PRELIMINARY DATA: Redd Dewatering Estimates for Keswick Fall Flow Scenarios

BDO Science Division

01 September, 2023

This script constructs real-time winter-run redd dewatering estimates based on most recent data available from CDFW (August 31, 2023) for winter-run data and dewatering estimates from USFWS (2006; see citation). Data are also available in the YYYY Winter-run Data file.xls online at [calfish.org](https://gcc02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.calfish.org%2FProgramsData%2FConservationandManagement%2FCentralValleyMonitoring%2FCDFWUpperSacRiverBasinSalmonidMonitoring.aspx&data=05%7C01%7Clelliott%40usbr.gov%7C689ebb9a6c8243b4f96c08da90f5c542%7C0693b5ba4b184d7b9341f32f400a5494%7C0%7C0%7C637981682646098788%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ik1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=A1eQkWPxbkXxnzEvc2K8%2FTmslZ8H8zvxdks3%2F78Yrvw%3D&reserved=0).

Please note that all data are preliminary until data collection is finalized. Likewise, there are uncertainties with forecasts which may lead to changes in proposed operations.

# Current Winter-run Chinook Salmon Redd Count

As of August 13, 2023, the unexpanded redd count is **347** Winter-run redds. There is no real time data on Fall-run redd counts and instead that data is predicted based estimated dewatering percentages from USFWS (2006). It is important to note that until data collection is completed for the year these are the **minimum** number of possible redds. The Winter-run number will always expand upon final analysis but gives an in-season guard rail of the minimum number of redds this year. Fall-run predictions may expand or contract depending on updates from real time operations. From 2018-2021, female expansion has ranged from 0.31 to 1.31 with a 0.7 average, thus we may expect the final number of Winter-run redds to be closer to 590 redds using average expansion on data this year, and using this value, 5.9 redds dewatered would be at the 1% population loss.

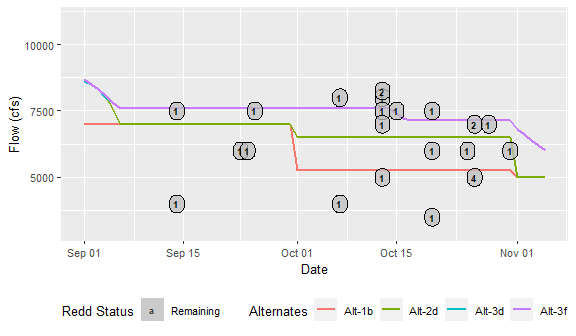
As of August 31, 2023, **0** Winter-run redds have **emerged** and **0** have been **dewatered**. This leaves **26** shallow water redds of concern. Depending on real-time flow information, scenario, and 100 and 250 cfs buffers, between **1.4** and **11.9%** Fall-run redds are estimated to be dewatered.

# Table

**Table 1.** Average September and October Keswick (KES) Flow in cfs, total water volume of each alternative for August through October in TAF, estimated numbers of SRWC redds dewatered, and percent of population that would be lost under each of the proposed alternatives. KES Flow data uses actual flow-to-date as of 2023-08-31 and proposed flows for the remainder of the incubation period. Redd dewatering is considered at the actual or estimated dewatering flow and with a 250 cfs buffer applied to the actual/estimated dewatering flow. Percentage of the population lost is based on the August 13, 2023 count of 347 Winter-run redds and updated redd counts may be available soon. See Scenario Descriptions file for additional information on each scenario.

| Metric | Alt.1b | Alt.2d | Alt.3d | Alt.3f |
| --- | --- | --- | --- | --- |
| Avg Sept Flow (cfs) | 7000 | 7207 | 7707 | 7713 |
| Avg Oct Flow (cfs) | 6617 | 5013 | 5541 | 5248 |
| Total Volume (TAF) | 3026 | 2548 | 2734 | 2646 |
| Winter-run Redds dewatered | 16 | 13 | 6 | 6 |
| Winter-run Percent Lost (based on current count) | 4.6 | 3.7 | 1.7 | 1.7 |
| Winter-run Percent Lost (based on expansion of 0.7) | 2.7 | 2.2 | 1 | 1 |
| Winter-run Percent Lost (based on expansion of 0.3) | 3.5 | 2.9 | 1.3 | 1.3 |
| Winter-run Redds Dewatered (w/ 250 cfs buffer) | 21 | 13 | 12 | 12 |
| Winter-run Percent Lost (w/ 250 cfs buffer) | 6.1 | 3.7 | 3.5 | 3.5 |
| Fall-run dewatered (%) | 5.5 | 9.8 | 10.5 | 11.9 |
| Fall-run dewatered (100 cfs buffer; %) | 5.4 | 9.7 | 10.4 | 11.8 |
| Fall-run dewatered (250 cfs buffer; %) | 1.4 | 9.6 | 10.3 | 11.7 |

# Plots



**Figure 1.** Actual or estimated emergence dates of SRWC redds and actual or estimated dewatering flow for the September-October estimated redd emergence dates as compared to Keswick flow (in cfs) of proposed management alternatives. Points represent emerged, dewatered, or remaining redds. Numbers inside of points indicate how many redds share that estimated emergence date and actual/estimated dewatering flow. Points that fall above/to the right of a flow alternative line are expected to be dewatered given that management alternative is followed. Points that fall below/to the left of/on a flow alternative line are not expected to be dewatered, given that management alternative is followed.

#References Gard, Mark. 2006. Relationsships between flow fluctuations and redd dewatering and juvenile stranding for Chinnok Salmon and Steelhead in the Sacramento River between Kesewick Dam and Battle Creek. 94 pages.