12.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

Public Law 104-267, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Act to establish new requirements for essential fish habitat (EFH) descriptions in Federal fishery management plans and to require Federal agencies to consult with NMFS on activities that may adversely affect EFH. EFH means "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act §3)." The Pacific Fisheries Management Council (PFMC) has designated EFH for Federally managed groundfish and coastal pelagics fisheries (PFMC 1998a and PFMC 1998b, respectively). The Council has also recommended an EFH designation for the Pacific salmon fishery (PFMC 1999). EFH for the ground fish, coastal pelagics, and Pacific salmon fisheries means those waters and substrate necessary to ensure the production needed to support a long-term sustainable fishery, i.e., properly functioning habitat conditions necessary for the long-term survival of the species through the full range of environmental variation.

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

The consultation requirements of section 305(b) of the Magnuson-Stevens Act [16 U.S.C. 1855(b)] provide that:

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

- NMFS shall provide conservation recommendations for any Federal or State activity that may adversely affect EFH.

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

12.1 ESSENTIAL FISH HABITAT IN THE COLUMBIA RIVER BASIN

The Columbia River estuary and the Pacific Ocean off the mouth of the Columbia River are designated EFH for groundfish and coastal pelagic species (see Table 12.1-1, PFMC 1998a and PFMC 1998b). The marine extent of groundfish and coastal pelagic EFH includes those waters from the nearshore and tidal submerged environments within Washington, Oregon, and California state territorial waters out to the exclusive economic zone (370.4km) offshore between the Canadian border to the north and the Mexican border to the south.

Table 12.1-1. Species with Designated EFH Found in Waters of the Proposed FCRPS Action Area

Groundfish Species	Blue rockfish (S. mystinus)	Rougheye rockfish (S. aleutianus)	Flathead sole (Hippoglossoides elassodon)
Leopard shark (Triakis semifasciata)	Bocaccio (S. paucispinis)	Sharpchin rockfish (S. zacentrus)	Pacific sanddab (Citharichthys sordidus)
Soupfin shark (Galeorhinus zyopterus)	Brown rockfish (S. auriculatus)	Shortbelly rockfish (S. jordani)	Petrale sole (Eopsetta jordani)
Spiny dogfish (Squalus acanthias)	Canary rockfish (S. pinniger)	Shortraker rockfish (S. borealis)	Rex sole (Glyptocephalus zachirus)
Big skate (Raja binoculata)	Chilipepper (S. goodei)	Silvergray rockfish (S. brevispinus)	Rock sole (Lepidopsetta bilineata)
California skate (R. inornata)	China rockfish (S. nebulosus)	Speckled rockfish (S. ovalis)	Sand sole (Psettichthys melanostictus)
Longnose skate (R. rhina)	Copper rockfish (S. caurinus)	Splitnose rockfish (S. diploproa)	Starry flounder (Platyichthys stellatus)
Ratfish (Hydrolagus colliei)	Darkblotched rockfish (S. crameri)	Stripetail rockfish (S. saxicola)	
Pacific rattail (Coryphaenoides acrolepsis)	Grass rockfish (S. rastrelliger)	Tiger rockfish (S. nigrocinctus)	**Coastal Pelagic Species**
Lingcod (Ophiodon elongatus)	Greenspotted rockfish (S. chlorostictus)	Vermillion rockfish (S. miniatus)	Northern anchovy (Engraulis mordax)
Cabezon (Scorpaenichthys marmoratus)	Greenstriped rockfish (S. elongatus)	Widow Rockfish (S. entomelas)	Pacific sardine (Sardinops sagax)
Kelp greenling (Hexagrammos decagrammus)	Longspine thornyhead (Sebastolobus altivelis)	Yelloweye rockfish (S. ruberrimus)	Pacific mackerel (Scomber japonicus)
Pacific cod (Gadus macrocephalus)	Shortspine thornyhead (Sebastolobus alascanus)	Yellowmouth rockfish (S. reedi)	Jack mackerel (Trachurus symmetricus)
Pacific whiting (Hake) (Merluccius productus)	Pacific Ocean perch (S. alutus)	Yellowtail rockfish (S. flavidus)	Market squid (Loligo opalescens)
Sablefish (Anoplopoma fimbria)	Quillback rockfish (S. maliger)	Arrowtooth flounder (Atheresthes stomias)	
Aurora rockfish (Sebastes aurora)	Redbanded rockfish (S. babcocki)	Butter sole (Isopsetta isolepsis)	**Salmon**
Bank Rockfish (S. rufus)	Redstripe rockfish (S. proriger)	Curlfin sole (Pleuronichthys decurrens)	Coho salmon (O. kisutch)
Black rockfish (S. melanops)	Rosethorn rockfish (S. helvomaculatus)	Dover sole (Microstomus pacificus)	Chinook salmon (O. tshawytscha)
Blackgill rockfish (S. melanostomus)	Rosy rockfish (S. rosaceus)	English sole (Parophrys vetulus)	

Note: From Casillas et al. 1998, Eschmeyer et al. 1983, Miller and Lea 1972, Monaco et al. 1990, Emmett et al. 1991, Turner and Sexsmith 1967, Roedel 1953, Phillips 1957, Roedel 1948, Phillips 1964, Fields 1965, Walford 1931, Gotshall 1977, Hart 1973, Healey 1991, Sandercock 1991, and Dees 1961.

The PFMC has recommended to the Secretary of Commerce an EFH designation for the Pacific salmon fishery that includes all those streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except above the impassable barriers identified by PFMC (1999). Chief Joseph Dam, Dworshak Dam, and the Hells Canyon Complex (Hells Canyon, Oxbow, and Browne dams) are among the listed man-made barriers that represent the upstream extent of the Pacific salmon fishery EFH. Salmon EFH excludes areas upstream of longstanding naturally impassable barriers (i.e., natural waterfalls in existence for several hundred years). In the estuarine and marine areas, proposed designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception (PFMC 1999).

12.2 SUMMARY OF PROPOSED ACTION

Below is a brief description of the proposed action. For a more detailed description, see **Section 3.**

12.2.1 Operation and Configuration of the FCRPS

The FCRPS serves an array of individual project and system purposes. Individual purposes vary widely and may include power generation, flood control, irrigation, recreation, and fish and wildlife benefits. Congress authorized all 31 of BOR's projects in the basin to provide water for irrigated agriculture; all the projects except Hungry Horse Dam and Reservoir currently fulfill the Congressional mandate.

12.2.2 Flow Objectives for Salmon and Steelhead

The Action Agencies recommend that mainstem flow operations be based on the 1995 RPA as supplemented by the 1998 Biological Opinion. System operators will continue to confer with NMFS and the regional fisheries co-managers to determine how to best manage in-season conditions relative to the seasonal average flow objectives.

For fall chinook and chum salmon spawning below Bonneville Dam, the FCRPS would be operated to use storage to augment natural flows, attempting to provide a flow level of 125 kcfs during early November through early April while maintaining the 1995 RPA requirement for storage projects to be at their upper (flood control) rule curve elevation on April 10 of each year. As natural conditions permit, a conservative step-wise approach would allow higher flows during late fall and early winter.

12.2.2.1 Water Quality

The Action Agencies propose to continue to operate the FCRPS to reduce water temperatures during periods of juvenile and adult fish migration and to minimize the harmful effects of elevated levels of spill-generated total dissolved gas (TDG) on anadromous and resident fish.

12.2.2.2 Specific Project Operations

See Section 3 for a detailed discussion of specific project operations.

12.2.2.3 Spill for Fish Passage

Spill reduces turbine-related mortality of juvenile salmon and steelhead at lower Snake and Columbia River hydroelectric projects. It will be maintained at the levels recommended in the 1998 Supplemental Biological Opinion, assuming that waivers to exceed their 110% TDG state water quality standards are obtained from Oregon and Washington.

12.2.2.4 Juvenile Fish Transportation

Juvenile salmonids would be collected at several dams on the lower Snake and Columbia rivers and transported downstream by truck or barge to release points below Bonneville Dam in an effort to improve survival over that experienced by inriver migrants.

12.2.2.5 Minimum Operating Pool (MOP)

Some mainstem run-of-river FCRPS reservoirs on the lower Snake River and John Day Reservoir on the Columbia River would be lowered during the spring and summer migration periods to increase water velocity (intended to increase the migration rate and survival of salmon).

12.2.2.6 Peak Turbine Efficiency Operation

The Action Agencies would operate turbines at the eight FCRPS mainstem Snake and Columbia river projects at high efficiency (within 1% peak operating efficiency) to reduce the mortality of fish passing through turbines.

12.2.2.7 Fish Passage Facilities

Turbine intakes with bypass/collection facilities at Lower Granite, Little Goose, Ice Harbor, Lower Monumental, McNary, John Day and Bonneville dams would be screened. An ice and trash sluiceway passage would be provided at The Dalles Dam. Water would be spilled through the spillway to enhance fish passage.

12.2.2.8 Predator Control Program

Northern Pikeminnow Management Program would continue. Efforts to relocate Caspian terns from Rice Island would continue.

12.2.2.9 Adaptive Management Framework Through Adoption of Performance Measures

Use of adaptive management would avoid jeopardy and facilitate the future recovery of listed stocks. Applying the "Construct for Achieving Survival Improvements" (Construct) would establish measurable biological performance standards for the hydrosystem, prioritize actions, and estimate the likely outcome of future actions. Ongoing studies would aid in evaluating the feasibility of lower Snake River actions, such as dam breaching, and the John Day Phase I report that addresses juvenile fish passage alternatives. Measures would be undertaken to improve dissolved gas and temperature conditions for the benefit of anadromous and resident species. Changes in storage project operations and configurations in the Snake and lower Columbia rivers would benefit anadromous species. The Action Agencies' Construct would establish an overall recovery goal.

The Action Agencies recommend that interim performance standards be developed during consultation to enhance decision-making and to provide a model for developing performance standards for all Hs.

12.2.2.10 Issuance of Section 10 Permit for Juvenile Fish Transportation Program by NMFS

NMFS extended the Corps' existing Permit 895 under authority of Section 10 of the ESA and the NMFS regulations governing ESA-listed fish and wildlife permits (50 CFR parts 217 through 227). The permit is valid until December 31, 2000. The Corps conducted a feasibility study, completed in spring 2000, to evaluate several alternatives to juvenile fish transportation. Permit 895 also authorizes the Corps' annual incidental takes of ESA-listed adult fish associated with fallbacks through the juvenile fish bypass systems at the four dams.

12.3 EFFECTS OF THE PROPOSED ACTION

12.3.1 General Considerations

As described above in Section 5.3, Habitat Impacts, the activities proposed for the FCRPS configuration and operation are likely to continue to reduce the functioning of already impaired EFH and retard the long-term progress of the impaired habitat toward properly functioning conditions. Direct effects of the FCRPS on EFH include blockage of habitat and habitat alteration.

By providing a storage capacity for almost 40% of the average annual runoff of the Columbia River above Bonneville Dam and operating to meet electrical generation, flood control, and irrigation demands, reservoir operations have changed streamflow conditions affecting turbidity and sediment transport, estuary conditions, and the extent and characteristics of the Columbia River plume. Reservoir operations on the mainstem Columbia and Snake rivers have altered the natural runoff pattern in the basin by increasing fall and winter flows, decreasing spring and summer flows, and effectively increasing the cross-sectional area of the river, resulting in downstream migration delays. Reduced flows result in substantial modification of the rivers' thermal regime and water quality by increasing water temperatures and altering water chemistry.

The effects of water regulation and impoundments effectively transform an ecosystem dependent on moving water (lotic habitat) into one dependent on still water (lentic habitat). This results in substantial changes in the distribution, abundance and diversity of organisms and in the carrying capacity of the habitat, as well as changed predator-prey dynamics. Because reservoirs have low water velocity, changes in water temperature, dissolved oxygen levels, turbidity, water chemistry, and aquatic habitat may result. Thermal and chemical stratification are likely to occur with potentially significant effects on associated aquatic life in, and downstream of the reservoir. Specific downstream effects depend on the site, water quality, size of the impoundment, and facility design (Washington Department of Ecology 1985).

12.3.2 Estuary and Nearshore Essential Fish Habitat

12.3.2.1 Groundfish EFH

Flow changes in the estuary as a result of changes in the FCRPS have the potential to adversely affect estuarine EFH for ground fish and coastal pelagic species primarily by altering the distribution of salt and freshwater. Increased river flow will decrease both the extent and duration of salt water intrusion into the estuary, while decreased river flows will do the opposite. Changes in flow can also affect the nearshore ocean environment by altering the size of the freshwater plume, which will alter the availability of habitat in the immediate area offshore of the Columbia River. Predicting the precise impact on EFH is not possible until the relationship between physical parameters in the plume and the biology of fish is better understood.

The estuary is used by juveniles of several ground fish species as a rearing area. The dominant species in the Columbia River are starry flounder and English sole. They occur in the estuary primarily as different age juveniles that use the channel as a migratory corridor to rearing areas in the bays and intertidal areas. These areas have large concentrations of food organisms such as the amphipod Corophium salmonis and are important rearing habitat. The less than 1-year-old juveniles occur throughout the estuary but are more concentrated in the freshwater and low salinity areas. They are generally not as abundant in the estuary as the older age classes. Age 1- to 2-year-old juveniles occur throughout the estuary but are abundant year around in the side channels and bays and also in the main navigation channel. Two-year-old juveniles are less widespread and occur mostly in the higher salinity portions of the lower estuary.

Altering the flow patterns has the potential to affect the value of these habitats for rearing of juvenile flounders if the change occurs in the summer months when they are in the estuary. The dominant flatfish species is the starry flounder, which are euryhaline and extremely tolerant of wide ranges of salinity. Starry flounder, for example, have been captured as far upstream as Portland in totally freshwater systems. Consequently, unless the change from altering flow patterns is extremely large, it is unlikely that it will have an effect beyond that to which the species are capable of adjusting. Altering salinity patterns may also affect prey items for these species and this could conceivably affect rearing success. These species are generalist feeders and would likely find other prey items if one group is negatively affected by change in flow patterns.

12.3.2.2 Coastal Pelagics EFH

Only Northern Anchovy of the Coastal Pelagic group uses the Columbia River estuary to any extent. Individuals that occur in the estuary are an extension of the coastal population and occur primarily in the lower estuary where salinity is high. Though anchovies spawn in the ocean, all life history stages can occur in the estuary. Eggs and larvae can apparently be swept into the estuary by flood tides. Individuals less than 1 year old, however, are not abundant in the estuary while anchovy one year or older actively move into the estuary and can be abundant particularly during low river flow periods when salinity is higher. Anchovies are pelagic feeders feeding primarily on copepods.

Changes in flow regulation are not expected to have an adverse impact on anchovy EFH in the Columbia River since all areas except the lower portion of the estuary are used on an irregular basis. High river flows may reduce the extent of this upstream habitat for anchovies but these areas contribute marginally important habitat for anchovies.

12.3.2.3 Salmon EFH

Flow changes in the estuary as a result of changes in the FCRPS also have the potential to adversely affect estuarine EFH for chinook and coho salmon primarily by altering the distribution of salt and freshwater. Increased river flow will decrease both the extent and duration of salt water intrusion into the estuary, while decreased river flows will do the opposite. Changes in flow can also affect the nearshore ocean environment by altering the size of the freshwater plume, which will change the availability of habitat in the immediate area offshore of the Columbia River. Predicting the precise impact on EFH is not possible until the relationship between physical parameters in the plume and the biology of salmon is better understood.

Water developments in the Columbia River have reduced average flow and altered the seasonality of Columbia River flows and sediment discharge, and have changed the estuarine ecosystem (NRC 1996; Sherwood et al. 1990; Simenstad et al. 1990, 1992; Weitkamp 1994). Annual spring freshet flows (May and June) through the Columbia River estuary are about 70% of predevelopment levels, and total sediment discharge is about one-third of 19th-century levels.

Decreased spring flows and sediment discharges have also reduced the extent, speed of movement, thickness, and turbidity of the plume that extended far out and south into the Pacific Ocean during the spring and summer (Barnes *et al.* 1972, Cudaback and Jay 1996; Hickey *et al.* 1998). Pearcy (1992) suggested that low river discharge is unfavorable for juvenile salmonid survival, despite some availability of nutrients from upwelling, because of reduced turbidity in the plume (increasing foraging efficiency of birds and fish predators, increased residence time of the fish in the estuary and near the coast where predation is high, decreased incidence of fronts with concentrated food resources for juvenile salmonids, and reduced overall total secondary productivity based on upwelled and fluvial nutrients. Reduced secondary productivity affects not only salmonid food sources but focuses predation by other fishes and birds on the juvenile salmonids.

Because of decreased river flows and development of the hydrosystem, juvenile migrant salmon likely arrive in the estuary later than under conditions in which they evolved. Efforts to restore the Columbia River plume toward conditions that existed prior to development of the hydrosystem would likely benefit salmonids (NRC 1996). Although the effects of reduced or altered timing of flow from individual tributaries (i.e., the Snake River) in the estuary and near-shore ocean are minimal, collectively they are not.

Small changes in salinity distribution may have significant effects on the ecology of fishes, including salmonids. Salinity distribution, as affected by tidal flow and river discharge, is a primary factor explaining seasonal species distributions and the structure of entire assemblages of fish and epibenthic and benthic invertebrate prey species throughout the Columbia River estuary (Haertel and Osterberg, 1967; Bottom and Jones, 1990; Jones et al., 1990). By altering the distribution of preferred habitats within particular salinity ranges and the particular suite of species that salmon encounter at different locations during their estuarine residence, small changes in salinity structure may have consequences for estuarine food webs and fish production in the estuary. In particular, small changes in the distribution and gradient of oligohaline salinities could change the type of habitats available when juvenile salmon must make the critical physiological transition from riverine to brackish salinities. Assessments of the ecological effects of salinity change on estuarine fishes, rearing conditions at specific places and times that support at-risk populations are needed to assess the impacts of altered flow regimes in the estuary.

12.3.2.4 Mainstem Essential Fish Habitat

Mainstem EFH provides the migratory corridor for juvenile salmonids and returning adults. In the Columbia River basin, dams built to provide hydropower and reservoirs built for water storage and flood control have the potential to adversely affect salmon EFH. Potential adverse effects include impaired fish passage (including blockages and diversions); alterations to water temperature, water quality, water quantity, and flow patterns; the interruption of nutrient, large woody debris, and sediment transport which affect river, wetland, riparian, and estuarine systems; increased competition with nonnative species; and increased predation and disease.

Hydrologic effects of dams include water-level fluctuations, altered seasonal and daily flow regimes, reduced water velocities, and reduced discharge volume. These altered flow regimes can affect the migratory behavior of juvenile salmonids. Water-level fluctuations associated with hydropower peak operations may reduce habitat availability, inhibit the establishment of aquatic macrophytes that provide cover for fish, and, in some cases, strand fish or allow desiccation of spawning redds. Drawdowns reduce available habitat area and concentrate organisms, potentially increasing predation and transmission of disease (Spence et al. 1996). Drawdown in the fall for flood control produces high flows during spawning, which allow fish to spawn in areas which may not have water during the winter and spring, resulting in loss of the redds.

12.4 CONCLUSION

NMFS believes that the proposed action may adversely affect designated EFH for groundfish and coastal pelagics listed in Table 11-1 and proposed designated EFH for chinook and coho salmon.

12.5 EFH CONSERVATION RECOMMENDATIONS

Conservation measures are discretionary measures suggested to avoid, minimize, or otherwise offset adverse modification of EFH, or to develop additional information. The RPA detailed in Section 9, along with the reasonable and prudent measures and the terms and conditions which implement them that are listed in Section 10, Incidental Take Statement, Subsections 10.2 and 10.3, are applicable to designated groundfish and coastal pelagics EFH, and proposed designated Pacific salmon EFH.

Because listed fish in the Columbia are in such precarious condition, the habitat strategy is intended to accelerate efforts to help fish in priority areas in the short-term, while laying a foundation for long-term strategies through subbasin and watershed assessment and planning. This habitat strategy is premised on a close linkage between Federal and non-Federal habitat programs to establish clear priorities and compatible assessments, planning and coordination mechanisms.

In the short term, Federal agencies commit in the All-H Paper to focus immediate attention on priority subbasins – subbasins with potential for significant improvement in anadromous fish productive capacity as a result of habitat restoration. The All-H Paper identifies these short-term actions, timelines, and responsible Federal agencies. This Opinion identifies the Action Agencies' contribution to the All-H program. In this Opinion, where costs are stated, they are estimates meant to help define the scale and pace of the action, not specific amounts the Action Agencies must actually spend to comply with this Opinion.

Over the long term, the habitat strategy has three overarching objectives: 1) protect existing high-quality habitat, 2) restore degraded habitats on a priority basis and connect them to other functioning habitats, and 3) prevent further degradation of tributary and estuary habitats and water quality.

When related to the basic habitat needs of listed anadromous fish, habitat efforts have the following objectives:

- Water quantity: increase tributary water flow to improve fish spawning, rearing and migration.
- Water quality: comply with water quality standards, first in spawning and rearing areas, and then in migratory corridors.

- Passage and diversion improvements: address instream obstructions and diversions that interfere with or harm listed species.

- Watershed health: manage both riparian and upland habitat, consistent with the needs of the species.

- Mainstem habitat: improve mainstem habitat on an experimental basis and evaluate the results.

- Estuary improvement: improve and restore habitat conditions in the Columbia River estuary.

Action: During 2001, the Corps and BPA, working with the Lower Columbia River Estuary Program (LCREP) shall, in a manner acceptable to NMFS, fund an inventory of estuary habitat; model physical and biological features of the historical lower river and estuary; and develop criteria for estuary habitat restoration.

The states of Oregon and Washington, under the CWA, have developed a management plan through the LCREP, to help rebuild the estuary. The plan is an appropriate starting point for the estuary's contribution to salmon recovery. As a preliminary step in building on the plan, an inventory and an analytical model should be developed. With this information, criteria for estuary habitat restoration can be identified to guide restoration efforts pending further refinements in the LCREP plan.

***Action*:** BPA and the Corps shall provide financial and technical support to LCREP to more specifically address the habitat needs of salmon and steelhead in the LCREP plan.

The Corps and BPA will provide financial and technical support to LCREP to clarify and elaborate those elements of the LCREP plan that relate to salmon and steelhead habitat protection, acquisition and restoration. This work should help establish clear goals for salmon conservation in the estuary, identify habitats whose characteristics and diversity support salmon productivity, identify potential performance measures, identify flow requirements to support estuarine habitat requirements for salmon, and develop a program of research, monitoring, and evaluation.

Action: Over a 10-year period beginning in 2001, BPA and the Corps shall provide two-thirds of the financial requirements of a program, administered through the LCREP's non-profit entity, to acquire, protect and restore high quality habitats identified in the LCREP plan (Plan Action 2) over a 10-year period. The Federal share of the program shall aim at an initial goal of 10,000 acres of tidal wetlands and other key habitats to rebuild productivity in the lower 46 river miles. The

Corps and BPA shall also provide planning and engineering expertise to implement the non-Federal share of on-the-ground habitat improvement efforts identified in Plan Action 2.

Much of the estuary's historic shallow-water habitat has been lost to due to the effect of local, navigational and hydropower development. The LCREP plan proposes a 10-year program of habitat acquisition and restoration to anchor high-quality habitat on both sides of the river to support salmon rebuilding. A high priority should be put on tidal wetlands and other key habitats to rebuild productivity in the lower 46 river miles. Federal agencies will provide technical and financial support for this program, and to implement on-the-ground activities identified in planning. As more information is gained from inventory and analytical work, the 10,000-acre figure will be modified to ensure that all habitats important to the survival and recovery of anadromous fish are included in this recovery effort. Examples of acceptable estuary habitat improvement work include acquiring rights to diked lands, breaching levees, improving wetlands and aquatic plant communities, enhancing moist soil and wooded wetland via better management of river flows, reestablishing flow patterns that have been altered by causeways, supplementing nutrient base by importing nutrient-rich sediments and large woody debris into the estuary, modifying abundance and distribution of predators by altering their habitat, creating wetland habitats in sand flats between the north and south channels, creating shallow channels in inter-tidal areas, and enhancing connections between lakes, sloughs, side channels and the main channel. The Corps and BPA will place a high priority on improving the access to and quality of chum habitat, especially in the Grays River system. The Corps currently is planning efforts to restore habitat in connection with its proposed navigation channel deepening project, and the work outlined in this term and condition is in addition to the mitigation/restoration work identified in any NMFS channel-deepening Biological Opinion.

Action: Between 2001 and 2010, BPA and the Corps shall provide two-thirds of the financial requirements to expand the LCREP monitoring and research program to address the objectives of this Biological Opinion to effectively protect and restore the estuary ecosystem for listed populations and evaluate the efficacy of management actions to rebuild the productivity of the system over the long term. (Plan Action 28).

Action: During 2000, BPA, working with NMFS, shall continue to develop a conceptual model focusing on critical linkages between estuarine conditions and salmon population structure and resilience to assess estuarine influence on salmon populations in the Columbia River. The model will highlight linkages that are probably impacted by upper river hydropower and water management and identify information gaps that need to be addressed in developing recommendations for FCRPS management and operations.

Cost: $150,000.

Implementing the habitat actions of the RPA (Section 9) and the appropriate terms and conditions of the Incidental Take Statement related to monitoring take (10.5.1) as EFH conservation recommendations will avoid, minimize, or otherwise offset potential adverse impacts to groundfish, coastal pelagic, and salmon EFH within the proposed action area.

12.6 STATUTORY REQUIREMENTS

The Magnuson-Stevens Act and Federal regulations (50 CFR Section 600.920) to implement the EFH provisions require Federal Action Agencies to provide a written response to EFH Conservation Recommendations within 30 days of receipt. Because the EFH designation for the Pacific salmon fishery has yet to be approved, this regulation does not apply for the salmon species involved in this consultation until such time as the Secretary of Commerce approves it, at which time the 30 day period will commence. The final response must include a detailed description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If the response is inconsistent with the EFH Conservation Recommendations, an explanation of the reasons for not implementing them must be included.

12.7 CONSULTATION RENEWAL

The Action Agencies must reinitiate EFH consultation with NMFS if the action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR Section 600.920 [k]).