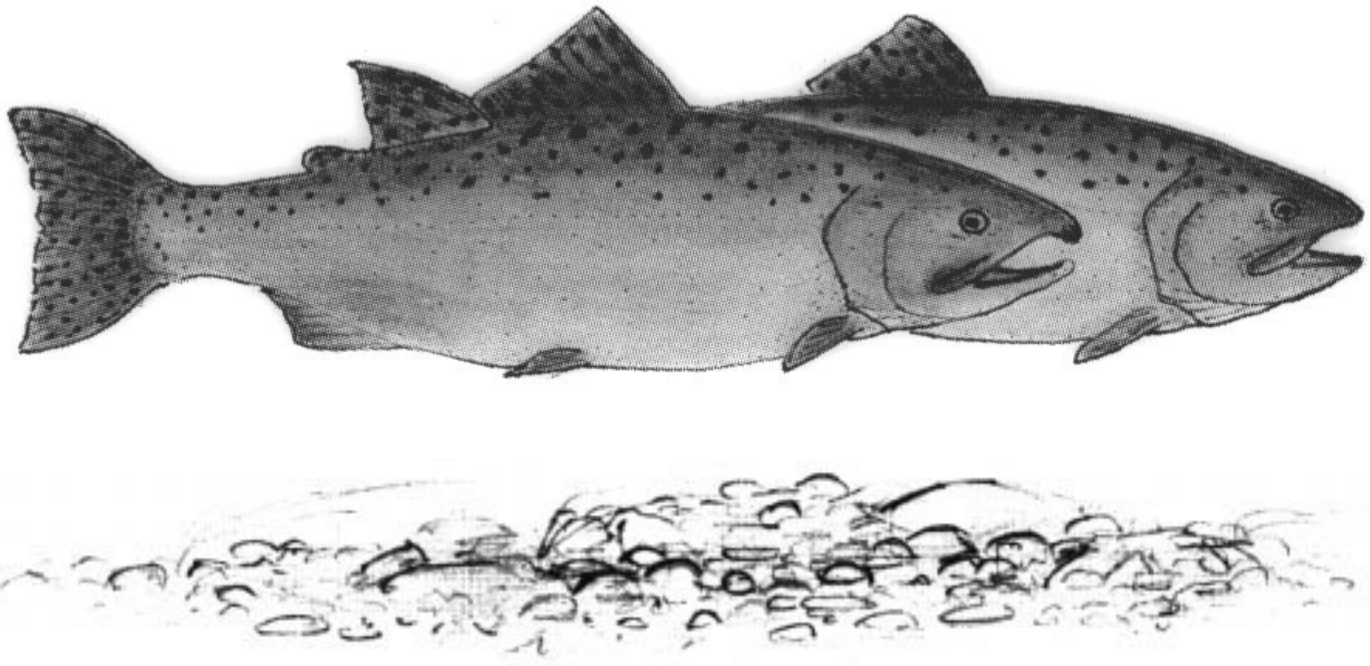
MAY 2000

TUCANNON RIVER SPRING CHINOOK CAPTIVE BROODSTOCK PROGRAM

Final Environmental Assessment and Finding of No Significant Impact

DOE/EA-1326



BONNEVILLE POWER ADMINISTRATION

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1. PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

Development of the hydropower system (dams and generators to make electricity) in the Columbia River Basin has had far-reaching effects on many species of fish and wildlife. The Bonneville Power Administration (BPA) is responsible for protecting, mitigating, and enhancing fish and wildlife affected by the development, operation, and management of hydroelectric facilities on the Columbia River and its tributaries. (See **Pacific Northwest Electric Power Planning and Conservation Act**[1], 16 U.S.C. 839 et seq., Section 4.(h)(10)(A).) In addition, BPA is responsible for protecting and conserving listed **Threatened** and **Endangered** species under the **Endangered Species Act (ESA)** of 1973, as amended, 16 U.S.C. 1531 *et seq*.

One of the measures recommended to help mitigate for anadromous fish loss and reduced habitat is the **Tucannon River Spring Chinook Captive Broodstock Program,** a joint proposal by the Washington Department of Fish and Wildlife (WDFW), the Nez Perce Tribe (NPT), and the Confederated Tribes of the Umatilla Indian Reservation (CTUIR).

This proposed project is analyzed in this Environmental Assessment (EA).[2] The captive **broodstock** program represents a "new artificial production initiative" as defined (7.4, 7.4A, 7.4A.1) in the Northwest Power Planning Council's (Council) Columbia River Basin Fish and Wildlife Program (NPPC 1994).

1.2 NEED FOR ACTION

Tucannon River spring chinook **returns** have seriously diminished in the last 7 years. Returns were relatively stable from 1985-1993 (mean return = 550 fish). However, between 1994 and 1999, the average return declined to 196 fish (range 54-351). These poor adult returns, coupled with floods during the winters of 1996 and 1997 and low **redd** counts because of the depressed returns, have left the river well below historical **carrying capacity**. The number of natural (not produced by hatchery) **smolts** from **brood years** (BY) 1994-1996 averaged less than 3,000 fish annually (Bumgarner et al. 1998, Bumgarner and Schuck 1999). By contrast, an average of 42,000 natural smolts (range 25,900-58,200) migrated from the 1985-1993 BYs (Bumgarner et al. 1998). Adults returning from the three depressed brood years are estimated at a total of 50-60 fish. Finally, hatchery supplementation production from 1994 - 1996 was less than expected to offset low production in the river, further reducing the chance that the population will rebound. This **Evolutionarily Significant Unit (ESU)** of the Snake River Spring/Summer Chinook was listed as Threatened under the ESA in 1992.

[1] Words in **boldface** in the text are defined in the Glossary.
[2] For more information on analysis requirements under the National Environmental Policy Act, please see Section 4.

These low spring chinook returns since 1994, and low returns expected in the future, have led WDFW, NPT, and CTUIR to propose this captive broodstock program to help preserve, and possibly increase, this depressed stock of ESA-listed fish. While current hatchery production exists for this stock, recent events (floods, poor ocean conditions, one hatchery production failure) have left the stock at such critically low numbers that preservation or rebuilding of the stock may not be possible unless more aggressive hatchery intervention is undertaken (captive broodstock program).[3]

The overall decline in the Columbia Basin fishery is due to five main factors:

1. the impacts of the construction and operation of the hydrosystem,
2. the impacts of long-term overharvest of the fish in both the ocean and the river,
3. the impacts of past hatchery management actions,
4. the impacts on fish habitat from a number of development activities such as the construction of hundreds of dams, grazing, irrigation, mining, and construction, and
5. long-term changes in ocean conditions.

The need to which BPA is responding in proposing to fund this action, however, is our need to mitigate for the hydrosystem impacts in response to the Pacific Northwest Power Planning and Conservation Act.

1.3 PURPOSES

BPA has identified six purposes for participating in this project. BPA will base its choice among alternatives on these purposes:

- potential to achieve short-term preservation and rebuilding of a critically depressed run of an ESA-listed spring chinook on the Tucannon River,
- consistency with the Council's Fish and Wildlife Program,
- administrative efficiency and cost-effectiveness,
- avoidance or minimization of adverse environmental impacts,
- degree to which an alternative complements the activities of fish and wildlife agencies and appropriate tribes, and
- consistency with the legal rights of the appropriate tribes in the region.

[3] Source: the WDFW Master Plan for Tucannon River Spring Chinook Captive Broodstock Program (WDFW et al. 1999). Text from the Master Plan also provides the underpinnings for subsequent technical discussions. The Master Plan is available from BPA or WDFW.

1.4 RELATED DOCUMENTS

- Endangered Species Act Section 7 Consultations (NMFS 1999a, USFWS 1999, WDFW 1999a).
- The Master Plan for Tucannon River Spring Chinook Captive Broodstock Program. This Plan was prepared for the Council by WDFW, NPT, and CTUIR, and was issued in November 1999. Portions of the report are summarized in this ~~preliminary~~final EA; the document is incorporated here by reference (WDFW et al. 1999).
- A Proposal for a Captive Broodstock Program with Tucannon River Spring Chinook (Bumgarner et al. April 1998).
- Columbia River Basin Fish and Wildlife Program (NPPC 1994).

1.5 DECISIONS TO BE MADE

BPA must decide whether to fund the Tucannon River Spring Chinook Captive Broodstock Program. Under the Pacific Northwest Electric Power Planning and Conservation Act, BPA receives recommendations from the Northwest Power Planning Council for projects to fund to mitigate for hydrosystem impacts on Northwest fish and wildlife habitat. BPA is required under the National Environmental Policy Act (NEPA) to examine the environmental effects of the project and determine whether they are significant. If they are found not to be significant, a Finding of No Significant Impact (FONSI) will be issued and work may proceed. If they are found to be significant, an Environmental Impact Statement (EIS) must be prepared before making a decision.

The Council must decide whether to recommend final funding for construction and operation of the project. The Council requires each preliminarily recommended project that involves artificial production to go through a 3-Step Review Process. These steps are:

Step 1 - Conceptual planning, primarily through development and approval of a Master Plan;

Step 2 - Preliminary design, cost estimation, and NEPA compliance; and

Step 3 - Final design review prior to construction and operation.

This EA will serve as the NEPA compliance for Step 2. It is based on the Master Plan developed by WDFW, the NPT, and the CTUIR. The Council consider~~ed~~ the Master Plan and Preliminary EA before making its final recommendation on the project on April 4, 2000. The Council recommended funding the project, but only after the NEPA process is complete and if a Finding of No Significant Impact is signed by BPA.

The Independent Scientific Review Panel review, which is part of the Council review, found that the Tucannon River Spring Chinook Captive Broodstock Program adequately addressed the scientific issues raised by the panel, and recommended that the project proceed with implementation. This recommendation was conditioned on the understanding that WDFW will

work on linking the proposed captive broodstock program to the habitat restoration activities in the basin and that future annual reports will include greater detail on the treatment and analysis of data collected.

2. ALTERNATIVES

2.1 BACKGROUND

Legislation under the Water Resources Development Act of 1976 authorized implementation of the Lower Snake River Compensation Plan (LSRCP) to provide hatchery compensation for Snake River spring and fall chinook salmon (*Oncorhynchus tshawytscha*) and summer steelhead (*Oncorhynchus mykiss*) juvenile and adult mortalities caused by the construction and operation of the four lower Snake River hydropower projects (USACE 1975). As a result, WDFW 's Lyons Ferry Hatchery was constructed, and the Tucannon Hatchery was modified as a satellite facility. One objective of these LSRCP hatcheries is to compensate for the loss of 1,152 (LSRCP mitigation goal) Tucannon River spring chinook salmon.

Since 1984, WDFW has evaluated the success of these two LSRCP hatcheries in meeting the mitigation goal, and has identified production adjustments, **rearing**, and **release strategies** to improve performance of the hatchery-reared spring chinook salmon. Beginning in 1985, WDFW trapped a portion of each year's spring chinook run for broodstock to use in the hatchery supplementation program. The goal of the supplementation program is to produce 132,000 hatchery-origin smolts annually. In addition to a hatchery monitoring program, an extensive evaluation program has also tracked the status of the natural spring chinook population in the river to document any negative effects the hatchery activities might have on the natural chinook population.

Since 1993, WDFW has been authorized by National Marine Fisheries Service (NMFS) under an ESA (ESA 1973) Section 10 direct take permit (Ref. #848, or #1126 and #1129) to operate the hatchery supplementation program and conduct associated research activities on this population listed as Threatened. NMFS has completed and submitted its Biological Opinion regarding the captive broodstock program (NMFS 1999a). A status letter has been received confirming that NMFS agrees with the captive broodstock program (NMFS 1999b).

2.2 PROPOSED ACTION – CAPTIVE BROODSTOCK PROGRAM

To meet the need for off-site mitigation for habitat losses on the mainstem Columbia River in a manner consistent with the objectives of the Council's Program, BPA is considering a proposal to fund the captive broodstock program at Lyons Ferry, Washington. The Tucannon River Spring Chinook Captive Broodstock Program described within this document qualifies as a "new production initiative" as defined by the Council. The goal of this captive broodstock program is the short-term preservation and rebuilding of the critically depressed Tucannon River spring chinook run. This project involves the following activities:

(1) expanding the Lyons Ferry Hatchery (LFH), an addition of eight circular rearing tanks 6 m (20 ft.) in diameter; collecting juvenile fish from the existing hatchery spring chinook ("supplementation") population for a period of five brood years (1997-2001),[4] rearing these fish in the hatchery to maturity, and "spawning" them;

(2) hatching and rearing their progeny; and

(3) **acclimating** and releasing up to 150,000 smolts annually (from 2002-2008) back into the Tucannon River to preserve and recover the population for the future.

This project is proposed to significantly increase (double) the number of hatchery juvenile spring chinook smolts planted into the Tucannon River. The current Lower Snake River Compensation Program hatchery supplementation program releases 132,000 smolts annually. The proposed captive broodstock program would add another 150,000 smolts to the annual release. These two programs are predicted to rebuild adult returns to pre-1994 levels (550-600 hatchery origin fish) between 2005 and 2010.

2.2.1 Hatchery Expansion

2.2.1.1 Feasible Option: Lyons Ferry Hatchery

The LFH was first completed in 1982, with additional facilities added in later years. The hatchery already has some facilities needed for the proposed captive broodstock program. These include 15 starter tanks (diameter of 1.2 m or 4 ft.) for rearing recently emerged fish from each brood year. (These tanks are needed to rear juveniles from "family" groups until the juveniles are large enough to mark.) The hatchery has in place, as regular production space, standard rearing **raceways** measuring 3 m x 30.5 m (10 ft. x 100 ft.) for rearing captive brood progeny before smolt releases and for broodstock-holding before spawning. Additional facilities needed for this proposed program include eight 6-m (20-ft.) circular rearing tanks, and the associated plumbing. The hatchery has adequate space and water supply to accommodate this expansion.

2.2.1.2 Option Selection

The LFH Option described above was originally one of two rearing options considered by WDFW. Each option included using existing facilities (federally funded under the LSRCP mitigation program), and each location required some slight modifications. The two options were as follows:

(1) **Rear the fish at two hatcheries (both LFH and the Tucannon Fish Hatchery [TFH]).** This option was preferred, as it reduces the risk of catastrophic loss by having two sites.

[4] The broodstock collection for the captive broodstock program began in 1997 in order not to delay the critical opportunity to address the severely declining runs. It has been funded until now by USFWS under the Lower Snake River Compensation Plan. Construction of the circular ponds at Lyons Ferry Hatchery was completed in September 1999, with funding by the U.S. Fish and Wildlife Service (USFWS). See Section 2.2.2.1.

(2) **Rear all fish at one facility**. This option increases the risk of failure due to disease outbreak or system water failure; however, it is a viable option, given the failing circumstances of the spring chinook population.

Although WDFW preferred Option 1, funding availability makes it impossible to complete facility modifications at both hatcheries. WDFW selected Option 2 at LFH because, although it increases risk, all the co-managers still viewed the program as important enough to proceed with all fish at one facility only. They reviewed the two facilities and chose LFH as the superior location, based on water quality, physical space, and existing staff needed to support the captive broodstock program. Option 2 is thus the preferred alternative.

2.2.2 Collecting, Rearing, and Spawning Fish

2.2.2.1 Options for Source of Stock

Only spring chinook from the Tucannon River would be used to build the captive broodstock program. As with the selection of location, WDFW had two options for sources of eggs/**fry**:

(1) hydraulically pumping redds or collection of **emergent** fry from the Tucannon River, or

(2) collecting eggs from the spring chinook supplementation program at LFH.

WDFW rejected Option 1, for the following reasons:

- Collecting fish from the river would reduce the already low natural production numbers.
- Close proximity of redds makes it difficult to distinguish "family" groups.
- Inability to screen parents for Bacterial Kidney Disease (BKD) and other diseases created concerns about fish health.
- Unless the spawned carcasses were recovered, parent origin could not be determined, and (though this would be unlikely) stray spawners (fish from other river systems) could be incorporated into the captive brood population.

WDFW elected Option 2 as the action they want BPA to fund. Because known parentage and disease history may be critical to the success of this program, it was decided to collect a small number of eggs/fry from multiple females that were spawned for the supplementation program at LFH. All hatchery adults collected are to be verified by Coded-Wire Tags (CWT) to come from the Tucannon program, and scales are to be collected from all unmarked spawners to check their origin (hatchery or natural). WDFW assumes that all unmarked fish collected for broodstock originated from the Tucannon River, as few **marked** (fish that are adipose- or right/left-ventral-fin-clipped) strays have ever been identified from carcasses recovered in the river.

Given the collapse of the spring chinook population in the Tucannon River, WDFW has already begun the captive broodstock program by holding 1997 BY and 1998 BY fish before designing and implementing facility modifications at LFH. This was done even without a secured long-term funding source because WDFW felt it was critical to preserve these brood years within a

captive broodstock program while adequate numbers of fish were still returning. Should future funding be unavailable for a captive broodstock program, WDFW plans to try to use the fish in the ongoing mitigation program.

2.2.2.2 Collection and Broodstock Selection

Adult spring chinook enter the river from April through June. Radio telemetry studies show that fish quickly move through the lower river until they reach **river kilometer** (RK) 40 or higher (Mendel et al. 1993, Bumgarner et al. 1994). The TFH adult trap (RK 59) captures adults and **jacks**, with fish either collected for broodstock or passed upstream for spawning. Collected broodstock are then hauled to LFH for spawning. The annual collection goal is 100 adults (generally 50 natural and 50 of hatchery origin). Spawning activity first begins in the uppermost reaches (RK 70-80) of the river in late August, and gradually moves downstream. Spawning is complete by the first week of October. Spawn timing in the river and hatchery are the same (Bumgarner 1998).

The captive broodstock program goal has been set at 150,000 smolts/year, which will be produced from 290,000 eggs (assuming 70% egg viability, and 20-30% egg-to-smolt mortality). Survival rates of captive fish are relatively unknown, though a minimum of 50% survival is estimated, based on WDFW's experience with the Dungeness River spring chinook captive broodstock program. Assuming a mean fecundity of 1,800, 2,200 and 2,500 eggs/female for Age 3, 4 and 5, respectively, about 100-125 females would be required to reach the egg take and smolt goal on an annual basis. Based on those assumptions, it is estimated that 450 juveniles from the supplementation program (30 fish each from 15 distinct families) would be needed from each brood year.

To reduce the potential risks of in-family matings and disease outbreaks, and to maximize the genetic diversity of the captive broodstock population, WDFW has taken the following actions to start the captive brood population:

1) divide each female's eggs into two lots and incubate separately,
2) track supplementation matings for identifying "family" groups, and
3) have disease certification (BKD and virology) conducted on all supplementation spawners.

The selection of the fish for the captive broodstock program would be based on the results of the BKD and virology screening of the supplementation program females, and on the origin of both parents.

Under current supplementation spawning guidelines, eggs from an individual female would be divided into two lots. Each egg lot would then be fertilized by a different male to increase genetic diversity and provide insurance against non-viable males. The same two males would then be used with another female. This fertilization process means that the progeny from those two females would be half-sibling-related. To reduce the potential of half-sibling crosses when the fish mature, and to increase the overall effective population that originally contributed to the

captive broodstock, females fertilized with the same two males would be "combined" to create a "family" unit. Generally, the 15 families selected for the captive broodstock would represent 30 spawned males and 30 spawned females.

2.2.2.3 Rearing

With the proposed action, juveniles would be collected from Heath incubation trays following egg sac absorption. Since emergent fry are too small for marking, each selected family unit must be reared separately until fry are of marking size (about 30 fish/pound [lb.]). To account for mortality between emergence and juvenile tagging, 40 fish from each female (or 80 fish from the two females representing one "family") are to be selected from the incubation trays and placed in one of the 15 1.2-m (4-ft.) circular tanks. Progeny would then be selected at random (with the exception of those with visible abnormalities); the sex ratio is assumed to be 50:50. All fish selected would remain in the tanks through Age 1, when marking of the juvenile fish occurs. Fish that are surplus and not tagged for the captive broodstock program would be returned to the supplementation program and released as smolts the following spring. The 30 fish selected from each tank are to be uniquely marked by "family" and then transferred to larger rearing tanks (6 m or 20 ft. in diameter). Captive brood fish are to be marked with a CWT in the snout and adipose fin; an alphanumeric Visual Implant (VI) tag would be inserted behind the left or right eye.

Under the originally proposed action, once the fish were transferred to the larger circular rearing tanks, they would not be moved again unless survival rates were greater than anticipated and density limits were exceeded within the tanks. As adults mature, fish that show indications they will spawn that year would be held in a separate adult holding raceway or circular pond for weekly sorting and spawning as they mature.

Note: Due to the delay in acquiring funding for facility modifications, WDFW has adjusted the ponding scheme described above.

- **1997 BY.** Fish collected from the 1997 BY have been tagged as described. However, rather than being placed in 6-m (20-ft.) circular tanks, all of the fish were placed in a large adult steelhead holding raceway at LFH. Protective measures were taken to avoid contact with hatchery steelhead. In October 1999, the immature fish from this brood were moved to one of the 6-m (20-ft.) circular tanks, and all mature fish (100% precocious males) were killed.[5]
- **1998 BY.** Fish collected from the 1998 BY were marked in October 1999. Immediately after tagging, these fish were held in a 1.5 x 12-m (5 x 40-ft.) rearing trough inside the hatchery building. The change occurred for two reasons: this action would allow the tagging scars to heal (to prevent VI tag loss), and the circular larger rearing tanks were

[5] The mature males were killed because they would eventually die anyway (part of the Pacific Salmon life history). If the hatchery waited for the males to die naturally (within a few weeks), the wait would increase the chance that fungus would spread to the entire population, resulting in greater mortality of the immature fish.

not ready at that time. The 1998 brood year was moved to one of the larger circular tanks in November 1999.

2.2.2.4 Spawning

A preliminary set of mating guidelines, similar to the mating protocol currently used in the supplementation program, is presented below. The **Captive Broodstock Technical Committee** (CBTC), made up of representatives from WDFW, NPT, and CTUIR, will finalize the specific protocol for mating captive brood fish. They will consult with geneticists, management and policy level personnel, other captive broodstock and captive rearing programs, and associated research programs.

Fish from the captive broodstock would mature from Age 2-5 (Witzack 1998), with males maturing earlier than females. Semen would likely be taken from all ripe fish in a given year. Family contributions would be tracked throughout the spawning season. If one family were contributing more often than others (males), some contributions might not be used, so that other families can contribute equally. Generally, semen would be collected from one male for every female that is spawned. Since males mature earlier, the CBTC would have to prioritize which males (brood years) should be spawned with the older brood-year females.

During the spawning process, females would be sorted first, with all mature females killed.[6] After the females have been enumerated and identified (CWT or VI), the number of males needed for fertilization would be selected. Through VI tag reading, enough males from different families would be selected to avoid full- or half-sibling crosses (when males and females are from the same brood year). Depending on the number of ripe males available on a given spawn day, semen from additional males might be taken to increase the genetic diversity within each cross.

If spawn timing between the captive broodstock and the supplementation fish should overlap, **gametes** might also be shared between the two to increase genetic variability. In addition, **cryopreserved** semen collected from 1990-1998 from natural-origin Tucannon River spring chinook spawners might be used to increase genetic diversity. However, fertilization success rates in experiments on cryopreserved semen have ranged from 10-65%. Low fertilization success rates might be deemed too risky to warrant use on these captive brood fish.

2.2.3 Hatching and Rearing Progeny

2.2.3.1 Water Temperature and Progeny Size

The hatchery incubation rearing environment is dramatically different than what occurs in the wild (river): while the water temperature at LFH is a constant 11^{o} C (51.8^{o} F), Tucannon River water temperature in the middle of winter will drop to near freezing. Because of these differences, and given the desire to produce hatchery smolts that are closer in size to natural

[6] To extract as many eggs as possible, the females are killed and cut open.

smolts, a water chiller was installed at LFH in 1991. The chiller is used during egg incubation to slow development, and in some years to synchronize **ponding dates**. However, the capacity of the chiller unit is limited (40 gallons [gal.]/minute at 4.4 ^{o} C or 40^{o} F), and in recent years it has had to be repaired many times to keep it functioning properly. With the limited chiller capacity, and unknown egg collections in the future from the captive broodstock and supplementation programs, it is uncertain at this time whether all eggs could be put on chilled water.

The CBTC will discuss options such as dividing egg incubation trays to accommodate multiple low-fecundity females or reducing the chilled water flow in early egg incubation. Further, it may be possible through feed manipulations and changes in diet to maintain the release goal of 15 fish/lb. without using the chiller. The NPT has indicated that releasing larger-size smolts (10-12 fish/lb.) would not be acceptable, as the returns from those releases would be of different age composition than naturally produced fish. However, the CTUIR is not averse to releasing fish of a larger size, as they believe that more fish would then return. CTUIR is less concerned about returning age composition of the fish. At this time, WDFW would prefer to stay with the plan to release fish at 15 fish/lb.

2.2.3.2 Release Strategies

It is estimated that about 290,000 eggs from the captive broodstock program might be collected, once full production is reached (three spawning brood years). However, depending on captive brood survival rates, fecundity of females, and egg viability, or on a larger number of females to spawn, it might be possible to obtain more viable eggs. Therefore, WDFW, NPT, and CTUIR are proposing four alternative release strategies (discussed below, under **2.2.5**) to be used in conjunction with the 150,000-smolt release that is the first priority: the strategies are Remote Site Incubators (RSIs), fry **outplants** in the Tucannon, adult outplants in the Tucannon, and Asotin Creek re-introduction (many combinations).

These options would be considered *only* if a greater-than-150,000 smolt release is anticipated. Following a thorough review of all the above options, and each brood year's success, the CBTC would decide on the best release strategy(ies) to maximize the benefits to the population.

2.2.4 Acclimating and Releasing Smolts

When the incubating fry have completely absorbed their yolk-sac, they would be ponded in standard raceways at LFH. After being marked, fish would be transferred to TFH in October, when river temperatures have cooled. Fish would be reared at TFH until mid-February and then transferred to the existing Curl Lake acclimation pond or released directly into the stream.

To identify adults from the captive broodstock program upon return, a blank wire tag (BWT) in the snout with no adipose fin clip is being proposed. Other external marks may be considered if they are cost-effective and proven not to reduce survival. This will allow hatchery personnel to avoid collection of captive brood progeny fish for the supplementation program. At this time, WDFW hopes to avoid using captive broodstock progeny as broodstock for the hatchery supplementation program, to minimize domestication impacts on the supplementation

population. However, if the run should experience another collapse, captive brood fish might be collected.

2.2.5 Alternative Release Strategies

The following alternate release strategies may be proposed by WDFW, NPT, and CTUIR if the target of 150,000 smolts for release in any one year is exceeded. However, for the reasons discussed in each section below, they are eliminated from consideration at this time.

2.2.5.1 Remote Site Incubators

Remote site incubators (RSIs) are a method of incubating eggs by placing them within a container placed either on a streamside or in a spring tributary water source. For this project, WDFW would use a 19-38 liter (l) (5-to-10-gal.) bucket containing a pipe that allows for water inflow, a gravel substrate, and trays of eggs. The eggs fall into the gravel substrate, mature, and then swim as fry in the pipe into the stream. WDFW has no history of using RSIs in the Tucannon River, though the technique is currently used in western Washington (Dimmitt and Fuss 1994). During the winter of 1998/1999, WDFW set out 10 continuous-recording temperature monitors in small springs located in the Wilderness Area of the Tucannon River. WDFW is also gathering past water temperature data for the Wilderness, and calculating temperature units available for naturally incubating eggs.

This type of release would be determined ultimately by the use of the water chiller at LFH. Without the use of the water chiller to slow egg incubation time at LFH, fish would emerge as fry too early, and enter the Tucannon River during the middle of winter. Most of the emergent fry would likely die of starvation.

The theory behind using RSIs is to return some natural production to the uppermost reaches of the historic spring chinook rearing area. In addition, by planting eggs within the incubators, **hatchery domestication** of these fish would be negligible and (in a sense), these fish would be considered natural. With the poor returns, and collection of all fish at the adult trap in recent years, little or no natural production has occurred within this area of river since 1994.

At this time, WDFW has not gained internal approval to use/test RSIs in the Tucannon River. It is hoped that testing the use of RSIs on an unlisted stock of spring chinook in the Tucannon River might be conducted at a later time.

2.2.5.2 Fry Outplants

Another option is to consider releasing unfed fry in the Tucannon River, using a small transport truck. Using unfed fry would reduce that chance that fish would become “trained” to being fed by someone. If they were not exposed to this conditioning in the hatchery, they might well have a better chance to survive in the river. The use of the water chiller at LFH would be critical to this strategy. Egg development would have to be greatly reduced, so that unfed emergent fry would be released at the correct time in the river (March).

River access by close proximity of roads and bridges would make this option easy from an operational standpoint. However, fry plants in other river systems with chinook have not been proven successful, and are not generally recommended.

2.2.5.3 Adult Outplants

If the number of maturing adults exceeds program goals, it might be possible to release mature adults into the Tucannon River to spawn naturally. For the greatest chance of success, adults would be transported as close to spawning time as possible, and placed in an area of river with (1) favorable water temperatures, (2) easily accessible, good-quality spawning habitat, and (3) areas that have had little natural production in recent years (above the hatchery trap).

However, if other spring chinook are spawning in the area, it might be necessary to section off areas of the river so that captive brood fish could not spawn with other hatchery or natural spawners in the river. Captive broodstock adults might not be successful spawning in the river because they would have spent their entire life in captivity and might have developed behavioral or **morphological differences** that decrease the success (Berejikian et al. 1997). Between now and that time, more information should be available from other captive broodstock programs/ research to answer this concern.

2.2.5.4 Asotin Creek Reintroduction

WDFW also has proposed a re-introduction of spring chinook into Asotin Creek. Asotin Creek empties into the Snake River upstream of the Tucannon River, above Lower Granite Dam and right through the city of Asotin. The creek is about 762 RK above the mouth of the Columbia River. WDFW data suggest that the Asotin Creek population became extinct after 1993. Possible Asotin Creek release strategies could include all of the above-mentioned strategies. However, access to the historical spawning and rearing area of spring chinook in Asotin Creek has been restricted following recent floods. Also, no agreement as to this action has been reached with the co-managers. The NPT has proposed using another spring chinook stock for reintroduction as well.

2.3 ALTERNATIVES TO THE PROPOSAL

The following alternatives to the proposed action have been reviewed, but eliminated from consideration, at least at this time.

2.3.1 Stop Operating the Supplementation Program

This alternative would stop operating the supplementation program (and not initiate the captive broodstock program) on the grounds that extinction of the ESA-listed species appears to be inevitable. Poor survival rates of the natural population in combination with the current **smolt-to-adult return rates (SAR)** of the hatchery fish are less than needed for stock recovery. At the current rate of decline, the stock would likely be functionally extinct within 20 years. This alternative is not acceptable because these fish are listed under the Endangered Species Act, and

WDFW is mandated under the ESA to do everything possible to preserve the stock. Further, Tribal treaty obligations specify fishing rights that need to be considered by the managing agencies.

2.3.2 Introduce a Non-endemic Stock

This alternative would introduce a **non-endemic** stock of spring chinook to the basin, in the short term, to increase the number of spawners in the river for natural production. This action would be a step backward from the efforts that been taken so far to maintain a locally adapted spring chinook stock in the Tucannon River. By introducing another stock, genetic variability could be lost, and the Tucannon stock's chance for survival further decreased. Also, there is no supporting evidence that a non-endemic stock would be expected to perform any better than, or even as well as, the Tucannon stock currently does.

2.3.3 Trap Adults

This alternative would increase the current hatchery program by trapping more adults from the river. This strategy is not feasible, as there are currently too few adults returning to increase the hatchery production level. The hatchery broodstock goal has not been met in three of the last five years. In addition, assuming more fish return, more fish would be "mined" from the river, resulting in less natural production. This would be contrary to basic premises behind "supplementation" programs. While this option could be considered for the future, program goals would change, as all concerns for the status and production level of the natural population would not exist.

2.4 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Tucannon River Spring Chinook Captive Broodstock Program project would not be funded by BPA, and most likely would not be implemented. This alternative would continue the current supplementation program (132,000-smolt release) and try to rebuild the population from the low number of fish presently returning and expected to return over the next few years. This action might lead to trapping all returning fish each year, at least through the year 2000. This alternative is not acceptable because, as discussed above, it would not be consistent with ESA, or with WDFW's Wild Salmonid Policy (WDFW 1997). It would eliminate natural production above the hatchery, reinforcing a downstream shift in spawning distribution, away from the better juvenile rearing areas above the hatchery. In addition, this alternative could cause low genetic variability in later generations due to the small founder population size, which could further increase the chance of extinction for the population as a whole.

Table 1: Predicted Performance Summary

Decision Factor	Proposed Action	No Action
Potential to achieve short-term	Greater potential due to short-term rapid	Lower potential due to

Decision Factor	Proposed Action	No Action
preservation and rebuilding of a critically depressed run of an ESA-listed spring chinook on the Tucannon River	increase in adult returns.	movement of spawner distribution below good juvenile rearing habitat and small founder-population-size genetic effects.
Consistency with the Council's Fish and Wildlife Program	Consistent with Measures 2.2A, 4.1A, 7.4C, and 7.4D. Consistent with many of the general policies in the Council Report and Recommendations on Artificial Production Programs in the Columbia River Basin, although some specific recommendations cannot be implemented.	Not consistent.
Administrative efficiency and cost-effectiveness	Higher cost than No Action, but costs and administrative efficiencies are maximized through the use of existing facilities and personnel.	Lower cost, but could result in extinction.
Avoidance or minimization of adverse environmental impacts	Minimal impacts on the environment from construction and operational activities. Potential genetic impacts on the spring chinook population minimized to the extent possible, because the project is short-term.	No impacts from construction or operational activities. Potential catastrophic impact on spring chinook population from extinction.
Degree to which an alternative complements the activities of fish and wildlife agencies and appropriate tribes	Complements WDFW Wild Salmonid Policy, existing Tucannon hatchery supplementation program, agreements under *US v. Oregon.*	Would be inconsistent.
Consistency with the legal rights of the appropriate tribes in the region	If population can be increased, would contribute to restoration of tribal fishing rights.	If population continues to decline, would contribute to a failure to meet tribal fishing rights.

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES, AND PROPOSED MITIGATION

3.1 BACKGROUND

The Tucannon River, located in the southeast corner of Washington State (Figure 1), enters the Snake River about 622 RK from the mouth of the Columbia River. Stream elevation rises from 150 meters (m) (about 492 feet [ft.]) at the **Tucannon River** mouth to 1,640 m (5,381 ft.) at the headwaters. Total area of the watershed (which contains cropland, rangelands, and forests) is 1,295 km^2. Mean discharge is 174 cubic feet per second (cfs), with a mean low flow of 61.5 cfs (August) and a mean high flow of 310 cfs (April or May). Stream water temperatures in the lowest miles commonly exceed 26.7 C (80^o F) throughout mid-summer. The middle portion of the river continues through agricultural areas, but **riparian** and water quality improve to levels that will support all life stages of most species of salmonids.

Farther upstream, the river runs through state land and parts of the Umatilla National Forest and the Tucannon/Wenaha Wilderness. State and U.S. Forest Service (USFS) land is timbered, although some of the riparian habitat has been affected by recent floods. Main species of interest are spring and fall chinook salmon, summer steelhead, and bull trout. Each species is currently listed as Threatened under the ESA. Steelhead spawn and rear above RK 28; spring chinook spawn and rear above RK 34 (King Grade); and bull trout spawn above RK 55, but rear throughout most of the basin, depending on season.

In 1993, the Tucannon River Watershed was selected as one of three Washington Model Watersheds. The Columbia Conservation District received funding from BPA, through the Washington State Conservation Commission (WCC), to develop a watershed-based habitat restoration plan. The *Plan* was developed to identify, protect and restore fish habitat by using sound technical information and citizen input. The Tucannon River Model Watershed Program has been implementing on-the-ground habitat projects guided by the *Plan* since 1996. The Program submits annual project reports to BPA, and submitted a comprehensive report on the Model Watershed Process to the NWPPC in 1997. The habitat restoration projects completed under this plan will complement the proposed captive broodstock program by providing improved habitat conditions for the fish when they eventually return to spawn naturally in the river.

In addition to the captive broodstock and supplementation program for spring chinook, WDFW carries out both a steelhead hatchery program and a rainbow trout planting program in the Tucannon. The steelhead program produces approximately 40,000 lbs. of hatchery juveniles for release to the Tucannon annually. This program has helped make the Tucannon one of the premier steelhead streams in southeastern Washington. Under the rainbow trout planting program, WDFW annually plants rainbow trout into Curl Lake after the spring chinook smolts (from the current supplementation program) have migrated from the lake. Curl Lake is also proposed to be used to acclimate smolts from the captive broodstock program.

3.2 PROPOSED ACTION – CAPTIVE BROODSTOCK PROGRAM

3.2.1 Water Quality and Quantity

3.2.1.1 Affected Environment

Lyons Ferry Hatchery

Water Quantity: The water for the existing LFH is supplied by the Marmes Cave Aquifer, which provides water to a large groundwater well that supplies the hatchery with 100% pathogen-free water, with a constant year-round temperature of 11°C (51.8° F). LFH has a water right (Permit # - G326147P & G3-26489P; Certificate No. - G3-26147C & G3-26489C) that allows for the pumping of 53,200 gallons of water per minute (g.p.m.) (118.5 cubic feet per second [cfs]) from the aquifer. Currently, LFH pumps about 40,000-45,000 g.p.m. from the aquifer on a daily basis from the eight wells located at the site.

Water Quality: Water temperature is a constant 11°C (51.8°F.). Water flowing through the hatchery is discharged through the main pipeline to the Snake River. During the summer months, the water from Lyons Ferry is significantly cooler than water in the Snake River. WDFW currently has an effluent discharge permit (# WAG137006).

Tucannon Fish Hatchery

Water Quantity: TFH currently has Water Right Permits (G3-27674P, G3-28233P & 16415; Certificate No. - G3-27674C & G3-28233C) that allow for the pumping of: (1) 900 g.p.m. (2.0 cfs) derived from two groundwater wells, (2) 2,400 g.p.m. (5.3 cfs) derived from "springs," and (3) 5,388 g.p.m. (12 cfs) derived directly from the Tucannon River.

Water Quality: Water temperatures vary, depending on the source and time of year. Well water temperatures vary from 12.2 - 15°C. "Spring" water temperatures average 10.5°C (50.9° F). Tucannon River water temperatures varies from 1 - 21°C (33.8 to 69.8° F). Effluent from the hatchery is currently discharged to the Tucannon River. The TFH Discharge Permit Number is WAG137017. Under section 303(d) of the Clean Water Act, the Tucannon River is listed for fecal coliform and temperature. The river is not listed for parameters that would be affected by hatchery discharges.

Curl Lake

Curl Lake is an artificial lake created as an acclimation pond. Its current use provides acclimation for Tucannon River spring chinook smolts from the hatchery supplementation program; it is also stocked with rainbow trout for summer fishing after the spring chinook have migrated from the lake. Curl Lake is allowed to drain~~ed~~ during the winter months, when the water supply is turned off.

Water Quantity: Curl Lake acclimation pond currently holds a Water Right Permit (#S3-27767P; Certificate No. S3-27767C), which allows the withdrawal of 2,694 g.p.m. (6 cfs) of surface water from the Tucannon River.

Water Quality: The total spring chinook smolt production planned for the Tucannon River (supplementation and captive broodstock progeny) would not exceed 300,000 fish at 15 fish/lb. (20,000 lbs total), and would likely be 282,000 fish (18,800 lbs) annually.

3.2.1.2 Environmental Consequences

Lyons Ferry Hatchery

Water Quantity: When fully operational, the captive broodstock tanks (the 1.2-m [4-ft.] and the 6-m [20-ft.] circulars) would require a maximum of 1,275 g.p.m. This represents a less than 3% increase of the hatchery water supply needed on a daily basis, and would remain well below the permitted level. The proposed captive broodstock program would not provide a significant increase in the water demands of the hatchery, and would not require any additional water right permit or modification to the existing permit. No impacts are expected on water quantity at surrounding properties (Bumgarner, pers. comm., 01/04/00).

Water Quality: During normal hatchery operations, the groundwater flowing through the hatchery is discharged directly to the Snake River. The water quality is generally higher than existing water quality in the Snake River, especially during the summer, when the well water is cooler than the Snake River water. Hatchery personnel test the effluent water quality monthly and provide quarterly reports to the Washington State Department of Ecology and WDFW. Pollution has never exceeded the discharge permit (Bumgarner, pers. comm., 01/04/00).

During pond cleaning operations (i.e., stirring up the fish waste and excess feed), the discharge is routed to the "off-line" settling basin (wastewater pond). The basin does not drain into the Snake River. Water that enters the basin evaporates or seeps through the ground and back to the river or to natural underground water storage. The hatchery adds micro-organisms to accelerate breakdown of the wastewater. The effluent from the basin would not change or exceed permit parameters, and no modifications to the existing permit would be necessary.

Tucannon Fish Hatchery

Water Quantity: Currently, the plan is to rear captive brood progeny at TFH from October to February (Age 1+) just before transfer to and release from Curl Lake. The addition of the captive broodstock program would not require additional water or a modification to the existing water rights at the hatchery.

Water Quality: The rearing of captive broodstock progeny at the hatchery would not change or exceed water quality parameters that currently exist, nor would changes be needed to the hatchery's discharge permit. Hatchery personnel test water quality monthly and provide quarterly reports to the Washington State Department of Ecology and WDFW.

Curl Lake

Water Quantity: The addition of captive brood progeny in Curl Lake would not require additional water from the Tucannon River; hence, no modifications would be necessary to the existing permit. The addition of the captive broodstock program would not require a modification to the existing water rights at Curl Lake.

Water Quality: Water from Curl Lake acclimation pond is discharged directly to the Tucannon River (not treated or settled). Permits and discharge monitoring of effluent (i.e., waste and excess feed) are not required for facilities that produce below 20,000 pounds of fish and 5,000 pounds of feed fed/month, because discharges from such facilities have been determined not to appreciably affect water quality. Feed requirements for the smolt would not exceed that amount, and it is unlikely that the hatchery would exceed the maximum poundage of production. Under section 303(d) of the Clean Water Act, the Tucannon River is listed for fecal coliform and temperature. The river is not listed for parameters that would be affected by pond discharges. A National Pollutant Discharge Elimination System (NPDES) permit would be acquired if the production level were exceeded (see Section 4.1).

3.2.2 Floodplains and Wetlands

Floodplains and wetlands would not be affected by this project, as there would be no new construction of facilities.

3.2.3 Threatened and Endangered Species

3.2.3.1 Affected Environment

Lyons Ferry Hatchery

The US Fish and Wildlife Service (USFWS) and NMFS list the following Threatened species that might occur within the vicinity of Lyons Ferry, Franklin County, Washington. (USFWS 1999; NMFS 1992a, 1992b, 1997).

Animals	**Taxonomic Name**	**Federal Status**
Bald eagle	*Haliaeetus leucocephalus*	Threatened
Bull trout	*Salvelinus confluentus*	Threatened
Chinook Salmon (Snake River Spring/Summer-run ESU)	*Oncorhynchus tshawytscha*	Threatened
Chinook Salmon (Snake River Fall-run ESU)	*Oncorhynchus tshawytscha*	Threatened
Steelhead (Snake River Basin ESU)	*Oncorhynchus mykiss*	Threatened

Plants	**Taxonomic Name**	**Federal Status**
None		

The following are listed as species of concern:

Black tern	*(Chlidonias niger)*
Columbia pebblesnail	(*Fluminicola (=Lithoglyphus) columbianus)*[great Columbia River spire snail]
Ferruginous hawk	*(Buteo regalis)*
Fringed myotis (bat)	*(Myotis thysanodes)*
Loggerhead shrike	*(Lanius ludovicianus)*
Northern sagebrush lizard	*(Sceloporus graciosus graciosus)*
Pacific lamprey	*(Lampetra tridentata)*
Pale Townsend's (=western) big-eared bat	*(corynorhinus (=Plecotus townsendii pallescens)*
River lamprey	*(Lampetra ayresi)*
Small-footed myotis (bat)	*(Myotis ciliolabrum)*
Washington ground squirrel	*(Spermophilus washingtoni)*
Western burrowing owl	*(Athene cunicularia hypugea)*
Westslope cutthroat trout	*(Oncorhynchus (=Salmo) clarki lewisi)*[7]
Yuma myotis (bat)	(*Myotis yumanensis)*

[7] The USFWS has been petitioned to list this species under the Endangered Species Act and is now surveying the status of the species; however, this fish is not found in the Tucannon River.

Tucannon Hatchery and Curl Lake

The USFWS and NMFS list the following Threatened species that might occur within the vicinity of the Tucannon Hatchery and Curl Lake, Columbia County, Washington. (USFWS 1999; NMFS 1992a, 1992b, 1997).

Animals	**Taxonomic Name**	**Federal Status**
Bald Eagle	*Haliaeetus leucocephalus*	Threatened
Bull trout	*Salvelinus confluentus*	Threatened
Chinook Salmon (Snake River Spring/Summer-run ESU)	*Oncorhynchus tshawytscha*	Threatened
Chinook Salmon (Snake River Fall-run ESU)	*Oncorhynchus tshawytscha*	Threatened
Steelhead (Snake River Basin ESU)	*Oncorhynchus mykiss*	Threatened
Plants	**Taxonomic Name**	**Federal Status**
Ute ladies'-tresses	*Spiranthes diluvialis*	Threatened

The following are listed as species of concern:

Black tern *(Chlidonias niger)*
California bighorn sheep *(Ovis canadensis californiana)*
Columbia spotted frog *(Rana luteiventris(=Rana pretiosa,* eastern population)
Fringed myotis (bat) (*Myotis thysanodes)*
Harlequin duck *(Histrionicus histrionicus)*
Interior redband trout *(Oncorhynchus mykiss gairdneri)*
Long-eared myotis (bat) *(Myotis evotis)*
Long-legged myotis (bat) *(Myotis volans)*
Northern goshawk *(Accipiter gentilis)*
Olive-sided flycatcher *(Contopus borealis)*
Pacific lamprey *(Lampetra tridentata)*
Pale Townsend's (=western) big-eared bat (*Corynorhinus (=Plecotus)townsendii pallescens)*
Small-footed myotis (bat) *(Myotis ciliolabrum)*
Tailed frog *(Ascaphus truei)*

Westslope cutthroat trout *(Oncorhynchus (=Salmo)clarki lewisi[8])*
Yuma myotis (bat) *(Myotis yumanensis)*

3.2.3.2 Environmental Consequences

Listed Species

Bald Eagles. These birds frequent estuaries, large lakes, reservoirs, major rivers, and some seacoast habitats. However, such areas must have an adequate food base, perching areas, and nesting sites to support them. In winter, bald eagles often congregate at specific wintering sites that are generally close to open water and that offer good perch trees and night roosts. (Department of Interior 1995). On occasion, bald eagles have been spotted near the TFH, attempting to capture rainbow trout from the rearing pond. (Bumgarner, pers. comm., January 2000.) This project would not have any adverse effects on bald eagles and may be beneficial in that it would provide additional prey for them. No mitigation measures are needed.

Ute's ladies'-tresses. According to the letter received from USFWS on December 7, 1999 (USFWS 1999), there is the potential for Ute's ladies'-tresses (*Spiranthes diluvialis*) to occur in the project area. This plant species, listed as Threatened in January 1992, can be found in wetland and riparian areas, including spring habitats, wet meadows, and river meanders ranging from approximately 914 m to 2134 m (3,000 to 7,000 ft.) in elevation. This plant would not be affected by this project. There is no ground disturbance planned other than the expansion at the LFH. This expansion is in an area that is dry and has been mowed and otherwise maintained by the hatchery for weed control.

Bull Trout. WDFW believes that the activities associated with this project may affect bull trout and could potentially result in competition with, predation on, transmission of diseases to, or displacement of bull trout in the river. However, it is believed that this potential is extremely low (WDFW 1999b). In fact, project activities may enhance the bull trout population by re-establishing an historic prey item for the bull trout within the river. The USFWS has concurred in these findings (USFWS 1999). There is potential for bull trout to be caught in the adult trap for the captive broodstock program. However, the WDFW bull trout take authorization permit requires annual reporting to USFWS on bull trout caught in the trap (WDFW 1999a), and any bull trout caught in the fish trap would be released immediately, with no/minimal handling.

Chinook Salmon (Snake River Spring/Summer-run ESU). The Tucannon River supplementation fish that would be used for the captive broodstock program are part of the Snake River spring/summer-run ESA, which is listed as Threatened. The Tucannon River supports both naturally spawned and hatchery-spawned stocks. Hatchery supplementation began in 1988. Since the listing of the fish in 1993, WDFW has been authorized by NMFS under an ESA Section 10 direct take permit (Ref. #848, or #1126 and #1129) to operate the hatchery supplementation program and conduct associated research activities on this population. NMFS

[8] The USFWS has been petitioned to list this species under the Endangered Species Act and is now surveying the status of the species.

has completed and submitted its Biological Opinion regarding the captive broodstock program (NMFS 1999a) to its Headquarters Office, and is awaiting its approval. A status letter has been received confirming that NMFS agrees with the Captive Broodstock Program (NMFS 1999b).

This project is designed to increase the spring run of chinook in the Tucannon River. WDFW has consulted with NMFS regarding impacts of the captive broodstock program on listed spring/summer chinook salmon. While there may be some adverse impacts (see discussion below), NMFS has determined that the amount of incidental take is at such levels, when quantifiable, as to not jeopardize listed populations in the Columbia and Snake rivers. (WDFW 1999a:22).

The following information summarized from the NMFS Biological Opinion addresses potential impacts of hatchery intervention on the naturally spawning component of the population. Impacts of disease transmission from the hatchery fish on all salmonids (including the natural spring chinook) are discussed under "Fish Health," below.

Hatchery salmon smolt releases may cause displacement of rearing natural chinook salmon and steelhead juveniles from occupied stream areas, leading to abandonment of advantageous feeding areas, or premature out-migration (Pearsons et al. 1994). The presence of large numbers of hatchery-produced fish may also alter natural fish behavior patterns, which may increase their vulnerability to predation (NMFS 1995). Direct competition for food and space between hatchery and listed fish may occur in spawning and/or rearing areas, the migration corridor, and ocean habitat. These impacts are assumed to be greatest in the spawning and nursery areas and at points of highest fish density (release areas) and to diminish as hatchery smolts disperse (USFWS 1994). Competition continues to occur at some unknown, but probably lower, level as smolts move downstream through the migration corridor.

The captive broodstock smolts will be acclimated and will be allowed to leave the acclimation pond voluntarily. These measures will ensure that the smolts are physiologically ready to migrate and will move quickly through the natural fish spawning and nursery areas, a process that will minimize competitive interactions. These measures will also minimize density-dependant effects on natural fish, such as niche displacement and premature migration. Releases of hatchery smolts during managed releases of water (flow augmentation) will also help accelerate downstream migration of hatchery salmon and steelhead in the mainstem corridor, further reducing spatial and temporal overlaps with the naturally spawned fish, and potential adverse behavioral effects.

At the target production goal, the program will produce up to 300,000 (supplementation and captive broodstock programs) hatchery smolts, based on the expected survival of broodstock and progeny. Due to size variance of the population around the target release size of 15 fish/lb (supplementation program), only a portion (about 10%) of each year's release is classified as true "smolts." However, based on snorkel observations made during releases over the last few years, Tucannon hatchery spring chinook releases tend to migrate down river almost immediately. This observation is further supported by recaptures of hatchery-produced smolts at the downstream migrant trap (RK 3). Smolt travel times of over 20 km/day have been documented for several hatchery release locations within the drainage.

Snorkel observations have determined that naturally produced fish do not generally move from their preferred location, and are apparently not disturbed by the release of large numbers of hatchery fish. In addition, opportunities for interaction between hatchery and natural fish are likely to be further reduced currently, due to the seriously depressed numbers of natural fish (<6,000 smolts emigrating annually since 1996). Competition for space and cover in the Tucannon River probably occurs between hatchery and natural fish shortly after release and during downstream migration; however, based on the smolt travel times, the duration of interaction is minimal in the river (WDFW 1998).

Natural Tucannon River chinook genetic diversity might be lost from domestication impacts in the captive broodstock program; extent is unknown at this time. When the program reaches its maximum level, approximately 500-600 hatchery adults may return to the river. Most will be left in the Tucannon River to spawn naturally and, as such, will interact and likely breed with naturally produced fish. Since most fish will be hatchery in origin, it is possible that some genetic diversity may be lost. However, this may not occur if the returning hatchery population is high enough, and spawners are mixed throughout the watershed.

The potential biological impacts discussed above may occur; however, WDFW, the tribes, and NMFS believe that the consequences of not doing anything (no project) would be extinction, with much more catastrophic genetic impacts on the population. The NMFS Biological Opinion states that "The direct take of listed Snake River spring/summer chinook salmon for the artificial propagation programs proposed in the Biological Opinion is expected to reduce the short-term risk of extinction and improve survival." (NMFS 1999a:40)

Chinook Salmon (Snake River Fall-run ESU). The proposed captive broodstock program would have no effects on natural fall chinook production in the Tucannon River. Captive brood progeny produced from the program and released into the Tucannon River would inhabit separate areas of the river, except for the brief period during smolt migration. It is not likely that captive brood progeny would have any negative effects on juvenile fall chinook during smolt migration. Returning progeny from the captive broodstock program would also have no effect on fall chinook because they are separated by time and location within the Tucannon River. No mitigation is needed.

Steelhead (Snake River Basin ESU). Tucannon River steelhead are part of the Snake River "evolutionarily significant unit" (ESU). Recent estimated **escapements** of natural fish in the Tucannon River have ranged from a high of 525 in 1988 to a low of 71 in 1996. The population was relatively stable prior to 1990. Following that, the population has rapidly decreased, and NMFS, WDFW, NPT, and CTUIR consider the Tucannon River steelhead a candidate for supplementation to help rebuild the run. The clear failure of this natural stock to replace itself in recent years is caused by the same factors that have limited the spring chinook population.

Captive broodstock progeny might transmit pathogens to the steelhead. This effect might be occurring in spawning and/or rearing areas, in addition to the entire juvenile migration corridor (Sanders et al. 1992). However, Chapman et al. (1994) concluded that disease transmittal from hatchery to natural populations is probably not a major factor negatively affecting natural

steelhead in the Columbia Basin. See "Fish Health," below, for a discussion of the measures being taken to prevent disease transmission between captive broodstock fish and other fish, including steelhead. There may be competition between juvenile spring chinook and steelhead for food and space when they are migrating out of the river. However, steelhead are bigger and are likely to out-compete the chinook. There is also a potential for steelhead to be caught in the adult trap for the captive broodstock program. However, any steelhead caught in the fish trap would be released immediately, with no/minimal handling. WDFW's steelhead take authorization permit requires annual reporting to USFWS on steelhead caught in the trap (WDFW 1999a). No additional mitigation is needed.

Fish Health

Interactions between hatchery fish and listed fish in the natural environment may be a source of pathogen transmission. This impact is probably occurring from headwater spawning and/or rearing areas and throughout the entire migration corridor. Because the pathogens responsible for diseases are present in both hatchery and natural-origin populations, there is some uncertainty associated with determining the extent of disease transmission from hatchery fish (Williams and Amend 1976, Hastein and Lindstad 1991).

Under natural conditions, usually of low rearing density, most pathogens are held in check. By contrast, hatchery populations are considered to be reservoirs of disease pathogens because of the relatively higher rearing densities and resultant stress. However, there is little evidence to suggest that diseases are routinely transmitted from hatchery to natural fish (Steward and Bjornn 1990). Chapman et al. (1994) concluded that disease transmittal from hatchery to natural populations is probably not a major factor negatively affecting natural steelhead in the Columbia Basin. This effect may be occurring in spawning and/or rearing areas, in addition to the entire juvenile migration corridor (Sanders et al. 1992).

The incidence of BKD and the potential for transmission between natural and hatchery stocks of spring/summer chinook salmon collected for transport are being investigated in ongoing research conducted by USFWS. They are trying to determine whether BKD contributes to the poor survival of spring/summer chinook salmon smolts (Elliott and Pascho 1993).

To address concerns of potential disease transmission from hatchery to natural fish, the Pacific Northwest Fish Health Protection Committee (PNFHPC) has established guidelines to ensure that hatchery fish are released in good condition, thus minimizing impacts on natural fish (PNFHPC 1989). The Integrated Hatchery Operations Team (IHOT 1995) also developed detailed hatchery practices and operations designed to prevent the introduction and/or spread of any fish diseases within the Columbia River Basin.

WDFW has implemented both disease prevention and disease control programs to maximize production of healthy fish. Adult broodstock are injected with Food and Drug Administration (FDA)-approved antibiotics, under the oversight of a certified Fish Pathologist, for treatment of BKD before the fish are transported and during spawning. Spawned adults are evaluated for the presence of viral and bacterial pathogens, following accepted standard procedures set forth by the

PHFHPC (PHFHPC 1989). Juvenile salmon reared at Lyons Ferry and Tucannon hatcheries are routinely monitored in accordance with WDFW fish health policies (WDFW 1996).

Potential Impacts on Listed Fish outside the Project Area

Questions have been raised as to whether the addition of Tucannon River spring chinook smolts to the Snake River Basin would affect other anadromous smolts as they migrate together to the ocean.

In seeking to increase the survival of outmigrating chinook smolts, the Project might result in increased impacts in the long run, because more smolts would survive to interact with other fish in the migration corridor than have in the past. However, survival is unlikely to increase enough during the three- or four-year timeframe of this project to result in a significant increase in Tucannon River Spring Chinook interactions with other fish in the migration corridor.

Species of Concern

See Section 3.2.3.1 above. This project is not expected to affect any of the species of concern listed above.

3.2.4 Land Use and Visual Impacts

No land use or visual impacts are expected. All facilities are already existing and on state land. There would be no impacts on private property.

3.2.5 Social and Economic Impacts

The tribes support this project, in the hopes that the result would be more fish returning to the Tucannon River. This would give them increased opportunities for in-river ceremonial fisheries. There would be no economic impacts from this project.

3.2.6 Cultural Resources

Cultural Resources are not expected to be affected by this project. The facilities necessary for this project already exist, with the exception of the minor addition to the Lyons Ferry Hatchery. All ground disturbance for the addition would take place on existing hatchery property in areas that have been previously disturbed. (See Section 3.2.5 above for discussion of tribal issues.)

3.3 ALTERNATIVE - NO ACTION

Under the No Action Alternative, the Tucannon River Spring Chinook Captive Broodstock Program would not occur. Consequently, none of the environmental impacts or enhancements associated with the project would occur. However, the potential to recover this ESA-listed fish might be lost.

Table 2: Summary of Affected Environment and Environmental Consequences

Environmental Resource	Existing Conditions	Proposed Action	No Action
Water Quantity	Water is supplied by groundwater sources and by the Tucannon River.	Would increase water usage by a small percentage at Lyon's Ferry Hatchery, but within existing water rights permits. No change at Tucannon Hatchery or Curl Lake.	No change.
Water Quality	Facilities discharge effluent into the Snake River, a settling pond, or the Tucannon River.	Would be a small increase in effluent discharge at Lyons Ferry Hatchery; expected to be within allowable limits. No changes at Tucannon Hatchery or Curl Lake.	No change.
Floodplain and Wetlands	None currently affected.	Would not be affected, as there would be no new facilities constructed.	No change.
Threatened and Endangered Species	Bald eagles, bull trout, chinook salmon and steelhead are present in the project area.	No adverse effects on bald eagles (may be some benefit). Small potential for impacts resulting from trapping bull trout and steelhead, and for interactions with captive broodstock. Because they are being used for broodstock, there would be direct impacts on spring/ summer chinook (trapping, genetic impacts, interaction with natural stock). However, these actions offer increased potential for long-term recovery of the population.	Potential for extinction of Tucannon River spring/summer chinook salmon population. No impacts on other species.
Land Use/Visual	Facilities already existing.	No new impacts.	No changes.
Socioeconomics	Decreasing runs of Tucannon River spring/summer chinook, with reduced opportunities for ceremonial fisheries for	More fish returning to the Tucannon, providing tribes with increased opportunities for ceremonial fisheries. No economic impact.	Possible extinction of Tucannon River spring/ summer chinook salmon, further reducing tribes' opportunity for ceremonial fisheries. No economic

Environmental Resource	Existing Conditions	Proposed Action	No Action
	tribes.		impacts.
Cultural Resources	No known resources present at project sites.	No impacts expected. Minor addition to Lyons Ferry Hatchery would occur on ground previously disturbed.	No change

4. COMPLIANCE WITH ENVIORNMENTAL STATURES AND REGULATIONS

4.1 APPLICABLE REQUIREMENTS

National Environmental Policy Act

This EA is being prepared pursuant to the National Environmental Policy Act (NEPA) (42 U.S.C. 4321 et. seq.) and the Council of Environmental Quality (CEQ) Implementing Regulations, which require Federal agencies to assess the impacts that their proposed actions may have on the environment. Based on information in the EA, BPA would determine whether the proposal significantly affects the quality of the human environment. If it does, an Environmental Impact Statement is required. If it is determined that the proposal would not have significant impacts, a Finding of No Significant Impact (FONSI) would be prepared.

Threatened and Endangered Species and Critical Habitat

The Endangered Species Act of 1973, as amended, requires that Federal agencies ensure that their actions do not jeopardize Threatened or Endangered species and their critical habitats. See Chapter 3. We have completed consultation (USFWS 1999, NMFS 1999a).

Fish and Wildlife Conservation

Provisions of the Pacific Northwest Electric Power Planning and Conservation Act (16 U.S.C. et seq.) are intended to address system-wide fish and wildlife losses. This project is proposed to fulfill these obligations, as part of the Columbia River Basin Fish and Wildlife Program.

Permits for Discharges into Waters of the United States

A National Pollutant Discharge Elimination System (NPDES) permit, required under the Clean Water Act, would be obtained by the WDFW if the fish production goes over 20,000 pounds and over 5,000 pounds of feed fed/month at the Curl Lake acclimation facility.

State of Washington

WDFW currently holds applicable water rights and effluent discharge permits from the State of Washington. See Section 3.2.1.

4.2 REQUIREMENTS NOT APPLICABLE

Safe Drinking Water Act

The proposed action would not affect a sole-source aquifer. No new injection wells would be required and no pollutants are expected to reach drinking water supplies.

Resource Conservation and Recovery Act

No hazardous materials would be used, discarded or produced by this project. Solid wastes would be disposed of at a landfill approved by the state of Washington.

Farmland Protection Policy Act

The project would not affect any prime, unique or other important farmland as defined in the Farmland Protection Policy Act (U.S.C. 4201 et seq.).

Recreation Resources

The proposed project would not affect Wild and Scenic Rivers, National Trails, Wilderness Areas, National Parks, or other specially designated recreational areas.

Heritage Conservation

Federal historic and cultural preservation acts include the National Historic Preservation Act (16 USC 470-470w-6), the Archeological Resources Protection Act (16 YSC 470aa-470ll), the Archeological and Historic Preservation Act (16 USE 469-469c), the American Antiquities Act (16 USC 431-433), and the American Indian Religious Freedom Act (42 USC 1996). See sections 3.2.5 and 3.2.6.

The Executive Order on Environmental Justice

The project would not adversely affect minority or disadvantaged groups. No adverse effects on any human groups or individuals are expected. This project would have a positive impact for minority/disadvantaged tribal populations.

Noise Control Act

The proposed hatchery expansion would be constructed and operated within State of Washington noise standards. Other activities would not create noise problems.

Wetlands and Floodplains Protection

Wetlands and Floodplains would not be affected by this project.

5. CONSULTING AGENCIES AND INDIVIDUALS

Confederated Tribes of the Umatilla Indian Reservation
Brian Zimmermann, Gary James

National Marine Fisheries Service
Richard Turner, Robert Koch, Steve Smith, Herb Pollard, Mike Delarm

Nez Perce Tribe
Becky Ashe, Dave Johnson, Ed Larson, Silas Whitman

Washington Department of Fish and Wildlife, Snake River Lab
Joe Bumgarner, Glen Mendel, Mark Schuck, Harold (Butch) Harty, Craig Busack, Steve Roberts

6. GLOSSARY

acclimation/ing: The process of imprinting fish to a particular water source, with the idea that adults will return to that location. The process is generally accomplished by holding the fish in the water source (e.g., pond) for a period of time.

broodstock: Adult fish used to propagate the subsequent generation of hatchery fish.

brood year: Designation for progeny that were conceived during a particular year (for example: the progeny of the fish that are spawned in 1999 are referred to as the "1999 brood year").

Captive Broodstock Technical Committee (CBTC). WDFW (evaluation, hatchery, fish management, and fish health personnel), NPT, and CTUIR would be represented on this committee.

carrying capacity: The maximum amount of production/biomass (living species) that a particular environment (e.g., river, forest, rearing pond) can withstand.

cryopreservation: Preservation of semen or eggs by flash-freezing for future use.

emergent fry: Fish that absorbed all of the yolk sac from the egg, and have emerged from the gravel to start actively feeding in the stream/hatchery.

Endangered: Under the Endangered Species Act, those species officially designated by the National Marine Fisheries Service or U.S. Fish and Wildlife Service as in danger of extinction through all or a significant portion of their range. Endangered species are protected by law. See also *Threatened.*

Endangered Species Act (ESA): The Endangered Species Act of 1873, as amended, requires that Federal agencies ensure that their actions do not jeopardize Threatened or Endangered species.

escapement: Generally used to describe fish that have returned to a particular point such as a river, adult trap, spawning grounds etc., by avoiding any fisheries, or other activities that would lead to their death.

Evolutionarily Significant Unit (ESU): A distinctive group of Pacific salmon, steelhead, or sea-run cutthroat trout.

fry: Describes the juvenile stage of a salmon, generally one that has just emerged from the gravel and is actively swimming and feeding.

gametes: The reproductive cells that unite with one another to form the cell that developed into a new individual.

hatchery domestication: Animals that have become so accustomed to life in the hatchery that their behaviors may compromise their survival after release, or may even be passed from generation to generation.

jacks: Describes an early maturing male salmon (generally a 2- or 3-year old salmon).

marked/ing: The act of placing an internal or external mark on fish for future identification.

morphological (differences): Describes body shape differences.

non-endemic: In this case, describes a fish that is not from the particular river system in question (e.g., a Umatilla River-origin salmon that returned to the Tucannon River).

outplant: The release of hatchery-reared fish into streams for rearing and maturing away from the hatchery sites.

Pacific Northwest Power Planning and Conservation Act: The Pacific Northwest Power Planning and Conservation Act of 1980 (16 U.S.C. 839 et. seq.), which authorized the creation of the Northwest Power Planning Council and directed it to develop this program to protect, mitigate and enhance fish and wildlife, including related spawning grounds and habitat on the Columbia River and its tributaries.

ponding: Describes the act of taking fish from the incubation trays and placing them in larger rearing containers so they can feed.

raceway: Holding area or rearing facility for juvenile or adult fish in a hatchery.

rearing: Describes the process of growing fish in the hatchery or the river.

release strategies: Different methods of releasing fish (e.g., direct stream, acclimation).

redd: The specific location in the river where the female salmon/fish laid her eggs and buried them in the gravel for incubation.

returns: The number of adults that returned to a specified location. Can be expressed either as that year's total number of fish (which may represent many different age classes), or as each brood year.

riparian: Growing or living on the banks of a stream.

river kilometers (RK): The distance the river travels between two given points, measured in kilometers.

smolt: The life-history stage of a salmonid that describes a fish that is migrating to, or about to enter the ocean.

smolt-to-adult return rates (SAR): Describes the survival rate of a brood year of fish from the smolt stage to adult return (e.g., 100,000 smolts return 1,000 adults = SAR of 1%)

Threatened: Under the Endangered Species Act, those species officially designated by the U.S. Fish and Wildlife Service as likely to become endangered within the foreseeable future through all or a significant portion of their range. Threatened species are protected by law. See *Endangered.*

7. REFERENCES

Berejikian, B. A., E. P. Tezak, S. L. Schroder, C. M. Knudsen, and J. J. Hard. 1997. Reproductive behavioral interaction between wild and captively reared coho salmon (*Oncorhynchus kisutch*). ICES Journal of Marine Science, 54:1040-1050.

Bumgarner, J. 1999. Fish Biologist 3, WDFW, Snake River Labs, Personal Communications, November, 1999-December 1999.

Bumgarner, J. 2000. Fish Biologist 3, WDFW, Snake River Labs, Personal Communication. January 4, 2000.

Bumgarner, J., G. Mendel, D. Milks, L. Ross, and J. Dedloff. 1994. LSRCP Tucannon River Spring Chinook Salmon Hatchery Evaluation Program - 1993 Annual Report - to U.S. Fish and Wildlife Service, AFF1/LSR-94-09, Cooperative Agreement 14-16-0001-93539. Washington Department of Fish and Wildlife, Olympia, Washington.

Bumgarner, J., D. Milks, L. Ross, and M. Varney. 1998. LSRCP Tucannon River Spring Chinook Salmon Hatchery Evaluation Program - 1997 Annual Report - to U.S. Fish and Wildlife Service, Cooperative Agreement 14-48-14110-

93-J038. Report # H98-06. Washington Department of Fish and Wildlife, Olympia, Washington.

Bumgarner, J., and M. Schuck. 1999.
Tucannon River Spring and Fall Chinook Salmon Research - 1998 ESA Section-10 Annual Report - Permit #1126 - to National Marine Fisheries Service, Portland, Oregon.

Chapman, D.W., C. Peven, T. Hillman, A. Giorgi, and F. Utter. 1994.
Status of summer steelhead: what do we really know? American Fisheries Society Symposium 15:37-353.

Council (Northwest Power Planning Council). 1994.
Columbia River Basin Fish and Wildlife Program. Northwest Power Planning Council, Portland, Oregon.

Department of the Interior (U.S. Fish and Wildlife Service). 1995.
Federal Register, Part II. July 12, 1995.

Dimmitt, K., and H. Fuss. 1994.
Evaluation of remote site incubators as an enhancement tool: 1994 Progress Report. Washington Department of Fish and Wildlife.

Elliott, C. and R. Pascho. 1993.
Juvenile fish transportation: Impact of bacterial kidney disease on survival of spring/summer chinook salmon stocks. Abstract. National Fisheries Research Center, U.S. Fish and Wildlife Service. Seattle, Washington.

Hastein, T. and T. Lindstad. 1991.
Diseases in wild and cultured salmon: Possible interaction. Aquaculture, 98:277-288.

Mendel, G., J. Bumgarner, K. Petersen, R. Bugert, L. Ross, D. Milks, J. Dedloff, J.B. Shaklee, C. Knutson. 1993.
LSRCP Tucannon River Spring Chinook Salmon Hatchery Evaluation Program - 1992 Annual Report - to U.S. Fish and Wildlife Service, AFF1/LSR-93-06, Cooperative Agreement 14-16-0001-92542. Washington Department of Fisheries, Olympia, Washington.

NMFS (National Marine Fisheries Service). 1992a.
Chinook Salmon Snake River Spring/Summer-run ESU, Listed Threatened, April, 1992. Found at www.nwr.noaa.gov/1salmon/salmesa/chinsrs.htm.

NMFS (National Marine Fisheries Service. 1992b.
Chinook Salmon Snake River Fall-run ESU, Listed Threatened, April, 1992. Found at Found at www.nwr.noaa.gov/1salmon/salmesa/chinsrs.htm.

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

NMFS (National Marine Fisheries Service). 1997.
Steelhead Snake River Basin ESU, Listed Threatened, August 1997. Found at www.nwr.noaa.gov/1salmon/salmesa/chinsrs.htm.

NMFS (National Marine Fisheries Service). 1999a.
Memorandum: Endangered Species Act (ESA) Section 7 Biological Opinion on Washington Department of Fish and Wildlife request for Section 10 Permit to enhance the Propagation or Survival of a Listed Species Under the Endangered Species Act—Tucannon River Spring Chinook Salmon (Snake River Spring/Summer Chinook Salmon). #F/N/WR/1998/00317. June 24, 1999.

NMFS (National Marine Fisheries Service). 1999b.
Statement Letter: Status of Section 10 permit application for the Tucannon River spring chinook salmon supplementation, captive broodstock, and remote site incubator programs. September 17, 1999.

Pearsons, T.N., G.A. McMichael, S.W. Martin, E.L. Bartrand, M. Fischer, and S.A. Leider. 1994.
Yakima River species interaction studies - annual report 1993. Project No. 89-105. Bonneville Power Administration, Portland, OR. 247 pp.

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

Sanders, J.E., J.J. Long, C.K. Arakawa, L. Bartholomew, and J.S. Rohovec. 1992.
Prevalence of *Renibacterium salmoninarum* among downstream migrating salmonids in the Columbia River. J. Aquat. An. Health 4:72-75.

Steward, C.R. and T.C. Bjornn. 1990.
Supplementation of salmon and steelhead stocks with hatchery fish: A synthesis of published literature. *In*: analysis of salmon and steelhead supplementation, William H. Miller editor. Report to BPA, Project No. 88—100. Copies available from BPA Div. of Fish and Wildlife, P.O. Box 3621, Portland, OR 97238-3621.

USFWS (US Fish and Wildlife Service). 1994.
Biological Assessments for operation of USFWS operated or funded hatcheries in the Columbia River Basin, 1995-1998. Submitted with cover letter dated August 2, 1994, from W.F. Shake, USFWS, to B. Brown, NMFS.

USFWS (US Fish and Wildlife Service). 1999.
Memorandum: Modification to LSRCP Biological Assessment and Biological Opinion:

Captive Broodstock Program for Snake River Spring Chinook Salmon. , December 7, 1999.

USACE (U.S. Army Corps of Engineers). 1975.
Special Report: Lower Snake River Fish and Wildlife Compensation Plan. Walla Walla, Washington.

WDFW (Washington Department of Fish and Wildlife). 1996.
Fish Health Manual. Hatcheries Program, Fish Health Division, Washington Dept. Fish and Wildlife, 600 Capital Way N, Olympia, WA 98501-1091. 69 pp.

WDFW (Washington Department of Fish and Wildlife). 1997.
Policy of Washington Department of Fish and Wildlife and Western Washington Treaty Tribes Concerning Wild Salmonids. Adopted by Washington Fish and Wildlife Commission. 46pp.

WDFW (Washington Department of Fish and Wildlife). 1998.
Section 10 Permit Application. Application for a Permit to Enhance the Propagation or Survival of Endangered or Threatened Species Under the Endangered Species Act of 1973. Tucannon River Spring Chinook Salmon/ Snake River Summer Steelhead Hatchery Production Activities. January 26, 1998.

WDFW (Washington Department of Fish and Wildlife). 1999a.
Endangered Species Act-Section 7 Consultation. Tucannon River Spring/Summer Chinook Salmon Supplementation, Captive Broodstock and Remore Site Incubator Programs-1999-2003. Drafted, 1999.

WDFW (Washington Department of Fish and Wildlife). 1999b.
Letter to Joe Krakker, USFWS-LSRCP Office, Boise, ID. October 28, 1999.

WDFW (Washington Department of Fish and Wildlife), Nez Perce Tribe, Confederated Tribes of the Umatilla Indian Reservation, 1999.
Master Plan for Tucannon River Spring Chinook Captive Broodstock Program.

Williams, I.V., and D.F. Amend. 1976.
A natural epizootic of infectious hematopoietic necrosis in fry of sockeye salmon (Oncorhynchus nerka) at Chilko Lake, British Columbia. J. Fish. Res. Board Can. 33:1564-1567.

Witzack, D. 1998
DFW Hurd Creek Hatchery Manager - Dungeness Spring Chinook Captive Broodstock Program, personal communication.

APPENDIX A

TUCANNON RIVER SPRING CHINOOK CAPTIVE BROODSTOCK PROGRAM

MITIGATION ACTION PLAN

	POTENTIAL IMPACT	MONITORING & MITIGATION	PERMIT	RESPONSIBLE PARTY
Water Quantity	Water usage is not expected to exceed quantities allowed by existing permits.	Existing water pipe sizes and pump capacities restricts water usage to within permit allowances.	Water rights permits are already in place.	Washington Department of Fish and Wildlife (WDFW)
Water Quality	**Lyons Ferry:** During pond cleaning, effluent is routed to "off-line" settling basin. Effluent is not expected to exceed existing permit parameters.	Hatchery personnel test water monthly and provide quarterly reports to Washington State Dept. of Ecology.	Effluent Discharge permit is in place. #WAG137006	WDFW
	Tucannon: During pond cleaning effluent is directed into the Tucannon River. Effluent is not expected to exceed existing permit parameters.	Hatchery personnel test water monthly and provide quarterly reports to Washington State Dept. of Ecology.	Effluent Discharge permit is in place. #WAG137017	WDFW
	Curl Lake: Water from the acclimation pond is discharged directly to the Tucannon River. Discharge monitoring of effluent is not required for facilities that are under 20,000 pounds of fish production and 5,000 pounds feed fed/month.	NPDES permit will be required if the production level is exceeded.	NPDES, if required.	WDFW
Bull Trout	There is a low potential that this project may result in competition with, predation on, transmission of diseases to or displacement of bull trout in the river. It is more likely that these activities may enhance the bull trout population by reestablishing historic prey item for the bull trout.	Any bull trout caught in the fish trap will be released.	None. See USFWS 1999.	WDFW
Chinook Salmon (Snake River Spring/Summer -run ESU)	This project is designed to increase the spring run of Chinook in the Tucannon River. Potential for disease transmission between hatchery and listed fish.	Follow guidelines established by PNFHPC and hatchery practices and operations developed by IHOT. Comply with the terms and conditions of the Biological Opinion.	None. See WDFW 1999a.	WDFW

	POTENTIAL IMPACT	MONITORING & MITIGATION	PERMIT	RESPONSIBLE PARTY
Chinook Salmon (Snake River Fall-run ESU)	No effects are expect as captive brood progeny released into the Tucannon River will inhabit separate areas, except for a brief time during smolt migration.	Comply with the terms and conditions of the Biological Opinion.	None.	WDFW
Steelhead (Snake River Basin ESU)	Potential for some steelhead to be taken during broodstock collection. Because they are larger, steelhead are likely to outcompete spring chinook for food and space when they are migrating out of the river.	Release steelhead taken, if any, during broodstock collection. Comply with the terms and conditions of the Biological Opinion.	None. See WDFW 1999a.	WDFW

APPENDIX B

Comments Received on the Preliminary EA

and Responses

Three people commented on the Preliminary EA:

1. Jean B. Jarvis, landowner

2. Bob Jacobs, landowner

3. Rebecca J. Inman, Washington Department of Ecology.

Copies of their comments are included in this appendix. In response to Ms. Jarvis' comments, BPA and WDFW drafted a letter to her, a copy of which is also included in this appendix. We made several additions to the EA in response to her comments; these are noted in the response letter. In response to Mr. Jacobs' comments, a further explanation of the circumstances that have resulted in the decline of the Columbia Basin fishery has been added to the end of Section 1.2, Need for Action. In response to Ms. Inman's comment, WDFW staff member Joe Bumgarner contacted her and confirmed that a shoreline permit is not needed for this project.

BPA and WDFW appreciate the efforts of those who took the time to review the document and submit comments.

Nancy H. Weintraub
Environmental Project Manager
Communications
Bonneville Power Ad. kc-7
P.O. Box 12999
Portland, Or. 97212

C.C.
Greg Baesler
Project Manager

Dear Nancy:

It is discouraging to say the least to be asked for comments on the publication of the "Tucannon River Spring Chinook Captive Broodstock DOE\ea 1326". You have finished building the eight new ponds at LFH. You have collected broodstock since 1997. In other words, you are off and running without any input from general public or particularly from residents along the river. The publication arrived with post mark of March 15th....comments due by March 31th. Decision scheduled for "early April." Am sure that decision already made.

Still let me have my say. You are going to trash the premier Steelhead river in SE Washington. Please remember they are on the Endangered List too. Also have a great population of native "resident" rainbow trout now, along with our share of bull trout, squawfish (both vicious predators}, white fish and a little two inch bullhead called Margined Sculpin that WDFW got put on national SPECIES OF CONCERN list. you can't load this river with another 20,000 lbs of Chinook smolt annually. This river just will not support bank to bank fish overload. Remember it gets real low and warm during the summer months. Please read again page 21 of your own booklet (paragraph 4) re competition. It will all come home to roost as your figures are not even taking into consideration the above diverse populations already present.

We (the farmers along the river) have spent the last 15 years improving the habitat, changing our way of farming and our full share of pool enhancement with logs, plantings, barbs, and jetties. The NWPC has declared it a "MODEL WATERSHED", and used it as an example over and over. We don't need the BPA to come along and make it a nothing river that runs through to the Snake River. It could happen!

Bonneville monies could make hugh difference if it were used on other projects within the watershed. The main problem is with the Tucannon Fish Hatchery sitting upstream. All waste they create in raising trout, steehead and chinook is dumped directly into the Tucannon River. You mention only the hatchery and Curl Lake-but there are three other huge impoundments stuffed to the brim with hatchery trout from March to October, for

public fishing. All excretion, spoiled food and diseases comes roaring down full length of river in October when they drain them annually Regardless of how their waste permits read or how they plan to get additional permits if needed--what is really needed are "offline" settling basins (waste water ponds) such as Lyons Ferry Hatchery has. The hatchery takes a huge amount of water from the Tucannon with their relative junior water right-let them be able to at least return some "instream flow" that is of decent quality.

Realize that WDFW is behind this mad dash toward the potential fiasco. Make them show you their own figures on fish/hour/caught on the Tucannon. It proves that it is the premier steelhead stream in S.E. Washington. They will also have to admit that both Spring & Fall Chinook redds are counted yearly in river as always. Let that natural spawning increase on its own and nature will determine what the carrying capacity should be. Otherwise, you are in real danger of mucking up whole system with dangerous overload of competing bodies in a stream that doesn't even meet Clean Water requirements.

Always feel the common sense doesn't amount to much, versus the will of the bureaucracies--but for what it's worth.

Jean B Jarvis

216 Tucannon Rd
Dayton, Wa. 99328-9631
509 382-2329

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

In reply refer to: KECN-4

May 26, 2000

Ms. Jean Jarvis
216 Tucannon Road
Dayton, WA 99328-9631

Dear Ms. Jarvis:

Thank you for your letter of March 22, 2000, providing comments on the Tucannon River Spring Chinook Captive Broodstock Program Environmental Assessment (EA), DOE/EA-1326. Bonneville Power Administration (BPA) and Washington Department of Fish and Wildlife (WDFW) are providing the following responses in hopes of addressing the concerns you have highlighted in your letter.

Issue: Concern that comments are being requested too late into the program and that decisions are already made.

Response: First, we want to provide some background on the process of the program to date. Beginning back in 1997, WDFW started collecting the juvenile chinook to hold as the captive broodstock population. WDFW did this with the hope they would receive State funding for the project, since other captive broodstock programs had been undertaken in the past by the agency. After failing to acquire the adequate State funding needed for the project, WDFW submitted a proposal in December 1998 to the Northwest Power Planning Council (Council) for funding from BPA under the Council's Fish and Wildlife Plan for Fiscal Year 2000. This proposal, one of over 500 proposals submitted, was recommended for funding after the initial round of review by various State, Federal, and Tribal entities. However, the original funding amount requested was cut, due to competition with other projects. WDFW was able to secure the additional money needed from the U.S. Fish and Wildlife Service to begin the construction of the ponds at Lyons Ferry Hatchery so the fish could continue to be raised. Therefore, in the summer of 1999, the rearing ponds were set in place.

However, the project was far from final approval by the Council and BPA. First, the proponents of the project had to submit a Master Plan. A Master Plan outlines what is going to happen over the project period and any consequences it might have for other species (listed under the Endangered Species Act or not) within the Tucannon River Basin. Along with the Master Plan, WDFW submitted plans for the physical design of the project (ponds, pipes, valves, etc.).

The Master Plan was sent to an Independent Scientific Review Panel for review. After submission of the Master Plan, BPA began the National Environmental Policy Act (NEPA) review and preparation of the EA.

The Independent Scientific Review Panel completed its review of the Master Plan and design in March 2000, and made their recommendations to the Council. On April 4, 2000, the Council accepted the project, but withheld a final recommendation to BPA for funding the project until the EA was completed and either a "Finding of No Significant Impact" was signed or an Environmental Impact Statement was completed. If WDFW is unable to go ahead with this project for any reason, the broodstock fish on hand at Lyons Ferry (1997 and 1998 brood years) may be raised to maturity or will be killed, but no other fish would be collected for the program. Should the fish on hand not be killed, it would mean only a portion of the fish for the designed program would ever be released into the Tucannon River.

Issue: We will be trashing a premier steelhead fishery and affecting other listed species, including steelhead. The river cannot support additional fish; it gets too low and warm in summer.

BPA and WDFW have always acknowledged there are other listed species and species of concern in the project area and that this project may potentially have impacts on them. Since the juvenile spring chinook are smaller than all but the whitefish and margined sculpin, the other species, (steelhead, rainbow, Northern pikeminnow, and bull trout) will all very likely benefit if the project can eventually produce more spring chinook in the river. Spring chinook juveniles are prey items for these species and would provide food for them.

The proposed project will not add another 20,000 pounds of spring chinook smolts annually. The 20,000 pounds would be the maximum ever produced from a combination of both the proposed project and the approximately 9,000 pounds produced annually by the existing hatchery supplementation program. So the proposed project would release an additional 10,000-11,000 pounds of spring chinook smolts into the river annually. While this increased production would double the poundage of spring chinook smolts released into the Tucannon each year, the increase in spring chinook production would be less than one-quarter of the poundage of summer steelhead (about 40,000 pounds) released annually into the Tucannon. If the Tucannon were being overloaded with the total poundage of fish being released, WDFW would need to consider reducing the hatchery steelhead production, because it is much larger than the spring chinook production, and because the prevention of extinction of the threatened spring chinook has a higher priority than supplying hatchery steelhead for a fishery (the hatchery steelhead are not listed, only the wild steelhead are).

Additionally, the juvenile fish that will be released into the river are smolts. Smolts are the migrating stage of salmonids; once released into the river, they will immediately begin moving downstream from their release point. Based on the WDFW operation of a smolt trap on the lower Tucannon River annually since 1986, greater than 90 percent of the spring chinook smolts

released into the system have left the river by late May. Therefore the low river flow and high summer temperatures will not occur during the time when these fish are in the river.

Issue: Local people have been working with the Model Watershed program to improve habitat in the stream for 15 years. Don't need BPA to come along and make it a nothing river.

BPA and WDFW have greatly appreciated the concerted effort of the Tucannon River landowners over the years in improving habitat within the stream. Both BPA and WDFW hope this habitat improvement continues into the future, not only for the success of this proposed project, but also for the benefit of all the other listed and threatened species in the river.

The "Tucannon Model Watershed Program" is a BPA-funded project that was recommended by the Council. So BPA is already greatly involved in the habitat restoration efforts in the Tucannon River.

BPA, WDFW, and the Council believe that the Tucannon Model Watershed habitat program and the captive broodstock program will be mutually beneficial, as the habitat needed by the spring chinook will be in place when the juvenile fish eventually return as adults, and the captive broodstock program will help return an important component of the original species found in the river.

Issue: The Tucannon Hatchery is a problem because waste from it is dumped directly into the river. Not only the hatchery and Curl Lake, but three other lakes for public fishing stocked with rainbow trout are drained directly into the river in October each year, along with excretion, spoiled food, and diseases. Really need offline settling basins like Lyon's Ferry Hatchery.

It is true that the Tucannon Hatchery does not have an offline settling basin, nor do any of the eight lakes stocked for rainbow trout fishing in the basin. However, the discharge water is tested monthly and within Washington State effluent standards. Also, once the trout are placed in the lakes for the fisheries they are not fed, so there is no spoiled food collecting in the lakes. In addition, since it would be in violation of the State's Fish Health Policy to release fish with known diseases, the fish released into the lakes are tested before their release. The effluent from these lakes is therefore basically clean. It is true that some of the lakes are drained each year (Deer, Beaver/Watson, and Curl). However, they are not "drained" in the typical sense (piping off the water directly into the river). Each October, the water supply to each lake is shut off, and the majority of water in each lake drains by seepage through the ground, which acts as a biological filter.

Issue: WDFW is behind this. They know the Tucannon is the premier steelhead stream in southeastern Washington. They find spring and fall chinook redds in the river every year. Let natural spawning increase the spring chinook to the natural carrying capacity.

WDFW agrees that the Tucannon River is one of the premier steelhead streams in southeastern Washington, and they would like to keep it that way. However, this is mainly due to the 160,000 smolts (40,000 pounds) of hatchery steelhead that are released annually into the river. Without this hatchery release, the steelhead fishery in the Tucannon River would likely decrease to nothing.

WDFW does not deny that spring and fall chinook redds are counted yearly in the river. However, the number of spring chinook redds in recent years has reached record lows (1995 had 5 total redds in the river, compared to 200 redds in 1992). That is the main reason WDFW has brought forth this proposal for funding by BPA.

The carrying capacity of the Tucannon River is well below the historical levels it once maintained in the 1950s (estimated annual escapement of 2,000 spring chinook alone). However, due to various factors, the run declined. Based on data collected by WDFW over the last 15 years, the spring chinook population in the river is below replacement. That is, for every adult spawner that comes back to the river, it will only produce 0.7 fish to come back as an adult in the future. Essentially, it is the formula for extinction. Since the spring chinook are listed under the Endangered Species Act, and have been genetically identified as a unique population within the Snake River Basin, WDFW has been mandated by the National Marine Fisheries Service to do everything possible to prevent the extinction of the species within the river. Hence, this is a last-ditch effort by WDFW to save this run of spring chinook from extinction.

We hope that the detailed responses above will clear up any misunderstandings about the project and its relationship to the watershed. Again, we thank you for your comments and questions regarding this project and the role of BPA. Please feel free to call with any other comments or to discuss any items further. Joe Bumgarner, the WDFW Biologist, can be reached at 509-382-4755 or 382-1710. I can be reached toll-free at 1-800-282-3713, or at my e-mail address nhweintraub@bpa.gov.

Sincerely,

/s/ Robert W. Beraud for

Nancy Weintraub
Environmental Specialist

cc:
J. Bumgarner, WDFW

BPA F 1210.02e
(08-99)

Electronic Form Approved by CIL – 08/10/1999

U.S. DEPARTMENT OF ENERGY
BONNEVILLE POWER ADMINISTRATION
800 TELEPHONE LOG

LOG NO.	DATE	RECEIVED BY BPA PUBLIC INVOLVEMENT
	3/28/00	LOG# TR-SC-002
	TIME	RECEIPT DATE:
	3PM	APR 04 2000

NAME
Bob Jacobs

FIRM (IF APPLICABLE)

ADDRESS
did not give

PHONE NO.	CALL RECEIVED BY
509-545-6310	**Nancy Weintraub**

INFORMATION REQUESTED/COMMENT

Jacobs wanted to comment on the Tucannon Preliminary EA. He is a rancher with a small ranch on the Tucannon. His main concern was that the EA fails to mention some of the activities, in addition to the hydrosystem development and operation, that have contributed to the decline of fish populations in the Tucannon. He specifically mentioned reports he has seen on public television or the Discovery Channel regarding the massive impacts of harvest by both foreign and domestic ocean drift nets and factory trawlers. He mentioned also Indian harvest in the river, cyclical predation by sea lions and Caspian terns, diseases, ocean conditions and weather. He stated that the dams have been there for 30 years, so why the decline now? Also, why are rivers without dams also having declining runs?
In sum, he asked that we mention these other factors in the decline of fish in the final EA.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
P.O. Box 47600 • Olympia, Washington 98504-7600
(360) 407-6000 • TDD Only (Hearing Impaired) (360) 407-6006

March 31, 2000

Ms. Nancy H. Weintraub
Bonneville Power Administration
PO Box 3621
Portland OR 97208-3621

Dear Ms. Weintraub:

Thank you for the opportunity to comment on the preliminary environmental assessment for the Tucannon River Spring Chinook Captive Broodstock Program (DOE/EA-1326). We have reviewed the document and have the following comment.

From the information provided, it appears that a shoreline permit will be required. Please contact the appropriate County Planning Office or call Mr. Michael Maher with Ecology's Shorelands and Environmental Assistance Program at (509) 625-5185.

Sincerely,

Rebecca J. Inman

Rebecca J. Inman
Environmental Coordination Section

#00-1610

cc: Michael Maher, ERO
Heidi Renz, ERO

Bonneville Power Administration
PO Box 3621 Portland, Oregon 97208-3621
DOE/BP-3302 MAY 2000 165