2013 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), Washington Department of Fish and Wildlife (WDFW), and Normandeau Associates, Inc. This was the 26th year that intensive, cooperative aerial surveys have been conducted in the Snake River and most major tributaries above Lower Granite Dam and 22nd year for ground surveys in tributaries downstream of Lower Granite Dam. The area immediate below Lower Granite Dam was the only lower Snake River dam surveyed in 2013. A total of 6,391 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 761 redds more than the previous high estimate of 5,630 redds in 2010. Due to safety concerns and to reduce risks of conducting weekly flights, the number of aerial surveys has been reduced to three or four flights for the last four years in major spawning rivers.

Table 1. Number of fall Chinook salmon redds in the Snake River Basin, 2013 (all aerial counts except as noted, N/S = no survey).

Survey Area	Number of Redds
Snake River	2,071
Snake River (underwater video)	596
Total Snake River	**2,667**
Clearwater River	2,858
Potlatch River	10
N.F. Clearwater River	3
S.F. Clearwater River	47
M.F. Clearwater River	28
Selway River	10
Total Clearwater River Subbasin	**2,956**
Grande Ronde River	255
Wallowa River	N/S
Wenaha River	N/S
Total Grande Ronde River Subbasin	**255**
Imnaha River	**38**
Salmon River	**31**
Tucannon River (ground count)	**386***
Asotin Creek (ground count)	**53**
Alpowa Creek (ground count)	N/S
Below Lower Granite Dam (underwater video)	**5**
Below Little Goose Dam	N/S
Below Lower Monumental Dam	N/S
Below Ice Harbor Dam	N/S
Grand Total Snake River Basin	**6,391**

*estimated count.

During aerial, ground, and underwater video counts, IPC and USFWS staff observed a total of 2,667 redds in the mainstem Snake River (Table 1). Fall Chinook salmon aerial redd surveys along the mainstem Snake River were attempted bi-weekly during the spawning season, beginning on 21 October, and ending on 4 December. During the survey flight of 18 November, environmental conditions (very strong winds) caused the flight to be terminated at approximately RM233 (near waterspout rapid). Due to inclement weather (strong winds, low clouds, and snow), the final survey was postponed by two days, until 4 December. Water clarity between Asotin, WA and the Hells Canyon Dam was generally good to excellent throughout most of the season. However, during the final survey, on 4 December, the main Snake River between Asotin, WA and the Grande Ronde River had elevated turbidity and very poor viewing conditions. Even given the poor water clarity in the lower portion of the river during the final survey, biologists do not believe that many redds were missed. The flows from the Hells Canyon Dam were maintained stable at approximately 9,000 cfs from 16 October through 4 December. The aerial surveys attempted to cover the river corridor between Asotin, Washington, and the Hells Canyon Dam (approximately 100 river miles). Intensive deepwater spawning searches were conducted throughout the main 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. Spawning was estimated to have begun during mid-October (100 redds observed on 21 October), appeared to peak in early November (1,538 new redds observed on 4 November), and was determined to be complete by early December (16 new redds observed on 4 December, the final survey). Approximately 79% of redds observed during aerial surveys were constructed by 4 November. During aerial surveys we observed a total of 2,071 redds, constructed at 110 distinct spawning locations. Due to time constraints, no comprehensive ground counts were conducted at sites within the main Snake River. The deepwater searches located an additional 596 redds at 40 sites (66 sites were searched). For 2013 the total redd count for the Snake River was 2,667. During the most recent five years (2009 – 2013), the mean number of redds occurring in the Snake River (including those found in deep water) has been 2,474, ranging between 1,828 and 2,944. The lowest redd count for the Snake River, since intensive, cooperative surveys began, was 46 redds in 1991, while the highest count was 2,944 redds in 2010.

During the fall of 2013 we continued to test the use of an unmanned air system (UAS) for conducting aerial counts and estimates of redds. We again contracted with the University of Alaska, Poker Flats Research Range, to continue UAS surveys at selected sites on both the Snake and Clearwater rivers. Similar to last year, we used a small remote controlled aerial drone (Aeryon Scout; quadrocopter), equipped with a digital camera (GoPro Hero), to capture video and still images at index areas within both the Snake and Clearwater rivers. A set of 37 index areas were selected on the Snake River, and 15 were selected for the Clearwater River. Index areas were selected based on advice from the department of statistics at the University of Idaho. Each area was scheduled to be flown once per week throughout the spawning season. For the most part, conditions remained good, and we were able to collect good data throughout the season. As in 2011 and 2012, flights were able to be conducted, and useable still photographs were collected, even under adverse conditions of strong wind, which would have otherwise resulted in cancelling a traditional helicopter survey due to safety. Preliminary assessment of the photographic data clearly shows redds (as well as fish) throughout each area. A final count, comparison with biologists “eyes in the skies”, and a total estimate of shallow redds, based on

the photographic data, will be forthcoming. The data and results from the past three years of testing the UAS has been a clear success, and we maintain that this type of technology be adapted for future use, in lieu of helicopter surveys, based on safety and cost.

During aerial surveys, NPT staff counted a total of 2,956 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 (5 miles), about one half mile of the lower North Fork Clearwater River below Dworshak Dam, the entire Middle Fork Clearwater River (22 miles), lower South Fork Clearwater River (14 miles), and lower Selway River (19 miles). On the lower mainstem Clearwater River up to the mouth of Orofino Creek, there were 474 redds observed during the first survey on 14 October, 1,368 new redds observed on 30 October, 579 new redds observed on 15 November, and 357 new redds observed on 25 November, the last scheduled survey. The upper Clearwater (from Orofino Creek upstream to the M.F. Clearwater), the S.F. Clearwater, M.F. Clearwater, and the Selway rivers were surveyed on 16 October, 30 October, and 18 November. On the upper mainstem Clearwater River, above Orofino Creek, there were 11, 40, and 29 new redds observed on three surveys for a total of 80 redds. Total redds observed on the entire mainstem Clearwater River was 2,858 redds in about 62 distinct locations. Aerial surveys on the Potlatch and the N.F. Clearwater rivers were on the same days as the lower Clearwater River. No redds were observed on the first two surveys in Potlatch River, 8 redds were counted on 15 November, and 2 new redds counted 25 November for a total of 10 redds. On the N.F. Clearwater, 3 redds were counted the last survey on 25 November. Survey counts were 11, 15 and 21 new redds for the same survey dates in the S.F. Clearwater for a total of 47 redds. For the M.F. Clearwater, 5, 16, and 7 new redds were observed for a total of 28 redds. On the Selway River, counts of 2, 5, and 3 new redds were recorded on the three surveys for a total of 10 redds. This year was a record redd count in the Clearwater River Subbasin surpassing the previous record of 1,958 redds estimated in 2012 by 998 redds. Survey conditions were excellent on all but the third survey which was good on the lower mainstem Clearwater. The upper Clearwater, M.F. Clearwater, S.F. Clearwater, and Selway rivers survey conditions were excellent on the first two surveys and good on the last survey. Not many redds were thought to have been missed in the Clearwater River Subbasin this year, except maybe some deep water redds. For example, in a deep water (> 15 ft) run just below Big Eddy, we observed 55 new redds the last survey on 25 November. These redds were most likely constructed earlier and were not visible during the previous surveys with slightly less water transparency. This was also an area where we had never recorded redds in the mainstem during previous years. Throughout the fall Chinook spawning period, Dworshak Reservoir discharges remained fairly stable between 1,600 – 1,700 cfs. Flows on the lower Clearwater (USGS Gauging Station at Spalding, ID) were low during surveys with a low of 3,220 cfs on the 30 October survey coinciding with peak spawning and highest recorded one day redd count of 1,408 new redds. In Lapwai Creek, the NPT coho staff constructed a coho weir just above the mouth and collected a total of 40 fall Chinook releasing all fish above the weir. This compares to 299 fall Chinook captured in the weir during 2012 and most likely related to higher flows in Lapwai Creek in 2012. During 2013, we observed redds in areas on the mainstem Clearwater, S.F. Clearwater, and M.F. Clearwater where no redds had been previously recorded. Since 2009, the mean number of redds occurring in the Clearwater River Subbasin has been 1,872 ranging between 1,185 and 2,956. 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 2,956 redds in 2013.

A total of three aerial surveys conducted by NPT staff on the Grande Ronde River resulted in a total of 255 redds observed (Table 1). Surveys on 23 October, 6 November, and 20 November resulted in 59, 191, and 5 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. On the mainstem Grande Ronde, redds were seen in 40 distinct spawning locations. Survey conditions were excellent on the first survey, fair on the second, and poor on the last survey, therefore a few redds may have been missed. Flows were a low 820 cfs (USGS Gauging Station at Troy, OR) on the first survey and increased to 1,400 cfs on the last survey with decreasing water visibilities. Since 2009, the mean number of redds counted in the Grande Ronde River Subbasin has been 218, ranging from 101 to 313. The lowest redd count for the Grande Ronde Subbasin since intensive surveys began, was zero in 1989 and 1991, while the highest count was 313 in 2012.

A total of three aerial surveys conducted by NPT staff on the Imnaha River resulted in a total of 38 redds observed (Table 1). Surveys on 23 October, 6 November, and 20 November resulted in 12, 18, and 8 new redds counted, respectively. Surveys were conducted from the mouth up to the town of Imnaha (19 miles). Flow during surveys was 133 cfs (USGS Gauging Station at Imnaha, OR) on the first survey and were not available during the last two surveys, however like the Grande Ronde, flows increased on the last survey. Survey conditions were excellent on the first survey and good on the last two surveys, therefore not many redds were thought to have been missed. Redds were constructed in 17 distinct locations. Since 2009, the mean number of redds observed in the Imnaha River has been 63, ranging from 24 to 132. 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 21 November by NPT staff on the Salmon River resulted in 31 redds observed (Table 1). Only one survey was scheduled this year because of budget constraints. The survey was extended and conducted from the mouth up to the mouth of the S.F. Salmon River (133 miles). One redd was observed just below French Creek and the other 30 redds were observed in the lower river. Salmon River flow was moderate at 5,200 cfs (USGS Gauging Station at Whitebird, ID) during the survey and conditions were good but not excellent, therefore, a few redds were probably missed, especially deep water redds. Since 2009, the mean number of redds occurring in the Salmon River has been 33, ranging between 8 and 60. 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 60 in 2011.

Due to rains and turbid water during the last week of November, a ground survey of lower Alpowa Creek was not conducted this year. This would have been the fourth year NPT staff have looked for redds in Alpowa Creek. A total of 31 redds were observed in the lower Alpowa Creek in 2010, while no redds were see in 2011, and 6 redds observed in 2012.

WDFW staff surveyed 92% of the lower 20 miles of the Tucannon River from 4 October until 27 November when high flows curtailed surveys. Sections with restricted access were estimated using counts from adjacent sections. On average, 78% of the total number of redds are constructed prior to 30 November, based on data from 2011, 2010, 2009, and 2007. In 2013, staff counted 261 fall Chinook redds which expand to 386 after all adjustments were made (Table 1). The first redds were observed on 8 October and the peak of spawning occurred during the week of 5 November. Prior to the high flow events, visibility was excellent due to low flows. Since 2009, the mean number of redds in the Tucannon was 361, ranging from 252 to 541. The lowest redd count for the Tucannon River was 16 redds in 1987 and the highest estimate was 541 redds in 2012.

WDFW staff counted 53 redds in the lower 3.1 miles of Asotin Creek from Cloverland Bridge to the mouth (Table 1). The first survey was walked on 6 November and ceased on 14 November. The peak of spawning occurred during the week of 14 November. This was the highest redd count in Asotin Creek and compares to the second highest count of 30 redds in 2012. Higher redd counts during the last two years in Asotin Creek may be related to ground surveys conducted as compared to previous aerial counts which proved difficult to see redds with its small stream size and extensive canopy cover.

Normandeau Associates, Inc. surveyed areas around the juvenile collection facility below Lower Granite Dam for the U.S. Army Corps of Engineers in 2013. Video results showed a total of 5 redds with fish observed and other mounds without recent substrate disturbance that were not thought to be redds. No surveys were funded to conduct deepwater video redd surveys at other lower Snake River dams during 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. Final report by Normandeau Associates, Inc. will be provided to the U.S. Army Corps of Engineers, Walla Walla District. Past reports on fall Chinook salmon spawning areas downstream of Lower Snake River dams can also be obtained through the Corps Walla Walla District.