

Consolidated excerpts from OC Coho plan:

Chapter 3: Threats and Limiting Factors describes “Loss of stream complexity, including connected floodplain habitat, is a primary limiting factor for many coho salmon populations and overwinter rearing of juvenile coho salmon is especially a concern. This instream habitat is critical to produce high enough juvenile survival to sustain productivity, particularly during periods of poor ocean conditions. Habitat conditions that create sufficient complexity for juvenile rearing and overwintering include... beaver ponds, ... Beaver provide considerable help in providing this connection and in maintaining proper watershed functioning in Oregon coast streams.

Table 31. Summary of how human-made and natural factors (underlying causes) contributed to listing of Oregon coast coho salmon.

Removing beaver and beaver habitat	Removing beaver and beaver habitat has caused loss of beaver pond habitat which is high value for rearing juvenile coho salmon (ODFW 2005c; Stout et al. 2012).
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3.3.1 Factor A. The present or threatened destruction, modification, or curtailment of the species’ habitat or range

Threat: Historical, current, and future land use activities that affect watershed and estuarine functions that support habitat for Oregon Coast coho salmon.

Primary related limiting factors: Reduced quantity of coho salmon habitat (e.g., area of connected floodplain); within the remaining habitat, reduced quality (e.g., complexity and water quality).

Reduced amount and complexity of habitat

Beaver removal, combined with loss of large wood in streams, has also led to degraded stream habitat conditions for coho salmon (Stout et al. 2012).

Because beaver ponds provide high-value coho salmon habitat on the Oregon Coast (Leidholt-Bruner et al. 1992; Nickelson et al. 1992), their reduction constitutes degraded conditions for coho salmon.

Regulatory mechanisms affecting beaver pond availability

In Oregon Coast streams, beaver dams create valuable summer and winter habitat for coho salmon (Leidholt-Bruner et al. 1992; ODFW 2005c). Much of this habitat has been lost post-European settlement to forestry and agricultural practices (ODFW 2005c). Lack of the type of habitat provided by beaver ponds has been identified as limiting the production of Oregon Coast coho salmon repeatedly (Nickelson et al. 1992; ODFW 2005c; ODFW 2007; Stout et al. 2012). Restoring beaver and beaver dams has proven effective at increasing juvenile coho salmon populations (Kemp et al. 2012) including on the Oregon Coast (Pollock et al. 2015).

On private land in Oregon, beaver are classified as a predatory species (ORS 610.002), landowners may lethally remove beaver without a permit from ODFW or requirement to report. On public land, beaver are classified as a protected furbearer (ORS 496.004 and OAR 635-050-0050). ODFW requires a permit to take protected furbearers. For beaver, this permit includes a designated trapping season, but does not limit the numbers of beaver taken. ODFW requires a permit to hold and relocate beaver (ORS 497.308) and has published beaver relocation guidelines. An Oregon Department of State Lands permit for beaver dam removal recently became required under their “large woody debris” definition to remove any volume within essential salmonid habitat or more than 50 cubic yards outside of essential salmonid habitat (OAR 141-085).

The Oregon Department of State Lands is currently engaged in a rulemaking process to develop a streamlined “General Authorization” under the Removal-Fill Law allowing installation of beaver dam analogues. Once final, beaver dam analogues meeting conditions of the rule would be a pre-authorized use, not requiring individual permits. This will encourage the use of beaver dam analogues and beaver for waterway restoration projects benefiting coho salmon. The rulemaking is anticipated to be complete in December 2016.

The mission of the USDA Animal and Plant Health Inspection Service (APHIS) Wildlife Services is to provide federal leadership and expertise to resolve wildlife conflicts to allow people and wildlife to coexist. Wildlife Services is not a regulatory agency and, therefore, works within the regulatory bounds of Oregon State law. For the five-year period of 2008-2012, Wildlife Services trapped over 2,800 beaver throughout Oregon, killing all but 10 of them. The number of beaver killed within the Oregon Coast domain is not available, nor do we have more recent numbers at this time.

Listing Factor D: The inadequacy of existing regulatory mechanisms

Criteria:

To meet the goal for Listing Factor D related to Listing Factor A, a combination of voluntary and regulatory mechanisms should be in place that: ... change beaver management to allow beavers to build more dams in Oregon Coast coho rearing habitat;

Chapter 4: recovery goals and delisting criteria:

To meet the goal for Listing Factor D related to Listing Factor A, a combination of voluntary and regulatory mechanisms should be in place that:...

- are effective in ensuring that voluntary and regulatory conservation ef-

forts will be implemented and that the efforts will be effective in attaining habitat-related goals. The criteria included in the Policy for Evaluation of Conservation Efforts (PECE) provides a useful checklist for NMFS to evaluate the overall effectiveness of the voluntary and regula-

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tory programs...

- change beaver management to allow beavers to build more dams in Oregon Coast coho rearing habitat;

Chapter 6. Recovery strategies and actions

6.2.1.1 Strategy to Improve Habitat at the ESU Level

... High quality overwintering habitat for juvenile fish provides refuge from high velocity flows and usually contains one or more of the following features: connected floodplains and wetlands with attached off-channel alcoves, beaver dams and ponds, lakes, and channels with large wood and debris and deep pools (ODFW 2007 and Cluer 2016).

2. Ensure long-term ecosystem functions and high quality habitat by reducing habitat-related threats and encouraging formation of beaver dams and beaver dam analogues.

Specific physical and biological features are essential to the conservation of the ESU. For example, connected and periodically inundated floodplains, channel complexity, spawning gravels, water quality and quantity, side channels, estuary habitat, and healthy food webs support one or more life stages of the Oregon Coast coho salmon ESU as sites for spawning, rearing, migration, and foraging). These sites and associated features include:

...

- Freshwater rearing sites with water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility in summer and winter; water quality and forage supporting juvenile development; and natural cover such as summer shade and some turbidity (Cluer 2016), submerged and overhanging large wood, log jams, **beaver dams and ponds**, aquatic vegetation, large rocks and boulders, side channels, and undercut banks (this is the top priority for Oregon Coast coho salmon recovery);
- Improving ecosystem function by increasing the number of beaver dams and beaver dam analogues (human-made, channel-spanning structures that mimic or reinforce beaver dams) is an important tool in the overall strategy to restore habitat. These dam structures support creation of coho salmon rearing habitat by impounding water and retaining sediment, and generally facilitating fluvial geomorphic changes that can result in increased stream sinuosity, pool formation, and reconnected and expanded floodplains. Besides increasing stream complexity, beaver dams and beaver dam analogues act to raise water tables in alluvial aquifers, thus helping to increase summer stream flows, reduce stream temperatures, and expand riparian areas and wetlands. Tools for increasing beaver activity, and their associated benefits, are described in *The Beaver Restoration Guidebook: Working with Beaver to Restore Streams, Wetlands, and Floodplains* (Pollock et al. 2015). The handbook is available online at: <http://www.fws.gov/oregonfwo/ToolsForLandowners/RiverScience/Beaver.asp>.

6.2.1.2 Habitat Management Actions at the ESU Level

Listing Factor A1: Habitat actions at the ESU Level

Design actions including multiple tools that contribute to the restoration and protection of natural watershed-scale and reach-scale physical and biological processes including the re-establishment of connected floodplain habitats.

- A1-1.1** Implement the Beaver Restoration Guidebook (Pollock et al. 2015). Increase number of beaver dams and beaver dam analogues (to modify sediment and fluvial processes in ways that contribute significantly to coho salmon habitat). To support a voluntary approach, create and fund a beaver support network of groups that can respond to reports of nuisance beavers. The goal of this group would be to offer choices to landowners including tree protection, flow devices to lower pond levels, translocation and other non-lethal alternatives. The group would also provide outreach and education about the role of beavers in healthy ecosystems and tools that landowners can use, such as the building of beaver dam analogues, to work with beaver to improve coho salmon rearing habitat.
- A1-1.2** Seek agreements with APHIS, ODFW, ODOT and other agencies, along with timber companies and others, to (1) refer all beaver nuisance reports to the beaver support network proposed above, (2) avoid lethal removal of beavers pending use of non-lethal methods by the beaver support network, and (3) keep a record of these referrals.
- A1-1.3** Increase incentives, such as creating a Beaver Pond Compensation Fund,¹ to encourage beaver conservation.
- A1-1.4** If necessary, revise regulations and statute(s) relating to beaver management to increase the number and size of beaver ponds (which can create prime coho salmon rearing habitat).

A2-2.4 Beaver management: provide support to landowners who experience beaver-related challenges in order to protect both property and beaver and their ponds. (See actions identified under Listing Factor A1, habitat actions at the ESU level.)

A2-4.3 Assemble, develop, and distribute outreach materials on the benefits of beaver dams to ecosystem functions in general, and specifically to improving juvenile coho salmon rearing habitat.²

6.2.1.3 ESU-level Habitat-related Priorities to Support Recovery

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¹ As recommended by Oregon Department of Agriculture (Oregon 2015)

² Considerable information is already developed and available. See:

· Needham, M.D. and A. T. Morzillo. 2011. Landowner incentives and tolerances for managing beaver impacts in Oregon. Final project report for ODFW and OWEB, Corvallis, OR.

(http://www.dfw.state.or.us/wildlife/living_with/docs/ODFW%20and%20OWEB%20-%20Landowner%20Beaver%20Project%20-%20Final%20Report%20-%20Needham%20and%20Morzillo.pdf)

· Guidelines for Relocation of Beaver in Oregon (2012), Oregon Department of Fish and Wildlife (http://www.dfw.state.or.us/wildlife/living_with/docs/Guidelines_for_Relocation_of_Beaver_in_Oregon.pdf)

· Living with Wildlife: American Beaver, ODFW (http://www.dfw.state.or.us/wildlife/living_with/docs/beaver.pdf)

· Pollock, M.M., G. Lewallen, K. Woodruff, C.E. Jordan and J.M. Castro (Eds). The Beaver Restoration Guidebook: Working with Beaver to Restore Streams, Wetlands, and Floodplains, Ver. 1.02. USFWS, Portland, Oregon.

(<http://www.fws.gov/oregonfwo/ToolsForLandowners/RiverScience/Documents/BRG%20v.1.02.pdf>)

2. Collaborate with governmental and non-governmental organizations and others to identify and implement actions that will restore watershed and estuarine processes (including access); provide stream complexity for juvenile rearing; increase shading to reduce stream temperature; connect side channels, wetlands and off-channel habitats; and reduce sediment levels. Activities should include restoring habitat capacity for rearing juvenile coho salmon by increasing large wood loading, beaver habitat, and wetland/off-channel connectivity, and by increasing native riparian vegetation to provide bank stability and shade stream reaches during warm summer months.

Table 6-1. Steps in developing habitat strategies and actions for Oregon Coast coho salmon.

4. What human activities (indirect and direct threats) and natural processes caused the important changes in OC coho salmon habitat?	Identify direct threats	Rural development and agriculture, stream cleaning, logging, development, levees, dikes, tidegates, mining, roads, reduction of beaver ponds, conversion of land to urban, water withdrawals.
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- Improve floodplain connectivity by increasing beaver pond abundance and reducing or limiting development of channel-confining structures, including roads and infrastructure.
 - [Key Strategies and Potential Actions for the North Coast Stratum](#)
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- Improve floodplain connectivity by increasing beaver pond abundance and reducing or limiting development of channel-confining structures, including roads and infrastructure.

Secondary Watershed Actions

Beaver Management

1. Include strategies to increase beaver, beaver ponds, and beaver dam analogues in strategic action plans.
2. Seek agreements with state and federal agencies and others to pursue non-lethal means of beaver removal (see Section 6.2.1.2, A1-1.2 above). If necessary, revise regulatory mechanisms to prohibit killing of beaver within the range of Oregon Coast coho salmon unless property or infrastructure damage is occurring and only when all other options are exhausted.
3. Create a program to educate landowners, managers, policymakers and the public in general about the benefits of beaver ponds to the health of our ecosystems, with a focus on benefits to salmonids. Include opportunities to conserve and manage beaver through cost effective, non-lethal management practices (Pollock et al. 2015).
4. Implement the Beaver Restoration Guidebook (Pollock et al. 2015) to incorporate beaver, beaver ponds, and beaver dam analogues into restoration actions.

Table 6-4. Habitat component specific actions to restore high quality coho salmon habitat in the North Coast Stratum.

NCS-7	Off-Channel and Wetlands	Increase habitat complexity and connectivity and access to alcoves, off-channel ponds, floodplains, and wetlands	Increase beaver pond abundance	All Populations	Medium
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