

July 17, 1996

F/NW03

TO: F/NW - Will Stelle

THROUGH: F/NW03 - Elizabeth Holmes-Gaar

FROM: F/NW03 - Matt Longenbaugh *ML*

SUBJECT: Anadromous Salmonid Unlisted Species Analysis and Findings for the Port Blakely Tree Farms' Habitat Conservation Plan and Unlisted Species Agreement.

This memorandum analyzes the effects of Port Blakely Tree Farms' Habitat Conservation Plan and Unlisted Species Agreement, on the anadromous salmonids resident to their land ownership. The analysis considers the same elements that would need to be considered under sections 7 and 10 of the Endangered Species Act, if these anadromous salmonids were listed.

As indicated in this analysis, this HCP meets the requirements of the statute and the regulations, and further, will result in a positive contribution to anadromous salmonid conservation. Based on this analysis, I recommend that you sign both the Finding of No Significant Impact and the Implementing Agreement associated with this HCP.

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I. Background

This document constitutes the National Marine Fisheries Service's (NMFS) biological opinion and findings in accordance with sections 7(a)(2) and 10(a)(2)(B) of the Endangered Species Act of 1973, as amended (ESA), on the issuance of an unlisted species agreement to Port Blakely Tree Farms, L.P., (Port Blakely), based on the Habitat Conservation Plan (HCP) and Implementation Agreement (IA). Although the anadromous salmonids in that area addressed in the Port Blakely HCP are currently unlisted at this time, and thus not protected under the ESA nor subject to the provisions of sections 7 and 10, the NMFS would agree to grant an incidental take permit to Port Blakely when and if these anadromous fish species become listed in the future. This document provides the rationale and biological basis for making that decision, structured by the administrative requirements of sections 7 and 10.

Based on this HCP, the U.S. Fish and Wildlife Service (FWS) is issuing a section 10(a)(1)(B) incidental take permit to Port Blakely for the northern spotted owl; the marbled murrelet; the bald eagle; and the peregrine falcon. The proposed IA between Port Blakely, the FWS, and the NMFS includes an unlisted species agreement for all vertebrates and invertebrates which may be found in the habitats which occur in the HCP area. The FWS has completed an analysis of the effects of this HCP on the fish and wildlife species under their jurisdiction.

Initial discussion (Informal Consultation) between the FWS and the NMFS (Services) and Port Blakely began in February 1995. Fundamental issues such as components of an all-species HCP for 50 years, and assurances to be attained by the company as result of an HCP, were discussed. Since that initial meeting ongoing discussions between biologists and management from the Services and company have occurred, including collaborative development conservation prescriptions and measures to avoid, minimize and mitigate take¹.

The initial draft of the HCP was provided to the Services on October 31, 1995. The Services provided comments to the applicant on this draft during November 1995. At this time, the Services requested technical reviews on the conservation measures proposed in the HCP from the Washington Department of Fish and Wildlife and Northwest Indian Fisheries Commission. Comments from these entities were submitted to the Services on November 28, 1995 and

¹ In the ESA, the term "take" means to harrass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm has further been defined as significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

November 22, 1995, respectively. A second draft of the HCP was provided to the Services on November 31, 1996. Ongoing discussions with the applicant continued until formal application on April 17, 1996. A thirty-day public comment period was initiated by Federal Register Notice on April 26, 1996 (61 F.R. 18616-18617). Application packages were mailed to 43 members of the public during the public comment period.

This conference opinion (based on the lack of any listed anadromous salmonids) and findings are based on information provided in the following sources: the HCP and IA for the Robert B. Eddy Tree Farm (Port Blakely, 1996a), the Environmental Assessment (EA) (Services 1996); field observations on the plan area; Forestry Impacts on Freshwater Habitat of Anadromous Salmonids in the Pacific Northwest and Alaska -- Requirements for Protection and Restoration (Murphy, 1995); Washington State Salmon and Steelhead Stock Inventory (WDFW et al 1994), and public comments. This conference opinion was prepared by the NMFS Olympia, Washington Field Office. The consultation record also includes the Biological Opinion prepared by the FWS that addresses listed wildlife species and their Unlisted Species Analysis. The complete administrative record of this consultation is on file at that office.

II. Project Description

Port Blakely has filed an application with the Services for an incidental take permit, under section 10(a)(1)(B) of the Act, to authorize incidental take of northern spotted owls, marbled murrelets, bald eagles and peregrine falcons. Additionally, Port Blakely has requested that the Services engage in unlisted species agreements for all species that exist now, or may occur in the future, on the Robert B. Eddy Tree Farm (Plan Area), in exchange for assurances that, barring extraordinary circumstances, that those species would be added to the permit pursuant upon listing of any such species. In the event these species are listed, the Services will initiate section 7 consultation, and consider any requests by Port Blakely to add these newly listed species to the permit. The IA describes the sequence of events that will transpire at that time. Port Blakely proposes to manage the tree farm for 50 years pursuant to the HCP and IA that were developed as part of their permit application. The term of the incidental take permit sought is for 50 years. The HCP and IA allow for the possibility of early termination of the permitted activity or amendments of the subject documents. If a dispute exists regarding the extent of any incidental take or mitigation inequities upon termination, either party is encouraged to seek mediation or alternative dispute resolution.

A. Location

The 7,486 acre Plan Area, located in Pacific and Grays Harbor Counties, Washington, has been used for commercial timber production since the turn of the century, and will continue to be used as such under the proposed action. The surrounding hills are primarily comprised of corporately owned commercial forest land; floodplains in the larger valley bottoms are smaller, privately-owned tracts, and are in forestry and agricultural production (hay and pasture land). Streams draining the Plan Area are mostly tributary to the North River, which empties into the north end of Willapa Bay, which is an enclosed, shallow estuary situated 5-20 miles north of the mouth of the Columbia River. Further description of the Plan Area can be found in HCP-2.1 and 2.2, and in Chapter 3 of the EA.

B. Summary of HCP Actions

The HCP, which is incorporated herein by reference, proposes a fully developed management scheme designed to avoid and minimize take, wherever possible, and mitigate impacts from any expected incidental take of the listed species named above. Furthermore, the HCP addresses all unlisted anadromous salmonid fish species in the Plan Area by addressing their habitat requirements and minimizing, mitigating for, and monitoring the impacts of the HCP to those fish species.

The HCP attempts to address structural attributes important to indigenous fish and wildlife, especially those attributes known to be limiting in managed forests in southwest Washington's Coast Ranges Physiographic Province. Prescriptive measures in the HCP are designed to increase the quantity, quality and/or distribution of these habitat structures during the 50-year term of the HCP and permit, and provide conservation benefits to species that use those habitat structures.

The HCP is a commitment to schedule timber harvest in ways that gradually change the age and size distributions of the upland forests from the current relatively narrow range of older age classes to a wider variety of forest successional stages that will then be maintained by an even-aged clearcut harvest of about 70 years. See HCP- 4.1. Riparian areas would be managed to maintain all the older riparian forest within the riparian management zones (RMZs) and eventually grow all the RMZs within the Plan Area to provide properly functioning riparian areas characterized by at least 50 large conifer trees/acre (>24 inches diameter), with a basal area greater than 150 ft²/acre. See HCP-4.34. Some riparian areas now dominated by hardwood trees may be converted to conifers and other similar sites may be appropriate to maintain as hardwoods for the long-term.

Measures to be implemented by Port Blakely to minimize and mitigate effects of incidental take of species are summarized in Section V below, and fully described in the HCP, Section 3.0.

III. Biological Information

There are currently no species of threatened or endangered anadromous salmonids in the Plan Area, but there are three at-risk species that are known to exist, or have a high likelihood of occasionally using, aquatic habitat types existing on the Plan Area. Based on a recently updated field inventory of streams in the Plan Area, there are approximately 25.5 miles of fish-bearing streams over the Plan Area (HCP-2.6). These are coho salmon (*Oncorhynchus kisutch*), steelhead (*O. mykiss*), and chinook salmon (*O. tshawytscha*). These are addressed individually below. Fish life histories, habitats and stocks are described in the EA, section 3.5.1, and are incorporated herein by reference. The status of each of these species is analyzed below.

A. Coho Salmon

Coho native to the upper North River are likely mixed throughout their sub-adult and adult lives with hatchery coho from Willapa Bay. "The status of Willapa Bay natural coho is unknown," (WDFW et al 1994). Incidental observations of coho spawning suggest that there has lately been wide distribution of wild spawning coho throughout Willapa Bay streams (WDFW et al 1994). Hatchery straying is suspected to be widespread in the spawning areas (WDFW et al 1994). Willapa Bay lies within a broad area of coastal Washington that includes the Humptulips, Chehalis, Cowlitz, and Lewis Rivers. These rivers, together with the Willamette and Clackamas Rivers of Oregon, are together considered to be a separate evolutionarily significant unit (ESU) (Weitkamp et al 1995). At the time of proposed coast-wide listings for coho it was stated that in light of equivocal evidence that some native, naturally reproducing fish may exist, NMFS would consider this ESU a candidate species and would initiate an intensive one-year review to determine if a proposed listing is warranted, (NMFS proposed rule for coho salmon, July 25, 1995, 60 FR 38011).

B. Steelhead Trout

Specific areas used by steelhead for travel, spawning, and rearing have not been identified within the Plan Area, but are suspected to include many sections of streams lying at low to moderate gradients that are accessible to anadromous fish. According to WDFW et al (1994), there are no stocks of summer steelhead in Willapa Bay, and the status of wild winter steelhead is unknown, but may be healthy, based on limited index spawner

surveys. Between half and three fourths of the steelhead caught in the in-river sport fishery are considered wild steelhead. The long-term presence of hatchery mixed with native stocks suggests there is a potential for genetic introgression from hatchery stocks.

West coast steelhead are currently under evaluation by a biological review team assembled by the NMFS to determine if they warrant protective status under the Endangered Species Act of 1973. More information on the status of steelhead in the Willapa Basin will be available upon publication of the NMFS status review in August 1996. Because steelhead are subject to a status review for a possible ESA listing, they are considered a "candidate" species for the purposes of this analysis. The ESU for steelhead will be determined when a listing determination is published in the Federal Register on July 31, 1996.

C. Chinook Salmon

There is an early-returning, native, run of fall chinook in the lower North River (WDFW et al 1994). This stock is thought to be primarily native, with the current status depressed at very low numbers. There are other healthy stocks of fall chinook in the Willapa basin and North River that are considered hybrids of remnant native and hatchery stocks, which were introduced in the Willapa basin nearly a century ago. West coast chinook are currently under evaluation by a biological review team assembled by the NMFS to determine if they warrant protective status under the Endangered Species Act of 1973. More information on the status of chinook in the Willapa basin is expected to become available upon completion of the NMFS status review which is due in 1997. Because chinook are subject to a status review for a possible ESA listing, they are considered a "candidate" species for the purposes of this analysis.

IV. Environmental Baseline

The environmental baseline for the anadromous salmonid species that inhabit the affected HCP area includes the past and present impacts of all Federal, State, or private activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process (50 CFR 402.02). As stated earlier, all anadromous salmonid species analyzed herein are presently unlisted, so there have not yet been section 7 consultations.

An analysis of historic habitat conditions is summarized in the EA (Sec. 3.5.2), which suggests that early forest practices in

the Plan Area were conducted largely without regard for salmonids and their habitat. Logging that took place in the early 1900s removed most of the stands of old-growth conifers from the Plan Area. Railroads were constructed throughout the Plan Area to allow log yarding and transport. Although there have been no specific studies of the channel conditions or impacts of early logging for the Plan Area, the types and extent of likely impacts have been well documented for similar landscapes that were logged in the same period (Murphy 1995).

- Channels were simplified by channelized landslides and splash damming that removed in-stream structure and pools.
- Fish passage was inadvertently blocked in some streams by road and railroad fills.
- Riparian trees that would have contributed shade, bank stability, and a steady supply of large woody debris (LWD) to streams were largely removed by extensive logging.

In addition to changes in fish habitats, there have been likely adverse interactions between the wild stocks of anadromous salmonids and the hatchery stocks of the same species within the Willapa basin. This information is summarized in the EA and the report by WDFW et al (1994). As well, hatcheries have contributed an increasing fraction of the commercial and sport catch (WDFW et al 1994). Further, harvesting of the mixed stocks of wild and hatchery fish have likely had adverse effects on the wild stocks (EA). To briefly summarize, the primary causes of salmonid population declines in the HCP area are habitat modifications from a variety of activities, possible adverse interactions between hatchery and wild stocks, and mixed-stock harvest impacts.

The Plan Area is not located next to any federal lands - the nearest national forest is located about 40 miles away and none of those lands drain into Willapa Bay. Thus, none of the components of the Aquatic Conservation Strategy of the Northwest Forest Plan are expected to influence fish habitat management associated with the proposed HCP.

V. Elements of the Habitat Conservation Plan

The HCP provides for protection and management of stream and riparian habitats through prescriptions that address mass-wasting (landslides), surface erosion, streambank stability, stream shading, recruitment of LWD, and riparian forest composition. The prescriptions are completely described in the HCP, Section 3, and the accompanying rationale is presented in Section 4.

Port Blakely does not own enough land within a sub-basin to initiate Washington State Watershed Analysis, but Port Blakely did use the modules for mass-wasting and surface erosion from that process to develop their own prescriptions.

Port Blakely developed ten types of riparian landforms, based on gradient and confinement of a channel, that describe the range of perennial stream channels on the Plan Area (Appendix D of the HCP). Each riparian landform describes a stream in terms of unique channel response to inputs of LWD and sediments. At the time of timber harvest next to a stream, each side of the channel would receive a site-specific prescription, based on the riparian landform, that would define the riparian management zone (RMZ) within which riparian forest management prescriptions would be applied.

A. Proposed Conservation Measures to Avoid, Minimize and Mitigate Take

1. Using an approach similar to WA Watershed Analysis, potential introductions of sediments from management will be minimized by following prescriptions that address these possible sources: mass wasting; surface erosion; and road construction, maintenance and upgrading. See HCP-3.2, 3.3, 4.3 and Appendices B and C.

2. Port Blakely would utilize site-specific prescriptions to address riparian functions including bank stability (minimum 25' no harvest on all fish-bearing streams), stream shading (following standard forest practices as water temperature does not appear to be a problem on the Plan Area), and soil stability (an entire streamside area evaluated as high potential for both mass-wasting and delivering that material to a stream would become a no-harvest zone). Recruitment of LWD would be met by RMZs along all fish-bearing streams that provide sizes and numbers of large conifers (>24 inch diameter) sufficient to assure potential contribution of LWD. Widths of RMZs would range between 50 feet (25' no-harvest and 25' managed) and 122 feet (25' no-harvest and 97' managed) dependent on stream type, channel type, and geologic landform. RMZ widths would be measured outside of channel migration zones (CMZs) that allow natural channel movements over time and maintain floodplain processes. By the end of the plan term, these RMZ widths would provide 100% of LWD recruitment potential to fish-bearing streams, based on the sizes and numbers of large conifer trees retained within the entire RMZ.

3. Riparian areas along more than 35% of all the perennial non-fish-bearing streams will be either no-harvest or partial harvest as a result of mass wasting prescriptions. For example, greater than 50% of all harvest units containing non-fish-bearing streams will have either partial or no-harvest riparian buffers along

these streams. All other perennial non-fish-bearing streams would have at least 30 trees per acre that are greater than 9"dbh left per 1000' of streambank, in discrete patches (HCP-4.3431).

4. Barriers to fish passage caused by roads on the Plan Area will be evaluated in conjunction with state habitat biologists to develop site-specific prescriptions for improving fish passage. See HCP - Appendix C.

5. In order to minimize increases in road densities, log yarding across RMZs would be allowed with the following provisions: use only full-suspension skyline cable systems, and corridors through the RMZs would be spaced no closer than 150 feet and would be no wider than 20 feet. Yarding corridors would occur on no more than 10% of total length of fish-bearing streams (HCP-3.33).

6. Compliance monitoring, conducted by Port Blakely staff, would be conducted on all enforceable aspects of the HCP, and Services would be in oversight capacity. See HCP-5.1.

7. Effectiveness of HCP prescriptions would be monitored in upland and riparian habitats, including RMZ prescriptions, and occurrence and cause of mass wasting events. Monitoring entails visiting all 400 stands on the Plan Area every 5 years. Further, stream habitat monitoring would focus on water temperature, substrate quality, LWD recruitment, and channel characteristics across all landforms on the Plan Area. See HCP-5.2.

8. If monitoring indicates that prescriptions are not resulting in desired outcomes, commitments in the IA and HCP ensure that prescriptions would/can be altered to better achieve stated goals, consistent with the HCP and IA.

B. Effects to Fish Species

The proposed HCP has been specifically designed to protect instream fish habitat and maintain healthy riparian habitats. Anadromous salmonids are present throughout the North River drainage, even after decades of habitat alterations, occasional blockages to migration and hatchery influences. The conservation measures identified above (section V), would maintain and slightly increase the quantity and quality of instream and riparian habitat throughout the course of the HCP period. Currently marginal or degraded riparian stands will become properly functioning habitats, because the RMZ strategy for fish-bearing streams will provide a managed buffer that will provide needed shade, nutrient input, bank stability and large woody debris (LWD). Increased protection on perennial non-fish-bearing streams will result in healthier riparian stands that will be able to also contribute LWD, which will function to store excess sediment and minimize effects to downstream fish-bearing waters.

These factors, in conjunction with prescriptions aimed at reducing ongoing and potential sources of erosion, and improving fish passage, assure that spawning and rearing habitats will be protected in the HCP area. Increases in LWD due to the RMZs will be expected to create deeper pools for returning adults and summer rearing juveniles, more hiding cover for juveniles, and more habitat complexity for winter rearing juveniles. Thus, the conservation measures in this HCP will most likely increase the productive potential of anadromous salmonids in the HCP area.

C. Effects on Fish Habitat

Although instream habitat and riparian conditions are generally degraded throughout the HCP area, the measures taken in this HCP will help to restore instream and riparian habitat across the Plan Area. Specifically, the RMZs on fish-bearing streams will provide for the growth and development of a properly functioning riparian zone that will provide over the life of the HCP the following riparian functions: sufficient shade, bank stability, litter inputs for healthy nutrient supply, and a continual source of LWD for instream structural elements important to fish. Other prescriptions will minimize sediment inputs due to landslides, assess the condition of fish habitats and riparian stands, and monitor the effects of forest practices on aquatic habitats. Also, in accordance with the road maintenance plan, prescriptions will reduce sediment delivered to aquatic resources and remove blockages to fish passage. The effectiveness monitoring will test assumptions made in some of the prescriptions, as well as monitor additional variables. Because these elements form the basis of adaptive management in this HCP, the incorporation of new information and the ability to change management strategy is assured. This flexibility is key to assuring this HCP will improve conditions for anadromous salmonids in the HCP area.

D. Indirect and Cumulative Effects

Indirect effects are those that are caused by the action and are later in time but still relatively certain to occur (50 C.F.R part 402.02). The action in this context is the issuing of an unlisted species agreement for anadromous salmonids, with provisions to grant the applicant, Port Blakely, an incidental take permit under section 10(a)(1)(B) of the ESA when and if any of these anadromous salmonids are listed. This plan is for 50 years so all effects analyzed are considered as direct effects.

Cumulative effects are those effects caused by other projects and activities unrelated to the action under consideration. The most relevant of these effects are problems associated with fishery management in Willapa Bay, and land management on state and private (i.e., non-Federal) land adjacent to the HCP area. One

effect in this category would be increased fishing pressure brought on by increased salmonid productivity resultant from the HCP. Increased angling pressure could result in increased vehicle traffic in the Plan Area, which may slightly increase surface erosion. It is expected that state regulations will adjust to changing numbers of anadromous salmonids and respond to habitat conditions as needed or appropriate. It is also anticipated that other non-Federal activities will continue at the same level as in the past. Considering the possible cumulative effects to anadromous salmonids, the conservation measures identified in this HCP either minimize, or mitigate these effects to the maximum practicable extent. Habitat for sensitive life stages of anadromous salmonids will be protected by the measures identified in this HCP.

VI. Findings

Although anadromous salmonids addressed in the HCP are not listed under the ESA at this time, this document is intended to provide Port Blakely assurances that they will receive an Incidental Take Permit if and when such species are subsequently listed, subject to the "extraordinary circumstances" clause in the IA. Thus, NMFS make the following findings with regard to the adequacy of the HCP meeting the statutory and regulatory requirements for such an Incidental Take Permit under Section 10 (a) (2) (B) of the ESA and 50 CFR 222.22 (c) (2).

1. The taking of listed species will be incidental. Activities that will occur in the HCP area that may result in take (if anadromous species were listed) may include "harm" through adverse changes in essential habitat features such as increased peak flows due to upslope harvesting, reduced LWD input due to harvest of riparian trees in non-fish-bearing streams, and additional sediment inputs due to landslides and road use throughout the planning area. Also, take may occur through the "harass" definition as well, by frightening or disturbing spawning fish during riparian yarding, road crossing or riparian management activities. These types of take are speculative and are not quantifiable.

Any take of anadromous salmonids (steelhead trout, chinook or coho salmon) will be incidental to otherwise lawful forest management and incidental land use activities by Port Blakely, specified in the HCP.

2. Port Blakely, will, to the maximum extent practicable, monitor, minimize and mitigate the impacts of taking coho, steelhead, or chinook. Measures in this HCP minimize and mitigate for any take impacts that may occur, through riparian prescriptions for (for example - designating no harvest areas on

steep unstable slopes), and by the designation of RMZs throughout the HCP area that assure properly functioning riparian habitats for fish-bearing streams. Also, Port Blakely will monitor to test assumptions and to determine effectiveness of prescriptions.

The HCP and IA contain measures to monitor, minimize and mitigate the impact of take of presently listed species under the permit.

3. Based upon the best available scientific information, the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild. Conservation measures identified in the plan will increase the quality and quantity of spawning and rearing habitat in the HCP area, and result in a benefit to anadromous salmonid species.

The Act's legislative history establishes the intent of Congress that this issuance criteria be based on a finding of "not likely to jeopardize" under section 7(a)(2) [see 50 CFR 402.02]. This is the identical standard to Section 10 (a)(2)(B). Thus, the NMFS has considered the status of the species, the environmental baseline and the effects of the proposed action, and any indirect and cumulative effects, to conclude that issuance of the unlisted species agreement to Port Blakely would not likely jeopardize the continued existence of the anadromous salmonids addressed in the HCP.

4. The plan has been revised to assure that other measures, as required by the NMFS, have been met.

The HCP and IA incorporate all elements determined by the NMFS to be necessary for approval of the HCP and issuance of the permit.

5. The NMFS has received the necessary assurance that the plan will be funded and implemented.

Signing of the IA by Port Blakely assures that the HCP will be implemented. Port Blakely, will ensure adequate funding for the HCP. Also, the HCP and IA commit Port Blakely to adequately fund implementation of the HCP.

VII. Procedures In the Event of Listings

As specified in the IA, should any of the currently unlisted species subsequently become listed, Port Blakely may request an amendment to the incidental take permit to include such vertebrate species. If an amendment request is received, the FWS and/or NMFS will reinitiate consultation under Section 7 of the

Act and initiate amendment of the HCP. Such an amendment will: (1) present relevant existing information on the status, trend, or other information pertinent to the Plan Area; (2) estimate the amount of take and the impacts of such take; (3) describe the ongoing minimization and mitigation steps the applicant is taking or will take relative to that species; (4) describe any additional actions that were found to be necessary or appropriate to successfully complete an amendment for that species; and (5) explain how each of the issuance criteria described in Section 10 (2)(B) are being met. Such amendment should cite the Federal Register documents used in proposed, emergency, or final listing; cite any pertinent draft recovery plan effort or similar management plans for the species or its habitats; and must consider the other obligations of the Services as Federal agencies. It is expected that, upon listing of a currently unlisted species, additional information will be available in any proposed, final, or emergency listing to determine the habitat and life-history requirements of the species, the range-wide status, threats to the species, applicable management recommendations, and other basic information necessary to complete the amendment and initiation processes. Before such species would be added to the permit, the FWS or NMFS must find that adding the species to the permit would not appreciably reduce the likelihood of survival and recovery of the affected species in the wild and would be consistent with its other responsibilities.

VIII. References

- Beak Consultants, Inc. 1996. Environmental Assessment for the proposed issuance of a multiple species Incidental Take Permit. Prepared for the USDI (FWS), and USDC (NMFS). Kirkland, WA. 176 pp.
- Murphy, M.L. 1995. Forestry impacts on freshwater habitat of anadromous salmonids in the Pacific Northwest and Alaska -- requirements for protection and restoration. NOAA Coastal Ocean Program Decision Analysis Series No. 7. NOAA Coastal Ocean Office, Silver Spring, MD. 156 pp.
- Port Blakely Tree Farms. 1996. Habitat conservation plan for the Robert B. Eddy Tree Farm. Port Blakely Tree Farms, L.P., Seattle WA. 124 pp.
- Washington Department of Fish and Wildlife (WDFW) and Western Washington Treaty Indian Tribes (WWTIT). 1994. 1992 Washington State salmon and steelhead stock inventory: Appendix 2, Coastal Stocks, August 1994. Wash. Dep. Fish. Wildlife, Olympia, 588 pp.
- Weitkamp, L.A., T.C. Wainwright, G.J. Bryant, G.B. Milner, D.J. Teal, R.G. Kope, and R.S. Waples. Status review of coho salmon from Washington, Oregon and California. U.S. Dept. Commerce, NOAA Tech. Memo. NMFS-NWFSC-24, 258 pp.