

2011 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 the Pacific Northwest National Laboratory (PNNL) during 2011. This was the 24th year that intensive, cooperative aerial surveys have been conducted in the Snake River and most major tributaries above Lower Granite Dam and 20th year for ground surveys in tributaries downstream of Lower Granite Dam. Below the lower four Snake River dams, only the Lower Monumental Dam tailrace region was surveyed in 2011. A total of 5,010 redds were observed in the Snake River Basin (Table 1), representing the second highest count since inception of intensive surveys in 1988. This year's redd count was 620 redds lower than the previous record count set 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 two years in major spawning rivers.

Table 1. Number of fall Chinook salmon redds observed in the Snake River Basin, 2011 (all aerial counts except as noted, N/S = no survey).

Survey Area	Number of Redds
Snake River (aerial and ground)	1,972
Snake River (underwater video)	865
Total Snake River	2,837
Clearwater River	1,574
Potlatch River (aerial and ground)	2
N.F. Clearwater River	3
S.F. Clearwater River	31
M.F. Clearwater River	3
Selway River	8
Total Clearwater River Subbasin	1,621
Grande Ronde River	154
Wallowa River	N/S
Wenaha River	N/S
Total Grande Ronde River Subbasin	154
Innaha River	24
Salmon River	60
South Fork Salmon River	0
Tucannon River (ground)	302
Asotin Creek	2
Alpowa Creek (ground)	0
Below Lower Granite Dam	N/S
Below Little Goose Dam	N/S
Below Lower Monumental Dam	10
Below Ice Harbor Dam	N/S
Grand Total Snake River Basin	5,010

During aerial, ground, and underwater video counts, IPC and USFWS staff observed a total of 2,837 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 24 October, and ending on 5 December. During the survey flight of 21 November, both mechanical (engine “chip light”) and environmental conditions (very strong winds) caused us to end the flight at approximately RM224. On 28 November biologists returned to the air and were able to survey the remaining portion of the river from RM224 to Hells Canyon Dam. The flows from the Hells Canyon Dam were maintained stable at approximately 14,000 cfs from 10 October through 23 November. The stable flow was reduced to 12,000 cfs on 24 November, and remained at that level through 6 December. Biologists assessed the potential of dewatering redds when the stable flow was reduced, and found that none were affected. The aerial surveys attempted to cover the river corridor between Asotin, Washington, and the Hells Canyon Dam (approximately 100 river miles). Visibility during aerial surveys was good to excellent throughout the season. 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 (34 redds observed on 24 October), appeared to peak in early November (925 new redds observed on 7 November), and was determined to be complete by early December (131 new redds observed on 5 December, the final survey). Approximately 49% of redds observed during aerial surveys were constructed by 7 November. During aerial surveys we observed a total of 1,972 redds, constructed at 109 distinct spawning locations. The deepwater searches located an additional 865 redds at 46 sites. For 2011, the total redd count for the Snake River was 2,837. Since 2002, the mean number of redds occurring in the Snake River (including deep water counts) has been 1,763, ranging between 1,025 and 2,944. The lowest redd count for the Snake River, since intensive surveys began, was 46 redds in 1991, while the highest count was 2,944 redds in 2010.

A new technique for counting, and estimating shallow redds was tested during the fall of 2011. Biologists from IPC used a small remote controlled aerial drone (hexacopter), equipped with a video camera, to enumerate redds at index sites. A set of 17 index sites were chosen, and were flown over once per week throughout the spawning season. Previous year’s data from those sites indicate that a relationship can be developed and used to estimate total shallow Snake River redds based on the total number of redds observed at those sites. Flights were able to be conducted, and useable video data was 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 video data clearly shows redds (as well as fish) at each site. A final count, comparison with biologists “eyes in the skies”, and a total estimate of shallow redds, based on the video, data will be forthcoming. However, based on what was observed during the season, the use of the hexacopter for ultimate data collection was a clear success, and it is recommended that this type of technology be adapted for future use, in lieu of helicopter surveys, based on safety and cost. For a short video showing the hexacopter in use, follow this link: http://videos.oregonlive.com/oregonian/2011/12/snake_river_salmon_survey_empl.html.

One aerial survey on Asotin Creek was conducted from the mouth up to about RM8 by IPC and USFWS staff. Two redds were observed at RM3.8 on 21 November, however redds in Asotin Creek are difficult to see because of its small size and dense canopy cover. Conducting redd surveys from the ground would provide a more accurate count than aerial surveys in Asotin Creek.

During aerial and ground surveys, NPT staff observed a total of 1,621 redds in the Clearwater River Subbasin (Table 1). Redd searches covered the entire Clearwater River from Potlatch Mill in Lewiston, Idaho to the forks of the South Fork and Middle Fork Clearwater rivers (approximately 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). There were 533 redds observed during the first aerial survey on 17 October in the lower Clearwater, 427 new redds observed on 31 October, 434 new redds on 21 November, and 163 new redds observed on 28 November. Three aerial surveys conducted in the upper mainstem Clearwater Subbasin (Orofino Creek upstream to Middle Fork Clearwater) on 19 October, 2 November, and 28 November resulted in 6, 2, and 9 new redds, respectively. The North Fork Clearwater was surveyed the same dates as the lower Clearwater with 2 redds observed on 31 October and one new redd observed on 28 November. Spawning was near completion by 28 November on the Clearwater with few live fish observed. Survey conditions were only fair on the first and second lower Clearwater survey because of higher than normal winds on the first survey and low light conditions on the second survey. Survey conditions were good on the last lower Clearwater survey with some deep water areas not clearly visible for counting redds, so a few redds were likely missed. Good to excellent conditions prevailed on all surveys upstream of the N.F. Clearwater confluence in the Clearwater, M.F. Clearwater, S.F. Clearwater and Selway rivers. During the spawning period, discharges from Dworshak Reservoir remained stable at 1,500-1,600 cfs during surveys. Flows on the lower Clearwater (USGS Gauging Station at Spalding, ID) remained relatively low during surveys and dropped to 3,740 cfs on last survey after the peak survey flow of 5,020 cfs on 2 November. Potlatch River was surveyed on the same dates as the lower Clearwater from the mouth upstream about 5 miles with two redds observed on the second survey and none on the first and last surveys. A ground survey was conducted on 9 December to verify the possibility of missed redds during aerial surveys, but no additional redds or fall Chinook carcasses were seen. Three surveys were conducted on the S.F. Clearwater, M.F. Clearwater and Selway rivers on 19 October, 2 and 28 November. A count of 12, 16, and 3 redds were observed on those dates, respectively, in the S.F. Clearwater for a total of 31 redds. A total of 3 redds were observed in the M.F. Clearwater River and a total of 8 redds observed in the Selway River. This is the highest redd count in all three upper Clearwater tributaries since we began surveys in the S.F. Clearwater during 1992 and in the M.F. Clearwater and Selway during 1994. Every year, we continue to observe redds in new spawning locations throughout the Clearwater River Subbasin and this year was no exception. Since 2002, the mean number of redds occurring in the Clearwater River Subbasin has been 916, ranging between 487 and 1,924 (average includes a redd estimate of 514 redds in 2006, because of turbid conditions and missed surveys after peak spawning). The lowest redd count for the Clearwater River Subbasin, since intensive surveys began was four redds in both 1990 and 1991, while the highest count was 1,924 redds in 2010.

A total of three aerial surveys conducted by NPT staff on the Grande Ronde River resulted in a total of 154 redds observed (Table 1). Surveys on 18 October, 9 November, and 29 November resulted in 13, 109, and 32 new redds counted, respectively. Redd surveys covered the mouth up to the Wildcat Bridge past the town of Troy (53 miles). The extended area of the Grande Ronde from Wildcat Bridge up to the Wallowa River (29 miles), lower Wallowa River (10 miles), and lower Wenaha River (11 miles) was not surveyed this year due to poor weather conditions on the scheduled survey. Redds were seen in 41 distinct spawning locations. Survey conditions were good to excellent on the first two surveys and fair during the last survey, therefore a few deep water redds may have been missed. Flows fluctuated only slightly between 790 and 939 cfs.

Since 2002, the mean number of redds occurring in the Grande Ronde River Subbasin has been 133, ranging from 42 to 263. The lowest redd count for the Grande Ronde River, since intensive surveys began, was zero in 1989 and 1991, while the highest count was 263 in 2010.

A total of two aerial surveys conducted by NPT staff on the Imnaha River resulted in a total of 24 redds observed (Table 1). Surveys on 18 October and 22 November resulted in 11 and 13 new redds counted, respectively. A scheduled survey on 9 November was not conducted because of helicopter mechanical problems after surveying the Grande Ronde that day. Surveys were conducted from the mouth up to the town of Imnaha (19 miles). Flows during surveys were stable from 176 to 182 cfs. Survey conditions were excellent on the first survey and only fair on the last survey, so a few redds may have been missed. Since 2002, the mean number of redds occurring in the Imnaha River has been 50, ranging from 17 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.

Two aerial surveys conducted by NPT staff on the Salmon River resulted in a total of 60 redds observed (Table 1). A survey on 2 November resulted in 38 redds counted with another 22 new redds counted on 29 November. Surveys were conducted from the mouth up to French Creek (105 miles). An additional survey was conducted on the Salmon River from French Creek up to the S.F. Salmon River (Rm 134) and on the S.F. Salmon from the mouth up to the Reed Ranch (Rm 49). No additional redds were observed in this extended area search. Salmon River flows were moderate during surveys beginning at 5,440 cfs on the first survey and declining to 4,680 cfs on the last survey. Survey conditions were excellent on both surveys resulting in deeper spawning habitat being visible for counting redds. Since 2002, the mean number of redds occurring in the Salmon River has been 24, 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.

The lower 200 m (mouth to Hwy 12 Bridge) of Alpowa Creek was surveyed from the ground on 3 November and 5 January by NPT staff but neither fall Chinook nor redds were observed. This is in contrast to 2010 when a total of 31 redds and numerous fall Chinook carcasses were observed in Alpowa Creek. Similar to Potlatch River, it may be that lower flow conditions than what prevailed in Alpowa Creek during 2010 prevented or discouraged fish from entering or spawning in 2011. This is only the second year that Alpowa Creek has been surveyed for fall Chinook in the recent decade.

WDFW staff surveyed 83% of the lower 4 miles of the Tucannon on 16 September to identify spring/summer Chinook redds and ensure they would be differentiated from fall Chinook redds in October. Fall Chinook surveys began 20 October and continued through 20 December. Staff surveyed 92% of the lower 21 miles of the Tucannon River and counted 311 redds (fall Chinook and coho) which expands to 341 when adjusted for estimated redds built in sections not surveyed. The estimated number of fall Chinook redds was determined by applying the proportion of fall Chinook carcasses recovered to the estimated total number of redds constructed. We estimate 302 total redds were dug by fall Chinook in 2011. The first redds were observed on 20 October, and we estimate peak spawning occurred during the week of 27 November. Flows were low to moderate with good to excellent visibility during surveys. Since 2002, the mean number of redds in the Tucannon has been 194, ranging from 66 to 324. The lowest redd count for the Tucannon River was 16 and occurred in 1987, the first year intensive surveys began, while the highest estimate was in 2010.

The Lower Monumental Dam tailrace was surveyed by the Pacific Northwest National Laboratory. Two intensive surveys were conducted on 15 November and 5-6 December, 2011. Both surveys were conducted using a boat deployed weighted platform with attached video camera, lasers and water velocity meter. Boat transects were run at 25-50 m spacing perpendicular to the river flow. Water clarity was good with turbidity readings of 2-3 NTU's. A total of 10 redds were found ~ 870 – 1450 ft downstream of the powerhouse in water depths of 11-23 ft. Live adult fish were observed near three of the redds. No surveys were funded to conduct deepwater video surveys at Lower Granite, Little Goose or Ice Harbor dams during 2011.

Final results will be provided in annual reports to Bonneville Power Administration. Past reports can be found at www.bpa.gov.