2013-14 Lower Columbia Fall Chinook Survey Summary

This report provides a brief summary of results from fall Chinook spawning ground surveys conducted in the Lower Columbia ESU in 2013-14. Site selection and survey methods mirrored those used for coho spawning ground surveys in the Lower Columbia. No fall Chinook surveys were conducted for the Upper Gorge population because points were pulled at the Lower Columbia Coho population complex scale. The Upper Gorge is included within the Hood River Coho population for this summary. Plympton Creek is within the Clatskanie population, but is reported separately here because the high density and hatchery influence present at this site is uncharacteristic of the population area as a whole.

Survey Effort

- Approximately 79 sites had at least one survey conducted in 2013. Currently, 77 sites are scheduled for the 2014 Chinook survey season in the Lower Columbia.
- 38 of the attempted 79 sites were successfully surveyed (48%), see Table 1.
- The majority of non-response sites either had an insufficient number of survey visits conducted (need ≥ 4 visits), or incurred gaps between survey visits of more than thirteen days. Poor survey conditions such as turbidity and/or high flows are the most common contributors to these site outcomes. The remaining non-response sites are inaccessible due to landowner denial (2 sites), remote and unreachable locations (1 site), or had dangerous floating conditions (2 sites).
- All sites surveyed are believed to be within Fall Chinook spawning habitat.

Table 1. Lower Columbia Fall Chinook ESU, GRTS spawning survey goals and results for number of valid surveys, 2013 run year. Target Response sites are within spawning habitat and were successfully surveyed in terms of survey qualification protocol. Successful surveys were defined as having no gaps between valid survey dates of 13 or more days, and no more than one gap of 9 to 12 days during the period when 90% of the live Chinook were observed for the stratum.

Stratum	Population	Goal	Target Response 2013
Coast	Youngs Bay	6	3
	Big Creek	4	5
	Clatskanie *	5	2 (3)
	Scappoose	4	2
	Total	**19**	**13**
Cascade	Clackamas	11	10
	Sandy	25	12
	Total	**36**	**22**
Gorge	Lower Gorge	2	2
	Hood	2	1
	Total	**4**	**3**
ESU Total		**59**	**38**

* The Clatskanie total includes one site from the Plympton Creek sub-population.

Distribution and Timing

- Live adult Chinook were observed in 66% of the surveys completed, which is down in comparison to last year's survey results.
- No Chinook live adults (or carcasses) were observed in the surveys attempted for the Scappoose population. This is consistent with survey outcomes for this area in 2009-2012.
- The number of live adults observed in each population varied considerably, ranging between 0 in the Lower Gorge and Scappoose populations to 4,079 in the Youngs Bay population. Out of the five surveys in the Clatskanie population, Plympton Creek contributed all but 2 of the 3,204 fish observed.
- More than 71% of surveys completed for both the Clackamas and Sandy populations were located on main stem environments (i.e., Sandy R, Clackamas R, Bull Run R, Salmon R, or Zig Zag R). The number of live adults observed in the Clackamas and Sandy populations is likely an underestimate due to the difficulties of surveying main stem sites (i.e. covering the entire width of river and lack of visibility in deep holes).
- Median adult peak count (live and dead) date ranged from 9/15/13 to 11/25/13 (Table 2).

Table 2. Total number of Chinook observed and peak information by Lower Columbia population, 2013. Peak date calculations represent data from all surveys attempted and do not screen for surveys deemed unsuccessful by AUC criteria. All other data shown in this table are from successful surveys.

Population	No. of Survey Segments	No. Surveys w/ Live Adults	Total Live Adults Observed	Median Adult Peak Date	Avg. Peak/mile
Youngs Bay	3	3	4079	10/20/2013	149
Big Creek[1]	5	4	696	9/20/2013	66
Clatskanie[2]	2	1	2	9/15/2013	2
Plympton Cr	1	1	3202	9/18/2013	874
Scappoose	2	0	0	-	-
Clackamas	10	8	145	10/22/2013	8
Sandy	12	7	2968	10/16/2013	15
Lower Gorge	2	0	0	11/25/2013	2
Hood[3]	1	1	86	10/8/2013	42

1 = The avg. peak/mile for Big Creek population without the surveys directly below the Big Cr. hatchery is 12.
2 = Plympton Creek is within the Clatskanie Population, but the very high hatchery influence at this site is not found in any other streams in this area. As a result estimates and other reported statistics are shown separately.
3 = The Hood population complex is a combination of both Upper Gorge and Hood population surveys.

H:W Information

- The percentage of unmarked carcasses recovered on the spawning grounds varied from 6% to 100%, with most population areas appearing to have a high hatchery influence (Figure 1).
- At least some of the 21 marked carcasses recovered for the Sandy population are likely Spring Chinook, not Fall Chinook. During the 2013 season, a marked carcass was recovered containing a coded wire tag that was later identified as a Spring Chinook originating from the Sandy Hatchery. There are also no Fall Chinook hatchery programs being implemented in the Sandy population.

Unmarked fish in the Plympton Creek had an occurrence rate of CWT's of 25%, indicating that a relatively high percentage of unmarked fish in this area are of hatchery origin. (Table 3).

Figure 1. The ratio of unmarked to marked Chinook carcasses observed on the spawning ground by Lower Columbia population. The total number of carcasses recovered is also displayed by population.

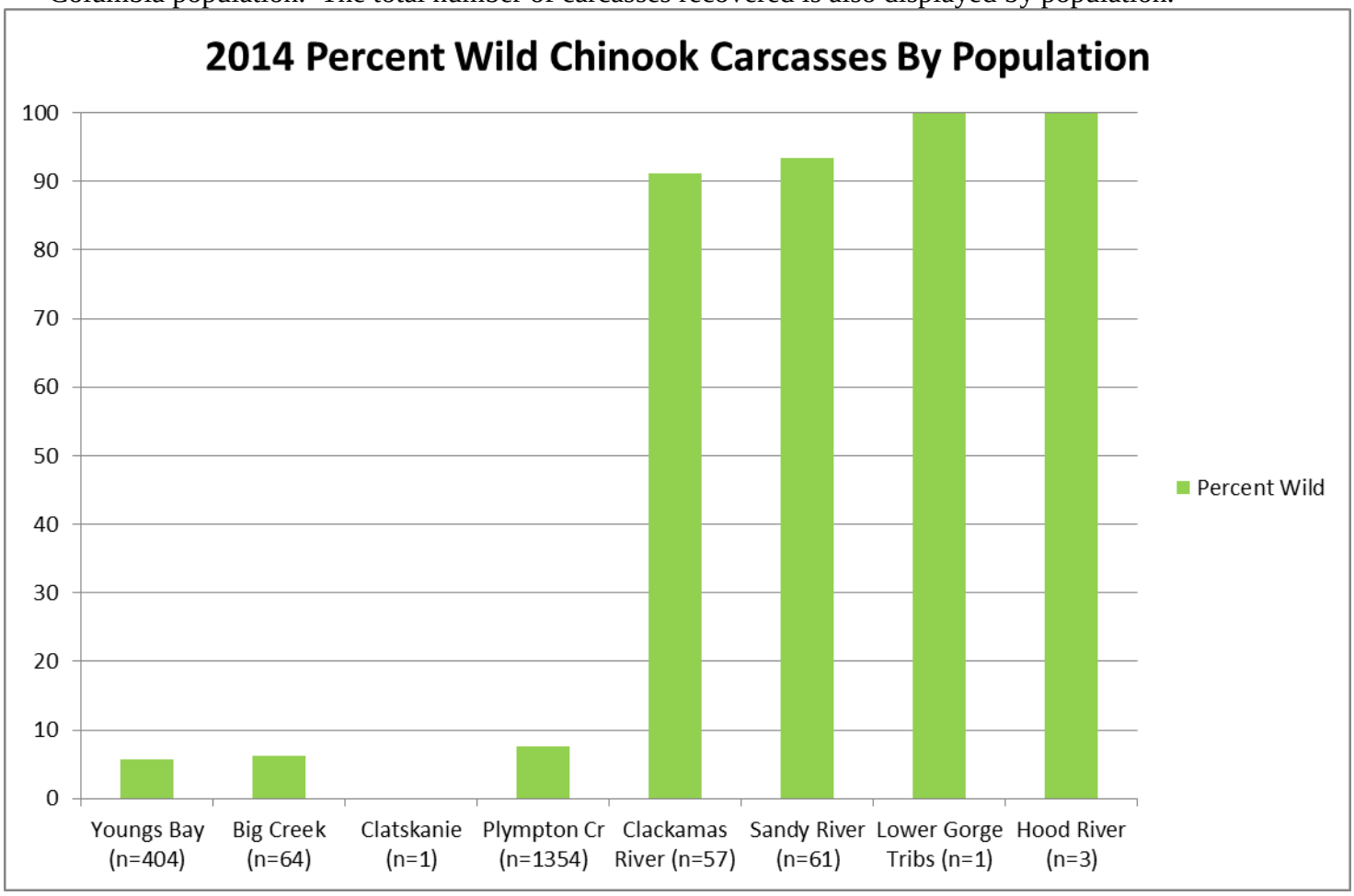

Table 3. The percentage of marked and unmarked carcasses from each population in the Lower Columbia that contained a coded wire tag (CWT) during 2013. Electronic detection (snout wands) were used on all carcasses to identify the presence of a CWT.

Population	% unmarked fish with CWT tags	% marked fish with CWT tags
Youngs Bay	0	1
Big Creek	0	0
Clatskanie River	0	0
Plympton Creek	25	5
Scappoose River [1]	N/A	N/A
Clackamas River	0	0
Sandy River	0	5
Lower Gorge Tributaries [1]	0	N/A
Hood River	0	0

1=There were no carcasses collected in the Scappoose population as well as there were no marked carcasses in the Lower Gorge population.

Abundance Estimates

Table 4: Preliminary and final results of randomly selected spawning ground surveys for Chinook salmon in the Oregon portion of the LCR ESU, run year 2013. Estimates derived using GRTS protocol. Preliminary estimates include all sites which were surveyed ≥ 4 times during the survey season regardless of gaps in survey effort. Final estimates are based on sites that passed qualifying criteria; qualifying surveys were defined as having no gaps between valid survey dates of 13 or more days, and no more than one gap of 9 to 12 days during the period when 90% of the live Chinook were observed for the stratum. Estimates of wild spawners derived through application of fin-mark observations. Missing values for populations indicate inadequate samples for determining total and/or wild abundance.

ESU, Stratum, and TRT Population	Survey Effort Number of		Adult Chinook Spawner Abundance			
			Total		Wild	
	Surveys	Miles	Estimate	95% CI	Estimate	95% CI
2013 Preliminary						
Lower Columbia ESU	**76**	**91**	**18346**	**6555**	**6373**	**3720**
Coast Stratum	**28**	**27**	**12233**	**5318**	**472**	**256**
Youngs Bay	11	12	9269	5186	457	256
Big Creek	5	5	946	1175	0	0
Clatskanie River	5	4	15	14	-	-
Plympton Cr	2	2	2004	0	14	0
Scappoose River	5	5	0	0	-	-
Cascade Stratum	**45**	**62**	**6113**	**3832**	**5901**	**3711**
Clackamas River	11	16	455	240	421	222
Sandy River	34	46	5658	3825	5480	3705
Gorge Stratum	**3**	**2**	**0**	**0**	-	-
Lower Gorge	2	1	0	0	-	-
Hood River	1	1.3	-	-	-	-
2013 Final						
Lower Columbia ESU	**47**	**58**	**14440**	**8554**	**3302**	**1907**
Coast Stratum	**15**	**16**	**11442**	**8333**	**423**	**398**
Youngs Bay	4*	6	8485	8250	409	398
Big Creek	5	5	946	1175	0	0
Clatskanie River	2	2	8	15	-	-
Plympton Cr	2*	2	2004	0	14	0
Scappoose River	2	1	0	0	-	-
Cascade Stratum	**29**	**40**	**2998**	**1932**	**2879**	**1865**
Clackamas River	12*	17	422	222	390	205
Sandy River	17*	22	2576	1919	2489	1854
Gorge Stratum	**3**	**2**	**0**	**0**	-	-
Lower Gorge	2	1	0	0	-	-
Hood River	1	1	-	-	-	-

* Survey totals represent the number of random points drawn and not necessarily the number of individual surveys in each population. As a result, there may be more than one random point per actual survey segment.

Future Monitoring Concerns

- **Fall vs Spring Chinook:** One of the apparent issues that arose while analyzing the live count and carcass data in the Sandy and Clackamas populations was how to separate Fall from Spring Chinook. Our original hope was that we could separate fish both temporally and spatially. Considerable variability seemed to exist between when Chinook arrived and where they spawned. We were also unable to differentiate Fall versus Spring Chinook carcass recoveries based on morphological characteristics. We are collecting fin-samples (for DNA analysis) in the Sandy basin in coordination with the Willamette Spring Chinook project. However, no money is currently dedicated for analysis of these samples.

- **Survey effort:** Hatchery influenced sites such as Plympton Cr. and Big Cr. require nearly full-time attention by multiple crews to maintain sampling schedules, due to the high volume of carcass recoveries. These surveys draw crews away from other sites, and dilute the ability to detect spawning activity in the other surveys around the area. Additional effort was provided by crews not funded under this project for the 2013-14 spawning year, but increased returns of hatchery strays in the Young's Bay population continue to stretch available effort.

- **Hatchery influenced sites:** Despite a lack of an adjacent hatchery release site, Plympton Creek in the Clatskanie River population draws large numbers of hatchery fish. No other stream in this area exhibits this density of fish, and as a result this single survey causes estimates for the Clatskanie population to be positively biased. Future estimates will be made more accurate by conducting separate estimates for Plympton Creek and the rest of the Clatskanie population.

- **Main stem float surveys:** We continue to have trouble keeping main stem float surveys on the Sandy River Population in rotation. Multiple survey gaps exist for those surveys due to high flows and visibility issues. It is our opinion that these survey methods are not well suited to this environment, and alternate methods may be required to reach monitoring goals within the Sandy Basin. The Hood River Basin provides even greater challenges, as it combines inaccessible areas with similar survey conditions.

- **Spawning residence time:** A brief review of the fall Chinook/Tule literature suggests that spawning residence time ranges from 5 – 8 days (Rawding et al. 2006 and Parken et al. 2003). Our crews surveyed under the Coho criteria of conducting a survey at least every 10 days. Anecdotal evidence of spawn timing on Plympton Creek suggest that residence times are likely higher than those specified by Rawding, but these patterns remain untested.

Literature Cited

Rawding**,** D., T. Hillson, B. Glaser, K. Jenkins, and S. VanderPloeg. 2006. Abundance and spawning distribution of Chinook salmon in Mill, Abernathy, and Germany Creeks during 2005. Washington Department of Fish and Wildlife. Vancouver, WA.

Parken, C.K., R.E. Bailey, and J.R. Irvine. 2003. Incorporating uncertainty into area under the curve and peak count salmon escapement estimation. North American Journal of Fisheries Management 23: 78–90.