PRELIMINARY DATA: Real-time SRWC Redd Dewatering Estimates

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This script constructs real-time winter-run redd dewatering estimates based on most recent data available from CDFW (August 22, 2023). 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) but updated data may be available upon request from CDFW.

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.

##   
## Attaching package: 'lubridate'

## The following objects are masked from 'package:data.table':  
##   
## hour, isoweek, mday, minute, month, quarter, second, wday, week,  
## yday, year

## The following objects are masked from 'package:base':  
##   
## date, intersect, setdiff, union

## 'data.frame': 213 obs. of 7 variables:  
## $ Date : Date, format: "2023-08-01" "2023-08-02" ...  
## $ Alt.1b: chr "10000" "10000" "10000" "10000" ...  
## $ Alt.2c: chr "10000" "10000" "10000" "10000" ...  
## $ Alt.3b: chr "9000" "9000" "9000" "9000" ...  
## $ Alt.3c: chr "9000" "9000" "9000" "9000" ...  
## $ Alt.3d: chr "10567" "10603" "10588" "10530" ...  
## $ Alt.3e: chr "10851" "10781" "10567" "10603" ...

# Current Redd Count

As of August 13, 2023, the unexpanded redd count is **347** Winter-run redds. It is important to note that until data collection is completed for the year this is the **minimum** number of possible redds. This number will always expand upon final analysis but gives an in-season guard rail of the minimum number of redds this year. 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 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% take level.

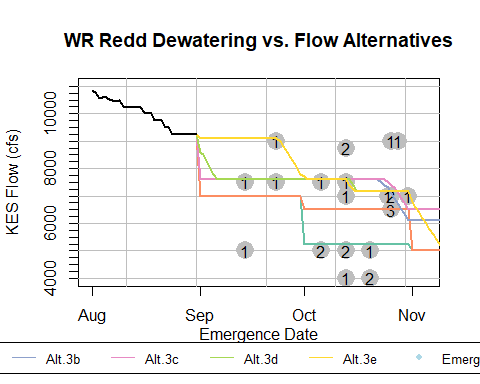
As of August 22, 2023, **0** Winter-run redds have **emerged** and **0** have been **dewatered**. This leaves **26** shallow water redds of concern.

# 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 100 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. Alternatives 1a, 2a, 2b, and 3a have been dropped from consideration because they are based on outdated forecasts and have been improved upon.

| Metric | Alt.1b | Alt.2c | Alt.3b | Alt.3c | Alt.3d | Alt.3e |
| --- | --- | --- | --- | --- | --- | --- |
| Avg Sept Flow (cfs) | 7000 | 7000 | 7600 | 7600 | 7707 | 8937 |
| Avg Oct Flow (cfs) | 6617 | 5013 | 5928 | 6107 | 5541 | 5539 |
| Total Volume (TAF) | 3026 | 2542 | 2773 | 2827 | 2734 | 2815 |
| Redds dewatered | 17 | 17 | 6 | 6 | 5 | 4 |
| Percent Lost (based on current count) | 4.9 | 4.9 | 1.7 | 1.7 | 1.4 | 1.2 |
| Percent Lost (based on expansion of 0.7) | 2.9 | 2.9 | 1 | 1 | 0.8 | 0.7 |
| Percent Lost (based on expansion of 0.3) | 3.8 | 3.8 | 1.3 | 1.3 | 1.1 | 0.9 |
| Redds dewatered (w/ 100cfs buffer) | 17 | 17 | 12 | 10 | 9 | 7 |
| Percent Lost (w/ 100cfs buffer) | 4.9 | 4.9 | 3.5 | 2.9 | 2.6 | 2 |

# 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.