



2020 Dutch Bill Creek Flow Release

Summary for the CMRPD Board

February 16, 2021

Overview

- Summary – Mary Ann King, Trout Unlimited
- Streamflow and water temperature – Krysia Skorko, Trout Unlimited
- Fish and habitat – Sarah Nossaman Pierce, California Sea Grant
- Wrap-up and questions - all

Summary

- Submitted petition: 5/28/2020
- Flow release dates: 7/1 - 12/21/2020
- Amount: ~24.5 acre-feet; average rate of 0.07 cubic feet per second
- Monthly reporting and final report

WY2020
Streamflow
and release
observations,
Dutch Bill
Creek

Krysia Skorko
& Mia van
Docto

Trout
Unlimited

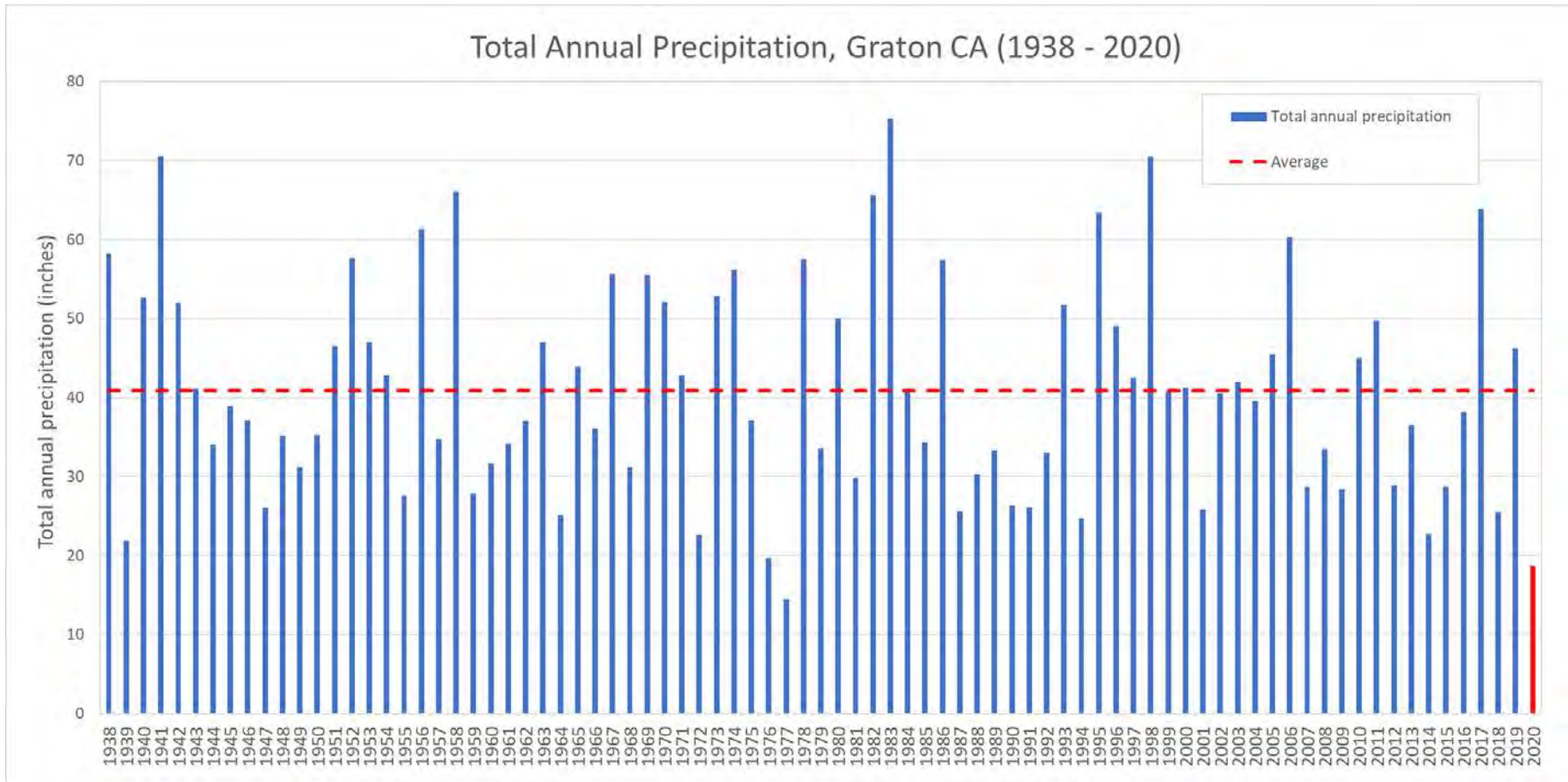
Outline

Rainfall for WY2020

Streamflow hydrograph showing benefit of releases

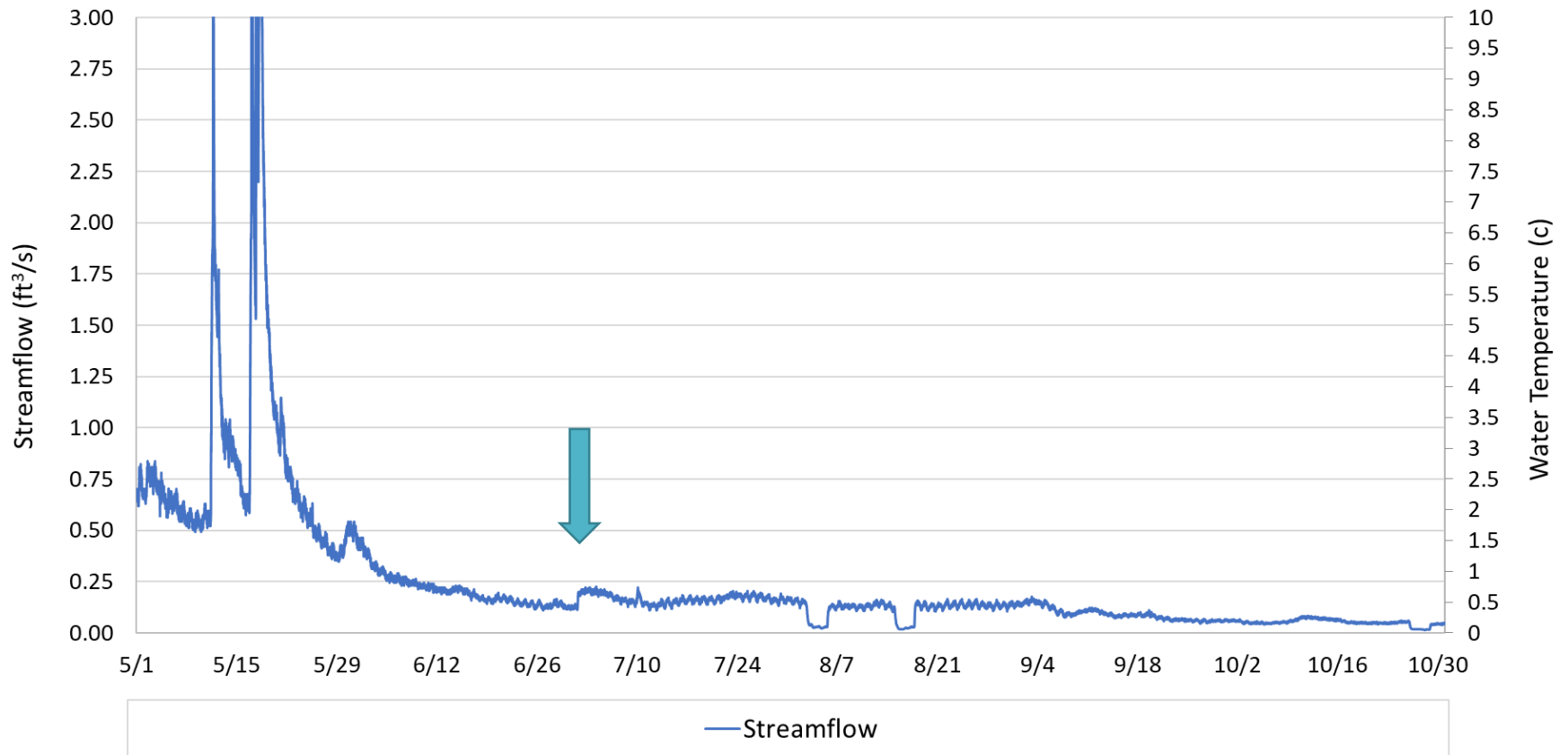
Water temperature

WY2020 Rainfall



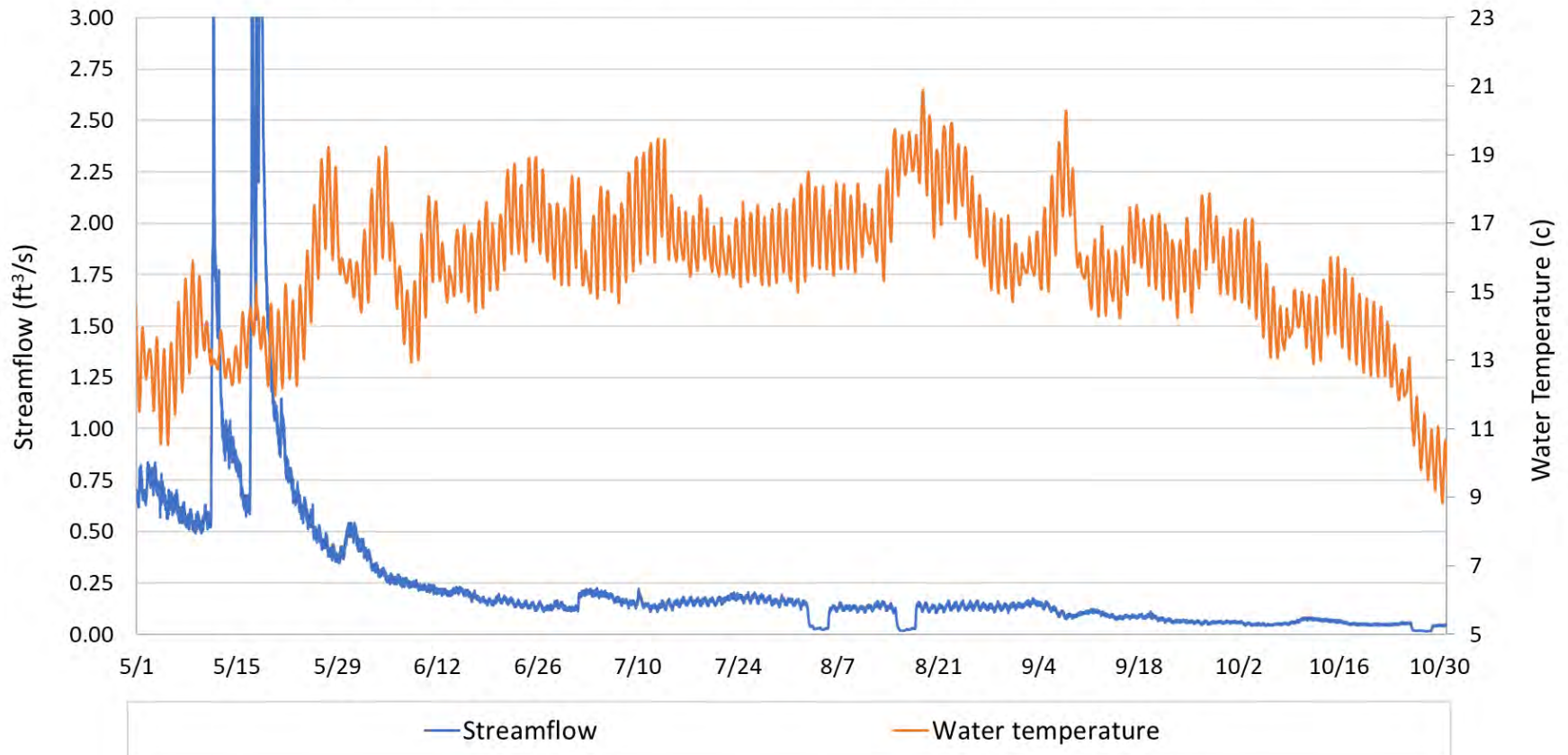
WY2020 Streamflow

(DB02) Dutch Bill Creek at Westminster Woods Streamflow Summer 2020



WY2020 Streamflow and Temperature

(DB02) Dutch Bill Creek at Westminster Woods Streamflow Summer 2020



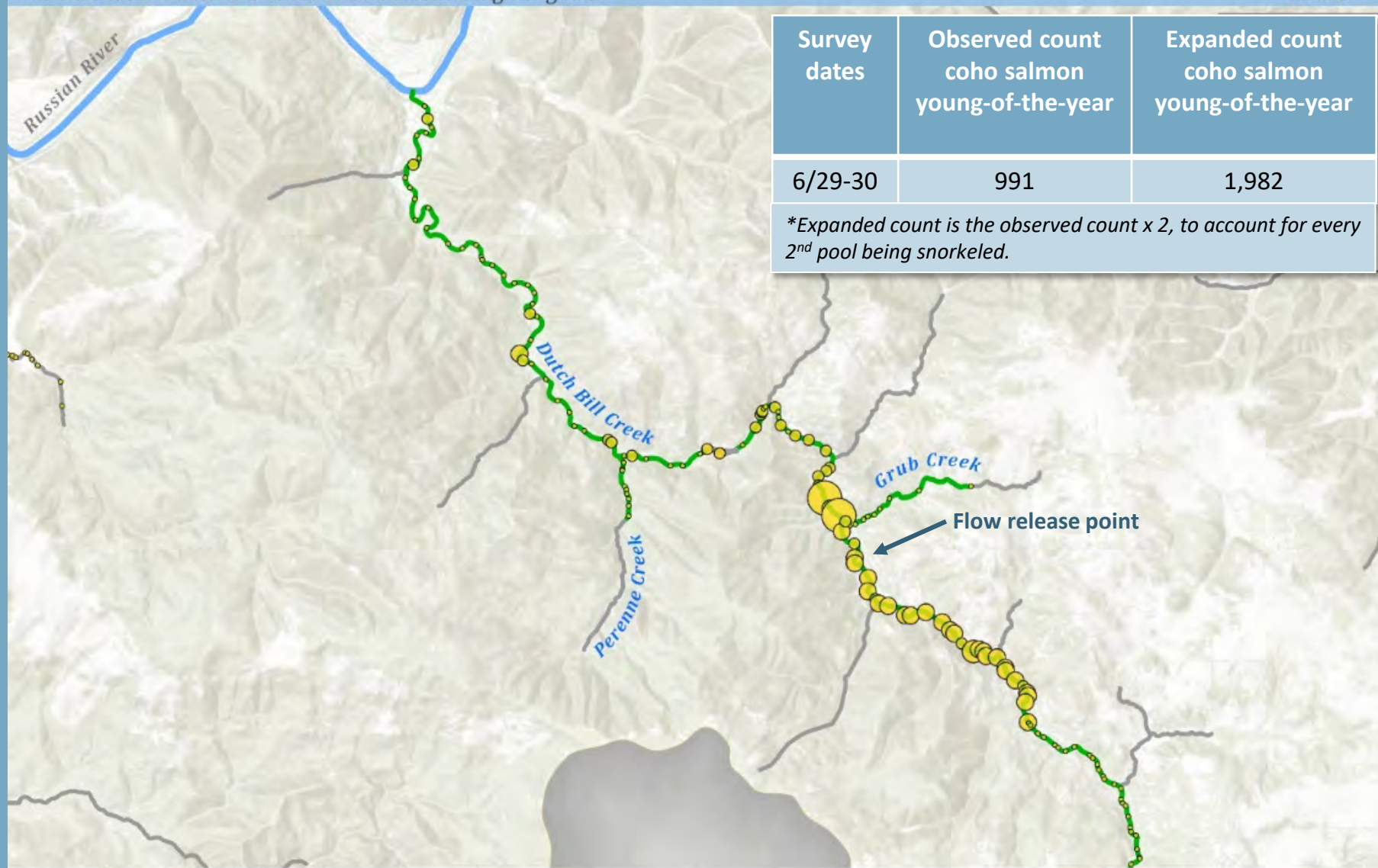
Dutch Bill Creek Fish and Habitat Monitoring Summer 2020

California Sea Grant
Russian River Salmon and
Steelhead Monitoring Program
& Sonoma Water



2020 Dutch Bill Creek: Juvenile Coho Salmon Distribution

Russian River Salmon and Steelhead Monitoring Program



Survey dates	Observed count coho salmon young-of-the-year	Expanded count coho salmon young-of-the-year
6/29-30	991	1,982
*Expanded count is the observed count x 2, to account for every 2 nd pool being snorkeled.		

Coho Young-of-Year Observed

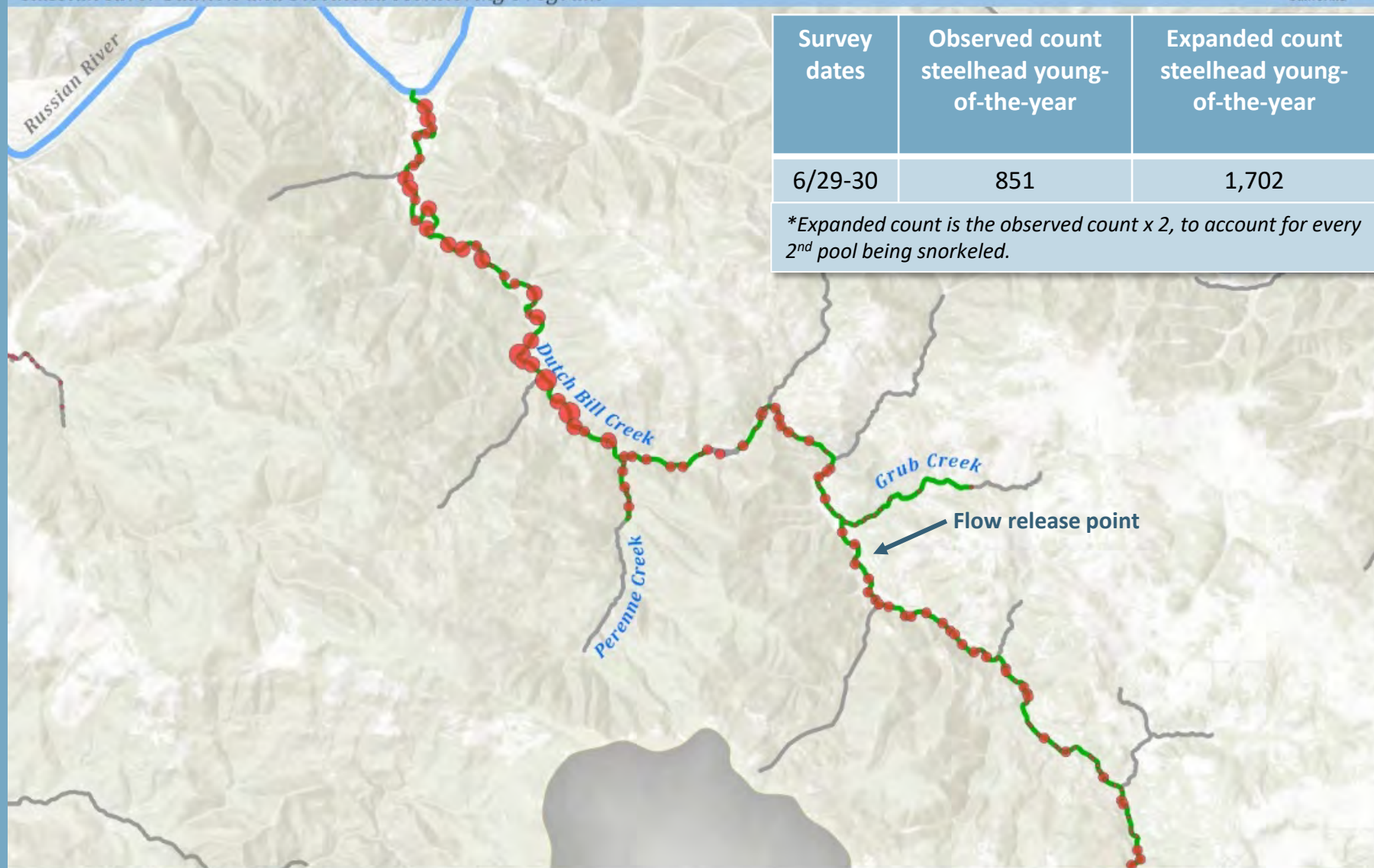


Projection: WGS 1984 Web Mercator Auxiliary Sphere
 Source: Streams, Cities and Roads (County of Sonoma),
 Map Prepared By: California Sea Grant, Santa Rosa, CA
 Map Name: Snorkel_Tributary



2020 Dutch Bill Creek: Juvenile Steelhead Distribution

Russian River Salmon and Steelhead Monitoring Program



Survey dates	Observed count steelhead young-of-the-year	Expanded count steelhead young-of-the-year
6/29-30	851	1,702
*Expanded count is the observed count x 2, to account for every 2 nd pool being snorkeled.		

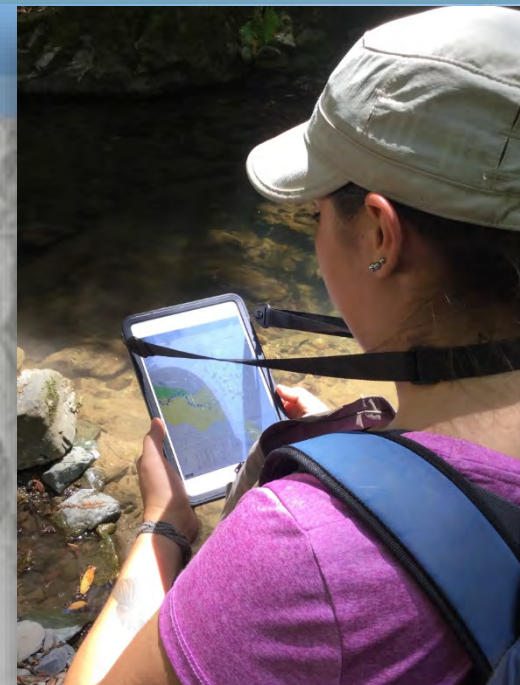
Steelhead Young-of-Year Observed



Projection: WGS 1984 Web Mercator Auxiliary Sphere
Source: Streams, Cities and Roads (County of Sonoma),
Map Prepared By: California Sea Grant, Santa Rosa, CA
Map Name: Snorkel_Tributary

Dutch Bill Creek: 2020 Wetted Habitat

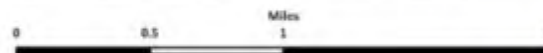
Russian River Salmon and Steelhead Monitoring Program



Surface Flow Condition

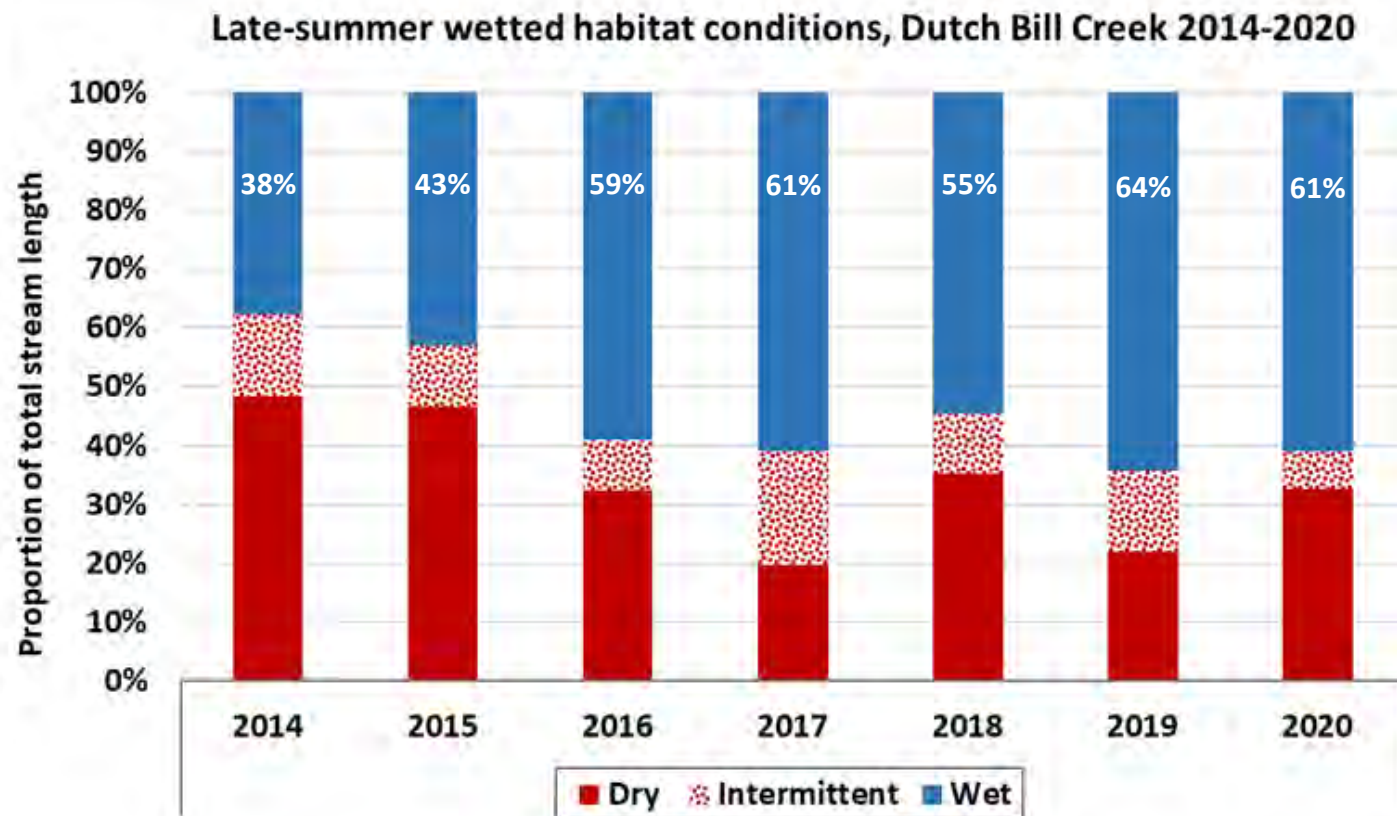
- Dry
- Wet
- Intermittent
- Not Surveyed

Surveys Conducted: September 3-8, 2020



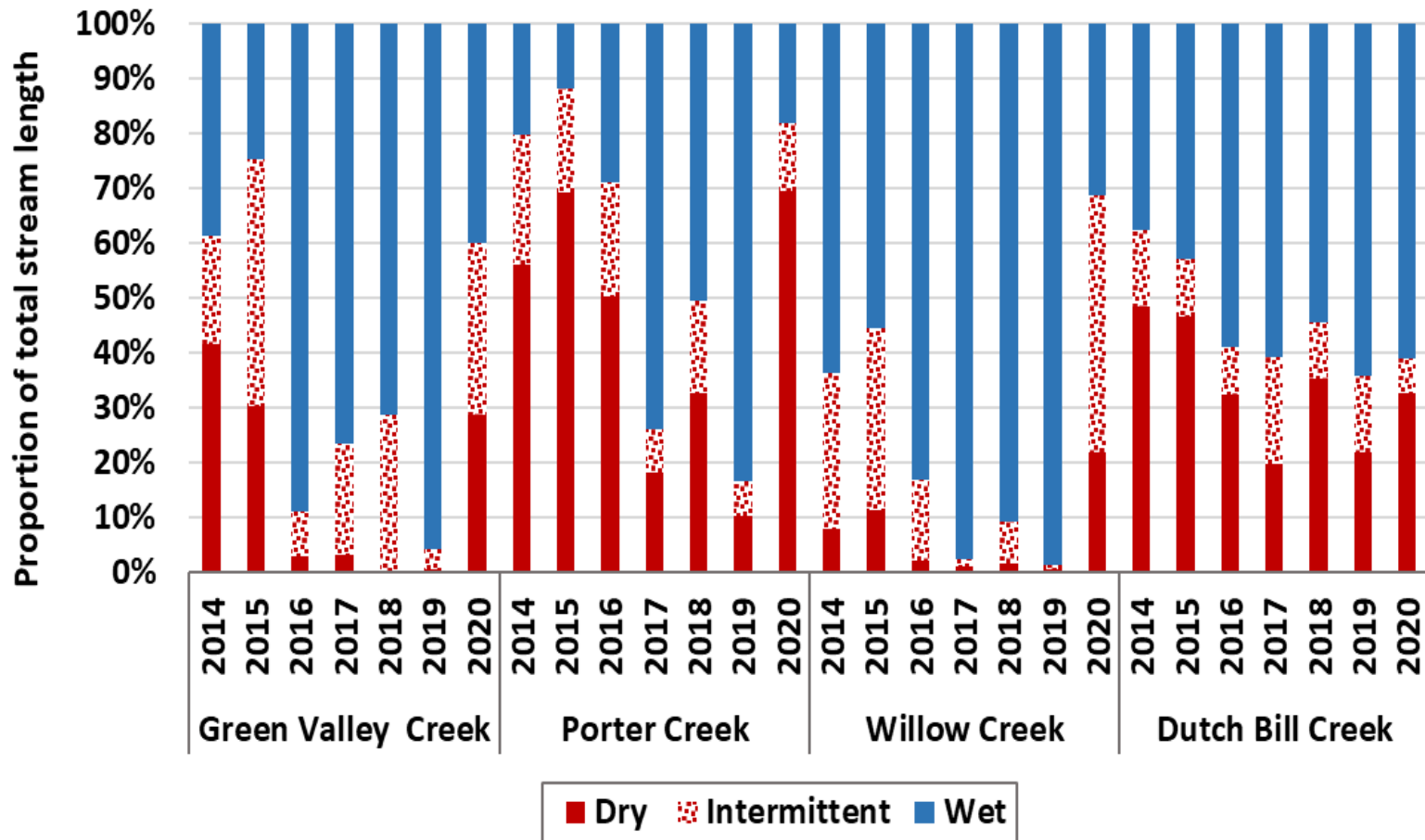
Projection: NAD 1983 UTM Zone 10N
Source: Streams (County of Sonoma),
Map Prepared By: California Sea Grant, Santa Rosa, CA





- % of stream still wet at driest point of the summer. *Note that flow releases occurred in all years from 2015-2020, except for 2017.*
- Late-summer available wetted habitat in Dutch Bill Creek in 2020 was 23% greater than the driest year of 2014 and equivalent to natural conditions in the wetter-than average water year of 2017.

Late-summer wetted habitat conditions in Russian River streams 2014-2020



In nearby reference streams, 2020 conditions (by total wetted stream length) were similar to severe drought conditions of 2014 and 2015.

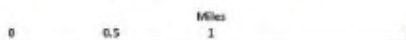
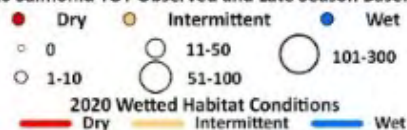
Dutch Bill Creek: 2020 Juvenile Salmonid Distribution & Wetted Habitat

Russian River Salmon and Steelhead Monitoring Program



What did this mean for fish?

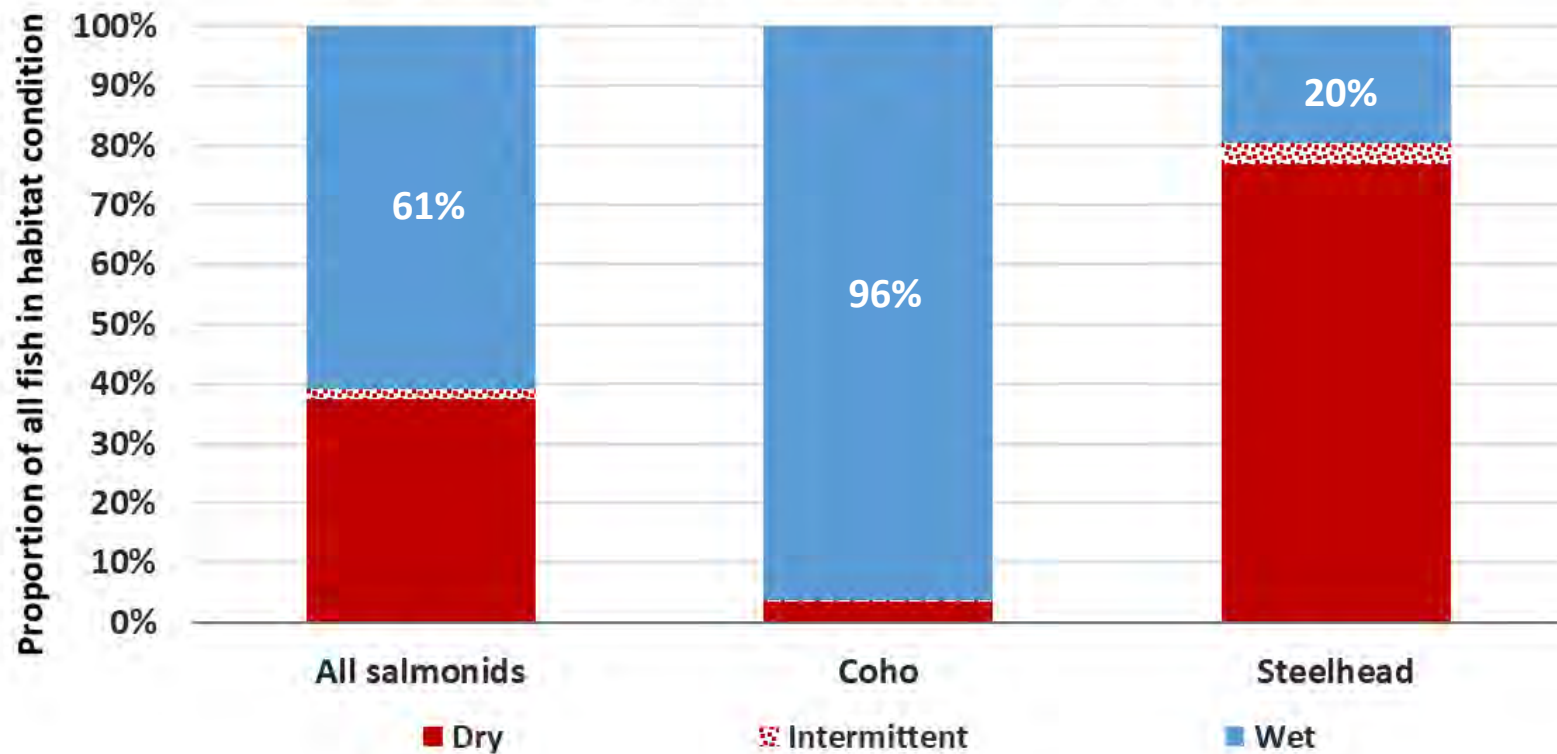
2020 Salmonid YOY Observed and Late Season Baseflow



Projection: NAD 1983 UTM Zone 30N
Source: Streams (County of Sonoma),
Map Prepared By: California Sea Grant, Santa Rosa, CA

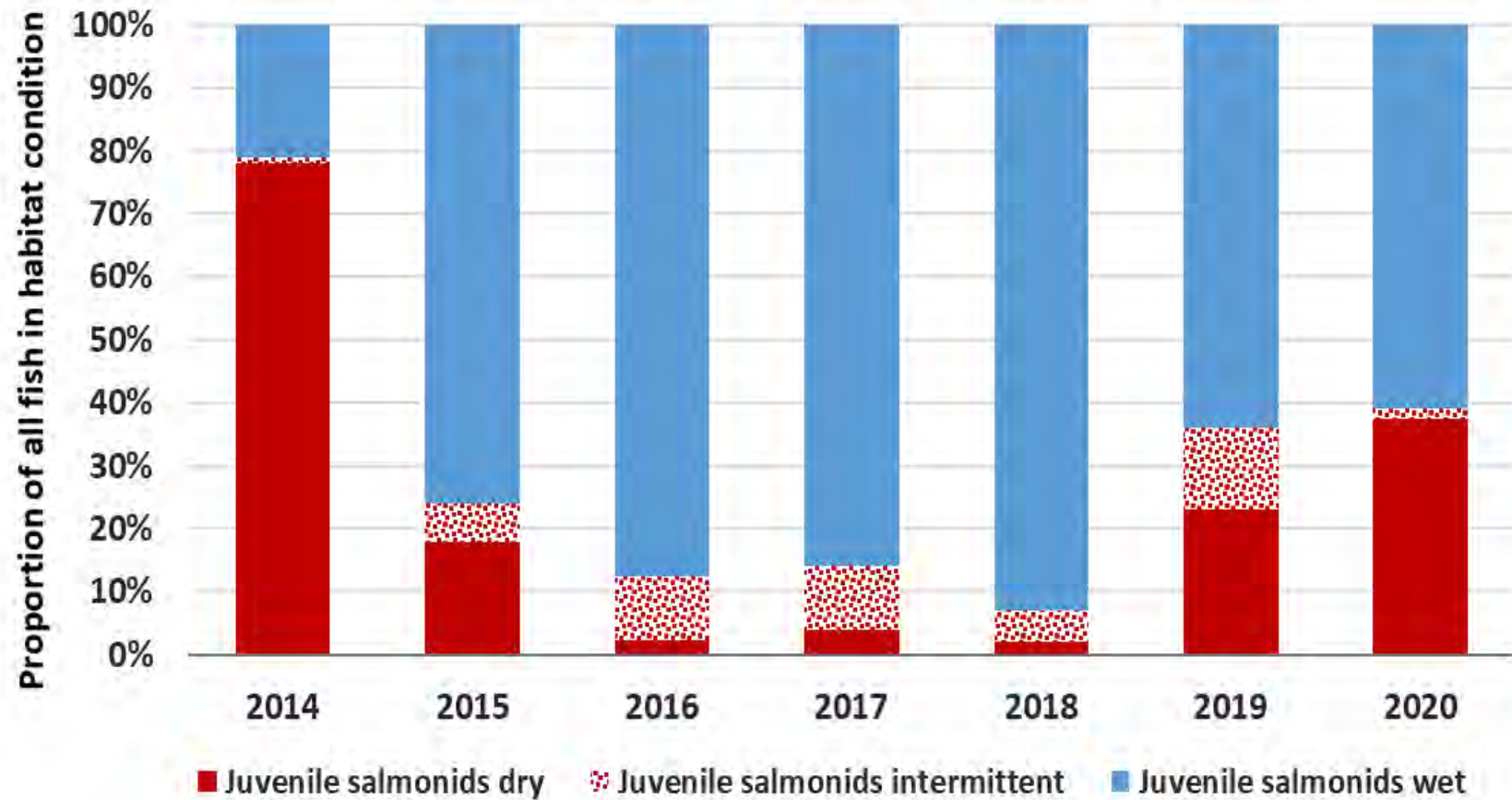


Coho salmon and steelhead young-of-the-year in relation to late-summer wetted habitat, Dutch Bill Creek 2020



- 96% of coho salmon, but only 20% of steelhead, were seen in locations that remained wet throughout the summer season – 61% of all juvenile salmonids
- This difference is related to the distribution of each species – more steelhead spawned in the lower reach that dried and more coho in the middle/upper reach that remained wet

Coho salmon and steelhead young-of-the-year in relation to late-summer wetted habitat, Dutch Bill Creek 2014-2020



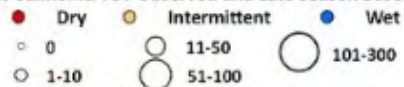
Dutch Bill Creek: 2020 Juvenile Salmonid Distribution & Wetted Habitat

Russian River Salmon and Steelhead Monitoring Program

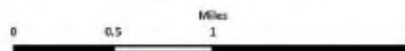
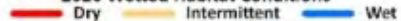


What did the release mean for fish?

2020 Salmonid YOY Observed and Late Season Baseflow



2020 Wetted Habitat Conditions



Projection: NAD 1983 UTM Zone 30N
Source: Streams (County of Sonoma),
Map Prepared By: California Sea Grant, Santa Rosa, CA



Conclusions



- Rainfall and streamflow conditions in Dutch Bill Creek in WY2020 were very low. TU's gage (DBo2) Dutch Bill Creek at Westminster Woods shows streamflow declined to approximately 0.1 ft³/sec by early July. The water release from Camp Meeker on July 1st raised streamflow to approximately 0.22 ft³/sec, after which streamflow gently receded to 0.13 ft³/sec. The flow release from Camp Meeker stopped three times during the summer. During each shut off period, streamflow at TU's gage DBo2 dropped to nearly zero at 0.02 ft³/sec. Without the release, the site would likely have been nearly dry by August and would have remained dry through October.
- The release resulted in higher summer streamflow, which has been correlated with improved water quality conditions and habitat (pool) connectivity.
- Reducing the number of days of pool disconnection has been shown to increase the probability of coho salmon oversummer survival, so we can conclude that this flow release increased the probability of juvenile salmonid survival in Dutch Bill Creek in 2020.
- Comparisons of stream drying in Dutch Bill and nearby streams over multiple water years indicates that the 2020 release increased the amount of wetted habitat that would have been present under natural conditions, and reduced the proportion of rearing salmon and steelhead impacted by stream drying in Dutch Bill.
- Other streams sampled in 2020 were about as dry as in 2014, a severe drought year, but Dutch Bill Creek had the same wetted stream length as 2017, an above-average water year.
- The release was most beneficial for fish in the reach below the release point, where the greatest densities of coho salmon were concentrated.
- Benefits appear to have occurred at least as far as 3 km downstream.
- The early onset of the release was critical for supporting fish prior to stream drying, disconnection, and deteriorating conditions that flow data indicates would have occurred in more of Dutch Bill Creek in the absence of the flow release.
- This flow augmentation continues to be a valuable tool to support oversummer success of endangered coho salmon and threatened steelhead in Dutch Bill Creek.

Thank you

“I would like to express my great appreciation for the Camp Meeker Recreation and Parks District flow augmentation project and share with you some of my recent observations to put it in context. In my new job, I am responsible for coordinating rescues of Coho Salmon, and this year’s drought has...made me very busy...While I haven’t seen it all, most of the core streams have become intermittent or completely dry throughout the rearing reaches and a good portion were burned over in the recent fires. There are a precious few...minor tributaries with exceptionally productive springs supporting enough water to maintain connection between pools for any substantial length of stream.

...When I went to Dutch Bill Creek yesterday, I was treated to the welcomed experience of continuous flow and deep pools from Alliance Redwoods down to the old fish ladder! I didn’t count fish, but there appeared to be Coho juveniles there in abundance. It made me proud to be even a small part of the hard work all of you have done...and to see it paying off in such a critical year. Though the lower and upper reaches of Dutch Bill Creek still went dry, I am hopeful the middle reach provides a significant contribution to the conservation of Coho in the Russian River by providing much-needed resilience in an otherwise bleak drought year.”

- David Hines, Coho Salmon Recovery Coordinator, CDFW