**UNITED STATES DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

**Refer to:**
**2003/00421**

July 22, 2003

Mr. Fred P. Patron
Senior Transportation Planning Engineer
Federal Highway Administration, Oregon Division
530 Center Street NE
Salem, OR 97301

Re: Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat Consultation for the Lake Creek Bridge Replacement Project, Jefferson County, Oregon

Dear Mr. Patron:

Enclosed is a project-specific consultation prepared by NOAA's National Marine Fisheries Service (NOAA Fisheries) pursuant to section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) on the effects of the Lake Creek Bridge Replacement Project near the City of Sisters, Jefferson County, Oregon. In this consultation, NOAA Fisheries concluded that the proposed action may adversely affect designated essential fish habitat (EFH) for chinook salmon (*Oncorhynchus tshawytscha*).

As required by section 305(b)(4)(A) of the MSA, NOAA Fisheries included conservation recommendations that NOAA Fisheries believes will avoid, minimize, mitigate, or otherwise offset adverse effects on EFH resulting from the proposed action. As described in the enclosed consultation, 305(b)(4)(B) of the MSA requires that a Federal action agency must provide a detailed response in writing within 30 days after receiving an EFH conservation recommendation.

Questions regarding this letter should be directed to Jim Collins of my staff in the Oregon Habitat Branch at 541.957.3389.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

cc: Bill Warncke, ODOT
Patti Caswell, ODOT
Randy Reeve, ODFW

# Magnuson-Stevens Fishery Conservation and Management Act
# Essential Fish Habitat Consultation

Lake Creek Bridge Replacement Project,
Jefferson County, Oregon

| | |
|---|---|
| Agency: | Federal Highway Administration |
| Consultation Conducted By: | NOAA's National Marine Fisheries Service, Northwest Region |
| Date Issued: | July 22, 2003 |
| Issued by: | for Michael R Course<br>D. Robert Lohn<br>Regional Administrator |
| **Refer to:** | **2003/00421** |

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## 1. BACKGROUND

Oregon State Highway 20 crosses Lake Creek at mile post 78.42, near Suttle Lake in Jefferson County, Oregon. Highway 20 is a major freight corridor from Interstate 5 in Albany to Central Oregon and Highway 97. Lake Creek Bridge was identified by the Oregon Department of Transportation (ODOT) as being structurally deficient, requiring truck weight restrictions. ODOT is proposing to replace the bridge with a new bridge that will accommodate heavier loads.

On April 15, 2003, NOAA's National Marine Fisheries Service (NOAA Fisheries) received a letter from the Federal Highway Administration (FHWA) requesting essential fish habitat (EFH) consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA) for the proposed Lake Creek Bridge Replacement Project. Although chinook salmon (*Oncorhynchus tshawytscha*) are currently precluded from the project area by the Pelton and Round Butte dams, and the project area is not included in the evolutionary significant units (ESUs) for Middle Columbia River spring chinook and Deschutes River summer/fall chinook ESUs, this area is still classified as chinook EFH. Thus, the remainder of this document will consist of EFH consultation only, pursuant to section 305(b) of the MSA and its implementing regulations (50 CFR Part 600).

## 2. MAGNUSON-STEVENS ACT

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of essential fish habitat: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity"' covers a species' full life cycle (50 CFR 600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH;

- NOAA Fisheries shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH;

- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activities that may adversely affect EFH, regardless of its location.

## 3. IDENTIFICATION OF EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Pacific salmon: Chinook (*O. tshawytscha*), coho (*O. kisutch*), and Puget Sound pink salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other waterbodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the *Pacific Coast Salmon Plan* (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based on this information.

## 4. PROPOSED ACTIONS

The FHWA proposes to replace the existing two-lane, three-span Lake Creek Bridge with a new two-lane, single-span bridge along the current alignment. The existing bridge is 23.2 meters (m) long, while the proposed bridge will be 28.0 m long; improving stream habitat and hydraulic function.

Due to the high traffic volumes, a detour bridge will be necessary during construction of the new structure. The detour bridge will be a single-span structure, fully spanning Lake Creek. To construct the detour, approximately 23 trees will need to be removed. The detour structure will

be a precast, prestressed slab superstructre supported by driven pile. If soil conditions permit, a vibratory hammer will be used to place the pile.

The only work below the ordinary high water mark (OHWM) will be to remove the two existing bridge supports. To minimize potential adverse effects, all work will be isolated from the active flowing channel with the use of a coffer dam.

Replacement of the Lake Creek Bridge will require utilities that are attached to the south side of the existing structure to be moved temporarily. This will involve suspending the utilities from poles at the southeast and southwest corners of the bridge. The poles will be constructed on an ODOT right-of-way in previously disturbed areas. The utilities will be reattached to the south side of the bridge upon completion of the new bridge.

All in-water work activities will occur during the Oregon Department of Fish and Wildlife (ODFW) in-water work period of July 1 through September 30. Any exceptions to this in-water work timing extension will require NOAA Fisheries' concurrence in consultation with the appropriate ODFW biologist.

The Lake Creek Bridge Replacement Project biological assessment (BA) includes a set of best management practices (BMPs) designed to minimize adverse effects on salmon and their habitats. These BMPs are described on pages 25-38 of the BA, dated April 9, 2003. Specific BMPs for in-water work, clearing and grubbing, bridge construction, erosion control, hazardous materials, and site-specific conservation measures are included. NOAA Fisheries regards these BMPs as integral components of the project and considers them to be part of the proposed action.

## 5. EFFECTS OF PROPOSED ACTION

The proposed actions have the potential to cause the following impacts to chinook salmon:

Construction Equipment

Accidental release of fuel, oil, and other contaminants may occur. Operation of back-hoes, excavators, and other equipment requires the use of fuel, lubricants, *etc.*, which, if spilled into a waterbody channel, or into the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants (such as fuel, oil, and some hydraulic fluids) contain poly-cyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids at high levels of exposure and can also cause chronic lethal and acute and chronic sublethal effects to aquatic organisms (Neff 1985). Similarly, exposure to herbicides can have lethal and sublethal effects on salmonids, aquatic invertebrates, aquatic vegetation, and target and non-target riparian vegetation (Spence *et al.* 1996). To minimize the potential of pollutants entering the waterway, construction equipment, materials and refueling will be staged at least 45 m from the OHWM

Hardened embankments

Impacts to waterways from installation of hardened embankments include simplification of stream channels, alteration of hydraulic processes, and prevention of natural channel adjustments (Spence *et al*. 1996). Moreover, embankment hardening may shift the erosion point upstream or downstream of the project site, and contribute to stream velocity acceleration. As amplified erosive forces attack different locations, and landowners respond with more bank hardening, the river eventually attains a continuous fixed alignment lacking habitat complexity (USACE 1977).

Fish habitats are enhanced by the diversity of habitats at land-water interfaces and adjacent banks (USACE 1977). Streamside vegetation provides shade that reduces water temperature. Overhanging branches provide cover from predators. Insects and other invertebrates that fall from overhanging branches may be preyed upon by fish, or provide food sources for other prey organisms. Immersed vegetation, logs, and root wads provide attachment points for aquatic prey organisms, shelter from swift currents during high flow events, retention of bed load materials, and reduction of flow velocity.

The most desirable method of bank protection is revegetation. However, revegetation alone can seldom stabilize banks steeper than 3 to 1 (horizontal-vertical) or areas of high velocity (USACE 1977). Although they are biologically less desirable, fixed structures provide the most reliable means of bank stability. The use of fixed structures should be a last resort. Combining structural measures such as sloped riprap, vegetation, and large woody debris (LWD) is preferable to a structural solution without vegetation (USACE 1977). The span length of the new bridge will be long enough to avoid the need for bank scour protection.

Sedimentation

Since chinook salmon are excluded from the project area by a series of downstream barriers, there is no potentially immediate sedimentation impact from the proposed action. The project does have the potential to impact chinook salmon once passage is provided past the current downstream barriers. Sedimentation produced by the project could result in impacts to the aquatic environment downstream of the project site. Construction-related effects necessary to complete the proposed action will be minimized by implementation of effective erosion and pollution control measures, and completing all work within the OHWM and during the ODFW-approved in-water work period. In addition, all work would be isolated from the wetted channel.

Water Quality Stormwater Effects

Due to a 377 $m^2$ increase of new impervious surface, the potential exists for an increase in runoff from the proposed new impervious surface. However, the proposed stormwater runoff treatment criteria will offset any potential adverse effects to water quality as a result of the proposed action.

Stream Hydraulics

Since the new bridge would fully span the OHWM, there will be no new fill within the stream. Removal of the existing bents within the OHWM will result in a net decrease of fill.

Riparian Vegetation

The removal of approximately 23 trees would result in the short-term potential for exposed soils and increased sediment transport to the Applegate River. Woody vegetation that will be cleared includes both coniferous and deciduous, ranging less than 8 centimeters (cm) to over 100 cm diameter at breast height (dbh). However, during construction, erosion control measures and post-project riparian plantings will reduce erosion during construction and restore woody vegetation. All impacted areas would be restored to pre-work conditions. Damaged streambanks would be restored to a natural slope, pattern, and profile suitable for establishment of permanent woody vegetation. All exposed soil surfaces, including construction access roads and associated staging areas, will be stabilized. Woody vegetation removed during construction will be replanted. The riparian plantings will provide bank stabilization and shading, and will increase the potential for insect production.

Work Area Isolation and Fish Removal

Bridge removal may require work area isolation from the flowing water. Fish removal activities will be in accordance with NOAA Fisheries' fish handling guidelines. However, due to downstream barriers, there will be no chinook salmon present in the project area.

Although chinook salmon are not present within the project area, work area isolation can result in a loss of aquatic invertebrates due to dewatering within the wetted channel. In addition, sediment-laden water created within isolated work areas could escape, resulting in impacts to the aquatic environment downstream of the project site.

The adverse effects of these activities on chinook salmon and their riparian and aquatic habitats will be avoided or minimized by carrying out the construction methods and approaches described in the BA (pages 25-38).

## 6. CONCLUSION

NOAA Fisheries believes that the proposed action will adversely affect the EFH for Pacific salmon.

## 7. EFH CONSERVATION RECOMMENDATIONS

Pursuant to section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project by the FHWA are applicable to salmon EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH recommendations.

NOAA Fisheries believes that the following conservation recommendations will minimize adverse effects to EFH for the above species. Therefore, NOAA Fisheries incorporates each of those measures here as EFH recommendations.

1. Minimize the likelihood of adverse effects to EFH by addressing in-water timing and minimizing the extent of in-water work.

    a. Construction impacts should be confined to the minimum area necessary to complete the project.
        i. Survey and mark the ordinary high water mark at the project site before commencement of work.
        ii. All work within the active channel that could potentially contribute sediment or toxicants to downstream fish-bearing streams should be completed within the ODFW in-water work period (July 1 to September 30).
    b. During in-water work (work within the OHWM), if the project involves either significant channel disturbance or use of equipment within the wetted channel, ensure that the work area is well isolated from the active flowing stream within a coffer dam (made out of sand bags, sheet pilings, inflatable bags, *etc.*) or similar structure, to minimize the potential for sediment entrainment.
    c. Extensions of the in-water work period, including those for work outside the wetted perimeter of the stream but below the ordinary high water mark, should have the written concurrence of a biologist from NOAA Fisheries.

2. Minimize the likelihood of adverse effects to EFH by addressing erosion and pollution control.

    a. The Contractor should develop and implement a site-specific spill prevention, containment, and control plan (SPCCP), and is responsible for containment and removal of any toxicants released. The Contractor should be monitored by an ODOT Engineer to ensure compliance with this SPCCP.
    b. Material removed during excavation should only be placed in locations where it cannot enter streams, wetlands, or other waterbodies.
    c. During excavation, native streambed materials should be stockpiled above the bankfull elevation for later use.
    d. A supply of erosion control materials (*e.g.*, silt fence and straw bales) should be on hand to respond to sediment emergencies. Sterile straw or hay bales should be used when available to prevent introduction of weeds.
    e. An oil-absorbing, floating boom is available on-site during all phases of construction. The boom must be of sufficient length to span the wetted channel.
    f. All temporary erosion controls (*e.g.*, straw bales, silt fences) are in place and appropriately installed downslope of project activities within the riparian area. Effective erosion control measures should be in place at all times during the

contract, and should remain and be maintained until such time that permanent erosion control measures are effective.

g. All exposed or disturbed areas should be stabilized to prevent erosion.
   i. Areas of bare soil within 45 m of waterways, wetlands or other sensitive areas should be stabilized by native seeding[1], mulching, and placement of erosion control blankets and mats, if applicable, but within 14 days of exposure.
   ii. All other areas should be stabilized quickly as reasonable, but within 14 days of exposure.
   iii. Seeding outside of the growing season should not be considered adequate nor permanent stabilization.

h. All erosion control devices should be inspected during construction to ensure that they are working adequately.
   i. Erosion control devices should be inspected daily during the rainy season, weekly during the dry season, monthly on inactive sites.
   ii. If inspection shows that the erosion controls are ineffective, work crews should be mobilized immediately, during working and off-hours, to make repairs, install replacements, or install additional controls as necessary.
   iii. Erosion control measures should be judged ineffective when turbidity plumes are evident in waters designated as EFH for chinook salmon during any part of the year.

i. If soil erosion and sediment resulting from construction activities is not effectively controlled, the engineer should limit the amount of disturbed area to that which can be adequately controlled.

j. Sediment should be removed from sediment controls once it has reached 1/3 of the exposed height of the control. Whenever straw bales are used, they should be staked and dug into the ground 12 cm. Catch basins should be maintained so that no more than 15 cm of sediment depth accumulates within traps or sumps.

k. Sediment-laden water created by construction activity should be filtered before it leaves the right-of-way or enters a stream or other waterbody. Silt fences or other detention methods should be installed as close as reasonable to culvert outlets to reduce the amount of sediment entering aquatic systems.

l. Refueling and hazardous materials.
   i. All staging and refueling shall occur at least 45 m from the ordinary high-water mark, except as stated below.
      (1) Fuel storage locations within 45 m of the ordinary high-water mark shall have containment measures in place that meets or exceeds 100% containment.
      (2) No auxiliary fuel tanks are stored within 45 m of the ordinary high-water mark.

[1] By Executive Order 13112 (February 3, 1999), Federal agencies are not authorized to permit, fund or carry out actions that are likely to cause, or promote, the introduction or spread of invasive species. Therefore, only native vegetation that is indigenous to the project vicinity, or the region of the state where the project is located, shall be used.

ii. Hazardous materials stored within 45 m of the ordinary high-water mark shall have containment measures in place that meets or exceeds 100% containment.
iii. No hazardous materials should be stored on the work bridge.

3. Minimize the likelihood of adverse effects to EFH from new impervious surface and stormwater management.

a. All stormwater runoff from any road or bridge built pursuant to a permit issued under this consultation must be managed to ensure that it should not result in a change in the existing hydraulic conditions or an increase of pollutants to the receiving water.
b. Any project that should produce new surfaces or land use conversions that retard the entry of water into the soil must control the quantity and quality of the resulting stormwater runoff for the life of the project.
c. Stormwater must be infiltrated or dispersed onsite to the maximum extent possible without causing flooding or erosion impacts.

4. Minimize the likelihood of adverse effect to EFH from vegetation removal and ground disturbance.

a. The distance between existing bridge approach fill and the 100-year floodplain or OHWM (whichever is closer to the existing fill) should not be reduced.
b. The amount of fill within the floodplain should be minimized.
c. Boundaries of the clearing limits associated with site access and construction should be flagged to prevent ground disturbance of riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.
d. During excavation, native streambed material should be stockpiled out of the two-year floodplain and for later use in back-filling the trenches used to construct the coffer dams.
e. Alteration or disturbance of streambanks and existing riparian vegetation should be minimized. Where bank work is necessary, bank protection material shall be placed to maintain normal waterway configuration whenever possible.
f. Temporary access roads should be designed as follows:
    i. Temporary access roads should not cross streams.
    ii. Alteration of existing native vegetation should be minimized in the construction, use, and maintenance of temporary access roads.
    iii. Existing roadways or travel paths should be used whenever reasonable.
    iv. Vehicles and machinery must cross riparian areas at right angles to the main channel wherever reasonable.
    v. Temporary roads within 45 m of streams should avoid, minimize and mitigate soil disturbance and compaction by clearing vegetation to ground level and placing clean gravel over geotextile fabric.

vi. No treated wood may be used within or above the ordinary high water mark.

g. Site restoration and clean-up, including protection of bare earth by seeding, planting, mulching and fertilizing, is done in the following manner:

i. All damaged areas should be restored to pre-work conditions including restoration of original streambank lines, and contours.

ii. All exposed soil surfaces, including construction access roads and associated staging areas, should be stabilized at finished grade with mulch, native herbaceous seeding, and native woody vegetation.

(1) Planting should occur between October 1 and April 30. Do not plant in freezing periods of weather.

(2) On cut slopes steeper than 1 to 2, a tackified seed mulch should be used so that the seed does not wash away before germination and rooting occurs. In steep locations, a hydromulch should be applied at 1.5 times the normal rate.

iii. Disturbed areas should be planted with native vegetation specific to the project vicinity or the region of the state where the project is located, and should comprise a diverse assemblage of woody and herbaceous species.

iv. Plantings should be arranged randomly within the revegetation area.

v. No herbicide application should occur within 90 m of any stream channel as part of this permitted action. Mechanical removal of undesired vegetation and root nodes is permitted.

vi. No surface application of fertilizer should be used within 15 m of any stream channel as part of this permitted action.

vii. Plantings should achieve 80% ground cover after five years.

(1) If success standard has not been achieved after five years, the applicant should submit an alternative plan to the FHWA. The alternative plan should address temporal loss of function.

5. Use comprehensive monitoring and prepare a post project report to ensure that these conservation recommendations meet their objective of minimizing the likelihood of adverse effects to EFH.

a. Submit a report to NOAA Fisheries within 120 days of completing the project. Describe the FHWA's success meeting conservation recommendations above. Include the following information.

i. <u>Project identification</u>.

(1) Project name.

(2) Starting and ending dates of work completed for this project.

(3) The FHWA contact person.

ii. <u>Pollution and erosion control</u>. A summary of all pollution and erosion control inspection reports, including descriptions of any failures experienced with erosion control measures, efforts made to correct them and a description of any accidental spills of hazardous materials.

iii. Site restoration. Documentation of the following conditions:
   (1) Finished grade slopes and elevations.
   (2) Planting composition and density.
   (3) A plan to inspect and, if necessary, replace failed plantings and structures for a period of five years, including the compensatory mitigation site.

iv. A narrative assessment of the effects of the project.

v. Photographic documentation of environmental conditions at the project site before, during and after project completion.
   (1) Photographs should include general project location views and close-ups showing details of the project area and project, including pre and post construction.
   (2) Each photograph should be labeled with the date, time, photo point, project name, the name of the photographer, and a comment describing the photograph's subject.
   (3) Relevant habitat conditions include characteristics of channels, streambanks, riparian vegetation, flows, water quality, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

b. Submit monitoring reports to:

National Marine Fisheries Service
Oregon Habitat Branch, Habitat Conservation Division
**Attn: 2003/00421**
525 NE Oregon Street, Suite 500
Portland, OR 97232-2778

## 7. STATUTORY RESPONSE REQUIREMENT

Please note that the MSA (section 305(b)) and 50 CFR 600.920(j) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

## 8. SUPPLEMENTAL CONSULTATION

The FHWA must reinitiate EFH consultation with NOAA Fisheries if either action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

## 9. LITERATURE CITED

This section identifies the data used in developing this consultation.


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Neff, J.M. 1985. Polycyclic aromatic hydrocarbons. *In*: Fundamentals of aquatic toxicology, G.M. Rand and S.R. Petrocelli, pp. 416-454. Hemisphere Publishing, Washington, D.C. Nickelson, T.E., J.W. Nicholas, A.M. McGie, R.B. Lindsay, D.L. Bottom, R.J. Kaiser, and S.E. Jacobs. 1992. Status of anadromous salmonids in Oregon coastal basins. Oregon Department of Fish and Wildlife, Research Development Section and Ocean Salmon Management, 83 pp. Oregon Department of Fish and Wildlife, P.O. Box 59, Portland.

PFMC (Pacific Fishery Management Council). 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon. Portland, Oregon.

Spence, B.C., G.A. Lomnicky, R.M. Hughes, and R.P. Novitzki. 1996. An Ecosystem Approach to Salmonid Conservation. TR-4501-96-6057. ManTech Environmental Research Services Corp., Corvallis, Oregon. (Available from the National Marine Fisheries Service, Portland, Oregon). 356 pp.

USACE (United States Army Corps of Engineers). 1977. Nehalem Wetlands Review: A Comprehensive Assessment of the Nehalem Bay and River (Oregon). U.S. Army Engineer District, Portland, Oregon. [Page count unknown].