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MEMORANDUM

August 11, 2015

To: Interested parties

From: Hayley Potter

RE: **Snorkel survey results for adult spring Chinook Salmon and Bull Trout in Icicle Creek, 2016**

The Mid-Columbia River Fisheries Resource Office has conducted an annual summer snorkel survey in Icicle Creek since 2003, with the primary objective of enumerating adult spring Chinook Salmon and Bull Trout. The current survey paradigm has been in place since 2006 (Table 1) based on stage height and flows of Icicle Creek to maximize survey potential. The surveyed area begins at the Boulders Falls on Icicle Creek (~RM 5.6) and continues downstream to the Icicle Creek/Wenatchee River confluence (Figure 1).

In 2016, the snorkel survey was conducted on August 10. The weather was sunny with the water visibility at an estimated 3.5m and “fair” for all sections of the river with the exception of turbulence/bubbles that obscured viewing in some small areas (ie. Hatchery ladder, headgate, boulder pockets). The flow at the Department of Ecology gage, located at the Icicle Bridge on East Leavenworth Road, was 179 cubic feet/second (cfs, Table 1), which is below average for this time of year. All Bull Trout lengths indicated were visually estimated to the nearest odd centimeter. For consistency all lengths are expressed in millimeters.

Table 1. Annual Icicle Creek snorkel dates and associated discharge.

Year	Date	Discharge (cfs)
2006	3-Aug	NA
2007	31-Jul	176
2008	6-Aug	195
2009	5-Aug	150
2010	12-Aug	300
2011	10-Aug	530
2012	9-Aug	366
2013	16-Aug	160
2014	31-Jul	300
2015	29-Jul	103
2016	10-Aug	179

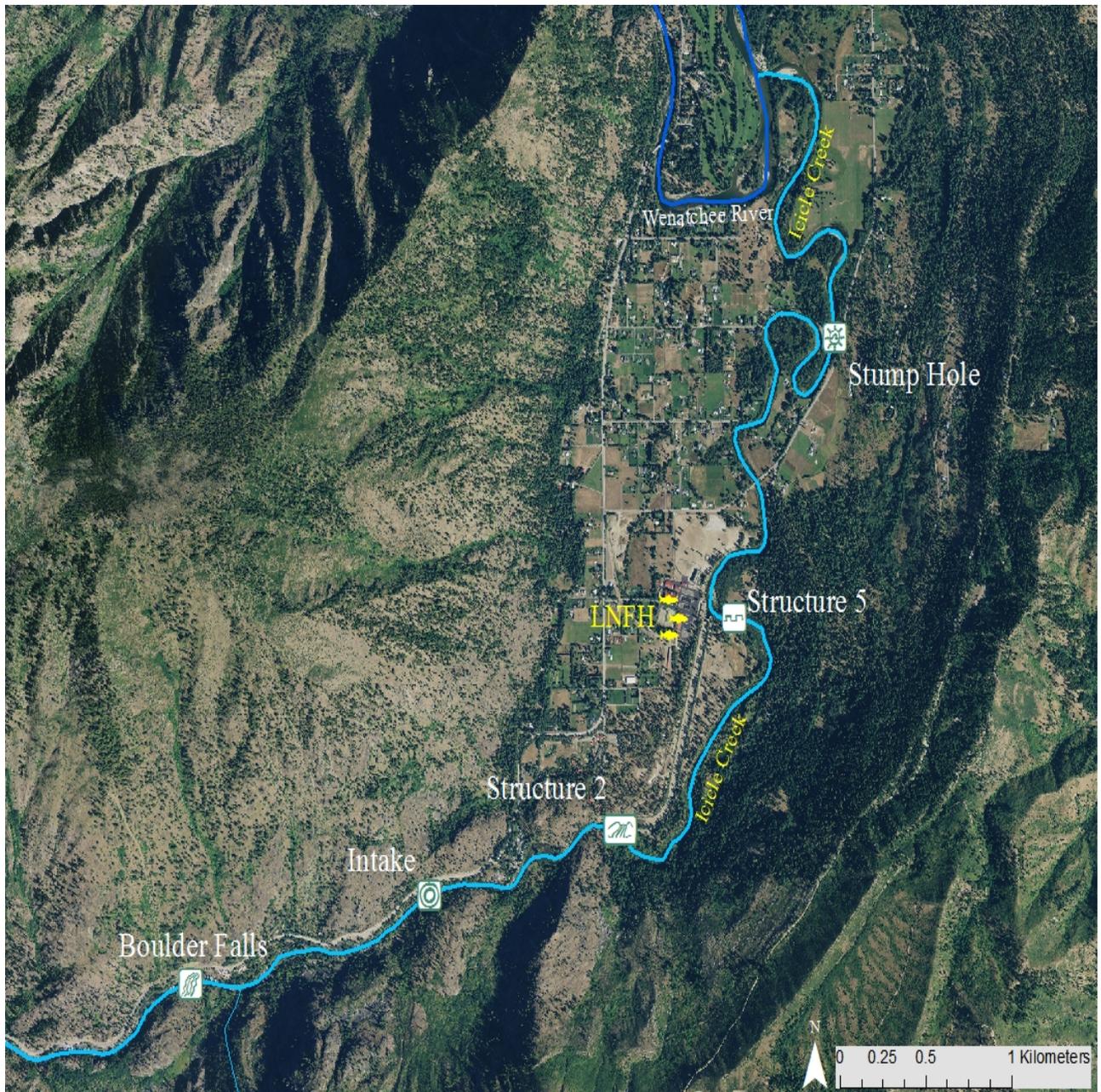


Figure 1. Surveyed segment of Icicle Creek identifying snorkel reach breaks and LNFH.

Table 2. Icicle Creek snorkel counts for spring Chinook Salmon and Bull Trout in 2016

Reach	Adult Chinook	Bull Trout	Bull Trout Size Range (mm)	# Viewers
Boulder Falls – LNFH Intake	9	8	(170-470)	3
LNFH Intake –S2	5	4	(270-330)	3
S2-S5 (Historic Channel)	11	3	(350-610)	3
LNFH Spillway Pool	0	1	(300)	3
S5 – Stump Hole	1	16	(170-310)	3
Stump Hole – Icicle Mouth	0	0		2
Totals				
	26	32	(170-610)	
2006-2015 Ave	184	57		
2006-2015 Min	48	10		
2006-2015 Max	357	157		

The survey was broken into six reaches (Figure 1) and was conducted in a downstream manner with snorkelers evenly spaced across the stream. The number of adult spring Chinook Salmon and Bull Trout observed (live and carcasses are combined) and the number of snorkelers utilized per reach are in Table 2. The surveyors enumerated a total of 26 adult spring Chinook Salmon and 32 Bull Trout in Icicle Creek (Figure 2). Of these, 9 adult spring Chinook Salmon and 8 Bull Trout were observed above Leavenworth National Fish Hatchery (LNFH) surface water intake (Figure 3).

Of the 32 Bull Trout observed, 94% were 450mm or less indicating they were juvenile/sub-adult fluvial Bull Trout (M. Nelson pers. comm.). This is similar to previous years, when >80% of observed Bull Trout were classified as juvenile/sub-adult fluvial fish.

The fish ladder at LNFH was opened on May 6<sup>th</sup>. The fish ladder was opened and closed intermittently to capture portions of the run, minimize strays, and to maximize catch opportunity by sport and tribal harvest fisheries (Figure 4). During this time, an estimated 3,200 adult spring Chinook Salmon ascended the fish ladder and entered the adult holding pond (Figure 5). The fish ladder was closed for the season on July 12<sup>th</sup>.

Although enumeration of spring Chinook Salmon and Bull Trout was the primary objective, some additional observations were noted. Rainbow Trout were abundant in most upstream reaches (Boulder Falls- LNFH Headgate (S2)). Mountain Whitefish were observed in all six reaches with ten Mountain Whitefish encountered above the LNFH surface water intake. Four Brook Trout were enumerated below the confluence with Snow Creek. One summer Chinook Salmon was encountered throughout the surveyed reaches in Icicle Creek.

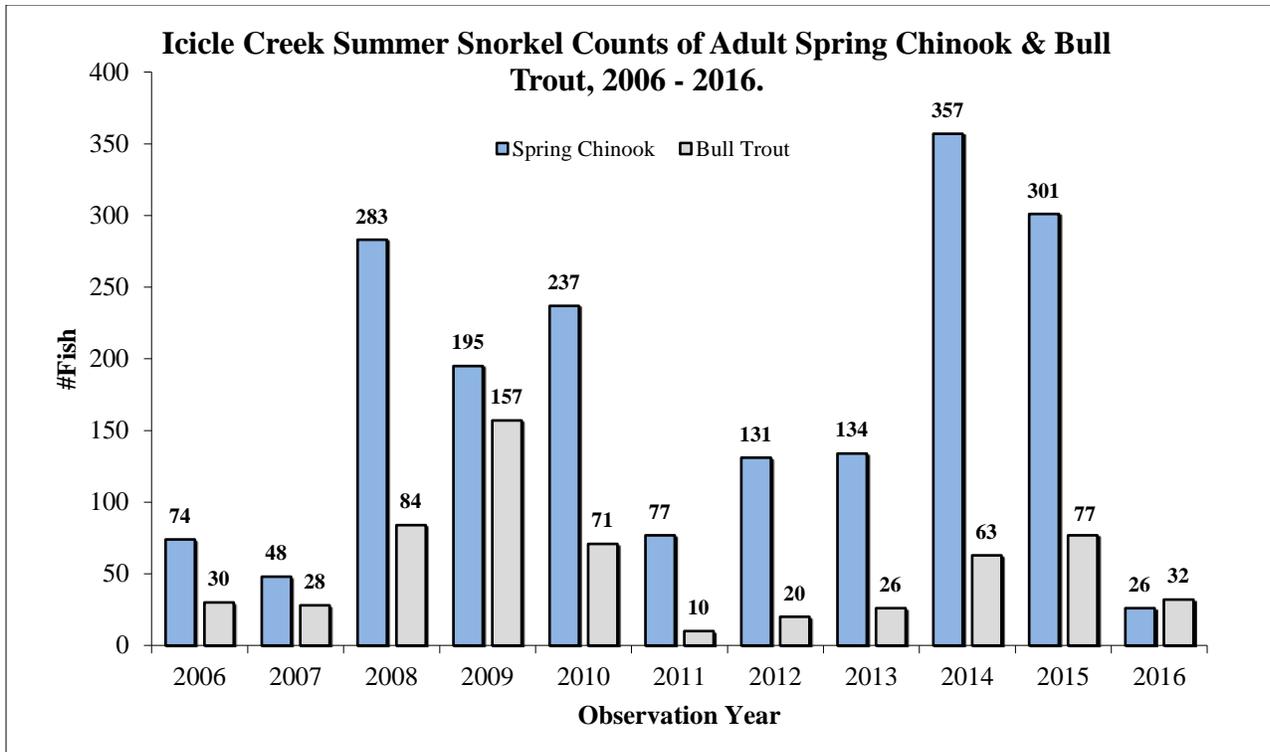


Figure 2. Icicle Creek snorkel survey counts by year.

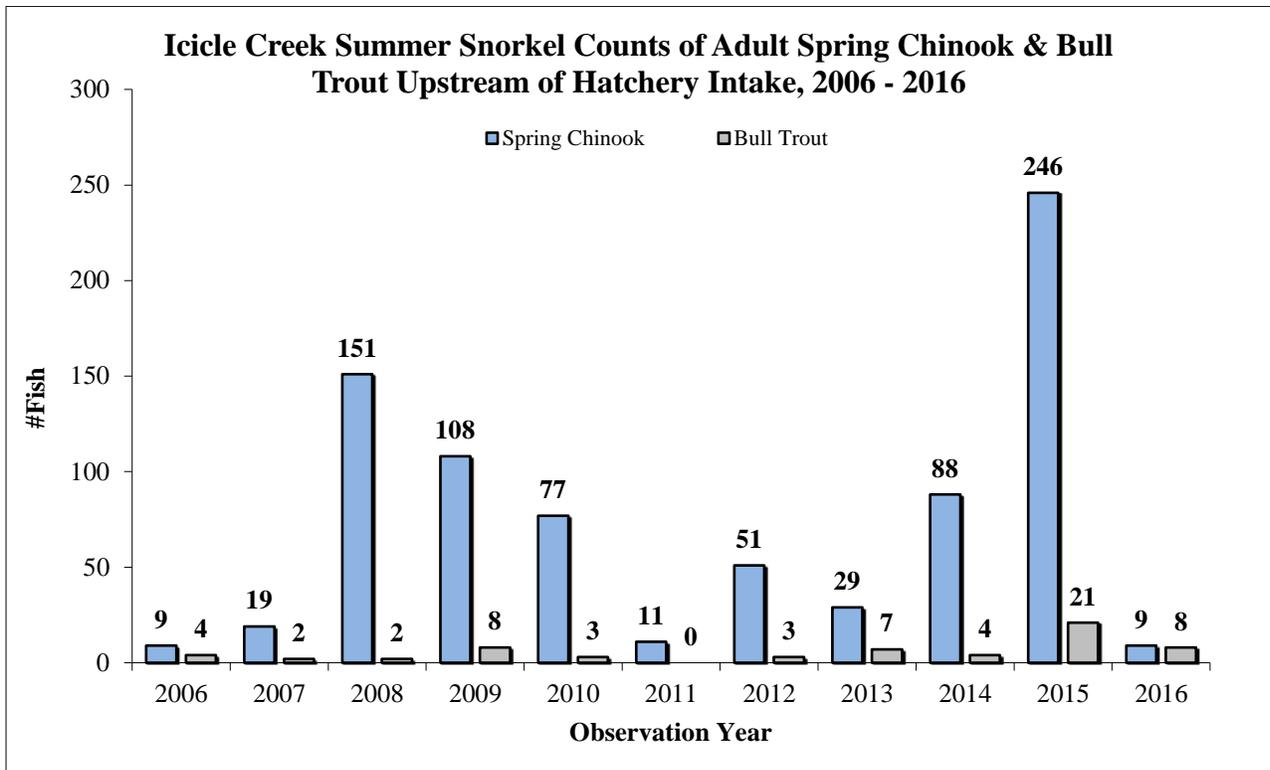


Figure 3. Icicle Creek snorkel survey counts above the Hatchery Intake, by year.

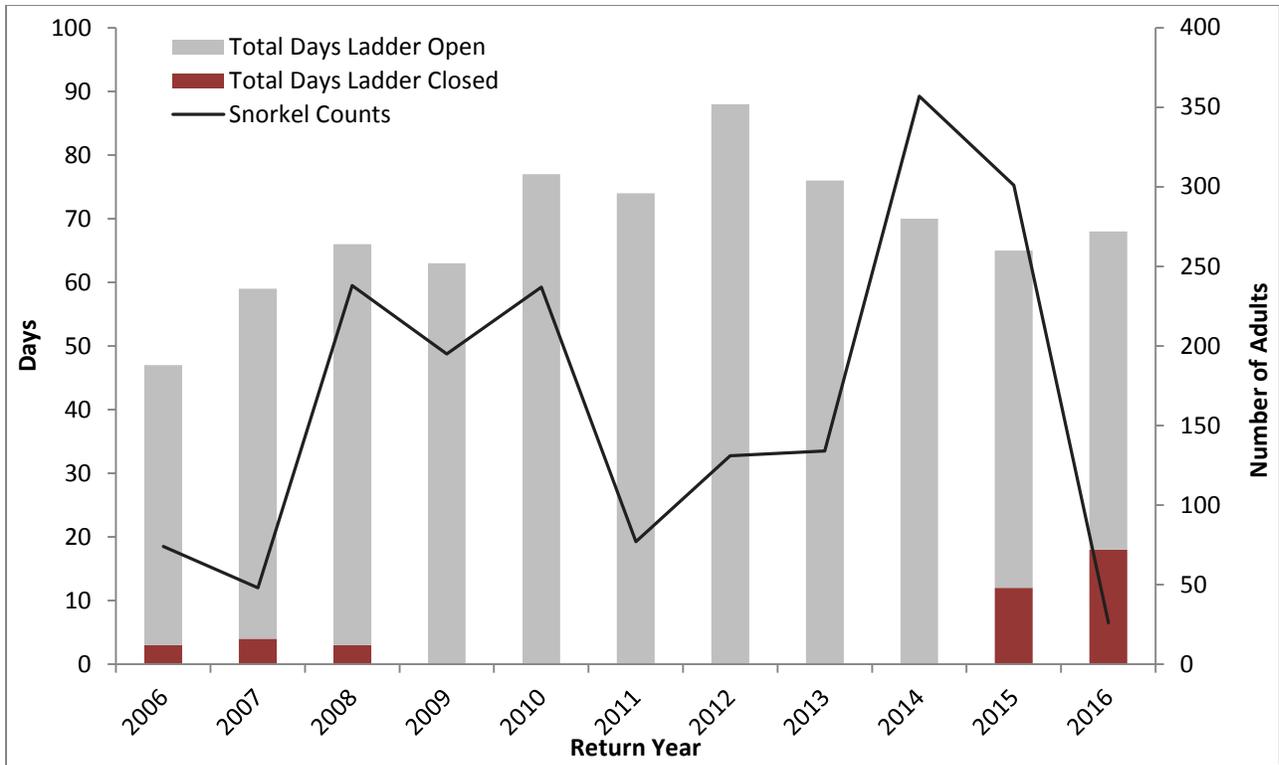


Figure 4. Spring Chinook Salmon snorkel counts and LNFH ladder operations.

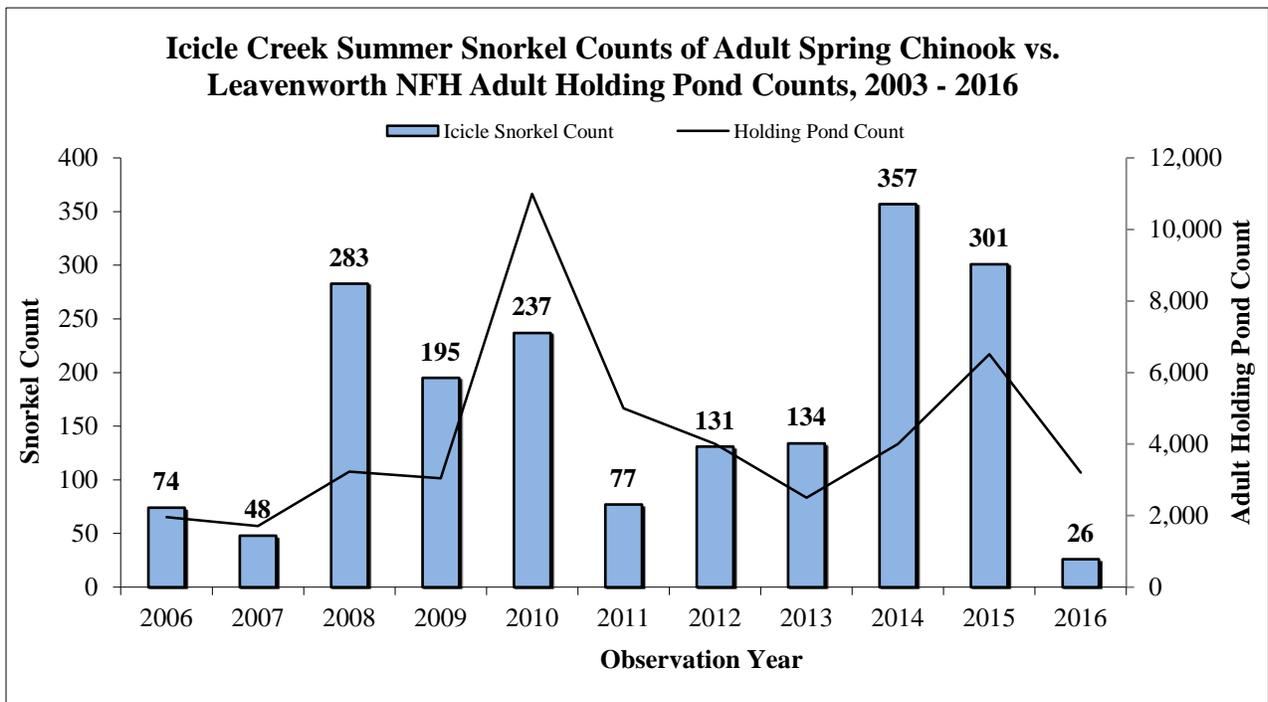


Figure 5. Icicle Creek snorkel counts vs. LNFH adult holding pond counts, by year.