City of Tacoma,
Department of Public Utilities, Light Division
Cowlitz Hydroelectric Project
FERC No. 2016

Settlement Agreement Article 3, License Article 415 and License Article 401

Upstream Fish Passage Study Report

2008 Annual Report

INTRODUCTION

This report is prepared as a response to the August 18, 2005 Federal Energy Regulatory Commission (the Commission), Order Modifying and Approving Upstream Fish Passage Study Report, Article 3 for the Cowlitz River Project, FERC No. 2016. The license article requires the City of Tacoma, Department of Public Utilities, Light Division (Tacoma) to file an annual report on adult anadromous fish traveling through the Cowlitz River Project within 60 days from the date of the Order, and annually thereafter beginning July 19, 2006 until a decision is made on constructing volitional upstream passage facilities. This fourth Annual Report presents information that will be used in making that decision.

In addition, this report partially fulfils the requirements of License Article 401 and fulfils the requirements for 2008 of Article 415 Final Fish Passage Plan as it applies to upstream passage. There have been no changes in operation and maintenance, emergency procedures or inspection procedures of the Cowlitz River Project fish passage facilities that were detailed in the Article 415 Final Fish Passage Plan submitted February 8, 2006, and approved by FERC in an order dated May 10, 2006. That plan detailed the current operation and maintenance, emergency and inspection procedures for each of the facilities. The approved plan stated that should any changes to the operation and maintenance, emergency or inspection procedures for the existing facilities occur, these changes will be documented and reported in a subsequent Article 415 Fish Passage Plan report. Updated or new operation and maintenance plans, emergency procedures, and inspection procedures will be developed for any future fish passage facilities, but until there is agreement on the type and design of any new facilities, such plans and procedures cannot be developed. Tacoma Power is reporting that no changes have occurred and no new facilities have been constructed so a new revised Article 415 report is not required.

PROJECT DESCRIPTION

The Cowlitz Project (FERC No. 2016) is located on the Cowlitz River, Lewis County, Washington between river mile (RM) 49.5 and RM 88.0. The project consists of Mossyrock Dam (RM 65.5), Mayfield Dam (RM 52.0), Riffe Lake reservoir, Mayfield Lake reservoir, two hydroelectric powerhouses, the transmission facilities associated with the dams, the Cowlitz Salmon Hatchery (RM 50.0), the Barrier Dam (RM 49.5), the Cowlitz Trout Hatchery (RM 42.0), recreational facilities at the reservoirs and lands within the Project boundary. Construction of the Project began with Mayfield Dam in 1956 and was completed with the construction of Mossyrock Dam ending in 1968. The Project has been operated and maintained continuously since original construction.

Tacoma Power built the Cowlitz Project between 1958 and 1968 and generation capacity was expanded in 1983. The original license for the project was issued November 28, 1951, and expired on December 31, 2001. A new thirty-five year license for the project was made effective on July 18, 2003.

Cowlitz Falls Project (FERC No. 2833) is located on the Cowlitz River, Lewis County, Washington between RM 88.0 and RM 101. The Project is owned and operated by the Lewis County Public Utility District and consists of Cowlitz Falls Dam (RM 88.0) and powerhouse and the transmission facilities associated with the Project. The BPA owned Cowlitz Falls Fish Collection Facility is attached to the LCPUD owned Cowlitz Falls Project and is located just below Cowlitz Falls Dam. Construction of the Project began in 1991 and was completed with initial operations in 1994. The Project has been operated and maintained continuously since original construction.

The original license for Cowlitz Falls Project was issued in 1986 and will expire on June 30, 2036.

FERC License Articles

Settlement Article License Article 3 ***Upstream Fish Passage: Barrier, Mayfield and Mossyrock.*** *b) Within six months of license issuance, or as soon as practicable thereafter depending on the availability of marked fish, and updated on an annual basis thereafter, the Licensee shall file with the Commission a report on adult anadromous fish traveling through the Cowlitz River Project[1], prepared in collaboration with the Fisheries Technical Committee provided for in the August 2000 Settlement Agreement, or if the Settlement Agreement has become void, with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, Washington Department of Fish and Wildlife and Washington Department of Ecology (referred to as "the FTC or agencies"). The report shall include: 1) the most recent version of Tables 3, 4, and 5 from the report entitled Contribution Rate Benchmarks for Future Runs of Spring Chinook, Fall Chinook, and Coho Produced at the Cowlitz Salmon Hatchery that provide estimated age 3 recruits and survival equivalency that enables comparison of future broods to the benchmark run year and survival rate for each of these species, dated June 28, 2000 and filed with the Commission concurrently with the August 2000 Cowlitz River Hydroelectric Project Settlement Agreement[2]; 2) tables estimating the annual number of adult recruits originating from the Cowlitz River basin upstream of the Toutle River, and including steelhead, cutthroat trout, and all other indigenous stocks that are produced at the hatcheries, along with an index of each stock to its benchmark values, or if not otherwise agreed, a default index of "1"; 3) a plan and schedule for studies, to be conducted at regular intervals, to evaluate whether the following criteria for implementing effective upstream passage through volitional facilities have been met: A) adult fish in Mayfield Lake are able to choose their tributary of origin and survive Mayfield Lake transit at rates determined by NMFS and USFWS, in consultation with the FTC or agencies, to be sufficient to achieve effective upstream passage through volitional facilities; and B) as determined based on the above-described tables with respect to: (i) the number of pre-spawners arriving at the Barrier Dam, in at least 3 of 5 consecutive brood years measured, and based on the 5-year rolling average, exceeds an abundance level which indicates natural recruitment above Mayfield Dam has achieved self-sustaining levels, as determined by the National Marine Fisheries Service in consultation with the FTC or agencies; (ii) the productivity level in 3 of 5 years and the 5-year rolling average, as measured at the Barrier Dam or other Cowlitz River fish counting*

[1] See Tables 1 & 2, this report.
[2] See Appendix B, this report.

facilities by the recruit/pre-spawner ratio, exceeds 1.0[3]; and (iii) the disease management plan required by Article 8 has been implemented. c) For any annual report filed within 12 years of license issuance in which the results of the studies indicate that, within the next three years or less, the above criteria for volitional upstream passage will be met with respect to any salmonid species originating in the Tilton basin and with respect to either spring Chinook salmon or late winter steelhead originating above Mossyrock Dam, the Licensee shall also include proposed preliminary designs and schedules for the construction of upstream passage systems for the Project. In the case of Barrier Dam, the proposed modifications shall provide for breaching the Barrier Dam. In lieu of breaching, a fish ladder may be constructed only if NMFS and USFWS determine, in consultation with the FTC or agencies, that a ladder is more appropriate than breaching for effective upstream passage. The proposed modifications for the Barrier Dam shall also include steps to disable the electrical field in the event of fish ladder construction or breaching the dam. In the case of Mayfield Dam, the upstream passage system proposed shall be a ladder with sorting facilities, unless prior to filing the report the NMFS and USFWS determine that a tram is more appropriate than a ladder for effective upstream passage, in which case the system proposed shall be a tram with sorting facilities. In the case of Mossyrock Dam, the passage system proposed shall be an adult trap and haul facility to facilitate adult transit above Cowlitz Falls Dam to be built before or concurrently with the upstream passage system at Mayfield Dam, unless prior to filing the report the USFWS and NMFS determine that a comparably-priced tram is more appropriate than a trap and haul facility based on studies that show fish are able to migrate through Riffe Lake, and it has also been determined that an adult upstream passage facility will be developed at Cowlitz Falls Dam. A draft report shall be provided to the FTC or agencies for review and comment. The Licensee shall include with the report documentation of consultation and copies of comments and recommendations on the report, and specific descriptions of how the FTC's and agencies' comments are accommodated by the report. The Licensee shall submit the final report to the NMFS and USFWS for approval prior to filing with the Commission. Upon approval by NMFS and USFWS and filing with the Commission, the Licensee shall implement the proposals in the report. d) Upon meeting the criteria above for the construction of volitional upstream passage systems, the Licensee shall proceed expeditiously to complete the final design, permitting and construction of upstream passage systems. The final design shall be subject to the same review and approval process described in paragraph c) above. Once the report containing the final design and implementation schedule for the construction of upstream fish passage systems is approved by NMFS and USFWS and filed with the Commission, volitional upstream passage facilities shall be completed and made operational within one (1) year of meeting the criteria or approval of the final design, whichever is later, unless there is good cause for extending the period beyond one year. e) Within five years of license issuance, the Licensee shall establish an interest-bearing escrow account in the amount of $15 million to contribute to the total cost of constructing volitional upstream fish passage facilities. To minimize administrative cost and allow conservative growth, said escrow account may be held by the Licensee as a separate account (with Licensee being obligated to treat said account substantially similar to an escrow account), and said account may be invested, consistent with investment limitations on public agencies within the State of Washington. f) If at any time the Licensee files a report indicating that the above criteria are not likely to be met within 15 years following license issuance with respect to listed Chinook salmon or steelhead originating above Mayfield Dam, the Licensee shall consult with the FTC or agencies, using the best available data at the time, regarding factors that may be contributing to the failure to meet such criteria, and the likelihood or not that such criteria will be met for the listed stocks in the foreseeable future. g) If preliminary or final upstream volitional fish passage design plans and implementation schedules have not been

[3] See Tables 6 & 7, this report

approved and filed with the Commission at the end of year 12, the Licensee must prepare and submit preliminary design plans and schedules in accordance with paragraphs c) and d) if the volitional upstream passage criteria set forth in paragraphs b) and c) have been met or are likely to be met for any salmonid species in the Tilton by year 15. The Licensee shall proceed expeditiously with final design and construction of volitional upstream passage facilities, unless otherwise directed under paragraph h) below. h) If within 14 years of license issuance the criteria for volitional upstream passage facilities, described in b), c) and g) above, have not been met and it is determined by the FTC or agencies, and affected Tribes, with the concurrence of NMFS and USFWS, that measures in addition to those provided for in the August 2000 Settlement Agreement are necessary to restore self-sustaining, natural production of ESA-listed stocks in the Cowlitz River basin, and that expenditure of the escrow fund on such additional measures in lieu of volitional upstream facilities is necessary and appropriate to achieve natural stock restoration, consistent with the express purpose of the license and the Settlement Agreement, and with applicable recovery plans for the listed Cowlitz River stocks, the Licensee shall submit to the Commission a plan to abandon volitional upstream passage and expend the funds in the escrow account for the purposes of protecting and promoting restoration and recovery of listed Cowlitz River stocks. If the above criteria have not been met for any salmonid species in the Tilton by year 15, the Licensee shall continue monitoring fishery conditions for future construction of upstream volitional fish passage, until either the criteria are met or a decision is made to abandon upstream volitional passage and fund other necessary and appropriate measures in accordance with this paragraph. i) Following construction of volitional upstream passage facilities, the Licensee, in consultation with the FTC or the agencies, shall monitor the effectiveness of the facilities. As deemed necessary by NMFS and USFWS, after consultation with the FTC, the Licensee shall implement such reasonable modifications as may be necessary to improve passage effectiveness. j) Any plan required to be filed pursuant to this article shall be prepared in consultation with the FTC or agencies. The Licensee shall include with the plan documentation of consultation and copies of comments and recommendations on the plan, and specific descriptions of how the FTC's or agencies' comments are accommodated by the plan. The Licensee shall submit the plan to the National Marine Fisheries Service and U.S. Fish and Wildlife Service for approval prior to filing with the Commission. Upon approval by NMFS and USFWS and filing with the Commission, the Licensee shall implement the plan.

License Article 401 ***Requirement to File Plans for Commission Approval:*** *Settlement agreement articles 1, 2 and 3 (Appendix A) require the licensee to prepare plans regarding fish passage in consultation with the Fisheries Technical Committee or the U.S. Fish and Wildlife Service, National Marine Fisheries Service, Washington Department of Fish and Wildlife and Washington Department of Ecology (FTC or agencies) if the agreement has become void.*

2008 ANNUAL REPORT

Table of Contents:

A. Definitions:

Natural-origin fish (NOR) are adult returns from juveniles produced from adult spawners in the Cowlitz River basin.

Hatchery-origin fish (HOR) are adults that return from smolts released from the Cowlitz Salmon or Trout hatcheries, or adult returns from hatchery fingerling or smolt releases in the upper Cowlitz River basin tributaries.

Marked fish are adults with a visible external fin clip, elastomer tag or alpha-numeric tag. The external mark is visible upon examination of the fish.

Unmarked fish do not have a visible external mark of any sort. All fins are intact.

Upper Cowlitz River basin is the area above Mayfield Dam.

Lower Cowlitz River basin is the area below Mayfield Dam.

Recruit (R) is an adult fish produced by a pre-spawner. Collected at the Cowlitz Salmon Hatchery separator.

Pre-spawner (S) is an adult that is the progeny of a hatchery or natural fish spawning in the natural environment. Collected at the Cowlitz Salmon Hatchery separator.

B. A Report on Adult Anadromous Fish Traveling Through the Cowlitz River Project

Adult salmonid returns to the Cowlitz River basin:

Adult salmonids traveling through the Cowlitz River Project return first to the separator facility at the Cowlitz Salmon Hatchery at RM 50.0 – the upstream limit of volitional anadromous passage. These fish are a mix of hatchery and natural-origin fish and are used for hatchery brood stock, or are transported upstream into the upper Cowlitz River sub-basins by Tacoma Power and the Washington Department of Fish and Wildlife (WDFW). Table 1 and Table 2 show the numbers of adult salmonids, by species, returning to the Cowlitz Salmon and Trout hatcheries and moving through Tacoma Power's Cowlitz River Project.

Adult spring Chinook returning to the Cowlitz Salmon Hatchery (CSH) separator in 2006/2007 may originate from a hatchery release (and therefore be either marked or unmarked), or the adult fish may originate from the upper Cowlitz River basin (and therefore be either marked or unmarked). A mix of marked and unmarked hatchery steelhead fry and hatchery spring Chinook fingerlings have been released into the upper Cowlitz River basins under past fisheries management practices. The adult recruits from those fish may be either hatchery or natural origin.

Table 3 and Table 4 show the possible origins of returning adults and are based on the information in Table 6, which shows the WDFW juvenile salmonid marking program for each species and release location in the Cowlitz River basin above the mouth of the Toutle River. Table 5 shows the origin of natural spawning fall Chinook in the lower Cowlitz River.

Table 1: Number of adult salmonids returning to the Cowlitz Salmon Hatchery separator in 2007/2008. ***(Data source: Tacoma Power separator count database)***

Week	SPCH	SPCH	SPCH	FCH	FCH	COHO	COHO	SRSH	SRSH	WRSH	SRCT	SRCT
Ending	Adult	Jack	Mini J	Adult	Jack	Adult	Jack	Adult	Jack	Adult	Jack	Adult
7-Apr	9									154		
14	53	1								272	3	
21	76	4								165	1	
28	230	11						5		165		1
5-May	190	37						6		127		
12	541	124						9		95	1	
19	346	82						17	1	53	2	
26	317	99						22		20		
2-Jun	178	64						33		8		
9	330	102	5					69		2		2
16	109	37	39					65		3		
23	24	16	33					33				
30	43	12	28					32				
7-Jul	151	50	66					71				
14	134	41	397					135				
21	32	8	228					88				
28	39	8	162					81				
4-Aug	73	19	184					118				3
11	9	2	146	2				98				1
18	11	2	59		4			143	1			2
25	7	4	46	6	10		1	85				
1-Sep	112	8	41	54	25	1		32				3
8	19	1	14	59	7	3		32				
15	30	7	13	249	23	54	11	39				11
22	16		3	351	59	383	29	34				17
29	4	2	1	689	72	983	343	31				11
6-Oct				741	57	2904	634	50				9
13				608	66	4377	910	40				11
20				476	101	5342	869	25				20
27				241	35	5209	351	15				10
3-Nov				338	44	4902	427	48		2		28
10				56	6	4375	377	24		11		37
17				21	2	3092	132	60		15		28
24				14		1753	60	71		12		12
1-Dec				8		1558	32	32		46		10
8				5		3012	60	85		114		10
15				2		1167	25	50		117		5
22						792	3	13		171		1
29						502	3	22		103		
5-Jan						304				45	1	
12						545				32		
19						685				49		
26						200				6		
2-Feb						207				9		
9						301				5		
16						429				25		
23						42				12		1
1-Mar						13				12		
8						7				26		
15										21		
22						1				73	2	
29										45	1	

Table 2: Number of adult salmonids returning to the Cowlitz Trout Hatchery in 2007. ***(Data source: WDFW, 2007 Cowlitz Complex annual report)***

	FCH	COHO-hatchery	COHO-natural	Early WRSH-hatchery	SRSH-hatchery	Late WRSH-hatchery	Sea-run CUTT-hatchery
Adult	0	0	0	460	887	398	1,266
Jack	0	0	0	0	1	0	0

Table 3: Possible origins of upper Cowlitz River basin adult returns in 2007. Does not include jack returns. ***(Data sources: Tacoma Power and WDFW)***

	Hatchery Unmarked	Hatchery Marked	Natural Unmarked	Natural Marked
Spring Chinook	**No**	**Yes**	**Yes**	**No**
Fall Chinook	**No releases**	**No releases**	**Yes**	**No**
Coho	**No releases**	**No releases**	**Yes**	**No**
Steelhead	**No**	**Yes**	**Yes**	**No**
Cutthroat trout	**No releases**	**No releases**	**Yes**	**Yes**

Table 4: Possible origins of lower Cowlitz River basin adult returns in 2007. Does not include jack returns. ***(Data sources: Tacoma Power and WDFW)***

	Hatchery Unmarked	Hatchery Marked	Natural Unmarked	Natural Marked
Spring Chinook	**Yes**	**Yes**	**Yes**	**No**
Fall Chinook	**Yes**	**Yes**	**Yes**	**No**
Coho	**No**	**Yes**	**Yes**	**No**
Chum	**No releases**	**No releases**	**Yes**	**No**
Sockeye	**No releases**	**No releases**	**Yes**	**No**
Steelhead	**No**	**Yes**	**Yes**	**No**
Cutthroat Trout	**No**	**Yes**	**Yes**	**No**

Table 5: Origin of natural spawning fall Chinook (FCH) by age in the Cowlitz River, 2007. ***(Data source: WDFW)***

Age Composition							Totals
Origin	*Stock*	2	3	4	5	6	
Cowlitz Hatchery	**SPCH**	**0**	**0**	**0**	**7**	**0**	**7**
Cowlitz Hatchery	**LRH**	**38**	**226**	**291**	**0**	**0**	**555**
Kalama	**LRH**	**0**	**0**	**0**	**141**	**0**	**141**
Lewis	**LRW**	**0**	**0**	**0**	**69**	**0**	**69**
Unknown origin	**LRH**	**63**	**89**	**541**	**82**	**28**	**803**
Unknown origin	**LRW**	**31**	**45**	**270**	**41**	**14**	**401**
Blank wire tag	**LRW**	**0**	**1**	**2**	**0**	**0**	**3**
Totals		**132**	**361**	**1104**	**340**	**42**	**1979**

Table 6: The 2007 marking program for juvenile salmonids released in the Cowlitz River basin. ***(Data sources: Tacoma Power and WDFW)***

Release Location	Spring Chinook	Fall Chinook	Coho	Steelhead	Cutthroat
Cowlitz Trout Hatchery	**None released**	**None released**	**None released**	**AD clip, AD&RV clip**	**AD clip**
Cowlitz Salmon Hatchery	**AD clip , AD&cwt**	**AD clip, AD&cwt**	**AD clip, AD&cwt**	**None released**	**None released**
Mayfield Dam Collector	**Snout CWT**	**Snout CWT**	**Snout CWT**	**Snout BWT**	**Snout BWT**
Cowlitz Falls Fish Facility	**Not marked**	**Not marked**	**Not marked**	**Not marked**	**Elastomer and alphanumeric tag**
Upper Cowlitz River basin	**RV or LV clip**	**None released**	**None released**	**AD&RV clip, RV clip**	**None released**

Tacoma Power Cowlitz River basin adult salmonid facilities – emergency events:

There were no emergency events to report in 2007 at Tacoma Power's adult salmonid handling and transportation facilities.

Tacoma Power Cowlitz River basin adult transportation individual fish truck haul records:

See Appendix 3 for the individual fish truck haul records from April 2007 to March 2008.

C. The status of Fisheries and Hatchery Management Plan and actions for determining the recruit per pre-spawner (R/S) ratio for selected upper Cowlitz River basin stocks.

The Order Modifying and Approving the Cowlitz River Hydroelectric Project Fisheries and Hatchery Management Plan (FHMP) was issued by the Commission on April 6, 2006. The modified FHMP directs Tacoma to continue the releases of hatchery juveniles in the upper Cowlitz River basin. This action will necessitate the marking of all hatchery juvenile fish releases in order to allow an accurate identification of the origin of adult salmonid returns in the Cowlitz River basin in the future. Currently, due to the mix of unmarked hatchery and natural spring Chinook and steelhead adults returning to the upper Cowlitz River basin in 2007 (see Table 3) the number of recruits and the recruit/pre-spawner (R/S) ratio cannot be calculated for spring Chinook and steelhead for the Cowlitz River above Cowlitz Falls Dam. Due to a unique mark applied at the Mayfield Dam downstream migrant collector, natural-origin Tilton River coho adults returning to the CSH separator were returned to the Tilton River beginning in 2003. The adult returns from those pre-spawners can be identified after 2007, and the R/S ratio can be calculated (see Table 7).

Table 7: Tilton River Coho salmon Recruit per Pre-spawner (R/S) ratio calculations.

YEAR	No. of adult coho released into Tilton River	No. of adult coho released into Mayfield Lake	TOTALS	No. unmarked & BWT adult coho released into Tilton River	No. unmarked & BWT adult coho released into Mayfield Lake	TOTALS	R/S ratio (Goal > 1.0)
2001	16,657	10,513	27,170	NA	NA	NA	
2002	10,476	7,901	18,377	NA	NA	NA	
2003	7,467	3,009	10,476	483	173	656	
2004	12,488	477	12,965	388	316	704	0.039
2005	8,438	153	8,591	1,261	71	1,332	0.110
2006	783	1,583	2,366	412	326	738	0.105
2007	2,176	235	2,411	709	112	821	0.095

Calculations:

2007: **Recruits** = 821

Coho smolt collection efficiency at Mayfield Dam = .67

$\mathbf{R_{expanded}}$ = 821/.67 = 1,225

Pre-spawners = 12,965

R/S ratio = $\mathbf{R_{expanded}}$/S = 1,225/12,965 = 0.09

D. A schedule for future actions and returns of adults needed to determine the status of naturally produced adult anadromous fish traveling through the Cowlitz River Project.

Table 8 lists the timetable for the calculation of the R/S ratio for the targeted Cowlitz River basin stocks. The goal of the R/S ratio as called for in Settlement Agreement License Article 3 (b) ii is for an R/S ratio > 1.0

Table 8: Timetable of actions for unmarked natural-origin salmonid returns to the Cowlitz River basin. **(Data source: Tacoma Power)**

	Spring Chinook	Steelhead	Coho – Tilton River
Start of FHMP implementation	**May 2006**	**May 2006**	**May 2006**
Last year of unmarked hatchery juvenile releases in the upper basin	**2003**	**2001**	**1999**
Last year of unmarked hatchery juvenile outmigrants from the upper basin	**2004**	**2004**	**2001**
Last year of adult returns from unmarked hatchery juvenile upper basin releases	**2009**	**2007**	**2004**
Start of pre-spawner adult returns to upper basin	**2010**	**2008**	**2005**
Calculation of R/S ratio	**2010**	**2008**	**2008**

The Tilton River coho R/S calculations were begun in 2004 (Tacoma Power 2005, and see Table 7). These R/S calculations are done by identifying the Tilton River natural-origin adult recruits by their unique mark. A combination of hatchery-origin adult coho and natural-origin adult coho are released into the Tilton River annually and those adults are used to calculate the number of pre-spawners (S), however, they do not meet the definition of a pre-spawner as pre-spawners must originate from adults spawning in the natural environment.

The August 18, 2005 Order Modifying and Approving the Upstream Fish Passage Study Report, Article 3 for the Cowlitz River Project from the Commission calls for a plan and schedule of studies to evaluate if adult fish transiting Mayfield Lake are able to chose their tributary of origin and survive Mayfield Lake transit at rates acceptable to the federal fishery agencies. Some of the adult steelhead and adult spring Chinook returning to the Cowlitz River in 2006/2007 are unmarked hatchery fish (see Table 3) and thus are indistinguishable from natural-origin adults. The adult transit study in Mayfield Lake requires natural-origin adults. Currently only natural-origin coho adults from the Tilton River are available to conduct this study (see Table 8). The earliest this study can be conducted utilizing only natural-origin "trigger" species of adult salmonids from the upper river is 2008.

As coho are not one of the "trigger" species for determining the development of self-sustaining runs of natural fish into the upper Cowlitz River basin, Tacoma Power will defer developing the schedule and study plan for the Mayfield Lake adult transit and survival study until such time as there are sufficient natural adult salmonids of the trigger species from the upper Cowlitz River basin available for conducting the study (also see Table 8).

E. References

Cramer, S.P. 2000. Contribution rate benchmarks for future runs of spring Chinook, fall Chinook and coho produced at Cowlitz Salmon Hatchery. Technical Report, July 5, 2000. S.P. Cramer & Associates. Gresham, OR. 32 pp.

Cramer, S.P. 2002. Evaluation of contribution to catch and escapement by spring Chinook, fall Chinook and coho produced at Cowlitz Salmon Hatchery. Technical Report, April, 2002. S. P. Cramer & Associates. Gresham, OR. 30 pp.

Tacoma Power, 2002. 2005 Downstream Fish Passage: Mayfield Study Results. Cowlitz Hydroelectric Project No. 2016-126, License Article 2. 6 pp with attachments.

Tacoma Power, 2005. 2005 Annual Upstream Fish Passage Study Report. Cowlitz Hydroelectric Project No. 2016-126, License Article 3. 23 pp.

Tacoma Power, 2006. 2006 Annual Upstream Fish Passage Study Report. Cowlitz Hydroelectric Project No. 2016-126, License Article 3. 22 pp.

Tacoma Power, 2007. 2007 Annual Upstream Fish Passage Study Report. Cowlitz Hydroelectric Project No. 2016-126, License Article 3. 28 pp.

F. Consultation and Comments

Date	Agencies/ Committees	Participants	Type of Communication	Topics
May 19, 2008	Cowlitz Fisheries Technical Committee	Tacoma Power, WDFW, Yakama Nation, AR/TU, WDOE, USFWS	Draft annual report posted and notification.	• Distribution of draft Annual Upstream Fish Passage Study Report and tables for review.
June 4, 2008	Cowlitz Fisheries Technical Committee (FTC)	Tacoma Power, WDFW, NMFS, WDOE,& AR/TU	Cowlitz FTC meeting discussion	• Announcement of Annual Upstream Passage Plan available for FTC review on Tacoma Power website.
July 2, 2008	Cowlitz Fisheries Technical Committee (FTC)	Tacoma Power, WDFW, NMFS & AR/TU	Cowlitz FTC meeting discussion	• Reminder of Annual Upstream Passage Plan available for FTC comment and review on Tacoma Power website.

Appendix A

Adult salmonids transported and released into the upper Cowlitz River basin. ***(Data source: WDFW, Cowlitz Evaluation program)***

NOTE:

These appendix tables detail the transportation and release of adult salmonids into the upper Cowlitz River basins from the CSH separator in 2007.

Table A-1: Fall Chinook transported and released in the Tilton Basin in 2007.

Mayfield Lake Park and Ike Kinswa State Park: August – December

	Female	Male	Jack	Total
Unmarked	41	88	156	285
Unmarked + blank wire tagged	50	64	15	129
AD-clipped only	1	0	0	1
Total	92	152	171	**415**

Gust Backstrom Park (Tilton River): August – December

	Female	Male	Jack	Total
Unmarked	450	513	243	1206
Unmarked + blank wire tagged	58	60	25	143
Total	508	573	268	**1349**

Note: A total of 1,325 adults (600 females) and 439 jacks were planted in Tilton Basin in 2007

Table A-2: Coho salmon transported and released in the Tilton Basin in 2007.

Mayfield Lake Park and Ike Kinswa State Park – Coho: August 2007 – March 2008

	Female	Male	Jack	Total
Unmarked	0	0	0	0
Unmarked + blank wire tagged	35	77	6	118
AD-clipped only	67	56	0	123
Total	102	133	6	**241**

Gust Backstrom Park – Coho: August 2007 – March 2008

	Female	Male	Jack	Total
Unmarked	2	3	0	5
Unmarked + blank wire tagged	339	371	30	739
AD-clipped only	807	654	14	1470
Total	1148	1028	44	**2220**

Note: A total of 2,411 adult coho salmon were transported to the Tilton Basin

Table A-3: Early and late winter steelhead trout transported to the Tilton Basin in 2007

	Unmarked+BWT			Unmarked			Ad only		
	Male	Female	Jack	Male	Female	Jack	Male	Female	Jack
November	1	0	0	0	0	0	0	0	0
December	3	11	0	0	0	0	0	0	0
January	4	2	0	0	0	0	0	0	0
February	3	1	0	*2*	0	0	*2*	*1*	0
March	*5*	*6*	*0*	*2*	*0*	*0*	*13*	*5*	*2*
April									
May									
TOTAL									

The italicized and highlighted numbers denotes the late winter steelhead. Early winter steelhead are not transported to the Tilton basin unless they were unmarked with a wire tag (identifying those fish as Tilton origin).

Table A-4: Cutthroat trout transported and released in the Tilton Basin in 2007.

Mayfield Lake Park and Ike Kinswa State Park – Cutthroat trout: June – December 2007

	unknown sex
Unmarked	0
Unmarked + blank wire tagged	0
Total	

Tilton River – Cutthroat trout: June – December 2007

	unknown sex
Unmarked	43
Unmarked + blank wire tagged	22
Total	**65**

TableA-5: Adults transported and released into the Cowlitz River basin above Mossyrock Dam in 2006/2007. ***(Data source: WDFW, Cowlitz Falls Fish Facility program)***

Coho: October 2006-March 2007	Female	Male	Jack	Total
Unmarked	2,181	3,305	242	5,728
AD- clipped	10,950	14,624	2,907	28,481
Total	13,131	17,929	3,149	34,209

Steelhead : January-June 2007				
Unmarked	309	304	9	622
RV	28	16	0	44
RVAD	104	129	1	234
AD	123	228	2	353
Total	564	677	12	1,253

Spring Chinook: April-September 2007				
Unmarked	24	46	9	79
LV-clipped	0	0	4	4
RV-clipped	0	0	1	1
AD- clipped	621	805	414	1,840
Total	645	851	428	1,924

Cutthroat: August-December 2007	
Smolted in 2007	12
Smolted in 2006	4
Smolted in 2005	0
Unknown	5
Total	21

Appendix B

Contribution Rate Benchmarks for spring Chinook, fall Chinook and coho salmon produced from the Cowlitz Salmon Hatchery. ***(Data source: Tacoma Power)***

NOTE:

These tables will not be updated for this report. The Cowlitz Fisheries Technical Team recognized that these are estimates only, and the data are not needed for the current Cowlitz Project license mitigation. The FTC recommended at their May 10, 2006 meeting that the tables be updated in a couple of years as there is currently no annual utility for the data and they are not related to any trigger for a fish mitigation action or decision.

Appendix tables 6, 7 and 8 of this report are intended to update the estimated age 3 recruits and survival equivalencies for spring Chinook, fall Chinook and coho salmon produced from the Cowlitz Salmon Hatchery. This work is based upon the formulations established in Cramer (2000) and Cramer (2002) and updates Tables 6, 7 & 8 from the 2005 Annual Upstream Fish Passage Study Report, License Article 3 with the latest information available. The calculations are based upon coded wire tag (cwt) recoveries from tagged lots of Cowlitz River salmonids. For this Annual Report the tables have not been updated per the recommendation of the Cowlitz Fisheries Technical Committee.

Table B-1: Estimated age 3 recruits and survival equivalency scaling for Cowlitz spring Chinook that enables comparison of future broods to the benchmark run year and survival rate. "Scaled Population" is the survival-equivalent recruitment to age 3.

Brood Year	Age 3-6 Catch	Age 3-6 Spawn	Age 3 Recruits	Observed Survival	Benchmark Scalar	Scaled Population
1960	42,598	14,538	79,416			
1961	59,505	19,035	106,134		1.00	106,134
1962	17,950	8,288	36,077			
1963	12,357	4,092	22,619			
1964	11,784	5,298	23,950			
1965	13,863	7,543	29,784			
1966	24,940	8,866	46,598			
1967	11,241	5,445	22,836			
1968	14,097	3,155	24,201			
1969	40,085	8,755	67,740			
1970	42,251	17,955	82,506			
1971	46,041	20,089	91,810	7.00%	2.13	195,852
1972	103,557	24,283	168,951	8.70%	1.73	292,456
1973	47,755	15,190	85,249			
1974	49,964	9,763	79,717			
1975	52,070	12,103	92,535	7.10%	2.11	194,854
1976	79,267	18,502	134,031	23.00%	0.65	87,165
1977	47,815	23,991	101,233	18.40%	0.81	82,468
1978	17,376	8,455	36,329			
1979	28,155	16,425	60,920			
1980	25,398	14,751	54,370	2.60%	5.75	312,771
1981	9,626	7,391	24,666	5.90%	2.53	62,444
1982	7,270	4,821	17,625	3.60%	4.21	74,254
1983	25,724	18,829	63,909	14.90%	1.00	64,179
1984	21,946	10,509	47,709	7.60%	1.96	93,591
1985	11,138	4,266	23,139	6.20%	2.40	55,484
1986	10,536	5,356	23,735			
1987	7,586	5,285	18,003	6.20%	2.44	43,881
1988	12,836	9,652	32,056			
1989	9,539	7,063	24,086	3.30%	4.56	109,849
1990	1,296	1,861	4,978	1.28%	11.72	58,338
1991	640	1,573	3,932	0.64%	23.43	92,123
1992	496	1,965	4,008	0.58%	25.86	103,643
1993	346	1,096	2,297	0.28%	53.57	123,065
1994	688	1,332	3,618	0.42%	35.71	129,185
1995	543	1,215	2,849	0.52%	28.85	82,206
1996	1,849	2,027	5,887	1.16%	12.93	76,126
1997	1,433	879	3,551	0.15%	100.00	355,111
1998	15,270	6,630	33,499	3.30%	4.55	152,269
1999	49,715	14,147	95,880	6.35%	2.36	226,489
2000	7,186	8,431	20,449	1.82%	8.24	168,533
2001						

Table B-2: Estimated age 3 recruits and survival equivalency scaling for Cowlitz fall Chinook that enables comparison of future broods to the benchmark run year and survival rate. "Scaled Population" is the survival-equivalent recruitment to age 3.

Fall Chinook

Brood Year	Age 3-6 Catch	Age 3-6 Spawn	Age 3-6 Recruits	Observed Survival	Benchmark Scalar	Scaled Population
1959	35,963	3,336	53,673			
1960	49,582	6,359	73,940		1.00	73,940
1961	49,208	6,420	72,099	2.4	1.00	72,099
1962	82,220	5,970	113,084	1.0	1.00	113,084
1963	45,291	4,731	64,075	3.1	1.00	64,075
1964	91,407	3,486	123,225	3.2	1.00	123,225
1965	70,282	4,023	101,492			
1966	191,428	9,311	263,881			
1967	114,078	12,652	161,372			
1968	38,480	7,210	60,182			
1969	92,385	5,083	125,417			
1970	42,078	4,661	62,190			
1971	27,592	5,086	44,293			
1972	45,488	3,837	63,416			
1973	24,674	2,681	36,333			
1974	38,381	3,037	53,774			
1975	29,910	4,756	45,674			
1976	25,310	3,424	37,475			
1977	21,552	4,419	36,354	1.3	1.69	61,523
1978	12,281	4,184	21,999	0.5	4.40	96,795
1979	8,974	4,301	17,305			
1980	17,925	8,196	38,524	1.1	2.00	77,049
1981	13,558	5,921	27,477	0.7	3.14	86,355
1982	14,421	4,797	25,355	0.8	2.75	69,726
1983	59,942	15,478	96,638	2.6	0.85	81,770
1984	62,496	19,894	115,808	2.8	0.79	90,992
1985	32,908	8,974	56,944	0.6	3.67	208,793
1986	7,577	6,267	21,503	0.4	5.50	118,269
1987	3,544	4,006	10,876	0.1	22.00	239,270
1988	7,686	2,917	16,885	0.2	11.00	185,739
1989	12,623	2,115	21,291	0.19	11.58	246,529
1990	3,514	6,050	13,515	0.45	4.91	66,369
1991	830	4,034	8,065	0.18	11.96	96,426
1992	1,929	5,080	11,463	0.32	6.79	77,832
1993	4,137	5,725	15,135	0.32	6.98	105,706
1994	593	915	2,565	0.29	7.46	19,139
1995	1,645	3,607	8,658	0.20	10.84	93,834
1996	5,417	3,508	13,430	0.10	22.00	295,457
1997	1,913	3,091	7,959	0.17	12.94	103,001
1998	15,222	8,927	33,986	0.48	4.58	155,770
1999	13,464	8,397	32,829	1.16	1.90	62,272
2000	1,805	1,535	5,001	0.15	14.67	73,349
2001						

Table B-3: Estimated age 3 recruits and survival equivalency scaling for Cowlitz coho that enables comparison of future broods to the benchmark run year and survival rate. "Scaled Population" is the survival-equivalent recruitment to age 3.

Coho

Brood Year	Run Year	Adults at Fish Facility	Age 3 Catch	Age 3 Recruits	Observed Survival	Benchmark Scalar	Scaled Population
1958	1961	23,388	50,874	74,262			
1959	1962	22,701	56,701	79,402			
1960	1963	22,083	100,045	122,128			
1961	1964	25,546	98,731	124,277		1.00	124,277
1962	1965	22,774	100,408	123,182			
1963	1966	31,001	155,997	186,998			
1964	1967	18,801	98,401	117,202			
1965	1968	12,636	71,928	84,564			
1966	1969	4,913	16,292	21,205			
1967	1970	63,407	220,988	284,395	7.7%	1.04	296,689
1968	1971	33,239	203,860	237,099	12.2%	0.65	155,048
1969	1972	16,354	85,567	101,921	6.4%	1.26	128,280
1970	1973	19,954	209,591	229,545			
1971	1974	17,627	206,304	223,931			
1972	1975	23,000	423,936	446,936	7.0%	1.15	511,996
1973	1976	25,166	512,713	537,879			
1974	1977	10,299	286,933	297,232			
1975	1978	20,512	154,311	174,823			
1976	1979	13,912	148,918	162,830			
1977	1980	28,776	119,378	148,154			
1978	1981	27,003	132,617	159,620			
1979	1982	22,528	112,232	134,760			
1980	1983	24,493	69,690	94,183	3.8%	2.11	198,903
1981	1984	26,149	60,783	86,932	3.8%	2.12	183,898
1982	1985	18,610	60,781	79,391	2.6%	3.07	244,016
1983	1986	54,685	282,854	337,539	10.8%	0.74	250,091
1984	1987	18,716	69,192	87,908	3.2%	2.49	219,203
1985	1988	30,888	121,283	152,171	6.9%	1.16	177,199
1986	1989	35,886	165,941	201,827	7.9%	1.01	203,560
1987	1990	13,009	35,479	48,488	1.6%	5.10	247,495
1988	1991	46,303	162,033	208,336	8.8%	0.91	188,797
1989	1992	14,780	32,443	47,223	2.3%	3.51	165,820
1990	1993	5,641	10,837	16,478	0.8%	9.58	157,857
1991	1994	5,922	1,746	7,668	0.3%	24.13	185,052
1992	1995	7,637	9,118	16,755	0.4%	18.18	304,600
1993	1996	11,352	5,460	16,812	0.8%	9.88	166,099
1994	1997	15,694	8,494	24,188	1.0%	8.16	197,377
1995	1998	19,231	10,837	30,068	0.6%	13.33	400,806
1996	1999	40,321	47,957	88,278	4.5%	1.78	156,939
1997	2000	49,341	78,707	128,048	3.6%	2.29	292,681
1998	2001	79,395	135,202	214,597	7.8%	1.03	220,100
1999	2002	85,632	145,461	231,093	4.0%	2.00	462,186
2000	2003	39,636	55,606	95,242	4.1%	1.95	185,838
2001							

Appendix C

Tacoma Power Fish Truck Worksheets. April 2007 – March 2008. ***(Data source: Tacoma Power)***

Appendix D

Response to Comments on License Article 401 and Settlement Agreement Article 3. Upstream Fish Passage Study Report Draft 2008 Annual Report.