

5.0 COORDINATION WITH OTHER PROGRAMS, PLANS, AND REGULATORY AUTHORITIES

5.1 Overview

There are many federal, state, tribal, and local laws, regulations and treaties potentially applicable to the CB/NRDA restoration activities. Other Commencement Bay area plans, policies, and programs instituted by those authorities may also need to be taken into consideration. At a programmatic level, however, specific requirements and interactions with other programs cannot be evaluated and those will be discussed in more detail at the project-specific review. The following sections list the key and potentially applicable regulatory authorities, some of the area plans and programs, and the common permit requirements.

In initiating the RP/EIS for Commencement Bay, it is necessary for the Trustees to comply with a number of environmental and regulatory requirements on several levels. The first requirement is that the Trustees follow the state and federal NRDA regulations and policies. Laws governing the NRDA process include the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the Oil Pollution Act of 1990 (OPA), the 1989 Model Toxics Control Act (MTCA), and other applicable laws.

To comply with NEPA, the Trustees elected to prepare the RP/EIS. The NEPA process itself has numerous opportunities for public participation, and it has many other process requirements. In addition to other environmental requirements, NEPA requires coordination with a number of other programs which may also affect the human environment. Because the Tribal Trustees have reservations and reserved treaty rights at or near the restoration study area, both federal and tribal regulations may apply. The State anticipates adopting the NEPA document under SEPA. After the RP/EIS has been completed, site-specific projects may still require additional environmental documentation. Section 1 of the EIS describes in more detail the NEPA process for subsequent environmental documents.

Trustees will also be working primarily in an area designated as a federal Superfund site. A number of decision documents have been produced by EPA, for example the Record of Decision (ROD) (EPA, 1989), which govern Superfund cleanup actions in the Bay. EPA and Ecology have also entered into a cooperative agreement to control sources of pollution and remediate contamination. Close Trustee coordination with these two entities is essential to prevent recontamination and minimize impacts to natural resources or potential restoration sites from remedial and/or disposal activities. One example of coordination is the Memorandum of Agreement between the Trustees and EPA.

Negotiations between Trustees and potentially responsible parties (PRPs) may occur at the same time remedial actions or sampling are being planned for upland cleanup or sediment remediation in waterways. These activities need to be coordinated to avoid impacts to potential restoration sites from cleanup actions, to maximize sampling and other data

gathering efforts, and to combine remediation and restoration efforts at the same time, where possible.

Because Trustees are comprised of various federal, state, and Indian tribal entities, a large number of other laws, policies and procedures may overlap. Settlements, for example, may include provisions in consent decrees with responsible parties which respond to requirements of various federal, state, and tribal government regulatory authorities. Cleanup and restoration activities in designated harbor areas or on state lands must be coordinated with the Washington Department of Natural Resources. If site cleanup is necessary prior to restoration, it may have to satisfy tribal, state or federal cleanup standards or permit requirements. In an area like the Thea Foss Waterway, plans should be coordinated with the Thea Foss Redevelopment Plan and the Urban Bay Action Team (UBAT) cleanup agreement with the City of Tacoma (City). Stormwater management plans and surface water plans are also important considerations.

Coordination on restoration actions is also required for other regional, state, local, or tribal plans and policies which may affect restoration planning or be affected by them. For example, much of the work will be done in an active port area, therefore NRDA restoration planning activities need to be coordinated with long range development and dredging plans for the Port. River basin plans and other geographic or regional environmental plans should be overlain with the NRDA restoration plan, not only to see if there are conflicts, but also to identify where opportunities for increased restoration or coordination may exist.

To construct a restoration project, various permits will be required from local, state or federal agencies, and a public hearing may be required at the local level. Some environmental permits are joint permits; examples are the Washington Joint Aquatic Resource Permits for hydraulic project approvals, and individual permits such as shoreline management permits, water quality certification, and approval for exceedance of standards of the Clean Water Act section 404 and section 10. In-water projects require review by several resource agencies. In the last stage of restoration work, compliance with various construction/code, health and safety and labor laws will be required. Monitoring of the site will involve complying with approved methodologies and other standard requirements contained in consent decrees.

5.2 Monitoring Compliance with NEPA

Monitoring to ensure that restoration projects minimize, avoid, or compensate for environmental impacts is necessary to provide consistency, focus, and documentation that the requirements spelled out in NEPA and the RP/EIS are institutionalized and carried forward. A Trustee Council and a Memorandum of Agreement among the Trustees have been in place since 1990 to ensure that the Trustees carry out their fiduciary duty in performing natural resource damage assessments and restoration activities, which will include the RP/EIS.

Most restoration projects will be implemented and monitored as part of a settlement agreement with PRPs, which will spell out what the project monitoring requirements are and the expectations of the settling parties. Additional Trustee oversight of these projects will include monitoring to compensate for or minimize potential environmental impacts; oversight will also include the physical monitoring, assessment, and adaptive management of the site. NEPA compliance and monitoring may also be included as part of the permitting process. Site monitoring can be assisted by public stewardship of some restoration projects.

5.3 Key Federal and State Statutes And Regulations

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 USC 9601 et seq.; 43 CFR Part 11 (DOI NRDA)

The Trustees may assess damages to natural resources resulting from a discharge of oil or a release of a hazardous substance covered under CERCLA or the Clean Water Act (CWA) and may seek to recover those damages. Regulations under CERCLA supplement the procedures established under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR 300, for the identification, investigation, study, and response to a discharge of oil or release of a hazardous substance, and provides a procedure by which a natural resource trustee can determine compensation for injuries to natural resources that have not been nor are expected to be addressed by response actions conducted pursuant to the NCP. Compensation for those injuries are used to restore, replace, or acquire the equivalent of natural resources and services through restoration.

Oil Pollution Act of 1990 (OPA), 42 USC 2701-2761, 15 CFR Part 990 (NOAA NRDA)

Section 1006(e)(1) of OPA requires the President, acting through the Under Secretary of Commerce for Oceans and Atmosphere, to promulgate regulations for the assessment of natural resource damages resulting from a discharge or substantial threat of a discharge of oil. This rule is for the use of authorized federal, state, Indian tribe, and foreign officials, referred to as Trustees. Natural resource damage assessments are not identical to response or remedial actions addressed by the larger statutory scheme of the OPA. Assessments are not intended to replace response actions, which have as their primary purpose the protection of human health, but to supplement them by providing a process for restoring, replacing, rehabilitating, and acquiring the equivalent of natural resources and services injured as a result of an incident involving oil.

Model Toxics Control Act (MTCA), Ch.70.105D RCW (1989) and Ch.173-340 WAC (1992)

MTCA, Washington's toxic cleanup law, mandates that site cleanups protect the state's citizens and the environment. The regulations established cleanup standards, which provide a uniform, statewide approach to cleanup that can be applied on a site-by-site basis; and requirements for cleanup actions, which involve evaluating the best methodology to achieve the cleanup standards at a site. The cleanup actions must also provide permanent cleanup

solutions, a reasonable timeframe for cleanup, and monitoring. MTCA is the state equivalent of the federal Superfund program. More detailed information on MTCA is available from Ecology.

Washington State Constitution, Articles XV, XVII, and XXVII; State Aquatic Lands Management Act, Ch. 79.90-96, 79.68 RCW and Ch. 332.30 WAC.

The Department of Natural Resources manages over two million acres of State-owned aquatic lands and will be a key player when planning restoration. This is particularly true in urban estuaries with State-established harbor lines, port management areas, and leased areas and tidelands within and outside the Port area in Commencement Bay. As the steward and trustee for these public lands, DNR's role is complex, and is governed to a large degree by the State Constitution and other statutory requirements. While encouraging public use, other uses related to commerce and navigation also play a central role in balancing their overall public trust mandate. More information may be found in the DNR publication entitled "Aquatic Lands, Strategic Plan, 1992."

5.4 Key Environmental Compliance Laws and Regulations

National Environmental Policy Act (NEPA), 42 USC 4321-4370d; 40 CFR Parts 1500-1508.

NEPA was enacted in 1969 to establish a national policy for the protection of the environment. NEPA applies to federal agency actions that affect the human environment. The Council on Environmental Quality (CEQ) was established by NEPA to advise the President and to carry out certain other responsibilities relating to implementation of NEPA by federal agencies. Pursuant to Presidential Executive Order, federal agencies are obligated to comply with the NEPA regulations adopted by the CEQ (40 CFR Parts 1500-1508). These regulations outline the responsibilities of federal agencies under NEPA and provide specific procedures for preparing environmental documentation to comply with NEPA. This programmatic RP/EIS is intended to accomplish partial NEPA compliance. Project-specific NEPA documents will need to be prepared for each proposed restoration project.

State Environmental Policy Act (SEPA), Ch. 43 RCW

Adopted in 1971, and revised several times, including as recently as 1995, SEPA requires state agencies and local governments to analyze proposed projects and plans for potentially significant impacts to the environment. Regulations implementing SEPA and providing guidance for state and local governments have been adopted (Ch. 197-11 WAC). Specific resource areas which must be considered under SEPA include earth, air, water, vegetation, wildlife, public health, and shorelines. The SEPA review process may be initiated at the local government level through the development application review procedures. Local regulations identifying and protecting critical or sensitive environmental areas help ensure compliance with SEPA requirements. State agencies also prepare documents in response to proposals for state agency action. An EIS is required under SEPA for any proposal for

major actions having a probable, adverse environmental impact, except for actions which are categorically exempt.

5.5 Environmental Justice

Environmental Justice - Executive Order 12898

On February 11, 1994, President Clinton issued Executive Order 12898 (E.O. 12898), Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. This Executive Order requires each federal agency to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low income populations. Among other actions required by E.O. 12898, each federal agency is required to identify differential patterns of consumption of natural resources among minority and low income populations which may be affected by agency actions.

Each federal agency is required by E.O. 12898 to collect, maintain and analyze data assessing and comparing environmental and human health risks to ensure that their activities do not have the effect of excluding persons from participating in or denying federal benefits on the basis of race, color, or national origin. Agencies are also to use this information to determine whether their activities, along with other public and private actions, have disproportionately high and adverse health or environmental effects on minority populations and low income populations. E.O. 12898 specifically mandates that federal agencies collect, maintain and analyze information on consumption patterns of populations who rely principally on fish and/or wildlife for subsistence.

EPA and the Council on Environmental Quality (CEQ) have emphasized the importance of incorporating environmental justice review in the analyses conducted by federal agencies under NEPA and the development of mitigation measures that avoid or minimize disproportionate environmental effects on minority and low-income populations. In turn, EPA has incorporated environmental justice review into EPA's NEPA review under section 309 of the Clean Air Act, 42 U.S.C. § 7609(a). This RP/EIS is subject to such review.

Affected Communities: The Puyallup Tribe of Indians and the Muckleshoot Indian Tribe constitute distinct, separate communities of Native Americans who rely on Treaty-reserved fish and shellfish resources of Commencement Bay for subsistence, economic and spiritual purposes. Other members of certain low-income communities in the Commencement Bay area also rely on fishery resources for subsistence purposes. The Trustees have not identified any disproportionate, adverse impacts on human health or environmental effects on implementation of the preferred alternative on members of the Puyallup and Muckleshoot tribes or other minority or low income population.

5.6 Other Potentially Applicable Laws and Regulations

This section lists other laws that potentially affect CB/NRDA restoration activities. Many of the regulations adopted to implement these laws require permits from federal or state permitting authorities.

Federal

Archaeological Resources Protection Act, 16 USC 470 et seq.
Clean Air Act, 42 USC 7401 et seq.
Clean Water Act (CWA), 33 USC 1251 et seq.
Coastal Zone Management Act, 16 USC 1451 et seq.
Endangered Species Act of 1973, 16 USC 1531 et seq.
Executive Order 12898, Federal Actions to Address Environmental
Justice in Minority Populations and Low-Income Populations
Federal Water Pollution Control Act, 33 USC 1321 et seq.
Fish and Wildlife Coordination Act, 16 USC 661 et seq.
Marine Mammal Protection Act, 16 USC 1361 et seq.
Migratory Bird Treaty Act, 16 USC 703 et seq.
National Historic Preservation Act, 12 USC 470 et seq.
Treaty of Medicine Creek of 1854, 10 Stat. 1132
Treaty of Point Elliott, 12 Stat. 927
Indian Reorganization Act of June 18, 1934
Puyallup Land Claims Settlement Act, 25 USC 1773 et seq.

Tribes

Puyallup Tribe of Indians. Tribal government air, land and water quality laws.
Muckleshoot Indian Tribe. Tribal government air, land and water quality laws.

State of Washington

Growth Management Act (GMA)
Hydraulic Code, Ch. 75.20 RCW
Model Toxics Control Act (MTCA), Ch. 70.105D RCW
Public Trust Doctrine
State Aquatic Lands Management Laws, Ch. 79.90-92 RCW
Shoreline Management Act
State Implementation Plan for Clean Air standards
State Environmental Policy Act, Ch. 43 RCW

Counties

King and Pierce Counties. Zoning ordinances, comprehensive plans, shoreline plans, growth management plans, construction grading or fill permits, noise, wetlands permits, sensitive areas ordinances.

Cities

City of Tacoma and others as appropriate. Zoning ordinances, comprehensive plans, shoreline plans, growth management plans, construction grading or fill permits, noise, wetlands permits, sensitive areas ordinances. Shoreline and Lane Use Standards. City of Tacoma Regulation 13.10.175.B.8 regarding habitat improvement actions.

5.7 Other Area Programs and Plans

Coordination of CB/NRDA restoration projects with other planned restoration activities and programs should also be considered at the project-specific level. Some of these plans are listed below.

Environmental Protection Agency - National Estuary Program. The Program promotes the development and implementation of management directives for pollution control in the estuary, such as the Puget Sound Water Quality Authority Management Plan and Washington Department of Ecology Urban Bay Action Program.

Environmental Protection Agency and Washington Department of Ecology - Superfund/ Model Toxics Control Act (MTCA). Under a cooperative agreement, the EPA is responsible for sediment remediation for the Superfund sediment problem areas, while Ecology UBAT is responsible for source control and remediation of upland sites both under MTCA and in cooperation with the EPA's Superfund Program. In the Bay, nine sediment problem areas were identified in the ROD for the CB/NT Superfund Site (EPA, 1989).

Washington Department of Ecology - Urban Bay Action Team (UBAT). Source control in the Commencement Bay area is the responsibility of Ecology's Urban Bay Action Team under Ecology's Urban Bay Action Plan using MTCA authority. Seventy (70) sources of problem chemicals were originally identified in 8 problem areas. Control has been completed for 50 of these sources. Control is expected to be complete for the remaining 20 sources by the end of 1996.

Washington Department of Ecology - Sediment Management Unit. Sediment Management Unit has developed the Washington State Sediment Management Standards (SMS), and is developing contaminated site lists to prioritize cleanup of sediment in Puget Sound. The Sediment Unit is also developing ecological risk criteria for contaminated sediments.

Washington Department of Ecology - Water Quality Management. Plans are being developed to address watershed water quality issues and priorities, such as the June 1995 Needs Assessment for the South Puget Sound Watershed.

Washington Department of Fish and Wildlife. This agency oversees state fishery policy and management activities and programs, including the State of Washington Wild Salmonid Policy FIS now underway.

Washington Department of Natural Resources. This state agency is responsible for management of state-owned aquatic lands for harbor areas, navigation and commerce, preservation and enhancement of water-dependent uses, public access, and management of wildlife habitat, natural area preserves, and state forest lands.

City of Tacoma. The City has several plans, including the Environmental Policy Plan (1992), which lays out the City's strategies for environmental conservation and regulation in the Commencement Bay area; the Open Space Plan, administered by the Metropolitan Parks District, which identifies a number of potential open space areas located along shoreline and waterway areas for acquisition and conservation; and the Thea Foss Waterway Design and Development Plan (1994), which sets forth the revitalization plan for the shores of the Thea Foss Waterway (City of Tacoma, 1992, 1994).

Port of Tacoma. The Port of Tacoma has several plans, including its Blair Waterway 2010 Plan (1991), and its Comprehensive Plan (1993), which generally seek to preserve and enhance industrial access to the Port Area (Port of Tacoma, 1991, 1993).

South Sound Spring Chinook Technical Committee is currently developing a recovery plan for White River Spring Chinook Salmon (South Sound Spring Chinook Technical Committee, 1995).

President's Northwest Forest Plan. The Record of Decision on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl, involves establishing protection buffers and managed areas for threatened species such as the marbled murrelet and the spotted owl. The eastern portion of the expanded study area includes lands designated as successional and riparian reserves. Permitted development and harvesting on these lands is extremely limited unless it specifically benefits "old growth habitat" (U.S. Department of Agriculture and U.S. Department of the Interior, April 1994).

Commencement Bay Cleanup Action Committee. The CBCAC (1993) adopted a Vision Document for Commencement Bay to illustrate the multiple uses of the Bay and to describe its restoration landscape concept plan and opportunities for improving the conditions of the Bays environmental and natural resources while maintaining and building a strong local economy.

5.8 Common Restoration and Construction Permits

As noted above, coordination and review occurs on federal, state, local, and tribal levels, and compliance may be certified by a permit process. The following table describes some of the applicable laws and regulations, the responsible agency(ies), compliance, and whether a permit is required under those authorities. Additional information can be found in the resource guides to commonly required environment permits available from Ecology. Specific permit requirements will be noted in specific project planning documents.

5.9 Compliance with Applicable Laws and Regulations

Table 5.9-1 summarizes the laws and regulations potentially applicable to restoration projects. Table 5.9-2 presents the typical sequencing of permit and compliance activities. This information will be provided in further detail at the project-specific level.

Table 5.9-1. Compliance with Applicable Laws and Regulations.

Law/Regulation	Scope	Responsible Agency	Compliance	Permit
FEDERAL				
National Environmental Policy Act of 1969 (NEPA), 42 USC 4321-4370d; 40 CFR 1500-1508.	Disclosure of environmental impacts of proposed project; evaluation of alternatives. Applies to federal actions.	Federal lead agency, EPA	Project-specific NEPA documentation also required.	No
Clean Water Act (CWA), 33 USC 1251 et seq.; Section 404 & 301	Regulating discharge of dredge and fill material in waters of the US; protection of wetlands.	Corps, EPA	Project-specific	Yes
Clean Water Act, Sections 401 & 402	Compliance with state water quality standards; discharges to waters of the Puyallup Tribe	Puyallup Tribe, Ecology	Project-specific	Yes
Rivers and Harbors Act of 1899, 33 USC 403, et seq.; Section 10	Prohibits obstruction or alterations of navigable waters. Regulates construction of any structures within navigable waters of the US.	Corps	Project-specific	Yes
Endangered Species Act (ESA), 16 USC 1531 et seq.	Continued existence of listed threatened and endangered species.	USFWS, NMFS	Partial compliance with RP/EIS. Project-specific consultation with USFWS also required.	No
Coastal Zone Management Act (CZMA), 16 USC 1451 et seq.	Compliance with CZMA for protection of coastal zone; certification by state required.	NOAA, Ecology	Project-specific; review at state level.	Yes

Table 5.9-1. Compliance with Applicable Laws and Regulations (continued).

Law/Regulation	Scope	Responsible Agency	Compliance	Permit
Fish and Wildlife Coordination Act	Protection of fish and wildlife. Applies to federal actions only.	USFWS, NMFS	Project-specific coordination with USFWS and NMFS.	No
Clean Air Act (CAA), 42 USC 7401 et seq.	Prevention of degradation of air quality.	EPA, Ecology	Project-specific	No
National Historic Preservation Act (NHPA), 12 USC 470 et seq.	Preservation/protection of historic and pre-historic resources.	State, Tribes	Project-specific; review at state level.	No
Federal Indian Law	Reserved hunting and fishing rights to signatory tribes.	Federal	Project-specific; review at federal level.	No
STATE				
State Environmental Policy Act (SEPA), Ch. 43 RCW	Disclosure of environmental impacts of proposed project; evaluation of alternatives.	Lead state/local agency, Ecology	Partial compliance if RP/EIS is adopted by the state. Project-specific SEPA documentation also required. Local review.	No
Aquatic Lands, Ch. 79.90 RCW	Navigation and commerce; management of wildlife habitat, natural area preserves.	WDNR	Project-specific use authorization required	No
Shoreline Management Act	Protection of shoreline/coastal areas and resources. Meets federal requirements under CZMA.	Ecology	Project-specific	Yes

Table 5.9-1. Compliance with Applicable Laws and Regulations (continued).

Law/Regulation	Scope	Responsible Agency	Compliance	Permit
Growth Management Act	Controls urban development. Protection of sensitive resources.	Local and county government, Ecology	Project-specific. Local jurisdiction review.	No
Forest Protective Act	Management of timber adjacent to state waters.	WDNR	Project-specific	Yes
Hydraulic Project Approval, Ch. 75.20 RCW	Protection of aquatic life, beds, and flow of state waters.	WDFW	Project-specific	Yes
Washington Water Pollution Control Act	Governs discharges to state waters.	Ecology	Project-specific	Yes
Growth Management Act	Construction work in wetlands	County, Cities	Local jurisdiction	Yes
LOCAL				
Zoning Ordinances	Restricts types of development within designated zones.	Local government	Project-specific	No
Clearing and Grading Ordinances	Regulates clearing and grading activities.	Local government	Project-specific	Yes
Noise/Nuisance Ordinances	Restricts noise and nuisance levels.	Local government	Project-specific	No

Table 5.9-2. Sequencing of Permit and Compliance Activities

	Activity	Applicability	Agency	Duration	Ongoing Activities
1.	Negotiation with property owner.	Following appropriate site selection.	Project Manager	Indefinite	0
(1a.)	Negotiation with state regarding development rights within harbor lands.	Any work extending beyond the extreme low tidemark.	WDNR	Indefinite	1
2.	Pre-meetings with local government.	Following appropriate site selection	Planning/ Zoning and Shoreline offices	Indefinite	1
3.	Local zoning and environmental review.	Upon submission of zoning application and SEPA checklist.	Pierce County Planning/ Zoning, Ecology	1-12 months	1
(3a.)		IF SEPA EIS required	Various state/local agencies	1 year or longer	1, 3
4.	Shoreline substantial development application	If project located adjacent to state waters	Local/Ecology	30 days	1, 3
(4a.)		If conditional use permit or variance is required	Local/Ecology	60 days	1, 3

Table 5.9-2. Sequencing of Permit and Compliance Activities (continued).

	Activity	Applicability	Agency	Duration	Ongoing Activities
5.	Grading and excavation permit application. Local approval	Disturbance of 50 or more cubic yards of soil or clearance of vegetation	City of Tacoma Planning/ Building Department	1-2 months	1,3,4
6.	Pre-meetings with state and federal agencies	Following site selection and local pre-meetings	Various state/federal	Indefinite	1-5
7.	Aquatic access application	If project involves State-owned aquatic lands	WDNR	indefinite	3-6
8.	Hydraulic project approval	Effect or impact within ordinary high water mark of state waters	WDFW	1-2 months	3-7
9.	NPDES application	Potential to discharge storm or surface runoff; at least 5 acres of disturbance	Ecology	1-3 months	3-8
10.	CZMA compliance	Project in federally designated coastal areas	Ecology	6 months, 45 days for federal	3-9
11.	Dam safety sectional approval	Impound at least 10 ac/ft; dam 5 feet or more	Ecology	2 months	3-9

Table 5.9-2. Sequencing of Permit and Compliance Activities (continued).

	Activity	Applicability	Agency	Duration	Ongoing Activities
12.	Short-term modification of water quality permit application	Potential to affect quality of state waters	Ecology	1-2 months	(3a)
13.	Forest Practices Act Permit application	Timber removal near state waters	WDNR	1 month	(3a)
14.	Corps Section 404 Permit	Dredge or fill in U.S. waters	Corps, Ecology	NWP: 1 month	(3a)
15.	Endangered Species Act coordination.	Impacts on federally endangered species.	NMFS, USFWS	Individual: 6-12 months	(3a)
16.	Corps Section 10 Permit	Structures or excavation in U.S. waters	COE/Ecology	NWP: 1 month Individual: 6-12 months	(3a)
17.	401 Water Quality Certification	With Section 404/10 Permits	EPA	3-12 months	(3a)
18.	Tribal review	Potential to impact reserved treaty rights	Tribe	Indefinite	2-16

6.0 REFERENCES

- American Friends Service Committee. 1970. *Uncommon Controversy: Fishing Rights of the Muckleshoot, Puyallup, and Nisqually Indians*. University of Washington Press, Seattle, WA.
- Angell, T. and K.C. Balcomb. 1982. *Marine Birds and Mammals of Puget Sound*. University of Washington Press, Seattle, WA.
- Atwater, B.F. and A.L. Moore. 1992. A Tsunami About 1000 Years Ago in Puget Sound, Washington. *Science* 258:1614-1617.
- Becker, D.S., G.R. Bilyard, and T.C. Ginn. 1990. Comparisons Between Sediment Bioassays and Alterations of Benthic Macroinvertebrate Assemblages at a Marine Superfund Site: Commencement Bay, Washington. *Environm. Toxicol. Chem.* 9: 669-685.
- Beechie, T., E. Beamer, and L. Wasserman. 1994. Estimating Coho Salmon Rearing Habitat and Smolt Production Losses in a Large River Basin, and Implications for Habitat Restoration. *North American Journal of Fisheries Management* 14:797-811.
- Beschta, R.L., J.R. Boyle, et al. 1995. *Cumulative Effects of Forest Practices in Oregon: Executive Summary*. Prepared for Oregon Department of Forestry, Oregon State University, Corvallis, OR.
- Block, E. 1992. *Contaminants in Great Blue Heron Eggs and Nestings from Dumas Bay and Nisqually Heronries, Puget Sound, Washington*. Report OFO-EC93-1, U.S. Fish and Wildlife Service, 32 pp.
- Buckley, R. Washington State Department of Fish and Wildlife. July, 1995. Personal communication.
- Butler, R.W. and R.W. Campbell. 1987. *Birds of the Fraser River Delta: Populations, Ecology, and International Significance*. Occasional Paper No. 65, Canadian Wildlife Service.
- Cairns, Jr., J. 1989. Restoring Damaged Ecosystems: Is Predisturbance Condition a Viable Option? *Environm. Profess.* 11: 152-159.
- Cairns, Jr., J. 1993. *Ecological Restoration: Replenishing our national and global ecological capital*. In: *Nature Conservation 3: Reconstruction of Fragmented Ecosystems* (D.A. Saunders, R.J. Hobbs, and P.R. Ehrlich, eds.), pp. 193-208. Surrey Beatty & Sons.

- Calambokidis, J., J.B. Buchanan, B.H. Steiger, and J.R. Evenson. 1991. Toxic Contaminants in Puget Sound Wildlife: Literature Review and Recommendations for Research and Monitoring. Prepared by PTI Environmental Research, Olympia, WA, for the U.S. Environmental Protection Agency, Region X, Seattle, WA.
- Carter, H.R. Nov. 1984. At Sea Biology of the Marbled Murrelet (*Brachyramphus marmoratus*) in Barkley Sound, British Columbia, (M.T.) Dept. of Zoology, Univ. of Manitoba, Winnipeg, Manitoba. 143 pp.
- City of Tacoma, Washington, Planning and Development Services Department, Washington. 1992. Draft Thea Foss Waterway Design and Development Plan. Prepared by Makers Architecture and Urban Design.
- City of Tacoma, Washington, Planning and Development Services Department, Washington. 1994. Final Thea Foss Waterway Design and Development Plan. Prepared by Makers Architecture and Urban Design.
- Clark, Jr., R. NOAA Damage Assessment and Restoration Center, Seattle, WA. July, 1995. Personal communication.
- Commencement Bay Cleanup Action Committee (CBCAC). 1993. A Vision for Commencement Bay.
- Commencement Bay Natural Resource Trustees. 1995. Commencement Bay Phase I Damage Assessment Report (CB/NRDA). Prepared by EVS Environment Consultants for the Commencement Bay Natural Resource Trustees and the NOAA Damage Assessment and Restoration Center, Seattle, WA.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. FWS/OBS-79/31. U.S. Fish and Wildlife Service, U.S. Department of Interior, Washington, D.C.
- Dames & Moore. 1981. Commencement Bay Study. Prepared for U.S. Army Corps of Engineers, Seattle District, Washington. Volume I - Summary and Synthesis, Volume II - Land and Water Use, Volume III - Fish Wetlands, Volume IV - Invertebrates, Volume V - Water Quality, Volume VI - Physical Oceanography, Volume VII - Sediments, Noise, Climate, and Air Quality, Aesthetics, Birds.
- David Evans and Associates. 1991. Historical review of special aquatic sites. In: Commencement Bay Cumulative Impact Study, Vol. I, Ch. 1. Prepared for U.S. Army Corps of Engineers, Seattle District; U.S. Fish and Wildlife Service; National Oceanic and Atmospheric Administration; and U.S. Environmental Protection Agency.

- Duker, G., C. Whitmus, E.O. Salo, G.B. Grectc, and W.M. Schuh. 1989. Distribution of Juvenile Salmonids in Commencement Bay, 1983. Prepared by Fisheries Research Institute, University of Washington, School of Fisheries, Seattle, WA, for the Port of Tacoma, WA.
- Eaton, C.M. and P.A. Dinnel. 1993. Development of Trawl-based Criteria for Assessment of Demersal Fauna (Macroinvertebrates and Fishes): Pilot Study in Puget Sound, Washington. Prepared for U.S. Environmental Protection Agency, Washington, DC.
- Ecological Society of America. 1995. Strengthening the Use of the Science in Achieving the Goals of the Endangered Species Act. Prepublication Copy, July 1995, Prepared by the Ad Hoc Committee on Endangered Species for the Ecological Society of America, Washington, DC.
- Elliott Bay/Duwamish Restoration Program. 1994. Concept Document, Panel Publication No. 7. Elliott Bay/Duwamish Restoration Program Panel. [Available from Administrative Director of Panel, Dr. Robert Clark, NOAA Damage Assessment and Restoration Center Northwest, 7600 Sand Point Way N.E., Seattle, WA 98115.]
- Everitt, R., C. Fiscus, and R. Delong. 1979. Marine Mammals of Northern Puget Sound and the Strait of Juan de Fuca. NOAA Tech. Memor. ERL MESA-41. National Marine Fisheries Service.
- Fonseca, M.S., W.J. Kenworthy, and G.W. Thayer. 1995. Guidelines for Mitigation and Restoration of Seagrass in the United States and Adjacent Waters. NOAA Coastal Ocean Program Decision Series. Draft Report Prepared by National Marine Fisheries Service, Southeast Fisheries Science Center, Beaufort, NC.
- Forman, R.T.T. and M. Godron. 1986. Landscape Ecology. John Wiley & Sons, New York, New York. 619 p.
- Garbisch, E.W. and J.L. Garbisch. 1994. Control of Upland Bank Erosion Through Tidal Marsh Construction on Reconstructed Shores: Application in the Maryland Portion of the Chesapeake Bay. Environm. Mgmt 18(5): 677-691.
- Giesy, J.D. 1995. Department of Fisheries and Wildlife, Michigan State University, East Lansing, MI. 48824-1222.
- Goetz, F. 1989. Biology of the Bull Trout *Salvelinus confluentus*: a literature review. U.S. Forest Service, Willamette National Forest, Eugene, OR. 53pp.
- Goetz, F. U.S. Army Corps of Engineers. Seattle District. October 1995. Personal communication with J. Lantor, USFWS, Olympia, WA.

- Gosselink, J.G. and L.C. Lee. 1989. Cumulative Impact Assessment in Bottomland Hardwood Forests. *Wetlands* 9:83-174.
- Guinon, M. 1989. Project Elements Determining Comprehensive Restoration Costs and Repercussions of Hidden and Inaccurate Costs. Paper Presented to Society for Ecological Restoration Annual Meeting, Oakland, CA.
- Hamer, T., and E. Cummins. 1991. Relationships Between Forest Characteristics and Use of Inland Sites by Marbled Murrelets in Northwestern Washington. Washington Department of Wildlife, Olympia, Washington. 47 p.
- Hart Crowser & Associates, Inc. 1975. Geology of the Port of Tacoma. Prepared for Port of Tacoma, Tacoma, Washington.
- Hollenbeck, J.L. 1987. A Cultural Resource Overview: Prehistory, Ethnography and History, Mt. Baker-Snoqualmie National Forest. U.S. Department of Agriculture, Forest Service.
- Hutchinson, I. 1986. Primary production functions of wetlands in the Pacific Northwest. In: *Wetland Functions, Rehabilitation, and Creation in the Pacific Northwest: The State of Our Understanding*, Richard Strickland (ed.). Washington State Department of Ecology, Olympia, Washington. Publ. No. 86-14. pp 73-91.
- Interagency Grizzly Bear Committee (IGBC) 1987. *Grizzly Bear Compendium*. U.S. Fish and Wildlife Service, Missoula, MT. 540 pp.
- Kaputska, L.A. and M. Reporter. 1991. Evaluating Exposure and Ecological Effects with Terrestrial Plants. Proceedings of a Workshop for the U.S. Environmental Protection Agency Assessment Group. Prep. by Ecological Planning and Toxicology, Inc, Corvallis, OR.
- Karr, J.R., K.D. Fausch, P.L. Angermeier, P.R. Yant, and I.J. Schlosser. 1986. *Assessing Biological Integrity in Running Waters: a Method and Its Rationale*. Special Publication 5. Illinois Natural History Survey, Champaign, Illinois.
- Kondolf, G. M. and E.R. Micheli. 1995. Evaluating Stream Restoration Projects. *Environm. Mgmt* 19: 1-15.
- Koski, K.V. 1992. Restoring Stream Habitats Affected by Logging Activities. In G.W. Thayer (ed). *Restoring the Nation's Marine Environment*. Chapter 8. A Maryland Sea Grant Book, College Park, MD.
- Kunz, K. 1993. Historical changes to the Puyallup River system. In: *Commencement Bay Cumulative Impact Study*, Appendix E. Prepared for U.S. Army Corps of Engineers, Seattle District, Seattle, Washington.

- Ladley, R. Puyallup Tribal Fisheries Department. Tacoma, WA. 1995. Personal communication.
- Leonard, W.P., H.A. Brown, L.L.C. Jones, K.R. McAllister, R.M. Storm. 1993. Amphibians of Washington and Oregon. Seattle Audubon Society, Seattle, WA. 168 pp.
- Levin, S.A. and T.R. Paine. 1974. Disturbance, Patch Formation and Community Structure. Proceedings of the National Academy of Sciences (USA) 71:2744-2747.
- Malcom, R. 1995. Muckleshoot Indian Tribe, Auburn, WA. July 1995. Personal communication.
- Malcom, R. 1996. Muckleshoot Indian Tribe, Auburn, WA. January 1995. Personal communication.
- Malins, D.C., B.B. McCain, J.T. Landahl, M.S. Myers, M.M. Krahn, D.W. Brown, S.-L. Chan, and W.T. Roubal. 1988. Neoplastic and Other Diseases in Fish in Relation to Toxic Chemicals: an Overview. Aquat. Toxicol. 11: 43-67.
- Malins, D.C., B.B. McCain, M.S. Myers, D.W. Brown, M.M. Krahn, W.T. Roubal, M.H. Schiewe, J.T. Landahl, and S.-L. Chan. 1987. Field and Laboratory Studies of the Etiology of Liver Neoplasms in Marine Fish from Puget Sound. Environm. Health Perspectives 71: 5-16.
- Marshall, D.B., 1988. Status of the Marbled Murrelet in North America: With Special Emphasis on Populations in California, Oregon, and Washington. Biol. Rept 88(30). U.S. Fish and Wildlife Service, Washington, DC.
- McCain, B.B., D.C. Malins, M.M. Krahn, D.W. Brown, W.D. Gronlund, L.K. Moore, and S.L. Chan. 1990. Uptake of Aromatic and Chlorinated Hydrocarbons by Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) in an Urban Estuary. Arch. Environ. Contam. Toxicol. 19: 10-16.
- McGarigal, K. and B.J. Marks. 1994. FRAGSTATS Spatial Analysis Program for Quantifying Landscape Structure. Forest Science Department, Oregon State University, Corvallis, Oregon.
- Minello, T.J., R.J. Zimmerman and R. Medina. 1994. The Importance of Edge for Natant Macrofauna in a Created Salt Marsh. Wetland 14:184-198.
- Mitsch, W.J. and J.G. Gosselink. 1993. Wetlands. Second edition. Van Nostrand Reinhold, New York, NY.
- Morgan, Murray and Rosa Morgan. 1984. South of the Sound: An Illustrated History of Tacoma and Pierce County. Windsor Publications, Woodland Hills, CA.

- Morlan, J.C., and B.E. Frenkel. 1992. The Salmon River Estuary. *Restora. Mgmt. Notes* 10(1): 21-23.
- National Research Council (NRC). 1992. *Restoration of Aquatic Ecosystems*. National Academy Press, Washington, DC.
- Nelson, L.M. 1979. Sediment Transport by the White River into Mud Mountain Reservoir, Washington. U.S. Geological Survey, Water Resources Investigations, Tacoma, WA.
- Noel, Patricia S. 1980. Muckleshoot Indian History. Auburn School District No. 408, Auburn, WA.
- Noss, R.F. 1991. Landscape connectivity: different functions at different scales. In: *Landscape Linkages and Biodiversity* (W.E. Hudson, ed.). Island Press, Washington, D.C. pp 27-39.
- Orians, G.H. 1986. Cumulative Effects: Setting the stage. In: *Cumulative Environmental Effects; A Binational Perspective*. Minister of Supply and Services, Canada.
- Parametrix. 1993. St. Paul Waterway Area Remedial Action and Habitat Restoration Project 1993 Monitoring Report. Parametrix, Kirkland, WA.
- Parametrix. 1994. Biological Indicators St. Paul Waterway Area Remedial Action and Habitat Restoration. Parametrix, Kirkland, WA.
- Phillips, R.C. 1984. The Ecology of Eelgrass Meadows in the Pacific Northwest: A Community Profile. FWS/OBS-84/24. U.S. Fish and Wildlife Service, Division of Biological Services, Washington, DC.
- Pierce County, Department of Planning and Land Services, Tacoma, WA. 1993. Final Environmental Impact Statement: Comprehensive Plan for Pierce County, Washington.
- Port of Seattle. 1992. Terminal 86 Net Pen Facility Environmental Checklist. SEPA Determination of Non-Significance (DNS) of Proposed Action. October 12.
- Port of Tacoma, Washington. 1991. Blair Waterway 2010 Plan, Executive Summary. Prepared by Miller Engineering.
- Port of Tacoma, Washington. 1993. Comprehensive Plan.
- Prych, E.A. 1988. Flood-Carrying Capacities and Changes in Channels of the Lower Puyallup, White, and Carbon Rivers in Western Washington. Water Resources Investigation Report 87-4129. U.S. Geological Survey, Tacoma, WA.

Puget Sound Air Pollution Control Agency. 1993. Air Quality Regulations I, II, and III, as amended. Seattle, WA.

_____. 1994. Air Quality Data Summary for the Counties King, Kitsap, Pierce, and Snohomish. Seattle, Washington.

Puget Sound Water Quality Authority. 1995. 1994 Puget Sound Update: Fifth Annual Report of the Puget Sound Ambient Monitoring Program. Puget Sound Water Quality Authority, Olympia, Washington.

Robinson, S.K., F.R. Thompson III, T.M. Donovan, D.R. Whitehead and J. Faaborg. 1995. Regional Forest Fragmentation and the Nesting Success of Migratory Birds. *Science* 267:1987-1990.

Shabman, L. 1993. Clarifying Classification. *National Wetlands Newsletter*. January/February 1993.

Shapiro and Associates. 1992. Assessment of Habitat Loss. In: Commencement Bay Cumulative Impact Study. Prepared for U.S. Army Corps of Engineers, Seattle District, Seattle, WA.

Shreffler, D.K., R.M. Thom, M.J. Scott, K.F. Wellman, M.A. Walters, and M. Curran. 1995. National Review of Non-Corps Environmental Restoration Projects. Draft Report Prepared for U.S. Army Corps of Engineers Institute for Water Resources, Alexandria VA by Battelle Marine Sciences Laboratory, Sequim, WA.

Shreffler, D.K., C.A. Simenstad, and R.M. Thom. 1990. Temporary Residence by Juvenile Salmon in a Restored Estuarine Wetland. *Can. J. Fish. Aquat. Sci.* 47: 2079-2084.

Shreffler, D.K., C.A. Simenstad, and R.M. Thom. 1992. Foraging by Juvenile Salmon in a Restored Estuarine Wetland. *Estuaries* 15(2): 204-213.

Shreffler, D.K. and R.M. Thom. 1993. Restoration of Urban Estuaries: New Approaches for Site Location and Design. Prepared by Battelle/Marine Sciences Laboratory, Sequim, WA, for Washington State Department of Natural Resources, Aquatic Lands Division.

Simenstad, C.A. 1983. The Ecology of Estuarine Channels of the Pacific Northwest Coast: A Community Profile. FWS/OBS-83/05. U.S. Fish and Wildlife Service, Division of Biological Services, Washington, DC.

Simenstad, C.A., C.D. Tanner, R.M. Thom, and L. Conquest. 1991. Estuarine Habitat Assessment Protocol. EPA 910/9-91-037. Prepared by Fisheries Research Institute, University of Washington, Seattle, Washington, for U.S. Environmental Protection Agency, Region X, Seattle, WA.

- Simenstad, C.A. and R.M. Thom. 1992. Restoring wetland habitats in urbanized Pacific Northwest estuaries. In: Restoring the Nation's Marine Environment (G. Thayer, ed.), pp. 423-472. Maryland Sea Grant College.
- Simenstad, C.A, J.R. Cordell, W.G. Hood, J.A. Miller, and R. Thom. 1992. Ecological Status of the Created Estuarine Slough in the Chehalis River Estuary: Report of Monitoring in Created and Natural Estuarine Sloughs, January-December 1991. Fisheries Research Institute, University of Washington, Seattle, WA. Report No. FRI-UW-9206.
- Simenstad, C.A, H.B. Anderson, J.R. Cordell, and L. Hallum. 1993. Analysis of changes in benthic and epibenthic invertebrate communities in Commencement Bay, Washington. In: Commencement Bay Cumulative Impact Study. Prepared for U.S. Army Corps of Engineers, Seattle District, WA.
- Simenstad, C.A. and R.M. Thom. 1995. Functional Equivalency of Restored Estuarine Wetlands: Temporal Patterns in Equivalency Trajectories of the Gog-Le-Hi-Te Wetland. Ecological Applications (in press).
- South Puget Sound Spring Chinook Technical Committee. 1995. Draft Recovery Plan for White River Spring Chinook Salmon. Prepared for Washington Department of Fish and Wildlife, Olympia, WA.
- Strand, J., S. Senner, A. Weiner, S. Rabinowitch, M. Brodersen, K. Rice, K. Klinge, S. MacMullin, R. Yender, and R. Thompson. 1993. Process to Identify and Evaluate Restoration Options. 1993 International Oil Spill Conference on Prevention Preparedness, Response. American Petroleum Institute, Washington, DC.
- Subcommittee on Global Change Research. No date. Our Changing Planet. The FY 1995 U.S. Global Change Research Program. A report by the Subcommittee on Global Change Research, Committee on Environment and Natural Resources Research of the National Science and Technology Council.
- TAMS Consultants. 1993. Corridor Noise Analysis Report for the 176th Street Easterly Extension. Prepared for Pierce County Public Works - Road Department, Tacoma, WA. Prepared by TAMS Consultants, Inc., Seattle, WA.
- Tanner, C.D. 1993. Spencer Island Wetland Restoration and Enhancement Report. Prepared for Snohomish County Department of Parks and Recreation and Public Works, Washington State Department of Ecology and Fish and Wildlife, and U.S. Environmental Protection Agency. Prepared by U.S. Fish and Wildlife Service, Olympia, WA.
- Tanner, C.D. USFWS, Olympia, WA. 1994. Personal communication.

- Teissere, R. 1996. Washington Department of Natural Resources. April 15 comment letter to F. Gardner, Washington Department of Ecology, Olympia, WA.
- Thom, R.M., C.A. Simenstad, and J.R. Cordell. 1986. Early Successional Development of a Benthic-Epibenthic Community at a Newly Constructed Beach in Slip 1, Commencement Bay, Washington: Initial Observations 1985. Report No. FRI-UW 8603. Prepared by Fisheries Research Institute, University of Washington, Seattle, Washington, for the Port of Tacoma, Washington.
- Thom, R.M., C.A. Simenstad, J.R. Cordell, and L. Hamilton. 1991. The Gog-li-hi-te Wetland System in the Puyallup River Estuary, Washington. Final Report to Port of Tacoma Wetland Ecosystem Team, University of Washington Rept. No. FRI-UW-9108.
- Thom, R.M. 1992. Accretion Rates of Low Intertidal Salt Marshes in the Pacific Northwest. *Wetlands* 12:147-156.
- Thom, R.M., P.L. Parkwall, D.K. Niyogi, and D.K. Shreffler. 1994. Effects of graveling on the primary productivity, respiration, and nutrient flux of two estuarine tidal flats. *Mar. Biol.* 118: 329-341.
- U.S. Army Corps of Engineers, Seattle District. 1993. Biological Assessment, Port of Tacoma, Milwaukee Fill and Fisheries Mitigation Project.
- U.S. Army Corps of Engineers, Seattle District, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and National Oceanic and Atmospheric Administration. 1993. Commencement Bay Cumulative Impact Study. Volumes 1 (Assessment of Impacts) and 2 (Restoration Options).
- U.S. Department of Agriculture. 1990. Final Environmental Impact Statement: Land and Resource Management Plan, Mt. Baker-Snoqualmie National Forest, Appendices A-I.
- U.S. Department of Agriculture and U.S. Department of the Interior. 1994. Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl. Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl.
- U.S. Fish and Wildlife Service, Fishery Resource Office. 1991. Changes in populations and distributions of anadromous fish, demersal fish and shellfish utilizing nearshore habitat in Commencement Bay, 1850-1988. In: Commencement Bay Cumulative Impact Study, Vol. 1, ch. 3. U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and National Oceanic and Atmospheric Administration.

- U.S. Department of the Interior, U.S. Fish and Wildlife Service, Oregon Department of Fish and Wildlife, and Confederated Tribes of the Umatilla Indian Reservation. 1994. Final Joint Environmental Assessment and Restoration Plan for the John Day River Acid Spill. U.S. Fish and Wildlife Service, Portland, OR.
- U.S. Department of Transportation. 1990. Final Environmental Impact Statement: SR 509 East-West Corridor, I-705 to East 11th Street and Marine View Drive. Volumes 1 (EIS Text and Appendices) and 2 (Comment Letters and Responses to Draft EIS).
- U.S. Environmental Protection Agency. 1989. Commencement Bay Nearshore/Tideflats Record of Decision. Seattle, WA.
- U.S. Fish and Wildlife Service. 1982. The Pacific Coast American Peregrine Falcon Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 87 pp.
- U.S. Fish and Wildlife Service. 1986. Pacific Bald Eagle Recovery Plan. U.S. Fish and Wildlife Service, Portland, OR. 163 pp.
- U.S. Fish and Wildlife Service. 1987. Northern Rocky Mountain Wolf Recovery Plan. U.S. Fish and Wildlife Service, Denver, CO. 119 pp.
- U.S. Fish and Wildlife Service. 1992. Recovery Plan for the Northern Spotted Owl (draft). U.S. Fish and Wildlife Service. Washington, DC. 662 pp.
- U.S. Fish and Wildlife Service, and National Oceanic and Atmospheric Administration. 1995. Commencement Bay Restoration Plan and Programmatic Environmental Impact Statement Scoping Document, Olympia, WA.
- Varanasi, U., E. Casillas, M.R. Arkoosh, T. Hom, D.A. Misitano, D.W. Brown, S.L. Chan, T.K. Collier, B.B. McCain, and J.E. Stein. 1993. Contaminant Exposure and Associated Biological Effects in Juvenile Salmon (Oncorhynchus tshawytscha) from Urban and Nonurban Estuaries of Puget Sound. NOAA Tech. Memo. NMFS-NWFSC-8. National Marine Fisheries Service, Northwest Fisheries Science Center, Seattle, WA.
- Warren, James R. 1986. Where Mountains Meet the Sea: An Illustrated History of Puget Sound. Windsor Publications, Northridge, CA.
- Washington State Department of Ecology. 1980a. Ambient Air Quality Standards for Carbon Monoxide, Ozone, and Nitrogen Dioxide, WAC 173-475. Olympia, WA.
- Washington State Department of Ecology. 1980b. Puyallup River Basin Instream Resource Protection Program Including Administrative Rules. Western Washington Instream Protection Program, Series 6. Olympia, WA. 42 pp.

Washington State Department of Ecology. 1991a. General Regulations for Air Pollution Sources, WAC 173-400. Olympia, WA.

Washington State Department of Ecology. 1991b. State Implementation Plan for Particulate Matter in the Tacoma Tidelands, Pierce County. Vol. 1. Olympia, WA.

Washington State Department of Ecology. 1992. Lower Puyallup Watershed Phase 1 Report. Prepared for Lower Puyallup Watershed Management Committee, Olympia, WA.

Washington State Department of Ecology. 1993. Lower Puyallup Watershed Action Plan. Prepared for Lower Puyallup Watershed Management Committee, Olympia, WA.

Washington State Department of Ecology. 1995a. Needs Assessment for the South Puget Sound Water Quality Management Area. Final Draft. Olympia, WA.

Washington State Department of Ecology. 1995b. Draft Initial Watershed Assessment Water Resources Inventory Area 10 Puyallup-White Watershed. Olympia, WA.

Washington State Department of Ecology, Science Applications International Corporation, Shapiro and Associates, Taylor Associates, and Environmental Systems Research Institute. 1995. Draft Initial Watershed Assessment Water Resources Inventory Area 10 Puyallup-White Watershed. Open-File Technical Report 95-08. Washington Department of Ecology, Southwest Regional Office, Water Resources Program, Olympia, WA.

Washington State Department of Fisheries. 1975. A Catalog of Washington Streams and Salmon Utilization. Olympia WA.

Washington State Department of Fish and Wildlife and Western Washington Treaty Indian Tribes. 1994. 1992 Washington State Salmon and Steelhead Stock Inventory, Appendix One. Puget Sound Stocks. South Puget Sound Volume. Olympia, WA.

Washington State Department of Fish and Wildlife and Washington Department of Natural Resources. 1995. Preliminary Priority Watersheds for Restoration and Conservation of Fish and Wildlife (draft). Watershed Restoration Partnership Program, Washington Department of Fish and Wildlife, Olympia, WA.

Washington State Department of Health. 1992. Public Health Assessment Addendum for Commencement Bay Nearshore/Tidelands, Tacoma, Pierce County, Washington. CERCLIS No. WAD980726368. Olympia, WA.

Webster's New Collegiate Dictionary. 1984. Ninth edition.

Wessen, G.C. and M.L. Stilson. 1987. Resource Protection Planning Process: Southern Puget Sound Study Unit. Washington State Department of Community Development, Office of Archaeology and Historic Preservation, Olympia, WA.

Yantis, M. R. 1993. Noise Assessment Proposed Northeast Overlook Residential Development. Prepared by Pac-Tech Engineering, Inc., Bellevue, WA.

Yates, S. 1988. Marine Mammals of Puget Sound, the San Juans and the Strait of Georgia. The Globe Pequot Press, Old Saybrook, CT.

7.0 LIST OF ACRONYMS AND ABBREVIATIONS

ac.	acres
ASARCO	American Smelting and Refining Company
AWQC	ambient water quality chronic criteria
Basin, the	Puyallup-White River Basin (WRIA #10)
Bay, the	Commencement Bay
CB/NRDA	Commencement Bay Natural Resource Damage Assessment
CB/NT	Commencement Bay Nearshore/Tideflats
CEQ	Council of Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulation
Ch.	Chapter
CHB	Citizens for a Healthy Bay
City, the	City of Tacoma
CO	carbon monoxide
Corps	U.S. Army Corps of Engineers
CSL	cleanup screening level
CWA	Clear Water Act
CZMA	Coastal Zone Management Act
dBs	decibels (measure of sound intensity)
DDT	dichlorodiphenyltrichloroethane (an insecticide)
DOI	United States Department of the Interior
EA	environmental assessment
Ecology	Washington State Department of Ecology
ed(s).	editor(s)
EHAP	Estuarine Habitat Assessment Protocol
EIS	Commencement Bay Programmatic Environmental Impact Statement (Volume I)
E.O.	Executive Order
U.S. EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FICUN	Federal Interagency Committee on Urban Noise
ft	feet
g	gram
GIS	Geographic Information System
GMA	Washington State Growth Management Act
HFA	Habitat Focus Area
ha	hectares (2.471 acres)
IGBC	Interagency Grizzly Bear Committee
I	Interstate highway, as in I-5
kg	kilogram
L	liter
MSA	Tacoma Metropolitan Statistical Area

m	meter
MHHW	mean higher high water
MLLW	mean lower low water
mm	millimeter
MTCA	State of Washington Model Toxics Control Act
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
No, no	number
NO	nitric oxide
NO _x	nitrous oxides
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination Act
NPP	net primary production
NRDA	Natural Resource Damage Assessment
NWP	Nationwide Permit (Corps)
OAHP	Office of Archeology and Historical Preservation
OC	organochlorine pesticides
OPA	Oil Pollution Act of 1990
PAHs	polynuclear aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PHS	Priority Habitat and Species database
PM-10	filterable particulate matter in air, 10 micrometer in diameter or less
pp.	pages
ppm	parts per million
PSAPCA	Puget Sound Air Pollution Control Agency
PRP	potential responsible party
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington (state)
RI/FS	Remedial Investigation/Feasibility Study
River, the	Puyallup River
ROD	Record of Decision
RP/EIS	Restoration Plan and Programmatic Environmental Impact Statement
Sec.	section
SEPA	Washington State Environmental Policy Act
SIP	State (of Washington) Implementation Plan
SMS	Washington State Sediment Management Standards
SO ₂	sulfur dioxide
spp	species
SQS	Washington State Sediment Quality Standards
SR	state highway route, as in SR-99
Superfund	EPA National Priorities List of Contaminated Sites

SDWA	Safe Drinking Water Act
TPCHD	Tacoma-Pierce County Health Department
Trustees	Commencement Bay Natural Resource Damage Assessment Trustees
$\mu\text{g}/\text{m}^3$	micrograms per cubic meter
UBAT	State of Washington Urban Bay Action Team
U.S.	United States
USC	United States Code
EPA	United States Environmental Protection Agency
US DOT	United States Department of Transportation
USFWS	United States Department of Interior, Fish and Wildlife Service
USGS	United States Geological Survey
VOC	volatile organic compounds
Vol.	volume
WAC	Washington Administrative Code
WARIS	Washington Rivers Information System
WDNR	Washington State Department of Natural Resources
WDFW	Washington State Department of Fish and Wildlife
WDW	Washington State Department of Wildlife
WQMA	Washington State Water Quality Management Area
WRIA	Washington State Water Resource Inventory Area
wt	weight
§404	Section 404, Clean Water Act
%	per cent

Abbreviations for states uses the U.S. Postal Service 2-letter ZIP Code designations.

8.0 REGULATORY AND RESTORATION DEFINITIONS

For additional reference, the terms listed below are taken from the CERCLA and OPA regulations. The RP/EIS does not necessarily address all of these terms. Please refer to the regulations for a more detailed discussion of the responsibilities of the natural resource trustees.

8.1 CERCLA, 43 CFR Part 11.14

(a) **"Acquisition of the equivalent" or "replacement"** means the substitution for an injured resource with a resource that provides the same or substantially similar services, when such substitutions are in addition to any substitutions made or anticipated as part of response actions and when such substitutions exceed the level of response actions determined appropriate to the site pursuant to the NCP.

(b) **"Air" or "air resources"** means those naturally occurring constituents of the atmosphere, including those gases essential for human, plant, and animal life.

(c) **"Assessment area"** means the area or areas within which natural resources have been affected directly or indirectly by the discharge of oil or release of a hazardous substance and that serves as the geographic basis for the injury assessment.

(d) **"Authorized official"** means the Federal or State official to whom is delegated the authority to act on behalf of the Federal or State agency designated as trustee, or an official designated by an Indian tribe, pursuant to Section 126(d) of CERCLA, to perform a natural resource damage assessment. As used in this part, authorized official is equivalent to the phrase "authorized official or lead authorized official," as appropriate.

(e) **"Baseline"** means the condition or conditions that would have existed at the assessment area had the discharge of oil or release of the hazardous substance under investigation not occurred.

(f) **"Biological resources"** means those natural resources referred to in section 101(16) of CERCLA as fish and wildlife and other biota. Fish and wildlife include marine and freshwater aquatic and terrestrial species; game, nongame, and commercial species; and threatened, endangered, and State sensitive species. Other biota encompass shellfish, terrestrial and aquatic plants, and other living organisms not otherwise listed in this definition.

(g) **"CERCLA"** means the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601 et seq., as amended.

(t) **"Ground water resources"** means water in a saturated zone or stratum beneath the surface of land or water and the rocks or sediments through which ground water moves. It includes ground water resources that meet the definition of drinking water supplies.

(u) **"Hazardous substance"** means a hazardous substance as defined in section 101(14) of CERCLA.

(v) **"Injury"** means a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to a discharge of oil or release of a hazardous substance, or exposure to a product of reactions resulting from the discharge of oil or release of a hazardous substance. As used in this part, injury encompasses the phrases "injury," "destruction," and "loss." Injury definitions applicable to specific resources are provided in § 11.62 of [43 CFR Part 11].

(w) **"Lead authorized official"** means a Federal or State official authorized to act on behalf of all affected Federal or State agencies acting as trustees where there are multiple agencies, or an official designated by multiple tribes where there are multiple tribes, affected because of coexisting or contiguous natural resources or concurrent jurisdiction.

(x) **"Loss"** means a measurable adverse reduction of a chemical or physical quality or viability of a natural resource.

(y) **"National Contingency Plan" or "NCP"** means the National Oil and Hazardous Substances Contingency Plan and revisions promulgated by EPA, pursuant to section 105 of CERCLA and codified in 40 CFR Part 300.

(z) **"Natural resources" or "resources"** means land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States (including the resources of the fishery conservation zone established by the Magnuson Fishery Conservation and Management Act of 1976), any State or local government, or any foreign government, any Indian tribe, or, if such resources are subject to a trust restriction on alienation, any member of an Indian tribe. These natural resources have been categorized into the following five groups: surface water resources, ground water resources, air resources, geologic resources, and biological resources.

(aa) **"Natural resource damage assessment" or "assessment"** means the process of collecting, compiling, and analyzing information, statistics, or data through prescribed methodologies to determine damages for injuries to natural resources as set forth in this part.

(bb) **"Oil"** means oil as defined in section 311(a)(1) of the CWA, as amended, of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil.

- (h) **"Committed use"** means either: a current public use; or a planned public use of a natural resource for which there is a documented legal, administrative, budgetary, or financial commitment established before the discharge of oil or release of a hazardous substance is detected.
- (i) **"Control area" or "control resource"** means an area or resource unaffected by the discharge of oil or release of the hazardous substance under investigation. A control area or resource is selected for its comparability to the assessment area or resource and may be used for establishing the baseline condition and for comparison to injured resources.
- (j) **"Cost-effective" or "cost-effectiveness"** means that when two or more activities provide the same or a similar level of benefits, the least costly activity providing that level of benefits will be selected.
- (k) **"CWA"** means the Clean Water Act, as amended, 33 USC 1251 et seq., also referred to as the Federal Water Pollution Control Act.
- (l) **"Damages"** means the amount of money sought by the natural resource trustee as compensation for injury, destruction, or loss of natural resources as set forth in sections 107(a) or 111(b) of CERCLA.
- (m) **"Destruction"** means the total and irreversible loss of a natural resource.
- (n) **"Discharge of oil"** means a discharge of oil as defined in section 311(a)(2) of the CWA, as amended, and includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping of oil.
- (o) **"Drinking water supply"** means any raw or finished water source that is or may be used by a public water system, as defined in the SDWA, or as drinking water by one or more individuals.
- (p) **"EPA"** means the United States Environmental Protection Agency.
- (q) **"Exposed to" or "exposure of"** means that all or part of a natural resource is, or has been, in physical contact with oil or a hazardous substance, or with media containing oil or a hazardous substance.
- (r) **"Fund"** means the Hazardous Substance Superfund established by section 517 of the Superfund Amendments and Reauthorization Act of 1986.
- (s) **"Geologic resources"** means those elements of the Earth's crust such as soils, sediments, rocks, and minerals, including petroleum and natural gas, that are not included in the definitions of ground and surface water resources.

(ll) **"Restoration" or "rehabilitation"** means actions undertaken to return an injured resource to its baseline condition, as measured in terms of the injured resource's physical, chemical, or biological properties or the services it previously provided, when such actions are in addition to response actions completed or anticipated, and when such actions exceed the level of response actions determined appropriate to the site pursuant to the NCP.

(mm) **"SDWA"** means the Safe Drinking Water Act, 42 USC 300f-300j-10.

(nn) **"Services"** means the physical and biological functions performed by the resource including the human uses of those functions. These services are the result of the physical, chemical, or biological quality of the resource.

(oo) **"Site"** means an area or location, for purposes of response actions under the NCP, at which oil or hazardous substances have been stored, treated, discharged, released, disposed, placed, or otherwise came to be located.

(pp) **"Surface water resources"** means the waters of the United States, including the sediments suspended in water or lying on the bank, bed, or shoreline and sediments in or transported through coastal and marine areas. This term does not include ground water or water or sediments in ponds, lakes, or reservoirs designed for waste treatment under the Resource Conservation and Recovery Act of 1976 (RCRA), 42 USC 6901-6987 or the CWA, and applicable regulations.

(qq) **"Technical feasibility" or "technically feasible"** means that the technology and management skills necessary to implement an Assessment Plan or Restoration Methodology Plan are well known and that each element of the plan has a reasonable chance of successful completion in an acceptable period of time.

(rr) **"Trustee" or "natural resource trustee"** means any Federal natural resources management agency designated in the NCP and any State agency designated by the Governor of each State, pursuant to Section 107(f)(2)(B) of CERCLA, that may prosecute claims for damages under section 107(f) or 111(b) of CERCLA; or an Indian tribe, that may commence an action under Section 126(d) of CERCLA.

(ss) **"Type A assessment"** means standard procedures for simplified assessments requiring minimal field observation to determine damages as specified in section 301(c)(2)(A) of CERCLA.

(tt) **"Type B assessment"** means alternative methodologies for conducting assessments in individual cases to determine the type and extent of short- and long-term injury and damages, as specified in section 301(c)(2)(B) of CERCLA.

(cc) **"On-Scene Coordinator" or "OSC"** means the On-Scene Coordinator as defined in the NCP.

(dd) **"Pathway"** means the route or medium through which oil or a hazardous substance is or was transported from the source of the discharge or release to the injured resource.

(ee) **"Reasonable cost"** means the amount that may be recovered for the cost of performing a damage assessment. Costs are reasonable when: the Injury Determination, Quantification, and Damage Determination phases have a well-defined relationship to one another and are coordinated; the anticipated increment of extra benefits in terms of the precision or accuracy of estimates obtained by using a more costly injury, quantification, or damage determination methodology are greater than the anticipated increment of extra costs of that methodology; and the anticipated cost of the assessment is expected to be less than the anticipated damage amount determined in the Injury, Quantification, and Damage Determination phases.

(ff) **"Rebuttable presumption"** means the procedural device provided by section 107(f)(2)(C) of CERCLA describing the evidentiary weight that must be given to any determination or assessment of damages in any administrative or judicial proceeding under CERCLA or Section 311 of the CWA made by a Federal or State natural resource trustee in accordance with the rule provided in this part.

(gg) **"Recovery period"** means either the longest length of time required to return the services of the injured resource to their baseline condition, or a lesser period of time selected by the authorized official and documented in the Assessment Plan.

(hh) **"Release"** means a release of a hazardous substance as defined in section 101(22) of CERCLA.

(ii) **"Replacement" or "acquisition of the equivalent"** means the substitution for an injured resource with a resource that provides the same or substantially similar services, when such substitutions are in addition to any substitutions made or anticipated as part of response actions and when such substitutions exceed the level of response actions determined appropriate to the site pursuant to the NCP.

(jj) **"Response"** means remove, removal, remedy, or remedial actions as those phrases are defined in sections 101(23) and 101(24) of CERCLA.

(kk) **"Responsible party or parties" and "potentially responsible party or parties"** means a person or persons described in or potentially described in one or more of the categories set forth in section 107(a) of CERCLA.

Injury: OPA authorizes trustees to recover damages for "injury to, destruction of, loss of, or loss of use of" natural resources (section 1002(b)(2)(A) of OPA, 33 USC 2702(b)(2)(A)). Trustees must establish that injury has resulted from an incident. Under this rule, injury is defined as an observable (i.e., qualitative) or measurable (i.e., quantitative) adverse change in a natural resource or impairment of a natural resource service.

There are two general bases for determining injury under this rule. Trustees must either determine that: (i) The natural resource was exposed, there is a pathway connecting the incident with the natural resource, and an adverse change to the natural resource and/or service has occurred; or (ii) For injuries resulting from response actions or from a substantial threat of a discharge of oil, an injury to a natural resource or an impairment of use of a natural resource service has occurred as a result thereof. Thus, under this rule, injury may result from direct or indirect exposure to oil, as well as from response-related activities, and loss of services is explicitly included in the definition of injury.

Oil: Under section 1001(23) of OPA (33 USC 2701(23)), the term "oil" includes oil of any kind or in any form, including, but not limited to, petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes other than dredged spoil, but does not include petroleum, including crude oil or any fraction thereof, which is specifically listed or designated as a hazardous substance under subparagraphs (A) through (F) of section 101(14) of CERCLA and which is subject to the provisions of that Act.

On July 9, 1975, the U.S. Environmental Protection Agency published a Federal Register notice to affirm that non-petroleum oils, such as fats and oils from animal and vegetable sources, are subject to oil spill reporting, civil penalties, cleanup costs, and oil spill prevention plan preparation and implementation under 40 CFR Part 112 and other requirements of section 311 of the Federal Water Pollution Control Act (33 USC 1321 et seq.). The U.S. Environmental Protection Agency and U.S. Coast Guard have interpreted and administered section 311 as applicable to incidents of non-petroleum oils. While the mechanism of injuries by non-petroleum oils may be different than that of petroleum oils, it is evident, based on current literature, that the nature of such injuries is similar (e.g., death) for both types of oils. However, the rule provides guidance to allow consideration of differences in the physical, chemical, biological, and other properties, and in the environmental effects of such oils in determining whether injuries result from an incident involving non-petroleum oils.

Pathway: Pathway is the medium, mechanism, or route by which the incident has resulted in an injury. For discharges of oil, a pathway is the sequence of events by which: (i) The oil travelled through various components of an ecosystem and contacted the natural resource of concern; or (ii) Exposure to oil in one part of an ecosystem was transmitted to the natural resource of concern, without the oil directly contacting the natural resource.

(uu) "Indian tribe" means any Indian tribe, band, nation, or other organized group or community, including any Alaska Native Village but not including any Alaska Native regional or village corporation, which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians.

8.2 Oil Pollution Act Regulations, 15 CFR 990

Baseline: Baseline refers to the condition of natural resources and services that would have existed had the incident not occurred. Although injury quantification requires comparison to a baseline condition, site-specific baseline information that accounts for natural variability and confounding factors prior to the incident may not be required. In many cases, injuries can be quantified in terms of incremental changes, rather than in terms of absolute changes relative to a known baseline. For example, some procedures do not require site-specific baseline information to quantify injury. Rather, the injury is quantified in terms of incremental adverse changes resulting from the incident. Counts of oiled bird carcasses can be used as a basis for quantifying incremental bird mortality resulting from an incident.

The rule does not distinguish between baseline, historical, reference, or control data in terms of value and utility in determining the degree and spatial and temporal extent of injuries. To the extent that historical data, reference data, or control data can provide valid information on which to base a determination of the conditions of the natural resource and service in the absence of the incident, these forms of data may effectively serve as baseline information.

Types of information that may be useful in evaluating baseline include: (i) Information collected on a regular basis and for a period of time from and prior to the incident; (ii) Information identifying historical patterns or trends on the area of the incident and injured natural resources and services; (iii) Information from areas unaffected by the incident, that are judged sufficiently similar to the area of the incident with respect to the parameter being measured; or (iv) Information from the area of the incident after a particular natural resources or services have been judged to have recovered.

Incident: An incident is any occurrence or series of occurrences having the same origin, involving one or more vessels, facilities, or any combination thereof, resulting in the discharge or substantial threat of discharge of oil into or upon navigable waters or adjoining shorelines or the Exclusive Economic Zone. When a discharge of oil occurs, natural resources and/or services may be injured by the actual discharge of oil or response activities related to the discharge. When there is a substantial threat of a discharge of oil, natural resources and/or services may also be injured by the threat or response actions related to the threat.

Services: Natural resource services are all functions that a natural resource provides for another natural resource(s) or for the public. Natural resource services may be classified as follows: (i) Ecological services--the physical, chemical, or biological functions that one natural resource provides for another. Examples include provision of food, protection from predation, and nesting habitat, among others; and (ii) Public services--the public uses of natural resources or functions of natural resources that provide value to the public. Examples include fishing, hunting, nature photography, and education, among others.

Value: Value can be measured in units of natural resource services or dollar amounts. An individual's value of a good or service is represented by the maximum amount of goods, services, or money that the individual is willing to give up to obtain a specific good or service, or the minimum amount of goods, services, or money that an individual is willing to accept to forgo a specific good or service. The total value of a natural resource or service includes the value individuals derive from direct use of the natural resource, for example, swimming, boating, hunting, or birdwatching, as well as the value individuals derive from knowing a natural resource will be available for future generations. In many contexts, particularly in markets, value is represented in terms of units of money. However, value can be measured using other measures, including units of a natural resource service.

8.3 RESTORATION DEFINITIONS

Aquatic ecosystems: Interrelated and interacting communities and populations of plants and animals that depend on aquatic habitat.

Creation of wetland habitat: Creating wetlands from upland habitat that was not historically wetland.

Enhancement of habitat: Increasing the habitat function of sites currently providing marginal aquatic habitat value.

Estuarine: Relating to a partially enclosed coastal body of water that has a free connection with the open sea and within which seawater is measurably diluted with freshwater derived from land drainage.

Habitat attributes: Physical and biological characteristics of wetland habitats that foster fish and wildlife utilization by facilitating reproduction, foraging, refuge from predation and/or disturbance, and physiological adaptation.

Habitat function: The ability of a site or area to provide support for fish and wildlife species and their associated resources.

Restoration: Returning historic aquatic habitats to sites that are currently upland or degraded wetland.

Reasonable Assessment Costs: Reasonable assessment costs are costs that trustees incurred in performing assessments in accordance with this rule. Trustees may recover the reasonable assessment costs they incur under this rule even if they ultimately determine not to pursue restoration, provided that they have determined that actions undertaken were premised on the likelihood of injury and need for restoration. Under the rule, reasonable assessment costs also include administrative, legal, and enforcement costs necessary to carry out this part, monitoring and oversight costs, and costs associated with public participation and indirect costs.

Recovery: Recovery is the return of injured natural resources and services to baseline. This concept encompasses the inherent tendency for natural resource and service attributes to vary over space and time. Projecting recovery involves determining the likelihood and rate at which natural resources and/or services will return to baseline. The availability and quality of baseline information can influence recovery projections. Trustees should use the best available baseline information that can be gathered relative to the incident and associated injuries.

Restoration: Restoration is any action (or an alternative), or a combination of actions (or alternatives), to restore, rehabilitate, replace, or acquire the equivalent of injured natural resources and services.

This rule includes the concepts of primary and compensatory restoration. Primary restoration is any action (whether on-site, off-site, in-kind, out-of-kind) that returns injured natural resources and services to baseline, while compensatory restoration is any action (or an alternative) taken to compensate for the interim loss of natural resources or services that occur from the date of the incident until such natural resources and services have recovered to their baseline condition. Trustees must consider, within the primary restoration component, natural recovery, in which no human intervention is taken to directly restore the injured natural resources and services. Depending on the injury of concern, primary restoration actions may include actions to actively accelerate recovery or simply to remove conditions that would make recovery unlikely. The rule discusses types of primary restoration actions that trustees may want to consider.

For some injuries, the need for and scale of compensatory restoration actions may depend on the range of feasible primary restoration actions, but trustees should evaluate the need to seek compensatory restoration for all demonstrable service losses that occur from the onset of the incident. The rule requires that trustees preferentially evaluate compensatory restoration actions that provide the same type, quality, and value of natural resources or services as those lost. Actions that provide services of comparable type, quality, and value may be considered if required to generate a range of feasible restoration alternatives for evaluation.

Landscape ecology: An approach to habitat development emphasizing broad spatial scales and the ecological effects of the spatial patterning on ecosystems. Considers the development, management, and dynamics of spatial heterogeneity, interactions and exchanges across heterogenous landscapes, and the influences of spatial heterogeneity on biotic and abiotic processes.

Mitigation: Implemented through a permit process, such as the U.S. Army Corps of Engineers' Section 404 permit program. Mitigation includes avoidance, minimization, and finally compensation if other forms of mitigation are not completely successful. Compensatory mitigation can include restoration, enhancement, and creation projects.

See also Restoration Plan, section 2.2.

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