BS Civil Engineering	11	Mr. Gornick has spent his career working in the navigation section managing the dredging program for the Columbia River and coastal projects. His expertise is in design and management of the annual dredging program as well as determining dredging volumes based on river sedimentation patterns.
Kim Larson	BS Zoology MS Fisheries Biology	29	Mr. Larson has spent most of his career at the Portland District office working on anadromous, freshwater and marine fish issues. His expertise includes estuarine and marine fisheries and anadromous fish habitat issues. He has spent several years working on Dungeness crab issues related to dredging at the mouth of the Columbia River. He is also the District Essential Fish Habitat Coordinator.

Mark Siipola	BS Oceanography MS Marine Science	24	Mr. Siipola is the Portland District office’s Ocean Dumping coordinator and has extensive experience with ocean dumping issues, disposal site designation and physical and environmental issues concerning ocean dumping issues at the mouth of the Columbia River. Mr. Siipola is also the Portland District’s designated expert in sediment quality with 25 years of experience.
--------------	--	----	--

Finally, conceptual models are recognized as a scientifically valid approach to understand ecosystems, and as stated in previous responses, have been used throughout the United States. *See* responses to previous CRANE comments at Final SEIS, Volume 4 at Stakeholders/Special Interests pp. 79-80. The National Academy of Science also recognizes conceptual models as valid tools to understand ecosystems. *Id.*

The Corps’ Response to CRANE’s comments related to Adaptive Management:

CRANE has presented several comments on the Corps’ adaptive management program for the Columbia River Channel Improvement Project (“Project”). The following is a general summary of CRANE’s comments that is followed by a more detailed response. CRANE’s comments A-5 and C-15 claim that the Corps has failed to provide appropriate standards to measure project success or failure; comment A-6 states the Corps failed to provide its implementation plan to agencies and parties; comment C-36 alleges that the Corps has not accounted for uncertainty or performed initial work for the adaptive management program; comment C-37 states the Corps’ adaptive management program is flawed. The Corps’ response follows.

The Corps proposed an adaptive management program coupled with a robust monitoring program during the ESA reconsultation process to address risk and uncertainties associated with long-term Project effects. The adaptive management process and proposed monitoring actions adopted in the 2002 Biological Opinions are intended to validate the conclusions of the 2001 BA and 2002 Biological Opinions, help minimize take of listed species, and ensure that proposed activities will not jeopardize listed species or adversely modify designated critical habitat [ESA Section 7(a)(2)]. The proposed monitoring plan will provide data for the adaptive management program. The Corps and resource agencies will use these data to address uncertainty and risk related to potential Project effects over the long term, and to validate assumptions used to analyze Project effects. Further, the adaptive management process will permit adjustments to the Project’s activities. Additionally, data and information obtained from the adaptive management process and related monitoring actions will be integrated into a broader set of research objectives and restoration activities in the Columbia Basin. *See* NOAA Fisheries 2002 Biological Opinion at 85. The Projects’ proposed monitoring plan and adaptive management process are contained in the Implementation Plan, which is available on the Corps’ website (<https://www.nwp.usace.army.mil/issues/crcip/implementation.htm>).

Contrary to CRANE's assertions, baseline data is adequate and the monitoring program provides detailed and sufficient data to evaluate Project effects. The Corps has collected, and continues to collect, adequate baseline information as detailed in response to CRANE's comments on the DSEIS. See Final SEIS, Volume 4, Stakeholders/Special Interests at pp. 85-86. The 1999 IFR/EIS, 2001 Biological Assessment, and the two 2002 Biological Opinions identify the Corps' baseline data. The Corps is conducting six monitoring programs that analyze a variety of parameters from water quality to bathymetry. Data collection for some of those plans is already underway. See Implementation Plan, Terms and Conditions 3. The Corps will also use data from the ongoing Anadromous Fish Evaluation Program ("AFEP"). This study began in 2001 and has already collected over two years of data. The study is scheduled to continue until 2011, depending upon availability of funds. See Imp. Plan, Term and Conditions 3a, MA-4. The Project will use all of the above data to refine the baseline before Project construction begins. These data will allow the Corps and the adaptive management team to conduct an objective assessment of Project impacts.

Also, the Corps' adaptive management plan is appropriate and consistent with scientific consensus about this management tool, and is based on requirements developed by NOAA Fisheries and the U.S. Fish & Wildlife Service ("Services"). The Corps, NOAA Fisheries, and the U.S. Fish and Wildlife Service ("USFWS") agreed to follow the adaptive management process that is detailed in the Services' handbook for Habitat Conservation Plans ("HCPs"). 65 Fed. Reg. 35242 (2000); *see also* NOAA Fisheries 2002 Biological Opinion at 85; Implementation Plan, Term and Condition 4d [hereinafter Imp. Plan].

Holling, in 1978 described "adaptive management" "as an interactive process that not only reduces, but benefits from, uncertainty." 65 Fed. Reg. 35242, 35252. The Services' guidance document defines adaptive management broadly as:

[A] method for examining alternative strategies for meeting measurable biological goals and objectives, and then, if necessary, adjusting future conservation management actions according to what is learned. *Id.*

The SEI panel also recognized that adaptive management may take several forms:

[I]n the scientific literature there's a divergence of opinion about what really constitutes an appropriate adaptive management scenario, which runs the gamut from a really tightly framed monitoring situation all the way through to things that have a research flavor—things like validation monitoring, or investigations, or research where you test your assumptions.

See Meeting Minutes, July 14-15 Working Group on Monitoring and Adaptive Management (http://sei.org/columbia/meet5_minutes.html).

As noted above, the Corps, NOAA Fisheries, and the USFWS have committed to implementing the Project's adaptive management program consistent with the Services' requirements for adaptive management. Imp. Plan, Terms and Conditions, 4a-h. The Services' HCP Handbook requires that an adaptive management strategy should:

(1) identify the uncertainty and the questions that need to be addressed to resolve the uncertainty; (2) develop alternative strategies and determine which experimental strategies to implement; (3) integrate a monitoring program that is able to detect the necessary information for strategy evaluation; and (4) incorporate feedback loops that link implementation and monitoring to a decision-making process . . . that result in appropriate changes in management. 65 Fed. Reg. 35242, 35253.

To implement the adaptive management program for the Project, the Corps has retained Dr. Steven Bartell, a nationally-recognized expert in adaptive management and risk assessment. Dr. Bartell has performed similar analysis for the states of California, Florida, Kentucky, the U.S. EPA, and the country of Japan. See Imp. Plan, Terms and Conditions 4f. Dr. Bartell will review project data and information, and from that review, will implement the adaptive management process. Dr. Bartell will collaborate with the Corps and the Services to develop the initial adaptive management framework consistent with the Services' adaptive management policy. The plan will also contain the Services' short-term, mid-term, and long-term components set forth in Term and Conditions 4d. See Imp. Plan.

Dr. Bartell, under this contract, will also assist the Corps to assemble a technical team that will be comprised of experts from different fields. This team will develop, at a minimum, the trigger values for the indicators listed in the Implementation Plan, Term and Conditions 4e. The adaptive management process will also solicit input from the tribes, state resource agencies, and interested stakeholder groups. Meetings will be semi-annual and open to the public. Evaluation proposals, monitoring results, and the adaptive management team's decisions will be posted on the Corps website. See Imp. Plan, Term and Conditions 4a. Finally, adaptive management provides a process that allows the adaptive management team to revisit impact areas if necessary and appropriately adjust the Project to address any unanticipated impacts. Imp. Plan, Term and Conditions 4c.

Contrary to CRANE's assertions, the Corps has not delayed implementing the adaptive management program in an inappropriate manner. The Corps has been collecting data and has hired Dr. Bartell to implement the adaptive management program.

The Corps' adaptive management program is therefore reasonable, based on science, and includes appropriate mechanisms for protecting endangered species as outlined in the Services' guidance. See 65 Fed. Reg. 35242, 35252.

C.1: The comment incorrectly asserts that the Corps predicted restoration of benthic invertebrate communities at the Miller-Pillar location would occur in 2 years, citing page 4-35 of the FSEIS. No such statement occurs in the FSEIS on that page. The comment is academic at this point because the State of Oregon has not approved the ecosystem restoration feature at the Miller-Pillar location so the Project will be implemented without the Miller-Pillar feature. Nevertheless, this feature would have provided significant benefits as described below. Miller-Pillar would have been built in increments using O&M materials over an estimated 15-year time period. The 15-year time period refers to completion of material placement to the target elevation, which would have been derived from an immediately adjacent tidal marsh habitat. The objective the Corps had established for this restoration feature was 25% ground cover by tidal marsh plants by O&M year 5 (Portland District Web Site: crcd\Final Supplemental EIS\Implementation plan).

The Corps disagrees that it has taken 60-80 years for successful tidal marsh fringes to develop at disposal locations in the Columbia River estuary. Miller Sands Spit has been present only since 1976 and fringing tidal marsh is present at the location. An analysis of historical aerial photos of habitat development at other Columbia River disposal sites also discounts the assertion. If we do not take actions to develop the proper conditions for tidal marsh establishment, there will be little or no future tidal marsh development in the Columbia River estuary under existing conditions and the current human use patterns of the landscape.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 69

3. As noted above in Section II(C)(I), the Corps points to success stories about establishment of tidal marsh fringes without answering critical questions about the importance of particular site characteristics and the timeframe for successful establishment. These comments apply equally to the sections of the FSEIS that address the Lois Island Embayment. In addition, the Corps still has no estimate of current productivity losses, nor of current biological use of the Lois Island Embayment. See FSEIS, at pages 4-23,4-33. In the absence of this critical baseline data, it is impossible to analyze the likely impacts of the Lois Island Embayment restoration project. In sum, the Corps' conclusion that the restoration sites will be improved based on the Project actions turns on the success of mitigation, yet the FSEIS offers no estimate of current productivity and no estimate of long-term losses, given the long time period required to produce a tidal marsh fringe. See generally Scott A. Matern, et al., "Native and Alien Fishes in a California Estuarine Marsh: Twenty-one Years of Changing Assemblages," 131 *Transaction of the American Fisheries Society* 797-816 (2002) (discussing the variability of biological communities in a California estuary monitored for twenty-one years) (attached as Exhibit 11).
4. The Corps offers best professional judgment but no data to support its conclusion that export of insects from Webb and Woodland Bottoms will be negligible. See FSEIS, at page 4-20. The Corps' assumes that the only production subsidies from this system to the estuary are through drift of larval insects without support—an assumption contradicted by both theory and empirical fact. See Gary A. Polis, et al., "Toward an Integration of Landscape and Food Web Ecology: The Dynamics of Spatially Subsidized Food Webs," 28 *Annual Review of Ecology and Systematics* 289-317 (1997) (attached as Exhibit 12); Robert L. Jeffries, "Allocthonous Inputs: Integrating Population Changes and Food-Web Dynamics," 15 *Trends in Ecology and Evolution* 19-22 (2000) (attached as Exhibit 13); Richard S. Ostfeld, et al., "Pulsed Resources and Community Dynamics of Consumers in Terrestrial Ecosystems," 15 *Trends in Ecology and Evolution* 232-37 (June 2000) (attached as Exhibit 14); S. Nakano and M. Murakami, "Reciprocal Studies: Dynamic Interdependence Between Terrestrial and Aquatic Food Webs," 98 *Proceedings of the National Academy of Sciences* 166-70 (2001) (attached as Exhibit 15). An increase in insect faunal import cannot be forecast if the present

C.2: As noted above, the State of Oregon has not allowed the Miller-Pillar ecosystem restoration feature, but the Corps provides this response for its relevance to the ecosystem restoration feature at Lois Island. The Corps developed a specific management objective (25% ground cover after O&M year 5) for tidal marsh establishment in the implementation plan for both the Miller-Pillar and Lois Island ecosystem restoration features (<https://www.nwp.usace.army.mil/issues/crcip/implementation.htm> at Terms and Conditions 5f). The Miller-Pillar Implementation Plan, and its associated objectives, were submitted to NOAA Fisheries and the U.S. Fish and Wildlife Service for their review and approval. The Miller-Pillar implementation plan and objectives have been approved by these agencies.

C.3: As noted above, the Corps developed a management objective (25% ground cover after O&M year 5) for tidal marsh establishment in the implementation plan for the Miller-Pillar and Lois Island ecosystem restoration features (<https://www.nwp.usace.army.mil/issues/crcip/implementation.htm> at Terms and Conditions 5f). The Implementation Plan, and its' associated objectives, were approved by both NOAA Fisheries and USFWS. Again, the State of Oregon has not allowed the Miller-Pillar ERF. However, the Corps provides this response because of its relevance to Lois Island.

The Implementation Plans for these two restoration features are virtually identical, with the exception of the location of reference or control locations. For ease of reference, we are providing the monitoring effort for the Lois Island embayment restoration feature in the text following this paragraph. See Implementation Plan, Terms and Conditions 5f. Species composition and primary productivity of tidal marsh will be measured for the restoration and reference sites. A similar investigation will address benthic invertebrates and juvenile salmonid/fisheries use of the restoration and reference sites. These include pre-construction monitoring efforts to provide additional baseline information.

Pre-Construction Monitoring Effort

a. Tidal marsh elevation survey

1. Lois Island embayment marshes at Lois Island, Mott Island and South Tongue Point – 3 transects from lower tidal marsh vegetation line to tidal marsh-upland transition elevation. One survey per location will be conducted to establish target elevation for ecosystem restoration feature.

2. Control Site (East Lois Island tidal marsh) - 2 survey transects from lower tidal marsh vegetation line to tidal marsh-upland transition elevation.

b. Juvenile Salmonid/Fisheries Use: Juvenile salmonid use will be measured in the Lois Island east marsh, fringing marshes of Lois Island, Mott Island, and South Tongue Point and within the ecosystem restoration feature. Due to their intertidal location and vegetative cover, trap nets would be used. A purse seine would be used to sample fisheries use in Lois Island embayment.

c. Benthic Invertebrate Productivity: Sampling locations, methodology and level of effort will be comparable to that described for post-construction monitoring.

d. Tidal Marsh Primary Productivity: Sampling locations, methodology and level of effort will be comparable to that described for post-construction monitoring.

Post-Construction Monitoring Effort

a. **Tidal Marsh Plant Production:** Tidal marsh plant production would be assessed in a manner generally comparable to the methodology used for the Columbia River Estuary Data Development Program (1984). Sampling would occur in late July and early August. Plant cover and species composition will be determined from 5 sample locations each at Lois Island east marsh and within the ecosystem restoration feature with another 5 sample locations distributed around the perimeter tidal marshes that abut Lois Island (n=3), Mott Island (n=1) and South Tongue Point (n=1). These sampling locations will be permanently staked plus their Global Positioning System location will be recorded to ensure that sample sites are reoccupied in subsequent years. Plant cover data will be recorded from five replicate 0.5m² quadrats randomly placed around each sampling location. Percent live biomass would be determined from nine randomly placed 0.1 m² clip-quadrats at each sampling location. The simple harvest method utilizing peak total standing crop measurements, including both live shoots and attached standing dead material of the same season's growth will be used to estimate primary production.

b. **Benthic Invertebrate Productivity:** Benthic invertebrate productivity will be measured per the methodology used by NOAA Fisheries in the Columbia River estuary (see Hinton et al. 1995. In-Water Restoration Between Miller Sands and Pillar Rock Island, Columbia River Environmental Surveys, 1992-93). The sampling timeframe would be May, July and September. Ten sampling stations would be established in the Lois Island east marsh and within the ecosystem restoration feature. Five of these 10 sampling stations would be paired with the tidal marsh plant production locations. Benthic invertebrate sampling locations would also be established in the Lois Island (n=5), Mott Island (n=3) and South Tongue Point (n=2) fringe marshes. Five of these sampling stations and would be paired with tidal marsh plant sampling locations. These sampling locations will be permanently staked plus their Global Positioning System location will be recorded to ensure that sample sites are reoccupied in subsequent years.

c. **Juvenile Salmonid/Fisheries Use:** Juvenile salmonid use will be measured in the Lois Island east marsh, fringing marshes of Lois Island, Mott Island, and South Tongue Point and within the ecosystem restoration feature. Due to their intertidal location and vegetative cover, trap nets would be used. A purse seine would be used to sample fisheries use in that portion of Lois Island embayment not used for development of the ecosystem restoration feature. The sampling timeframe would be May, July, and September.

Monitoring Schedule: Monitoring efforts would occur in construction years 1 and 2 and years 2, 6 and 10 during Operations and Maintenance. Photographs will be obtained at each sampling location to document control and ecosystem restoration feature conditions.

Correspondence: NOAA Fisheries and the U.S. Fish and Wildlife Service will be notified of contractors employed to accomplish these actions, dates of their notices to proceed, and when final reports are due. Each agency will be furnished final reports on each monitoring action as they are received.

Adaptive Management Actions: If tidal marsh sampling results indicate that vegetation establishment has not attained a level of 25% ground cover by O&M year 2, then actions to harvest seeds and propagules for planting in the ecosystem restoration feature will be evaluated and implemented if necessary.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 70

subsidy is unknown. Other unanswered questions raised in this Section of the FSEIS include: What will the actual loss of insect contribution to the system be and what percentage of total production is this? What percentage of seasonal production does it represent? How long would the subsidy be interrupted and at what time is the increase projected to occur? Id. In the absence of data of this kind, it is premature for the Corps to conclude that Martin Island mitigation actions will benefit outputs of “Critical Habitat Insect.” See FSEIS, at page 4-2 1. - \

5. Initial temporary and long-term substantial impacts on growth and productivity must be clarified and defined in terms of a numerical model of fish and invertebrate growth. FSEIS, at page 4-21. The FEIS fails to do this.
6. The Corps does not provide discussion of the impact on Shillapoo Lake’s restoration design and outcome if the Corps or sponsor ports are unable to obtain rights to the three cells currently under private ownership. FSEIS, at page 4-25. In addition to concerns about the ecological value of this “restoration” project discussed above in Section II(A)(8), this simple real estate dilemma could substantially reduce any possible benefits associated with the Shillapoo Lake project.
7. The Corps relies on monitoring to trigger each phase of the Tenasillaha Island restoration project. & FSEIS, at page 4-40. The comments on monitoring provided in Section II(C)(30) apply to this restoration action as well. The Corps offers no legitimate reason to exclude seasonality and the various important water quality variables from its monitoring. These elements are critical to the ecosystem’s function and must be monitored properly.
8. The Corps offers no discussion of the impacts to Bachelor Slough that will result from the anticipated continued dredging. See FSEIS, at page 4-45. The FSEIS provides no quantitative estimate of the value of this habitat, other than the “accounted value” obtained through HEP modeling, which has no demonstrated relationship to the actual habitat values of Bachelor Slough. See detailed discussion below at Section II(C)(44). Furthermore, why has there been no discussion of the current temperatures in the system and the expected effects on temperature that will be associated with the Bachelor Slough restoration project?

Progress Report: Monitoring reports for each pre- and post-construction monitoring action will be provided by December 1 of each monitoring year. These reports will discuss results to date, provide recommendations on potential methods to improve the specific restoration feature.

Implementation Plan, Terms and Conditions 5f.

The timeframe for successful reestablishment of tidal marsh vegetation and benthic invertebrates, 5 to 10 years or more depending on the species and their means of colonization, was identified in the 2001 Biological Assessment for the Columbia River Channel Improvements Project (See page 8-13). Impacts were discussed in the FSEIS on pages 6-29, 6-30, and 6-32 to 6-34.

The proposed restoration actions are voluntary actions under Section 7(a)(1) of the Endangered Species Act and do not represent mitigation for any project related impact. The restoration features were developed in concert with the U.S. Fish and Wildlife Service and NOAA Fisheries. Further, modifications to some of the proposed restoration features were incorporated before the FSEIS was issued based upon comments received on the Draft SEIS. Specifically, the Lois Island embayment restoration was modified to reflect the public and stakeholder desire for tidal marsh habitat rather than shallow subtidal – tidal flat habitats, which they noted was an abundant habitat in the estuary.

C.4: Both the Woodland Bottoms and Webb sites are located behind main flood control dikes and are subject to grazing and/or cultivation of agricultural crops. Thus, vegetative cover is principally pasture grasses or a specific crop. Based on our experience, these agricultural practices would limit insect production and there would be less likelihood for insects originating from ground level to be borne over the dikes by wind, which was considered the principal transport mechanism to the Columbia River. The development of riparian forest at these mitigation locations was considered a means to attain a more diverse insect fauna that would have a greater likelihood to be borne by the wind to the Columbia River. The assessment the Corps made is not a critical element for implementation of the mitigation actions, nor is it a driving force behind their implementation.

The Corps also disagrees with the comment’s suggestion that it is premature to conclude that the mitigation actions at Martin Island will likely provide beneficial outputs for listed salmonids. The Corps’ specific statement in the FSEIS at page 4-21 was “The direct effect of these actions at Martin Island would be beneficial to listed ESA salmonids and their Critical Habitat.” The actions referred to were intertidal marsh and riparian forest habitat development on the island. The Corps stated that “Insect and detrital export from riparian and emergent marsh habitat along with woody debris export would be expected from Martin Island mitigation actions.” Although the State of Washington Water Quality Certificate prohibits fill, and thus development of intertidal marsh habitat in Martin Island lagoon, the proposed action would have converted an approximately 20’ deep constructed lagoon into a shallow, emergent marsh habitat subject to tidal inundation and flooding during high river stages. This action would have provided for detrital export (marsh vegetation) during late fall, winter and spring from the lagoon. Similarly, the establishment and subsequent maturation of riparian forest habitat on floodplain lands currently restricted to pasture lands on Martin Island would increase detrital export (leaves), insects (detritivores in the duff, herbivores in the canopy), and eventually large woody debris to the Columbia River. Restoration of tidal marsh and riparian forest habitats are sought vigorously by various resource agencies and ecosystem restoration advocacy groups to restore significant historic losses of these habitat types along the lower Columbia River and thereby benefit the recovery of salmonids and many other fish and wildlife resources.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 71

See FSEIS, at page 4-43. The Corps offers no plan to monitor use of Bachelor Slough following Project completion in order to compare it with present use of the area. See FSEIS, at page 4-46. Even if the Corps were to implement monitoring, it would be difficult to design a competent monitoring program given the apparent lack of baseline information about existing Bachelor Slough operations.

9. Section 4.8.7 attempts to assign economic value to the proposed ecosystem restoration features. See generally FSEIS, at pages 4-46-4-5 1. The FSEIS does not illuminate how the Corps' valuations were derived; without a more transparent valuation process, it is impossible to provide independent analysis of this Section's conclusions. Nonetheless, it does not appear that data analysis played a central role in this valuation process. The Corps' reliance on consensus rather than data analysis indicates that policy considerations, rather than scientific considerations, may have been the primary determinant of "value." In addition, this exercise focuses on the value of the completed project, and does not appear to take into consideration either values associated with current uses or the temporary impacts of construction and rehabilitation activities prior to completion and associated losses of value.
10. In its new Section 4.9, the Corps describes Ecosystem Evaluation Actions by which the Corps will attempt to gain "additional understanding [of] the lower Columbia River ecosystem." FSEIS, at page 4-51. Despite this goal, the Corps fails to present evaluation actions that are actually designed to obtain this information in a scientifically reliable fashion. For instance, the Corps' description of Ecosystem Evaluation Action 1 does not describe such basic research information as the number of transects to be taken, the type of sampling to be undertaken on those transects and the number of samples to be taken at each transect. See FSEIS, at page 4-52. Important as Cathlamet Bay may be, as CRANE has noted in its previous comments, the numerical modeling used throughout the FSEIS is unverified; therefore, the Corps' conclusions about the Bay's particular relative utility are premature. In its current state, the Corps' model is not a reliable predictor of ecosystem behavior. Nevertheless, if, as the Corps asserts, Cathlamet Bay is of especially high importance, it is clear that a single transect in Cathlamet Bay would be insufficient to sample a large and environmentally critical area. As it is, the Corps' only existing baseline

C.5: The Corps disagrees. Pre and post-construction monitoring efforts for both Lois Island embayment and Miller-Pillar are set forth in the implementation plans for these ecosystem restoration features (<https://www.nwp.usace.army.mil/issues/crcip/implementation.htm> at Terms and Conditions 5f). The implementation plans have been approved by NOAA Fisheries and the U.S. Fish and Wildlife Service. Monitoring under these implementation plans would include reference sites in nearby natural marshes and those developed in association with previous dredged material deposition in addition to the area of the feature. The monitoring effort would provide sufficient information to compare fisheries and benthic invertebrate use of the developed restoration feature to that of a natural reference site which represents the ultimate objective to emulate. Growth, for which we assume the commenter is using weight and/or length as the feature to be measured, involves too many factors controlled or significantly influenced by elements external to the restoration feature. Therefore, it is not a useful indicator to seek.

C.6: Only two cells (2 and 6; Final SEIS page 4-26) are currently under private ownership. The Final SEIS provides a range of habitat development outcomes (i.e., 470 – 839 acres) for implementation of this feature that account for these private lands, with the larger acreage representing their inclusion and the smaller acreage representing their exclusion. The Final SEIS also notes (page 4-27) that drainage capability would have to be provided for these private lands via pumps and pipelines, infrastructure that will be in place to support the wildlife management objectives regardless of whether the private lands are included in the final restoration feature.

C.7: The Corps does not rely upon monitoring to trigger each phase of the Tenasillahe Island ecosystem restoration feature. The reference to monitoring at Tenasillahe Island (See FSEIS, page 4-40, 3rd bullet) specifically states that monitoring actions would be post-construction. Phases 1 (Interim restoration at Tenasillahe Island) and 2 (Reintroduction of Columbian white-tailed deer to Cottonwood-Howard Island) would be initiated concurrent with or prior to project construction start (physically deepening the navigation channel). Phase 3 (long-term; breach dikes) is predicated upon the delisting of the Columbian white-tailed deer and a change in the purpose of the national wildlife refuge. The hydrology/hydraulic engineering analysis at Tenasillahe Island is directed at providing technical information on infrastructure requirements of the Interim measure for inclusion in the plans and specifications for project construction and represents a pre-construction engineering evaluation.

Comment II.C.30 is directed at risk assessment and best professional judgment, and not monitoring. Thus, we are unable to determine the relevance of Comment II.C.30 to Comment II.C.7.

The approved monitoring protocol for ecosystem restoration features, including those at Tenasillahe Island, and the terms and conditions provided in the biological opinions, are available online on the Portland District website (<https://www.nwp.usace.army.mil/issues/crcip/implementation.htm>).

Interim Ecosystem Restoration Feature: A hydrology/hydraulic engineering analysis, juvenile salmonid/fisheries use monitoring, and benthic invertebrate productivity monitoring would occur pre-construction to provide baseline information. The hydrology/hydraulic engineering analysis at Tenasillahe Island is directed at providing technical information on infrastructure requirements of the Interim measure for inclusion in the plans and specifications for project construction and represents a pre-construction engineering evaluation. This analysis would also address the breach requirements (length, number, location) for implementation of the long-term measure.

Post-construction, juvenile salmonid/fisheries use and benthic invertebrate productivity monitoring would occur in construction years 1 and 2 and O&M year 2. These monitoring actions would occur in both the action area and adjacent reference sites.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 72

information for Cathlamet Bay was gathered in the space of a single sample year. FSEIS, at page 4-33. Samples obtained during this time were insufficiently replicated in space and time. In addition, the data is over twenty years old. Therefore, the Corps' knowledge about variability of physical and biological characteristics at Cathlamet Bay is subject to a tremendous amount of uncertainty. In fact, both uncertainty and incertitude are high in this case—the Corps knows very little about Cathlamet Bay. What little it does know is very out of date and comprises only a small amount of what needs to be known in order to predict changes to the system with confidence.

11. Evaluation Action 2 (“ascertaining coastal cutthroat trout use of tidal marsh habitat in the Columbia River estuary”) suffers from many of the same flaws discussed above for Evaluation Action 1. See FSEIS, at page 4-52. No evidence exists, or is presented, to support the contention that the variability of juvenile cutthroat use of tidal marsh habitat in space and time can be adequately captured by a two-year pre-construction monitoring effort, or that two years of post-construction data would be sufficient to detect any Project-related changes. The Corps fails to identify or discuss at what level a change would be said to occur (that is, what level of change in use is determined to be a significant change and why), nor does the FSEIS present any quantified estimate of the statistical power of Evaluation Action 2 studies to detect a change in coastal cutthroat use of tidal marsh. Evaluation Action 2 appears to be based upon no study design, no sampling methodologies and offers no plan to determine actual coastal cutthroat use habits through telemetry studies—the only acceptable mechanism for assessing actual habitat use.
12. Evaluation Actions 3 and 4 include further data collection for the three years post-construction, in addition to the single year of pre-construction data collected in 2002. FSEIS, at page 4-52. There is no indication that the three-year period of post construction monitoring has been chosen based on any principled determination that three years is an acceptable monitoring window. In a dynamic system, pre-construction sampling must be of sufficient replication in space and time to adequately describe the variability in the system. One or two years of widely separated sampling, like that conducted by the Corps, is totally insufficient for this task. See Daniel L. Bottom and Kim K. Jones, “Species Composition,

Benthic invertebrate sampling would occur in spring and fall per NOAA fisheries protocol that has been used for years in the Columbia River estuary. Juvenile salmonid/fisheries use would also be measured in spring and fall using NOAA Fisheries sampling and analytical protocols. As reflected in the services' approval of the monitoring plan for this ecosystem restoration feature, use of the NOAA fisheries sampling and analytical protocols over the time periods established in the monitoring plan are adequate to evaluate the results of the restoration feature.

Long-Term Ecosystem Restoration Feature: The long-term feature also provides monitoring for juvenile salmonid/fisheries use, benthic invertebrate productivity, and tidal marsh productivity. The sampling protocol for fish and benthic invertebrates associated with the long-term restoration feature is comparable to that proposed for the Interim feature and would occur during Spring and Fall. Tidal marsh productivity monitoring is based upon the sampling protocol used for the Columbia River Estuary Data Development Program (1984) and would occur in late July – early August timeframe, i.e., when the maximum tidal marsh plant biomass should be present.

Post-construction, juvenile salmonid/fisheries use and benthic invertebrate productivity monitoring would occur in O&M years 7, 8, and 11. These monitoring actions would occur in both the action area and adjacent reference sites. Results from the interim monitoring actions would provide the baseline for the long-term feature.

We will use the results of the juvenile fisheries and benthic invertebrate monitoring efforts to assess the habitat improvements associated with the Interim and Long-term ecosystem restoration features. Simple inspection, as we have done, amply demonstrates that the interior channels (formerly tidal marsh channels) are stagnant and warm under present conditions. The proposed Interim action, based upon the hydrology/hydraulic engineering analysis, will allow water to flow into the interior channels via inlet channels and/or tidegate modifications. Therefore, Columbia River waters, including their well characterized water quality parameters (dissolved oxygen, temperature, etc.) will dominate the interior channel system with implementation of the Interim feature. For the long-term feature, Columbia River waters will inundate and/or dewater the site via twice-daily tidal exchange. Monitoring information for these features will be provided to the interagency Adaptive Management Team. If results regarding juvenile salmonid use of these interior channels are evaluated to be low, as compared to adjacent reference areas, we anticipate that additional measures, via involvement of the interagency Adaptive Management Team, will be employed to remedy the situation. The nature of potential future actions would be determined via further analyses. They could include additional inlets and greater water export/import capability through tidegates for the Interim feature, or more extensive breaching for the Long-term measure.

Again, as reflected in the services' approval of the monitoring plan for this ecosystem restoration feature, the plan is adequate to evaluate the results of the restoration feature.

C.8: The Corps' dredging action at Bachelor Slough is a one-time effort only. The U.S. Fish and Wildlife Service will be responsible for O&M dredging of Bachelor Slough, if any. Their future O&M dredging actions will require permitting, ESA clearances, and perhaps preparation of an Environmental Assessment. It is unknown when or how much future material will have to be O&M dredged from Bachelor Slough.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 73

Distribution, and Invertebrate Prey of Fish Assemblages in the Columbia River Estuary,” 25 *Progress in Oceanography* 243-70 (1990) (commenting on the variability of biological elements of the ecosystem) (attached as Exhibit 16) [hereinafter “Species Composition, Distribution and Invertebrate Prey”]; Kim K. Jones, et al., “Community Structure, Distribution, and Standing Stock of Benthos, Epibenthos, and Plankton in the Columbia River Estuary,” 25 *Progress in Oceanography* 21 1-41 (1990) (same) (attached as Exhibit 17) [hereinafter “Community Structure, Distribution, and Standing Stock”]; &chard D. Brodeur, “The Importance of Various Spatial and Temporal Scales in the Interaction of Juvenile Salmon and the Marine Environment,” Alaska Fisheries Science Center, National Marine Fisheries Service, Seattle, WA (unpublished paper) (1 997) (attached as Exhibit 18) [hereinafter “Importance of Various Spatial and Temporal Scales”]; Charles A. Simenstad, “The Relationship of Estuarine Primary and Secondary Productivity to Salmonid Production: Bottleneck or Window of Opportunity?,” National Marine Fisheries Service, Seattle, WA (unpublished paper) (1 997) (attached as Exhibit 19) [hereinafter “Relationship of Estuarine Primary and Secondary Productivity”]; Carl J. Walters and C.S. Holling, “Large-scale Management Experiments and Learning by Doing,” 71 *Ecology* 2060-68 (1990) (attached as Exhibit 20). There is no ecological reason to assume that the Corps will be able to determine if a change has even occurred, much less able to gauge the duration, magnitude and intensity of this change. In addition, the Corps has neither justified its choice of monitoring targets (where such targets exist) nor identified those targets quantitatively. Finally, and perhaps most importantly, the Corps has not adopted standards for when an action will be considered successful, i.e., how near to the target a successful result must lie. The Corps has failed to provide any substantive response to previous comments raising these concerns and replicates the same elementary scientific study design flaws in the FSEIS. Whether or not recognized experts in the field have participated in the Corps’ studies, these basic scientific problems must be addressed if the Corps is to uphold its duty under NEPA.

13. In response to previous comments about the use of conceptual models to determine likely effects of the Channel Deepening Project, the Corps responded with statements about the qualifications of Dr. Thorn, the peer-review process this

Habitat Evaluation Procedures (“HEP”) were not conducted to estimate a value for Bachelor Slough habitat. The Bachelor Slough ecosystem restoration feature is a voluntary restoration feature included in the Project under the Corp’s ESA Section 7(a)(1) authority, not as mitigation. The feature was a proposal submitted by the U.S. Fish and Wildlife Service, Ridgefield National Wildlife Refuge. The refuge encompasses the whole of Bachelor Slough within its boundaries. Refuge staff provided their best professional judgment regarding present habitat conditions and the estimated improvements post-implementation to such factors as water temperature and increased potential for juvenile salmonid use. They did not provide baseline data. The implementation plan includes monitoring prior to construction to characterize the baseline condition. Water temperature in Bachelor Slough will be influenced by the Columbia River as flows into the slough are derived from surface waters of the Columbia River. The water temperatures of the river should be less than that of the very shallow slough, which has mudflats exposed during lower tidal stages. Therefore, increasing the depth of Bachelor Slough should lead to increased river flows which should in turn lead to a moderate decrease in slough water temperatures, resulting in a moderate improvement in value of the slough for juvenile salmonids as stated in Table S4-8 (FSEIS at page 4-30).

The Corps developed an implementation plan for this ecosystem restoration feature (See <https://www.nwp.usace.army.mil/issues/crcip/implementation.htm>). The implementation plan, and its associated objectives, were submitted to NOAA Fisheries and the U.S. Fish and Wildlife Service for their review and approval. The Services have approved the Implementation Plan and objectives for the Bachelor Slough ecosystem restoration feature. Monitoring efforts for juvenile salmonid/fisheries use and benthic invertebrates would be based upon established NOAA Fisheries protocols and sampling methodology. As reflected the services’ approval of the monitoring plan for this ecosystem restoration feature, the plan is adequate to evaluate the results of the restoration feature.

C.9: No economic value was assigned to the ecosystem restoration feature outputs. Rather, Section 4.8.7 compares the non-monetary outputs (environmental) to all implementation costs (development, real estate, monitoring, O&M) associated with an ecosystem restoration feature to determine, in an incremental manner, which features would be most cost effective to implement. Thus, our focus was on the cost of an ecosystem restoration feature relative to the environmental benefits (non-monetary) forecast for each. The analysis approach was qualitative in manner rather than quantitative due to the disparate nature of the proposed restoration features and their outputs. An explanation of the cost effectiveness-incremental cost effectiveness analysis and the development of the environmental outputs was presented in the FSEIS (pages 4-46 and 4-47). The high-medium-low valuations developed by the interagency Biological Review Team during the ESA consultation process are based on best professional judgment. These valuations were used as weighting factors times the feature acreage to derive the environmental output associated with each feature. They were initially presented in the Corps’ 2001 BA at 8-27. Table S4-8 (FSEIS; page 4-30) tabulates the information used to derive environmental outputs. Cost information specific to each ecosystem restoration feature is presented in Tables S4-9 through S4-11 (pp. 4-49 through 4-50). The incremental cost – cost efficiency analysis is a Corps’ required assessment technique.

C.10: The purposes of Ecosystem Evaluation Action 1 (“EEA 1”) is to expand the knowledge base of juvenile salmonid use of the Columbia River estuary, and provide further data for the NOAA Fisheries’ Anadromous Fish Evaluation Program (“AFEP”). The study is not used to assess project impacts. Further, the Corps did not use the conceptual model to develop this study, it is an additional study to supplement the AFEP. The Corps will fund NOAA Fisheries Science Center to conduct EEA 1 using the same methodologies it employs in the larger AFEP study. See Implementation Plan, EEA 1, at Terms and Conditions 6(d). The Implementation Plan is available on the Corps website at <https://www.nwp.usace.army.mil/issues/crcip/implementation.htm>.

CRANE infers that the Corps relied on only one transect in Cathlamet Bay. CRANE is referring to a study of Cathlamet Bay that contained relevant data for the Lois Island Embayment ERF. The Corps used the data referenced only for the Lois Island Embayment ERF. The Corps has sufficient data for Cathlamet Bay. See Emmett, R. L., G.T. McCabe, Jr., T.C. Coley, R.J. McConnell and W.D. Muir. 1986. Benthic Sampling in Cathlamet Bay, Oregon - 1984. National Marine Fisheries Service Report of Results to U.S. Army Corps of Engineers, FSEIS at LC-2.

C.11: Like Evaluation Action 1, Evaluation Action 2 (“EEA 2”) is not being used to assess project impacts. This study is designed to expand knowledge of cutthroat trout use and distribution in the Columbia River estuary. EEA 2 is described in the Implementation Plan, available on the Corps’s website. See EA2 at Term and Conditions 6d. <https://www.nwp.usace.army.mil/issues/crcip/implementation.htm>. The Corps selected a four-year monitoring window because this period covers the variation we expect to see in river conditions and the species’ corresponding responses to habitat changes.

C.12: Evaluation Action 4 (“EEA 4”) is being conducted in conjunction with the NOAA Fisheries ongoing salmonid studies currently underway through the AFEP. Again, the study is not used to assess project impacts. EEA 4 will assess juvenile salmonids and their prey for the concentration of chemical contaminants. The Corps selected a three-year, post construction monitoring interval for EEA 4 because it would allow the system to adjust to changes related to deepening and any actual impacts would be detectable after this period. Monitoring data will be presented annually to the Adaptive Management Team, who will determine whether the monitoring should continue. EEA 4 is described in the Implementation Plan, at Term and Conditions 6d. See <https://www.nwp.usace.army.mil/issues/crcip/implementation.htm>.

C.13: See the Corps’ response to this comment regarding the conceptual model at the beginning of our response to Section II.C. The SEI workshops were open to the public and attended by representatives of CRANE.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 74

model underwent, and the use of other conceptual models in other scenarios. We do not question Dr. Thom's ability to craft a conceptual model, and we acknowledge that conceptual models are used in other areas to organize initial thought processes. We would caution the Corps, however, that the general consensus on the "River Continuum Concept" since 1995 has been that it is only useful for Western montane streams. See Barry L. Johnson, et al., "Past, Present, and Future Concepts in Large River Ecology," 45 *BioScience* 135-41 (Mar. 1995) (attached as Exhibit 21); Mary E. Power, et al., "Hydraulic Food-Chain Models: An Approach to the Study of Food-Web Dynamics in Large Rivers," 45 *BioScience* 159-67 (Mar. 1995) (attached as Exhibit 22). CRANE stands by its critique of the Corps' conceptual modeling as outlined in previous comment letters, and offers the following additional context for our conclusion that the FSEIS's use of the conceptual model as a predictive tool is not appropriate. CRANE also points out that Dr. Robert Dillinger did not attend, nor did he comment upon, the SEI panel proceedings.

14. The Corps contends that "[t]he Columbia River conceptual model is a valid, peer-reviewed integration of existing scientific knowledge into a tool useful for understanding how the fundamental components of the river's ecosystem interact. This integrated understanding will substantially assist in assessing the effects of the channel improvement project on salmonids. The conceptual model is the most comprehensive model for the Columbia River developed to date." Response to Comments, at pages Stakeholders/Special Interests-79-80. Based on the minutes from the SEI panel process, summarized in excerpts from the transcripts below, it appears that the conceptual model on which the FSEIS relies on was the first and only conceptual model developed in the course of analyzing Project effects. As CRANE has noted in its previous comments, this conceptual model may be adequate as an initial modeling effort, but is entirely insufficient as a final predictive model.

To repeat observations made in CRANE'S previous comments, the conceptual model, as designed, serves only as an organizational tool. Because the model is completely theoretical, providing only the most rudimentary framework of how the system might operate, it establishes nothing about how the system operates in fact.

C.14: The comment incorrectly cites to the SEI panel meeting of June 7, 2001. The discussion quoted in footnote 4 of the comment actually occurred at the April 28-29, 2001 Modeling Workshop. This session was a presentation by Ed Casillas of the NMFS Science Center on the Corps' Estuarine Model, not the conceptual model. This statement therefore does not support CRANE's allegation that the SEI Panel was "concern[ed] . . . to move beyond conceptual work to matters directly impacting survival." The panel was discussing the appropriate level of modeling for the Project.

See the Corps' response to this comment regarding the conceptual model above at the beginning of our response to Section II.C.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 75

Review of the SEI panel's meeting minutes makes clear that the panel of invited scientists understood very well that the conceptual model could not be used for prediction or to actually understand how such a system functions.⁴ *See, e.g.*, SEI Panel Proceedings, Minutes of June 7, 2001. The panelists also expressed surprise that such a model had not been developed sooner in the process, when it could have informed early research development that would have increased understanding about the actual ecosystem. *Id.* Indeed, the panelists' comments provide abundant support to CRANE'S on-going criticisms of the Corps' modeling efforts.

15. The Corps has not established sufficient groundwork to support an adaptive management program. Critical baseline information is lacking, and without that baseline information, the Corps can neither establish credible monitoring parameters nor assess their variability with any accuracy. The Corps' proposed

C.15: See the Corps' response to this comment regarding the adaptive management program above at the beginning of our response to Section II.C.

⁴ The SEI transcripts document the following exchange among the panelists:

Curtis: I have a question and a concern. If you're concerned about the modeling, it seems like you want to be sure you're modeling the right thing. I'm not at all convinced that salinity is a dominant factor in determining the success of these young salmonids in the estuary. Are you?

Casillas: No.

Curtis: I'm not either. So it concerns me that we're spending a lot of time on the salinity model and we haven't got our eye on the ball. I'm worried about those shallow habitats, too, but rather than doing a dance, that's what we should be talking about. What do you need to define those shallow habitats?

Boesch: Well, if you're talking about altering the geomorphology of an estuary, the first-order question is how it would affect the salinity because that gives you indicators of a lot of other things.

Curtis: I understand. But is what they have on salinity enough? And accept that it's enough and say so. It's time to start talking about the things that we think are more directly involved with survival, or success, of these fish in the estuary.

SEI Panel Proceedings, Minutes of June 7, 2001 (emphasis added). This discussion highlights panelists' concern for the need to move beyond conceptual work to matters directly impacting survival.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 76

monitoring program for the Project provides only a starting point for baseline identification, but actual monitoring efforts would require the extension of the monitoring parameters at least as far out in time as the baseline assessment. This is perhaps the greatest weakness of the proposed monitoring and adaptive management program proposed by the Corps, which is especially troubling since the FSEIS proposes to defer all management decisions to the monitoring and adaptive management phases.

16. The Corps challenges CRANE'S comments on salmonid stomach content. An examination of the works cited by the Corps demonstrates that the Corps' conclusions about salmonid feeding preferences are likely the result of the fact that the mean fullness for any salmonid stomach is less than 1 percent (approx. 0.5%). We reiterate that it is unlikely that some of the species listed are preferred prey of salmonids. It is more likely that the importance of these prey items has been grossly overstated through low numbers of stomachs bearing prey and low numbers of prey in the few stomachs that are not empty. In addition, most infaunal benthic invertebrates, with the exception of mollusks, provide less consumable organic matter and correspondingly greater amounts of indigestible chitin; therefore they supply a lesser amount of food value than do epibenthic organisms such as mysids, or planktonic animals such as Daphnia. Furthermore, the Corps' assumptions about foraging strategy have been made without visible data support, indicating that its theories have not been adequately assessed, or even stated. NMFS's macroinvertebrate assessments were neither synoptic, nor comprehensive in their coverage of invertebrates because the sampling methodology used very small (3.25 cm) core samples; as a result, as mentioned in CRANE'S DSEIS Comments, the composition of the benthic community in the area was grossly undersampled, as only small, sedentary forms will be collected using this gear.
17. The SEI transcripts reveal that the panelists did not consider models for temperature because the Corps already understood that Project actions would lower water temperature by at least two degrees, and did not want temperature to be considered in any of the modeling. See SEI Panel Proceedings, Minutes of April 28-29, 2001. What effect did this modeling decision have on the Corps insistence in its Response to Comments that impacts on fish growth are related to

C.16: Juvenile salmonid stomach content analysis was based on several studies performed by NOAA Fisheries in the Columbia River estuary and not based solely on the NOAA Fisheries Lois Island embayment study. All these studies have indicated a similar preference for prey items. NOAA Fisheries' sampling methodology for benthic invertebrates is a well-documented and widely accepted method to evaluate benthic invertebrate populations. Small cores are a better way to assess population number and diversities of the benthic invertebrates that are prey items for juvenile salmonids. Core sampling allows a larger number of samples to be taken over a sample area than with a grab sample. The greater number of samples reduces the standard of error, and provides a better understanding of population numbers and spatial distribution. See also the Corps' Response to comments "'Eight species . . . occurred at depths of 16-20 feet.' DSEIS at 4-24," at Stakeholders/Special Interests at 78.

C.17: It was generally recognized at the SEI workshop that the river would cool slightly in some areas, to the extent that cooler ocean water would extend further upriver. This cooling was not considered problematic, and in fact is beneficial. Consequently, temperature was not considered a parameter of concern for modeling efforts.

This modeling decision had no effect on the Corps' evaluation of salmon growth.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 77

salinity rather than temperature, and the agency's resistance to models that instead focus on temperature? See discussion below at Section II(C)(18).

18. The Corps' Response to Comments takes issue with CRANE'S use of Fechhelm as an example of the influence of temperature and salinity on salmonids. See Response to Comments, at page Stakeholders/Special Interests-80. This response to CRANE'S comment fails to understand important and fundamental concepts of fish biology.
- First, the general concepts of euryhalinity and stenohalinity provide absolutely no illumination in this case. The range of salinities that these fish are able to tolerate, and the range occurring in their environment, are far more important elements. If a fish is less tolerant of salinity, as is the case for broad whitefish (compared to juvenile estuary-inhabiting salmonids), the negative impact on growth should be greater than it would be for a salinity-tolerant fish, as the intolerant fish is expending energy that could be used for growth for osmoregulation.
 - Second, if a fish is less euryhaline and encounters more saline water, the same thing should occur. Coregonids are at least salmonids, unlike the zebra danios being used by the NOAA-Fisheries Northwest Fisheries Science Center to determine the effects of toxic chemicals on endangered salmonids. The purpose of using phylogenetically similar organisms is to decrease uncertainty between measurement endpoints and assessment endpoints; thus, use of phylogenetically similar organisms is clearly preferred under the Ecological Risk Assessment principles. Thus, we can expect that responses to salinity from phylotogenetically similar fish provide data with less inherent uncertainty and more likely reliability than studies that compare phylotogenetically dissimilar species.
 - Third, the study stated that it took place during the growth period of the fish, which is in summer. Therefore, extreme winter conditions were not present.
 - Fourth, salinity in the study area varied from 0 ppt to 30 ppt, with temperatures from 3-18 degrees Celsius-conditions as variable as the Columbia River.

C.18: The Corps has reviewed CRANE's response concerning the Fechhelm study. The Corps continues to believe that the study, which was co-authored by CRANE's consultant, is of very limited relevance.

As stated in the Corps' prior responses (FSEIS, Volume IV at Stakeholders/Special Interests, p. 80), the comment references the Fechhelm study for the proposition that a study of salmonid fish in the Sagavanirktok River estuary in the Alaskan Beaufort Sea suggests that temperature plays a more important role in growth than salinity. The Fechhelm study, however, has limited relevance to the Columbia estuary for several reasons. First, the study involved the growth rates of broad whitefish (*Coregonus nasus*), which is known to be less euryhaline (less able to live in waters with a wide range of salinity), and is a distant arctic cousin. Second, this sampling for this study was conducted in the Beaufort Sea, in the Arctic region of Alaska, where saline levels would be expected to be less variable than in the Columbia River. Third, the study reports that the broad whitefish spends as much as nine months under the ice in the rivers and lakes of northern Alaska. Page 2. This variation in temperature regions is vastly different from the temperate Pacific Northwest. Fourth, the study area was a delta consisting of a shallow shelf (≤ 1.5 m deep) that extends seaward for 3-4 km. Thus, it is by definition a highly saline environment. Fifth, because of the shallow study area, temperatures remained fairly constant. Page 5. Finally, the study area has significantly more drastic swings in available daylight-from 0 hours in the winter to 24 in the summer.

Although the researchers concluded that temperature played a greater role than salinity in growth rates of yearling broad whitefish, they found that the minor association with salinity may have been an artifact of the inverse relationship between temperature and salinity. Page 7. They also found that salinity could not be discounted as a controlling factor, as other variables may have masked its effects in the model. Page 10. British Petroleum apparently funded the monitoring program for this study, which was intended to have direct application to assessing impacts of oil and gas development in the Arctic.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 78

- Fifth, the Corps' comments about daylight swings are not relevant, as the fish are dormant during the winter.
 - Sixth, even cursory examination of the regression lines would have demonstrated that the association with salinity was extremely minor, even when evaluated alone. The fact that salinity could not be discounted did not take away from the dominant role that temperature played.
 - Seventh, statements suggesting that the Sagavarnirktok River delta is not an estuary are not supported by fact. The Sagavarnirktok River mouth flows into the sea, forming an estuary that meets the definition of "estuary" every bit as well as the Columbia River.
 - Finally, this study appeared in the peer-reviewed, published literature, unlike many of the documents cited in the FSEIS.
19. The Corps rejects CRANE'S contention that habitat value and assessment should occur on a landscape matrix scale. CRANE reiterates that best available science strongly supports the use of a landscape-level process to truly understand the functions of the components of an ecosystem, and has since the publication of Wien's paper in 1989. See John A. Wiens, "Spatial Scaling in Ecology," 3 Functional Ecology 385-97 (1989) (attached as Exhibit 23). The agencies have ignored this accepted scientific approach, which should have been adopted and formed the basis of all environmental review at the Project's outset. As CRANE has stated in its previous comments, the Columbia River is an extremely dynamic environment. The Corps' FSEIS and underlying environmental review documents have failed to demonstrate that the *Corps* or other agencies understand this dynamic environment's workings in any meaningful way. Adoption of the landscape approach is essential in a dynamic system of this kind. See, e.g., Carolyn T. Hunsaker and Daniel A. Levine, "Hierarchical Approaches to the Study of Water Quality in Rivers: Spatial Scale and Terrestrial Processes are Important in Developing Models to Translate Research Results to Management Practices," 45 BioScience 193-203 (1 995) (attached as Exhibit 24). Especially in light of the already degraded conditions of the River and estuary, "expert opinion" cannot

C.19: The Corps' disagrees that it or the other agencies fail to understand the dynamic environmental workings of the lower Columbia River. Further, the Corps understands the context of landscape ecology as it pertains to the lower Columbia River and the numerous factors that influence its presence and restoration.

The Corps, in association with State and Federal agencies, have conducted a multitude of interdisciplinary studies to better understand the environment in which the proposed action would occur. These studies are either presented as appendices to or their information was incorporated into the text of the EIS and SEIS for the proposed action. The cumulative impacts analysis in the 1999 Final EIS, 2003 Final SEIS, Exhibit J to the 2003 Final SEIS, 2002 Biological Assessment, and other documents examines the landscape ecology of the lower Columbia River and document the extremely altered condition of the environment. Pertinent examples are the nearly 84,000 acres of Columbia River floodplain/tidal habitat now isolated from the river's influence by flood control dikes and the 20,000 acres of associated urban development, plus the substantial acres of agricultural development that has led to the cumulative loss of 51,997 acres of wetland/marsh and 27,004 acres of forested wetland habitat. The remaining habitat, either riparian forest or wetland, is typically fragmented and often linear in fashion along the edge of the river immediately outside the flood control levees. See, e.g., Final EIS at Section 6.12.

The representatives comprising the interagency HEP team purposely chose to focus on wetland and riparian forest habitat development in the context of the wildlife mitigation effort as these habitats were most reduced by the development that has occurred along the lower Columbia River and currently represent small percentages of their historic total acreages, i.e., when they had dominated the landscape ecology of the lower Columbia River. The Corps is also aware of the numerous efforts, such as that being pursued by LCREP, to identify habitats along the lower Columbia River, to determine those habitats important to key species such as salmonids, and to prioritize habitat restoration projects. The Corps also recognizes that opportunities to acquire property for tidal wetland restoration is profoundly limited by factors such as the overwhelming majority of lands in the lower Columbia River floodplain in private ownership, diking districts, and rules and regulations of city, county, state and federal governments that discourage restoration.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 79

replace detailed baselines and descriptions of processes as bases for management decisions.

20. The models employed in the FSEIS continue to suffer from a lack of verification. See DSEIS Comments, at page 2 1. Review of the SEI panel transcriptions reveals that verification was a key issue for the panelists, who raised some of the same concerns that have been raised in CRANE'S previous comments:

Boesch: **So the question remains is the modeling good enough for the objectives.** Cathy pointed out, 'Don't think only about salinity objectives.' **You have to ask that question, 'Is it good enough?' rather than, 'Is it as good as it can be?'** **Because that may be something everyone would like to achieve, but it may not be necessary to answer these questions.**

Baptista: For a very different type of change, much more substantial than what we are talking about here, I will show tomorrow some results that indicate that changes for the higher range of river discharges may actually be more significant for the river than for the lower range of river discharges. Again, I'm not a biologist. I'm a physicist, interpreting data and putting it in a context that fisheries researchers seem to understand

Bartell: Rob, you keep calling this a screening calculation. What would you do to the model to take it beyond that characterization?

McAdory: **I'd want to verify it against a large data set.** I don't know if there's one thing you could do; the more data you compare it to, the more time you take to run it, and the more detailed it is. Things like that. There does come a point when you feel like to answer whatever questions you have, you're wasting your clients' money. But for the purposes for which it was designed, I feel it adequately answers the questions. I'm not sure I'd do anything to it. We're just trying to understand what the order of magnitude of salinity changes are coming up due to this deepening, and then let a biologist tell whether that's important or not.

Bartell: How deep would the channel have to be before you think could lighten up the system in terms of salinity?

Berger: By the way, I don't know what the actual depths were run here, but it was more than the three-foot deepening.

McAdory: Yeah, it was eight feet because we assumed there was going to be maintenance. I don't know, if you made it deep enough, you might make it very hard for that salinity to get out at all.

C.20: CRANE cites to a SEI panel discussion on the Corps' hydrodynamic and salinity model. This discussion relates to that model's development and what the modeler would need to do to take it beyond its original purpose as an initial study of project effects on the estuary.

The hydrodynamic and salinity model is a three dimensional model that calculates parameters throughout the water column, allowing analysis of stratified situations, which are common characteristics of an estuary. The modelers, Dr. McAdory and Dr. Burger worked with both state and federal resource agencies to receive input and develop a consensus about the process before proceeding. None of the agency representatives, however, expected large changes to the estuary based on their past experiences with dredging activities in the Columbia River. Because its results matched data in the Columbia River Atlas, and other flow information, agency representative deemed the model adequate. The agencies agreed that a more detailed, rigorously verified model would not provide significant additional value. The Oregon Graduate Institute developed and ran an independent model of salinity in the estuary to determine the project's effects on salinity in the estuary. This second, independent model confirmed the results of the Corps' model. Finally, the passage referred to by CRANE in the SEI Molding Meeting Minutes of April 28-29, 200, is Dr. McAdory's answer to what he could do to the model to take it beyond a precursor study. In that same paragraph, Dr. McAdory states the model was appropriate for the task: "But for the purposes for which it was designed, I feel it adequately answers the questions. I'm not sure I'd do anything to it."

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 80

Berger: At some point, you're getting pretty far away from verification, and you're putting a lot of confidence in whatever turbulence model you've got behind this thing. Well, of course, it gets turned off when you stratify it. If you get away from verification, I think you can get in trouble.

McAdory: In this case, if you really look at the places where dredging is proposed and how much different that is from where they are, especially after they do maintenance dredging now, you're talking about an extremely small change to the cross-section of the system to all aspects of the system. I don't think anybody expects large salinity changes in the boundaries for these minor changes, given that everything else is the same. **However, we're perfectly willing to be surprised and we do find some surprising results occasionally.** For instance, your question instead of making it deeper had been make it a lot wider, then Charlie [Berger] would've given you some another answer from something we learned recently. So, you start off with some idea of where you're going, but you don't always get where you think you're going. So, I think the results are reasonable, and if we're still talking about whether we should invest more in the salinity order of magnitudes, I'm not sure I'd do it a whole lot differently.

See SEI Panel Proceedings (emphasis added). This discussion indicates that model verification is important (see also Naomi Oreskes, et al., "Verification, Validation, and Confirmation of Numerical Models in the Earth Sciences," 263 Science 64 1 - 46 (1 994) (attached as Exhibit 25)), has not been done, and that the system is variable enough to surprise even the modelers. Based upon the transcript above, the SEI panelists clearly did not necessarily expect the system to perform as modeled.

21. The Corps responds to CRANE comments about the potential for an ETM shift by concluding that "[t]he effect of the potential shift in ETM location on distribution of nutrients in the estuary is expected to be so small that it cannot be measured. These potential effects to the ETM are not anticipated to measurably effect salmonids." See Response to Comments, at page Stakeholders/Special Interests-80, 83-84. This is not responsive to CRANE'S comments and inquiries regarding the ETM. CRANE continues to note that the timing of any shift in the ETM may change related biological functions considerably. The Corps simply states that the associated biological changes would be unmeasurable and without consequence, but offers no supporting empirical data and no model runs. This provides one of the more egregious uses of best professional judgment, and is just one of a number of "armchair" biological assessments that appear in the FSEIS and

C.21: In the Columbia River, as in other large rivers, tidal processes and river flow result in a zone of increased turbidity, the Estuarine Turbidity Maximum (ETM). The turbidity in the ETM is the combination of both the concentration of suspended organic matter and the resuspension of organic and inorganic matter from the bottom. The length of the ETM is typically 0.6 to 3 miles. The position of the ETM in the Columbia River ranges between RM 9 and 18, from Youngs Bay to Tongue Point (Simenstad, 1994). 2001 BA at 6-19. Salmonids benefit from the distribution of nutrients out of the ETM. See 2001 BA at 6-18. Tidal forcing processes that influence salinity intrusion into the estuary effect the location of the ETM. Consequently, it was important to determine the change to the salinity profile as a result of project modification, which affects where the ETM is located.

The Corps quantitatively analyzed the effects of the project on salinity, and found it to be small. This result was independently verified with a second modeling effort that was presented to the SEI panel, and the panel agreed with the physical modeling efforts. See 2001 BA at 6-18; SEI Meeting Minutes, August 28-29, 2001. This modeling demonstrated that changes to the salinity regime were small. See 2001 BA at 6-20. This small impact on salinity intrusion, which effects the location of the ETM, was determined to be insignificant. *Id.* Finally, the Corps is required under the terms and conditions of the NOAA Fisheries' Biological Opinion to conduct a workshop on ETM to be held in conjunction with the detailed analysis of the Anadromous Fish Evaluation Program habitat data that will be collected in monitoring action MA-4. This information will assist ETM workshop participants to assess any effects to the ETM.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 81

that should not, in all scientific conscience, be made without quantitative support. The FSEIS's biological/ecological analysis assumes, unrealistically, that as long no change in the magnitude of an event occurs, changes in duration and intensity, and timing also do not matter. The FSEIS fails to offer credible responses to any of these comments.

22. The Corps takes issue with CRANE'S previous comments noting that the Corps' conclusions regarding the effects of Channel Deepening on habitat productivity and food webs appear to be based on the assumption that small or no changes in the physical environment. See Response to Comments, at page Stakeholders/Special Interests-71. The Corps points to the difficulty of predicting biological changes from small physical changes, but notes nonetheless that "because the models had predicted change and there is some uncertainty over the potential for long-term effects, a monitoring program is being developed in cooperation with the agencies to assess any potential long-term changes." Id. The Corps concludes that "[i]n the event the monitoring program shows a detectable change, it will be brought to the adaptive management group." In addition to reiterating CRANE'S previous comments on this subject, we note that the Corps admits that its quantitative baseline is lacking. In the absence of quantitative baseline information, the Corps and the ATM are incapable of making quantitative determinations regarding the relative importance of any particular ecosystem element to the function of the system. Without quantitative baseline information, monitoring is worthless because change cannot be detected if baseline levels are not understood. In addition, review of the SEI transcripts reveals that this issue of quantification was of particular concern to the panelists:

Bartell: The other issue was the location of ETM.

Casillas: Right. To me, that's a general sort of question about estuarine function. Again, the linkage to salmon would be somewhat distant. **One way to look at would be to say, 'If the ecosystem is operating properly, then it's to the benefit of salmon.' How we qualify and quantify that with that measurement is a bit shaky at this stage.** But I would ask Karl (*Eriksen*)—one of the original questions I had—on the input of sediment and the sediment change, how do you think that affects the ETM per se? Is it driven by what's coming into the system? Do you have any sense of that? You know, the reduction we have of 5.3 to less than

C.22: See the Corps' response to this comment regarding the adaptive management program at the beginning of our response to Section II.C.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 82

I over the past 30 years, shall we say. Do you characterize that as having some impact on the ETM, and do you know that it has or hasn't?

Eriksen: No, I don't know that it's had any impact. ETM is essentially the turbulent front of the salt wedge, and it might lower the concentrations a little bit, only of sediment ...

Casillas: But would that be something that we want to go after as one measure from general ecosystem health?

Boesch: **The sediments in the ETM are basically recycled sediments, they're re-suspended sediments, they're not necessarily sediments that are being actively put out at that time. Secondly, the biological importance of the ETM, at least based on studies elsewhere, has very little to do with the fact that it's a TM. It's that the physics, which creates the ETM, also is important in aggregating larvae and food, and things of this sort, independent of what the turbidity is in that particular system. So it's a coincident thing that the physics that results in a turbidity maximum has biological significance.** So, the question is, 'What do we know about the effect of changing channel morphology on the location of the ETM and the characteristics of it?' As a physical phenomenon, and not just the fact that it's high turbidity.

Tortorici: When we raised those issues about the ETM, that's what we were driving at. Is a physical change in the system going to affect the ETM, and if so, in what manner, and what can we say about that? **And whatever that change is, large or small, then how do we value that change as insignificant, more significant, whatever.** We had taken a look at the modeling input-output table as it was being developed. If you look at the left side of the column, it talks about hydraulic parameters of concern, and I'll just read them off: Salinity, ETM, surface water elevation, depth, velocity, shear stress, suspended sediments, and temperature. In having our in-house discussions, we thought that the top five to take a look at from a modeling standpoint would be salinity, surface water elevation, depth, velocity, and temperature. And then following that, in a more nested sense, suspended sediments.

Goldman: **I wouldn't agree on the suspended sediments from what we've been finding in the Bay Delta. It's a major factor in the fertility of the system. I think it ought to move up in priority, right toward the top.**

Casillas: Did I hear you correctly? You were saying to elevate suspended sediments?

Goldman: **Yes. In terms of importance. One thing, you've got automatic filter feeders in there and they take in sediment, along with any organic detrital material that they can use for food. If you've got more suspended sediment, they get less nutrition as they pass food**

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 83

automatically through their guts. Plus the euphotic zone is so greatly reduced by turbidity. In fact the Bay Delta system, according to the most recent studies, is really limited by turbidity.

Boesch: I think there's no question that primary production in this estuary is limited by turbidity, too. I guess the point in hand is the degree to which we think changing the morphology of the lower estuary by deepening it by three feet is going to change the suspended sediment distribution.

Boesch: **Just listening to Ed's presentation and the critique of the salinity model, I agree that the focus on salinity is a response variable which, in terms of affecting the salmon alone, is a very unidimensional analysis when, in reality, these organisms are responding to a lot of other variables. . . .**

SEI Panel Proceedings, Minutes of April 28-29, 2001 (emphasis added).

23. The Corps relies heavily on the “peer-review” process offered by the SEI panel. See, e.g., Response to Comments, at page Stakeholders/Special Interests-79 (“Contrary to the comments the conceptual model has substantial verification as it is based on multiple empirical studies. . . . [T]he comments concerning reliance on ‘professional judgment’ badly mischaracterize the peer review process through which the conceptual model was evaluated extensively by a nationally recognized scientific panel assemble by SEI as well as by scientists at NOAA Fisheries and Corps who have substantial expertise about the Columbia River.”). Despite this comment, we note the following pertinent discussion from the SEI panel proceedings:

Courtney: **The group also heard the panel's suggestion that you adopt as quantitative and as explicit an approach as possible.** Nevertheless, the panel understood the use and the need for a conceptual model that will tie things together. We heard some interest in hearing more about upstream areas. Also heard a suggestion in terms of prioritization of the concerns raised during the consultation documents and the reconultation process. Suggestion that we go through Document 2 in light of the conceptual model. Put on record that the regulatory agencies need to have ALL of that addressed, even though we may elect to try to deal with the things that are most burning. Nevertheless, from a process point of view, regulatory agencies are going to want to see all of those things considered.

C.23: See the Corps' response to this comment regarding the conceptual model at the beginning of our response to Section I.L.C. CRANE again mischaracterizes the SEI workshop meetings on several fronts. First, CRANE cites the wrong meeting date for its quoted material. This discussion occurred during the April 28-29, 2001 Modeling workshop. Second, only one person quoted is an SEI panelist, Dr. Thomas Dunne. Steve Courtney works for SEI and was the workshop facilitator. Ed Casillas is a scientist with the NMFS Fisheries Science Center, Kim Larson is a fisheries biologist with the U.S. Army Corps of Engineers. Third, again, this discussion is cited out of context. The workshop participants are discussing the underlying data for the conceptual model. CRANE's assertion that Kim Larson's comment was unsupported by either the panelists or the data is without merit. Omitted from this discussion, is Dr. Dunne's appraisal of the data collected for the *Oceanography* article. He states that it was sufficient and in-depth. Also omitted are the comments of another SEI Panelist, Dr. Donald Boesch who also stated that there was large quantity of available information:

I'd like some ground rules – you should have to tell us two things . . . before you say “we don't know”! We have a **tremendous amount of information here, and it's actually quite a lot of knowledge.** It's not perfect, but we ought to be looking at the key thing in this body of knowledge that provide the uncertainties that we need to try to resolve [] the disputes. Broad platitudes about what we don't know and would like to know are not helpful.

SEI Transcripts, April 28-29, 2001.

The discussion, when viewed in context, demonstrates that the workshop participants were doing exactly what the SEI Panel was hired to do: determine whether the Project was based on the best available science, through scientific discourse such as this.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 84

Casillas: From a general perspective, I don't think there's much disagreement. The issue is how much data exist to support the underpinnings of those particular processes in this system. We don't have the information about how processes support salmon. The Progress in Oceanography volume is based on one year of data. The system is very dynamic, so it's unlikely that one year of data will characterize the system in an effective way.

Dunne: What you're uncertain about are the rates of the processes that are represented by the arrows. And you're saying that is it that one side of the debate estimates that a certain arrow may be either not quantitatively important, or would not be quantitatively affected by the dredging process, and the other side of the argument says we don't know that?

Casillus: I think it's more fundamental than that. It's not a question of the arrows.

Larson: There is a lack of knowledge, but there's also a fair amount of knowledge on how these processes go on. There's a fair base of knowledge, which our EIS and BA were based on. Like Ed (Casillas) says it's not a conclusive array of knowledge, but it's still enough to move ahead with an assessment of what we feel the impacts would be.

SEI Panel Proceedings, Minutes of May 15-16, 2001 (emphasis added). This exchange among the panelists demonstrates that Larson's comment is not supported either by the panel or by the data. It is likewise clear that Casillas feels that *no evidence* exists to support the conceptual model's predictions, which is not surprising, since the conceptual model was not based on synoptic data collection, if indeed there was any data collection at all.

24. The Corps states that “[t]he conceptual model functioned well in helping to ensure that parameters and linkages between parameters were considered. Contrary to [CRANE comments], the analysis was done using best available scientific information pertinent to the Columbia River system and channel improvement project.” & Response to Comments, at page Stakeholders/Special Interests-79. As CRANE has noted in its previous comments, a quantitative model based on the Adaptive Environmental Assessment and Management (“AEAM”) protocols would have provided a much stronger modeling base. These protocols would have yielded a model capable of determining sensitivity of model parameters and predicting outcomes, and would have supported a true adaptive

C.24: See the Corps' response to this comment regarding the conceptual model at the beginning of our response to Section II.C.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 85

management program. Furthermore, we note that Walter Pearson of the Battelle Marine Sciences Laboratory provided an overview of the conceptual model to the SEI panel, including a description of how the model would be used to describe ecosystem function and interactions relative to effects of the Project on fish. The panel questioned exactly how the model addresses the effect of the Project on habitat opportunity. Pearson responded as follows: “This information is not the analytical tool for the quantitative analysis. This is a tool to help us organize the information, and at some point figure out what’s important to look at analytically.” See SEI Panel Proceedings, Minutes of May 15-16, 2001.

25. As noted in CRANE’S previous comments, the FSEIS continues to fail to provide appropriate sensitivity analyses. The mere existence of a biological process and potential linkages does not determine the value of those processes and linkages to fish populations. Without a determination of sensitivity, the Corps cannot draw linkages between salmon and the Project’s effects and cannot properly evaluate or predict Project effects. We note that the SEI panel raised these concerns in its review of the conceptual model:

Boesch: Having said that ... I’m trying to reason aloud ... **I think the process among the agencies could be better informed by sitting down and specifically identifying those parameters that NMFS is concerned might be changed as a result of the channel deepening. Then examine the evidence, have a discussion, have a debate, and then come to some specific resolution rather than a general view that we don’t understand the periphery well enough.** Well, what is it about the periphery in terms of those key environmental characteristics that we have less than adequate confidence about? And how can I convince you that that won’t be affected, or alternatively, what further analysis can we do to MITOW that uncertainty?

Courtney: I’d like to point your attention to the third bullet, which is what sort of variation should we look at? High flow, low flow ... Should we also try to see that in terms of annual variation? Are there other things we need to consider? Temperature of the water coming down? How would we try to get a handle on looking at several factors at once. There are well-tried techniques of sensitivity analysis which do exactly that. And partition variance in terms of inter-annual, or daily, or seasonal, etc., tidal variation - would that be a useful exercise? And where one of the parameters would be channel deepening or not? That would then give you a context in which to understand how much of the variance would be associated with the channel

C.25: CRANE again mischaracterizes the SEI Transcripts. First, the discussion the commenter quotes occurred at the April 28-29, 2001 Modeling Workshop. Second, the workshop participants were not discussing the conceptual model—they were discussing the Corps’ numerical hydrodynamic and salinity model and appropriate parameters for that modeling effort. The text CRANE quotes simply does not support the comment’s contention that the SEI Panel raised concerns about sensitivity analysis. Dr. Dunne explicitly states in the text that CRANE quotes that direct modeling would provide more answers than a sensitivity analysis. The Corps performed direct modeling for crabs, hydrodynamics and salinity. See also the Corps’ response to this comment regarding the conceptual model at the beginning of our response to Section II.C.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 86

versus what I've heard from Rob's and Karl's presentations, which is that it's a highly variable system inherently.

Dunne: I think the pattern is more responsive to flow and to topography than it is to anything else—your exercise will not tell us anything we don't already know. **What we're still not getting our heads around, and I don't know whether it's possible, is that the biologists would say, 'Look, if you could predict patterns of temperature and salinity through that estuary at the following range of flows (and, by the way, the low flow can easily be checked by going to the USGS web site) ...**

Suppose for every month of the year, you've got predictions of temperature, salinity, etc. If you did that, you would know where all the flies are living, etc., and then you could say, 'Here's a kind of time series of flow in the Columbia, including its extremes, and here's how this project changes the volume of habitat, for example. Again, it requires the biologists to say, 'This is what these critters need.' It seems to me you'd get more answers out of direct modeling like that than you would by running a sensitivity analysis. I think we probably know what the answers are most likely to be sensitive to, and then when we know that, I don't think we're going to do anything about it. I would say that you want to be concerned about the effect of the channel averaged over some significant amount of time. That would take into account whether you lose a year-class, have a bad energy crisis, or low flow, and so on. We need to simulate a range of discharges that take into account these rare events. You want to do it for the purpose of answering the questions, where do the bugs live, and where can the fish survive, and so on. Not just isolate the sensitivity to a variant.

SEI Panel Proceedings, Minutes of May 15- 16, 2001 (emphasis added). This discussion illuminates the fact that in May 2001, regulatory agency biologists and physicists were still grappling with how to understand an unverified model of the Columbia River system, much less an actual entire system. With regard to the need for additional research regarding linkages, Casillas went on to observe:

Do I think we need more spatial resolution than was done? The answer is yes. And more emphasis on the periphery, as we said. And, as Antonio showed, if the simple divisions that he made that were based on the CREDDP study point to that the estuary responds differently to various forcings, and so at least that seems to be a starting point to make those divisions. We had talked in our discussions that maybe if there's another set of even further divisions that we want to make -- we haven't looked at that yet -- but that's something we may want to consider. If the time frame allows this, I don't know.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 87

SEI Panel Proceedings, Minutes of May 15- 16, 2001. Casillas identifies the criticism that CRANE has raised in several comment letters; namely, that best professional judgment cannot quantify changes, nor can it establish the ranges of variation that have influence. Actual data is needed to fulfill those objectives—data the Corps has not yet collected.

26. The Corps has not established monitoring and evaluation metrics. FSEIS, at page 6-16. Although the Corps has begun discussion of how additional data for monitoring will be gathered, no data-based numbers have been identified to guide monitoring efforts, nor has there been any discussion of the statistical techniques that will be used to compare the observed and expected results. Appropriate statistical analysis is the hallmark of competent study design. Furthermore, there has not been any indication that the Corps has considered the spatial and temporal variability associated with the as-yet unidentified outcomes. Without knowledge of this variability, it will be impossible to determine whether a change that occurs in any of the monitored elements results from natural variability, or is the result of the Project. The FSEIS contains no evidence that the study design will be crafted to reflect the unknown spatial and temporal variability, nor that sufficient statistical power will be generated to adequately determine whether monitoring goals are met. Based on the data provided in the FSEIS, it appears unlikely, if not impossible, that the Corps could engage in competent study design at this time. The ability to assess existing Variability and effect size (i.e., the amount of change in the mean values that will indicate that a significant change has taken place) is an integral part of power determination. All these steps rely on data collection—data collection that has not yet occurred. Even where data have been collected, their measurements are so out of date and insufficiently sampled as to make it virtually impossible to determine with an appropriate degree of certainty whether a change has occurred. Despite the Corps' statements to the contrary, the criteria presented in the 2001 BA and 2002 Biological Opinions fail to address this issue even peripherally. Indeed, CRANE lodged the same criticism against each of those documents. Still, the Corps could have simulated the linkages and processes with the extremely sparse and grossly out-of-date data sets it did have available. Even with the extremely high levels of uncertainty associated with these data sets, the resulting quantitative model would have been infinitely better than the complete

C.26: The conclusions of the EIS, BA and SEIS as well as the SEI workshops and the Services in their BiOps are that the project impacts are expected to be small. This conclusion arises from physical modeling that was subsequently verified with a second, independent model that was presented to the SEI panel. The corresponding monitoring program logically flows from these conclusions. Details of the monitoring plan, which has been approved by NOAA Fisheries and US Fish and Wildlife Service, address monitoring and evaluation metrics, and are available on the Corps' website at <https://www.nwp.usace.army.mil/issues/crcip/implementation.htm>. The Corps will maintain three hydraulic monitoring stations for seven years: two pre-construction, two during construction, and three post-construction. The data will be analyzed to verify that the level of physical change predicted by the numeric models are not being exceeded. See, Implementation Plan, Terms and Conditions 3a, Monitoring Action MA-1. The data set that these will be compared against is current and has been ongoing for several years and will provide a more than adequate data base against which to compare post project changes. Had the Corps determined a specific impact was likely to occur, we would have designed a monitoring program specifically to monitor that impact.

The other evaluation actions (EEA 1-6) are not designed as monitoring programs or to assess project impacts. Rather, the evaluation actions are designed to collect additional data and will assist the efforts of the Corps, the Services, and others in enhancing understanding of the lower Columbia River ecosystem and will advance the knowledge base for the recovery of salmonids.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 88

lack of any quantifiable and verifiable conclusions associated with the conceptual model. See, e.g., Carl J. Walters, et al., "Ecosystem Modeling for Evaluation of Adaptive Management Policies in the Grand Canyon," 4 *Conservation Ecology* 1, at <<http://www.consecol.org/vol4/iss2/art1> (2000) (attached as Exhibit 26) (demonstrating application of the modeling process successfully to Grand Canyon water release).

27. The SEI panel also raised concerns about the Corps' lacking base of knowledge and the concomitant problems associated with developing a monitoring program:

Courtney: It sounds to me at the end there that you're making a pitch for what needs to be monitored. You talked about your various metrics. Is there anything in your proposed metrics that we've got information on that can be used in helping us evaluate the impacts of this proposed action? Or are your metrics essentially things that we should be looking at in the future?

Simenstad: The ability to predict potential change is key because of salinity restructuring on benthic communities and vegetative habitat in key locations like the interface at Cathlamet Bay. In other words, if that interface moves appreciably, there's going to be a response by the benthic and vegetative community. Trying to predict that I think is quite important.

Boesch: What sort of salinity changes would be meaningful in shallow water?

Simenstad: Overlaying benthic community structure with the salinity structure from the CREDDP studies, it would suggest that the mean isohaline would be an important feature. The important thing is how good is our ability to predict that in shallow-water habitat because that's where the critical change is going to be.

Boesch: Question from the last workshop as to whether the model is accurate for Cathlamet Bay. In answering my question just now, you talked more about mean condition, rather than low flow, high flow.

Simenstad: More the means rather than the extremes that sets the vegetation and benthic community.

Boesch: So a model of extreme low-flow conditions might be useful? (Yes)

Quinn: What are the physical things that are likely to be connected to these metrics?

C.27: We disagree that uncertainty and incertitude have not been reduced in the Columbia River estuary. According to Chechile and Carlisle (1991), ordinary uncertainty occurs when one has all the information, but is uncertain about what will occur in the future. Incertitude occurs when we do not have all the information, such as not knowing all the factors that are involved. Incertitude can be reduced by obtaining unknown information. Research has been conducted in the estuary since the early 1970's, and is ongoing. The reconsultation process reduced incertitude regarding potential project impacts through additional modeling of physical changes associated with the Project, and through developing a better understanding of the Columbia River ecosystem and how it functions. All ongoing research and additional information will further reduce incertitude relative to the Project.

Similarly, uncertainty regarding potential project impacts has been reduced through developing a better understanding of the Columbia River ecosystem and how it functions, and therefore how it might respond to physical changes associated with the project. The analysis of the Corps, NOAA Fisheries and US Fish and Wildlife Service generally demonstrated only low to moderate levels of uncertainty associated with this project. This analysis is entirely consistent with the conclusions reached by the SEI panel. See SEI Science Panel Final Workshop, August 28-29, 2001, Transcript of Discussions.

The Corps, NOAA Fisheries, and the USFWS reached their conclusion that the project would have no significant impacts on the Columbia River estuary after a long-term evaluation process, ending with reconsultation under the ESA. The reconsultation process began with the retention of the Sustainable Ecosystem Institute ("SEI") to assist the agencies in framing the scientific issues and providing them with an independent, scientific, peer review of the scientific basis of the project. A Biological Review Team ("BRT") made up of federal representatives (NOAA Fisheries, USFWS and Corps) was formed for the consultation process. The BRT met weekly for approximately 8 months to address biological concerns, and to identify ecosystem restoration features and evaluation actions to further resource recovery and enhance baseline information on ESA salmonids and their habitats. FSEIS at 1-5. The team also reviewed the project's potential effects. 2001 BA at 6-1. The Corps performed a careful analysis on a suite of analytical data to determine project impacts. This data is listed in the 2001 BA at 13-1. The quantitative data underlying the Corps' conceptual model is listed in the 2001 BA in Appendix E.

In reaching its conclusion of no significant impact, the Corps looked at changes in depth, velocity, and salinity, using two numerical models to assess what level of physical changes would occur from the three-foot channel deepening. The Corps and resource agencies evaluated this information through the BRT. The first model indicated very small changes to the salinity regime. A second, independent salinity model was conducted by the Oregon Graduate Institute, and it confirmed the Corps' modeling results. Based on these findings, the Corps' biologists, relying on their years of experience working directly on the Columbia River and with its species, next determined that these small changes in salinity and hydrodynamics would not cause a significant biological change to the system. As reflected in the 2002 BiOps, NOAA Fisheries and the USFWS concur with the Corps' conclusion. Similarly, the Oregon and Washington Clean Water Act and CZMA approvals reflect the states' concurrence with the Corps' conclusion.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28,2003
Page 89

Simenstad: The physical changes, the attributes, that are going to be most important, are the vegetation and the benthic communities in those systems.

Whitney: The real challenge is to explicitly link these measurable metrics in terms of diversity of landscape to capacity in say . To me, that's the challenge, to relate it to a model such as CRI. You want to link your landscape attributes to capacity as well as to productivity.

Simenstad: I don't think you can disconnect opportunity and access because the physical environment will potentially limit access to capacity. Just measuring capacity won't necessarily reflect actual access.

Whitney: I guess my point is ... At what point in your exercise do you explicitly link these measurable attributes of salmon life history...

Simenstad: Basically, I think you have to do that empirically to determine what the timing and characteristics of different life history types that occupy those various habitats in various regions through that system. I don't think we can extrapolate; we just do not have data at that level. We really don't know what the timing, the life history structure, and what the habitat utilization is that we could use to build that linkage.

SEI Panel Proceedings, Minutes of May 15,2001 (emphasis added). Dr. Simenstad's comments reiterate his comments at the 1997 Symposium dealing with the Columbia River estuary. See generally Simenstad, "Relationship of Estuarine Primary and Secondary Productivity." Namely, scientists did not know any more about the Columbia River estuary in 2001 than they did in 1990 during the first Columbia River estuary symposium. Furthermore, even the studies comprising the 1990 knowledge base were significantly limited by the fact that they were based on a single year's sampling. See, e.g., Bottom and Jones, "Species Composition, Distribution, and Invertebrate Prey"; Jones, et al., "Community Structure, Distribution, and Standing Stock." This fact directly contradicts the Corps' assertion that uncertainty regarding the estuary has been reduced, and makes even clearer that incertitude also has not declined with the passage of time.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 90

28. CRANE has offered previous comments on the lack of information about prey utilization and habitat-forming processes in the estuary's dynamic environment. See DSEIS Comments, at 2 1. We note that the SEI panel raised similar concerns:

Boesch: I'd just like to say that you [NMFS] don't really have a choice but to try to understand the present-day relationships between the fish and the habitats and then assume that the values are the ones you're going to manage for. I'm actually, despite other lines of questioning, fairly optimistic about being able to tackle that. Already you've had Dan's [Bottom], Antonio's [Baptista], and Si's [Simenstad] analysis of the historical changes -- trying to model historical changes in depth and flow -- very valuable to understand that in the long term. You have the analysis, some of which Si showed in terms of the changes in the desirable habitats in terms of wetlands and so on. So, I think we have a strong basis of reasoning that those are valuable as opposed to some of the alternatives.

The question that I have, though, is that one of the things about estuaries, the common pitfalls that people get into in trying to understand and manage them, is that they think they're static features. And really they're quite dynamic and phemeral. Inherently, they're about change. I would urge you rather than always thinking about the past, to think about the future in terms of what are the opportunities to manage for positive values with the changes that are taking place.

Case in point: Si talked about the deposition that's taking place on the tidal flats. The point is to think about the future in terms of the changes that would be taking place in that context. Channel deepening maintenance is just one of those changes. Then determine where are our opportunities to manage those processes constructively for the value of the habitat. Rather than always thinking about we want to reconstruct some picture of the past. It's Dorian Grey; you're not going to get there.

Casillas: In terms of characterizing habitat change, we think much further, in an integrated sense.

The question will be, and we understand the difficulty is really trying to arrive at the crux of the biological consequences of those changes. That is where we all agree we will have difficulty, but we will feel much better. For instance, if the outcome in an integrative evaluation of a physical set of matrices is evaluated, and we find that there is no change by however you evaluate it, we'll feel much better from that perspective. It won't answer the question that there won't be any impact, but we'll feel much better to let the project proceed with some monitoring going on. But, on the other hand, if we in fact see some differences with an integrative set of physical attributes that we see does in fact change in response to this

C.28: The primary tool used to assess impacts in the estuary was to evaluate potential changes in physical parameters using a numerical model. These physical changes, if significant, would then be used to assess biological changes. The results of the model runs conducted both by the Corps and independently by Oregon Health Sciences University/Oregon Graduate Institute as part of the SEI workshop indicated a very small change in the physical properties related to the three-foot deepening. This conclusion is consistent with opinions expressed by the SEI panelists. See SEI Meeting Minutes, May 14-15, 2001 (discussion following Antonio Baptista's update on physical modeling); SEI Meeting Minutes, July 14-15, 2001 (Cody: "Plus the physical models were fairly convincing; the potential impacts of the project on those factors were pretty well understood."). Based on these results, both the Corps' and the Services' biologists opined that there would likely be only minimal impacts to the biological system. The SEI panel encouraged the Corps and the Services to implement both a monitoring program and an adaptive management component to address remaining uncertainty associated with the project. See Meeting Minutes, SEI Science Panel, Final Workshop, August 28-29.

The Corps and Services have implemented both a monitoring and an adaptive management program. See Implementation Plan (Terms and Conditions 3 and 4). The Services agreed that the monitoring of the CORIE stations (MA-1) would be the principal indicator to verify the numerical modeling results, and that the independent, long-term biological research study being done under the AFEP program would provide a mechanism to evaluate project impacts. In fact, Casillas, in the quote the comment cites from the SEI workshop, agrees with this approach by saying "if the outcome in an integrative evaluation of a physical set of matrices is evaluated, and we find that there is no change by however you evaluate it, we'll feel better from that perspective. It won't answer the question that there won't be any impact, but we'll feel much better to let the project proceed with some monitoring going on."

The Corps has responded previously to CRANE's allegations related to the conceptual model. See Response to comments at the beginning of our response to Section II.C.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 91

evaluation, or this impact, then the question becomes how do we evaluate that in a biological context. And there is no clear way yet other than to develop a weight of evidence from the information we know as to how to interpret that information. That will be arrived at probably by regional consensus of those experts who have appreciation of the problem and the situation to gain a better understanding for the agencies, then to proceed and make a decision of how they will go.

CRANE has argued in its previous comments and continues to assert that the only way to “feel better” about the decisions made is to have sufficient understanding of, and quantitative data on, the ecosystem in question.

Dunne: You say we’re not going to get to the level of uncertainty reduction that we all feel ... science just doesn’t do that. Can you say these are the things we need to know before we feel better.

Casillas: That’s the question I’ve been wrestling with for this project - how will we know if we should or shouldn’t feel better? What we did in the report that we recently finished is to develop a family of curves to describe how the system responds in relation to physical features that we think are important over a variety of different conditions and ask the question, ‘What has changed?’ If we then impose this project on that evaluation, and ask, ‘Can we see any further change, or not?’

We know the system has changed through the modifications that have occurred over the past 100 years, and then we ask, ‘Did it change much more when we imposed this change on it?’ We can’t really resolve any change with the accuracy that we have. **I think at least two things: One, do we know that we can see change with the evidence that we have, which we have documented already under constraints that we’ve imposed, and two, that we will have evidence that no change will occur when we impose the proposed change in the system. Now the problem will be what happens if we do see further change in addition to the historical change? And that will be a dilemma for us.**

Courtney: Does the panel see the connection between the PFC and the conceptual model?

Boesch: It says here that it’s going to provide ‘descriptive and qualitative indications’ - yes, could do that - ‘of how historical conditions - no, not that I heard - ‘and/or a PFC’ - no because it didn’t give some specific indicators, criteria that were used in the other PFC example. So I’d say the conceptual model has a long way to go to meet two of the three expected uses.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 92

Tortorici: Fair enough.

Dunne: I'd like to get a sense of how you think you will be able to integrate PFC with this matrix.

I don't understand how you can incorporate historical conditions when they're so poorly, or incompletely, understood. We hardly even understand current conditions, let alone historical conditions. What's your strategy or timeline?

Tortorici: That's what we're struggling with. We're essentially using our best professional judgment of what's in the literature. What we need to do next is to send that around to the scientists in the region and ask them where can you get the information from to build those more detailed metrics? ***Because of the general lack of information, I suspect it's going to rely heavily on their best professional judgment. It's going to be an evolving thing. We're going to have to have more regional consensus and more peer review of it to make sure that the information that's being used in it is coming together from the group of scientists I realize it's not the most precise answer, but it's kind of where we're at. I really wanted to have this by the end of the year.***

Historically, there were certain habitat features that were important to the fish, and we have a sense of those I believe and so let's take a look at those features and try to use that information in some way to value what's going on in terms of current baseline and overlaying this project on top of it. I wouldn't say that we're trying to reconstruct historical conditions. We're just trying to learn from historical conditions as a methodology to help us with what we see right now.

The Corps does not address the panelists' concerns about the model's ability to provide descriptive and qualitative assessments of potential changes; furthermore, the transcript of this discussion indicates that the regulatory agencies were and are well aware of the shortcomings of the conceptual model (i.e., that it cannot be used for prediction, and that the Corps would be forced to rely on best professional judgment concerning the impacts because of its failure to craft a predictive model based on real data). Based on these failures, it is clear that the Corps simply does not have enough information to permit determination of the value of any habitats to the various juvenile stages of salmonids. The models cited by the Corps cannot determine actual impacts, but can only predict them in the loosest sense, and without scientific support. Until those models are verified, the Corps cannot provide a valid quantitative assessment of Project-related habitat loss.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 93

Nonetheless, the Corps' responses to comments repeatedly point to this unverified model as if its predictions are fact.

29. The FSEIS repeats problems associated with risk and uncertainty addressed in CRANE'S previous comment letters. See DSEIS Comments, at 21. In response to CRANE'S criticisms about the use of best professional judgment ("BJP"), the Corps quotes Holloway for the proposition that "some types of risk assessments require extensive use of BJP." Response to Comments, at page Stakeholders/Special Interests-85. Holloway never claims that BJP is science, which undermines the Corps' admission that it relies heavily on this method of assessment. The use of BJP yields results that are uncertain to an unquantifiable extent; reliance on BJP can, therefore, infuse a study with overwhelming uncertainty. The cited Holloway article describes only elements necessary for a scientifically-based assessment, and is not, as the Corps suggests, a whole-hearted endorsement of the use of BJP in the place of scientifically sound studies and data assessment.
30. The Corps also quotes R.T. Lackey for the proposition that "[t]he decision to use risk assessment is a heavily value-laden decision. Technical expertise cannot substitute for values and priorities in ecological risk assessment; these are issues of policy and not science." The Corps is correct that BJP is inherently value-laden and that risk assessment decisions are largely policy-driven. Still, in order to make informed decisions about what society considers to be acceptable levels of risk, the Corps' risk managers must consider some baseline data. At the very least, the Corps must be able to quantify the level of risk inherent in these policy decisions; the FSEIS's reliance on BJP and limited data constrains the Corps' risk managers in their ability to perform even this meager environmental review function.
31. As CRANE has noted in its previous comments, risk assessment analysis can only be done using a simulation model and examining the output under a suspected range of conditions. See DSEIS Comments, at 21. The Corps has not prepared a simulation model or examined the likely outcomes of various risk scenarios. If any risk assessment has been undertaken, it appears to be some strange sort of "verbal risk assessment," which is not identified as an appropriate methodology in any risk-assessment handbook.

C.29: The Corps has reviewed both CRANE's comments related to the Holdway article, and the article itself. The Corps agrees that Holdway does not equate best professional judgment to science; instead, Holdway recognizes the important role that professional judgment plays in interpreting modeling results:

If a professional judgement is called for, I would rather that judgement be made by an experienced ecotoxicologist sufficiently convinced of his or her beliefs to openly author the opinion. The idea that some simplistic computer program can be run anonymously to produce a numerical result for regulatory purposes, without understanding model limitations and assumptions without the personal credibility of a named professional being on the line, is very disturbing. Holloway, at 817.

Also the commenter mischaracterizes the Corps' discussion of Holdway. The Corps' discussion centers on the Holdway's acknowledgment that best professional judgment is often a component of risk analysis. Accordingly, in assessing Project impacts, the Corps and resource agencies relied on numeric models, the input and judgment of the SEI panel and their own judgment, all as encouraged by Holdway.

CRANE's suggestion that the Corps arbitrarily relied on its best professional judgment is inaccurate. CRANE again mischaracterizes the Corps' use of its expertise and consensus with the state and federal resource agencies. The comment does not recognize the years of research, modeling, and analysis underlying the conceptual model and other numerical models of the Columbia River estuary. The Corps' decision, which incorporates agency expertise, is based on good science. To date, in addition to studies performed by the Corps' Portland District and studies performed prior to issuance of the 1999 Final EIS, the Corps has also spent approximately \$3.6 million in contracts to others not employed by Portland District to acquire additional baseline data for the project, to expand the knowledge base on the river, and to have others review our assumptions and methodologies. This figure will continue to grow as the Corps implements the ESA terms and conditions.

C.30: CRANE's suggestion that the Corps lacks baseline data for the Channel Improvement Project is inaccurate. The Corps has developed additional data on the Columbia River estuary since its EIS scoping process. Further, continuing monitoring is underway to obtain additional data on parameters of concern. As noted above, the Corps has expended approximately \$3.6 million to acquire baseline data for the project, expand the knowledge base on the river, and to have others review the Corps' assumptions and methodologies. Further, the Corps considered a broad array of data in its assessment of Project impacts. This data is identified in the 1999 IFR/FEIS, the 2001 Biological Assessment, and the 2003 Final SEIS.

With regard to the assessment of potential risk associated with the Project, see the response above to comments II.C.27 and II.C.29. Again, the Corps, NOAA, USFWS, and the SEI panel analyzed potential physical changes from the three-foot deepening that could result in biological consequences. As previously discussed, the amount of physical change is predicted to be very small. See Biological Assessment at 6-18, 6-19. Further, the monitoring plan described in Terms and Conditions 3 (MA-1) will address uncertainty and risk related to potential Project effects over the long term, and help validate assumptions used in analyzing Project effects. Finally, the Adaptive Management Team will review and evaluate data from the monitoring programs, and may adjust the project accordingly to address any changes of concern.

C.31: The Corps performed a quantitative analysis of potential physical changes to the system, as discussed in the Corps' response to comments II.C.27 and II.C.29 above. The SEI panel reviewed this analysis and the Services accepted it as an appropriate way to evaluate biological risks and impacts. Using this input, together with the remainder of the best available science reviewed through the SEI and reconsultation process, the BRT developed a qualitative assessment of potential project risks to salmonids. See FSEIS at 6-45 through 6-47. Again, the Corps will monitor pre and post deepening to verify its assumptions related to risk, and the Adaptive Management Team will review and evaluate this data and may adjust the project accordingly to address any changes of concern. See Biological Assessment at 7-1 – 7-8; Implementation Plan, Terms and Conditions 3.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 94

32. As a number of comments above suggest, baseline sampling is essential to risk assessment, and the FSEIS simply does not provide the level of information needed to undertake that task. In particular, with regard to the Corps' invertebrate sampling, we note that a baseline rarely means a single year's, or even two consecutive years, of sampling. An examination of the variability associated with the Corps' sampling conducted suggests that two years is insufficient time to adequately understand the area. See generally Bottom and Jones, "Species Composition, Distribution, and Invertebrate Prey"; Jones, et al., "Community Structure, Distribution, and Standing Stock"; Brodeur, "The Importance of Various Spatial and Temporal Scales." This is especially true when dealing with species that are early colonizers, such as Corophium, because they tend to be forced out of more stable areas.
33. With regard to mobile epibenthos, the Corps continues to ignore basic species characteristics (i.e., mobile epibenthos' tendency to mimic drift organisms, yet be sufficiently high up in the water column to be ingested by a visual predator with a terminal mouth) in its analysis of salmonid prey activity. The reasons for ignoring this assemblage are based solely on the basis of two studies of fish stomachs with virtually no food in them. See discussion above at Section II(C)(16). The Corps improperly excludes mobile epibenthos from its baseline analyses; without consideration of this important element of the ecosystem, the Corps' conclusions regarding the likely effects of Project actions, including the restoration projects, cannot be considered complete or accurate.
34. The Corps continues to rely upon an unpublished paper by Bottom et al. (2001) for many of its conclusions regarding the monitoring program. This paper is still listed as a "draft" and has been unavailable for independent review. Without independent verification of its content, it is impossible to determine whether its conclusions are valid.
35. As CRANE has noted repeatedly, a successful monitoring program depends upon being able to 1) choose variables sensitive enough to change to detect any Project-related changes, 2) be able to understand the background variability associated with the variables of interest to be able to sort out effect from noise, 3) choose variables that have a demonstrated cause-effect relationship with the actions of the

C.32: CRANE's contention that the Corps lacked baseline data is incorrect. The Corps relied on large, robust sets of data (see, e.g., bibliography at response II.C.33). These studies were considered both individually and collectively to assess the baseline of the project area. The studies provided adequate information regarding baseline conditions in the area. Again, the Channel Improvement Project has, between the 1999 Final EIS and the end of July 2003, funded contracts outside Portland District for ocean studies (\$355,000), biological data collection (\$217,000), and physical data collection in the ocean (\$138,000). Taken together, these studies and all other studies conducted since completion of the 1999 Final EIS total \$3.6 million. These studies have all been conducted by recognized experts in their fields and provide a strong science-based assessment of baseline conditions. The Corps collected and considered these data, together with other readily available data on the River and the expertise of Corps' and Services' personnel with decades of experience in the Columbia River, to make determinations on potential projects impacts.

C.33: Contrary to the comment's assertions, the Corps and BRT conducted an exhaustive examination of salmonid prey sources in the Columbia River Estuary. This effort included consideration of numerous studies (see below) to assess the salmonid prey base in the Columbia River estuary and potential impacts of the entire Project.

Studies referenced in the August, 1999 IFR/FEIS:

- Holton, R.L., D.L. Higley and D.L. Brooker, 1984. Salinity-Temperature Relations of the Amphipod *Corophium salmonis* in the Columbia River Estuary. Oregon State University, Corvallis, OR. 36 pp.;
- Jones, K.K., C.A. Simenstad, D.L. Higley, and D.L. Bottom, 1990. Community Structure, Distribution, and Standing Stock of Benthos, Epibenthos, and Plankton in the Columbia River Estuary. *Prog. Oceanogr.* 25: 211-241;
- McCabe, G.T. Jr., 1997. Fishes in Bottom Habitats in Six Flowlane Disposal Areas of the Lower Columbia River, 1996-1997. National Marine Fisheries Service, Seattle, WA. 28 pp.;
- McCabe, G.T., Jr., S. Hinton, and R.L. Emmett, 1993. Benthic and Epibenthic Invertebrates, Fishes, and Sediments at and Adjacent to a Proposed New Site for Area D, an In-Water Dredged-Material Disposal Site in the Lower Columbia River. National Marine Fisheries Service, Seattle, WA.;
- Simenstad, C., D. Jay, C.D. McIntire, W. Nehlsen, C. Sherwood, and L. Small, 1984. The Dynamics of the Columbia River Estuarine Ecosystem. Vol. 1 and 2. Columbia River Estuary Study Task Force, Astoria, OR. 695 pp.;

Studies referenced in the January, 2003 FSEIS:

- Bottom, D.L., C.A. Simenstad, A.M. Baptista, D.A. Jay, J. Burke, K.K. Jones, E. Casillas, and M.H. Schiewe. 2001 (unpublished). Salmon at River's End: The Role of the Estuary in the Decline and Recovery of Columbia Salmon. Draft Report. National Marine Fisheries Service, Seattle, Washington;
- Cates, B.C. 1983. Fish Sampling Operations at Tongue Point, Oregon. U.S. Fish and Wildlife Service, Fisheries Assistance Office, Vancouver, Washington;
- Emmett, R. L., G.T. McCabe, Jr., T.C. Coley, R.J. McConnell and W.D. Muir. 1986. Benthic Sampling in Cathlamet Bay, Oregon - 1984. National Marine Fisheries Service Report of Results to U.S. Army Corps of Engineers;
- Simenstad C.A. 1994. Epibenthic Organisms of the Columbia River Estuary. Columbia River Estuary Data Development Program;

Studies referenced in the December, 2001 BA:

- Bottom, D.L., and K.K. Jones. 1990. Species Composition, Distribution, and Invertebrate Prey of Fish Assemblages in the Columbia River Estuary. Progress in Oceanography 25:243-270.
- Bottom, D.L. and K. Gores. 2001. Estuarine Habitat and Juvenile Salmon – Current and Historic Linkages in the Lower Columbia River and Estuary. Final Research Proposal to Portland District Corps of Engineers by Northwest Fisheries Science Center, National Marine Fisheries Service, Seattle, Washington.
- Bottom, D.L., C.A. Simenstad, A.M. Baptista, D.A. Jay, J. Burke, K.K. Jones, E. Casillas, and M.H. Schiewe. 2001 (unpublished). Salmon at River's End: The Role of the Estuary in the Decline and Recovery of Columbia Salmon. Draft Report. National Marine Fisheries Service, Seattle, Washington.
- Brodeur, R.D., H.V. Lorz, and W.G. Percy. 1987. Food Habits and Diet Variation of Pelagic Nekton off Oregon and Washington, 1979-1984. National Oceanographic and Atmospheric Administration and National Marine and Fisheries Services Technical Report. 57 pp.
- Cates, B.C. 1983. Fish Sampling Operations at Tongue Point, Oregon. U.S. Fish and Wildlife Service, Fisheries Assistance Office, Vancouver, Washington.
- Columbia River Estuary Data Development Program (CREDDP). 1984. The Columbia River Estuary Atlas of Physical and Biological Characteristics. 87 pp.
- Craddock, D.R., T.H. Blahm, and W.D. Parente. 1976. Occurrence and Utilization of Zooplankton by Juvenile Chinook Salmon in the Lower Columbia River. Transactions of the American Fisheries Society 105:72-76.

- Dawley, E.M., C.W. Sims, R.D. Ledgerwood, D.R. Miller, and F.P. Thrower. 1979. A Study to Define the Migrational Characteristics of Chinook and Coho Salmon and Steelhead Trout in the Columbia River Estuary. Annual Report to Pacific Northwest Regional Commission. 90 pp.
- Dawley, E.M., C.W. Sims, R.D. Ledgerwood, D.R. Miller, and J.G. Williams. 1981. A Study to Define the Migrational Characteristics of Chinook and Coho Salmon and Steelhead Trout in the Columbia River Estuary. Annual Report to Pacific Northwest Regional Commission. 53 pp.
- Dawley, E.M., R.D. Ledgerwood, T.H. Blahm, and A.L. Jensen. 1984a. Migrational Characteristics and Survival of Juvenile Salmonids Entering the Columbia River Estuary During 1981. Unpublished Report. National Marine Fisheries Service, Seattle, Washington. 43 pp. plus appendices.
- Dawley, E.M., R.D. Ledgerwood, T.H. Blahm, R.A. Kim, and A.E. Rankin. 1984b. Migrational Characteristics and Survival of Juvenile Salmonids Entering the Columbia River Estuary During 1983. Unpublished Report. National Marine Fisheries Service, Seattle, Washington. 40 pp. plus appendices.
- Dawley, E.M., R.D. Ledgerwood, and A.L. Jensen. 1985a. Beach and Purse Seine Sampling of Juvenile Salmonids in the Columbia River Estuary and Ocean Plume, 1977-1983. NMFS Report F/NWC-75, National Marine Fisheries Service, Seattle, Washington.
- Dawley, E.M., R.D. Ledgerwood, and T.H. Blahm. 1985b. Migrational Characteristics, Biological Observations, and Relative Survival of Juvenile Salmonids Entering the Columbia River Estuary, 1977-1983. Unpublished Manuscript. Northwest and Alaska Fisheries Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration: Seattle, Washington.
- Dawley, E.M., R.D. Ledgerwood, T.H. Blahm, C.W. Sims, J.T. Durkin, R.A. Kim, A.E. Rankin, G.E. Monan, and F.J. Ossiander. 1986. Migrational Characteristics, Biological Observations, and Relative Survival of Juvenile Salmonids Entering the Columbia River Estuary, 1966-1983. Unpublished Report by National Marine Fisheries Service, Seattle, Washington. 256 pp.
- Emmett, R. L., G.T. McCabe, Jr., T.C. Coley, R.J. McConnell and W.D. Muir. 1986. Benthic Sampling in Cathlamet Bay, Oregon – 1984. National Marine Fisheries Service Report of Results to U.S. Army Corps of Engineers. Contract DACW57-84-F-0348.
- Emmett, R.L. 1982. The Effects of the May 18, 1980 Mount St. Helens Eruption on the Food Habits of Four Salmonid and Two Non-Salmonid Fishes in the Columbia River Estuary. Master's Thesis, University of Oregon, Eugene. 44 pp.
- Gregory, R.S. 1988. Effects of Turbidity on Benthic Foraging and Predation Risk in Juvenile Chinook Salmon. In Effects of Dredging on Anadromous Pacific Coast Fishes. Workshop Proceedings, edited by C.A. Simenstad, pp. 64-78. University of Washington, Seattle.

- Haertel, L., and C. Osterberg. 1967. Ecology of Zooplankton, Benthos, and Fishes in the Columbia River Estuary. *Ecology* 48:459-472.
- Healey, M.C. 1982. Juvenile Pacific Salmon in Estuaries: the Life Support System. In *Estuarine Comparisons*, edited by V.S. Kennedy, pp. 315-341. Academic Press, New York, New York.
- Holton, R.L. 1984. Benthic Infauna of the Columbia River Estuary. Unpublished report, Oregon State University, Corvallis. Columbia River Estuary Data Development Program. 179 pp. plus appendices.
- Holton, R.L., and D.L. Higley. 1984. Salinity-Temperature Relations of the Amphipod *Corophium* Salmonis in the Columbia River Estuary. Unpublished report, Oregon State University to U.S. Army Corps of Engineers, Portland, Oregon. 36 pp.
- Johnson, S.W., J.F. Thedinga, and K. V. Koski. 1992. Life History of Juvenile Ocean-Type Chinook Salmon (*Oncorhynchus tshawytscha*) in the Situk River, Alaska. *Canadian Journal of Fisheries and Aquatic Science* 49:2621-2629.
- McCabe, G.T. Jr., 1997. Fishes in Bottom Habitats in Six Flowlane Disposal Areas of the Lower Columbia River, 1996-1997. National Marine Fisheries Service, Seattle, Washington. 28 pp.
- McCabe, G.T., and S. Hinton. 1996. Benthic Invertebrates and Sediment Characteristics at Ten Dredged Material Disposal Areas (Beach Nourishment) in the Lower Columbia River, 1994-1995. Coastal Zone and Estuarine Studies Division, National Marine Fisheries Service, Seattle, Washington. 110 pp.
- Reimers, Paul E. November 1964. A Modified Method of Analyzing Stomach Contents With Notes on the Food Habits of Coho Salmon in the Coastal Waters of Oregon and Southern Washington, Research Briefs, Fish Commission of Oregon, Vol. 10, No. 1.
- Simenstad C.A., L.F. Small, and C.D. McIntire. 1990. Consumption Processes and Food Web Structure in the Columbia River Estuary. *Progress in Oceanography* 25:271-297.
- Sims, C.W. 1970. Juvenile Salmon and Steelhead in the Columbia River Estuary. in *Proceedings of Northwest Estuarine and Coastal Zone Symposium*, Portland, Oregon, pp. 80-86.
- Tiffan, K.F., D.W. Rondorf, and P.G. Wagner. 2000. Physiological Development and Migratory Behavior of Subyearling Fall Chinook Salmon in the Columbia River. *North American Journal of Fisheries Management* 20:28-40.
- VanHyning, J.M. 1968. Factors Affecting the Abundance of Fall Chinook Salmon in the Columbia River. Dissertation, Oregon State University, Corvallis. 424 pp.

In contrast, CRANE's comment is relevant to only two ecosystem restoration features. The comment references two studies, one by NOAA Fisheries (Emmett et al, 1986) and one by the U.S. Fish and Wildlife Service (Cates, 1983), as the only source of information on salmon prey base. These studies were conducted to analyze benthic invertebrate and fish populations in Cathlamet Bay. The BRT referenced these studies to assess benthic invertebrates and fish resources in the Lois Island embayment and Miller-Pillar area, and not for the entire estuary.

The Corps' analysis of impacts of the ecosystem restoration features at Lois Island embayment and Miller-Pillar on benthic invertebrates, including the mobile epibenthos *Corophium salmonis*, was addressed in the 2001 BA for the Project on pages 8-13 and 8-14. For Lois Island embayment, the Corps anticipated a 5-10 year recolonization period post-construction for benthic invertebrates given the intensive site alteration that would occur during the two-year implementation phase of the feature. The BA noted that source populations were nearby. Both NOAA Fisheries and USFWS accepted the proposed ecosystem restoration feature. The Services recognized that the long-term benefits outweighed the short-term impacts.

The Miller-Pillar feature, which the State of Oregon has not approved, was predicated upon NOAA Fisheries' investigations in 1993 (Hinton et al. 1995). These investigators documented that benthic invertebrate populations were substantially lower in the deep subtidal erosion areas proposed for filling than in the shallow subtidal habitat that was the original objective of this restoration feature. This study provided an adequate characterization of the benthic and fisheries communities, and provided the basis for determining the projected benefits of the habitat restoration feature. The recommendation by the State of Oregon and others that tidal marsh would be a more relevant restoration objective was incorporated into the FSEIS.

Investigations have demonstrated that benthic invertebrates, including mobile epibenthos, have colonized locations altered by dredged material disposal, dredging actions and beach nourishment sites, such as the Rice Island disposal site and the Wahkiakum Ferry channel dredging project, amongst others. See Hinton, S.A., R.L. Emmett and G.T. McCabe, Jr., 1992. Fishes, Shrimp, Benthic Invertebrates and Sediment Characteristics in Intertidal and Subtidal Habitats at Rice Island and Miller Sands, Columbia river Estuary. Coastal Zone and Estuarine Studies Division, National Marine Fisheries Service, Seattle, Washington. 53 pp.

C.34: The draft paper by Bottom et al. (2001) is a contract report by NOAA Fisheries for the Bonneville Power Administration. It was researched, analyzed and written by NOAA juvenile salmonids researchers.

C.35: The Corps monitoring program, which has been approved by NOAA Fisheries and US Fish and Wildlife Service, is described in the Implementation Plan, available on the Corps' website, at Terms and Conditions 3a through 3i (<https://www.nwp.usace.army.mil/issues/crcip/implementation.htm>). The data the Corps are collecting are detailed enough to monitor changes potentially arising from the project, including unexpected changes in the highly dynamic system that may affect listed salmonids. For example, MA-1 is a focused, real-time monitoring program that will run before, during, and after the project that will carefully monitor physical changes that may occur as a result of the deepening. *Id.* at MA-1. The parameters selected for monitoring in MA-1 are sensitive enough to detect potential project effects and have been approved by the services.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 95

Project, 4) choose variables such that their changes will produce detectable changes in the target populations, 5) design sufficient spatial and temporal extent to the sampling so as to a) capture that variability and b) determine an effect, and 6) have sufficient sample size to provide sufficient power to any comparisons. This cannot be done without first having some notion of what the values might actually be. Certainly, none of these requirements can be met if, as is the case in the FSEIS, a monitoring program is based upon the predictions of an unverified model.

36. The Corps' responses to comments SS-170 and SS-171 (a) point again to the "unprecedented work of the SEI panel and consultation process" to conclude that levels of uncertainty have been reduced to appropriate levels, (b) mischaracterize CRANE'S comments regarding to demand the total elimination of uncertainty, and (c) purport to cite Holling to support the Corps' assertion that any remaining uncertainty is acceptable and can be dealt with through modeling. See Response to Comments, at pages Stakeholders/Special Interests-76-94. CRANE reiterates its previous comments on adaptive management below to correct the Corps' apparent misunderstanding.

Adaptive management uses the principles of adaptive environmental assessment and management ("AEAM") to establish and predict outcomes, reduce uncertainty about variability and conduct sensitivity analyses. In order to have an effective adaptive management program, the three groups of uncertainty that this process must deal with are:

- a. That which cannot be eliminated or reduced, but whose magnitude and relative importance can be estimated (the estimation of magnitude and importance should be quantitative rather than qualitative). These comprise the 'unknowable responses' or 'true surprises' that arise from the ever-changing character of ecosystems and their response to unprecedented perturbations,
- b. That arising from lack of understanding and principles. These comprise such elements as control and replication and the difficulties associated with nonlinearity and spatial scaling, which make transferring results

C.36: See the Corps' response to this comment regarding the adaptive management program at the beginning of our response to Section II.C.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 96

- difficult, (these arise from measuring variables at a smaller spatial and temporal scale, then attempting to interpret them at a scale greater or lesser. Linkages and interacting elements, if not understood, tend to make these extrapolations difficult) and
- c. Data quality, which includes the determination of which parameters are most relevant and monitoring program design.” Data quality is perhaps the most important element of uncertainty for this Project, or at least the element of uncertainty that must be dealt with first, as all other forms of uncertainty derive from and are compounded by data uncertainty.

Other factors that must be dealt with include: incertitude, errors in certitude (quantitative departures from the truth), incomplete data, anecdotal data gathered with no statistical design (BJP), inappropriate extrapolation, temporal and spatial variation of the measured parameter, and the inadequacy of models. All of these must be identified, assessed, and addressed as part of any adaptive management program. See C. S. Holling (ed.), Adaptive Environmental Assessment and Management (1978); C. Walters, “Challenges in Adaptive Management of Riparian and Coastal Ecosystems,” 1 Conservation Ecology 1-22 (1997) [hereinafter “Challenges in Adaptive Management”]; C. J. Walters, Adaptive Management of Renewable Resources (2002); J. Houlahan, “Big Problems, Small Science,” 2(1) Conservation Ecology 1-3 (1998); K. Rogers, “Managing Science/Management Partnerships: A Challenge of Adaptive Management,” 2(2) Conservation Ecology 1-6 (1998). All of these comments were made in relation to the DSEIS, and the concepts of which they are a part were considered critical by both the SEI panel members and the agencies. Despite this unanimity of opinion, the Corps fails to undertake the research actions and underlying preparatory work necessary to perform these tasks.

The current adaptive management program still addresses none of the above concerns. There are no environmental benchmarks against which to measure progress or initiate changes in procedures. A number of authors have stated that even in well-designed adaptive management programs, lack of implementation and coordination among agency personnel can defeat the very purpose of adaptive management. Walters, “Challenges in Adaptive Management”; Stephen C. Ralph

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 97

and Geoffrey C. Poole, “Putting Monitoring First: Designing Accountable Ecosystem Restoration and Management Plans,” in Restoration of Puget Sound Rivers 226-47 (D.R. Montgomery, et al. (eds.)) (attached as Exhibit 27) [hereinafter “Putting Monitoring First”]. Therefore it is even more important to have these elements well-described, with potential “fixes” and “changes in direction” identified, along with their predicted outcomes.

Finally, CRANE’S commentator was trained in developing and using *AEAM* by Holling and Walters in 1977. In keeping with not only the spirit, but also the letter of this training, the commentator consistently states that “incertitude can be . . . eliminated, but that uncertainty can only be minimized.”

37. We reiterate the comments and criticisms of the Corps’ adaptive management approach raised in prior CRANE comment letters. Ralph and Poole in their paper concerning the theory and reality of how adaptive management is conducted discuss these issues at length. See Ralph and Poole, “Putting Monitoring First.” As the Corps has not provided significant response to CRANE’S previous comments, we offer the following additional information from Ralph and Poole for its consideration:

Consequently, our attempts to implement iterative, adaptive restoration or management actions will also fail unless managers and researchers: (1) alter their current conceptual models about the relationship between monitoring and management/restoration; (2) design and implement monitoring programs before planning restoration/management actions; (3) recognize the need for hierarchical monitoring programs and learn how to implement them; and (4) eliminate myths about monitoring, including the assumption that we can generate reliable new information about management and restoration actions simply by observing their outcomes. In order for monitoring programs to provide reliable and timely information required by iterative and adaptive approaches to ecosystem restoration and management, **monitoring programs must serve as a scientifically rigorous framework for “Empirical Management” of natural resources.** To accomplish this, managers and researchers must work **together first to design hierarchically-structured monitoring experiments and then to plan on-the-ground management and restoration actions that serve as experimental manipulations** within the context of the monitoring experiment. Unlike current approaches, this empirical approach has the potential to generate rigorous new scientific information about the efficacy of implemented actions and therefore could support adaptive, iterative improvement in management and restoration plans.”

C.37: See the Corps’ response to this comment regarding the adaptive management program at the beginning of our response to Section II.C.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 98

We believe that adaptive management has failed largely because many processes implemented under the label “adaptive management” have only superficial similarities to the concept outlined by Holling (1978). To illustrate, we contrast Holling’s Adaptive Management (HAM), a science-based process, with the more commonly initiated process, which we term “socio-political adaptive management” (SPAM).

Holling’s Adaptive Management is a complete resource-management paradigm designed to provide a means of addressing the uncertain ecological risks associated with land-use and water-use decisions. **In theory, Holling’s Adaptive Management builds a credible scientific foundation by envisioning land-use activities (e.g., laying out timber sales, setting prescribed fire, building roads, stream restoration, and so on) as experimental manipulations that are implemented within the context of well-designed monitoring experiments.** This strategy seeks to simultaneously generate economic value and scientific understanding of ecosystem response to human activities (see also Holling and Meffe 1996; Walters 1997).

Socio-political adaptive management concepts emerge from socio-political decision-making processes (Chapter 6). Socio-political adaptive management concepts generally assume that an independent monitoring effort will be able to document any negative ecological impacts associated with continued land use, even though monitoring is not typically viewed as a series of well-designed experiments. **In part because of their genesis in the policymaking realm, socio-political adaptive management concepts often are scientifically incomplete and ineffective. Often, they are based on only casual or uninformed interpretations of Holling’s Adaptive Management.**

Explicitly recognizing the role of the socio-political adaptive management concept in consensus-building processes underscores Lee’s (1999) first conclusion . . . by revealing that **socio-political adaptive management has little utility beyond facilitating consensus-building processes.** Any resulting consensus-based management restoration plan is unlikely to induce adaptive social learning and changes in behavior.

There are two reasons for this failing. **First, consensus-building processes typically focus first and foremost on the nuts-and-bolts of determining allowable or acceptable management actions (e.g., defining best management practices, determining when they should apply, and deciding which should be mandatory and which should be voluntary).** Therefore, the consensus process results in a relatively complete blueprint for management actions, but no more than a statement of need for a monitoring plan and a requirement that it be developed in the future. Although management actions and monitoring programs are originally envisioned as interdependent activities (Figure 2a), **management actions typically**

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 99

are designed to proceed prior to implementation of the monitoring program (Figure 2b). The process may be well-intentioned and earnest, **but the substance and schedule of the monitoring plan is often poorly defined**. Thus there is little economic or political impetus to carry through on the monitoring component of the agreement. **Given that adequate monitoring is both time-consuming and expensive, planned monitoring programs are sometimes not implemented; even when implemented, they may be short-lived**. This results ultimately in the failure of the planned adaptive process and the loss of the opportunity to collectively explore the efficacy of agreed-to management decisions. Monitoring programs that do not last long enough to generate new information result in a linear rather than iterative process (Figure 2c). **The burden of proof to show the harmful effects of management decisions thus remains with the ecological system at risk, with no real prospect for lessening that burden through learning**.

Second, monitoring programs that accompany socio-political adaptive management plans typically fail to recognize that reliable new information can only be generated by conducting well-planned scientific experiments. This requires generating credible hypotheses and designing monitoring experiments to adequately test these hypotheses. Although some have argued that monitoring must be approached as an experiment with testable hypotheses (Walters 1986; Conquest and Ralph 1998; Currens et al. 2000), contemporary socio-political adaptive management plans tend to result in scientifically ineffectual monitoring programs (Walters 1997).

We illustrate this point by outlining several commonly held and deeply entrenched “myths” about monitoring and argue that most contemporary monitoring programs are built upon one or more of these myths, each of which can eliminate necessary scientific rigor from monitoring programs.

Myth 1: We can monitor anything, it's just a matter of figuring out how.

Because of real-world limitations arising from political, technical, and budget realities, some ecosystem responses are more easily measured over time than others. **Yet managers often set management benchmarks without considering our ability to accurately and repeatedly determine the status and trend of the benchmark** (e.g., Poole et al. 1997). Natural resource management goals, such as salmon recovery, need to be framed in terms of what we can (and will) measure so that we can determine success or failure. In contrast with contemporary management planning, management goals (in the form of benchmarks) should be set *after* determining what we are politically, technically, and financially able to measure.

Myth 2: We can learn from our management actions alone.

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 100

Landscapes and watershed processes that control the expression of salmon habitat can vary substantially in how they respond to disturbances (Reeves et al. 1995). For example, the frequency and magnitude of sediment inputs from steep unstable hillslope terrain will increase in proportion to logging and road building in comparison to similar timber harvest activities conducted in flat terrain with few erodible features. **In part because of this variability, management actions conducted outside of the context of a rigorous experimental design do not generate new knowledge that is broadly applicable. In the absence of an experimental control, there is no way to determine whether the effect of the management action or the effects of other events and processes are linked to observed changes.** Traditionally, land managers have taken a trial-and-error approach, where future decisions may be made based upon implementing a management action to “see what happens” and figuring they “would not do it again if the desired outcome is not achieved.” **If the outcome “looks good” based on limited, informal observation over a short period of time, the activity is assumed to have succeeded. This approach can lead to innumerable problems, such as the increasing frequency of perceived “acts of God” which result from delayed or cumulative effects of management activities.**

Myth 3: Monitoring can be a separate activity from management; i.e., an adequate monitoring program can be developed in response to proposed management or restoration actions.

If monitoring is to generate new information, it has to be approached as an experiment that tests hypotheses about the effects of management actions. If monitoring represents such an experiment, management activities (whether intended to restore watersheds or extract resources) must be planned as experimental manipulations associated with the monitoring experiment.

Thus, for monitoring to fulfill its requisite role in a rigorous, iterative and adaptive strategy for natural resource management, on-the-ground actions must be planned within the context of a monitoring experiment, not after-the-fact.

Interestingly, debunking any of these myths results in the same conclusion -monitoring programs must be designed *before* agreeing on management benchmarks, *before* determining what management actions are appropriate, and *before* laying out management or restoration activities across the landscape. **In other words, for adaptive management to succeed, on-the-ground activities must be designed within the context of rigorous monitoring programs. Therefore, monitoring programs must be designed first.**

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 101

The Corps' proposed monitoring and adaptive management plan clearly fit the definition of Ralph and Poole's "SPAM," committing all the sins highlighted in the paragraphs above.

38. The Corps' Exhibit I (Essential Fish Habitat ("EFH")) includes statements about river depth and productivity that are not supported by data, and are unlikely to be accurate. See FSEIS, Exhibit I, Essential Fish Habitat Assessment (Revised), at pages 3-4 [hereinafter "EFH Report"]. In addition, the EFH Report includes statements about habitat loss and gain that are not supported by any assessments of actual habitat use. Although the Corps concludes that the habitats in question are non-unique, common sense tells us that if organisms are using the habitat, that habitat must be important for some reason. See *id.* The Corps' determination that these habitats are not unique demonstrates a lack of understanding about why organisms choose habitat, and is not supported by either accepted theory or data. As noted below in Section II(C)(39) with regard to the Corps' HEP process, the conflation of potential habitat with actual habitat is intellectually bankrupt, and undermines the Corps' overall EFH conclusions.
39. The Corps responds to CRANE'S previous comments on and criticisms of the HEP procedure by (a) reasserting that the HEP analysis is sufficient "to establish baseline habitat value of disposal and mitigation sites," (b) confirming that the HEP analysis was intended to be used as a substitute for wetland delineation, and (c) rejecting the suggestion that appropriate habitat assessment would take place at the landscape matrix scale. Response to Comments, at page Stakeholders/Special Interests-91. As none of these responses addresses the major problems raised in CRANE'S previous comments, we reiterate those comments here. Furthermore, we note that:
- As noted above in Section II(C)(19), since 1989, best available science has strongly supported use of a landscape-level process to understand the functions of the various components of an ecosystem. Such an approach is especially critical in a dynamic system like the Columbia River and its estuary, where the risk associated with improper modeling is high.

C.38: The Corps' statement in the EFH analysis about productivity of the deeper areas of the channel is based on research done in these areas by NOAA Fisheries under contract to the Corps. (McCabe 1997 and McCabe et al. 1993). These studies found that benthic production and fish use were both much lower in deeper areas of the channel than in the shallow water areas. These studies are cited in the 1999 EIS. The comment on the uniqueness of habitat and its use by species is also inaccurate. The fact that a fish species occurs in a specific habitat at a certain time does not mean that that habitat is unique to the species or critical for its survival. The EFH analysis addresses the fact that some habitats are not unique to some species, and therefore modification of these habitats is not likely to have as great an effect on the species as impacts to habitats that are unique for the survival of the species. In the case of salmon, deep-water channel areas are infrequently used by juvenile salmonids and so are not unique to the species. In the case of the marine flatfish that prefer sand flat habitat at certain depths, the EFH analysis of the Lois-Mott and Miller-Pillar areas concludes that the habitat in these areas is not unique to these species because this type of habitat is abundant in the project area and is not a limiting factor for species production. See Final SEIS, Exhibit I at p. 4. NOAA Fisheries has concurred with the Corps' EFH analysis for both salmonids (in the May, 2002 Biological Opinion) and pelagic and groundfish species (July 9, 2003 letter response), which is part of the record.

C.39: Appendix G (Final IFR/EIS, 1999) and Appendix K-5 (FSEIS, 2003), describe the Corps' wildlife and wetland mitigation plan for the Channel Improvement Project. The State of Washington Department of Ecology's 401 Water Quality Certification ("Order") modifies the plan discussed in Appendices G and K-5. Specifically, the "Order" requires the Corps to purchase an additional 80 acres on Martin Island for riparian forest development and disallows creation of 16 acres of tidal marsh at the Martin Island embayment. Ecology also requires the Corps to develop a more detailed mitigation plan that the Corps will submit to Ecology for its approval before construction and implementation of the wildlife and wetland mitigation features. See Order No. 03SEAHA-5603 at 17-18. The mitigation plan required under the Order will provide the level of detail that CRANE asserts is appropriate.

As previously noted, the Corps convened a federal and state interagency team to assess Project impacts to wetlands and wildlife habitat, and to evaluate appropriate mitigation. The interagency team used HEP analysis to evaluate both impacts and mitigation. HEP is an effective and appropriate tool for assessing project impacts and assessing the appropriate level of mitigation. The HEP analysis was designed by the U.S. Fish & Wildlife Service (United States Fish and Wildlife Service. 1981. Standards for the development of suitability index modes. USFWS, Div. of Ecological Services, Ecological Services Manual 103, Washington D. C., USA).

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 102

- The Corps' use of its HEP model remains suspect because each HEP is designed as a single-species approach to evaluating potential habitat. The authors of each HSI state quite clearly that this method does not measure actual habitat use, and cannot serve as a replacement for actual population data. Credible HEP and HSI modeling efforts require the input of detailed analyses; the Corps' analysis appears only to consider similarity of dominant cover types for breeding purposes, which is clearly insufficient to support a more expansive modeling effort.
- The Corps fails to define the concepts of "habitat needs" and "habitat" in a clear and justifiable fashion in relation to its HEP modeling. There has been a tremendous amount of criticism of the implied definitions used in this document, especially in the published scientific literature. See, e.g., L.S. Hall, et al., "The Habitat Concept and a Plea for Standard Terminology," 25 *Wildlife Society Bulletin* 173-82 (1997) (attached as Exhibit 28). The Corps' definition of these terms is unacceptably limited. The FSEIS apparently defines habitat as "dominant plant cover." Instead, habitat should be regarded as a function of the actual use of a resource by an animal or plant. In addition, a number of the species-specific HSIs used in the FSEIS fail to follow the procedures outlined in Anderson and Gutzwiller (1995), the guidance document cited by the Corps. Therefore, the Corps' HEP process is fatally flawed, because the Corps' HEP makes no distinction between the mere presence of plant types and their actual use as habitat. See Trent L. McDonald and Lyman L. McDonald, "A New Ecological Risk Assessment Procedure Using Resource Selection Models and Geographic Information Systems," 30 *Wildlife Society Bulletin* 10 15-21 (2002) (attached as Exhibit 29) [hereinafter "A New Ecological Risk Assessment"]. The Corps' approach fails to provide quantitative assessment of habitat quality, as it relates to use, and therefore, no "significance" can be attached to the conclusions drawn from the modeling.
- Another essential element of modeling is the inclusion of habitat suitability curves, which are entirely absent from the Corps' efforts. The Corps also uses some models developed in the late 1970s and early 1980s, which are badly outmoded and need to be updated using the reams of data generated on these

While the comment fundamentally faults the Corps for using the HEP methodology, it is apparent from the literature cited in the comment that HEP is used nationally as a means to determine project-related impacts and evaluate mitigation efforts to offset those impacts (Morrison et al. 1998, Mitchell et al. 2002). Morrison et al. (1998) notes that HSI models are one of the most popular approaches to modeling environmental conditions by the U.S. Fish and Wildlife Service and other Federal resource management agencies. Recent HEP work across the nation demonstrates its widespread use in a variety of contexts. See Burks-Copes, K. A., A. C. Webb, A. A. Lee and M. F. Passmore. 2003. *Ecosystem Restoration Habitat Assessment for the Proposed East St. Louis and Vicinity, Illinois* (Ecosystem Restoration and Flood Damage Reduction Project). Draft Report. U. S. Army Engineer Research and Development Center, Environmental Laboratory, Vicksburg, MS. 1000 pp. + appendices; Webb, A.C., K.A. Burks-Copes, and D.E. Evans. 2001. *Indiana Bat Habitat Assessment on the U.S. Army TACOM Armament Research, Development, and Engineering Center, Picatinny Arsenal, New Jersey*. Preliminary Final Report. U.S. Army Engineer Research and Development Center, Environmental Laboratory, Vicksburg, MS. 53 pp. + appendix; Burks-Copes, K. A., A. C. Webb, and M. F. Passmore. 2001. *Habitat Restoration Assessment for the Proposed Whitebreast Creek Aquatic Ecosystem Restoration Study*. Preliminary Final Report. U.S. Army Engineer Research and Development Center, Environmental Laboratory, Vicksburg, MS. 515 pp. + appendix; U.S. Army Corps of Engineers. 1991. *Lower Snake River Fish and Wildlife Compensation Plan: Wildlife Habitat Compensation Evaluation for the Lower Snake River Project. Special Report*. North Pacific Division, Walla Walla District, Walla Walla, WA.; U.S. Army Corps of Engineers. 1998. *Raritan River Bay and Sandy Hook Bay Combined Flood Control and Shore Protection Project* in Port Monmouth, New Jersey. North Atlantic Division, New York District, New York, NY. In all of these studies, a multi-disciplined, multi-agency HEP Team was convened. The Team members typically included representatives from the USFWS, state natural resource agencies, Corps planners and biologists, tribal participants, experts from special interest groups, local governments, universities and other entities involved with the studies (e.g., cost-share sponsors).

The mitigation planning process for the Channel Improvement Project follows the model used elsewhere in the Country – using HEP analysis and an interagency team approach. An interagency team composed of representatives from the U.S. Fish and Wildlife Service, Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife and the Washington Department of Ecology conducted the HEP analysis for the Project. The interagency team accepted the HEP analysis as the appropriate methodology to conduct the habitat analysis. Therefore, it was not a unilateral action by the Corps, and the appropriate resource agencies were a part of the process.

The interagency team used the HEP analysis to determine the wildlife habitat value of wetland habitat, either impacted by disposal or proposed as a mitigation measure. In developing the mitigation plan, the interagency team emphasized creation and restoration of wetland mitigation habitat relative to the quantity of impacted wetlands (all of which are behind main flood control dikes, subject to drainage, and impacted by agricultural activities). This emphasis was based on the significant historical loss of wetland habitat acreage along the lower Columbia River relative to other habitat types (such as agricultural cropland). Thus, the wetland mitigation component of the wildlife mitigation plan will develop substantially more acreage of wetland habitat than is impacted. The mitigation will secure the wetland habitat from future impacts and allow for the full expression of wetland plant communities. Further, mitigation habitat will be substantially more productive for wildlife resources, in stark contrast to the wetland habitats impacted by disposal, which are currently used for agricultural practices, such as cattle grazing or haying. Finally, the mitigation habitat is located within the boundaries of larger, secure tracts of land and are interspersed with other wildlife habitats, thus promoting connectivity.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 103

species in the intervening time period. An even greater flaw in the Corps' approach is that most HSI curves they have generated are based on little or no quantitative data. See FEIS, App. G, Wildlife Mitigation. Despite purporting to provide a linear regression analysis, the Corps fails to document any role of interaction effects between and among the various levels of each resource. This is critical, as the resources used by organisms do not exist in absence of one another. Scientists have long recognized the importance of interaction effects. See, e.g., Peter C. de Ruiter, et al., "Energetics, Patterns of Interaction Strengths, and Stability in Real Ecosystems," 269 *Science* 1257-60 (Sept. 1995) (attached as Exhibit 30). As a result, the scientific community regards the use of HEP processes and associated "potential" HSI that use habitat models that lack not only verification and calibration, but which are also based on habitat use theory, as invalid. See, e.g., Mark S. Boyce and Lyman McDonald, "Relating Populations to Habitats Using Resource Selection Functions," 14 *Trends in Ecology and Evolution* 268-72 (1999) (attached as Exhibit 3 1) [hereinafter "Relating Populations to Habitats"]; Bryan F. J. Manly, et al., *Resource Selection by Animals: Statistical Design and Analysis for Field Studies* (2002) (attached as Exhibit 32); Michael S. Mitchell, et al., "Test of a Habitat Suitability Index for Black Bears in the Southern Appalachians," 30 *Wildlife Society Bulletin* 794-808 (2002) (attached as Exhibit 33); John A. Bissonette, "Linking Landscape Patterns to Biological Reality," in *Landscape Ecology and Resource Management: Linking Theory with Practice* 1-14 (John A. Bissonette and Isle Storch eds.) (2003) (attached as Exhibit 34).

- The Corps continues to ignore sources like McDonald and McDonald 2002 and Mitchell et al. 2002, which describe the necessary elements of setting up an HSI that can be used to generate predictions concerning *actual* habitat use. Despite the recent dates of these publications, their approaches have been well known since the 1980s. Notably, none of the elements described by Mitchell were used in the HEP process established by the Corps' working group. No telemetry studies were conducted to see whether and how populations actually use the existing areas. No population surveys were conducted over space and time to attempt to tie the presence of resources to the USFWS assessment of quality. The Corps' HSIs were constructed almost entirely of anecdotal

The Corps disagrees that a landscape matrix approach, rather than the HEP analysis, should be used for developing a mitigation plan for wetland impacts. Contrary to CRANE's assertion that the Corps should use a landscape ecology approach, and according to the literature relied upon in the comment, the use of landscape change information for resource management has only limited practical application, with specifically designed and implemented management plans from a landscape perspective having been carried out in only a few situations and primarily as paper exercises (Rutledge and Lepczyk, 2002). Turner et al. (2002) also recognize the limitation of using landscape ecology in resource management situations: "Most landscape models, however, have been developed as research tools rather than management tools. They are often complex, requiring information that is simply not available for most species" (p. 445-46). Further, Turner notes that landscape level goals remain difficult to translate into management schemes, which render them unsuitable for the wildlife mitigation analysis for the CRCIP because both the action (Corps) and/or resource agencies require a specific management scheme in order to cost and evaluate relative habitat losses and replacement (mitigation). Finally, Turner notes the often impossible task of conducting landscape-level experiments over large areas that span long periods of time.

In contrast to these limitations to the landscape method, federal agencies and other scientists recognize HEP as a valid method to evaluate potential habitat impacts and mitigation actions. (See Morrison et al., and Mitchell et al. reference above). The HEP analysis in this case was implemented by a team that has experience in the HEP process and knowledge of the lower Columbia River. Team members were also aware of the changes in the landscape ecology along the lower Columbia River and brought that awareness to bear in their implementation of the HEP analysis.

Bullet 1 (p. 101): See response to comment II.C.19.

Bullet 2 (p. 102 top): As discussed above, the HEP analysis was an interagency approach to determine project-related impacts, and was not a unilateral action of the Corps. Target species used in the HEP analysis were selected as representative members of the habitats present on disposal sites and proposed for development on mitigation sites. The Wildlife Mitigation plan provides pertinent background information on why each target species was selected as a representative of the general wildlife community occupying a particular habitat type. (Final IFR/EIS, August 1999 at Appendix G, page 22). HEP results represent a benchmark or estimate for project related impacts and mitigation. NEPA does not require that actual habitat use and population data be used to evaluate potential impacts. Further, HEP is an accepted tool for habitat assessment, discussed above. Finally, the HEP analysis used did not restrict itself, as CRANE asserts "to consider similarity of dominant cover types for breeding purposes. . . ." The analysis considered wintering habitat for Canada geese and mallards and breeding, cover and foraging habitat for other target species.

Bullet 3 (p. 102 middle): Habitat types are clearly defined on page 33 of the Wildlife Mitigation Plan (Final IFR/EIS, August 1999 at Appendix G). They formed the basis for habitat acreage determinations at disposal and mitigation sites used in the HEP analysis and the habitat quantity component of the analysis. The interagency team derived the habitat variables (needs) for some target species from available models. For other target species, modified and/or team-developed models (Canada goose and amphibian) were used to define the "habitat needs," which are those habitat variables that the species is expected to respond to through presence and use. See, *id.* at page 24-32. The habitat suitability indices evaluate a species' use of a habitat based upon specifically identified habitat variables that influence their use for cover, forage, breeding, and/or wintering habitat, or the habitat quality component of a HEP analysis. Therefore, we disagree with the comment that the HEP is fatally flawed due to a lack of distinction between the mere presence of plant types and their actual use as habitat. Species-specific habitat variables were measured in the field at various representative sites to quantify the habitat variables and thus assess the habitat quality for a species. See Appendix G, Section 3.5, page 23.

The guidance document used by the interagency team was the June 1994 Draft Habitat Evaluation Procedure (HEP) Study Guidelines from the Washington Department of Fish and Wildlife. Contrary to the comment, a reference to Anderson and Gutzwiller (1995) has not been located in Appendix G (Wildlife Mitigation Plan).

Bullet 4 (p. 102 bottom): Habitat suitability curves are present in Appendix G of the 1999 IFR/EIS. HSI curves were adopted and/or modified by the Interagency team, using the USFWS Bluebook Models, and for Canada goose and amphibians, the Interagency team developed its own models and associated HSI curves. CRANE asserts in the first sentence of this specific comment (Bullet 4) that the Corps failed to include any HSI curves, but in the third sentence, admits the Corps did include HSI curves.

The Corps did not use a linear regression analysis, nor did we suggest we had used a linear regression in the development of the Wildlife Mitigation Plan (Appendix G of the 1999 FIFR/EIS).

The HEP analysis approach was reasonable and permitted the interagency team to examine the relevant factors when deciding on proper mitigation measures. Further, it is consistent with Morrison et al. (1998). Morrison evaluated HEP as a separate modeling process from the HSI models that HEP uses. He noted that HEPs are often used to evaluate impacts of proposed projects on environmental conditions for species of special interest and mitigation. See *Id.* at 329. Morrison noted that the value of HSI models “lies in documenting a repeatable assessment procedure and providing an index to particular environmental characteristics that can be compared between alternative management plans.” *Id.* at 328. Comparison of alternative management plans is central to the NEPA/SEPA process.

Morrison stated further that “HSI models are useful for representing in a simple and understandable form the major environmental factors thought to influence most the occurrence and abundance of a wildlife species.” *Id.* Finally, Morrison further stated that it is a classic “waste of time” to measure everything possible. *Id.* at 140. Similarly, Green (1979, cited in Morrison et al. 1998) “asserted that it is not the degree to which a model meets perfection that renders it valid, but rather its adequacy in fulfilling a prescribed purpose.” *Id.* at 141. The purpose for the HEP analysis was to evaluate relative Project impacts and develop appropriate mitigation. To meet this purpose, the interagency team addressed nine target species at 13-16 disposal sites (depending upon the plan evaluated) and eight mitigation sites, all spread across much of the 100-mile long Project area, to determine Project impacts and to provide an appropriate level of mitigation for these impacts.

The literature cited in the comment does not support the comment’s assertion that “the scientific community regards the use of HEP processes and associated “potential” HSI . . . as invalid.” Mitchell et al. (2002) addressed HSI models, specifically for black bear, but did not say that the models are invalid. The other authors (Boyce and McDonald 1999; Manly et al. 2002; and Bissonette 2002) do not address HSI models or their validity.

The use of the USFWS Habitat Evaluation Procedures (HEP), and the development of Habitat Suitability Index (HSI) models used in the HEP analysis for this Project, are widely accepted approaches to compare and contrast the effects of design alternatives in Corps of Engineers’ planning studies and environmental review. The use of HEP is consistent with data needs for planning studies and environmental review because it is fairly simple, can be applied in a timely manner at reasonable cost, and produces outputs that are easily understood (Schamberger and O’Neil 1986).

HSI models are specifically designed for use in planning and environmental impact assessment studies because they quantify habitat quality and permit wildlife resources to be considered along with other aspects of project planning, such as engineering and/or economics. HSI models are not carrying capacity models, and do not claim to capture all factors that influence animal abundance (e.g., behavior, fecundity, mortality, predation, competition, etc). Instead, HSI models are designed to assess the change in potential habitat quality and availability for selected wildlife species. HSI models and the HEP approach that deploys such models are practical, operational planning models designed to assess impacts of change, using specific definitions of both habitat and carrying capacity, thereby incorporating appropriate science into the planning processes. See Romesburg, H.C. 1981. Wildlife science: gaining reliable knowledge. *J Wildl. Mgt* 45_293-313; Schamberger, M. L., and L. J. O'Neil. (1986). Concepts and constraints of habitat model testing. Pages 5-10 in J. Verner et al., eds. *Wildlife 2000*. University of Wisconsin Press, Madison; U.S. Fish and Wildlife Service. (1980). "Habitat evaluation procedures," 102 ESM, U.S. Fish and Wildlife Service, Washington, DC.

Bullet 5 (p. 103): We did not conduct telemetry studies or conduct population surveys because the HEP approach was appropriate for evaluating the nature of the resource and the magnitude of the impact relative to proposed mitigation. Knowledgeable individuals from the pertinent resource agencies, as well as outside experts participated in model development (amphibian), or were available for consultation with team members. For example, team members talked with Dr. Robert Jarvis (retired) from Oregon State University on Canada Geese, and Kelly McAllister (WDFW), Bill Leonard and Klaus Richter reviewed and critiqued the model for amphibians.

The comment's assertion that the HSI were developed using "anecdotal sighting data," is both unsupported and inaccurate. The interagency team discussed the habitat variables and the HSI scores for each target species. The amphibian model was developed by WDFW for the mitigation planning effort. The Corps developed the Canada goose model during the course of the mitigation effort. Most HSIs were based on models from the USFWS Bluebooks. The team reviewed the USFWS models to assess their fit to the region. When the team determined a model did not fit the regional habitat parameters, the team either modified or developed new models, such as Canada goose and amphibians, using their regional expertise.

The comment also overstates the result of the Louckmas and Halbrook (2002) study on the Mink Habitat Suitability Index Model. The study does not support CRANE's conclusion that the use of HSI models throughout the United States has been invalidated. Rather, it states the HSI model was not suitable to predict amount of mink activity in the Great Lakes basin of Wisconsin and suggests that the model was not well suited to predict habitat suitability in these areas. The authors did note that the model had some utility in predicting habitat quality and that habitats with high HSI scores could be considered good mink habitat. They observed that the mink has a wide prey base, i.e., aquatic, semi-aquatic and terrestrial prey items, and that the primary deficiency of the model was that it did not give appropriate value to some habitats that potentially support dense and reliable prey populations.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 104

sighting data from other portions of the country. The assumption that these models could be applied throughout all ecoregions of the United States has been tested and shown to be invalid. See Jeffrey J. Louckmas and Richard S. Halbrook, "A Test of the Mink Habitat Suitability Index Model for Riverine Systems," 29 *Wildlife Society Bulletin*, 821-26 (2002) (attached as Exhibit 35) [hereinafter "Test of the Mink HSI"].

40. CRANE reiterates its comments questioning the HSI employed for Great Blue Herons. As we have noted in past comments, prey population size, not diversity of cover types, is consistently cited as the most important of the foraging site characteristics. Furthermore, the use of this HSI calls for adequate ground-truthing to ensure that prey population characteristics are met. Despite the Corps' assertions in responses to comments to the contrary (see Response to Comments, at page Stakeholders/Special Interests-79), examination of the Appendix G of the 1999 FEIS, which was purported to contain these data, reveals that the Corps' methodologies are extremely inadequate. Other than a site visit to ground-truth aerial photo information, no field investigations were undertaken. As a general matter, the Corps failed to undertake any HSI model verification, despite the fact that model verification is critical to the use of the HSI approach. & Michael Morrison, et al., *Wildlife-Habitat Relationships: Concepts and Applications* (Chs. 5 and 10) (1998) (attached as Exhibit 36) (stating that HSI model verification is essential to the use of the HSI approach) [hereinafter "Wildlife-Habitat Relationships"].
41. CRANE reiterates its comments questioning the sufficiency of the mink HSI, and notes that recently published literature has pointed out the lack of utility of this entire HSI. Louckmas and Halbrook, "Test of the Mink HSI."
42. As discussed above in Section II(A)(14), the Corps contends that the Project complies with the Sandhill Recovery Plan. We note, however, that this document specifically states that the proposed mitigation for filling does not address the needs of Sandhill Cranes, but rather other waterfowl. Sandhill Recovery Plan, at page 25. No work has been done by either the Corps or the sponsor ports to establish how many birds use the affected habitat, for how long, and in what specific locations. The State estimates use by approximately 4000 birds, with at

C.40: Contrary to the comment, field data were collected from representative habitat sites to provide baseline data for the habitat parameters in the HSI models. See Appendix G, Section 3.5, at 23, sentence 3: "A variety of field data collection techniques were employed to measure these variables." The Corps also relied on the interagency team to assess the accuracy of the HSI scores relative to the target species use of a particular habitat.

The Corps response to C-46 demonstrates the nature of the habitats impacted by the proposed action. Habitat impacts are typically small in acreage, scattered in nature and entail primarily lands already impacted by agricultural development and levees.

C.41: See the Corps' response to CRANE's comment C 39, bullet five.

C.42: See response to comment II.A.14 above.

The Corps' mitigation plan for the Channel Improvement Project more than offsets any Project impacts to sandhill crane habitat. The mitigation plan provides 97 acres of wetlands and 132 acres of long-term agricultural lands suitable for sandhill cranes. See FSEIS Exhibits K-5 at p. 2, and K-8 at p. 10-11, and the Corps' Response to Comment SS-143, at Final SEIS, Volume 4, p. S/S-59. Moreover, this acreage directly supports the Washington State Department of Fish and Wildlife's goal of obtaining sufficient habitat in southwest Washington to support migrating cranes. See Littlefield, C. D., and G. L. Ivey, Washington State Recovery Plan for the Sandhill Crane, Washington Department of Fish and Wildlife, (June 2002) ("Final Recovery Plan") at p. 29, see also the Corps' Response to Comment SS-143 at Final SEIS, Volume 4, p. S/S-59.

The commenter also states that "the proposed mitigation for filling does not address the needs of Sandhill Cranes, but rather other waterfowl." The referenced passage of the Final Recovery Plan, however, relates to the Port of Vancouver's independent development of its Gateway property, and not impacts related to the Channel Improvement Project: "Proposals to mitigate wetland filling associated with Port of Vancouver development are focused on open-water habitat for ducks and geese and do not address loss of sandhill crane habitat values." Recovery Plan at p. 25; see also the FSEIS at p. 6-59, 6-68, 6-98-99, and the Corps' Response to Comment SS-145 at Final SEIS, Volume 4, p. S/S-60. Contrary to the commenter's contention, the wetlands and agricultural lands included in the Corps' mitigation plan for the Project provide habitat suitable for overwintering and migrating sandhill cranes as discussed in the Recovery Plan. See Recovery Plan at p. 23-25.

Finally, the commenter states the Corps or the Sponsor Ports should have conducted habitat use studies at the "affected habitat." New studies or habitat use assessments are unnecessary because the Final Recovery Plan provides the necessary information. The plan contains estimates of sandhill crane use at the Columbia River bottomlands and Appendices B & C contain crane counts at the Columbia River bottomlands. See Final Plan at p. 21, Appendices B & C. The Corps coordinated with WDFW personnel from the Shillapoo Wildlife Management Area and USFWS representatives from the Ridgefield National Wildlife Center regarding sandhill crane numbers and habitat use in the project area.

The Corps assessed sandhill crane use of the habitat at the Project's disposal site W-101.0 (Gateway) in the context of the crane's use of the land there. Our assessment of the site described sandhill crane use of the site, such as foraging for waste grains and/or invertebrates. The Corps' assessment is comparable to that of WDFW in their Final Recovery Plan (see pages 21-22) for Staging and Wintering Habitat in the Lower Columbia bottomlands. Further, WDFW's Recovery Plan, when describing "Factors Affecting Continued Existence" for "Staging and Wintering Areas," on pages 24-25, placed the greatest emphasis on habitat loss, conversion and/or disturbance features that affect sandhill crane foraging resources or opportunities in the Vancouver Lowlands, Sauvie Island, Ridgefield NWR and Woodland Bottoms staging and wintering area. See also the Corps' responses above to comments II.A.14 and II.A.31. Such habitat loss is the focus of the Project's mitigation plan, and, as noted above, the mitigation plan more than offsets Project impacts to sandhill crane habitat.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 105

least 1000 Sandhill Cranes using the area for overwintering. *Id.* The Corps assumes the limiting factor for Sandhill Cranes is food, but has not actually established limitation factors based upon real data. The Sandhill Recovery Plan specifically warns that destruction of Sandhill Crane habitat in the Vancouver Lowlands will present a challenge to species survival; the Corps presents no plan to address this serious concern.

43. In its analysis of water quality effects, the Corps describes the Project-related impacts as a “short-term increase in turbidity and sediment suspension” from “initial deepening” and “initial restoration.” FSEIS, at page 4- 16. Similarly, the Corps describes the adverse effects of the Channel Deepening and restoration projects as “temporary.” *Id.*, at pages 4-19,4-2 1. The Corps’ characterization of water quality and fishery effects as temporary is inconsistent with the description of the proposed action and misleading for agency decision-makers. The Channel Deepening will require year-round construction activities for two years followed by unending annual maintenance dredging between the months of May and October. FSEIS, Exhibit J, Revised Columbia River Sediment Impacts Analysis, at page 25. The Corps cannot pretend that continuous and never-ending dredging of the Columbia River and estuary will have only temporary water quality effects associated with the initial construction of the deeper channel and implementation of “restoration” fills. Channel maintenance will continue indefinitely and the environmental impacts of maintenance cannot be artificially separated from those of construction. They are connected actions and the maintenance will include maintenance of the deeper channel. Moreover, the disposal sites described in the FSEIS and subject to Corps approval will be used for channel maintenance. Any description of effects on water quality and fisheries as temporary is highly misleading. Even the Corps’ description of the Miller Sands and Lois Island “restoration” projects demonstrates that water quality and listed salmonid effects are not accurately characterized as temporary. In one case, the disposal site will be access via a sump that will be continuously operated for years until the Lois Island site is filled. At the location of the sump, hopper dredges will discharge several million cubic yards of dredge spoils during repeated visits. The other site will also be subject to repeated discharges of dredge spoils over a period of 15 to 20 years.

C 43: The commenter gives the impression that dredging and/or disposal operations are continuous throughout the year and the length of the project (~100 miles). Dredging operations are spatially discrete actions and only entail small areas within the 600-foot width of the navigation channel at any one time. The actual dredging area is typically only a minor percentage of the river’s width at any given location. Although there may be several dredges operating concurrently, collectively, they would still occupy only a minor fraction of a single percent of the navigation channel.

Furthermore, dredging actions in any location are temporary in nature. Typically, the Corps works 1-2 days to a few weeks on any given bar (discrete river segment) to remove material to reach project depth. This schedule applies to both new construction and operation and maintenance dredging operations. Thus, dredging actions are both spatially and temporally limited, thereby limiting the impacts of turbidity.

Additionally, the States of Oregon and Washington, the U.S. Fish and Wildlife Service, and NOAA Fisheries have issued strict criteria for all dredging and disposal operations associated with the Project in order to minimize turbidity and sediment suspension. See Washington and Oregon 401 Certifications, and 2002 Biological Opinions. The material to be dredged from the navigation channel is predominantly medium to coarse grained sand with less than 1% silt or clay. The sand, when discharged in water, settles rapidly with a sediment plume only extending a short distance downstream from the discharge point. Again, the States of Oregon and Washington have imposed specific criteria for turbidity associated with the project, as well as related monitoring and response actions. See 401 Certifications.

The Corps has projected that, if constructed, the Lois Island embayment restoration feature could be constructed in two years based upon the stipulated work windows. The State of Oregon, the U.S. Fish and Wildlife Service and NOAA Fisheries have stipulated that placement of dredged material in the embayment could only occur during the in-water work period of November 1 – February 28. Placement of dredged material in the sump by hopper dredges would occur prior to the start of the in-water work period to charge the sump with material and continue through the in-water work period to feed the site. Hopper dredge discharges in the sump would only occur for short periods (~5-20 minutes) at intervals of 1-4 hours or greater, depending on dredging location relative to the sump. Therefore, it is not a continuous operation for the full two-year period.

Placement of materials into Lois Island embayment would be via pipeline dredge and represents a continuous operation during the in-water work period. The materials to be placed and their associated turbidity are described above in this response. Dredged material placed at Lois Island embayment will comply with the mandatory requirements of the State of Oregon’s 401 Water Quality Certification. Dredged material disposal for construction of the Miller-Pillar ecosystem restoration feature has been disallowed by the State of Oregon, so no response is required.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 106

In each restoration project, the Corps will continuously deposit dredge spoils in water to raise the bottom elevation of hundreds of acres of the Columbia River. Water quality will obviously be repeatedly impacted until in-water disposal ends in 15 to 20 years. Then, it will take some time for the impacted area to reach equilibrium and begin to recover. Thus, even the proposed restoration projects will adversely affect approximately 5 to 7 salmon life cycles. It strains credibility when these effects are described as temporary.

44. The Corps' analysis of the effects of the project on White and Green Sturgeon is utterly inadequate. The Project will likely have severe impacts on sturgeon in at least three ways: (1) entrainment during dredging, (2) burial and loss of feeding opportunities because of flow lane disposal, and (3) burial and loss of feeding and rearing areas due to ecosystem "restoration" fills within the estuary's waters.

The likelihood that the project will adversely affect sturgeon is evident. The dredging will occur at depths where juvenile and adult sturgeon are found. The dredging will occur when sturgeon, including migrating Green Sturgeon, are present. Flowlane disposal will occur at depths of 35 to 65 feet, where sturgeon are found. FSEIS, Exhibit E, Section 404(b)(1) Evaluation (Revised), at page 7. Even the "restoration" projects will cause adverse effects. For example, the Lois Island restoration site is a rearing area for sturgeon, and the Corps has acknowledged that sturgeon rearing and presence are especially high around Lois Island restoration project and its associated dredging sump. Response to Comments, Comments of the State of Oregon, at page State-6.

The Corps analysis of effects on sturgeon relies on a study that merely confirms the presence of White Sturgeon in the channel dredging and disposal areas. See generally Sturgeon Report. The study confirming the presence of sturgeon expressly disclaims any utility for describing the effects of dredging on sturgeon. Id., at page 1. In fact, a study of the effects of the Project on sturgeon will be conducted and a report prepared after the close of public comment and after the expected timing of the Corps' decision on Channel Deepening. FSEIS, at pages 6-5, 6-22, 6-23, 6-38, 6-30. The need for study and the timing of its completion

C.44: Available data, including preliminary data from the ongoing USGS sturgeon study using acoustic telemetry, demonstrates that it is unlikely that the Channel Improvement Project will significantly adversely affect sturgeon. See response to comment II.A.10 above. In addition, the states of Oregon and Washington have imposed conditions on the Project to further avoid, minimize and, as necessary, mitigate for any unanticipated effects. See, e.g., Washington 401 certification at Section V.C (p. 13).

The Corps has previously conducted entrainment sampling for Dungeness crab and outmigrating fish, and during those studies, no sturgeon were entrained during normal dredging operations. Larson (1993); R2 Resource Consultants, Inc. (1999). While it is true that areas of riverbed are buried under a layer of sediment during flowlane disposal operations, the impact on benthic invertebrate production available for sturgeon consumption would be minor. The riverbed of the lower Columbia within the navigation channel is a complex environment characterized by extensive areas with moving bedforms resembling sand dunes, particularly in flow lane disposal areas. Benthic invertebrate production that could be considered forage for sturgeon is generally quite low in these areas due to the dynamic nature of the riverbed. Marine Taxonomic Services, Ltd. (2002) cited in Exhibit K-1 at 22.

With regard to the Lois Island embayment restoration feature, the Corps has acknowledged that, if the feature is constructed, sturgeon would be impacted in the embayment. The Corps, however, will use information from the USGS acoustic telemetry study to assist in further refining disposal actions at Lois Island embayment (including timing of disposal) in order to minimize impacts related to burial. The USGS study's preliminary data indicates that sturgeon appear to not be affected by disposal. The study will be completed before any disposal at the Lois Island embayment would begin. The commenter also mischaracterizes the relative importance of Lois Island as sturgeon habitat. The Lois Island embayment is a relatively deep hole that contains fine-grained sand and silt; its depth averages about 22 feet. This type of subtidal habitat is not unique in the Columbia River.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 107

suggest that the Corps' analysis of effects on White Sturgeon and Green Sturgeon is entirely unreliable. Response to Comments, Comments of the Washington Department of Ecology, at pages State-33-34 (confirming that the Corps has a long way to go on basic understanding of sturgeon presence, habitat use and dredging effects). As the WDFW notes, the Corps needed to assess the effects of the action on sturgeon and design mitigation before authorizing the project for construction. See Response to Comments, at pages State-57, 58. As it is, WDFW points out that the Corps is rushing the Project to authorization and construction, and precluding any attempt by WDFW to adequately protect sturgeon through avoidance and mitigation conditions.

45. The Corps failed to consider the effects of the Project on species of Lamprey that are now the subject of petitions for listing under the ESA. Petition for Rules to List Four Species of Lamprey (Jan. 23, 2003) (enclosed as Exhibit 37). Lamprey species, including those inhabiting the Columbia River, are experiencing a marked decline in population due to human activities and impacts. *Id.*, at pages 8-9, 32-38, 44. Lamprey juveniles, known as ammocoetes, are particularly vulnerable to entrainment, burial and mortality during dredging because they burrow in estuary mud. *Id.*, at 51, 58. This is particularly so for river lamprey, which concentrate their life cycle in the lower river estuaries such as the Columbia River estuary. *Id.*, at 15.
46. In summary, the Corps' refusal to incorporate landscape elements into their analysis is a rejection of the continued advances in the science and the requirements of Best Available Science as they have stood for a number of years. See Morrison, et al., *Wildlife-Habitat Relationships*; Boyce and McDonald, "Relating Populations to Habitats"; Jianguo Liu and William W. Taylor, "Coupling Landscape Ecology with Natural Resource Management: Paradigm Shifts and New Approaches," in [Integrating Landscape Ecology into Natural Resource Management](#) 3-20 (Jianguo Liu and William W. Taylor eds.) (2002) (attached as Exhibit 38); John A. Wiens, et al., "[Integrating Landscape Structure and Scale into Natural Resource Management](#)" in *Integrating Landscape Ecology into Natural Resource Management* 23-67 (Jianguo Liu and William W. Taylor eds.) (2002); Julie M. Brennan, et al., "Focal Patch Landscape Studies for Wildlife Management," in [Integrating Landscape Ecology into Natural Resource](#)

C.45: Contrary to the comment, the Final SEIS does consider the effects of the Project on Pacific and river lamprey. See FSEIS at pg 6-23, 6-29 and 6-30. River lamprey have not been collected in the Columbia River since the 1980s; however, it is still possible they may occur in the area, and therefore are considered in the SEIS. Additionally, no lamprey were collected during the extensive entrainment studies done at the mouth of the Columbia River in the 1980's. The Corps also concluded that impacts to lamprey are expected to be minimal because juveniles (ammocoetes) do not occur in the deep water areas of the navigation channel in which Project dredging and disposal will occur. As stated in the Petition to List, ammocoetes bury in the bottom in the shallower margins of tributary creeks and rivers, where they remain for one to two years. Once they reach adulthood, they migrate upstream and downstream, but they occur primarily in the water column above where Project dredging would occur.

C.46: HEP is an effective and appropriate tool for assessing project impacts and assessing the appropriate level of mitigation. Our previous responses to Comment II.C.19 and Comment II.C.39 address the commenter's statements related to landscape ecology. Our response to Comment II.C.39 also demonstrates the wide application of HEP to assessment of project-related impacts and associated mitigation efforts.

The implication from the comment is that habitats that will be impacted by dredged material disposal are pristine examples of wetland and/or riparian forest along the lower Columbia River and thus are complex, dynamic habitats hosting diverse species assemblages. We provide the following description of the disposal sites for which mitigation is planned in order to provide appropriate context for the comments.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 108

Management 68-91 (Jianguo Liu and William W. Taylor eds.) (2002) (attached as Exhibit 39); Rebecca L. Schneider, et al., “Aquatic-Terrestrial Linkages and Implications for Landscape Management,” in Integrating Landscape Ecology into Natural Resource Management 241-63 (Jianguo Liu and William W. Taylor eds.) (2002); Virginia H. Dale, et al., “A Landscape-Transition Matrix Approach for Land Management,” in Integrating Landscape Ecology into Natural Resource Management 265-93 (Jianguo Liu and William W. Taylor eds.) (2002); Daniel T. Rutledge and Christopher A. Lepczyk, “Landscape Change: Patterns, Effects, and Implications for Adaptive Management of Wildlife Resources,” in Integrating Landscape Ecology into Natural Resource Management 3 12-33 (Jianguo Liu and William W. Taylor eds.) (2002); John B. Dunning, “Landscape Ecology in Highly Managed Regions: The Benefits of Collaboration Between Management and Researchers,” in Integrating Landscape Ecology into Natural Resource Management 334-46 (Jianguo Liu and William W. Taylor eds.) (2002); William W. Taylor, et al., “Integrating Landscape Ecology into Fisheries Management: A Rationale and Practical Considerations,” in Integrating Landscape Ecology into Natural Resource Management 366-89 (Jianguo Liu and William W. Taylor eds.) (2002); Richard J. Hobbs and Robert Lambeck, “An Integrated Approach to Landscape Science and Management,” in Integrating Landscape Ecology into Natural Resource Management 412-30 (Jianguo Liu and William W. Taylor eds.) (2002); Monica G. Turner, et al., “Bridging the Gap Between Landscape Ecology and Natural Resource Management,” in Integrating Landscape Ecology into Natural Resource Management 433-60 (Jianguo Liu and William W. Taylor eds.) (2002); Manly, et al., Resource Selection by Animals; Mitchell, et al., “Test of a HSI for Black Bears”; Bissonette, “Linking Landscape Patterns”; Therese M. Donovan and Allan M. Strong, “Landscape Theory and Population Dynamics,” in Landscape Ecology and Resource Management: Linking Theory with Practice 35-54 (John A. Bissonette and Isle Storch eds.) (2003); Thomas C. Edwards, et al., “Modeling Multiple Ecological Scales to Link Landscape Theory to Wildlife Conservation,” in Landscape Ecology and Resource Management: Linking Theory with Practice 153-76 (John A. Bissonette and Isle Storch eds.) (2003); Isle Storch, “Linking a Multiscale Habitat Concept to Species Conservation, in Landscape Ecology and Resource Management: Linking Theory with Practice 303-20 (John A. Bissonette and Isle Storch eds.) (2003). Instead, the FSEIS is based upon a

- W-101.0: The Gateway site is a 40-acre proposed disposal location in the Vancouver Lowlands that is farmed annually. Typically, row crops such as field corn or cereal grains are grown on the location. No wetlands or riparian forest habitat occur within the disposal site boundaries. The disposal site also lies landward of a flood control dike.
- W-96.9: The Adjacent Fazio disposal site contains approximately eight acres of grazed pastureland that would be mitigated for with implementation of the project. It borders a gravel and sand processing plant and stockpile.
- W-86.5: The Austin Point disposal site is a historical disposal site that is currently used for heavy-equipment training. The site includes a three-acre riparian forest. Prior to the use of the location by the heavy equipment school, cattle were stockyarded on the location and severely damaged the riparian forest inclusion. This location is immediately riverward of the main flood control dike.
- W-82.0: The Martin Bar disposal location includes approximately three acres of riparian forest. These three acres occur within an area pastured by cattle. Little understory vegetation and no recruitment of trees are occurring at this location due to grazing pressure. Riverward of the main flood control dike, the site is elevated because of historical placement of dredged material. A housing development abuts the location upstream, while an access road and undeveloped park bisects the location.
- W-70.1 and W-68.7: Twenty-six acres of riparian forest on Howard and Cottonwood Island will be mitigated for under the proposed plan. These 26 acres represent the estimated acreage for scattered cottonwood trees and clumps occurring over the 262 acres of this disposal site, which was used in the 1980’s for disposal of ash, pumice, and sand from the eruption of Mt. St. Helens. The previous placement of dredged material has probably elevated these lands above the floodplain.
- O-64.8: The Rainier Industrial disposal site contains approximately eight acres of riparian forest best characterized as scattered remnant patches within the 53-acre disposal site. These patches are the result of historical disposal practices. A commercial sand borrow operation occurs at the location. Site elevation varies, but probably most is above the floodplain. This location is riverward of the main flood control dike. The substrate is now sand.
- W-62.0: The 47-acre Mt. Solo location is private property cleared and developed for pastureland. Grazing occurs at the location. Approximately 11 acres of wetland would be mitigated for in addition to the agricultural lands. Waste material from an adjacent quarry operation has been spread over much of the site in the recent past. This disposal site lies behind the main flood control dike and water is drained via ditches and an exhaust pump to the Columbia River. It is zoned for industrial development. A capped contaminant disposal location abuts the site on the upriver side. A closed landfill operation abuts the location to the landward.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 109

methodology that has no theoretical underpinning and little empirical support. The Corps' system functions only as a form of accounting, and does not expand the Corps' actual understanding of the ways in which the Columbia River systems function. The Corps' efforts are further undermined by the paucity of baseline knowledge about the Columbia River ecosystem.

Given this deficit of understanding, it is especially problematic that the Corps has rejected comments about improvements in its approach by stating merely that it does not agree with the commentator's criticisms and suggested approaches. This failure to respond is especially alarming because a number of criticisms raised by CRANE and others are well documented in cited published scientific literature. Rather than reject valid criticisms out of hand, we continue to request that the Corps provide, among other things, detailed habitat suitability, demonstrated use and critical habitat data as required by the published scientific literature. Kerkhoff, et al., "Toward a Panther-Centered View of the Forests of South Florida," 4 Conservation Ecology 1 (2000) (attached as Exhibit 40); Robert J. Fletcher and Rolf R. Kofold, "Habitat and Landscape Associations of Breeding Birds in Native and Restored Grasslands," 66 Journal of Wildlife Management 101 1-22 (Oct. 2002) (attached as Exhibit 41); S. Douglas Cram, et al., "Northern Bobwhite Population and Habitat Response to Pine-Grassland Restoration," 66 Journal of Wildlife Management 103 1-39 (Oct. 2002) (attached as Exhibit 42); Heather I. Johnston and John T. Ratti, "Distribution and Habitat Selection of Canyon Wrens, Lower Salmon River, Idaho," 66 Journal of Wildlife Management 1104-1 1 (Oct. 2002) (attached as Exhibit 43); Brett G. Dickson and Paul Beier, "Home Range and Habitat Selection by Adult Cougars in Southern California," 66 Journal of Wildlife Management 1235-45 (2002) (attached as Exhibit 44); Terrell D. Rich, "Using Breeding Land Birds in the Assessment of Western Riparian Systems," 30 Wildlife Society Bulletin 1128-39 (2002) (attached as Exhibit 45); Brent E. Jamison, et al., "Invertebrate Biomass: Associations with Lesser Prairie-Chicken Habitat Use and Sand Sagebrush Density in Southwestern Kansas," 30 Wildlife Society Bulletin 517-26 (2002) (attached as Exhibit 46); Keith B. Aubry and Catherine M. Raley, "Selection of Nest and Roost Trees by Pileated Woodpeckers in Coastal Forests of Washington," 66 Journal of Wildlife Management 1104-11 (Oct. 2002) (attached as Exhibit 47); David R. Brown, et

- W-59.7: The 69-acre Hump Island disposal location is a historical dredged material disposal location. Seven acres of riparian forest occurring in two clumps that have pioneered at the location would be mitigated for with project implementation. The previous placement of dredged material has probably elevated these lands above the floodplain.
- W-44.0: The Puget Island disposal location is approximately 100 acres in extent and is currently used for agricultural pastureland. Approximately 5 acres of wetland and 3 acres of riparian forest habitat would be mitigated for in addition to the agricultural lands. The wetland and riparian forest acreage are located along a drainage ditch and low area on the property. They are exposed to grazing from cattle. The drainage ditch feeds into a system of ditches and sloughs that terminate at a pumping station that discharges the water to the Columbia River. The site lies within the main flood control dike.

It is clear that, despite the Project impacts outlined above, the mitigation actions outlined in the Project Mitigation Plan will result in a major net benefit to the wildlife resources that use the lower Columbia River. The proposed mitigation will provide for large tracts of contiguous habitat that will provide for habitat interspersed and connectivity with other naturally established habitats along the river. Mitigation lands will be secured, and therefore protected from future development. These lands will also compliment existing wildlife management areas on the river. Finally, the Mitigation Plan reflects the Interagency Team's focus on developing riparian forest and wetland habitats because these have been most impacted by historical development along the Columbia River.

Robert E. Willis
 Judy Grigg
 Colonel Richard Hobernicht
 February 28, 2003
 Page 110

al., “Demographic Effects of Habitat Selection by Hermit Thrushes Wintering in a Pine Plantation Landscape,” 66 Journal of Wildlife Management 407-16 (April 2002) (attached as Exhibit 48); Cameron L. Aldridge and R. Mark Brigham, “Sage-Grouse Nesting and Brood Habitat Use in Southern Canada,” 66 Journal of Wildlife Management 433-44 (April 2002) (attached as Exhibit 49); Hartwell H. Welsh and Amy J. Lind, “Multi-Scale Habitat Relationships of Stream Amphibians in the Klamath-Siskiyou Region of California and Oregon,” 66 Journal of Wildlife Management 58 1-602 (July 2002) (attached as Exhibit 50); Louis Provencher, et al., “Breeding Bird Response to Midstory Hardwood Reduction in Florida Sandhill Longleaf Pine Forests,” 66 Journal of Wildlife Management 641-61 (July 2002) (attached as Exhibit 5 1); Joseph M. Kolowski and Alan Wolf, “Microhabitat Use by Bobcats in Southern Illinois,” 66 Journal of Wildlife Management 822-32 (July 2002) (attached as Exhibit 52); Joel M. Budnick, et al., “Effect of Habitat Characteristics on the Probability of Parasitism and Predation of Bell’s Vireo Nests,” 66 Journal of Wildlife Management 232-39 (Jan. 2002) (attached as Exhibit 53); Richard L. Hutto and Jock S. Young, “Regional Landbird Monitoring: Perspectives from the Northern Rocky Mountains,” 30 Wildlife Society Bulletin 738-50 (2002) (attached as Exhibit 54); Dorothy M. Feckse, et al., “Field Evaluation of a Habitat-Relation Model for the American Marten,” 30 Wildlife Society Bulletin 775-82 (2002) (attached as Exhibit 55); John C. Kilgo, et al., “A Test of an Expert-Based Bird-Habitat Relationship Model in South Carolina,” 30 Wildlife Society Bulletin 783-93 (2002) (attached as Exhibit 56). At the most basic level, all habitat composition models must be verified prior to use in decision-making. See Morrison, et al., Wildlife-Habitat Relationships. By contrast, the Corps offers no data to support any of the conclusions derived from its HEP modeling, and none of the models used in the USFWS HEP analysis have been verified. This critical failure alone demonstrates that the Corps has not undertaken the competent or cutting edge approach to modeling it purports to offer, and undermines its conclusions about the likely effects of the Project on the Columbia River ecosystem.

III. CONCLUSION

For all the reasons set forth above and in CRANE’S previous comment letters, including the DSEIS Comments, the FSEIS’s analysis of the likely environmental and

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 111

economic effects of the Channel Deepening Project is inadequate and fails to meet the requirements of federal law. Not only does the FSEIS continue to rely on bad science and bad economics to reach the conclusion that Channel Deepening should proceed, but it is based upon Biological Opinions from agencies that reached their no jeopardy conclusions in a manner that was arbitrary and capricious. In addition, the Corps has made significant changes to the Channel Deepening program and new species have emerged for listing since the issuance of the NMFS and USFWS 2002 Biological Opinions. For these reasons, CRANE requests that NMFS and USFWS withdraw their consultations, and that the Corps develop a new Channel Deepening Project proposal that addresses the failings described in this letter and in CRANE'S previous comment letters, and complies with federal law.

Sincerely,

Mark W. Schneider

MWS:sk

Robert E. Willis
Judy Grigg
Colonel Richard Hobernicht
February 28, 2003
Page 112

cc: (with enclosures) CRANE
(without enclosures—*Enclosures Available Upon Request*)
The Honorable Gary Locke
The Honorable John Kitzhaber
The Honorable Maria Cantwell
The Honorable Patty Murray
The Honorable Gordon Smith
The Honorable Ron Wyden
Congressman Brian Baird
Congressman Earl Blumenauer
Congressman David Wu
The Honorable John Iani, U. S. Environmental Protection Agency
Mr. Robert Lohn, NOAA Fisheries
Mr. Michael Crouse, NOAA Fisheries
Ms. Cathy Tortorici, NOAA Fisheries
Ms. Anne Badgely, USFWS
Ms. Loree Randall, WDOE
Mr. Russell Harding, ODEQ
Ms. Christine Valentine, ODLCD

October 11, 2002

Brian Shenk
Chief Economist
U.S. Army Corps of Engineers
Portland District
PO Box 2946
Portland, OR 97208-2946

Dear Brian,

I have attached two tables in an MS Excel file that summarize the geographic origins and inland transportation costs for container cargo exported through Portland. This data was gathered using the methods and assumptions described below. Although the cargo origin data was gathered two years ago, based on our on-going analysis of cargo data and discussions with shippers and shipping lines in the region, I believe that the geographic distribution of export cargo shipped via the Port is essentially the same today as it was 2000. The inland transportation cost data is derived from survey work we performed in August and September of this year with the assistance of Gene Levertson and Associates.

Collection of Cargo Origin Data

In the Fall of 2000, Port of Portland staff collected detailed information on the origins of container export cargo moving through Terminal 6. This information is summarized in the attached tables.

Container cargo origin and destination data were gathered from five sources: the Journal of Commerce Port Import and Export Reporting Service (PIERS), industry interviews, company research, Terminal 6 container cargo documentation, and Port of Portland sales and marketing staff. These five methods were used in conjunction with one another because none of these methods alone provides complete and accurate information.

To quantify the overall size of the market and provide commodity and shipper, the study used reports from PIERS. PIERS is a database of waterborne cargo shipments through United States ports. Some examples of the types of data that PIERS provide are shipper name, carrier, commodity type, container size, TEU count, port of discharge, and port of loading.

PIERS' chief limitation is that it does not identify the geographic origin of the cargoes it tracks. PIERS does have a field that identifies the origin of commodities ("org_des_city", "org_des_st"), but it is sometimes inaccurate and frequently left blank. Another PIERS limitation is that companies can request to be placed on a "Restricted Name List", thus masking the shipper name on the PIERS record. Another difficulty is that commodities are often shipped by freight forwarders, non-vessel owner operators, or trading companies and the identification of the true shipper is sometimes not possible. PIERS is useful, however, in providing accurate totals of box movements by commodity, port, and carrier. PIERS reports were primarily used to identify cargo shippers, the market size of each commodity category, and, where available, the origin of the cargo.

Interviewing shippers, freight forwarders, and ocean carriers proved to be very useful for finding origin and volume information. These interviews were conducted with the promise that information would be kept confidential. A limitation of the interviews is that shippers are

Geographic Origins and Inland Transportation Costs for Container Cargo Exported via Portland

Source: Port of Portland

All Costs are Roundtrip

Region	Total Ctnrs	Share	Weighted Cost/Ctnr		Cost/S. Ton		Difference in Cost Puget S. vs. Portland	
			Portland	P. Sound	Portland	P. Sound	Weighted Container	Short Ton
Lewiston	5,516	6.7%	\$450	\$841	\$19.82	\$36.99	\$390	\$17.17
Longview	9,725	12.9%	\$172	\$284	\$6.95	\$11.49	\$112	\$4.54
Mid Columbia	11,900	15.5%	\$425	\$728	\$17.56	\$30.03	\$302	\$12.47
Portland	15,481	18.4%	\$156	\$476	\$7.02	\$21.49	\$321	\$14.48
Willamette Valley	30,461	39.9%	\$231	\$680	\$9.50	\$27.90	\$448	\$18.40
Other	6,736	6.5%	\$699	\$993	\$38.95	\$55.36	\$294	\$16.41
Total	79,820	100.0%	\$293	\$637	\$12.57	\$27.32	\$344	\$14.75

Geographic Origins and Inland Transportation Costs for Container Cargo Exported via Portland
Source: Port of Portland

		All Costs are Roundtrip										Difference, Puget S. vs PDX		
Region	Zone	Total Ctnrs	Share	Cost 40ft Standard		Weighted Cost/Ctnr		Cost/TEU		Cost/S. Ton		40 ft Standard	Weighted Container	Short Ton
				Portland	Puget S.	Portland	P. Sound	Portland	P. Sound	Portland	P. Sound			
Lewiston	Lewiston	5,516	6.7%	\$455	\$780	\$450	\$841	\$246	\$459	\$19.82	\$36.99	\$325	\$390	\$17.17
Longview	Longview	9,725	12.9%	\$165	\$275	\$172	\$284	\$86	\$142	\$6.95	\$11.49	\$110	\$112	\$4.54
Mid Columbia	Boardman/Umatilla	8,469	11.3%	\$395	\$713	\$419	\$773	\$210	\$387	\$16.91	\$31.19	\$318	\$354	\$14.28
Mid Columbia	Pasco/Richland/Kennewick	1,915	2.4%	\$405	\$538	\$424	\$591	\$227	\$317	\$18.34	\$25.55	\$133	\$167	\$7.22
Mid Columbia	The Dalles	90	0.1%	\$227	\$590	\$281	\$663	\$191	\$452	\$15.42	\$36.46	\$363	\$383	\$21.04
Mid Columbia	Walla Walla	1,426	1.7%	\$475	\$630	\$473	\$642	\$259	\$351	\$20.87	\$28.34	\$155	\$169	\$7.47
	Subtotal	11,900	15.5%			\$425	\$728	\$218	\$372	\$17.56	\$30.03		\$302	\$12.47
Portland	Portland Inner	2	0.0%	\$115	\$420	\$115	\$420	\$58	\$210	\$4.64	\$16.94	\$305	\$305	\$12.30
Portland	Portland Middle	12,291	14.2%	\$135	\$445	\$149	\$463	\$85	\$266	\$6.89	\$21.48	\$310	\$315	\$14.59
Portland	Portland Outer	3,189	4.2%	\$155	\$495	\$182	\$528	\$92	\$267	\$7.44	\$21.53	\$340	\$345	\$14.09
	Subtotal	15,481	18.4%			\$156	\$476	\$87	\$267	\$7.02	\$21.49		\$321	\$14.48
Willamette Valley	Albany/Corvallis/Tangent/Jefferson	3,180	4.0%	\$230	\$650	\$242	\$672	\$129	\$358	\$10.38	\$28.86	\$420	\$430	\$18.47
Willamette Valley	Aurora/McMinnville	11,978	16.0%	\$150	\$570	\$168	\$607	\$84	\$304	\$6.79	\$24.48	\$420	\$438	\$17.68
Willamette Valley	Eugene/Springfield/Cottage Grove	7,394	9.7%	\$300	\$720	\$347	\$808	\$176	\$409	\$14.19	\$33.01	\$420	\$460	\$18.82
Willamette Valley	Salem/Silverton	7,056	9.1%	\$170	\$590	\$211	\$676	\$109	\$350	\$8.82	\$28.22	\$420	\$465	\$19.40
Willamette Valley	Willamina	853	1.1%	\$200	\$590	\$241	\$656	\$121	\$328	\$9.73	\$26.44	\$390	\$414	\$16.71
	Subtotal	30,461	39.9%			\$231	\$680	\$118	\$346	\$9.50	\$27.90		\$448	\$18.40
Other	Astoria/ N. Oregon Coast	20	0.0%	\$248	\$430	\$305	\$485	\$305	\$485	\$24.62	\$39.11	\$183	\$180	\$14.50
Other	Bend	33	0.0%	\$387	\$722	\$433	\$913	\$216	\$456	\$17.44	\$36.79	\$335	\$480	\$19.35
Other	Boise/Nampa	731	0.8%	\$910	\$1,310	\$1,012	\$1,386	\$643	\$882	\$51.89	\$71.10	\$400	\$374	\$19.21
Other	Clatskanie	172	0.2%	\$180	\$295	\$220	\$335	\$110	\$168	\$8.87	\$13.51	\$115	\$115	\$4.64
Other	Colfax	2,145	1.4%	\$528	\$640	\$455	\$700	\$450	\$692	\$36.31	\$55.79	\$112	\$244	\$19.48
Other	Connell	325	0.4%	\$435	\$450	\$475	\$528	\$238	\$264	\$19.15	\$21.29	\$15	\$53	\$2.14
Other	Coos Bay/ S. Oregon Coast	15	0.0%	\$550	\$940	\$588	\$983	\$294	\$492	\$23.71	\$39.65	\$390	\$395	\$15.94
Other	Grants Pass	2	0.0%	\$571	\$950	\$641	\$1,121	\$321	\$561	\$25.85	\$45.20	\$379	\$480	\$19.35
Other	Hood River/Cascade Locks	2	0.0%	\$171	\$590	\$250	\$678	\$125	\$339	\$10.06	\$27.32	\$419	\$428	\$17.26
Other	Idaho Falls/Pocatello	262	0.3%	\$1,512	\$1,770	\$1,543	\$1,784	\$797	\$922	\$64.31	\$74.33	\$258	\$240	\$10.02
Other	Kalama	199	0.1%	\$158	\$290	\$158	\$284	\$153	\$274	\$12.32	\$22.12	\$132	\$126	\$9.80
Other	Klamath Falls	69	0.1%	\$658	\$1,081	\$666	\$1,095	\$333	\$548	\$26.86	\$44.17	\$423	\$429	\$17.31
Other	Madras	215	0.3%	\$301	\$710	\$341	\$836	\$171	\$418	\$13.76	\$33.73	\$409	\$495	\$19.97
Other	Medford/Ashland/White City	147	0.2%	\$664	\$1,040	\$733	\$1,210	\$366	\$605	\$29.54	\$48.81	\$376	\$478	\$19.27
Other	Missoula	10	0.0%	\$834	\$1,100	\$834	\$1,100	\$417	\$550	\$33.61	\$44.35	\$267	\$267	\$10.75
Other	Newport	13	0.0%	\$320	\$740	\$363	\$853	\$321	\$754	\$25.91	\$60.81	\$420	\$490	\$34.90
Other	Pendleton/Pilot Rock	22	0.0%	\$490	\$700	\$522	\$748	\$319	\$457	\$25.72	\$36.85	\$210	\$226	\$11.13
Other	Redmond	29	0.0%	\$367	\$715	\$370	\$725	\$188	\$369	\$15.18	\$29.77	\$348	\$355	\$14.59
Other	Roseburg	886	1.2%	\$421	\$840	\$495	\$945	\$248	\$473	\$19.96	\$38.10	\$419	\$450	\$18.15
Other	Spokane	26	0.0%	\$601	\$700	\$576	\$732	\$365	\$464	\$29.46	\$37.45	\$99	\$156	\$7.99
Other	Twin Falls	1,065	0.7%	\$1,161	\$1,410	\$1,217	\$1,501	\$1,184	\$1,461	\$95.52	\$117.82	\$249	\$284	\$22.30
Other	Vale/Ontario	350	0.5%	\$915	\$1,195	\$915	\$1,195	\$458	\$597	\$36.90	\$48.18	\$280	\$280	\$11.28
	Subtotal	6,736	6.5%			\$699	\$993	\$483	\$686	\$38.95	\$55.36		\$294	\$16.41
	Total	79,820	100.0%			\$293	\$637	\$156	\$339	\$12.57	\$27.32		\$344	\$14.75

sometimes not aware from which port their cargo is shipped, having contracted for door pickup with carriers or freight forwarders. Also, some shippers have a mix of domestic and international cargoes, making it difficult for them to accurately trace their volumes and in some cases origin data. Lastly, some freight forwarders and trading companies were unwilling to provide the data needed as it was considered proprietary. In general, however, Port analysts and staff obtained excellent cooperation from industry sources. In many cases, carriers and freight forwarders provided extensive access to their sensitive marketing and sales data.

Researching companies or markets was useful in determining cargo origins when companies or freight forwarders could not be reached and PIERS data was not helpful. Common sources included company web sites, press releases, and SEC filings. Generally, research of this type was useful in identifying locations of plants and facilities producing exports.

Every export container shipped via Terminal 6 is accompanied by a container load plan (CLP) which is received upon entry into the terminal, processed by a berth agent, then forwarded to the container carrier. Many of these CLPs include notations identifying the geographic origin of the container. Port staff obtained very accurate cargo origin information by analyzing samples of these CLPs over the span of three months.

Port sales and marketing staff have developed extensive origin and destination data on shippers throughout the region. This data has been stored in company files and is updated by staff as they call on shippers and consignees. This data served as another way to find origin information and provided a way to verify volume information.

Each of these five methods complemented one another by providing volume and or origin information. These methods used alone provided fragments of the data; however, when used in conjunction with one another, they enabled staff to obtain both the volume and the origin and destination data and to confirm the validity of each data source.

The calendar year period of 1999 (or most recent twelve-month period) was used as a benchmark. Through interviews and PIERS data, volumes were determined based upon a 1999 calendar year period.

Cargo Origin Data Assumptions

Assumptions used in the collection and analysis of cargo origin data include:

- The cargo base was restricted to trade lanes in which Portland has direct service, i.e., Transpacific, Australia/New Zealand, Southern Europe, and South America. Container cargo in other trade lanes was excluded. The data provided the Corps includes all trade routes with Transpacific accounting for 95 percent of the cargo shipped via Portland. It is believed that removal of the non-Transpacific cargo from the data would result in little or no change in the geographic distribution provided.
- Intermodal cargo, i.e., cargo shipped by rail from the Midwest and points east, was excluded from the study.
- Where origin data were found to be inconsistent or conflicting, the most logical data was used. For example, volume information obtained from third-party sources databases sometimes differs from information obtained directly from shippers through interviews. In such cases, it is logical that the interview information derived from a specific client contact is more reliable than third-party database and, therefore, the interview data is used.

- Where calendar year 1999 data was unavailable, the most recent twelve-month period was used. The origin and destination data collected by the Port was derived from a number of different sources and no standardized time period information was available. The port used this assumption to most nearly approximate consistent 1999 calendar year data.
- Where origin, and destination information was unavailable, cargo was allocated to destinations based upon the known “market.” In cases where the commodity type could be identified, but the origin or destination was unknown, analysts allocated cargo to different locations based on the distribution of other shipments of the same commodity. For example, many commodities that are shipped through the Port of Portland are agricultural and their origins are closely tied to known production regions and processing facilities.
- Super chassis and standard chassis designation and 20’ or 40’ container size designation for each commodity are based upon how the commodity is drayed in normal conditions. Whether a specific cargo travels on a super chassis or regular chassis can affect its routing and the overall calculation of benefit. The same can be said for container size. Because many commodities travel on both regular and super chassis and in different container lengths depending on shipment specific factors, there are no clear rules to dictate which type of chassis or container should be used in the model. The Port allocated the percentage of each shipment traveling in each container size and by each chassis type based on interviews with industry representatives from each commodity group.
- The origin used in the model was assumed to be the cargo’s point of origin, not the location where it was loaded into a container. For example, all of the softwood lumber exported through Portland was found to travel by flatbed or other mode to a transloading point before being loaded into containers for ocean shipment. In these cases, the point of origin for the cargo was used rather than the point where it was moved into a container.
- Cargo was assigned a geographic origin when, through the use of the methods described above, a positive determination of origin could be made. However, we were unable to make a determination for cargo origin for eight percent of the cargo exported from Terminal 6. This cargo has been categorized as “Unknown” and is not included in the tables provided the Corps.

Collection of Inland Cost Data

In August and September 2002, Port of Portland staff, working with Gene Leverton and Associates, developed transportation rate tables to reflect current inland transportation costs for international container cargo moving in the region. The research effort focused on 11 geographic zones that account for 91 percent of the Portland’s container exports. Key shippers and transportation service providers in these zones were interviewed to determine representative rates and costs.

In most zones, a range of rates was obtained that reflect the specific situations of shippers and, where applicable, included confidential information regarding volume discounts and in-house trucking rates. The representative rates were chosen in consideration of input from the key shippers and service providers, and the composition of cargo and shippers within each zone.

The interviews with shippers and service providers revealed that trucking rates in 2002 are lower than those recorded in the 2000 HDR study due to lower fuel surcharges and general downward rate pressure due to weaker economic conditions. In addition, whereas the Peer

October 11, 2002

Review Panel for the original 2000 study recommended the use of tariff rates in low-volume traffic lanes where competitive quotes were unavailable, the revised rates for these lanes are now set to levels well below tariff to provide the most conservative estimates of benefits. Overall, the inland transportation rate update reduced inland transportation rates approximately 15 percent to 20 percent relative to rates obtained in the 2000 HDR study.

Inland Cost Data Assumptions

Even when considering just one origin and one destination point, rates can vary widely on a seasonal basis and are also subject to differences by carrier, commodity type, and many other factors. In order to simplify all of these variables to a manageable level, some assumptions were adopted, including:

- All rates include one direction full plus the cost of repositioning an empty container to the origin point (rates are typically quoted on a round-trip basis). This assumption has some limitations, particularly in heavy-traffic corridors where backhauls are available. The only corridor included in the region that meets this description is between Portland and Seattle. In order to test the impact of this assumption in the 2000 study, HDR completed a sensitivity analysis in which cargo moving in the corridor between Seattle and Portland was allowed to travel for the one-way full rate without paying a repositioning fee. This sensitivity analysis indicated that the reduced rates between Seattle and Portland would reduce costs by approximately 8 percent. However, it is believed that the prevailing round-trip rate, as determined through interviews with service providers and shippers, incorporated rate reductions available in situations where backhaul cargoes were available. Therefore, the attached tables show full round-trip costs for all origin and destination pairs.
- When determining truck/barge and truck/rail rates, the total rate includes the roundtrip throughput fee at upriver ports and inland rail terminals.
- Differences in delay times at export terminals are not specifically calculated into the rate model. It is assumed that terminal delays are figured into the rates quoted for delivery to each port.

Please contact me if I can be of further assistance.

Regards,

Jim Daly
Sr. Research Associate