UPPER WILLAMETTE RIVER SPRING CHINOOK SALMON ABUNDANCE, DISTRIBUTION AND SURVIVAL

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We surveyed major eastside tributaries of the upper Willamette River in 2014 to count Chinook salmon redds and collect carcasses in river reaches above and below USACE project dams. The goal of this project was to characterize spawning by Chinook salmon, considering the influences of hatchery and dam operations for reaches below projects and upstream fish passage for reaches above projects. Ultimately the intent is to inform hatchery management, fish passage, and effectiveness monitoring decisions. Our objectives were to conduct monitoring necessary to address viable salmonid population criteria (VSP: Crawford and Rumsey 2011), especially fish abundance, distribution and diversity, and to support other ongoing research and monitoring efforts in the watershed. Spawner abundance estimates in individual reaches were derived using the peak redd count expansion method. Carcass data including location, sex, size, spawning success, natural- vs. hatchery-origin, and presence of other marks or tags were recorded. Biological samples including scales, otoliths and DNA were obtained from carcasses to allow estimates of age structure of natural- and hatchery-origin fish, validate identification of natural-origin fish, and continue development of a specimen archive in support of ongoing and future research. Analysis of the 2014 scale, otolith and DNA samples is ongoing.

Spawning ground surveys and carcass sampling efforts were successful in 2014. Redd counts and, by extension, spawner abundance estimates were generally similar to those observed in recent years in all subbasins below project dams (Table 1). Above project Dams, recent changes in outplanting procedures in the North Santiam subbasin were successful in increasing spawner distribution. In the South Santiam subbasin fewer than expected natural-origin fish were outplanted above Foster Dam. Fewer than desired natural-origin fish returned to Cougar Dam on the South Fork McKenzie River and the population above Cougar Dam was supplemented with hatchery fish. Estimates of prespawning mortality (PSM) were generally low to moderate in important spawning reaches above and below project dams except in the Middle Fork Willamette where PSM rates below Dexter Dam, in Fall Creek and in the Middle Fork above Hills Creek Dam were high.

Table 1. Draft preliminary data from spring Chinook salmon spawning ground surveys in the upper Willamette subbasins in 2014. “CL” and “UNCL” refer to counts of adipose-clipped and non-adipose-clipped carcasses. The results of otolith analyses in 2013 (2013 OTO Mark) were used because data from 2014 are not yet available. The estimated proportion of hatchery origin spawners (pHOS) was derived by adjusting the counts of clipped and unclipped carcasses using the proxy otolith data. Spawner abundance of natural-origin spawners (NOS) and hatchery origin spawners (HOS) was obtained by parsing the expanded peak redd count (peak redd * 2.5 $\simeq$ number of spawners) using the estimate of pHOS. “PSM” indicates pre-spawning mortality and was obtained by examining female carcasses with “SP” indicating the number of female

carcasses with less than 50% of the eggs remaining and “UNSP” indicating the number of female carcasses with more than 50% of the eggs remaining.

ITM Reach	Peak Redd Count	Carcasses		2013 OTO Mark	Estimated H & W Carcasses			Estimated Spawner Abundance		PSM		
		CL	UNCL	%	H	W	pHOS	NOS	HOS	SP	UNSP	%
Below Minto	404	136	87	8.2%	143	80	64%	362	648	87	38	30%
Minto - Big Cliff	80	0	11	8.2%	1	10	8%	184	16	6	1	14%
Breitenbush	79	68	0	8.2%	68	0	100%	0	198	31	1	3%
NSNT Above Detroit	119	141	1	8.2%	141	1	99%	2	296	46	5	10%
Below Foster	551	106	150	7.6%	117	139	46%	746	632	127	34	21%
SSNT Above Foster	62	0	63	7.6%	5	58	8%	143	12	20	9	31%
Below Leaburg	187	144	33	19.0%	150	27	85%	71	397	69	26	27%
Leaburg - Cougar	297	38	66	5.2%	41	63	40%	447	296	58	1	2%
Abv SFM	237	5	23	5.2%	6	22	22%	461	131	13	0	0%
SFM Abv Cougar	248	32	4	5.2%	32	4	89%	65	555	20	0	0%
Below Dexter	25	56	51	14.2%	63	44	59%	26	37	7	41	85%
Fall Cr	24	3	29	0.0%	3	29	9%	54	6	5	12	71%
NFMF	140	80	1	14.2%	80	1	99%	4	346	84	10	11%
Above Hills Cr	83	105	4	14.2%	106	3	97%	7	201	5	56	92%