



# Columbia River Estuary ESA Recovery Plan Module for Salmon and Steelhead

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January 4, 2008

NOAA Fisheries Service is requesting public comment on the proposed *Columbia River Estuary ESA Recovery Plan Module* through March 3, 2008.

## **What Is the *Columbia River Estuary ESA Recovery Plan Module*?**

The *Columbia River Estuary ESA Recovery Plan Module* is part of a larger regional planning effort to develop recovery plans for Endangered Species Act-listed salmon and steelhead in the Columbia River basin. The module focuses on habitat in the lower Columbia River below Bonneville Dam and how that habitat affects the survival of ESA-listed chum, steelhead, Chinook, and coho from throughout the Columbia River basin. The goal of the module is to identify management actions that, if implemented, would improve the survival of ESA-listed salmon and steelhead during their migration and rearing in the estuary and Columbia River plume.

## **Key Components of the Module**

The module identifies and prioritizes limiting factors in the estuary – physical, chemical, or biological habitat features that affect the viability of salmon and steelhead populations. It also identifies and prioritizes threats, which are human actions or natural events in the estuary that cause or contribute to the limiting factors.

The module then identifies 23 broad actions whose implementation would reduce the threats and thus increase survival of salmon and steelhead during their time in the estuary. The actions are designed to benefit both ocean-type salmonids (which typically migrate to the estuary in their first year of life and rear there for weeks or months) and stream-type salmonids (which migrate later, move through the estuary more quickly, and spend more time in the plume waters). The module also estimates the cost of implementing each action over a 25-year period.

A description of monitoring, research, and evaluation needs that are appropriate to the management actions is in the process of being completed and will be included as an appendix to the module.

Table 1: Threats to Salmonids in the Estuary and Plume

Priority	Threat
Top	<ul style="list-style-type: none"> <li>• Flow regulation</li> <li>• Dikes and filling</li> </ul>
High	<ul style="list-style-type: none"> <li>• Altered predator/prey relationships</li> <li>• Urban and industrial practices</li> <li>• Agricultural practices</li> <li>• Impaired transport of coarse sediment</li> <li>• Pilings and pile dike structures</li> </ul>
Medium	<ul style="list-style-type: none"> <li>• Reservoir-related temperature changes</li> <li>• Riparian practices</li> <li>• Climate cycles and global warming</li> <li>• Water withdrawal</li> </ul>
Low	<ul style="list-style-type: none"> <li>• Dredging</li> <li>• Entrapment of fine sediment in reservoirs</li> <li>• Ship wakes</li> <li>• Reservoir phytoplankton production</li> </ul>
Lowest	<ul style="list-style-type: none"> <li>• Over-water structures</li> <li>• Ship ballast practices</li> </ul>

## Potential Benefits of Management Actions

The module expresses the potential benefits of management actions as “survival improvement targets,” which are assigned to each action based on assumptions about implementation difficulty, the significance of the specific threats and limiting factors the action would address, and the effect of the action on those threats and limiting factors. Survival improvement targets are useful in comparing the trade-offs involved in implementing different actions to different degrees, and in comparing the cost-effectiveness of actions.

Management actions are analyzed in terms of implementation constraints, survival benefit, cost, and cost-effectiveness, but the module refrains from prioritizing the actions. Given the ecological complexity of the estuary and the level of habitat degradation, *all* of the limiting factors identified in the module need to be reduced in order to significantly improve the survival of salmon and steelhead in the estuary. In many cases, addressing a major limiting factor only partially will provide greater benefits than fully eliminating a less important limiting factor. This strongly suggests that *every* one of the 23 management actions will need to be implemented, to some extent, if the limiting factors in the estuary and plume are to be meaningfully reduced.

Table 2: Actions That Would Yield the Greatest Benefits (*not in order of priority*)

Management Action	Type of Salmonid Affected*
Protect/restore riparian areas	Ocean and stream
Operate the hydrosystem to reduce reservoir heating.	Primarily ocean
Adjust the timing, magnitude, and frequency of flows.	Ocean and stream
Remove pilings and pile dikes.	Ocean and stream
Protect remaining high-quality off-channel habitat.	Ocean and stream
Breach or lower dikes and levees.	Ocean and stream
Manage pikeminnow and other piscivorous fish	Ocean and stream
Reduce predation by pinnipeds	Primarily stream
Redistribute Caspian terns.	Primarily stream
Redistribute cormorants.	Primarily stream
Identify and reduce sources of pollutants.	Ocean and stream
Monitor and/or restore contaminated sites.	Ocean and stream

Table 3: Additional Management Actions (*not in order of priority*)

Management Action	Type of Salmonid Affected*
Establish minimum instream flows.	Ocean and stream
Mitigate entrapment of fine sediment in reservoirs.	Ocean and stream
Use dredged materials beneficially	Primarily ocean
Reduce entrainment/habitat effects of dredging.	Ocean and stream
Reduce over-water structures.	Primarily ocean
Reduce vessel wake stranding.	Primarily ocean
Reduce noxious weeds.	Ocean and stream
Reduce shad abundance.	Ocean and stream
Prevent invertebrate introductions.	Primarily ocean
Implement pesticide/fertilizer BMPs.	Ocean and stream
Implement stormwater BMPs.	Primarily ocean

## Costs

Costs for implementing the management actions are estimated to be approximately \$500 million, spread over a 25-year time period. Although this value may seem high, federal agencies and other entities already are funding some activities associated with the management actions; thus, the estimate does not necessarily represent \$500 million in new funds.

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\* Ocean-type salmonids are those that migrate to the estuary in their first year of life and rear there for weeks or months; stream-type salmonids migrate later, move through the estuary more quickly, and spend more time in the plume waters.

## How Does the Estuary Module Support Other Regional Recovery Efforts?

To accomplish recovery planning in the Columbia River basin, NOAA Fisheries Service organized the eight listed salmon evolutionarily significant units (ESUs) and the five listed steelhead distinct population segments (DPSs) into two geographic recovery domains: the Lower Columbia/Willamette domain and the Interior Columbia domain (which was further divided into the Mid-Columbia, Upper Columbia, and Snake River subdomains). Recovery plans are being developed to address all listed salmon ESUs and steelhead DPSs within each domain. Because NOAA Fisheries Service believes that local support for recovery plans is essential, it has approached recovery planning collaboratively, relying heavily on local planning processes to address habitat, local hatchery, and local harvest conditions in Columbia River tributaries. To address survival through the Federal Columbia River Power System and in ocean and mainstem harvest, the agency has worked through appropriate management forums. The science and regulatory obligations provided through these forums have been incorporated into NOAA Fisheries Service's proposed and final ESA recovery plans for listed Columbia Basin salmon and steelhead.

Recovery plans must consider the factors affecting a species' survival throughout its entire life cycle. The salmonid life cycle includes spawning and rearing in the tributaries, rearing and migration through the mainstem Columbia River and estuary to the ocean, and the return journey to natal streams. Recovery planners in the states of Idaho, Oregon, and Washington have focused on tributary conditions within their jurisdictions and domains (domains are logical aggregations of ESUs and DPSs) to develop recovery plans. As a result of these separate but related local planning activities, NOAA Fisheries Service recognized the need for consistent treatment of factors in the estuary that affect all listed salmonids in the Columbia Basin.

To help account for this critical life stage, NOAA Fisheries Service and the Lower Columbia River Estuary Partnership developed the estuary recovery plan module. The module provides recovery planners throughout the basin with a shared set of assumptions about limiting factors, threats, and the potential survival improvements that could result from implementing management actions in the estuary.

The estuary module will be incorporated or adopted by reference into recovery plans being developed for ESUs and DPSs in the Lower Columbia/Willamette domain and the Mid-Columbia, Upper Columbia, and Snake River subdomains. Geographically, the module covers the tidally influenced reaches of the lower river, estuary, and plume.

### What the Module Does Not Address

For the most part, the estuary module does not address hatchery or harvest practices, hydroelectricity production, or tributary habitats in the Columbia River basin. Recovery needs related to these impacts are being identified and addressed through other aspects of the ESA recovery planning process for salmon and steelhead that is under way throughout the Columbia basin.

One exception to this is the treatment of flows entering the estuary. Estuary flows are directly tied to hydrosystem regulation, climate, and upstream water withdrawals.

Because estuary flows are central to habitat availability and quality, it was necessary to discuss and analyze them in the module.

## Comments to NOAA Fisheries Service

The estuary module will be available for public review and comment for 60 days. The public comment period ends Monday, March 3, at 5 p.m. PST.

**Obtaining a Copy of the Module.** If you want to review the estuary module, you can obtain an electronic copy (i.e., CD-ROM) by calling 503-230-5418 or e-mailing a request to [sharon.houghton@noaa.gov](mailto:sharon.houghton@noaa.gov), with the subject line "CD-ROM Request for Columbia River Estuary Module." Electronic copies of the estuary module and Federal Register notice also are available online on the NOAA Fisheries Service Web site: [www.nwr.noaa.gov/Salmon-Recovery-Planning/ESA-Recovery-Plans/Estuary-Module.cfm](http://www.nwr.noaa.gov/Salmon-Recovery-Planning/ESA-Recovery-Plans/Estuary-Module.cfm).

**Questions to Consider.** NOAA Fisheries Service welcomes comments on any aspect of the estuary module. Following are some questions to guide your review:

- In general, does the module provide the elements you consider necessary, appropriate, and useful in a recovery plan? For example:
  - Have limiting factors and threats been thoroughly and credibly identified and prioritized?
  - Are connections between limiting factors, threats, and actions easy to follow? Has the module made appropriate use of available information? Are assumptions and uncertainties adequately characterized?
  - Are assumptions about potential improvement in the estuary appropriate and adequately characterized? Are the potential benefits of each action appropriately and adequately characterized?
- Do you see a role for your agency or entity in implementing the module? If so, what is the nature and scope of your role?
- What are your thoughts about the effort that will be required to implement the actions in the module, in terms of:
  - Infrastructure to oversee, coordinate, and adaptively manage implementation
  - Resources to implement actions, sources of funding, and ways to coordinate and ensure effective use of resources
  - Regulatory or other mechanisms and programs that might enhance implementation
  - Social or cultural issues that might impair implementation, or changes that would enhance implementation
- How can NOAA Fisheries Service, the Lower Columbia River Estuary Partnership, and state and regional entities overseeing recovery plan implementation work with potential implementing partners to develop effective approaches to implementation?

**How to Comment.** Written comments should be submitted to:

Patty Dornbusch  
NOAA Fisheries Service  
1201 NE Lloyd Boulevard, Suite 1100  
Portland, OR 97232  
503-230-5430

Comments may be submitted by e-mail to: [EstuaryPlan.nwr@noaa.gov](mailto:EstuaryPlan.nwr@noaa.gov). Include in the subject line of the e-mail comment the following identifier: Comment on Columbia River Estuary Recovery Plan Module.

Comments may also be submitted via facsimile (fax) to 503-872-2737.

### **Additional Information**

For more information on regional ESA salmon recovery efforts, contact:

- NOAA Fisheries Service  
[www.nwr.noaa.gov/Salmon-Recovery-Planning/](http://www.nwr.noaa.gov/Salmon-Recovery-Planning/)
- Oregon Department of Fish and Wildlife  
[www.dfw.state.or.us/fish/esa/lower-columbia/](http://www.dfw.state.or.us/fish/esa/lower-columbia/)
- Lower Columbia Fish Recovery Board  
[www.lcfrb.gen.wa.us/default1.htm](http://www.lcfrb.gen.wa.us/default1.htm)