2015 Snake River Fall Chinook Salmon Spawning Summary

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Fall Chinook salmon redd surveys were conducted cooperatively by biologists from the Idaho Power Company (IPC), Nez Perce Tribe (NPT), U.S. Fish and Wildlife Service (USFWS), and Washington Department of Fish and Wildlife (WDFW). This was the 28th year that intensive, cooperative aerial surveys have been conducted in the Snake River and most major tributaries above Lower Granite Dam and 24th year for ground surveys in tributaries downstream of Lower Granite Dam. No underwater spawning surveys were conducted below any of the four lower Snake River dams during 2015. A total of 9,346 redds were estimated in the Snake River Basin (Table 1), representing the highest estimate since intensive surveys began in 1988. This years' redd estimate was 2,631 redds more than the previous high estimate of 6,715 redds in 2014. Due to safety concerns and to reduce risks of conducting weekly manned helicopter flights, the number of aerial surveys have been reduced to three or four flights for the last five years in most rivers. This was the first year that surveys on the main Snake River were accomplished only with a small unmanned aircraft system (sUAS) along with regular underwater video surveys.

Table 1. Number of fall Chinook salmon redds in the Snake River Basin, 2015 (all manned helicopter counts except as noted, N/S = no survey).

Survey Area	Number of Redds
Snake River (sUAS)	2,329*
Snake River (underwater video)	826
Total Snake River	**3,155***
Clearwater River	4,666
Potlatch River	0
N.F. Clearwater River	20
S.F. Clearwater River	119
M.F. Clearwater River	115
Selway River	162
Total Clearwater River Subbasin	**5,082**
Grande Ronde River	378
Wallowa River	N/S
Wenaha River	N/S
Joseph Creek	N/S
Total Grande Ronde River Subbasin	**378**
Imnaha River	**83**
Salmon River	**142**
Tucannon River (ground count)	**506***
Asotin Creek (ground count)	N/S
Alpowa Creek (ground count)	N/S
Below Lower Snake River dams (underwater video)	N/S
Grand Total Snake River Basin	**9,346**

*estimated count.

During aerial and underwater video counts, IPC and USFWS staff observed an estimated total of 3,155 redds in the mainstem Snake River (Table 1). This was the first year that surveys along the main Snake River were accomplished only with a small unmanned aircraft system (sUAS); no helicopter surveys were attempted. As such, the total shallow water redd number was estimated based on a sampling protocol established in cooperation with the USFWS and the Department of Statistics at the University of Idaho. For the sUAS survey samples, 35 individual sites were flown four times (every other week) during the spawning season, beginning the week of 26 Oct 2015, and ending during the week of 07 Dec 2015. The total number of new redds was compiled for each of the 35 sample sites, for each survey, and that provided a total number of redds present at each site that could be incorporated into our estimation model for the entire river (Table 2). All of our sUAS sample surveys went well, except for a few that were compromised due to both high winds (unable to fly) and increased turbidity (very limited visibility), mostly during the final week of the season. However, these same conditions would have compromised traditional helicopter methods, and we feel that the sUAS data collected still provided a good estimate that is comparable to what would have been observed through standard helicopter surveys. The total number of redds observed at the 35 sample sites was 1,118, and the estimated total number of shallow redds within the main Snake River was 2,329 (± 704). We estimated 591 (± 222) redds in the reach downstream of the Salmon River, and 1,738 (± 670) redds in the reach upstream of the Salmon River. The bounds on these estimates may seem high, but are the result of how the fish tend to "move" spawning sites from year to year; because it is impossible to know that the fish are going to use a specific spawning area consistently, this tends to result in large variances, which in turn create a large confidence bound. However, even given this wide bound, we are still very confident in the actual estimate, especially based on experience with these fish over the past 25 years.

Spawning was estimated to have begun during mid-October (232 redds observed during the week of 26 October), appeared to peak in early November (725 new redds observed during the week of 09 November), declined the third week in November (130 new redds observed during the week of 23 November), and was determined to be complete by early December (31 new redds observed during the week of 07 December, the final sample surveys).

Intensive deepwater spawning searches were conducted throughout the main Snake River corridor, using remote underwater video cameras, in areas too deep to be viewed from the air. The deepwater searches began in mid-November, and were completed in early December. The deepwater searches located an additional 826 redds at 46 sites (64 sites were searched).

The flows from the Hells Canyon Dam were held stable at approximately 8,500 cfs throughout the spawning season. That flow has become the base flow that will be maintained through emergence.

For 2015, the total redd count for the Snake River was 3,155. During the most recent five years (2011 – 2015), the average number of redds occurring in the Snake River (including those found in deep water) has been 2,659, ranging between 1,828 and 3,155. The lowest redd count for the Snake River, since intensive, cooperative surveys began, was 46 redds in 1991, while the highest count is 3,155 redds observed this past year (2015).

Table 2. Number of weekly new redds and season total redds counted at each sample site using the sUAS, Fall Chinook spawning season, Oct – Dec 2015.

River Mile	Week 1 New Redds	Week 2 New Redds	Week 3 New Redds	Week 4 New Redds	Total Redds
151.7	0	4	10	NF[2]	14
151.9	2	5	0	NF[2]	7
152.3	5	19	17	NF[2]	41
157.6	0	9	4	NF[2]	13
159.3	0	1	12	NF[2]	13
164.7	9	23	2	NF[2]	34
165.8	15	54	31	NF[2]	100
172.5	7	6	14	NF[2]	27
176.7	0	0	0	NF[2]	0
181.7	0	6	3	0	9
183.5	5	10	3	0	18
189.9	0	0	0	0	0
190.0	1	0	0	0	1
190.2	16	38	1	0	55
190.8	2	37	1	0	40
191.7	1	5	0	0	6
193.6	5	20	0	2	27
194.0	7	30	0	2	39
198.2	3	42	1	0	46
199.7	0	0	0	0	0
205.3	13	34	8	2	57
206.5	11	31	3	1	46
207.5	0	0	0	0	0
208.0	29	38	0	4	71
217.3	23	63	0	8	94
218.7	11	21	14	0	46
220.8	1	14	3	0	18
222.9	8	56	2	6	72
225.1	3	6	0	NF[1]	9
226.7	3	5	0	0	8
235.7	18	7	NF[1]	0	25
238.6	13	38	1	4	56
242.8	4	19	NF[1]	0	23
244.5	6	58	NF[1]	2	66
245.7	11	26	0	0	37
Total	232	725	130	31	1118

Week 1 = 26, 27, 28 Oct
Week 2 = 09, 10, 11 Nov
Week 3 = 23, 24, 25 Nov
Week 4 = 07, 08, 09 Dec
[1] No Flight-Extremely high winds
[2] No Flight-Extremely high winds coupled with high turbidity in the lower river

During traditional manned helicopter surveys, NPT staff counted a total of 5,082 redds in the Clearwater River Subbasin (Table 1). Redd searches covered the entire Clearwater River from the Clearwater Paper Mill in Lewiston, Idaho to the forks of the South Fork and Middle Fork Clearwater rivers (71 miles), lower Potlatch River (4 miles), about one half mile of the lower North Fork Clearwater River above the mouth, the entire Middle Fork Clearwater River (22 miles), lower South Fork Clearwater River (14 miles), and lower Selway River (19 miles). This was the first year an extended survey was conducted on the S.F. Clearwater River up to the Mount Idaho Grade (Rm 23.0) due to a report of spawning salmon in November. On the lower mainstem Clearwater River up to the mouth of Orofino Creek, there were 140 redds observed during the first survey on 13 October, 1,748 new redds observed on 28 October, and 2,773 new redds observed on 23 November. We did not conduct a survey scheduled 9 November because of rains and turbid water. Potlatch and the N.F. Clearwater rivers were surveyed on the same dates as the lower Clearwater. No redds were observed on the Potlatch River. On the N.F. Clearwater, 3, 7, and 10 new redds were counted on the three survey dates for a total of 20 redds.

The upper Clearwater (from Orofino Creek upstream to the M.F. Clearwater), M.F. Clearwater, Selway, and S.F. Clearwater rivers were surveyed on 14 October and 5 November. Inclement weather and turbid water prevented a survey on 28 October which was pushed back to 5 November, the last favorable survey date. On the upper Clearwater River, there were 2 and 23 new redds counted for a total of 25 redds. On the M.F. Clearwater River, we observed 18 and 97 new redds for a total of 115 redds. On the Selway River, we observed 57 and 105 new redds for a total of 162 redds. On the S.F. Clearwater River, we observed 16 and 103 redds for a total of 119 redds (53 of those redds were observed within the extended survey area between the town of Harpster and Mount Idaho Grade). Total redds observed on the mainstem Clearwater River was 4,666 redds in about 73 distinct locations.

This years' record count of 5,082 redds in the entire Clearwater River Subbasin surpassed the previous 2014 record of 3,118 by 1,964 redds. Survey conditions were excellent on the first survey, declined to only fair on the second survey and was good on the last survey on lower mainstem Clearwater. Similar survey conditions prevailed on the upper Clearwater, M.F. Clearwater, S.F. Clearwater, and Selway rivers. Since a last scheduled survey could not be conducted on the upper Clearwater, M.F. Clearwater, S.F. Clearwater and Selway rivers, some redds were probably missed. Not many redds were thought to have been missed on the lower Clearwater River this year.

Throughout the fall Chinook spawning period, Dworshak Reservoir discharges remained stable at 1,600 – 1,700 cfs. Flows on the lower Clearwater (USGS Gauging Station at Spalding, ID) were low during surveys with a low of 2,980 cfs on 13 October, increased to 3,180 and 3,560 cfs on 28 October and 23 November, respectively. During 2015, we observed redds in areas on the mainstem Clearwater, S.F. Clearwater, M.F. Clearwater, and Selway rivers where no redds had been previously recorded. Since 2011, the mean number of redds occurring in the Clearwater River Subbasin has been 2,947 ranging between 1,621 and 5,081. The lowest redd count for the Clearwater River Subbasin, since intensive surveys began was 4 redds in both 1990 and 1991, while the highest count was 5,082 redds in 2015.

A total of three aerial surveys conducted by NPT staff on the Grande Ronde River resulted in a total of 378 redds observed (Table 1). Surveys on 21 October, 4 November, and 18 November resulted in 116, 227, and 35 new redds counted, respectively. Redd surveys covered the mouth up to the Wildcat Bridge past the town of Troy (53 miles). Due to budget constraints, an extended survey covering the upper Grande Ronde River up to the Wallowa River, lower Wallowa River, and lower Wenaha River was not conducted this year. We did not receive any reports of spawning fall Chinook in Joseph Creek on the lower Grande Ronde. On the mainstem Grande Ronde, redds were seen in 54 distinct spawning locations. Survey conditions were fair on all surveys. Flows were a low 545 cfs (USGS Gauging Station at Troy, OR) on the first survey, increased to 751 cfs and 1,080 on the second and last survey, respectively. Since 2011, the mean number of redds counted in the Grande Ronde River Subbasin has been 288, ranging from 154 to 378. The lowest redd count for the Grande Ronde Subbasin since intensive surveys began, was zero in 1989 and 1991, while the highest count was 378 in 2015.

Three aerial surveys were conducted by NPT staff on the Imnaha River on the same dates as the Grande Ronde resulting in 83 redds observed (Table 1). Surveys were conducted from the mouth up to the town of Imnaha (19 miles). Surveys on 21 October, 4 November, and 18 November resulted in 10, 20, and 53 new redds counted, respectively. Flows were not monitored during surveys by the USGS Gauging Station at Imnaha, OR this year. Redds were constructed in 24 distinct locations. Since 2011, the mean number of redds observed in the Imnaha River has been 67, ranging from 24 to 103. The lowest redd count for the Imnaha River, since intensive surveys began, was zero redds in 1994 while the highest count was 132 in 2010.

One aerial survey conducted 20 November by NPT staff on the Salmon River resulted in 142 redds observed (Table 1). Only one survey was scheduled this year because of budget constraints. The survey was conducted from the mouth up to French Creek (105 miles). Redds were constructed in 24 distinct locations. Salmon River flow was moderate at 4,240 cfs (USGS Gauging Station at Whitebird, ID) during the survey and conditions were only good but not excellent, therefore, a few deep water redds may have been missed. Since 2011, the mean number of redds occurring in the Salmon River has been 62, ranging between 31 and 142. The lowest redd count for the Salmon River, since intensive surveys began in 1992, was zero redds in both 1999 and 2000, while the highest count was 142 in 2015.

Due to rains and turbid water during mid-November, a ground survey of lower Alpowa Creek was not conducted this year. A total of 31 redds were observed in the lower Alpowa Creek in 2010, the first year surveyed, while no redds were see in 2011, and 6 redds observed in 2012. Due to late rains and turbid conditions, a survey was not conducted in 2013 or 2014.

Due to cold weather during November and high turbid waters in December, WDFW staff periodically conducted surveys on the lower 20 miles of the Tucannon River. The lowest 7.2 miles of the Tucannon River were surveyed from 26 October until 4 December, during the time when 86% of the redds were historically built. Going upstream, the next 15.5 miles were surveyed until 20 November, when 61% of the redds were historically built. The furthest upstream reaches of fall Chinook spawning area was 10.5 miles long and was surveyed until 4 December, covering the full time redds were historically built. Overall, surveys covered 92% of the lower 20 miles of the Tucannon River from 26 October until 4 December. Sections with

restricted access were estimated using counts from adjacent sections, and adjustments were made for weeks the surveys were not performed based on proportions of redds built in the same time frame in prior years. In 2015, staff counted 295 fall Chinook redds which expand to 506 after all adjustments were made (Table 1). The first redds were observed on 26 October and the peak of spawning occurred during the week of 16 November. Prior to the high flow events, visibility was excellent due to low flows. Since 2011, the mean number of redds in the Tucannon was 408, ranging from 302 to 541. The lowest redd count for the Tucannon River was 16 redds in 1987 and the highest estimate was 541 redds in 2012.

No spawning ground surveys were conducted in the lower Asotin Creek during 2015. WDFW staff counted 53 redds in the lower 3.1 miles of Asotin Creek during 2014, which was the highest redd count since surveys began. The second highest count was 30 redds in 2012.

There were no underwater camera surveys conducted below any of the four lower Snake River dams during 2015 (Hockersmith, USACE personal communication). Underwater video results showed no fall Chinook redds below Ice Harbor Dam, the only dam surveyed, in 2014. Normandeau Associates, Inc surveyed areas around the juvenile collection facility below Lower Granite Dam and observed 5 redds in 2013. Previous fall Chinook redd surveys have been intermittent based on funding during recent years, typically not all dams were surveyed, and redds numbers tended to be low. There were no surveys conducted in either 2010 or 2012. There were 10 redds observed by Battelle Pacific Northwest Laboratory below Lower Monumental Dam during 2011, the only dam surveyed that year. During 2008, areas below all lower Snake River dams were surveyed by Battelle with no redds observed below Ice Harbor and Little Goose, 7 redds counted below Lower Monumental, and 8 redds counted below Lower Granite.

Final results will be provided in annual reports to Bonneville Power Administration. Past reports can be found at www.bpa.gov. Past reports below the lower Snake River dams can be obtained through the U.S. Army Corps of Engineers, Walla Walla District.