# Data Types

1. Upstream passage
2. Redd

# Adult Upstream Passage

Objective: Estimate escapement numbers

Type: Overhead camera and three underwater cameras

Location: Mouth of Clear Creek

Times of operation: August-December; 24 hours/day

Consistency: Some years are not directly comparable to others. Please contact staff associated with this package for more information.

The Clear Creek video monitoring system has been in operation at the mouth of Clear Creek since 2012 and is operated August through December. Fish are funneled through a resistance board weir. Inside the weir there is one overhead camera and three underwater cameras. Footage is viewed and entered into excel at the end of each monitoring season. When fish counts are unclear from the footage, it is reviewed by up to three experts.

Video data is focused on count of fish passage through the resistance board weir upstream. Additional information describing fish biology is collected by the Clear Creek monitoring program: date, time, count, run, adipose fin clip status, sex, passage direction, jack size, and spawning condition. Viewing condition is collected less consistently (75% NAs). Run assignment of chinook salmon is recorded based on date of passage observation. Some limitations of the video system and passage estimates based on the video system include identification challenges because of camera placement, turbidity visibility challenges, run determination by date inaccuracies, video outages in high flow years, and GAM model performance when there are low counts or uneven daily counts.

# Snorkel Surveys

Surveys have been conducted to collect adult data on Clear Creek since 2000. The first 7 years of surveys were focused on redd and carcass data but in 2008 surveys expanded to include holding data.

Location: The snorkel survey sampling reach is from Lower Clear Creek from Whiskeytown Dam located at river mile 18.1, (40.597786N latitude, -122.538791W longitude) to the Clear Creek Video Station located at river mile 0.0 (40.504836N latitude, -122.369693W longitude) near the confluence with the Sacramento River

Times of operation: August index and surveys on either side of pulse flow releases. An additional 3 - 4 surveys are conducted throughout the spawning season.

Consistency: Some years did not survey all reaches and thus are not directly comparable with other years. Please contact staff associated with this package for more information.

# Redd

Objective: Estimate spawning population

Type: Sample reaches are surveyed multiple times per season to determine redd decomposition rate

Variables collected consistently by Clear Creek include: date, latitude, longitude, reach, river mile, year, method, and run. Species is collected less consistently (57% NAs). Redd data is considered an accurate count of the spawning population. Redd data most accurately counts total spawning population in years with fewer redds and is a less reliable measure in years with large spawning populations.

Redds are assigned a unique redd ID upon observation. If a redd is observed more than once, it may be assigned an age, and that redd ID may have multiple observations in a table.

There is a natural barrier in Clear Creek where a picket weir is temporarily installed. Any Chinook redds observed above this picket weir are spring run.

Methods for measuring substrate size has varied over the years and for this package, substrate class was standardized using the Wentworth scale, created by W.C. Krumbein. This scale is what is commonly used in the United States. When the size range fell into two categories, they were rounded down. The scale, in descending size order, is boulder (>256mm), cobble (64-256mm), very coarse gravel (32-64mm), coarse gravel (16-32mm), medium gravel (8-16mm), fine gravel (4-8mm), very fine gravel (2-4mm), very coarse sand (1-2mm), coarse sand (0.5-1mm), medium sand (0.25-0.5mm), fine sand – clay (<0.25mm).