

1203 North Harbor

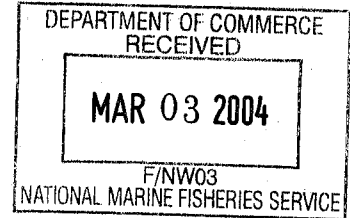


State of Washington
DEPARTMENT OF FISH AND WILDLIFE

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February 27, 2004

Mr. Rob Clapp
Protected Resource Division
U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Marine Fisheries Service
525 NE Oregon Street, Suite 500
Portland, OR 97232-2737



Dear Rob,

Attached is a permit application that we are now submitting to request renewal for authorization of the take of endangered steelhead and spring chinook salmon in the upper Columbia River (UCR) basin as a result of annual Washington Department of Fish and Wildlife research and stock assessment operations. These activities are consistent with those authorized under ESA Section 10(a)(1)(A) # 1203 which expired December 31, 2003.

WDFW stock assessment and research activities directed at non-listed and listed species in the region are included in this permit application. Trapping and other sampling actions associated with these programs may lead to the direct take of co-occurring listed Upper Columbia River spring chinook and steelhead ESUs, and Columbia River basin bull trout DPS. These projects are necessary to monitor the status of salmonid populations in the upper Columbia River region, and to evaluate the effects of WDFW fishery and habitat program management.

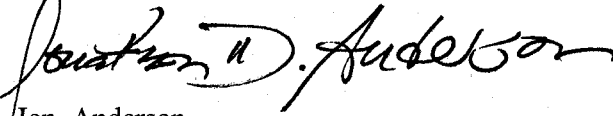
The WDFW habitat research and monitoring, stream typing, and other habitat assessment activities are also described under the General Program Description Section IV, B.2. These habitat activities are crucial to the protection and recovery of listed species, and effective management of fisheries on non-listed species. They determine potential impacts to fish and/or fish habitat from hydraulic projects and whether Hydraulic Project Approvals (HPAs) should be issued or denied. These habitat activities determine application of appropriate regulatory measures and the degree of habitat protection required in relation to land management activities. They also help determine fish habitat preferences, requirements, and limiting factors so that they may be adequately protected and/or restored.

We understand that the renewal of this permit may not be processed by the beginning of field sampling in August of 2004. If not, we request that a letter or other document would be available to ensure that ESA take authorizations relative to funding obligations are satisfied, and that the required sampling can continue uninterrupted.

Be advised that the take of ESA-Threatened Columbia River Basin bull trout DPS is authorized through the ESA Section 6(c)(1) Cooperative Agreement between the U.S. Fish & Wildlife Service and WDFW (Revised Section 7 Programmatic Consultation on Issuance of Section 10(a)(1)(A) Scientific Take Permits and Section 6(c)(1) (Exemption From Take for Bull Trout (*Salvelinus confluentus*) (6007.2100) dated February 14, 2000).

Please contact WDFW Fish Program Biologist Laura Praye at 509-664-3148 ext. 24, or me at 360-902-2711 if you have any questions regarding this permit application.

Sincerely,



Jon. Anderson
Fish Program
ESA Response Unit

Enclosure: Renewal Application for ESA Section 10 Permit #1203

cc: Garth Griffin, NOAA Fisheries PRD, Portland
Ross Fuller, WDFW Fish Management Division Manager
Bob Gibbons, WDFW Inland/Steelhead State Manager
Heather Bartlett, WDFW Multi-Regional Fish Program Manager
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Laura Praye, WDFW ESA-Mid-Columbia Studies, Wenatchee
Kirk Truscott, WDFW District 6 Fish Biologist
Art Viola, WDFW District 7 Fish Biologist
Andrew Murdoch, WDFW Science Division, Fish Biologist, Wenatchee
Bob Steele, WDFW Area Habitat Biologist, Wenatchee
Connie Iten, WDFW Area Habitat Biologist, Omak

Section 10 Direct Take Permit Application

I. Title: Application for a Permit for Scientific Purposes Under the Endangered Species Act of 1973 - *Upper Columbia River Region Research and Stock Assessment Activities Affecting Upper Columbia River Spring Chinook and Steelhead.*

II. Date: February 20, 2004

III. Applicant: Washington Department of Fish and Wildlife (WDFW)
Jeff Koenings, Director
600 Capitol Way North
Olympia, Washington 98501-1091

IV. Detailed Program Description:

A. Program justification

1. Population Status and Factors for Decline

The National Marine Fisheries Service (NMFS) concluded that the naturally-produced Upper Columbia River (UCR) spring chinook salmon (*Oncorhynchus tshawytscha*) Evolutionary Significant Unit (ESU) is at risk of extinction (Myers et al. 1998) and was listed under the ESA as "endangered" March 1999. When UCR spring chinook were listed as endangered, populations had been at record low abundances for several years, however adult returns have increased in more recent years. Despite increased returns in recent years, the ESU is still at critically low levels relative to historic production and desired escapement levels, particularly for natural spawners.

In its review of the status of west coast steelhead (*Oncorhynchus mykiss*) populations, the NMFS concluded that the upper Columbia River naturally-produced steelhead ESU (the portion of the Columbia River basin that is upstream of the Yakima River) is clearly not replacing itself (NMFS 1996). Total abundance of steelhead within the Upper Columbia River Steelhead ESU has been relatively stable or increasing in recent years only because of hatchery supplementation programs (NMFS 1996).

Hatchery-produced steelhead have dominated spawning escapements, with recent contributions estimated to average 54% in the Wenatchee River and 81% in the Methow and Okanogan rivers. This ESU might not exist today if there were no hatchery production based on indigenous upper Columbia River region steelhead stocks. The Wells Hatchery steelhead stock is also considered essential for recovery and is included in the listing. This stock was founded from a mixture of native populations and retains genetic resources of steelhead populations above Grand Coulee Dam (NMFS 1996).

Currently, the Wenatchee and Methow River basins have three species of salmonids listed under the ESA. Endangered spring chinook *Oncorhynchus tshawytscha* spawn in the tributaries of the upper Wenatchee and Methow rivers. A smolt monitoring program has been operated since 1994 on the Chiwawa River, a major spawning tributary to the Wenatchee River, to evaluate potential impacts of hatchery supplementation on wild production. In addition, a spring chinook captive broodstock program was initiated in 1997 on the White River and Nason Creek stocks. In 2000, a smolt trap was installed in the lower Wenatchee River (rkm 9.6) to monitor juvenile salmonid emigration.

Endangered summer steelhead *O. mykiss* are believed to spawn throughout the upper Columbia River basin. In 1998, a video monitoring system was installed at Tumwater Dam on the Wenatchee River to estimate steelhead returns. In 2001, the WDFW initiated steelhead spawning ground surveys to more accurately estimate Wenatchee River escapement. Historically, escapement to the Wenatchee River basin had been calculated from the difference between Rock Island Dam and Rocky Reach Dam counts on the Columbia River. The video monitoring system at Tumwater Dam (rkm 52.8) in 2002 showed that the Wenatchee River still has a high proportion of wild steelhead (56.8%). No monitoring program exists to determine the reproductive success of steelhead in the Wenatchee River basin.

Threatened bull trout *Salvelinus confluentus* populations exist in both fluvial and adfluvial forms within the Wenatchee Basin and fluvial form in the Methow Basin. The adfluvial population in Lake Wenatchee is thought to spawn in tributaries of Lake Wenatchee and the Chiwawa River. The videotape monitoring at Tumwater Dam has established the presence of a fluvial population of bull trout that migrate to the upper Wenatchee River, presumably from the Columbia River. However, little information exists concerning the life history strategies and reproductive success of this fluvial population.

Emigration timing and natural production estimates are critical to allow managers to make decisions that affect these listed stocks. In addition, natural populations of summer chinook and sockeye *O. nerka* found in the Wenatchee River basin are currently not warranted for listing under the ESA. However, monitoring the natural production of the remaining stable salmon populations would provide crucial data if productivity were to change. Data collected on these summer chinook and sockeye may help managers in making decisions that may prevent these stocks from declining.

Hydroelectric development of the mainstem Columbia River has resulted in a major disruption of migration corridors, and affected flow regimes and estuarine habitat. In particular, the construction of Chief Joseph and Grand Coulee dams prevented thousands of upper Columbia River-origin spring chinook and steelhead from reaching their natal streams. Fish in this ESU must traverse at least seven mainstem dams during downstream and upstream migration. Methow fish must migrate through nine mainstem dams. Mortalities occurring at the seven-mainstem Columbia River dams are considered a major factor in spring chinook and steelhead production (WDFW et al. 1993). Irrigation diversions, hydroelectric development, forest practices, urbanization, and livestock grazing also limit the productivity of naturally-produced spring chinook in the region.

Historically, artificial propagation efforts have significantly impacted spring chinook and steelhead populations, either through hatchery-based enhancement or the extensive trapping and transportation activities associated with the Grand Coulee Fish Maintenance Project (GCFMP). Because spring chinook and steelhead were at severely depressed levels at the time of the GCFMP, naturally spawning populations in this ESU were founded by the same GCFMP homogenized stock (Myers et al. 1998). Current artificial propagation efforts focus on supplementing naturally spawning populations, and reducing potential impacts to naturally spawning populations.

2. Program Rationale -

The WDFW stock assessment and research activities directed at non-listed and listed species in the region are also included in this permit application. Trapping and other sampling actions associated with these programs may lead to the direct take of co-occurring listed spring chinook, steelhead, and bull trout. These projects are necessary to monitor the status of salmonid populations in the upper Columbia River region, and to evaluate the effects of WDFW fishery and habitat program management.

The WDFW habitat research and monitoring, stream typing, and other habitat assessment activities are also described under the General Program Description Section IV, B.2. These habitat activities are crucial to the protection and recovery of listed species, and effective management of fisheries on non-listed species. They determine potential impacts to fish and/or fish habitat from hydraulic projects and whether Hydraulic Project Approvals (HPAs) should be issued or denied. These habitat activities determine application of appropriate regulatory measures and the degree of habitat protection required in relation to land management activities. They also help determine fish habitat preferences, requirements, and limiting factors so that they may be adequately protected and/or restored.

3. Consistency with the Mid-Columbia Mainstem Conservation Plan (MCMCP) and Existing Permits/Plans

Spring chinook and steelhead monitoring and evaluation activities proposed in this permit application are consistent with the MCMCP. The MCMCP conservation planning initiative is designed to recover salmonid populations upstream of Rock Island Dam to self-sustaining levels. The MCMCP is a consensus based plan developed by the fish co-managers, including NMFS, U. S. Fish and Wildlife Service, WDFW, Yakama Indian Nation, Colville Confederated Tribes, the Confederated Umatilla Tribes, and Chelan, Douglas, and Grant Public Utility Districts (PUDs) (MCMCP 1998). A "Biological Assessment and Management Plan" (BAMP) has been submitted as a part of the MCMCP. The BAMP describes monitoring and evaluation programs, and objectives to be applied within the region under a "Mid-Columbia River Hatchery Program" (BAMP 1998).

The proposed WDFW monitoring and evaluation program elements directed at supplementation are part of an application for the 50-year multi-species MCMCP and relicensing agreement for the PUDs. The program has two objectives:

- Help recover natural populations throughout the Mid-Columbia Region so that they can be self-sustaining and harvestable, while maintaining their genetic and ecologic integrity.
- Compensate for a 7% mortality rate at each of the five PUD-owned mid-Columbia River

mainstem dams (Wells, Rocky Reach, Rock Island, Wanapum, and Priest Rapids) in a manner that is consistent with the first objective.

The plan provides overall guidance for monitoring and evaluation of the Mid-Columbia Hatchery Program, and a means to detect and potentially ameliorate problems encountered in implementation. The WDFW intends for the activities proposed in this permit application to be consistent with the MCMCP.

B. General Program Descriptions -

The WDFW proposes to take listed upper Columbia spring chinook and steelhead through stock assessment, habitat assessment, and research activities directed at listed species, and other fish species, in regional tributaries accessible to anadromous fish (including, but not limited to Nason Creek, White River, Chiwawa River, Wenatchee River, Chewuch River, Methow River, Twisp River, Lost River, Early Winters Creek, Okanogan River, Similkameen River and the Columbia River mainstem upstream of its confluence with the Yakima River).

Proposed activities include:

- Collecting biological data to document stock status.
- Documenting habitat utilization or presence/absence.
- Determine fish habitat requirements/preferences, (through snorkeling, electroshocking, seining, or hook and line sampling).
- Habitat evaluation and monitoring needed for approval and conditioning of HPAs.
- Determining habitat restoration and enhancement needs.
- Determining regulatory requirements and habitat protection needs in relation to land management practices.
- Conducting stream ecological research projects.

These proposed monitoring, evaluation, and research activities must be responsive to ESA protective requirements for spring chinook, steelhead, and other ESA-listed salmonid (bull trout) in the Columbia River basin. These activities also need to be responsive to federal trust obligations to the Native American Tribes, fulfillment of court approved actions developed under the auspices of *United States v. Oregon*, the discharge of fisheries mitigation responsibilities incurred as a result of water development authorizations, and achievement of U.S./Canada Pacific Salmon Treaty obligations (CBFWA 1996).

Following are general descriptions of WDFW-managed monitoring, evaluation, and research programs proposed in this take authorization application. Included are all programs that may take listed upper Columbia River spring chinook and steelhead for stock assessment, research, biological sampling, and habitat evaluation activities during a five-year period commencing March 2004. The proposed take actions are in addition to those presented in separate WDFW Section 10 direct take permits including #1196, #1395, #1114, and #1347, pertaining to impacts on upper Columbia River spring chinook and steelhead resulting from permitted activities.

1. Salmonid Stock Assessment and Habitat Utilization Programs

The WDFW conducts various programs within spring chinook and steelhead tributaries to collect biological data from other salmonid populations, and to document the presence or absence of

salmonids for habitat assessment and stream utilization. Collection of biological data, including meristic, morphometric, and genetic stock identification information, is needed to improve scientific understanding of salmonid populations indigenous to upper Columbia River tributaries. Presence/absence studies are needed to assess salmonid distribution and habitat use. The WDFW uses this information to evaluate the potential environmental effects of proposed land use practices on critical salmonid habitat, determine the appropriate regulatory measures and degree of habitat protection required in land management activities, and evaluate salmonid productivity.

The above programs use electroshockers, seines, dip-nets, hook and line gear, or snorkel surveys. Spring chinook and steelhead takes associated with these sampling activities may include observation, harassment, capture, handling, and immediate (lethal take) or delayed mortality (incidental take).

2. Habitat Evaluation, Research, and Monitoring

The WDFW conducts stream habitat surveys to determine the potential hydraulic project impacts on fish and fish habitat. These habitat assessments are necessary to determine whether or not a Hydraulic Project Approval (HPA) should be issued, and under what conditions. Habitat research and monitoring (through Adaptive Management) will be conducted to determine if improved forest practices adequately provide the ecosystem functions needed by fish and their habitats.

Habitat surveys may occasionally include electrofishing to determine fish presence and/or habitat utilization. However, in general, these surveys will be accomplished through foot surveys to record measurements of habitat parameters (e.g. large woody debris, pools, stream width, gradient, and substrate type) and other measurements associated with fish passage evaluations (e.g. culverts). Other than the possible direct harm from electrofishing, take associated with these habitat surveys may include observation and harassment.

C. Descriptions of Proposed Program Activities

1. Salmonid Stock Assessment and Habitat Utilization Programs

The WDFW undertakes numerous fish stock assessment and habitat utilization studies within upper Columbia River spring chinook and steelhead tributaries each year to improve scientific knowledge of juvenile anadromous and resident salmonid population status, abundance and distribution. Data collected through these studies are used to further define salmonid population diversity within the region. Another important objective is the collection of presence/absence information to allow for the appropriate regulation of land-use activities within the watersheds to insure that such activities are protective of salmonid populations.

The biological sampling programs will occur in selected areas each year over the duration of the requested direct take permit. The watershed location, sampling method, and timing of these programs are indicated in Table 1. Most of these projects are directed at the collection of data necessary to improve scientific understanding of the status, distribution, and diversity of ESA-listed and non-listed salmonid populations in the upper Columbia region. The WDFW may be conducting similar activities in other waters, consistent with the intent of this application.

Assessment work on listed bull trout takes has been authorized by the USFWS through a revised Section 7 Programmatic Consultation on Issuance of Section 10(a)(1)(A) Scientific Take Permits and Section 6 (c)(1) Exemption From Take for Bull Trout (*Salvelinus confluentus*) (6007.2100) (USFWS 2000).

Methods used to collect information for the above programs may include the capture, biological sampling, marking, and release of fish. Fish will generally be captured using electroshockers, seines, snorkeling or hook and line. Electrofishing will be conducted in a manner consistent with NMFS and WDFW guidelines (NMFS 1998). Crews will sample index areas within a river reach using select electro fishing equipment. Hook and line sampling used for presence/absence or biological sampling programs will employ standardized angling techniques and artificial lures with barbless hooks. Snorkeling observations will be conducted using standardized fishery techniques and methods established by R. F. Thurow (1994). Teams of 1-3 snorkelers snorkel each bank moving downstream, and upstream when conditions allow. These capture methods and subsequent handling may lead to the direct or indirect take of listed spring chinook and steelhead. In 2002, a total of 18- artificially-produced, ESA-listed, steelhead were sampled during stock assessment. During habitat research 23- naturally-produced spring chinook and 5- naturally-produced steelhead were sampled.

Table 1. Annual stock assessment programs directed at listed salmonid populations in the upper Columbia River ESU.

Location	Listed Species Encountered	Sampling Methods	Time Frame
Methow River and Tributaries	Spring chinook, summer steelhead, bull trout	Snorkel, hook and line, electro fishing, seining	August-October
Entiat River and Tributaries	Spring chinook, summer steelhead, bull trout	Snorkel, hook and line, electrofishing, seining	August-October
Wenatchee River and Tributaries	Spring chinook, summer steelhead, bull trout	Snorkel, hook and line, electrofishing, seining	August-October
Columbia River (Upstream of the Yakima River) and Tributaries	Spring chinook, summer steelhead, bull trout	Snorkel, hook and line, electrofishing, seining	August-October

2. Habitat Evaluation, Research, and Monitoring

Prior to issuing a HPA, WDFW habitat biologists conduct project site evaluations. The WDFW habitat biologists conduct numerous site-by-site project assessments prior to issuance or denial of a Hydraulic Project Approval (HPA). These habitat evaluations determine potential project impacts to fish and their habitats. For HPAs that are issued, the habitat evaluations are important for determining site-specific conditions to assure that fish and their habitats are adequately

protected. Habitat evaluations may include occasional electrofishing, hook and line sampling, and snorkeling to document salmonid presence/absence and/or habitat utilization; walking the stream or bank to measure habitat parameters (e.g. channel width, pools, riffles, depth, flow, gradient, substrate, and Large Woody Debris (LWD)); and measuring various parameters associated with fish passage assessment (e.g. culverts).

These habitat evaluations occur year round in response to incoming permit applications. The watershed location, sampling method, and timing of these programs are indicated in Table 2. Spring chinook and steelhead may be temporarily disturbed during foot surveys in shallow stream areas or along the bank. Occasional electrofishing may cause injury or potential mortality, but numbers impacted are expected to be low. Assessments will be conducted using the least intrusive methods to attain necessary data.

Other habitat research, evaluation and monitoring will occur in response to updated forest practice rules (Timber Fish and Wildlife (TFW) Forestry Module). These additional activities will help determine whether improved forest practices will retain/restore salmonid life history requirements (adequate shade, LWD, bank stability, clean substrate, channel complexity, etc.). Within the Forestry Module Adaptive Management process, research and monitoring needs are currently being identified. Anticipated take of spring chinook may include harassment by walking within the stream to record habitat measurements.

Table 2. Annual habitat assessment programs directed at listed salmonid populations in the upper Columbia River ESU.

Location	Listed Species Encountered	Sampling Methods	Time Frame
Methow River and Tributaries	Spring chinook, summer steelhead, bull trout	Foot surveys, electrofishing, hook and line, snorkeling	January-December
Entiat River and Tributaries	Spring chinook, summer steelhead, bull trout	Foot surveys, electrofishing, hook and line, snorkeling	January-December
Wenatchee River and Tributaries	Spring chinook, summer steelhead, bull trout	Foot surveys, electrofishing, hook and line, snorkeling	January-December
Columbia River (Upstream of the Yakima River) and Tributaries	Spring chinook, summer steelhead, bull trout	Foot surveys, electrofishing, hook and line, snorkeling	January-December

V. Description Of the Purpose Of The Proposed Program

The general purpose of the proposed programs is to sample upper Columbia River salmonid

populations. Sampling will provide data to improve scientific understanding of fish abundance, status, distribution, diversity, and behavior. The specific purpose of each of the proposed programs is described in Section IV, A.

A. Detailed Discussion Of Procedures And Techniques

Detailed discussions of the procedures and techniques used within the proposed research programs are provided in Sections IV, B. and C.

B. Potential For Injury Or Mortality And Steps Taken To Minimize Adverse Effect

Details regarding potential injury or mortality of listed spring chinook by life stage associated with each activity are presented in Section VI. Estimated takes by life stage are summarized in Attachment 1.

Steps taken by the WDFW to minimize adverse effects on listed spring chinook and steelhead are presented in the following sections which detail impact minimization, mitigation, and monitoring actions.

1. Impact Mitigation, Minimization, and Monitoring.

a. General Approach to Minimize and Mitigate Adverse Effects -

Activities undertaken to improve scientific understanding in this ESU may lead to the direct or indirect take of listed fish. Habitat assessments allow the WDFW to evaluate the relationship between land management practices and their impacts to critical fish habitat. These programs may result in increased impacts to listed juvenile and adult spring chinook and steelhead. Strategies are therefore proposed to minimize potential impacts to listed species. Impacts to be addressed include:

1. Sampling equipment failure (potential for catastrophic loss)
2. Deleterious ecological effects on wild fish
 - a. Predation
 - b. Behavioral effects
3. Mortality or selection bias to captured populations
4. Risks to critical habitat

b. Hazard Mitigation and Minimization

Specific risk aversion measures to mitigate and minimize impacts to listed spring chinook and steelhead are proposed below.

1. Sampling equipment failure (potential for catastrophic loss)

The risk of catastrophic fish loss due to equipment operational failure, including power/water loss and disease will be minimized through the following means:

- Fish removed from streams for biological sampling will be dewatered for a minimal duration for sampling, then returned to the water immediately for recovery.
- Electroshockers used to sample fish populations will be maintained and operated in a manner consistent with NMFS (NMFS 1998) and WDFW guidelines.
- All fish will be handled in a manner to minimize stress (i.e. anesthetize fish and use sanctuary nets during transfer).

2. Ecological effects on wild fish

Ecological impacts to listed wild spring chinook and steelhead from biological sampling, and stream habitat surveys will be minimized through the following measures:

- All fish will be captured, handled, sampled, and released using methods in accordance with WDFW Fish Health Manual (WDFW 1996).
- Stream habitat surveys will be conducted in a manner that minimizes disruption of spring chinook and steelhead adult and juvenile behavior by limiting the frequency of surveys and the duration of contact with fish during the surveys.
- WDFW staff responsible for capturing, handling, and sampling fish will be adequately trained to minimize the risk of injury and disease transfer to listed fish that might compromise the fish's ability to avoid predators post-release.

3. Numerical reduction or selection effects risks to captured populations

The proposed programs minimize mortality to spring chinook and steelhead populations, including the mortality of any component of the total population. Measures to minimize mortality and selection bias to listed spring chinook and steelhead include:

- Uniform capture, handling, sampling, and release methods will be employed for the duration of the biological sampling programs, to ensure that all components of spring chinook and steelhead populations encountered are exposed to the same level of impact.
- Any hook and line sampling used for presence/absence or biological sampling programs will employ artificial lures with barbless hooks to minimize the risk of harm to any spring chinook or steelhead.
- Stream habitat surveys (foot, boat, snorkel) shall be conducted to ensure that contact with spring chinook and steelhead redds is minimized to reduce the risk of mortality to incubating eggs and alevins.

4. Spring chinook and steelhead critical habitat risks

The proposed research programs pose a minimal risk to critical spring chinook and steelhead habitat.

- Stream survey and biological sampling programs will be conducted to minimize impacts to spawning areas, redds, and streamside vegetation that provides cover for rearing salmonids.

c. Monitoring and Evaluation

Data from stock assessment projects, including stream surveys and biological data collection directed at other salmonid species, will be included in WDFW Fish Management databases.

VI. Description Of the Listed Species That Are The Subject Of The Application

A. Level of Take

- 1. A list of each species and the number of each estimated to be taken**

The spring chinook and summer steelhead that are the subject of this direct take application are wild fish indigenous to Upper Columbia Basin watersheds upstream of Rock Island Dam, including the Wenatchee, Entiat, and Methow rivers. Listed Upper Columbia ESU spring chinook and steelhead will be taken during the proposed research, monitoring, and assessment programs, either as the targeted species, or incidental to the capture of other species. The estimated number of spring chinook and steelhead that may be taken each year in the region is indicated in the attached take summary table (Attachment 1).

2. Alternative scenarios for the action and potential range of take numbers

On-going and proposed research and stock assessment actions described in this application constitute the scenarios on which the indicated takes are based. Take levels provided in Attachment 1 reflect recent run size and productivity conditions (and resultant fish collection and encounter levels). Attachment 1 also includes fish collection and encounter levels that may be anticipated in the near future (2004 - 2009).

B. Physical Description of the Animals to be Taken

Spring chinook

Adult spring chinook salmon enter the Columbia River from March through mid-May (Myers et al. 1998). Peak abundance of the run in the lower Columbia River occurs in April and May (Chapman et al. 1995). Upper Columbia-origin spring chinook exhibit peak migration at Rock Island Dam in mid-May, with arrival at Wells Dam slightly later. Fish spawn in the Wenatchee and Methow rivers from late July through September, peaking around mid-August (WDF et al. 1993; Chapman et al. 1995).

Wild Upper Columbia ESU spring chinook juveniles that may be affected by the proposed programs are present year-round in the Wenatchee and Methow rivers and tributaries, and may rear and over-winter in the mainstem upper Columbia River. Deposited eggs incubate from late July through late fall or early winter, when the eggs generally hatch (Chapman et al. 1995). Alevins remain in the gravel 4-6 weeks or more, emerging as fry in late winter or early spring. Most spring chinook fry disperse extensively downstream after emergence, although some fry assume residence in the natal stream near the spawning site. A second downstream movement occurs during late fall when chinook migrate to suitable over-wintering habitat, usually from the tributaries to the mainstem river. A third and final downstream movement occurs in the spring, when chinook migrate as yearling smolts out to sea. At Bonneville Dam the migration peaks during the last week in May.

Wild fry and subyearling spring chinook that may be affected by the proposed programs may range in size from 30-40 mm as swim-up fry in the spring, average 54 mm in June, and average 88 mm by October.

Steelhead

Adult steelhead enter the Columbia River between May and September and arrive at Wells Pool in early July. Fish enter the Wenatchee and Methow rivers in mid-July and peak between mid-September and October. During the winter, adult steelhead typically return to the warmer Columbia River and re-enter the Methow River to begin spawning in mid-March after the ice has

thawed. Steelhead spawn in the Wenatchee and Methow rivers from mid-March through mid-May, peaking about mid-April and many fish seek out higher reaches in the tributaries. Fry emerge that summer and juveniles rear for two to four years prior to spring downstream migration (62 FR 43937).

Artificially-produced steelhead return predominantly as 1-salt for males and 2-salt for females while naturally-produced steelhead typically return as 2-salt for both sexes (Mullan et al. 1992). Based on recent year spawner size data, adult steelhead that spent one year in the ocean will average 68 cm in length for females and 63 cm for males. Those that spent two years in the ocean will average 71 cm for females and 73 cm for males (Chapman et al. 1995).

Upper Columbia River ESU juvenile steelhead that may be affected by the proposed programs are present in the Wenatchee and Methow rivers and tributaries, and may rear and over-winter in the mainstem upper Columbia River.

C. Specific Dates and Locations of Take

1. Probable dates and locations of capture or other taking

Specific dates and locations of take associated with activities described in this application will be determined on a project specific basis and affected by management and research needs and through proposed land-use activities. Juvenile spring chinook and steelhead will be taken year-round, through biological sampling programs (summer and fall months), and through presence/absence surveys (year-round). The possibility exists to inadvertently take an adult spring chinook or steelhead during juvenile sampling. All precautions will be employed to avoid any take of adult listed fish.

2. Probable dates and locations of importation, exportation, and other acts requiring a permit.

The WDFW does not propose to import or export listed spring chinook or steelhead.

D. Description of the Stock Status of each Species

1. Distribution and Population Status

Spring chinook and steelhead populations within the Upper Columbia River ESU utilize upper Columbia River tributaries as spawning and juvenile rearing areas. The Columbia River mainstem and estuary are also used for rearing. The tributaries, mainstem, and estuary are used as migration corridors by seaward-migrating smolts and by returning adults. Activities proposed under this permit application pertain to the Upper Columbia River portion of the species' range. The proposed research, monitoring and assessment actions will occur mainly in spring chinook and steelhead spawning and rearing areas.

Upper Columbia River Spring Chinook ESU

This ESU includes stream-type spring chinook populations originating from all areas of the Columbia River basin upstream of Rock Island Dam (Myers et al. 1998). Production areas include the Wenatchee, Methow, and Entiat river basins. Nine stocks have been identified within the UCR spring chinook ESU (WDF et al. 1993). All stocks, except the Methow stock, were considered by WDF et al. (1993) to be of native origin, of "wild" production type, and as

“depressed” in status. The WDFW considers the Methow spring chinook salmon stock to be a “composite” in production type, but of native origin, and “depressed” in status. Six hatchery populations have also been listed as endangered and are considered to be essential for recovery of these stocks (62 FR 43937).

Spring chinook populations from all three basins have exhibited similar trends and patterns in abundance over the last 40 years. Long-term trends in abundance have been reported as generally negative (Myers et al. 1998). Abundance data continue to show a negative trend even with the inclusion of data from 1996-2001 and two years of increased escapement. Despite increased escapement in recent years, upper Columbia River spring chinook populations remain critically low (62 FR 43937).

Major risk factors for this ESU include habitat problems related to irrigation diversions and hydroelectric dams, urbanization, forest practices, livestock grazing, and blockages to migration caused by dams and road crossings on the mainstem and tributary rivers. Other risk factors are genetic homogenization resulting from hatchery supplementation and disease transfer to wild fish from hatchery operations (Myers et al. 1998). Based upon the population status of the species, and risk factors affecting the likelihood for its continued existence, NMFS has proposed that the ESU warrants listing under the ESA as “endangered”.

a. Status related to the location or area of taking

1) Adult fish

The number of listed adult spring chinook that may be affected by WDFW research activities may be estimated using total run size and escapement estimates. Recent five-year (1997-2001) mean spawning escapement estimates for wild and hatchery populations in the Upper Columbia region are shown in Table 2 (WDFW, unpublished data).

Table 2. Recent five year (1997-2001) mean spawning escapement estimates for wild and hatchery Upper Columbia spring chinook populations.

Population	Mean Escapement	
	Wild (SD)	Hatchery (SD)
Chiwawa River	217 (292)	434 (760)
Nason Creek	119 (123)	127 (207)
White River	49 (74)	5 (11)
Methow River	102 (133)	1,415 (2,826)
Twisp River	134 (256)	116 (141)
Chewuch River	218 (410)	354 (742)

2) Juvenile fish

a. Wild production -

The status of juvenile wild spring chinook within the research location is indicated by the following estimates of: 1) potential smolt production capacities, 2) recent ten year mean (actual) seeding levels, and 3) percent of capacity met by actual production (Table 3) (from BAMP 1998)).

Table 3. Estimated wild spring chinook smolt production capacities compared to estimated seeding levels.

Watershed	Smolt Production Capacity	Recent Ten-year Seeding levels	Percent Of Capacity
Wenatchee	1,200,000	510,863	42.6
Methow	826,359	155,734	18.8
Totals	2,026,359	666,597	32.9

Current wild smolt production is approximately one-third of the production capacity for the major systems that may be affected by the proposed programs.

b. Hatchery production -

Artificially-produced spring chinook are also listed as endangered in the upper Columbia River ESU and requires their consideration in the status of the listed populations. The following annual smolt production objectives for the WDFW upper Columbia River hatchery-based recovery programs are used to estimate the number of hatchery-origin spring chinook that may be affected by the research programs (Table 4).

Table 4. Estimated hatchery-origin spring chinook smolt releases into the upper Columbia River region from WDFW recovery programs.

Population	Program Type	Short Term Production Objective	Long Term Production Objective
Chiwawa	Supplementation	300,000	672,000
Nason	Captive Brood	360,000	N/A
White	Captive Brood	240,000	240,000
Methow	Supplementation	550,000	550,000
Twisp	Captive Brood	324,000	N/A
Totals		1,774,000	1,462,000

Upper Columbia River Steelhead ESU

This ESU includes all natural-origin populations of steelhead in the Columbia River basin upstream of the Yakima River to the U.S./Canada border. The Wells Hatchery steelhead stock is considered essential for recovery, and is included in the listing (62 FR 43937).

The Wells Hatchery stock is considered part of the UCR ESU because it was founded from a mixture of native populations and retains DNA from steelhead populations above Grand Coulee Dam that are now extinct. Since 1997, the WDFW has been developing a Wenatchee River stock of juveniles released into the Wenatchee basin. The natural and hatchery populations in this ESU are closely related because naturally-spawning adults were incorporated into the hatchery program and a large number of hatchery fish have been spawning in the natural

environment. Since natural replacement rates of UCR steelhead are low (0.3:1), hatchery supplementation programs were determined to be essential for recovery and included in the endangered listing under the ESA (62 FR 43937).

On April 4, 2002, NOAA Fisheries defined interim abundance recovery targets for each spawning population in this ESU (Lohn 2002). These targets are intended to represent the number and productivity of naturally produced spawners that may be needed for recovery, in the context of whatever take or mortality is occurring. For UCR steelhead, the interim recovery levels are 2,500 spawners in the Wenatchee River, 500 spawners in the Entiat River, and 2,500 spawners in the Methow River (Lohn 2002) (62 FR 43937)).

Returns of both hatchery and naturally produced steelhead to the UCR basin have increased in recent years. The average 1997-2001 return passing over the Priest Rapids Dam fish ladder was approximately 12,900 fish. The average for the previous five years (1992-1996) was 7,800 fish. Abundance estimates of returning naturally-produced steelhead have been extrapolated from mainstem dam counts and associated sampling information (e.g., hatchery/natural fraction, age composition). The natural component of the annual steelhead run passing over Priest Rapids Dam increased from an average of 1,040 (1992-1996), representing about 15 percent of the total adult count, to 2,200 (1997-2001), representing about 17 percent of the adult count during these years (BRT 2003) (62 FR 43937)).

Natural production numbers for the Wenatchee/Entiat and Methow rivers remain well below the interim recovery levels developed for these populations (BRT 2003). A 5-year mean (1997-2001) of approximately 900 naturally-produced steelhead returned to the Wenatchee and Entiat rivers compared to a combined abundance target of 3,000 fish. Although this is well below the interim recovery target, it represents an improvement over the past increasing trend of 3.4 percent per year. However, the average percentage of naturally-produced fish for the last 5-years dropped from 35 to 29 percent, as compared to the previous status review (62 FR 43937).

For the Methow population, the 5-year mean of natural returns over Wells Dam was 358 fish. Although this is well below the interim recovery target, it represents an improvement over the past increasing trend of 5.9 percent per year. In addition, the estimated 2001 return of 1,380 naturally-produced spawners was the highest single annual return in the 25-year data series. However, the average percentage of natural origin spawners dropped from 19 percent for the period prior to the 1998 status review to 9 percent for the 1997-2001 returns (62 FR 43937).

E. Description of the manner of taking

Details regarding the methods used to take listed spring chinook and steelhead are presented in Section IV. Detailed descriptions of methods used to collect, sample, or observe listed fish are presented in Section IV, B. and C.

F. Names and Qualifications of Persons Capturing or Taking Listed Fish

The stock assessment and research programs described in this permit application are managed and conducted by the WDFW. All individuals involved in the sampling activities are employees of WDFW, and are therefore acting under the authority of the agency. Agency staff also conduct other stock assessment and biological sampling activities.

Personnel involved in the take of listed spring chinook will include WDFW fisheries and habitat biologists, research scientists, and fisheries technicians. The following individuals are all funded by state and federal funds. All individuals participating at the field levels in the program are professionally trained in methods that will allow for the safe capture, handling, and release of listed spring chinook and steelhead.

1. Upper Columbia River Spring Chinook Research Program Oversight

The names and qualifications of WDFW personnel responsible for specific research activities described in this application are as follows:

Laura Praye, Fish Biologist, (509) 664-3148, 4 years with WDFW, Upper Columbia Region ESA program leader.

Andrew Murdoch, Fish Biologist, (509) 664-3148, 10 years with WDFW.

Heather Bartlett, Multi-Regional Fish Program Manager, (509) 826-7341, 10 years with WDFW.

Kirk Truscott, District Fish Biologist, (509) 664-3148, 20 years professional experience, 3 years with WDFW.

Art Viola, District Fish Biologist, (509) 665-3337, 15 years with WDFW.

Bob Steele, Area Habitat Biologist, (509) 662-0503, 19 years with WDFW.

Connie Iten, Area Habitat Biologist, (509) 754-4624, 14 years with WDFW.

G. Supervision and observation of taking by contractor.

No taking of spring chinook or steelhead by a contractor is proposed in this permit application. All stock assessment and research described will be managed and conducted by the Washington Department of Fish and Wildlife.

VII. Description Of Transportation Manner For Animals Taken, Imported, Exported, Or Shipped In Interstate Commerce

The WDFW has no plans to take, import, export, or ship any listed spring chinook or steelhead in interstate commerce as part of this permit application.

VIII. How The Program Will Enhance And Benefit The Wild Population

The proposed research, monitoring, and stock assessment programs described in this permit application will help improve scientific understanding of population status, distribution, productivity, and behavior of fish in the Upper Columbia River Spring Chinook and Steelhead ESU. These programs will also benefit knowledge of other listed salmonid species, including bull trout, and factors limiting their production. Information collected will be used to improve management actions directed at recovery of regional salmonid populations, and will help direct land management activities towards better management practices. Better management practices will maintain or enhance habitats needed for healthy sustainable salmonid populations. These measures will help minimize impacts to the recovery of spring chinook and steelhead that may result from the programs.

IX. Information Regarding All Endangered Or Threatened Species Captured or Maintained

A. Identification of Previous Permits Obtained to Work with Endangered or Threatened Species

The WDFW possesses several Section 10 permits issued by NMFS to allow the take of listed fish associated with agency activities in Washington state waters.

Section 10 Permit # 1094 - Authorizes the direct take of ESA-listed anadromous fish associated with the operation of a hatchery supplementation program for endangered upper Columbia River steelhead. Issued on February 4, 1998; expired May 31, 2003.

Section 10 Permit # 1395 - Replaces expired permit #1094 and authorizes the direct take of ESA-listed anadromous fish associated with the operation of a hatchery supplementation program for endangered Upper Columbia River steelhead. Issued on June 30, 2003; expires December 31, 2007.

Section 10 Permit # 1196 - Authorizes the direct take of ESA-listed anadromous fish associated with the operation of a hatchery supplementation program for endangered upper Columbia River spring chinook. Issued on August 16, 2002; expires December 31, 2007.

Section 10 Permit # 1114 - Authorizes the direct takes of juvenile, ESA-listed upper Columbia River steelhead associated with scientific research conducted at the Rock Island Dam smolt bypass facility. Issued on April 10, 1998; expires on December 31, 2002.

Section 10 Permit # 1347 - Authorizes the incidental takes of ESA-listed upper Columbia River steelhead and spring chinook associated with scientific research and the operation of a hatchery supplementation program, and monitoring and evaluation activities associated with unlisted summer chinook, fall chinook, and sockeye salmon artificial propagation programs in the upper Columbia River. Issued on October 29, 2003; expires on October 22, 2013.

Section 6 Cooperative Agreement between USFWS and WDFW - Authorizes the take of listed Columbia River distinct population segment bull trout associated with WDFW fish management and monitoring activities. Issued August 28, 1998.

B. Mortality Associated with Endangered or Threatened Species in the Last Five Years

Permit # 1094 -

A total of 2,726 ESA-listed adult steelhead were taken for upper Columbia River broodstock activities between 1998 and 2002. Adult collections ranged between 440 and 616 fish per year.

Permit # 1196-

A total of 2,798 ESA-listed, adult spring chinook were taken for upper Columbia River broodstock activities between 1999 and 2002. Between 394 and 1,091 adult were collected each year. No broodstock was collected for the Chiwawa program in 1999 due to extremely low escapement in the Chiwawa River ($N=75$).

Permit # 1114 -

A total of 393 ESA-listed upper Columbia River juvenile steelhead and 404 juvenile spring chinook (251 hatchery and 154 wild) were subject to indirect mortality during operation of the Rock Island Dam smolt monitoring program between 1998 and 2002. The direct take mortality ranged between 30 and 163 per year for steelhead, and 184 to 17 per year for spring chinook. Fish mortalities occurred during normal operation of the trap.

Permit # 1347 -

Incidental mortality of ESA-listed upper Columbia River steelhead and spring chinook associated supplementation programs using non-listed fish in the upper Columbia River is difficult to estimate. Inherent biological attributes of the listed species and stocks, variable ecological attributes of the Columbia River and tributaries, and complex/variable hatchery operations preclude estimating precise incidental take of ESA-listed species attributable to hatchery activities (NOAA 2003).

Section 6 Bull Trout Management Agreement -

A total of 3,777 ESA-listed adult and juvenile bull trout were taken as a result of WDFW trapping and research programs in the upper Columbia River basin (1998-2002). This includes 22 mortalities. The Chiwawa River weir had significant bull trout mortality in 1999 ($N=16$). Trap operation and fish handling were modified and have since reported no mortality.

C. Take Levels for Other Salmon Species

Other salmon species trapped and sampled in WDFW-managed programs in the upper Columbia River include sockeye, summer chinook, bull trout, and fall chinook. Mortalities to these species captured and released during regional research programs are thought to be low. Mortalities that do occur to these species can result from handling injuries, secondary fungal infection, predation, emigrational delay, and various fish diseases.

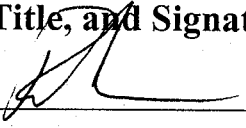
D. Steps Taken to Avoid or Decrease Mortalities

The risk of fish disease out-breaks will be minimized by complying with Pacific Northwest Fish Health Protection Committee and Washington Co-manager Fish Health Policy fish handling procedures.

IX. Certification:

"I hereby certify that the foregoing information is complete, true and correct to the best of my knowledge and belief. I understand that this information is submitted for the purpose of obtaining a permit under the Endangered Species Act of 1973 (16 U.S.C.1531-1543) and regulations promulgated thereafter, and that any false statement may subject me to the criminal penalties of 18 U.S.C. 1001, or penalties provided under the Endangered Species Act of 1973."

X. Name, Title, and Signature of Applicant:

Certified by  Date: 2-2-04

Ross Fuller
WDFW Fish Program
Fish Management Division Manager
600 Capitol Way North
Olympia, WA 98501-1091

Staff Contact:

Laura Praye
WDFW Fish Program
Mid Columbia ESA
3515 Chelan Hwy 97-A
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XIV. Sources Of Data:

References

- Biological Assessment and Management Plan (BAMP). 1998. Mid-Columbia River hatchery program. National Marine Fisheries Service, U. S. Fish and Wildlife Service, Washington Department of Fish and Wildlife, Confederated Tribes of the Yakama Indian Nation, Confederated Tribes of the Colville Indian Reservation, and the Confederated Tribes of the Umatilla Indian Reservation. Mid-Columbia Mainstem Conservation Plan. 135 pp.
- Bugert, R.M. 1998. Mechanics of supplementation in the Columbia River. *Fisheries* 23(1):11-20.
- Chapman, D., C. Peven, A. Giorgi, T. Hillman, and F. Utter. 1995. Status of spring chinook salmon in the mid-Columbia River. Don Chapman Consultants, Inc. Boise, ID. 477 pp.
- Chapman, D., C. Peven, A. Giorgi, T. Hillman, and F. Utter. 1994. Status of summer steelhead in the mid-Columbia River. Don Chapman Consultants, Inc. Boise, ID.
- CBFWA (Columbia Basin Fish and Wildlife Authority). 1996. Draft programmatic environmental impact statement - impacts of artificial salmon and steelhead production strategies in the Columbia River basin. USFWS, NMFS, and Bonneville Power Administration. Portland, OR. December 10, 1996 draft.
- Cuenco, M.L., T.W.H. Backman, and P.R. Mundy. 1993. The use of supplementation to aid in natural stock restoration. J.G. Cloud and G.H. Thorgaard, editors. Pages 269-293 IN: Genetic Conservation of Salmonid Fishes. Plenum Press, New York.
- ESA. 1973. Endangered Species Act of 1973 - as amended through 1988. Senate and House of Representatives of the United States of America. 75 pp.
- Hard, J.J., R.P. Jones, M.R. Delarm, and R.S. Waples. 1992. Pacific salmon and artificial propagation under the Endangered Species Act. Technical Memorandum NMFS- NWFSC-2. NOAA, U.S. Dept. Of Commerce. 56 pp.
- Johnsen, R.C., L.A. Hawkes, W.W. Smith, G.L. Fredricks, R.D. Martinson and W.A. Helvin. 1990. Monitoring of Downstream Salmon and Steelhead at Federal Hydroelectric Facilities - 1989. Annual Report for Bonneville Power Administration, Project 84-14.
- Lohn, D.R. April 4, 2002. Letter to Frank Cassidy, Jr., Chairman, Northwest Power Planning Council.
- Mullan, J. W. et al. 1992. Production and habitat of salmonids in mid-Columbia River tributary streams. U.S. Fish and Wildlife Service Monograph I. 187 pp.
- Murdoch, A., K. Petersen, and M. Tonseth. 1998. Freshwater production and emigration of juvenile spring chinook salmon from the Chiwawa River in 1996. Report # H98-01. Hatcheries

Program, Washington Dept. Fish and Wildlife. Olympia, WA. 63 pp.
Myers, J.M., R.G. Kope, G.J. Bryant, D. Teel, L.J. Lierheimer, T.C. Wainwright, W.S. Grant, F.W. Waknitz, K. Neely, S.T. Lindley, and R.S. Waples. 1998. Status review of chinook salmon from Washington, Idaho, Oregon, and California. U.S. Dept. Commer., NOAA Tech. Memo. NMFS-NWFSC-35, 443 pp.

National Marine Fisheries Service. 1995. Biological Opinion for 1995 to 1998 hatchery operations in the Columbia River Basin. NOAA/NMFS, April 5, 1995. 82 pp.

----- 1998. Backpack electrofishing guidelines. Suggested protocol for the use of backpack electroshocking equipment in waters containing fish listed under the Endangered Species Act (ESA). December 1998. NOAA/NMFS. Portland. 3 pp.

National Marine Fisheries Service. 2003. Biological Opinion for Upper Columbia River steelhead and spring chinook. NOAA/NMFS, October 2, 2003. 87 pp.

Pacific Northwest Fish Health Protection Committee (PNFHPC). 1989. Model comprehensive fish health protection program. 19 pp.

Petersen, K., R. Eltrich, and A. Mikkelsen. 1994. Downstream movement and emigration of chinook salmon from the Chiwawa River in 1992/1993. Hatcheries Program Assessment and Development Division. Washington Dept. Fish and Wildlife, Olympia. 46 pp.

Petersen, K., R. Eltrich, A. Mikkelsen, and M. Tonseth. 1995. Downstream movement and emigration of chinook salmon from the Chiwawa River in 1994. Hatcheries Program Assess. and Development Division. Washington Dept. Fish and Wildlife, Olympia. 37 pp.

Petersen, K. and Tonseth, M. 1998. Rock Island Dam smolt monitoring, 1998. Final Report. Washington Department of Fish and Wildlife, Olympia, WA.

Praye, L. and Petersen, K. 2001. Rock Island Dam smolt monitoring, 2000. Final Report. Washington Department of Fish and Wildlife, Olympia, WA.

Praye, L. and Dymowska, B. 2002. Rock Island Dam smolt monitoring, 2001. Final Report. Washington Department of Fish and Wildlife, Olympia, WA.

Praye, L. and Walter, J. 2003. Rock Island Dam smolt monitoring, 2002. Final Report. Washington Department of Fish and Wildlife, Olympia, WA.

Steward, C.R. and T.C. Bjornn. 1990. Supplementation of salmon and steelhead stocks with hatchery fish: a synthesis of published literature. Tech. Rpt. 90-1. Idaho Cooperative Fish and Wildlife Research Unit. University of Idaho, Moscow, ID.

Thurrow, R.F. 1997. Underwater Methods for Study of Salmonids in the Intermountain West. Gen. Tech. Rep. INT-GTR-307. Ogden UT: U.S. Department of Agriculture, Forest Service,

Intermountain Research Station.

Tonseth, M. and Petersen, K. 1999. Rock Island Dam smolt monitoring, 1999. Final Report. Washington Department of Fish and Wildlife, Olympia, WA.

Tonseth, Mike et al., 2002. 1999 Brood Sockeye and Chinook Salmon Reared and Released at Rock Island Fish Hatchery Complex Facilities. Washington Department of Fish and Wildlife, Olympia, WA.

Washington Department of Fisheries (WDF), Washington Department of Wildlife (WDW), and Western Washington Treaty Indian Tribes (WWTIT). 1993. 1992 Washington State salmon and steelhead stock inventory (SASSI). Washington Dept. Fish Wildlife, Olympia, 212 p. and 5 regional volumes. Washington Dept. Fish and Wildlife, Olympia, WA.

Washington Department of Fish and Wildlife (WDFW). 1996. Fish health manual. Fish Health Division, Hatcheries Program. Washington Dept. Fish and Wildlife, Olympia, WA.

----- 1998. Application for a permit to enhance the propagation or survival of endangered or threatened species under the Endangered Species Act of 1973. WDFW Upper Columbia River ESU spring chinook supplementation and captive brood programs - December 4, 1998. Wash. Dept. Fish and Wildlife, Olympia, WA. 46 p. (plus Appendices).

Washington Department of Fish and Wildlife (WDFW) and Western Washington Treaty Indian Tribes (WWTIT). 1998. Co-managers of Washington fish health policy. Washington Dept. Fish and Wildlife, Olympia, WA.

Washington Department of Fish and Wildlife (WDFW). 2002. 2000 Brood Sockeye and Chinook Salmon Reared and Released From Eastbank Fish Hatchery Complex Facilities. Technical Memo. WDFW Olympia, WA.

Washington Department of Fish and Wildlife (WDFW). 2003. 2001 Brood Sockeye and Chinook Salmon Reared and Released From Eastbank Fish Hatchery Complex Facilities. Technical Memo. WDFW Olympia, WA.

Washington Department of Fish and Wildlife (WDFW). August 16, 2002. Biological Opinion for Upper Columbia River Spring Chinook Salmon Supplementation and Captive Broodstock Programs. WDFW Olympia, WA. 50 pp.

Witty, K., C. Willis, and S. Cramer. 1995. A review of potential impacts of hatchery fish on naturally produced salmonids in the migration corridor of the Snake and Columbia rivers. Comprehensive Environmental Assessment - Final Report. S.P. Cramer and Associates. Gresham, OR. 76 pp.

Young, S., and C. Marlowe. 1995. Techniques of hydraulic redd sampling, seining, and electroshocking. Pages 40 - 57 in C. J. Smith and P. Wampler, editors. Dungeness River chinook salmon rebuilding project. Progress Report 1992 - 1993. Northwest Fishery Resource Bulletin, Project Report Series Number 3. Northwest Indian Fisheries Commission, Olympia, WA.

U.S. Fish and Wildlife Service. (USFWS). 1998. Letter from Chief, Endangered Species Branch, USFWS to Ross Fuller, WDFW approving WDFW fish management and monitoring activities affecting listed bull trout in the Columbia Basin. August 28, 1998, USFWS. Portland.

ATTACHMENT

Anticipated Annual Take

Summary of estimated listed spring chinook and steelhead take for WDFW stock assessment, biological sampling, and habitat evaluation associated with Study 1.

Applicant: Washington Department of Fish and Wildlife Location of Project: Upper Columbia River ESU

Number of Individuals	Species	Life Stage	Sex	Origin	Take Activity
500	Spring chinook	Juvenile	N/A	Hatchery	Capture, handle, release
15	Spring chinook	Juvenile	N/A	Hatchery	Indirect mortality ^{1/}
500	Spring chinook	Juvenile	N/A	Wild	Capture, handle, release
15	Spring chinook	Juvenile	N/A	Wild	Indirect mortality ^{1/}
500	Summer steelhead	Juvenile	N/A	Hatchery	Capture, handle, release
15	Summer steelhead	Juvenile	N/A	Hatchery	Indirect mortality ^{1/}
500	Summer steelhead	Juvenile	N/A	Wild	Capture, handle, release
15	Summer steelhead	Juvenile	N/A	Wild	Indirect mortality ^{1/}
5	Spring chinook	Adult	N/A	Hatchery	Capture, handle, release
1	Spring chinook	Adult	N/A	Hatchery	Indirect mortality ^{2/}
5	Spring chinook	Adult	N/A	Wild	Capture, handle, release
1	Spring chinook	Adult	N/A	Wild	Indirect mortality ^{2/}
5	Summer steelhead	Adult	N/A	Hatchery	Capture, handle, release
1	Summer steelhead	Adult	N/A	Hatchery	Indirect mortality ^{2/}
5	Summer steelhead	Adult	N/A	Wild	Capture, handle, release
1	Summer steelhead	Adult	N/A	Wild	Indirect mortality ^{2/}

^{1/} - Indirect mortality of trapped fish is expected to range between 1% and 3% whether released marked or unmarked.

^{2/} - Indirect mortality of trapped fish is expected to be one fish or less.

Anticipated Annual Take

Summary of estimated listed spring chinook and steelhead take for WDFW habitat evaluation, research, and monitoring associated with Study 2.

Applicant: Washington Department of Fish and Wildlife Location of Project: Upper Columbia River ESU

Number of Individuals	Species	Life Stage	Sex	Origin	Take Activity
500	Spring chinook	Juvenile	N/A	Hatchery	Capture, handle, release
15	Spring chinook	Juvenile	N/A	Hatchery	Indirect mortality ^{1/}
500	Spring chinook	Juvenile	N/A	Wild	Capture, handle, release
15	Spring chinook	Juvenile	N/A	Wild	Indirect mortality ^{1/}
500	Summer steelhead	Juvenile	N/A	Hatchery	Capture, handle, release
15	Summer steelhead	Juvenile	N/A	Hatchery	Indirect mortality ^{1/}
500	Summer steelhead	Juvenile	N/A	Wild	Capture, handle, release
15	Summer steelhead	Juvenile	N/A	Wild	Indirect mortality ^{1/}
5	Spring chinook	Adult	N/A	Hatchery	Capture, handle, release
1	Spring chinook	Adult	N/A	Hatchery	Indirect mortality ^{2/}
5	Spring chinook	Adult	N/A	Wild	Capture, handle, release
1	Spring chinook	Adult	N/A	Wild	Indirect mortality ^{2/}
5	Summer steelhead	Adult	N/A	Hatchery	Capture, handle, release
1	Summer steelhead	Adult	N/A	Hatchery	Indirect mortality ^{2/}
5	Summer steelhead	Adult	N/A	Wild	Capture, handle, release
1	Summer steelhead	Adult	N/A	Wild	Indirect mortality ^{2/}

^{1/} - Indirect mortality of trapped fish is expected to range between 1% and 3% whether released marked or unmarked.

^{2/} - Indirect mortality of trapped fish is expected to be one fish or less.