# HATCHERY AND GENETIC MANAGEMENT PLAN (HGMP)

| | |
|---|---|
| Hatchery Program: | **Touchet River Spring Chinook** |
| Species or Hatchery Stock: | Carson Stock Spring Chinook Salmon |
| Agency/Operator: | Washington Department of Fish and Wildlife |
| Watershed and Region: | Touchet River, Walla Walla River Basin, Mid-Columbia River Region |
| Date Submitted: | May 21, 2018 |
| Date Last Updated: | May 21, 2018 |

# Executive Summary

The Washington Department of Fish and Wildlife (WDFW) is submitting a Hatchery and Genetic Management Plan (HGMP) for the Touchet River Spring Chinook Salmon Program to the National Marine Fisheries (NMFS) for consultation under Limit 6 of the 4(d) rule of the Endangered Species Act (ESA). NMFS will use the information in this HGMP to evaluate the hatchery impacts on salmon and steelhead listed under the ESA. The primary goal of an HGMP is to devise biologically-based hatchery management strategies that ensure the conservation and recovery of ESA listed salmon and steelhead populations.

The purpose of the program is to produce spring Chinook for recreational and tribal fisheries in the mainstem Columbia River, and within the Walla Walla River basin. Program fish will be released in the North Fork or Mainstem Touchet River (WRIA 32). The program will annually release 250,000 yearlings spring Chinook (Carson Stock) to the Touchet River with releases occurring in early to mid-April. One-hundred percent of the fish will be adipose clipped and a portion (~1/3) will be coded wire tagged and ~6% will be Passive Integrated Transponder (PIT) tagged for estimating survival, fisheries contribution, and straying into other streams.

This spring Chinook HGMP is built around the basic principles and recommendations of the Hatchery Scientific Review Group (HSRG). These principles and recommendations represent the best science available for operating hatchery facilities consistent with the conservation of listed salmonid species. The program will be operated as a "segregated" program, as defined by the HSRG. A "segregated" program is generally one in which only hatchery-origin individuals are used in the hatchery broodstock. However, since we expect some natural production to occur within the Touchet River, and there are no ESA listed spring Chinook in the Touchet River (considered extinct from the basin nearly 100 years ago), future broodstock will consist of both clipped and non-clipped fish.

Touchet River summer steelhead are listed as "Threatened" under the ESA in the Mid-Columbia River Distinct Population Segment (DPS). Bull Trout in the Touchet River are listed under the ESA.

**Broodstock Collection:**
Initial broodstock collection will come from Carson National Fish Hatchery (NFH), and future broodstock collection will occur at the Dayton Adult Trap on the Touchet River. Initially, the program will collect green eggs and semen from Carson NFH, with gametes transported back to Lyons Ferry Hatchery (LFH). Fertilization, incubation and all rearing will take place (LFH) on the Snake River. Once fish start returning to the Touchet River, the plan it collect broodstock at the Dayton Adult Trap, with adults transported to LFH for holding and spawning. The current egg-take goal is 285,000 at either Carson NFH, or in the future at LFH; up to 88 adult pairs may be collected for broodstock. Surplus hatchery fish in excess of broodstock needs will be passed upstream of the Dayton Adult Trap in the Touchet River per agreement with the co-managers.

**Harvest:**
The program will produce salmon for harvest in regional recreational fisheries in the Ocean, mainstem Columbia River, and the Walla Walla basin that are of high value to the State of Washington. Adult fish produced also help meet tribal fishery harvest allocations that are guaranteed through treaties, as affirmed in *U.S. v. Oregon* (1968). Program-origin salmon also help meet Pacific Salmon Treaty harvest sharing agreements with Canada. These harvest objectives are met in a manner that minimizes diverse effects on listed fish.

Program performance (survival) is not currently known. However, based on other survivals from spring Chinook programs in the area (Umatilla River in Oregon), we anticipate smolt-to-adult return (SAR) of 0.55%. With a program release of 250,000 smolts targeted, we would expect 1,375 adults returning on average.

**Monitoring and Evaluation:**

Harvest performance indicators include continuing to mass-mark (adipose fin-clip and/or coded-wire tag). Coded-wire tag recoveries will also help determine stray rate contributions on spawning grounds in watersheds in close proximity to this program's release site (e.g. Tucannon River in SE Washington). PIT Tags will also be used to estimate overall hatchery performance and for determining stray effects.

# SECTION 1. GENERAL PROGRAM DESCRIPTION-

## 1.1) Name of hatchery or program.

Touchet River Spring Chinook Program

## *1.2) Species and population (or stock) under propagation, and ESA status.*

Carson stock spring Chinook salmon (*Oncorhynchus tshawytscha*) – not ESA listed

## *1.3) Responsible organization and individuals*

**Name (and title):** Chris Donley, Region 1 Fish Program Manager
**Agency or Tribe:** Washington Department of Fish and Wildlife
**Address:** 2315 North Discovery Place, Spokane Valley, WA 99216
**Telephone:** (509) 892-1001 x307
**Fax:** (509) 921-2440
**Email:** Christopher.Donley@dfw.wa.gov

**Name (and title):** Ace Trump, Lyons Ferry Hatchery Complex Manager
**Agency or Tribe:** Washington Department of Fish and Wildlife
**Address:** PO Box 278, Starbuck, WA 99359
**Telephone:** (509) 646-9201, or 646-3454
**Fax:** (509) 646-3400
**Email:** Ace.Trump@dfw.wa.gov

**Name (and title):** Jeremy Trump, District Fish Biologist
**Agency or Tribe:** Washington Department of Fish and Wildlife
**Address:** 529 W. Main Street, Dayton, WA 99328
**Telephone:** (509) 382-1005
**Fax:** (509) 382-1267
**Email:** Jeremy.Trump@dfw.wa.gov

**Name (and title):** Joe Bumgarner, Hatchery Monitoring and Evaluation Biologist
**Agency or Tribe:** Washington Department of Fish and Wildlife
**Address:** 401 S. Cottonwood, Dayton, WA 99328
**Telephone:** (509) 382-1004
**Fax:** (509) 382-2427
**Email:** Joseph.Bumgarner@dfw.wa.gov

Other agencies, Tribes, co-operators, or organizations involved, including contractors, and extent of involvement in the program: CTUIR is a sub-basin co-manager.

**Name (and title):** Gary James, Fisheries Program Manager
**Agency or Tribe:** Confederated Tribes of the Umatilla Indian Reservation

**Address:** 46411 Timine' Way, Pendleton, OR 97801
**Telephone:** 541-429-7285
**Fax:** Same as telephone number
**Email:** garyjames@ctuir.com

## *1.4) Funding source, staffing level, and annual hatchery program operational costs.*

Lyons Ferry Hatchery (LFH) is funded primarily by the United States Fish and Wildlife Service (USFWS) under the Lower Snake River Compensation Plan (LSRCP). LFH has an overall staff of 13 full time employees with no additional seasonal personnel. The Touchet spring Chinook program will be funded under LSRCP with an estimated initial operating budget of $125,000. Additional funding may be required to cover additional broodstock hauling needs from the Dayton Adult Trap to LFH, and limited spawning ground surveys in the Touchet River. Creel monitoring and any other natural production monitoring of juveniles or smolts will be covered with non-LSRCP funding sources.

## *1.5) Location(s) of hatchery and associated facilities.*

The locations of the hatchery facilities in the program are as follows:

Initial Holding, Spawning, and Incubation
Carson National Fish Hatchery (NFH) is located at RM 18.0 of the Wind River, Skamania County, Washington within the Columbia River basin.

Long Term Holding, Spawning, Incubation, Rearing and Marking
Lyons Ferry Hatchery is located at RM 58 of the Snake River in Franklin County, Washington.

Release
Direct stream release (250,000) in the Touchet River. Actual release locations have yet to be determined, but are being proposed for near the city of Dayton (mainstem Touchet River), North Fork Touchet River (Wolf Fork Road Bridge), and in the Wolf Fork of the Touchet River (8-10 miles upstream from the Wolf Fork mouth) – Figure 1.

Trapping
Dayton Adult Trap (DAT) is located at RM 53.3 of the Touchet River in the city of Dayton, Columbia County, Washington.

## *1.6) Type of program.*

Segregated Harvest.

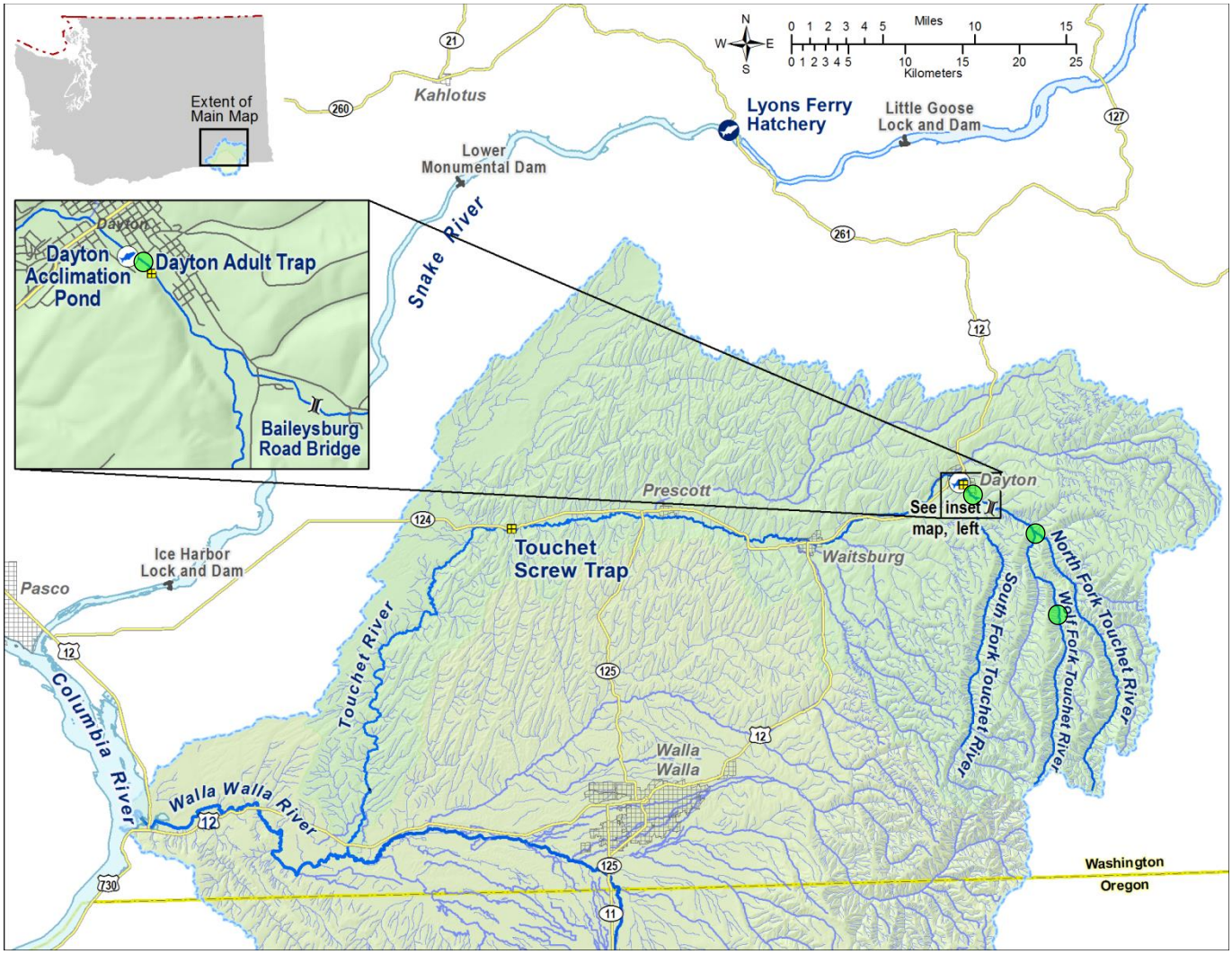



**Figure 1. Map of the Touchet River Basin, Lyons Ferry Hatchery, and Dayton Adult Trap. Map Source: WDFW GIS Staff 2017. Potential release locations indicated by green circles.**

## *1.7) Purpose (Goal) of program.*

The purpose of the hatchery program is to help reach the LSRCP mitigation goal for Snake River spring Chinook by providing harvest in the mainstem Walla Walla and Touchet rivers, as well as downriver fisheries in the Columbia River mainstem.

## *1.8) Justification for the program.*

This hatchery program is part of the LSRCP. Legislation under the Water Resources Act of 1976 authorized the establishment of the LSRCP to replace adult salmon, steelhead, and rainbow trout lost by construction and operation of four hydroelectric dams on the Lower Snake River in Washington (USACE 1975). Specifically, the stated purpose of the plan is:

*"…[to]…provide the number of salmon and steelhead trout needed in the Snake River system to help maintain commercial and sport fisheries for anadromous species on a sustaining basis in the Columbia River system and Pacific Ocean"* (NMFS & FWS 1972 pg. 14).

The LSRCP mitigation goal for spring Chinook is 58,700. This goal has never been reached and additional production is needed to meet it. Adding LSRCP mitigation in the Walla Walla and Touchet river basin, even though they are outside the Snake River project area, has been implemented for summer steelhead under WDFW's LSRCP mitigation program since 1983. This precedent has been set and has counted towards WDFW summer steelhead mitigation to the project area, and therefore should also be applied to this proposed spring Chinook program for WDFW and the LSRCP.

## *1.9) List of program "Performance Standards".*

The hatchery program will be operated to achieve performance standards as listed in Table 1 below.

**Table 1. Performance standards of Touchet Spring Chinook program.**

| Performance Standard | Definition |
|---|---|
| Achieve Best Management Hatchery Practices | Culture practices developed by the co-managers to increase life-stage specific survival rates, protect the genetic resources of the cultured population, produce a high quality rearing environment, and achieve effluent discharge standards. |
| Produce High Quality Smolts | High quality smolts are defined as having similar behavioral traits and survival rates of naturally produced smolts. |
| Achieve Production Target(s) | Collect adults, culture eggs and parr, and release the number of juveniles required to achieve yearly production targets. |
| Achieve Harvest Objectives | Provide for sport, commercial and tribal harvest of spring Chinook on an annual basis. |
| Minimize Program Impacts to ESA-listed species | Hatchery operations, fish releases and the harvest of those fish have minimal (or acceptable) impacts to ESA-listed fish. |

## *1.10) List of program "Performance Indicators*

The following (Table 2) lists the performance indicators addressing both benefits and risks;

**Table 2. Table of Standards and Indicators for Touchet spring Chinook.**

| Category | Standards | Indicators |
|---|---|---|
| 1. LEGAL MANDATES | 1.1. Program contributes to fulfilling tribal trust responsibility mandates and treaty rights, as described in applicable agreements such as under U.S. v. OR and U.S. v. Washington. | 1.1.1. Total number of fish harvested in Tribal fisheries targeting this program.<br>1.1.2. Total fisher days or proportion of harvestable returns taken in Tribal tributary fisheries.<br>1.1.3.Tribal acknowledgement regarding fulfillment of tribal treaty rights. |
| | 1.2. Program contributes to mitigation requirements. | 1.2.1.Number of fish released by program, returning, or caught, as applicable to given mitigation requirements. |
| | 1.3. Program addresses ESA responsibilities. | 1.3.1.Section 7, Section 10, 4d rule and annual consultation. |

| Category | Standards | Indicators |
|---|---|---|
| 2. IMPLEMENTATION AND COMPLIANCE | 2.1. Program contributes to mitigation requirements. | 2.1.1. Hatchery is operated as a segregated program. |
| | 2.2. Program addresses ESA responsibilities. | 2.2.1. Hatchery fish can be distinguished from natural origin fish. |
| | 2.3. Restore and maintain treaty-reserved tribal and non-treaty fisheries. | 2.3.1. Hatchery adult returns are produced at a level of abundance adequate to support fisheries in most years. |
| | 2.4. Fish for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while avoiding over-harvest of non-target species. | 2.4.1. Number of fish release by location estimated and in compliance with AOPs and US vs. OR Management Agreement.<br>2.4.2. Number of adult returns by release group harvested and reported.<br>2.4.3. Number of non-target species encountered in fisheries for targeted release group. |
| | 2.5. Hatchery incubation, rearing, and release practices are consistent with current best management practices for the program type. | 2.5.1. Juvenile rearing densities and growth rates are monitored and reported.<br>2.5.2. Numbers of fish per release group are known and reported.<br>2.5.3. Average size, weight and condition of fish per release group are known and reported.<br>2.5.4. Date, acclimation period (if applicable), and release location of each release group are known and reported. |
| | 2.6. Hatchery production, harvest management, and monitoring and evaluation of hatchery production are coordinated among affected co-managers. | 2.6.1. Production adheres to plans, documents developed by regional co-managers (e.g. US vs. OR Management agreement, AOPs etc.).<br>2.6.2. Harvest management, harvest sharing agreements, broodstock collection schedules, and disposition of fish trapped at hatcheries in excess of broodstock needs are coordinated among co-management agencies.<br>2.6.3. Co-managers react adaptively by consensus to monitoring and evaluation results.<br>2.6.4. Monitoring and evaluation results are reported to co-managers and regionally in a timely fashion. |
| 3. HATCHERY EFFECTIVENESS MONITORING REGIONAL FOR AUGMENTATION AND SUPPLEMENTATION PROGRAMS | 3.1. Release groups are marked in a manner consistent with information needs and protocols for monitoring impacts to natural- and hatchery-origin fish at the targeted life stage(s) (e.g. in juvenile migration corridor, in fisheries, etc.). | 3.1.1. All hatchery origin fish recognizable by mark or tag and representative known fraction of each release group marked or tagged uniquely.<br>3.1.2. Number of unique marks recovered per monitoring stratum sufficient to estimate number of unmarked fish from each release group with desired accuracy and precision. |
| | 3.2. Fish for harvest are produced and released in a manner enabling effective harvest, as described in all applicable fisheries management plans, while avoiding over-harvest of non-target species. | 3.2.1. Number of fish release by location estimated and in compliance with AOPs and US vs. OR Management Agreement.<br>3.2.2. Number of adult returns harvested<br>3.2.3. Number of non-target species encountered in fisheries for targeted release group. |
| | 3.3. Effects of strays from hatchery programs on non-target and same species populations remain within acceptable limits. | 3.3.1. Hatchery strays do not exceed 10% of the abundance of any out-of-basin natural population. |
| | 3.4. The distribution and incidence of diseases, parasites and pathogens in natural populations and hatchery populations are known and releases of hatchery fish are designed to minimize potential spread or amplification of diseases, parasites, or pathogens among natural populations. | 3.10. Detectable changes in rate of occurrence and spatial distribution of disease, parasite or pathogen in both the hatchery and natural populations. |
| 4. OPERATION OF ARTIFICIAL PRODUCTIO N FACILITIES | 4.1. Artificial production facilities are operated in compliance with all applicable fish health guidelines and facility operation standards and protocols such as those described by IHOT, PNFHPC, the Co-Managers of Washington Fish Health Policy, INAD, and MDFWP. | 4.1.1. Annual reports indicating level of compliance with applicable standards and criteria. |

| Category | Standards | Indicators |
|---|---|---|
| | 4.2. Effluent from artificial production facility will not detrimentally affect natural populations. | 4.2.1. Discharge water quality compared to applicable water quality standards and guidelines, such as those described or required by NPDES, IHOT, PNFHPC, and Co-Managers of Washington Fish Health Policy tribal water quality plans, including those relating to temperature, nutrient loading, chemicals, etc. |
| | 4.3. Water withdrawals and instream water diversion structures for artificial production facility operation will not prevent access to natural spawning areas, affect spawning behavior of natural populations, or impact juvenile rearing environment. | 4.3.1. Water withdrawals compared to applicable passage criteria.<br>4.3.2. Water withdrawals compared to NMFS, USFWS, and WDFW juvenile screening criteria.<br>4.3.3. Number of adult fish passing water intake point.<br>4.3.4. Proportion of diversion of total stream flow between intake and outfall. |
| | 4.4. Releases do not introduce pathogens not already existing in the local populations, and do not significantly increase the levels of existing pathogens. | 4.4.1. Certification of juvenile fish health immediately prior to release, including pathogens present and their virulence.<br>4.4.2. Juvenile densities during artificial rearing.<br>4.4.3. Samples of natural populations for disease occurrence before and after artificial production releases. |
| | 4.5. Weir/trap operations do not result in significant stress, injury, or mortality in natural populations. | 4.5.1. Mortality rates in trap.<br>4.5.2. Prespawning mortality rates of trapped fish in hatchery or after release. |
| | 4.6. Predation by artificially produced fish on naturally produced fish does not significantly reduce numbers of natural fish. | 4.6.1. Size at, and time of, release of juvenile fish, compared to size and timing of natural fish present. |
| **5. SOCIO-ECONOMIC EFFECTIVENESS** | 5.1. Cost of program operation does not exceed the net economic value of fisheries in dollars per fish for all fisheries targeting this population. | 5.1.1. Total cost of program operation.<br>5.1.2. Sum of ex-vessel value of commercial catch adjusted appropriately, appropriate monetary value of recreational effort, and other fishery related financial benefits. |
| | 5.2. Juvenile production costs are comparable to or less than other regional programs designed for similar objectives. | 5.2.1. Total cost of program operation.<br>5.2.2. Average total cost of activities with similar objectives. |
| | 5.3. Non-monetary societal benefits for which the program is designed are achieved. | 5.3.1. Number of adult fish available for tribal ceremonial use.<br>5.3.2. Recreational fishery angler days, length of seasons, and number of licenses purchased. |

## 1.10.1) "Performance Indicators" addressing benefits

See Table 2 above.

## 1.10.2) "Performance Indicators" addressing risks.

See Table 2 above.

# *1.11) Expected size of program.*

## 1.11.1) Proposed annual broodstock collection level (maximum number of adult fish).

It is estimated that 150-176 total adults (75–88 females depending on fecundity) will be required for brood, with 134-150 total adults spawned (67-75 females) to get 285,000 eggs, which will produce the total program of 250,000 yearling smolts. Numbers are based on a 1:1 spawning ratio, and assumes a 10% pre-spawning mortality level, and ~10% green egg to smolt mortality rate.

### 1.11.2) Proposed annual fish release levels (maximum number) by life stage and location.

The goal is to release 250,000 (275,000 maximum – takes into account an allowed 10% overage) smolts into the upper Touchet River basin. Also, see Section 1.5, and the table in Section 10.

## *1.12) Current program performance, including estimated smolt-to-adult survival rates, adult production levels, and escapement levels. Indicate the source of these data.*

The proposed hatchery program is new and there is no smolt-to-adult return (SAR) data for spring Chinook in the Touchet River on which to base performance. The assumption used in this proposal was taken from the Confederated Tribes of the Umatilla Indian Reservation (CTUIR) HGMP for their proposed Walla Walla Hatchery (which includes a Touchet release component), was an average SAR of 0.55 percent. If we use the same assumption for this program, the resultant adult return would provide an average escapement of 1,375 hatchery adults returning to the Walla Walla/Touchet River.

Clarke et al. (2016) have been tracking spring Chinook (Carson stock) released into the Umatilla River since 1988. Smolt-to-Adult returns from that program have averaged 0.42%, 0.43%, and 0.54%, for the entire history, last 10-years, and last 5-years of that program, respectively. Certain aspects of the Umatilla River program are different than what is being proposed here. Due to these program differences, WDFW is expecting to have slightly higher survival as a result.

## *1.13) Date program started (years in operation), or is expected to start.*

The plan is to collect eggs from brood year 2017, with first releases under the proposed program anticipated in 2019.

## *1.14) Expected duration of program.*

The program would be expected to continue for the foreseeable future.

## *1.15) Watersheds targeted by program.*

Target watershed is the Touchet River (Walla Walla Sub-basin) within the Mid-Columbia River Region.

## *1.16) Indicate alternative actions considered for attaining program goals, and reasons why those actions are not being proposed.*

Additional production alternatives have been considered towards meeting the LSRCP spring Chinook mitigation goal and help reach the Washington component of that goal:

1) Increased production for the Tucannon River – ESA restrictions do not allow for any additional hatchery production increases in the Tucannon program at this time.

2) Increased production for the Clearwater River – provides limited harvest benefits to the people of Washington except as a pass through fishery.

3) Initiate Asotin Creek program – current disagreement among co-managers as to appropriate stock. Tucannon stock has been identified by NMFS for reintroduction, but Tucannon population is not currently in a position to provide for another program.

4) Initiate Lower Grande Ronde program – choice of stock to use is in question, and potential release points to limit any negative effects to the Wenaha River. The fishery would target near the mouth of the Grande Ronde, or near WDFW's Cottonwood Acclimation Pond below the Oregon State line.

5) Reliance on Walla Walla Hatchery – being constructed under the BPA Fish and Wildlife program and does not have LSRCP funding and/or mitigation tied to it.

# SECTION 2. PROGRAM EFFECTS ON NMFS ESA-LISTED SALMONID POPULATIONS (Non-Salmonid Species are addressed in Section 15).

## *2.1) List all ESA permits or authorizations in hand for the hatchery program.*

No permits specific to the proposed program have been issued.

## *2.2) Provide descriptions, status, and projected take actions and levels for ESA-listed natural populations in the target area.*

### 2.2.1) Description of ESA-listed salmonid population(s) affected by the program.

ESA-listed species that may be potentially affected by the program are as follows:

- Walla Walla River summer steelhead (*Oncorhynchus mykiss*) (Mid-Columbia DPS)
- Tucannon Spring/Summer Chinook salmon (*Oncorhynchus tshawytscha*) (Snake River ESU)
- Bull Trout (*Salvelinus confluentus*) (Columbia River DPS) – see Section 15

The Tucannon spring Chinook population is the closest ESA listed spring/summer Chinook population to the target area. There has been one coded wire-tag recovery to date in the Tucannon River from the current CTUIR/USFWS Walla Walla hatchery releases, no hatchery origin PIT tag recoveries, but one wild origin PIT tag detection (Michael Gallinat, personal communication 2017). Whether or not these recoveries represent normal straying rates is unclear and will continue to be monitored. Based on the limited information to date, little impact is expected from this proposed program on the Tucannon River spring Chinook population. However, the mangers have planned for adequate tagging (CWT and PIT tags) of these fish to detect them should they show up in the Tucannon River, or other sensitive

locations. Based on results from these tagging and monitoring efforts, managers can adjust productions if necessary in the future.

## Identify the ESA-listed population(s) that will be directly affected by the program.

The program will not directly affect any ESA-listed fish population.

## Identify the ESA-listed population(s) that may be incidentally affected by the program.

### Walla Walla River summer steelhead (*Oncorhynchus mykiss*) (Mid-Columbia DPS)

The Walla Walla River basin native summer steelhead population is thought to be depressed from historical levels, and has been listed as Threatened under ESA since 1997. This stock is part of the Mid-Columbia River steelhead Distinct Population Segment (DPS). There are two distinct populations of Walla Walla summer steelhead identified by the Interior Columbia Technical Recovery Team (TRT) (2004); Touchet River and Walla Walla River (which comprises the remainder of the Walla Walla subbasin excluding the Touchet River system).

**Age Class Structure and Size Ranges** *(Source: Mahoney et al. 2015)*

Life history tables of summer steelhead were compiled from Walla Walla Sub-basin literature to show the current distribution and diversity of timing of stream use by life stage. Based on scale ages, Walla Walla and Touchet River steelhead populations exhibit somewhat dissimilar life-histories (Table 3). In general, Walla Walla steelhead returned as age 2.2, 2.3, and 3.2 (86%) having spent two or three years in fresh water and two or three in salt water; Touchet fish, returned as age 2.1 and 2.2 fish (80%) having spent two years in fresh and one or two years in salt water. Other life-history strategies were rare in both basins.

**Table 3. Percent of sample by age designation for summer steelhead adults.**

| | Life-History Pattern Designation (Percent of Sample) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Return Year | 1.1 | 1.2 | 2.1 | 1.3 | 2.2 | 3.1 | 2.3 | 3.2 | 3.3 | 2.4 | Repeat Spawners |
| ODFW 1992-1995[a] | | | 20% | | 61% | 6% | 2% | 11% | | 1% | 7% |
| CTUIR 2005-2010[b] | 2% | 6% | 6% | 2% | 47% | 2% | 17% | 22% | 2% | | 6% |
| WDFW 1994-2013[c] | 2% | 5% | 41% | | 35% | 8% | | 5% | | | 5% |

[a] Life history pattern based on scales taken from adult returns at Nursery Bridge Dam. [b] Ages of adult summer steelhead based on scales taken from JV outmigrants PIT tagged at the WWR rotatory trap and adult PIT-returns. [c] Ages of adult summer steelhead collected from the Touchet River Trap near Dayton Washington (Bumgarner and Dedloff 2015).

Lengths of 225 radio-tagged adult steelhead captured in the Walla Walla River by CTUIR from 2002-2005 ranged from 50 to 90 cm and averaged 65 cm (**Error! Reference source not found.**4; Schwartz et al. 2005, Mahoney et al. 2006). A similar result has been observed for steelhead captured at Dayton Adult Trap (DAT) as well (Table 4), though the Touchet endemic hatchery stock are more similar in return size to natural origin fish.

**Table 4. Average fork lengths of adult steelhead captured in the Walla Walla River by CTUIR 2002-2005 (adapted from Mahoney 2003, Mahoney et al. 2006), or from the Dayton Adult Trap (1994-2013) – WDFW Snake River Lab data files.**

| | Average Length | Range (cm) | n | Average Length | Range (cm) | n |
|---|---|---|---|---|---|---|
| Group | Walla Walla River Steelhead | | | Dayton Adult Trap Steelhead | | |
| All Steelhead | 64.6 | 50-90 | 225 | 63.7 | 44-89 | 3,806 |
| Hatchery Steelhead (Lyons Ferry) | 62.7 | 50-87 | 82 | 60.5 | 44-81 | 438 |
| Hatchery Steelhead (Touchet) | | | | 63.3 | 48-80 | 589 |
| Natural Steelhead | 65.6 | 50-90 | 143 | 64.3 | 45-89 | 2,796 |

**Sex Ratio of Natural Steelhead**

WDFW has trapped natural and hatchery origin fish from the DAT since the late 1980's. The percent females of natural steelhead adults captured at DAT has averaged 64% and ranged from 54% to 75% from 2003 to 2012 (Table 5). This skewed sex ratio is typical among steelhead populations in the Columbia River basin (Joe Bumgarner WDFW personal communication).

**Table 5. The number of steelhead captured at Dayton Adult Trap by origin and gender from 2003/04 to 2012/13 Run Years (WDFW unpublished data).**

| | Natural Steelhead | | | | | Hatchery Steelhead (Touchet Stock) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Total | % | % | | Total | Total | % | % | Total |
| Year | F | M | F | M | Total | F | M | F | M | Total |
| 2003-04 | 74 | 28 | 72.5% | 27.5% | 102 | 6 | 11 | 35.3% | 64.7% | 17 |
| 2004-05 | 49 | 41 | 54.4% | 45.6% | 90 | 7 | 5 | 58.3% | 41.7% | 12 |
| 2005-06 | 106 | 65 | 62.0% | 38.0% | 171 | 29 | 8 | 78.4% | 21.6% | 37 |
| 2006-07 | 118 | 39 | 75.2% | 24.8% | 157 | 36 | 18 | 66.7% | 33.3% | 54 |
| 2007-08 | 87 | 36 | 70.7% | 29.3% | 123 | 21 | 7 | 75.0% | 25.0% | 28 |
| 2008-09 | 96 | 53 | 64.4% | 35.6% | 149 | 48 | 27 | 64.0% | 36.0% | 75 |
| 2009-10 | 339 | 274 | 55.3% | 44.7% | 613 | 118 | 53 | 69.0% | 31.0% | 171 |
| 2010-11 | 250 | 93 | 72.9% | 27.1% | 343 | 43 | 14 | 75.4% | 24.6% | 57 |
| 2011-12 | 116 | 62 | 65.2% | 34.8% | 178 | 33 | 17 | 66.0% | 34.0% | 50 |
| 2012-13 | 131 | 66 | 66.5% | 33.5% | 197 | 64 | 23 | 73.6% | 26.4% | 87 |
| **Average** | **137** | **76** | **64.3%** | **38.4%** | **212** | **41** | **18** | **68.9%** | **31.1%** | **59** |

**Spawning Distribution and Timing**

Natural origin adult summer steelhead are believed to enter the Walla Walla River as early as June (approximately one-year prior to the year they spawn), and as late as May of the year they spawn, depending on stream flows and water temperatures. Low flows in the lower Walla Walla and Touchet rivers may prevent or inhibit adult steelhead from migrating above the mouth of the Touchet River until December in many years (Walla Walla County and WWBWC 2004, Mahoney et al. 2008, Mendel et al.

2007, Bumgarner and Dedloff 2011). PIT Tag data from the last 6 years indicate entry timing at the Pierces RV Park (PRV – rkm 9) or Oasis Road Bridge (ORB – rkm 10) in-stream PIT tag arrays around the first of October (Figures 1 and 2), and appear highly correlated with cooling stream temperatures and higher stream flows later in the fall.

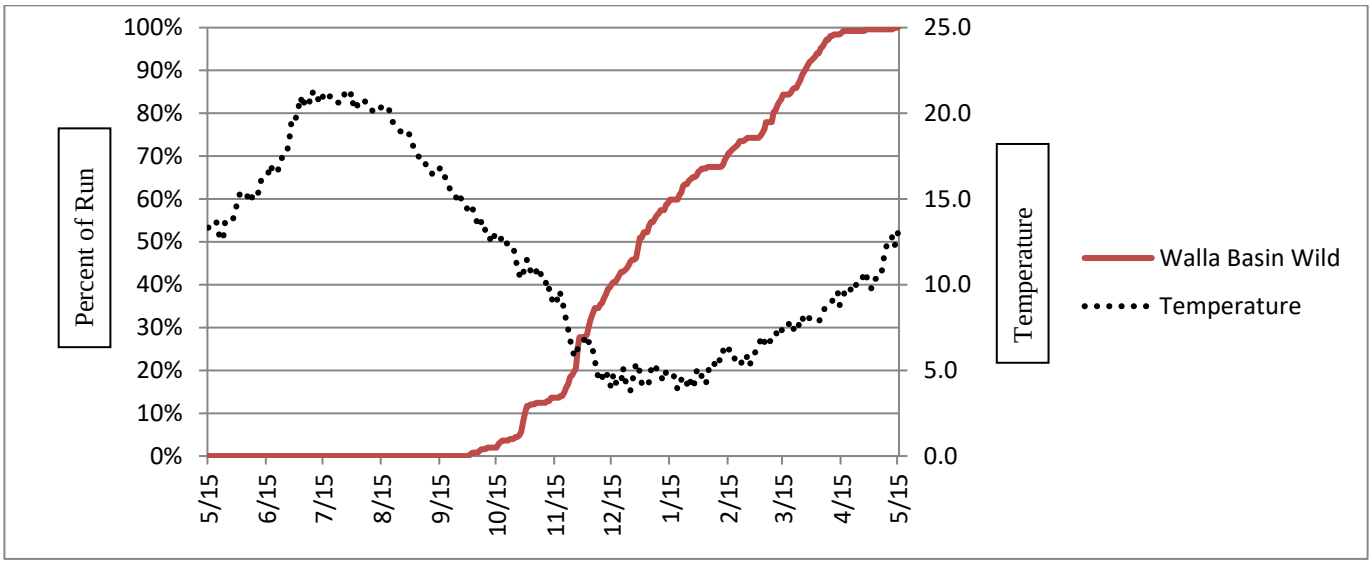



**Figure 1. Mean run timing at PRV and ORB Array sites in the Lower Walla Walla River of Walla Walla Basin Wild Origin steelhead plotted against mean daily stream temperature (°C) at Detour Rd (2006-2014 water years).**

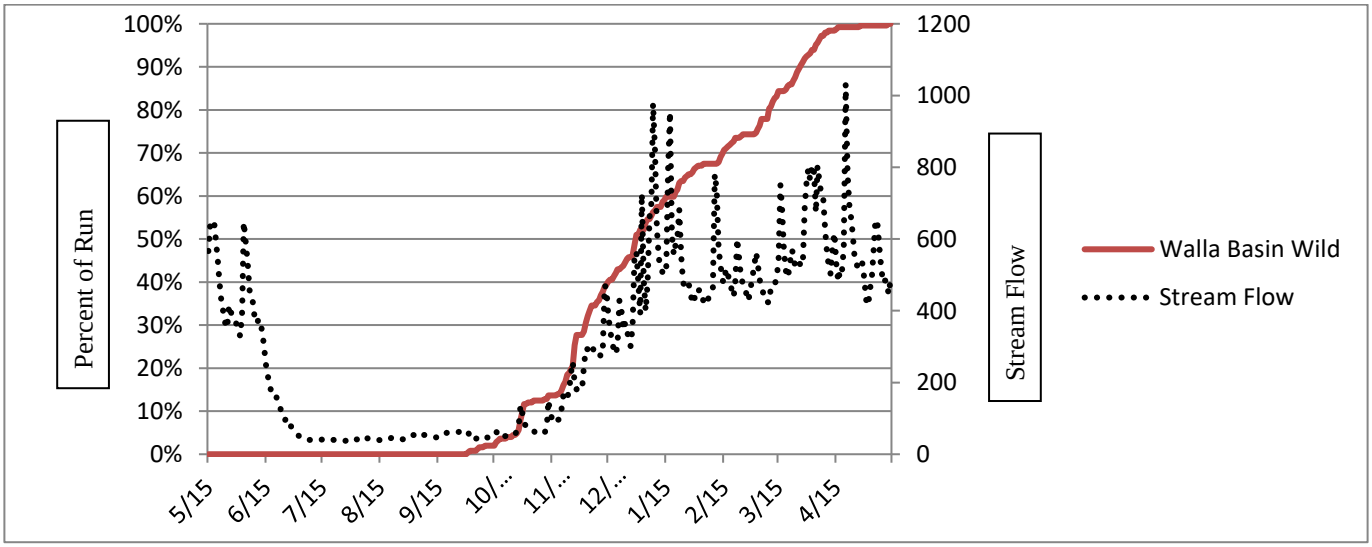



**Figure 2. Mean run timing at PRV and ORB Array sites in the Lower Walla Walla River of Walla Walla Basin Wild Origin steelhead plotted against mean daily stream flow (cfs) at Detour Rd (2006-2014 water years)**

Adult wild steelhead move upstream past Nursery Bridge Dam (NBD) on the Walla Walla River between January and June, and similarly at the DAT in the Touchet River (Figure 3). The later peak of adult returns observed at DAT from the LFH stock were new run year fish that would spend a year in the river

prior to spawning. Steelhead generally spawn in March, April, and May, but there has been some documentation of fish spawning as early as January and February, and into June depending on yearly environmental conditions.

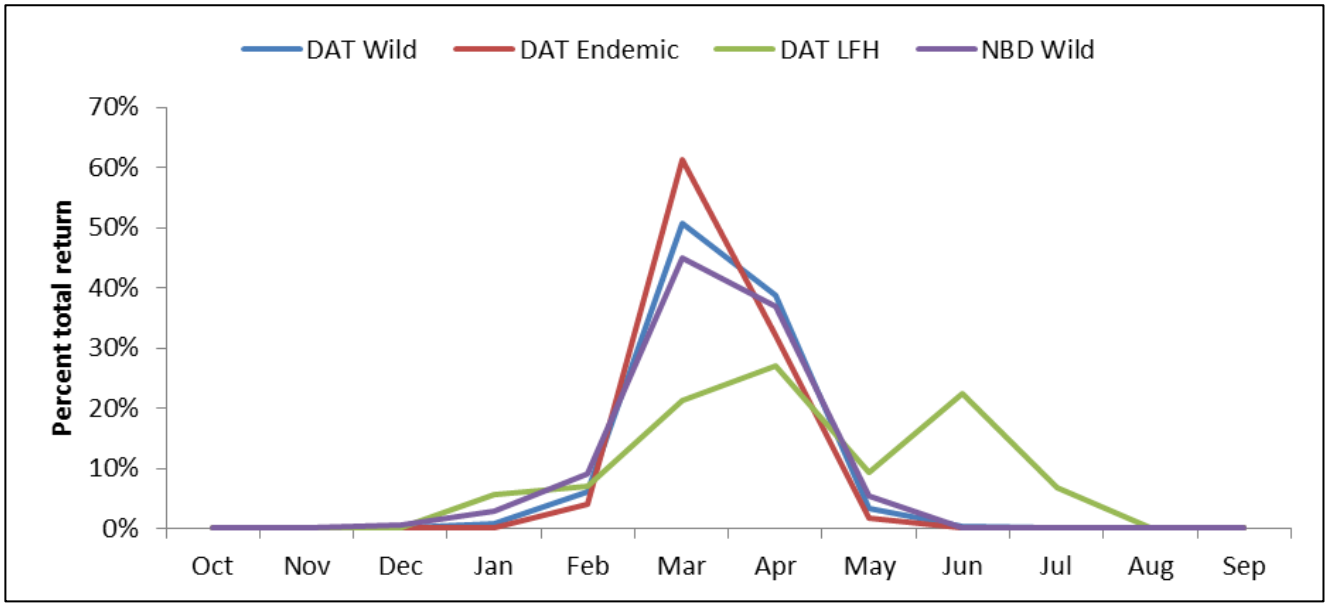



**Figure 3. Mean run timing of summer steelhead (by origin) at DAT, and NBD from 1998 to 2013.**

Known summer steelhead spawning areas are identified in Figure 4. Progeny of adults that spawn in the mid-river areas are likely to have low survival due to poor summer rearing habitat, unless they can find refuge areas prior to low summer flows. Considerable variability in redd density occurs between and within years and survey reaches (Mahoney et al. 2011). For example, in 2003 density of redds in portions of the Touchet sub-basin ranged from 1.0 to 7.3 redds/km, while in 1999 densities ranged from 3.2 to 32.2 (Mendel et al. 2000, 2001, 2002, 2004). WDFW has conducted redd surveys in index areas upstream of Dayton for many years and redd densities there have varied considerably (Bumgarner and Dedloff 2015).

**Juvenile Life-History, Migration and Distribution**

Walla Walla and Touchet river wild summer steelhead populations produce smolts that migrate between ages one and three (Figure 5), a few age-4 fish, and produce a resident life history form. Based on outmigrant trap data, a large number of juvenile steelhead descend into the mid and lower reaches at the onset of fall and winter prior to their spring migration (Mendel et al. 2014, Gallinat and Ross 2011a, 2012a, 2013a and 2013b). Natural origin migrants from the Walla Walla and Touchet Rivers arrived at McNary Dam from early March through June, with peak arrival timing in May. Over 90% of the migrants pass McNary Dam by early June, and 100% by late June (Figure 6). Hatchery steelhead of LFH stock migrated earlier than either endemic or wild steelhead.

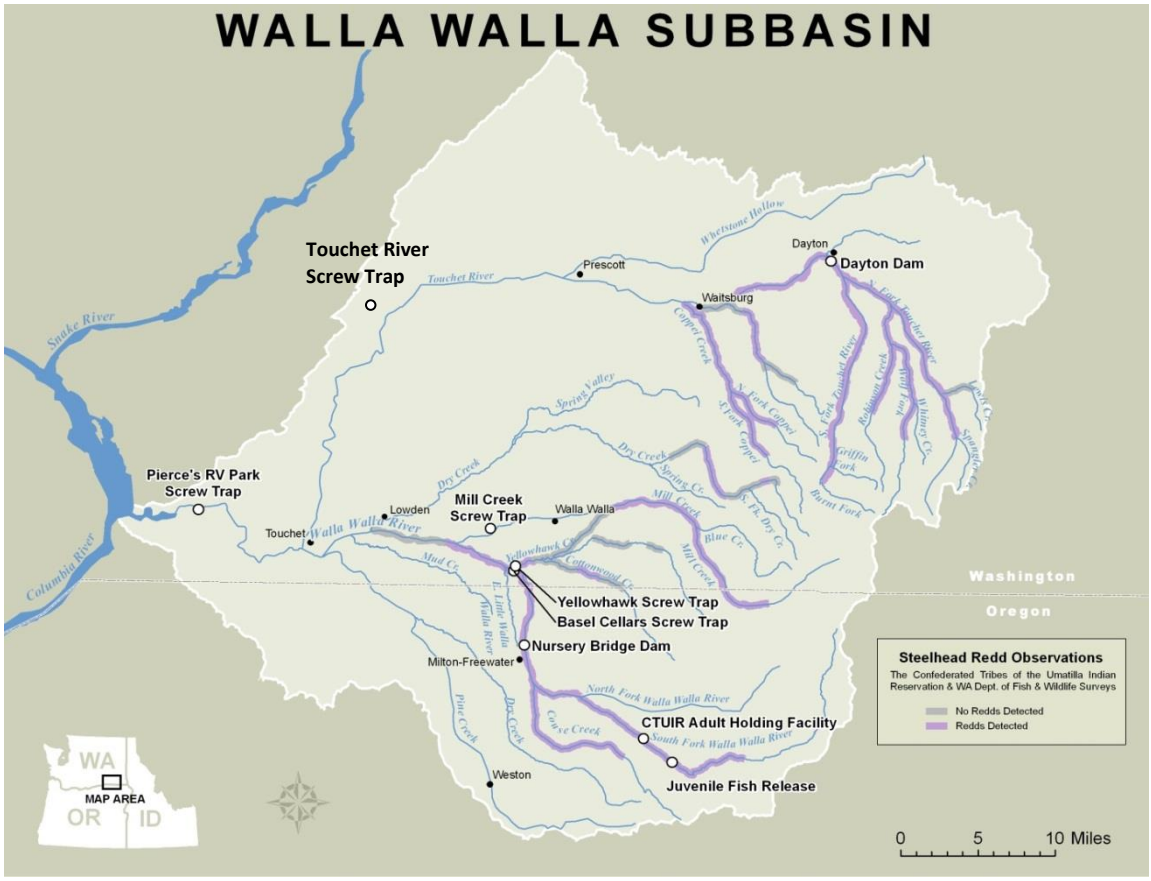



**Figure 4. Walla Walla steelhead spawning areas. Note that steelhead have been documented spawning in Walla Walla River above Mill Creek, in Mill Creek and Blue Creek, upper Dry Creek (in WA), Cottonwood Cr, Yellowhawk Creek, plus in the Oregon portions of the basin. Some spawning is likely in mainstem Walla Walla between upper Dry Creek (in WA) and Mill Creek.** Source: Mahoney et al. 2011

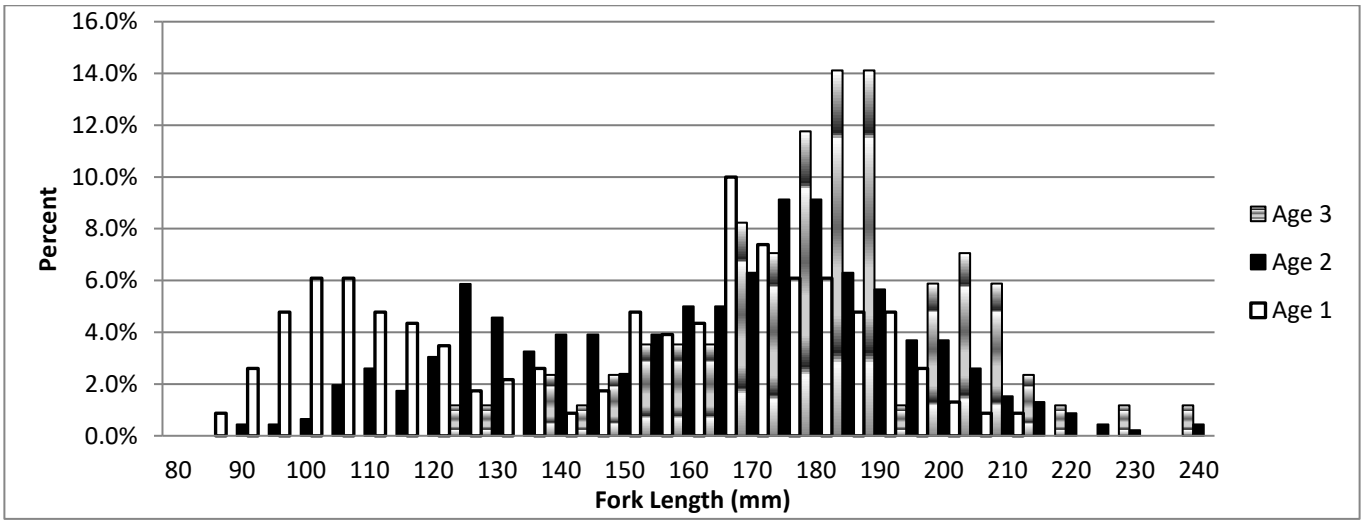



**Figure 5. Length at age frequency distribution of Touchet River natural origin summer steelhead during the spring 2016 outmigration period at the Touchet River screw trap. Data shown are from dates of capture were from February 2016 to June 2016.**

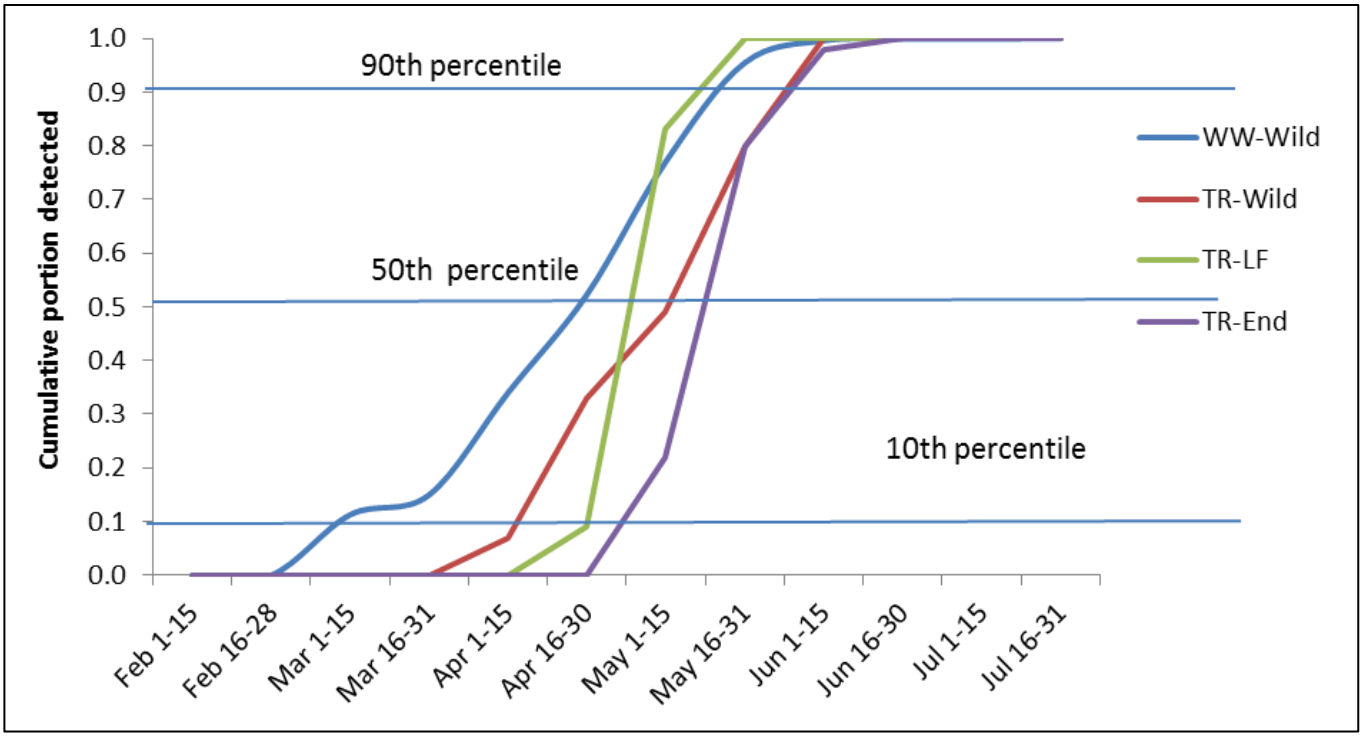



**Figure 6. Percent cumulative emigration timing of PIT tagged Walla Walla and Touchet summer steelhead (wild, LFH, and endemic hatchery stocks) juveniles (> 100 mm) to McNary Dam during spring 2013.**

**Juvenile Steelhead Production from the Touchet River**

Estimated outmigrant abundance of wild summer steelhead smolts at the Dayton rotary trap in the upper Touchet River has been variable. Beginning in 2010/11, estimates were made separately for fish < 125 mm and ≥ 125 mm. Steelhead outmigrants totaled 28,375 in 2014; 12,000 (95% CI=9,462 to 15,419, SE= 1,593) were < 124 mm FL, while 16,375 (95% CI= 13,607 to 20,087, SE= 1,740) were ≥125 mm FL. The four year geometric mean for the≥ 125 mm fish is 15,048. In 2015, the migrant trap in the Touchet River was relocated to a point below all known Juvenile steelhead rearing locations, so an estimate from the entire Touchet River basin could be derived. Estimates of juvenile steelhead ≥ 125 mm for the 2015 and 2016 outmigration years were 13,428 (95% CI = 10,154 to 17,745) and 22,778 (95% CI = 18,561 to 28,581), respectively (Figure 7).

As with all steelhead populations, a complex life history pattern has been documented for Touchet/Walla Walla basin steelhead (Table 6). Use of the system at various life stages has been mapped out so critical time periods can be considered for potential impacts that may be caused by this program.

**Table 6. Walla Walla Basin summer steelhead life stage periodicity (adapted from Mahoney et al. 2006, 2009, 2011, Mendel et al. 2007, and Bumgarner and Dedloff 2011, Stillwater Sciences, 2011, and other data compiled in this report).**

| Life stage | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adult spawning migration[1] | | | | | | | | | | | | |
| Pre-Spawn holding | | | | | | | | | | | | |
| Spawning [2] | | | | | | | | | | | | |
| Incubation/emergence | | | | | | | | | | | | |
| Juvenile rearing[3] | | | | | | | | | | | | |
| Adult outmigration [4] | | | | | | | | | | | | |
| Juvenile outmigration [5] | | | | | | | | | | | | |

[1] Adult steelhead sometimes hold in the Columbia River at the mouth of Walla Walla River from September to November and begin to migrate upriver and disperse into tributaries in January. However, some steelhead enter the lower Walla Walla River in September through November (see Mahoney et al. 2009) and migrate upstream into the lower Touchet River, or upstream in the Walla Walla River, if stream flows are adequate for them to do so. Low stream flows limit their upstream movements in the fall. Steelhead that are blocked from entering the Walla Walla by low stream flows, or high water temperatures, have been documented to migrate up the Snake River, with a portion of those returning at a later date to the Walla Walla Basin (Bumgarner and Dedloff 2011). Peak migration is February–May (Mahoney et al. 2006 and 2011), and at the Dayton Adult Trap (DAT) the migrants peak in March and April but can continue through July. Lyons Ferry Hatchery steelhead enter sooner than naturally produced steelhead, and the early portion of the next run year (which will not spawn until spring of the next year) may migrate up the Touchet River in June, or as late as early to mid-July at DAT, if water conditions are suitable.

[2] Only a few fish spawn in December or January, and they may be mostly of hatchery origin. Above Dayton peak spawning would include May. Spawning also has been documented in early June. Spawning occurs mostly upstream of the mouth of Mill Creek in the Walla Walla Basin, and upstream of the mouth of Coppei Creek in the Touchet drainage, with some rare exceptions.

[3] Juvenile rearing generally does not extend downstream of the mouth of Mill Creek in the Walla Walla Basin, and Waitsburg in the Touchet Basin, with some minor exceptions (see Mendel et al. 2007).

[4] Steelhead kelts rapidly leave spawning grounds, primarily from April–May (Mahoney et al. 2009).

[5] WDFW enumerated juvenile outmigration at the Touchet River rotary screw trap (Oct. 2007–June 2008). Peak outmigration was in October, November, and December, although most of those were small juveniles and it is uncertain whether they are leaving the drainage or seeking overwintering areas in the middle or lower Touchet River. Peak outmigration of transitional and smolt sized fish was in April and May in the Touchet River (Gallinat and Ross 2011). Tagged juveniles were recaptured in the Walla Walla River at Oasis Road Bridge and in the Columbia River at McNary, John Day, and Bonneville dams (Mahoney et al. 2009). CTUIR smolt traps at Joe West Bridge in Oregon, and the Lower Walla Walla River, detected peak outmigration of steelhead from the Walla Walla River in April and May (Mahoney et al. 2011).

Peak life stage timing

Common life stage timing

Life stage present

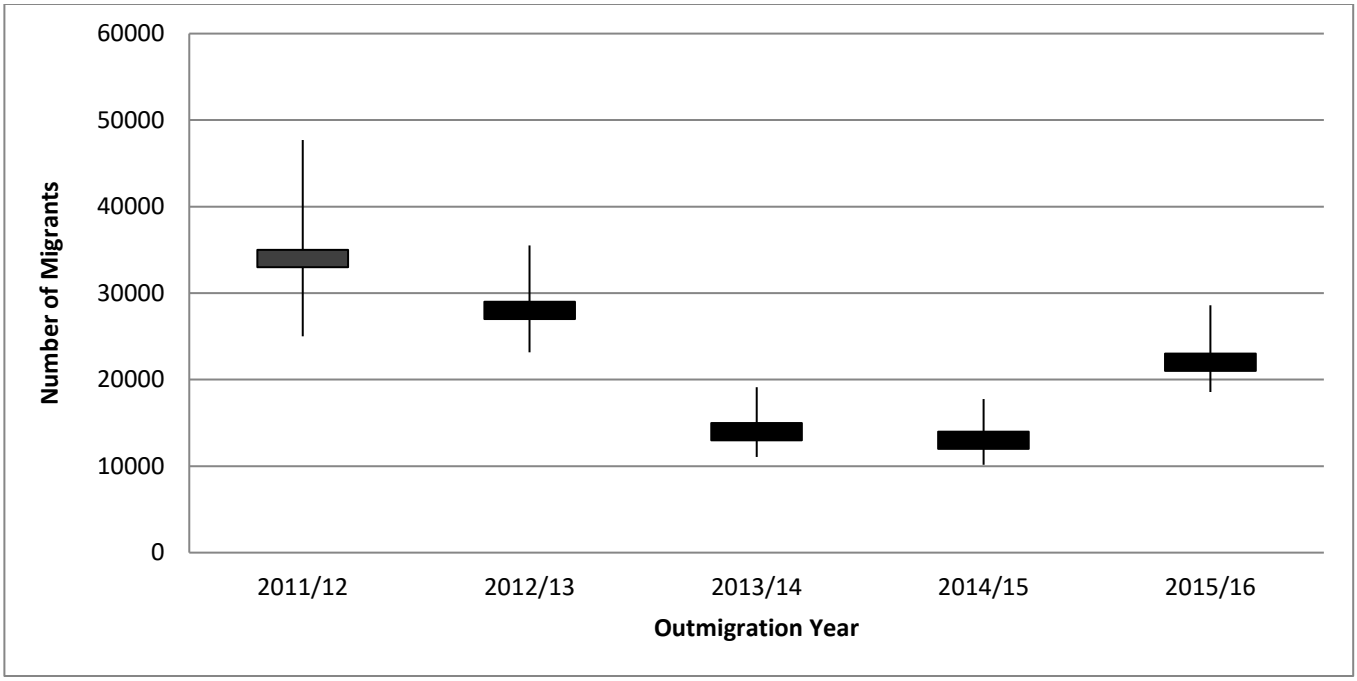



**Figure 7. Touchet River smolt trap natural origin steelhead smolt abundance estimates for migrants > 124 mm FL, with 95% CI (data from Gallinat and Ross 2016).**

Hatchery steelhead smolt releases have remained at approximately the same levels for the past several years; with 85,000 released annually into the Touchet River at Dayton, and 100,000 in the Walla Walla River downstream from the mouth of Mill Creek (at McDonald Bridge). With co-manager agreement, WDFW switched from the use of the non-native Lyons Ferry Hatchery stock to Wallowa stock in 2013 for all segregated hatchery steelhead programs in southeast Washington. The Wallowa stock is also non-native to the Walla Walla Basin (derived from trapping wild origin fish at Snake River basin dams in the late 70's and early 80's). In addition, WDFW has been testing the use of local Touchet River stock for hatchery production for over 15 years by releasing 50,000 smolts annually just upstream of Dayton. Currently, WDFW is committed to eliminating the Wallowa stock releases in the Walla Walla River, with the last release of smolts occurring in 2017. Similar reductions in Wallowa stock steelhead releases in the Touchet River are likely in future years. Increases of the Touchet endemic stock steelhead may be implemented in the future.

**Smolt to Adult Survival Rates**

The SARs for juveniles $\geq$ 125 mm PIT tagged in the Touchet River and detected as adults at McNary Dam have declined since 2008 (Figure 8), similar to the Walla Walla River. SARs for naturally produced steelhead from the Touchet Basin have ranged 0.37-3.02% to McNary Dam. Use of PIT tags to determine survival can underestimate the survival of untagged steelhead due to the effect of the PIT tag in the fish, so these SAR estimates should be considered as minimum estimates (Beckman et al. 1999, Knudsen et al 2009).

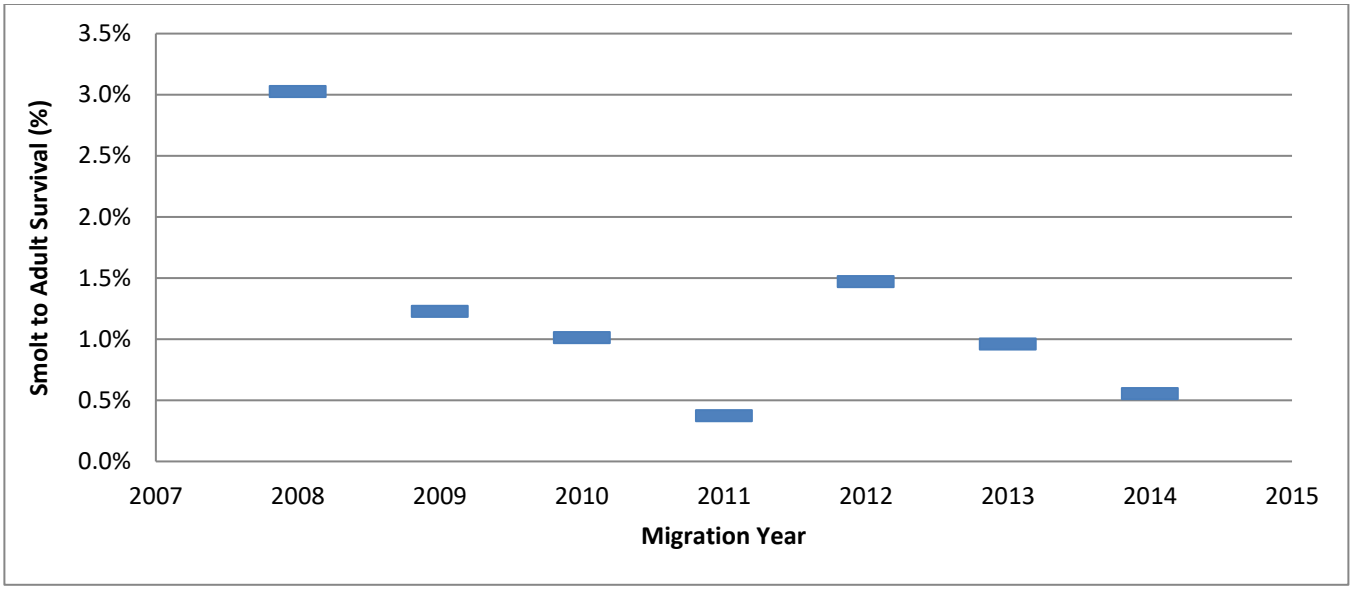



**Figure 8. Estimated Smolt-to-Adult Return (SAR) for Touchet River natural-origin summer steelhead PIT tagged at the Dayton and Waitsburg smolt traps and subsequently detected as returning adults at McNary Dam.**

**Juvenile Distribution** (*source:* Mahoney et al. 2015)

Figure 9 shows summer distribution of juvenile *O. mykiss* in the Walla Walla River Basin. Juvenile *O. mykiss* were found in ephemeral streams during the spring and appear to use these habitats seasonally as conditions allow. During the summer, *O. mykiss* have been found wherever there is sufficient water with suitable temperatures. Summer rearing densities of juvenile *O. mykiss* in the primary habitat areas generally range from 10 to 70 fish/100 $m^2$. Densities over 200 fish/100 $m^2$ have been documented in some locations. Year to year variation can be substantial and observed densities in marginal habitats have ranged from 0 to 10 fish/100 $m^2$ (Contor et al. 2003, Mendel et al. 2000, 2001, 2002, and 2004, Schwartz et al. 2005, Mahoney et al. 2006). Juvenile steelhead and spring Chinook are known to have overlapping but different habitat requirements, and interspecific interactions at the juvenile life stage. The current distribution in the Walla Walla shows both segregation and overlap.

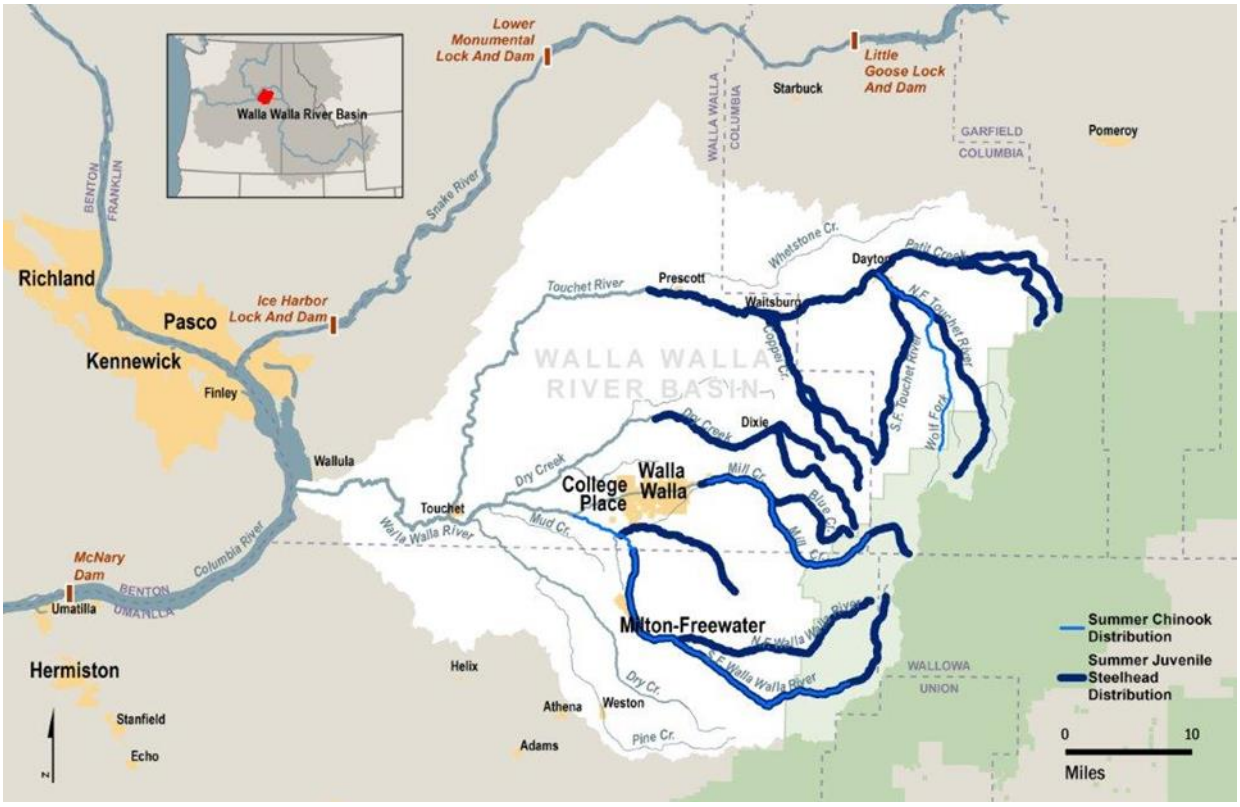



**Figure 9. Summer distribution of juvenile *O. mykiss* and *O. tshawytscha* in the Walla Walla River Basin. Note: the current attached map needs to be corrected. There is steelhead rearing in the Wolf Fork of the Touchet River, and spring Chinook rearing would be expected to be found in the North Fork Touchet River above the confluence with the Wolf Fork. In addition, the legend is incorrect as it states "summer Chinook"; this should be corrected to say, "spring Chinook".**

## Genetics

Summer steelhead in the Walla Walla River Basin are closely related to Umatilla and Snake River steelhead but have significant and unique genetic characteristics. Narum (et al. 2003), Blankenship et al. (2007), and Blankenship et al. (2009) found evidence of genetic structure between populations from the Touchet and Walla Walla rivers. There was more similarity between Umatilla River steelhead and lower Snake River steelhead than between Touchet and Walla Walla River Steelhead (Narum et al. 2004). This analysis also suggest that the Snake River-origin hatchery steelhead have not significantly interbred with either Walla Walla or Touchet River natural origin steelhead. Narum found some divergence between resident and anadromous forms within the Walla Walla but not the Touchet. Tests of Hardy-Weinberg equilibrium indicated that both anadromous and resident populations were in equilibrium, but mixed life-history collections were out of equilibrium (Blankenship et al. 2007 and 2009). These same studies documented temporal stability in natural steelhead populations in the Walla and Touchet rivers and little evidence of hatchery introgression from the Lyons Ferry stock hatchery releases in the Walla Walla Basin.

### 2.2.2) Status of ESA-listed salmonid population(s) affected by the program.

## Describe the status of the listed natural population(s) relative to "critical" and "viable" population thresholds.

The Walla Walla River Mid-Columbia River summer steelhead DPS is listed as threatened. The ICTRT is currently developing "critical" and "viable" thresholds for this population. In the proposed guidance document for viable salmonid populations, the ICTRT described population attributes for the Touchet River and Walla Walla River populations (NMFS 2009). Both populations, when at viable levels, would be expected to have an abundance of 1,000 adults over a full brood year cycle and productivity threshold of 1.35 (NMFS 2008). The structure of the Touchet River population was considered to be small and/or linear, whereas, the Walla Walla River population was considered to be dendritic with multiple spawning aggregations (ICTRT 2004). The designation of structure categories for these populations relates to the level of extinction risk for the population based on the present conditions compared to historical spatial distribution, life-history strategies, genetic variation, and natural spawner composition.

## Provide the most recent 12 year (e.g. 1988-present) progeny-to-parent ratios, survival data by life-stage, or other measures of productivity for the listed population. Indicate the source of these data.

**Adult-to-Adult Return** (AAR) (*source: Mahoney et al 2015*)

The Walla Walla River steelhead population recruits-per- spawner (R/S) have been estimated for the index area upstream of NBD (Figure 10). The 16 year (BY 1993-2008) geometric mean for R/S is 1.36 (SE 0.32; range 0.42 to 3.52), indicating that the stock is generally replacing itself, and is right at the ICTRT productivity threshold. The R/S at NBD exceeded replacement during 10 of the past 16 years (65%). This estimate excludes Mill Creek and other tributaries downstream of Nursery Bridge Dam which are included in the Walla Walla population. It is currently unknown if the areas below NBD have lower productivity, but is suspected based on habitat conditions. The Touchet River steelhead population R/S was estimated for the index area upstream of the DAT, including Coppei and Patit Creeks, but excluding the mainstem Touchet River below Dayton. The R/S has varied from a low of 0.5 (1992 BY) to a high of 3.0 (2006 BY). The 20 year geometric mean R/S was 1.21 (BY 1989-2008), and for the most recent ten years the geometric mean is 1.31 (BY 1999-2008), indicating that the stock is also replacing itself, similar to the Walla Walla River.

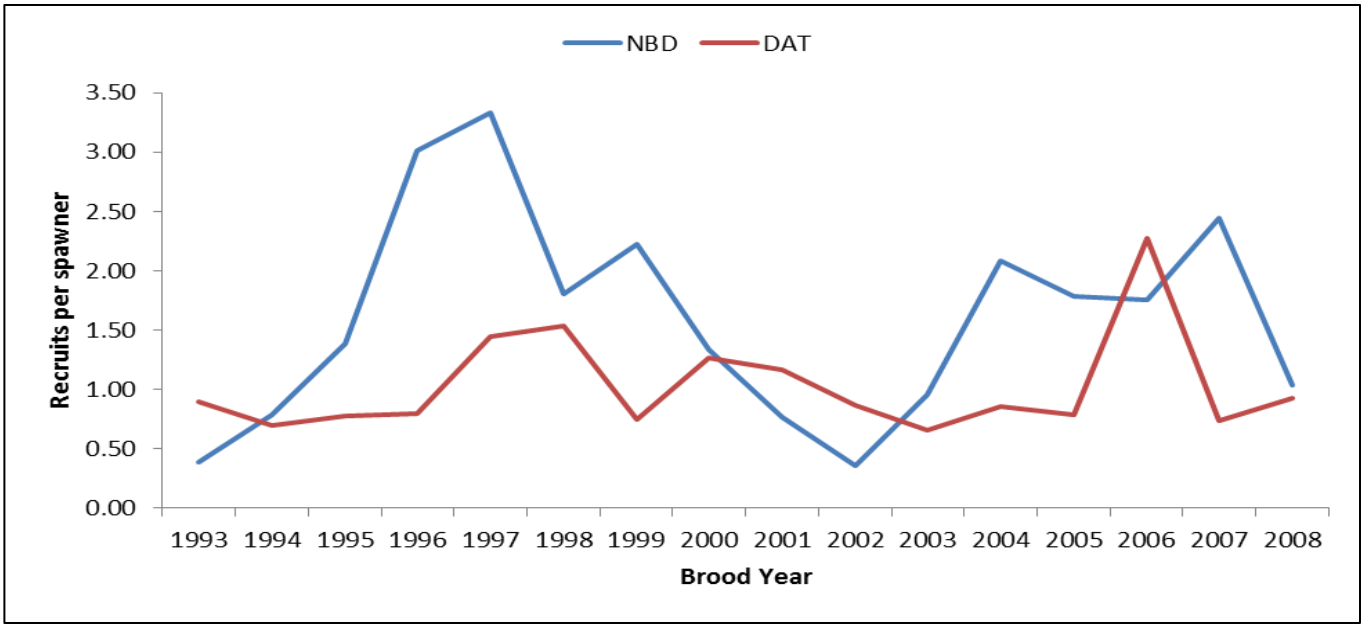



**Figure 10. Estimated R/S ratio of wild Walla Walla River and Touchet River summer steelhead for the index areas upstream of NBD and DAT, for juvenile outmigration years 1993-2008.**

## Provide the most recent 12 year (e.g. 1988-1999) annual spawning abundance estimates, or any other abundance information.

Adult Abundance (Mahoney et al. 2015):

Adult abundance estimates are problematic for steelhead because they return in moderate to high turbid flows over many months, they migrate into many tributaries or stream reaches to spawn, and there are two identified populations of steelhead in the Walla Walla Subbasin that must be monitored for VSP parameters. The counts at both the NBD and the DAT are partial counts of what passed and there is currently no way to adequately compile these estimates to provide total returns or escapement for all Walla Walla or Touchet steelhead. Current estimates do not include adults that might spawn downstream of these counting dams or outside the spawning survey index areas. Three steelhead spawning/rearing areas identified downstream of the primary counting points at NBD and the DAT that need improved adult accounting: 1) the Walla Walla River between NBD and mouth of Mill Creek, 2) the Touchet River between the DAT and the mouth of Coppei Creek, or further downstream, and 3) Coppei Creek. PIT tag detectors in the lower Walla Walla and in Mill Creek operated by CTUIR can provide some detections for returning PIT tagged steelhead but the detection efficiencies are not currently adequate or reliable (e.g., during high flows) to enable fish managers to estimate total returns. Similar reasons can be used for PIT tags arrays in the Touchet River, though improvements are being made.

Adult steelhead abundance is enumerated at NBD a short distance upstream of the Oregon Stateline. This site provides a good index of abundance for most of the primary spawning areas in Oregon but it does not include Mill Creek or other downstream areas and tributaries that are included as part of the Walla Walla steelhead population. Ladder video counts (Mahoney et al. 2013) are used to estimate natural and hatchery origin summer steelhead escapement above NBD into the upper Walla Walla River.

The NBD fish ladder and video operate year round. Ladder counts are considered minima because they have not been corrected for observer or video capture error. The 10-year (2005-2014) geometric mean for adult steelhead returns to NBD is 580 (SE 96; range 262 to 1,108 (Figure 11). The 5-year (2010-2014) mean hatchery origin return to NBD was 2.1 percent. Since 1993, steelhead returns at NBD have only exceeded the ESA minimum recovery abundance goal of 1,000 adults during three of 20 years (15%).

Prior to the 2002 return, all hatchery-origin fish captured at the west ladder NBD trap (operated by ODFW) were culled. Since 2002, video counts have been used and steelhead are no longer trapped and handled, so hatchery fish are not removed. Fish origin was not identified for 2002 through 2005 returns, and gender of adult steelhead returns has not been determined since videotaping began. The NBD is not a complete barrier to steelhead passage (depending on stream flows) and some fish pass over the dam without using the fish ladder (Mahoney et al. 2011). Passage modifications at NBD and the lower river sill, and construction and operation of the new east bank fish ladder, has likely increased passage and enumeration through the two fish ladders. The number of fish bypassing the fish ladders is no longer estimated and should be considered a data gap.

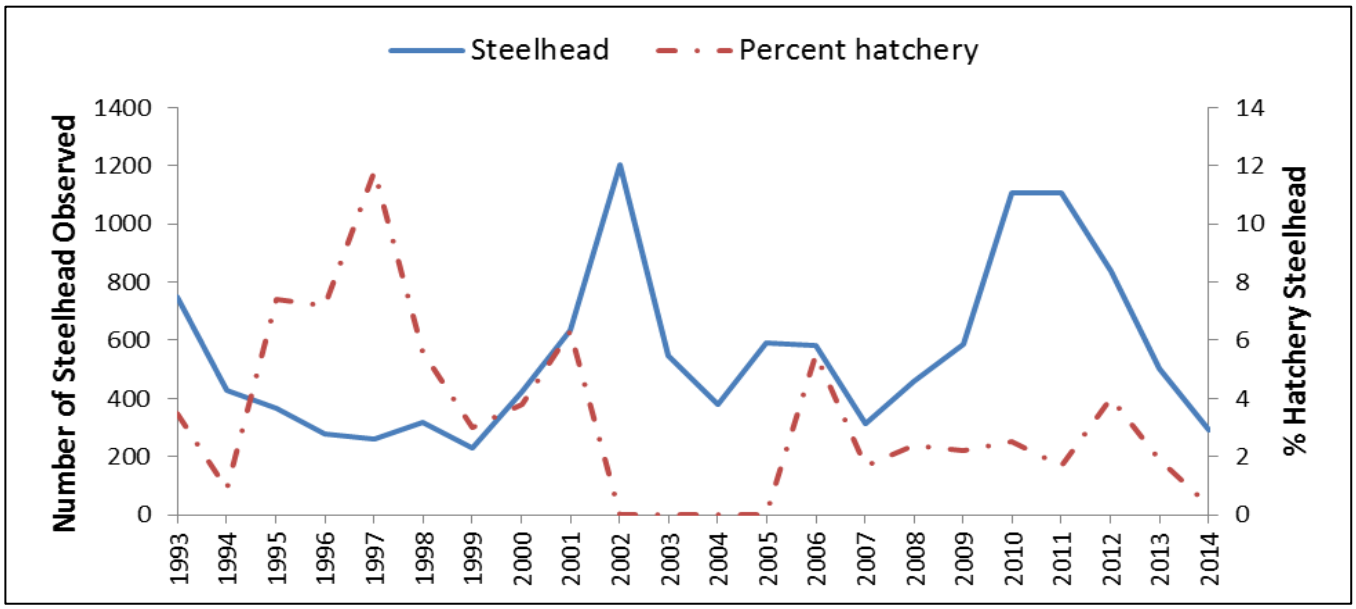



**Figure 11. Adult steelhead counts at NBD from ODFW and CTUIR, including hatchery fraction, 1993-2014.** Note: no data for fish origin was collected for return years 2002-2005; the 5-year mean hatchery return was 2.1% since 2007.

WDFW has been conducting annual steelhead spawning surveys in Mill Creek (whenever possible), and the U.S. Army Corps of Engineers (USACE) has operated video monitoring at several sites within the Mill Creek flood channel (i.e., Diversion works at Bennington Dam, Division works ladder and upstream end of Yellowhawk/Garrison) as indices of adult return abundance but these counts are incomplete. In 2014, Mill Creek redd surveys from Wickersham Bridge downstream to 0.3 rkm above Bennington Dam produced 26 redds, and 36 when expanded for the short reach with no access on private lands. By applying a standard of 2.1 adult steelhead per redd (derived from Asotin Creek data in Crawford et al. 2012), the resulting approximate abundance index is 75 steelhead in this reach of Mill Creek for 2014.

The USACE video sample data indicate that all these fish had adipose fins and should be considered natural origin.

Unlike counts at NBD, annual steelhead returns to the DAT are not a reliable index of adult abundance because an unknown, and likely variable, portion of adult steelhead jump the dam and pass the site without being enumerated. Pickets over the dam face are installed annually, but only extend over a portion of the dam, and during higher stream flow events water flows around the edge of the pickets and fish are able to easily bypass. WDFW has operated the DAT on the Touchet River for many years to collect natural-origin summer steelhead for broodstock for an endemic stock hatchery program at Lyons Ferry Hatchery (LFH). Fish counts at the DAT have provided partial enumeration of steelhead and run composition, as well as information regarding run timing and fish age. WDFW has used a combination of redd counts and the run composition of steelhead passed upstream at the DAT to estimate the number of spawners upstream of Dayton (Figure 12). Steelhead escapement estimates for the Touchet Basin upstream of the DAT, plus adult trap mark-recapture escapement estimates for Coppei Creek, provide indices to annual Touchet steelhead population abundance.

These estimates do not include the adult returns in the mainstem Touchet River downstream of the DAT, plus in several small tributaries between the DAT and Coppei Creek. Therefore, the results reported here are indices of adult abundance at a few locations and should not be considered total returns, or escapement, for the Touchet River Basin. Estimates of natural origin adult spawners upstream of the DAT have varied between 152 (2014) and 737 in 1988. The 10-year GM for natural steelhead returns upstream of the DAT is 301.7 (2005 through 2014), and the 10-year GM for endemic stock hatchery returns upstream of the dam is 86.7 (25.9% for 10 yr. average of all hatchery origin). Non-endemic hatchery steelhead have been removed from the river at the DAT since early 2009. Evaluation of the hatchery steelhead returns and the steelhead hatchery program in the Touchet River can be found in Bumgarner and Dedloff (2009, and 2011, 2015), and previous annual reports to LSRCP.

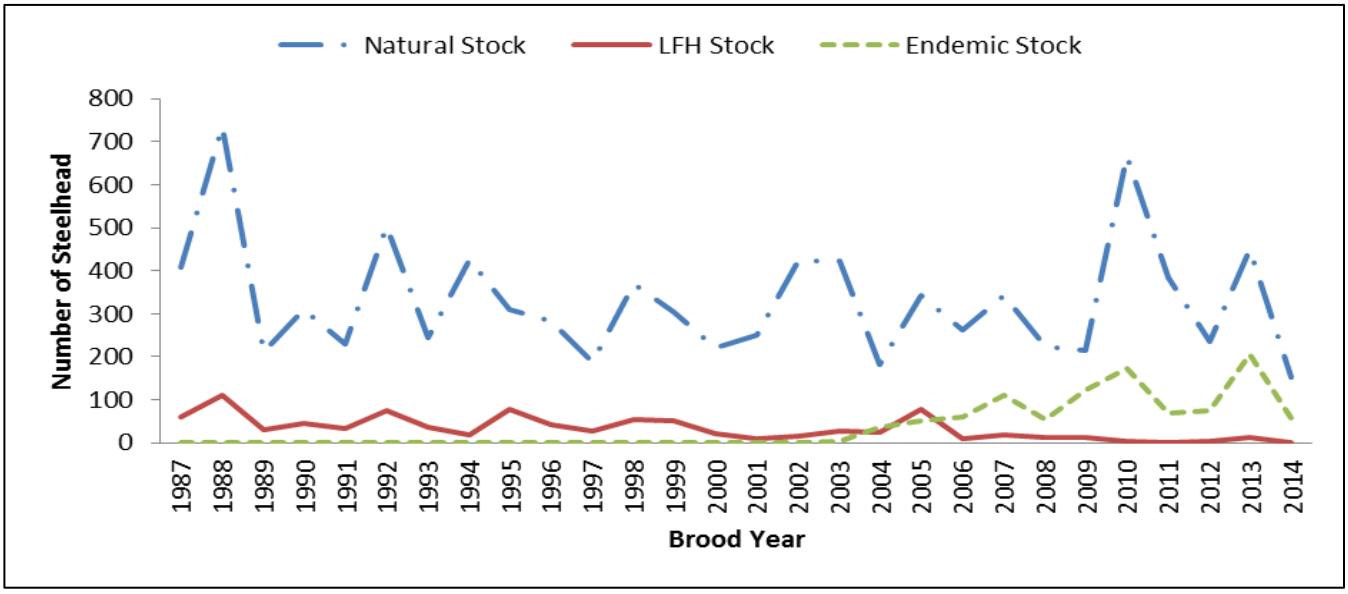



**Figure 12. Estimated adult steelhead spawner abundance for index areas of the Touchet River upstream of DAT (based on redd counts and run composition at the DAT, data from Joe Bumgarner, WDFW, personal communication).**

WDFW also supplements the DAT estimates by monitoring in Coppei Creek, a tributary of the Touchet River that passes through the town of Waitsburg, well downstream of the DAT. WDFW has been monitoring steelhead in this stream for several years to supplement the index estimates of adult returns above Dayton (Mahoney et al. 2011, and Table 7). Other years have had lengthy disruptions to operation of the trap and/or few recaptures of marked steelhead. Also, total returns to Coppei Creek that include the area downstream of the trap could not be estimated in 2011, 2012, 2013, or 2014 because high water and poor water clarity prevented adequate spawning surveys being conducted below the trap.

**Table 7. Upstream migrant steelhead trapped, mark-recapture estimates, confidence intervals (CI) and coefficient of variation (CV) for total returns (including hatchery), and natural origin steelhead at the Coppei Creek trap, 2010-2014.**

| Year | Total adult steelhead captured (unique) | Downstream captured fish checked for marks (marked recaptures) | Expanded estimate of total steelhead to the trap | 95 % CI [a] | CV for total steelhead | Unique natural origin steelhead captured | Expanded estimate of natural origin steelhead to the trap | 95% CI [a] | CV for natural origin steelhead |
|---|---|---|---|---|---|---|---|---|---|
| 2010 | 123 | 36 (32) | 138 | 124.87, 151.19 | 4.87 | 118 [b] | 129 [b c] | NA | NA |
| 2011 | 34 | 5 (1) | 104 | 34, 198.20 | 46.21 | 31 | 95 [d] | 31, 180.88 | 46.12 |
| 2012 | 32 | 9 (3) | 81 | 32, 134.01 | 32.87 | 32 | 73 [d] | 32, 118.72 | 31.67 |
| 2013 | 65 | 12 (10) | 74 | 58.44 88.47 | 10.42 | 59 | 67 | 59 82.38 | 11.34 |
| 2014 | 31 | 4 (0) | 124 | 31, 275.82 | 62.47 | 31 | 124 | 31, 275.82 | 62.47 |

[a] If the calculated lower CI was less than the number captured, the number of unique steelhead captured was reported instead of the lower CI.
[b] Revised from (Mahoney et al. 2010) annual report that showed total natural origin, not unique, steelhead.
[c] The origin of downstream migrants captured and examined for marks, or recaptured, was not recorded consistently. Therefore, this estimate is based on the trapping efficiency of 91.7% derived from marked and unmarked steelhead that were examined for marks (see Mahoney et al. 2011).
[d] In 2011, five natural origin fish were captured while moving downstream and one was a marked recapture. In 2012, eight natural origin were checked for marks and three were marked recaptures. In 2013, 12 steelhead were captured moving downstream, with nine wild steelhead recaptured, plus one endemic hatchery stock steelhead.

In 2014, WDFW attempted to install and run an adult steelhead trap on Patit Creek for the first time. Patit Creek is a tributary of the Touchet River and runs through the town of Dayton, WA. Little is known about steelhead use in the creek due to access issues on private lands. In 2014, the trap was installed at rkm 2.1 and operated from 23 January to 7 April. Due to the flashy nature of Patit Creek, the trap had numerous, lengthy interruptions throughout the trapping season and was removed after being repeatedly blown out. Dates for disruptions were 5 February to 21 February, 25 February, 1 March to 25 March, and 2 April to 7 April. The first upstream migrant at the trap was captured on 1 February and the last one was on 27 March. Three different upstream migrating steelhead were captured at the trap (one natural origin female, one natural origin male, and one hatchery male). WDFW installed the trap again in 2015 and 2016, with about 100 fish captured during 2015. The 2016 trapping data has yet to be completed.

## Provide the most recent 12 year (e.g. 1988-1999) estimates of annual proportions of direct hatchery-origin and listed natural-origin fish on natural spawning grounds, if known.

### Ratio of Hatchery-Origin Adults in the Natural Spawning Population

At NBD, the 18-year mean percent hatchery return was 3.98%. (Table 8). These fish are most likely non-native Lyons Ferry Hatchery stock, and prior to 2001, were removed to minimize the interaction with native steelhead spawning naturally above NBD. However, videotaping replaced physical trapping operations at NBD in 2001-02 and hatchery fish now have unrestricted access to the headwaters.

**Table 8. Partial fish counts of adult steelhead from NBD on the Walla Walla River and in Mill Creek.**

| | Nursery Bridge Dam | | | | | | Mill and Yellowhawk Creek | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Steelhead | Percent hatchery | Spring Chinook adults | Spring Chinook jacks | Total CHS | Bull trout | Steelhead[ab] | Percent hatchery | Spring Chinook adults | Spring Chinook jacks | Bull trout |
| 1990 | | | | | | | 15[a] | 33 | | | |
| 1991 | | | | | | | 13[a] | 39 | | | |
| 1992 | | | | | | | 48[a] | 0 | | | |
| 1993 | 748 | 3.5 | | | | | 35[a] | 6 | | | |
| 1994 | 426 | 0.9 | | | | | 11[a] | 0 | | | |
| 1995 | 367 | 7.4 | | | | | 10[a] | 20 | | | |
| 1996 | 278 | 7.2 | | | | | 42[a] | 5 | | | |
| 1997 | 262 | 11.8 | | | | | 10[a] | 20 | | | |
| 1998 | 320 | 5.6 | | | | | 10[a] | 60 | | | |
| 1999 | 231 | 3.0 | | | | | 1[a] | 0 | | | |
| 2000 | 425 | 3.8 | 9 | 0 | 9 | 20 | 13[a] | 0 | | | |
| 2001 | 635 | 6.3 | 47 | 0 | 47 | 24 | 15[a] | 20 | | | |
| 2002 | 1205 | NA | 27 | 3 | 30 | 32 | 57[a] | 9 | | | |
| 2003 | 545 | NA | 1 | 1 | 2 | 27 | 7[a] | 43 | | | |
| 2004 | 381 | NA | 131 | 3 | 134 | 36 | 33[a]/51[b] | 36[a] | 68[b] | 0 | 20[b] |
| 2005 | 590 | NA | 80 | 1 | 81 | 68 | 25[a]/10[b] | 4[a] | 17[b] | 0 | 16[a] |
| 2006 | 581 | 5.5 | 92 | 2 | 94 | 112 | 22[b] | 5 | 13[b] | 0 | 5[a] |
| 2007 | 314 | 1.7 | 236 | 6 | 242 | 60 | 35[b] | 3 | 0[b] | 0 | 3[a] |
| 2008 | 459 | 2.4 | 498 | 48 | 546 | 55 | 37[b] | 11 | 11[b] | 0 | 8[a] |
| 2009 | 585 | 2.2 | 576 | 167 | 743 | 136 | 67 | NA | 23 | 0 | 0 |
| 2010 | 1108 | 2.5 | 1186 | 8 | 1194 | 90 | 44 | NA | 3 | 0 | 5 |
| 2011 | 1105 | 1.7 | 435 | 33 | 468 | 416 | 75 | NA | 30 | NA | unk |
| 2012 | 839 | 4.0 | 397 | 1 | 398 | 212 | 81[b] | 0 | 0[c] | NA | 6[d] |
| 2013 | 503 | 1.9 | 92 | 5 | 97 | 153 | NA | NA | NA | NA | NA |
| 2014 | 290 | 0.30 | 344 | 3 | 347 | 188 | NA | NA | NA | NA | NA |

[a] Fish counts from Yellowhawk weir, collected by Wibb Wagoner, TSS, for WDFW.

[b] Source USACE Ben Tice and Greg Moody, video counts at the Diversion Dam, Yellowhawk Creek weir and Mill Creek Division Dam[c]. Hatchery Steelhead includes both Lyons Ferry Hatchery (LFH) and Touchet River Endemic stocks and these counts may include duplicate counts of some fish in multiple locations.
*Expanded estimate due to video shut down times.

[c] none at Bennington Dam, but 13 at the Division Ladder and 2 at top of Yellowhawk Cr.

[d] none at Bennington Dam, but 6 at Division Dam ladder

In the Touchet River, Lyons Ferry Hatchery (LFH)-origin fish escapement above Dayton has ranged from 4.3 to 23%. From 1993-2005, the mean percent LFH return was 2.4% (Table 9). These hatchery adults were also most likely of non-native Lyons Ferry Hatchery stock. Since 2005, all adipose clipped adult steelhead have been removed at the DAT upon capture. However, all hatchery Touchet endemic stock fish have been allowed upstream of the trap. Since 1999, the percent of LFH stock fish above DAT has averaged 1.6%, and Touchet endemic stock fish has averaged 18.5% (Table 9).

### 2.2.3) Describe hatchery activities, including associated monitoring and evaluation and research programs, that may lead to the take of listed fish in the target area, and provide estimated annual levels of take.

### Describe hatchery activities that may lead to the take of listed salmonid populations in the target area, including how, where, and when the takes may occur, the risk potential for their occurrence, and the likely effects of the take.

There is no known take directly associated with any component of the juvenile release program. Releases of hatchery spring Chinook could potentially interact with natural origin summer steelhead and bull trout in the Touchet River while on their migration. However, the duration of interaction is expected to be short, and spring Chinook will be smaller in size compared to steelhead and bull trout.

Spring Chinook broodstock collection activities, once implemented in the Touchet River, will be incorporated in the existing level of trapping, anesthetizing and handling of summer steelhead (and bull trout) that current occurs at the Dayton Adult Trap. Brood collection would occur in May and June at the DAT. Run timing of natural origin summer steelhead and bull trout at the DAT, and anticipated return of spring Chinook from this proposed program is provided (Figure 13).

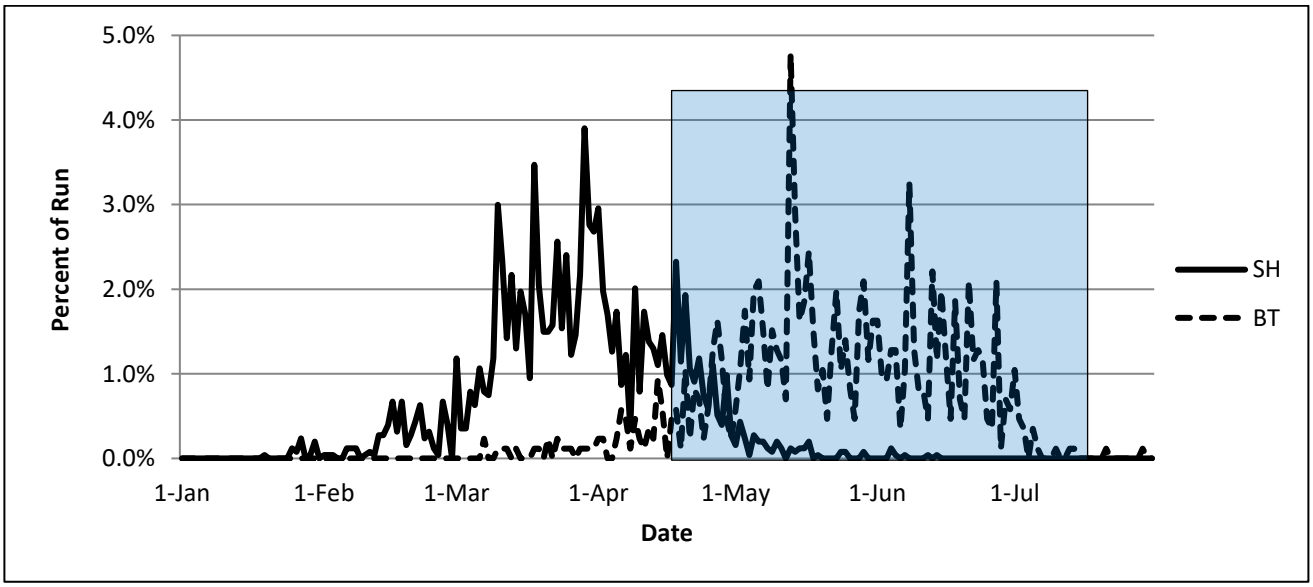



**Figure 13. Run Timing of natural origin summer steelhead (SH) and bull trout (BT) to the DAT (2000-2013 combined data), and anticipated run timing of spring Chinook from this proposed program (shaded Area).**

Monitoring and evaluation of the proposed hatchery program will be conducted by WDFW's Hatchery Monitoring and Evaluation project or WDFW Fish Management office in Dayton. Hatchery Production will be 100% adipose clipped with representative coded-wire-tag and PIT tag groups to estimate returns, fishery contributions, and to monitor potential straying (i.e. to the Tucannon River – the closest ESA population). Monitoring of this program will occur at Lyons Ferry (spawning and survival within the hatchery), as well as monitoring smolt out-migration through PIT tags, and incidental catches of marked hatchery fish at the Touchet River smolt trap. Fishery monitoring within the Columbia River and Walla Walla River basins, estimating and tracking adult migration and returns from PIT tags within the Columbia River and within the Walla Walla River basin, adult trapping (DAT), and spawning ground surveys in the Touchet River basin.

Of these activities, only smolt trapping and spawning ground surveys have the potential to impact listed fish (i.e. steelhead or bull trout) within the Touchet River. Smolt trapping activities have been discussed with risks identified in the Touchet Summer Steelhead HGMP. Bull trout are rarely captured in the current location of the Touchet smolt trap so impacts are minimal. Spawning ground surveys are not expected to result in any mortality of listed steelhead or bull trout in the Touchet River basin, and any disturbance-related impacts would be short-term and minor in nature. Spawning ground surveys are already conducted for bull trout in the Touchet River basin by WDFW Fish management staff. Adult steelhead would most likely not be present in the basin during the spring Chinook spawning season.

## Provide information regarding past takes associated with the hatchery program, (if known) including numbers taken and observed injury or mortality levels for listed fish.

See Submitted Touchet River Summer Steelhead HGMP and proposed takes of natural origin steelhead associated with that program.

## Provide projected annual take levels for listed fish by life stage (juvenile and adult) quantified (to the extent feasible) by the type of take resulting from the hatchery program (e.g. capture, handling, tagging, injury, or lethal take).

See Submitted Touchet River Summer Steelhead HGMP and proposed takes of natural origin steelhead associated with that program. Takes of steelhead for this proposed program would overlap with that Touchet River summer steelhead program and would be covered under that permit.

## Indicate contingency plans for addressing situations where take levels within a given year have exceeded, or are projected to exceed, take levels described in this plan for the program.

Exceedance of "take" to either summer steelhead or bull trout is not expected from broodstock collection activities, or other monitoring and evaluation activities. In addition, "take" of these two other species will be covered under different permits/Biological Opinions, so there shouldn't be an issue. If for some reason take levels are anticipated to exceed projections from any of the permits, the associated activities will be stopped and consultation will be re-initiated with NOAA Fisheries.

**Table 9. Touchet River steelhead [a] trapping results at the DAT, 1992-1994 and 1998-2014 run years (year that they entered freshwater to generally early June of the following year). Note that the numbers in parentheses as captured at the trap represent fresh steelhead that are designated as adult returns for the new run year (based on brightness and condition of fish).**

| | Number Captured at Trap | | | | | Number Passed Upstream | | | Percent Passed Upstream | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Run Year | Total | Natural Stock | LFH Stock | Endemic Stock | Total Hatchery | Natural Stock [b] | LFH Stock | Endemic Stock | Natural Stock | LFH Stock | Endemic Stock | Total Hatchery |
| 1992-93 | 61 | 53 | 8 | | 8 | 49 | 7 | | 77.8% | 11.1% | 0.0% | 11.1% |
| 1993-94 | 45 | 43 | 2 | | 2 | 43 | 2 | | 91.5% | 4.3% | 0.0% | 4.3% |
| 1994-95 | 10 | 8 | 2 | | 2 | 8 | 2 | | 66.7% | 16.7% | 0.0% | 16.7% |
| | No adult trapping was conducted in 1995-1997 | | | | | | | | | | | |
| 1998-99 | 49 | 42 | 7 | | 7 | 42 | 7 | | 75.0% | 12.5% | 0.0% | 12.5% |
| 1999-00 | 34 | 31 | 3 | | 3 | 9 | 0 | | 100.0% | 0.0% | 0.0% | 0.0% |
| 2000-01 | 217 | 180 | 37 (5) | | 37 | 142 | 8 | | 89.9% | 5.1% | 0.0% | 5.1% |
| 2001-02 | 193 | 174 (1) | 19 (10) | | 19 | 134 | 4 | | 94.4% | 2.8% | 0.0% | 2.8% |
| 2002-03 | 130 | 118 | 11 (1) | 1 | 12 | 82 | 1 | 1 | 95.3% | 1.2% | 1.2% | 2.3% |
| 2003-04 | 144 | 101 | 27 (1) | 16 | 43 | 72 | 1 | 16 | 67.9% | 0.9% | 15.1% | 16.0% |
| 2004-05 | 141 | 86 | 44 (21) | 11 | 55 | 42 | 16 | 11 | 43.8% | 16.7% | 11.5% | 28.1% |
| 2005-06 | 211 | 161 | 15 (1) | 35 | 50 | 135 | 0 | 34 | 66.5% | 0.0% | 16.7% | 16.7% |
| 2006-07 | 216 | 145 (2) | 27 (14) | 44 | 71 | 121 | 0 | 44 | 57.9% | 0.0% | 21.1% | 21.1% |
| 2007-08 | 165 | 119 | 19 (4) | 27 | 46 | 102 | 0 | 27 | 65.4% | 0.0% | 17.3% | 17.3% |
| 2008-09 | 249 | 148 (3) | 26 (1) | 75 | 101 | 129 | 0 | 75 | 46.2% | 0.0% | 26.9% | 26.9% |
| 2009-10 | 833 | 601 | 82 (40) | 150 (2) | 232 | 571 | 0 | 150 | 65.6% | 0.0% | 17.2% | 17.2% |
| 2010-11 | 456 | 334 (1) | 66 (35) | 56 | 122 | 300 | 0 | 56 | 72.8% | 0.0% | 13.6% | 13.6% |
| 2011-12 | 234 | 175 | 10 (6) | 49 | 59 | 153 | 0 | 49 | 61.0% | 0.0% | 19.5% | 19.5% |
| 2012-13 | 303 | 197 | 21 (2) | 85 | 106 | 163 | 0 | 84 | 49.2% | 0.0% | 25.4% | 25.4% |
| 2013-14 | 188 | 146 | 2 | 40 | 42 | 132 | 0 | 40 | 62.3% | 0.0% | 18.9% | 18.9% |
| Mean 2003-13 | | | | | | | | | 59.9% | 1.6% | 18.5% | 20.1% |

[a] All fish were at least 44 cm in length for inclusion here as adult steelhead. Fish < 44 cm were considered resident trout or juvenile steelhead.
[b] Natural stock passed upstream includes fish taken for hatchery broodstock that were returned to the river (either not used at the hatchery or were still alive when returned).
Source: Joe Bumgarner, WDFW; personal communication

# SECTION 3. RELATIONSHIP OF PROGRAM TO OTHER MANAGEMENT OBJECTIVES

## *3.1) Describe alignment of the hatchery program with any ESU-wide hatchery plan (e.g. Hood Canal Summer Chum Conservation Initiative) or other regionally accepted policies (e.g. the NPPC Annual Production Review Report and Recommendations - NPPC document 99-15). Explain any proposed deviations from the plan or policies.*

The program is consistent with the mitigation goals for LSRCP and the spring Chinook harvest goals outlined in the NPCC Walla Walla Subbasin Plan. It will follow the 1995 Integrated Hatchery Operations Team (IHOT) Policy and Procedures for Columbia Basin Anadromous Salmonid Hatcheries and be operated consistent with HSRG principles and recommendations (HSRG 2009a and 2009b).

## *3.2) List all existing cooperative agreements, memoranda of understanding, memoranda of agreement, or other management plans or court orders under which program operates.*

This program will be operated under LSRCP.

## *3.3) Relationship to harvest objectives.*

Carson stock spring Chinook are not listed under the ESA. It is anticipated that spring Chinook adults from this program will provide benefits to Columbia River fisheries. Adults from this program will be managed in mainstem Columbia River fisheries under the auspices of the *US v. Oregon* 2018-2027 Management Agreement (and future agreements). The production program in the Touchet River is not expected to adversely affect listed species or other stocks of concern beyond those effects currently allowable under non-jeopardy Biological Opinions for harvest in mainstem fisheries. In the future, adults from this program will also contribute to tributary fisheries in the Walla Walla and Touchet rivers.

### 3.3.1) Describe fisheries benefiting from the program, and indicate harvest levels and rates for program-origin fish for the last twelve years (1988-99), if available. *Also provide estimated future harvest rates on fish propagated by the program, and on listed fish that may be taken while harvesting program fish.*

Mainstem Columbia River sport, tribal and commercial fisheries are all expected to benefit from the program as well as tributary sport and tribal fisheries. There has been no recent tributary sport or tribal fisheries in the Touchet River for spring Chinook. Based on a planned SAR of 0.55%, it is expected that 1,375 fish will return to Walla Walla River basin once all age groups

are returning. Additional fish will also be taken in downriver fisheries in the Columbia River. Downriver harvest from CTUIR releases in the Walla Walla River are provided (Table 10). Harvest rates of fish once they return to the Walla Walla are still relative unknown as no active sport fisheries have occurred to date. Success of the sport fishery within the Walla Walla will depend on angling effort and river conditions at the time of the fishery.

**Table 10. Downriver harvest of spring Chinook released into the Walla Walla River between 2006 and 2012.**

| Release Year | CWT Code | Fishery Location Description | Number Recovered in Fishery | Expanded Recovered in Fishery from Sample Rate | Total Estimated (Expanded by Hatchery Tag Rate) |
|---|---|---|---|---|---|
| 2006 | 051573 | Bonneville to McNary Dam | 1 | 1 | 5.2 |
| | | Columbia River (OR) Sport Section 2 | 1 | 1 | 5.2 |
| | | Columbia River Zone 4 Net | 1 | 1 | 5.2 |
| | | Columbia River Zone 5 Net 45 | 2 | 3 | 15.6 |
| | | ***Totals*** | ***5*** | ***6*** | ***31.2*** |
| 2007 | 051572 | Columbia River (WA) Sport Section 1 | 1 | 4 | 18.4 |
| | | Columbia River (WA) Sport Section 2 | 1 | 4 | 18.4 |
| | | Columbia River (WA) Sport Section 3 | 1 | 4 | 18.4 |
| | | Columbia River Zone 4 Net | 2 | 4 | 18.4 |
| | | Columbia River Zone 4 Test Fishery | 1 | 1 | 4.6 |
| | | Columbia River Zone 5 Net 45 | 2 | 4 | 18.4 |
| | | **Totals** | ***8*** | ***21*** | ***96.6*** |
| 2008 | 052899 | Bonneville to McNary Dam | 8 | 33 | 118.8 |
| | | Columbia River (OR) Sport Section 2 | 1 | 4 | 14.4 |
| | | Columbia River (OR) Sport Section 3 | 1 | 4 | 14.4 |
| | | Columbia River (WA) Sport Section 6 | 1 | 4 | 14.4 |
| | | Columbia River (WA) Sport Section 3 | 1 | 4 | 14.4 |
| | | Columbia River Zone 1 Net 21 | 4 | 8 | 28.8 |
| | | Columbia River Zone 2 Net | 1 | 2 | 7.2 |
| | | Columbia River Zone 3 Net | 1 | 2 | 7.2 |
| | | Westport – Shoreside | 1 | 1 | 3.6 |
| | | Young Bay Net Zone | 1 | 2 | 7.2 |
| | | ***Totals*** | ***20*** | ***64*** | ***230.4*** |
| 2009 | 052968 | No Recoveries | NA | NA | NA |
| 2010 | 053275 | No Recoveries | NA | NA | NA |
| 2011 | NA | No Releases Available This Year | NA | NA | NA |
| 2012 | 615401 | Bonneville to McNary Dam | 1 | 14 | 56.0 |
| | | Columbia River (OR) Sport Section 3 | 1 | 4 | 16.0 |
| | | ***Totals*** | **2** | **18** | ***70.0*** |

## *3.4) Relationship to habitat protection and recovery strategies.*

There are many ongoing habitat improvement projects throughout the Walla Walla and Touchet river basins. However, since the hatchery program is designed for harvest mitigation, the primary benefit to the success of the hatchery program will be primarily related to juvenile and adult fish passage improvements.

Juvenile and adult passage improvements have been ongoing since 1997. In the Touchet and lower Walla Walla, these include removal of a decommissioned diversion dam, construction of a new juvenile screening system at a large irrigation diversion, one diversion consolidation with new screens and two new or upgraded adult fish ladders. In addition, many new or improved fish screens have been added to smaller pumps and diversions throughout the basin. There are additional juvenile screen and adult passage projects currently in the planning stages as well.

## *3.5) Ecological interactions.*

(1) Interactions with species that could negatively impact program: The program may be negatively affected by a variety of freshwater and marine predators during migration periods such as bull trout, northern pikeminnow, smallmouth bass, walleye, seagulls, cormorants, Caspian terns, pelicans, and pinnipeds – all of which could significantly reduce overall survival rates of program fish to the ocean, and upon adult return.

(2) Interactions with species that could be negatively impacted by program: Co-occurring natural steelhead and bull trout populations in the Walla Walla and Touchet rivers, and ESA listed salmon and steelhead populations in the mainstem Columbia River could be negatively impacted by co-mingling with program fish in migration corridors. Impacts could potentially occur from competition for food and rearing space, predation (very small likelihood), disease transmission, or density dependent effects. In order to minimize the potential for these effects, program fish are planned to be released as full-term yearling smolts in the upper part of the Touchet River basin during the major outmigration period typically seen for spring Chinook. The intent of this action is to limit interaction with listed steelhead and bull trout juveniles within the sub-basin by releasing fish at a size and time which would expedite outmigration from the basin. The program will also follow protocols outlined by IHOT (1995) to minimize the potential for disease transmission.

(3) Interactions with species that could positively impact program: None

(4) Interactions with species that could be positively impacted by program: Even though the program is for harvest mitigation, not all fish will be removed from the stream resulting in a benefit to other salmonid species in the basin by contributing marine derived nutrients from decaying carcasses that has the potential to increase overall stream productivity. In addition, migrating hatchery fish may overwhelm predator populations, providing a potential protective effect to natural steelhead and bull trout, both instream, and in the migration corridor. Further, should spring Chinook that escape the fishery and spawn naturally, their offspring will provide a potential additional prey item for listed bull trout in the basin.

# SECTION 4. WATER SOURCE

### *4.1) Provide a quantitative and narrative description of the water source (spring, well, surface), water quality profile, and natural limitations to production attributable to the water source.*

Incubation and rearing will take place at LFH. A total of nine production wells provide water for the facility with a maximum water right of up to 119.5 cfs or 53,300 gpm of nearly constant $52^0$F, pathogen-free water. Discharge from LFH complies with all NPDES standards and enters the Snake River and will not affect Touchet River water quality.

Adult holding/spawning will occur initially at Carson NFH. For water source details at Carson NFH, refer to USFWS HGMP for that facility.

### *4.2) Indicate risk aversion measures that will be applied to minimize the likelihood for the take of listed natural fish as a result of hatchery water withdrawal, screening, or effluent discharge.*

The LFH Complex facilities currently operates under the "Upland Fin-Fish Hatching and Rearing" National Pollution Discharge Elimination System (NPDES) general permit which conducts effluent monitoring and reporting and operates within the limitations established in its permit administered by the Washington Department of Ecology (DOE), WAG 13-7006. Monthly and annual reports on water quality sampling, use of chemicals at this facility, compliance records are available from DOE. Water withdrawal at LFH is through wells, and effluent is discharged to the Snake River, complying with NPDES standards.

Water intake screens at Dayton AP meet current NMFS 2011c screening guidelines, and effluent discharge is monitored, reported, and currently complies with NPDES standards. The permit administered by the DOE, WAG 13-7004 for Dayton was no longer required as of July 2006.

## SECTION 5. FACILITIES

### *5.1) Broodstock collection facilities (or methods).*

Initially, all adult spring Chinook broodstock will be collected at Carson NFH. For details, refer to USFWS HGMP for that facility.

In the long term, it is anticipated that broodstock will be collected at the DAT (Photo 1). A bar rack 2/3 of the way up the fish ladder is installed annually to preclude volitional upstream migration through the ladder, with all fish using the ladder diverted into the trapping area, just adjacent to the bar screen so little searching is required. However, since this is a new program, it is unknown at this time if the full broodstock complement can be achieved solely at the DAT. Additional brood may be required from other Carson Stock programs.

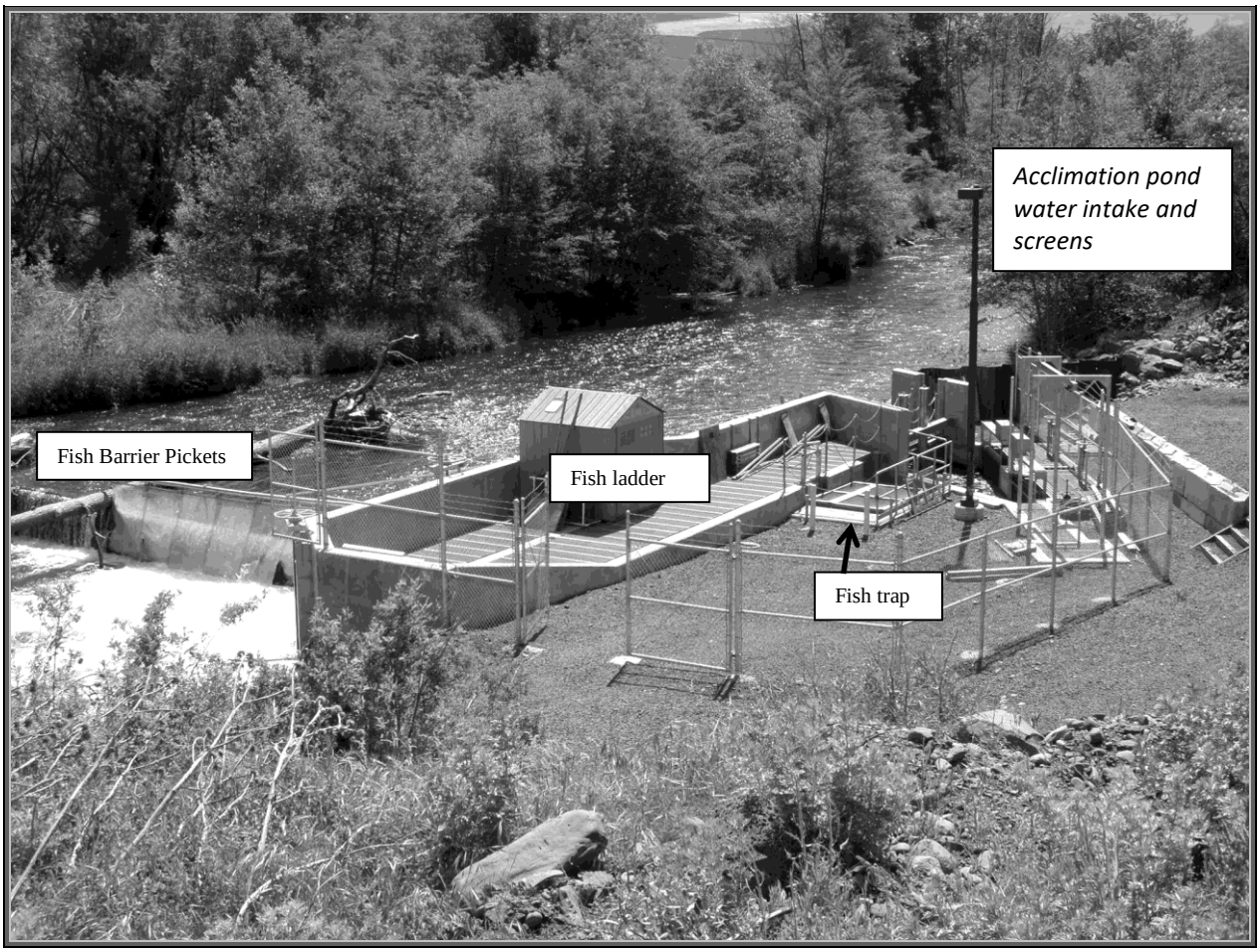



**Photo 1. Dayton Adult Fish Ladder, adult trap, and water diversion structure.**

## *5.2) Fish transportation equipment (description of pen, tank truck, or container used).*

Adult broodstock hauled from DAT will be transported in a stainless steel, 500 gallon tank on the back of a flatbed truck. The tank is equipped with supplemental oxygen and aerators. Transportation time to LFH is about 45 minutes. Up to 30 adults can be transported in the tank at one time, dependent on size of fish being hauled.

## *5.3) Broodstock holding and spawning facilities.*

Initially, all adult spring Chinook broodstock will be held and spawned at Carson NFH. For details on broodstock and holding facilities at Carson NFH, refer to USFWS HGMP for that facility.

Broodstock captured at the DAT would be hauled to LFH where they are held in an adult holding raceway (3.1 m x 1.8 m x 24.4 m) that receives constant temperature well water ($52^0$F).

The adult holding raceways are enclosed over the middle one-third by the spawning building. Additional netting will be placed over the ends of the raceways to prevent fish from jumping out.

## *5.4) Incubation facilities.*

Initially, green eggs and semen will be collected at Carson NFH, with gametes transported to LFH for fertilization, incubation and rearing. The incubation room at LFH receive constant $52^0$ F well water and have vertical tray incubation stacks. The incubation room holds four banks of 28 stacks, which hold 1,568 usable Heath trays. Each stack has its own water source, and is single use flow through. Each female will be individually incubated through eye-up. After eye-up is complete, eggs will be combined and placed in back into Heath trays (~5,000 eggs/tray) with substrate (Vexar screening). Eggs will hatch in the incubation trays and fry will be ponded to outside raceways at LFH.

## *5.5) Rearing facilities.*

When the incubating fry have completely absorbed their yolk sac, they are ponded in standard raceways (3.1 x 1.1 x 30.5 m) for rearing.

## *5.6) Acclimation/release facilities.*

No acclimation is planned, all fish will be direct stream released (see Section 1.5).

## *5.7) Describe operational difficulties or disasters that led to significant fish mortality.*

For details on Carson NFH, refer to USFWS HGMP for that facility.

In the past there have been issues at LFH with bird predation. In 2000, there was an estimated loss due to bird predation of 25% for 1998 brood year fall Chinook juveniles. These fish were being reared in one of the lakes at LFH for yearling production. Since then, netting has been installed over all rearing ponds and raceways to deter avian and mammalian predators. Netting has proven very effective in reducing losses to predation.

## *5.8) Indicate available back-up systems, and risk aversion measures that will be applied, that minimize the likelihood for the take of listed natural fish that may result from equipment failure, water loss, flooding, disease transmission, or other events that could lead to injury or mortality.*

Fish propagated in this program are not ESA listed, so on-station risk aversion measures for listed fish are not applicable. In addition to the screening measures mentioned in Section 5.6,

fish health practices will follow the Control Policy of the Fisheries Co-Managers of Washington State (WDFW and WWTIT 1998, updated 2006) and IHOT guidelines (1995).

# SECTION 6. BROODSTOCK ORIGIN AND IDENTITY

Describe the origin and identity of broodstock used in the program, its ESA-listing status, annual collection goals, and relationship to wild fish of the same species/population.

## *6.1) Source.*

Carson stock spring Chinook from Carson NFH.

## *6.2) Supporting information.*

### 6.2.1) History.

Development of the Carson spring Chinook stock occurred from 1955 through 1964. Approximately 500 spring Chinook salmon were trapped annually at Bonneville Dam on the Washington side of Columbia River and transported to the holding ponds at Carson NFH. Genetic data indicate that the Carson stock was derived from a mixture of upper Columbia and Snake River populations passing Bonneville Dam (Campton 2000 draft). Adult fish were held and spawned, with their progeny reared and released at Carson NFH. The first returns to Carson NFH occurred in 1959 when 107 fish entered the hatchery (99 jacks, 2 adult females and 6 adult males). This run of spring Chinook has been maintained since. Carson-origin spring Chinook eggs, fry, and fingerlings have been transferred to a wide range of localities within the northwest, including Alaska. In addition to Carson NFH, this stock is currently being propagated at Leavenworth and Little White Salmon NFHs, and Umatilla Hatchery.

The current juvenile release program in the South Fork Walla Walla River also uses Carson stock smolts from Carson NFH (2009 to present) and previously, Little White Salmon NFH (2005 to 2008). The adult out-planting program in the basin (including the Touchet River) has also used Carson stock adults from Ringold Hatchery and the Umatilla River.

### 6.2.2) Annual size.

It is estimated that 150-176 brood (at 1:1 Male : Female ratio) need to be collected.

### 6.2.3) Past and proposed level of natural fish in broodstock.

None

### 6.2.4) Genetic or ecological differences.

None. Native Touchet and Walla Walla river spring Chinook have been extirpated since the early 1900's. It is anticipated that all adult returns to the Walla Walla Basin in the future will be progeny of either Carson stock adult out-plants or juvenile releases within the Walla Walla or Touchet rivers.

### 6.2.5) Reasons for choosing.

Carson stock was selected due to its availability from Carson NFH, and due to its existing use in the Walla Walla basin.

## *6.3) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish that may occur as a result of broodstock selection practices.*

No effects from broodstock are expected at Carson NFH and it is unlikely that broodstock selection practices at the DAT will have any impact on listed summer steelhead or bull trout in the Touchet River. If any steelhead or bull trout are collected during brood trapping, they would be immediately released unharmed upstream of the DAT.

# SECTION 7. BROODSTOCK COLLECTION

## *7.1) Life-history stage to be collected (adults, eggs, or juveniles).*

Adult spawners returning to Carson NFH or Touchet River (DAT) will be collected. However, since this is a new program, additional brood may be collected from other Carson Stock program (i.e. Umatilla, Walla Walla) should the need arise.

## *7.2) Collection or sampling design.*

Adult spring Chinook return to Carson NFH from May to August. Fish are collected from throughout the spectrum of the run. In the future, after returns to the Touchet River become established, we plan to collect 100% of the broodstock at the DAT. Other Carson Stock programs may be requested for brood/eggs if shortfalls in brood collection occur at DAT.

## *7.3) Identity*

Adults (hatchery or natural origin) that return to the DAT will be used for broodstock. Any hatchery and natural origin fish returning to DAT will be assumed to be of Carson stock origin. All coded-wire tags collected from broodstock fish will be reported after spawning is complete.

## *7.4) Proposed number to be collected:*

### 7.4.1) Program goal (assuming 1:1 sex ratio for adults):

Current program goal for Carson NFH is to collect 1,400 adults and spawn 500 females and 500 males. This number allows for maintaining a 1:1 spawning criteria, to cull eggs from high titer BKD infected fish, and for any pre-spawning mortalities that may occur during the extended holding period of adults at the hatchery. This additional program would require another 150-176 adults (dependent on age and size of adults collected) at a 1:1 sex ratio, taking into account a 10% pre-spawning mortality rate, with approximately 67-75 females spawned (depending on fecundity). The number needed will likely vary annually due to differences in fish fecundity and resultant in-hatchery survival rates by life stage.

### 7.4.2) Broodstock collection levels for the last twelve years (e.g. 1988-99), or for most recent years available

Refer to Carson NFH HGMP.

## *7.5) Disposition of hatchery-origin fish collected in surplus of broodstock needs.*

Refer to Carson NFH HGMP for disposition of broodstock spawned there. In the future, any adults not collected for brood at DAT on the Touchet River will be passed upstream of the DAT to spawn naturally.

## *7.6) Fish transportation and holding methods.*

No transportation of broodstock is necessary as adults are trapped and held on site at Carson NFH. For a description of holding methods refer to the Carson NFH HGMP.

Adults collected from the DAT would be transported in 500 gallon tank trucks with re-circulation aeration and/or oxygenation. Hauling time from the Touchet trap site to LFH is approximately 45 minutes. A hauling guideline of no more than one adult per ~17 gallons (30 fish) of water will be applied.

Broodstock will be held at LFH in an adult holding raceway (3.1 m x 1.8 m x 24.4 m) that receives constant temperature well water. Holding criteria will follow the IHOT guidelines.

## *7.7) Describe fish health maintenance and sanitation procedures applied.*

Refer to Carson NFH HGMP for procedures at that facility.

Under current WDFW guidelines, adults collected at DAT would not be injected with prophylactic treatments (Oxytetracycline or Draxxin) at this time. However, future injection could occur with either treatment depending on future results/outbreaks in juveniles.

Because of very low numbers of adults held in broodstock raceways, raceway cleaning is unnecessary. Fish will be treated with formalin to control fungal infections at a maximum concentration of 167 ppm, for one hour, every other day.

## *7.8) Disposition of carcasses.*

Refer to Carson NFH HGMP for procedures at that facility.

All spring Chinook broodstock carcasses spawned at LFH will be landfilled on-site. There are no plans to use these for nutrient enhancement since they will have been injected, treated with formalin and anesthetized with MS-222.

## *7.9) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the broodstock collection program.*

Refer to Carson NFH HGMP for procedures at that facility.

Broodstock collection activities would likely occur in May and June at DAT and will entail some level of trapping, anesthetizing, handling and releasing of summer steelhead and bull trout.

Risk aversion measure would follow those outlined in the Touchet STS HGMP as follows:

1) During spring Chinook broodstock trapping, measures will be taken to ensure the trap holding area is free of sharp objects that may cause injury to natural origin fish (i.e. steelhead or bull trout that may be captured at the same time). The current trap is located behind a secure fenced area. All fish handled (either to be passed or collected for broodstock) are first placed in an 8 inch PVC trough (top 1/3 removed) with caps on the ends to hold water. Electronarcosis (60V max) is used to calm the fish for handling and taking biological samples (i.e. scales, DNA, fork length, sex, external condition, identifying marks, etc.) without the use of anesthetic.

2) Disease control efforts at LFH (in accordance with PNWFHC and IHOT standards) will effectively control expansion of species specific or general salmonid diseases to other “listed” hatchery fish at LFH.

# SECTION 8. MATING

Describe fish mating procedures that will be used, including those applied to meet performance indicators identified previously.

## *8.1) Selection method.*

Refer to Carson NFH HGMP for male and female selection criteria.

At LFH, all males and females that have been collected for broodstock will be examined weekly during the spawning season to determine ripeness, and all fish will be spawned when ripe. Fish are anesthetized using MS-222 to determine degree of ripeness. Based on the Tucannon River spring Chinook program, it's anticipated that 4-6 spawning events will occur during the season.

## *8.2) Males.*

Refer to Carson NFH HGMP for male selection. Initially at Carson NFH, semen will be collected in plastic whirl pack bags with oxygen added, and placed in a cooler with ice for transport back to LFH where the actual fertilization will take place.

Males (may include jacks) will be used at a proposed rate of one ripe male for every ripe female (1:1) and will be randomly selected from the broodstock population. Males may be used on multiple females if males are in short supply. Jacks may be incorporated into the broodstock at a maximum rate of 1:10 adult males.

## *8.3) Fertilization.*

Refer to Carson NFH HGMP for female selection. Initially at Carson NFH, eggs will be collected in large zip lock bags and placed in a cooler with ice for transport back to LFH where the actual fertilization will take place.

At times, the small number of fish ripe on individual days may limit spawning options. Males (including jacks) will usually be limited to primary status on only one female. When insufficient males are available though, they can be used as primary multiple times.

Females will be killed and bled by severing the gill arch. The eggs from each female will be stripped into a bucket lined with a plastic bag, and placed in a cooler to hold while males are being spawned.

Males will be killed, and the milt stripped directly into whirlpak bags. Whirlpak bags of semen are placed in a cooler until enough males are spawned for the day. After the eggs are fertilized with the milt they will be placed into an iodophor solution (100ppm) and allowed to water-harden for one hour.

In addition to using an iodophor solution for washing and water hardening to control vertical transmission of pathogens including IHNV and *Renibacterium salmoninarum* (BKD), an egg culling program will also be implemented to control BKD. The goal of the program will be to only use eggs from females with ELISA titer OD values <0.200.

### *8.4) Cryopreserved gametes.*

Cryopreservation of gametes does not occur at Carson NFH and is not planned for this program.

### *8.5) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic or ecological effects to listed natural fish resulting from the mating scheme.*

It is extremely unlikely that mating protocols for spring Chinook at either Carson NFH or LFH will have any impact on listed steelhead in the Touchet River.

## SECTION 9. INCUBATION AND REARING

Specify any management *goals* (e.g. "egg to smolt survival") that the hatchery is currently operating under for the hatchery stock in the appropriate sections below. Provide data on the success of meeting the desired hatchery goals.

### *9.1) Incubation*

#### 9.1.1) Number of eggs taken and survival rates to eye-up and/or ponding.

The goal for the program is to collect 285,000 green eggs from either Carson NFH (initially) or LFH (future) to produce 250,000 smolts.

Planned survival goals at LFH are:

- Green Egg to Eye-Up = 96.0%
- Eye-up to Smolt Release = 92.0%

#### 9.1.2) Cause for, and disposition of surplus egg takes.

The goal of the program is to stay within the IHOT guidelines of ± 10% of the egg take goal. The number of spawned females and their approximate age/fecundity will be monitored throughout the spawning season. If it appears eggtake needs will be met before spawning is complete, any additional females and males not needed would be taken back to the Touchet River for adult outplaning. As such, additional eggs are not anticipated.

Disposition of eggs over this amount has not been discussed at this time, but if needed, the initial intent would be to deal with the excess at the eyed fry stage. Fish would likely be planted as unfed fry in the upper Touchet River.

### 9.1.3) Loading densities applied during incubation.

Loading rate would be one female/Heath tray.

### 9.1.4) Incubation conditions.

Flow rate in the Heath units will be three to five gpm/single stack. Water supplied to Heath stacks is constant $52^0$F pathogen-free well water.

### 9.1.5) Ponding.

After the eggs have hatched and the fry are buttoned-up, fish are taken out of the incubation stacks and placed in outside rearing raceways. Fish are immediately introduced to a starter diet, with all mortalities removed each day from the pond. Fish will remain in the outside raceways or a large rearing lake (335 m x 27 m x 2 m; volume = 18,090 $m^3$) the entire time they are at LFH. Splitting into other raceways may occur, but will depend on densities. LFH guidelines for early rearing densities are generally not to exceed 0.2 lbs/$ft^{3)}$ to reduce BKD risk. At ponding, fry would be loaded at a rate not to exceed maximum loading at marking/tagging time.

### 9.1.6) Fish health maintenance and monitoring.

Green eggs will be water-hardened in 100 ppm iodophor for one hour. Eggs will be treated with formalin at a concentration of 600 ppm. After eyeing, dead eggs are picked and removed. Green eggs received at LFH from Carson NFH will be disinfected in iodophor at a 100ppm for 15 minutes as soon as they arrive, per WDFW fish health guidelines.

### 9.1.7) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish during incubation.

It is extremely unlikely that incubation practices will have any impact on listed steelhead in Touchet River.

## *9.2) Rearing.*

### 9.2.1) Provide survival rate data (*average program performance*) by hatchery life stage (fry to fingerling; fingerling to smolt) for the most recent twelve years (1988-99), or for years dependable data are available.

Planned survival goals at LFH are:

- Green Egg to Eye-Up = 97.0%
- Eye-up to Smolt Release = 93.0%

These are the survival rates expected based on WDFW experience rearing Tucannon River spring Chinook at LFH.

### 9.2.2) Density and loading criteria (goals and actual levels).

Planned maximum program goals are as follows:

| | Early Rearing | Final Rearing |
|---|---|---|
| Density Index | 0.90 lbs/$ft^3$/in | 0.20 lbs/$ft^3$/in |
| Flow Index | 1.65 lbs/gpm/in | 1.65 lbs/gpm/in |

### 9.2.3) Fish rearing conditions.

At LFH, raceways and large rearing lakes are supplied with pathogen free, oxygenated well water from the hatchery's central degassing building. Approximately 1,000 gpm of water of nearly constant $52^0$F enters each north raceway, 650 gpm enters each south raceway, 750 gpm in the adult ponds, and 3,500 to 5,000 gpm go into the large rearing lakes. Oxygen levels in the raceways range between 10-12 ppm entering, to 8-10 ppm leaving the raceway, depending on ambient air temperature and number of fish in the raceway. Oxygen levels in the large rearing lakes don't change due to wave action and natural surface exchange. Flow index (FI) is monitored monthly at all facilities and rarely exceeds 80% of the allowable loading. Raceways are vacuumed to remove accumulated uneaten feed and fecal material. Feeding is by hand presentation in raceways, or from a truck mounted blower for lake feeding. In 2001, netting was installed over the large rearing lakes to control avian predation. In 2005, netting was installed on the south and north raceways to minimize bird predation and disease transfer by predators. See also sections 9.1.5 and 9.2.2

### 9.2.4) Indicate biweekly or monthly fish growth information (*average program performance*), including length, weight, and condition factor data collected during rearing, if available.

Planned length and weight at the end of each month are presented below. Presented are the expected growth rates based on WDFW experience rearing Tucannon River spring Chinook at LFH.

| Month | Weight (#/lb) | Length (in) |
|---|---|---|
| November | 1600 | 1.27 |
| December | 1100 | 1.45 |
| January | 300 | 2.22 |
| February | 200 | 2.55 |
| March | 125 | 2.99 |
| April | 80 | 3.45 |
| May | 60 | 3.80 |
| June | 50 | 4.05 |
| July | 40 | 4.37 |
| August | 35 | 4.57 |
| September | 25 | 5.10 |
| October | 20 | 5.49 |
| November | 18 | 5.69 |
| December | 16 | 5.91 |
| January | 15 | 6.05 |
| February | 14 | 6.18 |
| March | 13 | 6.34 |
| Mid-April (release) | 12 | 6.51 |

### 9.2.5) Indicate monthly fish growth rate and energy reserve data (*average program performance*), if available.

Refer to table in Section 9.2.4.

### 9.2.6) Indicate food type used, daily application schedule, feeding rate range (e.g. % B.W./day and lbs/gpm inflow), and estimates of total food conversion efficiency during rearing (*average program performance*).

Fry/fingerlings/smolts will all be fed started and fry feeds adequate for good fish culture (e.g. Bio-Vita starter and Bio-Clarks Fry feed). Actual brands may vary over time based on state contracts and other needs, providing flexibility to the program. Fry are started at 2-3% BWD and rations are reduced to 0.5-1.1% to as fish increase in size. The average feed conversion is expected to fall in a range of 0.85 – 1.0 pounds fed to pounds produced.

### 9.2.7) Fish health monitoring, disease treatment and sanitation procedures.

Fish health monitoring will, at a minimum, follow those guidelines described in the fish health section of the Integrated Hatchery Operations Team (IHOT) Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (1995). A WDFW fish health specialist monitors fish health as least monthly. More frequent care is provided as needed if disease is noted. Treatment for disease is provided by Hatchery Specialists under the direction of the Fish

Health Specialist. Sanitation consists of raceway vacuuming to remove uneaten feed and fecal material. Equipment is disinfected between raceways and/or between species at the hatchery.

### 9.2.8) Smolt development indices (e.g. gill ATPase activity), if applicable.

Pre-liberation samples will visually note smolt development based on degree of silvering, presence/absence of parr marks. No gill ATPase activity or blood chemistry samples to determine degree of smoltification, or to guide fish release timing is anticipated.

### 9.2.9) Indicate the use of "natural" rearing methods as applied in the program.

No "Natures" rearing strategies are identified for the program. However, fish in this program will spend a considerable amount of time in one of the large rearing lakes at LFH, which have been shown to have natural prey items available to fish based on food conversion rates observed by hatchery staff.

### 9.2.10) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish under propagation.

No listed fish are under propagation in this program.

## SECTION 10. RELEASE

Describe fish release levels, and release practices applied through the hatchery program.

### *10.1) Proposed fish release levels.*

| Age Class | Number | Size (fpp) | Release Date | Location |
|---|---|---|---|---|
| Yearling | Up to 165,000 | 12 | Mid March-to-Mid April | Touchet River (near Dayton) |
| Yearling | Up to 110,000 | 12 | Mid March-to-Mid April | Touchet River (North Fork and Wolf Fork Drainages) |

### *10.2) Specific location(s) of proposed release(s).*

**Stream, river, or watercourse**: Touchet River
**Release point**: Variable Direct Stream release locations as described above.
**Major watershed**: Touchet River
**Basin or Region**: Walla Walla Basin, Mid-Columbia River Region

### *10.3) Actual numbers and sizes of fish released by age class through the program.*

No releases have occurred from the program. See Section 10.1 for program release goals.

## *10.4) Actual dates of release and description of release protocols.*

The scheduled release date would be Mid-March to Mid-April. All fish will be direct stream released.

## *10.5) Fish transportation procedures, if applicable.*

Transit time from LFH to the Touchet River release sites is approximately 45 minutes. Fish will be hauled at a maximum density of 1lb/g of water, and most likely at 0.75lbs/g of water. Water temperature and dissolved oxygen levels will be monitored in the tank during transportation and the water temperature will be checked at the release site to ensure there is minimal difference between transport tanks and receiving waters. If the temperature between the transport tank and the Touchet River is more than $10^0$F different, the water in the transport tank will be tempered with the river water to get temperatures within no more than $10^0$F difference.

## *10.6) Acclimation procedures.*

No acclimation is planned at this time.

## *10.7) Marks applied, and proportions of the total hatchery population marked, to identify hatchery adults.*

All fish will be adipose clipped prior to release to identify them as hatchery origin upon return. In addition, 85,000 (approximately 1:3) will receive a coded-wire tagged for production evaluation and stray monitoring. A portion of each release group will also be PIT-tagged (initially start with 15,000 PIT tags (~6%). Tagging levels may be reduced in the future if it appears that this group of fish do not stray into the Tucannon River, or other sensitive locations.

## *10.8) Disposition plans for fish identified at the time of release as surplus to programmed or approved levels.*

The intent will be to deal with any surplus over the IHOT 10% guideline, identifiable at the egg stage, with unfed fry plants planned to eliminate any overage. We do not anticipate any smolt surplus because of these measures.

## *10.9) Fish health certification procedures applied pre-release.*

Fish will be examined by a WDFW Fish Health Specialist and certified for release as required under the WDFW and WWTIT (2006), and PNWFHPC (1989) guidelines.

## *10.10) Emergency release procedures in response to flooding or water system failure.*

Professional personnel trained in fish cultural procedures are present at LFH. Facilities are state-of-the-art to provide a safe and secure rearing environment through the use of alarm systems, backup generators, and water re-use pumping systems to prevent catastrophic fish losses. Should other measures fail or not be available because they are dedicate to other ESA listed groups of fish at Lyons Ferry (i.e. Snake River fall Chinook, Tucannon spring Chinook, etc…), since these fish are not listed, and only used for harvest mitigation, they would not be released from Lyons Ferry and would have to be sacrificed.

## *10.11) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from fish releases.*

Fish will be reared to smolt stage and released during the primary migration period to minimize the time spent in the migratory corridor. This minimizes potential interaction with any listed fish in the Touchet, Walla Walla and Columbia rivers. In addition, pre-release disease sampling will be conducted to ensure fish are in good health and to minimize the risk of disease transmission.

# SECTION 11. MONITORING AND EVALUATION OF PERFORMANCE INDICATORS

## *11.1) Monitoring and evaluation of "Performance Indicators" presented in Section 1.10.*

### 11.11.1) Describe plans and methods proposed to collect data necessary to respond to each "Performance Indicator" identified for the program.

A basic monitoring and evaluation plan is anticipated for this program. As stated in Section 10.7, the group will have associated CWT and PIT tag groups in order to evaluate performance in relation to meeting the LSRCP mitigation goal and to address the Performance Indicators listed in Section 1.10. In addition to analysis of CWT return data. Returns will be enumerated at the DAT, spawning ground surveys, and creel surveys will be conducted to evaluate in-basin harvest contribution. Hatchery operations and effectiveness indicators will be monitored by hatchery staff.

One of the main concerns surrounding this program is the potential of program fish to stray into the Tucannon River, the nearest ESA listed spring Chinook population. There has been one CWT recovery of a hatchery fish from the Walla Walla program, and one wild origin spring Chinook that was tagged at a smolt trap in the Walla Walla, so spring Chinook from the Walla

Walla River basin have been seen in the Tucannon. However, the true rate of straying into the Tucannon River is still relatively unknown, but of potential concern.

Environmental conditions (temperature and stream flow) in the lower Walla Walla River is of a concern. Therefore, WDFW examined run timing of Carson stock spring Chinook into the Walla Walla based on PIT tags, and compiled that information with average stream temperatures and flow from gauges within the Walla Walla and Touchet Basin. A brief summary of that analysis is provided in Appendix A.

### 11.1.2) Indicate whether funding, staffing, and other support logistics are available or committed to allow implementation of the monitoring and evaluation program.

In hatchery monitoring will be conducted by existing hatchery staff under the LSRCP hatchery budget. Some additional M&E tasks have been identified for this program; the cost for these activities will be added in the existing LSRCP M&E budget when needed. Creel surveys will be funded with WDFW Columbia River Endorsement fund (*personal communication, Chris Donley, WDFW Regional Fish Program Manager, October 2016)*.

## *11.2) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse genetic and ecological effects to listed fish resulting from monitoring and evaluation activities.*

Potential take associated with monitoring and evaluation activities is discussed in Section 2.2.3. No additional measures are being considered at this time as monitoring and evaluation activities proposed are all considered benign to either summer steelhead or bull trout.

# SECTION 12. RESEARCH

## *12.1) Objective or purpose.*

There is no research proposed beyond normal program monitoring and evaluation.

## *12.2) Cooperating and funding agencies.*

N/A

## *12.3) Principle investigator or project supervisor and staff.*

N/A

### *12.4) Status of stock, particularly the group affected by project, if different than the stock(s) described in Section 2.*

N/A

### *12.5) Techniques: include capture methods, drugs, samples collected, tags applied.*

N/A

### *12.6) Dates or time period in which research activity occurs.*

N/A

### *12.7) Care and maintenance of live fish or eggs, holding duration, transport methods.*

N/A

### *12.8) Expected type and effects of take and potential for injury or mortality.*

N/A

### *12.9) Level of take of listed fish: number or range of fish handled, injured, or killed by sex, age, or size, if not already indicated in Section 2 and the attached "take table" (Table 1).*

N/A

### *12.10) Alternative methods to achieve project objectives.*

N/A

### *12.11) List species similar or related to the threatened species; provide number and causes of mortality related to this research project.*

N/A

## *12.12) Indicate risk aversion measures that will be applied to minimize the likelihood for adverse ecological effects, injury, or mortality to listed fish as a result of the proposed research activities.*

N/A

# SECTION 13. ATTACHMENTS AND CITATIONS

Beckman, B.,Walton W. Dickhoff, Waldo S. Zaug, Cameron Sharpe, Steve Hirtzel, Robin Schrock, Donald A. Larson, Richard D. Ewing, Aldo Palisano, Carl B. Schreck, and Conrad V. W. Mahnken. 1999. Growth, Smoltification, and Smolt-to-Adult Return of Spring Chinook Salmon from Hatcheries on the Deschutes River, Oregon. Transactions of the American Fisheries Society 128:1125-1150.

Blankenship, S.M., M.P. Small, J.D. Bumgarner, M. Schuck and G. Mendel. 2007. Genetic relationships among Tucannon, Touchet and Walla Walla River summer steelhead (O. mykiss) receiving mitigation hatchery fish from Lyons Ferry Hatchery – WDFW report.

Blankenship, S.M, M.P. Small and J. D Bumgarner. 2009. Temporal stability of genetic variation within natural populations of summer steelhead receiving mitigation hatchery fish. TAFS 138:1052-1064.

Bumgarner, Joseph D. and Jerry Dedloff. 2009 Lyons Ferry Complex Hatchery Evaluation: Summer Steelhead Annual Report 2006 and 2007 Run Year. Washington Department of Fish and Wildlife Fish Program / Science Division Hatchery & Wild Interactions Sub-Unit 600 Capital Way North Olympia, Washington 98501. Report to U.S. Fish and Wildlife Service Lower Snake River Compensation Plan Office 1387 Vinnell Way, Suite 343 Boise, Idaho 83709 Cooperative Agreements #s 141106J013, 141107J011

Bumgarner, Joseph D. and Jerry Dedloff. 2011. Lyons Ferry Complex Hatchery Evaluation: Summer Steelhead Annual Report 2008 and 2009 Run Year. Washington Department of Fish and Wildlife Fish Program / Science Division Hatchery & Wild Interactions Sub-Unit 600 Capital Way North Olympia, Washington 98501. Report to U.S. Fish and Wildlife Service Lower Snake River Compensation Plan Office 1387 Vinnell Way, Suite 343 Boise, Idaho 83709.

Bumgarner, Joseph D. and Jerry Dedloff. 2015. Lyons Ferry Complex Hatchery Evaluation: Summer Steelhead Annual Report 2012 Run Year. Washington Department of Fish and Wildlife Fish Program / Science Division Hatchery & Wild Interactions Sub-Unit 600 Capital Way North Olympia, Washington 98501. Report to U.S. Fish and Wildlife Service Lower Snake River Compensation Plan Office 1387 Vinnell Way, Suite 343 Boise, Idaho 83709.

Contor, Craig and Amy Sexton, editors. 2003. The Walla Walla Basin natural production monitoring and evaluation project. 1999-2002 progress report. The Confederated Tribes of the Umatilla Indian Reservation, Project No. 2000-030-00. Bonneville Power Administration, Portland, Oregon.

Contor, Craig R., Brian Mahoney and Tim Hanson. 2003. Juvenile salmonid monitoring: In Craig R. Contor and Amy Sexton, editors. 2003. The Walla Walla Basin natural production monitoring and evaluation project. 1999-2002 progress report. The Confederated Tribes of the Umatilla Indian Reservation, Project No. 2000-030-00. Bonneville Power Administration, Portland, Oregon.

Clarke, L.R., W. A. Cameron, R. S. Hogg, S. T. Onjukka, M. G. White, S. Benda, and S. A. Gee. 2016. Umatilla Hatchery Monitoring and Evaluation Annual Report: 2015. Annual progress report to the Bonneville Power Administration, project # 1990-005-00, Portland, Oregon.

Crawford, E., M. Schuck, and M. Herr. 2012. Asotin Creek Salmonid Assessment: 2011 Annual Report to Bonneville Power Administration. BPA Project Number 2002-053-00. 45 pages.

Gallinat, M.P. and L. A. Ross. 2011. Touchet River smolt trapping- 2015/16 Outmigration Assessment Brief. WDFW, Snake River Lab. annual report.

Gallinat, M.P. and L. A. Ross. 2012a. Touchet River Smolt Trapping – Dayton, Washington 2011/2012 Outmigration Assessment Brief. WDFW, Snake River Lab. Annual report.

Gallinat, M.P. and L. A. Ross. 2012b. Touchet River Smolt Trapping-Waitsburg, Washington 2011/2012 Outmigration Assessment Brief. WDFW, Snake River Lab. Annual report.

Gallinat, M.P. and L. A. Ross. 2013a. Touchet River Smolt Trapping – Dayton, Washington 2012/2013 Outmigration Assessment Brief. WDFW, Snake River Lab. Annual report.

Gallinat, M.P. and L. A. Ross. 2013b. Touchet River Smolt Trapping-Waitsburg, Washington 2012/2013 Outmigration Assessment Brief. WDFW, Snake River Lab. Annual report.

Gallinat, M.P. and L. A. Ross. 2016. Touchet River Smolt Trapping-Harvey Shaw Road, Washington 2015/2016 Outmigration Assessment Brief. WDFW, Snake River Lab. Annual report.

Gallinat, M.P., and L.A. Ross. 2015. Tucannon River Spring Chinook Salmon Hatchery Evaluation Program 2014 Annual Report to U.S. Fish and Wildlife Service, Cooperative Agreement F14AC00010. Washington Department of Fish and Wildlife, Olympia, Washington. Report FPA15-04. Appendix D.

HSRG (Hatchery Science Review Group). 2009a. Columbia River Hatchery Reform Project Final Systemwide Report. Appendix A. White Paper #4.

HSRG (Hatchery Science Review Group). 2009b. Columbia River Hatchery Reform Project Final Systemwide Report. Review and Recommendations. Walla Walla Spring Chinook Population and Related Hatchery Programs.

IHOT (Integrated Hatchery Operations Team). 1995. Policy and procedures for Columbia Basin anadromous salmonid hatcheries. Annual report 1994 to the Bonneville Power Administration, Portland, Oregon. Project # 92-043.

ICTRT (Interior Columbia Basin Technical Recovery Team). 2004. Preliminary Guidelines for Population-level Abundance, Productivity, Spatial Structure, and Diversity Supporting Viable Salmonid Populations: An Update. December 13, 2004. Available at: http://www.nwfsc.noaa.gov/trt/trt_viability.htm

Knudsen, C., Johnston M., Schroder, S., Bosch, W., Fast, D., Strom, C. 2009. Effects of Passive Integrated Transponder Tags on Smolt-to-Adult Recruit Survival, Growth, and Behavior of Hatchery Spring Chinook Salmon. North American journal of Fisheries Management 29:658-689.

Mahoney, Brian D., Michael Lambert, Travis Olsen, Eric Hoverson, Paul Kissner, and Jesse D. M Schwartz. 2006. Walla Walla Basin Natural Production Monitoring and Evaluation Project; 2004-05 Progress Report. Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon. Bonneville Power Administration Project No. 2000-039-00.

Mahoney B. D., Glen Mendel, Rey Weldert, Jeremy Trump, Joelle Pomraning, Michael Gembala and Michael Gallinat. 2011. Walla Walla Subbasin Monitoring and Evaluation Project: 2009 and 2010 Annual Report. Confederated Tribes of the Umatilla Indian Reservation and Washington Department of Fish and Wildlife, Report submitted to Bonneville Power Administration, Project No. 2000-039-00.

Mahoney, B.D., Glen Mendel, Rey Weldert, Jeremy Trump, Joelle Olsen, Michael Gembala, Michael Gallinat and Lance Ross. 2013. Walla Walla Subbasin Monitoring and Evaluation Project: 2012 Annual Report. Confederated Tribes of the Umatilla Indian Reservation and Washington Department of Fish and Wildlife, Report submitted to Bonneville Power Administration, Project No. 2000-039-00.

Mahoney, B.D., and Jesse Schwartz .D. 2015. 2014 Monitoring and Evaluation Plan for the Walla Walla Spring Chinook Hatchery Master Plan – public review draft. Confederated Tribes of the Umatilla Indian Reservation.

Department of Natural Resources Confederated Tribes of the Umatilla Indian Reservation and the Washington Department of Fish and Wildlife.

Mahoney, B.D., Rey Weldert, Joelle Olsen, and Alexandra Fitzgerald. 2015. Walla Walla Subbasin Salmonid Monitoring and Evaluation Report, 2014 Annual Report for Bonneville Power Administration, Portland, OR. BPA Project # 2000-039-00.

Mendel, Glen, David Karl and Terrence Coyle. 2000. Assessment of salmonid fishes and their habitat conditions in the Walla Walla River Basin of Washington: 1999 Annual Report. Project 1998-020-00. Bonneville Power Administration, Portland, Oregon. 86 pages.

Mendel, Glen, David Karl and Terrence Coyle. 2001. Assessment of salmonid fishes and their habitat conditions in the Walla Walla River Basin of Washington: 2000 Annual Report. Project 1998-020-00. Bonneville Power Administration, Portland, Oregon. 109 pages.

Mendel, Glen, Jeremy Trump and David Karl. 2002. Assessment of salmonid fishes and their habitat conditions in the Walla Walla River Basin of Washington: 2001 Annual Report. Project 1998-020-00. Bonneville Power Administration, Portland ,Oregon. 133 pages.

Mendel, Glen, Jeremy Trump and Mike Gembala. 2004. Assessment of salmonid fishes and their habitat conditions in the Walla Walla River Basin of Washington: 2003 Annual Report. Project 1998-020-00. Bonneville Power Administration, Portland, Oregon. 126 pages.

Mendel, Glen, Jeremy Trump, Mike Gembala, Scott Blankenship, and Todd Kassler. 2007. Assessment of salmonids and their habitat conditions in the Walla Walla River Basin of Washington. 2006 Annual Report for Project No. 19980200, Submitted to US DOE, Bonneville Power Administration, Portland Oregon.

Mendel, Glen, Brian D. Mahoney, Rey Weldert, Jeremy Trump, Joelle Olsen, and Alexandra Fitzgerald. 2014. Walla Walla Subbasin Monitoring and Evaluation Project: 2013 Annual Report. Confederated Tribes of the Umatilla Indian Reservation and Washington Department of Fish and Wildlife, Report submitted to Bonneville Power Administration, Project No. 2000-039-00.

Narum, Shawn R., Craig R. Contor, Andre Talbot and Matthew S. Powell. 2003. Genetic divergence of sympatric resident and anadromous forms of Oncorhynchus mykiss in the Walla Walla River in: Craig R. Contor and Amy Sexton editors. 2003. The Walla Walla Basin natural production monitoring and evaluation project. 1999-2002 progress report. The Confederated Tribes of the Umatilla Indian Reservation, Project No. 2000-030-00. Bonneville Power Administration, Portland, Oregon.

Narum, Shawn R., Craig R. Contor, Andre Talbot and Matthew S. Powell. 2004. Genetic divergence of sympatric resident and anadromous forms of Oncorhynchus mykiss in the Walla Walla River. Journal of Fish Biology 65, 471-488.

NMFS (National Marine Fisheries Service). 2009. Middle Columbia River Steelhead Distinct Population Segment ESA Recovery Plan. http://www.nwr.noaa.gov/Salmon-Recovery-Planning/Recovery-Domains/Interior-Columbia/Mid-Columbia/Mid-Col-Plan.cfm

Schwartz, Jesse D.M., Paul Kissner, Michael Lambert, Brian Mahoney, and Craig R. Contor. 2005. Walla Walla Basin Natural Production Monitoring and Evaluation Project; 2003 Progress Report. Confederated Tribes of the Umatilla Indian Reservation, Pendleton, Oregon. Bonneville Power Administration Project No. 2000-039-00.

Walla Walla County and Walla Walla Basin Watershed Council. 2004. Walla Walla Subbasin Plan. Prepared for the Northwest Power and Conservation Council.

# SECTION 14. CERTIFICATION LANGUAGE AND SIGNATURE OF RESPONSIBLE PARTY

"I hereby certify that the information provided is complete, true and correct to the best of my knowledge and belief."

Name, Title, and Signature of Applicant:

Certified by_____ Date:_____

# SECTION 15. PROGRAM EFFECTS ON OTHER (AQUATIC OR TERRESTRIAL) ESA-LISTED POPULATIONS. (Anadromous salmonid effects are addressed in Section 2)

## *15.1) List all ESA permits or authorizations for USFWS ESA-listed, proposed, and candidate salmonid and non-salmonid species associated with the hatchery program.*

When the current CTUIR 250,000 spring Chinook juvenile release program was initiated in the south Fork Walla Walla River, the USFWS issued a letter to CTUIR (dated 3/30/05) stating that the program was "not likely to cause negative impacts to the threatened bull trout in the basin". The USFWS also later developed a Biological Assessment for that existing program and conducted an internal consultation. In an internal memorandum (dated 7/26/07) they determined that the current program was "not likely to affect" the listed bull trout population in the basin.

Recent ESA consultation was completed for the WDFW summer steelhead programs in the Walla Walla and Touchet River. The USFWS completed their biological opinion on 12/22/2017. It was their opinion that "the action *(referring to the operation of the summer steelhead programs)*, as proposed, is not likely to jeopardize the continued existence of the bull trout, and it not likely to destroy or adversely modify designated critical habitat."

The proposed WDFW Touchet River spring Chinook program has identical actions as the summer steelhead programs (adult trapping, smolt releases, and spawning ground surveys), all of which have been determined to have minimal, to no effect, on bull trout. As such, a different determination would not be expected for this program.

## *15.2) Describe USFWS ESA-listed, proposed, and candidate salmonid and non-salmonid species and habitat that may be affected by hatchery program.*

### Listed Species

The Columbia River Bull Trout Distinct Population Segment was federally listed as threatened on June 10, 1998 (63 FR 31647). Bull trout (*Salvelinus confluentus*) exhibit two main life histories in the Walla Walla Basin, resident and migratory. Resident bull trout remain in their natal headwater stream for their entire life cycle, whereas migratory bull trout rear for one to four years in small streams and then migrate downstream to larger rivers, including migrating to and from the Columbia River (Marshall Barrows, USFWS, personal communication, 2011). Populations with different life histories may occupy the same stream.

Bull trout were listed as threatened in the Columbia Basin in 1998. The USFWS completed a bull trout Recovery Plan (USFWS 2015) with Recovery Unit Implementation Plans (of which the Walla Walla and Touchet are included). The upper Walla Walla River and Touchet River are identified as core population areas for bull trout. Local populations identified within the core area of the Walla Walla River include Mill Creek, and North and South Fork Walla Walla River. Local populations in the Touchet River basin include the North Fork, Wolf Fork, and South Fork (Burnt Creek) Touchet rivers. The following summary was taken from the Bull Trout Recovery Unit Implementation Plan for the Mid-Columbia Recovery Unit (USFWS 2015) – Touchet River Core Area.

*"As a tributary to the Walla Walla River, the Touchet River core area is part of the Lower Mid-Columbia Geographic Area in southeast Washington. The Touchet River drains the northern and northwestern portions of the Walla Walla Basin before entering the lower mainstem Walla Walla River about 21.6 miles (34.8 km) upstream of the Columbia River near the community of Touchet, Washington. The North Fork, South Fork and Wolf Fork feed into the Touchet River at the base of the Blue Mountains near the City of Dayton. Lewis Creek and Spangler Creek are main tributaries to the North Fork Touchet River, while the Burnt Fork is the main tributary to the South Fork Touchet River.*

*Historically bull trout were thought to be widely distributed in the Touchet River watershed (Mendel et al. 2003). Currently, local populations in the Touchet River core area occur in the North Fork, Wolf Fork, and in the Burnt Fork of the South Fork Touchet River (Kassler and Mendel 2007; Mendel et al. 2014). Both fluvial migratory and resident forms are present throughout. However, recent telemetry and PIT tag data indicate migratory bull trout in the Touchet River core area remain within the overall Walla Walla basin, foraging and overwintering in the lower Touchet drainage or mainstem Walla Walla River, and do not migrate further downstream into the Columbia River (Schaller et al. 2014). Kassler and Mendel (2007) determined that more than 50 percent of migratory bull trout in the Touchet River core area originate from the Wolf Fork population. Spawning also occurs in Spangler and Lewis Creeks; however, genetics from individuals from each tributary were not distinguishable from either North Fork or Wolf Fork individuals (Kassler and Mendel 2007). Redd counts in the North Fork and Wolf Fork between 1999 and 2013 suggest that these two local populations are stable (Mendel et al. 2014). However, redd count data for the Burnt Fork of the South Fork Touchet is more limited. Bull trout redds were first observed in 2000, but not detected in 2003 and 2004 (Mendel et al. 2004; Mendel et al. 2007; Mahoney et al. 2009; Fitzgerald pers. comm. 2015). Since 2005, access to complete surveys in the Burnt Fork has been restricted across private property (Mendel et al. 2014; A. Fitzgerald, pers. comm. 2015).*

*Elevated water temperatures from factors such as damaged riparian vegetation, increased sedimentation, and decreased water flows have reduced habitat quality for bull trout in the Touchet drainage (Mendel et al. 2003). Introduced brown trout and rainbow trout likely compete with native bull trout for food and habitat, while introduced non-native walleye and small mouth bass in the lower reaches of the Touchet and mainstem Walla Walla River pose a predatory risk to juveniles and sub-adults in the basin. There are a few partial or seasonal barriers to movement in the core area that limit connectivity between local populations. Flood control levees have confined the river and reduced channel complexity and wood recruitment. Recent climate change modeling indicates that the Touchet drainage is at high risk for reduced instream flows, elevated water temperatures, and reduced habitat suitability into the future and existing habitat threats will likely be exacerbated (Schaller et al. 2014)."*

Within the Touchet River, the status of bull trout appears to be viable, though maybe somewhat depressed (Figure 15-1). However, counts of bull trout at the DAT in the Touchet River showed an upward trend for a while (Figure 15-2), but numbers have dropped in recent years. A fish ladder was added and passage improvements were made to the DAT in 2008, so it

was first speculated that the increase in bull trout counts likely reflect improved passage and trapping conditions, but could have also been from increased numbers of bull trout. Based on recent returns to DAT, it would appear that returns were just higher than normal for a few years.

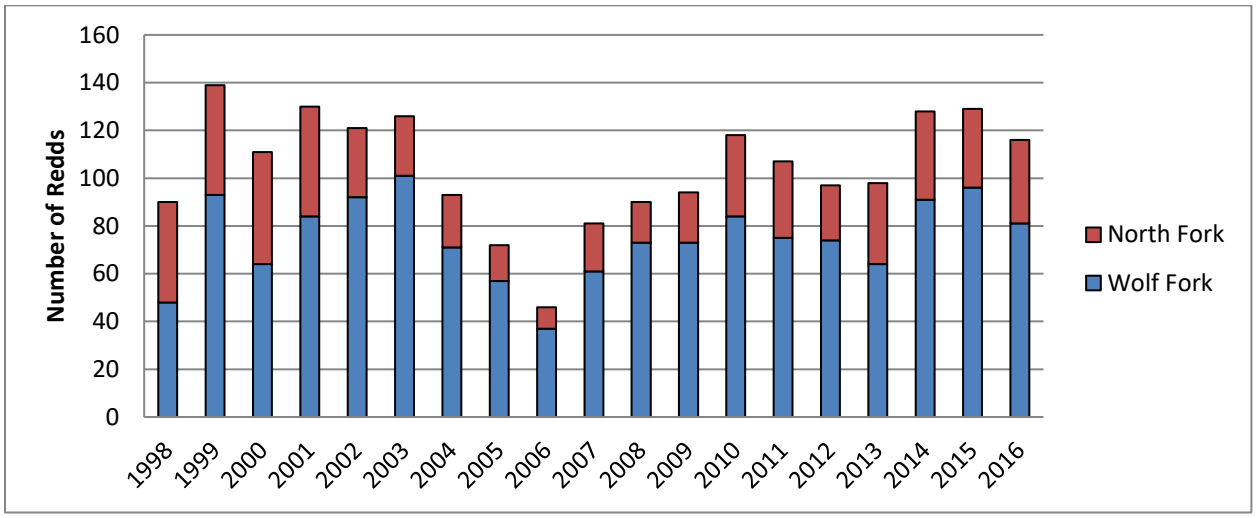



**Figure 15-1. Bull Trout Redd Counts in the North Fork and Wolf Fork of the Touchet River (data from Jeremy Trump – WDFW District 3 Fish Manager).**

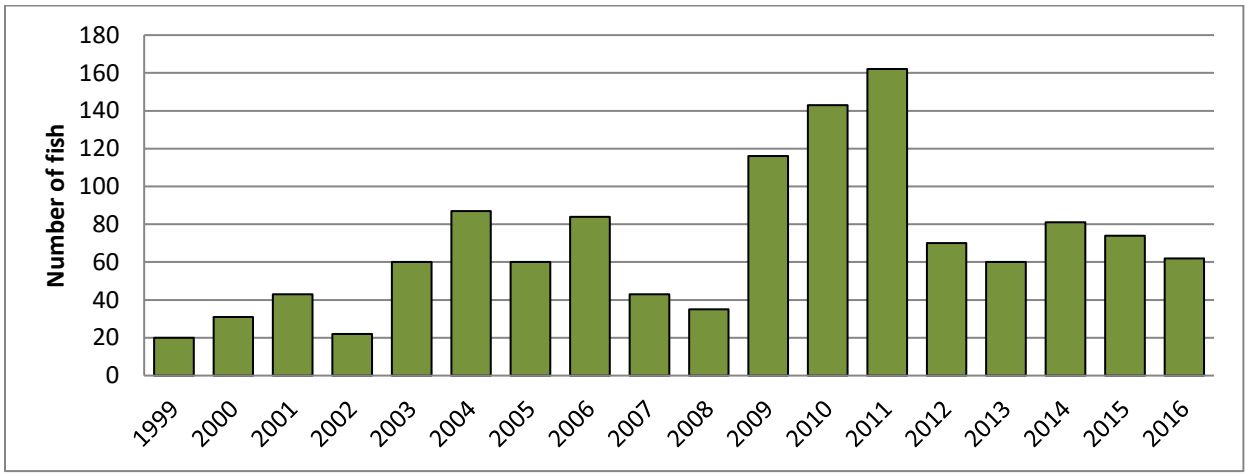



**Figure 15-2. Numbers of bull trout captured at the Dayton Adult Trap, 2000-2016. Numbers provided included recaptures of fish at the trap within a single season.**
Source: Joe Bumgarner, WDFW

## PROPOSED SPECIES

None

## CANDIDATE SPECIES

None that would be affected by the proposed action.

## CRITICAL HABITAT

Revised critical habitat for bull trout throughout the coterminous United States was proposed by the U.S. Fish and Wildlife Service (USFWS) on January 14, 2010 (Proposed rule, 75 FR 2270) and includes the Walla Walla Basin and the Touchet River. Final critical habitat was designated on September 30th, 2010 (75 FR 63898). Critical habitat identified in the Touchet River can be found at https://www.fws.gov/pacific/bulltrout/finalcrithab/oregon/Unit_14_Touchet_River.pdf, identifying both spawning/rearing areas, and foraging/migration/overwintering areas.

## *15.3 Analyze effects.*

Broodstock collection for spring Chinook in the future at the DAT would entail some level of trapping, anesthetizing, handling and releasing of bull trout. However, this type of sampling already occurs during the annual operation of the DAT by WDFW for steelhead, and other species; this program does not propose any activity that is not already taking place. Spring Chinook brood collection would likely occur in May and June, and interaction with bull trout will occur. During the past 15 years, 845 (approximately 55/year) bull trout have been enumerated at the DAT during May and June. Per the 12/22/2017 Opinion, *"the USFWS expects as many as two bull trout/year may be injured/die as a result of broodstock trapping activities."*

Water withdrawal for the steelhead acclimation facility, irrigation diversion, and effluent from the acclimation pond may also result in take. The diversion is non-consumptive and the withdrawal would only affect ~500 meters of stream reach. Per the 12/22/2017 Opinion, the USFWS determined for the intake/diversion that "*while migrating bull trout may be present between the intake and outflows during water withdrawals, the impacts to bull trout are anticipated to be insignificant or immeasurable over background conditions*." For effluent from the acclimation pond, the USFWS determined that "*exposure to effluent is anticipated, but given implemented conservation measures, small distance impacted, and location below known spawning and rearing areas, and ability of migrating bull trout to move away from the effluent, the effects are expected to not be measurable over background conditions and will be insignificant to adult bull trout in the area.*"

Routine and non-routine maintenance may occur at the intake/diversion as needed. Activities will be conducted during times when bull trout might be present, so some effect is anticipated. The Service determined that as many as 50 individuals could experience some level of short-term behavioral impacts of maintenance activities. Of the 50, the Service expected few effects will result in injury or mortality, but up to one bull trout adult or sub-adult may be injured or killed per in-water routine or non-routine maintenance event.

Direct stream releases are planned for this program. There is the potential for short-term competition and/or predation for bull trout juveniles (very small Age 0 fish), the impacts are not expected to be measurable. It is anticipated, the release of spring Chinook smolts will provide

additional food resources for adult and sub-adult bull trout below the spring Chinook release points. The 12/22/2107 USFWS Opinion for steelhead determined that "*this activity (acclimation and release) would be insignificant, or beneficial to the bull trout.*" We would anticipate a similar ruling for spring Chinook given their much smaller release size compared to summer steelhead.

Spawning ground surveys as proposed for monitoring and evaluation of this program are not expected to "take" any bull trout. Bull trout spawning surveys are currently conducted by WDFW Fish Management staff in the Touchet River (North Fork and Wolf Fork), and spawning ground surveys for spring Chinook will be conducted at the same time to lessen any effect that surveys might incur. Some overlap of spawning areas and timing is expected for this program but effects from surveys are expected to be minimal with no direct mortalities anticipated.

## *15.4 Actions taken to minimize potential effects.*

The USFWS concluded that the existing juvenile spring Chinook release program in the Walla Walla Basin would not adversely affect bull trout (USFWS letter to CTUIR dated 3/30/05 and USFWS internal memorandum dated 7/26/07), but have not ruled on this proposed program. However, a recent ESA consultation was completed for the WDFW summer steelhead programs in the Walla Walla and Touchet River. The USFWS completed their biological opinion on 12/22/2017. It was their opinion that "the action *(referring to the operation of the summer steelhead programs)*, as proposed, is not likely to jeopardize the continued existence of the bull trout, and it not likely to destroy or adversely modify designated critical habitat."

The proposed WDFW Touchet River spring Chinook program has identical actions as the summer steelhead programs (adult trapping, smolt releases, and spawning ground surveys), all of which have been determined to have minimal, to no effect, on bull trout. As such, a different determination would not be expected for this program.

Any bull trout captured during broodstock collection activities will be kept in water as much as possible during the handling process and be immediately released upstream. No actions have specifically been identified to mitigate for the water withdrawal in the 500 meters reach at the acclimation facility.

## *15.5 References*

Fitzgerald, Alexandra. 2015. Washington Department of Fish and Wildlife. Email communication with Erin Kuttel, U.S. Fish and Wildlife Service, regarding bull trout redd counts in the South Fork Touchet (Burnt Fork). April 3, 2015.

Kassler, T. W., and G. Mendel. 2007. Genetic characterization of bull trout from the Walla Walla River Basin. Washington Department of Fish and Wildlife. Dayton Washington. April 2007.

Mendel, G., C. Fulton, and R. Weldert. 2003. An Investigation into the migratory behavior of bull trout *(Salvelinus confluentus)* in the Touchet River Basin. Washington Department of Fish and Wildlife. Dayton, Washington. January 2003.

Mendel, G., J. Trump, and M. Gembela. 2004. Assessment of salmonids and their habitat conditions in the Walla Walla River Basin within Washington: 2003-2004 Annual Report. Project No. 199802000, 137 electronic pages (BPA Report DOE/BP-00006502- 2).

Mendel, G., J. Trump, M. Gembala, S.T Blankenship, and T. Kassler. 2007. Assessment of salmonids and their habitat conditions in the Walla Walla River Basin of Washington. 2006 Annual Report for Project No. 19980200. Submitted to US DOE, Bonneville Power Administration, Portland Oregon.

Mendel, G., B. Mahoney, R. Weldert, J. Olsen, J. Trump and A. Fitzgerald. 2014. Walla Walla subbasin salmonid monitoring and evaluation report, 2013 Annual Report for Bonneville Power Administration, Portland, OR. BPA Project # 2000-039-00.

Schaller, H., P. Budy, and C. Newlon. Walla Walla River bull trout ten year retrospective Analysis and implications for recovery planning. September 30, 2014. Study funded by U.S. Fish and Wildlife Service and U.S. Geological Survey, Utah Cooperative Fish and Wildlife Research Unit, Department of Watershed Sciences, Utah State University.

USFWS (U.S. Fish and Wildlife Service). Letter to CTUIR re: Release of juvenile spring Chinook salmon in the Walla Walla River Basin. March 30, 2005.

USFWS (U.S. Fish and Wildlife Service). Internal Memorandum re: Release of juvenile spring Chinook salmon in the Walla Walla River Basin. July 26, 2007.

USFWS (U.S. Fish and Wildlife Service). 2015. Mid-Columbia Recovery Unit Implementation Plan for
Bull Trout (*Salvelinus confluentus*). September 2015.

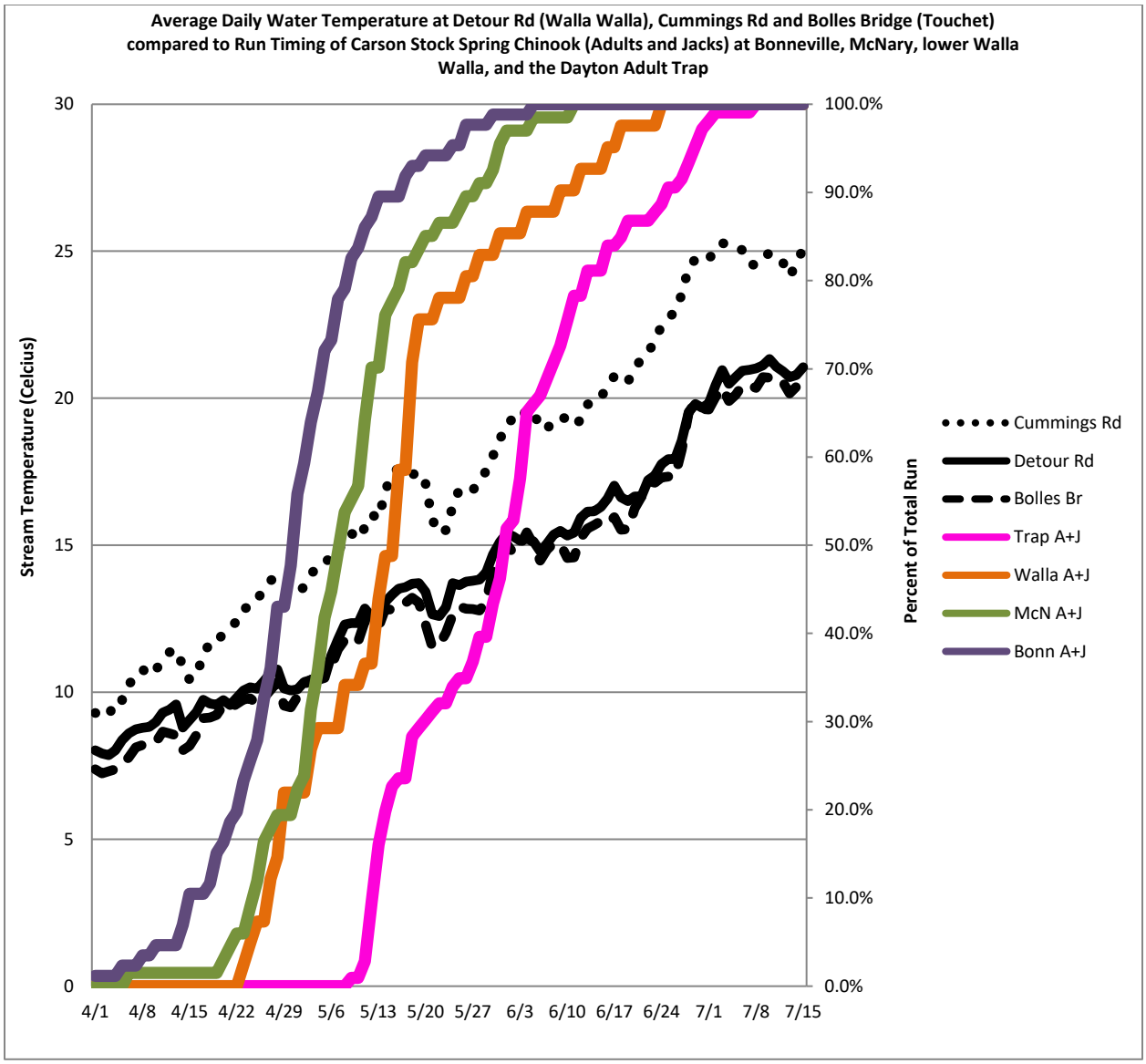
USFWS (U.S. Fish and Wildlife Service). 2015. Recovery plan for the coterminous United States population of bull trout (*Salvelinus confluentus*). Portland, Oregon. xii + 179 pages.

# Appendix A: Run timing of Carson spring Chinook stock related to environmental factors in the Walla Walla and Touchet River basins.

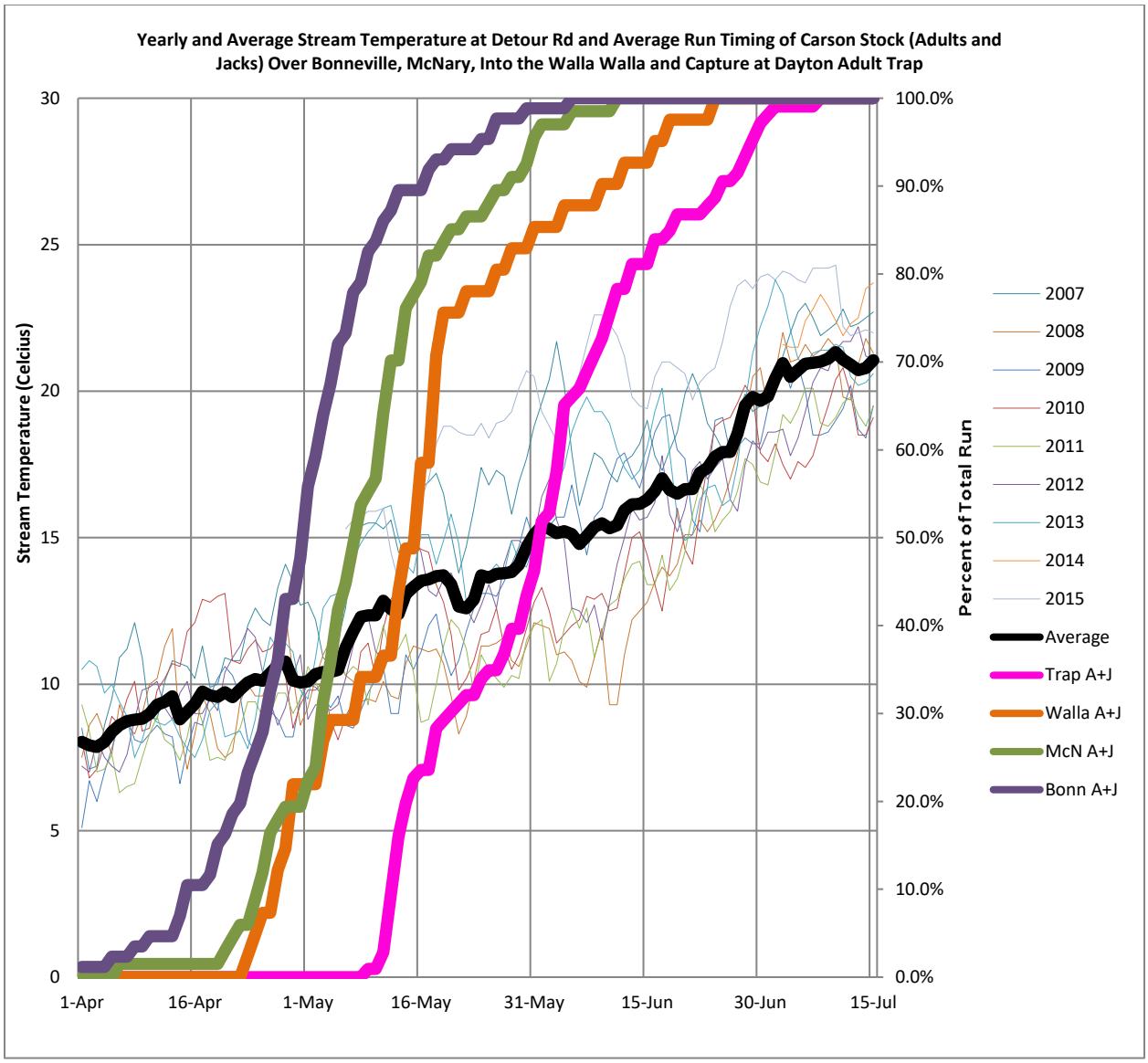
Concerns have been expressed about this proposed program and what environmental conditions (stream flow and water temperature) will be like when adults return. This brief is therefore a compilation of Carson Stock run timing data to Bonneville Dam, McNary Dam, the Walla Walla River, and Dayton Adult Trap (Touchet), stream flows in the lower Walla Walla and Touchet, and water temperatures from the lower Walla Walla and Touchet River as sites allow.

Carson stock run timing was compiled by querying the PIT Tag data base for Carson stock releases in the Umatilla (Bonneville Dam and McNary Dam run timing) and Walla Walla River (Bonneville Dam, McNary Dam, and Walla Walla River PIT Tag Arrays – Note: not all run years have the same detection probabilities). Due to the low number of PIT Tags generally present in each year, all data was combined into a single, average run timing curve from all years (2001-2016 Run Years). Run timing to the Dayton Adult Trap (rkm 85) was taken from trapping records by WDFW (Joe Bumgarner per comm; 2000-2013 run years). Run timing curves were created for adults and jacks combined or adults only. Average run timing curves were overlaid in the following graphs that show the stream flow and temperature data to indicate where potential problems might exist which could be detrimental to this program.

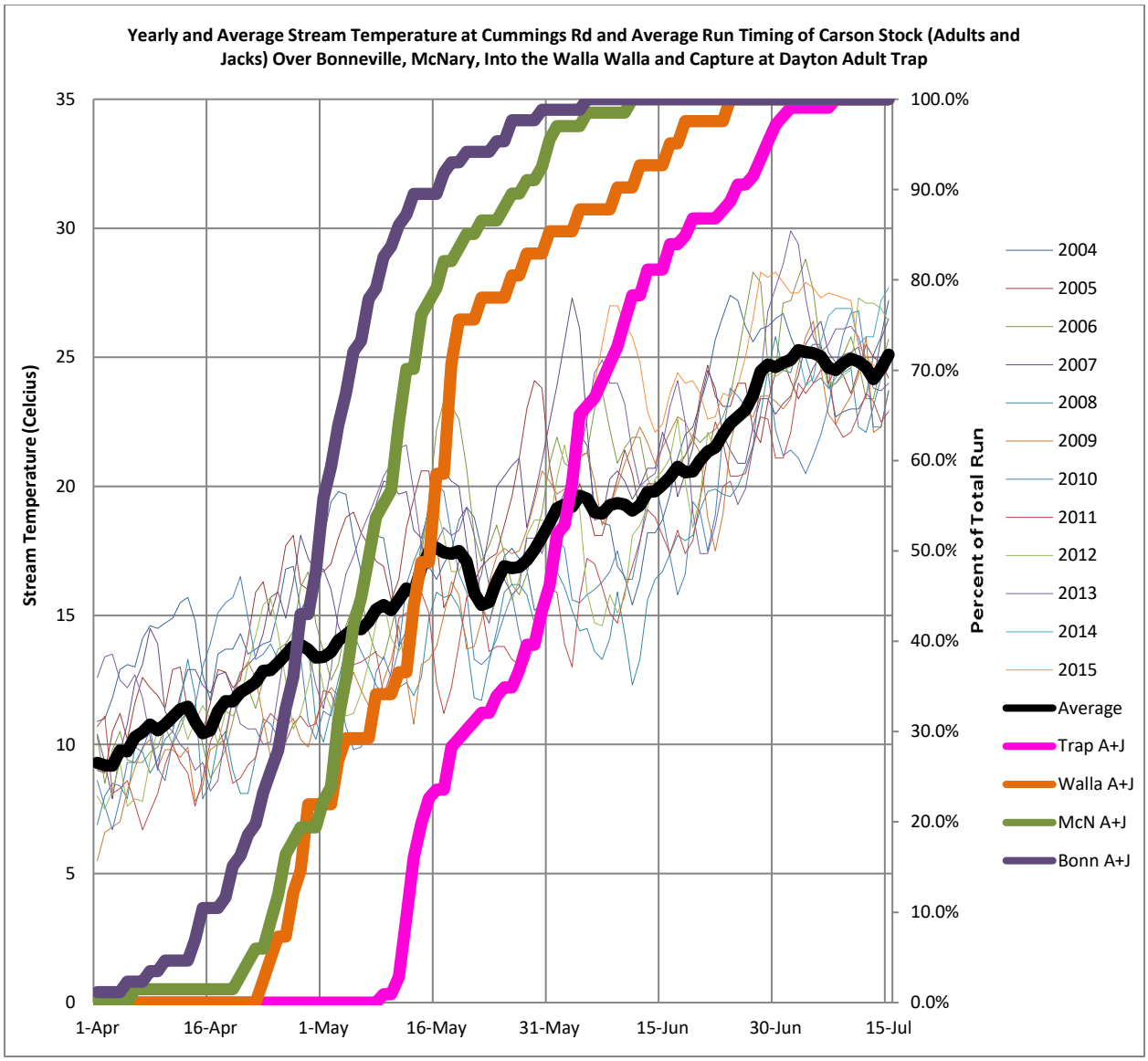
Stream flow and temperature data were compiled by querying mean daily flows and mean daily temperatures as reported on the Washington State Dept. of Ecology Website (https://fortress.wa.gov/ecy/eap/flows), or stream flow from the USGS Stream Flow Monitoring Site in the Walla Walla River (a short distance below the mouth of the Touchet River (https://waterdata.usgs.gov/nwis/uv?site_no=14018500). Stream flows from the USGS site will represent the mouth of the Walla Walla even though this site is located ~20 miles upstream of the mouth. For the Ecology sites in the Walla Walla, data from the Detour Rd site (rkm 57.3) was queried for stream temperatures in the Walla Walla, as the USGS site doesn't contain data on water temperature. Unfortunately, this site is located above the mouth of the Touchet River. For the Touchet River, data from the Touchet River at Cummings Rd site (rkm 4.8) and the Touchet River at Bolles Bridge (rkm 64.6) were queried for both stream flow and temperature. The Cummings Rd site is at the mouth and would represent the harshest conditions expected in the Touchet River, and the Bolles Bridge site is at lower end of salmonid rearing (juvenile) in the Touchet River.



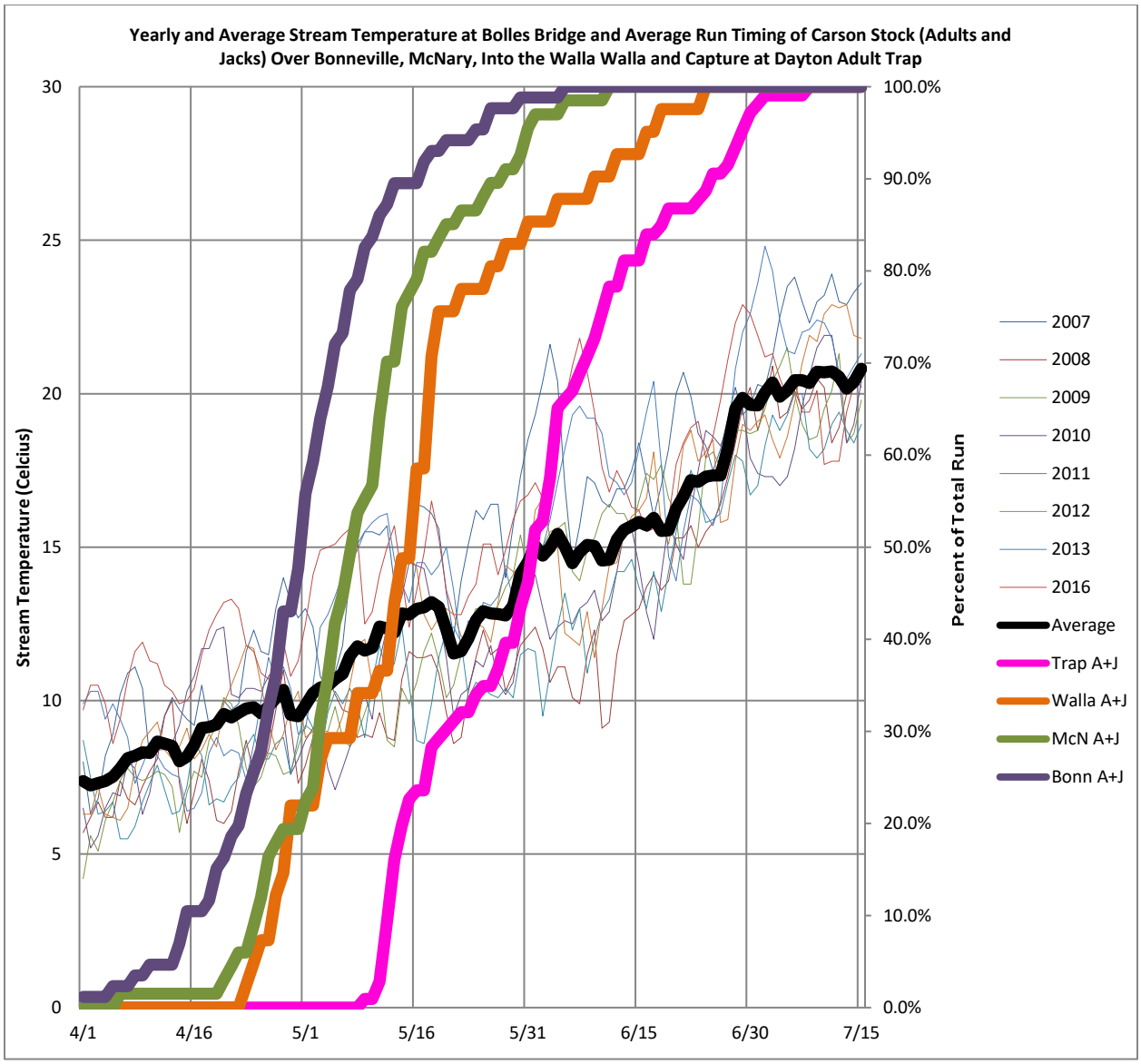

Appendix A, Figure 1.



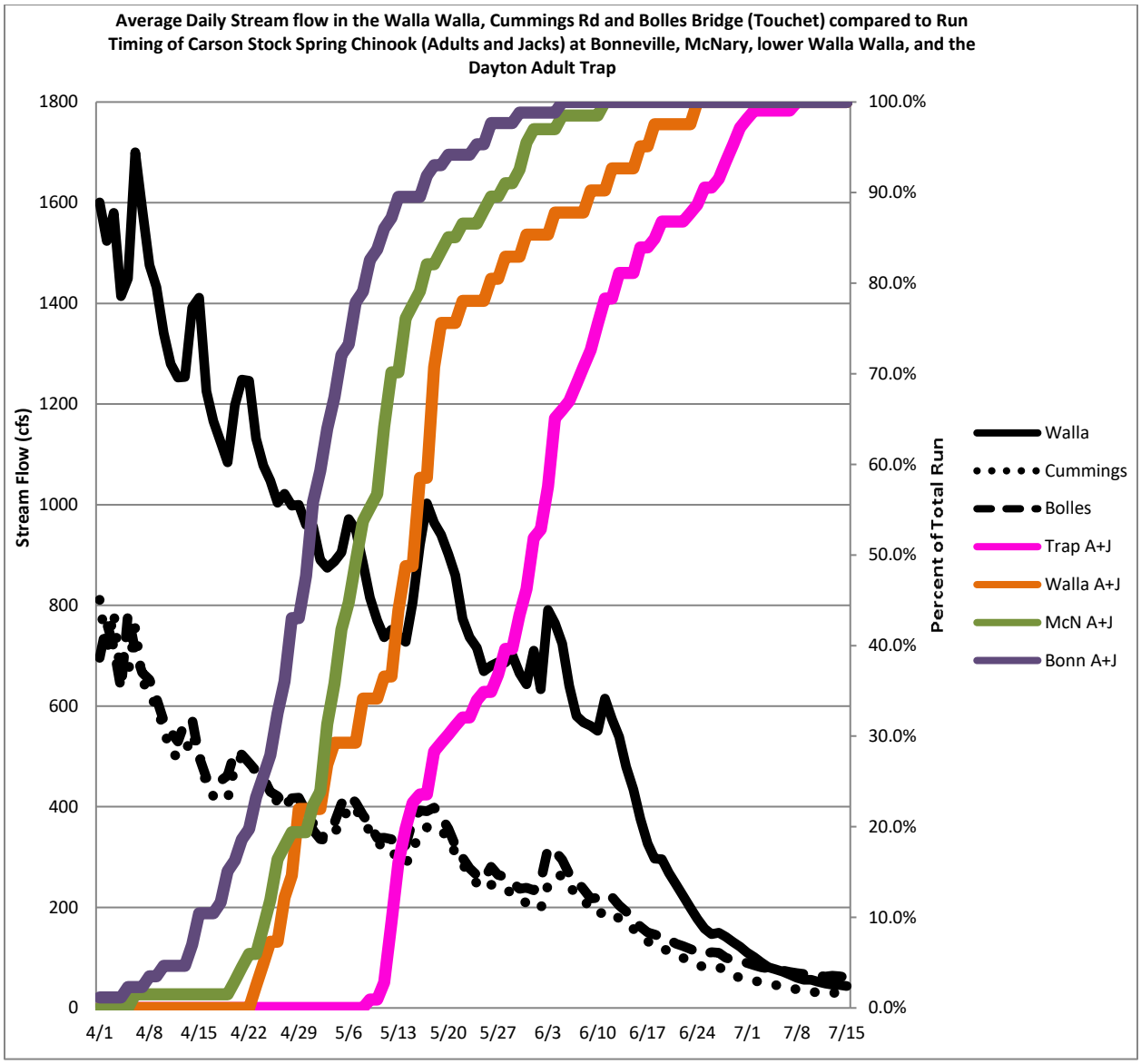

Appendix A, Figure 2.



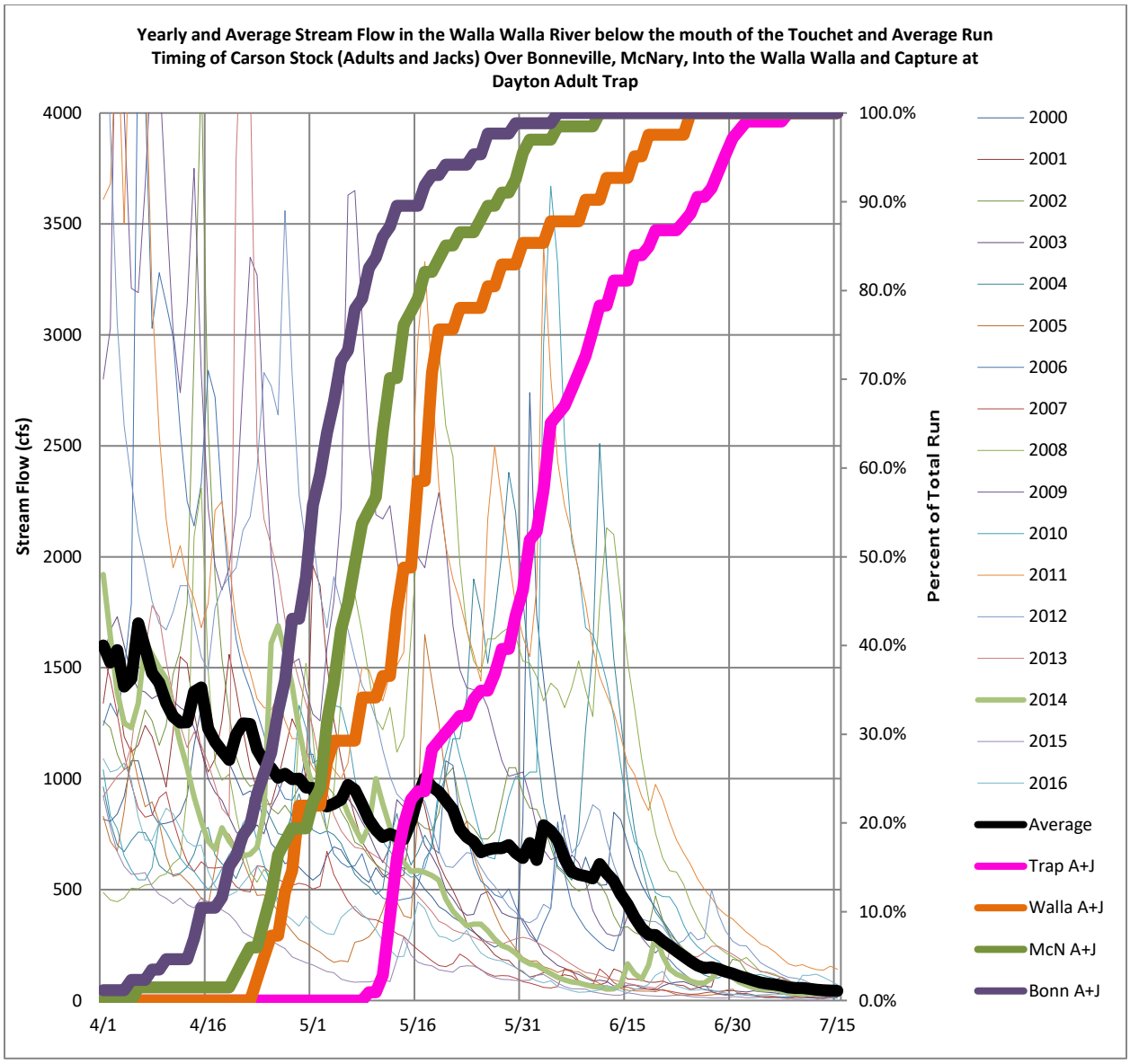

Appendix A, Figure 3.



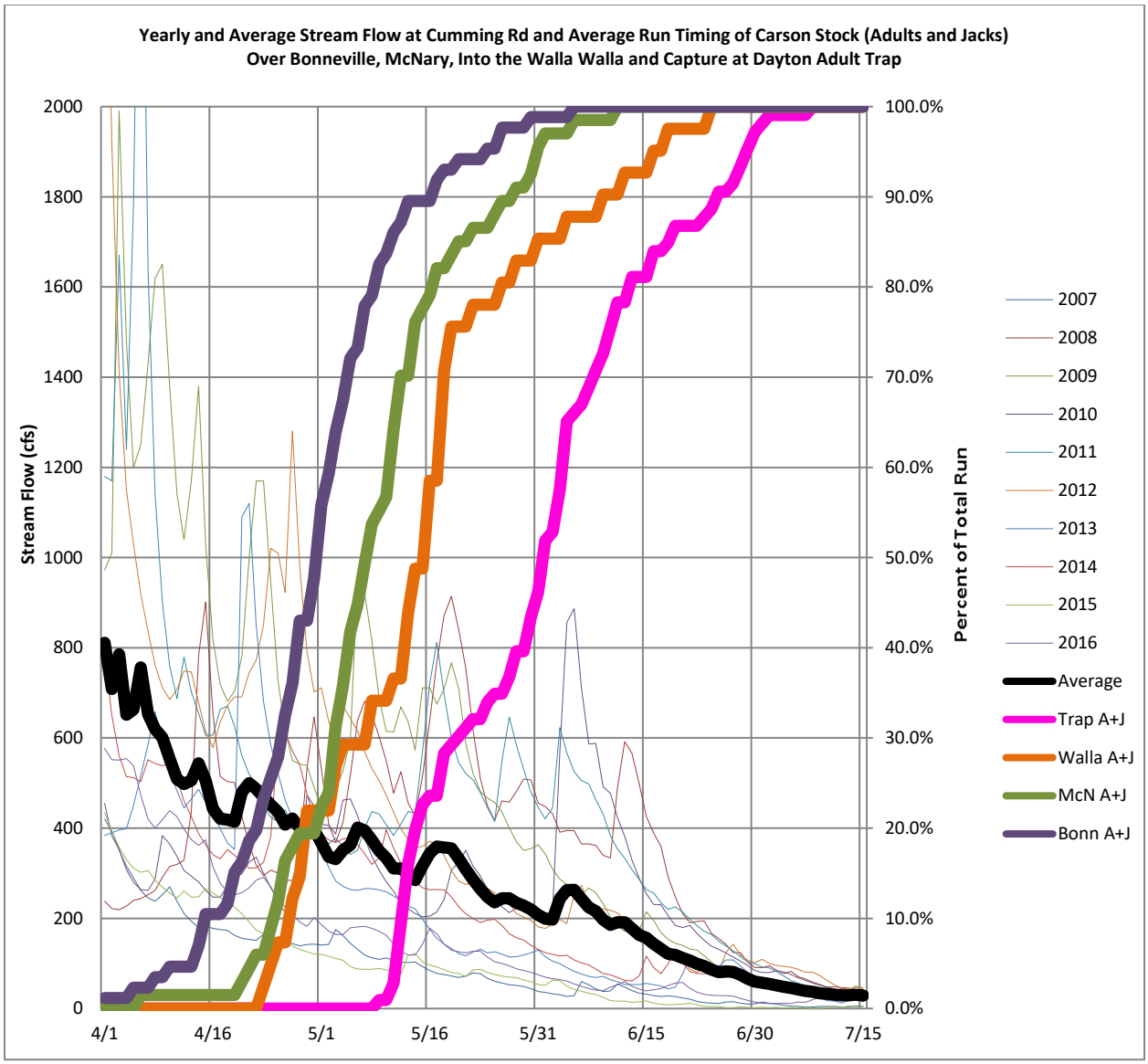

Appendix A, Figure 4.



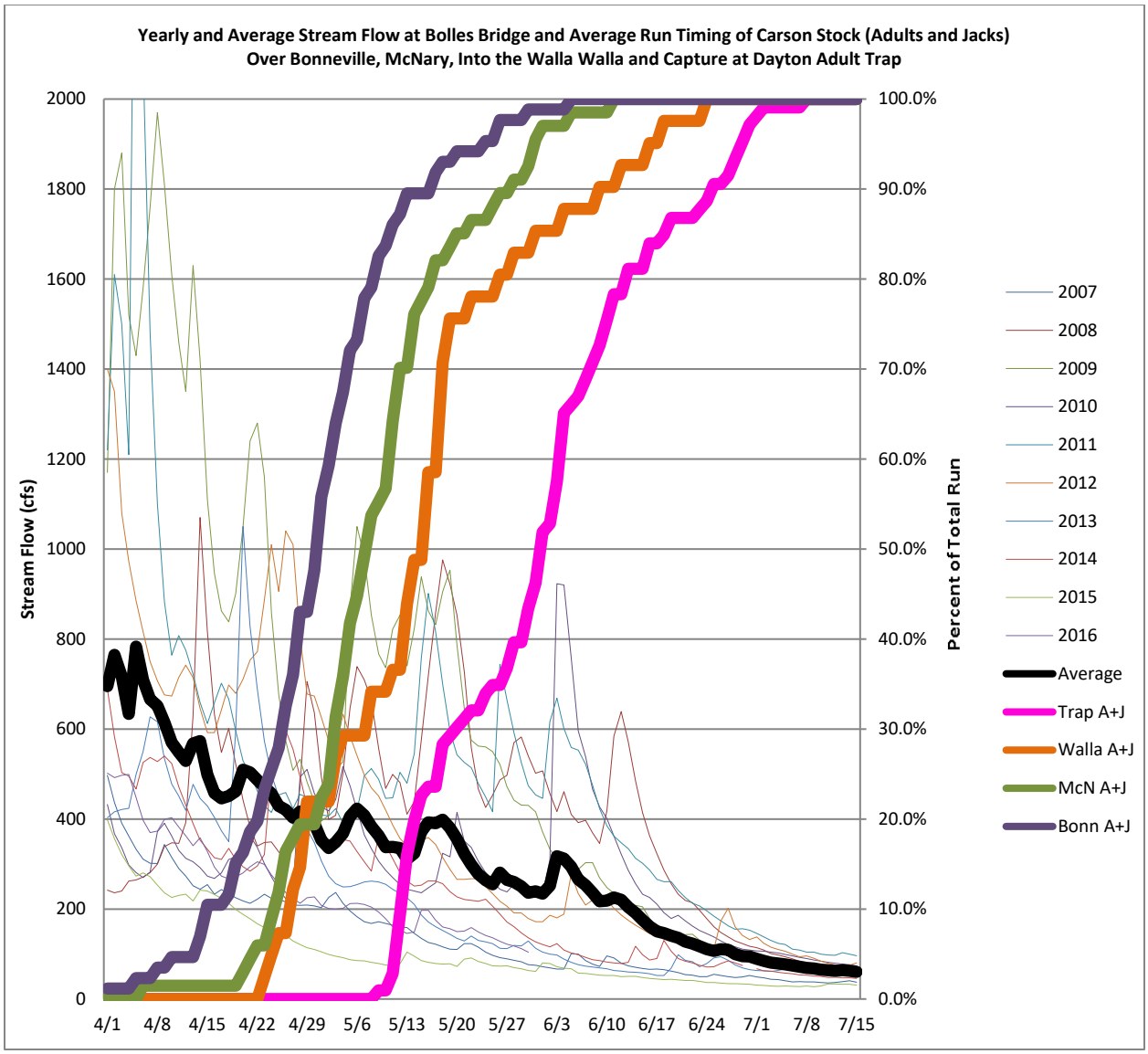

Appendix A, Figure 5.




Appendix A, Figure 6.




Appendix A, Figure 7.




Appendix A, Figure 8.