ENVIRONMENTAL ASSESSMENT

INTERIM STRATEGIES FOR MANAGING ANADROMOUS FISH-PRODUCING WATERSHEDS ON FEDERAL LANDS IN EASTERN OREGON AND WASHINGTON, IDAHO, AND PORTIONS OF CALIFORNIA

USDA Forest Service and USDI Bureau of Land Management

PURPOSE OF AND NEED FOR ACTION

Background

The U.S. Department of Agriculture Forest Service (FS) and the U.S. Department of the Interior Bureau of Land Management (BLM) [hereinafter jointly referred to as "the Agencies"] are developing an ecosystem-based, aquatic habitat and riparian-area management strategy (commonly referred to as PACFISH) for Pacific salmon, steelhead, and sea-run cutthroat trout habitat on lands they administer. The strategy is being developed in response to new information documenting broad declines in naturally reproducing Pacific salmon, steelhead, and sea-run cutthroat trout [hereinafter referred to as anadromous fish], and widespread degradation of the habitat upon which these anadromous fish depend.[1] This environmental assessment analyzes a range of interim strategies for arresting the degradation and beginning the restoration of aquatic and riparian ecosystems during the next 18 months while a longer-term strategy is developed and evaluated. Recent studies warrant consideration of an interim strategy for management of aquatic and riparian ecosystems on lands administered by the Agencies.

In March-April 1991, the American Fisheries Society (AFS), a professional society of fisheries research scientists and fisheries managers, published a report[2] that identified 214 stocks of naturally reproducing anadromous fish in California, Oregon, Washington, and Idaho, that were considered to be "at risk" of extinction or "of special concern." The report also documented 106 additional stocks that already are extinct. The depressed status of 214 stocks reflects the interaction of inherently variable environmental conditions, such as ocean productivity and weather patterns, with a variety of management activities. In general, stock survival is threatened by some combination of dam construction and operation, water diversions, habitat modifications, fish hatchery operations, and fish harvest. Reasons for the decline of anadromous fish vary by species and geographic area (e.g., dams are a primary factor affecting the status of some stocks, but have a negligible effect on others), however, degradation of freshwater habitat is a common feature affecting all at-risk stocks. A 1992 report[3] calculated that of the 192 stocks of anadromous fish in the Columbia River Basin, 35 percent are extinct, 19 percent were at high risk of extinction, 7 percent were at moderate risk of extinction, 13 percent were of special concern, and 26 percent were presumed secure.

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[1]USDA Forest Service Pacific Salmon Work Group and Field Team. 1992. *Informational Report - Background Report for the Development of the Forest Service Management Strategy for Pacific Salmon and Steelhead Habitat.*

[2]W. Nehlsen, J. E. Williams, and J. A. Lichatowich. 1991. *Pacific Salmon at the Crossroads: Stocks at Risk from California, Oregon, Idaho, and Washington.* Fisheries 16 (2): 4-21.

[3]J.E. Williams, J.A. Lichatowich, and W. Nehlsen. 1992. *Declining Salmon and Steelhead Populations: New Endangered Species Concerns for the West.* Endangered Species Update. 9(4):1-8.

Subsequent surveys in California[4], Oregon[5], and Washington[6] confirmed the scope but broadened the magnitude of the decline.

Assessments by researchers indicate that stream systems throughout California, Oregon, Washington, and Idaho, have been degraded considerably by human-induced cumulative effects from such activities as livestock use, road construction, timber harvest, recreational use, channelization, and other watershed management projects and activities (based on the following studies listed in Appendix A: Platts, 1989; Platts, 1991; Meehan, 1991; NMFS 1993; and Idaho Department of Fish and Game, 1992) . For example, from 1987 to 1992, researchers from the Pacific Northwest Research Forest and Range Experiment Station resurveyed 116 stream systems in Oregon, Washington, and Idaho, and compared the number of large, deep pools per stream mile--a primary indicator of high quality, in-channel habitat condition--to the number documented during surveys conducted between 1935 and 1945. Their report[7] documents substantial decreases in the quality and quantity of large, deep pools throughout managed areas of the region. The number of large, deep pools decreased 58 percent in the Cowlitz River Basin, 41 percent in the Lewis River, 84 percent in the Elochoman River Basin, and 85 percent in the Yakama River Basin, all in Washington State; 78 percent in the Lewis and Clark River and 85 percent in the Clatskanie River, both in Oregon; and 52 percent in the Salmon River Basin of Idaho. Pool-riffle ratios have decreased from historic levels of about 50:50 to 20:80 or 10:90 according to Oregon Game Commission surveys in the 1960s and Forest Service surveys in the 1970s (unpublished data).

Despite implementation of gradually improving best management practices through national forest Land and Resource Management Plans (forest plans) and BLM Land Use Plans (LUPs), riparian and aquatic habitat conditions on Federal lands have continued to decline. Generally, anadromous fish habitat on lands administered by the Agencies have 30-70 percent fewer large, deep pools, more fine sediments in spawning gravels, and greater disturbance of riparian vegetation than is acceptable. Such factors reflect a general reduction in fish habitat

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[4]P. Higgins, S. Dobush, and D. Fuller. 1992. *Factors in Northern California Threatening Stocks With Extinction.* American Fisheries Society, Humboldt Chapter. 25 pp.

[5]T.E. Nickelson, J.W. Nicholas, A.M. McGie, R.B. Lindsay, D.L. Bottom, R.J. Kaiser, and S.E. Jacobs. 1992. *Status of Anadromous Salmonids in Oregon Coastal Basins.* Oregon Dept. of Fish and Wild., Portland. 83 pp.

[6]Washington Department of Fisheries, Washington Department of Wildlife, and Western Washington Treaty Indian Tribes. 1993. *Washington State Salmon and Steelhead Stock Inventory*. Washington Dept. of Fisheries., Olympia. 212 pp.

[7]B.A. McIntosh, J.R. Sedell, J.E. Smith, R.C. Wissman, S.E. Clark, G.H. Reeves, and L.A. Brown. *Management History of Eastside Ecosystems: Changes in Fish Habitat over 50 years, 1935-1992.* USDA/FS PNW Research Station, General Technical Report PNW-GTR-321, February 1994.

capability.[8] Many streams have become simplified, having lost the structural complexity vital to the productivity and well-being of many aquatic species.

Agency-administered lands provide substantial habitat for remaining stocks of anadromous fish. The Agencies estimate that of the 214 stocks identified in the AFS published report as at risk of extinction, 134 occur on FS-administered lands and 109 on BLM-administered lands.[9] The National Marine Fisheries Service (NMFS) has determined that the Snake River sockeye salmon is endangered,[10] and the Snake River fall and spring/summer chinook salmon is threatened[11] pursuant to provisions of the Endangered Species Act of 1973, as amended (ESA). Since initial publication of this environmental assessment (EA), NMFS announced an emergency action to reclassify the status of the Snake River spring/summer chinook salmon and fall chinook salmon from threatened to endangered.[12] The emergency action will be in effect until April 15, 1995. During this time, NMFS will publish a proposed rule to reclassify these chinook stocks. The NMFS determination was based on a projected decline in adult Snake River chinook salmon abundance. The Sacramento River winter chinook salmon was listed as threatened[13] in 1990. The NMFS recently determined that reclassifying the Sacramento River winter chinook salmon as endangered was warranted.[14] Additional stocks have been, or are expected to be, petitioned for listing.[15] Further, all anadromous fish in the Snake River Basin have been designated as sensitive species by the FS and are being considered for such designation by the BLM.

The 1994 adult spring chinook salmon count at Bonneville Dam was 20,132 (Fish Passage Center 1994), about 43 percent of the previous record low return. The expected 1994 return of combined Snake River spring and summer chinook salmon runs to Lower Granite Dam is

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[8]R.J. Naiman, T.J. Beechie, L.E. Benda, et al. 1992. *Fundamental Elements of Ecologically Healthy Watersheds in the Pacific Northwest Coastal Ecoregion.* Pp. 127-188. In: Naiman, R.J. ed. *Watershed Management Balancing Sustainability and Environmental Change.* New York, NY. Springer-Verlag. P.A. Bisson, T.P. Quinn, G.H. Reeves, and S.V. Gregory. 1992. *Best Management Practices, Cumulative Effects, and Long-term Trends in Fish Abundance in Pacific Northwest River Systems.* Pp. 189-232. In: Naiman, R.J. ed. *Watershed Management Balancing Sustainability and Environmental Change.* New York, NY. Springer-Verlag.

[9]J.E. Williams and C. D. Williams. ms. *An Ecosystem-based Approach to Management of Salmon and Steelhead Habitat.* Ms. prepared for Pacific Salmon and Their Ecosystems Conference. Seattle, WA. January 1994.

[10]NMFS determination in 56 FR 58619; November 20, 1991. Added to list in 57 FR 212; January 3, 1992. Critical Habitat designated in 58 FR 68543; December 28, 1993.

[11]NMFS determination in 57 FR 14654; April 22, 1992 [Corrected in 57 FR 23458; June 3, 1992]. Added to list in 58 FR 49880; September 23, 1993. Critical Habitat designated in 58 FR 68543; December 28, 1993.

[12]NMFS determination in 59 FR 42529; August 18, 1994.

[13]NMFS determination in 55 FR 46515; November 5, 1990. Added to list in 55 FR 49623; November 30, 1990. Critical Habitat designated in 58 FR 33212; June 16, 1993.

[14]NMFS determination in 59 FR 440; January 4, 1994.

[15]In particular, the Illinois River winter steelhead in Oregon, other coastal and interior steelhead, the mid-Columbia River chinook, and the coho (silver) salmon throughout their range in the lower 48 States.

projected to yield only 14 to 28 percent of the recent 10-year average for spawning redds (NMFS and Fish and Wildlife Service (FWS) 1994). Based on the 1994 spring chinook jack count at Bonneville Dam, the 1995 run will likely be even lower than in 1994. The projected 1994 return of listed fall chinook salmon to the Columbia River is 803, the second lowest on record. When mortality is considered, NMFS estimates that only 300 adults will reach Lower Granite Dam. The 1995 forecast suggest that the fall chinook run will be about 60 percent of 1994 (NMFS and FWS 1994).

The Agencies have taken a number of independent actions to respond to declines in anadromous fish stocks and the degradation of habitat. Both participated in the 1990-1991 "Salmon Summit," which was convened by Senator Mark Hatfield to examine restoration of Columbia River Basin anadromous fish. The Agencies were instrumental in developing the Habitat Section of the Summit Report,[16] and have undertaken a number of the near-term actions identified in that report. They have developed and are implementing a variety of anadromous fish program initiatives[17] for management of their respective anadromous fish habitat resources. To date, however, even in light of ongoing efforts outside the range of the northern spotted owl, neither Agency has implemented a comprehensive approach to ecosystem-based management of aquatic and riparian habitats. In addition, as required by the ESA, projects and activities on 10 national forests and 4 BLM districts are subject to consultation with the NMFS on threatened and endangered anadromous fish in the Snake River Basin. During consultation the Agencies have found that adoption of habitat protection standards similar to those explored in this environmental assessment generally has become the accepted method of meeting threatened and endangered anadromous fish habitat requirements.

On January 25, 1994, the Agencies joined with the National Park Service (NPS), FWS, and NMFS in signing an Interagency Memorandum of Understanding (Interagency MOU) to cooperate in management of federally administered lands for the conservation of species that are tending towards Federal listing as threatened or endangered pursuant to the ESA. The Interagency MOU describes the protection and proper management of habitats as an important tool for preventing additional listings of species. The Interagency MOU was executed to facilitate compliance with ESA Section 7(a) obligations requiring all Federal agencies to proactively manage lands and resources within their jurisdictions for the conservation of rare species.

The strategy being developed by the Agencies would provide a consistent approach for maintaining and restoring aquatic and riparian habitat conditions, and would contribute to the sustained natural production of anadromous fish. The Agencies established two technical teams--the FS/BLM Field Team and Washington Office Work Group--and one Washington Office Policy Group, to coordinate strategy development. All three were composed of Agency research scientists and managers. The information developed by these groups provided the foundation for the aquatic and riparian components of the Scientific Analysis

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[16]Report of the Salmon Summit. 1991. Submitted by Governors Roberts (OR), Gardner (WA), Andrus (ID), and Stephens (MT) to Senator Hatfield (OR).

[17]USDI Bureau of Land Management. 1993. *Anadromous Fish Habitat Management and Funding Strategy for the Columbia and Snake River Basins.* USDA Forest Service, Regions 1, 4, and 6. 1991. *Columbia River Basin Anadromous Fish Habitat Management Policy and Implementation Guide.*

Team Report[18] and the Forest Ecosystem Management Assessment Team (FEMAT) Report.[19] Measures for maintaining and restoring anadromous fish habitat are included in the *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl* (Northern Spotted Owl FSEIS) for all or parts of the 15 national forests and 6 BLM districts[20] that are within the range of the northern spotted owl and which accommodate naturally reproducing stocks of anadromous fish.

Over the next 18 months, the Agencies will cooperatively prepare several geographically-specific environmental analyses (e.g., environmental impact statements (EISs)) to examine longer-term management strategies for protecting or restoring anadromous fish-producing watersheds in areas considered in this environmental assessment.[21] These analyses will build on the information developed by the Agencies' technical teams and policy group, and determine if amendments to forest plans, LUPs, or regional guides in California, Idaho, Oregon, and Washington are necessary.

Because new information documents that nearly one-half of the anadromous fish stocks are at risk of extinction, and habitat degradation is a common causal factor, the Agencies are analyzing a range of interim strategies, based on the work of the technical teams and policy group, for immediately arresting the decline in habitat conditions, initiating habitat restoration, and protecting remaining high quality habitat until the geographically-specific environmental analyses are completed. The Agencies want to make their best effort to ensure that nothing done on national forests and BLM public lands in the interim results in the extinction or further endangerment of at-risk anadromous fish stocks, or otherwise precludes options that will be considered in the geographically-specific environmental analyses. Improved management of aquatic and riparian ecosystems on lands administered by the Agencies, combined with improvements in hydropower operations, hatchery practices, and fish harvest management, can prevent additional stocks from becoming extinct and preclude the need to extend the protection of the Endangered Species Act to other anadromous fish stocks in California, Idaho, Oregon, and Washington.

In accordance with congressional direction provided in the Fiscal Year 1994 Interior and Related Agencies Appropriations Act, the FS will not implement new anadromous fish habitat management direction during fiscal year 1994 on the Tongass National Forest in Alaska, but will conduct studies and monitor current management practices on the Tongass. In

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[18]J.W. Thomas, M.G. Raphael, R.G. Anthony, E.D. Forsman, A.G. Gunderson, R.S. Holthausen, B.G. Marcot, G.H. Reeves, J.R. Sedell, and D.M. Solis. March 1993. *Viability Assessments and Management Considerations for Species Associated with Late-Successional and Old-Growth Forests of the Pacific Northwest - The Report of the Scientific Analysis Team*. USDA, Forest Service. Portland, OR.

[19]Forest Ecosystem Management Assessment Team. 1993. *Forest Ecosystem Management: an Ecological, Economic, and Social Assessment*, USDA, Forest Service. Portland, OR.

[20]The Mt. Hood, Rogue River, Siskiyou, Siuslaw, Umpqua, Willamette, Gifford-Pinchot, Mt. Baker-Snoqualmie, a portion of the Okanogan, Olympic, Wenatchee, Klamath, Shasta-Trinity, Mendocino, and Six Rivers National Forests; and the Coos Bay, Medford, Eugene, Roseburg, and Salem BLM Districts in Oregon; and the Arcata and Redding Resource Areas of the Ukiah BLM District in California.

[21]The notices initiating these analyses are included in Appendix I.

subsequent years, as determined necessary for stewardship of anadromous fish habitat in Alaska and evaluated as required by the National Environmental Policy Act (NEPA), both Agencies will incorporate appropriate measures into regional guides and forest plans and LUPs for management of all lands and resources within their respective jurisdictions in Alaska.

Although neither Agency has jurisdiction over other factors affecting anadromous fish, each will remain alert for opportunities to coordinate its efforts to improve habitat condition on Agency-administered lands with the efforts taken by others to address such factors as dams, hatcheries, fish harvesting, and private-land habitat condition. Full recovery of listed anadromous fish and conservation of other anadromous fish that are at risk of extinction will depend on the development of a response to all factors affecting their decline, including those factors outside the Agencies' jurisdictions. Regardless of any action or inaction by other responsible agencies or organizations that might affect populations of anadromous fish stocks, the Agencies have responsibilities to proceed with action to restore degraded habitat and protect good-quality habitat.

The FS, BLM, and National Marine Fisheries Service and others signed a Memorandum of Understanding in January, 1994 to "[w]ork together and participate in the conservation of selected plant and animal species and their habitats to reduce, mitigate, and possibly eliminate the need for their listing under the ESA by developing habitat conservation assessments leading to Conservation Agreements." This MOU was signed to facilitate the agencies working cooperatively to assess and protect habitat in an effort to conserve at-risk species, avoiding the need to list them as threatened or endangered under the ESA.

In recognition of the alarming decline of some Pacific Northwest salmon stocks and the need for the federal government to respond in a coordinated fashion, the Departments of the Interior and Agriculture signed a Memorandum of Agreement with other Departments, the White House Office on Environmental Policy, and the Environmental Protection Agency to establish a framework to facilitate the development of a coordinated and comprehensive salmon restoration plan in October, 1994. The Agreement is intended to ensure that federal agencies work together in a coordinated manner that maximizes the use of federal expertise and resources, and eliminates unnecessary duplication and inefficiencies. The Agreement established a plan for salmon, and a regional Coordinating Committee to "assume primary responsibility for developing and implementing a coordinated Federal effort to conserve and restore Pacific salmon and their associated habitats."

Purpose

The purpose of this environmental assessment is to provide decision makers with analysis of a range of interim strategies for arresting the degradation and beginning the restoration of riparian and aquatic ecosystems in watersheds where anadromous fish habitat is present or easily could be reestablished (hereinafter referred to as anadromous watersheds), to publicly disclose the possible environmental consequences that adoption of each strategy would bring, and to provide continuing opportunities to incorporate the latest scientific information into resource plans and management practices. Alternative strategies presented in this environmental assessment are designed to maintain options for more comprehensive mitigation or environmental protection measures that may be found necessary through the geographically-specific environmental analyses that will be prepared for the affected area.

To protect the good quality anadromous fish habitats, arrest the degradation, and begin restoration of anadromous fish habitat, as well as to respond to a wide array of new scientific information on the status of various anadromous fish stocks and the condition of aquatic and riparian habitat, the Agencies are reevaluating all management projects and activities in anadromous watersheds not considered in the Northern Spotted Owl FSEIS. Because the preparation of geographically-specific environmental analyses that will examine longer-term options for protecting this habitat is scheduled to take 18 months, and because recent assessments of the short- and long-term risks to maintenance and recovery of anadromous fish stocks under current management direction are high, the Agencies believe that a range of interim strategies must be examined for possible adoption. Such strategies are an attempt to ensure that management actions taken in the interim do not have adverse environmental effects that could result in extinction or further endangerment of anadromous fish stocks or otherwise limit the range or number of reasonable alternatives that are to be evaluated in the geographically-specific environmental analyses (40 Code of Federal Regulations (CFR) 1506.1). The interim strategies are intended to bridge the time gap between existing forest plans and whatever long-term strategy is finally adopted.

The FS, in accordance with 36 CFR. 219.19, develops land and resource management plans to manage fish and wildlife habitat to maintain viable populations of existing native and desired non-native vertebrate species in the particular planning area. Because of the complexity and dynamic nature of the national forest resources managed under the NFMA, there is no specific or precise standard or technique for satisfying this requirement, as recognized by the scientific community and many courts (see *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents Within the Range of the Northern Spotted Owl* (NSO ROD)), pp. 43-47). The BLM, in accordance with the Federal Land Policy and Management Act of 1976 (FLPMA), 43 U.S.C. 1701.8, is required to manage public lands to protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values. Both agencies are required by the Clean Water Act, 33 U.S.C. 1251, 1329, to see that activities occurring on lands they administer comply with requirements concerning the discharge or run-off of pollutants. In compliance with their own laws and regulations, and in accordance with the Interagency MOU, the Clean Water Act, and applicable Council on Environmental Quality (CEQ) regulations, the Agencies jointly propose to develop and adopt a coordinated, interim strategy for protecting quality anadromous fish habitat, and arresting the degradation and beginning the restoration of aquatic and riparian ecosystems that constitute anadromous fish habitat.

Interim direction also would facilitate the ability of managers of Federal land within the range of listed anadromous fish to more efficiently and effectively prepare project-specific decisions that will successfully meet requirements of the ESA. Because consultation with the NMFS and the FWS on the interim direction has been completed prior to any adoption, the interim direction would establish guidance that incorporates during initial project design those measures generally determined necessary for compliance with the ESA. This would result in an approach to project design that is more efficient and cost-effective than awaiting project-specific consultation to incorporate all necessary provisions. Interim direction also would increase Agency consistency with and responsiveness to riparian and aquatic habitat concerns across the range of anadromous fish habitat in the western contiguous United States. This, in turn, would reduce the probability that some additional stocks of anadromous fish will need to be listed as threatened or endangered.

There is a noted and continuing decline of habitat elements essential to anadromous fish; and not all forest plans or LUPs include standards, guidelines, and procedures that allow managers

to efficiently and effectively address measures suggested by the NMFS for protection of listed anadromous fish species. Further, not all these planning documents ensure the maintenance and restoration of habitat for other anadromous fish stocks. To better meet responsibilities to provide habitat for listed and other at-risk anadromous fish stocks, and to avoid gridlock in the management of the national forests and BLM public lands and help stabilize the flow of goods and services from these lands, both Agencies believe there is an immediate need to examine appropriate modifications in management direction.

Need

The need for interim management has been made clear by the rapidly declining status of numerous anadromous fish stocks and numerous studies that have demonstrated that declining freshwater habitat condition is a common causal factor in those declines. Furthermore, independent investigations by Agency scientists have confirmed the declining habitat conditions on Agency-administered lands and the dependency of anadromous fish upon high quality habitat conditions. Because of this decline in habitat elements, there is a need to adopt an interim strategy now.

In 1991, the AFS published the first comprehensive report on the status of anadromous fish stocks.[22] The AFS report documents the results of a 4-year effort by the AFS Endangered Species Committee to gather, interpret, and summarize information compiled from previously published literature and unpublished data on the status of anadromous fish in California, Idaho, Oregon, and Washington. Information contained in that report was gathered from fish management agencies, Native American tribes, Oregon and Idaho chapters of the AFS, and sportfishing and conservation groups as well as from published scientific journals, proceedings, and books. The authors used a wide variety of available data, including spawning escapements, redd counts, adult counts, recreational catch, dam counts, and anecdotal information. The report documented 1 stock that in 1991 already was listed pursuant to the ESA, another 101 stocks at high risk of extinction, 58 at moderate risk of extinction, and 54 of special concern. Thirty-nine of these stocks occur in California, 58 on the Oregon Coast, 76 in the Columbia River Basin, and 41 in the Washington Coast/Puget Sound area. The present or threatened destruction, modification, or curtailment of habitat or range was cited as one of the primary causal factors in the decline of 195 (91 percent) of the at-risk anadromous fish stocks.

Since the AFS Endangered Species Committee report was published, three State-specific reviews of at-risk anadromous fish stocks have been conducted. In northern California, the Humbolt Chapter of the AFS published a report[23] identifying 49 stocks of anadromous fish stocks in streams between the Russian River and the Oregon border. That report generally agreed with the AFS report except that coastal cutthroat were considered by the Humboldt Chapter to be more seriously affected and were reclassified from "of special concern" to "at moderate risk" of extinction, and many of the summer and winter steelhead stocks were subdivided into smaller stock units.

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[22]Report by W. Nehlsen, J.E. Williams, and J.A. Lichatowich, cited in footnote 2.

[23]Report by P. Higgins, S. Dobush, and D. Fuller, cited in footnote 4.

For the Oregon coast, the Oregon Department of Fish and Wildlife (ODFW) conducted a review of anadromous fish stocks in the coastal basins.[24] In this report, the ODFW ranked stocks differently than had the AFS and the Humbolt Chapter reports. The ODFW used the terms "of special concern" to note a high-risk stock, and "depressed" to note a moderate-risk stock. The ODFW report also included the terms "unknown" and "healthy." Although they agreed with documentation of the widespread declines reported by the AFS, the ODFW added many additional stocks to the list from the AFS Report, and also considered several stocks to be in a somewhat better condition than reported by the AFS. Because the ODFW report reviewed only coastal stocks, all of their data applied to stocks within the range of the northern spotted owl and outside the range of this environmental assessment.

The Washington Department of Fisheries (WDOF) reported[25] on the status of anadromous fish stocks throughout the State. In addition to the WDOF, the Washington Department of Wildlife and technical staffs of 23 Native American tribes also contributed to the report. That report identified 78 salmon and 44 steelhead stocks as "depressed" (defined the same as "at moderate risk" of extinction in the AFS published report), and 11 salmon stocks and 1 steelhead stock as "critical" (defined the same as "at high risk" of extinction in the AFS published report). Of the 134 stocks in Washington identified by WDOF as depressed and critical, 71 occur in the Columbia River Basin.

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[24]Report by T.E. Nickelson, J.W. Nichols, A.M. McGie, R.B. Lindsay, D.L. Bottom, R.J. Kaiser, and S.E. Jacobs, cited in footnote 5.

[25]Report by Washington Department of Fisheries, Washington Department of Wildlife, and Western Washington Indian tribes, cited in footnote 6.

The FEMAT report[26] reviewed and compared the above referenced reports. In general, each succeeding report added or subdivided stocks from the original list in the AFS published report. Including data from the AFS report, the Humboldt Chapter report, the ODFW report, and the WDOF report, FEMAT found a total of 314 anadromous fish stocks at-risk just within the range of the northern spotted owl, more than doubling that number originally reported for the same area in the AFS report (an increase of 178 over the original 136).

Assessments by researchers indicate that stream systems throughout California, Oregon, Washington, and Idaho have been degraded considerably by human-induced cumulative effects. Such activities as livestock use, road construction, timber harvest, recreational use, channelization, and other watershed management projects and activities are the most common causal factors. The effects of livestock grazing and timber harvest related activities on anadromous fish and their habitat have been specifically demonstrated in the geographic range of the interim direction. For example, in the Upper Grande Ronde River basin in northeastern Oregon, over 80 percent of the drainage is considered to be in a deteriorated state because of high water temperatures, high sediment levels, and low levels of woody debris caused primarily by livestock grazing, timber harvest, road-building, and other land management activities (Wallowa-Whitman National Forest 1992). Chapman and Witty (1993) cite work of Rich et al. (1992) which demonstrated that, in the Middle Fork of the Salmon River, streams not grazed by livestock possessed ten times the number of juvenile chinook salmon compared to Bear and Elk Creeks, which receive heavy grazing pressure. The Idaho Department of Fish and Game (1992) found that Chamberlain Creek, a tributary of the Salmon River which has been protected from major human impacts by wilderness designation, has higher parr densities than other streams which have been exposed to multiple development-related impacts.

Between 1987 and 1992, researchers from the Pacific Northwest Research Forest and Range Experiment Station (PNW) resurveyed 116 stream systems in Oregon, Washington, and Idaho, and compared the number of large, deep pools per stream mile--a primary indicator of high-quality, in-channel habitat condition, to the number documented during surveys conducted between 1935 and 1945. The PNW report[27] documents substantial decreases in the quality and quantity of large, deep pools throughout managed areas of the region. The number of large, deep pools decreased 58 percent in the Cowlitz River Basin, 41 percent in the Lewis River, 84 percent in the Elochoman River Basin, and 85 percent in the Yakama River Basin, all in Washington State; 78 percent in the Lewis and Clark River and 85 percent in the Clatskanie River, both in Oregon; and 52 percent in the Salmon River Basin of Idaho.

Pool-riffle ratios are a gauge of aquatic habitat diversity, and are an indicator of the degree to which streams are capable of producing and supporting a varied and complex community of fish species. According to Oregon Game Commission surveys in the 1960s and Forest Service surveys in the 1970s (unpublished data), pool-riffle ratios have decreased from historic levels of about 50:50 to 20:80 or 10:90, indicating a dramatic loss of diversity and diminution of fish habitat capability. BLM scientists found that of the 211 miles of anadromous fish habitat in that Agency's Salem District of western Oregon, 42 percent was in

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[26]Report by Forest Ecosystem Management Assessment Team, cited in footnote 19.

[27]Report by B.A. McIntosh et al., cited in footnote 7.

poor condition, 35 percent in fair condition, and 23 percent in good condition.[28] On Forest Service-administered lands, 80 percent of fish habitat in the upper Grande Ronde Basin fails to meet current forest plan standards and guidelines for water temperature, sediment levels, and riparian condition. Seventy percent of stream habitats of the Middle Fork Clearwater and Lochsa Rivers on Idaho's Clearwater National Forest fail to meet current forest plan standards and guidelines. These results provide confirmation that Agency-administered lands also have experienced deterioration of anadromous fish habitat condition.

Several papers recently have reviewed and reconfirmed the dependency of healthy anadromous fish stocks on high-quality freshwater habitats. Studies by R.J. Naiman and others defined ecologically healthy watersheds by the delivery and routing of water, sediment, and woody debris.[29] Healthy riparian areas provide the primary control for this delivery and routing. Riparian areas are critical to the maintenance of water temperature, habitat complexity, pools, sediment levels, and instream structure, which are necessary for the natural reproduction of anadromous fish stocks.[30]

The Agencies independently have examined the results of these and other studies (Appendix A) and believe that the conclusions regarding declining status of anadromous fish stocks, degradation of aquatic and riparian habitat condition, and the causal link between the two are consistent with the Agencies' own studies. Forest plans and LUPs were intended by Congress to be readily adaptable to new information to make adjustments that assure sound resource management. A reasoned response to new information is crucial to the Agencies' success in meeting the "continuing compliance" obligations of NEPA, National Forest Management Act of 1976 (NFMA), FLPMA, ESA, and other environmental laws. By using the latest scientific information, the Agencies will better be able to contribute to the long-term conservation of anadromous fish species and the continuing production of goods and services from public lands.

Decision Framework

Analyses and findings described in this environmental assessment will help the Agencies decide:

(1) whether to continue with management direction described in current forest plans and LUPs, or to increase protection through interim management direction until longer-term management options proposed in the geographically-specific environmental analyses are evaluated and an alternative is approved and implemented;

(2) what direction would be necessary to arrest the degradation, begin the restoration of, and protect aquatic and riparian ecosystems during the interim period;

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[28]R.A. House. 1992. *Management of Anadromous Salmon and Trout Habitat and Their Status in the Salem District*. Report of Bureau of Land Management, Salem, OR.

[29]Report by Naiman, R.J., T.J. Beechie, L.E. Benda, et al., cited in footnote 8.

[30]S.V. Gregory, F.J. Swanson, W.A. McKee, and K.W. Cummins. 1991. *An Ecosystem Perspective of Riparian Zones*. BioScience. 41:540-551. R.J. Naiman, and H. Decamps. (eds.). 1990. *The Ecology and Management of Aquatic-terrestrial Ecotones*. UNESCO, Paris. Report by R.J. Naiman, T.J. Beechie, L.E. Benda, et al., cited in footnote 8.

(3) which watersheds would be subject to interim direction; and

(4) whether interim direction would apply to:

a. only proposed or new projects and activities;

b. all proposed or new projects and activities and all ongoing projects and activities; or

c. all proposed or new projects and activities and some ongoing projects and activities.

The geographically-specific environmental analyses will evaluate longer-term management direction for anadromous fish habitat within all or portions of the 15 national forests and 7 BLM districts described under *Proposed Action*, and may include alternatives that are not considered for interim application in this environmental assessment. The geographically-specific environmental analyses will complement aquatic and riparian provisions of the Northern Spotted Owl FSEIS and provide consistently sound habitat management practices on lands administered by the Agencies throughout the range of anadromous fish in California, Oregon, Washington, and Idaho. The Agencies are examining the need for NEPA analyses of possible longer-term modifications in anadromous fish habitat management direction for the 2 national forests and 5 BLM districts in Alaska.

PROPOSED ACTION

Geographic Range and Duration

The proposed action in this environmental assessment is to establish interim management direction that would arrest the degradation and begin the restoration of anadromous fish habitat within all or portions of 15 national forests[31] in 4 Forest Service Regions in 4 States, and 7 BLM districts in 4 States while the Agencies examine longer-term options that will be developed in geographically-specific environmental analyses. The geographically-specific environmental analyses are scheduled to be completed in 18 months. The proposed action together with the NSO ROD would provide an aquatic and riparian management strategy for all anadromous fish-producing watersheds on FS- and BLM-administered lands in the western contiguous United States. The proposed action would be a short-term effort to preserve or initiate improvement in the environmental status quo while the Agencies develop and evaluate a longer-term policy. The temporary nature of the proposed action would limit effects of the interim direction.

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[31]These are all or part of those national forests listed in Appendix A of the *Informational Report--Background Report for the Development of the Forest Service Management Strategy for Pacific Salmon and Steelhead Habitat* (December 1992), which are not included in the Northern Spotted Owl FSEIS. This management direction would apply to any anadromous fish-producing watersheds located in Idaho, Washington, Oregon, and California, outside the areas implementing the Northern Spotted Owl ROD.

Areas considered in the proposed action are those anadromous watersheds in the western contiguous United States excluding areas implementing the Northern Spotted Owl ROD (Figure 1). The national forests considered in this assessment include:

STATE	REGION	NATIONAL FOREST
California	5	Lassen and Los Padres
Idaho	1 4	Bitterroot, Clearwater, Nez Perce, Boise, Challis, Payette, Salmon, and Sawtooth[32]
Oregon	6	Malheur, Ochoco, Umatilla, and Wallowa-Whitman
Washington	6	Okanogan

By State, the BLM districts include:

STATE	BLM DISTRICT
California	Bakersfield and Ukiah[33]
Idaho	Coeur d'Alene and Salmon
Oregon	Prineville and Vale
Washington	Spokane

Appendix B displays the estimated acreage in anadromous watersheds for each of the 7 BLM districts and 15 national forests. Approximately 16 million acres of anadromous watersheds are considered in this environmental assessment; however, the standards and guidelines proposed under the various alternatives examined would apply only to protect the defined Riparian Habitat Conservation Areas (RHCAs) within anadromous fish watersheds. Projects and activities that are not within defined RHCAs would continue to operate under direction in current forest plans and LUPs--except in those cases where NEPA analyses (or screening of ongoing actions) indicate that those projects and activities would degrade RHCA conditions. As a consequence, there would be few effects upon existing resource users outside the defined RHCAs.

[32]The Sawtooth National Recreational Area and the Columbia River Gorge National Scenic Area also are included.

[33]This includes "Eastside" portions of the Okanogan National Forest and the BLM's Ukiah District that are not implementing the Northern Spotted Owl ROD.

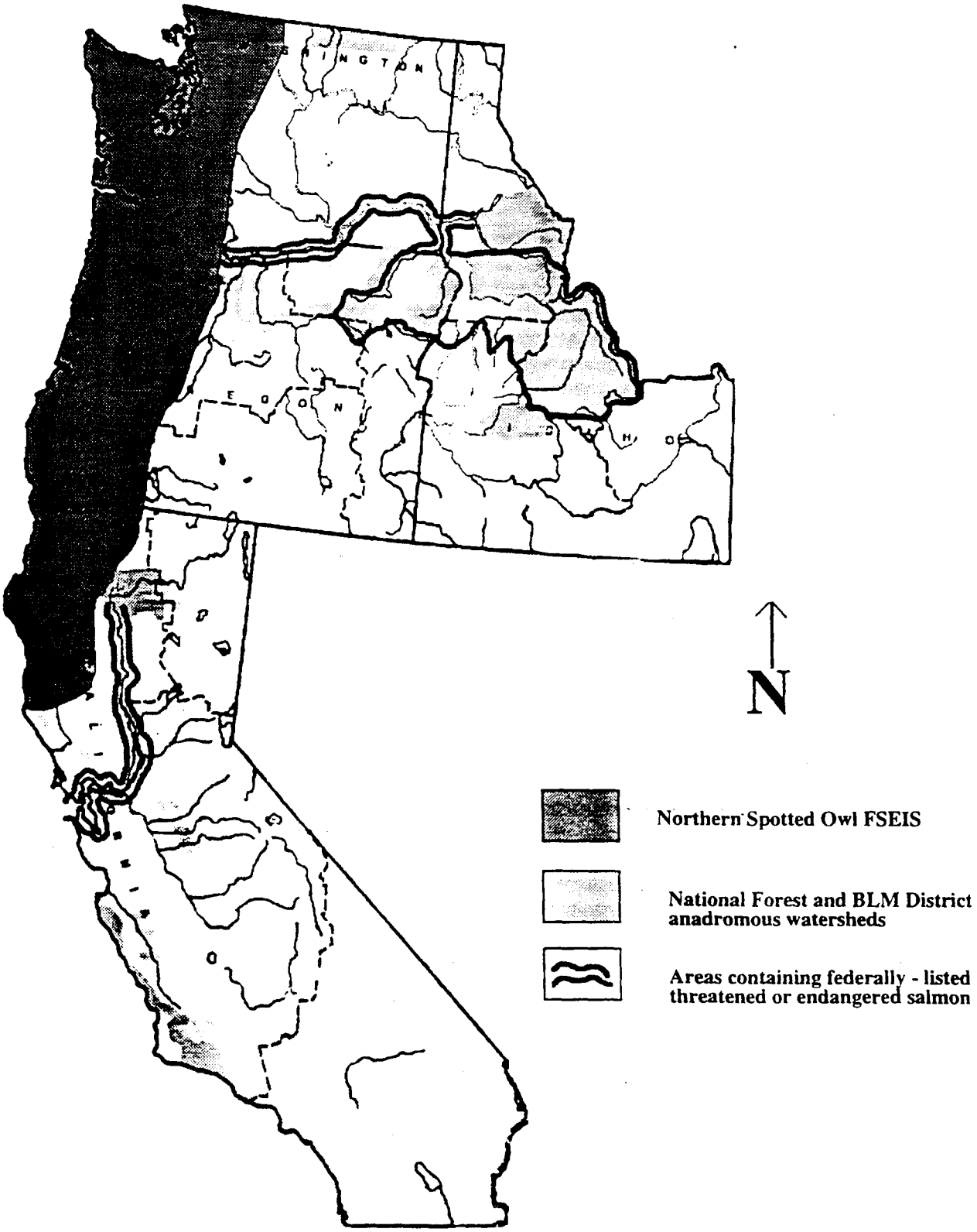
As part of the analysis for the Northern Spotted Owl FSEIS, "riparian reserves" were modeled using substantially the same criteria as is specified for RHCAs in the proposed action. In Key Watersheds, the reserves generally encompassed 40-50 percent of the westside watersheds, in non-key westside watersheds the reserves generally encompassed 25-45 percent.[34] Within the proposed action area, this estimate would constitute 4-7 million acres in RHCAs. Because drainage networks generally are less dense within the proposed action area than within the range of the northern spotted owl, the actual area delineated as RHCAs will likely be less than this estimate.

Management Direction

The Agencies propose to adopt mitigation and management measures specified under Alternative 4 (PREFERRED). This alternative, which is described in detail in Appendix C, would provide interim management direction that would supplement LUPs and would amend current regional guides and forest plans to add new riparian goals, interim Riparian Management Objectives (RMOs), and standards and guidelines for application to all new and proposed and some ongoing projects and activities to protect the condition and function of RHCAs. The standards and guidelines serve to provide adequate environmental safeguards for proposed or new and ongoing projects and activities that pose an unacceptable risk within RHCAs or that degrade RHCAs. For the FS, these interim standards and guidelines replace conflicting direction described in the existing forest plans, except where that direction provides more protection for anadromous fish habitat. No additional mitigation measures are identified here. It also would provide for identification of a network of Key Watersheds and development and trial application of a protocol for Watershed Analysis.

[34]J.R. Sedell. 1994. *Personal Communication*. Pacific NW Research Station, Corvallis, OR.

Figure 1. General Location of Proposed Action Area.



Riparian Goals would establish a common set of characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats. Because the quality of water and fish habitat in aquatic systems is inseparably related to the integrity of upland and riparian areas within the watersheds, the proposed action articulates several goals for watershed, riparian, and stream channel conditions, including the maintenance or restoration of: water quality, stream channel integrity, channel processes, sediment regime, instream flows, natural timing and variability of the water table elevation in meadows and wetlands, and the diversity and productivity of native and desired non-native plant, vertebrate, and invertebrate communities. These goals focus on ecological processes and functions under which the riparian and aquatic ecosystems developed and the unique genetic anadromous fish stocks evolved.

RMOs would establish measurable habitat parameters that together define good anadromous fish habitat and serve as indicators against which attainment, or progress toward attainment, of the goals can be measured. The proposed action would establish 6 landscape-scale interim RMOs (including 1 key and 5 supplemental features) that are indicative of ecosystem health and are easily quantified and subject to accurate, repeatable measurements. For all areas (including forested and non-forested ecosystems) the key feature is the number of deep pools per mile of stream and supplemental features include water temperature and width-to-depth ratio. In forested ecosystems the amount of woody debris in the stream also is a supplemental feature. In non-forested ecosystems, stream bank stability and lower bank angle also are supplemental features.

Proposed standards and guidelines have been developed for management of timber, roads, grazing and recreation resources, minerals, fire and fuels, and general riparian areas, as well as for land uses such as those governed by leases, permits, rights-of-way, and easements. Standards and guidelines also have been developed for the restoration of watershed, fisheries, and wildlife habitat. The proposed standards and guidelines would provide management direction believed necessary to halt degradation and begin restoration to meet Riparian Goals and RMOs for stream channel, riparian area, and watershed. Standards and guidelines specified under the proposed action, for activities and projects within RHCAs or that degrade RHCAs, in combination with standards and guidelines that have been established in current forest plans and LUPs, have been designed to provide a benchmark for mitigation of management activities, to recognize the need for increased sensitivity to ecological balances, and to foster a continuing commitment to ecosystem management. The complete text of the standards and guidelines specified under the proposed action is included in Appendix C, pages C-9 through C-18.

The proposed action would establish interim RHCAs to identify areas in watersheds that are most sensitive to management. The standards and guidelines of the proposed action would be applied within all RHCAs and to projects and activities outside RHCAs that would degrade RHCA condition. Interim RHCAs would be based on geomorphic features such as the edges of the active stream channels, the top of the inner gorge, the extent of the 100-year flood plain, the outer edges of riparian vegetation, the height of site-potential trees, and the extent of unstable soils. Generally, interim RHCAs would include the following areas: 300 feet on either side of fish-bearing streams, 150 feet on either side of permanent non-fish-bearing streams, and around ponds, reservoirs, and wetlands greater than one acre, and 100 feet in Key Watersheds (50 feet in non-key watersheds) on either side of seasonally flowing or intermittent streams, and around wetlands less than one acre, and landslides and landslide-prone areas. In non-forested rangeland ecosystems, the interim RHCA width for permanently flowing fish-bearing and non-fish-bearing streams would be the extent of the 100-year flood plain.

The proposed action would provide for Key Watersheds within the proposed action area. Actual designation of Key Watersheds will be addressed in the geographically-specific environmental analyses to be prepared for eastern Oregon/Washington, Idaho, and portions of California outside of areas implementing the Northern Spotted Owl ROD. Designation would be based on information developed through ecological assessments (e.g., Interior Columbia River Basin Assessment). Key Watersheds would likely be selected from among those that are important to at-risk anadromous fish stocks, or those that are providing, or are readily capable of being restored to provide "good" anadromous fish habitat, and that would contribute to a network of watersheds across the landscape that provide for the long-term conservation of anadromous fish. During the period of interim direction, all watersheds with listed anadromous fish or with designated critical habitat for anadromous fish will be treated as if they are Key Watersheds. Identified Key Watersheds would receive priority for Watershed Analysis, as well as maintenance and restoration projects and activities . RHCAs within Key Watersheds would include a larger area than in non-key watersheds. Specifically, more area around seasonally flowing or intermittent streams, wetlands, and landslide or landslide-prone areas would be included within RHCAs in Key Watersheds. The proposed action would provide for watershed-specific tailoring of the interim RMOs and RHCAs through watershed and site-specific analyses or as a result of ESA consultation.

A Watershed Analysis protocol would be established under the proposed action to characterize watershed/fish habitat conditions and contributing factors, and identify areas that are in need of immediate, corrective management. As per conservation recommendations provided by NMFS in consultation on the proposed action, the guidelines and procedural manuals developed by the Interagency Watershed Analysis Coordination Team and other potentially relevant procedures (e.g., the Cumulative Watershed Effects Process for Idaho, etc.) will be considered and used, where appropriate, in development of the protocol. This more complete assessment would identify watershed restoration objectives, strategies, and priorities, and would provide the scientific basis for watershed-specific adjustments to the interim RMOs and interim RHCAs. To provide accountability, the proposed action would establish a certification process to that the analysis has been conducted and completed according to expected scientific standards.

The proposed action includes both management measures (e.g., Watershed Analysis) and mitigation measures (e.g., standards and guidelines). Adoption of interim direction would establish a management regime and system of mitigation measures that would maintain or protect environmental conditions until the more geographically-specific environmental analyses are completed. Under the proposed action, subsequent decisions that would affect the environment (i.e., proposed projects and activities within RHCAs or that degrade RHCAs) would be subject to the interim standards and guidelines. Evaluation of all proposed projects and activities would continue through site-specific analyses that are required by NEPA to assure consistency with interim RMOs. Further, the standards and guidelines also would apply to high-priority, ongoing projects and activities within RHCAs or that degrade RHCAs.

Proposed or new projects and activities include those initiated during the interim period, as well as those that have been approved but not yet implemented, or for which contracts have not been awarded, or for which permits have not been issued. Within the range of listed anadromous fish, continuing actions for which biological assessments (BAs) have not been prepared and submitted for consultation, prior to signature of the decision notice for the proposed action, will also be treated as new projects or activities.

"Ongoing projects and activities that pose an unacceptable risk" are those determined on the basis of a case-by-case evaluation to pose unacceptable risk to anadromous fish. Unacceptable risk is defined as a level of risk from an ongoing activity or group of ongoing activities that is determined through review of biological assessments/evaluations to be: "likely to adversely affect" listed anadromous fish or their designated critical habitat; or "likely to adversely impact" non-listed anadromous fish. Biological assessments/evaluations or environmental analyses for all ongoing projects and activities will be reviewed with a checklist to screen for unacceptable risk. When applying these screens, managers will consider such factors as the condition of the watershed, the status of anadromous fish stocks in the watershed, and the magnitude, frequency, duration, and timing of the impacts caused by the ongoing project or activity.

The unacceptable risk determination triggers application of the interim standards and guidelines to ongoing projects. There will be appropriate level of involvement in this process for contract holders and those whose ongoing projects are affected. A common understanding of the term is critical to consistent application of interim direction. Where ongoing projects and activities may affect listed anadromous fish, this common understanding also facilitates effects determinations made in BAs prepared by Forest Service and BLM biologists that can be concurred with by NMFS. Definitions of "adverse effect" (for listed anadromous fish) and "adverse impact" (for non-listed anadromous fish) provided in the glossary are a key component of evaluating unacceptable risk. The following guidelines build upon the definition of "adverse effect" used by the Forest Service and NMFS to conduct Section 7 consultation.[35] These more explicit guidelines are provided to facilitate expedient review of ongoing actions that may affect listed anadromous fish or their designated critical habitat and promote consistent determination of unacceptable risk.

Checklists for Unacceptable Risk

Checklists to screen ongoing projects and activities for unacceptable risk will be developed for both within and outside of the area of listed anadromous fish.

Within the Area of Listed Anadromous Fish: If either of the following results is probable or foreseeable as a result of an ongoing action or group of actions, that action or group of actions will be considered to pose an unacceptable risk and the interim standards and guidelines would be applied to avoid adverse effects.

1. One or more of the essential features of critical habitat for listed anadromous fish is affected such that the value of that habitat to contribute to the survival and recovery of listed anadromous fish is diminished.

2. The action or group of actions results in increased mortality, reduced growth, or other adverse physiological changes, harassment of fish, physical disturbance of redds, reduced reproductive success, delayed or premature migration, or other adverse behavioral changes.

Ongoing actions outside of Riparian Habitat Conservation Areas that may affect listed anadromous fish or their designated critical habitat may also pose an unacceptable risk based on whether these results are probable or foreseeable.

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[35]USDA Forest Service. June 22, 1992. *Anadromous Fish (Snake River Basin) Guide for Section 7 Consultation.* Portland, OR.

Outside the Area of Listed Anadromous Fish: If either of the following results is probable or foreseeable as a result of an ongoing action or group of actions, that action or group of actions will be considered to pose an unacceptable risk and the interim standards and guidelines would be applied to avoid adverse impacts.

1. Environmental changes that may cause a species to become threatened or endangered.

2. Environmental changes that decrease the estimated numbers and distribution of reproductive individuals such that the continued existence of the population throughout its existing range is at risk.

Draft copies of the checklists for screening ongoing actions within and outside areas with listed anadromous fish are provided in Appendix K.

Application of the screen to identify ongoing projects and activities within watersheds with listed fish that pose unacceptable risk will be completed within 30 days of publication of the decision notice for the proposed action. Application of the screen to identify ongoing projects and activities in other watersheds that pose unacceptable risk will be completed within 60 days of publication of the decision notice.

Those ongoing projects and activities that may pose an unacceptable risk might require additional NEPA analysis to incorporate the interim direction encompassed by the proposed action. Within the range of listed salmon, ongoing projects and activities that may pose an unacceptable risk shall be suspended until completion of ESA consultation. Affected contract or permit holders will be notified of their applicant status and right to participate in the consultation. Depending on the importance and scope of such projects, it is possible that some may need to be examined as part of the geographically-specific environmental analyses. Ongoing projects considered not to pose unacceptable risk will be allowed to continue during the interim period under the direction that was in effect at the time of project approval, even if such projects are not fully in compliance with standards, guidelines, and other provisions of the proposed action.

The Agencies' Approaches

The FS and the BLM propose to apply interim direction by means of different administrative procedures.

BLM Approach:

> Under the provisions of the Federal Land Policy and Management Act, BLM will incorporate management direction (i.e., goals, objectives, RHCAs, standards, guidelines, and procedures) that are consistent with current LUPs into certain ongoing and all proposed or new projects. When proposed management direction is not consistent with existing LUPs, BLM will attempt to apply proposed standards, guidelines, and procedures for applicable ongoing projects through negotiation. If agreement with the affected permittee or applicant cannot be reached, direction as described in the existing LUP will be applied.
>
> Management direction, consistent with the existing LUPs, would be incorporated during the site-specific analysis and documentation process for all future projects, including those that have not yet been authorized (e.g., contracted, permitted, etc.). Additionally, in accordance

with NEPA regulations (CFR 1506.1), upon issuance of a Notice of Intent, and until issuance of a ROD, BLM will take no actions that limit the choice of reasonable alternatives being analyzed or that have an adverse environmental impact.

FS Approach:

For the FS, under provisions of the NFMA, the proposed interim direction would amend regional guides and forest plans for each of the 15 national forests listed to incorporate new goals, objectives, standards, guidelines, and management direction (see Appendix L for overview of Forest Service land management planning). These new standards, guidelines, and direction will supersede or replace conflicting direction described in forest plans that provide less protection. Thereafter, future and, depending on the alternative selected, some or all ongoing projects and activities would be evaluated to determine if modifications are warranted. The FS believes the preferred alternative would not be a significant amendment as defined by NFMA for the following reasons: (1) It would be applied for a limited time. (2) It would result in only minor modifications to standards and guidelines in existing forest plans. (3) It would not substantially modify the goals and objectives developed in the existing forest plans. (4) It would not alter long-term levels of goods and services projected by current forest plans.

On its own, none of the alternatives examined in this environmental assessment would change the physical environment. Any subsequent proposed actions that would change the environment will be subject to mitigation measures prescribed under the interim direction adopted. Any action proposed within lands administered by the Agencies during the interim period would be subject to appropriate, site-specific analyses required by NEPA and, where appropriate, provisions of the ESA, as well as relevant planning regulations. Thus, the site-specific effects of application of the standards and guidelines specified under any alternative would be disclosed at the project level of decision making, depending on the previous level of environmental analysis. Such projects or activities would be carried out only after the Agencies have undertaken the appropriate level of NEPA analysis. For more information on this process (including provisions for public notice, review and comment, and administrative appeal) refer to 40 CFR 1500-1508 as well as the FS NEPA Handbook FSH 1909.15 and FS Manual FSM 1950 and the BLM NEPA Handbook, Manual 1792. Further, those ongoing projects and activities that pose an unacceptable risk to aquatic and riparian habitat and at-risk anadromous fish stocks would require additional NEPA analysis prior to incorporating modifications in project direction. In addition, consultation with the NMFS and the FWS pursuant to the ESA will be completed by the Agencies prior to project level decisions.

The geographically-specific environmental analyses for long-term management, which are scheduled to be completed in 18 months, could result in decisions that would supersede the interim direction and require further modifications to projects and activities. The decision regarding which alternative is appropriate for the interim period would not preclude consideration in the geographically-specific environmental analyses of any alternatives that may be developed for long-term management.

ISSUES

From questions raised in briefings with Members of Congress and in conversation and correspondence with employees of the Agencies, as well as with representatives from other Federal and State agencies, Tribal governments, service and commodity interests, and conservation organizations, the Interdisciplinary Team (ID Team) identified five issues as relevant to the proposed action. These issues, which have been addressed in formulating and evaluating action alternatives, are:

1. **Maintaining stocks of anadromous fish:** A number of anadromous fish stocks have been listed by the NMFS as threatened or endangered, in part as a result of habitat modifications caused by past and ongoing resource management practices on Federal, State, and private land. Dam construction and operation, water diversions, fish hatchery operations, fish harvest, and random natural events (e.g., drought, unfavorable ocean conditions) also have contributed to the listings. Additional anadromous fish stocks have been identified as at risk of extinction, and in the near future may be petitioned for listing pursuant to the ESA. The Agencies have an obligation to provide habitat conditions necessary to conserve the viability of listed anadromous fish stocks and protect or restore designated critical habitat. They also have Section 7(a) obligations to conserve anadromous fish stocks not now listed under the ESA and to manage habitat in ways that would halt or reverse trends toward future listing.

2. **Providing management direction to facilitate consultation required by the Endangered Species Act:** Where there are listed stocks of anadromous fish, management activities conducted under current forest plans and LUPs must undergo consultation pursuant to the ESA--incorporating, where appropriate, protective measures identified by NMFS as necessary to avoid jeopardy to listed species or adverse modification of designated critical habitat or minimize adverse effects. Protective measures identified during ESA consultation may result in changes in project design and/or project-specific amendments of regional guides and forest plans and LUPs. Rather than designing projects only according to standards described in current forest plans and LUPs, and risk having to redesign projects following consultation, land managers and project proponents may find it more efficient and cost-effective to incorporate into initial project planning those measures that are necessary to avoid jeopardy to listed species or adverse modification of critical habitat.

3. **Considering the ability of national forests and BLM districts to provide traditional amounts and kinds of goods and services:** The adoption of any proposed interim strategy, including the alternative to continue management under current forest plan and LUP direction, may affect the flow of goods and services that are provided from Federal lands and may directly or indirectly affect management activities conducted on other Federal, State, and private lands. Any interim management strategy must consider the demand for and the supply of goods and services, and the often conflicting issues that can affect supply. It is important to note, however, that the production of goods and services from the national forests is contingent upon compliance with the mandates of federal environmental laws such as the ESA, Clean Water Act, and 36 CFR 219.19. If commodity production cannot be conducted within the parameters of these laws, then development will not go forward. Decisions resulting in an irretrievable or irreversible commitment of resources are made during project-level planning. Thus, there is no guaranteed or assured level of commodity production in national forest planning. It is important to note, however, that the production of goods and services from FS- and BLM-administered lands is contingent upon compliance with the mandates of Federal environmental laws, such as the ESA, Clean Water Act, NFMA, and FLPMA. If commodoity production cannot be conducted within the parameters of these laws, then development will

not go forward. Decisions resulting in an irretrievable or irreversible commitment of resources are made during project level planning. Thus, there is no guaranteed or assured level of commodity production in forest plans or LUPs.

4. **Integrating proposed interim direction for management of anadromous fish habitat with other planning efforts:** The development of an appropriate interim strategy for managing anadromous fish habitat must take into account other strategies and approaches that have been proposed or implemented within or adjacent to the areas considered in this environmental assessment. The Northern Spotted Owl FSEIS, pending legislative or administrative action on Rangeland Reform, mining reform, etc., has described the need for flexible, coordinated resource management strategies that would help maintain and restore the health of riparian and aquatic ecosystems that are necessary for the survival of listed and other anadromous fish stocks. Any interim strategy for the proposed action area must be coordinated with other habitat management efforts and be based on cooperative management of aquatic and riparian ecosystems throughout the range of anadromous fish. In addition, any interim strategy must take into account and be coordinated with efforts undertaken to address other non-habitat factors influencing the status of anadromous fish (e.g., dam construction and operation, water diversions, fish hatchery operations, and fish harvest practices).

5. **Integrating new scientific knowledge into the management of anadromous fish:** As explained above, new scientific knowledge on the status of anadromous fish stocks and the condition of anadromous fish habitat has become available. Research on these and other matters is ongoing. Any interim strategy must allow for the application of new scientific knowledge and provide a mechanism for adapting management direction to watershed-specific conditions. Further, any interim strategy must include "implementation and effectiveness monitoring" and must include mechanisms for adapting management practices in response to the information gained.

COMPONENTS OF THE ALTERNATIVES

The development of alternatives included in this environmental assessment focused around three component parts that define the range of alternatives for interim direction. These three components are:

(1) the geographic range of the proposed action;

(2) the range of interim management direction, including the standards, guidelines, and procedures; and

(3) the range of projects and activities to which interim standards, guidelines, and procedures would apply.

Formulating alternatives around these three components was not a hierarchical process, i.e., deciding on the range of projects and activities, then prescribing direction and geography, or vice versa. Rather, the alternatives for interim direction were formulated through an iterative process, which considered various combinations of the three aspects (geography, management direction, and projects and activities covered) that fit logically together.

Geographic Range

The ID Team determined that most of the new information regarding declines in anadromous fish stocks and the degradation of aquatic and riparian habitat is more relevant to changes of habitat within the western contiguous United States than in the State of Alaska. Management direction has already been evaluated for that part of the anadromous fish range in the western contiguous United States that is also within the range of the northern spotted owl. As a result, interim direction is proposed for lands administered by the Agencies within anadromous watersheds in California, Oregon, Washington, and Idaho, excluding areas implementing the Northern Spotted Owl ROD.

Range of Management Direction

The range of standards, guidelines, and procedures considered for interim direction is based on 10 preliminary proposals, or management direction options, developed by Agency researchers and managers from Oregon, Washington, California, Idaho, and Alaska. The management direction options contain one or more of the seven components defined below:

Riparian Goals: Riparian goals establish a common set of the characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats (e.g., maintaining or restoring water quality, stream channel integrity, channel processes, sediment regime, instream flows, natural timing and variability of the water table elevation in meadows and wetlands, and the diversity and productivity of plant communities).

Riparian Management Objectives: RMOs establish a number of instream- and streamside-habitat conditions that together define good anadromous fish habitat at the landscape scale, and serve as indicators against which attainment, or progress toward attainment, of the goals can be measured. These objectives consist of such parameters as the number of deep pools per mile of stream, water temperature, amount of woody debris in the stream, stream bank stability, width-to-depth ratio, and bank angle. Several alternatives provide for landscape-scale interim objectives that can be refined and tailored to specific watershed conditions through the Watershed Analysis process or be modified as a result of ESA consultation.

Standards and Guidelines: Standards and guidelines constrain how riparian and other important areas (such as landslide and landslide-prone areas) are managed. They provide management direction believed necessary to meet Riparian Goals and RMOs for stream channel, riparian, and watershed conditions.

Riparian Management Areas: Riparian management areas describe portions of the watershed that require special management attention, and to which the standards and guidelines generally apply. These areas most directly affect the hydrologic, geomorphic, and ecologic processes of the riparian ecosystem and, depending on the alternative, can include permanent and intermittent streams, wetlands, ponds, lakes, reservoirs, and landslide or landslide-prone areas. Several alternatives establish interim RHCAs with widths dependent on the type of stream or area and which, on average, vary from 50 feet to 300 feet on either side of the water body. Interim RHCAs can be refined and tailored to specific watershed conditions through the Watershed Analysis process or be modified as a result of ESA consultation.

Key Watersheds: Key Watersheds are selected from among those watersheds important to anadromous fish stocks, or those that are providing, or are readily capable of being restored to

provide "good" anadromous fish habitat. Key Watersheds are selected to contribute to a network of watersheds across the landscape that provide for the long-term conservation of anadromous fish. Key Watersheds receive priority for Watershed Analysis, as well as maintenance and restoration projects and activities. Key Watersheds may be afforded stricter management standards, guidelines, and procedures than non-key watersheds.

Watershed Analysis: Watershed Analysis identifies areas within a watershed that need immediate corrective management, and it provides a more complete assessment of cumulative effects. Watershed Analysis also provides the scientific basis for watershed-specific adjustments to the interim RMOs and interim RHCAs. The extent of Watershed Analysis will vary by alternative.

Watershed Restoration: Several alternatives provide guidance for landscape/watershed-scale restoration. Key Watersheds would receive priority for aquatic and riparian habitat restoration.

Range of Projects and Activities

For the application of interim management direction to projects and activities within RHCAs on Agency-administered lands, this environmental assessment considers three options:

1. Apply the standards, guidelines, and procedures to only proposed or new projects and activities (i.e., those projects and activities initiated during the interim period, as well as those that have been approved but not yet implemented, or for which contracts have not been awarded, or for which permits have not been issued, and within the range of listed anadromous fish, continuing actions for which BAs have not been prepared and submitted for consultation, prior to signature of the decision notice/decision record for the proposed action.)

2. Apply the standards, guidelines, and procedures to proposed or new projects and activities and to those ongoing projects and activities that, through case-by-case evaluation, are determined to pose an unacceptable risk to anadromous fish stocks.

3. Apply the standards, guidelines, and procedures to all proposed or new projects and activities, and all ongoing projects and activities.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Outside Agency Jurisdiction Option Eliminated

One option was considered that would address all the principal factors limiting anadromous stock survival that were discussed on page 1, but the option was eliminated from detailed study.

This option would have considered the broad geographical area within the range of Pacific anadromous fish and evaluated the principal human actions that influence anadromous fish populations, including dam construction and operation, water diversions, habitat modifications, fish hatchery operations, and fish harvest. This option would have evaluated management direction for all limiting factors, and would have involved the coordination of a number of Federal and State agencies that have jurisdiction over commercial, sport, and subsistence fish

harvest, hatcheries, dams, and habitat; including, for example, the NMFS, FWS, State fish and game departments, and Federal and State water quality regulatory agencies. This option was not analyzed in detail because efforts by responsible agencies to develop management strategies for dam construction and operation, water diversions, fish hatchery operations, and fish harvest practices, although underway, are at the formative stage. The time required to develop reasonable alternatives that address all factors affecting anadromous fish stocks and complete the coordinated and highly complex analyses would substantially delay application of measures necessary to effectively manage habitat on Agency-administered lands. Both Agencies remain alert for opportunities to coordinate their efforts to improve habitat conditions with efforts by other Federal and State agencies to evaluate the non-habitat related factors. Each will take into consideration the evaluations of the other Federal and State agencies.

Geographic Options Eliminated

Three geographic options were eliminated from detailed study:

Alternative A: The option of applying interim direction to lands administered by the Agencies only within specific, designated Key Watersheds of the western contiguous United States that contain at-risk stocks of anadromous fish was eliminated from detailed study because it fails to provide a level of protection necessary to provide habitat conditions that would support viable and sustainable anadromous fish populations, and fails to assure adequate water quality in non-key watersheds. By applying interim direction only to Key Watersheds there would be no assurance that options that will be considered in the geographically-specific environmental analyses would not be compromised by actions taken in non-key watersheds during the interim period.

Alternative B: The option of applying interim direction to Agency-administered lands in Alaska was eliminated for the following reasons:

1. Generally, anadromous fish stocks and habitat conditions in Alaska are not as degraded as those in the western contiguous United States. Agency biologists and others have determined that these stocks generally are not in need of interim protection to maintain future options are maintained.

2. The Fiscal Year 1994 Interior and Related Agencies Appropriations Act contains language that prohibits the application of PACFISH standards and guidelines to the Tongass National Forest during fiscal year (FY) 1994.[36]

3. During FY 1994, the Agencies conducted stream analyses and studies and reviewed procedures regarding land management to evaluate the effectiveness of current stream protection and determine the need for additional protection of lands and resources they administer in Alaska. Analysis of these findings will be completed in FY 1995.

Alternative C: The option of applying interim direction to watersheds beyond the range of anadromous fish, but where there is habitat important to at-risk resident fish species--such as the bull trout--was eliminated because it is beyond the scope of this environmental

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[36]P.L. 103-138. November 11, 1993. 107 Stat. 1379. Department of Interior and Related Agencies Appropriation Act of 1994.

assessment, and because independent initiatives to address resident fish habitat management already have begun.[37] This option will be further examined in the geographically-specific environmental analyses, being prepared for long-term management, which will consider local conditions and the status of various resident fish stocks.

Public involvement during the scoping process for the geographically-specific environmental analyses will examine options for management after the interim period and may produce alternatives that include some of the geographic options considered but eliminated from detailed study.

Management Direction Options Eliminated

A number of management direction options for standards, guidelines, and procedures were considered, ranging from current direction to alternatives specifying riparian goals, interim riparian management objectives, standards and guidelines, a new definition of riparian area, Key Watershed identification, and increasing levels of road and/or watershed analysis.

Six management direction alternatives were eliminated from detailed study:

Alternative A: This alternative generally assumed that forest plan and LUP goals, objectives, standards, guidelines, riparian areas, and procedures are sufficient for interim protection. However, it would have modified current direction by (1) applying draft Forest Service Pacific Southwest Region (R5) minerals management standards and guidelines within riparian areas; and (2) requiring the identification of Key Watersheds and specifying "no net gain" in road mileage within them. This alternative would have provided for neither road nor Watershed Analyses.

Alternative B: Similar to Alternative A, this alternative would have modified current direction with R5 minerals management standards and guidelines within riparian areas. It also would have applied riparian standards and guidelines that were developed for the Willamette National Forest[38] and required a reduction in road mileage within Key Watersheds. This alternative would not have provided for road or Watershed Analyses.

Alternative C: This alternative was derived from R5 draft standards and guidelines for riparian management. It would have imposed standards, guidelines, and procedures adopted from R5's riparian management direction for Zones 1 and 2.[39] It would have required identification of Key Watersheds. Roads standards would have specified construction that

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[37]For example, a Habitat Conservation Assessment (HCA) to determine bull trout habitat requirements and habitat condition has been completed, and HCAs for several inland cutthroat trout species are underway. In addition, the FWS, BLM, NPS, FS, NMFS have held preliminary interagency planning meetings to initiate development of an agreement regarding habitat management to conserve bull trout throughout its range. The Bureau of Indian Affairs and the Soil Conservation Service are expected to join the interagency effort.

[38]Gregory, S. Askenas, L. 1990. *Riparian management guide*. Willamette National Forest, Portland, OR, USDA-Forest Service, Pacific Northwest Region. 120 p.

[39]These standards and guidelines are included in the draft forest plans for the Klamath, Mendocino, Shasta-Trinity, and Six Rivers National Forests.

would accommodate 100-year flood events in non-key watersheds and 150-year flood events in Key Watersheds. It provided for road analysis, but not for Watershed Analysis.

Alternative D: This alternative would have modified current direction by applying the minerals area management guidance described in Appendix C for Alternatives 3 and 4. Further, it would have applied the remaining standards and guidelines and RHCAs described in Appendix C for Alternatives 3 and 4 in Key Watersheds and areas not meeting current standards and guidelines. In all other watersheds, Alternative D would have applied the riparian guidance described under Alternative C. This alternative would have provided for Watershed Analysis.

Alternative E: This alternative would have modified current direction by applying the goals, interim RMOs, standards and guidelines, interim RHCAs, Key Watershed identification, and Watershed Analysis protocol specified in Appendix C for Alternatives 3 and 4. This alternative differed from Alternatives 3 and 4 by specifying a 180- to 200-year timber rotation within all watersheds. This alternative would have provided for Watershed Analysis.

Alternative F: This alternative is identical to Alternative 9 in the Northern Spotted Owl Draft Supplemental Environmental Impact Statement (DSEIS). The goals, standards and guidelines, Riparian Reserves, Key Watershed identification, and Watershed Analysis protocol of this alternative are substantially the same as those described for Alternatives 3 and 4 in Appendix C. However, it differed from Alternatives 3 and 4 in two ways: (1) Alternative F would have limited the construction of new roads in roadless areas; a provision not included in Alternatives 3 and 4. Nonetheless, the presence or absence of this provision would not make a substantial difference, because current direction requires a project-level analysis of any entry into roadless areas that could be expected to extend beyond the interim period, and Alternatives 3 and 4 also require completion of Watershed Analysis prior to road or landing construction in an RHCA. (2) Alternative F would not have included interim RMOs (the objectives specified for this alternative were comparable to the goals contained in Alternatives 3 and 4), but instead would depend on Watershed Analyses to establish RMOs; i.e., interim RMOs would not have been established to guide decisions prior to completion of Watershed Analyses.

Alternatives A, B, and C were not analyzed in detail for interim direction because they would not have provided comprehensive direction addressing the full suite of management actions that can occur on lands administered by the Agencies. Further, these three alternatives would not have included a Watershed Analysis protocol providing for a comprehensive and consistent evaluation of watershed condition, which would facilitate tailoring landscape-scale information and expectations to the capabilities of specific watersheds. By adopting any of these alternatives for a short, interim period, there would have been no assurance that options to be considered in the geographically-specific environmental analyses would not be compromised by management activities not covered by the direction described by them. In addition, the standards, guidelines, and procedures of Alternatives A, B, and C were not believed to be sufficient to facilitate successful ESA consultation with the NMFS on projects and activities in those areas where anadromous fish are listed as threatened or endangered.

Alternatives D, E, and F were not analyzed in detail for interim direction because they include management direction similar to that contained in Alternatives 3, 4, and 5, which are carried forward for detailed evaluation in this environmental assessment. Also, as discussed above, the differences among Alternatives D, E, and F, when compared to Alternatives 3, 4, and 5, were not considered substantial over the interim period.

ALTERNATIVES CONSIDERED IN DETAIL

This environmental assessment examines five alternatives in detail. The alternatives considered in detail represent combinations of four options for management direction and three options for the range of projects and activities. All are applied only to those anadromous watersheds outside the range of the northern spotted owl and within the western contiguous United States.

This area includes anadromous watersheds on the 15 national forests and 7 BLM districts listed under the *PROPOSED ACTION*. The five alternatives are compared in Table 1. Standards, guidelines, and procedures specified for the five alternatives are described in detail in Appendix C, and the special riparian management areas are depicted in Figures 2-4. The alternatives were designed to provide progressively more protection of habitat and resources within the affected area. For example, riparian goals and objectives, special standards and guidelines, riparian areas, special procedures, and other management actions afford more habitat protection under Alternative 2 than under the no-action alternative, and protection is increased further under Alternative 3. Alternative 5 affords the most protection, although certain tradeoffs in resource outputs may make it more impractical than another alternative.

A summary discussion of the scientific basis and ecological principles supporting elements of the five alternatives is included in the process records.[40] The alternatives, particularly Alternatives 3-5, include provisions to facilitate incorporation of new information and Agency responsiveness to changed circumstances. The five alternatives assume that geographically-specific environmental analyses to evaluate the need for longer-term modifications to management direction will be completed, and that decisions resulting from the longer-term analyses could result in changes to forest plans, LUPs, or regional guides.

Alternative 1. Under this alternative, the Agencies would manage national forest and public land resources under direction specified in current forest plans and LUPs, without any adjustment during the interim period. NEPA compliance would be required for all projects and activities. Under provisions of the ESA, consultation with either the NMFS (for anadromous fish species and marine mammals) or the FWS (for terrestrial and freshwater species) would be necessary where projects and activities may affect listed species or designated critical habitat. Responsible officials also would be required to identify any reasonable and prudent alternatives that may be needed to avoid jeopardy to a listed species or the destruction or adverse modification of critical habitat.

Alternative 2. This alternative would provide management direction that would modify current direction (as specified in Alternative 1). It would include standards and guidelines for road systems construction and reconstruction, logging slash treatment and prescribed fire, livestock grazing, and riparian and fish-habitat restoration. It would provide riparian protection zones of approximately 300 feet on either side of fish-bearing streams, 150 feet on either side of permanent water courses, and 50 feet on either side of intermittent streams in areas with moderately to highly unstable soils. It also would require the identification of Key

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[40]USDA Forest Service - USDI Bureau of Land Management. 1994. Summary of scientific principles followed in developing alternatives for an *Environmental Assessment: Interim Strategies for Managing Anadromous Fish-Producing Watersheds on Federal Lands in Eastern Oregon and Washington, Idaho, and Portions of California*, Internal report to the ID Team.

Watersheds and provide for road- and cumulative-effects analyses. The direction provided under this alternative includes the riparian and aquatic provisions of the watershed and fish habitat emphasis option detailed in the October 8, 1991, report by the Scientific Panel on Late-Successional Forest Ecosystems (Scientific Panel Report), which was presented to the Agriculture Committee and the Merchant Marine and Fisheries Committee of the U.S. House of Representatives.[41] Standards, guidelines, and procedures specified under this alternative would apply only to proposed projects and activities , and would have no effect on ongoing projects and activities .

Alternative 3. This alternative would provide management direction that would modify current direction (as specified in Alternative 1). It would include riparian goals, interim RMOs, and standards and guidelines for all kinds of projects and activities. Interim RHCAs would be established to identify areas of watersheds most sensitive to management. RHCAs would be based on geomorphic features and would include the following (approximate) areas: 300 feet on either side of fish-bearing streams, 150 feet on either side of permanent non-fish bearing streams, and around ponds, reservoirs, and wetlands greater than one acre, and 100 feet in Key Watersheds (50 feet in non-key watersheds) on either side of seasonally flowing or intermittent streams, and around wetlands less than one acre, as well as landslides and landslide-prone areas. In non-forested rangeland ecosystems, the interim RHCA width for permanently flowing streams would be the extent of the 100-year floodplain. This alternative also would require identification of Key Watersheds and development of a protocol for Watershed Analysis. It is not anticipated that extensive Watershed Analysis would be initiated under this alternative. The standards, guidelines, and procedures would apply only to proposed projects and activities. They would not apply to ongoing projects and activities.

Alternative 4 (PREFERRED): This alternative would provide management direction that would modify current direction (as specified in Alternative 1) with the management direction that is specified under Alternative 3. It would include riparian goals, interim RMOs, and standards and guidelines for all kinds of projects and activities. RHCAs would be established to identify areas of watersheds most sensitive to management. RHCAs would be based on geomorphic features and would include the following (approximate) areas: 300 feet on either side of fish-bearing streams, 150 feet on either side of permanent non-fish bearing streams, and around ponds, reservoirs, and wetlands greater than one acre, and 100 feet in Key Watersheds (50 feet in non-key watersheds) on either side of seasonally flowing or intermittent streams, and around wetlands less than one acre, as well as landslides and landslide-prone areas. In non-forested rangeland ecosystems, the interim RHCA width for permanently-flowing streams would be the extent of the 100-year floodplain. It also would provide for identification of a network of Key Watersheds and development and trial application of a protocol for Watershed Analysis. During the period of interim direction, the Agencies will complete at least four or five prototype watershed analyses within the Snake River Basin.

Management direction would apply to all new and proposed projects and activities and ongoing projects and activities determined, on a case-by-case evaluation, to pose unacceptable risk to anadromous fish stocks.

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[41]K.N. Johnson, J.F. Franklin, J.W. Thomas, and J. Gordon. 1991. *Alternatives for Management of Late-Successional Forests of the Pacific Northwest.* A report to the Agriculture Committee and Merchant Marine Fisheries Committee of the U.S. House of Representatives.

Alternative 5: This alternative would provide management direction that would modify current direction (as specified in Alternative 1). It would include the same riparian goals, interim RMOs, and standards and guidelines for all kinds of projects and activities as specified in Alternatives 3 and 4. RHCAs would be established to identify watershed areas most sensitive to management. RHCAs would be based on geomorphic features and would include the following (approximate) areas in all watersheds: 300 feet on either side of fish-bearing streams, 150 feet on either side of permanent non-fish bearing streams, and around ponds, reservoirs, and wetlands greater than one acre, and 100 feet on either side of seasonally flowing or intermittent streams, and around wetlands less than one acre as well as landslides and landslide-prone areas. In non-forested rangeland ecosystems, the interim RHCA width for permanently-flowing streams would be the extent of the 100-year floodplain. It also would require identification of Key Watersheds and require that Watershed Analysis be initiated in all Key Watersheds during the interim period and be completed prior to initiation of new projects and activities in these areas. Management direction would be applied to all ongoing and proposed projects and activities.

Table 1. Summary Comparison of Alternatives Considered in Detail.

ALTERNATIVE	RIPARIAN GOALS/ OBJECTIVES	SPECIAL STANDARDS AND GUIDELINES	RIPARIAN AREAS	SPECIAL PROCEDURES	AFFECTED MANAGEMENT ACTIONS
1	Current plan goals and objectives	Current plan S&Gs	Current plan riparian buffers	Watershed Analysis/Key Watershed designation not required	Proposed
2	Scientific Panel Report goals & objectives	Scientific Panel Report S&Gs for roads, logging slash treatment & fire, range, restoration	Riparian areas: fish bearing = 300 feet permanent = 150 feet some intermittent = 50 feet	Road analysis and cumulative effects analysis initiated/Key Watershed designation required	Proposed
3	New riparian goals and quantified interim riparian management objectives	Increased S&Gs for all activities: timber, roads, grazing, recreation, minerals, fire/fuels, lands, general riparian area, and fisheries and wildlife management, and watershed and habitat restoration	RHCA zones: fish bearing streams = 300 feet permanent non-fish bearing steams, ponds, reservoirs, and wetlands > 1 acre = 150 feet intermittent streams, wetlands < 1 acre, and landslide or landslide prone areas = 100 feet in Key Watersheds and = 50 feet in non-key watersheds	Watershed Analysis initiated/Key Watershed designation required	Proposed

Table 1, cont. Summary Comparison of Alternatives Considered in Detail.

ALTERNATIVE	RIPARIAN GOALS/ OBJECTIVES	SPECIAL STANDARDS AND GUIDELINES	RIPARIAN AREAS	SPECIAL PROCEDURES	AFFECTED MANAGEMENT ACTIONS
4	New riparian goals and quantified interim riparian management objectives	Increased S&Gs for all activities: timber, roads, grazing, recreation, minerals, fire/fuels, lands, general riparian area, and fisheries and wildlife management, and watershed and habitat restoration	RHCA zones: fish bearing streams = 300 feet permanent non-fish bearing steams, ponds, reservoirs, and wetlands > 1 acre = 150 feet intermittent streams, wetlands < 1 acre, and landslide or landslide prone areas = 100 feet in Key Watersheds and = 50 feet in non-key watersheds	Watershed Analysis initiated/Key Watershed designation required	Proposed and some ongoing
5	New riparian goals and quantified interim riparian management objectives	Increased S&Gs for all activities: timber, roads, grazing, recreation, minerals, fire/fuels, lands, general riparian area, and fisheries and wildlife management, and watershed and habitat restoration	RHCA zones: fish bearing streams = 300 feet permanent non-fish bearing steams, ponds, reservoirs, and wetlands > 1 acre = 150 feet intermittent streams, wetlands < 1 acre, and landslide or landslide prone areas = 100 feet	Complete Watershed Analysis required in Key Watersheds prior to initiation of new projects & activities/Key Watershed designation required	Proposed and all ongoing

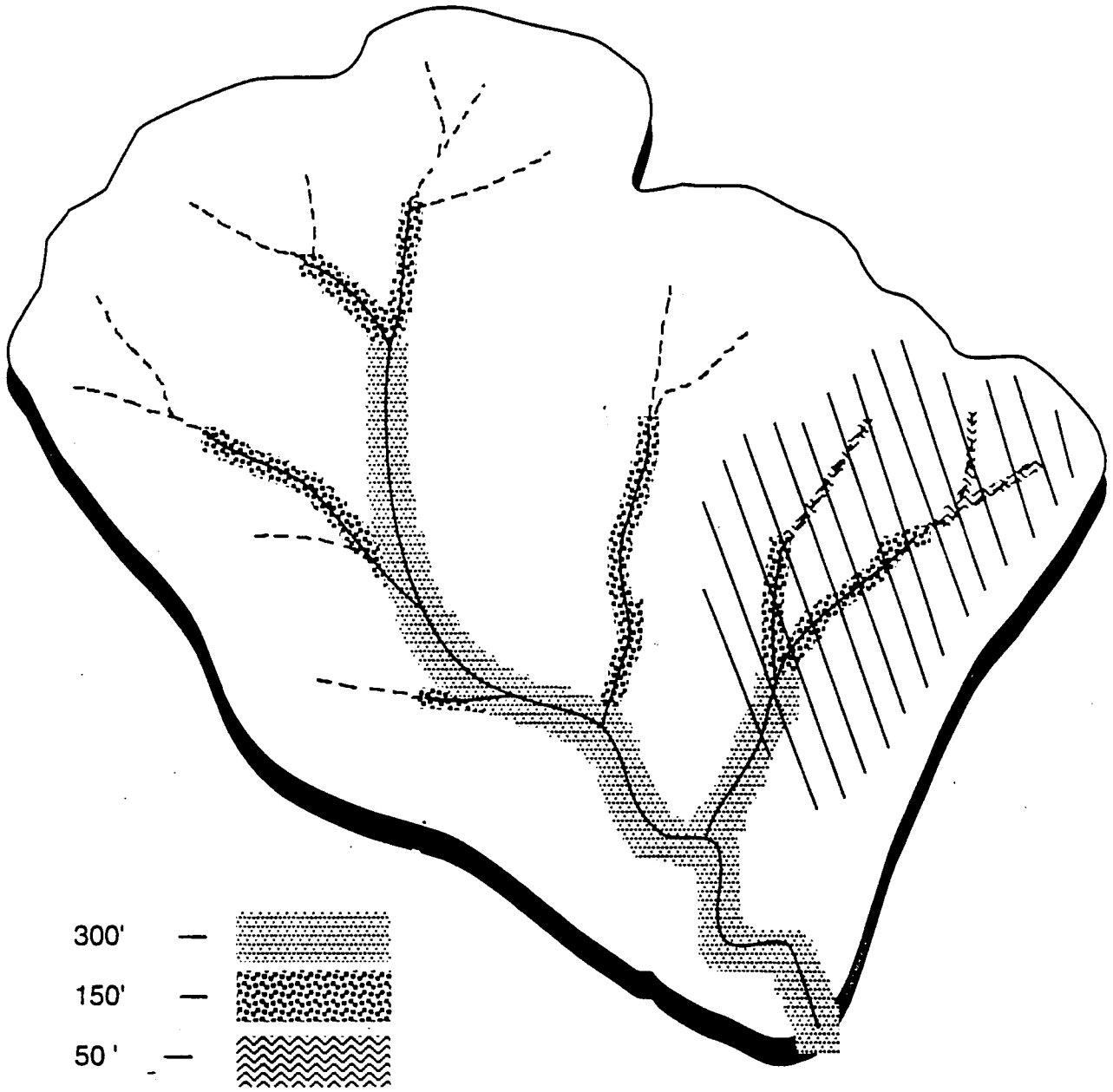

Figure 2. Schematic Delineation of Riparian Area Under Alternative 2. Hatch area denotes landslide-prone area.

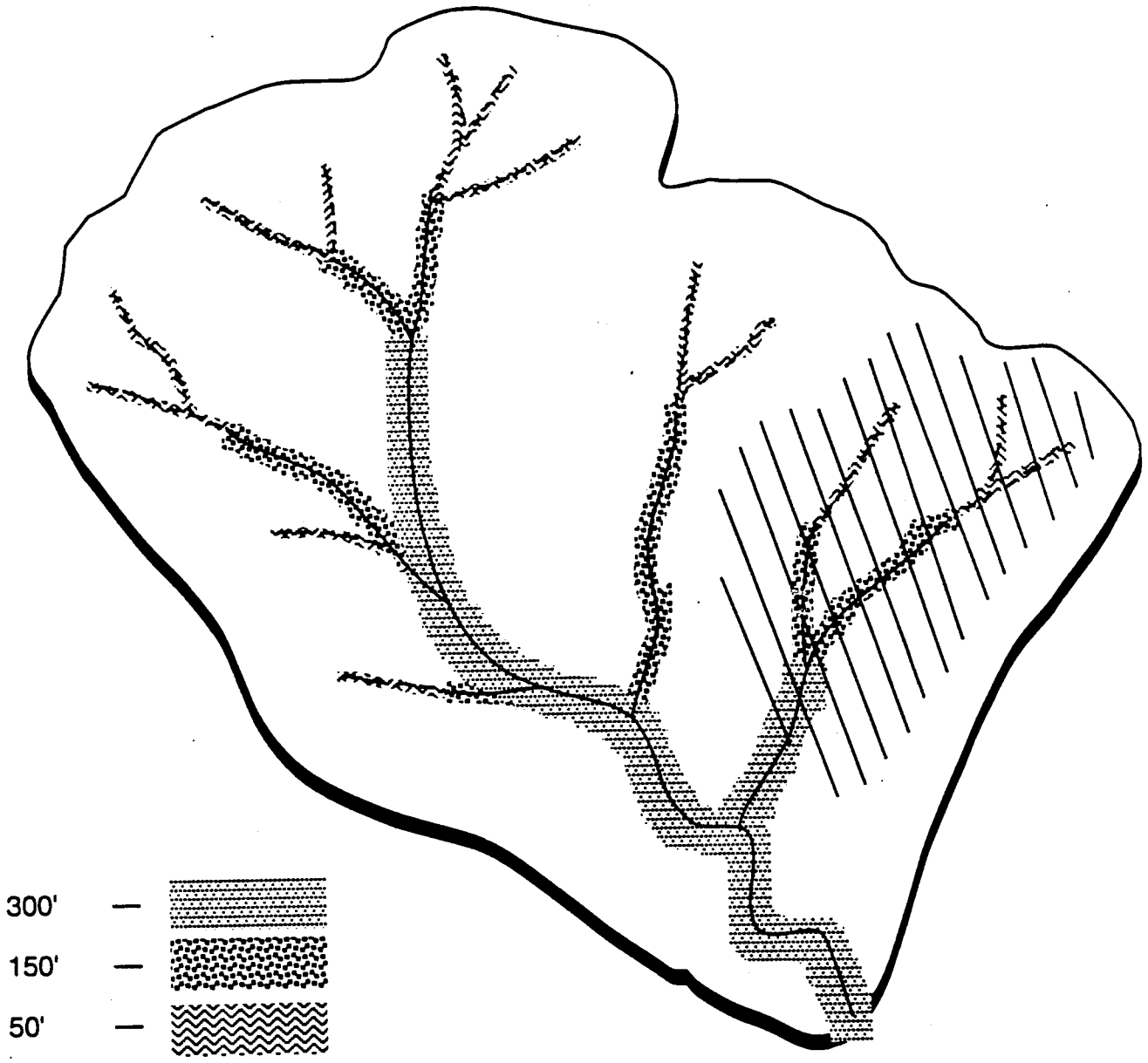

Figure 3. Schematic Delineation of Riparian Habitat Conservation Areas in Non-Key Watersheds Under Alternatives 3 and 4. Hatch area denotes landslide-prone area.

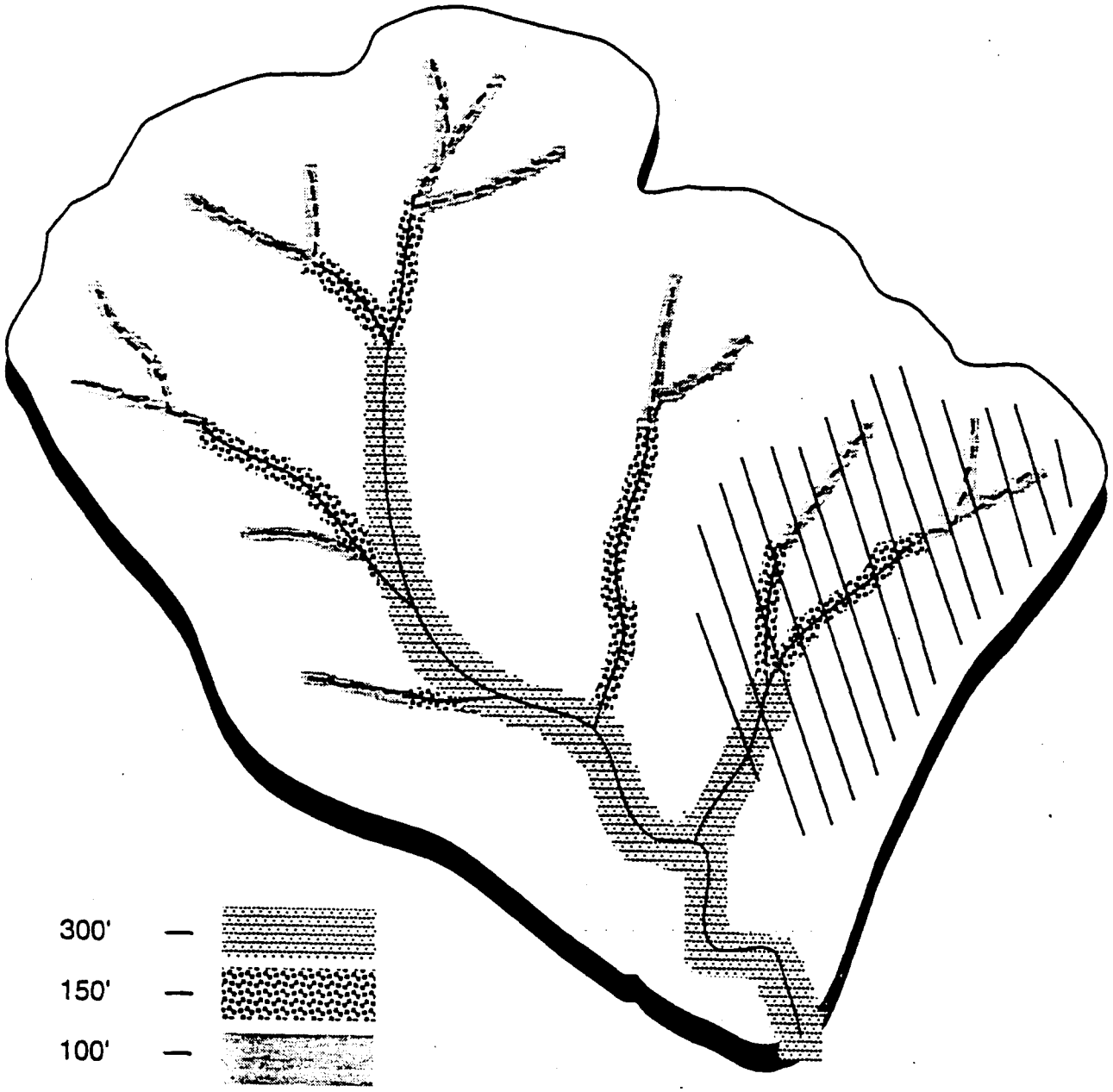

Figure 4. Schematic Delineation of Riparian Habitat Conservation Areas in Key Watersheds Under Alternatives 3 and 4, and all Watersheds Under Alternative 5. Hatch area denotes landslide-prone area.

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

None of the alternatives examined in this environmental assessment would, on its own, change the physical environment within RHCAs. However, any subsequent proposed projects and activities within RHCAs that would change the environment would be subject to mitigation measures prescribed under the interim direction adopted. Such projects and activities would be carried out only after the Agencies have undertaken the appropriate level of NEPA analysis and completed ESA Section 7 consultation. Depending on the alternative selected, some or all ongoing projects and activities within RHCAs also would be subject to the mitigation measures following appropriate NEPA and ESA analysis.

To provide the decision maker with a means of comparing the possible effects of the alternatives, the ID Team prepared reports on components of the environment (i.e., physical, biological, and human) that would be affected by the proposed action. The following discussion describes the direct, indirect, and cumulative effects that the alternatives would have on each component during the interim period. Virtually all of the environmental consequences disclosed in this environmental assessment are "cumulative effects," because they are the environmental and management impacts of an accumulation of management actions that would occur locally within the proposed action area. Appendix D lists those forest plans and LUPs that have been prepared for lands within the proposed action area that are under the Agencies' jurisdictions and the EISs from which those plans were developed. On a watershed-specific basis, those forest plans, LUPs, and EISs describe current riparian and aquatic environments in greater detail than is presented in this environmental assessment.

Analyses of environmental consequences are based primarily on estimates of the effects of predicted changes in livestock grazing, recreational use, and timber harvesting, as well as the road construction and reconstruction activities associated with those uses, which would result from implementation of each of the alternatives. A report of the estimated changes in these resource outputs for each alternative is included in the process records.[42] The changes were determined as follows:

The estimated effects of each alternative on timber, range, and recreation programs were based on preliminary analyses[43] conducted by field and research economists who collected data from the 15 affected national forests and 7 BLM districts. As originally conceived, the preliminary analyses considered environmental effects over a 10-year period. The assumption underlying the preliminary analysis was that during that time, management direction on the scope of projects and activities would be consistent with that which is described for Alternative 4, the preferred alternative in this environmental assessment. The results of the preliminary analyses were based on forest plan and LUP output projections, as well as data from current, actual outputs. A key concept of the study was the incremental change that

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[42]USDA Forest Service - USDI Bureau of Land Management. 1993. *Determination of Managed Activities Affected by Alternatives Described in the Environmental Assessment for Managing Anadromous Fish-producing Watershed on Federal Lands in Eastern Oregon and Washington, Idaho, and Portions of California.* Process paper to the ID Team.

[43]C.S. Hansen-Murray, N.A. Bolon, and R.W. Haynes. 1993. *The Estimated Impacts on the Timber, Range, and Recreation Programs on National Forest and Bureau of Land Management Lands From Adopting the Proposed PACFISH Strategy.* Draft internal report to the WO PACFISH Policy Group.

would result from adoption of new management direction. The economists followed a 3-step process that included: (1) identification and delineation of anadromous watersheds, (2) definition of interim boundaries for RHCAs, described in terms of width-in-feet for each category of stream or water body, and (3) estimated changes in management activities and output levels within the RHCAs, which would result from applying proposed standards and guidelines to achieve RMOs. Full consideration of changes in outputs will require the more site-specific analyses that will be developed, analyzed, and displayed in the separate and distinct geographically-specific environmental analyses and project level NEPA documents.

Data from the preliminary analyses were used as a basis for estimating the effects, in terms of the physical outputs and the costs to the Government, of implementing Alternative 4, the preferred alternative, during the interim period. The changes in outputs described in Alternatives 2, 3, and 5, were extrapolated from data that were computed for Alternative 4 (Preferred) by an interagency, interdisciplinary technical advisory group.

All cost data in this environmental assessment are reported in 1993 dollars. Costs and effects not reported include those related to additional impacts to road and trail systems construction, reconstruction, and maintenance, minerals extraction, and water management programs, as well as costs incurred by private operators and users. More complete costs will be developed, analyzed, and displayed in economic reports prepared for and included in the geographically-specific environmental analyses.

The Agencies have participated in extensive consultation with the NMFS about listed salmon in the Snake River Basin and the effects of ongoing and proposed activities there. These consultations indicate that the greatest changes to resource outputs would be expected in timber, range, and recreation resources. Nonetheless, some minor changes in other activities--such as mining, wildlife habitat improvement, and the use of prescribed fire--also would be expected.

In analyzing the alternatives considered in detail, the ID Team assumed the following:

1. On their own, the alternatives considered will not result in any ground-disturbing activities or direct changes to the environmental status quo. The alternatives provide a range of management regimes and mitigation measures to be applied to projects and activities. The mitigation measures may result in the delay or modification of projects and activities. New project decisions will be preceded, as appropriate, by site-specific NEPA analysis.

2. Alternative 1 represents no deviation from the level and intensity of ongoing or proposed projects and activities. Conditions and trends would not change substantially, and all ongoing and proposed projects and activities would proceed, in accordance with approved forest plans and LUPs, and in compliance with Agency regulations, provisions of the ESA, and direction provided by the Congress.

3. The affected environment is the present environment. Analyses in this environmental assessment consider trends and changes associated primarily with ongoing and proposed timber harvesting, livestock grazing, and recreation uses during the interim period. Net changes to the affected environment are the basis for comparison of alternatives.

4. Environmental effects of the alternatives considered in detail are based solely on the implementation of any new strategy within the geographic scope of the proposed action.

Management direction described for each alternative would apply only to lands within anadromous watersheds that are administered by the Agencies.

5. The effects of the alternatives are considered only for the interim period. Because recovery processes within riparian and aquatic habitats are gradual, short-term adjustments in management practices may not result in dramatic habitat improvement during the interim period. However, redirection of trends, shifts in rates of change, establishment of different risk factors, or changes in the time frames of ongoing or proposed projects and activities may occur. Incremental improvement in habitat condition and trends is necessary to contribute to the protection or restoration of some anadromous fish stocks.

6. Any changes in environmental conditions that may result are attributable to modifications in management practices within RHCAs and increased understanding of watershed condition that is gained through Watershed Analysis. The ID Team analyzed the **net** effect of modifications in management practices, based on differences among the alternatives in the size, number, and distribution of RHCAs, as well as in the breadth of standards and guidelines, the scope of projects and activities covered, and the degree to which Watershed Analysis is conducted.

7. No Alternative Considered in Detail would require the removal or obliteration of roads or facilities during the interim period. However, closure or a reduction in use of such facilities may occur.

8. Projects and activities within the range of listed anadromous fish, and for which ESA consultation with the NMFS has been completed will be considered to be in compliance with any interim direction alternative that is selected.

9. Implementation of any interim strategy for protecting anadromous fish would not begin until analysis of the public's comments on this environmental assessment is completed, and ESA consultation provisions are met. The Agencies have incorporated corrections, clarifying language, and minor modifications based on these reviews.

Cumulative Effects

Cumulative effects result from the incremental impact of individually minor, but collectively important effects, taking place over a period of time. Virtually all of the environmental consequences disclosed in this environmental assessment are "cumulative effects," as they are the potential environmental impacts of management actions which may occur throughout anadromous fish-producing watersheds on FS- and BLM-administered lands. Those cumulative effects that are reasonably foreseeable at this programmatic stage of planning are discussed on a resource-by-resource basis for the various alternatives in the following sections of this chapter.

The potential cumulative effects of this action would be limited by the nature of the interim direction itself. No ground-disturbing actions would be authorized, funded, or carried-out by the interim direction. The interim direction would not involve any irreversible or irretrievable commitment of resources. In this programmatic environmental assessment, the Agencies are merely considering the impacts of various interim strategies for protecting anadromous fish habitat over an 18-month period. The intended effect of the interim direction is to maintain the environmental status quo while long-term management strategies are being developed.

The standards and guidelines presented in the various alternatives are intended to limit or mitigate the effects of human activity on anadromous fish habitat on FS- and BLM-administered lands. The potential cumulative effects of this action would also be limited by the short time period in which this interim direction will be in effect.

The interim direction would not be the sole or final direction for anadromous fish habitat protection on FS- and BLM-administered lands. Potential cumulative effects of habitat protection measures would continue to be assessed at several planning levels. For example the environmental analyses for the long-term management strategies will assess cumulative effects at a broad scale. Several alternatives for interim direction include procedures for Watershed Analysis and monitoring which would provide more detailed analysis of cumulative effects (Appendix C). Additionally, cumulative effects will be assessed as specific project and activities are proposed and analyzed. Site-specific, detailed cumulative effects analysis can only be conducted as specific projects and activity proposals crystalize the environmental consequences of the project decision. At the programmatic level of this interim direction, analysis of these cumulative effects is not possible, because such analysis would require speculation as to the scope, character, and environmental consequences of future project and activity decisions. Because it is not possible to provide a meaningful analysis of potential site-specific effects at this interim, programmatic level, analysis of the cumulative effects of projects and activities will not be complete until particular projects and activities are proposed and analyzed.

Other Federal agencies that have jurisdiction over factors that influence Pacific anadromous fish populations are preparing management plans, operation plans, or other actions that may have an cumulative effect on anadromous fish populations. However, at this stage in the preparation of those actions, it would be speculative to attempt to analyze what cumulative effect on anadromous fish populations may result. Furthermore, however these actions might develop, they would not have a reasonably foreseeable cumulative effect on anadromous fish habitat on FS- and BLM-administered lands.

Reasonably foreseeable related future actions, such as the development of long-term management strategies for anadromous fish-producing watersheds, were considered in the analysis presented in this chapter. At this time, the preparation of these long-term management strategies is not complete, and it would be speculative to attempt to analyze what, if any, cumulative effects may result. It is not clear at this time if any part of the interim strategy will be adopted as part of the long-term strategies. There is no precedent established by this interim strategy. Moreover, in the process of developing the long-term strategies, additional analyses are now underway which will produce additional scientific information and may effect the assumptions underlying the interim strategy. Any actions or mitigation measures adopted in the long-term strategy will be based on the best scientific information available at that time. Any cumulative effects that do arise from such related future actions would likely be beneficial to the protection of anadromous fish habitat and other related natural resources.

This analysis incorporates by reference the analysis and discussion of potential cumulative effects in existing EISs -- including the discussion of cumulative effects of watershed protection measures -- prepared for the affected forest plans and LUPs (Appendix D). Similarly, this analysis incorporates by reference the analysis and discussion in the NSO FSEIS of cumulative effects of an aquatic conservation strategy similar to several alternatives presented in this analysis (NSO FSEIS, Chapters 3&4, pp. 51-82).

Physical Environment

WATERSHED & WATER RESOURCES

Important water resource issues are related to water quality (primarily the delivery, movement, and disposition of sediment); temperature changes (extremes and fluctuations); flow regimen adjustments (flooding and low flows); stream channel conditions (including the stability characteristics of erosion and deposition); and channel morphology (structural components, width-depth ratio, bank angle). These elements often are functionally related.[44] Further, they are influenced by natural soil erosion hazards, potential and actual mass stability hazards, geomorphology, and the status of other riparian-area components including flood-prone areas, wetlands, and proximal upslope or terrestrial lands that buffer or directly influence riparian areas.

The response of water and associated aquatic and riparian resources is a function of the entire river basin and the cumulative effects of activities in the river basin. The interim standards and guidelines evaluated in this analysis apply to activities within riparian areas or RHCAs or degrading RHCAs; however, their application may indirectly affect or be affected by management activities elsewhere in the watershed.

AFFECTED ENVIRONMENT

The proposed action encompasses much of the Columbia River Basin upstream and east of the Cascade Mountains in Oregon and Washington, and large areas of Idaho, as well as portions of the Sacramento, San Joaquin, and south coastal drainages in California. Below are summary descriptions of the affected areas. More complete, watershed-specific descriptions of the affected physical environment are included in the forest plans, LUPs, and EISs listed in Appendix D.

Columbia River Basin: The Columbia and its tributaries flow through several geomorphic provinces. The area within the scope of the proposed action is dominated by the intrusive granites and metasediments associated with the Idaho Batholith and Bitterroot Ranges, the extruded basalts and other igneous rocks associated with the Columbia Plateau, and various sedimentary and wind-deposited formations. Glacial actions and mountain uplift defined the morphology of most of the higher elevations. Volcanic activity influences much of the western and central basins.

Streamflow from the headwaters generally is snow-dominated. A significant snowpack accumulates from late fall through spring. Snow melt in spring and early summer results in a notable runoff surge that usually is sustained well into the summer. Water temperatures tend to be cool year-round. Generally, water quality is excellent in the headwaters.

In general, the rivers and streams are relatively steep in the headwaters, controlled by bedrock and glacially-derived formations. Falls, step-pools, and cascades are not uncommon. High mountain lakes are common in the headwaters. Relatively gentle gradient meadow reaches are frequent, but they are not dominant over most tributary lengths near the headwaters.

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[44]L.B. Leopold, M.G. Wolman, and J.P. Miller. 1964. *Fluvial Processes in Geomorphology*. W.H. Freeman and Co., San Francisco, CA.

Lower in the drainage where gradients are less, channels are not as confined, and depositional landforms dominate, the streams often exhibit meandering characteristics with lateral adjustments taking place. Wide flood-prone areas become more frequent. Channels tend toward pool-riffle-run systems.

Sacramento River Basin: The Sacramento River and its tributaries drain four geomorphic provinces: the Coast Range on the west side of the Sacramento Valley; the Siskiyou Mountains to the north and northwest; the southern Cascade volcanics on the northeastern side of the valley; and the northern Sierra Nevada mountains on the east side. The area of the proposed action--the southern Cascades--is derived from layers of quaternary and Pliocene volcanics overlaying extensions of some Sierra Nevada formations, with Mt. Shasta and Mt. Lassen being dominant terrain features. The lower reach of the Sacramento flows mostly through recent alluvium that forms the floor of the Central Valley.

Main channel flows are heavily regulated by releases from major dams, including Folsom, Oroville, and Shasta. Most of the tributary streams are obstructed at multiple locations by dams for hydroelectric power and irrigation. In the area proposed for action Deer Creek, Mill Creek, and Antelope Creek are the last, unobstructed anadromous streams in interior California. They all drain southern Cascade volcanic formations and flow southwest, directly into the Sacramento River below Shasta Dam. Streamflows in these tributaries mostly are supplied by snowmelt, with sustaining base flows from springs and groundwater seepage. Deer, Mill, and Antelope Creeks are all young drainages, with few perennial tributaries to their main channels and without a well-developed, dendritic tributary drainage pattern.

Temperature regimes in the anadromous "transport" reaches of the Sacramento River are affected primarily by release flows from Shasta Dam and by irrigation diversions and returns. Deer, Mill, and Antelope creeks have a minor effect on the temperature of the Sacramento, compared to that of other major tributaries and to outflows from Shasta Dam.

Temperatures in Deer, Mill, and Antelope creeks are determined almost entirely by elevation. Their upper and middle reaches have cold water, flowing mostly in deeply-incised, mainstream canyons through moderate gradient reaches. Streambeds are dominated by riffles, interspersed with deep pools scoured into volcanic bedrock. Their upper reaches include a few alluvial meadows on the main channels. The lower reaches maintain somewhat warmer temperatures in similar gradient and streambed conditions, without cooling perennial tributaries. The lowest reaches have general warming though their lowest canyon and foothill sections to the valley floor and their confluences with the Sacramento River. Water quality is excellent on all three streams.

San Joaquin River Basin: The San Joaquin River drains the Sierra Nevada mountains to the east, the related Tehachapi Mountains to the south, and the Coast Range to the west. The primary source of flows is snowmelt from the high mountain snowpacks in the Sierra. Geology in the major tributaries is dominated by extensive areas of granitics, with notable areas of metavolcanic and metasedimentary bedrock. On the arid west side of the San Joaquin Valley, small ephemeral streams drain the east side of the Coast Range but rarely reach the San Joaquin River. From the wetter Sierra Nevada, west slope snowpacks supply numerous streams and three major rivers--the Merced, Tuolumne, and Stanislaus Rivers. The Consumnes, Mokelumne, and Calaveras Rivers are significant, smaller tributaries. The San Joaquin and its major tributaries all are obstructed by one or more large dams in their deep, middle reach canyons. Below the impoundments, the rivers' gradients are moderate, and their channels include a variety of boulder rapids and gentle pool-riffle sequences.

The anadromous, "transport" reaches of the San Joaquin River are affected by nutrient, mineral, and heat loading from agricultural return flows and by pumped import flows from the Sacramento River system. Riparian woodlands and floodplain areas have been vastly reduced by agricultural development and expanding urbanization. The San Joaquin system, which once maintained one of the largest spring-run chinook salmon fisheries on the Pacific Coast, now provides habitat for only a limited escapement of fall-run chinook salmon in the foothill regions below the tributary dams. Most of the eastern tributaries have cold flows, with good to excellent water quality.

South Coastal Drainages: Most of the coastal watersheds in central and southern California once supported substantial runs of steelhead. Coastal watersheds in central California also supported coho salmon. These runs have been reduced gradually and some may no longer be in existence. Dams, channelization, and habitat modification, combined with ground and surface water withdrawals, have limited steelhead runs.

The South Coast Drainages flow through several geomorphic provinces. The area within the range of the proposed action is dominated by metamorphic rock intermixed with various sedimentary formations and igneous rock of the Central Coast Subregion and various sedimentary formations intermixed with metamorphic and igneous rocks of the South Coast and Transverse Ranges. The bedrock of the area has been intensively folded, fractured, and faulted. Major faults in the area are considered active or potentially active. Seismic activity influences much of the morphology of the area.

Generally, streamflow from the headwaters is rainstorm-event dominated. Snow accumulates in the higher elevations but is not a significant part of the winter precipitation. Most drainages are dependant on winter rainfall and year-round springs and seeps. Generally, water quality is good, although lime cementation of the substrate, either due to natural mineral content or upstream mining operations, may cause degradation of habitat. Late summer water flows and high temperatures may become limiting in some areas. Flooding sometimes occurs along major stream courses during and following extended rains. The worst flooding results from high intensity winter rains falling on burned watersheds, increasing peak flows and enabling increased transport of sediment loads within the channel. Large deposits of sand at river mouths often form coastal lagoons and sand bars that may block fish passage during low flows. During periods when river mouths close, dissolved oxygen levels and water temperatures may stress trapped aquatic life.

In general, the rivers and streams flow through deep and relatively moderate to high gradient canyons. Bedrock outcrops, cascades, and falls historically limited fish passage in the headwaters. Deep pools separated by short, shallow glides and large-cobble/small-boulder riffles and runs, dominate the historically accessible reaches.

Lower in the drainages where gradients are less, channels are not as confined, depositional landforms dominate the streams, and stream courses often exhibit meandering characteristics with lateral adjustments taking place. Wider flood prone areas become more frequent. Channels tend toward pool-riffle-run systems.

ENVIRONMENTAL CONSEQUENCES

Past and continuing management practices are causing erosion and sedimentation in various forms and by varying degrees throughout the project area. In central Idaho, for example, where granite bedrock rapidly weathers into highly mobile, coarse sand, these phenomena are prevalent. Inadequately located, designed, and constructed roads, as well as poorly designed timber-harvest units, have provided a substantial mechanism for delivering sediments to and through major stream systems throughout the project area.

Mass erosion has been accelerated in many locations where instability is a common natural feature of the landscape. Reduction of tree root holding capacity, increases in slope subsurface water, and undercutting the toe of unstable slopes have resulted in significant sources of downstream sedimentation and local channel damage.

Local extremes in water temperature have been significantly increased by a reduction of shading from bank and other vegetation, flattening of bank angles, and reduction of overall water depth in the summer months from sedimentation as well as water diversion. Temperature effects tend to be localized in the mountainous areas, but in the lower gradient and non-timbered stream reaches, temperature change can be geographically extensive.

Channel condition and channel stability have been and continue to be affected, especially in areas of extensive or long term management. Grazing animals, road construction, logging practices, and recreational use in some areas have destabilized stream banks resulting in bank erosion, loss of cover and shading, widening and filling of channels, and accelerated lateral migration. Recently developed and implemented Best Management Practices, forest plans, and LUPs have reduced the frequency with which new stream destabilization occurs; however, existing channel condition and stability problems are not expected to be significantly corrected if present trends continue.

Channel structure, which is a natural control mechanism for maintaining water quality and the stream's ability to handle flooding and provide appropriate fish habitat, has been widely modified throughout the basin. In forested systems, habitat complexity and channel structure are created and maintained largely by the effects of large woody debris. In non-forested systems, healthy riparian communities contribute to the creation and maintenance of structure and complexity as exhibited by the presence of deep pools and undercut banks.

Logging and other associated timber management activities can affect water resources in several ways. Removal of trees and stream-side brush can reduce the complexity of habitat and channel structure by influencing the amount of large woody debris available for recruitment into stream systems. By altering stream shading, such activities can affect water temperature regimes and eliminate stream habitat cover. Removal of vegetation also can destabilize marginally stable slopes by increasing the subsurface water load, lowering root strength, and altering water flow patterns in the slope. Skid trails, logging roads, and road crossings can be direct sources of sediment to the creek and can provide direct conduits for water yield and sediment from other local sources. Roads, road crossings, and skid trails also can partially constrict or channelize flows and impede a stream's ability to maintain pools.

Grazing patterns in and around riparian areas can alter the vigor, composition, and amount of the natural vegetation. This in turn can affect the site's ability to control erosion, provide stability to stream banks, and provide shade and cover to the stream. Mechanical compaction

can reduce the productivity of the soils appreciably and cause bank slough and erosion. Mechanical bank damage often leads to channel widening, lateral migration (channel erosion), and excess sedimentation.

Recreation sites in riparian areas attract and concentrate human use in and around stream channels. Heavy and continuous use often results in severe compaction and bank sloughing, not unlike the effects of heavy livestock use. Erosion and gully formation can follow. Bank and near-bank vegetation often is damaged and the potential for important woody riparian vegetation replacement can be compromised.

Water diversions and impoundments that alter flow regimes (i.e., peaks flows, low flows, and duration of flows) directly reduce available fish habitat, and reduce the stream's ability to move sediment and woody debris, maintain its structural integrity and form, and prevent vegetative encroachment.

Alternative 1: Because this alternative is limited to providing only those protection measures provided in current plans and through NEPA and the ESA, present trends in riparian and aquatic habitat condition would be expected to continue. Modifications to projects and activities to comply with the requirements of current plans or the ESA may reduce recreation visitor days (RVDs), animal unit months (AUMs) of permitted grazing, or timber harvest. However, to the extent these reductions occur, they are independent of any decision by the Agencies regarding adoption of interim direction.

Where soil is compacted from heavy use, additional erosion and stream degradation would be expected. Localized benefits would be limited primarily to areas protected by special designation or subject to ESA Section 7 consultation.

Alternative 2: Because this alternative is limited to certain kinds of proposed projects and activities, expected effects on watershed and water resources would be limited and randomly dispersed over the planning area. However, modifications to proposed projects and activities would result in fewer RVDs and reduced timber harvest. The level of permitted grazing would not be affected.

This alternative would apply standards and guidelines that are designed to prevent further stream degradation to some specified kinds of proposed projects and activities within riparian areas would meet . Those measures would be taken to contribute to the maintenance of effective habitat.

In some areas, where soils have not been compacted by heavy use, and ongoing activities are not contributing to substantial habitat degradation, revegetation would begin. Localized benefits could be large where a large number of proposed projects and activities occur within the affected riparian areas. However, it is not likely that improvements in basin-wide water resources and stream conditions would be measurable as a result of actions taken during the interim period.

Alternative 3: Because additional standards and guidelines would apply to all proposed projects and activities within RHCAs or that degrade RHCAs, localized risks associated with all proposed projects or activities would be reduced.

Modifications to proposed projects and activities would lead to reductions in some resource outputs. These modifications would account for fewer RVDs and a modest reduction in timber harvest. The level of permitted grazing would not be affected.

In areas where soils have not been compacted by heavy use, and ongoing activities are not contributing substantially to habitat degradation, revegetation would begin. Localized benefits could be large where a large number of proposed projects and activities are conducted within the affected RHCAs.

Although measurable improvements in basin-wide water resource and stream conditions would be unlikely, because standards and guidelines would be applied to all proposed projects and activities, and RHCAs would include more of the watershed than would be protected under Alternative 2, some additional protection of anadromous fish would occur.

Alternative 4 (PREFERRED): On a case-by-case basis, land managers would evaluate ongoing projects and activities within RHCAs and modify those that are determined to be causing unacceptable risk. Modifications to proposed projects and activities and to some ongoing projects and activities would lead to a reduction in resource outputs. Those modifications would account for fewer RVDs, a reduction in timber harvest, and fewer AUMs of permitted grazing within certain streamside areas.

Several existing dispersed and developed recreation sites, where continued use would prevent attainment of Riparian Management Objectives or adversely affect listed anadromous fish, would be closed during the interim period. Such closures would allow some recovery in riparian areas and streams where heavy human uses have degraded riparian and aquatic habitat, although soil compaction resulting from extended use would inhibit such recovery.

Where grazing and timber harvest have caused impacts, adoption of this alternative would provide improved soil stability, additional stream shading, and continuing supplies of large woody debris to affected streams. Where grazing has contributed to unstable stream banks, loss of vegetative cover and shade, and increased sedimentation, the trend toward such habitat degradation would be reversed. This action would be expected to arrest habitat degradation and initiate recovery.

Protection measures prescribed for timber-, recreation-, and grazing-related activities, as well as other activities, would be widely dispersed throughout the area of the proposed action. Where such measures are applied, associated risks to water resources would be reduced. Where they are not applied, associated risks will be few. Risks associated with sediment loading, bank damage, loss of shade, and water temperature increases, or the loss of large woody debris from the riparian area would be substantially reduced from current and expected levels. The degree of recovery would be contingent on the extent of damage, the sensitivity of the affected site and stream channel to modifications in management direction, and the availability of moisture during the interim period. Although improvements to watersheds and water resources could be noticeable at a few sites, measurable improvement in habitat condition during the interim period would not likely be substantial because recovery processes are gradual.

Alternative 5: Watershed Analyses would be required within all Key Watersheds prior to initiation of proposed projects and activities in RHCAs, and all activities within RHCAs in all watersheds would be modified to comply with new standards and guidelines. Modifications to ongoing projects and activities would lead to a reduction in resource outputs. Those

modifications would result in fewer RVDs, a reduction in timber harvest, and fewer AUMs of livestock grazing within streamside areas.

Many dispersed and developed recreation sites likely would be closed during the interim period. Such closures would allow some recovery in riparian areas and streams where heavy human uses have degraded riparian and aquatic habitat, although soil compaction resulting from extended use would inhibit such recovery.

Adoption of this alternative would provide improved soil stability, additional stream shading and continuing supplies of large woody debris to affected streams. Where grazing, timber, and other activities have contributed to unstable stream banks, loss of vegetative cover and shade, and increased sedimentation, the trend toward such habitat degradation would be slowed or reversed. This action would be expected to arrest habitat degradation and initiate recovery.

Protection measures prescribed for timber-, recreation-, and grazing-related activities, as well as other activities, would be dispersed widely throughout the area considered in this environmental assessment. Associated risks to water resources would be reduced. Risks associated with sediment loading, bank damage, loss of shade and water temperature increases, or the loss of large woody debris from the riparian area would be substantially reduced from current and expected levels. The degree of recovery would be contingent on the extent of damage, the sensitivity of the affected site and stream channel to modifications in management direction, and the availability of moisture during the interim period, although measurable improvements to watersheds and water resources could be noticeable at a few sites. The overall health of affected areas and any substantial improvement in habitat conditions would occur gradually, and would not be expected to improve substantially during the interim period.

Biological Environment

NON-FORESTED VEGETATION

AFFECTED ENVIRONMENT

Non-forested uplands within the affected area consist mostly of sagebrush plant communities. Wyoming, Basin Big, and Mountain Big sagebrush are the most common species. Other common shrubs include bitterbrush, wild rose, and rabbitbrush. Typical perennial grasses are Bluebunch wheatgrass, Idaho fescue, Western wheatgrass, and Giant wild rye. Various forbs, including buckwheats, daisies, phlox, and dandelions, are common.[45] Upland sagebrush communities typically occur in areas where precipitation averages 10-18 inches per year and comes as snow or rain in the winter and spring.

Riparian vegetation in non-forested areas consists mainly of herbaceous species such as Kentucky bluegrass, although sedges, forbs, and woody species such as willow, alder, and cottonwoods are common. Vegetative cover is absent or much diminished in severely degraded riparian areas, and stream banks in such areas have been increasingly exposed to severe erosion. Moderately degraded areas typically have a good cover of Kentucky

[45]T.N. Shiflet, ed. 1994. *Rangeland Cover Types of the United States*. Soc. Range Mgmt.

bluegrass and other plant species but often are lacking in woody species. Riparian areas in good condition have a cover of sedges and/or a variety of different age classes of willows, alders and, in some cases, cottonwoods.

Non-forested vegetation in the Sacramento Valley is principally of four cover types. The Valley Foothill Hardwood type is comprised of various oak species (blue, valley, Engleman, interior live, coast live and canyon live oaks). The Valley riparian type has cottonwood, California sycamore, and valley oak as dominant species; with white alder, boxelder, and Oregon ash as subcanopy types. The mixed chaparral type is characterized by species which vary with precipitation, aspect, and soil type. Included are California scrub oak, chaparral oak, manzanita species, mountain mahogany, ceanothus species, and chemise.

The non-forested vegetation along the Pacific coast is represented by chaparral and oak-woodland types, with cottonwood and willows occurring in riparian zones.

More complete, watershed-specific descriptions of the affected non-forested vegetation environment are included in the forest plans, LUPs, and EISs listed in Appendix D.

ENVIRONMENTAL CONSEQUENCES

Most negative effects to riparian vegetation have been caused by excessive grazing, although excessive recreational use is important in some areas. Popular summer recreation areas, as well as areas where year-round grazing or grazing during the hot, mid-summer months occurs, have experienced degradation of riparian and aquatic habitat. Normally, changes in ecological condition resulting from a modification in the percent composition of plant species do not occur in the short term. Changes in ecological condition require at least 5 years and in most cases 10 or more years.

The time frame in which measurable change can be expected is dependent on the precipitation zone and the plant community. In higher precipitation areas (where more than 12 inches of precipitation per year is common), improved management regimes in upland plant communities may effect changes in ecological condition within 5-10 years. In drier, more arid areas (where less than 10 inches of precipitation per year is common), improvement in ecological condition may take 30 years or longer. Unlike the uplands, where ecological recovery may take 5-10 years or longer, vegetative improvement in riparian areas may occur within a relatively short time, because water usually is available for plant growth during the entire growing season.

Alternative 1: Effects on non-forested uplands would continue, as modified in some areas by consultation provisions of the ESA. Uplands would not be expected to show measurable improvement in overall ecological condition, although some proposed projects or activities that are determined likely to affect listed anadromous fish species would be cancelled or modified as a result of ESA consultation. The result of consultation would be the application of standards, guidelines, and procedures determined by the NMFS as necessary to conserve listed species and their habitat.

Due to the proximity of water and the resultant concentration of livestock and people, uplands adjacent to riparian areas, which are typically some of the most productive, have been some of the most adversely affected. In those upland areas not receiving additional protection, a

continued concentration of livestock grazing and dispersed recreational use would continue to cause degradation of upland vegetation.

Non-forested riparian areas would not be expected to show measurable improvement. Current forest plan and LUP direction would apply to all ongoing and proposed actions. The condition of riparian areas where appropriate protection measures are taken (e.g., "riparian emphasis areas" and those areas where projects and activities are subject to consultation under provisions of the ESA) would improve somewhat. But the condition of riparian and aquatic habitat not designated as riparian emphasis areas, as well as those areas for which consultation does not occur, would not be expected to improve. A downward trend may be evident in some of those areas. In other, severely degraded areas, where sloughing banks and erosion have resulted in a major loss of soil, degradation would continue.

Alternative 2: Under this alternative, specific new standards and guidelines would apply to some kinds of activities. Other proposed projects and activities and ongoing projects and activities would continue, as modified in some areas by provisions of the ESA. Uplands would not be expected to show measurable improvement in their overall ecological condition, although some projects and activities that are determined likely to affect listed fish species would be cancelled or modified as a result of consultation, and some other proposed projects and activities would be modified as a result of the new standards and guidelines. Standards, guidelines, and procedures would apply only to some proposed projects and management activities, and not to any ongoing projects and activities.

Livestock grazing, timber harvesting, and recreational uses would continue at near-current levels. However, during the interim period some proposed projects and activities would be modified. Some incremental reduction in the risks to upland and riparian vegetation would be expected; although for the duration of the interim period the improvement in habitat conditions would be negligible.

Alternative 3: During the interim period, the effects on non-forested uplands would continue, as modified in some areas by provisions of the ESA and in all RHCAs by standards, guidelines, and procedures applied to proposed projects and management activities. These more comprehensive measures would help see that all new projects and activities would be developed in a manner that is responsive to new information on stock status and habitat condition. However, because ongoing projects and activities would continue under direction prescribed in current forest plans and LUPs, there would be negligible effects on much of the upland and riparian vegetation.

Livestock grazing, timber harvesting, and recreational uses would continue at near-current levels. However, during the interim period all proposed projects and activities would be subject to new standards and guidelines. Some incremental reduction in the risks to riparian vegetation would be expected, although adoption for the duration of the interim period would result in negligible improvement in habitat conditions.

Alternative 4 (PREFERRED): Under this alternative, the negative effects on non-forested uplands would be somewhat reduced, not only by modifications of proposed projects and activities within RHCAs, but also by the application of standards and guidelines to those ongoing projects and activities within RHCAs that are determined to be posing an unacceptable risk to aquatic and riparian habitat and anadromous fish stocks. This more comprehensive application of direction would help see that ongoing projects and activities, as

well as all new projects and activities, would be carried out in a manner that is responsive to new information on stock status and habitat condition.

Accordingly, livestock grazing, for example, would be modified if current grazing practices pose an unacceptable risk. Modification in such practices could include such things as a reduction in numbers of livestock or season of use, changes in handling practices, or the complete removal of livestock from RHCAs. Similar modifications in management of recreation and other activities would occur as needed. The amount of improvement of non-forested uplands would be dependent on the type and number of modifications adopted.

In riparian areas where current projects and activities are modified or halted, habitat conditions would be expected to improve, although the amount of improvement would depend on the extent of degradation that has occurred and the overall health of the riparian community. In some areas, the vegetative response to improved management would be expected to be measurable, and in some less degraded areas, substantial. Most vegetated riparian areas would be expected to show an increase in desirable riparian vegetation such as sedges and/or young willows.

With the modification or elimination, during the interim period, of projects that are determined to be causing unacceptable risk, as well as the application of protective measures in all future projects and activities, some improvement in upland and riparian habitat would be expected, and new causes of degradation would be avoided.

Alternative 5: Because standards and guidelines would apply to all ongoing projects and activities as well as all proposed projects and activities, and larger RHCAs would be established within all watersheds, land managers would be more likely to see that projects and activities are carried out in a manner that is responsive to new information on stock status and habitat condition.

Livestock grazing could be modified by changing permits to reduce the number of livestock or the season of use, changing handling practices that result in habitat degradation; and, in some cases, requiring the complete removal of livestock from previously permitted areas. Recreational uses, as well as other activities, also could be modified or, if necessary, reduced. The amount of improvement in non-forested uplands would be dependent on the type and number of modifications implemented.

Measures required under this alternative would further contribute to improvement of the ecological condition of all non-forested upland and riparian areas. In areas where current projects and activities are modified or halted, habitat conditions would be expected to improve, although the amount of improvement would depend on the extent of degradation that has occurred and the relative health of the upland or riparian community. In some areas the vegetative response to improved management would be expected to be measurable, and in some less degraded areas, substantial. Desirable riparian vegetation, such as sedges and/or willow, would be expected to increase in most affected areas.

FORESTED VEGETATION

AFFECTED ENVIRONMENT

The major forest types found in the affected areas include Fir-Spruce, Ponderosa pine, and Lodgepole pine in eastern Oregon and eastern Washington; Fir-Spruce, Ponderosa pine, Lodgepole pine, White pine, and Larch in Idaho; Fir-Spruce and Ponderosa pine in northern California; and Monterey pine, Redwood, and Valley hardwoods in southern California.[46] Although the predominant tree species are softwoods, there also are hardwoods such as aspen, cottonwood, willow, and various oaks associated with many of the foregoing forest types, as well as a wide range of understory plant species. More complete, watershed-specific descriptions of the affected forested vegetation environment are included in the forest plans, LUPs, and EISs listed in Appendix D.

Forest types that would be affected are primarily those found in Idaho, because most of the timber harvesting that would be affected by the proposed interim direction is within RHCAs in the national forests in Idaho.

Forests in the affected areas developed over time under conditions of periodic disturbance by fire (natural and human-caused), catastrophic insect and disease infestations, windstorms, and logging. In terms of tree growth rates and biomass production, the forests are very productive, particularly those areas in or near riparian systems that often are characterized by deep soils and high-moisture regimes. Forest vegetation provides habitat for many species of wildlife and is critical to ensuring the integrity of aquatic ecosystems and the life-forms they support.

The condition of forests on the affected areas varies considerably. Those forests represent a full range of successional stages, from young-growth stands to late-successional stands approaching the end of their biological life-span, often referred to as old growth. Old-growth forests range in age from 100 years for species such as aspen, to many hundreds of years for species such as Douglas fir. The diversity of tree and other vegetative species varies considerably, on a site-by-site basis, as does the extent of canopy closure and vertical and horizontal structure. Forest health as viewed in terms of endemic tree mortality generally is a function of tree age; however, insect and disease infestations and adverse climatic condition cause mortality in both young and old forests. High mortality rates are particularly prevalent in the affected areas in eastern Oregon and are described in detail in the *Eastside Forest Ecosystem Health Assessment.*[47]

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[46]W.M. Harlow, E.S. Harrar, and F.M. White. 1979. *Textbook of Dendrology*. McGraw-Hill.
C.S. Schopmeyer. 1989. *Seeds of Woody Plants in the United States*. Ag. Handbook 450.

[47]USDA Forest Service Pacific Northwest Region. 1991. *Eastside Forest Ecosystem Health Assessment.* April 1993.

ENVIRONMENTAL CONSEQUENCES

Forest riparian areas normally constitute a strip along and adjacent to water courses, meadows, and water bodies. Timber harvesting would be permitted in some of these areas--using best management practices and in consideration of other requirements described under Alternative 1. Alternatives 2 through 5 prescribe progressively wider riparian protection areas or RHCAs, in which timber harvesting generally is not permitted. In general, when viewed in the context of forest-wide vegetative conditions and successional time scales, adoption of any of the 5 alternatives during the interim period would have little effect on forest vegetation.

Alternative 1: Under this alternative, implementation of forest plans and LUPs would continue. All proposed projects and management activities would undergo NEPA analyses, which would be presented for formal public review and comment.; and all proposed projects and activities that may affect listed species or adversely affect designated critical habitat would be subject to consultation provisions of the ESA.

The major environmental impact on forest vegetation would result from timber harvesting, which interrupts natural successional stages of stand development and reduces biomass and structural diversity. Because timber harvest would continue to the extent prescribed in current forest plans and LUPs, with modifications made necessary by consultation provisions of the ESA, adoption of this alternative would result in a continuation of the rate at which degradation of riparian and aquatic habitat is occurring. Species composition and structural diversity of forest vegetation following timber harvest is dependent, in part, on the harvest method prescribed in forest plans and LUPs and employed in affected areas. The number of living and dead trees and the amount of material that is involved, which is comprised of down woody material and other vegetation that remains on cut-over areas also depends on the harvest method selected. In general, timber harvest simulates natural events that create an early-seral stage in forest succession. Under this alternative, more overall acreage would be returned to those early stages than under the action alternatives.

Alternative 2: Under this alternative, specific new standards and guidelines regarding timber management projects and activities, logging-slash treatment and the use of prescribed fire, as well as road construction, reconstruction, and maintenance, livestock grazing, and riparian and fish habitat restoration, would apply to proposed projects and activities.

Generally, timber harvesting would not be permitted within riparian areas. The exclusion of proposed timber harvesting in the affected areas would permit the natural succession of forest vegetation and rely more heavily on natural events, such as fire and insect and disease infestations, to influence or shape forest succession. Consequently, increases in tree mortality and the associated risk of fire, insects, and disease would be expected, although less than would be expected under any of the other action alternatives, which provide more extensive protection to riparian areas. However, during the interim period the effect would be minimal.

Alternative 3: Specific new standards and guidelines regarding timber management actions described under Alternative 2 would apply to all proposed projects and activities within RHCAs.

Timber harvesting generally would not be permitted within RHCAs. The exclusion of proposed timber harvesting in RHCAs would permit the natural succession of forest vegetation and rely more heavily on natural events, such as fire and insect and disease infestations, to influence or shape forest succession. Consequently, tree mortality and the

associated risk of fire, insects, and disease could be expected to increase somewhat from levels expected under Alternative 2. However, during the interim period the effect would be minimal.

Alternative 4 (PREFERRED): Specific new standards and guidelines regarding timber management projects and activities described under Alternative 3 would apply to some ongoing projects and activities within RHCAs, as well as all proposed projects and activities.

Timber harvesting generally would not be permitted within RHCAs. The exclusion of proposed timber harvesting in RHCAs--and in other areas where it is determined that such activities would pose an unacceptable risk to aquatic and riparian habitat or anadromous fish--would permit the natural succession of forest vegetation and rely more heavily on natural events, such as fire and insect and disease infestations, to influence or shape such succession. Consequently, tree mortality and the associated risk of fire, insects, and disease could be expected to increase somewhat from levels expected under Alternative 2 or 3. However, during the interim period the effect would be minimal.

Alternative 5: Specific new standards and guidelines regarding timber management projects and activities described under Alternative 3 would apply to all ongoing and proposed projects and activities within RHCAs.

Timber harvesting generally would not be permitted within RHCAs. The exclusion of timber harvesting would permit the natural succession of forest vegetation and rely more heavily on natural events, such as fire and insect and disease infestations, to influence or shape forest succession. Consequently, tree mortality and the associated risk of fire, insects, and disease could be expected to increase from levels expected under the other action alternatives. However, during the interim period the effect would be minimal.

FISHERY RESOURCES

AFFECTED ENVIRONMENT

Within the area considered in this environmental assessment, approximately 16 million acres of lands provide diverse riparian and aquatic habitats for a variety of fish species, including cutthroat, rainbow, brook, brown, golden, and bull trout; sockeye, chinook, and coho salmon, and steelhead trout; and white sturgeon, northern squawfish, suckers, chubs, dace, shiners, sculpins, and other lesser known species.[48] More complete, watershed-specific descriptions of the affected fishery resource environment are included in the forest plans, LUPs, and EISs listed in Appendix D. Several fish species, including many salmon and trout stocks, are threatened, endangered, State-sensitive, or at risk of becoming "special status" species. Of the 214 anadromous fish identified in the AFS published report as at-risk or of special concern, 39 are from California, 58 are from the Oregon coast, 76 are from the Columbia River basin in Idaho, Oregon and Washington, and 41 are from the Washington coast/Puget Sound area. Activities in areas used by those species that are threatened, endangered, or proposed for listing, are subject to ESA provisions that require consultation or special consideration. See

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[48]P.B. Moyle. 1976. *Inland Fishes of California.* Univ. CA Press, Berkeley. C.E. Bond. 1973. *Keys to Oregon Freshwater Fishes.* Tech. Bull 58. OSU Ag. Exp. Sta., Corvallis, OR. R.S. Wydoski and R.R. Whitney. 1979. *Inland Fishes of Washington.* Univ. WA Press, Seattle. J. Simpson and R. Wallace. 1978. *Fishes of Idaho.* Univ. Press of ID, Moscow.

pages 1-11 above for further description of recent studies on aquatic and riparian habitat degradation and anadromous fish population declines.

Generally, State agencies manage fish resources, although sovereign Tribes and some regulatory Federal agencies also have responsibility for management of fishery resources. The Agencies' responsibilities are focused on management of habitat that is within their jurisdictions. Close cooperation among the various other agencies, governments, and jurisdictions is necessary to provide proper management of fishery resources.

Anadromous fish are widely distributed throughout the area and tend to thrive in streams that are characteristic of most watersheds within the area of consideration. Figure 1 shows known anadromous watersheds within the proposed area. Anadromous fish require a marine environment to complete their life cycles, and they spend varying amounts of time in the ocean during their major growth phase. Over the past 50-80 years, freshwater anadromous fish habitats have been adversely affected by human population growth and factors associated with that growth.

Generally, anadromous fish streams currently contain 30-70 percent fewer large, deep pools, more fine sediments in spawning gravels, and greater disturbance of riparian vegetation than is acceptable. As a result, the fish habitat capability of those streams has diminished. The number of anadromous fish returning to freshwater systems has declined substantially from the levels recorded in years past. This decline stems from a variety of factors, including excessive ocean and freshwater harvest, habitat losses from logging, grazing, mining, recreation, and other surface-disturbing activities, genetic and disease problems associated with hatchery supplementation efforts, and problems with passage and flow associated with hydropower installations and other impoundment and diversion facilities located in critical watersheds. Future human population growth is expected to continue to increase pressures on these habitats. Management changes that work to improve habitat capability and fish populations will be necessary to ameliorate these pressures.

ENVIRONMENTAL CONSEQUENCES

Anticipated effects on anadromous fish and riparian and aquatic habitats traditionally have been estimated by the effects on representative habitats and species. By ensuring that such representative habitats and species are adequately considered, sufficient habitat quality and diversity are presumed to exist where all species using similar habitats are protected and/or restored. Adoption of alternatives presented here would serve, by varying degrees, to preserve or restore existing riparian and aquatic habitats and related aquatic resources, with special emphasis on anadromous fish habitat. To gain a crucial perspective on how best to manage riparian and aquatic habitat, it is necessary not only to focus on specific representative habitats and species, but also on those habitats' processes and functions.

Management activities can adversely affect fishery habitats and fish populations by altering riparian vegetation amount, composition, diversity and vigor, reducing streambank vegetation and cover, reducing streambank stability, modifying water quantity, timing, and quality, and by changing delivery of structural elements, nutrients, and sediments to the water. Livestock grazing, timber harvest, and recreational use, with their associated road building and site development, are the most prevalent activities affecting riparian and aquatic habitats and anadromous fish populations. Application of management constraints or prescriptions serves to alleviate problems with habitat and anadromous fish populations. Improvements in habitat

quality and quantity and anadromous fish population diversity and abundance can result from application of management prescriptions that produce improved riparian health and increased aquatic habitat diversity.

Alternative 1: Under this alternative, the effects of ongoing and proposed projects and activities would continue, pursuant to guidance provided in current forest plans and LUPs, and in compliance with NEPA procedures and ESA provisions. Direct, indirect, and cumulative effects to fishery resources--from grazing, timber harvesting, recreation uses, mining, and other discretionary activities--would be expected to continue at current levels.

The severity of effects on fisheries and aquatic and riparian habitat would be proportional to the level of ground-disturbing activities associated with ongoing and future activities that are permitted within riparian areas. Overall trends in habitat degradation and declines in anadromous fish populations indicate that ESA provisions may result in modifications to projects and activities, amendments to current regional guides and forest plans and LUPs where anadromous fish already are listed, and the listing of additional species in the near future.

Alternative 2: Under this alternative, specific new standards and guidelines would apply to proposed livestock grazing, logging slash treatment and the use of prescribed fire, road construction and reconstruction, and riparian and fish-habitat restoration. Other proposed projects and activities, and all ongoing projects and activities, would continue, pursuant to guidance provided in current forest plans and LUPs, and in compliance with NEPA procedures and consultation provisions of the ESA.

The effects of this alternative on anadromous fish habitat would be related to the level of permitted ground-disturbing activities associated with future livestock grazing, logging slash treatment and prescribed fire, road systems, and riparian and fish habitat restoration activities within riparian areas. It would see that these kinds of proposed projects and activities would meet standards and guidelines that are designed to prevent further stream degradation.

Because the scope of this alternative is limited to certain kinds of proposed projects and activities, expected beneficial effects on anadromous fish habitat would be limited and randomly dispersed over the planning area. Localized benefits to anadromous fish habitat could be large where large percentages of proposed projects and activities occur within affected watersheds. However, improvements in anadromous fish habitat condition are gradual, and can take decades.

Alternative 3: Because this alternative would broaden the scope of management direction to include new standards and guidelines for all proposed projects and activities within RHCAs or that degrade RHCAs, and because RHCAs would be established in all watersheds and would be larger in Key Watersheds, some measure of additional protection of riparian and aquatic habitat and anadromous fish would occur.

Adoption of this alternative would not result in permanently foregoing any proposed activity within the RHCAs, but some actions could be deferred or modified during the interim period, resulting in a slight, short-term beneficial effect on certain anadromous fish species. Ongoing projects and activities would not be modified as a result of interim direction. No measurable effects on riparian or aquatic habitat would be expected, although potential benefits would include incremental improvements resulting from modifications to proposed projects and

activities and from proposed riparian restoration projects. Although improved aquatic habitat condition and the attainment of RMOs eventually would be an expected result of this management direction, such benefits would not be achieved through adoption during the interim period, nor would the rate of restoration be increased substantially.

Alternative 4 (PREFERRED): Because this alternative would broaden the application of management direction by including new standards and guidelines to all proposed projects and activities and some ongoing projects and activities within RHCAs or that degrade RHCAs, and because large RHCAs would be established in all Key Watersheds, additional protection of riparian and aquatic habitat would occur.

Although there would be no permanent cessation of activities in RHCAs, some actions would be modified or deferred during the interim period. As a result, some adverse effects on riparian and aquatic habitats within RHCAs would be reduced. Because the restoration of riparian and aquatic habitat complexity typically occurs over a much longer time than is considered in this environmental assessment, benefits through adoption during the interim period would be expected to be negligible. However, because case-by-case reviews would be made of ongoing actions, and those actions determined to pose an unacceptable risk would be modified, some benefits to anadromous fish populations, including a reduction in risks, would be expected.

Potential benefits would include the initiation of riparian vegetative recovery that would result from a reduction in human activities and livestock use within riparian areas. Although this eventually would result in improved aquatic habitat condition and the attainment of RMOs, such benefits would not likely be apparent during the interim period.

Alternative 5: Because this alternative would broaden the scope of management direction to include new standards and guidelines for all proposed and ongoing projects and activities within RHCAs or that degrade RHCAs, and because large RHCAs would be established in all watersheds, additional protection of riparian and aquatic habitat would occur, and the associated risks associated with management would be reduced.

Although there would be no permanent cessation of activities, some actions would be modified or deferred during the interim period. As a result, some adverse effects on riparian and aquatic habitats within RHCAs would be reduced. Because the restoration of riparian and aquatic habitat complexity typically occurs over a much longer time than is considered in this environmental assessment, benefits through implementation during the interim period would be expected to be negligible. However, because large RHCAs would be established in all anadromous watersheds, and because all ongoing and proposed actions would be modified as needed to comply with the management direction, some benefits, including a reduction in risks to anadromous fish populations, would be expected.

Potential benefits would include the initiation of riparian vegetative recovery that would result from a reduction in human activities and livestock use within riparian areas. Although this eventually would result in improved aquatic habitat condition and the attainment of RMOs, such benefits would not likely be apparent through implementation during the interim period.

THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Numerous threatened, endangered, and sensitive plant species occur within the proposed project area (50 CFR 17.12).[49] Projects that might affect plant species listed as threatened or endangered under the Endangered Species Act are subject to consultation with FWS. To avoid negative effects on individual plants or populations, projects sometimes are modified or, in some rare instances, cancelled. Generally, plant species designated as "sensitive" by the Agencies are inventoried during project planning, so that potential impacts can be avoided or mitigated. None of the proposed alternatives would affect this direction.

A number of threatened, endangered, and sensitive terrestrial vertebrate and invertebrate species occur on lands administered by the Agencies (50 CFR 17.11). Among the federally-listed threatened and endangered species that occur within the area are bald eagle, peregrine falcon, grizzly bear, and gray wolf. More complete, watershed-specific descriptions of the affected threatened, endangered, and sensitive species environment are included in the forest plans, LUPs, and EISs listed in Appendix D.

Under the ESA, activities that may have an effect on threatened or endangered wildlife species are subject to consultation with FWS or NMFS. Requirements for consultation would remain in effect under any of the interim strategies. Management of sensitive wildlife species varies by national forest or BLM district, and usually is conducted in cooperation with State wildlife agencies. On lands administered by the Agencies, managers are directed to plan and implement projects in ways which would avoid impacts which could move any species towards Federal listing.

The Agencies have concluded consultation with FWS and NMFS on the effect of the proposed action on listed species. The FWS, through a letter of concurrence, found that the proposed action would have a neutral or beneficial effect on listed species under their jurisdiction.[50] NMFS, through a biological opinion, has determined that the proposed action is not likely to jeopardize the continued existence of listed species under their jurisdiction or result in destruction or adverse modification of critical habitat.[51]

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[49]R.J. Meinke. 1982. *Threatened and endangered vascular plants of Oregon: an illustrated guide.* U.S. Fish and Wildlife Service.

[50]Letter to Forest Service Chief Jack Ward thomas, dated June 27, 1994, from Fish and Wildlife Service, Portland, OR, signed by Regional director Marvin L. Plenert.

[51]NMFS Biological Opinion, dated January 23, 1995.

WILDLIFE RESOURCES

AFFECTED ENVIRONMENT

The 15 national forests and 7 BLM districts included in the proposal provide an array of wildlife habitats, ranging from the alpine meadows and mesic, old-growth coniferous forests of northern Washington and Idaho to the semi-arid sagebrush steppes, alkali flats, and volcanic formations of the Great Basin and northern California. These diverse landforms and plant communities, in turn, support a large number of species. For example, over 400 species of terrestrial vertebrates have been identified on the Okanogan National Forest (Okanogan Land and Resource Management Plan, 1989). More complete, watershed-specific descriptions of the affected wildlife environment are included in the forest plans, LUPs, and EISs listed in Appendix D.

During the preparation of forest plans, indicator species were selected to represent either featured species or groups of species that respond to environmental variables in similar ways. Specific allocations and management practices were established to contribute to the continued viability and sustainability of indicators and the species groups they represent. More than 30 bird, mammal, and amphibian indicator species are identified in the forest plans. Many of these species have either complex habitat requirements or are closely associated with unique or scarce habitats. Riparian habitats are critical to the conservation of many species in the more arid interior portions of the West and, in general, support greater species richness and density than any other habitat type. Riparian habitats in the West are in short supply, both naturally and as a result of human manipulation, and account for less than 10 percent of the total land base considered in this environmental assessment.

Many indicator species are considered old-growth-associated or old-growth-dependent. A combination of circumstances (including steep slopes, inaccessibility and/or long fire-return intervals) have resulted in the survival of remnant old-growth stands along many streams in the inland Northwest. Although often highly fragmented, these stringers of late-successional forest still provide micro-climates and forest structure important for a variety of species--from salamanders to bald eagles to Rocky Mountain elk.

ENVIRONMENTAL CONSEQUENCES

Any of the action alternatives would have potential beneficial effects on wildlife habitats and populations, either by avoiding habitat loss, allowing incremental improvement of degraded habitat in the absence of further disturbance, providing the potential for increased reproductive success (on a site-specific basis), or simply by the retention of options for future protection under measures prescribed in the geographically-specific environmental analyses. However, the degree of benefit varies by alternative.

Alternative 1: Current forest plans and LUPs would remain in effect. Standards and guidelines within those plans call for protection of wildlife species and their habitats, as do ESA provisions. Both would govern proposed and ongoing projects and activities. No change of benefit or risk would be expected to result from project implementation.

Alternative 2: This alternative applies the aquatic and riparian components of the "watershed and fish habitat emphasis option," which were developed by the Scientific Panel on Late-Successional Forest Ecosystems, to anadromous watersheds considered in this environmental assessment. This strategy would augment reserve areas already in place for indicator species and maintain important refugia for other species, including big-game hiding cover.

Because the construction of new roads would be minimized, habitat effectiveness and reduced stresses on big-game species would increase, particularly during hunting seasons.

Because restrictions on livestock grazing, timber management, logging slash treatment and prescribed fire, road systems construction and reconstruction, and riparian and fish-habitat restoration would apply to proposed projects and activities only, substantial improvements in riparian wildlife habitats would not be expected during the interim period.

Alternative 3: Standards, guidelines, and procedures for riparian habitat conservation would apply to all proposed projects and activities. Such measures would contribute to the protection of wildlife species and their habitats, although the effects of adoption during the interim period would likely not be measurable.

Alternative 4 (PREFERRED): Standards, guidelines, and procedures for riparian habitat conservation would apply to all proposed projects and activities and those ongoing projects and activities within RHCAs that are determined to pose unacceptable risk to anadromous fish stocks. Because RHCAs would be designated within all watersheds, and larger RHCAs would be established in Key Watersheds, the distribution and size of those areas would contribute to the protection of wildlife species and their habitats. However, during the interim period the effects of adoption likely would not be measurable.

Modifications to livestock grazing programs, although representing only about 4 percent of current AUMs, are within RHCAs. Generally, this small decrease would have very little effect on wildlife habitat, except perhaps within those specific local project areas where unacceptable impacts are occurring. Some benefits to habitats and populations would result from road closures, but overall beneficial effects would be expected to be small.

Alternative 5: Standards, guidelines, and procedures for riparian habitat conservation would apply to all proposed projects and activities, as well as all ongoing projects or activities. Because large RHCAs would be designated within all watersheds, the distribution and size of those areas would contribute to the protection of wildlife species and their habitats. However the effects of adoption during the interim likely would not be measurable.

Changes to livestock grazing programs, although representing only about 8-10 percent of the total AUMs, would be within RHCAs. Generally, this small decrease would have very little effect on wildlife habitat, except perhaps within those specific local project areas where unacceptable impacts are occurring. Some benefits to habitats and populations would result from road closures, but overall beneficial effects would be expected to be small.

SOCIAL

SOCIAL VALUES

A wide range of social values are assigned to the resources administered by the Agencies. More complete, watershed-specific descriptions of these values are included in the forest plans, LUPs, and EISs listed in Appendix D.

Hoover (1993)[52] has provided an overview of non-economic values that are assigned to anadromous fish in the Pacific Northwest, by both native and non-native peoples. Symbolic values, cultural and spiritual values, subsistence uses, and psychological and social benefits describe some of the importance that people assign to those species.

In an attempt to prevent further degradation of anadromous fish habitat and declines in fish populations, the Agencies also are seeking an appropriate means of preventing losses in the social, cultural, and psychological investment that people have made in anadromous fish.

However, during the interim period, adoption of any of the alternatives likely would have no direct or immediate effect on any human values associated with anadromous fish. Such effects would be brought about by the presence or absence of fish. Modifications in management practices affect habitat conditions only gradually, and changes in habitat conditions, whether positive or negative, bring about changes in fish populations only over a period of years. For this reason, the best available information suggests that adoption of any of the alternatives considered in this environmental assessment would be of little consequence during the interim period. Perhaps the greatest effect that adoption of an interim strategy would have on those people and communities that value anadromous fish would be associated with the perception that action was being taken to protect a valued resource.

Others in the Pacific Northwest feel that their lifestyle and economic stability are threatened by actions such as are proposed in this environmental assessment, as well as a variety of other Federal actions, such as Rangeland Reform, Northern Spotted Owl ROD, and provisions of the Endangered Species Act. Some local communities and individuals believe that recent changes in natural resource management on Federal lands are designed to remove users and to redefine the relationship between Federal land management agencies and traditional user groups.

A variety of factors contributes to social stress and disruption, but perhaps none is so pervasive as the prospect of unprecedented change. Involuntary changes in lifestyle, impending threats to independence and financial stability, and direct confrontation with values and motives other than our own, often lead to stasis and social uncertainty. The prospects seem unequivocal:

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[52]A.P. Hoover. 1993. *Non-economic values of Pacific salmon and steelhead: U.S. Forest Service Pacific salmon and steelhead habitat management strategy*. Paper prepared for the PACFISH Washington Office Working Group. Policy Analysis Staff.

job losses, a kind of Federal management that would seem to be taking away the availability of predictable volumes of raw materials and our open access to public lands and resources, for the possible protection of species other than our own.

Effects that the interim strategies considered in this environmental assessment would have on the human community would vary, depending on the Agencies' capacity to adapt to internal and external forces, as well as the consequences of adopting any of them. A community's capacity to adapt to such forces depends on its ability to pursue collective goals, the skills, experience, and educational levels of people in the community; the size and diversity of local businesses; and access to financial capital, transportation, markets, and raw materials.

Generally, small, isolated communities are more vulnerable to external forces due to their less active leadership, weaker links to centers of political and economic influence, lower levels of economic diversity, and lack of control over resources and capital. Small communities are more likely to experience unemployment, increased poverty, and social disruption in the face of shifts in natural resource management policy.

The social effects of adopting any of the alternatives would be manifested in a variety of ways. Because the amount of real change in resource use during the interim period would be relatively small, it is not anticipated that adoption of any of the alternatives would have substantial positive or negative social implications. Further, any social effects would differ from individual to individual and community to community.

CULTURAL RESOURCES

Watershed-specific descriptions of the cultural resources (e.g., archaeological and historical sites) within the proposed action area are included in the forest plans, LUPs, and EISs listed in Appendix D. Effects to cultural resource sites include direct, indirect, and cumulative impacts that would result from either intentional or inadvertent damage to those sites. In general, such effects would be the result of ground-disturbing activities in the vicinity of cultural resources. Such activities are constrained by forest plan and LUP standards and guidelines. Surveys for archaeological resources are accomplished prior to approval of ground-disturbing projects and activities. However, there is a potential for effects on this resource when ground-disturbing projects and activities are implemented. The action alternatives, by varying degrees, would provide additional, incremental protection to cultural resources in riparian and associated upland areas, depending on the application of standards and guidelines and the size of riparian areas or RHCAs in which they are principally applied. However, during the interim period, no alternative would be expected to substantially threaten or benefit cultural resources. Alternatives 2 and 3 would provide some additional measure of protection to cultural resources by applying additional standards, guidelines, and procedures to proposed projects and activities. Alternative 4 (Preferred) would increase the benefits by also applying these provisions to some ongoing activities. Alternative 5 would offer the most additional protection by applying management direction to all proposed and ongoing projects and activities, and by establishing large RHCAs within all anadromous watersheds on lands administered by the Agencies.

WILD AND SCENIC RIVERS

Watershed-specific descriptions of the Wild and Scenic Rivers System within the proposed action area are included in the forest plans, LUPs, and EISs listed in Appendix D. Waters included in, or determined eligible for inclusion in, the National Wild and Scenic Rivers System are governed by legislation, regulations, and management plans designed to achieve goals and objectives similar to those considered in Alternatives 2-5. Anadromous fish typically are considered to be "outstandingly remarkable" features of waters in the System. Wild and Scenic River corridors always are wholly included within the definition of riparian areas described in Alternative 2, and of RHCAs described in Alternatives 3-5. Therefore, adoption of any alternative would have essentially no direct effect on the condition or response of Wild and Scenic Rivers. Indirect and cumulative effects also would be negligible.

INDIAN TRIBES

Indian Tribal governments in Oregon, Washington, and Idaho have interests in the planning area (see Table 2). Several of these governments have reserved certain off-reservation rights involving resources on Federal lands managed by the Agencies; the Klamath Tribe exercises rights in former reservation lands. All of the Tribal governments maintain interests in the management of Federal lands and resources, beyond the scope of treaty-reserved rights, which include protection of sacred areas, burial locations, and archaeological sites, as well as the perpetuation of traditional practices. Further description of the affected Indian Tribes are included in the forest plans, LUPs, and EISs listed in Appendix D.

Treaties negotiated in Oregon and Washington between 1851 and 1855 enumerated a variety of specific reserved rights in addition to the reservation of lands as homes for the tribes. Treaties with the Warm Springs, Umatilla, Nez Perce, and Yakama reserve the right to fish, hunt, gather roots and berries, pasture horses and cattle, and erect temporary buildings for curing fish in off-reservation areas. More specific to fishing, the Warm Springs and Umatilla treaties state as follows:

> "Provided also, that the exclusive right of taking fish in the streams running through and bordering said reservation is hereby secured to said Indians, and at all other usual and accustomed stations in common with citizens of the United States, and of erecting suitable buildings for curing the same."

The Yakama and Nez Perce treaties include slight variations of the language. The scope and extent of fishing at "usual and accustomed places in common with citizens" have been defined through numerous court decisions. Exclusive rights to certain resources are limited to streams running through or bordering reservations, whereas other rights off-reservation are to be shared with non-Indians. One primary intent of the treaties was to provide a right of access to the tribes' resources and a certain share of those resources. The Fort Bridger treaty only addresses off-reservation hunting, but has been held by the Supreme Court of Idaho to include the right to fish as well as the right to hunt.

Even though the Klamath Tribe was terminated in 1964, the courts have held that the Tribe retained hunting, fishing, and trapping rights on former reservation lands still in public ownership (the Winema National Forest). The Klamath Tribe was restored to Federal recognition in 1986.

The courts, Federal legislation, and policy of the Department of the Interior recognize that Federal land managing agencies have a continuing trust responsibility to honor the terms of the treaties and to protect the rights of Indian governments, as well as the resources subject to those rights. In addition, a number of laws, court decisions, and executive orders have increasingly sustained the rights of Tribal governments in public resources. There is an obligation and a responsibility for Federal agencies to consult, cooperate, and coordinate resource management programs and activities upon public lands with Tribes with reserved treaty rights or other interests in those lands.

The five alternatives offer increasingly protective management strategies for trust resources, with Alternative 5 being most protective. Perpetuation of the ability to exercise treaty rights is legally guaranteed under all alternatives, but Alternatives 3-5 offer greater flexibility in the exercise of those rights and the conducting of other traditional practices on Federal lands. The sections addressing water quality and water resources, fisheries, plants, riparian areas, and wildlife address the impacts more specifically.

Other Tribal heritage concerns, including protection of archaeological sites and locations of religious importance, are considered in the cultural resources and social values sections.

Table 2 - Tribal Governments Affected by Proposed Interim Direction

Pacific Northwest Tribal Governments

+ Confederated Tribes of the Warm Springs Reservation, *Treaty of Middle Oregon*, 1855. (12 Stat 963)
+ Klamath Indian Tribe of Oregon, *Klamath Treaty of 1864* (16 Stat 7 07)
+ Confederated Tribes of the Umatilla Indian Reservation, *Walla-Walla, Cayuse Treaty of 1855.* (12 Stat 945)
+ Nez Perce Tribe, *Nez Perce Treaty of 1855* (12 Stat 957)
+ Yakama Nation, *Yakama Treaty of 1855* (12 Stat 951)
+ Confederated Salish and Kootenai Tribes of the Flathead Reservation, *Treaty with the Flatheads of 1855* (12 Stat 975)
+ Northwestern Band of Shoshoni Nation, *Treaty of 1868*

Shoshone-Bannock Tribes of the Fort Hall Reservation, *Treaty with the Eastern Band Shoshoni and Bannock of 1868*
Confederated Tribes of the Colville Reservation, Executive Order of April 9, 1872
Spokane Tribe, Executive Order of March 23, 1914
Kalispel Indian Community, Executive Order of March 23, 1914
Burns Paiute Tribe, Executive Order of 1897
Coure D'Alene Tribe, Executive Order of January 18, 1881
Kootenai Tribe of Idaho, Executive Order of March 8, 1859

California Tribal Governments

Alturas Rancheria (Pit River Tribe), Act of June 21, 1906 (34 Stat 325-333)
Big Bend Rancheria (Pit River Tribe), Act of June 21, 1906
Big Lagoon (Yurok-Tolowa Tribes), Restored December 15, 1983
Colusa Rancheria (Wintun), Secretarial action. June 21, 1907
+ Greenville Rancheria (Maidu), Restored December 22, 1983
+ Grindstone Creek Rancheria (Nomalaki-Wintu-Wailaki-Nuimok), Act of June 21, 1906
+ Jackson Rancheria (Miwok), Act of March 3, 1893
+ Lookout Rancheria (Miwok) Act of June 21, 1906
+ Montgomery Creek Rancheria (Madesi Band of Pit River), Act of June 30, 1913
+ Mooretown Rancheria (Maidu), restored December 22, 1983
+ Pit River Tribe of California
+ Redding Rancheria (Wintu/Pit River), restored December 15, 1983

Roaring Creek Rancheria (Pit River Tribes), Act of August 31, 1915
Covelo Indian Community (Yuki/Pit River/Achomawi/Pomo/Konkow/Wylacki/Nomalaki/Wintun), Act of April 8, 1864
Rumsey Rancheria (Wintun), Act of 1907
Sheep Ranch (Miwok), established April 5, 1916
Shingle Springs Rancheria (Miwok), established December 16, 1916
Susanville Rancheria (Paiute, Maidu, Pit River, Achomawi, Atsugewi, Washoe), established August 15, 1923
Tuolumne Rancheria (Miwok, Yokut), Act of June 21, 1906
Chico Rancheria (Wailaki and Maidu)
Guidiville Rancheria (Northern Pomo)
Lytton Rancheria (Pomo)
Scotts Valley Rancheria (Northern Pomo)

+ Tribes with off-reservation treaty rights

ECONOMIC

The economic effects analysis presents, by alternative, information about impacts to resources that would be expected to result from interim direction as it applies to timber, range, and recreation programs. Estimated effects on physical output levels and budget costs to the Agencies that would result from interim direction are reported by alternative. Further consideration of changes in outputs and costs to the Agencies will be developed, analyzed, and displayed in more complete economic studies, which will be prepared for the geographically-specific environmental analyses.

An essential concept used to conduct the economic analysis is incremental change. The resource impacts presented are estimates attributable only to the adoption of interim direction. Decisions already made and actions already taken--to provide some degree of protection to aquatic and riparian ecosystems and anadromous fish habitat--are part of the baseline for assessing the economic effects of interim direction. Those prior decisions and actions already are in place and will continue to have their effect, regardless of whether interim direction is adopted. The focus of the economic effects discussion in this environmental assessment is to identify the additional or incremental effects that may be expected as a result of interim direction. Because of ESA requirements and the presence of listed anadromous fish stocks, both Agencies' field units in the Snake River Basin generally are operating under more stringent management requirements than are called for under current forest plans or LUPs. These units already have experienced reductions in many activities and output levels as a result of consultation and other ESA provisions. This environmental assessment examines the incremental economic effects that can be expected, over and above those brought about by actions that will proceed regardless of interim direction.

With a proposal of this nature, there are two main categories of economic interest. The first category is concerned with changes in economic value to society, as reflected by changes in actual revenue and cash flows (market prices and administrative fees) and by changes in economic value to individuals which are not measured by market prices (nonmarket values). The second category includes changes in levels of economic activity (employment and income) that are associated with potential modifications in management actions. More complete descriptions of the affected economic environment (including economic values and economic activity levels) are included in the forest plans, LUPs, and EISs listed in Appendix D.

The alternatives analyzed in this document include management and mitigation measures that may affect the way Agency-administered lands are used. As a result, adoption of any alternative would in some way affect the associated production of consumer goods and services from those lands. Effects on environmental goods and services, such as healthy and abundant anadromous fish populations and clean water, are considered in previous discussions of the effects on the physical and biological environment. Consumer goods and services have economic values associated with them. They may be marketed directly, as is the case with timber stumpage. They may be subject to prices that are administratively set, such as for livestock grazing on public lands or for camping in developed campsites. These administrative fees do not generally capture the full economic value of the goods or services. Finally, some goods or services may provide aesthetic or other benefits that are not purchased directly but for which people would still be willing to pay, such as river floating or driving for pleasure. This "consumer surplus" is another way to measure economic value associated with goods and services.

The alternatives also would have direct budget costs associated with them. These costs are economically relevant, but are discussed under Agency Effects.

The geographic area described in this environmental assessment includes large parts of four States, and is economically complex. There are substantial amounts of timber, forage, recreation, water, fish, wildlife, minerals, and other resources or resource uses provided from national forest and BLM lands in the area under consideration. The economic value associated with these resources uses is substantial. State and private lands provide additional amounts of many of those resources and resource uses, but those uses are not addressed in this document because the management direction applies only to lands administered by the Agencies.

The total geographic area also encompasses many cities, towns, and rural populated areas. Each of these population centers or areas has its own economic structure, which is integrated with a wider subregional economy, which, in turn, is part of an even larger regional economy. All are affected by State, national, and international economic activity and events to a greater or lesser degree.

ECONOMIC VALUES

The Agencies used preliminary analyses conducted by field and research economists[53] and modified for the purposes of this environmental analysis,[54] to assess potential effects of the proposed alternatives on market and non-market economic values. The available information relates primarily to expected changes over the interim period in outputs of timber, use of grazing lands, and recreation use on the national forests and BLM districts. Some information also is available regarding changes in mineral exploration and development activities. The estimated resource changes displayed in Table 3 focus on timber, range, and recreation activities because the greatest impacts during the interim period would be expected there. Impacts from mineral exploration and development activities, development of small hydroelectric sites, or new road or trail construction would not be expected to be substantial during the interim period. Long-term resource impacts will be examined in detail in the geographically-specific environmental analyses.

Some indication of the estimated direct revenue and non-market economic values associated with the timber, range, and recreation programs is possible. These figures do not constitute the basis for an economic analysis in the classical sense of the term. Rather, they are broad indicators of the magnitude of economic value changes that may be expected over the interim period. There are other economic benefits and values that will be experienced in the longer term if anadromous fish habitat degradation and the decline of anadromous fish populations is slowed, stopped, and reversed. These values would include increased recreational fishing opportunities, success rates, and quality of experience; increased fish availability for commercial and subsistence fisheries; and increased existence and option values (passive-use values) for people who would not necessarily use the fisheries directly, but value the fact that they exist and would exist in a healthier state.

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[53]Report by C.S. Hansen-Murray, N.A. Bolon, and R.W. Haynes, cited in footnote 43.

[54]Process paper cited in footnote 42.

There are also other economic direct and opportunity costs that may be experienced in the interim period that were not measured or available. These could include such things as higher costs of operation of minerals development, changes in operation of existing permitted hydroelectric facilities, and delay in development of proposed hydro sites. A major cost area not analyzed for this environmental assessment is that of road closures and the probable effects on various resource activities and uses. These costs will be examined in the geographically-specific environmental analyses.

Table 3. Comparison of Changes in Resource Yields by Alternative.

Alternative	Recreation Use (M RVDs)	Timber Harvested (MMBF)	Animals Grazed (M AUMs)
1	0	0	0
2	-710.4	-27	0
3	-789.3	-36	0
4	-789.3	-58	-42.1
5	-868.2	-81	-84.2

Under current law, 25 percent of the gross receipts collected by the Forest Service from timber sales, grazing permits, campground fees, and other special use permits are returned to the counties which contain the National Forest System lands (based on all receipts over an entire year for the forest). The payments to counties are based on **gross** receipts. In the case of timber stumpage payments, gross receipts are defined by law to include not only the stumpage payments, but also the purchaser road credits going to timber purchasers. (Purchaser road credits allow timber purchasers to deduct a certain amount of the costs they incur for building timber harvest roads from the price they pay to the U.S. government for the timber stumpage they have purchased.) These payments to counties are transfer payments from the Federal government back to the local governments. They are not additive to revenue effects from changes in use of the Federal lands, but are a subset of the changes in the level of those revenues collected.

For BLM lands within the geographic scope covered by this EA, timber receipts are not shared with local governments. However, under the Taylor Grazing Act, receipts from grazing permits and leases administered by the BLM are shared with the States where the fees are collected. For fees from grazing permits within grazing districts 12.5 percent is returned to the States. For fees from grazing leases outside grazing districts, 50 percent is returned to the States. The changes in resource outputs and associated market and non-market economic values for timber, range, and recreation resources are discussed below.

Effects on Timber Harvesting: The timber harvest change estimate reflects the number of timber sales that would be partly or totally deferred, suspended, or relocated during the interim period. Only the Clearwater, Nez Perce, and the Malheur National Forests, and the BLM Coeur d'Alene District reported expected deferment of planned or cancellation of active timber sales; of that total, about 90 percent would be from the Clearwater. It is expected that less than 2 percent of the affected sales would be on BLM-administered lands. Timber yields would be reduced by 27 million board feet (mmbf) under Alternative 2, by 36 mmbf under Alternative 3, 58 mmbf under Alternative 4, and by 81 mmbf under Alternative 5. In addition, up to 50 miles of road construction and reconstruction would be affected.

Recent timber price calculations made for the upcoming Resources Program and Assessment (RPA) 1995 updates indicate that stumpage values foregone (which reflect gross revenues) would be about $3.7 million under Alternative 2 and increase to about $11.0 million under Alternative 5 (in 1993 dollars). Recent analysis of timber prices[55] also indicates there is about a 20 percent increment of consumer surplus value on timber prices, compared with straight stumpage values. Timber values foregone for the interim period, including consumer surplus, would be about $4.2 million under Alternative 2 and increase to about $12.6 million under Alternative 5 (in 1993 dollars).

Timber harvest reductions would be accompanied by reductions in the 25 percent payments to counties from timber harvested on National Forest System lands. For the 18-month period of interim direction, this reduction in payments to counties would range from about $900,000, plus 25 percent of any purchaser road credits, for Alternative 2, up to about $2.7 million, plus 25 percent of any purchaser road credits, for Alternative 5. This impact would be concentrated in the north-central Idaho counties that have National Forest System lands in the Clearwater and Nez Perce National Forests, as these two forests account for almost 94 percent of the estimated timber harvest reductions that would be associated with the adoption of the proposed interim direction.

The Agencies might incur costs for compensating timber purchasers holding existing contracts for active or awarded sales (sales under contract). Field units report that sales under contract are limited to 45 mmbf of timber on the Clearwater National Forest. Under Alternatives 1, 2, and 3, no active or awarded sales would be cancelled, and there would be no potential cost for compensation. The economic analysis assumes that under Alternative 4, half of the sales under contract (22.5 mmbf) might be cancelled, and that under Alternative 5, all sales under contract (45 mmbf) might be cancelled. The potential cost for compensation for cancelled contracts would depend heavily on sale-specific conditions and on the difference between recent 6-month average bid prices for stumpage and the value of stumpage under contract at the the time of sale cancellation. While specific cost estimates are not possible to make at this time, the range of sale cancellation costs would be about $225,000 to $450,000 for Alternative 4, and $450,000 to $900,000 for Alternative 5.

Effects on Range Resources: Alternatives 1-3 would not require adjusting ongoing livestock grazing activities. Therefore, no changes in grazing use during the interim period, as measured in AUMs, would be expected. The changes in grazing use under Alternatives 4 and

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[55]R.W. Haynes. 1993. *Personal Communication*. Forestry Sciences Laboratory, PNW, Portland, OR.

5 would be spread across 13 of the 21 national forests and BLM districts and would occur within the anadromous watersheds. Individual unit changes range from under 5 percent to over 30 percent. For the entire grazing program in anadromous watersheds across all units considered in this environmental assessment, estimated changes would range from 6-12 percent decreases. This translates to decreases of 42.1 thousand AUMs under Alternative 4, and 84.2 thousand AUMs under Alternative 5. Approximately 9 percent of the estimated reduction in AUMs is anticipated to occur on BLM-administered lands.

Fee income from grazing use that would be foregone by the Agencies would be $0 for Alternatives 1-3, and from about $90 thousand under Alternative 4 (Preferred) to about $180 thousand under Alternative 5 (in 1993 dollars). Grazing fees are set by administrative formula and are significantly below comparable private market values. The "fair market rental values" are estimated to be 2-3 times higher than the administrative price. There are not good consumer surplus studies for range values, although a study using linear programming and ranch budgeting[56] showed shadow prices of forage ranging between $6 and $12 (1993 dollars) per AUM for the geographic area considered in this environmental assessment. "Fair market values" from grazing use that would be foregone would be $0 under Alternatives 1-3, about $230 thousand under Alternative 4 (Preferred), and about $460 thousand under Alternative 5 (in 1993 dollars).

Grazing reductions would be accompanied by reductions in the payments shares to counties and States--primarily in 25 percent payments to counties--as grazing reductions on National Forest System lands would account for about 94 percent of the total. For the 18-month period of interim direction, there would be no reduction in these payments for Alternatives 1-3. The reduction would be about $22,500 for Alternative 4 and about $45,000 for Alternative 5, spread across a large number of the counties within the geographic scope of this EA.

Effects on Recreation Resources: Changes in recreation use would be concentrated along rivers and streams. Areas most affected would be developed and dispersed camping, boating and floating, and fishing. Changes would come from seasonal closures or permanent closures necessary to meet the proposed alternative standards and guidelines and riparian management objectives.

Almost 85 percent of the estimated change in recreation use during the interim period would be on the Wallowa-Whitman, Los Padres, and Boise National Forests. The balance of the expected changes would occur on the Prineville BLM District and the Clearwater and Malheur National Forests. About 9 percent of the estimated reduction in recreation use would occur on BLM-administered lands. Individual unit changes would range from under 5 percent to over 30 percent. For recreation use in anadromous watersheds across all units covered by the proposed action, the estimated changes range between 5 percent and 6 percent. This translates to 710.4 thousand RVDs under Alternative 2, 789.3 thousand RVDs under Alternatives 3 and 4, and 868.2 thousand RVDs under Alternative 5.

As suggested by these figures, there would be little expected difference among the alternatives during the interim period. Alternative 2 would provide for somewhat less stringent consideration of recreation uses in the anadromous watersheds. Alternative 5 would extend

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[56]W.F. Hahn, T.L. Crawford, K.E. Nelson, and R.A. Bowe, 1989. *USDA Economic Research Staff Report 89-51*. (Also available from Range Management Staff, USDA Forest Service, Washington, D.C.)

more protection to intermittent streams and small wetlands. This would result in a somewhat greater effect, primarily on dispersed camping uses in those areas.

Sufficient data were not available to determine expected revenues foregone from developed campground use that would not be allowed during the interim period. Recreation values are represented primarily by consumer surplus, because only a small part is paid as fee-for-use, typically in developed facility settings. They are predominantly "non-market" values. Recreation values foregone, based on consumer surplus estimates, are around $19 million under Alternative 2, about $22 million under Alternatives 3 and 4, and almost $24 million for Alternative 5 (all in 1993 dollars) during the interim period.

ECONOMIC IMPACTS ON EMPLOYMENT

Impacts on employment are very difficult to estimate with any degree of confidence because of the short duration of this proposed action, the scope of analysis, the widely varied economies (both in size and in complexity), and the relative concentration of estimated effects in certain geographic areas. The employment multipliers or "response coefficients" developed during earlier planning efforts are generally based on input-output models. These models provided estimates of direct, indirect, and induced employment changes. In reality, such changes generally take place over a period of several years, as the changes in economic activity work their way through the economy. Therefore, they are likely to overstate the effects for an 18-month time frame. The response coefficients also were developed for areas of local economic influence, and are not technically additive with others over this much larger geographic area.

However, it is possible to give an indication of the relative magnitudes of what might be expected from adoption of the alternatives considered in detail, both by alternative and by resource area. Employment response coefficients (again, including direct, indirect, and induced employment) for timber-stumpage sales average in the neighborhood of 10 jobs per mmbf of timber harvested, expressed on a basis of annual jobs. Range coefficients appear to be between 0.3 and 0.6 total jobs per thousand AUMs grazed. Recreation coefficients vary widely, with developed recreation providing more total jobs per thousand RVDs than dispersed motorized or dispersed nonmotorized recreation. Generally, the more equipment, food, lodging, etc,. associated with a recreation activity (e.g., developed camping, hunting, skiing), the larger the associated employment factor. Sample response coefficients for recreation range from around 1 job per thousand RVDs for dispersed, nonmotorized recreation, to around 6 jobs for developed, equipment-intensive recreation. Again, these figures are highly dependent on the structure, size, and diversity of the local economy.

Given the above discussion, and looking at the various resource outputs reported by alternative, one can conclude that over the entire geographical area the magnitude of jobs affected on an annual basis would probably be in the low tens for range, the low hundreds for timber, and the low thousands for recreation.

AGENCY EFFECTS

The best available information indicates that adoption of Alternative 5 could cost the Agencies up to $54 million. However, both Agencies have limited experience conducting the new, more rigorous Watershed Analyses included under some of the alternatives. In addition, different levels of technical skills, inventory completeness, and monitoring capability exists between the Agencies as well as among the 15 national forests and 7 BLM districts. Finally, no funds have been budgeted specifically for adoption of interim direction. It was assumed that, for the interim period, funds largely would need to be redirected from within current funding levels regardless of which alternative is adopted. However, new funds probably would be required to fully implement the more costly alternatives (Table 4). The range of costs varies from no additional costs under Alternative 1 to about $54 million under the most expensive alternative (Alternative 5). In addition, the government may be required to pay compensation to timber purchasers for timber sales under contract that could not be relocated under Alternatives 4 and 5. This compensation could range from under $100,000 to several million dollars, depending on sale-specific circumstances. These costs break out in the following three categories:

Watershed Analysis - Up to $20.0 million. For simplicity, costs to complete inventories and conduct supplemental training were included as analysis costs. Monitoring was estimated as a separate category of cost, although a portion of those costs relates directly to the conduct of Watershed Analysis. The BLM makes up about 40 percent of total Watershed Analysis costs, despite managing about 12 percent of the anadromous watershed acreage covered by the proposed interim direction. The BLM estimates represent the full costs estimated to conduct Watershed Analysis, including substantial inventory work, which is not funded within current budget levels. Because some of the activities necessary to conduct Watershed Analysis already are funded in current FS budgets, the FS estimates represent only a 30 percent incremental increase over current funding levels. Without actual experience conducting the more rigorous Watershed Analyses anticipated, these preliminary cost estimates could be substantially over- or understated.

To estimate the costs of conducting Watershed Analysis under Alternatives 3 and 4, costs were calculated as 5 percent and 10 percent, respectively, of the $20 million estimated for Alternative 5. Additional funds of $1.5 million were added to the estimate for Alternative 4 (Preferred), based on the assumption that analyses of all ongoing projects and activities would need to be conducted for all watersheds to identify projects with unacceptable levels of risk. Watershed Analysis would be optional under Alternative 3, and under Alternative 2 costs would be incurred only for roads inventory and analysis on a limited number of new projects.

Monitoring - Up to $25 million. Complete monitoring costs have not been developed by either Agency. However, given historical underfunding of this activity, and based on current levels of investment for managing timber, recreation, and range resources, a surrogate 15 percent increase was calculated to cover additional monitoring activities. This estimate assumes that much of the programmatic monitoring would be covered under ongoing program budgets. The increase represents the increment associated with adoption of interim direction, 80 percent of which would be incurred by the FS. Under Alternatives 3 and 4, costs were

estimated at 20 percent and 40 percent, respectively, of Alternative 5. Alternatives 1 and 2 would incur no additional monitoring costs.

Program Management - Up to $9 million. Almost 80 percent of these costs would be incurred by the FS. These costs may be significantly overstated for the interim period. They were derived from preliminary estimates developed for multiple-year application of Alternative 4 (Preferred) and, therefore, contain costs associated with mitigation of effects on timber, range, and recreation program resources that would not be anticipated during the interim period. For instance, the livestock-grazing component of the above figure is overstated due to the assumed cost of fencing that would be necessary to restrict livestock access to riparian zones. During the interim period, however, livestock may be kept off the range to avoid the additional cost of fence building. Annual costs, appropriately included as costs that would be incurred during the interim period, include additional program administration, enforcement, and educational expenses. Site and facility modification, or reconstruction, and other mitigation costs would not be incurred to a significant extent during the interim period. Estimates of costs under Alternatives 2 and 3 were reduced from Alternative 4 (Preferred) by 25 percent each and increased 25 percent under Alternative 5. The previous "Economic Values" section discusses changes in resource outputs in more detail. Potential costs to the Agencies of compensating timber purchasers for cancelled contracts range from $225,000 to $450,000 for Alternative 4 and from $450,000 to $900,000 for Alternative 5.

Research - Not estimated. In keeping with approximate amounts that have been budgeted to implement the Northern Spotted Owl ROD, it was assumed that funds would need to be redirected toward applied research on ecosystem management. It was not clear whether new funds would be required or if existing funds would be "reprogrammed" from current projects. For the interim period, the investment could probably be less than $2 million. The level of investment would probably not differ substantially among the alternatives.

Table 4. Comparison of Incremental Costs to Implement Alternatives (Dollars in Millions)

Alternative	1	2	3	4	5
Watershed Analysis	0	0.5	1.0	3.5	20.0
Monitoring	0	0	5.0	10.0	25.0
Program Management	0	4.0	5.0	7.0	9.0
TOTAL	0	4.5	11.0	20.5	54.0

CONSULTATION WITH OTHERS

The Agencies' public involvement efforts began with a series of briefings for Members of the House and Senate, Federal and State agency officials, Tribal governments, and a variety of other organizations. Written input was received from Members of Congress, and from others for whom briefings were held and from those not briefed. The briefings held and letters of comment received are listed in Appendix E.

Such initial public involvement is consistent with guidance issued by the Council on Environmental Quality. Summaries of these meetings, letters, and other information relative to the Agencies' public involvement efforts are documented in the process records.

The process of determining appropriate direction included a period for public comment, and consultation with NMFS and FWS relative to the effects of the proposed action on listed species. The documentation from these consultations with NMFS and FWS is presented as Appendix J. The 45-day public comment period was extended by 15 days to facilitate broad review of the direction being proposed for the interim period. Consultation with NMFS took place over several months and examined all aspects of the interim direction. Modifications to clarify the interim direction were made in response to public comments and consultation with NMFS and FWS. An overview of the comments received and Agencies' response to those comments are presented as Appendix F.

The public also will be involved in the development of the longer-term strategy and future regional guide, forest plan and LUP amendments. Additional administrative appeal opportunities will be available. The public is encouraged to provide any information they feel is relevant to the consideration of interim direction and the development of future plan amendments.

GLOSSARY

Adverse Effects - Adverse effects include short- or long-term, direct or indirect management-related impacts of an individual or cumulative nature, such as mortality, reduced growth or other adverse physiological changes, harassment of fish, physical disturbance of redds, reduced reproductive success, delayed or premature migration, or other adverse behavioral changes to listed anadromous fish at any life stage. Adverse effects to designated critical habitat include effects to any of the essential features of critical habitat (e.g., as described in 58 FR 68543) that would diminish the value of the habitat for the survival and recovery of listed anadromous fish.

Adverse Impacts - As used to define unacceptable risk, the term refers to management-related, short- or long-term, direct or indirect impacts of an individual or cumulative nature that is likely to contribute to the need for listing of a non-listed anadromous salmonid population.

The Agencies - U.S. Department of the Interior Bureau of Land Management and U.S. Department of Agriculture Forest Service.

Anadromous Fish - Fish that are spawned and reared in freshwater, move to the ocean to grow and mature, and return to freshwater to reproduce. For purposes of this Environmental Assessment, "anadromous fish" refers to Pacific salmon, steelhead, and sea-run cutthroat trout.

Anadromous Watershed - Watersheds where anadromous fish habitat is present or easily could be reestablished.

At Risk Stocks - Stocks of Pacific anadromous fish that have been identified by professional societies, fish management agencies, and in the scientific literature as being in need of special management consideration because of low or declining populations.

Attain RMOs - Meet riparian management objectives for the given attributes. For habitats below the objective level, recovery will be initiated during the period the interim strategy is in place. For habitats at or better than the objective level, maintain at least the current condition. Actions that "degrade" habitat conditions (as defined elsewhere) would be considered inconsistent with the concept of attaining RMOs.

Avoid - Apply pre-project planning, best available technology, management practices, and scientific knowledge to eliminate known management induced impacts to the greatest extent practicable and minimize the risk of other potential impacts.

Best Conventional - Most effective existing techniques, methods, and/or management practices.

Biological Diversity - The variety of life forms and processes, including the complete natural complex of species, communities, genes, and ecological functions.

Consultation - A formal interaction between the National Marine Fisheries Service or U.S. Fish and Wildlife Service and another Federal agency when it is determined that the agency's action may affect a species that has been listed as threatened or endangered or its critical habitat.

Critical Habitat - Under the Endangered Species Act, critical habitat is defined as (1) the specific areas within the geographic area occupied by a federally listed species on which are found physical and biological features essential to the conservation of the species, and that may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the listed species, when it is determined that such areas are essential for the conservation of species.

Cumulative Effects - Those effects on the environment that result from the incremental effect of the action when added to the past, present, and reasonably foreseeable future actions regardless of what agency (Federal or nonfederal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Degrade - Measurably change an RMO feature in a way that :

--further reduces habitat quality where existing conditions meet or are worse than the objective values.

--reduces habitat quality where existing conditions are better than the objective values.

Designated Critical Habitat - Those habitats designated by the National Marine Fisheries Service or U.S. Fish and Wildlife Service under the provisions of the Endangered Species Act that include (1) the specific areas within the geographical area occupied by a federally listed species on which are found physical or biological features essential to the conservation of the species, and that may require special management considerations or protection, and (2) specific areas outside the geographical area occupied by a listed species, upon determination by the Secretary of Commerce or Interior that such areas are essential for the conservation of the species.

Drainage - An area (basin) mostly bounded by ridges or other similar topographic features, encompassing part, most, or all of a watershed.

Eastside - Generally, east of the crest of the Cascade Range in the States of Oregon and Washington.

Ecosystem Approach - A strategy or plan to manage ecosystems to provide for all associated organisms, as opposed to a strategy or plan for managing individual species.

Effects - Effects, impacts, and consequences, as used in this environmental assessment, are synonymous. Effects may be direct, indirect or cumulative.

Endangered Species - Any species of plant or animal defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range, and published in the Federal Register.

Environmental Analysis - An analysis of alternative actions and their predictable short-term and long-term environmental effects, incorporating physical, biological, economic, and social considerations.

Environmental Assessment (EA) - A systematic analysis of site-specific or programmatic activities used to determine whether such activities have a significant effect on the quality of the physical, biological, and human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with the National Environmental Policy Act when no environmental impact statement is necessary.

Federal Land Policy and Management Act (FLPMA) - A law passed in 1976 applying to the BLM directing the management of lands administered by that agency including the requirement to develop land use plans and prepare regulations to guide that development.

Fish-bearing Streams - Stream segments that support fish during all or a portion of a typical year.

Forest Plans - Land and Resource Management Plans developed by the Forest Service pursuant to requirements of the National Forest Management Act to guide land management.

Ongoing Projects and Activities That Pose an Unacceptable Risk - Those ongoing projects and activities occurring on lands administered by the Agencies that are determined on a case-by-case examination to pose an unacceptable risk to anadromous fish stocks. Such factors as the condition of the watershed, the status of anadromous fish stocks in the watershed, and the magnitude, frequency, duration, and timing of the impacts caused by the ongoing action shall be considered when determining if an unacceptable threat is being posed.

High Water Quality - Water with the physical, biological, and chemical attributes necessary to meet the life-history requirements and provide for the naturally attainable productivity of anadromous fish.

Interdisciplinary Team - A group of individuals with varying areas of specialty assembled to solve a problem or perform a task. The team is assembled out of recognition that no one scientific discipline is sufficiently broad enough to adequately analyze the problem and propose action.

Interim Direction - Management direction that would guide management decisions on lands administered by the Agencies during the 18 month period that Environmental Impact Statements are being prepared to examine longer-term options for management.

Intermittent Stream - Any non-permanent flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two criteria.

Key Watershed - A watershed that (1) is important to at risk anadromous fish, or (2) provides good anadromous fish habitat, or (3) is readily capable of providing good anadromous fish habitat; and is selected to contribute to a network across the landscape that provides for the long-term conservation of anadromous fish.

LUPs - Land Use Plans developed by the Bureau of Land Management pursuant to the Federal Land Policy and Management Act.

Minimize - Apply pre-project planning, best available technology, management practices, and scientific knowledge to limit, to the greatest extent practicable, the magnitude, extent, and/or duration of an activity and/or effect.

Mitigation Measures - Modifications of actions that (1) avoid impacts by not taking a certain action or parts of an action; (2) minimize impacts by limiting the degree or magnitude of the actions and its implementation; (3) rectify impacts by repairing, rehabilitating, or restoring the affected environment; (4) reduce or eliminate impacts over time by preservation and maintenance operations during the life of the action; or (5) compensate for impacts by replacing or providing substitute resources or environments.

Monitoring - A process of collecting information to evaluate if objective and anticipated or assumed results of a management plan are being realized (effectiveness monitoring) or if component activities are proceeding as planned (implementation monitoring).

National Environmental Policy Act - An act passed in 1969 to declare a National policy that encourages productive and enjoyable harmony between humankind and the environment, promotes efforts that prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, enriches the understanding of the ecological systems and natural resources important to the nation, and establishes a Council on Environmental Quality.

National Forests - Lands administered by the USDA Forest Service.

National Forest Management Act (NFMA) - A law passed in 1976 as an amendment to the Forest and Rangeland Renewable Resources Planning Act, requiring the preparation of Forest Plans and the preparation of regulations to guide that development.

Non-forested Rangelands - Land on which the native vegetation is predominantly grasses, grass-like plants, forbs, or shrubs. In determining what minimum interim RHCA boundary widths apply, there may be instances where the widths for non-forested rangelands apply to one side of a stream and the widths for forested lands apply to the other side of the stream (based on the vegetative cover of adjacent uplands).

Ongoing Projects and Activities - Those actions that have been implemented, or that have contracts awarded, or permits issued, and (within the range of listed anadromous fish) for which biological assessments have been prepared and submitted for consultation, prior to signature of the decision notice for the proposed action (PACFISH Interim Direction).

PACFISH - An inter-agency ecosystem management approach for maintaining and restoring healthy, functioning watersheds, riparian areas, and aquatic habitats within the range of Pacific anadromous fish on Federal lands managed by the USDI-Bureau of Land Management and the USDA-Forest Service.

Permanently Flowing, Non Fish-bearing Streams - Stream segments that contain running water throughout a typical year, but do not support fish during any portion of a typical year.

Prevent Attainment of RMOs - Preclude attainment of habitat conditions that meet RMOs. Permanent or long-term modification of the physical/biological processes or conditions that determine the RMO features would be considered to prevent attainment of RMOs.

Proposed or New Projects and Activities - Those actions that have not been implemented, or for which contracts have not been awarded, or for which permits have not been issued, or (within the range of listed anadromous fish) continuing actions for which biological assessments have not been prepared and submitted for consultation, prior to

signature of the decision notice for the proposed action (PACFISH Interim Direction).

Public Lands - Lands administered by the USDI Bureau of Land Management.

Retard Attainment of RMOs - Measurably slow recovery of any identified RMO feature (e.g., pool frequency, water temperature, etc.) that is worse than the objective level. Degradation of the physical/biological process or conditions that determine RMO features would also be considered to retard attainment of RMOs.

Riparian Area - A geographic area containing an aquatic ecosystem and the adjacent upland areas that directly affect it. This includes floodplain, and associated woodland, rangeland, or other related upland areas.

Riparian Goals - The characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats that are established as a common expectation.

Riparian Management Objectives (RMOs) - Quantifiable measures of stream- and stream-side conditions that define good anadromous fish habitat, and serve as indicators against which attainment, or progress toward attainment, of the goals will be measured.

Riparian Habitat Conservation Areas (RHCA) - Portions of watersheds where riparian-dependent resources receive primary emphasis, and management activities are subject to specific standards and guidelines. RHCAs include traditional riparian corridors, wetlands, intermittent headwater streams, and other areas where proper ecological functioning is crucial to maintenance of the stream's water, sediment, woody debris and nutrient delivery systems.

Riparian Zone - Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables, and soils that exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows.

Salmon Summit - A regional effort convened by Senator Mark Hatfield that involved all interested parties in an effort during 1990-1991 to examine restoration of Columbia River Basin anadromous fish, and identify those actions that could eliminate the need to list Columbia River Basin anadromous fish under the Endangered Species Act.

Sensitive Species - Those plant or animal species for which population viability is a concern as evidence by a significant current or potential downwards trend in population numbers, distribution, density, or habitat capability.

Short-term Habitat Impacts - Impacts of short duration--generally days or weeks--that would not retard or prevent attainment of RMOs.

Special Status Species - Those plant or animal species that are listed or are candidate or proposed for listing pursuant to the Federal Endangered Species Act; or those species that are listed pursuant to a State law or regulation, or those species that are designated as sensitive by the Forest Service or the BLM.

Standards and Guidelines - The primary instructions for land managers. Standards address mandatory actions, while guidelines are recommended actions necessary to a land management decision.

Stock - A group of fish that spawn in a particular river system (or portion of it) during a particular season, and do not interbreed to any substantial degree with any other group of fish.

Threatened Species - Those plant or animal species likely to become endangered species throughout all or a significant portion of their range within the foreseeable future. A plant or animal identified and defined in accordance with the 1973 Endangered Species Act and published in the Federal Register.

Unacceptable Risk - A level of risk from an ongoing activity or group of activities that is determined through NEPA analysis or the preparation of biological assessments/evaluations, or their subsequent review, to be:

--"likely to adversely affect" listed anadromous fish or their designated critical habitat, or

--"likely to adversely impact non-listed anadromous fish.

Viable Population - A viable population is one which has such numbers and distribution of reproductive individuals as to provide a high likelihood that species will continue to exist and be well-distributed throughout its range.

Watershed - The drainage basin contributing water, organic matter, dissolved nutrients, and sediments to a stream or lake.

Watershed Analysis - A systematic procedure for characterizing watershed and ecological processes to meet specific management and social objectives. Watershed analysis is a stratum of ecosystem management planning applied to watersheds of approximately 20 to 200 square miles.

Watershed Restoration - Actions taken to improve the current conditions of watershed to restore degraded habitat, and to provide long-term protection to natural resources, including riparian and aquatic resources.

Westside - Generally, west of the Cascade Range in the States of Oregon and Washington.

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