

# Memorandum

To: Colin Purdy  
Environmental Program Manager

Date: August 21, 2019

From: Clint Garman –Environmental Scientist  
**Department of Fish and Wildlife – North Central Region - Chico**

Subject: **2019** Butte Creek Spring-run Chinook Salmon Snorkel Escapement Survey

The annual Butte Creek spring-run Chinook salmon (*Oncorhynchus tshawytscha*) (SRCS) spawning escapement survey was conducted July 23 - 26, 2019. A standard swimming snorkel methodology was used and covered Centerville Head Dam (CHD) to Parrott-Phelan Diversion Dam (PPDD) (Figure 1). The four reaches from Quartz Bowl Pool to the PPDD were surveyed on four consecutive days. The CHD to Quartz Bowl Pool reach was conducted on August 9, 2019.

Since 2001, survey data collection and analysis has been standardized. Prior to the 2001 survey, each crew member developed an independent estimate for each holding pool, and before proceeding, a single group consensus estimate was agreed upon and recorded in the field. The survey protocol, established in 2001 and currently in use, requires each pool to be observed only once by each crew member, with each of the individual estimates recorded separately for each pool. The total for each pool is subsequently calculated as the average of the individual estimates. The total annual escapement estimate is then calculated by summing the averages for each pool. As with past surveys, some pools were observed from above the pool where pool size and depth made in-water observations questionable. In some cases, individual observations were recorded but not used in the average where an individual felt the observation was materially in question. **The estimate for the 2019 adult escapement is 6253 salmon.** Below is the range and average number of adult spring-run Chinook salmon observed in each reach:

Date	Reach	Range	Average	% of Total
7/23	Quartz Bowl Pool to Whiskey Flat	228-279	254	4.1%
7/24	Whiskey Flat to Centerville Powerhouse	2008-2592	2240	35.8%
7/25	Centerville Powerhouse to Covered Bridge	2462-3858	3067	49.0%
7/26	Covered Bridge to Parrot-Phelan Diversion Dam	639-744	692	11.1%
8/9	Centerville Head Dam to Quartz Bowl Pool	0	0	0
	Totals	5337-7473	<b>6253</b>	100%

For the 2019 migration season, the Vaki RiverWatcher (Vaki) at Durham Mutual Fish Ladder was operational and detected a preliminary count of 5,650 salmon traveling upstream through the ladder and migrating into the summer holding habitat. However, several hundred fish were observed jumping onto and ascending over the Dam located adjacent to the ladder and Vaki. Therefore, the

estimate derived from the Vaki should not be considered a 100% upstream passage count of migrating spring-run Chinook into Butte Creek.

A mark-recapture carcass survey (Cormack Jolly-Seber model) is scheduled to start in mid-September and will be used to generate an escapement estimate that is used to define the size of the spawning population. This will be the nineteenth year in which a mark re-capture carcass survey estimate can be used to compare escapement estimates against the traditional swimming snorkel methodology. Long term data suggests snorkel survey methodology likely underestimates the number of adults in Butte Creek when there are large populations (Figure 2). The snorkel survey is used to provide long term trends in populations.

This year's participants were Department employees, Matt Johnson, Jason Julienne, Hideki Kubo, Mark Beccio and Ryan Revnek. Also assisting with the survey were National Marine Fisheries Service employee Jeremy Notch and Pacific States Marine Fisheries Commission employee Steven Silva. Please address any questions regarding this survey to me at (530) 895-5110.

cc: Kevin Thomas, DFW, North Central Region

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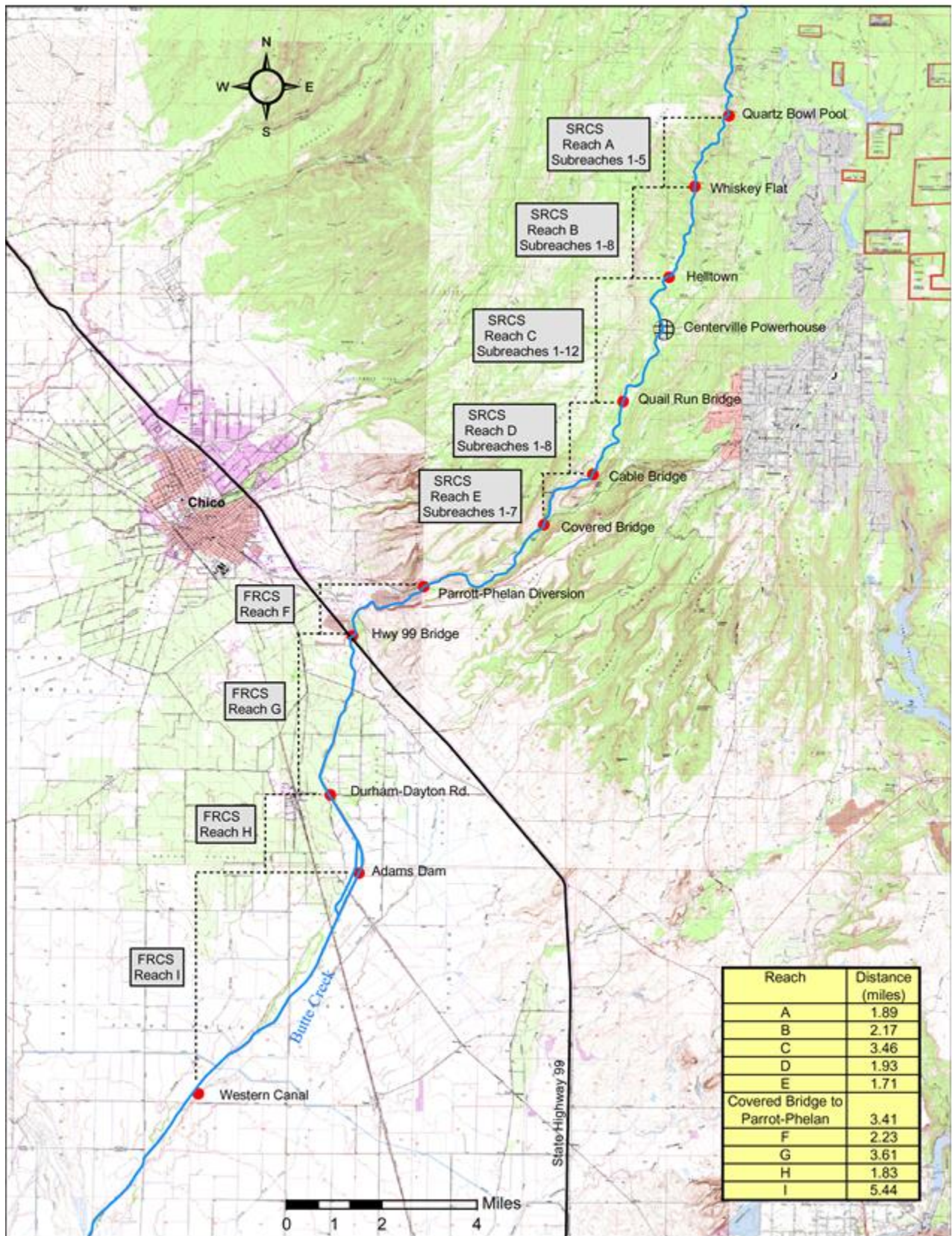


Figure 1. Map showing reaches and major physical features for both SRCS and FRCS spawning and holding areas on Butte Creek.

## Butte Creek (SRCS) Escapement Estimates 2001-2019

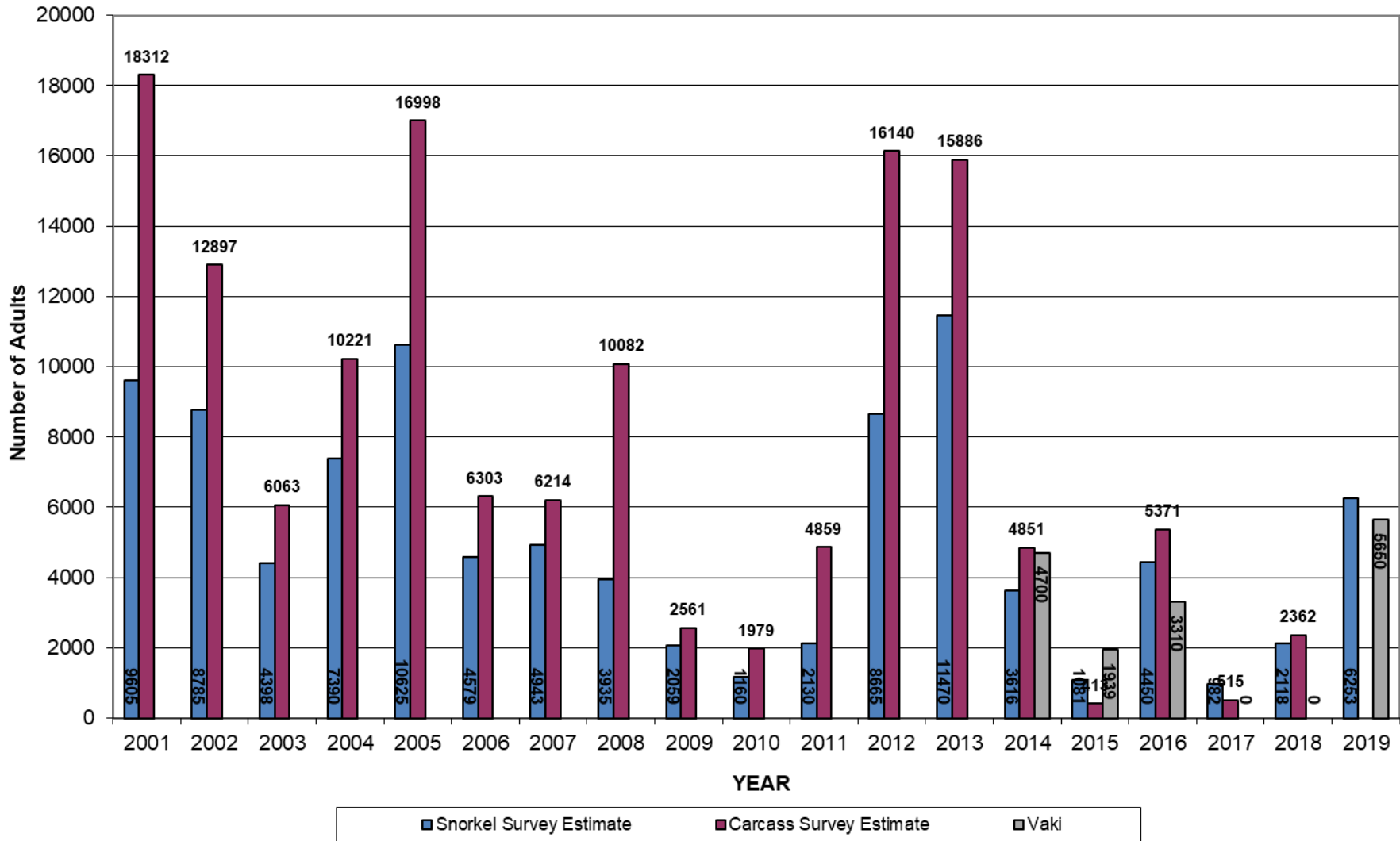


Figure 2. Butte Creek escapement estimates: carcass survey vs. snorkel survey vs. Vaki from 2001-2019.