ANNUAL PROJECT PERFORMANCE REPORT

Lower Snake River Compensation Plan

Oregon Evaluation Studies

FWS Agreement No. F12AC00092
Contract Period 1 October 2011 – 30 September 2012

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INTRODUCTION

The goals of these studies are: 1) to evaluate the success of achieving Lower Snake River Compensation Plan objectives, 2) develop and recommend hatchery practices for LSRCP hatchery production facilities in Oregon that will meet compensation requirements and management objectives for the production of spring Chinook salmon and summer steelhead lost as a result of construction of the Lower Snake River dams, and 3) provide natural production and life history information to assist in recovery and monitoring of threatened salmonids in northeast Oregon.

We are conducting an ongoing comprehensive evaluation program for LSRCP activities in Oregon that address the following general guidelines:

1. Develop and evaluate operational procedures which will meet recovery and compensation goals as well as management objectives by priority.
2. Monitor operational practices to document hatchery production capabilities and challenges.
3. Monitor fish-rearing activities and results to document accomplishment of goals.
4. Coordinate research and management programs with hatchery capabilities.
5. Recommend hatchery production strategies that are consistent with endangered species recovery efforts.
6. Develop knowledge and information to guide recovery actions and to monitor recovery in the Grande Ronde and Imnaha river basins.

A long-term evaluation and monitoring process is envisioned for the duration of operation of the hatcheries to develop and maintain fish runs that meet recovery and compensation goals at minimum costs.

This document is a contract performance report for the period 1 October 2011- 30 September 2012. This is not an Annual Progress Report, rather a brief report on statement of work task specific accomplishments.

PRODUCTION MONITORING

Objective 1. Assist with spring Chinook salmon and summer steelhead broodstock management.

Task 1.1. Provide run strength and run composition predictions for Chinook salmon and steelhead for development of pre-season broodstock collection and fishery plans.

We provided escapement predictions and run composition to LSRCP facilities that are presented in the 2012 Annual Operations Plan for Chinook salmon (Tables 7-11) and steelhead (Table 3). These estimates were used to set broodstock collection plans and fisheries for the coming year.

Objective 2. Document fish culture and hatchery operation practices at each Lower Snake River Compensation Plan facility in Oregon.

Subobjective 2.1. Document spawning activities at all LSRCP facilities.

Task 2.1.1. Document run-timing, spawning-timing, pass/keep scenarios, and spawning matrices for spring Chinook salmon returning to Lookingglass Fish Hatchery, and the Imnaha River, Catherine Creek, upper Grande Ronde River and Lostine River.

Hatchery Production and/or Research personnel from ODFW (Lookingglass Hatchery and Imnaha River), CTUIR (Catherine Creek and upper Grande Ronde River) and NPT (Lostine River) recorded data from all Chinook salmon adults captured at weirs to document run timing and pass/keep scenarios. Pass/keep scenarios were set prior to the run (at the Annual Operating Plan meeting) and altered, as necessary, as the run developed, based on these data. Data collected on spawning ground surveys, by all co-management agencies, were also used to document run (punched vs. unpunched) and spawn timing of hatchery and natural Chinook. Hatchery spawning matrices were documented by ODFW Research and Lookingglass Hatchery personnel. These data were compiled by ODFW Research for reporting.

Task 2.1.2. Document run timing, spawning timing, pass/keep scenarios, and spawning matrices for summer steelhead returning to Wallowa Fish Hatchery, Big Canyon Facility and Little Sheep Creek Facility.

Projected steelhead spawn timing, pass/keep scenarios, and spawning matrices for brood year 2012 are in the 2012 Annual Operations Plan. Actual run timing, spawn timing, pass/keep scenarios, and spawning matrices for run year 2010 were published in the 2010 Annual Progress

Report (published October 2012). These metrics were also recorded for adults returning in 2012.

Task 2.1.3. Document number, size, sex, and marks for all spring Chinook salmon and summer steelhead broodstock spawned in Oregon.

ODFW Research personnel were on site to collect and record these data from all Chinook salmon spawned at Lookingglass Hatchery. Characteristics (number, length, sex, marks) of adult steelhead returns to LSRCP facilities in Oregon are presented in Figures 1 and 2, and Table 7 of the 2010 Annual Progress Report. These metrics were recoded for adult returns in 2012.

Task 2.1.4. Measure fecundity (including retained eggs) and egg size (weight) for spring Chinook salmon females spawned in Oregon.

ODFW Research personnel were on site to collect and record these data from all Chinook salmon spawned at Lookingglass Hatchery. Fecundity was determined using an egg counter and mean egg weight was estimated by individually weighing 20 eyed eggs from each female.

Task 2.1.5. Collect genetic samples from Imnaha stock summer steelhead and Chinook salmon spawned in Oregon.

ODFW Research personnel were on site to collect genetic samples (opercle punches) from all Chinook salmon spawned at Lookingglass Hatchery.

Steelhead genetic samples were collected as follows: 1. Tissue samples from 50 Wallowa and Imnaha stock hatchery juveniles were collected and sent to Matt Campbell (IDFG) for Genetic Stock Identification, 2. Samples from approximately 500 natural-origin juveniles were collected from Little Sheep Creek and sent to Ewan Bernstein (NOAA Fisheries) for a Relative Reproductive Success study, 3. Samples from 360 mixed origin Little Sheep stock adults, 492 Wallowa Hatchery stock adults, and 73 Grande Ronde River natural-origin adults were collected and sent to IDFG and NOAA Fisheries for the Parental Based Tagging project.

Task 2.1.6. Record disposition of all broodstock collected, including spawned, killed not spawned (landfill, food bank, tribal ceremonial and subsistence or donated for educational purposes), passed, or outplanted.

ODFW Research personnel were on site to collect and record these data from all Chinook salmon spawned at Lookingglass Hatchery. The disposition of adult steelhead collected at LSRCP facilities in Oregon is presented in Table 7 of the 2010 Annual Progress Report published in

October 2012. The disposition of steelhead returning to facilities in 2012 was recorded and will be reported in the 2012 Annual Progress Report.

Task 2.1.7. Collect snouts from coded-wire tagged fish and scales from untagged fish for ageing steelhead and spring Chinook salmon spawned at LSRCP facilities in Oregon.

ODFW Research personnel were on site to collect snouts and scales and to record associated data from all Chinook salmon spawned at Lookingglass Hatchery and all steelhead spawned at Wallowa Hatchery and the Little Sheep Creek weir.

Subobjective 2.2. Document juvenile rearing and release activities at all LSRCP facilities.

Task 2.2.1. Calculate fertility rates for spring Chinook salmon and egg-to-fry and fry-to-smolt survival rates for each stock of summer steelhead and spring Chinook salmon. Collect individual fecundity (green eggs) and number of eyed eggs for determination of fertilization rate (percent of green eggs reaching the eyed stage) for spring Chinook salmon. Document number of fry ponded, number of parr coded-wire tagged and number of mortalities to estimate number of smolts released for spring Chinook salmon and summer steelhead.

ODFW Lookingglass Hatchery personnel used an electronic egg counter to enumerate live and dead eggs at the time of eye-up for Chinook salmon. They also documented mortalities at all life stages to determine the numbers of fry ponded and smolts released. A census of the fish on hand was also made at the time of coded-wire tagging. These data were then compiled by ODFW Research personnel to calculate fertilization rates and egg-to-fry and fry-to-smolt survival rates.

Information pertaining to steelhead egg collection at LSRCP facilities in Oregon and associated life-stage survival rates are reported in Tables 1 and 10 of the 2010 Annual Progress Report published in October of 2012. This information was also collected in 2012 for reporting in the 2012 Annual Progress Report.

Task 2.2.2. Document numbers, size, time of release, and release location for all LSRCP produced summer steelhead and spring Chinook salmon.

Numbers of Chinook salmon smolts released were determined by subtracting the numbers of mortalities following coded-wire tagging from the census taken during tagging. Mean length, weight and condition factor were determined from a pre-release sample conducted by ODFW, CTUIR and NPT Research staff approximately one month prior to smolt release. Date of transfer to acclimation sites, dates of release and release location

were documented by Hatchery Production and Fish Transport staff from the co-management agencies. These data were entered into the ODFW Hatchery Management Information System database.

Juvenile steelhead release numbers, size, time of release, and release location at LSRCP facilities are reported in Table 3 of the 2010 Annual Progress Report published in October of 2012. This information was also collected in 2012 for reporting in the 2012 Annual Progress Report.

Task 2.2.3. Conduct periodic monitoring for Chinook salmon size (eggs and fish) during incubation and rearing. Weigh 20 individual eggs from each female at the eyed stage to compare among origins (natural, captive broodstock, or conventional broodstock) and ages (4 and 5) of females. Collect individual length and weight measurements from a sample of juveniles during CWT tagging and prior to release.

All eggs were weighed in 2012 (BY 2012; FY 2013). Individual lengths were collected from 250 fish and weights (and condition factor calculated) from 50 fish in each pond at the time of coded-wire tagging and at pre-release sampling.

Task 2.2.4. Conduct pre-release sampling of length, weight and condition factor for summer steelhead from acclimation ponds or hatchery raceways.

This task was completed in 2012. Pre-release sampling from brood year 2009 is reported in Table 3 of the 2010 Annual Progress Report published in October of 2012.

Task 2.2.5. Estimate sex ratios of summer steelhead remaining in acclimation ponds after volitional release periods to determine if they will be forced out or be outplanted to reduce the abundance of residual hatchery fish.

This task was completed at Big Canyon and Little Sheep Acclimation sites in 2012. At Little Sheep 58.3% of fish remaining after volitional release were males and at Big Canyon 68.0% were males. Because the percentage of males was less than 70%, all remaining fish were force-released.

Task 2.2.6. Participate in planning processes for ponding and rearing of all steelhead and Chinook salmon.

ODFW Research personnel participated in the discussions of ponding and rearing held at the Annual Operating Plan meetings held in December 2011 and February 2012.

Task 2.2.7. Collect tissue samples for genetic analyses.

Genetic samples were collected from fish handled at weirs, spawned at Lookingglass Hatchery and from carcasses recovered on spawning ground surveys by ODFW, CTUIR and NPT Hatchery Production and Research personnel. Tissue samples from juvenile and adult steelhead were collected for several ongoing projects (see Task 2.1.5).

Task 2.2.8. Prepare and submit tag, mark and release reports.

Tag, mark and release reports were prepared and submitted to the ODFW Fish Propagation Section. Coded-wire tag release files were submitted to ODFW's HEMIS database, then transferred to RMIS. PIT tag release files were submitted directly to PTAGIS.

Task 2.2.9. Summarize and evaluate the results of Tasks 2.2.1-2.2.4.

Results from Tasks 2.2.1-2.2.4 are included in annual reports written for the LSRCP Chinook salmon monitoring. Annual reports are commonly two data years behind, due to the time required to obtain coded-wire tag data from PSMFC. We have made an agreement with NPT to write a joint report for 2011 and are discussing this with CTUIR so that we can write one report for Chinook salmon activities in the Grande Ronde and Imnaha basins. Steelhead data summarization and evaluation for Tasks 2.2.1-2.2.4 are included in the Annual Progress Reports.

DISEASE MONITORING, PREVENTION, AND TREATMENT

Objective 3. Document and monitor bacterial kidney disease (BKD) status of hatchery-reared spring Chinook salmon released from LSRCP facilities, natural smolts and hatchery-reared and natural adults returning to supplemented (upper Grande Ronde River, Catherine Creek, Lostine River, Lookingglass Creek, and Imnaha River) and unsupplemented (Minam and Wenaha rivers) Grande Ronde and Imnaha basin streams.

Task 3.1. Collect kidney tissues from hatchery-reared spring Chinook salmon smolts during pre-release sampling and from hatchery and natural smolts at screw traps (incidental mortalities).

We collected kidney tissues from ~40 Chinook salmon smolts from each stock (Catherine Creek, upper Grande Ronde River, Lostine River, Lookingglass Creek and Imnaha River) at Lookingglass Hatchery by ODFW Fish Health personnel. Natural Chinook incidental mortalities from screw traps were also provided to ODFW Fish Health Services by ODFW Early life History Program personnel.

Task 3.2. Collect kidney tissues from intact carcasses of natural and hatchery-reared spring Chinook salmon adults recovered during spawning ground surveys.

Kidney samples were collected from intact (abdominal cavity not exposed to the environment) carcasses recovered on spawning ground surveys. We collected a total of 256 samples and had a target of at least 20 samples from each sampled stream, which we achieved, except for the Minam and Wenaha rivers.

Task 3.3. Deliver samples to ODFW Fish Health Laboratory, La Grande, for determination of BKD status using enzyme-linked immunosorbent assay (ELISA).

Kidney samples not collected by ODFW Fish Health Services personnel (e.g., from spawning ground surveys) were delivered to the Fish Health Lab, generally within 24 hours of being collected.

Task 3.4. Compare ELISA optical densities between natural and hatchery-reared salmon and between supplemented and unsupplemented streams. Examine trends in BKD prevalence over time.

These results are included in annual reports written for the LSRCP Chinook salmon monitoring. Annual reports are commonly two years behind, due to the time required to obtain coded-wire tag data from PSMFC. These results were also presented at the LSRCP Chinook Salmon Review in 2010.

OPTIMUM PRODUCTION STRATEGIES

Survival Studies

Objective 4. Determine optimum rearing and release strategies that will produce maximum survival to adulthood for hatchery-produced summer steelhead smolts.

Subobjective 4.1. Determine and compare the juvenile outmigration performance of summer steelhead smolts that leave the Little Sheep Creek Facility throughout a volitional release period.

Task 4.1.1. Summarize information on PIT-tagged fish recovered at traps or mainstem dams from fish released from ponds.

Outmigrating juvenile PIT-tag detection files from releases in 2011 have been downloaded from PTAGIS and summarized. Adult PIT-tag recoveries at mainstem dams from juveniles volitionally released from the Little Sheep Creek Facility in 2009 and 2010 and returning in this contract year have also been downloaded and summarized.

Task 4.1.2. Compare the outmigration performance of PIT-tagged fish that emigrate from the Little Sheep Creek Facility throughout the volitional release period.

PIT-tag recovery data at Lower Granite Dam have been downloaded to compare the outmigration performance of fish that volitionally migrated in the earliest 25% of the release period with those that migrated in the middle 50% and last 25% of the release. We will report this information in the 2011 annual report.

Task 4.1.3. Sample for residual steelhead abundance in index streams at index areas during summer of 2012.

Residual steelhead sampling at index sites in Deer and Little Sheep creeks was conducted in August 2012.

Subobjective 4.2. Compare stray rates and smolt-to-adult survival of adults that are progeny from early-arriving adult broodstock and those of standard production broodstock summer steelhead.

Task 4.2.1. Compare adult migration timing between progeny of early returning (fall brood) adults and standard production groups to determine if run timing is heritable.

Adult migration timing for the first six brood years has been summarized and compared. In the contract period, oral presentations that included these data were given at the 2012 LSRCP Steelhead Program Review Symposium and an ODFW northeast region science conference. Data were also presented informally to ODFW managers and co-managers. A written summary of the symposium presentation was also submitted to the LSRCP office.

Task 4.2.2. Compare out-of-basin stray rates between progeny of early returning (fall brood) adults and standard production groups to determine if fall brood progeny are less likely to stray.

Coded-wire-tag recovery data has been summarized to compare stray rates between the two groups. Recovery data is only partially complete for the fourth year of the first generation releases. In the contract period, oral presentations that included these data were given at the 2012 LSRCP Steelhead Program Review Symposium and an ODFW Northeast Region science conference. Data were also presented informally to ODFW managers and co-managers. A written summary of the symposium presentation was also submitted to the LSRCP office.

Task 4.2.3. Compare smolt-to-adult survival between progeny of early returning (fall brood) adults and standard production groups.

Smolt-to-adult survival data based on PIT-tag recoveries have been summarized and compared for the first six brood years of releases. In the contract period, oral presentations that included these data were given at the 2012 LSRCP Steelhead Program Review Symposium and an ODFW northeast region science conference. Data were also presented informally to ODFW managers and co-managers. A written summary of the symposium presentation was also submitted to the LSRCP office.

Task 4.2.4 Compare harvest between progeny of early returning (fall brood) adults and standard production groups.

Harvest of adults within the compensation area has been summarized and compared for run years 2006-07, 2007-08, and 2008-09. In the contract period, oral presentations that included these data were given at the 2012 LSRCP Steelhead Program Review Symposium and an ODFW Northeast Region science conference. Data were also presented informally to ODFW managers and co-managers. A written summary of the symposium presentation was also submitted to the LSRCP office.

Task 4.2.5 Convene a manager's meeting, prior to the 2012 hatchery Annual Operation Plan meeting that occurs in January or February, to present the monitoring and evaluation results from first generation offspring (brood years ′04-′07) of the early arriving broodstock (fall brood). Some data from second generation offspring will also be available. A decision on whether or not to continue spawning the fall brood line in 2012 (and beyond) will be integrated into the hatchery operation plan, and may be the basis for future meetings to discuss alternatives to reduce straying in the Wallowa steelhead hatchery program.

A meeting with managers was held on November 21, 2011. As a result, we worked with managers to draft a plan for future management of the early arriving broodstock. That document is in the 2012 Hatchery Annual Operations Plan.

Release Strategies

Subobjective 4.3. Conduct a pilot study to determine the feasibility of doing live prey recognition training during acclimation.

Task 4.3.1 Identify sources of live prey and conduct trial prey collections to determine if sufficient quantities can be collected.

Locations for live prey collections were investigated. The most suitable location appeared to be the mouth of an irrigation diversion located on the

Wallowa River. Drift nets were deployed at this location for one day in April to quantify live prey abundance in the diverted water. Based on this pilot study it does not appear that drift nets alone can capture enough prey items to conduct live prey recognition training during acclimation. We will continue to consider other sources for obtaining live prey.

Proposals for Optimum Production Studies

Subobjective 4.4. Prepare study proposals for research projects to investigate alternative spawning, rearing and release strategies to improve survival and/or shift age composition toward older age at maturation in hatchery-produced Chinook salmon.

Task 4.4.1. Evaluate the effect of allowing a period of volitional release of Chinook salmon parr from Lookingglass Hatchery on survival, stray rate and age composition.

This was not done because we did not have sufficient numbers of coded-wire tags. We hope to do it when tags are available.

Task 4.4.2. Evaluate mini-jack and jack production in hatcheries, based on testosterone levels in smolts and PIT tag detections following release, from various growth regimes during rearing.

This was not done because funding was not supplied.

Task 4.4.3. Evaluate the effect direct vs. acclimated release on survival and stray rates.

We conducted the first direct release of Chinook salmon smolts into the Imnaha River in April 2012. The first direct stream releases occurred on 30 March and the associated acclimated releases occurred on 30 March (volitional release) and 6 April (force out). The acclimated smolts took a mean of 29 days to reach Lower Granite Dam (LGD) and 69.4% survived. The direct stream released smolts took a mean of 30 days to reach LGD and 67.8% survived.

Task 4.4.4. Evaluate the effect of parental age and origin of hatchery broodstock on growth in the hatchery, survival to maturation and age composition of returning salmon using parental-based tagging.

We collected genetic samples from all salmon spawned at Lookingglass Hatchery for these analyses.

CATCH ACCOUNTING

Marking and Tagging

Objective 5. Mark (adipose clip), PIT tag, and coded-wire tag representative groups of hatchery-produced spring Chinook salmon and steelhead for selective fisheries and comparison of migration patterns and survival differences among hatchery rearing and release groups.

Task 5.1. Tag and mark 100,000 early-arriving (Ad-RV+CWT) and 100,000 standard production (Ad-LV+CWT) summer steelhead progeny of the 2011 brood year to assess the fall brood program.

This task was completed as scheduled. (See Table 1)

Table 1. Tagging summary for 2010 brood summer steelhead at Irrigon Hatchery. Comparative Survival Study (CSS) provided 14,000 tags to supplement the LSRCP tagging and achieve a 70% LSRCP and 30% CSS split. WAP = Wallowa acclimation ponds at Wallowa Hatchery; BC = Big Canyon facility.

Stock, release group	Raceway	No. of CWTs	Fin Clip	LSRCP PIT tags	CSS PIT tags	Total PIT tags
Wallowa stock						
WAP, forced April	10, 12	50,000	Ad-LV	2,600	1,200	3,800
WAP, forced April	14	25,000	Ad-LV	1,200	600	1,800
WAP, volitional May	25	25,000	Ad-LV	1,500	700	2,200
WAP, early brood April	7, 9	50,000	Ad-RV	2,000	1,000	3,000
WAP, early brood April	11	25,000	Ad-RV	1,000	400	1,400
WAP, early brood May	15	25,000	Ad-RV	1,000	300	1,300
BC, forced April	17	25,000	Ad-LV	3,000	1,400	4,400
BC, forced May	23	25,000	Ad-LV	3,000	1,400	4,400
Subtotal		250,000		15,300	7,000	22,300
Imnaha stock						
Little Sheep, volitional April	29	25,000	Ad-LV	11,200	5,200	16,400
Big Sheep, direct April	32	–	Ad only	3,800	1,800	5,600
Subtotal		25,000		15,000	7,000	22,000
Grand total		275,000		30,300	14,000	44,300

Task 5.2. PIT tag 3,600 early-arriving (Ad-RV+CWT or Ad-RV) and 5,300 standard production (Ad-LV+CWT or Ad only) summer steelhead progeny of the 2011 brood year (8,900 total) to assess juvenile migration performance and adult return timing.

This task was completed as scheduled. (See Table 1)

Task 5.3. Mark (Ad-LV & CWT) two groups of 25,000, 2011 brood year Wallowa stock steelhead for release at the Big Canyon Facility, and one group of 25,000, 2011 brood Imnaha stock steelhead for release at the Little Sheep Creek Facility for production monitoring. PIT-tag 6,800 steelhead for release at the Big Canyon Facility, 8,900 for release at Wallowa Fish Hatchery, 11,500 steelhead for release at Little Sheep Creek Facility, and 3,500 for release in Big Sheep Creek for juvenile migration performance monitoring, and smolt to adult return back to the LSRCP area.

This task was completed as scheduled. (See Table 1)

Task 5.4. Mark Ad+CWT representative groups of 2010 brood year, Imnaha River, Lostine River, upper Grande Ronde River, Lookingglass Creek and Catherine Creek spring Chinook salmon at Lookingglass Fish Hatchery. PIT tag 2,000 (500 tags per raceway) brood year 2009 upper Grande Ronde River stock and 3,000 (1,000 tags per raceway) brood year 2009 spring Chinook salmon to be released at Lookingglass Fish Hatchery to assess juvenile migration performance, including outmigration timing and survival to Lower Granite Dam.

We inserted coded-wire tags, PIT tags and/or clipped adipose fins from fish from each stock (Tables 2 and 3). PIT tags were used to assess juvenile migration timing and survival to Lower Granite Dam and, if enough fish were tagged, for in-season adult run estimates. Coded-wire tags were used to identify the origin of hatchery fish spawned at Lookingglass Hatchery or recovered as carcasses on the spawning grounds, as well as from fisheries and stray locations. Adipose fin clips identified hatchery salmon.

Table 2. Number of BY 2010 Chinook salmon marked with coded-wire tags, adipose fin clips and PIT tags.

Stock	Program	Total released	Ad + CWT	CWT Only	Ad Only	No Ad No CWT	External mark	PIT-tagged
Catherine Creek	Conv.	161,374	99,456	3,454	56,219	2,245	Ad	20,641
Grande Ronde River	Conv.	285,737	132,054	149,506	1,786	2,391	47% Ad; 53% None	2,910
Imnaha R.	Conv.	469,870	245,688	7,949	199,481	16,752	Ad	20,819
Lookingglass Creek	Conv.	228,565	117,127	2,730	106,063	2,645	Ad	1,992
Lostine R.	Conv.	267,351	140,181	1,001	125,300	869	Ad	5,969

Table 3. Number of BY 2011 Chinook salmon marked with coded-wire tags and adipose fin clips.

Stock	Program	Number on hand 30 SEP 2012	Ad + CWT	CWT Only	Ad Only	External mark
Catherine Creek	Conventional	135,148	90,540	0	44,608	Ad
Grande Ronde River	Conventional	135,924	0	135,924	0	None
	Captive	155,757	155,757	0	0	Ad
Imnaha River	Conventional	391,848	224,614	0	167,234	Ad
Lookingglass Creek	Conventional	280,192	133,656	0	146,536	Ad
Lostine River	Conventional	265,790	135,149	0	130,641	Ad

Task 5.5. Recover CWTs and calculate smolt-to-adult return and survival rates (SAR and SAS) for hatchery Chinook salmon and steelhead.

We collected snouts from all adipose fin-clipped Chinook salmon spawned at Lookingglass Hatchery, trap morts and carcasses recovered on spawning ground surveys. The snouts were sent to the ODFW CWT Lab in Clackamas for recovery and reading. The resulting CWT data will be entered into the PSMFC database. Snouts are also collected, by various agencies, from ocean and freshwater fisheries and other (stray) locations. When the final data are available, they will be used to calculate SAR and SAS and incorporated into annual reports.

The smolt-to-adult return and survival rates of steelhead released at LSRCP facilities in Oregon is presented in Table 7 of the 2010 Annual Progress Report published in October of 2012. Summaries of these metrics were also reported orally at the 2012 LSRCP Steelhead Program Review Symposium and in written summaries of those presentations. Snouts from ventral fin clipped adult steelhead (indicating the presence of a CWT) were collected during creel surveys and at hatchery facilities on the Wallowa River and Little Sheep Creek.

Task 5.6. Compare smolt-to-adult survival rates of Wallowa and Imnaha stock steelhead to Bonneville Dam and smolt-to adult return rates to the LSRCP area estimated using PIT tag and CWT recoveries.

During this report period we downloaded and summarized PIT-tag recoveries which allow for calculations of smolt-to-adult survival to Bonneville Dam and smolt-to-adult return to the LSRCP area for brood year 2009. To date, coded-wire-tag recovery is complete for brood year 2007 (the first year of increased PIT tagging) and mostly complete for brood year 2008, but incomplete for brood year 2009. We will make the

comparison in our annual reports when CWT recoveries allow. Summaries of these metrics were also reported orally at the 2012 LSRCP Steelhead Program Review Symposium and in written summaries of those presentations.

Objective 6. Coordinate spring Chinook salmon broodstock marking programs for Lookingglass Fish Hatchery.

Task 6.1. Develop and coordinate spring Chinook salmon broodstock management strategies and marking programs for Grande Ronde and Imnaha production programs to identify broodstock source of returning adults.

ODFW Research personnel coordinated with Hatchery and Research personnel from CTUIR, NPT and LSRCP at the Annual Operating Plan meetings to develop broodstock management strategies for each stock and marking programs to identify hatchery salmon upon their return as adults.

Fishery Catch Estimation and Sampling

Objective 7. Determine the number of summer steelhead harvested annually and angler effort in recreational fisheries on the Grande Ronde, Wallowa, and Imnaha rivers.

Task 7.1. Conduct creel surveys for steelhead on the lower Grande Ronde River from 1 October 2011 to 15 April 2012 and for September 2012 between Wildcat Creek in Oregon to Boggan's Oasis (where State Highway 3 crosses the river in Washington), at the mouth and along the mainstem Wallowa River from 1 February 2011 to 15 April 2012, and on the Imnaha River from 1 February2102 to 15 April 2012.

This task was completed on schedule.

Task 7.2. Collect snouts from coded-wire-tagged fish, decode tags, and estimate number of fish harvested for each tag code in each fishery.

This task was completed. Estimates of number of fish harvested for the 2009-10 run year are published in the Annual Creel Survey Report (draft submitted to LSRCP office in November 2012).

Task 7.3. Summarize punch card information. Combine this information with creel data. Generate summaries for the steelhead fishery.

This task was completed (see task 7.2) on schedule.

Task 7.4. Write a progress report summarizing findings of creel surveys for the 2009-2010 summer steelhead fishery.

A draft of this report was submitted to LSRCP office in November 2012.

ESTIMATING PROJECT AREA ESCAPEMENT

Returns to Compensation Area

Objective 8. Determine if the total production of spring Chinook salmon and summer steelhead adults meet compensation goals and index annual smolt survival and adult returns to Lower Granite Dam for production groups.

Subobjective 8.1. Estimate number of spring Chinook salmon and summer steelhead adults that escape to the Columbia River, past Lower Granite Dam and to program streams.

Task 8.1.1. Determine size, age, sex, and origin of adult spring Chinook salmon and summer steelhead returning to LSRCP facilities.

All Chinook returning to weirs were measured for fork length, from which we estimated the age of the fish. Sex was also determined and origin determined from the presence or absence of marks and/or tags. If the fish was taken to Lookingglass Hatchery for spawning or the carcass was recovered on spawning grounds, scales and/or the snout were taken to confirm the age of the fish, and the fork length was measured. From these data, we developed a length at age relationship for each population by origin, from which salmon that were only measured for fork length could be assigned an age.

Information pertaining to size, age, sex and hatchery or natural origin of adult steelhead returning to LSRCP facilities in Oregon are reported in Tables 6 of the 2010 Annual Progress Report, published in October of 2012. Summaries of these metrics were also reported orally at the 2012 LSRCP Steelhead Program Review Symposium and in written summaries of those presentations. This information was also collected in 2012 for reporting in the 2012 Annual Progress Report.

Task 8.1.2. Acquire CWT recovery data on ocean, Columbia River, and Snake River fisheries from the monitoring agencies.

CWTs were recovered from all hatchery salmon spawned at Lookingglass Hatchery and steelhead spawned at Wallowa Hatchery, recovered on spawning grounds, in sport fisheries, or sacrificed for tribal subsistence/food banks. The snouts were transported to the ODFW Snout Lab for recovery and reading of the tags. These data were uploaded into the RMIS database, from which we obtained CWT recovery data from other monitoring agencies.

Task 8.1.3. Summarize fishery recovery and escapement information and determine exploitation rates for each stock of spring Chinook salmon and summer steelhead.

Steelhead fisheries information, including exploitation rates, for the 2009-10 run year is in the Annual Creel Survey Report, submitted to the LSRCP in November of 2012. This information was also collected in the contract period for reporting in the 2011-12 Annual Creel Survey Report. In addition, we orally presented summary steelhead fishery data at the 2012 LSRCP Steelhead Program Review Symposium and in written summaries of those presentations. We obtained steelhead and Chinook CWT recovery data from the RMIS database and summarized those data by population and recovery location to estimate escapements to the Columbia River and home stream, as well as exploitation rates.

Task 8.1.4. Determine total adult escapement (catch plus escapement) to the Columbia River basin for each stock of salmon and steelhead by expansion of CWT marked fish recoveries. In addition we will estimate steelhead returns to the compensation area based on PIT tagged returns. Comparisons will be made between CWT and PIT based estimates.

Adult escapement of steelhead to the Columbia River basin is presented in Table 12 of the 2010 Annual Progress Report, published in October of 2012. We also reported this information orally at the 2012 LSRCP Steelhead Program Review Symposium and in written summaries of those presentations. We will make comparisons between PIT and CWT derived data in our annual reports when CWT recoveries allow. We obtained steelhead and Chinook CWT recovery data from the RMIS database. Those data were expanded based on sampling and marking rates and summarized by population to estimate escapements to the Columbia River and home streams. Reporting of these data is usually two years behind the year of recovery, due to the time required to read all of the coded-wire tags.

Task 8.1.5. Determine escapement past Lower Granite Dam for each stock of salmon and steelhead.

We obtained CWT recovery data from the RMIS database and summarized those data by population and recovery location to estimate escapements past Lower Granite Dam. This task was completed (see Task 8.1.4).

Task 8.1.6. Determine escapement to program streams for each stock of salmon and steelhead.

We obtained CWT recovery data from the RMIS database and summarized those data by population and recovery location to estimate escapements to each program stream. This task was completed (see Task 8.1.4).

Task 8.1.7. Calculate recruits per spawner (R:S) ratio for hatchery and natural Chinook salmon.

We calculated R:S ratios for the 2007 brood year of natural and hatchery (where appropriate) Chinook salmon populations from Catherine and Lookingglass creeks and the Imnaha, Lostine, Minam, upper Grande Ronde and Wenaha rivers.

Task 8.1.8. Calculate progeny to parents ratios for hatchery and natural steelhead returning to Little Sheep Creek.

Progeny to parent ratios for Little Sheep Creek steelhead are presented in Figure 5 of the 2010 Annual Progress Report, published in October of 2012, respectively. We also reported this information orally at the 2012 LSRCP Steelhead Program Review Symposium and in written summaries of those presentations.

Subobjective 8.2. Determine and compare return rates of steelhead marked no Ad-wire tag with steelhead marked Ad-LV-CWT to assess influence of selective fisheries.

Task 8.2.1. Summarize the results of marked (Ad-LV-CWT) and no Ad-wire adult returns in the 2010 Annual Progress Report.

This information is reported in the text of the 2010 Annual Progress Report.

Spawning Ground Surveys

Objective 9. Monitor the natural spawning of spring Chinook salmon and steelhead in northeast Oregon.

Subobjective 9.1. Conduct index, extensive, and supplemental spring Chinook salmon spawning ground surveys in the Grande Ronde and Imnaha basins.

Task 9.1.1. Develop spawning ground survey schedules in cooperation with ODFW District Fish Biologists, CTUIR, and NPT.

ODFW Fish Research took the lead to develop spawning ground survey schedules and logistical details in collaboration with ODFW district fish biologists and biologists from CTUIR and NPT.

Task 9.1.2. Conduct spawning ground surveys in the streams and sections listed in Table 4. Mark all new redds observed. Record the number of redds, live adults observed (on and off redds), and carcasses recovered.

All streams were successfully surveyed the planned number of times (usually three surveys). Numbers of redds, live adults and carcasses recovered were recorded.

Task 9.1.3. Record the sex, length, fin marks, opercle marks, and any tags from carcasses observed on the survey. Collect snouts from adipose fin marked fish and scales samples from unmarked fish for age determination of hatchery and natural salmon, respectively. Send snouts to Clackamas snout lab for processing. All fish will be sampled, where feasible. Where there are large numbers of hatchery fish, snouts will be subsampled. Determine hatchery:natural salmon ratios for all streams based on marked and unmarked carcass recoveries and scale analyses.

We had to subsample carcasses on the Imnaha and Lostine rivers, due to high numbers of natural spawners – all carcasses were counted, noted for marks, and length and sex were recorded but snouts/scales were collected from only a portion of the carcasses. All snouts were sent to the ODFW Clackamas Snout Lab for processing and scales were pressed and read by ODFW Fish Research staff in La Grande. From these data, hatchery:natural ratios were calculated.

Task 9.1.4. Number and mark redds observed. Cut the tails off carcasses sampled to avoid multiple sampling.

All identified redds were marked with flagging and numbered sequentially. All recovered carcasses had tails removed following processing.

Subobjective 9.2. Determine how adequately historic index surveys measure current spawner abundance.

Task 9.2.1. Calculate the percentage of total redds observed in the index area on the day of the extensive-index count for 2010.

We have conducted these analyses for Catherine Creek and the Imnaha, Lostine, Minam, upper Grande Ronde and Wenaha rivers and are preparing a report on the effectiveness of index counts vs. more complete counts in these streams.

Table 4. Location and length (km) of spring Chinook salmon spawning ground survey areas in northeast Oregon. Index surveys are conducted in historical areas and at the same time each year. Extensive surveys are conducted in additional areas on the index date. Supplemental surveys are conducted after the index date and include both index and extensive areas.

	Survey type		
Basin, stream and location of survey	Index	Extensive	Supplemental
Imnaha River Basin			
Big Sheep Creek			
Road 39-140 Bridge to Coyote Creek	4	9	None
Imnaha River			
Forks to Freezeout Creek	9.7	33.2	23.7
Lick Creek			
Lower 4 miles	4	None	None
Grande Ronde River Basin			
Bear Creek			
2 miles above Guard station to Road 8250 Bridge	8.5	2	None
Butte Creek (tributary to Wenaha River)			
Lower 1.5 Miles	None	1.5	None
Catherine Creek			
Forks to 2nd Union City bridge	7.5	14.5	14.5
North Fork Catherine Creek			
North Fork Campground to mouth	4	None	4
South Fork Catherine Creek			
Road barrier to mouth	2	2.7	2.7
Grande Ronde River			
Three Penny Claim to Starkey Bridge	8.5	22.2	22
Hurricane Creek			
Gravel pit to mouth	3	None	1.3
Lookingglass Creek			
Summer Creek to mouth	6.2	10	None
Lostine River			
Lapover Meadow to Williamson Campground and Canyon to mouth	3	17	2
Minam River			
Elk Creek to Bluff *	8.9	4.3	6.7
Wallowa River			
McClaren Lane Bridge to Hatchery intake	4.5	None	None
Wenaha River			
Forks to Crooked Fork	None	15.5	15.5
North Fork Wenaha River			
Lower 4 miles	None	4	None
South Fork Wenaha River	6	6	6

*Only selected reaches within this area are surveyed. Length of survey given is amount actually surveyed, not distance from top to bottom.

Task 9.2.2. Calculate the percent increase in redds in supplemental survey areas from the first to last counts for 2010.

We have conducted these analyses for Catherine Creek and the Imnaha, Lostine, Minam, upper Grande Ronde and Wenaha rivers and are preparing a report on the effectiveness of index counts vs. more complete counts in these streams.

Subobjective 9.3. Determine the relationship between number of redds observed and fish escapement.

Task 9.3.1. Mark all Chinook salmon that are released above weirs on the Imnaha River, Catherine Creek, Lookingglass Creek, Lostine River, and upper Grande Ronde River with an opercle punch.

ODFW, CTUIR and NPT have marked all Chinook handled at and released above weirs with an opercle punch. These punches were identified on carcasses recovered on spawning ground surveys and used to calculate a population estimate for salmon above the weir.

Task 9.3.2. Conduct surveys to enumerate total redds above the weirs and recover carcasses and record data collected from them.

Three surveys were conducted on most of the streams listed in Table 4. Total redds were enumerated in each reach. Fork length, sex and marks/tags were recorded from all carcasses. Snouts and/or scales were collected from all fish, except when we had to subsample on the Imnaha and Lostine rivers – subsampling rates varied with reach. Genetic samples were taken from salmon on Catherine Creek and the Imnaha, Lostine and upper Grande Ronde rivers. Kidney samples were collected from carcasses with an intact abdominal cavity.

Task 9.3.3. Determine total escapement by origin, age and sex above the weirs based on marked:unmarked ratios.

We used presence/absence of opercle punches on carcasses recovered above weirs on Catherine Creek and the Imnaha, Lostine and upper Grande Ronde rivers to estimate escapement above weirs by origin, age and sex. We used that estimate and the number of redds identified above the weir to calculate the number of fish/redd above the weir. That ratio was used to estimate total numbers of fish below the weirs.

Task 9.3.4. Calculate fish per redd ratios.

Total numbers of redds and escapement estimates above weirs were used to calculate fish/redd ratios for all streams with weirs – Catherine Creek and the Imnaha, Lostine and upper Grande Ronde rivers.

Task 9.3.5. Use fish/redd ratios, number of redds below the weir, and origin, age and sex composition of carcass recoveries and weir collections to estimate the number of spawners below the weirs by origin, age and sex. Add to estimated number of spawners above the weir to estimate total number of spawners in the stream. Add that to the number of fish removed (for hatchery broodstock, outplanting, or ceremonial/subsistence) and estimated pre-spawn mortality to estimate total escapement to the stream by origin, age and sex.

We conducted these analyses for all streams with weirs – Catherine Creek and the Imnaha, Lostine and upper Grande Ronde rivers. The fish/redd ratio for the Imnaha River was used to estimate escapement to the Minam and Wenaha rivers.

Subobjective 9.4. Determine age-composition and length-age relationships for spring Chinook salmon in each stream sampled.

Task 9.4.1. Mount, press, and age (years in fresh and saltwater) scales collected from carcasses sampled on spawning ground surveys.

Scales collected from natural salmon on spawning grounds and at Lookingglass Hatchery were aged independently by two persons without knowledge of the length of the fish. If the two age estimates differ, the scales were reexamined with the aid of the fork length to determine a final age estimate.

Task 9.4.2. Calculate age composition and determine mean length of each age class for spawning populations in each stream surveyed.

Age composition (percent of all returning fish comprising ages 3, 4 and 5) and mean length at age were calculated after ages were determined for all salmon from which scales or CWTs were collected.

Subobjective 9.5. Assist with steelhead spawning ground surveys above weir in Deer Creek (Wallowa River tributary) above the Big Canyon acclimation facility.

Task 9.5.1. Develop a spawning ground survey schedule in cooperation with ODFW District Fish Biologists.

This task was completed.

Task 9.5.2. Assist with surveys to enumerate total redds and live fish above weir. jumps to 9.5.6 what is missing

This task was completed.

Task 9.5.3. Georeference all identified redds during last spawning ground survey.

This task was completed.

Subobjective 9.6. Support NOAA Fisheries study of natural production of hatchery and natural steelhead above weir on Little Sheep Creek.

Task 9.6.1. Electrofish representative sample reaches to collect steelhead parr and obtain tissue using fin clips. Also electrofish additional areas as needed to collect tissue samples from resident *O. mykiss* adults.

Electrofishing occurred over three days in August 2012.

Task 9.6.2. Catalog and deliver tissue samples to NOAA Fisheries Service for analysis.

Tissue samples from juvenile *O. mykiss* and samples from natural and hatchery adults that returned to Little Sheep Creek weir were delivered to NOAA.

SMOLT-TO-ADULT SURVIVAL AND PRODUCTION

See objective 5 for tagging accomplishments and objective 8 for survival and recruits per spawner.

LEGAL OBLIGATIONS

Objective 10. Participate in planning activities associated with anadromous fish production and management in the Grande Ronde and Imnaha river basins as well as participate in ESA permitting, consultation and recovery activities.

Task 10.1. Analyze data to guide planning processes in the Grande Ronde and Imnaha river basins and to provide appropriate information to the ESA process.

Hatchery and natural production data were provided to the Independent Scientific Review Panel, the Fish Passage Center, NOAA BRT, NOAA's ESA Recovery Planning processes, AMIP Life Cycle Monitoring Workgroup, and AMIP reintroduction workgroup.

Task 10.2. Continue to provide information for development of subbasin management plans and basin-wide research activities.

Staff participated in the State of the Salmon Supplementation Symposium and presented at the NPCC meeting on supplementation.

Task 10.3. Review and comment on future Chinook salmon production and facilities being planned under NEOH.

We provided information to guide development and modification of hatchery facilities for both the Imnaha and Lookingglass Hatchery facilities. This information was incorporated into HGMPs .

Task 10.4. Participate in ESA activities as requested by ODFW, USFWS, and NOAA Fisheries, including FMEP, HGMP, Biological Assessment, Section 10 document preparation and reporting, and TRT status and limiting factors analyses.

Staff participated in numerous meetings and led development of numerous sections of Oregon's HGMPs. Provided population abundance and productivity data to NOAA Fisheries for the recent five-year status review. Reviewed and commented on the NOAA Five-year Review.

Task 10.5. Participate in planning and implementation activities for developing population specific management and recovery plans for Grande Ronde and Imnaha populations as specified in the Snake River spring/summer Chinook salmon recovery plan.

LSRCP staff worked closely with NOAA in development of the Northeast Oregon Chinook and steelhead ESA Recovery Plan, led the ODFW review process of the NOAA Plan and presented life history limiting factors and life cycle survival information to the NE Oregon Recovery Plan Sounding Board and BPA habitat expert panel.

Task 10.6. Participate in planning and data summarization related to the 4D rule and listing of summer steelhead in the lower Snake River.

This task was completed in past years and should have been removed from the SOW.

Task 10.7. Participate in LSRCP summer steelhead program review, including serving on the organization committee, preparing presentations, and presenting.

We played a key role in development of the presentation content and organization structure for the LSRCP steelhead Review Planning Team. Staff made five presentations and wrote four papers for the review.

Task 10.8. Participate on LSRCP technical teams that will develop analytical methods and databases for the LSRCP Review and LSRCP annual reports.

Staff participated in meetings and conference call discussions for the formation of methods and databases.

ELECTRONIC DATABASE SYSTEMS

The LSRCP Oregon Evaluation Studies Project has begun developing a central Access database for storage, analysis and distribution of LSRCP RM&E data. Data are currently stored in numerous Excel spreadsheets and small Access databases, which have become cumbersome and inefficient. PIT tag data are uploaded and downloaded from the PSMFC PTAGIS database, and coded-wire tag data are downloaded from the PSMFC RMIS database. Staff have been participating in the basinwide Coordinated Assessment project to pilot the Data Exchange Template data sharing approach. We are providing the LSRCP office with annual data updates via the LSRCP production and survival spreadsheets. Natural population abundance and productivity data are provided to the ODFW Recovery Tracker database and to NOAA's SPS database.

REGIONALLY SIGNIFICANT RESEARCH

Chinook Salmon Life History

Objective 11. Monitor and assess productivity, abundance, hatchery fraction, and life history characteristics of hatchery- and naturally-produced Chinook salmon in the Grande Ronde and Imnaha river basins.

Subobjective 11.1. Assess the productivity and life history characteristics of all supplemented populations in the Grande Ronde and Imnaha river basins using data collected from weir collection, spawning ground surveys, and hatchery spawning.

Task 11.1.1. Estimate and compare smolt-to-adult survival rates for hatchery- and naturally-produced Chinook salmon and examine for changes over time in all Grande Ronde and Imnaha river basin supplemented populations.

We calculated smolt-to-adult survival rates (SAR) for hatchery and natural salmon through the 2006 brood year for Catherine Creek and the Imnaha, Lostine, Minam and upper Grande Ronde rivers. Natural smolt numbers were provided by ODFW's Early Life History Project. SARs were compared over time to look for trends.

Task 11.1.2. Estimate and compare recruit:spawner ratios for hatchery- and naturally-produced Chinook salmon and examine for changes over time in the Grande Ronde and Imnaha river basin populations. Compare productivity, total

spawner abundance and natural origin abundance between the supplemented Imnaha population and unsupplemented populations in Idaho.

We calculated recruit:spawner (R:S) ratios for hatchery and natural salmon through the 2006 brood year for Catherine Creek and the Imnaha, Lostine, Minam, upper Grande Ronde and Wenaha rivers. R:S ratios were examined over time to look for trends. We also compare productivity, total spawner abundance and natural origin abundance between the supplemented Imnaha population and unsupplemented populations in Idaho.

Task 11.1.3. Estimate and compare run timing for hatchery- and naturally-produced Chinook salmon and examine for changes over time in all Grande Ronde and Imnaha river basin supplemented populations.

We estimated run timing for hatchery and natural Chinook on Catherine Creek and the Imnaha, Lostine and upper Grande Ronde rivers. These estimates were based on weir capture and punched:unpunched ratios above weirs. We examined these data for trends over time.

Task 11.1.4. Estimate and compare spawn timing in nature and in captivity for hatchery- and naturally-produced Chinook salmon and examine for changes over time in all Grande Ronde and Imnaha river basin supplemented populations.

Spawn timing in nature was estimated based on recovery of female and male (separately and pooled) carcasses on each of three spawning ground surveys. Spawn timing at Lookingglass Hatchery was based on the date on which a fish was spawned. We monitor these data for changes in mean (and first and last in the hatchery) spawn date over time.

Task 11.1.5. Estimate and compare spawning distribution for hatchery- and naturally-produced Chinook salmon and examine for changes over time in all Grande Ronde and Imnaha river basin supplemented populations.

Spawning distributions are based on female carcass recoveries on spawning ground surveys. Female carcasses, by origin, recovered in each reach were enumerated and used to calculate percentages of carcasses recovered in each reach. Changes in those percentages over time were examined to monitor spawning distributions.

Task 11.1.6. Estimate and compare age structure of returning adult hatchery- and naturally-produced Chinook salmon and examine for changes over time in all Grande Ronde and Imnaha river basin supplemented populations.

Age structures (the percentage of fish returning at ages 3, 4 and 5) were determined for the 2007 brood year for each origin and sex. These percentages are monitored for changes over time.

Task 11.1.7. Collect tissue samples to provide to NOAA Fisheries for genetic analysis between hatchery- and naturally-produced Chinook salmon and examine them for changes over time in the Grande Ronde and Imnaha river basins.

ODFW attempted to collect genetic samples from all recovered salmon from Catherine Creek and the Imnaha, Lostine and upper Grande Ronde rivers. These samples were sent to NOAA Fisheries for storage and analysis.

Task 11.1.8. Estimate population size of naturally-produced adult Chinook salmon and examine for changes over time in all Grande Ronde and Imnaha river basin populations.

Population sizes of naturally-produced Chinook were estimated using mark:recapture estimates and/or fish/redd ratios in all surveyed streams. These numbers are monitored for changes over time.

PEER REVIEW, BIOMETRIC REVIEW, ANALYSIS, REPORTING, AND LSRCP PROGRAM REVIEW

Objective 12. Complete reports of progress that summarize results of our work and participate in the planning, development and execution of the LSRCP Program Review.

Task 12.1. Write and submit the following annual reports and data summaries:

Title	Period covered	Final report date
Lower Snake River Compensation Plan, Hatchery Evaluation Studies:		
Chinook comprehensive	2010	30 September 2012
Steelhead comprehensive	2010	30 September 2012
Summer steelhead creel surveys	2009-2010	30 September 2012

We completed the 2009 and 2010 Chinook annual reports and the 2011 data summary and submitted them to LSRCP.

Because of the time committed to preparing for the steelhead review symposium, the annual steelhead reports were not completed by 30 September but were completed soon thereafter. A draft of the 2010 steelhead annual report was submitted to the LSRCP by 30 September and the final report was submitted in October. A draft of the annual steelhead creel survey report was submitted to the LSRCP office for review in November, 2012.

Task 12.2. Prepare the following manuscripts for review and publication:

Title	Due Date
Size of Release of Imnaha River Chinook Salmon Smolts	30 September 2012
Life History and Spawning Characteristics of Hatchery- and Natural-Origin Imnaha River Female Chinook Salmon Spawned in Captivity	30 September 2012

These manuscripts were not completed due to time constraints from other obligations.

Task 12.3. Prepare summer steelhead presentations and written summaries of hatchery program performance for the program review.

We completed five presentations and four papers for the LSRCP steelhead review.

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