UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
BIN C15700
Seattle, WA 98115-0070

June 20, 2003

Shannon Stewart
Bonneville Power Administration
Post Office Box 3632
Portland, Oregon 97208-3621

Re: Biological Opinion and Essential Fish Habitat Consultation Hancock Springs Culvert Replacement Project, Okanogan County, Washington, WRIA 48 (NMFS Tracking No.: 2003/00654).

Dear Ms. Stewart:

In accordance with section 7 of the Endangered Species Act of 1973, as amended, 16 USC 1536, and the Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996, 16 USC 1855, the attached document transmits NOAA's National Marine Fisheries Service (NOAA Fisheries) Biological Opinion (Opinion) and MSA consultation on the proposed Hancock Springs Culvert Replacement Project Okanogan County, Washington.

The Bonneville Power Administration has determined that the proposed action was likely to adversely affect Upper Columbia River spring-run chinook (*Oncorhynchus tshawytscha*) and Upper Columbia River steelhead (*O. mykiss*) Evolutionary Significant Units. Formal consultation was initiated on June 4, 2003.

This Opinion reflects formal consultation and an analysis of effects covering the above listed species in Hancock Springs, Washington. The Opinion is based on information provided in the biological assessment received by NOAA Fisheries on May 23, 2003, subsequent information transmitted by telephone conversations, and electronic mail. A complete administrative record of this consultation is on file at the Washington State Habitat Branch Office.

NOAA Fisheries concludes that the implementation of the proposed project is not likely to jeopardize the continued existence of the above listed species. Please note that the incidental take statement, which includes reasonable and prudent measures and terms and conditions, was designed to minimize take.

The MSA consultation concluded that the proposed project may adversely impact designated Essential Fish Habitat for chinook and coho (*O. kisutch*) salmon. Specific reasonable and Prudent Measures of the Endangered Species Act consultation, and Terms and Conditions identified therein, would address the negative effects resulting from the proposed COE actions. Therefore, NOAA Fisheries recommends that they be adopted as Essential Fish Habitat conservation measures.

If you have any questions, please contact Justin Yeager of the Washington State Habitat Branch Office at (509) 925-2618 or email at justin.yeager@noaa.gov.

Sincerely,

For Michael R Crouse

D. Robert Lohn
Regional Administrator

Enclosure

Endangered Species Act - Section 7 Consultation

Biological Opinion

and

Magnuson-Stevens Fishery Conservation and Management Act

Essential Fish Habitat Consultation

Hancock Springs Culvert Replacement
Okanogan County, Washington

NMFS Tracking No.: 2003/00654

Agency:	Bonneville Power Administration
Consultation Conducted By:	National Marine Fisheries Service Northwest Region

Issued by: for Michael R Course Date Issued: June 20, 2003

D. Robert Lohn
Regional Administrator

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1.0 INTRODUCTION

This document is the product of an Endangered Species Act (ESA) section 7 formal consultation and Magnuson-Stevens Fishery Conservation and Management Act (MSA) Essential Fish Habitat (EFH) consultation between NOAA's National Marine Fisheries Service (NOAA Fisheries) and the Bonneville Power Administration (BPA) for the proposed Hancock Springs Culvert Replacement Project, Okanogan County, Washington. The proposed action will occur within the geographic boundaries and habitats of two Evolutionarily Significant Units (ESU[1]) and the ESA listed salmon and steelhead therein, including endangered Upper Columbia River spring-run (UCRS) chinook (*Oncorhynchus tshawytscha*) and endangered Upper Columbia River (UCR) steelhead (*O. mykiss*). Additionally, the action area is designated as EFH for chinook (*O. tshawytscha*) and coho (*O. kisutch*) salmon.

The purpose of this document is to present NOAA Fisheries' Biological Opinion (Opinion) on whether the proposed action is likely to jeopardize the continued existence of the UCRS chinook and/or UCR steelhead ESUs listed under the ESA. Further, this document will determine if the proposed action will adversely affect designated chinook and coho salmon EFH. These ESA and EFH determinations are reached by analyzing the biological effects of construction activities related to the culvert replacement, relating those effects to the biological and ecological needs of the listed species, and then adding these effects to the environmental baseline of the action area.

1.1 Background and Consultation History

The BPA is proposing to fund a project with the Yakama Nation to replace a culvert on Hancock Springs which is a tributary to the Methow River. Hancock Springs enters into the Methow River at river mile 58.8 with the culvert located about 833 feet upstream of the confluence. The purpose of this project is to restore salmonid access to the upper portion of Hancock Springs and improve riparian habitat and stream conditions.

On May 23, 2003, NOAA Fisheries received a Biological Assessment (BA) and a request for Endangered Species Act (ESA) section 7 formal consultation from the BPA. Formal consultation was initiated on June 4, 2003. The proposed Federal action is the funding of a project with the Yakama Nation to replace an existing culvert and conduct stream/riparian area restoration activities at Hancock Springs in Okanogan County, Washington.

1.2 Description of the Proposed Action

This project will replace an existing culvert that impedes fish passage, with an open bottom arched culvert. The new structure will restore natural channel processes and pass 100-year flood events. The project is likely to include: removal of vegetation, installation of sedimentation reduction devices, construction of a stream bypass channel, excavation and removal of the old culvert, diversion of the stream into a bypass channel, herding and removal of fish from the

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"ESU" means a population or group of populations that is considered distinct (and hence a "species") for purposes of conservation under the ESA. To qualify as an ESU, a population must (1) be reproductively isolated from other conspecific populations, and (2) represent an important component in the evolutionary legacy of the biological species (Waples 1991).

project area, excavation of the stream channel, construction of an open bottom arched culvert, diversion of the stream back into the main channel, reconstruction of the road, revegetation with native plants and shrubs, and implementation of measures designed to minimize impacts to salmonids.

In addition to the culvert replacement, the project includes the reconstruction of four livestock watering points. The watering points are above the undersized culvert and will involve some minor shaping of the streambed and bank. Fencing will be installed to help guide livestock to the watering points and to protect streambanks and vegetation. Furthermore, two naturally occurring springs will be fenced to exclude livestock, and the banks of the upper reach will be replanted with native vegetation.

The BPA has proposed the following conservation measures or Best Management Practices (BMPs) to minimize the impacts of the proposed project on listed salmonids.

- Before any activity, the contractor will secure a block seine, both above and below the culvert to exclude fish. Any fish located between the block seines will be gently herded downstream out of the construction area and placed downstream.

- Construction will occur in the dry. The construction area will be isolated by building a sandbag wall, upstream and downstream the full width of the channel. To pass flow, a PVC pipe extension will extend from both the inflow and out flow ends of the 24-inch culvert, through the up and downstream sandbag walls. A portable pump will be used to maintain a dry construction area. Pump discharge will be routed into the marsh area on the downstream side of the culvert.

- After the sandbag walls have been installed and flow established through the 24-inch culvert, the two block seines will be removed.

- Excavated spoils will be properly disposed at an upland site.

- A washed gravel mixture will be added between the footings. The gravel will provide the substrate bottom for the stream under the arched culvert.

- The old pipe culverts will be removed and disposed of by Okanogan County Public Works.

- Okanogan County Public Works will add fill over the culvert and to the existing road prism.

- After the road prism has been graded the sandbag walls will be removed and disposed.

- Disturbed portions of the road prism will be seeded with native vegetation.

1.3 Description of the Action Area

Under the ESA, the "action area" is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For the purposes of this consultation, the action area includes Hancock Springs from the culvert

to the confluence with the Methow River. The action area also includes the adjacent riparian zone within the construction area and all areas affected by the project including any staging areas and roadways.

2.0 ENDANGERED SPECIES ACT

2.1 Biological Opinion

The objective of this Biological Opinion (Opinion) is to determine whether the proposed project is likely to jeopardize the continued existence of the UCRS chinook and/or UCR steelhead ESUs.

2.1.1 Status of Species

The listing status and biological information for NOAA Fisheries listed species that are the subject of this consultation are described below in Table 1.

Species	Listing Status	Critical Habitat	Protective Regulations	Biological Information
Upper Columbia River spring-run chinook salmon	March 24, 1999; 64 FR 14308, Endangered	Not Designated[2]	July 10, 2000; 65 FR 42422	Myers *et al.* 1998; Healey 1991
Upper Columbia River steelhead	August 18, 1997; 62 FR 43937, Endangered	Not Designated	July 10, 2000; 65 FR 42422	Busby *et al.* 1995; 1996

Table 1. References for Additional Background on Listing Status, Biological Information, and Critical Habitat Elements for the Listed Species Addressed in this Opinion.

Throughout the Columbia Basin, salmonids have been negatively affected by a combination of habitat alteration and hatchery management practices. Mainstem dams on the Columbia River are perhaps the most significant source of habitat degradation for the ESUs addressed under this consultation. The dams act as a partial barrier to passage, kill out-migrating smolts in their turbines, raise temperatures throughout the river system, and have created lentic refugia for salmonid predators. In addition to dams, irrigation systems have had a major negative impact by diverting large quantities of water, stranding fish, acting as barriers to passage, and returning effluents containing chemicals and fine sediments. Other major habitat degradation has occurred through urbanization and livestock grazing practices (WDFW *et al.* 1993; Busby *et al.* 1996; NMFS 1996; 1998; 2000; 64 FR 14308, April 22, 1992; 62 FR 43937, August 18, 1997).

Habitat alterations and differential habitat availability (*e.g.*, fluctuating discharge levels) impose an upper limit on the production of naturally spawning populations of salmon and steelhead.

[2]Under development. On April 30, 2002, the U.S. District Court for the District of Columbia approved a NOAA Fisheries consent decree withdrawing a February 2000 Critical Habitat designation for this and 18 other ESUs.

The National Research Council Committee on Protection and Management of Pacific Northwest Anadromous Salmonids identified habitat problems as a primary cause of declines in wild salmon runs (NRCC 1996). Some of the habitat impacts identified were the fragmentation and loss of available spawning and rearing habitat, migration delays, degradation of water quality, removal of riparian vegetation, decline of habitat complexity, alteration of stream flows and streambank and channel morphology, alteration of ambient stream water temperatures, sedimentation, and loss of spawning gravel, pool habitat, and large woody debris (LWD) (NMFS 1996; 1998; NRCC 1996; Bishop and Morgan 1996).

Hatchery management practices are suspected to be a major factor in the decline of these ESUs. The genetic contribution of non-indigenous, hatchery stocks may have reduced the fitness of the locally adapted native fish through hybridization and associated reductions in genetic variation or introduction of deleterious (non-adapted) genes. Hatchery fish can also directly displace natural spawning populations, compete for food resources, or engage in agonistic interactions (Campton and Johnston 1985; Waples *et al.* 1991; Hilborn 1992; NMFS 1996; 63 FR 11798, March 10, 1998).

The following information summarizes the status of Columbia River salmonids by ESU that are the subjects of this consultation. Most of this narrative was largely taken from the Biological Opinion on Reinitiation of Consultation on Operation of the Federal Columbia River Power System (FCRPS), including the Juvenile Fish Transportation Program, and 19 Bureau of Reclamation Projects in the Columbia Basin (NMFS 2000).

2.1.1.1 Upper Columbia River Spring Chinook

The UCRS chinook salmon ESU, listed as endangered on March 24, 1999 (64 FR 14308), includes all natural-origin, stream-type chinook salmon from river reaches above Rock Island Dam and downstream of Chief Joseph Dam, including the Wenatchee, Entiat, and Methow River basins. All chinook in the Okanogan River are apparently ocean-type and are considered part of the UCR summer- and fall-run ESU. The spring-run components of the following hatchery stocks are also listed: Chiwawa, Methow, Twisp, Chewuch, and White rivers and Nason Creek. Critical Habitat is not currently designated for UCRS chinook, although a designation is forthcoming (see footnote 2).

The populations are genetically and ecologically separate from the summer- and fall-run populations in the lower parts of many of the same river systems (Myers *et al.* 1998). Although fish in this ESU are genetically similar to spring chinook in adjacent ESUs (*i.e.*, mid-Columbia and Snake), they are distinguished by ecological differences in spawning and rearing habitat preferences. For example, spring-run chinook in upper Columbia tributaries spawn at lower elevations (500 to 1,000 meters) than in the Snake and John Day River systems.

The UCR populations were intermixed during the Grand Coulee Fish Maintenance Project (1939 through 1943), resulting in a loss of genetic diversity between populations in the ESU. Homogenization remains an important feature of the ESU. Fish abundance has trended downward both recently and over the long-term. At least six former populations from this ESU are now extinct, and nearly all extant populations have experienced escapements of fewer than 100 wild spawners in recent years. There is limited information on spring chinook spawning and

rearing characteristics in Hancock Springs. Hubble (unpublished 1998) documented juvenile spring chinook rearing up to the Wolf Creek Road culvert.

2.1.1.2 Upper Columbia River Steelhead

The UCR steelhead ESU, listed as endangered on August 18, 1997 (62 FR 43937), includes all natural-origin populations of steelhead in the Columbia River basin upstream from the Yakima River in Washington, to the U.S./Canada border. The Wells Hatchery stock is included among the listed populations. Critical habitat is not presently designated for UCR steelhead, although a designation is forthcoming (see footnote 2).

Estimates of historical (pre-1960s) abundance specific to this ESU are available from fish counts at dams. Counts at Rock Island Dam from 1933 to 1959 averaged 2,600 to 3,700, suggesting a pre-fishery run size exceeding 5,000 adults for tributaries above Rock Island Dam (Chapman *et al.* 1994). Runs may, however, already have been depressed by lower Columbia River fisheries. The spawning and rearing characteristics of steelhead are not well known for Hancock Springs. However, steelhead spawning has not been documented in the action area as high spring flows and turbidity complicate visual observation. Joel Hubble of the Yakama Nation suspects steelhead rear up to the culvert and possibly to the head waters of the Hancock Springs (Personal communication 2002).

2.1.2 Evaluating Proposed Actions

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR part 402 (the consultation regulations). NOAA Fisheries must determine whether the action is likely to jeopardize the listed species. This analysis involves the initial steps of (1) defining the biological requirements of the listed species and (2) evaluating the relevance of the environmental baseline to the species' current status.

From that, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries considers estimated levels of mortality attributed to: (1) collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmonid's life stages that occur beyond the action area. If NOAA Fisheries finds that the action is likely to jeopardize, NOAA Fisheries must identify reasonable and prudent alternatives for the action.

2.1.2.1 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying ESA section 7(a)(2) to listed salmon is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species; taking into account population size, trends, distribution, and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its original decision to list the species for protection under the ESA. In addition, the assessment will consider any new information or data that are relevant to the determination.

The relevant biological requirements are those necessary for the listed species to survive and recover to naturally reproducing population levels at which time protection under the ESA would be unnecessary. Species or ESUs not requiring ESA protection have the following attributes: population sizes large enough to maintain genetic diversity and heterogeneity, the ability to adapt to and survive environmental variation, and are self-sustaining in the natural environment.

UCRS chinook and UCR steelhead share similar basic biological requirements. These requirements include food, flowing water (quantity), high quality water (cool, free of pollutants, high dissolved oxygen concentrations, low sediment content), clean spawning substrate, and unimpeded migratory access to and from spawning and rearing areas (adapted from Spence *et al.* 1996). The specific biological requirements affected by the proposed action include water quality, food, and unimpeded migratory access.

2.1.2.2 Environmental Baseline

The environmental baseline represents the current basal set of conditions to which the effects of the proposed action would be added. The term "environmental baseline" means "the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process" (50 CFR 402.02).

Hancock Springs enters the Methow River at river mile 58.8, which is 8.8 river miles upstream of the Chewuch River's confluence with the Methow River. The spring channel is about .75 miles in length and is a natural feature. The mean gradient from the spring source to its confluence with the Methow River is approximately 0.4 percent. In general, pools and slow runs dominate the spring. Substrate is generally composed of silts, with some areas of exposed cobble 1.5 to 3.0 inches in diameter. The exception is the upper section, where the cobble is 4 to 10 inches in diameter.

The contribution of flow by Hancock Springs to the Methow River is small. The range in discharge from the spring is thought to range from around 20 cubic feet per second (cfs) in the spring (snow melt period) down to 3 to 5 cfs in the fall/winter months. By comparison, the mean flow at the end of April in the Methow River is about 1800 cfs (USGS website data), roughly 100 times the flow of Hancock Springs.

Data specific to habitat conditions in Hancock Springs are limited. Most indicators of habitat condition below the culvert are properly functioning. This section consists of extensive pools and deep, narrow channels resulting from beaver activity. This section of the spring is functioning appropriately for temperature, sediment, dissolved oxygen, and peak and base flows.

Above the culvert, there is limited riparian cover as a results of livestock grazing (Andonaegui 2000). The substrate is highly embedded, also as a result of cattle grazing, and there is a low pool/riffle ratio (Andonaegui 2000). Very little data that pertains to the other pathways and indicators have been collected in the Hancock Springs drainage (Andonaegui 2000).

2.1.2.2.1 Factors Affecting the Species at the Population Scale. In previous Opinions, NOAA Fisheries assessed life history, habitat and hydrology, hatchery influence, and population trends in analyzing the effects of the underlying action on affected species at the population scale (see, for example, FCRPS, NMFS 2000). A thumbnail description of each of these factors for each ESU covered under this consultation is provided below.

Upper Columbia River Spring Chinook

Life History. UCRS chinook are considered stream-type fish, smolting as yearlings. Most stream-type fish mature at four years of age. Few coded-wire tags are recovered in ocean fisheries, suggesting that the fish move quickly out of the north central Pacific and do not migrate along the coast.

Habitat and Hydrology. Salmon in this ESU must pass up to nine Federal and public utility district dams. Chief Joseph Dam prevents access to historical spawning grounds farther upstream. Degradation of remaining spawning and rearing habitat continues to be a major concern associated with urbanization, irrigation projects, and livestock grazing along riparian corridors. Overall harvest rates are low for this ESU, currently less than 10% (ODFW and WDFW 1995).

Hatchery Influence. Spring-run chinook salmon from the Carson National Fish Hatchery (a large composite, nonnative stock) were introduced into and have been released from local hatcheries (Leavenworth, Entiat, and Winthrop National Fish Hatcheries [NFH]). Evidence suggests that these hatchery fish largely do not stray into wild areas or hybridize with naturally spawning populations. In addition to these NFH, two supplementation hatcheries are operated by the Washington State Department of Fish and Wildlife (WDFW) in this ESU. The Methow Fish Hatchery Complex (operations began in 1992) and the Rock Island Fish Hatchery Complex (operations began in 1989) were both designed to supplement naturally spawning populations on the Methow and Wenatchee rivers, respectively (Chapman *et al.* 1995).

Population Trends and Risks. For the UCRS chinook salmon ESU as a whole, NOAA Fisheries estimates that the median population growth rate (lambda) over the base period[3] ranges from 0.85 to 0.83, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to that of fish of wild origin (Tables B-2a and B-2b in McClure *et al.* 2000). NOAA Fisheries has also estimated median population growth rates and the risk of absolute extinction for the three spawning populations identified by Ford *et al.* (1999), using the same range of assumptions about the relative effectiveness of hatchery fish. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (*i.e.*, hatchery effectiveness equals zero), the risk of absolute extinction within 100 years ranges from 0.97 for the Methow River to 1.00 for the Methow and Entiat rivers (Table B-5 in McClure *et al.* 2000). At the high end, assuming that hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness equals 100%), the risk of extinction within 100 years is 1.00 for all three spawning populations (Table B-6 in McClure *et al.* 2000).

[3]Estimates of median population growth rate, risk of extinction, and the likelihood of meeting recovery goals are based on population trends observed during a base period that varies between spawning aggregations. Population trends are projected under the assumption that all conditions will stay the same into the future.

NOAA Fisheries has also used population risk assessments for UCRS chinook salmon and steelhead ESUs from the draft Quantitative Analysis Report (QAR) (Cooney 2000). Risk assessments described in that report were based on Monte Carlo simulations with simple spawner/spawner models that incorporate estimated smolt carrying capacity. Population dynamics were simulated for three separate spawning populations in the UCRS chinook salmon ESU, the Wenatchee, Entiat, and Methow populations. The QAR assessments showed extinction risks for UCRS chinook salmon of 50% for the Methow, 98% for the Wenatchee, and 99% for the Entiat spawning populations. These estimates are based on the assumption that the median return rate for the 1980 brood year to the 1994 brood year series will continue into the future.

Upper Columbia River Steelhead

Life History. As in other inland ESUs (the Snake and mid-Columbia River basins), steelhead in the Upper Columbia River ESU remain in freshwater up to a year before spawning. Smolt age is dominated by two year olds. Based on limited data, steelhead from the Wenatchee and Entiat rivers return to freshwater after one year in salt water, whereas Methow River steelhead are primarily age-2-ocean (Howell *et al.* 1985). Life history characteristics for UCR steelhead are similar to those of other inland steelhead ESUs; however, some of the oldest smolt ages for steelhead, up to seven years, are reported from this ESU. The relationship between anadromous and nonanadromous forms in the geographic area are unclear.

Habitat and Hydrology. The Chief Joseph and Grand Coulee Dam construction caused blockages of substantial habitat, as did that of smaller dams on tributary rivers. Habitat issues for this ESU relate mostly to irrigation diversions and hydroelectric dams, as well as to degraded riparian and instream habitat from urbanization and livestock grazing.

Hatchery Influence. Hatchery fish are widespread and escape to spawn naturally throughout the region. Spawning escapement is dominated by hatchery-produced fish.

Population Trends and Risks. For the UCR steelhead ESU as a whole, NOAA Fisheries estimates that the median population growth rate (lambda) over the base period ranges from 0.94 to 0.66, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to that of fish of wild origin (Tables B-2a and B-2b in McClure *et al.* 2000). NOAA Fisheries has also estimated the risk of absolute extinction for the aggregate UCR steelhead population, using the same range of assumptions about the relative effectiveness of hatchery fish. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (*i.e.*, hatchery effectiveness equals zero), the risk of absolute extinction within 100 years is 0.25 (Table B-5 in McClure *et al.* 2000). Assuming that the hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness equals 100%), the risk of absolute extinction within 100 years is 1.00 (Table B-6 in McClure *et al.* 2000). Because of data limitations, the QAR steelhead assessments in Cooney (2000) were limited to two aggregate spawning groups-the Wenatchee/Entiat composite and the above-Wells populations. Wild production of steelhead above Wells Dam was assumed to be limited to the Methow system. Assuming a relative effectiveness of hatchery spawners of 1.0, the risk of absolute extinction within 100 years for UCR steelhead is 100%. The QAR also assumed hatchery effectiveness values of 0.25 and 0.75. A hatchery effectiveness of 0.25 resulted in projected risks of extinction of 35% for the Wenatchee/Entiat and 28% for the Methow

populations. At a hatchery effectiveness of 0.75, risks of 100% were projected for both populations.

2.1.2.2.2 Factors Affecting the Species within the Action Area. Section 4(a)(1) of the ESA and NOAA Fisheries listing regulations (50 CFR 424) set forth procedures for listing species. The Secretary of Commerce must determine, through the regulatory process, if a species is endangered or threatened based upon any one or a combination of the following factors: (1) the present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) inadequacy of existing regulatory mechanisms; or (5) other natural or human-made factors affecting its continued existence.

The proposed action includes activities that will have some level of effects with short-term impacts from category (1) in the above paragraph, and the potential for long-term impacts as described in category (5). The characterization of these effects and a conclusion relating the effects to the continued existence of the listed salmon and steelhead that are the subject of this consultation is provided below, in Section 2.1.3.

The major factor affecting UCRS chinook and UCR steelhead within the action area is land use. NOAA Fisheries uses the Matrix of Pathways and Indicators (MPI) to analyze and describe the effects of these factors on listed salmon and steelhead. The MPI relates the biological requirements of listed species to a suite of habitat variables. In the analysis presented here, each factor is considered in terms of its effect on relevant pathways and associated indicators (*properly functioning, at risk, or not properly functioning*).

Numerous anthropogenic features and/or activities (*e.g.,* residential dwellings, livestock, roads, rip-rap, and landscaping) in the action area, have become permanent fixtures on the landscape and have displaced and altered native riparian habitat to some degree. Consequently, the potential for normal riparian processes (*e.g*., shading, bank stabilization, and LWD recruitment) to occur is diminished, and aquatic habitat has become simplified (Ralph *et al.* 1994; Young *et al.* 1994; Fausch *et al.* 1994; Dykaar and Wigington 2000).

2.1.3 Effects of the Proposed Action

The proposed culvert replacement is likely to adversely affect UCRS chinook and UCR steelhead. The portion of Hancock Springs that flows through the action area provides juvenile rearing habitat for UCRS chinook and UCR steelhead.

NOAA Fisheries' ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on the species together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline" (50 CFR 402.02).

2.1.3.1 Direct Effects

Direct effects are the immediate effects of the project on the species or its habitat. Direct effects result from the agency action and include the effects of interrelated and interdependent

actions. Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated (USFWS and NMFS 1998).

2.1.3.1.1 Water Quality. Removal of the existing culvert and installation of a new arched culvert, and related activities, could mobilize sediments and temporarily increase downstream turbidity levels. In the immediate vicinity of the construction area (several hundred feet), the level of turbidity would likely exceed ambient levels by a substantial margin and potentially affect UCR steelhead and UCRS chinook. The activities that will cause the mobilization of sediment are the diversion of the stream to the bypass channel, excavation of the stream channel, and diversion of the stream back into the main channel. These activities will deliver short-term (hours to a few days) pulses of sediment downstream. However, the proposed action includes measures to decrease the likelihood and extent of any such affect on listed salmonids. These measure include timing restrictions and construction BMPs.

Quantifying turbidity levels, and their effect on fish species is complicated by several factors. First, turbidity from an activity will typically decrease as distance from the activity increases. How quickly turbidity levels attenuate is dependent upon the quantity of materials in suspension (*e.g.*, mass or volume), the particle size of suspended sediments, the amount and velocity of ambient water (dilution factor), and the physical/chemical properties of the sediments. Second, the impact of turbidity on fish is not only related to the turbidity levels, but also the particle size of the suspended sediments.

For salmonids, turbidity has been linked to a number of behavioral and physiological responses (*i.e.*, gill flaring, coughing, avoidance, increase in blood sugar levels) which indicate some level of stress (Bisson and Bilby 1982; Sigler *et al.* 1984; Berg and Northcote 1985; Servizi and Martens 1992). The magnitude of these stress responses are generally higher when turbidity is increased and particle size decreased (Bisson and Bilby 1982; Servizi and Martens 1987; Gregory and Northcote 1993). Although turbidity may cause stress, Gregory and Northcote (1993) have shown that moderate levels of turbidity (35-150 nephelometric turbidity units [NTUs]) accelerate foraging rates among juvenile chinook salmon, likely because of reduced vulnerability to predators (camouflaging effect).

Turbidity arising from the project will be short-lived and have a low potential for causing take. The project includes measures to reduce or avoid turbidity impacts. Installation will occur when listed species are least likely to be present near the project site, minimizing the potential for adverse effects. Those fish that are present in the action area when the effects are manifest are likely to be able to avoid the area until the effects dissipate.

2.1.3.1.2 Streambed and Bank Disturbance. The replacement of the culvert would disturb the existing substrate present in the river and require a small amount of bank disturbance. The primary mechanisms of disturbance would be the construction of the bypass, the diversion of the stream into the bypass channel, and alteration of the streambed. The direct effects on UCR steelhead and UCRS chinook are expected to be minor. Because of the project work window UCR steelhead and UCRS chinook lifestages present in the action area include juvenile and young-of-the-year fish that should be able to evacuate the area when disturbance is initiated. In

addition, the BPA will be implementing numerous BMPs as outlined in the BA to minimize and reduce these effects to listed salmonids.

2.1.3.1.3 Diversion of Stream and Removal of Fish. The diversion of the stream may result in the stranding of fry and juvenile steelhead and spring chinook. Additionally, the diversion of water in the channel will impede salmonid movement. The impacts associated with dewatering are expected to be reduced through the use of a gradual process of dewatering that will enable fish to move with the receding water.

Diverting water will also cause the temporary loss (burial, dessication, and displacement) of macroinvertebrate habitat. Aquatic invertebrates serve as an important source of prey for salmonids, and the loss of their habitat through burial, dessication, or displacement may reduce foraging opportunities for listed salmonids. Effects associated with the disruption of the streambed likely would be short-lived as new invertebrates tend to recolonize disturbed areas (Allan 1995). In the action area, recolonization rates are expected to be rapid because of the small size of the disturbance and relatively short time period of construction activities.

Fish will be removed from the construction area in the following manner (developed from RRMTWG, 2000). A block net will be installed at the upstream terminus of the construction area. A crew will then drag a seine through the entire construction area, beginning at the upstream block net. A second block net will then be installed at the downstream terminus of the construction area. If listed fish are stranded between the block nets, they will be removed by hand or with dip nets, placed in buckets, and released downstream of the construction area.

2.1.3.2 Indirect Effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the action. Indirect effects might include other Federal actions that have not undergone section 7 consultation but will result from the action under consideration. These actions must be reasonably certain to occur, or be a logical extension of the proposed action.

2.1.3.2.1 Riparian and Fisheries Habitat. The culvert replacement will result in a minor short-term loss of riparian function because of the removal of vegetation. The loss of vegetation may affect riparian habitat functions such as shading and organic matter inputs to the stream. However, the loss of riparian function should be minimal because of the small footprint of the project. Few, if any, large trees will need to be removed. Therefore, LWD recruitment is not expected to be significantly reduced by the proposed project. Vegetation loss will be mitigated by seeding with native plant stock and riparian planting that will provide additional long term cover for fish. The adverse effects of these activities on UCR steelhead, UCRS chinook, and aquatic habitat indicators will be limited by implementing construction methods and approaches included in the project design, BMPs, and by following the terms and conditions in Section 2.2.3 of this Opinion.

2.1.3.2.2 Fish Passage Improvement. The indirect effect of culvert replacement is to enable anadromous salmonids access to historical habitats from which they have been excluded by an existing, non-functioning road crossing culvert. While barrier removal will involve removal

and replacement with the attendant construction effects (as described above), enabling access to historic habitat should be beneficial over time. Increasing available habitat is likely to positively influence existing population trends to the extent that previous foreclosure of the use of that habitat contributed to adverse population trends.

2.1.3.3 Population Scale Effects

As detailed in Section 2.1.2.2, NOAA Fisheries has estimated the median population growth rate (lambda) for each species affected by the Hancock Springs Culvert Project. For both ESUs, life history diversity has been limited by the influence of hatchery fish, by physical barriers that prevent migration to historical spawning and/or rearing areas, and by water temperature barriers that influence the timing of emergence, juvenile growth rates, or the timing of upstream or downstream migration. In addition, hydropower development has profoundly altered the riverine environment and those habitats vital to the survival and recovery of the ESUs that are the subject of this consultation.

Construction of the culvert in Hancock Springs will result in short-term impacts to listed salmonids. Conservation measures and BMPs are expected to reduce the potential for harm to listed fish through increased turbidity, streambed and bank disturbance, and fish removal. The action will negatively affect listed salmonids in the action area, but is not expected to be significant at the ESU scale for UCR steelhead or UCRS chinook.

2.1.3.4 Cumulative Effects

Cumulative effects are defined as "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 CFR 402.02). Future Federal actions that are unrelated to the proposed actions are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

In the action area for this project, agricultural activities are the main land use. Riparian buffers are not properly functioning, containing little woody vegetation. Although land use practices that would result in take of endangered species is prohibited by section 9 of the ESA, such actions do occur. NOAA Fisheries cannot conclude with certainty that any particular riparian habitat will be modified to such an extent that take will occur. Riparian habitat is essential to salmonids in providing and maintaining various stream characteristics such as; channel stabilization and morphology, leaf litter, and shade. However, given the patterns of riparian development in the action area and the rapid human population growth of Okanogan County, (18.6% from 1990 - 2000, U.S. Census Bureau), it is reasonably certain that some riparian habitat will be impacted in the future by non Federal activities.

2.1.4 Conclusion/Opinion

NOAA Fisheries has reviewed the direct, indirect, and cumulative effects of the proposed action on the above listed species and their habitat. NOAA Fisheries evaluated these effects in light of existing conditions in the action area and the measures included in the action to minimize the effects. The proposed action is likely to cause short-term adverse effects on listed salmonids by

modifying habitat and construction activities. These effects are unlikely to reduce salmonid distribution, reproduction, or numbers in any meaningful way. Consequently, the proposed action is not likely to jeopardize the continued existence of listed UCRS chinook and/or UCR steelhead.

2.1.5 Reinitiation of Consultation

This concludes formal consultation for the Hancock Springs Culvert Replacement Project. Consultation must be reinitiated if: (1) the amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is listed (50 CFR 402.16). To reinitiate consultation, the BPA should contact the Habitat Conservation Division (Washington Branch Office) of NOAA Fisheries. Upon reinitiation, the protection provided by this incidental take statement, section 7(o)(2), becomes invalid.

2.2 Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined as significant habitat modification or degradation that results in death or injury to listed species by "significantly impairing behavioral patterns such as breeding, spawning, rearing, migrating, feeding, and sheltering" (50 CFR 222.102). Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the effects of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures (RPMs) that are necessary to minimize take and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of Take Anticipated

As stated in Section 2.1.1, above, UCRS chinook and UCR steelhead use the action area for rearing. UCRS chinook and UCR steelhead are likely to be present in the action area during part of the year such that they will likely encounter some of the effects of the proposed action. Therefore, incidental take of these listed fish is reasonably certain to occur. The proposed action includes measures to reduce the likelihood and amount of incidental take. To ensure the action agency carries out these measures, take minimization measures included as part of the proposed action are restated in the Terms and Conditions provided below.

Take is likely to result during construction and includes the activities used to move fish during work site isolation and any other habitat affecting activities. NOAA Fisheries cannot estimate a specific amount of incidental take of listed fish, despite the use of the best scientific and commercial data available. As a surrogate for estimating the number of fish harmed by the proposed action, NOAA Fisheries has estimated the extent of habitat affected by those activities. The estimated extent of habitat affected from the construction activities (e.g., sediment mobilization, stream dewatering, and short-term loss of riparian habitat) are the thresholds for reinitiating consultation.

For water quality effects, take is exempted for turbidity increases within 100 feet downstream of the project area (for flows up to 10 cfs, expected flows are between 3-5 cfs). Take is also exempted for work site isolation and temporary diversion of up to 80 feet of Hancock Springs, and for riparian vegetation removal along 125 feet of either side of the spring channel. Should any of these limits be exceeded during project activities, the reinitiation provisions of this Opinion apply.

2.2.2 Reasonable and Prudent Measures

The measures described below are non-discretionary. They must be implemented so that they become binding conditions in order for the exemption in section 7(a)(2) to apply. The BPA has the continuing duty to regulate the activities covered in this incidental take statement. If the BPA fails to adhere to the terms and conditions of the incidental take statement through enforceable terms added to the document authorizing this action, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

NOAA Fisheries believes that the following reasonable and prudent measures, along with conservation measures described by the BPA, are necessary and appropriate to minimize the take of ESA-listed fish resulting from implementation of this Opinion.

1. The BPA will minimize the incidental take from construction activities in Hancock Springs, by limiting the duration, timing, and extent of in-water work.

2. The BPA will minimize incidental take from construction activities in or near Hancock Springs by protecting water quality.

3. The BPA will minimize the incidental take by implementing measures to minimize impacts to riparian and instream habitat.

2.2.3 Terms and Conditions

To comply with ESA Section 7 and be exempt from the prohibitions of Section 9 of the ESA, the BPA must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measures described above. These Terms and Conditions largely reflect measures described as part of the proposed action in the BA and the foregoing Opinion. NOAA Fisheries has included them here to ensure that the action agency is well aware that they are non-discretionary.

1. To implement RPM No. 1 (in-water work) above, the BPA shall ensure that:

1.1 All work within the active channel of Hancock Springs will be completed between July 15, 2003 and August 31, 2003. Any extension of the in-water work period will first be approved by, and coordinated with, NOAA Fisheries.

1.2 All in-water work will be isolated by a cofferdam (sand bags), or the stream shall be routed through a culvert, to minimize the potential for sediment entrainment. If a cofferdam is used, any fish trapped in the isolation pool will be removed prior to dewatering, using NOAA Fisheries approved methods.

1.2.1 If seining is possible, fish will be captured under the supervision of a fishery biologist experienced in such efforts and all staff working with the seining operation must have the necessary knowledge, skills, and abilities to ensure the safe handling of all ESA-listed fish.

1.2.2 If seining is not possible, fish may be captured using electrofishing gear as described in NOAA Fisheries guidelines (NMFS 2000). No electrofishing may occur if water temperatures exceed 18° C, or are expected to rise above this temperature before concluding the capture.

1.2.3 ESA-listed fish must be handled with extreme care and kept in water to the maximum extent possible during capture and transfer procedures. The transfer of ESA-listed fish must be conducted using a sanctuary net that holds water during transfer, whenever necessary to prevent the added stress of an out-of-water transfer.

1.2.4 ESA listed fish will not be marked or anaesthetized.

1.2.5 Captured fish must be released in appropriate habitat, as near as possible to the capture site.

1.3 Alteration or disturbance of stream banks and existing riparian vegetation will be minimized.

1.4 During excavation, native streambed materials will be stockpiled out of the two-year floodplain for later use.

2. To implement RPM No. 2 (construction activities), the BPA shall ensure that all erosion and pollution control measures included in the BA are included as special provisions in the Hancock Springs culvert replacement contract.

2.1 Effective erosion control measures shall be in place at all times during the contract. Construction within the project vicinity will not begin until all temporary erosion controls (e.g., sediment barriers and containment curtains) are in place.

2.2 All exposed areas will be replanted with a native seed mix. Erosion control planting will be completed on all areas of bare soil within 14 days of completion of construction.

2.4 Measures will be taken to prevent construction debris from falling into any aquatic habitat. Any material that falls into a stream during construction operations will be removed in a manner that has a minimum impact on the streambed and water quality.

2.5 The Contractor will develop an adequate, site-specific Spill Prevention and Countermeasure or Pollution Control Plan (PCP), and is responsible for containment and removal of any toxicants released. The Contractor will be monitored by the BPA to ensure compliance with this PCP. The PCP shall include the following:

2.5.1 A site plan and narrative describing the methods of erosion/sediment control to be used to prevent erosion and sediment for contractor's operations related to disposal sites, borrow pit operations, haul roads, equipment storage sites, fueling operations, and staging areas.

2.5.2 Methods for confining and removing and disposing of excess construction materials, and measures for equipment washout facilities.

2.5.3 A spill containment and control plan that includes: Notification procedures; specific containment and clean up measures which will be available on site; proposed methods for disposal of spilled materials; and employee training for spill containment.

2.5.4 Measures to be used to reduce and recycle hazardous and non-hazardous waste generated from the project, including the following: Types of materials, estimated quantity, storage methods, and disposal methods.

2.5.5 The person identified as the Erosion and Pollutant Control Manager shall also be responsible for the management of the contractor's PCP.

2.6 Areas for fuel storage, refueling, and servicing of construction equipment and vehicles will be at least 150 feet from the stream channel and all machinery fueling and maintenance will occur within a contained area. Overnight storage of vehicles and equipment must also occur in designated staging areas.

2.7 Equipment refueling and storage areas will have hydrologic function restored (e.g., ripping or subsoiling) in areas where it has been degraded.

2.8 No surface application of nitrogen fertilizer will be used within 50 feet of any water body.

3. To implement RPM No. 3 (riparian habitat protection), the BPA shall ensure that:

3.1 Alteration of native vegetation will be minimized. Where native vegetation will be altered, measures will be taken to ensure that roots are left intact. This will reduce erosion while still allowing room to work. No protection will be made of invasive exotic species (e.g. Himalayan blackberry), although no chemical treatment of invasive species will be used.

3.2 Riparian vegetation removed will be replaced with a native seed mix, shrubs, and trees according to the re-vegetation plan in section 1.2.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance Essential Fish Habitat (EFH) for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2));

- NOAA Fisheries must provide conservation recommendations for any Federal or State action that would adversely affect EFH (§305(b)(4)(A));

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

Essential Fish Habitat means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 CFR 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810).

Essential Fish Habitat consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of Essential Fish Habitat

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

3.3 Proposed Actions

The proposed action and action area are detailed above in Section 1.2 and 1.3 of this document. The action area includes habitats that have been designated as EFH for various life-history stages of chinook and coho salmon.

3.4 Effects of Proposed Action

As described in detail in Section 2.1.3 of this document, the proposed action may result in short- and adverse effects to a variety of habitat parameters.

1. The proposed action will result in a temporary risk of contamination of waters through the accidental spill or leakage of petroleum products from heavy equipment.

2. The proposed action will result in a short-term degradation of water quality (turbidity) because of instream construction activities.

3. Temporary loss of aquatic insects (a prey base for listed fish) due to the physical loss of existing habitat at the structure placement sites and sedimentation of downstream habitat.

3.5 Conclusion

NOAA Fisheries concludes that the proposed action will adversely affect designated EFH for chinook and coho salmon.

3.6 EFH Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. While NOAA Fisheries understands that the conservation measures described in the BA will be implemented by the BPA, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. To minimize the adverse effects to designated EFH for Pacific salmon (contamination of waters, suspended sediment, and habitat

alteration), NOAA Fisheries recommends that the BPA implement Terms and Conditions No. 1, No. 2, and No. 3 as described in Section 2.2.3 of this document.

3.7 Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 CFR 600.920(k), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The BPA must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920(l)).

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