

Hatchery and Supplementation Program

FINAL 2016 Annual Report

Lewis River Hydroelectric Projects
FERC Project Nos. 935, 2071, 2111, 2213



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1.0 INTRODUCTION

The purpose of this report is to document results from field studies associated with implementation of the Hatchery and Supplementation (H&S) Program during 2016. Monitoring and evaluation (M&E) activities of the H&S program are planned in consultation with the H&S subgroup and incorporated into the Annual Operating Plan (AOP) each year. The following key activities were completed as part of the 2016 AOP:

- Transport of winter steelhead and coho salmon upstream of Swift Dam
- Screw trapping of emigrating juveniles downstream of Merwin Dam
- Carcass and redd surveys downstream of Merwin Dam
- Broodstock collection and production for wild winter steelhead supplementation
- Hatchery production of trout and salmon as stipulated in Section 8 of the Lewis River Settlement Agreement.
- Fall Chinook carcass surveys downstream of Merwin Dam

This report is required by Section 8.2.4 of the Lewis River Settlement Agreement that states:

“On an annual basis, the Licensees shall provide to the ACC for review and comment a report compiling all information gathered pursuant to implementation of the Hatchery and Supplementation Plan. The report also will include recommendations for ongoing management of the Hatchery and Supplementation Program. The ACC shall have 60 days to comment on the annual report. Within 60 days of the close of the comment period, the Licensees shall finalize the report after consideration of all comments. The Licensees shall also provide the comprehensive periodic review undertaken pursuant to Section 8.2.6 below to the ACC. The Licensees shall provide final annual reports and the comprehensive periodic review to the Services during the development of any required ESA permit or authorization for hatchery operations, including NOAA Fisheries’ HGMP process. The report may be included as part of the detailed annual reports of the ACC activities required by Section 14.2.6.”

2.0 LATE WINTER STEELHEAD

Late winter steelhead in the Lewis River are composed primarily of native stock. This stock is preferred in reestablishing a population upstream of Swift Dam. The program is composed of three main elements:

- Broodstock collection at traps and through in-river netting.
- Spawning and rearing at Merwin Hatchery.
- Transport of returning adults upstream of Swift Dam.

The primary goal of this program is to support a self-sustaining population upstream of Swift Dam that, over time, requires no hatchery support. Table 1 provides a summary of late winter steelhead collected for the years 2009 through 2016.

Table 1. Summary of total captures of late winter steelhead by method between January and July for years 2009 through 2016 (excludes same year recaptures).

	YEAR							
	2009	2010	2011	2012	2013	2014	2015	2016
Merwin Trap	27	48	25	193	752	1,075	1,323	878
Lewis River Trap	0	0	0	7	5	1	0	0
Tangle Netting	39	42	65	166	103	162	114	63
Angling	8	2	Discontinued in 2011					
TOTAL	74	92	90	366	860	1,238	1,437	941

2.1 Broodstock Collection

Broodstock collection relies on two methods: (1) trapping at Merwin Dam and (2) tangle netting. Natural origin winter steelhead captured from the Merwin Trap and in-river netting are transported to Merwin Hatchery for genetic assignment analysis. Once results are known, these fish are either held for broodstock or released back to river depending on predetermined collection curves. A portion of NOR steelhead netted from the river are released on site depending on the broodstock needs of the hatchery (e.g., only females are needed). Data for all steelhead transported to the Merwin hatchery are provided in Appendix A.

2.1.1 Merwin Trap

During the period from January 1 until July 1, there was a total of 49 NOR steelhead and 829 BWT winter steelhead captured at the Merwin trap (Table 2). In addition to the typical BWT and NOR steelhead, the trap also trapped eight BWT steelhead with a clipped adipose fin. Genetic analyses of this type of marked fish in 2015 indicated origin to Lewis River. Thus, fish with clipped adipose fins with BWT present most likely represent supplementation program fish that were inadvertently clipped. The ratio of males to females was essentially 1:1 for both NOR and HOR captured winter steelhead. However, the proportion of BWT steelhead relative to natural origin steelhead was 94% or about 17 to 1.

Table 2. Origin and gender of winter steelhead captured at the Merwin Trap between January 1 and June 27, 2016

Origin	Males	Females
NOR	26	23
HOR (BWT)	403	414
HOR (BWT+AD Clip)*	3	9
TOTAL	432	446

*Considered BWT returns that were inadvertently AD clipped prior to release.

Figure 2 illustrates the cumulative proportion of both NOR and BWT steelhead captured during the first six months of 2016. As in previous years, BWT returns to the Merwin Trap begin earlier than NOR winter steelhead. For example, by April 1, 50 percent of the BWT steelhead were captured whereas only 19 percent of the total NOR's had been captured for the six month period.

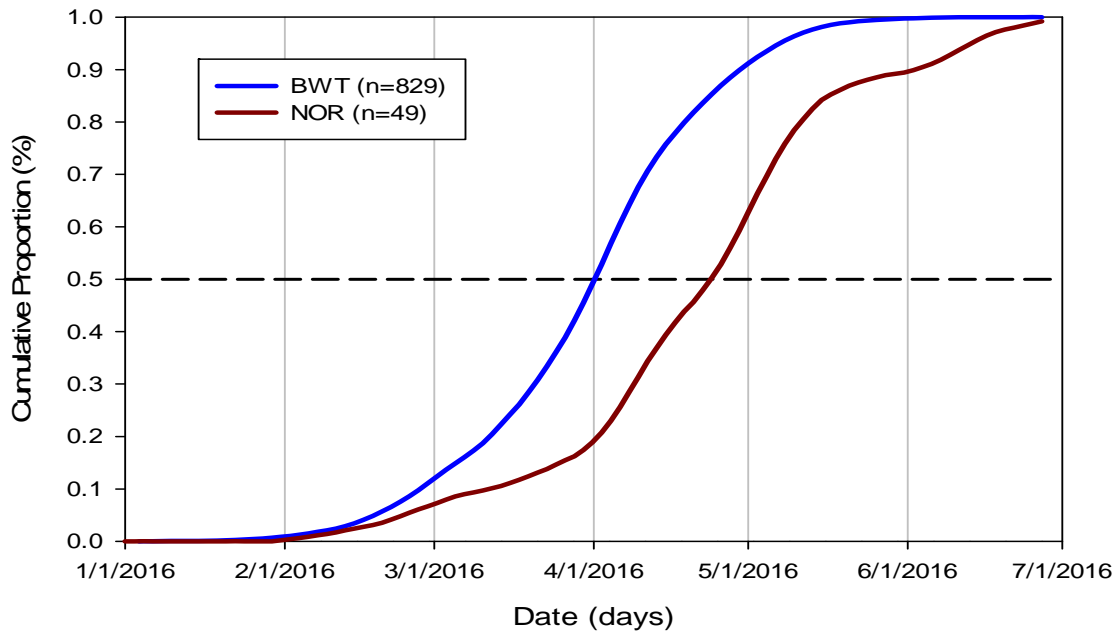


Figure 1. Monthly proportion of NOR and BWT steelhead trapped at the Merwin Collection Facility between January 1, 2016 and July 1, 2016.

2.1.2 Tangle Netting

Tangle netting efforts began on March 1, 2016 and continued through May 10, 2016. A PacifiCorp crew of two biologists netted one day per week for a total of 11 net days. Six to eight pound test monofilament, 4-inch (stretch) mesh tangle nets are drifted in known and established steelhead holding areas. Once steelhead become entangled in the drifting net it is pulled into the boat, freed and then placed in an insulated cooler with fresh river water. All steelhead are processed on the boat and either released or transported to an oxygenated holding tank at the Lewis River hatchery access area. Table 3 summarizes the disposition of steelhead captured during tangle netting efforts.

Table 3. Origin, gender and disposition of steelhead captured through tangle netting in 2016 (excludes same year recaptures)

Disposition	Males	Females
<i>NOR shipped to Merwin</i>	16	6
<i>NOR Released on site</i>	10	1
<i>BWT Released on site</i>	16	5
<i>Stubby Dorsal Released on site</i>	4	2
<i>Euthanized (AD Clip)</i>	0	1
<i>AD Clip Released on site</i>	0	1
<i>Mortality (NOR)</i>	1	0
TOTAL	47	16

In total, 63 steelhead (70 if including same year recaptures) were handled through the tangle netting program. Of these, 34 (54%) were of natural origin (Figure 2). Remaining steelhead were either program returns (43%) or from traditional hatchery programs (3%). Sex ratio was nearly 75 percent males, which may be an indication of netting bias towards males that become more easily entangled in the net from snout shape and larger teeth. Although this has not been verified.

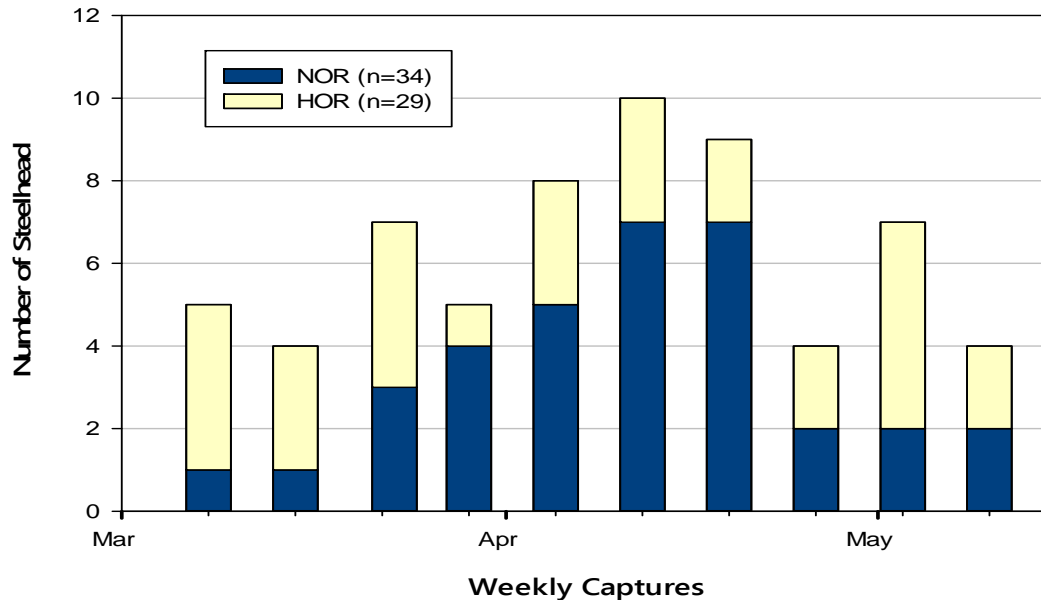


Figure 2. Composition of winter steelhead captured through tangle netting between March 1, 2016 and May 10, 2016 (n= 63)

2.2 Late Winter Steelhead Broodstock Collection Timing

The ability to conform to predetermined collection curves presents several difficulties in the field. Several variables continue to make broodstock collection challenging including:

- Genetic assignment results may reduce the number of available broodstock.
- Spawning maturity in females is highly variable creating uncertainty when deciding to retain or release male broodstock.
- In-river capture efficiency is affected by river flow volume and turbidity.
- In-river netting tends to capture significantly more males than females.
- The number of kelts increases substantially from mid to late April.
- Individual fecundity is highly variable

The collection curve proposed in the annual operating plan is intended to help ensure that broodstock are collected across their spawning period. Up to 50 steelhead are held for broodstock and spawned over the course of the run.

Between February 7 and May 16, 2016, 58 steelhead were transferred to Merwin Hatchery as potential broodstock. Of these, 37 were spawned, 14 were surplus and returned to river, 1 was euthanized and 6 were mortalities (includes the 1 mortality from tangle netting). All fish that were spawned were also returned to river. Figure 3 provides the capture timing of actual spawners relative to the proposed collection curve (expressed as a proportion).

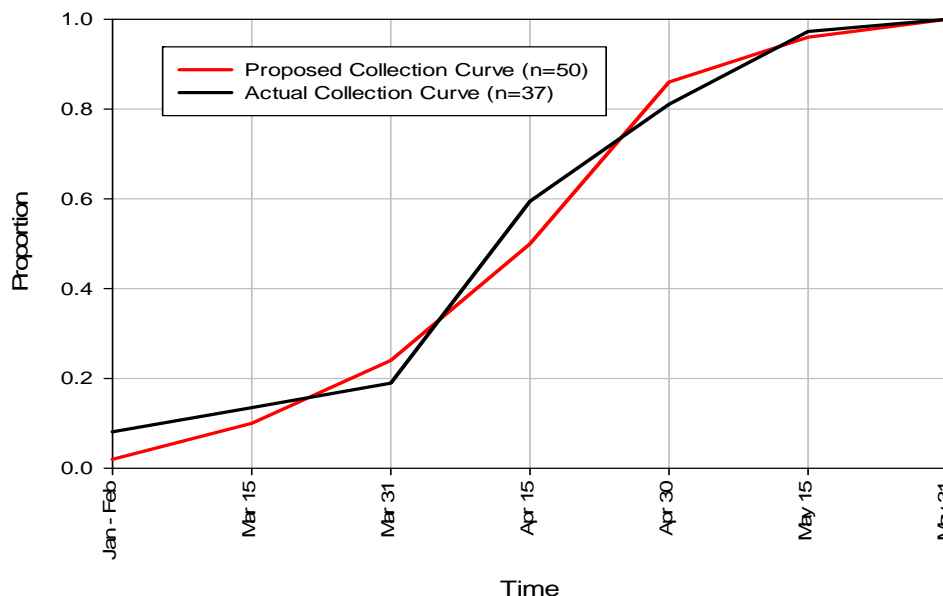


Figure 3. Actual collection timing of steelhead used as broodstock compared to predetermined collection curve during the 2016 season

2.3 Genetic Analysis of Potential Broodstock

The H&S Subgroup agreed to use a genetic assignment target level of 50 percent or greater to the NF Lewis River or Cedar Creek stock(s) to be considered acceptable broodstock. Additionally, steelhead captured after April 1 with 50 percent or greater assignment to the Cascade Strata are also considered acceptable broodstock. The only exception to this rule is for fish showing hatchery assignment at levels greater than 5 percent. These fish would not be incorporated into the broodstock despite any assignment of 50 percent or greater to the NF Lewis River wild winter steelhead stock or Cascade Strata.

A total of 69 samples were taken from steelhead captured in the Merwin Trap or through in-river tangle netting. All sampled steelhead were assigned a probability percentage as to likelihood of assignment to known baselines established for Lower Columbia River tributaries. Probabilities are classified as primary, secondary and tertiary to account for introgression from other basins and provide a more complete picture of diversity present within the samples. Figure 4 provides an illustration of results of sampled (n=69) non-BWT steelhead. Appendix B provides the tabular genetic assignments results for each individual unclipped steelhead captured at the Merwin trap and tangle netting.

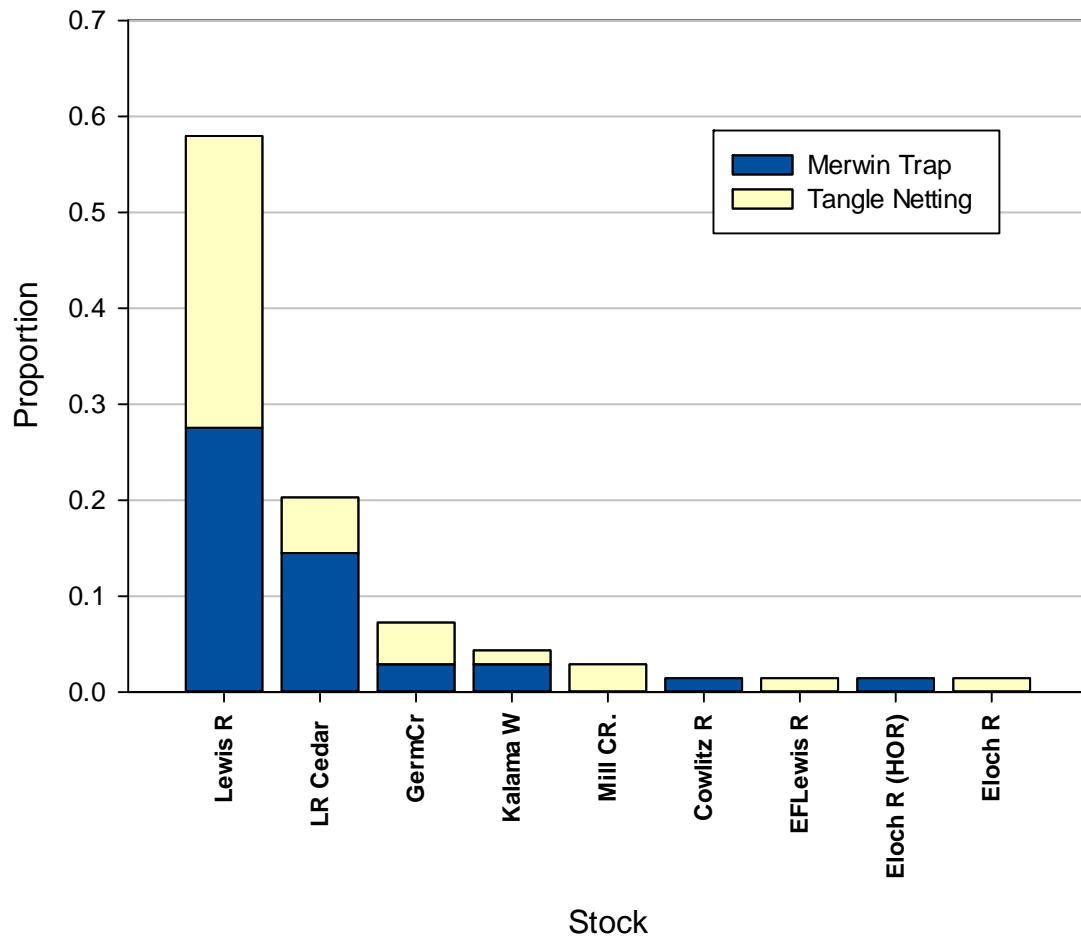


Figure 4. Proportion of primary genetic assignment of NOR late winter steelhead from the Merwin Trap and through in-river tangle netting January 1 through July 1, 2016 (n=68)

2.4 Spawning and Egg Take

A total of 17 females and 20 males were spawned through 10 crosses between April 8 and May 27, 2016 (Appendix C). The target goal of 25 females and 25 males was not achieved in 2016 (Table 4). However, factorial mating (e.g., 2x2, 3x3, etc.) was used to help maintain genetic diversity given the low broodstock numbers.

Fecundity averaged 4,274 eggs per female resulting in an egg take of 72,649. However, one cross resulting in about 5,845 eggs was separated after primary assignment probabilities of the parents did not meet the genetic criteria established in the 2016 AOP. Eggs from this cross were hatched and were released as unfed fry into the North Fork Lewis River. Appendix D provides the spawning log for 2016 indicating fecundity, eyed egg take and estimated egg loss.

Table 4. Number of spawning crosses and parents including the duration of each spawning periods for brood years between 2009 and 2016

Brood Year	Crosses	Females	Males	Spawn Period	Days
2009	10	12	19	Mar 2 - May 21	81
2010	22	22	24	Mar 17 - May 14	56
2011	9	16	19	Mar 30 - May 18	49
2012	12	19	23	Apr 10 - May 29	49
2013	8	8	11	Apr 10 - May 6	26
2014	26	26	25	Apr 7 - May 16	39
2015	25	25	25	Mar 26 – May 22	58
2016	10	17	20	Apr 8 - May 27	49

2.5 Spawn Timing

Steelhead broodstock captured in February were retained on average 50 days until spawned. Conversely, those captured in April were retained on average only 8 days until spawned. Thus, capture timing is not a useful predictor of spawn timing. For example, the first broodstock retained was captured on February 19, 2016 at the Merwin Trap. This steelhead did not spawn until April 26, 2016 - a length of 66 days. Peak spawn timing for female broodstock held at Merwin Hatchery occurred on April 15 (Figure 5).

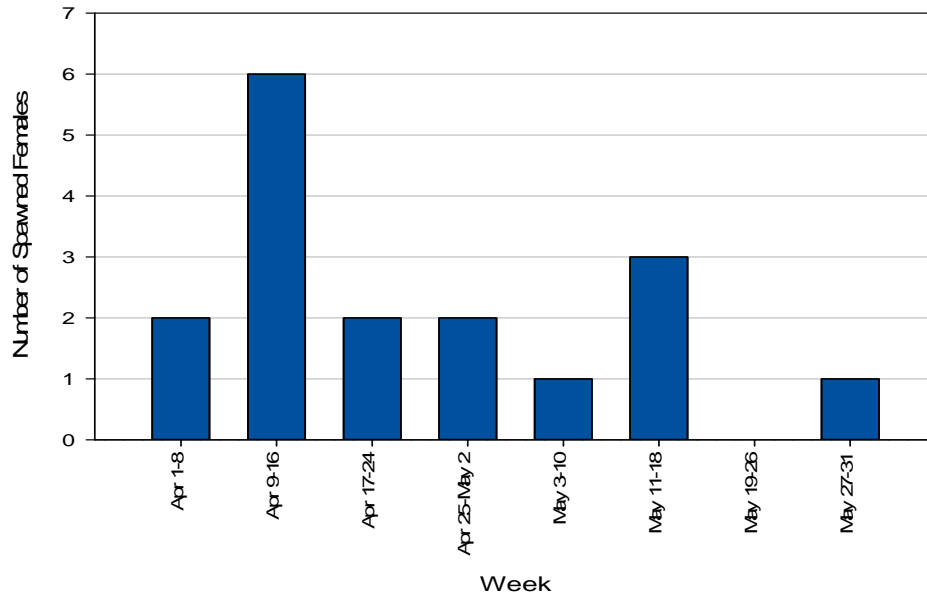


Figure 5. Spawn timing of female broodstock held at the Merwin Hatchery (n= 17)

2.6 Rearing, Tagging and Release of Late Winter Steelhead

The expected release in May of 2017 is 51,900 yearling smolts. This is based on an initial ponding of 61,506 fry ponded and a mortality rate of 16 percent due to disease and natural causes (Table 5). This achieves the target release of 50,000 smolts each year. All program fish will be marked with a blank wire tag in the snout.

2.6.1 Rearing

Table 5. Summary of late winter steelhead rearing statistics for the 2016 brood year

GENERAL	STATISTIC
Actual Egg Take	72,649
Eyed Eggs	67,817
Total Fry Poned	61,506
Total Fry out-planted (unfed)	5,461
MORTALITY	
Egg Loss %	6.65
Total Rearing Loss	(8,989)
<i>from natural causes</i>	(5,160)
<i>from disease</i>	(3,829)
Shortage / Adjustment	(510)
RELEASE	
Projected Smolt Release (survival)	51,900
Release Date (Start Volitional)	5/1/17
Release size	8 fpp

2.6.2 Tagging

All subyearling steelhead were tagged with blank wire snout tag in December 2016.

2.6.3 Release

All fish will be volitionally released on May 1, 2017 at the Merwin boat launch. Volitional release will continue until June 1, 2017. Any fish remaining in the ponds on June 1, 2017 will be forced out and released downstream of the County Bridge in Woodland, WA. Projected average release size in 8 per pound. A total release number of 51,900 smolts is projected.

3.0 MONITORING AND EVALUATION

3.1 Winter Steelhead Redd Surveys (Lower River)

Redd surveys are used to estimate spawning abundance and distribution of winter steelhead in the mainstem North Fork Lewis River. Surveys are conducted weekly throughout the spawning period, which starts on March 1 and extends into mid-June.

3.1.1 Spawning Abundance

Spawning abundance estimates rely on new redd census data, assumed sex ratio and females per redd to calculate total spawner abundance (Freymond and Foley 1986). Females per redd

follow WDFW generalized guidelines of 0.81 females per redd and sex ratio is assumed equal (Table 6). Beginning in 2013, we also calculate the spawner abundance using the observed sex ratio of late winter steelhead entering the Merwin Trap. This may be a more accurate estimate of female to male ratio in the river because of the large numbers captured in the trap and is unbiased in terms of capture efficiency for males or females.

Using trap data collected for 2016, a total of 878 steelhead were trapped. These include mainly BWT steelhead, but also include steelhead held for broodstock and steelhead released because of stubby dorsal fins and no wire tag in their snout. Of this total, 432 were male and 446 were female. Therefore, for every female we assume that there are 0.97 males, which (in 2016) is very close to the assumed 1:1 ratio.

In the spring of 2016, the North Fork Lewis River experienced an unusually high and prolonged turbidity event. Visibility was less than two feet throughout the spawning period. Given the poor visibility and the duration of the event, no redd surveys were possible. Therefore, an estimate of spawner abundance was not possible.

Table 6. Late winter steelhead abundance downstream of Merwin Dam 2008 through 2016 based on redd counts

Year	Number of Redds observed	Spawner Estimate	Observed sex ratio (females : males)	Spawner Estimate (Corrected)
2008	131	212		
2009	176	286		
2010	248	402		
2011	108	174		
2012	343	556		
2013	456	739	1 : 1.43	898
2014	364	590	1 : 0.80	531
2015	384	622	1 : 1.46	765
2016	NA	NA	1 : 0.97	NA

3.1.2 Distribution

No data are available for distribution in 2016 because no redds were visible due to turbidity.

3.2 Proportion of Hatchery Origin Spawners (pHOS) on the Spawning Grounds

Program returns (BWT) are treated as hatchery origin (HOR) steelhead despite their genotype assignment to NOR stocks. This is due to the hatchery influence during mating and captive rearing conditions during their first year of life. As these program fish return as adults, there is opportunity for these (HOR) fish to spawn with NOR stocks. It has been shown that reproductive success (fitness) declines rapidly (up to 37 percent per captive reared generation) within a natural population (Araki et. al. 2007). The evolutionary mechanisms for declines in

fitness are not fully understood, but hatchery protected rearing environments and controlled mating selection are suspected contributors to this decline (Araki et. al. 2007). Inbreeding between program fish is also a concern because of loss in genetic diversity or effective population size further limits fitness and adaptability of the natural spawning population.

In 2016, the ratio of HOR to NOR captured through tangle netting is used to estimate pHOS and related PNI. Tangle netting provides a direct measure of the proportion of hatchery to natural origin fish on the spawning grounds when done during spawning and in areas where spawning is occurring. However, there is a portion of HOR steelhead caught in the tangle nets that are destined for the Merwin Trap. Figure 7 provides the proportion of fish collected through the run time of late winter steelhead on average between 2014 and 2016. The first week of April represents the day in which half of the available steelhead have been trapped. It is important to note that this is true of all years and that trap timing from one year to the next has not shown a statistical difference despite substantially different flow rates between years.

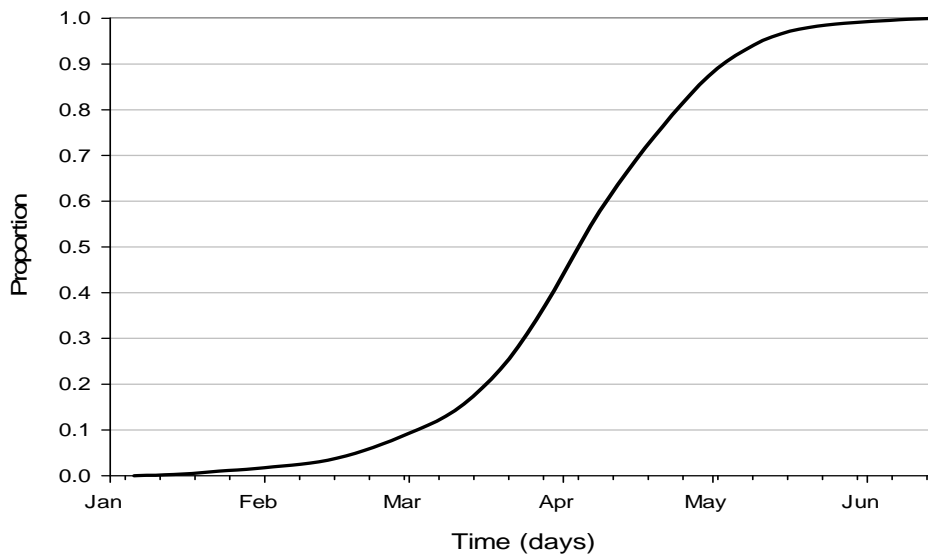


Figure 6. Average cumulative proportion of total late winter steelhead captured at the Merwin Trap for years 2014 -2016

To estimate pHOS through tangle netting, the number of HOR (primarily BWT) and NOR are recorded during the peak spawn time of NOR winter steelhead in the Lewis River (Figure 3). The total HOR and NOR captures during the peak spawn time (March through the end of netting) provides an estimate of the ratio 'present' on the spawning grounds (Table 8). To account for HOR steelhead that have not yet entered the Merwin Trap, the number of HOR steelhead netted is adjusted based on the proportion of marked and released HOR steelhead that are recaptured at the Merwin Trap (Table 8).

The use of tangle netting is limited by its duration in that netting normally does not extend past the first or second week of May. Netting past this date raises the potential for disrupting and

reducing natural spawning success, because nearly all steelhead captured past this date are either kelts or active spawners. Despite this limitation, tangle netting remains an effective means to directly sample and determine origin of steelhead while on the spawning grounds.

Table 7. Ratio of marked steelhead recaptured at the Merwin Trap including estimates of escapement, pHOS and PNI

Abundance	BWT	NOR	Total
Merwin Trap	829	49	878
Redd Survey			NA
Total Escapement			NA
Marks			
Tangle Netting	36		
Recaptured in net	4		
Recaptured at trap	7		
Recruitment to trap	19%		
pHOS			
<i>Observed Average</i>			50%
<i>Observed Average (corrected)*</i>			31%
PNI			
<i>Season Average</i>			67%

*Represents the observed average minus the observed proportion of naïve late winter steelhead captured and marked in the tangle nets that were recaptured at the trap (19%).

Table 8. Weekly ratio of HOR and NOR steelhead captured in the tangle net for year 2016

Week	NOR	HOR	Observed pHOS (max)*	PNI (min)*
Mar-8	1	4	80%	56%
Mar-15	1	3	75%	57%
Mar-23	3	4	57%	64%
Mar-29	4	1	20%	83%
Apr-5	5	3	38%	73%
Apr-12	7	3	30%	77%
Apr-19	7	2	22%	82%
Apr-26	2	2	50%	67%
May-3	2	5	71%	58%
May-10	2	2	50%	67%

*Values assume no recruitment of HOR steelhead to the Merwin Trap

Based on tangle net captures during the spawning period, we estimate the proportion of hatchery origin spawners is 45 percent (51 percent for the season). The main contributor to this estimate is the number of BWT steelhead on the spawning grounds during the natural spawning period. Based on our estimate, over half of the late winter steelhead spawning in the North Fork Lewis River mainstem are of hatchery origin. The ability to remove a meaningful number of BWT and AD clipped winter steelhead spawning in the lower river would be challenging without directly and irreversibly reducing NOR spawning success.

Estimates of PNI are always going to exceed HSRG standards as long as the program continues to use only verified NOR broodstock. Estimates of PNI are provided in Table 9. HSRG recommendations for pHOS and PNI for late winter steelhead on the Lewis River are as follows:

- pHOS: < 30 percent
- PNI: > 50 percent

3.3 Recaptures of Circular Pond Reared Late Winter Steelhead

Recapture information for circular pond reared steelhead is limited at this time because Merwin Trap reporting into PTAGIS is not complete. This information, however, will be reported in future reports as the system becomes fully functional and prior year tag recaptures are loaded.

There were two recaptures in the tangle netting however from fish originating from the circular tanks. Both fish were captured at 'Haggies' and were from the 2013 smolt release cohort. One fish was captured on April 26, 2016 and measured 795 mm; the other fish was captured on May 3, 2016 and measured 895 mm.

More detailed reporting will be available in 2017 as field crews adopt electronic data recording and real-time downloading of PIT tag data to the PTAGIS database.

3.4 Upstream Transport of Steelhead, Coho and Spring Chinook

In 2016, a total of 754 blank wire tagged steelhead (378 males, 376 females) were transported upstream of Swift Dam (Table 9). All steelhead were transported from the Merwin Trap. Eighty-two (82) transported steelhead also received a gastric radio tag for distribution studies in the upper basin as part of the Aquatic Monitoring and Evaluation Plan.

This year represents the fifth year of steelhead transportation activities and numbers for the first time were less than the previous years' count. The goal of the H&S program is 500 winter steelhead transported each year. We have exceeded this target the last four years with an average supplementation of about 950 winter steelhead per year.

In 2015, late coho were used for the first time for adult supplementation upstream of Swift Dam. This decision was made by the H&S subgroup and approved by the ACC. The main

reason for this change was that both early and late coho are treated as the same population for recovery planning purposes. Also, by using late coho there is more flexibility in the transportation schedule to spread the transportation over a longer period of time. It is anticipated that over the years, survival between early and late coho will differ based on natural processes (e.g., river flow, temperature, turbidity, etc) at the time each group spawns. This difference is considered beneficial as the natural environment will have a larger influence on survival.

Total transported coho for 2016 was 7,346 – slightly less than the target of 7,500.

Adult spring Chinook supplementation has not been possible for several years due to poor hatchery returns to the Lewis River hatchery. The WDFW is modifying the release timing of spring Chinook from the hatchery in hopes of improving survival of spring Chinook smolts and returns back to the Lewis in coming years.

Table 9. Summary of late winter steelhead, coho and spring Chinook salmon transported and released upstream of Swift Dam

YEAR	Late Winter Steelhead		Coho (early and late)		Spring Chinook
	TOTAL	Radio Tagged (of total)	TOTAL	Radio Tagged (of total)	
2005			2,006		0
2006			1,848		155
2007			2,000		0
2008			2,000		0
2009			2,058		0
2010			1,822		188
2011			2,000		0
2012	189	39	206		0
2013	741	100	6,962		513
2014	1,033	82	9,179		0
2015*	1,265	83	3,754	99	0
2016	754	82	7,346	0	0

*starting in 2015, late coho (Type N) were also transported

3.5 2016 Screw Trap Operations (downstream of Merwin Dam)

The Golf Course traps (two traps fished in tandem side-by-side with 8-foot diameter cones) were operated from March 24 to June 30, 2016. The traps were checked on a daily basis. The traps were turned off (cones raised) due to potential shallow water concerns for a 24-hour period from June 21 to 22; estimates for fish that may have passed the traps during this time period were not made.

Total trap captures are combined for the purposes of this summary. Total fish captured by species is summarized in Table 10. Fork length distribution of focal salmonid fish species is presented in Figure 8. Marked coho, Chinook, rainbow/steelhead, cutthroat, and sockeye were placed upstream of the trap to estimate trap efficiency on a daily basis as fish were available from trap captures (Table 11). Fish were marked with an alcian blue tattoo or upper caudal fin clip and only fish ≥ 60 mm fork length FL were used for mark-recapture efficiency tests. All species efficiency tests were combined to generate weekly trap efficiency estimates (Table 11).

Focal salmonid fish species timing is presented in Figure 9 and was calculated by making estimates of the total number of fish that passed the trap on a weekly basis using the adjusted weekly trap efficiency summarized in Table 12. Total estimates of fish passing the trap during the trapping period and 95% confidence intervals were generated using the Bootstrap Method (Thidenga et al. 1994). The sum of discrete interval method of calculating total outmigration described by Volkhardt et al. (2007) for a single partial capture trap was used to make a secondary estimate for coho, but was not used due to the low number of weekly recaptures for other species (Table 13). Total estimates should only be viewed as the total fish that passed the trap during the study period and not total species outmigration abundance.

Table 10. Summary of total captures for lower river (golf course) screwtraps

SPECIES	TOTAL		
	HOR	<60 mm FL (NOR)	≥ 60 mm FL (NOR)
Coho	25,539	62	1,447
Chinook	47	53,356	48
Rainbow/Steelhead	9	1	555
Cutthroat	0	0	66
Sockeye	0	0	2
OTHER	TOTAL		
Lamprey	32		
Longnose Dace	2		
Mountain Whitefish	8		
Northern Pikeminnow	217		
Redside Shiner	29		
Sculpin	3,423		
Largescale Sucker	2		
Three-spined Stickleback	35		
Unidentified Salmonid Fry	1		
Brown bullhead	1		
Banded Killifish	1		

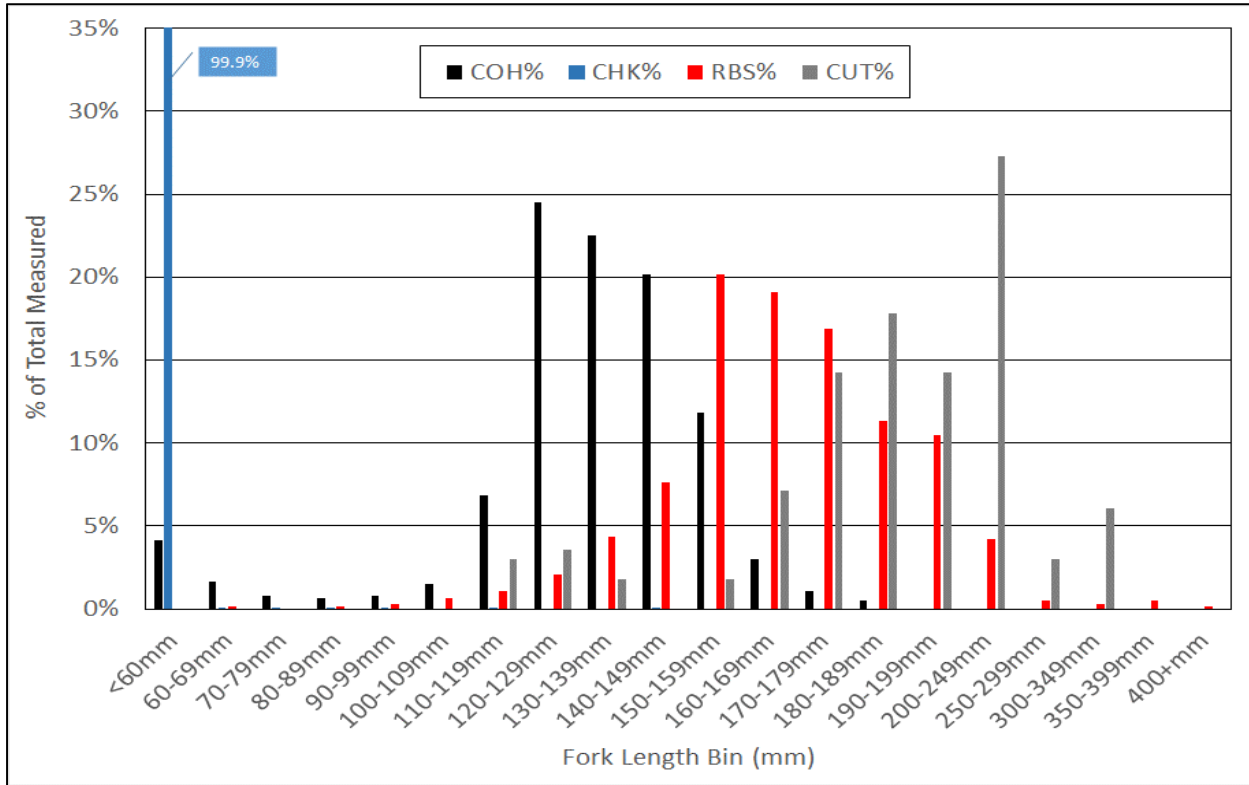


Figure 7. Length frequency distribution of NOR coho, Chinook, steelhead and cutthroat

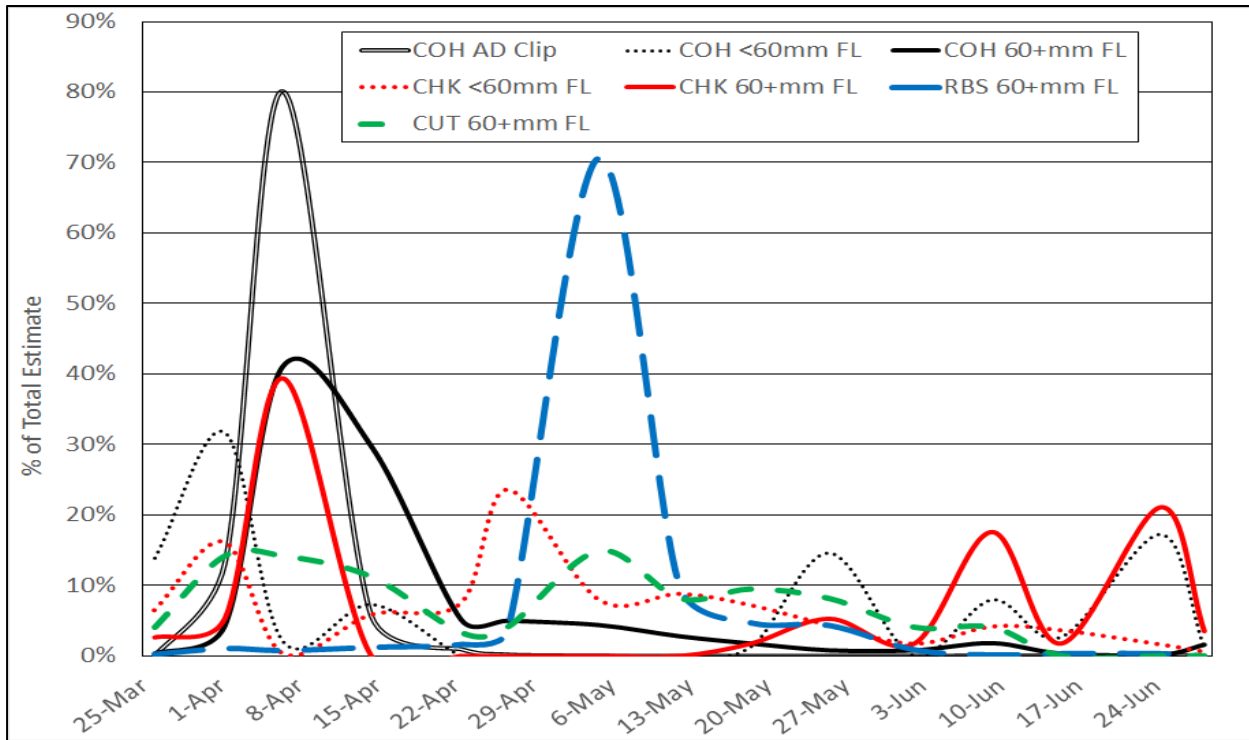


Figure 8. Species migration timing based on total weekly estimates

Table 11. Summary of mark-recapture tests of trap efficiency by species

Species	Total Marked & Released Upstream ≥60 mm FL	Total Recaptured	Trap Efficiency
Coho	2,867	57	0.020
Chinook	47	1	0.021
Steelhead	514	15	0.029
Cutthroat	48	0	NA
Sockeye	2	0	NA
All Salmonids	3,478	73	0.021

^aIncludes 199 coho PIT-tagged and released upstream from FSC captures.

Table 12. Summary of weekly mark-recapture tests of trap efficiency

Week	Total Caught ≥ 60 mm FL	Total Marked & Released Upstream ≥ 60 mm FL	Total Recaptured	Trap Efficiency	Average Weekly Flow (cfs) ^e	Adjusted Efficiency Based on Flow
1	8	0	0	NA	6,014	0.015 ^a
2	3,303	241	2	0.008	5,437	0.015 ^a
3	20,442	889	15	0.017	6,520	0.015 ^a
4	1,935	981	16	0.016	4,241	0.016 ^b
5	947	388	18	0.046	2,803	0.046 ^c
6	180	175	3	0.017	2,754	0.022 ^d
7	482	441	11	0.025	2,774	0.022 ^d
8	112	111	3	0.027	2,759	0.022 ^d
9	65	64	3	0.047	2,759	0.022 ^d
10	47	45	1	0.022	2,741	0.022 ^d
11	23	23	0	NA	2,617	0.022 ^d
12	53	49	0	NA	2,316	0.022 ^d
13	10	8	0	NA	2,313	0.022 ^d
14	73	43	1	0.023	2,310	0.022 ^d
15	34	20	0	NA	2,310	0.022 ^d
TOTAL	27,714	3,478	73	0.021		

^aSum of weeks 1 through 3 mark/recapture.

^bSum of week 4 mark/recapture.

^cSum of week 5 mark/recapture.

^dSum of weeks 6 through 15 mark/recapture.

^eUSGS gage 14220500 Lewis River at Ariel, WA

Table 13. Estimates of total fish passing the trap by species (Bootstrap and Sum of Discrete Interval Method)

Bootstrap Method (Thedinga et. al. 1994)				
Species	Capture Efficiency Applied	Bootstrap Mean Total Estimate	Variance	95% CI +/-
Coho (no AD clip)	0.020	74,065	97,024,650	19,306
Coho (AD clip)	0.020	1,309,518	28,400,870,000	330,310
Chinook (no AD clip)	0.021	2,327	189,739	854
Steelhead (no AD clip)	0.029	20,404	37,124,110	11,942
Cutthroat (no AD clip)	0.021	3,180	308,787	1,089
Sum of Discrete Interval Method (Volkhardt et. al. 2007)				
Species		Total Estimate	Variance	95% CI +/-
	Coho (no AD clip)	76,504	121,611,210	21,614
	Coho (AD clip)	1,548,800	107,963,356,448	644,012

3.6 Mainstem Carcass and Redd Surveys

*NOTE: Mainstem and tributary carcass survey data for spring Chinook and coho are surveyed beginning in the fall season of each year and extend until the end of January. This schedule does not typically provide adequate time to input, review and analyze collected data and present the results in formal reporting by April 1 of each year. Therefore, reporting for mainstem and tributary surveys of coho and spring Chinook may be delayed one year from the survey period. However, placeholder titles in each report iteration are never removed until the data are available, analyzed or deemed inadequate. This is especially true of tributary coho estimates whereby estimates of adult coho abundance are grouped into the larger lower Columbia River DPS. These results will be presented when WDFW completes their final analysis for years 2012 – 2016.

3.6.1 Spring Chinook Salmon Mainstem Surveys – 2016 **Meridian to provide results**

3.6.2 Coho Salmon Mainstem Surveys – 2016 **Meridian to provide results**

3.6.3 Coho Salmon Tributary Surveys: 2012 – 2016 **WDFW to provide results**

3.6.4 Fall Chinook Salmon Mainstem Surveys – 2016 **WDFW to provide results**

4.0 RECOMMENDATIONS FOR ONGOING MANAGEMENT

The annual operating plan (AOP) for the Hatchery and Supplementation program continues to be updated and used as an adaptive management tool to address both ongoing and new priorities as they relate to hatchery operations, supplementation activities and development of effective monitoring designs.

In 2016, the Hatchery and Supplementation subgroup prioritized several objectives in the AOP. These included addressing the decline in hatchery returns for spring Chinook, developing statistical models for estimating pHOS downstream of Merwin Dam and drafting protocols to monitor the effects of the late winter steelhead program on the native stock.

In 2017, a primary goal will be to finalize the AOP. This will require regular planning meetings to discuss the priority issues mentioned above as well as finalize the monitoring and evaluation programs for the objectives in the H&S plan. The decline in spring Chinook is of primary concerns and through several H&S subgroup meetings, the Utilities will push forward proposals that address the physical rearing conditions at the hatchery as well as provide recommendations for rearing, growth and release strategies.

5.0 REFERENCES

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APPENDIX A - Wild Winter Steelhead Collection Log - 2016

Trap Date	Capture Location	Gender	Fork Length (cm)	Floy Tag #	Pit Tag #	DNA Sample #	Scale Card # - Position	DISPOSITION	Returned To River	Days held prior to spawn	Comments
2/7/2016	Merwin Trap	M	91	Orange 181	3D6.001569A23C	MH16- 001	30331-1	M	N		Mortality 3/23
2/19/2016	Merwin Trap	M	69	Blue 604	3D6.001569A228	MH16- 002	30331-2	S	Y	66	Spawned 4/26 w/ Female MH16-024
2/26/2016	Merwin Trap	F	71	Pink/Blue 2026	3D6.001569A1F1	MH16- 003	30331-3	S	Y	47	Spawned 4/15 w/ Males TN16-003 & TN16-010
2/29/2016	Merwin Trap	M	83	White 245	3D6.001569A1E6	MH16- 004	30331-4	S	Y	38	Spawned 4/8 w/ Female MH16-005 & TN16-013
3/8/2016	Merwin Trap	F	63	Yellow 1125	3D6.001569A232	MH16- 005	30332-1	S	Y	30	Spawned 4/8 w/ Male MH16-004 & MH16-007
3/8/2016	Tangle Net	F	71	Pink 76	3BE8	TN16-001	30393-1	SPL	Y		
3/15/2016	Tangle Net	M	90	Yellow 75	CAF8	TN16-00 3	30393-2	S	Y	30	Spawned 4/15 w/ Females MH16-003 & MH16-008
3/18/2016	Merwin Trap	M	68	Blue 623	3D6.001569A202	MH16-006	30332-2	M	N		Mortality 4/3
3/23/2016	Merwin Trap	M	56	White 243	3D6.001569A22B	MH16-007	30332-3	S	Y	15	Spawned 4/8 w/ Female MH16-005 & TN16-013
3/23/2016	Tangle Net	M	87	Orange 25	CB0B	TN16-005		SPL	Y		Decide Not to Hold Due to Condition of Fish
3/23/2016	Tangle Net	M	94	Orange 24	CB1C	TN16-006		M	N		3/23 Mortality On Tangle Net Boat
3/25/2016	Merwin Trap	F	74	Green 24	3D6.001569A233	MH16-008	30332-4	S	Y	20	Spawned 4/15 w/ Males TN16-003 & TN16-010
3/29/2016	Tangle Net	F	71	Orange 23	CB0D	TN16-007	30393-6	M	N		Mortality 4/20
4/1/2016	Merwin Trap	F	71	Orange 183	3D6.001569A220	MH16-009	30333-1	M	N		Mortality 4/21
4/5/2016	Merwin Trap	F	85	Blue/Pink 2050	3D6.001569A224	MH16-010	30333-2	E	N		Culled >50% Hatchery Fish
4/5/2016	Tangle Net	M	79	Pink 51	CACC	TN16-010	30393-9	S	Y	10	Spawned 4/15 w/ Females MH16-003 & MH16-008
4/5/2016	Tangle Net	M	73	Pink 52	CAD6	TN16-011	30393-10	M	N		Mortality 4/21
4/5/2016	Tangle Net	F	78	Yellow 74	CAFC	TN16-013	30393-13	S	Y	3	Spawned 4/8 w/ Male MH16-004 & MH16-007
4/6/2016	Merwin Trap	F	67	White 241	3D6.001569A244	MH16-011	30333-3	S	Y	9	Spawned 4/15 w/ Males MH16-014 & MH16-017
4/7/2016	Merwin Trap	F	77	White 240	3D6.001569A23D	MH16-012	30380-1	S	Y	8	Spawned 4/15 w/ Male TN16-018 & MH16-018
4/7/2016	Merwin Trap	M	80	White 239	3D6.001569A1F3	MH16-013	30380-2	S	Y	15	Spawned 4/22 w/ Female MH16-015 & TN16-027
4/11/2016	Merwin Trap	M	88	White 238	3D6.001569A215	MH16-014	30381-1	S	Y	4	Spawned 4/15 w/ Females MH16-011 & TN16-015
4/11/2016	Merwin Trap	F	65	White 237	3D6.001569A204	MH16-015	30381-2	S	Y	11	Spawned 4/22 w/ Male TN16-042 & MH16-013
4/12/2016	Merwin Trap	F	72	Yellow 601	3DD.003BE8D2A2	MH16-016	30381-3	S	Y	3	Spawned 4/15 w/ Male TN16-018 & MH16-018
4/12/2016	Merwin Trap	M	69	Yellow 602	3DD.003BE8D293	MH16-017	30381-4	S	Y	3	Spawned 4/15 w/ Females MH16-011 & TN16-015
4/12/2016	Merwin Trap	M	72	Yellow 603	3DD.003BE8D2AF	MH16-018	30381-5	S	Y	3	Spawned 4/15 w/ Females MH16-012 & MH16-016
4/12/2016	Merwin Trap	F	70	Yellow 604	3DD.003BE8D295	MH16-019	30381-6	SPL	Y		
4/12/2016	Tangle Net	F	84	Orange 26	CB02	TN16-015	30393-15	S	Y	3	Spawned 4/15 w/ Males MH16-014 & MH16-017
4/12/2016	Tangle Net	M	82	Pink 1	CAF1	TN16-016	30393-16	SPL	Y		
4/12/2016	Tangle Net	M	79	Yellow 100	CB1F	TN16-018	30393-18	S	Y	3	Spawned 4/15 w/ Females MH16-012 & MH16-016
4/12/2016	Tangle Net	F	85	Yellow 99	CB23	TN16-019	30393-19	SPL	Y		
4/12/2016	Tangle Net	M	69	Yellow 98	CB12	TN16-021	30393-21	S	Y	14	Spawned 4/26 w/ Female MH16-024
4/12/2016	Tangle Net	M	93	Pink 25	CAC7	TN16-022	30393-22	DNM	Y		>20% Coastal Strata
4/14/2016	Merwin Trap	M	46	Pink/Blue 28	3DD.003BE8D29A	MH16-020	30382-1	S	Y	15	Spawned 4/29 w/ Female MH16-025
4/15/2016	Merwin Trap	F	62	Pink/Blue 30	3DD.003BE8D29F	MH16-021	30382-2	S	Y	31	Spawned 5/16 w/ Male MH16-031, MH16-029, MH16-026
4/19/2016	Tangle Net	F	81	Yellow 76	CAE8	TN16-027	30391-23	S	Y	3	Spawned 4/22 w/ Male TN16-042 & MH16-013
4/19/2016	Tangle Net	M	67	Pink 24	CACF	TN16-024	30391-24	S	Y	10	Spawned 4/29 w/ Female MH16-025
4/19/2016	Tangle Net	M	89	Yellow 77	CAE4	TN16-031	30391-25	DNM	Y		>20% Coastal Strata
4/19/2016	Tangle Net	M	85	Yellow 78	CB18	TN16-042	30391-28	S	Y	3	Spawned 4/22 w/ Female MH16-015 & TN16-027
4/26/2016	Merwin Trap	M	74	Orange 184	3DD.003BE8D29D	MH16-022	30382-3	DNM	Y		>20% Coastal Strata
4/26/2016	Merwin Trap	F	63	Green 22	3DD.003BE8D2AA	MH16-023	30382-4	S	Y	13	Spawned 5/9 w/ Male TN16-082 & TN16-090
4/26/2016	Merwin Trap	F	73	Green 21	3DD.003BE8D2B0	MH16-024	30382-5	S	Y	0	Spawned 4/26 w/ Male MH16-002 & TN16-021

Trap Date	Capture Location	Gender	Fork Length (cm)	Floy Tag #	Pit Tag #	DNA Sample #	Scale Card # - Position	DISPOSITION	Returned To River	Days held prior to spawn	Comments
4/26/2016	Tangle Net	M	91	Yellow 79	CACE	TN16-082	30391-29	S	Y	13	Spawned 5/9 w/ Female MH16-023
4/26/2016	Tangle Net	M	86	Yellow 80	CAC9	TN16-064	30391-30	K	Y		Return to River Spawn Out
4/28/2016	Merwin Trap	F	78	Pink 47	3DD.003BE8D294	MH16-025	30383-1	S	Y	1	Spawned 4/29 w/ Male MH16-020 & TN16-024
4/28/2016	Merwin Trap	M	82	Pink 46	3DD.003BE8D2C2	MH16-026	30383-2	S	Y	18	Spawned 5/16 w/ Female MH16-021, MH16-030, MH16-035
4/29/2016	Merwin Trap	F	75	Yellow 625	3DD.003BE8D2A8	MH16-027	30383-3	SPL	Y		
5/2/2016	Merwin Trap	M	69	Green 8	3DD.003BE8D298	MH16-028	30383-4	K	Y		Return to River Spawn Out
5/2/2016	Merwin Trap	M	73	Green 9	3DD.003BE8D29E	MH16-029	30383-5	S	Y	14	Spawned 5/16 w/ Female MH16-021, MH16-030, MH16-035
5/2/2016	Merwin Trap	F	67	Green 10	3DD.003BE8D2ED	MH16-030	30383-6	S	Y	14	Spawned 5/16 w/ Male MH16-031, MH16-029, MH16-026
5/3/2016	Tangle Net	M	83	Orange 50	CAD8	TN16-090	30391-31	S	Y	6	Spawned 5/9 w/ Female MH16-023
5/5/2016	Merwin Trap	M	91	Pink 45	3DD.003BE8D2AD	MH16-031	30384-1	S	Y	11	Spawned 5/16 w/ Female MH16-021, MH16-030, MH16-035
5/9/2016	Merwin Trap	M	77	Pink 44	3DD.003BE8D29C	MH16-032	30384-2	S	Y	18	Spawned 5/27 w/ Female MH16-033
5/10/2016	Tangle Net	M	64	Yellow 97	CAE1	TN16-085	30391-32	SPL	Y		DNA vial 52 sent to Gary / TN16-085 WDFW
5/10/2016	Tangle Net	M	69	Yellow 96	CAFD	TN16-077	30391-33	K	Y		Return to River Spawn Out
5/11/2016	Merwin Trap	F	59	Green 11	3DD.003BE8D2B5	MH16-033	30384-3	S	Y	16	Spawned 5/27 w/ Male MH16-032
5/13/2016	Merwin Trap	F	55	Yellow 606	3DD.003BE8D2DD	MH16-034	30384-4	SPL	Y		
5/16/2016	Merwin Trap	F	75	Yellow 607	3DD.003BE8D2C0	MH16-035	30334-1	S-UF	Y	0	Spawned 5/16, return as unfed fry

Codes: (M) Mortality, (S) Spawned, (DNM) Did not meet genetic criteria, (S-UF) Spawned, unfed fry release, (K) Kelt, (SPL) Surplus, (E) Euthanized

APPENDIX B - Genetic Assignment Results from Late Winter Steelhead Captures at Merwin Trap (MT) and Tangle Netting (TN) - 2016

LABEL	PRIMARY		SECONDARY		TERTIARY		QUATERNARY	
MH16-001	LRMerwin	0.90	LRCedar	0.10				
MH16-002	LRCedar	0.73	LRMerwin	0.26				
MH16-003	LRMerwin	0.73	LRCedar	0.19	KalamW	0.08	GermCr	0.00
MH16-004	LRCedar	0.74	KalamW	0.16	LRMerwin	0.03	MillCr	0.03
MH16-005	LRMerwin	0.99						
MH16-006	LRMerwin	0.90	LRCedar	0.09	LRhatW	0.01		
MH16-007	LRMerwin	0.62	LRCedar	0.30	Cowman	0.06	SFTout	0.01
MH16-008	LRMerwin	0.56	LRCedar	0.20	ElochR	0.17	GermCr	0.02
MH16-009	LRCedar	0.91	KalamW	0.05	GrRLC	0.03	KalamSu	0.01
MH16-010	ElochHat	0.62	Cowman	0.17	ElochR	0.08	LRCedar	0.07
MH16-011	LRMerwin	0.94	KalamW	0.02	LRCedar	0.02	GrRLC	0.01
MH16-012	LRCedar	0.44	LRMerwin	0.40	SandyR	0.06	ElochR	0.04
MH16-013	LRCedar	0.67	LRMerwin	0.32	MillCr	0.01		
MH16-014	LRCedar	0.65	Cowman	0.18	LRMerwin	0.09	SandyR	0.06
MH16-015	LRMerwin	0.56	Cowman	0.21	LRCedar	0.16	KalamW	0.05
MH16-016	LRMerwin	0.63	LRCedar	0.32	MillCr	0.02	GermCr	0.02
MH16-017	LRMerwin	0.81	LRCedar	0.14	GermCr	0.02	GrRLC	0.02
MH16-018	LRCedar	0.86	LRMerwin	0.12	Cowman	0.01		
MH16-019	LRCedar	0.40	MillCr	0.33	GermCr	0.15	KalamW	0.07
MH16-020	LRMerwin	0.51	LRCedar	0.37	GrRLC	0.09	Clack	0.01
MH16-021	LRCedar	0.89	GrRLC	0.07	LRMerwin	0.03		
MH16-022	LRCedar	0.37	LRMerwin	0.27	GermCr	0.23	KalamW	0.10
MH16-023	KalamW	0.66	LRMerwin	0.20	LRCedar	0.14		
MH16-024	LRMerwin	0.37	LRCedar	0.21	ElochR	0.16	GermCr	0.07
MH16-025	LRMerwin	0.85	GrRLC	0.07	KalamSu	0.04	GermCr	0.01
MH16-026	LRMerwin	0.80	LRCedar	0.15	KalamW	0.04	GrRLC	0.00
MH16-027	GermCr	0.91	LRMerwin	0.08	MillCr	0.01		
MH16-028	LRMerwin	0.86	LRCedar	0.06	GermCr	0.03	ElochHat	0.02
MH16-029	LRMerwin	0.94	KalamW	0.03	LRCedar	0.03		
MH16-030	LRMerwin	1.00						
MH16-31	LRMerwin	0.87	LRCedar	0.13				
MH16-32	CowlitzR	0.81	LRMerwin	0.18	KalamW	0.01		
MH16-33	LRMerwin	0.95	LRCedar	0.05				
MH16-34	KalamW	0.50	LRCedar	0.23	GermCr	0.20	EFLewisR	0.04
MH16-35	GermCr	0.63	LRMerwin	0.24	MillCr	0.05	LRCedar	0.04
TN16-001	MillCr	0.45	GermCr	0.38	ElochR	0.09	Cowman	0.03
TN16-002	GrRLC	0.69	LRMerwin	0.17	SFTout	0.04	KalamW	0.03
TN16-003	EFLewisR	0.39	KalamW	0.27	LRMerwin	0.22	LRCedar	0.07
TN16-004	LRMerwin	0.53	LRCedar	0.18	GermCr	0.09	KalamW	0.06
TN16-005	LRMerwin	0.81	LRCedar	0.18				

LABEL	PRIMARY		SECONDARY		TERTIARY		QUATERNARY	
TN16-006	LRMerwin	0.70	LR Cedar	0.29				
TN16-007	LRMerwin	0.49	LR Cedar	0.33	KalamW	0.11	GrRLC	0.02
TN16-008	LRMerwin	0.90	LR Cedar	0.10				
TN16-009	LR Cedar	0.43	LRMerwin	0.38	GermCr	0.11	ElochR	0.05
TN16-010	LRMerwin	0.81	GermCr	0.18	SFTout	0.01	GrRLC	0.01
TN16-011	LRMerwin	0.82	MillCr	0.10	LR Cedar	0.05	Cowman	0.01
TN16-012	ElochR	0.61	LRMerwin	0.13	GermCr	0.11	LR Cedar	0.09
TN16-013	LR Cedar	0.51	LRMerwin	0.25	MillCr	0.10	EFLewisR	0.07
TN16-014	LRMerwin	0.99	LR Cedar	0.01				
TN16-15	LRMerwin	0.87	LR Cedar	0.04	Cowman	0.03	ElochR	0.02
TN16-16	GermCr	0.94	Cowman	0.03	LRMerwin	0.02	ElochR	0.01
TN16-17	LRMerwin	0.91	Cowman	0.05	SFTout	0.01	EFLewisR	0.01
TN16-18	LRMerwin	0.85	LR Cedar	0.12	SFTout	0.01	ElochR	0.01
TN16-19	GermCr	0.95	Cowman	0.03	KalamW	0.01		
TN16-20	MillCr	0.77	Cowman	0.18	LRMerwin	0.02	GermCr	0.01
TN16-21	LRMerwin	0.66	Cowman	0.20	LR Cedar	0.14		
TN16-22	GermCr	0.36	LR Cedar	0.35	LRMerwin	0.22	MillCr	0.06
TN16-23	LR Cedar	0.54	LRMerwin	0.35	GermCr	0.10		
TN16-24	LR Cedar	0.64	KalamW	0.21	LRMerwin	0.12	KalamSu	0.01
TN16-27	LRMerwin	0.88	MillCr	0.08	KalamW	0.03	Cowman	0.01
TN16-31	LRMerwin	0.72	GermCr	0.23	GrRLC	0.04	LR Cedar	0.00
TN16-41	KalamW	0.46	SandyR	0.21	Cowman	0.21	KalamSu	0.05
TN16-42	LRMerwin	0.94	LR Cedar	0.06				
TN16-44	LRMerwin	0.80	LR Cedar	0.19				
TN16-064	LRMerwin	0.87	LR Cedar	0.08	KalamSu	0.03	SandyR	0.01
TN16-082	LRMerwin	0.49	LR Cedar	0.35	Cowman	0.13	MillCr	0.02
TN16-090	LRMerwin	0.80	LR Cedar	0.07	KalamW	0.06	GermCr	0.03
TN16-77	LRMerwin	0.51	LR Cedar	0.31	Cowman	0.14	KalamW	0.04
TN16-85	LRMerwin	0.57	LR Cedar	0.18	ElochHat	0.16	LRhatW	0.05

APPENDIX C – NOR Late Winter Steelhead Spawning Crosses - 2016

Spawn Date	Female & Male Release Date	Female DNA #	Female Assignment	Male DNA #	Male Assignment	Total Egg Weight w/ovarian (grams)	Total Egg Weight w/o ovarian (50grams)	Estimate Eggs/Female	Eyed Egg Eggs/LB	Eyed Eggs On-Hand	Dead Eggs	Actual Eggs/Female	Percent of Egg Loss	Estimate # Fry Pondered	Spawn Crosses
4/8/2016	4/8/2016	MH16-005	LRMerwin .9934	MH16-004 MH16-007	LRCedar .7402 LRMerwin .6203	428.8	378.8	2582	2914	2856	252	3108	8.11%	2827	2x2
4/8/2016	4/8/2016	TN16-013	LRCedar .5071 LRMerwin .2515	MH16-004 MH16-007	LRCedar .7402 LRMerwin .6203	997.1	947.1	6455	2229	4815	474	5289	8.96%	4767	
4/15/2016	4/15/2016	MH16-003	LRMerwin .7251	TN16-003 TN16-010	EFLewis .39, KalW .2749, LRMerw .2243; LRMerwin .8058	769	719	4901	2497	4245	445	4690	9.49%	4203	2x2
4/15/2016	4/15/2016	MH16-008	LRMerwin .5575	TN16-003 TN16-010	EFLewis .39, KalW .2749; LRMerwin .8058	928.5	878.5	5988	2633	5898	119	6017	1.98%	5839	
4/15/2016	4/15/2016	MH16-012	LR Cedar .4353 LRMerwin .4022	TN16-018 MH16-018	LRMerwin .8546; LRCedar .8569	698.4	648.4	4419	2587	3933	347	4280	8.11%	3894	2x2
4/15/2016	4/15/2016	MH16-016	LRMerwin .6302 LR Cedar .3208	TN16-018 MH16-018	LRMerwin .8546; LRCedar .8569	919.4	869.4	5926	2315	5186	92	5278	1.74%	5134	
4/15/2016	4/15/2016	MH16-011	LRMerwin .9404	MH16-014 MH16-017	LRCedar .6480; LRMerwin .8122	532.7	482.7	3290	2905	3312	53	3365	1.58%	3279	2x2
4/15/2016	4/15/2016	TN16-015	LRMerwin .8676	MH16-014 MH16-017	LRCedar .6480; LRMerwin .8122	272	222	1513	2012	926	38	964	3.94%	917	
4/22/2016	4/22/2016	MH16-015	LRMerwin .5620	TN16-042 MH16-013	LRMerwin .9353; LRCedar .6686 LRMerw .3193	665.9	615.9	4198	2437	3656	307	3963	7.75%	3619	2x2
4/22/2016	4/22/2016	TN16-027	LRMerwin .8758	TN16-042 MH16-013	LRMerwin .9353; LRCedar .6686; LRMerw .3193	789.6	739.6	5041	2568	3903	606	4509	13.44%	3864	
4/26/2016	4/26/2016	MH16-024	LRMerwin .3716 LRCedar .2136	MH16-002 TN16-021	LRCedar .7333; LRMerwin .6606	1050.5	1000.5	6819	2132	5245	95	5340	1.78%	5193	1x2
4/29/2016	4/29/2016	MH16-025	LRMerwin .8486	MH16-020 TN16-024	LRMerwin .5139; LRCedar .6394	952	902	6148	2752	5256	358	5614	6.38%	5203	1x2
5/9/2016	5/9/2016	MH16-023	KalamaW .6594 LRMerwin .2004 LRCedar .1375	TN16-082 TN16-090	LRMerwin .487 LRCedar .3541 LRMerwin .7984	528.6	478.6	3262	3172	3806	370	4176	8.86%	3768	1x2
5/16/2016	5/16/2016	MH16-021	LRMerwin .6606	MH16-031 MH16-029 MH16-026	LRMerwin .8686; LRMerwin .9415; LRMerwin .8019	441.4	391.4	2668	2820	2256	754	3010	25.05%	2233	3x3
5/16/2016	5/16/2016	MH16-030	LRMerwin .999	MH16-031 MH16-029 MH16-026	LRMerwin .8686; LRMerwin .9415; LRMerwin .8019	638.2	588.2	4009	2933	4400	106	4506	2.35%	4356	
5/16/2016	5/16/2016	MH16-035	GermCr .6319	MH16-031 MH16-029 MH16-026	LRMerwin .8686; LRMerwin .9415; LRMerwin .8019	907.1	857.1	5842	2651	5461	384	5845	6.57%	-5406	
5/27/2016	5/27/2016	MH16-033	LRMerin 0.95	MH16-032	Cowlitz 0.80; LRMerwin 0.17	398.5	348.5	2375.376	3519	2663	35	2698	1.30%	2636	1X1

17

20

75437

67817

4835

72652

6.90%

56326

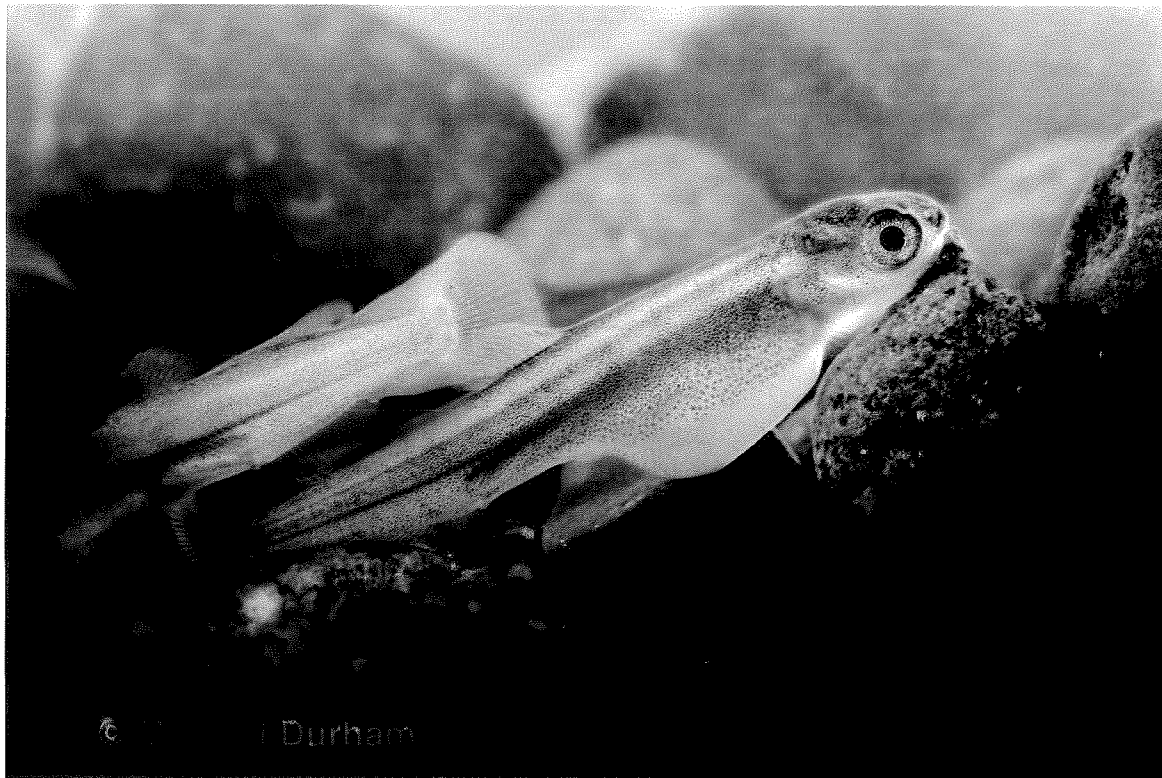
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**APPENNDIX E - Lewis River Fall Chinook Escapement Report
2016-2017 (WDFW to provide)**

APPENDIX F - WDFW Lewis River Hatchery Complex Operations Program Report – 2016

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE
FISH PROGRAM
HATCHERIES DIVISION

LEWIS RIVER COMPLEX OPERATIONS PROGRAM
FOR
JANUARY 1, 2016 TO DECEMBER 31, 2016



FUNDED BY
PACIFICORP ENERGY
&
COWLITZ P.U.D.

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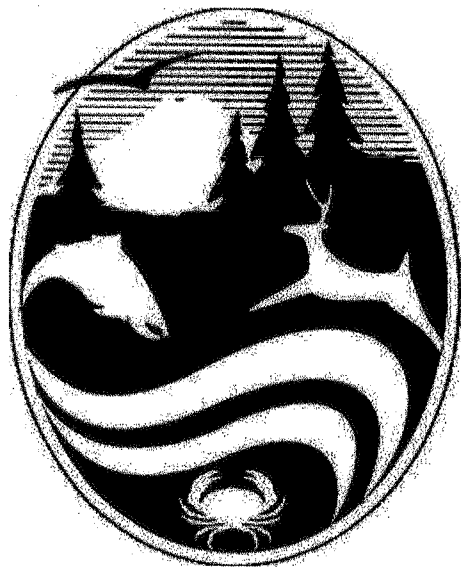
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**OPERATIONS PROGRAM
LEWIS RIVER HATCHERY**

FOR

January 1, 2016 TO DECEMBER 31, 2016



*Washington
Department of*
**FISH and
WILDLIFE**

**WRITTEN AND COMPILED BY:
LEWIS RIVER HATCHERY STAFF**

Introduction

The Lewis River Salmon Hatchery is located approximately eight miles east of Woodland, WA. on the North Fork of the Lewis River. Originally constructed in 1909 on Johnson Creek, the hatchery was moved to its present site in 1923.

Program Goals

- 1,250,000 yearling Spring Chinook at 8 to 12 fpp released into the North Fork Lewis River.
- 1,100,000 yearling Early Coho at 16 fpp released into the North Fork Lewis River.
- 900,000 yearling Late Coho at 16 fpp released into the North Fork Lewis River.

Approximately 29,000 gallons of water per minute can be delivered to the hatchery system by eight pumps that are located at two separate intakes. Four booster pumps permit further distribution of water to other areas of the facility as needed. Three gas stabilization towers and one packed column are available to remove supersaturated gases from the water supply when necessary.

There is approximately 312,000 cubic feet of available rearing space. This space consists of 14 super raceways and 12 standard raceways. Adult holding space consists of 4 large concrete ponds with a common center channel totaling 53,000 cubic feet.

The incubation facility houses fifty stacks (16 trays/stack) of vertical incubators and four shallow troughs.

The Lewis Hatchery facility also includes three residences, hatchery/office building, freezer building, two three bay storage buildings, two small storage buildings, public restroom, two intake structures, two generator/pump control buildings, two compressor buildings a two-story adult handling facility and a domestic water pump house.

Lewis River hatchery is staffed with a FHS 4, FHS 3, three FHS 2s and a FHT.

TRAPPING

The Merwin Fish Collection Facility (F.C.F.) and the Lewis Ladder operate continuously. The fish trapped are sorted for broodstock needs, identification and processing; either in the trap, at Merwin Hatchery, or at Lewis River Hatchery.

2016 Lewis River Winter Steelhead

The last 2016 brood winter steelhead was trapped at the Lewis Ladder was on March 28th, and the last one trapped at the Merwin F.C.F was on May 28th, 2016. All broodstock was collected at the Merwin F.C.F. and shipped to Merwin Hatchery.

Total Trapped (F.C.F.)	2,213
Total Trapped (Lewis)	1,005
Trap Mortality	49
Broodstock Shipped	126
Food Banks/Tribes	3,043
Landfill	49

2017 Brood Lewis River Summer Steelhead

The first summer steelhead was trapped at Merwin F.C.F. on April 12th, 2016. The first summer steelhead trapped at the Lewis Ladder was on June 12th, 2016. Steelhead utilized for broodstock were collected from the Merwin F.C.F. and shipped to Merwin Hatchery from June 27th through September, 2016.

Total Trapped (F.C.F.)	6,718
Total Trapped (Lewis)	166
Recycled	1,402
Trap Mortality	83
Broodstock Shipped	375
Food Banks/Tribes	5,034
Landfill	83

2017 Brood Lewis River Winter Steelhead

The first winter steelhead was trapped at Merwin F.C.F. on November 29th, 2016. The first winter steelhead trapped at the Lewis Ladder was on December 5th, 2016. Steelhead utilized for broodstock were collected from the Merwin F.C.F and shipped to Merwin Hatchery from December 13th through December 28th, 2016.

Total Trapped (F.C.F.)	593
Total Trapped (Lewis)	53
Recycled	90
Trap Mortality	5
Broodstock Shipped	83
Food Banks/Tribes	468

2015 Brood Lewis River (Type N) Coho

The last late Coho captured at Merwin F.C.F. was on January 25th, 2016. The last late Coho captured at the Lewis Ladder was on February 16th, 2016.

Adults Trapped (F.C.F.)	1,657
Jacks Trapped (F.C.F.)	423
Adults Trapped (Lewis)	11,985
Jacks Trapped (Lewis)	2,006
Trap Mortality (Adults)	827
Trap Mortality (Jacks)	53
Spawned (Adults)	3,621
Spawned (Jacks)	30
Food Banks/Tribes (Adults)	3,123
Food Banks/Tribes (Jacks)	2,304
Nutrient Enhancement (Adults)	4,775
Nutrient Enhancement (Jacks)	74
Broodstock Shipped (Adults)	1,698
Broodstock Shipped (Jacks)	2
Shipped to Swift (Adults)	3,055
Shipped to Swift (Jacks)	16

2016 Brood Lewis River Spring Chinook

The first spring Chinook trapped at the Merwin F.C.F. was March 16th, 2016. The first arrival at the Lewis Ladder was May 27th, 2016. All broodstock was collected at both trapping sites and shipped to Speelyai Hatchery.

Adults Trapped (F.C.F.)	327
Jacks Trapped (F.C.F.)	55
Adults Trapped (Lewis)	99
Jacks Trapped (Lewis)	65
Trap Mortality (Adults)	1
Trap Mortality (Jacks)	2
Broodstock Shipped (Adults)	425
Broodstock Shipped (Jacks)	118

2016 Brood Lewis River (Type S) Early Coho

The first early Coho trapped at Merwin F.C.F. and the Lewis Ladder was on August 15th, 2016. Broodstock was collected at both trapping sites and shipped to Speelyai Hatchery. All fish returned to stream were shipped above Swift Reservoir for reintroduction purposes.

Adults Trapped (F.C.F.)	2,302
Jacks Trapped (F.C.F.)	284
Adults Trapped (Lewis)	11,000
Jacks Trapped (Lewis)	1,670
Trap Mortality (Adults)	147
Trap Mortality (Jacks)	25
Broodstock Shipped (Adults)	1,746
Broodstock Shipped (Jacks)	121
Shipped to Swift (Adults)	2,567
Shipped to Swift (Jacks)	153
Food Banks/Tribes (Adults)	8,743
Food Banks (Jacks)	1,643
Nutrient Enhanced (Adults)	99
Nutrient Enhanced (Jacks)	19

2016 Brood Lewis River (Type N) Late Coho

The first late Coho trapped at the Lewis Ladder was on October 11th, 2016. The first arrival at the Merwin F.C.F. was on October 12th, 2016. All broodstock was held and spawned at Lewis River Hatchery. The majority of the broodstock was captured in the Lewis Ladder. All fish returned to stream were shipped above Swift Reservoir for reintroduction purposes.

Adults Trapped (F.C.F.)	4,955
Jacks Trapped (F.C.F.)	145
Adults Trapped (Lewis)	11,706
Jacks Trapped (Lewis)	760
Broodstock Shipped (Adults)	9
Broodstock Shipped (Jacks)	0
Trap Mortality (Adults)	56
Trap Mortality (Jacks)	15
Spawned (Adults)	1,576
Spawned (Jacks)	62
Food Banks/Tribes (Adults)	2,931
Food Banks/Tribe (Jacks)	451
Nutrient Enhanced (Adults)	8,650
Nutrient Enhanced (Jacks)	325
Shipped to Swift (Adults)	3,209
Shipped to Swift (Jacks)	2

INCIDENTAL TRAPPING

2016 Brood Lewis River Wild Winter Steelhead

All broodstock was collected at the Merwin F.C.F. and then shipped to Merwin Hatchery to be spawned. All live fish were planted into the Lewis River.

Adults Trapped (F.C.F.)	52
Adults Trapped (Lewis)	4
Mortality	0
Returned to Stream	21
Broodstock Shipped	35

2017 Brood Lewis River Wild Summer Steelhead

The first wild summer steelhead was trapped at Merwin F.C.F. on June 29th, 2016. The Lewis Ladder trapped its first and only wild summer steelhead on July 19th, 2016. All live fish were planted into the Lewis River.

Adults Trapped (F.C.F.)	11
Adults Trapped (Lewis)	1
Mortality	0
Returned to Stream	12

2017 Brood Lewis River Wild Winter Steelhead

The first and only 2017 brood wild winter was trapped at the Merwin F.C.F. on December 29th, 2016. All live fish were planted into the Lewis River.

Adults Trapped (F.C.F.)	1
Adults Trapped (Lewis)	0
Mortality	0
Returned to Stream	1

2016 Brood Lewis River Wild Spring Chinook

The first wild spring Chinook was trapped at Merwin F.C.F. on April 7th, 2016. The Lewis Ladder didn't trap any wild spring Chinook. All fish were shipped to Speelyai to be spawned.

Adults Trapped (F.C.F.)	15
Jacks Trapped (F.C.F.)	1
Adults Trapped (Lewis)	9
Jacks Trapped (Lewis)	0
Mortality (Adults)	0
Mortality (Jacks)	0
Broodstock Shipped (Adults)	15
Broodstock Shipped (Jacks)	1
Returned to Stream (Adults)	0
Returned to Stream (Jacks)	0

2016 Brood Lewis River Wild Fall Chinook

The first wild fall Chinook was trapped at Merwin F.C.F. on August 8th, 2016. The first arrival at the Lewis Ladder was September 27st, 2016. All live fish were top caudal marked and returned to stream.

Adults Trapped (F.C.F.)	86
Jacks Trapped (F.C.F.)	5
Adults Trapped (Lewis)	5
Jacks Trapped (Lewis)	3
Mortality	0
Mortality (Jacks)	0
Returned to Stream (Adults)	91
Returned to Stream (Jacks)	8

2016 Brood Fall Chinook (Unknown Hatchery Origin)

These are adipose clipped fall Chinook that have strayed from the hatchery stream they originated at. There is no hatchery fall Chinook production on the Lewis River. The first fall Chinook was trapped at Merwin F.C.F. on August 22st, 2016. The first arrival at the Lewis Ladder was August 15th, 2016.

Adults Trapped (F.C.F.)	156
Jacks Trapped (F.C.F.)	18
Adults Trapped (Lewis)	121
Jacks Trapped (Lewis)	14
Mortality (Adult)	15
Mortality (Jack)	1
Food Banks/Tribes (Adults)	260
Food Banks/Tribes (Jacks)	30
Returned to Stream (Adults)	2
Returned to Stream (Jacks)	1

2016 Brood Lewis River Wild Early Coho

The first wild early Coho was trapped at Merwin F.C.F. was August 15st, 2016. The first arrival at the Lewis Ladder was August 23, 2016. All will early Coho were planted in to the Lewis River at Eagle Cliff above the Swift Reservoir.

Adults Trapped (F.C.F.)	1,106
Jacks Trapped (F.C.F.)	406
Adults Trapped (Lewis)	51
Jacks Trapped (Lewis)	4
Mortality	0
Returned to Stream at Swift (Adults)	94
Returned to Stream at Swift (Jacks)	17

2016 Brood Lewis River Wild Late Coho

The first wild late Coho was trapped at Merwin F.C.F. on October 15th, 2016. The first arrival at the Lewis Ladder was October 12th, 2016. The majority of the wild late Coho captured were used as broodstock and spawned at Lewis River Hatchery as the integration portion of the hatchery's late Coho program. The remainder of these fish were marked and returned to stream.

Adults Trapped (F.C.F.)	130
Jacks Trapped (F.C.F.)	10
Adults Trapped (Lewis)	172
Jacks Trapped (Lewis)	5
Mortality (F.C.F.)	0
Mortality (Lewis)	62
Broodstock Shipped to LRH (Adults)	117
Broodstock Shipped to LRH (Jacks)	0
Returned to Stream at Swift (Adults)	13
Returned to Stream at Swift (Jacks)	10
Returned to Stream (Adults)	16
Returned to Stream (Jacks)	0
Spawned (Adults)	214
Spawned (Jacks)	3

2016 Brood Lewis River Sockeye (Unknown Origin)

The first Sockeye was trapped at Merwin F.C.F. on June 30th, 2016. The first and only arrival at the Lewis Ladder was on July 26th, 2016. All live fish were top caudal marked and returned to the Lewis River

Adults Trapped (F.C.F.)_____	19
Adults Trapped (Lewis)_____	1
Mortality_____	0
Returned to Stream (Adults)_____	20

2016 Lewis River Chum (Unknown Origin)

The Lewis Ladder captured one Chum for the year on September 12th, 2016. The caudal fin was clipped and then returned to stream.

Adults Trapped (F.C.F.)_____	0
Adults Trapped (Lewis)_____	1
Returned to Stream_____	1

ADULT TRAPPING - LEWIS RIVER LADDER 2016

SPECIES	ESTIMATED TRAPPED/RECEIVED		RETURNED TO STREAM			RECYCLED FISH TRAPPED			RECYCLED FISH RETURNED TO STR			SHIPPED / PLANTED			MORTALITIES			CARCASS DISTRIBUTION			LETHAL SPAWNED				LIVE SPAWNED				ESTIMATED ON-HAND		MARKS RECOVERED			ESTIMATED EGGS TAKEN			
	A	J	M	F	J	M	F	J	M	F	J	M	F	J	M	F	J	M	F	J	M	VF	NVF	J	M	VF	NVF	J	A	J	M	F	J				
CO:ND:LEW:15:H	474	10													10	23	8	187	254	2																	
CO:ND:LEW:15:W	0																																				
SH:SU:LEW:16:H	0																																				
SH:W:MEHA:16:H	0																																				
SH:W:LEW:16:H	0																																				
SH:W:LEW:16:W	0																																				
CK:SP:LEW:16:H	99	65										57	42	84			1																				
CK:SP:LEW:16:W	0																																				
SH:SU:MEHA:17:H	166		36	45											1	1		30	53																		
SH:SU:LEW:17:W	1			1																																	
SO:NA:LEW:16:W	1		1																																		
CT:AC:LEW:16:W	0																																				
CO:SO:LEHA:16:H	11,000	1,670	484	441	115							826	874	102	34	70	9	4,902	3,389	1,444														706	703	188	
CO:SO:LEW:16:W	51	4	40	11	4																																
CK:FA:UNKN:16:H	121	14	1	1	1										2	3	1	77	37	12																	
CK:FA:LEW:16:W	5	3	4	1	3																																
CH:NA:LEW:16:W	1		1																																		
CO:ND:LEW:16:H	11,715	760													10	17	6	5,394	4,709	692	741	830	5	62										803	892	87	2,129,581
CO:ND:LEW:16:W	406	10	4	12	0										32	27	3				120	94	0	2													
SH:W:MEHA:17:H	53																	18	35																		
SH:W:LEW:17:W	0																																				
SH:W:LEW:17:H	0																																				
TOTALS	24,093	770	571	512	123	0	0	0	0	0	0	883	916	166	89	141	28	10,608	8,477	2,150	861	924	5	64	0	0	0	0	0	0	0	0					

Egg Take and Incubation

2015 Brood Lewis River Late Coho (Integrated and Segregated)

Egg inventory and distribution was as follows:

Total Egg Take (green)	4,005,399
Egg Loss	329,207
Short/Over	-6,333
Adjusted Egg Take	4,011,399
Total Eyed Eggs	2,135,884
Shipped	2,647,152
Fecundity	2,585

Once the eggs develop a strong eye they were shocked and picked to remove dead eggs. After the morbid eggs are removed, the eyed eggs were re-inventoried and laid down to hatch or ship. Total eggs loss (roughly 13.4%) was 329,207. All 1,035,040 of the eyed eggs for the Lewis River program were integrated and kept on station.

A total of 2,647,152, both green and eyed, segregated eggs were shipped out. Washougal Hatchery received 1,546,308 green eggs in December of 2015. The remaining egg shipments were shipped as eyed eggs during January and February. The eggs were distributed as followed: Klickitat Hatchery 613,951; Clark PUD 60,000; Columbia Springs 14,500; The Steve Syverson Project 5,000; Fish First 407,393.

2016 Brood Lewis River Early Coho

No fish were spawned at Lewis River Hatchery for this stock. All adult fish were shipped to Speelyai Hatchery. Eggs were taken, incubated to the eyed stage at Speelyai and 1,545,308 eyed eggs were transferred back to the Lewis River Hatchery in November 2016.

2016 Brood Lewis River Late Coho (Integrated & Segregated)

Egg inventory and distribution was as follows:

Total Egg Take (green)	3,217,383
Egg Loss	0
Destroyed	0
Shipped	1,549,900
Fecundity	3,486

Spawning of the late Coho took place over a five week period with the first egg take occurring on November 21st and the last on December 20nd. Over 3.2 million green eggs were taken in 2016. Of these green eggs 1,549,900 (segregated) were shipped to Washougal Hatchery December 5th, the remaining were laid down for incubation at Lewis River Hatchery. At the time of this report the Lewis River Hatchery has 1.67 million green eggs on hand and of those eggs approximately one million are integrated and are for the Lewis River late Coho production. The remaining 600K, once eyed, will be distributed and shipped out to Fish First, Clark PUD, Ridgefield High School, Columbia Springs, and the Steve Syverson project.

REARING PROGRAM

2014 Brood Lewis River Spring Chinook

Lewis River Hatchery received 2014 brood spring Chinook from Speelyai Hatchery in May 2015. The 2014 spring Chinook were adipose clipped (AD) and snout tagged (CWT) prior to the transfer. Approximately 150K were AD+CWT, 150K CWT only (double index group), and the rest AD only. The 2014 Lewis River Spring Chinook were split into two release groups an October and February which were differentially tagged.

In 2015 region wide drought created poor fish rearing conditions and the spring Chinook suffered as a result. The low flows and warmer than average river temperatures brought with it higher than normally fish pathogens. With an increase in pathogens came an increase in sick fish, formalin treatments, and medicated feed. By late summer and after hundreds of gallons of formalin and thousands of pounds of medicated feed with little improvement the hatchery pathologist requested an emergency early release. The early release reduced loading which in turn reduced some of the stress on the fish making the remaining fish less susceptible to disease. The early release occurred August 3rd 2015, liberating 466,890 spring Chinook at 20.7 fish per pound (fpp).

On October 1st 661,020 spring Chinook at 11.5 fpp were released as originally scheduled. The fish released in October were healthy, going into a good smolt, and ready to migrate.

After the October release 144,703 spring Chinook remained for release in February 2016. As in previous years the remaining fish continued to go in and out of multiple smolts and with no access to the river for migration the stress becomes too much for many and the mortality rate increased. More than 8,000 fish per month were lost in both December and January. On February 1st, 2016 a total of 116,775 spring Chinook at 8.1 fpp were released.

Again the February release group had a higher percent rearing mortality (23.12%) than that of the October/August group (4.03%)

Final Stock Inventory

Fish Received	1,327,120
Pounds Received	14,890
Rearing Mortality (6.2%)	-82,435
Planted	1,244,685
Pounds Planted	94,342
Feed Fed (lbs.)	61,620
Net Gain (lbs.)	79,452
Conversion	0.78:1
CV	6.1

2015 Brood Lewis River Spring Chinook

The prior two spring Chinook broods (2013 and 2014) were split into two release groups. One group an early release, October, and the other released later in February. Both groups were released at Lewis River Hatchery. The earlier release groups did well with rearing loss ranging from 0.65% to 4.03% whereas the later release groups did poor with rearing loss ranging from 19.42% to 23.12%. Due to the high rearing loss on the February release group from Lewis River Hatchery it was decided to keep that group at Speelyai for the entire rearing period then truck the fish down to the lower Lewis River for release in February.

On May 23rd, 2016 the Lewis River Hatchery received 614,920 spring Chinook from Speelyai Hatchery. The 2015 brood year spring Chinook were adipose clipped (AD) and snout tagged (CWT) prior to the transfer. Approximately 75K were AD+CWT, 75K CWT only (double index group), and the rest AD only.

Rearing of the 2015 spring Chinook did not go as well as it had in the previous two seasons. The 2015 brood had battled bacterial kidney disease from the day Lewis River Hatchery received the fish. The fish were feed medicated feed (TM-200) for 10 days at a time which would help reduce the mortality rate for a while but then it would slowly creep back up. Once the daily mortality rate consistently reached 0.25% another 10 day feeding of TM would occur.

Starting October 1st, 2016 all of the 2015 spring Chinook at Lewis River Hatchery were volitionally released. By the end of October a total of 506,547 spring Chinook at 12fpp were released into the Lewis River.

Final Stock Inventory

Fish Received	614,920
Pounds Received	8,173
Rearing Mortality (17.6%)	108,373
Planted	506,547
Pounds Planted	42,224
Feed Fed (lbs.)	28,023
Net Gain (lbs.)	34,051
Conversion	0.82:1
CV	6.0

2015 Brood Cowlitz River Spring Chinook

On June 2nd, 2016 the Lewis River Hatchery received 230,000 Cowlitz spring Chinook from Grays River Hatchery. These fish were transferred because of poor rearing conditions at Grays River Hatchery and due to shortages in the fish programs at Lewis River Hatchery extra space was available.

These spring Chinook were originally scheduled to be hauled to net pens in the Columbia River at Cathlamet in the middle of October. The October transfer of fish never happened since the ownership of the docks for the net pens was at question between the City of Cathlamet and the Washington Department of Natural Resources. By the time the issue over the docks was resolved it was late November. Inclement weather and the lack of available staff prevented the transfer of fish and as of the end of December 2016 the 2015 Cowlitz River Spring Chinook were still on station at Lewis River Hatchery.

This group of fish got off to a rough start. The last truck load of fish ran out of oxygen and approximately 29,000 of the 230,000 were dead when received. This stock of springers like the Lewis River stock also developed an infection of bacterial kidney disease. As a result the rearing loss was very high.

Stock Inventory This Period

Fish Received	230,000
Pounds Received	2,851
Rearing Mortality (43.1%)	-99,717
Fish on Hand	130,283
Pounds on Hand	10,418
Feed Fed (lbs.)	8,624
Net Gain (lbs.)	7,561
Conversion	1.14:1

2014 Brood Lewis River Early Coho

Lewis River Hatchery volitionally released 1,242,461 early Coho averaging 15.4 fpp between April 1st and 10th, 2016. Approximately 75K was identified with an AD+CWT, 75K was CWT only (double index group) and the rest with an AD clip only. At time of release the fish appeared healthy and ready to migrate.

Final Stock Inventory

Beginning Balance	1,318,846
Pounds Pondered	1,027
Rearing Mortality (6.7%)	-88,701
Adjustment	12,316
Fish Planted	1,242,461
Pounds Planted	80,813
Feed Fed (lbs.)	69,386
Net Gain (lbs.)	79,786
Conversion	0.86:1
CV	8.01

2014 Brood Lewis River Late Coho

Lewis River Hatchery volitionally released 935,240 late Coho averaging 15.2 fpp between April 1st and 10th, 2016. Approximately 75K was identified with an AD+CWT, 75K was CWT only (double index group) and the rest with an AD clip only. At time of release the fish appeared healthy and ready to migrate.

Final Stock Inventory

Beginning Balance	1,010,348
Pounds Pondered	718
Rearing Mortality (4.7%)	-46,553
Adjustment	-28,555
Fish Planted	935,240
Pounds Planted	61,557
Feed Fed (lbs.)	55,113
Net Gain (lbs.)	60,839
Conversion	0.91:1
CV	8.19

2015 Brood Lewis River Early Coho

The last take of early Coho was moved from inside the incubation room outside to a small raceway on January 19th, 2016.

The quality of the 2015 early Coho adults, eggs, and fry was poor. The returning adults that made it to spawn were smaller than normal, had low fecundity, and appeared very malnourished. The poor health of the adults showed later on in higher than normal egg and fry loss. To make matters worse historical rains and landslides occurred in December of 2015 making the Lewis River very turbid, hampering the visibility clear into March of 2016.

The three months of muddy water was tough on the early Coho and contributed to higher than normal rates of gill fungus. In addition to the gill fungus these fish also fought bacterial cold water disease as well. Getting accurate mortality numbers and vacuuming the raceways without sucking up some fry was nearly impossible until the river cleared up in early April. With the poor health of the 2015 brood and the turbid river water there ended up being higher than normal loss and an ever higher shortage.

The early Coho shortage was discovered after the fish were clipped in June. Approximately 75K was identified with an AD+CWT, 75K was CWT only (double index) and the rest AD clip only. After marking these Coho were moved to raceways 14-1, 2, and 3. The 2015 early Coho are scheduled for release starting April 2017.

Stock Inventory This Period

Beginning Balance	1,128,814
Pounds Pondered	764
Rearing Mortality (15.7%)	-131,174
Adjustment	-294,156
Fish on Hand	703,484
Pounds on Hand	32,940
Feed Fed (lbs.)	30,956
Net Gain (lbs.)	32,176
Conversion	0.96:1

2015 Brood Lewis River Late Coho

Between March 4th and April 8th, 2016 1,035,040 fry were moved from the incubation room to raceways 8 thru 12. The 2015 late Coho did much better than the 2015 early Coho. The river water had cleared up considerable by the time the fry came out of incubation, the fry were healthy, and loss was minimal.

Marking of these fish took place in June 2016. Approximately 75K was identified with an AD+CWT, 75K was CWT only (double index) and the rest AD clip only. After being clipped and tagged the late Coho were moved to the larger raceway 16-1, 2, 3, 4, and 5. The 2015 late Coho are scheduled for release starting April 2017.

Stock Inventory This Period

Beginning Balance	1,035,040
Pounds Poned	764
Rearing Mortality (5.0%)	-50,925
Rearing Adjustment	-17,142
Fish on Hand	966,973
Pounds on Hand	46,089
Feed Fed (lbs.)	39,185
Net Gain (lbs.)	45,325
Conversion	0.87:1

2016 Brood Lewis River Early Coho

The first take of early Coho, 485,083 were moved from the incubation room to a raceways two and three on December 23th, 2016. The rest of the takes will be ponded in January of 2017.

Stock Inventory This Period

Beginning Balance	485,083
Pounds Poned	334
Rearing Mortality (2.2%)	-10,872

2015 Brood Kalama River Winter Steelhead

In October 2015 Lewis River Hatchery received 54,000 winter steelhead from Kalama Falls Hatchery. The winter steelhead were held at Lewis River Hatchery for about three months while Kalama Falls Hatchery underwent some construction. The winter steelhead were shipped back to Kalama Falls Hatchery in January 2016.

Final Stock Inventory

Beginning Balance	54,000
Pounds Pondered	2,571
Rearing Mortality (8.7%)	-4,710
Fish Shipped	49,290
Pounds Shipped	4,929
Feed Fed (lbs.)	2,611
Net Gain (lbs.)	2,358
Conversion	1.10:1

RAINFALL REPORT

Hatchery: Lewis River

Year: 2016

Water Source: Lewis River

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
1	0	0.2	0.6	0	0	0.4	0	0	0.2	1.1	0.5	0.3	
2	0	0.1	0.4	0.3	0	0	0	0	0.1	0	0.1	0.7	
3	0.2	0.8	0.3	0.25	0	0	0	0	0	0.2	0.2	0.9	
4	0.2	0.6	0.4	0	0	0	0	0	0	0.6	0	0.3	
5	0.1	0.3	0.3	0	0	0	0	0	0	1	0.1	0.5	
6	0	0	0.5	0	0	0	0	0	0.9	1.1	1.5	0	
7	0	0	0.3	0	0	0	0.4	0.1	0	0.2	0.1	0	
8	0	0	0.4	0	0	0	0.7	0	0	0.6	0	0.1	
9	0	0	1.3	0	0	0.5	0.1	0.2	0	1.25	0.1	0.8	
10	0	0	0.2	0	0	0.65	0	0	0	0	0	0.9	
11	0.15	0.4	0.5	0	0	0	0	0	0	0	0	0.7	
12	1.75	0.4	0.7	0.4	0	0	0	0	0	0.5	0.2	0.2	
13	0.55	1.7	0.7	0.6	0	0.3	0	0	0	2.75	0.2	0	
14	0.2	1.1	0.5	0.5	0.8	1	0	0	0	1.1	0.9	0	
15	0.45	0.6	0.3	0	2	0.1	0	0	0	0.8	0.8	0	
16	0.8	0.2	0	0	0	0.1	0	0	0	1.2	1.1	0	
17	0.7	1	0	0	0	0	0	0	1	0.5	0.1	0	
18	0.3	0.8	0	0	0.2	0.05	0	0	0	0.1	0	0.4	
19	1.3	0.8	0	0	0.2	0	0	0	0	0.6	0	2.3	
20	0.5	0.3	0.5	0.1	0.45	0	0	0	0	0.4	0.4	0.2	
21	0.8	0.25	0.5	0.5	0.3	0	0	0	0	0.2	0.9	0	
22	0.3	0	0.2	0.2	0.2	0.05	0	0	0	0.1	0.1	0.3	
23	0.4	0	0.5	0.3	0	0.6	0	0	0	0	1.4	0.1	
24	0.05	0	0.4	0.2	0	0.2	0	0	0	0.3	0.7	0.2	
25	0	0	0	0	0.1	0.2	0	0	0	0.5	2.3	0	
26	0.1	0.8	0.4	0	0.2	0	0	0	0	0.8	0.2	0.9	
27	0.75	0.2	0.5	0	0	0	0	0	0	0.2	0.5	0.7	
28	0.45	0.2	0	0	0	0	0	0	0	0.2	0.8	0.1	
29	0.65	0.6	0	T	0	0	0	0	0	0.1	0.4	0.1	
30	0.4		0	0	0	0	0	0	0	0	0.3	0	
31	0.2		0		0		0	0.2		0.6		0.5	
TOTAL	11.30	11.35	10.40	3.35	4.45	4.15	1.20	0.50	2.20	17.00	13.90	11.20	Year Total 91.0

YEARLY TEMPERATURE REPORT

HATCHERY: LEWIS RIVER

YEAR: 2016

WATER SOURCE: N.F. LEWIS RIVER

DAY	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
1	44	43	43	43	44	43	45	44	49	45	53	49	57	53	60	56	59	58	60	59	56	56	51	50
2	44	43	43	43	44	44	45	44	49	46	52	49	57	54	59	56	60	58	61	60	56	56	50	50
3	44	43	43	43	44	44	45	44	48	46	53	50	57	54	61	56	60	58	60	60	56	55	50	50
4	44	43	43	43	44	44	45	44	47	46	54	50	55	54	61	56	60	58	61	60	55	55	50	49
5	44	43	43	43	44	44	46	44	49	46	51	50	56	54	61	56	60	58	61	60	55	55	49	49
6	44	43	43	43	44	44	45	44	50	46	55	50	58	54	60	56	60	58	61	60	55	55	49	48
7	43	43	43	43	44	44	45	44	50	46	55	50	56	54	59	56	60	58	61	60	55	54	49	48
8	43	42	43	43	44	44	45	44	50	46	53	51	56	55	59	56	61	58	61	60	55	54	49	48
9	43	43	43	43	44	44	45	44	50	46	52	51	56	55	58	57	61	58	61	60	55	54	49	48
10	43	43	44	43	44	44	45	44	51	46	53	51	56	54	60	56	61	58	61	60	55	54	49	48
11	43	43	44	43	44	44	46	44	51	46	53	51	59	54	61	56	61	58	61	60	55	54	48	48
12	43	43	44	43	44	44	45	44	52	47	54	51	57	54	61	57	61	58	62	60	55	54	48	47
13	43	43	44	43	44	44	45	44	48	47	52	48	56	56	61	57	61	58	62	61	54	54	47	47
14	43	43	44	43	44	44	45	44	48	47	53	51	57	54	61	57	61	58	61	60	54	54	47	47
15	43	43	44	43	44	44	46	44	49	48	53	48	56	55	61	57	61	58	61	60	55	54	47	47
16	43	43	44	44	44	44	47	44	52	48	54	52	58	55	61	57	61	58	61	60	54	53	47	46
17	43	43	44	44	44	44	48	44	49	46	53	52	59	55	61	57	60	59	60	59	54	53	47	46
18	43	43	44	44	45	44	49	44	49	48	53	52	56	55	61	57	61	58	59	59	54	53	46	45
19	43	43	44	43	45	44	48	44	52	48	56	53	57	55	61	57	60	59	59	58	54	54	45	45
20	43	43	44	44	44	45	48	45	50	48	56	53	59	55	61	57	60	58	58	58	54	53	45	44
21	43	43	44	44	44	44	48	45	51	49	56	52	60	55	61	57	61	58	58	58	54	53	45	44
22	43	43	44	44	45	44	46	45	50	49	56	53	57	55	60	57	60	58	58	58	53	52	44	44
23	43	43	44	44	44	44	46	45	50	49	56	54	59	55	61	57	60	59	58	57	52	52	44	44
24	43	43	44	44	44	44	46	44	51	48	56	53	60	55	61	57	61	59	58	57	52	52	44	44
25	43	43	44	44	45	44	47	45	51	49	57	53	60	55	61	57	62	59	58	57	52	52	44	44
26	43	43	44	44	45	44	47	45	51	48	57	53	60	55	61	57	62	59	57	57	52	52	44	44
27	43	43	44	43	44	44	47	45	51	49	57	53	60	55	61	57	61	59	57	56	52	51	44	44
28	43	43	44	43	45	44	46	45	51	49	57	53	61	55	61	57	61	59	57	56	52	51	44	44
29	43	43	44	43	45	44	47	45	52	49	57	53	61	56	61	57	61	59	57	56	51	51	44	44
30	43	43			45	44	49	46	53	49	57	53	60	56	60	58	61	59	57	56	51	50	44	44
31	43	43			45	44			53	49			60	56	59	58			56	56			44	43
AVG.	43.19	42.97	43.69	43.3	44.29	44	46.2	44.37	50.23	47.4	54.47	51.4	57.94	54.74	60.48	56.74	60.63	58.33	59.45	58.65	53.9	53.3	46.68	46.2
MIN	43	42	43	43	44	43	45	44	47	45	51	48	55	53	58	56	59	58	56	56	51	50	44	43
MAX	44	43	44	44	45	45	49	46	53	49	57	54	61	56	61	58	62	59	62	61	56	56	51	50

0

Washington DEPARTMENT OF FISH AND WILDLIFE NPDES Chemical Operational Log. Records of Disease Control Chemicals Used

YEAR 2016

Keep records on station for at least five years

Facility: Lewis River Hatchery

NPDES Permit Number: WAG 13-1040

Brood Stock Species	Pond/ Raceway	Date of Application	Chemical Name	Dosage	Duration	Method Application	Amount used	Reason for use	Flow	Water Temp	Estimated Concentration Discharge	Method Disposal	location any disposed spent chemical dip	Name
CO:SO:LEWI:15:H	3 & 4	5-Jan	Formalin	1:10000	1 HR	DRIP	1.2	Gill Fungus	108	43.5				DMG
CO:SO:LEWI:15:H	3 & 4	6-Jan	Formalin	1:10000	1 HR	DRIP	1.2	Gill Fungus	108	43.5				DMG
CO:SO:LEWI:15:H	3 & 4	7-Jan	Formalin	1:10000	1 HR	DRIP	1.2	Gill Fungus	108	43.5				AES
CO:SO:LEWI:15:H	3 & 4	17-Jan	Formalin	1:6000	1 HR	DRIP	3	Gill Fungus	150	43				AES
CO:SO:LEWI:15:H	6 & 7	2-Feb	Formalin	1:10000	1 HR	DRIP	1.3	Gill Fungus	108	43				DMG
CO:SO:LEWI:15:H	5	2-Feb	Formalin	1:10000	1 HR	DRIP	0.65	Gill Fungus	108	43				AES
CO:SO:LEWI:15:H	3 & 4	25-Jan	Aquafor	10Mg/Kg	14 Days	DRIP	176 LBS	Gill Fungus	200	43				MLC
CO:SO:LEWI:15:H	5 to 7	11-Feb	Formalin	1:6000	1 HR	FEED	4.56	Cold Water	150	43				DMG
CO:SO:LEWI:15:H	3 & 4	17-Feb	Formalin	1:6000	1 HR	DRIP	5	Gill Fungus	250	43				AES
CO:SO:LEWI:15:H	3 to 7	18-Feb	Formalin	1:6000	1 HR	DRIP	9.5	Gill Fungus	250/150	43				AES
CO:SO:LEWI:15:H	3 & 4	2/24/2016	Formalin	1:6000	1 HR	DRIP	5	Gill Fungus	250	44				AES
CO:SO:LEWI:15:H	3 to 7	2/25/2016	Formalin	1:6000	1 HR	DRIP	9.5	Gill Fungus	250/150	44				AES
CO:SO:LEWI:15:H	3 & 4	2-Mar	Formalin	1:6000	1 HR	DRIP	5	Gill Fungus	250	44				DMG
CO:SO:LEWI:15:H	5 to 7	3/3/2016	Formalin	1:6000	1 HR	DRIP	6	Gill Fungus	200	44				DMG
CO:SO:LEWI:15:H	3 & 4	3/4/2016	Formalin	1:6000	1 HR	DRIP	5	Gill Fungus	250	44				DMG
CO:SO:LEWI:15:H	3 & 4	3/9/2016	Formalin	1:6000	1 HR	DRIP	5	Gill Fungus	250	44				AES
CO:SO:LEWI:15:H	5 to 7	3/10/2016	Formalin	1:6000	1 HR	DRIP	6	Gill Fungus	200	44				AES
CO:NO:LEWI:15:H	8	3/15/2016	Formalin	1:6000	1 HR	DRIP	1.5	Gill Fungus	150	44				AES
CO:SO:LEWI:15:H	3 to 7	3/30/2016	Formalin	1:6000	1 HR	DRIP	12.5	Gill Fungus	250	45				AES
CO:NO:LEWI:15:H	8 & 9	3/30/2016	Formalin	1:6000	1 HR	DRIP	3	Gill Fungus	150	45				AES
CO:SO:LEWI:15:H	3 to 7	4/21/2016	Formalin	1:6000	1 HR	DRIP	12.5	Gill Fungus	250	46				AES

Notes:

Washington DEPARTMENT OF FISH AND WILDLIFE NPDES Chemical Operational Log. Records of Disease Control Chemicals Used

Keep records on station for at least five years

YEAR 2016

Facility: Lewis River Hatchery

NPDES Permit Number: WAG 13-1040

Brood Stock Species	Pond/Raceway	Date of Application	Chemical Name	Dosage	Duration	Method Application	Amount used	Reason for use	Flow	Water Temp	Estimated Concentration Discharge	Method Disposal	location any disposed spent chemical dip	Name
CO:SO:LEWI:15:H	3 to 7	11-May	Formalin	1:6000	1 HR	DRIP	12.5	Gill Fungus	250	48				AES
CO:NO:LEWI:15:H	8 to 12	11-May	Formalin	1:6000	1 HR	DRIP	12.5	Gill Fungus	250	48				AES
CO:SO:LEWI:15:H	3 & 4	12-May	Formalin	1:6000	1 HR	DRIP	5	Gill Fungus	250	48				AES
CO:NO:LEWI:15:H	11 & 12	21-May	Formalin	1:6000	1 HR	DRIP	5	Bugs	250	50				AES
CO:NO:LEWI:15:H	11 & 12	23-May	Formalin	1:6000	1 HR	DRIP	5	Bugs	250	50				DMG
CK:SP:LEWI:15:H	13-1	8-Jun	Formalin	1:6000	1 HR	DRIP	32	Bugs	1800	51				DF
CK:SP:LEWI:15:H	13-2	9-Jun	Formalin	1:6000	1 HR	DRIP	32	Bugs	1800	51				DF
CK:SP:LEWI:15:H	13-3	9-Jun	Formalin	1:6000	1 HR	DRIP	32	Bugs	1800	51				SC
CO:SO:LEWI:15:H	16 1-3	8-Nov	Formalin	1:6000	1 HR	DRIP	60	Prophylactic	2000	54				DMG
CO:SO:LEWI:15:H	16 1-3	9-Nov	Formalin	1:6000	1 HR	DRIP	60	Prophylactic	2000	54				DMG

Notes:

MAINTENANCE AND CAPITAL PROJECTS – 2016

MAINTENANCE

1. Cleaned out incubation tower with potassium permanganate.
2. Rebuilt and repaired portable fire suppression pump.
3. Replaced pressure regulator and hand dentent switch on adult sorting facility.
4. Fixed cracks in raceways 13 and 14 with Sikaflex.
5. Serviced all vehicles.
6. Serviced all air compressors.
7. Replaced heater in visitor center.
8. Serviced and repaired HVAC systems at all residences
9. Pruned all fruit trees.
10. Serviced gators and all lawn equipment.
11. Installed new belts on compressor for DSI blowoff.
12. Replaced bathroom sink in residence #3
13. Removed maple trees in common area.

CAPITAL

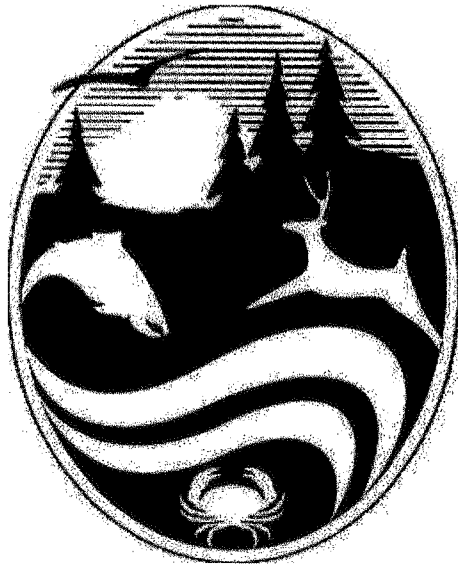
1. Replaced control switch on R2D2 pump
2. Replaced remaining 10% of high pressure line.
3. Installed air relief valve on pump # 1 at DSI.
4. Repaired screen on pesculator lift gate.
5. The motor control at USI was accessed for replacement.

OPERATIONS PROGRAM

MERWIN HATCHERY

FOR

January 1, 2016 TO DECEMBER 31, 2016



Washington
Department of
FISH and
WILDLIFE

WRITTEN AND COMPILED BY:

MERWIN HATCHERY STAFF

Introduction

The Merwin Hatchery is a PacifiCorp owned and funded facility that is operated by the State of Washington's Department of Fish and Wildlife. The facility has been in operation since October of 1993.

Merwin Hatchery is located 11 miles east of Woodland off state route 503 adjacent to the PacifiCorp Merwin Dam and Lake Merwin.

Mitigation goals for fish production are;

- * 50,000 Rainbow Trout at 2.5 fpp stocked into Swift Reservoir.
- * 175,000 summer Steelhead at 4.8 fpp stocked into N.F. Lewis River.
- * 100,000 winter Steelhead at 4.8 fpp stocked into N.F. Lewis River.
- * 50,000 wild winter Steelhead at 6 fpp stocked into N.F. Lewis River.

Approximately 5,000 gallons of water per minute can be delivered to the hatchery by three-intake pumps located midway on Merwin Dam, which draft water from Lake Merwin. Two screened intakes located at depths of approximately fifteen feet and ninety feet below the surface of the reservoir enable some temperature manipulation for fish rearing.

Ozone water sterilization is part of the design criteria to meet fish health needs not only at the hatchery but also for fish stocks and the Lewis River Hatchery downstream of our effluent discharge area. Two ozone generators fed by compressed air (or liquid oxygen in the event of compressor failure), supply ozone gas to a water/ozone contact chamber. A maximum flow of 3,800 gallons per minute can be sterilized and supplied to the hatchery building, raceways and rearing ponds. The facility has the capability to ozone treat all effluent water from the adult holding area and incubation room in the event of a viral outbreak.

There is approximately 216,470 cubic feet of rearing space. These areas consist of four one-quarter acre rearing ponds, ten 9.5 x 80 x 2.5 fingerling raceways, four 7.5 x 33 x 4 adult holding ponds, six 4.5 x 34 x 2 intermediate raceways, one 3x14x2 deep trough, four 16 c.f. fry troughs and 15 double stack Mari Source incubators.

The hatchery complex has an operations building housing the office, feed room, shop, lab, day room, locker room, shower room, mud room, crew rest room and public restrooms. Other buildings associated with this facility are; the hatchery building with attached covered adult holding ponds, water treatment facility including the ozone generator building/ contactor structure, one three bay storage building, chemical storage building and three residences.

Trapping

During this reporting period, trapping was conducted at the Merwin Dam Fish Collection Facility, Lewis River Hatchery, Cedar Creek Trap and the lower river, depending on the species.

2017 Brood Lewis River Summer Steelhead

A total of 375 adults were received for spawning purposes. All of these fish were trapped at the Merwin Dam Fish Collection Facility. Disposition is as follows:

Adults Spawnd	201
Non-Viable females	0
Mortality (7.96%)	16
Nutrient Enhancement	0

2017 Brood Lewis River Winter Steelhead

A total of 118 adults were received for spawning purposes. These fish were trapped at the Merwin Dam Fish Collection Facility. Disposition is as follows:

Adults Spawnd	33
Non Viable females	0
Mortality (0.0%)	0
Nutrient Enhancement	0

2016 Brood Lewis River Wild Winter Steelhead

A total of 58 adults were received for spawning purposes. These fish were collected at various sites, to include: the Merwin Dam Fish Collection Facility, and tangle net fishing in the lower river. Disposition is as follows:

Adults Spawnd	35
Non Viable Females	0
Mortality (10.34%)	6
Nutrient Enhancement	0
Culled (hatchery genetics)	1
Return to river	51

2016 Brood Lewis River Late Winter Steelhead Hatchery Origin

This stock is a result of live spawning wild broodstock winter steelhead at Merwin Hatchery collected from the Merwin F.C.F., tangle netting in the lower river, and the Lewis River Ladder. These fish are reared at Merwin Hatchery and blank wire tagged as juveniles. Then, are transported upstream by PacifiCorp staff as part of a supplementation project when they return as adults. A portion of the returning adults were planted downstream for a survey of trap efficiency, these fish were then hauled upstream once recaptured.

Below is a list of fish trapped in the 2016 season. The first arrival at Merwin F.C.F. was on December 19th, 2015. All upstream fish were planted at Eagle Cliff release site at the upper end of Swift Reservoir. Downstream plants were at Island Boat Ramp. Twelve fish of this stock were trapped throughout the season with a clipped adipose fin and a blank wire tag. They were shipped to Merwin Hatchery and surplussed in efforts to identify snout tag and not needed for upstream supplementation.

Adults Trapped (F.C.F.) _____	834
Mortality _____	0
Planted upstream _____	690
Planted downstream _____	131
Recaptured & planted upstream _____	94
Shipped to Merwin Hatchery (surplussed) _____	12

MERWIN HATCHERY ADULT COLLECTION

SPECIES	ESTIMATED		RETURNED			RECYCLED FISH			RECYCLED FISH			SHIPPED /			MORTALITIES			CARCASS			LETHAL				LIVE				ESTIMATED		MARKS RECOVERED			ESTIMATED							
	TRAPPED/RECEIVED		TO STREAM			TRAPPED			RETURNED TO STR.			PLANTED			DISTRIBUTION			DISTRIBUTION			SPAWNED				SPAWNED				ON-HAND		EGGS			EGGS							
	A	J	M	F	J	M	F	J	M	F	J	M	F	J	M	F	J	M	F	J	M	VF	NVF	J	M	VF	NVF	J	A	J	M	F	J	TAKEN							
SH:SU:MEHA:17:H	375	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	11	0	91	67	0	101	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	410,000
SH:WL:MEHA:17:H	118	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	28	0	33	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	145,200		
SH:WL:MEHA:16:H	58	0	30	21	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	1	0	0	0	0	0	0	0	19	16	0	0	0	0	0	0	0	75,436			

ADULT TRAPPING - MERWIN DAM FISH COLLECTION FACILITY 2016

SPECIES	ESTIMATED TRAPPEE/RECEIVED		RETURNED TO STREAM			RECYCLED FISH TRAPPED			RECYCLED FISH RETURNED TO STN.			SHIPPED / PLANTED			MORTALITIES			CARCASS DISTRIBUTION			LETHAL SPAWNED				LIVE SPAWNED				ESTIMATED ON-HAND			MARKS RECOVERED			ESTIMATED EGGS TAKEN			
	A	J	M	F	J	M	F	J	M	F	J	M	F	J	M	F	J	M	VF	NVF	J	M	VF	NVF	J	A	J	M	F	J								
CONCLEWI15H	43	1																19	24	1																		
CONCLEWI15W	0	0																																				
SHSULEWI16H	0																																					
SHWMEHA16H	1			1																																		
SHWLEWI16H	829		397	420					3	9																												
SHWLEWI16W	49		10	4					16	19																												
CKSPLEWI16H	328	55							158	169	84	1		1																								
CKSPLEWI16W	15	1							7	8	1																											
SHSUMEHA17H	6,718		428	893					119	176				15	56		2,004	2,947																				
SHSULEWI17W	11		7	4																																		
SONAWEWI16W	19		12	7																																		
CTACLEWI16W	0																																					
COSOLEHA16H	2,302	284	845	797	38				27	19	12	17	26	16		299	272	218															167	115	22			
COSOLEWI16W	1,106	406	512	594	406																																	
CKFAUNKH16H	156	18												5	5	0	62	84	18																			
CKFALEWI16W	86	5	40	46	5																																	
CHNALEWI16W	0																																					
CONCLEWI16H	4,953	145	1,634	1,573	2				9				5	24	9	269	272	218	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	242	203	20	0	
CONCLEWI16W	130	10	5	8	10				63	54																												
SHWMEHA17H	593		33	57					40	43			1	4		188	227																					
SHWLEWI17W	1																																					
SHWLEWI17W	23		5	18																																		
TOTALS	17,383	155	3,928	4,422	461	0	0	0	0	0	0	0	442	497	67	44	115	26	2,871	3,826	455	0	0	0	0	0	0	0	0	0	0	0	0	0	409	318	42	0

Egg Take and Incubation

2016 Brood Goldendale Rainbow

Merwin Hatchery received 75,000 eyed eggs from Goldendale Hatchery on December 5, 2016.

2017 Brood Lewis River Summer Steelhead

The first eggs were taken on November 22, 2016. Due to higher than average fecundity and lower than expected egg loss 108,887 eggs were culled, leaving the eyed egg number on hand at 304,508. Disposition of this stock to date is as follows:

Total Egg Take	413,395
Egg Loss (13.1%)	62,487
Eggs Destroyed	108,887
Shipped	0
Fecundity	4,759

2017 Brood Lewis River Winter Steelhead

The first eggs were taken on December 28, 2016. All of these eggs are incubating and none of the egg takes have been shocked or picked. Disposition of this stock to date is as follows:

Total Egg Take	145,200
Egg Loss	0
Eggs Destroyed	0
Fecundity	4,400

2016 Brood Lewis River Wild Winter Steelhead

These fish were spawned from April 8th - May 27th, 2016. Disposition is as follows:

Total Egg Take	72,649
Egg Loss (6.7%)	4,832
Eggs Destroyed	0
Fecundity	4,273

REARING PROGRAM

2015 Brood Lewis River Summer Steelhead

The rearing of this brood went very well year and all program goals were achieved. During this rearing cycle these fish were diagnosed with ichthyophthirius, lactobacillus, and furunculosis. They were therapeutically treated accordingly with higher than average mortality rates. Hatchery staff began releasing these fish in April 2016. All of these fish were trucked and planted at river mile 5 on the North Fork of the Lewis River.

Final Stock Inventory

Fish Pondered _____	269,308
Pounds Pondered _____	108
Fish Planted _____	175,504
Pounds @ release (5.5 fpp) _____	31,910
Rearing Mortality (14.3%) _____	38,725
Destroyed _____	0
Transferred _____	0
Shortage _____	0
Feed Fed (lbs) _____	41,582
Net Gain (lbs) _____	31,802
Conversion _____	1.31:1
CV @ Release _____	8.1

2015 Brood Lewis River Summer Steelhead @ Echo Net Pens

50,343 adipose only clipped summer steelhead were shipped from Merwin Hatchery to Echo Net Pen site on March 8th, 2016. These fish were released on April 15th, 2016.

Final Stock Inventory

Fish Received _____	50,343
Pounds Received _____	9,323
Fish Planted _____	50,343
Pounds @ Release (4.8 fpp) _____	10,488
Rearing Mortality (0.0%) _____	0
Feed Fed (lbs.) _____	1,188
Net Gain (lbs.) _____	1,165
Conversion _____	1.02:1
CV @ Release _____	9.4

2015 Brood Lewis River Winter Steelhead

All programs goals were achieved. During this rearing cycle these fish were diagnosed with ichthyophthirius, lactobacillus, and furunculosis. They were therapeutically treated accordingly. 9,972 fish in December 2015 and 4,792 fish in February 2016 totaling 14,764 were transferred to Beaver Creek Hatchery. Hatchery staff began releasing the remaining fish on hand in April 2016. All fish on site were trucked and planted at river mile 5 on the North Fork of the Lewis River.

Final Stock Inventory

Fish Pondered _____	118,133
Pounds Pondered _____	48
Fish Planted _____	100,000
Pounds @ release (5.5 fpp) _____	18,182
Rearing Mortality (4.3%) _____	5,043
Destroyed _____	0
Transferred _____	14,764
Shortage _____	0
Feed Fed (lbs) _____	19,436
Net Gain (lbs) _____	18,134
Conversion _____	1.07:1
CV @ Release _____	6.3

2015 Brood Lewis River Wild Winter Steelhead

All program goals were achieved. After genetic assessment, one female spawned this quarter did not meet the genetic criteria for program. As a result 4,400 unfed fry were planted at the Merwin Boat launch on the North Fork of the Lewis in June 2015. During this rearing cycle these fish were diagnosed with ichthyophthirius, bacterial cold water disease, and furunculosis. They were therapeutically treated accordingly. Hatchery staff released these fish in May 2016. All of these fish that were volitional release were planted at the Merwin Boat Launch on the North Fork of the Lewis River. The remaining forced out fish were planted at river mile 5 on the North Fork of the Lewis River.

Final Stock Inventory

Fish Pondered _____	84,337
Pounds Pondered _____	34
Fish Planted _____	67,922
Pounds @ Release (8.4 fpp) _____	8,086
Rearing Mortality (29.5%) _____	24,875
Planted as unfed fry _____	4,400
Transferred _____	0
Shortage _____	0
Feed Fed (lbs) _____	6,368
Net Gain (lbs) _____	8,120
Conversion _____	.78:1
CV @ Release _____	7.9

2016 Brood Lewis River Summer Steelhead

The overall rearing of this brood has gone really well and program goals will be achieved. Currently at Merwin Hatchery there are 60,000 juveniles that will go to Echo Net Pens in March 2017. During this rearing cycle, these fish were diagnosed with ichthyophthirius, lactobacillus, and furunculosis. They were therapeutically treated accordingly with average loss. Hatchery staff will start the release of the remaining fish on hand in April 2017.

Stock Inventory this period

Fish Pondered _____	301,804
Pounds Pondered _____	121
Fish on hand _____	255,001
Pounds on hand (8.0 fpp) _____	31,875
Rearing Mortality (7.7%) _____	23,121
Destroyed _____	0
Eggs Transferred _____	0
Fish Transferred _____	0
Feed Fed (lbs) _____	24,805
Net Gain (lbs) _____	31,754
Conversion _____	0.78:1

2016 Brood Lewis River Winter Steelhead

The overall rearing of this brood has gone really well and program goals will be achieved. During this rearing cycle, these fish were diagnosed with ichthyophthirius, lactobacillus, and furunculosis. They were therapeutically treated accordingly with average loss Hatchery staff will start the release of the fish on hand in April 2017.

Stock Inventory this period

Fish Pondered _____	123,966
Pounds Pondered _____	50
Fish on hand _____	116,526
Pounds on hand (8.5 fpp) _____	13,709
Rearing Mortality (3.6%) _____	4,460
Destroyed _____	0
Eggs Transferred _____	0
Fish Transferred _____	0
Feed Fed (lbs) _____	11,862
Net Gain (lbs) _____	13,659
Conversion _____	0.87:1

2016 Brood Lewis River Wild Winter Steelhead

The overall rearing of this brood has gone really well and program goals will be achieved. After genetic assessment, one female spawned did not meet the genetic criteria for program. As a result 5,461 unfed fry were planted at the Merwin Boat launch on the North Fork of the Lewis. During this rearing cycle these fish were diagnosed with ichthyophthirius and bacterial cold water disease. They were therapeutically treated accordingly with average loss. Hatchery staff will start the release of the fish on hand in May 2017.

Stock Inventory this period

Fish Pondered _____	61,506
Pounds Pondered _____	25
Rearing Mortality (14.6%) _____	8,989
Unfed Fry Plant _____	5,461
Fish Transferred _____	0
Fish on Hand _____	52,007
Pounds on Hand (15 fpp) _____	3,467
Feed Fed (lbs) _____	2,801
Net Gain (lbs) _____	3,442
Conversion _____	.81:1

2017 Brood Lewis River Summer Steelhead

Spawning operations were completed in four egg-takes and went well this period. All takes are still in the incubators with the last take yet to hatch. Female fecundities were well above average and eyed egg loss was average (13.1%). As a result surplus eyed eggs were culled (108,877). Currently there are a combination of 304,508 alevin and eggs on hand.

2017 Brood Lewis River Winter Steelhead

Spawning operations were completed in two egg-takes and went excellent this period. Currently, there are 145,200 eggs on hand; these eggs have not been picked yet.

2016 Brood Goldendale Rainbow

We received 75,000 eyed eggs from Goldendale Hatchery in December 2016. These fish will be ponded to IR#6.

Stock Inventory this period

Fish Ponded _____	0
Pounds Ponded _____	0
Rearing Mortality _____	0
Shortage _____	0
Fish on Hand _____	Approx. 75K

2015 Brood Goldendale Rainbow

The rearing of this stock has gone really well. During this rearing cycle these fish were diagnosed with ichthyophthirius, furunculosis, and lactobacillus. They were therapeutically treated accordingly with higher than average loss. A total of 57,148 fish were transferred to Speelyai Hatchery in October 2016. The fish on hand will be used for the Merwin Park Fishing Derby in June 2017 and the Merwin Special Kids Derby (MSKD) in July 2017. Also, 2000 fish will be held over for the 2018 MSKD.

Stock Inventory this period

Fish Ponded _____	81,564
Pounds Ponded _____	27
Fish Planted _____	0
Rearing Mortality (21.5%) _____	17,569
Destroyed _____	0
Transferred _____	57,148
Pounds Transferred (19 fpp) _____	3,008
Shortage _____	0
Feed Fed (lbs) _____	2,540
Net Gain (lbs) _____	2,981
Conversion _____	.85:1
Fish on Hand (Derby fish 2017/2018) _____	5,011

2016 Merwin Special Kids Derby and Forest Service Derby

For the purpose of this report, we have listed all these fish under one section. Fourteen 2013 Brood Goldendale Rainbow were planted into Merwin Reservoir for the Forest Service Derby in June 2016. The remaining 2013 brood were caught at the MSKD derby in July 2016 or planted into Merwin Reservoir following the derby. The disposition of the 2013 brood is as follows: 1,232 planted into Merwin Reservoir and 408 caught at the derby. The disposition of the 2014 brood is as follows: 1,500 planted in Merwin Reservoir for Forest Service Derby, 1,277 planted in Merwin Reservoir following the MSKD derby, and 144 caught at the derby. 2,000 were kept for the 2017 MSKD derby.

Stock Inventory This Period 2013 Derby Goldendale Rainbow

Beginning Balance _____	2,088
Rearing Mortality (16.6%) _____	346
Fish Caught 2016 Derby _____	408
After MSKD Merwin Plant _____	1,232
Shortage _____	0
On Hand (Derby fish 2017) _____	0

Stock Inventory This Period 2014 Derby Goldendale Rainbow

Beginning Balance _____	5,225
Rearing Mortality (2.1%) _____	111
Fish Caught 2016 Derby _____	144
After MSKD Merwin Plant _____	1,277
Forest Service Derby Plant _____	1,500
Shortage _____	0
On Hand (Derby fish 2017) _____	1,994

RAINFALL REPORT

Rainfall is recorded from 8:00 a.m. to 8:00 a.m. day prior

HATCHERY: MERWIN HATCHERY YR: 2016 WATER SOURCE: MERWIN

YEAR TOTAL: 113.57 INCHES

DAY	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	0	0.3	0.7	0	0	0.4	0	0	0.25	1.1	0.15	0.3
2	0	0.1	0.5	0	0	0.1	0	0.1	0.4	0	0.15	0.8
3	0.3	1	0.25	0.5	0	0	0	0	0	0.3	0	1.3
4	0.1	0.5	0.4	0.5	0	0	0	0	0	0.75	0.25	0.35
5	0.05	0.3	0.35	0	0	0	0	0	0.45	1.3	1.8	0.6
6	0.01	0	0.65	0	0	0	0	0.25	0.45	1.6	0.1	0
7	0	0	0.4	0	0	0	0.4	0.3	0	0.25	0	0
8	0.01	0	0.6	0	0	0	0.7	0.15	0	1.05	0	0.25
9	0.01	0	1.75	0	0	0.5	0.1	0	0	1.4	0	1
10	0	0	0.4	0	0	0.1	0.15	0	0	0	0	1.25
11	0.2	0.4	0.7	0	0	0.65	0	0	0	0	0	0.85
12	2.3	0.6	0.85	0.4	0	0	0	0	0	0.7	0.2	0.3
13	0.7	2.2	1	0.5	0	0.4	0	0	0	3.1	1.4	0.01
14	0.5	1.5	0.6	0.55	0.7	1.1	0	0	0	1.3	1.1	0.01
15	0.6	0.8	0.5	0	0.2	0.1	0	0	0	1.1	1.05	0
16	1	0.15	0	0	0	0.1	0	0	0.1	1.3	0.2	0
17	1	1.1	0	0	0	0	0	0	1.3	0.3	0.01	0.01
18	0.3	0.95	0	0	0.3	0	0	0	0	0.1	0.01	0
19	1.5	0.4	0	0.01	0.6	0	0	0	0	0.6	0.4	2.5
20	0.6	0	0.5	0.4	0.25	0	0	0	0	0.6	0.75	2.5
21	0.9	0.3	0.7	0.3	0.5	0.3	0	0	0	0.2	0.1	0.2
22	0.45	0	0.3	0.4	0.2	0.6	0	0	0.1	0.2	1.5	0
23	0.45	0	0.4	0	0	0.1	0	0	0.5	0.01	0.6	0.4
24	0.1	0	0.4	0.4	0	0	0	0	0	0.35	2.75	0.1
25	0.01	0	0.1	0	0	0	0	0	0	0.5	0.15	0.01
26	0.15	1	0.5	0	0	0	0	0	0	1.3	0.6	4.8
27	0.9	0.4	0.5	0	0.2	0	0	0	0	0.15	0.8	0.6
28	0.55	0.35	0	0	0	0	0	0	0	0.2	0.35	0.1
29	1	0.75	0	0	0	0	0	0	0	0.1	0.4	0.1
30	0		0	0	0	0	0	0	0	0.75	0.4	0
31	0.3		0				0	0.15		0.55		1.5
Total	14.0	13.1	13.05	3.96	2.95	4.45	1.35	0.95	3.55	21.16	15.22	19.84

TOTAL
RAINFALL
113.57

* SNOW

YEARLY TEMPERATURE REPORT

HATCHERY MERWIN HATCHERY

YEAR: 2016

WATER SOURCE: N.F. LEWIS RIVER
MERWIN RESERVOIR

DAY	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEP		OCT		NOV		DEC	
	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN
1	44	43	43	43	45	43	45	44	49	48	53	52	57	56	59	58	61	61	64	63	57	56	51	50
2	44	43	43	43	45	44	45	44	48	47	55	53	57	55	60	58	61	60	64	63	57	56	51	50
3	44	43	43	43	45	44	45	44	50	47	55	53	58	55	59	58	62	60	64	63	56	55	51	50
4	44	43	43	43	45	44	46	45	50	48	55	53	57	55	60	58	62	60	64	63	56	55	50	49
5	44	43	43	43	46	44	46	45	49	48	54	53	57	56	60	58	62	60	64	64	56	55	49	49
6	44	43	43	43	45	44	46	45	50	48	56	53	57	56	61	58	62	61	64	63	55	55	50	49
7	43	43	44	43	45	44	46	45	50	48	55	53	57	56	60	58	62	61	64	64	56	55	49	48
8	43	42	44	42	44	44	46	45	50	48	55	53	57	56	60	58	62	61	64	63	56	55	49	48
9	43	43	44	43	46	44	46	44	51	49	55	53	57	56	60	59	63	60	64	63	56	55	48	48
10	43	43	44	43	45	44	47	46	50	49	55	53	57	56	59	58	62	61	63	63	55	54	49	48
11	43	43	44	43	46	44	47	46	50	49	55	54	57	56	60	59	64	61	64	63	55	54	49	48
12	43	43	44	43	45	44	46	46	50	49	55	53	57	56	61	59	62	60	64	63	55	54	48	48
13	43	43	44	43	45	44	47	45	50	49	56	54	58	56	60	59	61	60	64	62	55	54	48	47
14	43	43	44	44	44	44	47	46	53	49	55	54	59	56	61	59	63	62	63	62	55	54	47	47
15	43	43	44	43	44	44	47	45	52	50	55	54	60	56	61	59	63	62	62	61	55	54	47	47
16	43	43	44	43	44	44	47	46	50	49	56	54	58	57	62	59	63	62	62	60	54	54	47	46
17	43	43	44	43	45	44	49	47	52	50	55	54	58	57	62	59	63	62	61	60	54	54	47	46
18	43	43	44	43	45	44	48	47	52	50	55	54	58	57	62	59	63	62	60	59	54	53	46	46
19	43	43	45	43	45	44	50	46	54	50	56	54	58	57	61	59	64	62	60	59	55	54	46	45
20	43	42	45	43	45	44	48	46	51	50	55	54	59	57	60	59	63	62	59	59	55	54	46	45
21	43	43	44	44	45	44	48	47	52	50	56	55	59	57	60	59	64	63	59	59	55	54	46	44
22	43	42	44	43	45	44	48	46	52	51	56	55	59	57	61	59	63	62	60	58	53	53	45	44
23	43	43	44	44	45	44	47	46	52	50	56	55	58	58	61	60	64	63	60	58	53	52	45	44
24	43	43	44	44	44	44	48	46	52	50	56	55	59	58	62	59	63	62	58	58	53	52	45	44
25	43	42	44	44	45	44	48	47	54	50	56	55	60	58	61	58	64	63	58	58	53	52	45	44
26	44	43	44	44	45	44	49	47	53	50	57	55	60	57	62	59	64	63	58	57	53	52	45	44
27	44	43	45	44	44	44	48	47	53	51	57	55	59	58	61	60	64	63	58	57	52	51	45	44
28	44	42	44	43	44	44	48	47	53	51	58	55	59	58	63	60	64	63	58	56	52	51	45	44
29	44	43	44	44	45	44	49	47	53	51	57	55	60	58	61	60	64	63	58	56	52	51	45	44
30	43	42			45	44	50	48	55	52	58	55	60	58	62	60	64	63	57	56	51	51	44	44
31	44	43			45	44							60	58					57	56			44	44
AVG	43.354839	42.806452	43.896552	43.241379	44.870968	43.967742	47.233333	45.833333	51.333333	49.366667	55.6	53.933333	58.258065	56.677419	60.733333	58.833333	62.866667	61.6	61.258065	60.290323	54.466667	53.633333	47.16129	46.3870968
MIN	43	42	43	42	44	43	45	44	48	47	53	52	57	55	59	58	61	60	57	56	51	51	44	44
MAX	44	43	45	44	46	44	50	48	55	52	58	55	60	58	63	60	64	63	64	64	57	56	51	50

DISEASES AND TREATMENTS

DATE: 1/1/16 - 12/31/16

HATCHERY: MERWIN HATCHERY

DATE	BROOD YEAR/ SPECIES	POND NUMBERS	TREATMENT CHEMICAL	DISEASE
January-July	2016 Summer, Winter & Wild Winter Steelhead	(Eggs) Incubators	Formalin	Fungus
June-Dec.	2016 Summer Steelhead Brood	SP 1 & 2	Formalin	Fungus
July, August	2016 Wild Winter Steelhead	IR's 5, 4, 3, & 2	Aquflor	Bacterial Cold Water Disease
Sept, October	2015 Goldendale Rainbow	RW's 5, 6, & 7	Romet	Lactobacillus & Furunculosis
Sept, October	2016 Summer Steelhead	RW-4	Romet	Lactobacillus & Furunculosis
Sept, October	2016 Winter Steelhead	RW-3	Romet	Lactobacillus & Furunculosis
Sept.-Oct.	2014 Goldendale Rainbow	RW 9 & 10	Formalin	Ichthyophthirius
Sept.-Oct.	2016 Winter Steelhead	RW-4 & RP-13	Formalin	Ichthyophthirius
Sept.-Oct.	2016 Summer Steelhead	RW-2 & RP-11,12, & 14	Formalin	Ichthyophthirius
Sept.-Oct.	2015 Goldendale Rainbow	RW-1	Formalin	Ichthyophthirius
Sept.-Oct.	2016 Wild Winter Steelhead	RW-7 & 8	Formalin	Ichthyophthirius
December	2016 Goldendale Rainbow	(Eggs) Incubators	Formalin	Fungus
December	2017 Summer & Winter Steelhead	(Eggs) Incubators	Formalin	Fungus
December	2017 Winter Steelhead Brood	AP-2	Formalin	Fungus

MAINTENANCE AND CAPITAL PROJECTS

Maintenance

1. Routine maintenance on air compressors in Ozone Plant
2. Replaced all dielectric tubes, rings, and fuses on Ozone Generator #1
3. Replaced drying towers, solenoid valves, and inlet filters on both compressed air line systems at Ozone Plant
4. Tress pruned
5. Replaced some of the worn out bird netting panels around facility rearing vessels
6. New batteries for both planting trucks
7. Replaced alternator, belts, and pulleys on International planting truck
8. Replaced front tires, alternator, belts, pulleys, water pump & hoses, fuel lines, fuel injectors, reset valves, and block heater on Ford Cargo planting truck.
9. Replaced hydraulic cylinder for mast on forklift
10. Replaced fuel injectors for Ford F350 flatbed
11. Repair service for residence's heat pump
12. Residence drain line cleared
13. Purchased gravel and rented tractor & compactor to add extra parking areas and widen 3-Bay area
14. Repaired some asphalt cracks and sink holes around facility

Capital

1. Replaced intake pump #3 and rebuilt work done by JR Merit and DeVaux Pump.

OPERATIONS PROGRAM

SPEELYAI HATCHERY

FOR

January 1, 2016 to December 31, 2016



Washington
Department of
FISH and
WILDLIFE

WRITTEN AND COMPILED BY:

SPEELYAI HATCHERY STAFF

Introduction

The Speelyai Hatchery is a PacifiCorp owned and funded facility that is operated by the Washington Department of Fish and Wildlife. It has been in operation since 1958.

Speelyai Hatchery is located 21 miles east of Woodland, just off Highway 503. The hatchery is adjacent to Speelyai Creek on the north shore of Lake Merwin.

Program Goals

- 50,000 Rainbow at 2.5fpp stocked in Swift Reservoir.
- 45,000 Kokanee at 8fpp released into Merwin Reservoir.
- 48,000 Kokanee at 6.9fpp released into Merwin Reservoir.
- 1,300,000 Spring Chinook reared to 90fpp for transfer to Lewis River Hatchery.
- 37,000 Spring Chinook reared to 15fpp for Clear Creek acclimation.
- 15,000 Spring Chinook reared to 15fpp for Crab Creek acclimation.
- 53,000 Spring Chinook reared to 15fpp for Muddy River acclimation.

Approximately 9,200 gallons of water per minute can be delivered to the hatchery system by gravity flow from Speelyai Creek.

There are approximately 166,450 cubic feet of available rearing space. This space consists of four 17'x3'x3' intermediate troughs, twenty-four 10'x 80'x4' raceways, four 115'x10'x5' raceways, and one large asphalt pond that serves as an adult holding/spawning pond for Spring Chinook and Type S Coho stocks.

Incubation consists of fifty stacks of FAL vertical incubators, two deep troughs, and a shallow trough.

The Speelyai hatchery site also includes two residences, a hatchery building, a two bay storage building, a shop/garage, a domestic pump house, a small storage building, and two chemical storage buildings.

The Speelyai hatchery staff is also responsible for ten 20'x20'x20' net pens located at Speelyai Bay in Merwin Reservoir.

Adult Holding

2016 Lewis River Spring Chinook, Hatchery Origin

The first fish were received on March 16, 2016. Brood stock was collected at the Merwin Dam Fish Collection Facility and Lewis River trap. Disposition is as follows:

Adults Received _____	406
Jacks Received _____	130
Mortality (17.7%) _____	72
Adults Spawnd _____	300
Non-Viable _____	0
Nutrient Enhancement _____	334
Landfill _____	72

Adults were injected this year in hope to achieve a lower mortality from BKD and Furunculosis. We treated one group with Draxen and another with Erythromycin and Draxen. Mortality did drop considerably and we will continue in 2017 with injections. Both ELISA and PCR (Polymerase Chain Reaction) testing that checks DNA extracts for bacterium in salmonid eggs were used. ELISA results showed six females had high BKD levels and one had moderate levels. In comparison PCR testing showed elevated levels of BKD in all females spawned. No fish were culled since egg take goals were not met. All mortality was disposed of at the Cowlitz County Landfill. Spawnd and surplus males were given to the Clark/Skamania Fly Fishers Association for Nutrient Enhancement.

2016 Lewis River Spring Chinook, Wild Origin

The first fish were received on April 7, 2016. Brood stock was collected at the Merwin Dam Fish Collection Facility. Disposition is as follows:

Adults Received _____	19
Jacks Received _____	1
Mortality (21.1%) _____	4
Adults Spawnd _____	15
Non-Viable _____	0
Landfill _____	4
Nutrient Enhancement _____	15

Wild origin spring Chinook were integrated with hatchery origin spring Chinook at a rate of 1:1. The offspring of these will be used in upstream reintroduction. All mortality was disposed of at the Cowlitz County Landfill. Spawnd carcasses were used for nutrient enhancement by the Clark/Skamania Fly Fishers Association.

2016 Lake Merwin Kokanee

Adult collection started September 22, 2016. Fish were collected from the hatchery effluent Kokanee trap and held in raceway 12. All carcasses were disposed of at the Cowlitz County landfill. Disposition is as follows:

Adults Trapped	452
Mortality (0.0%)	0
Returned to Stream	0
Adults Spawnd	452
Non-Viable	0

2016 Lewis River Type S Coho

The first fish were received on September 6, 2016. Brood stock was collected at the Merwin Dam Fish Collection Facility and Lewis River trap. Disposition is as follows:

Adults Received	1,746
Jacks Received	114
Mortality (5.3%)	92
Adults Spawnd	969
Non-Viable	2
Nutrient Enhancement	1,654
Landfill	92

All mortality was disposed of at the Cowlitz County Landfill. Spawnd and surplus fish were given to the Clark/Skamanian Fly Fishers Association for Nutrient Enhancement.

SPEELYAI HATCHERY ADULT COLLECTION

SPECIES	ESTIMATED TRAPPED / RECEIVED		RETURNED TO STREAM			SHIPPED / PLANTED			MORTALITIES			CARCASS DISTRIBUTION			LETHAL SPAWNED				LIVE SPAWNED			ESTIMATED ON HAND		MARKS RECOVERED			ESTIMATED EGGS TAKE
	A	J	M	F	J	M	F	J	M	F	J	M	F	J	M	F	NVF	J	M	F	J	A	J	M	F	J	
CK:SP:LEWI:16:H	406	130							35	37	36	34	0	84	143	157	0	10				0	0	40	41	22	492,100
CK:SP:LEWI:16:W	19	1							3	1	0				9	6		1				0	0	N/A	N/A	N/A	53,300
CO:SO:LEWI:16:H	1,746	114							55	37	1	340	343	60	458	511	2	53				0	0	206	157	24	1,570,200
KO:NA:MERL:16:M	452														226	226						0	0	N/A	N/A	N/A	158,000

Egg Take and Incubation

2016 Lewis River Spring Chinook, Hatchery Origin

Egg Inventory and distribution is as follows:

Total Egg Take _____	481,865
Egg Loss (9.5%) _____	45,765
Destroyed _____	0
Shipped _____	0
Ponded _____	436,100
Fecundity _____	3,278

At the time of this report there are 10,200 fish in incubation to be ponded in January 2017. Those fish are included in the total ponded number.

2016 Lewis River Spring Chinook, Mixed Origin

Egg Inventory and distribution is as follows:

Total Egg Take _____	56,500
Egg Loss (5.7%) _____	3,200
Destroyed _____	0
Shipped _____	0
Ponded _____	53,300
Fecundity _____	3,531

2016 Lewis River Type S Coho, Hatchery Origin

Egg Inventory and distribution is as follows:

Total Egg Take	1,652,894
Egg Loss (8.4%)	139,000
Shipped	1,513,894
Fecundity	3,235

2016 Lake Merwin Kokanee, Mixed Origin

Egg Inventory and distribution is as follows:

Total Egg Take	144,700
Egg Loss (34.8%)	50,400
Fecundity	648

At the time of this report, the 2016 Kokanee are still in incubation and will be ponded in January 2017.

Rearing Program

2015 Lewis River Spring Chinook, Hatchery Origin

Tagging and mass marking was completed in May 2016. The 2015 spring Chinook were not Elisa tested. In May, a total of 614,920 fish at an average size 75.3 fpp were shipped to Lewis River Hatchery. The remaining 151,380 fish were held at Speelyai scheduled to be released in February 2017. Due to high levels of bacterial kidney disease these fish had to be planted in October 2016 at an average size 14.6 fpp. Disposition is as follows:

Final Stock Inventory

Beginning Balance	787,100
Rearing Mortality (11.6%)	93,018
Fish Shipped	614,920
Pounds Shipped	8,166
Fish Planted	94,420
Pounds Planted	6,467
Beginning Pounds	967
Feed Fed (lbs.)	11,002
Net gain (lbs.)	13,666
Conversion	0.81:1
Population Adjustment	15,258

2015 Lewis River Spring Chinook, Mixed Origin

In September and October 2016, 15,000 fish were planted into the Crab Creek acclimation site, 10,050 fish into the Clear Creek acclimation site, 4,350 fish into Muddy River and Drift Creek received 500 fish all at an average 31.0 fpp. Disposition is as follows:

Final Stock Inventory

Beginning Balance	36,000
Rearing Mortality (13.7%)	4,729
Fish Shipped	0
Pounds Shipped	0
Fish Planted	29,900
Pounds Planted	965
Beginning Pounds	47
Feed Fed (lbs.)	772
Net gain (lbs.)	918
Conversion	0.84:1
Population Adjustment	-1,371

2016 Lewis River Spring Chinook, Hatchery Origin

A total of 425,900 Chinook were ponded in November and December. Fish on hand are at an average size 730 fpp. At the time of this report there are still 10,200 fish to be ponded in January 2017 which are included in the disposition below. Mass marking and coded-wire tagging are scheduled to take place April 2017. Disposition is as follows:

Stock Inventory

Beginning Balance	436,100
Ponding Mortality (2.0%)	8,900
Pounds Ponded	356
Pounds on Hand	578
Feed Fed (lbs.)	148
Net gain (lbs.)	222
Conversion	0.67:1

2016 Lewis River Spring Chinook, Mixed Origin

Fish on hand are an average size 863 fpp. Fry will be transferred to the Clear Creek, Crab Creek and Muddy River acclimation sites in 2017. Disposition is as follows:

Stock Inventory

Beginning Balance	53,300
Ponding Mortality (2.0%)	1,100
Pounds Ponded	44
Pounds on Hand	60
Feed Fed (lbs.)	15
Net gain (lbs.)	16
Conversion	0.94:1

2014 Lake Merwin Kokanee

On March 1, 2016, 46,380 Kokanee at an average size 6.19 fpp were released from the raceways into Speelyai bay for a total plant of 7,487 pounds.

2015 Lake Merwin Kokanee

On August 2, 2016, 56,775 Kokanee at an average size 21.8 fpp were released from the raceways into Speelyai bay. These Kokanee were released early due to signs of bacterial kidney disease. At the time of this report there are 55,550 fish on hand at an average 13.1 fpp scheduled to be released from raceways into Speelyai bay in March 2017.

Disposition is as follows:

Stock Inventory

Beginning Balance	127,600
Rearing Mortality (12.6%)	16,125
Fish Planted	56,775
Pounds Planted	2,604
Beginning Pounds	31
Feed Fed (lbs.)	4,732
Net gain (lbs.)	6,813
Conversion	0.69:1
Population Adjustment	850

2016 Lake Merwin Kokanee

At the time of this report there are 94,300 fish in incubation to be ponded starting January 2017.

2014 Goldendale Rainbow

On April 20, 2016, 2,690 fish at an average 2.26 fpp were planted into the power canal. On May 31 and June 1, 2016, a total of 45,350 fish at an average size 2.53 fpp were released into Swift reservoir. The power canal received a second plant of 2,600 fish at 2.53 fpp on May 31. Disposition is as follows:

Stock Inventory

Beginning Balance	51,113
Rearing Mortality (0.93%)	473
Beginning Pounds	3,651
Pounds Planted	20,141
Feed Fed (lbs.)	15,290
Net Gain (lbs.)	16,490
Conversion	0.93:1
Population Adjustment	0

2015 Goldendale Rainbow

On October 26, 2016, 57,148 fish were received from Merwin Hatchery at an average 19.0 fpp. At the time of this report there are 57,020 fish at an average size 9.89 fpp. These fish are currently being reared in Pond 13 and are on schedule to be planted into Swift reservoir and the power canal in June 2017.

2015 North Toutle River, Type S Coho

On June 2, an estimated 170,000 fish at an average size 115 fpp were received from the North Toutle Hatchery due to drought conditions poor water quality and high temperatures. Tagging and mass marking was completed in August 2016. The fish were shipped back in October 2016 when water conditions improved at North Toutle.

Disposition is as follows:

Stock Inventory

Beginning Balance	170,000
Rearing Mortality (0.67%)	978
Fish Shipped	145,260
Pounds Shipped	3,045
Beginning Pounds	1,271
Feed Fed (lbs.)	1,447
Net gain (lbs.)	1,774
Conversion	0.82:1
Population Adjustment	-23,762

2016 Grays River Summer Steelhead, Hatchery Origin

On June 27, an estimated 280,000 fish at an average size 431 fpp were received from the Grays River Hatchery due to drought conditions poor water quality and high temperatures. Mass marking was completed in August 2016. In November 2016; 140,000 fish were shipped to Beaver Creek Hatchery to meet program goals. From the remaining fish; Skamania Hatchery received 14,000 fish and Kalama Falls Hatchery received 22,000 fish to make up for shortage in their programs.

Disposition is as follows:

Stock Inventory

Beginning Balance	280,000
Rearing Mortality (8.8%)	16,993
Fish Shipped	176,000
Pounds Shipped	7,027

HATCHERY: Speelyai

YEAR: 2016

WATER SOURCE: Speelyai Creek

DAY	JAN			FEB			MAR			APR			MAY			JUN			JUL			AUG			SEP			OCT			NOV			DEC		
	MAX	MIN	RAIN	MAX	MIN	RAIN	MAX	MIN	RAIN	MAX	MIN	RAIN	MAX	MIN	RAIN	MAX	MIN	RAIN	MAX	MIN	RAIN	MAX	MIN	RAIN	MAX	MIN	RAIN	MAX	MIN	RAIN	MAX	MIN	RAIN			
1	46.0	45.1		48.6	47.5	0.10	49.6	48.2	0.91	51.3	49.5		52.2	50.4		54.5	52.5		55.4	54.3		56.7	54.5		55	52.5	0.17	53.2	50.0	0.11	52.2	51.4	0.75	50.2	49.3	0.45
2	45.9	44.6		48.0	46.9	0.18	49.8	48.7	0.65	51.6	49.8		52.9	50.5		54.5	52.5	0.21	55.9	53.8		56.3	54.0		55	52.5	0.35	52.7	51.4	1.1	52.5	50.9	0.09	50.0	49.3	0.35
3	45.1	44.2		48.2	46.4	0.08	50.4	48.7	0.53	51.4	50.0		53.6	50.5		54.1	53.2	0.07	56.1	54.3		56.1	54.3		54.3	52.3	0.2	53.1	51.4		52.7	51.1	0.14	50.0	49.6	0.78
4	45.9	44.2	snow	48.4	47.7	1.24	50.6	48.2		51.8	49.8	0.7	53.6	52.0		55.2	53.1		55.9	54.1		56.1	54.2		54.4	52.7		52.7	51.6	0.22	52.2	50.7	0.03	50.5	49.5	1.49
5	47.8	46.4	0.09	48.7	47.7	0.30	50.9	48.5	0.36	51.3	49.8	0.36	52.9	52.0		56.3	53.1		54.5	53.3		56.7	54.9		54.5	52.3		52.7	51.6	0.9	52.5	50.7	0.15	49.5	48.2	0.24
6	47.7	46.4	0.15	49.1	48.2	0.46	51.4	49.3	0.24	50.5	49.6		53.1	51.8		56.6	54.0		54.1	52.9		56.5	54.1		55	52.3	0.45	52.5	52.0	0.8	52.3	51.4	1.8	48.2	47.3	0.51
7	48.0	46.4		49.5	48.0	0.02	49.8	48.4	0.86	51.1	49.1		54.0	51.8		57.2	54.5		55.4	53.3		55.8	54.5		54.7	53.1	0.3	53.1	52.2	1.79	52.7	51.4	0.07	48.2	46.6	0.08
8	48.6	46.0		49.8	48.2		49.8	48.2	0.38	52.5	50.7		54.3	52.5		57.1	53.5		54.8	53.6	0.68	54.9	54.5	0.17	55.8	53.1		53.2	52.3	0.19	53.2	51.3	0.01	46.9	46.0	0.1
9	47.1	46.2	0.04	50.0	48.4		49.5	48.2	0.7	52.9	50.7		54.1	52.3		55.4	54.1		54.9	54.3	0.41	55.0	54.3	0.07	56.3	51.3		53.6	52.3	0.91	51.8	50.5	0.12	46.9	45.1	0.25
10	48.0	46.4		50.0	48.6		49.1	48.4	1.87	52.3	51.3		53.6	51.8		55.4	53.1	0.31	54.7	54.1	0.1	55.2	54.5	0.01	55.8	51.1		53.2	51.4	1.34	52.5	50.9	0.1	46.9	44.1	1.5
11	48.0	46.4	0.05	50.0	48.6	0.02	50.2	47.7	0.28	51.6	50.5		53.2	50.7		53.2	52.5	0.94	54.5	53.6		56.5	54.3		56.5	51.8		52.7	49.3		52.7	51.1	0.01	47.1	46.6	0.5
12	47.8	46.6	0.25	50.4	49.3	0.33	49.8	47.7	0.91	51.3	50.5		54.0	50.7		53.4	52.5	0.02	55.0	53.8		56.5	54.3		55.4	50.7		52.0	49.3		53.2	51.6	0.42	47.3	46.4	1.47
13	48.2	47.8	2.20	50.0	48.9	1.29	48.9	48.0	0.95	50.7	50.2	0.45	54.3	52.3		54.3	52.0		54.7	54.0	0.03	57.0	54.9		55.2	50.4		52.7	49.8	1.12	52.7	51.1	0.26	47.7	46.8	0.31
14	48.7	47.7	0.58	49.5	48.4	2.26	49.5	47.8	1	50.7	50.0	0.41	54.0	52.3		53.6	52.3	0.42	55.6	53.1		57.2	55.8		54.9	50.0		52.7	51.6	3.38	52.2	51.3	2.12	47.3	45.9	0.14
15	48.6	47.7	0.45	49.3	48.4	1.48	48.9	48.0	0.71	50.4	50.0	0.43	53.8	52.2	0.63	52.5	52.0	0.86	55.9	53.8		57.2	55.4		54.9	50.4		53.1	52.3	1.24	52.5	51.8	1.36	46.6	45.7	
16	48.4	47.7	0.62	50.4	49.3	0.66	48.6	48.0	0.33	50.7	49.6	0.02	52.3	52.0	0.06	52.9	51.8	0.06	54.9	54.1		56.8	55.4		55.0	50.5		52.9	52.2	1.29	52.3	50.4	1.04	46.6	45.9	
17	48.6	47.7	1.31	50.4	49.3	0.09	50.5	47.5		51.4	49.3		52.3	51.6		53.2	51.8	0.08	54.9	53.6		56.5	55.4		55.2	51.1	0.23	52.5	51.6	1.36	51.3	50.5	0.19	46.6	46.6	
18	48.2	47.8	0.90	50.5	48.9	0.90	50.0	47.1		52.7	50.5		53.8	51.8		53.1	52.3	0.16	55.0	54.1		56.7	54.5		53.4	52.7	1.45	53.1	51.6	1.03	51.3	49.1		46.6	46.6	
19	49.1	47.8	0.32	49.1	48.6	1.02	49.1	47.8		54.0	51.8		53.8	51.8	0.11	53.4	52.0	0.03	54.9	54.3		57.1	54.8		55.2	51.6		53.1	51.6	0.25	50.5	49.5	0.08	47.1	47.1	
20	48.2	47.7	1.64	48.9	48.2	0.48	50.0	49.1		54.1	51.6		52.7	51.8	0.41	54.1	51.4		55.4	54.1		57.6	55.2		54.0	50.9	0.03	53.1	51.4	0.76	51.4	49.8	0.32	47.1	47.1	3.87
21	48.9	47.8	0.68	49.5	47.3		50.0	49.6	0.58	53.4	52.0	0.07	52.9	51.4	0.12	54.5	51.4		56.1	54.1		57.6	55.4		54.1	50.0		53.2	51.3	0.61	51.1	50.2	1.06	47.5	45.9	
22	49.6	48.2	0.69	49.5	47.3	0.29	49.6	49.3	0.76	53.2	51.8	0.28	52.3	51.8	0.45	54.7	53.6		56.5	54.7		56.8	54.9		54.1	49.6	0.03	53.1	51.3	0.12	51.4	49.6	0.03	46.8	46.0	
23	50.0	48.4	0.23	49.8	46.6	0.18	49.6	49.1	0.16	52.7	51.4	0.25	52.2	51.6	0.39	55.4	53.4	0.23	55.8	54.1		56.1	53.8		53.1	50.2	0.02	52.7	51.4	0.22	51.1	49.6	1.59	47.3	46.2	0.35
24	48.9	48.2	0.36	49.6	46.6		49.6	49.3	0.77	51.6	50.7	0.42	52.9	51.6	0.08	54.1	52.9	0.7	55.2	53.8		56.1	53.8		52.2	51.1	0.44	53.1	51.4		50.2	49.6	0.97	47.5	46.2	0.17
25	49.3	48.0	0.02	50.9	47.8		49.5	48.9	0.53	51.3	50.4	0.23	53.1	52.0		53.4	52.7	0.07	56.1	53.6		56.7	54.1		54.1	51.1		52.7	51.3	0.27	50.4	49.8	2.68	47.7	46.8	0.02
26	49.3	48.2	0.05	50.5	47.7		49.6	48.6	0.07	51.4	50.0	0.08	52.7	51.8	0.09	55.4	52.3		56.8	54.5		56.8	54.7		54.9	50.9		52.5	51.3	0.54	50.9	50.4	0.11	47.7	46.2	
27	49.4	46.6	0.26	50.5	48.4	1.04	50.2	48.6	0.52	51.3	49.8	0.02	52.7	51.6	0.03	56.1	53.2		56.5	55.2		56.8	54.7		56.1	52.3		52.7	51.8	1.49	51.3	49.5	0.39	47.7	44.8	
28	50.4	49.1	1.52	50.2	48.7	0.30	50.0	48.7	0.3	51.4	50.5	0.02	52.3	51.4		56.3	54.1		56.8	55.2		56.5	54.7		55.6	51.6		52.7	51.8	0.11	50.4	49.3	1.19	47.7	44.8	2.04
29	50.0	47.8		50.0	48.2	0.43	49.6	48.6		51.1	50.0	0.11	52.9	51.3		56.3	54.1		57.2	55.4		56.1	54.3		54.7	51.3		52.7	51.3	0.34	50.5	49.8	0.17	46.9	46.4	0.06
30	50.0	47.8	1.66							51.7	50.4		53.1	52.0		55.4	54.5		57.4	55.4		56.1	54.3		54.5	50.0		52.9	50.9	0.04	50.9	49.6	0.71	48.2	46.8	0.1
31	48.4	47.5	0.60										53.8	51.6					56.7	55.2								52.2	50.9	1.16				47.8	45.3	
Avg / Tot	48.3	47.0	14.67	49.6	48.1	13.15	49.8	48.4	14.37	51.8	50.4	3.85	53.2	51.6	2.37	54.7	52.9	4.16	55.6	54.1	1.22	56.4	54.6	0.25	54.8	51.4	3.67	52.9	51.3	22.69	51.8	50.5	17.96	47.7	46.6	14.78
Acc. Rain	14.67			27.82			42.19			46.04			48.41			52.57			53.79			54.04			57.71			80.40			98.36			113.14		

DISEASES AND TREATMENTS

DATE: 1/1/16 - 12/31/16

HATCHERY: SPEELYAI HATCHERY

DATE	BROOD YEAR/ SPECIES	POND NUMBERS	TREATMENT CHEMICAL	DISEASE
1/5 - 7/25	2015 Lewis River Spring Chinook	Raceways	Formalin Drip	Costia
3/25 - 6/16	2015 Kokanee	Raceways	Formalin Drip	Costia
3/29-9/19	2016 Lewis River Spring Chinook Brood	Raceways 25-28	Formalin Drip	Fungus
9/12-10/20	2016 Lewis River Type S Coho Brood	Adult Pond	Peroxide	Fungus
9/26 - 10/12	2016 Kokanee Brood	Raceway 12	Formalin Drip	Fungus
1/1 - 1/20	2015 Type N Coho	Incubation	Formalin Drip	Fungus
9/3 - 11/22	2016 Spring Chinook	Incubation	Formalin Drip	Fungus
10/9 - 12/3	2016 Kokanee	Incubation	Formalin Drip	Fungus
10/12 - 11/22	2016 Type S Coho	Incubation	Formalin Drip	Fungus
3/19-4/1	2015 Lewis River Spring Chinook	Raceways	TM-200	BKD
9/4-9/17	2015 Lewis River Spring Chinook	Raceways	TM-200	BKD

MAINTENANCE AND CAPITAL PROJECTS

Maintenance

1. Replace UV bulbs on domestic water system.
2. Annual preventative maintenance to fork-lift.
3. Annual preventative maintenance to generator.
4. Annual preventative maintenance to three-phase compressor.
5. Annual preventative maintenance to residential HVAC.
6. Continual patching of potholes in entry road.
7. Annual preventative maintenance to tractor.
8. Annual maintenance completed on traveling screens at intake structure.

Capital

1. Install new heat pumps in residence 1 and 2.
2. New submersible pump and spray-bar installed at intake structure.

Complex Staff Jan. 2016-Dec. 2016

Complex Manager-	Aaron Roberts
FHS4-	Michael Chamberlain
FHS4-	Kevin Young
FHS3-	Shawn Collins
FHS3	Luke Miller
FHS3	Jesse Cody
FHS2-	Jay VonBargen
FHS2-	Bruce Kincaid Jr. (Out on L&I)
FHS2-	Jim Trammell
FHS2-	Dwayne Fossen
FHS2-	Bryan Coyle
FHS2-	Kevin Kitchell
FHS2-	Mathew Lyons
FHS2-	Doni Grove
FHS2-	Chris Roe
MHCC Student-Work Study	Chase Kozlowski
MHCC Student-Work Study	Brad Kyle

2016 LEWIS RIVER COMPLEX

	CK:SP:LEWI:H:16			CO:SO:LEWI:H:16			CO:NO:LEWI:H:16			SH:SU:LEWI:H:17			SH:WI:LEWI:H:17			CK:FA:LEWI:H:16			CK:SP:LEWI:W:16			Total
	Males	Females	Jacks	Males	Females	Jacks	Males	Females	Jacks	Males	Females	Jacks	Males	Females	Jacks	Males	Females	Jacks	Males	Females	Jacks	
DISTRIBUTION																						
American Canadian				18	38											5	5					66
CAP										356	632	0	11	25								1,024
Landfill	36	37	36	88	95	26	45	68	16	214	234	0	47	48	0	2	3	1	3	1		1,000
NW Harvest				4,817	3,463	804	533	807	367	7	20					109	93	15				11,035
Forest Service																						0
Nutrient Enhancement	177	157	94	890	881	133	4,343	4,533	289							1	2	2	9	6	1	11,518
Salvation Army																						0
Shoshone/Bannock																						0
Schools																						0
Cowlitz Tribe			1	146	75	489	112	52	32	920	1,402	0	442	574	0	16	13	4				4,278
Chinook Tribe																						0
Faith Harvest				146	76	349	450	202	186	751	946					13	13	9				3,141
Yakima Tribe							1,754	736	18													2,508
N. County FB																						0
NW Indian V.A.																						0
Wanapum Tribe																						0
TOTAL	213	194	131	6,105	4,628	1,801	7,237	6,398	908	2,248	3,234	0	500	647	0	146	129	31	12	7	1	34,570

Executive Summary

Adult returns were adequate on some stocks but low on others. The Early and Late Coho returns were good and egg take goals were met. We were able to plant 2,567 Early Coho and 3,209 Late Coho into the upper watershed. Our spring Chinook return was very low and we were not able to meet broodstock goals. Summer Steelhead returns were good with 6,884 fish returned and were able to recycle 1,402 adults downstream. Hatchery winter Steelhead were very good this year a return of 1,234. The Late Winter Steelhead was good with 834 returned and planted into the upper watershed.

We did take ELISA samples on the Spring Chinook this year. We also continued our alternative PCR (Polymerase Chain Reaction) testing that checks DNA extracts for bacterium in salmonid kidney was used. No results were given from the PCR testing instead the data was used to create a reference database, so no fish were identified as BKD low or high and segregated. We did identify Below Low-High Elisa results and there was no culling because we were unable to meet our egg take goal. All spring Chinook held for brood were injected with Draxen for BKD and LA-200 (Oxytetracycline) for Furunculosis.

We had some minor projects at the facilities done this year. One of the projects was the replace and rebuild pump #3 at Merwin Hatchery intake, replaced both heat pumps at the Speelyai Hatchery residence's, finished replacing high pressure line at Lewis River. Routine annual maintenance on equipment was done at all three facilities. Thanks to our outstanding WDFW staff and the local staff from PacifiCorp, all three stations are looking and operating well.

As we move forward into re-licensing, we will be presented with many new challenges, both with upstream re-introduction and facilities remodeling. Staff here on the Lewis River system is some of the best in the industry, and committed to facing these challenges with both professionalism and dedication. Their efforts are much appreciated.

Mitigation Summary

Stock	Mitigation Target	Actual Production
Spring Chinook	1,250,000@ 8-12 FFP	600,967 @ 13.3 FPP
Early Coho	1,100,000@ 16 FFP	1,242,461 @ 15.4 FPP
Late Coho	900,000@ 16 FFP	935,240 @ 15.2 FPP
Summer Steelhead	175,000@ 4.8 FFP	175,504 @ 5.5 FPP
Winter Steelhead	100,000@ 4.8 FFP	100,000 @ 5.5 FPP
Wild Winter Steelhead	50,000@ 6-8 FFP	67,922 @ 8.4 FPP
Kokanee	12,500 Pounds	10,091 pounds
Rainbow	50,000@ 2.5 FFP	50,640 @ 2.5 FPP
Wild Spring Chinook	100,000 @ 10-25 FFP	29,900 @ 31 FPP