

## 9. CONCLUSION

### 9.1 Introduction

The analysis in the preceding sections of this Opinion forms the basis for conclusions as to whether the proposed action, the Columbia River Federal Navigation Channel Improvements Project, satisfies the standards of Section 7(a)(2) of the ESA. To do so, the Corps must ensure that their proposed action is not likely to jeopardize the continued existence of any listed species or destroy or adversely modify proposed and designated critical habitat. Section 3 of this Opinion describes the constituent components of the proposed action. Section 4 outlines the biological requirements and current status of the ESA-listed salmonids considered in this Opinion. Section 5 evaluates the relevance of the Lower Columbia River and estuary environmental baseline to the ESA-listed species' current status. Section 6 details the likely effects of the proposed action, both on individuals of the ESA-listed species in the action area, as well as to the properly functioning condition of their habitat. Section 7 analyzes the effects of the proposed action on PCEs of proposed and designated critical habitat. Section 8 considers the cumulative effects of relevant non-Federal actions reasonably certain to occur in the action area. On the basis of this information and analysis, NMFS draws its conclusions about the effects of the Project on the survival and recovery of the ESA-listed salmonid species.

In this concluding section, NMFS analyzes whether the proposed action is likely to jeopardize the continued existence of ESA-listed species or result in the destruction or adverse modification of proposed and designated critical habitats. NMFS recognizes the importance of the Lower Columbia River and estuary to the conservation of ESA-listed salmonids, in particular, ocean-type Chinook and chum salmon. The 2004 FCRPS Hydropower Biological Opinion and the Northwest Fisheries Science Center draft report, *Salmon at the River's End (Bottom et al., 2001)*, acknowledge that conservation and restoration of habitat in this portion of the Columbia River Basin is essential to the eventual recovery of ESA-listed salmonids.

### 9.2 Summary of Navigation Channel Improvement Effects - Jeopardy Standard

Based on the effects analyses in section 6 of this Opinion, NMFS believes that the most predictable impacts from the proposed action to ESA-listed salmonids and their habitats in the Lower Columbia River, estuary and river mouth are short-term, physical changes during the construction and subsequent maintenance periods of the Project. Impacts to key physical processes have the potential to affect habitat forming processes. However, expected impacts to these key physical processes will be limited and short-term in nature during the Project construction and maintenance periods. This conclusion was verified during the SEI panel process, as well as during BRT discussions of the numerical modeling conducted by WES and OHSU/OGI. Therefore, Project construction and maintenance impacts to key habitat types (*i.e.*, tidal marsh and swamp, shallow water and flats, and water column) should be limited as well.

Section 6.2.1 (Direct Effects) of this Opinion indicated that Project construction and maintenance would have limited potential to result in the incidental take of ESA-listed salmonids via dredging entrainment and blasting activities. Section 6.2.2 (Indirect Effects) indicated that short-term, physical changes to the habitat-forming process indicators during Project construction and maintenance periods are unlikely to have more than a limited adverse effect on

any of the habitat indicators identified in section 6.3 of this Opinion. Section 6.4 of this Opinion analyzes indicators that occur in more than one key habitat. Based on minor predicted changes to key physical habitat-forming processes discussed above, short-term Project effects to habitat complexity, connectivity, and conveyance, feeding habitat opportunity, refugia, and habitat-specific food availability are expected to be limited.

Contaminants (section 6.4.2 of this Opinion) are another indicator that can affect more than one habitat type. NMFS' concerns over resuspension of contaminants by the Project were raised in our August 25, 2000, withdrawal letter for the 1999 Opinion. The environmental baseline clearly indicates that juvenile salmonids are being exposed to toxicants in their food supply (*see* section 5 of this Opinion) in the estuary. However, while the source of those toxicants is not clear, the potential of the Project to exacerbate this situation is unlikely given the characteristics of the material being dredged and disposed of during the construction period. To be as protective as possible, Monitoring Action 5, identified in Table 7-3 of the 2001 BA (page 7-9), addresses the potential for release of contaminants during the construction process and will help identify and minimize the potential to resuspend contaminants during Project construction and maintenance activities.

Based on the limited direct and indirect Project effects on the key indicators of the estuarine habitat conceptual ecosystem model, NMFS concludes that the proposed action would not prevent or delay the achievement of properly functioning habitat conditions for listed species within the action area. In addition, population numbers of ESA-listed salmonids will not be appreciably reduced. NMFS also believes that the Project, other than during short-duration and limited locations of salmonid avoidance of dredging and disposal operations, will not appreciably reduce the distribution of ESA-listed salmonids. Of all ESA-listed salmonids, only Columbia River chum salmon spawning habitat occurs in the Project area. However, NMFS believes the direct and indirect effects of the Project will not appreciably reduce any of the ESA-listed salmonid ESUs' population numbers, distribution within each ESU, or reproductive success. Therefore, NMFS believes that the Project will not appreciably reduce the likelihood of both the survival and recovery of ESA-listed salmonids.

### **9.2.1 Summary of Navigation Channel Improvement Effects - Critical Habitat**

Based on the effects analyses in section 6 of this Opinion, NMFS believes that the most predictable impacts from the proposed action to critical habitat in the Lower Columbia River, estuary and river mouth are short-term, physical changes during the construction and subsequent maintenance periods of the Project. Impacts to key physical processes have the potential to affect habitat forming processes. However, expected impacts to these key physical processes will be limited and short-term in nature during the Project construction and maintenance periods. This conclusion was verified during the SEI panel process and NMFS' review of the numerical modeling conducted by WES and OHSU/OGI. Therefore, Project construction and maintenance impacts to key habitat types (*i.e.*, tidal marsh and swamp, shallow water and flats, and water column) should be limited as well.

Section 6.2.1 of this Opinion indicated Project construction and maintenance would have limited potential to result in the incidental take of ESA-listed salmonids via dredging entrainment. Our indirect effects analysis also determined that short-term, physical changes to any of the habitat-

forming process indicators (section 6.2) during Project construction and maintenance periods are unlikely to have more than a limited adverse effect on any of the habitat indicators identified in section 6.3 of this Opinion. Section 6.4 of this Opinion analyzes indicators that occur in more than one key habitat. Based on minor predicted changes to key physical habitat-forming processes discussed above, short-term Project effects to habitat complexity, connectivity, and conveyance, feeding habitat opportunity, refugia, and habitat-specific food availability are expected to be limited.

Contaminants (section 6.4.2 of this Opinion) are another indicator that can affect more than one habitat type. NMFS' concerns over resuspension of contaminants by the Project were raised in our August 25, 2000, withdrawal letter for the 1999 biological opinion. The environmental baseline clearly indicates that juvenile salmonids are being exposed to toxicants in their food supply (*see* Section 5 of this Opinion) in the estuary. However, while the source of those toxicants is not clear, the potential of the Project to exacerbate this situation is unlikely given the characteristics of the material being dredged and disposed of during the construction period. To be as protective as possible, Monitoring Action 5, identified in Table 7-3 of the 2001 BA (page 7-9), addresses the potential for release of contaminants during the construction process and will help identify and minimize the potential to resuspend contaminants during Project construction and maintenance activities.

Based on the limited direct and indirect Project effects on the key indicators of the estuarine habitat conceptual ecosystem model, NMFS concludes that the physical and biological features (riparian vegetation, water quality, substrate, food, and safe passage) of Lower Columbia River and estuary critical habitat will not appreciably diminish the value of critical habitat for the recovery of ESA-listed species.

### **9.3 Monitoring and Adaptive Management**

Because of the low levels of risk and uncertainty surrounding the long-term biological response of ESA-listed salmonids to predicted physical changes, the best available scientific information does not allow NMFS to predict with certainty how the limited physical changes would affect ESA-listed salmonids and their habitats over the life span of the Project. Section 6.8 of this Opinion discusses long-term uncertainty and risk, and reviews the need for reducing long-term uncertainty and risk via a precautionary approach to the protection of ecosystem elements (*i.e.*, key indicators within each pathway of importance to salmonids). Therefore, the Corps proposes, and NMFS concurs, that a robust monitoring program and adaptive management process will address the risk and uncertainties associated with key salmonid pathways and indicators identified in this Opinion. Implementation of the monitoring and adaptive management programs will ensure that long-term Project effects are addressed, and that these long-term effects will not appreciably reduce the likelihood of ESA-listed salmonid survival or recovery through the diminishment of properly functioning habitat conditions.

Monitoring and adaptive management will allow NMFS to verify our conclusion that the Project's long-term adverse effects to ESA-listed salmonids and their habitats are likely to be limited. Based on the results of the monitoring plan and adaptive management process, adjustments may be made to the construction and maintenance activities of the Project. As an

additional result of annual monitoring program review, the adaptive management team may decide that mitigation or restoration actions will be necessary to address adverse impacts.

The monitoring program elements and the framework for the adaptive management process, as currently proposed in the 2001 BA, address the main concerns identified in Section 6 (Effects of the Proposed Action), and will ensure that Project-related environmental impacts to the Lower Columbia River, estuary and river mouth are minimized. NMFS also believes that the monitoring program and the adaptive management process provide the Corps with the opportunity to integrate elements of the Project into a broader set of research objectives and restoration features in the Columbia River Basin (*i.e.*, estuary action items in the All-H paper, the 2004 FCRPS Hydropower Biological Opinion, and NMFS' current recovery planning actions).

NMFS and FWS have jointly published a policy statement on adaptive management in the context of and for its habitat conservation plan and safe harbor strategies. While the HCP context may vary in some respects from the implementation of the proposed action, the policy statement provides instructive guidance on the key elements of a scientifically credible adaptive management strategy. As NMFS, FWS and the Corps work to refine the adaptive management process governing the implementation of this proposed action, NMFS and FWS will look to the fundamental elements of its guidance for adaptive management, which may be found in 65 FR 106 at 35242, 35252 (July 1, 2000).

#### **9.4 Ecosystem Research Actions**

The Corps has proposed a series of ecosystem research actions (Table 8-1 of the 2001 BA) under Section 7(a)(1) of the ESA. The proposed ecosystem research actions support currently ongoing research actions in the Lower Columbia River. They also begin to address longer-term environmental issues of the river's ecosystem, such as contaminants, and will provide a venue via the proposed workshop to better understand and propose meaningful management actions to conserve the ETM. The data and information resulting from the ecosystem research actions can also be brought forward into the adaptive management process to inform and guide future management decisions associated with the Project.

#### **9.5 Ecosystem Restoration Features**

The Corps has proposed multiple ecosystem restoration features (*see* Table 8-2 of the 2001 BA) in furtherance of Section 7(a)(1) of the ESA. During BRT discussions, and discussions among the Corps, the Ports, FWS, and NMFS management, participants identified the need to address any proposed restoration features in the context of habitat type, function, and value, and to link those values to ESA-listed salmonids, particularly juvenile salmonids. The ecosystem restoration features also respond to the indications in Sherwood *et al.* (1990) and Bottom *et al.* (2001) regarding estuarine habitat losses and habitats important for restoring the estuary to properly functioning conditions.

An important distinction between the 1999 Opinion and this Opinion is that the Project now includes these restoration features as part of the proposed action. By including the restoration features as part of the Project, the Corps has significantly increased the certainty that these

activities will occur and has provided NMFS with the opportunity to evaluate their potential effects on ESA-listed salmonids and proposed and designated critical habitat for those species.

The ecosystem restoration features will provide benefits to the habitat types identified in the conceptual ecosystem model (*see* Chapter 5 of the 2001 BA). When implemented in coordination with NMFS and other entities conducting habitat conservation/restoration features, these features should complement those activities currently occurring in the Lower Columbia River and estuary. For these reasons, NMFS believes that the proposed ecosystem restoration features will benefit ESA-listed salmonids and their habitats. As with the monitoring plan, the adaptive management process, and the ecosystem research actions, the ecosystem restoration features also provide the Corps the opportunity to integrate elements of the Project into a broader suite of research objectives and restoration features in the Columbia River Basin (*i.e.*, estuary action items in the Basinwide Salmon Recovery Strategy or ‘All-H’ paper, the 2004 FCRPS Hydropower Biological Opinion, and NMFS’ current recovery planning actions).

## **9.6 Jeopardy Conclusion**

After reviewing the current status and factors for decline of of ESA-listed salmonids included in this consultation, the environmental baseline in the action area, the effects of the proposed action, and cumulative effects, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of Snake River sockeye salmon, Snake River fall Chinook salmon, Snake River spring/summer Chinook salmon, Snake River Basin steelhead, Upper Columbia River steelhead, Lower Columbia River steelhead, Upper Willamette River steelhead, Middle Columbia River steelhead, Columbia River chum salmon, Lower Columbia River Chinook salmon, Upper Willamette River Chinook salmon, Upper Columbia River spring run Chinook salmon, and Lower Columbia River coho salmon (proposed for listing).

## **9.7 Critical Habitat Conclusion**

After reviewing the current condition and trends of PCEs within the action area, the environmental baseline, effects of the proposed action, and cumulative effects, NMFS concludes that the proposed action will not result in the destruction or adverse modification of proposed and designated critical habitat for Snake River sockeye salmon, Snake River fall Chinook salmon, Snake River spring/summer Chinook salmon, Snake River Basin steelhead, Upper Columbia River steelhead, Lower Columbia River steelhead, Upper Willamette River steelhead, Middle Columbia River steelhead, Columbia River chum salmon, Lower Columbia River Chinook salmon, Upper Willamette River Chinook salmon, Upper Columbia River spring run Chinook salmon, and Lower Columbia River coho salmon (proposed for listing).

# **10. CONSERVATION RECOMMENDATIONS**

## **10.1 Introduction**

Section 7 (a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to