

and safe, NMFS recommends that the Corps release pipeline-dredged materials into as deep a depth as possible.

### **10.2.8 Control of Non-Indigenous Species**

NMFS recommends that the Corps continue its efforts to minimize and/or avoid future, non-indigenous species introductions from deep draft vessel traffic associated with the deepened navigation channel by assisting the Coast Guard, and States of Oregon and Washington, in implementing rules to minimize ballast discharge and associated invasive species introductions.

### **10.2.9 Involvement of the Columbia River Tribes in Project Implementation**

The Columbia River Tribes, represented by the Columbia River Intertribal Fish Commission (CRITFC), have specific technical expertise that should be included into the Project implementation. The Corps should encourage CRITFC participation in the following Project activities: Adaptive management process, monitoring program, ecosystem research program, and the annual contaminants review team activities (*see* Table 3.5). The Corps should also encourage CRITFC participation with the Regional Sediment Evaluation Team that is updating the DMEF manual. The Corps should provide funding for CRITFC involvement in these Project and Project-related activities.

## **11. REINITIATION OF CONSULTATION**

Consultation must be reinitiated as follows:

This concludes formal consultation on these actions in accordance with 50 C.F.R. 402.14(b)(1). Reinitiation of consultation is required: (1) If the amount or extent of incidental take is exceeded; (2) if the action is modified in a way that causes an effect on ESA-listed salmonids that was not previously considered in the BA and this Opinion; (3) if through the monitoring and adaptive management process, or by any other means, new information or project monitoring reveals effects on the action that may affect the ESA-listed salmonids in a way not previously considered or in a way not predicted by the 2001 BA or this Opinion; or (4) a new species is listed or critical habitat is re-designated in a manner that may be affected by the action (50 C.F.R. 402.16)

## **12. INCIDENTAL TAKE STATEMENT**

### **12.1 Introduction**

Sections 4(d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm in the definition of “take” in the ESA means an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns, including, breeding, spawning, rearing, migrating, feeding or sheltering (50 C.F.R. 222.102, 2001). Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are

not limited to, breeding, feeding, and sheltering. Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary. They must be implemented by the action agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in Section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered in this Incidental Take Statement. If the Corps: (1) Fails to adhere to the terms and conditions of the Incidental Take Statement; and/or (2) fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of Section 7(o)(2) may lapse. The Corps will report to NMFS on annual progress toward implementing these reasonable and prudent measures.

An Incidental Take Statement specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

This Incidental Take Statement becomes effective at the point of signature of this Opinion, and continues to apply through construction and into the maintenance period of the Project. This Incidental Take Statement will be reviewed every year during the annual meeting of the adaptive management team. As appropriate, NMFS will determine whether reinitiation of consultation is indicated based on new information resulting from the adaptive management process.

## **12.2 Amount or Extent of the Take**

Section 9(a)(1) of the ESA prohibits the taking of ESA-listed species without a specific permit or exemption. Protective regulations adopted pursuant to Section 4(d) extend the prohibition to threatened species. Among other things, an action that harasses, wounds, or kills an individual of a listed species or harms a species by altering habitat in a way that significantly impairs its essential behavioral patterns is a taking. 50 C.F.R. 222.102. Incidental take refers to takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant. 50 C.F.R. 402.02. Section 7(o)(2) exempts any taking that meets the terms and conditions of a written Incidental Take Statement from the taking prohibition.

Take prohibitions of the ESA do not apply to an ESU that is proposed for listing until it is placed on the list of threatened or endangered species at the conclusion of the listing process. Therefore, this Incidental Take Statement will be not effective for any ESU that is proposed for listing during this consultation until that ESU is listed, and the conference portion of this Opinion is confirmed by NMFS as a biological opinion issued through formal consultation.

### 12.3 Effect of the Take

NMFS expects take to occur because of proposed actions that will harass, harm, injure, or kill individuals of the ESUs considered in this consultation that are likely to be present in the action area during part of the year when some effects of the proposed action will occur. NMFS anticipates that the proposed action covered by this Opinion will result in short-term and long-term incidental take of ESA-listed salmonids.

To the extent practicable, NMFS has defined take in terms of numbers of fish. In the case of take resulting from entrainment and habitat modifications resulting from channel dredging, take caused by these effects cannot be accurately quantified. In such circumstances, NMFS provides a surrogate to quantify the extent of incidental take.

#### 12.3.1 Short-term Extent of Take

Based on BRT discussions of the conceptual ecosystem model, other BRT deliberations including the SEI workshops, and use of the conceptual ecosystem model and numerical models in the effects analysis (*see* section 6 of this Opinion), short-term incidental take of ESA-listed salmonids is reasonable certain to occur.

**Blasting.** NMFS believes that short-term incidental take, in the form of killing and injury from blasting is reasonably certain to occur during channel construction actions. However, based on the effects analysis in Chapter 6.0 of the 2001 BA, the Corps concluded that few, if any, ESA-listed salmonids are likely to be directly taken as a result of blasting actions. Therefore, NMFS limits the amount of allowable incidental take from the single blasting event to no more than ten adult ESA-listed salmonids and 50 juvenile ESA-listed salmonids. Incidental take occurring beyond these limits is not authorized by this consultation.

**Dredging.** Dredging activities are reasonably certain to cause short-term incidental take from entrainment. The loss of salmonid prey items due to entrainment and burial in the immediate dredge vicinity may cause short-term take in the form of harm, while localized turbidity at the dredge site may harass ESA-listed salmonids by temporarily modifying their behavior.

Entrainment occurs when organisms are trapped during the uptake of sediments and water by dredging machinery (*e.g.*, clamshell, hydraulic). Cutterhead intake velocities may be as high as 40 feet/second for a 72-inch diameter cutterhead creating a zone of induction. Entrainment would result in the mortality of juvenile salmon, benthic infauna and epibenthic fauna. The probability of juvenile salmonid entrainment is largely dependent upon the likelihood of fish occurring within the dredge prism, dredge depth, fish densities, the entrainment zone (surface area of draghead or cutterhead plus the zone of induction), location of dredging within the river, equipment operations, time of year, and species life stage. Entrainment of adult salmonids, while possible, is considered to be extremely unlikely. Therefore, take of adult salmonids from entrainment is not authorized in this Incidental Take Statement.

Dredging in the action area may occur on a year-round basis. Fish are present in the Lower Columbia River throughout the year. Juvenile salmonids are most likely to occur in the upper 20-25 feet of the water column, although they may use water depths ranging from 22 feet to 37

feet (Carlson *et al.* 2001, Beeman *et al.* 2003). Adult salmonids may use water column depths ranging from 1 to 50 feet, although most adult salmonids are likely to be present in the upper 25 feet of the water column. Dredging in the navigation channel would occur at a minimum dredge depth of 36 feet CRD (this assumes maximum sand wave accretion height), with a maximum dredge depth of 48 feet.

The proposed conservation measure to maintain the cutterheads and dragheads in the sediment or no more than 3 feet above the river bottom is likely to substantially reduce, but not completely eliminate, the potential for fish entrainment. The potential for incidental take from benthic prey entrainment and turbidity is low, and no additional conservation measures have been identified to further reduce the potential for harm and harassment from dredging activities.

Based on the effects analysis in Chapter 6.0 of the 2001 BA, the Corps concluded that few, if any, ESA-listed salmonids are likely to be directly taken as a result of entrainment during dredging. This conclusion was based on dredging techniques required by the Corps and data that indicated that ESA-listed salmonids are not commonly found at the depths being dredged in the navigation channel. The 2001 BA indicates, based on sampling of hopper dredge entrainment events, no ESA-listed salmonids were entrained using hopper dredging methodologies proposed in the 2001 BA.

Based on the behavior of juvenile salmonids in deep-water and shallow water habitats, timing, and the proposed dredging operations and depths, the probability of entraining juvenile salmonids is considered to be low. Applying a methodology<sup>3</sup> that considers the various factors discussed above, NMFS estimates that up to 75 juvenile salmonids may be incidentally taken per year from dredging entrainment in the navigation channel between RM 4.4 and RM 106.4.

Due to the Corps' inability to monitor entrainment events and other potential sources of take associated with dredging activities, the Corps included, as part of the proposed action, to implement and monitor the impact minimization measure of limiting the dredge's draghead and/or cutterhead to be no more than 3 feet above the bottom whenever the dredge pumps are running (Table 3-2 of the 2001 BA). The Corps will not exceed the level of estimated take through controlling the operation of the draghead and/or cutterhead to a depth level of -35 feet CRD off the river bottom while the pumps are running (not idling).

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<sup>3</sup> An estimate of the amount of incidental take associated from entrainment was generated by first calculating the percent area of the navigation channel to be dredged in a given year relative to the total navigation channel area. The total navigation channel area was then multiplied by the average channel depth to calculate a relative volume. The 4-year smolt average (NWFSC 2004) was then divided into the relative cross-sectional volume to generate a fish density. A volumetric dredge cell was estimated to calculate a fish density relative to a given dredge cell within the cross section. After factoring minimum dredge elevations, equipment operations, and dredge intake velocities, a percent of the water column relative to the entrainment zone and fish use potential was calculated to estimate a number of fish in the entrainment zone. Relative fish abundance to peak outmigration and non-peak rearing and outmigration was then calculated over a 12 month period to estimate the number of fish subject to entrainment relative to season. This number was then divided by the number of likely hours that dredging actually occurs per year. This number was then multiplied by a residence time coefficient and then multiplied by an error coefficient calculated from the total estimate of juvenile salmonid abundance evenly distributed in the lower Columbia River.

NMFS believes that the Corps reporting the draghead location while the pumps are running (not idling) to be an adequate surrogate of direct take resulting from entrainment during dredging. If the draghead and/or cutterhead is higher than -35 feet CRD or more than 3 feet off the river bottom while the pumps are running (not idling) for more than 3 times in a 8 hour period, the Corps must stop dredging operations and reinitiate consultation with NMFS.

NMFS expects some low level of incidental take of ESA-listed salmonids to occur in the form of harm as a result of the loss of salmonid prey items due to entrainment and burial in the immediate dredge vicinity and in the form of harassment from localized turbidity at the dredge site that may temporarily modify fish behavior. However, the best scientific and commercial data available are not sufficient to enable us to quantify the amount of take reasonably certain to occur as a result of these aspects of dredging activity. Therefore, NMFS utilizes the total volume of dredged material as a reasonable surrogate indicator to represent the extent of incidental take from these dredging effects. Monitoring action MA-2, included in this Opinion, focuses on monitoring annual dredging volumes to determine if they exceed those proposed in the Project. Data generated during pre-construction, construction, and post-construction phases of the Project will be used to determine if changes in Project are necessary. Such determinations will be made through the adaptive environmental management process for the Project (*i.e.*, mitigation actions, project modification, stop project - *see* Figure 2.3 in Bartell 2004). Should the monitoring of dredged material volumes and subsequent evaluation through the adaptive management process reveal effects that exceed those predicted, the Corps would be required to reinitiate consultation with NMFS.

**Ecosystem Restoration Features.** In the 2002 Opinion, NMFS was unable to quantify the level of expected short-term take resulting from the construction of ecological restoration measures because of uncertainties related to the construction of the Millar-Pillar and Lois Mott ecological restoration measures. However, these two restoration measures have been eliminated from the proposed action as a result of Oregon's Coastal Zone consistency determination and are no longer covered by this Incidental Take Statement

Since the release of the 2002 Opinion, NMFS has been working with the Corps on the implementation of the remaining ecosystem restoration features. Base on new information provide by the Corps, NMFS can now provide more detailed information concerning restoration construction and the likely short-term take from the remaining restoration actions.

The estimated take is as follows:

Purple Loosestrife Control Program:

Projected Take - No take is anticipated because the Corps is employing a biological control agent for this program that does not adversely affect ESA-listed salmonids.

Tenasillahe Island Interim Restoration:

Projected Take - 0 adults, 36 juveniles

Tenasillahe Long-term:

Projected Take - To be determined during site specific ESA consultation

Bachelor Slough:  
Projected Take - 0 adults, 20 juveniles

Tidebox Retrofits:  
Projected Take - 2 adults, 66 juveniles

Lord-Walker Hump-Fisher Improved Embayment Circulation:  
Projected Take - No take occurred because project construction occurred in the dry.

These estimates of the amount of incidental take are based on the expected densities of ESA-listed salmonids within the action area and the proposed restoration construction activities as described in section 6.7.2 of this Opinion. Note that this habitat to be affected by this Project is not unique to the Lower Columbia River, nor will the effects thereto substantially affect population abundance, growth rate, spatial structure, or diversity of each ESU addressed in the Opinion.

### 12.3.2 Long-term Extent of Take

Over the long term, Project-related habitat modifications to the Lower Columbia River, estuary and river mouth may degrade shallow water habitat important ESA-listed salmonids, and therefore cause harm to these species.

**Habitat Modifications Resulting from Channel Dredging.** Habitat modifications resulting from channel dredging are likely to occur throughout the Project area. Habitat impacts from dredging and disposal sites are addressed in Sections 3.3.2 - 3.3.9 of the 2001 BA.

***Upland Disposal.*** As identified in section 6 of this Opinion, changes in the volume of dredged material disposed of at upland sites may affect habitat forming processes such as sediment accretion and erosion in the vicinity of the disposal sites. Localized effects to these habitat processes in turn, may affect the amount and quality of shallow water habitats (*e.g.*, tidal marsh and swamp) which provide important foraging and rearing (*i.e.*, feeding habitat opportunity, refugia, and habitat-specific food availability) areas for ESA-listed juvenile salmonids.

According to the Corps, upland dredged material disposal sites proposed by the Corps have been sited on existing disposal sites of low habitat value or occur behind main flood control levees where ESA-listed salmonids are virtually excluded from access and export of detritus and terrestrial insects is limited. Additionally, large woody debris is scarce in these areas. NMFS believes that effects from the deposition of dredged material at upland disposal sites, although limited in nature, are reasonably certain to result in a low level of incidental take of individuals.

While NMFS expects some low level of incidental take to occur, the best scientific and commercial data available are not sufficient to enable us to quantify the amount of take reasonably certain to occur as a result of this activity. Therefore, NMFS utilizes the volume of dredged material disposed at these upland sites as a reasonable surrogate to measure the extent of incidental take.

The Corps developed an updated disposal plan based on the Final supplemental EIS prepared in 2002 (Final Supplement EIS [2003] Table S4-1. Proposed Disposal Plan Including Beneficial Use Sites, Ecosystem Restoration and Wildlife Mitigation [Martin Island Embayment]). Monitoring action MA-2, included in this Opinion, focuses on monitoring annual dredging volumes to determine if dredge disposal volumes exceed those proposed in the Project. Data generated during pre-construction, construction, and post-construction phases of the Project will be used to determine if changes in Project are necessary. Such determinations will be made through the adaptive environmental management process for the Project (*i.e.*, mitigation actions, project modification, stop project - *see* Figure 2.3 in Bartell 2004). Should the monitoring of dredged material volumes reveal that the material being deposited into the sites is not what was predicted (*see* Table S4-1, referenced above), the Corps would be required to reinitiate consultation with NMFS.

***Estuary-wide Habitat Impacts.*** The analysis in section 6.2.2 of this Opinion discusses how habitat forming processes that result in the natural development of tidal marsh and swamp habitats in estuary areas like Cathlamet and Grays Bays could potentially be affected in the long term by the Project. Based on the risk and uncertainty analysis conducted by the BRT (*see* Table 7-1 of the 2001 BA), how these impacts could affect ESA-listed salmonids and their habitats is uncertain over the life span of the Project. Although these potential long-term effects to ecosystem indicators are not of high risk to ESA-listed salmonids or their critical habitat at the ESU level, NMFS believes implementation of the Project is reasonably certain to result in a low level of incidental take (harm) of individuals.

While NMFS expects some low level of long-term incidental take to occur, the best scientific and commercial data available are not sufficient to enable us to quantify the amount of long-term incidental take that is reasonably certain to occur over the life of the Project. Therefore, NMFS utilizes bathymetric changes induced by the Project as a reasonable surrogate to measure the extent of incidental take.

Bathymetry was chosen as a surrogate because changes in this physical indicator can affect tidal marsh and swamp habitats for juvenile salmonids. Tidal marsh and swamp habitats are particularly important to juvenile salmonids because they provide feeding habitat opportunity, refugia, and habitat-specific food availability. These habitat types are generally defined by specific elevation ranges (2001 BA, Figure 5-5). Therefore, measuring changes in bathymetry is important because ocean-type juvenile salmonids use the edges of these marshes to feed, and the edges of shallow channels within the marshes as refugia and feeding areas (2001 BA, Figure 5-6). The aquatic edge is considered to be an important factor governing the exchange of organisms and the connectivity associated with the channels offers more opportunity to marsh access (Shafer and Yozzo, 1998). Consequently, access to the edges at high tide and development of low-tide refuge areas near or within marshes is critical to lower river ocean-type juvenile salmonids. Channel order (the number and width of channels) and channel depth are also functional characteristics of a marsh area. A change in bathymetry could affect the quality and quantity of this habitat.

Therefore, NMFS has determined that the post-construction measurement of changes in bathymetry is an appropriate surrogate for long-term take. The Corps completed a bank-to-bank bathymetric survey of the estuary (mouth to RM 40) in 2004. This data will compliment the 1984

CREDDP data to show natural changes that occurred in the estuary over a twenty-year period. As required by the State of Washington's 401 water quality certification, the Corps will repeat the bank-to-bank survey from RM 3 to 18 within two years after completion of construction. Although the potential long-term effects to ecosystem indicators are not of high risk to ESA-listed salmonids at the ESU level (*see* Table 7-1 of the 2001 BA), NMFS believes the effects are reasonably certain to result in harm to individuals of the ESA-listed species, consequently resulting in a low level of incidental take.

To address the long-term change to habitat types in the estuary the Corps will repeat the bank-to-bank estuary survey (mouth to RM 40) five years after the State of Washington's required survey and compare the results to the previous surveys of the estuary. This portion of the river (*e.g.*, Cathlamet Bay, Grays Bay) was chosen because the habitat is important to ESA-listed juvenile salmonids. If this comparison demonstrates that the Project caused an appreciable reduction in the type, value, or function of either tidal marsh and swamp habitats or shallow-water and flats habitats, the Corps will reinitiate consultation with NMFS. However, in any circumstance, reinitiation shall be required if a 1% or greater reduction in acreage occurs.

#### **12.4 Reasonable and Prudent Measures**

NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of ESA-listed salmonids from activities associated with navigation channel improvements:

1. Minimize the likelihood of incidental take associated with short-term (direct and indirect) impacts to listed salmonids during Project construction and maintenance activities.
2. Minimize the likelihood of incidental take associated with long-term uncertainty and associated risk regarding Project effects by implementing a monitoring program.
3. Minimize the likelihood of incidental take associated with project impacts by implementing an adaptive management process to review results of monitoring program and other applicable new information, and determine actions necessary to minimize any adverse effects.
4. Minimize the likelihood of incidental take during implementation of ecosystem restoration features that aid in the recovery of ESA-listed species in the Lower Columbia River, estuary and river mouth.
5. Provide NMFS with annual reports from Project compliance, monitoring, restoration, and research activities to ensure adequate organization, coordination, and reporting of all information resulting from the Project and this Opinion.

#### **12.5 Terms and Conditions**

In order to be exempt from the prohibitions of Section 9 of the ESA, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. In order to minimize the likelihood of incidental take associated with short-term (direct and indirect) impacts to ESA-listed salmonids during Project construction and maintenance activities, the Corps shall do the following:
  - a. Minimize effects from entrainment through the following actions:
    - i. Implement the dredging Impact Minimization Measures and Best Management Practices as identified in Chapter 3 of the 2001 BA.
    - ii. Monitor operation of the dredge draghead and/or cutterhead to minimize the time they are removed from the substrate.
  - b. Minimize effects from blasting through the following actions:
    - i. The blasting plan, outlined on page 6-20 of the FEIS for the Project, will be developed in conjunction with Federal and state agencies and submitted to NMFS for approval 30 days before blasting. The blasting plan will include specific monitoring actions to determine if any listed fish are killed or injured, and include a clause that, if the blasting results in a take of listed salmonids, the Corps will discontinue blasting until such time as that take can be assessed and measures enacted to minimize impacts.
    - ii. The results of the blasting plan monitoring shall be presented at the adaptive management team meeting during the year in which the blasting occurs.
  - c. Before navigation channel construction and maintenance implementation, the Corps shall provide a “contractor compliance plan” to NMFS for review and approval. The plan must describe specific compliance monitoring actions, designed to minimize impacts to ESA-listed salmonids, that will occur during dredging and disposal actions, as described in 2001 BA table 7-4, 7-5, and 7-6. In addition, the contractor shall be required to report to the Corps any unanticipated or unusual events or visual observations (*e.g.*, water surface oil slicks, injured/dead fish, unusual colored or smelling sediments) that are not required in the contractor compliance plan. If take of ESA-listed species is observed during compliance monitoring, the NMFS shall be contacted immediately to determine the need for Project modification, mitigation, or cessation.
2. In order to minimize the likelihood of incidental take associated with uncertainty and risk regarding long-term Project effects, the Corps shall implement a monitoring program with the following elements:
  - a. The Corps shall finalize and implement the monitoring program (Table 7-3 of the 2001 BA). All activities related to scope identification, *i.e.*, goals, milestones for completion, and check-in points, triggers for management change (management decision points that include specific metrics), and sampling/testing protocols to be developed, will be coordinated with NMFS. The final monitoring program shall also ensure that adequate pre-, during, and post- construction monitoring actions occur to allow for comparable pre- and post-Project data analysis.
  - b. Two proposed monitoring actions, MA-1 and MA-3, shall be implemented over a longer time-scale (Term and Condition 5.a.1 of this Incidental Take Statement discusses Adaptive Management timeframes that link to long-term monitoring actions) than proposed in the 2001 BA. These monitoring activities are vital to

- understanding long-term Project-related changes to the Lower Columbia River, estuary and river mouth, and to allow for future adaptive management team decisions. Therefore, the Corps will continue, for the entire duration that the adaptive management program is operating, to collect and analyze data associated with MA-1 and MA-3 activities.
- c. Through monitoring measure MA-4, the Corps shall ascertain Project related changes in habitat. Additionally, the Corps shall compare results of this monitoring action to any similar research efforts by the Northwest Fisheries Science Center's (*i.e.*, their Columbia River estuary study) or other organizations in the estuary for a more complete assessment of habitat changes. At the end of the proposed monitoring period, monitoring results from MA-4 and associated research/monitoring shall be reviewed by the adaptive management team. The adaptive management team will determine whether additional MA-4 actions or a sub-component of MA-4 will go forward into the future.
  - d. In developing the above monitoring program information, the Corps will use the scope and sampling/testing protocols being implemented by the Northwest Fisheries Science Center in their on-going research activities in the Lower Columbia River and estuary as the basis for design. The final program will also describe how the various actions integrate together to form an ecosystem approach to evaluating ecosystem changes overtime.
    - i. Since the issuance of the 2002 Opinion, the final monitoring plan was submitted to NMFS in March 2004.
    - ii. Implement the final monitoring program, as per the implementation dates.
    - iii. Ensure that development and implementation of the monitoring program is consistent with the 2004 FCRPS Hydropower Biological Opinion.
  - e. The Corps shall continue to work with NMFS and FWS on the revision of the DMEF manual to develop a set of contaminant testing protocols appropriate for marine and fresh water environments. Upon final completion of the revised DMEF manual, the monitoring program will be updated based on the new manual based on the contaminants portion of the monitoring program (*see* Table 7-3 of the 2001 BA, item MA-5). These changes may require additional changes to the monitoring program. Any changes are deemed necessary, will be submitted to NMFS for review and approval before their implementation. The Corps shall continue to support the work of the Regional Sediment Evaluation Team that is updating the DMEF manual.
  - f. The best available information indicates that the Columbia River navigation channel sediments do not exceed current DMEF or NMFS contaminants thresholds. The interagency contaminants review team, identified in MA-5, shall ensure that the Project continues to proceed with the best available sediment and contaminant information. The interagency contaminants review team shall meet annually to review sampling distribution and frequency, sediment quality, and contaminants concerns of all Lower Columbia River, estuary and river mouth sediment sample locations. The interagency contaminants review team shall provide the adaptive management team with annual, or more regular, updates on current sediment and contaminants information in the Project area.

Since the issuance of the 2002 Opinion, the interagency contaminants review team has continued to work with the adaptive management team to identify if additional sampling or contaminants testing necessary for purposes of minimizing contaminants re-suspension from Project dredging and/or disposal activities. The Corps shall complete additional sediment and contaminant samples determined necessary by the adaptive management team. Any samples that the adaptive management team determines are necessary as a result of the January 2003, meeting shall be completed before Project construction.

- g. The Corps shall host an ETM workshop to better understand and propose meaningful management actions to conserve the ETM. The ETM workshop will be held in October 2005. The Corps will coordinate the following actions with NMFS in the development of this workshop, including:
  - i. Develop the scope of the meeting, agenda, and list of meeting attendees.
  - ii. Make information obtained through monitoring and research available for the workshop.
  - iii. Prepare a final report of the ETM workshop to be submitted to NMFS one month after completion of the workshop.
  - iv. Present the results of the ETM workshop (final report) to the adaptive management team.
  - v. Present management actions from the final ETM report to the adaptive management team for consideration in the adaptive management process.
- h. The Corps shall minimize effects from stranding through the following actions:
  - i. Develop and implement a stranding study to be developed in conjunction with NMFS, FWS, the Ports, and appropriate state agencies. The stranding study will evaluate parameters that influence stranding. Potential factors include: cross-sectional area, velocity, water level, bank configuration, location along river, slope of bank, ship traffic past site, and type, size, draft, and speed of vessel. To the extent appropriate, the Corps will integrate this study with efforts related to implementation of the September 15, 1999 Opinion on the operation and maintenance dredging from John Day Dam to the Mouth of the Columbia.
  - ii. The scope of the stranding plan shall include an identified scope including goals, milestones for completion, check-in points, triggers for management change (*i.e.*, management decision points that include specific metrics), and sampling/testing protocols to be developed in coordination with NMFS.
  - iii. The results of the stranding plan shall be used to develop a plan to minimize and/or eliminate fish stranding. The stranding minimization plan, as it applies to ship traffic will be provided to the U.S. Coast Guard, for use in their regulation of river traffic, and to the adaptive management team for consideration during the adaptive management process.
  - iv. Since the issuance of the 2002 Opinion, the stranding study design was submitted to NMFS in June 2004 for approval.
  - v. Since the issuance of the 2002 Opinion, the stranding study, which was originally to be implemented in April 2003, was approved by NMFS in June 2004, and is now being implemented.
  - vi. The results of the stranding study, including management recommendations to minimize stranding, shall be presented at the adaptive management team

- meeting (January 2006). Management recommendations shall be reviewed by the adaptive management team and implemented where feasible.
- vii. The stranding study will be repeated two years following construction of the deeper channel.
  - viii. Post-construction stranding studies will be evaluated by the adaptive management team.
  - i. In the event the Project will use ocean disposal at the Deep Water Site (*see* Section 3.2.8 of the 2001 BA), the management plan for this disposal site will be coordinated with NMFS.
3. The Corps shall implement an adaptive management process to review results of the monitoring program and other applicable new information and determine actions necessary to minimize any adverse Project effect.
- a. Establish the adaptive management team that implements the adaptive management process. The adaptive management team will meet annually (or more frequently if new circumstances arise) to review scientific information collected through monitoring, research, or BMPs while implementing this action.
  - b. The adaptive management team shall assess Project effects, and evaluate the effectiveness of the compliance measures, the monitoring program, research, and ecosystem restoration features. In doing so, the adaptive management team will ensure that Project construction, operation and maintenance, and ecosystem restoration features have no greater impacts than predicted in the 2001 BA or in this Opinion and Incidental Take Statement.
  - c. If an adverse effect is determined by the adaptive management team, the Corps shall, within 30 days, submit an impact minimization plan to NMFS for approval. The Corps plan could range from proposing mitigation actions, to modifying or stopping the Project if warranted.
  - d. The Corps will work cooperatively with NMFS and FWS to develop goals, stated purposes, operating principles, and composition of the adaptive management team. The Corps should review 65 FR 35242 for overview of using adaptive management for certain ESA-listed species decision-making and permitting activities. Portions of this policy document may be pertinent to the Corps' final design of the adaptive management process for this Project. The framework for actions taken by the adaptive management team shall be based on the following:
    - i. Short-term (Years 0-5: Pre-construction, construction, and post-construction). Focus shall be on potential short-term project impacts and modifications to minimize impacts. The effectiveness of the compliance measures, the monitoring program, research, and ecosystem restoration features will be evaluated. Additional mitigation features may be recommended for implementation and/or modifying or stopping the project if warranted.
    - ii. Mid-term (Years 5-10). Conduct trend analyses with monitoring data and research actions to detect ecosystem changes over the longer term and apply to actions identified above.

- iii. Long-term (Years 10 and beyond). Translate trend analysis information into long-term trends in ecosystem impacts and restoration of the ecosystem.
    - e. Information gathered through monitoring and research actions will be used to annually assess Project effects to the following indicators:<sup>4</sup>
      - i. Shift in the location of the ETM.
      - ii. ETM functions.
      - iii. Accretion/erosion rates.
      - iv. Habitat types.
      - v. Food resources for salmonids.
      - vi. Changes to sideslope adjustments beside the entire navigation channel and associated loss of shallow water/flats or tidal marsh and swamp habitats in riverine and estuarine areas.
      - vii. Physical features of habitat types, habitat opportunity, bathymetry, bedload changes, rate of suspended sediment transport, and water level changes to the estuary.
      - viii. Structure, distribution, net productivity, and detritus production of marshes and swamps.
      - ix. Velocity changes in shallow water habitats and available refugia.
      - x. Salinity changes as they impact habitat types.
    - f. Since the issuance of the 2002 Opinion, the Corps submitted the final design of the adaptive management process to NMFS in December 2002 for approval.
    - g. Since the issuance of the 2002 Opinion, the Corps conducted the first adaptive management team meeting in January 2003. The adaptive management team will function for the duration of the monitoring program and prescribed ecosystem research actions. The Corps will provide facilitation support at all meetings of the adaptive management team.
    - h. The Corps shall ensure that development and implementation of the adaptive management process is consistent with the estuary sections of the 2004 FCRPS Hydropower Biological Opinion.
4. In order to minimize the likelihood of incidental take through implementation of ecosystem restoration features (*see* Table 8-2 of the 2001 BA), the Corps shall:
- a. Conduct all shallow water ecosystem restoration in-water construction activities, including excavation and dredge material placement, during approved in-water construction windows. The pipeline dredge in-water construction window for ecosystem restoration projects in the Lower Columbia River and estuary is November 1 to February 28. Hopper dredge disposal in deep water temporary storage sump locations, does not have an in-water construction window. The in-water construction window for Columbia River tidegate retrofit projects is July 1 to September 15.

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<sup>4</sup> These are minimum effects to be examined based on the state of knowledge at the time this Opinion was issued. As additional effects are identified, or the existing list of effects is modified, this list will be changed to fit the contemporary needs to the monitoring program and adaptive management process.

- b. To the extent practicable, maintain dredge draghead and/or cutterhead at or below the substrate surface during ecosystem restoration construction activities that require dredging activities.
  - c. Tidegate retrofits:
    - i. The Corps shall enter into an agreement with the Project sponsors that will require the sponsors to ensure future maintenance of retrofitted tidegates. In addition, the Corps will require guarantees from the Project sponsors that volitional fish passage, via timely operation of the tidegate passage features, will occur during key salmonid migration periods. The Corps will coordinate fish design for tidegate retrofits with NMFS fish passage engineers.
    - ii. The Corps shall coordinate fish passage designs for tidegate retrofits with NMFS fish passage engineers.
  - e. The Corps shall coordinate with NMFS on the development and implementation of pre- and post- monitoring protocols for the ecosystem restoration features to gauge their effectiveness in restoring the type, function, and value habitats identified in the 2001 BA. The Corps' restoration features monitoring plans shall be submitted to NMFS for review and approval by December 15, 2005.
5. The Corps shall provide NMFS with annual reports starting one year after the date of this Opinion regarding Project compliance, monitoring, restoration, and research activities. The report shall also summarize annual implementation of reasonable and prudent measures and their implementing terms and conditions.
- a. Compliance:
    - i. The Corps will submit a series of reports based on the dredging Impact Minimization Measures and BMPs for compliance (*i.e.*, construction and maintenance) actions to NMFS in six-month intervals during the construction process. These reports shall include the following minimum elements: a description of how the Corps implemented and responded to the impact minimization measures and BMPs, how much material was dredged and disposed of, how many fish were taken due to blasting, were any unusual sediments encountered and how were these events addressed, how effective were the BMPs in minimizing impacts from Project construction, and how the Corps addressed any adverse compliance monitoring finding.
    - ii. The Corps must record daily operations while dredging to ensure all BMPs are followed. In order to complete this task, the Corps will develop a standard tracking table for workers of the dredging vessels. The results of the tracking information will be included in summary form and as an appendix to the construction and maintenance annual reports (*see* Integrated Annual Report requirement, below).
  - b. Monitoring Activities:
    - i. An annual monitoring report will be completed for each monitoring action (MA-1 to MA-6). The following shall be included in the monitoring report for each monitoring action: (1) Overview of monitoring action; (2) monitoring data and results; (3) description of adverse impacts to ESA-

listed salmonids and/or their habitats that were determined to be related to Project activities; and (4) recommendations to be reviewed by adaptive management team.

- c. Ecosystem Restoration Features:
  - i. Upon completion of each restoration feature, the Corps will submit an monitoring report to NMFS. The report will include:
    - (1) Detailed discussion of monitoring results.
    - (2) Photographic documentation of environmental conditions at the project site before, during, and after project completion.
    - (3) Photographs will include general project location views and close-ups showing details of the project area and project, including pre and post construction.
    - (4) Each photograph will be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
    - (5) Recommendations on methods to improve site-specific restoration feature.
- d. Ecosystem Research Actions:
  - i. An annual research progress report, and a final report, shall be completed for each research action. Each final report shall clearly define research objectives, and report on research findings. Recommendations for additional research, or discussion of management implications, also shall be provided.
- e. Integrated Annual Report:
  - i. The Corps shall provide an annual progress report that documents the Corps progress implementing all reasonable and prudent measures and their implementing terms and conditions. As appropriate, based on the Integrated Annual Report, NMFS will determine whether reinitiation of consultation is indicated.

If a dead, injured, or sick endangered or threatened species specimen is found during Project dredging, disposal, monitoring, research, or restoration feature, initial notification must be made to the National Marine Fisheries Service Law Enforcement Office, at the Vancouver Field Office, 600 Maritime, Suite 130, Vancouver, Washington 98661; phone: 360.418.4246.

Care should be taken in handling sick or injured specimens to ensure effective treatment and care or the handling of dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered and threatened species or preservation of biological materials from a dead animal, the finder has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed.