# Data Types

1. Upstream passage
2. Redd

# Upstream Passage

Objective: Estimate escapement numbers

Type: Video monitoring and trap

Location: Coleman National Fish Hatchery Barrier Weir

Times of operation: March-November

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

Battle Creek collects two types of adult upstream passage data: trap and video monitoring data. The video system and trap are located at the Coleman National Fish Hatchery Barrier Weir and are operated between March and November.

Video footage is collected using a video vault and reviewed manually by monitoring crews. Information collected includes date, time, video condition, fish count, species, run, fin clip status, passage direction, and occasional comments are associated with a record. Chinook or rainbow trout footage is reviewed by a second, more experienced, personnel for quality and accuracy. Total hours of video footage and total hours of fish passage are recorded to understand video efficiency. A Cormack Jolly-Seber (CJS) model is applied to the video passage data. 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 turbidity visibility challenges, run determination by date inaccuracies, video outages in high flow years, and CJS model performance when there are low counts or uneven daily counts.

Monitoring crews conduct sampling in the spawning building, where a false bottom trap is located at the top of the fish ladder. This sampling occurs in two phases: from March 1st through April, the trap is sampled once per every 24 hour period, five days a week. From April onward, the trap is sampled once per every 24 hour period, seven days a week, until water temperature limits are reached. Trapping is only conducted when water temperatures are below 68 degrees, and the trap is checked every 30 minutes during trapping. The following attributes are collected for any fish caught in the trap: fork length, marks or tags, sex, fish health, adipose fin status. Tags are removed from any CWT hatchery fish to collect information on that fish. All monitoring data is collected manually in the field and entered into a digital format by hand.

# Redd

Objectives: Estimate spawning population

Type: Multiple surveys per year

Location: 18.6 miles are sampled in each survey. The survey starts at the upstream end of the reach and the entire sample area of the creek is typically completed within a week.

Times of operation:

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.

Snorkel surveys began in 2001 on Battle Creek. Usually three snorkel surveys are performed each year. 18.6 miles are sampled in each survey period: the sample area spans from the South Fork of Battle Creek starting at Coleman Dam, North Fork of Battle Creek starting at Trout Farm location (start of R1B) (historically starting at Eagle Canyon Dam), the mainstem of Battle Creek from the NF/SF confluence down to the confluence with the Sacramento River (end of R7)(end of R6 is Coleman National Fish Hatchery). The survey starts at the upstream end of the sample area and surveying the entire sample area typically takes four days to a week. Three snorkelers swim perpendicular to the flow and count holding Chinook, carcasses and redds. Data displayed below are filtered to Spring Run and reaches 6 & 7 are excluded because they primarily contain Fall or Late Fall Run populations. Holding and carcass data are not currently available in this package.

When redds are encountered on a snorkel survey, crews collect additional data on the redds: date, latitude, longitude, reach, river mile, fish guarding, year, species, run, redd substrate class, tail substrate class, and pre-redd substrate class. Less consistently, Battle Creek also collects redd width and length as well as velocity. Redd data is used to determine the spawning window. 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.

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).