Grande Ronde Satellite Facilities O&M

Annual Report

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Michael L. McLean
Ryan Seeger
Laurie Hewitt
Brian Zimmerman

Confederated Tribes of the Umatilla Indian Reservation
Department of Natural Resources, Fisheries Program
46411 Timine Way, Pendleton, Oregon 97801

Prepared for:

Jonathan McCloud, Project Manager
U.S. Department of Energy
Bonneville Power Administration
Division of Fish and Wildlife
P. O. Box 3621
Portland, Oregon 97208-3621

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ABSTRACT

There was only one release group acclimated at the Catherine Creek Acclimation Facility (CCAF) in 2013. The fish arrived at the facility on 19 March and all were from the conventional program. The volitional release began on 21 March and the fish were forced out on 15 April. It is estimated that 47.2% of the fish left the facility during the volitional release period. The total number of fish released was 134,519. Total mortality for the acclimation period was 72 (0.05%). No fish health problems were encountered this year. Average size of the force released fish was 18.6 fish/lb.

There were two groups of spring Chinook acclimated at the upper Grande Ronde Acclimation Facility (UGRAF) in 2013. The first group was from the captive program and the second group was from the conventional program. The first acclimation period ran from 18 March to 2 April with volitional release beginning 20 March. It was estimated that 26.9% of the fish left during the volitional release period. The total number of fish released from the acclimation facility in the first group was 155,264. There were 57 mortalities during the first acclimation period (0.04%). The size of the fish that were forced from the facility was 24.4 fish/lb. The second group arrived on 4 April, was allowed to volitionally leave on 6 April, and was forced from the facility on 15 April. It was estimated that 30.9% of the fish left during the volitional release period. The total number of fish released from the acclimation facility in the second group was 135,308. There were 62 mortalities during the second acclimation period (0.05%). The size of the fish that were forced from the facility was 22.0 fish/lb. No fish health problems were encountered this year for any group.

The Catherine Creek Adult Capture Facility (CCACF) was put into operation on 21 February 2013. The first adult summer steelhead was captured on 13 March. A total of 171 unmarked adult summer steelhead were trapped and released from 13 March to 10 June 2013. Median arrival time was the week of 8 April. No adipose-clipped fish were captured. The first adult spring Chinook salmon was captured at CCACF on 27 May. A total of 799 (505 adult and 294 jack) spring Chinook salmon were trapped from 27 May to 24 July. The total catch was made up of 245 adults and 97 jacks of natural origin, 55 adults and 197 jacks of conventional broodstock progeny and 205 adult and zero jacks of captive broodstock progeny. A total of 409 adult (191 natural, 14 conventional, 204 captive) and 96 jack (94 natural, 2 conventional) spring Chinook salmon were released above the weir to spawn naturally. Median arrival time for adults was the week of 10 June.

Broodstock were collected systematically over the entire return from 27 May to 24 July. There were 54 unmarked (22.0% of the natural return trapped) and 41 conventional broodstock (15.8% of the hatchery return trapped) collected and transported from CCACF.

The trap was removed from Catherine Creek on 31 July. Trap efficiency in 2013 was estimated at 97.7%.

The upper Grande Ronde Adult Capture Facility (UGRACF) was put into operation on 6 March 2013. The first adult summer steelhead was captured on 13 March. A total of 28 unmarked adult summer steelhead were trapped and released from 13 March to 6 May. No adipose-clipped fish were captured. Median arrival time was the week of 22 April. The first adult spring Chinook salmon was captured at UGRACF on 29 May. A total of 174 (127 adult and 47 jack) spring Chinook salmon, were trapped from 29 May to 17 June. The total catch was made up of 47 adults

and 5 jacks of natural origin, 62 adults and 24 jacks from conventional broodstock, and 18 adults and 18 jacks from captive broodstock. Median arrival for adults was the week of 3 June.

Broodstock were collected from 29 May to 17 June. A total of 24 adult and no jack natural fish, 59 adult and 9 jack hatchery fish (conventional broodstock) were transported to LGH for broodstock. The natural adults collected for broodstock comprised 51.1% of the total natural adult return trapped while 73.8% of the adult hatchery fish trapped were collected for broodstock.

The trap and weir were removed from the upper Grande Ronde River once on 7 June, reinstalled on 11 June, then finally removed for the season on 18 June 2013 due to high stream temperatures (daily maximum >20 ^{o}C). Trap efficiency was estimated at 3.5% this year.

In 2013, a total of 49 females, 34 males and 3 jacks were spawned from the Catherine Creek stock. A total of 66 females, 38 males, and 8 jacks from the upper Grande Ronde stock were spawned. A total of 67 females, 48 males, and 5 jacks from the Lookingglass Creek stock were spawned. Median spawning week was 29 August for Catherine Creek and the upper Grande Ronde and 4 September for Lookingglass Creek. A total of 18 females, 10 males, and 1 jack from the Grande Ronde captive brood were spawned. Median spawning week for the captive brood was 23 September.

A total of 128 fish from the 2009 broodyear and 111 fish from the 2010 broodyear were transported from BOH to LGH on 4 June. On 14 August 2013 these fish were transported for outplanting into Sheep Creek (rm 9.10 to 9.25), a tributary to the Upper Grande Ronde River. There were a total of 54 mortalities at LGH making the total number released into the wild, 185.

A total of 34,958 surplus eggs from the upper Grande Ronde captive brood spawned at BOH were outplanted by the project into Sheep Creek on 14 (18,324) and 27 November (12,539) and into Meadow Creek on 5 December 2013(4,095).

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INTRODUCTION

Anadromous salmonid stocks have declined in both the Grande Ronde River Basin (Lower Snake River Compensation Plan (LSRCP) Status Review Symposium 1998) and in the entire Snake River Basin (Nehlsen et al. 1991), many to the point of extinction. The Grande Ronde River Basin historically supported large populations of fall and spring Chinook (*Oncorhynchus tshawytscha*), sockeye (*O. nerka*), and coho (*O. kisutch*) salmon and steelhead trout (*O. mykiss*) (Nehlsen et al. 1991). The decline of Chinook salmon and steelhead populations and extirpation of coho and sockeye salmon in the Grande Ronde River Basin was, in part, a result of construction and operation of hydroelectric facilities, over fishing, and loss and degradation of critical spawning and rearing habitat in the Columbia and Snake River basins (Nehlsen et al. 1991).

Hatcheries were built in Oregon, Washington and Idaho under the Lower Snake River Compensation Plan (LSRCP) to compensate for losses of anadromous salmonids due to the construction and operation of the lower four Snake River dams. Lookingglass Hatchery (LGH) on Lookingglass Creek, a tributary of the Grande Ronde River, was completed under LSRCP in 1982 and has served as the main incubation and rearing site for spring Chinook salmon programs in the Grande Ronde and Imnaha rivers in Northeast Oregon. Despite these hatchery programs, natural spring Chinook populations continued to decline resulting in the National Marine Fisheries Service (NMFS) listing Snake River spring/summer Chinook salmon as "threatened" under the federal Endangered Species Act (1973) on 22 April 1992.

Continuing poor escapement levels and declining population trends indicated that Grande Ronde River basin spring Chinook salmon were in imminent danger of extinction. These continuing trends led fisheries co-managers in the basin to initiate the Grande Ronde Endemic Spring Chinook Salmon Supplementation Program (GRESCSSP) in order to prevent extinction and preserve options for use of endemic fish stocks in future artificial propagation programs. The GRESCSSP was implemented in three Grande Ronde River basin tributaries; the Lostine River, the upper Grande Ronde River, and Catherine Creek. The GRESCSSP employed two broodstock strategies utilizing captive and conventional brood sources. The captive brood program that began in 1995, with the collection of parr from the three tributary areas, has now been discontinued in Catherine Creek and the Lostine River. There is still a safety net program for the Upper Grande Ronde River. The conventional broodstock component of the program began in 1997 with the collection of natural adults returning to these tributary areas.

Although LGH was available as the primary production facility for spring Chinook programs in the Grande Ronde Basin, there were never any adult or juvenile satellite facilities developed in the tributary areas that were to be supplemented. An essential part of the GRESCSSP was the construction of adult traps and juvenile acclimation facilities in these tributary areas. Weirs were installed in 1997 for the collection of adult broodstock for the conventional component of the program. Juvenile facilities were built in 2000 for acclimation of the smolts produced by the captive and conventional broodstock programs as release sites within the natural production areas of their natal streams. The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) operate both the juvenile acclimation and adult trapping facilities located on Catherine Creek and the upper Grande Ronde River under this project. The Nez Perce Tribe (NPT) operate the facilities on the Lostine River under a sister project.

Hatcheries were also built in Oregon, Washington and Idaho under the LSRCP to compensate for losses of summer steelhead due to the construction and operation of the lowest four Snake River dams. Despite these harvest-driven hatchery programs, natural summer steelhead populations continued to decline as evidenced by declining counts at Lower Granite Dam since 1995 (Columbia River Data Access in Real Time, DART) and low steelhead redd counts on index streams in the Grande Ronde Basin. Because of low escapement the Snake River summer steelhead were listed as threatened under the Endangered Species Act of 1973 by the National Marine Fisheries Service (NMFS) on 18 August, 1997. Co-managers have also discontinued off-station releases of juvenile Wallowa stock (non-endemic) hatchery summer steelhead into Catherine Creek in 1998 and the upper Grande Ronde River in 1999.

Data are lacking on summer steelhead adult return numbers, stray rates, and the genetic make-up of populations that return to tributaries of the Grande Ronde River basin. The adult fish weirs in place on Catherine Creek and the upper Grande Ronde River are also used to collect data on summer steelhead populations in those areas.

METHODS

Juvenile Acclimation

The Catherine Creek Acclimation Facility (CCAF) is located at river mile (rm) 52.5 of Catherine Creek (Figure 1). Catherine Creek originates in the Wallowa Mountains and flows north to northwest entering the Grande Ronde River at rm 117. The Upper Grande Ronde Acclimation Facility (UGRAF) is located at rm 170.5 of the Grande Ronde River (Figure 1). The Grande Ronde River originates in the Elkhorn Mountains and flows north to northeast 183 rm, before entering the Snake River.

Each facility consists of 4 portable raceways lined with vinyl fabric (Figures 2 and 3). Each raceway is 86 ft long, 8 ft wide, and the water depth is kept at around 3.25 ft (2,236 ft^3). The water supply for CCAF is pumped directly from Catherine Creek into the raceways using a screened submersible pump powered by a diesel powered electrical generator. The water supply for UGRAF is diverted from the Grande Ronde River into the raceways by gravity using a screened cement intake structure located about 600 ft upstream from the raceways. For both facilities the water is drained from each raceway through an 8 inch pipe back to the river below the water intake. A 29 ft travel trailer is placed at each facility to provide onsite housing for facility operators, who provide 24 hour watch and maintenance of the facility.

Each facility is designed to hold 42,475 fish per raceway at 25 fish/lb (169,900 total, 6,796 lbs), a density of 0.76 lbs/ft^3. Flow measured at the facilities has been 330 gpm/raceway, a flow density of 5.15 lbs/gpm. The production goal for Catherine Creek is 150,000 smolts. Under this scenario, there would be only one acclimation period. At the UGRAF the plan is for two acclimation periods with the production goal at 250,000 smolts. The proposed acclimation period for CCAF runs from the mid-March to mid-April. To accomplish the two acclimation periods at UGRAF, the period is split in half with the first group released at the end of March. This time period is chosen to mimic the spring outmigration timing for natural smolts in the system.

Fish are transported to the facilities from LGH by Oregon Department of Fish and Wildlife (ODFW) in tanker trucks. The fish are fed daily when water temperatures are above 3^oC at a rate ranging from 0.2 to 2.4 % body weight per day (BWD) depending on the water temperature during the acclimation period (Bio-Oregon feed rate guidelines, November 2006). Fish are fed Bio-Oregon Bio-Vita Fry 2.5mm feed. Fish are allowed to volitionally leave the raceways beginning two days after delivery to the facilities. Fish remaining in the raceways at the end of the volitional period are forced from the raceway in the afternoon. The fish are released in the afternoon because flows are slightly higher and low light provides fish cover as they move downstream.

A portion of the fish at both facilities are tagged with passive integrated transponders (PIT) each year by ODFW and CTUIR for survival estimation to Snake and Columbia River dams. PIT tag detectors are installed on the volitional release drains (Figures 2 and 3) before the volitional release to monitor the outmigration (only three readers for UGRAF). Mortalities are removed daily, scanned for PIT tags, and saved for ODFW pathology. The total number of fish released is estimated using ODFW Fish Liberation Reports and acclimation mortality records. Lengths and weights are taken at both facilities by monitoring and evaluation personnel at arrival, and just before the force out, by netting 50 fish from each raceway. Project personnel conduct maintenance

and repair activities on the facility grounds and equipment as needed to operate each of the facilities.

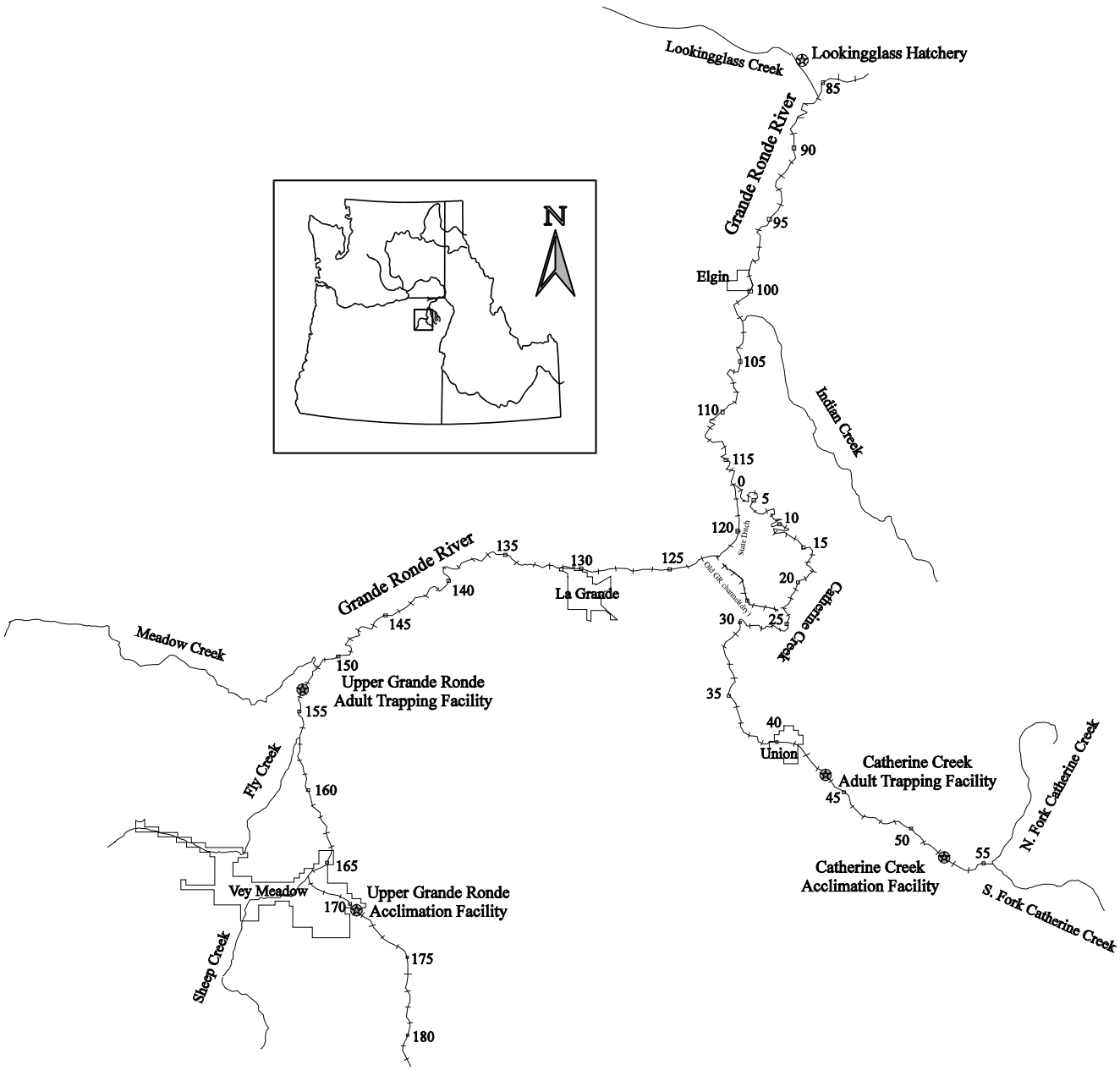

Figure 1. Map of the upper Grande Ronde River basin showing locations (rm) of Lookingglass Hatchery and Catherine Creek and Upper Grande Ronde juvenile acclimation and adult capture facilities.

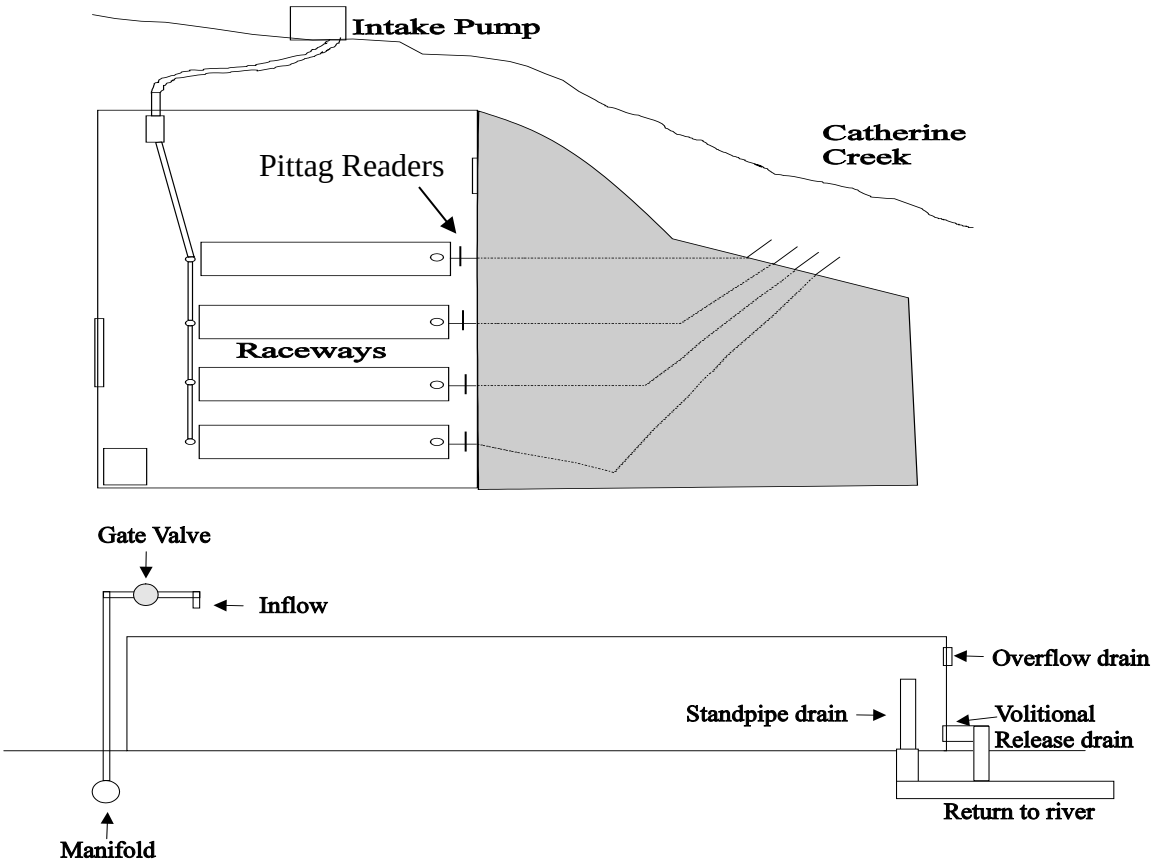

Figure 2. Photo and diagram of the Catherine Creek acclimation facility. The lines passing through the shaded area represent underground return pipes.

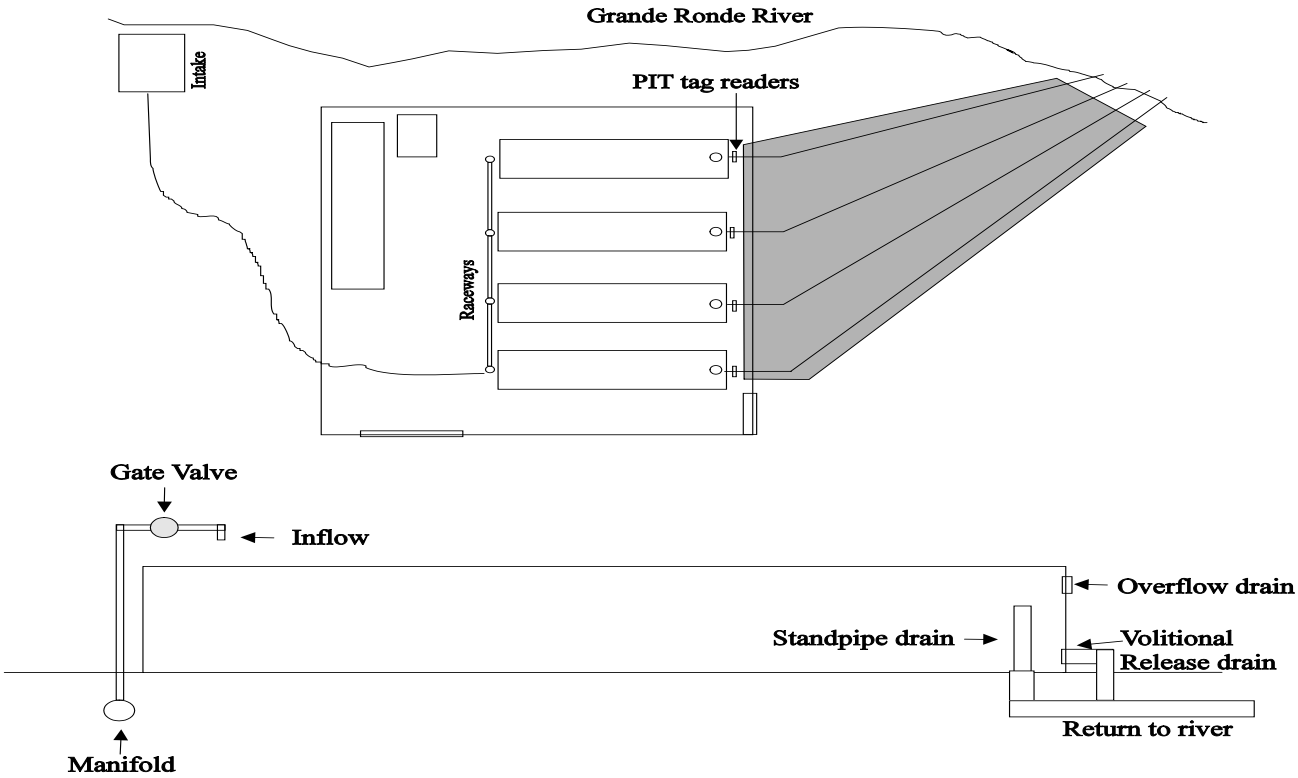

Figure 3. Photo and diagram of the Upper Grande Ronde acclimation facility. The main intake line and the lines passing through the shaded area represent underground pipes.

Adult Collections

The Catherine Creek Adult Collection Facility (CCACF) is located at rm 43.5 of Catherine Creek (Figure 1). The facility consists of a hydraulic weir which is attached at the bottom sill of a full channel width pool and chute type ladder (Figure 4). Trapping of adult summer steelhead and spring Chinook salmon is accomplished by directing adults into an off channel trap with a fyke opening and holding area that is 25 ft long and 6 ft wide. The depth is operated at about 6 ft (900 ft^3). The designed adult spring Chinook salmon holding capacity for this facility is 90 using 10 ft^3/adult. There is also a recovery area in the ladder above the trap that the fish can remain in until ready to continue upstream.

The Upper Grande Ronde Adult Collection Facility (UGRACF) is located at rm 153.5 of the Grande Ronde River (Figure 1). The facility consists of a floating weir and trapbox that spans the entire stream effectively blocking upstream passage (Figure 4). Trapping of summer steelhead and spring Chinook salmon is accomplished by directing adults into the trapbox. The trapbox is located in the main channel near the bank and is 11 ft long and 10 ft wide. There are two openings in the trapbox, one in the front of the box with a fyke attached and the other a trap door on the side under the weir panels. The depth of the water in the trapbox is normally about 2.5 ft (275 ft^3). The designed adult spring Chinook salmon holding capacity for this facility is 28 using 10 ft^3/adult. There is a structure on the upstream side of the trap that reduces the flow of the river on the trap side and allows an area of recovery for the fish that are passed.

A travel trailer is placed at each facility after the completion of the acclimation periods to allow for 24 hour/7 day a week security during the peak trapping periods. Each of the traps is checked daily and water temperatures are taken with a pocket thermometer before the trap is operated. An Onset™ recording thermometer is also installed in the trap boxes for hourly temperature readings. Handling events only occur when water temperatures are below 20.0^{o}C. Later in the season, as water temperatures rise, fish are processed earlier in the day when water temperatures are lower, in order to reduce stress. At the upper Grande Ronde facility, if and when the daily maximum water temperature exceeds 20.0^{o}C the trap is opened and the weir is removed from the stream for the year (2013 LSRCP AOP).

Electro-narcosis (EN) was used during trap checks at Catherine Creek to sedate the fish prior to handling. Drug free methods are used due to possible harvest of the fish above the weir. Electro-narcosis was not used at the Grande Ronde due to safety concerns specific to that trap. A solution to this situation is being worked on so EN can be used at this site as well. The fish were worked un-anesthetized again due to harvest concerns above the trap. The EN system consists of a 75 gallon trough with an 18 in. x 18 in. aluminum plate attached at each end of the trough. The plates are covered with a plastic mesh to eliminate contact of the fish with the plates. The plates are wired to the power system which was a variable 0 – 60 volt; 3 amp DC power source.

Fork lengths from both summer steelhead and spring Chinook salmon are measured to the nearest millimeter (mm). A paper punch is used to mark fish and collect tissues for genetic samples. A single punch on the right opercle plate is used to mark the fish that are released upriver as having been trapped. Tissue from opercle punches and one additional caudal punch are collected for genetics evaluation (all steelhead, and only Chinook from CCAF). Tissue samples are preserved in labeled vials with 95% ethanol. Each fish is examined externally for marks, injuries or other

physical conditions, and a preliminary determination of sex is made. Naturally and hatchery produced summer steelhead are enumerated and passed upstream. Spring Chinook salmon are collected and transported to LGH for broodstock, outplanted in another stream, or enumerated and passed upstream. Summer steelhead kelts encountered are counted and allowed to pass downstream over the weir if alive and sampled (length, weight, and otolith) if dead. Any spring Chinook salmon mortality recovered is also sampled. Fish species captured incidentally are released upstream.

Spring Chinook broodstock collection at the Catherine Creek facility is based on a sliding scale developed by co-managers in the basin (Appendix Table 1). The sliding scale was developed to allow for increases and decreases in the number of returning naturally- and hatchery-produced fish and to provide a basin specific approach to broodstock and natural escapement management. The scale is based on preseason population estimates and regulates the percentage of natural and hatchery broodstock to be retained and hatchery/wild ratio above the weir. When the ratio is applied above the weir and surplus fish are the result, these fish can be used for Lookingglass Creek broodstock or outplanted in Lookingglass Creek and/or Indian Creek. Fish collected for broodstock are taken systematically (adult/jack) from across the run. Progeny from the captive broodstock program are not to be incorporated into the Catherine Creek conventional hatchery broodstock but may be used for broodstock in the Lookingglass Creek program.

This sliding scale management does not apply to the upper Grande Ronde River. For the upper Grande Ronde River, escapement and broodstock collection guidelines were agreed to by the co-managers as part of the Grande Ronde Spring Chinook Hatchery Management Plan (GRSCHMP 2002). Up to 50% of the natural fish returning to the weir may be retained for brood and as many conventional origin adults as needed to meet the broodstock goal. No captive brood progeny adults are used for broodstock. There are no restrictions on hatchery/wild ratio above the weir. Fish collected for broodstock are to be taken systematically (adult/jack) from across the run. However, due to temperature concerns in the upper Grande Ronde, a contingency collection schedule is developed and agreed to as part of the LSRCP Annual Operating Plan (AOP) in case of early, high temperature conditions.

Hatchery jack management above the weirs is the same for both Catherine Creek and the upper Grande Ronde River. The goal is not to exceed a total of one jack for every ten adult male spring Chinook passed (10%). All natural origin jacks are passed upriver along with enough conventional jacks to meet the target. Surplus jacks that arrive at the weirs are sacrificed for data collection (coded wire tag) and distributed for ceremonial and subsistence uses. Preferred jack management in the Catherine Creek broodstock is 1 jack for every 10 males (10%) while the Grande Ronde broodstock can be as high as 1 jack for every 5 adult fish. The high percentage allowed in the Grande Ronde broodstock is due to the historical very low adult numbers when the GRSCHMP was being developed and the possible need for more males in the brood. Generally the same rate (1:10) is used as for the Catherine Creek brood.

All fish collected for broodstock and transported to LGH received prophylactic dorsal sinus injections of oxytetracycline and erythromycin upon loading. Dosage of each antibiotic is based on estimated age length data (3 year fish <600mm, 4 year fish 600-799mm, 5 year fish >799). For the erythromycin injection (100mg/ml), 3-year-old fish received 0.50cc, 4-year-old fish 1.0cc, and 5-year-old fish 2.0cc. The oxytetracycline (200mg/ml) is given at one-quarter the dose of the erythromycin injections.

The fish are transferred from the trap to the CTUIR transport vehicle by using a water-filled tube. Broodstock are transported from each weir site to LGH using 300 gallon fiberglass tanks mounted on flatbed trailers. The tanks are each equipped with an aerator and oxygen tank. Transport time to LGH from the weir site is about 1.0 to 1.5 hours. Target dissolved oxygen level in the tank during transport is 11 mg/l. Dissolved oxygen levels are checked mid-way through the transport.

The possible effects of the weirs on fish behavior is evaluated by walking or snorkeling a one-mile segment of the stream immediately downstream of the weirs once a week when water levels and clarity allow for viewing fish. Live fish, carcasses, and evidence of spawning activities (redds, test digs) are recorded. ODFW and CTUIR staff conducts standard spawning ground surveys (Monzyk et al. 2006) on segments upstream and downstream of the weir in August and September and the same information is collected.

Project personnel conduct maintenance and repair activities on facility grounds and equipment as needed to operate the facilities.

Broodstock Activities

Assistance is provided to ODFW for the spawning of the Lookingglass Creek, Catherine Creek and Upper Grande Ronde River conventional broodstocks held at LGH and for the Grande Ronde captive brood at Bonneville Hatchery (BOH). All stocks at LGH are checked for ripeness once a week over a five week period beginning around the middle of August.

At BOH, the maturing captive brood from the 2009 and later broodyears will be trucked to LGH in late May or early June in 2013 for outplanting in the fall or spawning at LGH if needed for the conventional program. The last of the evaluation captive brood (< 2009 broods) will be checked once a week over a six week period beginning in September at BOH. Any surplus eggs from the captive brood spawning are outplanted into Meadow or Sheep Creeks (upper Grande Ronde tributaries) after eye up in the fall.

Figure 4. Photos of the Catherine Creek (top) and the Upper Grande Ronde (bottom) adult broodstock collection facilities.

RESULTS AND DISCUSSION

Juvenile Acclimation

There was only one group of fish acclimated at the CCAF in 2013 (Table 1). The CCAF received 134,591 conventional smolts on 19 March. The volitional release began on 21 March, and continued until force release on 15 April. The average size of the fish at delivery was 22.0 fish/lb (Table 2). Densities in the raceways ranged from 0.60 to 0.76 lbs/ft^3. The variability in the raceway densities was due to the densities at LGH and the way they were loaded onto the transport truck.

During the volitional release period there were a total of 9,906 PIT-tagged fish scanned. Based on the number of PIT-tagged fish in this group (15.6%, 20,911), an estimated 63,500 fish left volitionally. This was 47.2% of the fish released from this group (Table 3). Migration timing of the fish that volitionally migrated showed that only 28.0% left in the first five days (Figure 5).

The total number of fish that were released from the acclimation facility was 134,519. The size of the fish that were forced from the facility was 18.6 fish/lb. Based on the size of the fish at delivery it appears that the smaller fish left the raceways volitionally leaving the larger fish to be forced out or there was substantial growth during acclimation. A total of 491.5 pounds of food was fed during the acclimation period. The water temperature data logger at the acclimation facility was stolen in 2013 so water temperature at CCACF was used. The average daily water temperature at the adult site ranged from 2.1^{o}C to 6.5 ^{o}C during the acclimation period and was usually at the lowest temperature around 0800 with the peak temperature around 1600 (Figures 6 and 7).

The total mortality for the acclimation period was 72 (0.05%). There was no substantial fish health problems detected in this group. ODFW Fish Health Services examined a total of 10 mortalities (raceways 1-4). These represented fish from raceways 1-3 at Lookingglass Hatchery. One of 10 (10%) mortalities had a low level of aeromonad-pseudomonad (APS) bacteria. One of 10 (10%) mortalities had an ELISA result of 2.193 OD units indicating this fish had BKD; all others were ≤0.094 OD units. All samples collected for culturable viruses were negative. BKD was detected in 2/70 (2.9%) mort/moribund fish examined from raceways 1-3 while rearing at Lookingglass Hatchery.

Table 1. Raceway fish density and flow data for the Catherine Creek acclimation facility before volitional release in 2013.

Catherine Creek	Raceway				
	1	2	3	4	Direct stream
No. of fish	33,748	33,771	37,416	29,656	0
Total lbs.	1,534	1,535	1,701	1,348	
Mortality	12	30	20	10	
Density lbs/ft^3	0.69	0.69	0.76	0.60	
lbs/gpm	4.65	4.65	5.15	4.08	
Flow gpm	330	330	330	330	
Treatment	Conv.	Conv.	Conv.	Conv.	

Table 2. Group, number, size, raceways, mortality, feed fed, and numbers released from the Catherine Creek acclimation facility in 2013.

Facility/ rel. yr	Group	Number Received	Size fish/lb.	Raceways used	Density lbs/ft^3	Total mortality (%)	Feed Fed (lbs)	Number released
CC 13	1 Conv.	134,591	22.0	4	0.69	0.05	491.5	134,519

Table 3. Group, acclimation dates, temperature, dissolved oxygen, and estimated volitional migration of fish acclimated at the Catherine Creek acclimation facility in 2013.

Facility/ rel. yr	Group	Acclimation Period	Volitional began	Temp.^{o}C		DO mg/l		Volitional	
				Min.	Max.	Min.	Max.	migration	%
CC 13	1 Conv.	3/19 – 4/15	3/21	NA	NA	10.6	12.3	63,500	47.2

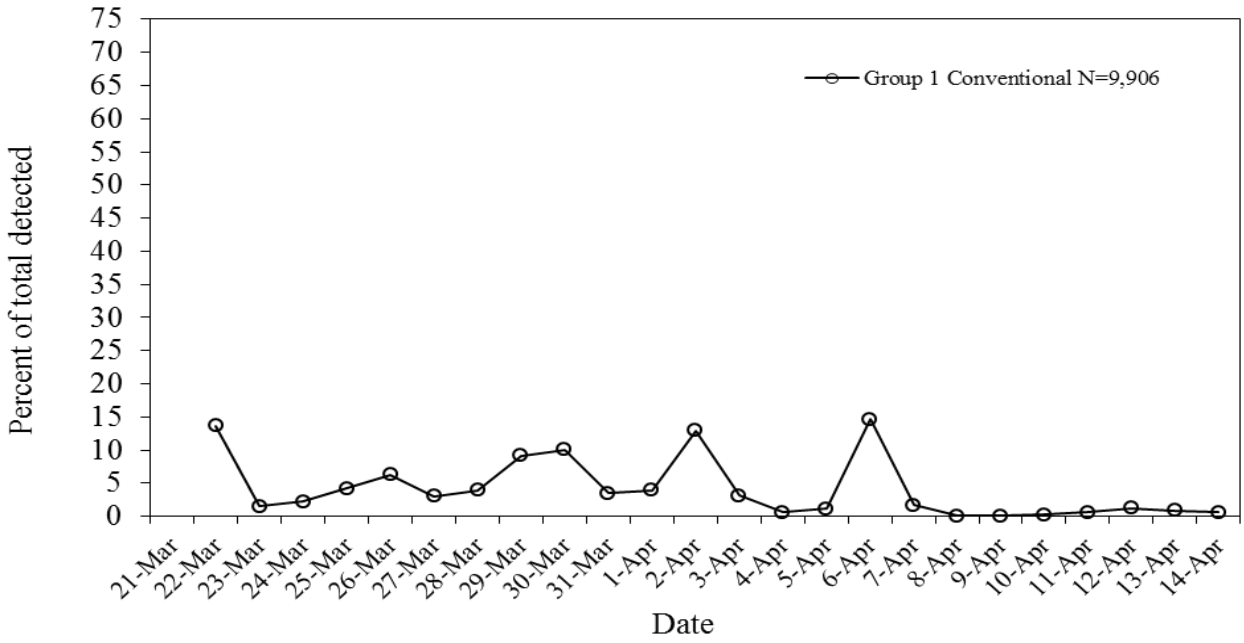

Figure 5. Daily PIT tag detections of fish leaving the raceways during the volitional release period at the Catherine Creek acclimation facility in 2013.

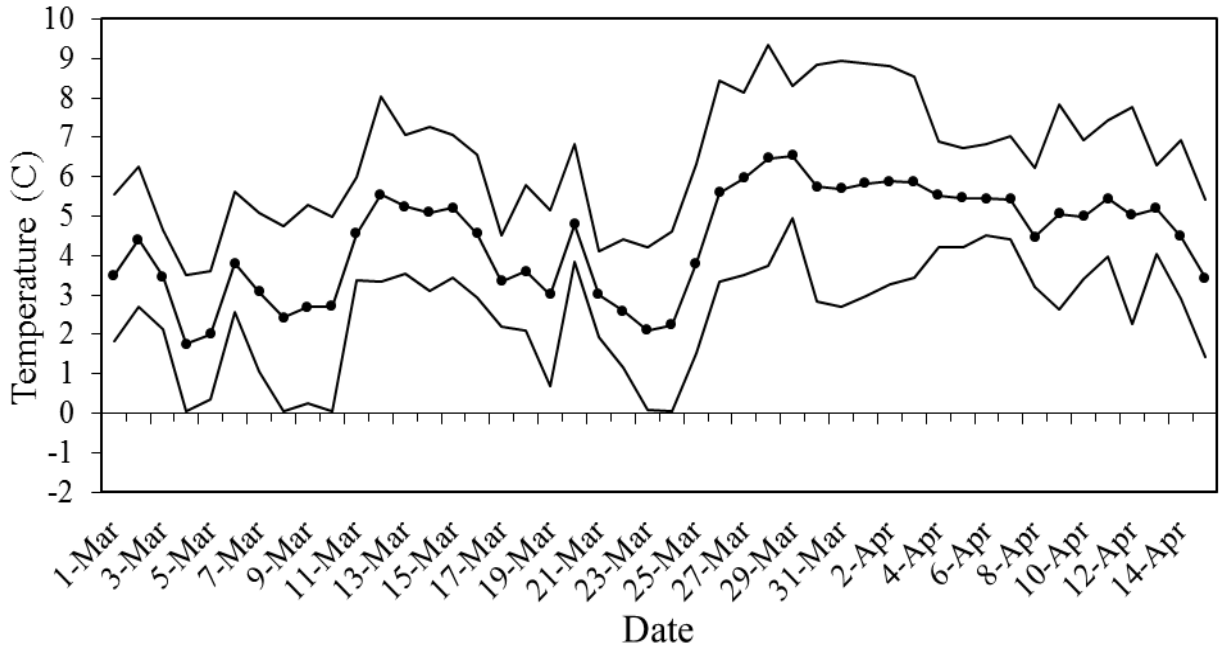

Figure 6. Daily maximum, minimum, and average water temperatures (recorded hourly) at the Catherine Creek adult trapping site in 2013. The temperature logger at the juvenile site was lost in 2013 so the adult site data is shown.

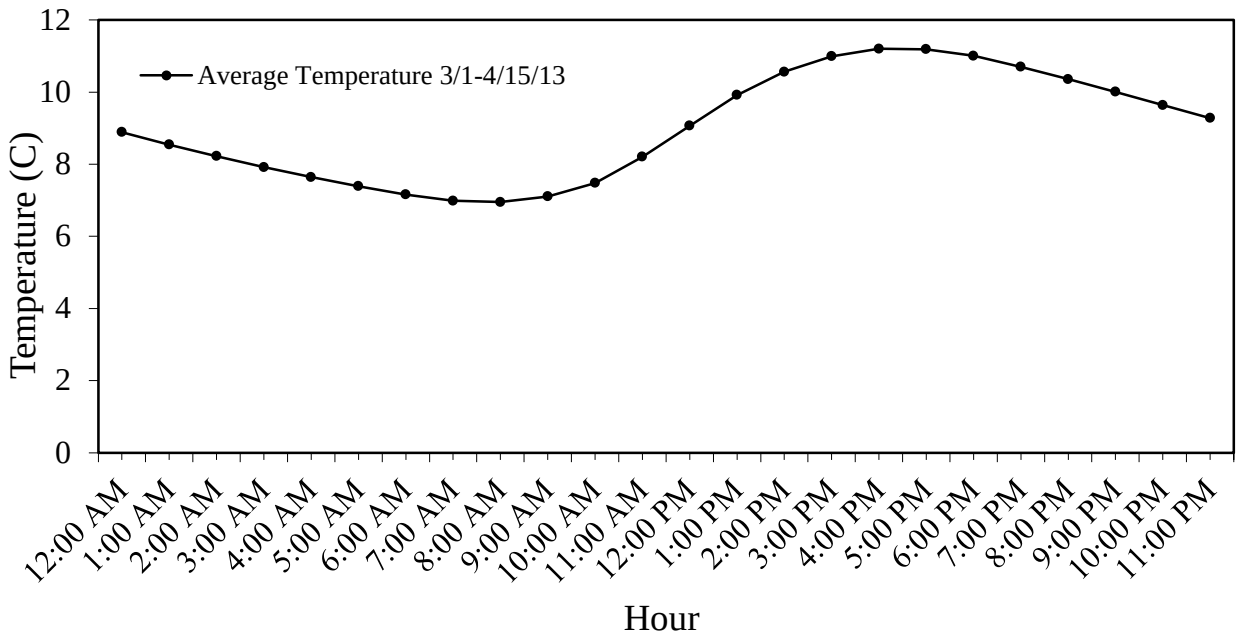

Figure 7. Average hourly water temperature at the Catherine Creek adult trapping site in 2013. The temperature logger at the juvenile site was lost in 2013 so the adult site data is shown.

There were two acclimation groups at the UGRAF in 2013 (Table 4). Group 1, 155,321 captive smolts, arrived at the facility on 18 March 2013. Group 2, 135,370 conventional smolts, arrived on 4 April. Volitional release for Group 1 began on 20 March with force out on 2 April. The average size of the fish at delivery was 24.0 fish/lb (Table 5). The densities in the raceways ranged from 0.72 to 0.73 lbs/ft^3. Volitional release for Group 2 began on 6 April with force out on 15 April. The average size of the fish at delivery was 21.5 fish/lb (Table 5). The densities in the raceways ranged from 0.70 to 0.71 lbs/ft^3.

There were only three operational readers for four raceways so outmigration for the fourth raceway was estimated based on the average of the other three. The CTUIR monitoring and evaluation program will begin a more rigorous maintenance program to keep all of the readers operational in the future. During the volitional release period for Group 1 there were a total of 267(200+67 est.) PIT-tagged fish scanned. Based on the number of PIT-tagged fish in this group (0.6%, 998), an estimated 41,719 fish left volitionally. This was 26.9% of the fish released from this group (Table 6). Migration timing of the fish that volitionally migrated from Group 1 showed that 77.5% left during the first five days (Figure 8). There were an estimated 293 (220+73 est.) PIT-tagged fish scanned for Group 2. Based on the number of PIT-tagged fish in this group (0.7%, 1,005), an estimated 41,857 fish left volitionally. This was 30.9% of the fish released from this group (Table 6). Migration timing of the fish that volitionally migrated from Group 2 showed that 95.0% left during the first 5 days of release (Figure 8).

The total number of fish that were released from the acclimation facility was 290,572 (155,264 Group 1 captive, 135,308 Group 2 conv.). The size of the fish that were forced from the facility was 24.4 and 22.0 fish/lb, for groups 1 and 2 respectively. Based on these sizes it appears that the larger fish left the raceways volitionally leaving the smaller fish to be forced out. A total of 292.5 pounds

of food was fed during the acclimation period (131.0 early, 161.5 late). The average daily water temperature at UGRAF for the acclimation ranged from -0.6^{o}C to 2.8 ^{o}C and was lowest around 0800 and highest around 1600 (Figures 9 and 10).

There were a total of 119 mortalities during acclimation. There were 57 mortalities in Group 1 (0.04%) and 62 in Group 2 (0.05%). No Grande Ronde Captive Broodstock smolt mortalities were examined from the first acclimation group. No virus was detected in this group throughout rearing at LGH. Bacterial kidney disease was detected in 7/74 (9.5%) mort/moribund fish examined during the last four months of their rearing at LGH. ODFW Fish Health Services examined a total of 10 Grande Ronde conventional smolt mortalities during acclimation. Infectious hematopoietic necrosis virus (IHNV) was detected at a low level in one tissue sample pool from mortalities collected from a cross section of all acclimation ponds. This virus, in association with cold water disease bacteria, had caused chronic low level loss (0.01-0.03%/day) in this group while at LGH prior to transfer to acclimation. No significant levels of systemic bacteria were detected in any of the 10 mortalities examined from the acclimation site. All BKD ELISA values were ≤ 0.070 OD units indicating that these fish did not have a BKD problem at release.

Maintenance and repair activities were conducted at both acclimation facilities in 2013. Facility maintenance work at the CCAF consisted of snow removal, work on the intake site, and fence repair. Facility maintenance work at the UGRAF consisted of snow removal and removal of gravel from intake area.

Table 4. Raceway fish density and flow data for the Upper Grande Ronde acclimation facility before volitional release in 2013.

Grande Ronde Group 1	Raceway			
	1	2	3	4
No. of fish	37,393	37,394	40,267	40,267
Total lbs.	1,631	1,632	1,601	1,601
Mortality	10	9	17	21
Density lbs/ft^3	0.73	0.73	0.72	0.72
lbs/gpm	4.94	4.94	4.85	4.85
Flow gpm	330	330	330	330
Treatment	Captive	Captive	Captive	Captive
Grande Ronde Group 2	Raceway			
	1	2	3	4
No. of fish	33,277	33,277	34,408	34,408
Total lbs.	1,585	1,585	1,585	1,585
Mortality	4	10	23	25
Density lbs/ft^3	0.71	0.71	0.70	0.70
lbs/gpm	4.80	4.80	4.74	4.74
Flow gpm	330	330	330	330
Treatment	Conv.	Conv.	Conv.	Conv.

Table 5. Group, number, size, raceways, mortality, feed fed, and numbers released from the Upper Grande Ronde acclimation facility in 2013.

Facility/ rel. yr	Group	Number Received	Size fish/lb.	Raceways used	Density lbs/ft^3	Total mortality (%)	Feed Fed (lbs)	Number released
GR 13	1 Conv.	155,321	24.0	4	0.72	0.04	131.0	155,264
GR 13	2 Conv.	135,370	21.5	4	0.70	0.05	161.5	135,308

Table 6. Group, acclimation dates, temperature, dissolved oxygen, and estimated volitional migration of fish acclimated at the Upper Grande Ronde facility in 2013.

Facility/ rel. yr	Group	Acclimation Period	Volitional began	Temp.^{o}C		DO mg/l		Volitional	
				Min.	Max.	Min.	Max.	migration	%
GR 13	1 Conv.	3/18 – 4/2	3/20	-5.5	0.3	10.6	12.9	41,719	26.9
GR 13	2 Conv.	4/4 – 4/15	4/6	-0.1	5.5	10.4	12.7	41,857	30.9

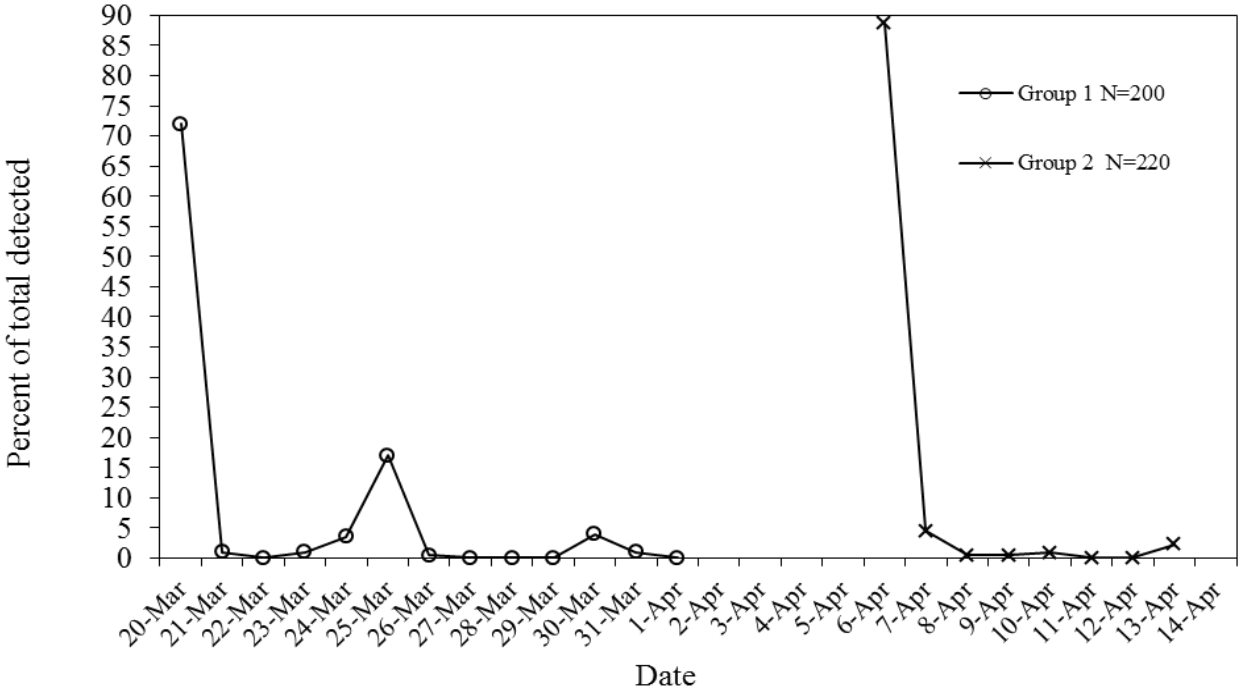

Figure 8. Daily PIT tag detections of fish leaving the raceways during the early and late volitional release periods at the Grande Ronde acclimation facility in 2013.

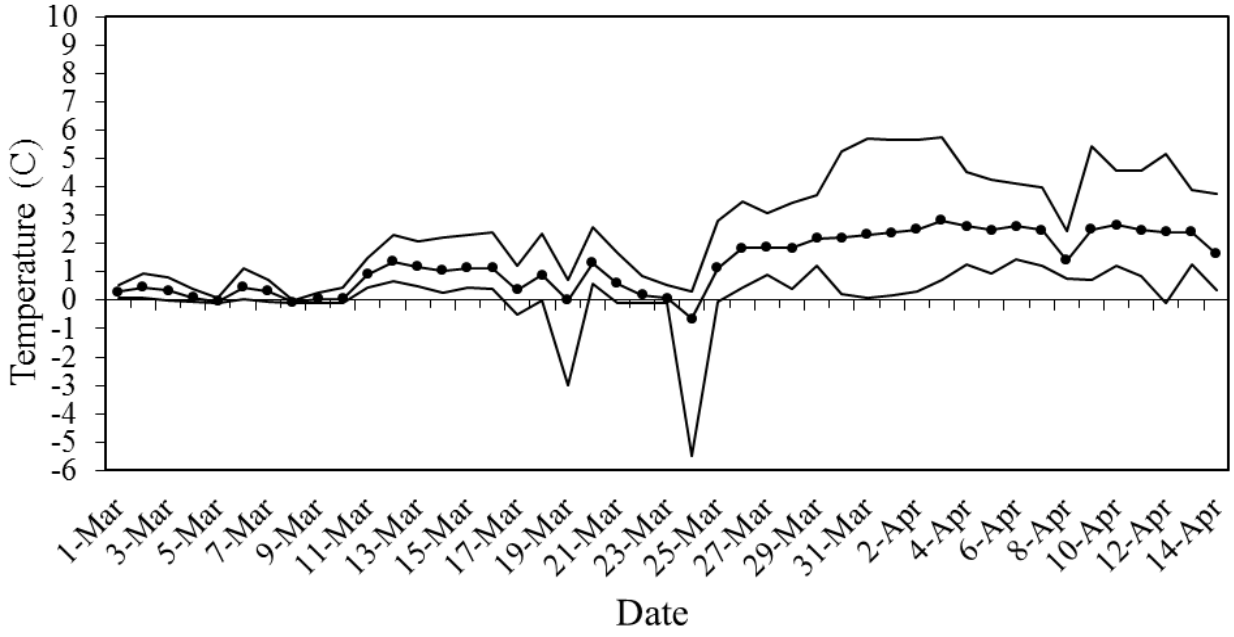

Figure 9. Daily maximum, minimum, and average water temperatures (recorded hourly) at the Upper Grande Ronde juvenile acclimation facility in 2013.

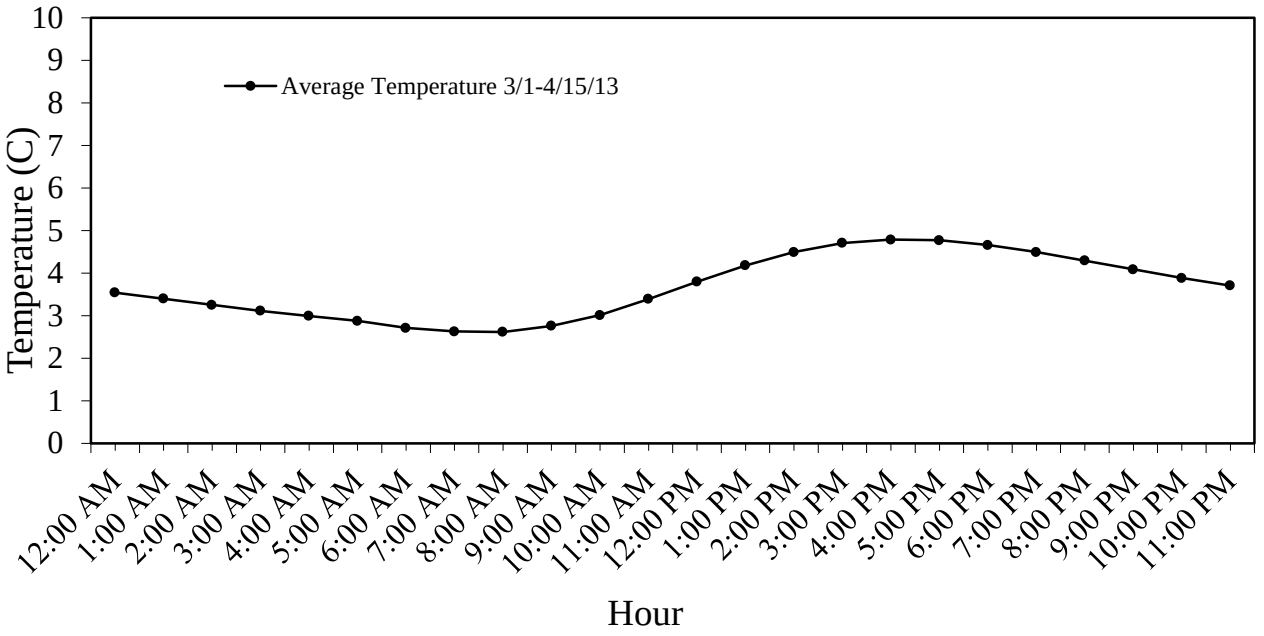

Figure 10. Average hourly water temperature at the Upper Grande Ronde juvenile acclimation facility in 2013.

Adult Collections

The CCACF was put into operation on 21 February 2013. The first adult summer steelhead was captured on 13 March. A total of 171 unmarked adult summer steelhead were trapped and released from 13 March to 10 June 2013 (Table 7). No hatchery adults were trapped. Median arrival at the trap was the week of 8 April (Figure 11). Twenty five previously trapped fish, as indicated by the presence of an opercle mark, were re-trapped and released, and 5 previously trapped kelts were recovered dead on the weir.

The first adult spring Chinook salmon was captured in the trap at CCACF on 27 May 2013. A total of 799 (505 adult and 294 jack) spring Chinook salmon were trapped from 27 May to 24 July 2013 (Table 8). The total catch was made up of 245 adults and 97 jacks of natural origin, 55 adults and 197 jacks of conventional broodstock progeny, and 205 adults and zero jacks of captive broodstock progeny. A total of 409 adult (191 natural, 14 conventional, 204 captive) and 96 jack (94 natural, 2 conventional) spring Chinook salmon were released above the weir to spawn naturally. Median arrival for all origins of adults at the trap was the week of 10 June (Figure 12). By the week of 24 June, 90% of the adult fish had been trapped for all origins. This was a week earlier than the mean timing for the 2002 to 2012 run years. The median arrival for jacks was the week of 17 June for both natural and conventional fish which was also a week earlier than the 1997 to 2012 run years. There was only one trap mortality in 2013 and 11 recaptured carcasses were recovered on the weir.

The trap was removed from Catherine Creek on 31 July. Surveys conducted by ODFW in 2013 resulted in 110 redds counted above the weir and no redds below the weir. Based on the number of redds below the weir there did not appear to be any weir effect. A total of 43 adult carcasses were recovered above the weir which was 10.5% of the total adults passed (409). Of the 43 carcasses recovered above the weir, 42 were punched fish resulting in a trap efficiency of 97.7%. The population estimate above the weir in 2013 was 419 adult fish (2013 Spawning Ground Survey Results, ODFW, unpublished). The spring runoff in 2013 occurred about one month earlier than the mean flows from 2008 to 2012 (Figure 13). This early flow may have accounted for the earlier run timing observed. The early flow also led to very low summer flows in 2013 which may affect spawning distribution and juvenile rearing.

The sliding scale management plan (Appendix Table 1) is a tool used to determine spring Chinook salmon disposition in Catherine Creek. There are, however, some concerns with the implementation of the scale and its application to Catherine Creek as discussed in McLean et al. 2004 and 2005. Weir management decisions regarding broodstock collection percentages and wild:hatchery escapement ratios are made using preseason forecasts and total returns to the tributary. There is substantial error associated with these forecasts which can change these percentages or ratios during the return. It is difficult to make mid-season changes without seriously affecting the cross section of the run collected for brood or released above the weir.

The predicted adult spring Chinook salmon return to Catherine Creek for 2013 was 830 (293 natural + 537 hatchery). Based on these predictions the sliding scale called for retaining <20% of the adult returning natural population for broodstock. Since the predicted total return was more than 500 fish, the percent of adults released above the weir that can be of hatchery origin should be less than or equal to 50%. Adults that are not passed above the weir or taken for Catherine Creek broodstock have three possible dispositions: transported to Lookingglass Creek for a fishery/natural

spawning, taken as broodstock for the Lookingglass Creek program, or outplanted into Indian Creek for natural spawning. In season estimates of the adult return were made as the fish were passing the mainstem dams. This lead to reduction of the estimate (116 natural adults, 259 hatchery adults) and a movement in the sliding scale. Based on the new estimate, the sliding scale called for retaining 20% of the adult returning natural population for broodstock and the percent of adults released above the weir that can be of hatchery origin should be less than or equal to 70%. The natural adult return trapped was 245 fish which was 83.6% of the original predicted number and 211.2% of the modified estimate. The hatchery adult return trapped was 260 fish which was 48.4% of the original predicted number and 100.4% of the modified estimate. The hatchery percentage of adult fish released above the weir in 2013 was 53.3% (218). There were 96 jacks released above the weir and 200 males (32.4% jacks). All of the jacks released above the weir were unmarked fish.

The broodstock collection goal for 2013 was 96 adults (54 natural, 42 hatchery) and 4 jacks (2 natural and 2 hatchery). The broodstock collected and transported from CCACF consisted of 54 unmarked (22.0% of the natural return trapped) and 41 conventional broodstock adults (15.8% of the hatchery return) along with two natural and two conventional jacks. Collection of broodstock at the weir was one hatchery adult short of the goal because the run ended abruptly and this fish was to be taken at the end of the run. This is also the reason the natural portion of the return collected exceeded the limit of 20%. Late in the season there was not enough fish trapped to lower the percentage. It was decided to keep the extra fish (5) at the hatchery instead of returning them back to the stream. Broodstock were collected systematically over the entire return from 27 May to 24 July. The 2013 AOP called for the adult broodstock to be made up of between 51% to 56% natural origin fish. The unmarked portion in the broodstock ended up at 56.2%. Gender classification of adults at spawning was compared to gender classification at the weir to estimate the accuracy of sex determination. Accuracy was 91.6% (87/95). The fish that were missed were called males at the weir so more females were in the broodstock than were said to be collected.

The EN unit was operated for the second year at the CCACF in 2013. The unit performed well and did not appear to injure the fish (no mortalities in the recovery area). There was a slightly higher incidence of mortality, 13.5%, at the hatchery compared to 2012 (4.4%). Since mortality is variable year to year it is difficult to pinpoint the cause.

Hourly water temperatures were taken at the CCACF in 2013 (Figures 14 and 15). Water temperatures ranged from 0.1^{o}C on 8 March to 22.6^{o}C on 17 July. Lowest temperature usually occurred around 0800 with the peak temperature around 1700. The period of low water temperature set the time of day that the trap was checked and the fish worked up.

Maintenance work conducted at the CCACF in 2012 consisted of hydraulic weir component maintenance, rebuild of the weir to better handle the rock load, and weed abatement.

Table 7. Summer steelhead trap capture data from the Catherine Creek adult collection facility in 2013. Trapping began 21 February and ended 31 July.

Week	Trap capture		Kelt	
	First time	Reruns	Not punched[a]	Punched
4-Mar	0			
11-Mar	0			
18-Mar	10			
25-Mar	2			
1-Apr	40	1		
8-Apr	53	4		
15-Apr	5			
22-Apr	8	1		
29-Apr	30	7		
6-May	11	7		1
13-May	9	1		
20-May	1			
27-May	1	2		2
3-Jun	0	1		1
10-Jun	1	1		1
17-Jun	0			
24-Jun	0			
1-Jul	0			
	171	25	0	5

[a] *These fish were kelts recovered on or near the weir that were not previously opercle punched at the weir. Punched fish were previously trapped then recovered as a kelt carcass on or near the weir.*

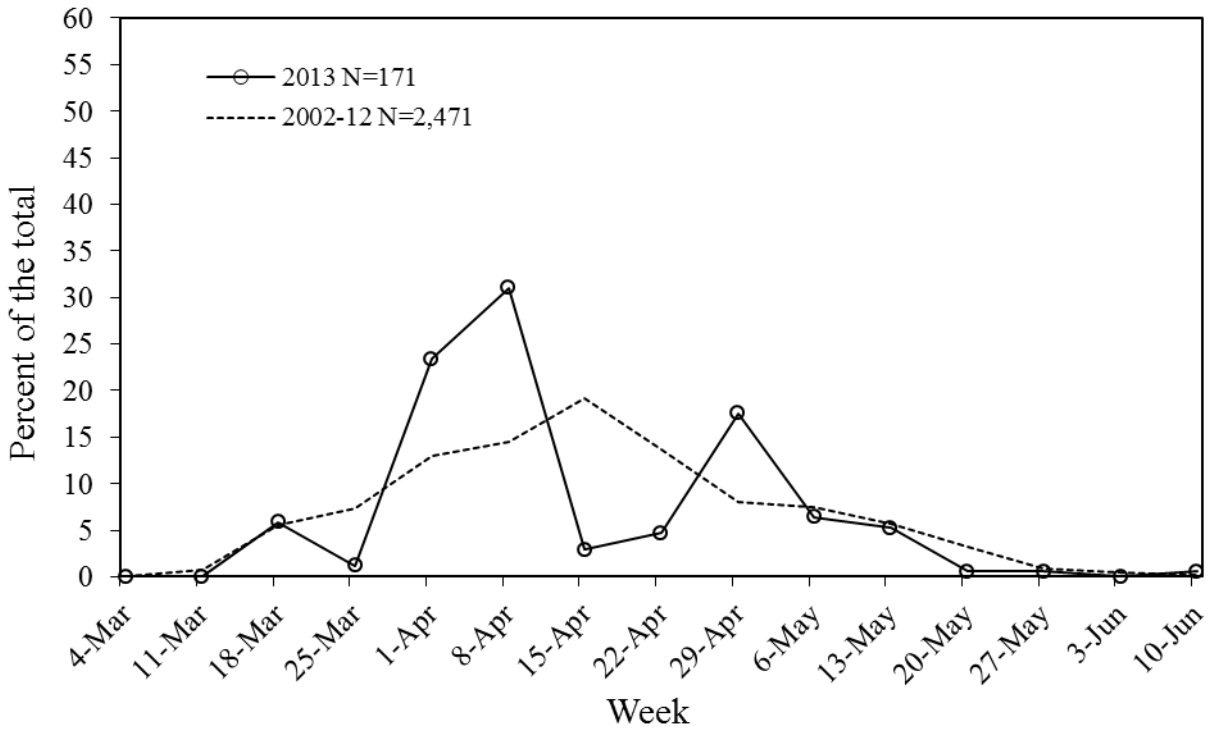

Figure 11. Summer steelhead arrival timing at the Catherine Creek adult collection facility in 2013 and mean arrival timing from 2002 to 2012.

Table 8. Spring Chinook salmon trap capture, transport, and mortality data for the Catherine Creek stock at the adult collection facility in 2013. Trapping began 21 February and ended 31 July.

	Trap capture[a]						Broodstock hauled				Trap
Week	Nat.	(jack)	Capt.	(jack)	Conv.	(jack)	Nat.	(jack)	Conv.	(jack)	mort
13-May				Program							
20-May				finished							
27-May	1		1								
3-Jun	83	3	43		12	1	13	1	12	1	
10-Jun	101	40	103		25	92	15	1	17		1
17-Jun	29	26	33		12	70	13		7		
24-Jun	15	9	15		4	25	7		3	1	
1-Jul	7	10	6		2	7	6		2		
8-Jul	7	7	4			2					
15-Jul	2										
22-Jul		1									
29-Jul		1									
5-Aug											
	245	97	205	0	55	197	54	2	41	2	1

[a] *Age 4 and 5 spring Chinook salmon(age 3 fish). Nat. = Naturally-produced, Capt. = Captive broodstock program, Conv. = Conventional broodstock program.*

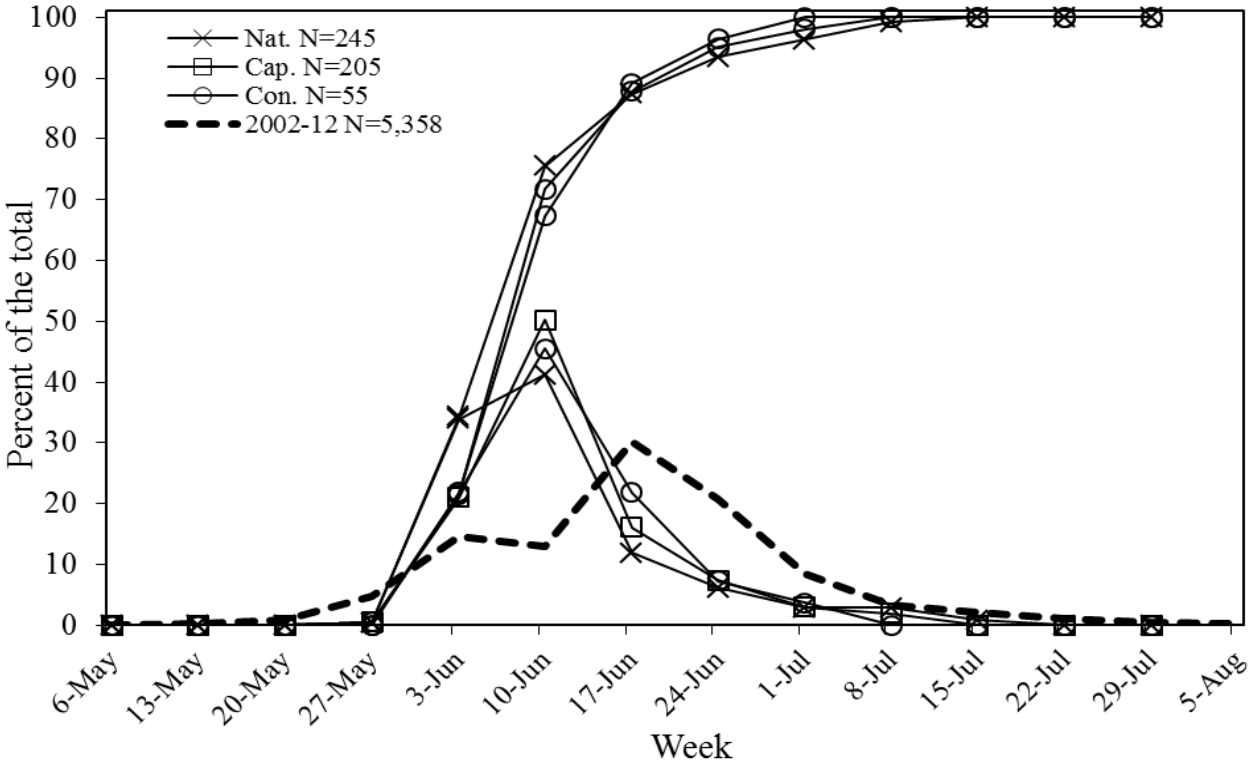

Figure 12. Arrival timing of age 4 and 5 spring Chinook salmon at the Catherine Creek adult collection facility in 2013 and mean arrival timing from 2002 to 2012.

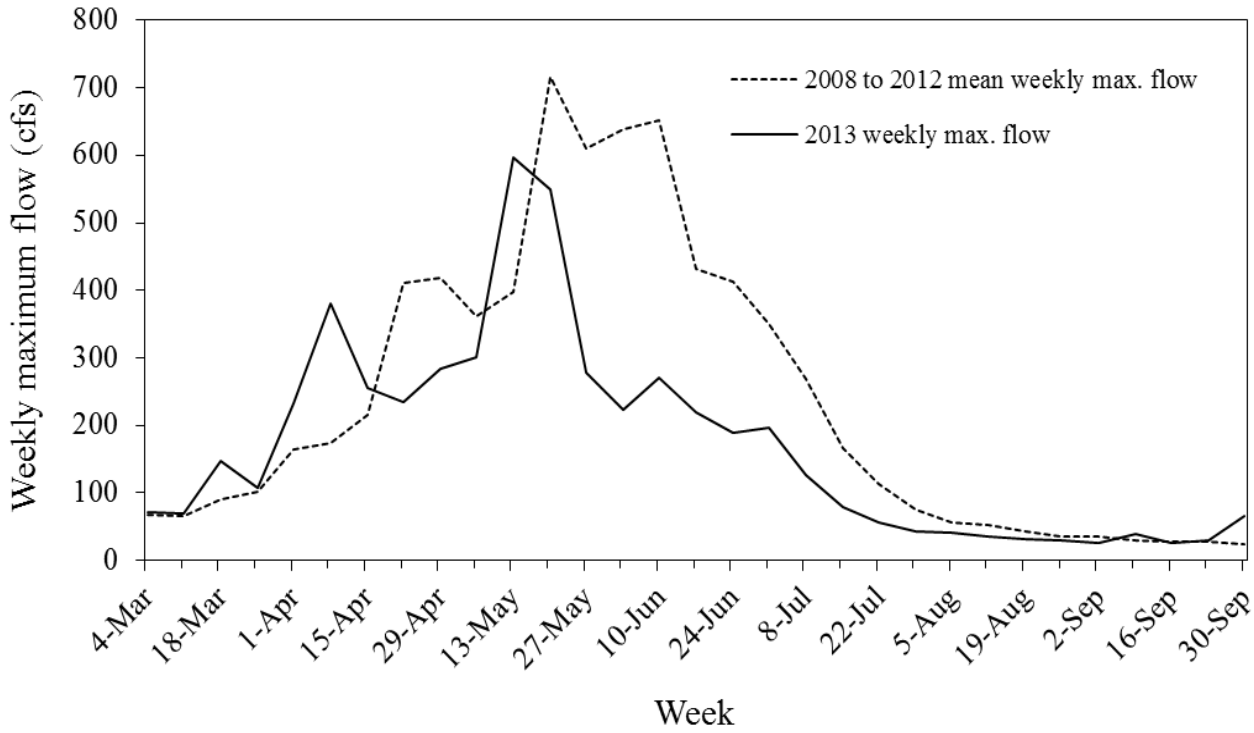

Figure 13. Weekly maximum flow (recorded daily) near the town of Union, OR in 2013(data from Oregon Water Resources Department (OWRD) website). Also shown is the mean weekly maximum flow for 2008 to 2012.

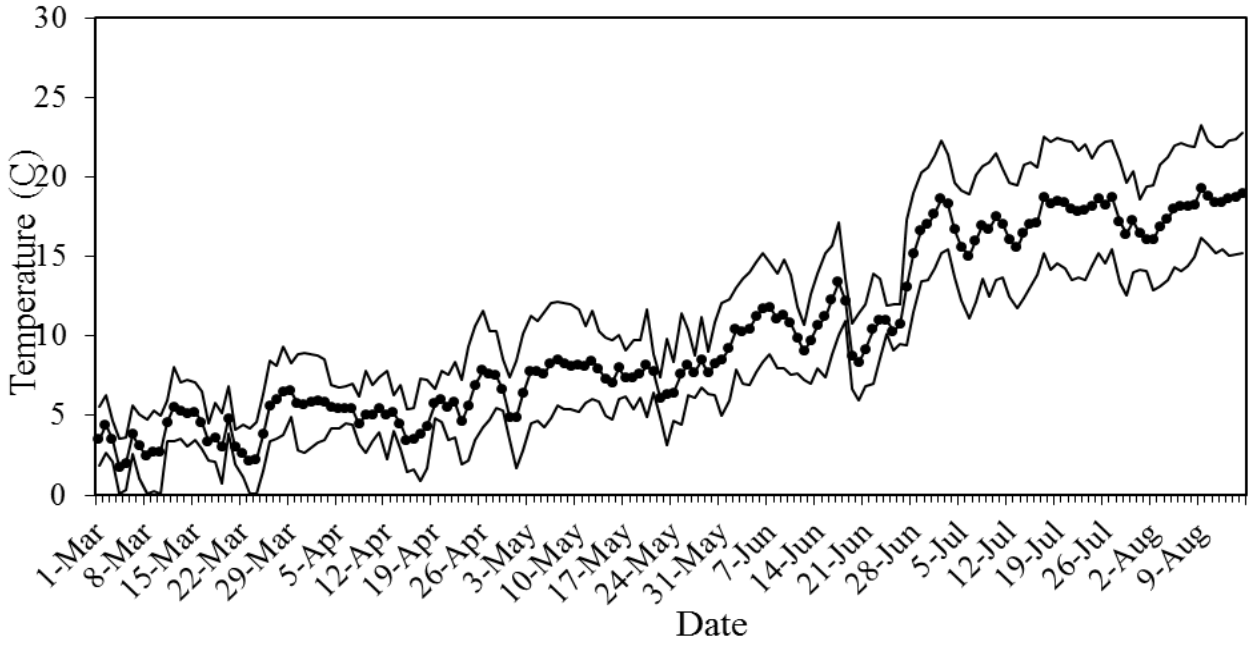

Figure 14. Daily maximum, minimum, and average water temperatures (recorded hourly) at the Catherine Creek adult collection facility in 2013.

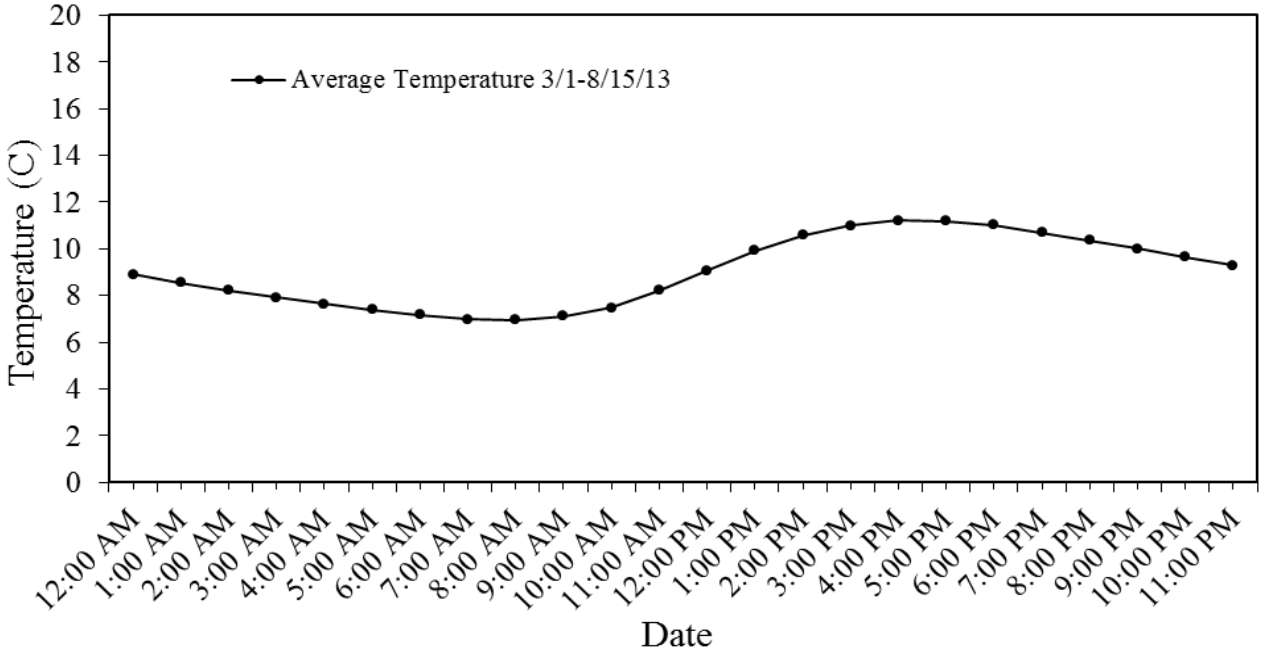

Figure 15. Average hourly water temperature at the Catherine Creek adult collection facility in 2013.

The UGRACF was moved ten miles downstream after the 2006 trapping season. This is the seventh season of trapping at the new location. There are about ten miles of spawning habitat located below the old weir location that were being utilized by returning fish. By moving the trap downstream below this spawning habitat, a more representative sample of the entire population could be trapped. The UGRACF was put into operation on 6 March 2013. The first adult summer steelhead was captured on 13 March. A total of 28 unmarked adult summer steelhead were trapped and released from 13 March to 6 May (Table 9, Figure 16). No adipose-clipped fish were captured. Median arrival at the trap was the week of 22 April. Three kelts were recovered dead on the weir and two of the three were recaptures.

The first adult spring Chinook salmon was captured at UGRACF on 29 May 2013. A total of 174 (127 adult and 47 jack) spring Chinook salmon, were trapped from 29 May to 17 June (Table 10). The daily maximum water temperature rose above 20.0^{o}C on 6 June prompting removal of the pickets from the trap on 7 June. Since the temperature criteria was reached earlier than in the past and the weather forecast for the next week was substantially cooler, the stream temperature was monitored and decided to fish a few more days reinstalling the pickets in the trap on 11 June (dropped to 18 ^{o}C). The stream temperature again rose above 20.0^{o}C on 17 June and it was decided to finish trapping for the season on 18 June. The total catch was made up of 47 adults and 5 jacks of natural origin, 62 adults and 24 jacks from conventional broodstock, and 18 adults and 18 jacks from captive broodstock. A total of 44 adult (23 natural, 3 conventional, 18 captive) and 6 jack (5 natural and 1 captive) spring Chinook salmon were released above the weir to spawn naturally. Median arrival timing for adults was the week of 3 June and for jacks was the week of 10 June (Figure 17).

Surveys conducted by ODFW resulted in 41 redds above the weir and none below the weir. Based on the number of redds below the weir there did not appear to be any weir effect. There were a total

of 57 adult carcasses recovered above the weir. This was 130% of the total trapped and passed (44). Two of the 57 fish recovered had an opercle punch for a trap efficiency of 3.5%. The population estimate above the weir for 2013 was 869 adults (2013 Spawning Ground Survey Results, ODFW, unpublished). The spring runoff in 2013 occurred about one month earlier than the mean flows from 2008 to 2012 (Figure 18). The earlier run timing observed this year may have been a direct result of the early flow. The early runoff also led to very low summer flows in 2013 which may have affected spawning distribution. The removal of the weir early does not allow for a true trap efficiency estimate because there is no way to distinguish between the fish that escaped past the weir due to holes or fish that passed the weir after it was removed.

The predicted adult spring Chinook salmon return to the upper Grande Ronde River for 2013 was 1,019 (196 natural + 823 hatchery). There is no sliding scale used for the upper Grande Ronde River. Up to 50% of the natural return and up to 100% of the conventional hatchery return can be collected for broodstock. The actual number of hatchery adults trapped was 80 (62 conventional, 18 captive) which was 9.7% of the predicted number. The number of natural adults trapped was 47 fish which was 24.0% of the predicted number. There were 16 males (10 natural, 6 hatchery) and 6 jacks (5 natural, 1 hatchery) released above the weir (37.5% jacks). The goal of 10% jacks above the weir was exceeded due to the high number of natural jacks returning which could not be removed from the population.

The broodstock collection goal for 2013 was 164 adults and 8 jacks. The broodstock collected and transported from UGRACF consisted of both natural and conventional hatchery fish. Due to the high water temperatures observed and early removal of the weir, broodstock were only collected from 29 May to 17 June 2013. A total of 24 adults and zero jacks of natural origin and 59 adults and 9 jacks of conventional hatchery origin were transported to LGH for broodstock. The natural adults collected for broodstock comprised 51.1% of the total adult natural return trapped while 73.8% of the adult hatchery fish trapped were collected for broodstock (95.2% of just the conventional return trapped). Gender classification of adults at spawning was compared to gender classification at the weir to estimate the accuracy of sex determination. Accuracy at the weir was 100.0% (83/83). There were also 32 spring Chinook salmon with CWT but no-fin clip that returned to Lookingglass Hatchery that were retained for upper Grande Ronde broodstock. These fish were assumed to be from the upper Grande Ronde conventional program based on marking strategy.

Hourly water temperatures were taken at the UGRACF in 2013. The water temperature during the period of operation ranged from -0.1^{o}C to 21.8^{o}C on 6 March and 17 June, respectively (Figure 19). The hourly temperatures at the adult trap during the period of operation showed that the lowest water temperature usually occurred at 0800 and the highest water temperature usually occurred at 1600 hours (Figure 20). The time of day that the trap was checked and fish were handled was based on water temperature. We use daily maximum water temperature to estimate the removal date of the weir and adjust broodstock take accordingly.

Maintenance and repair activities conducted at the facility in 2013 consisted of installation, removal, and repair of the floating weir panels and trap, and gravel removal from under the weir panels and in front of the trapbox during the instream work window.

Table 9. Summer steelhead trap capture data from the Upper Grande Ronde adult collection facility in 2013. Trapping began 6 March and ended 18 June. The trap was pulled on 7 June due to high water temperature and reinstalled on 11 June as the temperature dropped.

Week	Trap capture		Kelt	
	First time	Reruns	Not punched[a]	Punched
11-Mar	0			
18-Mar	2			
25-Mar	0			
1-Apr	7			
8-Apr	3			
15-Apr	1			
22-Apr	1			
29-Apr	11			
6-May	3			1
13-May	0		1	
20-May	0			1
27-May	0			
3-Jun	0			
	28	0	1	2

[a] *These fish are kelts recovered on or near the weir that were not previously opercle punched at the weir. Punched fish were previously trapped then recovered as a kelt carcass on or near the weir.*

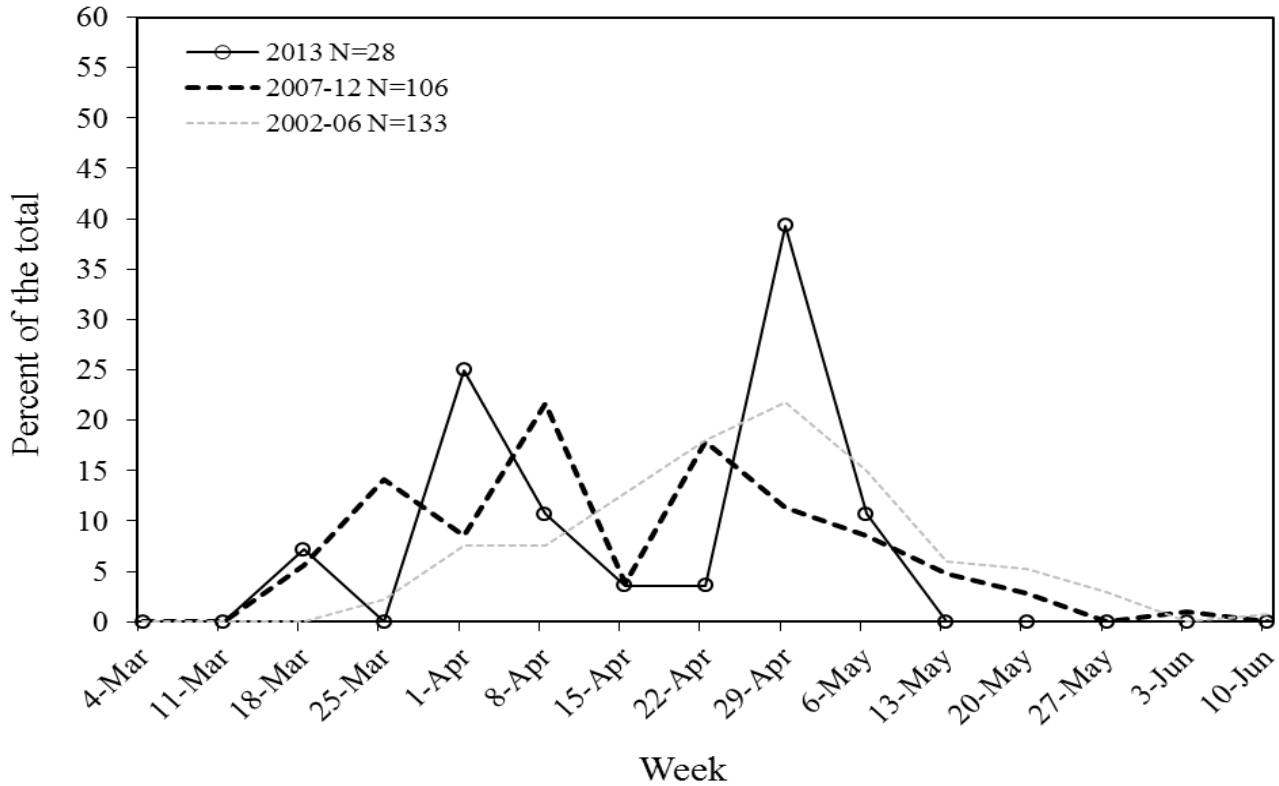

Figure 16. Summer steelhead arrival timing at the Grande Ronde adult collection facility in 2013 and for 2007-12 (rm 153.5) and mean arrival timing for 2002-06 (rm 163).

Table 10. Spring Chinook salmon trap capture, transport, and mortality data for the Grande Ronde River stock at the adult collection facility in 2013. Trapping began 6 March and ended 18 June. The trap was pulled on 7 June due to high water temperature and reinstalled on 11 June as the temperature dropped.

Week	Trap capture[a]						Broodstock hauled				Trap Mort
	Nat.	(jack)	Capt.	(jack)	Conv.	(jack)	Nat.	(jack)	Conv.	(jack)	
6-May	0		0		0						
13-May	0		0		0						
20-May	0		0		0						
27-May	0		0		0						
3-Jun	27	2	11	2	28	7	13		27	2	
10-Jun	13	1	6	14	27	13	7		25	5	
17-Jun	7	2	1	2	7	4	4		7	2	
24-Jun											
	47	5	18	18	62	24	24	0	59	9	0

[a] *Age 4 and 5 spring Chinook salmon(age 3 fish). Nat. = Naturally-produced, Capt. = Captive broodstock program, Conv. = Conventional broodstock program.*

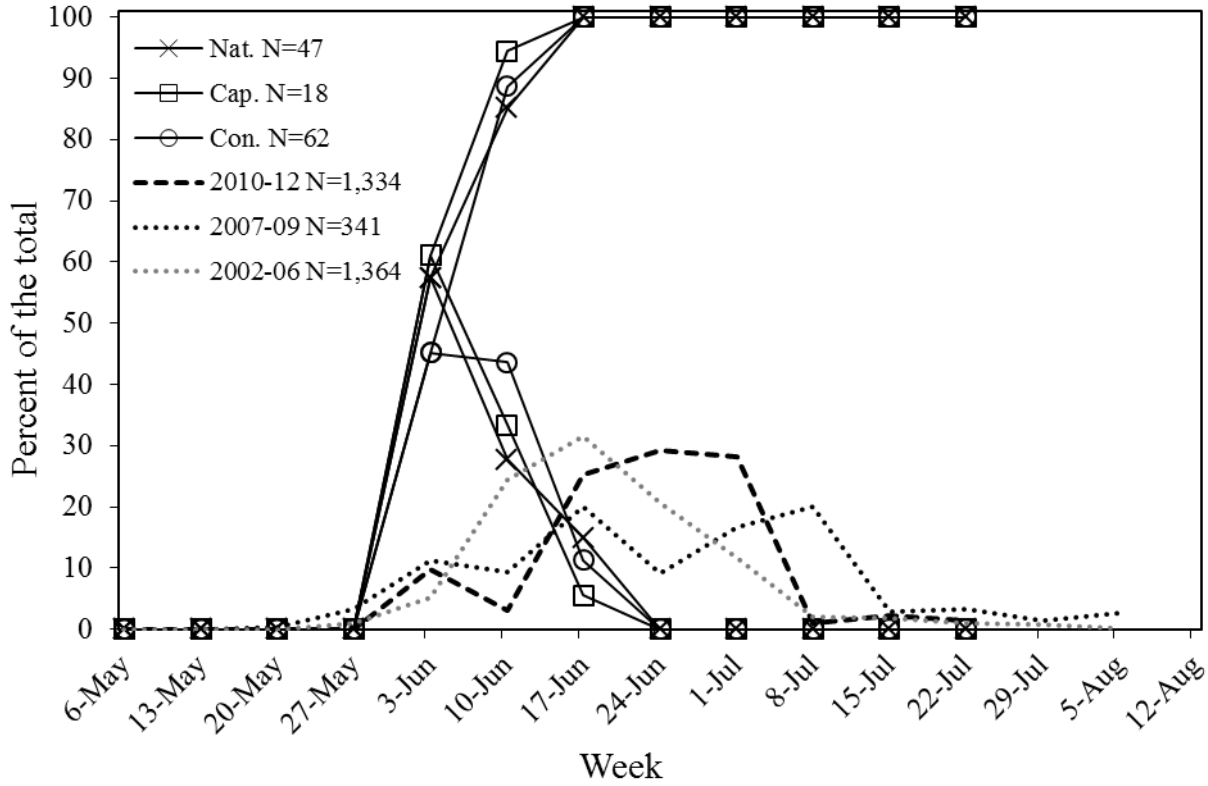

Figure 17. Arrival timing of age 4 and 5 spring Chinook salmon at the Upper Grande Ronde adult collection facility in 2013 and mean arrival timing for 2010 -12 (weir out early), 2007-10 (rm 153.5) and 2002-06 (rm 163).

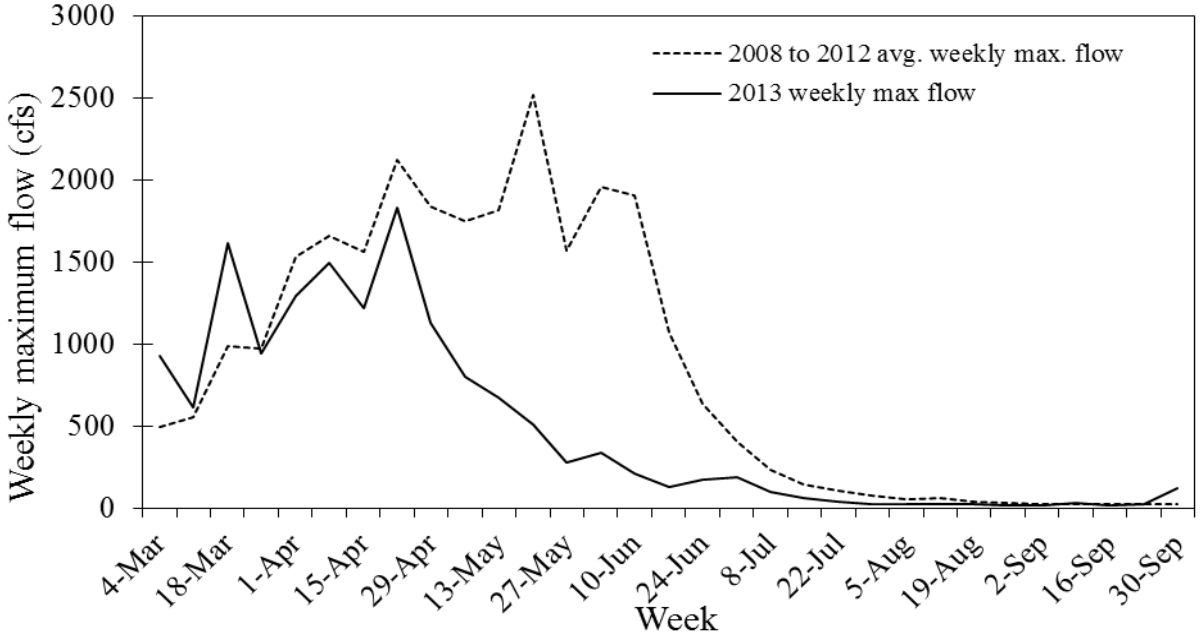

Figure 18. Weekly maximum flow (recorded daily) near the town of Perry, OR in 2013 (data from Oregon Water Resources Department (OWRD) website). Also shown is the mean weekly maximum flow for 2008 to 2012.

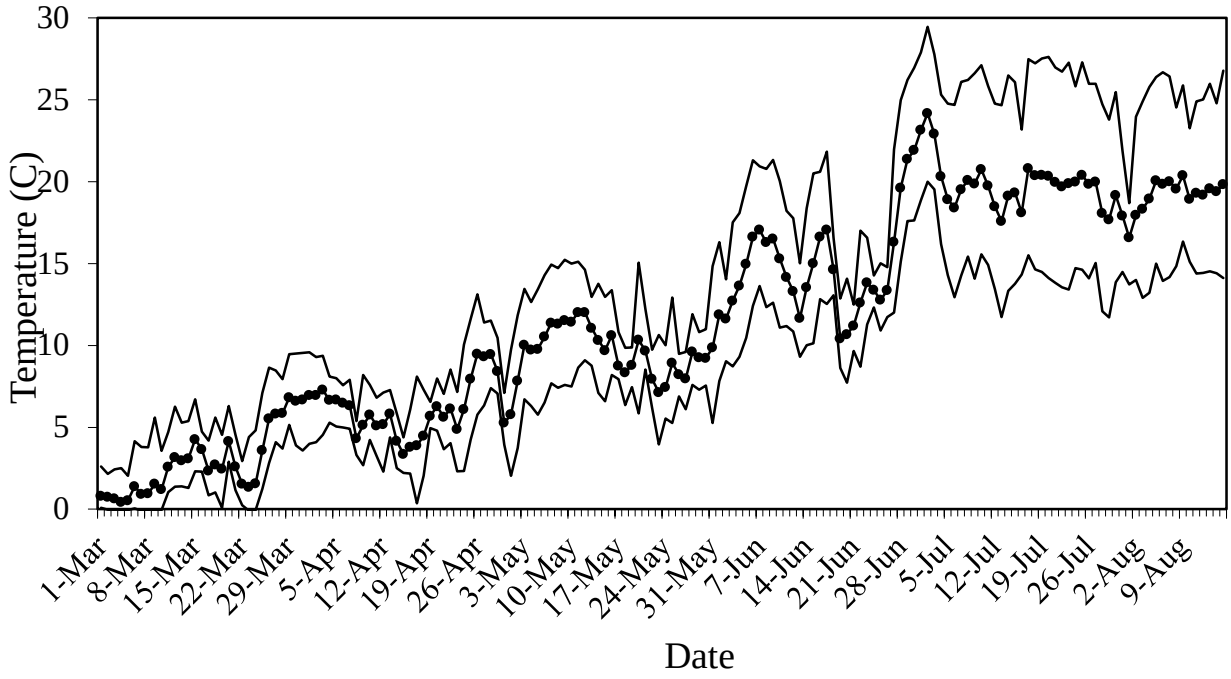

Figure 19. Daily maximum, minimum, and average water temperatures (recorded hourly) at the Upper Grande Ronde adult collection facility in 2013. Temperature logger was out of the water when collected for download (temps. in July are likely air temps.).

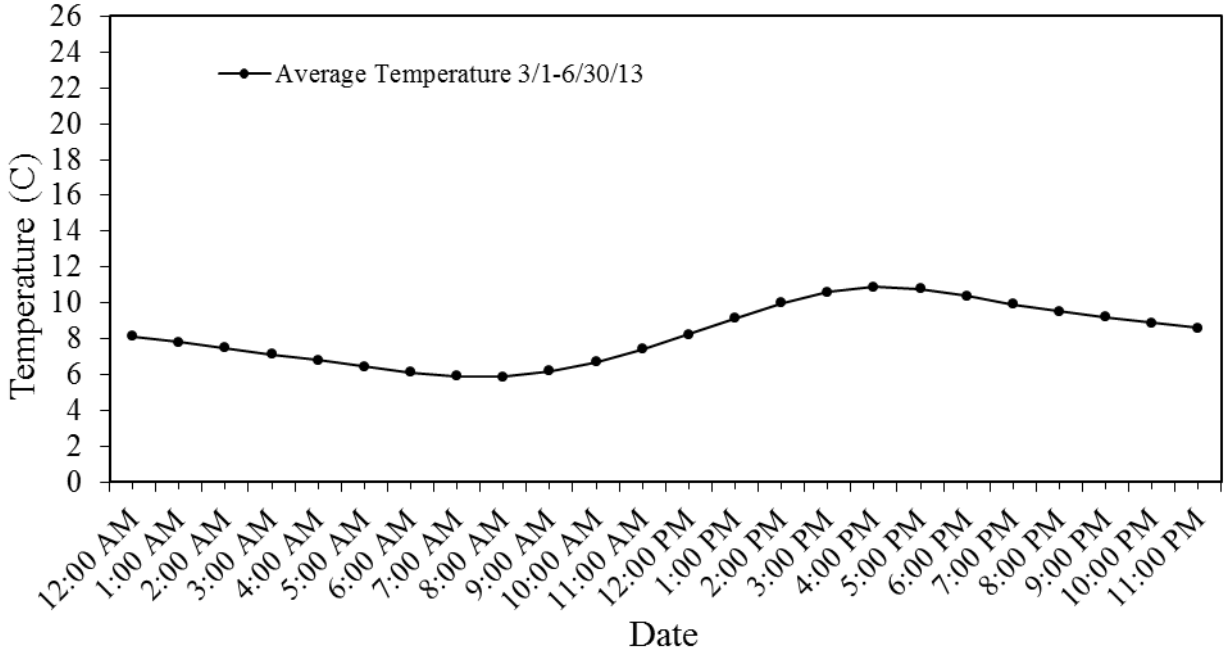

Figure 20. Average hourly water temperature at the Upper Grande Ronde adult collection facility in 2013.

Broodstock Activities

Lookingglass Hatchery

A total of 49 females, 34 males and 3 jacks were spawned from the Catherine Creek stock at LGH in 2013 (Tables 11-13). Seven natural and three hatchery males were spawned twice. There was one wild female, eight hatchery female, and three wild male pre-spawning mortalities at the hatchery. Included in the mortality were two females and one male that appeared to have overdosed on erythromycin (gold/red heads). This is seen occasionally but not at this level. Injections and their effects will be closely monitored in the future. Median spawning date at LGH occurred on 29 August (Appendix Table 25). This year a point was made to keep the sliding doors to the building the fish were held in open at all times and the overhead lights were not used. This was done to increase natural lighting and not affect the natural photoperiod if artificial lights were used at the wrong time. All 49 females spawned had ELISA values of 0.176 OD units or less.

A total of 66 females, 38 males, and 8 jacks were spawned from the upper Grande Ronde stock in 2013 (Tables 14-16). There were 14 natural males and 3 hatchery males spawned twice. There were 12 pre-spawn mortalities at the hatchery (8 females, 3 males, and 1 jack). Median spawning date at LGH occurred on 29 August (Appendix Table 25). There was one female spawned that had an ELISA value of 2.092 OD units; the remainder had values 0.171 or less.

A total of 67 females, 48 males, and 5 jacks were spawned for the Lookingglass Creek program in 2013 (Tables 17-19). Six natural and nine hatchery males spawned twice. There were nine pre-spawn mortalities (3 female, 6 male) and seventeen killed not spawned (7 males, 10 jacks) at the hatchery. Median spawning date occurred on 4 September (Appendix Table 25). There was one female spawned that had and ELISA value of 0.213 OD units the remainder had values 0.157 or less. A total of 160 adults and 63 jacks (129 hatchery and 31 natural adults, 63 natural jacks) were released above the hatchery at the weir to spawn naturally.

In 2013, EN was used for the second year during the ripe sorts. The EN system was not used on the Catherine Creek stock held in the circular tank due to logistical reasons. The mean egg viability in 2013 for stocks the EN was used on was 91.2%, while for 2007 to 2012 it was 88.8%. The use of EN did not appear to affect the egg viability (Appendix Table 26).

Captive Broodstock

A total of 18 females, 10 males (age 3), and 1 jack (age 2) were spawned from the upper Grande Ronde captive brood at BOH in 2013 (Table 20). Median spawning date at BOH occurred on 23 September (50.0% of the females). The last spawn date was 14 October. This was the final spawn for the program at BOH.

A total of 128 fish from the 2009 broodyear and 111 fish from the 2010 broodyear were transported from BOH to LGH on 4 June. On 14 August 2013 these fish were transported for outplanting into Sheep Creek (rm 9.10 to 9.25), a tributary to the Upper Grande Ronde River. There were a total of 54 mortalities at LGH making the total number released into the wild, 185. During surveys on Sheep Creek in 2013 a total of nine redds were observed and a total of six carcasses were recovered (2013 Spawning Ground Survey Results, ODFW, unpublished).

A total of 34,958 surplus eggs from the upper Grande Ronde captive brood spawned at BOH were outplanted by the project into Sheep Creek on 14 (18,324) and 27 November (12,539) and into Meadow Creek on 5 December 2013(4,095). Release locations on Sheep Creek ranged from rm 9.10 to 9.25 and at rm 2.71 on Meadow Creek.

Lookingglass Hatchery transferred 303 eggs from Upper Grande Ronde stock females spawned at LGH in 2013 to BOH for the safety net captive broodstock program. This is different from past years where the eggs were taken to Wallowa Hatchery until smolt stage and then transferred to BOH.

Table 11. Spawning information from Catherine Creek spring Chinook salmon female broodstock at Lookingglass Hatchery in 2013

	Natural n=27					Hatchery n=31				
Date	Morts	Spawned	DPS	KPS	KNS	Morts	Spawned	DPS	KPS	KNS
Till 8/15	1					8				
15-Aug		2					2			
22-Aug		5					5			
29-Aug		14					11			
5-Sep		3					4			
11-Sep		2					1			
Totals	1	26	0	0	0	8	23	0	0	0

Table 12. Spawning information from Catherine Creek spring Chinook salmon male broodstock at Lookingglass Hatchery in 2013.

	Natural n=24					Hatchery n=13				
Date	Morts	Spawned[a]	DPS	KPS	KNS	Morts	Spawned[a]	DPS	KPS	KNS
Till 8/15	2									
15-Aug		2					2			
22-Aug		3					7			
29-Aug	1	16(5)					7(3)			
5-Sep		5		12					10	
11-Sep		2(2)	1	6				2	1	
Totals	3	28	1	18	0	0	16	2	11	0

[a] *The number in parentheses indicates the number of recycled fish used in the total.*

Table 13. Spawning information from Catherine Creek spring Chinook salmon jack broodstock at Lookingglass Hatchery in 2013.

	Natural n=2					Hatchery n=2				
Date	Morts	Spawned	DPS	KPS	KNS	Morts	Spawned	DPS	KPS	KNS
Till 8/15										
15-Aug										
22-Aug										
29-Aug		1								
5-Sep							1			
11-Sep	1						1			
Totals	1	1	0	0	0	0	2	0	0	0

Table 14. Spawning information from Grande Ronde spring Chinook salmon female broodstock at Lookingglass Hatchery in 2013.

	Natural n=17					Hatchery n=57				
Date	Morts	Spawned	DPS	KPS	KNS	Morts	Spawned	DPS	KPS	KNS
Till 8/15	4					2				
15-Aug										
22-Aug							3			
29-Aug		8				2	25			
5-Sep		4					21			
11-Sep		1					4			
Totals	4	13	0	0	0	4	53	0	0	0

Table 15. Spawning information from Grande Ronde spring Chinook salmon male broodstock at Lookingglass Hatchery in 2013.

	Natural n=10					Hatchery n=31				
Date	Morts	Spawned[a]	DPS	KPS	KNS	Morts	Spawned[a]	DPS	KPS	KNS
Till 8/15	2									
15-Aug										
22-Aug		2								
29-Aug		7(3)				1	22(1)			
5-Sep		8(7)		1			11(1)		7	
11-Sep		4(4)	1	1			1(1)		9	
Totals	2	21	1	2	0	1	34	0	16	0

[a] *The number in parentheses indicates the number of recycled fish used in the total.*

Table 16. Spawning information from Grande Ronde spring Chinook salmon jack broodstock at Lookingglass Hatchery in 2013.

	Natural n=0					Hatchery n=9				
Date	Morts	Spawned[a]	DPS	KPS	KNS	Morts	Spawned	DPS	KPS	KNS
Till 8/15										
15-Aug										
22-Aug										
29-Aug						1	3			
5-Sep							5			
11-Sep										
Totals						1	8	0	0	0

Table 17. Spawning information from Lookingglass Creek spring Chinook salmon female broodstock at Lookingglass Hatchery in 2013.

	Natural n=16					Hatchery n=55				
Date	Morts	Spawned	DPS	KPS	KNS	Morts	Spawned	DPS	KPS	KNS
Till 8/14						2				
14-Aug		1								
21-Aug		1					7			
28-Aug		6					13			
4-Sep	1	6					24			
11-Sep		1				1	8			
Totals	1	15	0	0	0	3	52	0	0	0

Table 18. Spawning information from Lookingglass Creek spring Chinook salmon male broodstock at Lookingglass Hatchery in 2013.

	Natural n=13					Hatchery n=45				
Date	Morts	Spawned[a]	DPS	KPS	KNS	Morts	Spawned[a]	DPS	KPS	KNS
Till 8/14						2				
14-Aug							2			
21-Aug		4					4			
28-Aug		5					12(2)			
4-Sep		9(6)				1	19(7)		2	
11-Sep		3	1	7			6	2	22	7
Totals	0	21	1	7	0	3	43	2	24	7

[a] *The number in parentheses indicates the number of recycled fish used in the total.*

Table 19. Spawning information from Lookingglass Creek spring Chinook salmon jack broodstock at Lookingglass Hatchery in 2013.

	Natural n=0					Hatchery n=16				
Date	Morts	Spawned	DPS	KPS	KNS	Morts	Spawned	DPS	KPS	KNS
Till 8/14										
14-Aug										
21-Aug										
28-Aug						1	1			
4-Sep							2			9
11-Sep						1	2			1
Totals						2	5			10

Table 20. Spawning information from Grande Ronde captive broodstock at Bonneville Hatchery in 2013[a].

Spawn week	Females n=18			Age 3+ males n=10			Age 2 males n=1		
	Morts	Spawned	KNS	Morts	Spawned	KNS	Morts	Spawned	KNS
2-Sep		0			0			0	
9-Sep		0			0			0	
16-Sep		0			0			0	
23-Sep		9			7			2(1)	
30-Sep		5			5(2)			0	
7-Oct		2			3(3)			0	
14-Oct		2			3(3)			0	
Totals	0	18	0	0	18	0	0	2	0

[a] *All production from captive brood will be released as eyed eggs into Sheep and Meadow creeks.*

[b] *The number in parentheses indicates the number of recycled fish used in the total.*

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APPENDIX TABLES

Appendix Table 1. Sliding Scale Management Plan for the Catherine Creek and Upper Grande Ronde Spring Chinook Artificial Propagation Program.

Estimated total adult escapement to the Catherine Creek mouth (hatchery plus natural) [a]	Ratio of hatchery to natural adults at the mouth	Maximum % of natural adults to retain for broodstock	% of conventional hatchery adults to retain for broodstock [b]	% of adults released above the weir that can be of hatchery origin	Minimum % of broodstock of natural origin	% Strays allowed above the weir [c]
UGR	Any	Up to 50	Up to 100	Up to 100	[d]	≤5
CC						
<250	Any	40	40	[d]	[d]	≤5
251-500	Any	20	20	≤70	≥20	≤5
>500	Any	≤20	d	≤50	≥30	≤5

a Pre-season estimate of total escapement
b Conventional hatchery adults only, all captive brood adults released to spawn naturally or outplanted
c For hatchery adults originating from different gene conservation groups (Rapid River stock or strays from outside the Grande Ronde basin)
d Not decision factor at this level of escapement, percentage determined by other criteria
e Not to exceed 130,000 smolt production initially

Appendix Table 2. Group, number, size, raceways, mortality, feed fed, and numbers released from the Catherine Creek acclimation facility 2000 to 2013 release years.

Facility/ rel. yr	Group[a]	Number received	Size fish/lb.	Raceways used	Density lbs/ft^3	Total Mortality (%)	Feed fed	Number released
CC 00	Single cap	38,009	23.6	4	0.20	0.10	474	37,980
CC 01	Single cap	137,588	19.6	4	0.85	0.70	1,296	136,902
CC 02	Single cap	180,912	17.4	4	1.26	0.30	1,968	180,343
CC 03	Early cap	105,352	12.8	4	1.00	0.04	345	105,313
CC 03	Late con	24,404	12.6	2	0.47	0.05	73	24,392
CC 04	Early cap	92,475	23.1	4	0.49	0.07	179	92,413
CC 04	Late con	70,539	23.4	4	0.37	0.03	115	70,521
CC 05	Early con	61,743	23.6	2	0.63	0.03	100	61,717
CC 05	Early cap	69,005	24.4	2	0.70	0.23	109	68,827
CC 05	Late con	59,100	21.8	2	0.66	0.11	60	59,036
CC 06	Single con	23,227	33.7	1	0.33	0.05	65	23,216
CC 06	Single cap	45,667	26.1	2	0.42	0.14	132	45,604
CC 07	Single con	49,709	27.4	3	0.29	0.03	202	49,696
CC 07	Single cap	21,584	24.9	1	0.42	0.06	86	21,572
CC 08	Single con	116,967	19.9	4	0.71	0.07	549	116,882
CC 09	Single con	93,240	27.4	3	0.58	0.07	229	93,176
CC 09	Early con	25,436	22.7	1	0.48	0.06	18	25,422
CC 09	Late con	20,254	20.6	1	0.44	0.04	35	20,245
CC 10	Single con	110,445	20.8	3	0.79	0.18	248	110,242
CC 10	Single cap	34,215	21.0	1	0.73	0.32	83	34,111
CC 11	Single con	58,887	26.6	2	0.54	0.25	300	58,737
CC 11	Single cap	50,194	25.6	2	0.41	0.02	126	48,343
CC 11	Single cap	50,246	24.9	2	0.50	0.02	173	48,395
CC 12	Single con	106,939	21.8	4	0.55	0.05	278	106,882
CC 13	Single con	134,591	22.0	4	0.69	0.05	491.5	134,519

[a] *Single= one acclimation period. Early=1st of 2 groups. Late= 2nd of 2 groups.*

Appendix Table 3. Group, number, size, raceways, mortality, feed fed, and numbers released from the Upper Grande Ronde acclimation facility 2000 to 2013 release years.

Facility/ rel. yr	Groupa	Number received	Size fish/lb.	Raceways used	Density lbs/ft3	Total Mortality (%)	Feed fed	Number released
GR 00	Single cap	1,512	19.4	1	0.04	0.30	1	1,508
GR 01	Single cap	2,570	13.9	1	0.09	1.01	8	2,544
GR 02	Single cap	201,958	18.4	4	1.33	25.01	568	151,444
GR 03	Early cap	110,169	14.2	4	1.14	0.05	24	110,114
GR 03	Late con	26,946	13.7	1	0.90	0.09	50	26,923
GR 03	Late cap	100,685	13.6	3	1.10	0.16	150	100,523
GR 04	Early cap	77,418	20.3	4	0.48	0.27	58	77,204
GR 04	Late con	70,098	22.4	3	0.50	0.01	79	70,088
GR 05	Single con	105,418	21.0	4	0.61	0.05	10	105,369
GR 06	Single con	18,986	29.3	2	0.16	0.05	3	18,977
GR 07	Early cap	20,620	23.2	2	0.22	0.00	9	20,620
GR 07	Late con	118,840	21.7	4	0.67	0.03	120	118,803
GR 08	Early con	127,552	21.8	4	0.71	0.05	0	127,491
GR 08	Late con	132,501	20.9	4	0.77	0.05	38	132,441
GR 09	Single con	94,203	22.7	3	0.72	0.06	28.2	94,148
GR 09	Early cap	28,080	22.0	1	0.63	0.04	0	28,068
GR 09	Late cap	24,340	20.2	1	0.66	0.03	7.5	24,332
GR 10	Early cap	125,951	28.3	4	0.50	0.07	0	125,868
GR 10	Late con	41,873	23.0	2	0.41	0.13	63	41,819
GR 10	Late cap	64,721	21.4	2	0.68	0.09	63	64,663
GR 11	Early cap	53,166	24.0	2	0.54	0.10	23	53,114
GR 11	Early con	55,160	27.7	2	0.49	0.51	23	54,880
GR 11	Late con	134,882	17.7	4	0.81	0.37	242	134,388
GR 12	Early con	73,402	23.0	2	0.72	0.16	86	73,286
GR 12	Single con	73,402	23.0	2	0.72	0.13	38	73,303
GR 12	Late con	72,211	20.5	2	0.79	0.03	47	72,192
GR 13	Early con	155,321	24.0	4	0.72	0.04	131.0	155,264
GR 13	Late con	135,370	21.5	4	0.70	0.05	161.5	135,308

[a] *Single= one acclimation period. Early=1st of 2 groups. Late= 2nd of 2 groups.*

Appendix Table 4. Group, acclimation dates, temperature, dissolved oxygen, and estimated volitional migration of fish acclimated at the Catherine Creek facility 2000 to 2013 release years.

Facility/ rel. yr	Group[a]	Acclimation period	Volitional began	Temp.°C		DO mg/l		Volitional	
				Min.	Max.	Min.	Max.	migration	%
CC 00	Single cap	2/28-4/18	4/2	0.2	9.3	8.2	14.4	6,842	18.0
CC 01	Single cap	3/8-4/16	4/2	0.5	9.6	8.9	13.9	[b]	
CC 02	Single cap	2/26-4/15	4/2	0.0	10.5	7.0	13.3	68,948	38.1
CC 03	Early cap	3/7-3/23	3/13	1.1	6.2	10.3	12.2	25,092	23.8
CC 03	Late con	3/24-4/14	3/31	0.7	8.2	9.7	12.6	16,218	66.4
CC 04	Early cap	3/8-3/22	3/15	1.8	7.9	10.5	11.7	8,785	9.5
CC 04	Late con	3/24-4/12	3/30	2.1	8.2	10.5	12.4	49,147	69.2
CC 05	Early mix	3/7-3/27	3/14	0.1	5.8	9.6	15.4	29,402	22.5
CC 05	Late con	3/28-4/7	4/4	0.6	8.7	8.9	12.7	None	
CC 06	Single mix	3/13-4/12	3/27	0.2	7.6	9.0	11.4	28,311	41.1
CC 07	Single mix	3/12-4/11	3/26	0.3	8.8	9.6	12.3	23,761	33.3
CC 08	Single con	3/10-4/14	3/24	0.0	9.1	9.0	12.4	43,128	35.2
CC 09	Single con	3/9 – 4/13	3/23	0.0	7.5	8.9	11.8	48,442	52.0
CC 09	Early con	3/9 – 3/23	3/16	0.0	6.7	10.0	11.8	18,059	71.0
CC 09	Late con	3/24 – 4/13	4/1	0.6	7.5	9.9	11.3	8,613	42.5
CC 10	Single mix	3/15 – 4/12	3/29	0.2	7.6	8.5	12.6	21,357	14.8
CC 11	Single con	3/14 – 4/14	3/30	1.2	6.9	9.7	11.5	22,027	37.4
CC 11	Early cap	3/14 – 3/29	3/21	1.2	5.9	9.8	11.5	3,383	7.0
CC 11	Late cap	3/30 – 4/14	4/5	1.5	6.9	10.0	10.9	12,767	26.4
CC 12	Single con	3/20 – 4/14	3/22	0.5	8.1	11.0	13.6	53,377	49.9
CC 13	Single con	3/19 – 4/15	3/21	NA	NA	10.6	12.3	63,500	47.2

[a] *Single= one acclimation period. Early=1st of 2 groups. Late= 2nd of 2 groups.*

[b] *Problems with PIT tag readers made it impossible to estimate accurately the number of PIT tagged fish leaving volitionally or during force out from the Catherine Creek facility. Actual PIT tags detected during the volitional release period were 290; tags detected during the force out were 6,862.*

Appendix Table 5. Group, acclimation dates, temperature, dissolved oxygen, and estimated volitional migration of fish acclimated at the Upper Grande Ronde facility 2000 to 2013 release years.

Facility/ rel. yr	Group[a]	Acclimation period	Volitional began	Temp.°C		DO mg/l		Volitional	
				Min.	Max.	Min.	Max.	migration	%
GR 00	Single cap	2/28-3/14	None	-0.5	2.7	-	-	None	
GR 01	Single cap	2/27-3/27	None	-0.7	3.8	8.7	12.1	None	
GR 02	Single cap	2/27-4/15	4/2	0.0	3.5	9.2	12.7	68,200	44.9
GR 03	Early cap	3/10-3/23	3/17	0.0	4.4	10.0	11.9	31,900	30.0
GR 03	Late mix	3/24-4/14	3/30	0.0	6.6	9.0	11.9	37,900	29.7
GR 04	Early cap	3/9-3/22	3/15	-0.1	5.9	11.3	14.7	12,889	16.3
GR 04	Late con	3/25-4/12	3/31	-0.1	7.1	10.6	12.3	34,085	48.6
GR 05	Single con	3/8-3/14	None	-0.1	3.4	10.3	11.9	None	
GR 06	Single con	3/13-4/12	3/27	-0.7	4.5	10.3	12.3	10,461	55.1
GR 07	Early cap	3/12-3/25	3/19	-0.1	5.4	8.7	12.7	2,932	11.6
GR 07	Late con	3/26-4/11	4/2	-0.1	6.9	8.5	11.9	28,718	24.2
GR 08	Early con	3/11-3/24	3/17	-5.8	2.6	na	na	29,065	22.8
GR 08	Late con	3/25-4/14	4/7	-5.9	4.3	na	na	10,880	8.2
GR 09	Single con	3/16 – 4/13	3/23	-0.1	4.0	11.3	13.5	54,859	58.3
GR 09	Early cap	3/16 – 3/23	3/18	-0.1	1.8	11.3	13.5	3,013	10.7
GR 09	Late cap	3/24 – 4/13	4/1	-0.1	4.0	11.7	13.5	10,264	42.2
GR 10	Early cap	3/8 – 3/22	3/15	-5.5	3.5	9.4	14.7	20,000	15.9
GR 10	Late mix	3/23 – 4/13	3/30	-3.6	5.6	10.0	12.5	16,000	15.0
GR 11	Early cap	3/15 – 3/30	3/22	-0.1	3.2	10.8	13.3	2,069	3.8
GR 11	Early con	3/15 – 3/30	3/22	-0.1	3.2	10.8	13.3	4,048	7.6
GR 11	Late con	3/31 – 4/14	4/5	-0.1	4.0	10.0	12.0	15,413	11.4
GR 12	Early con	3/19 – 4/2	3/21	0.0	5.0	7.9	9.2	17,100	23.3
GR 12	Single con	3/19 – 4/14	3/22	0.0	6.2	7.9	9.3	5,800	7.9
GR 12	Late con	4/4 – 4/14	4/9	-0.1	6.2	8.1	9.3	9,545	13.2
GR 13	Early con	3/18 – 4/1	3/20	-5.5	0.3	10.6	12.9	41,719	26.9
GR 13	Late con	4/4 – 4/14	4/6	-0.1	5.5	10.4	12.7	41,857	30.9

[a] *Single= one acclimation period. Early=1st of 2 groups. Late= 2nd of 2 groups.*

[b] *Problems with PIT tag readers made it impossible to estimate accurately the number of PIT tagged fish leaving volitionally or during force out from the Catherine Creek facility. Actual PIT tags detected during the volitional release period were 290; tags detected during the force out were 6,862.*

Appendix Table 6. Release and return summary for spring Chinook salmon from Catherine Creek 1998 to 2011 broodyears.

Brood year	Release location	Life stage	Rearing Type	Number released	Returns trapped[a]			Min. SAR
					3	4	5	
1998	Acc.	Smolt	Captive ad	37,980	29	132	54	0.57
1999	Acc.	Smolt	Captive ad	136,902	10	181	19	0.15
2000	Acc.	Smolt	Captive ad	180,343	70	564	24	0.36
2001	Acc.	Smolt	Captive ad	105,313	30	84	2	0.11
2001	Acc.	Smolt	Conventional ad vie	24,392	22	28	3	0.22
2002	Acc.	Smolt	Captive ad	92,413	19	118	15	0.16
2002	Acc.	Smolt	Conventional ad vie	70,521	11	59	4	0.10
2003	Acc.	Smolt	Captive ad	68,827	0	63	8	0.10
2003	Acc.	Smolt	Conventional ad vie	120,753	7	55	2	0.05
2004	Acc.	Smolt	Captive ad	45,604	24	102	4	0.29
2004	Acc.	Smolt	Conventional ad vie	23,216	4	35	1	0.17
2005	Acc.	Smolt	Captive ad vie Blue	21,572	4	22	0	0.12
2005	Acc.	Smolt	Conventional ad	49,696	99	117	79	0.59
2006	Acc.	Smolt	Conventional ad	116,882	351	774	22	0.98
2007	IndianCr	Egg	Captive	46,727	Unk	Unk	Unk	--
2007	Acc.	Smolt	Conventional ad	138,843	90	115	38	0.18
2008	Acc.	Smolt	Captive ad	34,111	57	185	5	0.72
2008	Acc.	Smolt	Conventional ad vie	110,242	77	343	12	0.39
2009	Acc.	Smolt	Captive ad	96,738	23	200		
2009	Acc.	Smolt	Conventional ad vie	58,737	14	43		
2010	Acc.	Smolt	Conventional ad	106,882	189			
2010[b]	Dir.stream	Smolt	Conventional ad	54,492	8			
2011	Acc.	Smolt	Conventional ad	134,519				

a *Age structure calculated using length data. Adult returns are actual numbers trapped at the weir.*

b *Number of fish returning was estimated using PIT tag recoveries from this group.*

Appendix Table 7. Release and return summary for spring Chinook salmon from the upper Grande Ronde River 1998 to 2011 broodyears.

Brood year	Release location	Life stage	Rearing Type	Number released	Returns trapped[a]			Min. SAR
					3	4	5	
1998	Acc.	Smolt	Captive	1,508	0	3	0	0.20
1999	Acc.	Smolt	Captive	2,544	0	4	4	0.31
2000	Acc.	Smolt	Captive	151,444	35	321	15	0.24
2000	Dir. stream	Parr	Captive	76,941	2	51	2	0.07
2001	Acc.	Smolt	Captive ad	210,637	48	180	7	0.11
2001	Acc.	Smolt	Conventional cwt	26,923	9	60	0	0.26
2001	Dir. stream	Parr	Captive ad	32,800	0	0	0	0.00
2002	Acc.	Smolt	Captive ad	77,204	0	1	0	0.00
2002	Acc.	Smolt	Conventional cwt	70,088	6	140	9	0.22
2003	Acc.	Smolt	Captive ad	1,022	0	0	0	0.00
2003	Acc.	Smolt	Conventional cwt	104,347	2	28[b]	1[c]	0.03
2004	Acc.	Smolt	Captive ad	76	0	0	5[d]	6.58
2004	Acc.	Smolt	Conventional cwt	18,901	18[b]	8[c]	48[d]	0.39
2005	Acc.	Smolt	Captive ad	20,620	5	49[d]	21[e]	0.36
2005	Acc.	Smolt	Conventional cwt	118,803	98	328[d]	33[e]	0.39
2006	Acc.	Smolt	Conventional	259,932	382[d]	1,080[e]	14	0.57
2006	MeadowCr	Egg	Captive	1,263	Unk	Unk	Unk	--
2007	Acc.	Smolt	Captive ad	52,404	12[e]	47	7	0.13
2007	Acc.	Smolt	Conventional cwt	94,148	13[e]	60	13	0.09
2008	Acc.	Smolt	Captive ad	190,531	45	355	8	0.21
2008	Acc.	Smolt	Conventional cwt	41,819	43	95	6	0.34
2009	MeadowCr	Egg	Captive	143,349	Unk	Unk		
2009	Acc.	Smolt	Captive ad	53,114	3	10		
2009	Acc.	Smolt	Conventional cwt	189,268	14	56		
2010	MeadowCr	Egg	Captive	251,107	Unk			
2011	MeadowCr	Egg	Captive	96,885				
2011	SheepCr	Egg	Captive	103,365				
2010	Acc.	Smolt	Conventional	218,781	42			
2010	Dir.stream	Smolt	Conventional	66,956	Unk			
2011	Acc.	Smolt	Conventional	290,572				

a *Age structure calculated using length data. Adult returns are actual numbers trapped at the weir. When life stage release from the same broodyear could not be determined at the trap (similar marks), CWT data was used to divide the returns by group.*

b *Two of the 28 fish were recovered just below the weir. Thirteen of the 18 jacks were recovered just below the weir. Two of the 3 fish were recovered below the weir.*

c *The weir was blown out in 2008, resulting in very low weir catch.*

d *Approximately 379 fish held below the weir in 2009. We salvaged 130 adults and 10 jacks and released above the weir. We recovered 140 adults and 99 jacks dead below the weir (high water temps). Age and origin of live fish released based on carcass recovery below the weir.*

e *The weir was pulled from the stream early in 2010, 2011, and 2012 due to high stream temperature . A portion of the later returning fish is unknown.*

Appendix Table 8. Release and return summary for spring Chinook salmon from Lookingglass Creek 2000 to 2011 broodyears.

Brood year	Release location	Life stage	Rearing type	Number released	Returns trapped[a]			Min. SAR
					3	4	5	
2000	LGC	Parr	Captive	51,864	3	37	2	0.08
2001	LGC	Parr	Captive	17,880	11	24	1	0.20
2002	Hat.	Smolt	Captive	53,333	11	42	10	0.12
2003	Hat.	Smolt	Captive	98,023	22	97	21	0.14
2004	Hat.	Smolt	Cap/Conv	149,857	57	253	17	0.22
2005	Hat.	Smolt	Cap/Conv	0	0	0	0	--
2006	Hat.	Smolt	Captive	43,218	185	350	34	1.32
2007	Hat.	Smolt	Cap/Conv	150,477	116	448	34	0.40
2008	Hat.	Smolt	Conv.	262,911	639	915	37	0.61
2009	Hat.	Smolt	Conv.	102,828	59	224		
2010	Hat.	Smolt	Conv.	228,565	506			
2011	Hat.	Smolt	Conv.	273,097				

a *Age structure calculated using length data. Adult returns are actual numbers trapped at the weir. Trap operated by ODFW Lookingglass Hatchery.*

Appendix Table 9. Adult trapping, broodstock and redd counts for spring Chinook salmon from Catherine Creek 1997 to 2013 (does not include jack salmon).

Year	Adults captured			Passed above	Est. above	Trap eff.	Redds		Adult broodstock taken		
	Nat.	Capt.	Conven.				Above	Below	Nat.	Capt.	Conven.
1997	2	--	--	2	--	--	40	6	0	0	0
1998	28	--	--	28	85	23.5	34	0	0	0	0
1999	16	--	--	16	58	27.8	38	2	0	0	0
2000	22	--	--	22	45	33.3	26	8	0	0	0
2001	78	--	--	57	459	14.8	131	2	21	0	0
2002	161	132	--	247	413	61.2	156	2	35	0	0
2003	248	235	--	431	474	95.1	165	2	50	0	0
2004	83	575	--	190	209	94.6	94	2	16	0	0
2005	56	108	28	131	155	98.0	72	2	10	0	20
2006	103	120	62	221	266	83.3	115	2	20	0	43
2007	70	78	59	142	159	90.0	57	2	28	0	37
2008	90	110	37	186	198	94.4	100	1	18	0	33
2009	115	26	118	175	197	88.9	87	2	31	1[a]	52[b]
2010	438	0	853	818	907	89.5	373	11	28	0	40
2011	89	0	137	103	1,238	8.7	444	0	37	0	45
2012	362	185	381	631	689	91.7	238	1	48	0	38
2013	245	205	55	409	419	97.7	110	0	54	0	41

a *This fish was taken because the mark that distinguishes captive brood from conventional brood was not present. The fish was PIT tagged and later read discovering it was captive brood. The fish was placed in the Lookingglass stock rather than trucking all the way back to Catherine Creek.*

b *Two females from this group were captives (CWT) and transferred to Lookingglass stock.*

Appendix Table 10. Adult trapping, broodstock and redd counts for spring Chinook salmon from the upper Grande Ronde River 1997 to 2013 (does not include jack salmon).

Year	Adults captured			Passed above	Est. above	Trap eff.	Redds		Adult broodstock taken		
	Nat.	Capt.	Conven.				Above	Below	Nat.	Capt.	Conven.
1997	9	--	--	9	--	--	19	6	0	0	0
1998	33	--	--	39	88	30.4	31	2	0	0	0
1999	1	--	--	1	--	--	0	0	0	0	0
2000	17	--	--	15	30	50.0	8	12	0	0	0
2001	38	--	--	29	29	85.7	7	8	21	0	0
2002	101	3	--	54	54	88.9	16	2	48	0	0
2003	120	4	--	63	95	78.9	19	19	71	0	0
2004	30	376	--	386	453	91.1	134	51	15	0	0
2005	14	197	60	204	205	100.0	52	38	7	0	59
2006	51	8	140	50	51	100.0	18	4	26	0	123
2007	33	0	37	16	16	100.0	1	0	17	0	34
2008	17	0	9	8	117	4.0	37	5	9	0	9
2009	37	27	183	84	241	87.3	50	2	21	0	142
2010	63	21	1,113	1,023	2,160	46.9	316	16	29	0	141
2011	16	47	74	51	956	4.6	221	4	9	0	73
2012	168	362	108	477	707	69.6	95	2	79	0	81
2013	47	18	62	44	869	3.5	41	0	24	0	59

Appendix Table 11. Adult trapping, broodstock and redd counts for spring Chinook salmon from Lookingglass Creek 2004 to 2013 (does not include jack salmon)(Trap operated by ODFW Lookingglass Hatchery).

Year	Adults captured			Passed above	Est. above	Trap eff.	Redds		Adult broodstock taken	
	Nat.	Hat.	Stray				Above	Below	Nat.	Hat.
2004	73	37	0	100	100	100.0	49	49	0	136
2005	24	26	5	45	45	100.0	29	10	0	0
2006	10	41	17	41	44	76.5	28	28	0	0
2007	13	108	17	66	66	100.0	32	21	0	41
2008	49	274	9	179	185	97.0	102	40	11	135
2009	82	15	24	83	83	100.0	67	30	27	11
2010	138	422	46	347	347	100.0	170	89	68	99
2011	133	483	24	439	443	99.4	212	129	58	123
2012	142	949	22	930	1016	91.6	314	133	47	112
2013	60	228	32	160	173	93.8	60	43	29	99

Appendix Table 12. Daily summer steelhead trapping data from the Catherine Creek adult collection facility in 2013.

		Trapped		Sacrificed/mortality		Recaptures at trap	
DATE	TOTAL	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
13-Mar	2	0	2	0	0	0	0
14-Mar	4	0	4	0	0	0	0
18-Mar	4	0	4	0	0	0	0
20-Mar	1	0	1	0	0	0	0
22-Mar	1	0	1	0	0	0	0
27-Mar	6	0	6	0	0	0	0
29-Mar	8	0	8	0	0	0	0
MAR	26	0	26	0	0	0	0
1-Apr	26	0	26	0	0	0	1
2-Apr	6	0	6	0	0	0	1
3-Apr	11	0	11	0	0	0	0
4-Apr	15	0	15	0	0	0	0
5-Apr	6	0	6	0	0	0	1
6-Apr	9	0	9	0	0	0	1
8-Apr	6	0	6	0	0	0	1
10-Apr	1	0	1	0	0	0	0
12-Apr	2	0	2	0	0	0	0
15-Apr	2	0	2	0	0	0	0
19-Apr	0	0	0	0	0	0	1
22-Apr	8	0	8	0	0	0	0
24-Apr	2	0	2	0	0	0	0
26-Apr	6	0	6	0	0	0	3
29-Apr	22	0	22	0	0	0	4
APR	122	0	122	0	0	0	13
1-May	1	0	1	0	0	0	1
3-May	3	0	3	0	0	0	1
4-May	0	0	0	0	0	0	0
6-May	7	0	7	0	0	0	4
8-May	6	0	6	0	0	0	1
10-May	2	0	2	0	0	0	0
13-May	1	0	1	0	0	0	0
17-May	1	0	1	0	0	0	0
22-May	1	0	1	0	0	0	0
27-May	0	0	0	0	0	0	0
MAY	22	0	22	0	0	0	7
2-Jun	0	0	0	0	0	0	0
10-Jun	1	0	1	0	0	0	0
JUN	1	0	1	0	0	0	0

Appendix Table 13. Daily spring Chinook salmon trapping data from the Catherine Creek adult collection facility in 2013.

		Trapped				Sacrificed/mortality				Brood collected			
		Adults		Jacks		Adults		Jacks		Adults		Jacks	
Date	Total	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
27-May	2	1	1	0	0	0	0	0	0	0	0	0	0
29-May	15	5	10	0	0	0	0	0	0	0	0	0	0
30-May	19	6	13	0	0	0	0	0	0	2	6	0	0
31-May	8	3	5	0	0	0	0	0	0	0	0	0	0
MAY	44	15	29	0	0	0	0	0	0	2	6	0	0
1-Jun	11	3	8	0	0	0	0	0	0	0	0	0	0
2-Jun	26	8	18	0	0	0	0	0	0	0	0	0	0
3-Jun	63	30	29	1	3	0	0	0	0	10	7	1	1
5-Jun	128	51	39	26	12	0	0	25	0	0	0	0	0
6-Jun	57	29	22	0	6	1	0	0	1	12	8	0	0
7-Jun	69	20	13	25	11	0	0	25	0	0	0	0	0
8-Jun	40	13	12	12	3	0	0	12	0	0	0	0	0
10-Jun	67	15	15	29	8	0	0	29	0	5	7	0	1
11-Jun	40	6	3	24	7	0	0	24	0	0	0	0	0
13-Jun	45	16	16	13	0	0	0	13	0	7	13	0	0
14-Jun	22	6	2	10	4	0	0	10	0	0	0	0	0
16-Jun	34	10	1	13	10	0	0	13	0	0	0	0	0
17-Jun	29	7	7	10	5	0	0	10	0	0	0	0	0
18-Jun	24	9	2	10	3	0	0	10	0	0	0	0	0
19-Jun	23	6	8	7	2	0	0	6	0	2	5	1	0
21-Jun	5	1	2	1	1	0	0	1	0	0	0	0	0
24-Jun	16	3	3	7	3	0	0	7	0	1	2	0	0
26-Jun	4	1	0	2	1	0	0	1	0	0	0	0	0
28-Jun	11	5	3	0	3	0	0	0	0	2	3	0	0
JUN	714	239	203	190	82	1	0	186	1	39	45	2	2
1-Jul	17	2	4	5	6	0	0	5	0	0	3	0	0
2-Jul	9	1	3	1	4	0	0	1	0	0	0	0	0
5-Jul	10	3	3	1	3	0	0	1	0	0	0	0	0
8-Jul	1	0	1	0	0	0	0	0	0	0	0	0	0
11-Jul	2	0	2	0	0	0	0	0	0	0	0	0	0
17-Jul	1	0	0	0	1	0	0	0	0	0	0	0	0
24-Jul	1	0	0	0	1	0	0	0	0	0	0	0	0
JUL	41	6	13	7	15	0	0	7	0	0	3	0	0

Appendix Table 14. Daily summer steelhead trapping data from the Upper Grande Ronde adult collection facility in 2013.

DATE	TOTAL	Trapped		Sacrificed/mortality		Recaptures at trap	
		Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
13-Mar	1	0	1	0	0	0	0
15-Mar	1	0	1	0	0	0	0
27-Mar	1	0	1	0	0	0	0
29-Mar	2	0	2	0	0	0	0
MAR	5	0	5	0	0	0	0
1-Apr	4	0	4	0	0	0	0
3-Apr	3	0	3	0	0	0	0
15-Apr	1	0	1	0	0	0	0
22-Apr	1	0	1	0	0	0	0
29-Apr	11	0	11	0	0	0	0
APR	20	0	20	0	0	0	0
3-May	2	0	2	0	0	0	0
6-May	1	0	1	0	0	0	0
8-May	0	0	0	0	0	0	0
31-May	0	0	0	0	0	0	0
MAY	3	0	3	0	0	0	0

Appendix Table 15. Daily spring Chinook salmon trapping data from the Upper Grande Ronde adult collection facility in 2013.

		Trapped				Sacrificed/mortality				Brood collected			
		Adults		Jacks		Adults		Jacks		Adults		Jacks	
Date	Total	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
29-May	12	7	5	0	0	0	0	0	0	4	3	0	0
31-May	12	5	5	2	0	0	0	0	0	3	2	1	0
May	24	12	10	2	0	0	0	0	0	7	5	1	0
1-Jun	19	10	7	2	0	0	0	1	0	8	3	1	0
3-Jun	34	17	10	5	2	0	0	5	0	12	5	0	0
5-Jun	45	22	8	15	0	0	0	15	0	15	5	0	0
6-Jun	16	7	4	5	0	0	0	2	0	6	1	3	0
7-Jun	13	4	1	7	1	0	0	5	0	4	1	2	0
12-Jun	4	2	2	0	0	0	0	0	0	2	0	0	0
13-Jun	4	1	2	1	0	0	0	1	0	1	2	0	0
14-Jun	4	1	1	2	0	0	0	0	0	1	1	2	0
17-Jun	11	4	2	3	2	0	0	3	0	3	1	0	0
JUN	150	68	37	40	5	0	0	32	0	52	19	8	0

Appendix Table 16. Daily summer steelhead trapping data from the Lookingglass Creek adult collection facility in 2013.

Date	Total	Trapped		Sacrificed/mortality		Recaptures at trap	
		Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
11-Mar	1	0	1	0	0	0	0
13-Mar	1	0	1	0	0	0	0
14-Mar	4	0	4	0	0	0	0
18-Mar	4	0	4	0	0	0	0
20-Mar	1	0	1	0	0	0	0
25-Mar	1	0	1	0	0	0	0
27-Mar	3	1	2	0	0	0	0
29-Mar	4	1	3	0	0	0	0
MAR	19	2	17	0	0	0	0
1-Apr	3	0	3	0	0	0	0
2-Apr	6	0	6	0	0	0	0
3-Apr	3	0	3	0	0	0	0
4-Apr	4	0	4	0	0	0	0
7-Apr	2	0	2	0	0	0	0
8-Apr	1	0	1	0	0	0	0
10-Apr	5	0	5	0	0	0	0
12-Apr	3	0	3	0	0	0	0
15-Apr	4	0	4	0	0	0	0
17-Apr	5	0	5	0	0	0	0
19-Apr	1	0	1	0	0	0	0
22-Apr	12	0	12	0	0	0	1
25-Apr	10	0	10	0	0	0	0
26-Apr	3	0	3	0	0	0	0
28-Apr	5	0	5	0	0	0	3
29-Apr	4	0	4	0	0	0	2
30-Apr	1	0	1	0	0	0	0
APR	72	0	72	0	0	0	6

Appendix Table 16 (cont.). Daily summer steelhead trapping data from the Lookingglass Creek adult collection facility in 2013.

Date	Total	Trapped		Sacrificed/mortality		Recaptures at trap	
		Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
3-May	15	0	15	0	0	0	1
4-May	7	0	7	0	0	0	2
5-May	4	0	4	0	0	0	0
6-May	7	0	7	0	0	0	1
7-May	8	0	8	0	0	0	4
8-May	2	0	2	0	0	0	0
9-May	6	0	6	0	0	0	0
10-May	6	1	5	1	0	0	1
12-May	4	0	4	0	0	0	1
13-May	2	0	2	0	0	0	0
15-May	0	0	0	0	0	0	1
17-May	1	0	1	0	0	0	0
20-May	0	0	0	0	0	0	1
22-May	1	0	1	0	0	0	0
29-May	1	0	1	0	0	0	0
30-May	1	0	1	0	0	0	0
MAY	65	1	64	1	0	0	12
2-Jun	2	0	2	0	0	0	0
5-Jun	2	0	2	0	0	0	0
JUN	32	0	32	0	0	0	0

Appendix Table 17. Daily spring Chinook salmon trapping data from the Lookingglass Creek adult collection facility in 2013.

		Trapped				Sacrificed/mortality				Brood collected			
		Adults		Jacks		Adults		Jacks		Adults		Jacks	
Date	Total	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
12-May	1	0	1	0	0	0	0	0	0	0	0	0	0
13-May	1	0	1	0	0	0	0	0	0	0	0	0	0
21-May	1	1	0	0	0	0	0	0	0	1	0	0	0
24-Feb	4	1	2	1	0	0	0	0	0	1	2	0	0
26-May	5	0	3	2	0	0	0	0	0	0	0	0	0
27-May	5	4	0	1	0	0	0	1	0	1	0	0	0
28-May	10	5	3	2	0	0	0	1	0	0	0	0	0
29-May	14	6	4	3	1	0	0	0	0	0	0	0	0
30-May	14	4	2	7	1	0	0	1	0	0	0	0	0
31-May	23	8	2	12	1	0	0	6	0	0	0	0	0
MAY	78	29	18	28	3	0	0	9	0	3	2	0	0
1-Jun	6	4	2	0	0	0	0	0	0	0	0	0	0
2-Jun	25	3	0	18	4	0	0	4	0	0	0	0	0
3-Jun	23	2	1	19	1	0	0	8	0	0	0	0	0
4-Jun	27	7	1	17	2	0	0	5	0	1	1	0	0
5-Jun	26	8	4	14	0	0	0	6	0	2	2	0	0
6-Jun	28	7	0	18	3	0	0	10	0	2	0	0	0
7-Jun	20	2	1	15	2	0	0	4	0	0	1	0	0
8-Jun	26	4	4	15	3	0	0	7	0	2	4	0	0
9-Jun	16	2	2	11	1	0	0	3	0	2	1	0	0
10-Jun	45	16	1	27	1	0	0	14	0	7	0	0	0
11-Jun	52	11	5	34	2	0	0	13	0	9	4	0	0
12-Jun	20	3	1	15	1	0	0	3	0	1	1	0	0
13-Jun	14	5	1	5	3	0	0	2	0	4	1	0	0
14-Jun	12	2	0	9	1	0	0	2	0	2	0	3	0
15-Jun	21	7	2	12	0	0	0	2	0	6	1	3	0
16-Jun	34	9	0	23	2	0	0	12	0	8	0	0	0
17-Jun	24	7	1	14	2	0	0	7	0	4	1	0	0
18-Jun	13	3	0	8	2	0	0	4	0	3	0	0	0
19-Jun	4	1	1	2	0	0	0	1	0	1	1	1	0
20-Jun	3	1	0	2	0	0	0	0	0	1	0	2	0
21-Jun	10	1	0	7	2	0	0	4	0	1	0	0	0
22-Jun	7	2	0	4	1	0	0	4	0	2	0	0	0
23-Jun	10	4	0	6	0	0	0	6	0	3	0	0	0
24-Jun	11	3	0	7	1	0	0	7	0	2	0	0	0
25-Jun	6	1	0	5	0	0	0	5	0	1	0	0	0
26-Jun	13	3	2	7	1	0	0	6	0	0	0	0	0
27-Jun	18	1	1	15	1	0	0	15	0	0	0	0	0
28-Jun	23	10	1	10	2	0	0	8	0	0	1	0	0
29-Jun	15	5	1	8	1	0	0	8	0	0	0	0	0

Appendix Table 17 (cont.). Daily spring Chinook salmon trapping data from the Lookingglass Creek adult collection facility in 2013.

		Trapped				Sacrificed/mortality				Brood collected			
		Adults		Jacks		Adults		Jacks		Adults		Jacks	
Date	Total	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
30-Jun	20	8	0	9	3	0	0	9	0	0	0	0	0
JUN	572	142	32	356	42	0	0	179	0	64	19	9	0
1-Jul	13	6	0	7	0	0	0	7	0	6	0	0	0
2-Jul	18	4	1	12	1	0	0	12	0	4	1	0	0
3-Jul	12	5	0	5	2	0	0	4	0	4	0	0	0
4-Jul	11	5	4	2	0	0	0	2	0	1	4	0	0
6-Jul	11	6	0	4	1	0	0	4	0	0	0	0	0
7-Jul	7	3	0	4	0	0	0	4	0	0	0	0	0
8-Jul	7	2	1	3	1	0	0	3	0	2	1	0	0
9-Jul	3	0	0	2	1	0	0	2	0	0	0	0	0
10-Jul	4	1	0	3	0	0	0	2	0	0	0	1	0
12-Jul	9	5	0	3	1	0	0	3	0	0	0	0	0
14-Jul	7	3	1	0	3	0	0	0	0	0	0	0	0
16-Jul	7	4	0	3	0	0	0	3	0	0	0	0	0
19-Jul	2	1	0	0	1	0	0	0	0	0	0	0	0
22-Jul	7	2	0	5	0	0	0	3	0	1	0	2	0
26-Jul	2	0	0	2	0	0	0	2	0	0	0	0	0
31-Jul	2	0	0	2	0	0	0	2	0	0	0	0	0
JUL	122	47	7	57	11	0	0	53	0	18	6	3	0
2-Aug	1	0	0	1	0	0	0	1	0	0	0	0	0
4-Aug	1	0	0	1	0	0	0	1	0	0	0	0	0
6-Aug	1	0	0	1	0	0	0	1	0	0	0	0	0
8-Aug	3	1	0	2	0	0	0	1	0	0	0	0	0
9-Aug	1	1	0	0	0	0	0	0	0	0	0	0	0
10-Aug	2	0	0	2	0	0	0	1	0	0	0	0	0
12-Aug	3	0	1	2	0	0	0	2	0	0	0	0	0
13-Aug	2	2	0	0	0	0	0	0	0	1	0	0	0
14-Aug	5	1	1	3	0	0	0	3	0	0	1	0	0
16-Aug	4	3	0	1	0	0	0	1	0	2	0	0	0
18-Aug	7	4	0	3	0	0	0	3	0	2	0	0	0
19-Aug	3	0	0	3	0	0	0	3	0	0	0	0	0
20-Aug	7	3	0	4	0	0	0	4	0	0	0	0	0
21-Aug	2	1	0	1	0	0	0	1	0	0	0	0	0
23-Aug	5	1	0	4	0	0	0	4	0	0	0	0	0
24-Aug	10	4	0	5	1	0	0	5	0	0	0	0	0
25-Aug	3	2	1	0	0	0	0	0	0	2	1	0	0
26-Aug	9	4	0	4	1	0	0	4	0	1	0	0	0
27-Aug	10	4	0	5	1	0	0	5	0	1	0	0	0
30-Aug	18	6	0	10	2	0	0	9	0	3	0	0	0

Appendix Table 17 (cont.). Daily spring Chinook salmon trapping data from the Lookingglass Creek adult collection facility in 2013.

		Trapped				Sacrificed/mortality				Brood collected			
		Adults		Jacks		Adults		Jacks		Adults		Jacks	
Date	Total	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
4-Sep	16	4	0	12	0	0	0	11	0	2	0	0	0
6-Sep	9	1	0	6	2	0	0	5	0	0	0	0	0
9-Sep	3	0	0	3	0	0	0	3	0	0	0	0	0
11-Sep	2	0	0	2	0	0	0	1	0	0	0	0	0
SEP	30	5	0	23	2	0	0	20	0	2	0	0	0

Appendix Table 18. Adult summer steelhead trapping summary from the Catherine Creek adult collection facility 1997-2013.

		Trapped		Sacrificed/mortality		Recaptures at trap	
Year	Total	Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
1997	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0
2000	17	7	10	1	1	0	0
2001	203	50	153	50	0	0	0
2002	267	1	266	1	0	0	5
2003	226	2	224	2	1	0	2
2004	181	0	181	0	0	0	7
2005	191	1	190	1	0	0	6
2006	171	0	171	0	0	0	4
2007	128	0	128	0	0	0	3
2008	121	0	121	0	0	0	0
2009	147	0	147	0	0	0	15
2010	298	3	295	3	0	0	8
2011	348	0	348	0	0	0	30
2012	329	0	329	0	0	0	13
2013	171	0	171	0	0	0	20

Appendix Table 19. Adult summer steelhead trapping summary from the Upper Grande Ronde River adult collection facility 1997-2013.

Year	Total	Trapped		Sacrificed/mortality		Recaptures at trap	
		Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
1997	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0
2001	11	0	11	0	0	0	0
2002	37	0	37	0	0	0	0
2003	56	0	56	0	0	0	1
2004	63	0	63	0	0	0	8
2005	41	0	41	0	0	0	0
2006	0	0	0	0	0	0	0
2007	63	0	63	0	0	0	3
2008	31	0	31	0	0	0	6
2009	36	0	36	0	0	0	2
2010	15	0	15	0	0	0	0
2011	11	0	11	0	0	0	0
2012	13	0	13	0	0	0	2
2013	28	0	28	0	0	0	0

Appendix Table 20. Adult summer steelhead trapping summary from the Lookingglass Creek adult collection facility 1997-2013.

Year	Total	Trapped		Sacrificed/mortality		Recaptures at trap	
		Hat.	Nat.	Hat.	Nat.	Hat.	Nat.
1997	10	1	9	0	0	0	0
1998	15	4	11	0	0	0	0
1999	40	0	40	0	0	0	0
2000	11	0	11	0	0	0	0
2001	114	1	113	0	0	0	2
2002	260	2	258	2	0	1	42
2003	165	0	165	0	0	0	14
2004	135	3	132	3	0	0	14
2005	206	5	201	5	1	0	20
2006	196	3	193	3	0	0	19
2007	132	0	132	0	0	0	15
2008	135	6	129	6	0	0	10
2009	194	0	194	0	0	0	49
2010	334	23	311	14	0	10	11
2011	281	3	278	3	0	0	28
2012	276	1	275	1	0	0	41
2013	160	2	157	1	0	0	18

Appendix Table 21. Spawning data for Catherine Creek stock spring Chinook salmon at Lookingglass Hatchery 2001-2013.

		Fish spawned										Median	Mortality		
Year	Stock	NatF	HatF	NatM	recy	HatM	recy	NatJ	recy	HatJ	recy	Spawn wk	F	M	J
2001	CC	13	0	5		0		2		0		30-Aug	2	2	1
2002	CC	20	0	11		0		3		0		23-Aug	1	1	0
2003	CC	28	0	17		0		1		0		21-Aug	1	2	0
2004	CC	9	0	6		0		0		1		16-Sep	0	2	0
2005	CC	8	9	2		10		0		5		8-Sep	2	0	0
2006	CC	8	29	11		16		1		1		31-Aug	0	0	0
2007	CC	14	31	16	3	13	1	1		4		29-Aug	2	1	0
2008	CC	11	21	19	14	32	21	0		4		3-Sep	0	0	0
2009	CC	13	30	14	1	5		4		2		27-Aug	4	4	0
2010	CC	13	29	22	7	18	3	1		2		9-Sep	1	0	0
2011	CC	19	20	13	2	24	3	2		2		15-Sep	5	5	0
2012	CC	23	22	24	3	18		2		2		16-Aug	2	2	0
2013	CC	26	23	21	7	13	3	1		2		29-Aug	9	3	1

NatF=Natural Females, HatF=Natural Males, etc. Recy=number of fish that were spawned multiple times. These are included in the total. Example 2007: NatM=16 total males, recy=3 indicates that 3 of the 16 males spawned multiple times. There were 13 unique individuals. Median spawn wk=the week in which 50% of the females had spawned. Mortality=total mortality for the season.

Appendix Table 22. Spawning data for Grande Ronde stock spring Chinook salmon at Lookingglass Hatchery 2001-2013.

		Fish spawned										Median	Mortality		
Year	Stock	NatF	HatF	NatM	recy	HatM	recy	NatJ	recy	HatJ	recy	Spawn wk	F	M	J
2001	GR	8	0	7		0		0		0		5-Sep	2	3	0
2002	GR	21		14		0		1		0		23-Aug	6	3	0
2003	GR	23	0	20		0		0		0		28-Aug	16	11	0
2004	GR	7	0	5		0		0		1		9-Sep	1	2	1
2005	GR	2	38	4		24	6	0		5		1-Sep	3	4	0
2006	GR	13	71	14	2	50		2		1		7-Sep	4	15	0
2007	GR	6	25	10	2	14	1	0		7		11-Sep	1	4	1
2008	GR	4	8	10	5	11	6	0		5	2	3-Sep	0	1	0
2009	GR	9	52	10	2	30	1	1		9	1	13-Aug	37	28	4
2010	GR	14	68	23	6	63	6	1		0		2-Sep	5	12	1
2011	GR	2	37	8	4	32	3	2	1	1		1-Sep	17	4	0
2012	GR	27	47	40	3	32		1		5		30-Aug	8	10	2
2013	GR	13	53	7	14	31	3	0		8		29-Aug	8	3	1

NatF=Natural Females, HatF=Natural Males, etc. Recy=number of fish that were spawned multiple times. These are included in the total. Example 2006: NatM=14 total males, recy=2 indicates that 2 of the 14 males spawned multiple times. There were 12 unique individuals. Median spawn wk=the week in which 50% of the females had spawned. Mortality=total mortality for the season.

Appendix Table 23. Spawning data for Lookingglass Creek stock spring Chinook salmon at Lookingglass Hatchery 2004-2013.

		Fish spawned										Median	Mortality		
Year	Stock	NatF	HatF	NatM	recy	HatM	recy	NatJ	recy	HatJ	recy	Spawn wk	F	M	J
2004	LG	0	53	0		53		0		4		9-Sep	5	12	0
2005	LG	Fish were released above the hatchery													
2006	LG	Fish were released above the hatchery													
2007	LG	0	23	0		19	4	0		23		6-Sep	2	1	3
2008	LG	0	76	22	11	91	45	1		6	4	3-Sep	1	2	0
2009	LG	19	7	14	6	8	5	27		0		3-Sep	1	1	4
2010	LG	20	55	23		49	3	9		0		2-Sep	8	10	0
2011	LG	29	50	32	6	41	3	8		0		1-Sep	4	9	0
2012	LG	24	57	28		52	10	2		5		30-Aug	3	7	0
2013	LG	15	52	15	6	34	9	0		5		4-Sep	4	3	2

NatF=Natural Females, HatF=Natural Males, etc. Recy=number of fish that were spawned multiple times. These are included in the total. Example 2008: NatM=22 total males, recy=11 indicates that 11 of the 22 males spawned multiple times. There were 11 unique individuals. Median spawn wk=the week in which 50% of the females had spawned. Mortality=total mortality for the season.

Appendix Table 24. Bulltrout trapping summary from the Catherine Creek, Upper Grande Ronde, and Lookingglass Creek adult collection facilities 1999-2012.

Year	Catherine Creek	Grande Ronde	Lookingglass Creek
1999	1	0	47
2000	1	0	49
2001	1	0	43
2002	3	0	87
2003	5	0	45
2004	7	0	42
2005	5	0	60
2006	1	2	51
2007	5	0	58
2008	4	0	58
2009	14	0	35
2010	31	0	36
2011	35	0	81
2012	56	0	126
2013	52	1	177

Appendix Table 25. Median spawn dates and holding location at Lookingglass Hatchery for Catherine Creek, Grande Ronde, and Lookingglass Creek stocks 2001-2013.

Year	Catherine Creek (#fem.)	Grande Ronde (#fem.)	Lookingglass Creek (#fem.)
2001	8/30 (12) circular	9/5 (8) circular	--
2002	8/23 (20) circular	8/23 (21) circular	--
2003	8/21 (28) circular	8/28 (23) circular	--
2004	9/16 (9) circular	9/9 (7) circular	9/9 (53) raceway
2005	9/8 (17) circular	9/1 (40) circular	--
2006	8/31 (37) circular	9/7 (85) circular	--
2007	8/29 (45) raceway	9/11 (32) circular	9/6 (23) raceway
2008	9/3 (32) raceway	9/3 (12) circular	9/3 (76) raceway
2009	8/27 (43) raceway	8/13 (61) circular	9/3 (26) raceway
2010	9/9 (42) circular	9/2 (82) raceway	9/2 (75) raceway
2011	9/15 (39) circular	9/1 (39) raceway	9/1 (79) raceway
2012	8/16 (45) circular	8/30 (74) raceway	8/30 (81) raceway
2013	8/29 (49) circular	8/29 (66) raceway	9/4 (67) raceway

Appendix Table 26. Pecent egg viability for stocks of fish spawned at Lookingglass Hatchery (mean percent viability).

Year	Catherine Creek	Grande Ronde	Lookingglass Creek	Lostine	Imnaha
2007	85	81	77	87	74
2008	95	90	93	92	88
2009	93	87	98	96	93
2010	92	93	87	93	92
2011	93	86	90	92	85
2012	87	92	94	90	80
2013	84	92	92	89	92