

PUBLIC UTILITY DISTRICT NO. 1 *of* CHELAN COUNTY
P.O. Box 1231, Wenatchee, WA 98807-1231 • 327 N. Wenatchee Ave., Wenatchee, WA 98801
(509) 663-8121 • Toll free 1-888-663-8121 • www.chelanpud.org

April 14, 2010

VIA ELECTRONIC FILING

Honorable Kimberly D. Bose, Secretary, and
Nathaniel J. Davis, Sr., Deputy Secretary
FEDERAL ENERGY REGULATORY COMMISSION
888 First Street NE
Washington, DC 20426

Subject: Rocky Reach Hydroelectric Project, FERC No. 2145
Annual Report of Activities under the Anadromous Fish Agreement and Habitat Conservation Plan for Calendar Year 2009

Dear Secretary Bose and Deputy Secretary Davis:

Public Utility District No. 1 of Chelan County, Washington (Chelan PUD), licensee for Rocky Reach Hydroelectric Project No. 2145 (Rocky Reach Project) respectfully submits the attached progress report in accordance with Article 10 of Appendix B of the *Order on Offer of Settlement and Issuing New License* (License) issued on February 19, 2009.[1]

The 50-year Anadromous Fish Agreement and Habitat Conservation Plan (HCP) Agreement[2] for the Rocky Reach Project was filed with the Federal Energy Regulatory Commission (Commission) on November 24, 2003, and approved by the Commission at 107 FERC ¶ 61,280 (2004) and 107 FERC ¶ 61,281 (2004),[3] and prescribed by National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service pursuant to Section 18 of the Federal Power Act. Article 10 of Appendix B of the new License requires Chelan PUD to file with the Commission: (1) the final annual and comprehensive progress reports developed pursuant to the HCP; and (2) the final results of all studies and testing pursuant to the HCP.[4]

[1] 126 FERC ¶ 61,138 (2009).
[2] 107 FERC ¶ 61,280 (2004).
[3] 107 FERC ¶ 61,281 (2004).
[4] Article 10 of Appendix B supersedes License Article 410 of *Order Amending License* issued June 21, 2004. Pursuant to License Article 404 of *Order Modifying and Approving Plan for Assessing Operation Effects of the Juvenile Bypass System* issued January 26, 2003 and *Order Amending License* issued April 12, 2002, the reporting requirements were incorporated as Section 1.1 of the progress report. This information will now be reported under new License Article 402. *Operations Plan*.

The progress report is intended to fulfill the License requirements and Section 4.8 of the HCP requiring an annual report of progress toward achieving the no net impact (NNI) goal described in Section 3 of the HCP, and includes a discussion of the agreements and other common understandings based upon completed studies and work in 2009. A copy of this report is being submitted by copy of this letter with the National Marine Fisheries Service as specified in Section 9.8 of Appendix E of the License.

Please forward any questions regarding this filing or requests for additional information to the Licensing and Compliance Manager, Chelan PUD, 327 North Wenatchee Avenue, Wenatchee, Washington 98801.

Sincerely,

Michelle Smith
Licensing and Compliance Manager
michelle.smith@chelanpud.org
(888)663-8121, Ext. 4180

cc: Keith Truscott, Chelan PUD
Erich Gaedeke, FERC
Bryan Nordlund, NMFS
HCP Coordinating Committee
HCP Hatchery Committee
HCP Tributary Committee

Attachments:
Annual Report, Calendar Year 2009, of Activities under the Anadromous Fish Agreement and Habitat Conservation Plan

Appendix A	Habitat Conservation Plan Coordinating Committees Meeting Minutes and Conference Call Minutes
Appendix B	Habitat Conservation Plan Hatchery Committees Meeting Minutes and Conference Call Minutes
Appendix C	Habitat Conservation Plan Tributary Committees Meeting Minutes
Appendix D	List of Rocky Reach HCP Committee Members
Appendix E	Statements of Agreement for Coordinating Committees
Appendix F	Statements of Agreement for Hatchery Committees
Appendix G	Shuswap River Hatchery Information
Appendix H	Broodstock Collection Protocols
Appendix I	2009 Chelan PUD Action Plan
Appendix J	2009 Annual Financial Report for the Plan Species Accounts
Appendix K	Monitoring and Evaluation of the Chelan County PUD Hatchery Programs – 2008 Annual Report

ANNUAL REPORT

CALENDAR YEAR 2009
OF ACTIVITIES UNDER THE ANADROMOUS FISH AGREEMENT AND HABITAT CONSERVATION PLAN

ROCKY REACH HYDROELECTRIC PROJECT
FERC LICENSE NO. 2145

Prepared for

Federal Energy Regulatory Commission
888 First Street N.E.
Washington, D.C. 20426

Prepared by

Anchor QEA, LLC
1423 Third Avenue, Suite 300
Seattle, Washington 98101
and
Public Utility District No. 1
of Chelan County, Washington
327 N. Wenatchee Ave
P.O. Box 1231
Wenatchee, Washington 98807

March 2010

ANNUAL REPORT
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March 2010

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1 INTRODUCTION

On June 21, 2004, the Federal Energy Regulatory Commission (FERC) approved an Anadromous Fish Agreement and Habitat Conservation Plan (HCP) for the Rocky Reach Hydroelectric Project (Rocky Reach – FERC License No. 2145) on the Columbia River in Washington State, operated by Chelan County Public Utility District No 1 (Chelan PUD). The HCP provides a comprehensive and long-term adaptive management plan for species addressed in the plan (Plan Species) and their habitat. This document is intended to fulfill Article 413(a) (Section 4.8 of the HCP) requiring an annual report of progress toward achieving the No Net Impact (NNI) goal described in Section 3 of the HCP, and common understandings based upon completed studies including those conducted as research/development for NNI progress or those not considered valid due to extenuating circumstances (HCP, Section 5.2.3).

The signatories of the Mid-Columbia HCPs (HCPs of the Wells, Rocky Reach, and Rock Island hydroelectric projects) meet as combined Coordinating Committees, Hatchery Committees, and Tributary Committees to expedite the process of overseeing and guiding HCP implementation. Minutes from the monthly meetings are compiled in Appendices A (Coordinating Committees), B (Hatchery Committees), and C (Tributary Committees); Appendix D lists members of the Rocky Reach committees. In addition, there is a Policy Committee whose function is to provide dispute resolution for issues arising in the Coordinating, Hatchery, or Tributary Committees. The Policy Committees did not meet in 2009. The Coordinating Committee for the Rocky Reach HCP oversaw the preparation of this sixth Annual Report for calendar year 2009, which covers the period from January 1 to December 31, 2009. (The first five Annual Reports covered January 1 to December 31, 2004 through 2008, respectively.)

2 PROGRESS TOWARD MEETING NO NET IMPACT

The Rocky Reach HCP requires preparation of an Annual Report that describes progress toward achieving the performance standard of NNI for each Plan Species. The NNI standard consists of two components: 1) 91 percent combined adult and juvenile project survival achieved by project improvement measures implemented within the geographic area of the project; and 2) 9 percent compensation for unavoidable project mortality provided through hatchery and tributary programs, with 7 percent compensation provided through hatchery programs and 2 percent through tributary programs (Section 3.1 of the HCP). Section 5.2 of the HCP states that given the present inability to differentiate between the sources of adult mortality, initial compliance with the combined adult and juvenile survival standard will be based on the measurement of 93 percent juvenile project survival or 95 percent juvenile dam passage survival (described further in Sections 3 and 5 of the HCP).

The following sections of this chapter describe progress made in 2009 toward achieving the HCP objectives as they relate to phase designations, decision-making, continued implementation of the juvenile and adult passage plans, hatchery project improvements, and implementation of the tributary program.

2.1 Status of Phase Designations for Current Plan Species

A major feature of the Rocky Reach HCP is what is termed "a phased implementation of measures to achieve the survival standards." Briefly, Phase I consists of a 3-year minimum period in which studies are conducted to determine annual survival rates for each of the Plan Species. Following the completion of 3 years of valid studies, the Rocky Reach HCP Coordinating Committee will determine whether the survival standard has been achieved. Depending on the results of this determination, the Chelan PUD will proceed to either Phase II or Phase III.

Under Phase II, the Rocky Reach HCP Coordinating Committee would have determined that the standards have not been met, and Chelan PUD is responsible for evaluating additional tools to improve survival. Under Phase III, the Rocky Reach HCP Coordinating Committee would have determined that the survival standards have been achieved, and the PUD is required to re-evaluate survival at 10-year intervals. It should be noted that juvenile survival

studies conducted during Phase I testing may result in different phase designations for each of the Plan Species.

During 2009, Chelan PUD continued juvenile survival testing, which was begun in 2004 at Rocky Reach. Coho salmon are designated as in Phase III (Standards Achieved – Interim Value); steelhead are designated as in Phase III; and sockeye salmon are still being tested. The Coordinating Committee has agreed to defer additional yearling Chinook survival studies until 2011[1], when optimal passage conditions for juvenile sockeye salmon are better understood. Current phase designations for all Plan Species are summarized in Table 1.

Table 1
Current Phase Designations for Rocky Reach HCP

Plan Species	Phase Designation	Date
Upper Columbia River (UCR) steelhead	Phase III (Standards Achieved)	October 24, 2006
UCR yearling spring Chinook	Phase III (Provisional Review)	June 24, 2008
UCR subyearling summer/fall Chinook	Phase III (Additional Juvenile Studies)	June 24, 2008
Okanogan River sockeye	Phase II (Additional Tools)	November 30, 2005
Coho	Phase III (Standards Achieved –Interim Value)	June 20, 2007

2.2 2009 HCP Decisions

Throughout 2009, the HCP Coordinating, Hatchery, and Tributary Committees made and noted a number of agreements during committee meetings, some of which were captured in Statement of Agreements (SOAs), in order to document HCP decisions and maintain NNI conditions for Plan Species. These SOAs are summarized in Table 2 and are discussed in the

[1] The HCP Coordinating Committees accepted Chelan PUD's summary of phase designations document as final at the June 24, 2008 HCP Coordinating Committees meeting (Chelan PUD. 2008. Summary of Phase Designation of Plan Species under the Rocky Reach and Rock Island Hydroelectric Projects' Habitat Conservation Plans. Final June 2008).

remainder of this report. No habitat projects were approved by the Rocky Reach Tributary Committee during 2009.

Table 2
Summary of 2009 SOA Decisions for Rocky Reach HCP

Date	Agreement	HCP Committee	Reference
Mar 24, 2009	Approval of 2008 Rocky Reach and Rock Island fish survival and biological evaluation reports.	Coordinating	Appendix A and Appendix E, March 24, 2009
Mar 24, 2009	Approval of 2009 Rocky Reach and Rock Island fish survival study plans, fish passage plan, and biological evaluation reports.	Coordinating	Appendix A and Appendix E, March 24, 2009
June 17, 2009	Approval of the use of Ringold Springs Hatchery for rearing up to 200,000 summer Chinook during the summer of 2009.	Hatchery	Appendix B, May 20, 2009; Appendix F, June 17, 2009
Aug 19, 2009	Approval of sockeye early rearing density criteria.	Hatchery	Appendix B, July 15, 2009; Appendix F, Aug 19, 2009
Aug 19, 2009	Approval of the Final HCP Hatchery Committees' Draft HGMP for Wenatchee River Summer Steelhead.	Hatchery	Appendix B and Appendix F, Aug 19, 2009
Oct 21, 2009	Agreement for rearing up to 400,000 yearling summer Chinook at Ringold Hatchery and Eastbank Re-use Facility for release at Chelan Falls and Turtle Rock.	Hatchery	Appendix B and Appendix F, Oct 21, 2009
Nov 18, 2009	Agreement regarding Chelan PUD having met its obligations to conduct a study to investigate the natural spawning success of hatchery reared steelhead relative to wild steelhead. This obligation will be met through Chelan PUD's funding and complete implementation of the Wenatchee steelhead reproductive success study which will also contribute to Objectives 2 and 3 of the M&E Plan as they pertain to steelhead.	Hatchery	Appendix B, Oct 21, 2009 and Nov 18, 2009; Appendix F, Nov 18, 2009

2.3 Project Operations and Improvements

This section summarizes project operations and progress toward achieving the project survival standard at Rocky Reach Dam in 2009.

2.3.1 Operations

In March 2009, the Coordinating Committee approved Chelan PUD's study plan to conduct a day/night fish release study with no project spill at Rocky Reach for juvenile sockeye in the spring of 2009. The study was conducted as per the 2009 study plan (Appendices A and E), and took place from May 15 through June 9. The spill program for juvenile sockeye smolts was modified in 2009 in order to conduct the study with the bypass operating under a no-spill operation. The purpose of the experiment was to compare project survival (reservoir and dam) for groups of acoustically-tagged sockeye released during daytime hours and during nighttime hours. The study also compared route-specific survivals for sockeye passing the dam during day and night hours, and compared differences in passage through the surface collector for smolts arriving day and night at the dam. Study results are presented in Section 2.3.2.2 of this report.

The juvenile bypass system operated from April 1 through August 31, 2009, during the outmigration of juvenile salmon and steelhead at Rocky Reach. The target level for summer spill was 9 percent of the daily average river flow. Spill for summer-migrating subyearling Chinook at Rocky Reach Dam began on June 10, 2009, at 0000 hours immediately following completion of the spring sockeye study, and continued though August 14, 2009. Spill was stopped from August 15 through August 19 as smolt counts decreased sharply and stop-spill criteria were met at Rocky Reach. Smolt counts again increased August 18 to 19, prompting Chelan PUD to re-start and continue spill from August 20 through August 31. After termination of spill on August 31, 2009, it was estimated that spill was provided for 97.20 percent of the subyearling Chinook outmigration. Spill for the 78-day summer period averaged 9.06 percent of the total river flow. The Columbia River flows past Rocky Reach Dam during the spill period averaged 102,946 cubic feet per second (cfs) and the daily average spill rate was 9,323 cfs.

2.3.1.1 Pikeminnow Predator Control

Chelan PUD used a combination of capture methods (passive overflow weir traps, hook and line, and long-line angling) in conducting the 2009 pikeminnow control program. Two passive overflow weir traps were used to capture pikeminnow in the Rocky Reach fish ladder from June 9 through 20, 2009. This effort resulted in the capture and removal (euthanized on site) of 505 pikeminnow at Rocky Reach. No adult or mini-jack spring or summer Chinook, steelhead, or sockeye were incidentally trapped at Rocky Reach in 2009. Two bull trout sub-adults were incidentally caught (noted for Endangered Species Act [ESA] reporting purposes) and immediately released, unharmed, into the Rocky Reach forebay.

A pilot long-line fishery was conducted from November 10 through November 16, 2009, by Columbia Research to evaluate the effectiveness of a late-fall long-line effort. A total of 1,783 pikeminnow were removed in 7 days of long-lining for a catch per unit effort (CPUE) of 0.47 (number of pikeminnow caught per 100 hook hours). The observed CPUE was similar to those typically achieved in April, demonstrating that long-lining can be used effectively into the late fall.

The total harvest of pikeminnow in 2009 from Rocky Reach and Rock Island reservoirs was 90,291 fish. Harvest numbers from the various control efforts in 2009 were as follows: USDA hook-and-line angling – 50,333 fish; Columbia Research long-line angling – 31,683 fish; East Wenatchee Rotary Club pikeminnow derby – 3,812 fish; pikeminnow trapping in Rocky Reach and Rock Island adult ladders – 2,636 fish; angling by Chelan PUD Fish and Wildlife personnel – 1,827 fish.

The northern pikeminnow predator control work will continue in 2010, including ladder trapping at Rocky Reach and the use of long-line angling during the pre-migration period to target large pikeminnow staging in deep reservoir areas that are difficult to capture with other gear types, with the contract being extended to overlap with the U.S. Department of Agriculture (USDA) effort in 2010. The USDA hook-and-line angling program will commence during the peak of juvenile salmonid migration. Chelan PUD will also continue to provide contract funding for the annual East Wenatchee Rotary Club Pikeminnow Derby.

2.3.2 Assessment of Project Survival

The HCP requires that Chelan PUD shall work toward 91 percent combined adult and juvenile project survival at Rocky Reach Dam achieved by project improvement measures implemented within the geographic area of the project. Progress toward this objective is described below.

2.3.2.1 Adult Passage Monitoring

The HCP acknowledges that no scientific methodology currently exists that would allow the Rocky Reach HCP Coordinating Committee to assess adult project survival for Plan Species (presumed to be 98 percent). This is because available methods are unable to differentiate between mortality caused by the project versus other sources of non-detection (such as mortality from natural causes, injuries resulting from passage at downstream projects, or injuries sustained by harvest activities; or fish not detected for other reasons, such as spawning in locations downstream from Rocky Reach Dam). However, the Rocky Reach HCP Coordinating Committee is able to evaluate information to assess whether or not there is a high likelihood that the adult survival rates are being achieved. Table 3 details detections at Priest Rapids Dam of known-origin adult steelhead and Chinook salmon that were Passive Integrated Transponder tagged (PIT-tagged), the number of those adults redetected at Wells Dam, the estimated conversion rate (Priest Rapids Dam to Wells Dam), and average per project (i.e., four dams and four reservoirs) conversion rates.

These conversion rates are best viewed as a minimum survival estimate between the two detection sites because they encompass mortalities from all sources and non-detected fish (as described above) between the two detection sites. They do not include any indirect or delayed mortality that might occur upstream of Wells Dam (the redetection site). The per-project conversion rate exceeded 98 percent for steelhead and spring and summer Chinook salmon (that is, mortalities from all sources averaged less than 2 percent through each project. Data for fall Chinook and sockeye are not available. As noted above, this 2 percent figure reflects a combination of mortality attributable to both non-project related causes (e.g., recreational and tribal harvest, tailrace spawning, and disease) and dam passage, as well as non-detections resulting from straying and spawning below Wells Dam. For this reason, it

is highly probable that the actual conversion rate for adult Plan Species exceeds the 98 percent per-project assumption set forth in the HCP.

Table 3
Adult Conversion Rates for All Available Release Groups

Stock Species	Priest Rapids Dam	Wells Dam	Priest Rapids to Wells Total Conversion Rate	Priest Rapids to Wells Average Per Project Conversion Rate[1]
All Releases[2] Summer Steelhead 2004-2009	5,480	5,102	93.0%	98.2%
All Releases[3] Spring Chinook 2003-2009	451	420	93.1%	98.2%
All Releases[4] Summer Chinook 2003-2004	15	14	93.3%	98.3%

Source: Columbia River DART website: http://www.cbr.washington.edu/dart/pit_obs_adult_conrate.html

1 Calculated as Priest Rapids Dam to Wells Dam Total Conversion Rate to the fourth root (four dams and four pools). Adults detected at Wells Dam that were not also detected at Priest Rapids Dam were excluded from the analysis.

2 Summer steelhead released into the Okanogan and Methow River Systems—PIT-tag release site designations: CHEWUR, METHR, OKANR, OMAKC, SIMILR, TWIS2P, TWISPR, BEAV2C, WINT, LIBBYC, METTRP, and STAPAC. Please note that many fish detected at Priest Rapids in 2009 will not pass Wells Dam until spring of 2010.

3 Spring Chinook salmon released into Methow River System—PIT-tag release site designations: CHEWUP, METH, METHR, TWISPP, TWISPR, BEAV2C, WINT, and METTRP.

4 Summer Chinook salmon released into Columbia River System above Wells Dam—PIT-tag release site designations: OKANR.

2.3.2.2 Completed Studies 2009

In 2008, Chelan PUD estimated survival and route-specific passage through Rocky Reach Dam using a triple release model, under two turbine-loading conditions: the conventional loading condition, and an increased flow in Powerhouse Units 1 and 2. The project survival estimate was 92.02 percent (standard error of 0.212) as assessed with acoustic tags. Results indicated that passage was not increased through the desired surface collector route in the test condition versus the conventional loading condition. The Coordinating Committees approved the 2008 survival results and the final reports in March 2009.

In 2009, Chelan PUD conducted follow-up studies at Rocky Reach (2009 Study Plan to Compare Effects of Daytime and Nighttime Fish Releases on Estimates of Project Survival for Juvenile Sockeye Survival at Rocky Reach Dam). These studies focused on testing an alternative fish release strategy and testing for a potential survival advantage that may be inherent to run-of-the-river (ROR) sockeye that migrate downstream at night and pass the dam under darkness, potentially reducing the overall effect of predation on project survival. The purpose of the 2009 study was to measure survival as a means to determine if day-time-only fish releases accurately represent survival for ROR juvenile sockeye, and to gain information on the migration behavior of juvenile sockeye as they pass Rocky Reach Dam. The information could then be used to coordinate the study fish release strategy with ROR fish passage timing characteristics for future survival studies. Along with sockeye smolts, ROR yearling Chinook and steelhead smolts were also sampled at the Rocky Reach juvenile bypass sampling facility to monitor diel passage distribution for these species.

Overall, study results indicated that the time of 9:00 pm was generally a peak passage time for juvenile salmonids, but that sockeye passed in greater numbers during daylight hours while yearling Chinook passed in noticeably greater numbers in the night-time hours. During data analyses for this study, it became apparent that results were biased by an obvious and statistically significant tagger effect attributable to Tagger 3 (one of three different taggers responsible for tagging all study fish). Because fish tagged by Tagger 3 survived at a substantially lower rate that those tagged by Taggers 1 and 2, the Coordinating Committee recommended removing those fish from the dataset prior to analysis. Because of high detection efficiency and minimal loss of statistical power, it was possible to remove fish tagged by Tagger 3 without affecting statistical precision. In November, the Coordinating Committees approved the 2009 Rocky Reach sockeye survival study as valid with tagger-affected sockeye removed from the survival analysis. With the tagger-affected sockeye removed, project study-wide survival estimates for day-time releases was 95.07 percent (0.0160 standard error) and 95.92 percent (0.0175 standard error) for night-time releases for Rocky Reach. The study-wide survival estimate for all releases combined was 95.45 percent (0.0118 standard error). The results indicate that there was no significant project-wide survival difference for sockeye; however, powerhouse survival for sockeye passing at night was significantly higher than for sockeye passing during the day. In December, the draft

2009 Rocky Reach Juvenile Sockeye Day/Night Survival Study Report was still under review by Coordinating Committee members; it will be considered for final approval in early 2010.

As in the last several years, no Chinook survival studies were conducted in 2009; the Coordinating Committee previously agreed to defer additional yearling Chinook survival studies until optimal passage conditions for juvenile sockeye salmon are better understood. In the case of subyearling Chinook, the Coordinating Committee previously concluded that there will be no studies until a suitable tagging methodology is developed. In 2009, the Coordinating Committees began investigating tagging technologies being used in subyearling studies at Priest Rapids Project and in the lower Columbia River and Snake River project survival studies. In November 2009, the Coordinating Committees held a Mid-Columbia Subyearling Chinook Survival Study Workshop which was an update on the status of the science and technology available to facilitate subyearling survival and passage studies.

2.3.2.3 Planned Studies 2010

A study investigating potential diel passage effects on yearling Chinook at Rocky Reach with no spill is planned for 2010; the draft study plan will be reviewed by the Coordinating Committees in early 2010. In 2009, the Rocky Reach day/night study was performed with sockeye only. As in 2009, all ROR smolts will be sampled at the Rocky Reach juvenile bypass sampling facility to monitor diel passage distribution in 2010.

2.3.3 Maintenance and Improvements

Maintenance and improvements at Rocky Reach Dam in 2009 were largely in the category of repairs.

While performing operational checks during startup of the Rocky Reach juvenile fish collection facility on March 23, 2009, the sampling screen that shunts fish into the Rocky Reach juvenile fish facility building was accidentally misaligned when it was deployed. Although plant crew observed that one of the four hydraulic cylinders was operating too quickly and shut the screen deployment down immediately, one cylinder continued to operate, which led to the misalignment. Rocky Reach personnel deduced that air had been introduced into the hydraulic system and the compressed air caused the one cylinder to

continue to operate until pressures were equalized. The cause of the failure was determined to be cracked rubber bladders inside accumulator tanks that store 160 gallons of pressurized hydraulic oil. The bladders were temporarily isolated from the hydraulic system to allow the sampling screen to be deployed and retracted. Replacement bladders were installed within 2 weeks.

From December 1, 2008, through March 1, 2009, the Rocky Reach fishway was dewatered to replace a shaft on the attraction water system (AWS) pump.

Installation of a PIT-tag antenna array is planned in the Juvenile Fish Bypass System (JFBS) at Rocky Reach Dam. Plans are to install the array in the bypass flow spreaders in 2009 in support of Douglas PUD's plans to conduct their first 10-year project survival check-in study. A requirement of the PIT-tag antenna installation is to maintain the exact hydraulic configuration of the flow spreaders as originally designed and installed. Preliminary designs were circulated to the Coordinating Committees in October 2009. The plans were approved by the Coordinating Committees in early 2010 and installation is in progress.

2.4 Hatchery Compensation

As required by the HCP, Chelan PUD continued funding and providing capacity for hatchery production in 2009 to compensate for unavoidable project mortality. Section 8.1 of the HCP outlines a Hatchery Compensation Plan with two hatchery objectives for Chelan PUD: 1) to provide hatchery compensation for Plan Species; and 2) to implement specific elements of the hatchery program consistent with the overall objectives of rebuilding natural populations and achieving NNI.

To improve coordination, a representative from Grant PUD is invited to the monthly Hatchery Committees meetings. In addition, the Grant PUD representative and the PRCC Hatchery Subcommittee facilitator receive meeting announcements, draft agendas, and meeting minutes. This practice benefits the Hatchery Committees through increased coordination and sharing of expertise. The Grant PUD representative has no voting authority.

The Hatchery Committees reviewed the Broodstock Collection Protocols in March 2009 (for Chinook, sockeye, and steelhead). The protocols were finalized in April 2009 and implemented at program hatcheries (Appendix H); in-season revisions were made as needed in coordination with the Hatchery Committees. Coho broodstock collection protocols were provided by the Yakama Nation and are included in the Broodstock Collection Protocols. Broodstock protocols were intended to be a guide for 2009 collection of salmon and steelhead broodstocks in the Methow, Wenatchee, and Columbia River basins. The protocols are consistent with previously defined program objectives such as program operational intent (i.e., conservation and/or harvest augmentation) and mitigation production levels (HCPs, Priest Rapids Dam 2008 Biological Opinion), and they comply with ESA permit provisions. Hatchery compensation in 2009 included the release of 2,713,691 juveniles (1,099,391 smolts plus 1,614,300 sockeye fry from Shuswap River Hatchery) from hatcheries associated with the Rocky Reach Project (Table 4).

2.4.1 Hatchery Production Summary

Table 4 summarizes and compares HCP hatchery production levels and actual 2009 smolt releases.

Table 4

Production Level Objectives and Smolt Releases for Rocky Reach HCP Hatchery Programs

Species	Program	Final Rearing Site	Rocky Reach Production Level Objectives (2004-2013)	Total Smolt Releases for Rocky Reach in 2009 (No. of fish)	Total Smolt Releases from Final Rearing Site
Spring Chinook	Methow	Methow Hatchery	144,000[1]	78,420	299,558[2]
Summer Chinook	Turtle Rock Island Yearlings	Turtle Rock Island (and net pen experiment in 2009)	200,000	176,257[3]	176,257
	Turtle Rock Island Sub-yearlings	Turtle Rock Island	1,180,000	309,003[4]	309,003[4]
	Turtle Rock Island Sub-yearlings (Accelerated Growth)	Turtle Rock Island	450,000	372,320[4]	372,320[4]
Steelhead	Wenatchee	Turtle Rock Island	200,000	163,391[5]	326,782
Sockeye	Okanogan	Shuswap Hatchery	300,000[6]	1,614,300[7]	1,614,300[7]

1 Combined with the Rock Island HCP, Wells HCP, and Grant PUD Biological Opinion production obligation, the spring Chinook production at the Methow Fish Hatchery totals 550,071 smolts.

2 There were 299,558 spring Chinook smolts released at an average of 15.3 fpp from the Methow Hatchery (C. Snow WDFW 2009, pers. comm.). The target release of 550,071 fish was a combination of Wells NNI (61,071) and the sharing agreements with Chelan PUD (288,000) and Grant PUD (201,000). This is 54.4 percent of the numerical target for release for 2009. The shortfall was equally applied to the three programs giving Wells NNI 33,258; Chelan PUD 156,839; and Grant PUD 109,460 fish in 2009.

3 115,254 of the total smolt releases in 2009 were transferred to net pens and released into Chelan River.

4 Insufficient broodstock are collected to meet the current production level due to a shortage of incubation and rearing space between Eastbank, Turtle Rock, and the Rocky Reach Annex. An additional significant impact to the existing production is coagulated yolk due to the lack of chilled incubation.

5 Combined with the Rock Island HCP, the Wenatchee steelhead production totals 400,000 smolts (smolt production allocated evenly between the two HCPs). Insufficient females were collected and spawned to meet the expected 400,000 smolt release (however, total broodstock goal of 208 fish was met). Additionally, poor green egg-to-eye survival contributed to the shortage.

6 Combined with the Rock Island HCP, the Okanogan sockeye production requirement totals 591,040 fish (production allocated between the two HCPs). By agreement of the HCP Hatchery Committee, this production requirement is satisfied for Okanogan sockeye by funding of the Okanogan Skaha sockeye reintroduction program until otherwise determined by the HCP HC.

7 Fry release numbers, not smolts. The Hatchery Committee Statement of Agreement from July 20, 2005 agreed that Chelan PUD will provide the funding and capacity to rear and monitor a portion of the Skaha Lake reintroduction program equivalent to a release of 591,040 smolts from Skaha Lake, thus meeting Okanogan sockeye mitigation responsibility for both Rocky Reach and Rock Island HCPs. The fry-smolt conversion rate was initially set for 40% - 50% and Chelan PUD's funding and capacity requirement is for 1,182,080 – 1,477,600 fry, until completion of four years of monitoring to determine actual fry-smolt conversion rates. Fry production is the total for both Grant and Chelan PUDs combined. In 2009, 1,614,300 fry were released into Skaha Lake.

2.4.2 Hatchery Planning

The following sections detail 2009 actions relevant to planning for hatchery operations supporting the HCP.

2.4.2.1 M&E Plan Implementation

In 2009 Chelan PUD continued to implement M&E activities to meet goals and objectives of the C*onceptual Approach to Monitoring and Evaluating the Chelan County Public Utility District Hatchery Programs* (2005). Implementation of this M&E Plan began in 2006 and continues in accordance with two refining documents: the *Analytical Framework for Monitoring and Evaluating PUD Hatchery Programs*, which was prepared in 2006 and which identifies the analytical strategies and methods for the M&E Program; and the document *Chelan County PUD Hatchery Monitoring and Evaluation Work Plan 2009 (*M&E Work Plan), which is prepared annually and describes the M&E activities for the next calendar year, anticipating that adaptive modification of the plan may be necessary in future years. The Hatchery Committees approved the M&E Work Plan for next year (2010) in October 2009. Similar to previous years, Chelan PUD provided an M&E Annual Report documenting M&E activities in 2008, titled *Monitoring and Evaluation of the Chelan County PUD Hatchery Programs* (Appendix K). A similar report will be prepared in 2010 for 2009 hatchery evaluation.

2.4.2.2 Okanogan Sockeye Mitigation

In 2009, Chelan PUD provided a fourth year of funding for a portion of the Skaha Lake Sockeye Salmon Reintroduction Program (current obligation for Okanogan sockeye salmon mitigation is 591,040 smolts for both Rocky Reach and Rock Island HCPs combined). The Shuswap River Hatchery compensation included the release of 1,614,300 sockeye fry from the Hatchery (Appendix G).

In December 2008, the Hatchery Committees agreed that the Okanagan Nation Alliance 2006-2017 Experimental Reintroduction of Sockeye Salmon into Skaha Lake (Canada) will be a component of Chelan PUD's Okanogan Sockeye obligation (artificial propagation and M&E) until 2017, unless new information becomes available and the Committees agree otherwise. A comprehensive analysis and determination of project contribution will proceed in 2013, as described in the Hatchery Committees SOA dated July 20, 2005.

2.4.2.3 Partial Water Re-Use Pilot Study

Beginning in 2008 and continuing in 2009, Chelan PUD conducted a pilot study to test the rearing of 100,000 Wells summer Chinook from the Chelan PUD's hatchery compensation program on a partial water re-use system at Eastbank Hatchery. The Hatchery Committees agreed that Chelan PUD would implement the study as described in a first year "proof of concept" test, and then would review results with WDFW fish health staff and the Hatchery Committees before a potential second year of study would be proposed. Results from 2008 indicated that fish condition was good, dissolved oxygen levels were high, carbon dioxide and ammonia were low, and disease was not a problem. Fish health specialists observed minor gill inflammation in study fish, a result of chronic low-level irritation and not typically a major problem in cultured fish. In 2009, a building was constructed to shade the re-use ponds and to reduce the potential for algae causing gill irritation in subsequent years. Fish health monitoring indicated overall performance of the re-use fish as it compared to the raceway fish was excellent, demonstrating the potential for water re-use for raising fish (Appendix B, October 21, 2009).

Much of the data related to the 2008 study group was collected during the migration of these fish in the summer of 2009. The migration data indicated that summer Chinook raised in the re-use pilot migrated more rapidly and survived at a higher rate compared to fish raised in a standard raceway (i.e., 30% more re-use fish survived to reach McNary Dam compared the standard raceway control). Based on the results from the 2008 study group, the Hatchery Committees approved doubling the rearing density of summer Chinook in the partial water re-use study (from 100,000 to approximately 200,000 summer Chinook). The double density program was implemented in 2009 and study results will be forthcoming in 2010. In

October and November of 2009, the Hatchery Committee agreed to a third year of re-use piloting using Wenatchee River summer Chinook. This third year of study will begin in the spring of 2010.

2.4.2.4 Hatchery and Genetic Management Plans

In October of 2008 the National Marine Fisheries Service (NMFS) requested that the Rocky Reach Hatchery Committee prepare updated Hatchery and Genetic Management Plans (HGMPs) for Wenatchee basin hatchery programs. NMFS will use the new HGMPs to determine whether the current Biological Opinions and Incidental Take Permits will require amendment or modification, or will require a new consultation.

On August 19, 2009, the Hatchery Committees approved the Final Draft Chiwawa spring Chinook and Wenatchee steelhead HGMPs, and in October 2009 Chelan PUD submitted the HGMPs to NMFS for consideration. On January 4, 2010, Chelan PUD received a letter of response to their submittal of the draft HGMPs. Chelan PUD will prepare a response to NMFS for review by the Hatchery Committees and submittal in early 2010.

In preparing the new HGMPs, NMFS requested that the Hatchery Committees consider the recommendations of the Hatchery Scientific Review Group (HSRG) as well as other documents (i.e., Interior Columbia Basin Technical Recovery Team [ICTRT] documents and the Federal Columbia River Power System [FCRPS] Supplemental Comprehensive Analysis). The HSRG conducted a review of the Upper Columbia River hatcheries in spring 2008. The final HSRG review report was produced in 2009 and contained three principles and 17 system-wide recommendations. Recommendations include expressing conservation goals in terms of a population's biological significance and viability, selecting an integrated or segregated broodstock management strategy based on population goals and hatchery program purpose, and managing harvest, hatchery broodstock, and natural spawning escapement to meet HSRG standards (pHOS[2], pNOB[3], and PNI[4]) appropriate to the affected natural population's designation.

[2] pHOS is the proportion of the natural spawning population made up of hatchery-origin fish.
[3] pNOB is the proportion of hatchery broodstock composed of natural-origin fish.
[4] PNI is the proportion natural influence on an integrated population that results from the combination of pHOS and pNOB.

2.4.2.5 Objective 9 of the Hatchery M&E Plan - BKD

In 2009, the Hatchery Committee agreed to a BKD management strategy as part of the Wenatchee Spring Chinook HGMP. This strategy incorporated recommendations from the HSRG, WDFW broodstock collection protocols, and BKD data from annual M&E reports. The strategy relies on: 1) culling hatchery-origin fish that have a high probability of becoming infectious, and 2) rearing natural-origin progeny at lower densities to reduce disease prevalence. To ensure that program production levels are met, the BKD strategy also relies on collection of up to 20 percent additional hatchery-origin females. The 2009 Broodstock Collection Protocols (Appendix H) reflected portions of this strategy (i.e., culling infectious hatchery origin fish and collecting additional hatchery-origin broodstock). It is anticipated that the BKD strategy will be implemented fully in 2010.

2.4.2.6 Objective 10 of the Hatchery M&E Plan - NTTOC

The Hatchery Committees agreed on a plan to address the interaction of Plan Species with non-target taxa of concern (NTTOC; Objective 10 of the Hatchery M&E Plan) in early 2008. At the close of 2008, the Hatchery Committees agreed to conduct an expert panel review of risks to NTTOC in late spring 2009 using a risk-based model that the WDFW has previously developed and applied in the Yakima River basin (Ham and Pearsons, 2001, Fisheries 26: 15-23). The Committees agreed on which species interactions to analyze and agreed on risk containment objective categories for these species, as well as potential panel members for the exercise in November 2008. The final documentation for this decision, titled *Summary and Strategy for Monitoring and Evaluation Plan Objective 10 (NTTOC)*, was made available as Attachment B to the January 21, 2009 Hatchery Committee meeting minutes.

During the August 2009 meeting, the Hatchery Committees directed the HETT to conduct the NTTOC assessment. For Hatchery Committees' review, input, and approval, the HETT was asked to develop a list of regional and local ecological experts to serve on a panel to estimate the risk of Plan Species hatchery programs to NTTOC, develop a strategy and logistics for conducting the assessment panel workshops (phone, in person, or a combination of the two), and schedule the workshops. In November 2009, the HETT was working on completing the NTTOC risk template for Hatchery Committees' review in January or

February 2010. The HETT is completing the risk analysis for presentation to the Hatchery Committees by approximately March 2010.

2.4.2.7 Steelhead Reproductive Success Study

Section 8.5.3 of the Rocky Reach HCP directs the Hatchery Committee to plan and Chelan PUD to implement a steelhead reproductive success study in the Wenatchee River basin. Chelan PUD began working with the Hatchery Committees to develop such a steelhead spawning success study proposal in 2008. In September 2009, Chelan PUD, WDFW, and the National Oceanic and Atmospheric Administration proposed a steelhead spawning success study for the Wenatchee basin and presented it to the Hatchery Committees. In November 2009, the Hatchery Committees approved the proposal. The study will examine the reproductive success of natural and hatchery-origin steelhead using a DNA pedigree analysis and will be conducted beginning in 2010 through 2017. The study will also address Objectives 2 and 3 of the Chelan PUD M&E Plan.

2.4.2.8 M&E Program Control Groups

In 2007, the HETT was tasked with making recommendations to the Hatchery Committees on reference streams (now called control groups) for the Chelan PUD M&E program. In 2008, the HETT completed the draft control group analysis for the Chiwawa, Methow, Chewuch, and Twisp rivers. The HETT considered correlation coefficients for effect sizes, and also productivity and abundance. The next step was for the HETT to provide a list of recommended control groups for steelhead and sockeye. The Hatchery Committees will then consider these recommendations in their selection of control groups for the M&E programs. At the November 2009 Hatchery Committee meeting, it was reported that the HETT was completing the control group analysis and would present it to the Committees by approximately March 2010. The analysis will include a document that describes the methods and results for the analysis.

2.4.2.9 Sockeye Enumeration Study

In February 2009, Chelan PUD implemented an approach to estimating the number of returning sockeye to the White and Little Wenatchee rivers using PIT-tag detection arrays. The enumeration study was designed to provide an alternative method of describing

escapement and run-timing characteristics versus a visual observation approach that may be biased as a result of turbidity. In 2009, PIT-tag detectors were installed in the White and Little Wenatchee rivers and they were operational by June 1. Data from both of these arrays has been archived in the PIT Tag Information System (PTAGIS). Analyses are in progress to calculate spawner abundance and run timing for the 2009 run.

2.4.2.10 Hatchery Facilities Issues and Actions

In April 2009, U.S. Fish and Wildlife Service (USFWS) provided a memorandum detailing plans for removal of adipose-clipped Leavenworth Hatchery strays at Tumwater Dam. The plan would allow for detection and documentation of coded-wire tagged Chiwawa fish that might be removed unintentionally.

In 2009, Chelan PUD continued to work on permitting needs associated with development of the Chiwawa steelhead acclimation facility. At the close of 2009, water rights and ESA permitting issues were still being discussed for facility construction. One of the primary requirements for proceeding with development of the facility will be the National Marine Fisheries Service completing their ESA consultation associated with the steelhead HGMP.

In 2009, Chelan PUD had reached the 30% design criteria for the proposed Chelan Falls summer Chinook acclimation facility and had initiated consultation with National Marine Fisheries Service (NMFS) for issuance of a Corps 404 permit (June 2009). The completion of this facility may be delayed significantly if NMFS determines that an HGMP is also needed for unlisted summer Chinook. Chelan PUD has been working with the Hatchery Committee and NMFS to make a determination on whether or not and HGMP is required, in addition to the ESA section 7 consultation required for construction. It is anticipated that NMFS will make a determination on whether or not an HGMP is needed in 2010. Chelan PUD anticipates completion of the Chelan Falls facility in late 2011 to early 2012 if the existing Section 10 permit (#1347 expires in 2013) provides adequate ESA coverage for the proposed summer Chinook program.

In 2008, the Hatchery Committees approved development of Blackbird Pond as a Wenatchee steelhead acclimation site for up to 50,000 juvenile steelhead annually for the years 2009 to

2013. Substantial improvements were made to the pond in the winter of 2008-2009 and final modifications were completed in the spring of 2009. Fish were moved on station on March 27, 2009. Acclimation progressed as planned in 2009 and non-migrant *O. mykiss* were made available for a youth recreational fishery in June 2009. In July 2009, the Hatchery Committees agreed that Blackbird Pond should be used as an acclimation pond in 2010, pending review of results from 2009 and improvements to the pond. Two issues affecting the continued operation of Blackbird Pond for acclimation in 2010 were identified: 1) problems with the intake system configuration in allowing for continual flow; and 2) exit conditions at the pond, including problems with the PIT-tag detection system at the pond exit. As of October 2009, Chelan PUD was working on a report of findings for the 2009 Blackbird Pond acclimation and release activities, and the USFWS and Trout Unlimited were investigating improvement options to the pond PIT-tag detection system at the outlet. Modifications to the outfall by Chelan PUD were not anticipated; however, Chelan PUD planned to make needed improvements to the inlet to allow for reliable flows into the pond by March 2010 (Path forward for Blackbird Pond 2010 steelhead rearing – for Rocky Reach and Rock Island HCP HC discussion October 21, 2009; produced by Chelan PUD).

In 2009 Chelan PUD funded the Colville Confederated Tribes for the rearing of 200,000 summer Chinook (for release in 2010) at Bonaparte Pond. The agreement was based upon successful development of a ground water supply to prevent icing of the pond. Previously, Chelan PUD funded a well field feasibility study, and the Bonneville Power Administration, as part of the Chief Joe Hatchery program, funded the installation and completion of the balance of the water warming system (Completed in January 2009).

In August 2009, a cobble bar accumulated on the right bank of the Wenatchee River just downstream of the confluence of Peshastin Creek, with the potential to impede fish exiting the right-bank fishway of the Dryden weir. The Hatchery Committees worked with Chelan PUD to identify and approve several courses of action to allow for the continued egress of fish that successfully pass upstream of Dryden weir but may be unable to migrate over the gravel bar that had accumulated (Appendix B, September 16, and 17, 2009). In December 2009, Chelan PUD updated the Hatchery Committees that Chelan PUD will be providing a memo to the HCP Hatchery and Tributary Committees stating that the PUD anticipates removing the cobble accumulated near Dryden Weir.

In 2009, the Chiwawa spring Chinook HGMP described the reduction of spring Chinook production from 672,000 to 298,000 consistent with anticipated changes identified in the HCP and recommendations derived from the HSRG and M&E data from Chiwawa River. The HSRG suggested that hatchery production levels were in excess of the carrying capacity of the Chiwawa River. The proposed reduction in production will be formalized through an SOA in 2010 and the production changes will be implemented immediately thereafter.

2.5 Tributary Committees and Plan Species Accounts

As outlined in the Rocky Reach HCP, the signatory parties designated one member each to serve on the Tributary Committee. The Rock Island, Rocky Reach, and Wells Tributary Committees met on a regularly scheduled basis as a collective group to enhance coordination and minimize meeting dates and schedules. Subject items requiring decision making were voted on in accordance with the terms outlined in the specific HCPs. During 2009, the Tributary Committees met on seven different occasions.

The initial focus of the Tributary Committees was to adopt operating procedures, which provide a mechanism for decision making on various issues related to the Committees, and which were provided in the 2005 HCP Annual Report (Anchor 2005)[5], and most recently updated in April of 2009. The Tributary Committees also developed policies for soliciting, reviewing, and approving project proposals (Anchor 2005); this document was last updated in April of 2009. The policies document provides formal guidance to project sponsors on submission of proposals for projects to protect and restore habitat of Plan Species within the geographic scope of the HCP. The Committees established two complementary funding programs, the General Salmon Habitat Program and the Small Projects Program.

In 2008, the Tributary Committees outlined a general strategy for monitoring the effectiveness of habitat actions funded through the Plan Species Accounts. Under Section 7.5 of the Anadromous Fish Agreement and Habitat Conservation Plans, each of the three

[5] Anchor Environmental, L.L.C. 2005. Annual Report, Calendar Year 2005, of Activities Under the Anadromous Fish Agreement and Habitat Conservation Plan. Rocky Reach Hydroelectric Project, FERC license no. 2145. Prepared for FERC by Anchor Environmental L.L.C. and Public Utility District No. 1 of Chelan County.

project operators (for Rock Island, Rocky Reach, and Wells) are required to provide up to $200,000 to each of their respective Tributary Assessment Programs, which are separate from the Plan Species Accounts. The Programs were established to monitor and evaluate the relative performance of tributary enhancement projects approved by the Committees and funded directly by the Plan Species Accounts. Simply stated, the Programs are intended to make sure that dollars allocated to the Plan Species Accounts are used in an effective and efficient manner. To that end, the Committees established the following draft guidelines for funding effectiveness monitoring projects.

- The Committees intend to focus on the effects of off-channel habitat actions on the rearing and spawning of salmonids.
- The Committees intend to focus monitoring efforts at the reach or project scale where a signal is more likely to be detected.
- The Committees are interested in measuring changes in fish abundance, distribution, and size, and changes in physical/environmental performance metrics that are linked directly to the habitat action.
- The Committees recommend that changes in response variables be compared to spatial and/or temporal reference or control conditions.
- The Committees are interested in partnering with existing monitoring programs.

Based on these draft guidelines, in April 2008, the Tributary Committees solicited effectiveness monitoring proposals from the Yakama Nation and the Okanagan Nation Alliance (see Section 2.5.5). Only the Okanagan Nation Alliance responded to the solicitation in 2008. In 2009, the Rocky Reach Tributary Committee did not receive or solicit any proposals to monitor the effectiveness of habitat restoration actions.

2.5.1 Regional Coordination

Similar to the Hatchery Committees and to improve coordination, a representative from Grant PUD and the facilitator of the Priest Rapids Coordinating Committees (PRCC) Habitat Subcommittee are invited to the Tributary Committees monthly meetings. In addition, Grant PUD receives meeting announcements, draft agendas, and meeting minutes (Appendix C). This practice benefits the Tributary Committees through increased coordination and sharing of expertise. The Grant PUD representative and PRCC Habitat Subcommittee have

no voting authority. The Tributary Committees, through the Coordinating Committees, also invited American Rivers and the Confederated Tribes of the Umatilla Indian Reservation to participate in annual coordination meetings. Both parties contributed to the development of the HCP, yet elected not to sign the document. Neither of these parties participated in the deliberations of the Tributary Committees in 2009.

The Tributary Committees also coordinate with the Upper Columbia Salmon Recovery Board (UCSRB). Coordination is typically between the chairperson of the Tributary Committees and the Executive Director or Associate Director of the UCSRB. The Tributary Committees also invite representatives from the UCSRB to at least one meeting per year to update the Committees on activities proposed by the Board. For example, in January 2009, the Executive Director, RTT Chair, and the Data Steward discussed 2009 UCSRB proposed activities with the Tributary Committees. In addition, some members of the Committees regularly attend the UCSRB meetings to foster coordination in developing and selecting projects for funding. Some members of the Committees are also members of the Upper Columbia Regional Technical Team, which increases coordination in selecting projects for funding. Many of the policies and procedures of the Salmon Recovery Funding Board (SRFB) and Tributary Committees are complementary, and annual funding rounds by these funding entities have been coordinated over the last several years.

2.5.2 Fiscal Management of Plan Species Accounts

The Tributary Committees set up methods for the long-term management of the Plan Species accounts for each HCP. The Rocky Reach Tributary Committee appointed the accounting firm LeMaster and Daniels, PLLC, to perform the necessary tasks for fiscal management of Rocky Reach Plan Species Account. These tasks include, but are not limited to, the following: (1) develop a long-term approach to maintain the funds and to carry out tax calculations and reporting; (2) conduct the daily management of activities (such as processing of invoices); and (3) provide technical expertise on financial matters to the committees. The beginning balance of the Rocky Reach Plan Species Account on January 1, 2009, was $1,306,988.03, interest accrued during 2009 was $16,316.28, funds disbursed for projects in 2009 totaled $122,579.96, and $3,439.29 was paid to LeMaster and Daniels and Chelan PUD for account administration during 2009, resulting in an ending balance of $1,505,124.36 on

December 31, 2009. The 2009 Annual Financial Report for this Plan Species Account is provided in Appendix K.

In 2009, the Tributary Committees requested an external financial review of the Plan Species accounts. The objectives of the review are to:

- Review all areas associated with the receiving and handling of funds, including processes, internal controls, and work flow. Also review bank statements and statement reconciliation.
- Review project budgets and corresponding financial reporting, ensuring that the record keeping is in balance with the intent of the budget.
- Review procedures and controls associated with the allocation and approval of expenses to ensure a tight process.

In November 2009, the Tributary Committees hired the accounting firm Cordell, Neher & Company, PLLC, to conduct the financial review. The firm will submit their results to the Committees in February 2010. The Committees will request an external financial review of the Plan Species accounts every three-five years.

The Rocky Reach Tributary Committee delegated signatory authority to the chairperson for processing of payments for invoices approved by the Committee, with the Coordinating Committee Chairperson serving as the alternate. Chelan PUD recognizes the uniqueness of the Tributary Committee decision-making process and delegation of signatory authority to the Chairperson, and the Chelan PUD subsequently has provided funding necessary to assign reasonable liability insurance to the Tributary Chairperson.

2.5.3 General Salmon Habitat Program

The Tributary Committees established the General Salmon Habitat Program as the principle mechanism for funding projects. The goal of the program is to fund habitat protection and restoration projects that contribute to the rebuilding of the Plan Species. An important aspect of this program is to assist project sponsors in developing practical and effective applications for relatively large projects. Many habitat projects are increasingly complex in nature and require extensive design, permitting, and public participation to be feasible.

Often, a reach-level project involves many authorities and addresses more than one habitat factor. Because of this trend, the General Salmon Habitat Program was designed to fund relatively long-term projects. There is no maximum financial request in the General Salmon Habitat Program; the minimum request is $50,000, although the Committees may provide lesser amounts during a phased project.

In an effort to coordinate with ongoing funding and implementation programs within the region, the Tributary Committees used the previously established technical framework and review process for this area and worked with the other funding programs to identify cost-sharing procedures.

2.5.3.1 2009 General Salmon Habitat Projects

The Tributary Committees announced their 2009 funding cycle in April, with pre-proposal applications due on June 1, 2009 and full proposals due on July 24, 2009. The Tributary Committees received and reviewed 16 pre-proposal applications. The Committees selected 15 projects that they believed warranted full proposals, and dismissed one project because it did not have strong technical merit.

In July, the Tributary Committees received 14 full proposals to the General Salmon Habitat Program. Most of these were "cost-shares" with SRFB or other funding entities. By the end of December, two proposals were withdrawn by the project sponsors. Of the remaining 12 proposals, the Committees approved funding for six projects. Table 5 identifies the projects, sponsors, total cost of each project, amount requested from Tributary Funds, and, if funded, which Plan Species Account supported the project.

Table 5

General Salmon Habitat Program Projects Reviewed by the Tributary Committees in 2009

Project Name	Sponsor[1]	Total Cost	Request from T.C.	Plan Species Account[2]
White River Nason View Acquisition	CDLT	$545,000	$76,635	RI
Upper Methow II (Tawlks) Riparian Protection	MC	$411,943	$61,948	RI
Nason Creek UWP Floodplain Reconnection	CCNRD	$35,000	$5,250	RI
Upper Methow III (Hardy) Riparian Protection	MC	$423,402	$63,520	Not Funded
Foreman Floodplain Reconnection Side Channel	CCNRD	$208,592	$104,296	RR
White River Tall Timber Ranch Conservation Easement	CDLT	$462,000	$43,000	Not Funded
McLoughlin Falls Conservation	WDFW	$700,000	$200,000	Not Funded
Entiat River Troy Acquisition	CDLT	$406,770	$325,909	Not Funded
Entiat NFH Habitat Improvement Project	CCD	$285,886	$61,373	RR
Nason Creek LWP Floodplain Reconnection Assessment	CCNRD	$99,166	$49,583	Not Funded
Lower Wenatchee Instream Flow Enhancement	WRC	$4,954,466	$167,500	RI
Peshastin Creek Reconnection Alternatives Analysis	CCNRD	$84,606	$12,690	Not Funded

1 CDLT = Chelan-Douglas Land Trust; MC = Methow Conservancy; CCNRD = Chelan County Natural Resource Department; WDFW = Washington Department of Fish and Wildlife; CCD = Cascadia Conservation District; WRC = Washington Rivers Conservancy.

2 RI = Rock Island Plan Species Account; RR = Rocky Reach Plan Species Account.

In 2009, the Rocky Reach Tributary Committee agreed to fund the following General Salmon Habitat Program projects:

- Foreman Floodplain Reconnection Side Channel Project for the amount of $104,296 (with cost share, the total cost of this project was $208,592). This project will remove portions of two levees and excavate a 1,100-linear-foot side channel to restore fish access and flows to off-channel habitat and floodplain. The project will increase refuge and rearing habitat, improve the ability of the river to recruit large woody debris, and continue to restore habitat-forming processes in the lower Entiat.
- Entiat National Fish Hatchery Habitat Improvement Project for the amount of $61,373 (with cost share, the total cost of this project was $285,886). This project will increase channel complexity, provide high-water refugia and juvenile rearing habitat for native salmonids, increase recruitment of large woody debris, activate existing floodplain, and increase the spatial extent of the floodplain through levee removal

and breaching. This project will occur on about 12 acres of federal land between River Mile (RM) 6.8 and 7.1 on the Entiat River.

2.5.3.2 Modifications to General Salmon Habitat Program Contracts

The Rocky Reach Tributary Committee received no requests from project sponsors in 2009 asking for contract amendments to General Salmon Habitat Program projects funded by the Committee.

2.5.4 Small Projects Program

The Small Projects Program has an application and review process that increases the likelihood of participation by private stakeholders that typically do not have the resources or expertise to go through an extensive application process. The Tributary Committees encourage small-scale projects by community groups, in cooperation with landowners, to support salmon recovery on private property. Project sponsors may apply for funding at any time, and in most cases, will receive a notification of funding within 3 months. The maximum contract allowed under the Small Projects Program is $50,000.

2.5.4.1 2009 Small Projects

In 2009, the Tributary Committees received four requests for funding under the Small Projects Program. Two projects were approved for funding. The two projects not funded lacked technical merit. Table 6 identifies the projects, sponsors, total cost of each project, amount requested from Tributary Funds, and, if funded, which Plan Species Account supported the project.

Table 6

Projects Reviewed by the Tributary Committees under the Small Projects Program in 2009

Project Name	Sponsor[1]	Total Cost	Request from T.C.	Plan Species Account[2]
Legacy Park Stream Restoration Project	OCD	$22,370	$16,500	Not Funded
LWD/Rootwad Acquisition and Transport II	CCD	$35,000	$35,000	RI
2010 Entiat River Riparian Planting	CCD	$49,951	$49,951	Not Funded
Sleepy Hollow Reserve Protection Feasibility	CCNRD	$25,000	$20,000	RI

1 CCNRD = Chelan County Natural Resource Department; CCD = Cascadia Conservation District; OCD = Okanogan Conservation District.

2 RI = Rock Island Plan Species Account; RR = Rocky Reach Plan Species Account.

The Rocky Reach Tributary Committee did not fund any Small Projects in 2009.

2.5.4.2 Modifications to Small Project Contracts

The Rocky Reach Tributary Committee received no requests from project sponsors in 2009 asking for contract amendments to Small Projects funded by the Committee.

2.5.5 Tributary Assessment Program

In 2009, the Rocky Reach Tributary Committee did not receive or solicit any proposals to monitor the effectiveness of habitat restoration actions.

3 HCP ADMINISTRATION

In 2005 and 2006, Mid-Columbia Forums (Forum) were held as a means of communicating and coordinating with the non-signatories and other interested parties on the implementation of the HCPs. Current non-signatory parties at the time of the 2006 meeting included the Confederated Tribes of the Umatilla Reservation and American Rivers. As in 2007 and 2008, these parties were invited by letter in 2009 to attend a Forum, in conformity with the 2005 FERC Order on Rehearing 109 FERC 61208 and in accordance with the offer to non-signatory parties of non-voting membership in HCP Tributary and Hatchery Committee processes. The parties indicated no interest in attending a Forum in 2009, and thus no forum was held in 2009.

APPENDIX A
HABITAT CONSERVATION PLAN COORDINATING COMMITTEES MEETING MINUTES AND CONFERENCE CALL MINUTES

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Coordinating Committees	**Date:**	February 24, 2009
From:	Michael Schiewe, Chair, HCP Coordinating Committees		
Cc:	Ali Wick, Steve Hemstrom		
Re:	Final Minutes of January 27, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met at the Radisson Gateway Hotel in SeaTac, Washington on Tuesday, January 27, 2009, from 9:30 am to 1:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Ali Wick will distribute the final December 16 Meeting Minutes to the Coordinating Committees (Item I).
- Keith Truscott will send the 2009 Chelan PUD HCP Action Plan for review and comment (Item II-B).
- Steve Hemstrom will provide an electronic copy of the 2009 Chelan PUD Rocky Reach juvenile sockeye survival study plan to Ali Wick for group distribution (Item II-C).
- Steve Hemstrom will provide an electronic copy of the 2009 Rock Island Study Plan to Ali Wick for group distribution (Item II-F).
- The Coordinating Committees will provide comments or edits to the 2009 Wells Action Plan by February 4 (Item III-A).

DECISION SUMMARY

There were no decision items at this meeting.

I. Approval of Meeting Minutes and Agenda (Mike Schiewe)

The December 16 Meeting Minutes were approved with minor revisions. Ali Wick will distribute the final minutes to the Coordinating Committees.

II. Chelan PUD (Keith Truscott)

A. Rock Island Pikeminow Ladder Trapping Follow-up

Keith Truscott updated the group that, for this year, Chelan PUD will use the same Pikeminnow ladder trapping methodology and protocol as in previous years. In response to a question raised at the last Coordinating Committees meeting, Bryan Nordlund said that he had checked with National Marine Fisheries Service (NMFS) staff regarding the rationale for identifying take limits for non-listed Plan Species in the Biological Opinion for the HCPs. They had noted that a relatively large number of adult sockeye had been incidentally trapped during pikeminnow trapping in 2008. Nordlund reported that in his conversation with NMFS staff, 'take' for sockeye was considered in the BiOp because the PUDs, at the time, had wanted some discussion in case sockeye were eventually Endangered Species Act (ESA)-listed. With this information, the Committees said today that they were comfortable with the numbers of sockeye captured during pikeminnow trapping, as they have been released with minimal handling and in good condition, and the Committees do not see this as a problem at this point. They noted that the high numbers were likely a consequence of an exceptionally large return of adult sockeye in 2008. The Committees said they would re-visit this issue if they believe that this is becoming a problem.

B. 2009 Chelan PUD HCP Action Plan

Keith Truscott will send the 2009 Chelan PUD HCP Action Plan for review and comment. This document will be up for approval at the next meeting.

C. 2009 Rocky Reach Juvenile Sockeye Survival Study Plan

Steve Hemstrom distributed and discussed the 2009 study plan for estimating passage timing and project survival for juvenile sockeye at Rocky Reach Dam. The study plan focuses on implementing an alternative fish release strategy, testing for a potential survival advantage that may be inherent to run-of-river (ROR) sockeye that migrate downstream at night and pass the dam under darkness, potentially reducing the overall effect of predation on project survival. The Coordinating Committees asked Hemstrom to include some information on how flow may contribute to fish travel and reservoir residency times. The Committees had questions about how the information gained could be applied in future study years. Steve Hemstrom said that a primary reason to reduce uncertainties related to day/night conditions between study sockeye and ROR sockeye is so that future studies could be designed to match up the study fish release strategy with ROR fish passage timing characteristics. The Committees will review the study plan and provide comments to Chelan PUD. The plan will

be up for approval at the next meeting. Steve Hemstrom will provide an electronic copy to Ali Wick for group distribution.

D. Additional Efforts Toward Improving Rocky Reach Survival

Keith Truscott said that he had met with senior management at Chelan PUD to ensure a commitment to maximize the implementation efforts for current survival tools in place such as increasing U.S. Department of Agriculture (USDA) and long-lining efforts during Pikeminnow control and he had received support from them. In addition, Truscott also noted that Chelan PUD will also begin preliminary modeling efforts to evaluate additional tools such as intake guidance screens at powerhouse units 3 and 4, and they will also begin a parallel conceptual engineering effort with CFD modeling to analyze potential behavioral guidance devices.

E. Pikeminnow Control Program

Keith Truscott said that Chelan PUD would be meeting with Grant PUD to possibly extend the pikeminnow control program to include Wanapum Reservoir because large numbers of pikeminnow have been observed moving upstream at Rock Island Dam in recent years.

F. Rock Island Study Plan Release Modification

Steve Hemstrom reminded the group that Rock Island 10 percent spill study would be performed this year on sockeye, steelhead, and yearling Chinook, similar to last year. The changes in releases at Rocky Reach per the 2009 Rocky Reach sockeye study (Item II-C) will change the number of fish per release at Rock Island. Twelve control releases consisting of twice the number of fish are now planned at Rocky Reach (normally 24 releases with half the numbers), to meet statistical requirement and logistical constraints. Hemstrom will provide an electronic copy of the study plan to Ali Wick for group distribution once it is available.

III. Douglas PUD (Rick Klinge)

A. 2009 Wells HCP Action Plan

Rick Klinge said that Douglas PUD had sent out an Action Plan for 2009; the Coordinating Committees agreed to provide comments by February 4. The plan will be up for approval at the next meeting.

B. Draft Bypass Operating Memo

Rick Klinge said that the Draft of the Bypass Operating Memo had been distributed to the group for review. Bryan Nordlund asked whether there was reason to re-visit the fixed start date for the bypass. Klinge said that Douglas PUD has abundant historical data that the fixed start date encompasses 95 percent of spring and summer migration. Klinge further noted that the start date was discussed in the HCP and subsequently agreed to by the Wells Committee. Klinge indicated he will provide the historic hydro acoustic data that helped set this date; he noted that this should help the current Coordinating Committees membership better understand the rationale for this start date. Klinge will also ask Shane Bickford to discuss this at a future meeting. Following this discussion, the Committees approved the bypass plan for 2009.

IV. NMFS

C. Discussion of Subyearling Chinook Survival Studies

Bryan Nordlund said that he has recently become aware of some new information about tagging technology. He said that his update today was to provide this information to the Coordinating Committees for consideration when discussing a potential future subyearling survival study in the Upper Columbia. This information indicates that the use of the new flat-plate Passive Integrated Transponder tag (PIT-tag) detectors at downstream dams might greatly reduce the numbers of fish that would be needed to perform a valid study (i.e., higher sampling efficiency). In addition, the Juvenile Salmon Acoustic Tracking System (JSAT) acoustic tags that the U.S. Army Corps of Engineers (Corps) uses are much smaller (0.6 g) and might be used to implant an acoustic tag in subyearling fish (although the JSAT tags do not match the current fish tracking hardware at the dams). Nordlund suggested that the PUDs investigate whether this technology might be useful for subyearling survival studies. It was suggested that later on this year it would useful to invite researchers using these tools to make presentations for the Committees, so they would be knowledgeable regarding the use of these tools; Tom Kahler and Bryan Nordlund agreed to follow up on this.

V. Update: Tributary and Hatchery Committees (Mike Schiewe)

Mike Schiewe updated the group that the Tributary Committees have made their final funding decisions for the 2008 funding cycle. He reviewed the list of funded projects, saying that there were seven proposals, five of which were funded.

Schiewe gave an update on the issues under discussion by the Hatchery Committees at the last meeting:

- The Hatchery Committees have come to an agreement to conduct a modeling exercise for Non-Target Taxa of Concern in late spring/summer 2009, to help address Regional Objective 10 of the Monitoring and Evaluation (M&E) Plans.
- The Hatchery Genetic Management Plan (HGMP) Workgroup, as part of the Hatchery Committees, is making progress toward completing new HGMPs required by NMFS; deadlines agreed to by NMFS are the end of March for Wenatchee steelhead and end of May for Chiwawa spring Chinook.
- The Hatchery Committees are discussing and planning a steelhead reproductive success study. They are developing a set of study proposal evaluation protocols that will be used for this and future studies.
- The Hatchery Committees are evaluating the Wells Action Plan.
- Grant PUD has requested rearing capacity at Methow Hatchery.
- NMFS has developed a clinical test to evaluate the proportion of juvenile male Chinook salmon in a hatchery population that will return as jacks or mini-jacks; the Hatchery Committees are considering applying this technique to fish from Chelan PUD's pilot water re-use study.
- The Hatchery Committees are finishing preparations for a sockeye escapement study.
- Chelan PUD is working with the U.S. Forest Service (USFS) on a potential land swap, so that the new Chiwawa steelhead acclimation ponds will be on PUD-owned property.
- The Hatchery Committees received confirmation that Blackbird Island Pond facility was complete and ready for steelhead this spring. Jim Craig reported at today's meeting that the U.S. Fish and Wildlife Service (USFWS) would be installing a PIT-tag detector at the outlet of the pond to check for emigrant steelhead.
- Jerry Marco reported that operations at Bonaparte Pond are going well this year. Groundwater has been used to keep the pond ice-free.
- The Hatchery Committees will soon be reviewing 2009 broodstock collection protocols for this year. Coho broodstock collection protocols will be reviewed prior to June.
- The Yakama Nation is planning a series of regional meetings on their coho program.

- The Yakama Nation expects to submit a proposal to Bonneville Power Administration (BPA) at the end of March for multiple acclimation sites in the Methow and Wenatchee Rivers.
- The Yakama Nation's kelt reconditioning is on hold following review of the Independent Scientific Review Panel (ISRP).

VI. HCP Committees Administration (Mike Schiewe)

A. Meeting Schedule

The upcoming meetings are set as follows:

- February 24 from 9:30 am to 3:00 pm in SeaTac
- March 24 from 9:30 am to 3:00 pm in SeaTac
- April 28 from 9:30 am to 3:00 pm in SeaTac

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor Environmental, L.L.C.
Ali Wick	Anchor Environmental, L.L.C.
Keith Truscott *	Chelan PUD
Steve Hemstrom	Chelan PUD
Jerry Marco * (by conference call)	Colville Confederated Tribes
Rick Klinge *	Douglas PUD
Tom Kahler *	Douglas PUD
Bryan Nordlund *	NMFS
Jim Craig *	USFWS
Bill Tweit *	WDFW
Bob Rose *	Yakama Nation

* Denotes Coordinating Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Coordinating Committees	**Date:**	March 24, 2009
From:	Michael Schiewe, Chair, HCP Coordinating Committees		
Cc:	Ali Wick, Steve Hemstrom		
Re:	Final Minutes of February 24, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met at the Radisson Gateway Hotel in SeaTac, Washington on Tuesday, February 24, 2009, from 9:30 am to 12:30 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Steve Hemstrom will email new text to be added to the 2009 Rocky Reach Sockeye Survival Study Plan; this text will clarify that the purpose of the study is not to measure survival *per se*, but to gain information on the behavior of juvenile sockeye salmon as they pass Rocky Reach Dam. This text will be subject to Coordinating Committees' approval by email; following this, Keith Truscott will provide the final plan (Item II-B).
- Keith Truscott will update the Coordinating Committees at the next meeting on new resource committees that will be established under the new Rocky Reach Federal Energy Regulatory Commission (FERC) license, and how these committees are expected to relate to the Coordinating Committees (Item II-D).
- Tom Kahler will send out the final 2009 Douglas PUD HCP Action Plan, for the record (Item III-A).
- The Coordinating Committees agreed that they will revisit the discussion of technology for subyearling survival studies in June, in order to provide focus for a full discussion at the September or October meeting (Item IV-A).
- Keith Truscott will ask Chelan PUD to investigate whether there might be an engineering solution that can be applied in order to meet fishway criteria at Rock Island Dam during times when tailwater levels are high (Item IV-B).

- Tom Kahler reported that the Tributary Committees had recommended that Douglas PUD provide new contributions to the Wells Plan Species Account on an annual basis, rather than as a 10-year lump sum, but that the HCP specified that the Joint Fisheries Parties (JFP) needed to approve this action. Douglas PUD will provide a short explanation of this situation to the Coordinating Committees and a JFP agreement will be memorialized at the next Coordinating Committees meeting (Item V).

DECISION SUMMARY

- The Coordinating Committees approved the 2009 Chelan PUD HCP Action Plan (Item II-A).The Coordinating Committees approved the "Study Plan to Compare Effects of Daytime and Nighttime Fish Releases On Estimates of Project Survival For Juvenile Sockeye at Rocky Reach Dam" (Item II-B).
- The Coordinating Committees approved the 2009 Rock Island Study Plan (Item II-C).
- The Coordinating Committees approved the 2009 Wells HCP Action Plan (Item III-A).

I. Approval of Meeting Minutes and Agenda (Mike Schiewe)

The January 27 Meeting Minutes were approved with minor revisions. Ali Wick will distribute the final minutes to the Coordinating Committees.

II. Chelan PUD (Keith Truscott)

A. 2009 Chelan PUD HCP Action Plan

Keith Truscott said that the 2009 Chelan PUD HCP Action Plan has been reviewed and is now ready for approval. The Coordinating Committees had no further comments and approved the plan as is.

B. 2009 Rocky Reach Juvenile Sockeye Survival Study Plan

Steve Hemstrom distributed a handout on questions raised by Bryan Nordlund on the 2009 Rocky Reach Sockeye Survival Study Plan, including responses from Chelan PUD. Ali Wick emailed this document to the Coordinating Committees so that Jerry Marco and Bob Rose (participating by phone) could access this during the meeting. Hemstrom discussed each of these comments and how they were resolved.

The Committees approved the study plan with the revisions that will be made based on today's discussion. Steve Hemstrom will add new text to the introduction that explains that the purpose of the study is to improve knowledge of juvenile sockeye salmon behavior, and will send it out for approval by email. Following approval of this text, Keith Truscott will provide the final study plan to the Committees. [Update: The new title is: "Study Plan to Compare Effects of Daytime and Nighttime Fish Releases On Estimates of Project Survival For Juvenile Sockeye at Rocky Reach Dam"].

C. Rock Island Study Plan

Keith Truscott said that the 2009 Rock Island Study Plan has been out for review between meetings and he would like to discuss it and potentially approve it today. He said that the main difference between last year's study and this year's study is that there will be 12 tailrace releases of juvenile sockeye salmon at Rocky Reach Dam this year instead of 24 releases, as there were last year. The Coordinating Committees approved this study plan today.

D. Rocky Reach FERC License

Keith Truscott notified the Coordinating Committees that Chelan PUD has received its Rocky Reach FERC license. Bill Tweit asked how the relicensing committees would be structured and asked for information on how the Coordinating Committees would interface with these groups. Truscott said that he will provide an update to the Coordinating Committees on this at the next meeting. Truscott will also distribute the FERC license for the Coordinating Committees' information.

E. Rocky Reach Surface Collector Video

Steve Hemstrom presented several Dual-frequency Identification Sonar (DIDSON) hydro-acoustic videos of fish behavior in the entrance to the Rocky Reach surface collector; videos documented predation by presumptive Northern pikeminnow on smolts. It is not possible to identify the species of smolt in this type of footage due to video quality.

III. Douglas PUD (Rick Klinge)

A. 2009 Wells HCP Action Plan

Tom Kahler notified the Coordinating Committees that the 2009 Wells HCP Action Plan has been reviewed and is ready for approval. The Committees provided some comments and approved the plan. Kahler will send out the final plan for the record.

B. Fish Salvage during Annual Maintenance of the West Ladder at Wells Dam

Tom Kahler updated the group that Douglas PUD had sent out a memo on the results of fish salvage during annual maintenance of the west ladder at Wells Dam. There were no questions on this report.

C. Douglas PUD Committees' Representation

Mike Schiewe updated the group that Tom Kahler will be the new Coordinating and Hatchery Committees representative and Rick Klinge will be the alternate. Also, Bob Clubb at Douglas PUD will soon be retiring.

IV. NMFS (Bryan Nordlund)

A. Discussion of Subyearling Chinook Survival Studies

Last meeting, Bryan Nordlund suggested that the PUDs investigate whether the new flat-plate Passive Integrated Transponder tag (PIT-tag) detection technology might be useful for subyearling survival studies. Today, Nordlund updated the group that he had continued to evaluate whether it may be possible to conduct subyearling survival studies with current technology. Some of the issues he brought up included residualism of subyearling migrants, and potential locations of new PIT-tag detector arrays. The Coordinating Committees agreed that they will revisit this discussion in June, with the intention of having information gathered by September to have a detailed discussion on whether current technology is sufficient to conduct these studies.

B. Fishway Winter Outages

Bryan Nordlund brought up the topic of fishway operating criteria. He noted that Dave Benner of the Fish Passage Center has released a 'report card' for fishway operation at Rock Island Dam (in a memorandum entitled "Pertinent Data for Fish Facility Inspections in 2007 at Rock Island Dam"). Nordlund asked Chelan PUD to investigate whether there might be an engineering solution that can be applied in order to improve the probability of meeting criteria. This has been a reoccurring problem at Rock Island Dam, particularly when tailwater levels are high. Keith Truscott agreed to take this question back to Chelan PUD's Operations and Maintenance staff and will report back to the Coordinating Committees.

V. Update: Tributary and Hatchery Committees (Mike Schiewe)

Mike Schiewe updated the group on the issues under discussion by the Tributary Committees at their last meeting:

- The Tributary Committees have decided that their preference is for Douglas PUD to provide yearly installments to the Wells Plan Species Accounts beginning in January of 2010, rather than to provide another lump-sum payment (as per Section 7.4 of the Wells HCP). Tom Kahler reminded the Coordinating Committees today that the decision on funding options is not a necessarily for the Wells Tributary Committee, but rather, the HCP requires only that there be JFP agreement on this issue. When this was explained to the Wells Coordinating Committee at their January meeting, the representatives of the JFP indicated that they would inquire about this within their respective entities, but ultimately they desired the input from their counterparts on the Wells Tributary Committee. Therefore, Douglas PUD will provide a short explanation of this situation to the Committees and JFP agreement will be memorialized at the next Coordinating Committees meeting.
- The Tributary Committees are reviewing their policies and procedures.
- The Tributary Committees are implementing an external audit.
- The Tributary Committees discussed the idea of combining agenda items that are common to both the Priest Rapids Coordinating Committee (PRCC) Habitat Subcommittee and the Tributary Committees.
- The Tributary Committees reviewed the Salmon Recovery Funding Board application form.
- The Tributary Committees received an update on activities proposed by the Upper Columbia Salmon Recovery Board in 2009.

Schiewe gave an update on the issues under discussion by the Hatchery Committees at the last meeting:

- The Hatchery Committees are working on Wenatchee steelhead and Chiwawa spring Chinook Hatchery Genetic Management Plans (HGMPs) and are preparing for submittals to National Marine Fisheries Service (NMFS) this spring.
- The Hatchery Committees are developing a protocol for development and review of study plans by the Hatchery Committees.
- Chelan PUD introduced the Integrated Hatchery Improvement Plan (IHIP), a Chelan PUD comprehensive planning effort that will guide hatchery improvements over the coming years.
- The Hatchery Committees agreed to test the pilot water reuse study fish for precocity.

- The Hatchery Committees are moving forward on an adult sockeye enumeration study.
- Chelan PUD has met with Bonneville Power Administration (BPA) staff (Jeff Gislason and others) regarding the processes to be used for funding and review of studies implemented under the recently signed Three Treaty Tribes Memoranda of Agreement (MOAs).
- Columbia River Inter-Tribal Fish Commission (CRITFC) and Chelan PUD have had preliminary discussions regarding installation of a PIT-tag detection array for adults in the fishway (or at additional sites) at Zosel Dam in the Okanogan basin.
- Grant PUD will be using the Lake Wenatchee net pens to acclimate White River spring Chinook this spring; the Hatchery Committees supported this use, and acknowledged the potential risk for damage to the pens during movement of the pens to another location within the lake.
- Chelan PUD has signed an interim agreement with Washington Department of Fish and Wildlife (WDFW) to collect steelhead tissue samples at Tumwater Dam.
- The Hatchery Committees are working to identify agreed-upon goals and objectives for a Wenatchee Steelhead Reproductive Success Study. Today, Bill Tweit suggested that there might be a need for a symposium to get input from regional researchers. Mike Schiewe and Bill Tweit will discuss this offline.
- Due to ice buildup just upstream from the Twisp Weir, Douglas PUD will not be able to begin operation of the Twisp Weir on March 1 as planned. The Hatchery Committees agreed to this.
- Douglas PUD is considering options for implementing a steelhead reproductive success study in the Methow basin. Douglas PUD staff will be working with Andrew Murdoch on refining a study design proposed in 2007 by WDFW that used the Well Spawning Channel Study.
- The Hatchery Committees agreed that Douglas PUD can rear 80,000 summer steelhead at Wells Hatchery and 201,000 spring Chinook at Methow Hatchery on behalf of Grant PUD.
- Douglas PUD is still working through the details of access to the east ladder during the turbine re-wind construction project at Wells Dam.

VI. HCP Committees Administration (Mike Schiewe)

A. Meeting Schedule

The upcoming meetings are set as follows:

- March 24 from 9:30 am to 3:00 pm in SeaTac
- April 28 from 9:30 am to 3:00 pm in SeaTac
- May 26 – Wenatchee meeting: potential agenda will be to watch sockeye tagging

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Keith Truscott *	Chelan PUD
Steve Hemstrom	Chelan PUD
Jerry Marco * (by conference call)	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Bryan Nordlund *	NMFS
Jim Craig *	USFWS
Bill Tweit *	WDFW
Bob Rose * (by conference call)	Yakama Nation

* Denotes Coordinating Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Coordinating Committees	**Date:**	April 28, 2009
From:	Michael Schiewe, Chair, HCP Coordinating Committees		
Cc:	Ali Wick, Steve Hemstrom		
Re:	Final Minutes of March 24, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met at the Radisson Gateway Hotel in SeaTac, Washington on Tuesday, March 24, 2009, from 9:30 am to 12:30 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Tom Kahler will send the final Statement of Agreement (SOA) for annual contributions to the Wells Plan Species Account to Ali Wick for distribution (Item III-D).
- Keith Truscott will prepare two SOAs for Chelan PUD reports and study plans approved today, one for the 2008 studies and one for the 2009 plans (Item V-A).

DECISION SUMMARY

- The Coordinating Committees approved the SOA memorializing the decision by the Fisheries Parties to accept the recommendation of the Wells Tributary Committee regarding future Douglas PUD contributions to the Wells Plan Species Account (Item III-D).

I. Approval of Meeting Minutes and Agenda (Mike Schiewe)

The February 24 Meeting Minutes were approved, with minor revisions. Ali Wick will distribute the final minutes to the Coordinating Committees.

II. Update: Tributary and Hatchery Committees (Mike Schiewe)

Mike Schiewe updated the group on the issues under discussion by the Tributary Committees at their last meeting:

- The Tributary Committees reviewed a Small Projects Program application from the Okanogan Conservation District titled Legacy Park Stream Restoration Project, and decided not to fund the project due to some concerns about stream bank stability and the potential for surface erosion.
- In April, the Tributary Committees will finalize their Tributary Fund Policies and Procedures for Funding Projects and the Tributary Committees Operating Procedures.
- Dennis Beich had initiated a Tributary Committees discussion about connecting tributary projects to hatchery projects and whether it makes sense to do so. At today's Coordinating Committees meeting, Mike Schiewe said that he had a discussion with Tracy Hillman (chair of the Tributary Committees) discussing this. Schiewe said today that the Hatchery Committees are extremely busy at this time managing the revision of Hatchery Genetic Management Plans (HGMPs), but he and Hillman will be talking about this once the HGMPs are finished. Keith Truscott then noted that Joe Miller will soon be replacing him as the Tributary Committees representative.

Schiewe gave an update on the issues under discussion by the Hatchery Committees at the last meeting:

- The Hatchery Committees are nearing completion of the Wenatchee steelhead HGMP, which is scheduled to be submitted to National Marine Fisheries Service (NMFS) on March 31. The current draft includes a statement that priorities of the hatchery program are mitigation or production, escapement, and management for a Proportion of Natural Influence (PNI) objective of 0.67.
- The Hatchery Committees are discussing the level of support Chelan PUD will provide in implementing adult management at Tumwater Dam. It was discussed that Chelan PUD would likely state in their cover letter transmitting the revised HGMP to NMFS that responsibilities for adult management is a topic under continuing discussion.
- The next HGMP to be completed will be for Chiwawa spring Chinook, which is due to NMFS on May 31. Following that, the Methow HGMPs will be due in July.
- The protocol for the development and review of study plans by the Hatchery Committees is on hold, as the HGMPs are currently taking most of the work time available.

- NMFS' Hatchery Committees representative, Kris Petersen, will abstain from voting on Hatchery Committees agreement on the HGMPs because she will be the NMFS regulatory reviewer for the document(s).
- Chelan PUD is collecting information for a potential study of rearing densities of steelhead and sockeye salmon and will be providing a proposal soon.
- Chelan PUD would like to conduct a pilot water reuse study at Chiwawa Ponds for rearing and acclimating Wenatchee steelhead. This would not change the schedule or design of the current project for acclimation facilities at Chiwawa ponds. The Committees will be making a decision on this at the next meeting.
- The 2008 Chelan PUD M&E Report is out for review.
- The Sockeye Enumeration Study Plan is nearing completion and will be implemented this year.
- Construction at Blackbird Island Pond has been completed.
- Douglas PUD and Washington Department of Fish and Wildlife (WDFW) have discussed interim solutions for access to the east ladder at Wells Dam for 2009 including the ability to periodically move the portable building that currently blocks access to the ladder.
- The Hatchery Committees will soon discuss developing an integrated steelhead reproductive success study plan that would consider not only the HCP required studies, but also the studies required by the Reasonable and Prudent Alternative (RPA) in the Federal Columbia Power System (FCRPS) Biological Opinion and the Grant PUD Settlement Agreement.
- NMFS has released a notice of decision on expanding the scope of the Environmental Impact Statement (EIS) that analyzes the operation of Columbia River Mitchell Act hatcheries.
- The 9th District Court of Appeals has made a ruling in NMFS' favor on a legal case against NMFS regarding how NMFS treats hatchery programs in Endangered Species Act (ESA) listings.
- The Hatchery Committees approved NMFS researchers collecting 200 summer Chinook yearlings from each of several programs for a precocity study. The collected fish would come from stocks at Dryden, Similkameen, Carlton, and Wells hatchery facilities.
- Broodstock collection protocols are under review and are due to NMFS by April 15.

- WDFW sent out the Twisp Weir Operations Protocol. The ice has been removed from the weir and the weir is now in operation.
- The Methow Hatchery staff have asked Douglas PUD to design and build a new broodstock collection trap at the hatchery outfall. Douglas PUD is fulfilling this request.
- The Hatchery Committees agreed with the Colville Tribes' request for 25,000 Wells summer steelhead smolts for release in Salmon Creek again this year, as in the past 3 years.
- The Hatchery Committees received an update on a proposed study to measure egg-to-fry survival in several spring Chinook populations in the Upper Columbia. The principal investigator will be Phil Roni, a NMFS watershed ecologist at the Northwest Fisheries Science Center. These data will be used in habitat-based population modeling.
- Dave Burgess from Grant PUD is conducting a predator impact study in Priest Rapids Reservoir and will be requesting 20 reference samples (fish specimens; e.g., fresh hatchery mortalities) from each Upper Columbia hatchery program in 2009.
- Columbia River Inter-Tribal Fish Commission is considering a Passive Integrated Transponder Tag (PIT-tag) Array at Zosel Dam for sockeye monitoring, and may build this at a future time when funding is available.

III. Douglas PUD (Rick Klinge)

A. Initiation of the Juvenile Bypass per 2009 Action Plan

Rick Klinge notified the Coordinating Committees that Douglas PUD is planning to initiate the operation of the juvenile bypass system on April 12 at 0000 hours.

B. Repair to Tailrace Gull Wires

Rick Klinge updated the group that the tailrace gull wires will be repaired next week by U.S. Department of Agriculture (USDA). Typical of past years, hazing with pyrotechnics will be implemented in April and May during spring juvenile migration.

C. Start of Pikeminnow Removal Efforts

Tom Kahler reported that pikeminnow removal efforts have begun for this year and will end in July. Fishing has been slow because of cold water temperatures, which are often encountered early in the season.

D. SOA for Annual Contributions to Wells Plan Species Account

Douglas PUD is proposing to make Wells Plan Species Account payments annually instead of lump sum payments. Tom Kahler reminded the group that the Coordinating Committees and the Tributary Committees have both discussed this so far. The Coordinating Committees agreed to the SOA distributed today that memorializes the decision by the Fisheries Parties to accept the recommendation of the Wells Tributary Committee on this matter. Kahler will send out a final SOA for consideration and will send this to Ali Wick for distribution.

IV. NMFS (Bryan Nordlund)

A. Effects of Chief Joseph Spill Tests on Bypass Operations at Wells Dam

Bryan Nordlund asked whether the ongoing tests at Chief Joseph Dam investigating spill and total dissolved gas would have any effects on bypass operations at Wells Dam. Tom Kahler and Rick Klinge said that they do not expect that there will be an effect.

V. Chelan PUD (Keith Truscott)

A. Chelan PUD Reports and Study Plans

Keith Truscott listed several reports and study plans for which agreement needs to be memorialized for the record. The Coordinating Committees stated their approval of these documents today. Truscott will prepare two SOAs, one for the 2008 studies and one for the 2009 plans, stating that the Committees approved these documents. The documents include:

- Survival of Yearling Chinook Salmon Smolts through the Rock Island Project in 2008
- Acoustic Tag Investigations of Sockeye Salmon Smolt Survival and Migration Dynamics at Rocky Reach Dam in 2008
- Route Specific Passage of Juvenile Chinook and Sockeye Salmon using Acoustic Tag Methodologies at Rocky Reach and Rock Island Dams in 2008
- Biological Evaluation of the Rocky Reach Juvenile Fish Bypass System Final Report 2008
- Rocky Reach and Rock Island Fish Passage Plan 2009
- Study Plan for the Biological Evaluation of the Rocky Reach Juvenile Fish Bypass System 2009
- 2009 Fish Spill Plan – Rocky Reach and Rock Island Dams
- Approval of Revised Title and Language for 2009 Rocky Reach Sockeye Study Plan

B. Rock Island Attraction Water Pumps

Keith Truscott said that Chelan PUD is developing a plan for long-term maintenance of the attraction water pumps at Rock Island. To begin, Chelan PUD staff met internally and agreed to compile background information on all work that has been done over the years with the attraction water pumps.

C. Feedback on Juvenile Subyearling Survival Study Planning

Keith Truscott said that Chelan PUD and Douglas PUD are putting together workgroups to investigate the potential to conduct subyearling survival studies in the future.

D. EonFusion Software

Steve Hemstrom said that Hydroacoustic Technology, Inc. (HTI) has a new software tool called EonFusion that can be used to take a visual and analytical look at fish data versus time in relation to forebay configurations. Data from 2008 Rocky Reach sockeye passage has been uploaded into the software at HTI. Examples of metrics that the software can produce include amount of water passing the units, spillway flow, and bypass flow. The program also shows fish behavior and can produce "fish tracks" for fish travel. The Coordinating Committees will receive a presentation on this at the upcoming May meeting. Hemstrom said that the software did not currently have an ability to do predictive modeling of how changes in behavior would be affected by the parameters, but if there was some level of certainty on parameter behavior correlated with fish behavior, predictive model runs could potentially be done. He said, however, that the software is not necessarily geared for this use, and his understanding is that it runs best with real data.

E. Startup of Tagging Operations and Juvenile Fish Collection Facility

Keith Truscott updated the group that Chelan PUD's tagging crews have arrived and are now being trained for this year's work. Yesterday, the sampling screen that shunts fish into the Rocky Reach juvenile fish facility building was accidentally misaligned. While performing operational checks of the sampling screen, the Rocky Reach plant crew deployed the screen and immediately observed that one of the four hydraulic cylinders (for deployment and retraction) was operating too quickly. They immediately stopped the screen deployment, but one cylinder continued to operate, which led to the misalignment. The cause of the failure was determined to be cracked rubber bladders inside accumulator tanks that store 160 gallons of pressurized hydraulic oil.

Rocky Reach personnel deduced that air had been introduced into the hydraulic system, and the compressed air caused the one cylinder to continue to operate until pressures were equalized. The bladders have been temporarily isolated from the hydraulic system to allow the sampling screen to be deployed and retracted. Replacement bladders have been ordered and will be installed when delivered (in approximately 2 weeks.)

He also noted that there is currently one non-operational knife-gate located in turbine unit 1 south gate slot (C-1 South). The knife-gates are hydraulically operated valves mounted in collection pipes that transport fish from each of twelve weir boxes of the intake screen system. Each gate slot (six slots total—turbine units 1 and 2 combined) contains two weir boxes. The knife-gates are used to isolate individual weir boxes for repair, maintenance, or contamination of the gate slot water, and are operated either 100 percent open or 100 percent closed.

Because there are two weir boxes per gate slot, even with one knife-gate inoperable, as in the case of C-1 South, the fish still have access to a weir box and associated collection pipe as a bypass route. Due to the fact that fish can still access the bypass route from C-1 South, the District will leave that inoperable knife-gate closed for the duration of the bypass operating season. This decision was made with consideration of the fact that allowing the non-operational knife-gate to remain at 100 percent open would significantly hinder the District's response in isolating any possible contamination of the gate slot water.

F. Rocky Reach License Update

Keith Truscott said that Chelan PUD is seeking a rehearing with Federal Energy Regulatory Commission (FERC) on the new Rocky Reach license, asking for clarification on the 43-year time period that was granted in the license, as well as a removal of bull trout critical habitat from the license, since such habitat has not been designated at the Project. Truscott said that in the meantime, Chelan PUD will be progressing with the work that extends from the license because the license does not go on hold while this appeal is in process.

Truscott said that the license work most relevant to the Coordinating Committees will be the Rocky Reach Fish Forum that will meet and develop future actions for fisheries management. There will be an email and meeting set up in the next month that will begin to shape this forum. Truscott said that one question might be how the Coordinating Committees might interact with the Fish Forum. He said that coordination between the Fish

Forum and the Coordinating Committees would be necessary for non-Plan Species such as sturgeon and lamprey, since Plan Species are the responsibility of the Coordinating Committees. Bob Rose suggested the idea of coordinating across the three PUDs (Chelan, Douglas, and Grant PUD) on the Fish Forum, since these species typically cross all five reservoir pools in their use of habitat. Truscott said that a coordinated effort might make sense for certain subjects, and Chelan PUD will be laying this out in the coming months.

VI. HCP Committees Administration (Mike Schiewe)

A. Meeting Schedule

The upcoming meetings are set as follows:

- April 28 from 9:30 to noon in SeaTac
- May 26 – Potential agenda to include EonFusion demonstration at Rock Island and visit to juvenile sampling facility and sockeye tagging at Rocky Reach; wear steel-toe boots, safety glasses, and hard hats if you have them
- June 23 from 9:30 to noon in SeaTac

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Keith Truscott *	Chelan PUD
Steve Hemstrom	Chelan PUD
Jerry Marco *	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Rick Klinge *	Douglas PUD
Bryan Nordlund *	NMFS
Jim Craig *	USFWS
Bill Tweit *	WDFW
Bob Rose *	Yakama Nation

* Denotes Coordinating Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Coordinating Committees	**Date:**	May 27, 2009
From:	Michael Schiewe, Chair, HCP Coordinating Committees		
Cc:	Ali Wick, Steve Hemstrom, Josh Murauskas, Shane Bickford		
Re:	Final Minutes of April 28, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met at the Radisson Gateway Hotel in SeaTac, Washington on Tuesday, April 28, 2009, from 9:30 am to 12:30 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Shane Bickford will draft a Statement of Agreement (SOA) for the next meeting for the Wells Hydroelectric Project survival verification study. The SOA will state that a future survival study may be conducted targeting fish originating in the Okanagan River (Item III-B).
- Douglas PUD and Chelan PUD will continue to discuss the logistics of a Passive Integrated Transponder tag (PIT-tag) detector at Rocky Reach to support Douglas PUD's survival verification study (Item III-B).
- Rick Klinge will send the Columbia River Inter-Tribal Fish Commission (CRITFC) sockeye proposal to Ali Wick for distribution (Item III-C).
- Mike Schiewe with confirm the approval of the Chelan PUD SOAs with Bill Tweit and Bob Rose (Item IV-A).
- Chelan PUD will update the Coordinating Committees by email regarding tag failure rate in the steelhead and spring Chinook survival studies at Rock Island Dam; and will schedule a conference call if necessary (Item IV-B).
- Mike Schiewe will follow up with Columbia Basin Fish and Wildlife Authority (CBFWA) for more information about the survival data request. (Item V).

DECISION SUMMARY

- Chelan PUD SOAs for 2008 reports and 2009 studies were approved pending approval by Bill Tweit and Bob Rose (approval was confirmed via email on May 4 and 5).

I. Approval of Meeting Minutes and Agenda (Mike Schiewe)

The March 24 Meeting Minutes were approved, with revision to the due date to May 31 for the spring Chinook Hatchery Genetic Management Plan (HGMP) described in the minutes. Ali Wick will distribute the final minutes to the Coordinating Committees.

II. Update: Tributary and Hatchery Committees (Mike Schiewe)

Mike Schiewe updated the group on the issues under discussion by the Tributary Committees at their last meeting:

- The Tributary Committees approved expansion of the Methow Conservancy's Riparian Restoration and Regeneration Initiative Project to properties in the Beaver Creek watershed.
- The Tributary Committees approved a proposal from Cascadia Conservation District (CCD) to collect large woody debris (LWD)/rootwads for use in projects. The money was allocated, but requires CCD to coordinate with the Tributary Committees each time they access funds to purchase, transport, and stockpile wood.
- The Tributary Committees completed a review of policies and procedures; they accepted minor changes, and these changes are now posted on their website.
- The Committees will hire an outside accountant to review the Committees' management of the Plan Species accounts.
- The Tributary Committees are working to develop a uniform policy for acceptable administrative costs associated with projects. The purpose is to establish an administrative cost threshold for use in assessing the relative cost-effectiveness of projects.

Mike Schiewe gave an update on the issues under discussion by the Hatchery Committees at the last meeting:

- A primary focus of the last Hatchery Committees meeting was a presentation on the Wenatchee Spring Chinook Implementation Plan. The general approach would be to use genetic data to segregate all unmarked spring Chinook arriving at

Tumwater Dam based on tributary-of-origin, and use this information for broodstock collection and decisions to pass fish upstream for natural spawning. The Off-Ladder Adult Fish Trap (OLAFT) at Priest Rapids Dam would be used to collect unmarked, returning adults and conduct pedigree analyses. The Hatchery Committees may need an extension from National Marine Fisheries Service (NMFS) beyond the May 31 deadline because of the anticipated timeframe necessary for Committees review and approval of the Implementation Plan. NMFS indicated this would be acceptable as long as good progress is being made toward completing the HGMP.

- Mike Schiewe reported that he has contacted NMFS, Bonneville Power Administration (BPA), and Northwest Power Planning and Conservation Council (NPPC) staff regarding interest in developing an integrated plan for steelhead reproductive success studies in the Upper Columbia River. BPA and NPPC both acknowledged the value of coordinating these efforts. BPA also indicated that the development of an integrated plan would have to be a very public process to avoid the potential perception of a conflict of interest. This potential perception stems from parties participating in the plan development later submitting proposals to conduct the planned research. Some Hatchery Committees members voiced concern that the multiple jurisdictions involved in such a study would cause a delay. Schiewe agreed, but indicated that he felt that the benefits of having a single integrated plan were worth the additional time and effort.
- The Hatchery Evaluation Technical Team (HETT) is working to incorporate a consideration of carrying capacity in the process of identifying control populations against which measure supplementation effects.
- Chelan PUD submitted the draft HGMP for Wenatchee steelhead to NMFS on March 31. No feedback from NMFS has been provided yet.
- Chelan PUD is moving forward on a Chiwawa spring Chinook HGMP draft due May 31. This HGMP is tied to the implementation plan being prepared by Washington Department of Fish and Wildlife (WDFW) and the Yakama Nation.
- For the Douglas PUD HGMPs, discussions are underway to reduce the number of HGMPs required by combining populations in a sensible manner. The deadline for the draft Douglas PUD HGMPs is July 31.
- The Chelan PUD update topics included the following:

1. A discussion of the 2008 Summer Chinook Pilot Water Reuse Study: Sam Dilly noted that some gill irritation was observed, possibly due to elevated levels of carbon dioxide and algal growth in the pond.
2. Chelan PUD introduced an SOA for a pilot Chiwawa steelhead water reuse Study. A unique aspect of the steelhead study (as compared to the summer Chinook study) is the use of surface water. Surface water will likely carry higher concentrations of sediment particulates and has a greater potential for introducing fish pathogens. Following a follow-up review by WDFW fish health staff, the Hatchery Committees approved the SOA.
3. The Hatchery Committees approved Chelan PUD's request for short-term holding of adult sockeye broodstock at Eastbank Hatchery per a WDFW memo with this recommendation.
4. The installations of the PIT-tag detection arrays in the White and Little Wenatchee rivers are complete and will be operational by June 1. These detectors were installed for the purpose of collecting sockeye and spring Chinook information. Data from both of these arrays will be archived in the PIT Tag Information System (PTAGIS).
5. Shaun Seaman reported that all is well at Blackbird Island Pond. Several Hatchery Committee members visited the pond after the Hatchery Committees meeting. He commended the Hatchery Committees for their teamwork in helping to get the project accomplished. Fish were placed into the pond on March 27 and will likely be released in early May.

- The Douglas PUD update topics included the following:
  1. There was an unintended release of subyearling summer Chinook from the Wells Hatchery. This escape likely happened at the time of marking, but the exact cause is not known at this time. Chelan PUD provided Douglas PUD with information from the Rocky Reach bypass to help calculate a rough estimate of the number of fish that may have escaped. The estimated number was not available, but it is believed to be a small number.
  2. A large log/ice jam upstream of the Twisp weir was observed in early April, and there has been concern that when it breaks up it could block the water intake of the Twisp Acclimation Pond. The Wells Committee discussed this risk, but was reticent to forego acclimation and drop-plant fish upstream of the weir. The Wells Committee approved moving the fish to the acclimation pond, which occurred on April 15. The fish were subsequently acclimated for

7 days and released on April 22. Ultimately, the log/ice jam did not impact the water supply to the ponds or the fish. Based on this experience, WDFW and Douglas PUD staff agreed to meet to consider possible ways to minimize the risk of water intake blockage at the Twisp holding ponds in future years, and will report back at the June Hatchery Committees meeting.

- Dave Carie provided a memorandum from the U.S. Fish and Wildlife Service (USFWS) detailing plans for removal of ad-clipped and non-Coded-Wire-Tagged (CWT) Leavenworth Hatchery strays at Tumwater Dam. Carie noted that these fish cannot be distributed for human consumption because they will have been treated with MS-222. Tom Scribner will be following up with USFWS personnel to discuss options for surplus fish other than euthanizing them.

III. Douglas PUD (Rick Klinge)

A. Proposed Chief Joseph Flip-Lip Tests for 2009

Rick Klinge informed the Coordinating Committees that Chief Joseph Dam would be conducting spill testing this spring to assess the recently installed flip-lips for their effectiveness at reducing total dissolved gas. Bryan Nordlund noted that he had been alerted as well, and that it was his understanding that the testing would occur in the next week or so. Klinge summarized that the spill schedule has been developed, and the test starts today. The Corps will target 5 spill rates between 18,000 cubic feet per second (cfs) and 145,000 cfs. It will be a 4-day test, ending Friday May 1. Operators of downstream projects will manage pool levels to accommodate pulses of water that will result from the study. Mike Snyder (U.S. Army Corps of Engineers [Corps]) and Joe Carroll (contractor formerly with Corps) will be managing the tests. There is the potential for gas bubble trauma (GBT) to occur in migrating fish, and biologists will be watching for signs of GBT at downstream sampling locations.

B. 2010 Verification Survival Study

Shane Bickford and Josh Murauskas sent a draft plan for a 2010 Wells Dam Survival Verification Survival Study to the Coordinating Committees in mid-April. The purpose of today's discussion was to provide an overview of the study plan and receive Committee feedback; Douglas PUD was not seeking approval of the plan at this meeting. In describing the plan, Bickford indicated that the HCP requires survival verification studies every 10 years following achievement of the Phase III (Standard Achieved) designation. Since the original studies were completed in 2000, the next study is due in 2010. Bickford noted that

Douglas PUD had received approval from the Wells Hatchery Committee in 2008 to rear an extra 70,000 yearling summer/fall Chinook for study.

Bickford indicated that Douglas PUD will utilize PIT-tagged fish and the double release model to estimate survival; he described the precision/accuracy considerations in designing the proposed study, including sample sizes. The planned detection locations are McNary, John Day, and Bonneville Dams, with the possible addition of Rocky Reach Dam. Douglas PUD is working with Chelan PUD to install a PIT-tag detection system in the Rocky Reach Juvenile Fish Bypass system. The addition of a Rocky Reach detection location would increase the probability of meeting HCP precision/accuracy standards with 70,000 fish, whereas without detection at Rocky Reach, up to 120,000 fish might be needed.

Bickford noted that a number of issues need to be considered in the design and installation of a PIT-tag detection system at Rocky Reach. A detector in the flow separator at the head of the system is a good location because it provides the slowest and most laminar flow. . A second option could be to use a design similar to that at the Bonneville Dam corner collector somewhere lower in the system; however, that configuration would likely have a much lower likelihood of success. Douglas and Chelan PUD staffs are continuing to discuss these and additional options and will include NMFS engineering staff in these discussions. Because the study is planned for the 2010 migration, installation of a PIT-tag detector at Rocky Reach would need to occur in late fall 2009 or winter 2009/2010. Douglas PUD plans to continue to refine the survival study plan and bring it before the Coordinating Committees for approval at the next meeting. They would also draft an SOA for decision.

Following this discussion, several members of the Committees expressed interest in Douglas PUD's plans for developing survival estimates for juveniles originating in the Columbia River above the confluence of the Methow River, and in particular in the vicinity of the Okanogan River. Bickford described differences in environmental conditions that Okanogan versus Methow fish would face, and concluded that differences in water quality (higher temperatures and turbidity) and fish travel times suggest the need to conduct a separate study targeting Okanagan fish. He also noted that such a study had been planned between 1998 and 2000, but at that time the Committees viewed the Okanagan work as lower priority and, as such, the previous studies focused on Methow vicinity releases only. Jerry Marco proposed releasing study fish at the confluence of the Okanogan and Columbia rivers as a

way to minimize the logistical and physical challenges as described by Bickford; others agreed that this option should be considered.

C. CRITFC Request for Adult Sockeye At Wells

Rick Klinge reported that CRITFC staff has requested access to the adult fish ladder at Wells Dam to sample adult sockeye again this year; however, this year's request was different from past years' requests. The difference is that CRITFC wants to implant sonic tags into 100 adults in addition to collecting data on length and gender, and obtaining scale samples from an additional 400 sockeye. In total, this would include handling up to 500 sockeye in June/July. Klinge noted that the June/July period is a busy time at Wells Dam because this is a peak time for the collection of Chinook broodstock for hatchery programs. In previous years, accommodating CRITFC data collection slowed broodstock collection and occasionally interfered with other work. Klinge also emphasized that access this year will be very different than previous years due to the turbine rewind that is in progress. Mike Schiewe suggested that approval should be sought from both the Coordinating and Hatchery Committees because it may have a ripple effect on other HCP activities. He noted this appeared to be primarily a Hatchery Committees issue, and particularly a WDFW issue. The Coordinating Committees identified no concerns for fish passage, but encouraged review by the Hatchery Committees. The topic will be on the agenda for the May Hatchery Committees meeting.

IV. Chelan PUD (Keith Truscott)

A. SOA for the 2008 Reports (previously sent) and SOA for This Year's Studies (previously sent)

Keith Truscott introduced two SOAs: one for approval of 2007 study reports, and a second for 2009 study plans. Both had been subject to lengthy review and discussion at previous meetings. The Coordinating Committees conditionally approved both SOAs; Mike Schiewe agreed to confirm approval by WDFW and YN who were not on the call at this point. (Note: Bill Tweit and Bob Rose approved the SOAs by e-mail on May 4 and 5, respectively, thus completing consensus approval).

B. Update on Implementation of 2009 Survival Studies at Rocky Reach and Rock Island

Juvenile Chinook salmon and steelhead survival studies at Rock Island Dam were initiated the week of April 20 as planned. The juvenile sockeye studies are expected to start in 2 to 3 weeks when adequate numbers juvenile can be collected at Rocky Reach bypass.

Despite what appeared to be a good start to this year's field tests, Chelan PUD and HTI are finding that an unusually large number of tags are failing prior to fish release. This situation has only become evident in the last couple of days (beginning April 28). The tags are routinely energized and checked prior to implanting in fish. Approximately 25 percent of the tags have stopped working either before implantation or after implantation but before fish are released. This failure rate could compromise the validity of the study. The tags are straight acoustic 795E tags that have previously had few problems. The tags in question come from different manufacturing lots, including some not included in Chelan PUD's battery test. Grant PUD had similar problems in 2008, but with a slightly different design of tag (combination). In an effort to further understand the extent of this problem, Chelan PUD is tagging an additional 25 fish and holding them at Eastbank Hatchery to monitor longer term tag performance.

Chelan will be monitoring this situation very closely over the next 2 weeks and will routinely update the Coordinating Committees, initiating conference calls as necessary.

V. Columbia Basin Fish and Wildlife Authority Request for Information

Mike Schiewe reported that he was contacted by the CBFWA regarding a request for survival estimates at each of the HCP dams. CBFWA has previously collected such information at federal dams and now wants to include PUD information. It was discussed that more information is needed on what the information will be used for and whether it duplicates information already provided by the PUDs for incorporation into the COMPASS model program. Schiewe agreed to follow up with CBFWA to find out if this is a repeat request and how the group wants data reported. If additional information is provided to CBFWA, it will be important to make sure it is consistent with previous information provided for such requests.

VI. HCP Committees Administration (Mike Schiewe)

A. Meeting Schedule

The upcoming meetings are set as follows:

- May 26 at Rock Island Dam, starting at 10:00 am – Rock Island Smolt Monitoring Program, EonFusion demonstration, and visit to Rocky Reach juvenile sampling facility and sockeye tagging; *wear steel-toe boots, safety glasses, and hard hats if*

you have them. The order of the agenda will depend upon whether tag operations at Rocky Reach are occurring in the morning or afternoon on that day.

- June 23 in SeaTac
- July 28 in SeaTac

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Paul Schlenger	Anchor QEA, LLC
Keith Truscott *	Chelan PUD
Steve Hemstrom	Chelan PUD
Jerry Marco *	Colville Confederated Tribes
Rick Klinge *	Douglas PUD
Tom Kahler *	Douglas PUD
Josh Murauskas	Douglas PUD
Shane Bickford	Douglas PUD
Bryan Nordlund *	NMFS
Jim Craig *	USFWS
Bob Rose *	Yakama Nation

* Denotes Coordinating Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Rocky Reach and Rock Island HCP Coordinating Committees	**Date:**	May 27, 2009
From:	Michael Schiewe, Chair, HCP Coordinating Committees		
Cc:	Ali Wick and Steve Hemstrom		
Re:	Final Minutes of May 5, 2009 HCP Rock Island and Rocky Reach Coordinating Committees Conference Call		

The Rock Island and Rocky Reach Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met via conference call on Tuesday, May 5, 2009, from 2:00 pm to 3:00 pm regarding the status of on going passage research at Rock Island and Rocky Reach dams. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Rock Island and Rocky Reach Coordinating Committees will meet by conference call on May 12, 2009, from 2:00 pm to 3:00pm for an update on tag reliability testing and the ongoing studies.

DECISION SUMMARY

- No decisions were made at this meeting

I. Update on Rock Island and Rocky Reach tag reliability Issues (Keith Truscott)

Mike Schiewe stated that the purpose of today's call was an update by Chelan PUD staff on the status of on going fish passage research at Rock Island and Rocky Reach Dams, and in particular, on efforts to resolve problems with acoustic tag reliability. Keith Truscott provided the following information.

- As reported at the Coordinating Committees meeting last week (April 28, 2009), Chelan PUD has discovered that about 25 percent of the acoustic tags being used in the yearling Chinook and steelhead studies have been failing during the first 3 days after being activated. The tags either fail to "turn on" or cease operating during a 1-day observation period before being inserted into fish, or during a 2-day holding period after being inserted into fish, but before release.

- As a result, Chelan PUD researchers have increased the activation time to 3 days and the holding time to 2 days, for a total of 5 days.
- HTI will be providing an additional 900 newly manufactured tags to replace the oldest shelf-life tags manufactured for this study and also obtained an additional 250 "new" manufactured tags from other projects.
- Using these new tags (both sources) will allow future releases composed of 50 percent new tags and 50 percent old tags.
- Today's fish release (using the 5-day pre-release protocol and a 60/40 mix of new and old tags) appeared successful in that 50 of the 51 fish tagged still had actively transmitting tags.
- Preliminary testing of failed tags by HTI engineers indicates that capacitors in the tags are failing and not the batteries.
- Additional testing of tags in fish held at East Bank Hatchery is underway. Out of 29 fish, 2 have failed in the first 2.5 days.

The Coordinating Committees agreed that these actions taken by Chelan PUD were appropriate and that the studies should continue for the time being. The Committees agreed to revisit this issue during a conference call on May 12, 2009, to review results and make a determination on whether to continue the study. It was discussed that if approximately 95 percent or more of the tags remained functioning up until the time of release (using the new 5-day activation and holding period), then the Committees would likely recommend continuing the study. If, however, tag failure was approximately 10 percent or more during this period, then the Committees would likely recommend that the study be terminated, and Rock Island spill returned to 20 percent of daily flow until the start of the sockeye salmon passage study.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Lance Keller	Chelan PUD
Keith Truscott *	Chelan PUD
Steve Hemstrom	Chelan PUD
Jerry Marco *	Colville Confederated Tribes
Shane Bickford	Douglas PUD
Barry Keesee	Chelan PUD
Bryan Nordlund *	NMFS
Josh Murauskas	Douglas PUD
Bill Tweit *	WDFW
Bob Rose *	Yakama Nation

* Denotes Coordinating Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Rocky Reach and Rock Island HCP Coordinating Committees	**Date:**	May 27, 2009
From:	Michael Schiewe, Chair, HCP Coordinating Committees		
Cc:	Ali Wick and Steve Hemstrom		
Re:	Final Minutes of May 12, 2009 HCP Rock Island and Rocky Reach Coordinating Committees Conference Call		

The Rock Island and Rocky Reach Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met via conference call on Tuesday, May 12, 2009, from 2:00 pm to 3:00 pm for an update on tag reliability testing and the ongoing survival studies at Rocky Reach and Rock Island Dams. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- None.

DECISION SUMMARY

- The Coordinating Committees agreed that Chelan PUD can terminate the Rock Island juvenile project survival study for steelhead and Chinook this year due to high acoustic tag failure rate occurring prior and up to the time of the release of tagged test fish and the ensuing uncertainty of tag performance (Item I).

I. Update on Rock Island and Rocky Reach tag reliability Issues (Keith Truscott)

Mike Schiewe stated that the purpose of today's call was an update by Chelan PUD staff on tag reliability testing and the ongoing studies at Rock Island Dam. As discussed on the conference call last week (May 5, 2009), Chelan PUD has found a high rate of tag failure in the early releases of yearling Chinook salmon and steelhead used in the Rock Island Dam survival testing under conditions of 10 percent spill. On last week's call, the Coordinating Committees agreed that if approximately 95 percent or more of the tags remained functioning up until the time of release (using the new 5-day activation and holding period),

then the Committees would likely recommend continuing the study. If, however, tag failure continued at the rate observed in the first week of the study then the Committees would likely recommend that the study be terminated, and Rock Island spill returned to 20 percent of daily flow until the start of the Rocky Reach and Rock Island sockeye salmon survival passage study.

Steve Hemstrom distributed a summary of the issues yesterday (*Attachment B*). Chelan PUD has discussed what they have learned in the past week and decided that the tag-life issues are not resolvable, even with the proposed 5-day activation testing period agreed to last week. Thus, due to tag failure rate and uncertainty in tag performance after fish are released for the study, Chelan PUD is requesting Coordinating Committees' approval to terminate the Rock Island steelhead and Chinook studies for this year. A different model of tag used for the sockeye study do not appear to have been affected, and Chelan PUD plans to continue with the sockeye study at Rocky Reach and Rock Island, which is expected to start between May 15 and May 18. Chelan PUD will change spill levels from 10 to 20 percent beginning midnight on May 12, and maintain 20 percent spill until the sockeye study begins at Rock Island. Upon start of the sockeye study, Rock Island will switch back to the 10 percent spill level as agreed to for the study.

Jerry Marco added that the Coordinating Committees will want to discuss tag vendors in the future and any potential contingencies that may be needed for next year. Keith Truscott agreed and said that Chelan PUD will be modifying its contract with HTI to reflect that Chelan PUD will be more involved in tag production and the QA/QC process. He said that HTI will be testing their production line for the 2010 studies in a few weeks once parts come in to assemble the tags. Truscott said that he believes that HTI has done an adequate diagnosis of the key issues in this year's tags. He also said that one contingency could be to set aside a set of micro-tags for use in case the acoustic tag failure rate is unsatisfactory again. Truscott thanked the Committees for their time and focus in working together to come to an agreement for this year's studies.

List of Attachments

Attachment A – List of Attendees

Attachment B - Summary of events leading to suspension of the 2009 Rock Island HCP Chinook and Steelhead Survival Study

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Keith Truscott *	Chelan PUD
Steve Hemstrom	Chelan PUD
Jerry Marco *	Colville Confederated Tribes
Bryan Nordlund *	NMFS
Jim Craig	USFWS
Bob Rose *	Yakama Nation

* Denotes Coordinating Committees member or alternate

Attachment B

Summary of events leading to suspension of the 2009 Rock Island HCP
Chinook and Steelhead Survival Study:

- Study began April 25 with first Chinook first release into Rocky Reach tailrace.

- Tag performance became suspect in the first four days of the study when approximately 25% of the tags either did not activate or died before fish were tagged.

- HTI identified tag problem linked to capacitor in tag. Chelan PUD and HTI devised strategy to attempt to "identify bad tags" prior to fish release by activating tags three days prior to fish tagging, allowing 5 days of tag evaluation prior to fish release into the river.

- April 28 Chelan tagged 29 Chinook and held them at East Bank Hatchery to determine if implantation in swimming fish could be a contributing mechanism of tag failure through time. Six of 29 tags have failed over a 10 day period.

- With 8 individual treatment and control groups released for the study, 13% (95/728) of tags have failed at some point after activation; three percent failed after 3.5 days of proper operation.

- On May 12 at midnight, Chelan is proposing to discontinue study for Chinook and Steelhead at Rock Island due to tag failure rate and uncertainty in tag performance after fish are released for the study.

- Chelan will continue with the sockeye study at Rocky Reach and Rock Island, anticipated to start between May 15 and May 18. The tag-life test using 25 HTI 795M acoustic tags for sockeye (a different tag than those used for Chinook and Steelhead) have performed with no tag failures after being activated 11 days ago.

- Chelan will change spill levels from 10% to 20% beginning midnight, May 12, until the sockeye study begins at Rock Island. Upon start of this study, Rock Island will switch back to the 10% spill level as planned in the study.

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	June 23, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick and Steve Hemstrom		
Re:	Final Minutes of May 26, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met at Rock Island Dam, Washington, on Tuesday, May 26, 2009, from 10:00 am to 11:15 am. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Mike Schiewe will send the Coordinating Committees a summary table of dam passage survival estimates that has been requested by Dave Ward of the Columbia Basin Fish and Wildlife Authority (CBFWA) (Item V).

DECISION SUMMARY

- There were no decision items approved at this meeting.

I. Welcome

The Coordinating Committees approved the April 28 meeting minutes and the Rocky Reach/Rock Island Committees' May 5 and May 12 conference call minutes. Ali Wick will distribute the final Minutes to the Committees.

II. Tributary and Hatchery Committees Update

Mike Schiewe updated the group on the issues discussed by the Tributary Committees at their last meeting:

- Administrative cost guidelines were discussed and decided upon.

- The solicitation process has started for large projects for 2009. Pre-proposals are due on June 1. The project site visits will be June 22 and July 5, and final project selection will occur at the end of November.

Mike Schiewe gave an update on the issues under discussion by the Hatchery Committees at their last meeting:

- Chelan PUD discussed with the Hatchery Committees a proposed test to rear up to 200,000 summer/fall Chinook (2008 brood) at the Ringold Springs Hatchery during the summer of 2009. The motivation for this trial is to help alleviate some of the water supply problems that will soon be facing Eastbank Hatchery and aquifer.
- Columbia River Inter-Tribal Fish Commission (CRITFC) staff will soon begin their annual sockeye data collection at Tumwater Dam.
- The Hatchery Committees discussed CRITFC's annual request for sampling adult sockeye at Wells Dam. The main issue under discussion is whether this activity will interfere with any Chinook broodstock trapping changes that might occur during the re-wind project at Wells Dam this year.
- Chelan PUD and Washington Department of Fish and Wildlife (WDFW) agreed to work to develop a strategy for managing non-migrating steelhead juveniles from Blackbird Island Pond that will reduce/minimize risk to other species.
- Chelan PUD gave an update on the Chiwawa and Chelan Falls rearing facility projects and the accompanying permitting issues.
- The 2008 Chelan PUD Monitoring and Evaluation (M&E) Report due date was changed from May 1 to June 1, 2009. The intent is to finalize the document at either the June or July 2009 meeting. The 2010 M&E Implementation Plan, which was due June 1, will now be due July 1, 2009.
- Chelan PUD shared some preliminary information on Passive Integrated Transponder tag (PIT-tag) detections of juvenile summer Chinook passing McNary Dam; there has been a ratio of about 3.5 to 1 of pilot water reuse study fish compared to raceway-reared fish arriving at McNary Dam.
- The design for the Chiwawa steelhead pilot water re-use study is proceeding as expected, and the current plan is to implement the study in fall 2009.
- The new broodstock trap at the Methow Hatchery outfall has now been completed and is operational.

- Douglas PUD will be modifying the location of the water meter on Well #6 at Methow Hatchery so that it accurately records water usage.
- Douglas PUD requested Hatchery Committees' concurrence to not coded-wire-tag yearling spring migrant Chinook fish used in the survival verification study, as study fish will already be marked externally and PIT-tagged. The Hatchery Committees will be coordinating to ensure that not code-wire-tagging these fish will not create a U.S. v. Oregon or M&E Implementation Plan conflict.
- The Yakama Nation (YN) has prepared a proposal for Lake Cle Elum sockeye reintroduction for the U.S. v. Oregon Production Advisory Committee and coordinated with the Hatchery Committees to ensure that there would be no unintended effects to the Skaha sockeye HCP mitigation program.
- The Joint Fisheries Parties (JFP) will meet and discuss future adult management and disposition of surplus Leavenworth Hatchery adults captured at Tumwater Dam if MS-222 anesthetic will continue to be used there. For this year, Chelan PUD will be investigating options for handling fish at Tumwater Dam to support varied uses of surplus fish.
- The Hatchery Committees are discussing a U.S. Fish and Wildlife Service (USFWS) Statement of Agreement (SOA) for broodstock collection for a new summer Chinook program at Entiat Hatchery.
- The USFWS has investigated methods and a plan for collecting steelhead brood at Winthrop Hatchery; hook-and-line sampling was the most effective method.
- National Marine Fisheries Service (NMFS) has completed a preliminary review of the Wenatchee steelhead Hatchery Genetic Management Plan (HGMP) and will provide comments to Chelan PUD by June 8.
- The YN, WDFW, and NMFS will meet on June 1 to consider a revised Management Implementation Plan (MIP) for Wenatchee Basin spring Chinook; on June 2 the Hatchery Committees will meet by conference call to receive guidance from NMFS on whether the draft MIP contains sufficient information for Chelan PUD, in collaboration with the Hatchery Committees, to complete a draft HGMP. This HGMP is due to NMFS on June 17.
- For the Methow and Okanogan spring Chinook and steelhead hatchery HGMPs, Anchor QEA, CCT, WDFW, and USFWS will participate in the early drafting workgroup.
- The Colville Tribes have received the Step 2 approval for Chief Joseph Hatchery.

III. Douglas PUD

A. Future Survival Verification Study

Shane Bickford said that Douglas PUD is continuing to plan a survival verification study for Wells Dam in 2010. Initially, Douglas PUD had planned to conduct the study as implemented in 1998 to 2000, but is now investigating the possibility of also addressing survival of fish originating in the Okanogan River. The new survival estimate will be used to adjust (if necessary) hatchery production and/or allocation of fish at various hatcheries in order to continue to meet project mitigation requirements. Bickford clarified that, under the HCP, the study is a 1-year effort, using one species, with the survival estimate result averaged into the previous survival estimates.

IV. Chelan PUD

A. Update on Sockeye Study at Rocky Reach

Keith Truscott said that Chelan PUD is halfway through the releases for the sockeye study at Rocky Reach and that the study is proceeding well.

V. Columbia Basin Fish and Wildlife Authority Request for Information

Mike Schiewe notified the Coordinating Committees that he has been contacted by Dave Ward at CBFWA regarding survival estimates at each of the HCP projects. The CBFWA will be sending him a blank table that they would like filled in with the most recent data. Schiewe indicated that he will send the Committees a draft table for review before forwarding to CBFWA.

VI. HCP Administration

A. Next Meetings

The next scheduled Coordinating Committees meetings are as follows: June 23, July 28, and August 25; all meetings will be in SeaTac.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Keith Truscott *	Chelan PUD
Lance Keller	Chelan PUD
Barry Keesee	Chelan PUD
Steve Hemstrom	Chelan PUD
Tom Kahler *	Douglas PUD
Shane Bickford *	Douglas PUD
Josh Murauskas	Douglas PUD
Bryan Nordlund *	NMFS
Jim Craig *	USFWS
Bill Tweit *	WDFW
Bob Rose *	Yakama Nation

* Denotes Coordinating Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	July 21, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Josh Murauskas, and Steve Hemstrom		
Re:	Final Minutes of June 23, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met at the Radisson Gateway Hotel in SeaTac, Washington, on Tuesday, June 23, 2009, from 9:30 am to 12:30 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Josh Murauskas will provide the draft lamprey study plan, information on timing of Chinook/steelhead passage at Wells Dam, and a Statement of Agreement (SOA) for the study plan prior to the July meeting (Item III-B).
- Steve Hemstrom will provide information confirming that Chelan PUD will maintain Rock Island spill through 95 percent of the spring Chinook run, and the Coordinating Committees will send any comments or objections to the proposed spill stoppage for hydraulic capacity testing by the end of the day on Thursday, June 24 (Item IV-C).

DECISION SUMMARY

- The Wells Coordinating Committee approved the Wells 2010 Survival Verification Study Plan and SOA as distributed prior to the meeting (Item III-A).

I. Welcome

The Coordinating Committees approved the May 26 meeting minutes. Ali Wick will distribute the final minutes to the Committees.

II. Tributary and Hatchery Committees Update

Mike Schiewe updated the group that the Tributary Committees did not meet in June. However, members will attend project tours in late June and the pre-proposal workshop will occur on July 7 and 8. There will be a final review of the pre-proposals following this meeting. Thus far, the Tributary Committees have received 18 General Salmon Habitat Program proposals.

Ali Wick and Mike Schiewe updated the group on the following Hatchery Committees discussion topics:

- Washington Department of Fish and Wildlife (WDFW) has provided preliminary results of an evaluation of 2009 steelhead spawn timing and distribution in the Twisp River and recommendations for next year's evaluation, which includes body cavity tagging. Hatchery Committees concerns are under discussion.
- The Hatchery Committees agreed that WDFW can proceed with a 5,000 hatchery by hatchery (HxH) egg take of Wenatchee spring Chinook for a study of spring Chinook egg-to-fry survival sponsored by the National Marine Fisheries Service (NMFS) Science Center. The WDFW Commission will consider a draft hatchery reform policy at the July Commission meeting.
- Passive Integrated Transponder tag (PIT-tag) arrays for the Chelan PUD sockeye enumeration study will be installed once flows decrease.
- Chelan PUD provided preliminary results from their water reuse study, showing that PIT-tagged water reuse study fish were detected earlier and in larger numbers at downstream PIT-tag arrays than their raceway-reared cohorts.
- Non-migrant steelhead in the Blackbird Island pond will be available for a recreational fishery.
- The Hatchery Committees agreed to Chelan PUD rearing 200,000 spring Chinook at Ringold Springs Hatchery in 2009.
- The Hatchery Committees received an update that 1,000 adult sockeye will be needed for outplanting into Lake Cle Elum for the Cle Elum Sockeye Reintroduction program; 200 pairs (400 total broodstock) will be needed for egg take with Okanagan Nation Alliance (ONA) assistance in the Okanogan River. Chelan PUD is investigating whether there will be an impact on the ONA sockeye program.

- Douglas PUD will be requesting more information about a videographer's proposal to film in the Wells fish ladder.
- Douglas PUD is in the process of replacing the existing pollution abatement system at Methow Hatchery with an underground system.
- The Hatchery Committees are reviewing an SOA on Wells/Entiat summer Chinook collection for 2009.
- The Hatchery Committees are discussing the Yakama Nation (YN) pursuing summer/fall Chinook overwintering acclimation at Carlton and Dryden Ponds as part of a partnership with Grant PUD.
- The Hatchery Committees received a handout from NMFS clarifying the Endangered Species Act (ESA) consultation process, which may be useful when preparing Hatchery Genetic Management Plans (HGMPs).
- The Hatchery Committees are working through NMFS' comments to the Wenatchee steelhead HGMP. The Hatchery Committees will soon be receiving NMFS' and Hatchery Committees' comments to the submitted spring Chinook HGMP. Neither HGMP has been approved by the Hatchery Committees.
- The Douglas PUD Methow and Okanogan spring Chinook and steelhead program HGMPs are underway.
- The Hatchery Committees will soon be conducting a preliminary Non-Target Taxa of Concern (NTTOC) analysis.
- The Hatchery Committees are continuing to discuss a steelhead reproductive success study.
- The Hatchery Committees are developing a Study Plans Protocol to facilitate review of proposals submitted to them for funding consideration.
- The Hatchery Evaluation Technical Team (HETT) is currently working on how to standardize estimates of spawner recruits for the control group analysis.

III. Douglas PUD

A. DECISION ITEM: Survival Verification Study

Tom Kahler began by introducing the Survival Verification Study proposed for Wells Dam in 2010, saying that Douglas PUD has sent out the study plan and an SOA for review. John Skalski (University of Washington) joined today's meeting to answer any questions about the study. Josh Murauskas gave an overview of the study as proposed. The study plan has been modified to include releases in the lower Okanogan River. John Skalski answered some

Coordinating Committees questions, including the rationale for implementing internal weighting for the various release groups. The Wells Coordinating Committee approved to the study plan and SOA as distributed prior to the meeting (Attachment B).

B. 2009 Lamprey Behavior Study Plan at Wells Dam

Josh Murauskas introduced Douglas PUD's plans for lamprey study at Wells Dam in late summer 2009, including the background, hypotheses, and study design. He said that recent data have indicated that most adult lamprey are entering the adult fishway collection galleries between the hours of 8:00 pm to 12:00 midnight. This is a time period during which few salmon and steelhead enter the collection gallery. The minimal overlap of passage timing creates an opportunity to evaluate reduced gallery entrance velocities as a possible operational change to improve passage of adult lamprey with nominal impact to salmon. Murauskas emphasized that any change to gallery entrance velocities would not require a change in in-ladder flows, would not coincide with peak diurnal passage timing of salmon, could be implemented with a head differential that is at or near original target levels, and would represent a minor window of adjustments. He indicated that a key feature of the proposed study was the use of Dual Frequency Identification Sonar (DIDSON) technology to monitor lamprey behavior at the gallery entrances under different velocities.

Following this discussion, the Coordinating Committees requested more detail on the timing of Chinook and steelhead passage at the fishway. Bryan Nordlund said that one of his key concerns is whether fishway entrance velocity would still be high enough to attract salmon at the same rate as current operations if there were eventual modifications to ladder operations for lamprey passage. Shane Bickford said that Douglas PUD would evaluate results of this study for lamprey passage, and then, if appropriate, would consider ladder modifications. If modifications were considered, then a supplemental salmonid study would be conducted to investigate any potential effects on salmonids. Bill Tweit asked about how quickly the collection gallery velocities could be returned to specification flows. Murauskas said that flow modifications are automated and are returned to specifications within minutes; he reminded the group that the remainder of the fishway (i.e., the 73-pool staircase ladder above the collection gallery) would remain within specifications during the study, as ladder flows above the collection gallery would not be altered during any portion of the study. Douglas PUD indicated that it would like to gain approval for the study by the July Coordinating Committees meeting. The HCP Committees indicated their general support for

the study plan as proposed, but want additional time to review the salmon passage data. Murauskas will provide the draft lamprey study plan, the information on Chinook/steelhead passage, and an SOA for the study plan prior to the July meeting.

IV. Chelan PUD

A. Update on Sockeye Study at Rocky Reach

Keith Truscott said that the sockeye study at Rocky Reach Dam was completed as planned. Chelan PUD expects that preliminary results from the study will be available in August or September 2009. More information will be coming soon on the 2010 study plan.

B. Rock Island Spill

Steve Hemstrom updated the group that Grant PUD has proposed that Chelan PUD shut down Rock Island spill for five sampling periods between 12:00 midnight and 1:00 am, between July 2 and August 27, as part of their predator index study. The group indicated their agreement with this proposal.

C. Powerhouse Unit Test

Steve Hemstrom said that the Chelan PUD Power Management Group is proposing some spill modification at Rock Island on June 30 to test the capacity of the new powerhouse unit. These tests would require increasing flow to 220,000 cubic feet per second (cfs) for 2 hours, sometime between 7:00 am and 3:30 pm. Hemstrom confirmed that existing flows are approximately 180,000 or 190,000 cfs. By the end of the day on Thursday, June 24, Hemstrom will provide information confirming that Chelan PUD will maintain spill for 95 percent of the spring Chinook run, and the Coordinating Committees will send any comments or objections out by end of the day on Thursday, June 24.

D. 2009 Pikeminnow Removal Project

Keith Truscott updated the group that Chelan PUD has commenced the pikeminnow removal project for 2009, and it is proceeding as planned thus far. Ladder trapping is going well.

V. HCP Administration

A. Meeting Agreements

The following agreements were made at the meeting and did not require formal SOAs:

- The Coordinating Committees agreed that Chelan PUD may shut down the Rock Island spill for five sampling periods between 12:00 midnight and 1:00 am, between July 2 and August 27, as part of Grant PUD's predator index study.

B. Next Meetings

The next scheduled Coordinating Committees meetings are as follows: July 28, August 25, and September 22; all meetings will be in SeaTac.

List of Attachments

Attachment A – List of Attendees

Attachment B.1 - Wells HCP Coordinating Committee Statement of Agreement Regarding 2010 Wells Dam Survival Verification Study, Phase III (Standard Achieved)

Attachment B.2 – Wells Project Survival Verification Study, Phase III (Standard Achieved) – 2010 Study Plan

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Keith Truscott *	Chelan PUD
Steve Hemstrom	Chelan PUD
Jerry Marco *	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Shane Bickford *	Douglas PUD
Josh Murauskas	Douglas PUD
Bryan Nordlund *	NMFS
Jim Craig *	USFWS
John Skalski	University of Washington
Bill Tweit *	WDFW

* Denotes Coordinating Committees member or alternate

Attachment B.1

Wells HCP Coordinating Committee
Statement of Agreement
Regarding 2010 Wells Dam Survival Verification Study
Phase III (Standard Achieved)
June 12, 2009
Approved June 23, 2009

Statement

The Wells HCP Coordinating Committee approves the Douglas PUD study proposal, dated June 12, 2009, *Wells Project Survival Verification Study; Phase III (Standard Achieved), 2010 Study Plan*. The goal of the study is to verify the achievement of Phase III (Standard Achieved) for yearling Chinook and steelhead migrating through the Wells Project as per Section 4.2.5.1 of the Wells HCP.

Background

During Phase I of the Wells HCP Passage Survival Plan (Section 4), Douglas PUD conducted three years of valid juvenile project survival studies with steelhead and yearling Chinook salmon. Results from those studies consistently exceeded the 93% juvenile project survival standard and the precision and accuracy requirements of the HCP. The average juvenile project survival for yearling Chinook and steelhead over the three years of study was 96.2%. The results from the Phase I juvenile project survival studies, coupled with the results from the adult passage studies, provided the necessary information for the HCP Coordinating Committee to determine that the Wells Project could proceed to Phase III (Standard Achieved) for yearling Chinook and steelhead (adopted at the February 2005 Coordinating Committee meeting).

Phase III of the Passage Survival Plan (Wells HCP Section 4.2.5.1) indicates that when the appropriate survival standard has been achieved, periodic monitoring is required to ensure that the survival of Plan Species is maintained and remains in compliance with the survival standards set forth in the plan for the term of the Agreement. Section 4.2.5 states that:

> *In this case, the District shall re-evaluate performance under the applicable standards every 10 years. The Coordinating Committee shall pick representative species for all Plan Species. However, only one species will be utilized to represent spring migrants and one species for summer migrants. This reevaluation will occur over one year and be included in the pertinent average for that particular species. If the survival standard is met, then Phase III (Standards Achieved) status will remain in effect.*

Attachment B.2

WELLS PROJECT SURVIVAL VERIFICATION STUDY

Phase III (Standard Achieved)
2010 Study Plan

Study Proposal

June 12, 2009

Prepared By:
Shane Bickford
Joshua Murauskas

Public Utility District No. 1 of Douglas County
1151 Valley Mall Parkway
East Wenatchee, WA 98802

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INTRODUCTION

The Wells Habitat Conservation Plan (HCP) requires the Public Utility District No. 1 of Douglas County (Douglas) to periodically conduct juvenile salmon survival studies at the Wells Hydroelectric Project (Wells Project). The results of these studies are then used to guide passage and mitigation programs for Plan Species migrating through the Wells Project. The Passage Survival Plan included in the HCP was structured with a phased implementation plan. Phase I of the HCP (1998 through 2002) required, "juvenile and adult operating plans and criteria to meet the survival standards set forth in sub-Section 4.1, and a monitoring and evaluation program to determine compliance with the standards" (Section 4.2.1). During Phase I, Douglas conducted three years of valid juvenile project survival studies with steelhead and yearling Chinook salmon. Results from these studies consistently exceeded the 93% juvenile project survival standard and the precision and accuracy requirements of the HCP (Bickford et al. 1999; 2000; 2001). The average juvenile project survival for yearling Chinook and steelhead over the three years of study was 96.2%. The results from the Phase I juvenile project survival studies, coupled with the results from the adult passage studies, provided the necessary information for the HCP Coordinating Committee to determine that the Wells Project could proceed to Phase III (Standard Achieved) for yearling Chinook and steelhead (Appendix A).

Phase III of the Passage Survival Plan (Section 4.2.5) indicates that when the appropriate survival standard has been achieved, that periodic monitoring is required to ensure that the survival of Plan Species is maintained and remains in compliance with the survival standards set forth in the plan for the term of the Agreement. Therefore, Douglas is required to "reevaluate performance under the applicable standards every 10 years", including a one-year reevaluation of juvenile project survival for spring-migrant species. The results from the one-year juvenile project survival reevaluation study will be included in the pertinent average for yearling spring migrating Chinook and steelhead. If the survival standard is verified, Douglas will remain in Phase III (Standard Achieved). Otherwise, additional testing will occur, followed by Phase II (Interim or Additional Tools) if the standard cannot be achieved within three years of reevaluation.

Douglas PUD is proposing to conduct a Phase III (Standard Achieved) Survival Verification Study (SVS) in 2010, on the 10th anniversary of Douglas' third and final year of Phase I survival studies. The SVS is designed to meet the precision requirements of the HCP for juvenile Chinook and steelhead originating from both the Methow and Okanogan rivers.

METHODS

Study Goals

The primary goal of the SVS is to confirm that survival through the Wells Project for yearling Chinook and steelhead remains equal to or above the 93% juvenile project survival standard. Toward supporting the primary goal of the study, the SVS is also designed to test the assumptions of the Single (SR) and Paired-Single (PSR) release-recapture models, and estimate capture and reach-specific survival probabilities through the mid-Columbia River. The SVS will also provide additional information related to the physiology, behavior, migration speed and survival of yearling Chinook through the mid-Columbia River

Study Fish

Yearling summer Chinook salmon (brood year 2008) are currently on station at the Wells Fish Hatchery (WFH) for use in the SVS. Chinook parr will be PIT-tagged during February of 2010 and will be held in raceways until transfer to release containers in April and May of 2010 one day prior to release. Planned fish collection, transportation, and physiological monitoring techniques are detailed by Bickford et al. (2001).

Estimation Methodology

Survival estimates generated for the survival reevaluation study will be based upon the SR and PSR models (Cormack 1964; Jolly 1965; Seber 1965; Burnham et al. 1987). These methodologies have been used extensively to accurately estimate project-specific survival for juvenile salmon passing through Columbia River Basin hydroelectric projects (Iwamoto et al. 1994; Muir et al. 1996; Smith et al. 2000). Specifically, these models were used multiple times to successfully generate precise survival estimates of migrating juvenile Chinook and steelhead at Wells Dam (Bickford et al. 1999; 2000; 2001). Appendix B contains the statistical plan for the SVS.

Precision Objectives and Sample Size

The primary objective of the SVS will be to confirm Phase III (Standard Achieved) survival estimates of yearling Chinook and steelhead migrating through the Wells Project at a 95% confidence level with a standard error that will not exceed ± 2.5% (i.e., $\varepsilon = 0.05$). A minimum of 70,000 PIT-tagged juvenile Chinook salmon will required to achieve the estimated level of precision for the study (Skalski and Townsend, Appendix B). The proposed model design requires the release of 15 replicates of PIT-tagged fish at the Methow confluence (Pateros), Okanogan confluence (Okanogan), and the Wells tailrace at 3:1:3 ratios, respectively.

Tagging and Release

Study fish at the WFH will be tagged with ISO 134 kHz PIT-tags. Each tagged replicate (i.e., treatment and control paired-release groups) will be held within one large-volume rearing container at the Wells Fish Hatchery. The common rearing environment will reduce differences in fish health and physiology between treatment and control groups. The early tag

implementation will allow ample recovery time for study fish prior to the spring outmigration. Early tagging will also allow researchers to closely monitor fish for tag shed and diseases that could bias the study results. Test fish will be released at Pateros, Okanogan, and control fish will be released into the Wells Tailrace (Figure 1).

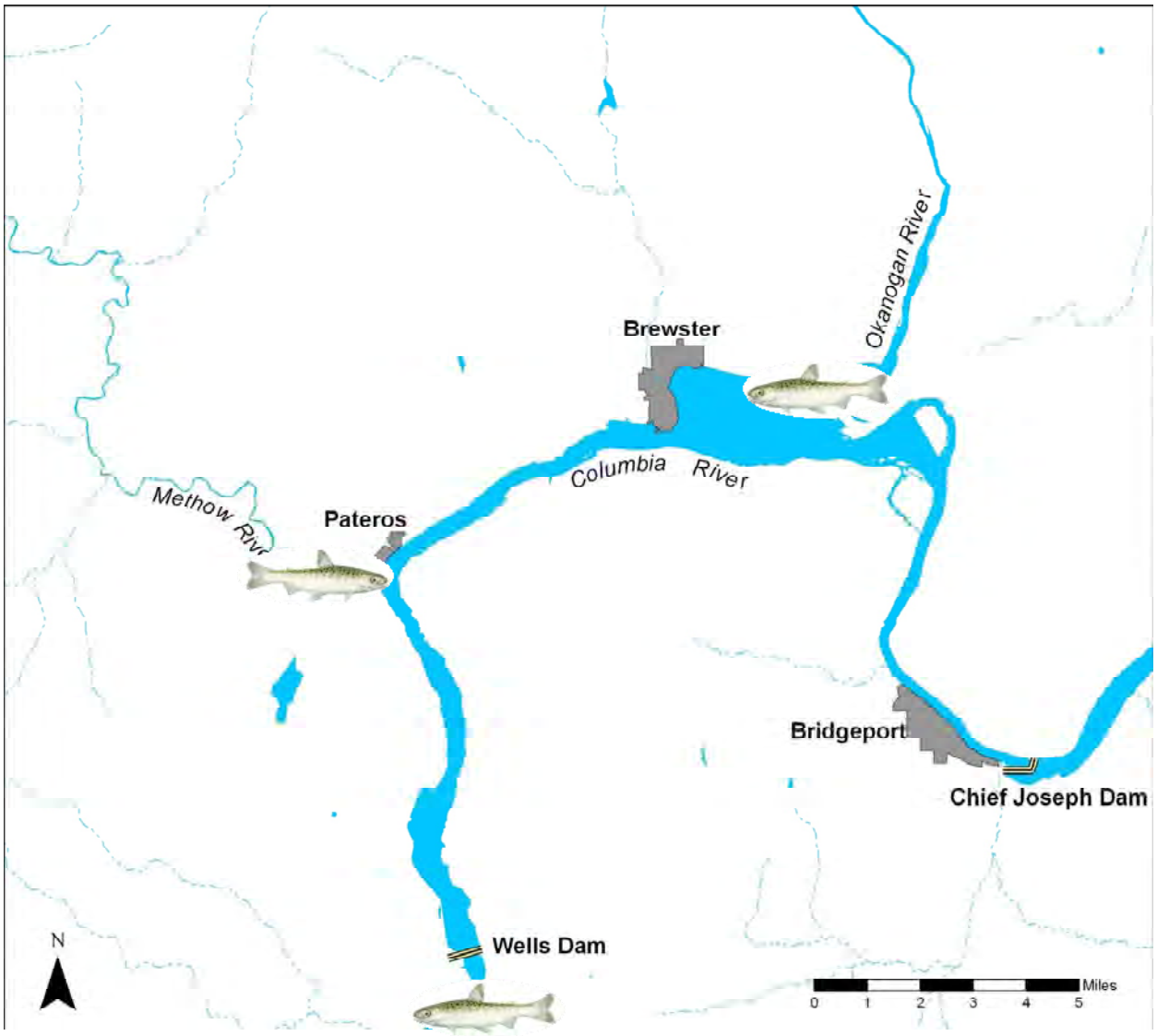

Figure 1 Proposed release locations for the 2010 Survival Verification Study on the Columbia River. Both test and control (Wells Dam tailrace) release sites are approximately indicated with juvenile salmon markers.

Each of the 15 replicate release groups will contain approximately 4,670 fish, and each paired release of treatment and control fish will be collected from the same rearing vessel, interrogated for PIT-tag codes, and released on a staggered schedule to allow the test groups to join the control group at downstream recapture facilities. The total number of Chinook released for the 2010 SVS will be approximately 70,000 fish. Release sites and PIT-tag detection facilities used

for the SVS are illustrated in Figure 2. Planned fish collection, recovery, and release techniques are detailed by Bickford et al. (2001).

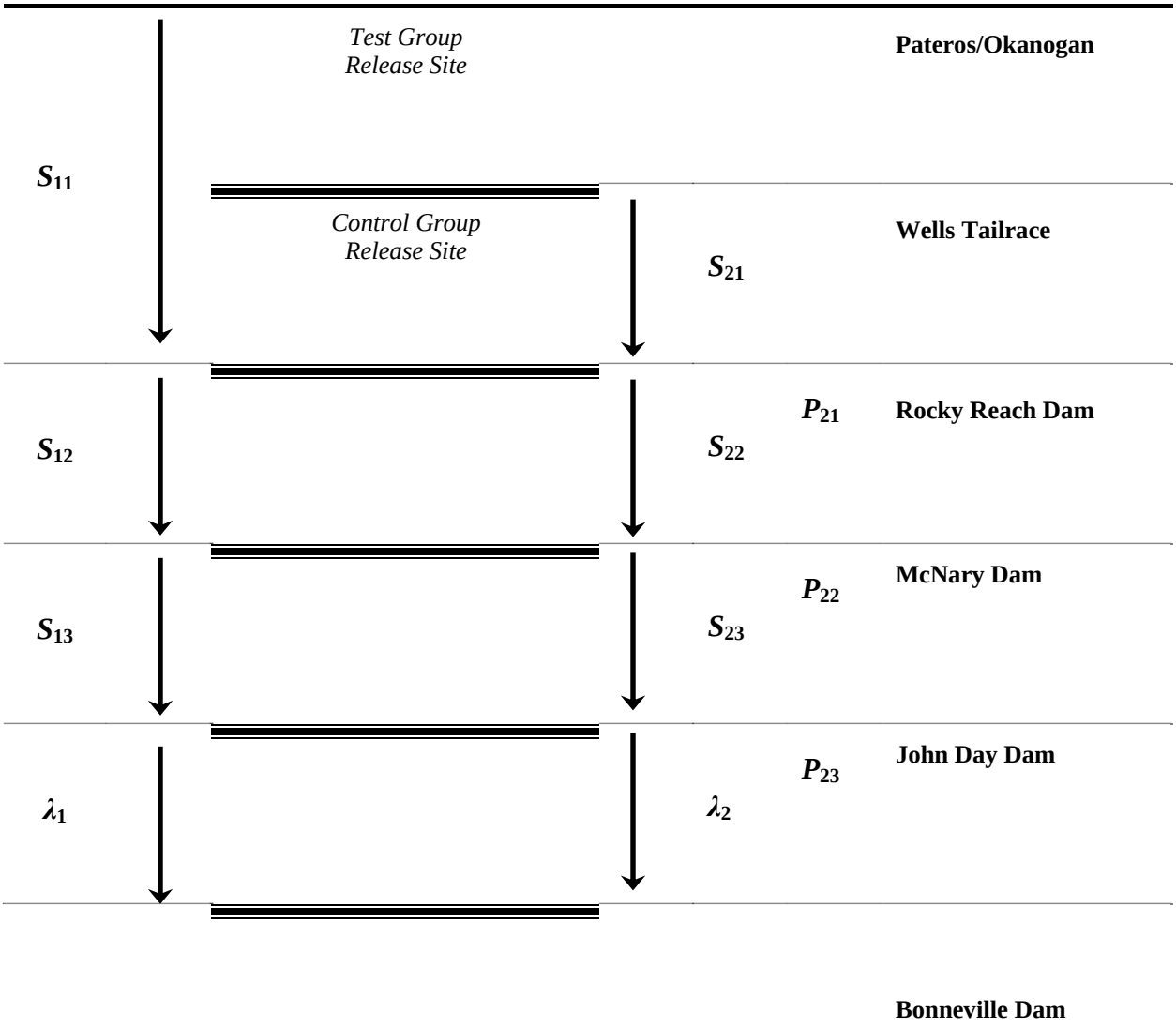

Figure 2 Schematic of release sites and PIT-tag detection facilities used for the SVS at Wells Dam. Parameters that will be estimated from the release-recapture data are indicated alongside.

SUMMARY

Douglas PUD is proposing to conduct a Phase III (Standards Achieved) Survival Verification Study in 2010. The study will utilize approximately 70,000 Chinook smolts released over 15 replicates at three release locations. The goal of the study is to reaffirm that project survival for yearling Chinook and steelhead remains greater than or equal to the 93% juvenile project survival standard. Should the survival estimates collected during this study meet the study methodology requirements contained within Section 4.1.4 of the HCP, then the results will be included in the pertinent average survival estimate for yearling Chinook and steelhead, per Section 4.2.5.1 of the HCP, toward adjusting hatchery compensation levels for yearling Chinook and steelhead.

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APPENDIX A

HCP PLAN SPECIES PHASE DESIGNATION
WELLS PROJECT

February 26, 2008

Summary of Phase Designations of Plan Species under the Wells Hydroelectric Project Habitat Conservation Plan

The purpose of this document is to summarize and confirm the phase designations of Plan Species under the Wells Hydroelectric Project Habitat Conservation Plan. Further, it serves to document that the Wells HCP Coordinating Committee has reviewed the limitations associated with the best available technology for measuring dam passage survival of subyearling Chinook and sockeye salmon, and has again concluded that these limitations constrain the ability to make empirically based survival estimates.

Upper Columbia Steelhead and Spring Chinook are designated as Phase III (Standard Achieved) based on the results of three years of empirically based survival studies conducted prior to the signing of the HCP. This designation is documented in Section 4.2.1 of the Wells HCP. A summary of the results of these studies can be found in Section 15, Appendix B of the HCP Agreement. Because the HCP requires the consideration of both juvenile and adult project survival in making a final phase designation, the Wells HCP Coordinating Committee reviewed and considered in early 2005 both past radio-telemetry studies and recent information on inter-dam conversion rates to conclude that it was highly likely that the adult survival standard (i.e., $\leq$ 2.0% passage mortality) had been achieved as well. Accordingly, the current designation for yearling spring Chinook and steelhead as Phase III (Standard Achieved) was formally adopted by the Wells HCP Coordinating Committee in February 2005.

At this same meeting, the Wells HCP Coordinating Committee issued final designations of Phase III (Additional Juvenile Studies) for both subyearling summer/fall Chinook and sockeye salmon. As noted in the Wells HCP (Section 3.1), current logistical, biological and/or technological limitations precluded the conduct of empirical survival studies. Hence, phase designations are based upon calculated estimates that take into account the high guidance efficiency of the Wells juvenile fish bypass system, in-season monitoring for run-timing, and species composition for fish passing through the juvenile fish bypass system. Data used for estimating juvenile fish survival is documented in the FEIS for the HCP. As was the case for yearling Chinook and steelhead, the high likelihood that adult summer/fall Chinook and sockeye salmon meet or exceed the adult survival standard was based on previously conducted radio-telemetry studies and analyses of inter-dam conversion rates. Accordingly, the current designation for subyearling summer/fall Chinook salmon and sockeye salmon as Phase III (Additional Juvenile Studies) was formally adopted by the Wells HCP Coordinating Committee in February 2005.

For coho salmon (a Plan Species with newly designated mitigation requirements), the Wells HCP Coordinating Committee agreed on a designation of Phase III (Additional Juvenile Studies) on December 27, 2006. On December 12, 2007, in a Statement of Agreement (SOA), the Wells HCP Hatchery Committee concluded that a criterion pursuant to a long-term coho program had been met, and subsequently the Wells HCP Coordinating Committee agreed that survival of coho was assumed to be 96.2%. As documented in the SOA, the District agreed to provide funding at a compensation level commensurate with a 93% survival rate in lieu of juvenile coho survival studies for a ten-year period.

APPENDIX B

SAMPLES SIZE CALCULATIONS
PHASE III (STANDARD ACHIEVED)
PERFORMANCE VERIFICATION STUDY
2010 Study Plan

Statistical Plan for the 2010 Wells Project PIT-Tag Survival Study

Prepared for:

Joshua Murauskas
Public Utility District No. 1 of Douglas County
1151 Valley Mall Parkway
East Wenatchee, WA 98802

Prepared by:

John R. Skalski
Columbia Basin Research
School of Aquatic and Fishery Sciences
University of Washington
1325 Fourth Avenue, Suite 1820
Seattle, Washington 98101-2509

2 June 2009

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1.0 Introduction

The 2010 PIT-tag study at Wells Dam will estimate project passage survival of yearling Chinook salmon smolts. The 2010 study is part of a 10-year "checkup" to assess whether project passage survival at Wells Dam has changed since compliance with the Habitat Conservation Plan a decade ago. The performance standard remains the same; a project passage survival of $\hat{S}_{\text{Dam}} \geq 0.93$ with a standard error of $\text{SE}(\hat{S}) \leq 0.025$.

Unlike past PIT-tag survival studies at Wells, in 2010 fish will be released at both the Methow (Pateros) and the Okanogan rivers. This joint release will be pooled and paired with a common tailrace release below Wells Dam for purposes of estimating project passage survival. The Methow and Okanogan fish will be released in a ratio of 3:1 to mimic the contributions of the two fish sources to the overall Chinook and steelhead population migrating past Wells Dam.

This report summarizes the statistical design and analysis of the 2010 yearling Chinook salmon PIT-tag survival study. This report covers four key factors of the spring investigation as follows.

1. Release-recapture design for the tagging study.
2. Estimation of project passage survival.
3. Tests of assumptions of the survival model.
4. Sample size determination.

Details of the field operations will be covered elsewhere.

2.0 Release-Recapture Design

The release-recapture design consists of two upstream release sites and one tailrace release site below Wells Dam (Figure 1). The two upstream release sites will be located at (1) mouth of the Methow River, near the town of Pateros, Washington, and (2) at the confluence of the Okanogan River. Proposed release numbers of yearling Chinook salmon smolts will be 30,000 and 10,000 at the Methow and Okanogan release sites, respectively (i.e., ratio of 3:1). While from separate release locations, data from these two releases will be pooled to represent a single fish source comprised of fish from the two locales. A total of 30,000 fish will be released at the Wells tailrace to serve as the downstream control group (Figure 1). The tailrace release will be approximately 1,000 ft downstream of the project.

The study will consist of 15 replicate releases over the course of the yearling Chinook salmon outmigration, spaced one day apart. On any particular release sequence, 2000, 667, and 2000 yearling Chinook salmon smolts will be released from the Methow, Okanogan, and Wells tailrace release locations, respectively. The Okanogan releases will occur the day before the releases at the Methow and tailrace to provide adequate mixing of the treatment and control release groups.

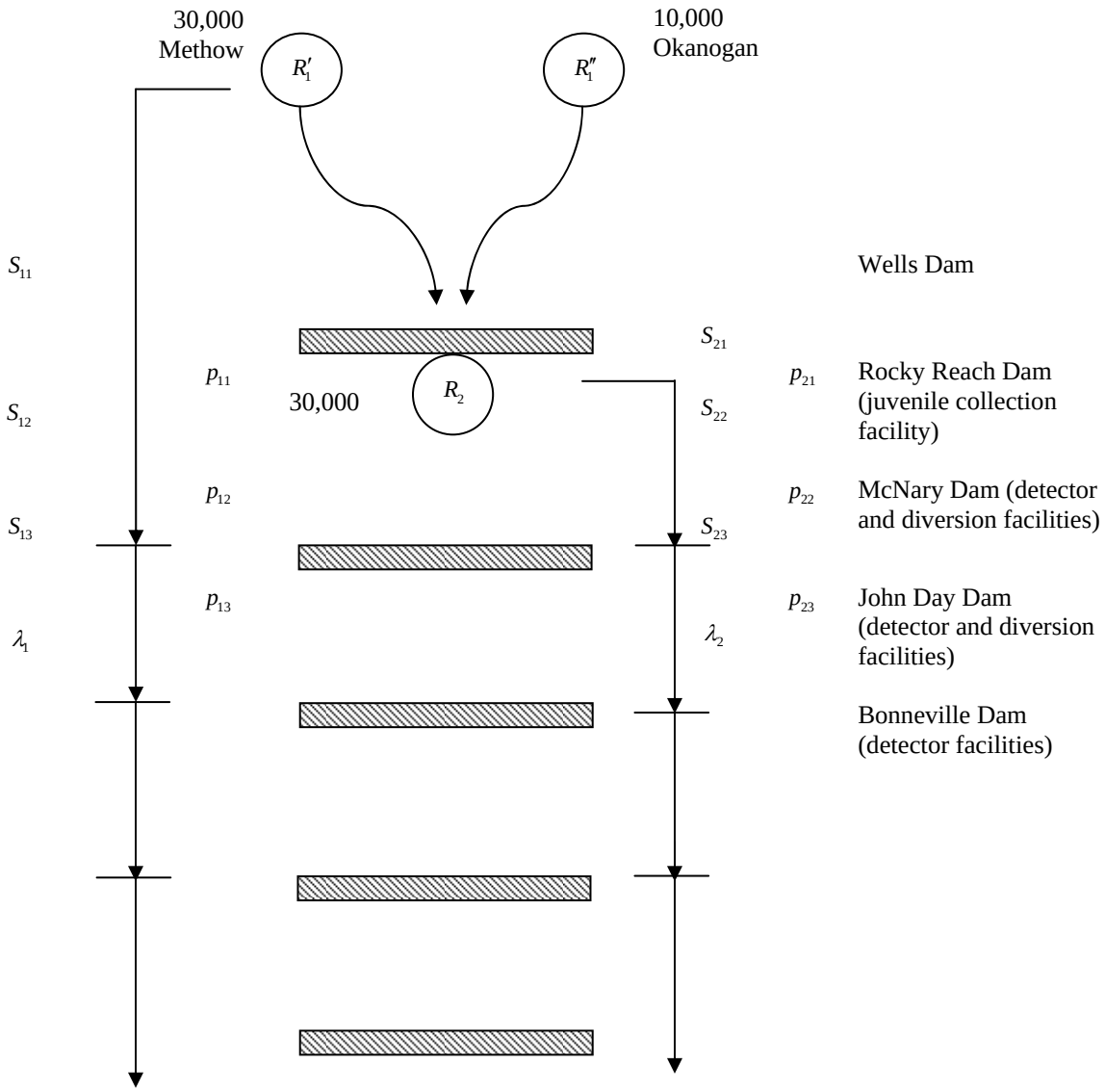

Figure 1. Schematic of release and PIT-tag detection facilities used in the 2010 Wells Dam survival study. Parameters that will be estimated from the release-recapture data are indicated.

PIT-tag detection sites used in the release-recapture study will be at Rocky Reach, McNary, John Day, and Bonneville dams. A new PIT-tag detection facility at the Rocky Reach juvenile collection facility is scheduled for operation in spring 2010.

3.0 Statistical Analysis

3.1 Survival Estimation

The estimate of survival through the Wells project $(\hat{S}_W)$ will be estimated from the result of the upstream and downstream releases by the expression

$$\hat{S}_W = \frac{\hat{S}_{11}}{\hat{S}_{21}} \qquad (1)$$

with an associated variance estimate, based on the delta method (Seber 1982:7-9) of

$$\widehat{\mathrm{Var}}\left(\hat{S}_W\right) \approx \left(\frac{\hat{S}_{11}}{\hat{S}_{21}}\right)^2 \left[\frac{\mathrm{Var}\left(\hat{S}_{11}\right)}{\hat{S}_{11}^2} + \frac{\mathrm{Var}\left(\hat{S}_{21}\right)}{\hat{S}_{21}^2}\right]$$

$$\approx \hat{S}_W^2 \left[\widehat{\mathrm{CV}}\left(\hat{S}_{11}\right)^2 + \widehat{\mathrm{CV}}\left(\hat{S}_{21}\right)^2\right] \qquad (2)$$

and where

$$\widehat{\mathrm{CV}}(\hat{\theta}) = \frac{\sqrt{\mathrm{Var}(\hat{\theta})}}{(\hat{\theta})}.$$

Capture histories will be pooled across the replicate Methow and Okanogan releases in estimating S_{11}. The data from the replicate tailrace releases will be pooled in estimating S_{21}.

The most efficient estimator of S_W will depend on the relationship between the releases (R_1 and R_2) and the downstream survival and capture probabilities. If all downstream parameters are different between releases, survival will be estimated by Equation (1). This is model $H_{k-1,\phi}$ of Burnham et al. (1987:117-120). Intermediate models may also exist (Burnham et al. 1987:116,120-126). The most efficient estimate of Wells survival (S_W) will be based on the statistical model for the releases R_1 and R_2 that properly share all common parameters. The best representation for the survival and capture processes of releases R_1 and R_2 can be found using Program SURPH.4 . Sequential modeling will be performed to determine the most appropriate and precise estimate of S_W and its associated variance estimate.

The capture rates at John Day and Bonneville dams may be low. If this is indeed the case, capture data at the lower sites may be pooled to provide more precise estimates to fewer, more relevant parameters. Data analyses will explore the statistical benefits of pooling some of the downriver sites to improve the precision of $\hat{S}_W$.

3.2 Tests of Assumptions

Assumptions of the paired release-recapture design (Burnham et al. 1987) include the following:

A1. The test fish are representative of the population of inference.
A2. Test conditions are representative of the conditions of interest.
A3. The number of fish released is exactly known.
A4. PIT-tag codes are accurately recorded at the time of tagging and at all detection sites.
A5. The fate of each individual fish is independent of the fates of all other fish.
A6. All fish in a release group have equal survival and detection probabilities.
A7. Prior detection history has no effect on subsequent survival and detection probabilities.

In order to estimate S_W, the survival S_{11} is assumed to be of the form:

$$S_{11} = S_W \cdot S_{21}, \quad (3)$$

leading to the relationship

$$\frac{S_{11}}{S_{21}} = \frac{S_W \cdot S_{21}}{S_{21}} = S_W .$$

The equality (3) implies two additional assumptions for valid estimation of Wells project survival. These are:

A8. Survival in the Wells project (S_W) is conditionally independent of survival in the Rocky Reach (S_{21}) project.
A9. Releases (R_1) and (R_2) experience the same survival probability in the Rocky Reach (S_{21}) project.

Assumptions (A1) and (A2) regard making valid inferences from the test fish to the survival process of run-of-river fish. Wells hatchery fish will be used in the survival investigations, and are assumed to have similar survival as run-of-river fish. Conducting the study over the course of the yearling Chinook salmon outmigration should also help assure test conditions are similar to those experienced by run-of-river fish. Another implied assumption is the 3:1 ratio of Methow to Okanogan release numbers is representative of the actual proportions of these fish sources to the run-of-river fish.

Careful fish handling and data processing should help assure Assumptions (A3) and (A4) that the release-recapture data are accurate. Assumption (A5) is essentially for mathematically modeling the release-recapture investigation. Furthermore, in a system of tens of thousands of migrating smolts, the death of one fish should not influence the fate of other fish in the system.

Assumption (A6) will be violated by the pooling of the Methow and Okanogan upstream releases (R_1' and R_1''). Fish from these different locations can be expected to have different survival probabilities because of the differences in travel distances, etc. Nevertheless, the release-recapture model will provide a weighted estimate of dam passage survival:

$$\frac{S'_W R'_1 + S''_W R''_1}{R'_1 + R''_1} = S'_W P_{METH} + S''_W P_{OKAN}$$

where

S'_W = survival of released fish from Methow through the Wells project,

S''_W = survival of released fish from Okanogan through the Wells project,

$P_{METH} = \frac{R'_1}{R'_1 + R''_1} =$ proportion of fish released from Methow,

$P_{OKAN} = \frac{R''_1}{R'_1 + R''_1} =$ proportion of fish released from Okanogan.

The survival of fish released at the Methow and Okanogan will be a pooled survival probability. Independent but not identically distributed survival probabilities, however, will affect the variance estimates produced by the model. The actual variance will be smaller than that produced by the mark-recapture model (Feller 1968). Consequently, the point estimate will be unbiased (i.e., as long as the proportions P_{METH} and P_{OKAN} are representative of the system) and the variance estimate biased but conservative (i.e., too big).

Assumption (A7) will be evaluated using Burnham et al. (1987) tests T_2 and T_3. Assumptions (A8) and (A9) will be facilitated by staggering the release times in order for downstream mixing of the test fish.

3.2.1 Tests between Releases

At each downstream PIT-tag recapture site (i.e., Rocky Reach, McNary, John Day, Bonneville), the assumption of mixing among the releases of smolts R_1 and R_2 will be tested. An R x C contingency table test of homogeneous recoveries over time will be performed using a table of the form:

Day of	R'_1	R''_1	R_2
1			
2			
3			
⋮	⋮	⋮	⋮
D			

(4)

A contingency table of the form (4) will be calculated for each of the PIT-tag detection sites. Each test will be performed at α = 0.10 significance level. Invariably, these tests of mixing are significant. More revealing are plots of the arrival distributions to assess important departures from mixing.

3.2.2 Tests within a Release

For the single release-recapture model to be valid, certain data patterns should be evident from the capture histories. For each release group, a series of tests of assumptions can be performed to determine the validity of the model (i.e., goodness-of -fit). The data from a single release can be summarized by an m-array matrix of the form below:

	Recovery Site			
Release Site	Rocky Reach (2)	McNary (3)	John Day (4)	Bonneville (5)
Initial (1)	m_{12}	m_{13}	m_{14}	m_{15}
Rocky Reach (2)		m_{23}	m_{24}	m_{25}
McNary (3)			m_{34}	m_{35}
John Day (4)				m_{45}

The value m_{ij} is the number of fish detected at site i that are next detected at site j.

Burnham et al. (1987: p. 65, pp. 71-74) presents a series of tests of assumptions called Test 2 that examine whether upstream detections affect downstream survival and/or detection. For each of the R_1', R_1'', and R_2 releases, the contingency table tests are as follows:

Test 2.2

m_{13}	m_{14}	m_{15}
m_{23}	m_{24}	m_{25}

χ_2^2 (5)

Test 2.3

$m_{14} + m_{24}$	$m_{15} + m_{25}$
m_{34}	m_{35}

χ_1^2 (6)

Overall significance of Test 2 will be based on the sum of the chi-square statistics $\chi_2^2 + \chi_1^2 = \chi_3^2$. Test-wise error rates will be adjusted for the experimental-wise error rate of α_{EX} = 0.10.

Burnham et al. (1987: p. 65, pp.74-77) also present a series of test assumptions called Test 3 which also examine whether upstream capture histories affect downstream survival and/or capture. For each of the releases R_1 and R_2, contingency tables can be constructed of the form:

		Capture History to McNary Dam	
		101	111
Capture History at John Day and Bonneville Dams	11		
	10		
	01		
	00		

χ^2_3 (7)

Contingency table (7) tests whether capture at McNary Dam has a subsequent effect on capture histories at John Day and Bonneville dams. To test whether capture at McNary Dam and/or John Day Dam has a subsequent effect on the capture history at Bonneville Dam, a contingency table can be constructed of the form:

		Capture History at John Day Dam			
		1111	1101	1011	1001
Capture History at Bonneville	1				
	0				

χ^2_3 (8)

Contingency tables (7) and (8) are slight modifications from Burnham et al. (1987) to take into account more of the information from the individual capture histories.

4.0 Anticipated Precision

Considering a Project survival probability through Wells Dam of 0.93 or higher, precision calculations were performed. Release sizes of 30,000, 10,000, and 30,000 for Methow, Okanogan, and Wells tailrace were used. Survival probabilities between projects and detection probability at dams were based on PIT-tagged yearling Chinook salmon releases during spring 2008 (Figure 2). Based on the anticipated detection and survival probabilities, the estimate of Wells passage survival has a projected standard error of $SE(\hat{S}_w) = 0.0179$. This projected standard error is based on a detection probability of 0.41 at the new Rocky Reach PIT-tag detector. Should the detection rate drop to 0.30, the anticipated standard error is $SE(\hat{S}_w) = 0.0227$. These projections are much smaller than the requirement of $SE(\hat{S}_w) \leq 0.025$. Therefore, the proposed sample sizes should be adequate and provide for robustness if anticipated detection rates are lower than those used in the sample size calculations.

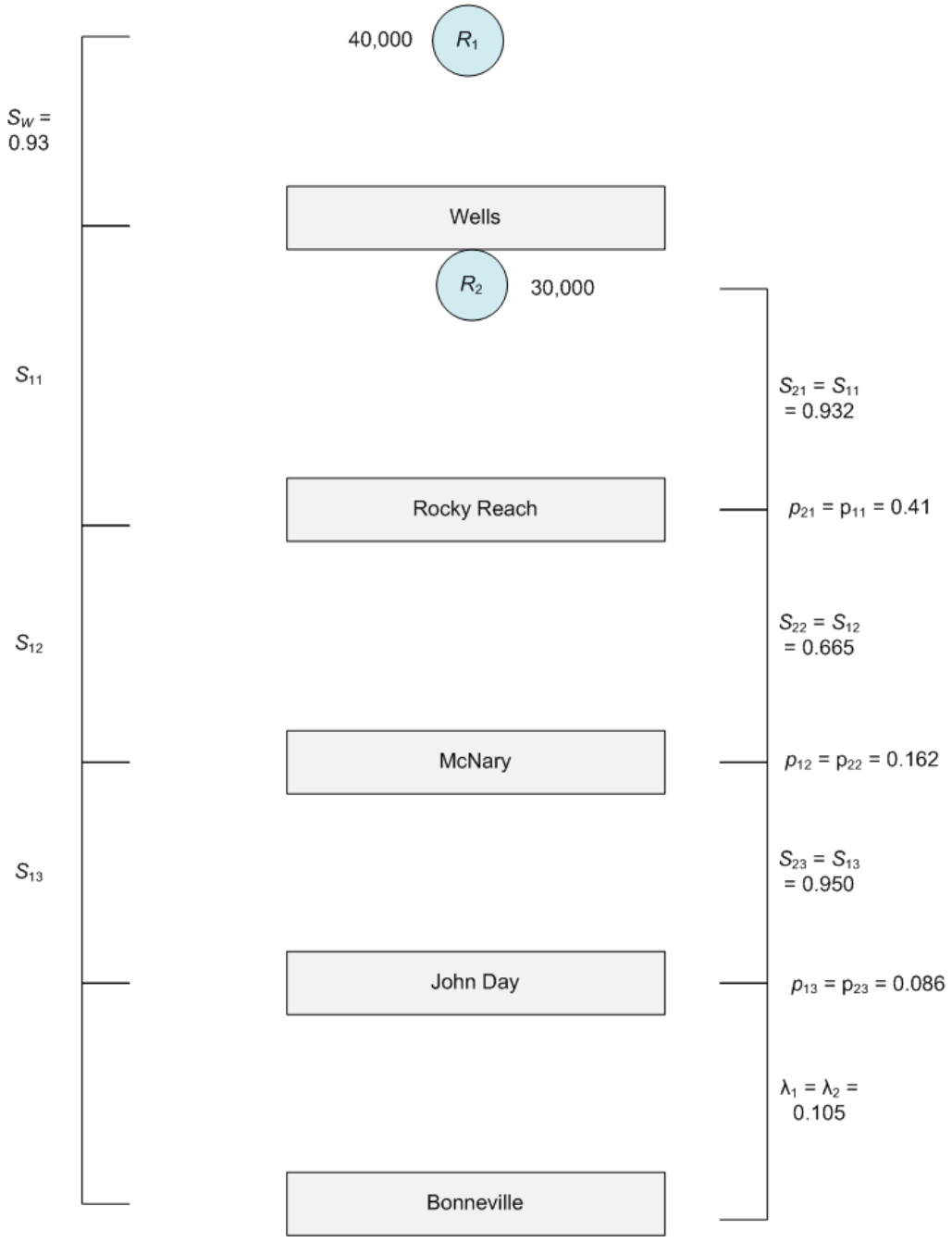

Figure 2. Parameter values used in precision calculations for the 2010 survival study.

5.0 Literature Cited

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ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	August 25, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Josh Murauskas, and Steve Hemstrom		
Re:	Final Minutes of July 21, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met by conference call, on Tuesday, July 21, 2009, from 8:00 am to 9:30 am. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- There were no action items at this meeting.

DECISION SUMMARY

- The Wells Coordinating Committee approved a 30-day modification of ladder entrance velocity between the hours of 9:00 pm and 1:00 am at Wells Dam to evaluate measures to enhance lamprey passage. Testing would begin the end of the third week in August (No SOA provided.) (Item II-A).

I. Welcome

The Coordinating Committees approved the June 23 meeting minutes with revisions. Ali Wick will distribute the final Minutes to the Committees.

II. Douglas PUD

A. DECISION ITEM: Lamprey Study Plan

Josh Murauskas provided a brief presentation on salmon and lamprey passage at Wells Dam. The Coordinating Committees reviewed this information to inform their decision on dam operations for the 2010 lamprey study. There was considerable discussion of the best time period for testing, with an emphasis on identifying a period during which impacts on

salmonids would be minimal and the opportunity to improve lamprey passage would be optimized. The Committees agreed that the tests will be conducted from 9:00 pm to 1:00 am instead of from 8:00 pm to 12:00 am, which was the time period that was originally considered. A summary of the experimental design is as follows: 10 replicate tests of 3-day blocks, each block testing 1.5-foot, 1.0-foot, and 0.5-foot head differentials. These tests would involve both fishway entrances simultaneously. The tests will span a 30-day period beginning on a date between August 16 and 20, depending on water conditions and downstream counts.

In response to a question from Bill Tweit on whether proposed reductions in head differential between the gallery and tailrace would change flows in the ladder, Murauskas explained that when velocities are reduced, there is a slight reduction in flow entering the lower half of the collection gallery, but there is no flow change in the upper half; there is also no change in the flow in the ladder itself. Tweit also said that the passage distribution at night appears to be different than other Mid-Columbia dams. Shane Bickford explained that a key reason for this difference is that there is no ambient light in the Wells Dam ladder, unlike in other Mid-Columbia dams, and this darkness functions as a cue for some fish to migrate. Mike Schiewe asked whether there would be an effect on statistical power due to changing the test time period; Murauskas responded that he has discussed this in conversations with John Skalski (statistician), and the effect is unknown at this time due to the lack of baseline data.

The Wells Coordinating Committees approved the 30-day operational change during which velocities at the adult fishway entrance would be modified between the hours of 9:00 pm and 1:00 am, in order to evaluate the efficiency of nighttime flow reductions at fishway entrances to facilitate lamprey passage.

III. Chelan PUD

A. Rock Island Powerhouse 1 Modernization

Keith Truscott said that the modernization effort at Rock Island powerhouses is ongoing. He noted that unit B10 was the first unit to receive the new turbine with a horizontal flow vein installed in the draft tube at mid-height, spanning the full width. The runner design was changed from five blades to four. Wicket gates were replaced with a design that aligns with the stay vanes and lengthened to close the gap. The discharge liner was made partially

spherical and the hub shape changed to close the gaps with the runner. The construction outage started January 7, 2007 and was completed May 18, 2008. From May 2008 to May 2009 the unit was run extensively to prove out the design. Unit B9 was released for manufacturing June 30, 2009.The turbine design will be modified from B10 in that it will be capable of passing about 800 cfs more flow than the old Unit B9 by extending the stroke of the turbine blades and wicket gates. Additionally, the flow vane will not be installed, and instead the draft tube walls will be modified to reduce draft tube flow instabilities. The construction outage for B9 is planned for July 1, 2010 to April 15, 2011.Work on unit B4 will begin in August of this year. A major overhaul will be conducted on the turbine including: replacing wicket bushing with a greaseless design, modifying the turbine guide bearing from grease to water lubricated, and changing the gate ring to a non-lubricated design. The six turbine blades are sagging and in danger of striking the discharge liner so they will be welded in place at a blade position of 85% open.

An extensive condition assessment will be performed on one Powerhouse 2 Unit from July 2010 to December 2010. The purpose of outage is to disassemble the Unit and inspect the components to provide recommendations for future maintenance, repairs, and replacements.

B. Pikeminnow Ladder Trapping

Steve Hemstrom updated the group that Chelan PUD ceased trapping pikeminnow at Rock Island Dam on July 9 and ceased trapping at Rocky Reach on June 30. The total number of pikeminnow trapped was 2,610 at both dams combined. There were large numbers of sockeye entering the traps during this effort; all were released in good condition. Hemstrom also noted that there have been 21,255 pikeminnow caught thus far in the longlining effort.

IV. Tributary and Hatchery Committees Update

Mike Schiewe updated the group that the Tributary Committees recently approved a Small Projects Proposal funding request for the Sleepy Hollow Reserve Protection Feasibility Assessment ($20,000). The General Fund received 16 pre-proposals this year. One project was withdrawn from consideration by the project sponsor after submission and another was added. Of the 16 pre-proposals, the Tributary Committees identified one project that did not warrant a full proposal, because it had a low level of certainty of success. The Tributary Committees solicited full proposals for the remaining 15 projects, which are due on Friday, July 24. The projects are located in the Okanogan, Methow, Entiat, and Wenatchee basins.

Mike Schiewe updated the group that the Hatchery Committees are discussing the following topics:

- Passive Integrated Transponder tag (PIT-tag) detection arrays for the sockeye enumeration study have been installed in the White and Little Wenatchee rivers, and the study will start as soon as sockeye arrive.
- The Hatchery Committees preliminarily agreed that Chelan PUD can plan for another year of Blackbird Island Pond use.
- The Hatchery Committees reviewed National Marine Fisheries Service (NMFS) comments on the Chelan PUD 2010 Draft Monitoring and Evaluation (M&E) Plan.
- The Hatchery Committees received an update that 30,000 steelhead will soon be transferred to the Chiwawa Facility for the Chelan PUD water re-use acclimation study.
- There has been continuing discussion regarding fish anesthetic use at Tumwater Dam, and a working group of entities that use the dam (Yakama Nation [YN], U.S. Fish and Wildlife Service [USFWS], Washington Department of Fish and Wildlife [WDFW], Grant PUD, and Chelan PUD) will soon be convened to discuss needs and constraints and to develop a dam operational plan for review by the Hatchery Committees.
- Chelan PUD is investigating early rearing densities used in other hatcheries for sockeye salmon, and will be proposing facilities modification at the Eastbank Hatchery to accommodate rearing sockeye.
- The Hatchery Committees have preliminarily agreed to a pilot proposal to investigate distribution and spawn timing of hatchery origin (HOR) and natural origin (NOR) steelhead in the Upper Columbia River Basin. Final details are being worked out with Chelan and Douglas PUDs.
- The Hatchery Committees received a brief presentation on a YN multi-species acclimation proposal that is currently under review by the Independent Scientific Review Panel (ISRP).
- The YN is discussing the option of implementing over-winter acclimation of yearling summer/fall Chinook at Dryden given that results from Twisp, Chiwawa, and Similkameen suggest that acclimating juveniles over-winter can lead to increased survival.

- The Hatchery Committees approved the Colville Confederated Tribe's (CCT's) proposal to tag up to 10 summer Chinook at the west ladder at Wells Dam in order to support an upcoming salmon derby.
- The Hatchery Genetic Management Plans (HGMPs) for the Wenatchee programs will be finalized by the August Hatchery Committees meeting and submitted to NMFS.
- The Methow HGMPs are currently in progress, and the submission schedule will likely be shifted to October.
- The Non-Target Taxa of Concern (NTTOC) analysis will likely occur in late fall following the HGMP process.
- The Okanagan Nation Alliance (ONA) will attend a future meeting to update the group on the ONA sockeye program and the water management tool.

V. HCP Administration

A. Next Meetings

The next scheduled Coordinating Committees meetings are as follows: August 25, September 22, and October 27; all meetings will be in SeaTac.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Keith Truscott *	Chelan PUD
Steve Hemstrom	Chelan PUD
Jerry Marco *	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Shane Bickford *	Douglas PUD
Josh Murauskas	Douglas PUD
Bryan Nordlund *	NMFS
Jim Craig *	USFWS
Bill Tweit *	WDFW
Bob Rose *	Yakama Nation

* Denotes Coordinating Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	September 22, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Greg Mackey, and Steve Hemstrom		
Re:	Final Minutes of August 25, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met on Tuesday, August 25, 2009, from 9:30 am to 12:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- There were no action items at this meeting.

DECISION SUMMARY

- There were no decisions or agreements at this meeting.

I. Welcome

The Coordinating Committees approved the July 21 meeting minutes with revisions. Ali Wick will distribute the final Minutes to the Committees.

II. Chelan PUD

A. Rocky Reach and Rock Island Spill Summary

Steve Hemstrom distributed a summary of spring and summer spill and reviewed the parameters and dates of the operations. Hemstrom noted that summer spill is scheduled to end August 31 due to declining fish passage.

B. Rocky Reach Fish Forum

Keith Truscott said that the Rocky Reach Fish Forum is underway as of this week. This forum is the mechanism for implementing the provisions of the new Federal Energy

Regulatory Commission (FERC) license for Rocky Reach Dam. Jeff Osborne is the designated representative for Chelan PUD.

C. Dryden Weir Fish Passage

Keith Truscott notified the group that recently a cobble bar has accumulated on the right bank of the Wenatchee River just downstream of the confluence of Peshastin Creek, which could impede fish from exiting the right bank fishway of the Dryden Weir. Chelan PUD will be working with the appropriate permitting agencies for a solution to this problem, which will likely involve removal or relocation of this material.

D. Status of Rocky Reach Survival Study Analysis

Steve Hemstrom provided an update to the group on the status of the Rocky Reach behavior and survival studies. The studies are now complete and the data are being analyzed, including a day/night analysis, a tag-life analysis, and a tagger effect analysis. Hemstrom anticipates that Chelan PUD will have data to share at the September meeting.

E. Subyearling Summit

The Coordinating Committees asked for an update on the work that is ongoing for the "subyearling summit," which is an update on the status of the science and technology that would facilitate subyearling studies. Keith Truscott said that the PUDs are working on this and will likely have a presentation at the October meeting.

III. Douglas PUD

A. Wells Coordinating Committee Representation

Tom Kahler updated the group that he will continue to be the Wells Coordinating Committee representative for Douglas PUD, but that Shane Bickford will now be the alternate in place of Rick Klinge, who is out on medical leave.

B. Bypass Update

Tom Kahler said that fish bypass operations at Wells Dam are scheduled to conclude at midnight on August 26.

C. Update on Survival Study Planning

Tom Kahler mentioned briefly that Douglas PUD 2010 survival study planning is ongoing.

D. PIT-Tag Detector at Rocky Reach

Tom Kahler said that Douglas PUD is working with its contractor and Chelan PUD on installation of the Passive Integrated Transponder tag (PIT-tag) antennas in the Juvenile Fish Bypass System at Rocky Reach. The antennas will be installed in the bypass flow spreaders, with the intention of maintaining the exact hydraulic configuration of the flow spreaders. Rather than modifying the existing flow spreaders, the contractor will fabricate duplicate flow spreaders with integrated antennas.

E. Modifications to West Ladder Trap

Tom Kahler said that Douglas PUD is in the preliminary stages of designing some modifications to the Wells west ladder trap, for several reasons. First, more fish have been using the west ladder in recent years; second, the Wells Dam multi-year Re-wind project began this year, and access to the west ladder has been somewhat limited relative to previous years. The intent of these modifications is to minimize fish handling. The schedule for this work is for construction to commence by February of 2010, which necessitates bid development by the end of November. Douglas PUD will be coordinating with the hatchery staff at Wells Dam, as well as other west ladder users, during the design process.

IV. Tributary and Hatchery Committees Update

Mike Schiewe updated the group on the Tributary Committees' recent work:

- The Tributary Committees have received the final applications for the 2009 General Salmon Habitat Program (GSHP). There were 14 applications, and the Tributary Committees have made initial evaluations of the proposals. The projects submitted were "cost-shares" with the Salmon Recovery Funding Board (SRFB). The Upper Columbia Regional Technical Team has conducted their technical review of these proposals and provided their scores and technical comments to the Tributary Committees for deliberation. Proposals were submitted to both the SRFB and the GSHP, and so the Tributary Committees will work with SRFB staff and members over the next few months to ensure close coordination.
- The Tributary Committees have recently discussed changes to the Policies and Procedures document that might allow them to provide funds for acquisition of lands where part of the land acquired could be used for hatchery production systems or facilities. Draft language will be reviewed by the Tributary Committees during the

September meeting. The Tributary Committees are not in agreement over the proposed changes; the draft language is for the purpose of discussion.

- At the next Tributary Committees meeting, there will be a presentation from the U.S. Fish and Wildlife Service (USFWS) on the Entiat National Fish Hatchery Habitat Improvement Project. On October 7 and 8, the Tributary Committees will visit the Okanagan River Restoration Initiative project in Canada.

Mike Schiewe updated the group that the Hatchery Committees are discussing the following topics:

- The Hatchery Committees agreed to a higher rearing density for Lake Wenatchee sockeye during the early rearing period.
- The Hatchery Committees approved the Wenatchee spring Chinook and steelhead Hatchery Genetic Management Plans (HGMPs).
- Chelan PUD will be holding both of their HGMPs for future submittal to the National Marine Fisheries Service (NMFS), following discussions and a NMFS decision on permit-related processes after submittal of the HGMPs.
- The Hatchery Committees approved a request for 150 summer/fall Chinook from Ringold Hatchery for a NMFS separation-by-code (SBC) study.
- The Hatchery Committees have reviewed WDFW collection of a surplus of summer Chinook broodstock at Wells Dam and agreed that these fish are in excess of HCP program broodstock needs.
- A letter has been provided to the Hatchery Committees on the status of the Yakama Nation's (YN's) Environmental Impact Statement (EIS) scoping process for the coho reintroduction program master plan; scoping meetings are currently underway.
- The Hatchery Evaluation Technical Team (HETT) was tasked with organizing the Non-Target Taxa of Concern (NTTOC) risk analysis.
- The USFWS has received approval from the Production Advisory Committee (PAC) for broodstock collection for the USFWS' new Entiat summer Chinook program. The next step is for USFWS to present the proposal to the policy committee under *U.S. v. Oregon*.
- Following the September Hatchery Committees meeting, the Okanagan Nation Alliance (ONA) will provide an update on the Skaha sockeye program (which provides sockeye mitigation for Chelan and Douglas PUD), and Kim Hyatt (Department of Fisheries and Oceans - Canada) will present the latest information

from the Okanogan Basin Water Management Tool (which provides sockeye mitigation for Douglas PUD).

V. USFWS

Steve Hemstrom asked for an update on the status of bull trout critical habitat designation in the Wenatchee basin. Jim Craig said that he is not clear on the status at this time and he would get back to the Coordinating Committees with this information. His recommendation is to go forward with addressing critical habitat in the event that critical habitat is designated.

VI. HCP Administration

A. Next Meetings

The next scheduled Coordinating Committees meetings are as follows: September 22, October 27, and November 24; all meetings will be in SeaTac. The October meeting will be an all-day meeting to facilitate inclusion of the subyearling information. At the November meeting, John Skalski will be present Chelan PUD survival study results.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Keith Truscott *	Chelan PUD
Steve Hemstrom	Chelan PUD
Tom Kahler *	Douglas PUD
Greg Mackey	Douglas PUD
Bryan Nordlund *	NMFS
Jim Craig *	USFWS
Bill Tweit *	WDFW

* Denotes Coordinating Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	November 5, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick and Steve Hemstrom		
Re:	Revised Minutes of September 22, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met on Tuesday, September 22, 2009, from 9:30 am to 12:00 pm at the Radisson Gateway Hotel in SeaTac, Washington. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- There were no action items at this meeting.

DECISION SUMMARY

- There were no decision items at this meeting.

I. Welcome

The Coordinating Committees approved the August 25 meeting minutes with revisions. Ali Wick will distribute the final Minutes to the Committees.

II. Chelan PUD

A. Study Results for Rocky Reach and Rock Island Spring Survival Studies

Keith Truscott summarized some preliminary results of the 2009 Rocky Reach and Rock Island juvenile sockeye salmon studies at today's meeting. John Skalski (University of Washington) and Tracy Steig (Hydroacoustic Technology, Inc. [HTI]) will attend the November meeting to present more detailed results. Steve Hemstrom distributed handouts with the preliminary results; Ali Wick will scan these and provide them to the Coordinating Committees in PDF format. Preliminary results indicated that there was a significant tag effect for one tagger. After substantial analyses to identify the cause of this phenomenon,

Chelan PUD has identified that this tag effect was possibly the result of the tagger using water without anesthetic, instead of low-anesthetic water, during tag surgery on the sockeye. There was also a larger day/night survival effect for this one tagger, versus the other two taggers' individual and combined results. The effects observed at Rocky Reach were also evident in the Rock Island sockeye study for the same tagger. For the preliminary results, this one tagger's fish were removed from the survival analyses. With these results removed, project study-wide survival estimates were 0.9545 (0.0118 standard error) for the Rocky Reach study and 0.9457 (0.0159 standard error) for the Rock Island study. The standard errors required for the HCP survival estimates (0.025) at both Rocky Reach and Rock Island were still met even with the affected set of fish removed from both studies.

Given that the 2009 Rock Island sockeye study was a Phase Designation study, and Rocky Reach will begin Phase Designation studies soon, Keith Truscott asked the Committees to review the preliminary results with regard to the tag-tagger effect for the 2009 sockeye survival estimates at Rock Island and Rocky Reach with the tagger-biased fish removed (HCP study standard errors still achieved). Truscott noted that each year of survival study implementation allows acquisition of additional information that improves the study design/analyses, and this year's tag/tagger effect is another element to recognize as Chelan pursues the task of estimating project survival. It was anticipated that further discussion of this subject will occur in the October meeting.

B. Rocky Reach 24-Hour/Diel Analysis

Steve Hemstrom handed out graphs showing relative passage frequencies plotted on 24-hour clocks. An interesting result was that 9:00 pm appears to be a high frequency passage time for all juvenile species considered (sockeye, yearling Chinook, subyearling Chinook, steelhead, and coho), but overall, sockeye passed in greater proportions during daylight hours while yearling Chinook passed in noticeably greater proportions in night time hours. Keith Truscott said that Chelan PUD is not ready to set 2010 study plans, but that when those plans are set, they will include further research into diel passage.

C. Tags as Budget Item for 2010 Studies

Steve Hemstrom said that Chelan PUD will likely be using 100 percent microtags next year for all species, as there was no tag life effect or premature tag failure observed this year with

microtags as there was with the 795E tags The Coordinating Committees agreed that microtags were acceptable for 2010.

Bob Rose asked whether Chelan PUD has discussed the use of juvenile salmon acoustic tag system (JSATS) tags. Keith Truscott said that Chelan PUD is aware of the tags, but that considering the progress that the PUD has made in conducting survival studies with HTI acoustic tags and the substantial investment involved with ownership of the equipment, doing a switch to JSAT at this time would be cost-prohibitive. Rose indicated his interest in keeping the discussion active in the future. Truscott agreed that going forward, keeping this discussion open is acceptable. He also mentioned that Grant PUD conducted a study this year with JSATS tags and it will be interesting to see these results.

D. Proposal for Hydrokinetic Project on Rock Island Reservoir

Keith Truscott updated the group that there is a proposal by Green Hydro for constructing a hydrokinetic project on Rock Island reservoir and noted that the PUD would be submitting a Notice of Intervention to FERC the week of October 19. This would be a pilot project generating approximately 2 megawatts.

E. Pikeminnow Program

Keith Truscott updated the group that the pikeminnow removal project is going well; as of the end of last week, there were approximately 82,750 pikeminnow removed. The long-line contractor will begin a fishing effort in November.

III. Douglas PUD

A. Additional Brood Fish for Potential 2011 Survival-verification Study

Tom Kahler said that Douglas PUD is planning for a contingency follow-up survival-verification study on juvenile spring migrants in 2011 just in case the 2010 study is unsuccessful, does not meet precision requirements, or does not meet Representative Environmental Conditions. To plan for this, the Coordinating Committees would need to agree on whether planning for this study is necessary, and then the Hatchery Committees would need to agree on how to complete study fish collection. At this time, Douglas PUD proposes to collect additional broodstock as a contingency in case a 2011 study is needed; approximately 22 to 25 females would be needed. Kahler has discussed this with almost all of the Hatchery Committees members at this time, and will be completing those discussions

soon. The Coordinating Committees agreed that Douglas PUD shall plan for a contingency study, which includes obtaining broodstock for this study, and that Douglas PUD will work with the Hatchery Committees as necessary.

B. 2009 Wells Bypass Summary

Tom Kahler said that he will be providing the 2009 bypass summary soon.

IV. Tributary and Hatchery Committees Update

Ali Wick updated the group that the Tributary Committees did not meet this month.

Ali Wick updated the group of the following discussions that occurred at the Hatchery Committees meeting:

- The Hatchery Committees approved Grant PUD's annual request to Douglas PUD for space at Wells and Methow hatchery facilities for hatchery production.
- Douglas PUD is continuing work on its Hatchery Genetic Management Plans (HGMPs).
- Douglas PUD presented a draft study design for a Methow steelhead reproductive success study and will be convening a subgroup to further develop the study.
- Chelan PUD has developed a proposal for a steelhead spawning success study in the Wenatchee Basin and the Hatchery Committees will be providing comments soon for October approval.
- The Hatchery Committees are discussing the technical issues surrounding whether to use Blackbird Pond in 2010.
- The Hatchery Committees will consider reviewing the Upper Columbia Salmon Recovery Board's (UCSRB) Monitoring and Evaluation (M&E) Plan and commenting on data gaps identified in Upper Columbia salmon recovery efforts.
- The Hatchery Committees are reviewing potential paths forward for rearing yearling summer/fall Chinook in water reuse ponds for Chelan PUD's HCP production.
- The Chelan PUD sockeye enumeration study is progressing well.
- Chelan PUD is involved in contingency planning for fish care during low flows at the gravel bar at Dryden weir that has recently accumulated. The Hatchery Committees approved several courses of action that may be taken if necessary.
- The Yakama Nation (YN) provided an update on their proposal to implement multi-species acclimation in the Wenatchee and Methow subbasins.

- The YN has approached Washington Department of Fish and Wildlife (WDFW) on opening a non-tribal and tribal fishery on coho salmon, and the YN is currently waiting for a response.
- A public meeting was held in the Wenatchee and the Methow on the YN's coho Environmental Impact Statement (EIS); the meeting went well and the proposal was well received.
- There may soon be a workshop to discuss a web-based data sharing portal sponsored by the Pacific Northwest Ambient Monitoring Program (PNAMP).
- The Hatchery Evaluation Technical Team (HETT) presented preliminary plans to convene an expert panel to consider potential effects to Plan Species from Non-Target Taxa of Concern (NTTOC). The Hatchery Committees have tasked the HETT with this action item, which addresses Regional Objective 10 of the M&E Plan. The Hatchery Committees agreed with the proposed path forward and will be reviewing work products as this process develops.

V. HCP Administration

A. Meeting Agreements not requiring a Statement of Agreement (SOA)

- The Coordinating Committees agreed that removing the fish tagged by the individual tagger associated with a large tag effect is acceptable for 2009 survival study analyses (Item II-A).
- The Coordinating Committees agreed that Chelan PUD may use 100 percent microtags for survival studies in 2010 (Item II-C).
- The Coordinating Committees agreed that Douglas PUD shall plan for a contingency survival-verification study, which includes obtaining broodstock for this study, and that Douglas PUD will work with the Hatchery Committees as necessary (Item III-A).

B. Next Meetings

The next scheduled Coordinating Committees meetings are as follows: October 27, November 24, and December 15; all meetings will be in SeaTac. The October meeting will be an all-day meeting to facilitate inclusion of the subyearling information (Note added after the meeting: The technical session on the feasibility of conducting subyearling Chinook salmon survival studies is being to moved to November 2009). At the November meeting, John Skalski will be present to provide Chelan PUD survival study results and answer any questions.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Ali Wick	Anchor QEA, LLC
Keith Truscott *	Chelan PUD
Steve Hemstrom	Chelan PUD
Jerry Marco * (by conference call)	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Bryan Nordlund *	NMFS
Jim Craig *	USFWS
Bob Rose * (by conference call)	Yakama Nation

* Denotes Coordinating Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	November 19, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick and Steve Hemstrom		
Re:	Final Minutes of October 27, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met on Tuesday, October 27, 2009, from 9:30 am to 12:30 pm at the Radisson Gateway Hotel in SeaTac, Washington. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Steve Hemstrom will draft a Statement of Agreement (SOA) confirming that the Coordinating Committees agree that the analysis of the 2009 sockeye survival data should exclude fish tagged by Tagger No. 3 (Item II-A).
- Steve Hemstrom and John Skalski will develop draft guidelines for removing a tag group or lot from survival study results (Item II-A).
- Tom Kahler will circulate the preliminary designs for modifications to the flow spreaders in the Rocky Reach juvenile bypass to accommodate PIT-tag detection antennas (Item III-A).
- Mike Schiewe will confirm the date and agenda for the Mid-Columbia subyearling Chinook survival study workshop (Item V-A).

DECISION SUMMARY

- There were no decision items at this meeting.

I. Welcome

The Coordinating Committees will approve the September 22 meeting minutes with revisions by email. Ali Wick will distribute the final minutes to the Committees.

II. Chelan PUD

A. Study Results for Rocky Reach and Rock Island 2009 Survival Studies

Steve Hemstrom introduced John Skalski, who provided a presentation on 2009 sockeye studies at Rocky Reach and Rock Island. The objectives were to estimate and compare Rocky Reach passage survival for daytime and nighttime releases, and to estimate Rock Island passage survival (daytime only) under conditions of 10 percent spill. Skalski's analysis included a detailed examination of tagger effects. As discussed at a previous Coordinating Committees meeting, there was a marked reduction in post-release survival of sockeye smolts tagged by one of the three taggers (Tagger No. 3). Skalski said that it was possible and justifiable to remove fish tagged by Tagger No. 3 from the analysis (approximately one-third of all tags); he confirmed that precision of the survival estimate remained high because the reduced sample size was offset by the high detection efficiency. Based on the analysis of fish tagged by Taggers No. 1 and 2 only, Rock Island project passage survival was 0.9467 (standard error [SE] = 0.0159); Rocky Reach project passage survival for day-time releases was 0.9507 (0.0160), and it was 0.9592 (0.0175) for night-time releases. This latter result indicates that there was no significant diel passage effect for sockeye.

Bill Tweit asked whether there should be technological or other contingencies to minimize the potential that tagger effects will significantly impact a study. Skalski suggested that these contingencies would not be necessary as long as the sample size remains high enough to overcome the tagger effect. Skalski also said that analyzing tagger effects and tag lot effects will be part of all future studies. Bryan Nordlund asked that the analysis of tagger effects be included in the final report; Hemstrom confirmed that this would be the case and that this information may be included in an appendix. Mike Schiewe suggested that Skalski write up a set of general guidelines under which it would be appropriate to remove a tagged group in the future. These would be appended to the study report, but Chelan PUD will clarify that these constitute a working document and can be revised in the future. Bob Rose suggested that Chelan PUD might want to evaluate the quality assurance/quality control (QA/QC) process for taggers, and Hemstrom said that this had been done and the protocols had been communicated correctly to the taggers.

Hemstrom asked whether the Rock Island Coordinating Committee was comfortable with using this year's survival studies as a study contributing to Phase Designation for sockeye at Rock Island. Mike Schiewe said that that decision will be part of the approval of the

forthcoming 2009 survival study report. In the meantime, Hemstrom will draft an SOA that documents the Coordinating Committees' concurrence to remove fish tagged by Tagger No. 3 from the 2009 analysis. At the November meeting or after the study report is complete and reviewed by the Committees, the Committees will consider an SOA approving the study and its use for Phase Designation.

For 2010, Chelan PUD is considering investigating potential diel passage effects on steelhead and sockeye at Rocky Reach and Rock Island. In addition, they will conduct survival studies for Chinook and steelhead at Rock Island.

B. 2010 Pikeminnow Acoustic Deterrent Study and Comparison of Biological Catch Statistics for Chelan PUD's 2007 to 2009 Pikeminnow Control Programs

Lance Keller discussed Chelan PUD's preliminary plans for a pilot study on the use of underwater sound to modify pikeminnow behavior, identify a potential optimal acoustic frequency, and evaluate potential effects on salmonids and lamprey. Such an acoustic device could potentially be deployed at locations where pikeminnow would be unwanted, such as in the fish ladder or the entrance to the corner surface collector. Bill Tweit suggested that Chelan PUD consider looking at effects on sturgeon as well. Steve Hemstrom said that the pilot study is under development and that the Coordinating Committees would have an opportunity to review it once it is available.

III. Douglas PUD

A. Modification of Rocky Reach Juvenile Bypass for PIT-Tag Detector

Tom Kahler updated the group on Douglas PUD's work on modification of the Rocky Reach juvenile bypass system to accommodate passive integrated transponder tag (PIT-tag) detection equipment. Kahler is awaiting preliminary designs for this structure and will circulate them to the Coordinating Committees when available.

IV. Tributary and Hatchery Committees Update

Mike Schiewe updated the group that the Tributary Committees did not meet in September. They informally met on October 7 and 8 to visit several projects they have funded in Canada, including the Okanagan River Restoration Initiative.

Mike Schiewe updated the group of the following discussions that occurred at the recent Hatchery Committees meeting:

- The Hatchery Committees are discussing a potential Wenatchee steelhead spawning success study.
- The Hatchery Committees received presentations on results of fish health monitoring of the summer Chinook that were raised in the pilot study of the partial water reuse system at Eastbank Hatchery and results of a study on precocial (age 2 "mini jacks") male maturation in summer Chinook in the reuse and control groups from the study.
- Chelan PUD will soon be providing a detailed update on future plans for Blackbird Pond for steelhead.
- The Hatchery Committees approved summer Chinook rearing at Ringold Hatchery and Eastbank Re-use Facility and agreed to the rearing of 400,000 yearling summer Chinook for acclimation and release at Chelan Falls and Turtle Rock (2009 brood year).
- Chelan PUD reported that Chiwawa spring Chinook are currently experiencing a *Saprolegnia* ("flag-tail") outbreak with approximately 1 percent of the fish affected.
- The Hatchery Committees received an update on the Chiwawa steelhead reuse pilot study; construction is almost complete and fish will be transferred soon.
- The Hatchery Committees are considering a draft SOA for reduction of spring Chinook production levels and the implementation of testing early parental-based tagging (PBT) rearing.
- The Hatchery Committees approved the transfer of 200,000 Met-Comp fish currently at Winthrop Hatchery to Tonasket Pond and Omak Creek Acclimation Facility (in the Okanogan basin) in early November. The total transfer will be 200,000 fish; 50,000 to Omak and 150,000 to Tonasket.
- The Douglas PUD Methow spring Chinook and steelhead Hatchery Genetic Management Plans (HGMPs) are still in progress and most of the remaining work involves achieving consistency with the Hatchery Scientific Review Group's (HSRG's) recommendations; Douglas PUD will continue to work toward the October 31 deadline but informed National Marine Fisheries Service (NMFS) that it may not be met because the HGMP sub-group has not reached consensus on a few outstanding details of each program.
- Douglas PUD is planning some modifications for adult fish holding and sorting at Wells Hatchery.

- The 2010 Wells Monitoring and Evaluation (M&E) Implementation Plan is out for Hatchery Committees' review.
- The Yakama Nation (YN) provided an update on the status of the YN proposal to implement multi-species acclimation in the Wenatchee and Methow subbasins.
- NMFS is reviewing the Wenatchee basin HGMPs and will provide comments to the parties that have submitted these HGMPs in the near future.
- The Hatchery Evaluation Technical Team (HETT) has completed the draft letter of interest and the panel member list for the Non-Target Taxa of Concern (NTTOC) analysis.
- The HETT continues to work on the control group (aka reference stream) analysis.
- Joe Miller will be the new Chelan PUD representative on the Hatchery Committees; Steve Hayes will be the alternate.

V. HCP Administration

A. Subyearling Survival Study Workshop

Mike Schiewe distributed the draft agenda for the Coordinating Committees' Mid-Columbia Subyearling Chinook Survival Study Workshop scheduled for the morning of Tuesday, November 24. This meeting is currently scheduled for the Radisson Gateway Hotel in SeaTac from 8:00 am to 2:00 pm (same location as today's meeting). Attendance to this workshop will be limited to the members of the Wells, Rocky Reach, and Rock Island HCP Coordinating Committees, the Priest Rapids Coordinating Committees, and up to four members of their staff. Schiewe will confirm the dates and times with these groups in the next few days.

B. Next Meetings

The next scheduled Coordinating Committees meetings are as follows: November 24, December 15, and January 26; all meetings will be in SeaTac. The November meeting will be an all-day meeting to facilitate inclusion of the subyearling information in the morning/early afternoon and the Coordinating Committees meeting in the late afternoon.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Steve Hemstrom *	Chelan PUD
Lance Keller	Chelan PUD
Joe Miller	Chelan PUD
Jerry Marco *	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Bryan Nordlund *	NMFS
John Skalski	UW
Rich Townsend	UW
Bill Tweit *	WDFW
Bob Rose *	Yakama Nation

* Denotes Coordinating Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Coordinating Committees	**Date:**	January 19, 2010
From:	Michael Schiewe, Chair, HCP Coordinating Committees		
Cc:	Ali Wick		
Re:	Final Minutes of November 24, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met on Tuesday, November 24, 2009, from 2:30 pm to 4:30 pm at the Radisson Gateway Hotel in SeaTac, Washington.

ACTION ITEM SUMMARY

- Keith Truscott will send out the proposed 2010 Rock Island HCP Yearling Chinook Study Plan (Item III-D).

DECISION SUMMARY

- The Rock Island Coordinating Committee approved the Statement of Agreement (SOA) "Approval of 2009 Rock Island Phase Designation Survival Study results (10% spill study) with tagger-affected sockeye removed from the survival analyses" (see Attachment B).

I. Welcome

The Coordinating Committees approved the October 27 meeting minutes with revisions. Ali Wick will distribute the final minutes to the Committees.

II. Douglas PUD

A. Modification of Rocky Reach Juvenile Bypass for PIT-Tag Detector

Tom Kahler showed conceptual plans for modification of the flow spreaders at the Rocky Reach juvenile bypass to accommodate antennas for PIT-tag detection. Bryan Nordlund provided his approval for the concept prior to the meeting, and there were no additional questions or comments from the rest of the committee on this conceptual design. The

Coordinating Committees approved Douglas PUD moving forward with design and implementation of this modification.

III. Chelan PUD

A. DECISION ITEM: 2009 Rock Island Sockeye Study Results with Tagger Affected Fish Removed

Steve Hemstrom introduced this SOA for decision at this meeting. He and John Skalski had an action item from the last meeting to develop and include in the Rock Island study report a protocol for handling tag and tagger effects for this year's study and for future studies. This has been done and included in the draft report. The Coordinating Committees approved the SOA (Attachment B). The Committees will provide any comments to Chelan PUD before the December 15 meeting; the draft report will be considered for approval at the December meeting.

B. Discussion of a Draft 2009 SOA approving Rock Island Sockeye Phase III Standard Achieved Under 10% Spill Operation

Keith Truscott introduced for discussion at this meeting an SOA for approval of Phase III (Standard Achieved) for sockeye under a 10 percent spill operation. Truscott asked for comments on this SOA from Coordinating Committees members prior to the next meeting; the SOA will be considered for approval at the next meeting.

C. Update and Schedule for 2010/2011 Rocky Reach Adult Fishway Maintenance Outage with AWS Pump Overhaul

Keith Truscott updated the group that the Rocky Reach fishway will be dewatered from December 1 through March 1 to replace a shaft on the attraction water system (AWS) pump. There were no concerns from the Rocky Reach Committee about this activity.

D. Summary of Proposed 2010 Rock Island HCP Yearling Chinook Study

Keith Truscott said that Chelan PUD has begun planning the 2010 yearling Chinook study and asked for any preliminary Coordinating Committees' feedback. One key difference between 2010 and previous years will be that a representative portion of the tagged Chinook will be released off the mouth of the Wenatchee River, based on the proportion of fish entering the Rock Island pool from that location, and a portion of fish will be released in the Rocky Reach tailrace based on the appropriate proportion entering from above Rocky Reach. Prior HCP studies at Rock Island estimated survival of smolts originating only from above

Rocky Reach Dam (represented by Rocky Reach tailrace releases only), without survival representation for a large proportion of Chinook smolts (56 percent) entering further downstream from the Wenatchee River. Chelan PUD will finalize the proposal and Truscott will distribute a full draft study plan to the Committees. The study plan will be up for approval in early 2010.

Keith Truscott said that Chelan PUD will also be completing a day/night study at Rocky Reach in 2010 for yearling Chinook that mirrors the project operations and study protocol of the 2009 Rocky Reach day/night study that was performed with sockeye. Steve Hemstrom said that route-specific reports for sockeye at Rocky Reach will be distributed soon.

IV. Tributary and Hatchery Committees Update

Mike Schiewe updated the group that the Tributary Committees have 13 applications to review under the 2009 General Salmon Habitat Program and will make funding decisions in January 2010. The Tributary Committees also are discussing the issue of potentially allowing use of Tributary Funds for acquisition of lands for hatchery production systems or facilities. There has not been a decision on this issue at this time.

Mike Schiewe updated the group of the following discussions/actions that occurred at the recent Hatchery Committees meeting:

- The Hatchery Committees concurred with Washington Department of Fish and Wildlife's (WDFW's) recommendation to cull approximately 26,000 Chiwawa spring Chinook eggs from female broodstock that tested "high" BKD.
- The Hatchery Committees concurred with WDFW's recommendation to cull 57,000 Methow composite spring Chinook eggs that are excess to program needs at Methow Hatchery unless another HCP use can be identified before close of business Tuesday, December 1.
- Douglas PUD is continuing to work with WDFW on steelhead and spring Chinook Hatchery Genetic Management Plans (HGMPs).
- The Hatchery Committees approved the WDFW/Northwest Fisheries Science Center (NWFSC) Wenatchee Steelhead Spawning Success Study.
- The Hatchery Committees will soon be considering a SOA reducing Chiwawa spring Chinook production, and a linked SOA for pilot-scale testing of parental based tagging.

- Chelan PUD is re-evaluating the need for the new water right for the Chiwawa steelhead acclimation ponds.
- Chelan PUD is ready to move forward on final design and construction for the summer Chinook program at Chelan Falls, and is working with National Marine Fisheries Service (NMFS) to resolve any permitting issues.
- USFWS reported the removal of 62 Leavenworth National Fish Hatchery (NFH) spring Chinook adults at Tumwater in 2009.
- The potential transfer of 200,000 spring Chinook from Winthrop Hatchery to the Colvilles was cancelled due to some unforeseen Endangered Species Act (ESA) issues.
- There is a workgroup investigating protocols for handling hatchery adults at Tumwater Dam that are in excess to broodstock or natural spawning needs.
- The Hatchery Evaluation Technical Team (HETT) is currently working on the risk template for the Non-Target Taxa of Concern (NTTOC) process; this template will be available in January or February for Hatchery Committees review. For control groups, the HETT is completing the analysis and will have that to present to the Hatchery Committees by approximately March 2010.

V. HCP Administration

A. Meeting Agreements not Requiring an SOA

The Coordinating Committees approved Douglas PUD moving forward with design and implementation of the modification of the flow spreader at the Rocky Reach juvenile bypass to accommodate the PIT-tag detection antennas.

B. Next Meetings

The next scheduled Coordinating Committees meeting will be on December 15 in Wenatchee. The two meetings after that (January 26 and February 23) will be in SeaTac.

List of Attachments

Attachment A – List of Attendees

Attachment B – Final Statement of Agreement - Rock Island HCP Coordinating Committee Approval of 2009 Rock Island Phase Designation Survival Study results (10% spill study) with tagger-affected sockeye removed from survival analyses

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Steve Hemstrom *	Chelan PUD
Keith Truscott *	Chelan PUD
Joe Miller	Chelan PUD
Jerry Marco *	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Josh Murauskas	Douglas PUD
Shane Bickford *	Douglas PUD
Bryan Nordlund *	NMFS
Jim Craig *	USFWS
Bill Tweit *	WDFW
Bob Rose *	Yakama Nation

* Denotes Coordinating Committees member or alternate

Attachment B

FINAL
Statement of Agreement
Rock Island HCP Coordinating Committee
Approval of 2009 Rock Island Phase Designation Survival Study results (10% spill study) with tagger-affected sockeye removed from survival analyses

November 24, 2009

Agreement Statement

The Rock Island HCP Coordinating Committee (RICC) has reviewed tagging and survival data for all juvenile sockeye used in Chelan PUD's 2009 Phase Designation study at Rock Island under a10% spill operation. On October 27, 2009, the RICC determined that an obvious and statistically significant tagger effect (bias) was expressed in juvenile sockeye tagged by one of the three fish tagging teams in the 2009 study (Skalski et al. 2009), and that these fish can and should be removed from the paired-release analysis to estimate Project survival for juvenile sockeye at Rock Island in 2009. The RICC also agrees that the 2009 Rock Island sockeye study will remain a valid Habitat Conservation Plan (HCP) study given that both the Project survival estimate (0.9457) and the necessary HCP study precision (0.0159) were met with the affected fish removed. The RICC requests that results of the tagger effect analysis be appended to the 2009 Rock Island Survival Study report and Chelan PUD agrees to provide this as an appendix to the report.

Background
2009 marked the third year of survival testing for juvenile sockeye at Rock Island Dam in accordance with the Rock Island HCP under an alternative 10% spill level. Two paired-release studies (2008 and 2009) and one single-release study (2007) were conducted by Chelan PUD to test juvenile Project survival for sockeye. In 2009, significantly lower survival was observed for all groups of fish tagged by one tagger during the 24-day study (approximately 1/3 of the study fish). The effect was readily apparent at all four fish release locations used in the study, and was statistically significant when compared to survival of fish tagged by the other two fish taggers at the same four locations. A thorough analysis of individual tagger results was completed by John Skalski which showed that this tagger effect introduced a strong undesirable bias to the study. Chelan conducted a review of tagging procedures and determined that one tagger deviated consistently from tag surgery/anesthesia protocols which likely resulted in the poor survival of affected release groups. Skalski presented and discussed these results of the analyses with the RICC on October 27, 2009. Due to the very high detection efficiency of each of the acoustic detection arrays downstream of release sites, the study precision remained high with affected fish removed , and the Project survival estimate exceeded the 93% juvenile survival standard required by the HCP.

References:
Skalski, J.R., R.L. Townsend, T. W. Steig, and P. A. Nealson. 2009. Survival of Sockeye Salmon Smolts through the Rock Island Project in 2009. Prepared for: Public Utility District No. 1 of Chelan County.

Table 1. Summary of Results for HCP Phase Designation Survival Studies (standard errors in parentheses) at Rock Island under a 10% Spill Level.

Species	2007	2008	2009	**3-Year Average**
Sockeye	.9188^ (.0123)	.9335 (.0129)	.9457 (.0159)	.9327
Yearling Chinook	.9725 (.0185)	.8972 (.0157)	Study suspended*	NA
Steelhead	NA	.9699 (.0103)	Study suspended*	NA

^Single-Release Estimate
*Study started but suspended due to malfunction of acoustic tags used for Chinook and Steelhead

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Coordinating Committees	**Date:**	January 26, 2010
From:	Michael Schiewe, Chair, HCP Coordinating Committees		
Cc:	Ali Wick		
Re:	Final Minutes of December 15, 2009 HCP Coordinating Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met on Tuesday, December 15, 2009, from 12:30 pm to 2:30 pm at Chelan PUD in Wenatchee, Washington. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- The Coordinating Committees will send any edits on the subyearling workshop minutes to Ali Wick by January 19 (Item I-A).
- The Coordinating Committees will send any edits on the Draft 2009 Rocky Reach Juvenile Sockeye Day/Night Survival Study Report to Chelan PUD by January 15 (Item II-B).
- Chelan PUD will send out the 2010 Rock Island Yearling Chinook Study Plan (Item II-C).

DECISION SUMMARY

- The Rock Island Coordinating Committee approved the Statement of Agreement (SOA) for Phase III HCP Standards Achieved for Juvenile Sockeye at Rock Island Project (Item II-A).

I. Welcome

The Coordinating Committees discussed the November 24, 2009 meeting minutes. Jim Craig said that he will need additional time to review these. If there are not substantial edits from him, Ali Wick will distribute the final minutes to the group following his review. If there are substantial edits, Wick will send the revised minutes out for email approval.

Mike Schiewe noted that the minutes from this meeting and the minutes from the subyearling workshop that also occurred on November 24 were separated into two documents instead of one. The Committees said that they will need additional review time for the subyearling workshop minutes. They agreed to provide comments to Ali Wick by January 19 for considerations at the next meeting.

II. Chelan PUD

A. DECISION ITEM: SOA, Phase III HCP Standards Achieved for Juvenile Sockeye at Rock Island Project

Steve Hemstrom introduced the SOA for Phase III HCP Standards Achieved for juvenile sockeye at the Rock Island Project, for decision at this meeting. The Coordinating Committees approved the SOA with minor edits (Attachment B).

B. Draft 2009 Rocky Reach Juvenile Sockeye Day/Night Survival Study Report

This report has been distributed to the Coordinating Committees for review; final comments are due January 15 to Chelan PUD. Bryan Nordlund provided several comments for Steve Hemstrom to consider for incorporation into the final report.

C. Status of Rock Island Yearling Chinook Study Plan 2010

Keith Truscott updated the group that Chelan PUD is currently planning the 2010 yearling Chinook 10 percent spill survival study at Rock Island Dam. Chelan PUD will have this completed soon and will distribute a full draft study plan to the Coordinating Committees for their review and approval in early 2010.

D. PIT-Tag Monitoring Equipment at Rocky Reach and Rock Island Fishways

Keith Truscott said that Chelan PUD is moving forward on acquiring and installing half duplex passive integrated transponder tag (PIT-tag) monitoring equipment at Rock Island and Rocky Reach fishways.

E. HTI Route-Specific Passage Report

Steve Hemstrom updated the group that he will soon be sending the Coordinating Committees the route-specific passage report for 2009.

F. Rocky Reach Fish Forum

Keith Truscott made a suggestion that he could provide notes from the Rocky Reach Fish Forum group meetings to the Coordinating Committees. The Committees agreed that they would like to be provided these minutes.

III. Douglas PUD

A. Wells Fish Ladder De-Watering

Tom Kahler updated the group that the Wells east fish ladder would be dewatered for yearly maintenance starting on December 22. As usual, as part of this work, fish remaining in the ladder after de-watering will be removed and returned to the river. Bryan Nordlund asked Kahler to verify that there are no gaps between the collection gallery and the auxiliary water supply chamber that could entrain fish, and Kahler agreed to do so. Kahler added that west ladder maintenance work will occur in January 2010.

B. Discussion of Design for West Ladder Fish Return Pipe Plan

Tom Kahler updated the group that Douglas PUD has designed a pipe system to return fish to the west ladder. The function of this pipe is to return fish to the river that have been trapped but are not used for broodstock. Bryan Nordlund suggested that Kahler may want to connect with Kris Petersen on this action, and Kahler said that he would. The Coordinating Committees discussed that there was no need for formal Committees' approval for these drawings, and agreed that Douglas PUD may move forward with this design.

IV. Tributary and Hatchery Committees Update

Mike Schiewe updated the group that the Tributary Committees will not meet until January 2010 and will be making 2009 funding decisions at that time. The Hatchery Committees will meet tomorrow (December 16), so there is no update today.

V. HCP Administration

A. Next Meetings

The next scheduled Coordinating Committees meeting will be on January 26, February 23, and March 23, all in SeaTac.

List of Attachments

Attachment A – List of Attendees

Attachment B – Statement of Agreement, Rock Island HCP Coordinating Committee Approval of Rock Island Sockeye Phase III Standards Achieved with 10% Project Spill

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Steve Hemstrom *	Chelan PUD
Keith Truscott *	Chelan PUD
Jerry Marco * (by phone)	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Bryan Nordlund * (by phone)	NMFS
Jim Craig *	USFWS
Teresa Scott * (by phone)	WDFW

* Denotes Coordinating Committees member or alternate

Attachment B

Final
Statement of Agreement
Rock Island HCP Coordinating Committee
Approval of Rock Island sockeye Phase III Standards Achieved with 10% Project spill

(Approved December 15, 2009 HCP CC Meeting)

Agreement Statement

The Rock Island HCP Coordinating Committee (RICC) agrees that Chelan PUD (Chelan) has conducted three years of valid HCP studies (2007-2009) with juvenile sockeye at the Rock Island Project with a 10% spill level. The RICC agrees that Chelan may move to Phase III Standard Achieved for juvenile sockeye at Rock Island with a 10% Project spill level.

Background
In 2009, Chelan completed the third year of survival testing for juvenile sockeye at Rock Island Project in accordance with the Rock Island HCP under an alternative 10% spill level. One single release study (2007) and two paired release studies (2008 and 2009) yielded Project Survival estimates of 0.9188, 0.9335 and 0.9457, respectively. Each study achieved the necessary precision of $\leq 2.5\%$. The three-year (2007-2009) arithmetic mean for these juvenile sockeye studies is 93.27%, exceeding the HCP Juvenile Project Survival Standard of 93%.

Table 1. Summary of Results for HCP Phase Designation Survival Studies (standard error in parentheses) at Rock Island under a 10% Spill Level.

Species	**2007**	**2008**	**2009**	**3-Year Average**
Sockeye	.9188^ (.0123)	.9335 (.0129)	.9457 (.0159)	**.9327**
Yearling Chinook	.9725 (.0185)	.8972 (.0157)	Study suspended*	NA
Steelhead	NA	.9699 (.0103)	Study suspended*	NA

^Single-Release Estimate
*Study started but suspended due to malfunction of acoustic tags used for Chinook and Steelhead

APPENDIX B
HABITAT CONSERVATION PLAN HATCHERY COMMITTEES MEETING MINUTES AND CONFERENCE CALL MINUTES

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	February 18, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Julie Pyper, Tom Kahler, Steve Hays, and Joe Miller		
Re:	Final Minutes of January 21, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at the Chelan PUD offices in Wenatchee, Washington, on Wednesday, January 21, 2009, from 9:30 am to 4:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Ali Wick will send out the final document *Summary and Strategy for Monitoring and Evaluation Plan Objective 10 (NTTOC),* with the edits made at today's meeting (Item II-A). (Attachment B)
- Julie Pyper and Alene Underwood, in coordination with Douglas PUD, will summarize the process for contracting for HCP studies for their respective PUDs, for the Hatchery Committees' information (Item II-C).
- Mike Schiewe will compile information on the scientific peer review and evaluation process used by other funding entities, with a special emphasis on the ranking criteria that they utilize (Item II-C).
- The Hatchery Committees will provide feedback on the Hatchery Committees study evaluation flowchart by February 4 (Item II-C).
- Kirk Truscott will provide today's WDFW handout on goals and objectives for the steelhead reproductive success study to Ali Wick for group distribution (Item II-D).
- Hatchery Committees members will provide recommended changes/comments on the Washington Department of Fish and Wildlife (WDFW) steelhead study handout to Ali Wick for group review by February 4 (Item II-D).

- Hatchery Committees members will provide any comments to Douglas PUD on the 2009 Wells HCP Action Plan by February 4 (Item III-A).
- Joe Miller will provide details on Chelan PUD's proposed approach for evaluating detection efficiency for the sockeye escapement study at the next meeting (Item IV-C).

DECISION SUMMARY

- The Committees agreed to allocate 800 – 1,000 summer Chinook from the Pilot Water Re-Use Study for a study on precocity and fatty livers.
- The Committees agreed that Chelan PUD should PIT-tag 10,000 fish per group for the 2009 Pilot Water Re-Use study.

I. Welcome

The Hatchery Committees approved the December 17, 2008 Meeting Minutes and confirmed the approval of the December 4, 2008 Conference Call Minutes; Ali Wick will distribute the final Minutes to the Hatchery Committees.

II. All Committees

A. NTTOC

The Hatchery Committees discussed the document *Summary and Strategy for Monitoring and Evaluation Plan Objective 10 (NTTOC),* which was previously sent out to memorialize the October 2008 Committees decision on Non-Target Taxa of Concern (NTTOC). Todd Pearsons suggested coordinating the NTTOC expert panel analyses for HCP programs' Plan Species with the Priest Rapids Hatchery Subcommittee NTTOC analyses. Because both Committees would be conducting similar analyses, conducting them at the same time and place would more efficient. Pearsons confirmed that the PRCC Subcommittee would be finalizing the details of their NTTOC process soon. Mike Schiewe said that he would be open to the coordination of both processes, provided they align similarly in content (species to be analyzed and containment objectives).

The Committees discussed whether to remove Little Wenatchee spring Chinook from the Wenatchee sockeye analysis, for the sake of consistency, or to add it to the list of interactions for other Wenatchee basin species. Currently, Little Wenatchee spring Chinook are not listed as a species of potential interaction with other species groups except for the sockeye group, which was an oversight when preparing the document. The Committees agreed to

add it to the other species groups in the Wenatchee Basin. Ali Wick will send out the final document with this update (Attachment B).

B. HGMP Update and Schedule

Rob Jones of NMFS called in to the meeting for this discussion. Mike Schiewe said that he had sent the National Marine Fisheries Service (NMFS) a letter in late December requesting a revision of the schedule for completing the Hatchery Genetic Management Plans (HGMPs), and that NMFS had agreed to the new schedule; Rob Jones was calling in today to confirm NMFS agreement. Rob Jones then confirmed that NMFS concurs with the revised schedule in the letter; the new completion dates are March 2009 for Wenatchee steelhead and May 2009 for Chiwawa spring Chinook salmon.

Mike Schiewe then summarized the January 7 meeting of the HGMP workgroup (which included staff from Chelan PUD, WDFW, and NMFS), and reviewed the new schedule, which, for reference, was included as part of the notes from the January HGMP meeting. Rob Jones indicated that NMFS would be sending out by the end of next week a list of key considerations that NMFS will weigh when reviewing the HGMPs. He expects that this list will be helpful to the group preparing the HGMPs. Regarding schedule, Jerry Marco said that the Colville Tribes are particularly interested in the Wenatchee spring Chinook HGMP and want to make sure that they have adequate time to review the proposed management plan being jointly developed by WDFW and the Yakama Nation (YN). This comment prompted a discussion about YN and WDFW progress in preparing the spring Chinook management plan and the accompanying implementation plan. Keely Murdoch said that the process has been delayed by some policy issues and genetics questions that needed to be addressed. The expected date of release has been changed from the end of January to the first or second week of February. Mike Schiewe suggested that when complete, the YN/WDFW should provide the plan to NMFS and the Hatchery Committees at the same time, which would help provide some extra time for the review by the Committees (including the Colville Tribes). Murdoch agreed, and said that she will ask the YN/WDFW to do this. Rob Jones indicated that NMFS concurred with this approach,

C. Hatchery Committees Protocol for Developing and Reviewing Study Plans

Mike Schiewe introduced this topic by noting that the Hatchery Committees did not have a formal protocol for developing study plans and soliciting proposals, nor for reviewing, ranking, and funding research study plans. The Committees acknowledged this need, and

discussed developing a formal process, including establishing a priori technical criteria that would be used judge the technical merits and acceptability of a proposal. Schiewe provided a flowchart for discussion that showed a conceptual approval and implementation process for HCP studies. Julie Pyper and Alene Underwood, in coordination with Douglas PUD, will summarize the processes for contracting for HCP studies for their respective PUDs; Pyper noted that the PUDs have strict contracting regulations that the Committees should be aware of. Regarding the technical review, Mike Schiewe will compile information on the scientific peer review and evaluation process used by other funding entities, with a special emphasis on the ranking criteria that they utilize. Schiewe asked for feedback by February 4 from Committees members on the flowchart handed out today. Schiewe then indicated that an additional aspect of the review process that would need to be addressed was a mechanism for dealing with potential bias and conflict of interest. The Committees provided preliminary thoughts on this topic, and will have a more robust discussion at upcoming meetings. The final criteria and flowchart as eventually agreed upon will be an addendum to the Hatchery Committees Operating Protocols that were approved in 2005.

D. Steelhead Reproductive Success Study

Mike Schiewe initiated a discussion on goals and objectives for the steelhead reproductive success study. The Hatchery Committees previously agreed to bring these goals and objectives to this meeting. Joe Miller provided a handout that included some possible hypotheses that might be tested in a steelhead reproductive success study and how different results of testing might be interpreted. Steve Hayes emphasized that it was important that HCP research produce information that could be applied to HCP hatchery programs. Kirk Truscott provided a handout with some goals and objectives that WDFW had developed. Truscott will send this handout to Ali Wick for group distribution. Committee members will provide recommended changes/comments on the WDFW handout to Ali Wick by February 4, and for discussion at the next meeting. Seaman asked that the Committees review Joe Miller's objectives for consideration in providing their comments.

III. Douglas PUD

A. 2009 Wells HCP Action Plan

Rick Klinge noted that the 2009 Wells HCP Action Plan has been sent out for review and comment. Comments are due by February 4. The document will be up for approval at the February meeting.

B. Grant PUD Request for Hatchery Access in 2009

Rick Klinge provided a memorandum from Grant PUD describing Grant PUD's recent request for hatchery production at Douglas PUD facilities in 2009. This has been provided for the Hatchery Committees' information. This request will be up for approval at the February meeting.

IV. Chelan PUD

A. Hatchery Induced Life History Variability Study

Mike Schiewe said that Kris Petersen had informed him that she has sent to Brian Beckman and Don Larsen of NMFS the Hatchery Committees' comments on the Beckman/Larsen study plan to evaluate selected hatchery populations for proportions of male fish likely to undergo early maturation. Beckman and Larsen have reviewed those comments and are preparing a response, which Petersen will share with the Committees.

B. Testing Pilot Study Fish for Precocity

Joe Miller informed the Hatchery Committees that Chelan PUD would like to test the fish produced in the Pilot Water Re-Use Study (summer Chinook) for precocity and fatty livers. The test would be completed similarly to the process proposed in the Beckman/Larsen study (see Item IV-A). The sacrifice of approximately 800 to 1,000 fish would be needed for this testing. Chelan PUD will send out more information to the Committees on the test details. The Committee agreed to use the fish for this study.

C. Sockeye Escapement Study Update

Joe Miller gave an update on the sockeye escapement study, saying that the final logistical details are being worked out. Chelan PUD is in the process of purchasing the Passive Integrated Transponder tags (PIT-tags). Miller said that the timeline will be finalized once the contracts are in place. He agreed to provide the Hatchery Committees with additional details on an approach for evaluating PIT-tag detection efficiencies at the next meeting.

D. PIT-tags for 2009 Pilot Water Re-Use Study

Joe Miller updated the group that he has contacted John Skalski about the numbers of PIT-tags needed for the 2009 Pilot Water Re-Use study, and in particular how reduced detection probabilities at McNary Dam would affect the statistical power. Miller summarized that while the detection efficiency is changing slightly at McNary Dam because of the temporary spillway weirs (TSWs), the study numbers are still expected to provide results similar to

2008. The Committee agreed that Chelan PUD should tag 10,000 fish per group as previously planned.

E. Hatchery Program Summary

Julie Pyper said that Chelan PUD had sent out the Hatchery Program Summary earlier this month. For the Chelan Falls and Chiwawa rearing facilities, Chelan PUD is nearing a 30 percent design for both projects. In addition, Chelan PUD is considering a land swap with the U.S. Forest Service (USFS) to acquire the property on which the Chiwawa rearing facilities (for both spring Chinook and summer steelhead) is located. Currently, Chelan PUD has access to this property through a special use permit with the USFS.

F. Meetings with BPA

Shaun Seaman said that Chelan PUD would be meeting on February 6 with Bonneville Power Administration (BPA) to better understand the programs that BPA will be funding under the Federal Columbia River Power System (FCRPS) Biological Opinion and the recent Tribal Fish Accord Memorandums of Agreement.

G. Blackbird Island Pond

Shaun Seaman updated the group that Blackbird Island Pond in-ground facilities have been completed and that they were ready for use in early 2009. Work on other equipment such as the pump station is progressing over the winter.

V. Colville Tribes

A. Bonaparte Pond Update

Jerry Marco provided an update on the Colville Tribes development of a well water supply to minimize ice formation at Bonaparte Pond. He indicated that as the temperature dropped in December, a small snow-covered island of ice had formed in the pond prior to the addition of groundwater, but that once some warmer groundwater was added, the ice had melted. The pond water is currently at approximately 37 degrees F. Air temperatures have ranged from 0 to mid-30s degrees F. The Tribes intend to keep operating the pond as planned and do not anticipate any temperature problems. Marco also said that some goldeneye ducks have been able to penetrate the avian netting; approximately 170 dead fish have been observed, not counting bird predation. Overall, fish health exams have been excellent.

VI. WDFW

A. Broodstock Collection Protocol Schedule

Kirk Truscott gave an update on the schedule for broodstock collection protocols. He will provide his first draft to the Hatchery Committees by the end of February. The review and comment period will be approximately 2 weeks, and then the document will be finalized at the March Hatchery Committee meeting in order to meet the April 15 NMFS submittal deadline. Keely Murdoch commented that the YN's coho broodstock collection protocols are not due to NMFS until June, so those will be provided at a later point.

VII. Yakama Nation

A. Coho Master Plan

Keely Murdoch said that the YN is planning public meetings for the National Environmental Policy Act (NEPA) process and preparation of an Environmental Impact Statement (EIS) for the Coho Master Plan.

B. Multi-Species Acclimation in YN Memorandum of Agreement

Keely Murdoch said that the YN is working toward contracting in March for preparation of a formal proposal for multi-species acclimation (spring Chinook and steelhead), which is an action identified in the YN Memorandum of Agreement (MOA). The YN will be working with Anchor staff to help write the plan.

C. Kelt Reconditioning

Regarding the YN's plan to recondition kelts, Keely Murdoch said that the YN is currently working with the USFS on facilities issues. She also said that the YN would like to organize a meeting with WDFW and USFWS to discuss fish health concerns.

VIII. HCP Administration

A. Next Meetings

The next scheduled Hatchery Committees meetings are as follows: February 18, March 18, and April 15; all meetings are at the Chelan PUD offices in Wenatchee. The HGMP Workgroup will be meeting on February 10 and March 11.

List of Attachments

Attachment A – List of Attendees

Attachment B - Summary and Strategy for Monitoring and Evaluation Plan Objective 10 (NTTOC)

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor Environmental, L.L.C.
Ali Wick	Anchor Environmental, L.L.C.
Shaun Seaman *	Chelan PUD
Julie Pyper *	Chelan PUD
Joe Miller	Chelan PUD
Steve Hays	Chelan PUD
Jerry Marco *	Colville Tribes
Rick Klinge *	Douglas PUD
Tom Kahler	Douglas PUD
Todd Pearsons	Grant PUD
Rob Jones * (10-11 am by conference call)	NMFS
Bill Gale *	USFWS
Pat Phillips	WDFW
Kirk Truscott *	WDFW
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

Attachment B

FINAL

Rocky Reach, Rock Island, and Wells HCP Hatchery Committees
Summary and Strategy for Monitoring and Evaluation Plan Objective 10 (NTTOC)

January 22, 2009

Over the past year, the HCP Hatchery Committees considered several approaches and methods for addressing Objective 10 of the Chelan and Douglas PUD M&E Plans. Objective 10 directs the Committees to evaluate the potential effects of hatchery supplementation on non-target taxa:

- **Chelan PUD** Objective 10: Determine if ecological interactions attributed to hatchery fish reduce the abundance, size, or distribution of non-target taxa (NTT).
- **Douglas PUD** Objective 10: Determine if the release of hatchery fish impact non-target taxa of concern (NTTOC) within acceptable limits.

At the October 15, 2008 Hatchery Committees meeting, the members agreed to convene an expert panel to conduct a preliminary evaluation of potential effects of supplemented Plan Species on non-target taxa using an approach similar to that used in the Yakima Basin (Ham and Pearsons, 2001, Fisheries 26: 15-23). The Committees agreed to convene the panel in spring or early summer 2009, and focus this initial effort on HCP Plan Species and the two non-Plan Species westslope cutthroat trout and lamprey. The Hatchery Committees explicitly discussed the addition of bull trout to the list of species to be considered, but agreed that a recently completed Biological Opinion by USFWS had already considered this species' interactions. It was agreed that containment objectives will include broad categories of percent ranges within which impacts are acceptable, and will not include a 0% category because that would be difficult, if not impossible, to verify. The table below summarizes species interactions, containment objectives for non-target species, and individuals identified as possessing the expertise to contribute as panel members.

Summary of NTTOC Interactions

Hatchery program and NTT with spatial overlap	Containment Objective Category[1]	List of Potential Panel Members (will include HETT)[2]
Wenatchee steelhead		
Chiwawa spring Chinook	L	Todd Pearsons
Nason spring Chinook	L	
Westslope cutthroat	M	
Summer Chinook	L	
Pacific lamprey	VL	
Ltl. Wen. spring Chinook	VL	
Wenatchee sockeye	L	
Chiwawa spring Chinook		
Chiwawa steelhead	VL	Todd Pearsons
Nason spring Chinook	VL	
Westslope cutthroat	M	
Summer Chinook	L	
Pacific lamprey	VL	
Ltl. Wen. spring Chinook	VL	
Wenatchee sockeye	L	
Wenatchee sockeye		
Wenatchee steelhead	VL	Todd Pearsons
White spring Chinook	VL	
Ltl. Wen. spring Chinook	VL	
Westslope cuttroat	M	
Summer Chinook	L	
Turtle Rock summer Chinook		
Summer Chinook	L	Todd Pearsons
Wenatchee summer Chinook	L	
Wenatchee steelhead	VL	
Wen. spring Chinook	VL	
Westslope cutthroat	M	
Ltl. Wen. spring Chinook	VL	
Pacific lamprey	VL	
Wenatchee sockeye	L	
Methow summer Chinook		
Methow steelhead	VL	Todd Pearsons Jenny Molesworth Charlie Snow John Jorgenson
Methow spring Chinook	VL	
Westslope cutthroat	M	
Pacific lamprey	VL	
Okanogan summer Chinook		
Okanogan steelhead	VL	Todd Pearsons John Arterburn
Pacific lamprey	VL	
Okanogan sockeye	L	

[1] "Categories" is defined as Moderate (M; ll to 41%), Low (L; 6 to 10%), and Very low (VL; 5% or less), and does not include a No Impact (0%) objective that would be difficult (if not impossible) to verify.

[2] Preliminary list of panel members. Panel will be finalized during planning for this expert panel meeting.

Hatchery program and NTT with spatial overlap	Containment Objective Category[1]	List of Potential Panel Members (will include HETT)[2]
Upper Columbia coho		
Spring Chinook	VL	None identified at this time
Steelhead	VL	
Ltl. Wen. spring Chinook	VL	
Wenatchee sockeye	L	
Twisp spring Chinook		
Methow spring Chinook	VL	
Chewuch spring Chinook	VL	
Methow steelhead	VL	Todd Pearsons Jenny Molesworth Charlie Snow John Jorgenson
Summer Chinook	L	
Westslope cutthroat	M	
Pacific lamprey	VL	
MetComp spring Chinook		
Twisp spring Chinook	VL	Todd Pearsons Jenny Molesworth Charlie Snow John Jorgensen
Summer Chinook	L	
Methow steelhead	VL	
Westslope cutthroat	M	
Pacific lamprey	VL	
Wells steelhead		
Methow spring Chinook	VL	Todd Pearsons Jenny Molesworth Charlie Snow John Jorgensen John Arterburn
Chewuch spring Chinook	VL	
Twisp spring Chinook	VL	
Summer Chinook	L	
Methow steelhead	VL	
Okanogan steelhead	VL	
Okanogan sockeye	L	
Westslope cutthroat	M	
Pacific lamprey	VL	
Wells summer Chinook		
Spring Chinook	VL	Todd Pearsons Jenny Molesworth Charlie Snow John Jorgensen John Arterburn
Summer Chinook	L	
Methow steelhead	VL	
Okanogan steelhead	VL	
Okanogan sockeye	L	
Westslope cutthroat	M	
Pacific lamprey	VL	

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	March 18, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Alene Underwood, Julie Pyper, Steve Hays, Bob Pfeifer, and Joe Miller		
Re:	Final Minutes of February 18, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at the Chelan PUD offices in Wenatchee, Washington, on Wednesday, February 18, 2009, from 9:30 am to 4:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Mike Schiewe asked the Hatchery Committees to review the draft flowchart and protocol for Hatchery Committees study review and provide feedback by March 4 (Item II-C).
- Julie Pyper will provide the Integrated Hatchery Improvement Program (IHIP) summary to Ali Wick for distribution to the Hatchery Committees, and will provide hard copies to Kris Petersen, Tom Scribner, and Keely Murdoch (Item III-A).
- Joe Miller will send to Ali Wick for distribution the handout that discusses estimation of Passive Integrated Transponder tag (PIT-tag) array efficiency for the Wenatchee sockeye enumeration study (Item III-C).
- Jerry Marco will check with the Colville Tribes staff regarding their interest in supporting installation of a PIT-tag detection array at Zoesel Dam (Item III-D).
- The Hatchery Committees will provide feedback on the 2009 Chelan PUD Action Plan by March 4 (Item III-F).
- Tom Kahler will circulate for Hatchery Committees' review the spreadsheet comparing alternative approaches to reproductive success studies (Item IV-B).
- Douglas PUD will work with Andrew Murdoch to refine the design of the Methow basin reproductive success study, for discussion at the next meeting (Item IV-B).

- Rick Klinge will provide the final 2009 Douglas PUD Action Plan to Ali Wick for distribution (Item IV-D).

DECISION SUMMARY

- The Hatchery Committees approved the annual agreement for Douglas PUD to rear 80,000 summer steelhead at Wells Hatchery and 201,000 spring Chinook at the Methow Hatchery on behalf of Grant PUD (Item IV-E).

I. Welcome

The Hatchery Committees approved the January 21, 2009 Meeting Minutes; Ali Wick will distribute the final Minutes to the Hatchery Committees.

II. All Committees

A. HSRG Update

Tom Scribner said that the Hatchery Scientific Review Group (HSRG) will be meeting with Representative Norm Dicks and other legislative officials in Portland on March 27, 2009, to summarize their findings, and will be finalizing the HSRG recommendations that were sent out in draft form in November 2008.

B. HGMP Update

Wenatchee steelhead

Kirk Truscott summarized that the Wenatchee steelhead Hatchery Genetic Management Plan (HGMP) Workgroup is discussing implementation of a two-zone approach to management in the basin, one for above and one for below Tumwater Dam. Tom Scribner said that in concept, this appears to be consistent with the Yakama Nation's goals, but he will need to discuss this internally and he looks forward to seeing the HGMP draft when it is available. Mike Schiewe updated the group that on February 26, the Hatchery Committees will receive the draft plan for a 10-day review period.

Chiwawa spring Chinook

It was agreed that Washington Department of Fish and Wildlife (WDFW) would defer sending a revised draft of the Chiwawa spring Chinook HGMP back to Chelan PUD for continuing review. There are several elements of the HGMP that depend on information that is being developed by WDFW and the Yakama Nation in their spring Chinook management implementation plan; Keely Murdoch said that their working group is within 2

weeks of sending the plan out for broader review (the first week of March). She gave a brief preview on the plan, for the Hatchery Committees' information. Her update focused on the targeted percent of natural and hatchery origin fish in the broodstock and the disposition of these fish once they arrive at Tumwater Dam. The Committees gave some preliminary feedback on this information and will discuss this further once the plan is available.

NOTE: The HGMP Workgroup meeting on March 3 is now cancelled and will be rescheduled once the spring Chinook management implementation plan is available.

C. Hatchery Committees Protocol for Developing and Reviewing Study Plans

Mike Schiewe reviewed additions to the flowchart and protocol for the development and review of study plans by the Hatchery Committees. This was an action item from the last meeting. He mentioned that the Committees may want to consider establishing time limits for completing the review steps. He also asked the Committees to look at the flowchart and protocol and provide feedback to him by March 4.

III. Chelan PUD

A. Integrated Hatchery Improvement Plan (IHIP)

Julie Pyper gave an update on Chelan PUD's progress on the Chelan PUD IHIP. She said that the IHIP is a comprehensive planning tool that will guide hatchery improvements over the coming years. It builds on the Hatchery Facility Evaluation Plan and Hatchery Committees decisions, and is intended to help the PUD meet long term resident and anadromous fish agreements, which include the HCPs as well as the Rocky Reach, Rock Island, and Lake Chelan Dam licenses. One of the key issues to address in developing this plan is to validate moving sockeye to Chelan Hatchery in a bio-secure facility (e.g., fish disease containment, vandalism protection). Sam Dilly is working on a feasibility study to look at this.

Julie Pyper will provide the IHIP to Ali Wick for distribution to the Hatchery Committees (Item III-A). She will provide hard copies to Kris Petersen, Tom Scribner, and Keely Murdoch.

B. Testing Pilot Study Fish for Precocity

The Hatchery Committees had previously agreed to complete precocity testing on pilot water re-use study fish. Sam Dilly said that Chelan PUD has identified a battery of clinical tests that will be conducted; the Committees said today that they agree with this testing plan.

C. Sockeye Escapement Study Update

Joe Miller distributed a handout that discusses approaches to estimating efficiency of the PIT-tag detection array for the Wenatchee sockeye escapement study. The handout also provides some key assumptions for determining the total number of fish to be PIT-tagged. He reviewed some of these assumptions to confirm Hatchery Committees' agreement. Miller will send the handout to Ali Wick for distribution, and the Committees will provide any feedback to him so that he can incorporate it into the final study design.

D. Update on Portland Meetings with Bonneville Power Administration

Shaun Seaman updated the group that Chelan PUD has met in Portland with Bonneville Power Administration (BPA) (Jeff Gislason and others) regarding coordination and potential project opportunities associated with the Federal Columbia River Power System (FCRPS) Biological Opinion and other recently signed agreements. Seaman said that Chelan initiated these meetings in order to foster collaboration between BPA and Chelan PUD regarding the projects that may be implemented under the Tribal Memoranda of Agreement (MOAs).

On this topic, Tom Scribner provided an update on preliminary discussions between Columbia River Inter-Tribal Fish Commission (CRITFC) and Chelan PUD regarding the possible installation of a PIT-tag array for adult detection in the fishway (or at additional sites) at Zoesel Dam in the Okanogan basin. He wanted to know whether the Colville Tribes would object to this project; Jerry Marco said that he did not know. Marco will check in with the Colville staff regarding their interest in supporting a PIT-tag array at Zoesel Dam.

E. Hatchery Program Summary

Julie Pyper answered several brief questions on the Hatchery Program Summary that was provided to the Hatchery Committees. Mike Schiewe suggested that projects discussed in the Hatchery Program Summary be linked to the recommendations provided in the IHIP, as applicable.

F. 2009 Chelan PUD HCP Action Plan

Julie Pyper distributed a copy of the 2009 HCP Action Plan for review and discussion by the Hatchery Committees. This is a document that is distributed to the Coordinating and Policy Committees to inform them of action items in the upcoming year. The Committees will provide any comments to Chelan PUD by March 4. Kris Petersen noted that Chelan PUD

may want to include summer Chinook HGMPs on the 2009 schedule, as submittal of this HGMP is scheduled to occur in 2010. Julie Pyper said that she will look into this.

G. Grant PUD's use of Chelan PUD's Lake Wenatchee Net Pens

Julie Pyper said that Grant PUD has approached Chelan PUD regarding the use of Chelan PUD's Lake Wenatchee net pens to acclimate White River spring Chinook. Pyper wanted to make sure that the Hatchery Committees were aware that there is a possibility (although highly unlikely) that the net pen frames could be damaged during installation and moving of the pens to the anchoring location at the top of Lake Wenatchee, which could potentially impact the sockeye program (if they were damaged). The Committees agreed with Chelan PUD that this is an acceptable risk.

H. Steelhead Tissue Sampling at Tumwater Dam

Julie Pyper updated the group that Chelan PUD has signed an interim measure with WDFW to collect steelhead tissue samples at Tumwater Dam as part of the study begun last year by WDFW under funding from NOAA.

On a related topic, Shaun Seaman said that Washington State Department of Transportation (WSDOT) is planning substantial repaving work in Tumwater Canyon this summer that will close the highway in the evenings. Chelan PUD will need to work with the users of the trapping facility to ensure access. Shaun Seaman will work on scheduling a meeting or other means of communication with the users to work through these concerns.

I. Wenatchee Steelhead Reproductive Success Study Goals and Objectives

Mike Schiewe said that he has compiled the comments on WDFW's goals and objectives document and sent it to the Hatchery Committees. He said that he recommends that this item be tabled until the HGMP is completed in a month or so, and the Committees can come back to it at that time. Schiewe also recommended that the HGMP state that a study will occur, identify goals and objectives, and then note that the details of the study are still being developed by the Hatchery Committees. Kris Petersen added that the HGMP should include as much detail as possible regarding the study. Kirk Truscott and Joe Miller will meet to discuss how to address the specificity that National Marine Fisheries Service (NMFS) is looking for in the HGMP. The Committees agreed to table the discussion of the study for today's meeting.

Schiewe asked whether there was a potential scenario in which other agencies or entities would contribute funding to support a steelhead reproductive success study. Tom Scribner said that he did not think so, as he sees the study as directly linked to the questions that are laid out in the HCP Monitoring and Evaluation (M&E) Plan regarding whether the HCP programs are having an effect on wild fish populations. Shaun Seaman noted that Chelan PUD considered the requirement for a steelhead reproductive success study as articulated in the HCP to be the primary basis for a PUD-funded study.

IV. Douglas PUD

A. Committee Members

Rick Klinge said that he and Tom Kahler are going to switch roles on the HCP Committees such that Kahler will be the Committee Member on the Hatchery and Coordinating Committees and Klinge will be the Alternate. Douglas PUD will send a letter to Mike Schiewe for the record.

B. Methow Steelhead Reproductive Success Study

Tom Kahler said that Douglas PUD was having internal discussions about how to proceed on a steelhead reproductive success study in the Methow basin. He would like to gain clarification from the Hatchery Committees on the goals and objectives of the study. Tom Scribner suggested implementing the Wenatchee and Methow studies concurrently, consistent with a holistic approach for steelhead as a species. Kirk Truscott said that WDFW is less concerned with performing the two studies concurrently as they are with doing the right study for each population. Rick Klinge said that in the next 5 years, Douglas PUD will be considering some modifications to the Wells Hatchery facility, so this is a good time to be discussing any study that might use hatchery facilities, such as the spawning channel study that was suggested by WDFW in 2007. Steve Hays said that he did not think that a study using a spawning channel would get at the real question contemplated by the HCP, which is to test for a difference in reproductive success (and if there is a difference, potentially find the reasons for this difference) between hatchery and wild steelhead. Tom Kahler will circulate a spreadsheet for Committees review that compares some of the suggested approaches for studying reproductive success. This spreadsheet was put together last year by several Committees members to assist the Committees in coordinating multiple studies in different subbasins. Also, Douglas PUD will work with Andrew Murdoch to consider whether to bring the spawning channel study back before the Committees for discussion at the next meeting.

C. Twisp Weir Operation as part of M&E Activities and Dates

Tom Kahler updated the group that, due to ice buildup just upstream from the Twisp Weir, Douglas PUD will not be able to begin operation of the weir on March 1 as planned because damage to the weir could occur from ice impact. The PUD will keep monitoring the ice and will operate it once the danger to the weir has passed.

D. 2009 Douglas PUD HCP Action Plan

Tom Kahler distributed the 2009 Douglas PUD HCP Action Plan. Mike Schiewe asked whether the Hatchery Committees had any additional comments to this plan, which was previously sent out. There were no additional comments. Rick Klinge will provide a final copy to Ali Wick for distribution.

E. Approval of 2009 Grant PUD Hatchery Access

Rick Klinge asked for approval of this year's agreement for Douglas PUD to rear 80,000 summer steelhead at Wells Hatchery and 201,000 spring Chinook at Methow Hatchery on behalf of Grant PUD. This activity would bring the Methow Hatchery production up to full program. Bill Gale asked whether there is any impact to Winthrop Hatchery broodstock from this action. Kirk Truscott said that the impact is minimal, as the removal of broodstock to create these progeny is very low compared to what is required for the Winthrop Hatchery program. Truscott also reminded the Hatchery Committees that these fish are required to be "below low" in terms of Enzyme-Linked Immunosorbent Assay (ELISA) test category, and thus the protocols will include culling as an option if ELISA values are higher than this. The Committees gave their approval for Douglas PUD to raise these fish.

F. Access to East Ladder during Re-Wind at Wells Dam

Rick Klinge updated the group that Douglas PUD is still working through the details of access to the east ladder during the generator re-wind construction project at Wells Dam. Douglas PUD will keep the Hatchery Committees informed of any changes.

V. NMFS

A. Follow-up on Larsen/Beckman Precocity Study

Kris Petersen said that Don Larsen and Brian Beckman are still reviewing the Hatchery Committees' comments to the precocity study.

VI. HCP Administration

A. Next Meetings

The next scheduled Hatchery Committees meetings are as follows: March 11, March 18, April 15, and May 20; all meetings will be at the Chelan PUD offices in Wenatchee. The HGMP Workgroup will be meeting on February 23 and March 11.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, L.L.C.
Ali Wick	Anchor QEA, L.L.C.
Shaun Seaman *	Chelan PUD
Julie Pyper *	Chelan PUD
Joe Miller	Chelan PUD
Alene Underwood	Chelan PUD
Steve Hays	Chelan PUD
Sam Dilly (morning only)	Chelan PUD
Jerry Marco *	Colville Tribes
Rick Klinge *	Douglas PUD
Tom Kahler *	Douglas PUD
Todd Pearsons	Grant PUD
Russell Langshaw	Grant PUD
Kris Petersen *	NMFS
Bill Gale *	USFWS
Bob Pfeifer	WDFW
Kirk Truscott *	WDFW
Tom Scribner *	Yakama Nation
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Rocky Reach, Rock Island, and Wells HCP Hatchery Committees	**Date:**	April 6, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Joe Miller, Alene Underwood, Steve Hays		
Re:	Final Minutes of February 23, 2009 HGMP Workgroup Meeting		

The Wenatchee Basin HGMP Workgroup, including representatives from Chelan PUD, NMFS and WDFW, met on Monday, February 23, 2009, from 9:00 am to 1:00 pm to reconcile Chelan PUD, WDFW, and Yakama Nation comments to the Wenatchee steelhead HGMP. Attendees are listed in Attachment A.

I. Discussion (Mike Schiewe)

Mike Schiewe opened the discussion, saying that today's meeting is to review WDFW comments on the HGMP, as well as hear from the Yakama Nation on some concerns they have on the two-zone approach for separate management strategies above and below Tumwater Dam.

Yakama Nation Concerns

Tom Scribner and Keely Murdoch joined the call. Scribner said that the Yakama Nation has concerns that the two-zone approach for separate management strategies for the areas upstream versus downstream of Tumwater Dam may reduce the likelihood of meeting program production goals. This is because under two-zone management, only wild by wild (W X W) fish would be allowed to proceed above Tumwater Dam, which Scribner said could limit broodstock choices in low-run years. Kirk Truscott said that WDFW is aware of this concern, and is looking at ways to address this.

WDFW Comments

The group discussed the details of this type of program (Integrated Harvest) and agreed that the HGMP should be somewhat flexible in this regard so that adaptive management could be employed in the future. The remainder of the call was focused on integrating WDFW and

Chelan PUD edits on a case-by-case basis. The schedule for completion is to send the HGMP to the Hatchery Committees for their review on February 26.

Attachment A
List of Attendees

Name	Organization
Michael Schiewe	Anchor Environmental, L.L.C.
Ali Wick	Anchor Environmental, L.L.C.
Shaun Seaman *	Chelan PUD
Julie Pyper *	Chelan PUD
Joe Miller	Chelan PUD
Alene Underwood	Chelan PUD
Steve Hays	Chelan PUD
Tom Kahler *	Douglas PUD
Kirk Truscott *	**WDFW**
Bob Pfeifer *	**WDFW**
Keely Murdoch *	**Yakama Nation**
Tom Scribner *	**Yakama Nation**

* Denotes Rocky Reach, Rock Island, and Wells Hatchery Committees members or alternates

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Rocky Reach, Rock Island, and Wells HCP Hatchery Committees	**Date:**	April 23, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Joe Miller, Alene Underwood, and Bob Pfeifer		
Re:	Final Minutes of March 9, 2009 Hatchery Committees Meeting		

The Hatchery Committees met on Monday, March 9, 2009, from 10:00 am to 4:00 pm at the Chelan PUD Auditorium in Wenatchee, Washington, to review and resolve any outstanding issues in the draft Wenatchee steelhead Hatchery Genetic Management Plan (HGMP). Attendees are listed in Attachment A.

ACTION ITEM SUMMARY

- Washington Department of Fish and Wildlife (WDFW) will draft a new Section 1.7 for the Hatchery Committees to review by March 12 (Item II).
- Julie Pyper will email the new Section 13 (Roles and Responsibilities) for Hatchery Committees' distribution and discussion (Item IV).
- Kirk Truscott will meet with Jeff Korth to verify the WDFW position on adult management roles (Item IV-A).
- Shaun Seaman and Kirk Truscott will meet to discuss the issue of permit holder(s) offline (Item IV-B).

I. Welcome (Mike Schiewe)

Mike Schiewe opened the discussion by making a list of several topics that need to be addressed during today's review and revision of the draft HGMP. These included:

- The need for a complete description of the two-zone management concept early in the document, and revision of the remainder of the document to make sure subsequent sections of the HGMP are consistent with this description
- The need for additional details regarding adult management, broodstock collection, and escapement goals
- The need to reconcile recreational fisheries with U.S. v. Oregon, and clarification of relationships between the Wenatchee steelhead program and other programs

- Greater clarity on roles and responsibilities for implementation and funding

The remainder of these minutes covers these topics; some topics are discussed within the context of others.

II. Two-zone Concept and Consistency of Explanation

Mike Schiewe began by asking for Hatchery Committees discussion on the two-zone management concept set forth in the current draft of the HGMP. Kirk Truscott gave an overview of the management zones, saying that the concept is that there would be a program in the upper basin that is actively managed, with an acclimation and smolt release strategy that allows movement and outplanting of these fish to other locations. One goal of this strategy would be to enhance the contribution of natural-origin fish in the brood. Keely Murdoch suggested that the two-zone management concept be described earlier in the document and that more clarity be provided, as the concept is not currently clear to the reader. She suggested listing the assumptions and uncertainties, as well as contingency plans in the case that homing fidelity does not match what was expected. She said that the main issue for the Yakama Nation (YN) is that the draft HGMP currently limits the parental crosses (i.e., hatchery by hatchery [HxH]) that are allowed for fish released below Tumwater Dam; the YN has concerns that releasing only WxW crosses above Tumwater may, in some years, constrain the ability to meet HCP mitigation requirements. She also said that the management priorities (such as escapement, Percent Natural Influence [PNI], meeting program production goals) need to be clarified earlier in the document. Kris Petersen commented that National Marine Fisheries Service (NMFS) would not likely approve a program in which meeting escapement above Tumwater would be a higher priority than meeting PNI. She also said that the apparent plan for a lower PNI above than below Tumwater would seem to lead to less, not more, natural origin fish in the program. Responding to a comment from U.S. Fish and Wildlife Service (USFWS), Kirk Truscott said that he would provide additional information regarding the disposition of hatchery fish removed at Tumwater. Kirk Truscott suggested that if PNI is low after conducting upper basin releases, then the upper basin releases would be reduced in favor of lower basin releases. Keely Murdoch also thought that releasing HxH fish in the lower basin while stating that the lower basin would be unsupplemented, sends a mixed message. Another concern of the YN is that selective harvest could affect the treaty/non-treaty harvest balance and would need to be addressed through US v. OR. Kirk Truscott said that the selective

fishery would only act as a tool that can be used to manage PNI in the lower basin. Murdoch suggested that a contingency plan be added to the HGMP that could direct such actions.

Following these discussions, Mike Schiewe suggested that Kirk Truscott re-work the draft to be clear on the two-zone management concept, with 200,000 smolts released above and 200,000 below Tumwater Dam, with an emphasis on HxH in the lower basin, and the HCP Hatchery Committees involved in adaptive management for this program. To support these revisions, Schiewe then asked the JFP members of the Committees to state their priorities for the following: mitigation/production, escapement, and PNI. All JFP members indicated that their highest priority was mitigation/production, but there was no agreement regarding the priority of escapement versus PNI. Schiewe suggested that the Committees might want to assign equal weight to escapement and PNI, noting that the difference between priorities is largely artificial, and will in the end be determined by the management actions taken for the program. The Committees provisionally agreed to this. WDFW will draft a new Section 1.7 for the Committees to review by Thursday of this week (March 12). The YN and NMFS are meeting next week on a number of other issues, and Mike Schiewe asked that a discussion of priorities be added to their agenda.

III. Recreational Fisheries Reconciled with U.S. v. Oregon

Keely Murdoch provided some text to WDFW suggesting that the U.S. v. Oregon Settlement be mentioned as a legally binding condition for WDFW and the YN. After some discussion regarding the placement of this text in the HGMP, the Hatchery Committees agreed that although this text will not be added, text will be included indicating that this HGMP is consistent with WDFW and YN U.S. v. Oregon hatchery production agreements.

IV. Roles and Responsibilities

A. Permit holders

Kirk Truscott asked for clarification on who should be listed as the permit holder(s). Kris Petersen said that the cover letter should describe the purpose of submitting the HGMP and this will help dictate who the permit holder should be. Shaun Seaman said that Chelan PUD is not anticipating submitting the HGMP as a permit application, and so expects that Chelan PUD will be listed as the "responsible organization" and others involved will be listed as "authorized agents." The intent of this designation is to be consistent with the HCP. Kirk Truscott said that WDFW would like to be included on the permit because they are legally

mandated to manage the resource. Shaun Seaman and Kirk Truscott agreed to meet to resolve this offline.

B. Adult management roles

Shaun Seaman said that Chelan PUD would like the HGMP to include clarity on roles for adult management. The PUD has drafted a new Section 13 of the HGMP that describes these roles, which says that Chelan PUD is responsible for producing fish and the co-managers are responsible for implementation of adult management actions. Kirk Truscott said that he believes that Chelan PUD may be responsible for removal of hatchery fish at Tumwater Dam in order to be able to maintain consistency with No Net Impact (NNI). Shaun Seaman said that his understanding, based on conversations with Jeff Korth of WDFW, is that WDFW may have a different view of this responsibility and that the issue still warrants further discussion, and so Truscott will meet with Korth to verify this. Julie Pyper will email the new Section 13 for Hatchery Committees' distribution and discussion.

V. Additional USFWS Comments

A. Residuals and genetics

Bill Gale said that he would like more discussion on genetics and recent research on residualization of hatchery steelhead. Kirk Truscott said that there are currently no available data that can identify the percentage of residuals in the program. The HGMP does say that once empirical data can be collected, the scope of residuals will be addressed.

B. Ecological risk / interactions section

Bill Gale suggested that there are additional scientific citations that would help support the ecological risk/interactions section regarding what impacts are occurring and what might be done to minimize these. He also said that there should be an acknowledgment of the impact of residuals, as they may contribute to additional hatchery spawners in the wild. Kirk Truscott said that the current section may seem short because it only addresses key issues, and that most risk aversion measures are imbedded within the other applicable sections.

VI. Additional NMFS Comments

A. Maps

Kris Petersen suggested that some maps be added to the document if possible. It was decided that maps would be added if time allows.

B. Spawner distribution

Kris Petersen suggested additional text be added regarding spawner distribution and redd counts.

VII. Additional Chelan PUD Comments

Shaun Seaman asked whether the HGMP needed to mention that there could be a future reduction in program size based on future Hatchery Committees' agreement; the Committees decided that such language was not necessary. Seaman indicated that Chelan PUD may also incorporate some aspects of the bull trout Biological Opinion into the draft HGMP.

VIII. Schedule

The group clarified that by the end of the day Thursday, March 12, WDFW will provide to the Hatchery Committees a rewritten Section 1.7. During that time, Chelan PUD will look through the entire list of recent comments (USFWS, NMFS, and YN) and determine those that can be addressed. The Committees will have a conference call on Monday afternoon at 1 pm to discuss the new sections, and a revision will be provided by the end of day Wednesday, March 18. The draft is due on March 31 to NMFS.

Attachment A
List of Attendees

Name	Organization
Michael Schiewe	Anchor QEA, L.L.C.
Ali Wick	Anchor QEA, L.L.C.
Shaun Seaman *	Chelan PUD
Julie Pyper *	Chelan PUD
Joe Miller	Chelan PUD
Alene Underwood	Chelan PUD
Tom Kahler *	Douglas PUD
Rick Klinge *	Douglas PUD
Kris Petersen * (by conference call)	NMFS
Kirk Truscott *	WDFW
Bob Pfeifer	WDFW
Bill Gale *	USFWS
Keely Murdoch *	Yakama Nation

* Denotes Rocky Reach, Rock Island, and Wells Hatchery Committees member or alternates

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Rocky Reach, Rock Island, and Wells HCP Hatchery Committees	**Date:**	April 15, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Joe Miller		
Re:	Final Minutes of March 16, 2009 HGMP Workgroup Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met by conference call on Monday, March 16, 2009, from 1:00 pm to 3:30 pm to reconcile final comments to the Wenatchee steelhead HGMP. Attendees are listed in Attachment A to these Meeting Minutes.

I. Discussion (Mike Schiewe)

Mike Schiewe opened the discussion, saying that today's meeting is to resolve comments on the HGMP, particularly Sections 1.6 – 1.8 and Section 13, which have been modified since the last Hatchery Committees meeting. The purpose and focus of the call was to integrate Committee edits on a case-by-case basis. The Committees worked through the various comments and by 3:00 pm, agreement had been reached for Sections 1.6 and 1.7. There were still comments to be addressed in subsections of Section 1.8, and Section 13. Near the end of today's discussions, NMFS and the Colville Tribes had to leave the call due to prior commitments, and so the Committees continued to address sections that did not require their direct input.

At the close of the call, it was agreed that Chelan PUD and WDFW will revise and re-send Section 1.8 with today's edits by the end of the day tomorrow (Tuesday, March 14) and will incorporate other comments provided by the Committees for the other Sections. The Hatchery Committees will re-convene on Wednesday for their regularly scheduled meeting with the goal of coming to agreement on these edits as well as any parts not covered on today's call.

The schedule for completion of the document is to submit the HGMP to NMFS on March 31.

Attachment A
List of Attendees

Name	Organization
Michael Schiewe	Anchor QEA, L.L.C.
Ali Wick	Anchor QEA, L.L.C.
Shaun Seaman *	Chelan PUD
Julie Pyper *	Chelan PUD
Joe Miller	Chelan PUD
Tom Kahler *	Douglas PUD
Jerry Marco *	Colville Tribes
Kris Petersen *	NMFS
Bill Gale *	USFWS
Kirk Truscott *	WDFW
Bob Pfeifer *	WDFW
Keely Murdoch *	Yakama Nation

* Denotes Rocky Reach, Rock Island, and Wells Hatchery Committees members or alternates

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	April 14, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick and Joe Miller		
Re:	Final Minutes of March 18, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at the Chelan PUD offices in Wenatchee, Washington, on Wednesday, March 18, 2009, from 9:30 am to 4:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Julie Pyper will send out the current version of Sections 1.6 through 1.8 of the Wenatchee steelhead Hatchery Genetic Management Plan (HGMP) at the end of the day on March 18 (Item II-A).
- The Hatchery Committees will provide any remaining changes to Sections 1.6 through 1.8 of the Wenatchee steelhead HGMP as modified in today's meeting by noon Friday, March 20 (Item II-A).
- The Hatchery Committees will provide any comments to the final Wenatchee steelhead HGMP Hatchery Committees draft by noon on Thursday, March 26, and will meet by conference call at 1 pm on that Thursday (Item II-A).
- Sam Dilly will send out the information on steelhead and sockeye salmon trough rearing densities that has been compiled by Chelan PUD to the Hatchery Committees (Item III-C).
- Ali Wick will burn and send a CD copy of the 2008 Draft Monitoring and Evaluation (M&E) Plan to Kris Petersen (Item III-D).
- Sam Dilly will send the Wenatchee steelhead pilot water reuse proposal to the Hatchery Committees for their review (Item III-E).
- The Hatchery Committees will send initial comments to Chelan PUD by April 1 on the Wenatchee steelhead pilot water reuse proposal, along with requests for further information (Item III-E).

- Shaun Seaman will update the Hatchery Committees by email on recent progress on Blackbird Island Pond (Item III-G).
- Mike Schiewe will work with National Marine Fisheries Service (NMFS) to develop, for Committees consideration, a plan for the integration of steelhead reproductive success studies for the Upper Columbia (Item IV-B).
- The Hatchery Committees will send any final comments on broodstock collection protocols to Kirk Truscott by April 1 (VI-A).
- Jerry Marco will send the notice on an upcoming summer/fall Chinook workshop to Ali Wick for distribution to the Hatchery Committees (Item VI-A).

DECISION SUMMARY

- There were no decision items at this meeting.

I. Welcome

The Hatchery Committees approved the February 18, 2009 Meeting Minutes; Ali Wick will distribute the final Minutes to the Hatchery Committees.

II. All Committees

A. HGMP Update

Wenatchee steelhead

Mike Schiewe gave an update on the progress on the Wenatchee steelhead HGMP. The Hatchery Committees met by conference call this past Monday to attempt to resolve any remaining comments to the document. Kris Petersen also said that she had met with Kirk Truscott yesterday to help draft text for a program overview section in the document. The Committees discussed the usefulness of including an executive summary in future HGMPs

Section on Priorities

The Committees then turned their attention to the draft overview section in the HGMP (Section 1.8) on program priorities; the current draft includes a statement that the priorities are mitigation or production, escapement, and management for a Proportion of Natural Influence (PNI) objective of 0.67. Mike Schiewe asked the Committees members for their opinions on this section because it had not been discussed during the Monday conference call.

Keely Murdoch said that the Yakama Nation favored having a priorities section that establishes a clear path for future actions. Kirk Truscott agreed with this, but thought that prioritizing escapement ahead of managing for a PNI of 0.67 would be a concern. Jerry Marco said that the Colvilles do not think that the priorities necessarily are needed in the HGMP. Bill Gale said that the U.S. Fish and Wildlife Service (USFWS) also does not think the section is necessary, primarily because each year's actions could be managed on a year-by-year basis. Keely Murdoch said that this situation is what the Yakama Nation is working to avoid. Shaun Seaman said that Chelan PUD would be in favor of leaving the section out, but noted that the fisheries co-managers are the parties that deal with the PNI and escapement issues. He stressed that Chelan PUD believes in the importance of a balanced approach that is consistent with the HCP, the Recovery Plans, and the principles of the Hatchery Scientific Review Group (HSRG). (Because this was brought up, Kris Petersen noted that she would like to clarify that NMFS has not communicated that the HSRG recommendations must be implemented.) She went on to say that NMFS sees the priorities as a balance but thinks that ranking the priorities in the way they have been ranked in the HGMP will be problematic in NMFS review. She suggested a paragraph that would describe the importance of each of these goals rather than ranking them in priority order. The Committees worked with this paragraph until the group agreed that it adequately captured program goals, emphasizing their intent to balance mitigation, escapement, and PNI goals.

Section 13 on Roles and Responsibilities

Shaun Seaman said that Chelan PUD has met (via phone) with Hatchery Committees members and their policy staff individually to discuss responsibilities and obligations that should be included in the HGMP. He handed out a copy of a Chelan PUD draft of Section 13 that discusses these roles and identifies responsible parties.

Kirk Truscott commented that the current draft section does not describe the level of support Chelan PUD will provide in implementing adult management at Tumwater Dam. Shaun Seaman agreed, saying that under the terms of the HCP, Chelan PUD does not have responsibility for removal of excess adults at Tumwater Dam. Seaman said that Chelan PUD legal counsel had reviewed the HCPs, and concurred with this interpretation. Seaman did note, however, that they were open to discussing some level of participation. Kirk Truscott said that Washington Department of Fish and Wildlife (WDFW) policy staff would be reviewing this section. Keely Murdoch, Jerry Marco, Kris Petersen, Kirk Truscott, and Bill Gale said that their opinion was that funding removal of adult fish at Tumwater should be a

Chelan PUD responsibility; they also said that they believed that post-removal management of fish removed is a separate issue. Mike Schiewe suggested that Chelan PUD's responsibilities for adult management were largely a matter of legal interpretation of the HCP. The Committees agreed that they would check in with their legal/policy staff on interpretation of the HCP and would bring this information back to the Committees for further discussion. It was discussed that Chelan PUD would likely state in their cover letter transmitting the revised HGMP to NMFS that responsibility for adult management is a topic under continuing discussion.

Schedule

The Hatchery Committees will provide any remaining changes to Sections 1.6 through 1.8 as modified in today's meeting by noon on this Friday, March 20 (tomorrow). Julie Pyper will send out these sections at the end of the day today (March 18).

The schedule for the final Hatchery Committees draft is for Chelan PUD to send out a document with changes accepted for Committees' review by Wednesday morning, March 25, at 8 am. The Committees will provide any comments by noon on Thursday, March 26, and will meet by conference call at 1 pm on the same day.

Chiwawa spring Chinook

Keely Murdoch reported that the Yakama Nation (YN) and WDFW will be addressing final internal comments on the spring Chinook management plan at a conference call tomorrow (Thursday, March 19).

B. Hatchery Committees Protocol for Developing and Reviewing Study Plans

The Hatchery Committees agreed that the flowchart and protocol for the development and review of study plans by the Hatchery Committees is on hold, as the HGMPs are currently taking most of the work time available.

III. Chelan PUD

A. IHIP Follow-Up

Julie Pyper said that the Integrated Hatchery Improvement Plan (IHIP) has now been distributed to the Hatchery Committees.

B. Hatchery Program Summary

Julie Pyper distributed copies of the Hatchery Program Summary and welcomed any questions. There were no questions. Mike Schiewe asked that Chelan PUD continue to alert the Hatchery Committees of progress toward implementing changes to hatchery programs that are identified in the IHIP.

C. Intermediate Trough Densities for Rearing Steelhead and Sockeye

Sam Dilly joined the meeting to discuss a potential study of rearing densities of steelhead and sockeye salmon. Dilly said that early life stages of steelhead and sockeye are reared at Eastbank Hatchery in separate intermediate troughs concurrently, which creates a pinch point in space for these fish. Dilly noted that it may be necessary to add infrastructure, but before making a decision, the PUD is compiling information on design criteria. Dilly said that Chelan PUD would like to investigate how other facilities/institutions deal with rearing these species/life stages. The Hatchery Committees agreed that a review of existing information is a good starting point to address this issue. Chelan PUD will send out the information that has been compiled thus far to the Committees.

D. Draft 2008 Chelan PUD M&E Report Out for Review

The Draft 2008 Chelan PUD M&E Report is now out for 60-day review and comments are due to Julie Pyper by Friday, May 1. Ali Wick will burn and send a CD copy of this to Kris Petersen.

E. Chiwawa Steelhead Ponds

Shaun Seaman said that Chelan PUD would like to conduct a pilot water reuse study at Chiwawa Ponds for rearing and acclimating Wenatchee steelhead, and invited Sam Dilly to discuss this. Dilly said that the study could be conducted using the existing Wenatchee River water right. Wastewater from the reuse ponds would be collected and filtered by a wastewater treatment system consisting of a settling tank and purifier. Dilly noted a pilot study would provide important data on the proportion of steelhead that residualized. Volitional release would be accomplished by providing fish an outlet from the pond into a raceway, allowing volitional movement in the typical fashion. Dilly noted that because there are currently no steelhead being reared at the Chiwawa site, the study results would not be evaluated against a reference or control. Dilly indicated that the reuse system could be ready for testing by this fall; steelhead reared in this configuration could potentially be released by 2011 or 2012. Sam Dilly will send the study proposal to the Hatchery

Committees for their review; the Committees will send initial comments to Chelan PUD by April 1 along with requests for further information. Chelan PUD will prepare a Statement of Agreement (SOA) for the next meeting.

F. Sockeye Enumeration Study Comments

Joe Miller said that comments on the sockeye enumeration study are currently being addressed. Bill Gale will be providing comments to Joe Miller for incorporation.

G. Blackbird Island Pond Update

Shaun Seaman reported that the concrete pad will soon be poured at Blackbird Island Pond in Leavenworth. Chelan PUD is currently anticipating fish to be on station by the end of next week, but Shaun Seaman will check on this and update the Hatchery Committees.

H. NMFS Grants

Shaun Seaman updated the group that Chelan PUD is looking at recent information regarding newly available NMFS funding for coastal and marine habitat restoration projects. Chelan PUD will be evaluating whether any PUD projects may qualify.

IV. Douglas PUD

A. Access to East Ladder at Wells

Tom Kahler said that Douglas PUD and WDFW have identified that the best interim solution for access to the east ladder at Wells Dam during turbine re-wind at the dam will be to periodically move the portable building that currently blocks access to the ladder. Kirk Truscott asked that Douglas PUD coordinate with them on the schedule for the re-wind and Kahler agreed to do so. Rick Klinge noted that Douglas PUD may need to minimize trips across the project in order to facilitate the re-wind construction schedule. He also said that Douglas PUD will be working on some improvements to the west ladder and is open to suggestions for configurations from the Hatchery Committees.

B. Methow Steelhead Reproductive Success Study Follow-Up

Tom Kahler said that Douglas PUD is willing to implement a version of the steelhead reproductive success study proposed by WDFW in November 2007 if it was agreed that it would fulfill the Douglas PUD HCP required study; however, Kahler indicated that he would rather see the Hatchery Committees decide on goals and objectives before planning the study. The Committees agreed. Mike Schiewe mentioned that he had been in contact with

NMFS about developing an integrated plan for conducting steelhead reproductive success studies in the Upper Columbia. An integrated study plan would consider not only the HCP required studies, but also the studies required by the Reasonable and Prudent Measures (RPAs) in the Federal Columbia River Power System (FCRPS) Biological Opinion (BiOp) and the Grant PUD Settlement Agreement. The Committees agreed to defer further discussion of steelhead reproductive success studies until Schiewe hears back from NMFS.

V. NMFS

A. Expanding Scope of EIS on Mitchell Act Funding and Operation of Columbia River Hatcheries

Kris Petersen updated the group that NMFS has released a Federal Register notice on expanding the scope of the Environmental Impact Statement (EIS) that analyzes Mitchell Act funding and the operation of Columbia River hatcheries. She said that this release relates to the distribution of Mitchell Act funds, will not determine Endangered Species Act (ESA) compliance or make any decisions on any individual hatchery programs, and is intended to be a policy direction that applies only to Mitchell Act funding of programs. None of this is expected to affect any of the HCP hatchery programs that are in place. Shaun Seaman added that in his conversations with Rob Jones on this topic, Jones said that any National Environmental Policy Act (NEPA) analysis that may be done on the HCP programs as a result of this scope will rely on the work that has already taken place for these programs.

B. 9th District Court of Appeals Ruling in NMFS Case

Kris Petersen said that the 9th District Court of Appeals has made a ruling in NMFS' favor on a legal case against NMFS regarding how NMFS views hatchery programs in the context of ESA listings. The decision upheld NMFS' policy to determine which hatchery fish are part of an Evolutionarily Significant Unit (ESU) or Distinct Population Segment (DPS) and upheld that hatchery fish could be included in listings but managed differently than natural origin fish.

C. Follow-up on Larsen/Beckman Precocity Study

Kris Petersen said that Don Larsen and Brian Beckman of NMFS request permission to collect 200 summer Chinook from each of several programs for a precocity study. The collected fish would come from stocks at Dryden, Similkameen, Carlton, and Wells hatchery facilities. The Hatchery Committees agreed to support the study.

VI. WDFW

A. Comments to Broodstock Collection Protocols

Kirk Truscott updated the group that broodstock collection protocols have been sent out and comments were received from USFWS and Douglas PUD. Final comments need to be turned in by April 1. He will incorporate these and will submit the protocols to NMFS by the April 15 deadline.

On another note, Jerry Marco will send the notice on an upcoming summer/fall Chinook workshop to Ali Wick for distribution to the Hatchery Committees for their information.

B. Comments to Twisp Weir Operations Protocol

Kirk Truscott noted that the Twisp Weir Operations Protocol has been sent out and no comments have been received. Tom Kahler added that most of the ice has been removed from the weir and the weir is now in operation. Pat Phillips added that WDFW has not moved spring Chinook juveniles into the Twisp River acclimation pond this year because there is an ice jam on the intake to the ponds that is preventing operation of the intake gate, and an ice/debris jam upstream that could break loose and clog the intake, resulting in injury to or loss of fish. The alternative that is likely will be to transport the fish by truck higher into the Twisp River watershed for release. Phillips will alert the Hatchery Committees when fish are moved.

C. New Methow Hatchery Broodstock Collection Trap

Tom Kahler updated the group that Methow Hatchery staff have asked Douglas PUD to design a new broodstock collection trap at the hatchery outfall. Douglas PUD is developing designs for the trap and intends to complete and install it by the end of April.

D. Smolt Releases in Salmon Creek

Kirk Truscott informed the Hatchery Committees that the Colville Tribes have requested 25,000 Wells summer steelhead smolts for release in Salmon Creek again this year, as in the past 3 years. The Committees concurred with this request.

E. Study to Assess Egg-to-Fry Survival of Upper Columbia Spring Chinook

Andrew Murdoch joined the meeting to provide an update on a proposed study to measure egg-to-fry survival in several spring Chinook populations in the Upper Columbia. The principal investigator will be Phil Roni, a NMFS watershed ecologist at NMFS' Northwest Fisheries Science Center. These data will be used in habitat-based population modeling.

This study began last year on fish in the upper Yakima River, but the researchers would like to expand to the Wenatchee and Methow basins. This expanded and multi-year study will entail collecting gametes from hatchery origin fish (species unknown at this time) and raising juveniles from those fish in both artificial redds and in hatcheries. The study will begin in September of this year, and he will forward information as it becomes available. Murdoch may visit the Hatchery Committees at a later date to provide a further study description. Murdoch said that, in the meantime, questions are welcome.

F. Request For Samples from Upper Columbia Salmon and Steelhead for Predator Study in Priest / Wanapum Pools from Grant PUD

Andrew Murdoch said that Dave Burgess from Grant PUD is conducting a predator impact study in Priest Rapids Reservoir and will be requesting 20 reference samples (fish specimens; e.g., fresh hatchery mortalities) from each Upper Columbia hatchery program in 2009. Murdoch said that he believes that this study will contribute to understanding of survival of these program fish. Shaun Seaman pointed out that bone samples from the avian predation study exist and may be useful for this study. Murdoch said that he will look into this. Murdoch will forward additional information on the needs of this study to the Hatchery Committees as this information is available.

VII. Colville Tribes

A. Update on Colvilles Position on PIT-Tag Array at Zosel Dam for Sockeye Monitoring

Jerry Marco reminded the group that at the last Hatchery Committees meeting, Tom Scribner suggested that the Colvilles may have some concerns about a Columbia River Inter-Tribal Fish Commission (CRITFC) proposal to install a Passive Integrated Transponder tag (PIT-tag) array at Zosel Dam. Jerry Marco said today that it turns out that there may have been a miscommunication at some point, and the Colvilles support installing this array. The Colvilles expect to coordinate with CRITFC as implementation occurs, but that construction may not occur this year due to funding constraints.

VIII. HCP Administration

A. Meeting Agreements Not Requiring an SOA

- The Hatchery Committees agreed that Don Larsen and Brian Beckman of NMFS have permission to collect 200 summer Chinook from various programs for a precocity study from stocks at Dryden, Similkameen, Carlton, and Wells hatchery facilities.

- The Hatchery Committees concurred that WDFW may provide 25,000 Wells summer steelhead smolts to the Colville Tribes for release in Salmon Creek again this year, as in the past 3 years.

B. Next Meetings

The next scheduled Hatchery Committees meetings are as follows: April 15, May 20, and June 17; all meetings will be at the Chelan PUD offices in Wenatchee.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, L.L.C.
Ali Wick	Anchor QEA, L.L.C.
Shaun Seaman *	Chelan PUD
Julie Pyper *	Chelan PUD
Joe Miller	Chelan PUD
Alene Underwood	Chelan PUD
Sam Dilly (afternoon only)	Chelan PUD
Jerry Marco *	Colville Tribes
Rick Klinge *	Douglas PUD
Tom Kahler *	Douglas PUD
Kris Petersen *	NMFS
Bill Gale *	USFWS
Bob Pfeifer	WDFW
Pat Phillips	WDFW
Andrew Murdoch (update only)	WDFW
Kirk Truscott *	WDFW
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Rocky Reach and Rock Island Hatchery Committees	**Date:**	April 15, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Joe Miller		
Re:	Final Minutes of March 26, 2009 RI and RR Hatchery Committees Conference Call		

The Rock Island and Rocky Reach Projects HCP Hatchery Committees met by conference call on Thursday, March 26, 2009, from 1:00 pm to 4:00 pm to reconcile comments on the Wenatchee steelhead draft Hatchery Genetic Management Plan (HGMP). Attendees are listed in Attachment A to these Meeting Minutes.

I. Discussion (Mike Schiewe)

Mike Schiewe opened the discussion, by thanking the group for all of their hard work to bring the draft HGMP to this near-final stage. He indicated that today's meeting is to resolve any final issues prior to Chelan PUD submitting the HGMP to National Marine Fisheries Service (NMFS) on March 31, 2009.

The Workgroup then discussed outstanding issues associated with each section of the draft HGMP. The subjects included the need for consistent nomenclature for the Dryden facility (i.e., dam versus weir), the rationale and need for the use hormones to synchronize spawning of hatchery broodstock, and the proposed text comprising Section 13 on roles and responsibilities.

By end of the conference call, the Hatchery Committees members were in general agreement on Sections 1 through 12 of the draft HGMP; however, there was no agreement on Section 13, which articulated Chelan PUD's interpretation of its responsibility under the HCP. Chelan PUD indicated that it would include Section 13 with the submittal, but would indicate the HGMP was not yet approved by the HCP Hatchery Committees. Chelan PUD agreed to provide its draft transmittal letter to the Committees on Monday, March 30, with formal transmittal to NFMS on Tuesday, March 31.

Attachment A
List of Attendees

Name	Organization
Michael Schiewe	Anchor QEA, L.L.C.
Shaun Seaman *	Chelan PUD
Julie Pyper	Chelan PUD
Joe Miller	Chelan PUD
Tom Kahler *	Douglas PUD
Kris Petersen *	NMFS
Bill Gale *	USFWS
Kirk Truscott *	WDFW
Bob Pfeifer	WDFW
Keely Murdoch *	Yakama Nation
Alene Underwood	Chelan PUD

* Denotes Rocky Reach, Rock Island, and Wells Hatchery Committees members or alternates

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	May 20, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick and Joe Miller		
Re:	Final Minutes of April 15, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at the Chelan PUD offices in Wenatchee, Washington, on Wednesday, April 15, 2009, from 9:30 am to 4:30 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- The Hatchery Committees will provide any additional comments to the March 9 and 18 meeting minutes by next Wednesday, April 22, and then the minutes will be finalized. Keely Murdoch will provide revised text for the March 9 minutes to Ali Wick (Item I
- Sam Dilly will provide the final 2008 Pilot Water Reuse Study Report when available (Item III-A).
- Shaun Seaman will provide the letter from the U.S. Forest Service (USFS) to Chelan PUD on land use at the Chiwawa Rearing Facility and the National Environmental Policy Act (NEPA) process (Item III-B).
- Julie Pyper will provide a spreadsheet on timing and schedule for the Chiwawa Rearing/Acclimation Facility project so that the Hatchery Committees can track progress (Item III-B).
- Kirk Truscott will relay responses on the Chiwawa Steelhead Reuse Study to Bob Rogers, Washington Department of Fish and Wildlife (WDFW) fish health specialist, and Chelan PUD will provide information as needed to address Rogers' comments (Item III-C).
- Chelan PUD will finalize and send out a draft final Statement of Agreement (SOA) for the Chiwawa Steelhead Reuse Study (Item III-C).

- Joe Miller will compile information on the number of juvenile Chinook recently collected in the Rocky Reach bypass and provide this information to Douglas PUD so that they can estimate the total number of summer Chinook that may have escaped Wells Hatchery (Item IV-A).
- WDFW will meet with Douglas PUD to consider possible ways to eliminate problems with plugging of the screens at the Twisp acclimation ponds and will report back at the June Hatchery Committees meeting (Item IV-B).
- Ali Wick will send the presentation on the Wenatchee Spring Chinook Implementation Plan to the Hatchery Committees (Item V-A).
- Julie Pyper will let the Hatchery Committees know when Chelan PUD can provide a draft Chiwawa spring Chinook Hatchery Genetic Management Plan (HGMP) to the Committees (Item V-A).
- The Hatchery Committees will provide comments on the Wenatchee Spring Chinook Implementation Plan to the Yakama Nation (YN) and WDFW no later than the end of the day on May 1 (Item V-A).
- Tom Scribner will contact Bill Gale and Ray Brunson at USFWS to discuss the disposition of fish to be potentially removed at Tumwater dam (Leavenworth strays and potentially Chiwawa fish) (Item VI-A).

DECISION SUMMARY

- The Hatchery Committees provisionally approved the Chiwawa Steelhead Water Reuse Pilot Study and SOA contingent on WDFW approval by next Wednesday, April 22 (Item III-C).

I. Welcome

The Hatchery Committees approved the March 16 and March 26 meeting minutes. Ali Wick will distribute the final Minutes to the Hatchery Committees, and will provide revisions to the Committees on the March 9 and March 18 meeting minutes for the Committees' email comment and approval.

II. All Committees

A. Steelhead Reproductive Success Studies

Mike Schiewe reported that he had contacted National Marine Fisheries Service (NMFS), Bonneville Power Administration (BPA), and the Northwest Power Planning and

Conservation Council (NPPC) staff regarding interest in developing an integrated plan for steelhead reproductive success studies in the Upper Columbia River. One issue that Schiewe wanted to resolve upfront was whether participating in the planning would trigger a conflict of interest for parties later interested in submitting proposals to conduct the planned research. Schiewe indicated he has contacted BPA staff regarding this concern, and is waiting for their response. Also, BPA staff indicated that they are working with the NPPC on a targeted solicitation for the steelhead reproductive success study identified as a Reasonable and Prudent Alternative (RPA) in the Federal Columbia River Power System (FCRPS) Biological Opinion, and that an integrated plan could be consistent with their process. If the path were to be followed, a next step would be for the Hatchery Committees to identify a smaller group that would develop the study plan. Tom Scribner voiced concern that the multiple jurisdictions involved in such a study would cause a delay. Schiewe agreed, but indicated that he felt that the benefits of having a single integrated plan were worth the additional time and effort.

B. HETT Update

Tom Kahler provided a progress report on the Hatchery Evaluation Technical Team's (HETT's) recent analytical efforts to identify Monitoring and Evaluation (M&E) control populations. The HETT has been working to include an estimate of carrying capacity in its spawner recruit relationships for use in identifying control populations. Spring Chinook populations were the first data to be analyzed, beginning with Chiwawa spring Chinook; Wenatchee steelhead populations will be next, followed by sockeye populations.

C. HGMP Update

Wenatchee Steelhead

Mike Schiewe noted that Chelan PUD had submitted the draft HGMP for Wenatchee steelhead to NMFS on March 31. Kris Petersen acknowledged that NMFS has received the document, but was unsure of when NMFS would be providing comments back to Chelan PUD and the Hatchery Committees.

Chiwawa Spring Chinook

The deadline for this HGMP is May 31. Chelan PUD intends to move forward drafting sections of the HGMP that are not likely to change from the previous HGMP, while the

implementation plan prepared by WDFW and the YN is being reviewed by the Hatchery Committees.

Methow Populations

The deadline for these HGMPs is the end of July. A schedule for these will be developed soon.

III. Chelan PUD

A. Review of 2008 Pilot Water Reuse Study Report

Sam Dilly gave an overview of the 2008 Pilot Water Reuse Study Report. He discussed fish health issues, saying that fish health specialists observed some gill irritation, possibly due to slightly elevated carbon dioxide levels caused by algal growth in the pond. Dilly said that increased water flow and pond covers should greatly reduce algal growth next year. In terms of fish morphology, the reuse pond fish were less fatty and more torpedo-shaped than raceway fish. However, they were somewhat fattier than naturally-reared fish. Chelan PUD is working with NMFS to understand whether fattiness in these juveniles might cause these fish to return early as adults.

Tom Scribner asked whether gill irritation has been previously reported in water reuse systems. Dilly and Steve Hays indicated that their research had not shown that it was common, but noted that elevated concentrations of suspended particulates can be an issue in ponds that are not being flushed well; therefore, the next year's study plan is to increase water velocities to increase flushing. Kirk Truscott noted that elevated ammonia and carbon dioxide levels can sometimes cause gill irritation and asked whether these could have been a factor. Dilly said that ammonia was consistently non-detectable and that carbon dioxide levels were consistently low. Oxygen levels were supplemented up to saturation by bottled oxygen that was added as needed. Dilly said that in order to take extra precautions for fish safety, oxygen levels will, in the future, be monitored and supplemented with an automatic system backed up with an alarm. Julie Pyper added that a dedicated Chelan PUD-funded staff member will be hired to monitor this project. Dilly will add the water quality information to the report as an appendix. The Hatchery Committees approved this report with this addition, and Dilly will provide the final report when available.

B. Hatchery Program Summary

Julie Pyper reviewed for the group the topics covered in the Hatchery Program Summary. This discussion included the schedule for the Chiwawa Rearing/Acclimation Facility permitting. Tom Scribner raised a concern that the steelhead water reuse pilot study might affect progress on the planning and permitting of the traditional acclimation ponds at the Chiwawa facility. Shaun Seaman spoke to this, saying that the pilot study will not delay the Chiwawa facility work. Seaman noted that there have been discussions between Chelan PUD and USFS regarding NEPA compliance for site preparation; he will provide the letter to Chelan PUD from the USFS regarding this issue. Also, Julie Pyper will provide a spreadsheet on schedule and timing for the Chiwawa Rearing/Acclimation Facility project so that the Hatchery Committees can track progress. Kirk Truscott asked about progress on the Chelan County shorelines permit; Pyper responded that the County and Federal Emergency Management Agency (FEMA) are negotiating on the floodplain fill mitigation requirement. Other requirements related to the shorelines permit will include Chelan PUD getting a new easement to facilitate construction on the water supply line because the existing easement was only wide enough to allow maintenance.

C. DECISION ITEM: Chiwawa Steelhead Water Reuse SOA

Mike Schiewe invited comment on the proposed Chiwawa steelhead pilot water reuse SOA. Kirk Truscott said that WDFW's main concerns are with the use of surface water as a water source, such that there is a potential for increased pathogen loading, and increased sediment and particulate loading. In addition, there could be growth of filamentous algae, which could affect the ability to provide a constant water supply. Kris Petersen said that NMFS is in agreement with the proposal in concept and requested periodic project updates to track progress. Jerry Marco said that the Colvilles' key concern is also the use of surface water and the potential problems with gill irritation due to suspended materials.

Sam Dilly said that the experience gained with the summer/fall Chinook pilot study at Eastbank would be extremely helpful in anticipating and minimizing or avoiding problems in the steelhead study. Regarding water quality, changes to be made include reducing residence time of water in the ponds and retaining the ability to have a flow-through option. Regarding the possibility of increased sediment particulates from surface water, the design includes sending water through a settling basin and filters prior to first use, as well as using

the swirling action of the ponds themselves to segregate particulates at the bottom of the pond, which are then flushed out of the pond and re-filtered by the water reuse system.

Kirk Truscott will relay these responses to Bob Rogers, WDFW fish health specialist, and Chelan PUD will provide information as needed to address any of Rogers' comments. The Hatchery Committees provisionally approved the proposal and SOA, contingent on WDFW approval by next Wednesday, April 22, and following such approval, Chelan PUD will finalize and send out the final SOA.

D. Adult Sockeye Holding

Julie Pyper asked for Hatchery Committees' approval to hold adult sockeye at Eastbank as described in March 27, 2009, WDFW memo on the recommendation for short-term adult sockeye broodstock holding at Eastbank Hatchery. The Committees gave their approval.

E. Sockeye Enumeration Study Update

Joe Miller said that installation of the Passive Integrated Transponder (PIT)-tag detection arrays are going well and they will be operational by June 1 for collecting sockeye and spring Chinook information. Todd Miller has obtained access to PIT Tag Information System (PTAGIS) for achieving data from both the White and Little Wenatchee arrays. Keely Murdoch said that detections from the Entiat and Peshastin arrays may be included the Integrated Status and Effectiveness Monitoring Project (ISEMP) arrays, which will soon also be achieved in the PTAGIS database. Joe Miller anticipates that the study will proceed as planned.

F. Blackbird Island Update/Tour

Shaun Seaman said that all is well at Blackbird Island Pond and he invited the Hatchery Committees to visit the pond after the meeting today. He commended the Committees for their teamwork in helping to get the project accomplished. Fish were placed into the pond on March 27 and will likely be released in early May.

G. Reminder: Draft 2009 M&E Report Comments due by May 1

Julie Pyper reminded the Hatchery Committees that the Draft 2009 M&E Report comments are due May 1 and Chelan PUD anticipates approval of this at the May meeting.

IV. Douglas PUD

A. Subyearling Summer Chinook Escape from Wells Hatchery

Pat Phillips updated the group that several thousand hatchery subyearling summer Chinook (sized 60 to 75 millimeters) have been observed arriving at Rocky Reach Dam; CWTs indicate an escape from Wells hatchery at some point. This escape likely happened at the time of marking (approximately 3 weeks ago), but the exact cause is not known at this time. Kirk Truscott asked whether Chelan PUD might be able to look at the number of fish that entered the Rocky Reach bypass and provide information to calculate a rough estimate of the number of fish that may have escaped. Joe Miller confirmed that he would do this.

B. Update on Twisp Acclimation Ponds

Pat Phillips said that a large log/ice jam upstream of the Twisp weir could block the water intake to the Twisp acclimation pond once the ice melts. Currently, fish have not been moved into the pond, but WDFW is willing to accept the potential risk and is poised to place fish in the pond if there is Hatchery Committees approval. Phillips said that if the river were to begin to quickly rise, increasing the likelihood of a blockage, fish in the pond could be released in a matter of several hours. Alternatively, to avoid this situation, fish could be drop-planted upstream instead of placed into the pond. Because of the value of even a short acclimation, the Committees agreed to accept the potential risk of moving fish into the pond. WDFW will meet with Douglas PUD to look at possible ways to minimize the possibility of water intake blockage at the Twisp holding pond in future years, and will report back at the June Hatchery Committees meeting.

V. WDFW / Yakama Nation

A. Presentation: Wenatchee Spring Chinook Implementation Plan

Keely Murdoch began the presentation by acknowledging that the group preparing the plan is still meeting to discuss further issues. The plan is essentially a set of principles to guide the management of spring Chinook in the Wenatchee basin, to document the rationale for various goals and targets, and to provide a reference for operations on an annual and long-term basis. The general approach is to use genetic data to segregate all unmarked spring Chinook arriving at Tumwater Dam based on tributary-of-origin, and use this information for broodstock collection and decisions to pass fish upstream for natural spawning.

Management priorities of the plan are to meet mitigation objectives, meet escapement goals, and implement the first two priorities so that proportion of natural influence (PNI) goals will be met. Management objectives for recovery are based on the Viable Salmon Population (VSP) parameters of abundance, productivity, spatial structure, and genetic diversity. Adult management methods will include pre-season run sizes and in-season run size updates. The Off-Ladder Adult Fish Trap (OLAFT) at Priest Rapids Dam will be used to collect unmarked, returning adults and conduct parental broodstock genetic testing. Broodstock needed will consist of natural origin recruits (NOR) and hatchery origin recruits (HOR). Percentages of NOR and HOR taken will depend on fish numbers and timing of arrival at Tumwater Dam. The goal will be to typically take 33 percent, with a maximum of 40 percent, of the NOR for broodstock. Weekly escapement goals will be in place and used to determine how many HOR fish should be passed upstream of the Tumwater Dam to spawn depending on the number and origin of fish arriving weekly. The plan includes contingency planning for short- and long-term scenarios. Monitoring and evaluation will occur in coordination with Chelan PUD's M&E Plan, as well as the performance standards listed in this implementation plan.

The Hatchery Committees discussed some of the questions that came up during the presentation. The Committees requested more time to internally process the information that was presented today and to have an opportunity to ask questions. Ali Wick will send this presentation to the Committees. Julie Pyper will let the Committees know when Chelan PUD can provide a draft HGMP to the Committees, minus the sections that NMFS and WDFW/YN still need to discuss. The Committees will likely need an extension on the submittal date to NMFS because of limited NMFS staff availability to meet to discuss until early May. Rob Walton indicated that NMFS would be flexible on a submission date as long as good progress was being made toward completing the HGMP.

VI. USFWS

A. Leavenworth Strays at Tumwater Dam: 2009 Management Activities Update

Dave Carie provided a memorandum from the USFWS detailing plans for removal of ad-clipped and non-Coded-Wire-Tagged (CWT) Leavenworth Hatchery strays at Tumwater Dam. He acknowledged that this action may lead to unintentionally removing Chiwawa Hatchery fish that have shed CWT tags. Carie confirmed that any mortalities would be

passed through a tunnel CWT detector at Leavenworth Hatchery in order to document any tagged Chiwawa fish.

Carie noted that these fish cannot be distributed for human consumption because they have been treated with MS-222; Tom Scribner said that he was uncomfortable with the idea of euthanizing these fish and not using them. Carie said that there may be a possibility of holding them in a raceway, but he could not be sure about this. To follow up, Scribner will call Bill Gale and Ray Brunson at USFWS to discuss this matter.

VII. HCP Administration

A. Meeting Agreements Not Requiring an SOA

- The Hatchery Committees approved the 2008 Summer/Fall Chinook Pilot Water Reuse Study Report, with the addition of a water quality appendix (Item III-A).
- The Hatchery Committees approved WDFW holding adult sockeye at Eastbank as described in the March 27, 2009, WDFW memo on the recommendation for short-term adult sockeye broodstock holding at Eastbank Hatchery (Item III-D).
- The Hatchery Committees agreed that WDFW could proceed with placing fish into the Twisp acclimation pond (Item IV-B).

B. Next Meetings

The next scheduled Hatchery Committees meetings are as follows: May 20, June 17, and July 15; all meetings will be at the Chelan PUD offices in Wenatchee.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Shaun Seaman *	Chelan PUD
Julie Pyper *	Chelan PUD
Joe Miller	Chelan PUD
Alene Underwood	Chelan PUD
Sam Dilly	Chelan PUD
Gregg Carrington	Chelan PUD
Jerry Marco *	Colville Tribes
Rick Klinge *	Douglas PUD
Tom Kahler *	Douglas PUD
Shane Bickford	Douglas PUD
Russell Langshaw	Grant PUD
Todd Pearsons	Grant PUD
Kris Petersen *	NMFS
Rob Walton	NMFS
Dave Carie *	USFWS
Bob Pfeifer	WDFW
Pat Phillips	WDFW
Kirk Truscott *	WDFW
Tom Scribner *	Yakama Nation
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

MEMORANDUM

To:	Rocky Reach and Rock Island HCP Hatchery Committees	**Date:**	June 8, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Steve Hays, Heather Bartlett,		
Re:	Final Minutes of May 11, 2009 HCP Rock Island and Rocky Reach Hatchery Committees Conference Call		

The Rock Island and Rocky Reach Hydroelectric Projects Habitat Conservation Plans (HCPs) Coordinating Committees met via conference call on Monday, May 11, 2009, from 1:00 pm to 2:45 pm regarding comments on and the schedule for the Wenatchee Spring Chinook Management Plan. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Jeff Korth will send the Management Implementation Plan (MIP) draft to the Yakama Nation (YN) today or early tomorrow, and will copy National Marine Fisheries Service (NMFS) as an FYI, noting that the YN and Washington Department of Fish and Wildlife (WDFW) have not resolved the comments yet.
- The YN, NMFS, and WDFW will meet on May 14 to discuss and resolve comments to the extent possible.
- The YN, NMFS, and WDFW will send a document to the Hatchery Committees on Monday, May 18, summarizing the progress of the discussions and noting whether any outstanding Hatchery Genetic Management Plan (HGMP) issues will be resolved by the May deadline.
- The Hatchery Committees will discuss the MIP at the Hatchery Committees meeting on Wednesday, May 20.

DECISION SUMMARY

- No Hatchery Committees decisions were made at this meeting.

I. Wenatchee Spring Chinook Management Implementation Plan (Mike Schiewe)

Mike Schiewe stated that the purpose of today's call is to review Hatchery Committees' comments on the Wenatchee spring Chinook MIP, and establish a schedule to resolve outstanding issues. Kirk Truscott said that WDFW is currently reviewing comments submitted by Committees members and the draft comments that NMFS circulated to the Committees today. He noted that review will require additional time, as responses will need to be vetted with the YN. Jeff Korth said that WDFW is currently rewriting certain sections and is prepared to submit a revised draft MIP to the YN today or tomorrow. Mike Schiewe reminded everyone that information in the MIP is needed to complete the Wenatchee spring Chinook HGMP, and it may be that the MIP will not be finished in time to supply this information to Chelan PUD for the HGMP. Rob Jones said that NMFS understands this but is not prepared to change the HGMP deadline, which is currently May 31. Shaun Seaman said that if co-manager agreement is not reached on the MIP, Chelan PUD will be ready to submit an HGMP to NMFS based on the current program along with a cover letter that summarizes the issues that are still outstanding to ensure Chelan has met the timelines specified by NMFS. Chelan also noted their reluctance to submit an HGMP with new management actions that have not been approved by the entire HC. Chelan discussed the difficulties of meeting the current timeline based on the level of work still to be completed and the uncertainty of reaching consensus in time to complete the HGMP.

The Rocky Reach and Rock Island Hatchery Committees members on the call today and the HGMP authors agreed to the following steps and schedule:

- Jeff Korth will send the MIP draft to the YN today or early tomorrow, and will copy NMFS as an FYI, noting that the YN and WDFW have not resolved the comments yet.
- The YN, NMFS, and WDFW will then meet on May 14 to discuss and resolve comments to the extent possible.
- The YN, NMFS, and WDFW will send a summary document to the HC on Monday, May 18, summarizing the progress of the discussions and noting whether any outstanding HGMP issues will be able to be resolved by the May deadline.
- The Hatchery Committees will discuss the MIP at the Hatchery Committees meeting on Wednesday, May 20. If the Hatchery Committees agree with the way that the YN, NMFS, and WDFW have addressed comments to the MIP, then the Hatchery

Committees will set a schedule for finalizing the HGMP for the purposes of meeting the deadline.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Julie Pyper *	Chelan PUD
Alene Underwood	Chelan PUD
Steve Hays	Chelan PUD
Shaun Seaman *	Chelan PUD
Jerry Marco *	Colville Confederated Tribes
Todd Pearsons	Grant PUD
Russell Langshaw	Grant PUD
Kris Petersen *	NMFS
Rob Jones	NMFS
Elizabeth McManus	Ross and Associates
Patrick Donovan	Ross and Associates
Kirk Truscott *	WDFW
Heather Bartlett	WDFW
Bob Pfeifer *	WDFW
Jeff Korth	WDFW
Bill Gale *	USFWS
Steve Parker	Yakama Nation
Tom Scribner *	Yakama Nation
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	June 25, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick , Joe Miller, Steve Hays, Shane Bickford, Bob Pfeifer, Pat Phillips		
Re:	Final Minutes of May 20, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at the Chelan PUD offices in Wenatchee, Washington, on Wednesday, May 20, 2009, from 9:30 am to 4:30 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- The Hatchery Committees will provide comments on the May 11 conference call minutes to Ali Wick by Wednesday, May 27 (Item I).
- Washington Department of Fish and Wildlife (WDFW) will meet with Douglas PUD to consider possible ways to eliminate problems with plugging of the screens at the Twisp Acclimation Pond and will report back at the June Hatchery Committees meeting (from last meeting).
- Shaun Seaman will inform the Hatchery Committees by the end of next week whether Chelan PUD will continue to pursue Ringold Springs as a possible rearing location for HCP production summer/fall Chinook. If yes, Chelan PUD will provide a new Statement of Agreement (SOA) for Committees' discussion. (Item II-A).
- Chelan PUD will work with WDFW to develop a plan to manage non-migrating steelhead juveniles from Blackbird Island Pond. Chelan PUD will document the strategy in a letter to National Marine Fisheries Service (NMFS). A draft of the letter will be circulated to the Hatchery Committees for review by Wednesday, May 27 (Item II-D).

- Julie Pyper will provide the project schedules for the Chelan Falls summer Chinook salmon and Chiwawa steelhead rearing and acclimation facilities to Ali Wick for distribution to the Hatchery Committees (Item II-E).
- Julie Pyper will send out a draft letter to the Hatchery Committees that they can use to document their support for Chelan PUD's water right application at the Chelan Falls and Chiwawa River acclimation and rearing facilities; this letter will include information on minimum flow, average flow, and minimum instream flows at the Plain gauge (Item II-F).
- By the end of next week, Keely Murdoch will check with Tom Scribner to ensure there is no U.S. v. Oregon issue if the Wells Dam survival verification study fish are not marked with coded-wire-tags (CWTs) (Item III-E).
- Kirk Truscott will check with WDFW research staff to determine if not marking the Wells Dam survival verification fish with a CWT will adversely affect the HCP hatchery Monitoring and Evaluation (M&E) programs (Item III-E).
- By July, Chelan PUD will investigate options for handling fish at Tumwater Dam to support varied uses of surplus fish (Item IV-B).
- Bill Gale will provide information to Keely Murdoch on how the Entiat summer Chinook program could potentially impact the HCP coho program; (Item V-A).
- Kris Petersen will send Bill Gale comments on the SOA for the proposed summer Chinook program at Entiat Hatchery (Item V-A).
- Bill Gale will provide a revised draft of the SOA for the summer Chinook program at Entiat Hatchery to the Hatchery Committees in June (Item V-A).
- The Hatchery Committees will meet by conference call on Tuesday, June 2 at 8:00 am to discuss the NMFS determination on whether the draft Wenatchee spring Chinook Management Implementation Plan (MIP) is consistent with Endangered Species Act (ESA) regulations; Grant PUD staff working on the White and Nason Creek Hatchery Genetic Management Plans (HGMPs) will be invited to participate. Ali Wick will send out a conference call line for this call (Item VI-A).
- Kris Petersen noted that Chuck Peven has been hired as a contractor to write "Status of the Species" sections for the Upper Columbia Hatchery Biological Opinions; she will ask Peven to check with Bill Gale and Ali Wick regarding the schedule for completing these sections (Item VI-A).
- Ali Wick will send the previously-approved SOA for Okanogan spring Chinook out to the Hatchery Committees for their information (Item VII-A).

DECISION SUMMARY

- There were no decision items approved at this meeting.

I. Welcome

The Hatchery Committees approved the April 15 meeting minutes. Ali Wick will distribute the final Minutes to the Hatchery Committees. The Committees will provide comments on the May 11 conference call minutes to Wick by Wednesday, May 27. These will be approved by email.

II. Chelan PUD

A. SOA for Possible Use of Ringold Springs Hatchery

Julie Pyper summarized a Chelan PUD proposal to test rear 200,000 summer/fall Chinook (2008 brood) at the Ringold Springs Hatchery during the summer of 2009. The purpose of the test would be to evaluate Ringold Springs as an alternative to Eastbank Hatchery, and thereby reduce demand for water from the Eastbank Aquifer. After the summer rearing period, these fish would be transferred to the Bonaparte Rearing Pond in October 2009 for over-winter rearing and acclimation, followed by release in the Okanogan River in spring 2010. If fish are successfully produced in 2009, Chelan PUD will propose using Ringold Springs Hatchery to summer rear the 600,000 yearling summer/fall Chinook that will be over-winter reared and acclimated at Chelan Falls.

Kirk Truscott raised several questions about the Chelan PUD proposal. His questions included the proposed rearing densities, the temperature regimes, and any implications for precocity. Pyper addressed these questions and described how Chelan PUD plans to consider these in the program. Bill Gale asked about what flexibility the facility has for accommodating various densities that may be needed due to disease. Kris Petersen commented that she had questions about several longer-term issues: the future of the summer Chinook program, including the role of the reuse project; long-term availability of the Ringold Springs facility; and provisions for monitoring juveniles and adults. Julie Pyper said that WDFW staff at Ringold had confirmed that the facility would be available longer-term.

Jerry Marco commented that he would like additional information about how capacity could be increased at Ringold in order to test different rearing densities. Tom Scribner commented

that in order for this proposal to go forward, WDFW would need to coordinate it with the U.S. v. Oregon Production Advisory Committee, as Ringold is currently under consideration for mitigation production for John Day Dam. He also had concerns about high density rearing, as some of the facility's water supply is from irrigation return flow. Shaun Seaman addressed some of Petersen's concerns regarding the direction of the future of the summer Chinook program, saying that Chelan PUD is pursuing this proposal as part of its long-term plan to protect the Eastbank aquifer, primarily in terms of temperature. Seaman said that by the end of next week, Chelan PUD will make a decision on whether it will pursue Ringold as a rearing location. If their decision is to pursue this option, then Chelan PUD will provide a new SOA for Hatchery Committees' discussion.

B. CRITFC Use of Tumwater Dam

Julie Pyper notified the group that Columbia River Inter-Tribal Fish Commission (CRITFC) notified the District they will use Tumwater Dam for their annual sockeye data collection at Tumwater Dam. Keely Murdoch said that there may be efficiencies for coordinating with the Sockeye Enumeration Study because fish could be tagged for the sockeye study at the time that fish will already be anesthetized for CRITFC data collection.

C. Sockeye Enumeration Study Update

Joe Miller updated the group that the Passive Integrated Transponder tag (PIT-tag) detectors for this study are ready to be installed.

D. Blackbird Island Pond Update

Shaun Seaman updated the group that the water level in the Wenatchee River at Blackbird Island Pond is so high that water is not exiting the pond and it appears the juvenile steelhead have ceased to volitionally leave the pond. Chelan PUD is seeking ideas for encouraging the fish to migrate and ideas for how to manage non-migrating steelhead juveniles. There is concern that the non-migrant steelhead, if released into the Wenatchee River after the flow subsides, might pose a predation risk to juvenile salmonids. Chelan PUD will work with WDFW to develop a proposed management plan that will be forwarded to NMFS for evaluation for consistency with their ESA permit. The draft plan will be distributed to the Hatchery Committees for review by Wednesday, May 27.

E. Hatchery Program Summary

Julie Pyper distributed spreadsheets that summarized the timelines for planning and permitting new hatchery facilities at Chelan Falls and the Chiwawa Rearing Ponds, and she invited several Chelan PUD staff to summarize for the Hatchery Committees selected aspects of the projects. George Velazquez gave an update on the design phases of the Chiwawa and Chelan Falls rearing facilities, and Waikele Hampton answered several questions on permitting issues. Velazquez reviewed the schedule for tracking important dates and activities. Pyper will provide these schedules to Ali Wick for distribution to the Committees.

F. Ecology Letters for Chiwawa Cost Reimbursement regarding Water Right

Julie Pyper informed the Hatchery Committees that the Washington State Department of Ecology (Ecology) has asked for letters of support from the Hatchery Committees for the water right applications for the new Chiwawa rearing facilities for summer steelhead. Pyper will provide Committees members with a draft letter to consider and help with their response to the request. The letter will include information on average flow and minimum instream flows at the Plain gauge.

G. 2008 Chelan PUD M&E Report

Julie Pyper reminded the Hatchery Committees that comments on the 2008 Chelan PUD M&E Report were due May 1; however, Chelan PUD has extended the deadline to June 1 to accommodate a WDFW request. Chelan PUD will plan to finalize the document at either the June or July 2009 meetings. The overall M&E Report schedule will be revised over the coming year.

H. 2010 M&E Implementation Plan Due Date

Julie Pyper requested an extension for distribution of the Chelan PUD 2010 M&E Implementation Plan, which was originally due June 1. The Committees agreed that the new distribution date will be July 1.

I. Preliminary PIT-tag Readings at McNary Dam

Steve Hays reported some preliminary information on McNary Dam detections of juvenile summer Chinook from the Pilot Water Re-use Study. So far, there has been about a 3.5:1 ratio of pilot water re-use study fish compared to raceway-reared fish arriving at McNary. Hays was unsure at this time whether there will be enough fish detected to estimate survival.

J. Chiwawa Steelhead Pilot Water Re-use Update

Julie Pyper said that the design for the Chiwawa steelhead pilot water re-use study is proceeding as expected. The current plan is to implement the study in fall 2009.

K. Hatchery Improvement Budgets

Shaun Seaman alerted the Hatchery Committees that Chelan PUD's budgets for hatchery activities were limited this year due to the general economic downturn. Changes to Chelan PUD's bond rating have made it more difficult and expensive to borrow capital for projects.

III. Douglas PUD

A. CRITFC Request for Adult Sockeye at Wells

Tom Kahler reported that CRITFC had requested access to the Wells Dam adult ladder to sample and tag adult sockeye salmon. He indicated that the request was for collecting scale samples from 400 fish, and for acoustic tagging an additional 100 fish. Keely Murdoch said that she believed that that the 100 fish to be acoustic tagged were included in the 400 fish total. Murdoch also clarified that the permit specifies that sockeye trapping can occur only when WDFW is collecting summer Chinook broodstock.

Kahler noted that the main concern for the Hatchery Committees was whether this additional tagging activity would interfere with Chinook broodstock trapping, especially because of the access issues posed by the turbine rewind project at Wells Dam this year. Douglas PUD has previously said that access to the east ladder, where trapping is typically conducted, may be limited. Murdoch and Truscott agreed that there would need to be closer coordination between the Yakama Nation (YN) tagging crew and the WDFW trapping crew, so that both projects could proceed smoothly. Changes that may occur include trapping at the west ladder instead of the east ladder. The Committees agreed that the intent is for WDFW to accommodate the YN to the greatest extent possible, with the priority being collection of HCP broodstock.

B. Douglas PUD Representation on Hatchery Committees

Tom Kahler informed the Hatchery Committees that Shane Bickford will now be the alternate for Douglas PUD on the Wells Hatchery Committee.

C. New Broodstock Trap at Methow Hatchery

Tom Kahler reported that the new broodstock collection trap at the Methow Hatchery outfall has now been completed and is operational.

D. Update at Water Metering at Methow Hatchery

Tom Kahler said that Douglas PUD will be modifying the location of the water meter on Well #6 at Methow Hatchery so that it reads correctly, as it has been located in a position that is not ideal for providing accurate readings. Douglas PUD engineers and contractors will be working to rectify this situation.

E. WDFW Request to Change Mark of Future Survival Verification Study Fish

Tom Kahler said that Douglas PUD would rather not CWT yearling spring migrant Chinook fish because they will already be tagged externally and PIT-tagged. Keely Murdoch will check with Tom Scribner to ensure there is no U.S. v. Oregon issue if the CWT mark is eliminated. Kirk Truscott will check with WDFW staff to ensure there would not be an adverse effect on Douglas or Chelan PUD HCP M&E implementation. Murdoch and Truscott will report back to the Hatchery Committees by the end of next week.

IV. Yakama Nation

A. Lake Cle Elum Sockeye Reintroduction

Tom Scribner reported that he had recently provided a proposal to the U.S. v. Oregon Production Advisory Committee (PAC) for Lake Cle Elum sockeye reintroduction. The proposal has been approved by the PAC. The proposal specified the collection of the initial broodstock at either Priest Rapids or Wells dam. Julie Pyper noted that it was important that broodstock collection for this new program did not compromise broodstock collection for the existing Skaha Lake program, and will follow up with Howie Wright regarding Okanogan Nation Alliance future needs to see if there may be some impact. Currently, Chelan PUD does not believe that there are any issues but also wanted to ensure that the Lake Wenatchee sockeye program was not impacted by the collections.

B. Use of Fish Anesthetics at Tumwater Dam and other Adult Trapping Locations

Tom Scribner raised the topic of the use of fish anesthetics that limits the use of the fish for harvest or human consumption. He noted that if MS-222 is used at Tumwater Dam, then there is a 21-day required lag time between MS-222 anesthesia and release of fish back into

the fishery or outplanting that could result in human consumption. Scribner asked the Hatchery Committees for their current thinking regarding potential other anesthetics that would provide more flexibility for beneficial use of these fish following anesthesia. Shaun Seaman indicated that Chelan PUD will, by the July HC meeting, investigate options for handling fish at Tumwater Dam to support varied uses of surplus fish. The Joint Fisheries Parties (JFP) agreed to meet and discuss future adult management options and, in particular, the disposition of surplus Leavenworth Hatchery adults captured at Tumwater Dam.

C. Fish Ladder Filming

Tom Scribner mentioned that a videographer he knew had inquired about filming in the Wells Dam fish ladder. Scribner will discuss this request with Douglas PUD.

V. USFWS

A. Wells/Entiat Summer Chinook Collection SOA

Bill Gale introduced a SOA that had been previously sent to the Hatchery Committees that described broodstock collection for a new summer Chinook program at Entiat Hatchery. Gale asked for feedback on the SOA. He indicated that he hoped to obtain Hatchery Committees' approval before taking the proposal to the U.S. v. Oregon PAC. Keely Murdoch indicated that the YN would like some information on how this could potentially impact the coho program; Gale agreed to provide this information. Tom Kahler thanked Bill for including Douglas' suggestion for collection of broodstock from the hatchery outfall channel rather than the Wells ladder traps

Jerry Marco said that the Colvilles are not ready to approve the SOA, and that they will not be prepared to consider it until after the next summer Chinook summit on June 11. Committee members agreed to provide comments on the SOA by June 3; Gale will provide a revised draft to the Committees in June. The Committees will discuss the SOA again in June.

B. Methow River Brood Collection at Winthrop Hatchery

Bill Gale summarized for the Hatchery Committees that the U.S. Fish and Wildlife Service (USFWS) completed an investigation of methods for collecting steelhead broodstock for Winthrop Hatchery. Results were that hook-and-line sampling was the most effective method, and that collecting broodstock at Foghorn Dam was not a realistic option because fish avoid the trap at the dam.

VI. All Committees

A. HGMP Update

- *Wenatchee Programs*

The Wenatchee steelhead HGMP has been submitted to NMFS. Kris Petersen said that NMFS has completed a preliminary review and will provide comments to Chelan PUD on the HGMP by June 8.

The Wenatchee spring Chinook HGMP is still in progress. The YN, WDFW, and NMFS will be meeting again on June 1 to discuss revision of the plan. Kris Petersen said today that immediately after the June 1 meeting, NMFS would inform the Hatchery Committees whether the MIP was consistent with ESA requirements and was appropriate to consider in preparation of the Chiwawa spring Chinook HGMP. If not, NMFS would work directly with Chelan PUD to prepare an HGMP that was consistent with NMFS ESA regulatory responsibility. Rob Walton confirmed that in either case a draft HGMP is due to NMFS on June 17. Shaun Seaman confirmed that Chelan PUD will deliver an HGMP to NMFS by this date, but reminded the Committees that there would not be time for the draft to be approved by the full Committees before submission. There was no further discussion on this point. The Hatchery Committees will meet by conference call on Tuesday, June 2 at 8:00 am to receive guidance from NMFS on the acceptability of the draft YN and WDFW spring Chinook MIP; Grant PUD staff working on the White and Nason Creek HGMPs will be invited to participate. Ali Wick will send out a conference call line for this call.

- *Methow and Okanogan spring Chinook and Steelhead Programs*

Mike Schiewe asked the Hatchery Committees members about their interest in participating in preparation of the Methow and Okanogan HGMPs. The group agreed that Douglas PUD, WDFW, USFWS, and Anchor QEA staff would participate in the early drafting workgroup. The YN and Chelan PUD will be part of the review process, but not in early drafting. The Colvilles will be involved in the early drafting of the Okanogan steelhead HGMP, and will be involved in review of the Methow steelhead and Methow spring Chinook HGMPs. Kris Petersen noted that Chuck Peven has been hired as a contractor to write "Status of

the Species" sections for the Upper Columbia hatchery program Biological Opinions. Petersen will ask Peven to contact Bill Gale and Ali Wick regarding the schedule.

In response to a question from Kris Petersen as to the status of the WDFW Region 2 Steelhead Plan, Kirk Truscott said that WDFW is almost finished developing the plan.

VII. Colville Tribes

A. Chief Joseph Hatchery Tier 2 Approval Secured

Jerry Marco updated the group that Step 2 approval by the Northwest Power Planning and Conservation Council has been secured for Chief Joseph Hatchery. As a follow-up to questions about the status of mitigation for Okanogan spring Chinook required by the HCP, Ali Wick will send the previously approved SOA for Okanogan spring Chinook to the Hatchery Committees for their information.

VIII. HCP Administration

A. Meeting Agreements Not Requiring an SOA

- The JFP agreed to meet and discuss future adult management and disposition of surplus fish at Tumwater Dam.
- The Hatchery Committees agreed that the Chelan PUD 2010 M&E Implementation Plan will now be due July 1.

B. Next Meetings

The next scheduled Hatchery Committees meetings are as follows: June 17, July 15, and August 19; all meetings will be at the Chelan PUD offices in Wenatchee.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Shaun Seaman *	Chelan PUD
Julie Pyper *	Chelan PUD
Joe Miller (afternoon only)	Chelan PUD
Waikele Hampton (afternoon only)	Chelan PUD
Steve Hays	Chelan PUD
George Velasquez	Chelan PUD
Jerry Marco *	Colville Tribes
Tom Kahler *	Douglas PUD
Russell Langshaw	Grant PUD
Todd Pearsons	Grant PUD
Kris Petersen * (by conference call)	NMFS
Rob Walton (by conference call)	NMFS
Bill Gale *	USFWS
Bob Pfeifer	WDFW
Pat Phillips	WDFW
Kirk Truscott *	WDFW
Tom Scribner * (by conference call)	Yakama Nation
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Rocky Reach and Rock Island HCP Hatchery Committees	**Date:**	July 15, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Steve Hays, Joe Miller, Alene Underwood, Todd Pearsons, Russell Langshaw, Steve Parker		
Re:	Final Minutes of June 2, 2009 HCP Rock Island and Rocky Reach Hatchery Committees Conference Call		

The Rock Island and Rocky Reach Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met via conference call on Tuesday, June 2, 2009, from 8:00 am to 9:00 am regarding the Chiwawa Spring Chinook Hatchery Genetic Management Plan (HGMP) path forward. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- The Yakama Nation (YN) and Washington Department of Fish and Wildlife (WDFW) will send a revised draft Management Implementation Plan (MIP) to the Hatchery Committees by the close of business on Friday, June 5.

DECISION SUMMARY

- No Hatchery Committees decisions were made at this meeting.

I. Wenatchee Spring Chinook Management Implementation Plan and Hatchery Genetic Management Plan (Mike Schiewe)

Mike Schiewe stated that the purpose of today's call is to hear and discuss the National Marine Fisheries Service (NMFS) guidance on whether the draft Wenatchee Spring Chinook MIP prepared by the YN and WDFW staff is appropriate to consider in preparing the Chiwawa spring Chinook HGMP. Kris Petersen began by saying that NMFS met over the past week with the YN and WDFW to work through several issues in the MIP and it appears that the MIP's approach would be appropriate for inclusion in an HGMP. Rob Walton added that NMFS would accept such an HGMP to initiate Section 10 consultation leading to a new

permit. Shaun Seaman asked for clarification, as Chelan PUD is not submitting the HGMP as a Section 10 application. Rob Walton responded that NMFS believes it is highly likely that a new permit will be needed. Kris Petersen said that it would likely be a 10-year permit.

Keely Murdoch provided an overview of the MIP for the group. The MIP is based on both a conservation component and a safety net (segregated) component. The conservation component would in most years have a percent natural origin broodstock (PNOB) of 100 percent. Returning hatchery fish would be used in the safety net program. Murdoch further explained that the plan includes a sliding scale for Proportion Natural Influence (PNI) goals based on natural origin run size. Kris Petersen commented that implementation of this plan is not dependent on using the parental-based tagging (PBT) and genotyping approach, although the concept of PBT is being contemplated.

Keely Murdoch said that the YN and WDFW currently plan to have the MIP ready for delivery to the Hatchery Committees by June 8. Shaun Seaman expressed concern that it will be difficult for Chelan PUD to complete the HGMP by the NMFS deadline of June 17, including Hatchery Committees agreement on the document. After this discussion, the YN and WDFW agreed to send the final MIP to the Hatchery Committees for review by the close of business Friday, June 5. The Committees agreed to re-convene by conference call at 9:00 am on Tuesday, June 9, to discuss outstanding issues and concerns, and to review how the MIP will be integrated into the HGMP.

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Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Julie Pyper *	Chelan PUD
Joe Miller	Chelan PUD
Alene Underwood	Chelan PUD
Steve Hays	Chelan PUD
Shaun Seaman *	Chelan PUD
Jerry Marco *	Colville Confederated Tribes
Todd Pearsons	Grant PUD
Russell Langshaw	Grant PUD
Kris Petersen *	NMFS
Rob Walton	NMFS
Bob Pfeifer *	WDFW
Kirk Truscott *	WDFW
Bill Gale *	USFWS
Steve Parker	Yakama Nation
Keely Murdoch *	Yakama Nation

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ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
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FINAL MEMORANDUM

To:	Rocky Reach and Rock Island HCP Hatchery Committees	**Date:**	July 15, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Alene Underwood, Tom Kahler, Russell Langshaw, Todd Pearsons, Steve Parker		
Re:	Final Minutes of June 9, 2009 HCP Rock Island and Rocky Reach Hatchery Committees Conference Call		

The Rock Island and Rocky Reach Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met via conference call on Tuesday, June 9, 2009, from 9:00 am to 10:30 am regarding the Wenatchee spring Chinook Hatchery Genetic Management Plan (HGMP). Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Ali Wick will send out call information for a follow up call on June 23 at 2:00 pm (subsequently rescheduled to 12:30 pm).

DECISION SUMMARY

- No formal Hatchery Committees decisions were made at this meeting.

I. Wenatchee Spring Chinook Management Implementation Plan and Hatchery Genetic Management Plan (Mike Schiewe)

Mike Schiewe stated that the purpose of today's call is to discuss the path forward for incorporating components of the draft Wenatchee Spring Chinook Management Implementation Plan (MIP) (prepared by Washington Department of Fish and Wildlife [WDFW] and the Yakama Nation [YN]) into a draft Chiwawa Spring Chinook Hatchery Genetic Management Plan (HGMP) .

Mike Schiewe started the discussion by inviting attendees to discuss big picture issues that were of continuing concern or needed clarification. Shaun Seaman said that Chelan PUD has a list of questions that they would like addressed. Jerry Marco said that the Colville

Confederated Tribes (CCT) also have a list of questions, primarily on the "safety net" program. Kris Petersen and Bill Gale both said that their agencies have no major concerns at this time, but needed more time to review the document and wanted to reserve the opportunity for additional comment. Keely Murdoch said that she had no questions. Steve Parker said that he has concerns about some of the harvest provisions included in the MIP; Parker stated that he also had questions about the interaction and integration of the Chelan PUD program in the Chiwawa River and the Grant PUD programs in the White River and Nason Creek. Kirk Truscott said that his main concerns related to the transition from the current to future programs, and to certain provisions of the safety net program.

Mike Schiewe reminded the group that the submittal date to National Marine Fisheries Service (NMFS) is June 17. Shaun Seaman said that Chelan PUD's timeline will be to deliver the HGMP to NMFS and the Hatchery Committees as a draft on June 17. Chelan PUD will copy and paste relevant sections from the MIP into the HGMP draft as red-line edits. Seaman said that Chelan PUD would also be incorporating their institutional comments directly into the draft document. The cover letter will clearly indicate that the HGMP is a draft and will require additional review and editing by the Hatchery Committees before it can be considered a final HGMP. Schiewe encouraged those Hatchery Committees members who also have comments on any aspects or feature of the MIP to provide those to Chelan PUD by close of business on June 16 in the form of a letter to be attached to the MIP, which, in turn, will be an attachment to the HGMP. Jerry Marco indicated that the CCT would be submitting comments in the letter directly to NMFS, but was not certain that it would be ready by the June 16 deadline. Bill Gale indicated that it was unlikely that the U.S. Fish and Wildlife Service (USFWS) would submit a letter with comments at this time.

Shaun Seaman asked about any future purposes or uses for the MIP beyond informing the preparation of the HGMP. Steve Parker said that from the YN perspective, the plan is a resource document that records co-manager intent for the program. Kirk Truscott agreed and also added that it is a management plan that may be required to undergo an agency approval process; he will clarify this within WDFW and report back to the Hatchery Committees.

Schiewe then moved to specific comments on the document itself. These are captured here, but will be expanded upon in the comment letters and in further discussions to take place in the future:

1) Section 2.1: Chelan PUD requested clarification on how some of the background data were used in developing the plan. Keely Murdoch said that the recruit/spawner values were used to construct the Beverton-Holt curves. Seaman said that Chelan PUD has additional technical questions about this, and will work these out with Murdoch and Bob Pfeifer (key authors of the document).
2) Chelan PUD requested that more information be provided on the details and necessity for compositing broodstock. Keely Murdoch said that for smaller programs, the need to composite broodstock will be very low.
3) Chelan PUD requested that more information on agency roles and responsibilities be included in the MIP; Mike Schiewe suggested that the most appropriate place to address roles and responsibilities would be in the HGMP.
4) Chelan PUD requested more information on how the issue of any non-migratory spring Chinook would be handled. Keely Murdoch said that high levels of residualism are not anticipated; thus, specific information has not been included in the MIP.
5) Chelan PUD requested additional information on future plans for releasing smolts, including whether the YN would pursue additional acclimation sites with Fish Accord funding. Steve Parker indicated that no final decisions had been made, but that additional acclimation facilities were definitely under consideration.
6) Chelan PUD asked if Proportion Natural Influence (PNI) goals might be different for the different tributary populations (i.e., the Nason Creek, White River, and Chiwawa River). Kris Petersen said that NMFS intends to adaptively manage the Wenatchee programs and that if there is large disparity in PNI between these subpopulations, then NMFS would work with the Hatchery Committees to consider alternative approaches to achieve agreed-upon goals.
7) Chelan PUD asked whether Tables 5 and 6 were based on the equilibrium population (N_{eq}). Keely Murdoch said that the tables are for information only, as this plan is based on meeting PNI goals and not N_{eq}.
8) Chelan PUD asked about any changes to the Monitoring and Evaluation (M&E) plan that were contemplated in the document. Keely Murdoch said that there were no M&E additions suggested, but several new monitoring questions were added that could be addressed with information already being collected. She said that these new aspects of the MIP will likely need to be reviewed on the existing 5-year M&E review cycle. The group discussed that the M&E Plan may need to be modified to address this.

9) Chelan PUD asked several questions about the marking scheme, and will talk offline with Murdoch and Pfeifer about this.
10) The CCT expressed concern about the impacts of a non-selective fishery, primarily how a non-selective fishery would avoid indirect harvest of natural origin fish. Steve Parker said that this issue was still being worked out, but one tool that could be used would be to segregate the two fisheries from one another by differential release strategies.
11) Grant PUD requested more details on the safety net program, including release strategies, numbers, and locations. Keely Murdoch said that the logistics of the program were still under discussion. One option might be to do split releases in both the parent tributary and minor spawning areas.

Regarding schedule, Kris Petersen said that NMFS would likely provide comments on the draft HGMP submitted on June 17 approximately 1 to 2 weeks following submittal. Mike Schiewe scheduled a Hatchery Committees call on Tuesday, June 23, from 2:00 pm to 3:00 pm to reconvene and discuss the next steps. Ali Wick will send out call-in information.

List of Attachments

Attachment A – List of Attendees

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Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Julie Pyper *	Chelan PUD
Alene Underwood	Chelan PUD
Shaun Seaman *	Chelan PUD
Jerry Marco *	Colville Confederated Tribes
Tom Kahler	Douglas PUD
Todd Pearsons	Grant PUD
Russell Langshaw	Grant PUD
Kris Petersen *	NMFS
Bob Pfeifer *	WDFW
Kirk Truscott *	WDFW
Bill Gale *	USFWS
Steve Parker	Yakama Nation
Keely Murdoch *	Yakama Nation

* Denotes Rocky Reach and Rock Island Hatchery Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	July 15, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Steve Hays		
Re:	Final Minutes of June 17, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at the Chelan PUD offices in Wenatchee, Washington, on Wednesday, June 17, 2009, from 9:30 am to 3:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Julie Pyper will talk to Washington State Department of Ecology (Ecology) staff about what additional support from the Hatchery Committees members is needed for WDOE to approve minimum flows at the Chiwawa facility (Item I).
- Andrew Murdoch will provide the results of the 2009 study comparing Passive Integrated Transponder tag (PIT-tag) shedding rates between fish tagged in the body cavity versus those tagged in the pelvic girdle (Item II-A).
- Andrew Murdoch will provide the Hatchery Committees a summary of the literature on effects of Floy tags alone and multiple tagging and markings on survival of salmonids (Item II-A).
- Keely Murdoch will provide recent Yakama Nation (YN) information on Floy tagging of coho salmon to Andrew Murdoch (Item II-A).
- Andrew Murdoch will prepare a draft Statement of Agreement (SOA) on Washington Department of Fish and Wildlife's (WDFW's) proposal to evaluate spawn timing and location of hatchery and wild steelhead in the Upper Columbia Basin for consideration at the July meeting (Item II-A).
- Ali Wick will provide a link to the draft Washington Fish and Wildlife Commission policy on hatchery reform (Item II-C).
- Julie Pyper will provide the Hatchery Program Summary by email (Item III-A).

- Kirk Truscott will talk to Todd Miller about timing for installing PIT-tag detection arrays in the Little Wenatchee and White River by July 1, given current runoff predictions (Item III-B).
- Kris Petersen will provide the Hatchery Committees with the National Marine Fisheries Service (NMFS) letter approving the WDFW and Chelan PUD request to shut off the Blackbird Island pond outlet (Item III-D).
- Kirk Truscott will talk to Art Viola about creel census work for the Blackbird Island pond youth fishery (Item III-D).
- Julie Pyper and Kirk Truscott will coordinate a mark/recapture sampling prior to the start of the Blackbird Pond youth fishery (Item III-D).
- Julie Pyper will send out the final SOA on use of Ringold Springs Hatchery for rearing summer Chinook prior to transfer to Bonaparte Pond (Item III-E).
- Bill Gale will provide the Wells/Entiat Summer Chinook Collection SOA, showing tracked changes (Item V-A).
- Kris Petersen will email out today's handout on the Endangered Species Act (ESA) consultation process for new hatchery permits (VII-A).
- Ali Wick will send out conference line information for a call on June 23 at 12:30 pm to address the following issues: (1) NMFS' response to the draft Wenatchee spring Chinook Hatchery Genetic Management Plan (HGMP); (2) NMFS comments on the Wenatchee spring Chinook HGMP; (3) approval of the U.S. Fish and Wildlife Service (USFWS) Wells/Entiat Summer Chinook Collection SOA (Items V-A and VIII-A).
- Kris Petersen will provide to the Hatchery Committees NMFS' response letter on the draft steelhead HGMP (Item VIII-A).
- Ali Wick will re-send the Non-Target Taxa of Concern (NTTOC) decision document to the Hatchery Committees, for discussion this fall (Item VIII-B).
- Ali Wick will talk to Mike Schiewe about which version of the hatchery programs will be analyzed by the NTTOC panel—the current programs or the HGMP-proposed hatchery programs (Item VIII-B).
- Ali Wick will resend the draft study proposal review and approval protocols to the group and remind them of where they left off on the discussion (Item VIII-D).

DECISION SUMMARY

- The Hatchery Committees approved the SOA for Possible Use of Ringold Springs Hatchery, as modified at today's meeting.

I. Welcome, Agenda Review, Meeting Minutes

Ali Wick will incorporate recommended changes and redistribute the revised final May 20 meeting minutes to the Hatchery Committees for final approval by email. During the review of Action Items from the last meeting, it was discussed that Julie Pyper will talk with Ecology staff about what is still needed from the Hatchery Committees members regarding minimum flows at the Chiwawa facility.

II. WDFW

A. *Preliminary results and recommendations for implementation of Objective 2 for the HCP M&E Plan (Andrew Murdoch*.)

Andrew Murdoch provided hard copies of preliminary results of an evaluation of 2009 steelhead spawn timing and distribution in the Twisp River, and recommendations for next year's evaluation. Results indicate that the combination of PIT-tags and Floy tags is a good approach for determining spawn timing and distribution for steelhead. Andrew Murdoch proposed the double-tagging approach for an additional year, with a report back to Hatchery Committees for future work. If it is determined that there is enough data to evaluate spawning timing and distribution of wild steelhead, then the evaluations will not need to be repeated annually.

Keely Murdoch voiced concern about abdominal cavity tagging because these tags are more likely to be shed at spawning, which limits collection of potential data on kelts and return spawners. She acknowledged there is currently no kelt reconditioning study being conducted, and that monitoring repeat spawners is not an objective of the current Monitoring and Evaluation (M&E) plan. However, she expressed interest in continuing to collect data on return spawners while meeting Objective 2 needs. Andrew Murdoch responded that radio telemetry was another option, but that WDFW would like to take advantage of existing PIT-tag arrays if possible. He also said that not all females lose tags, so some data will be collected, and there are already 2 to 3 years of data on returns of PIT tagged fish. The Committees asked for further information on shed rates between body tags and abdominal tags, and it was agreed that Andrew Murdoch will provide this information. Kris Petersen asked for a brief summary of the literature on effects of Floy tags and multiple tagging and markings on survival. Keely Murdoch said that the YN has some information on Floy tagging of coho and can provide this to Murdoch. WDFW would like to begin

implementation of this study next month, so Andrew Murdoch will prepare a draft SOA for consideration at the July meeting.

B. Preliminary Wenatchee spring Chinook egg-fry survival study

Andrew Murdoch presented a proposal for a NMFS Northwest Fisheries Science Center-sponsored spring Chinook egg-to-fry survival study. The proposal is to place egg boxes in two reaches of Nason Creek and two reaches of the Chiwawa River during fall of 2009 to estimate survival, with possible expansion to other tributaries in the Wenatchee subbasin or the upper Columbia Basin in later years. A similar study is in its second year in the Yakima River. Andrew summarized the study and provided a handout of the proposal. The objective is to see if there are habitat differences that contribute to some of the fitness differences between hatchery and wild fish. The proposal requires up to 5,000 HxH eggs to be collected in 2009 during spawning. WDFW would take eggs from nine females over the year to comprise the 5,000 egg take, such that any impacts to hatchery operations are minimized. HxH fish will not be released into the wild, but rather will be destroyed after hatching.

The Hatchery Committees asked several questions about the proposal. Keely Murdoch asked whether there is a plan to look at habitat effects later in the life cycle. Andrew Murdoch said that if no difference is observed, he agreed there would be a need to look at later stages in the life cycle. Andrew also commented that the study will not evaluate redd morphology, as there are differences in redd morphology across the stream in general. He acknowledged that if reduced survival is a result of redd morphology, there would be no signal in the study results. Andrew discussed the results from the Yakima River study, stating that extra eggs will be used for sentinel redds for use in determining when it is time to pull redd boxes. He stated that he does not anticipate problems with the redd boxes being scoured out, but this remains to be seen. Kris Petersen asked how sites will be selected; Andrew responded that knowledge of good spawning sites can be based on past annual surveys. Mylar ribbon will be used at each redd site to prevent fish from accidentally digging on the redd boxes.

Following these discussions, the Hatchery Committees approved the taking of 5,000 eggs in 2009 for this study.

C. Washington Fish and Wildlife Commission policy on hatchery reform

The group discussed that the Washington Fish and Wildlife Commission will consider for approval a draft policy on hatchery reform at their July Commission meeting. The draft

policy is available on the WDFW website. Kris Petersen asked if what is being proposed in the new HGMPs is consistent with proposed WDFW Commission policy, and Truscott responded that it was. Ali Wick will distribute to the Hatchery Committees a link to this policy.

III. Chelan PUD

A. Hatchery program summary

Julie Pyper provided the Hatchery Program Summary and will email a copy to Hatchery Committee members. She welcomed any questions.

B. Sockeye enumeration study update

Julie Pyper updated the group that anchors have been installed for the PIT-tag detectors in the Little Wenatchee and the White River for this study, but antenna arrays have not yet been installed due to high river flows. The arrays will be installed as soon as flows diminish. Kirk Truscott will talk to Todd Miller (WDFW) regarding expectations for getting the PIT-tag detection arrays in by July 1, given current runoff predictions.

C. Water reuse study

Steve Hays provided a handout of preliminary results of downstream PIT-tag detections from the water reuse study for the Hatchery Committees' information. Lab results from physiological testing will not be back until almost August, and the final report is not due until later this year. John Skalski will be providing single release model survival estimates to McNary Dam.

D. Blackbird Island pond

Julie Pyper said that Chelan PUD has sent a request to NMFS for concurrence to leave the non-migrant steelhead in the Blackbird Island pond to be the subject of a recreational fishery. Kris stated that NMFS has prepared a letter approving this request and expects it to be signed today. She will provide this letter to the Hatchery Committees by email.

Kirk Truscott stated that on May 27, WDFW estimated that about 10,500 fish were left in the pond (based on PIT-tag data), and approximately one-third of the remaining fish still appeared to be in a smolted condition. He said that on June 22, WDFW will conduct a mark/recapture sampling study to provide a second assessment of numbers of fish that have

left the pond. Julie Pyper said that Chelan PUD will coordinate with Truscott on this sampling before the fishery is opened. Steve Hays asked whether there would be a creel census; Truscott said that he did not believe so, but would talk to Art Viola. Julie Pyper asked that the Committees start thinking about next year's potential program. This item will be on the agenda at the July meeting.

E. Revised SOA for possible use of Ringold Springs Hatchery

Julie Pyper provided a revised SOA for the use of Ringold Springs Hatchery for early rearing of yearling summer/fall Chinook. Chelan PUD is proposing to rear up to 200,000 Chinook at a density of 0.125 and the rest at 0.20 in 2009, while collecting standard monitoring and evaluation data like that being collected at Eastbank. In the event there is a problem rearing at the 0.20 density, fish could be moved to the lower density. The fish would be reared for 6 to 12 weeks before being moved to Bonaparte for over-winter acclimation and release. The Hatchery Committees acknowledged that approval of the SOA would by default also approve use of Bonaparte Pond for acclimation. Julie Pyper reiterated that Chelan PUD is looking for a decision for 2009 only.

The Committees discussed the proposed SOA and the mechanics of the density rearing test. Bill Gale suggested looking at smolt-to-adult returns (SARs) for these various rearing densities. Steve Hays stated that looking at SARs is reasonable for the future but is not the purpose of this year's evaluation. This year's test is limited to evaluating the difference of in-hatchery rearing density effects to evaluate Ringold as a summer rearing site. Kris Petersen stated that it may be worthwhile to do different coded wire tags (CWTs) for the different rearing density groups. Chelan PUD agreed to add this to the SOA. Julie Pyper confirmed that 100 percent of the fish will be coded-wire-tagged. The Committees approved the SOA as modified, and Pyper will send out the modified final SOA to the group by Monday, June 22.

F. Lake Cle Elum sockeye reintroduction

Julie Pyper stated that there was an action item from the last Hatchery Committees meeting regarding whether sockeye broodstock proposed to be collected for the sockeye reintroduction would impact other ongoing programs. She stated that 1,000 adult sockeye will be needed for outplanting into Lake Cle Elum for the Cle Elum Sockeye Reintroduction program; 200 pairs (400 total broodstock) will be needed for egg take with Okanagan Nation

Alliance (ONA) assistance in the Okanogan River. Her understanding is that there is not yet agreement between the YN and the tribes that comprise the ONA. Kirk Truscott, Jerry Marco, and Kris Petersen all stated they expect adult sockeye collection at the Off-Ladder Adult Fish Trap (OLAFT) will occur this year. Julie stated she does not know yet if there will be an impact on the ONA sockeye program from the Cle Elum Sockeye Reintroduction program, as there is not enough data at this time.

IV. Douglas PUD

A. Request for video filming in the Wells fish ladder.

Tom Kahler reported that Douglas PUD will be requesting more information about a videographer's proposal to film in the Wells fish ladder.

B. Methow Hatchery vacuum system

Tom Kahler said that the above-ground vacuum system at the Methow Hatchery for removing waste from the production raceways is performing poorly and Douglas PUD is in the process of replacing the existing system with an underground system.

V. USFWS

A. Wells/Entiat summer Chinook collection SOA

Bill Gale said that he has made changes to the SOA that were suggested by Tom Kahler and Kris Petersen and provided copies at today's meeting. He will send out to the Hatchery Committees an electronic version with tracked changes. USFWS will coordinate with the YN on the two options for adults: 1) to split the existing ponds into two separate areas, one for coho and one for Chinook; or 2) to move Coho to a separate facility in Leavenworth where a change in production has made room available. Bill Gale said the plan is to hold adults and spawn fish at Entiat this year, and that USFWS and YN could test the two pond alternative this year.

Steve Hays asked whether USFWS had considered protecting Entiat spring Chinook from summer Chinook looking to pioneer the upper Entiat. Bill Gale said there is a location to anchor a weir in the Entiat River but that USFWS would prefer not to construct one. The Hatchery Committees agreed to vote on the SOA at the previously planned June 23 conference call, now set for 12:30 pm. Gale said that if he has support from the Hatchery

Committees, his next step would be to take the proposal to the next U.S. v. Oregon PAC meeting.

VI. Yakama Nation

A. Overwintering acclimation at Carlton and Dryden

Keely Murdoch said that Tom Scribner had sent out information on overwintering acclimation of summer Chinook parr/smolts at Carlton and Dryden, including an opportunity to partner with Grant PUD. Based on Similkameen acclimation data and from experience with overwinter acclimation in other locations, it seems like there is a large SAR benefit, as well as conservation of water, if fish are moved out of hatcheries earlier. Keely asked for input from the Hatchery Committees, saying that the JFP have agreed with the concept, but that further JFP discussion is necessary.

Steve Hays commented that overwintering acclimation outside the hatchery would not serve water conservation needs at Eastbank, because water limitations only come into play during the summer, and after that the winter water supply is not a problem. Also, for overwintering, an entirely new water right would be needed for Dryden. Julie Pyper said that from a process perspective, Chelan PUD needs to look at their 5-year M&E plan for the potential priority for overwintering at Dryden. Chelan PUD is concerned about being able to provide certainty for Grant PUD programs past 2013. Keely Murdoch responded that an agreement could be used to address these uncertainties, as this overwintering would be a high priority for the YN regardless of Grant PUD's participation. The Hatchery Committees discussed that the proposal lines up well with the HGMPs. Tom Kahler stated that after 2013, Douglas PUD may need to increase summer Chinook production, and this may preclude Grant PUD participating at Carlton because Douglas PUD has reserved the excess capacity at the Carlton Pond.

VII. NMFS

A. Overview of consultation process steps

Kris Petersen provided a handout on the steps in the ESA consultation process. She will send the handout electronically to the Hatchery Committees, for their information.

VIII. All Committees

A. HGMP updates

- *Wenatchee programs*

  Steelhead. Kris Petersen distributed NMFS' recent comment letter on the Wenatchee steelhead HGMP and will email a copy to the group. The letter provides page-by-page comments with suggestions and requested clarifications. The NMFS letter also requests that the HGMP template be followed and not include a section 13. She suggested that information in section 13 on funding responsibilities could be added into individual sections in the template, for example. Petersen stated that there is still some NMFS uncertainty as to whether the proposal to operate as a two-zone program is a feasible approach and adequate to reach recovery goals. Julie Pyper asked for clarification on whether Petersen was saying the two-zone approach is inadequate. Petersen said that NMFS could not make a call on this until after a consultation is complete, but she did say that percent hatchery-origin spawners (PHOS) are a concern.

  Pyper said that the HGMP submittal cover letter to NMFS recommended a June 23 date to convene to discuss steps forward. Ali Wick will send out call information for this discussion. Kris Petersen will provide to the Hatchery Committees NMFS' response letter on the draft steelhead HGMP (Item VIII-A).

  Spring Chinook. Julie Pyper said the draft spring Chinook HGMP will be submitted to NMFS today. NMFS' preliminary comments will be discussed during the June 23 call.

- *Methow and Okanogan programs*

  Ali Wick said that the team of parties working on the first draft Methow and Okanogan spring Chinook and steelhead HGMPs has met, tasks have been assigned, and schedules set. The approach to the programs has been vetted with NMFS and the JFP parties, and detailed discussions are underway. The Hatchery Committees will get two draft HGMPs at the close of business on July 8, for review and discussion by the July 15 Hatchery Committees meeting. One HGMP will address Methow, Twisp, and Chewuch spring Chinook programs; one HGMP will address Methow steelhead. The Methow steelhead HGMP will include Methow and Wells Hatchery fish only,

and the Okanogan program will be covered in the Colville Confederated Tribes' (CCT's) HGMP for Okanogan steelhead. Jerry Marco confirmed that the Okanogan steelhead HGMP would need to be modified to accommodate this.

B. NTTOC

Ali Wick said that, next month, the Hatchery Committees should select final panel members for the NTTOC analysis, and should set a date for the analysis. Kris Petersen suggested that the panel meet no later than end of September 2009, so that the analysis could inform the hatchery program Biological Opinions that she will be preparing. Next month, the Hatchery Committees will come prepared to select panel members. Wick will re-send the NTTOC decision document for the Committees information. Todd Pearsons asked if there would be an effort to coordinate the HCP hatchery program analysis with the Priest Rapids Coordinating Committees Hatchery Subcommittee; the Hatchery Committees noted that a decision should be made as to whether or not the analysis will be coordinated. Bill Gale asked if the analysis will be of the current program or of the planned HGMP programs. Wick will talk to Mike Schiewe about this, and this will be on the agenda for discussion at the July meeting.

C. Steelhead reproductive success study

Ali Wick reported that Mike Schiewe had talked to Bonneville Power Administration (BPA) about the potential to implement a regional steelhead reproductive success study. The feedback received was that a regional study would be appropriate, but the process involved would likely slow the study down for the needs of the Hatchery Committees. This issue will be revisited in July.

D. Study plans protocol

Ali Wick said that earlier this year, the Hatchery Committees were developing a Study Plans Review Protocol to use to consider and approve proposals. The group will bring this discussion back up in the fall; Wick will resend the draft Protocols to the Hatchery Committees, reminding them of where they left off on this.

E. HETT update

Tom Kahler reported that the Hatchery Evaluation Technical Team (HETT) is currently working on how to standardize estimates of spawner recruits and is working with Mark Miller at BioAnalysts to develop and document this decision.

IX. HCP Administration

A. Meeting agreements not requiring an SOA

- The Hatchery Committee approved the taking of 5,000 Wenatchee spring Chinook HxH eggs for 2009.

B. Next meetings

The next scheduled Hatchery Committees meetings are as follows: July 15, August 19, and September 16; all meetings will be at the Chelan PUD offices in Wenatchee.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Ali Wick	Anchor QEA, LLC
Carmen Andonaegui	Anchor QEA, LLC
Julie Pyper *	Chelan PUD
Steve Hays	Chelan PUD
Jerry Marco *	Colville Tribes
Tom Kahler *	Douglas PUD
Todd Pearsons	Grant PUD
Kris Petersen *	NMFS
Bill Gale *	USFWS
Bob Pfeifer (by conference call in AM and in-person in PM) *	WDFW
Andrew Murdoch (morning only)	WDFW
Kirk Truscott *	WDFW
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	July 15, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Steve Hays, Joe Miller		
Re:	Final Minutes of June 23, 2009 HCP Wells, Rock Island, and Rocky Reach Hatchery Committees Conference Call		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met via conference call on Tuesday, June 23, 2009, from 12:30 pm to 2:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Bill Gale will add text to the Entiat Summer Chinook Statement of Agreement (SOA) to address comments discussed today and will provide it by email (Item I). [Completed on 6/23].
- Kirk Truscott will report back on the Washington Department of Fish and Wildlife (WDFW) path forward for the spring Chinook management implementation plan (MIP) (Item III).

DECISION SUMMARY

- The Hatchery Committees approved the Entiat Summer Chinook SOA, as revised at today's meeting (Item I).

I. Entiat Summer Chinook SOA

Mike Schiewe introduced this topic, and Bill Gale said that he had incorporated the edits to the SOA that were provided. Schiewe invited any further comment by the Hatchery Committees. These comments were:

- Tom Kahler said that Douglas PUD has concerns about the growing number of programs using Wells Dam and Wells Hatchery facilities, and the potential burden this places on hatchery staff. Gale said that the U.S. Fish and Wildlife Service (USFWS) will provide staff or other assistance for the adult management/egg

collection program at the discretion of the Wells WDFW hatchery staff. Additionally, in the draft SOA the timeline is indefinite for establishing the capacity for adult holding at Entiat NFH, a prerequisite for moving adult holding from Wells Hatchery to Entiat NFH in future years. Douglas PUD seeks certainty in the SOA that adult holding at Wells will not continue beyond 2009.

- Schiewe suggested adding text saying that this agreement is to be in effect for only 1 year.
- Kirk Truscott asked for clarification that green eggs would be provided to USFWS staff.

Following these discussions, the Hatchery Committees approved the SOA with today's edits. Bill Gale will add text to the SOA to address comments discussed today and will provide it by email.

II. Wenatchee Steelhead HGMP

Mike Schiewe introduced this topic, saying that the National Marine Fisheries Service (NMFS) has now provided comments to the Wenatchee steelhead Hatchery Genetic Management Plan (HGMP). He invited more discussion on significant or outstanding issues. Kris Petersen outlined NMFS' key concerns:

- NMFS asked for the information in Section 13 to be folded back into the main document and for Section 13 to be removed, in order to conform to the NMFS HGMP template.
- NMFS asked for additional detail on the transition of Wenatchee steelhead to acclimation on Wenatchee River water.
- NMFS asked for additional detail on the certainty of managing hatchery fish on the spawning grounds above and below Tumwater Dam.
- NMFS asked for a consistency check among sections of the document that cover similar activities.
- NMFS asked for a clear linkage to the Recovery Plan or other existing agreements.

Members will provide any additional comments to the Hatchery Committees by June 26. Chelan PUD will review these comments and will provide a letter to NMFS by July 1 with a revised schedule for final submittal. On July 15, Chelan PUD and WDFW will provide an update to the Hatchery Committees on progress on the HGMP. Chelan PUD will provide a revised HGMP on July 24. Comments will be due on August 7, and a final draft will be

reviewed and considered for approval at the August 19 Hatchery Committees meeting. The goal is to submit this document to NMFS on August 21.

III. Wenatchee Spring Chinook HGMP

Mike Schiewe said that the spring Chinook HGMP was submitted to NMFS on June 17. Because of timing constraints, this draft was not approved by Chelan PUD or the Hatchery Committees prior to submittal. The draft schedule is for Hatchery Committees members to submit comments by July 7. The Hatchery Committees will then review Committees members' comments by conference call on July 10. Chelan PUD and WDFW will update the Committees on progress on addressing comments at the July 15 Hatchery Committees meeting. On July 24, Chelan PUD will provide a revised HGMP to the Hatchery Committees. Any comments will be due on August 11. The final draft will be reviewed and considered for approval at the August 19 Hatchery Committees meeting, with a goal of submitting a Hatchery Committees-approved plan to NMFS on August 21.

Kris Petersen asked the Joint Fisheries Parties (JFP) to consider the path forward for the spring Chinook MIP. Keely Murdoch said that the document would be finalized. Kirk Truscott will report back on the WDFW process for this.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Julie Pyper *	Chelan PUD
Joe Miller	Chelan PUD
Steve Hays	Chelan PUD
Shane Bickford *	Douglas PUD
Tom Kahler *	Douglas PUD
Josh Murauskas	Douglas PUD
Jerry Marco *	Colville Confederated Tribes
Kris Petersen *	NMFS
Bob Pfeifer *	WDFW
Kirk Truscott *	WDFW
Bill Gale *	USFWS
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

ANCHOR QEA

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Seattle, Washington 98101
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Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	August 19, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Alene Underwood		
Re:	Final Minutes of July 9, 2009 Rock Island, and Rocky Reach Hatchery Committees Conference Call		

The Rocky Reach and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met via conference call on Thursday, July 9, 2009, from 1:30 pm to 2:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- There were no action items from this meeting.

DECISION SUMMARY

- There were no decision items from this call.

I. Wenatchee Spring Chinook HGMP

Mike Schiewe introduced this topic and said that today's call is to discuss comments on the July 17 draft Wenatchee (Chiwawa) spring Chinook Hatchery Genetic Management Plan (HGMP). He reviewed the schedule, which is:

- July 15 Hatchery Committees meeting: Chelan PUD and WDFW will update the Hatchery Committees on progress addressing comments.
- July 24: Chelan PUD will provide a revised HGMP to the Hatchery Committees.
- August 11: Hatchery Committees comments due to Chelan PUD.
- August 19 Hatchery Committees meeting: review final draft, and approval.
- August 21: Chelan PUD submits a Hatchery Committees-approved plan to National Marine Fisheries Service (NMFS).

Julie Pyper opened the discussion, saying that Chelan PUD has not yet received any comments from the Hatchery Committees. Mike Schiewe asked whether Committees'

members had any comments. Jerry Marco, Keely Murdoch, and Bill Gale each indicated that they do not have any comments at this time. Kris Petersen indicated that she had a few initial comments. She said that a take table should be provided. She also said that the HGMP did not indicate when the program described in the HGMP would begin, but she assumes that the start point would be next year (2010).

Shaun Seaman asked whether the strategy of parental based tagging (PBT) was considered an experimental method or an agreed-to protocol. He explained that he was asking this because previously the Yakama Nation (YN) had agreed to reduce Chiwawa spring Chinook production if PBT were implemented as described in the Washington Department of Fish and Wildlife (WDFW)/YN Management Implementation Plan. Keely Murdoch said that if PBT was only implemented on an experimental basis, she would have to check with Steve Parker to verify the YN agreement on production changes. Bob Pfeifer said that he would need to talk to Jeff Korth as well to verify WDFW agreement. Seaman asked whether there was a biological relationship between the use of PBT and the reduced production, indicating that it was his understanding that the reduced production was more related to estimated carrying capacity. Petersen suggested that this was an issue the full Hatchery Committees should address.

Seaman also noted that a delay in receiving comments would make it difficult for Chelan to meet the schedule for delivering the next drafts to the Committee.

At the close of the discussion, Hatchery Committees members agreed that they would provide any outstanding comments by close of business on Tuesday, July 14. The HGMP will again be discussed at the Hatchery Committees meeting on July 15.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Julie Pyper *	Chelan PUD
Shaun Seaman *	Chelan PUD
Alene Underwood	Chelan PUD
Tom Kahler *	Douglas PUD
Jerry Marco *	CCT
Kris Petersen *	NMFS
Bob Pfeifer *	WDFW
Kirk Truscott *	WDFW
Bill Gale *	USFWS
Keely Murdoch *	Yakama Nation

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ANCHOR QEA

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Seattle, Washington 98101
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Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	August 19, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Joe Miller		
Re:	Final Minutes of July 15, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at the Chelan PUD offices in Wenatchee, Washington, on Wednesday, July 15, 2009, from 9:30 am to 4:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- (From June meeting) Julie Pyper will talk to Washington State Department of Ecology (Ecology) staff about what additional support from the Hatchery Committees' members is needed for Ecology to approve minimum flows at the Chiwawa facility.
- (From June meeting) Keely Murdoch will provide recent Yakama Nation (YN) information on Floy tagging of coho salmon to Andrew Murdoch.
- Julie Pyper will provide the Hatchery Program Summary as soon as it is available (Item II-A). [completed July 15]
- Joe Miller will send a revised draft 2010 Monitoring and Evaluation (M&E) Work Plan to the Hatchery Committees this week. Following final review, the Committees will approve the document by email no later than July 31 (Item II-D).
- Chelan PUD, Douglas PUD, and Washington Department of Fish and Wildlife (WDFW) staff will meet next week to discuss and resolve their concerns on the steelhead spawning ground survey Statement of Agreement (SOA) and will report back to the Hatchery Committees (Item III-A).
- Joe Miller will request data from Andrew Murdoch on overwinter acclimation and juvenile survival at Twisp, Chiwawa, and Similkameen (Item IV-B).
- Kris Petersen will investigate the basis for the coefficients of variance (CVs) listed in Endangered Species Act (ESA) permits for hatchery programs (Item VI-A).

- Bill Gale will forward U.S. Fish and Wildlife Service (USFWS) comments on the Wenatchee spring Chinook Hatchery Genetic Management Plan (HGMP) to the Hatchery Committees (Item VI-A).
- Julie Pyper will check with the Okanagan Nation Alliance (ONA) and Kim Hyatt regarding availability to meet either September 16 or 17 for a meeting in SeaTac (Item VI-D).

DECISION SUMMARY

- There were no decision items at this meeting.

I. Welcome, Agenda Review, Meeting Minutes

The Hatchery Committees approved revisions to the June 17 meeting minutes, and the June 2, June 9, and June 23 conference call minutes. Jeff Korth updated the group that Kirk Truscott will be leaving WDFW at the end of the month; the vacated position will not be filled at this time.

II. Chelan PUD

A. Hatchery Program Summary

Julie Pyper will provide the Hatchery Program Summary as soon as it is available.

B. Sockeye enumeration study update

Joe Miller reported that the Passive Integrated Transponder tag (PIT-tag) detection arrays for the study have been installed in the White and Little Wenatchee rivers, and the study will start as soon as sockeye arrive. Keely Murdoch reported that sockeye have already began passing Tumwater Dam. Miller said that there is now an extra holding tank at Tumwater Dam to accommodate the fish.

C. Blackbird Pond 2010 use

During the review of action items at today's meeting, it was discussed that there was an action item for Kirk Truscott to check with Art Viola as to whether there would be a creel census during the non-migratory steelhead fishery at Blackbird Pond. Today, Jeff Korth and Shaun Seaman agreed that they would follow up with Trout Unlimited to see if they could help with such a survey during the fishery.

At last month's meeting, the Hatchery Committees agreed to discuss whether Blackbird Pond would be used for acclimation in 2010 in the same manner that it was used in 2009. Committees' members commented as follows. Shaun Seaman said that before a final decision is made, Chelan PUD would like to review information on detections of PIT-tagged steelhead at mainstem dams. Jeff Korth said that this information should be available by next month. Kris Petersen said that National Marine Fisheries Service (NMFS) is optimistic about the program, but said that issues include how non-migrants would be handled and counted, including how the fishery for the non-migrants would ultimately work out; she was hopeful that future operation of the pond would allow for a more successful volitional fish release. Keely Murdoch said that the YN sees this year as a trial effort, recognizing that some modification to the outlet may be needed. Jerry Marco agreed. Bill Gale suggested that a better PIT-tag detection system could also be designed for better census information, including perhaps incorporating arrays at the outlet of the pond. He said that this would also provide better travel time estimates to McNary Dam. Pat Phillips suggested several engineering solutions that could be considered, including a second set of dam boards extending from the surface to just above the bottom, and a tide gate at the outlet that would close when head pressure is higher in the Wenatchee River. Tom Scribner said that he would like the Hatchery Committees to have the opportunity to provide input to the changes that are ultimately selected; Seaman said that this would be the case. The Committees signaled that Chelan PUD can plan for another year of pond use. Chelan PUD will continue to involve the Committees in discussions regarding potential changes to the pond or detection system.

D. 2010 Draft M&E Work Plan

Kris Petersen and Joe Miller reviewed NMFS' comments that have been provided to Chelan PUD. There were no other Hatchery Committees comments. Key NMFS comments include the following:

- Add due dates for the annual report and a schedule for the HCP 5-year review. Tom Scribner said that he wants to be able to consider adjustments to the M&E program within the 5-year period and not wait until the end of the 5-year period, if the Hatchery Committee should agree that those adjustments would improve the program. Shaun Seaman agreed that this would be the case. Julie Pyper agreed, adding that any changes would need to be weighed against other program changes that would be occurring simultaneously. Chelan PUD will provide a draft schedule

for Hatchery Committees' review and approval of the 5-year report, which will include data from the 2010 M&E season. Seaman clarified that this schedule would not be part of the 2010 Draft M&E Work Plan.

- Add understanding of how the Conceptual Work Plan, the Analysis Framework, and the yearly implementation plan(s) all work together to meet the obligations in the HCPs. Chelan PUD will add this discussion.
- Add brief description and reference to the ESA permits that cover this work. Chelan PUD will add this.
- Clarify roles. Explain the role of the Hatchery Evaluation Technical Team (HETT), clarify that the M&E contractor meeting is not the HETT meeting, and consistently identify roles for the M&E work. Chelan PUD will add this.
- Add justification for prioritizing steelhead surveys above Tumwater Dam. Chelan PUD will add this.
- Add relevant work that results from new HGMPs. Kris Petersen said that there would likely be adjustments, and Chelan PUD may want to include this information. Chelan PUD will add text that acknowledges that new work may be included later to address issues resulting from the HGMPs.

Next steps are for Joe Miller to send a revised draft to the Hatchery Committees this week. Following Committees' review, the Committees will approve the document by email no later than July 31.

E. Transfer of steelhead to the Chiwawa steelhead recirculation ponds

Joe Miller said that 30,000 steelhead will be transferred to the Chiwawa Facility for the water re-use acclimation study this fall. The current marking scheme for Chiwawa steelhead is typically to mark fish that are at 20 to 30 fish per pound (fpp). If growth were not suppressed, the study fish could be at this size by early September. Chelan PUD proposes to not suppress the growth of these fish so that they meet the marking criteria at the appropriate time. The Hatchery Committees agreed to this approach.

F. Report on fish anesthetic (Chelan PUD/JFP)

At a previous meeting, Julie Pyper said that Chelan PUD would work with the Joint Fisheries Parties (JFP) to review fish anesthetic use at Tumwater Dam. Today, she said that a working group of entities that use the dam (YN, USFWS, WDFW, Grant PUD, and Chelan PUD) will

be convened to discuss needs and constraints, and develop a dam operational plan for review by the Hatchery Committees. Bill Gale said that a key issue to address is increasing the effectiveness of detecting coded wire tags (CWTs) at the dam. Tom Scribner requested that the working group consider alternatives to killing and disposing of excess hatchery fish. Keely Murdoch noted that a fish anesthetic working group had been formed after a fish anesthetic symposium that occurred earlier this year. Tom Scribner indicated that he will contact this group and will bring their information to the Tumwater working group meeting.

G. Draft SOA regarding sockeye early rearing density

Julie Pyper said that a draft SOA on sockeye early rearing densities was previously provided for discussion. Chelan PUD plans to ask for approval of this SOA at the August Hatchery Committees meeting. Sam Dilly provided a presentation on some recent research he has completed investigating rearing densities at regional hatcheries in order to inform Chelan PUD's design and capacity for sockeye rearing facilities. He surveyed 29 steelhead and 11 sockeye hatcheries in the Pacific Northwest for information on their early rearing programs. He found a high degree of variability in early rearing indices, and found that most hatcheries are rearing sockeye at higher densities than Chelan PUD. Chelan PUD typically rears at a density index of 0.13; these other hatcheries typically rear at a density index of 0.3 to 0.5. He described potential modifications that would need to be made to achieve these densities at the Eastbank facility. This would include replacing four existing shallow troughs with 12 deep troughs. Tom Scribner asked whether Dilly had investigated adult return data for these programs. Dilly said that there were no adult data available for these programs. Jerry Marco asked that WDFW consider the history of infectious hematopoietic necrosis (IHN) in these programs; Dilly indicated that if IHN were identified in the Lake Wenatchee program, these fish would be destroyed and the tanks would be emptied and cleaned.

III. WDFW

A. SOA for estimating spawn timing for HOR-NOR steelhead in the Upper Columbia River Basin

Andrew Murdoch joined the meeting to discuss a recent WDFW SOA for a pilot proposal to investigate distribution and spawn timing of hatchery origin (HOR) and natural origin (NOR) steelhead in the Upper Columbia River Basin. He began by describing the study, saying that a similar study was recently conducted in the Twisp River and that the proposal requires Floy tagging and body-cavity PIT-tagging of returning female steelhead. The Hatchery Committees discussed this proposal. Tom Kahler said that he had previously met

with Murdoch about the Douglas PUD concern that the proposal did not consider radio telemetry as a method, and said that he and Murdoch had discussed how the radio telemetry technique might be cost-prohibitive in this case. Shaun Seaman asked how this study would work in conjunction with the upcoming steelhead reproductive success study and expressed concern that the study objectives and management implications are not clear at this time. Tom Scribner said that the YN supports the proposal as long as cost consideration does not compromise the study integrity. Kris Petersen said that NMFS supports the proposal, and Bill Gale said that USFWS supports the proposal. The Committees agreed that this study will provide a pilot study for this technology, and agreed that body-cavity and Floy tagging can be implemented at the tagging sites of Dryden, Priest Rapids Dam, Wells Dam, and Twisp Weir. The two PUDs and WDFW will meet next week to discuss and resolve any outstanding concern with the proposal and will report back to the Committees. On a last note, Bill Gale wondered whether WDFW could investigate tagging individual fish with both half-duplex and full-duplex tags. The group agreed that this would be something to investigate.

B. Fish and Wildlife Commission vote on hatchery reform policy

Jeff Korth said that a Fish and Wildlife Commission hatchery reform policy will be considered by the Commission in September 2009. Shaun Seaman said that Chelan PUD has provided comments to this policy.

IV. Yakama Nation

A. Multi-species acclimation proposal

Tom Scribner gave a brief presentation on a YN multi-species acclimation proposal that is under review by the Independent Scientific Review Panel (ISRP). He said that he is asking for feedback on the concept and not full agreement with the program. The objectives are twofold: 1) to develop an expanded, multi-species acclimation program for Upper Columbia spring Chinook and steelhead in the Wenatchee and Methow basins, and 2) to develop natural or semi-natural acclimation ponds there. The Twisp River would be the first system for implementation. Scribner clarified that the YN is not looking for funding from the PUDs at this point; if, at the end of the Fish Accord funding (2017), it is clear that these programs directly support meeting PUD mitigation requirements, there may be discussions regarding the PUDs becoming co-funders.

The Hatchery Committees provided feedback. Bill Gale said that he would like this proposal to include how managing Proportion of Hatchery Origin Spawners (pHOS) is involved, given that USFWS must control pHOS on the spawning ground, and currently the only control over pHOS is through removal of hatchery volunteers. Pat Phillips commented in terms of fish health: he said that coho and steelhead would be less risky for rearing together due to coho resistance to infectious hematopoietic necrosis (IHN), whereas steelhead and spring Chinook together may not fare as well unless the steelhead were 100 percent IHN-free. Chelan PUD questions revolved around whether M&E associated with this proposal would be part of the plan for these ponds, and how many fish would be involved. Scribner said that M&E would be included and would be rather minimal, and that he is not certain of the number of fish that would be involved yet.

B. Dryden Pond overwinter acclimation

Tom Scribner indicated that the YN would like to explore implementing overwinter acclimation of yearling summer/fall Chinook at Dryden given that results from Twisp, Chiwawa, and Similkameen suggest that acclimating juveniles over-winter can lead to increased survival. He would like to discuss the possibility of overwinter rearing at Carlton Pond and/or Dryden Pond. Julie Pyper said that Chelan PUD is not opposed to this possibility, but would need to evaluate whether these recent M&E results would be applicable elsewhere, such as at Carlton and/or Dryden. She said that she and Todd Pearsons have been discussing moving Grant PUD's program to Dryden and how such a move would affect both Chelan and Grant PUD mitigation obligations. She also said that there are certain trapping and passage requirements that Chelan PUD must meet, and Chelan PUD is also obligated to manage the irrigation canal headworks at Dryden Dam. Mike Schiewe asked when the overwintering would potentially be implemented, given that it is found to be feasible within these constraints; Tom Scribner replied that it seems the implementation should align with the HCP 10-year check-in in 2013. Joe Miller will request the overwintering data from Andrew Murdoch that Scribner mentioned today.

V. Colville Confederated Tribes

A. Tagging of summer Chinook salmon derby fish

Jerry Marco said that the Colville Confederated Tribes (CCT) proposes to tag up to ten summer Chinook at the west ladder at Wells Dam in order to support an upcoming salmon derby. The Hatchery Committees agreed to this tagging.

VI. All Committees

A. HGMP Update

- *Wenatchee programs*

Wenatchee Steelhead

Julie Pyper updated the group that Chelan PUD is currently addressing NMFS' comments on the steelhead HGMP and will provide a comment matrix to NMFS showing decisions on how these comments were incorporated.

Shaun Seaman mentioned that Chelan PUD has two competing directives from NMFS regarding meeting the CV criterion for steelhead size: one in the ESA permit, and one in the Federal Columbia River Power System (FCRPS) Supplemental Comprehensive Analysis (SCA). Kris Petersen said that the general basis of the permit condition regarding the size at release, and the CV is to release fish at a target size large enough that fish will migrate and survive well through the dams. Petersen suggested that Chelan PUD could add text to the HGMP that will say that fish will be raised to a size that allows them to rapidly migrate, and that text should be added to that to include monitoring that shows that the fish are rapidly migrating. She said that where NMFS guidance may conflict, Chelan PUD will want to adhere to their permit conditions. Kris Petersen will investigate the basis for the CVs listed in the SCA guidance.

Wenatchee Spring Chinook

Julie Pyper updated the group that a draft spring Chinook HGMP will be provided to the Hatchery Committees by July 24. At the last conference call on this topic, the Hatchery Committees agreed to resolve and bring any final comments to today's meeting. Jerry Marco commented that the CCT does not agree to use conservation fisheries as a tool to remove surplus fish until a trend toward recovery can be demonstrated. He said that implementing conservation fisheries before a recovery trend is demonstrated could lead to a third-party lawsuit, based on what the CCT has observed in similar discussions ongoing elsewhere. Kris Petersen commented that the fishery issue would be addressed outside of the HGMP by the JFP. Marco agreed, and suggested that language could be developed for the HGMP, saying that the conservation fishery would be just one tool that could be used for adult management, reiterating that this particular tool would only be used following a demonstrated recovery trend. Regarding this, Shaun Seaman noted that

Chelan PUD will need to coordinate with WDFW on level of effort for adult management if conservation fisheries were only used in this manner. Regarding the rest of the HGMP, Seaman pointed out that one issue not yet addressed in the HGMP is bacterial kidney disease (BKD) management. At the end of this discussion, Kris Petersen reviewed NMFS' comments. Bill Gale also brought comments and will forward those to the Committees.

- *Methow programs*

Tom Kahler reported that the HGMP programs are behind schedule due to workload issues within Douglas PUD and within the Hatchery Committees. The HGMP work team will set a meeting early next week to re-convene and discuss coordination with the Winthrop steelhead HGMP.

B. NTTOC analysis

Mike Schiewe brought up the topic of the Non-Target Taxa of Concern (NTTOC) analysis. The group will come back to the next meeting with the list of panel members to be involved in the analysis, scheduled for this fall.

C. HETT update

The HETT has developed a schedule to provide the control group analysis to the Hatchery Committees by the January Hatchery Committees meeting. This will include a document that describes the methods and results for the analysis.

D. ONA Sockeye presentation

Mike Schiewe is working to schedule the ONA sockeye presentation and the water management tool presentation for later this year. The group agreed to plan this meeting in SeaTac on September 16 or 17, 2009. Julie Pyper will check with the ONA and Kim Hyatt regarding availability for one these days.

VII. HCP Administration

A. Meeting agreements not requiring an SOA

- The Hatchery Committees signaled that Chelan PUD can plan for another year of Blackbird Pond use for steelhead (Item II-C).

- The Hatchery Committees agreed that Chiwawa steelhead for use in the recirculation study will not be growth-suppressed to allow for marking at the appropriate time (Item II-E).
- The Hatchery Committees agreed that steelhead Floy and body-cavity tagging can be implemented at the tagging sites of Dryden, Priest Rapids Dam, Wells Dam, and Twisp Weir (Item III-A).
- The Hatchery Committees agreed that the CCT can tag up to ten summer Chinook at the west ladder at Wells Dam in order to support an upcoming salmon derby (Item V-A).

B. Next meetings

The next scheduled Hatchery Committees meetings are as follows: August 19, September 16, and October 21; all meetings will be at the Chelan PUD offices in Wenatchee, except the September meeting, which may be moved to SeaTac.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Julie Pyper *	Chelan PUD
Joe Miller	Chelan PUD
Shaun Seaman *	Chelan PUD
Jerry Marco *	Colville Tribes
Tom Kahler *	Douglas PUD
Todd Pearsons	Grant PUD
Kris Petersen *	NMFS
Bill Gale *	USFWS
Bob Pfeifer *	WDFW
Andrew Murdoch (afternoon only)	WDFW
Pat Phillips	WDFW
Jeff Korth *	WDFW
Tom Scribner *	Yakama Nation
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Rocky Reach and Rock Island HCP Hatchery Committees	**Date:**	September 24, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Alene Underwood, Joe Miller		
Re:	Final Minutes of August 17, 2009 Rock Island and Rocky Reach Hatchery Committees Conference Call		

The Rocky Reach and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met via conference call on Monday, August 17, 2009, from 11:00 am to 1:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Chelan PUD will email the final draft version of the Wenatchee spring Chinook HGMP to the Hatchery Committees for final review by 10:00 am tomorrow, August 18 (Item II).
- Chelan PUD will email the final draft version of the Wenatchee steelhead HGMP before the end of the day tomorrow, August 18 (Item III).

DECISION SUMMARY

- The Hatchery Committees concurred that the 2010 Chelan PUD M&E Implementation Plan was approved as of the July 31 approval deadline (Item I).

I. 2010 Chelan PUD M&E Implementation Plan

Mike Schiewe asked for final agreement on the 2010 Chelan PUD M&E Implementation Plan, as there were no comments following the July 31 deadline for approval. The Committees concurred that this plan was approved as of the July 31 deadline.

II. Wenatchee Spring Chinook HGMP

Mike Schiewe introduced this topic and said that a primary purpose of today's call is to discuss comments on the July 29 draft Chiwawa Hatchery Genetic Management Plan (HGMP).

Shaun Seaman said that Chelan PUD has received comments from WDFW on the Chiwawa spring Chinook HGMP and will incorporate recommended changes as agreed to by the Hatchery Committee during the call. Schiewe asked other Committees members for additional comments. Kris Petersen asked for a clarification of the term "conservation fisheries," and suggested that it be distinguished from a recreational fishery (at the subsequent Hatchery Committees meeting on August 19, Jeff Korth explained that this term defines the reason for the fishery as a reduction in hatchery influence). She also emphasized the importance of including as much information as possible regarding adult management. Kirk Truscott (now representing the Colville Tribes) raised a number questions regarding the balance between recovery and harvest, and reaffirmed the Colville Tribes' intent to work with the JFP to resolve any issues. He also raised questions regarding broodstock compositing, BKD management, and the need to double check estimated take numbers. All of these issues were resolved through Committee discussion, or agreement to resolve them before the end of the week and will be reflected in the draft HGMP. At the close of the discussion, Chelan PUD agreed to send out a final draft version of the Wenatchee spring Chinook HGMP that includes the changes from today's discussion, by 10:00 am tomorrow, August 18. The final draft version will be up for approval at this Wednesday's (August 19) Hatchery Committees meeting.

III. Wenatchee Steelhead HGMP

Mike Schiewe verified with the Committees that all comments on the Wenatchee steelhead HGMP have been provided to Chelan PUD at this time. Committee members agreed that all comments have been submitted. There was a brief discussion on the differences between the safety net program and the conservation programs, and how the distinction could be clarified. Chelan PUD will incorporate these changes and email the final draft version of the Wenatchee steelhead HGMP before the end of the day tomorrow, August 18 (Item III). The final draft version will be up for approval at this Wednesday's (August 19) Hatchery Committees meeting.

For both HGMPs there was discussion by Committee members about providing additional comments at a later date. Seaman noted that the Committees would be asked to approve the plans at the Committee meeting on August 19 and the expectation would be that the HGMPs reflect the positions of all parties. Seaman emphasized that any comments contrary to the approved plans made after the approval date would be inconsistent with the process the Committees have established.

List of Attachments

Attachment A – List of Attendees

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Julie Pyper *	Chelan PUD
Shaun Seaman *	Chelan PUD
Alene Underwood	Chelan PUD
Joe Miller	Chelan PUD
Kirk Truscott *	CCT
Kris Petersen *	NMFS
Bob Pfeifer *	WDFW
Jeff Korth *	WDFW
David Carie *	USFWS
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	September 24, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Joe Miller, Alene Underwood, Greg Mackey, Pat Phillips, Steve Hays		
Re:	Final Minutes of August 19, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at the Chelan PUD offices in Wenatchee, Washington, on Wednesday, August 19, 2009, from 9:30 am to 4:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Julie Pyper will provide a draft letter to the Hatchery Committees for their review that indicates their respective agencies' support for submittal of Chelan PUD's water right application to Washington State Department of Ecology (Ecology) for the Chiwawa facility (Item I).
- Hatchery Committees members will, as appropriate, provide the above-mentioned letter to Ecology prior to the next Hatchery Committees meeting (Item I).
- Chelan PUD will provide final draft Hatchery Genetic Management Plans (HGMPs) to the Hatchery Committees when they are available (Item II-B).
- Julie Pyper will provide the Hatchery Program Summary as soon as it is available (Item II-C).
- Joe Miller will confirm with National Marine Fisheries Service (NMFS) the reason for requesting Ringold hatchery-reared summer/fall Chinook for the separation-by-code (SBC) study (Item II-E).
- Douglas PUD will provide to the Hatchery Committees a new schedule for review of the Methow spring Chinook HGMP as soon as it is available (Item III-A).

DECISION SUMMARY

- The Hatchery Committees approved the Statement of Agreement (SOA) for sockeye early rearing density criteria (Item II-A; Attachment B).
- The Hatchery Committees approved the SOA and the Final HCP Hatchery Committees Draft HGMP for Wenatchee River Spring Chinook (Item II-B; Attachment C).
- The Hatchery Committees approved the SOA and the Final HCP Hatchery Committees Draft HGMP for Wenatchee River Steelhead (Item II-B; Attachment D).

I. Welcome, Agenda Review, Meeting Minutes

The Hatchery Committees approved revisions to the July 15 meeting minutes, and the July 9 conference call minutes. Ali Wick will provide the final minutes for the record. During review of action items, Julie Pyper noted that she had an action item to talk to Ecology on what additional support from the Hatchery Committees is needed for Ecology to approve minimum flows at Chiwawa facility. She said that Ecology had confirmed that they need letters of support from fishery managers; she has drafted a letter of support for the Hatchery Committees members to review and use in providing their agencies' endorsement of Chelan PUD's water right application to Ecology. Hatchery Committees members will provide, as appropriate, a letter from their respective agencies to Ecology prior to the next Hatchery Committees meeting.

II. Chelan PUD

A. DECISION ITEM: Sockeye Early Rearing Density SOA

Shaun Seaman reminded the group that Sam Dilly (Chelan PUD) had compiled data on appropriate rearing density for the Lake Wenatchee sockeye program. Seaman distributed copies of a previously provided SOA for rearing these fish at up to 0.4 pounds per inch-cubic foot (lbs/in-cf) until fish reach 400 fish per pound (fpp), and in rare short-term conditions held at 0.6 lbs/in-cf if necessary to reduce handling and fish stress. Kirk Truscott (CCT) inquired whether or not WDFW Eastbank Hatchery staff and WDFW Fish Health had been involved in the discussion regarding the proposed rearing density for sockeye at Eastbank FH. Chelan PUD indicated that both John Penny (Eastbank FH Complex Manager) and Bob Rogers (WDFW Fish Health) were involved in the discussion and were in agreement with the proposed rearing density. The Hatchery Committees approved this SOA and the proposed rearing densities (Attachment B).

B. Wenatchee Basin HGMPs

Shaun Seaman began by thanking the entire group for their work on the HGMPs, especially Alene Underwood and Julie Pyper, who have contributed significant time to this effort. He invited final comments on the HGMPs.

Wenatchee Spring Chinook HGMP

Jeff Korth said that Washington Department of Fish and Wildlife (WDFW) would like as many decisions regarding hatchery management as possible to be reflected in the HGMP rather than being left open for future Hatchery Committees consideration (e.g., how to handle broodstock crosses for natural origin returns [NORs] from the segregated hatchery component in years when NOR run sizes are large). Mike Schiewe said that there is precedent for decisions like these in the Hatchery Committees, and he would expect that future decisions would occur similarly in a cooperative fashion as per the HCP. Korth also expressed concern that potential limitations associated with the Chiwawa Weir broodstock collection and identification were not described at the same level of detail as were limitations associated with the parental-based tagging (PBT) approach. Shaun Seaman noted that Chelan PUD felt that the experimental nature of PBT justified the need to gather additional information regarding key uncertainties prior to full scale implementation but PBT has been included in the HGMP as an option for NMFS to review. The use of PBT in the long term would be based on collection of data during preliminary trials and future consideration by the Hatchery Committees. Seaman also noted that by including both the weir and PBT for NMFS consideration, future options for broodstock collection remain open. Regarding these concerns, the Committees agreed that the agenda for the November Hatchery Committees meeting should include two items for discussion: 1) possible modifications to the operation of Chiwawa weir and any associated Monitoring and Evaluation (M&E) procedures, as well as 2) protocols for testing PBT.

Kirk Truscott provided some final Colville Confederated Tribes (CCT) comments and the text was modified to address these. Truscott reiterated that the Colville Tribes were concerned about increases in overall mortality of UCR spring Chinook and that a selective fishery would increase the mortality on natural origin spring Chinook where a substantial gap in recovery currently exists. Although the Colville Tribe has concerns with the proposed selective fishery detailed in the HGMP, they acknowledge the value of harvest opportunity,

and WDFW's concerns of removal of fish at Tumwater Dam without any level of harvest opportunity. Kirk provided and the Committee accepted language specific to the selective harvest adult management strategy in the HGMP acknowledging the potential harvest of adults from the safety-net production only, and JFP commitment to develop and agree upon "triggers" that would guide the decision to implement a selective fishery. Other comments were generally regarding marking strategy for the harvest component, modifications to the take tables, references to categorizations for bacterial kidney disease (BKD) levels, and other text corrections.

Bill Gale provided some final U.S. Fish and Wildlife Service (USFWS) comments regarding clarifying adult management roles and funding. The text was modified to address these comments, primarily noting that Chelan PUD does not believe that it has an obligation to fund adult management activities, while the Joint Fisheries Parties (JFP) disagree.

The Hatchery Committees approved the HGMP and the SOA (Attachment C).

Wenatchee Steelhead HGMP

Shaun Seaman noted that any applicable changes made in the spring Chinook HGMP would be made to the steelhead HGMP as well. Chelan PUD then addressed comments raised at today's meeting, including one on coefficient of variation (CV) criteria for hatchery programs that was carried over from the previous HGMP. Joe Miller said there was conflicting guidance from NMFS on this issue and that the relationship to residualism was uncertain. Kirk Truscott inquired, and Chelan PUD confirmed that the Wenatchee Steelhead HGMP being considered for approval was identical to the previous Committee approved HGMP submitted to NOAA Fisheries, not withstanding Section 13. The Hatchery Committees approved the HGMP and the SOA (Attachment D).

Chelan PUD will provide final draft HGMPs to the Hatchery Committees when they are available.

C. Hatchery Program Summary

Julie Pyper will provide the Hatchery Program Summary as soon as it is available.

D. Removal of Cobble at Right Bank near Dryden Weir

Shaun Seaman noted that the right bank of the Wenatchee River just downstream of the confluence of Peshastin Creek has accumulated a bar of cobble that is impeding fish from exiting the fishway. Chelan PUD will be working with the appropriate parties and permitting agencies for a solution to this problem, which will likely involve removal or relocation of this material.

E. NMFS Request for Hatchery Chinook from Ringold Hatchery

Joe Miller informed the group that Chelan PUD has received a request for 150 summer/fall Chinook from Ringold Hatchery for a NMFS SBC study. Joe Miller will ask NMFS whether there is another stock that can work; if there is a reasonable case for another stock to be used, Miller will ask them to do so. Otherwise, the Hatchery Committees gave their approval for the use of these fish.

III. Douglas PUD

A. HGMP Revised Schedule

Tom Kahler said that the schedule for review of the Methow Spring Chinook HGMP will be earlier than indicated. Douglas PUD will inform the Hatchery Committees as soon as this schedule is revised. Bill Gale noted that NMFS consideration of the USFWS HGMP for Winthrop National Fish Hatchery (NFH) is being held up until the completion of the Douglas PUD HGMP.

IV. WDFW

A. Wells Memo on Surplus Summer Chinook

Pat Phillips notified the Hatchery Committees that WDFW will be collecting a surplus of summer Chinook broodstock at Wells Dam. The Hatchery Committees have reviewed this information via a memorandum that was previously provided, and agreed that these fish are in excess of HCP program broodstock needs.

V. Yakama Nation

A. Update on Coho EIS Scoping Process

Keely Murdoch said that a letter has been provided to the Hatchery Committees on the status of the Yakama Nation's (YN's) Environmental Impact Statement (EIS) scoping process for the coho reintroduction program master plan. Two public scoping meetings will be

occurring this week: one on Thursday, August 20, in Leavenworth, and one on Friday, August 21, in Twisp.

VI. All Committees

A. NTTOC analysis

Mike Schiewe opened the discussion on the selection of potential members of the panel that will conduct the Non-Target Taxa of Concern (NTTOC) risk analysis. Several Hatchery Committees members provided names of individuals whom they would like to be considered. The Hatchery Committees directed the Hatchery Evaluation Technical Team (HETT) to develop recommendations regarding next steps, including a list of panel members and their geographic distribution (local versus regional), strategy and logistics for conducting the workshops (phone, in person, or a combination of the two), and scheduling. HETT will report their recommendations back to the Hatchery Committees.

VII. USFWS

A. Entiat Summer Chinook discussions with Production Advisory Committee

Bill Gale said that the Production Advisory Committee (PAC) has approved broodstock collection for the USFWS' new Entiat summer Chinook program. The next step is for USFWS to present the proposal to the policy committee under U.S. v. Oregon.

VIII. HCP Administration

A. Meeting agreements not requiring an SOA

- The Hatchery Committees agreed that NMFS can take 150 hatchery Chinook from Ringold Hatchery for an SBC study (Item II-E).
- The Hatchery Committees agreed that there are returning summer/fall Chinook at Wells Hatchery that are in excess of broodstock needs and hence available for distribution by the JFP (Item IV-A).
- The Hatchery Committees agreed that the HETT will develop the next steps for the NTTOC process, including panel selection, strategy, and scheduling, and will report these back to the Hatchery Committees (Item VI-A).

B. Next meetings

The next scheduled Hatchery Committees meeting will be on September 16 and 17 at Grant PUD offices in SeaTac. The usual Hatchery Committees meeting will be on September 16

from 9:30 am to 4:30 pm. On the next day, September 17, the Okanagan Nation Alliance (ONA) will provide an update on the Skaha sockeye program, and Kim Hyatt (Department of Fisheries and Oceans) will present the latest information from the Okanagan Basin Water Management Tool. The September 17 meeting time has not yet been decided, but will be provided soon.

The next meetings will occur on October 21 and November 18 at the Chelan PUD offices in Wenatchee.

List of Attachments

Attachment A – List of Attendees
Attachment B – Final Statement of Agreement on Sockeye Early Rearing Density Criteria
Attachment C – Statement of Agreement – Approval of Final HCP Hatchery Committees Draft HGMP for Wenatchee River Spring Chinook
Attachment D – Statement of Agreement – Approval of Final HCP Hatchery Committees Draft HGMP for Wenatchee River Steelhead

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Julie Pyper *	Chelan PUD
Joe Miller	Chelan PUD
Shaun Seaman *	Chelan PUD
Alene Underwood	Chelan PUD
Steve Hays	Chelan PUD
Kirk Truscott *	Colville Confederated Tribes
Shane Bickford * (morning only)	Douglas PUD
Tom Kahler *	Douglas PUD
Greg Mackey	Douglas PUD
Todd Pearsons	Grant PUD
Bill Gale *	USFWS
Bob Pfeifer *	WDFW
Pat Phillips	WDFW
Jeff Korth *	WDFW
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

Attachment B

FINAL Statement of Agreement
Sockeye Early Rearing Density Criteria

Rocky Reach HCP Hatchery Committee
August 19, 2009

Statement of Agreement

The Rock Island HCP Hatchery Committee (Committee) agrees that Chelan County Public Utility District No.1 (the District) may rear Lake Wenatchee sockeye at a density of up to 0.4 lbs/in-cf until fish reach 400 fish/lb (1.1 gram), within the District's hatchery facilities or other facilities approved by the Committee for rearing juvenile sockeye. In rare short term conditions sockeye may be held at 0.6 lbs/in-cf if necessary to reduce future fish handling and physiological stresses.

Background

The District intends to rear 280,000 sockeye for the Lake Wenatchee program as soon as practical. The Eastbank Hatchery incubation and early rearing building does not have adequate capacity to accommodate sockeye, steelhead and Chinook programs currently envisioned. A study was conducted to research and survey early rearing information and assist with design recommendations. The resulting study report cited the median sockeye density index of thirteen hatcheries is 0.59 lb/in-cf, the mean is 0.81 lb/in-cf. Most hatcheries rear fish at these densities between 900 and 300 fish/lb.

Statement of Agreement - Approval of Final HCP Hatchery Committee Draft HGMP for Chiwawa River Spring Chinook

Rock Island HCP Hatchery Committee
August 19, 2009

Statement of Agreement The Rock Island HCP Hatchery Committee (Committee) approves the Final HCP Hatchery Committee Draft Hatchery And Genetic Management Plans for Wenatchee Upper Columbia River Spring Chinook – Chiwawa Spring Chinook hatchery program dated August 19, 2009.
Background In August 2008, National Marine Fisheries Service (NMFS) announced in a letter their intent to initiate a series of consultations to analyze the effects of hatchery programs and assure compliance with the Federal Endangered Species Act (ESA) and the National Environmental Policy Act (NEPA). This process and other subsequent actions by NMFS lead to the development of revised HGMPs for the program noted above. The HC members worked collaboratively over the past 12 months to develop the final document.

Attachment D

DRAFT Statement of Agreement - Approval of Final HCP Hatchery Committee Draft HGMP for Wenatchee River Summer Steelhead

Rocky Reach and Rock Island HCP Hatchery Committees
August 19, 2009

Statement of Agreement The Rocky Reach and Rock Island HCP Hatchery Committees (Committees) approve the Final HCP Hatchery CommitteeDraft Hatchery And Genetic Management Plans for Wenatchee River Summer Steelhead dated August 19, 2009.
Background In August 2008, National Marine Fisheries Service (NMFS) announced in a letter their intent to initiate a series of consultations to analyze the effects of hatchery programs and assure compliance with the Federal Endangered Species Act (ESA) and the National Environmental Policy Act (NEPA). This process and other subsequent actions by NMFS lead to the development of revised HGMPs for the program noted above. The Committee members worked collaboratively over the past 12 months to develop the final document.

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	December 2, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Joe Miller, Greg Mackey		
Re:	Final Minutes of September 16 and 17, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at the Grant PUD offices in SeaTac, Washington, on Wednesday, September 16, 2009, from 9:30 am to 4:30 pm, and on September 17, from 8:30 am to 11:00 am. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Shaun Seaman will complete Julie Pyper's action item from the last Hatchery Committee meeting (August 19). The Action Item was to provide a draft letter to the Hatchery Committees for their review that indicates their respective agencies' support for submittal of Chelan PUD's water right application to Washington State Department of Ecology (Ecology) for the Chiwawa facility.
- Hatchery Committee members will submit comments on the Wells Methow Steelhead Reproductive Success study design to Douglas PUD by Sept 30 (Item II-C).
- Hatchery Committees will submit comments on the Wenatchee steelhead spawning success study proposal within 2 weeks to Andrew Murdoch, with copies of comments to all other Hatchery Committee members. The final study proposal is due to the Hatchery Committee prior to the October meeting (Item III-A).
- Shaun Seaman will revise the Wenatchee steelhead spawning success study Statement of Agreement (SOA) as discussed at the meeting (Item III-A).
- Shaun Seaman will draft a schedule for preparing a report on 2009 Blackbird Pond Acclimation and the path forward for a decision next year as to whether to acclimate fish again in Blackbird Pond (Item III-B).
- Bob Pfeifer will locate the memo from Heather Bartlett (Washington Department of Fish and Wildlife [WDFW]) regarding the status of space at Ringold Hatchery for *U.S. v Oregon* production goals (Item III-D).

- Kirk Truscott will check with Chris Fisher (Colville Confederated Tribes [CCT]) about temperature concerns regarding a potential mid-December transfer of juveniles to Bonaparte Pond (Item III-D).
- Shaun Seaman will verify that a seine net will be stored on the Dryden Dam site for use in potential fish salvage operations (Item III-G).
- Keely Murdoch will email a copy of the draft agenda from Shawn Quigley (Pacific Northwest Aquatic Monitoring Partnership [PNAMP]) on the data portal workshop to Ali Wick for distribution to the Hatchery Committee. The distribution email will indicate that the draft agenda is a very rough draft (Item IV-D).
- Shaun Seaman will send a letter to Mike Schiewe designating Joe Miller as Chelan PUD's Hatchery Committee Alternate (Item VIII-A).

DECISION SUMMARY

- The Hatchery Committee approved Grant PUD's request for Wells and Methow hatchery production in principal, subject to modification of the steelhead production number to up to 80,000 (Item II-A).

I. Welcome, Agenda Review, Meeting Minutes

The Hatchery Committee approved the August 17 Rock Island and Rocky Reach Hatchery Committees conference call meeting minutes and the August 19 Hatchery Committees meeting minutes as revised.

Kris Peterson stated a concern that the Wenatchee steelhead Hatchery Genetic Management Plan (HGMP) has not yet been submitted as agreed to on the timeline submitted by the Hatchery Committees. Shaun Seaman stated that Chelan PUD is on hold pending a discussion with WDFW regarding submittal of letters asking for certain structures of permits. Bob Pfeifer will speak with Jeff Korth about resolution of this matter. Shaun Seaman also informed the Committee that he had informed Rob Jones of the status of the HGMPs and the process Chealn and WDFW were completing and there was no discussion of the timeline submitted by the Hatchery Committees.

II. Douglas PUD

A. Approval of Grant PUD Request for Hatchery Production from Wells and Methow Hatcheries

Tom Kahler said Douglas PUD received Grant PUD's annual request for space at Wells and Methow hatchery facilities for hatchery production. In the past, the committee has approved the request for Grant PUD to take to the Priest Rapids Coordinating Committee (PRCC) Hatchery Subcommittee. Concerns in the past have been with the potential impact of the request on HCP production. Tom Kahler stated that this year's request is the same as last year's request. No one saw any potential impact of this year's request on HCP production. Kirk Truscott noted that the CCT is in the process of revamping the Okanogan steelhead program. The new program will use locally adapted broodstock to fully meet Grant PUD's mitigation obligation by ramping production up to 100,000 fish, with a commensurate reduction in production for Grant PUD at Wells Hatchery. Tom Kahler said that Douglas PUD will need to know by the commencement of broodstock collection in July 2010 how many BY 2011 steelhead will be needed by Grant from Wells. The Hatchery Committee agreed to add the words, "up to" 80,000 steelhead with the final number being determined based on consideration of CCT's Cassimer Bar production. The Hatchery Committee approved the request subject to this modification.

B. HGMP Update

Tom Kahler said that after the last HGMP meeting, Douglas PUD is behind on the schedule previously circulated to the Hatchery Committees. Mike Schiewe stated there is an October 31 due date for both the spring Chinook and steelhead HGMPs. Douglas PUD and WDFW are currently working to resolve remaining issues, and then the HGMP workgroup will review the draft. At this point, the spring Chinook HGMP is relatively complete. Schiewe noted that the steelhead HGMP will include many changes from the current program to accommodate Hatchery Scientific Review Group (HSRG) recommendations.

C. Douglas PUD Steelhead Reproductive Success Study Design

Greg Mackey presented a draft study design for a Methow steelhead reproductive success study. Objectives include addressing the role of genetics vs environmental effects on the relative reproductive success of hatchery and wild fish. Mackey stated that the proposed study would involve a small stream that can be controlled to set up contrasts and assess reproduction to the emergent-fry stage. The study will investigate the mechanisms that affect reproductive success from the spawner to emergent fry stage, providing insight that

managers may be able to use to improve the use of hatchery fish, fulfilling the requirements for a spawning (reproductive) success study as specified in the HCP. The study will complement Chelan PUD's basin-wide spawning success study or an anticpated FCRPS BiOp Action Agencies' study in the Methow by providing more detailed and mechanistic information that cannot be gained in a broader study, making both studies more valuable.

The Committees provided Mackey with some preliminary comments. Keely Murdoch mentioned that stream selection or the way in which hatchery fish are stocked and released may play a role on spawning success. She said that it would be preferable not to select a stream where spawning already occurs. Greg replied that those points are correct, but to investigate them would require a different type of study than the one Douglas PUD is proposing. Kirk Truscott stated his concern that not observing a significant difference might be interpreted to mean that there is no difference in survival between hatchery and wild fish. Mackey responded that while knowledge of reproductive success through the adult stage is desirable, there is a trade-off in gaining more detailed, mechanistic knowledge verses broader lifetime fitness estimates. An equally undesirable outcome would be a study that identifies a difference in reproductive success to the returning adult stage, but fails to identify the lifestage or mechanism(s) where the difference occurred or whether it was a consequence of the environment or genetics, or a combination of both. The DPUD study is seeking to understand why relative reproductive success may differ among hatchery and wild fish to inform management decisions that may improve the use of hatchery fish. Next steps will be to convene a subgroup to develop the proposal. The subgroup will include Bill Gale and Kirk Truscott, as well as potentially Mike Ford and Barry Berejikian (both of NMFS). Anyone else wishing to serve on the subcommittee should contact Greg Mackey. Hatchery Committee members agreed to submit comments on the Wells Methow Steelhead Reproductive Success study design to Douglas PUD by Sept 30.

III. Chelan PUD

A. Steelhead Reproductive (Spawning) Success Study

Joe Miller summarized a Chelan PUD proposal for a steelhead spawning success study in the Wenatchee Basin. The proposal focuses on adult-to-smolt success rather than adult to adult, which is the only difference between this proposal and a previous version reviewed by the Committees last year. It is Chelan PUD's intent that this proposal will meet the PUD's HCP

obligation to conduct a spawning success study, and to fulfill its required monitoring as per Objectives 2 and 3 of the Chelan PUD Monitoring and Evaluation Plan (M&E Plan).

Andrew Murdoch, who worked with Chelan PUD to develop the proposal, provided a brief summary of study objectives and design. He noted that the spawning distribution and timing element of the proposed study will address Objective 2 of the Hatchery M&E Program, as well as an observer efficiency study being conducted for the Integrated Status Monitoring and Effectiveness Program (ISEMP). It will also include an element to test the hypotheses for Objective 3 in the M&E plan. Most importantly, however, the study will compare relative productivity of hatchery and naturally produced steelhead upstream of Tumwater Dam, looking at four broodyears (2008 to 2011), age-1 parr, and smolt for both WxW and HxH crosses. Currently, collection of the first age-1 parr group has begun. Observer efficiency from an ongoing ISEMP study will be used to calculate observer efficiency for this study.

The Committees agreed to provide comments on the study proposal to Andrew Murdoch within 2 weeks. Chelan PUD would like to have a decision on the SOA at the October meeting. Shaun Seaman will modify the SOA text to address concerns discussed at today's meeting.

B. Update on Blackbird Pond

Shaun Seaman summarized that there are at least two issues affecting the continued operation of Blackbird Pond for acclimation that the Hatchery Committees should consider: 1) intake system configuration to allow continual flow; and 2) exit conditions at the pond. Shaun Seaman stated that Chelan PUD is willing to make minor changes to the pond; however, if there is an issue related to changing conditions for fish egress, it would be difficult to address at this time. Bill Gale stated that the U.S. Fish and Wildlife Service (USFWS) is working to adjust the Passive Integrated Transponder tag (PIT-tag) detector at the outlet to improve detection by adding a second antennae. Shaun Seaman agreed to compile information on Blackbird Pond in 2009 from WDFW, Trout Unlimited, and University of Washington to inform a decision on whether to use Blackbird Pond in 2010. He will draft a schedule for preparing a report and for making a 2010 decision.

C. M&E Plan for Upper Columbia River Salmon Recovery Plan

Shaun Seaman updated the group on a meeting last month on the Upper Columbia Salmon Recovery Board's (UCSRB's) M&E Plan convened by the Columbia Basin Fish and Wildlife Authority (CBFWA). Seaman suggested that the Hatchery Committees consider reviewing the document and commenting on data gaps identified in Upper Columbia salmon recovery efforts. This will be on the agenda for discussion at the next meeting.

D. Update on 2010 Pilot Reuse Study at Eastbank

Joe Miller distributed a flow chart outlining potential paths forward for rearing of yearling summer/fall Chinook to meet Chelan PUD's HCP production obligations. These options included rearing at Ringold Hatchery, use of Chelan Falls, and use of the water re-use systems currently being tested at Eastbank Hatchery. Chelan PUD prepared a draft SOA requesting Committees' approval of the flow chart. Kirk Truscoutt noted that whether or not to cull high enzyme-linked immunosorbent assay (ELISA) bacterial kidney disease (BKD) fish reared in water re-use systems still need to be resolved. Other issues to be addressed included verifying that Ringold will be available in the future and that such use will not interfere with *U.S. v Oregon* plans to use Ringold for John Day mitigation production, and overwintering strategies. To resolve the Ringold availability issue, Bob Pfeifer will locate the memo from Heather Bartlett regarding the status of space at Ringold Hatchery. In addition, Kirk Truscott will check with Chris Fisher, CCT, about mid-December transfers to Bonaparte Pond for overwinter acclimation. Truscott expressed concern that December transfers would increase the risk of temperature stress to transferred fish.

E. Hatchery Program Report

Shaun Seaman advised the Hatchery Committee that the Chelan PUD Hatchery Program Summary has been provided and he is available to address any questions. There were no questions.

F. Sockeye Enumeration Study

Joe Miller reported that White River and Little Wenatchee sockeye data have been uploaded to the Passive Integrated Transponder Information System (PTAGIS). There have been 149 detections at the White River and 29 at the Little Wenatchee River. The sockeye monitoring effort is going well and there will be frequent and regular updates at upcoming Hatchery Committee meetings.

G. Dryden Weir Passage Contingency Planning

The Hatchery Committees considered the letter received from Chelan PUD which requests that the Committees agree on a plan of action for the Dryden Weir passage issue. Shaun Seaman explained that high winter flows had washed out portions of Highway 97, bedload from which has accumulated at the right bank of the Wenatchee River just downstream of the confluence of Peshastin Creek. During low flows this fall, fish that successfully pass upstream of Dryden weir may be unable to migrate over the gravel bar that has accumulated. Chelan PUD has met with Washington State Department of Transportation (WDOT) to determine how WDOT intends to proceed to address issues raised by the gravel bar. WDOT has indicated that it will not be able to address the gravel bar in the near term, but Chelan PUD anticipates that WDOT will address this issue over the coming year.

In the interim, the Committees approved Chelan PUD's voluntary use of the weir's bladder to raise water levels when flows fall below 1,000 cubic feet per second (cfs), with a goal of helping fish pass the gravel bar successfully. Hatchery Committees members agreed, should flows fall below 450 cfs, to help with salvaging any fish stranded below the gravel bar and move them to above the gravel bar. Should flows fall below 350 cfs, or should Hatchery Committees member staffs at the weir identify that flows are insufficient to pass fish over the gravel bar, the Hatchery Committees approved that, when trapping is occurring, all trapped salmon, steelhead, and bull trout will be moved to above the gravel bar rather than being released immediately above the weir. When trapping is not occurring, the Hatchery Committees approve Chelan PUD's closure of the fishway entrance to prevent fish from successfully passing through the fishway, only to be unable to migrate further upstream due to the presence of the gravel bar. The Hatchery Committees anticipate that those fish will remain below the weir until the fishway entrance is opened and such fish are trapped and moved to above the gravel bar, or will migrate back downstream to use the left bank of the Wenatchee River. Chelan also agreed to provide a seine net at the site to facilitate any necessary fish salvaging activities and that the PUD, its contractors (WDFW and the Yakama Nation [YN]), and\or the users of the Dryden facilities will act accordingly to notify the appropriate agencies and parties if it appears there may be, or are, fish being stranded above the weir. Shaun Seaman will verify that a seine net will be stored onsite for potential use.

IV. Yakama Nation

A. Update on Expanded Acclimation Proposal – Tom Scribner

Tom Scribner updated the Hatchery Committee on the status of the YN proposal to implement multi-species acclimation in the Wenatchee and Methow subbasins. He will have an updated proposal to the Hatchery Committee on October 7, distributed by email, for consideration at the next Hatchery Committee meeting. The plan is to acclimate at two sites, one at Rohlfing Pond on Nason Creek and one at Lincoln Ponds on the Twisp River. Coho and steelhead will be acclimated together at the Rohlfing site on upper Nason Creek, which is already being used for coho acclimation. The YN proposal identifies the use of Chelan PUD mitigation fish. Fish numbers will depend on what is required for a statistically valid study. It is currently estimated that 50,000 to 75,000 fish of each species will be needed. All fish will be PIT tagged. Objectives will include estimating in-pond survival, survival to McNary, and in-pond growth and smolt condition. Adult returns will be monitored at all available PIT tag detectors.

The Lincoln site on the upper Twisp River will be used to acclimate spring Chinook and steelhead, and juveniles will be monitored for disease during acclimation. Tom Kahler noted that there were fewer than 50,000 total Twisp spring Chinook available for acclimation in 2010, and that the HGMP being developed for steelhead contemplated fewer than 50,000 WxW locally adapted Twisp steelhead be planted in the Twisp River annually. In general Douglas PUD would not support the release of their entire Twisp production in a given year to an untested acclimation facility or rearing combination.

Kirk Truscott suggested that only WxW spring Chinook crosses be used in the Nason Creek acclimation trial since such crosses were the only crosses used previously. Bill Gale expressed concern about placing such large numbers of spring Chinook in an untested multispecies acclimation site. Keely Murdoch stated that the Rohlfing site has a back-up well in case of emergency. The Hatchery Committee discussed other examples of multi-species acclimation. In the 1970s, the Sol Duc Hatchery mixed spring Chinook and coho successfully. No results were ever published and the source of this information is Harry Senn, who has long since retired. Tom Scribner said he will call the hatchery to verify whether there are any records.

B. Coho Returns

Tom Scribner said the YN has approached WDFW on opening a non-tribal and tribal fishery on coho. The YN is currently waiting for a response.

C. Coho EIS Public Meeting

Tom Scribner said the public meeting in the Wenatchee and the Methow on the YN's coho Environmental Impact Statement (EIS) went well and the proposal was well received.

D. Web-Based Data Sharing Portal

Keely Murdoch said she received an email on Monday from Shawn Quigley of PNAMP asking if the YN would be interested in participating on a workshop to discuss a web-based data-sharing portal. Keely Murdoch said the email included a draft agenda for an upcoming workshop. Murdoch asked that Mike Schiewe and/or Ali Wick request they be added to the email group list so they would receive future notices to forward to Hatchery Committee members. Murdoch will email the draft agenda to Wick.

V. HETT Update

Keely Murdoch updated the Hatchery Committees on the Hatchery Evaluation Technical Team's (HETT's) assignment to conduct the Non-Target Taxa of Concern (NTTOC) assessment. Recommendations were to use a panel that included both ecological experts across regions and biologists with local knowledge. The initial list is long and it will be used as a pre-outreach list. All individuals on the list will be sent a letter of interest asking them to provide information on species they are interested in and time they could commit to the process. The scientists selected for the Final Panel would be sent descriptions of the hatchery programs and matrix tables to fill out and record their estimate of risk. Risk templates would be submitted to the HETT and the HETT would compile the information and produce a report on the results. The results would not be analyzed, just compiled. To keep with the timeline, the HETT would like to send the outreach letters out after the next HETT meeting. It was decided that the HETT will discuss the intended letter on September 23 and will soon thereafter submit it and the list of potential panel members to the Hatchery Committees for approval.

VI. Presentation: Reintroduction of Sockeye into Okanagan Basin (Held on September 17th)

Howie Wright from the Okanagan Nation Alliance (ONA) provided an update of the program for the 2008 broodyear; 2008 was the sixth year of the program. He gave an overview of the egg take, collection, and fry release activities. Six hundred eighty females and 730 males were taken for spawning, and 1,614,300 fry were released. In 2008, fry-release strategy timing included both midnight and early evening releases. Fry survival results in 2008 and over past years indicated that midnight releases in early June produced the highest survival.

Outmigrating smolts were counted in Skaha and Osoyoos Lakes, but there was some error due to low efficiency of some sampling gears (fyke net). Smolt-to-adult ratios (SAR) were calculated using pre-smolt winter estimates. The SAR calculated for Skaha sockeye was 8 percent and the SAR for Osoyoos fish was 6 percent.

The ONA is currently completing the program report for the 2006 and 2007 BYs and is working on a 4-year synthesis report. Plans for 2009 include collecting approximately 400 to 450 females, which is a reduction from past years due to a hatchery limitation of 1,000,000 eggs. Construction drawings are nearing the final design stage, which includes design for a 5,000,000 egg capacity with provisions for expansion to 8,000,000. The timeline for commencing construction is spring 2010 with an initial egg take in 2011. Final negotiations are ongoing between the ONA and the PUDs on a revised agreement to end the experimental period for the program.

Tom Scribner asked about the apparently high SARs for the program compared to other salmonid mitigation programs on the Columbia River. Kim Hyatt said that these SAR estimates are typical for some Canadian rivers and are within the range of expectation for these stocks. He also said that these SARs are the result of peak survival years for the area.

VII. Presentation: Okanagan Fish-Water Management Tool

Kim Hyatt from Department of Fisheries and Oceans – Canada (DFO Canada) provided a presentation on the Okanagan Fish-Water Management Tool (FWMT), a decision-support system that displays various water scenarios real-time within the Okanagan system. Release

patterns for the Okanagan Basin are typically managed by a Water Management Agreement and the tool assists water managers in meeting criteria in the Agreement.

Hyatt said that 2009 has been a high drought year and water managers have essentially been asked to retain as much water as possible in Lake Okanagan. This action is intended to protect the large fry population rearing in the lake this year from the record spawning year of 2008. He also said that use of the FWMT has stabilized the production value of egg survival per female over the last several years.

Hyatt noted that decision timing using the tool can be as little as 24 hours, plus a 6-hour timeframe after which change in lake conditions can be observed. He said that the FWMT now has the capability to model the date of onset of an autumn "temperature squeeze" in Osoyoos Lake and the duration of the squeeze based on systematic measurements of temperature and dissolved oxygen at certain lake depths. There is currently no mechanism to link the model to ocean conditions, but even if this existed, it would likely be difficult to observe any changes other than large effects. Hyatt also said that, approximately 4 years ago, DFO Canada processed some scenarios to model climate change and will be doing so again in the future. The 50-year scenario from this effort showed precipitous drops in water flow between Skaha and Okanagan Lakes, potentially leading to dry channels.

VIII. HCP Administration

A. Committee Representation

Shaun Seaman will send a letter to Mike Schiewe designating Joe Miller as the Hatchery Committee Alternate.

B. Meeting Agreements not Requiring an SOA

- The Hatchery Committee agreed to continually operating the bladder at the adult weir at the Dryden Dam adult fish trap until flow conditions improve (Item III-G).
- The Hatchery Committees agreed with the hybrid option of salvaging fish, if necessary, as a coordinated effort, and considering the option of closing the right bank adult fish ladder (depending on timing) or implementing a trap-and-haul operation, given availability of trucks for hauling and efficiency of trapping (Item III-G).
- The Hatchery Committee agreed to review the NTTOC pre-outreach list and the letter of interest when both are received (Item V).

C. Next Meetings

The next scheduled Hatchery Committees meetings will occur as follows: October 21, November 18, and December 16, all at the Chelan PUD offices in Wenatchee.

List of Attachments

Attachment A – Lists of Attendees

Attachment A
Lists of Attendees

Attendees for September 16 Meeting

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Carmen Andonaegui	Anchor QEA, LLC
Joe Miller*	Chelan PUD
Shaun Seaman *	Chelan PUD
Sam Dilly (by conference call)	Chelan PUD
Kirk Truscott *	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Greg Mackey	Douglas PUD
Todd Pearsons	Grant PUD
Kris Petersen *	NMFS
Mike Ford	NMFS
Bill Gale *	USFWS
Bob Pfeifer *	WDFW
Andrew Murdoch	WDFW
Tom Scribner *	Yakama Nation
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

Attachment A
Lists of Attendees

Attendees for September 17 Meeting

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Carmen Andonaegui	Anchor QEA, LLC
Joe Miller	Chelan PUD
Kirk Truscott *	Colville Tribes
Kim Hyatt	DFO Canada
Tom Kahler *	Douglas PUD
Greg Mackey	Douglas PUD
Todd Pearsons	Grant PUD
Russell Langshaw	Grant PUD
David Duvall	Grant PUD
Kris Petersen *	NMFS
Howie Wright	Okanagan Nation Alliance
Elizabeth McManus	Ross and Associates
Patrick Donovan	Ross and Associates
Bill Gale *	USFWS
Bob Pfeifer *	WDFW
Jeff Korth *	WDFW
Tom Scribner *	Yakama Nation
Keely Murdoch *	Yakama Nation

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	November 19, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Joe Miller, Greg Mackey		
Re:	Final Minutes of October 21, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at the Chelan PUD offices in Wenatchee, Washington, on Wednesday, October 21, 2009, from 9:30 am to 4:30 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Kris Petersen and Mike Schiewe will consult with Mike Ford about the statistical power/value of extending the duration of the proposed Wenatchee steelhead reproductive success study, and report back to the Hatchery Committees by November 4 (Item II-A).
- Any Hatchery Committees members that have remaining questions on the Chiwawa River water right will send these questions to Joe Miller by October 28 (Item II-B).
- Joe Miller and Bill Gale will coordinate potential changes to the passive integrated transponder tag (PIT-tag) array at Blackbird Pond (Item II-D).
- The Hatchery Committees will provide a 30-day review for the Douglas PUD 2010 Monitoring and Evaluation (M&E) Implementation plan. Tom Kahler will send out an email that outlines any differences between last year's plan and this year's plan (Item IV-C).

DECISION SUMMARY

- The Hatchery Committees approved the Statement of Agreement (SOA) Regarding Summer Chinook Rearing at Ringold Hatchery and Eastbank Re-use Facility (Attachment B; Item II-E).

I. Welcome, Agenda Review, Meeting Minutes

The Hatchery Committee approved the October 21 Rock Island and Rocky Reach Hatchery Committees conference call meeting minutes and the September 16-17 Hatchery Committees meeting minutes as revised.

II. Chelan PUD

A. WDFW/NWFSC Steelhead Spawning Success Study

Joe Miller said that at the last Hatchery Committees meeting, an SOA for a proposed Wenatchee steelhead spawning success study was presented and the Committees heard a presentation on the proposed study from Mike Ford. Miller distributed copies of comments that arrived by email today from National Marine Fisheries Service (NMFS) on the study. Mike Schiewe asked if anyone had comments on the SOA. There was a discussion about the potential to extend the study duration to include adult returns if there was no detectable difference in reproductive success between hatchery and natural origin spawners based on juvenile life stages. Miller said that Chelan PUD was willing to modify the SOA language to indicate that Chelan PUD "will," instead of "may," fund additional genetic analyses of adults. He indicated that Chelan PUD would like the Committees to develop an Implementation Plan outlining how the steelhead hatchery program would change if this study demonstrated reduced reproduction success of hatchery steelhead spawning naturally. Kris Petersen said that NMFS would still have concerns that the 4 smolt production years and the follow-on adult production of 4 years of the proposed study will not be long enough to take annual variability into account. Bill Gale stated concerns that the current proposal does not adequately address how changes in management detailed in the current HGMP and Steelhead Management Plan may impact reproductive spawning success of H x W (hatchery X wild) adults.

Joe Miller said that Chelan PUD received the proposed study from Washington Department of Fish and Wildlife (WDFW) and Northwest Fisheries Science Center (NWFSC) staff with the understanding that it was consistent with the recommendations of the Ad-Hoc Steelhead Supplementation Workgroup, and he was under the impression that this was the right study to meet the study goals. There was some discussion about this, culminating in a vote to define each signatory's position. Chelan PUD voted yes. Yakama Nation (YN) voted to abstain. Tom Scribner said that his main concern was that he would like Mike Ford (co-author of the proposal) to weigh in on the importance of the study duration. U.S. Fish and

Wildlife Service (USFWS) voted no based on this same concern and would like to add language to the SOA for a path forward based on power analysis. WDFW voted yes. Colville Confederated Tribes (CCT) voted no based on needing a better understanding of where Mike Ford stands on the current study proposal. NMFS voted no based on discussions with Mike Ford that additional study years would better address the management questions for which the study is being proposed. Kris Petersen said that she would approve the proposal if there were 2 additional years of adult study. The Hatchery Committees ultimately agreed that Kris Petersen and Mike Schiewe will work with Mike Ford to assist the Committees in better understanding the proposed study. In particular, the Committees are seeking assurance that it is the right study to address management questions about the future direction of the steelhead supplementation program. The Committees also would like additional information on what the incremental value would be of extending the duration of the proposed study to include evaluation of additional years of adult returns. Petersen and Schiewe will report back to the Committees on these issues by November 4.

B. Chiwawa Water Right

Shaun Seaman said that he had sent out a draft letter to the Hatchery Committees for their use in drafting their own letters to the Washington State Department of Ecology (Ecology) regarding Chelan PUD's application for a Chiwawa River water right. Bill Gale said that USFWS' letter will say that USFWS' support for the water right will be contingent on the consultation between Chelan PUD and USFWS. Shaun Seaman then said that this may cause an endless loop as Ecology cannot issue the 401 until the water right support letters are received. Based on today's discussion, there are some questions that will need to be answered between USFWS and Chelan PUD, and between NMFS and Chelan PUD. YN and WDFW said that they did not have any questions. Any other Committees members who have questions will send them to Joe Miller by October 28.

C. Beckman/Larsen/Harstad Presentation of Precocity Study Findings on Steelhead and Summer Chinook

Chris Good provided a presentation on results of fish health monitoring of the summer Chinook that were raised in the pilot study of the partial water reuse system at Eastbank Hatchery. Sampling occurred at 0, 13, and 21 weeks post-ponding for virology, histology, and fin condition. There were no major effects in terms of fish length (although some differences were found to be statistically significant). Raceway fish were slightly heavier

than fish reared in reuse ponds (reuse fish). Condition factors were lower for reuse fish, though there was no gross fin erosion in either group. Survival of both groups was more than 99 percent. Gill filaments in reuse fish exhibited clubbing. However, this gill condition is considered by Good to be a result of chronic low-level irritation and not major in comparison to the range in gill cell sizes often seen in gill pathology in cultured fish. Good said that the level of condition of these fish does not indicate hypoxia. No viruses or pathologic bacteria were a problem in either fish group. Blood chemistry was within normal range for salmonids. A higher blood carbon dioxide and higher oxygen level was observed in reuse fish. Good's opinion was the performance between the two fish groups was excellent; Good said that these results present evidence of the viability of reuse for raising fish.

Bill Gale asked Good's opinion about saltwater performance, suggesting that the gill effects might affect transition to seawater. Good said that it is likely that the gills would be normal by the time the fish reach saltwater. Sam Dilly said that a higher density of the fish in the reuse pond has a positive effect on the cleaning action in the pond and that he expects that this year's fish, which were raised at a higher density than last year, should have little to no gill condition problems. Results are forthcoming.

Brian Beckman provided a presentation on the physiology of reuse summer Chinook. Both control and reuse fish lengths were bi-modal through the course of the study, with the modes essentially the same and in the same proportion for both groups. Thus, the rearing regime does not affect bi-modality. The study then considered four groups of fish from these four separate modes. There were no significant differences between treatments within size modes for various clinical indices of growth. Fish in the small size mode have more dynamic patterns of growth and smolting in the spring.

Don Larsen presented results on precocial (age 2 "mini jacks") male maturation in summer Chinook in the reuse and control groups. The size distribution for reuse fish was less broad than other fish of similar genetics studied in the Mid-Columbia (Carlton, Similkameen, Dryden fish). Overall, precocious maturation was very low in the reuse fish versus the control fish, and was substantially lower than in other fish studied in the basin. Larsen discussed plans for next year's studies, which include more sampling and more investigation on the role of size modes. There was some discussion about whether it is appropriate to have criteria for coefficient of variation (CV) for various hatchery juveniles, and the opinion of the

presenters was that CVs are appropriate to have fish in similarly-sized, controllable groups. They also indicated that it may make sense to separate size modes and apply separate CVs. Mike Schiewe asked whether adult return data were consistent with their results of screening juveniles for precocity prior to release. Larsen said that mini-jack abundance from most years does typically correlate with abundance of mini-jacks climbing the fish ladders the next year.

D. Update on Blackbird Pond

Shaun Seaman said that Steve Hays has been compiling information on last year's experience acclimating and releasing steelhead from Blackbird Pond. Hays will provide this information soon. Seaman did say that, currently, Chelan PUD plans to make some changes that will keep the water moving safely and freely, but does not expect to make any changes to the outfall. Bill Gale added that he and USFWS PIT-tag specialist had looked at the pond configuration and would propose installing two antennas at the site. Deep-cycle batteries would be used for this year and if data are good this year, hard power could be provided in future years. Seaman asked Gale to coordinate with Joe Miller on facility modifications.

E. DECISION ITEM: SOA Regarding Summer Chinook Rearing at Ringold Hatchery and Eastbank Reuse Facility

Joe Miller brought up the SOA for summer Chinook rearing at Ringold Hatchery and the Eastbank Reuse Facility (Attachment B). The Hatchery Committees agreed to the rearing of up to 400,000 yearling summer Chinook for acclimation and release at Chelan Falls and Turtle Rock (starting with 2009 brood year). Tom Scribner said that he was in favor of the SOA, but wanted to verify that Chelan PUD would make other arrangements to rear these fish if Ringold Hatchery were needed by the *U.S. v. Oregon* parties. Shaun Seaman verified that this would be the case. This SOA was approved.

F. Review of Monthly M&E Reports

Joe Miller said that Chelan PUD will now regularly ask for member comments on the monthly M&E reports at Hatchery Committees meetings.

G. Chiwawa Spring Chinook "Flag-Tail" Outbreak

Sam Dilly said that Chiwawa spring Chinook are currently experiencing a *Saprolegnia* ("flag-tail") outbreak with approximately 1 percent of the fish affected. These outbreaks are

typically stress-related, and the phenomenon has been cyclical approximately every 3 to 5 years at this facility. Dilly is working with Bob Rogers, WDFW fish health specialist, to treat these fish.

H. Update on Chiwawa Steelhead Pilot Progress

Sam Dilly said that construction is almost complete on the Chiwawa steelhead reuse facilities. Start-up and testing occurred about 2 weeks ago. There is an automatic oxygen sensing system with automatic backup. Dilly said that this year the steelhead were not large enough to transfer on the original timeline, and will now be transferred to the reuse facility in December. The water temperature differential between Eastbank hatchery and the Chiwawa reuse tanks will be approximately 20 degrees Fahrenheit, so water heaters will be used to warm the cold Chiwawa River water in the reuse tanks to make it closer to the temperature that the fish have been experiencing at Eastbank Hatchery, and then the temperature will be slowly reduced to the colder Chiwawa River temperature level that will be maintained at the reuse ponds.

I. Draft SOA for Reduction of Spring Chinook Production Levels and Implementation of Early PBT Rearing

Joe Miller distributed a draft SOA for reduction of spring Chinook production levels and the implementation of testing early parental-based tagging (PBT) rearing. Joe indicated that these actions are described in the Spring Chinook HGMP and are scheduled for 2010 as written and approved by the Committee. Tom Scribner said that he needed to talk with Steve Parker about the proposed timelines. Jeff Korth mentioned that WDFW is developing a PBT study design. Joe Miller suggested that the discussion of the SOA and ultimate decision is needed prior to brood stock collection this spring.

J. Priest Rapids Hatchery Sub-committee SOA for Dryden Pond

Shaun Seaman brought to the Hatchery Committees' attention that the Priest Rapids Hatchery Sub-committee has recently approved an SOA for Dryden Pond, dated September 14, 2009, titled *Priest Rapids Coordinating Committee (PRCC) Hatchery Subcommittee Statement of Agreement on Assessing the Feasibility of Modification of Chelan PUD's Dryden Pond to Provide Overwinter Acclimation Facilities and/or Expanded Capacity for Grant's Fish*. The Hatchery Committees said that they concur with the action proposed in

the PRCC SOA. Any direct obligation to the HCP Committees, however, would need to be memorialized by a SOA in the minutes of the HCP meetings.

K. Draft M&E Plan for Upper Columbia River Salmon Recovery Plan

Shaun Seaman brought up the Draft M&E Plan for the Upper Columbia River Salmon Recovery Plan. Keely Murdoch was an author on this draft document and said that this document is still under review and comments by individual entities should be provided soon if possible.

L. Hatchery Committees Representation

Shaun Seaman said that Joe Miller will now be the Hatchery Committees representative and Steve Hays will be the alternate. Mike Schiewe and the Committees thanked Seaman for his service on the Committees over the years.

III. Colville Confederated Tribes

Kirk Truscott updated the Hatchery Committees that 200,000 Met-Comp fish currently at Winthrop Hatchery would be transferred to Tonasket Pond and Omak Creek Acclimation Facility (in the Okanogan basin) in early November; 50,000 to Omak and 150,000 to Tonasket. The Committees approved this transfer.

IV. Douglas PUD

A. HGMP Update

Greg Mackey updated the group that the Methow spring Chinook and steelhead Hatchery Genetic Management Plans (HGMPs) are still in progress, with most of the changes being made based on the recommendations of the Hatchery Scientific Review Group's (HSRG). Douglas PUD will continue to work toward the October 31 deadline but informed Kris Petersen that it may not be met because the HGMP sub-group has not reached consensus on a few outstanding details of each program. Petersen said that meeting the October 31 deadline was important, and encouraged the HGMP sub-group to keep the pressure on to complete the documents.

B. Plans for Modifications to Fish Holding at Wells Dam

Greg Mackey said that Douglas PUD is planning some modifications to the configuration for new fish holding and sorting at Wells Hatchery; preliminary plans were emailed to the

Hatchery Committees prior to today's meeting. The modifications will reduce stress on fish and improve handling by providing a larger holding area for fish shunted to the hatchery from the west ladder at Wells Dam, eliminating the need for water level changes in the holding pond to handle fish, providing water-to-water transfer of fish, and increasing the efficiency of fish handlers. These improvements involve no changes to the structure or operation of the west fish ladder.

C. 2010 Wells M&E Implementation Plan

Tom Kahler said that the 2010 Wells M&E Implementation Plan has been distributed to the group and asked for a 30-day review (comments then due Friday, November 20). The Hatchery Committees agreed to this review schedule. Bill Gale asked whether any changes to the HGMPs would need to be considered in the plan. Kahler and Mackey said that they do not believe that there are any proposed HGMP alterations that would create major changes in monitoring. When asked whether there were any differences between the draft 2010 plan and the plan approved in 2009, Tom Kahler stated that the plans were essentially similar with only minor differences; he will send out an email that outlines the differences between the two plans.

V. Yakama Nation

A. Presentation and Discussion on Draft Expanded Multi-Species Acclimation Proposal

Tom Scribner updated the Hatchery Committees on the status of the YN proposal to implement multi-species acclimation in the Wenatchee and Methow subbasins. The proposal has been sent out to the Committees as a working draft. More work is being done on the proposal and a revised proposal will be sent out to the Committees soon. The YN is hoping to implement the proposal in 2010 in the Wenatchee and in 2011 in the Methow. Scribner reviewed some of the key points of the proposal and asked for initial comments on it from the Committees. Kris Petersen asked whether this proposal was mentioned in the HGMPs; Scribner said that a placeholder was included, but the placeholder does not mention the multi-species aspect of the proposal. In response to some questions about whether the ponds would be used as a reference against traditional acclimation pond rearing, Keely Murdoch confirmed that they would not; data from this study would be used comparatively to verify that the program was producing similar results to traditional pond rearing. Scribner then reviewed actions for the Methow basin. There was discussion and feedback to Scribner about various points of the proposal. One of the suggestions was that upper Methow

acclimation be tested with Methow Hatchery Met-Comp spring Chinook rather than Winthrop spring Chinook. He said that those comments would be taken into account as the proposal evolves. The Committees indicated that they were basically favorable to the schedule, contents, and elements of the proposal as presented today.

VI. NMFS

A. NMFS' HGMP Review

Kris Petersen updated the group that NMFS is reviewing the HGMPs and will provide comments to the parties submitting the HGMPs in the near future. NMFS is developing a letter format for their comments, which will reiterate NMFS' understanding of the program, and highlight where concepts (if any) are unclear. These letters can be expected in the next 2 to 3 weeks. Petersen said that NMFS will be processing the Wenatchee HGMPs first. She said that NMFS will not post the HGMPs in the Federal Register until after NMFS has received a letter from the applicants (or lack thereof after a certain period of time) acknowledging NMFS' preliminary comments.

B. FCRPS Adaptive Management Implementation Plan

Kris said that the Federal Columbia River Power System (FCRPS) Adaptive Management Implementation Plan identifies Evolutionarily Significant Unit (ESU)- or Distinct Population Segment (DPS)-level triggers that would lead NMFS to an implementable action. These triggers are based on 20 percent of the most recent average returns to the ESU or DPS.

VII. HETT Update

Keely Murdoch updated the group that the Hatchery Evaluation Technical Team (HETT) has completed the draft letter of interest and the panel member list for the Non-Target Taxa of Concern (NTTOC) analysis. The Hatchery Committees have reviewed both the letter and the list. The HETT is currently working on the risk template. For control groups, the HETT is completing the analysis and will have that to present to the Hatchery Committees by February or March 2010.

VIII. HCP Administration

A. Committee Representation

Shaun Seaman will send a letter to Mike Schiewe designating Joe Miller as the Hatchery Committee representative and Steve Hays as the alternate.

B. Meeting Agreements not requiring an SOA

- The Hatchery Committees concurred with the CCT transfer of Met-Comp fish currently at Winthrop Hatchery to Tonasket Pond and Omak Creek Acclimation Facility (in the Okanogan basin) in early November. The total transfer will be 200,000 fish: 50,000 to Omak and 150,000 to Tonasket.
- The Hatchery Committees agreed to a 30-day review period for the Douglas PUD 2010 M&E Implementation Plan.
- The Hatchery Committes agreed via email responses to Kahler on September 28-30, to obtaining gametes from excess summer/fall Chinook broodstock at Wells Hatchery to provide study fish for a 2011 survival study.

C. Next Meetings

The next scheduled Hatchery Committees meetings will occur as follows: November 18, December 16, and January 20, all at the Chelan PUD offices in Wenatchee.

List of Attachments

Attachment A – List of Attendees

Attachment B – SOA Regarding Summer Chinook Rearing at Ringold Hatchery and Eastbank Reuse Facility

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Joe Miller *	Chelan PUD
Shaun Seaman *	Chelan PUD
Ian Adams	Chelan PUD
Sam Dilly	Chelan PUD
Kirk Truscott *	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Greg Mackey	Douglas PUD
Chris Good	Freshwater Institute
Todd Pearsons	Grant PUD
Russell Langshaw	Grant PUD
Kris Petersen * (by conference call)	NMFS
Don Larsen	NMFS
Deb Harstad	NMFS
Brian Beckman	NMFS
Bill Gale *	USFWS
Bob Pfeifer *	WDFW
Jeff Korth *	WDFW
Tom Scribner *	Yakama Nation
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

Attachment B

FINAL Statement of Agreement
Regarding Summer Chinook Rearing at Ringold Hatchery and Eastbank Re-use Facility

Rocky Reach and Rock Island HCP Hatchery Committees
October 21, 2009

Statement of Agreement
The Rocky Reach and Rock Island HCP Hatchery Committees (Committees) agree that WDFW may produce up to 400,000 yearling Columbia River summer Chinook for acclimation and release at Chelan Falls and Turtle Rock (2009 brood year).

Secondly, the Committees agree that Chelan County Public Utility District No.1 (District) may proceed with rearing yearling summer Chinook using (1) the Re-use facility currently located at Eastbank Hatchery and (2) Ringold Hatchery according to the proposed path described in Attachment 1.

Background
This request represents a continuation of Turtle Rock/Chelan Falls yearling production from brood year 2008 (i.e., 400,000). The purpose of this effort is continue evaluation of rearing options to achieve the desired target of 600,000 yearling summer Chinook ultimately destined for acclimation at the proposed Chelan Falls acclimation facility. This decision is needed now because mating will be completed in the coming weeks and opportunity to create yearling fish (above the current 200,000 production plan target) will be eliminated. Broodstock have already been collected for 2009, but the fate of the eggs is in question (i.e., subyearling or yearling).

Secondly, The District has been testing the efficacy of (1) water Re-use at Eastbank Hatchery and (2) Ringold hatchery to rear summer Chinook for HCP production. The purpose of these alternative rearing methods is to reduce the demand for water at Eastbank and create additional space necessary for reaching the Districts' HCP production targets (including sockeye, spring Chinook and steelhead) in an expedient, efficient manner.

Previous SOAs have provided opportunities to evaluate both Re-use and Ringold approaches.

From the October 27, 2008, SOA: *Regarding Pilot Study For Partial Reuse*, the Committee agreed to evaluate rearing fish at higher densities in the Re-use system:

"The Rocky Reach and Rock Island HCP Hatchery Committees (hereafter "Committees") agree that Chelan County PUD (hereafter "District) can perform the second year of the partial water reuse pilot study. Approximately 200,000 Wells Summer Chinook from the District's Turtle Rock Island program will be converted from the subyearling program

(reducing the subyearling program by 200,000 fish) and will be reared on partial water reuse utilizing circular ponds. This effectively doubles the density from the 2008 pilot study. The Committees agree to allow the District to perform the study as outlined in the attached Pilot Water Reuse Fish Rearing Criteria (2009) and the Partial Water Reuse Pilot Study Monitoring and Evaluation (2009)."

From the June 17, 2009, SOA: *Use of Ringold Springs Hatchery*, the Committee agreed to evaluate Ringold springs and alternative rearing densities to rear yearling summer Chinook:

"The Rocky Reach HCP Hatchery Committee (Committee) agrees that Chelan County Public Utility District No.1 (the District) can rear up to 200,000 summer Chinook (2008 brood) at the Ringold Springs Hatchery (Ringold) during the summer of 2009. The fish to be reared at Ringold in 2009 will be from the portion of the District's Similkameen River summer Chinook obligation that are reared during the winter and released at the Bonaparte Rearing Pond. Approximately one half of the fish will be reared at density index (DI) of 0.125 and the other half at 0.20. Each group of fish reared at the different density will be differentially coded wire tagged. After fish are transferred from Ringold to Bonaparte Pond, the Committee will review the fish rearing data and determine the District's ability to use Ringold in the future."

The Ringold SOA also identified several key opportunities provided by the additional space at Ringold, and subsequent reduced demand at Eastbank:

"If ultimately successful, this proposed program change may provide the following benefits (particularly if the 600,000 Turtle Rock Island yearling program is reared at Ringold):

- Freeing capacity at Eastbank Hatchery which could then be used for Lake Wenatchee Sockeye alleviating the need to provide biosecurity measures at Chelan Hatchery.
- Converting the Turtle Rock Island sub-yearling program to a yearling program more rapidly. Though the Chelan Falls rearing facility is not scheduled to be substantially complete until 2012, this would allow yearlings to be released from Turtle Rock Island and probably provide a higher smolt survival and adult return."

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	December 17, 2009
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Joe Miller, Greg Mackey		
Re:	Final Minutes of November 18, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at the Chelan PUD offices in Wenatchee, Washington, on Wednesday, November 18, 2009, from 9:30 am to 1:30 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- The Hatchery Committees members will provide comments on the parental based tagging (PBT) study plan and Statement of Agreement (SOA) by Monday, December 7 to Joe Miller; he will then send these items back out to the Committees members for final review and consideration prior to the December Hatchery Committees meeting (Item IV-B).
- Kris Petersen will evaluate options for Endangered Species Act (ESA) consultation on the construction and operation of the Chelan Falls Chinook Acclimation Facility that would allow the project to proceed without a revised Hatchery Genetic Management Plan (HGMP) (Item IV-F).
- Joe Miller will talk to Court Hill about facility modifications at Tumwater Dam to improve efficiency of handling of returning adult salmonids; Miller will include this information in the monthly hatchery program reports (Item VI-A).

DECISION SUMMARY

- The Hatchery Committees approved the SOA Regarding Steelhead Spawning Success and Objectives 2 &3 of the Monitoring and Evaluation Plan as they Pertain to Steelhead (Item Attachment B).

I. Welcome, Agenda Review, Meeting Minutes

The Hatchery Committee approved the October 21 Hatchery Committees meeting minutes as revised.

II. WDFW

A. Chiwawa spring Chinook ELISA results and path forward

John Kerwin of Washington Department of Fish and Wildlife (WDFW) attended today's meeting on behalf of the WDFW fish health department. He stated that enzyme-linked immunosorbent assay (ELISA) results for bacterial kidney disease (BKD) antigen from seven Chiwawa spring Chinook females were in the moderate or high categories, and WDFW is evaluating options for managing their eggs—including culling (WDFW does not plan to make any management changes for "low" ELISA eggs). Kerwin asked for recommendations from the Hatchery Committees. Keely Murdoch asked whether there were any opportunities to save the moderate-ELISA eggs by rearing them separately; Kerwin said that this was not an option at this time because of space limitation and concern over the release of *Renibacterium salmoninarum* into the river. Joe Miller reminded the group that culling eggs from high ELISA females was agreed to in Chelan PUD's Wenatchee spring Chinook Hatchery Genetic Management Plan (HGMP). Kerwin confirmed that there is currently not a cost-effective technology for treating hatchery effluent water. The Committees concurred with WDFW's recommendation to cull these high and moderate ELISA eggs; this culling would reduce production by 26,000 eggs.

B. Extra Methow Composite spring Chinook eggs at Methow Hatchery

Jeff Korth said that there are 57,000 spring Chinook eggs above program needs currently at Methow Hatchery; these eggs are the result of intentional overcollection of broodstock to compensate for culling potential high ELISA fish. He reminded the group that the overcollection protocol was reviewed by the Hatchery Committees during their review of the broodstock collection protocols for this year. The 57,000 eggs are all "low or below low" ELISA eggs. Korth asked for the Committees' recommendations on disposition of these eggs. Kirk Truscott indicated that the Colville Tribes would not be able to accept the eggs for their hatchery needs. Bill Gale suggested that the fish could potentially be reared to fry and then released into the Methow. Keely Murdoch suggested that these fish might be useful for research. The Committees wanted some extra time to try to identify an alternative use. For

the path forward, they concurred with a WDFW recommendation to cull these eggs *unless* another HCP use can be identified before close of business Tuesday, December 1.

III. Douglas PUD

A. HGMP Update

Tom Kahler said that Douglas PUD is continuing to work with WDFW to complete Methow steelhead and spring Chinook HGMPs. He anticipates finishing work on the steelhead HGMP in another day, which would translate to Hatchery Committees review commencing at the end of the week of December 4 at earliest. For the spring Chinook HGMP, Douglas PUD is close to finishing discussions with WDFW on the last few questions. The Committees agreed that the next step following Douglas PUD completion of the HGMPs will be review by the Committees (as opposed to review by the HGMP workgroup). This change was made in order to expedite the review process.

IV. Chelan PUD

A. DECISION ITEM: WDFW/NWFSC Steelhead Spawning Success Study Statement of Agreement

Joe Miller distributed hard copies of the revised Statement of Agreement (SOA) for the WDFW/Northwest Fisheries Science Center (NWFSC) Steelhead Spawning Success Study. Bill Gale said that he has concerns that the study will not adequately span the present and upcoming management strategies (current management and the reduced escapement of hatchery-origin steelhead above Tumwater Dam as described in the new HGMP), and that the value of the study results for assessing the effectiveness of changes envisioned in the HGMP will be diminished. Bill Gale suggested that a longer term of study or interrupted time frame (several years at previous/present conditions and several years post HGMP) may provide more useful information for future management. Joe Miller replied that this is true, but that the study was not intended to test management strategies, acknowledging that management would always be changing. Miller also indicated that Chelan PUD had raised this issue previously, when the proposal was originally brought before the Hatchery Committees, and there was clear direction from the Committee to implement now as opposed to waiting for a stable management scenario. Gale said that he understood, but still had doubts as to the value of the current study for assessing the effectiveness of planned management changes envisioned in the current HGMPs. The Hatchery Committees discussed and ultimately agreed that having two different strategies ongoing during the study was an acceptable condition. In the SOA, a change was made to capture that the study will

contribute to Objectives 2 and 3 of the Chelan PUD Monitoring and Evaluation Plan (M&E Plan) . The Committees approved the study and the SOA as revised today (Attachment B).

B. Chiwawa Spring Chinook Program Reduction and PBT SOA

Joe Miller submitted a draft SOA regarding the reduction of the Chiwawa spring Chinook program concomitant with testing of PBT in 2010. The first step in moving toward this change would be a test of PBT. The test would include trapping, tagging, and taking a tissue sample of spring Chinook at the Priest Rapids off-ladder adult fish trap (OLAFT) followed by analysis of trapping and handling effects, evaluating the logistical feasibility of PBT, and assessing the accuracy of parental-based assignments. Miller provided a brief synopsis of the study for the Hatchery Committees to review, and asked for feedback. Keely Murdoch commented that 1 year of study may not be enough to decide whether PBT is viable for full implementation and would like language in the SOA to clarify that additional study years may be necessary. Miller agreed. Murdoch also suggested that there be a comparison of multiple-handling events. Kirk Truscott said that parameters identifying success of the study should be defined. Committees members will provide any additional comments by Monday, December 7, to Miller; he will then send this back out for consideration prior to the December Hatchery Committees meeting. The Committees will consider the SOA at the December meeting.

The *U.S. v. Oregon* parties present at today's meeting recognized that there will need to be internal agency coordination to ensure that changes to production are consistent with their *U.S. v. Oregon* obligations.

C. Chiwawa Acclimation Water Right Application

Joe Miller updated the group that Chelan PUD is re-evaluating whether a new 22 cubic feet per second (cfs) water right is needed for acclimation of steelhead, given that there is an existing 11 cfs water right for spring Chinook. Miller will update the Hatchery Committees with more information as it is available.

D. Review of Monthly M&E Reports

There were no questions on the monthly Monitoring and Evaluation (M&E) Reports at this month's meeting. Ali Wick will add John Penny to the distribution list for Chelan PUD M&E monthly reports.

E. Hatchery Program Report

There were no questions on Chelan PUD's Hatchery Program Report at this month's meeting.

F. Chelan Falls

Joe Miller said that Chelan PUD is ready to move forward with final design and construction of the Chelan Falls yearling Chinook rearing facility, but they would like some assurance that NMFS will not require modifications based on a revised HGMP scheduled for completion in 2010. Chelan cannot move forward with engineering and construction without an understanding of how the HGMP or subsequent consultation would affect the design of the facility. Kris Petersen said that she understands Chelan PUD's concern, but does not have this assurance at this time. She agreed to explore permitting options to see whether there is a non-HGMP solution that would expedite the process.

V. USFWS

A. Tumwater Dam Transfer of Leavenworth Fish

Bill Gale said that 62 fish arrived at Tumwater Dam that were ad-clipped but not coded-wire tagged, indicating that they were potentially Leavenworth Hatchery fish. These fish were removed and sacrificed. Carcass outplanting did not occur due to fish health issues. Of the 62 fish, five were subsequently found to be coded-wire tagged; three were of Chiwawa Hatchery origin, and two were of Leavenworth Hatchery origin.

B. Transfer of Met-Comp Spring Chinook at Winthrop Hatchery

Bill Gale updated the group that the 200,000 spring Chinook that were slated for transfer from Winthrop National Fish Hatchery to the Colvilles (as discussed at the last Hatchery Committees meeting) would not be transferred, due to Endangered Species Act (ESA) issues.

VI. Yakama Nation

A. Tumwater Dam 2010 Leavenworth Spring Chinook

Keely Murdoch said that the Yakama Nation (YN) is investigating protocols for handling surplus hatchery-origin adult spring Chinook at Tumwater Dam in 2010. Bill Gale said that his preferred alternative would be not to anesthetize these fish so that they could be used for consumption without the additional 21-day holding time (this holding time is required for

fish exposed to MS-222 before consumption). He stated that it was unlikely that sufficient space/ resources/ staff were available to track and hold individual fish for the 21 day period at Leavenworth NFH. He also said that U.S. Fish and Wildlife Service (USFWS) would be willing to discuss the option of heat-treating carcasses so that surplus fish could be used for carcass outplants. Keely Murdoch reported that there has been a workgroup discussing the situation at Tumwater and her understanding was that a conceptual design for facilities modifications is being prepared by engineers at Chelan PUD. Joe Miller will follow up with Court Hill (engineer) on the status of this design and will include this information in the monthly hatchery program reports.

VII. HETT Update

Keely Murdoch updated the group that the Hatchery Evaluation Technical Team (HETT) is currently working on the Non-Target Taxa of Concern (NTTOC) risk template and this template will be available in January or February for Hatchery Committees' review. For control groups, the HETT is completing the analysis and will have that to present to the Hatchery Committees by approximately March 2010.

VIII. HCP Administration

A. Meeting Agreements not requiring an SOA

- The Hatchery Committees concurred with WDFW recommendations to cull 26,000 Chiwawa spring Chinook eggs from seven high and moderate ELISA spring Chinook female broodstock (Item II-A).
- The Hatchery Committees concurred with WDFW recommendations to cull 57,000 Met-Comp spring Chinook eggs that are above program needs currently at Methow Hatchery unless another HCP use can be identified before close of business on Tuesday, December 1 (Item II-B).

B. Next Meetings

The next scheduled Hatchery Committees meetings will occur as follows: December 16, January 20, and February 17, all at the Chelan PUD offices in Wenatchee.

List of Attachments

Attachment A – List of Attendees

Attachment B – SOA Regarding Steelhead Spawning Success and Objectives 2 &3 of the Monitoring and Evaluation Plan as they Pertain to Steelhead

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Joe Miller *	Chelan PUD
Steve Hays	Chelan PUD
Kirk Truscott *	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Shane Bickford *	Douglas PUD
Todd Pearsons	Grant PUD
Kris Petersen *	NMFS
Bill Gale *	USFWS
Bob Pfeifer *	WDFW
John Kerwin	WDFW
Jeff Korth *	WDFW
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

Attachment B

FINAL Statement of Agreement
Regarding Steelhead Spawning Success and Objectives 2 &3 of the Monitoring and Evaluation Plan as they Pertain to Steelhead

Rocky Reach and Rock island HCP Hatchery Committees
November 18, 2009.

Statement of Agreement

***Note: The underlined passage is an addition to the original September, 2009 Draft.*

The Rocky Reach (RR) and Rock Island (RI) HCP Hatchery Committees (HC) agree that Chelan County Public Utility District No.1 (the District) has met its obligations to conduct a study to investigate the natural spawning success of hatchery reared steelhead relative to wild steelhead [as described in Section 8.5.3 of the RR & RI HCPs] through the funding and complete implementation of the attached study proposal submitted by WDFW and NOAA Fisheries (Attachment 1).

In the event that no significant difference is detected between the reproductive success of Hatchery and Natural-origin spawners, based on comparisons of their offspring at the juvenile life-history stages, the District will fund the genetic analyses of additional samples collected from returning adults.

As a component of this study, the Committees agree to develop a plan to interpret the potential results of the reproductive success study as they pertain to future hatchery actions/operations.

This study will be included as part of the Wenatchee Summer Steelhead Hatchery and Genetic Management Plan (HGMP) submitted by Chelan PUD.

Background

The District is obligated to conduct a study to investigate the natural spawning success of hatchery reared steelhead relative to wild steelhead in Section 8.5.3 of the RR & RI HCPs. In developing this study, the HCP HC considered study guidance from NMFS, the ad hoc supplementation monitoring and evaluation work group, and critical uncertainties identified during the Federal Columbia River Power System ESA consultation process.

As proposed, the WDFW/NOAA reproductive success study also contributes to two objectives of the District's hatchery monitoring and evaluation plan (Murdoch and Peven 2005): Objective 2-*Determine if the run timing, spawn timing, and spawning distribution of both natural and hatchery components of the target population are similar*; Objective 3-*Determine if the genetic diversity, population structure, and effective population size have changed in natural spawning populations as a result of the hatchery program.*

Additionally determine if hatchery programs have caused changes in phenotypic characteristics of natural population.

As proposed, this study will commence in 2009 and sampling is expected to continue through 2014 for juvenile steelhead (evaluating reproductive success to juvenile life histories) and 2017 for adult steelhead (in the event there is no significant difference between Hatchery and Natural-origin steelhead at the juvenile life history stage).

The proposed study relies on work previously performed by WDFW and NOAA and funded by NOAA and the District.

ANCHOR QEA

1423 Third Avenue, Suite 300
Seattle, Washington 98101
Phone 206.287.9130
Fax 206.287.9131
www.anchorqea.com

FINAL MEMORANDUM

To:	Wells, Rocky Reach, and Rock Island HCP Hatchery Committees	**Date:**	February 2, 2010
From:	Michael Schiewe, Chair, HCP Hatchery Committees		
Cc:	Ali Wick, Greg Mackey		
Re:	Final Minutes of December 16, 2009 HCP Hatchery Committees Meeting		

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans (HCPs) Hatchery Committees met at Chelan PUD in Wenatchee, Washington, on Wednesday, December 16, 2009, from 9:30 am to 3:00 pm. Attendees are listed in Attachment A to these Meeting Minutes.

ACTION ITEM SUMMARY

- Greg Mackey will provide a copy of the Douglas PUD PowerPoint presentation provided at the December Hatchery Committee Meeting that summarized the key points of the Wells Steelhead Hatchery Genetic Management Plan (HGMP) (Item II-A).
- The Hatchery Committees will provide comments to Douglas PUD on the spring Chinook and steelhead HGMPs by January 15 (note that the steelhead Reproductive Spawning Success (RSS) study plan included in the steelhead HGMP has been updated and re-submitted on 12-23-09 per discussion at the December meeting) (Items II-A and II-B).
- The Hatchery Committee will provide comments on the proposed adult RSS study plan in time for the January 15 conference call to discuss this and the Committees' HGMP edits (Item II-C).
- Greg Mackey will investigate and report back to the Hatchery Committees on proposed modifications to the west ladder fish return pipe (Item II-D).
- Keely Murdoch will check with Kris Petersen to verify Endangered Species Act (ESA) coverage to test multi-species acclimation of steelhead and coho salmon in Rohlfings Pond, Nason Creek (Item III-A).

- Keely Murdoch will obtain additional information from Columbia River Inter-Tribal Fish Commission (CRITFC) staff on the configuration of the new Zosel Dam passive integrated transponder tag (PIT-tag) array and will send it to Joe Miller (Item III-D).
- Mike Schiewe will check with Kris Petersen regarding ESA coverage for Chelan Falls yearling summer/fall Chinook program (Item III-F).

DECISION SUMMARY

- The Rock Island HCP Hatchery Committee approved the Statement of Agreement (SOA) "Reduction of Chiwawa Spring Chinook Production Levels to 298,000 Smolts" (Item V-A; Attachment B).

I. Welcome, Agenda Review, Meeting Minutes

The Hatchery Committees approved the November 18 Hatchery Committees meeting minutes as revised. Ali Wick will send the final minutes to the Committees.

II. Douglas PUD

A. Wells Steelhead HGMP

Greg Mackey provided the committee with an overview of the draft Wells steelhead Hatchery Genetic Management Plan (HGMP) that was sent to the Hatchery Committees on December 15. He provided a short PowerPoint presentation summarizing the key features of the HGMP. The Committee discussed several proposed changes to the program, including alternative release locations. The Committee discussed the potential for straying of mainstem releases of steelhead into the Methow or Okanogan rivers. Shane Bickford said that Douglas PUD is aware of this potential and mentioned several measures that could be put into place to remedy this, should the monitoring and evaluation (M&E) program detected unacceptable rates of straying. Greg Mackey will provide today's PowerPoint presentation to the Committees, and the Committees agreed to provide comments on the draft HGMP prior to the January 15 conference call, with a goal of final approval at the January 20 meeting. There will be a conference call on January 15 from 9:00 to 11:00 am to discuss Committees' comments.

B. Methow Spring Chinook HGMP

Tom Kahler presented a table summarizing key features of the draft Methow River spring Chinook HGMP. He described the two components of the program—Twisp and

Methow/Chewuch—that would be managed separately because of their distinguishing genetic differences, and the higher proportion of NORs and the capacity to control percent hatchery-origin spawners (pHOS) in the Twisp River. Kahler briefly outlined the management objectives for the Twisp component, which are focused on the achievement of the HSRG genetic objectives. He then pointed out that for the Methow/Chewuch component it is not possible to meet Proportion Natural Influence (PNI) goals with the current numbers of natural origin returns (NORs). Shane Bickford added that, using NORs only, it is also not possible to meet No Net Impact (NNI) mitigation for the five Mid-Columbia dams, as required by the current licenses for those projects. As a result, in most years hatchery fish will have to be used to meet the NNI requirements for the five PUD dams. He said that National Marine Fisheries Service (NMFS) guidance to Douglas PUD has been to first ensure adequate seeding of the available habitat with returning natural origin fish. Douglas PUD's proposed HGMP focuses on maintaining a minimum number of NORs in the river; however, because of the low numbers of NORs in most years, there is a low probability of meeting the NOR escapement objectives while also meeting mitigation goals for the hatchery program and achieving PNI objectives. Bickford said that Douglas PUD's plans are to develop the HGMP for Committees' review with a program that meets the mitigation requirements for all three PUDs while still maintaining adequate NOR escapement. Douglas PUD anticipates working through as many remaining issues as possible in Committee prior to submission to NMFS. The Committees agreed with this path forward. Douglas PUD will send this HGMP to the Committees by the end of this week, and the Committees will provide comments prior to the next meeting, and will discuss these on the January 15 conference call.

C. Steelhead Reproductive Success Study

Greg Mackey provided a short presentation summarizing Douglas PUD's recent work on a steelhead reproductive success study (RSS) plan. Mackey noted that Douglas PUD's previously discussed study plan required more wild fish than were likely available in order to produce a statistically valid study, and therefore a new study plan has been developed. The plan identifies a 10-year study beginning in 2010 focusing on adult-to-adult RSS, hatchery versus wild comparisons, and covariates of fitness. Also, the study will provide data that may be used to assess genetic influences. The results of the study will relate findings to management. Hypotheses include those looking at overall RSS, sex-specific RSS, and pHOS to proportion of offspring. This proposed study is Appendix B of the steelhead HGMP that

the Hatchery Committees will review in coming weeks. Tom Kahler noted that he recently learned that Washington Department of Fish and Wildlife (WDFW) will be conducting a study on steelhead reproductive success on the Twisp River. Greg Mackey will meet with Andrew Murdoch to discuss coordination of the two studies. Following these discussions, Douglas PUD will submit a revised RSS study plan to the HCP HC (Note that the revised RSS study plan was sent to the Hatchery Committees for review on December 23, 2009). The Committees will discuss this item on the January 15 call as well.

D. Discussion of Design for Modification of West Ladder Fish Return Pipe

Tom Kahler distributed design drawings for modification of the west ladder fish return pipe. The Hatchery Committees expressed interest in additional information on how the system will be operated, and in particular, desired a clearer understanding of the number of fish to be released per truck, the number of fish to be released per day, and any procedures to minimize stress in the truck. Greg Mackey will find this information and report back to the Committees.

III. Yakama Nation

A. Update on Steelhead Acclimation at Rohlfings Pond

Keely Murdoch said that the Yakama Nation (YN) and WDFW met to discuss steelhead acclimation at Rohlfings Pond. Initially, the YN was planning to PIT-tag steelhead at the pond, but has since learned that the segregation needed to do this tagging would not be feasible. Hence, it may not be possible to estimate steelhead survival from release to McNary Dam or to estimate smolt-to-adult returns (SARs) from PIT-tag returns. Accordingly, the YN proposes to focus on testing in-pond performance this first year, acclimating 10,000 wild-by-wild (WxW) steelhead in the pond, of which approximately 700 would be PIT-tagged. Performance metrics would include in-pond survival, growth and condition, immigration from the pond, and any residualism in the pond. This test of in-pond performance would be used to decide whether to tag a greater proportion of steelhead in future years in order to estimate SARs and other longer-term metrics. Murdoch confirmed that the test would not appreciably affect the rearing density in the pond because the YN will be reducing coho numbers in the pond this year. She also said that she will check with Kris Petersen to confirm ESA coverage. The Hatchery Committees discussed this plan and agreed that it was consistent with the previously agreed-upon plan for YN acclimation sites.

B. Steelhead at Wells and Kelt Reconditioning

Keely Murdoch said that the YN has heard indirectly that Douglas PUD will not be supporting adult holding and live spawning of steelhead kelts at Wells Hatchery at this time. She asked Tom Kahler to comment on whether this was true. Kahler said that there were insufficient resources at Wells to accommodate the segregation of family groups necessitated by live spawning. Additionally, the proposed changes in Douglas' steelhead programs would substantially reduce the availability of wild steelhead for any kelt-reconditioning program. When asked about a rumor that Douglas PUD would not allow any new programs at Wells Hatchery, Kahler stated that higher level management at Douglas PUD is reviewing the use of Wells Hatchery, and is concerned about the widespread use of the hatchery for programs other than those required by the Wells HCP or authorized through formal agreements. Bill Gale suggested that the YN get in touch with U.S. Fish and Wildlife Service (USFWS) about potentially using Winthrop Hatchery for this program.

C. Spring Chinook Forecast and Removal of Hatchery Fish at Tumwater Dam

Keely Murdoch brought up the topic of removal of surplus fish at Tumwater Dam. She asked for an update from Joe Miller on his discussions with Court Hill (engineer at Chelan PUD) on some conceptual drawings that she said he agreed to create after the last Tumwater Working Group meeting. Murdoch said that the YN would not be against watershed distribution of carcasses as a use of these surplus fish, but before agreeing to that, they would want to explore possibilities for human consumption as opposed to carcass outplants. Miller responded that for 2010, the 1196 permittees do not have the "take" authority toimplement adult management/remove excess hatchery fish as described in the HGMP. He then said that he would be meeting with Hill next week to examine possibilities discussed at the past Working Group meetings. Miller said that he planned to reconvene the Working Group in early 2010.

D. PIT-Tag Detection at Zosel Dam

Keely Murdoch updated the group that next spring, CRITFC will be installing a PIT-tag detection array at Zosel Dam. Joe Miller asked whether she knew about the configuration of this array. She said she would contact Jeff Fryer at CRITFC for additional details, and would send this information to Joe Miller.

IV. WDFW

A. Impact of Tiered vs. Open Fisheries on pHOS Control

Bob Pfeifer reviewed with the Hatchery Committees a series of spreadsheets and graphs that showed estimated changes in PNI that are possible under a variety of harvest assumptions and historic run sizes in the Wenatchee and Methow basins. He said that Jeff Korth wanted the Committees to be aware that it is theoretically achievable to meet PNI levels at or near the 0.67 goal when harvest and removal of hatchery fish at dams are implemented together. Pfeifer will send these files to the Committees for their information.

V. Chelan PUD

A. DECISION ITEM: Rock Island HCP Hatchery Committees SOA on Reduction of Chiwawa Spring Chinook Production Level to 298,000 Smolts

Joe Miller introduced the Rock Island Hatchery Committee SOA for reduction of Chiwawa spring Chinook production levels to 298,000 smolts. Keely Murdoch had provided some edits and the Hatchery Committees discussed these. The Committees approved the SOA with these edits and others suggested at today's meeting (Attachment B).

B. Hatchery Program Summary

Joe Miller updated the group that Chelan PUD will be providing a memo to the HCP Hatchery and Tributary Committees stating that the PUD anticipates removing the cobble accumulated immediately upstream of the Dryden Facility. Chelan PUD had previously informed the Committees that bedload from Highway 97 washouts has accumulated at the right bank of the Wenatchee River just downstream of the confluence of Peshastin Creek, causing potential passage issues at low flows.

C. Review of Monthly Monitoring and Evaluation (M&E) Reports

There were no issues to discuss at today's meeting.

D. Discussion of Future Chiwawa Water Right

Joe Miller updated the group on a future water right for the Chiwawa acclimation ponds and hatchery. He provided a summary memo describing the water right need as 16 cubic feet per second (cfs) during fall and early spring and 21 cfs for the remainder of the year. The current water right is 12 cfs in fall and early spring with intermittent increases. He said that the next steps are for him to check with NMFS habitat staff and then to ask for each HCP

signatory party to send a letter of support to Washington State Department of Ecology (Ecology) following the next Hatchery Committees meeting.

E. Moving 200,000 WxW steelhead from Turtle Rock to Chiwawa Hatchery

Joe Miller said that when space is available at Chiwawa Hatchery, Chelan PUD would like the Hatchery Committees to consider moving 200,000 WxW steelhead from Turtle Rock to the Chiwawa Hatchery for acclimation and release. This move would bring the total steelhead count at Chiwawa up to 240,000 (currently, 40,000 steelhead are being reared at the Chiwawa Facility in a pilot water re-use study). Kirk Truscott questioned whether or not rearing 200,000 steelhead at Chiwawa Facility would compromise the ability to addresses segregated rearing of higher ELISA spring Chinook and whether or not dividing one of the two existing ponds at Chiwawa to rear higher ELISA spring Chinook and steelhead was still a consideration by the PUD. Miller responded that it was still a option, but that the PUD did not have a formal PUD position in regards to the pond division. The Committees agreed to consider this when the space is available.

F. Chelan Falls Facility and Yearling Chinook

At the last meeting, Petersen agreed to evaluate options for ESA coverage for the construction and operation of the Chelan Falls yearling Chinook Acclimation project. (Petersen was unable to attend today's meeting.) Joe Miller indicated that Chelan PUD wanted to make sure the Hatchery Committees continued to support this program, and wanted to be able to use this support to encourage NMFS to expedite permitting. The Committees confirmed that they continue to support this program. Mike Schiewe agreed to check with Petersen to verify progress on this last meeting's action item.

VI. Colville Tribes

E. Update on Summer Chinook at Bonaparte Pond

Kirk Truscott updated the group that summer Chinook currently on station at Bonaparte Pond have been treated for bacterial gill disease. Truscott said that fish densities and flow dynamics in the pond may have contributed to the mortality, even though the loading densities were within acceptable rearing criteria. The pond initially held 200,000 fish this year; that number is now 193,000. Last year, there were 100,000 fish in the pond.

VII. HCP Administration

A. Next Meetings

The next scheduled Hatchery Committees meetings will occur as follows: January 20, February 17, and March 17, all at the Chelan PUD offices in Wenatchee. There will be a conference call on January 15th to discuss the Twisp steelhead RSS, Wells steelhead HGMP and Methow spring Chinook HGMP.

List of Attachments

Attachment A – List of Attendees

Attachment B – Rock Island HCP Hatchery Committees SOA on Reduction of Chiwawa Spring Chinook Production Level to 298,000 Smolts

Attachment A
List of Attendees

Name	Organization
Mike Schiewe	Anchor QEA, LLC
Ali Wick	Anchor QEA, LLC
Joe Miller *	Chelan PUD
Kirk Truscott *	Colville Confederated Tribes
Tom Kahler *	Douglas PUD
Shane Bickford *	Douglas PUD
Greg Mackey	Douglas PUD
Todd Pearsons (by phone)	Grant PUD
Bill Gale *	USFWS
Bob Pfeifer *	WDFW
Mike Tonseth (morning only)	WDFW
John Penny	WDFW
Keely Murdoch *	Yakama Nation

* Denotes Hatchery Committees member or alternate

Attachment B

Rock Island HCP Hatchery Committee
FINAL Statement of Agreement on
Reduction of Chiwawa Spring Chinook Production Level to 298,000 smolts
December 16, 2009 meeting

Statement

The Rock Island HCP Hatchery Committee (HC) agrees that Chelan PUD's (District) production requirement for Chiwawa spring Chinook will be reduced from 672,000 to 298,000 from brood year 2010, subject to the condition described below, until subsequent modification by *Periodic Adjustment of District Hatchery Level* (RI HCP § 8.4.3). This change implements the 2009 HGMP production level agreed to by the HC.

As consideration for this reduction, beginning in 2010, the District agrees to fund a multiple-year pilot study that determines the efficacy of the Parental Based Tagging (PBT) methodology. The study may be terminated prior to 2013 if a definitive conclusion concerning the PBT approach is reached by the Hatchery Committee. The District will coordinate with interested Committee members and Grant PUD to develop a pilot study protocol.

Background

PBT offers the potential to identify returning adult spring Chinook to stream (or spawning aggregate) of origin in the Wenatchee Basin. If successful, this capability could enhance the management and cost-effectiveness of broodstock collection for the mitigation programs funded by Chelan PUD and Grant PUD. This SOA serves several purposes: (1) implement the HC approved HGMP production level for spring Chinook, (2) formalize brood stock collection plan before Chiwawa spring chinook brood stock are collected in 2010, (3) provide notification related to changes in production (e.g., HCP Coordinating Committee and the *US v. Oregon* Policy Committee), and (4) provide adequate time to develop a plan for piloting PBT in 2010.

The Chiwawa Spring Chinook HGMP specifies the program reduction in § 1.8.2:

Currently, Chelan PUD operates a 672,000 smolt program. It is anticipated that the program will be reduced to 298,000 smolts, with HCP Hatchery Committee concurrence and consistent with the adaptive management principles outlined in the HCP, in 2010 (broodstock collection for 298,000 smolts would begin in 2010), as some program components are proposed to be tested in 2010 (see Section 7.2).

As noted in the paragraph above, the HGMP anticipates implementing the program change and testing PBT concurrently in 2010. This document represents the instrument to accomplish both.

APPENDIX C
HABITAT CONSERVATION PLAN TRIBUTARY COMMITTEES MEETING MINUTES

Wells, Rocky Reach, and Rock Island HCP Tributary Committees Meeting Notes 12 February 2009

Members Present: Dale Bambrick (NOAA-Fisheries), Dennis Beich (WDFW), Chris Fisher (Colville Tribes), Tom Kahler (Douglas PUD), David Morgan[1] (USFWS), Lee Carlson (Yakama Nation), Keith Truscott (Chelan PUD), and Tracy Hillman (Committees Chair).

Others Present: Becky Gallaher (HCP Project Coordinator), Joe Miller (Chelan PUD), Ben Lenz (Grant PUD), Denny Rohr (PRCC Habitat Subcommittee facilitator), and Alyssa Buck (Wanapum Tribe). Julie Morgan (UCSRB Executive Director), Casey Baldwin (UCRTT Chair), and James White (UCSRB Data Steward) joined the last hour of the meeting.

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans Tributary Committees met at the Chelan PUD Auditorium in Wenatchee, Washington, on Thursday, 12 February 2009 from 9:00 am to 12:15 pm.

I. Review and Adopt Agenda

Tracy Hillman welcomed everyone to the meeting, and the Committees adopted the proposed agenda with the following additions/changes:

- Addition of three Information Update items.
- Addition of a Small Project Proposal.

II. Review and Approval of Meeting Minutes

The Committees reviewed and approved the 19 December meeting notes with revisions suggested by Tom Kahler and Keith Truscott.

III. Monthly Update on Ongoing Projects

Becky Gallaher gave an update on funded projects.

- The Wildhorse Spring Creek Conservation Easement Project is complete and the Committees should receive a final report soon.
- Landowner agreements are being secured for the Entiat PUD Canal System Conservation Project. Only two landowner agreements need to be signed. NEPA Section 106 surveys and consultation have been completed for wells and piping connections. The PUD made several repairs to the leaking pipeline along the Entiat River Road in December. The sponsor intends to dig test wells in April and May.

[1] David joined the first part of the meeting via conference call.

- For the Roaring Creek Flow Enhancement and Barrier Removal Project, a map of the proposed transfer was submitted to the U.S. Fish and Wildlife Service Realty Group in November. The Service reviewed the land-transfer process with Cascadia Conservation District and the Entiat National Fish Hatchery. Cascadia is completing the necessary Project Summary for Service approval. Cascadia will be developing and soliciting a surveying contract for land transfer that will be completed in March to April. After the survey is complete, Cascadia will complete the Certificate of Exemption and Boundary Line Adjustment.
- Anchor Environmental and the Bureau of Reclamation have completed conceptual designs for the Below the Bridge Project. In addition, the Forest Service and Reclamation have completed the Biological Assessment and Cascadia Conservation District has completed NEPA Section 106 surveys and consultation for the project. Streamlined Fish Enhancement and JARPA will be submitted on 13 February. Cascadia is currently working with Washington Department of Fish and Wildlife to develop a Land Use Permit.
- During autumn 2008, Cascadia planted about 4,900 plants (about 4.9 acres) on seven properties under the WRIA 45/46 Riparian Restoration Project.
- Cascadia Conservation District will be meeting with the Natural Resources Conservation Service engineer to develop a new location and placement of the log boom for the Entiat Canal Log Boom Installation Project.
- Cascadia Conservation District will be using funds under the Entiat Instream Structures Engineering and Permitting Project to develop a new, single-wing diversion design. The original cross-vane design was not acceptable to one of the landowners.
- The Salmon Recovery Funding Board (SRFB) has not accepted the updated designs for instream structures under the Keystone Canyon Habitat Restoration Project. The Yakama Nation is currently redesigning the project and plans to begin construction in July to September. If the Board does not accept the design developed by the Yakama Nation, the contract will be turned back to the SRFB.

IV. Installments to the Wells Plan Species Account

Tracy Hillman noted that Douglas PUD will be making a contribution to the Wells Plan Species Account in January of 2010. According to Section 7.4.1 of the Wells Hydroelectric Project Anadromous Fish Agreement and Habitat Conservation Plan (HCP), "[f]ive years after the initial contribution to the Plan Species Account, the District shall do one of the following: 1) make annual payments of $176,178 (2%) in 1998 dollars as long as the Agreement is in effect; or 2) provide an up front payment of $1,761,780 (2% for 10 years) in 1998 dollars, but deducting the actual cost of bond issuance and interest." The Wells HCP does not specify that the Tributary Committee shall choose between the funding options. Rather, Section 7.4.5 states only that the Fisheries Parties (FP) shall choose between the funding options.

At the January meeting of the Wells Coordinating Committee, Tom Kahler notified the FP representatives that, within the next few months, the FP must choose between contribution options so that Douglas PUD has the necessary time to make the funds available by the end of January 2010. The FP representatives to the Coordinating Committee indicated that they would consult within their respective entities regarding the contribution options, but all agreed that they wished to have the input of their Tributary Committee representative on this matter.

Tom Kahler discussed the pros and cons of the two options (see Attachment A). In short, the annual contributions over ten years surpass the value of the lump-sum payment ($1,442,420 vs. $2,655,193; see calculations in Attachment A). ***Therefore, the Wells Tributary Committee unanimously agreed that Douglas PUD should make annual payments to the Wells Plan Species Account over the ten year period beginning in 2010.*** Tom will convey this decision to the Coordinating Committee for their consideration at their February 24 meeting.

V. Updates to Policies and Procedures for Funding Projects and Operating Procedures

Tracy Hillman reported that every year the Committees are to review the Tributary Fund Policies and Procedures for Funding Projects and the Tributary Committee Operating Procedures. The intent is to edit and update the documents. For example, under the Tributary Committee Operating Procedures, the document still identifies Chris Parsons as the WDFW representative on the Committees.

Tom Kahler pointed out that under Section 6.8 of the Policies and Procedures for Funding Projects, the Committees are to request an external audit of all financial transactions made by the Committees. Unless agreed to otherwise, the audit will be conducted annually. This has not happened in the past. The Committees proposed that an audit be conducted in 2009 and every three to five years thereafter, depending on the cost. Keith Truscott agreed to talk with folks in the Chelan PUD Finance Department to determine what is involved in hiring an external auditor and the cost of the audit. Keith will report back to the Committees in March.

The Committees agreed to review the two documents and bring their edits, comments, and updates to the March meeting.

VI. Consolidation of Meetings/Processes

Tracy Hillman reported that there are so many meetings conducted in the Upper Columbia that members have little time to work on assignments. Therefore, there is a need to combine meetings or agenda items that are common to different processes. For the HCP Tributary Committees, it makes sense to combine efforts with the Priest Rapids Coordinating Committee (PRCC) Habitat Subcommittee. However, because the HCP Tributary Committees and the PRCC have different policies and procedures, the groups cannot be combined. Therefore, Tracy proposed the following:

1. After agenda items are identified, Tracy Hillman, Denny Rohr, and Becky Gallaher will work together to identify common agenda items (items that overlap in both groups).
2. The agenda for the Tributary Committees will be set so that items common with the PRCC will occur at the end of the Committees meeting.
3. The PRCC will join the Tributary Committees to discuss those items that are common to both groups.
4. Following the Tributary Committees meeting, the PRCC Habitat Subcommittee will meet to discuss items that are relevant only to the PRCC.
5. Meeting minutes for the joint agenda items will be shared between the two groups.

The Committees agreed that combining common agenda items was appropriate and will rely on Tracy and Denny to organize agendas and schedules.

VII. Information Updates

The following information updates were provided during the meeting.

1. Approved Payment Requests in January:

   Rock Island Plan Species Account:

   - $495.83 to Chelan County PUD for fourth-quarter administration in 2008.
   - $190.00 to LeMaster and Daniels for fourth-quarter financial management in 2008.
   - $2,083.35 to the Colville Confederated Tribes for completion of the conservation easement and draft baseline and stewardship plan for the Wildhorse Spring Creek Conservation Easement Project.

   Rocky Reach Plan Species Account:

   - $422.85 to Chelan County PUD for fourth-quarter administration in 2008.
   - $190.00 to LeMaster and Daniels for fourth-quarter financial management in 2008.

   Wells Plan Species Account:

   - $294.22 to Chelan County PUD for fourth quarter administration in 2008.
   - $165,127.70 to the Okanagan Nation Alliance for removal of a culvert, excavation of test pits, examination of soil types and stability, removal of concrete refuse, and installation of two additional 40-cm x 10-m culverts for the Okanagan River Restoration Initiative Project.

2. Approved Payment Requests in February:

   Rock Island Plan Species Account:

   - $61,034.85 to the Colville Confederated Tribes for the conservation easement payment and transaction fees for the Wildhorse Spring Creek Conservation Easement.

   Wells Plan Species Account:

   - $78.47 to the Methow Conservancy for species tags, photos, and height data for ten cages on the Luvon property under the Riparian Restoration and Regeneration Initiative.
   - $107.49 to the Okanogan Conservation District for conducting their final site visit and preparing the final report on the Lower Beaver Creek Livestock Exclusion Project.

3. Tracy Hillman reported that he and Tom Kahler attended the Entiat Implementation and Monitoring Workshop on 2 February. The major impetus of this workshop was to discuss how to pull off using the Entiat as an Intensively Monitored Watershed, which requires agreement on the study design and buy-in by all parties, including funders, implementers, and monitoring entities. The specific objectives of the workshop were to: (1) gain a better understanding of the long-term monitoring plans in the sub-basin, (2) identify specific types of projects for implementation in the short- and long-term that are consistent with the monitoring plans; and (3) agree on an implementation approach that is consistent with

biological priorities, feasible to implement, and leads to useful monitoring information for the region.

Tracy indicated that the monitoring approach in the Entiat will focus on population-scale assessments (i.e., the effects of tributary habitat restoration actions will be assessed at the population scale). Attempts to document the effectiveness of habitat action types at the project scale will be limited because of poor control of when and where habitat actions will be implemented and a lack of independence among habitat action types and their reference/control areas. Chris Jordan, Integrated Status and Effectiveness Monitoring Program (ISEMP) lead, will put together an approach or approaches for monitoring the effectiveness of restoration actions in the Entiat.

Tom noted that the workgroup also discussed the need to have coordination and collaboration among all entities involved in monitoring and implementation of habitat actions in the Entiat. Tracy will keep the Committees informed on updates from the Entiat.

4. Tracy Hillman reported that he and Becky Gallaher have completed Section 2.6 (Tributary Committees and Plan Species Accounts) of the Annual Report of Activities under the Anadromous Fish Agreement and Habitat Conservation Plan for each hydroelectric project. Members of the Committees should soon receive the draft reports for their reviews. The final reports will be submitted to the Federal Energy Regulatory Commission in April.

5. Tracy Hillman reported that he received from Douglas PUD the 2009 Action Plan for the Wells HCP. The Action Plan for the Wells Tributary Committee is as follows:

   Annual Report – Plan Species Account Status

   - Draft to Committee: February 2009
   - Approval Deadline: March 2009
   - Period Covered: January to December 2009

   2009 Funding-Round Review and Funding Decisions

   - RFP: To be determined (typically March)
   - Approval Deadline: To be determined (typically December)

   After the meeting, Keith Truscott provided the following draft information for both the Rocky Reach and Rock Island Tributary Committees:

   - Plan Species Account Deposit: January 2009
   - Project solicitation: To be determined (typically March)
   - Project approval deadline: To be determined (typically December)
   - Implementation: Ongoing

6. Tracy Hillman indicated that he has received requests from sponsors to attend the Tributary Committees meetings. When the request comes in late (within two days of the meeting), Tracy indicated that he denies the request to attend the meeting because there is not enough time to consult with each member. For requests made well in advance of the meeting, however, Tracy secures the approval of all Committee members. Although the

requests are not frequent, Tracy asked for guidance from the Committees on how to handle the requests.

The Committees indicated that the Chair has the authority to approve or deny a request by a sponsor or other entity to attend a Committees meeting. However, the visitor must understand that they will be asked to leave when the Committees go into executive session.

7. Tracy Hillman reported that the National Fish and Wildlife Foundation and the SRFB have announced requests for proposals from the Chelan County Community Salmon Fund. The Chelan County Community Salmon Fund awards grants of up to $75,000 for small-scale, community-based restoration projects that reflect the goals of local salmon recovery strategies. The goals of the Fund are to:

    - Fund habitat protection and restoration projects that have a substantial benefit to watershed health and are consistent with the Upper Columbia River Salmon Recovery Plan.
    - Encourage landowners, business owners, and community groups to become engaged in salmon habitat conservation and stewardship.
    - Stimulate creativity and leadership among various constituencies to address conservation needs, especially farmers, rural forest landowners, suburban homeowners, businesses, and industries.

    Applications for the Chelan County Community Salmon Fund are due on 4 March 2009.

8. Tracy Hillman reported that money from the economic stimulus package may become available for fish and wildlife habitat restoration on private lands via the U.S. Fish and Wildlife Service Partners for Fish and Wildlife Program (note that this is a technical assistance program that has assistance monies; it is not a granting program). The purpose of the funding is to accomplish important ecological goals and provide employment opportunities in the local communities. More specifically, the goals are to:

    - Preserve and create jobs and promote economic recovery.
    - Assist those most impacted by the recession.
    - Provide investments needed to increase economic efficiency.
    - Invest in transportation, environmental protection, and other infrastructure.

    Preference will be given to projects that can be started and completed expeditiously. It appears that about $1.1-3.3 million will be available in Region 1.

    On a related note, Dale Bambrick reported that money has been added to the Open Rivers Initiative for passage projects.

9. Tracy Hillman reported that the Upper Columbia Salmon Recovery Board (Board) will be hosting a 2009 Regional Technical Team Analysis Workshop. The purpose of the workshop is to provide information and data to assess progress in recovery of ESA-listed species in the Upper Columbia and to improve the implementation of future recovery actions. The objectives of the workshop are to:

    - Provide the current status of Upper Columbia populations and ESUs/DPSs.
    - Provide technical information on project effectiveness.
    - Assess deviations from targets or anticipated results.

- Provide recommendations for improvements to management actions and policies where appropriate.

The Board has proposed the following timelines:

- Two-Day Workshop in November 2009 (audience includes Regional Technical Team, scientific colleagues, and technical staff from the Watershed Action Teams).
- Workshop summary document released in February 2010.
- One-Day Workshop in March 2010 (audience includes Watershed Action Teams, public, policy makers, fish and land co-managers, and project sponsors).
- Adaptive Management Workshop in summer or fall 2010 (audience includes Watershed Action Teams, public, policy makers, project sponsors, and fish and land co-managers).

Tracy will provide the Committees with more information as it becomes available.

VIII. Review of SRFB/General Salmon Habitat Program Application Forms

The Committees reviewed the SRFB application form, which was also used by the Committees in 2008 for General Salmon Habitat Program proposals. Although the Committees identified much redundancy in the proposals, they were satisfied with the information requested in the application forms. That is, the information requested in the application form provided sufficient information to evaluate the proposals. It was suggested that the applications include more detail in the budget/cost estimates. The Committees acknowledged, however, that more detailed cost information could be requested by the Committees following the initial review of applications and during presentations.

IX. Review of Small Projects Proposal

The Committees received a Small Projects Program proposal from the Okanogan Conservation District titled, *Legacy Park Stream Restoration Project*. Because the Committees received the application the day before the meeting, they did not have time to review the application in detail. Therefore, review of the application was tabled until the March meeting. However, the Committees did request that the sponsor provide lengths, widths, and areas, of the riparian zone that is proposed for treatment along Bonaparte Creek. Tracy Hillman will request this information from the Okanogan Conservation District.

X. Upper Columbia Salmon Recovery Board Update

Julie Morgan (UCSRB Executive Director), Casey Baldwin (UCRTT Chair), and James White (UCSRB Data Steward) provided the Committees with updates on activities proposed by the Upper Columbia Salmon Recovery Board in 2009. What follows is a summary of information provided by each individual.

Julie Morgan (Executive Director):

Julie gave a brief presentation on the Board's goal of "Improving Returns on Investments." She indicated that the Board has identified six key tasks:

- Support Collaborative Decision Making

- Refine and Manage the Recovery Plan
- Coordinate Implementation and Reporting
- Coordinate Monitoring and Adaptive Management
- Coordinate with Public, Tribes, and Agencies
- Develop Financing Plan for Operation and Implementation

Julie then described the habitat adaptive management framework (described in Appendix Q in the Recovery Plan) adopted by the Board. The framework consists of two major components: (1) monitoring, technical review, and analysis and (2) plan management and outreach. Under the monitoring, technical review, and analysis component, the framework links monitoring, data compiling, and evaluation with design and implementation. Researchers, co-managers, monitors, and technical review teams are involved with this component. Under the plan management and outreach component, information from monitoring and evaluation is communicated to the Watershed Action Teams (WATs), co-managers, federal agencies, and the public. These entities then adjust the plan (if necessary), which is used to guide future design and implementation of habitat restoration actions.

Julie noted that the Board convened an Implementation Team (IT), which is responsible for facilitating the implementation of the Recovery Plan. The purpose of the IT is to:

- Promote coordination of recovery actions across watersheds to increase effectiveness and efficiency,
- Identify issues of implementation and develop recommendations for the Board's consideration,
- Conduct a periodic process audit of the adaptive management framework to evaluate regularly the overall efficacy of the framework's process flow, and
- Compile an annual summary of plan progress and implementation actions for the Board.

The IT meets regularly to coordinate funding sources, coordinate updates to the Recovery Plan implementation schedule, and coordinate monitoring and adaptive management of the Recovery Plan. The Implementation Team has no regulatory or enforcement functions.

There are five WATs working within the Upper Columbia whose role is to assist in updating the implementation schedule of actions, ensure a coordinated and sequenced implementation of recovery actions in their respective watershed, and to engage in the adaptive management framework. Each WAT has a lead person responsible for helping to ensure coordination with the IT and the Board. The five WATs are:

1. Wenatchee Subbasin: Habitat Subcommittee of the Wenatchee Watershed Planning Unit.
2. Entiat Subbasin: Habitat Subcommittee of the Entiat Watershed Planning Unit.
3. Methow Subbasin: Methow Restoration Council.
4. Okanogan Subbasin: Okanogan Restoration Council.
5. Douglas County Watersheds: Foster Creek-Moses Coulee Watershed Planning Unit.

Julie identified some of the challenges before the Board. They include resilience of decisions, All-H coordination, funding coordination of large-scale projects, and funding infrastructure for capacity, O&M, and outreach. Dale Bambrick asked Julie what role the Board expects to play in All-H coordination. Julie indicated that the Board understands that they are non-regulatory, but nevertheless would like to be in a position to report actions that are inconsistent with the recovery

plan. The Board also wants to be in a position to know what is happening in other venues so they can help the region focus on the greatest threats.

Lastly, Julie summarized the Board's 2009 Work Plan (see Attachment B), and funding coordination and development of the three-year implementation work plan (see Attachment C).

Casey Baldwin (RTT Chair):

Casey gave a brief update on the work of the RTT. The RTT has three main functions:

- Recommend region-wide approaches and priorities to protect and restore salmonid habitat.
- Develop and evaluate salmonid recovery projects.
- Develop and guide salmonid recovery monitoring plans.

Under the first function, the RTT will participate in the development of the three-year work plans, update the Biological Strategy, and plan for the 2009 RTT analysis workshop. Under the second function, the RTT will review SRFB proposals, General Salmon Habitat Program proposals (at the request of the Tributary Committees), Community Salmon Fund proposals, and provide other technical reviews as requested by project sponsors or the Board. Finally, under the third function, the RTT has established a Monitoring and Data Management Committee (MaDMC) that provides coordination and guidance to the Integrated Status and Effectiveness Monitoring Program, the Okanogan Basin Monitoring and Evaluation Program, and monitoring in the Methow. In addition, the MaDMC reviews the Data Steward work plan and prioritizes monitoring data gaps.

James White (Data Steward):

James gave a brief update on adaptive management, RME, and data management. He noted that he and others are currently preparing for the RTT Analysis Workshop, which is hosted by the Board and RTT and will occur in November 2009 and early spring 2010 (see Item #9 under Information Updates). He indicated that there are four major components in planning the workshop: (1) logistics, (2) data compilation, QA/QC, and delivery, (3) key questions and analysis, and (4) planning for the future. James is responsible for the last three components and has been working with all those involved with data collection in organizing and standardizing the flow of data in the Upper Columbia.

XI. Next Steps

The Tributary Committees will meet on Thursday, 12 March at Chelan PUD in Wenatchee. Tentative agenda items include:

- Review of Policies and Procedures for Funding Projects and Tributary Committee Operating Procedures.
- Review of Small Projects Application.
- External audit.

Meeting notes submitted by Tracy Hillman (tracy.hillman@bioanalysts.net).

Attachment A

This worksheet contemplates the pros and cons of the two options available in the Wells HCP for future Douglas PUD contributions to the Wells Plan Species Account. Section 7.4 of the Wells HCP describes the funding of the Wells Plan Species Account (account) and details the disbursement options. The account was established by a lump-sum contribution in the last quarter of 2004. The HCP presents two options for subsequent contributions, as described in Section 7.4.1.

> 7.4.1 The District shall make an initial contribution of $1,982,000 in 1998 dollars to the Plan Species Account. Five years after the initial contribution to the Plan Species Account, the District shall do one of the following: 1) make annual payments of $176,178 (2%) in 1998 dollars as long as the Agreement is in effect; or 2) provide an up front payment of $1,761,780 (2% for 10 years) in 1998 dollars, but deducting the actual cost of bond issuance and interest.

The last sentence of Section 7.4.1 describes deductions from the 10-year lump sum that include interest and the cost of bond issuance. The following exercise will assist us in determining the magnitude of these deductions. Assuming a hypothetical amount for the purpose of calculations, how much would remain from a $2,000,000.00 lump-sum contribution after interest and bond-issuance costs are subtracted?

Annual debt service on $2,000,000 would be $527,580, assuming a 4.5% annual rate and a 10-year term. Bond-issuance costs are typically between 1% and 2% of the bond amount. Thus, bond-issuance costs would be $30,000, assuming a 1.5% cost on a $2,000,000 bond. Combined, the total deductions from the 10-year lump-sum payment would be $557,580, for a final contribution of $1,442,420 (Table 1.).

Table 1. Calculations used to estimate the value of option 2 under Section 7.4.1 of the Wells HCP (up-front lump-sum payment)

$2,000,000	Hypothetical Contribution on January 31, 2010
$527,580	Estimated Total Debt Service (10-yrs @ 4.5%)
$30,000	Estimated Bond-issuance Cost (1.5% of $2,000,000)
$1,442,420	**Total 10-year Lump Sum After Deductions**

Funds in the Wells Plan Species Account are presently held in a money market account. Of course, interest would accrue on the lump sum while held in the account, but rates paid on such accounts are typically much lower than interest charged for borrowing. Therefore, depending upon how much of the contribution was held in the money market account and over what time period, the actual value obtained from the lump-sum contribution would exceed $1,442,420, but would never approach the value obtained from annual payments (see below).

For comparison purposes, how much would $176,178 (1998 dollars) annual payments yield over 10 years?

Using the US Department of Labor consumer price index (CPI) for the last ten years, I extrapolated the future value of the annual contributions (applying the 1999 CPI to 2009, 2000 CPI to 2010, etc). Starting with the $176,178 as the initial 1998 dollar amount, and using the last

10 years (most recent 10 years available) of CPI values, I summed the estimated annual contributions that would be contributed over the next ten years (Table 2). For this exercise, the contributions begin in 2009 instead of 2010, as will occur in reality. With annual increases in the CPI, the annual contributions steadily increase, and without the deduction of the interest and bond-issuance costs as apply in the lump-sum option, the annual contributions over 10 years dramatically surpass the value of the lump-sum payment ($1,442,420 vs. $2,655,193).

Table 2. Calculations used to estimate the value of 10 years of annual payments of $176,178 in 1998 dollars to the Wells Plan Species Account, using CPI values from the most recent 10 years.

CPI Year	CPI	Future Year	Estimated Future Contribution
1999	1.022086	2009	$234,629.97
2000	1.056442	2010	$242,516.69
2001	1.086503	2011	$249,417.58
2002	1.103681	2012	$253,360.94
2003	1.128834	2013	$259,135.14
2004	1.158896	2014	$266,036.02
2005	1.19816	2015	$275,049.42
2006	1.23681	2016	$283,921.98
2007	1.272037	2017	$292,008.68
2008	1.303	2018	$299,116.59
		10-year Total	**$2,655,193.02**

Attachment B

Upper Columbia Salmon Recovery Board
2009 Work Plan Summary
December 18, 2009

2009 Tasks Throughout the Year
• Facilitate and support collaborative decision-making • Development of products for the Upper Columbia Salmon Recovery Forum (UCSRF) • Continue outreach to federal and state agencies and partners • Improve outreach to local groups, focusing on success stories (e.g. irrigation districts, local governments, business interests) - WATs will lead and UCSRB staff will support when necessary • Facilitate next round of project funding (March thru December) • Funding coordination • Facilitate first round of UC adaptive management cycle
January thru March
• Development of the 3-year work plans (funding coordination) • Outreach on SRFB request to State for funding recovery • Development of UCSRB operations budget and secure funds (thru June) • UCSRB DC visits (March)
April thru June
• Presentation to federal caucus • Presentation to Northwest Power and Conservation Council • FCRPS workshops (April) • Tour of UC for members of the federal caucus and others (June?) • UCSRB policies (e.g. personnel policies, executive director transition)
July thru September
• Convene first meeting of the UC Board of Trustees (September) • UCSRB 10 year birthday celebration (September) • Approve adaptive management framework narrative and monitoring & evaluation plan
October thru December
• UC RTT Analysis workshop • Implementation report
2010 Tasks
• UC RTT Analysis workshop Phase II • Adaptive Management workshops

Attachment C

To: Watershed Action Teams (WATs)
UC Implementation Team (UC IT)
UC Regional Technical Team (UC RTT)

From: Lee Carlson, Yakama Nation
Bill Towey, Colville Tribes
Julie Morgan, UCSRB
Derek Van Marter, UCSRB
Casey Baldwin, UC RTT

Re: Funding Coordination of Salmon Recovery Projects in the Upper Columbia and the Development of the Mid-Range Implementation Plan/3-Year Work Plan

Date: January 16, 2009

For the last two decades, salmon recovery funding in the Upper Columbia has ostensibly operated on an annual or biennial basis. Access to these annual funding sources has been competitive and dominated by single, discrete, project focused recovery actions that are commensurate with the short-term nature of funding commitments. During this time period, regional partners have completed numerous habitat improvement and restoration projects that have increased habitat access and to some extent improved habitat characteristics in the Upper Columbia. These single-project-focused actions have reopened areas of tributary habitat, preserved key habitat areas in perpetuity, and protected countless fry and smolts from entrainment in irrigation diversions.

While these single-project-focused actions have provided important contributions to recovery, they also have a limit. Specifically, many of the most cost-effective and immediately beneficial single-project-focused actions have already been identified, funded, and accomplished. Under these circumstances, there is a growing consensus among biologists, project managers, and the entities providing salmon recovery funding, that the greatest current opportunities for habitat restoration projects that will yield the greatest biological benefits are found in the yet to be addressed large-scale, multi-year, multi-million dollar recovery activities. By their very nature, these long-term projects are more difficult to design, fund, coordinate and implement.

It has also become increasingly clear that the Upper Columbia cannot achieve the recovery of listed species without these larger-scale projects. The fisheries co-managers of the Upper Columbia and the Upper Columbia Salmon Recovery Board (UCSRB) are in agreement that pursuing isolated opportunities, though still important in some instances, will generally yield diminishing results and that a comprehensive, coordinated, and strategic approach to restoration is warranted to meet the objectives as specified in the Upper Columbia Recovery Plan (see Yakama Nation memo date September 8, 2008).

To date, these long-term, reach level efforts have not been implemented in the Upper Columbia for a number of reasons. Not only do such projects require a high level of local and regional coordination, cooperation, and planning, but they require a long-term commitment of stable funding. Just as no rational building contractor would undertake a three-year construction project

with only one year of committed funding, salmon recovery project implementers are hesitant to begin large complex projects without funding commitments.

Perhaps for the first time, there is an opportunity in the Upper Columbia to overcome the long-standing hurdles to implementing large-scale, long-term projects. Two key events in the last few years have changed the landscape of the Upper Columbia in a way that creates the first real opportunity to implement these essential large-scale projects. First, the completion of the locally developed Upper Columbia Spring Chinook Salmon and Steelhead Recovery Plan (August 2007, UCSRB) provides a regionally and federally accepted framework for implementing coordinated recovery actions. The Recovery Plan provides an important roadmap towards implementation of priority habitat actions. Second, the recent multi-year funding commitments by federal agencies to implement the reasonable and prudent alternatives associated with Federal Columbia River Power System (FCRPS) – coupled with the multi-year funding agreements in the Columbia Basin fish accords – provides a genuine opportunity for stable funding sources over a multi-year period.

Under these new circumstances, essential large-scale recovery projects are a feasible reality in the Upper Columbia. To capitalize on this opportunity, the partners in the Upper Columbia need to focus, now more than ever, on coordinating their funding and recovery efforts. These large-scale projects often involve numerous voluntary commitments from multiple landowners, and government agencies. Although the current climate supports such projects, these actions cannot get off the ground without the necessary commitment to coordinate funding and planning efforts of the partners within the Upper Columbia.

Not only is additional coordination necessary to help mobilize large-scale projects, but additional coordination efforts are essential to closing funding gaps. Despite recent increases in funding commitments, current allocations still remain below projected recovery needs identified in the Implementation Schedules of the Recovery Plan. Increased coordination and development of large projects with demonstrable benefits will build the region's credibility and encourage funding entities that money is being well spent.

A number of funding entities are very committed to supporting recovery actions in the Upper Columbia, and to working with the Watershed Action Teams (WATs), Implementation Team (IT), and the Regional Technical Team (RTT). The priority of the UCSRB is to restore salmonid populations based on the VSP criteria and it recognizes that a strategic way to do so is through the development of a mid-range implementation/3-year work plan and coordinated funding. This will afford project sponsors greater certainty of funding commitments consistent with the duration of large-scale projects. Under the 2008 FCRPS BiOp and the tribes' fish accords, funds over a ten-year horizon will be available to the Upper Columbia. The UCSRB, WATs, IT, RTT, and our partners are in a position to define how these dollars are spent, guided by the Upper Columbia Salmon Recovery Plan. Through a series of working sessions, the UCSRB, RTT and WATs will develop the work plan and coordinate the available funds for restoration and protection of the Upper Columbia salmonids. Please note that we are not suggesting an abandonment of the past and current funding processes. Rather, through this approach, we anticipate making the current and future funding processes congruent with the need for funding larger and more complex projects. The proposed schedule for these working sessions is outlined below.

<u>Overview of purpose and schedule to the WATs (January 2009)</u>
In January, the UC Implementation Team Leader will introduce the purpose, tasks, and schedule at the Watershed Action Team meetings. Also confirm that the Implementation Schedules and the priority areas/reaches are updated and that the actions identified within are ready for expansion into a mid-range/3-year work plan.

Tributary Subbasin	WAT	Date	Location
Methow	MRC	Tuesday, January 20th	Twisp
Wenatchee	WHSC	Wednesday, January 21st	Leavenworth
Okanogan	ORC	Monday, January 26th	Okanogan
Entiat	EHSC	Tuesday, January 27th	Entiat

Between the January and February WAT meetings, the UC Implementation Team Leader and the WAT Leads will work with project sponsors to identify projects for inclusion in the updated implementation schedule.

Workshop #1 - Regional Technical Team Biological Priorities: In February, the RTT will present to the WATs the results of their effort to recommend the most biologically important reaches and actions. The WATs will reference this information in confirming that the projects currently proposed and in development are consistent with these biological priorities. Throughout February, the UC Implementation Team Leader and the WAT Leads will continue to work with project sponsors to identify projects for inclusion in the updated implementation schedule.

Tributary Subbasin	WAT	Date	Location
Methow	MRC	Tuesday, February 17th	Twisp
Wenatchee	WHSC	Wednesday, February 18th	Leavenworth
Entiat	EHSC	Thursday, February 19th	Entiat
Okanogan	ORC	Monday, February 23rd	Okanogan

Workshop #2 – Continued Implementation Schedule Updates and Development of Mid-range/3-year work plan (March, 2009)
In March, the WATs will continue to work on the first draft of the updated implementation schedule, including details on the next 3 years of projects will continue at the Watershed Action Team meetings. The purpose is to continue to update the implementation schedule with detailed information for the next 3 years (or more) of work. The March WAT meetings will be facilitated as workshops with RTT participation to provide technical guidance to the WATs using the RTT biological priorities report. The WATs will focus on identifying project sponsors and potential funding sources for each of the projects over the next three years. This information will be compiled into a 3-year work plan for discussion at the March Implementation Team meeting.

Tributary Subbasin	WAT	Date	Location
Methow	MRC	Tuesday, March 17th	Twisp
Wenatchee	WHSC	Wednesday, March 18th	Leavenworth
Okanogan	ORC	Monday, March 23rd	Okanogan
Entiat	EHSC	Tuesday, March 24th	Entiat

Workshop #3 – Continued Implementation Schedule Updates and Development of Mid-range/3-year work plan (April, 2009)
In April, the WATs will work on the second draft of the updated implementation schedule will continue at the Watershed Action Team meetings, particularly focused on incorporating feedback from the Implementation Team review of funding coordination. The April WAT meetings will be facilitated as workshops with RTT participation to provide technical guidance to the WATs. The focus will be on finalizing project details for the next three years and refining the funding coordination through the identification of fund sources and potential project sponsors.

Tributary Subbasin	WAT	Date	Location
Methow	MRC	Tuesday, April 15th	Twisp
Wenatchee	WHSC	Wednesday, April 21st	Leavenworth
Okanogan	ORC	Monday, April 27th	Okanogan
Entiat	EHSC	Tuesday, April 28th	Entiat

Finalize Updates to the Implementation Schedule and Mid-range/3-year work plan (May 2009)
In May the groups will finalize the implementation schedule updates and development of the mid-range/3-year work plan at the Watershed Action Team meetings. The May WAT meetings will be utilized to provide final input before the tables are finalized. UCSRB staff will use the mid-range/3-year work plan as an outreach tool to facilitate commitments from various funding entities.

Tributary Subbasin	WAT	Date	Location
Methow	MRC	Tuesday, May 19th	Twisp
Wenatchee	WHSC	Wednesday, May 20th	Leavenworth
Okanogan	ORC	Monday, May 25th	Okanogan
Entiat	EHSC	Tuesday, May 26th	Entiat

Wells, Rocky Reach, and Rock Island HCP Tributary Committees Meeting Notes 12 March 2009

Members Present: Dennis Beich (WDFW), Chris Fisher (Colville Tribes), Tom Kahler (Douglas PUD), David Morgan (USFWS), Bob Rose[1] (Yakama Nation), Keith Truscott (Chelan PUD), and Tracy Hillman (Committees Chair).

Others Present: Becky Gallaher (HCP Project Coordinator), and Joe Miller (Chelan PUD). Ben Lenz (Grant PUD) and Denny Rohr (PRCC Habitat Subcommittee facilitator) joined the last hour of the meeting.

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans Tributary Committees met at the Chelan PUD Auditorium in Wenatchee, Washington, on Thursday, 12 March 2009 from 9:00 am to 12:10 pm.

I. Review and Adopt Agenda

Tracy Hillman welcomed everyone to the meeting, and the Committees adopted the proposed agenda with the following additions/changes:

- Addition of three Information Update items.

II. Review and Approval of Meeting Minutes

The Committees reviewed and approved the 12 February meeting notes with revisions suggested by Tom Kahler, Dale Bambrick, and Tracy Hillman.

III. Monthly Update on Ongoing Projects

Becky Gallaher gave an update on funded projects.

- The Wildhorse Spring Creek Conservation Easement Project is complete and the Committees should receive a final report soon.
- Cascadia Conservation District would like to set up a budget with the Rocky Reach Committee for the $150,000 that the Committee approved for the Below-the-Bridge Project. When the Committee approved the funds, they stipulated that the money would only be used for construction of the rock-wing dam (which will replace the existing push-up dam), the construction of the engineered log jam, and the restoration of the riparian community. The funds are <u>not</u> to be used to construct more boulder clusters or small woody debris structures. Cascadia, therefore, would like to know how much of the approved funds can be used for administration. The Committee decided that the ratio of

[1] Bob joined the first part of the meeting via conference call. Dale Bambrick was absent but indicated before the meeting that his vote on the Small Project Proposal would follow the recommendation of Chris Fisher.

the total administrative cost to the total cost of the project ($398,998) would be multiplied by the Committee-approved amount ($150,000) to estimate the administration budget for the portion of the project funded by the Committee. Becky indicated that she would provide that amount at the next meeting.

- Under the WRIA 45/46 Riparian Restoration Project, Cascadia Conservation District would like to shift some of the funds from landowner outreach to the gathering of native seed for riparian habitat restoration. The Rocky Reach Committee decided that they do not want funds that are allocated for outreach to be used to gather native seed. Rather, the Committee recommended that the sponsor submit a new proposal that requests funds for gathering seed and for raising plants for riparian restoration.
- The Salmon Recovery Funding Board (SRFB) has rejected the updated designs for instream structures under the Keystone Canyon Habitat Restoration Project. Cascadia Conservation District is currently looking for funds from other sources to cover the cost of the project. The Committees requested that the notes reflect the fact that Dale Bambrick was unsuccessful in convincing Marc Duboiski and Michelle Kremer with the SRFB that the replacement of rock barbs with wood was unfounded.

IV. Review of Small Projects Proposal

The Committees reviewed a Small Projects Program application from the Okanogan Conservation District titled *Legacy Park Stream Restoration Project*.

Legacy Park Stream Restoration Project

The purpose of this project is to improve water quality and salmonid rearing and spawning habitat within Bonaparte Creek by creating a filter strip of native vegetation adjacent to a stretch of Highway 97. The sponsor proposes to remove exotic vegetation (elm trees and noxious weeds) in an area of 2,000 ft^2 (100 ft x 20 ft) on the north side of the stream and 4,550 ft^2 (130 ft x 35 ft) on the south side of the stream. The exotic species will be replaced with grass filter strips consisting of water birch, red osier dogwood, snowberry, and woods rose. In addition, the sponsor proposes to design two information kiosks to educate the public about the negative impacts of poor water quality on fish habitat. The total cost of the project is $22,370. The sponsor requested $16,500 from HCP Tributary Funds. After careful consideration of the proposal, ***the Committees decided not to fund the project***.

Although the Committees appreciate projects that replace exotic species with native species and improve public understanding of habitat-fish relationships, the Committees were concerned that the proposed approach will reduce the stability of the streambanks and increase surface erosion during the first series of high-flow events. This is because the root system of the native vegetation will not be established well enough in the first few years to prevent erosion. In addition, the proposed project will likely result in a very small (immeasurable) improvement to water quality and rearing and spawning habitat for salmonids in Bonaparte Creek.

V. External Audit for Plan Species Accounts

Becky Gallaher reported that she talked with folks in the Chelan PUD Finance Department to determine what is involved in hiring an external auditor and the cost of the audit. The Finance Department advised the Committees to identify a Scope of Work (SOW) and submit it to local accounting firms for bids. The SOW should request an audit of dispersed funds, requested funds, and administrative costs. The intent is to make sure that payments from Plan Species Accounts

match payment requests. The Committees directed Becky and Tracy to put together a SOW and send it to local accounting firms before the next meeting.

Keith Truscott suggested that the Committees put together a brochure for the public that describes the projects funded by the Committees. The Committees directed Becky to look into the preparing a brochure.

VI. Updates to Policies and Procedures for Funding Projects and Operating Procedures

Tracy Hillman asked Committees members for any edits, comments, or updates to the Tributary Fund Policies and Procedures for Funding Projects and the Tributary Committee Operating Procedures. Members identified a number of changes, which are identified in track changes in the two documents. Tracy will send the edited documents to the members for final review. During the April meeting, members will review edits and finalize the documents.

Joe Miller indicated that he will research what the maximum administrative cost should be for a project. He will provide this information to the Committees at the next meeting.

Dennis Beich reported that Casey Baldwin will be the WDFW alternate to the Tributary Committees. Keith Truscott indicated that he will be stepping down from the Committees later this year and Joe Miller will serve at the Chelan PUD representative on the Tributary Committees. Tom Kahler indicated that WDFW and CPUD will each need to submit a letter to the Coordinating Committees identifying their proposed alternates or replacements.

VII. Information Updates

The following information updates were provided during the meeting.

1. Approved Payment Requests in March:

   Rocky Reach Plan Species Account:

   - $77.41 to Cascadia Conservation District for monitoring the Entiat PUD Canal Log Boom Installation Project.
   - $9,856.29 to Chelan County Treasurer for completion of the Harrison Side Channel Project and preparation of the final report.

   Wells Plan Species Account:

   - $55,000 to Inland Professional Title for the Conservation Easement on the Neighbor-Vasquez Property under the Twisp River Riparian Project.
   - $580.15 to Okanagan Conservation District for site visit, assisting landowner with final receipts, taking photos, and preparing a final report on the Lower Beaver Creek Livestock Exclusion Project.

2. Tracy Hillman reported that Mike Schiewe (Chair of the HCP Coordinating Committees) sent letters to the Confederated Tribes of the Umatilla Indian Reservation and American Rivers inquiring about their interest in participating in a meeting with members of the HCP Coordination, Hatchery, and Tributary Committees. These parties were involved in negotiating the HCPs, but elected to not sign the HCPs. This is an opportunity for the Committees to provide them with a progress report on implementation, as well as give

them an opportunity to ask questions of the Committees members. The two entities are to provide a formal response to the invitation by 31 March.

3. Tracy Hillman reported that the Upper Columbia Salmon Recovery Board and the Lead Entities will hold a debrief meeting of the Salmon Recovery Funding Board's ninth grant round. The meeting will be in Chelan on Tuesday, 31 March from 9:00 am to 2:00 pm. The Committees directed Becky Gallaher to attend the meeting. She will provide an update at the April meeting.

4. David Morgan reported on a large woody debris meeting that was convened by Mike Kaputa and Michael Kane with Chelan County in late February. The purpose of the meeting was to discuss possible liability issues associated with implementing habitat actions that include woody debris. Apparently, a user group from Lake Chelan has some issues with using woody debris in habitat restoration projects. Other groups from the Puget Sound area have also voiced concern. David noted that no other user groups in the Upper Columbia had an issue with the use of woody debris. Mike Kaputa intends to convene one or two more community workshops to discuss the issue of liability (e.g., who owns the wood). David noted that this could reduce the number of restoration projects that can be used to help recovery of listed species. David indicated that he will keep the Committees posted on upcoming workshops.

5. Chris Fisher provided an update on the Okanagan River Restoration Initiative (ORRI) Project. Chris noted that originally the ORRI project proposed the reconnection of two historic channel meanders or oxbows (Phase I) and the creation of two channel meanders (Phase II). Chris reported that during implementation, a dyke that channelized the Okanogan River was moved about 75 m from the channel to substantially increase floodplain area. The relocation of the dyke was completed in November 2008. Test pits were then dug within the area proposed for creation of two meanders. The test pits revealed that under an organic layer there was partially saturated, unconsolidated, coarse sand, which would likely not maintain lateral and vertical channel stability. The project manager, on-site engineer, project proponents, and regulatory agencies met in January to discuss modifications to the original plan.

   The outcome of the meeting was to omit the creation of the upper-most meanders and reconnect a relic side channel immediately upstream and on the east side of the channelized reach. They decided that the side channel should contain flow year round. Using an upstream reference reach on the Okanagan River, they determined that during high flow conditions, the side channel should contain 40% of the total flow. During low flow conditions, the side channel should contain about 20% of the total flow. Gravels would be added to improve and increase spawning habitat and control structures would be added to maintain and mimic natural flows into the side channel.

   David Morgan had several questions about the rationale for specific techniques that will be used under the modified design. Chris passed those questions to Chris Bull and Dr. Robert Newberry. David's questions and Dr. Newberry's responses are provided at the end of these notes as Attachment 1.

   With regard to Phase II of the project, Chris noted that there are only two landowners involved. However, it appears that they are not interested in a conservation easement. Rather, they are currently more interested in selling their property.

   Chris suggested that the Committees should think about a site visit sometime this fall when sockeye are spawning. The Committees decided to review possible dates for a site visit during the June or July meeting.

As a final note, Chris reported that the project is under budget and the sponsor may use some of the money for O&M.

6. Dennis Beich reported on the need for the Tributary Committees to coordinate with the Hatchery Committees on habitat and hatchery projects. Dennis noted that currently the Tributary Committees and Hatchery Committees are not trying to match actions, but perhaps should to improve overall benefits. For example, Dennis suggested that the Tributary Committees may want to focus habitat actions in areas where hatchery acclimation ponds have been proposed. This raised the question, is the intent to improve habitat to support or match hatchery production goals, or should hatchery production goals be matched to habitat availability? Dennis did not know, but indicated that this is why better coordination or communication within and among agencies and committees is needed to maximize benefits.

   David Morgan and Keith Truscott indicated that the Tributary and Hatchery Committees had discussed this issue in the past, but, at that time, there was no formal decision to coordinate actions.

   David indicated that the goal of the Tributary Committees should be to improve the quantity and quality of habitat for naturally produced fish. He noted that he would be disappointed if high quality habitat was lost because of hatchery fish acclimation. Tracy Hillman asked the Committees if they would be concerned if an off-channel habitat project they funded was used as a hatchery acclimation site. All members present indicated that they would be disappointed if that occurred (note, Dale Bambrick and Bob Rose were not present during this discussion). Tom Kahler pointed out that artificial rearing facilities, remote site incubation systems, and supplementation projects are not eligible for funding under the current Policies and Procedures for Funding Projects (see Section 4.3).

   Members present recognized the need to communicate and coordinate better with the Hatchery Committees. They directed Tracy to discuss this issue with Mike Schiewe, who chairs the Hatchery Committees.

VIII. Next Steps

The Tributary Committees will meet on Thursday, 9 April at Chelan PUD in Wenatchee. Tentative agenda items include:

- Review of Policies and Procedures for Funding Projects and Tributary Committee Operating Procedures.
- External audit.
- Information updates from Joe Miller, Becky Gallaher, and Tracy Hillman.

Meeting notes submitted by Tracy Hillman (tracy.hillman@bioanalysts.net).

Attachment 1

Chris Fisher asked Chris Bull and Dr. Robert Newberry to respond to questions posed by David Morgan about the rationale for specific techniques proposed under the modified design for the ORRI Project. What follows are David's questions and Dr. Newberry's responses. Chris provided this information to the Committees on Wednesday, 18 March in an email.

Morgan: "I assume part of the idea is to breach the dyke to partially restore river process. So why lock the river in place via the rock crests and riprap? Why not encourage oxbow movement within the new floodplain once dikes are set back? Also-if migration is a concern, why is the new set back dike not protected with riprap where the apex of the oxbow will most closely approach the dike? And what about on the opposite side where oxbow re-connects to main thread and may direct energy at existing dike to the east? Maybe they're already armored?"

Newberry: "These questions are insightful and correct for normal rivers. But in this case, all the channel forming median flood flows are backflooded by Vertical Drop Structure 13. There is a very low gradient in the Phase One lower end of the reach with velocities that are below the competency needed to move the bed materials and meander bends.

The reach profile from the 1980 survey plan is attached. The original gradient before VDS13 is about 0.18%. The gradient with VDS13 is 0.06%. In an overall sense what we are doing is creating short sections by breaking the profile into steeper spawning gravels segments with the old gradient separated by longer flatter pools. This should alleviate the sedimentation on the redds in the steeper segments. With 1/3 of the gradient the best we could do would be to restore 1/3 of the reach."

Morgan: "Why are rock crests needed across both the main thread and the new oxbow? Seems if any crests is needed, all you really need is one across the main thread to set that elevation higher and ensure the oxbow entrance is lower. If 100% of water goes into oxbow during low flow, is that a problem? Just because reference reach upstream has split flow doesn't mean it has to be same here. I assume these reference reaches have no rock crests."

Newberry: "The rock controls are there to split the low flows (10 cm/s or less) when the backwater effects are limited. They are placed at the head of the gravel spawning ramps to ensure that there is a local increase in gradient to limit the midwinter sedimentation on the redds (about 4X that in the natural gravel bars at split sections upstream). The bars are adjustable to ensure that the redds are not de-watered in either channel as the flow drops off in the winter.

There is no 3D model precedent to test how the backwater and adjusted profile will react together exactly. Hydraulic models that are based on the cross-section and slope are too gross for this level of detail. The advantage of using rock riffles for controls is that we can adjust them as we see how the ramps and flow behaves."

Morgan: "Why bring in gravel? How long will it last? Cost? Will it silt in? Why not allow natural deposition to happen and fish will figure out where they want to spawn? If slope is steeper at head ends (near rock crests), then perhaps they won't silt in."

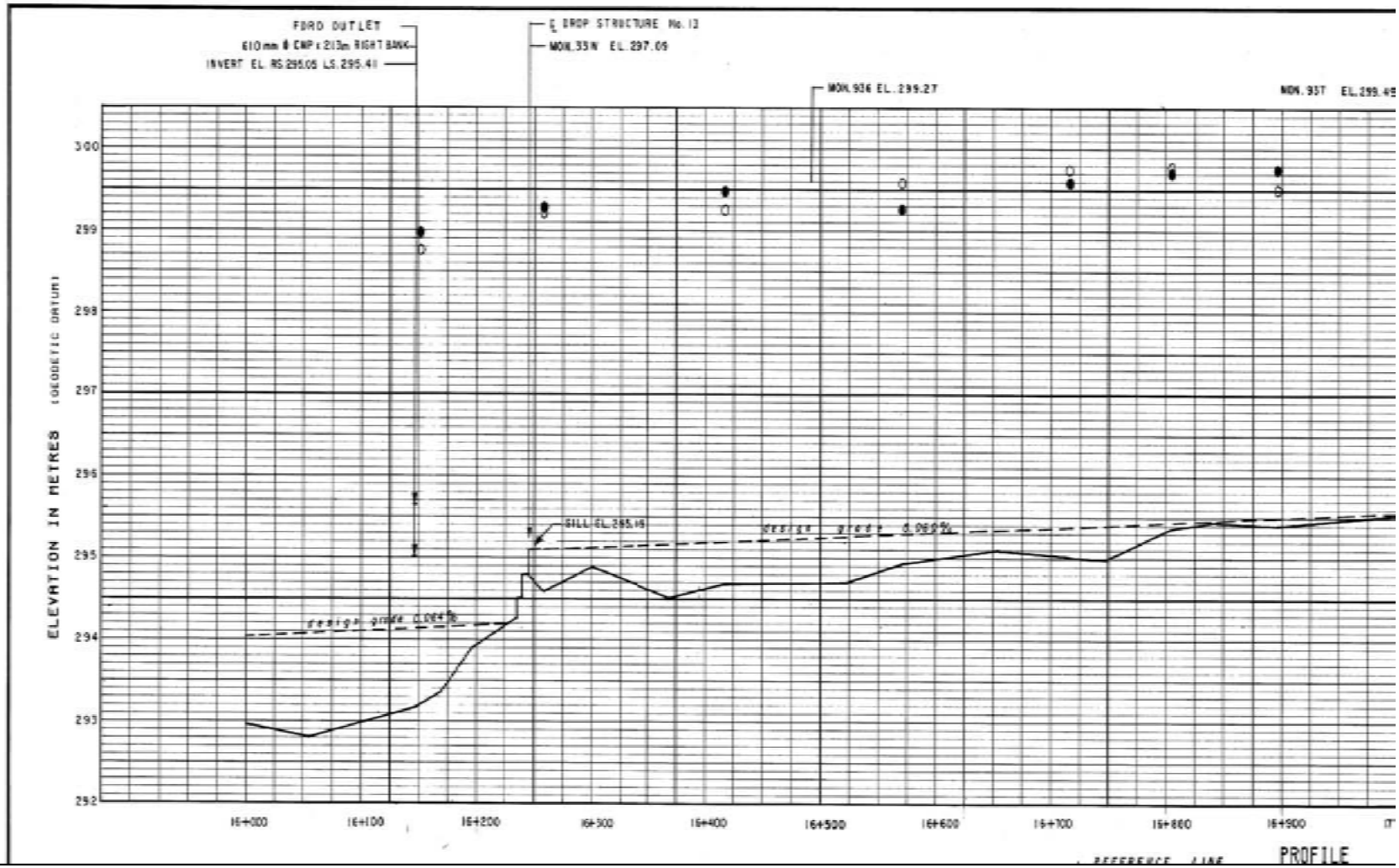
Newberry: "Spawning size gravels are slightly stable in the bars at spawning level flows. In contrast to a normal river their stability increases at higher flows because of the increasing effect of the VDS 13 backflooding. There is high flow gravel migration into the upper end of the ORRI reach but it tapers out as the backwater effect takes over. That seems to be at about 3/4 of the way up the reach in the first few hundred metres below Park Rill. We could have scabbed gravel off the bed in the low gradient reaches instead of building up the ramps but it looks like the

underlying materials are very fine sand that has infilled the old profile up to the sill level of VDS13. It could flood the lower river with fines if it is exposed."

Morgan: "But what about gravel patches at lower ends of oxbows where I assume slope will be less and therefore deposition more likely?"

Newberry: "The gradient over the gravel patches at the end of the meanders are there to take advantage of a local gradient that occurs because there is a slight drop between the flow in the deep meanders and the shallow mainstem at the lower junction at spawning discharges.

A saving grace is that all of the works are accessible and adjustable. We will see what the fish have to say after a season or two."


FORD OUTLET
610mm Ø CMP x 21.3m RIGHT BANK
INVERT EL. RS 295.05 LS 295.41
℄ DROP STRUCTURE No. 12
MON. 35N EL. 297.09
MON. 936 EL. 299.27
MON. 937 EL. 299.45
ELEVATION IN METRES (GEODETIC DATUM)
300
299
298
297
296
295
294
293
292
SILL EL. 295.19
design grade 0.069%
design grade 0.064%
16+000
16+100
16+200
16+300
16+400
16+500
16+600
16+700
16+800
16+900
PROFILE

Wells, Rocky Reach, and Rock Island HCP Tributary Committees Meeting Notes 9 April 2009

Members Present: Casey Baldwin (WDFW), Dale Bambrick (NOAA Fisheries), Chris Fisher (Colville Tribes), Tom Kahler (Douglas PUD), David Morgan (USFWS), Keith Truscott (Chelan PUD), and Tracy Hillman (Committees Chair).

Members Absent: Bob Rose[1] (Yakama Nation).

Others Present: Becky Gallaher (HCP Project Coordinator) and Joe Miller (Chelan PUD). Ben Lenz (Grant PUD) and Denny Rohr (PRCC Habitat Subcommittee facilitator) joined the last hour of the meeting.

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans Tributary Committees met at the Chelan PUD Auditorium in Wenatchee, Washington, on Thursday, 9 April 2009 from 9:00 am to 11:45 am.

I. Review and Adopt Agenda

Tracy Hillman welcomed everyone to the meeting, and the Committees adopted the proposed agenda.

II. Review and Approval of Meeting Minutes

The Committees reviewed and approved the 12 March meeting notes with an edit suggested by Casey Baldwin.

III. Monthly Update on Ongoing Projects

Becky Gallaher gave an update on funded projects.

- HCP Tributary Committee/Sponsor Agreements are being prepared for the Below the Bridge Project, Poorman Creek Barrier Removal Project, Twisp River Conservation Acquisition II Project, and the Cashmere Pond Off-Channel Habitat Project.
- Under the Entiat Instream Structures Engineering and Permitting Project, Chelan County is preparing a contract with GeoEngineers to redesign the Knapp-Wham Diversion single-wing dam.
- Under the WRIA 45/46 Riparian Restoration Project, Cascadia Conservation District is actively recruiting willing landowners. They are continuing their outreach and education efforts and are in the process of developing a native plant brochure for landowners.

[1] Bob was unable to join the meeting. He did, however, provide his vote on decision items following the meeting.

- The Wildhorse Spring Creek Conservation Easement Project is complete and the Rock Island Tributary Committee received the final report, which is posted on the website.
- Landowner agreements have been secured for the Entiat PUD Canal System Conversion Project. The project manager and geotechnical consultant will meet on 9 April to discuss locations for test wells. The current schedule is to begin drilling test wells in May.
- Cascadia Conservation District completed the project summary for the Roaring Creek Flow Enhancement and Barrier Removal Project. The summary is needed to finalize a land transfer that will allow one of the wells to be located on private property rather than on USFWS property. Upon approval by the USFWS, Cascadia will develop a scope of work for surveying. The Certificate of Exemption and Boundary Line Adjustment will be completed after the survey is finished.
- The Yakama Nation is currently reviewing the design for the Keystone Canyon Habitat Restoration Project.
- Cascadia Conservation District will meet with the Natural Resources Conservation District engineer on 8 April to review possible modifications to the Entiat Canal Log Boom Installation Project. Information from that meeting will be provided to the Rocky Reach Committee in May.
- The Methow Conservancy asked the Wells Committee if it would be okay to expand the Riparian Restoration and Regeneration Initiative Project to properties in the Beaver Creek watershed. Recall that the purpose of this project is to build re-usable cages that protect seedlings and saplings of cottonwood, aspen, and willow trees within riparian areas along the Methow and Twisp rivers from wildlife browsing. The Conservancy would like to expand the geographic scope of the project to properties in the Beaver Creek watershed. There is no change in funding. ***The Wells Committee approved the change in geographic scope of the project.***
- The Methow Salmon Recovery Foundation (MSRF) asked the Rock Island Tributary Committee if the MSRF could use left-over money from the Twisp River Conservation Acquisition II Project to fund restoration work on the Yoakum and Doran properties. Recall that the MSRF received funding from the Rock Island Tributary Committee ($220,000) and the Salmon Recovery Funding Board (SRFB; $261,814) to purchase the two properties along the lower Twisp River (0.9-1.0 miles upstream from the mouth). The MSRF will purchase the land for $394,000 (recent appraisals were $369,000 for the Yoakum Property and $25,000 for the Doran Property), saving $86,000, of which $38,500 is the Committee's portion. The MSRF would like to use the left-over money to fund the following actions on the two properties:
    - Removal of one stick-built residential structure ($20,000),
    - Removal of one stick-built agricultural structure ($8,000),
    - Removal of road and re-vegetate ($10,000),
    - Re-establish native plantings in the cleared pasture area ($15,000),
    - Install temporary water system ($6,000),
    - Install exclusion fencing ($15,000),
    - Remove fill placed in riparian areas ($12,000).

    Dale Bambrick noted that the SRFB will not allow the MSRF to use left-over SRFB money to fund restoration efforts on the properties. Although in general the Committee

supported the use of left-over funds for restoration activities, the Committee determined that they need more information before they could grant the request. The Committee would appreciate MSRF responses to the following questions:

- What, if any, elements of the original proposal changed? For example, the Committee understood that that the resale of the uplands on the Yoakum Property would provide the funds needed for restoration of the riparian and floodplain areas. Now it appears that the MSRF is asking the Committee to cover a portion of the cost of the restoration work.
- To reduce the cost of removing the stick-built structures, can the local fire department use them for fire training?
- Would Chris Johnson be available by phone during the next Tributary Committees meeting to answer questions?

The Committee directed Tracy Hillman to share the Committee's questions with Mr. Johnson.

- In March, Cascadia Conservation District approached the Rocky Reach Committee with a request to set up a budget for the $150,000 that the Committee approved for the Below-the-Bridge Project. When the Committee approved the funds, they stipulated that the money would only be used for construction of the rock-wing dam (which will replace the existing push-up dam), the construction of the engineered log jam, and the restoration of the riparian community. The funds are <u>not</u> to be used to construct more boulder clusters or small woody debris structures. Cascadia, therefore, would like to know how much of the approved funds can be used for administration. During the March meeting, the Committee decided that the ratio of the total administrative cost to the total cost of the project would be multiplied by the Committee-approved amount ($150,000) to estimate the administration budget for the portion of the project funded by the Committee.

  At the time of the April meeting the Committee had not received the "total" administrative cost estimate on this project from the sponsor. However, following the meeting, Becky Gallaher received the estimate from the sponsor. Based on this information, the ratio was calculated as 0.15 (15%). Therefore, the portion of the total amount from the Committee ($150,000) that is budgeted for administration is $22,500.

IV. Review of Small Projects Proposal

The Committees reviewed a Small Projects Program application from the Cascadia Conservation District titled *LWD/Rootwad Acquisition and Transport II*.

<u>LWD/Rootwad Acquisition and Transport II</u>

The purpose of this project is to acquire, transport, and stockpile more than 200 pieces of large woody debris (with rootwads) for instream projects in the Entiat and Wenatchee basins. The sponsor estimates that they will need about 10-30 pieces of wood in the Bridge-to-Bridge Reach on the Entiat, more than 150 pieces in the Preston Reach on the Entiat, and 8-16 pieces in Mission Creek. The wood will be used to help create habitat diversity and restore physical channel processes. The total cost of the project is $35,000. The sponsor requested $35,000 from HCP Tributary Funds. After careful consideration of the proposal, ***the Rock Island Committee approved funding for this project***.

Although the Committee agreed to the project in general, the Committee placed the following conditions on this project.

1. The funds from this project are not to be used to support administrative functions, such as searching for wood, which should already be a component of their existing projects.
2. When wood is available, Cascadia must submit in writing (letter or email) their desire to use the available funds for the purchase, transport, and stockpile of wood.
3. In the written request, Cascadia must indicate the location, cost, general size, and species of wood available; where Cascadia intends to store the wood; and the type of habitat actions or projects that will benefit from the wood purchased with Tributary Funds. As quickly as possible the Committee will either grant or deny the request.

The purpose for placing these conditions on the project is to retain the right to approve distribution of funds for this project on a case-by-case basis. Some members were concerned that Plan Species Account money may be used to purchase wood that would never make it into a project funded by the Tributary Committee (or that the cost savings attributed to this project would be passed on to other projects the Committee would not support), while at the same time the Plan Species Account would be billed for collection of the necessary wood for Committee-funded projects. Finding wood for any funded project and stockpiling that wood next to the project site should be a component of every project, and thus should not require a separate project or administrative effort to locate and stockpile wood. It is assumed that some portion of the administrative cost embedded in most in-stream restoration projects is for acquiring wood. Thus, the conditions placed on the project should prevent Plan Species Account funds from being used to support the salary of a "wood prospector." Rather, once the wood is available, the funds can be used to purchase, transport, and stockpile the wood near a project site. The Committee expects to see reduced costs associated with gathering and staging wood in future proposals from this sponsor.

V. External Financial Review for Plan Species Accounts

Becky Gallaher reported that she talked with folks in the Chelan PUD Finance Department to determine what is involved in putting together an external audit. Becky provided a handout that identified the purpose and scope of work for the audit. Tom Kahler indicated that he had the Douglas PUD Treasurer review the purpose and scope of work. Tom noted that Douglas PUD was not entirely clear on the purpose of the audit as stated in the draft scope of work. The term "audit" has a specific meaning in accounting jargon, implying the highest level of review and includes the most in-depth examination and verification of financial accounts and records. This probably goes well beyond the intent of the Committees. Douglas PUD indicated that the purpose should be a simple "financial review" rather than an "audit."

Tom stated that since the narrow role of the "account managers" (LeMaster & Daniels and Douglas PUD) of the three Plan Species Accounts is to respond to payment requests, track interest earned, handle contributions from the PUDs, and periodically report on the status of the accounts, review of their records should be relatively simple. The more complicated aspects of financial management reside with the Committees' administration; thus, the majority of the effort of the "financial review" should focus on that end of the management of the funds. The Committees agreed to the financial review, which will consist of the following:

Purpose: Provide a report on the financial performance and position of the financial account manager.

Scope of Work:

- Incoming Funds—Review all areas associated with the receiving and handling of funds, including processes, internal controls, and work flow. Also review bank statements and statement reconciliation.
- Budget Process—Review project budgets and corresponding financial reporting, assuring that the record keeping is in balance with the intent of the budget.
- Allocating/Approval of Funds—Review procedures and controls associated with the allocation and approval of expenses to ensure a tight process.

The Committees directed Becky to ask local accountants for a cost estimate to do the financial review. The Committees directed Becky and Tracy to select the lowest bidder.

VI. Updates to Policies and Procedures for Funding Projects and Operating Procedures

Tracy Hillman walked the Committees through the proposed edits and comments to the Policies and Procedures for Funding Projects and the Tributary Committee Operating Procedures. Members agreed to the proposed changes and directed Tracy and Becky to post the revised drafts to the website. Tracy indicated that he would also fix some of the formatting problems in the documents.

Joe Miller shared with the Committees his research on what the maximum administrative cost should be for a project. He provided the Committees with a handout, which is attached to these notes as Attachment 1. As a proposal for reducing administrative costs in project applications, Joe identified a three-step process defining administrative costs, identifying reward/penalty for administrative costs, and identifying a method for calculating "reward" and "penalty." The Committees asked Joe, Becky, and Tracy to identify what specific elements constitute administrative costs, identify a threshold value (i.e., percent of total budget that is made up of administrative costs), and describe how to quantitatively or qualitatively assign "penalty" and "reward."

VII. Information Updates

The following information updates were provided during the meeting.

1. Approved Payment Requests in April:

   Rocky Island Plan Species Account:

   - $192.04 to Chelan County PUD for first-quarter project coordination and administration.
   - $143.00 to LeMaster and Daniels for first-quarter financial management.

   Rocky Reach Plan Species Account:

   - $192.04 to Chelan County PUD for first-quarter project coordination and administration.
   - $143.00 to LeMaster and Daniels for first-quarter financial management.

   Wells Plan Species Account:

- $192.04 to Chelan County PUD for first-quarter project coordination and administration.
- $50.00 to the Methow Conservancy for landowner contact and developing a list of potential properties for the Riparian Regeneration and Restoration Initiative.

2. Tracy Hillman reported that he talked with Mike Schiewe (Chair of the HCP Hatchery Committees) about the need for the Tributary Committees to coordinate with the Hatchery Committees on habitat and hatchery projects. Recall that during the last meeting Dennis Beich noted that currently the Tributary Committees and Hatchery Committees are not trying to match actions, but perhaps should to improve overall benefits. Dennis suggested that the Tributary Committees may want to focus habitat actions in areas where hatchery acclimation ponds have been proposed.

   Tracy stated that Mike is in favor of better coordination and communication between the Committees and indicated that a joint meeting would be beneficial. However, the meeting would have to wait until the Hatchery Committees are finished or nearly finished with developing their Hatchery Genetic Management Plans. Mike indicated that he would like to have this joint meeting sometime this year. Committees members reiterated that they are in favor of better coordination and communication, but stressed that they are not in favor of using Tributary Funds to fund projects that would be used for hatchery fish acclimation. They indicated that Hatchery Funds should be used for those projects.

   Casey Baldwin mentioned that he and Dennis have drafted a document that outlines some concepts of the integration. He thought that Dennis would seek input from the Committees on the draft document.

   Tracy noted that he will stay in communication with Mike and the two will develop a draft agenda and time for the joint meeting.

3. Becky Gallaher reported that she attended the debrief meeting of the SRFB's ninth grant round on 31 March. Becky noted that the meeting provided project sponsors an opportunity to share their concerns about the SRFB process. One issue discussed during the meeting was the difference in the formats of pre-proposal and final proposal applications. Becky noted that the Lead Entity representatives will work with her to make the applications more similar. This will ease the transfer of information from the pre-proposals to the final proposals.

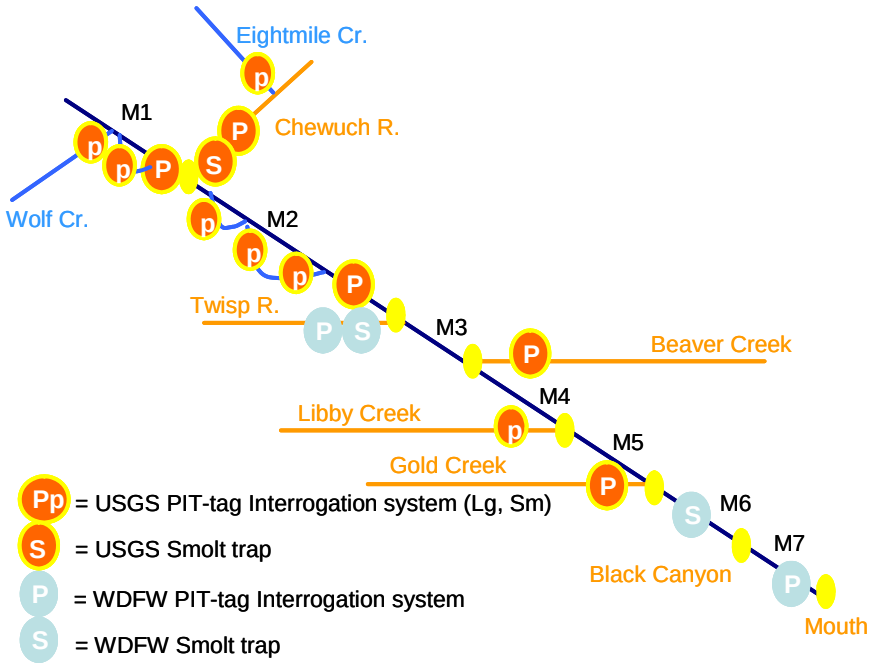
   Becky also noted that sponsors were concerned that presentations come too early in the process. Their solution is to have tours before the presentations. This will help the sponsors develop better presentations and be more prepared to answer questions and address concerns. Tours are currently scheduled for the end of June (22-25 June) and presentations for early July (7 and/or 8 July). Becky shared the draft schedule with the Committees and asked members to send her edits and comments on the schedule.

   Casey Baldwin noted that they also discussed the concern that the Regional Technical Team (RTT) is basing project scores on cost. Note that the RTT is not supposed to evaluate the overall cost of SRFB proposals, but they do consider certain technical aspects of the budget. Casey indicated that there was some discussion about forming an independent committee to evaluate costs. The NOAA Science Center has folks that can do this type of evaluation. Other discussions included the criteria that the Citizens Committee uses to evaluate cost and the fact that many of the members of the Citizens Committee do not have the expertise to evaluate critically the legitimacy of budgets for large, complex projects that are often proposed. Casey also that Derek Van Marter

(UCSRB assistant director) will be exploring some alternative or additional options for evaluating budgets, which may involve the RTT.

Tracy Hillman indicated that last year one of the project sponsors was upset because not all the information in their proposal was provided to the RTT and Tributary Committees. In an effort to minimize this problem in the future, there will be more time for copying and distributing the proposals. Given the economic crunch, however, Tracy asked the Committees if they would be okay receiving the proposals electronically. The cost to the Committees and Chelan PUD approaches $3,000 for copying and mailing. This covers copies for both the Tributary Committees members and the RTT. The Committees agreed that proposals should be sent electronically to Committees members and the RTT.

4. Tracy Hillman shared with the Committees the Bureau of Reclamation's (BOR) proposed plan for monitoring the effectiveness of habitat actions in the Methow Basin. The plan was developed by Pat Connolly with the USGS Western Fisheries Research Center and is designed to address the effects of habitat restoration (primarily off-channel habitat restoration) on production and life-stage survivals of Chinook, steelhead, and bull trout. Tracy directed the members to Figure 1 in the report (shown below) that identifies the locations and types of sampling gear (PIT tag interrogators and smolt traps) proposed in the Methow Basin. Tracy noted that M1 is the reference reach (preferred condition), M2 is the treatment reach, and M3 is the control reach. Tracy noted that the BOR is coordinating with the Hatchery Committees to determine how best to deal with the confounding effects of hatchery actions and nutrient supplementation efforts.



5. Chris Fisher reported that he talked with Chris Bull about the desire of the Committees to visit the Okanagan River Restoration Initiative (ORRI) Project in September. Chris indicated that Chris Bull will not be available in September and proposed that the visit occur in October. The Committees agreed and noted that this would be a good time to observe sockeye spawning in the project area.

VIII. Next Steps

The Tributary Committees will meet on Thursday, 14 May at the Chelan PUD office in Leavenworth. Tentative agenda items include:

- External financial review.
- Review of the Twisp River Conservation Acquisition II request.
- Information updates from Becky Gallaher and Tracy Hillman.

Meeting notes submitted by Tracy Hillman (tracy.hillman@bioanalysts.net).

Attachment 1

Proposal to reduce administrative costs

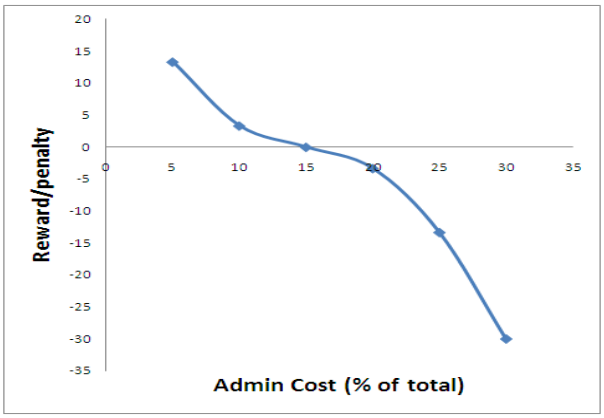
HCP Tributary committees, Draft 4/2/09

Purpose: This proposal describes a method to encourage Trib. Fund applicants to submit proposals with low administrative costs.

Step 1. Define administrative costs: We can set this up to target specific items we don't want to see or leave it somewhat vague. I'd start with the usual suspects: overhead, indirect, permitting costs that exceed x% of total, unexplained or redundant engineering costs, proposal development costs, etc.

Step 2. Identify rewarded/penalty level for administrative costs : For illustrative purposes, I chose a 15% threshold (i.e., the committee should agree on a level). This means that projects with admin costs above or below 15% of the total project cost are either rewarded or penalized: projects with admin costs above 15% are penalized; those below 15% are rewarded.

Step 3. Technical calculation of reward/penalty: The basic idea is to quantitatively guide applicants to the conclusion that more admin charges translate into lower project scores. In the figure below, I've tried to illustrate an exponential relationship[2] where the penalty or reward accelerates as the applicant's admin costs depart from 15%. The relationship chosen is arbitrary except to the extent it is not linear. I set the "maximum penalty" to 30 points, but it could be adjusted to any value.



The short story, if admin costs are greater than 15%, then a negative "penalty" results. If admin costs are less than 15%, then a positive "reward" occurs. These numbers would be added directly to the RTT score (or some other rating index chosen by the Trib. Committee). Implementing this type of reward/penalty system, up front, could help encourage on-the-ground projects and dissuade requests to fund administrative FTEs, proposal development costs, or other expenses with a "low impact/high cost" ratio. The key is not to create a technical scoring system that makes life difficult for the committee, but instead, provide a clear message to applicants that we *can* use an unambiguous, emotionless scoring system that penalizes projects with high admin costs.

[2] x = admin costs, y = reward or penalty: If x>15%, then $y=-1*[(x-15)^2/7.5]$, or if x<15%, then $y=(x-15)^2/7.5$

Wells, Rocky Reach, and Rock Island HCP Tributary Committees Meeting Notes 14 May 2009

Members Present: Dale Bambrick (NOAA Fisheries), Dennis Beich (WDFW), Chris Fisher (Colville Tribes), Tom Kahler (Douglas PUD), David Morgan (USFWS), Lee Carlson (Yakama Nation), Keith Truscott (Chelan PUD), and Tracy Hillman (Committees Chair).

Others Present: Becky Gallaher (HCP Project Coordinator), Casey Baldwin (WDFW), and Joe Miller (Chelan PUD). Ben Lenz (Grant PUD) and Denny Rohr (PRCC Habitat Subcommittee facilitator) joined the last hour of the meeting.

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans Tributary Committees met at the Chelan PUD Auditorium in Leavenworth, Washington, on Thursday, 14 May 2009 from 9:00 am to 11:20 am.

I. Review and Adopt Agenda

Tracy Hillman welcomed everyone to the meeting, and the Committees adopted the proposed agenda.

II. Review and Approval of Meeting Minutes

The Committees reviewed and approved the 9 April meeting notes with edit suggested by Casey Baldwin, Tom Kahler, and Tracy Hillman.

III. Monthly Update on Ongoing Projects

Becky Gallaher gave an update on funded projects.

- Under the WRIA 45/46 Riparian Restoration Project, Cascadia Conservation District has nearly completed the project and will soon prepare the final report. Cascadia requested a budget amendment for this project. They asked if they could transfer money from Contract Labor, Project Materials & Equipment, and Travel to Salaries & Benefits. This transfer would increase Salaries & Benefits from $15,330 (original budget) to $19,520 (amended budget), a 27% increase. ***The Rock Island Tributary Committee denied the request.*** Thus, the budget for Salaries & Benefits will remain at $15,330.
- The PUD met with the contractor to locate sites for test wells for the Entiat PUD Canal System Conversion Project. The current schedule is to begin drilling test wells in May.
- For the Roaring Creek Flow Enhancement and Barrier Removal Project, Cascadia Conservation District is still working on the land transfer that will allow one of the wells to be located on private property rather than on USFWS property. Upon approval by the USFWS, Cascadia will develop a scope of work for surveying.

- Cascadia Conservation District was scheduled to reinstall the log boom, but because of steelhead spawning in the area and the fact that Cascadia did not have a current HPA, they were unable to complete the work.

IV. Methow Salmon Recovery Foundation Request (Twisp River Acquisition II)

In April, the Methow Salmon Recovery Foundation (MSRF) asked the Rock Island Tributary Committee if the MSRF could use left-over money from the Twisp River Conservation Acquisition II Project to fund restoration work on the Yoakum and Doran properties. The MSRF received funding from the Rock Island Tributary Committee ($220,000) and the Salmon Recovery Funding Board (SRFB; $261,814) to purchase the two properties along the lower Twisp River (0.9-1.0 miles upstream from the mouth). The MSRF will purchase the land for $394,000 (recent appraisals were $369,000 for the Yoakum Property and $25,000 for the Doran Property), saving $86,000, of which $38,500 is the Committee's portion. The MSRF would like to use the left-over money to fund the following actions on the two properties:

- Removal of one stick-built residential structure ($20,000),
- Removal of one stick-built agricultural structure ($8,000),
- Removal of road and re-vegetate ($10,000),
- Re-establish native plantings in the cleared pasture area ($15,000),
- Install temporary water system ($6,000),
- Install exclusion fencing ($15,000),
- Remove fill placed in riparian areas ($12,000).

During the April meeting, the Rock Island Tributary Committee questioned what, if any, elements of the original proposal had changed? For example, the Committee understood that that the resale of the uplands on the Yoakum Property would provide the funds needed for restoration of the riparian and floodplain areas.

During the May meeting, Tracy Hillman quoted the following from the original proposal:

- "Existing manufactured home will be removed as a condition of purchase within 60 days of closing, and the site restored. Upland portions will be protected with conservation easements and remarketed for residential use. MSRF will use resale funds for restoration of the lower riparian and floodplain areas. Work will include removal of sections of bank armoring, planting riparian vegetation, plant protection through caging, and use of 'exclosure' fencing for release of natural vegetation."
- "MSRF proposed to secure needed funds for this project by marketing upland portions of the property for residential use to create a funding reserve for long-term maintenance and restoration needs. Sale of these properties will also be used to fill any potential funding gap between the amount requested from SRFB and TRIB and the actual appraised value."
- "One existing manufactured home and two accessory buildings are currently located on the riparian/floodplain portion of the Yoakum properties. The home will be removed as a condition of the purchase agreement. Accessory structures will be removed as restoration is implemented. One additional structure exists on the upland portion of the Yoakum site. This portion of the property will be retained for MSRF for re-sale to a conservation buyer as a funding mechanism for restoration."

After careful consideration, ***the Rock Island Tributary Committee denied the request to use left-over money to implement restoration actions on the properties***. The Committee noted that it

expects the MSRF to use resale funds for restoration work on the properties. In the event that the resale funds are not sufficient to cover the costs of restoration work, the Committee would entertain a Small Projects Program Proposal or General Salmon Habitat Program Proposal.

V. Review of Small Projects Proposal

The Committees reviewed a Small Projects Program application from the Cascadia Conservation District titled *2010 Entiat River Riparian Planting*.

2010 Entiat River Riparian Planting

The purpose of this project is to improve instream habitat diversity and moderate extreme water temperatures by restoring degraded riparian habitat along the Entiat and Mad rivers. The sponsor intends to plant about 3.36 acres of riparian vegetation at four sites in 2010. The total cost of the project is $49,951. The sponsor requested $49,951 from HCP Tributary Funds. After careful consideration of the proposal, ***the Committees elected not to fund this project***.

The Committees identified the following issues with the proposed project.

1. It was not clear if the properties selected for plantings were consistent with the priorities specified in GeoEngineers (2007) report. The sponsor cited the document in the proposal, but it was not apparent that the sponsor considered the priorities identified in the GeoEngineers report.
2. There was no information on which native species would be used and at what density they would be planted. The Committees assume that different mixes of species and densities would be needed at different sites.
3. The Committees also believed the total cost of the project was high. The cost of the project equated roughly to $14,600 per acre.
4. Finally, the sponsor did not define the 351 hours of labor (at $14,026) identified in the budget. They defined administration costs and costs for Professional Services (Cultural Resources) and Contracting (WCC). It was not clear what the 351 hours of labor would accomplish.

VI. Okanagan River Restoration Initiative Monitoring

Chris Bull, ORRI Project Coordinator, submitted a monitoring report titled, "Aquatic Monitoring of the Okanagan River Restoration Initiative (ORRI)—the initial year, 2008" for Committee review. The Committees reviewed the report and noted that the monitoring efforts should continue as planned. Thus, ***the Wells Committee chose to fund the following components for another year: (1) Fish Holding and Rearing for $3,867, (2) Channel Morphometry and Hydraulics for $9,680, and (3) Substrate Composition for $5,713.*** The Committee elected not to fund any other "unfunded" components of the monitoring plan. The Committee directed the sponsor to submit another report and budget at the end of the monitoring year (April 2010).

VII. Information Updates

The following information updates were provided during the meeting.

1. Approved Payment Requests in April:

   Rock Island Plan Species Account:

- $200,500.00 to Baines Title for the purchase of the Yoakum and Doran Properties under the Twisp River Acquisition II Project.
- $14,925.18 to Cascadia Conservation District for ongoing public outreach and project coordination under the WRIA 45/46 Riparian Restoration Project.

Wells Plan Species Account:

- $46,238.95 to the Okanagan Nation Alliance for final measurements and movement of materials, project coordination and planning, and outreach under the Okanagan River Restoration—Phase IV Project.

2. Becky Gallaher reported that she will be seeking bids from local accounting firms to conduct the financial review on the management of the Plan Species Accounts. The lowest bidder will be selected for the job.
3. Tracy Hillman reported that he and Becky Gallaher updated the project information sheets. For each Plan Species Account, the sheets identify the projects funded by the Tributary Committees, the sponsor, fund type (General Salmon Habitat or Small Projects), project type (e.g., protection, fish passage, off-channel habitat, etc.), total cost of the project, Committees financial contribution, and the status of the project. Under the Wells Committee project sheet, Tom Kahler pointed out that the contribution to the Wells Account should state that contributions will be made "annually beginning in 2010." Tracy indicated that he will send the sheets electronically to the Committees members along with the draft meeting notes.
4. Tracy Hillman reported that the Policies and Procedures document contained a few minor errors. After the document was reformatted, the numbering of sections changed from the original document. This caused references to specific sections within the text to be incorrect. Tracy noted, for example, that in the text under Section 2 there is a reference to Section 6.7. The text should actually reference Section 6.8. The Committees directed Tracy to make the changes.
5. Joe Miller and Becky Gallaher shared with the Committees their research on what the maximum administrative cost should be for a project. They provided the Committees with a handout describing their research. They addressed three questions: (1) what constitutes administrative costs, (2) what is the maximum allowable administrative cost as a percent of the total budget, and (3) how can the Committees qualitatively assign "penalty" and "reward?"

   Joe reported that the Salmon Recovery Funding Board (SRFB) has already addressed the first two questions in their Reimbursement Manual. Tab D in the Reimbursement Manual provides a list of acceptable administrative costs associated with acquisitions. Tab E in the manual provides a list of acceptable administrative costs and architectural and engineering (A&E) costs for restoration projects. Becky noted that the lists in the handout do not include all items identified in the SRFB manual, because not all those listed in the manual apply to the Tributary Committees. Joe then reported that the SRFB limits administrative costs at 5% for acquisition projects and 30% for restoration projects (broken down by Joe and Becky as 15% for admin and 15% for A&E). With regard to ranking proposals, Joe indicated that proposals that demonstrate a high likelihood of tangible, on-the-ground results with a minimum of administrative costs would rank higher than proposals with similar anticipated results but higher admin costs.

   The members of the Committees thanked Joe and Becky for their hard work on this issue. They questioned whether overhead and appraisal costs should be included in the list of

admin costs. Joe indicated that he would add overhead to the list of admin costs, but with regard to appraisal costs, he noted that the SRFB identifies appraisals as a project cost not an admin costs. The Committees agreed.

The Committees noted that they also receive design-only proposals. It is not clear how the current criteria would apply to design-only proposals. Joe indicated that he and Becky would draft some language for design-only proposals.

6. Tracy Hillman reported that the 2008 Rock Island, Rocky Reach, and Wells HCP Annual Reports were submitted to FERC. Tracy stated that each member should have received the link to the website containing the Rock Island and Rocky Reach reports and a CD containing the Wells report. Tom Kahler reported that the CD sent to FERC was corrupted. He also noted that there were errors in the reporting of broodstock protocols. Keith Truscott indicated that those errors were also in the Rock Island and Rocky Reach reports. Tom noted that those errors have been corrected.

7. Tracy Hillman reported that he received an email from Derek Van Marter indicating that the Upper Columbia Salmon Recovery Board has determined that it is the role of the Regional Technical Team (RTT) to evaluate cost-effectiveness of project proposals. The Citizens' Committee will evaluate cost-benefit to the community. Recall that in the past the RTT was not supposed to evaluate the overall cost of proposals, only certain technical aspects of the budget. Casey Baldwin reported that the RTT has drafted an approach to scoring the cost-effectiveness of proposals. According to the scoring approach developed by the RTT, cost-effectiveness will constitute about 20% of the overall score of a proposal.

8. David Morgan reported that the Chelan County Natural Resource Department has scheduled large woody debris (LWD) workshops for 20 May at 1:30 pm at the Leavenworth Fire Hall in Leavenworth and 21 May at 1:30 pm at the Chelan Fire Hall in Chelan. David noted that these are planning meetings. Casey Baldwin indicated that he received a draft agenda for the meeting. *Following the meeting, Casey sent an email that identified the objectives of the meetings. The objectives are to discuss expected outcomes and goals for the LWD Forum, identify issues to meet desired outcomes and goals, develop an agenda and speaker list for community meetings, and discuss next steps beyond community meetings.* Members of the Committees discussed the pros and cons of attending the meetings. Both David and Casey stated that they were planning to attend at least one of the meetings. Tracy indicated that he would provide Casey and David, and the rest of the Committees members, with a summary paper describing the role of LWD in streams.

9. Becky Gallaher reported that she attended the SRFB 10th Round Upper Columbia Regional Kick-off Meeting on Thursday, 7 May. The purpose of the meeting was to approve the regional Process Guide, review the regional technical and citizens' criteria, and review materials and process changes from the SRFB or Tributary Committees. Becky provided a copy of the process schedule, which is appended to the notes as Attachment 1. She noted that the pre-proposals are due on 1 June. Becky also noted that she would inform members via email after she has uploaded the proposals to the ftp site. Project tours are scheduled for 22-25 June, but it is unlikely that four days will be needed (based on past tours). Pre-proposal presentations will occur on 7 (tentative) and 8 July. The Tributary Committees will conduct their final review of pre-proposals on 9 July.

VIII. Meeting with Chelan County Lead Entity

Chelan County Lead Entity representatives Joy Juelson and Mike Kane intended to meet with the Committees, but because of other commitments, they were unable to attend.

IX. Next Steps

Because several members will be absent in early June, the Committees will not meet on Thursday, 11 June for their regularly scheduled meeting. Rather, the Committees will attend the project tours during 22-25 June and the pre-proposal workshop on 7 and 8 July. The next meeting of the Committees will be on 9 July at Chelan PUD in Wenatchee. Tentative agenda items include:

- Final review of pre-proposals.
- Update on administrative costs.

Meeting notes submitted by Tracy Hillman (tracy.hillman@bioanalysts.net).

Attachment 1

2009 UPPER COLUMBIA PROCESS SCHEDULE

Tributary Fund and SRFB

Project Proposal Development, Submission, and Review

DATE	ACTIVITY/MILESTONE (MEETING/DEADLINE)
APRIL	
1 April	**SRFB/Tributary Fund Debrief of 2008; preparations for 2009**
April	SRFB/Tributary Fund cycles announced; SRFB Policy Manual available
MAY	
7 May	**SRFB/Tributary Fund Kickoff Meeting for the Region; RTT Technical criteria presentation; Citizens' Committee criteria presentation**
May	**Project Sponsors develop projects and pre-proposal materials (available from http://www.midcolumbiahcp.org/)**
JUNE	
1 June	**Pre-proposals due to Tributary Committees and to Lead Entities**
5 June	**Pre-proposals delivered to RTT members and Tributary Committee; and SRFB Panel Members (via PRISM)**
11 June	Tributary Committees' internal review of pre-proposals
15 June	Conference Call to discuss project tour logistics (RTT, LEs, Trib and UCSRB)
22-25 June	***SRFB/Trib Fund/RTT project tours*** • **22nd – Okanogan** • **23rd – Methow** • **24th – Wenatchee** • **25th – Entiat**
JULY	
7(*tentative*)-8 July (all day)	**Pre-proposal Presentation Workshop: review pre-proposals with RTT, Tributary Committee and Citizens' Committee**
9 July	Tributary Committees' final review of pre-proposals
16 July	Final comments from Tributary Committee due to project sponsors
24 July	**Final project proposals due to Tributary Committees and Lead Entities**
31 July	**Project proposals delivered to RTT and Citizens Committees**
AUGUST	
3 August	**Draft project review forms due from State Technical Review Panel to LEs and project sponsors**
11(*tentative*)-12 August	**RTT Meeting: formal project reviews and technical ranking**
19 August	**RTT ratings delivered to Lead Entities and Tributary Committees**
19-24 August	**Individual Citizen's Committee project ranking**
27 August	**Joint Citizen's Committee identifies combined ranked list**

SEPTEMBER	
1 September	**Lead Entity project applications due to SRFB and on to PRISM**
12 September	Tributary Committees' supplemental tours of selected projects (project sponsors will be notified in advance of visit)
14 September	**Final ranked list with regional funding recommendations due to SRFB; information submission questionnaire**
30 September	**Second Draft project review forms due from State Technical Review Panel to LEs and project sponsors**
OCTOBER	
8 October	Project Presentations to Tributary Committee (*if needed*)
12-16 October	Regional Presentations to SRFB Review Panel
30 October	Draft report by Review Panel to SRFB
NOVEMBER	
5 November	Tributary Committees make initial internal decisions
20 November	Final report by Review Panel to SRFB
DECEMBER	
10-11 December	**SRFB makes formal decisions**
December	Tributary Committees make supplemental decisions

Wells, Rocky Reach, and Rock Island HCP Tributary Committees Meeting Notes 9 July 2009

Members Present: Dale Bambrick (NOAA Fisheries), Dennis Beich (WDFW), Chris Fisher (Colville Tribes), Tom Kahler (Douglas PUD), David Morgan (USFWS), Bob Rose (Yakama Nation), Keith Truscott (Chelan PUD), and Tracy Hillman (Committees Chair).

Others Present: Becky Gallaher (HCP Project Coordinator), Casey Baldwin (WDFW), and Joe Miller (Chelan PUD). Ben Lenz (Grant PUD) and Denny Rohr (PRCC Habitat Subcommittee facilitator) joined the last 1.5 hours of the meeting.

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans Tributary Committees met at the Chelan PUD Auditorium in Wenatchee, Washington, on Thursday, 9 July 2009 from 8:30 am to 1:30 pm.

I. Review and Adopt Agenda

Tracy Hillman welcomed everyone to the meeting, and the Committees adopted the proposed agenda with the following changes:

- Sponsors of the *Entiat River Tyee Ranch Conservation Easement Pre-Acquisition* (Chelan-Douglas Land Trust) and the *Spatial Distribution, Hybridization, and Threat Abatement in Sympatric Bull Trout and Brook Trout Populations in the Methow Subbasin* (Wild Fish Conservancy) projects removed their pre-proposals from Tributary Committees consideration.
- The *Lower Wenatchee River CMZ 6 Side Channel* project was added to the list of pre-proposals to be reviewed by the Tributary Committees.

II. Review and Approval of Meeting Minutes

The Committees reviewed and approved the 14 May meeting notes.

III. Monthly Update on Ongoing Projects

Becky Gallaher gave an update on funded projects.

- For the *Entiat Instream Structures Engineering and Permitting* project, Cascadia Conservation District completed the Knapp-Wham single wing dam, which helps divert water into the Knapp-Wham irrigation ditch. This is part of the Knapp-Wham, Hannan-Detwiler ditch consolidation project that will eliminate the Hannan-Detwiler ditch.
- Under the *WRIA 45/46 Riparian Restoration* project, Cascadia Conservation District has completed the project and will soon submit the final report.

- Under the *Entiat PUD Canal System Conversion*, all landowner agreements have been signed and the cultural resource consultation was completed for test well drilling and piping. A design memorandum, which recommended two test wells was prepared by the geotechnical consultant, Ground Affects, Inc. The two test wells were drilled on 2 June on the Asher and Milne properties. The 12-inch casing for the first test well is currently at a depth of 34 feet.
- For the *Keystone Canyon Habitat Restoration* project, the Yakama Nation is developing an amended design that includes many of the features in the original design. The amended design will be provided to the Committees for review. Cascadia Conservation District anticipates construction to being in summer 2010.
- Under the *Okanagan River Restoration Initiative*, the old dyke was removed and the setback dyke was constructed, a hiking and bike path was paved, and fencing and gates were installed along the project boundary and private lands. Channel construction is scheduled to being in late June and end in August. Pre-treatment monitoring has occurred and environmental and water quality monitoring will occur throughout the construction period. Tracy Hillman reminded the Committees that they will visit the site in October.
- Under the *Riparian Regeneration and Restoration Initiative*, so far the Methow Conservancy has placed cages around 150 young trees.
- Cascadia Conservation District has secured all the necessary permits for the *Below the Bridge* project on the Entiat River.

IV. Review of Small Projects Proposal

The Committees reviewed a Small Projects Program application from the Chelan County Natural Resource Department and the Chelan-Douglas Land Trust titled *Sleepy Hollow Reserve Protection Feasibility Assessment*.

Sleepy Hollow Reserve Protection Feasibility Assessment

The Committees reviewed a Small Projects Program application from the Chelan County Natural Resource Department and Chelan-Douglas Land Trust titled *Sleepy Hollow Reserve Protection Feasibility Assessment*. The purpose of the project is to evaluate about 240 acres of land on the north side of the lower Wenatchee River, downstream from the Sleepy Hollow Bridge, for various protection opportunities, including fee-simple acquisition, conservation easements, conservation buyers, landowner agreements, and regulatory measures. The sponsors will hire a consultant to develop the work products. The total cost of the project is $25,000. The sponsor requested $20,000 from HCP Tributary Funds.

The Committees first reviewed this proposal in July 2008. After requesting additional information from the sponsors, and reviewing the responses to the additional information requests, the Committees in September 2008 noted that this was an appropriate project for the sponsors and that it could serve as a pilot project; however, it was not clear if landowners potentially affected by the proposed plan agreed to the conservation plan concept. Therefore, the Committees asked the sponsors to secure signed landowner agreement forms from affected landowners in the proposed project area. In June 2009, the sponsors submitted two signed landowner agreement forms.

After reviewing the original proposal, responses to additional information requests, and the signed landowner agreement forms, ***the Rock Island Tributary Committees elected to fund the project with the following conditions:***

1. The funds from this project are only to be used to identify and evaluate conservation alternatives and to develop a conservation plan. The funds are not to be used to support landowner outreach and ownership verification.
2. No expenses can be billed to this project until the landowners have agreed to participate in the process (requires signed landowner willingness forms).
3. The sponsors must identify on a map the locations of landowners who agree to participate in the process (e.g., identify property owners on the aerial photo attached with the proposal).

V. General Salmon Habitat Program Pre-Proposals

The Committees received 16 pre-proposals submitted under the General Salmon Habitat Program. The Wild Fish Conservancy removed their pre-proposal and Chelan County Natural Resource Department added a project. The Committees reviewed 16 pre-proposals.

The Committees reviewed each pre-proposal and selected those that they believe warranted a full proposal. Projects that the Committees dismissed were either inconsistent with the intent of the Tributary Fund or did not have strong technical merit. In addition, the Committees assigned pre-proposals to one of three preliminary tiers: Tier 1—fundable, Tier 2—fundable with questions, and Tier 3—do not fund. It is important to note that these are ratings of pre-proposals and do not reflect ratings of full proposals. The Committees directed Tracy to notify sponsors with appropriate projects to submit a full proposal, with a discussion of the questions/comments identified for each pre-proposal listed below.

Nason Creek Upper White Pine Reconnection *(Tier 2)*

The Committees recommend that the sponsor (Chelan County Natural Resource Department) consider the following comments/suggestions as they develop the full proposal:

- The sponsor needs to describe how they intend to protect the PUD power poles and identify the costs associated with protection.

Nason Creek LWP Floodplain Reconnection Assessment *(Tier 2)*

The Committees recommend that the sponsor (Chelan County Natural Resource Department) consider the following comments/suggestions as they develop the full proposal:

- The Committees strongly recommend that the sponsor approach the Bureau of Reclamation to complete the alternative analysis and conceptual design.
- The Committees would be interested in reviewing a proposal concerning landowner outreach.

White River Nason View Acquisition *(Tier 2)*

The Committees recommend that the sponsor (Chelan-Douglas Land Trust) consider the following comments/suggestions as they develop the full proposal:

- The sponsor needs to make it clear in the final proposal if the total cost of the acquisition includes the value of timber on the property.
- The sponsor should provide a map showing the ownership of the valley bottom from the Tall Timber Ranch to the mouth of the White River.

White River Tall Timber Ranch Conservation Easement *(Tier 2)*

The Committees recommend that the sponsor (Chelan-Douglas Land Trust) consider the following comments/suggestions as they develop the full proposal:

- The sponsor needs to explain why this property is considerably more expensive per acre than the Whiter River Nason View Acquisition property.
- The sponsor should also provide a map showing the ownership of the valley bottom from the Tall Timber Ranch to the mouth of the White River.

Peshastin Creek Reconnection Alternatives Analysis (RM 3.9) *(Tier 1)*

The Committees have no specific comments/suggestions on this project. However, they hope that the sponsor (Chelan County Natural Resource Department) will consider the comments/suggestions offered by the RTT and Committees members during the site visit and presentation.

Lower Wenatchee Instream Flow Enhancement Project *(Tier 2)*

The Committees recommend that the sponsor (Washington Rivers Conservancy) consider the following comments/suggestions as they develop the full proposal:

- The sponsor needs to describe in more detail the involvement of the City of Wenatchee in this project.
- The Committees recommend that the sponsor more completely nail down the budget for this project (e.g., specific contributions from the City of Wenatchee and other entities).
- The sponsor should describe how much it will cost annually for pumping and who will pay the pumping costs.
- The Committees recommend including an implementation timeline for the project once necessary funds are secured. Also, because cost shares are the majority of the funding for this project, the Committees would like more details on the anticipated timing of receiving the cost shares.

Habitat Farming Enterprise Program Pilot Project *(Tier 3)*

The Committees recommend that this project, sponsored by the Initiative for Rural Innovation and Stewardship (IRIS), should not be submitted as a full proposal to the Tributary Committees for the following reasons:

- This project has a relatively low level of certainty of success.
- The sponsor should build on the existing Conservation Reserve Enhancement Program so that it works better for irrigated agriculture and orchards, and work with WSU on cost share.

Entiat River Foreman Floodplain Reconnection *(Tier 2)*

The Committees recommend that the sponsor (Chelan County Natural Resource Department) consider the following comments/suggestions as they develop the full proposal:

- The Committees recommend that the sponsor revise the project to include the approach suggested by Joe Lange during the site visit (i.e., expand the project upstream by removing the small orchard near the stream, extending and building up the road to serve as a dyke, and reconnect the floodplain to the channel at a point further upstream). If this cannot be accomplished in the near term, the sponsor should describe how the current proposed approach will not preclude expanding the project in the future.

Entiat River Troy Acquisition *(Tier 2)*

The Committees recommend that the sponsor (Chelan-Douglas Land Trust) consider the following comments/suggestions as they develop the full proposal:

- The Committees would like to know if it is possible to purchase only the bottom lands (riparian area on the west side of the road).

Entiat National Fish Hatchery Habitat Improvement Project *(Tier 2)*

The Committees recommend that the sponsors (Cascadia Conservation District and USFWS Mid-Columbia River Fishery Resource Office) consider the following comments/suggestions as they develop the full proposal:

- The sponsors need to describe how water use on the site will change as a result of this project.
- The sponsors should describe the intended function of the log jams near the downstream end of the project area (i.e., the function of the revetment-type jams).
- The Committees recommend that the proposed culverts be replaced with fords. If this is not possible, please explain why (see RTT 7-8 July notes for more details).

Upper Methow Riparian Protection II (Tawlks Property) *(Tier 1)*

The Committees have no specific comments/suggestions on this project. However, they hope that the sponsor (Methow Conservancy) will consider the comments/suggestions offered by the RTT and Committees members during the site visit and presentation.

Upper Methow Riparian Protection III (Hardy Property) *(Tier 1)*

The Committees have no specific comments/suggestions on this project. However, they hope that the sponsor (Methow Conservancy) will consider the comments/suggestions offered by the RTT and Committees members during the site visit and presentation.

Lower Libby Creek Riparian Acquisition *(Tier 2)*

The Committees recommend that the sponsor (Washington Department of Fish and Wildlife) consider the following comments/suggestions as they develop the full proposal:

- The sponsor needs to describe any future plans for the site to be used as a hatchery acclimation site.
- The sponsor should describe the connection of this property to other protected or public lands in the area (provide a map showing the ownership of lands in the Libby Creek drainage).

Driscoll Island Restoration, Phase I *(Tier 2)*

The Committees recommend that the sponsor (Washington Department of Fish and Wildlife) consider the following comments/suggestions as they develop the full proposal:

- The sponsor should include the engineering report, or at least the results of the engineering report in the full proposal.
- The sponsor should consider reconfiguring the proposed weir in the cross channel to also serve as a means to access the island. This would allow for the complete removal of the existing ford.

McLoughlin Falls Conservation *(Tier 2)*

The Committees recommend that the sponsor (Washington Department of Fish and Wildlife) consider the following comments/suggestions as they develop the full proposal:

- The sponsor needs to identify in the full proposal which properties are part of the proposal (with signed landowner agreement forms) and the specific costs of the acquisitions or conservation easements for each property.
- The sponsor should describe the criteria of the easements and the fate (intended use) of the lands after purchase.
- The sponsor needs to identify in the full proposal the amount of uplands included on each of the properties.
- The Committees recommend that the sponsor include a map showing the specific properties that will be included in the full proposal. The sponsor should also identify existing landowners on the map.

Lower Wenatchee River CMZ 6 Side Channel *(Tier 1)*

The Committees have no specific comments/suggestions on this project. However, they hope that the sponsor (Chelan County Natural Resource Department) will consider the comments/suggestions offered by the RTT and Committees members during the site visit and presentation.

VI. Information Updates

The following information updates were provided during the meeting.

1. Approved Payment Requests in April:

   Rock Island Plan Species Account:

   - $845.79 to Chelan County PUD for second-quarter project coordination and administration.
   - $100.00 to LeMaster and Daniels for second-quarter financial management.

   Rocky Reach Plan Species Account:

   - $845.79 to Chelan County PUD for second-quarter project coordination and administration.
   - $100.00 to LeMaster and Daniels for second-quarter financial management.
   - $4,024.36 to Cascadian Conservation District for securing permits and administration costs on the Entiat Instream Structure project.

   Wells Plan Species Account:

   - $865.54 to Chelan County PUD for second-quarter project coordination and administration.
   - $66,295.31 to the Okanagan Nation Alliance for dyke removal and setback, paving the walking and bike path, and installation of fencing and gates under the Okanagan River Restoration—Phase IV Project.

2. Tracy Hillman reported that he added Section 4.4 (Administrative and Support Costs) to the Policies and Procedures for Funding Projects document. This section includes the

information that Joe Miller and Becky Gallaher compiled for the Committees for the May meeting. The Committees reviewed and accepted the updated information added to the Policies and Procedures document. Tracy also reported that he updated the Tributary Committee Operating Procedures. He changed Dale Bambrick's affiliation from NOAA to National Marine Fisheries Service. Casey Baldwin noted that the Chelan County PUD representative should be changed from Chuck Peven to Keith Truscott. The Committees agreed to the changes to the Operating Procedures document.

3. Tracy Hillman reported that the Salmon Recovery Funding Board allotted $18 million for projects for the 2009 grant round. The Upper Columbia will receive about 10.8% ($1,953,000) of the funds. Puget Sound will receive about 42% of the funds.

4. David Morgan provided an update on the large woody debris (LWD) meeting he attended in May hosted by Chelan County Natural Resource Department. The objectives of the meeting in May were to discuss expected outcomes and goals for the LWD Forum, identify issues to meet desired outcomes and goals, develop an agenda and speaker list for community meetings, and discuss next steps beyond community meetings. David noted that Chelan County seemed to agree with the participants at the meeting in Leavenworth that the upcoming forum should focus on Lake Chelan, since a Lake Chelan interest group (Lake Chelan Sailing Association) was the only group to voice concern over the use of LWD in restoration projects. David said that another important outcome of the meeting was to focus on river safety in general. That is, the proposed upcoming forum should discuss all hazards, including bridge piers, inexperienced users, and other risks, rather than focus only on LWD.

   Following the Tributary Committee meeting, David forwarded an email from Chelan County NRD that identified the next steps for the Lake Chelan LWD meeting. As identified in the email, here are the next steps:

   - Regulatory agencies will convene to discuss their various permitting policies and requirements and look for opportunities for coordination. Lead: Anne Knapp, Office of Regulatory Assistance. The Corp of Engineers is currently reviewing available studies regarding effects of overwater structures and appropriate forms of mitigation as they apply to Lake Chelan.

   - An inventory of LWD structures with potential placement and construction issues will be conducted and surveyed in the next few weeks. Lead: Ken Bevis, Washington Department of Fish and Wildlife (WDFW) and Debbie Knaub, Corp of Engineers. WDFW, Corps of Engineers, and Washington Department of Ecology conducted site reviews at LWD sites of concern on Lake Chelan and will determine what can be done at these sites to alleviate concerns.

   - A panel of experts will be convened for a community forum on the role of LWD in the ecology of Lake Chelan. Lead: Mike Kaputa, CCNRD. Chelan County is working to convene the forum, which will likely occur in September or October.

5. Dennis Beich asked if the Committees have opportunities to review/revise the Policies and Procedures document. Tracy Hillman indicated that the Committees conduct an annual review of the document (usually in January), but because it is a living document, it can be reviewed/revised at any time by the Committees. That said, Dennis indicated that he would like the Committees to review the language in the document that indicates that projects funded by the Tributary Committees cannot be linked to, or used to support hatchery supplementation facilities and systems. Tracy indicated that he would include this as an agenda item for the August meeting.

VII. Cost Share Opportunities with Priest Rapids Coordinating Committee Habitat Subcommittee

Becky Gallaher indicated that a few sponsors (e.g., Chelan-Douglas Land Trust) had asked about how they could apply for funds through the Priest Rapids Coordinating Committee (PRCC) Habitat Subcommittee. Although the process/application for seeking funds from the PRCC Habitat Subcommittee is simple, Denny Rohr indicated that he would send to interested groups the PRCC Habitat Funds Project Specifications Sheet, which is a simple one-two page application. In addition, sponsors can find the Specifications Sheet online at: http://www.gcpud.org/prcc/PRCC%20Habitat.htm.

VIII. Next Steps

Tracy Hillman noted that full proposals are due to the Tributary Committees and Lead Entities on Friday, 24 July (see Attachment 1). Becky Gallaher will let members know when the proposals are posted on the website. Tracy also reported that the RTT will review and score full proposals on 11 and/or 12 August. RTT evaluations will be available to the Committees before the August meeting.

The next meeting of the Committees will be on Thursday, 20 August at Chelan PUD in Wenatchee. Tentative agenda items include:

- Initial review of full proposals.
- Review ineligible projects and elements (Section 4.3) in the Policies and Procedures document.

Meeting notes submitted by Tracy Hillman (tracy.hillman@bioanalysts.net).

Attachment 1

2009 UPPER COLUMBIA PROCESS SCHEDULE

Tributary Fund and SRFB

Project Proposal Development, Submission, and Review

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JULY	
7(*tentative*)-8 July (all day)	**Pre-proposal Presentation Workshop: review pre-proposals with RTT, Tributary Committee and Citizens' Committee**
9 July	Tributary Committees' final review of pre-proposals
16 July	Final comments from Tributary Committee due to project sponsors
24 July	**Final project proposals due to Tributary Committees and Lead Entities**
31 July	**Project proposals delivered to RTT and Citizens Committees**
AUGUST	
3 August	**Draft project review forms due from State Technical Review Panel to LEs and project sponsors**
11(*tentative*)-12 August	**RTT Meeting: formal project reviews and technical ranking**
19 August	**RTT ratings delivered to Lead Entities and Tributary Committees**
19-24 August	**Individual Citizen's Committee project ranking**
27 August	**Joint Citizen's Committee identifies combined ranked list**

SEPTEMBER	
1 September	**Lead Entity project applications due to SRFB and on to PRISM**
12 September	Tributary Committees' supplemental tours of selected projects (project sponsors will be notified in advance of visit)
14 September	**Final ranked list with regional funding recommendations due to SRFB; information submission questionnaire**
30 September	**Second Draft project review forms due from State Technical Review Panel to LEs and project sponsors**
OCTOBER	
8 October	Project Presentations to Tributary Committee (*if needed*)
12-16 October	Regional Presentations to SRFB Review Panel
30 October	Draft report by Review Panel to SRFB
NOVEMBER	
5 November	Tributary Committees make initial internal decisions
20 November	Final report by Review Panel to SRFB
DECEMBER	
10-11 December	**SRFB makes formal decisions**
December	Tributary Committees make supplemental decisions

Wells, Rocky Reach, and Rock Island HCP Tributary Committees Meeting Notes 20 August 2009

Members Present: Dale Bambrick (NOAA Fisheries), Dennis Beich (WDFW), Chris Fisher (Colville Tribes), Tom Kahler (Douglas PUD), David Morgan (USFWS), Lee Carlson (Yakama Nation), Keith Truscott (Chelan PUD), and Tracy Hillman (Committees Chair).

Others Present: Becky Gallaher (HCP Project Coordinator), Casey Baldwin (WDFW), Joe Miller (Chelan PUD), and Greg Mackey (Douglas PUD). Ben Lenz (Grant PUD) joined the last hour of the meeting. Denny Rohr (PRCC Habitat Subcommittee facilitator) joined the last half hour of the meeting.

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans Tributary Committees met at the Chelan PUD Auditorium in Wenatchee, Washington, on Thursday, 20 August 2009 from 9:00 am to 12:30 pm.

I. Review and Adopt Agenda

Tracy Hillman welcomed everyone to the meeting, and the Committees adopted the proposed agenda with the following changes:

- Addition of two information updates from Keith Truscott.
- Annual review of the Tributary Committees Chair.

II. Review and Approval of Meeting Minutes

The Committees reviewed and approved the 9 July meeting notes with edits offered by Keith Truscott, Tom Kahler, and Casey Baldwin.

III. Monthly Update on Ongoing Projects

Becky Gallaher gave an update on funded projects.

- Cascadia Conservation District has acquired 42 trees/logs for the *Below the Bridge* project. They secured 24 trees that were 25 feet in length and had rootwads and 18 logs that were 33 feet in length and had no rootwads.
- Under the *Entiat PUD Canal System Conversion* Project, bedrock for test well #1 (Asher property) was encountered at a depth of 63 feet. Drilling proceeded to 65 feet. Ground Affects, Inc. developed a screen design and Chelan PUD is working with Bach Drilling and Johnson Screen on approving the screen-shop drawing. The PUD anticipates that the screen will be ordered and installed before the end of August. Drilling will begin on test well #2 (Milne property) in September, following the pump test of test well #1.

- Under the *Riparian Regeneration and Restoration Initiative*, the Methow Conservancy recently completed caging 120 seedlings. An additional 15-20 will be caged before the end of the month. In addition, WDFW has signed a landowner willingness form and the sponsor will begin caging seedlings within the Methow Wildlife Area in late September.
- Under the *Okanagan River Restoration Initiative*, the old dyke was removed and the setback dyke was constructed and spawning gravel was added to the channel. Work at McIntyre Dam is progressing and fish passage should be available in September.
- Construction under the *Cashmere Pond Off-Channel Habitat Project* has begun. The pond has been dewatered and construction crews are digging it deeper (below the groundwater level). In addition, the outlet channel has been constructed, but is shorter than described in the original proposal. Also, a rock sill was constructed downstream from the pond to prevent channel migration. Becky indicated that she will visit the project site and report back to the Tributary Committees in September.

IV. General Salmon Habitat Program Proposals

The Committees received 14 proposals submitted under the General Salmon Habitat Program. Committee members evaluated each proposal and assigned them to one of three preliminary tiers: Tier 1—fundable, Tier 2—fundable with questions, and Tier 3—do not fund. It is important to note that these are "preliminary ratings" and ratings may change after further discussion and evaluation. The following table summarizes the preliminary rankings of the proposals (these ratings may change after further discussion).

Proposed Project	Preliminary Rankings			Comments
	Tier 1	Tier 2	Tier 3	
Nason Creek UWP Floodplain Reconnection Levee Breach	X			Keith Truscott will provide updates on discussions between the sponsor and the PUD. The PUD requires access to the power poles and that the poles be protected.
Nason Creek LWP Floodplain Reconnection Assessment			X	Bureau of Reclamation should take the lead on the assessment.
Lower Wenatchee River CMZ 6 Side Channel			X	The project will likely have low benefits and will destroy existing riparian vegetation.
White River Nason View Acquisition	X			The White River is an important spawning area for sockeye salmon. Not clear on the level of risk of development on the property. Not sure how many homes could be built on the property.
White River Tall Timber Ranch Conservation Easement	X			The White River is an important spawning area for sockeye salmon. Would it be more appropriate to sell the land rather than establish conservation easements?
Peshastin Creek Reconnection Alternatives Analysis			X	A transportation plan will be developed for Highway 97. This plan will include restoration/conservation measures.

Proposed Project	Preliminary Rankings			Comments
	Tier 1	Tier 2	Tier 3	
				Thus, this project appears premature. In addition, there are about 13 landowners that would need to agree to the proposed project.
Lower Wenatchee Instream Flow Enhancement Project	X			The funding status is still pending for some funding entities. This project may serve as a pilot project for other streamflow restoration actions.
Foreman Floodplain Reconnection Side Channel Construction	X			This is an appropriate action for this section of the Entiat River.
Entiat River Troy Acquisition		X		Need to find out if the upland can be sold and the money from the sale returned to the Tributary Committees. Identify the number of home sites on the floodplain.
Entiat Nation Fish Hatchery Habitat Improvement Project		X		Additional information from hydraulic modeling should be available soon. Recommend that the sponsor provide a presentation after the modeling work is complete.
Upper Methow II (Tawlks) Riparian Protection	X			No comments
Upper Methow III (Hardy) Riparian Protection			X	Concern about maintaining a trail for small, motorized vehicles. Also, the conservation easement protects a relatively small portion of the floodplain and shoreline.
Driscoll Island Restoration Phase I	X			This project could have a relatively large benefit to summer Chinook by providing spawning habitat. Benefits to steelhead will probably be minor.
McLoughlin Falls Conservation		X		This project appears premature. Chris Fisher will provide the Committees with additional information on the cost of the Pariseau property. WDFW will provide appraised cost on the Wilson property.

The Committees directed Tracy Hillman to contact the U.S. Fish and Wildlife Service to schedule a time for a presentation on the Entiat National Fish Hatchery Habitat Improvement Project. The Committees requested no other presentations from sponsors. However, the Committees asked Tracy to contact the Chelan-Douglas Land Trust to find out if the upland portion of the Entiat River Troy Acquisition can be sold and the money from the sale be returned to the Committees. In addition, the Land Trust should identify the number of potential home sites on the floodplain.

Members of the Committees will review the proposals in more detail during the November and December meetings.

V. Information Updates

The following information updates were provided during the meeting.

1. Approved Payment Requests in July and August:

   Rock Island Plan Species Account:

   - $228.21 to Cascadia Conservation District for preparing the final report on the WRIA 45/46 Riparian Restoration Project.

   Rocky Reach Plan Species Account:

   - $8,850.00 to Cascadia Conservation District for the purchase of 42 logs for the Below the Bridge Project.
   - $28,641.82 to Cascadia Conservation District for engineering and permitting costs on the Entiat Instream Structure Engineering Project.
   - The following payment request was denied: $745.84 to Cascadia Conservation District for monitoring and rental of heavy equipment for the Entiat PUD Canal Log-Boom Installation Project. The sponsor was unable to realign the boom because they did not secure appropriate permits. Keith Truscott reported that the crews identified steelhead spawning in the area of the log boom.

2. Becky Gallaher reported that she has requested bids from three accounting firms to complete the financial review. Bids are due on 13 September. The lowest bidder will be selected to conduct the review.

3. Tracy Hillman reported that he received a letter from William Dobbins, General Manager of Douglas PUD, indicating that Shane Bickford will replace Rick Klinge as the Douglas PUD alternate representative for the Wells HCP Tributary Committee. This is because Rick's health does not currently allow him to participate on the Committee. For those interested in tracking Rick's progress, please see the following site: http://tinmanofwenatchee.blogspot.com

4. Tracy Hillman noted that the U.S. Fish and Wildlife Service is requesting proposals for fiscal year 2010 cooperative restoration and recovery projects in Washington State. The Service provides technical assistance and funding for restoration and recovery projects through the following programs: (1) Puget Sound Coastal Program, (2) Partners for Fish and Wildlife Program, (3) Chehalis Fisheries Restoration Program, and (4) the Recovery Program. Proposals seeking funds from these programs are due on 11 September (for more information on these programs contact Judy Delavergne).

   The Service has two other national restoration programs: (1) National Fish Passage Program and (2) Western Native Trout Initiative. The former is a voluntary program to restore native fish and other aquatic species to sustainable levels by reconnecting habitat that has been fragmented by man-made barriers. The latter is a non-regulatory, science-based, cooperative program to fund conservation actions for western native trout. Proposals to these programs are due on 18 September (for more information on these programs contact Kate Terrell).

5. Tracy Hillman reported that Bonneville Power Administration (BPA) is preparing an Environmental Impact Statement that analyzes the reintroduction of coho salmon into mid-Columbia tributaries (Wenatchee and Methow basins) in Chelan and Okanogan counties. As BPA initiates the process for assessing the potential environmental impacts of the project, they have scheduled two public meetings: (1) Thursday, 20 August, 6:30

pm to 9:00 pm at the Chelan Fire District 3 Community Center in Leavenworth and (2) Friday, 21 August, 6:30 pm to 9:00 pm at the Methow Valley Community Center in Twisp. Dennis Beich noted that WDFW intends to provide written comments.

6. After two years of service with the Committees, Tracy Hillman asked the members for feedback on how he could better serve them as their Chairperson. Tracy noted that a formal review will be conducted next year, after three years of service. Members requested that Tracy (1) more freely offer technical information on projects and monitoring and (2) provide occasional updates on monitoring activities in the region. With regard to the first suggestion, Tracy noted that his contracts with the PUDs do not allow him to offer technical advice and opinions. The Committees agreed that Tracy should provide technical advice and information provided he does not attempt to persuade members in how to vote on projects. Thus, he can provide technical advice and information without compromising his independence. Members indicated that they would let Tracy know when he crossed the line to advocacy. Finally, Tracy indicated that he would call upon Casey Baldwin to provide information updates from the Upper Columbia Recovery Board.
7. Keith Truscott shared with the Committees that he received a letter from the Upper Columbia Salmon Recovery Board and Regional Technical Team requesting money to help fund the upcoming analysis workshops (one in November and others in spring). The purpose of the workshops is to provide information and data to assess recovery plan progress, and to interpret information gathered from monitoring and research, assess deviations from targets or anticipated results, and recommend changes in policies or management actions where appropriate. Keith noted that Chelan PUD will not be contributing financially to the workshop, but noted that if the Committees so desire, they could contribute money from the Rock Island and Rocky Reach administration fund. The Committees elected not to contribute money from the administration fund. Members noted that funds for the workshop should come from each agency, but not from the Committees.
8. Keith Truscott reported that flows last December pushed large sediments (cobbles and boulders) down Peshastin Creek and into the Wenatchee River. The deposition of these materials, which resulted from flood flows washing out the highway during the winter of 2008-2009, has now migrated downstream toward the Dryden Dam right-bank fish ladder. The concern is that the deposition of large sediments could block fish passage along the right bank. Keith showed photographs of the current location of the rock bar. Prior to the meeting, Keith met with Dale Bambrick at the site and discussed possible solutions. The current recommendation is to cut a notch in the bar to provide fish passage. The material removed from the bar would be redistributed in the channel. This will allow the river to rework the materials during high flows.

VI. Review of Ineligible Projects and Elements (in the Policies and Procedures Document)

Dennis Beich requested a review of the language in the Policies and Procedures document that states that projects funded by the Tributary Committees cannot be linked to, or used to support hatchery supplementation facilities and systems. Section 4.3 in the Policies and Procedures document states that there are specific projects that are ineligible for funding consideration. The following elements apply to hatchery facilities and systems:

- Purchase or construction of buildings or land not essential to the functions or operation and maintenance of the project site.
- Net pens, artificial rearing facilities, remote site incubation systems and supplementation.

Dennis suggested that it should be appropriate for the Tributary Committees to provide funds for the purchase of land in which part of the acquired land could be used in the future for hatchery production. Dennis noted, for example, that the Tributary Committees could provide funds for the purchase of the 28-acre Libby Creek Acquisition property. The Hatchery Committee could then fund the construction of production facilities on 5 acres of the property. According to Dennis, this would not only protect high-quality habitat on lower Libby Creek, but would also help increase production of salmon and/or steelhead in the Methow Basin.

Several members noted that it should be the responsibility of the Hatchery Committees to find the land, provide funds for the purchase of the land, and to fund the construction of the production facilities. It was also noted that lands acquired with Tributary Funds cannot be used for mitigation projects or activities (see third bullet under Section 4.3 in the Policies and Procedures document). For example, properties purchased with Tributary Funds cannot be used to support Action Agency (Bonneville Power Administration, Army Corp of Engineers, and Bureau of Reclamation) mitigation needs. That is, BPA-funded hatchery facilities cannot be placed on lands acquired with Tributary funds.

Tom Kahler suggested that perhaps the language in Section 4.3 does not necessarily preclude the Committees from providing funds for purchase of lands in which some portion of the land could be used for construction of HCP production facilities; but it certainly precludes the use of Tributary Committee funds for the purchase or construction of production facilities. Some members suggested that the Tributary Committees could provide funds for the purchase of the property, but the Hatchery Committees would have to reimburse the Tributary Committees if the land was used for hatchery production.

Tracy Hillman stated that Section 3.8 (Management Guidelines for Conservation Easements/Acquired Lands) in the Policies and Procedures document describes the intended management of the property. The language does not specifically state that hatchery facilities cannot be constructed on acquired properties, but does identify limits on the use of the properties. The Committees directed Tracy to draft for consideration by the Committees some language under Section 3.8 that indicates that acquired lands may be used for HCP hatchery production systems insofar as the systems are consistent with the other management elements identified in Section 3.8. That is, if the construction of a hatchery system on a property requires bank armoring, and will reduce over-bank flows and decrease LWD recruitment and retention, then the facility cannot be constructed on the property.

VII. Next Steps

Tracy Hillman noted that the next meeting will be on Thursday, 10 September at Chelan PUD in Wenatchee. At that time, if modeling results are available, the Committees will hear a presentation from the U.S. Fish and Wildlife Service on the Entiat National Fish Hatchery Habitat Improvement Project. On 7 and 8 October, the Committees will visit the Okanagan River Restoration Initiative project in Canada. Tracy also shared with the Committees the SRFB/TC schedule for the rest of the year (see Attachment 1).

Meeting notes submitted by Tracy Hillman (tracy.hillman@bioanalysts.net).

Attachment 1

2009 UPPER COLUMBIA PROCESS SCHEDULE

Tributary Fund and SRFB

Project Proposal Development, Submission, and Review

DATE	ACTIVITY/MILESTONE (MEETING/DEADLINE)
APRIL	
1 April	**SRFB/Tributary Fund Debrief of 2008; preparations for 2009**
April	SRFB/Tributary Fund cycles announced; SRFB Policy Manual available
MAY	
7 May	**SRFB/Tributary Fund Kickoff Meeting for the Region; RTT Technical criteria presentation; Citizens' Committee criteria presentation**
May	**Project Sponsors develop projects and pre-proposal materials (available from http://www.midcolumbiahcp.org/)**
JUNE	
1 June	**Pre-proposals due to Tributary Committees and to Lead Entities**
5 June	**Pre-proposals delivered to RTT members and Tributary Committee; and SRFB Panel Members (via PRISM)**
11 June	Tributary Committees' internal review of pre-proposals
15 June	Conference Call to discuss project tour logistics (RTT, LEs, Trib and UCSRB)
22-25 June	***SRFB/Trib Fund/RTT project tours*** • **22nd – Okanogan** • **23rd – Methow** • **24th – Wenatchee** • **25th – Entiat**
JULY	
7(*tentative*)-8 July (all day)	**Pre-proposal Presentation Workshop: review pre-proposals with RTT, Tributary Committee and Citizens' Committee**
9 July	Tributary Committees' final review of pre-proposals
16 July	Final comments from Tributary Committee due to project sponsors
24 July	**Final project proposals due to Tributary Committees and Lead Entities**
31 July	**Project proposals delivered to RTT and Citizens Committees**
AUGUST	
3 August	**Draft project review forms due from State Technical Review Panel to LEs and project sponsors**
11(*tentative*)-12 August	**RTT Meeting: formal project reviews and technical ranking**
19 August	**RTT ratings delivered to Lead Entities and Tributary Committees**
19-24 August	**Individual Citizen's Committee project ranking**
27 August	**Joint Citizen's Committee identifies combined ranked list**

SEPTEMBER	
1 September	**Lead Entity project applications due to SRFB and on to PRISM**
12 September	Tributary Committees' supplemental tours of selected projects (project sponsors will be notified in advance of visit)
14 September	**Final ranked list with regional funding recommendations due to SRFB; information submission questionnaire**
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OCTOBER	
8 October	Project Presentations to Tributary Committee (*if needed*)
12-16 October	Regional Presentations to SRFB Review Panel
30 October	Draft report by Review Panel to SRFB
NOVEMBER	
5 November	Tributary Committees make initial internal decisions
20 November	Final report by Review Panel to SRFB
DECEMBER	
10-11 December	**SRFB makes formal decisions**
December	Tributary Committees make supplemental decisions

Wells, Rocky Reach, and Rock Island HCP Tributary Committees Meeting Notes 5 November 2009

Members Present: Dale Bambrick (NOAA Fisheries), Chris Fisher (Colville Tribes), Tom Kahler (Douglas PUD), David Morgan (USFWS), Lee Carlson (Yakama Nation), Keith Truscott (Chelan PUD), and Tracy Hillman (Committees Chair).

Members Absent: Dennis Beich[1] (WDFW).

Others Present: Becky Gallaher (HCP Project Coordinator). Robes Parrish (USFWS) joined the meeting for the fourth agenda item (Entiat National Fish Hatchery Habitat Improvement Project presentation).

The Wells, Rocky Reach, and Rock Island Hydroelectric Projects Habitat Conservation Plans Tributary Committees met at the Chelan PUD Service Building Conference Room in Wenatchee, Washington, on Thursday, 5 November 2009 from 9:00 am to 12:35 pm.

I. Review and Adopt Agenda

Tracy Hillman welcomed everyone to the meeting, and the Committees adopted the proposed agenda with the following additions:

- Information updates from Dale Bambrick, David Morgan, and Chris Fisher.

II. Review and Approval of Meeting Minutes

The Committees reviewed and approved the 20 August meeting notes with edits offered by Keith Truscott and Tom Kahler.

III. Monthly Update on Ongoing Projects

Becky Gallaher gave an update on funded projects.

- For the *Below the Bridge* project, Cascadia Conservation District hired Award Construction out of Ferndale, WA, to construct the instream structures, ELJs, and diversion.
- Under the *Entiat PUD Canal System Conversion* project, drilling of Test Well #1 was completed on 16 October. The pump test yielded a maximum production rate of 62.5 gallons per minute (gpm). This falls short of the 73 gpm goal for this well. Based on these results, the engineer recommended drilling two additional test wells. Drilling on Test Well #2 began on 4 November.

[1] Dennis was unable to join the meeting. He did, however, provide his vote on decision items following the meeting.

- Under the *Riparian Regeneration and Restoration Initiative*, the Methow Conservancy has caged 577 seedlings on 12 properties. The Sponsor requested a time extension beyond the original project termination date of 31 December 2009. The Conservancy asked the Wells Committee to extend the date to 31 October 2010. This will allow them to continue to protect seedlings in 2010. ***The Wells Tributary Committee agreed to extend the termination date to 31 October 2010.***
- Under the *Twisp River Riparian Protection* project, the Pampanin and Spier Conservation Easements will close on 18 November.
- The *Poorman Creek Barrier Removal* project is complete. The Methow Salmon Recovery Foundation will be submitting a final report to the Wells Tributary Committee soon. Chris Fisher asked that the final report include photos showing the channel roughness inside the culvert.

IV. Entiat National Fish Hatchery Habitat Improvement Project Presentation

Mr. Robes Parrish with the U.S. Fish and Wildlife Service provided a brief presentation to the Committees on the Entiat National Fish Hatchery Habitat Improvement Project, which is being considered for funding by the Salmon Recovery Funding Board and the Tributary Committees. Robes began by reminding the Committees that the project has three main components: breaching the levee, placement of engineered log jams (ELJs), and structure enhancement. He then noted that the final modeling results will not be available until 18 November. The Bureau of Reclamation is currently modeling individual project elements and their cumulative effects. This is a small set back, because, as Robes noted, it is difficult to describe the exact design without the modeling results. Therefore, the sponsor is proposing a two phased approach: (1) breach the levee and (2) construct ELJs and off-channel habitat.

The levee will be breached up to the existing terrace. Current modeling information is sufficient to predict the results of breaching. The intent is to return the entire floodplain to a more normative function. All trees removed during breaching will be incorporated into woody debris structures. Small ring dikes will be constructed around the existing wells to protect them from all flows. This is much cheaper than relocating the wells. Materials from the levee will be used to construct the ring dikes. The roads that access the wells will be lowered to the elevation of the floodplain. In addition, the road culverts will be removed and replaced with rock fords. Finally, riparian vegetation will be planted in the floodplain to enhance floodplain function and connectivity.

Robes noted that they will decide this winter what type of modeling (1D or 2D) will be needed to determine the effects of ELJs and off-channel habitat actions on stream dynamics. Robes was certain that the higher gradient section of the river will require some wood to divert water onto the floodplain. Modeling work will also help identify timeframes for design completion and implementation.

Robes indicated that the phased approach may not fit well with the design of the Entiat Intensively Monitored Watershed (IMW) approach. The IMW proposes to track the effects of habitat actions in the Entiat River by implementing habitat actions in a sequenced approach, beginning upstream and moving downstream over time. The IMW design will not be confounded if the Entiat National Fish Hatchery Habitat Improvement Project can be implemented in 2010. However, actions implemented in 2011 may confound the IMW design. One option being discussed is to delay the project to better fit the IMW design. Robes noted that he is working closely with those involved with the Entiat IMW.

Finally, Robes stated that the total cost of the project is $285,886. The sponsor is requesting $87,673 from the Salmon Recovery Funding Board and $61,373 from the HCP Tributary Committees. Robes noted that the $74,990 from the Community Salmon Fund may be lost if the money is not used in 2010. He indicated that he would check into the possibility of losing these funds. The USFWS is providing a $61,850 cost share (direct and in-kind). When asked how much it costs to construct an ELJ, Robes noted that they cost about $25,000 per structure.

V. Entiat River Troy Acquisition Update

In August, the Committees asked Tracy Hillman to contact the Chelan-Douglas Land Trust to find out if the upland portion of the Entiat River Troy Acquisition could be sold and the money from the sale be returned to the Committees. In addition, they asked the Land Trust to identify the number of home sites on the floodplain.

In an email from Mickey Fleming with the Chelan-Douglas Land Trust, she indicated that the 40-acre riparian area southwest of the road is zoned for minimum 10-acre parcels. However, because there is no access across the river and the land area between the river and the road is relatively small, they are estimating only one homesite on the floodplain. The 25 acres north of the road is zoned for minimum 5-acre parcels, but because of the steep topography, they figure only one homesite north of the road.

Mickey noted that the Land Trust would be willing to try and sell the upland as a single homesite to a conservation buyer. By itself, the property would not command anywhere near the value of properties with waterfront, and is less desirable because of the steep topography. She noted that the Land Trust would need to make an investment to split the property through a certificate of exemption. There would be a filing fee of $500, plus additional costs for staff time, legal fees, and a survey. In sum, they would be willing to return the balance of the proceeds after subtracting all expenses and reasonable overhead.

VI. Acquisition of Lands for Hatchery Facilities and Systems

As directed by the Committees during the August meeting, Tracy Hillman drafted language for the Policies and Procedures document that addresses the use of Tributary Funds to purchase lands that may be used for hatchery production systems. Under Section 3.8, Tracy drafted the following language:

- *Lands acquired with Tributary Funds may be used for hatchery production systems insofar as the development and use of those systems are consistent with the above identified management elements.*

David Morgan noted that the draft language does not adequately capture the thinking of the Committees. Specifically, it does not state that the HCP Hatchery Committees would reimburse the Tributary Funds if hatchery facilities or systems were placed on the lands.

Members present noted that adding language to the policies and procedures document is not necessary and each acquisition should be handled on a case-by-case basis. That is, rather than add language that does or does not allow acquired lands to be used for hatchery systems, the Committees would rather evaluate the merits of each acquisition proposal independent of any policy or procedure statement. Thus, the members present believe that no language should be added to the policies and procedures document regarding the purchase of lands that may be used for hatchery systems. This does not mean that the Committees will not accept proposals that intend to purchase lands that could be used for hatchery production systems. Several members did

note that it should be the responsibility of the Hatchery Committees, not the Tributary Committees, to purchase lands that will be used for future hatchery systems.

Because Dennis Beich introduced this issue to the Committees earlier this year, and he was not available to participate in the discussion during the current meeting, the Committees will revisit this issue when Dennis is present.

VII. Entiat Riparian Outreach and Planting Projects

Becky Gallaher reported that she was contacted by Phylisha Olin with Cascadia Conservation District regarding landowner outreach, coordination, and riparian planting. She reminded the Committees that last May, Cascadia submitted a Small Projects Proposal asking the Committees to fund landowner coordination and public education and outreach, which would lead to riparian planting projects in the Wenatchee and Entiat basins. The Committees declined funding because of the high cost of the proposal and the lack of information on when, where, and how the project would be implemented. And before that, Cascadia submitted a Small Projects Proposal asking for additional funds (i.e., funds in addition to the WRIA's 45/46 Riparian Restoration Project) to do riparian plantings in the two basins. That proposal was not funded because the total amount of the riparian planting project exceeded the $50,000 limit for Small Projects.

Cascadia believes that riparian plantings are an important component of habitat restoration and recovery of listed species, and that this type of restoration cannot occur without landowner outreach, coordination, and education. Therefore, they are wondering how to approach the Committees to seek funding for this work. After discussion, the Committees believe the best approach would be to submit the project under the General Salmon Habitat Program, which has no upper funding limit. In addition, the Committees recommended that the sponsor address all the concerns that they raised with the Small Projects Proposals, including where and when outreach will occur, what native species will be used, and at what density they will be planted.

Becky will relay this information back to Cascadia Conservation District.

VIII. Okanagan/ORRI Site Visit

Tracy Hillman, with much help from Chris Fisher, David Morgan, and Keith Truscott, provided a briefing on their trip to the Okanagan River Restoration Initiative (ORRI) Project in Canada (the Power Point presentation is posted on the Tributary Committees ftp and website). During the first day of the visit (7 October), members of the Committees toured McIntyre Dam. The Dam diverts water from the Okanagan River to the Town of Oliver. At the time of the visit, engineers were testing the new passage structures. Sockeye were attempting to pass the structure, but many failed because the passage structures (horizontal lift gates) were raised to their maximum height. In addition, some sockeye became temporarily trapped in a cavity along the outer edge of the horizontal lift gate. Members recommended that a half-pipe be welded onto the leading edge of the gate to minimize trapping and injury to fish.

Members of the Committees then visited a rock, push-up diversion on Vaseux Creek. A large percentage of the flow in Vaseux Creek is diverted into an unlined canal, which transmits water to agricultural lands. The Okanagan Nation Alliance (ONA) is considering several different options to minimize water loss, including: (1) pipe system, (2) re-reg reservoir, (3) lining the canal, (4) intake screen, and (5) closing the diversion and pumping water from the Okanagan River. Once the ONA decides on a recommended approach, they may submit a proposal to the Tributary Committees for funding. This stream is an important steelhead/rainbow spawning and rearing stream.

Members then visited the lower portion of Shuttleworth Creek. The lower portion of Shuttleworth Creek was reconfigured to act as a sediment trap. As such, the lower portion of the stream is wide, shallow, and heavily embedded with fine sediments. The banks are laid-back and there is limited channel structure and riparian vegetation. In addition, there is a partial barrier just upstream from the mouth of the stream. Restoration actions under consideration include removing the barrier, reconfiguring the channel, and restoring riparian vegetation. This stream is also an important spawning and rearing area for steelhead/rainbow. In the future, the Committees may see a proposal from ONA to help fund restoration in this stream.

On the second day (8 October), members visited the ORRI Project, which is located just upstream from the Town of Oliver. The first phase of implementation, which is nearly complete, was to rebuild the setback dike in the lower portion of the project area. Members observed the completed side channel and instream rock structures. Although sockeye were spawning in the main channel, no spawning was occurring in the side channel at the time of the visit. Members also observed the constructed gravels bars that were placed along the margin of the main channel to enhance flow meander.

Work during the second phase of the project will reconnect the channel with the floodplain and rebuild setback dikes in the upper portion of the project area, and address drop structures in the lower portion of the project area. Eight different options are being evaluated under Phase II.[2] One approach, remove the dikes and let the river do the work, is not a valid option because there is not enough stream energy to do restoration work with the drop structures in place. However, there is an option to modify the drop structures. The intent would be to lower the structure by about 30 cm (~12 inches), which would reduce energy dissipation and allow the stream to remove fines that embed redds upstream from the structures. The cost to lower the structure would be about $50-$60K. The ONA, fisheries agencies, and engineers are conducting cost-benefit analyses on the eight different options.

Dr. Newberry stated that although the Okanagan River has limited woody debris, it may not be feasible to add wood because it can detach and collect at the drop structures. In addition, they are also limited on the type of trees that they can plant along the river.

IX. Information Updates

The following information updates were provided during the meeting.

1. Approved Payment Requests in September and October:

   Rock Island Plan Species Account:

   - $179.00 to LeMaster and Daniels for administration for third quarter 2009.
   - $1,244.65 to Chelan County PUD for administration and project coordination for third quarter 2009.

   Rocky Reach Plan Species Account:

   - $213.67 to Cascadia Conservation District for staff time to secure logs and rootwads for the Below the Bridge project.
   - $179.00 to LeMaster and Daniels for administration for third quarter 2009.
   - $1,366.31 to Chelan County PUD for administration and project coordination for third quarter 2009.

[2] During the visit, Dr. Newberry did not identify the eight different options they are currently considering.

Wells Plan Species Account:

- $2,340.14 to Douglas County PUD for account administration for fiscal year ending 31 August 2009.
- $1,069.06 to Chelan County PUD for project coordination for third quarter 2009.
- $4,905.80 to the Methow Conservancy for purchasing materials, meeting with landowners, and caging about 230 seedlings on five properties under the Riparian Regeneration and Restoration Initiative.
- $48,649.00 to Inland Professional Title for the Pampanin Property Conservation Easement under the Twisp River Riparian Protection project.
- $23,993.00 to Inland Professional Title for the Speir Property Conservation Easement under the Twisp River Riparian Protection project.
- $53,748.00 to the Methow Salmon Recovery Foundation for the Poorman Creek Barrier Removal project.

2. Becky Gallaher reported that Cordell, Nehr, & Company, PLLC was selected to conduct the financial review. They have already begun the review.
3. Becky Gallaher gave an update on the amount of money available in each Plan Species Accounts. She reported that there is about $1.1 million available in the Rock Island Account, about $382K in the Rocky Reach Account, and about $600K in the Wells Account.
4. Tracy Hillman reported that he received an email from Mickey Fleming with the Chelan-Douglas Land Trust stating that the PRCC Habitat Subcommittee has verbally agreed to contribute $388,790 toward the 117 acre Nason View Acquisition on the White River. However, the email noted that the total cost of the project has increased from $457,900 to $545,000, because the landowners found that there were several aspects of the DNR forestry easement program that make it infeasible to combine it with a fish-habitat funded purchase. That is, the DNR money would apparently be considered ordinary income (sale of a crop) rather than sale of real estate. In addition, the landowners may have to cut some timber to show that it is harvestable. Nevertheless, the Land Trust still supports the project and is asking $64,575 from the Salmon Recovery Funding Board and $91,635 from the Tributary Committees. The original proposal requested $365,925 from the Committees.
5. Tracy Hillman updated the Committees on the efforts by the co-managers, Bonneville Power Administration (BPA), Columbia Basin Fish and Wildlife Authority (CBFWA), the Northwest Power and Conservation Council (Council), and others to develop a regional monitoring strategy for the Columbia Basin. Since the release of the most recent Federal Columbia River Power System (FCRPS) Biological Opinion, the Action Agencies, NOAA, and the Council have been developing monitoring strategies to address the RPA requirements in the BiOp. In order to implement the monitoring recommendations most efficiently and effectively, the Council recommended that the Action Agencies, NOAA, CBFWA, and the Council convene all interested parties, include local, state, federal, and tribal entities, to identify existing monitoring efforts, monitoring gaps, and monitoring needs. The region held two workshops: one on 20-21 October and the other on 3-5 November. Both policy and technical representatives from each entity were present.

The goal of the workshops was to agree on an efficient and effective framework and project-specific implementation strategy for anadromous salmon and steelhead monitoring to assess (1) VSP parameters, (2) habitat effectiveness, and (3) hatchery effectiveness. The framework should meet the needs of the FCRPS BiOp, address the needs of the Council's Fish and Wildlife Program, contribute to the monitoring needs of ESA recovery planning, and contribute to other regional fisheries management needs. Some of the key outcomes and next steps of the workshops were development of a draft Columbia River Basin Anadromous Fish Monitoring Framework document, identification of monitoring gaps needed to fulfill FCRPS BiOp needs, confirm existing monitoring projects, estimate costs and budget balancing, and develop a draft plan for basin-wide hatchery RME.

Tracy noted that the Upper Columbia was well represented in the workshops. He also reported that BPA and the Bureau of Reclamation will likely provide additional funding to fill existing monitoring gaps in the Upper Columbia (filling these gaps will satisfy BiOp requirements, but may not fill all monitoring needs associated with ESA recovery planning). In addition, the Upper Columbia, unlike most other regions in the Columbia Basin, has some of the most intensive and extensive monitoring in the region. This is largely due to hatchery effectiveness monitoring conducted under the HCPs and relicensing agreements, and the Integrated Status and Effectiveness Monitoring Program funded by BPA and NOAA. Without this level of monitoring, the Upper Columbia would have significant monitoring gaps. Tracy indicated that he and Casey Baldwin will continue to update the Committees on further developments and outcomes from the regional efforts.

6. Tracy Hillman reported that the Upper Columbia Regional Technical Team Analysis Workshop has been rescheduled for 12-13 January 2010. The workshop will be at the Red Lion Hotel in Wenatchee. The purpose of the workshop is to address key management questions associated with VSP, limiting factors and threats, habitat status and trend, habitat effectiveness, and data gaps and research. Information from the workshop will help support adaptive management, which is a critical component of the Upper Columbia spring Chinook salmon and steelhead recovery plan. Tracy urged members of the Tributary Committees to attend the workshop.

7. David Morgan reported that he recently spoke with the Chelan County Planning Department about the risk of development along rivers. The Planning Department indicated that it is difficult to get a variance to build along the river, which, as David noted, is not necessarily consistent with conventional wisdom. Ultimately, it is up to the County Commissioners to grant the variance. If the Committees have questions, the Planning Department may be willing to discuss projects on a case-by-case basis.

8. David Morgan reported that he attended the Wenatchee Watershed Planning Unit Meeting in which there was discussion about the proposed Campbell Creek Off-Channel Reservoir. David noted that Chelan County Natural Resource Department is pushing the project even though the landowner has no interest in having the reservoir on his land. In addition, if the reservoir is constructed upstream on Forest Service land, the private landowner will not allow any technical analysis or pipeline easement on his land. David noted that there was also discussion about taking water out of Icicle Creek, which does not have water to spare, and via the existing canal. David and others believe that Campbell Creek should not be emphasized. Instead, pumping water directly from the Wenatchee River into the irrigation canal may be more promising.

9. David Morgan noted that during a Habitat Subcommittee Meeting, the Washington Department of Transportation talked about focusing habitat work on lower Peshastin Creek. Lower Peshastin Creek is in need of habitat rehabilitation, but suitable stream flow is still one of the primary limiting factors in that system. It appears that this might be an opportunity to formally engage with the Department of Transportation's "chronic deficiencies" program, and potentially discuss big-picture planning actions such as relocating significant portions of Highway 97. This would allow the stream greater access to its pre-1960 floodplain.
10. Dale Bambrick shared with the Committees his visit with the Chewuch Canal Company. He reported that there are opportunities for the Company to use less water in their system. They currently divert about 34 cfs when Chewuch River flows reach 100 cfs. Dale noted that it should be possible with an efficient system to irrigate the number of acres currently irrigated (~1,447 acres) with about 15 cfs. Dale proposed an agreement with the Company in which the Tributary Committees, PRCC, and/or BPA could provide funding for system improvements and advocacy with the Department of Ecology to enable more freedom in the operation of the lake in exchange for restricting the amount of water diverted at a given river discharge. Dale suggested that the Company test the proposal for at least three years. This would give them enough time to see if it is possible to operate with less water in their system. The Company noted that this could become an issue if those currently not irrigating, or those who have never irrigated but are paying their assessments, suddenly ask for water. Dale will continue to update the Committees on his exchanges with the Chewuch Canal Company.
11. Chris Fisher updated the Committees on his recent conversation with Mike Kane, Chelan County Natural Resource Department, about the Nason Creek Upper White Pine Floodplain Reconnection Project. The original proposal called for selectively breaching the levee to reconnect about 25 acres of off-channel and floodplain habitat within the Upper White Pine Reach on Nason Creek. After reviewing the proposal, the SRFB Review Panel requested that the sponsor consider a more aggressive breaching approach that would allow channel migration processes into the floodplain area. The Review Panel also asked for hydraulic modeling information that shows the frequency of the rearing connection and how long-term channel profile changes my affect the connection. The Bureau of Reclamation has agreed to do further analyses. Because the project lies on Forest Service lands, the Forest Service would like to take a more active role in the project, which could start a NEPA process. Keith Truscott noted that Chelan PUD must have access to the power poles. Chris and Keith agreed to update the Committees on future changes or modifications to the proposed project.

X. Next Steps

The Committees decided not to meet in December, because of the holidays and because funding decisions by the SRFB will not be available until 10-11 December. Therefore, the Committees will next meet on Thursday, 14 January. At that time, the Committees will make their final funding decisions on the 2009 General Salmon Habitat Program proposals. The meeting will follow the Upper Columbia RTT Analysis Workshop.

Meeting notes submitted by Tracy Hillman (tracy.hillman@bioanalysts.net).

APPENDIX D
LIST OF ROCKY REACH HCP COMMITTEE MEMBERS

Rocky Reach Mid-Columbia HCP Committees

Coordinating Committee

Name	Organization
Michael Schiewe (Chair)	Anchor QEA, LLC
Jerry Marco	Colville Tribes
Keith Truscott	Chelan PUD
Bryan Nordlund	NMFS
Jim Craig	USFWS
Bill Tweit	WDFW
Steve Parker	Yakama Nation

Hatchery Committee

Name	Organization
Michael Schiewe (Chair)	Anchor QEA, LLC
Kirk Truscott	Colville Tribes
Joe Miller	Chelan PUD
Kristine Petersen	NMFS
Bill Gale	USFWS
Jeff Korth	WDFW
Tom Scribner	Yakama Nation

Tributary Committee

Name	Organization
Tracy Hillman (Chair)	BioAnalysts
Chris Fisher	Colville Tribes
Keith Truscott	Chelan PUD
Dale Bambrick	NMFS
David Morgan	USFWS
Dennis Beich	WDFW
Bob Rose	Yakama Nation

Policy Committee

Name	Organization
Michael Schiewe (Facilitator)	Anchor QEA, LLC
Joe Peone	Colville Tribes
Gregg Carrington	Chelan PUD
Keith Kirkendall	NMFS
Mark Miller	USFWS
Bill Tweit	WDFW
Virgil Lewis	Yakama Nation

APPENDIX E
STATEMENTS OF AGREEMENT FOR COORDINATING COMMITTEES

Rocky Reach and Rock Island HCP Coordinating Committees
Statement of Agreement
Chelan County PUD
Final Acceptance of 2008 Rocky Reach and Rock Island Fish Survival and Biological Evaluation Reports

March 24, 2009

Statement
The Rocky Reach and Rock Island HCP Coordinating Committees have reviewed and accepted as "Final" the following documents reporting results of 2008 survival studies and biological evaluations conducted by Chelan County PUD:

"*Final Report: Survival of Yearling Chinook Salmon, Steelhead, and Sockeye Salmon Smolts through the Rock Island Project in 2008"*

"Final Report: Acoustic-Tag Investigations of Sockeye Salmon Smolt Survival and Migration Dynamics at Rocky Reach Dam in 2008"

"Final Report: Route Specific Passage of Juvenile Chinook, Sockeye, and Steelhead Salmon using Acoustic Tag Methodologies at Rocky Reach and Rock Island Dams in 2008"

"Final Report: Biological Evaluation of the Rocky Reach Juvenile Fish Bypass System 2008"

Rocky Reach and Rock Island HCP Coordinating Committees
Statement of Agreement
Chelan County PUD
Final Acceptance of 2009 Rocky Reach and Rock Island Fish Survival Study Plans, Fish Passage Plan, and Biological Evaluations

March 24, 2009

Statement
The Rocky Reach and Rock Island HCP Coordinating Committees have reviewed and accepted as "Final" the following documents addressing Chelan PUD actions and activities in 2009 related to HCP mainstem fish passage:

"Study Plan to compare effects of daytime and nighttime fish releases on Estimates of Project Survival for Juvenile Sockeye at Rocky Reach Dam"

"Final 2009 Study Plan to Estimate Rock Island Project Survival for Yearling Chinook, Steelhead, and Sockeye under a 10% Spill Operation"

"Final 2009 Fish Spill Plan Rocky Reach and Rock Island Dams, Chelan PUD"

"Study Plan for the Biological Evaluation of the Rocky Reach Juvenile Fish Bypass System, 2009"

APPENDIX F
STATEMENTS OF AGREEMENT FOR HATCHERY COMMITTEES

FINAL Statement of Agreement Use of Ringold Springs Hatchery

Rocky Reach HCP Hatchery Committee
June 17, 2009

Statement of Agreement

The Rocky Reach HCP Hatchery Committee (Committee) agrees that Chelan County Public Utility District No.1 (the District) can rear up to 200,000 summer Chinook (2008 brood) at the Ringold Springs Hatchery (Ringold) during the summer of 2009. The fish to be reared at Ringold in 2009 will be from the portion of the District's Similkameen River summer Chinook obligation that are reared during the winter and released at the Bonaparte Rearing Pond. Approximately one half of the fish will be reared at density index (DI) of 0.125 and the other half at 0.20. Each group of fish reared at the different density will be differentially coded wire tagged. After fish are transferred from Ringold to Bonaparte Pond, the Committee will review the fish rearing data and determine the District's ability to use Ringold in the future.

Background

The District is proposing to rear 200,000 fish in 2009 to ensure that the Ringold Hatchery will meet the District's needs and satisfy any concerns the Hatchery Committee may have about the facility.

One variation in condition between the Ringold and Eastbank Hatchery facility is the rearing DI. At Ringold, the summer Chinook would be reared at the DI of 0.2 (which is the IHOT DI and is normally used for Ringold production – based on conversations with Mike Lewis, current Complex Manager), versus the HCP standard DI of 0.125. While the Ringold density is higher than the HCP standard, the District believes that the Ringold Hatchery's record of success with Chinook demonstrates that WDFW can meet the overall production goals at a higher DI. Mike Lewis has been in close communication with the WDFW Region 3 fish health specialist (Steve Roberts) and it appears the production changes proposed are consistent with WDFW's standard operating procedures at Ringold. These fish will be raised at the Committee agreed DI once they are transferred to District hatchery facilities. In addition, the District believes that trying the facility in 2009 with 200,000 fish will allow the District and other HCP parties to evaluate whether or not the density will work for the District's program.

If ultimately successful, this proposed program change may provide the following benefits (particularly if the 600,000 Turtle Rock Island yearling program is reared at Ringold):

- Freeing capacity at Eastbank Hatchery which could then be used for Lake Wenatchee Sockeye alleviating the need to provide biosecurity measures at Chelan Hatchery.
- Converting the Turtle Rock Island sub-yearling program to a yearling program more rapidly. Though the Chelan Falls rearing facility is not scheduled to be substantially complete until 2012, this would allow yearlings to be released from Turtle Rock Island and probably provide a higher smolt survival and adult return.

FINAL Statement of Agreement
Sockeye Early Rearing Density Criteria

Rocky Reach HCP Hatchery Committee
August 19, 2009

Statement of Agreement

The Rock Island HCP Hatchery Committee (Committee) agrees that Chelan County Public Utility District No.1 (the District) may rear Lake Wenatchee sockeye at a density of up to 0.4 lbs/in-cf until fish reach 400 fish/lb (1.1 gram), within the District's hatchery facilities or other facilities approved by the Committee for rearing juvenile sockeye. In rare short term conditions sockeye may be held at 0.6 lbs/in-cf if necessary to reduce future fish handling and physiological stresses.

Background

The District intends to rear 280,000 sockeye for the Lake Wenatchee program as soon as practical. The Eastbank Hatchery incubation and early rearing building does not have adequate capacity to accommodate sockeye, steelhead and Chinook programs currently envisioned. A study was conducted to research and survey early rearing information and assist with design recommendations. The resulting study report cited the median sockeye density index of thirteen hatcheries is 0.59 lb/in-cf, the mean is 0.81 lb/in-cf. Most hatcheries rear fish at these densities between 900 and 300 fish/lb.

DRAFT Statement of Agreement - Approval of Final HCP Hatchery Committee Draft HGMP for Wenatchee River Summer Steelhead

Rocky Reach and Rock Island HCP Hatchery Committees
August 19, 2009

Statement of Agreement The Rocky Reach and Rock Island HCP Hatchery Committees (Committees) approve the Final HCP Hatchery CommitteeDraft Hatchery And Genetic Management Plans for Wenatchee River Summer Steelhead dated August 19, 2009.
Background In August 2008, National Marine Fisheries Service (NMFS) announced in a letter their intent to initiate a series of consultations to analyze the effects of hatchery programs and assure compliance with the Federal Endangered Species Act (ESA) and the National Environmental Policy Act (NEPA). This process and other subsequent actions by NMFS lead to the development of revised HGMPs for the program noted above. The Committee members worked collaboratively over the past 12 months to develop the final document.

FINAL Statement of Agreement
Regarding Summer Chinook Rearing at Ringold Hatchery and Eastbank Re-use Facility

Rocky Reach and Rock Island HCP Hatchery Committees
October 21, 2009

Statement of Agreement

The Rocky Reach and Rock Island HCP Hatchery Committees (Committees) agree that WDFW may produce up to 400,000 yearling Columbia River summer Chinook for acclimation and release at Chelan Falls and Turtle Rock (2009 brood year).

Secondly, the Committees agree that Chelan County Public Utility District No.1 (District) may proceed with rearing yearling summer Chinook using (1) the Re-use facility currently located at Eastbank Hatchery and (2) Ringold Hatchery according to the proposed path described in Attachment 1.

Background

This request represents a continuation of Turtle Rock/Chelan Falls yearling production from brood year 2008 (i.e., 400,000). The purpose of this effort is continue evaluation of rearing options to achieve the desired target of 600,000 yearling summer Chinook ultimately destined for acclimation at the proposed Chelan Falls acclimation facility. This decision is needed now because mating will be completed in the coming weeks and opportunity to create yearling fish (above the current 200,000 production plan target) will be eliminated. Broodstock have already been collected for 2009, but the fate of the eggs is in question (i.e., subyearling or yearling).

Secondly, The District has been testing the efficacy of (1) water Re-use at Eastbank Hatchery and (2) Ringold hatchery to rear summer Chinook for HCP production. The purpose of these alternative rearing methods is to reduce the demand for water at Eastbank and create additional space necessary for reaching the Districts' HCP production targets (including sockeye, spring Chinook and steelhead) in an expedient, efficient manner.

Previous SOAs have provided opportunities to evaluate both Re-use and Ringold approaches.

From the October 27, 2008, SOA: *Regarding Pilot Study For Partial Reuse*, the Committee agreed to evaluate rearing fish at higher densities in the Re-use system:

"The Rocky Reach and Rock Island HCP Hatchery Committees (hereafter "Committees") agree that Chelan County PUD (hereafter "District) can perform the second year of the partial water reuse pilot study. Approximately 200,000 Wells Summer Chinook from the District's Turtle Rock Island program will be converted from the subyearling program

(reducing the subyearling program by 200,000 fish) and will be reared on partial water reuse utilizing circular ponds. This effectively doubles the density from the 2008 pilot study. The Committees agree to allow the District to perform the study as outlined in the attached Pilot Water Reuse Fish Rearing Criteria (2009) and the Partial Water Reuse Pilot Study Monitoring and Evaluation (2009)."

From the June 17, 2009, SOA: *Use of Ringold Springs Hatchery*, the Committee agreed to evaluate Ringold springs and alternative rearing densities to rear yearling summer Chinook:

"The Rocky Reach HCP Hatchery Committee (Committee) agrees that Chelan County Public Utility District No.1 (the District) can rear up to 200,000 summer Chinook (2008 brood) at the Ringold Springs Hatchery (Ringold) during the summer of 2009. The fish to be reared at Ringold in 2009 will be from the portion of the District's Similkameen River summer Chinook obligation that are reared during the winter and released at the Bonaparte Rearing Pond. Approximately one half of the fish will be reared at density index (DI) of 0.125 and the other half at 0.20. Each group of fish reared at the different density will be differentially coded wire tagged. After fish are transferred from Ringold to Bonaparte Pond, the Committee will review the fish rearing data and determine the District's ability to use Ringold in the future."

The Ringold SOA also identified several key opportunities provided by the additional space at Ringold, and subsequent reduced demand at Eastbank:

"If ultimately successful, this proposed program change may provide the following benefits (particularly if the 600,000 Turtle Rock Island yearling program is reared at Ringold):

- Freeing capacity at Eastbank Hatchery which could then be used for Lake Wenatchee Sockeye alleviating the need to provide biosecurity measures at Chelan Hatchery.
- Converting the Turtle Rock Island sub-yearling program to a yearling program more rapidly. Though the Chelan Falls rearing facility is not scheduled to be substantially complete until 2012, this would allow yearlings to be released from Turtle Rock Island and probably provide a higher smolt survival and adult return."

FINAL Statement of Agreement
Regarding Steelhead Spawning Success and Objectives 2 &3 of the Monitoring and Evaluation Plan as they Pertain to Steelhead

Rocky Reach and Rock island HCP Hatchery Committees
November 18, 2009.

Statement of Agreement

***Note: The underlined passage is an addition to the original September, 2009 Draft.*

The Rocky Reach (RR) and Rock Island (RI) HCP Hatchery Committees (HC) agree that Chelan County Public Utility District No.1 (the District) has met its obligations to conduct a study to investigate the natural spawning success of hatchery reared steelhead relative to wild steelhead [as described in Section 8.5.3 of the RR & RI HCPs] through the funding and complete implementation of the attached study proposal submitted by WDFW and NOAA Fisheries (Attachment 1).

In the event that no significant difference is detected between the reproductive success of Hatchery and Natural-origin spawners, based on comparisons of their offspring at the juvenile life-history stages, the District will fund the genetic analyses of additional samples collected from returning adults.

As a component of this study, the Committees agree to develop a plan to interpret the potential results of the reproductive success study as they pertain to future hatchery actions/operations.

This study will be included as part of the Wenatchee Summer Steelhead Hatchery and Genetic Management Plan (HGMP) submitted by Chelan PUD.

Background

The District is obligated to conduct a study to investigate the natural spawning success of hatchery reared steelhead relative to wild steelhead in Section 8.5.3 of the RR & RI HCPs. In developing this study, the HCP HC considered study guidance from NMFS, the ad hoc supplementation monitoring and evaluation work group, and critical uncertainties identified during the Federal Columbia River Power System ESA consultation process.

As proposed, the WDFW/NOAA reproductive success study also contributes to two objectives of the District's hatchery monitoring and evaluation plan (Murdoch and Peven 2005): Objective 2-*Determine if the run timing, spawn timing, and spawning distribution of both natural and hatchery components of the target population are similar*; Objective 3-*Determine if the genetic diversity, population structure, and effective population size have changed in natural spawning populations as a result of the hatchery program.*

Additionally determine if hatchery programs have caused changes in phenotypic characteristics of natural population.

As proposed, this study will commence in 2009 and sampling is expected to continue through 2014 for juvenile steelhead (evaluating reproductive success to juvenile life histories) and 2017 for adult steelhead (in the event there is no significant difference between Hatchery and Natural-origin steelhead at the juvenile life history stage).

The proposed study relies on work previously performed by WDFW and NOAA and funded by NOAA and the District.

APPENDIX G
SHUSWAP RIVER HATCHERY INFORMATION

SHUSWAP RIVER HATCHERY PROGRESS REPORT – NOVEMBER, 2009

SOCKEYE SALMON

1. Okanagan River Stock

a) Incubation Data

Incubation units: 8 Kitoi boxes
Water source: well
Water temperature: 10.0 °C
Water flow: 45 lpm – 50 lpm
ATU range on November 30, 2009: 413 – 458

Estimated number of eggs in incubation: 1,144,000

b) Final Inventory Data

Number of "green eggs": 1,355,700
Number of "morts": 211,100
Number of eyed eggs: 1,144,600
% survival: 84.4

Note:
A surplus of 236,000 eyed eggs has to be removed from the incubation by December 10, 2009. The proposed solutions for the transfer include a river eggplant in Okanagan River.

CHINOOK SALMON

1. Middle Shuswap River Stock

a) Incubation Data

Water temperature: 10.0 °C
Water flow: 14 lpm – 15 lpm
ATU range on November 30, 2009: 609 –695

Number of alevins in incubation: 158,200

2. Lower Shuswap River Stock

a) Incubation Data

Water temperature: 10.0 °C
Water flow: 12 lpm – 15 lpm
ATU range on November 30, 2009: 484 – 617

Number of eyed eggs and alevins in incubation: 548,730

b) Final Inventory Data

Number of "green eggs": 672,540
Number of "morts": 23,890
Number of eyed eggs: 648,650
% survival: 96.4

Note:
Eggs from three females were discarded prior to the final inventory

c) Eyed Egg Transfer to Kingfisher Hatchery

Dates: November 18, 2009
ATU range at transfer: 346 – 424
Number of eyed eggs: 99,920

COHO SALMON

1. Duteau Creek Stock 2008

a) Rearing Data

Rearing units: two concrete IRT-s
Water temperature: 10.0 °C
Water flow: 600 lpm per unit
Feeding level: SKRETTING Bio Fry 1.5 mm pellet; 1.0 kg per day
Feeding frequency: once a day
Cleaning frequency: daily vacuuming and screen brushing

Average fish mass range on December 04, 2009: 10.69 g – 11.07 g
Number of fish in rearing: 19,860

2. Duteau Creek Stock 2009

a) Brood Stock Collection

Method: fence
Period: October 12 – November 30, 2009
Number of fish captured:
- females – 44;
- males - 114

b) Fish Transfer and Holding

Period of fish transfer to the hatchery: November 3 – November 26, 2009
Number of held fish:
- females – 20;
- males - 28.
Holding mortality: 0

c) Egg Take

Period: November 4 – November 26, 2009
Number of fish spawned:
- females – 20;
- males - 28.

Estimated number of eggs collected: 54,000

Note:

Between November 18 and November 20, 2009, four females and eight males from the hatchery outflow(Middle Shuswap River) were spawned at the hatchery. After incubation to the eyed stage the eggs will be planted in the Middle Shuswap River.

d) Incubation Data

Water source: well and river
Water temperature: 10.0 °C – 2.5 °C
Water flow: 13 lpm – 14 lpm
ATU range on December 03, 2009: 70 – 290

Estimated number of eggs in incubation: 54,000

APPENDIX H
BROODSTOCK COLLECTION PROTOCOLS

STATE OF WASHINGTON
DEPARTMENT OF FISH AND WILDLIFE
Mid-Columbia Field Office
3515 Chelan Hwy 97-A Wenatchee, WA 98801 (509) 664-1227 FAX (509) 662-6606

April 15, 2009

To: Kristine Petersen, Salmon Recovery Division, NMFS

From: Kirk Truscott, WDFW

Subject: **Final DRAFT 2009 UPPER COLUMBIA RIVER SALMON AND STEELHEAD BROODSTOCK OBJECTIVES AND SITE-BASED BROODSTOCK COLLECTION PROTOCOLS**

The attached protocol was developed in coordination with the mid-Columbia Habitat Conservation Plans (HCPs) for hatchery programs rearing spring Chinook salmon, sockeye salmon, summer Chinook salmon and summer steelhead associated with the mid-Columbia HCPs, spring Chinook salmon and steelhead programs associated with the 2008 Biological Opinion for the Priest Rapids Hydroelectric Project (FERC No. 2114) and fall Chinook consistent with Grant County Public Utility District and Federal mitigation obligations associated with Priest Rapids and John Day dams, respectively. These programs are funded by Chelan, Douglas, and Grant County Public Utility Districts (PUDs) and are operated by the Washington Department of Fish and Wildlife (WDFW). Additionally, the Yakama Nation's (YN) Coho Reintroduction Program broodstock collection protocol, when provided by the YN, will be included in this protocol because of the overlap in trapping dates and locations.

This protocol is intended to be a guide for 2009 collection of salmon and steelhead broodstocks in the Methow, Wenatchee, and Columbia River basins. It is consistent with previously defined program objectives such as program operational intent (i.e., conservation and/or harvest augmentation), mitigation production levels (HCPs, Priest Rapids Dam 2008 Biological Opinion and to comply with ESA permit provisions.

Notable in this years protocols are: (1) Wenatchee spring Chinook broodstock collection strategies targeting Chiwawa hatchery origin Chinook at Tumwater Dam, intended to provide improved hatchery origin broodstock collection and to reduce the number of Leavenworth NFH strays into other Wenatchee basin UCR spring Chinook spawning aggregates; (2) Natural origin Chiwawa spring Chinook collection at the Chiwawa Weir, consistent with ESA Section 10 Permit 1196; (3) Methow spring Chinook broodstock protocol targeting natural origin spring Chinook at Wells Dam and at the Twisp River weir; (4) utilization of genetic sampling/assessment to differentiate Twisp River and non Twisp River natural origin adults collected at Wells Dam and CWT interrogation during spawning of hatchery spring Chinook collected at the Twisp Weir, Methow FH and Winthrop NFH to differentiate Twisp and Methow Composite hatchery fish for discrete management of Twisp and Methow Composite production components; (5) the collection of hatchery origin spring Chinook for the Methow River Basin program in excess of production requirements for BKD management, (6) the use of ultra-sound technology to determine sex of Wenatchee summer Chinook during collection to aid in achieving the appropriate female equivalents for programmed production, and (7) the potential collection of Wells summer Chinook

to support the Yakama Nation (YN) summer Chinook re-introduction program in the Yakima River Basin (requires agreement of the HCP Hatchery Committee). These protocols may be adjusted in-season, based on actual run monitoring at mainstem dams and other sampling locations.

Above Wells Dam

Spring Chinook

Natural origin fish inclusion into the broodstock will be a priority, with natural origin fish specifically being targeted. Natural origin fish collections will not exceed 33 percent of the MetComp and Twisp natural origin run escapement at Wells Dam.

To facilitate BKD management, to comply with ESA Section 10 permit take provisions and to meet programmed production, hatchery origin spring Chinook will be collected in numbers excess to program production requirements. Based on historical Methow FH spring Chinook ELISA levels above 0.12, the hatchery origin spring Chinook broodstock collection will include hatchery origin spring Chinook in excess to broodstock requirements by approximately 18 percent. The parties to the HCP have acknowledged that targeting broodstock collection objectives at levels that provide for culling of eggs from higher ELISA level hatchery origin females and prioritizing natural origin fish for rearing to yearling smolt stage is a viable approach to balance the promotion of fish health while limiting indirect reductions in genetic diversity and reduced program production, particularly for ESA listed supplementation programs. For purposes of BKD management and to comply with maximum production levels and other take provisions specified in ESA Section 10 permit 1196, culling will include the destruction of eggs from hatchery origin females with ELISA levels greater than 0.12 and or that number of hatchery origin eggs required to maintain production at 550,000 yearling smolts. Culling of eggs from natural origin females will not occur, unless their ELISA levels are determined by WDFW Fish Health to be a substantial risk to the program. Juveniles from natural origin females with ELISA levels greater than 0.12 will be differentially tagged for evaluation purposes. To monitor the efficacy of culling in reducing the prevalence of BKD in Methow Basin spring Chinook, annual monitoring and evaluation of the prevalence and level of BKD in returning hatchery and natural origin spring Chinook will continue and will be reported in the annual monitoring and evaluation report for this program.

The 2009 Methow spring Chinook broodstock collection will occur at Wells Dam, Twisp River Weir, Methow FH and Winthrop NFH. Limited on-station release of smolts from the Methow FH, absence of a trapping facility on the Chewuch River and poor trapping success at Foghorn Dam on the mainstem Methow River preclude reasonable certainty of meeting adult collection requirements via tributary and Methow FH outfall collections. The aforementioned limitations are the principle reasons for the inclusion of broodstock collection at Wells Dam and Winthrop NFH during 2009.

Recent WDFW genetic assessment of natural origin Methow spring Chinook (Small et al. 2007) suggest that Twisp natural-origin spring Chinook can be identified with sufficient confidence that natural origin collections can occur at Wells Dam, thereby facilitating natural origin inclusion in the broodstock, while maintaining the ability to manage separately the Twisp origin spring Chinook spawning aggregate. Although Twisp natural origin fish can be assigned to the Twisp population with confidence, some gene flow between the Twisp and Methow Composite spawning aggregates are anticipated as a result of collecting natural origin broodstock at Wells Dam. Based on projected Proportion Natural Origin (pNOB) broodstock composition for Twisp and Methow Composite programs (31% and 30%, respectively) and composite brood year assignment errors for wild Twisp

and MetComp spring Chinook provided in Snow et al. (2007), the projected non-source fish contributions to the Twisp and MetComp hatchery programs for 2009 are 1.6% and 1.5%, respectively. In this instance, percent non-source fish contribution may be considered a gene flow estimate between the two program production elements (Twisp and Methow Composite) and is an unavoidable consequence associated with natural origin broodstock collection at Wells Dam during 2009. Although gene flow between the two hatchery production components is likely, it is expected to be relatively low in 2009 and supports a hatchery broodstock collection program objective to infuse natural origin fish into the hatchery program to maintain/improve genetic diversity and reduced domestication. For complete discussion regarding Methow Spring Chinook genetic monitoring and evaluation see Snow et al. (2007).

Non-lethal tissue samples (fin clips) for genetic analysis and scale samples will be obtained from adipose present, non-CWT, non-ventral clipped spring Chinook (suspected natural origin spring Chinook) collected at Wells Dam for origin analysis. Natural origin fish retained for broodstock will be tagged with a PIT tag (dorsal sinus) for tissue sample/genetic analysis cross-reference. Tissue samples will be preserved and sent to WDFW genetics lab in Olympia Washington for genetic/stock analysis. The spring Chinook sampled will be retained at Methow FH and will be sorted as Twisp or non-Twisp natural origin fish prior to spawning. The number of natural origin Twisp and Methow Composite (non-Twisp) spring Chinook retained will be dependent upon the number of natural origin adults returning and the collection objective limiting extraction to no greater than 33% of the natural origin spring Chinook return past Wells Dam. Based on the broodstock collection schedule (3-day/week, 16 hours/day), natural origin spring Chinook extraction is expected to be approximately 33% or less.

Weekly estimates of natural-origin spring Chinook passage past Wells Dam will be provided through stock assessment and broodstock collection activities and will provide the opportunity to adjust, in-season, the extraction of natural origin spring Chinook to maintain no greater that 33% extraction of Twisp and Methow Composite natural origin components while maximizing the opportunity for the inclusion of natural origin spring Chinook in the broodstock. Additionally, in-season estimates of Twisp and Methow Composite natural origin escapement past Wells Dam provides the opportunity to utilize both Wells Dam and the Twisp Weir as natural origin collection sites for the Twisp production component, thereby providing additional flexibility to account for differences between projected and actual returns of Twisp and Methow Composite natural origin fish. Twisp and Methow Composite hatchery origin spring Chinook will be captured at the Twisp Weir, Methow FH outfall. Trapping at the Winthrop NFH will be included if needed to address broodstock shortfalls.

The Methow FH rears spring Chinook salmon for three acclimation/release sites in the Methow River Basin, including: (1) Methow River (Methow FH); (2) Twisp River (Twisp Acclimation Pond) and (3) Chewuch River (Chewuch Acclimation Pond). The total production level target is 550,000 smolts divided equally among the three release sites (approximately 183,000 smolts per site).

Pre-season run-escapement of Methow origin spring Chinook past Wells Dam during 2009 are estimated at 2,237 spring Chinook, including 1,943 hatchery and 294 natural origin Chinook (Table 1 and Table 2). In-season estimates of natural origin spring Chinook will be adjusted proportional to the estimated returns to Wells Dam at weekly intervals and may result in adjustments to the broodstock collection targets presented in this document.

Based on current juvenile rearing capacity at Methow FH, programmed production levels (550,000 smolts), BKD management strategies, projected return for BY 2009 Methow Basin spring Chinook at Wells Dam (Table 1 and Table 2), and assumptions listed in Table 3, the following broodstock collection protocol was developed.

The 2009 Methow spring Chinook broodstock collection will target 359 adult spring Chinook. Based on the pre-season run forecast, Twisp fish are expected to represent 3% of the adipose present, CWT tagged hatchery adults and 12% of the natural origin spring Chinook passing above Wells Dam (Tables 1 and 2). Based on this proportional contribution, and a collection objective to limit extraction to no greater than 33%, the 2009 Twisp origin broodstock collection will be predominantly hatchery origin and total 33 fish (11 wild and 22 Hatchery), representing 30% of the broodstock necessary to meet Twisp program production of 183,000 smolts. Methow Composite fish are expected to represent 97% of the adipose present CWT tagged hatchery adults and 88% of the natural origin spring Chinook passing above Wells Dam (Tables 1 and 2). Based on this proportional contribution and a collection objective to limit extraction to no greater than 33%, the 2009 Methow Composite (combined Methow and Chewuch river spawning aggregates) broodstock collection will be predominantly hatchery origin and total 326 spring Chinook (86 wild and 240 Hatchery). The broodstock collected for the Methow Composite production represents 100% of the broodstock necessary to meet Methow Composite program production of 367,000 smolts (combined Methow and Chewuch production), and sufficient to backfill the expected shortfall of 129,000 Twisp River spring Chinook. The Twisp River releases will be limited to releasing progeny of broodstock identified as wild Twisp and or known Twisp hatchery origin fish, per ESA Permit 1196. The Chewuch Pond and Methow FH releases will include progeny of broodstock identified as wild non-Twisp origin and known Methow Composite hatchery origin fish.

Table 1. Brood Year 2004-2006 age-class return projection for wild spring Chinook Dam above Wells during 2009.

	Smolt Estimate		Age-at-Return								
	Twisp [1/]	Methow Basin [2/]	Twisp				Methow Basin				
BY			Age-3	Age-4	Age-5	Total	Age-3	Age-4	Age-5	Total	SAR [3/]
2004	5,873	22,941	2	21	**10**	33	6	83	**38**	128	0.005581
2005	5,372	55,381	1	**19**	9	30	15	**201**	93	309	0.005581
2006	18,580	198,400	**5**	67	31	104	**55**	720	332	1107	0.005581
2009 Return Year			**5**	**19**	**10**	**34**	**55**	**201**	**38**	**294**	

[1/]- Smolt estimate based on sub-yearling and yearling emigration (Snow et al. 2008)

[2/]- Estimated Methow Basin smolt emigration, based on Twisp Basin smolt emigration, proportional redd deposition in the Twisp River and Twisp Basin smolt production estimate.

[3/]- Mean 1998-2003 Chiwawa River wild SAR as a surrogate wild SAR for Methow spring Chinook

BY 2004-2006 age-class and origin run-escapement projection for UCR spring Chinook at Wells Dam, 2009

	Projected Escapement											
	Origin								Total			
	Hatchery				Wild				Methow Basin			
Stock	Age-3	Age-4	Age-5	Total	Age-3	Age-4	Age-5	Total	Age-3	Age-4	Age-5	Total
MetComp	164	947	42	1,153	50	182	28	260	214	1,129	70	1,413
% Total				59%				88%				63%
Twisp	14	47	6	67	5	19	10	34	19	66	16	101
% Total				3%				12%				5%
Winthrop (MetComp)				723								723
				37%								
Total				1,943	55	201	38	294				2,237
				87%				13%				100%

Table 3. Assumptions and calculations to determine number of broodstock needed for BY 2009 production of 550,00 smolts

Smolt release		**550,000**	**Smolts**
Fertilization-to-release survival	90%		
Egg-take (Production)		611,000	Eggs
18% cull allowance [2/]		73,000	
Total Egg Take		**684,000**	**Eggs**
Fecundity	4,000 [1/]	171	Females spawned
Female to male ratio	1 to 1	341	Total spawned
Pre-spawn survival	**95%**	**359**	**Broodstock collection target**

[1/]- Based on historical program age-4 fecundities and expected 2009 return age structure (Table 1).

[2/]- Hatchery origin MetComp. component only, and is based on projected natural origin collection and assumption that all Twisp (hatchery and wild) and wild MetComp. will be retained for production.

Trapping at Wells Dam will occur at the East and West ladder traps beginning on 04 May, or at such time as the first spring Chinook are observed passing Wells Dam and continue through 24 June 2009. Access to the east ladder trap will be coordinated with staff at Wells Dam due to rotor rewind project. Trapping schedule will consists of 3-day/week (Monday-Wednesday), up to 16-hours/day. Two of the three trapping days will be concurrent with the stock assessment sampling activities authorized through the 2009 Douglas PUD Hatchery M&E Implementation Plan. Natural origin spring Chinook will be retained from the run, consistent with spring Chinook run timing at Wells Dam (weekly collection quotas). Once the weekly quota target is reached, broodstock collection will cease until the beginning of the next week. If a shortfall occurs in the weekly trapping quota, the shortfall will carry forward to the following weeks collection quota. All natural origin spring Chinook collected at Wells Dam for broodstock will be held at the Methow FH.

To meet Methow FH broodstock collection for hatchery origin Methow Composite and Twisp River stocks, adipose-present coded-wire tagged hatchery fish will be collected at Methow FH, Winthrop NFH and the Twisp Weir beginning 01May or at such time as spring Chinook are observed passing Wells Dam and continuing through 21 August 2009. Natural origin spring Chinook will be retained at the Twisp weir as necessary to bolster the Twisp program production so long as the aggregate collection at Wells Dam and Twisp River weir does not exceed 33% of the estimated Twisp River natural origin return past Wells Dam. All hatchery and natural origin fish collected at Methow FH, Twisp Weir and Winthrop NFH for broodstock will be held at the Methow FH.

Steelhead

Steelhead mitigation programs above Wells Dam (including the USFWS steelhead program at Winthrop NFH) utilize adult broodstock collections at Wells Dam and incubation/rearing at Wells Fish Hatchery (FH). The Wells Steelhead Program also provides eggs for UCR steelhead reared at Ringold FH, not as a mitigation requirement, but rather an opportunity to reduce the prevalence of early spawn hatchery steelhead in the mitigation component above Wells Dam. Typically, Wells hatchery origin steelhead held at Wells FH spawn earlier than natural origin steelhead. Early maturation of hatchery fish in the hatchery may indicate a propensity for these fish to spawn early in the natural environment as well and may have a negative effect on hatchery spawner success. In efforts to minimize impacts from early maturation, the Wells Hatchery program has transferred eggs from the earliest spawn hatchery steelhead to Ringold FH. Preliminary evaluations indicate that the mean spawn timing of HxH steelhead at Wells FH has been delayed and may be a function of these actions (Figure 1). Based on these preliminary evaluations, WDFW proposes to continue the transfer eggs from early spawn hatchery origin steelhead to Ringold FH.

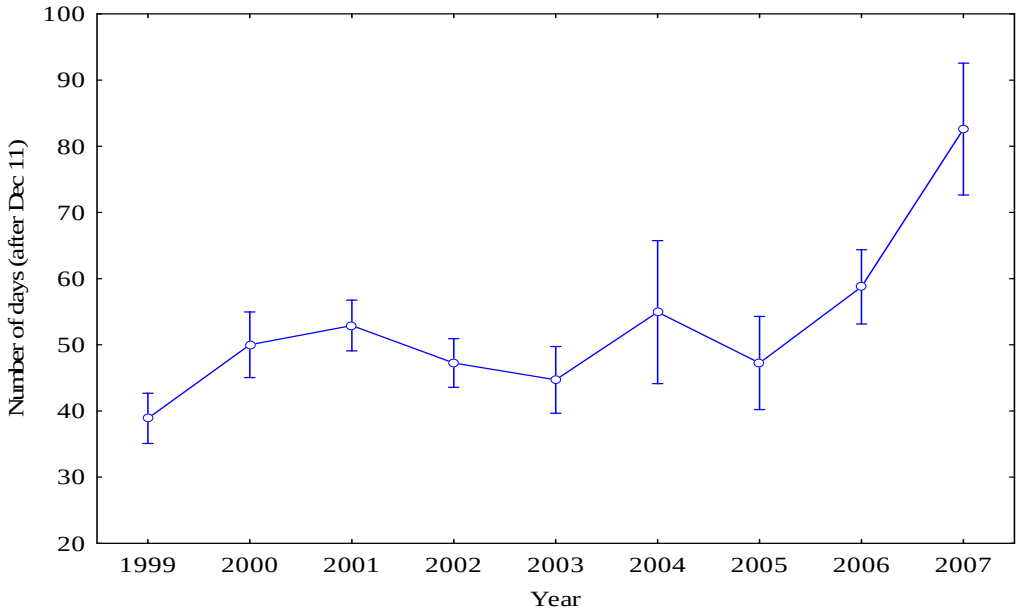

Figure 1. Mean spawn timing of HxH steelhead at Wells FH, BY 1999-2007 (WDFW unpublished Data).

Based on mitigation program production objectives (Table 4) and program assumptions (Table 5), the following broodstock collection protocol was developed.

Trapping at Wells Dam will selectively retain 366 steelhead (east and west ladder collection). Access to the east ladder trap will be coordinated with staff at Wells Dam due to rotor rewind project. Hatchery and natural origin collections will be consistent with run-timing of hatchery and natural origin steelhead at Wells Dam. The collection will retain no greater than 33% natural origin broodstock for the mitigation programs and 100% hatchery origin within the Ringold FH production component. Overall collection will be limited to no more than 33% of the entire run or 33% of the natural origin return. The east and west ladder trapping at Wells Dam will begin on 01 August and terminate by 31 October and will be operated concurrently, three days per week, up to 16 hours per day, if required to meet broodstock objectives. Trapping on the east ladder will be concurrent with summer Chinook broodstocking efforts through 14 September and will continue through 31 October, concurrent with west ladder steelhead collections. Adult return composition including number, origin, age structure, and sex ratio will be assessed in-season at Priest Rapids and Wells dams. Broodstock collection adjustments may be made based on in-season monitoring and evaluation.

Table 4. Adult steelhead collection objectives for programs supported through adult steelhead broodstock collection at Wells Dam.

Program	# Smolts	# eyed eggs	% Wild	# Wild	# Hatchery	Total Adults	
DCPUD [1/]	349,000	401,149	33%	59	119	178	
GCPUD [1/]	80,000	91,954	33%	14	27	41	
USFWS [1/]	80,000	91,954	33%	14	27	41	3/
Sub-Total	**509,000**	**585,057**	**33%**	**87**	**174**	**260**	
Ringold	180,000	240,000	0%	0	106	106	3/
Sub-Total	**180,000**	**240,000**	**0%**	**0**	**106**	**106**	
Grand Total [2/]	**689,000**	**825,057**	**24%**	**87**	**289**	**366**	

[1/]- Above Wells Dam releases. Target HxW parental adults as the hatchery component

[2/]- Based on steelhead production consistent with Mid Columbia HCP's, GCPUD BiOp and Section 10 Permit 1395.

[3/]- Based on adults required for eyed egg allotment

Table 5. Program assumptions used to determine adult collection required to meet steelhead production objectives for programs above Wells Dam and at Ringold Springs Fish Hatchery.

Program assumption	Standard
Pre-spawn survival	97%
Female to male ratio	1.0 : 1.0
Fecundity	5,400
Propagation survival	
87% fertilization to eyed egg	87%
86% eyed egg to yearling release	86% [1/]
75% fertilization to yearling release	75% [1/]

[1/]- Not applicable to Ringold Springs Fish Hatchery

Summer/fall Chinook

Summer/fall Chinook mitigation programs above Wells Dam utilize adult broodstock collections at Wells Dam and incubation/rearing at Eastbank Fish Hatchery. The total production level target is 976,000 summer/fall Chinook smolts for two acclimation/release sites on the Methow and Similkameen rivers (Carlton Pond and Similkameen Pond, respectively).

The TAC 2009 Columbia River UCR summer Chinook return projection to the Columbia River (Appendix A) and BY 2005, 2006 and 2007 spawn escapement to tributaries above Wells Dam indicate sufficient summer Chinook will return past Wells Dam to achieve full broodstock collection for supplementation programs above Wells Dam. Based on initial run expectations of summer Chinook to the Columbia River, program objectives and program assumptions (Table 6); the following broodstock collection protocol was developed.

WDFW will retain 556 natural-origin summer/fall Chinook at Wells Dam east and west ladder, including 278 females. Collection will be proportional to return timing between 01 July and 13 September. Access to the east ladder trap will be coordinated with staff at Wells Dam due to rotor rewind project. Trapping will occur 3-days/week, 16 hours/day. The 3-year old component will be limited to 10 percent of the broodstock collection. If the probability of achieving the broodstock goal is reduced based on actual natural-origin escapement levels, broodstock origin composition will be adjusted to meet the broodstock collection objective.

Table 6. Assumptions and calculations to determine number of broodstock needed for summer/fall Chinook production at Carlton and Similkameen ponds.

Program Assumption		Carlton Pond	Similkameen Pond	Total
Smolt release		**400,000**	**576,000**	**976,000**
Fertilization-to-release survival	90%			
Eggtake Target		**512,821**	**738,462**	**1,251,282**
Fecundity	5,000			
Female target		**103**	**148**	**250**
Female to male ratio	1 to 1			
Broodstock target		**205**	**295**	**501**
Pre-spawn survival	95%			
Total collection target		**228**	**328**	**556**

Columbia River Mainstem below Wells Dam

Summer/fall Chinook

Summer/fall Chinook mitigation programs that release juveniles directly into the Columbia River between Wells and Rocky Reach dams are supported through adult broodstock collections at Wells Dam. The total production level supported by this collection is 520,000 yearling and 1,562,000 sub-yearling Chinook. Upon agreement in the HCP, the 2009, summer Chinook broodstock collections at Wells FH may also include 250,000 green eggs to support the Yakama Nation (YN) reintroduction of summer Chinook to the Yakima River Basin. If approved by the HCP Hatchery Committee, the YN eggs will be the last eggs taken and will be the responsibility of staff associated with the YN program.

Adults returning from this program are to support harvest opportunities and are not intended to increase natural production and have been termed segregated harvest programs. These programs have contributed to harvest opportunities; however, adults from these programs have been documented contributing to the adult spawning escapement in tributaries upstream and downstream from their release locations. Because adults from these programs contribute to the natural spawn escapement, the broodstock collection will incorporate 10 percent natural-origin fish into the broodstock to reduce the potential genetic risk to the naturalized summer/fall Chinook stocks in the upper Columbia River region. Based on mitigation objectives and program assumptions (Table 7), the following broodstock collection protocol was developed.

WDFW will collect 1,476 run-at-large summer Chinook including 1,339 hatchery fish from the volunteer ladder trap at Wells Fish Hatchery outfall and 137 natural-origin fish from the Wells Hatchery outfall, and/or Wells Dam east and west ladders. Access to the east ladder trap will be coordinated with staff at Wells Dam due to rotor rewind project. Overall extraction of natural-origin fish passing Wells Dam (Wells program and above Wells Dam summer/fall Chinook programs) will not exceed 33 percent. West ladder collections will begin 01 July and completed by 14 September and will be consistent with run timing past Wells Dam. Due to fish health concerns associated with the volunteer collection site (warming Columbia River water during late August), the volunteer collection will begin 10 July and terminate by 31 August. The 3-year old component will be limited to 10 percent of the broodstock collection.

Table 7. Assumptions and calculations to determine number of broodstock needed for summer/fall Chinook production at Wells and Turtle Rock Island hatcheries.

	Standard		Wells FH		Turtle Rock FH		YN [1/]	
Program Assumption	**Sub-yearling**	**Yearling**	**Sub-yearling**	**Yearling**	**Sub-yearling**	**Yearling**	**green-egg**	**Total**
Smolt release			484,000	320,000	1,078,000	200,000	250,000	NA
Fertilization-to-release survival	73% [2/]	78%					NA	NA
Eggtake Target			663,014	410,256	1,476,712	256,410	250,000	3,056,392
Fecundity	4,600	4,600						
Female target			144	89	321	56	54	664
Female to male ratio	1 to 1	1 to 1						
Broodstock target			288	178	642	111	109	1,328
Pre-spawn survival	90%	90%						
Total collection target			**320**	**198**	**713**	**124**	**121**	**1,476**

[1/] - Green eggs for YN reintroduction program in the Yakima River Basin.

[2/] - Based on increased monitoring of the green egg-to-marking loss for BY 07 and 08 that indicates a un-fertilized- to- marking loss of 27%.

Coho

Yakama Nation will provide broodstock collection objectives for the coho reintroduction program in the Methow River basin. WDFW will work collaboratively with the Yakama Nation to facilitate coho collections at Wells Dam. Access to the east ladder trap will be coordinating with staff at Wells Dam due to the rotor rewind project.

Wenatchee River Basin

Spring Chinook

The Eastbank Fish Hatchery (FH) rears spring Chinook salmon for the Chiwawa River acclimation pond located on the Chiwawa River. The program production level target is 672,000 smolts, requiring a total broodstock collection of 379 spring Chinook (Table 8).

Table 8. Assumptions and calculations to determine number of broodstock needed for Chiwawa program release of 672,000 smolts.

Program Assumption	Standard	Chiwawa program
Smolt release		**672,000**
Fertilization-to-release survival	83%	
Eggtake Target		**809,639**
Fecundity	4,400	
Female target		**184**
Female to male ratio	1 to 1	
broodstock target		**368**
Pre-spawn survival	97%	
Total broodstock collection		**379**

Natural origin fish inclusion into the broodstock will continue to be a priority, with natural origin fish specifically being targeted. Consistent with ESA Section 10 Permit 1196, natural origin fish collections will not exceed 33 percent of the return to the Chiwawa River and will provide, at a minimum, 33 percent of the total broodstock retained.

In addition to production levels and ESA permit provisions, the 2009 broodstock collection, will again, as in 2008, target hatchery origin Chiwawa spring Chinook at Tumwater Dam. Also in 2009, an interim measure will include extraction of adipose clipped non-coded wire tag adult spring Chinook, as a strategy to reduce straying of Leavenworth NFH spring Chinook to the upper Basin habitat.

Pre-season estimates project 5,114 spring Chinook destine for the Chiwawa River, of which 703 (13.7%) and 4,411 fish (86.3%) are expected to be natural and hatchery origin spring Chinook, respectively (Table 9 and 10). Based on the projected 2009 Chiwawa River run-size and origin composition, and provisions in ESA Section 10 Permit 1196, WDFW will retain 379 spring

Chinook for broodstock purposes, representing 100% of the program broodstock objective. Two hundred and thirty-two (232) natural origin spring Chinook will be retained at the Chiwawa Weir and 147 adipose-clipped, CWT hatchery origin spring Chinook will be collected at Tumwater Dam. In-season assessment of the magnitude and origin composition of the spring Chinook return above Tumwater Dam will be used to provide in-season adjustments to broodstock collection, consistent ESA Section 10 Permit 1196.

Table 9. BY 2004-2006 age-class return projection for wild spring Chinook above Tumwater Dam during 2009

	Smolt Estimate		Chiwawa				Wen. Basin above Tumwater Dam				
Brood Year	1/ Chiwawa	2/ Wen. Basin	3/ Age-3	3/ Age-4	3/ Age-5	Total	3/ Age-3	3/ Age-4	3/ Age-5	Total	4/ SAR
2004	101,172	197,944	28	367	**169**	565	55	718	**331**	1,105	0.005581
2005	140,737	338,079	39	**510**	236	785	94	**1,226**	566	1,887	0.005581
2006	86,579	153,918	**24**	314	145	483	**43**	558	258	859	0.005581
Total 2008 Return			**24**	**510**	**169**	**703**	**43**	**1,226**	**331**	**1,600**	

1/- Smolt production estimate.

2/- smolt production estimate based on proportional redd disposition in the Wenatchee Basin above Tumwater Dam and Chiwawa smolt production estimate.

3/- Based on average age-at-return for natural-origin spring Chinook above Tumwater Dam (WDFW unpublished data).

4/- Mean Chiwawa spring Chinook SAR to the Wenatchee Basin (BY 1998-2003)(WDFW unpublished data).

Table 10. BY 2004-2006 age-class return projection for Chiwawa Hatchery spring Chinook above Tumwater Dam during 2009

	Smolt Estimate	Adult Return				
Brood Year	1/ Chiwawa	2/ Age-3	2/ Age-4	2/ Age-5	Total	3/ SAR
2004	494,517	883	2,564	**757**	4,203	0.0085
2005	494,012	882	**2,561**	756	4,199	0.0085
2006	612,482	**1,093**	3,176	937	5,206	0.0085
Total 2008 Return		**1,093**	**2,561**	**757**	**4,411**	

1/- Chiwawa smolt release (Hillman et al. 2007)

2/- Based on average age-at-return for natural-origin spring Chinook above Tumwater Dam (Hilllman et al. 2007) . and total estimated BY return.

3/- Mean Chiwawa hatchery spring Chinook SAR to the Wenatchee Basin (BY 1996-2001)

Trapping at Tumwater Dam will begin 01 May and will be concurrent with trapping for the Spring Chinook Reproductive Success Study. Collection at both Tumwater Dam and Chiwawa Weir will be based on weekly quotas, consistent with average run timing at Tumwater Dam. If the weekly quota is attained prior to the end of the week, retention of spring Chinook for broodstock will cease. If the weekly quota is not attained, the shortfall will carry forward to the next week. The number of hatchery origin fish retained at Tumwater Dam will be adjusted in-season, based on estimated Chiwawa River natural-origin returns provided through extrapolation of returns past Tumwater

Dam. If hatchery origin Chinook are retained in excess to that required to maintain a minimum 33 percent natural origin composition in the broodstock, excess fish will be returned to the Chiwawa River beginning the third week of July.

Throughout broodstock collection at Tumwater Dam, adipose absent, non-CWT spring Chinook will be extracted and provided to USFWS as a measure to reduce the prevalence of non-endemic spring Chinook above Tumwater Dam. All adults that are found at Tumwater Dam with a missing adipose fin and lacking a coded wire tag will be putatively classified as LNFH strays. However, it is likely that some proportion of the adipose clipped non-CWT fish are ESA-listed hatchery adults that have shed their tags. Based on the BY 2004, 2005, and 2006 tag rate for Chiwawa spring Chinook and the projected 2009 Chiwawa hatchery return to Tumwater Dam, the extraction of adipose clipped non-CWT spring Chinook may include 61 Chiwawa spring Chinook, representing just 1.4% of the projected 4,411 returning Chiwawa hatchery origin spring Chinook. Based on the USFWS estimates of projected LNFH strays arriving at Tumwater Dam in 2009 (USFWS 2009), the extraction action is expected to remove an estimated 89 LNFH stays, representing 54% of the total stray estimate. With reduced rates of CWT marking at LNFH (in upcoming return years) the USFWS forecasts that the rate of extraction of LNFH strays at Tumwater will increase to 68% in 2010, 75% in 2011, and 80% in 2011. As long as CWT marking rates remain at the current USFWS goal of 17%, the extraction rate of LNFH strays at Tumwater Dam will remain greater than 80% for 2012 and beyond. Logistics for 2009 extraction activities will be coordinated between USFWS, WDFW and CPUD.

Broodstock collection at the Chiwawa Weir will begin 01 June and terminate no later than 10 September. Spring Chinook trapping at the Chiwawa Weir will follow a 4-days up and 3-days down schedule, consistent with weekly broodstock collection quotas that approximate the historical run timing and a maximum 33 percent retention of the projected natural-origin escapement to the Chiwawa River. If the weekly quota is attained prior to the end of the 4-day trapping period, trapping will cease. If the weekly quota is not attained within the 4- day trapping period, the shortfall will carry forward to the next week.

All bull trout and spring Chinook in excess of broodstock needs trapped at the Chiwawa weir will be transported by tank truck and released into a resting/recovery pool at least 1.0 km upstream from the Chiwawa River Weir.

Steelhead

The steelhead mitigation program in the Wenatchee Basin use broodstock collections at Dryden and Tumwater dams located on the Wenatchee River. Per ESA section 10 Permit 1395 provisions, broodstock collection will target 50% natural origin fish and 50% hatchery origin fish, not to exceed 33% of the natural origin steelhead return to the Wenatchee Basin. Based on these limitations and the assumptions listed below (Table 11), the following broodstock collection protocol was developed.

WDFW will retain 208 mixed origin steelhead at Dryden and Tumwater dams, including 104 natural origin and 104 hatchery origin steelhead. Collection will be proportional to return timing between 01 July and 12 November. Collection may also occur between 13 November and 3 December at both traps, concurrent with the Yakama Nation coho broodstock collection activities. Hatchery x hatchery parental cross and unknown hatchery parental cross adults will be excluded from the broodstock collection. Hatchery steelhead parental origins will be determined through

evaluation of VIE tags and PIT tag interrogation during collection. Adult return composition including number, origin, age structure, and sex ratio will be assessed in-season at Priest Rapids and at Dryden Dam. Broodstock collection adjustments may be made based on these in-season monitoring and evaluation.

In the event that steelhead collections fall substantially behind schedule, WDFW may initiate/coordinated adult steelhead collection in the mainstem Wenatchee River by hook and line. In addition to trapping and hook and line collection efforts, Tumwater and Dryden dams may be operated between February and early April to supplement broodstock numbers if the fall trapping effort provides fewer than 208 adults.

Table 11. Assumptions and calculations to determine number and origin of adult steelhead needed for Wenatchee Basin Steelhead program release of 400,000 smolts.

Program Assumption	Standard	Wenatchee program
Smolt release		**400,000**
Fertilization-to-release survival	75%	
Eggtake Target		**533,333**
Fecundity	5,400	
Female target		**99**
Female to male ratio	1 to 1	
broodstock target		**198**
Pre-spawn survival	95%	
Total broodstock collection		**208**
Natural : hatchery ratio	1 to 1	
Natural origin collection total		**104**
Hatchery origin collection total		**104**

Summer/fall Chinook

Summer/fall Chinook mitigation programs in the Wenatchee River Basin utilize adult broodstock collections at Dryden and Tumwater dams, incubation/rearing at Eastbank Fish Hatchery (FH) and acclimation/release from the Dryden Acclimation Pond. The total production level target is 864,000 smolts.

The TAC 2009 Columbia River UCR summer Chinook return projection to the Columbia River (Appendix A) and BY 2005, 2006 and 2007 spawn escapement to the Wenatchee River indicate sufficient summer Chinook will return to the Wenatchee River to achieve full broodstock collection for the Wenatchee River summer Chinook supplementation program. Review of recent summer/fall Chinook run-timing past Dryden and Tumwater dam indicates that previous broodstock collection activities have omitted the early returning summer/fall Chinook, primarily due to limitations imposed by ESA Section 10 Permit 1347 to minimize impacts to listed spring Chinook. In an effort to incorporate broodstock that better represent the summer/fall Chinook run timing in the Wenatchee Basin, the broodstock collection will front-load the collection to account for the disproportionate collection timing. Approximately 43 percent of the summer/fall Chinook passage to the upper Basin occurs prior to the end of the first week of July; therefore, the collection will provide 43 percent of the objective by the end of the first week of July. Weekly collection after the

first week of July will be consistent with run timing of summer/fall Chinook during the remainder of the trapping period. Collections will be limited to a 33 percent extraction of the estimated natural-origin escapement to the Wenatchee Basin. Based on these limitations and the assumptions listed below (Table 12), the following broodstock collection protocol was developed.

WDFW will retain 492 natural-origin, summer Chinook at Dryden and Tumwater dams, including 246 females. To better assure achieving the appropriate females equivalents for programmed production, the collection will utilize ultra-sound equipment to determine the sex of each fish retained for broodstock. Trapping at Dryden Dam will begin 01 July and terminate no later than 14 September and operate up to 7-days/week, 24-hours/day. Trapping at Tumwater Dam may begin 15 July and terminate no later than 14 September and operate 3-days/week, 8-hours/day.

If the probability of achieving the broodstock goal is reduced, based on the estimated escapement levels, broodstock composition will be adjusted to meet the broodstock collection objective of 492 summer Chinook..

Table 9. Assumptions and calculations to determine number of summer Chinook broodstock needed for Wenatchee Basin program release of 864,000 smolts.

Program Assumption	Standard	Wenatchee program
Smolt release		**864,000**
Fertilization-to-release survival	78%	
Eggtake Target		**1,107,692**
Fecundity	5,000	
Female target		**222**
Female to male ratio	1 to 1	
broodstock target		**443**
Pre-spawn survival	90%	
Total broodstock collection		**492**

Sockeye

Sockeye Salmon mitigation in the Wenatchee River Basin utilizes adult broodstock collections at Tumwater Dam, incubation/rearing at Eastbank Fish Hatchery (FH) and rearing/pre-smolt releases from the net pens in Lake Wenatchee. The total production level for the 2009 BY is 200,000 pre-smolts. 1/

The TAC 2009 UCR sockeye return projection to Columbia River (Appendix A) indicates sufficient Lake Wenatchee sockeye will be available to meet broodstock collection objectives. Based on TAC projected return, 100% natural-origin broodstock composition and assumptions listed below (Table 13), the following broodstock collection protocol was developed.

WDFW will retain 260 natural origin sockeye, proportional to run timing at Tumwater Dam. Due to the unequal sex ratio in previous years, attempts will be made to collect an equal number of males and females. Trapping may begin on 15 July and terminate by 15 August. Trapping will occur no more than 3-days/week, 8- hours/day.

1/- Chelan HCP Hatchery Committee has agreed to future production level of 280,000 fish, pending appropriate infrastructure improvements.

Table 13. Assumptions and calculations to determine number of sockeye salmon broodstock needed for Wenatchee Basin program release of 200,000 pre-smolts.

Program Assumption	Standard	Wenatchee program
Smolt release		**200,000**
Fertilization-to-release survival	78%	
Eggtake Target		**256,410**
Fecundity	2,615	
Female target		**99**
Female to male ratio	1 to 1	
broodstock target		**198**
Pre-spawn survival	76%	
Total broodstock collection		**260**

Coho

Yakama Nation will provide broodstock collection objectives and program assumptions for the coho reintroduction program in the Wenatchee River basin. WDFW will work collaboratively with the Yakama Nation to facilitate coho broodstock collections at Dryden and Tumwater Dam.

White River Spring Chinook Captive Brood

Smolt production associated with the White River Captive Broodstock Program (150,000 smolts) will be separate from the smolt production objective associated with the Chiwawa River adult supplementation program. Spawning, incubation, rearing acclimation and release will be consistent with provisions of ESA Permit 1592.

Broodstock collection efforts for brood year 2009 will be addressed in a document separate from this 2009 broodstock collection/protocol document and developed through the Priest Rapids Coordinating Committee Hatchery Committee (PRCC HC).

Priest Rapids Fall Chinook

Collection of fall Chinook broodstock at Priest Rapids Hatchery will generally begin in early September and continue through mid November. Smolt release objectives specific to Grant PUD (5,000,000 sub-yearlings) and Federal (1,700,000 sub-yearlings) mitigation commitments and biological assumptions are detailed in Table 14.

Agreements are in place and/or being negotiated that would allow Priest Rapids to take up to 3.7M eyed eggs for the Ringold Springs Rearing Facility. Us V Oregon parties recently agreed that the brood stock used for the program at Ringold should be Priest Rapids stock. This was also a key recommendation by HSRG. This program is partial mitigation for the John Day Dam and will be funded by the ACOE if implemented. Upon negotiated agreement among the effected parties for the additional egg collection for Ringold Springs Rearing Facility, the broodstock collection total will be adjusted accordingly.

Table 14. Assumptions and calculations to determine the number of fall Chinook broodstock needed for the Priest Rapids program release of 6,700,000 sub-yearling fall Chinook

Biological Assumptions	Standard	Program Objective
Smolt Production level:		
Grant PUD Mitigation-PUD Funded		**5,000,000**
John Day Mitigation- Federally Funded		**1,700,000**
Fert.-to-release survival	87%	
Eggtake Target		**7,700,000**
Fecundity	*4,500*	
Female requirement		**1,711**
Sex ratio	*1:1*	
Pre-Spawn Survival	*88%*	
Broodstock Required		**3,888**

Reference

Snow et al. 2007. Snow, C., c. Frady, A. Fowler, A. Murdoch, M. Small, K. Warheit, and C. Dean. Monitoring and evaluation of the Wells and Methow programs in 2006. Prepared for Douglas County Public Utility District and Wells Habitat Conservation Plan Hatchery Committee. Washington Dept. of Fish and Wildlife, Supplementation Research Office, Twisp, WA., and Washington Dept. Fish and Wildlife, Conservation Unit, Genetics Lab, Olympia, WA.

USFWS 2009. Hatchery and Genetics Management Plan (HGMP), Leavenworth National Fish Hatchery. U.S. Fish and Wildlife Service, Leavenworth, WA.

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

Fishing & Shellfishing

2009 Forecasts: Spring Chinook, Summer Chinook and Sockeye

2009 Forecasts For Columbia River Spring Chinook, Summer Chinook, Sockeye and Steelhead			
	2008 Forecast	**2008 Return**	**2009 Forecast**
Total Spring Chinook	**326,300**	**223,330**	**353,700**
Lower River Stocks	**57,000**	**44,730**	**54,800**
Willamette River [1/]	34,100	27,000	37,600
Cowlitz River [2/]	5,200	2,700	4,100
Kalama River [2/]	3,700	1,600	900
Lewis River [2/]	3,500	2,400	2,200
Sandy River [2/]	6,800	6800	5,200
Select Areas			
Youngs Bay	2,000	3,200	2,850
Tongue Point	1,400	1,000	1,450
Blind Slough	270	2,60	470
Deep River	30	30	30
Upriver [3/]	**269,300**	**178,600**	**298,900**
Snake River [4/]	145,400	99,200	
Snake River Wild [5/]	21,100	23,600	
Upper Columbia [4/]	23,300	19,800	
Upper Columbia Wild [6/]	2,900	2,000	
Wind River [2/ 4/]	10,000		
Little White Salmon [2/ 4/]	36,800		
Klickitat River [2/ 4/]	1,100	1,000	2,000
Yakima River [2/ 4/]	10,100	6,600	15,900

Upper Columbia Summer Chinook	**52,000**	**55,500**	**70,700**
Sockeye	75,600	214,500	183,800
Wenatchee Stock	13,700	26,300	18,300
Okanogan Stock	61,200	187,200	164,900
Snake River Sockeye	700	1,000	600
Steelhead			
Wild Winter Steelhead	15,300		
Summer Steelhead [7/]	**326,400**	**355,100**	
Skamania Hatchery	*8,200*	*11,300*	
Skamania Wild	*2,200*	*4,500*	
Group A-Index Hatchery	*196,900*	*164,200*	
Group A-Index Wild	*69,400*	*81,600*	
Group B-Index Hatchery	*41,200*	*74,900*	
Group B Index Wild	*8,500*	*18,500*	

[1/] Includes age-3 jacks.
[2/] To mouth of tributary.
[3/] Includes Snake Summer Chinook.
[4/] Included in Upriver Spring Chinook number.
[5/] Included in Snake River Spring Chinook number.
[6/] Included in Upper Columbia Spring Chinook number.
[7/] To Bonneville Dam.

Prepared by *U.S. v Oregon* Technical Advisor Committee
January 28, 2009

APPENDIX I
2009 CHELAN PUD ACTION PLAN

2009 Rocky Reach and Rock Island
HCP Action Plan

	Dec 2008			Jan-09			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec			Actual Completion Date
Action Item	1	15	31	1	15	31	1	15	31	1	15	31	1	15	31	1	15	31	1	15	31	1	15	31	1	15	31	1	15	31	1	15	31	1	15	31	1	15	31	
HCP COORDINATING COMMITTEE																																								
2008 study results	D											F																												
Deliver 2008 RR Bypass Evaluation report		F																																						
Deliver 2009 Bypass Evaluation plan	D							F																																
Deliver 2009 Bypass Report																																				D			F	
Deliver 2009 study plan						D					F																													
Deliver 2009 Study results																																	D						F	
Pikeminnow long-line control programs																																								
Pike minnow angling control programs																																								
Avian Predation programs																																								
Northern Pikeminnow Ladder Trapping RI/RR																																								
Proposed Pikeminnow Effort in Wanapum Pool																																								To Be Determined
Deliver 2009 RI/RR Fish Passage Plan								D			F																													
Deliver 2009 Spill Report																																					F			
RR & RI Spring Survival Studies																																								
RR 9% Summer Spill																																								
RI 10% Spring spill																																								
RI 20% Summer Spill																																								
RR Juvenile Fish Bypass Operations																																								
RR Surface Collector Hydroacoustics																																								
RR CFD Model																																								
RR Modeling/Engineering-screens																																								
HCP Annual Report								D						F																										
HCP HATCHERY COMMITTEE																																								
Wenatchee steelhead HGMP submittal												X																												
Wenatchee spring Chinook HGMP submittal																X																								
Determine 2010 hatchery projects																					D												F							
Hatchery M & E Report									D							F																								
2009 Hatchery M & E work plans																						D						F											
2010 Hatchery Operations work plan																												D									F		
2009 Hatchery Operations budget																									D						F								
Partial re-use Pond Pilot - Fish in ponds																			X																					
Partial re-use Pond Pilot - Fish out of ponds																																		X						
HCP TRIBUTARY COMMITTEE																																								
Plan Species Account Annual Deposit						X																																		
Project solication process																																								To Be Determined
Project approval deadline																																								To Be Determined
Implementation																																								Ongoing

D = Draft
F = Final

APPENDIX J
2009 ANNUAL FINANCIAL REPORT FOR THE PLAN SPECIES ACCOUNTS



PUBLIC UTILITY DISTRICT NO. 1 of CHELAN COUNTY
P.O. Box 1231, Wenatchee, WA 98807-1231 • 327 N. Wenatchee Ave., Wenatchee, WA 98801
(509) 663-8121 • Toll free 1-888-663-8121 • www.chelanpud.org

MEMORANDUM

DATE: **January 15, 2010**

TO: **Becky Gallaher**
Natural Resources Contract Coordinator

C: **Keith Truscott**
Natural Resources Program Department Manager

FROM: **Debbie Litchfield** Debbie Litchfield
Treasurer/Director – Finance Division

RE: **Rocky Reach Hydro Project Habitat Conservation Plan**
2009 Annual Financial Report, Plan Species Account

In accordance with Section 7.4.3 of the Rocky Reach Habitat Conservation Plan attached is the 2009 year end annual financial report of the Plan Species Account activity completed by Chelan County Public Utility District No. 1.

Chelan County PUD
Rocky Reach Hydroelectric Project
Habitat Conservation Plan
Plan Species Cash Account Activity
Annual Financial Report Per Section 7.4.3
Reporting Period: 1/1/2009 - 12/31/2009

Beginning Balance:	**1/1/2009**		**$ 1,306,988.03**
Transfers In:			
Rocky Reach Funding		307,933.00	
Interest Earnings		16,316.28	
			324,249.28
Transfers Out:			
Payments		(126,018.95)	
Bank Service Fees		(94.00)	
			(126,112.95)
Ending Balance:	**12/31/2009**		**$ 1,505,124.36**

The Plan Species Account was established per the Rocky Reach Habitat Conservation Plan, Section 7.4. Interest earnings shall remain in the Account in accordance with Appendix E, Section 7.4.1.



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RE: **Rock Island Hydro Project Habitat Conservation Plan**
2009 Annual Financial Report, Plan Species Account

In accordance with Section 7.4.3 of the Rock Island Habitat Conservation Plan attached is the 2009 year end annual financial report of the Plan Species Account activity completed by Chelan County Public Utility District No. 1.

Chelan County PUD
Rock Island Hydroelectric Project
Habitat Conservation Plan
Plan Species Cash Account Activity
Annual Financial Report Per Section 7.4.3
Reporting Period: 1/1/2009 - 12/31/2009

Beginning Balance:	**1/1/2009**		**$ 2,396,872.11**
Transfers In:			
Rock Island Funding		650,181.00	
Reimbursement For Payment Over Expense		697.51	
Interest Earnings		29,523.16	
			680,401.67
Transfers Out:			
Payments		(292,203.00)	
Bank Service Fees		(94.05)	
			(292,297.05)
Ending Balance:	**12/31/2009**		**$ 2,784,976.73**

The Plan Species Account was established per the Rock Island Habitat Conservation Plan, Section 7.4. Interest earnings shall remain in the Account in accordance with Appendix E, Section 7.4.1.

APPENDIX K
MONITORING AND EVALUATION OF THE CHELAN COUNTY PUD HATCHERY PROGRAMS – 2008 ANNUAL REPORT

(Appendix K is provided only in the CD-ROM versions of this report and in the submittal to FERC. This appendix is available from Chelan PUD upon request. In addition, appendices to the M&E report are not included and are also available upon request.)

MONITORING AND EVALUATION OF THE CHELAN COUNTY PUD HATCHERY PROGRAMS

2008 Annual Report

June 1, 2009

Prepared by:

T. Hillman
M. Miller
BioAnalysts, Inc.
Boise, ID

J. Miller
Chelan PUD
Wenatchee, WA

M. Tonseth
T. Miller
K. Truscott
A. Murdoch
WA Dept of Fish and Wildlife
Wenatchee, WA

Prepared for:
HCP Hatchery Committee
Wenatchee, WA

TABLE OF CONTENTS

PREFACE

This annual report is the result of coordinated field efforts conducted by Washington Department of Fish and Wildlife (WDFW), the Confederated Tribes and Bands of the Yakama Nation (Yakama Nation), Chelan County Public Utility District (Chelan PUD), and BioAnalysts, Inc. An extensive amount of work was conducted in 2006 through 2008 to collect the data needed to monitor the effects of the Chelan County PUD Hatchery Programs. This work was directed and coordinated by the Habitat Conservation Plan (HCP) Hatchery Committee, consisting of the following members: David Carie, U.S. Fish and Wildlife Service (USFWS); Jerry Marco, Confederated Tribes of the Colville Reservation (Colville Tribes); Kristine Petersen, National Marine Fisheries Service (NMFS); Shaun Seaman, Chelan County PUD; Tom Scribner, the Yakama Nation; and Kirk Truscott, WDFW.

The approach to monitoring the hatchery programs was guided by the "*Conceptual Approach to Monitoring and Evaluating the Chelan County Public Utility District Programs*" written by Andrew Murdoch and Chuck Peven. Technical aspects of the monitoring and evaluation program were developed by the Hatchery Evaluation Technical Team (HETT), which consists of the following scientists: Matt Cooper, USFWS; Steve Hays, Chelan PUD; Tracy Hillman, BioAnalysts; Tom Kahler, Douglas PUD; Rick Klinge, Douglas PUD; Russell Langshaw, Grant PUD; Ben Lenz, Grant PUD; Joe Miller, Chelan PUD; Andrew Murdoch, WDFW; Keely Murdoch, Yakama Nation; Kristine Petersen, NMFS; and Ali Wick, Anchor Environmental. The HETT developed an "*Analytical Framework for Monitoring and Evaluating PUD Hatchery Programs*" (Hays et al. 2006), which directs the analyses of hypotheses developed under the conceptual approach. Most of the analyses outlined in the Analytical Framework paper will be conducted after the fifth year of monitoring.

Most of the work reported in this paper was funded by Chelan PUD. Bonneville Power Administration purchased the Passive Integrated Transponder (PIT) tags that were used to mark juvenile Chinook and steelhead captured in tributaries. This is the third annual report written under the direction of the HCP.

"I often say that when you can measure something and express it in numbers, you know something about it. When you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind. It may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the stage of science, whatever it may be."

Lord Kelvin

SECTION 1: INTRODUCTION

Chelan PUD implements hatchery programs as part of two Habitat Conservation Plan (HCP) agreements related to the operation of Rocky Reach and Rock Island dams. The HCPs define the goal of achieving no net impact to spring Chinook, summer/fall Chinook, sockeye salmon, steelhead, and coho salmon affected by the operation of these dams. The two HCPs identify general program objectives as "*contributing to the rebuilding and recovery of naturally reproducing populations in their native habitats, while maintaining genetic and ecologic integrity, and supporting harvest*." The fish resource management agencies initially developed the following general goal statements for each hatchery program, which were adopted by the Hatchery Committee:

(1) Support the recovery of ESA listed species by increasing the abundance of natural adult population, while ensuring appropriate spatial distribution, genetic stock integrity, and adult spawner productivity.

Includes the Wenatchee spring Chinook, Wenatchee summer steelhead, and Methow spring Chinook programs.

(2) Increase the abundance of the natural adult population of unlisted plan species, while ensuring appropriate spatial distribution, genetic stock integrity, and adult spawner productivity. In addition, provide harvest opportunities in years when spawning escapement is sufficient to support harvest.

Includes the Wenatchee sockeye, Wenatchee summer/fall Chinook, Methow summer/fall Chinook, Okanogan summer/fall Chinook, and Okanogan sockeye programs.

(3) Provide salmon for harvest and increase harvest opportunities, while segregating returning adults from natural tributary spawning populations.

Includes the Turtle Rock summer/fall Chinook program.

Thus, there are two different types of artificial propagation strategies that address the different goals of the program: supplementation and harvest augmentation. The supplementation programs primarily focus on increasing the natural production of fish in tributaries. A fundamental assumption of this strategy is that hatchery fish returning to the spawning grounds are "reproductively similar" to naturally produced fish. The second program type, harvest augmentation, focuses on increasing harvest opportunities. This is accomplished by releasing hatchery fish directly into the Columbia River with the intent that returning adults remain segregated from the naturally spawning populations in tributaries.

Monitoring is needed to determine if the programs are performing properly. The HCP Hatchery Committee adopted a monitoring and evaluation (M&E) approach that will guide the assessment of the hatchery programs. The approach, developed by Murdoch and Peven (2005), identified the following objectives:

(1) Determine if supplementation programs have increased the number of naturally spawning and naturally produced adults of the target population relative to a non-supplemented population (i.e., reference stream) and the changes in the natural replacement rate (NRR) of the supplemented population is similar to that of the non-supplemented population.

(2) Determine if the run timing, spawn timing, and spawning distribution of both the natural and hatchery components of the target population are similar.

(3) Determine if genetic diversity, population structure, and effective population size have changed in natural spawning populations as a result of the hatchery program. Additionally, determine if hatchery programs have caused changes in phenotypic characteristics of natural populations.

(4) Determine if the hatchery adult-to-adult survival (i.e., hatchery replacement rate or HRR) is greater than the natural adult-to-adult survival (i.e., natural replacement rate or NRR) and equal to or greater than the program-specific HRR expected value based on estimated survival rates listed in Appendix D in Murdoch and Peven(2005).

(5) Determine if the stray rate of hatchery fish is below the acceptable levels to maintain genetic variation between stocks.

(6) Determine if hatchery fish were released at the programmed size and number.

(7) Determine if the proportion of hatchery fish on the spawning grounds affects the freshwater productivity (i.e., number of juveniles per redd) of supplemented streams when compared to non-supplemented streams.

(8) Determine if harvest opportunities have been provided using hatchery returning adults where appropriate (e.g., Turtle Rock program).

Two additional objectives that were not explicit in the goals specified above but were included in the M&E approach because they relate to goals and concerns of all artificial production programs include:

(9) Determine whether bacterial kidney disease (BKD) management actions lower the prevalence of disease in hatchery fish and subsequently in the naturally spawning population. In addition, when feasible, assess the transfer of *Renibacterium salmoninarum* (Rs) infection at various life stages from hatchery fish to naturally produced fish.

(10) Determine if the release of hatchery fish impact non-target taxa of concern (NTTOC) within acceptable limits.

Attending each objective is one or more testable hypotheses (see Murdoch and Peven 2005). Each hypothesis will be tested statistically following the routines identified in Hays et al. (2006). Most of these analytical routines will be conducted at the end of five-year monitoring blocks, as outlined in the M&E plan (Murdoch and Peven 2005; Hays et al. 2006).

Throughout each five-year monitoring period, annual reports will be generated that describe the M&E data collected during a specific year. This is the third annual report developed under the direction of the M&E guidance approach (Murdoch and Peven 2005). The purpose of this report is to describe monitoring activities conducted in 2008. Activities included broodstock collection, collection of life-history information, within hatchery spawning and rearing activities, juvenile monitoring within streams, and redd and carcass surveys. Data from reference areas are not included in this annual report, because the process of selecting reference areas is still occurring. To the extent currently possible, we have included information collected before 2008.

This report is divided into several sections, each representing a different species (i.e., steelhead, sockeye salmon, spring Chinook, and summer Chinook). For all species we provide broodstock information; hatchery rearing history, release data, and survival estimates; disease information; juvenile migration and productivity estimates; redd counts, distribution, and spawn timing; spawning escapements; and life-history characteristics. For salmon species, we also provide information on carcasses.

Finally, we end each section by addressing compliance issues with ESA/HCP mandates. For each Chelan PUD Hatchery Program, WDFW and the PUD are authorized annual take of ESA-listed spring Chinook and steelhead through Section 10 of the Endangered Species Act (ESA), including:

1. ESA Section 10(a)(1)(A) Permit No. 1395, which authorizes the annual take of adult and juvenile endangered upper Columbia River (UCR) spring Chinook and endangered UCR steelhead associated with implementing artificial propagation programs for the enhancement of UCR steelhead. The authorization includes takes associated with adult broodstock collection, hatchery operations, juvenile fish releases, monitoring and evaluation activities, and management of adult returns related to UCR steelhead artificial propagation programs in the UCR region (NMFS 2003a).
2. ESA Section 10(a)(1)(A) Permit No. 1196, which authorizes the annual take of adult and juvenile endangered UCR spring Chinook and endangered UCR steelhead associated with implementing artificial propagation programs for the enhancement of UCR spring Chinook. The authorization includes takes associated with adult broodstock collection, hatchery operations, juvenile fish releases, and monitoring and evaluation activities supporting UCR spring Chinook artificial propagation programs in the UCR region (NMFS 2004).
3. ESA Section 10(a)(1)(A) Permit No. 1347, which authorizes the annual incidental take of adult and juvenile endangered UCR spring Chinook and endangered UCR steelhead through actions associated with implementing artificial propagation programs for the enhancement of non-listed anadromous fish populations in the UCR. The authorization includes incidental takes associated with adult broodstock collection, hatchery operations, juvenile fish releases, and monitoring and evaluation activities associated with non-listed summer Chinook, fall Chinook, and sockeye salmon artificial propagation programs in the UCR region (NMFS 2003b).

SECTION 2: SUMMARY OF METHODS

Sampling in 2008 followed the methods and protocols described in Murdoch and Peven (2005) and Peven (2007). In this section we only briefly review the methods and protocols. More detailed information can be found in Murdoch and Peven (2005) and Peven (2007).

2.1 Broodstock Sampling

Methods for collecting broodstock during 2008 are described in Appendix A in WDFW (2007). Methods for sampling broodstock are described in Appendices A and B in Murdoch and Peven (2005). Generally, 2008 broodstock were collected over the migration period (to the extent allowed in ESA-permit provisions) in proportion to their temporal occurrence at collection sites, with in-season adjustments dictated by 2008 run timing and trapping success relative to achieving weekly and annual collection objectives. Pre-season weekly collection objectives are shown in Table 2.1 and assumptions associated with broodstock trapping are provided in Table 2.2.

Table 2.1. Weekly collection objectives for steelhead, sockeye, and Chinook in 2008.

Collection week beginning day	Chiwawa Spring Chinook[a]		Wild Wenatchee Summer Chinook	Wild ME/OK Summer Chinook	Wenatchee Steelhead		Wild Wenatchee Sockeye[b]	
	Hatchery	Wild			Hatchery	Wild	Male	Female
16 May	1							
23 May	5	5						
1 June	15	12						
10 June	21	17						
17 Jun	29	24						
24 Jun	35	29						
1 Jul	40	34	126	87	1	1		
8 Jul	33	27	98	83	1	1		
15 Jul	17	12	82	83	1	1	20	20
22 Jul	8	7	63	73	1	1	40	40
29 Jul	4	4	44	59	1	1	25	25
5 Aug			29	44	4	4	20	20
12 Aug			21	40	7	7	16	16
19 Aug			16	26	8	8	9	9
26 Aug			13	24	7	7		
2 Sep				23	6	6		
9 Sep				14	6	6		
16 Sep					8	8		
23 Sep					9	9		
30 Sep					17	17		
7 Oct					15	15		
14 Oct					8	8		
21 Oct					4	4		
28 Oct								

Collection week beginning day	Chiwawa Spring Chinook[a]		Wild Wenatchee Summer Chinook	Wild ME/OK Summer Chinook	Wenatchee Steelhead		Wild Wenatchee Sockeye[b]	
	Hatchery	Wild			Hatchery	Wild	Male	Female
Total	**208**	**171**	**492**	**556**	**104**	**104**	**130**	**130**

[a] Collection quota based on 29 April 2008 run-escapement abundance and migration timing estimate.
[b] Collection targeted equal numbers of males and females.

Table 2.2. Biological and trapping assumptions associated with collecting broodstock for the Chelan PUD Hatchery Programs (from Appendix A in Murdoch and Peven 2005).

Assumptions	Wenatchee Steelhead	Wenatchee Sockeye	Chiwawa Spring Chinook	Wenatchee Summer Chinook	ME/OK Summer Chinook
Production level	400,000 yearling smolts	200,000 subyearlings	672,000 yearling smolts	864,000 yearling smolts	976,000 yearling smolts
Broodstock required	208 adults (not to exceed 33% of population)	260 adults (not to exceed 33% of population)	379 adults (not to exceed 33% of population)	492 adults (not to exceed 33% of the population)	556 adults (not to exceed 33% of the population)
Trapping period	7 July – 12 Nov	7 July – 28 Aug	1 May – 12 Sep	7 Jul – 12 Sep	7 Jul – 15 Sep
# days/week	5	3	4	5	3
# hours/day	24	16	24	24	16
Broodstock composition	50% wild; 50% WxW and/or HxW	100% wild	Sliding scale; minimum 33% wild (depends on the number of wild fish)	100% wild	100% wild
Trapping site	Dryden Dam (Tumwater will be used if weekly quota not achieved at Dryden Dam)	Tumwater Dam	Tumwater Dam (hatchery fish only) and the Chiwawa Weir (both hatchery and wild fish)	Dryden Dam (Tumwater will be used if weekly quota not achieved at Dryden Dam)	Wells Dam east ladder

Several biological parameters were measured during broodstock collection at adult collection sites. Those parameters included the date and start and stop time of trapping; number of each species collected for broodstock; origin, size, and sex of trapped fish; age from scale analysis; and pre-spawn mortality. For each species, trap efficiency, extraction rate, and trap operation effectiveness were estimated following procedures in Appendix B in Murdoch and Peven (2006). In addition, a representative sample of most species trapped but not taken for broodstock were sampled for origin, sex, age, and size (stock assessment). All steelhead trapped were sampled.

2.2 Within Hatchery Monitoring

Methods for monitoring hatchery activities are described in Appendix C in Murdoch and Peven (2005). Biological information collected from all spawned adult fish included age at maturity, length at maturity, spawn timing, and fecundity of females. In addition, all fish were checked for tags and females were sampled for disease.

Throughout the rearing period in the hatchery, fish were sampled for growth, health, and survival. Each month, lengths and weights were collected from a sample of fish and rearing density indices were calculated. In addition, fish were examined monthly for health problems following standard fish health monitoring practices for hatcheries. Various life-stage survivals were estimated for each hatchery stock. These estimates were then compared to the standard survival rates identified in Table 2.3 to provide insight as to how well the hatchery operations were performing. Failure to achieve a survival standard could indicate a problem with some part of the hatchery program. However, failure to meet a standard may not be indicative of the overall success of the program to meet the goals identified in Section 1.

Table 2.3. Standard life-stage survival rates for fish reared within the Chelan PUD hatchery programs (from Appendix C in Murdoch and Peven 2005).

Life stage	Standard survival rate (%)
Collection-to-spawning (females)	90
Collection-to-spawning (males)	85
Unfertilized egg-to-eyed	92
Unfertilized egg-to-ponding	98
30 d after ponding	97
100 d after ponding	93
Ponding-to-release	90
Transport-to-release	95
Unfertilized egg-to-release	81

Nearly all hatchery fish from each stock were marked (adipose fin clip) or tagged (coded-wire tag or elastomer tag). Different combinations of marks and tags were used depending on the stock. In addition, about 10,000 juvenile hatchery fish from spring Chinook and each stock of steelhead (HxW-early production and HxW-late production) were PIT tagged during June and September to aid in estimating survival rates (e.g., smolt-to-adult) outside the hatchery. About 10,000 wild x wild steelhead were PIT tagged in October, and about 15,000 juvenile sockeye were PIT tagged in June. Finally, about 10,000 Turtle Rock yearling summer Chinook were PIT tagged from each of two treatment groups (circular-reuse rearing pond and standard raceway) in September.

Lastly, the size and number of fish released were assessed and compared to programmed production levels. The goal of the program is that numbers released and their sizes should fall within 10% of the programmed targets identified in Table 2.4. However, because of constraints due to run size and proportions of wild and hatchery adults, production levels may not be met every year.

Table 2.4. Targets for fish released from the Chelan PUD hatchery programs; CV = coefficient of variation (from Appendix C in Murdoch and Peven 2005).

Hatchery stock	Release targets	Size targets		
		Fork length (CV)	Weight (g)	Fish/pound
Wenatchee Summer Chinook	864,000	176 (9.0)	45.4	10
Okanogan Summer Chinook	576,000	176 (9.0)	45.4	10
Methow Summer Chinook	400,000	176 (9.0)	45.4	10
Turtle Rock Summer Chinook (yearlings)	200,000	176 (9.0)	45.4	10

Hatchery stock	Release targets	Size targets		
		Fork length (CV)	Weight (g)	Fish/pound
Turtle Rock Summer Chinook (subyearlings)	1,620,000	112 (9.0)	11.4	40
Chiwawa Spring Chinook	672,000	176 (9.0)	37.8	12
Wenatchee Sockeye	200,000	133 (9.0)	22.7	20
Wenatchee Steelhead	400,000	198 (9.0)	75.6	6

2.3 Juvenile Sampling

Juvenile sampling within streams included operation of rotary smolt traps, snorkel observations, and PIT tagging. Methods for sampling juvenile fish are described in Appendix E in Murdoch and Peven (2005).

Smolt traps were located on the Wenatchee River at river km 9.6 at the West Monitor Bridge (Lower Wenatchee Trap) and about 0.5 km downstream from the mouth of Lake Wenatchee (Upper Wenatchee Trap), and in the Chiwawa River about 1 km upstream from the mouth (Chiwawa Trap). All traps operated throughout the smolt migration period. The Chiwawa Trap operated throughout most of the year (March through November), but not during icing or extreme high flow conditions. The following data were collected at each trap site: water temperature, discharge, number and identification of all species captured, degree of smoltification for anadromous fish, presence of marks and tags, size (fork lengths and weights), and scales from steelhead and sockeye salmon smolts. Trap efficiencies at each trap site were estimated by using mark-recapture trials conducted over a wide range of discharges. Linear models relating discharge and trap efficiencies were developed to estimate daily trap efficiencies during periods when no mark-recapture trials were conducted. The total number of fish migrating past the trap each day was estimated as the quotient of the daily number of fish captured and the estimated daily trap efficiency. Summing the daily totals resulted in the total emigration estimate.

Snorkel observations were used to estimate the number of juvenile spring Chinook salmon, juvenile rainbow/steelhead, and bull trout within the Chiwawa River Basin. The focus of the study was on juvenile spring Chinook salmon. Sampling followed a stratified random design with proportional allocation of sites among strata. Strata were identified based on unique combinations of geology, land type, valley bottom type, stream state condition, and habitat types. A total of 184 randomly selected sites were surveyed during August (Table 2.5). Counts of fish within each sampling site were adjusted based on water temperatures. That is, non-linear models that described relationships between water temperatures and detection efficiencies (Hillman et al. 1992) were used to estimate total numbers of fish within sampling sites. These numbers were then converted to densities by dividing total fish numbers by the wetted surface area and water volume of sample sites. Total numbers within a stratum were estimated as the product of fish densities times the total wetted surface or water volume for the stratum. The sum of fish numbers across strata resulted in the total number of fish within the basin. The calculation of total numbers, densities, and degrees of certainty are fully explained in Hillman and Miller (2004).

Working in collaboration with the Integrated Status and Effectiveness Monitoring Program (ISEMP) funded by NOAA Fisheries and Bonneville Power Administration (BPA), crews PIT tagged juvenile wild Chinook, wild and hatchery steelhead, and wild sockeye salmon throughout the Wenatchee

basin. Tags were injected into juvenile fish collected at the Chiwawa Trap, Upper Wenatchee Trap, and the Lower Wenatchee Trap. In addition, fish were collected and tagged in the Chiwawa River upstream from the trap, in Nason Creek, and in the Wenatchee River. The proposed number of wild spring Chinook and steelhead to be tagged at each location is provided in Table 2.6. The goal of this work was to better understand the life-history characteristics of fish in the Wenatchee Basin and to estimate SARs. This in turn improves the ability to detect potential impacts of the hatchery program on wild fish.

Table 2.5. Location of strata and numbers of randomly sampled sites within each strata that were sampled in the Chiwawa River Basin in 2008.

Reach/stratum	River kilometers (RKm)	Number of randomly selected sites
Chiwawa River		
1	0.0-6.1	11
2	6.1-8.9	5
3	8.9-12.7	7
4	12.7-14.3	6
5	14.3-17.4	4
6	17.4-19.0	6
7	19.0-32.2	32
8	32.2-40.9	24
9	40.9-46.4	11
10	46.4-50.1	10
Phelps Creek		
1	0.0-0.6	3
Chikamin Creek (includes Minnow Creek)		
1	0.0-1.5	15
Rock Creek		
1	0.0-1.2	11
Peven Creek (unnamed stream on USGS map)		
1	0.0-0.1	1
Big Meadow Creek		
1	0.0-1.6	10
Alder Creek		
1	0.0-0.1	2
Brush Creek		
1	0.0-0.1	8
Y Creek		
1	0.0-0.1	1

Table 2.6. Number of wild spring Chinook and steelhead proposed for tagging at different locations within the Wenatchee Basin, 2008.

Sampling location	Target sample size	
	Wild spring Chinook	Wild steelhead
Chiwawa Trap	2,500-8,000	500-2,000
Chiwawa River	500-2,000	500-2,000
Upper Wenatchee Trap	500-1,000	50-250
Upper Wenatchee	500-2,000	500-2,000
Nason Creek	500-2,000	500-2,000
Lower Wenatchee Trap	1,000-2,000	500-2,500
Total	**5,500-17,000**	**2,550-10,750**

Survival rates for various juvenile life-stages were calculated based on estimates of seeding levels (total egg deposition), numbers of parr, numbers of emigrants, and numbers of smolts. Total egg deposition was estimated as the product of the number of redds counted in the basin times the mean fecundity of female spawners. Fecundity was estimated from females collected for broodstock using an electronic egg counter. Numbers of emigrants and smolts were estimated at trapping sites and numbers of parr were estimated using snorkel observations only in the Chiwawa Basin. Survival estimates could not be calculated for some stocks (e.g., summer Chinook) because life-stage abundance estimates were lacking.

2.4 Spawning/Carcass Surveys

Methods for conducting carcass and spawning ground surveys are detailed in Appendix F in Murdoch and Peven (2005). Information collected during spawning surveys included spawn timing, redd distribution, and redd abundance. Data collected during carcass surveys included sex, size (fork length and postorbital-to-hypural length), scales for aging[1], degree of egg voidance, DNA samples, and identification of marks or tags. The sampling goal for carcasses was 20% of the spawning population. Crews also conducted snorkel surveys to assess the incidence of precocial fish spawning naturally in streams.

Both redd and carcass surveys were conducted in reaches that encompassed the spawning distribution of most populations. Steelhead surveys were the exception. These surveys were conducted within major spawning areas in the basin and therefore may not capture the entire spawning distribution of the population. Steelhead surveys were conducted during March through June in reaches and index areas described in Table 2.7. Total redd counts were estimated by expanding counts within non-index areas by expansion factors developed within index areas.

[1] In this report we use two methods of describing age. One is termed the "European Method." This method has two digits, separated by a period. The first digit represents the number of winters the fish spent in freshwater before emigrating to the sea. The second digit indicates the number of winters the fish spent in the ocean. For example, a fish designated as 1.2 spent one winter in freshwater and two in the ocean. A fish designated as 0.3 emigrated to the ocean in its first year and spent three winters in the ocean. The other method describes the total age of the fish (egg-to-spawning adult, i.e., gravel-to-gravel), so fish demarcated as 0.3 or 1.2 are considered 4-year-olds, from the same brood.

Table 2.7. Description of reaches and index areas surveyed for steelhead redds in the Wenatchee Basin.

Stream	Code	Reach	Index/reference area
Wenatchee River	W2	Sleepy Hollow Br to L. Cashmere Br	Monitor Boat Rmp to Cashmere Boat Rmp
	W6	Leavenworth Br to Icicle Rd Br	Leavenworth Boat Ramp to Icicle Ck
	W8	Tumwater Dam to Tumwater Br	Swift Boat Ramp to Tumwater Br
	W9	Tumwater Br to Chiwawa R	Tumwater Br to Plain
	W10	Chiwawa R to Lk Wenatchee	Chiwawa Pump St. to Lk Wenatchee
Peshastin Creek	P1	Mouth to Camas Cr	Kings Br to Camas Cr
	P2A	Camas Cr to Mouth of Scotty Cr	Ingalls Cr to Ruby Cr
	P2	Camas Cr to Mouth of Scotty Cr	FR7620 to Shaser Cr
Ingalls Creek	D1	Mouth to Trailhead RM 1	Mouth to Trailhead RM 1
	D2	Trailhead to Wilderness Bd RM 1.5	Trailhead to Wilderness Bd RM 1.5
Chiwawa River	C1	Mouth to Grouse Cr	Mouth to Rd 62 Br RM 6.4
	C2	Grouse Cr to Rock Cr	Chikamin Cr to Log Jam
Clear Creek	V1	Mouth to Hwy 22	Mouth to Hwy 22
	V2	Hwy 22 to Lower Culvert RM 2	Hwy 22 to Lower Culvert
Nason Creek	N1	Mouth to Kahler Cr Br	Mouth to Swamp Cr
	N3	Hwy 2 Br to Lower RR Br	Hwy 2 Br to Merrit Br
	N4	Lower RR Br to Whitepine Cr	Rayrock to Church Camp
Icicle River	I1	Mouth to Hatchery	Mouth to Boulder Block
Little Wenatchee	L2	Mouth to Lost Cr	Old Fish Weir to Lost Cr
	L3	Lost Cr to Rainy Cr Br	Lost Cr to Rainy Cr Br
White River	H2	Sears Cr Br to Napeequa R	Riprap Bank to Napeequa R
	H3	Napeequa R to Mouth of Panther Cr	Napeequa R to Grasshopper Meadows
Napeequa River	Q1	Mouth to RM 1	Mouth to RM1

Spring Chinook redd and carcass surveys were conducted during August through September in the Chiwawa River (including Rock and Chikamin creeks), Nason Creek, Icicle Creek, Peshastin Creek (including Ingalls Creek), upper Wenatchee River, Little Wenatchee River, and the White River (including the Napeequa River and Panther Creek). Survey reaches for spring Chinook are described in Table 2.8.

Table 2.8. Description of reaches surveyed for spring Chinook redds and carcasses in the Wenatchee Basin.

Stream	Code	Reach	River mile (RM)
Chiwawa River	C1	Mouth to Grouse Creek	0.0-11.7
	C2	Grouse Creek to Rock Creek	11.7-19.3
	C3	Rock Creek to Schaefer Creek	19.3-22.4
	C4	Schaefer Creek to Atkinson Flats	22.4-25.6
	C5	Atkinson Flats to Maple Creek	25.6-27.0
	C6	Maple Creek to Trinity	27.0-30.3
Rock Creek	R1	Mouth to End	0.0-0.5
Chikamin Creek	K1	Mouth to End	0.0-0.5
Nason Creek	N1	Mouth to Kahler Creek Bridge	0.0-3.9
	N2	Kahler Creek Bridge to Hwy 2 Bridge	3.9-8.3
	N3	Hwy 2 Bridge to Lower RR Bridge	8.3-13.2
	N4	Lower RR Bridge to Whitepine Creek	13.2-15.4
Little Wenatchee River	L2	Old Fish Weir to Lost Creek	2.7-5.2
	L3	Lost Creek to Rainy Creek	5.2-9.2
	L4	Rainy Creek to Falls	9.2-Falls
White River	H2	Sears Creek Bridge to Napeequa River	6.4-11.0
	H3	Napeequa River to Grasshopper Meadows	11.0-12.9
Napeequa River	Q1	Mouth to End	0.0-1.0
Panther Creek	T1	Mouth to End	0.0-0.7
Wenatchee River	W8	Tumwater Dam to Tumwater Bridge	30.9-35.6
	W9	Tumwater Bridge to Chiwawa River	35.6-48.4
	W10	Chiwawa River to Lake Wenatchee	48.4-54.2
Icicle Creek	I1	Mouth to Boulder Block	0.0-4.0
Peshastin Creek	P1	Mouth to Camas Creek	0.0-5.9
	P2	Camas Creek to Mouth of Scotty Creek	5.9-16.3
Ingalls Creek	D1	Mouth to Trailhead	0.0-1.0

Surveys for live sockeye and carcass were conducted during August through October in the White, Napeequa, and Little Wenatchee rivers. No sockeye redds were counted in 2008. Live fish counts were used to estimate spawning escapements using the area-under-the-curve (AUC) method.

Table 2.9. Description of reaches surveyed for sockeye salmon carcasses and live fish in the Wenatchee Basin.

Stream	Code	Reach	River mile (RM)
Little Wenatchee River	L1	Mouth to Old Fish Weir	0.0-2.7
	L2	Old Fish Weir to Lost Creek	2.7-5.2
	L3	Lost Creek to Rainy Creek	5.2-9.2
White River	H1	Mouth to Sears Creek Bridge	0.0-6.4
	H2	Sears Creek Bridge to Napeequa River	6.4-11.0
	H3	Napeequa River to Grasshopper Meadows	11.0-12.9
Napeequa River	Q1	Mouth to End	0.0-1.0

Wenatchee summer Chinook surveys were conducted during September through November within ten reaches on the Wenatchee River (Table 2.10). Both peak redd counts and total redd counts were estimated in the Wenatchee River. Total redd counts were only conducted within index areas, not throughout the entire river. Total redd counts for the entire river were estimated by expanding the peak counts within non-index areas by expansion factors developed within index areas.

Table 2.10. Description of reaches and index areas surveyed for summer Chinook redds in the Wenatchee Basin.

Code	Reach	River mile	Index/reference area
W1	Mouth to Sleepy Hollow Br	0.0-3.5	Monitor Br to L. Cashmere Br
W2	Sleepy Hollow Br to L. Cashmere Br	3.5-9.5	
W3	L. Cashmere Br to Dryden Dam	9.5-17.5	
W4	Dryden Dam to Peshastin Br	17.5-20.0	Dryden Dam to Peshastin Br
W5	Peshastin Br to Leavenworth Br	20.0-23.9	
W6	Leavenworth Br to Icicle Rd Br	23.9-26.4	Icicle to Takeout
W7	Icicle Rd Br to Tumwater Dam	26.4-30.9	Swiftwater Campground to Tumwater Br
W8	Tumwater Dam to Tumwater Br	30.9-35.6	
W9	Tumwater Br to Chiwawa River	35.6-48.4	Swing Pool to Railroad Tunnel
W10	Chiwawa River to Lake Wenatchee	48.4-54.2	Swamp to Bridge

Summer Chinook surveys were also conducted in the Methow, Okanogan, Similkameen, and Chelan rivers during September through November. Total redd counts were conducted in these rivers. Table 2.11 describes the survey reaches in these rivers.

Table 2.11. Description of reaches surveyed for summer Chinook redds and carcasses on the Methow, Okanogan, and Similkameen rivers.

Stream	Code	Reach	River mile (RM)
Methow River	M1	Mouth to Methow Bridge	0.0-14.8
	M2	Methow Bridge to Carlton Bridge	14.8-27.2
	M3	Carlton Bridge to Twisp Bridge	27.2-39.6
	M4	Twisp Bridge to MVID	39.6-44.9
	M5	MVID to Winthrop Bridge	44.9-49.8
	M6	Winthrop Bridge to Hatchery Dam	49.8-51.6
Okanogan River	O1	Mouth to Mallot Bridge	0.0-16.9
	O2	Mallot Bridge to Okanogan Bridge	16.9-26.1
	O3	Okanogan Bridge to Omak Bridge	26.1-30.7
	O4	Omak Bridge to Riverside Bridge	30.7-40.7
	O5	Riverside Bridge to Tonasket Bridge	40.7-56.8
	O6	Tonasket Bridge to Zosel Dam	56.8-77.4
Similkameen River	S1	Driscoll Channel to Oroville Bridge	0.0-1.8
	S2	Oroville Bridge to Enloe Dam	1.8-5.7

Except for sockeye, total spawning escapements for each population were estimated as the product of total number of redds times the ratio of fish per redd for a specific stock. Fish per redd ratios were estimated as the ratio of males to females sampled at broodstock collection sites. Total spawning escapement for sockeye salmon was estimated using the AUC approach (where escapement = [AUC/redd residence time] x observer efficiency). This method relied on weekly counts of live sockeye and assumed a redd residence time of 11 days (from Hyatt et al. 2006) and an observer efficiency of 100%.[2]

During carcass surveys for summer Chinook in 2008, crews collected tissue samples for genetic analysis. Tissue was collected from the operculum of wild and hatchery carcasses (target of 144 wild and 144 hatchery fish). Sampling within a population was proportional to the distribution of carcasses across survey reaches. That is, samples were collected in all reaches but the number collected within a given reach was proportional to the density of carcasses within that reach. In addition, tissue samples were collected from Wenatchee spring Chinook as part of the spring Chinook reproductive study. Methods for analyzing samples are described in Appendix H in Murdoch and Peven (2005).

Derived metrics calculated from carcass surveys, broodstock sampling, stock assessments, and harvest records included proportion of hatchery spawners, stray rates, age-at-maturity, length-at-age, smolt-to-adult survival (SAR), hatchery replacement rates (HRR), exploitation rates, harvest rates, and natural replacement rates (NRR). The expected SARs and HRRs for different stocks raised in the Chelan PUD hatchery programs are provided in Table 2.12. Methods for calculating these

[2] It is very unlikely that observer efficiency is 100%, especially within the White River. Therefore, in 2009, tagging methods will be used to estimate sockeye escapements into spawning tributaries.

variables are described in Appendices D, F, and G in Murdoch and Peven (2005) and in "White Papers" developed by the Hatchery Evaluation Technical Team (HETT).

Table 2.12. Expected smolt-to-adult (SAR) and hatchery replacement rates (HRR) for stocks raised in the Chelan PUD Hatchery Programs (from Table 6 in Appendix D in Murdoch and Peven 2005).

Program	Number of broodstock	Smolts released	SAR	Adult equivalents	Number of smolts/adult	HRR
Chiwawa Spring Chinook	379	672,000	0.003	2,016	333	5.3
Wenatchee Summer Chinook	492	864,000	0.003	2,592	333	5.3
Similkameen Summer Chinook	328	576,000	0.003	1,728	333	5.3
Methow Summer Chinook	228	400,000	0.003	1,200	333	5.3
Wenatchee Sockeye	260	200,000	0.007	1,400	143	5.4
Wenatchee Steelhead	208	400,000	0.010	4,000	100	19.2

Derived data that rely on CWTs (e.g., HRR, SAR, stray rates, etc.) are three to five years behind release information because of the lag time for returning adult fish to enter the fishery and the processing of tags. Consequently, complete information on rates and ratios based on CWTs is generally only available for years prior to 2002. In addition, some methods for calculating derived variables are still being developed by the HETT. Therefore, estimates of derived data in this report are subject to change after the HETT and Hatchery Committee decide on standard methods for calculating derived data.

SECTION 3: WENATCHEE STEELHEAD

3.1 Broodstock Sampling

This section focuses on results from sampling 2007 and 2008 brood years of Wenatchee steelhead, which were collected at Dryden and Tumwater dams. The 2007 brood begins the tracking of the life cycle of steelhead released in 2008. The 2008 brood is included because juveniles from this brood are still maintained within the hatchery.

Origin of Broodstock

A total of 176 Wenatchee steelhead from the 2006 return (2007 brood) were collected at Dryden and Tumwater dams (Table 3.1). About 45% of these were natural origin (adipose fin present, no CWT, and no elastomer tags) fish and the remaining 55% were hatchery origin (pink right, orange right, or green left elastomer tagged) adults. Origin was determined by analyzing scales and/or otoliths. The total number of steelhead spawned from the 2007 brood was 134 adults (57% natural origin and 43% hatchery origin).

A total of 211 steelhead were collected from the 2007 return (2008 brood) at Dryden and Tumwater dams; 104 natural origin (adipose fin present, no CWT and no elastomer tags) and 107 hatchery origin (pink right, orange right, or green left elastomer tagged) adults. A total of 131 steelhead were spawned; 59% were natural origin fish and 41% were hatchery fish (Table 3.1). Origins were confirmed by sampling scales and/or otoliths.

Table 3.1. Numbers of wild and hatchery steelhead collected for broodstock, numbers that died before spawning, and numbers of steelhead spawned, 1998-2008. Unknown origin fish (i.e., undetermined by scale analysis, no elastomer, CWT, or fin clips, and no additional hatchery marks) were considered naturally produced. Mortality includes fish that died of natural causes typically near the end of spawning and were not needed for the program or were immature fish killed at spawning.

Brood year	Wild steelhead					Hatchery steelhead					Total number spawned
	Number collected	Prespawn loss	Mortality	Number spawned	Number released	Number collected	Prespawn loss	Mortality	Number spawned	Number released	
1998	35	0	0	35	0	43	4	2	37	0	72
1999	58	5	1	52	0	67	1	2	64	0	116
2000	39	2	1	36	0	101	9	12	60	20	96
2001	64	5	8	51	0	114	5	6	103	0	154
2002	99	0	1	96	2	113	1	0	64	48	160
2003	63	10	4	49	0	92	2	0	90	0	139
2004	85	3	0	75	7	132	1	0	61	70	136
2005	95	8	0	87	0	114	7	1	104	2	191
2006	101	5	0	93	3	98	0	0	69	29	162
2007	79	0	2	76	1	97	0	14	58	25	134
2008	104	0	3	77	22	107	0	28	54	25	131
Average	***75***	***4***	***2***	***66***	***3***	***98***	***3***	***6***	***69***	***20***	***136***

Age/Length Data

Broodstock ages were determined from examination of scales and/or otoliths. For the 2007 return, natural-origin steelhead consisted primarily of 2-salt adults, while hatchery-origin adults consisted mostly of 1-salt fish (Table 3.2). For the 2008 return, both hatchery and natural origin steelhead consisted primarily of 1-salt adults. A small proportion (0.9%) of the 2008 return, natural-origin steelhead were 3-salt adults (Table 3.2).

Table 3.2. Percent of hatchery and wild steelhead of different ages (saltwater ages) collected from broodstock, 1998-2008.

Return year	Origin	Saltwater age		
		1	2	3
1998	Wild	39.4	60.6	0.0
	Hatchery	20.9	79.1	0.0
1999	Wild	50.0	48.3	1.7
	Hatchery	81.8	18.2	0.0
2000	Wild	56.4	43.6	0.0
	Hatchery	67.9	32.1	0.0
2001	Wild	51.7	48.3	0.0
	Hatchery	14.9	85.1	0.0
2002	Wild	55.6	44.4	0.0
	Hatchery	94.6	5.4	0.0
2003	Wild	13.1	85.3	1.6
	Hatchery	29.4	70.6	0.0
2004	Wild	94.8	5.2	0.0
	Hatchery	95.2	4.8	0.0
2005	Wild	22.1	77.9	0.0
	Hatchery	20.5	79.5	0.0
2006	Wild	28.7	71.3	0.0
	Hatchery	60.3	39.7	0.0
2007	Wild	40.3	59.3	0.0
	Hatchery	62.1	37.9	0.0
2008	Wild	65.4	33.7	0.9
	Hatchery	88.8	11.2	0.0
Average	***Wild***	***47.1***	***52.5***	***0.4***
	Hatchery	***57.9***	***42.2***	***0.0***

There was little difference between mean lengths of hatchery and natural origin steelhead for both the 2007 and 2008 return years (Table 3.3). Natural origin fish were on average <1 to 5 cm larger than hatchery origin fish of the same age.

Table 3.3. Mean fork length (cm) at age (saltwater ages) of hatchery and wild steelhead collected from broodstock, 1998-2008; N = sample size and SD = 1 standard deviation.

Return year	Origin	Steelhead fork length (cm)								
		1-Salt			2-Salt			3-Salt		
		Mean	N	SD	Mean	N	SD	Mean	N	SD
1998	Wild	63	15	4	79	20	5	-	0	-
	Hatchery	61	9	4	73	34	4	-	0	-
1999	Wild	65	29	5	74	28	5	77	1	-
	Hatchery	62	54	4	73	12	4	-	0	-
2000	Wild	64	22	3	74	17	5	-	0	-
	Hatchery	60	57	3	71	27	4	-	0	-
2001	Wild	61	33	6	77	31	5	-	0	-
	Hatchery	62	17	4	72	97	4	-	0	-
2002	Wild	64	55	4	77	44	4	-	0	-
	Hatchery	63	106	4	73	6	4	-	0	-
2003	Wild	69	8	6	77	52	5	91	1	-
	Hatchery	66	27	4	75	65	4	-	0	-
2004	Wild	63	73	6	78	4	2	-	0	-
	Hatchery	61	59	3	73	3	1	-	0	-
2005	Wild	59	21	4	74	74	5	-	0	-
	Hatchery	59	23	4	72	89	4	-	0	-
2006	Wild	63	27	5	75	67	6	-	0	-
	Hatchery	61	41	4	72	27	5	-	0	-
2007	Wild	64	31	6	76	46	5	-	0	-
	Hatchery	60	60	4	71	36	5	-	0	-
2008	Wild	64	68	4	77	35	4	80	1	-
	Hatchery	60	95	4	72	12	2	-	0	-

Sex Ratios

Male steelhead in the 2007 return made up about 48% of the adults collected, resulting in an overall male to female ratio of 0.93:1.00 (Table 3.4). For the 2008 return, males made up about 61% of the adults collected, resulting in an overall male to female ratio of 1.57:1.00. On average (1998-2008), the sex ratio is slightly less than the 1:1 ratio assumed in the broodstock protocol (Table 3.4).

Table 3.4. Numbers of male and female wild and hatchery steelhead collected for broodstock, 1998-2008. Ratios of males to females are also provided.

Return year	Number of wild steelhead			Number of hatchery steelhead			Total M/F ratio
	Males (M)	Females (F)	M/F	Males (M)	Females (F)	M/F	
1998	13	22	0.59:1.00	15	28	0.54:1.00	0.56:1.00
1999	22	36	0.61:1.00	35	32	1.09:1.00	0.84:1.00
2000	18	21	0.86:1.00	60	41	1.46:1.00	1.26:1.00
2001	38	26	1.46:1.00	40	74	0.54:1.00	0.78:1.00
2002	32	67	0.48:1.00	81	32	2.53:1.00	1.14:1.00
2003	19	44	0.43:1.00	44	48	0.92:1.00	0.68:1.0
2004	43	42	1.02:1.00	90	42	2.14:1.00	1.58:1.00
2005	36	59	0.61:1.00	46	68	0.68:1.00	0.65:1.00
2006	38	63	0.60:1.00	47	51	0.92:1.00	0.75:1.00
2007	36	43	0.84:1.00	49	48	1.02:1.00	0.93:1.00
2008	61	43	1.42:1.00	68	39	1.74:1.00	1.57:1.00
Total	***356***	***466***	***0.76:1.00***	***575***	***503***	***1.14:1.00***	***0.96:1.00***

Fecundity

Fecundities for Wenatchee steelhead returning in 2007 and 2008 averaged 5,660 and 5,443 eggs per female, respectively, which were not greatly different than the 10-year average (Table 3.5). Mean fecundities for the 2007 and 2008 returns were at or greater than the 5,400 eggs per female assumed in the broodstock protocol.

Table 3.5. Mean fecundity of wild, hatchery, and all female steelhead collected for broodstock, 1998-2008.

Return year	Mean fecundity		
	Wild	Hatchery	Total
1998	6,202	5,558	5,924
1999	5,691	5,186	5,424
2000	5,858	5,729	5,781
2001	5,951	6,359	6,270
2002	5,776	5,262	5,626
2003	6,561	6,666	6,621
2004	5,118	5,353	5,238
2005	5,545	6,061	5,832
2006	5,688	5,251	5,492
2007	5,840	5,485	5,660
2008	5,693	5,153	5,433
Average	***5,811***	***5,642***	***5,755***

3.2 Hatchery Rearing

Rearing History

Number of eggs taken

Based on the unfertilized egg-to-release survival standard of 81%, a total of 493,827 eggs are required to meet the program release goal of 400,000 smolts. Between 1998 and 2008, the egg take goal was reached 45% of the time (Table 3.6).

Table 3.6. Numbers of eggs taken from steelhead broodstock, 1998-2008.

Brood year	Number of eggs taken
1998	224,315
1999	303,083
2000	280,872
2001	549,464
2002	503,030
2003	532,708
2004	408,538
2005	672,667
2006	546,382
2007	462,662
2008	439,980
Average	***447,609***

Number of acclimation days

Juvenile steelhead were transferred from Chelan FH to Turtle Rock FH in December 2007 and from Eastbank FH to Turtle Rock FH in January 2008. At Turtle Rock FH, juvenile steelhead were reared on Columbia River water (range, 111-148 d) before being trucked and released into the Wenatchee River and tributaries.

Acclimation of Wenatchee juvenile steelhead has occurred on occasion in the Chiwawa Ponds when space is available. At Chiwawa Ponds, steelhead were reared under the same water source as spring Chinook (Chiwawa and Wenatchee River water). Typically, Wenatchee steelhead are reared on Columbia River water from January through April before being trucked and released into the Wenatchee Basin (Table 3.7).

Table 3.7. Water source and mean acclimation period for Wenatchee steelhead, brood years 1998-2007.

Brood year	Release year	Parental origin	Water source	Number of Days
1998	1999	H x H	Wenatchee/Chiwawa	36
		H x W	Wenatchee/Chiwawa	36
		W x W	Wenatchee/Chiwawa	36
1999	2000	H x H	Wenatchee/Chiwawa	138
		H x W	Wenatchee/Chiwawa	138
		W x W	Wenatchee/Chiwawa	138
		H x W	Eastbank	0
		W x W	Eastbank	0
2000	2001	H x H	Wenatchee/Chiwawa	122
		H x W	Wenatchee/Chiwawa	122
		H x W	Wenatchee/Chiwawa	122
		W x W	Wenatchee/Chiwawa	122
2001	2002	H x H	Columbia	92
		H x H	Wenatchee/Chiwawa	63
		H x W	Columbia	92
		H x W	Wenatchee/Chiwawa	63
		W x W	Columbia	153
2002	2003	H x H	Columbia	98
		H x W	Columbia	98
		W x W	Columbia	117
2003	2004	H x H	Columbia	88
		H x W	Wenatchee/Chiwawa	84
		W x W	Columbia	148
2004	2005	H x H	Columbia	160
		H x W	Columbia	160
		W x W	Columbia	160
2005	2006	H x H	Columbia	116
		H x W	Columbia	113
		W x W	Columbia	141
2006	2007	Early H x W	Columbia	111
		Late H x W	Columbia	112
		W x W	Columbia	148
2007	2008	Early H x W	Columbia	94-95
		Late H x W	Columbia	91-93
		W x W	Columbia	138

Release Information

Numbers released

The release of 2007 brood Wenatchee steelhead achieved 77% of the 400,000 target goal with about 306,690 fish released directly into the Wenatchee and Chiwawa rivers and Nason Creek (Table 3.8). Distribution of juvenile steelhead released in each of the three basins was determined by the mean proportion of steelhead redds in each basin. About 30.9% and 16.3% of the steelhead were released in Nason Creek and the Chiwawa River, respectively. The balance of the program was split between the Wenatchee River downstream from Tumwater Dam (21.0%) and the Wenatchee River upstream from the dam (31.8%).

Table 3.8. Numbers of steelhead smolts released from the hatchery, brood years 1998-2007. The release target for steelhead is 400,000 smolts.

Brood year	Release year	Number of smolts
1998	1999	172,078
1999	2000	175,701
2000	2001	184,639
2001	2002	335,933
2002	2003	302,060
2003	2004	374,867
2004	2005	294,114
2005	2006	452,184
2006	2007	299,937
2007	2008	306,690
Average		***289,820***

Numbers elastomer tagged

Wenatchee hatchery steelhead from the 2007 brood were marked with elastomer tags in the clear tissue posterior of the eye to denote parental origin. About 47% of the juveniles released were also adipose fin clipped (Table 9).

Table 3.9. Release location and marking scheme for the 1998-2007 brood Wenatchee steelhead.

Brood year	Release location	Parental origin	Ad-clip (%)	VIE color/side	Tag rate	Number released
1998	Chiwawa River	H x H	0.0	Red Left	0.994	52,765
	Chiwawa River	H x W	0.0	Green Left	0.990	37,013
	Chiwawa River	W x W	0.0	Orange Left	0.827	82,300
1999	Wenatchee River	H x H	0.0	Green Left	0.911	45,347
	Wenatchee River	H x W	0.0	Orange Left	0.927	30,713

Brood year	Release location	Parental origin	Ad-clip (%)	VIE color/side	Tag rate	Number released
	Chiwawa River	H x H	0.0	Red Right	0.936	25,622
	Chiwawa River	H x W	0.0	Green Right	0.936	43,379
	Chiwawa River	W x W	0.0	Orange Right	0.936	30,600
2000	Chiwawa River	H x H	0.0	Red Left	0.963	33,417
	Chiwawa River	H x W	0.0	Green Left	0.963	57,716
	Chiwawa River	H x W	0.0	Green Right	0.949	48,029
	Chiwawa River	W x W	0.0	Orange Right	0.949	45,477
2001	Nason Creek	H x W	0.0	Green Right	0.934	75,276
	Nason Creek	W x W	0.0	Orange Right	0.934	48,115
	Chiwawa River	H x W	0.0	Green Left	0.895	92,487
	Chiwawa River	H x H	0.0	Red Left	0.895	120,055
2002	Chiwawa River	H x H	0.0	Red Left	0.920	156,145
	Chiwawa River	H x W	0.0	Green Left	0.928	33,528
	Nason Creek	W x W	0.0	Orange Right	0.928	112,387
2003	Wenatchee River	H x H	0.0	Red Left	0.968	117,663
	Chiwawa River	H x W	0.0	Green Left	0.927	191,796
	Nason Creek	W x W	0.0	Orange Right	0.962	65,408
2004	Wenatchee River	H x H	0.50	Red Left	0.804	39,636
	Chiwawa River	H x W	0.0	Green Left	0.977	153,959
	Nason Creek	W x W	0.0	Pink Right	0.940	100,519
2005	Wenatchee River	H x H	100.0	Red Left	0.983	104,552
	Wenatchee River	H x W	61.6	Green Left	0.979	190,319
	Chiwawa River	H x W	61.6	Green Left	0.979	18,634
	Chiwawa River	W x W	0.0	Pink Right	0.969	14,124
	Nason Creek	W x W	0.0	Pink Right	0.969	124,555
2006	Wenatchee River	H x W (early)	100.0	Green Right	0.918	66,022
	Wenatchee River	H x W (late)	67.1	Green Left	0.935	92,176
	Chiwawa River	H x W (late)	67.1	Green Left	0.935	41,240
	Chiwawa River	W x W	0.0	Pink Right	0.945	7,500
	Nason Creek	W x W	0.0	Pink Right	0.945	92,999
2007	Wenatchee River	H x W (early)	96.7	Green Right	0.950	64,310
	Wenatchee River	H x W (late)	58.6	Green Left	0.951	97,549
	Chiwawa River	H x W (late)	58.6	Green Left	0.951	43,011

Brood year	Release location	Parental origin	Ad-clip (%)	VIE color/side	Tag rate	Number released
	Chiwawa River	W x W	0.0	Pink Right	0.952	7,026
	Nason Creek	W x W	0.0	Pink Right	0.952	94,794

Numbers PIT tagged

2007 Brood Wenatchee Summer Steelhead (WxW)—A total of 10,051 WxW steelhead were PIT tagged at the Chelan Falls Hatchery during 24-27 September 2007 (Table 3.10). The mean size of steelhead tagged was 72 mm; no fish smaller than 60 mm were tagged. Fish were not fed for 24 hours before or after tagging. Four days following tagging, the fish were transferred to raceways outside the hatchery complex. These fish were transported to the Turtle Rock Hatchery on 19 February. None of these fish were adipose fin clipped.

A total of 9,982 PIT-tagged WxW steelhead were released during spring 2008 (Table 3.10). Of the 10,051 WxW steelhead tagged, 55 died and another 14 shed their tags.

Table 3.10. Summary of PIT-tagging activities for WxW steelhead from the Chelan Falls Hatchery, 2007.

Date of tagging	Number of fish tagged	Number of fish that died	Number of tags shed	Number of tagged fish alive
9/24/07	2,500	15	4	2,481
9/25/07	3,300	15	5	3,280
9/26/07	3,201	15	3	3,183
9/27/07	1,050	10	2	1,038
Total	***10,051***	***55***	***14***	***9,982***

2007 Brood Wenatchee Summer Steelhead (HxW-early production)—A total of 10,052 early-production HxW steelhead were PIT tagged at the Eastbank Hatchery (raceway 4) on 4-7 September 2007 (Table 3.11). The mean size of steelhead tagged was 85 mm; no fish smaller than 60 mm were tagged. Fish were not fed for 24 hours before or after tagging. These fish were transported to the Turtle Rock Hatchery in early February 2008. All of these fish were adipose fin clipped.

A total of 9,820 PIT-tagged early-production HxW steelhead were released during early May 2008 (Table 3.11). Of the 10,052 steelhead tagged, 222 died and another 10 shed their tags.

Table 3.11. Summary of PIT-tagging activities for early-spawn HxW steelhead from the Eastbank Hatchery, 2007.

Raceway	Date of tagging	Number of fish tagged	Number of fish that died	Number of tags shed	Number of tagged fish alive
4 (HxW early)	9/4	2,154	62	3	2,089
	9/5	2,942	66	2	2,874
	9/6	3,040	60	3	2,977
	9/7	1,916	34	2	1,880
Total		***10,052***	***222***	***10***	***9,820***

2007 Brood Wenatchee Summer Steelhead (HxW-late production)—A total of 10,063 late-production HxW steelhead were PIT tagged at the Eastbank Hatchery (raceway 3) on 10-13 September 2007 (Table 3.12). The mean size of steelhead tagged was 80 mm; no fish smaller than 60 mm were tagged. Fish were not fed for 24 hours before or after tagging. These fish were transported to the Turtle Rock Hatchery in early February 2008. None of these fish were adipose fin clipped.

A total of 9,912 PIT-tagged, late-production HxW steelhead were released during early May 2008 (Table 3.12). Of the 10,063 steelhead tagged, 73 died and another 78 shed their tags.

Table 3.12. Summary of PIT-tagging activities for HxW steelhead from the Eastbank Hatchery, 2007.

Raceway	Date of tagging	Number of fish tagged	Number of fish that died	Number of tags shed	Number of tagged fish alive
3 (HxW late)	9/10	3,027	28	14	2,985
	9/11	3,017	18	16	2,983
	9/12	3,008	21	27	2,960
	9/13	1,011	6	21	984
Total		***10,063***	***73***	***78***	***9,912***

2008 Brood Wenatchee Summer Steelhead (WxW)—A total of 10,101 steelhead were PIT tagged at the Chelan Hatchery during 6-9 October 2008. These fish were not fed during tagging or for two days before or after tagging. These fish consisted of wild x wild crosses.

As of the end of January 2009, a total of 153 tagged steelhead have died and 74 others have shed their tags, leaving 9,874 tagged steelhead alive at the end of the month. These fish were transferred to the Turtle Rock Hatchery and will rear there until they are released in the spring.

2008 Brood Wenatchee Summer Steelhead (HxW-early production)—A total of 10,101 steelhead were tagged at Eastbank Hatchery during 2-10 September 2008. These fish came from raceway 1 and consisted of hatchery x wild-early spawn crosses. These fish were not fed during tagging or for two days before or after tagging.

As of the end of January 2009, a total of 57 tagged steelhead have died and another 10 have shed their tags, leaving 10,034 tagged steelhead alive at the hatchery.

2008 Brood Wenatchee Summer Steelhead (HxW-late production)—A total of 10,005 steelhead were tagged at Eastbank Hatchery during 2-10 September 2008. These fish came from raceway 3 and consisted of hatchery x wild-late spawn crosses. These fish were not fed during tagging or for two days before or after tagging.

As of the end of January 2009, a total of 87 tagged steelhead have died and another 12 have shed their tags, leaving 10,005 tagged steelhead alive at the hatchery.

Fish size and condition at release

All 2007 brood steelhead were trucked and released as yearling smolts in May of 2008. Of the three parental groups, only the early H x W group exceeded length and weight targets. The late H x W and the W x W group (which is typically the last group ponded and therefore has a shorter rearing

period) did not meet size-at-release targets. All three groups exceeded the target for coefficient of variation for fork length (Table 3.13).

Table 3.13. Mean lengths (FL, mm), weight (g and fish/pound), and coefficient of variation (CV) of steelhead smolts released from the hatchery, brood years 1998-2007. Size targets are provided in the last row of the table.

Brood year	Release year	Parental origin	Fork length (mm)		Mean weight	
			Mean	CV	Grams (g)	Fish/pound
1998	1999	H x H	201	11.1	92.3	5
		H x W	190	12.8	76.9	6
		W x W	173	12.0	55.3	8
1999	2000	H x H	181	8.9	70.6	6
		H x W	187	7.2	75.3	6
		W x W	184	11.3	71.5	6
2000	2001	H x H	218	15.2	122.4	4
		H x W	209	10.6	107.5	4
		W x W	205	10.7	100.9	5
2001	2002	H x H	179	17.4	67.0	7
		H x W	192	15.6	82.8	6
		W x W	206	11.6	102.6	4
2002	2003	H x H	194	13.1	83.0	6
		H x W	191	13.0	77.4	6
		W x W	180	19.1	70.3	7
2003	2004	H x H	191	14.4	73.1	6
		H x W	199	12.9	83.9	5
		W x W	200	11.1	90.1	5
2004	2005	H x H	204	11.3	87.2	6
		H x W	202	13.5	71.9	5
		W x W	198	12.4	76.6	6
2005	2006	H x H	215	12.6	116.6	4
		H x W	198	11.8	86.3	5
		W x W	189	15.4	55.3	6
2006	2007	H x H (early)	213	12.1	109.6	4
		H x W (late)	186	11.8	68.3	7
		W x W	178	11.1	58.6	8
2007	2008	H x W (early)	192	17.4	77.1	6
		H x W (late)	179	19.3	63.8	7
		W x W	183	12.3	62.8	7

Brood year	Release year	Parental origin	Fork length (mm)		Mean weight	
			Mean	CV	Grams (g)	Fish/pound
Targets			***198***	***9.0***	***75.6***	***6***

Survival Estimates

Overall survival of Wenatchee steelhead from green (unfertilized) egg to release was significantly below the standard set for the program, primarily because of poor green egg-to-eyed egg and eyed egg-to-ponding survival (Table 3.14). The Wenatchee steelhead program, from its inception, has experienced highly variable fertilization rates. It is unknown at this time what mechanisms may be influencing stock performance at these stages. Mortality in the W x W group during tagging was the result of a negative reaction to a formalin drip treatment for *ICH*. Once the drip concentration was reduced, mortality quickly subsided.

Table 3.14. Hatchery life-stage survival rates (%) for steelhead, brood years 1998-2007. Survival standards or targets are provided in the last row of the table.

Brood year	Collection to spawning		Unfertilized egg-eyed	Eyed egg-ponding	30 d after ponding	100 d after ponding	Ponding to release	Transport to release	Unfertilized egg-release
	Female	Male							
1998	92.0	100.0	85.5	91.7	99.2	98.8	97.8	99.9	76.7
1999	91.2	100.0	66.9	93.0	95.9	94.9	93.1	99.7	58.0
2000	83.9	96.2	77.6	86.7	99.3	98.9	97.7	99.5	65.7
2001	90.0	100.0	73.0	91.8	99.1	97.8	91.3	99.7	61.1
2002	99.0	100.0	69.2	93.1	95.9	94.4	89.6	89.6	60.0
2003	87.0	96.8	86.3	83.8	97.2	94.8	97.6	85.3	70.4
2004	97.6	98.5	83.4	93.7	97.8	94.1	92.2	99.9	72.0
2005	91.3	95.1	81.3	92.1	95.6	91.8	89.7	99.6	67.2
2006	99.1	95.3	73.2	85.4	95.4	94.6	87.8	98.5	54.9
2007	100.0	100.0	80.3	92.0	95.7	92.7	89.8	99.1	66.3
Standard	***90.0***	***85.0***	***92.0***	***98.0***	***97.0***	***93.0***	***90.0***	***95.0***	***81.0***

3.3 Disease Monitoring

Rearing of the 2007 brood Wenatchee summer steelhead was typical to previous years with fish being held on Chelan spring water, Eastbank well water, and Columbia River water before being released directly into Nason Creek and the Chiwawa and Wenatchee rivers. Elevated mortality due to a negative reaction to a formalin treatment for *ICH* in the W x W juveniles at Chelan in October was the only significant source of post-ponding loss in this brood year. Mortality quickly subsided once the treatment concentration was reduced.

3.4 Natural Juvenile Productivity

During 2008, juvenile steelhead were sampled at the Upper Wenatchee, Lower Wenatchee, and Chiwawa traps and counted during snorkel surveys within the Chiwawa Basin. Because the snorkel surveys targeted juvenile Chinook salmon, the entire distribution of juvenile steelhead in the Chiwawa Basin was not surveyed. Therefore, the parr numbers presented below represent a minimum estimate.

Parr Estimates

A total of 15,230 (±11.0%) subyearling (<100 mm) and 10,576 (±16.0%) yearling (100-200 mm)[3] steelhead/rainbow were estimated in the Chiwawa Basin in August 2008 (Table 3.15 and 3.16). During the survey period 1992-2008, numbers of subyearling and yearling steelhead/rainbow have ranged from 1,410 to 45,727 and 2,533 to 22,128, respectively, in the Chiwawa Basin (Table 3.15 and 3.16; Figure 3.1). Numbers of all fish counted in the Chiwawa Basin are reported in Appendix A.

Juvenile steelhead/rainbow were distributed primarily throughout the lower seven reaches of the Chiwawa River (downstream from Rock Creek). Their densities were highest in the lower portions of the river and in tributaries. Subyearling steelhead/rainbow most often used riffle and multiple channel habitats in the Chiwawa River, although they also associated with woody debris in pool and glide habitat. In tributaries they were generally most abundant in small pools. Those that were observed in riffles selected stations in quiet water behind small and large boulders or occupied stations in quiet water along the stream margin. In pool and multiple-channel habitats, subyearling steelhead/rainbow used the same kinds of habitat as subyearling Chinook.

Yearling steelhead/rainbow most often used pool, riffle, and multiple-channel habitats. Those that used pools were usually in deeper water than subyearling steelhead/rainbow and Chinook. Like subyearling steelhead/rainbow, yearling steelhead/rainbow selected stations in quiet water behind boulders in riffles, but the two age groups rarely occurred together. Yearling steelhead/rainbow appeared to use deeper and faster water than did subyearling steelhead/rainbow.

Table 3.15. Total numbers of subyearling steelhead/rainbow trout estimated in different steams in the Chiwawa Basin during snorkel surveys in August 1992-2008; NS = not sampled.

Sample Year	Chiwawa River	Phelps Creek	Chikamin Creek	Rock Creek	Peven Creek	Big Meadow Creek	Alder Creek	Brush Creek	Clear Creek	Total
1992	4,927	NS	NS	NS	NS	NS	NS	NS	NS	**4,927**
1993	3,463	0	356	185	NS	NS	NS	NS	NS	**4,004**
1994	953	0	256	24	0	177	0	0	0	**1,410**
1995	6,005	0	744	90	0	371	40	107	0	**7,357**
1996	3,244	0	71	40	0	763	127	0	0	**4,245**
1997	6,959	224	84	324	0	1,124	58	50	0	**8,823**
1998	2,972	22	280	96	113	397	18	22	0	**3,921**
1999	5,060	20	253	189	0	255	34	27	0	**5,838**
2000	NS	NS	NS	NS	NS	NS	NS	NS	NS	**NS**

[3] A steelhead/rainbow trout larger than 200 mm (8 in) was considered a resident trout.

Sample Year	Chiwawa River	Phelps Creek	Chikamin Creek	Rock Creek	Peven Creek	Big Meadow Creek	Alder Creek	Brush Creek	Clear Creek	Total
2001	35,759	192	1,449	1,826	0	6,345	156	0	0	**45,727**
2002	12,137	0	2,252	889	0	4,948	277	18	0	**20,521**
2003	9,911	296	996	1,166	96	5,366	73	116	0	**18,020**
2004	8,464	110	583	113	40	957	35	78	0	**10,380**
2005	4,852	120	2,931	477	45	2,973	65	0	0	**11,463**
2006	10,669	21	858	872	34	3,647	73	71	0	**16,245**
2007	8,442	53	2,137	348	11	2,955	65	28	34	**14,073**
2008	9,863	0	2,260	859	0	1,987	57	168	36	**15,230**
Average	***8,355***	***71***	***1,034***	***500***	***24***	***2,305***	***77***	***49***	***5***	***12,012***

Table 3.16. Total numbers of yearling steelhead/rainbow trout estimated in different steams in the Chiwawa Basin during snorkel surveys in August 1992-2008; NS = not sampled.

Sample Year	Chiwawa River	Phelps Creek	Chikamin Creek	Rock Creek	Peven Creek	Big Meadow Creek	Alder Creek	Brush Creek	Clear Creek	Total
1992	2,533	NS	NS	NS	NS	NS	NS	NS	NS	**2,533**
1993	2,530	0	228	102	NS	NS	NS	NS	NS	**2,860**
1994	4,972	0	476	296	5	107	0	0	0	**5,856**
1995	8,769	0	494	71	0	183	0	0	0	**9,517**
1996	11,381	0	6	27	0	435	0	0	0	**11,849**
1997	6,574	160	0	105	0	66	0	0	0	**6,905**
1998	10,403	0	133	49	0	0	0	0	0	**10,585**
1999	21,779	0	68	201	0	82	0	0	0	**22,130**
2000	NS	NS	NS	NS	NS	NS	NS	NS	NS	**NS**
2001	9,368	16	186	407	0	646	0	0	0	**10,623**
2002	7,200	0	199	165	0	1,526	0	0	0	**9,090**
2003	4,745	362	426	599	0	47	0	0	0	**6,179**
2004	7,700	107	209	0	0	174	0	0	0	**8,190**
2005	4,624	63	957	257	0	287	0	0	0	**6,188**
2006	7,538	76	748	1,186	0	985	0	0	0	**10,533**
2007	6,976	0	945	96	0	431	0	0	0	**8,448**
2008	8,317	0	1,168	298	0	793	0	0	0	**10,576**
Average	***7,838***	***52***	***416***	***257***	***0***	***412***	***0***	***0***	***0***	***8,879***

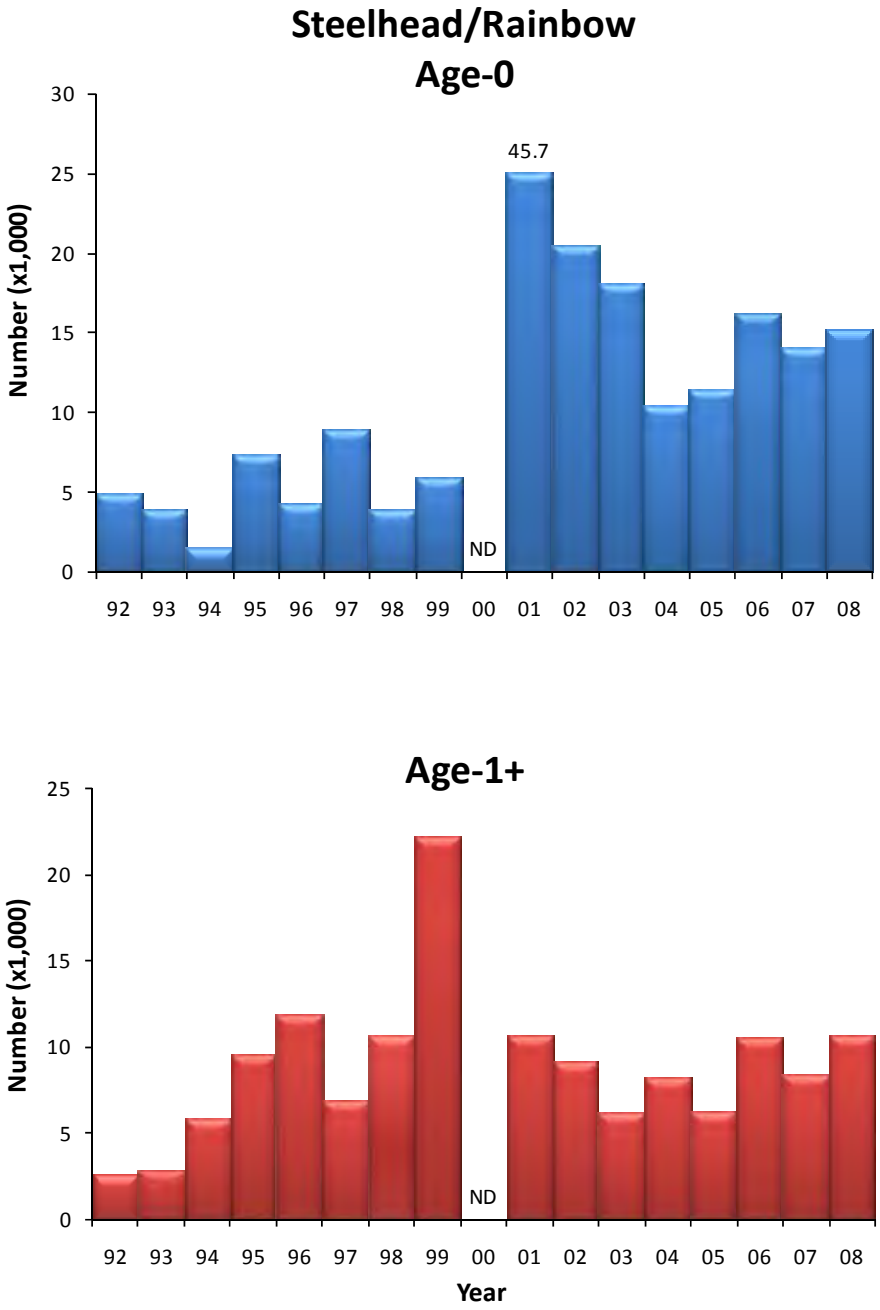


Figure 3.1. Numbers of subyearling and yearling steelhead/rainbow trout within the Chiwawa River Basin in August 1992-2008; ND = no data.

Emigrant and Smolt Estimates

Numbers of steelhead smolts and emigrants were estimated at the Upper Wenatchee, Chiwawa, and Lower Wenatchee traps in 2008.

Chiwawa Trap

The Chiwawa Trap operated between 5 March and 3 December 2008. During that time period the trap was inoperable for 21 days because of high river flows, debris, snow/ice, or mechanical failure. The trap operated in two different positions depending on stream flow; lower position at flows greater than 12 m^3/s and an upper position at flows less than 12 m^3/s. Monthly captures of all fish collected at the Chiwawa Trap are reported in Appendix B.

A total of 448 wild steelhead/rainbow smolts, 2,684 hatchery smolts, and 1,250 wild parr were captured at the Chiwawa Trap. Nearly all (95%) of the hatchery smolts were collected in May, while most (59%) of the wild steelhead smolts were captured during May and June (Figure 3.2). Although steelhead/rainbow parr emigrated throughout the sampling period, most emigrated during May through June and in November (Figure 3.2). No mark-recapture efficiency trials were conducted with steelhead/rainbow at the Chiwawa Trap to estimate total population sizes.

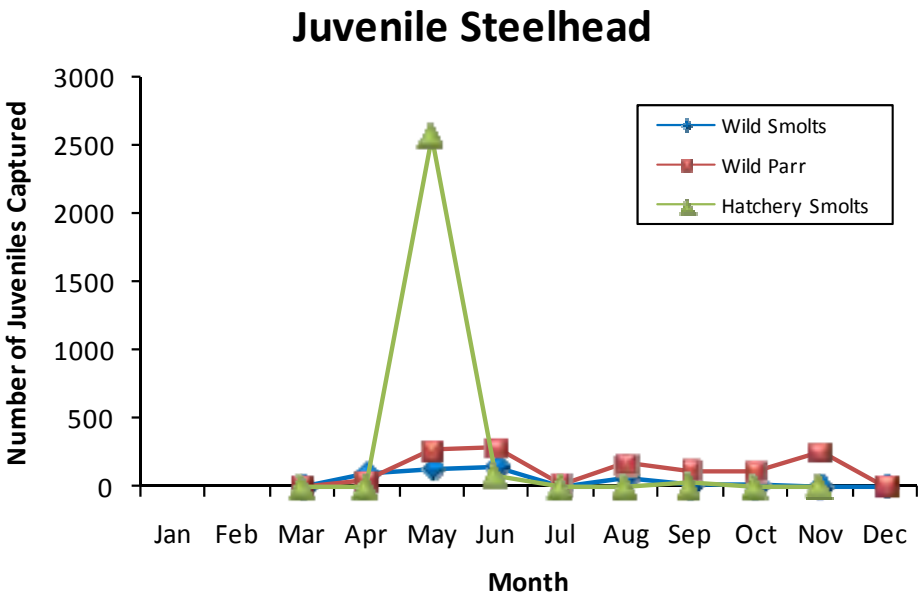


Figure 3.2. Monthly captures of wild smolts, wild parr, and hatchery smolt steelhead/rainbow at the Chiwawa Trap, 2008.

Upper Wenatchee Trap

The Upper Wenatchee Trap operated nightly between 22 March and 30 July 2008. During the four-month sampling period, a total of 13 wild steelhead/rainbow smolts, 61 hatchery smolts, and 14 wild parr were captured at the Upper Wenatchee Trap. Monthly captures of all fish collected at the Upper Wenatchee Trap are reported in Appendix B.

Lower Wenatchee Trap

The Lower Wenatchee Trap operated nightly between 14 February and 15 August 2008. During that time period, the trap was inoperable for 29 days because of high river flows, debris, snow/ice, or mechanical failure. During the five-month sampling period, a total of 220 wild steelhead/rainbow smolts, 2,106 hatchery smolts, and 99 wild parr were captured at the Lower Wenatchee Trap. Based

on capture efficiencies estimated from the flow model, the total number of wild yearling steelhead/rainbow that emigrated past the Lower Wenatchee Trap was 31,902 (± 8,979). Most of the wild yearling steelhead/rainbow migrated during April and May. Nearly all (60%) the hatchery yearling steelhead/rainbow migrated during May. Monthly captures of all fish collected at the Lower Wenatchee Trap are reported in Appendix B.

PIT Tagging Activities

A total of 3,139 juvenile steelhead/rainbow trout (2,950 wild and 189 hatchery) were PIT tagged and released in 2008 throughout the Wenatchee Basin (Table 3.17). Most (67%) of these were tagged in the Chiwawa Basin and in the Wenatchee River between Tumwater and Lake Wenatchee. Few were tagged and released at the Upper Wenatchee trap. A total of 461 juvenile steelhead/rainbow trout were tagged and released at the Lower Wenatchee trap. See Appendix C for a complete list of all fish captured, tagged, lost, and released.

Table 3.17. Numbers of wild and hatchery steelhead/rainbow trout that were captured, tagged, and released at different locations within the Wenatchee Basin, 2008. Numbers of fish that died or shed tags are also given.

Sampling location	Origin	Number captured for tagging	Number tagged	Number that died	Number of shed tags	Total number of tagged fish released
Chiwawa Trap	Wild	1,571	1,440	8	2	1,431
	Hatchery	4	2	0	0	2
	Total	**1,575**	**1,442**	**8**	**2**	**1,433**
Chiwawa River	Wild	103	94	1	0	94
	Hatchery	39	35	0	0	35
	Total	**142**	**129**	**1**	**0**	**129**
Upper Wenatchee Trap	Wild	26	24	0	0	24
	Hatchery	0	0	0	0	0
	Total	**26**	**24**	**0**	**0**	**24**
Nason Creek[a]	Wild	271	258	3	0	255
	Hatchery	97	88	1	0	87
	Total	**368**	**346**	**4**	**0**	**342**
Upper Wenatchee River	Wild	22	21	0	0	21
	Hatchery	28	26	0	0	26
	Total	**50**	**47**	**0**	**0**	**47**
Middle Wenatchee	Wild	1,026	981	0	0	981
	Hatchery	12	11	0	0	11
	Total	**1,038**	**992**	**0**	**0**	**992**
Lower Wenatchee	Wild	103	102	0	0	102
	Hatchery	11	10	0	0	10
	Total	**114**	**112**	**0**	**0**	**112**
Lower Wenatchee	Wild	295	285	0	0	285
	Hatchery	2	0	0	0	0

Sampling location	Origin	Number captured for tagging	Number tagged	Number that died	Number of shed tags	Total number of tagged fish released
Trap	**Total**	**297**	**285**	**0**	**0**	**285**
Totals	***Wild***	***3,417***	***3,205***	***12***	***2***	***3,193***
	Hatchery	***193***	***172***	***1***	***0***	***171***
	Total	***3,610***	***3,377***	***13***	***2***	***3,364***

[a] An additional 2,154 wild steelhead/rainbow were tagged and released by the Yakama Nation at the Nason Creek smolt trap.

3.5 Spawning Surveys

Surveys for steelhead redds were conducted during March through May, 2008, in the Wenatchee River (including Beaver and Chiwaukum creeks), Chiwawa River (including Meadow, Alder, and Clear creeks), Nason Creek (including White Pine, Roaring, and an un-named stream), Icicle Creek, Peshastin Creek (including Mill, Ingalls, Tronsen, Scotty, Shaser, and Schafer creeks), and White River (including the Napeequa River and Panther Creek). Surveys were conducted in both index and non-index areas throughout the Wenatchee Basin (see Appendix D for more details).

Redd Counts

A total of 286 steelhead redds were estimated in the Wenatchee Basin in 2008 (Table 3.18). This is about an 80% increase from the estimate in 2007 (the higher count is largely due to the two fold increase in run size over 2007; see Appendix D). Most spawning occurred in the Wenatchee River (35%) and Nason Creek (31%) (Table 3.18; Figure 3.3). Peshastin Creek contained 17% of all redds in the Wenatchee Basin. No redds were observed in the Little Wenatchee River and the number of redds in the Chiwawa Basin was below the average for that area.

Table 3.18. Numbers of steelhead redds estimated within different streams/watersheds within the Wenatchee Basin, 2001-2008; NS = not sampled. Redd counts beginning in 2004 have been conducted within the same areas and with the same methods. Therefore, comparing redd numbers before 2004 with estimates since may not be valid.

Survey year	Number of steelhead redds							
	Chiwawa	Nason	Little Wenatchee	White	Wenatchee River[a]	Icicle	Peshastin	Total
2001	25	27	NS	NS	116	19	NS	**187**
2002	80	80	1	0	315	27	NS	**503**
2003	64	121	5	3	248	16	15	**472**
2004	62	127	0	0	151	23	34	**397**
2005	162	412	0	2	459	8	97	**1,140**
2006	19	77	NS	0	191	41	67	**395**
2007	11	78	0	1	46	6	17	**159**
2008	11	88	NS	1	100	37	49	**286**
Average[b]	***53***	***156***	***0***	***1***	***189***	***23***	***53***	***475***

[a] Includes redds in Beaver and Chiwaukum creeks.
[b] The average is based on estimates from 2004 to present.

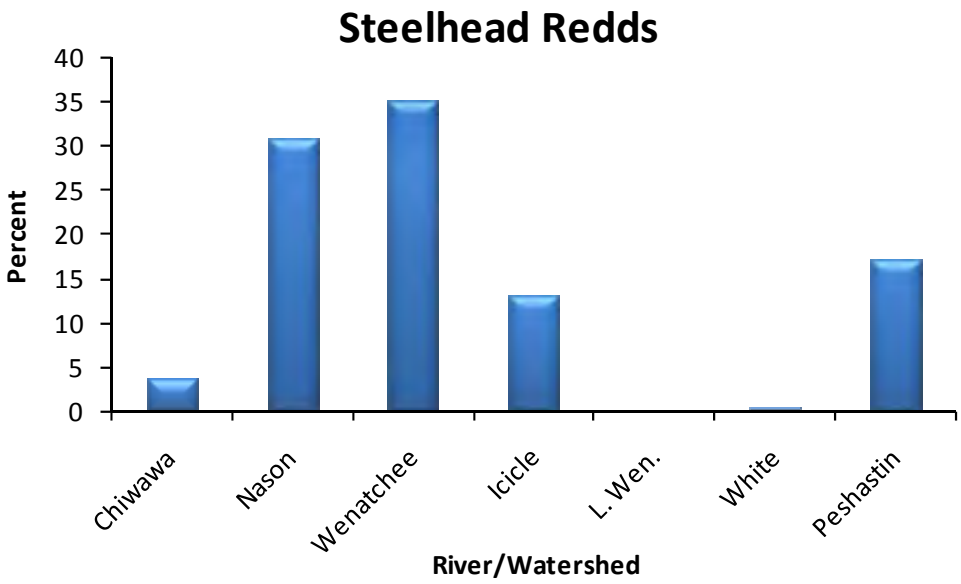


Figure 3.3. Percent of the total number of steelhead redds counted in different streams/watersheds within the Wenatchee Basin during March through May, 2008.

Redd Distribution

Steelhead redds were not evenly distributed among reaches within survey streams in 2008 (Table 3.19). Most of the spawning in the Chiwawa Basin occurred in Reach 1 and in Clear Creek. No redds were observed in Meadow or Alder creeks. Most of the spawning in the Nason Creek Basin occurred in Nason Creek (primarily in Reaches 2 and 3), with little spawning in tributaries. All spawning in the Peshastin Creek Basin occurred in Peshastin Creek (mostly in Reach 1). Only one redd was found in Peshastin Creek tributaries. About 59% of the spawning in the Wenatchee River occurred upstream from Tumwater Dam.

Table 3.19. Numbers and percentages of steelhead redds counted within different streams/watersheds within the Wenatchee Basin during March through May, 2008.

Stream/watershed	Reach	Number of redds	Percent of redds within stream/watershed
Chiwawa	Chiwawa 1	9	81.8
	Rock Creek	0	0.0
	Chikamin Creek	0	0.0
	Meadow Creek	0	0.0
	Alder Creek	0	0.0
	Clear Creek	2	18.2
	Total	**11**	**100**
Nason	Nason 1	13	14.8
	Nason 2	24	27.3

Stream/watershed	Reach	Number of redds	Percent of redds within stream/watershed
	Nason 3	35	39.8
	Nason 4	15	17.0
	White Pine Creek	0	0.0
	Un-named Creek	1	1.1
	Roaring Creek	0	0.0
	Total	**88**	**100**
White	White 2	0	0.0
	White 3	0	0.0
	Panther Creek	0	0.0
	Naqeequa River	1	100.0
	Total	**1**	**100**
Icicle	Icicle	37	100.0
	Total	**37**	**100**
Peshastin	Peshastin 1	35	71.4
	Peshastin 2	13	26.5
	Mill Creek	1	2.1
	Ingalls Creek	0	0.0
	Tronsen Creek	0	0.0
	Scotty Creek	0	0.0
	Shaser Creek	0	0.0
	Schafer Creek	0	0.0
	Total	**49**	**100**
Wenatchee	Wenatchee 1	3	3.0
	Wenatchee 2	7	7.0
	Wenatchee 3	15	15.0
	Wenatchee 4	0	0.0
	Wenatchee 5	2	2.0
	Wenatchee 6	14	14.0
	Wenatchee 7	0	0.0
	Wenatchee 8	6	6.0
	Wenatchee 9	6	6.0
	Wenatchee 10	47	47.0
	Beaver Creek	0	0.0
	Chiwaukum Creek	0	0.0
	Total	**100**	**100**

Spawn Timing

Steelhead began spawning during the third week of March in Nason Creek and the fourth week of March in the Wenatchee River and progressed upstream as water temperatures increased. Spawning occurred at temperatures between 3.2° and 9.9°C. Most spawning began when mean daily temperatures reached about 4.3°C. Spawning in most tributaries within the Wenatchee River Basin peaked the fourth week of April (Figure 3.4).

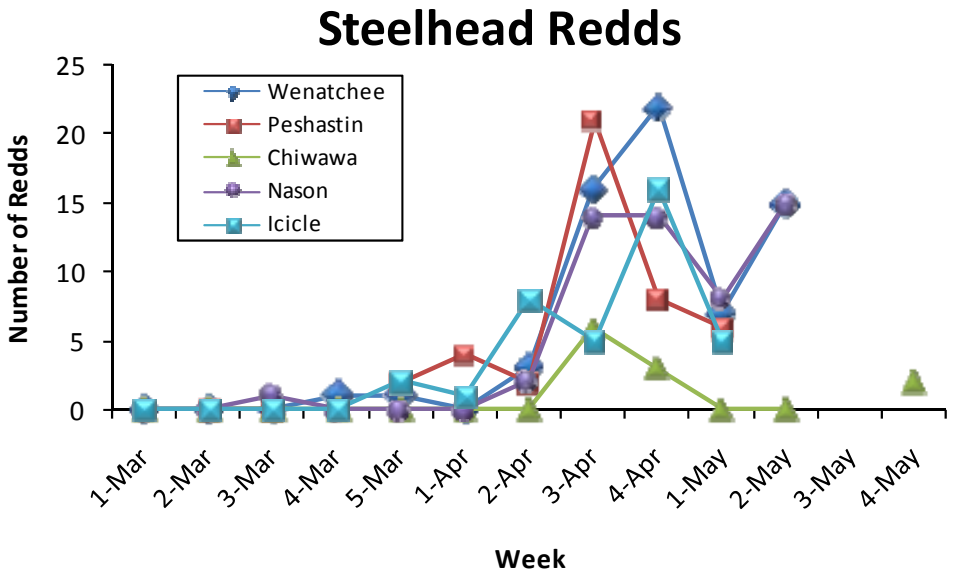


Figure 3.4. Numbers of steelhead redds counted during different weeks in different index areas within the Wenatchee Basin, March through May 2008.

Spawning Escapement

Spawning escapement for steelhead upstream from Tumwater Dam was calculated as the number of redds (upstream from the dam) times the fish per redd ratio (based on sex ratios estimated at Tumwater Dam using video surveillance). The estimated fish per redd ratio for steelhead in 2008 was 2.81 (Table 3.20). Multiplying this ratio by the total number of redds upstream from the dam resulted in a total spawning escapement of 447 steelhead (Table 3.20). This means that of the 1,328 steelhead counted at Tumwater, only about 34% of them were estimated to have spawned upstream from the dam. This estimate was lower than the average of 47%.

The low estimated spawning escapement in 2008 may have resulted from the difficult survey conditions that biologists experienced in that year. That is, poor survey conditions may have obscured redds that were missed by the biologists. The effect of other factors, such as pre-spawning mortality, fallback, illegal harvest, etc. remain unknown.

Table 3.20. Numbers of steelhead counted at Tumwater Dam, fish/redd estimates (based on male-to-female ratios estimated at Tumwater Dam), numbers of steelhead redds counted upstream from Tumwater Dam, total spawning escapement upstream from Tumwater Dam (estimated as the total number of redds times the fish/redd ratio), and the proportion of the Tumwater Dam count that made up the spawning escapement.

Survey year	Total count at Tumwater Dam	Fish/redd	Number of redds			Spawning escapement	Proportion of Tumwater count that spawned
			Index area	Non-index area	Total redds		
2001	820	2.08	118	19	137	285	0.35
2002	1,720	2.68	296	179	475	1,273	0.74
2003	1,810	1.60	353	88	441	706	0.39
2004	1,869	2.21	277	92	369	815	0.44
2005	2,650	1.61	828	136	964	1,552	0.59
2006	1,053	2.05	192	34	226	463	0.44
2007	657	1.94	105	29	134	260	0.40
2008	1,328	2.81	124	35	159	447	0.34
Average[a]	***1,511***	***2.12***	***305***	***65***	***370***	***707***	***0.47***

[a] The average is based on estimates from 2004 to present.

3.6 Life History Monitoring

Life history characteristics of steelhead were assessed by examining fish collected at broodstock collection sites, examining videotape at Tumwater Dam, and by reviewing tagging data and fisheries statistics. Some statistics could not be calculated at this time because few fish have been tagged with CWTs. All steelhead released from the hatchery received elastomer tags and about 30,000 were PIT tagged. With the placement of remote PIT tag detectors in spawning streams in 2007 and 2008, statistics such as origin on spawning grounds, stray rates, and SARs can be estimated more accurately.

Migration Timing

Sampling at Tumwater Dam indicates that steelhead migrate throughout the year; however, the migration distribution is bimodal, indicating that steelhead migrate past Tumwater Dam in two pulses: one pulse during summer-autumn the year before spawning and another during winter-spring the year of spawning (Figure 3.5). Most steelhead passed Tumwater Dam during July through October and April. The highest proportion of both wild and hatchery fish migrated during October.

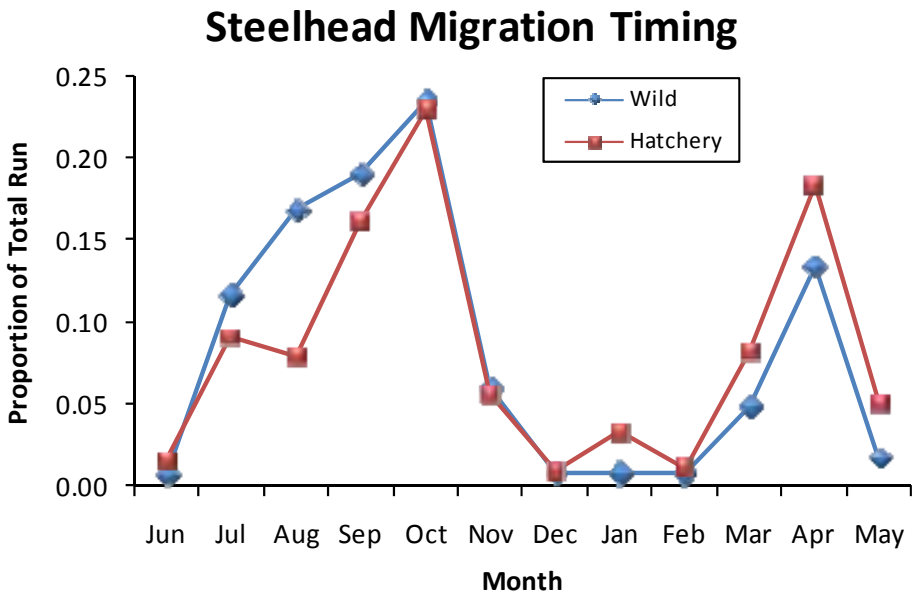


Figure 3.5. Proportion of wild and hatchery steelhead sampled at Tumwater Dam for the combined brood years of 1999-2008.

Because the migration of steelhead is bimodal, we estimated migration statistics separately for each migration pulse (i.e., summer-autumn migration and winter-spring migration). That is, we compared migration statistics for wild and hatchery steelhead passing Tumwater Dam during the summer-autumn period independent of those for the winter-spring migration period. We estimated the week and month that 10%, 50%, and 90% of the wild and hatchery steelhead passed Tumwater Dam during the two migration periods. We also estimated the mean weekly and monthly migration timing for wild and hatchery steelhead.

Overall, there was little difference in migration timing of wild and hatchery fish enumerated at Tumwater Dam (Table 3.21a and b; Figure 3.5). For both the summer-autumn and winter-spring migration periods, wild and hatchery steelhead arrived at the dam during the same week and month. The mean and median migration timing for wild and hatchery steelhead was also similar. However, for both migration periods, 90% of the migration of wild steelhead occurred earlier than for hatchery steelhead.

Table 3.21a. The week that 10%, 50% (median), and 90% of the wild and hatchery steelhead passed Tumwater Dam during their summer-autumn migration (June through December) and during their winter-spring migration (January through May), 1999-2008. The average week is also provided for both migration periods. Migration timing is based on video sampling at Tumwater. The presence of eroded fins and/or missing adipose fins was used to distinguish hatchery fish from wild fish during video monitoring at Tumwater Dam. Estimates also include steelhead collected for broodstock.

Spawn year	Origin	Steelhead Migration Time (week)									
		Summer-Autumn Migration (Jun-Dec)					Winter-Spring Migration (Jan-May)				
		10%	50%	90%	Mean	Sample size	10%	50%	90%	Mean	Sample size
1999	Wild	27	32	47	35	81	12	16	17	15	29
	Hatchery	25	31	47	34	47	12	16	18	15	27
2000	Wild	31	36	41	36	238	11	14	18	14	40
	Hatchery	31	34	41	36	194	12	14	16	14	69
2001	Wild	29	34	41	35	391	13	15	17	15	84
	Hatchery	30	38	41	36	227	12	16	17	15	156
2002	Wild	29	39	46	38	810	13	14	17	14	181
	Hatchery	35	42	46	41	610	12	15	18	15	124
2003	Wild	30	33	40	35	731	3	9	16	10	193
	Hatchery	30	35	51	37	372	3	9	15	9	538
2004	Wild	30	40	45	39	644	13	16	18	16	222
	Hatchery	29	40	44	38	677	11	17	19	16	361
2005	Wild	30	39	43	38	986	10	15	17	15	206
	Hatchery	27	38	42	36	1,112	12	16	18	15	377
2006	Wild	29	40	43	39	428	12	15	17	15	191
	Hatchery	29	41	43	39	334	4	13	16	12	181
2007	Wild	30	36	41	35	277	11	17	17	15	108
	Hatchery	29	38	43	36	90	11	17	18	16	214
2008	Wild	30	38	43	38	397	13	15	18	16	123
	Hatchery	33	41	45	40	554	14	18	19	17	311
Average	***Wild***	***30***	***37***	***43***	***37***	***510***	***11***	***15***	***17***	***14***	***139***
	Hatchery	***30***	***37***	***44***	***37***	***407***	***10***	***15***	***17***	***14***	***227***

Table 3.21b. The month that 10%, 50% (median), and 90% of the wild and hatchery steelhead passed Tumwater Dam during their summer-autumn migration (June through December) and during their winter-spring migration (January through May), 1999-2008. The average month is also provided for both migration periods. Migration timing is based on video sampling at Tumwater. The presence of eroded fins and/or missing adipose fins was used to distinguish hatchery fish from wild fish during video monitoring at Tumwater Dam. Estimates also include steelhead collected for broodstock.

Spawn year	Origin	Steelhead Migration Time (month)									
		Summer-Autumn Migration (Jun-Dec)					Winter-Spring Migration (Jan-May)				
		10%	50%	90%	Mean	Sample size	10%	50%	90%	Mean	Sample size
1999	Wild	7	8	11	8	81	4	4	4	4	29
	Hatchery	6	8	11	8	47	3	4	5	4	27
2000	Wild	8	9	10	9	238	3	4	5	4	40
	Hatchery	8	8	10	9	194	3	4	4	4	69
2001	Wild	7	8	10	8	391	3	4	4	4	84
	Hatchery	7	9	10	9	227	3	4	4	4	156
2002	Wild	7	9	11	9	810	3	4	4	4	181
	Hatchery	9	10	11	10	610	3	4	5	4	124
2003	Wild	7	8	10	8	731	1	3	4	3	193
	Hatchery	7	8	12	9	372	1	3	4	2	538
2004	Wild	7	10	11	9	644	3	4	4	4	222
	Hatchery	7	10	10	9	677	3	4	5	4	361
2005	Wild	7	9	10	9	986	3	4	4	4	206
	Hatchery	7	9	10	9	1,112	3	4	5	4	377
2006	Wild	7	10	10	10	428	3	4	4	4	191
	Hatchery	7	10	10	9	334	1	3	4	4	181
2007	Wild	7	9	10	9	277	3	4	4	4	108
	Hatchery	7	9	10	9	90	3	4	5	4	214
2008	Wild	7	9	10	9	397	3	4	5	4	123
	Hatchery	8	10	11	10	554	4	4	5	4	311
Average	***Wild***	***7***	***9***	***10***	***9***	***510***	***3***	***4***	***4***	***4***	***139***
	Hatchery	***7***	***9***	***11***	***9***	***407***	***3***	***4***	***5***	***4***	***227***

Age at Maturity

Nearly all steelhead broodstock collected at Tumwater and Dryden dams lived in saltwater 1 to 2 years (saltwater age) (Table 3.22; Figure 3.6). Very few saltwater age-3 fish returned and those that did were wild fish. In general there was little difference between the saltwater age of wild and hatchery fish. A slightly greater number of wild fish returned as saltwater age-2 fish than age-1 fish. In contrast, a slightly greater number of hatchery fish returned as saltwater-1 fish.

Table 3.22. Proportions of wild and hatchery steelhead broodstock of different ages collected at Tumwater and Dryden dams, 1998-2008. Age represents the number of years the fish lived in salt water.

Sample year	Origin	Saltwater age			Sample size
		1	2	3	
1998	Wild	0.39	0.61	0.00	35
	Hatchery	0.21	0.79	0.00	43
1999	Wild	0.50	0.48	0.02	58
	Hatchery	0.82	0.18	0.00	67
2000	Wild	0.56	0.44	0.00	39
	Hatchery	0.68	0.32	0.00	101
2001	Wild	0.52	0.48	0.00	64
	Hatchery	0.15	0.85	0.00	114
2002	Wild	0.56	0.44	0.00	99
	Hatchery	0.95	0.05	0.00	113
2003	Wild	0.13	0.85	0.02	63
	Hatchery	0.29	0.71	0.00	92
2004	Wild	0.95	0.05	0.00	85
	Hatchery	0.95	0.05	0.00	132
2005	Wild	0.22	0.78	0.00	95
	Hatchery	0.21	0.79	0.00	114
2006	Wild	0.29	0.71	0.00	101
	Hatchery	0.60	0.40	0.00	98
2007	Wild	0.40	0.59	0.00	79
	Hatchery	0.62	0.38	0.00	97
2008	Wild	0.65	0.34	0.01	104
	Hatchery	0.89	0.11	0.00	107
Average	***Wild***	***0.47***	***0.52***	***0.00***	***75***
	Hatchery	***0.58***	***0.42***	***0.00***	***98***

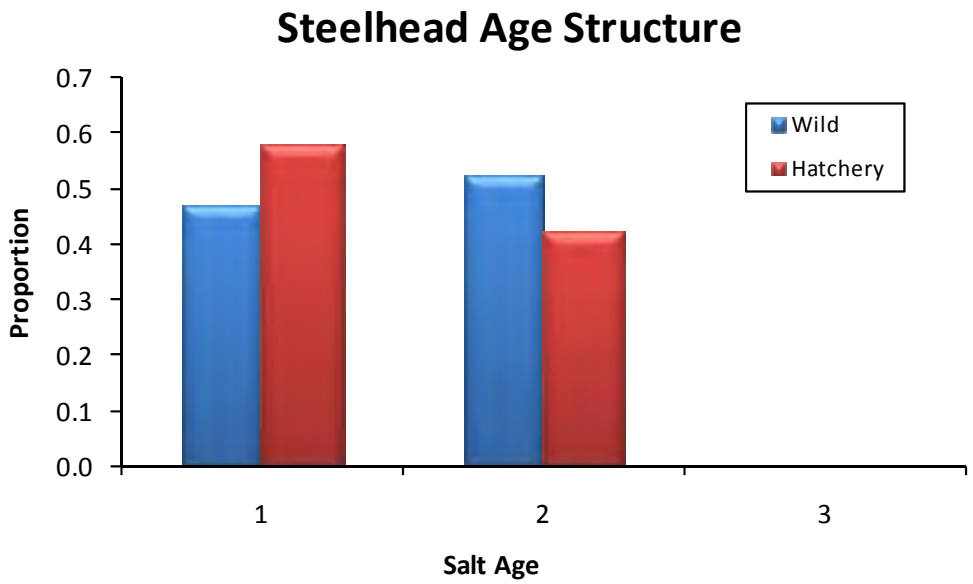


Figure 3.6. Proportions of wild and hatchery steelhead of different saltwater ages sampled at Tumwater Dam for the combined years 1998-2008.

Size at Maturity

On average, hatchery steelhead collected at Tumwater and Dryden dams were about 3 cm smaller than wild steelhead (Table 3.23). This may be related to the fact that slightly more wild steelhead return as saltwater age-2 fish than hatchery steelhead.

Table 3.23. Mean fork length (cm) at age (saltwater ages) of hatchery and wild steelhead collected from broodstock, 1998-2008; N = sample size and SD = 1 standard deviation.

Return year	Origin	Steelhead fork length (cm)								
		1-Salt			2-Salt			3-Salt		
		Mean	N	SD	Mean	N	SD	Mean	N	SD
1998	Wild	63	15	4	79	20	5	-	0	-
	Hatchery	61	9	4	73	34	4	-	0	-
1999	Wild	65	29	5	74	28	5	77	1	-
	Hatchery	62	54	4	73	12	4	-	0	-
2000	Wild	64	22	3	74	17	5	-	0	-
	Hatchery	60	57	3	71	27	4	-	0	-
2001	Wild	61	33	6	77	31	5	-	0	-
	Hatchery	62	17	4	72	97	4	-	0	-
2002	Wild	64	55	4	77	44	4	-	0	-
	Hatchery	63	106	4	73	6	4	-	0	-
2003	Wild	69	8	6	77	52	5	91	1	-
	Hatchery	66	27	4	75	65	4	-	0	-
2004	Wild	63	73	6	78	4	2	-	0	-

Return year	Origin	Steelhead fork length (cm)								
		1-Salt			2-Salt			3-Salt		
		Mean	N	SD	Mean	N	SD	Mean	N	SD
	Hatchery	61	59	3	73	3	1	-	0	-
2005	Wild	59	21	4	74	74	5	-	0	-
	Hatchery	59	23	4	72	89	4	-	0	-
2006	Wild	63	27	5	75	67	6	-	0	-
	Hatchery	61	41	4	72	27	5	-	0	-
2007	Wild	64	31	6	76	46	5	-	0	-
	Hatchery	60	60	4	71	36	5	-	0	-
2008	Wild	64	68	4	77	35	4	80	2	-
	Hatchery	60	95	4	72	12	2	-	0	-
Average	Wild	64	35	5	76	38	5	83	0	-
	Hatchery	61	50	4	72	37	4	-	0	-

Contribution to Fisheries

Nearly all harvest on Wenatchee steelhead occurs within the Columbia basin. Harvest rates on steelhead in the Lower Columbia River fisheries (both tribal and non-tribal) are generally less than 5-10% (NMFS 2004). WDFW regulates steelhead harvest in the Upper Columbia. Under certain conditions, WDFW may allow a harvest on hatchery steelhead (adipose fin clipped fish). The intent is to reduce the number of hatchery steelhead that exceed habitat seeding levels in spawning areas and to increase the proportion of wild steelhead in spawning populations.

The Hatchery Evaluation Technical Team (HETT) is currently developing methods for calculating harvest rates on Wenatchee steelhead. These methods will be presented to the Hatchery Committee for their review in 2009.

Origin on Spawning Grounds

At this time, origin of steelhead (wild or hatchery) on spawning grounds cannot be determined precisely. However, based on scales collected during steelhead run composition sampling at Dryden Dam in 2006 (2007 spawners), naturally produced steelhead made up about 37% of the escapement. More precise estimates of wild and hatchery spawners within tributaries can be generated after remote PIT tag detectors are installed within spawning tributaries.

Straying

Stray rates are currently difficult to estimate because fish are not handled on spawning grounds. As remote PIT-tag detectors are installed in spawning streams, we will be able to more accurately determine steelhead stray rates.

Genetics

A report on the genetic analysis of Wenatchee steelhead will be completed in 2009.

Proportion of Natural Influence

Another method for assessing the genetic risk of a supplementation program is to determine the influence of the hatchery and natural environments on the adaptation of the composite population. This is estimated by the proportion of natural origin fish in the hatchery broodstock (pNOB) and the proportion of hatchery origin fish in the natural spawning escapement (pHOS). The ratio pNOB/(pHOS+pNOB) is the Proportion of Natural Influence (PNI). The larger the ratio (PNI), the greater the strength of selection in the natural environment relative to that of the hatchery environment. In order for the natural environment to dominate selection, PNI should be greater than 0.5 (HSRG/WDFW/NWIFC 2004).

For brood years 2001-2007, the PNI was equal to or greater than 0.4 (Table 3.24). This indicates that the hatchery environment has an equal or greater influence on adaptation of Wenatchee steelhead than does the hatchery environment.

Table 3.24. Proportionate natural influence (PNI) of the Wenatchee steelhead supplementation program for brood years 2001-2007. PNI was calculated as the proportion of naturally produced steelhead in the hatchery broodstock (pNOB) divided by the proportion of hatchery steelhead on the spawning grounds (pHOS) plus pNOB. NOS = number of natural origin steelhead on the spawning grounds; HOS = number of hatchery origin steelhead on the spawning grounds; NOB = number of natural origin steelhead collected for broodstock; and HOB = number of hatchery origin steelhead included in hatchery broodstock.

Brood year	Spawners[a]			Broodstock			PNI
	NOS	HOS	pHOS	NOB	HOB	pNOB	
2001	158	127	0.45	51	103	0.33	0.43
2002	731	542	0.43	96	64	0.60	0.59
2003	356	350	0.50	49	90	0.35	0.42
2004	371	444	0.55	75	61	0.55	0.50
2005	690	862	0.56	87	104	0.46	0.45
2006	253	210	0.45	93	69	0.57	0.56
2007	145	115	0.44	76	58	0.57	0.56
Average	***386***	***379***	***0.50***	***75***	***78***	***0.49***	***0.50***

[a] Proportions of natural origin and hatchery origin spawners were determined from video tape at Tumwater Dam. Therefore, these PNI estimates are appropriate for steelhead spawning upstream from Tumwater Dam. They may not represent PNI for steelhead spawning downstream from Tumwater Dam.

Natural Replacement Rates

Natural replacement rates (NRR) were calculated as the ratio of natural origin recruits (NOR) to the parent spawning population. For brood years 1989-2002, NRR in the Wenatchee averaged 0.83 (range, 0.07-3.13) (Table 3.25). NRRs for more recent brood years will be calculated as soon as the data are available.

Table 3.25. Spawning escapements, natural origin recruits (NOR), and natural replacement rates (NRR) for Wenatchee steelhead, 1989-2002. Numbers of hatchery and wild steelhead were based on radio telemetry results, numbers of steelhead passing Priest and Wells dams, and the number of steelhead harvested or removed for broodstock. *(The numbers in this table may change as the HETT and HC refine the methods for estimating steelhead escapement, NORs, and NRRs.)*

Brood year	Spawning escapement			NOR	NRR
	Hatchery	Wild	Total		
1989	1,849	1,001	2,851	348	0.122
1990	1,487	936	2,423	342	0.141
1991	990	481	1,471	321	0.218
1992	1,333	888	2,221	262	0.118
1993	2,951	566	3,516	241	0.068
1994	985	309	1,294	342	0.265
1995	1,637	303	1,940	427	0.220
1996	1,036	409	1,445	1,037	0.717
1997	245	269	514	1,609	3.129
1998	391	278	668	1,225	1.832
1999	114	268	382	796	2.085
2000	738	406	1,144	1,260	1.101
2001	1,065	773	1,838	1,301	0.707
2002	NA	NA	NA	NA	NA
Average	***1,140***	***530***	***1,670***	***731***	***0.825***

Hatchery Replacement Rates

Hatchery replacement rates were estimated as hatchery adult-to-adult returns. These rates should be greater than the NRRs and greater than or equal to 19.2 (the calculated target value in Murdoch and Peven 2005). In years with data, HRRs and adjusted HRRs were consistently greater than NRRs (Table 3.26). In contrast, HRRs exceeded the estimated target value of 19.2 in only one year and adjusted HRRs exceeded the estimated target in two of the six years (Table 3.26).

Table 3.26. Hatchery replacement rates (HRR), adjusted HRR (for estimated tag loss), and NRR for Wenatchee steelhead, 1998-2004. *(The numbers in this table may change as the HETT and HC refine the methods for estimating steelhead HRRs and NRRs.)*

Brood year	HRR	Adjusted HRR	NRR
1998	1.89	3.49	1.83
1999	15.47	23.16	2.09
2000	2.60	3.33	1.10
2001	57.97	63.37	0.71
2002	11.76	12.18	NA
2003	6.56	6.56	NA
2004	NA	NA	NA

Brood year	HRR	Adjusted HRR	NRR
Average	***16.04***	***18.68***	***1.43***

Smolt-to-Adult Survivals

Smolt-to-adult ratios (SARs) are calculated as the number of returning hatchery adults divided by the number of hatchery smolts released. SARs are generally based on CWT returns. However, Wenatchee steelhead have not been extensively tagged with CWTs. Therefore elastomer-tagged fish were used to estimate SARs from release to capture at Priest Rapids Dam. Two different estimates are provided. One (unadjusted) is based on elastomer tag recaptures at Priest Rapids Dam; the other (adjusted) is corrected for tag loss after release (based on the number of unmarked hatchery adults that could not be accounted for). SARs for steelhead may change once a more accurate methodology for estimating adult survival has been developed.

Unadjusted SARs for Wenatchee steelhead ranged from 0.0017 to 0.0307 (mean = 0.0076) for brood years 1996-2004 (Table 3.27). Accounting for post-release tag loss, SARs ranged from 0.0016 to 0.0336 (mean = 0.0105) for brood years 1998-2004.

Table 3.27. Smolt-to-adult ratios (SARs) for Wenatchee hatchery steelhead, 1996-2004; NA = not available. Unadjusted estimates were based on elastomer tags recaptured at Priest Rapids Dam. Adjusted estimates were corrected for tag loss after release.

Brood year	Number of tagged smolts released	SAR (unadjusted)	SAR (adjusted)
1996	348,693	0.0034	NA
1997	429,422	0.0041	NA
1998	172,078	0.0009	0.0016
1999	175,661	0.0110	0.0165
2000	184,639	0.0017	0.0022
2001	335,933	0.0307	0.0336
2002	302,060	0.0063	0.0065
2003	374,867	0.0027	0.0027
2004	NA	NA	NA
Average	***278,355***	***0.0076***	***0.0105***

3.7 ESA/HCP Compliance

Broodstock Collection

Collection of brood-year 2007 broodstock for Wenatchee steelhead at Tumwater and Dryden dams began on 5 July and ended on 11 November 2006 and represented a slightly shortened collection duration from the 1 July – 12 November collection period detailed in the 2005 broodstock collection protocol. The broodstock collection protocols specified a total collection of 208 steelhead, including 104 natural-origin steelhead. Actual broodstock collection totaled 176 steelhead collected at

Tumwater and Dryden dams, including 79 natural-origin fish (44.9% of the total collection). Both the total number and proportion of natural-origin steelhead in the broodstock were less than the 104 and 50% values identified in the 2006 protocol and ESA Permit 1395, respectively.

About 79 and 261 steelhead were handled and released at Dryden Dam and Tumwater Dam, respectively, during BY 2007 Wenatchee steelhead broodstock collection. These fish were released because the weekly quota for either hatchery or wild steelhead had been attained, but not both, or because they were non-target (red VIE), or they were unidentifiable hatchery-origin steelhead. All steelhead released were allowed to fully recover from the anesthesia and released immediately upstream from the trap sites.

In addition to steelhead encountered at Dryden Dam during steelhead broodstock collection, 39 spring Chinook salmon and four bull trout were captured and released unharmed immediately upstream from the trap facility. Consistent with ESA Section 10 Permit 1395 impact minimization measures, all ESA species handled at this site were subject of water-to-water transfers.

Hatchery Rearing and Release

The 2007 brood Wenatchee steelhead reared throughout all life-stages without significant mortality (defined as >10% population mortality associated with a single event). However, the 2007 brood had poor fertilization to eyed-egg and eyed-egg to ponding survival resulting in an unfertilized-to-release survival of 66.3%, which was considerably less than the program target of 81% (see Section 3.2).

Juvenile rearing occurred at three separate facilities including Eastbank Fish Hatchery, Chelan Falls Fish Hatchery, and Turtle Rock Fish Hatchery. Multiple facilities were used to take advantage of variable water temperatures to manipulate growth of juveniles from different parental crosses. Typically, wild steelhead spawn later than their hatchery cohort and are therefore reared at Chelan Falls Fish Hatchery on warmer water to accelerate their growth so they achieve a size at release similar to HxH and HxW parental cross progeny reared on cooler water at Eastbank Fish Hatchery. All parental cross groups receive final rearing at Turtle Rock Fish Hatchery on Columbia River surface water before direct release (scatter planting) in the Wenatchee River basin.

The 2007 brood steelhead smolt release in the Wenatchee Basin totaled 306,690 smolts, representing about 77% of the program target of 400,000 smolts identified in the Rocky Reach and Rock Island Dam HCPs and in ESA Section 10 Permit 1395. As specified in ESA Section 10 Permit 1395, all steelhead smolts released were externally marked or tagged and a representative number were PIT tagged (see Section 3.2)

Hatchery Effluent Monitoring

Per ESA Permits 1196, 1347, and 1395, permit holders shall monitor and report hatchery effluents in compliance with applicable National Pollution Discharge Elimination Systems (NPDES) (EPA 1999) permit limitations. There were no NPDES violations reported at Chelan PUD Hatchery facilities during the period 1 January 2008 through 31 December 2008. NPDES monitoring and reporting for Chelan PUD Hatchery Programs during 2008 are provided in Appendix E.

Smolt and Emigrant Trapping

Per ESA Section 10 Permit No. 1395, the permit holders are authorized a direct take of 20% of the emigrating steelhead population and a lethal take not to exceed 2% of the fish captured (NMFS

2003). Based on the estimated wild steelhead population (smolt trap expansion) and hatchery juvenile steelhead population estimate (hatchery release data) for the Wenatchee Basin, the reported steelhead encounters during the 2008 emigration complied with take provisions in the Section 10 permit and are detailed in Table 3.28. Additionally, juvenile fish captured at the trap locations were handled consistent with provisions in ESA Section 10 Permit 1395 Section B.

Table 3.28. Estimated take of Upper Columbia River steelhead resulting from juvenile emigration monitoring in the Wenatchee Basin, 2008. NA = not available.

Trap location	Population estimate				Number trapped				Total	Take allowed by Permit
	Wild[a]	Hatchery[b]	Parr[c]	Fry	Wild	Hatchery	Parr	Fry		
Chiwawa Trap										
Population	NA	50,037	NA	NA	448	2,684	1,250	0	4,382	
Encounter rate	NA	NA	NA	NA	NA	0.0536	NA	NA	NA	0.20
Mortality [d]	NA	NA	NA	NA	8	0	3	NA	11	
Mortality rate	NA	NA	NA	NA	0.0178	0.0000	0.0024	NA	0.0025	0.02
Upper Wenatchee Trap										
Population	NA	306,690	NA	NA	13	61	14	0	88	
Encounter rate	NA	NA	NA	NA	NA	0.0004	NA	NA		0.20
Mortality [d]	NA	NA	NA	NA	0.0000	1	0	0	1	
Mortality rate	NA	NA	NA	NA	0.0000	0.0164	0.0000	NA	0.0114	0.02
Lower Wenatchee Trap										
Population	31,902	306,690	NA	NA	220	2,106	99	0	2,425	
Encounter rate	NA	NA	NA	NA	0.0069	0.0069	NA	NA	NA	0.20
Mortality [d]	NA	NA	NA	NA	0	2	1	NA	3	
Mortality rate	NA	NA	NA	NA	0.0000	0.0009	0.0101	NA	0.0012	0.02
Wenatchee Basin Total										
Population	31,902	306,690	NA	NA	681	4,851	1,363	0	6,895	
Encounter rate	NA	NA	NA	NA	0.0213	0.0158	NA	NA	NA	0.20
Mortality [d]	NA	NA	NA	NA	8	3	4	NA	15	
Mortality rate	NA	NA	NA	NA	0.0117	0.0006	0.0029	NA	0.0022	0.02

[a] Smolt production estimates based on juvenile emigration monitoring (Miller2009).

[b] 2008 smolt release data for the Wenatchee basin.

[c] Estimated parr emigrating past juvenile trap sites (Miller et al.2009)

[d] Mortality includes trapping and PIT tag mortalities.

Spawning Surveys

Steelhead spawning ground surveys were conducted in the Wenatchee Basin during 2008, as authorized by ESA Section 10 Permit No. 1395. Because of the difficulty of quantifying the level of take associated with spawning ground surveys, the Permit does not specify a take level associated with these activities, even though it does authorize implementation of spawning ground surveys. Therefore, no take levels are reported. However, to minimize potential impacts to established redds, wading was restricted to the extent practical, and extreme caution was used to avoid established redds when wading was required.

Stock Assessment at Priest Rapids Dam

Upper Columbia River steelhead stock assessment sampling at Priest Rapids Dam (PRD) is authorized through ESA Section 10 Permit No. 1395 (NMFS 2003). Permit authorizations include interception and biological sampling of 10% of the UCR steelhead passing PRD to determine upriver adult population size, estimate hatchery to wild ratios, determine age-class contribution, and evaluate the need for managing hatchery steelhead consistent with ESA recovery objectives, which include fully seeding spawning habitat with naturally produced Upper Columbia River steelhead supplemented with artificially propagated enhancement steelhead (NMFS 2003). The 2006-07 run-cycle report (BY 2007) for stock assessment sampling at Priest Rapids Dam was complied under provisions of ESA Section 10 Permit 1395. Data and reporting information are included in Appendix F. The 2008-09 run-cycle summary is pending the completion of the run-cycle (31 May 2009) and final age-at-return assessment based on scale analysis. Data and reporting information will be included in the 2009 annual report.

SECTION 4: WENATCHEE SOCKEYE SALMON

4.1 Broodstock Sampling

This section focuses on results from sampling 2006 and 2007 Wenatchee sockeye broodstock, which were collected at Tumwater Dam. The 2006 brood begins the tracking of the life cycle of sockeye that were released as parr into Lake Wenatchee in 2007 and some of which began smolt migrations in 2008. The 2007 brood is included because juveniles from this brood were released as parr in the lake in 2008. Complete information is not currently available for the 2008 brood (this information will be provided in the 2009 annual report). Collection of sockeye broodstock targets naturally produced fish and equal numbers of male and female fish.

Origin of Broodstock

The 2006 broodstock consisted of mostly naturally produced sockeye collected at Tumwater Dam between 17 July and 3 August 2006 (Table 4.1). A total of 214 sockeye were spawned, all of which were naturally produced fish. The 2007 broodstock consisted of naturally produced Wenatchee sockeye salmon collected at Tumwater Dam between 16 July and 12 August 2007 (Table 4.1). A total of 210 naturally produced sockeye were spawned.

Table 4.1. Numbers of wild and hatchery sockeye salmon collected for broodstock, numbers that died before spawning, and numbers of sockeye spawned, 1989-2007. Unknown origin fish (i.e., undetermined by scale analysis, no CWT or fin clips, and no additional hatchery marks) were considered naturally produced. Mortality includes sockeye that died of natural causes typically near the end of spawning and were not needed for the program, surplus sockeye killed at spawning, sockeye that died but were not recovered from the net pens, and sockeye that may have jumped out of the net pens.

Brood year	Wild sockeye					Hatchery sockeye					Total number spawned
	Number collected	Prespawn loss	Mortality	Number spawned	Number released	Number collected	Prespawn loss	Mortality	Number spawned	Number released	
1989	299	93	47	115	44	0	0	0	0	0	115
1990	333	7	7	302	17	0	0	0	0	0	302
1991	357	18	16	199	124	0	0	0	0	0	199
1992	362	18	5	320	19	0	0	0	0	0	320
1993	307	79	21	207	0	0	0	0	0	0	207
1994	329	15	9	236	69	5	0	0	5	0	241
1995	218	5	7	194	12	3	0	0	3	0	197
1996	291	2	0	225	64	20	0	0	0	20	225
1997	283	12	3	192	76	19	0	0	19	0	211
1998	225	37	25	122	41	6	0	0	6	0	128
1999	90	7	1	79	3	60	0	0	60	0	139
2000	256	19	1	170	66	5	0	0	5	0	175
2001	252	27	10	200	15	8	1	0	7	0	207
2002	257	0	1	256	0	0	0	0	0	0	256
2003	261	12	9	198	42	0	0	0	0	0	198
2004	211	13	12	177	9	0	0	0	0	0	177
2005	243	29	12	166	36	0	0	0	0	0	166

Brood year	Wild sockeye					Hatchery sockeye					Total number spawned
	Number collected	Prespawn loss	Mortality	Number spawned	Number released	Number collected	Prespawn loss	Mortality	Number spawned	Number released	
2006	260	2	4	214	40	0	0	0	0	0	214
2007	248	15	3	210	20	0	0	0	0	0	210
Average	***268***	***22***	***8***	***199***	***37***	***7***	***0***	***0***	***6***	***1***	***205***

Age/Length Data

Ages of sockeye were determined from scales and otoliths collected from broodstock. The 2006 return was comprised primarily of age-5 returning adults (65.5%; Table 4.2). Age-4 and 6 sockeye made up 34.0% and 0.5% of the 2006 return, respectively. The 2007 return consisted primarily of age-5 adults (85.4%; Table 4.2). Age-4 and 6 sockeye made up 1.9% and 9.7% of the 2007 return, respectively.

Table 4.2. Percent of hatchery and wild sockeye salmon of different ages (total age) collected from broodstock, 1994-2007.

Return year	Origin	Total age		
		4	5	6
1994	Wild	57.3	41.7	1.0
	Hatchery	40.0	60.0	0.0
1995	Wild	77.3	20.7	2.0
	Hatchery	66.7	33.3	0.0
1996	Wild	65.8	34.2	0.0
	Hatchery	0.0	0.0	0.0
1997	Wild	86.5	13.5	0.0
	Hatchery	57.9	42.1	0.0
1998	Wild	9.9	88.6	1.5
	Hatchery	66.7	33.3	0.0
1999	Wild	21.8	74.7	3.5
	Hatchery	90.0	8.3	1.7
2000	Wild	97.7	2.3	0.0
	Hatchery	100.0	0.0	0.0
2001	Wild	69.9	29.6	0.5
	Hatchery	71.4	28.6	0.0
2002	Wild	31.6	67.6	0.8
	Hatchery	0.0	0.0	0.0
2003	Wild	2.6	90.5	6.9
	Hatchery	0.0	0.0	0.0
2004	Wild	97.5	2.0	0.5
	Hatchery	0.0	0.0	0.0
2005	Wild	74.2	25.8	0.0

Return year	Origin	Total age		
		4	5	6
	Hatchery	0.0	0.0	0.0
2006	Wild	34.0	65.5	0.5
	Hatchery	0.0	0.0	0.0
2007	Wild	1.9	88.4	9.7
	Hatchery	0.0	0.0	0.0
Average	***Wild***	***53.3***	***44.8***	***1.9***
	Hatchery	***79.0***	***20.0***	***1.0***

Lengths of sockeye for the 2006 and 2007 return years are provided in Table 4.3. Lengths of age-4, 5, and 6 sockeye sampled in 2007 averaged 57, 58, and 58 cm, respectively.

Table 4.3. Mean fork length (cm) at age (total age) of hatchery and wild sockeye salmon collected for broodstock, 1994-2007; SD = 1 standard deviation.

Return year	Origin	Sockeye fork length (cm)								
		Age-4			Age-5			Age-6		
		Mean	N	SD	Mean	N	SD	Mean	N	SD
1994	Wild	56	125	3	55	91	3	54	2	3
	Hatchery	57	2	1	56	3	1	-	0	-
1995	Wild	51	153	2	55	41	4	54	4	5
	Hatchery	53	2	4	59	1	-	-	0	-
1996	Wild	52	146	4	53	76	3	-	0	-
	Hatchery	-	0	-	-	0	-	-	0	-
1997	Wild	50	166	3	53	26	5	-	0	-
	Hatchery	54	11	4	59	8	2	-	0	-
1998	Wild	51	13	4	55	117	3	53	2	3
	Hatchery	52	4	2	55	2	8	-	0	-
1999	Wild	52	19	4	50	65	4	56	3	1
	Hatchery	50	54	3	56	5	4	56	1	-
2000	Wild	52	167	2	54	4	3	-	0	-
	Hatchery	54	5	1	-	0	-	-	0	-
2001	Wild	54	151	3	56	65	4	58	1	-
	Hatchery	51	5	5	55	2	4	-	0	-
2002	Wild	54	77	2	56	165	4	57	2	0
	Hatchery	-	0	-	-	0	-	-	0	-
2003	Wild	54	5	4	60	172	2	60	13	4
	Hatchery	-	0	-	-	0	-	-	0	-
2004	Wild	53	192	3	56	4	3	63	1	-
	Hatchery	-	0	-	-	0	-	-	0	-

Return year	Origin	Sockeye fork length (cm)								
		Age-4			Age-5			Age-6		
		Mean	N	SD	Mean	N	SD	Mean	N	SD
2005	Wild	51	132	3	57	46	4	-	0	-
	Hatchery	-	0	-	-	0	-	-	0	-
2006	Wild	52	70	3	56	135	4	54	2	3
	Hatchery	-	0	-	-	0	-	-	0	-
2007	Wild	57	4	2	58	182	5	58	20	5
	Hatchery	-	0	-	-	0	-	-	0	-

Sex Ratios

Male sockeye in the 2006 return made up about 50% of the adults collected, resulting in an overall male to female ratio of 1.00:1.00 (Table 4.4). In 2007, males made up about 51% of the adults collected, resulting in an overall male to female ratio of 1.05:1.00. Ratios for both years are at or near the 1:1 ratio target in the broodstock protocol.

Table 4.4. Numbers of male and female wild and hatchery sockeye collected for broodstock, 1989-2007. Ratios of males to females are also provided.

Return year	Number of wild sockeye			Number of hatchery sockeye			Total M/F ratio*
	Males (M)	Females (F)	M/F	Males (M)	Females (F)	M/F	
1989	162	137	1.18:1.00	0	0	-	1.18:1.00
1990	177	156	1.13:1.00	0	0	-	1.13:1.00
1991	260	97	2.68:1.00	0	0	-	2.68:1.00
1992	180	182	0.99:1.00	0	0	-	0.99:1.00
1993	130	177	0.73:1.00	0	0	-	0.73:1.00
1994	162	167	0.97:1.00	1	4	0.25:1.00	0.95:1.00
1995	102	116	0.88:1.00	1	2	0.50:1.00	0.87:1.00
1996	150	161	0.93:1.00	0	0	-	0.93:1.00
1997	139	144	0.97:1.00	10	9	1.11:1.00	0.97:1.00
1998	115	110	1.05:1.00	2	4	0.50:1.00	1.03:1.00
1999	22	68	0.32:1.00	37	23	1.61:1.00	0.65:1.00
2000	155	101	1.53:1.00	3	2	1.50:1.00	1.53:1.00
2001	114	138	0.83:1.00	4	4	1.00:1.00	0.83:1.00
2002	128	129	0.99:1.00	0	0	-	0.99:1.00
2003	161	100	1.61:1.00	0	0	-	1.61:1.00
2004	108	103	1.05:1.00	0	0	-	1.05:1.00
2005	130	113	1.15:1.00	0	0	-	1.15:1.00
2006	130	130	1.00:1.00	0	0	-	1.00:1.00
2007	127	121	1.05:1.00	0	0	-	1.05:1.00
Total	***2,652***	***2,450***	***1.08:1.00***	***58***	***48***	***1.21:1.00***	***1.08:1.00***

Fecundity

Fecundities for the 2006 and 2007 returns of sockeye salmon averaged 2,656 and 3,115 eggs per female, respectively (Table 4.5). The higher mean fecundity for the 2007 return was likely because of the strong age-5 component in the return. Fecundities for this program between 1989 and 2006 are based upon the total (pooled) number of eyed eggs divided by the number of females spawned. Mean fecundities for the 2007 brood were derived from individual fecundities.

Table 4.5. Mean fecundity of female sockeye salmon collected for broodstock, 1989-2007. Fecundities were determined from pooled egg lots and were not identified for individual females.

Return year	Mean fecundity
1989	2,344
1990	2,225
1991	2,598
1992	2,341
1993	2,340
1994	2,798
1995	2,295
1996	2,664
1997	2,447
1998	2,813
1999	2,319
2000	2,673
2001	2,960
2002	2,856
2003	3,511
2004	2,505
2005	2,718
2006	2,656
2007	3,115
Average	***2,637***

4.2 Hatchery Rearing

Rearing History

Number of eggs taken

Based on the unfertilized egg-to-release survival standard of 81%, a total of 246,914 eggs are required to meet the program release goal of 200,000 smolts. Between 1989 and 2007, the egg take

goal was reached in most years (Table 4.6). The number of eggs taken in 2008 was above the egg take target by 28%.

Table 4.6. Numbers of eggs taken from sockeye broodstock,1989-2008.

Return year	Number of eggs taken
1989	133,600
1990	326,267
1991	231,254
1992	381,561
1993	231,700
1994	338,562
1995	247,900
1996	314,390
1997	254,459
1998	163,278
1999	190,732
2000	227,234
2001	301,925
2002	356,982
2003	319,470
2004	225,499
2005	211,985
2006	292,136
2007	302,363
2008	316,476
Average	***268,389***

Number of acclimation days

Wenatchee sockeye have only been acclimated on Lake Wenatchee water. For brood years 1989 through 1998, unfed fry were transferred from Eastbank FH to Lake Wenatchee Net Pens until release (Table 4.7). For brood years 1999 to present, juvenile sockeye were reared at Eastbank FH until July in an effort to increase growth before release.

Table 4.7. Water source and mean acclimation period for Wenatchee sockeye, brood years 1989-2006.

Brood year	Release year	Transfer date	Release date	Number of Days	Water source
1989	1990	5-Apr	24-Oct	202	Lake Wenatchee
1990	1991	10-Apr	19-Oct	192	Lake Wenatchee
1991	1992	1-Apr	20-Oct	202	Lake Wenatchee
1992	1993	5-Apr	7-Sep	155	Lake Wenatchee

Brood year	Release year	Transfer date	Release date	Number of Days	Water source
		5-Apr	26-Oct	204	Lake Wenatchee
1993	1994	5-Apr	1-Sep	149	Lake Wenatchee
		5-Apr	17-Oct	195	Lake Wenatchee
1994	1995	4-Apr	15-Sep	164	Lake Wenatchee
		4-Apr	23-Oct	202	Lake Wenatchee
1995	1996	4-Apr	25-Oct	204	Lake Wenatchee
1996	1997	4-Apr	22-Oct	201	Lake Wenatchee
1997	1998	1-Apr	9-Nov	222	Lake Wenatchee
1998	1999	1-Apr	29-Oct	211	Lake Wenatchee
1999	2000	25-Jul	28-Aug	34	Lake Wenatchee
		26-Jul	1-Nov	98	Lake Wenatchee
2000	2001	2-Jul	27-Aug	56	Lake Wenatchee
		3-Jul	27-Sep	86	Lake Wenatchee
2001	2002	15-Jul	28-Aug	44	Lake Wenatchee
		16-Jul	22-Sep	68	Lake Wenatchee
2002	2003	30-Jun	25-Aug	56	Lake Wenatchee
		1-Jul	22-Oct	113	Lake Wenatchee
2003	2004	6-Jul	25-Aug	50	Lake Wenatchee
		7-Jul	3-Nov	119	Lake Wenatchee
2004	2005	5-Jul	29-Aug	55	Lake Wenatchee
		6-Jul	2-Nov	120	Lake Wenatchee
2005	2006	11-Jul	30-Oct	111	Lake Wenatchee
2006	2007	9-10-Jul	31-Oct	113-114	Lake Wenatchee

Release Information

Numbers released

The 2006 Wenatchee sockeye program achieved 126.1% of the 200,000 target goal with about 252,133 fish being released (Table 4.8).

Table 4.8. Total number of sockeye parr released and numbers of released fish with CWTs and PIT tags for brood years 1989-2006. The release target for sockeye is 200,000 fish.

Brood year	Release year	CWT mark rate	Number of released fish with PIT tags	Number released
1989	1990	Not marked	0	108,400
1990	1991	0.9308	0	270,802
1991	1992	0.8940	0	167,523
1992	1993	0.9240	0	340,597
1993	1994	0.7278	0	190,443
1994	1995	0.8869	0	252,859
1995[a]	1996	1.0000	0	150,808
1996[a]	1997	0.9680	0	284,630
1997[a]	1998	0.9642	0	197,195
1998[a]	1999	0.8713	0	121,344
1999	2000	0.9527	0	167,955
2000	2001	0.9558	0	190,174
2001	2002	0.9911	0	200,938
2002	2003	0.9306	0	315,783
2003	2004	0.9291	0	240,459
2004	2005	0.8995	0	172,923
2005	2006	0.9811	14,791	140,542
2006	2007	0.9735	14,764	225,670
Average		***0.9283***	***14,778***	***213,567***

[a] These groups were only adipose fin clipped.

Numbers tagged

About 97% of the hatchery sockeye released in 2007 were CWT and adipose fin clipped (Table 4.8). In addition, a total of 15,049 juvenile sockeye were PIT tagged at the Eastbank Hatchery during 12-20 June 2007. These fish were transported to the Lake Wenatchee net pens on 9 July and released into the lake on 31 October 2007. At the time of release, a total of 65 fish had died and another 220 had shed their tags. Thus, the total number of PIT-tagged sockeye released into the lake was 14,764 (Table 4.8).

In 2008, a total of 15,096 juvenile sockeye were PIT tagged at the Eastbank Hatchery during 12-17 June. These fish were transported to the Lake Wenatchee net pens on 7 July and released into the lake on 29 October 2008. At the time of release, a total of 100 fish had died and another 49 had shed their tags. Thus, the total number of PIT-tagged sockeye released into the lake was 14,947.

Fish size and condition at release

The 2006 brood sockeye were released as parr in 2007 and emigrated as yearling smolts in spring of 2008. Size at release was 103.8% and 142.7% of the fork length and weight goals, respectively. The 2006 brood year was also above the CV goal for length by 17.7% (Table 4.9).

Table 4.9. Mean lengths (FL, mm), weight (g and fish/pound), and coefficient of variation (CV) of sockeye released, brood years 1989-2006. Size targets are provided in the last row of the table.

Brood year	Release year	Fork length (mm)		Mean weight	
		Mean	CV	Grams (g)	Fish/pound
1989	1990	128	-	18.2	25
1990	1991	131	-	18.9	24
1991	1992	117	3.0	20.6	22
1992	1993	73	6.8	4.2	44
1993	1994	103	-	13.6	40
1994	1995	75	6.1	4.5	38
1995	1996	137	8.2	14.7	30
1996	1997	107	5.6	15.1	30
1997	1998	122	6.1	21.3	21
1998	1999	112	5.4	17.0	27
1999	2000	94	9.5	9.5	48
		134	11.5	31.3	15
2000	2001	123	6.5	22.3	20
		146	8.4	26.0	12
2001	2002	118	7.4	20.7	22
		135	7.3	30.5	15
2002	2003	73	5.6	4.4	104
		118	7.7	13.7	23
		145	9.4	38.6	13
2003	2004	79	4.6	4.8	96
		118	5.9	17.0	26
		158	8.1	44.3	10
2004	2005	116	4.5	17.2	18
		151	7.0	39.3	12
2005	2006	149	7.5	43.7	10
2006	2007	138	10.6	32.4	14
Targets		***133***	***9.0***	***22.7***	***20***

Survival Estimates

Overall survival of Wenatchee sockeye from green (unfertilized) egg to release was below the standard set for the program as a result of poor green egg-to-eye and eye-to-ponding survival. Investigations to determine the effects of holding adults on warm surface water at Lake Wenatchee on gamete maturation/viability in addition to reducing negative phototactic behavior at swim up (potential influences on survival at the fertilization to ponding stages) should be considered (Table 4.10).

Table 4.10. Hatchery life-stage survival rates (%) for sockeye salmon, brood years 1989-2006. Survival standards or targets are provided in the last row of the table.

Brood year	Collection to spawning		Unfertilized egg-eyed	Eyed egg-ponding	30 d after ponding	100 d after ponding	Ponding to release	Transport to release	Unfertilized egg-release
	Female	Male							
1989	41.6	100.0	88.1	63.9	99.2	98.9	98.1	65.2	83.0
1990	96.2	99.4	90.8	96.3	99.9	99.2	98.4	98.4	81.1
1991	91.8	94.1	79.2	94.8	99.8	99.3	96.4	96.4	72.4
1992	91.1	98.8	92.3	98.0	99.9	99.8	98.6	98.8	89.2
1993	57.1	99.2	89.2	98.3	99.6	99.1	93.7	93.8	82.2
1994	89.8	99.2	79.2	96.0	99.5	98.6	98.3	98.2	74.7
1995	97.5	99.1	87.5	95.0	99.0	93.3	73.2	73.2	60.8
1996	99.2	100.0	95.1	98.7	99.7	99.3	96.4	96.5	90.5
1997	92.8	99.3	84.8	97.9	97.9	97.6	95.5	94.9	77.5
1998	75.4	95.5	77.7	98.4	98.6	98.2	97.1	97.2	74.3
1999	92.3	100.0	92.2	97.3	99.6	99.3	98.2	99.7	88.1
2000	84.5	98.1	93.8	97.7	96.7	96.1	91.4	96.8	83.7
2001	75.4	99.2	78.5	97.6	98.0	97.6	86.9	95.1	66.6
2002	100.0	100.0	95.7	97.8	99.6	99.2	94.6	99.8	88.5
2003	91.0	98.1	87.2	96.9	99.0	98.2	94.8	95.5	74.6
2004	88.7	92.6	88.0	93.1	97.9	97.4	93.7	96.1	76.7
2005	98.5	98.5	85.3	94.9	97.8	96.6	95.5	99.2	66.3
2006	95.3	99.1	73.2	85.4	95.4	94.6	87.8	98.5	54.9
Standard	***90.0***	***85.0***	***92.0***	***98.0***	***97.0***	***93.0***	***90.0***	***95.0***	***81.0***

4.3 Disease Monitoring

Rearing of the 2006 brood sockeye was typical to previous years with fish being held on Lake Wenatchee water in net pens for 114 days before being released directly into the lake. Mortality due to Columnaris began to increase in the juveniles in late August, about 2 weeks after the last adult sockeye broodstock were transferred from Tumwater Dam to holding pens at lake Wenatchee. A 1% TM-100 treatment was initiated for control, which abated the condition. No further outbreaks or disease issues were observed or detected.

4.4 Natural Juvenile Productivity

During 2008, juvenile sockeye salmon were sampled at the Upper Wenatchee and Lower Wenatchee traps.

Emigrant and Smolt Estimates

Upper Wenatchee Trap

The Upper Wenatchee Trap operated nightly between 22 March and 30 July 2008. During the four-month sampling period, a total of 9,133 wild sockeye and 1,367 hatchery sockeye smolts were captured at the Upper Wenatchee Trap. Based on a pooled daily trap efficiency of 1.7% for both wild and hatchery sockeye (based on two mark-recapture trials), the total number of smolts that emigrated past the trap in 2008 was 549,682 (±70,676) wild and 102,907 (±14,016) hatchery sockeye (Table 4.11). This was the second brood year since 1999 that all hatchery sockeye parr were released at a similar size and time. Monthly captures of all fish and results of capture efficiency tests at the Upper Wenatchee Trap are reported in Appendix B.

Table 4.11. Estimated numbers of wild and hatchery sockeye smolts that emigrated from Lake Wenatchee during run years 1997-2008.

Run year	Numbers of sockeye smolts	
	Wild smolts	Hatchery smolts
1997	55,359	28,828
1998	1,447,259	55,985
1999	1,944,966	112,524
2000	985,490	24,684
2001	39,353	94,046
2002	729,716	121,511
2003	5,303,056	140,322
2004	5,771,187	216,023
2005	723,413	122,399
2006	1,266,971	159,500
2007	2,797,313	140,542
2008	549,682	102,907
Average	***1,801,147***	***109,939***

Age classes of wild sockeye smolts were determined from a length frequency analysis based on scales collected randomly each year since 1997 (Table 4.12). For the available run years, most wild sockeye smolts migrated as age 1+ fish. Only in two years (1997 and 2005) did more smolts migrate as age 2+ fish. Relatively few smolts migrated at age 3+.

Table 4.12. Age structure and estimated number of wild sockeye smolts that emigrated from Lake Wenatchee, 1997-2008.

Run year	Proportion of wild smolts			Total wild emigrants
	Age 1+	Age 2+	Age 3+	
1997	0.075	0.906	0.019	55,359
1998	0.955	0.037	0.008	1,447,259
1999	0.619	0.381	0.000	1,944,966
2000	0.599	0.400	0.001	985,490
2001	0.943	0.051	0.006	39,353
2002	0.961	0.039	0.000	729,716
2003	0.740	0.260	0.000	5,303,056
2004	0.929	0.071	0.000	5,771,187
2005	0.168	0.707	0.125	723,413
2006	0.994	0.006	0.000	1,266,971
2007	0.959	0.038	0.003	2,797,313
2008	0.775	0.224	0.001	549,682
Average	***0.819***	***0.176***	***0.005***	***1,801,147***

Lower Wenatchee Trap

The Lower Wenatchee Trap operated nightly between 14 February and 15 August 2008. Because of high river flows, debris, snow/ice, or mechanical failure, trap 1 and trap 2 were inoperable for 29 and 37 days, respectively. During the seven-month sampling period, a total of 216 wild sockeye smolts and 207 hatchery sockeye smolts were captured at the Lower Wenatchee Trap. Most of the smolts migrated during May. Monthly captures and mortalities of all fish collected at the Lower Wenatchee Trap are reported in Appendix B.

Freshwater Productivity

Egg-smolt survival estimates for wild sockeye salmon are provided in Table 4.13. Estimates of egg deposition were calculated based on the spawner escapement at Tumwater Dam and the sex ratio and fecundity of the broodstock. Egg-smolt survival rates for brood years 1995-2004 have ranged from 0.012 to 0.212 (mean = 0.082).

Table 4.13. Estimated egg deposition (estimated as mean fecundity times estimated number of females), numbers of smolts, and survival rates for wild Wenatchee sockeye salmon, 1995-2007; NA = not available.

Brood year	Number of females	Mean fecundity	Total eggs	Numbers of wild smolts				Egg-smolt survival
				Age 1+	Age 2+	Age 3+	Total	
1995	2,136	2,295	4,902,120	4,174	53,549	0	57,723	0.012
1996	3,767	2,664	10,035,288	1,382,133	741,032	985	2,124,150	0.212
1997	5,404	2,447	13,223,588	1,203,934	394,196	236	1,598,366	0.121
1998	2,024	2,813	5,693,512	590,309	2,007	0	592,316	0.104
1999	513	2,319	1,189,647	37,110	28,459	0	65,569	0.055

Brood year	Number of females	Mean fecundity	Total eggs	Numbers of wild smolts				Egg-smolt survival
				Age 1+	Age 2+	Age 3+	Total	
2000	11,413	2,673	30,506,949	701,257	1,378,795	0	2,080,052	0.068
2001	21,685	2,960	64,187,600	4,024,884	409,754	15,915	4,450,553	0.070
2002	17,226	2,856	49,197,456	5,361,433	511,453	0	5,872,886	0.119
2003	2,158	3,511	7,576,738	166,385	7,602	8,392	182,379	0.024
2004	15,469	2,534	39,198,446	1,259,369	106,298	550	1,366,216	0.035
2005	5,867	2,718	15,946,506	2,682,623	123,129	NA	NA	NA
2006	2,747	2,656	7,296,032	426,003	NA	NA	NA	NA
2007	903	3,115	2,812,845	NA	NA	NA	NA	NA
Average	***7,024***	***2,735***	***19,366,671***	***1,486,635***	***341,479***	***2,608***	***1,839,021***	***0.082***

Juvenile survival rates for hatchery sockeye salmon are provided in Table 4.14. Release-smolt survival rates for brood years 1995-2006 have ranged from 0.000 to 1.000 (mean = 0.551). Egg-smolt survival rates for the same brood years ranged from 0.000 to 0.707 (mean = 0.268). On average, egg-smolt survival of hatchery sockeye is about three times greater than egg-smolt survival of wild sockeye. On three separate occasions, however, the estimated number of hatchery smolts equaled or exceeded the number of hatchery parr released in the lake. This is probably because the pooled trap efficiencies are biased high.

Table 4.14. Juvenile survival rates for hatchery Wenatchee sockeye, brood years 1995-2006.

Brood year	Number of eggs	Number of parr released	Date of release	Estimated number of smolts	Egg-smolt survival	Release-smolt survival
1995	247,900	150,808	10/25/96	28,828	0.116	0.191
1996	314,390	284,630	10/22/97	55,985	0.178	0.197
1997	254,459	197,195	11/9/98	112,524	0.442	0.571
1998	163,278	121,344	10/27/99	24,684	0.151	0.203
1999	190,732	84,466	8/28/00	30,326	0.159	0.359
		83,489	11/1/00	63,720	0.334	0.763
2000	227,234	92,055	8/27/01	30,918	0.136	0.336
		98,119	9/27/01	90,593	0.399	0.923
2001	301,925	96,486	8/28/02	36,484	0.121	0.378
		104,452	9/23/02	103,838	0.344	0.994
2002	356,982	98,509	6/16/03	5,192	0.015	0.053
		104,855	8/25/03	98,412	0.276	0.939
		112,419	10/22/03	112,419	0.315	1.000
2003	319,470	32,755	6/15/04	0	0.000	0.000
		104,879	8/25/04	19,574	0.061	0.187
		102,825	11/3/04	102,825	0.322	1.000
2004	225,499	81,428	8/29/05	159,500	0.707	0.922
		91,495	11/2/05			

Brood year	Number of eggs	Number of parr released	Date of release	Estimated number of smolts	Egg-smolt survival	Release-smolt survival
2005	211,985	70,386	10/30/06	140,542	0.663	1.000
		70,156	10/30/06			
2006	292,136	225,670	10/31/07	102,907	0.352	0.456

4.5 Spawning Surveys

Spawning surveys were conducted in the Little Wenatchee and White (including the Napeequa River) rivers from 25 August to 9 October 2008. Surveys in 2008 only included counting numbers of live sockeye spawners. No redds were counted in 2008 (see Appendix G for more details).

Spawn Timing

Sockeye began spawning during the first week of September and peaked around the third week of September (Figure 4.1). Peak spawning was determined using the total number of spawners observed on the spawning grounds.

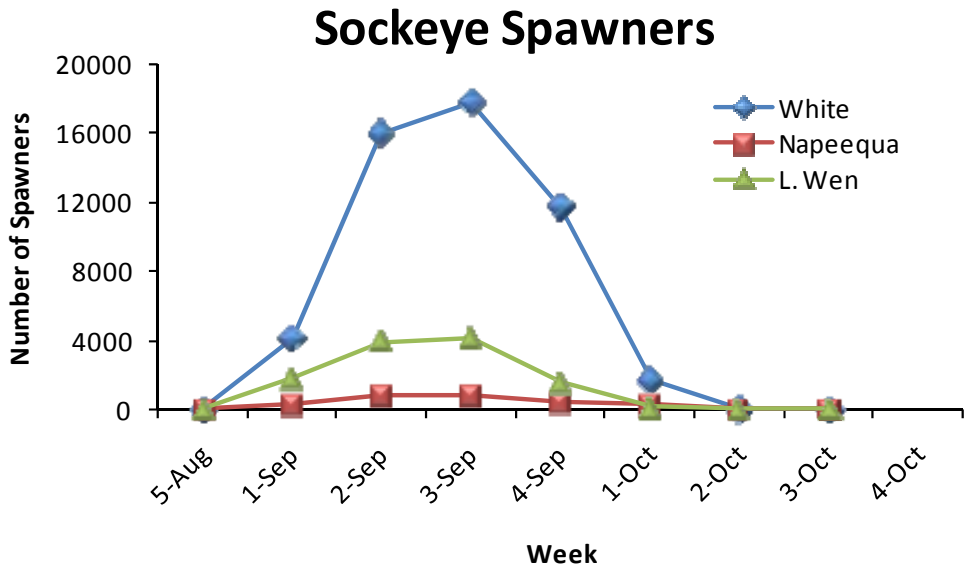


Figure 4.1. Numbers of sockeye spawners counted during different weeks in different sampling streams within the Wenatchee Basin, August through October 2008.

Spawning Escapement

Spawning escapement of sockeye salmon in 2008 was estimated using the area-under-the-curve (AUC) method (i.e., escapement = (AUC/redd residence time) x observer efficiency). This method relied on weekly counts of live sockeye and assumed a redd residence time of 11 days and an

observer efficiency of 100%. In 2009, a mark-recapture method using PIT tags will be used to estimate Sockeye spawning escapement.

Area-under-the-curve

Based on the AUC approach, the estimated total spawning escapement of sockeye in the Wenatchee Basin in 2008 was 20,248 (Table 4.15). About 83% of the escapement spawned in the White River (including the Napeequa River).

Table 4.15. Peak numbers of live spawners and total spawning escapement estimates for sockeye salmon in the Wenatchee Basin, August through October 2008.

Sampling area	Peak number of live fish	Spawning escapement
Little Wenatchee	2,130	3,491
White River	10,040	16,757
Total	***12,170***	***20,248***

The spawning escapement of 20,248 Wenatchee sockeye is greater than the 1989-2008 average of 15,756 (Table 4.16).

Table 4.16. Spawning escapements for sockeye salmon in the Wenatchee Basin for return years 1989-2008; NA = not available. Total escapements before 2003 were based on counts at Tumwater Dam.

Return year	Spawning escapement		
	Little Wenatchee	White	Total
1989	NA	NA	**28,778**
1990	NA	NA	**25,177**
1991	NA	NA	**26,565**
1992	NA	NA	**22,628**
1993	NA	NA	**29,952**
1994	NA	NA	**9,447**
1995	NA	NA	**4,272**
1996	NA	NA	**7,534**
1997	NA	NA	**10,808**
1998	NA	NA	**4,047**
1999	NA	NA	**1,025**
2000	NA	NA	**20,751**
2001	NA	NA	**29,134**
2002	NA	NA	**27,565**
2003	NA	NA	**4,704**
2004	NA	NA	**25,834**
2005	NA	NA	**8,582**
2006	574	5,634	**6,208**
2007	150	1,720	**1,870**
2008	3,491	16,757	**20,248**

Return year	Spawning escapement		
	Little Wenatchee	White	Total
Average	***1,405***	***8,037***	***15,756***

4.6 Carcass Surveys

Carcass surveys were conducted in the Little Wenatchee and White (including the Napeequa River) rivers from 9 September to 16 October 2008.

Number sampled

A total of 5,733 sockeye carcasses were sampled during September through October, 2008, in the Wenatchee Basin (Table 4.17). This is considerably higher than the 1993-2008 average of 2,473 carcasses. Most of the carcasses sampled in 2008 were collected in the White River basin (92% or 5,257 carcasses) (Figure 4.2). The remaining 8% were sampled in the Little Wenatchee River (476 carcasses).

Table 4.17. Numbers of sockeye carcasses sampled within different streams/watersheds within the Wenatchee Basin, 1989-2008.

Survey year	Numbers of sockeye carcasses			
	Little Wenatchee	White	Napeequa	Total
1993	90	195	0	**285**
1994	121	165	0	**286**
1995	0	56	0	**56**
1996	43	1,387	3	**1,433**
1997	69	1,425	41	**1,535**
1998	61	524	4	**589**
1999	40	186	0	**226**
2000	821	5,494	0	**6,315**
2001	650	3,127	0	**3,777**
2002	506	7,258	55	**7,819**
2003	86	1,002	14	**1,102**
2004	625	6,960	138	**7,723**
2005	1	7	0	**8**
2006	101	2,158	38	**2,297**
2007	17	363	3	**383**
2008	476	5,132	125	**5,733**
Average	***232***	***2,215***	***26***	***2,473***

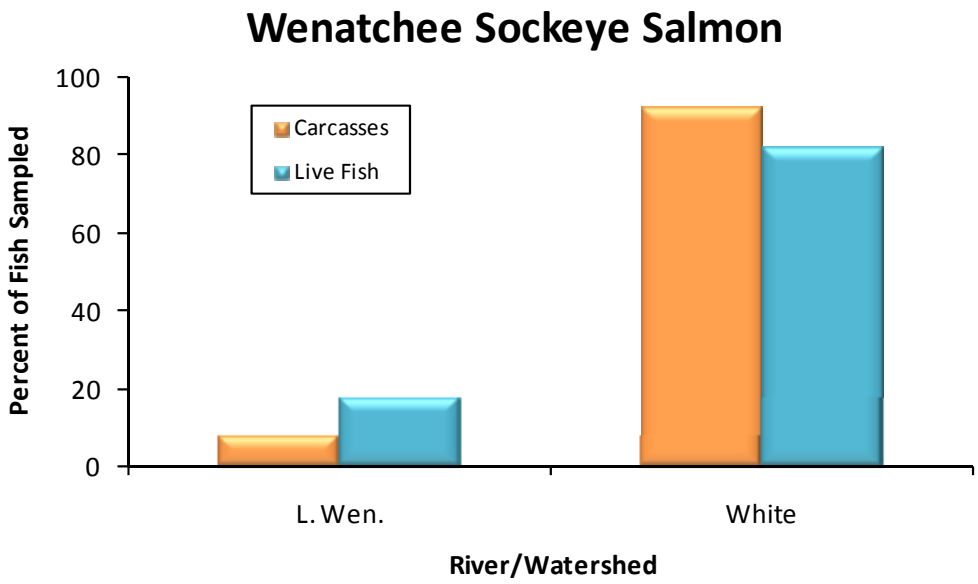


Figure 4.2. Percent of the peak number of live sockeye observed and the total number of sockeye carcasses sampled in different streams/watersheds within the Wenatchee Basin during August through October, 2008.

Carcass Distribution and Origin

Sockeye carcasses were not evenly distributed among reaches within survey streams in 2008 (Table 4.18). Carcasses were only found in Reaches 2 (Lost Creek to Rainy Creek) on the Little Wenatchee. Most (98%) of the carcasses sampled in the White River Basin were in Reach 2 (Sears Creek Bridge to Napeequa River). About 2% of the carcasses sampled in the White River Basin were in the Napeequa River.

Table 4.18. Numbers of carcasses sampled within different streams/watersheds within the Wenatchee Basin during August through September, 2008.

Stream/watershed	Reach	Total carcasses
Little Wenatchee	Little Wen 1	0
	Little Wen 2	476
	Little Wen 3	0
	Total	**476**
White	White 1	0
	White 2	5,132
	White 3	0
	Napeequa 1	125
	Total	**5,257**
Grand Total		***5,733***

Numbers of wild and hatchery origin sockeye carcasses sampled in 2008 will be available after analysis of marks/tags and scales. Based on the available data (1993-2007), the largest percentage of

both wild and hatchery sockeye spawned in Reach 2 on the White River (Table 4.19 and Figure 4.3). However, a greater percentage of wild fish were found in Reach 2 than hatchery fish. The opposite occurred in Reach 2 on the Little Wenatchee. There, a larger percentage of hatchery fish were found compared to wild fish.

Table 4.19. Numbers of wild and hatchery sockeye carcasses sampled within different reaches in the Wenatchee Basin, 1993-2007. Reach codes are described in Table 2.9.

Survey year	Origin	Numbers of sockeye carcasses					
		Little Wenatchee		White River			Total
		L2	L3	H1	H2	Q1	
1993	Wild	86	0	0	183	0	**269**
	Hatchery	4	0	0	12	0	**16**
1994	Wild	112	0	0	155	0	**267**
	Hatchery	9	0	0	9	0	**18**
1995	Wild	0	0	0	55	0	**55**
	Hatchery	0	0	0	1	0	**1**
1996	Wild	41	0	0	1,299	3	**1,343**
	Hatchery	2	0	0	88	0	**90**
1997	Wild	65	0	0	1,411	40	**1,516**
	Hatchery	4	0	0	11	1	**16**
1998	Wild	61	0	0	515	4	**580**
	Hatchery	0	0	0	9	0	**9**
1999	Wild	30	0	0	164	0	**194**
	Hatchery	10	0	0	22	0	**32**
2000	Wild	694	0	3	5,239	0	**5,936**
	Hatchery	127	0	0	252	0	**379**
2001	Wild	625	0	0	3,063	0	**3,688**
	Hatchery	25	0	0	64	0	**89**
2002	Wild	504	0	0	7,207	55	**7,766**
	Hatchery	2	0	0	51	0	**53**
2003	Wild	81	0	0	993	14	**1,088**
	Hatchery	5	0	0	9	0	**14**
2004	Wild	606	0	0	6,755	166	**7,527**
	Hatchery	19	0	0	205	22	**246**
2005	Wild	201	0	5	2,966	21	**3,193**
	Hatchery	1	0	0	8	0	**9**
2006	Wild	80	0	0	2,112	36	**2,228**
	Hatchery	21	0	0	46	2	**69**
2007	Wild	17	0	0	346	3	**366**
	Hatchery	0	0	0	17	0	**17**
Average	***Wild***	***214***	***0***	***1***	***2,164***	***23***	***2,401***
	Hatchery	***15***	***0***	***0***	***54***	***2***	***71***

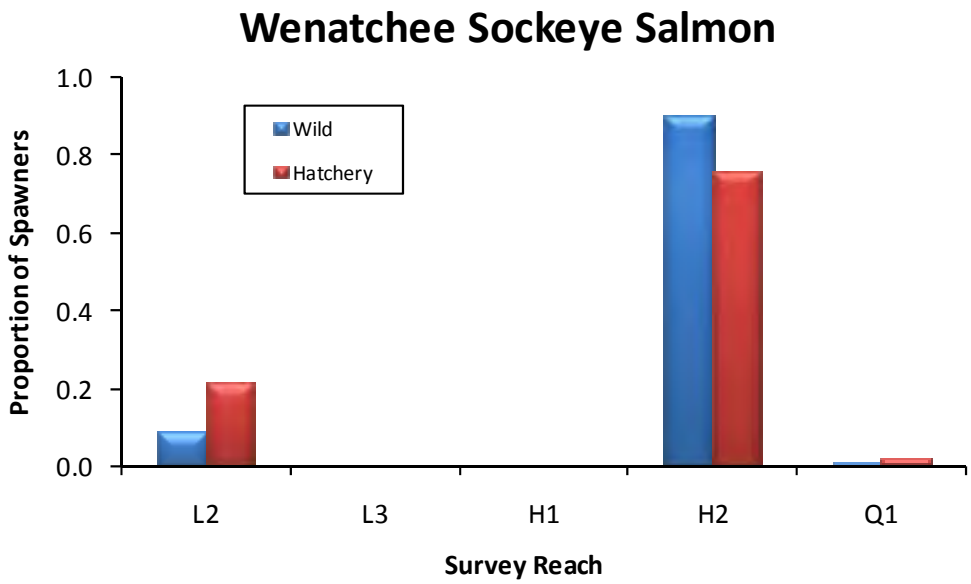


Figure 4.3. Distribution of wild and hatchery produced carcasses in different reaches in the Wenatchee Basin, pooled data from 1993-2007. Reach codes are described in Table 2.9; L = Little Wenatchee, H = White River, and Q = Napeequa River.

Sampling Rate

The sampling rate of sockeye carcasses differed among basins, with a higher sampling rate in the White than in the Little Wenatchee (Table 4.20). Nevertheless, the overall sampling rate for both basins combined exceeded the target of 20%.

Table 4.20. Numbers of carcasses, estimated spawning escapements, and sampling rates for sockeye salmon in the Wenatchee Basin, 2008.

Sampling basin	Total number of carcasses	Total spawning escapement	Sampling rate
Little Wenatchee	476	3,491	0.136
White	5,257	16,757	0.314
Total	***5,733***	***20,248***	***0.283***

Length Data

Mean lengths (POH, cm) of male and female hatchery sockeye carcasses sampled during surveys in the Wenatchee Basin in 2008 are provided in Table 4.21. On average, males were slightly larger than females. Wild sockeye salmon are not sampled on the spawning grounds. They are sampled at Tumwater Dam.

Table 4.21. Mean lengths (postorbital-to-hypural length; cm) and standard deviations (in parentheses) of male and female hatchery sockeye carcasses sampled in different streams/watersheds in the Wenatchee Basin, 2008; N = number of fish sampled. Wild sockeye are sampled at Tumwater Dam.

Stream/watershed	Male		Female	
	N	Length (cm)	N	Length (cm)
Little Wenatchee River	1	41 (0)	5	38 (1.3)
White River	4	40 (1.5)	9	38 (3.4)
Napeequa River	0	-	1	36 (0)
Wenatchee River	0	-	0	-
Total	***5***	***40 (1.5)***	***15***	***38 (3.5)***

4.7 Life History Monitoring

Life history characteristics of Wenatchee sockeye were assessed by examining carcasses on spawning grounds and fish sampled at broodstock collection sites, and by reviewing tagging data and fisheries statistics.

Migration Timing

There was little difference in migration timing of hatchery and wild sockeye past Tumwater Dam (Table 4.22a and b; Figure 4.4). Early in the run, hatchery and wild sockeye arrived at the dam at about the same time. Toward the end of the migration period, hatchery sockeye tended to arrive at the dam slightly later than did wild sockeye. Most hatchery and wild sockeye migrated upstream past Tumwater Dam during July through early August. The peak migration time for both hatchery and wild sockeye was the last week of July (Figure 4.4).

Table 4.22a. The Julian day and date that 10%, 50% (median), and 90% of the wild and hatchery sockeye salmon passed Tumwater Dam, 1998-2008. The average Julian day and date are also provided. Migration timing is based on video sampling at Tumwater. Data for 1998 through 2003 were based on videotapes and broodstock trapping and may not reflect the actual number of hatchery sockeye salmon. All sockeye were visually examined during trapping from 2004 to present.

Survey year	Origin	Sockeye Migration Time (days)								Sample size
		10 Percentile		50 Percentile		90 Percentile		Mean		
		Julian	Date	Julian	Date	Julian	Date	Julian	Date	
1998	Wild	195	14-Jul	201	20-Jul	208	27-Jul	202	21-Jul	4,173
	Hatchery	196	15-Jul	204	23-Jul	220	8-Aug	206	25-Jul	31
1999	Wild	226	14-Aug	233	21-Aug	241	29-Aug	234	22-Aug	908
	Hatchery	228	16-Aug	234	22-Aug	242	30-Aug	235	23-Aug	264
2000	Wild	200	18-Jul	206	24-Jul	213	31-Jul	207	25-Jul	18,390
	Hatchery	199	17-Jul	206	24-Jul	213	31-Jul	206	24-Jul	2,589
2001	Wild	189	8-Jul	194	13-Jul	214	2-Aug	198	17-Jul	32,554
	Hatchery	199	18-Jul	212	31-Jul	240	28-Aug	214	2-Aug	79
2002	Wild	204	23-Jul	208	27-Jul	219	7-Aug	210	29-Jul	27,241

Survey year	Origin	Sockeye Migration Time (days)								Sample size
		10 Percentile		50 Percentile		90 Percentile		Mean		
		Julian	Date	Julian	Date	Julian	Date	Julian	Date	
	Hatchery	204	23-Jul	209	28-Jul	222	10-Aug	211	30-Jul	580
2003	Wild	194	13-Jul	200	19-Jul	208	27-Jul	201	20-Jul	4,699
	Hatchery	194	13-Jul	201	20-Jul	211	30-Jul	203	22-Jul	375
2004	Wild	191	9-Jul	196	14-Jul	207	25-Jul	198	16-Jul	31,408
	Hatchery	189	7-Jul	194	12-Jul	203	21-Jul	196	14-Jul	1,758
2005	Wild	192	11-Jul	199	18-Jul	227	15-Aug	204	23-Jul	14,176
	Hatchery	187	6-Jul	200	19-Jul	251	8-Sep	212	31-Jul	42
2006	Wild	201	20-Jul	204	23-Jul	214	2-Aug	206	25-Jul	9,151
	Hatchery	202	21-Jul	219	7-Aug	228	16-Aug	215	3-Aug	507
2007	Wild	201	20-Jul	210	29-Jul	227	15-Aug	213	1-Aug	2,542
	Hatchery	205	24-Jul	213	1-Aug	231	19-Aug	216	4-Aug	65
2008	Wild	200	18-Jul	207	25-Jul	219	6-Aug	208	26-Jul	29,229
	Hatchery	201	19-Jul	206	24-Jul	215	2-Aug	208	26-Jul	103
Average	Wild	***199***	**-**	***205***	**-**	***218***	**-**	***207***	**-**	***14,524***
	Hatchery	***200***	**-**	***209***	**-**	***225***	**-**	***211***	**-**	***629***

Table 4.22b. The week that 10%, 50% (median), and 90% of the wild and hatchery sockeye salmon passed Tumwater Dam, 1998-2008. The average week is also provided. Migration timing is based on video sampling at Tumwater. Data for 1998 through 2003 were based on videotapes and broodstock trapping and may not reflect the actual number of hatchery sockeye salmon. All sockeye were visually examined during trapping from 2004 to present.

Survey year	Origin	Sockeye Migration Time (week)				Sample size
		10 Percentile	50 Percentile	90 Percentile	Mean	
1998	Wild	28	29	30	29	4,173
	Hatchery	28	30	32	30	31
1999	Wild	33	34	35	34	908
	Hatchery	33	34	35	34	264
2000	Wild	29	30	31	30	18,390
	Hatchery	29	30	31	30	2,589
2001	Wild	27	28	31	29	32,554
	Hatchery	29	31	35	31	79
2002	Wild	30	30	32	30	27,241
	Hatchery	30	30	32	31	580
2003	Wild	28	29	30	29	4,699
	Hatchery	28	29	31	29	375
2004	Wild	28	28	28	29	31,408
	Hatchery	27	28	29	28	1,758

Survey year	Origin	Sockeye Migration Time (week)				Sample size
		10 Percentile	50 Percentile	90 Percentile	Mean	
2005	Wild	28	29	33	30	14,176
	Hatchery	27	29	36	31	42
2006	Wild	29	29	31	30	9,151
	Hatchery	29	32	33	31	507
2007	Wild	29	30	33	31	2,542
	Hatchery	30	31	33	31	65
2008	Wild	29	30	32	30	29,229
	Hatchery	29	30	31	30	103
Average	Wild	***29***	***30***	***31***	***30***	***14,524***
	Hatchery	***29***	***30***	***33***	***31***	***629***

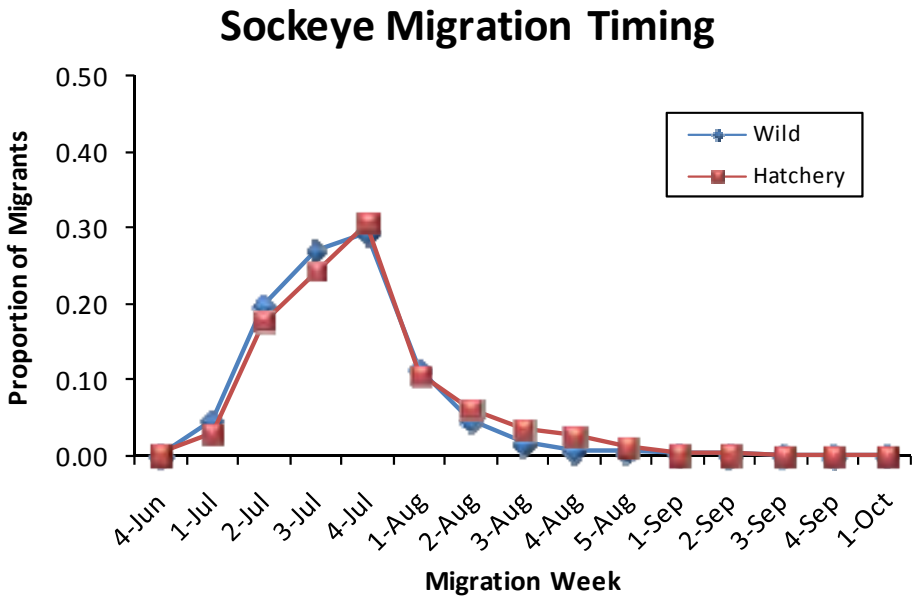


Figure 4.4. Proportion of wild and hatchery sockeye observed (using video) passing Tumwater Dam each week during their migration period late-June through early-October; data were pooled over survey years 1998-2008.

Age at Maturity

Although sample sizes are small, it appears that most wild sockeye returned as age-5 fish, while most hatchery sockeye returned as age-4 fish (Table 4.23; Figure 4.5). Only wild fish have returned at age-6.

Table 4.23. Proportions of wild and hatchery sockeye of different ages (total age) sampled in broodstock and on spawning grounds, 1994-2007.

Survey year	Origin	Total age						Sample size
		2	3	4	5	6	7	
1994	Wild	-	-	-	-	-	-	0
	Hatchery	0.00	0.00	0.88	0.13	0.00	0.00	16
1995	Wild	-	-	-	-	-	-	0
	Hatchery	0.00	0.00	0.00	1.00	0.00	0.00	1
1996	Wild	-	-	-	-	-	-	0
	Hatchery	0.00	0.00	1.00	0.00	0.00	0.00	82
1997	Wild	-	-	-	-	-	-	0
	Hatchery	0.00	0.00	0.77	0.23	0.00	0.00	13
1998	Wild	0.00	0.08	0.85	0.08	0.00	0.00	26
	Hatchery	0.00	0.00	0.64	0.36	0.00	0.00	11
1999	Wild	0.00	0.00	0.18	0.73	0.10	0.00	113
	Hatchery	0.00	0.00	0.65	0.35	0.00	0.00	31
2000	Wild	0.00	0.00	0.00	1.00	0.00	0.00	1
	Hatchery	0.00	0.00	0.98	0.02	0.00	0.00	359
2001	Wild	0.00	0.00	0.76	0.24	0.00	0.00	29
	Hatchery	0.00	0.00	0.75	0.25	0.00	0.00	171
2002	Wild	0.00	0.00	0.20	0.80	0.00	0.00	5
	Hatchery	0.00	0.00	0.29	0.71	0.00	0.00	63
2003	Wild	0.00	0.00	0.00	1.00	0.00	0.00	5
	Hatchery	0.00	0.33	0.67	0.00	0.00	0.00	6
2004	Wild	-	-	-	-	-	-	0
	Hatchery	0.00	0.02	0.93	0.05	0.00	0.00	244
2005	Wild	-	-	-	-	-	-	0
	Hatchery	0.00	0.13	0.75	0.13	0.00	0.00	8
2006	Wild	0.00	0.00	0.34	0.65	0.01	0.00	207
	Hatchery	0.00	0.00	1.00	0.00	0.00	0.00	65
2007	Wild	0.00	0.00	0.02	0.88	0.10	0.00	206
	Hatchery	0.00	0.00	0.35	0.65	0.00	0.00	17
Average	***Wild***	***0.00***	***0.00***	***0.24***	***0.70***	***0.06***	***0.00***	***42***
	Hatchery	***0.00***	***0.01***	***0.86***	***0.13***	***0.00***	***0.00***	***78***

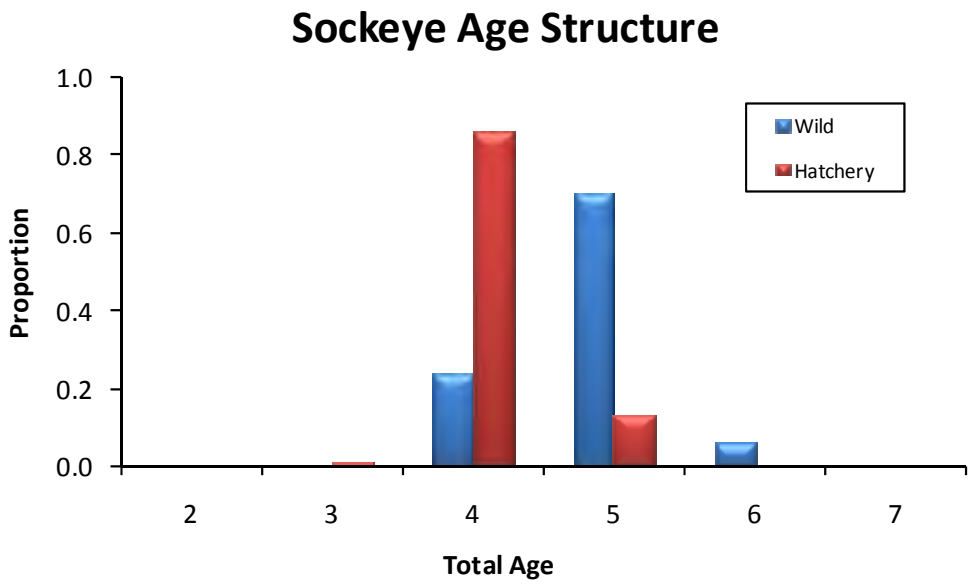


Figure 4.5. Proportions of wild and hatchery sockeye salmon of different total ages sampled at Tumwater Dam and on spawning grounds in the Wenatchee Basin for the combined years 1994-2007.

Size at Maturity

Although sample sizes are small, wild sockeye were larger than hatchery sockeye in 2007 (Table 4.24). This is because more wild fish return at age 5, while more hatchery fish return at age 4. However, the pooled data indicate that there is virtually no difference in mean sizes of hatchery and wild sockeye salmon sampled in the Wenatchee Basin (Table 4.24). Future analyses will compare sizes of hatchery and wild fish of the same age groups and gender.

Table 4.24. Mean lengths (POH; cm) and variability statistics for wild and hatchery sockeye salmon sampled at Tumwater Dam (broodstock) and on spawning grounds in the Wenatchee Basin, 1994-2007; SD = 1 standard deviation.

Survey year	Origin	Sample size	Sockeye length (POH; cm)			
			Mean	SD	Minimum	Maximum
1994	Wild	0	-	-	-	-
	Hatchery	14	42	3	37	47
1995	Wild	0	-	-	-	-
	Hatchery	1	53	-	53	53
1996	Wild	0	-	-	-	-
	Hatchery	5	51	3	49	55
1997	Wild	6	40	3	38	45
	Hatchery	17	41	3	37	50
1998	Wild	585	43	3	34	50
	Hatchery	20	43	3	40	51
1999	Wild	99	42	3	36	50

Survey year	Origin	Sample size	Sockeye length (POH; cm)			
			Mean	SD	Minimum	Maximum
	Hatchery	31	41	3	36	47
2000	Wild	1	48	-	48	48
	Hatchery	377	40	2	30	49
2001	Wild	29	42	2	38	47
	Hatchery	184	43	3	35	51
2002	Wild	5	42	1	40	43
	Hatchery	52	44	3	37	49
2003	Wild	5	44	4	38	47
	Hatchery	13	42	5	30	48
2004	Wild	0	-	-	-	-
	Hatchery	230	40	3	33	49
2005	Wild	0	-	-	-	-
	Hatchery	8	43	9	35	64
2006	Wild	248	45	4	34	52
	Hatchery	17	41	5	31	48
2007	Wild	248	45	3	32	52
	Hatchery	16	41	5	31	48
Pooled	***Wild***	***1,226***	***43***	***3***	***32***	***52***
	Hatchery	***985***	***43***	***4***	***30***	***64***

Contribution to Fisheries

The total number of hatchery and wild sockeye captured in different fisheries is provided in Tables 4.25 and 4.26. Harvest on hatchery sockeye was minimal during brood years 1989-2002. In contrast, harvest on wild sockeye was relatively high for the same brood years.

Table 4.25. Estimated number and percent (in parentheses) of hatchery Wenatchee sockeye captured in different fisheries, 1989-2002.

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational[a] (sport)	
1989	0 (0)	0 (0)	0 (0)	0 (0)	0
1990	0 (0)	0 (0)	0 (0)	0 (0)	0
1991	0 (0)	0 (0)	0 (0)	0 (0)	0
1992	0 (0)	0 (0)	0 (0)	0 (0)	0
1993	0 (0)	0 (0)	0 (0)	639 (100)	639
1994	0 (0)	0 (0)	0 (0)	0 (0)	0
1995	0 (0)	0 (0)	0 (0)	0 (0)	0
1996	0 (0)	0 (0)	0 (0)	0 (0)	0

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational[a] (sport)	
1997	0 (0)	0 (0)	0 (0)	0 (0)	0
1998	0 (0)	0 (0)	0 (0)	0 (0)	0
1999	0 (0)	0 (0)	0 (0)	0 (0)	0
2000	0 (0)	0 (0)	5 (100)	0 (0)	5
2001	0 (0)	1 (100)	2 (100)	0 (0)	2
2002	0 (0)	0 (0)	0 (0)	0 (0)	1

[a] Includes the Lake Wenatchee fishery.

Table 4.26. Estimated number and percent (in parentheses) of wild Wenatchee sockeye captured in different fisheries, 1989-2002.

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational[a] (sport)	
1989	0 (0)	242 (5)	73 (1)	4,954 (94)	5,269
1990	0 (0)	0 (0)	46 (100)	0 (0)	46
1991	0 (0)	0 (0)	0 (0)	0 (0)	0
1992	0 (0)	0 (0)	0 (0)	0 (0)	0
1993	0 (0)	0 (0)	0 (0)	0 (0)	0
1994	0 (0)	0 (0)	0 (0)	0 (0)	0
1995	0 (0)	6 (46)	1 (8)	5 (46)	12
1996	0 (0)	1,260 (46)	213 (8)	1,246 (46)	2,719
1997	0 (0)	3,151 (57)	353 (6)	2,014 (37)	5,518
1998	0 (0)	839 (92)	7 (1)	68 (7)	914
1999	0 (0)	15 (22)	2 (2)	51 (76)	67
2000	0 (0)	1,196 (19)	151 (3)	4,863 (78)	6,209
2001	0 (0)	1,060 (100)	1 (0)	0 (0)	1,061
2002	0 (0)	347 (100)	0 (0)	0 (0)	348

[a] Includes the Lake Wenatchee fishery.

Straying

Stray rates were determined by examining CWTs recovered on spawning grounds within and outside the Wenatchee Basin. Targets for strays based on return year (recovery year) outside the Wenatchee Basin should be less than 5%. The target for brood year strays should also be less than 5%.

There is no record that Wenatchee sockeye have strayed into other spawning areas outside the Wenatchee Basin. This may be related to the lack of carcass surveys in other locations. Nevertheless, the existing data indicate that Wenatchee sockeye stray at a rates less than the target of 5%.

Based on brood year analysis, virtually no Wenatchee sockeye have strayed into non-target spawning areas or hatchery programs (Table 4.27). These data indicate that Wenatchee sockeye stray at rates less than the target of 5%.

Table 4.27. Number and percent of hatchery Wenatchee sockeye that homed to target spawning areas and the target hatchery program, and number and percent that strayed to non-target spawning areas and hatchery programs, by brood years 1990-2002. Hatchery sockeye from brood years 1995-1998 were not tagged because of columnaris disease. Percent stays should be less than 5%.

Brood year	Homing				Straying			
	Target streams		Target hatchery		Non-target streams		Non-target hatcheries	
	Number	%	Number	%	Number	%	Number	%
1990	402	99.5	2	0.5	0	0.0	0	0.0
1991	1	100.0	0	0.0	0	0.0	0	0.0
1992	92	98.9	0	0.0	0	0.0	1	1.1
1993	29	96.7	1	3.3	0	0.0	0	0.0
1994	66	94.3	4	5.7	0	0.0	0	0.0
1995	-	-	-	-	-	-	-	-
1996	-	-	-	-	-	-	-	-
1997	-	-	-	-	-	-	-	-
1998	-	-	-	-	-	-	-	-
1999	65	100.0	0	0.0	0	0.0	0	0.0
2000	571	100.0	0	0.0	0	0.0	0	0.0
2001	17	100.0	0	0.0	0	0.0	0	0.0
2002	204	100.0	0	0.0	0	0.0	0	0.0
Total	***1,430***	***99.4***	***7***	***0.5***	***0***	***0.0***	***0***	***0.1***

Genetics

Genetic studies were conducted to determine the potential impacts of the Wenatchee sockeye supplementation program on natural origin sockeye in the upper Wenatchee Basin (Blankenship et al. 2008; the entire report is appended as Appendix H). Specifically, the objective of the study was to determine if the genetic composition of the Lake Wenatchee sockeye population had been altered by the supplementation program, which was based on the artificial propagation of a small subset of the Wenatchee population. Microsatellite DNA allele frequencies were used to differentiate between temporally replicated collections of natural and hatchery-origin sockeye in the Wenatchee Basin. A total of 13 collections of Wenatchee sockeye were analyzed; eight temporally replicated collections of natural-origin sockeye and five temporally replicated collections of hatchery-origin sockeye. Paired natural-hatchery collections were available from return years 2000, 2001, 2004, 2006, and 2007.

Overall, the study showed that allele frequency distributions were consistent over time, regardless of origin, resulting in small, insignificant measures of genetic differentiation among collections. This

indicates that there was no year-to-year differences in allele frequencies between natural and hatchery-origin sockeye. In addition, the analyses found no differences between pre- and post-supplementation collections. Thus, it was concluded that the allele frequencies of the broodstock collections equaled the allele frequency of the natural collections.

Proportion of Natural Influence

Another method for assessing the genetic risk of a supplementation program is to determine the influence of the hatchery and natural environments on the adaptation of the composite population. This is estimated by the proportion of natural origin fish in the hatchery broodstock (pNOB) and the proportion of hatchery origin fish in the natural spawning escapement (pHOS). The ratio pNOB/(pHOS+pNOB) is the Proportion of Natural Influence (PNI). The larger the ratio (PNI), the greater the strength of selection in the natural environment relative to that of the hatchery environment. In order for the natural environment to dominate selection, PNI should be greater than 0.5 (HSRG/WDFW/NWIFC 2004).

For brood years 1989-2005, the PNI was consistently been greater than 0.5 (Table 4.28). This indicates that the natural environment has a greater influence on adaptation of Wenatchee sockeye than does the hatchery environment.

Table 4.28. Proportionate natural influence (PNI) of the Wenatchee sockeye supplementation program for brood years 1989-2006. PNI was calculated as the proportion of naturally produced sockeye in the hatchery broodstock (pNOB) divided by the proportion of hatchery sockeye on the spawning grounds (pHOS) plus pNOB. NOS = number of natural origin sockeye on the spawning grounds; HOS = number of hatchery origin sockeye on the spawning grounds; NOB = number of natural origin sockeye collected for broodstock; and HOB = number of hatchery origin sockeye included in hatchery broodstock.

Brood year	Spawners[a]			Broodstock			PNI
	NOS	HOS	pHOS	NOB	HOB	pNOB	
1989	28,778	0	0.00	115	0	1.00	1.0
1990	25,177	0	0.00	302	0	1.00	1.0
1991	26,565	0	0.00	199	0	1.00	1.0
1992	22,628	0	0.00	320	0	1.00	1.0
1993	27,226	2,726	0.09	207	0	1.00	0.9
1994	8,840	607	0.06	236	5	0.98	0.9
1995	4,216	56	0.01	199	3	0.99	1.0
1996	7,067	467	0.06	225	0	1.00	0.9
1997	10,722	86	0.01	192	19	0.91	1.0
1998	4,015	32	0.01	151	6	0.96	1.0
1999	894	131	0.13	68	60	0.53	0.8
2000	19,589	1,162	0.06	170	5	0.97	0.9
2001	28,347	787	0.03	200	7	0.97	1.0
2002	27,378	187	0.01	256	0	1.00	1.0
2003	4,814	51	0.01	198	0	1.00	1.0
2004	26,605	954	0.03	180	0	1.00	1.0
2005	13,995	39	0.00	166	0	1.00	1.0

Brood year	Spawners[a]			Broodstock			PNI
	NOS	HOS	pHOS	NOB	HOB	pNOB	
2006	5,985	223	0.04	220	0	1.00	1.0
Average	***16,269***	***417***	***0.02***	***200***	***6***	***0.97***	***0.98***

[a] Proportions of natural origin and hatchery origin spawners were determined from video tape at Tumwater Dam.

Natural Replacement Rates

Natural replacement rates (NRR) were calculated as the ratio of natural origin recruits (NOR) to the parent spawning population. For brood years 1989-2002, NRR in the Wenatchee averaged 1.21 (range, 0.12-4.23) if harvested fish were not included in the estimate and 1.27 (range, 0.12-4.51) if harvested fish were included in the estimate (Table 4.29).

Hatchery replacement rates (HRR) were estimated as hatchery adult-to-adult returns. These rates should be greater than the NRRs and greater than or equal to 5.40 (the calculated target value in Murdoch and Peven 2005). HRRs exceeded NRRs in 8 of the 14 years of data regardless if harvest was included or not in the estimates (Table 4.29). Hatchery replacement rates for Wenatchee sockeye have equaled or exceeded the estimated target value of 5.40 in only two years if harvest is not included and three years if harvest is included in the estimate (Table 4.29).

Table 4.29. Spawning escapements, hatchery replacement rates (HRR), natural origin recruits (NOR), and natural replacement rates (NRR) with and without harvest for sockeye salmon in the Wenatchee Basin, 1989-2002.

Brood year	Escapement	Harvest not included			Harvest included		
		HRR	NOR	NRR	HRR	NOR	NRR
1989	28,778	11.3	30,172	1.05	13.9	30,487	1.06
1990	25,177	1.6	6,118	0.24	1.6	6,164	0.24
1991	26,565	0.1	5,908	0.22	0.1	5,908	0.22
1992	22,628	1.5	6,337	0.28	1.5	6,337	0.28
1993	29,952	0.3	13,164	0.44	0.3	13,164	0.44
1994	9,447	0.2	1,188	0.13	0.2	1,188	0.13
1995	4,272	0.5	517	0.12	0.5	532	0.12
1996	7,534	6.0	31,847	4.23	6.3	34,009	4.51
1997	10,808	2.9	36,808	3.41	3.4	40,354	3.73
1998	4,047	0.8	15,642	3.87	0.9	16,488	4.07
1999	1,025	0.4	453	0.44	0.4	469	0.46
2000	20,751	4.8	34,357	1.66	7.2	35,704	1.72
2001	29,134	0.1	17,146	0.59	0.1	18,207	0.62
2002	27,565	1.5	5,370	0.19	1.6	5,718	0.21
Average	***17,692***	***2.3***	***14,645***	***1.21***	***2.7***	***15,338***	***1.27***

Juvenile-to-Adult Survivals

When possible, both parr-to-adult ratios (PAR) and smolt-to-adult ratios (SAR) were calculated for hatchery sockeye salmon. Ratios were calculated as the number of hatchery adults divided by the number of hatchery parr released or the estimated number of smolts emigrating from Lake Wenatchee. Survival ratios were based on CWT returns, when available, or on the estimated number of hatchery adults recovered on the spawning grounds, in broodstock, and harvested. For the available brood years, PARs have ranged from 0.0001 to 0.0136 for hatchery sockeye salmon and SARs have ranged from 0.0002 to 0.0254 (Table 4.30).

Table 4.30. Parr-to-adult ratios (PAR) and smolt-to-adult ratios (SAR) for Wenatchee hatchery sockeye salmon, brood years 1990-2001; NA = not available.

Brood year	Number of parr released	Number of smolts	Estimated adult recaptures	PAR	SAR
1989	260,400	NA	3,548	0.0136	NA
1990	372,102	NA	500	0.0013	NA
1991	167,523	NA	29	0.0002	NA
1992	340,557	NA	503	0.0015	NA
1993	190,443	NA	84	0.0004	NA
1994	252,859	NA	48	0.0002	NA
1995	150,808	28,828	107	0.0007	0.0037
1996	284,630	55,985	1,421	0.0050	0.0254
1997	197,195	112,524	768	0.0039	0.0068
1998	121,344	24,684	166	0.0014	0.0067
1999	167,955	94,046	66	0.0004	0.0007
2000	190,174	121,511	1,399	0.0074	0.0115
2001	200,938	140,322	29	0.0001	0.0002
Average	***222,841***	***82,557***	***667***	***0.0028***	***0.0079***

4.8 ESA/HCP Compliance

Broodstock Collection

The 2006 sockeye broodstock collections at Tumwater Dam occurred concurrently with the spring Chinook reproductive success monitoring and evaluation activities (BPA Project No. 2003-039-00) and Wenatchee steelhead broodstock collection activities authorized under ESA permits 1196 and 1395, respectively. No ESA-listed spring Chinook or steelhead takes occurred during sockeye broodstock collections at Tumwater Dam that were outside those authorized through ESA Section 10 permits 1196 and 1395.

Hatchery Rearing and Release

The 2006 Wenatchee sockeye program released 225,670 juveniles, representing 113% of the program production objective and 100.3% of the 10% production overage allowance in ESA Section 10 Permit 1347.

Hatchery Effluent Monitoring

Per ESA Permits 1196, 1347, and 1395, permit holders shall monitor and report hatchery effluents in compliance with applicable National Pollution Discharge Elimination Systems (NPDES) (EPA 1999) permit limitations. NPDES monitoring and reporting for Chelan PUD Hatchery Programs during 2008 are provided in Appendix E.

Smolt and Emigrant Trapping

ESA-listed spring Chinook and steelhead were encountered during operation of the upper and lower Wenatchee traps. ESA takes are reported in the steelhead (Section 3.8) and spring Chinook (Section 5.8) sections and will not be repeated here.

Spawning Surveys

Sockeye spawning ground surveys conducted in the Wenatchee Basin during 2008 were consistent with ESA Section 10 Permit No. 1347. Because of the difficulty of quantifying the level of take associated with spawning ground surveys, the Permit does not specify a take level associated with these activities, even though it does authorize implementation of spawning ground surveys. Therefore, no take levels are reported. However, to minimize potential impacts to established redds, wading was restricted to the extent practical and extreme caution was used to avoid established redds when wading was required.

SECTION 5: WENATCHEE (CHIWAWA) SPRING CHINOOK

Although this section of the report focuses on results from monitoring the Chiwawa spring Chinook program, information on spring Chinook collected throughout the Wenatchee Basin is also provided.

5.1 Broodstock Sampling

This section focuses on results from sampling 2006-2008 Chiwawa spring Chinook broodstock, which were collected at the Chiwawa weir and at Tumwater Dam. Some information for the 2008 return is not available at this time (e.g., age structure and final origin determination). This information will be provided in the 2009 annual report.

Origin of Broodstock

Hatchery origin adults made up between 63-69% of the Chiwawa spring Chinook broodstock for return years 2006-2008 (Table 5.1). Hatchery origin adults were collected at both Tumwater Dam and the Chiwawa weir. In an effort to partially address straying of Chiwawa spring Chinook to other tributaries in the basin, and secondarily to ensure meeting adult collection quotas, hatchery origin adults were collected to the greatest extent possible at Tumwater Dam. Natural origin fish were collected only at the Chiwawa weir. Broodstock were trapped at Tumwater Dam and Chiwawa weir from mid June through August.

Table 5.1. Numbers of wild and hatchery Chiwawa spring Chinook collected for broodstock, numbers that died before spawning, and numbers of Chinook spawned, 1989-2008. Unknown origin fish (i.e., undetermined by scale analysis, no CWT or fin clips, and no additional hatchery marks) were considered naturally produced. Mortality includes fish that died of natural causes typically near the end of spawning and were not needed for the program or were surplus fish killed at spawning.

Brood year	Wild spring Chinook					Hatchery spring Chinook					Total number spawned
	Number collected	Prespawn loss	Mortality	Number spawned	Number released	Number collected	Prespawn loss	Mortality	Number spawned	Number released	
1989	28	0	0	28	0	0	0	0	0	0	28
1990	19	1	0	18	0	0	0	0	0	0	18
1991	32	0	5	27	0	0	0	0	0	0	27
1992	113	0	0	78	35	0	0	0	0	0	78
1993	100	3	3	94	0	0	0	0	0	0	94
1994	9	0	1	8	0	4	0	0	4	0	12
1995	No Program										
1996	8	0	0	8	0	10	0	0	10	0	18
1997	37	0	5	32	0	83	1	3	79	0	111
1998	13	0	0	13	0	35	1	0	34	0	47
1999	No Program										
2000	10	0	1	9	0	38	1	16	21	0	30
2001	115	2	0	113	0	267	8	0	259	0	372
2002	21	0	1	20	0	63	1	11	51	0	71
2003	44	1	2	41	0	75	2	20	53	0	94
2004	100	1	16	83	0	196	30	34	132	0	215
2005	98	1	6	91	0	185	3	1	181	0	279

Brood year	Wild spring Chinook					Hatchery spring Chinook					Total number spawned
	Number collected	Prespawn loss	Mortality	Number spawned	Number released	Number collected	Prespawn loss	Mortality	Number spawned	Number released	
2006	95	0	4	91	0	303	0	29	224	50	315
2007	45	1	1	43	0	124	2	18	104	0	147
2008	88	2	3	83	0	241	5	16	220	0	303
Average[a]	***54***	***1***	***2***	***49***	***2***	***90***	***3***	***8***	***76***	***3***	***126***

[a] Origin determinations should be considered preliminary pending scale analyses.

Age/Length Data

Ages were determined from scales and/or coded wire tags (CWT) collected from broodstock. For both the 2006 and 2007 returns, most adults, regardless of origin, were age-4 Chinook (Table 5.2). A larger percentage of the age-5 Chinook were natural origin fish, whereas a larger percentage of the age-3 fish were hatchery origin fish.

Table 5.2. Percent of hatchery and wild spring Chinook of different ages (total age) collected from broodstock, 1991-2007.

Return year	Origin	Total age			
		2	3	4	5
1991	Wild	0.0	15.6	59.4	25.0
	Hatchery	0.0	0.0	0.0	0.0
1992	Wild	0.0	0.0	0.0	0.0
	Hatchery	0.0	0.0	0.0	0.0
1993	Wild	0.0	0.0	22.0	78.0
	Hatchery	0.0	0.0	0.0	0.0
1994	Wild	0.0	0.0	28.6	71.4
	Hatchery	0.0	0.0	50.0	50.0
1995	Wild	No program			
	Hatchery				
1996	Wild	0.0	28.6	71.4	0.0
	Hatchery	0.0	50.0	50.0	0.0
1997	Wild	0.0	0.0	87.5	12.5
	Hatchery	0.0	1.2	98.8	0.0
1998	Wild	0.0	0.0	63.6	36.4
	Hatchery	0.0	0.0	62.9	37.1
1999	Wild	No program			
	Hatchery				
2000	Wild	0.0	20.0	70.0	10.0
	Hatchery	0.0	76.3	23.7	0.0
2001	Wild	0.0	2.8	94.4	2.8
	Hatchery	0.0	1.5	98.5	0.0
2002	Wild	0.0	0.0	66.7	33.3

Return year	Origin	Total age			
		2	3	4	5
	Hatchery	0.0	0.0	93.4	6.6
2003	Wild	0.0	27.0	2.7	70.3
	Hatchery	0.0	21.3	5.3	73.3
2004	Wild	1.1	4.3	89.4	5.3
	Hatchery	0.0	36.9	63.1	0.0
2005	Wild	0.0	1.1	84.5	14.4
	Hatchery	0.0	4.3	94.6	1.1
2006	Wild	0.0	1.1	71.1	27.8
	Hatchery	0.0	1.4	81.3	17.3
2007	Wild	2.3	16.3	48.8	32.6
	Hatchery	0.0	27.4	61.5	11.1
Average	***Wild***	***0.2***	***7.8***	***57.3***	***28.0***
	Hatchery	***0.0***	***14.7***	***52.2***	***13.1***

There was little difference in mean lengths between hatchery and natural origin broodstock of age-4 and 5 Chinook in 2006 and 2007 (Table 5.3). Additionally, for the 2006 and 2007 returns, there was relatively little difference in mean lengths within years for age-3 hatchery and natural origin fish; however, there was a large difference in mean lengths in age-3 hatchery and natural origin fish between years (10-cm difference) between 2006 and 2007.

Table 5.3. Mean fork length (cm) at age (total age) of hatchery and wild spring Chinook collected from broodstock, 1991-2007; N = sample size and SD = 1 standard deviation.

Return year	Origin	Spring Chinook fork length (cm)											
		Age-2			Age-3			Age-4			Age-5		
		Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD
1991	Wild	-	0	-	-	5	-	-	19	-	-	8	-
	Hatchery	-	0	-	-	0	-	-	0	-	-	0	-
1992	Wild	-	0	-	-	0	-	-	0	-	-	0	-
	Hatchery	-	0	-	-	0	-	-	0	-	-	0	-
1993	Wild	-	0	-	-	0	-	79	22	3	92	78	4
	Hatchery	-	0	-	-	0	-	-	0	-	-	0	-
1994	Wild	-	0	-	-	0	-	79	2	3	96	5	6
	Hatchery	-	0	-	-	0	-	82	2	11	91	2	3
1995	Wild	No program											
	Hatchery												
1996	Wild	-	0	-	51	2	1	79	5	7	-	0	-
	Hatchery	-	0	-	56	5	4	74	5	6	-	0	-
1997	Wild	-	0	-	-	0	-	80	28	5	99	4	8

Return year	Origin	Spring Chinook fork length (cm)											
		Age-2			Age-3			Age-4			Age-5		
		Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD
	Hatchery	-	0	-	56	1	-	82	82	4	-	0	-
1998	Wild	-	0	-	-	0	-	78	7	13	83	4	18
	Hatchery	-	0	-	-	0	-	77	22	8	93	13	7
1999	Wild	No program											
	Hatchery												
2000	Wild	-	0	-	51	2	3	82	7	4	98	1	-
	Hatchery	-	0	-	58	29	7	79	9	8	-	0	-
2001	Wild	-	0	-	49	3	6	82	101	6	95	3	3
	Hatchery	-	0	-	56	4	7	83	261	5	-	0	-
2002	Wild	-	0	-	-	0	-	79	12	4	96	6	10
	Hatchery	-	0	-	-	0	-	81	57	6	94	4	9
2003	Wild	-	0	-	55	10	5	83	1	-	99	26	6
	Hatchery	-	0	-	59	16	5	86	4	18	96	55	6
2004	Wild	47	1	-	57	4	4	80	84	5	95	5	9
	Hatchery	-	0	-	49	72	6	79	123	6	-	0	-
2005	Wild	-	0	-	49	1	-	80	82	6	96	14	8
	Hatchery	-	0	-	56	8	5	82	175	6	93	2	2
2006	Wild	-	0	-	48	1	-	80	64	7	96	25	5
	Hatchery	-	0	-	49	4	4	80	240	6	95	51	7
2007	Wild	54	1	-	57	7	10	79	21	6	93	14	7
	Hatchery	-	0	-	59	32	8	81	72	6	93	13	6

Sex Ratios

Male spring Chinook in 2006-2008 return years made up about 43%, 51%, and 46%, respectively, of the adults collected. This resulted in overall male to female ratios of 0.77:1.00, 1.04:1.00, and 0.84:1.00, respectively (Table 5.4). Only returns in 2007 were at or above the 1:1 ratio target in the broodstock protocol. For the 2008 return year, hatchery and natural origin fish consisted of a slightly lower proportion of males than females, consistent with what was observed in 2006 (Table 5.4.).

Table 5.4. Numbers of male and female wild and hatchery spring Chinook collected for broodstock, 1989-2008. Ratios of males to females are also provided.

Return year	Number of wild spring Chinook			Number of hatchery spring Chinook			Total M/F ratio
	Males (M)	Females (F)	M/F	Males (M)	Females (F)	M/F	
1989	11	17	0.65:1.00	-	-	-	0.65:1.00
1990	7	12	0.58:1.00	-	-	-	0.58:1.00
1991	13	19	0.68:1.00	-	-	-	0.68:1.00
1992	39	39	1.00:1.00	-	-	-	1.00:1.00

Return year	Number of wild spring Chinook			Number of hatchery spring Chinook			Total M/F ratio
	Males (M)	Females (F)	M/F	Males (M)	Females (F)	M/F	
1993	50	50	1.00:1.00	-	-	-	1.00:1.00
1994	5	4	1.25:1.00	2	2	1.00:1.00	1.17:1.00
1995	No program						
1996	6	2	3.00:1.00	8	2	4.00:1.00	3.50:1.00
1997	14	23	0.61:1.00	34	49	0.69:1.00	0.67:1.00
1998	9	4	2.25:1.00	18	17	1.06:1.00	1.29:1.00
1999	No program						
2000	5	5	1.00:1.00	32	6	5.33:1.00	3.36:1.00
2001	45	70	0.64:1.00	90	177	0.51:1.00	0.55:1.00
2002	9	12	0.75:1.00	30	33	0.91:1.00	0.87:1.00
2003	28	16	1.75:1.00	42	33	1.27:1.00	1.43:1.00
2004	58	42	1.38:1.00	102	94	1.09:1.00	1.18:1.00
2005	58	40	1.45:1.00	89	96	0.93:1.00	1.08:1.00
2006	49	46	1.07:1.00	123	179	0.69:1.00	0.77:1.00
2007	20	25	0.80:1.00	66	58	1.14:1.00	1.04:1.00
2008	41	47	0.87:1.00	109	132	0.83:1.00	0.84:1.00
Total	***467***	***473***	***0.99:1.00***	***745***	***878***	***0.85:1.00***	***0.90:1.00***

Fecundity

Mean fecundities for the 2006-2008 returns of spring Chinook ranged from 4,324-4,592 eggs per female (Table 5.5). These fecundities were less than the overall average of 4,775 eggs per female, but were close to the expected fecundity of 4,400 eggs per female assumed in the broodstock protocol. For the three return years, natural origin Chinook produced more eggs per female than did hatchery origin fish (Table 5.5). This could be attributed to differences in size and age of hatchery and natural origin fish described above.

Table 5.5. Mean fecundity of wild, hatchery, and all female spring Chinook collected for broodstock, 1989-2008; NA = not available.

Return year	Mean fecundity		
	Wild	Hatchery	Total
1989*	NA	NA	2,832
1990*	NA	NA	5,024
1991*	NA	NA	4,600
1992*	NA	NA	5,199[a]
1993*	NA	NA	5,249
1994*	NA	NA	5,923
1995	No program		
1996*	NA	NA	4,645

Return year	Mean fecundity		
	Wild	Hatchery	Total
1997	4,752	4,479	4,570
1998	5,157	5,376	5,325
1999	No program		
2000	5,028	5,019	5,023
2001	4,530	4,663	4,624
2002	5,024	4,506	4,654
2003	6,191	5,651	5,844
2004	4,846	4,775	4,799
2005	4,365	4,312	4,327
2006	4,773	4,151	4,324
2007	4,722	4,240	4,387
2008	4,757	4,531	4,592
Average	***4,922***	***4,700***	***4,775***

* Individual fecundities were not tracked with females until 1997.
[a] Estimated as the mean of fecundities two years before and two years after 1992.

5.2 Hatchery Rearing

Rearing History

Number of eggs taken

Based on the unfertilized egg-to-release survival standard of 81%, a total of 829,630 eggs are required to meet the program release goal of 672,000 smolts. Between 1989 and 2008, the egg take goal was reached in one of those years (Table 5.6). The green egg takes for 2006-2008 brood years were 90%, 43%, and 92% of program goals, respectively.

ESA Permit 1196 sets limits on the percentage of the total run, natural origin run, and a minimum contribution of natural origin fish that must be in the broodstock. Applying these criteria to the low total abundance of spring Chinook salmon to the Chiwawa Basin and the low abundance of natural origin fish returning to the basin has resulted in the program not meeting production goals.

Table 5.6. Numbers of eggs taken from spring Chinook broodstock, 1989-2008.

Return year	Number of eggs taken
1989	45,311
1990	60,287
1991	73,601
1992	111,624
1993	257,208
1994	35,539
1995	No program

Return year	Number of eggs taken
1996	18,579
1997	312,182
1998	90,521
1999	No program
2000	55,256
2001	1,099,630
2002	196,186
2003	247,501
2004	538,176
2005	536,490
2006	744,344
2007	359,739
2008	761,821
Average	***308,000***

Number of acclimation days

Early rearing of the 2006 brood Chiwawa spring Chinook was similar to previous years with fish being held on well water before being transferred to Chiwawa Ponds for final acclimation. Beginning in 2006 (2005 brood acclimation), modifications were made to the Chiwawa FH intakes so that Wenatchee River water could be applied to the Chiwawa River intakes during severe cold periods to prevent the formation of frazzle ice. During acclimation of the 2006 brood, fish were acclimated for 231 days on Chiwawa River water, with 95 of those days containing a small percentage of Wenatchee River water (Table 5.7).

Table 5.7. Number of days spring Chinook broods were acclimated and water source, brood years 1989-2006; NA = not available.

Brood year	Release year	Transfer date	Release date	Number of days and water source		
				Total	Chiwawa	Wenatchee
1989	1991	19-Oct	11-May	204	NA	NA
1990	1992	13-Sep	27-Apr	227	NA	NA
1991	1993	24-Sep	24-Apr	212	NA	NA
1992	1994	30-Sep	20-Apr	202	NA	NA
1993	1995	28-Sep	20-Apr	204	NA	NA
1994	1996	1-Oct	25-Apr	207	NA	NA
1995	1997	No Program				
1996	1998	25-Sep	29-Apr	216	NA	NA

Brood year	Release year	Transfer date	Release date	Number of days and water source		
				Total	Chiwawa	Wenatchee
1997	1999	28-Sep	22-Apr	206	NA	NA
1998	2000	27-Sep	24-Apr	210	NA	NA
1999	2001	No Program				
2000	2002	26-Sep	25-Apr	211	NA	NA
2001	2003	22-Oct	1-May	191	NA	NA
2002	2004	25-Sep	2-May	220	NA	NA
2003	2005	30-Sep	3-May	215	NA	NA
		30-Sep	18-Apr-18-May	200	NA	NA
2004	2006	3-Sep	1-May	240	88-104	124
		3-Sep	17-Apr-17-May	226		
2005	2007	25-Sep	1-May	217	217	98[a]
		26-Sep	16-Apr-15-May	202-232	202-232	98[a]
2006	2008	24-27-Sep	14-Apr-13-May	231	231	95[a]

[a] Represents the number of days Wenatchee River water was applied to the Chiwawa River intake screen to prevent the formation of frazzle ice.

Release Information

Numbers released

The 2006 brood Chiwawa spring Chinook program achieved 91.1% of the 672,000 target goal with about 612,482 smolts (621,976 fish if the high ELISA group released directly into Big Meadow Creek is included) being released volitionally into the Chiwawa River (Table 5.8).

Table 5.8. Numbers of spring Chinook smolts tagged and released from the hatchery, brood years 1989-2006. The release target for Chiwawa spring Chinook is 672,000 smolts.

Brood year	Release year	Type of release	CWT mark rate	Number released that were PIT tagged	Number of smolts released	Total number of smolts released
1989	1991	Volitional	0.9932	0	43,000	43,000
1990	1992	Volitional	0.9931	0	53,170	53,170
1991	1993	Volitional	0.9831	0	62,138	62,138
1992	1994	Volitional	0.9747	0	85,113	85,113
1993	1995	Volitional	0.9892	0	223,610	223,610
1994	1996	Volitional	0.9967	0	27,226	27,226
1995	1997	No program				
1996	1998	Forced	0.8413	0	15,176	15,176

Brood year	Release year	Type of release	CWT mark rate	Number released that were PIT tagged	Number of smolts released	Total number of smolts released
1997	1999	Volitional	0.9753	0	266,148	266,148
1998	2000	Volitional	0.9429	0	75,906	75,906
1999	2001	No program				
2000	2002	Volitional	0.9920	0	47,104	47,104
2001	2003	Forced	0.9961	0	192,490[a]	377,544
		Volitional	0.9856	0	185,054[a]	
2002	2004	Volitional	0.9693	0	149,668	149,668
2003	2005	Forced	0.9783	0	69,907	222,131
		Volitional	0.9743	0	152,224	
2004	2006	Forced	0.9533	0	243,505	494,517
		Volitional	0.9493	0	251,012	
2005	2007	Forced	0.9882	4,993	245,406	494,012
		Volitional	0.9864	4,988	248,606	
2006	2007	Direct	0.0000	0	12,977[b]	612,482
	2008	Volitional	0.9795	9,894	612,482	

[a] This does not include the 226,456 eyed eggs that were planted in the Chiwawa River.
[b] This high ELISA group was only adipose fin clipped and directly planted into Big Meadow Creek in May 2007.

Numbers tagged

The 2006 brood Chiwawa spring Chinook were 98.0% CWT and adipose fin clipped (Table 5.8). In addition, a total of 10,055 juveniles from the 2006 brood were PIT tagged at Eastbank Hatchery during 24-26 July 2007 (Table 5.9). These fish were transferred to the Chiwawa raceway #2 on 26-27 September. During spring 2008, 9,894 tagged Chinook were released volitionally between 14 April and 13 May (Table 5.8). During the rearing period, a total of 134 tagged fish died and another 27 lost their tags.

In 2008, a total of 10,112 spring Chinook from the 2007 brood were PIT tagged at the Eastbank Hatchery during 24-26 June 2008. These fish were transferred to the Chiwawa raceway at the end of September. As of the end of January 2009, a total of 58 tagged fish have died and another 8 have shed their tags, leaving 10,046 tagged spring Chinook alive. These fish will be released in spring of 2009 with the rest of the 2007 brood.

Fish size and condition at release

Spring Chinook from the 2006 brood were released as yearling smolts between 14 April and 13 May of 2008. Size at release was below the targets established for the program. However, the coefficient of variation for fork length was below the target indicating fish were released with an acceptable size distribution (Table 5.9).

Table 5.9. Mean lengths (FL, mm), weight (g and fish/pound), and coefficient of variation (CV) of spring Chinook smolts released from the hatchery, brood years 1989-2006. Size targets are provided in the last row of the table.

Brood year	Release year	Fork length (mm)		Mean weight	
		Mean	CV	Grams (g)	Fish/pound
1989	1991	147	4.4	37.8	12
1990	1992	137	5.0	32.4	14
1991	1993	135	4.2	30.3	15
1992	1994	133	5.0	28.4	16
1993	1995	136	4.5	30.2	15
1994	1996	139	7.1	34.4	13
1995	1997	No Program			
1996	1998	157	5.3	52.1	9
1997	1999	146	7.2	38.7	12
1998	2000	143	9.1	39.5	12
1999	2001	No Program			
2000	2002	150	6.8	46.7	10
2001	2003	142	7.1	37.6	12
2002	2004	146	8.5	40.3	11
2003	2005	167[a]	5.9	59.4	8
		151[b]	7.4	44.2	10
2004	2006	146[a]	6.4	39.1	12
		139[b]	5.7	34.3	13
2005	2007	136[a]	4.6	30.8	15
		129[b]	5.8	26.6	17
2006	2008	124	8.8	23.5	19
Targets		***176***	***9.0***	***37.8***	***12***

[a] Forced release group.
[b] Volitional release group.

Survival Estimates

Overall survival of Chiwawa spring Chinook from green (unfertilized) egg to release was above the standard set for the program (Table 5.10). Survival from the unfertilized to eyed egg stage was slightly below program objectives. Pre-spawn survival of adults was also above the standard set for the program.

Table 5.10. Hatchery life-stage survival rates (%) for spring Chinook, brood years 1989-2006. Survival standards or targets are provided in the last row of the table.

Brood year	Collection to spawning		Unfertilized egg-eyed	Eyed egg-ponding	30 d after ponding	100 d after ponding	Ponding to release	Transport to release	Unfertilized egg-release
	Female	Male							
1989	100.0	100.0	98.0	99.1	99.1	99.0	96.4	99.3	94.8
1990	100.0	85.7	91.8	98.1	99.5	98.9	97.9	99.2	88.2
1991	100.0	100.0	94.4	96.1	99.6	97.9	93.2	95.0	84.4
1992	100.0	100.0	98.4	96.7	99.9	99.9	80.0	80.6	76.2
1993	96.0	98.0	89.7	98.0	99.7	99.3	98.9	99.7	86.9
1994	100.0	100.0	98.6	100.0	99.8	99.4	77.0	78.9	76.6
1995	No program								
1996	100.0	100.0	88.3	100.0	93.8	93.0	89.9	97.7	81.7
1997	98.6	100.0	93.2	95.7	98.3	99.6	95.6	99.3	85.3
1998	95.2	100.0	94.5	99.0	98.5	98.3	89.6	99.1	83.9
1999	No program								
2000	100.0	100.0	91.0	98.1	97.2	96.6	95.4	99.3	85.2
2001	97.6	97.0	88.9	98.1	99.7	99.6	51.3	51.8	34.3
2002	97.8	100.0	82.1	98.0	97.4	96.7	94.8	99.1	76.3
2003	93.9	100.0	93.2	97.7	99.5	99.3	98.5	98.1	89.7
2004	97.8	82.5	93.3	98.4	98.8	94.3	93.9	97.2	91.9
2005	97.1	100.0	95.9	98.0	99.2	99.0	97.9	99.1	92.1
2006	100.0	100.0	90.1	98.1	99.2	99.0	95.3	97.7	84.2
Standard	***90.0***	***85.0***	***92.0***	***98.0***	***97.0***	***93.0***	***90.0***	***95.0***	***81.0***

5.3 Disease Monitoring

Results of adult broodstock bacterial kidney disease (BKD) monitoring indicated that most females (97.8%) had ELISA values less than 0.199. About 84% of females had ELISA values less than 0.120, which would require about 16% of the progeny to be reared at densities not to exceed 0.06 fish per pound (Table 5.11).

No significant health issues were encountered during juvenile rearing. Some individuals began exhibiting signs of BKD at release; however, it was restricted to only one pond. No treatment was recommended.

Table 5.11. Proportion of bacterial kidney disease (BKD) titer groups for the Chiwawa spring Chinook broodstock, brood years 1996-2008. Also included are the proportions to be reared at either 0.125 fish per pound or 0.060 fish per pound.

Brood year[a]	Optical density values by titer group				Proportion at rearing densities (fish per pound, fpp)	
	Very Low (≤ 0.099)	Low (0.1-0.199)	Moderate (0.2-0.449)	High (≥ 0.450)	≤ 0.125 fpp (<0.119)	≤ 0.060 fpp (>0.120)
1996	0.0000	0.2500	0.2500	0.5000	0.0000	1.0000
1997	0.1176	0.7353	0.0588	0.0882	0.3529	0.6471
1998	0.1176	0.8235	0.0588	0.0000	0.4706	0.5294
1999	No Program					
2000	0.0000	0.9091	0.0909	0.0000	0.1818	0.8182
2001	0.4066	0.5436	0.0373	0.0124	0.6515	0.3485
2002	0.2195	0.6585	0.0732	0.0488	0.5610	0.4390
2003	0.6957	0.1087	0.0652	0.1304	0.7174	0.2826
2004	0.8182	0.1515	0.0227	0.0076	0.8939	0.1061
2005	0.9084	0.0916	0.0000	0.0000	0.9695	0.0305
2006	0.7222	0.2556	0.0000	0.0222	0.8444	0.1556
2007	0.5854	0.3415	0.0244	0.0488	0.7073	0.2927
2008	0.8304	0.1520	0.0058	0.0117	0.9357	0.0643
Average	*0.6349*	*0.3165*	*0.0239*	*0.0248*	*0.7798*	*0.2202*

[a] Individual ELISA samples were not collected before the 1996 brood.

5.4 Natural Juvenile Productivity

During 2008, juvenile spring Chinook were sampled at the Upper Wenatchee, Lower Wenatchee, and Chiwawa traps and counted during snorkel surveys within the Chiwawa Basin.

Parr Estimates

A total of 82,351 (±14%) subyearling and 189 (±58%) yearling spring Chinook were estimated in the Chiwawa River Basin in August 2008 (Table 5.12 and 5.13). During the survey period 1992-2008, numbers of subyearling and yearling Chinook have ranged from 5,815 to 134,872 and 5 to 563, respectively, in the Chiwawa Basin (Table 5.12 and 5.13; Figure 5.1). Numbers of all fish counted in the Chiwawa Basin are reported in Appendix A.

Table 5.12. Total numbers of subyearling spring Chinook estimated in different steams in the Chiwawa Basin during snorkel surveys in August 1992-2008; NS = not sampled.

Sample Year	Number of subyearling spring Chinook									
	Chiwawa River	Phelps Creek	Chikamin Creek	Rock Creek	Peven Creek	Big Meadow Creek	Alder Creek	Brush Creek	Clear Creek	Total
1992	45,483	NS	NS	NS	NS	NS	NS	NS	NS	**45,483**
1993	77,269	0	1,258	586	NS	NS	NS	NS	NS	**79,113**

Sample Year	Number of subyearling spring Chinook									
	Chiwawa River	**Phelps Creek**	**Chikamin Creek**	**Rock Creek**	**Peven Creek**	**Big Meadow Creek**	**Alder Creek**	**Brush Creek**	**Clear Creek**	**Total**
1994	53,492	0	398	474	68	624	0	0	0	**55,056**
1995	52,775	0	1,346	210	0	683	67	160	0	**55,241**
1996	5,500	0	29	10	0	248	28	0	0	**5,815**
1997	15,438	0	56	92	0	480	0	0	0	**16,066**
1998	65,875	0	1,468	496	57	506	0	13	0	**68,415**
1999	40,051	0	366	592	0	598	22	0	0	**41,629**
2000	NS	NS	NS	NS	NS	NS	NS	NS	NS	**NS**
2001	106,753	168	2,077	2,855	354	2,332	78	0	0	**114,617**
2002	117,230	75	8,233	2,953	636	5,021	429	0	297	**134,874**
2003	80,250	4,508	1,570	3,255	118	1,510	22	45	0	**91,278**
2004	43,360	102	717	215	54	637	21	71	0	**45,177**
2005	45,999	71	2,092	660	17	792	0	0	0	**49,631**
2006	73,478	113	2,500	1,681	51	1,890	62	127	0	**79,902**
2007	53,863	125	5,235	870	51	538	20	28	22	**60,752**
2008	72,431	214	3,287	4,730	163	1,221	28	255	22	**82,351**
Average	***59,328***	***358***	***2,042***	***1,312***	***112***	***1,220***	***56***	***50***	***24***	***64,088***

Table 5.13. Total numbers of yearling spring Chinook estimated in different steams in the Chiwawa Basin during snorkel surveys in August 1992-2008; NS = not sampled.

Sample Year	Number of yearling spring Chinook									
	Chiwawa River	**Phelps Creek**	**Chikamin Creek**	**Rock Creek**	**Peven Creek**	**Big Meadow Creek**	**Alder Creek**	**Brush Creek**	**Y Creek**	**Total**
1992	563	NS	NS	NS	NS	NS	NS	NS	NS	**563**
1993	174	0	0	0	NS	NS	NS	NS	NS	**174**
1994	14	0	0	4	0	0	0	0	0	**18**
1995	13	0	0	0	0	0	0	0	0	**13**
1996	22	0	0	0	0	0	0	0	0	**22**
1997	5	0	0	0	0	0	0	0	0	**5**
1998	63	0	0	0	0	0	0	0	0	**63**
1999	41	0	0	0	0	0	0	0	0	**41**
2000	NS	NS	NS	NS	NS	NS	NS	NS	NS	**NS**
2001	66	0	3	0	0	0	0	0	0	**69**
2002	32	0	0	0	0	0	0	0	0	**32**
2003	134	0	0	0	0	0	0	0	0	**134**
2004	14	0	0	0	0	7	0	0	0	**21**
2005	62	0	17	0	0	0	0	0	0	**79**
2006	345	0	0	43	0	0	0	0	0	**388**
2007	41	0	0	0	0	0	0	0	0	**41**
2008	144	0	45	0	0	0	0	0	0	**189**

Sample Year	Number of yearling spring Chinook									
	Chiwawa River	Phelps Creek	Chikamin Creek	Rock Creek	Peven Creek	Big Meadow Creek	Alder Creek	Brush Creek	Y Creek	Total
Average	*108*	*0*	*4*	*3*	*0*	*1*	*0*	*0*	*0*	*116*

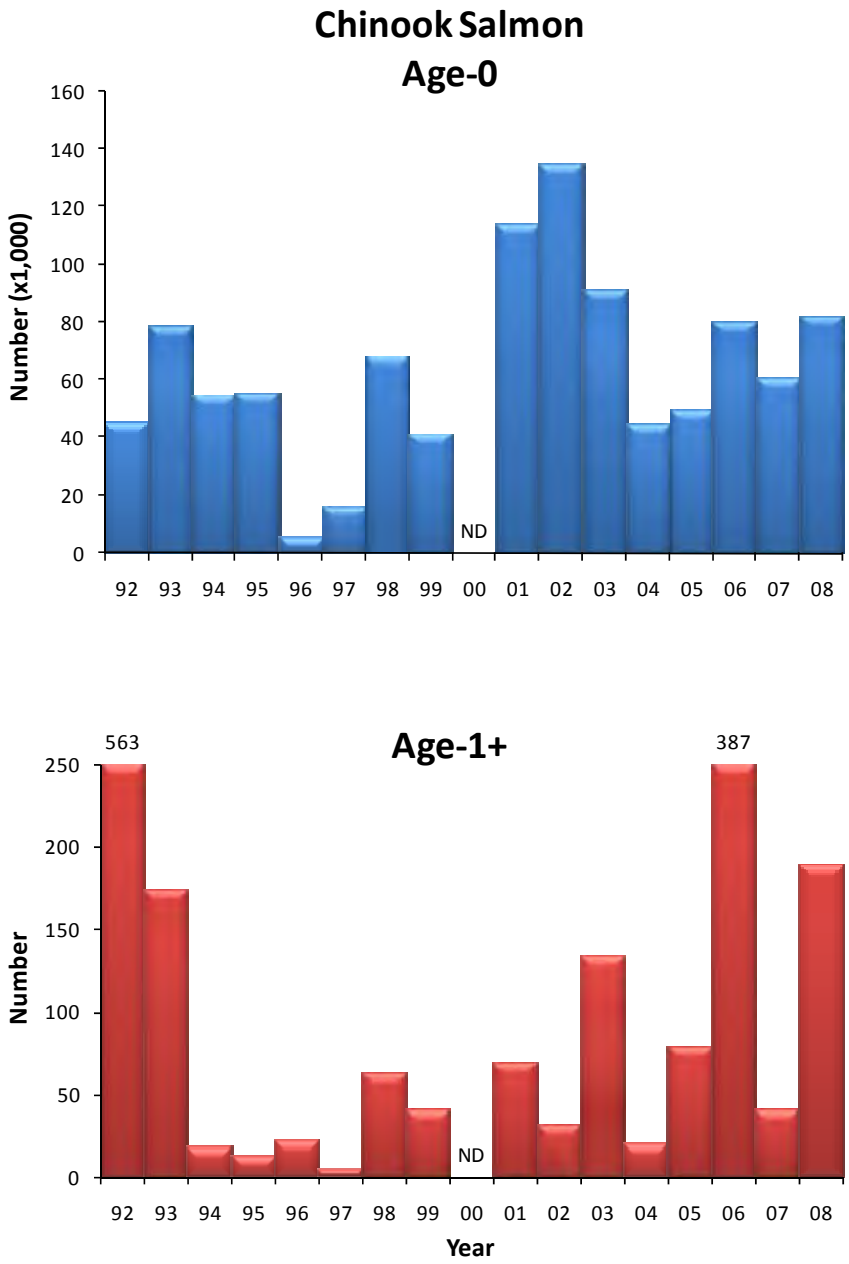


Figure 5.1. Numbers of subyearling and yearling Chinook salmon within the Chiwawa River Basin in August 1992-2008; ND = no data.

Juvenile Chinook were distributed contagiously among reaches in the Chiwawa River. Their densities were highest in the upper portions of the basin, with the highest densities within tributaries. Juvenile Chinook were most abundant in multiple channels and least abundant in glides. Most Chinook associated closely with woody debris in multiple channels. These sites (multiple channels) made up 17% of the total area of the Chiwawa Basin, but they provided habitat for 45% of all the subyearling Chinook in the basin in 2008. In contrast, riffles made up 51% of the total area, but provided habitat for only 11% of all juvenile Chinook in the Chiwawa Basin. Pools made up 23% of the total area and provided habitat for 40% of all juvenile Chinook in the basin. Virtually no Chinook used glides that lacked woody debris.

Mean densities of juvenile Chinook in two reaches of the Chiwawa River were generally less than those in corresponding reference areas (Nason Creek and the Little Wenatchee River) (Figure 5.2). Within both the Chiwawa River and its reference areas, pools and multiple channels consistently had the highest densities of juvenile Chinook.

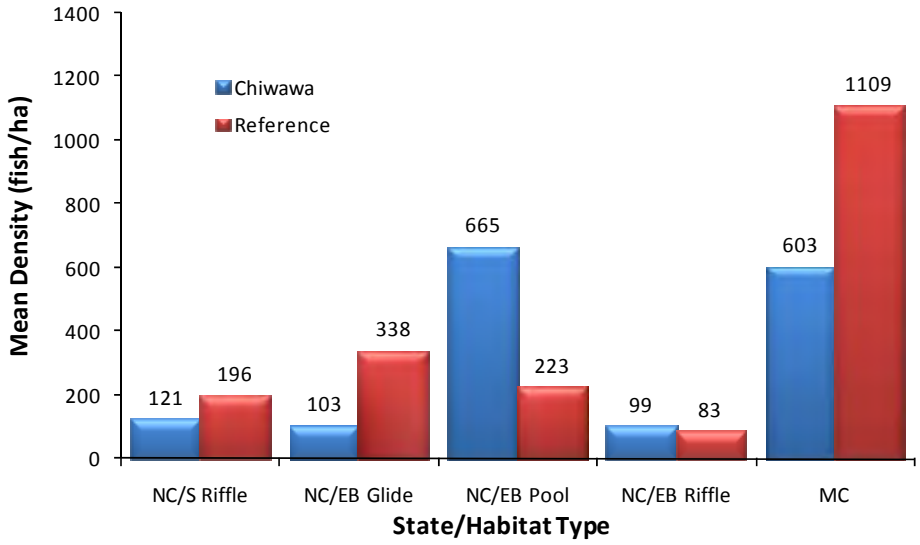


Figure 5.2. Comparison of the 15-year means of subyearling spring Chinook densities within state/habitat types in reaches 3 and 8 of the Chiwawa River and their matched reference areas on Nason Creek and the Little Wenatchee River. NC = natural channel; S = straight channel; EB = eroded banks; MC = multiple channel. There was no sampling in 2000 and no sampling within reference areas in 1992.

Smolt and Emigrant Estimates

Numbers of spring Chinook smolts and emigrants were estimated at the Upper Wenatchee, Chiwawa, and Lower Wenatchee traps in 2008.

Chiwawa Trap

The Chiwawa Trap operated between 5 March and 3 December 2008. During that time period the trap was inoperable for 21 days because of high river flows, debris, snow/ice, or mechanical failure.

The trap operated in two different positions depending on stream flow; lower position at flows greater than 12 m^3/s and an upper position at flows less than 12 m^3/s. Daily trap efficiencies were estimated from two regression models depending on trap position and age class of fish (e.g., subyearling and yearling). The daily number of fish captured was expanded by the estimated trap efficiency to estimate daily total emigration. Monthly captures of all fish and results of mark-recapture efficiency tests at the Chiwawa Trap are reported in Appendix B.

Wild yearling spring Chinook (2006 brood year) were primarily captured from March to June 2008 (Figure 5.3). Based on capture efficiencies estimated from the flow model, the total number of wild yearling Chinook emigrating from the Chiwawa River was 45,050 (±20,377). Combining the total number of subyearling spring Chinook (62,922) that emigrated during the fall of 2007 with the total number of yearling Chinook (45,050) that emigrated during 2008 resulted in a total emigrant estimate of 107,972 (±33,802) spring Chinook for the 2006 brood year (Table 5.14).

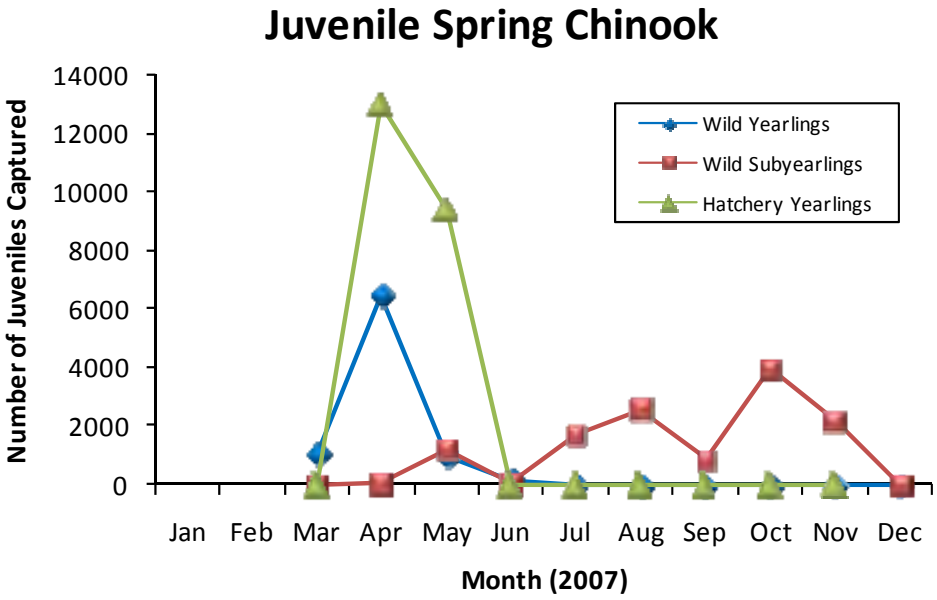


Figure 5.3. Monthly captures of wild subyearling, wild yearling, and hatchery yearling spring Chinook at the Chiwawa Trap, 2008.

Table 5.14. Numbers of redds and juvenile spring Chinook at different life stages in the Chiwawa Basin for brood years 1991-2008; NS = not sampled.

Brood year	Number of redds	Egg deposition	Number of parr	Number of smolts produced within Chiwawa Basin[a]	Total number of smolts[b]	Number of emigrants
1991	104	478,400	45,483[c]	42,525	42,525	NS
1992	302	1,570,098	79,113	39,723	56,763	65,541
1993	106	556,394	55,056	8,662	17,926	22,698
1994	82	485,686	55,240	16,472	22,145	25,067
1995	13	66,248	5,815	3,830	5,230	5,951

Brood year	Number of redds	Egg deposition	Number of parr	Number of smolts produced within Chiwawa Basin[a]	Total number of smolts[b]	Number of emigrants
1996	23	106,835	16,066	15,475	17,922	19,183
1997	82	374,740	68,415	28,334	39,044	44,562
1998	41	218,325	41,629	23,068	24,953	25,923
1999	34	166,090	NS	10,661	13,953	15,649
2000	128	642,944	114,617	40,831	50,634	55,685
2001	1,078	4,984,672	134,874	86,482	389,940	546,266
2002	345	1,605,630	91,278	90,948	152,547	184,279
2003	111	648,684	45,177	16,755	27,897	33,637
2004	241	1,156,559	49,631	72,080	101,172	116,158
2005	332	1,436,564	79,902	69,064	140,737	177,659
2006	297	1,284,228	60,752	45,050	86,579	107,972
2007	283	1,241,521	82,351	-	-	-
2008	689	-	-	-	-	-
Average	***238***	***1,001,389***	***64,087***	***38,123***	***74,373***	***96,415***

[a] The estimated number of smolts (yearlings) that are produced entirely within the Chiwawa Basin. Smolt estimates for brood years 1992-1996 were calculated with a mark-recapture model; brood years 1997-present were calculated with a flow model.

[b] These numbers represent Chiwawa smolts produced within the entire Wenatchee Basin. This assumes that 66% of the subyearling migrants from the Chiwawa Basin survive to smolt in the Wenatchee Basin, regardless of the number of subyearling migrants (i.e., no density dependence). Smolt estimates for brood years 1992-1996 were calculated with a mark-recapture model; brood years 1997-present were calculated with a flow model.

[c] Estimate only includes numbers of Chinook in the Chiwawa River. Tributaries were not sampled at that time.

Wild subyearling spring Chinook (2007 brood year) were captured between 19 April and 3 December 2008. Based on capture efficiencies estimated from the flow model for both the upper position and lower position, the total number of wild subyearling (fry and parr) Chinook from the Chiwawa Basin was 90,978 (±16,480). Removing fry from the estimate, a total of 60,196 (±10,780) parr emigrated from the Chiwawa Basin in 2008. Although subyearlings migrated during most months of sampling, the majority (68%) migrated during August, October, and November (Figure 5.3).

Yearling spring Chinook sampled in 2008 averaged 93 mm in length, 8.8 g in weight, and had a mean condition of 1.08 (Table 5.15). These size estimates were similar to the overall mean of yearling spring Chinook sampled in previous years (overall means: 94 mm, 9.4 g, and condition of 1.09). Subyearling spring Chinook sampled in 2008 at the Chiwawa Trap averaged 79 mm in length, averaged 5.9 g, and had a mean condition of 1.15 (Table 5.15). These sizes comport well with the overall mean of subyearling spring Chinook sampled in previous years (overall means, 77 mm, 5.7 g, and condition of 1.10).

Table 5.15. Mean fork length (mm), weight (g), and condition factor of subyearling and yearling spring Chinook collected in the Chiwawa Trap, 1996-2008. Numbers in parentheses indicate 1 standard deviation.

Sample year	Life stage	Sample size[a]	Mean size		
			Length (mm)	Weight (g)	Condition (K)
1996	Subyearling	514	78 (25)	6.9 (4.2)	1.11 (0.11)
	Yearling	1,589	94 (9)	9.5 (3.0)	1.11 (0.08)
1997	Subyearling	840	86 (8)	7.5 (2.1)	1.16 (0.08)
	Yearling	1,114	100 (7)	10.2 (2.6)	1.02 (0.10)
1998	Subyearling	3,743	82 (11)	6.2 (2.2)	1.08 (0.09)
	Yearling	2,663	97 (7)	10.3 (2.8)	1.12 (0.23)
1999	Subyearling	569	89 (9)	8.5 (2.4)	1.15 (0.07)
	Yearling	3,664	95 (8)	9.6 (3.4)	1.09 (0.19)
2000	Subyearling	1,810	85 (10)	7.4 (2.4)	1.15 (0.10)
	Yearling	1,891	97 (8)	10.5 (5.2)	1.13 (0.07)
2001	Subyearling	4,657	82 (11)	6.6 (3.4)	1.14 (0.09)
	Yearling	2,935	97 (7)	10.5 (2.4)	1.15 (0.08)
2002	Subyearling	6,130	64 (12)	3.0 (1.6)	1.06 (0.10)
	Yearling	1,735	94 (8)	9.0 (2.3)	1.09 (0.08)
2003	Subyearling	3,679	64 (12)	3.2 (1.7)	1.08 (0.10)
	Yearling	2,657	87 (9)	7.2 (3.5)	1.07 (0.10)
2004	Subyearling	2,278	75 (16)	4.3 (2.1)	0.92 (0.16)
	Yearling	1,032	91 (9)	8.5 (2.7)	1.09 (0.10)
2005	Subyearling	2,702	73 (12)	4.6 (2.2)	1.08 (0.09)
	Yearling	803	96 (9)	9.9 (2.8)	1.08 (0.08)
2006	Subyearling	3,462	76 (11)	5.1 (2.0)	1.12 (0.21)
	Yearling	4,645	95 (7)	9.4 (2.3)	1.10 (0.13)
2007	Subyearling	1,718	72 (12)	4.5 (2.1)	1.13 (0.16)
	Yearling	2,245	91 (8)	8.6 (2.5)	1.10 (0.09)
2008	Subyearling	10,443	79 (12)	5.9 (2.3)	1.15 (0.15)
	Yearling	8,792	93 (7)	8.8 (2.1)	1.08 (0.10)
Average	***Subyearling***	***3,273***	***77***	***5.7***	***1.10***
	Yearling	***2,751***	***94***	***9.4***	***1.09***

[a] Sample size represents the number of fish that were measured for both length and weight.

Upper Wenatchee Trap

The Upper Wenatchee Trap operated nightly between 22 March and 30 July 2008. During the five-month sampling period, a total of 194 wild yearling Chinook, 71 wild subyearling Chinook, and 398 hatchery yearling Chinook were captured at the Upper Wenatchee Trap. Monthly captures of all fish collected at the Upper Wenatchee Trap are reported in Appendix B.

Lower Wenatchee Trap

The Lower Wenatchee Trap operated nightly between 14 February and 15 August 2008. During that time period the trap was inoperable for 29 days because of high river flows, debris, snow/ice, or mechanical failure. During the seven-month sampling period, a total of 612 wild yearling Chinook, 30,547 wild subyearling Chinook (mostly summer Chinook), and 19,440 hatchery yearling Chinook were captured at the Lower Wenatchee Trap. Based on capture efficiencies estimated from the flow model, the total number of wild yearling Chinook that emigrated past the Lower Wenatchee Trap was 85,558 (±9,262). The majority (65%) of these fish emigrated during April. Monthly captures of all fish collected at the Lower Wenatchee Trap are reported in Appendix B.

PIT Tagging Activities

A total of 17,932 juvenile Chinook (8,870 subyearling and 9,062 yearlings) were PIT tagged and released in 2008 throughout the Wenatchee Basin (Table 5.16). Most of these (96%) were tagged in the Chiwawa Basin (17,152 at the trap plus 43 others upstream from the trap). Few were tagged and released in Nason Creek, lower Wenatchee River, or the upper Wenatchee River. A total of 508 Chinook were tagged and released at the Lower Wenatchee trap. See Appendix C for a complete list of all fish captured, tagged, lost, and released.

Table 5.16. Numbers of wild Chinook that were captured, tagged, and released at different locations within the Wenatchee Basin, 2008. Numbers of fish that died or shed tags are also given.

Sampling location	Origin	Number captured for tagging	Number tagged	Number that died	Number of shed tags	Total number of tagged fish released
Chiwawa Trap	Subyearling	9,584	8,787	28	4	8,755
	Yearling	9,045	8,429	30	3	8,397
	Total	**18,629**	**17,216**	**58**	**7**	**17,152**
Chiwawa River	Subyearling	51	43	0	0	43
	Yearling	0	0	0	0	0
	Total	**51**	**43**	**0**	**0**	**43**
Upper Wenatchee Trap	Subyearling	0	0	0	0	0
	Yearling	169	160	1	0	159
	Total	**169**	**160**	**1**	**0**	**159**
Nason Creek[a]	Subyearling	4	4	0	0	4
	Yearling	0	0	0	0	0
	Total	**4**	**4**	**0**	**0**	**4**
Upper Wenatchee River	Subyearling	1	1	0	0	1
	Yearling	0	0	0	0	0
	Total	**1**	**1**	**0**	**0**	**4**
Middle Wenatchee	Subyearling	71	66	1	0	65
	Yearling	0	0	0	0	0
	Total	**71**	**66**	**1**	**0**	**65**
Lower Wenatchee	Subyearling	0	0	0	0	0
	Yearling	0	0	0	0	0

Sampling location	Origin	Number captured for tagging	Number tagged	Number that died	Number of shed tags	Total number of tagged fish released
	Total	**0**	**0**	**0**	**0**	**0**
Lower Wenatchee Trap	Subyearling	4	2	0	0	2
	Yearling	607	509	3	0	506
	Total	**611**	**511**	**3**	**0**	**508**
Totals	***Subyearling***	***9,715***	***8,903***	***29***	***4***	***8,870***
	Yearling	***9,821***	***9,098***	***34***	***3***	***9,062***
	Total	***19,536***	***18,001***	***63***	***7***	***17,932***

[a] An additional 1,744 wild subyearling Chinook and 895 wild yearling Chinook were tagged and released by the Yakama Nation at the Nason Creek smolt trap.

Freshwater Productivity

Both productivity and survival estimates for different life stages of spring Chinook in the Chiwawa Basin are provided in Table 5.17. Estimates for brood year 2006 fall within the ranges estimated over the period of brood years 1991-2005. During that period, freshwater productivities ranged from 125-1,015 parr/redd, 169-779 smolts/redd, and 214-834 emigrants/redd. Survivals during the same period ranged from 2.7-19.1% for egg-parr, 3.2-16.8% for egg-smolt, and 4.1-18.0% for egg-emigrants. Overwinter survival rates for juvenile spring Chinook within the Chiwawa Basin have ranged from 15.7-100.0%.

Table 5.17. Productivity (fish/redd) and survival (%) estimates for different juvenile life stages of spring Chinook in the Chiwawa Basin for brood years 1991-2007; ND = no data. These estimates were derived from data in Table 5.14.

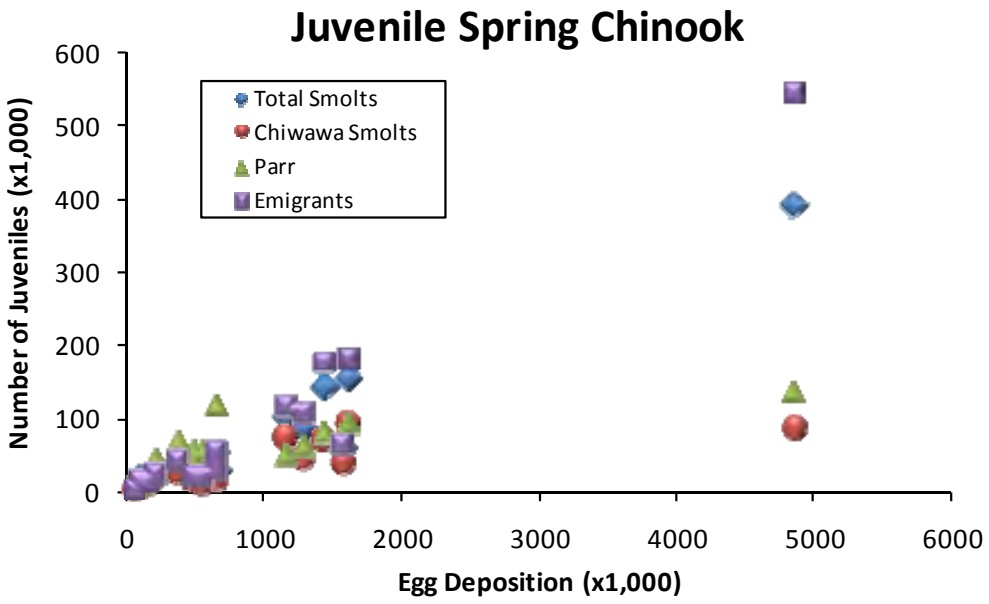
Brood year	Parr/Redd	Smolts/Redd[a]	Emigrants/ Redd	Egg-Parr (%)	Parr-Smolt[b] (%)	Egg-Smolt[a] (%)	Egg-Emigrant (%)
1991	437	409	ND	9.5	93.5	8.9	ND
1992	262	188	217	5.0	50.2	3.6	4.2
1993	519	169	214	9.9	15.7	3.2	4.1
1994	674	270	306	11.4	29.8	4.6	5.2
1995	447	402	458	8.8	65.9	7.9	9.0
1996	699	779	834	15.0	96.3	16.8	18.0
1997	834	476	543	18.3	41.4	10.4	11.9
1998	1,015	609	632	19.1	55.4	11.4	11.9
1999	ND	410	460	ND	ND	8.4	9.4
2000	895	396	435	17.8	35.6	7.9	8.7
2001	125	362	507	2.7	64.1	7.8	11.0
2002	265	442	534	5.7	99.6	9.5	11.5
2003	407	251	303	7.0	37.1	4.3	5.2
2004	206	420	482	4.3	100.0	8.7	10.0
2005	241	424	535	5.6	86.4	9.8	12.4

Brood year	Parr/Redd	Smolts/Redd[a]	Emigrants/ Redd	Egg-Parr (%)	Parr-Smolt[b] (%)	Egg-Smolt[a] (%)	Egg-Emigrant (%)
2006	205	292	364	4.7	74.2	6.7	8.4
2007	291	-	-	6.6	-	-	-
Average	***287***	***359***	***450***	***6.1***	***63.5***	***7.5***	***9.5***

[a] These estimates include Chiwawa smolts produced within the Wenatchee Basin. This assumes that 66% of the subyearling migrants survive to smolt, regardless of the number of subyearling migrants (i.e., no density dependence). Smolt estimates for brood years 1992-1996 were calculated with a mark-recapture model; brood years 1997-present were calculated with a flow model.

[b] These estimates represent overwinter survival within the Chiwawa Basin. It does not include Chiwawa smolts produced outside the Chiwawa Basin. As noted in footnote *a*, smolts/redd and egg-smolt survival include Chiwawa smolts produced in the Wenatchee Basin.

Seeding level (egg deposition) explained most of the variability in productivity and survival of juvenile spring Chinook in the Chiwawa Basin. That is, for estimates based on "within-Chiwawa-Basin" life stages (e.g., parr and within-Chiwawa-Basin smolts), survival and productivity decreased as seeding levels increased (Figure 5.4). This suggests that density dependence regulates juvenile productivity and survival within the Chiwawa Basin. This form of population regulation is less apparent with total smolts (i.e., Chiwawa smolts produced within the Wenatchee Basin) and total emigrants. However, one would expect the number of emigrants to increases as seeding levels exceed the capacity of the Chiwawa Basin.



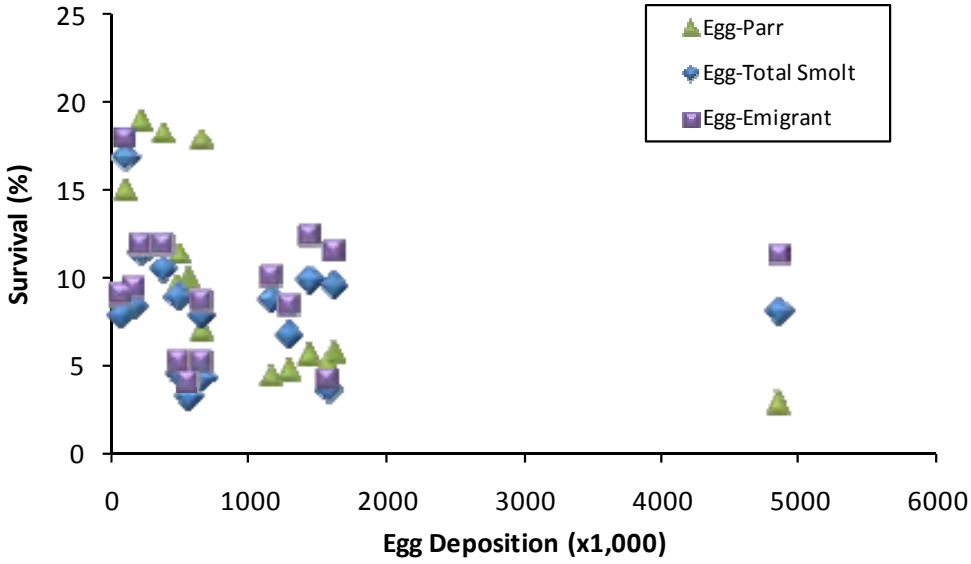


Figure 5.4. Relationships between seeding levels (egg deposition) and juvenile life-stage survivals and productivities for Chiwawa spring Chinook, brood years 1991-2006. Total smolts are Chiwawa smolts produced within and outside the Chiwawa Basin (assumes a 66% survival on subyearling emigrants). Chiwawa smolts are smolts produced only in the Chiwawa Basin.

5.5 Spawning Surveys

Surveys for spring Chinook carcasses were conducted during August through September, 2008, in the Chiwawa River (including Rock, Phelps, Big Meadow, and Chikamin creeks), Nason Creek, Icicle Creek, Peshastin Creek (including Ingalls Creek), Upper Wenatchee River (including Chiwaukum Creek), Little Wenatchee River, and White River (including the Napeequa River and Panther Creek).

Redd Counts

A total of 1,411 spring Chinook redds were counted in the Wenatchee Basin in 2008 (Table 5.18). This is higher than the average of 503 redds counted during the period 1989-2007 in the Wenatchee Basin. Most spawning occurred in the Chiwawa River (49% or 689 redds) (Table 5.18; Figure 5.5). Nason Creek contained 24% (336 redds), Little Wenatchee contained 3% (38 redds), White River contained 2% (31 redds), Icicle contained 8% (116 redds), the Upper Wenatchee River 13% (180 redds), and Peshastin Creek contained 1% (21 redds).

Table 5.18. Numbers of spring Chinook redds counted within different streams/watersheds within the Wenatchee Basin, 1989-2008. Redd counts in Peshastin Creek in 2001 and 2002 (*) were elevated because the U.S. Fish and Wildlife Service planted 487 and 350 spring Chinook adults, respectively, into the stream. These counts were not included in the total or average calculations.

Sample year	Number of spring Chinook redds							
	Chiwawa	Nason	Little Wenatchee	White	Wenatchee River	Icicle	Peshastin	Total
1989	314	98	45	64	94	24	NS	**639**
1990	255	103	30	22	36	50	4	**500**
1991	104	67	18	21	41	40	1	**292**
1992	302	81	35	35	38	37	0	**528**
1993	106	223	61	66	86	53	5	**600**
1994	82	27	7	3	6	15	0	**140**
1995	13	7	0	2	1	9	0	**32**
1996	23	33	3	12	1	12	1	**85**
1997	82	55	8	15	15	33	1	**209**
1998	41	29	8	5	0	11	0	**94**
1999	34	8	3	1	2	6	0	**54**
2000	128	100	9	8	37	68	0	**350**
2001	1,078	374	74	104	218	88	173*	**2,109**
2002	345	294	42	42	64	245	107*	**1,139**
2003	111	83	12	15	24	18	60	**323**
2004	241	169	13	22	46	30	55	**576**
2005	332	193	64	86	143	8	3	**829**
2006	297	152	21	31	27	50	10	**588**
2007	283	101	22	20	12	17	11	**466**
2008	689	336	38	31	180	116	21	**1,411**
Average	***243***	***127***	***26***	***30***	***54***	***47***	***10***	***548***

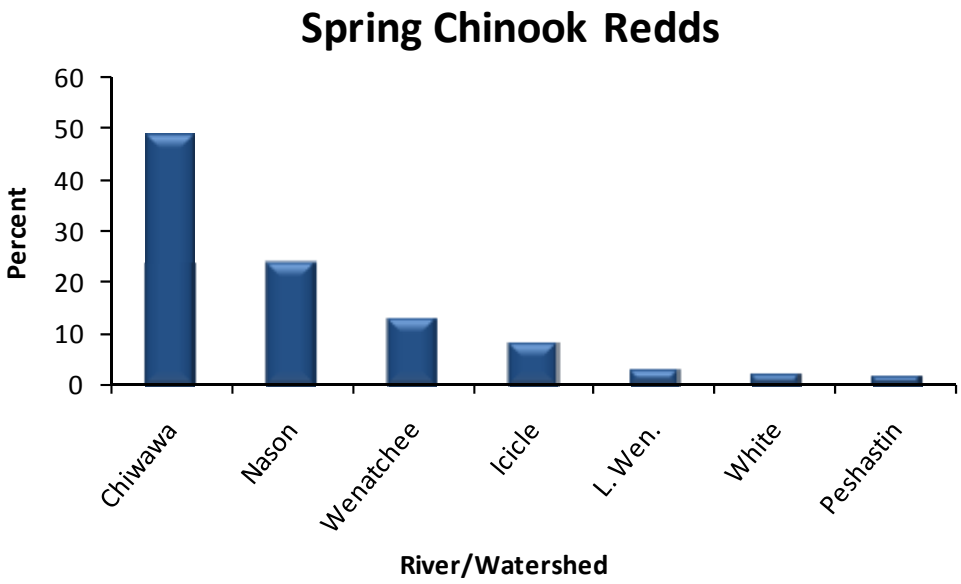


Figure 5.5. Percent of the total number of spring Chinook redds counted in different streams/watersheds within the Wenatchee Basin during August through September, 2008.

Redd Distribution

Spring Chinook redds were not evenly distributed among reaches within survey streams in 2008 (Table 5.19). Most of the spawning in the Chiwawa Basin occurred in Reaches 1, 2, 5, and 6. Over half of all the spawning in the Chiwawa Basin occurred in the lower two reaches (RM 0.0-19.3; from the mouth to Rock Creek). Relatively few fish spawned in Rock, Chikamin, Phelps, and Big Meadow creeks, although it was higher than in other years. The spatial distribution of redds in Nason Creek was weighted towards Reach 1, having 40% of the Nason Creek redds. In the Little Wenatchee River, 68% of all spawning occurred in Reach 3 (RM 5.2-9.2; Lost Creek to Rainy Creek). On the White River, 87% occurred in Reach 3 (RM 11.0-12.9; Napeequa River to Grasshopper Meadows). Seventy two percent of all the spawning in the Wenatchee River occurred upstream from the mouth of the Chiwawa River.

Table 5.19. Numbers and proportions of spring Chinook redds counted within different streams/watersheds within the Wenatchee Basin during August through September, 2008.

Stream/watershed	Reach	Number of redds	Proportion of redds within stream/watershed
Chiwawa	Chiwawa 1	131	0.19
	Chiwawa 2	290	0.42
	Chiwawa 3	12	0.02
	Chiwawa 4	58	0.08
	Chiwawa 5	72	0.10
	Chiwawa 6	79	0.11
	Phelps 1	6	0.01
	Rock 1	19	0.03

Stream/watershed	Reach	Number of redds	Proportion of redds within stream/watershed
	Chikamin 1	18	0.03
	Big Meadow 1	4	0.01
	Total	**689**	**1.00**
Nason	Nason 1	133	0.40
	Nason 2	64	0.19
	Nason 3	85	0.25
	Nason 4	54	0.16
	Total	**336**	**1.00**
Little Wenatchee	Little Wen 2	12	0.32
	Little Wen 3	26	0.68
	Total	**38**	**1.00**
White	White 2	2	0.065
	White 3	27	0.87
	Napeequa 1	0	0.00
	Panther 1	2	0.065
	Total	**31**	**1.00**
Wenatchee River	Wen 8	7	0.04
	Wen 9	32	0.18
	Wen 10	130	0.72
	Chiwaukum 1	11	0.06
	Total	**180**	**1.00**
Icicle	Icicle 1	116	1.00
	Total	**116**	**1.00**
Peshastin	Peshastin 1	13	0.62
	Peshastin 2	0	0.00
	Ingalls	8	0.38
	Total	**21**	**1.00**
Grand Total		***1,411***	***1.00***

Spawn Timing

Spring Chinook began spawning during the first week of August in the Chiwawa River, White River, and Nason Creek, the second week in the Little Wenatchee River, and the third week in the Upper Wenatchee River (Figure 5.6). Spawning generally peaked the fourth or fifth week of August. All spawning was completed by the end of September.

The temporal distribution of spawning activity in the Chiwawa River in 2008 occurred slightly earlier compared to the 17-year mean spawning distribution (Figure 5.7). The greatest difference in distributions was noted in early August.

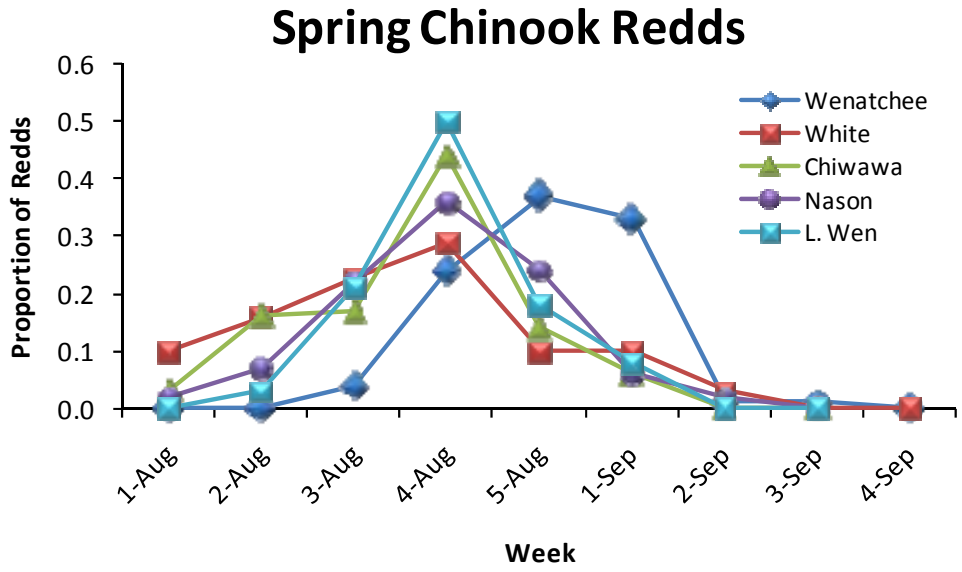


Figure 5.6. Proportion of spring Chinook redds counted during different weeks in different sampling streams within the Wenatchee Basin, August through September 2008.

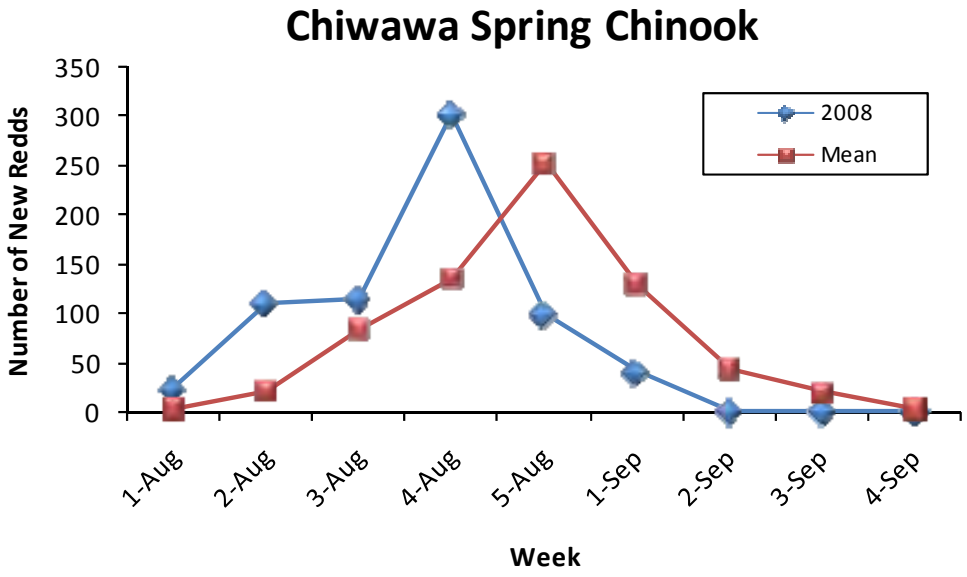


Figure 5.7. Comparison of the number of new spring Chinook redds counted during different weeks in the Chiwawa Basin, August through September, 2008, to the 17-year average.

Spawning Escapement

Spawning escapement for spring Chinook was calculated as the number of redds times the male-to-female ratio (i.e., fish per redd expansion factor) estimated from broodstock and fish sampled at

adult trapping sites. The estimated fish per redd ratio for spring Chinook upstream from Tumwater in 2008 was 1.68 (based on sex ratios estimated at Tumwater Dam). The estimated fish per redd ratio for spring Chinook downstream from Tumwater (Icicle and Peshastin creeks) was 1.77 (derived from broodstock collected at the Leavenworth National Fish Hatchery). Multiplying these ratios by the number of redds counted in the Wenatchee Basin resulted in a total spawning escapement of 2,383 spring Chinook (Table 5.20). The Chiwawa Basin had the highest spawning escapement (1,158 Chinook), while Peshastin Creek had the lowest.

Table 5.20. Number of redds, fish per redd ratios, and total spawning escapement for spring Chinook in the Wenatchee Basin, 2008. Spawning escapement was estimated as the product of redds times fish per redd.

Sampling area	Total number of redds	Fish/redd	Total spawning escapement
Chiwawa	689	1.68	1,158
Nason	336	1.68	565
Upper Wenatchee River	180	1.68	302
Icicle	116	1.77	205
Little Wenatchee	38	1.68	64
White	31	1.68	52
Peshastin	21	1.77	37
Total	***1,411***	**-**	***2,383***

The estimated total spawning escapement of 2,383 spring Chinook in 2008 was greater than the 1989-2007 average of 1,178 spring Chinook (Table 5.21). The large escapement in the Chiwawa Basin in 2008 was over twice the escapement in Nason Creek, the second most abundant stream in the Wenatchee Basin (Table 5.21).

Table 5.21. Spawning escapements for spring Chinook in the Wenatchee Basin for return years 1989-2008; NA = not available.

Return year	Upper basin spawning escapement						Lower basin spawning escapement			Total
	Fish/redd	Chiwawa	Nason	Little Wenatchee	White	Wenatchee River	Fish/redd	Icicle	Peshastin	
1989	2.27	713	222	102	145	213	2.27	54	NA	**1,449**
1990	2.24	571	231	67	49	81	2.24	112	9	**1,120**
1991	2.33	242	156	42	49	96	2.33	93	2	**680**
1992	2.24	676	181	78	78	85	2.24	83	0	**1,181**
1993	2.20	233	491	134	145	189	2.20	117	11	**1,320**
1994	2.24	184	60	16	7	13	2.24	34	0	**314**
1995	2.51	33	18	0	5	3	2.51	23	0	**82**
1996	2.53	58	83	8	30	3	2.53	30	3	**215**
1997	2.22	182	122	18	33	33	2.22	73	2	**463**
1998	2.21	91	64	18	11	0	2.21	24	0	**208**
1999	2.77	94	22	8	3	6	2.77	17	0	**150**
2000	2.44	312	244	22	20	90	2.44	166	0	**854**
2001	2.31	2,490	864	171	240	504	2.31	203	400	**4,872**
2002	2.05	707	603	86	86	131	2.05	502	219	**2,334**

Return year	Upper basin spawning escapement						Lower basin spawning escapement			Total
	Fish/redd	Chiwawa	Nason	Little Wenatchee	White	Wenatchee River	Fish/redd	Icicle	Peshastin	
2003	2.43	270	202	29	36	58	2.43	44	146	**785**
2004a	3.56/3.00	858	507	39	66	138	1.79	54	98	**1,759**
2005	1.80	598	347	115	155	257	1.75	14	5	**1,491**
2006	1.78	529	271	37	55	48	1.80	90	18	**1,048**
2007	4.58	1,296	463	101	92	55	1.86	32	20	**2,059**
2008	1.68	1,158	565	64	52	302	1.77	205	37	**2,383**
Average	***2.36***	***565***	***286***	***58***	***68***	***115***	***2.20***	***99***	***51***	***1,238***

[a] In 2004 the fish/redd expansion estimate of 3.56 was applied to the Chiwawa River only and 3.00 fish/redd for the rest of the upper basin.

5.6 Carcass Surveys

Surveys for spring Chinook carcasses were conducted during August through September, 2008, in the Chiwawa River (including Rock, Phelps, Big Meadow, and Chikamin creeks), Nason Creek, Icicle Creek, Peshastin Creek (including Ingalls Creek), Upper Wenatchee River (including Chiwaukum Creek), Little Wenatchee River, and White River (including the Napeequa River and Panther Creek).

Number sampled

A total of 838 spring Chinook carcasses were sampled during August through September in the Wenatchee Basin (Table 5.22). Most were sampled in the Chiwawa Basin (46% or 386 carcasses) and Nason Creek (29% or 243 carcasses) (Figure 5.8). A total of 108 carcasses were sampled in the upper Wenatchee River, 15 in the Little Wenatchee, 68 in Icicle, 13 in the White River, and 5 in Peshastin Creek.

Table 5.22. Numbers of spring Chinook carcasses sampled within different streams/watersheds within the Wenatchee Basin, 1996-2008.

Survey year	Number of spring Chinook carcasses							
	Chiwawa	Nason	Little Wenatchee	White	Wenatchee River	Icicle	Peshastin	Total
1996	22	3	0	2	0	1	0	**28**
1997	13	42	3	8	1	28	1	**96**
1998	24	25	3	2	1	6	0	**61**
1999	15	5	0	0	2	1	0	**23**
2000	122	110	8	1	37	52	0	**330**
2001	751	388	68	74	213	163	63	**1,720**
2002	190	292	30	24	34	91	49	**710**
2003	70	100	8	8	12	37	42	**277**
2004	178	186	1	13	29	16	40	**463**
2005	391	217	48	52	120	2	0	**830**

Survey year	Number of spring Chinook carcasses							
	Chiwawa	Nason	Little Wenatchee	White	Wenatchee River	Icicle	Peshastin	Total
2006	241	190	13	25	15	7	0	**491**
2007	250	201	16	13	25	15	6	**526**
2008	386	243	15	13	108	68	5	**838**
Average	***204***	***154***	***16***	***18***	***46***	***37***	***16***	***492***

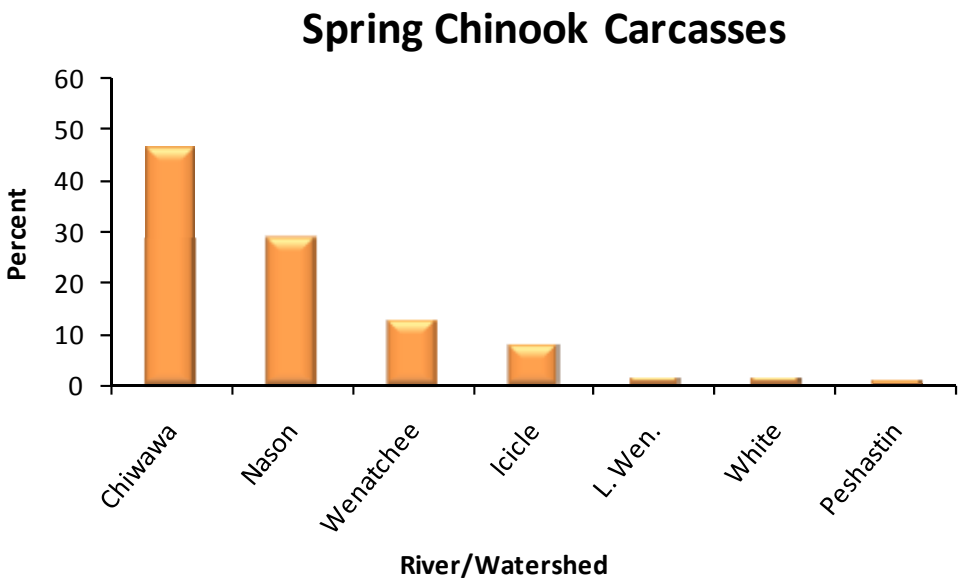


Figure 5.8. Percent of the total number of spring Chinook carcasses sampled in different streams/watersheds within the Wenatchee Basin during August through September, 2008.

Carcass Distribution and Origin

Spring Chinook carcasses were not evenly distributed among reaches within survey streams in 2008 (Table 5.23). Most of the carcasses in the Chiwawa Basin occurred in Reaches 1 and 2 (downstream from Rock Creek). In Nason Creek, most carcasses (48%) were collected in Reach 1 and the fewest (10%) in Reach 4. Most of the carcasses in the little Wenatchee River (60%) were sampled in Reach 3 (Lost Creek to Rainy Creek). On the White River, about 62% occurred in Reach 3 (Napeequa River to Grasshopper Meadows). Most of the carcasses sampled in the Wenatchee River were found upstream from the mouth of the Chiwawa River.

Table 5.23. Numbers and proportions of carcasses sampled within different streams/watersheds within the Wenatchee Basin during August through September, 2008.

Stream/watershed	Reach	Number of carcasses	Proportion of redds within stream/watershed
Chiwawa	Chiwawa 1	179	0.46
	Chiwawa 2	145	0.38
	Chiwawa 3	2	0.01
	Chiwawa 4	13	0.03
	Chiwawa 5	19	0.05
	Chiwawa 6	23	0.06
	Phelps 1	0	0.00
	Rock 1	1	0.00
	Chikamin 1	4	0.01
	Big Meadow 1	0	0.00
	Total	**386**	**1.00**
Nason	Nason 1	116	0.48
	Nason 2	52	0.21
	Nason 3	52	0.21
	Nason 4	23	0.10
	Total	**243**	**1.00**
Little Wenatchee	Little Wen 2	6	0.40
	Little Wen 3	9	0.60
	Total	**15**	**1.00**
White	White 2	3	0.23
	White 3	8	0.62
	Napeequa 1	0	0.00
	Panther 1	2	0.15
	Total	**13**	**1.00**
Wenatchee River	Wen 8	1	0.01
	Wen 9	24	0.22
	Wen 10	73	0.68
	Chiwaukum 1	10	0.09
	Total	**108**	**1.00**
Icicle	Icicle 1	50	0.73
	Icicle 2	18	0.27
	Total	**68**	**1.00**
Peshastin	Peshastin 1	3	0.60
	Ingalls	2	0.40
	Total	**5**	**1.00**
Grand Total		***838***	***1.00***

Of the 838 carcasses sampled in 2008, 87% were hatchery fish (Table 5.24; these numbers may change after analysis of CWTs and scales). In the Chiwawa Basin, the spatial distribution of hatchery and wild fish was not equal (Table 5.24). A larger percentage of hatchery fish were found in the lower reaches (C1 and C2; Mouth to Rock Creek) than were wild fish. This general trend was also apparent in the pooled data (Figure 5.9). As of now, one carcass (not included in Table 5.24) is of unknown origin.

Table 5.24. Numbers of wild and hatchery spring Chinook carcasses sampled within different reaches in the Chiwawa Basin, 1993-2008. See Table 2.8 for description of survey reaches.

Survey year	Origin	Survey Reach								Total
		C-1	C-2	C-3	C-4	C-5	C-6	Chikamin	Rock	
1993	Wild	0	0	0	0	0	0	0	0	**0**
	Hatchery	1	0	0	0	0	0	0	0	**1**
1994	Wild	0	6	0	2	0	1	0	0	**9**
	Hatchery	1	1	0	2	0	0	0	0	**4**
1995	Wild	0	0	0	0	0	0	0	0	**0**
	Hatchery	2	3	0	1	0	0	0	0	**6**
1996	Wild	11	1	1	1	0	0	0	0	**14**
	Hatchery	6	0	0	0	0	0	0	0	**6**
1997	Wild	5	2	0	1	0	0	0	0	**8**
	Hatchery	3	1	0	0	0	1	1	3	**9**
1998	Wild	0	3	5	1	2	4	0	0	**15**
	Hatchery	1	3	2	0	1	1	0	0	**8**
1999	Wild	1	8	0	5	0	0	0	0	**14**
	Hatchery	0	0	0	0	1	0	0	0	**1**
2000	Wild	25	27	1	1	1	1	0	0	**56**
	Hatchery	42	12	0	0	0	2	0	0	**56**
2001	Wild	24	57	15	40	16	20	1	3	**176**
	Hatchery	164	284	19	58	14	21	8	0	**568**
2002	Wild	15	11	9	6	7	5	2	0	**55**
	Hatchery	46	40	12	5	1	15	14	4	**137**
2003	Wild	7	13	0	11	3	2	0	0	**36**
	Hatchery	14	14	0	3	1	0	0	0	**32**
2004	Wild	23	48	2	11	7	3	0	1	**95**
	Hatchery	46	21	1	1	1	3	0	2	**75**
2005	Wild	16	36	3	4	3	2	0	0	**64**
	Hatchery	170	132	7	7	4	3	0	1	**324**
2006	Wild	10	17	2	8	4	3	1	0	**45**
	Hatchery	84	75	5	7	6	13	3	3	**196**
2007	Wild	3	20	3	4	4	2	0	0	**36**
	Hatchery	42	113	15	14	16	12	2	0	**214**
2008	Wild	4	24	0	5	4	8	0	0	**45**

Survey year	Origin	Survey Reach								Total
		C-1	C-2	C-3	C-4	C-5	C-6	Chikamin	Rock	
	Hatchery	174	121	2	8	15	15	4	1	**340**
Average	***Wild***	***9***	***17***	***3***	***6***	***3***	***3***	***0***	***0***	***42***
	Hatchery	***50***	***51***	***4***	***7***	***4***	***5***	***2***	***1***	***124***

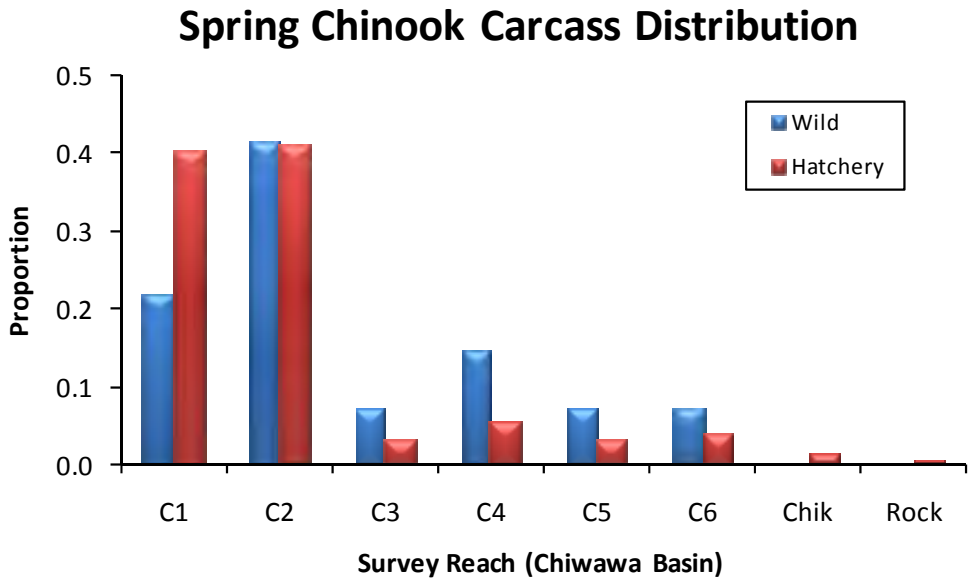


Figure 5.9. Distribution of wild and hatchery produced carcasses in different reaches in the Chiwawa Basin, 1993-2008; Chik = Chikamin Creek and Rock = Rock Creek. Reach codes are described in Table 2.8.

Sampling Rate

Overall, 35% of the estimated total spawning escapement of spring Chinook in the Wenatchee Basin was sampled in 2008 (Table 5.25). Sampling rates among streams/watershed varied from 14 to 43%.

Table 5.25. Number of redds and carcasses, total spawning escapement, and sampling rates for spring Chinook salmon in the Wenatchee Basin, 2008.

Sampling area	Total number of redds	Total number of carcasses	Total spawning escapement	Sampling rate
Chiwawa	689	386	1,158	0.33
Nason	336	243	565	0.43
Upper Wenatchee	180	108	302	0.36
Icicle	116	68	205	0.33
Little Wenatchee	38	15	64	0.23
White	31	13	52	0.25
Peshastin	21	5	37	0.14
Total	***1,411***	***838***	***2,383***	***0.35***

Length Data

Mean lengths (POH, cm) of male and female spring Chinook carcasses sampled during surveys in the Wenatchee Basin in 2008 are provided in Table 5.26. The average sizes of males and females sampled in the Wenatchee Basin were 60 and 63 cm, respectively.

Table 5.26. Mean lengths (postorbital-to-hypural length; cm) and standard deviations (in parentheses) of male and female spring Chinook carcasses sampled in different streams/watersheds in the Wenatchee Basin, 2008.

Stream/watershed	Mean lengths (cm)	
	Male	Female
Chiwawa	61 (11)	64 (4)
Nason	58 (9)	63 (4)
Upper Wenatchee	62 (12)	63 (5)
Icicle	62 (9)	60 (6)
Little Wenatchee	0 (-)	61 (4)
White	59 (4)	63 (6)
Peshastin	0 (-)	66 (5)
Total	***60 (10)***	***63 (4)***

5.7 Life History Monitoring

Life history characteristics of spring Chinook were assessed by examining carcasses on spawning grounds and fish collected at broodstock collection sites, and by reviewing tagging data and fisheries statistics.

Migration Timing

There was little difference in migration timing of hatchery and wild spring Chinook past Tumwater Dam (Table 5.27a and b; Figure 5.10). On average, early in the migration, hatchery Chinook arrived at Tumwater Dam slightly earlier than hatchery fish, but by the end of the migration, both arrived at about the same time. Most hatchery and wild spring Chinook migrated upstream past Tumwater Dam during June and July (Figure 5.10).

Table 5.27a. The Julian day and date that 10%, 50% (median), and 90% of the wild and hatchery spring Chinook salmon passed Tumwater Dam, 1998-2008. The average Julian day and date are also provided. Migration timing is based on video sampling at Tumwater. Data for 1998 through 2003 were based on videotapes and broodstock trapping and may not reflect the actual number of hatchery spring Chinook. All spring Chinook were visually examined during trapping from 2004 to present.

Survey year	Origin	Spring Chinook Migration Time (days)								Sample size
		10 Percentile		50 Percentile		90 Percentile		Mean		
		Julian	Date	Julian	Date	Julian	Date	Julian	Date	
1998	Wild	156	5-Jun	156	5-Jun	156	5-Jun	156	5-Jun	49
	Hatchery	156	5-Jun	156	5-Jun	156	5-Jun	156	5-Jun	25

Survey year	Origin	Spring Chinook Migration Time (days)								Sample size
		10 Percentile		50 Percentile		90 Percentile		Mean		
		Julian	Date	Julian	Date	Julian	Date	Julian	Date	
1999	Wild	192	11-Jul	207	26-Jul	224	12-Aug	207	26-Jul	173
	Hatchery	200	19-Jul	211	30-Jul	229	18-Aug	213	1-Aug	25
2000	Wild	171	19-Jun	186	4-Jul	194	12-Jul	184	2-Jul	651
	Hatchery	179	27-Jun	189	7-Jul	201	19-Jul	190	8-Jul	357
2001	Wild	154	3-Jun	166	15-Jun	185	4-Jul	167	16-Jun	2,073
	Hatchery	157	6-Jun	169	18-Jun	185	4-Jul	170	19-Jun	4,244
2002	Wild	174	23-Jun	189	8-Jul	204	23-Jul	189	8-Jul	1,033
	Hatchery	178	27-Jun	189	8-Jul	199	18-Jul	189	8-Jul	1,363
2003	Wild	162	11-Jun	181	30-Jun	200	19-Jul	181	30-Jun	919
	Hatchery	157	6-Jun	179	28-Jun	192	11-Jul	178	27-Jun	423
2004	Wild	156	4-Jun	172	20-Jun	189	7-Jul	172	20-Jun	969
	Hatchery	161	9-Jun	177	25-Jun	189	7-Jul	177	25-Jun	1,295
2005	Wild	153	2-Jun	172	21-Jun	193	12-Jul	173	22-Jun	1,038
	Hatchery	153	2-Jun	173	22-Jun	187	6-Jul	172	21-Jun	2,808
2006	Wild	177	26-Jun	184	3-Jul	193	12-Jul	185	7-Jul	577
	Hatchery	178	27-Jun	185	4-Jul	194	13-Jul	186	5-Jul	1,601
2007	Wild	169	18-Jun	185	4-Jul	203	22-Jul	185	4-Jul	351
	Hatchery	174	23-Jun	192	11-Jul	209	28-Jul	192	11-Jul	3,232
2008	Wild	173	21-Jun	188	6-Jul	209	27-Jul	189	7-Jul	634
	Hatchery	177	25-Jun	193	11-Jul	210	28-Jul	193	11-Jul	5,368
Average	Wild	***167***	-	***181***	-	***195***	-	***181***	-	***783***
	Hatchery	***170***	-	***183***	-	***196***	-	***183***	-	***1,537***

Table 5.27b. The week that 10%, 50% (median), and 90% of the wild and hatchery spring Chinook salmon passed Tumwater Dam, 1998-2008. The average week is also provided. Migration timing is based on video sampling at Tumwater. Data for 1998 through 2003 were based on videotapes and broodstock trapping and may not reflect the actual number of hatchery spring Chinook. All spring Chinook were visually examined during trapping from 2004 to present.

Survey year	Origin	Spring Chinook Migration Time (week)				Sample size
		10 Percentile	50 Percentile	90 Percentile	Mean	
1998	Wild	23	23	23	23	49
	Hatchery	23	23	23	23	25
1999	Wild	28	30	32	30	173
	Hatchery	29	31	34	31	25
2000	Wild	24	27	27	27	651
	Hatchery	26	27	29	28	357
2001	Wild	22	24	27	24	2,073

Survey year	Origin	Spring Chinook Migration Time (week)				Sample size
		10 Percentile	50 Percentile	90 Percentile	Mean	
	Hatchery	23	25	27	25	4,244
2002	Wild	25	27	30	27	1,033
	Hatchery	26	27	29	27	1,363
2003	Wild	24	26	29	26	919
	Hatchery	23	26	28	26	423
2004	Wild	23	25	27	25	969
	Hatchery	23	26	27	26	1,295
2005	Wild	22	25	28	25	1,038
	Hatchery	22	25	27	25	2,808
2006	Wild	26	27	28	27	577
	Hatchery	26	27	28	27	1,601
2007	Wild	25	27	29	27	351
	Hatchery	25	28	30	28	3,232
2008	Wild	25	27	30	27	634
	Hatchery	26	28	30	28	5,368
Average	Wild	***24***	***26***	***28***	***26***	***783***
	Hatchery	***25***	***27***	***28***	***27***	***1,537***

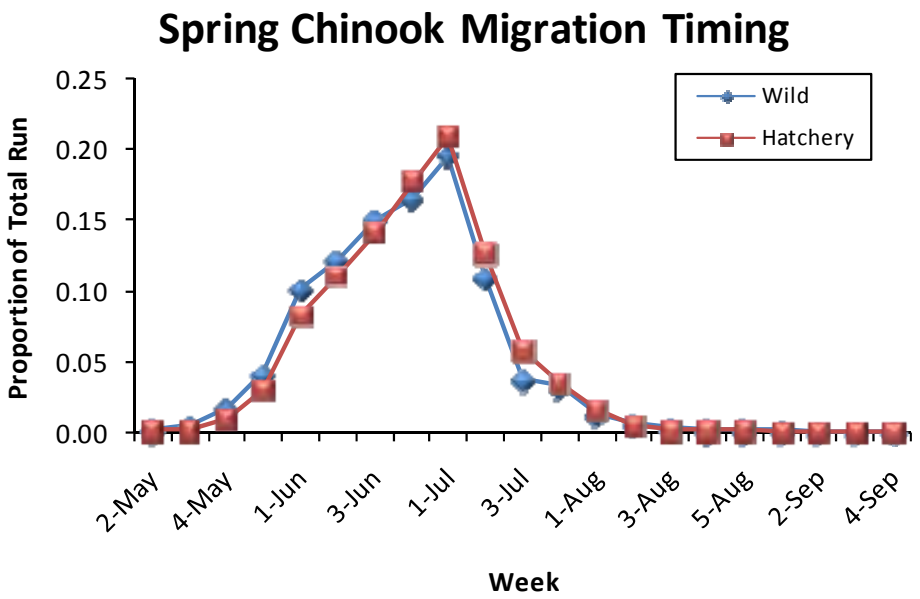


Figure 5.10. Proportion of wild and hatchery spring Chinook observed (using video) passing Tumwater Dam each week during their migration period May through September; data were pooled over survey years 1998-2008.

Age at Maturity

Most of the wild and hatchery spring Chinook sampled during the period 1994-2008 in the Chiwawa Basin were age-4 fish (total age) (Table 5.28; Figure 5.11). On average, hatchery fish made up a higher percentage of age-3 and 4 Chinook than did wild fish. In contrast, a higher proportion of age-5 wild fish returned than did age-5 hatchery fish. Thus, wild fish tended to return at an older age than hatchery fish.

Table 5.28. Proportions of wild and hatchery spring Chinook of different ages (total age) sampled on spawning grounds in the Chiwawa Basin, 1994-2008.

Sample year	Origin	Total age					Sample size
		2	3	4	5	6	
1994	Wild	0.00	0.00	0.33	0.67	0.00	9
	Hatchery	0.00	0.20	0.00	0.80	0.00	5
1995	Wild	0.00	0.00	0.00	0.00	0.00	0
	Hatchery	0.00	0.00	1.00	0.00	0.00	2
1996	Wild	0.00	0.36	0.64	0.00	0.00	14
	Hatchery	0.00	0.83	0.17	0.00	0.00	6
1997	Wild	0.00	0.00	0.75	0.25	0.00	8
	Hatchery	0.00	0.00	1.00	0.00	0.00	9
1998	Wild	0.00	0.00	0.00	1.00	0.00	15
	Hatchery	0.00	0.00	0.13	0.88	0.00	8
1999	Wild	0.00	0.07	0.50	0.43	0.00	14
	Hatchery	0.00	0.00	0.00	1.00	0.00	1
2000	Wild	0.00	0.02	0.95	0.03	0.00	56
	Hatchery	0.00	0.50	0.50	0.00	0.00	52
2001	Wild	0.00	0.01	0.95	0.04	0.00	176
	Hatchery	0.00	0.02	0.98	0.00	0.00	571
2002	Wild	0.00	0.00	0.56	0.44	0.00	55
	Hatchery	0.00	0.00	0.91	0.09	0.00	128
2003	Wild	0.00	0.09	0.00	0.91	0.00	36
	Hatchery	0.00	0.19	0.03	0.78	0.00	32
2004[a]	Wild	0.00	0.02	0.97	0.01	0.00	124
	Hatchery	0.00	0.43	0.57	0.00	0.00	80
2005[a]	Wild	0.00	0.00	0.85	0.15	0.00	111
	Hatchery	0.00	0.07	0.93	0.00	0.00	656
2006[a]	Wild	0.01	0.03	0.56	0.40	0.00	86
	Hatchery	0.00	0.16	0.72	0.12	0.00	451
2007[a]	Wild	0.00	0.09	0.26	0.65	0.00	54
	Hatchery	0.00	0.32	0.61	0.07	0.00	304
2008[a]	Wild	0.02	0.02	0.80	0.16	0.00	44
	Hatchery	0.00	0.07	0.89	0.04	0.00	339

Sample year	Origin	Total age					Sample size
		2	3	4	5	6	
Average	*Wild*	*0.00*	*0.03*	*0.73*	*0.24*	*0.00*	*53*
	Hatchery	*0.00*	*0.12*	*0.83*	*0.05*	*0.00*	*176*

[a] These years include carcass and live fish PIT-tag detection data (fish that were sampled both as carcasses and detected as live fish on the spawning grounds were not counted twice). Also origin assignments have been made to fish that were previously identified as fish of unknown origin.

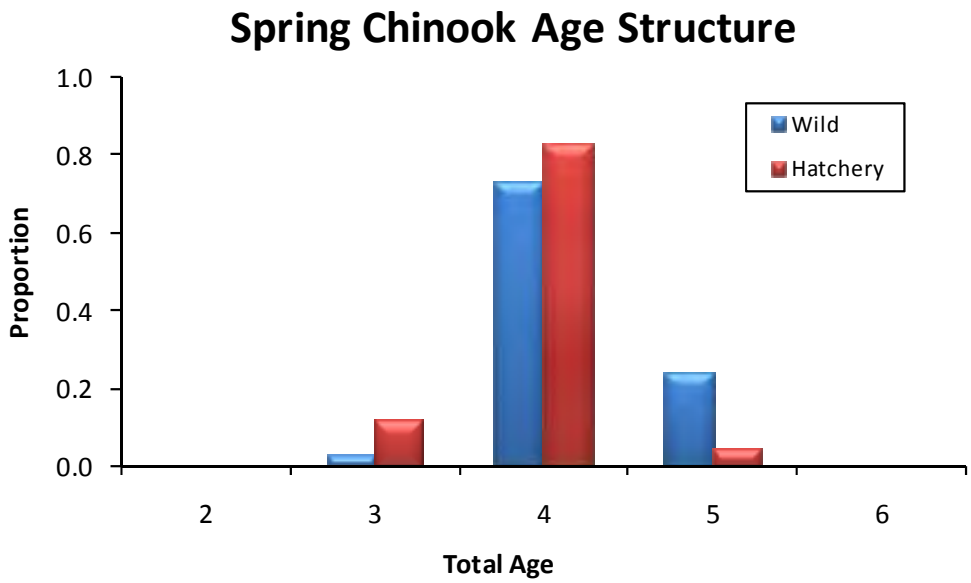


Figure 5.11. Proportions of wild and hatchery spring Chinook of different total ages sampled at the Chiwawa Weir and on spawning grounds in the Chiwawa Basin for the combined years 1994-2008.

Size at Maturity

On average, hatchery and wild spring Chinook of a given age differed slightly in length (Table 5.29). For example, wild age-5 fish were larger on average than the age-5 hatchery fish. In contrast, hatchery age-3 and 4 Chinook were generally larger than age-3 and 4 wild fish.

Table 5.29. Mean lengths (POH in cm; ±1SD) and sample sizes (in parentheses) of different ages (total age) of male and female spring Chinook of wild and hatchery origin sampled in the Chiwawa Basin, 1994-2008. Brood years 2004-2007 include carcasses and live fish PIT-tag detections. In addition, 2005 and 2006 include fish released at the weir.

Brood year	Total age	Mean length (cm)			
		Male		Female	
		Wild	Hatchery	Wild	Hatchery
1994	3				43 ±0 (1)
	4			62 ±3 (3)	
	5	76 ±0 (1)		73 ±2 (5)	
	6				

Brood year	Total age	Mean length (cm)			
		Male		Female	
		Wild	Hatchery	Wild	Hatchery
1995	3				
	4		61 ±5 (5)		
	5				
	6				
1996	3	45 ±3 (5)	49 ±7 (10)		
	4	69 ±4 (6)	69 ±0 (1)	67 ±8 (2)	
	5				
	6				
1997	3				
	4	61 ±1 (2)	68 ±0 (1)	67 ±5 (3)	63 ±3 (8)
	5	67 ±5 (2)			
	6				
1998	3				
	4				54 ±0 (1)
	5	77 ±7 (8)	75 ±4 (4)	74 ±4 (7)	76 ±4 (3)
	6				
1999	3	44 ±0 (1)			
	4	61 ±0 (1)		64 ±3 (6)	
	5	76 ±5 (3)		72 ±5 (3)	66 ±0 (1)
	6				
2000	3		46 ±3 (17)		50 ±7 (3)
	4	60 ±8 (23)	62 ±5 (5)	61 ±5 (26)	62 ±3 (20)
	5	77 ±1 (2)			
	6				
2001	3	37 ±0 (1)	42 ±4 (11)	41 ±0 (1)	60 ±0 (1)
	4	63 ±5 (57)	65 ±5 (151)	62 ±4 (110)	63 ±4 (407)
	5	75 ±5 (2)	83 ±0 (1)	76 ±1 (5)	
	6				
2002	3				
	4	64 ±4 (14)	66 ±5 (46)	60 ±4 (15)	63 ±4 (71)
	5	80 ±6 (13)	75 ±5 (4)	72 ±3 (12)	73 ±6 (6)
	6				
2003	3	45 ±2 (3)	45 ±1 (6)		
	4		63 ±0 (1)		
	5	78 ±5 (12)	74 ±8 (11)	75 ±3 (19)	72 ±5 (14)
	6				
2004	3	42 ±3 (3)	44 ±5 (33)		
	4	63 ±7 (60)	66 ±5 (9)	63 ±4 (59)	63 ±6 (36)
	5			74 ±0 (1)	
	6				

Brood year	Total age	Mean length (cm)			
		Male		Female	
		Wild	Hatchery	Wild	Hatchery
2005	3		43 ±5 (48)		
	4	61 ±5 (32)	65 ±5 (224)	62 ±4 (61)	62 ±4 (382)
	5	74 ±5 (6)	54±0 (1)	71 ±3 (11)	
	6				
2006	3	45 ±3 (3)	43 ±3 (73)		
	4	64 ±3 (7)	62 ±6 (91)	63 ±5 (41)	60 ±4 (227)
	5	74 ±6 (8)	75 ±6 (17)	71 ±4 (26)	71± 4 (37)
	6				
2007	3	39 ±3 (5)	45 ±6 (90)		50 ±3 (7)
	4	60 ±4 (4)	66 ±5 (45)	61 ±4 (10)	63 ±3 (142)
	5	78 ±6 (15)	76 ±5 (8)	74 ±3 (20)	73 ±5 (12)
	6				
2008	3	43 ±0 (1)	44 ±5 (22)		
	4	65 ±4 (9)	64 ±6 (73)	62 ±4 (26)	64 ±4 (229)
	5	65 ±5 (3)	79 ±5 (10)	73 ±3 (4)	72 ±3 (5)
	6				

Contribution to Fisheries

Nearly all the harvest on Chiwawa spring Chinook occurs within the Columbia Basin. Ocean catch records (Pacific Fishery Management Council) indicate that virtually no Upper Columbia spring Chinook are taken in ocean fisheries. Most of the harvest on Chiwawa spring Chinook occurs in the Lower Columbia River fisheries, which are managed by the states and tribes pursuant to management plans developed in *U.S. v Oregon*. The Lower Columbia River fisheries occur during what is referred to in *U.S. v Oregon* as the winter, spring, and summer seasons, which begin in February and ends July 31 of each year. The treaty fishery occurs exclusively in Zone 6, the area between Bonneville and McNary dams; the non-treaty commercial fisheries occur in Zones 1-5, which are downstream from Bonneville Dam. The non-treaty recreational (sport) fishery occurs in the lower mainstem.

The total number of spring Chinook captured in different fisheries has been relatively low (Table 5.30). Relatively larger numbers of spring Chinook were taken from the 1997 and 1998 brood years because those years produced large escapements.

Table 5.30. Estimated number and percent (in parentheses) of Chiwawa spring Chinook captured in different fisheries; NA = not available.

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational[a] (sport)	
1989	3 (13)	5 (21)	0 (0)	16 (67)	24
1990	0 (0)	0 (0)	0 (0)	18 (100)	18

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational[a] (sport)	
1991	0 (0)	3 (100)	0 (0)	0 (0)	3
1992	0 (0)	1 (100)	0 (0)	0 (0)	1
1993	3 (75)	1 (25)	0 (0)	0 (0)	4
1994	0 (0)	0 (0)	0 (0)	0 (0)	0
1995	NA	NA	NA	NA	NA
1996	0 (0)	2 (100)	0 (0)	0 (0)	2
1997	1 (0)	1 (0)	260 (69)	115 (31)	377
1998	9 (5)	7 (4)	52 (27)	126 (65)	194
1999	NA	NA	NA	NA	NA
2000	0 (0)	0 (0)	17 (74)	6 (26)	23
2001	17 (50)	0 (0)	9 (26)	8 (24)	34
2002	8 (12)	1 (1)	33 (49)	26 (38)	68

[a] Includes the Wanapum fishery.

Straying

Stray rates were determined by examining CWTs recovered on spawning grounds within and outside the Wenatchee Basin. Targets for strays based on return year (recovery year) within the Wenatchee Basin should be less than 10% and targets for strays outside the Wenatchee Basin should be less than 5%. The target for brood year stray rates should be less than 5%.

Rates of Chiwawa spring Chinook straying into non-target spawning areas within the Wenatchee Basin have been high in some years and exceeded the target of 10% (Table 5.31). They have strayed into spawning areas on Nason Creek, the White River, the Little Wenatchee River, and the Upper Wenatchee River. On average, stray rates are typically highest in Nason Creek and the Upper Wenatchee River. Stray rates of Chiwawa spring Chinook should decrease with the change in source water that was implemented in 2006-2007 for the Chiwawa rearing ponds.

Table 5.31. Number and percent of spawning escapement in other non-target spawning streams within the Wenatchee Basin that consisted of Chiwawa spring Chinook, return years 1992-2006. For example, for return year 2001, 24.4% of the spring Chinook spawning escapement in Nason Creek consisted of Chiwawa spring Chinook. Percent strays should be less than 10%.

Return year	Nason Creek		Icicle Creek		Upper Wenatchee		White River		Little Wenatchee	
	Number	%	Number	%	Number	%	Number	%	Number	%
1992	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
1993	61	12.4	0	0.0	34	18.0	7	4.8	0	0.0
1994	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
1995	0	0.0	0	0.0	2	66.7	0	0.0	0	0.0
1996	25	30.1	0	0.0	0	0.0	0	0.0	0	0.0
1997	55	45.1	8	11.0	0	0.0	0	0.0	0	0.0
1998	3	4.7	0	0.0	0	0.0	0	0.0	0	0.0

Return year	Nason Creek		Icicle Creek		Upper Wenatchee		White River		Little Wenatchee	
	Number	%	Number	%	Number	%	Number	%	Number	%
1999	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
2000	45	18.4	0	0.0	31	34.4	0	0.0	6	27.3
2001	211	24.4	0	0.0	271	53.8	46	19.2	52	30.4
2002	188	31.2	10	2.0	60	45.8	14	16.3	21	24.4
2003	14	6.9	0	0.0	30	51.7	0	0.0	0	0.0
2004	139	27.4	0	0.0	54	39.1	1	1.5	0	0.0
2005	252	72.6	7	50.0	256	99.6	106	68.4	65	56.5
2006	131	48.3	13	14.4	28	58.3	9	16.4	12	32.4
Total	***1,124***	***27.6***	***38***	***2.6***	***766***	***49.2***	***183***	***18.9***	***156***	***20.0***

Rates of Chiwawa spring Chinook straying into basins outside the Wenatchee have been low (Table 5.32). Chiwawa spring Chinook have strayed into the Methow and Entiat basins. During return year 2002, their stray rate exceeded the target of 0.05 in the Entiat Basin. Stray rates of Chiwawa spring Chinook should decrease with the change in source water that was implemented in 2006-2007 for the Chiwawa rearing ponds.

Table 5.32. Number and percent of spawning escapements within other non-target basins that consisted of Chiwawa spring Chinook, return years 1992-2006. For example, for return year 2002, 12.6% of the spring Chinook spawning escapement in the Entiat Basin consisted of Chiwawa spring Chinook. Percent strays should be less than 5%. NS = not sampled; NA = not available.

Return year	Methow Basin		Entiat Basin	
	Number	%	Number	%
1992	0	0.0	0	0.0
1993	0	0.0	0	0.0
1994	0	0.0	0	0.0
1995	0	0.0	0	0.0
1996	NS	NS	0	0.0
1997	0	0.0	0	0.0
1998	NS	NS	0	0.0
1999	0	0.0	0	0.0
2000	0	0.0	1	0.6
2001	0	0.0	1	0.2
2002	0	0.0	34	12.6
2003	0	0.0	0	0.0
2004	0	0.0	0	0.0
2005	10	0.7	4	1.1
2006	8	0.5	8	3.1
Total	***18***	***0.1***	***48***	***1.5***

On average, about 35% of the returns have strayed into non-target spawning areas, exceeding the target of 5% (Table 5.33). Depending on brood year, percent strays into non-target spawning areas have ranged from 0-81%. Few (<1%) have strayed into non-target hatchery programs. Stray rates of Chiwawa spring Chinook should decrease with the change in source water that was implemented in 2006-2007 for the Chiwawa rearing ponds.

Table 5.33. Number and percent of Chiwawa spring Chinook that homed to target spawning areas and the target hatchery program, and number and percent that strayed to non-target spawning areas and non-target hatchery programs, by brood years 1989-2002. Percent stays should be less than 5%.

Brood year	Homing				Straying			
	Target stream		Target hatchery		Non-target streams		Non-target hatcheries	
	Number	%	Number	%	Number	%	Number	%
1989	58	35.4	1	0.6	102	62.2	3	1.8
1990	0	0.0	1	100.0	0	0.0	0	0.0
1991	29	87.9	0	0.0	2	6.1	2	6.1
1992	2	6.5	4	12.9	25	80.6	0	0.0
1993	134	47.5	82	29.1	63	22.3	3	1.1
1994	4	19.0	14	66.7	3	14.3	0	0.0
1995	No program							
1996	58	75.3	7	9.1	12	15.6	0	0.0
1997	1,242	55.6	298	13.4	687	30.8	5	0.2
1998	553	55.8	109	11.0	329	33.2	0	0.0
1999	No program							
2000	144	42.6	115	34.0	79	23.4	0	0.0
2001	647	35.8	276	15.3	878	48.6	4	0.2
2002	286	45.8	210	33.7	127	20.4	1	0.2
Total	***3,157***	***47.8***	***1,117***	***16.9***	***2,313***	***35.0***	***18***	***0.3***

Genetics

Genetic studies were conducted to determine the potential impacts of the Chiwawa Supplementation Program on natural origin spring Chinook in the upper Wenatchee Basin (Blankenship et al. 2007; the entire report is appended as Appendix I). Microsatellite DNA allele frequencies collected from temporally replicated natural and hatchery origin spring Chinook were used to statistically assign individual fish to specific demes (locations) within the Wenatchee population. In addition, genetic effects of the hatchery program were assessed by examining relationships between census and effective population sizes (N_e) from samples collected before and after supplementation.

Overall, this work showed that although allele frequencies within and between natural and hatchery origin spring Chinook were significantly different, there was no evidence (i.e., robust signal) that the difference was the result of the hatchery program. Rather, the differences were more likely the result of life history characteristics. However, there was an increasing trend toward homogenization of the

allele frequencies of the natural and hatchery origin fish that comprised the broodstock, even though there was consistent year-to-year variation in allele frequencies among hatchery and natural origin fish. In addition, there were no robust signals indicating that hatchery-origin hatchery broodstock, hatchery-origin natural spawners, natural-origin hatchery broodstock, and natural-origin natural spawners were substantially different from each other. Finally, the N_e estimate of 387 was only slightly larger than the pre-hatchery N_e (based on demographic data from 1989-1992), which means that the Chiwawa hatchery program has not reduced the N_e of the Wenatchee spring Chinook population.

Significant differences in allele frequencies were observed within and among major spawning areas in the Upper Wenatchee Basin. However, these differences made up only a very small portion of the overall variation, indicating genetic similarity among the major spawning areas. There was no evidence that the Chiwawa program has changed the genetic structure (allele frequency) of spring Chinook in Nason Creek and the White River, despite the presence of hatchery origin spawners in both systems.

Proportion of Natural Influence

Another method for assessing the genetic risk of a supplementation program is to determine the influence of the hatchery and natural environments on the adaptation of the composite population. This is estimated by the proportion of natural origin fish in the hatchery broodstock (pNOB) and the proportion of hatchery origin fish in the natural spawning escapement (pHOS). The ratio pNOB/(pHOS+pNOB) is the Proportion of Natural Influence (PNI). The larger the ratio (PNI), the greater the strength of selection in the natural environment relative to that of the hatchery environment. In order for the natural environment to dominate selection, PNI should be greater than 0.5 (HSRG/WDFW/NWIFC 2004).

For brood years 1989-1996, the PNI was greater than 0.50, indicating that the natural environment had a greater influence on adaptation of Chiwawa spring Chinook than did the hatchery environment (Table 5.34). For brood years 1997-2007, however, the PNI was generally less than 0.50, indicating that the hatchery environment had a greater influence on adaptation than did the natural environment.

Table 5.34. Proportionate natural influence (PNI) of the Chiwawa spring Chinook supplementation program for brood years 1989-2007. PNI was calculated as the proportion of naturally produced Chinook in the hatchery broodstock (pNOB) divided by the proportion of hatchery Chinook on the spawning grounds (pHOS) plus pNOB. NOS = number of natural origin Chinook on the spawning grounds; HOS = number of hatchery origin Chinook on the spawning grounds; NOB = number of natural origin Chinook collected for broodstock; and HOB = number of hatchery origin Chinook included in hatchery broodstock.

Brood year	Spawners			Broodstock			PNI
	NOS	HOS	pHOS	NOB	HOB	pNOB	
1989	713	0	0.00	28	0	1.00	1.00
1990	571	0	0.00	18	0	1.00	1.00
1991	242	0	0.00	27	0	1.00	1.00
1992	676	0	0.00	78	0	1.00	1.00
1993	76	157	0.67	94	0	1.00	0.60
1994	132	52	0.28	8	4	0.67	0.70

Brood year	Spawners			Broodstock			PNI
	NOS	HOS	pHOS	NOB	HOB	pNOB	
1995	6	26	0.81	No Program			
1996	53	5	0.08	8	10	0.44	0.84
1997	74	108	0.59	32	79	0.29	0.33
1998	52	39	0.43	13	34	0.28	0.39
1999	71	23	0.25	No Program			
2000	203	109	0.35	9	21	0.30	0.46
2001	680	1,810	0.73	113	259	0.30	0.29
2002	220	487	0.69	20	51	0.28	0.29
2003	165	105	0.39	41	53	0.44	0.53
2004	582	276	0.32	83	132	0.39	0.55
2005	135	463	0.77	91	181	0.33	0.30
2006	116	412	0.78	91	224	0.29	0.27
2007	192	1,104	0.85	43	104	0.29	0.26
Average	***265***	***226***	***0.51***	***42***	***58***	***0.41***	***0.44***

Natural and Hatchery Replacement Rates

Natural replacement rates (NRR) were calculated as the ratio of natural origin recruits (NOR) to the parent spawning population (spawning escapement). For brood years 1989-2001, NRR for spring Chinook in the Chiwawa averaged 0.45 (range, 0.03-4.45) if harvested fish were not include in the estimate and 1.63 (range, 0.03-6.71) if harvested fish were included in the estimate (Table 5.35). NRRs for more recent brood years will be calculated as soon as all tag recoveries and sampling rates have been loaded into the database.

Hatchery replacement rates (HRR) are the hatchery adult-to-adult returns and were calculated as the ratio of hatchery origin recruits (HOR) to the parent broodstock collected. These rates should be greater than the NRRs and greater than or equal to 5.30 (the calculated target value in Murdoch and Peven 2005). In nearly all years, HRRs were greater than NRRs, regardless if harvest was or was not included (Table 5.35). In contrast, HRRs exceeded the estimated target value of 5.3 in only four years (brood years 1989, 1997, 1998, and 2000).

Table 5.35. Broodstock collected, spawning escapements, natural and hatchery origin recruits (NOR and HOR), and natural and hatchery replacement rates (NRR and HRR; with and without harvest) for spring Chinook in the Chiwawa Basin, brood years 1989-2001; NP = no program. *(The numbers in this table may change as the HETT and HC refine the methods for estimating spring Chinook HRRs and NRRs.)*

Brood year	Broodstock Collected	Spawning Escapement	Harvest not included				Harvest included			
			HOR	NOR	HRR	NRR	HOR	NOR	HRR	NRR
1989	28	713	180	175	6.43	0.24	188	220	6.71	0.31
1990	19	571	1	45	0.05	0.08	19	61	1.00	0.11
1991	32	242	33	6	1.03	0.03	36	8	1.13	0.03

Brood year	Broodstock Collected	Spawning Escapement	Harvest not included				Harvest included			
			HOR	NOR	HRR	NRR	HOR	NOR	HRR	NRR
1992	113	676	31	51	0.27	0.08	32	54	0.28	0.08
1993	100	233	282	173	2.82	0.74	286	188	2.86	0.81
1994	13	184	21	55	1.62	0.30	21	60	1.62	0.32
1995	NP	33	NP	46	NP	1.41	NP	51	NP	1.58
1996	18	58	77	167	4.28	2.88	79	213	4.39	3.66
1997	120	182	2,232	816	18.60	4.48	2,609	1,222	21.74	6.71
1998	48	91	1,009	276	21.02	3.05	1,185	372	24.69	4.10
1999	NP	94	NP	5	NP	0.05	NP	6	NP	0.06
2000	48	312	344	515	7.17	1.65	367	573	7.65	1.83
2001	382	2,490	1,813	309	4.75	0.12	1,839	NA	4.81	NA
Average	***84***	***452***	***548***	***203***	***6.19***	***0.45***	***606***	***252***	***6.99***	***1.63***

Smolt-to-Adult Survivals

Smolt-to-adult survival ratios (SARs) were calculated as the number of hatchery adults divided by the number of hatchery smolts released. SARs were based on CWT returns. For the available brood years, SARs have ranged from 0.00036 to 0.01562 for hatchery spring Chinook (Table 5.36).

Table 5.36. Smolt-to-adult ratios (SARs) for Chiwawa hatchery spring Chinook, brood years 1989-2002.

Brood year	Number of tagged smolts released	Estimated adult captures	SAR
1989	42,707	188	0.00440
1990	52,798	19	0.00036
1991	61,088	36	0.00059
1992	82,976	31	0.00037
1993	221,316	284	0.00128
1994	27,135	21	0.00077
1995	No hatchery program		
1996	12,767	67	0.00525
1997	259,585	2,549	0.00982
1998	71,571	1,118	0.01562
1999	No hatchery program		
2000	46,726	365	0.00781
2001	374,129	1,824	0.00488
2002	145,074	674	0.00465
Average	***116,489***	***598***	***0.00465***

5.8 ESA/HCP Compliance

Broodstock Collection

The collection of 2006 Brood Chiwawa River spring Chinook broodstock was consistent with the 2006 Upper Columbia River salmon and steelhead broodstock objectives and site-based broodstock collection protocols. Specifically, broodstock collection targeted hatchery origin fish at Tumwater Dam and the Chiwawa Weir, while only natural-origin spring Chinook were collected at the Chiwawa Weir. In-season adjustments were made to the number of hatchery and natural origin spring Chinook collected for bloodstock and were based on in-season escapement monitoring at Tumwater Dam and estimated Chiwawa run-escapement.

Broodstock collection at Tumwater Dam began 7 May 2006, concluded on 27 July 2006, and targeted hatchery-origin, coded-wire tagged spring Chinook. Collection was implemented concurrent with trapping, sampling, and tagging associated with the spring Chinook reproductive success study (BPA project No. 2003-039-00). Trapping at the Chiwawa Weir began on 7 June 2006 and concluded on 28 July 2006. Broodstock were collected between 11 July 2006 and 28 July 2006 and targeted natural-origin spring Chinook and hatchery-origin spring Chinook as needed to attain a minimum 33% natural-origin broodstock and a maximum 33% extraction of the estimated natural-origin return to the Chiwawa River.

The BY 2006 brood collection retained a total of 347 spring Chinook, including 95 natural-origin fish, representing a 27% natural-origin broodstock. The brood collection failed to meet the targeted 33% natural-origin composition primarily because of false negative wire detection at Chiwawa weir that underestimated the number of hatchery-origin Chinook retained.

Both passive (low abundance periods) and active (high abundance periods) trapping were used to collect spring Chinook at Tumwater Dam. During passive trapping, the trap was checked and fish were processed several times per day. At the Chiwawa Weir, the trap was operated passively, checked several times per day, and fish were processed once daily. Trapping at the Chiwawa Weir generally followed a four-up and three-down schedule, and operated only as needed to meet weekly collection objectives consistent with the 2006 collection protocol or as adjusted based on in-season run escapement monitoring and ESA Section 10 Permit 1196 requirements. All spring Chinook, steelhead, and bull trout that were captured were anesthetized with tricaine methanesulfonate (MS-222) and subject to water-to-water transfers during handling. All fish were allowed to fully recover before release.

The estimated escapement of 2006 spring Chinook past Tumwater Dam totaled 2,175 adult and jack spring Chinook (Murdoch et al. 2007). In 2006, the Wenatchee Basin experienced severe drought conditions that adversely affected pre-spawn survival. Murdoch et al. (2007) estimated pre-spawn survival of natural and hatchery-origin spring Chinook migrating past Tumwater Dam at 62.3% and 49.8%, respectively. Based on 2006 spawning ground data (redd and carcass surveys), an estimated 116 natural-origin spring Chinook spawned in the Chiwawa River Basin (Table 5.34). Assuming the pre-spawn survival of Chiwawa River natural-origin spring Chinook was similar to the at-large population upstream from Tumwater Dam (62.3%), combined with the 95 natural-origin Chinook extracted for broodstock, the natural-origin escapement to the Chiwawa Basin totaled 281 spring Chinook (i.e., (116/0.623) + 95 = 281). The 2006 broodstock retention of 347 spring Chinook (95 natural-origin and 252 hatchery-origin) represents 33.8% of the estimated 2006 natural-origin Chiwawa spring Chinook escapement past Tumwater Dam and 16.0% of the run escapement of

spring Chinook upstream from Tumwater Dam. The estimated broodstock extraction rate of natural-origin Chiwawa spring Chinook and overall extraction of spring Chinook upstream from Tumwater Dam comply with provisions of ESA Permit 1196.

In addition to spring Chinook collected at the Chiwawa Weir for broodstock, an additional 50 spring Chinook were handled and released as a function of maintaining, at minimum, 33% natural-origin spring Chinook in the broodstock. No bull trout were captured and released. To minimize fallback or impingement on the weir, all spring Chinook were released unharmed about 10 km upstream from the weir.

Hatchery Rearing and Release

The rearing and release of 2006 Chiwawa spring Chinook was completed without incident. No mortality events occurred that exceeded 10% of the population. Fish were acclimated on Wenatchee River water and to the extent possible on Chiwawa River water (see Section 5.2).

The release of 2006 brood Chiwawa spring Chinook smolts totaled 612,482 spring Chinook, representing 91.1% of program objective and complied with ESA Section 10 Permit 1196 production level of 672,000 smolts.

Hatchery Effluent Monitoring

Per ESA Permits 1196, 1347, and 1395, permit holders shall monitor and report hatchery effluents in compliance with applicable National Pollution Discharge Elimination Systems (NPDES) (EPA 1999) permit limitations. There were no NPDES violations reported at Chelan PUD Hatchery facilities during the period 1 January 2008 through 31 December 2008. NPDES monitoring and reporting for Chelan PUD Hatchery Programs during 2008 are provided in Appendix E.

Smolt and Emigrant Trapping

Per ESA Section 10 Permit No. 1196, the permit holders are authorized a direct take of 20% of the emigrating spring Chinook population during juvenile emigration monitoring and a lethal take not to exceed 2% of the fish captured (NMFS 2003). Based on the estimated wild spring Chinook population (smolt trap expansion) and hatchery juvenile spring Chinook population estimate (hatchery release data) for the Wenatchee Basin, the reported spring Chinook encounters during 2008 emigration monitoring complied with take provisions in the Section 10 permit. Spring Chinook encounter and mortality rates for each trap site (including PIT tag mortalities) are detailed in Table 5.37. Additionally, juvenile fish captured at the trap locations were handled consistent with provisions in ESA Section 10 Permit 1196, Section B.

Table 5.37 . Estimated take of Upper Columbia River spring Chinook resulting from juvenile emigration monitoring in the Wenatchee Basin, 2008.

Trap location	Population estimate			Number trapped			Total	Take allowed under Permit
	Wild[a]	Hatchery[b]	Subyearling	Wild	Hatchery	Subyearling		
Chiwawa Trap								
Population	107,972	612,482	90,978	8,711	22,367	12,728	43,806	
Encounter rate	NA	NA	NA	0.0807	0.0365	0.1399	0.0540	0.20
Mortality[e]	NA	NA	NA	58	0	127	185	
Mortality rate	NA	NA	NA	0.0067	0.0000	0.0099	0.0042	0.02
Upper Wenatchee Trap								
Population	NA[f]	142,033	NA[f]	194	398	71	663	
Encounter rate	NA	NA	NA	NA	0.0028	NA	NA	0.20
Mortality[e]	NA	NA	NA	1	1	NA	2	
Mortality rate	NA	NA	NA	0.0052	0.0025	NA	0.0030	0.02
Lower Wenatchee Trap								
Population	213,763[e]	754,515	NA[c]	612	19,440	NA[c]	20,052	
Encounter rate	NA	NA	NA	0.0029	0.0258	NA	0.0	0.20
Mortality[e]	NA	NA	NA	6	0	NA	6	
Mortality rate	NA	NA	NA	0.0098	0.0000	NA	0.0002	0.02
Wenatchee Basin Total								
Population	213,763[e]	754,515	NA	9,517	42,205	12,799	64,521	
Encounter rate	NA	NA	NA	0.0445	0.0559	NA	NA	0.20
Mortality[e]	NA	NA	NA	65	1	127	192	
Mortality rate	NA	NA	NA	0.0068	0.0000	0.0099	0.0030	0.02

[a] Smolt population estimate derived from juvenile emigration trap data.

[b] 2008 smolt release data for the Wenatchee Basin.

[c] Based on size, date of capture, and location of capture, subyearling Chinook encountered at the Lower Wenatchee Trap are categorized as summer Chinook.

[d] Combined trapping and PIT tagging mortality.

[e] Expanded total Wenatchee Basin natural-origin spring Chinook smolt estimates based on the estimated Chiwawa smolt production and proportion of total redds in the Chiwawa Basin.

[f] Insufficient numbers of natural-origin spring Chinook were encountered to derive a population estimate.

Spawning Surveys

Spring Chinook spawning ground surveys were conducted in the Wenatchee Basin during 2008, as authorized by ESA Section 10 Permit 1196. Because of the difficulty of quantifying the level of take associated with spawning ground surveys, the Permit does not specify a take level associated with these activities, even though it does authorize implementation of spawning ground surveys. Therefore, no take levels are reported. However, to minimize potential impacts to established redds, wading was restricted to the extent practical, and extreme caution was used to avoid established redds when wading was required.

Spring Chinook Reproductive Success Study

ESA Section 10 Permit 1196 specifically provides authorization to capture, anesthetize, biologically sample, PIT tag, and release adult spring Chinook at Tumwater Dam for reproductive success studies and general program monitoring. During 2007 and 2008, all spring Chinook passing Tumwater Dam were enumerated, anesthetize, biologically sampled, PIT tagged, and released (not including hatchery-origin Chinook retained for broodstock) as a component of the reproductive success study (BPA Project No. 2003-039-00). Please refer to Murdoch et al. (2006) and Murdoch et al. (2007) for complete details on the methods and results of the spring Chinook reproductive success study for 2005 and 2006. Results of the 2007 study year will be available pending completion of the 2007 annual report.

SECTION 6: WENATCHEE SUMMER CHINOOK

6.1 Broodstock Sampling

This section focuses on results from sampling 2006-2007 Wenatchee summer Chinook broodstock, which were collected at Dryden and Tumwater dams. Complete information is not currently available for the 2008 brood (this information will be provided in the 2009 annual report).

Origin of Broodstock

Both the 2006 and 2007 broodstock consisted almost entirely of natural origin (adipose fin present) summer Chinook (Table 6.1). Less than 1% (nine fish) of the fish spawned were hatchery origin fish (hatchery origin was determined by examination of scales and/or CWTs).

Table 6.1. Numbers of wild and hatchery summer Chinook collected for broodstock, numbers that died before spawning, and numbers of Chinook spawned in the Wenatchee Basin, 1989-2007. Unknown origin fish (i.e., undetermined by scale analysis, no CWT or fin clips, and no additional hatchery marks) were considered naturally produced. Mortality includes fish that died of natural causes typically near the end of spawning and were not needed for the program and surplus fish killed at spawning.

Brood year	Wild summer Chinook					Hatchery summer Chinook					Total number spawned
	Number collected	Prespawn loss	Mortality	Number spawned	Number released	Number collected	Prespawn loss	Mortality	Number spawned	Number released	
1989	346	29	27	290	0	0	0	0	0	0	290
1990	87	6	24	57	0	0	0	0	0	0	57
1991	128	9	14	105	0	0	0	0	0	0	105
1992	341	48	19	274	0	0	0	0	0	0	274
1993	480	28	46	406	0	44	0	0	44	0	450
1994	363	29	1	333	0	55	1	0	54	0	387
1995	382	15	4	363	0	16	0	0	16	0	378
1996	331	34	34	263	0	3	0	0	3	0	266
1997	225	14	6	205	0	15	1	1	13	0	218
1998	378	40	39	299	0	94	4	12	78	0	377
1999	250	7	1	242	0	238	1	1	236	0	478
2000	298	18	5	275	0	194	7	7	180	0	455
2001	311	41	60	210	0	182	8	38	136	0	346
2002	469	28	32	409	0	13	1	2	10	0	419
2003	488	90	61	337	0	8	1	0	7	0	344
2004	494	24	46	424	0	2	0	0	2	0	426
2005	491	29	19	397	46	3	0	0	3	0	400
2006	483	29	21	433	0	5	1	0	4	0	437
2007	415	53	99	263	0	4	0	1	3	0	266
Average	***356***	***30***	***34***	***294***	***2***	***46***	***1***	***3***	***42***	***0***	***335***

Age/Length Data

Ages of summer Chinook broodstock were determined from analysis of scales and/or CWTs. Broodstock collected from the 2006 return consisted primarily of age-5 natural origin Chinook (81%). Age-4 natural origin fish made up 15% of the broodstock, while age-2, 3, and 6 fish collectively made up 3% (Table 6.2). Of the five hatchery Chinook included in the broodstock, 80% were age-5 and 20% were age-6 fish.

Broodstock collected from the 2007 return consisted primarily of age-5 natural origin Chinook (46%). Age-3, 4, and 6 natural origin fish collectively made up 50% of the broodstock, while age-2 fish made up 4% (Table 6.2). Of the four hatchery Chinook included in the broodstock, all were age-5 fish.

Table 6.2. Percent of hatchery and wild Wenatchee summer Chinook of different ages (total age) collected from broodstock in the Wenatchee Basin, 1991-2007.

Return Year	Origin	Total age				
		2	3	4	5	6
1991	Wild	0.0	4.6	36.8	57.5	1.1
	Hatchery	0.0	0.0	0.0	0.0	0.0
1992	Wild	0.0	2.6	40.4	50.9	6.1
	Hatchery	0.0	0.0	0.0	0.0	0.0
1993	Wild	0.0	1.5	36.0	60.3	2.2
	Hatchery	0.0	0.0	93.0	7.0	0.0
1994	Wild	0.0	1.0	33.7	64.3	1.0
	Hatchery	0.0	0.0	1.9	98.1	0.0
1995	Wild	0.0	3.3	18.9	76.6	1.2
	Hatchery	0.0	0.0	0.0	0.0	100.0
1996	Wild	0.0	4.6	40.1	53.3	2.0
	Hatchery	0.0	0.0	33.3	66.7	0.0
1997	Wild	0.0	2.3	42.6	53.2	1.9
	Hatchery	0.0	26.7	66.7	6.6	0.0
1998	Wild	0.0	5.5	34.8	58.6	1.1
	Hatchery	0.0	5.4	68.5	19.6	6.5
1999	Wild	0.5	1.9	39.0	56.3	2.4
	Hatchery	0.0	1.3	23.2	72.1	2.4
2000	Wild	2.6	6.3	24.6	66.5	0.0
	Hatchery	0.0	23.6	15.2	42.9	18.3
2001	Wild	0.3	16.4	53.9	27.7	1.7
	Hatchery	0.0	6.3	80.6	10.0	3.1
2002	Wild	1.6	8.4	61.1	28.3	0.6
	Hatchery	0.0	0.0	41.7	58.3	0.0
2003	Wild	0.9	2.8	31.4	64.9	0.0
	Hatchery	0.0	12.5	25.0	62.5	0.0

Return Year	Origin	Total age				
		2	3	4	5	6
2004	Wild	0.2	3.6	10.1	84.0	2.1
	Hatchery	0.0	0.0	50.0	50.0	0.0
2005	Wild	0.0	4.3	53.5	35.1	7.1
	Hatchery	0.0	0.0	0.0	100.0	0.0
2006	Wild	1.4	0.9	14.9	81.8	1.0
	Hatchery	0.0	0.0	0.0	80.0	20.0
2007	Wild	3.6	14.9	18.6	46.4	16.5
	Hatchery	0.0	0.0	0.0	100.0	0.0
Average	***Wild***	***0.65***	***4.99***	***34.73***	***56.81***	***2.82***
	Hatchery	***0.00***	***4.46***	***29.36***	***45.52***	***8.84***

Mean lengths of natural origin summer Chinook of a given age differed little between return years 2006 and 2007 (Table 6.3). Mean lengths of age-3 to 6 Chinook differed between years by about 2 cm, 1 cm, 0 cm, and 6 cm, respectively. The few hatchery fish that were included in broodstock were similar in size to natural origin fish for the 2006 brood and were about 9 cm smaller than their natural counterparts in the 2007 brood (Table 6.3).

Table 6.3. Mean fork length (cm) at age (total age) of hatchery and wild Wenatchee summer Chinook collected from broodstock in the Wenatchee Basin, 1991-2007; N = sample size and SD = 1 standard deviation.

Return year	Origin	Summer Chinook fork length (cm)														
		Age-2			Age-3			Age-4			Age-5			Age-6		
		Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD
1991	Wild	-	0	-	-	4	-	-	32	-	-	50	-	-	1	-
	Hatchery	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
1992	Wild	-	0	-	66	3	10	69	46	5	81	58	3	87	7	1
	Hatchery	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
1993	Wild	-	0	-	68	6	10	84	142	9	98	238	6	100	9	6
	Hatchery	-	0	-	-	0	-	79	41	8	101	3	8	-	0	-
1994	Wild	-	0	-	74	3	5	86	101	8	96	193	7	106	3	7
	Hatchery	-	0	-	-	0	-	75	1	-	90	53	8	-	0	-
1995	Wild	-	0	-	66	11	8	85	64	7	97	255	6	106	4	7
	Hatchery	-	0	-	-	0	-	-	0	-	-	0	-	91	16	8
1996	Wild	-	0	-	69	14	5	86	121	6	97	161	6	104	6	5
	Hatchery	-	0	-	-	0	-	63	1	-	96	2	4	-	0	-
1997	Wild	-	0	-	54	5	10	85	92	7	98	115	7	97	4	9
	Hatchery	-	0	-	46	4	2	74	10	4	98	1	-	-	0	-

Return year	Origin	Summer Chinook fork length (cm)														
		Age-2			Age-3			Age-4			Age-5			Age-6		
		Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD
1998	Wild	-	0	-	66	19	9	85	120	7	99	201	7	106	4	7
	Hatchery	-	0	-	53	5	2	77	63	8	95	19	8	98	6	8
1999	Wild	42	1	-	65	4	6	86	83	6	97	120	7	103	5	8
	Hatchery	-	0	-	52	3	6	79	55	7	90	171	6	100	8	6
2000	Wild	43	7	4	60	17	7	84	67	5	98	181	6	-	0	-
	Hatchery	-	0	-	53	47	7	76	29	8	94	83	7	102	35	9
2001	Wild	48	1	-	66	48	7	88	155	7	97	80	6	102	5	3
	Hatchery	-	0	-	51	10	3	75	132	8	91	17	8	100	5	8
2002	Wild	48	7	4	64	37	8	89	270	7	100	125	7	99	3	13
	Hatchery	-	0	-	-	0	-	78	5	8	95	7	5	-	0	-
2003	Wild	41	4	2	58	13	4	87	144	8	100	297	7	-	0	-
	Hatchery	-	0	-	40	1	-	78	2	4	101	5	8	-	0	-
2004	Wild	51	1	-	69	17	5	84	47	8	99	392	6	109	10	7
	Hatchery	-	0	-	-	0	-	84	1	-	108	1	-	-	0	-
2005	Wild	-	0	-	68	20	7	86	247	8	95	162	6	101	33	6
	Hatchery	-	0	-	-	0	-	-	0	-	90	3	9	-	0	-
2006	Wild	44	6	6	63	4	11	88	66	7	99	363	6	96	5	7
	Hatchery	-	0	-	-	0	-	-	0	-	99	4	7	100	1	-
2007	Wild	44	14	5	65	58	7	89	72	8	99	180	7	102	64	6
	Hatchery	-	0	-	-	0	-	-	0	-	90	4	5	-	0	-

Sex Ratios

Male summer Chinook in the 2006 broodstock made up about 49% of the adults collected, resulting in an overall male to female ratio of 0.95:1.00 (Table 6.4.). In 2007, males made up about 58% of the adults collected, resulting in an overall male to female ratio of 1.35:1.00 (Table 6.4). The ratios in 2007 were considerably greater than the 1:1 ratio goal in the broodstock protocol.

Table 6.4. Numbers of male and female wild and hatchery summer Chinook collected for broodstock in the Wenatchee Basin, 1989-2007. Ratios of males to females are also provided.

Return year	Number of wild summer Chinook			Number of hatchery summer Chinook			Total M/F ratio
	Males (M)	Females (F)	M/F	Males (M)	Females (F)	M/F	
1989	166	180	0.92:1.00	0	0	-	0.92:1.00

Return year	Number of wild summer Chinook			Number of hatchery summer Chinook			Total M/F ratio
	Males (M)	Females (F)	M/F	Males (M)	Females (F)	M/F	
1990	45	39	1.15:1.00	0	0	-	1.15:1.00
1991	60	68	0.88:1.00	0	0	-	0.88:1.00
1992	154	187	0.82:1.00	0	0	-	0.82:1.00
1993	208	228	0.91:1.00	35	9	3.89:1.00	1.03:1.00
1994	158	179	0.88:1.00	24	31	0.77:1.00	0.87:1.00
1995	169	213	0.79:1.00	1	15	0.07:1.00	0.75:1.00
1996	150	181	0.83:1.00	2	1	2.00:1.00	0.84:1.00
1997	104	121	0.86:1.00	15	0	-	0.98:1.00
1998	211	167	1.26:1.00	64	30	2.13:1.00	1.40:1.00
1999	130	120	1.08:1.00	108	130	0.83:1.00	0.95:1.00
2000	153	145	1.06:1.00	112	82	1.37:1.00	1.17:1.00
2001	187	124	1.51:1.00	132	50	2.64:1.00	1.83:1.00
2002	266	203	1.31:1.00	5	8	0.63:1.00	1.28:1.00
2003	270	218	1.24:1.00	5	3	1.67:1.00	1.24:1.00
2004	230	264	0.87:1.00	1	1	1.00:1.00	0.87:1.00
2005	291	200	1.46:1.00	2	1	2.00:1.00	1.46:1.00
2006	237	246	0.96:1.00	1	4	0.25:1.00	0.95:1.00
2007	239	176	1.36:1.00	2	2	1.00:1.00	1.35:1.00
Total	***180***	***172***	***1.05:1.00***	***27***	***19***	***1.39:1.00***	***1.09:1.00***

Fecundity

Fecundities for the 2006 and 2007 returns of summer Chinook averaged 5,133 and 5,115 eggs per female, respectively (Table 6.5). These values are close to the 18-year average of 5,152 eggs per female. Mean observed fecundities for the 2006 and 2007 returns were above the expected fecundity of 5,000 eggs per female assumed in the broodstock protocol.

Table 6.5. Mean fecundity of wild, hatchery, and all female summer Chinook collected for broodstock in the Wenatchee Basin, 1989-2007; NA = not available.

Return year	Mean fecundity		
	Wild	Hatchery	Total
1989*	NA	NA	5,280
1990*	NA	NA	5,436
1991*	NA	NA	4,333
1992*	NA	NA	5,307
1993*	NA	NA	5,177
1994*	NA	NA	5,899
1995*	NA	NA	4,402
1996*	NA	NA	4,941

Return year	Mean fecundity		
	Wild	Hatchery	Total
1997	5,385	5,272	5,390
1998	5,393	4,825	5,297
1999	5,036	4,942	4,987
2000	5,464	5,403	5,441
2001	5,280	4,647	5,097
2002	5,502	5,027	5,484
2003	5,357	5,696	5,361
2004	5,372	6,681	5,377
2005	5,045	6,391	5,053
2006	5,126	5,633	5,133
2007	5,124	4,510	5,115
Average	***5,280***	***5,366***	***5,152***

* Individual fecundities were not tracked with females until 1997.

6.2 Hatchery Rearing

Rearing History

Number of eggs taken

Based on the unfertilized egg-to-release survival standard of 81%, a total of 1,066,667 eggs are required to meet the program release goal of 864,000 smolts. Between 1989 and 2007, the egg take goal was reached in five of those years (Table 6.6).

Table 6.6. Numbers of eggs taken from Wenatchee summer Chinook broodstock, 1989-2007.

Return year	Number of eggs taken
1989	829,012
1990	163,109
1991	247,000
1992	827,911
1993	1,133,852
1994	999,364
1995	949,531
1996	756,000
1997	554,617
1998	854,997
1999	1,182,130
2000	1,113,159
2001	733,882
2002	1,049,255

2003	901,095
2004	1,311,051
2005	883,669
2006	1,190,757
2007	655,201
Average	***859,768***

Number of acclimation days

The 2007 brood Wenatchee summer Chinook were transferred to Dryden Pond on 11-14 March 2008. These fish received 45-48 days of acclimation on Wenatchee River water before being released on 28 April 2008 (Table 6.7). In recent years, a small proportion of the brood (high ELISA fish) has been reared separately and received no acclimation (i.e., these fish were released directly into the Wenatchee River). These data are not shown in Table 6.7. One such release occurred on 21 April 2008 into the Wenatchee River near Leavenworth.

Table 6.7. Number of days Wenatchee summer Chinook were acclimated at Dryden Pond, brood years 1989-2006. Numbers in parenthesis represents the number of days fish reared at Chiwawa Ponds.

Brood year	Release year	Transfer date	Release date	Number of days
1989	1991	2-Mar	7-May	66
1990	1992	19-Feb	2-May	73
1991	1993	10-Mar	8-May	59
1992	1994	1-Mar	6-May	66
1993	1995	3-Mar	1-May	59
1994	1996	2-Oct	6-May	217 (154)
		5-Mar	6-May	62
1995	1997	16-Oct	8-May	205 (139)
		27-Feb	8-May	70
1996	1998	6-Oct	28-Apr	204 (142)
		25-Feb	28-Apr	62
1997	1999	23-Feb	27-Apr	63
1998	2000	5-Mar	1-May	57
1999	2001	8-Mar	23-Apr	46
2000	2002	1-Mar	6-May	66
2001	2003	19-Feb	23-Apr	63
2002	2004	5-Mar	23-Apr	49
2003	2005	15-Mar	25-Apr	41
2004	2006	25-Mar	27-Apr	33

2005	2007	15-Mar	30-Apr	46
2006	2008	11-14-Mar	28-Apr	45-48

Release Information

Numbers released

The 2006 Wenatchee summer Chinook program achieved 110% of the 864,000 target goal with about 950,657 fish being released (of which 51,550 were high ELISA fish planted directly into the Wenatchee River; Table 6.8). The overage was related to a slightly higher than expected fecundity and greater proportion of females in the broodstock.

Table 6.8. Numbers of Wenatchee summer Chinook smolts released from the hatchery, 1989-2006. The release target for Wenatchee summer Chinook is 864,000 smolts.

Brood year	Release year	CWT mark rate	Number of smolts released
1989	1991	0.2013	720,000
1990	1992	0.9597	124,440
1991	1993	0.9957	191,179
1992	1994	0.9645	627,331
1993	1995	0.9881	900,429
1994	1996	0.9697	797,350
1995	1997	0.9725	687,439
1996	1998	0.9758	600,127
1997	1999	0.9913	438,223
1998	2000	0.9869	649,612
1999	2001	0.9728	1,005,554
2000	2002	0.9723	929,496
2001	2003	0.9868	604,668
2002	2004	0.9644	835,645
2003	2005	0.9778	653,764
2004	2006	0.9698	892,926
2005	2007	0.9596	644,182
2006	2008	0.9676	51,550[a]
		0.9676	899,107
Average		***0.9320***	***680,723***

[a] Represents high Elisa group planted directly in the Wenatchee River at Leavenworth Boat Launch.

Numbers tagged

The 2006 brood Wenatchee summer Chinook were 96.8% CWT and adipose fin-clipped, but were not PIT tagged.

Fish size and condition at release

Summer Chinook from the 2006 brood were released as yearling smolts in two groups, a direct release of about 51,550 high-ELISA fish on 21 April and a forced release of about 899,107 fish from Dryden Pond on 28 April 2008. Size at release of the acclimated population was 77.3% and 64.3% of the target fork length and weight goals, respectively. This brood year exceeded the target CV for length by 138.9% (Table 6.9). Since the program began, Wenatchee summer Chinook have not met the target length and CV values. The target weight (fish/pound or FPP) of juvenile fish has been met occasionally.

Table 6.9. Mean lengths (FL, mm), weight (g and fish/pound), and coefficient of variation (CV) of Wenatchee summer Chinook smolts released from the hatchery, brood years 1989-2006; NA = not available. Size targets are provided in the last row of the table.

Brood year	Release year	Fork length (cm)		Mean weight	
		Mean	CV	Grams (g)	Fish/pound
1989	1991	158	13.7	45.4	10
1990	1992	155	14.2	45.4	10
1991	1993	156	15.5	42.3	11
1992	1994	152	13.1	40.1	10
1993	1995	149	NA	34.9	13
1994	1996	138	NA	21.7	21
1995	1997	149	12.2	42.5	11
1996	1998	151	16.6	43.2	10
1997	1999	154	10.1	42.8	11
1998	2000	166	9.7	53.1	9
1999	2001	137	16.1	29.0	16
2000	2002	148	14.6	37.1	12
2001	2003	148	NA	38.9	12
2002	2004	146	15.1	37.3	14
2003	2005	147	13.2	36.5	12
2004	2006	147	10.7	35.4	13
2005	2007	153	16.3	40.6	11
2006	2008	136	21.5	29.2	16
Targets		***176***	***9.0***	***45.4***	***10***

Survival Estimates

Overall survival of the 2006 brood Wenatchee summer Chinook from green (unfertilized) egg to release was below the standard set for the program because of poor green egg-to-eye survival (Table 6.10).

Table 6.10. Hatchery life-stage survival rates (%) for Wenatchee summer Chinook, brood years 1989-2006. Survival standards or targets are provided in the last row of the table.

Brood year	Collection to spawning		Unfertilized egg-eyed	Eyed egg-ponding	30 d after ponding	100 d after ponding	Ponding to release	Transport to release	Unfertilized egg-release
	Female	Male							
1989	90.0	93.4	90.9	97.0	99.7	99.3	98.5	99.4	86.9
1990	89.7	95.6	80.9	96.6	99.6	99.2	97.7	98.8	76.3
1991	88.2	98.3	86.9	96.1	99.3	98.5	94.9	98.1	77.4
1992	84.3	92.2	79.8	97.8	99.9	99.9	97.1	98.1	75.8
1993	92.4	95.9	84.2	97.5	99.6	99.3	96.7	98.8	79.4
1994	90.7	95.3	83.7	100	99.2	97.0	95.3	98.4	79.8
1995	94.7	98.2	86.0	100	96.7	96.4	74.9	90.8	72.4
1996	84.6	96.1	84.1	100	97.9	97.7	94.4	97.7	79.4
1997	89.3	98.3	82.6	97.3	97.1	96.9	98.3	98.2	79.0
1998	85.3	94.6	80.9	98.3	99.4	98.6	95.6	99.8	76.0
1999	98.4	98.3	90.4	97.9	98.1	97.9	96.2	99.4	85.1
2000	93.0	96.6	88.3	98.0	99.6	99.3	96.5	98.9	83.5
2001	87.4	91.5	90.6	97.7	99.8	99.6	93.1	93.3	82.4
2002	93.8	94.1	85.1	99.8	98.1	97.6	93.7	96.5	79.6
2003	77.4	85.1	80.5	98.1	99.6	99.1	91.9	93.5	72.6
2004	92.8	97.8	85.7	87.8	99.9	99.6	86.6	92.1	65.1
2005	97.3	89.6	83.5	98.0	99.7	99.4	89.1	99.5	72.9
2006	92.4	95.2	85.6	98.4	99.3	98.4	94.8	97.2	79.8
Standard	***90.0***	***85.0***	***92.0***	***98.0***	***97.0***	***93.0***	***90.0***	***95.0***	***81.0***

6.3 Disease Monitoring

Rearing of the 2006 brood Wenatchee summer Chinook was similar to previous years with fish being held on well water before being transferred to Dryden Pond for final acclimation in March 2008. Fish were transferred to Dryden pond from 11 to 14 March. Increased mortality caused by external fungus began to occur late in the acclimation period at Dryden pond. Because of the close proximity to the scheduled release time, no treatment was suggested or initiated. No fish health problems were noted during rearing of the high ELISA component.

Results of adult broodstock bacterial kidney disease (BKD) monitoring indicated that most females (97.0%) had ELISA values less than 0.199. About 94% of females had ELISA values less than 0.120, which would require about 6% of the progeny to be reared at densities not to exceed 0.06 fish per pound (Table 6.11).

Table 6.11. Proportion of bacterial kidney disease (BKD) titer groups for the Wenatchee summer Chinook broodstock, brood years 1997-2008. Also included are the proportions to be reared at either 0.125 fish per pound or 0.060 fish per pound.

Brood year[a]	Optical density values by titer group				Proportion at rearing densities (fish per pound, fpp)	
	Very Low (≤ 0.099)	Low (0.1-0.199)	Moderate (0.2-0.449)	High (≥ 0.450)	≤ 0.125 fpp (<0.119)	≤ 0.060 fpp (>0.120)
1997	0.7714	0.0857	0.0381	0.1048	0.8095	0.1905
1998	0.3067	0.2393	0.1656	0.2883	0.4479	0.5521
1999	0.9590	0.0123	0.0123	0.0164	0.9713	0.0287
2000	0.6268	0.1053	0.1627	0.1053	0.7321	0.2679
2001	0.6513	0.0263	0.0987	0.2237	0.6776	0.3224
2002	0.7868	0.0457	0.0711	0.0964	0.8325	0.1675
2003	0.9825	0.0000	0.0058	0.0117	0.9825	0.0175
2004	0.9593	0.0081	0.0163	0.0163	0.9675	0.0325
2005	0.9833	0.0056	0.0000	0.0111	0.9833	0.0167
2006	0.9134	0.0563	0.0000	0.0303	0.9351	0.0649
2007	0.9535	0.0078	0.0078	0.0310	0.9535	0.0465
2008	0.9868	0.0088	0.0044	0.0000	0.9868	0.0132
Average	*0.8381*	*0.0466*	*0.0461*	*0.0692*	*0.8700*	*0.1300*

[a] Individual ELISA samples were not collected before the 1997 brood.

6.4 Natural Juvenile Productivity

During 2008, juvenile summer Chinook were sampled at the Lower Wenatchee Trap located at the West Monitor Bridge.

Emigrant Estimates

The Lower Wenatchee Trap operated nightly between 14 February and 15 August 2008. During that time period, trap 1 and trap 2 were inoperable for 29 and 66 days, respectively, because of high river flows, debris, snow/ice, or mechanical failure. During the six-month sampling period, a total of 30,547 wild subyearling Chinook were captured at the Lower Wenatchee Trap. Based on capture efficiencies estimated from the flow model, the total number of wild subyearling Chinook that emigrated past the Lower Wenatchee Trap was 4,470,050 (±2,959,237). Most of these fish emigrated during June (Figure 6.1). Monthly captures and mortalities of all fish collected at the Lower Wenatchee Trap are reported in Appendix B.

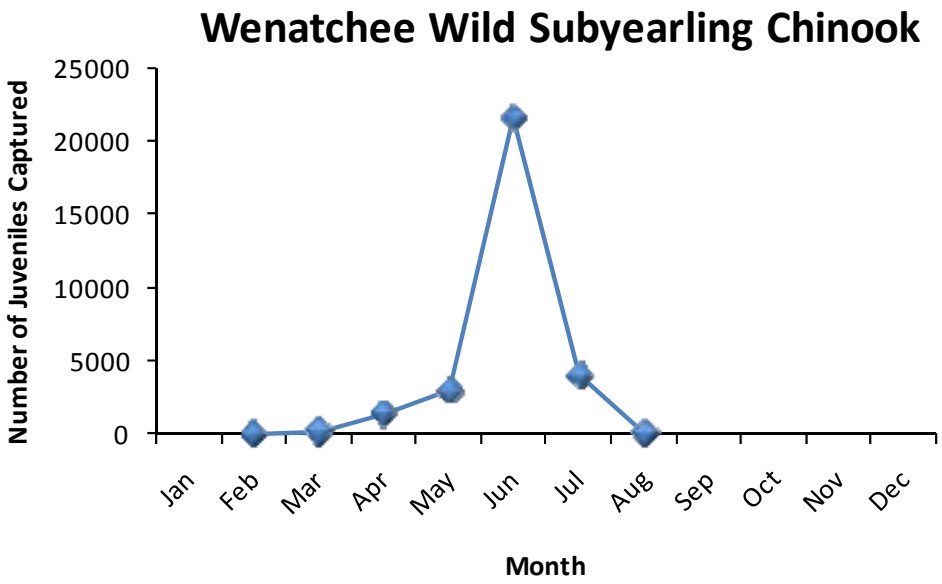


Figure 6.1. Numbers of wild subyearling Chinook captured at the Lower Wenatchee Trap during February through August, 2008.

6.5 Spawning Surveys

Surveys for Wenatchee summer Chinook redds were conducted from late September to mid-November, 2008, in the Wenatchee River and Icicle Creek. Both peak counts and total counts (based on a peak count expansion factor; Murdoch and Peven 2005) were conducted in the river (see Appendix G for more details).

Redd Counts

A peak count of 1,158 summer Chinook redds was estimated in 2008 based on ground surveys conducted in the Wenatchee River and Icicle Creek (Table 6.12). A total redd count of 2,800 redds was estimated in 2008 based on expanded peak counts and 2,658 based on the naïve expansion method in the Wenatchee Basin (Table 6.12).

Table 6.12. Peak and total numbers of redds counted in the Wenatchee River, 1989-2008; NA = not available. Total counts are based on two different methods: expanded peak counts and naïve expansion methods (see Appendix G for more information).

Survey year	Peak redd count	Total redd count	
		Peak expansion	Naïve expansion
1989	3,331	NA	NA
1990	2,479	NA	NA
1991	2,180	NA	NA
1992	2,328	NA	NA
1993	2,334	NA	NA
1994	2,426	NA	NA
1995	1,872	NA	NA
1996	1,435	NA	NA
1997	1,388	NA	NA
1998	1,660	NA	NA
1999	2,188	NA	NA
2000	2,022	NA	NA
2001	2,857	NA	NA
2002	5,419	NA	NA
2003	4,328	NA	NA
2004	3,764	5,804	NA
2005	3,327	NA	NA
2006*	7,233	8,896	NA
2007*	1,870	1,970	NA
2008*	1,158	2,800	2,658
Average	***2,780***	***4,868***	***2,658***

* Peak and total counts include 68, 13, and 23 redds counted in Icicle Creek in 2006, 2007, and 2008, respectively.

Redd Distribution

Summer Chinook redds were not evenly distributed among reaches within the Wenatchee Basin in 2008 (Table 6.13; Figure 6.2). Most of the spawning occurred upstream from the Leavenworth Bridge in Reaches 6, 9, and 10. The highest density of redds occurred in Reach 6 near the confluence of the Icicle River.

Table 6.13. Peak and total numbers of summer Chinook redds counted in different reaches in the Wenatchee Basin during September through mid-November, 2008. Reach codes are described in Table 2.10.

Survey reach	Peak redd count	Total redd count	
		Peak expansion	Naïve expansion
Wenatchee 1	9	15	16
Wenatchee 2	37	137	80
Wenatchee 3	67	227	113

Survey reach	Peak redd count	Total redd count	
		Peak expansion	Naïve expansion
Wenatchee 4	22	22	22
Wenatchee 5	10	56	63
Wenatchee 6	536	1,125	1,157
Wenatchee 7	144	215	241
Wenatchee 8	92	139	134
Wenatchee 9	87	491	378
Wenatchee 10	131	350	431
Icicle Creek	23	23	23
Totals	***1,158***	***2,800***	***2,658***

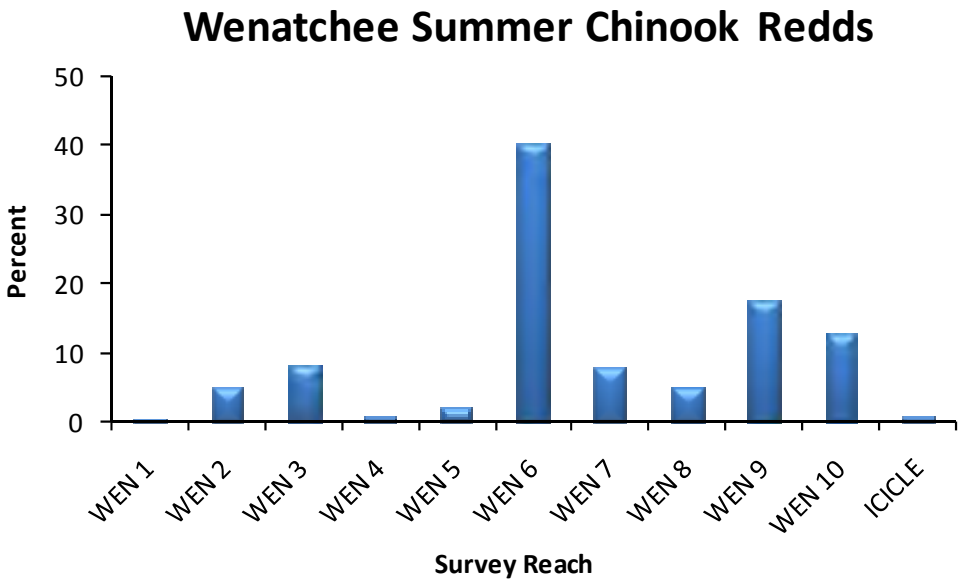


Figure 6.2. Percent of the total number (based on peak expansion) of summer Chinook redds counted in different reaches in the Wenatchee Basin during September through mid-November, 2008. Reach codes are described in Table 2.10.

Spawn Timing

In 2008, spawning in the Wenatchee River began the last week of September, peaked the second week of October, and ended in late October (Figure 6.3).

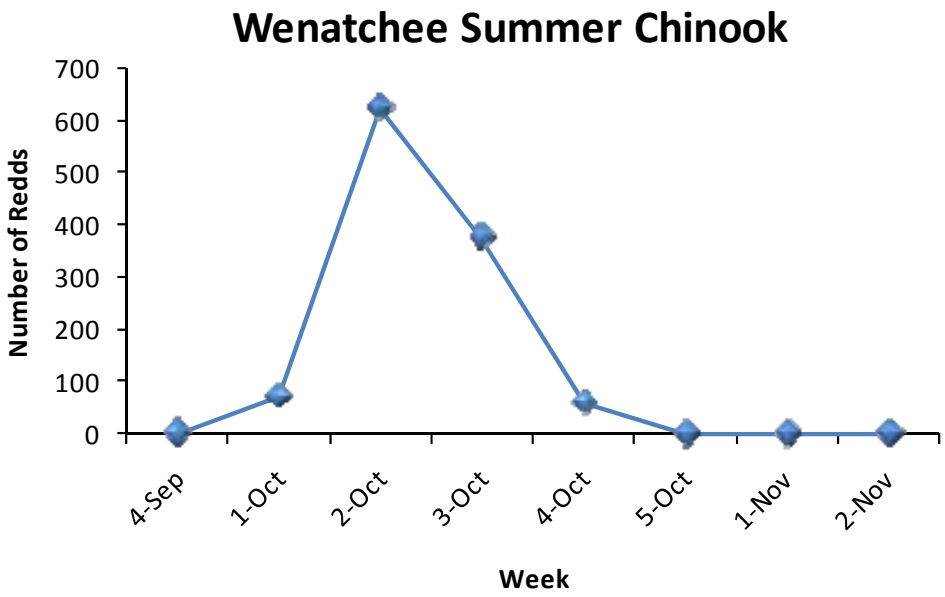


Figure 6.3. Number of new summer Chinook redds counted during different weeks in the Wenatchee River, September through mid-November 2008 (based on mapping counts).

Spawning Escapement

Spawning escapement for Wenatchee summer Chinook was calculated as the total (or peak) number of redds times the fish per redd ratio estimated from broodstock and fish sampled at adult trapping sites. The estimated fish per redd ratio for summer Chinook in 2008 was 2.32. Multiplying this ratio by the number of redds counted in the Wenatchee Basin resulted in a total spawning escapement of 6,496 summer Chinook (Table 6.14).

Table 6.14. Spawning escapements for summer Chinook in the Wenatchee Basin, return years 1989-2008.

Return year	Fish/Redd	Redds	Total spawning escapement
1989	3.40	3,331	11,325
1990	3.50	2,479	8,677
1991	3.70	2,180	8,066
1992	4.00	2,328	9,312
1993	3.20	2,334	7,469
1994	3.30	2,426	8,006
1995	3.30	1,872	6,178
1996	3.40	1,435	4,879
1997	3.40	1,388	4,719
1998	2.40	1,660	3,984
1999	2.00	2,188	4,376
2000	2.17	2,022	4,388
2001	3.20	2,857	9,142

Return year	Fish/Redd	Redds	Total spawning escapement
2002	2.30	5,419	12,464
2003	2.24	4,328	9,695
2004	2.15	3,764	8,093
2005	2.46	3,327	8,184
2006	2.00	8,896 [a]	17,792
2007	2.33	1,970 [a]	4,590
2008	2.32	2,800[a]	6,496
Average	***2.84***	***2,950***	***7,892***

[a] These are total counts based on expanded peak counts. All others are peak counts.

6.6 Carcass Surveys

Surveys for Wenatchee summer Chinook carcasses were conducted during late September to mid-November, 2008, in the Wenatchee River and Icicle Creek.

Number sampled

A total of 1,192 summer Chinook carcasses were sampled during October through mid-November in the Wenatchee Basin in 2008 (Table 6.15).

Table 6.15. Numbers of summer Chinook carcasses sampled within each survey reach in the Wenatchee Basin, 1993-2008. Reach codes are described in Table 2.10.

Survey year	Number of summer Chinook carcasses											
	W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10	Icicle	Total
1993	61	138	627	12	77	141	202	38	0	0	0	**1,296**
1994	0	6	22	1	17	48	18	47	125	1	0	**285**
1995	0	10	14	0	0	111	49	36	19	0	0	**239**
1996	0	5	67	39	9	190	26	30	41	0	0	**407**
1997	1	44	118	4	28	288	7	71	67	13	0	**641**
1998	6	74	141	3	0	248	28	346	324	59	0	**1,229**
1999	0	160	97	15	31	857	61	133	171	72	0	**1,597**
2000	7	109	165	7	79	651	75	111	159	193	0	**1,556**
2001	0	45	127	26	0	323	33	110	87	81	0	**832**
2002	0	238	170	0	196	809	0	306	520	155	6	**2,400**
2003	6	323	164	61	132	673	56	237	482	47	36	**2,217**
2004	8	141	181	157	158	975	87	312	428	366	5	**2,818**
2005	8	85	106	39	46	707	70	140	353	257	7	**1,818**
2006	22	140	160	64	112	953	435	343	703	658	18	**3,608**
2007	3	15	49	9	26	475	38	38	96	91	8	**848**
2008	10	34	63	36	36	678	47	42	103	143	8	**1,200**
Mean	***8***	***98***	***142***	***30***	***59***	***508***	***77***	***146***	***230***	***134***	***5***	***1,437***

Carcass Distribution and Origin

Summer Chinook carcasses were not evenly distributed among reaches within the Wenatchee Basin in 2008 (Table 6.15; Figure 6.4). Most of the carcasses in the Wenatchee Basin were found upstream from the Leavenworth Bridge. The highest percentage of carcasses (57%) was sampled in Reach 6 near the confluence of the Icicle River.

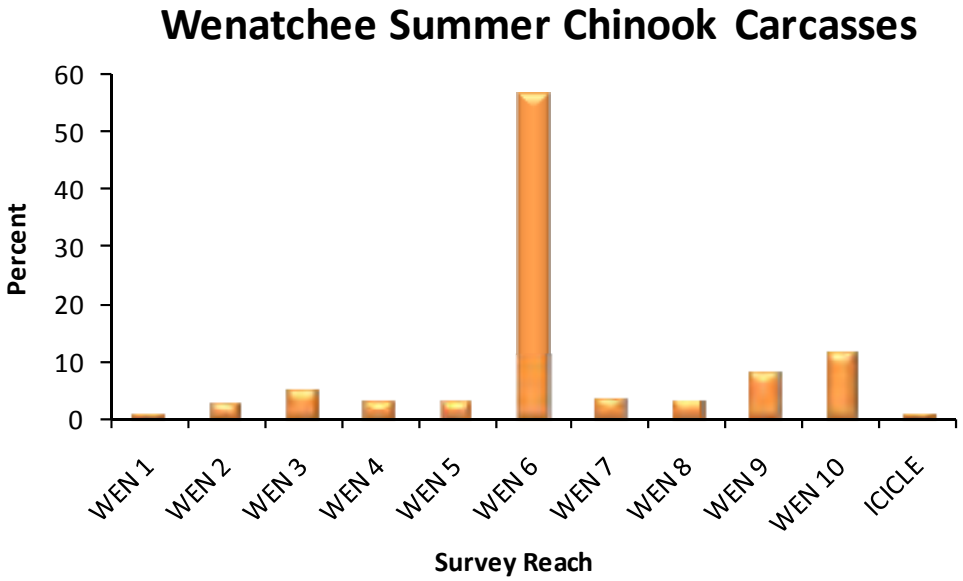


Figure 6.4. Percent of summer Chinook carcasses sampled within different reaches in the Wenatchee Basin during September through mid-November, 2008. Reach codes are described in Table 2.10.

Numbers of wild and hatchery origin summer Chinook carcasses sampled in 2008 will be available after analysis of CWTs and scales. Based on the available data (1993-2007), most fish, regardless of origin, were found in Reach 6 (Leavenworth Bridge to Icicle Road Bridge) (Table 6.16). However, a larger percentage of hatchery fish were found in that reach than were wild fish (Figure 6.5). In contrast, a larger percentage of wild fish were found in reaches upstream from the Icicle Road Bridge.

Table 6.16. Numbers of wild and hatchery summer Chinook carcasses sampled within different reaches in the Wenatchee Basin, 1993-2007.

Survey year	Origin	Survey reach											Total
		W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10	Icicle	
1993	Wild	52	133	591	11	77	124	200	37	0	0	0	**1,225**
	Hatchery	9	5	36	1	0	17	2	1	0	0	0	**71**
1994	Wild	0	2	15	1	15	34	18	47	124	1	0	**257**
	Hatchery	0	4	7	0	2	14	0	0	1	0	0	**28**
1995	Wild	0	4	11	0	0	99	49	34	19	0	0	**216**
	Hatchery	0	6	3	0	0	12	0	2	0	0	0	**23**

Survey year	Origin	Survey reach											Total
		W-1	W-2	W-3	W-4	W-5	W-6	W-7	W-8	W-9	W-10	Icicle	
1996	Wild	0	5	65	37	8	181	26	30	41	0	0	**393**
	Hatchery	0	0	2	2	1	9	0	0	0	0	0	**14**
1997	Wild	1	35	104	4	21	242	7	71	66	13	0	**564**
	Hatchery	0	9	14	0	7	46	0	0	1	0	0	**77**
1998	Wild	6	55	106	2	0	169	25	325	297	56	0	**1,041**
	Hatchery	0	19	35	1	0	79	3	21	27	3	0	**188**
1999	Wild	0	79	55	7	14	525	51	124	155	68	0	**1,078**
	Hatchery	0	81	42	8	17	332	10	9	16	4	0	**519**
2000	Wild	4	68	102	6	51	443	68	100	154	186	0	**1,182**
	Hatchery	3	41	63	1	28	208	7	11	5	7	0	**374**
2001	Wild	0	33	88	4	0	230	29	108	83	78	0	**653**
	Hatchery	0	12	39	22	0	93	4	2	4	3	0	**179**
2002	Wild	0	140	110	0	94	440	0	295	514	150	4	**1,747**
	Hatchery	0	98	60	0	102	369	0	11	6	5	2	**653**
2003	Wild	5	218	118	21	94	425	52	223	445	46	11	**1,658**
	Hatchery	1	105	46	40	38	248	4	14	37	1	25	**559**
2004	Wild	7	108	151	102	97	640	74	282	416	357	0	**2,234**
	Hatchery	1	33	30	55	61	335	13	30	12	9	5	**584**
2005	Wild	4	49	78	24	26	397	66	125	336	243	0	**1,348**
	Hatchery	4	36	28	15	20	310	4	15	17	14	7	**470**
2006	Wild	16	108	133	46	80	753	426	336	700	654	5	**3,257**
	Hatchery	6	32	27	18	32	200	9	7	3	4	13	**351**
2007	Wild	1	9	29	2	16	241	36	37	96	91	3	**561**
	Hatchery	2	6	20	7	10	234	2	1	0	0	5	**287**
Average	***Wild***	***6***	***70***	***117***	***18***	***40***	***330***	***75***	***145***	***230***	***130***	***2***	***1,161***
	Hatchery	***2***	***32***	***30***	***11***	***21***	***167***	***4***	***8***	***9***	***3***	***4***	***292***

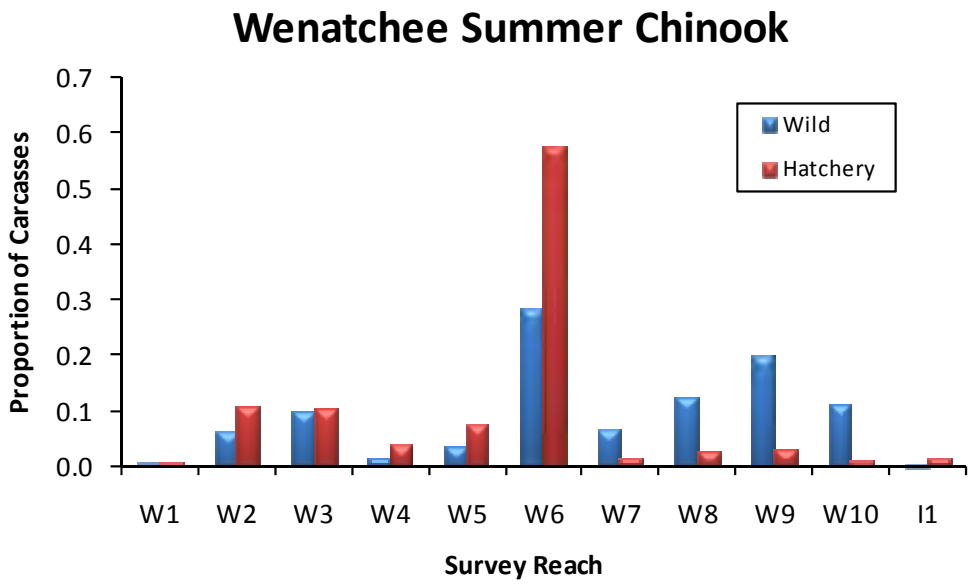


Figure 6.5. Distribution of wild and hatchery produced carcasses in different reaches in the Wenatchee Basin, 1993-2007. Reach codes are described in Table 2.10.

Sampling Rate

If escapement is based on total numbers of redds (based on peak expansion), then about 19% of the total spawning escapement of summer Chinook in the Wenatchee Basin was sampled in 2008 (Table 6.17). Sampling rates among survey reaches varied from 9 to 71%.

Table 6.17. Number of redds and carcasses, total spawning escapement, and sampling rates for summer Chinook in the Wenatchee Basin, 2008.

Sampling reach	Total number of redds	Total number of carcasses	Total spawning escapement	Sampling rate
Wenatchee 1	15	10	35	0.29
Wenatchee 2	137	34	318	0.11
Wenatchee 3	227	63	527	0.12
Wenatchee 4	22	36	51	0.71
Wenatchee 5	56	36	130	0.28
Wenatchee 6	1,125	678	2,610	0.26
Wenatchee 7	215	47	499	0.09
Wenatchee 8	139	42	322	0.13
Wenatchee 9	491	103	1,139	0.09
Wenatchee 10	350	143	812	0.18
Icicle Creek	23	8	53	0.15
Total	***2,800***	***1,200***	***6,496***	***0.19***

Length Data

Mean lengths (POH, cm) of male and female summer Chinook carcasses sampled during surveys in the Wenatchee Basin in 2008 are provided in Table 6.18. The average size of males and females sampled in the Wenatchee basin were 67 cm and 70 cm, respectively.

Table 6.18. Mean lengths (postorbital-to-hypural length; cm) and standard deviations (in parentheses) of male and female summer Chinook carcasses sampled in different streams/watersheds in the Wenatchee Basin, 2008.

Stream/watershed	Mean length (cm)	
	Male	Female
Wenatchee 1	69.6 (7.7)	70.0 (-)
Wenatchee 2	64.7 (9.4)	67.4 (4.9)
Wenatchee 3	67.3 (14.3)	71.5 (6.5)
Wenatchee 4	67.9 (13.2)	69.0 (3.7)
Wenatchee 5	64.8 (11.6)	73.2 (3.3)
Wenatchee 6	67.1 (10.6)	71.0 (5.6)
Wenatchee 7	65.2 (11.3)	70.3 (5.5)
Wenatchee 8	65.6 (12.5)	68.5 (5.4)
Wenatchee 9	68.9 (8.2)	69.4 (5.2)
Wenatchee 10	66.4 (7.0)	68.7 (4.4)
Icicle Creek	71.0 (2.8)	67.0 (3.6)
Total	***67***	***70***

6.7 Life History Monitoring

Life history characteristics of Wenatchee summer Chinook were assessed by examining carcasses on spawning grounds and fish collected or examined at broodstock collection sites, and by reviewing tagging data and fisheries statistics.

Migration Timing

Migration timing of hatchery and wild Wenatchee summer Chinook was determined from broodstock data and stock assessment data collected at Dryden Dam. Sampling at Dryden Dam occurs from early July through mid-October. During that period, wild summer Chinook arrived about 1-2 weeks before hatchery Chinook (Table 6.19). This was true throughout the migration period. This pattern was also observed when data were pooled for the 2007-2008 survey period.

Table 6.19. The week that 10%, 50% (median), and 90% of the wild and hatchery summer Chinook salmon passed Dryden Dam, 2007-2008. The average week is also provided. Migration timing is based on collection of summer Chinook broodstock at Dryden Dam.

Survey year	Origin	Wenatchee Summer Chinook Migration Time (week)				Sample size
		10 Percentile	50 Percentile	90 Percentile	Mean	
2007	Wild	28	31	37	31	274
	Hatchery	30	33	41	35	305
2008	Wild	29	31	40	32	219
	Hatchery	32	37	41	37	576
Average	Wild	***29***	***31***	***39***	***32***	***247***
	Hatchery	***31***	***35***	***41***	***36***	***441***

Age at Maturity

Most of the wild and hatchery summer Chinook sampled during the period 1993-2007 in the Wenatchee Basin were age-5 fish (total age) (Table 6.20; Figure 6.6). A higher percentage of age-4 wild Chinook returned to the basin than did age-4 hatchery Chinook. In contrast, a higher proportion of age-6 hatchery fish returned than did age-6 wild fish. Thus, a higher percentage of hatchery fish returned at an older age than did wild fish.

Table 6.20. Proportions of wild and hatchery summer Chinook of different ages (total age) sampled on spawning grounds in the Wenatchee Basin, 1993-2007.

Sample year	Origin	Total age						Sample size
		2	3	4	5	6	7	
1993	Wild	0.00	0.03	0.42	0.55	0.00	0.00	1,224
	Hatchery	0.00	0.03	0.91	0.06	0.00	0.00	69
1994	Wild	0.01	0.03	0.44	0.52	0.00	0.00	257
	Hatchery	0.00	0.00	0.12	0.88	0.00	0.00	25
1995	Wild	0.00	0.03	0.19	0.74	0.05	0.00	216
	Hatchery	0.00	0.00	0.00	0.05	0.95	0.00	22
1996	Wild	0.00	0.02	0.36	0.60	0.02	0.00	513
	Hatchery	0.00	0.00	0.45	0.18	0.27	0.09	22
1997	Wild	0.00	0.01	0.38	0.57	0.03	0.00	562
	Hatchery	0.00	0.05	0.20	0.66	0.08	0.00	74
1998	Wild	0.00	0.03	0.34	0.62	0.01	0.00	1,041
	Hatchery	0.00	0.03	0.51	0.40	0.06	0.00	187
1999	Wild	0.00	0.01	0.43	0.55	0.01	0.00	1,087
	Hatchery	0.00	0.01	0.16	0.81	0.03	0.00	512
2000	Wild	0.01	0.04	0.27	0.68	0.00	0.00	1,182
	Hatchery	0.00	0.07	0.12	0.65	0.15	0.00	342
2001	Wild	0.00	0.08	0.59	0.32	0.01	0.00	653

Sample year	Origin	Total age						Sample size
		2	3	4	5	6	7	
	Hatchery	0.00	0.05	0.76	0.15	0.04	0.00	182
2002	Wild	0.00	0.03	0.66	0.31	0.00	0.00	1,747
	Hatchery	0.00	0.01	0.19	0.78	0.02	0.00	643
2003	Wild	0.00	0.02	0.34	0.64	0.00	0.00	1,649
	Hatchery	0.00	0.06	0.11	0.75	0.09	0.00	522
2004	Wild	0.00	0.06	0.13	0.80	0.01	0.00	2,234
	Hatchery	0.00	0.09	0.57	0.25	0.09	0.00	561
2005	Wild	0.00	0.04	0.60	0.32	0.04	0.00	1,186
	Hatchery	0.00	0.02	0.10	0.86	0.02	0.00	451
2006	Wild	0.00	0.01	0.15	0.84	0.01	0.00	2,972
	Hatchery	0.00	0.02	0.17	0.26	0.55	0.00	299
2007	Wild	0.01	0.08	0.20	0.62	0.10	0.00	479
	Hatchery	0.00	0.01	0.15	0.76	0.06	0.03	275
Average	***Wild***	***0.00***	***0.03***	***0.34***	***0.61***	***0.01***	***0.00***	***1,133***
	Hatchery	***0.00***	***0.04***	***0.26***	***0.60***	***0.10***	***0.00***	***279***

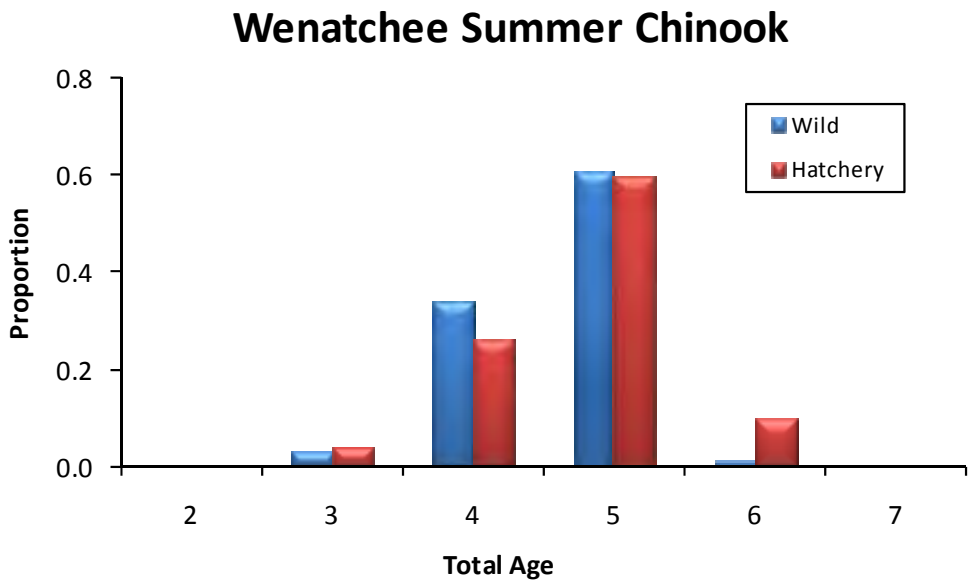


Figure 6.6. Proportions of wild and hatchery summer Chinook of different total ages sampled at broodstock collection sites and on spawning grounds in the Wenatchee Basin for the combined years 1993-2007.

Size at Maturity

On average, hatchery summer Chinook were about 5 cm smaller than wild summer Chinook sampled in the Wenatchee Basin (Table 6.21). This is interesting given that a slightly higher percentage of

hatchery fish returned as age-5 and 6 fish than did wild fish. Future analyses will compare sizes of hatchery and wild fish of the same age groups and gender.

Table 6.21. Mean lengths (POH; cm) and variability statistics for wild and hatchery summer Chinook sampled in the Wenatchee Basin, 1993-2007; SD = 1 standard deviation.

Sample year	Origin	Sample size	Summer Chinook length (POH; cm)			
			Mean	SD	Minimum	Maximum
1993	Wild	1,344	73	8	33	94
	Hatchery	68	61	9	37	83
1994	Wild	276	73	8	31	89
	Hatchery	25	70	8	54	85
1995	Wild	225	75	7	48	87
	Hatchery	23	74	7	57	85
1996	Wild	210	74	7	43	92
	Hatchery	9	66	12	52	84
1997	Wild	615	74	8	29	99
	Hatchery	78	69	10	29	83
1998	Wild	1,179	73	8	28	97
	Hatchery	188	67	10	37	87
1999	Wild	1,218	72	8	29	95
	Hatchery	518	71	8	26	94
2000	Wild	1,302	71	10	24	94
	Hatchery	369	69	11	33	91
2001	Wild	730	70	9	30	93
	Hatchery	179	63	10	28	86
2002	Wild	1,914	72	8	39	94
	Hatchery	653	71	8	34	95
2003	Wild	1,950	74	9	24	105
	Hatchery	546	69	10	26	97
2004	Wild	2,571	72	9	32	98
	Hatchery	580	59	11	25	91
2005	Wild	1,352	69	7	41	92
	Hatchery	469	69	8	39	91
2006	Wild	3,249	74	6	29	99
	Hatchery	350	71	9	35	90
2007	Wild	566	73	9	29	92
	Hatchery	269	70	7	45	87
Pooled	***Wild***	***18,701***	***73***	***8***	***24***	***105***
	Hatchery	***4,324***	***68***	***9***	***25***	***97***

Contribution to Fisheries

Most of the harvest on Wenatchee summer Chinook occurred in the ocean (Table 6.22). Ocean harvest has made up 50% to 100% of all Wenatchee summer Chinook harvested. Total harvest on early brood years (1990-1993) was much lower than for later brood years (1997-2002).

Table 6.22. Estimated number and percent (in parentheses) of Wenatchee summer Chinook captured in different fisheries.

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational (sport)	
1989	1,461 (50)	1,292 (44)	140 (5)	20 (1)	2,913
1990	30 (100)	0 (0)	0 (0)	0 (0)	30
1991	30 (63)	0 (0)	0 (0)	18 (38)	48
1992	144 (79)	39 (21)	0 (0)	0 (0)	183
1993	44 (64)	25 (36)	0 (0)	0 (0)	69
1994	625 (91)	57 (8)	7 (1)	0 (0)	689
1995	508 (97)	3 (1)	11 (2)	0 (0)	522
1996	183 (95)	0 (0)	3 (2)	6 (3)	192
1997	2,929 (95)	38 (1)	23 (1)	106 (3)	3,096
1998	4,953 (92)	48 (0)	96 (2)	280 (5)	5,377
1999	1,610 (85)	7 (0)	182 (10)	100 (5)	1,899
2000	7,822 (73)	51 (0)	1,630 (15)	1,204 (11)	10,707
2001	1,071 (61)	9 (1)	332 (19)	348 (20)	1,760
2002	1,659 (62)	2 (0)	670 (25)	342 (13)	2,673

Straying

Stray rates were determined by examining CWTs recovered on spawning grounds within and outside the Wenatchee Basin. Targets for strays based on return year (recovery year) and brood year should be less than 5%.

On average, rates of Wenatchee summer Chinook straying into basins outside the Wenatchee have been low (Table 6.23). Although Wenatchee summer Chinook have strayed into other spawning areas, straying has generally been less than 5%. In three different years, Wenatchee strays have made up more than 5% of the spawning escapement in the Methow Basin, Chelan tailrace, and the Entiat Basin.

Table 6.23. Number and percent of spawning escapements within other non-target basins that consisted of Wenatchee summer Chinook, return years 1994-2005. For example, for return year 2000, 3% of the summer Chinook escapement in the Methow Basin consisted of Wenatchee summer Chinook. Percent strays should be less than 5%.

Return year	Methow		Okanogan		Chelan		Entiat		Hanford Reach	
	Number	%	Number	%	Number	%	Number	%	Number	%
1994	0	0.0	75	1.9	-	-	-	-	-	-
1995	0	0.0	0	0.0	-	-	-	-	-	-
1996	0	0.0	0	0.0	-	-	-	-	-	-
1997	0	0.0	0	0.0	-	-	-	-	-	-
1998	25	3.7	0	0.0	0	0.0	0	0.0	0	0.0
1999	20	2.0	3	0.1	0	0.0	0	0.0	13	0.1
2000	36	3.0	13	0.4	0	0.0	0	0.0	0	0.0
2001	163	5.9	57	0.5	30	3.0	0	0.0	0	0.0
2002	153	3.3	53	0.4	40	6.9	74	14.8	0	0.0
2003	80	2.0	24	0.7	44	10.5	132	19.1	26	0.0
2004	113	5.2	42	0.6	30	7.1	0	0.0	0	0.0
2005	245	9.6	67	0.8	51	11.5	49	13.4	0	0.0
Total	***835***	***3.7***	***334***	***0.5***	***195***	***5.9***	***255***	***11.0***	***39***	***0.0***

On average, about 11.2% of the returns have strayed into non-target spawning areas, exceeding the target of 5% (Table 6.24). Depending on brood year, percent strays into non-target spawning areas have ranged from 0-23.1%. In addition, on average, about 6.4% have strayed into non-target hatchery programs.

Table 6.24. Number and percent of Wenatchee summer Chinook that homed to target spawning areas and the target hatchery program, and number and percent that strayed to non-target spawning areas and non-target hatchery programs, by brood years 1989-2002. Percent stays should be less than 5%.

Brood year	Homing				Straying			
	Target stream		Target hatchery		Non-target streams		Non-target hatcheries	
	Number	%	Number	%	Number	%	Number	%
1989	1,352	62.9	60	2.8	75	3.5	662	30.8
1990	74	84.1	1	1.1	0	0.0	13	14.8
1991	14	60.9	1	4.3	0	0.0	8	34.8
1992	375	84.8	7	1.6	0	0.0	60	13.6
1993	67	72.8	9	9.8	4	4.3	12	13.0
1994	890	71.8	205	16.5	56	4.5	88	7.1
1995	748	74.8	139	13.9	42	4.2	71	7.1
1996	261	70.4	42	11.3	53	14.3	15	4.0
1997	3,609	85.6	171	4.1	396	9.4	38	0.9
1998	1,790	78.5	11	0.5	416	18.2	64	2.8

Brood year	Homing				Straying			
	Target stream		Target hatchery		Non-target streams		Non-target hatcheries	
	Number	%	Number	%	Number	%	Number	%
1999	507	79.7	0	0.0	121	19.0	8	1.3
2000	2,710	82.8	0	0.0	526	16.1	35	1.1
2001	464	81.8	0	0.0	96	16.9	7	1.2
2002	325	76.5	0	0.0	98	23.1	2	0.5
Total	***13,186***	***78.5***	***646***	***3.8***	***1,883***	***11.2***	***1,083***	***6.4***

Genetics

Tissue (operculum) samples were collected from 144 wild and 144 hatchery summer Chinook in the Wenatchee Basin in 2008. Results from genetic samples should be available in 2009.

Proportion of Natural Influence

Another method for assessing the genetic risk of a supplementation program is to determine the influence of the hatchery and natural environments on the adaptation of the composite population. This is estimated by the proportion of natural origin fish in the hatchery broodstock (pNOB) and the proportion of hatchery origin fish in the natural spawning escapement (pHOS). The ratio pNOB/(pHOS+pNOB) is the Proportion of Natural Influence (PNI). The larger the ratio (PNI), the greater the strength of selection in the natural environment relative to that of the hatchery environment. In order for the natural environment to dominate selection, PNI should be greater than 0.5 (HSRG/WDFW/NWIFC 2004).

For brood years 1989-2006, the PNI was consistently greater than 0.5 (Table 6.25). This indicates that the natural environment has a greater influence on adaptation of Wenatchee summer Chinook than does the hatchery environment.

Table 6.25. Proportionate natural influence (PNI) of the Wenatchee summer Chinook supplementation program for brood years 1989-2006. PNI was calculated as the proportion of naturally produced Chinook in the hatchery broodstock (pNOB) divided by the proportion of hatchery Chinook on the spawning grounds (pHOS) plus pNOB. NOS = number of natural origin Chinook on the spawning grounds; HOS = number of hatchery origin Chinook on the spawning grounds; NOB = number of natural origin Chinook collected for broodstock; and HOB = number of hatchery origin Chinook included in hatchery broodstock.

Brood year	Spawners			Broodstock			PNI
	NOS	HOS	pHOS	NOB	HOB	pNOB	
1989	11,325	0	0.00	290	0	1.00	1.00
1990	8,677	0	0.00	57	0	1.00	1.00
1991	8,066	0	0.00	105	0	1.00	1.00
1992	9,312	0	0.00	274	0	1.00	1.00
1993	6,974	495	0.07	406	44	0.90	0.93
1994	6,673	1,333	0.17	333	54	0.86	0.84
1995	5,474	704	0.11	363	16	0.96	0.89

Brood year	Spawners			Broodstock			PNI
	NOS	HOS	pHOS	NOB	HOB	pNOB	
1996	4,748	131	0.03	263	3	0.99	0.97
1997	4,306	413	0.09	205	13	0.94	0.91
1998	3,321	663	0.17	299	78	0.79	0.83
1999	3,209	1,167	0.27	242	236	0.51	0.65
2000	3,521	867	0.20	275	180	0.60	0.75
2001	6,301	2,841	0.31	210	136	0.61	0.66
2002	9,368	3,096	0.25	409	10	0.98	0.80
2003	8,010	1,579	0.16	337	7	0.98	0.86
2004	6,993	1,099	0.14	424	2	1.00	0.88
2005	6,373	1,812	0.22	397	3	0.99	0.82
2006	16,064	1,728	0.10	433	4	0.99	0.91
Average	***7,151***	***996***	***0.12***	***296***	***44***	***0.87***	***0.88***

Natural and Hatchery Replacement Rates

Natural replacement rates (NRR) were calculated as the ratio of natural origin recruits (NOR) to the parent spawning population (spawning escapement). For brood years 1989-2001, NRR for summer Chinook in the Wenatchee averaged 1.03 (range, 0.39-3.01) if harvested fish were not include in the estimate and 2.81 (range, 0.63-10.65) if harvested fish were included in the estimate (Table 6.26). NRRs for more recent brood years will be calculated as soon as all tag recoveries and sampling rates have been loaded into the database.

Hatchery replacement rates (HRR) are the hatchery adult-to-adult returns and were calculated as the ratio of hatchery origin recruits (HOR) to the parent broodstock collected. These rates should be greater than the NRRs and greater than or equal to 5.30 (the calculated target value in Murdoch and Peven 2005). HRRs exceeded NRRs in eight or nine of the 12 years of data depending on if harvest was or was not included in the estimate (Table 6.26). Hatchery replacement rates for Wenatchee summer Chinook have exceeded the estimated target value of 5.30 in three or four of the 12 years of data depending on if harvest was or was not included in the estimate.

Table 6.26. Broodstock collected, spawning escapements, natural and hatchery origin recruits (NOR and HOR), and natural and hatchery replacement rates (NRR and HRR; with and without harvest) for summer Chinook in the Wenatchee Basin, brood years 1989-2001. *(The numbers in this table may change as the HETT and HC refine the methods for estimating summer Chinook HRRs and NRRs.)*

Brood year	Broodstock Collected	Spawning Escapement	Harvest not included				Harvest included			
			HOR	NOR	HRR	NRR	HOR	NOR	HRR	NRR
1989	346	11,325	2,149	8,995	6.21	0.79	5,062	15,645	14.63	1.38
1990	84	8,677	88	8,063	1.01	0.93	118	11,688	1.36	1.35
1991	128	8,066	23	4,487	0.18	0.56	71	7,112	0.55	0.88
1992	341	9,312	442	4,601	1.30	0.49	625	6,726	1.83	0.72
1993	524	7,469	92	4,102	0.18	0.55	161	5,346	0.31	0.72
1994	418	8,006	1,239	3,151	2.96	0.39	1,928	5,051	4.61	0.63
1995	398	6,178	1,000	4,025	2.51	0.65	1,522	8,010	3.82	1.30
1996	334	4,879	371	3,406	1.11	0.70	563	9,194	1.69	1.88
1997	240	4,719	4,214	7,526	17.56	1.59	7,310	23,626	30.46	5.01
1998	472	3,984	2,281	12,009	4.83	3.01	7,658	42,431	16.22	10.65
1999	488	4,376	636	8,732	1.30	2.00	2,535	30,580	5.19	6.99
2000	492	4,388	3,271	3,118	6.65	0.71	13,978	9,593	28.41	2.19
2001	493	9,142	567	NA	1.15	NA	2,327	NA	4.72	NA
Average	***366***	***6,963***	***1,259***	***6,018***	***3.44***	***1.03***	***3,374***	***14,584***	***9.21***	***2.81***

Smolt-to-Adult Survivals

Smolt-to-adult survival ratios (SARs) were calculated as the number of hatchery adults divided by the number of hatchery smolts released. SARs were based on CWT returns. For the available brood years, SARs have ranged from 0.00037 to 0.01673 for hatchery summer Chinook in the Wenatchee basin (Table 6.27).

Table 6.27. Smolt-to-adult ratios (SARs) for Wenatchee hatchery summer Chinook, brood years 1989-2002.

Brood year	Number of tagged smolts released	Estimated adult captures	SAR
1989	144,905	1,017	0.00702
1990	119,214	115	0.00096
1991	190,371	71	0.00037
1992	605,055	610	0.00101
1993	210,626	161	0.00076
1994	452,340	1,903	0.00421
1995	668,409	1,489	0.00223
1996	585,590	555	0.00095
1997	434,645	7,272	0.01673
1998	641,109	7,584	0.01183

Brood year	Number of tagged smolts released	Estimated adult captures	SAR
1999	988,328	2,512	0.00254
2000	903,368	13,632	0.01509
2001	596,618	2,312	0.00388
2002	805,919	3,012	0.00374
Average	***524,750***	***3,018***	***0.00509***

6.8 ESA/HCP Compliance

Broodstock Collection

Per the 2006 broodstock collection protocol, 492 natural-origin (adipose fin present) summer Chinook adults were targeted for collection at Dryden and Tumwater dams. Because of inventory errors during collection, the actual 2006 collection totaled 494 summer Chinook. Collection at Dryden Dam began 5 June 2005 and concluded 15 August 2005 and accounted for the entire 2006 BY broodstock collection.

Summer Chinook and steelhead broodstock collections occurred concurrently at Dryden Dam; therefore, steelhead and spring Chinook encounters at Dryden Dam during Wenatchee summer Chinook broodstock collection were attributable to steelhead broodstock collections authorized under ESA Permit 1395 take authorizations. No steelhead or spring Chinook takes were associated with the Wenatchee summer Chinook collection.

Consistent with impact minimization measures in ESA Permit 1347, all ESA-listed species handled during summer Chinook broodstock collection were subject to water-to-water transfers or anesthetized if removed from water during handling.

Hatchery Rearing and Release

The 2006 Wenatchee summer Chinook program released an estimated 950,657 smolts, representing 110% of the 864,000 programmed production. While production exceeded the planned/permitted production of 864,000 smolts, it was within a 10% allowance identified in ESA permit 1347.

Hatchery Effluent Monitoring

Per ESA Permits 1196, 1347, and 1395, permit holders shall monitor and report hatchery effluents in compliance with applicable National Pollution Discharge Elimination Systems (NPDES) (EPA 1999) permit limitations. There were no NPDES violations reported at Chelan PUD Hatchery facilities during the period 1 January 2008 through 31 December 2008. NPDES monitoring and reporting for Chelan PUD Hatchery Programs during 2008 are provided in Appendix E.

Smolt and Emigrant Trapping

ESA-listed spring Chinook and steelhead were encountered during operation of the Lower Wenatchee Trap. ESA takes are reported in the steelhead (Section 3.8) and spring Chinook (Section 5.8) sections and are not repeated here.

Spawning Surveys

Summer Chinook spawning ground surveys conducted in the Wenatchee Basin during 2008 were consistent with ESA Section 10 Permit No. 1347. Because of the difficulty of quantifying the level of take associated with spawning ground surveys, the Permit does not specify a take level associated with these activities, even though it does authorize implementation of spawning ground surveys. Therefore, no take levels are reported. However, to minimize potential impacts to established redds, wading was restricted to the extent practical, and extreme caution was used to avoid established redds when wading was required.

SECTION 7: METHOW SUMMER CHINOOK

7.1 Broodstock Sampling

This section focuses on results from sampling 2006-2007 Methow summer Chinook broodstock, which were collected in the East Ladder of Wells Dam. Summer Chinook adults collected at Wells Dam are also used in the Okanogan/Similkameen supplementation program. Complete information is not currently available for the 2008 return (this information will be provided in the 2009 annual report).

Origin of Broodstock

Both 2006 and 2007 broodstock consisted almost entirely of natural origin (adipose fin present) summer Chinook (Table 7.1). These fish were used for both the Methow and Okanogan supplementation programs. Less than 3% of the fish spawned were hatchery origin fish (hatchery origin was determined by examination of scales and CWTs).

Table 7.1. Numbers of wild and hatchery summer Chinook collected for broodstock, numbers that died before spawning, and numbers of Chinook spawned for the Methow/Okanogan programs, 1989-2007. Unknown origin fish (i.e., undetermined by scale analysis, no CWT or fin clips, and no additional hatchery marks) were considered naturally produced. Mortality includes fish that died of natural causes typically near the end of spawning and were not needed for the program and surplus fish killed at spawning.

Brood year	Wild summer Chinook					Hatchery summer Chinook					Total number spawned
	Number collected	Prespawn loss	Mortality	Number spawned	Number released	Number collected	Prespawn loss	Mortality	Number spawned	Number released	
1989[a]	1,419	72	-	1,297	-	341	17	-	312	-	1,609
1990[a]	864	34	-	828	-	214	8	-	206	-	1,034
1991[a]	1,003	59	-	924	-	341	20	-	314	-	1,238
1992[a]	312	6	-	297	-	428	9	-	406	-	703
1993[a]	813	48	-	681	-	464	28	-	388	-	1,069
1994	385	33	11	341	12	266	15	7	244	1	585
1995	254	13	10	173	58	351	28	9	240	74	413
1996	316	15	11	290	0	234	2	9	223	0	513
1997	214	11	5	198	0	308	24	20	264	0	462
1998	239	28	58	153	0	348	18	119	211	0	364
1999	248	5	19	224	0	307	2	16	289	0	513
2000	184	15	5	164	0	373	17	17	339	0	503
2001	135	8	36	91	0	423	29	128	266	0	357
2002	270	2	21	247	0	285	11	33	241	0	488
2003	449	14	53	381	0	112	2	9	101	0	482
2004	541	23	12	506	0	17	0	1	16	0	522
2005	551	29	76	391	55	12	2	0	9	1	400
2006	579	50	10	500	19	12	2	0	10	0	510
2007	504	22	26	456	0	19	0	2	17	0	473
Average[b]	***348***	***19***	***25***	***294***	***9***	***219***	***11***	***26***	***176***	***5***	***470***

[a] Number of fish spawned and collected during these years included fish retained from the right- and left-bank ladder traps at Wells Dam and fish collected from the volunteer channel. There was no distinction made between fish collected at trap locations and program (i.e., aggregated population used for Wells, Methow, and Okanogan summer Chinook programs).

[b] Because of bias from aggregating the spawning population from 1989-1993, averages are based on adult numbers collected from 1994-2006.

Age/Length Data

Ages of summer Chinook broodstock were determined from analysis of scales and/or CWTs. Broodstock collected from the 2006 return consisted primarily of age-4 and age-5 natural origin Chinook (92%). Age-2, 3, and 6 natural origin fish collectively made up 6% of the broodstock (Table 7.2). The six hatchery Chinook included in the broodstock were age-5 fish. Note that according to broodstock protocol, age-3 males are limited to no more than 10% of the total broodstock collection.

Broodstock collected from the 2007 return consisted primarily of age-4 and age-5 natural origin Chinook (78%). Age-3 natural origin fish made up 15% of the broodstock, and age-2 and 6 natural origin fish collectively made up 6% of the broodstock (Table 7.2). The 19 hatchery Chinook included in the broodstock were primarily age-5 fish.

Table 7.2. Percent of hatchery and wild summer Chinook of different ages (total age) collected from broodstock for the Methow/Okanogan programs, 1991-2007.

Return Year	Origin	Total age				
		2	3	4	5	6
1991	Wild	0.5	6.8	35.1	55.4	2.2
	Hatchery	0.5	5.1	36.2	49.0	9.2
1992	Wild	0.0	13.1	36.2	50.7	0.0
	Hatchery	0.0	0.0	0.0	0.0	0.0
1993	Wild	0.0	3.9	75.3	20.8	0.0
	Hatchery	0.0	1.0	85.9	13.1	0.0
1994	Wild	3.1	9.7	26.3	60.3	0.6
	Hatchery	0.0	14.7	11.3	74.0	0.0
1995	Wild	0.0	4.6	15.2	75.6	4.6
	Hatchery	0.0	0.4	13.0	25.6	61.0
1996	Wild	0.0	8.4	56.6	30.4	4.6
	Hatchery	0.0	3.0	31.0	47.0	19.0
1997	Wild	1.0	9.3	52.9	34.8	2.0
	Hatchery	0.0	20.7	10.8	62.0	6.5
1998	Wild	2.0	14.1	54.8	29.1	0.0
	Hatchery	2.3	18.5	56.6	15.9	6.7
1999	Wild	4.7	5.1	53.7	36.0	0.5
	Hatchery	0.3	3.6	28.0	66.1	2.0
2000	Wild	0.6	14.0	28.7	56.1	0.6
	Hatchery	0.0	27.0	14.3	54.3	4.3
2001	Wild	7.1	26.0	52.0	11.8	3.1

Return Year	Origin	Total age				
		2	3	4	5	6
	Hatchery	0.3	19.8	68.1	9.5	2.3
2002	Wild	0.4	17.4	66.0	16.2	0.0
	Hatchery	0.0	2.4	39.4	58.2	0.0
2003	Wild	0.7	3.9	65.9	29.5	0.0
	Hatchery	0.9	5.6	18.5	69.4	5.6
2004	Wild	0.8	15.3	11.6	72.1	0.2
	Hatchery	0.0	6.7	53.3	33.3	6.7
2005	Wild	0.0	17.2	69.9	11.0	1.9
	Hatchery	0.0	1.0	40.0	50.0	0.0
2006	Wild	1.6	3.0	41.0	52.9	1.5
	Hatchery	0.0	16.7	25.0	50.0	8.3
2007	Wild	1.8	15.3	8.2	70.2	4.5
	Hatchery	0.0	0.0	21.1	57.9	21.0
Average	***Wild***	***1.4***	***11.0***	***44.1***	***41.9***	***1.6***
	Hatchery	***0.3***	***8.6***	***32.5***	***43.3***	***9.0***

Mean lengths of natural origin summer Chinook of a given age differed little between 2006 and 2007 (Table 7.3). For all age groups, mean lengths of natural origin adults were larger than hatchery origin fish of the same age (Table 7.3). These differences may be related to the small sample size of hatchery origin fish (i.e., few hatchery fish were included in the broodstock).

Table 7.3. Mean fork length (cm) at age (total age) of hatchery and wild Methow/Okanogan summer Chinook collected from broodstock for the Methow/Okanogan programs, 1991-2007; N = sample size and SD = 1 standard deviation.

Return year	Origin	Summer Chinook fork length (cm)														
		Age-2			Age-3			Age-4			Age-5			Age-6		
		Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD
1991	Wild	47	1	-	68	15	6	82	78	10	94	123	8	97	5	5
	Hatchery	47	1	-	49	10	6	78	71	5	91	96	8	96	18	6
1992	Wild	-	0	-	55	9	5	69	25	6	78	35	6	-	0	-
	Hatchery	-	0	-	-	0	-	-	0	-	-	0	-	-	0	-
1993	Wild	-	0	-	72	3	4	86	58	7	98	16	5	-	0	-
	Hatchery	-	0	-	42	1	-	76	85	8	88	13	6	-	0	-
1994	Wild	42	10	6	51	31	7	80	84	9	93	193	8	104	2	13
	Hatchery	-	0	-	49	38	5	76	29	7	88	191	7	-	0	-
1995	Wild	-	0	-	67	6	8	79	20	9	96	99	5	94	6	5
	Hatchery	-	0	-	52	1	-	73	32	9	89	63	9	95	150	8

Return year	Origin	Summer Chinook fork length (cm)														
		Age-2			Age-3			Age-4			Age-5			Age-6		
		Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD
1996	Wild	-	0	-	68	22	9	83	149	8	95	80	7	101	12	5
	Hatchery	-	0	-	52	7	10	77	72	7	90	109	8	100	44	7
1997	Wild	36	2	6	60	19	7	85	108	8	96	71	7	98	4	11
	Hatchery	-	0	-	45	63	5	71	33	9	92	189	7	97	20	7
1998	Wild	43	4	6	59	23	6	83	107	7	96	58	7	-	0	-
	Hatchery	42	8	7	50	64	6	74	190	8	92	54	8	98	23	5
1999	Wild	38	10	3	64	11	8	82	115	8	96	77	6	104	1	-
	Hatchery	37	1	-	53	11	9	75	92	7	91	204	6	98	6	5
2000	Wild	39	1	-	66	23	7	83	47	6	96	92	5	95	1	-
	Hatchery	-	0	-	54	100	7	78	53	8	93	201	6	99	16	6
2001	Wild	40	9	3	65	33	8	87	66	8	93	15	5	97	4	16
	Hatchery	44	1	-	51	79	7	78	271	8	93	38	7	102	9	5
2002	Wild	56	1	-	65	44	7	88	167	6	100	41	7	-	0	-
	Hatchery	-	0	-	45	6	5	76	100	7	95	148	5	-	0	-
2003	Wild	43	3	6	61	16	6	87	268	7	99	120	6	-	0	-
	Hatchery	49	1	-	55	6	9	73	20	8	91	75	7	102	6	9
2004	Wild	51	4	4	67	78	6	81	59	6	97	368	7	99	1	-
	Hatchery	-	0	-	52	1	-	70	8	5	97	5	8	109	1	-
2005	Wild	-	0	-	68	89	6	83	363	8	94	57	6	101	10	7
	Hatchery	-	0	-	55	1	-	70	4	4	89	5	4	-	0	-
2006	Wild	48	9	3	69	16	4	88	222	7	97	286	6	97	8	6
	Hatchery	-	0	-	52	2	0	80	3	3	88	6	7	94	1	-
2007	Wild	50	8	6	69	69	9	85	37	8	98	317	6	96	20	8
	Hatchery	-	0	-	-	0	-	70	4	2	94	11	7	91	4	18

Sex Ratios

Male summer Chinook in the 2006 broodstock made up about 50% of the adults collected, resulting in an overall male to female ratio of 1.00:1.00 (Table 7.4.). In 2007, males made up about 46% of the adults collected, resulting in an overall male to female ratio of 0.84:1.00 (Table 7.4). The ratio for the 2006 broodstock equaled the assumed 1:1 ratio goal in the broodstock protocol; the ratio for the 2007 broodstock was below the assumed 1:1 ratio.

Table 7.4. Numbers of male and female wild and hatchery summer Chinook collected for broodstock at Wells Dam for the Methow/Okanogan programs, 1991-2007. Ratios of males to females are also provided.

Return year	Number of wild summer Chinook			Number of hatchery summer Chinook			Total M/F ratio
	Males (M)	Females (F)	M/F	Males (M)	Females (F)	M/F	
1989[a]	752	667	1.13:1.00	181	160	1.13:1.00	1.13:1.00
1990[a]	381	482	0.79:1.00	95	120	0.79:1.00	0.79:1.00
1991[a]	443	559	0.79:1.00	151	191	0.79:1.00	0.79:1.00
1992[a]	349	318	1.10:1.00	38	35	1.09:1.00	1.10:1.00
1993[a]	513	300	1.71:1.00	293	171	1.71:1.00	1.71:1.00
1994	205	180	1.14:1.00	165	101	1.63:1.00	1.32:1.00
1995	103	149	0.69:1.00	158	197	0.80:1.00	0.75:1.00
1996	178	138	1.29:1.00	132	102	1.29:1.00	1.29:1.00
1997	102	112	0.91:1.00	174	134	1.30:1.00	1.12:1.00
1998	130	109	1.19:1.00	263	85	3.09:1.00	2.03:1.00
1999	138	110	1.25:1.00	161	146	1.10:1.00	1.17:1.00
2000	82	102	0.80:1.00	243	130	1.87:1.00	1.40:1.00
2001	89	46	1.93:1.00	311	112	2.78:1.00	2.53:1.00
2002	166	104	1.60:1.00	149	136	1.10:1.00	1.31:1.00
2003	255	194	1.31:1.00	61	51	1.20:1.00	1.29:1.00
2004	263	278	0.95:1.00	12	5	2.40:1.00	0.97:1.00
2005	365	186	1.96:1.00	6	6	1.00:1.00	1.93:1.00
2006	287	292	0.98:1.00	9	3	3.00:1.00	1.00:1.00
2007	228	276	0.83:1.00	11	8	1.38:1.00	0.84:1.00
Total[b]	***185***	***163***	***1.13:1.00***	***133***	***87***	***1.53:1.00***	***1.28:1.00***

[a] Numbers and male to female ratios were derived from the aggregate population collected at Wells Fish Hatchery volunteer channel and left- and right-ladder traps at Wells Dam.

[b] Total values were derived from 1994-2007 data to exclude aggregate population bias from 1989-1993 returns.

Fecundity

Fecundities for the 2006 and 2007 summer Chinook broodstock averaged 4,854 and 5,260 eggs per female, respectively (Table 7.5). These values are close to the overall average of 4,989 eggs per female. Mean observed fecundity for the 2006 return fell short of the expected fecundity of 5,000 eggs per female assumed in the broodstock protocol; the 2007 return was slightly above the broodstock protocol.

Table 7.5. Mean fecundity of wild, hatchery, and all female summer Chinook collected for broodstock at Wells Dam for the Methow/Okanogan programs, 1989-2007; NA = not available.

Return year	Mean fecundity		
	Wild	Hatchery	Total
1989*	NA	NA	4,750
1990*	NA	NA	4,838
1991*	NA	NA	4,819
1992*	NA	NA	4,804

Return year	Mean fecundity		
	Wild	Hatchery	Total
1993*	NA	NA	4,849
1994*	NA	NA	5,907
1995*	NA	NA	4,930
1996*	NA	NA	4,870
1997	5,166	5,296	5,237
1998	5,043	4,595	4,833
1999	4,897	4,923	4,912
2000	5,122	5,206	5,170
2001	5,040	4,608	4,735
2002	5,306	5,258	5,279
2003	5,090	4,941	5,059
2004	5,130	5,118	5,130
2005	4,545	4,889	4,553
2006	4,854	4,824	4,854
2007	5,265	5,093	5,260
Average	***5,042***	***4,977***	***4,989***

* Individual fecundities were not assigned to females until 1997 brood.

7.2 Hatchery Rearing

Rearing History

Number of eggs taken

Based on the unfertilized egg-to-release survival standard of 81%, a total of 493,827 eggs are needed to meet the program release goal of 400,000 smolts. Between 1989 and 2007, the egg take goal was reached in six of those years (Table 7.6).

Table 7.6. Numbers of eggs taken from summer Chinook broodstock collected at Wells Dam for the Methow/Okanogan programs, 1989-2007.

Return year	Number of eggs taken
1989	482,800
1990	464,097
1991	586,594
1992	486,260
1993	531,490
1994	595,390
1995	491,000
1996	448,000
1997	401,162
1998	389,346

Return year	Number of eggs taken
1999	483,726
2000	403,268
2001	279,272
2002	466,530
2003	473,681
2004	537,210
2005	305,826
2006	509,334
2007	549,802
Average	***467,620***

Number of acclimation days

Rearing of the 2006 brood Methow summer Chinook was similar to previous years with fish being held on well water before being transferred to Carlton Pond for final acclimation on Methow River water in March 2008 (Table 7.7). Groups of the 1994 and 1995 broods were reared for longer durations at Methow FH on Methow River water.

Table 7.7. Number of days Methow summer Chinook were acclimated at Carlton Pond, brood years 1989-2006.

Brood year	Release year	Transfer date	Release date	Number of days
1989	1991	15-Mar	6-May	52
1990	1992	26-Feb	28-Apr	61
1991	1993	10-Mar	23-Apr	44
1992	1994	4-Mar	21-Apr	48
1993	1995	18-Mar	2-May	45
1994	1996	25-Sep	28-Apr	215
		19-Mar	28-Apr	40
1995	1997	22-Oct	8-Apr	168
		19-Mar	22-Apr	34
1996	1998	9-Mar	14-Apr	36
1997	1999	10-Mar	20-Apr	41
1998	2000	19-Mar	2-May	44
1999	2001	18-Mar	18-Apr	31
2000	2002	28-Mar	1-May	34
2001	2003	27-Mar	24-Apr	28
2002	2004	16-Mar	24-Apr	39

Brood year	Release year	Transfer date	Release date	Number of days
2003	2005	18-Mar	21-Apr	34
2004	2006	12-Mar	22-Apr	41
2005	2007	12-Mar	15-Apr – 8-May	34-57
2006	2008	4-7-Mar	16-Apr – 2 May	40-59

Release Information

Numbers released

The 2006 Methow summer Chinook program achieved 104.9% of the 400,000 target goal with about 419,734 fish being volitionally released between 16 April and 2 May 2008 (Table 7.8). The volitional release was terminated 14 days short of the scheduled volitional release period and remaining fish were forced out of the acclimation site because of inundation of the acclimation site with flood waters, which backed-up into the facility through the out-fall channel.

Table 7.8. Numbers of Methow summer Chinook smolts released from the hatchery, brood years 1989-2006. The release target for Methow summer Chinook is 400,000 smolts.

Brood year	Release year	CWT mark rate	Number of smolts released
1989	1991	0.8529	420,000
1990	1992	0.9485	391,650
1991	1993	0.6972	540,900
1992	1994	0.9752	402,641
1993	1995	0.4623	433,375
1994	1996	0.9851	406,560
1995	1997	0.9768	353,182
1996	1998	0.9221	298,844
1997	1999	0.9884	384,909
1998	2000	0.9429	205,269
1999	2001	0.9955	424,363
2000	2002	0.9928	336,762
2001	2003	0.9902	248,595
2002	2004	0.9913	399,975
2003	2005	0.9872	354,699
2004	2006	0.9848	400,579
2005	2007	0.9897	263,723
2006	2008	0.9783	419,734
Average		***0.9256***	***371,431***

Numbers tagged

The 2006 brood Methow summer Chinook were 97.8% CWT and adipose fin-clipped, but were not PIT tagged.

Fish size and condition at release

Fish were volitionally released as yearling smolts beginning in April 2008. Size at release of the acclimated population was 88.6% and 94.3% of the respective target fork length and weight goals (Table 7.9). This brood year exceeded the CV of length goal by 200%.

Table 7.9. Mean lengths (FL, mm), weight (g and fish/pound), and coefficient of variation (CV) of Methow summer Chinook smolts released from the hatchery, brood years 1991-2006. Size targets are provided in the last row of the table.

Brood year	Release year	Fork length (mm)		Mean weight	
		Mean	CV	Grams (g)	Fish/pound
1991	1993	152	13.6	40.3	11
1992	1994	145	16.0	37.2	12
1993	1995	154	8.6	37.1	12
1994	1996	163	8.2	48.2	9
1995	1997	141	9.6	37.0	12
1996	1998	199	13.1	105.1	4
1997	1999	153	7.6	39.5	12
1998	2000	164	8.7	51.7	9
1999	2001	153	9.3	41.5	11
2000	2002	170	10.2	54.2	8
2001	2003	167	7.4	52.7	9
2002	2004	148	13.1	35.7	13
2003	2005	148	10.1	35.5	13
2004	2006	142	9.8	31.1	15
2005	2007	158	15	42.2	11
2006	2008	156	18	42.8	11
Targets		***176***	***9.0***	***45.4***	***10***

Survival Estimates

Overall survival of the Methow summer Chinook from green (unfertilized) egg to release was above the standard set for the program (Table 7.10). Lower than anticipated survival at the fertilized to eyed-egg and eyed-egg to ponding stage prevented the program from exceeding those respective target survival rates. Currently it is unknown if gamete viability is gender biased or is uniform between sexes and more influenced by between-year environmental variations.

It is important to note that the Methow summer Chinook program typically receives progeny from the highest ELISA females, while the lowest titer progeny are reserved for the Okanogan program.

The inability to effectively manage BKD at Similkameen Pond during the winter months precludes an even mix of progeny for a given brood year between the two programs.

Table 7.10. Hatchery life-stage survival rates (%) for Methow summer Chinook, brood years 1989-2006. Survival standards or targets are provided in the last row of the table.

Brood year	Collection to spawning		Unfertilized egg-eyed	Eyed egg-ponding	30 d after ponding	100 d after ponding	Ponding to release	Transport to release	Unfertilized egg-release
	Female	Male							
1989[a]	89.8	99.5	89.9	96.7	99.7	99.4	73.3	98.5	87.0
1990[a]	93.9	99.0	84.9	97.1	81.2	80.6	97.7	99.5	84.4
1991[a]	93.1	95.5	88.2	98.0	99.4	99.1	97.5	99.6	92.2
1992[a]	96.9	99.0	87.8	98.0	99.9	99.9	90.9	98.3	82.8
1993[a]	82.2	99.4	85.4	97.6	99.8	99.5	92.0	99.4	81.5
1994	96.1	90.0	86.6	100.0	98.1	97.4	73.1	99.1	68.3
1995	91.9	96.2	98.2	84.1	96.5	96.2	92.7	89.6	71.9
1996	95.4	98.1	83.2	100.0	97.7	96.9	86.5	89.0	66.7
1997	91.9	94.6	86.1	98.4	98.7	98.3	98.8	99.7	95.9
1998	84.0	96.2	54.1	98.0	99.4	98.9	96.6	99.9	52.7
1999	98.8	98.7	92.9	96.9	98.0	97.6	96.9	99.9	87.7
2000	90.5	96.9	89.2	98.1	98.5	98.3	94.6	94.4	83.5
2001	96.2	92.3	89.1	97.6	97.2	97.1	97.5	99.8	89.0
2002	97.1	98.1	88.3	99.9	97.7	97.5	96.7	99.9	85.7
2003	96.7	97.5	82.8	98.2	99.7	99.2	93.7	99.9	74.9
2004	93.6	98.2	84.0	97.8	99.6	99.2	98.3	98.5	74.6
2005	97.0	89.6	88.0	95.5	99.6	98.9	96.6	99.9	86.2
2006	92.9	89.5	86.3	98.3	99.6	98.7	97.2	99.5	82.4
Standard	***90.0***	***85.0***	***92.0***	***98.0***	***97.0***	***93.0***	***90.0***	***95.0***	***81.0***

[a] Survival rates were calculated from aggregate population collected at Wells Fish Hatchery volunteer channel and left- and right-ladder traps at Wells Dam.

7.3 Disease Monitoring

No disease concerns were detected or observed in the 2006 brood. Progeny did receive a 4.5% Aqua-100 prophylactic treatment for BKD in July 2007. Some erythromycin toxicity was detected; however, the mortality was not sufficient to justify shortening the treatment period.

Results of adult broodstock bacterial kidney disease (BKD) monitoring indicated that most females (100%) had ELISA values less than 0.199. About 99.6% of females had ELISA values less than 0.120, which would require about 0.4% of the progeny to be reared at densities not to exceed 0.06 fish per pound (Table 7.11).

Table 7.11. Proportion of bacterial kidney disease (BKD) titer groups for the Methow/Okanogan summer Chinook broodstock, brood years 1997-2008. Also included are the proportions to be reared at either 0.125 fish per pound or 0.060 fish per pound.

Brood year[a]	Optical density values by titer group				Proportion at rearing densities (fish per pound, fpp)	
	Very Low (≤ 0.099)	Low (0.1-0.199)	Moderate (0.2-0.449)	High (≥ 0.450)	≤ 0.125 fpp (<0.119)	≤ 0.060 fpp (>0.120)
1997	0.6267	0.1333	0.0622	0.1778	0.6844	0.3156
1998	0.9632	0.0184	0.0123	0.0061	0.9816	0.0184
1999	0.9444	0.0198	0.0238	0.0119	0.9643	0.0357
2000	0.7476	0.0952	0.0238	0.1333	0.8000	0.2000
2001	0.9801	0.0199	0.0000	0.0000	1.0000	0.0000
2002	0.9567	0.0130	0.0130	0.0173	0.9740	0.0260
2003	0.9620	0.0127	0.0169	0.0084	0.9747	0.0253
2004	0.9585	0.0151	0.0075	0.0189	0.9736	0.0264
2005	0.9884	0.0000	0.0000	0.0116	0.9884	0.0116
2006	0.9962	0.0038	0.0000	0.0000	0.9962	0.0038
2007	0.9202	0.0266	0.0152	0.0380	0.9354	0.0646
2008	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000
Average	*0.9196*	*0.0297*	*0.0150*	*0.0357*	*0.9384*	*0.0616*

[a] Individual ELISA samples were not collected before the 1997 brood.

7.4 Spawning Surveys

Surveys for Methow summer Chinook redds were conducted from late September to mid-November, 2008, in the Methow River. Total redd counts (not peak counts) were conducted in the river (see Appendix J for more details).

Redd Counts

A total of 599 summer Chinook redds were counted in the Methow River in 2008 (Table 7.12). This was higher than the 19-year average of 597 redds.

Table 7.12. Total number of redds counted in the Methow River, 1989-2008.

Survey year	Total redd count
1989	167*
1990	409*
1991	153
1992	107
1993	154
1994	310
1995	357

Survey year	Total redd count
1996	181
1997	205
1998	225
1999	448
2000	500
2001	675
2002	2,013
2003	1,624
2004	973
2005	874
2006	1,353
2007	620
2008	599
Average	***597***

* Total counts based on expanded aerial counts.

Redd Distribution

Summer Chinook redds were not evenly distributed among the seven reaches in the Methow River. Most redds (77%) were located in reaches downstream from the town of Twisp and in Reach 5 between Methow Valley Irrigation Diversion (MVID) and the Winthrop Bridge (Table 7.13; Figure 7.1). Few summer Chinook spawned upstream from the Winthrop Bridge in Reaches 6 and 7.

Table 7.13. Total number of summer Chinook redds counted in different reaches on the Methow River during September through early November, 2008. Reach codes are described in Table 2.11.

Survey reach	Total redd count	Percent
Methow 1	104	17.4
Methow 2	146	24.4
Methow 3	209	34.9
Methow 4	45	7.5
Methow 5	88	14.7
Methow 6	7	1.2
Methow 7	0	0.0
Totals	***599***	***100.0***

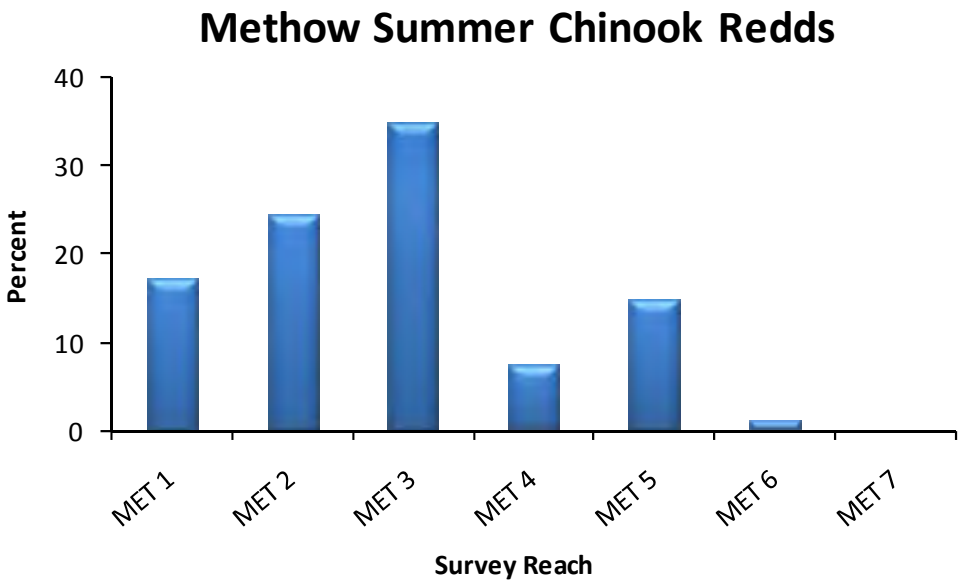


Figure 7.1. Percent of the total number of summer Chinook redds counted in different reaches on the Methow River during September through mid-November, 2008. Reach codes are described in Table 2.11.

Spawn Timing

Spawning in 2008 began the first week of October, peaked the second week of October, and ended after the first week of November (Figure 7.2). Stream temperatures in the Methow River, when spawning began, varied from 6.5-11.0°C. Peak spawning occurred in the upper reaches of the Methow River during the second week of October and in the lower reaches the following week.

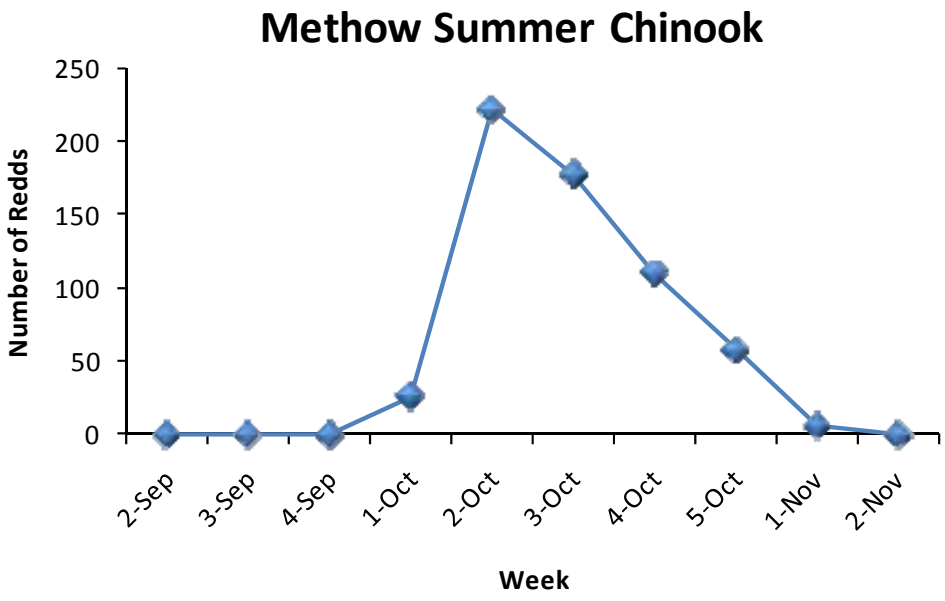


Figure 7.2. Number of new summer Chinook redds counted during different weeks in the Methow River, September through mid-November 2008.

Spawning Escapement

Spawning escapement for Methow summer Chinook was calculated as the total number of redds times the fish per redd ratio estimated from fish sampled at Wells Dam. The estimated fish per redd ratio for Methow summer Chinook in 2008 was 3.25. Multiplying this ratio by the number of redds counted in the Methow River resulted in a total spawning escapement of 1,947 summer Chinook (Table 7.14).

Table 7.14. Spawning escapements for summer Chinook in the Methow River for return years 1989-2008.

Return year	Fish/Redd	Redds	Total spawning escapement
1989*	3.30	167	551
1990*	3.40	409	1,391
1991*	3.70	153	566
1992*	4.30	107	460
1993*	3.30	154	508
1994*	3.50	310	1,085
1995*	3.40	357	1,214
1996*	3.40	181	615
1997*	3.40	205	697
1998	3.00	225	675
1999	2.20	448	986
2000	2.40	500	1,200

Return year	Fish/Redd	Redds	Total spawning escapement
2001	4.10	675	2,768
2002	2.30	2,013	4,630
2003	2.42	1,624	3,930
2004	2.25	973	2,189
2005	2.93	874	2,561
2006	2.02	1,353	2,733
2007	2.20	620	1,364
2008	3.25	599	1,947
Average	***3.04***	***597***	***1,604***

* Spawning escapement was calculated using the "Modified Meekin Method" (i.e., 3.1 x jack multiplier).

7.5 Carcass Surveys

Surveys for Methow summer Chinook carcasses were conducted during late September to mid-November, 2008, in the Methow River (see Appendix J for more details).

Number sampled

A total of 482 summer Chinook carcasses were sampled during September through mid-November in the Methow River (Table 7.15).

Table 7.15. Numbers of summer Chinook carcasses sampled within each survey reach on the Methow River, 1991-2008. Reach codes are described in Table 2.11.

Survey year	Number of summer Chinook carcasses							
	M-1	M-2	M-3	M-4	M-5	M-6	M-7	Total
1991	0	12	8	4	2	0	0	**26**
1992	8	8	19	0	17	1	0	**53**
1993	19	25	14	2	5	0	0	**65**
1994[a]	43	33	20	5	13	0	0	**114**
1995	14	33	58	7	7	0	0	**119**
1996	6	30	46	5	2	0	0	**89**
1997	6	12	38	2	19	1	0	**78**
1998	90	84	99	17	30	0	0	**320**
1999	47	144	232	32	37	12	2	**506**
2000	62	118	105	9	99	5	0	**398**
2001	392	275	88	14	76	11	1	**857**
2002	551	318	518	164	219	34	10	**1,814**
2003	115	383	317	115	128	5	0	**1,063**
2004	40	173	187	82	92	2	1	**577**
2005	154	173	182	42	112	3	0	**666**
2006	121	149	111	56	146	3	1	**587**
2007	135	131	108	27	55	0	0	**456**

Survey year	Number of summer Chinook carcasses							
	M-1	M-2	M-3	M-4	M-5	M-6	M-7	Total
2008	64	128	197	33	57	3	0	**482**
Average	***104***	***124***	***130***	***34***	***62***	***4***	***1***	***459***

[a] An additional 113 carcasses were sampled, but reach was not identified.

Carcass Distribution and Origin

Summer Chinook carcasses were not evenly distributed among reaches within the Methow River in 2008 (Table 7.15; Figure 7.3). Most of the carcasses in the Methow River were found downstream from Twisp. The highest percentage of carcasses (41%) was sampled in Reach 3 downstream from the town of Twisp.

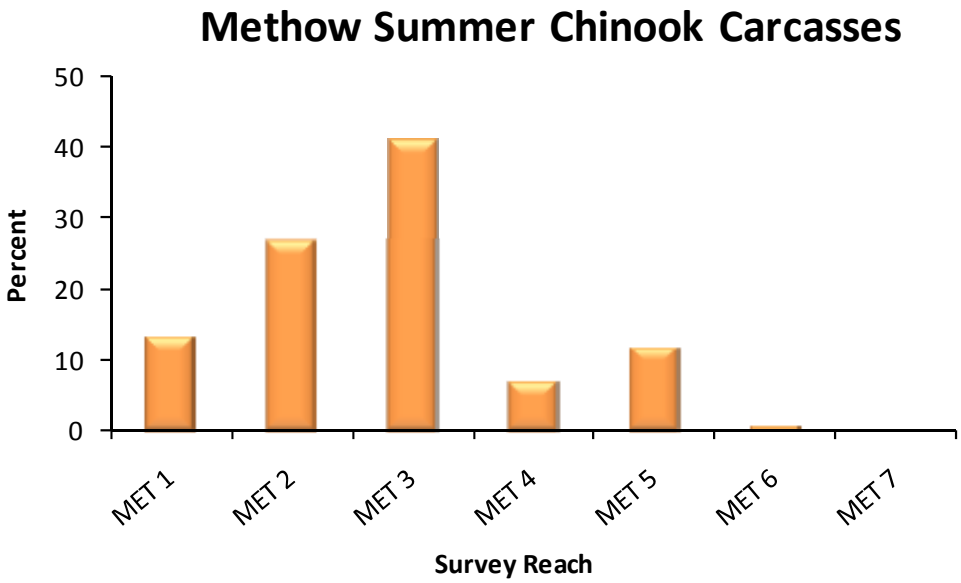


Figure 7.3. Percent of summer Chinook carcasses sampled within different reaches on the Methow River during September through mid-November, 2008. Reach codes are described in Table 2.11.

Numbers of wild and hatchery origin summer Chinook carcasses sampled in 2008 will be available after analysis of CWTs and scales. Based on the available data (1991-2007), hatchery and wild summer Chinook carcasses were not distributed equally among the reaches in the Methow River (Table 7.16). A larger percentage of hatchery carcasses occurred in the lower reaches, while a larger percentage of wild summer Chinook carcasses occurred in upstream reaches (Figure 7.4).

Table 7.16. Numbers of wild and hatchery summer Chinook carcasses sampled within different reaches on the Methow River, 1991-2007.

Survey year	Origin	Survey reach							Total
		M-1	M-2	M-3	M-4	M-5	M-6	M-7	
1991	Wild	0	12	8	4	2	0	0	**26**
	Hatchery	0	0	0	0	0	0	0	**0**
1992	Wild	8	8	19	0	17	1	0	**53**
	Hatchery	0	0	0	0	0	0	0	**0**
1993	Wild	11	15	9	0	3	0	0	**38**
	Hatchery	8	7	5	2	2	0	0	**24**
1994	Wild	21	17	8	4	9	0	0	**59**
	Hatchery	20	15	11	0	3	0	0	**49**
1995	Wild	6	9	27	7	5	0	0	**54**
	Hatchery	7	24	25	0	1	0	0	**57**
1996	Wild	1	20	29	4	2	0	0	**56**
	Hatchery	5	7	11	1	0	0	0	**24**
1997	Wild	5	5	28	1	17	0	0	**56**
	Hatchery	1	4	7	1	2	1	0	**16**
1998	Wild	41	46	70	9	23	0	0	**189**
	Hatchery	48	36	28	6	5	0	0	**123**
1999	Wild	27	79	110	14	17	4	2	**253**
	Hatchery	15	57	102	17	13	7	0	**211**
2000	Wild	23	78	74	7	72	3	0	**257**
	Hatchery	37	33	20	1	16	2	0	**109**
2001	Wild	49	102	54	9	66	11	1	**292**
	Hatchery	330	157	32	4	6	0	0	**529**
2002	Wild	124	163	362	129	183	34	9	**1,004**
	Hatchery	412	141	138	24	22	0	1	**738**
2003	Wild	33	123	176	63	85	3	0	**483**
	Hatchery	80	122	127	38	36	2	0	**405**
2004	Wild	14	108	144	61	73	1	0	**401**
	Hatchery	24	52	28	17	12	1	1	**135**
2005	Wild	62	99	133	33	107	3	0	**437**
	Hatchery	92	74	49	9	5	0	0	**229**
2006	Wild	68	103	83	49	131	3	1	**438**
	Hatchery	53	46	28	7	15	0	0	**149**
2007	Wild	52	71	62	19	45	0	0	**249**
	Hatchery	93	60	47	9	10	0	0	**219**
Average	***Wild***	***32***	***62***	***82***	***24***	***50***	***4***	***1***	***256***
	Hatchery	***72***	***49***	***39***	***8***	***9***	***1***	***0***	***177***

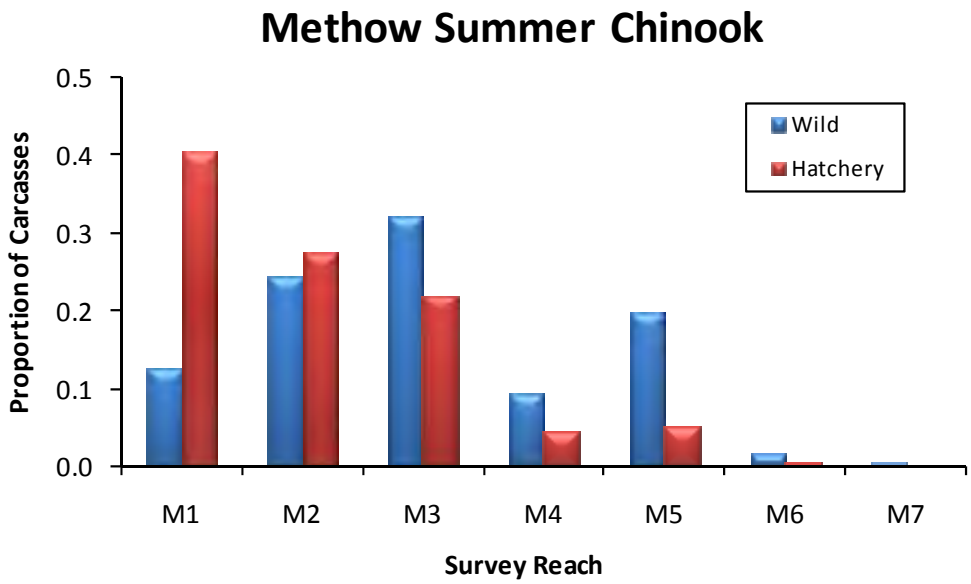


Figure 7.4. Distribution of wild and hatchery produced carcasses in different reaches on the Methow River, 1993-2007. Reach codes are described in Table 2.11.

Sampling Rate

Overall, 25% of the total spawning escapement of summer Chinook in the Methow Basin was sampled in 2008 (Table 7.17). Sampling rates among survey reaches varied from 13 to 29%.

Table 7.17. Number of redds and carcasses, total spawning escapement, and sampling rates for summer Chinook in the Methow Basin, 2008. Reach codes are described in Table 2.11.

Survey reach	Total number of redds	Total number of carcasses	Total spawning escapement	Sampling rate
Methow 1	104	64	338	0.19
Methow 2	146	128	475	0.27
Methow 3	209	197	679	0.29
Methow 4	45	33	146	0.23
Methow 5	88	57	286	0.20
Methow 6	7	3	23	0.13
Methow 7	0	0	0	-
Total	***599***	***482***	***1,947***	***0.25***

Length Data

Mean lengths (POH, cm) of male and female summer Chinook carcasses sampled during surveys on the Methow River in 2008 are provided in Table 7.18. The average size of males and females sampled in the Methow River were 62 cm and 72 cm, respectively.

Table 7.18. Mean lengths (postorbital-to-hypural length; cm) and standard deviations (in parentheses) of male and female summer Chinook carcasses sampled in different reaches on the Methow River, 2008. Reach codes are described in Table 2.11.

Stream/watershed	Mean length (cm)	
	Male	Female
Methow 1	55 (18)	73 (5)
Methow 2	60 (16)	72 (5)
Methow 3	63 (12)	70 (5)
Methow 4	69 (7)	72 (3)
Methow 5	67 (12)	74 (4)
Methow 6	--	75 (3)
Methow 7	--	--
Total	***62 (14)***	***72 (5)***

7.6 Life History Monitoring

Life history characteristics of Methow summer Chinook were assessed by examining carcasses on spawning grounds and fish collected or examined at broodstock collection sites, and by reviewing tagging data and fisheries statistics.

Migration Timing

Migration timing of hatchery and wild Methow/Okanogan summer Chinook was determined from broodstock data collected at Wells Dam. Counting of summer/fall Chinook at Wells Dam occurs from 29 June to 15 November. Broodstock collection at the Dam occurs from early July (week 27) to mid-September (week 37) (Table 2.1). Based on broodstock sampling, both wild and hatchery summer Chinook arrived at Wells Dam about the same time (Table 7.19). This was true throughout most of the migration period. This pattern was also observed when data were pooled for the 2007-2008 survey period.

Table 7.19. The week that 10%, 50% (median), and 90% of the wild and hatchery summer Chinook salmon passed Wells Dam, 2007-2008. The average week is also provided. Migration timing is based on collection of summer Chinook broodstock at Wells Dam.

Survey year	Origin	Methow/Okanogan Summer Chinook Migration Time (week)				Sample size
		10 Percentile	50 Percentile	90 Percentile	Mean	
2007	Wild	27	30	34	30	485
	Hatchery	27	30	33	30	433
2008	Wild	28	30	34	30	542
	Hatchery	28	30	36	31	884
Average	Wild	***28***	***30***	***34***	***30***	***514***
	Hatchery	***28***	***30***	***35***	***31***	***659***

Age at Maturity

Most of the wild and hatchery summer Chinook sampled during the period 1993-2007 in the Methow River were age-4 and 5 fish (total age) (Table 7.20; Figure 7.5). A higher percentage of age-4 wild Chinook returned to the basin than did age-4 hatchery Chinook. In contrast, a higher proportion of age-5 and 6 hatchery fish returned than did age-5 and 6 wild fish. Thus, a higher percentage of hatchery fish returned at an older age than did wild fish.

Table 7.20. Proportions of wild and hatchery summer Chinook of different ages (total age) sampled on spawning grounds in the Methow River, 1993-2007.

Survey year	Origin	Total age						Sample size
		2	3	4	5	6	7	
1993	Wild	0.00	0.05	0.34	0.58	0.03	0.00	38
	Hatchery	0.00	0.00	1.00	0.00	0.00	0.00	20
1994	Wild	0.01	0.02	0.53	0.44	0.00	0.00	101
	Hatchery	0.00	0.00	0.07	0.93	0.00	0.00	111
1995	Wild	0.00	0.02	0.07	0.89	0.02	0.00	54
	Hatchery	0.00	0.02	0.04	0.43	0.52	0.00	56
1996	Wild	0.00	0.04	0.46	0.41	0.09	0.00	56
	Hatchery	0.00	0.00	0.04	0.48	0.43	0.04	23
1997	Wild	0.00	0.00	0.36	0.63	0.02	0.00	56
	Hatchery	0.00	0.13	0.06	0.56	0.25	0.00	16
1998	Wild	0.00	0.13	0.52	0.34	0.00	0.00	188
	Hatchery	0.00	0.02	0.52	0.42	0.03	0.00	123
1999	Wild	0.00	0.02	0.59	0.39	0.01	0.00	253
	Hatchery	0.00	0.00	0.07	0.90	0.03	0.00	209
2000	Wild	0.00	0.05	0.15	0.80	0.00	0.00	257
	Hatchery	0.00	0.10	0.22	0.57	0.11	0.00	97
2001	Wild	0.01	0.15	0.59	0.24	0.02	0.00	292
	Hatchery	0.00	0.11	0.60	0.26	0.04	0.00	528
2002	Wild	0.00	0.04	0.66	0.29	0.00	0.00	1,004
	Hatchery	0.00	0.01	0.41	0.57	0.01	0.00	733
2003	Wild	0.00	0.01	0.43	0.55	0.00	0.00	483
	Hatchery	0.00	0.02	0.07	0.88	0.03	0.00	394
2004	Wild	0.00	0.04	0.08	0.86	0.01	0.00	401
	Hatchery	0.00	0.08	0.29	0.30	0.33	0.00	134
2005	Wild	0.00	0.03	0.58	0.34	0.05	0.00	410
	Hatchery	0.00	0.08	0.30	0.61	0.01	0.00	220
2006	Wild	0.00	0.02	0.18	0.78	0.02	0.00	379
	Hatchery	0.00	0.00	0.22	0.48	0.29	0.00	129
2007	Wild	0.02	0.08	0.19	0.64	0.07	0.00	209
	Hatchery	0.00	0.04	0.14	0.73	0.08	0.01	189

Survey year	Origin	Total age						Sample size
		2	3	4	5	6	7	
Average	*Wild*	*0.00*	*0.05*	*0.44*	*0.50*	*0.02*	*0.00*	*278*
	Hatchery	*0.00*	*0.04*	*0.31*	*0.58*	*0.07*	*0.00*	*199*

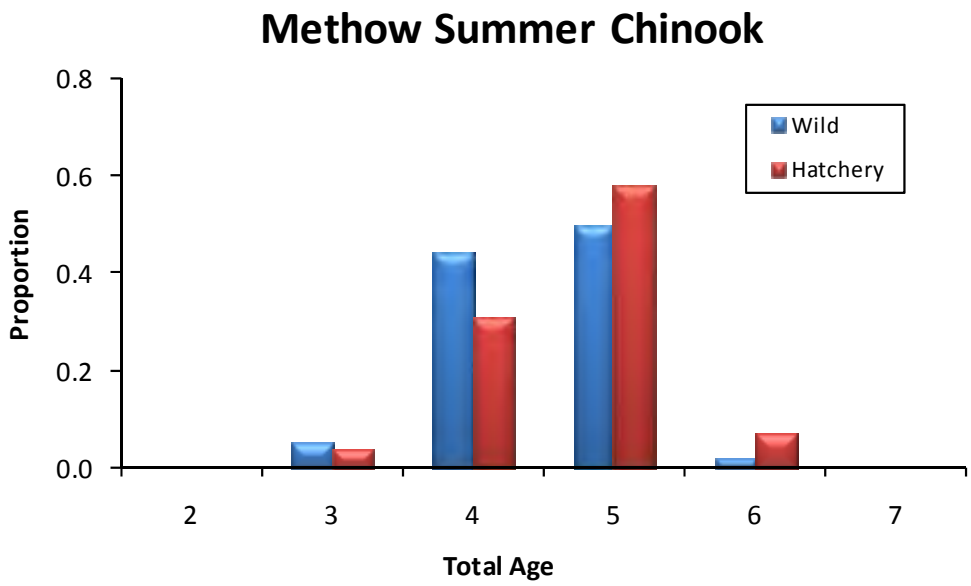


Figure 7.5. Proportions of wild and hatchery summer Chinook of different total ages sampled at broodstock collection sites and on spawning grounds in the Methow River for the combined years 1993-2007.

Size at Maturity

On average, hatchery summer Chinook were about 4 cm smaller than wild summer Chinook sampled in the Methow Basin (Table 7.21). This is interesting given that a slightly higher percentage of hatchery fish returned as age-5 and 6 fish than did wild fish. Future analyses will compare sizes of hatchery and wild fish of the same age groups and gender.

Table 7.21. Mean lengths (POH; cm) and variability statistics for wild and hatchery summer Chinook sampled in the Methow Basin, 1993-2007; SD = 1 standard deviation.

Survey year	Origin	Sample size	Summer Chinook length (POH; cm)			
			Mean	SD	Minimum	Maximum
1993	Wild	41	74	9	51	89
	Hatchery	24	62	8	36	80
1994	Wild	112	69	8	35	87
	Hatchery	114	67	5	43	77
1995	Wild	62	74	6	52	88
	Hatchery	57	73	7	46	85
1996	Wild	64	70	11	34	91
	Hatchery	23	72	7	58	85

Survey year	Origin	Sample size	Summer Chinook length (POH; cm)			
			Mean	SD	Minimum	Maximum
1997	Wild	62	76	9	35	90
	Hatchery	16	68	15	33	87
1998	Wild	196	67	10	38	97
	Hatchery	123	63	10	37	87
1999	Wild	293	66	8	43	99
	Hatchery	211	66	7	26	89
2000	Wild	288	74	8	37	89
	Hatchery	109	68	12	24	87
2001	Wild	328	67	10	29	86
	Hatchery	529	63	10	31	87
2002	Wild	1,076	70	8	37	94
	Hatchery	738	67	9	33	87
2003	Wild	543	71	8	35	88
	Hatchery	405	69	8	35	89
2004	Wild	442	73	7	38	89
	Hatchery	135	65	12	34	85
2005	Wild	437	69	8	45	86
	Hatchery	229	64	9	36	79
2006	Wild	438	73	7	35	92
	Hatchery	149	69	8	38	91
2007	Wild	249	72	11	33	89
	Hatchery	219	69	9	22	84
Pooled	***Wild***	***4,631***	***71***	***9***	***29***	***99***
	Hatchery	***3,081***	***67***	***9***	***22***	***91***

Contribution to Fisheries

Most of the harvest on Methow summer Chinook occurred in the Ocean (Table 7.22). Ocean harvest has made up 13% to 98% of all Methow summer Chinook harvested. Brood years 1989 and 1998 provided the largest harvests, while brood years 1996 and 1999 provided the lowest.

Table 7.22. Estimated number and percent (in parentheses) of Methow summer Chinook captured in different fisheries, brood years 1989-2002.

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational (sport)	
1989	1,056 (53)	805 (40)	79 (4)	66 (3)	2,006
1990	60 (59)	37 (37)	4 (4)	0 (0)	101
1991	12 (20)	49 (80)	0 (0)	0 (0)	61
1992	17 (55)	14 (45)	0 (0)	0 (0)	31
1993	14 (58)	8 (33)	2 (8)	0 (0)	24
1994	139 (79)	32 (18)	3 (2)	1 (1)	175
1995	58 (98)	0 (0)	1 (2)	0 (0)	59
1996	11 (92)	1 (8)	0 (0)	0 (0)	12
1997	214 (88)	4 (2)	3 (1)	21 (9)	242
1998	1,773 (84)	20 (1)	95 (4)	233 (11)	2,121
1999	2 (13)	0 (0)	13 (87)	0 (0)	15
2000	367 (71)	2 (0)	112 (22)	34 (7)	515
2001	326 (52)	4 (1)	137 (22)	157 (25)	624
2002	281 (57)	1 (0)	100 (20)	114 (23)	496

Straying

Stray rates were determined by examining CWTs recovered on spawning grounds within and outside the Methow Basin. Targets for strays based on return year (recovery year) and brood year should be less than 5%.

Rates of Methow summer Chinook straying into basins outside the Methow have been very low (Table 7.23). Although a few Methow summer Chinook have strayed into the Okanogan Basin, Chelan tailrace, and Hanford Reach, staying has consistently been less than 5%.

Table 7.23. Number and percent of spawning escapements within other non-target basins that consisted of Methow summer Chinook, return years 1994-2005. For example, for return year 2002, 0.4% of the summer Chinook escapement in the Okanogan Basin consisted of Methow summer Chinook. Percent strays should be less than 5%.

Return year	Wenatchee		Okanogan		Chelan		Entiat		Hanford Reach	
	Number	%	Number	%	Number	%	Number	%	Number	%
1994	0	0.0	72	1.8	-	-	-	-	-	-
1995	0	0.0	9	0.3	-	-	-	-	-	-
1996	0	0.0	0	0.0	-	-	-	-	-	-
1997	0	0.0	0	0.0	-	-	-	-	-	-
1998	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
1999	0	0.0	6	0.2	0	0.0	0	0.0	7	0.0
2000	0	0.0	3	0.1	0	0.0	0	0.0	0	0.0

Return year	Wenatchee		Okanogan		Chelan		Entiat		Hanford Reach	
	Number	%	Number	%	Number	%	Number	%	Number	%
2001	0	0.0	0	0.0	0	0.0	0	0.0	7	0.0
2002	0	0.0	54	0.4	0	0.0	0	0.0	0	0.0
2003	0	0.0	1	0.0	6	1.4	0	0.0	0	0.0
2004	0	0.0	7	0.1	3	0.7	0	0.0	0	0.0
2005	0	0.0	25	0.3	0	0.0	0	0.0	0	0.0
Total	***0***	***0.0***	***177***	***0.3***	***9***	***0.2***	***0***	***0.0***	***14***	***0.0***

On average, about 4.0% of the returns have strayed into non-target spawning areas, falling below the target of 5% (Table 7.24). Depending on brood year, percent strays into non-target spawning areas have ranged from 0-8.3%. Few (<2% on average) have strayed into non-target hatchery programs.

Table 7.24. Number and percent of Methow summer Chinook that homed to target spawning areas and the target hatchery program, and number and percent that strayed to non-target spawning areas and non-target hatchery programs, by brood years 1989-2002. Percent stays should be less than 5%.

Brood year	Homing				Straying			
	Target stream		Target hatchery		Non-target streams		Non-target hatcheries	
	Number	%	Number	%	Number	%	Number	%
1989	773	55.7	459	33.0	81	5.8	76	5.5
1990	199	70.6	81	28.7	0	0.0	2	0.7
1991	82	65.6	43	34.4	0	0.0	0	0.0
1992	68	63.0	40	37.0	0	0.0	0	0.0
1993	25	65.8	10	26.3	3	7.9	0	0.0
1994	419	79.7	94	17.9	13	2.5	0	0.0
1995	126	81.8	28	18.2	0	0.0	0	0.0
1996	57	93.4	4	6.6	0	0.0	0	0.0
1997	379	93.8	7	1.7	18	4.5	0	0.0
1998	1,653	94.7	32	1.8	61	3.5	0	0.0
1999	18	100.0	0	0.0	0	0.0	0	0.0
2000	233	92.8	4	1.6	14	5.6	0	0.0
2001	236	89.1	6	2.3	22	8.3	1	0.4
2002	89	98.9	0	0.0	1	1.1	0	0.0
Total	***4,357***	***81.2***	***808***	***15.1***	***213***	***4.0***	***79***	***1.5***

Genetics

Tissue (operculum) samples were collected from 144 wild and 144 hatchery summer Chinook in the Methow Basin in 2008. Results should be available in 2009.

Proportion of Natural Influence

Another method for assessing the genetic risk of a supplementation program is to determine the influence of the hatchery and natural environments on the adaptation of the composite population. This is estimated by the proportion of natural origin fish in the hatchery broodstock (pNOB) and the proportion of hatchery origin fish in the natural spawning escapement (pHOS). The ratio pNOB/(pHOS+pNOB) is the Proportion of Natural Influence (PNI). The larger the ratio (PNI), the greater the strength of selection in the natural environment relative to that of the hatchery environment. In order for the natural environment to dominate selection, PNI should be greater than 0.5 (HSRG/WDFW/NWIFC 2004).

For brood years 1989-2006, the PNI was equal to or greater than 0.5 in all but three years (Table 7.25). This indicates that the natural environment has a greater influence on adaptation of Methow summer Chinook than does the hatchery environment.

Table 7.25. Proportionate natural influence (PNI) of the Methow summer Chinook supplementation program for brood years 1989-2006. PNI was calculated as the proportion of naturally produced Chinook in the hatchery broodstock (pNOB) divided by the proportion of hatchery Chinook on the spawning grounds (pHOS) plus pNOB. NOS = number of natural origin Chinook on the spawning grounds; HOS = number of hatchery origin Chinook on the spawning grounds; NOB = number of natural origin Chinook collected for broodstock; and HOB = number of hatchery origin Chinook included in hatchery broodstock.

Brood year	Spawners			Broodstock			PNI
	NOS	HOS	pHOS	NOB	HOB	pNOB	
1989	551	0	0.00	1,297	312	0.81	1.00
1990	1,391	0	0.00	828	206	0.80	1.00
1991	566	0	0.00	924	314	0.75	1.00
1992	460	0	0.00	297	406	0.42	1.00
1993	310	198	0.39	681	388	0.64	0.62
1994	574	511	0.47	341	244	0.58	0.55
1995	565	649	0.53	173	240	0.42	0.44
1996	424	192	0.31	290	223	0.57	0.64
1997	513	184	0.26	198	264	0.43	0.62
1998	432	243	0.36	153	211	0.42	0.54
1999	536	449	0.46	224	289	0.44	0.49
2000	838	362	0.30	164	339	0.33	0.52
2001	1,052	1,716	0.62	91	266	0.25	0.29
2002	2,512	2,118	0.46	247	241	0.51	0.53
2003	2,231	1,699	0.43	381	101	0.79	0.65
2004	1,609	580	0.26	506	16	0.97	0.79
2005	1,673	888	0.35	391	9	0.98	0.74
2006	2040	693	0.25	500	10	0.98	0.79
Average	***1,015***	***582***	***0.30***	***427***	***227***	***0.60***	***0.68***

Natural and Hatchery Replacement Rates

Natural replacement rates (NRR) were calculated as the ratio of natural origin recruits (NOR) to the parent spawning population (spawning escapement). For brood years 1989-2001, NRR for summer Chinook in the Methow averaged 1.75 (range, 0.54-6.08) if harvested fish were not include in the estimate and 4.88 (range, 0.77-21.25) if harvested fish were included in the estimate (Table 7.26). NRRs for more recent brood years will be calculated as soon as all tag recoveries and sampling rates have been loaded into the database.

Hatchery replacement rates (HRR) are the hatchery adult-to-adult returns and were calculated as the ratio of hatchery origin recruits (HOR) to the parent broodstock collected. These rates should be greater than the NRRs and greater than or equal to 5.30 (the calculated target value in Murdoch and Peven 2005). HRRs exceeded NRRs in four or five of the 13 years of data depending on if harvest was or was not included in the estimate (Table 7.26). Hatchery replacement rates for Methow summer Chinook have exceeded the estimated target value of 5.30 in two of the 13 years of data, regardless if harvest is or is not included in the estimate.

Table 7.26. Broodstock collected, spawning escapements, natural and hatchery origin recruits (NOR and HOR), and natural and hatchery replacement rates (NRR and HRR; with and without harvest) for wild summer Chinook in the Methow Basin, brood years 1989-2001. *(The numbers in this table may change as the HETT and HC refine the methods for estimating summer Chinook HRRs and NRRs.)*

Brood year	Broodstock Collected	Spawning Escapement	Harvest not included				Harvest included			
			HOR	NOR	HRR	NRR	HOR	NOR	HRR	NRR
1989	202	551	1,389	754	6.88	1.36	3395	1,286	16.81	2.33
1990	202	1,391	282	776	1.40	0.56	383	1,070	1.90	0.77
1991	266	566	125	342	0.47	0.60	186	541	0.70	0.96
1992	214	460	108	649	0.50	1.41	139	985	0.65	2.14
1993	234	508	38	575	0.16	1.13	62	763	0.26	1.50
1994	280	1,085	526	632	1.88	0.58	701	956	2.50	0.88
1995	256	1,214	154	1,226	0.60	1.01	213	2,420	0.83	1.99
1996	220	615	61	785	0.28	1.28	73	2,078	0.33	3.38
1997	209	697	404	2,282	1.93	3.27	646	7,143	3.09	10.25
1998	235	675	1,746	4,101	7.43	6.08	3867	14,344	16.46	21.25
1999	222	986	18	3,180	0.08	3.23	33	11,295	0.15	11.46
2000	222	1,200	251	649	1.13	0.54	766	2,005	3.45	1.67
2001	223	2,768	265	NA	1.19	NA	889	NA	3.99	NA
Average	***230***	***978***	***413***	***1,329***	***1.80***	***1.75***	***873***	***3,741***	***3.80***	***4.88***

Smolt-to-Adult Survivals

Smolt-to-adult survival ratios (SARs) were calculated as the number of hatchery adults divided by the number of hatchery smolts released. SARs were based on CWT returns. For the available brood years, SARs have ranged from 0.00008 to 0.01892 for hatchery summer Chinook in the Methow Basin (Table 7.27).

Table 7.27. Smolt-to-adult ratios (SARs) for Methow summer Chinook, brood years 1989-2002.

Brood year	Number of tagged smolts released	Estimated adult captures	SAR
1989	358,237	2,881	0.00804
1990	371,483	366	0.00099
1991	377,097	130	0.00034
1992	392,636	138	0.00035
1993	200,345	62	0.00031
1994	400,488	696	0.00174
1995	344,974	211	0.00061
1996	289,880	72	0.00025
1997	380,430	642	0.00169
1998	202,559	3,833	0.01892
1999	422,473	33	0.00008
2000	334,337	765	0.00229
2001	246,159	884	0.00359
2002	310,846	585	0.00188
Average	***330,853***	***807***	***0.00293***

7.7 ESA/HCP Compliance

Broodstock Collection

Summer Chinook adults collected at Wells Dam are used for both the Methow and Okanogan supplementation programs. Per the 2006 broodstock collection protocol, 556 natural-origin (adipose fin present) adults were targeted for collection between 1 July and 14 September at the East Ladder of Wells Dam. Actual collections occurred between 3 July and 12 September and totaled 591 summer Chinook. The overage in adult broodstock collection was necessary to replace about 35 summer Chinook broodstock that died during transfer as a result of a combination of $C0_2$ and MS-222 toxicity. ESA Permit 1347 provides authorization to collect Methow and Okanogan summer Chinook at Wells Dam three days per week and up to 16 hours per day from July through November. During 2006, broodstock collection activities encompassed a total of 19 days, representing 29% of the allowable trapping days allowed under ESA Permit 1347.

Collection of Methow and Okanogan summer Chinook broodstock at Wells Dam occurred concurrently with collection of summer steelhead for the Wells steelhead program authorized under ESA Section 10 Permit 1395. Encounters with steelhead and spring Chinook during Methow and Okanogan summer Chinook broodstock collections did not result in takes that were outside those authorized in Permit 1347 and in Permit 1395 for the Wells Steelhead program. Steelhead encountered during summer Chinook collections that were not required for steelhead broodstock were passed at the trap site and were not physically handled. Any spring Chinook encountered during summer Chinook broodstock activities were also passed without handling.

Hatchery Rearing and Release

The 2006 brood Methow/Okanogan summer Chinook reared throughout their juvenile life-stages at Eastbank Fish Hatchery and the Carlton Acclimation pond without incident (see Section 7.2). The 2006 brood smolt release totaled 419,734 summer Chinook, representing 105% of the production objective and was compliant with the 10% overage allowable in ESA Section 10 Permit 1347.

Hatchery Effluent Monitoring

Per ESA Permits 1196, 1347, and 1395, permit holders shall monitor and report hatchery effluents in compliance with applicable National Pollution Discharge Elimination Systems (NPDES) (EPA 1999) permit limitations. There were no NPDES violations reported at Chelan PUD Hatchery facilities during the period 1 January 2008 through 31 December 2008. NPDES monitoring and reporting for Chelan PUD Hatchery Programs during 2008 are provided in Appendix E.

Spawning Surveys

Summer Chinook spawning ground surveys conducted in the Methow Basin during 2008 were consistent with ESA Section 10 Permit No. 1347. Because of the difficulty of quantifying the level of take associated with spawning ground surveys, the Permit does not specify a take level associated with these activities, even though it does authorize implementation of spawning ground surveys. Therefore, no take levels are reported. However, to minimize potential impacts to established redds, wading was restricted to the extent practical, and extreme caution was used to avoid established redds when wading was required.

SECTION 8: OKANOGAN/SIMILKAMEEN SUMMER CHINOOK

8.1 Broodstock Sampling

Summer Chinook broodstock for the Okanogan/Similkameen and Methow programs is collected in the East Ladder of Wells Dam. Refer to Section 7.1 for information on the origin, age and length, sex ratios, and fecundity of summer Chinook broodstock collected at Wells Dam.

8.2 Hatchery Rearing

Rearing History

Number of eggs taken

Based on the unfertilized egg-to-release survival standard of 81%, a total of 711,111 eggs are required to meet the program release goal of 576,000 smolts. Between 1989 and 2007, the egg take goal was reached in 11 of those years (Table 8.1).

Table 8.1. Numbers of eggs taken from summer Chinook broodstock collected at Wells Dam for the Okanogan program, 1989-2007.

Return year	Number of eggs taken
1989	724,200
1990	696,144
1991	879,892
1992	729,389
1993	797,234
1994	893,086
1995	736,500
1996	672,000
1997	601,744
1998	584,018
1999	725,589
2000	645,403
2001	418,907
2002	718,599
2003	710,521
2004	805,814
2005	452,928
2006	757,350
2007	824,703
Average	***703,896***

Number of acclimation days

Fish were volitionally released from Similkameen Pond as yearling smolts beginning in April 2008. Fish acclimated at Similkameen were held for 182 to 205 days (Table 8.2). No fish were reared or released in Bonaparte pond in 2008.

Table 8.2. Number of days Okanogan summer Chinook broods were acclimated at Similkameen and Bonaparte ponds, brood years 1989-2006.

Brood year	Release year	Rearing facility	Transfer date	Release date	Number of days
1989	1991	Similkameen	29-Oct	7-May	190
1990	1992	Similkameen	5-Nov	25-Apr	171
1991	1993	Similkameen	1-Nov	9-Apr	159
1992	1994	Similkameen	2-Nov	1-Apr	150
			26-Feb	1-Apr	34
1993	1995	Similkameen	24-Oct	1-Apr	159
			24-Feb	1-Apr	36
1994	1996	Similkameen	30-Oct	6-Apr	158
			14-Mar	6-Apr	23
1995	1997	Similkameen	1-Oct	1-Apr	182
1996	1998	Similkameen	10-Oct	15-Mar	156
1997	1999	Similkameen	7-Oct	19-Apr	194
1998	2000	Similkameen	5-Oct	19-Apr	196
1999	2001	Similkameen	5-Oct	18-Apr	195
2000	2002	Similkameen	10-Oct	8-Apr	180
2001	2003	Similkameen	1-Oct	29-Apr	210
2002	2004	Similkameen	9-Nov	23-Apr	165
2003	2005	Similkameen	19-Oct	28-Apr	191
2004	2006	Similkameen	26-Oct	23-Apr	179
2005	2007	Bonaparte	6-Nov	11-Apr	156
		Similkameen	25-Oct	18-Apr – 9-May	179-200
2006	2008	Similkameen	15-17-Oct	16-Apr – 7-May	182-205

Release Information

Numbers released

The 2006 Okanogan summer Chinook program achieved 143.2% of the 576,000 target goal with about 824,703 fish being released volitionally in the Similkameen River between 16 April and 7 May (Table 8.3).

Table 8.3. Numbers of Okanogan summer Chinook smolts released from the Similkameen and Bonaparte ponds, brood years 1989-2006; NA = not available. The release target for Okanogan summer Chinook is 576,000 smolts.

Brood year	Release year	Rearing facility	CWT mark rate	Number of smolts released
1989	1991	Similkameen	0.5732	352,600
1990	1992	Similkameen	0.6800	540,000
1991	1993	Similkameen	0.5335	675,500
1992	1994	Similkameen	0.9819	548,182
1993	1995	Similkameen	0.6470	586,000
1994	1996	Similkameen	0.4176	536,299
1995	1997	Similkameen	0.9785	587,000
1996	1998	Similkameen	0.9769	507,913
1997	1999	Similkameen	0.9711	589,591
1998	2000	Similkameen	0.9825	293,191
1999	2001	Similkameen	0.9689	630,463
2000	2002	Similkameen	0.9928	532,453
2001	2003	Similkameen	0.9877	26,642
2002	2004	Similkameen	0.9204	388,589
2003	2005	Similkameen	0.9929	579,019
2004	2006	Similkameen	0.9425	703,359
2005	2007	Bonaparte	0	0 (assumed)
		Similkameen	0.9862	275,919
2006	2008	Bonaparte	NA	NA
		Similkameen	0.9878	604,035
Average			***0.8623***	***489,767***

Numbers tagged

The 2006 brood Okanogan summer Chinook from the Similkameen facility were 98.8% CWT and adipose fin-clipped. No fish were PIT tagged.

Fish size and condition at release

Size at release of the Similkameen population was 68.2% and 46.0% of the target fork length and weight, respectively. The target CV for fork length was exceeded by 37% (Table 8.4).

Table 8.4. Mean lengths (FL, mm), weight (g and fish/pound), and coefficient of variation (CV) of Okanogan summer Chinook smolts released from the hatchery, brood years 1989-2006. Size targets are provided in the last row of the table.

Brood year	Release year	Fork length (mm)		Mean weight	
		Mean	CV	Grams (g)	Fish/pound
1989	1991	-	-	41.3	11
1990	1992	143	9.5	37.8	12
1991	1993	125	15.5	22.4	20
1992	1994	120	15.4	20.7	22
1993	1995	132	-	23.2	20
1994	1996	136	16.0	29.6	15
1995	1997	137	8.2	32.8	14
1996	1998	127	12.8	26.2	17
1997	1999	144	9.9	36.0	13
1998	2000	148	5.9	41.0	11
1999	2001	141	15.7	35.4	13
2000	2002	121	13.4	20.4	22
2001	2003	132	8.2	25.7	18
2002	2004	119	13.4	20.8	22
2003	2005	133	10.6	28.9	16
2004	2006	132	9.9	29.8	15
2005	2007	132	9.6	25.9	18
2006	2008	120	12.3	20.9	22
Targets		***176***	***9.0***	***45.4***	***10***

Survival Estimates

Overall survival of Okanogan summer Chinook from green (unfertilized) egg to release was slightly below the standard set for the program (Table 8.5). Lower than expected green egg-to-eye survival had the greatest effect on the overall survival performance. Currently, it is unknown if gamete viability is gender biased or is uniform between sexes and more influenced by between-year environmental variations.

Table 8.5. Hatchery life-stage survival rates (%) for Okanogan summer Chinook, brood years 1989-2006. Survival standards or targets are provided in the last row of the table.

Brood year	Rearing facility	Collection to spawning		Unfertilized egg-eyed	Eyed egg-ponding	30 d after ponding	100 d after ponding	Ponding to release	Transport to release	Unfertilized egg-release
		Female	Male							
1989[a]	Similkameen	89.8	99.5	89.9	96.7	99.7	99.4	73.3	57.4	48.7
1990[a]	Similkameen	93.9	99.0	84.9	97.1	81.2	80.6	97.7	98.6	77.6
1991[a]	Similkameen	93.1	95.5	88.2	97.1	99.4	99.1	98.4	97.1	76.8
1992[a]	Similkameen	96.9	99.0	87.0	98.0	99.9	99.9	91.7	92.6	75.2

Brood year	Rearing facility	Collection to spawning		Unfertilized egg-eyed	Eyed egg-ponding	30 d after ponding	100 d after ponding	Ponding to release	Transport to release	Unfertilized egg-release
		Female	Male							
1993[a]	Similkameen	82.2	99.4	85.4	97.6	99.8	99.5	92.0	90.2	73.5
1994	Similkameen	96.1	90.0	86.6	100.0	98.1	97.4	73.1	89.8	60.1
1995	Similkameen	91.9	96.2	98.2	84.1	96.5	96.2	92.7	98.2	79.7
1996	Similkameen	95.4	98.1	83.2	100.0	97.7	96.9	86.5	92.5	75.6
1997	Similkameen	91.9	94.6	86.1	98.4	98.7	98.3	98.8	99.4	98.0
1998	Similkameen	84.0	96.2	54.1	98.0	99.4	98.9	96.6	99.6	50.2
1999	Similkameen	98.8	98.7	92.9	96.9	98.0	97.6	96.9	99.0	86.9
2000	Similkameen	90.5	96.9	89.2	98.5	98.2	98.0	93.6	97.2	82.5
2001	Similkameen	96.2	92.3	89.1	97.6	99.7	99.5	7.4	11.9	6.4
2002	Similkameen	97.1	98.1	89.8	98.0	99.7	99.5	51.6	52.2	54.1
2003	Similkameen	96.7	97.5	86.8	97.6	99.3	98.5	98.0	98.8	81.5
2004	Similkameen	93.6	98.2	84.0	97.6	99.6	99.3	97.8	98.8	80.2
	Bonaparte	93.6	98.2	84.0	97.6	99.6	99.3	97.9	98.9	80.3
2005	Similkameen	97.0	89.6	88.0	99.5	99.5	99.0	93.5	94.6	81.8
	Bonaparte	97.0	89.6	88.0	99.5	99.5	99.0	0.0	0.0	0.0
2006	Similkameen	92.9	89.5	86.3	98.3	99.6	99.3	94.1	95.5	79.8
Standard		***90.0***	***85.0***	***92.0***	***98.0***	***97.0***	***93.0***	***90.0***	***95.0***	***81.0***

[a] Survival rates were calculated from the aggregate population collected at Wells Fish Hatchery volunteer channel and left- and right-ladder traps at Wells Dam.

8.3 Disease Monitoring

Rearing of the 2006 brood Okanogan summer Chinook was similar to previous years with fish being held on well water before being transferred for final acclimation on Similkameen or Okanogan river water. The Similkameen population was transferred in mid October 2007. In early November, in response to an increase in external fungus and bacterial cold-water disease, Chloramine-T and formalin treatments were initiated consecutively. In mid February, this population was again treated with formalin for control of external *Costia*. No additional disease-related problems were noted before the fish were released.

Results of adult broodstock bacterial kidney disease (BKD) monitoring for Methow/Okanogan summer Chinook are shown in Table 7.11 in Section 7.3.

8.4 Spawning Surveys

Surveys for Okanogan/Similkameen summer Chinook redds were conducted from late September to mid-November, 2008, in the Okanogan and Similkameen rivers. Total redd counts (not peak counts) were conducted in the rivers (see Appendix J for more details).

Redd Counts

A total of 2,146 summer Chinook redds were counted in the Okanogan Basin in 2008 (Table 8.6). This was greater than the 19-year average of 1,608 redds.

Table 8.6. Total number of redds counted in the Okanogan Basin, 1989-2008.

Survey year	Number of summer Chinook redds		
	Okanogan River	Similkameen River	Total count
1989	134*	370	504
1990	47	147	194
1991	64	91	155
1992	53	57	110
1993	162	288	450
1994	375	777	1,152
1995	267	616	883
1996	116	419	535
1997	158	486	644
1998	88	276	364
1999	369	1,275	1,644
2000	549	993	1,542
2001	1,108	1,540	2,648
2002	2,667	3,358	6,025
2003	1,035	378	1,413
2004	1,327	1,660	2,987
2005	1,611	1,423	3,034
2006	2,592	1,666	4,258
2007	1,301	707	2,008
2008	1,146	1,000	2,146
Average	***758***	***876***	***1,635***

* Peak count based on an aerial survey.

Redd Distribution

Summer Chinook redds were not evenly distributed among the survey reaches in the Okanogan Basin. Most redds (81%) were located in the upper Okanogan and lower Similkameen reaches (reaches upstream of the Riverside Bridge) (Table 8.7; Figure 8.1). Relatively few summer Chinook spawned downstream of the Riverside Bridge on the Okanogan River (Reaches 1-4).

Table 8.7. Total number of summer Chinook redds counted in different reaches in the Okanogan Basin during September through mid-November, 2008. Reach codes are described in Table 2.11.

Survey reach	Total redd count	Percent
Okanogan 1	4	0.2
Okanogan 2	51	2.4
Okanogan 3	60	2.8
Okanogan 4	96	4.5
Okanogan 5	374	17.4
Okanogan 6	561	26.1

Survey reach	Total redd count	Percent
Similkameen 1	801	37.3
Similkameen 2	199	9.3
Totals	***2,146***	***100.0***

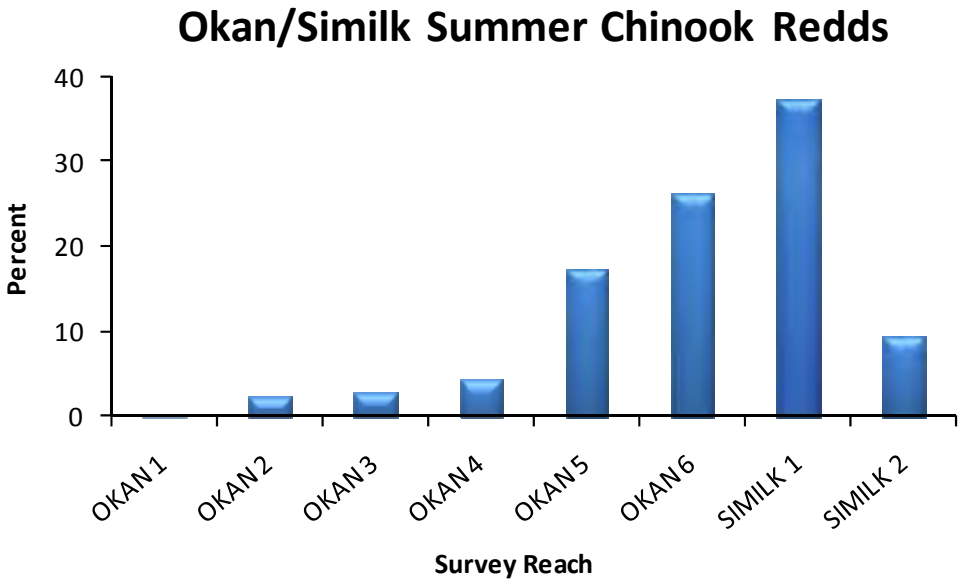


Figure 8.1. Percent of the total number of summer Chinook redds counted in different reaches in the Okanogan Basin during September through mid-November, 2008. Reach codes are described in Table 2.11.

Spawn Timing

Spawning in 2008 began the last week in September in the Similkameen and the first week of October in the Okanogan, and peaked during the second week of October in both rivers (Figure 8.2). Spawning began when stream temperature varied from 10-16°C.

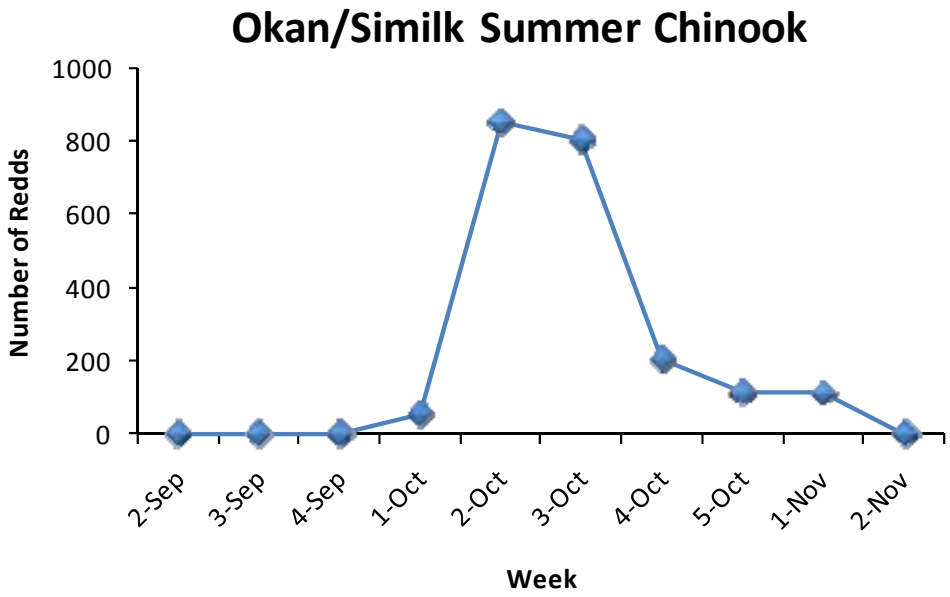


Figure 8.2. Number of new summer Chinook redds counted during different weeks in the Okanogan Basin, September through mid-November, 2008.

Spawning Escapement

Spawning escapement for Okanogan/Similkameen summer Chinook was calculated as the total number of redds times the fish per redd ratio estimated from fish sampled at Wells Dam. The estimated fish per redd ratio for Okanogan/Similkameen summer Chinook in 2008 was 3.25. Multiplying this ratio by the number of redds counted in the Okanogan and Similkameen rivers resulted in a total spawning escapement of 6,974 summer Chinook (Table 8.8).

Table 8.8. Spawning escapements for summer Chinook in the Okanogan and Similkameen rivers for return years 1989-2008.

Return year	Fish/Redd	Spawning escapement		
		Okanogan	Similkameen	Total
1989*	3.30	561	1,221	1,782
1990*	3.40	381	500	881
1991*	3.70	237	337	574
1992*	4.30	228	245	473
1993*	3.30	535	950	1,485
1994*	3.50	1,313	2,720	4,033
1995*	3.40	908	2,094	3,002
1996*	3.40	394	1,425	1,819
1997*	3.40	537	1,652	2,189
1998	3.00	264	828	1,092
1999	2.20	812	2,805	3,617
2000	2.40	1,318	2,383	3,701

Return year	Fish/Redd	Spawning escapement		
		Okanogan	Similkameen	Total
2001	4.10	4,543	6,314	10,857
2002	2.30	6,134	7,723	13,857
2003	2.42	2,505	915	3,420
2004	2.25	2,986	3,735	6,721
2005	2.93	4,720	4,169	8,889
2006	2.02	5,236	3,365	8,601
2007	2.20	2,862	1,555	4,417
2008	3.25	3,725	3,250	6,975
Average	***3.04***	***2,010***	***2,409***	***4,419***

* Spawning escapement was calculated using the "Modified Meekin Method" (i.e., 3.1 x jack multiplier).

8.5 Carcass Surveys

Surveys for summer Chinook carcasses were conducted during late September to mid-November, 2008, in the Okanogan and Similkameen rivers (see Appendix J for more details).

Number sampled

A total of 2,019 summer Chinook carcasses were sampled during September through mid-November in the Okanogan Basin (Table 8.9). A total of 1,003 were sampled in the Okanogan River and 1,016 in the Similkameen River.

Table 8.9. Numbers of summer Chinook carcasses sampled within each survey reach in the Okanogan Basin, 1993-2008. Reach codes are described in Table 2.11.

Survey year	Number of summer Chinook carcasses								
	Okanogan						Similkameen		Total
	O-1	O-2	O-3	O-4	O-5	O-6	S-1	S-2	
1993[a]	0	2	3	0	23	13	73	1	**115**
1994[b]	0	4	4	0	27	5	318	60	**418**
1995	0	0	2	0	30	0	239	15	**286**
1996	0	0	0	2	5	2	226	0	**235**
1997	0	0	2	0	9	3	225	1	**240**
1998	0	1	8	1	7	7	340	4	**368**
1999	0	0	3	2	23	53	766	48	**895**
2000	0	2	20	15	47	16	727	41	**868**
2001	0	26	75	10	127	112	1,141	105	**1,596**
2002	10	32	83	35	204	573	1,265	259	**2,461**
2003[c]	0	0	26	0	15	208	180	8	**437**
2004	0	4	31	24	146	283	1,392	298	**2,178**
2005	0	8	93	37	371	431	731	276	**1,947**

Survey year	Number of summer Chinook carcasses								
	Okanogan						Similkameen		Total
	O-1	O-2	O-3	O-4	O-5	O-6	S-1	S-2	
2006	4	3	31	16	120	291	513	100	**1,078**
2007	2	1	48	1	459	519	657	29	**1,716**
2008	4	10	40	36	248	665	859	157	**2,019**
Average	***1***	***6***	***29***	***11***	***116***	***199***	***603***	***88***	***1,054***

[a] 25 additional carcasses were sampled on the Similkameen and 46 on the Okanogan without any reach designation.
[b] One additional carcasses was sampled on the Similkameen without any reach designation.
[c] 793 carcasses were sampled on the Similkameen before initiation of spawning (pre-spawn mortality) and an additional 40 carcasses were sampled on the Okanogan. The cause of the high mortality (*Ichthyophthirius multifilis* and *Flavobacterium columnarae*) was exacerbated by high river temperatures.

Carcass Distribution and Origin

Summer Chinook carcasses were not evenly distributed among reaches within the Okanogan Basin in 2008 (Table 8.9; Figure 8.3). Most of the carcasses in the basin were found in the upper Okanogan River and lower Similkameen River. The highest percentage of carcasses (43%) was sampled in Reach 1 on the Similkameen River between the Driscoll Channel and Oroville Bridge.

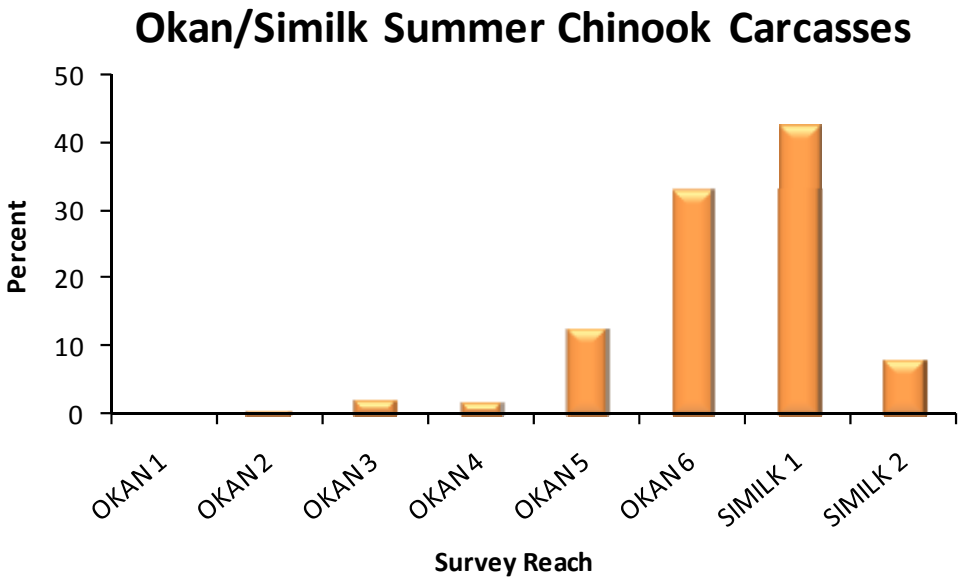


Figure 8.3. Percent of summer Chinook carcasses sampled within different reaches in the Okanogan Basin during September through mid-November, 2008. Reach codes are described in Table 2.11.

Numbers of wild and hatchery origin summer Chinook carcasses sampled in 2008 will be available after analysis of CWTs and scales. Based on the available data (1991-2007), most fish, regardless of origin, were found in Reach 1 on the Similkameen River (Driscoll Channel to Oroville Bridge) (Table 8.10). However, a slightly larger percentage of hatchery fish were found in reaches on the

Similkameen River than were wild fish (Figure 8.4). In contrast, a larger percentage of wild fish were found in reaches on the Okanogan River.

Table 8.10. Numbers of wild and hatchery summer Chinook carcasses sampled within different reaches in the Okanogan Basin, 1993-2007.

Survey year	Origin	Survey reach								Total
		O-1	O-2	O-3	O-4	O-5	O-6	S-1	S-2	
1993	Wild	0	0	3	0	13	4	48	1	**69**
	Hatchery	0	2	0	0	10	9	25	0	**46**
1994	Wild	0	0	1	0	8	1	113	22	**145**
	Hatchery	0	4	3	0	19	4	205	38	**273**
1995	Wild	0	0	1	0	10	0	66	4	**81**
	Hatchery	0	0	1	0	20	0	173	11	**205**
1996	Wild	0	0	0	1	3	1	53	0	**58**
	Hatchery	0	0	0	1	2	1	173	0	**177**
1997	Wild	0	0	1	0	0	2	83	0	**86**
	Hatchery	0	0	1	0	9	0	142	1	**153**
1998	Wild	0	1	3	1	6	5	162	4	**182**
	Hatchery	0	0	5	0	1	2	178	0	**186**
1999	Wild	0	0	0	0	9	24	298	10	**341**
	Hatchery	0	0	3	2	14	29	468	38	**554**
2000	Wild	0	0	8	8	24	11	189	4	**244**
	Hatchery	0	2	12	7	23	5	538	37	**624**
2001	Wild	0	10	23	5	67	42	390	54	**591**
	Hatchery	0	16	52	5	60	70	751	51	**1,005**
2002	Wild	6	14	20	10	81	212	340	72	**755**
	Hatchery	4	18	63	25	123	360	925	187	**1,705**
2003	Wild	0	0	13	0	12	149	221	116	**511**
	Hatchery	0	0	15	0	5	91	364	257	**732**
2004	Wild	0	2	19	19	108	225	1,126	260	**1,759**
	Hatchery	0	2	12	5	38	58	266	38	**419**
2005	Wild	0	5	51	21	256	364	532	176	**1,405**
	Hatchery	0	3	42	16	115	67	199	100	**542**
2006	Wild	2	2	23	11	110	271	70	78	**567**
	Hatchery	2	1	8	5	10	20	443	22	**511**
2007	Wild	1	0	33	1	303	347	441	21	**1,147**
	Hatchery	1	0	22	0	150	172	217	8	**570**
Average	***Wild***	***1***	***2***	***13***	***5***	***67***	***111***	***275***	***55***	***529***
	Hatchery	***0***	***3***	***16***	***4***	***40***	***59***	***338***	***53***	***513***

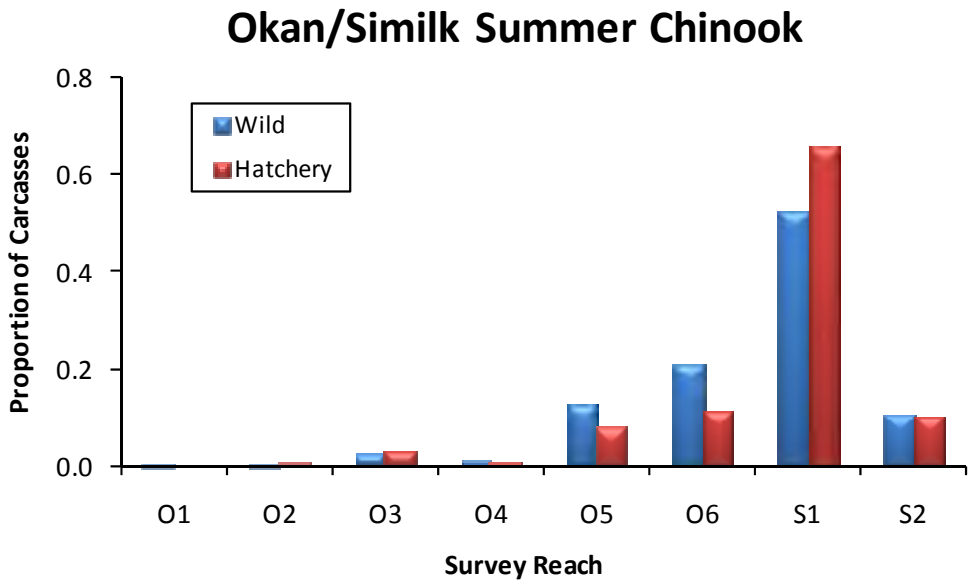


Figure 8.4. Distribution of wild and hatchery produced carcasses in different reaches in the Okanogan Basin, 1993-2007. Reach codes are described in Table 2.11.

Sampling Rate

Overall, 29% of the total spawning escapement of summer Chinook in the Okanogan Basin was sampled in 2008 (Table 8.11). This was above the target of 20%. Sampling rates among survey reaches varied from 6 to 36%.

Table 8.11. Number of redds and carcasses, total spawning escapement, and sampling rates for summer Chinook in the Okanogan Basin, 2008.

Sampling reach	Total number of redds	Total number of carcasses	Total spawning escapement	Sampling rate
Okanogan 1	4	4	13	0.31
Okanogan 2	51	10	166	0.06
Okanogan 3	60	40	195	0.21
Okanogan 4	96	36	312	0.12
Okanogan 5	374	248	1,216	0.20
Okanogan 6	561	665	1,823	0.36
Similkameen 1	801	859	2,603	0.33
Similkameen 2	199	157	647	0.24
Total	***2,146***	***2,019***	***6,975***	***0.29***

Length Data

Mean lengths (POH, cm) of male and female summer Chinook carcasses sampled during surveys on the Okanogan and Similkameen rives in 2008 are provided in Table 8.12. The average size of males and females sampled in the Okanogan Basin were 62 cm and 73 cm, respectively.

Table 8.12. Mean lengths (postorbital-to-hypural length; cm) and standard deviations (in parentheses) of male and female summer Chinook carcasses sampled in different reaches in the Okanogan Basin, 2008.

Stream/watershed	Mean length (cm)	
	Male	Female
Okanogan 1	64 (11)	--
Okanogan 2	56 (5)	80 (5)
Okanogan 3	61 (9)	71 (4)
Okanogan 4	63 (9)	69 (5)
Okanogan 5	61 (8)	69 (6)
Okanogan 6	68 (6)	60 (8)
Similkameen 1	64 (9)	70 (5)
Similkameen 2	65 (9)	70 (6)
Total	***62 (9)***	***70 (6)***

8.6 Life History Monitoring

Life history characteristics of Okanogan/Similkameen summer Chinook were assessed by examining carcasses on spawning grounds and fish collected or examined at broodstock collection sites, and by reviewing tagging data and fisheries statistics.

Migration Timing

Migration timing for Okanogan/Similkameen summer Chinook is described in Section 7.6.

Age at Maturity

Most of the wild and hatchery summer Chinook sampled during the period 1993-2007 in the Okanogan Basin were age-4 and 5 fish (total age) (Table 8.13; Figure 8.5). A higher percentage of age-3 and 4 wild Chinook returned to the basin than did age-3 and 4 hatchery Chinook. In contrast, a higher proportion of age-5 and 6 hatchery fish returned than did age-5 and 6 wild fish. Thus, a higher percentage of hatchery fish returned at an older age than did wild fish.

Table 8.13. Proportions of wild and hatchery summer Chinook of different ages (total age) sampled on spawning grounds in the Okanogan Basin, 1993-2007.

Sample year	Origin	Total age						Sample size
		2	3	4	5	6	7	
1993	Wild	0.00	0.00	0.76	0.24	0.00	0.00	63
	Hatchery	0.00	0.02	0.97	0.02	0.00	0.00	61
1994	Wild	0.00	0.03	0.42	0.55	0.00	0.00	135
	Hatchery	0.00	0.02	0.09	0.89	0.00	0.00	292
1995	Wild	0.00	0.01	0.26	0.72	0.00	0.00	68
	Hatchery	0.00	0.01	0.16	0.35	0.48	0.00	204
1996	Wild	0.00	0.14	0.50	0.36	0.00	0.00	36
	Hatchery	0.00	0.02	0.21	0.55	0.20	0.01	177
1997	Wild	0.00	0.00	0.05	0.66	0.29	0.00	73
	Hatchery	0.00	0.00	0.03	0.86	0.12	0.00	153
1998	Wild	0.00	0.03	0.64	0.34	0.00	0.00	151
	Hatchery	0.01	0.05	0.50	0.23	0.22	0.00	185
1999	Wild	0.00	0.00	0.33	0.66	0.00	0.00	275
	Hatchery	0.00	0.00	0.12	0.86	0.01	0.00	545
2000	Wild	0.01	0.07	0.28	0.63	0.02	0.00	216
	Hatchery	0.00	0.12	0.03	0.75	0.10	0.00	545
2001	Wild	0.02	0.15	0.75	0.07	0.00	0.00	531
	Hatchery	0.00	0.05	0.88	0.02	0.05	0.00	1,005
2002	Wild	0.01	0.11	0.65	0.23	0.00	0.00	692
	Hatchery	0.00	0.01	0.21	0.78	0.00	0.00	1,681
2003	Wild	0.01	0.02	0.76	0.21	0.00	0.00	478
	Hatchery	0.00	0.03	0.06	0.79	0.12	0.00	653
2004	Wild	0.00	0.12	0.11	0.76	0.01	0.00	1,529
	Hatchery	0.00	0.01	0.32	0.46	0.21	0.00	381
2005	Wild	0.00	0.08	0.76	0.14	0.02	0.00	1,282
	Hatchery	0.00	0.03	0.13	0.69	0.14	0.00	526
2006	Wild	0.00	0.01	0.47	0.51	0.01	0.00	839
	Hatchery	0.01	0.06	0.26	0.27	0.40	0.00	112
2007	Wild	0.01	0.07	0.10	0.80	0.02	0.00	1,061
	Hatchery	0.01	0.21	0.31	0.45	0.02	0.01	519
Average	***Wild***	***0.00***	***0.08***	***0.44***	***0.47***	***0.01***	***0.00***	***495***
	Hatchery	***0.00***	***0.04***	***0.28***	***0.59***	***0.08***	***0.00***	***469***

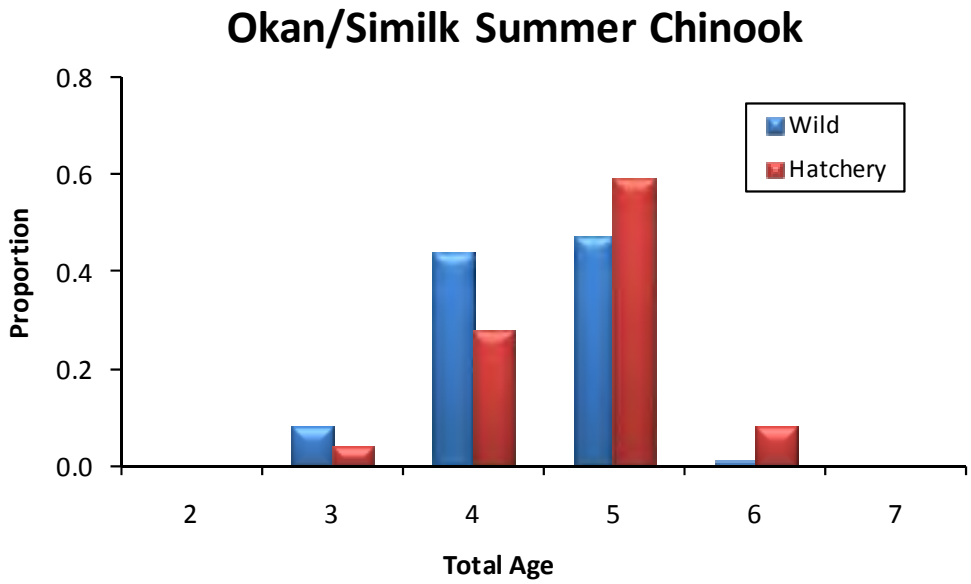


Figure 8.5. Proportions of wild and hatchery summer Chinook of different total ages sampled at broodstock collection sites and on spawning grounds in the Okanogan Basin for the combined years 1993-2007.

Size at Maturity

On average, hatchery summer Chinook were about 3 cm smaller than wild summer Chinook sampled in the Okanogan Basin (Table 8.14). This is interesting given that a slightly higher percentage of hatchery fish returned as age-5 and 6 fish than did wild fish. Future analyses will compare sizes of hatchery and wild fish of the same age groups and gender.

Table 8.14. Mean lengths (POH; cm) and variability statistics for wild and hatchery summer Chinook sampled in the Okanogan Basin, 1993-2007; SD = 1 standard deviation.

Sample year	Origin	Sample size	Summer Chinook length (POH; cm)			
			Mean	SD	Minimum	Maximum
1993	Wild	69	73	7	52	90
	Hatchery	59	62	6	47	75
1994	Wild	164	71	7	40	86
	Hatchery	300	69	8	30	84
1995	Wild	81	75	6	54	87
	Hatchery	201	73	8	39	87
1996	Wild	22	68	14	22	85
	Hatchery	26	75	8	60	88
1997	Wild	87	71	7	44	85
	Hatchery	148	74	6	48	88
1998	Wild	182	70	8	45	94
	Hatchery	186	65	12	30	87
1999	Wild	340	73	7	56	91

Sample year	Origin	Sample size	Summer Chinook length (POH; cm)			
			Mean	SD	Minimum	Maximum
	Hatchery	554	71	7	23	84
2000	Wild	241	70	10	32	86
	Hatchery	624	69	12	24	92
2001	Wild	579	67	9	26	90
	Hatchery	997	61	8	32	90
2002	Wild	755	69	9	28	91
	Hatchery	1,705	70	8	33	87
2003	Wild	533	68	9	30	93
	Hatchery	732	69	10	26	90
2004	Wild	1,757	71	10	33	94
	Hatchery	416	66	9	41	92
2005	Wild	1,407	66	7	41	99
	Hatchery	542	68	8	31	85
2006	Wild	940	72	6	31	91
	Hatchery	138	70	10	33	86
2007	Wild	1,147	75	9	27	99
	Hatchery	570	63	13	30	85
Pooled	***Wild***	***8,304***	***71***	***8***	***22***	***99***
	Hatchery	***7,198***	***68***	***9***	***23***	***92***

Contribution to Fisheries

Most of the harvest on Okanogan/Similkameen summer Chinook occurred in the Ocean (Table 8.15). Ocean harvest has made up 58% to 100% of all Okanogan/Similkameen summer Chinook harvested. Brood years 1989, 1997-2000, and 2002 provided the largest harvests, while brood year 1996 provided the lowest.

Table 8.15. Estimated number and percent (in parentheses) of Okanogan/Similkameen summer Chinook captured in different fisheries, brood years 1989-2002.

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational (sport)	
1989	2,344 (79)	351 (12)	200 (7)	77 (3)	2,972
1990	356 (89)	27 (7)	7 (2)	12 (3)	402
1991	220 (86)	37 (14)	0 (0)	0 (0)	257
1992	441 (92)	24 (5)	6 (1)	10 (2)	481
1993	24 (80)	6 (20)	0 (0)	0 (0)	30
1994	379 (92)	17 (4)	8 (2)	7 (2)	411
1995	647 (93)	3 (0)	18 (3)	24 (3)	692

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational (sport)	
1996	4 (100)	0 (0)	0 (0)	0 (0)	4
1997	6,683 (92)	92 (1)	80 (1)	416 (6)	7,271
1998	4,334 (89)	14 (0)	238 (5)	217 (4)	4,847
1999	1,342 (68)	14 (1)	241 (12)	376 (19)	1,973
2000	3,137 (69)	35 (1)	719 (16)	661 (15)	4,552
2001	183 (58)	0 (0)	111 (35)	24 (8)	318
2002	815 (63)	15 (1)	251 (19)	221 (17)	1,302

Straying

Stray rates were determined by examining CWTs recovered on spawning grounds within and outside the Okanogan Basin. Targets for strays based on return year (recovery year) and brood year should be less than 5%.

Rates of Okanogan summer Chinook straying into basins outside the Okanogan have been very low (Table 8.16). Although a few Okanogan summer Chinook have strayed into other spawning areas, straying, on average, has been less than 5%. The Chelan tailrace has received the largest number of Okanogan strays.

Table 8.16. Number and percent of spawning escapements within other non-target basins that consisted of Okanogan summer Chinook, return years 1994-2005. For example, for return year 2002, 1% of the summer Chinook spawning escapement in the Entiat Basin consisted of Okanogan summer Chinook. Percent strays should be less than 5%.

Return year	Wenatchee		Methow		Chelan		Entiat		Hanford Reach	
	Number	%	Number	%	Number	%	Number	%	Number	%
1994	0	0.0	0	0.0	-	-	-	-	-	-
1995	0	0.0	0	0.0	-	-	-	-	-	-
1996	0	0.0	0	0.0	-	-	-	-	-	-
1997	0	0.0	0	0.0	-	-	-	-	-	-
1998	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
1999	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
2000	0	0.0	6	0.5	30	4.5	0	0.0	3	0.0
2001	12	0.1	0	0.0	10	1.0	0	0.0	0	0.0
2002	0	0.0	3	0.1	4	0.7	5	1.0	0	0.0
2003	0	0.0	8	0.2	22	5.3	14	2.0	0	0.0
2004	0	0.0	0	0.0	5	1.2	0	0.0	0	0.0
2005	5	0.1	27	1.1	36	8.1	7	1.9	8	0.0
Total	***17***	***0.0***	***44***	***0.2***	***107***	***2.9***	***26***	***1.0***	***11***	***0.0***

On average, less than 1% of the returns have strayed into non-target spawning areas, falling below the target of 5% (Table 8.17). Depending on brood year, percent strays into non-target spawning areas have ranged from 0-4.2%. Few (<1% on average) have strayed into non-target hatchery programs.

Table 8.17. Number and percent of Okanogan summer Chinook that homed to target spawning areas and the target hatchery, and number and percent that strayed to non-target spawning areas and non-target hatchery programs, by brood years 1989-2002. Percent stays should be less than 5%.

Brood year	Homing				Straying			
	Target stream		Target hatchery		Non-target streams		Non-target hatcheries	
	Number	%	Number	%	Number	%	Number	%
1989	3,133	69.7	1,328	29.6	2	0.0	31	0.7
1990	729	71.4	291	28.5	0	0.0	1	0.1
1991	1,125	71.3	453	28.7	0	0.0	0	0.0
1992	1,264	68.5	572	31.0	8	0.4	1	0.1
1993	54	62.1	32	36.8	0	0.0	1	1.1
1994	924	80.8	203	17.7	16	1.4	1	0.1
1995	1,883	85.4	271	12.3	50	2.3	0	0.0
1996	27	100.0	0	0.0	0	0.0	0	0.0
1997	11,629	97.1	309	2.6	34	0.3	3	0.0
1998	2,727	95.4	99	3.5	31	1.1	2	0.1
1999	828	96.7	18	2.1	10	1.2	0	0.0
2000	2,087	93.8	29	1.3	94	4.2	15	0.7
2001	101	98.1	2	1.9	0	0.0	0	0.0
2002	646	97.3	12	1.8	6	0.9	0	0.0
Total	***27,157***	***89.3***	***3,619***	***11.9***	***245***	***0.8***	***55***	***0.2***

Genetics

Tissue (operculum) samples were collected from 144 wild and 144 hatchery summer Chinook in the Okanogan Basin in 2008. Results should be available in 2008.

Proportion of Natural Influence

Another method for assessing the genetic risk of a supplementation program is to determine the influence of the hatchery and natural environments on the adaptation of the composite population. This is estimated by the proportion of natural origin fish in the hatchery broodstock (pNOB) and the proportion of hatchery origin fish in the natural spawning escapement (pHOS). The ratio pNOB/(pHOS+pNOB) is the Proportion of Natural Influence (PNI). The larger the ratio (PNI), the greater the strength of selection in the natural environment relative to that of the hatchery environment. In order for the natural environment to dominate selection, PNI should be greater than 0.5 (HSRG/WDFW/NWIFC 2004).

For brood years 1989-2006, the PNI was equal to or greater than 0.5 in 9 out of the 18 years (Table 8.18). This indicates that in those years the natural environment has had a relatively greater influence on adaptation of Okanogan/Similkameen summer Chinook than has the hatchery environment.

Table 8.18. Proportionate natural influence (PNI) of the Okanogan/Similkameen summer Chinook supplementation program for brood years 1989-2006. PNI was calculated as the proportion of naturally produced Chinook in the hatchery broodstock (pNOB) divided by the proportion of hatchery Chinook on the spawning grounds (pHOS) plus pNOB. NOS = number of natural origin Chinook on the spawning grounds; HOS = number of hatchery origin Chinook on the spawning grounds; NOB = number of natural origin Chinook collected for broodstock; and HOB = number of hatchery origin Chinook included in hatchery broodstock.

Brood year	Spawners			Broodstock			PNI
	NOS	HOS	pHOS	NOB	HOB	pNOB	
1989	1,782	0	0.00	1,297	312	0.81	1.00
1990	881	0	0.00	828	206	0.80	1.00
1991	574	0	0.00	924	314	0.75	1.00
1992	473	0	0.00	297	406	0.42	1.00
1993	915	570	0.38	681	388	0.64	0.63
1994	1,323	2,710	0.67	341	244	0.58	0.46
1995	979	2,023	0.67	173	240	0.42	0.39
1996	568	1,251	0.69	290	223	0.57	0.45
1997	862	1,327	0.61	198	264	0.43	0.41
1998	600	492	0.45	153	211	0.42	0.48
1999	1,275	2,342	0.65	224	289	0.44	0.40
2000	1,175	2,527	0.68	164	339	0.33	0.33
2001	4,306	6,551	0.60	91	266	0.25	0.29
2002	4,358	9,499	0.69	247	241	0.51	0.43
2003	1,932	1,488	0.44	381	101	0.79	0.64
2004	5,356	1,424	0.21	506	16	0.97	0.82
2005	6,441	2,448	0.28	391	9	0.98	0.78
2006	5,508	3,094	0.36	500	10	0.98	0.73
Average	***2,184***	***2,097***	***0.49***	***427***	***227***	***0.62***	***0.57***

Natural and Hatchery Replacement Rates

Natural replacement rates (NRR) were calculated as the ratio of natural origin recruits (NOR) to the parent spawning population (spawning escapement). For brood years 1989-2001, NRR for summer Chinook in the Okanogan averaged 0.97 (range, 0.32-4.01) if harvested fish were not include in the estimate and 2.62 (range, 0.51-13.62) if harvested fish were included in the estimate (Table 8.19). NRRs for more recent brood years will be calculated as soon as all tag recoveries and sampling rates have been loaded into the database.

Hatchery replacement rates (HRR) are the hatchery adult-to-adult returns and were calculated as the ratio of hatchery origin recruits (HOR) to the parent broodstock collected. These rates should be greater than the NRRs and greater than or equal to 5.30 (the calculated target value in Murdoch and Peven 2005). HRRs exceeded NRRs in ten of the 13 years of data, regardless if harvest was or was not included in the estimate (Table 8.19). Hatchery replacement rates for Okanogan summer Chinook have exceeded the estimated target value of 5.30 in six or seven of the 13 years of data depending on if harvest was or was not included in the estimate.

Table 8.19. Broodstock collected, spawning escapements, natural and hatchery origin recruits (NOR and HOR), and natural and hatchery replacement rates (NRR and HRR; with and without harvest) for wild summer Chinook in the Okanogan Basin, brood years 1989-2001. *(The numbers in this table may change as the HETT and HC refine the methods for estimating summer Chinook HRRs and NRRs.)*

Brood year	Broodstock Collected	Spawning Escapement	Harvest not included				Harvest included			
			HOR	NOR	HRR	NRR	HOR	NOR	HRR	NRR
1989	304	1,782	4,494	2,139	14.78	1.20	7,466	3,637	24.56	2.04
1990	288	881	1,021	1,591	3.55	1.81	1,423	2,244	4.94	2.55
1991	364	574	1,578	575	4.34	1.00	1,835	882	5.04	1.54
1992	304	473	1,845	754	6.07	1.59	2,326	1,135	7.65	2.40
1993	328	1,485	87	774	0.27	0.52	117	1,025	0.36	0.69
1994	302	4,033	1,144	1,287	3.79	0.32	1,555	2,074	5.15	0.51
1995	385	3,002	2,204	1,981	5.72	0.66	2,896	3,836	7.52	1.28
1996	330	1,819	27	928	0.08	0.51	31	2,406	0.09	1.32
1997	313	2,189	11,975	3,818	38.26	1.74	19,246	11,557	61.49	5.28
1998	352	1,092	2,859	4,378	8.12	4.01	7,706	14,878	21.89	13.62
1999	333	3,617	856	6,318	2.57	1.75	2,829	21,850	8.50	6.04
2000	334	3,701	2,225	1,744	6.66	0.47	6,777	5,629	20.29	1.52
2001	335	10,857	103	8,204	0.31	0.76	421	21,828	1.26	2.01
Average	***329***	***2,731***	***2,340***	***2,653***	***7.12***	***0.97***	***4,202***	***7,152***	***12.79***	***2.62***

Smolt-to-Adult Survivals

Smolt-to-adult survival ratios (SARs) were calculated as the number of hatchery adults divided by the number of hatchery smolts released. SARs were based on CWT returns. For the available brood years, SARs have ranged from 0.00006 to 0.03271 for hatchery summer Chinook in the Okanogan Basin (Table 8.21).

Table 8.21. Smolt-to-adult ratios (SARs) for Okanogan/Similkameen summer Chinook, brood years 1989-2002.

Brood year	Number of tagged smolts released	Estimated adult captures	SAR
1989	202,125	4,297	0.02126
1990	367,207	973	0.00265
1991	360,380	978	0.00271
1992	537,190	2,301	0.00428
1993	379,139	117	0.00031
1994	217,818	1,532	0.00703
1995	574,197	2,845	0.00495
1996	487,776	30	0.00006
1997	572,531	18,727	0.03271
1998	287,948	7,603	0.02640
1999	610,868	2,759	0.00452
2000	528,639	6,751	0.01277
2001	26,315	420	0.01596
2002	245,997	1,960	0.00797
Average	***385,581***	***3,664***	***0.01026***

8.7 ESA/HCP Compliance

Broodstock Collection

Because summer Chinook adults collected at Wells Dam are used for both the Methow and Okanogan supplementation programs, please refer to Section 7.7 for information on ESA compliance during broodstock collection.

Hatchery Rearing and Release

The 2006 brood Okanogan/Similkameen summer Chinook reared throughout their juvenile life-stages at Eastbank Fish Hatchery and Similkameen Acclimation ponds without incident; although there was minor mortality associated with external fungus, bacterial cold-water disease, and Costia. (see Section 8.3). The 2006 brood smolt release from the Similkameen pond totaled 604,035 summer Chinook, representing 105% of the production objective for the Okanogan/Similkameen program and was compliant with the 10% overage in production allowable in ESA Section 10 Permit 1347.

Hatchery Effluent Monitoring

Per ESA Permits 1196, 1347, and 1395, permit holders shall monitor and report hatchery effluents in compliance with applicable National Pollution Discharge Elimination Systems (NPDES) (EPA 1999) permit limitations. There were no NPDES violations reported at Chelan PUD Hatchery

facilities during the period 1 January 2008 through 31 December 2008. NPDES monitoring and reporting for Chelan PUD Hatchery Programs during 2008 are provided in Appendix E.

Spawning Surveys

Summer Chinook spawning ground surveys conducted in the Okanogan Basin during 2008 were consistent with ESA Section 10 Permit No. 1347. Because of the difficulty of quantifying the level of take associated with spawning ground surveys, the Permit does not specify a take level associated with these activities, even though it does authorize implementation of spawning ground surveys. Therefore, no take levels are reported. However, to minimize potential impacts to established redds, wading was restricted to the extent practical, and extreme caution was used to avoid established redds when wading was required.

SECTION 9: TURTLE ROCK SUMMER CHINOOK

9.1 Broodstock Sampling

Broodstock for the Turtle Rock programs (yearling and sub-yearling) are collected as part of the Wells summer Chinook volunteer program. Refer to Snow et al. (2007) for information related to adults collected for these programs.

9.2 Hatchery Rearing

Rearing History

Number of eggs taken

Broodstock for the Turtle Rock summer Chinook are collected at Wells Dam and consist of volunteers to the hatchery. In recent years some naturally produced fish have been incorporated into the brood. Eyed eggs are transferred from Wells FH to Eastbank FH for rearing. As such, the number of green (unfertilized) eggs collected for this program is reported as egg inventory and distribution reports provided by Wells FH personnel.

Disease

Within the normal and accelerated subyearling program, the primary cause of mortality in the early life stages (swim-up to early ponding) continues to be coagulated yolk as a result of lack of chilled water during incubation. No additional significant health concerns were encountered with the two subyearling groups during rearing and no treatments were recommended. The yearling program had no significant health concerns during rearing and no treatments were recommended.

Number of acclimation days

Rearing of the 2006-brood normal and accelerated subyearling Turtle Rock summer Chinook was similar to previous years with fish being held on well water before being transferred to Turtle Rock for final acclimation in May 2007. Both rearing groups were released on 3 July 2007 after 41 days of acclimation on Columbia River water. One group of yearling Turtle Rock summer Chinook was released on 14 May 2008, after 239 days of acclimation on Columbia River water. The Chelan River net pen group was released on 9 May, after 51 days of acclimation on Chelan River water.

Release Information

Numbers released

The 2006 subyearling Turtle Rock summer Chinook program achieved 66.5% of the 810,000 target goal with about 538,392 fish being released (Table 9.1). The 2006 accelerated subyearling summer Chinook program achieved 42.3% of the 810,000 target goal with about 342,273 fish being released (Table 9.2). The 2006 yearling summer Chinook program achieved 71.6% of the 200,000 target goal with about 143,214 fish being released (43,943 from Turtle Rock and 99,271 from the Chelan River net pens) (Table 9.3).

Table 9.1. Numbers of Turtle Rock summer Chinook subyearlings released from the hatchery, 1995-2006. The release target for Turtle Rock summer Chinook subyearlings is 810,000 fish.

Brood year	Release year	CWT mark rate	Number of subyearlings released
1995	1996	0.1873	1,074,600
1996	1997	0.9653	385,215
1997	1998	0.9780	508,060
1998	1999	0.6453	301,777
1999	2000	0.9556	369,026
2000	2001	0.3678	604,892
2001	2002	0.9871	214,059
2002	2003	0.3070	656,399
2003	2004	0.4138	491,480
2004	2005	0.4591	411,707
2005	2006	0.4337	490,074
2006	2007	0.3388	538,392
2007	2008	0.4385	439,806
Average		***0.5752***	***498,884***

Table 9.2. Numbers of Turtle Rock summer Chinook accelerated subyearlings released from the hatchery, 1995-2006. The release target for Turtle Rock summer Chinook accelerated subyearlings is 810,000 fish.

Brood year	Release year	CWT mark rate	Number of subyearlings released
1995	1996	0.9834	169,000
1996	1997	0.4163	477,300
1997	1998	0.3767	521,480
1998	1999	0.6033	307,571
1999	2000	0.9748	347,946
2000	2001	0.4331	449,329
2001	2002	0.4086	480,584
2002	2003	0.5492	364,461
2003	2004	0.6414	289,696
2004	2005	0.5471	364,453
2005	2006	0.9783	457,340
2006	2007	0.5510	342,273
2007	2008	0.4745	392,024
Average		***0.6106***	***381,804***

Table 9.3. Numbers of Turtle Rock summer Chinook yearling smolts released from the hatchery, 1995-2006. The release target for Turtle Rock summer Chinook is 200,000 smolts.

Brood year	Release year	Acclimation facility	CWT mark rate	Number of smolts released
1995	1997	Turtle Rock	0.9688	150,000
1996	1998	Turtle Rock	0.9582	202,727
1997	1999	Turtle Rock	0.9800	202,989
1998	2000	Turtle Rock	0.9337	217,797
1999	2001	Turtle Rock	0.9824	285,707
2000	2002	Turtle Rock	0.9948	165,935
2001	2003	Turtle Rock	0.9824	203,279
2002	2004	Turtle Rock	0.9799	195,851
2003	2005	Turtle Rock	0.9258	215,366
2004	2006	Turtle Rock	0.9578	206,734
2005	2007	Turtle Rock	0.9810	204,644
2006	2008	Chelan	0.9752	99,271
		Turtle Rock	0.9752	43,943
Average			***0.9689***	***199,520***

Numbers tagged

About 55.1% of the Turtle Rock accelerated subyearling Chinook and 33.9% of the normal subyearling Chinook were adipose fin-clipped and CWT. The remaining fish were released untagged and unmarked. The yearling Chinook were 97.5% CWT and adipose fin-clipped. No 2006 brood Turtle Rock summer Chinook were PIT tagged.

Fish size and condition at release

Size at release of the normal subyearling Turtle Rock summer Chinook was 70.5% and 49.1% of the target fork length and weight, respectively. This brood year was below the target CV for length by 19% (Table 9.4).

Table 9.4. Mean lengths (FL, mm), weight (g and fish/pound), and coefficient of variation (CV) of Turtle Rock summer Chinook subyearlings released from the hatchery, 1995-2006. Size targets are provided in the last row of the table.

Brood year	Release year	Fork length (mm)		Mean weight	
		Mean	CV	Grams (g)	Fish/pound
1995	1996	102	6.3	12.6	36
1996	1997	87	8.0	7.4	62
1997	1998	98	6.2	10.2	45
1998	1999	96	6.3	10.7	43
1999	2000	90	9.0	9.8	46
2000	2001	100	7.1	11.3	40

Brood year	Release year	Fork length (mm)		Mean weight	
		Mean	CV	Grams (g)	Fish/pound
2001	2002	104	7.2	13.4	34
2002	2003	97	7.3	11.8	39
2003	2004	101	8.0	12.0	43
2004	2005	100	7.8	11.4	40
2005	2006	100	6.5	12.5	36
2006	2007	79	7.3	5.6	81
Targets		***112***	***9.0***	***11.4***	***40***

Size at release of the accelerated subyearling Turtle Rock Chinook was 85.7% and 87.7% of the target fork length and weight, respectively. This brood year was below the target CV for length by 14% (Table 9.5).

Table 9.5. Mean lengths (FL, mm), weight (g and fish/pound), and coefficient of variation (CV) of Turtle Rock summer Chinook accelerated subyearlings released from the hatchery, 1995-2006. Size targets are provided in the last row of the table.

Brood year	Release year	Fork length (mm)		Mean weight	
		Mean	CV	Grams (g)	Fish/pound
1995	1996	129	7.1	27.3	17
1996	1997	107	6.5	15.6	29
1997	1998	117	6.0	18.9	24
1998	1999	119	8.0	18.9	24
1999	2000	114	6.7	19.0	24
2000	2001	111	7.0	16.8	27
2001	2002	117	8.4	19.5	23
2002	2003	116	11.3	21.2	21
2003	2004	113	14.9	17.0	30
2004	2005	117	11.3	20.1	23
2005	2006	119	9.1	22.2	21
2006	2007	96	7.7	10.0	46
Targets		***112***	***9.0***	***11.4***	***40***

Size at release of the yearling summer Chinook was 97.7% and 128.6% of the target fork length and weight, respectively, for the Chelan Falls group. This group also exceeded the target CV for length by 161%. The Turtle Rock group was 89.2% and 119.2% of the target fork length and weight, respectively, and exceeded the target CV for length by 287% (Table 9.6).

Table 9.6. Mean lengths (FL, mm), weight (g and fish/pound), and coefficient of variation (CV) of Turtle Rock summer Chinook yearlings released from the hatchery, 1995-2006. Size targets are provided in the last row of the table.

Brood year	Release year	Acclimation facility	Fork length (mm)		Mean weight	
			Mean	CV	Grams (g)	Fish/pound
1995	1997	Turtle Rock	-	-	-	-
1996	1998	Turtle Rock	166	14.2	60.9	7
1997	1999	Turtle Rock	198	4.6	91.3	5
1998	2000	Turtle Rock	161	11.9	53.9	8
1999	2001	Turtle Rock	164	18.6	59.0	8
2000	2002	Turtle Rock	170	15.3	59.0	8
2001	2003	Turtle Rock	154	22.3	48.6	9
2002	2004	Turtle Rock	157	16.7	44.0	12
2003	2005	Turtle Rock	173	13.8	54.7	8
2004	2006	Turtle Rock	176	20.6	45.3	7
2005	2007	Turtle Rock	158	11.0	43.5	10
2006	2008	Chelan	172	14.5	58.4	8
		Turtle Rock	157	25.8	54.1	8
Targets			***176.0***	***9.0***	***45.4***	***10.0***

Survival Estimates

Normal subyearling releases

Overall survival of the normal subyearling Turtle Rock summer Chinook program from green egg to release was below the standard set for the program (Table 9.7). Lower than expected survival at ponding and post-ponding (because of coagulated yolk) reduced the overall program performance.

Table 9.7. Hatchery life-stage survival rates (%) for Turtle Rock subyearling (zero program) summer Chinook, brood years 2004-2006. Survival standards or targets are provided in the last row of the table.

Brood year	Collection to spawning		Unfertilized egg-eyed	Eyed egg-ponding	30 d after ponding	100 d after ponding	Ponding to release	Transport to release	Unfertilized egg-release
	Female	Male							
2004	NA	NA	93.5	74.4	93.9	91.4	90.8	99.7	63.1
2005	NA	NA	94.4	87.9	85	84.8	84.2	99.4	69.8
2006	NA	NA	97.8	87.9	85.0	84.8	84.2	99.4	72.4
Standard	***90.0***	***85.0***	***92.0***	***98.0***	***97.0***	***93.0***	***90.0***	***95.0***	***81.0***

Accelerated subyearling releases

Overall survival of the accelerated subyearling Turtle Rock summer Chinook program from green egg to release was below the standard set for the program (Table 9.8). Lower than expected survival

between fertilization and post-ponding (because of coagulated yolk) reduced the overall program performance.

Table 9.8. Hatchery life-stage survival rates (%) for Turtle Rock subyearling (accelerated program) summer Chinook, brood years 2004-2006. Survival standards or targets are provided in the last row of the table.

Brood year	Collection to spawning		Unfertilized egg-eyed	Eyed egg-ponding	30 d after ponding	100 d after ponding	Ponding to release	Transport to release	Unfertilized egg-release
	Female	Male							
2004	NA	NA	92.5	98.3	93.4	92.4	90.0	97.8	81.8
2005	NA	NA	93.8	94.6	83.7	83.4	81.7	98.8	72.5
2006	NA	NA	86.1	94.6	83.7	83.4	81.7	98.8	66.5
Standard	***90.0***	***85.0***	***92.0***	***98.0***	***97.0***	***93.0***	***90.0***	***95.0***	***81.0***

Yearling releases

Overall survival of the yearling Turtle Rock summer Chinook program from green egg to release was below the standard set for the program (Table 9.9). Lower than expected survival between fertilization and ponding reduced the overall program performance.

Table 9.9. Hatchery life-stage survival rates (%) for Turtle Rock yearling summer Chinook, brood years 2004-2006. Survival standards or targets are provided in the last row of the table.

Brood year	Collection to spawning		Unfertilized egg-eyed	Eyed egg-ponding	30 d after ponding	100 d after ponding	Ponding to release	Transport to release	Unfertilized egg-release
	Female	Male							
2004	NA	NA	92.9	97.7	96.8	96.4	95.5	99.6	86.7
2005	NA	NA	89.1	97.5	98.1	97.8	96.6	99.1	83.9
2006	NA	NA	86.2	78.8	97.6	97.1	95.2	98.7	64.8
Standard	***90.0***	***85.0***	***92.0***	***98.0***	***97.0***	***93.0***	***90.0***	***95.0***	***81.0***

9.3 Life History Monitoring

Life history characteristics of Turtle Rock summer Chinook were assessed by examining carcasses on spawning grounds and by reviewing tagging data and fisheries statistics.

Contribution to Fisheries

Normal subyearling releases

Most of the harvest on Turtle Rock summer Chinook (normal subyearling releases) occurred in the Ocean (Table 9.10). Most of the harvest on Turtle Rock summer Chinook occurred in ocean fisheries (59-100% of the fish harvested). Brood year 1995 provided the largest total harvest, while brood year 1997 provided the lowest.

Table 9.10. Estimated number and percent (in parentheses) of Turtle Rock summer Chinook (normal subyearling releases) captured in different fisheries, brood years 1995-2002.

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational (sport)	
1995	682 (84)	5 (1)	112 (14)	16 (2)	815
1996	72 (80)	0 (0)	5 (6)	13 (14)	90
1997	9 (100)	0 (0)	0 (0)	0 (0)	9
1998	24 (100)	0 (0)	0 (0)	0 (0)	24
1999	583 (76)	7 (1)	75 (10)	100 (13)	765
2000	36 (59)	0 (0)	11 (18)	14 (23)	61
2001	165 (73)	0 (0)	29 (13)	31 (14)	225
2002	23 (59)	0 (0)	3 (8)	13 (33)	39

Accelerated subyearling releases

Most of the harvest on Turtle Rock summer Chinook (accelerated subyearling releases) occurred in ocean fisheries (Table 9.11). Ocean harvest has made up 60% to 100% of all Turtle Rock summer Chinook harvested. Brood year 2001 provided the largest total harvest, while brood years 1995 and 1997 provided the lowest.

Table 9.11. Estimated number and percent (in parentheses) of Turtle Rock summer Chinook (accelerated subyearling releases) captured in different fisheries, brood years 1995-2002.

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational (sport)	
1995	3 (100)	0 (0)	0 (0)	0 (0)	3
1996	72 (88)	0 (0)	10 (12)	0 (0)	82
1997	3 (100)	0 (0)	0 (0)	0 (0)	3
1998	97 (95)	2 (2)	3 (3)	0 (0)	102
1999	93 (62)	2 (1)	14 (9)	41 (27)	150
2000	119 (100)	0 (0)	0 (0)	0 (0)	119
2001	205 (60)	2 (1)	57 (17)	80 (23)	344
2002	9 (100)	0 (0)	0 (0)	0 (0)	9

Yearling releases

Most of the harvest on Turtle Rock summer Chinook (yearling releases) occurred in ocean fisheries (Table 9.12). Ocean harvest has made up 55% to 96% of all Turtle Rock summer Chinook harvested. Brood year 1998 provided the largest harvest, while brood year 1995 provided the lowest.

Table 9.12. Estimated number and percent (in parentheses) of Turtle Rock summer Chinook (yearling releases) captured in different fisheries, brood years 1995-2002.

Brood year	Ocean fisheries	Columbia River Fisheries			Total
		Tribal (Zone 6)	Commercial (Zones 1-5)	Recreational (sport)	
1995	479 (76)	6 (1)	77 (12)	70 (11)	632
1996	857 (96)	1 (0)	15 (2)	21 (2)	894
1997	2,838 (91)	30 (1)	58 (2)	176 (6)	3,102
1998	4,277 (90)	41 (1)	199 (4)	230 (5)	4,747
1999	1,665 (73)	12 (1)	228 (10)	382 (17)	2,287
2000	1,113 (73)	7 (0)	170 (11)	243 (16)	1,533
2001	1,958 (59)	10 (0)	616 (19)	716 (22)	3,300
2002	1,077 (55)	18 (1)	417 (21)	432 (22)	1,944

Straying

Normal subyearling releases

Rates of Turtle Rock summer Chinook (normal subyearling releases) straying into spawning areas in the upper basin have been low (Table 9.13). Although a few Turtle Rock summer Chinook have strayed into other spawning areas, straying, on average, has been less than 5%. The Chelan tailrace has received the largest number of Turtle Rock strays.

Table 9.13. Number (No.) and percent of spawning escapements within other non-target basins that consisted of Turtle Rock summer Chinook (normal subyearling releases), return years 1998-2005. For example, for return year 2003, 0.6% of the summer Chinook spawning escapement in the Okanogan Basin consisted of Turtle Rock summer Chinook. Percent strays should be less than 5%.

Return year	Wenatchee		Methow		Okanogan		Chelan		Entiat		Hanford Reach	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1998	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
1999	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
2000	8	0.2	3	0.3	13	0.4	63	9.5	0	0.0	0	0.0
2001	0	0.0	5	0.2	13	0.1	0	0.0	0	0.0	0	0.0
2002	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
2003	0	0.0	26	0.7	19	0.6	13	3.1	0	0.0	9	0.0
2004	5	0.1	8	0.4	0	0.0	8	1.9	0	0.0	0	0.0
2005	5	0.1	0	0.0	5	0.1	0	0.0	2	0.5	0	0.0
Total	***18***	***0.03***	***42***	***0.22***	***50***	***0.10***	***84***	***2.20***	***2***	***0.07***	***9***	***0.00***

On average, about 37% of the brood year returns have strayed into spawning areas in the upper basin (Table 9.14). Depending on brood year, percent strays into spawning areas have ranged from 0-100%. Few (1% on average) have strayed into non-target hatchery programs.

Table 9.14. Number and percent of Turtle Rock summer Chinook (normal subyearling releases) that homed to the target hatchery and strayed to non-target spawning areas and non-target hatchery programs, by brood years 1995-2002.

Brood year	Homing				Straying			
	Target stream		Target hatchery		Non-target streams		Non-target hatcheries	
	Number	%	Number	%	Number	%	Number	%
1995	-	-	197	74.1	64	24.1	5	1.9
1996	-	-	54	54.5	44	44.4	1	1.0
1997	-	-	2	28.6	5	71.4	0	0.0
1998	-	-	0	0.0	24	100.0	0	0.0
1999	-	-	79	56.8	60	43.2	0	0.0
2000	-	-	5	50.0	5	50.0	0	0.0
2001	-	-	28	63.6	16	36.4	0	0.0
2002	-	-	0	0.0	0	0.0	0	0.0
Total	***-***	***-***	***365***	***62.0***	***218***	***37.0***	***6***	***1.0***

Accelerated subyearling releases

Rates of Turtle Rock summer Chinook (accelerated subyearling releases) straying into spawning areas in the upper basin have been very low (Table 9.15). Although a few Turtle Rock summer Chinook have strayed into other spawning areas, straying, on average, has been less than 1%. The Hanford Reach, Chelan tailrace, Okanogan Basin, and Methow Basin have received the largest number of Turtle Rock strays.

Table 9.15. Number (No.) and percent of spawning escapements within other non-target basins that consisted of Turtle Rock summer Chinook (accelerated subyearling releases), return years 1998-2005. For example, for return year 2001, 1.7% of the summer Chinook spawning escapement in the Methow Basin consisted of Turtle Rock summer Chinook. Percent strays should be less than 5%.

Return year	Wenatchee		Methow		Okanogan		Chelan		Entiat		Hanford Reach	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1998	3	0.1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
1999	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
2000	7	0.2	0	0.0	0	0.0	24	3.6	0	0.0	0	0.0
2001	0	0.0	15	1.7	31	0.3	0	0.0	0	0.0	0	0.0
2002	0	0.0	5	0.7	7	0.1	0	0.0	0	0.0	0	0.0
2003	4	0.0	4	0.4	0	0.0	3	0.7	0	0.0	0	0.0
2004	0	0.0	0	0.0	7	0.1	3	0.7	0	0.0	18	0.0
2005	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	***14***	***0.02***	***21***	***0.23***	***45***	***0.09***	***30***	***0.78***	***0***	***0.00***	***18***	***0.00***

On average, about 62% of the brood year returns have strayed into spawning areas in the upper basin (Table 9.16). Depending on brood year, percent strays into spawning areas have ranged from 0-68%. None of these fish have strayed into non-target hatchery programs.

Table 9.16. Number and percent of Turtle Rock summer Chinook (accelerated subyearling releases) that homed to the target hatchery and strayed to non-target spawning areas and non-target hatchery programs, by brood years 1995-2002.

Brood year	Homing				Straying			
	Target stream		Target hatchery		Non-target streams		Non-target hatcheries	
	Number	%	Number	%	Number	%	Number	%
1995	-	-	0	0.0	0	0.0	0	0.0
1996	-	-	33	32.4	69	67.6	0	0.0
1997	-	-	6	100.0	0	0.0	0	0.0
1998	-	-	0	0.0	0	0.0	0	0.0
1999	-	-	21	42.9	28	57.1	0	0.0
2000	-	-	0	0.0	0	0.0	0	0.0
2001	-	-	0	0.0	0	0.0	0	0.0
2002	-	-	0	0.0	0	0.0	0	0.0
Total	**-**	**-**	***60***	***38.2***	***97***	***61.8***	***0***	***0.0***

Yearling releases

Rates of Turtle Rock summer Chinook (yearling releases) straying into spawning areas in the upper basin have varied widely depending on spawning area (Table 9.17). Most of these fish strayed to spawning areas within the Chelan tailrace, Entiat Basin, and Methow Basin. Relatively few, on average, have strayed to spawning areas in the Okanogan Basin, Wenatchee Basin, and Hanford Reach.

Table 9.17. Number (No.) and percent of spawning escapements within other non-target basins that consisted of Turtle Rock summer Chinook (yearling releases), return years 1998-2005. For example, for return year 2003, 4.3% of the summer Chinook spawning escapement in the Methow Basin consisted of Turtle Rock summer Chinook. Percent strays should be less than 5%.

Return year	Wenatchee		Methow		Okanogan		Chelan		Entiat		Hanford Reach	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1998	0	0.0	2	0.3	0	0.0	0	0.0	0	0.0	0	0.0
1999	3	0.1	2	0.2	0	0.0	0	0.0	0	0.0	0	0.0
2000	18	0.4	57	4.8	167	4.5	73	11.0	0	0.0	10	0.0
2001	109	1.2	523	18.9	334	3.1	316	32.1	0	0.0	7	0.0
2002	92	0.7	437	9.4	194	1.4	191	32.8	136	27.1	0	0.0
2003	64	0.7	170	4.3	14	0.4	165	39.4	180	26.0	9	0.0
2004	10	0.1	51	2.3	116	1.7	75	17.9	0	0.0	0	0.0
2005	5	0.1	73	2.9	73	0.8	88	16.8	42	11.4	0	0.0

Return year	Wenatchee		Methow		Okanogan		Chelan		Entiat		Hanford Reach	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Total	***301***	***0.50***	***1,315***	***6.94***	***898***	***1.72***	***908***	***23.74***	***358***	***13.30***	***26***	***0.01***

On average, about 76% of the brood year returns have strayed into spawning areas in the upper basin (Table 9.18). Depending on brood year, percent strays into spawning areas have ranged from 40-86%. Few (<1% on average) have strayed into non-target hatchery programs.

Table 9.18. Number and percent of Turtle Rock summer Chinook (yearling releases) that homed to the target hatchery and strayed to non-target spawning areas and non-target hatchery programs, by brood years 1995-2002.

Brood year	Homing				Straying			
	Target stream		Target hatchery		Non-target streams		Non-target hatcheries	
	Number	%	Number	%	Number	%	Number	%
1995	-	-	180	39.3	278	60.7	0	0.0
1996	-	-	218	27.2	583	72.8	0	0.0
1997	-	-	254	14.2	1,531	85.6	3	0.2
1998	-	-	166	16.1	864	83.8	1	0.1
1999	-	-	181	42.7	243	57.3	0	0.0
2000	-	-	89	27.4	236	72.6	0	0.0
2001	-	-	389	59.8	261	40.2	0	0.0
2002	-	-	241	57.5	177	42.2	1	0.2
Total	***-***	***-***	***1,718***	***31.4***	***4,173***	***76.2***	***5***	***0.1***

Smolt-to-Adult Survivals

Smolt-to-adult survival ratios (SARs) were calculated as the number of hatchery adults divided by the number of hatchery subyearling or yearling Chinook released. SARs were based on CWT returns.

Normal subyearling releases

For the available brood years, SARs for normal subyearling-released Chinook have ranged from 0.000057 to 0.004494 (Table 9.19).

Table 9.19. Smolt-to-adult ratios (SARs) for Turtle Rock normal subyearling-released summer Chinook, brood years 1995-2002.

Brood year	Number released	Estimated adult captures	SAR
1995	201,230	203	0.001009
1996	194,729	188	0.000965
1997	177,119	16	0.000090
1998	496,904	30	0.000060

Brood year	Number released	Estimated adult captures	SAR
1999	194,723	875	0.004494
2000	192,665	26	0.000135
2001	222,460	269	0.001209
2002	211,306	12	0.000057
Average	***236,392***	***202***	***0.000856***

Accelerated subyearling releases

For the available brood years, SARs for accelerated subyearling-released Chinook have ranged from 0.000015 to 0.000996 (Table 9.20).

Table 9.20. Smolt-to-adult ratios (SARs) for Turtle Rock accelerated subyearling-released summer Chinook, brood years 1995-2002.

Brood year	Number released	Estimated adult captures	SAR
1995	166,203	13	0.000078
1996	198,720	77	0.000387
1997	196,459	3	0.000015
1998	185,551	69	0.000372
1999	197,793	197	0.000996
2000	194,603	64	0.000329
2001	196,355	166	0.000845
2002	200,165	5	0.000025
Average	***191,981***	***74***	***0.000387***

Yearling releases

For the available brood years, SARs for yearling-released Chinook have ranged from 0.007370 to 0.026697 (Table 9.21).

Table 9.21. Smolt-to-adult ratios (SARs) for Turtle Rock yearling-released summer Chinook, brood years 1995-2002.

Brood year	Number released	Estimated adult captures	SAR
1995	145,318	1,071	0.007370
1996	194,251	1,640	0.008443
1997	198,924	4,816	0.024210
1998	215,646	5,757	0.026697
1999	280,683	2,678	0.009541
2000	165,072	1,857	0.011250
2001	199,694	3,906	0.019560

Brood year	Number released	Estimated adult captures	SAR
2002	192,234	2,335	0.012147
Average	***198,978***	***3,008***	***0.015115***

9.4 ESA/HCP Compliance

Broodstock Collection

The 2006 brood Turtle Rock summer Chinook program is supported through adult collections at the volunteer trap at Wells Fish Hatchery and in conjunction with the Wells summer Chinook collections. During 2006, broodstock collections at the volunteer trap were consistent with the 2006 Upper Columbia River Salmon and Steelhead Broodstock Objectives and site-based broodstock collection protocols as required in ESA permit 1347. The 2006 collection totaled 1,284 summer Chinook (combined Wells Fish Hatchery and Turtle Rock Fish Hatchery programs), representing 100.01% of the targeted 1,274 broodstock collection objective. The minor overage in adult broodstock was a result of enumeration errors during collection.

Hatchery Rearing and Release

Brood year 2006 releases totaled 1,023,879 fish, including yearling, regular subyearling, and accelerated subyearling releases (143,214; 538,392 and 342,273 juveniles, respectively). These releases represented 71.6% and 54.4% of the Rocky Reach HCP and ESA Section 10 Permit 1347 production for Turtle Rock yearling and subyearling production, respectively.

Consistent with ESA Permit 1347, a total of 371,106 normal and accelerated subyearling Chinook were adipose fin clipped and coded-wire tagged, representing 92.8% of the 400,000 adipose clipped and CWT target for sub-yearling production. The remainder of the subyearling production was released untagged and unmarked. The yearling Chinook were 97.5% CWT and adipose fin-clipped. No 2006 brood Turtle Rock summer Chinook were PIT tagged. See Section 9.2 for specific rearing, tagging, and release information related to the 2006 brood Turtle Rock summer Chinook program.

SECTION 10: REFERENCES

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SECTION 11: APPENDICES

Appendix A: **Abundance and Total Numbers of Chinook Salmon and Trout in the Chiwawa River Basin, Washington, 2008.**

Appendix B: **Fish Trapping at the Chiwawa, Upper Wenatchee, and Lower Wenatchee Smolt Traps during 2008.**

Appendix C: **Summary of ISEMP PIT Tagging Activities in the Wenatchee Basin, 2008.**

Appendix D: **Wenatchee Steelhead Spawning Ground Surveys, 2008.**

Appendix E: **NPDES Hatchery Effluent Monitoring, 2008.**

Appendix F: **Steelhead Stock Assessment at Priest Rapids Dam, 2008.**

Appendix G: **Wenatchee Sockeye and Summer Chinook Spawning Ground Surveys, 2008.**

Appendix H: **Genetic Diversity of Wenatchee Sockeye Salmon.**

Appendix I: **Genetic Diversity of Natural Chiwawa River Spring Chinook Salmon.**

Appendix J: **Summer Chinook Spawning Ground Surveys in the Methow and Okanogan Basin, 2008.**