

## Appendix

### Protection, Mitigation, and Enhancement of Regional Fish and Wildlife Resources

In December, 1982, the National Marine Fisheries Service submitted recommendations to the Northwest Electric Power Planning and Conservation Council for the protection, mitigation, and enhancement of the anadromous fish resource of the Region. Similar recommendations for resident fish and wildlife were submitted to the Council by the Northwest Conservation Act Coalition, Seattle Audubon Society, and The Mountaineers. The separate recommendations have been brought together to form the following document.

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## Fish and Wildlife Procedures and Criteria

### I. Conditions of Development

The Bonneville Power Administration (BPA) and the Federal Energy Regulatory Commission (FERC) (the Federal project operators and regulators) shall not license, exempt from license, relicense, amend a license, propose, recommend, agree to acquire power from, grant billing credits for, enter into option agreements, or otherwise support any Northwest power resource development, particularly hydroelectric development, without providing for:

- 1) Procedures which ensure consultation with the fish and wildlife agencies and tribes and the Regional Council throughout study, design, construction, and operation of the project.
- 2) Procedures which provide due weight to the views and recommendations of the fish and wildlife agencies and tribes.
- 3) Compliance with the following criteria for the protection, mitigation, and enhancement of fish and wildlife and their habitat, including sufficient quantity and quality of flows for successful migration, survival and propagation of anadromous fish.

(The Army Corps of Engineers, the Bureau of Reclamation and other State and Federal agencies are also encouraged to apply these criteria and procedures to power studies and proposals.)

### II. Fish and Wildlife Criteria

The following criteria to protect, mitigate and enhance existing and potential fish and wildlife production shall be satisfied for any power resource. If these criteria can not be fully satisfied, then project approvals or other support cannot be provided.

Criteria A, B, and C are elemental criteria for power projects. They are set out in order of relative priority. Thus, a project must satisfy A before B becomes an issue, and must satisfy A and B before C becomes an issue.

#### (A) Protection and Enhancement

Power resource development and operation shall assure protection and enhancement of fish and wildlife and related spawning grounds and habitat, including sufficient quantities and qualities of flows for successful migration, survival, and propagation of anadromous fish; and shall not impair or reduce existing and potential fish and wildlife resources of value.

All stream areas shall be assessed for value to resident fish, whether or not the areas are utilized by anadromous fish. Protection of spawning grounds and habitat and provision of flows for resident fish shall not be limited to areas shared with anadromous fish but shall also be assured where anadromous fish are absent, such as above impassable stream barriers. Enhancement of resident fish populations and habitat shall be planned for selected streams, with preference being given to retention of existing wild populations.

Assessments of wildlife habitat and needs shall give equal consideration to game and nongame wildlife. Protection of both game and nongame habitats shall be assured; enhancement measures shall be designed so that nongame habitats and threatened ecotypes are protected. Special emphasis shall be given to the protection of older seral stages, snags, and specialized habitats such as bogs, sinks, wetlands, cliffs, and talus slopes. Suitable habitat corridors or other connections shall be provided to enable individuals to interact with other members of their species. Suitable flows and protection from flow fluctuation extremes shall be provided for aquatic habitats and for support of riparian areas.

(B) Mitigation

All available measures shall be taken to avoid losses of fish and wildlife resources due to power development and operation. Adequate flows, passage, and habitat shall be assured. Mitigation measures shall be developed in consultation with and with the prior approval of fish and wildlife agencies and tribes. All mitigation measures shall be developed as part of project feasibility planning.

1. Anadromous and Resident Fish Mitigation

Effective fish passage, flow regimes, and water quality criteria shall be provided to eliminate losses to existing and potential fish resources, and to ensure successful migration, survival, and propagation of fish.

Fish Passage

Effective fish passage for both upstream and downstream migrating anadromous and resident fish shall be provided to eliminate delay, injury and stress.

1. The best available passage and protective facilities shall be installed during project construction and shall be operated at all times that fish are present at the project. When construction impacts passage, temporary passage measures acceptable to fisheries agencies shall be installed and operated during construction as needed.

2. Detailed plans defining type, size, method of operation and other pertinent facility characteristics shall be developed during project feasibility studies. These

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plans shall be submitted to fish and wildlife agencies and tribes for prior review and input and shall reflect their design criteria.

3. All passage facilities shall be designed and maintained to function properly through the full range of flows normally occurring during fish migration periods.

4. All fish facilities proposed shall reflect results of site-specific studies conducted during early project feasibility planning. Studies and design development shall take place in early feasibility planning stages, in consultation with fish and wildlife agencies and tribes.

5. The best available upstream migrant passage and protective facilities shall be provided at any project feature which impairs, impedes, or delays natural passage. This may require a fish collection system with fishway entrances correctly located, adequate attraction flows, a fish ladder, and an exit structure to return adults to the stream upstream from the project.

6. The best available downstream migrating juvenile passage and protective facilities shall be provided at any project which <sup>/has the potential to</sup> cause injury and mortality and/or impedes passage. This includes screening turbine intakes to prevent mortalities and injuries resulting from passage through turbine intakes. Requirements such as screen areas, mesh sizes, bypass conduits, and acceptable operations shall be reviewed and approved by fish and wildlife agencies and tribes during project feasibility studies.

#### Flows and Water Quality

Flow regimes of adequate water quality and adequate quantities shall be provided at levels sufficient for successful spawning, rearing and migration. Instream flows sufficient to protect the existing fish and wildlife resource and habitat shall be maintained. Flow regimes shall be maintained through and downstream of the project area. Project feasibility planning shall address the following factors, in consultation with the fish and wildlife agencies and tribes. Identification of impacts, specific solutions to the following, and costs of these solutions shall be included in all project feasibility determinations.

1. Construction impacts such as siltation of spawning gravels. Construction schedules and techniques shall be reviewed and approved by fishery agencies.

2. Temperature elevation or reduction which may cause reduced fish growth, disease, or adversely affect migration.

3. Gas supersaturation which may occur due to plunging water and result in fish gas bubble disease.

4. Reservoirs which tend to be nutrient traps may cause decreased fish production downstream by reducing available food supplies.

5. Silt-laden reservoir releases which decrease invertebrate production and

fish egg survival. This is a function of reservoir location and soils and should be identified during the planning process.

6. Disruption of flow patterns necessary for adult and juvenile fish migration and survival including rapid or large flow fluctuations resulting from power peaking operations. Flow reduction, diversion, or modification of flow regimes anticipated in development of a project shall be assessed not only in the immediate project area but in the entire system downstream of the facility. The effects on invertebrate populations shall be assessed.

7. Lack of gravel accretion downstream of reservoirs or barriers due to blockage of gravel movement which results in reduced spawning habitat in the future.

8. Effects of water intake and outflow on fish populations, habitat, and prey species, including effects of water velocity and density.

9. Effects of water diversion to neighboring stream systems (where applicable).

## B. 2. Wildlife Mitigation

Flow Regimes, water quality criteria, riparian habitat and stream channel management, and adequate amounts of suitable habitat shall be provided to prevent losses to existing and potential wildlife resources and to ensure successful migration, propagation, and survival of wildlife.

### Terrestrial habitats

1. On-site mitigation shall be preferred over off-site mitigation. Lands which are proposed for mitigation must be afforded institutionally stable protection that will protect them from future encroachments by other development.

2. Wildlife habitat shall be distributed so that normal patterns of wildlife migration and travel are not interrupted.

3. Game and nongame wildlife shall receive equal consideration in mitigation studies and implementation efforts.

4. Utility corridors shall be designed in such a manner as to pose no barrier to moving animals. Measures for enhancing wildlife habitat by managing right-of-way vegetation shall be investigated and implemented wherever practical.

5. Pesticide use, especially aerial spraying, shall be discouraged in favor of ecologically benign alternatives.

6. Power lines shall be sited so as to avoid as much as practical stringing lines across bird migration routes.

### Riparian area and stream channel management

1. Riparian areas are the key link between aquatic and terrestrial habitats, and are essential to the retention of the wildlife resource. Management actions

shall be directed to maintain the productivity and utility of these areas for wildlife.

2. Riparian areas shall be retained under natural vegetative conditions; snags shall be retained and older seral stages and communities allowed to develop.

3. Development in riparian areas, such as roads, transmission lines, pipelines, and other structures, shall be avoided to the fullest extent possible. Existing but poorly sited developments shall be relocated out of the riparian areas. Natural vegetative bank control measures will be preferred over riprap. Where channels present a barrier to animals crossing, suitable fording places shall be provided.

4. Pesticide use in riparian areas shall be prohibited.

5. Livestock will be fenced out of riparian areas, particularly ones of special importance to wildlife.

#### Stream flows and water quality

Flows of adequate quality and quantity to support riparian and aquatic habitats and stream-bank integrity shall be provided. The following adverse effects shall be prevented:

1. Large sediment loads, siltation of benthic communities, increases in dissolved gases and solids, and elevated chemical and biological oxygen demands.
2. Significant alteration of temperature regimes.
3. Fluctuations in water levels during critical life-cycle periods.
4. Interference with groundwater-dependent habitat.
5. Release of damaging chemicals and elements from embankments and spoils.

#### (C) Compensation for Unavoidable Losses

Despite compliance with (A) and (B), unavoidable losses to fish and wildlife resources may occur either during or after construction or during project operations.

Compensation in the form of off-site habitat acquisition, habitat improvements, artificial production, or similar methods shall be provided to fully replace such unavoidable losses. During project feasibility planning stages, a plan which recognizes contingencies such as unanticipated construction impacts shall be developed and subject to review and approval by the fish and wildlife agencies and tribes. Equal attention shall be paid to game and nongame species.

Success of mitigation measures must be assessed after the project is completed and operational, with final compensation assessed at that time. Lands which are proposed for compensation must be afforded stable protection that will protect them from pressure of future development.

(D) Cumulative Impacts

1. Projects which may have minimal direct individual impact on fish and wildlife resources collectively may have significant cumulative impacts. Basinwide impacts of development and operation of hydroelectric projects shall be assessed during project feasibility studies. Area-wide impacts of development and operation of other power resources shall be assessed during project feasibility studies. An evaluation of the uncertainties in protection, enhancement, mitigation, and compensation plans, and of the risk of fish and wildlife resource and habitat loss due to the biological, physical, or technological infeasibility of these measures, shall be a part of the assessments of cumulative impacts.

2. Measures shall be taken to address cumulative impacts (e.g., exclusion of certain drainages or subbasins from hydroelectric development, limitations on the number of power developments in an area, etc.). (See, Paragraph (A).)

(E) Indian Fisheries

1. Project planning and operation shall assure that the project will not inundate the usual and accustomed fishing and hunting places of any tribes.

2. Project planning and operation shall assure that the project will not degrade fish and wildlife habitat or reduce numbers of fish and wildlife in such a way that the exercise of treaty rights will be diminished.

3. Project planning and operation shall assure that the project will not adversely affect Indian reservations.

(F) Maintenance and Operation

Project feasibility planning for power projects shall include specific plans for maintenance, evaluation, and monitoring of mitigation facilities. These plans shall provide for modification and improvement of facilities and operations based upon evaluation and monitoring results upon request by a fish and wildlife agency or tribe.

(G) Project Decommissioning and Removal

Project feasibility planning for power projects shall include specific plans for project decommissioning and removal, and restoration of the fish and wildlife habitat, or provisions for the continuance in perpetuity of fish and wildlife mitigation, enhancement, and compensation measures.

(H) Power Benefits

Alternative means of power production shall be explored to the same degree as

the proposed development during project planning. Alternative methods of power production without adverse fish and wildlife impacts, such as conservation and load management, shall be given priority over harmful power development, particularly hydroelectric development proposed to be located in or affecting anadromous fish habitat.

### III. Procedures

#### (A) Timing

##### 1. Feasibility

Protection, mitigation, compensation and other fish and wildlife requirements shall be reviewed and approved in advance by the fish and wildlife agencies and tribes and shall be included in determinations of project feasibility. Funding for fish and wildlife protection, enhancement, mitigation, and compensation measures shall be identified prior to project approval. Fish and wildlife agencies and tribes shall be included in determinations of funding suitability and long-term security.

##### 2. Construction and Operation

All protection, mitigation, compensation, and other fish and wildlife plans shall be finalized prior to project construction and shall be in place and effectively operating at the time that project operation begins.

##### 3. Severance

Protection, mitigation, compensation, and other fish and wildlife requirements shall not be severed or separated from decisions on project approval, financial assistance, or support, i.e., a project cannot be approved without fish and wildlife requirements by setting a separate "fish and wildlife proceeding" or a separate "fish and wildlife study" in connection with project approval.

#### (B) Compliance with Criteria

1. All applicants for licenses (including license renewals, amendments, and exemptions), preliminary permits, billing credits, resource acquisition, option agreements, or other support shall be required to demonstrate in their applications how the proposed project would satisfy the criteria in Sections I, II, and III. This application demonstration must have been subject to review and comment by the fish and wildlife agencies and tribes prior to submission or the application will be rejected as deficient.



2. If initial review of an application or proposal for license (including license renewals, amendments, and exemptions), preliminary permits, billing credits, resource acquisition, option agreements, or other support indicates that the development may affect fish and wildlife resources, the Federal project operator or regulator shall notify the appropriate fish and wildlife agencies and tribes and provide them with copies of the application or proposal. This notice shall request the agencies and tribes' views on whether the application or proposal complies with the criteria in this Section; and, if it is not in compliance, what measures, procedures, or conditions would be required for compliance. If the agencies and tribes so determine, they shall advise the Federal project operator or regulator that the development would be inconsistent with the criteria or with the protection, mitigation, and enhancement of fish and wildlife even if measures and conditions are imposed.

3. In order to ensure that the appropriate fish and wildlife agencies are able to provide the information identified in paragraph 2, BPA shall provide necessary funding for preparation of the information by the agencies and tribes. If funding is not provided and the agencies or tribes are unable to provide the information due to staff constraints, then the Federal project operator or regulator shall not proceed with evaluation of the application or proposal.

4. In order to determine that a development is consistent (or not inconsistent) with the protection, mitigation, and enhancement of fish and wildlife, the Federal project operator or regulator must find:

- a) That the development will be constructed and operated in compliance with the criteria in this section; and
- b) That the development will be constructed and operated as recommended by the appropriate fish and wildlife agencies and tribes unless the Federal project operator or regulator, after giving due weight to those recommendations, adopts alternative recommendations which:
  - (i) are more effective in protecting, mitigating and enhancing fish and wildlife, while at the same time achieving the same sound biological objectives of the agencies and tribes; or
  - (ii) are less costly than the recommendations of the fish and wildlife agencies, while at the same time achieving the same sound biological objectives of the agencies and tribes; or
  - (iii) are based upon and supported by better scientific knowledge than the recommendations of the agencies and tribes, while at the same time achieving the same sound biological objectives of the agencies and tribes.

If the relevant agencies and tribes recommend that the project not be constructed

and operated, the Federal project operators or regulator shall not approve or support the development unless he finds that construction and operation of the project will not degrade fish and wildlife habitat or populations such that the size or quality of the affected fish and wildlife resources will be diminished.

5. All licenses for hydroelectric projects or documents that propose, recommend, or otherwise support hydroelectric development shall explain in detail how the criteria and procedures in Sections I, II, and III will be accomplished.

6. BPA shall apply this section and this paragraph to decisions on contracts, billing credits, resource acquisitions, option agreements, environmental cost/benefit analysis, power supply forecasting, rates, power scheduling, inter-tie arrangements, use of advance energy withdrawals, and other pertinent planning and operations. The FERC shall apply this section and this paragraph to decisions on preliminary permits, licenses, license amendments, license renewals, and exemptions. The Corps and the Bureau of Reclamation and other agencies are encouraged to apply this section to decisions on studies and proposals for power development.

(C) Power Planning and Management

1. Project operators and regulators shall treat fish and wildlife criteria as hard constraints in power system planning, operations, regulation, and in decision-making under the Pacific Northwest Coordination Agreement. BPA shall use its financial and legal authorities in a manner consistent with this section. Federal project operators and regulators shall use this section to the fullest extent practicable.

2. Project operators and regulators shall integrate relevant fish measures (such as flow requirements) into power system rule curves.

(D) Consultation

1. The Federal project operators and regulators shall work with the fish and wildlife agencies and tribes to develop mutually satisfactory arrangements for implementing the consultation and coordination requirements in section I.

2. Throughout the implementation of the Regional Energy Plan, the fish and wildlife agencies, tribes, and the project operators and regulators will be expected to consult with the Regional Council to the fullest extent possible at each stage of implementation, especially in the development of research plans and feasibility assessments.

3. Project operators and regulators will inform, consult, and work with other federal and state agencies, citizen's groups, and other interested parties

in order to coordinate operations and activities to meet all objectives for the benefit of fish and wildlife.

(E) Implementation Plans

In order to use this section to the fullest extent practicable, project operators and regulators shall provide in a timely manner:

1. Plans indicating that the agency has decided to implement these measures; or
2. Explanations, citing supporting information, why it will not be physically, legally, or otherwise practicable to implement the program measures, including a description of all possible allowances available to permit implementation.

(IV) Cumulative Effects

1. The Federal project operators and regulators shall review all applications or proposals for hydroelectric development in a single river drainage simultaneously through consolidated hearings, environmental impact statements or assessments, or other appropriate methods. This review shall assess cumulative environmental effects of existing and proposed hydroelectric development on fish and wildlife.

2. BPA and others shall fund studies to develop criteria and methods for assessing potential cumulative effects of hydroelectric development on fish and wildlife. The study shall also develop a method for incorporating these assessments into Federal processes for review, authorization, or other support of hydroelectric development.

3. Critical habitat for fish and wildlife

a) BPA and others shall fund studies of alternative means for classifying and designating certain streams and wildlife habitat that should be protected from all future hydroelectric development. The study shall draw on existing information on the hydroelectric potential of such streams, as well as the value of their fish and wildlife resources. Priority for study shall be given to streams which are existing or potential anadromous fish habitat areas, particularly those which support wild stocks.

b) Based on the results of these studies and other requirements of the Northwest Power Act, Federal Power Act, and others, the Regional Council and FERC shall designate stream reaches and wildlife habitat areas which shall

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be protected from further hydroelectric development. In the interim, the Council and the FERC will advise all Federal project operators, regulators, land managers, and appropriate agencies that the studies are underway and provide them with the full list of habitat areas proposed for protection from all hydroelectric development.