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20 March 2014

TO: Joelle Gore, Acting Chief, Coastal Programs Division (N/ORM3), Office of Ocean and Coastal Resource Management, National Ocean Service, NOAA
VIA: joelle.gore@noaa.gov

Subject: **Comments on Oregon's Failure to Submit an Approvable Coastal Nonpoint Pollution Control Program**

Dear Joelle and NOAA:

Please accept the following comments from [redacted] regarding the proposed finding that Oregon has Failed to Submit an Approvable Coastal Nonpoint Pollution Control Program. [redacted] represents approximately 10,000 members and supporters who share our mission to protect and restore Oregon's wildlands, wildlife and waters as an enduring legacy.

[redacted] supports the intended finding that Oregon has Failed to Submit an Approvable Coastal Nonpoint Pollution Control Program. Oregon must do more to protect water quality in its coastal zone.

Climate Change Preparation AND Mitigation, and Ocean Acidification
Oregon must do more to anticipate climate change and the amplification of the hydrologic cycle. Oregon is located in the direct path of large Pacific storms, which are expected to increase in response to global warming. Heavy precipitation events interact with land use (such as agriculture, forestry, and roads) to cause significant non-point source pollution. There is also evidence that the jet stream may slow down as a result of the decreased pole-to-equator temperature gradient. This means that storms will move more slowly over coastal watersheds and potentially drop more precipitation per storm event.

To prepare for climate change, Oregon must put programs in place to prevent harm to water quality and make watersheds more resilient to large storms, by requiring:

- wider stream buffers for forestry and agriculture operations,
- larger fish-friendly culverts that pass more water from larger storms,

- improved road drainage,
- road drainage disconnected from streams,
- removal of valley bottom and mid-slope roads that intercept the downslope movement of beneficial wood and sediment,
- reduced road density especially in steep terrain, and
- better protection for unstable slopes.

All these programs and requirements are desirable even in the absence of climate change, but with climate change they are essential.

Climate change is itself a source of coastal zone water quality problems in at least two ways. First, more intense storms will increase production of storm water and interact with land use activities to cause increased erosion. Second, a portion of the excess CO_2 in the atmosphere eventually ends up ocean where it causes acidification that is harmful to ocean life and upsets the ocean carbon cycle. To limit these adverse water quality impacts associated with greenhouse gases (GHG) emissions, Oregon should require greater efforts to reduce GHG emissions from fossil fuels and institute programs to increase biogenic carbon storage by protecting native vegetation, conserving soil, protecting mature & old-growth forests, providing larger stream buffers, significantly extending harvest rotations, retaining more live and dead trees within harvest units, and improving efficiency of wood use.

Carbon pollution caused by logging in Oregon's coastal zone has caused a highly disproportionate impact on climate, both historically and currently. Through 1990, more than 1.5 billion metric tons of net carbon emissions were caused by the conversion of old growth forests to short rotation forestry in western Washington and western Oregon. This region represent only .017% of global land area but emitted an astounding 2% of global carbon emissions from land use. Put another way ... in the century preceding 1990 the logging binge on the westside of Oregon and Washington caused 100 times more carbon emissions from land use activities compared to the global average for similar sized areas. Harmon, M., Ferrell, W., and J. Franklin. 1990. Effects on Carbon Storage of Conversion of Old-Growth to Young Forests. Science. 9 February 1990. In recent years, logging in western Oregon (mostly on non-federal land) removes ~5.5 million metric tons of carbon from the forest each year. In a typical year, the magnitude of carbon removal caused by logging is roughly 50 times greater than carbon removal due to wildfire. Law, B.E., Turner, D., et al 2004. Disturbance and climate effects on carbon stocks and fluxes across Western Oregon USA. Global Change Biology (2004) 10, 1429-1444. This carbon export is equivalent to doubling the number of vehicles on Oregon's roads (~4 million).

Forest carbon storage should be viewed like salmon restoration. Oregon needs to rebuild the carbon stores in coastal forests, just like it is striving to rebuild salmon populations in coastal streams. Current forest practices on non-federal lands are trending toward shorter rotations, which means forests are storing less carbon over time instead of more. This means more carbon in the atmosphere and accelerated climate change with its associated water quality problems.

Carbon Carrying Capacity and Land Use

Oregon's programs for protection of water quality could be improved by fully implementing its statewide land use goals which incorporate concepts of "carrying capacity." Oregon's Department of Land Conservation and Development (DLCD) defines "carrying capacity" as a "Level of use which can be accommodated and continued without irreversible impairment of natural resources productivity, the ecosystem and the quality of air, land, and water resources."

The carrying capacity of our atmosphere has already been exceeded, and any further net emissions of greenhouse gases, including but not limited to CO_2 and other GHG emitted by logging and other activities will exacerbate the exceedance. In addition, much of the excess CO_2 in the atmosphere eventually ends up dissolved in the oceans where it dissolves and forms carbonic acid. The carrying capacity of our oceans in terms of pH has also been exceeded, so any further net emissions of CO_2 to the atmosphere will result in further exceedances of ocean acidification carrying capacity. CO_2 has a very long residence time in the atmosphere before it is dissolved in the ocean, so there is a large degree of "committed acidification" that must be accounted for.

The state needs to develop a coastal zone policy framework that fully implements Oregon's Statewide Land Use Goals, including those related to carrying capacity:

- DLCD Statewide Goal 5 says "Plans providing for open space, scenic and historic areas and natural resources should consider as a major determinant the carrying capacity of the air, land and water resources of the planning area. The land conservation and development actions provided for by such plans should not exceed the carrying capacity of such resources." OAR 660-015-0000(5).
- DLCD Statewide Goal 6 says "With respect to the air, water and land resources of the applicable air sheds and river basins described or included in state environmental quality statutes, rules, standards and implementation plans, such discharges shall not (1) exceed the carrying capacity of such resources, considering long range needs;..." OAR 660-015-0000(6) [Note, we can not envision any "long-term needs" that would justify wrecking the climate or the oceans.]
- DLCD Statewide Goal 19 says "all actions by local, state, and federal agencies that are likely to affect the ocean resources and uses of Oregon's territorial sea shall be developed and conducted to conserve marine resources and ecological functions for the purpose of providing long-term ecological, economic, and social values and benefits..." OAR 660-015-0010(4) [Ocean acidification will not conserve ecological functions associated with shell-organisms.]

There is a large body of science indicating that we are already beyond the level of CO_2 in our atmosphere that can be described as safe. The changes to our climate and our oceans caused by CO_2 already emitted may already be irreversible. Global warming is caused by the cumulative build up of greenhouse gases, especially carbon, in the atmosphere. Each additional increment of carbon adds to the harm caused to our climate and our oceans.

State TMDLs undermined by relaxation of federal rules for stream protection
Oregon has approved several TMDLs in the Coast Range but the assumptions underlying those TMDLs are about to be undermined by efforts to reduce stream protection on federal forest lands. All of the alternatives proposed by BLM for the revision of its Resource Management Plans in western Oregon call for significant narrowing of stream buffers, and none of the action alternatives maintain the current buffers. http://www.blm.gov/or/plans/rmpswesternoregon/files/alternfaq.pdf

The TMDLs approved by the state allow more logging on non-federal lands, under the assumption that there logging near streams on federal lands would be strictly limited. Now it turns out that there will likely be more logging near streams on federal lands, so there needs to be a corresponding decrease in logging near streams on non-federal lands in order to avoid exceeding the watershed scale waste load identified in the TMDLs. See Reeves, G.H., Pickard, B.R., and K.N. Johnson 2013. Alternative Riparian Buffer Strategies for Matrix Lands of BLM Western Oregon Forests That Maintain Aquatic Ecosystem Values. REVIEW DRAFT. January 23, 2013, http://fes.forestry.oregonstate.edu/sites/fes.forestry.oregonstate.edu/files/PDFs/Riparian%20paper%20Jan%2023.pdf; and Heiken, D. 2013. Riparian Reserves Provide Both Aquatic & Terrestrial Benefits - A Critical Review of Reeves, Pickard & Johnson (2013). https://dl.dropboxusercontent.com/u/47741/Heiken%202013.%20Review%20of%20Reeves%20et%20al%20Riparian%20Proposal.pdf

Improved large wood recruitment is necessary to meet biological criteria
Oregon's current forest practice rules for stream protection are focused on shade and sediment control. While the current requirements do not adequately address either of these issues, there is another big issue that is being ignored, that is streams' need for large wood to dissipate energy, stabilize stream banks, store sediment, partition habitat, provide a nutrients, energy, and a substrate for biological activity, etc. In a natural stream/riparian system, large wood is recruited from a large area adjacent o streams and upslope, including unstable areas that move downslope toward streams.

Oregon has rules requiring "Waters of the State must be of sufficient quality to support aquatic species without detrimental changes in the resident biological communities." OAR 340-041-0011. However, Oregon lacks programs to actually realize this important objective. Oregon's lack of requirements regarding recruitment of large wood to streams in forest and agricultural areas is a good example.

The "key conclusion" of Oregon's Riparian Management Workgroup is that "Riparian corridors have been substantially degraded across large portions of the landscape. Achieving water quality standards and aquatic habitat objectives in such areas will require that vegetated, functional riparian areas be reestablished and maintained … Oregon does not have an overarching comprehensive riparian or stream corridor management policy or program. For the most part, three state programs influence the management and use of riparian areas, and each one has evolved to achieve different

objectives. Restoration and maintenance of productive aquatic habitat is not a common, stated objective of all three of these programs." OREGON STATE PROGRAMS FOR MANAGING RIPARIAN RESOURCES REPORT BY THE RIPARIAN MANAGEMENT WORK GROUP, October 2000. http://www.oregon.gov/OPSW/archives/riparian/4-0.pdf [Note: in general, this report identifies the problem, but is vastly overoptimistic that voluntary programs will achieve objectives.]

Abundant large wood is essential to maintain biological and hydrological processes in streams.

> Large quantities of down logs are an important component of many streams. Coarse woody debris influences the form and structure of a channel by affecting the profile of a stream, pool formation, and channel pattern and position. The rate at which sediment and organic matter are transported downstream is controlled in part by storage of this material behind coarse woody debris. Coarse woody debris also affects the formation and distribution of habitat, provides cover and complexity, and acts as a substrate for biological activity. Coarse woody debris in streams comes directly from the adjacent riparian area, from tributaries that may not be inhabited by fish, and from hillslopes.

1994 Northwest Forest Plan FSEIS, page 3&4-61.

> Large wood in streams—preferably whole trees with root wads and all—provides the randomness and dynamic environment that fish absolutely need to survive in the ever-changing waters they occupy. Wood breaks up the current and spreads water sideways across its natural floodplain, creating wonderful, dynamic and necessary diversity while also absorbing energy that could cause serious damage downstream otherwise, such as flooding or unnatural erosion. It sorts gravels during high flows, creating those beautiful spawning gravel beds laid out like blankets among bigger rock. It makes those current breaks downstream of log jams. It provides cooling shade and cover, and slow pools and edge habitat that baby fish need after emerging from those gorgeous gravels to ride out high flows, find food and hide from prying eyes. Decomposing wood and the nutrients it produces jumpstarts that the natural processes critical to insect, animal, amphibian and plant life.

Alan Moore, Why Fish Love 'Large Woody Debris.' Trout Unlimited. 2-4-2013. http://troutunlimitedblog.com/large-woody-debris-makes-for-fishy-rivers/

Large wood is needed not just instream but also adjacent to the stream.

> Several studies (Steinblums 1977, Franklin et al. 1981, Heimann 1988, Andrus et al. 1988, Ursitti 1991, and Morman 1993) have found the basal area of conifers, which reflects the size and number of trees present, to be less in riparian areas of second-growth forests than in late-successional and old-growth forests. …
> Maintenance of riparian forests in late-successional and old-growth forests and restoration in second-growth forests will depend on regeneration rates of conifers in the future. Regeneration of conifers in the riparian zones of natural stands is

> dependent, at least in part, on downed large trees. Researchers at the Pacific Northwest Research Station, Corvallis, Oregon found that more than 80 percent of conifer regeneration in the riparian zones along coastal Oregon streams that they studied occurred on down logs. The role of nurse trees in forest regeneration in the Pacific Northwest is widely recognized (Harmon et al. 1986). in riparian zones, nurse trees originate within 0 to 400 feet of the active channel. Greater retention of live trees and snags in riparian stands and adjacent upslope source areas will enhance the generation of future riparian forests
>
> 1993 Scientific Analysis Team (SAT) Report, page 460.

The Clean Water Act requires that public waters not only be protected from chemical impurities and thermal loadings, but also provide high quality habitat and hydrologic functions offered by large wood. Once recruited large wood decays and/or moves through the system. This requires that large wood be recruited continuously over time, or in periodic pulses associated with disturbance events. Logging near streams and on unstable slopes deprives streams of the essential functions provided by dead wood. Once removed, trees near streams cannot serve these important biophysical functions, and the forest areas near streams will not regrow large trees capable of recruiting new wood for decades or centuries. Oregon needs a program to ensure that streamside forests are protected for large wood recruitment.

Pesticides

Oregon needs greater controls on spraying chemicals such as pesticides and herbicides in coastal watersheds, especially near streams. Chemicals used by the forest and agriculture industries have direct adverse effects on listed fish and other organisms. Healthy streams require inputs of diverse vegetation types that support diverse insects that serve as food for a diverse aquatic food chain. Homogenizing the vegetation adjacent to streams has serious adverse consequences for aquatic life. Forest practices often involves spraying herbicides that suppress the growth of diverse vegetation needed to support these diverse vegetation and insect inputs.

State authority and Public participation

There are some deeply troubling aspects of Oregon's programs for water quality. The state lacks a balanced program of state authority, public representation, public notice and comment necessary to protect water quality. In fact, the problems listed blow may be among the primary causes of the state's failure to have an approvable coastal zone water quality program.

- The state has taken concrete steps to avoid responsibility for the impacts of forest operations in Oregon. The state has adopted an explicit position that it does not approve or disapprove of forest operations, but merely receives notice of operations from landowners. This means that the state cannot be held accountable for its failure to have rules and programs in place to avoid logging on steep slopes above salmon spawning areas that may cause "take" of endangered species.
- Oregon has delegated authority for water quality programs from DEQ to Oregon Dept of Agriculture and Oregon Department of Forestry. These agencies have been captured by the industries they purport to regulate. The state should put

water quality programs in an independent agency that has expertise and authority to implement and enforce programs for water quality.

- The make-up of the Board of Forestry is not representative of the general public interest in protecting clean water, but heavily weighted toward the regulated industries which see water quality programs as a cost. The state should adjust the make-up of the board of Forestry to include more representation from those interested in public values like clean water, wildlife, carbon storage, and quality of life.
- The Board of Forestry places far too much emphasis on voluntary compliance and minimizing the regulatory burden on the timber industry. In fact, these principles are institutionalized within the policy framework of the Board. The state lacks enforceable mechanisms and policies to ensure that its voluntary approach meets water quality objectives. If voluntary programs were working we would not have so many streams listed as water-quality-limited, and so many stocks of listed fish. Voluntary measures are very likely to conflict with economic objectives, and very unlikely to lead to comprehensive changes in forest practices necessary to protect and restore water quality in the coastal zone.
- The Oregon Department of Forestry does not adequately foster public participation. For instance, the agency charges the public a fee in order to receive notice of proposed forest operations. The fee is based on the size of the area, so if someone would like to receive notice of operations within a coastal watershed, the fee would be very large.

State forest practice rules are inadequate to protect water quality.

Congress recently considered a controversial proposal to apply Oregon forest practice rules to federal lands. This resulted in some useful analyses that compared the water protection rules on federal land non-federal lands, and highlighted the inadequacy of Oregon water protection rules for forestry. See Oregon Wild 2012. "Problems and Pitfalls with the Proposed O&C Trust, Conservation, and Jobs Act" http://www.oregonwild.org/oregon_forests/old_growth_protection/westside-forests/western-oregon-s-patchwork-public-lands/O-C_Trust_Act_White_Paper_FINAL_6-5-2012_w_DeFazio_response.pdf The analysis in this white paper and the sources cited in the footnotes provide ample evidence supporting the need for more stringent programs to protect water quality in Oregon's coastal zone. Here are a few excerpts:

> **Rules for Private Lands Fail to Protect Streams and Water Quality.**
> Areas near streams and the vegetation that grows there, referred to as "riparian areas," provide essential ecological functions such as bank stability; slope stability; shade and temperature moderation; large wood structure; capture, storage, and release of nutrients and sediments; carbon storage and habitat for a variety of fish and wildlife. Since streams form a linked network, water quality and stream health is closely associated with the intensity and cumulative extent of forest management activities near streams of all sizes, in all parts of the network.[1]
>
> > Aquatic ecosystems in the range of the northern spotted owl exhibit signs of degradation and ecological stress. … Approximately 55 percent of the 27,000 stream miles examined in Oregon are either severely or moderately

> impacted by nonpoint source pollution … Concern about aquatic ecosystems is elevated with the identification of large numbers of native freshwater and anadromous fish species and stocks that require special management considerations due to low or declining numbers …
> … Of the 314 at-risk anadromous salmonid stocks identified within the range of the northern spotted owl, only 55 occur solely on nonfederal land. Thus, federal agencies share in the responsibility for managing habitat for the other 259 at-risk stocks. Over the last century, federal land within the range of the northern spotted owl has become increasingly important for ensuring the existence of high quality aquatic resources. Privately held forest lands have been developed into farms, urban areas, transportation corridors, and industrial forests. Conversion of native forest to tree farms and agriculture decreases the capacity of these lands to supply high quality aquatic resources. Thus, society's reliance on federal forest lands to sustain aquatic resources continues to grow. …
> … An ecosystem approach is necessary to halt habitat degradation, maintain habitat and ecosystems that are currently in good condition, and to aid the recovery of habitat of at-risk fish species and stocks. ... This approach is both prudent and necessary given the current perilous state of many native salmon and trout stocks…[2]

The contrast between current BLM management and OFPA in terms of stream protection is alarming. Under NWFP Aquatic Conservation Strategy (ACS), Riparian Reserves are intended to serve two important purposes: first, to maintain and restore aquatic ecosystems, and second, to provide a network of terrestrial habitat refugia and “stepping stones” so that terrestrial wildlife can persist outside of the reserves and move across the landscape.[3] The ACS provides for no-harvest stream buffers based on biological and hydrological criteria. Buffers are typically 340 feet for fish-bearing streams, and 170 feet for non-fish bearing streams. Under the ACS, clearcutting is not allowed inside the stream buffers, but thinning dense young forests is allowed if broad ecological objectives are met. Under the OFPA, no-cut buffers on fish-bearing streams are 20 feet, with more logging allowed from 20-100 feet. Small, non-fish bearing streams may have a 0 to 20 foot tree buffer, with some logging allowed between 20-70 feet. Logging is allowed across streams, which can mean taking out a swath of riparian vegetation to permit extraction of trees on the other side of the waterway. The Oregon Forest Practices Act does not even compare favorably with the forest practice rules of other states.[4]

Table 2. Comparison of existing and proposed management for streams and fish; minimum standards are listed

	Northwest Forest Plan	Proposed Legislation
Stream protection	Aquatic Conservation Strategy	Oregon Forest Practices Act
Recovery/de-listing of salmon	Yes	No
Fish streams	300-foot no-cut buffer	20-foot no-cut buffer
Small/medium non-fish-bearing streams	150-foot no-cut buffer	20-foot no-cut buffer
Small non-fish-bearing streams	150-foot no-cut buffer	10-foot buffer of 6-inch trees
Landslide prone or hazard land	No-cut riparian areas expanded to reduce landsliding into streams	Landslide protection primarily for people, limited protections for fish
Cumulative impacts protection from increased peak flows/sediment	Yes	No
Habitat improvement	Hundreds of stream miles improved	Credit system with incentives Rarely implemented.
Aerial herbicide application	No	Yes
Clearcutting	Restricted and rarely used	Widespread
Public involvement	National Environmental Policy Act	Fees for notification
Federal Endangered Species Act consultation	Yes	No
Roads	Decreasing road densities through de-commissioning	Increasing road densities
Sediment	Maintain or decrease	Increase
Stream temperatures	Maintain or decrease	Increase

Source: KS Wild, Rogue Riverkeeper. [Draft] Fact Sheet: Impact of OCTCJA on Salmon and Water Quality.

The OFPA and similarly intensive forest practices have been widely criticized for failing to protect water quality and habitat for salmonids. Particular problems include:

- failure to protect streamside trees and vegetation necessary to provide shade and long-term inputs of large wood structure,
- failure to protect small streams that flow into larger fish-bearing streams,
- failure to protect unstable slopes, and
- inadequate management of the adverse impacts of road systems.[5]

Studies recently confirmed that stream protections were insufficient to meet minimal Clean Water Act requirements for stream temperature.[6]
See also, subsequent section on how OCTCJA threatens "Salmon and Drinking Water"

Evidence of Forest Practices Act Inadequacy is Abundant.
We don't have to speculate on the adverse effects of the Oregon Forest Practices Act. These rules are already applied across the non-federal forest landscape. There is abundant evidence that water quality, fish habitat, and wildlife habitat are degraded on lands managed under the OFPA. For instance:
Streams flowing through federal forestlands exhibit higher water quality than streams flowing through non-federal forestlands.[7]

The NW Forest Plan monitoring program found —

> [N]onfederal watersheds had the lowest [watershed] condition scores of the land use allocations. … Watersheds that contained more than 50 percent nonfederal lands had the highest road densities of the watersheds. … Sixty-two percent of the [non-federal] watersheds had less than 30 percent of the riparian area containing large conifers (fig. 36). … More acres of timber were harvested on nonfederal watersheds than in any of the other land use categories (fig. 39). In general, watersheds that are predominantly nonfederal have the lowest [watershed] condition scores of

> all of the watersheds, notably worse than predominantly federal watersheds. …[8]

The Independent Multidisciplinary Science Team, established by the Oregon legislature to advise the state on the Oregon Plan for Salmon and Watersheds, found —

> … 94 percent of the riparian areas [on non-federal forest lands] (a potential source of future large wood in streams) are themselves ranked as poor with regard to the presence of large conifers (ODF 1999). We conclude that Oregon streams and adjacent forests currently contain much lower levels of larger wood than they did historically, and under the current management practices, the potential for recruitment will not result in its replenishment.[9]

Buchanan (2005) found —

> The modern forest management paradigm in west-side forests of Washington and Oregon has changed little over the last half-century (DeBell and Curtis 1993). Forestry practices during this period have emphasized short rotations, clearcut harvesting, and replanting. … The general lack of meaningful conservation value being provided for species associated with mature forest structures on non-federal lands is an impediment to Partners in Flight conservation planning in the Pacific Northwest and elsewhere.[10]

Hudiburg et al (2009) found —

> [M]ean live and dead biomass were usually higher on public lands, primarily because of the younger age class distribution on private lands … Private land accounts for 35% of live biomass (and 44% of the forested area)… Mean stand age of publicly owned forests is 50–150 years older than privately owned forests and mean carbon stores are 30–50% higher.[11]

Relatively generous stream buffers under the Northwest Forest Plan also benefits terrestrial wildlife, but these benefits will be lost under OCTCJA. A wide variety of terrestrial wildlife spend part of their lives near water, but they typically also need large trees and snags to meet their habitat requirements. Spotted owls spend a disproportionate amount of time on lower 1/3 of slopes. A map of telemetry locations will thus reveal a map of spotted owl use over time that closely resembles a map of riparian reserves. Logging and increased fragmentation of habitat near streams under OCTCJA will thus have severe consequences for spotted owls and other wildlife.

We urge EPA to carefully review the following additional sources to fully appreciate the water quality impacts of industrial forestry and associated road impacts in coastal watersheds:

- Draft Report of the Forest Practices Committee on Salmon and Watershed. August 2000. http://web.archive.org/web/20050210221951/http://159.121.125.11/FP/FPAC/TOC.htm
- NMFS Position Paper of Oregon Forest Practices: http://web.archive.org/web/20090211024048/http://umpqua-watersheds.org/local/nmfs_on_ofpa.html

- Independent Multidisciplinary Science Team. 1999. Recovery of Wild Salmonids in Western Oregon Forests: Oregon Forest Practices Act Rules and the Measures in the Oregon Plan for Salmon and Watersheds. Technical Report 1999-1 to the Oregon Plan for Salmon and Watersheds, Governor's Natural Resources Office, Salem, Oregon; http://www.fsl.orst.edu/imst/reports/forestry.html, and
- National Marine Fisheries Service 1998. A Draft Proposal Concerning Oregon Forest Practices.http://www.coastrange.org/documents/NMFS_FP_pdf.pdf. and 1993.
- National Marine Fisheries Service 1996. Position Paper on the Oregon Forest Practices Act. http://web.archive.org/web/20090211024048/http://umpqua-watersheds.org/local/nmfs_on_ofpa.html.
- Buchanan, J.B. 2005. Challenges of Avian Conservation on Non-Federal Forests in the Pacific Northwest. USDA Forest Service Gen. Tech. Rep. PSW-GTR-191. 2005. http://www.fs.fed.us/psw/publications/documents/psw_gtr191/psw_gtr191_0419-0428_buchanan.pdf.
- Stout, H.A., P.W. Lawson, D. Bottom, T. Cooney, M. Ford, C. Jordan, R. Kope, L. Kruzic, G.Pess, G. Reeves, M. Scheuerell, T. Wainwright, R. Waples, L. Weitkamp, J. Williams, and T. Williams. 2011. Scientific conclusions of the status review for Oregon Coast coho salmon (Oncorhynchus kisutch). Draft revised report of the Oregon Coast Coho Salmon Biological Review Team. NOAA/NMFS/NWFSC, Seattle, WA. http://www.nwr.noaa.gov/publications/status_reviews/salmon_steelhead/coho/occ-review-2011.pdf.
- FEMAT Chapter V - Aquatic Ecosystem Assessment, pp V-12 - V-29.
- "Cumulative Effects of Forest Practices..." by Beschta et al. (its 33 Mb). http://www.forestry.oregonstate.edu/cof/fr/facultypages/CumulativeEffectsofForestPractices.pdf.
- WA DNR Forest Practices HCP EIS http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesRules/Pages/fp_rules_eis.aspx and http://www.dnr.wa.gov/BusinessPermits/Topics/ForestPracticesHCP/Pages/fp_hcp_feis.aspx

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Endnotes:

[1] See 1993 FEMAT Report, Chapter V.

[2] 1993 FEMAT Report pp V-2.

[3] 1994 NWFP ROD pp B-9, B-13.

[4] Forest practices compared: http://pacificrivers.org/science-research/resources-publications/preventing-salmon-extinction-forest-practices-guidelines And

2007: http://ddr.nal.usda.gov/bitstream/10113/39841/1/IND43930109.pdf

[5] See, for instance, Independent Multidisciplinary Science Team. 1999. Recovery of Wild Salmonids in Western Oregon Forests: Oregon Forest Practices Act Rules and the Measures in the Oregon Plan for Salmon and Watersheds. Technical Report 1999-1 to the Oregon Plan for Salmon and Watersheds, Governor's Natural Resources Office, Salem, Oregon; http://www.fsl.orst.edu/imst/reports/forestry.html, and National Marine Fisheries Service 1998. A Draft Proposal Concerning Oregon Forest Practices. http://www.coastrange.org/documents/NMFS_FP_pdf.pdf. and 1993 FEMAT Chapter V.

[6] Jeremiah D. Groom, Liz Dent, Lisa J. Madsen, Jennifer Fleuret 2011. Response of western Oregon (USA) stream temperatures to contemporary forest management. Forest Ecology and Management Volume 262, Issue 8, 15. October 2011, Pages 1618-1629. http://oregon.gov/ODF/BOARD/docs/2011_November/BOFATTCH_20111103_04_02.pdf

[7] Shannon Hubler, Sarah Miller, Lesley Merrick, Robin Leferink, Aaron Borisenko, High Level Indicators of Oregon's Forested Streams. DEQ09-LAB-0041-TR. June 2009. http://egov.oregon.gov/ODF/indicators/docs/High_Level_Indicators_DEQ09_LAB_0041_TR.pdf

[8] Gallo, K., et al. 2005. Northwest Forest Plan—the first 10 years (1994–2003): preliminary assessment of the condition of watersheds. Gen. Tech. Rep. PNW-GTR-647. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 133 p. http://www.fs.fed.us/pnw/publications/pnw_gtr647/pnw-gtr647c.pdf

[9] Independent Multidisciplinary Science Team. 1999. Recovery of Wild Salmonids in Western Oregon Forests: Oregon Forest Practices Act Rules and the Measures in the Oregon Plan for Salmon and Watersheds. Technical Report 1999-1 to the Oregon Plan for Salmon and Watersheds, Governor's Natural Resources Office, Salem, Oregon. http://www.krisweb.com/biblio/gen_ognro_imst_1999_1.pdf

[10] Buchanan, J.B. 2005. Challenges of Avian Conservation on Non-Federal Forests in the Pacific Northwest. USDA Forest Service Gen. Tech. Rep. PSW-GTR-191. 2005. http://www.fs.fed.us/psw/publications/documents/psw_gtr191/psw_gtr191_0419-0428_buchanan.pdf

[11] Hudiburg, T. et al. 2009. Carbon dynamics of Oregon and Northern California forests and potential land-based carbon storage. Ecological Applications, 19(1), 2009, pp. 163–180. http://terraweb.forestry.oregonstate.edu/pubs2/Hudiburg2009EA.pdf