2009

ANNUAL REPORT - FINAL

HATCHERY AND SUPPLEMENTATION PROGRAM

NORTH FORK LEWIS RIVER

Prepared By
Erik Lesko

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I. Introduction

The purpose of this report is to document activities associated with implementation of the Hatchery and Supplementation (H&S) Plan during 2009. In 2009, only the wild winter steelhead program was initiated. Plans to begin the spring Chinook and early coho programs will be drafted in 2010. Therefore, this report focuses only on the wild winter steelhead program and includes results from broodstock collection, genetic analysis, hatchery spawning and rearing practices, recommendations for 2010 activities and other items as specified in Sections 4.2.1 and 4.2.2 of the 2009 Wild Winter Steelhead Annual Operating Plan (AOP). Data collection methods can also be found in the 2009 AOP for wild winter steelhead.

This report is required by Section 8.2.4 of the Lewis River Settlement Agreement which 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."

Table 1 provides a summary of collection and spawning values for the 2009 wild winter steelhead program.

TABLE 1. Summary of collection and spawning activities in the North Fork Lewis River.

METRIC	Number of Steelhead	
	Male	Female
Total Transported to Merwin hatchery	48	26
Total Released Back to River	22	13
Total Spawned (goal)	19 (25)	12 (25)
Total Adult Mortality	7	1
Total Egg Take (goal)	54,240 (80,000)	
Percent Egg Loss	22%	
Total Expected Release (yearlings)	24,310	

II. Broodstock Collection and Transport

Broodstock collection relied on three different methodologies: (1) trapping at Merwin dam, (2) In-river netting and (3) the use of a volunteer angler. Transportation of adult broodstock collected in-river was accomplished by holding fish in insulated coolers filled with fresh river water and use of rubber mesh nets to transport fish from the coolers to holding tanks. Most unmarked winter steelhead (caught in-river by nets or angling) were transported (via the insulated coolers) to the Lewis River hatchery river access area where an oxygenated holding tank was available. Fish were transported to the oxygenated holding tank with the rubber mesh nets. Steelhead captured in the Merwin trap were transported to the Merwin hatchery via fish transport trucks. No mortalities were observed using these procedures.

A. Merwin Trapping

The first (8) wild winter steelhead were collected at the Merwin trap on January 26, 2009. These fish were held at Merwin hatchery to await genetic assignment. Due to delays in analyzing these particular fish it was decided to release all (8) fish back to the river at Island Boat Launch. All fish were PIT tagged in the event they are recaptured in the future. Information is included on this first group of fish in Appendix A. In total, 27 unmarked steelhead were transported from the Merwin fish trap to the Merwin hatchery during the period January 26 through May 21, 2009. Ten were spawned and 15 were released back to the river due to poor genetic assignment. Two mortalities were observed. Figure 1 illustrates the catch rates at the Merwin trap during the period.

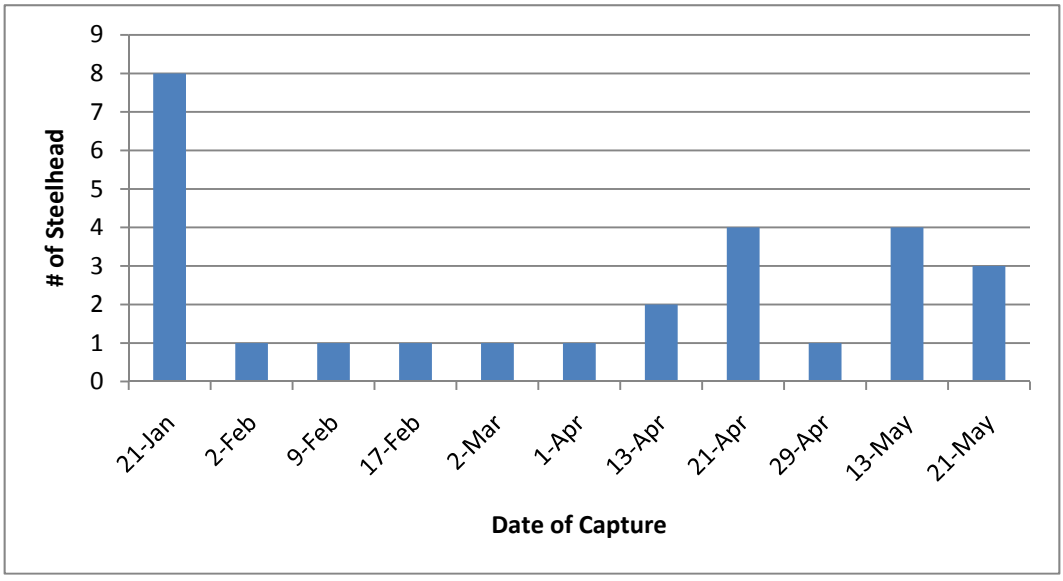

Figure 1. Catch frequency of unmarked steelhead from the Merwin trap during the period January 21, 2009 to May 21, 2009 (total = 27).

B. In-River Netting

In-river collection efforts began on March 4, 2009 and continued through May 21, 2009. Two crews using two boats typically went out once per week. Crews consisted of two to three people. Six to eight pound test monofilament, 4-inch mesh tangle nets were drifted in known and established steelhead holding areas (see section 'X' for more detailed information on net selection and efficiency). Once steelhead became entangled in the drifting net it was pulled into the boat and freed from the net and placed in an insulated cooler with fresh river water. Steelhead were then transported to the oxygenated holding tank at Lewis River hatchery access area. In total, 65 unmarked steelhead were captured. A total of 39 were transferred to Merwin hatchery for genetic assignment (Figure 2). Of these fish, 19 were released back to the river from the hatchery, 16 were spawned and four mortalities were observed after transfer to Merwin hatchery. The remaining 26 fish were males which the hatchery already had adequate broodstock or spawned out females. All of these 26 fish were released on site (from the boats). ***It is interesting to note that one fish (DNA No. 43) which was captured on April 15, 2009 and later released at the Island Boat Launch and which assigned strongly (91%) to the Kalama River was later recovered at the Kalama River trap and released upstream of the trap.***

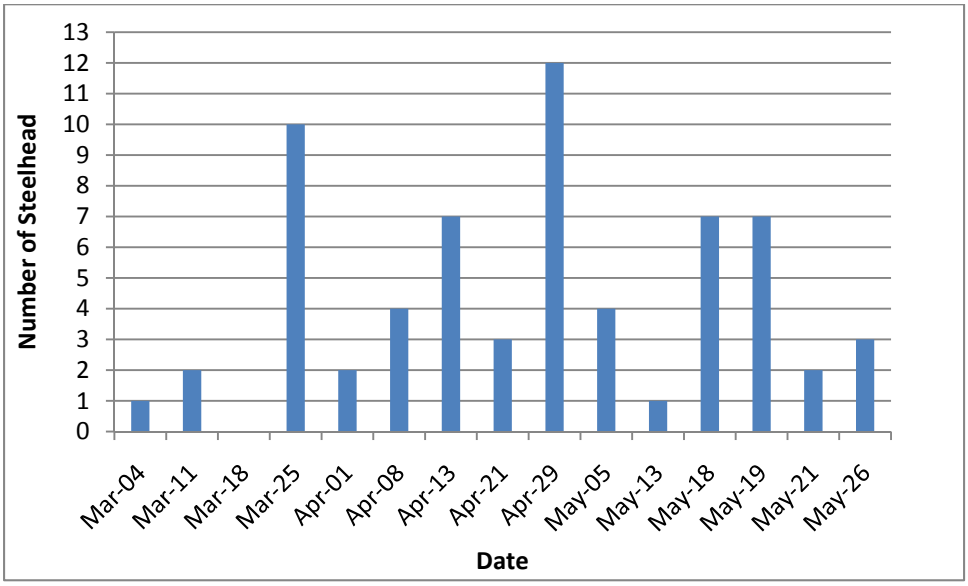

Figure 2. Catch frequency of unmarked steelhead from in-river netting during the period March 4, 2009 to May 26, 2009 (total = 65).

C. Selected Sport Anglers

One volunteer angler assisted with in-river collection efforts. This angler contributed a total of 8 steelhead to the hatchery (Figure 3). Two died (25%) and one was released back to river because no suitable female was available at the time for spawning. One of the mortalities was

determined to be from a defective oxygen regulator on the holding tank. The regulator was immediately replaced and no further issues were observed. Despite the relatively small number of fish, five of the eight fish brought to the hatchery were used as broodstock for the program.

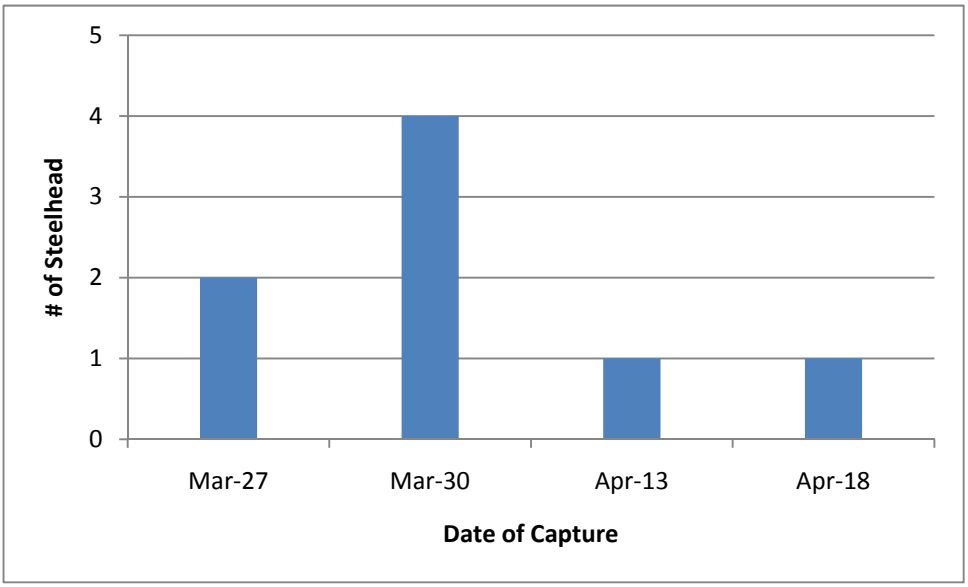

Figure 3. Catch frequency of unmarked steelhead from angling in the lower river during the period March 27, 2009 to April 18, 2009 (total = 8).

D. Fish Collection Timing

The ability to conform to predetermined collection curves presents several difficulties in the field. Some of the specific issues encountered in 2009 are listed below:

- More fish (than stipulated in the collection curve) need to be captured each period to ensure assignment analysis will not reduce available broodstock below target levels.
- Capture efficiency is affected by river conditions which can change weekly if not daily.
- Gender ratios need to be managed and maintained to ensure adequate number of crosses and limited multiple use of broodstock males
- Steelhead condition varies throughout the collection period with a larger percentage of fish being returned to river later in the collection window due to ripeness.
- Fecundity varies substantially from fish to fish.

Because of the many unknowns with collecting live fish in their natural environment, the collection curve is intended to be a guide for collection crews to help plan fish collection activities on a weekly basis. This planning helps to ensure that fish are collected across their spawning period and helps ensure genetic diversity among the available broodstock.

In 2009, in-river netting was delayed until March 4, which limited our ability to capture early migrating fish. The in-river netting effort was the most productive method available for collecting broodstock. Unfortunately, it is also the most invasive and relatively large numbers of spawning steelhead were captured in late May and subsequently returned to river because they were either spent (majority) or very ripe.

Figure 4 provides the actual captures of steelhead from all available methods as compared to the predetermined collection curve. The actual number of steelhead captured was higher to account for fish that were returned to river or removed after genetic assignment results were completed.

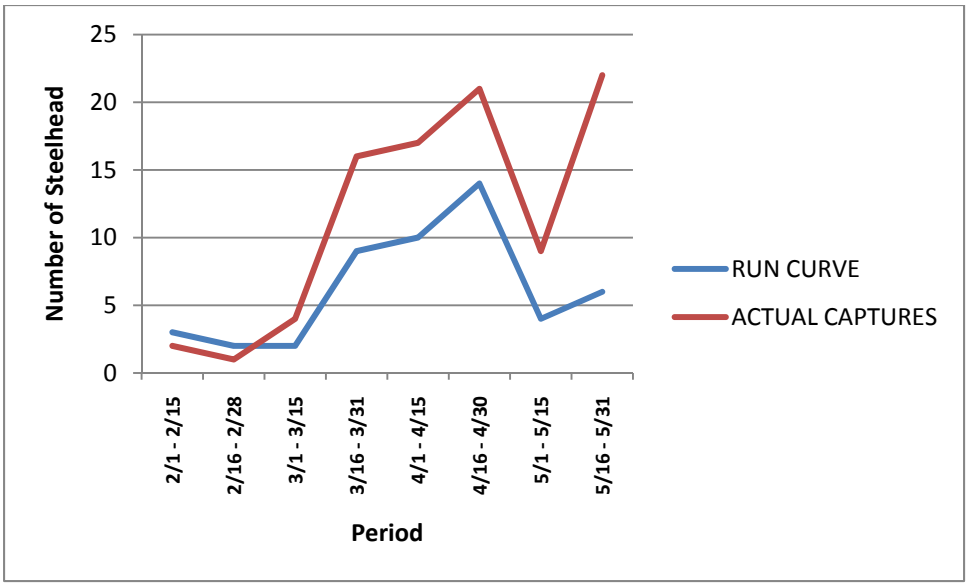

Figure 4. Actual Steelhead Collections (all methods) compared to predetermined collection curve provided in the 2009 Annual Operation Plan for Wild Winter Steelhead.

III. Genetic Assignment Analysis

As part of the 2009 Annual Operation Plan, the HSS agreed to use a genetic assignment level of 50 percent or greater to the NF Lewis River or Cedar Creek stock(s) to identify acceptable broodstock. The only exception to this rule was for fish showing hatchery assignment at levels greater than 5 percent. These fish would not be incorporated into the broodstock despite an assignment of 50 percent or greater to the NF Lewis River wild winter steelhead stock. Most

fish (36) assigned to the North Fork Lewis River stock. The next largest group (14) assigned to the Cedar Creek stock.

A total of 74 unclipped steelhead were analyzed and assigned a probability percentage. Table 2 provides a summary of those results using only the greatest probability. Appendix B provides the results for each individual unclipped steelhead.

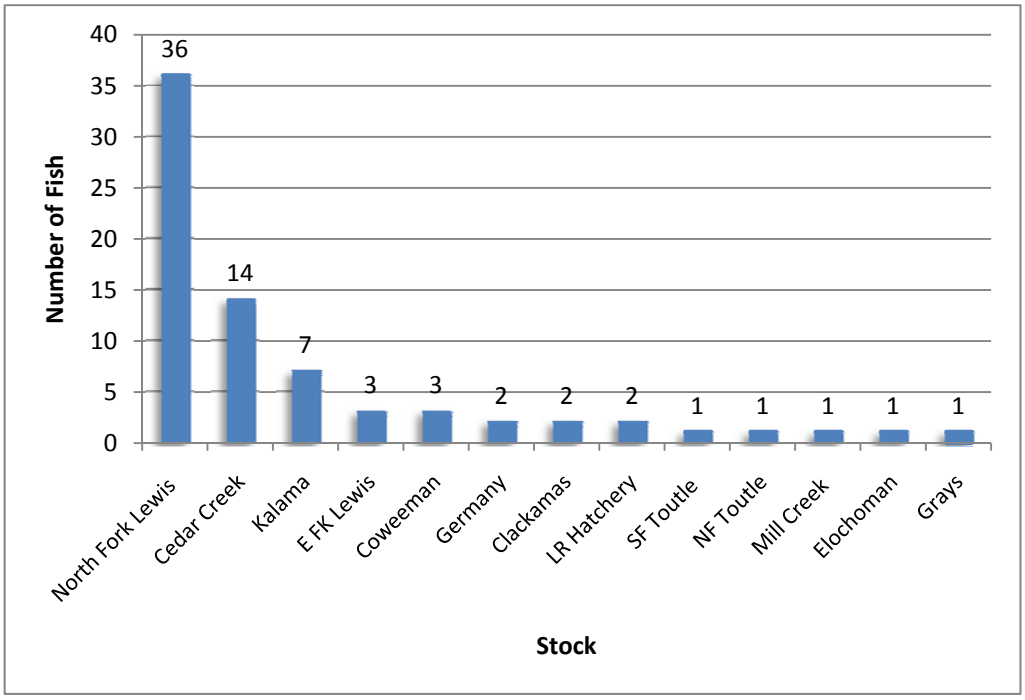

Figure 5. Primary genetic assignments for all fish collected using all methods (n=74)

By evaluating all the assignments percentages greater than 5 percent, we can gain an understanding of how important each stock is in terms of their contribution to the Lewis River basin. Figure 5 provides the proportion or percentage of various stocks identified through genetic assignment analysis. Figure 5, however, only incorporates assignment percentages that were equal to or exceeded 5 percent of the genotype for each fish analyzed.

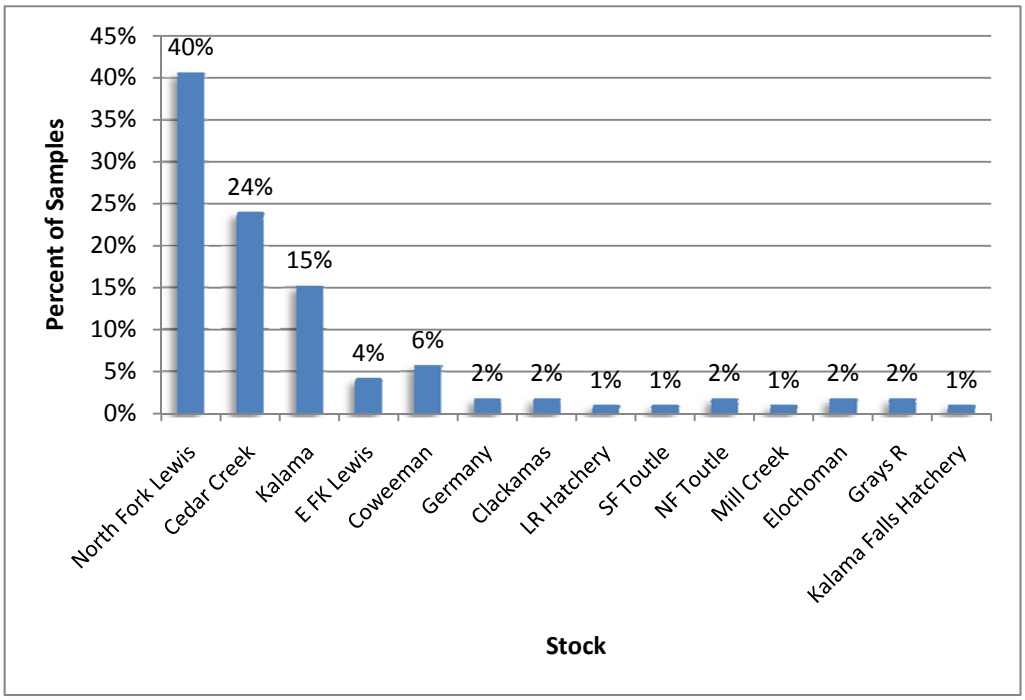

Figure 6. Percent Composition of all unclipped fish collected in 2009 with a 5 percent or greater assignment to a particular stock

IV. Spawning

A total of 21 spawning events took place during the period March 2, 2009 to May 21, 2009 (Table 2). This comprised 12 females and 19 males (Table 1). Three of the crosses were from fish that assigned to out of basin river systems or included summer run steelhead. These crosses were conducted prior to genetic assignment analysis, but after genetic assignment results were known the progeny from these crosses were planted in Battleground Lake - a closed system to provide future sport fishing opportunities. After removing these out of basin fish or summer runs from the brood, a total of 10 females and 16 males represent the 2009 broodstock. The target number (goal) is 25 females and 25 males. The inability to reach the goal in 2009 was due primarily to the late collection start, but poor run size and because this was the first year of the program which decreased efficiency of the in-river netting effort we collected far less than anticipated. Program egg take was 54,400 eggs. The target egg take is 80,000 eggs.

Spawning protocols state a 2x2 cross procedure, however, given the lack of available broodstock (especially females) this was not always possible. The 2009 AOP provides that 1X1 or 2X1 crosses can occur, they are just not preferred. In most instances, a 2x2 cross was conducted (Table 2). Procedures will be implemented in 2010 to improve upon the spawning protocols outlined in the 2010 wild winter steelhead annual plan.

Table 2. Total number of females and male crosses comprising the entire broodstock used during the 2009 egg take season complete with individual primary genetic assignment results for each steelhead spawned

	FEMALES				MALES	
CROSS NUMBER	DNA No.	Primary Assignment Area	Primary Assignment (%)		Primary Assignment Area	DNA No.
1	32	NF LEWIS	100%	99%	N FK LEWIS	12
2	32	NF LEWIS	100%	97%	N FK LEWIS	28
3	35	NF LEWIS	90%	62%	N FK LEWIS	37
4	35	NF LEWIS	90%	99%	N FK LEWIS	29
5	63	NF LEWIS	81%	95%	CEDAR	40
6	63	NF LEWIS	81%	90%	CEDAR	57
7	23	NF LEWIS	99%	82%	N FK LEWIS	19
8	23	NF LEWIS	99%	100%	N FK LEWIS	39
9	65	NF LEWIS	94%	74%	N FK LEWIS	56
10	65	NF LEWIS	94%	58%	N FK LEWIS	46
11	66	NF LEWIS	26%	56%	CEDAR	17
12	66	CEDAR	72%	93%	N FK LEWIS	51
13*	67	**KALAMA/summer**	**97%**	**89%**	**N FK LEWIS**	**45**
14*	67	**KALAMA/summer**	**97%**	**96%**	**N FK LEWIS**	**49**
15	68	CEDAR	55%	62%	CEDAR	41
16	68	CEDAR	55%	88%	CEDAR	55
17	69	MILL CR	78%	58%	N FK LEWIS	46
18	69	MILL CR	78%	74%	N FK LEWIS	56
19	74	KALAMA	65%	98%	N FK LEWIS	25
20	64	CEDAR	85%	96%	N FK LEWIS	71
21*	70	**SF TOUTLE**	**55%**	**93%**	**N FK LEWIS/summer**	**73**

*** Indicates fish that were spawned, but progeny were removed from program and released in Battleground Lake. Source: Eric Kinne, WDFW**

V. Rearing

Unusually high mortality rates were encountered during both egg incubation and pond rearing stages during the 2009 brood year. Columnaris (*Flexibacter columnaris)* contributed significantly to mortality resulting in a nearly 25 percent mortality rate on ponded steelhead fry. This in combination with high egg losses (for unknown reasons) resulted in an overall mortality rate of 55 percent (Table 3). The mode of transmission for the columnaris infection in 2009 is not known.

Table 3. Rearing summary statistics for the 2009 brood year.

GENERAL	**Count**	**Percent of Total**
Egg Take	54,240	
Total Ponded	42,122	
Food Conversion	80:1	
MORTALITY		
Total Egg Loss	12,118	22%
Total Pond Loss	17,812	42%
Due to natural causes	7,658	18%
Due to disease (Culumnaris)	10,154	24%
Overall Loss (egg and pond)	29,930	55%
RELEASE		
Projected Smolt Release (survival)	24,310	45%
Release Date	May 24, 2010	
Release size	7 fpp	

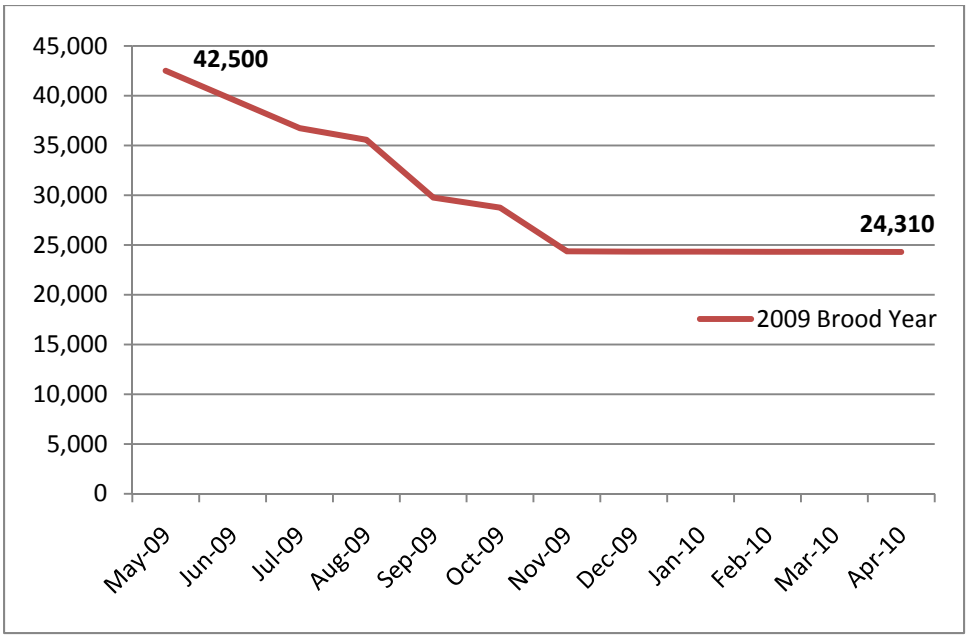

Figure 7. Rate of fish loss during the ponding period for the 2009 brood year.

VI. Tagging

All fish were tagged with blank wire snout tags on November 3 and 4 of 2009

VII. Release Date

All fish will be released by May 24, 2010 at the Merwin boat Launch. A total release number of 24,300 smolts is projected. All fish released volitionally will be released at the Merwin boat ramp. Remaining smolts will be released downstream at the County Bridge in Woodland.

VIII. Monitoring and Evaluation

A. Lower Lewis River Wild Winter Steelhead Abundance Estimates

Redd surveys were used to monitor wild winter steelhead abundance in the lower Lewis River following methods outlined in the Annual Operations Plan. Only three boat surveys (May 1, May 18 and June 15) were conducted during the 2009 sampling period. Survey frequency was limited by periods of poor water clarity and high runoff, which decreased visibility. Each survey started at the Merwin boat ramp. A crew of two biologists motored downstream and enumerated redds, checking both sides of the river. In areas such as Eagle Island where the river splits, both channels were surveyed. The survey area extended to the County Bridge in Woodland –a distance of approximately 14 miles. Redd counts from 2009 surveys are

presented in Table 4. Figure 7 presents the spatial distribution of the steelhead redds observed during 2009 surveys.

Table 4: 2009 Lewis River steelhead redd survey results.

Survey Dates:	**5/1/09**	**5/18/09**	**6/15/09**
New Redds	27	60	85
Still Visible Redds	0	21	44
Survey Totals	27	81	129

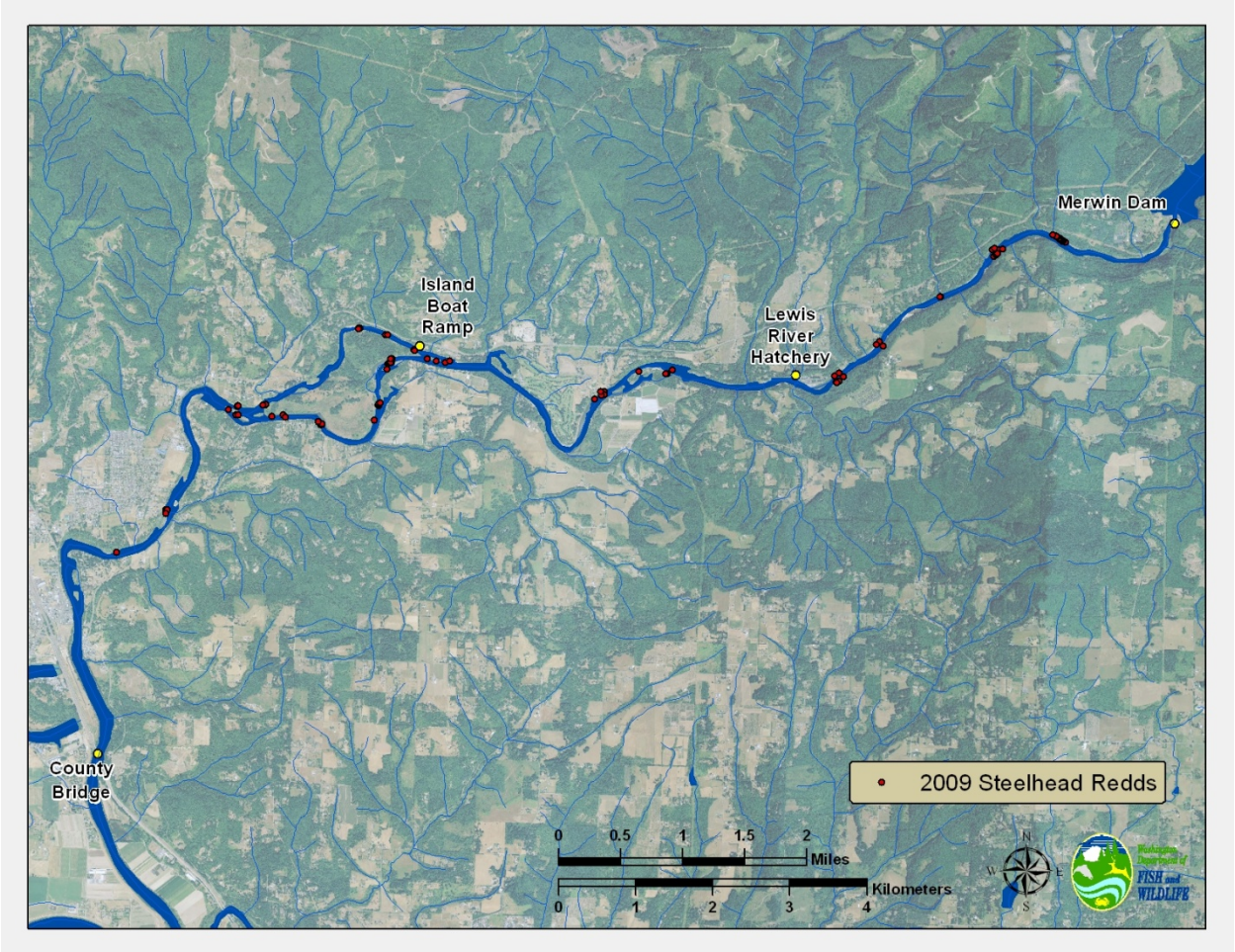

Figure 7. Locations of 2009 winter steelhead redds on the N.F. Lewis River within the survey area from the Woodland County Bridge upstream to Merwin dam. (Redd locations identified are from 2009 survey days only and do not represent a total count of redds for the 2009 season.)

Redd counts were expanded to an estimate of total redds using Area-Under-the-Curve (AUC) methods, similar to those described by Kinsel et al. (2009). The methods of Hilborn et al. (1999) were modified and used to estimate the total number of redds. Spawning time (redd

construction) was assumed to be normally distributed (Hill 1997) and measurement errors were assumed to be normally distributed (Hilborn et al. 1999). Redd life was fixed at 24 days based on results from 2008 surveys. Data analysis was performed in Microsoft Excel (Microsoft Corporation, Redmond, Washington) using an Excel add-in called PopTools (Hood 2009). A total of 172 unique redds were counted in 2009, which resulted in an estimated total of 218 redds (95%CL 182 -264) (Table 5).

Using standard WDFW methodology, the seasonal count of new redds (actual count) and estimated total number of redds (via AUC) were converted to an estimate of spawners to provide a minimum abundance estimate and total abundance estimate, respectively. To estimate the number of spawners, the number of redds was multiplied by 0.81, which was the average number of redds per female in Snow and Salmon Creeks between 1977 and 1980 (Freymond and Foley 1986). This calculation yielded an estimate of the number of female steelhead, which was then multiplied by two to provide the abundance estimate; based on the average winter steelhead sex ratio of 1:1 (Freymond and Foley 1986). Expansion of the actual redd count (n=172) yielded a minimum escapement estimate of 278 spawners, while expansion of the total number of estimated redds (n=218) resulted in a total escapement estimate of 354 spawners (Table 5). Expansion of the redd estimate upper and lower 95% confidence limits provides a range of potential escapement estimates of 182 to 264 spawners. It is important to note that additional uncertainty exists in the redds per female and sex ratio estimates used in the redd count expansion. The total variance associated with these escapement estimates was not calculated.

Table 5. 2009 redd count, estimated total number of redds, and spawner escapement estimate for mainstem Lewis River wild winter steelhead.

	Redds	**L 95% CL**	**U 95% CL**	**Est. ESC**
Count	**172**			**278**
Est. Total	**218**	182	264	**354**

IX. Recommendations for Ongoing Management

On June 16, 2009, the Hatchery and Supplementation subgroup met with the purpose of identifying areas that could be improved based upon implementation in 2009. The following is excerpted from these notes:

- *Annual Operating Plan for steelhead should be completed by December 31 of each year.*
- *Spawning protocols for steelhead will be revisited for out of basin stocks.*

- *What is the preferred disposition of steelhead fry currently being reared at Merwin that have genetic assignment to summer or hatchery fish? The group said the best option would be to release all excess steelhead into Battleground Lake.*
- *Broodstock selection may change in 2010 depending on capture efficiencies and run size. Broodstock may be composed of wild winter steelhead from other select basins. In no event though shall hatchery or summer steelhead be used. Specific stocks to be used will be detailed in the wild winter steelhead AOP for 2010.*
- *The time required to obtain genetic assignment results was longer than expected in 2009. That is, results were not known prior to in-river collection at times, which caused the unnecessary removal of steelhead from their spawning locations. This lag time for genetics will improve for 2010 now that Ken Warheit has developed his procedure.*
- *There is a definite benefit to having more participation by guides in 2010. Especially in our ability to collect females. In 2010, increased coordination with guides will occur*
- *Coordination activities will need more consistent communication among all members, but especially within the in-river collection activities, guides and with the hatchery staff. Weekly conference call should be implemented.*
- *In-river collection timing will be reduced by two weeks to limit the effect on actively spawning steelhead. A majority of the steelhead captured in the last two weeks of May were spawned out. If necessary, additional effort will be directed during the course of the shortened collection curve.*
- *Unusually high egg loss was observed in 2009: Thus, the following actions will take place in 2010.*
    - *Eliminate fecundity sampling on green eggs*
    - *Evaluate the effect of ozone treated water*
    - *The effect or occurrence of poor quality milt or eggs*
- *Fish condition of steelhead being held at Merwin was very poor. The following methods will be employed in 2010 to hopefully improve fish health for steelhead being held at Merwin hatchery.*
    - *The use of circular tanks*
    - *Use of MS-222 to reduce handling stress*
    - *Use of rubberized nets to reduce descaling and slime removal*

Other areas that should be evaluated include

1. Ways to improve the balance or ratio of males and females at the hatchery to ensure that adequate females and males are available to achieve spawning protocols.
2. Provide weekly updates to the HS subgroup to improve dissemination of information to all interested parties.
3. Timely genetic results are very important to the success of this program and in limiting the effect on the natural population. Delays in obtaining results should be kept at a minimum if at all possible. In-river collection activities pose the largest threat to exploiting the natural population. Therefore, this activity will be limited by at least two weeks and should have defined numbers (or quotas) for each outing. That way, excess fish are not collected from spawning areas and

thus limiting potential production or diversity within the endemic population of Lewis River winter steelhead.

Redd Surveys: There were a total of three surveys completed in 2009. This small number of surveys does not provide a useful estimate of escapement. Increasing the number of surveys may not always be possible due to poor water conditions during this time of year. Redd surveys should capitalize on times when river conditions are good. That is, instead of specifying a certain day per week, the surveys should be completed when river conditions are favorable – low and clear. Also, the method for each survey and how each redd is identified should be standardized. Survey method should incorporate index areas within the 14 mile survey area. This area is so large that it is difficult for one boat to complete an area this size in one day. Also, rather than use of flagging to identify redds, painted rocks placed on each redd would be a more precise indicator that a particular redd has already been included in the estimate. The use of GPS, rather than descriptive identifiers should also be incorporated.

X. In-river Netting Recommendations

Net types and selection

In 2009, several types of nets were used to test their efficiency. We also tested ways in which the net was deployed from the boat and how the boat was positioned to drift with the net. It became clear that every area is different and requires different deployment methods.

A number of different type tangle nets were tested in 2009. These include the following:

- Monofilament vs. Multistrand
- Color of net material
- Tensile strength of net material
- Mesh Size
- The use of runner strands to keep lead line moving
- Experimenting with different size floats
- Experimenting with different deployment and drifting methods

Monofilament nets performed better than multi-strand nets. The multi-strand nets were more durable, but were not as “sticky” as the monofilament which became an

important factor in faster water. The color and tensile strength of the net material are also important. Lighter tensile strength nets catch more fish, but can break on larger fish and are not very durable. We found that tensile strength of 8 pound test was a good compromise between capture efficiency and durability. Dying the monofilament a dark green appears to enhance capture efficiency as well. Perhaps the most important factor is the mesh size. Too small and larger fish will not be captured; too large and there is a risk of causing unacceptable handling stress or injury to fish. Based on our experience, we found a 4-inch stretch mesh to meet both our capture efficiency goal and to reduce any serious injury to potential broodstock.

All nets used a 6 or 8 foot bag. The depth of the net does not appear to be a major component determining efficiency. This is probably because steelhead are typically near the bottom and deeper nets will not improve capture efficiency for these fish. The depth of net should be based on personal preference and the ability of the crew to deploy the net. Smaller depth nets are easier to deploy and retrieve.

Our recommendation for tangle nets in the Lewis River includes the following:

Mesh Size: 4-inch stretch

Net Strength: 8 pound test monofilament

Net Color: Dark green

Net Length: 125 – 175 feet

Bag Depth: 6 – 8 feet

* Float line and weight should be balanced to allow maximum floatation of the net while drifting. Different size weight lines may improve catch rates depending on flows.

<u>Netting period</u>

In 2009, we found that as we approached the last two weeks of the collection window a substantial number of the steelhead captured were either spawned out, in the act of spawning or very ripe. We had significant concerns regarding the benefits of continuing in-river netting activities into late May and its effect on actively spawning steelhead. We believe that the effects of netting on spawning steelhead are largely unknown; therefore, we suspended in-river netting activities on May 26 after consultation with the HSS. The collection window for in-river netting needs further review by the HSS to reduce any adverse effects to actively spawning steelhead in the North Fork Lewis River.

XI. References

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APPENDIX A

Broodstock Collection Datasheet

APPENDIX A - BROODSTOCK COLLECTION DATASHEET

Sample Date	Trap Date	Location of Capture	Capture Method	Gender	Fork Length (CM)	Floy Tag #	Pit Tag #	DNA Sample #	DNA Results % N. R. Lewis	Returned To River	Maturity	MS 222 Y or N	Other Marks	Comments
1/26/2009	1/21/2009	MDFCF	Merwin Trap	M	84		2CEA87A6	1	0.668	N.Fork Lewis Island BL	Green	Y	N	
1/26/2009	1/21/2009	MDFCF	Merwin Trap	M	73		2CEC2503	2	0.001	N.Fork Lewis Island BL	Green	Y	N	
1/26/2009	1/21/2009	MDFCF	Merwin Trap	F	84		2CE9E215	3	0.594	N.Fork Lewis Island BL	Green	Y	N	
1/26/2009	1/21/2009	MDFCF	Merwin Trap	F	78		2CDA9A84	4	0.048	N.Fork Lewis Island BL	Green	Y	N	
1/26/2009	1/21/2009	MDFCF	Merwin Trap	F	77		2CEBD4E1	5	0.598	N.Fork Lewis Island BL	Green	Y	N	
1/26/2009	1/21/2009	MDFCF	Merwin Trap	F	80		2CEA28FA	6	0.05	N.Fork Lewis Island BL	Green	Y	N	
1/26/2009	1/21/2009	MDFCF	Merwin Trap	M	54		2CEA879B	7	0.034	N.Fork Lewis Island BL	Green	Y	N	
1/26/2009	1/21/2009	MDFCF	Merwin Trap	F	87		2CE9F302	8	0.001	N.Fork Lewis Island BL	Ripe	Y	N	
2/2/2009	2/2/2009	MDFCF	Merwin Trap	M	89		2CEA950B	9	0.959	N.Fork Lewis Island BL	Green	Y	N	
2/9/2009	2/9/2009	MDFCF	Merwin Trap	M	88		2CEBD25E	10	.836 Kalama W	N.Fork Lewis Island BL	Not Checked	N	N	
2/17/2009	2/17/2009	MDFCF	Merwin Trap	F	68		2CEAF76E	11	1	N.Fork Lewis Island BL	Green	N	N	
3/2/2009	3/2/2009	MDFCF	Merwin Trap	M	77		2CEAF1E5	12	0.986		Ripe	Y	N	Spawned w/#32 4/16/09
3/4/2009	3/4/2009	Lower River	Tangle net	M	67	chartreuse 0026	2CEA2AF2	13	0.698	N.Fork Lewis Island BL	Green	N	N	North Fork Fish Release
3/11/2009	3/11/2009	Lower River	Tangle net	M	77	orange 00050	2CEBB125	14	0.625 Eloch, 0.254 NF L.	N.Fork Lewis Island BL	Green	Y	N	
3/11/2009	3/11/2009	Lower River	Tangle net	M	68	green/yellow 1076	2CEA8BD4	15	362 NF L., 0.355 Kal Su, 0,275 El	N.Fork Lewis Island BL	Green	Y	N	
3/25/2009	3/25/2009	Lower River	Tangle net	M	48	pink 00125	2CEBCD3A	16	0.991 Cedar 0.009 NF Lewis		Green	Y	Y	Mortality
3/25/2009	3/25/2009	Lower River	Tangle net	M	89	pink 00124	2CEA59A0	17	0.556 Cedar 0.441 NF Lewis		Green	Y	Y	Spawn w/#66 5/13/09
3/25/2009	3/25/2009	Lower River	Tangle net	F	81	pink 00123	2CEA2935	18	1.0 EF Lewis	N.Fork Lewis Island BL	Green	Y	Y	
3/25/2009	3/25/2009	Lower River	Tangle net	M	94	pink 00122	2CEA88EC	19	0.819		Ripe	Y	Y	Spawned w/#23 5/1/09
3/25/2009	3/25/2009	Lower River	Tangle net	M	85	pink 00120	2CEA5B1B	20	0.108 Cedar	N.Fork Lewis Island BL	Green	Y	Y	
3/25/2009	3/25/2009	Lower River	Tangle net	M	52	pink 00119	2CEBD83D	21	0.486 NR L. 0.476 EF L.		Green	Y	Y	Mortality
3/25/2009	3/25/2009	Lower River	Tangle net	F	84	pink 00118	2CEC416F	22	0.991 EF Lewis	N.Fork Lewis Island BL	Green	Y	Y	
3/25/2009	3/25/2009	Lower River	Tangle net	F	80	pink 00117	2CEC1FDC	23	0.999		Ripe	Y	Y	Spawned w/#19,#39 5/1/09
3/30/2009	3/30/2009	MDFCF	Merwin Trap	M	77	orange/blue 00025	2C48978F	24	0.951 Clackamas. 0.046 NF L.	N.Fork Lewis Island BL	Green	Y	N	
3/30/2009	3/27/2009	Lower River	Hook and Line	M	57	orange/blue 0024	2C486050	25	0.977		Green	Y	Y	Spawned w/#74 5/21/09
4/1/2009	3/27/2009	Lower River	Hook and Line	F	73	N/A	Mortality	26	0.994			N/A	N	Mortality due to malfunctioning oxygen regulator
4/1/2009	3/30/2009	Lower River	Hook and Line	M	70	N/A	Mortality	27	0.912			N/A	N	Mortality
4/1/2009	3/31/2009	Lower River	Hook and Line	M	63	orange 00026	2C486072	28	0.973		Ripe	Y	Y	Spawned w/#32 4/16/09
4/1/2009	3/31/2009	Lower River	Hook and Line	M	88	orange 00027	2C46DD18	29	0.998		Ripe	Y	Y	Spawned w/#35 4/29/09
4/1/2009	3/31/2009	Lower River	Hook and Line	M	77	orange 00028	2C464420	30	0.998	N.Fork Lewis Island BL	Green	Y	N	Broodstock Released
4/2/2009	4/1/2009	Lower River	Tangle net	M	92	green/yellow 00026	2CEC2BA9	31	0.864 Coweeman	N.Fork Lewis Island BL	Green	Y	Y	
4/2/2009	4/1/2009	Lower River	Tangle net	F	84	green/yellow 00031	2CEBD579	32	1		Ripe	Y	N	Spawned w/#12,#28 4/16/09
4/2/2009	4/1/2009	Lower River	Tangle net	F	73	green/yellow 00030	2CEBD590	33	0.967 Coweeman	N.Fork Lewis Island BL	Green	Y	N	
4/9/2009	4/8/2009	Lower River	Tangle net	M	74	orange/blue 00007	2CEBEB7B	34	0.98		Green	Y	N	Mortality 5/13/09
4/9/2009	4/8/2009	Lower River	Tangle net	F	82	orange/blue 00008	2CEBF082	35	0.9		Green	Y	N	Spawned w/#29,#37 4/29/09
4/9/2009	4/8/2009	Lower River	Tangle net	M	56	orange/blue 00009	2CEBAD5B	36	0.946	N.Fork Lewis Island BL	Green	Y	N	Broodstock Released 5/26/09 Green

Sample Date	Trap Date	Location of Capture	Capture Method	Gender	Fork Length (CM)		Pit Tag #	DNA Sample #	DNA Results % Merwin Wild	Returned To River	Maturity	MS 222 Y or N	Other Marks	comments
4/13/2009	4/13/2009	MDFCF	Merwin Trap	M	91	yellow 00027	**2CE9FCF7**	37	0.621 NF L., .379 Coweeman		**Ripe**	Y	N	**Spawned w/#35 4/29/09**
4/13/2009	4/13/2009	MDFCF	Merwin Trap	M	74	yellow 00028	**2CEA5EBE**	38	0.851 Coweeman		Green	Y	N	**Mortality**
4/14/2009	4/13/2009	Lower River	Hook and Line	M	71	orange 00049	**2CEBFEF5**	39	1		**Ripe**	Y	N	**Spawned w/#23 5/1/09**
4/16/2009	4/15/2009	Lower River	Tangle net	M	53	orange/blue 00010	**2CEA2BED**	40	94.5		**Ripe**	Y	N	**Spawned w/ #63 5/12/09**
4/16/2009	4/15/2009	Lower River	Tangle net	M	56	orange/blue 00011	**2CEA2681**	41	0.622 Cedar, 0.377 NF L.		Green	Y	N	**Spawn w/#68 5/14/09**
4/16/2009	4/15/2009	Lower River	Tangle net	F	79	orange/blue 00012	**2CEA9B44**	42	0.922 EF Lewis	N.Fork Lewis Island BL	Green	Y	N	
4/16/2009	4/15/2009	Lower River	Tangle net	F	64	orange/blue 00013	**2CEBB7E4**	43	0.913 Kalama W	N.Fork Lewis Island BL	Green	Y	N	**After release fish was tapped at K. Falls Hatchery and released above the hatchery**
4/16/2009	4/15/2009	Lower River	Tangle net	F	61	orange/blue 00014	**2CEBC0A8**	44	0.766 Kalama Su	N.Fork Lewis Island BL	Green	Y	N	
4/16/2009	4/15/2009	Lower River	Tangle net	M	55	orange/blue 00015	**2CEA54F4**	45	0.892		Green	Y	N	**Spawn w/#67 5/13/09**
4/16/2009	4/15/2009	Lower River	Tangle net	M	45	orange/blue 00016	**2CEC1F03**	46	0.579 NF L., 0.214 Cedar		Green	Y	N	**Spawn w/#65,#69 5/19/09**
4/21/2009	4/21/2009	MDFCF	Merwin Trap	M	93	No floy tag	**2CEA64A0**	47	0.937		Green	Y	N	**Mortality 4/28/09**
4/21/2009	4/21/2009	MDFCF	Merwin Trap	F	85	Green 00052	**No Pit Tag**	48	0.564 Kalama, 0.399 NF L.	N.Fork Lewis Island BL	**Ripe**	Y	N	**Returned to River per protocal, DNA taken**
4/21/2009	4/21/2009	MDFCF	Merwin Trap	M	68	Green 00053	**2CEA5A8C**	49	0.955		Green	Y	N	**Spawn w/#67 5/13/09**
4/21/2009	4/21/2009	MDFCF	Merwin Trap	M	68	Green 00054	**2CEBB448**	50	0.897	N.Fork Lewis Island BL	Green	Y	N	**Broodstock Released 5/26/09 Green**
4/21/2009	4/18/2009	Lower River	Hook and Line	M	79	Orange 00029	**2CEA991E**	51	0.927		Green	Y	N	**Spawn w/#66 5/13/09**
4/21/2009	4/21/2009	Lower River	Tangle net	M	61	Orange 00030	**2CEC35D5**	52	0.949	N.Fork Lewis Island BL	Green	Y	Y	**Broodstock Released 5/26/09 Green**
4/21/2009	4/21/2009	Lower River	Tangle net	M	90	Orange 00031	**2CEA29EE**	53	0.993	N.Fork Lewis Island BL	Green	Y	N	**Broodstock Released 5/26/09 Green**
4/21/2009	4/21/2009	Lower River	Tangle net	M	55	Orange 00032	**2CEA471A**	54	0.965	N.Fork Lewis Island BL	Green	Y	N	**Broodstock Released 5/26/09 Green**
4/29/2009	4/29/2009	MDFCF	Merwin Trap	M	93	Green/Yellow 00032	**2CDA9AF5**	55	0.883 Cedar, .054 NF L.		Green	Y	N	**Spawned w/#68 5/14/09**
4/29/2009	4/29/2009	Lower River	Tangle net	M	58	Green/Yellow 00050	**2CEBCC6E**	56	0.743		Green	Y	N	**Spawned w/#65, #69 5/19/09**
4/29/2009	4/29/2009	Lower River	Tangle net	M	76	Green/Yellow 00049	**2CEBF1BE**	57	0.902 Cedar		**Ripe**	Y	N	**Spawned w/#63 5/12/09**
4/29/2009	4/29/2009	Lower River	Tangle net	M	97	Green/Yellow 00048	**2CEA931D**	58	0.831 Cedar		Green	Y	Y	**Mortality 4/30/09**
4/29/2009	4/29/2009	Lower River	Tangle net	M	63	Green/Yellow 00047	**2CEA8956**	59	0.776	N.Fork Lewis Island BL	Green	Y	N	**Broodstock Released**
4/29/2009	4/29/2009	Lower River	Tangle net	M	52	Green/Yellow 00046	**2CEAF388**	60	0.96	N.Fork Lewis Island BL	Green	Y	N	**Broodstock Released**
4/29/2009	4/29/2009	Lower River	Tangle net	M	73	Green/Yellow 00045	**2CEBD96A**	61	0.982 Kalama Su	N.Fork Lewis Island BL	Green	Y	N	
4/29/2009	4/29/2009	Lower River	Tangle net	M	63	Green/Yellow 00044	**2CEBC339**	62	0.965	N.Fork Lewis Island BL	Green	Y	N	**Broodstock Released 5/26/09 Green**
4/29/2009	4/29/2009	Lower River	Tangle net	F	73	Green/Yellow 00043	**2CDA989F**	63	0.814		**Ripe**	Y		**Spawned w/#57,#40 5/12/09**
5/13/2009	5/13/2009	MDFCF	Merwin Trap	F	78	Orange 00034	**2CEAF2A2**	64	0.858 Cedar, 0.142 NF L.		Green	Y	N	**Spawned w/#71 5/26/09**
5/13/2009	5/13/2009	MDFCF	Merwin Trap	F	83	Orange 00035	**2CEC3B3E**	65	0.942 NF L., 0.042 Kalama		Ripe	Y	Y	**Spawned w/#46,#56 5/19/09**
5/13/2009	5/13/2009	MDFCF	Merwin Trap	F	75	NA	NA	66	0.723 Cedar, 0.264 NF L.		Ripe	Y	N	**Spawned w/#17,#51 5/13/09**
5/13/2009	5/13/2009	MDFCF	Merwin Trap	F	80	NA	NA	67	0.97 Kalama S, 0.025 NF L.		Ripe	Y	N	**Spawned w/#45,#49 5/13/09**
5/14/2009	5/14/2009	Lower River	Tangle net	F	71	NA	NA	68	0.553 Cedar, 0.285 Kalama		Ripe	Y	N	**Spawned w/#41,#55 5/14/09**
5/19/2009	5/18/2009	Lower River	Tangle net	F	69	NA	NA	69	.779 Mill Cr		Ripe	Y	N	**Spawned w/#46,#56 5/19/09**
5/21/2009	5/21/2009	MDFCF	Merwin Trap	F	73	Orange 00036	2CEA790C	70	.549 SF Toutle, 0.289 NF L.		Green	Y	N	**Spawned w/#73 5/26/09**
5/21/2009	5/21/2009	MDFCF	Merwin Trap	M	78	Orange 00037	2CEA99DB	71	.959 NF Lewis		Green	Y	N	**Spawned w/#64 5/26/09**
5/21/2009	5/21/2009	MDFCF	Merwin Trap	M	71	Orange 00038	2CEBAD8B	72	.652 Cedar, 0.341 Kalama	N.Fork Lewis Island BL	Green	Y	N	
5/21/2009	5/21/2009	Lower River	Tangle net	M	74	Orange 00039	2CEC41F7	73	.928 LR Hatchery Sum.		Green	Y	N	**Spawned w/#70 5/26/09**
5/21/2009	5/21/2009	Lower River	Tangle net	F	75	NA	**NA**	74	.648 Kalama, 0.310 Kalama hat		Ripe	Y	N	**Spawned w/#25 5/21/09**

Wild Winter Steelhead Data Sheet

Sample Date	Trap Date	Location of Capture	Capture Method	Gender	Fork Length (CM)	Pit Tag #	DNA Sample #	DNA Results	Returned To River	Maturity

APPENDIX B

Genetic Assignments

APPENDIX B: Genetic Assignments for Lewis River Late Wild Winter Steelhead Program 2009

Sample	Population with Greatest Probability	Greatest Prob	Pop with 2nd greatest prob	2nd greatest prob	Pop with 3rd greatest prob	3rd greatest prob	NFLewisR Totals	
1	NFLewisR_Cedar	0.952	NFToutleR	0.035	GermanyCr	0.012	NFLewis	0.952
2	LRhatcW	0.970	NFLewisR_Cedar	0.026	GermanyCr	0.004	NFLewis	0.026
3	GarysR	0.550	NFToutleR	0.250	NFLewisR_Cedar	0.191	NFLewis	0.191
4	NFToutleR	0.982	GermanyCr	0.017	NFLewisR_Cedar	0.001	NFLewis	0.001
5	NFLewisR_Cedar	0.990	GermanyCr	0.009	LRhatcW	0.001	NFLewis	0.990
6	NFLewisR_Cedar	0.998	NFToutleR	0.002	GermanyCr	0.000	NFLewis	0.998
7	GermanyCr	0.713	NFLewisR_Cedar	0.156	GarysR	0.120	NFLewis	0.156
8	GermanyCr	0.948	LRhatcW	0.046	NFLewisR_Cedar	0.005	NFLewis	0.005
9	NFLewisR_Merwin	0.959	KalamaR_W	0.030	NFLewisR_Cedar	0.011	NFLewisR	0.97
10	KalamaR_W	0.836	KalamaR_Su	0.099	NFLewisR_Merwin	0.055	NFLewisR	0.06
11	NFLewisR_Merwin	1.000	KalamaR_Su	0.000	KalamaR_W	0.000	NFLewisR	1.00
12	NFLewisR_Merwin	0.986	ElochomanR	0.008	KalamaR_Su	0.005	NFLewisR	0.99
13	NFLewisR_Merwin	0.698	NFLewisR_Cedar	0.227	KalamaR_W	0.035	NFLewisR	0.93
14	ElochomanR	0.652	NFLewisR_Merwin	0.254	NFLewisR_Cedar	0.057	NFLewisR	0.31
15	NFLewisR_Merwin	0.362	KalamaR_Su	0.355	ElochomanR	0.275	NFLewisR	0.362
16	NFLewisR_Cedar	0.991	NFLewisR_Merwin	0.009	ClackamasR	0.000	NFLewisR	1.000
17	NFLewisR_Cedar	0.556	NFLewisR_Merwin	0.441	ClackamasR	0.003	NFLewisR	0.997
18	EFLewisR	1.000	NFLewisR_Merwin	0.000	NFLewisR_Cedar	0.000	NFLewisR	0.000
19	NFLewisR_Merwin	0.819	NFLewisR_Cedar	0.180	EFLewisR	0.000	NFLewisR	0.999
20	ClackamasR	0.705	EFLewisR	0.126	NFLewisR_Cedar	0.108	NFLewisR	0.108
21	NFLewisR_Merwin	0.486	EFLewisR	0.476	ClackamasR	0.036	NFLewisR	0.486
22	EFLewisR	0.991	NFLewisR_Merwin	0.009	NFLewisR_Cedar	0.000	NFLewisR	0.009
23	NFLewisR_Merwin	0.999	NFLewisR_Cedar	0.001	ClackamasR	0.000	NFLewisR	1.000
24	ClackamasR	0.951	NFLewisR_Merwin	0.046	NFLewisR_Cedar	0.002	NFLewisR	0.048
25	NFLewisR_Merwin	0.977	NFLewisR_Cedar	0.023	ClackamasR	0.000	NFLewisR	1.000
26	NFLewisR_Merwin	0.994	CoweemanR	0.006	KalamaR_W	0.000	NFLewisR	0.994
27	NFLewisR_Merwin	0.912	CoweemanR	0.087	KalamaR_W	0.001	NFLewisR	0.912
28	NFLewisR_Merwin	0.973	CoweemanR	0.027	KalamaR_W	0.000	NFLewisR	0.973
29	NFLewisR_Merwin	0.998	CoweemanR	0.002	KalamaR_W	0.000	NFLewisR	0.998
30	NFLewisR_Merwin	0.998	KalamaR_W	0.001	CoweemanR	0.000	NFLewisR	0.998
31	CoweemanR	0.864	KalamaR_W	0.080	NFLewisR_Merwin	0.056	NFLewisR	0.056
32	NFLewisR_Merwin	1.000	KalamaR_W	0.000	CoweemanR	0.000	NFLewisR	1.000
33	CoweemanR	0.967	NFLewisR_Merwin	0.033	KalamaR_W	0.000	NFLewisR	0.033
34	NFLewisR_Merwin	0.980	CoweemanR	0.020	KalamaR_W	0.000	NFLewisR	0.980
35	NFLewisR_Merwin	0.900	CoweemanR	0.100	KalamaR_W	0.000	NFLewisR	0.900
36	NFLewisR_Merwin	0.946	CoweemanR	0.054	KalamaR_W	0.000	NFLewisR	0.946
37	NFLewisR_Merwin	0.621	CoweemanR	0.379	KalamaR_W	0.000	NFLewisR	0.621
38	CoweemanR	0.851	NFLewisR_Merwin	0.149	KalamaR_W	0.000	NFLewisR	0.149
39	NFLewisR_Merwin	1.000	CoweemanR	0.000	KalamaR_W	0.000	NFLewisR	1.000
40	NFLewisR_Cedar	0.945	NFLewisR_Merwin	0.045	KalamaR_W	0.010	NFLewisR	0.990
41	NFLewisR_Cedar	0.622	NFLewisR_Merwin	0.377	KalamaR_W	0.001	NFLewisR	0.999
42	EFLewisR	0.922	NFLewisR_Merwin	0.053	NFLewisR_Cedar	0.025	NFLewisR	0.078
43	KalamaR_W	0.913	NFLewisR_Cedar	0.064	NFLewisR_Merwin	0.023	NFLewisR	0.087
44	KalamaR_Su	0.766	NFLewisR_Cedar	0.205	NFLewisR_Merwin	0.029	NFLewisR	0.234
45	NFLewisR_Merwin	0.892	NFLewisR_Cedar	0.102	KalamaR_W	0.004	NFLewisR	0.994
46	NFLewisR_Merwin	0.579	NFLewisR_Cedar	0.214	KalamaR_W	0.205	NFLewisR	0.793
47	NFLewisR_Merwin	0.937	NFLewisR_Cedar	0.055	KalamaR_W	0.008	NFLewisR	0.992
48	KalamaR_W	0.564	NFLewisR_Merwin	0.399	EFLewisR	0.019	NFLewisR	0.399
49	NFLewisR_Merwin	0.955	NFLewisR_Cedar	0.042	KalamaR_W	0.003	NFLewisR	0.997

50	NFLewisR_Merwin	0.897	KalamaR_W	0.087	NFLewisR_Cedar	0.016	NFLewisR	0.913
51	NFLewisR_Merwin	0.927	KalamaR_W	0.073	NFLewisR_Cedar	0.001	NFLewisR	0.927
52	NFLewisR_Merwin	0.949	KalamaR_W	0.027	NFLewisR_Cedar	0.025	NFLewisR	0.973
53	NFLewisR_Merwin	0.993	KalamaR_W	0.005	NFLewisR_Cedar	0.003	NFLewisR	0.995
54	NFLewisR_Merwin	0.965	NFLewisR_Cedar	0.031	KalamaR_W	0.004	NFLewisR	0.996
55	NFLewisR_Cedar	0.883	KalamaR_Su	0.063	NFLewisR_Merwin	0.054	NFLewisR	0.937
56	NFLewisR_Merwin	0.743	NFLewisR_Cedar	0.199	KalamaR_Su	0.058	NFLewisR	0.942
57	NFLewisR_Cedar	0.902	NFLewisR_Merwin	0.050	KalamaR_Su	0.048	NFLewisR	0.952
58	NFLewisR_Cedar	0.831	KalamaR_Su	0.141	NFLewisR_Merwin	0.027	NFLewisR	0.859
59	NFLewisR_Merwin	0.776	NFLewisR_Cedar	0.223	KalamaR_Su	0.000	NFLewisR	1.000
60	NFLewisR_Merwin	0.960	NFLewisR_Cedar	0.038	KalamaR_Su	0.001	NFLewisR	0.999
61	KalamaR_Su	0.982	NFLewisR_Cedar	0.013	NFLewisR_Merwin	0.005	NFLewisR	0.018
62	NFLewisR_Merwin	0.965	NFLewisR_Cedar	0.035	KalamaR_Su	0.000	NFLewisR	1.000
63	NFLewisR_Merwin	0.814	KalamaR_Su	0.131	NFLewisR_Cedar	0.055	NFLewisR	0.869
64	NFLewisR_Cedar	0.858	NFLewisR_Merwin	0.142	KalamaR_Su	0.000	NFLewisR	1.000
65	NFLewisR_Merwin	0.942	KalamaR_Su	0.042	NFLewisR_Cedar	0.016	NFLewisR	0.958
66	NFLewisR_Cedar	0.723	NFLewisR_Merwin	0.269	KalamaR_Su	0.008	NFLewisR	0.992
67	KalamaR_Su	0.970	NFLewisR_Merwin	0.025	NFLewisR_Cedar	0.005	NFLewisR	0.030
68	NFLewisR_Cedar	0.553	KalamaR_W	0.285	NFLewisR_Merwin	0.162	NFLewisR	0.715
69	MillCr	0.779	KalamaFallHat	0.085	NFLewisR_Cedar	0.061	NFLewisR	0.081
70	SFToutleR	0.549	NFLewisR_Merwin	0.289	NFLewisR_Cedar	0.101	NFLewisR	0.389
71	NFLewisR_Merwin	0.949	NFLewisR_Cedar	0.047	KalamaR_W	0.003	NFLewisR	0.996
72	NFLewisR_Cedar	0.652	KalamaR_W	0.341	ElochomanHat	0.004	NFLewisR	0.655
73	LRhatcSum	0.928	NFLewisR_Cedar	0.032	NFLewisR_Merwin	0.030	NFLewisR	0.062
74	KalamaR_W	0.648	KalamaFallHat	0.310	NFLewisR_Merwin	0.037	NFLewisR	0.039

APPENDIX C

Egg Inventory and Distribution

APPENDIX C - EGG INVENTORY AND DISTRIBUTION

I.D. CODE: SH:WI:LEWI:09:W **HATCHERY:** Merwin **PERIOD ENDING:** Jun-09

TAKE	LOT	GREEN EGGS			EYED EGGS			EGG	%	SHORT/	ADJUSTED		PLANTED/			Project to
DATE	NO.	NUMBER	LBS/OZ	SAMPLE	NUMBER	LBS/OZ	SAMPLE	LOSS	LOSS	OVER	EGG TAKE	RECEIVED	SHIPPED	DESTROYED	TOTAL ON HAND	Pond
16-Apr	F#32	8,300		2997	4,941		2529	4,194	46%	835	9,135				4,941	4900
29-Apr	F#35	1,549		2383	1,204		2141	235	16%	-110	1,439				1,204	1200
1-May	F#23	4,606		2698	3,027		2142	1,313	30%	-266	4,340				3,027	3000
11-May	F#63	4,904		3365	3,380		2663	1,349	29%	-175	4,729				3,380	3300
13-May	F#66	5,150		3214	3,338		2506	1,195	26%	-617	4,533				3,338	3300
14-May	F#68	5,755		2993	4,864		2432	731	13%	-160	5,595				4,864	4800
19-May	F#65	9,614		3930	6,904		2625	1,063	13%	-1,647	7,967				6,904	6900
19-May	F#69	2,384		2450	2,281		2352	412	15%	309	2,693				2,281	2200
21-May	F#74	2,867		2650	3,723		3416	737	17%	1,593	4,460				3,723	3700
26-May	F#64	12,331		3350	8,460		2120	889	10%	-2,982	9,349				8,460	8400
TOTAL	10	57,460		3,003	42,122		2,493	12,118	22%	-3,220	54,240				42,122	41,700

APPENDIX D

Wild Winter Steelhead

Spawning Log

APPENDIX D - Wild Winter Steelhead Spawning Log 2009

Female Assignment	Spawn Date	Female DNA #	Male DNA #	Live Spawn Males	Total Egg Weight (grams)	Green Egg Sample Weight (grams)	# Eggs in sample	Green Eggs/LB	Estimate Eggs/Female	Eyed Egg Eggs/LB	Total Dead Eggs	Eyed Eggs On-Hand	Actual Eggs/Female	Percent of Egg Loss	Ponding	Estimate # Fry
Lewis	4/16/2009	32	12,28	N	1261.2	35.6	235	2997	8325	2529	4194	4941	9135	45.9	Shallow 1 lower	4900
Lewis	4/29/2009	35	29,37	N	295.1	32.2	169	2383	1549	2041	230	1204	1434	16	Shallow 1 upper	1200
Lewis	5/1/2009	23	19,39	N	775	31.8	189	2698	4606	2142	1313	3027	4340	30.2	Shallow 1 upper	3000
Lewis	5/11/2009	63	40,57	N	661.7	25.5	189	3365	4904	2663	1349	3380	4729	28.5	Trough 4	3300
Cedar	5/13/2009	66	17,51	N	727.5	25	177	3214	5150.7	2506	1195	3338	4533	26	Trough 4	3300
Kalama Summer	5/13/2009	67	45,49	N	1114.6	23.5	205	3960	9723	2967	1859	7349	9208	20	**un-fed fry plant 7/6 B.G.**	0
Cedar	5/14/2009	68	41,55	N	872.9	31.7	209	2993	5755	2432	731	4864	5595	13	Trough 4	4800
Cedar	5/19/2009	65	56,46	N	1110.6	NA	NA	3930	9614	2625	1063	6904	9030	11.8	Trough 3	6900
Mill Creek	5/19/2009	69	46,56	N	441.7	NA	NA	2450	2384	2352	412	2281	2693	15.2	Trough 3	2200
Kalama Wild Winter	5/21/2009	74	25	N	491.2	NA	NA	2650	2867	3416	737	3723	4460	16.5	Trough 3	3700
Cedar	5/26/2009	64	71	N	1671.1	NA	NA	3350	12331	2120	889	8460	9349	9.5	Shallow 2	8400
South Fork Toutle	5/26/2009	70	73	N	729.9	NA	NA	3200	5145	2781	3330	1944	5274	63	**un-fed fry plant 7/13 B.G.**	0
												42122				**41700**

Represents fry plant into Battleground Lak