

# Trinity River Watershed Council

December 10th, 2024 at 10:00am – 12:00pm

TCRCD Conference Room, #30 Horseshoe Lane, Weaverville

## **Our Mission:**

To protect, enhance, restore and revitalize the watershed through collaborative efforts that leverage external resources, work toward common goals, educate and engage community stakeholders, address natural resource issues, and support healthy ecosystems for future generations.

## **Agenda**

**10:00-10:10** Welcome and Introductions

**10:10-10:45** Guest Speakers Topic: Environmental Flows and the Factors that Limit the Chinook Salmon Life Cycle with Eric Peterson of Trinity River Restoration Program

**10:45-11:55** Partner Updates

a. USFS – Shasta Trinity National Forest

b. USFS- Six Rivers National Forest

c. Bureau of Land Management (BLM)

d. California Department of Fish and Wildlife (CDFW)

e. Natural Resources Conservation Service (NRCS)

f. Trinity River Restoration Program (TRRP)/  
Bureau of Reclamation (BOR)

g. Trinity County

h. Hoopa Tribal Fisheries

i. Yurok Tribal Fisheries

j. Tsnungwe Tribe

k. Nor Rel Muk Wintu Nation

l. Trinity County Resource Conservation District

m. The Watershed Research and Training Center

n. 5 Counties Salmonid Conservation Program/  
Northwest California Resource Conservation &  
Development Council

o. Trinity County Fish and Game Commission

p. Trinity County Agricultural Alliance

q. Flowra

r. New Attendees

**11:55-12:00** Close

**Next Meeting is March 11<sup>th</sup>, 2025 at 10am-12pm**

### **Virtual Meeting Information**

Zoom link: <https://us02web.zoom.us/j/89707228772?pwd=WUo1VW5hS2x0UC85ODE4dFViNEFYUT09>

Meeting ID: **897 0722 8772**

Passcode: **96093**

+16694449171,,89707228772#,,,,\*96093# US +16699009128,,89707228772#,,,,\*96093# US (San Jose)

### **Questions?**

Contact Annyssa Interrante at 530 623 6004 X 209 or email at [ainterrante@tcrd.net](mailto:ainterrante@tcrd.net)

# Trinity River Watershed Council – December 10<sup>th</sup>, 2024

## Attendance

### In person (3):

- Annyssa Interrante – TCRC
- Eric Peterson – TRRP
- Chris Losey – Flowra

### Online (14):

- Amelia Fleitz –USFS Shasta Trinity National Forest
- Bridger Cohen - Watershed Research and Training Center
- Cindy Buxton – Watershed Research and Training Center
- Cyndie Childress - Nor Rel Muk Wintu
- David Colbeck - Trinity County
- Dylan Kirkley - TCRC
- Karl Reisinger - TCRC NRCS
- Greg Pasternack - UC Davis
- Lesli Mounivong – Watershed Research and Training Center
- Manashi Paul - State Water Board
- Matt Mitchell – California Department of Fish and Game
- Sandra Perez - Yurok Tribe
- Kate Blanchard – California Department of Fish and Game
- Adrien Keys - Flowra

Total Attendees: 17 people

Meeting Start 10:00 am

### Questions?

Contact Annyssa Interrante at 530 623 6004 X 209 or email at [ainterrante@tcrd.net](mailto:ainterrante@tcrd.net)

# Trinity River Watershed Council – December 10<sup>th</sup>, 2024

**Guest Speaker Topic:** “Environmental Flows and the Factors that Limit the Chinook Salmon Life Cycle with Eric Peterson of Trinity River Restoration Program”

## Introduction

- Hydrograph – Water year starts in October
- The current state of salmon in Trinity River – Out migrating juveniles has increased (started in 2005 when TRRP started rod flow implementation)
- Snow melt imitation of releasing water from the dam
- Production of juvenile fish has roughly doubles
- However number of adults returning has not reflected the number of juveniles (less)
- Why does the Trinity River need restoration?
- Above lake river has low floodplains with wood and habitat for fish when flood, opportunities for additional sediment
- Below dam mining washed off sediments into river changing river, then dam was put in keeping flooding from happening
  - Dam meant to provide water to central valley
    - For 10 years 90% of water went to central valley
    - Since 200 half the water goes to trinity river, other half to valley
- Unintended consequences
  - In 1950 scientists determined that since spawning happens in slow shallow water, a dam will be great for salmon
    - Fish numbers crashed
- What happened to the fish?
  - General pattern for the TR is a dry early fall, big early storms in fall usually, creates geomorphic change, wet season continues with consistent rise in hydrograph, then snow melt feeds the river, occasional summer storm
- Lewiston streamgauge strated in October, 1911 giving us hydrographical data, collected data to see how much water could be sent to central valley
  - Big plans to take water from the Klamath to the Trinity river
  - Naturally before dams there were big spike during winter and an increased in flows during winter, even during critically dry years there was an increase in flows during the winter
    - Generally historical flows never dipped below 1000 cfs in late March
- Water year 1961 Trinity Dam was put in, river flow immediately changed, next years flow remained consistent throughout the year, even the 1964 flood didn't show at the Lewiston streamgauge
- After the dam the river got narrower and after the flood of 1965 Weaver Creek deposited a lot of sand, narrowing the river even more, increasing the speed of the water
  - Sands were deposited along the river channel, effects noticed as soon as 1963
- Willows and alders came into the river channel without floods to wash them away
- Channel became narrow, fast, and steep along the edges, no slow shallow water for the salmon
- Lots of efforts to repair damages to the river, digging with mechanical methods through to 70s, 80s, and 90s
- Trinity River Flow Evaluation study 1999 foundation for the TRRP
  - Led to TRRP being allotted an amount of water to be released from the reservoir every year depending on water year type

## Questions?

Contact Annyssa Interrante at 530 623 6004 X 209 or email at [ainterrante@tcrd.net](mailto:ainterrante@tcrd.net)

## Trinity River Watershed Council – December 10<sup>th</sup>, 2024

- TRRP has been given adaptive management to change how water is released based on the most recent science
  - Ex. Multiple short spikes instead of one long spire
- Water year not decided until mid spring, which means water is not released until April
- Has been beneficial to the salmon
  - Doubling of juvenile salmon since the spring Record of Decision flows have been implemented, however not all the juveniles come back as adults
    - One clue: Juveniles after this was implemented are smaller than before
      - Studies show bigger fish survive better
- How do we improve salmon survivability?
  - How do hydrographs influence different stages of the life cycle
    - ROD flows concentrate all the water during one point in time later in the year than natural flows
    - During the salmon juvenile rearing period there is no increase in flow
      - Naturally during that time river would be getting on the floodplain, which have been shown to be productive habitats for the small soft bugs that the young fish can eat
        - The increase floods also wipe away the difficult to eat invertebrates leaving more room for the small soft invertebrates
        - During ROD there is no flooding creating food for the young fish
      - When water is released during the ROD it is coming out cold and a lot is coming out
        - Young fish do best in mid-range temperatures (55-63 degrees)
          - Temperatures coming out of Lewiston are mostly in the minimal growth range, doesn't get higher into marginally impaired growth until March
          - In Douglas City the release of water in May is having a chilling effect on river temperatures
        - The effect of the release of water late has had the effect of keeping fish hungry and chilling them
        - Forecasting has greatly improved, so there can be an attempt of releasing water in conjunction with how water would naturally flow
          - Leads to using water earlier in the year while still being conservative about water release
  - Plan will be to synchronize water release with storm activity from mid December through mid February, allowing for natural changes to geomorphology and flooding river during juvenile feeding season
  - Starting in mid-February will be an increased base flow season
  - Mid-April will have a simulated snowmelt period with reduced water as water has already been used earlier
    - Ex. In water year 2024 there would have been synchronized storm pulses in January with an increase in base flows in March
  - These changes should mimic the natural flow of the river better than before, creating better conditions for the changes

### Questions:

David Colbek would like to clarify his understanding of how TRRP handled adaptive management in the past and if they have adapted the initial diagram of flows from 1999. Eric stated that they have revised the shape of the flows but the timing has still been locked into the mid April start with the exception of 2023 where they got permission to implement some of the planned changes but missed the timing due to complications with the dam, leading to releasing flows in

### Questions?

Contact Annyssa Interrante at 530 623 6004 X 209 or email at [ainterrante@tcrwd.net](mailto:ainterrante@tcrwd.net)

## Trinity River Watershed Council – December 10<sup>th</sup>, 2024

mid-March. The increased flow from big storm events and this release lead to many lost fishing days, unpopular with guides.

David Colbek would also like to know if optimal temperatures would be achieved with dam releases in December. Eric responded that the optimal temperatures wouldn't be achieved in December but distributing cold water over a longer period of time will create a reduced effect of cold water. There will still be some drop but should be less drastic during the important months of late April and early May

### Partner Updates

#### Shasta Trinity NF

##### Amelia:

- Crews found flow monitoring logger, zero to four meter logger from Forestry Suppliers. Serial number is 1-80-376-12.
- Galen is retiring in March, Fran Nessler will be moving into hydrologist position. Hyampom fuel reduction fisheries report is almost done. Make sure agreements with Forest Service that expire at end of year and have money on them are processed for extension.
- Ben Sundall is still in detail as district ranger through January. Fred Perrin is currently detailed as deputy district ranger until March. Tara is back but unsure at what role while those two are finishing up.
- Forest Service and BLM will not be able to use the same structure for utilizing the PEA. There will be slightly different processes on between the two different agencies to be able to work underneath the PEA. Forest Service will still require site-specific NEPA.
- Spawning surveys will be over soon.
- Currently supporting the Watershed Center in their South Fork OHV and Bowerman NEPA project.
- Big Ranch has started.

#### NRCS

##### Karl:

- EQIP application period has closed, and we are working with NRCS to get those ranked for the next funding year.

#### TRRP

##### Eric:

- Hopefully at some point this week we will hear back from the Department of Interior whether or not we're able to do environmental flows this winter.

#### Yurok

##### Sandra

- Yurok Tribe was able to implement a missing piece of the Indian Creek Phase 1 floodplain project that was largely built in 2020, but there was a small area at the very upstream portion that wasn't able to be built due to a private mining claim that was since abandoned. Was able to get funding to implement the last piece of it; there's floodplain fill at the upper end along with large-width structures and some grid control that has been installed.
- Have been tentatively awarded funding to get the Weber Creek project implemented as early as next year. The agencies are still going through some final review process
- Put in a request to the DWR Stream Age Improvement Program that was featured at one or mentioned anyway at one of the last meetings here, and was invited by DWR to submit an application which is under review. Hopefully will be able to re-establish a gauge on Weber Creek.

### Questions?

Contact Annyssa Interrante at 530 623 6004 X 209 or email at [ainterrante@tcrd.net](mailto:ainterrante@tcrd.net)

# Trinity River Watershed Council – December 10<sup>th</sup>, 2024

## TCRCD

### Annyssa:

- Currently still have a program manager vacancy for the watershed program. If you are interested or know anyone that would be qualified, please contact Kelly Sheen about that.
- Working on environmental compliance pathways for the Upper Trinity Project with the Watershed Research and Training Center, potentially including a programmatic.
- Also moving forward with site selection and NEPA in the Weaverville Community Forest for beaver dam analogs and working closely with the Forest Service on that, and assessing potential future funding sources for the Trinity River Watershed Council.
  - We have a potential extension on it through the end of 2025, but if there are any partners that are writing grants that would like to include the Trinity River Watershed Council, please consider it so we can keep this collaborative group going.

## WRTC

### Leslie:

- The Klamath Meadows Partnership Group has been meeting once a month, and are exploring a larger NEPA document to cover the entire Shasta Trinity National Forest for meadow restoration.
- Joe Rodarm suggested the condition-based management approach.
  - The Upper Trinity CEQA document, and possibly 401 permit as well, might cover the entire Trinity River Watershed.
- Working on is the West Tule Fish Migration Project.
  - Removing a small dam that is a complete fish barrier.

### Bridger:

- Wrapped up inventory effort for this season and did that in partnership with some Forest Service staff, and also the RCD got physically to about 40-something meadows, and then have quite a few more that are on the docket to potentially get out in inventory next year to support the Climate Meadows Partnerships overall inventory effort for this region.
- Awarded some NIFWF funding the Salt Creek Floodplain Restoration Project right there at the confluence with Hayfork Creek
  - Not full funding to actually implement that project
- Received NIFWF funding to do an assessment of the upper Hayfork Creek drainage, including East Fork Hayfork Creek.

## Flowra

### Chris:

- The 319-H grant that we applied for back in December of 2022 with the Water Board, we signed a contract on October 23rd. So 22 months later, we have a contract. We're planning to have a ranked final kind of process for road restoration next spring. Although it's a sediment reduction grant, we want to do work in a way that will be helpful to the community. The grant is with Cannabis for Conservation.

## Others

### Greg:

- Small funding opportunity available through UC Berkeley for flood risk, contact Greg for more details

Meeting End 11:38 am

### Questions?

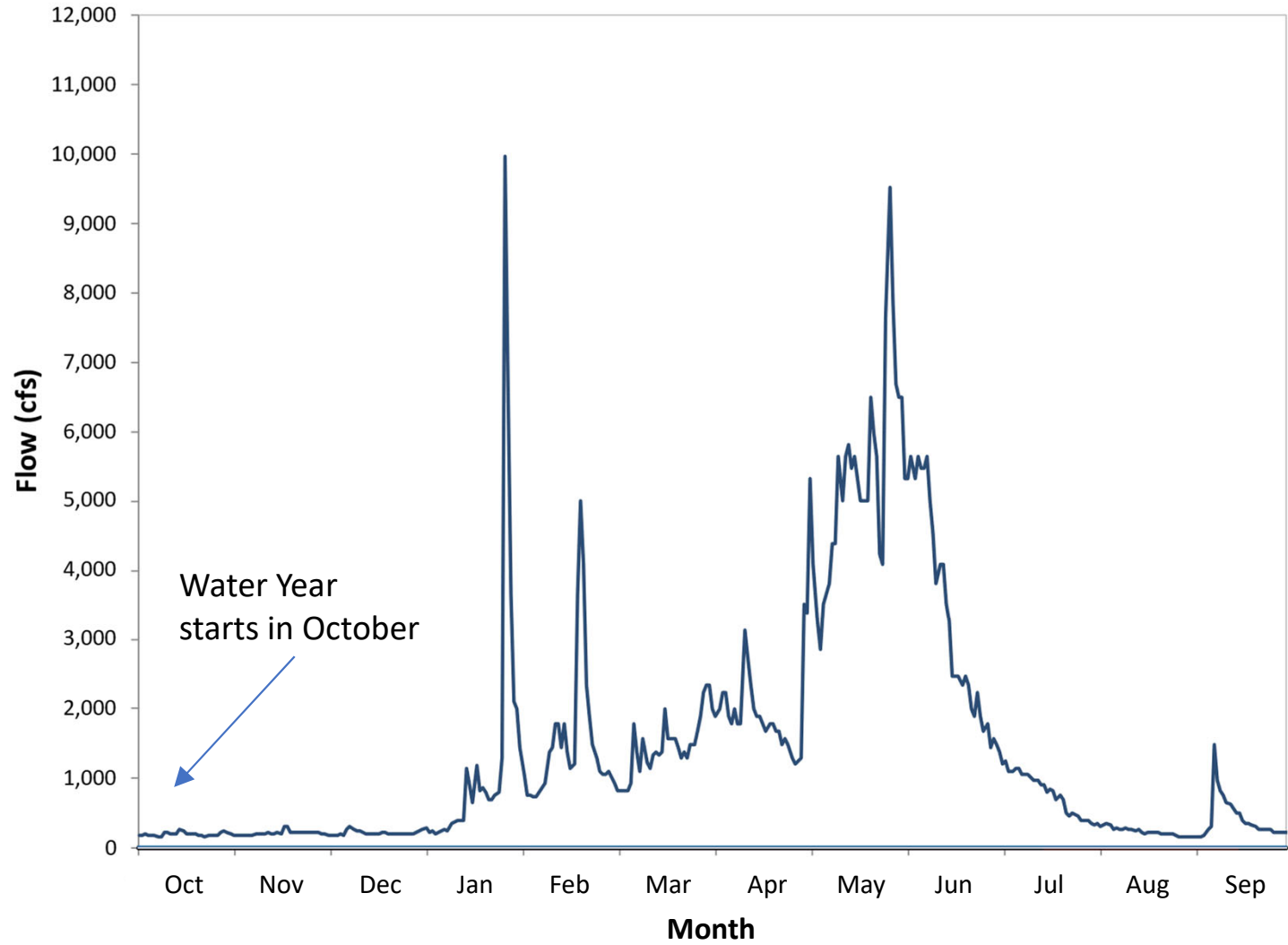
Contact Annyssa Interrante at 530 623 6004 X 209 or email at [ainterrante@tcrd.net](mailto:ainterrante@tcrd.net)



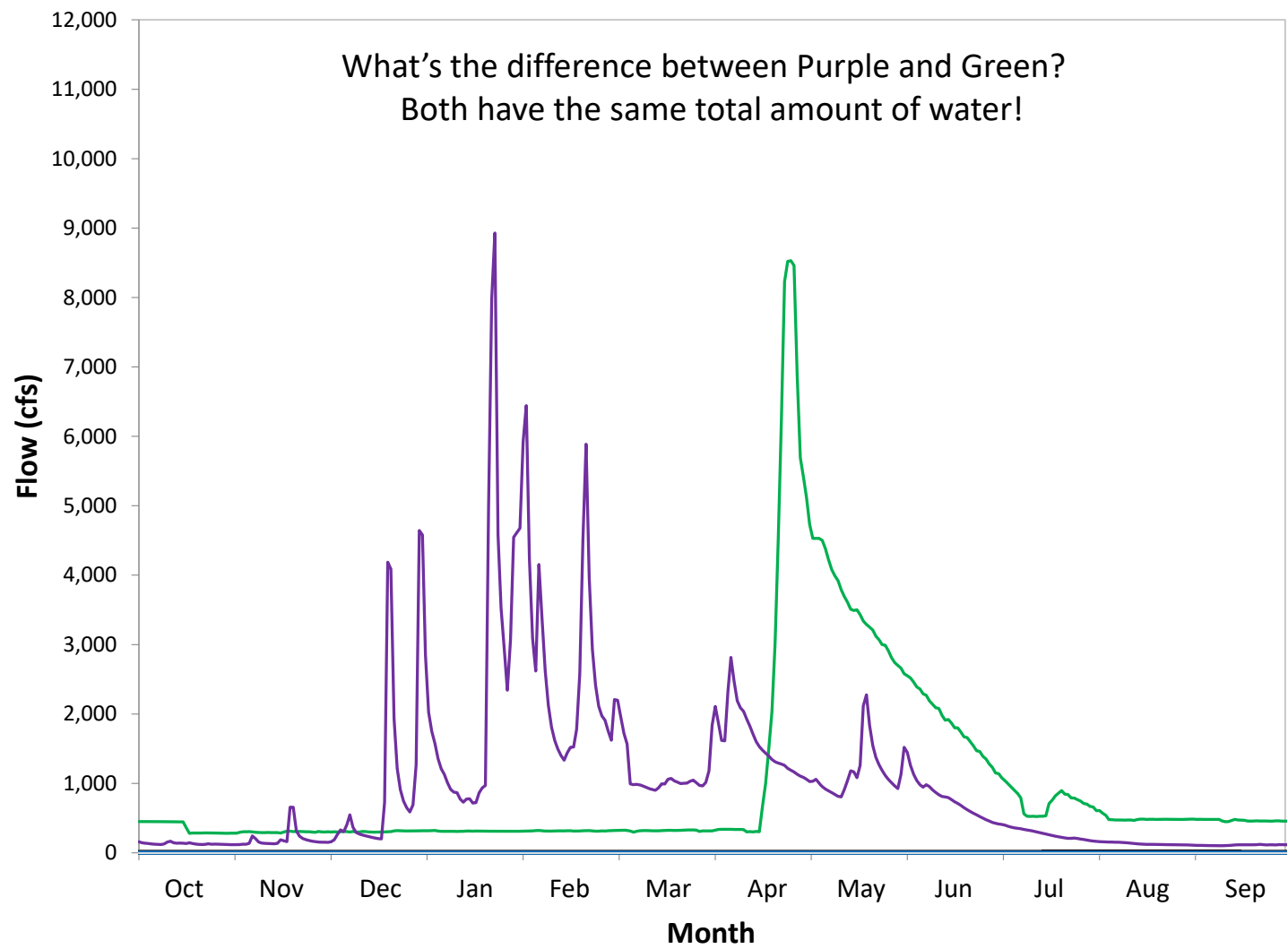
# Environmental Flows and the Factors that Limit the Chinook Salmon Life Cycle

Eric Peterson

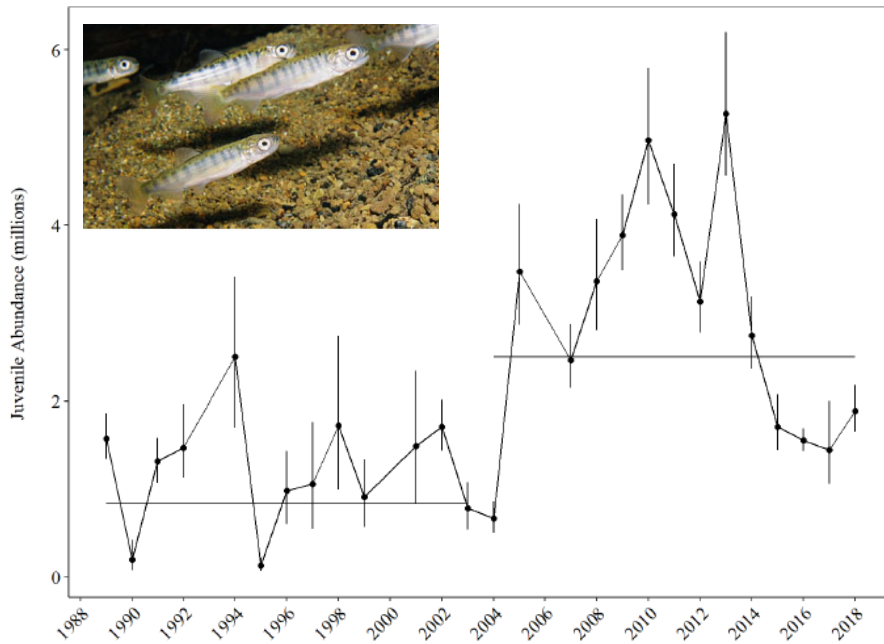
Flow... drawn as a **hydrograph**





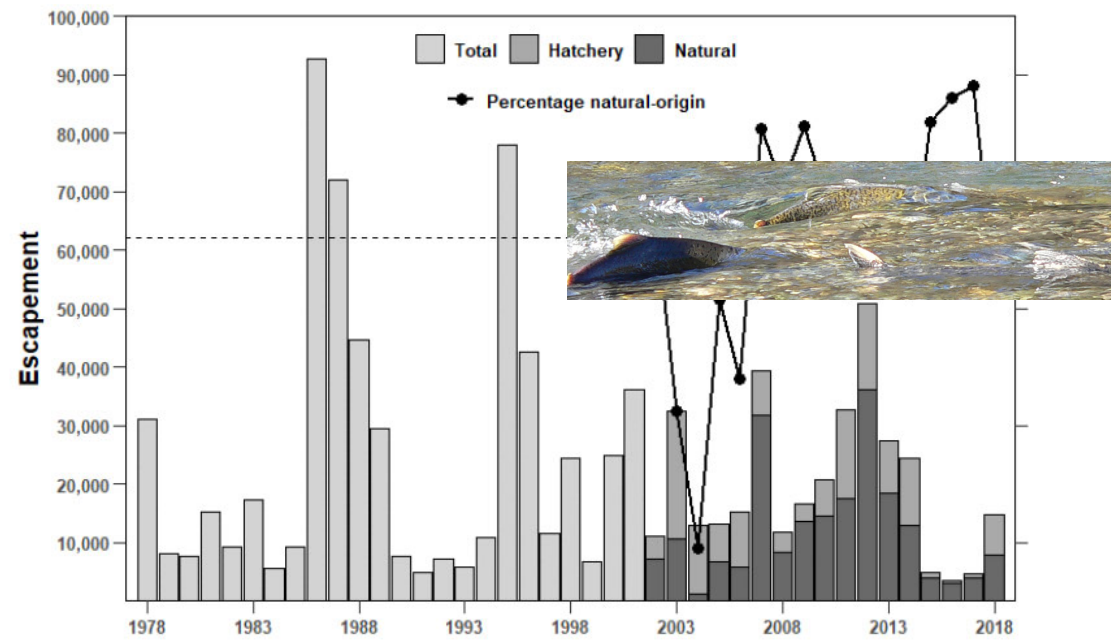


# Spoiler Alert! The Current Situation...



Years, from 1988 to 2018

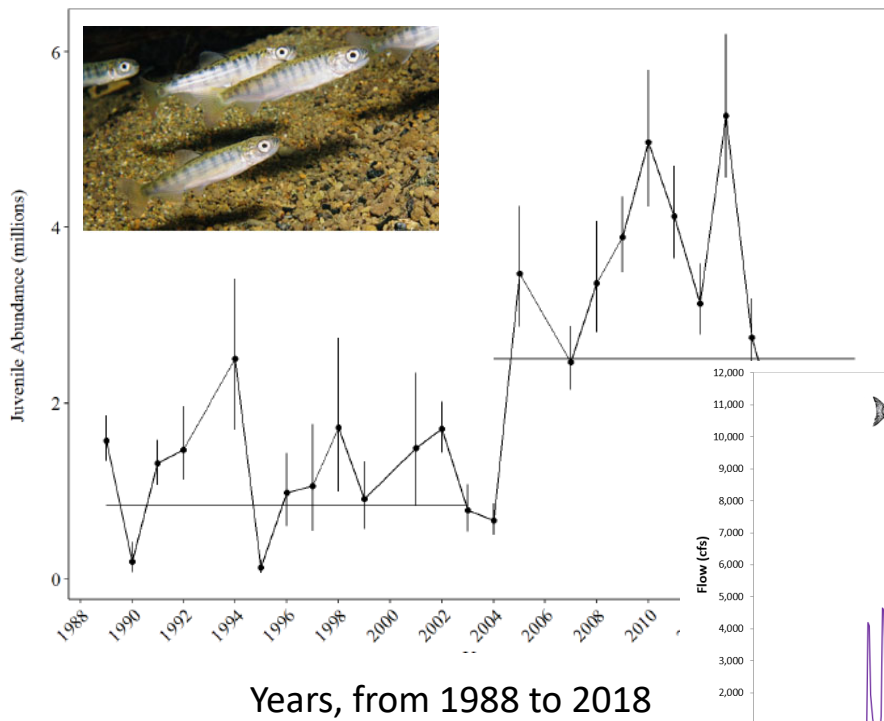
Pinnix et al. (2022)



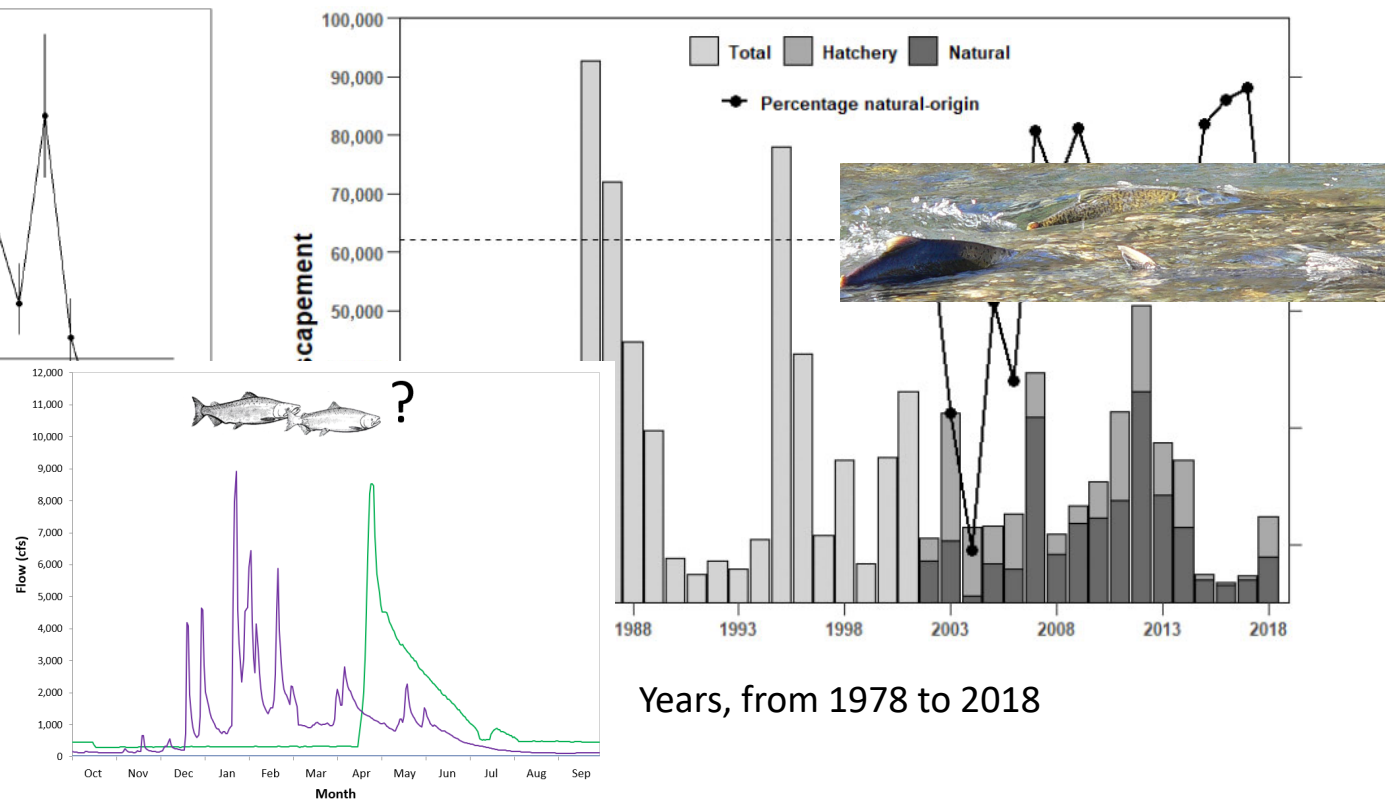
Years, from 1978 to 2018

Gough et al. (pending)

# Spoiler Alert! The Current Situation...



Pinnix et al. (2022)



Gough et al. (pending)



Why  
restore  
this  
beautiful  
river?

Form

Function



~~Form~~

1849 – 1950ish



~~Function~~

1960 – ???



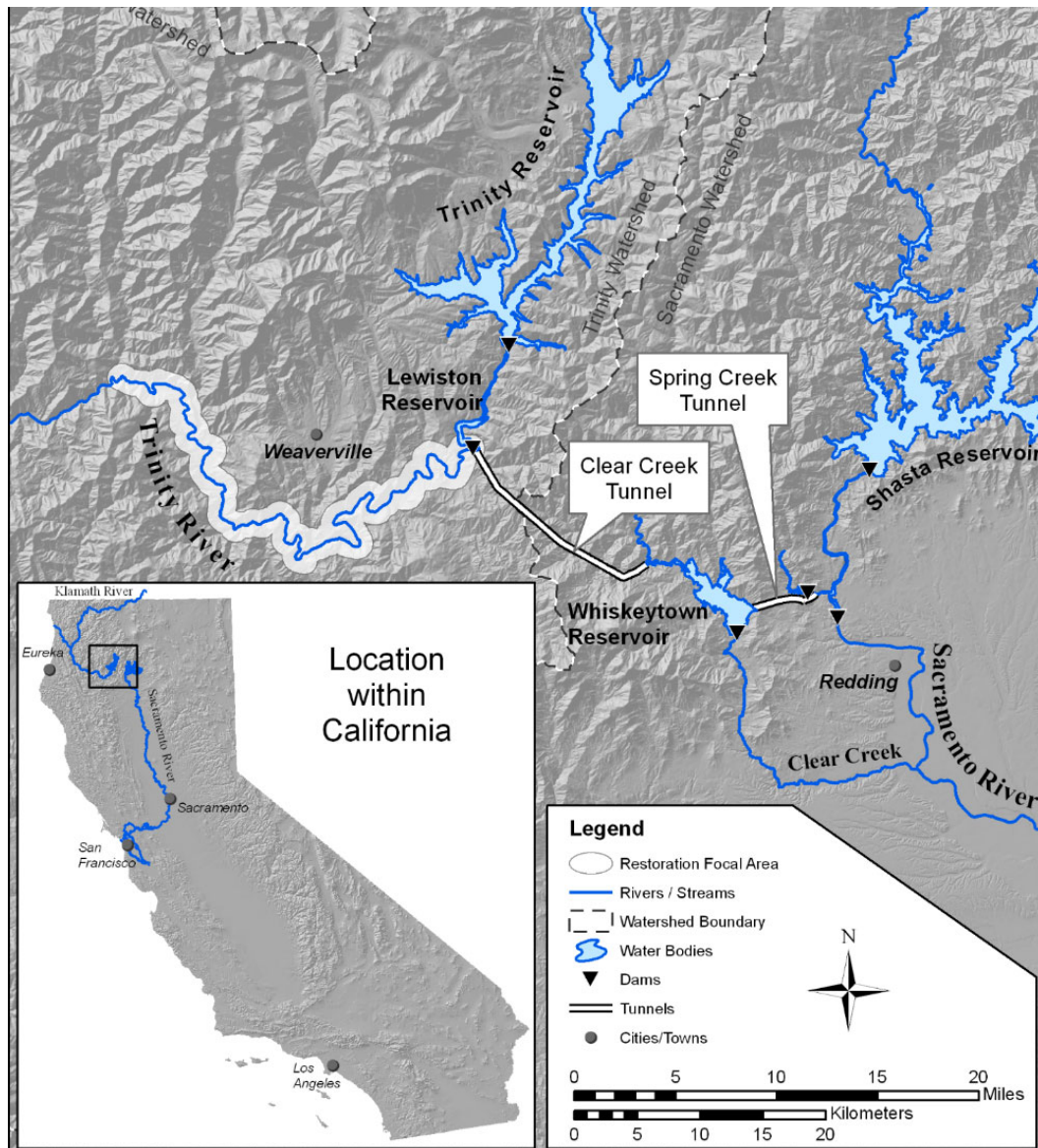
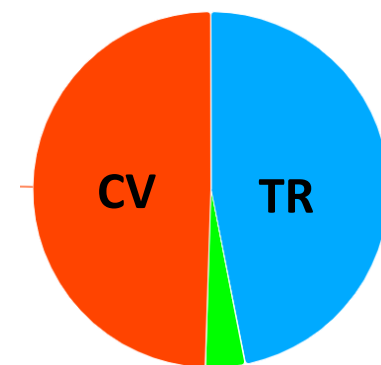


Photo: Van Matre family



**First 10 years of full operation (1964-1973):  
89% of the reservoir  
flowed through the  
tunnels to the  
Central Valley**

**Since 2000**

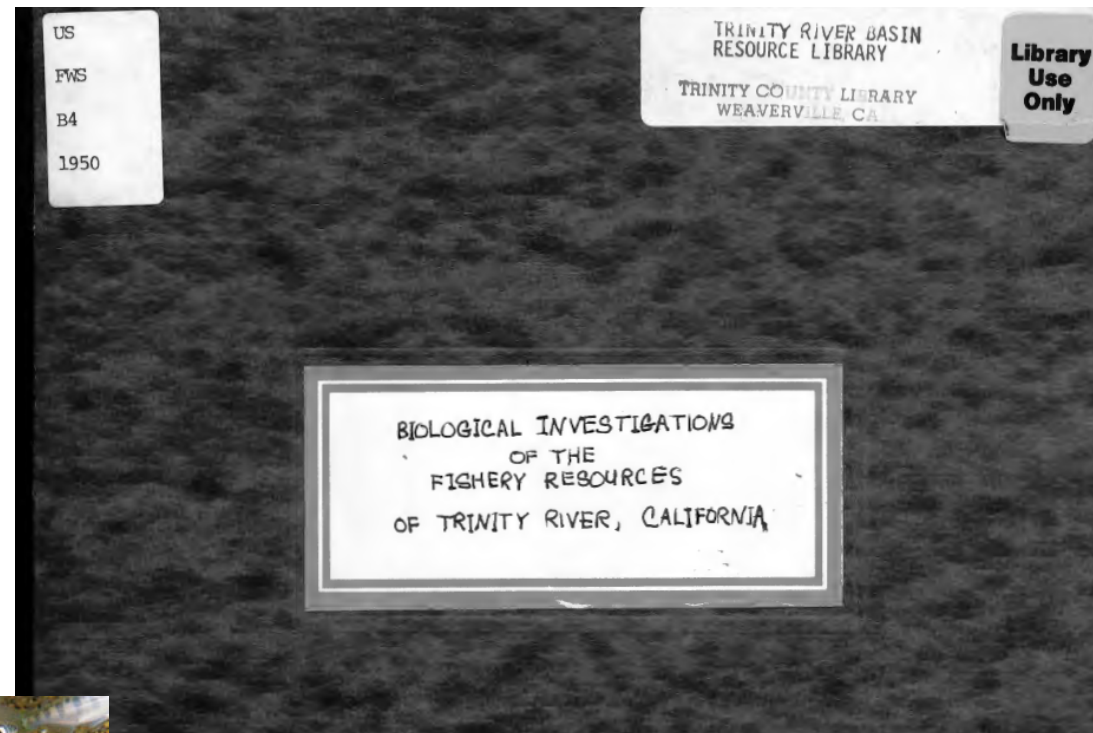
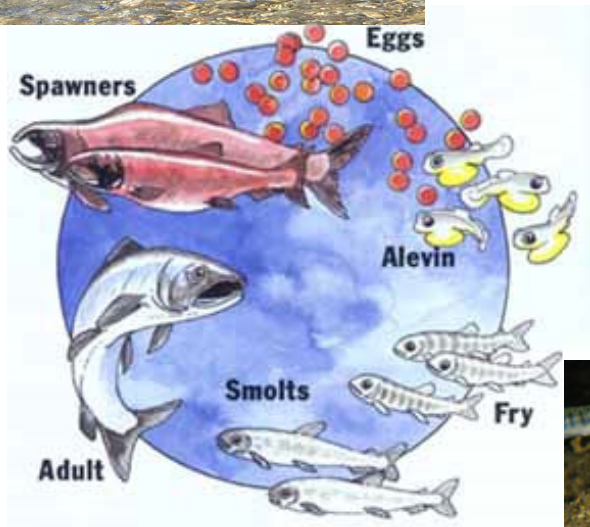


# Unintended Consequences

1950 U.S. Fish and Wildlife Service report  
by James W. Moffett and Stanford H. Smith



Showed that  
salmon primarily use  
slow, shallow water.



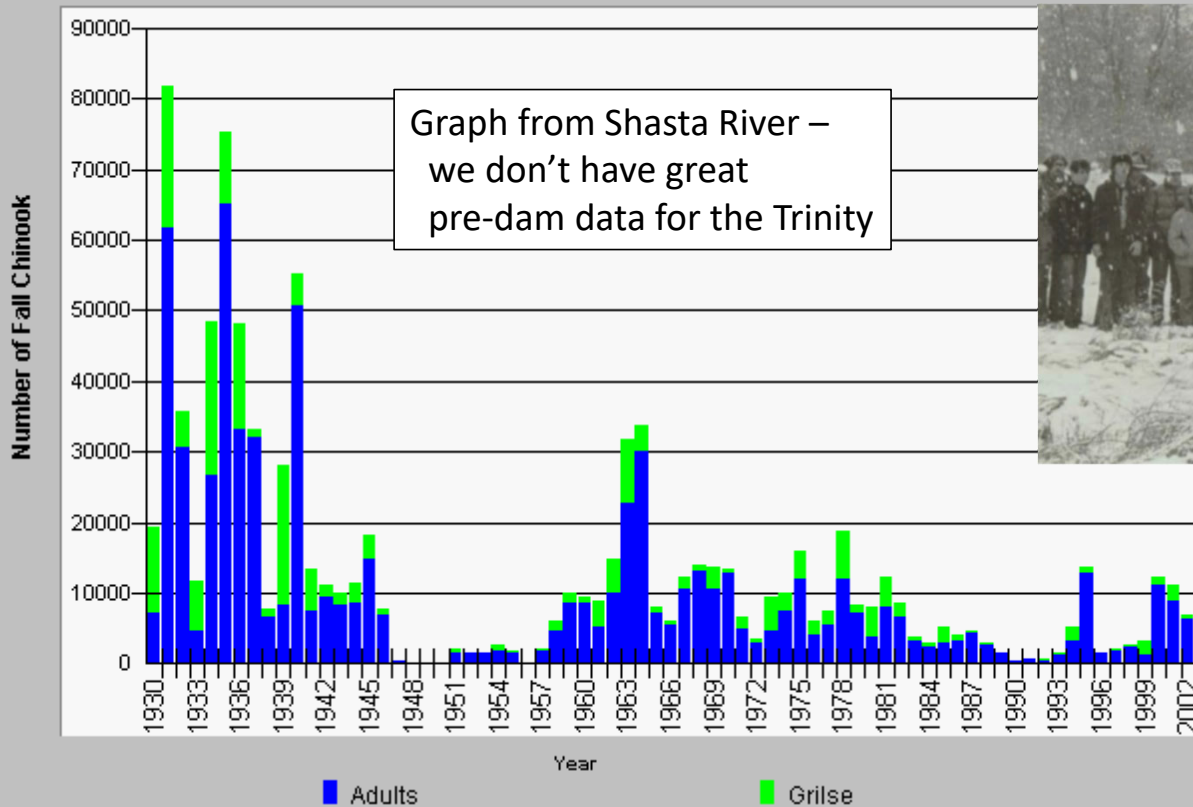
*... so... damming the river and sending all the 'extra' water to the Central Valley should be great!*



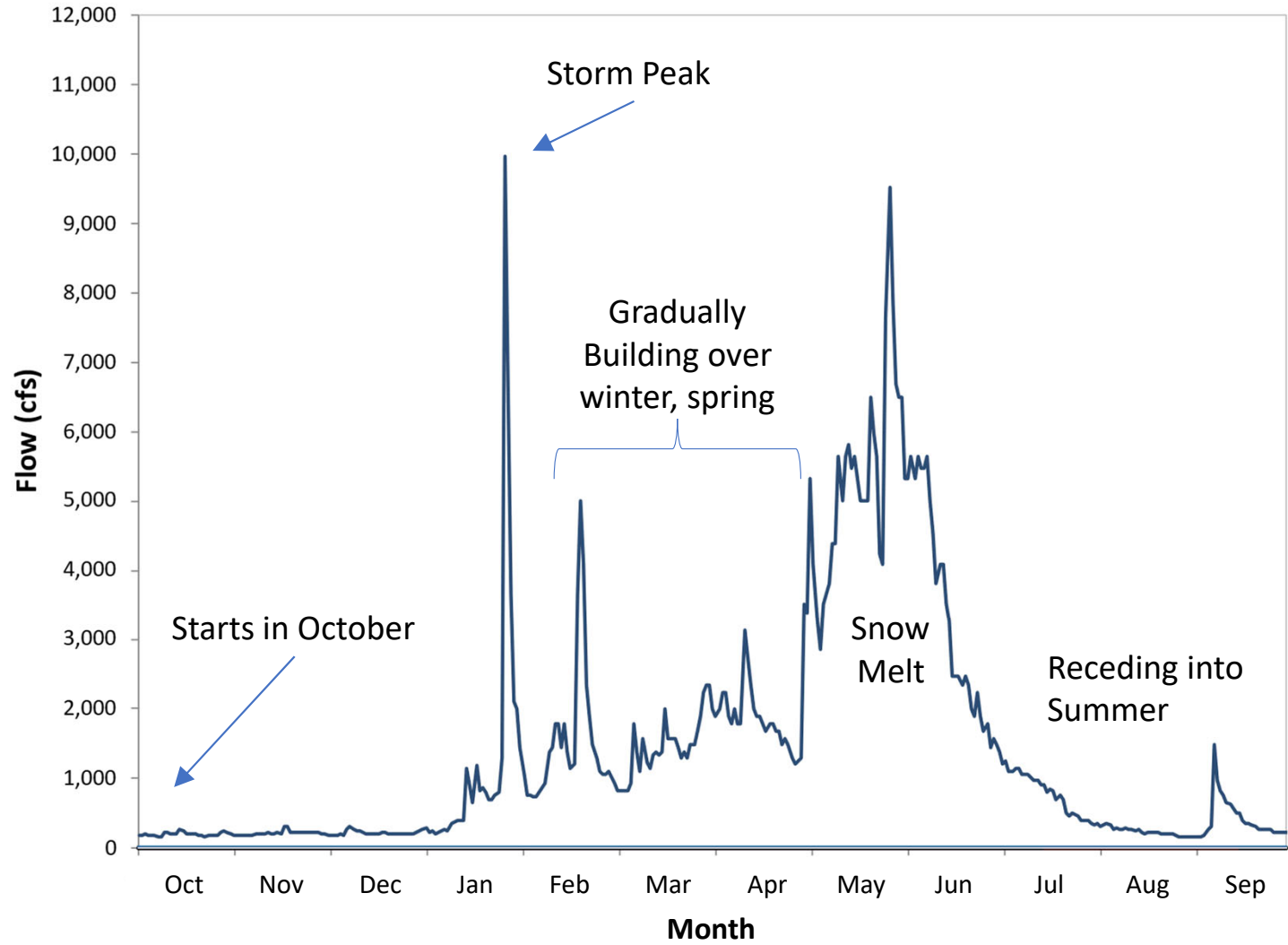
But, it wasn't so good...

Why?

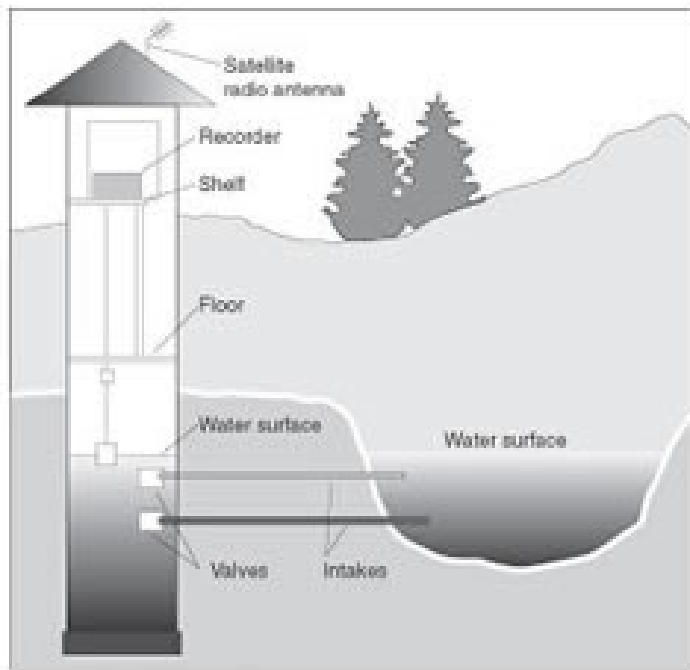
Shasta River Fall Chinook Estimated Spawning Escapement 1930 - 2002



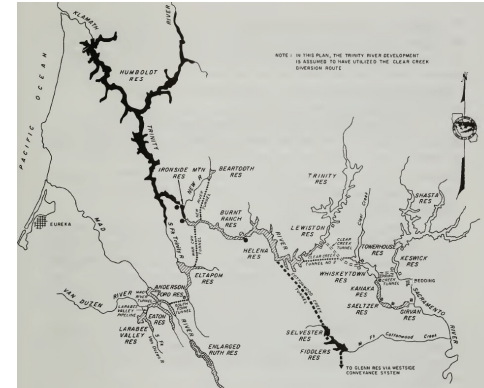
Flow... drawn as a **hydrograph**



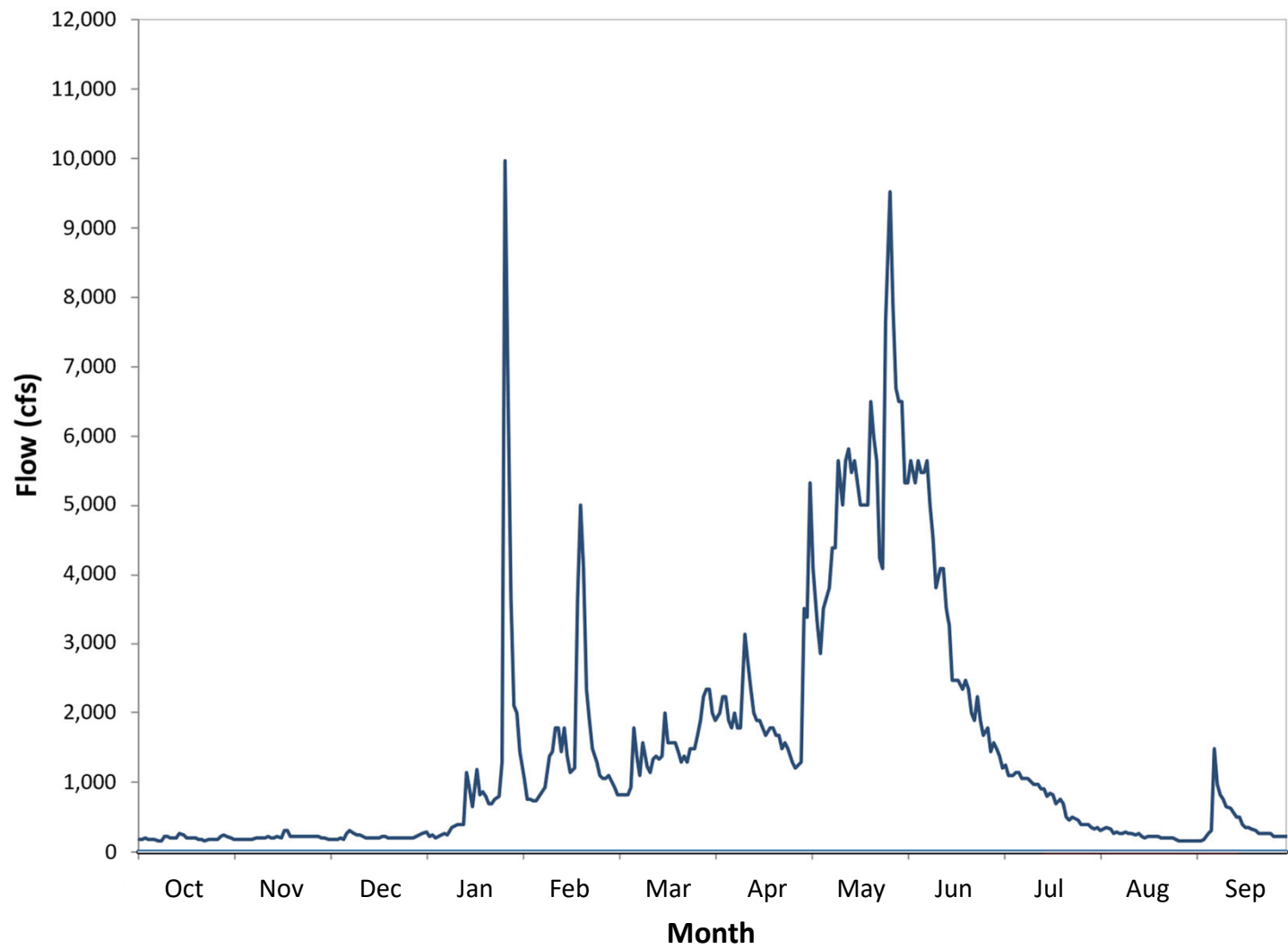
# Lewiston Streamgage started in October, 1911



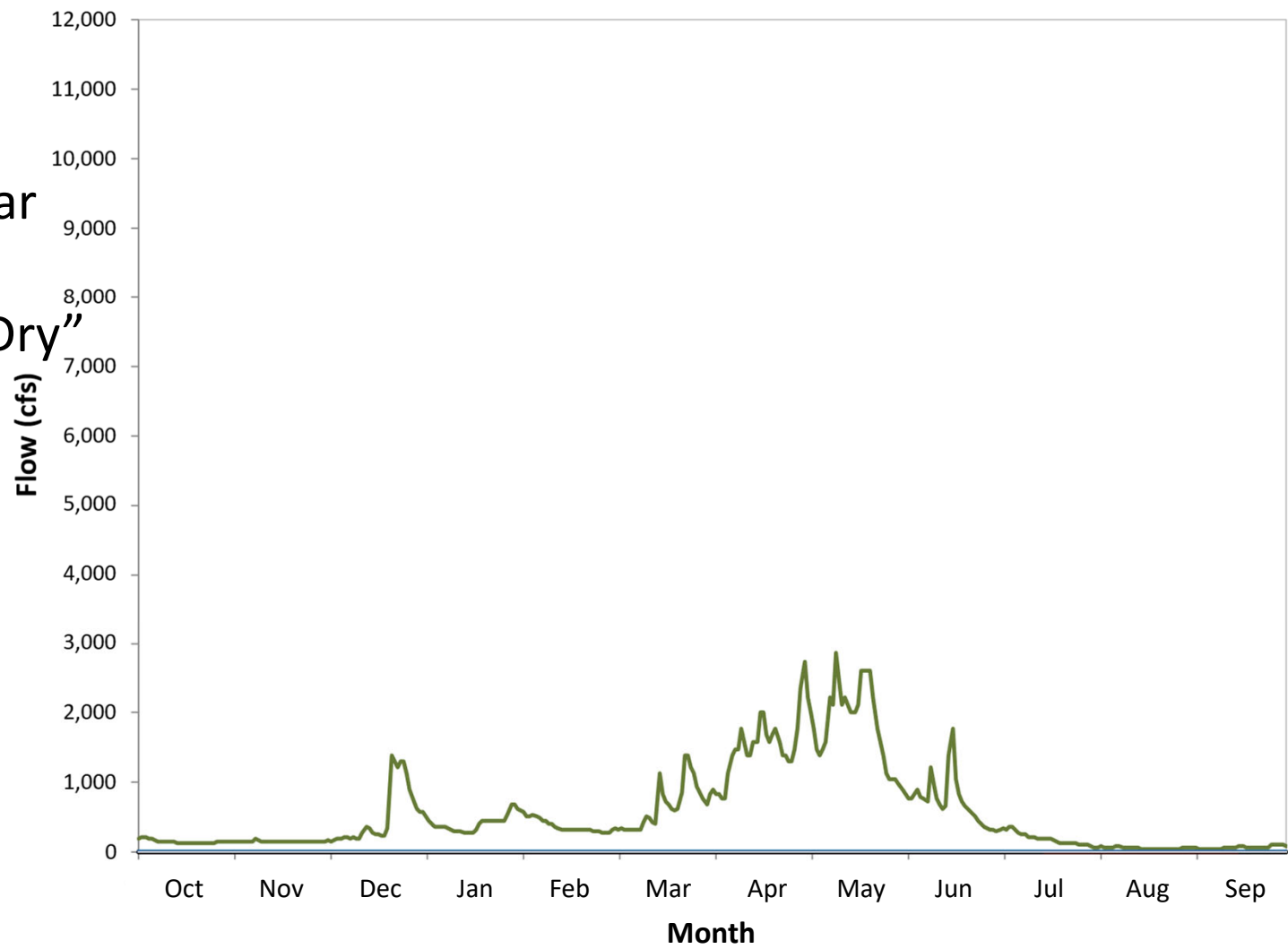
First Model T: 1908



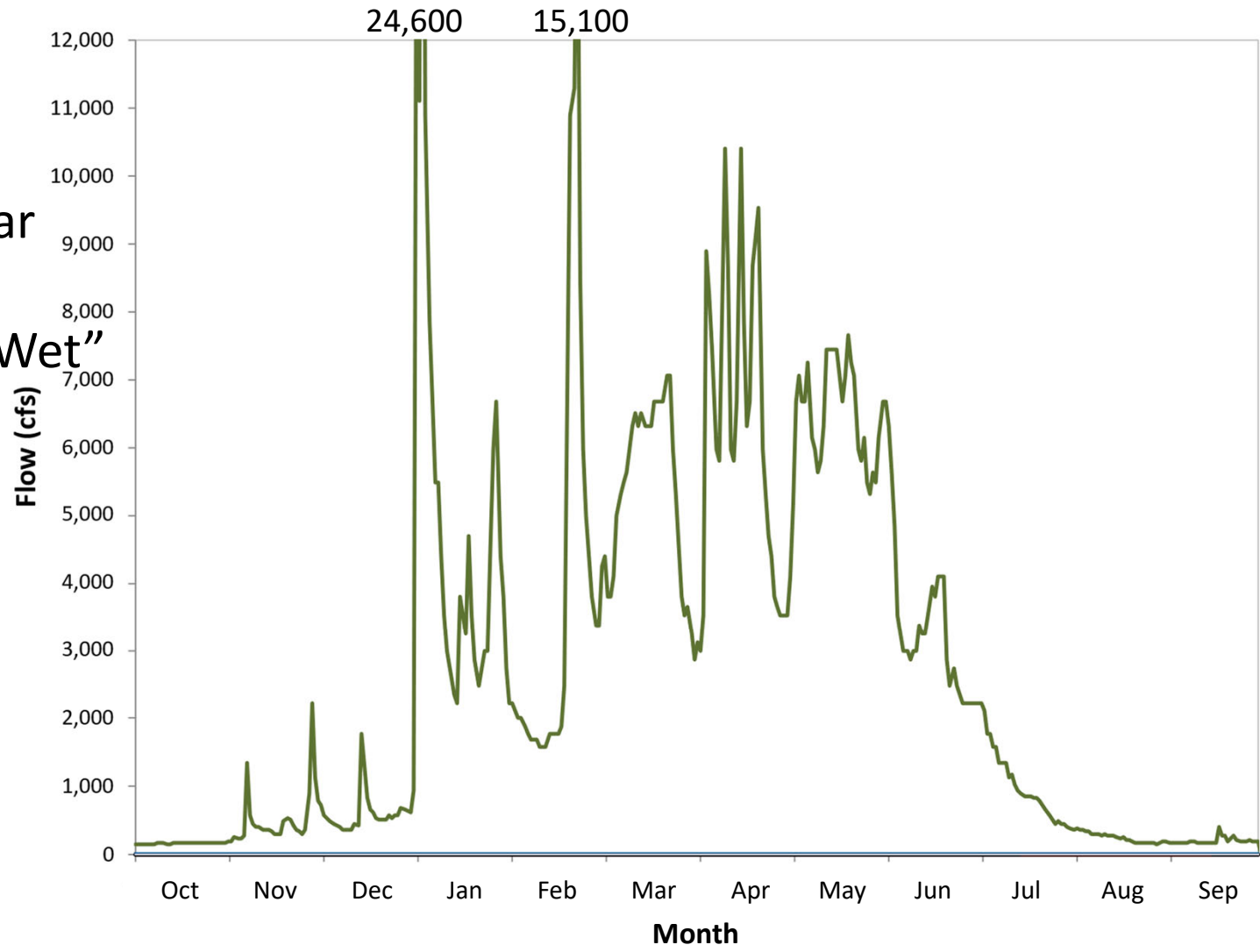
Water Year  
1912  
"Normal"



Water Year  
1920  
"Critically Dry"

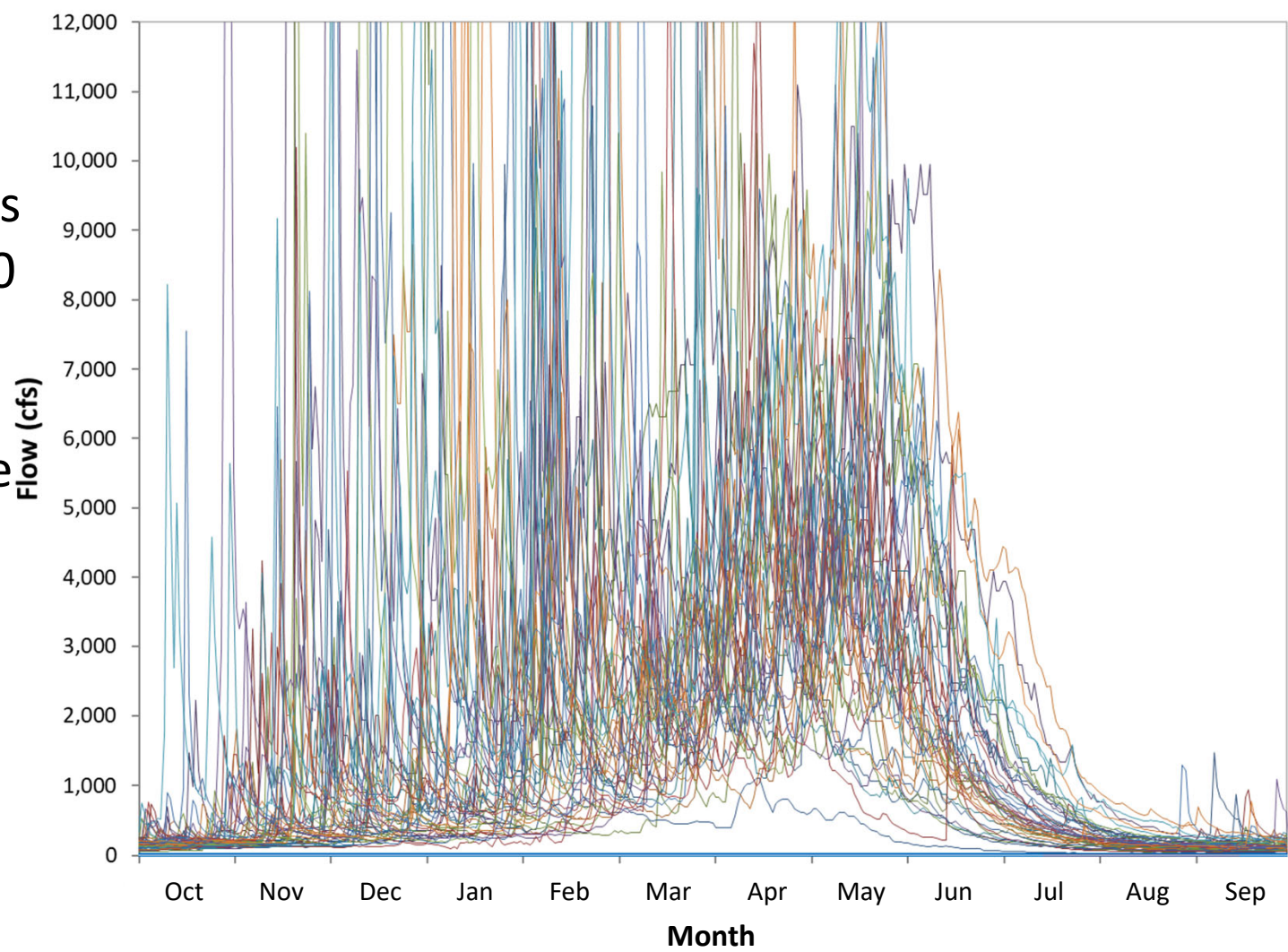


Water Year  
1914  
"Extremely Wet"



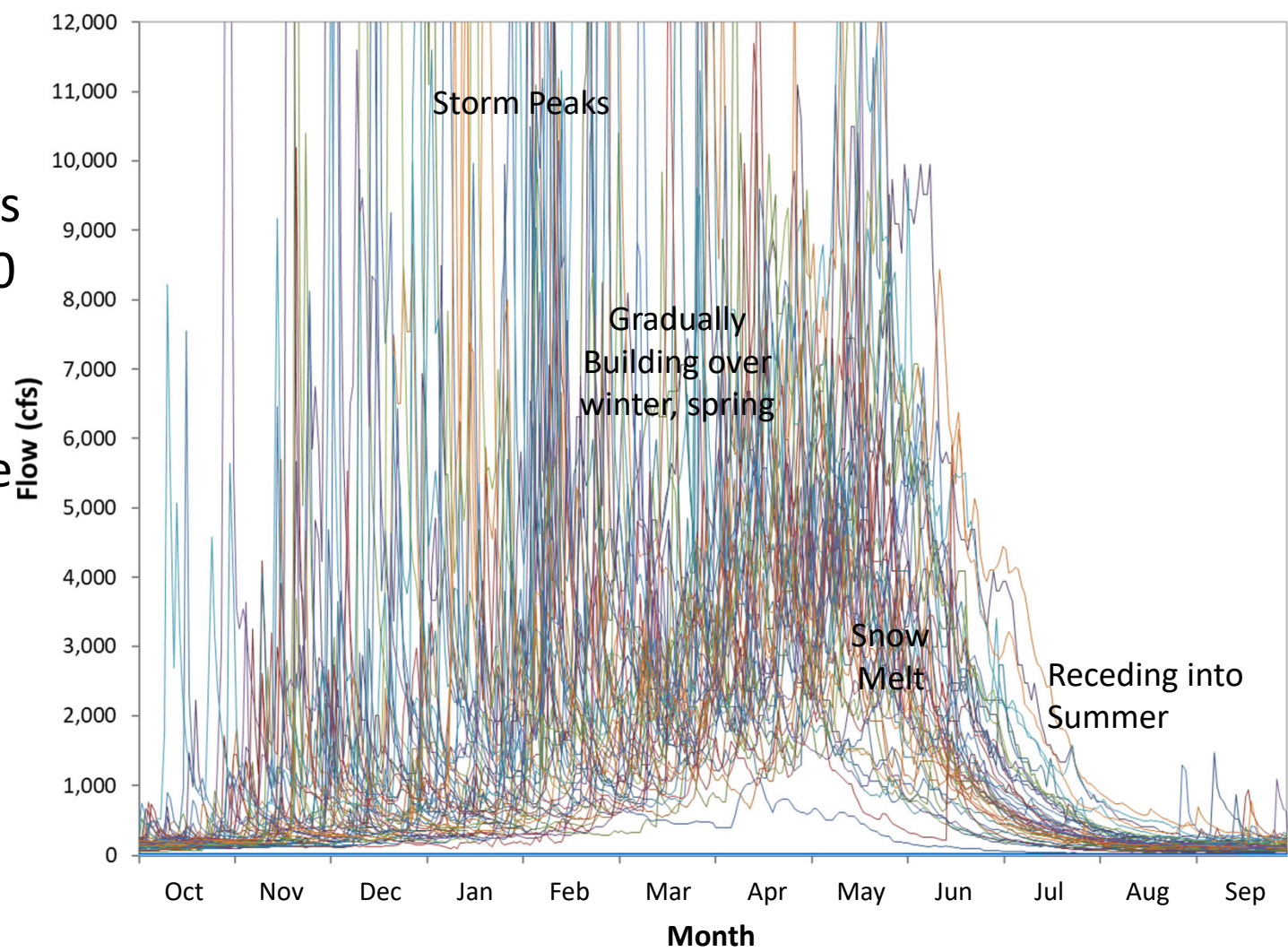
Water Years  
1912-1960

Before the  
dams



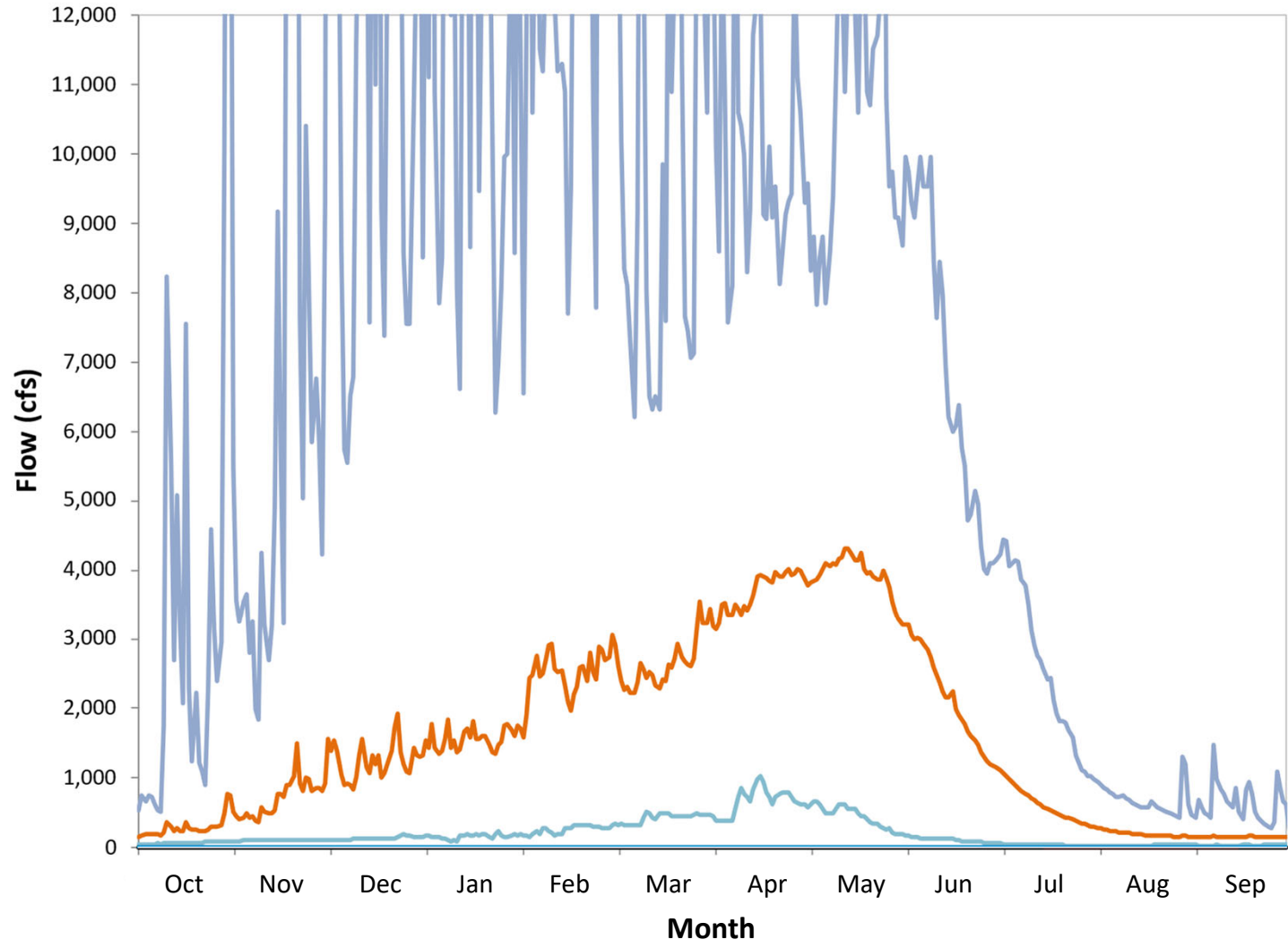
Water Years  
1912-1960

Before the  
dams





Maximum  
Average  
Minimum  
  
Before the  
dams



# Water Year 1961

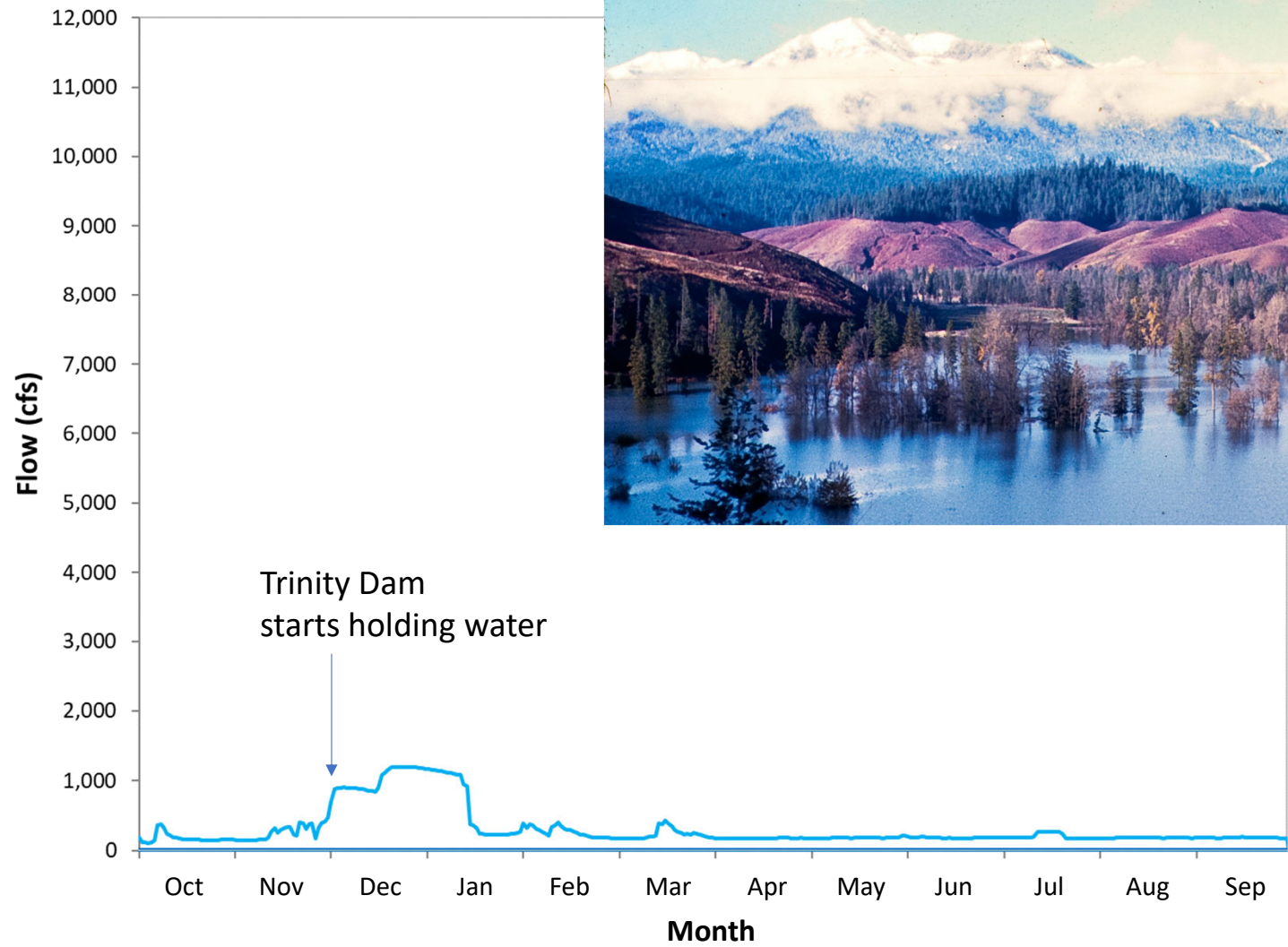
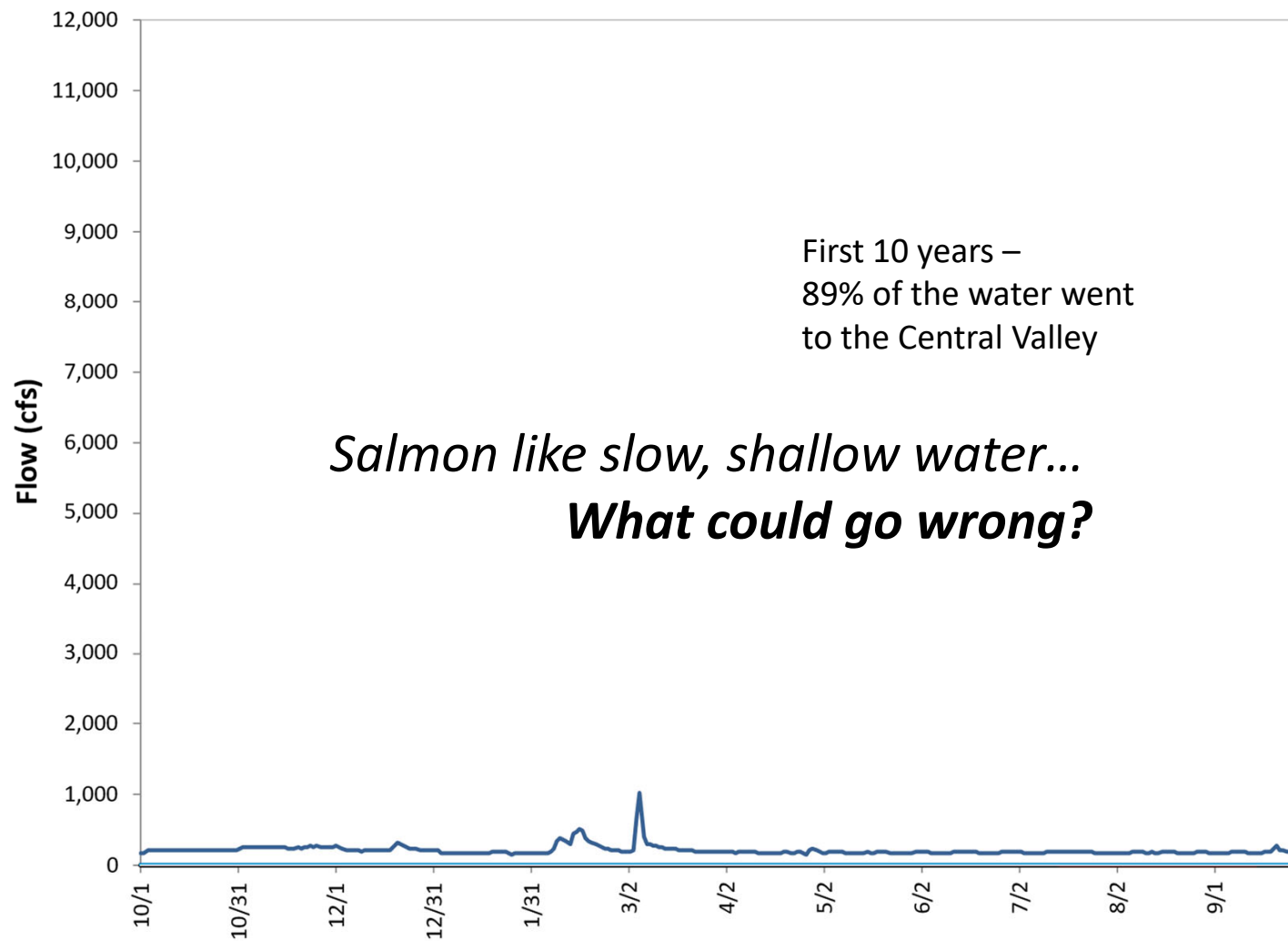
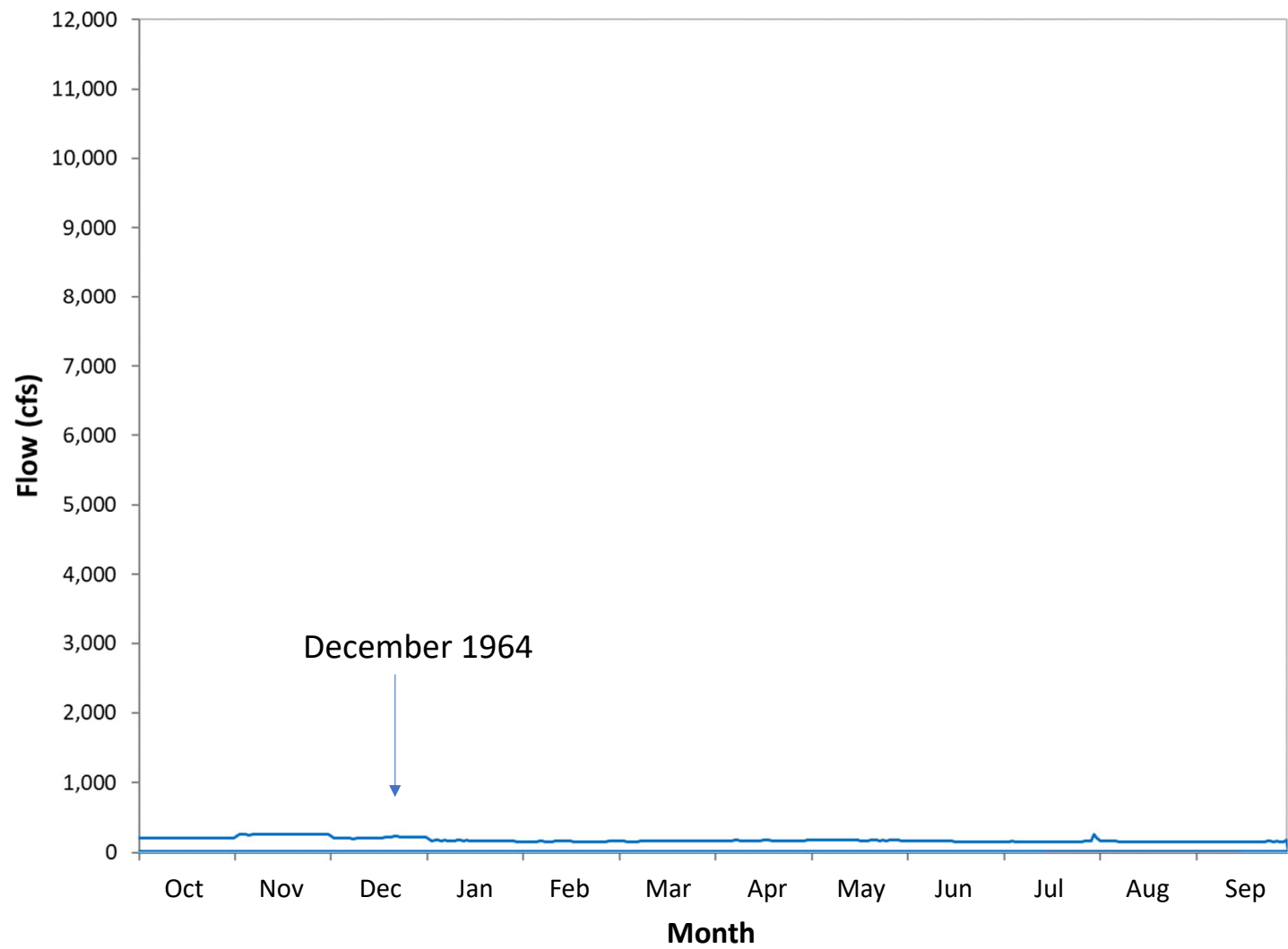


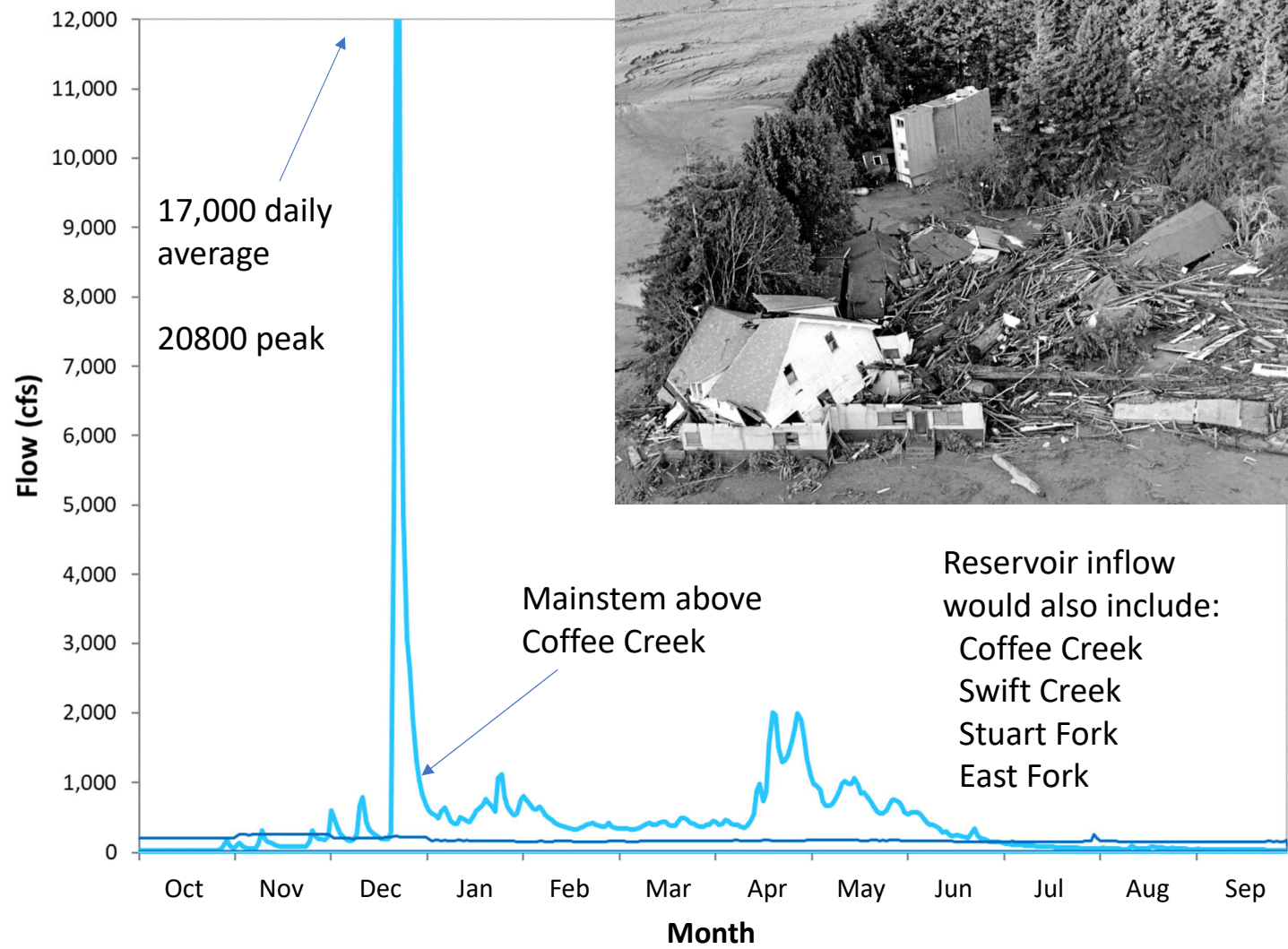
Photo courtesy of the  
Van Matre family

Water Year  
1962



# Water Year 1965





Pepperwood  
Humboldt Co.

Photo:  
Eureka Times Standard



**1960**

**1965**





**1960**

**2023**





**1960**  
**200 cfs**

**2023**  
**450 cfs**





# Poker Bar



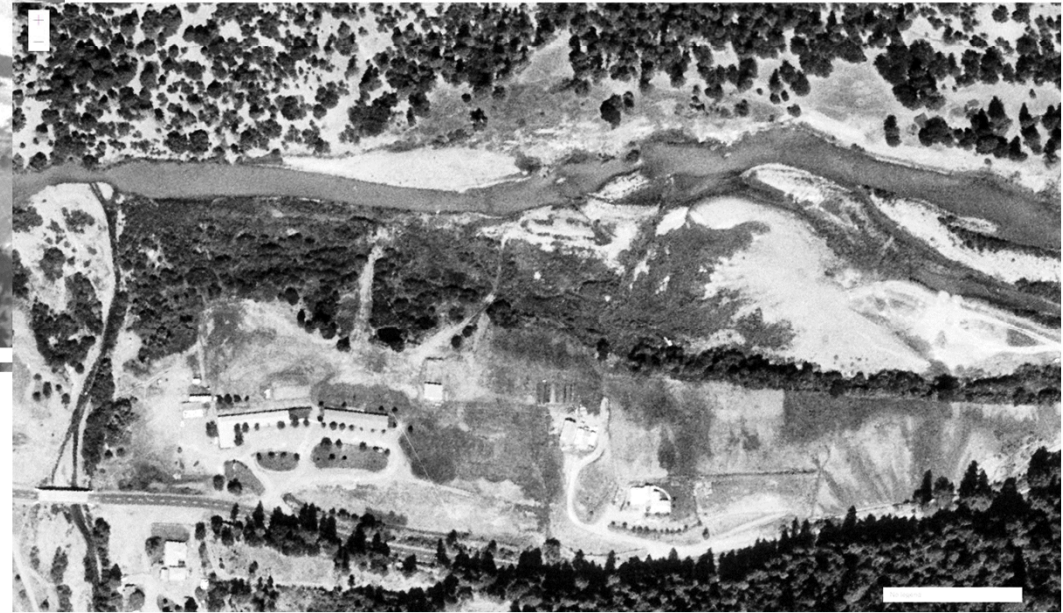


- 1963 memo (even before diversions actually started)
  - “Grass Valley Creek and other streams are building deltas into the Trinity river now that flows are controlled at a low level.”
- 1964 memo about a Lewiston landowner,
  - “wing dam built to keep the granite sand off the riffle”

# Willow and Alder Encroachment



1960



1965



Bureau of Reclamation digging sand out of pools...  
one had to be done twice in one summer!



Raking the spawning riffles to clear out sand.



# TRINITY RIVER FLOW EVALUATION

Final Report

A report to the:

Secretary  
U.S. Department of the Interior  
Washington, D.C.

1999

Prepared by:

U.S. Fish and Wildlife Service  
Arcata Fish and Wildlife Office  
1125 16<sup>th</sup> Street, Room 209  
Arcata, CA 95521

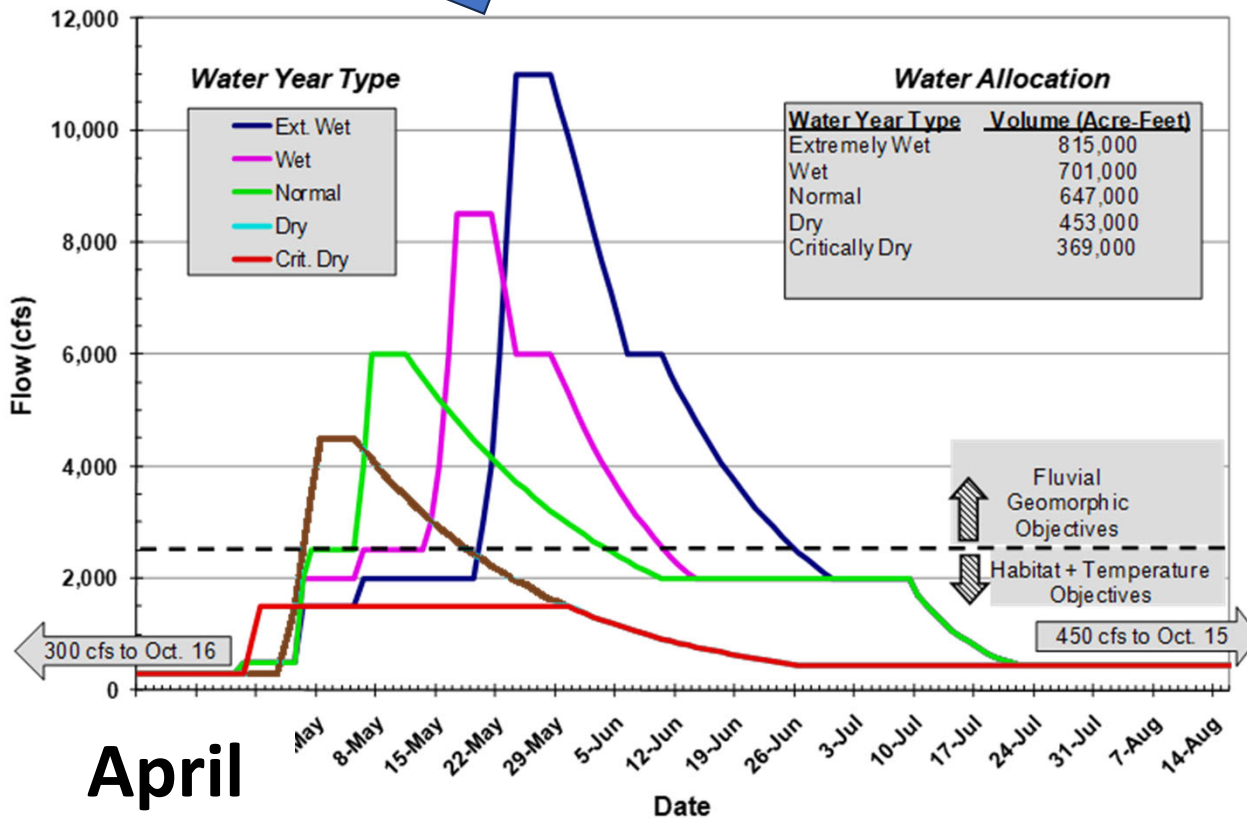
and

Hoop Valley Tribe  
P.O. Box 417  
Hoopa, CA 95546



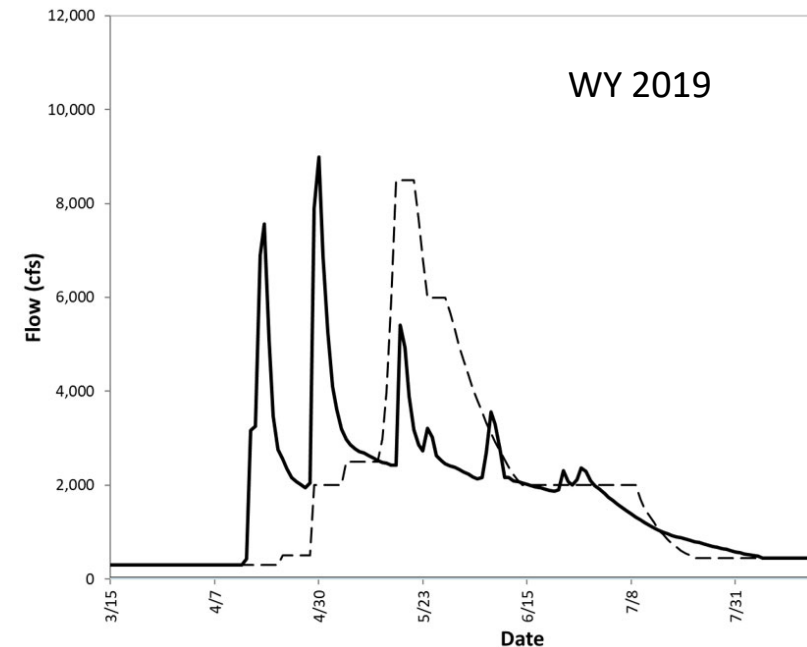


# 2000 Record of Decision (ROD)



## Adaptive Management:

“recommend possible adjustments to the annual flow schedule”





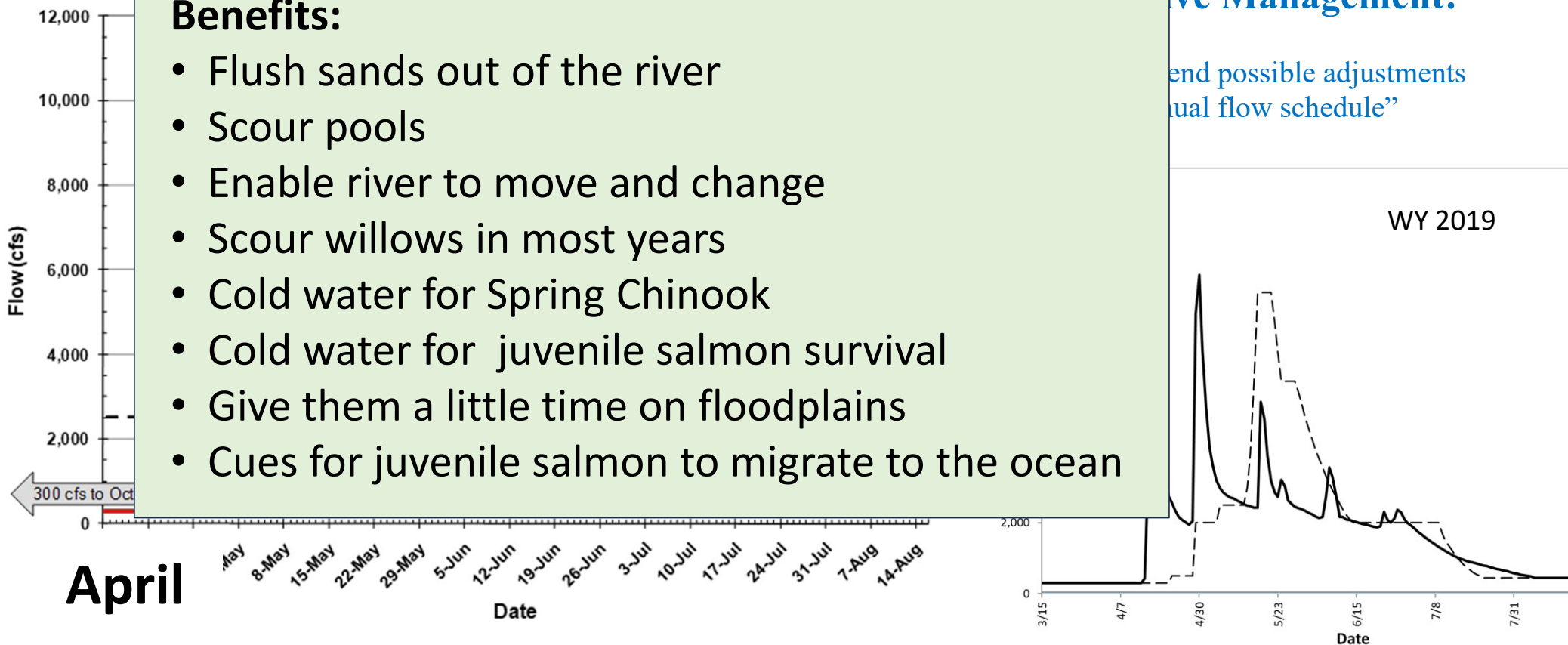
# 2000 Record of Decision (ROD)

## Benefits:

- Flush sands out of the river
- Scour pools
- Enable river to move and change
- Scour willows in most years
- Cold water for Spring Chinook
- Cold water for juvenile salmon survival
- Give them a little time on floodplains
- Cues for juvenile salmon to migrate to the ocean

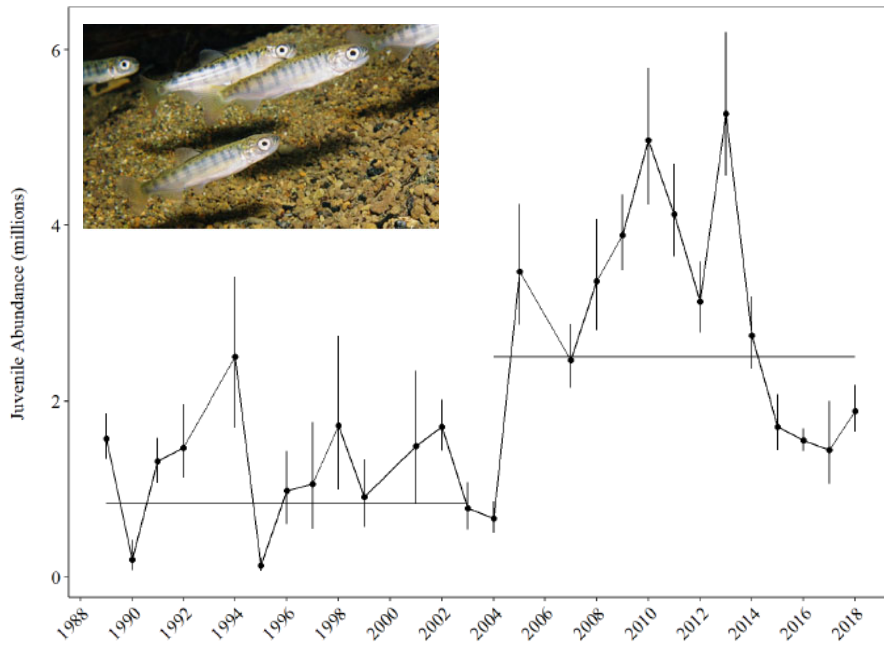
## Flow Management:

“...to evaluate and recommend possible adjustments to the actual flow schedule”





A huge advance!  
thought to be the reason for increased production.

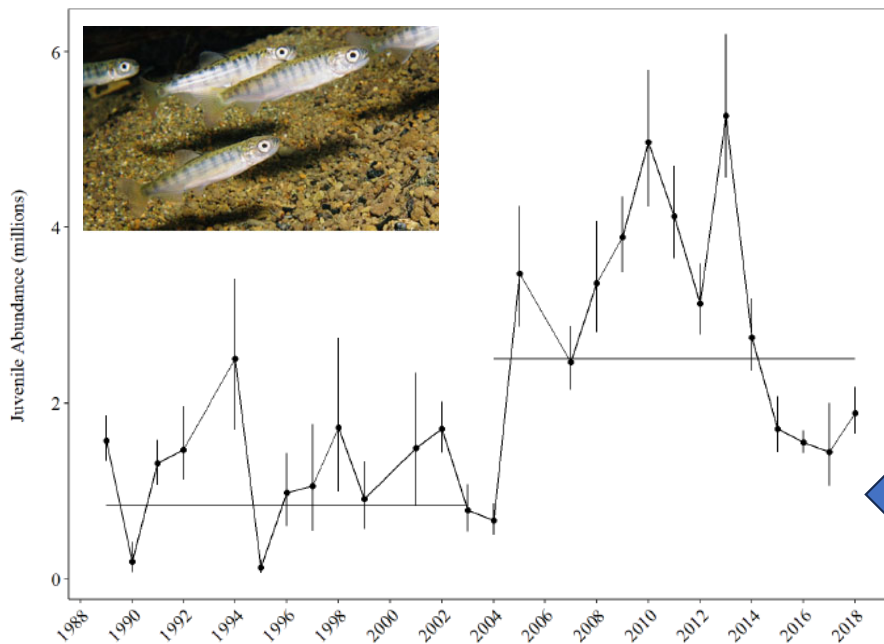


Years, from 1988 to 2018

Pinnix et al. (2022)

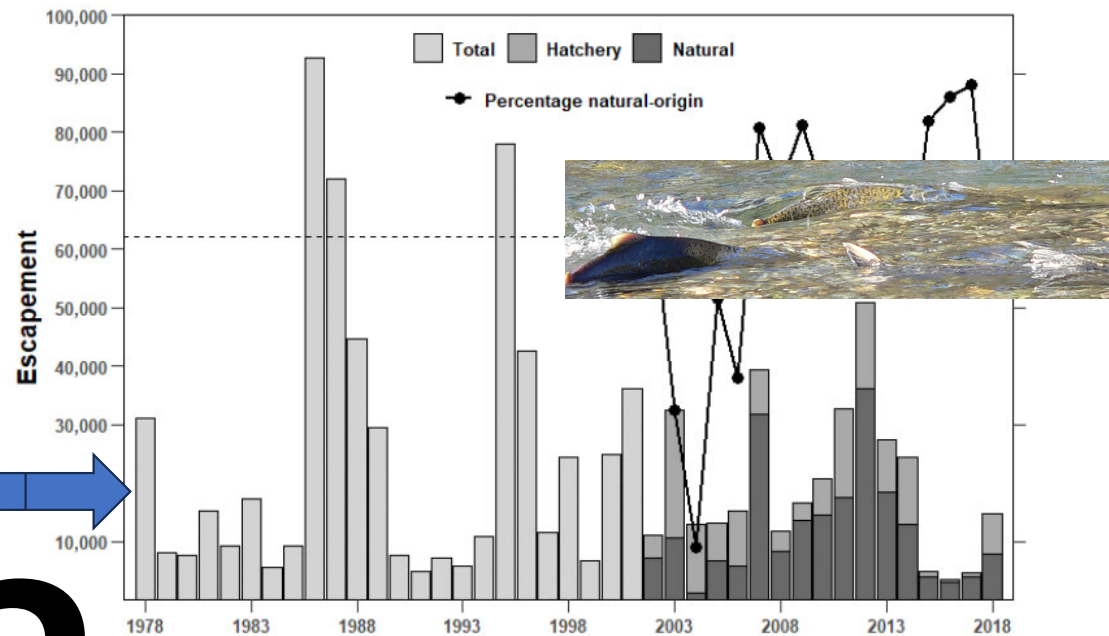
**Wahoo!**

A huge advance!  
thought to be the reason for increased production.



Years, from 1988 to 2018

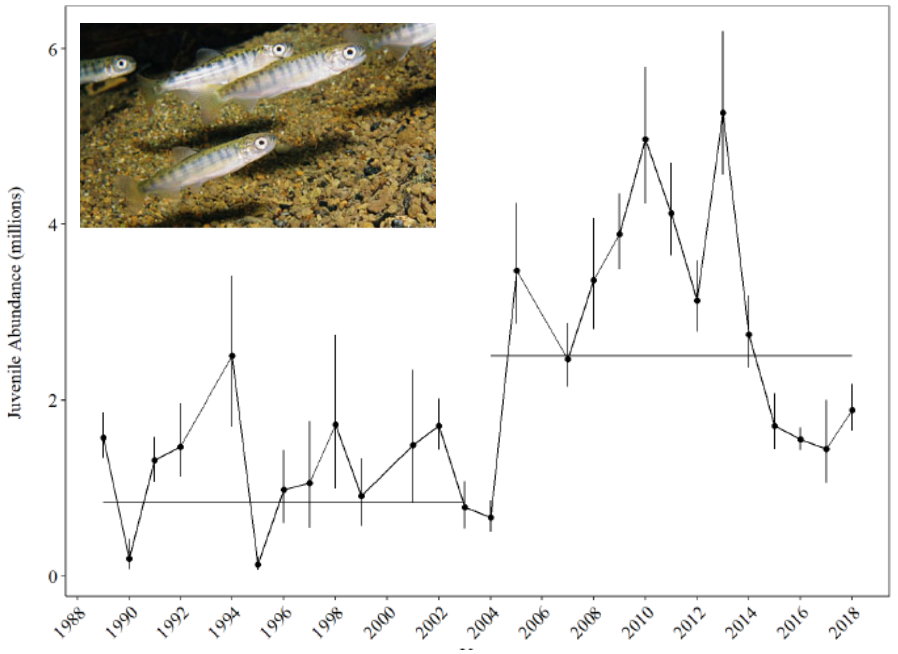
Pinnix et al. (2022)



Years, from 1978 to 2018

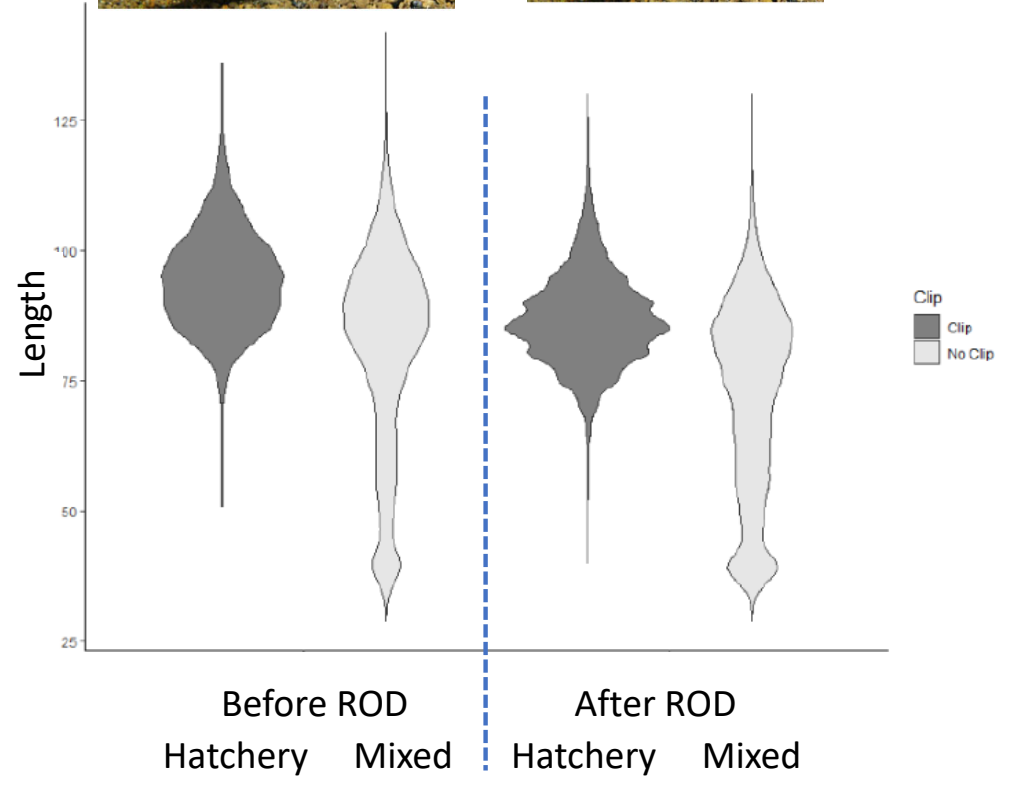
Gough et al. (pending)

# The fish are giving us a clue!

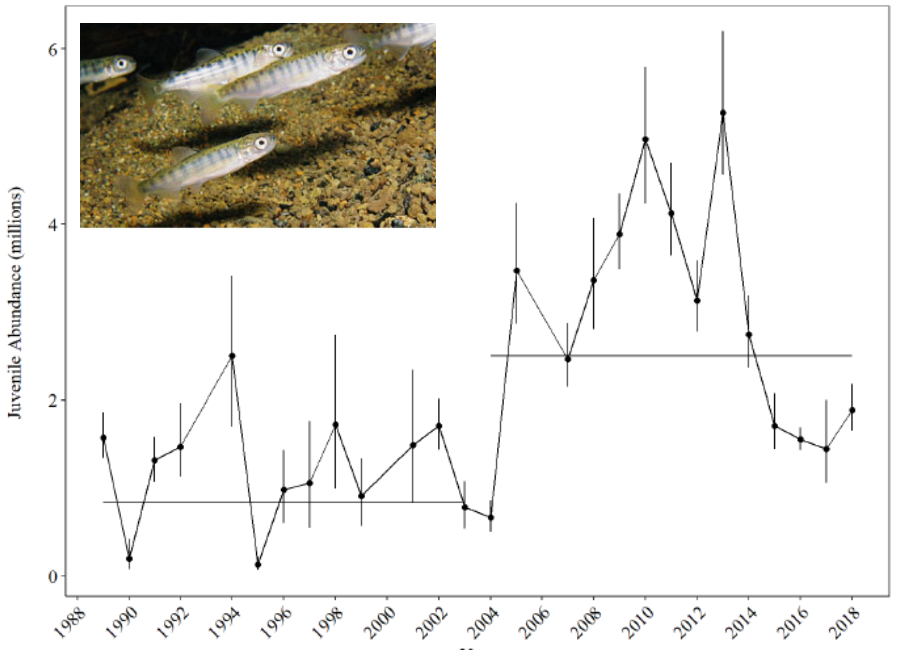


Years, from 1988 to 2018

Pinnix et al. (2022)



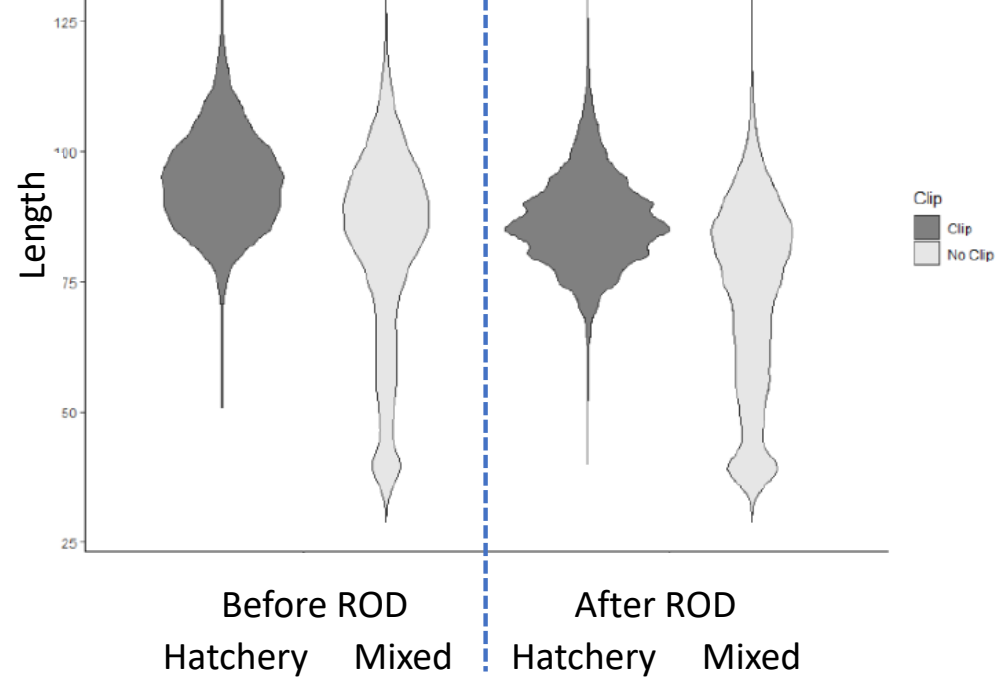
# The fish are giving us a clue!



Years, from 1988 to 2018

Pinnix et al. (2022)

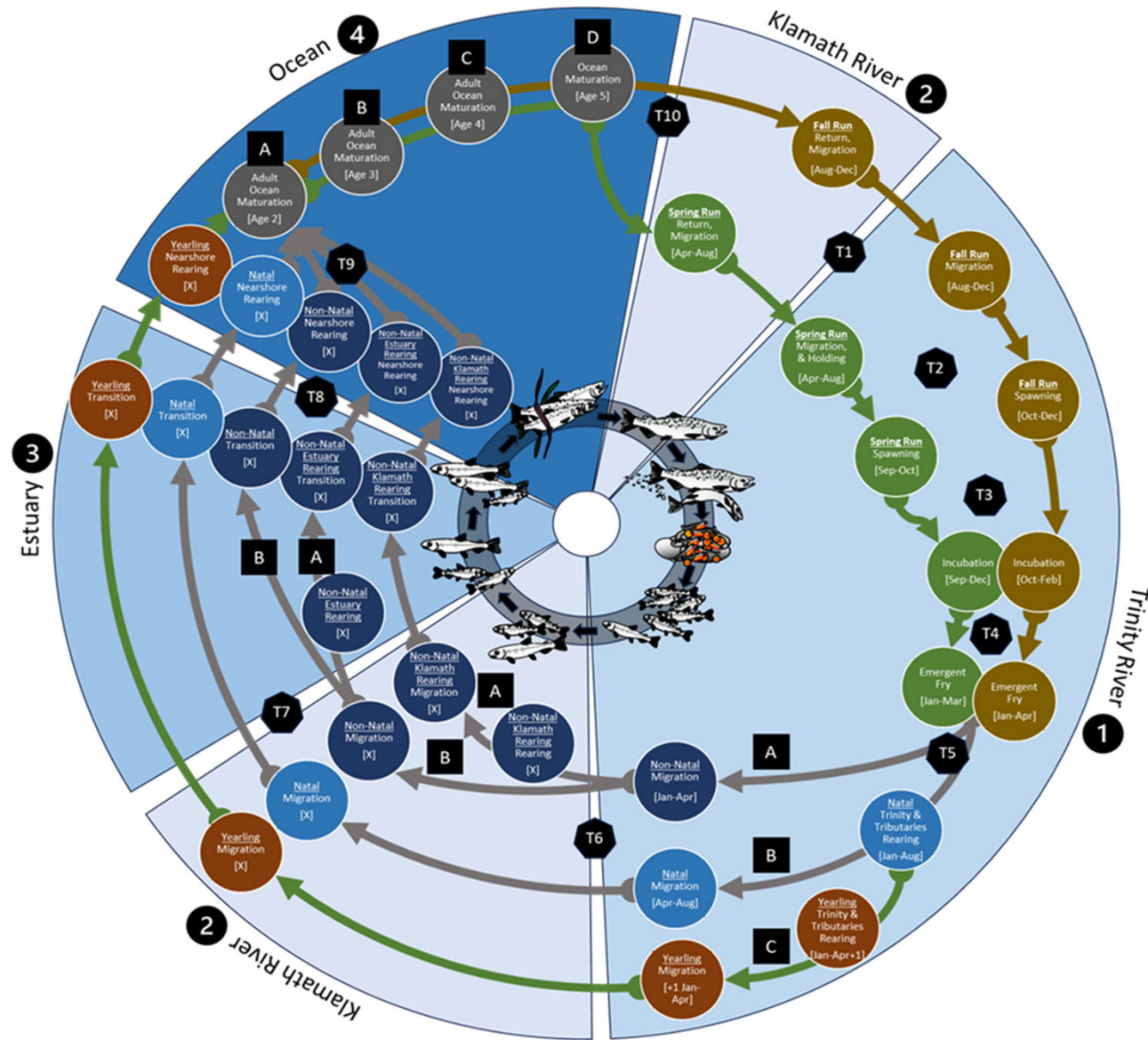
External studies: Bigger fish survive better in the ocean.



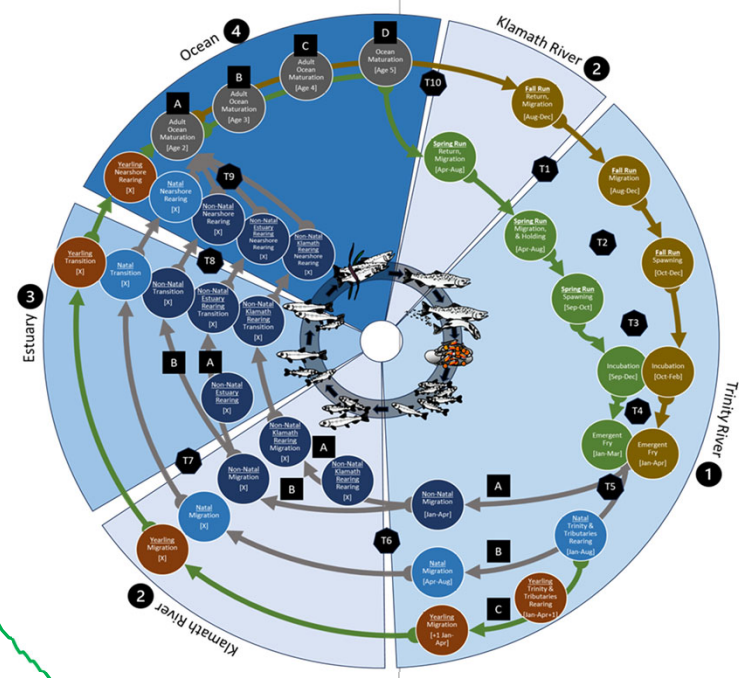
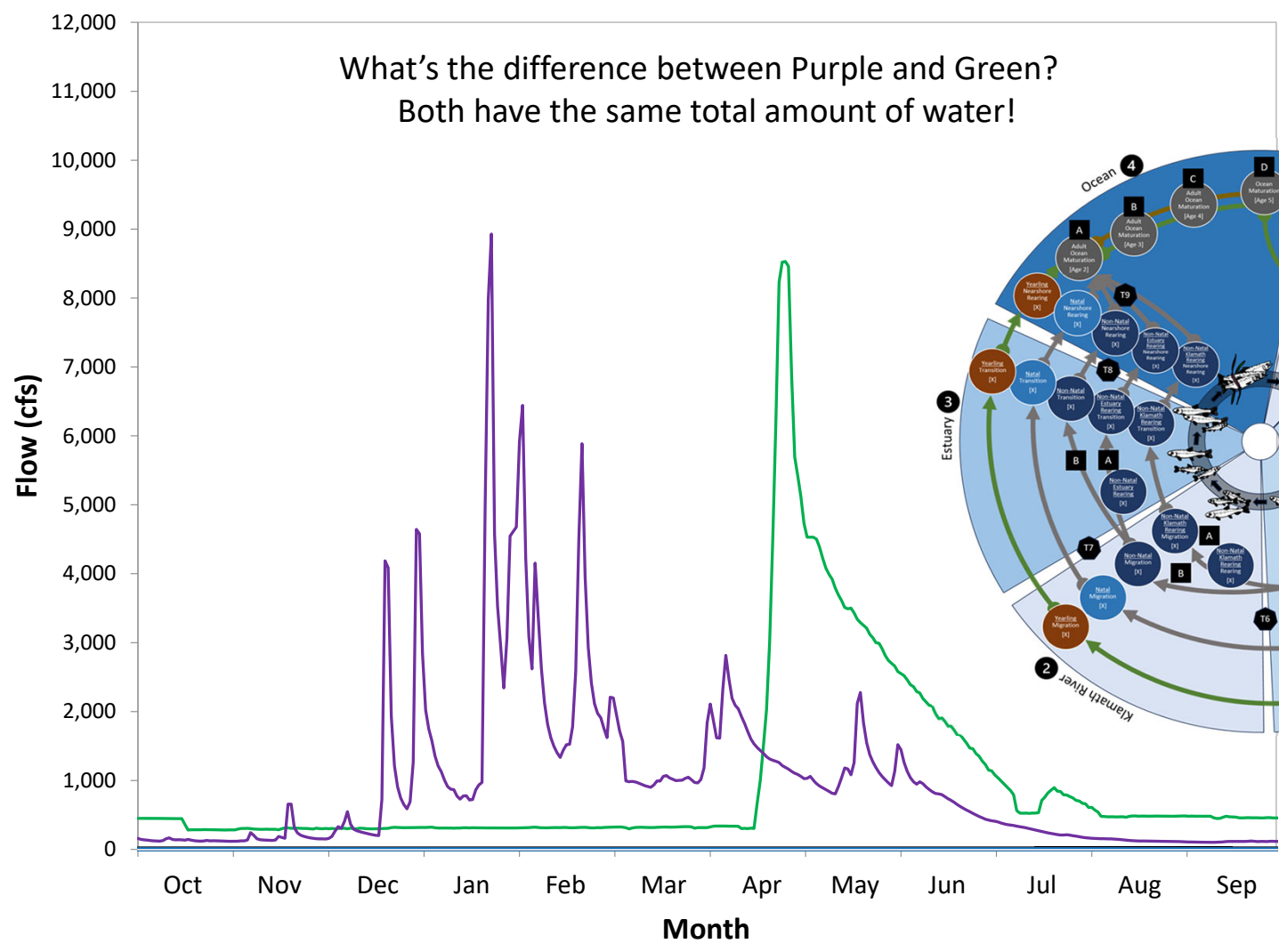
What can we do to improve their chances?

Limiting Factors Analysis

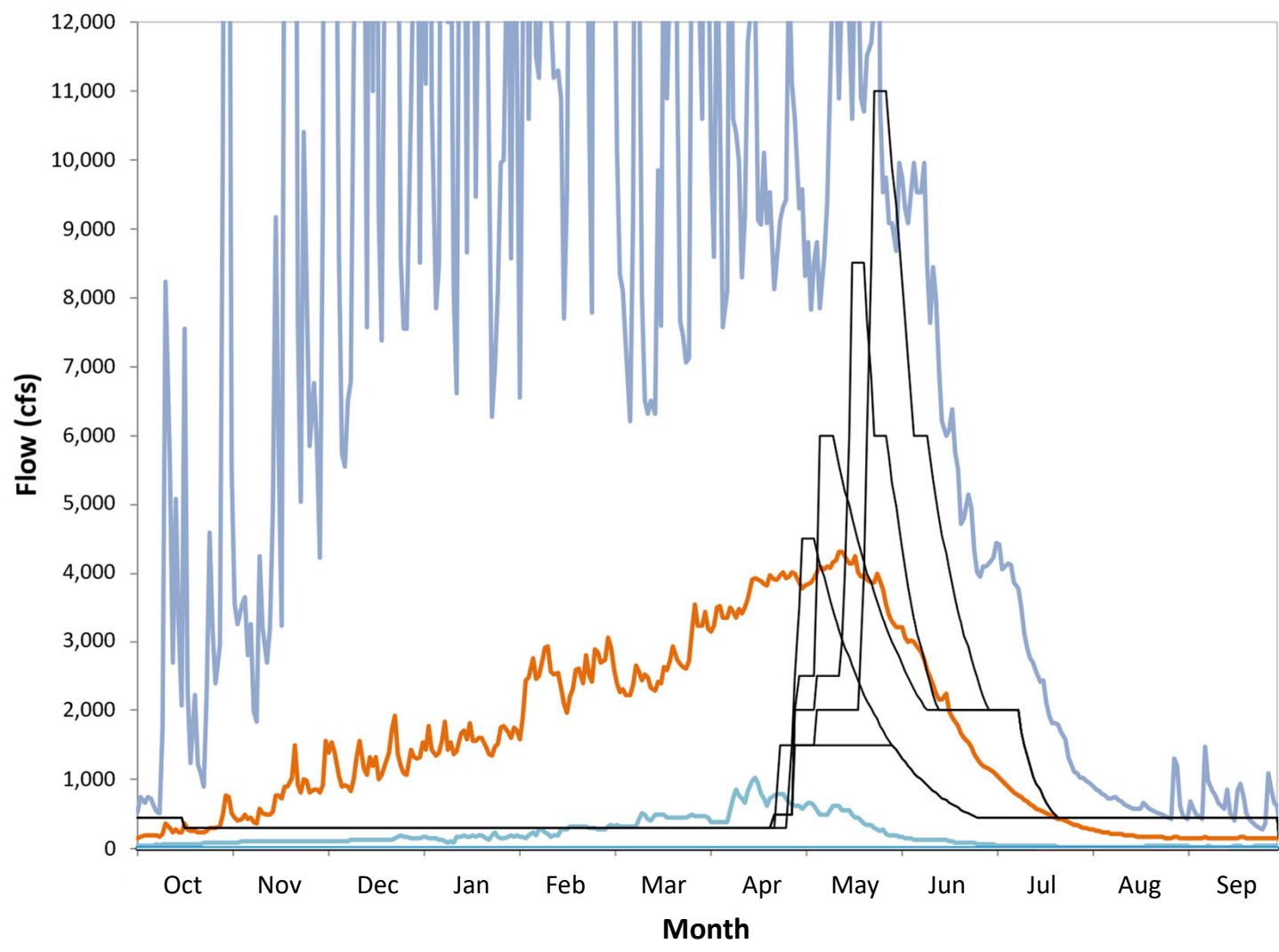
Chinook Life Cycle with variations



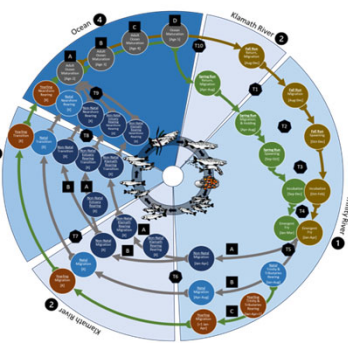
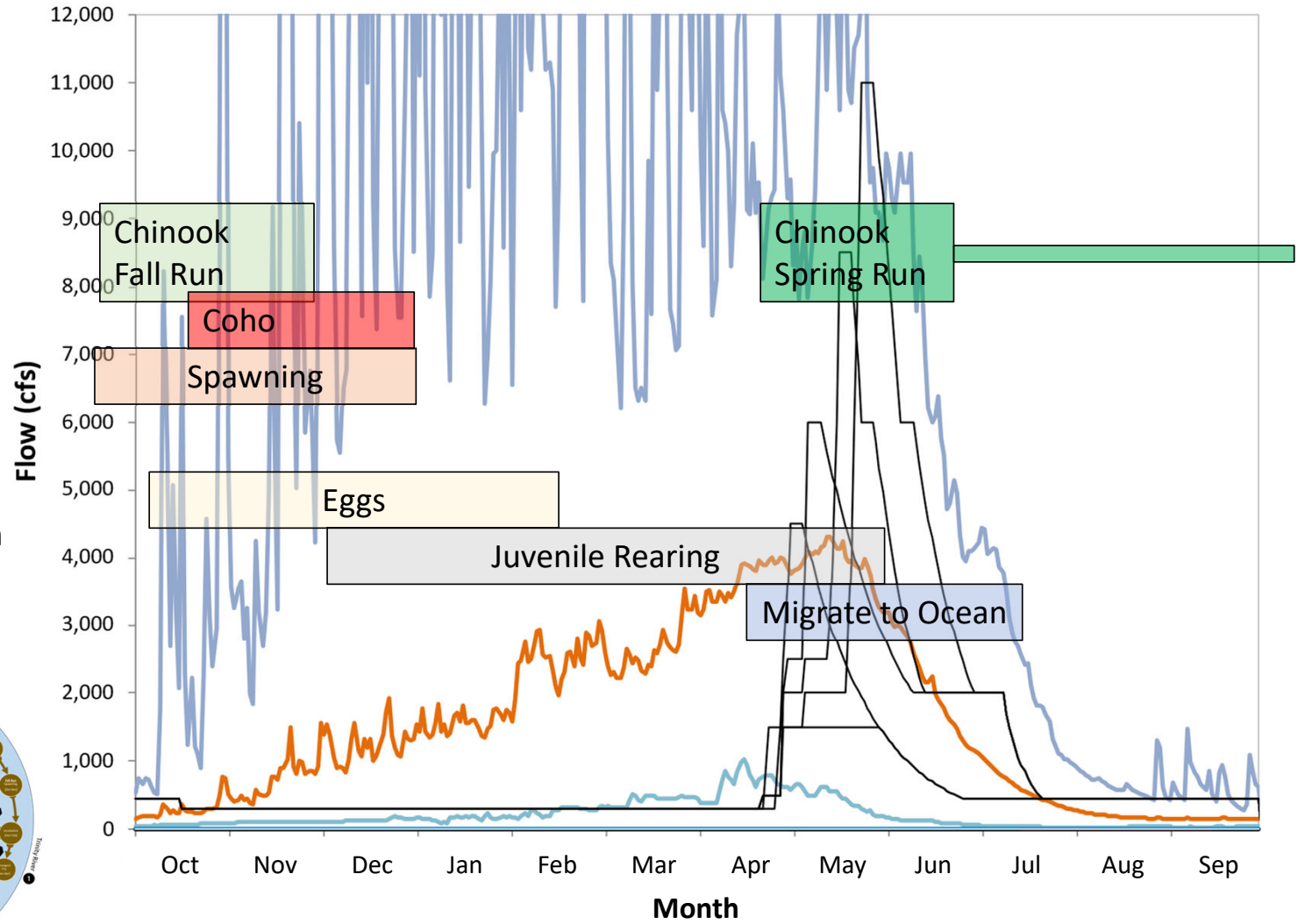
What's the difference between Purple and Green?  
Both have the same total amount of water!



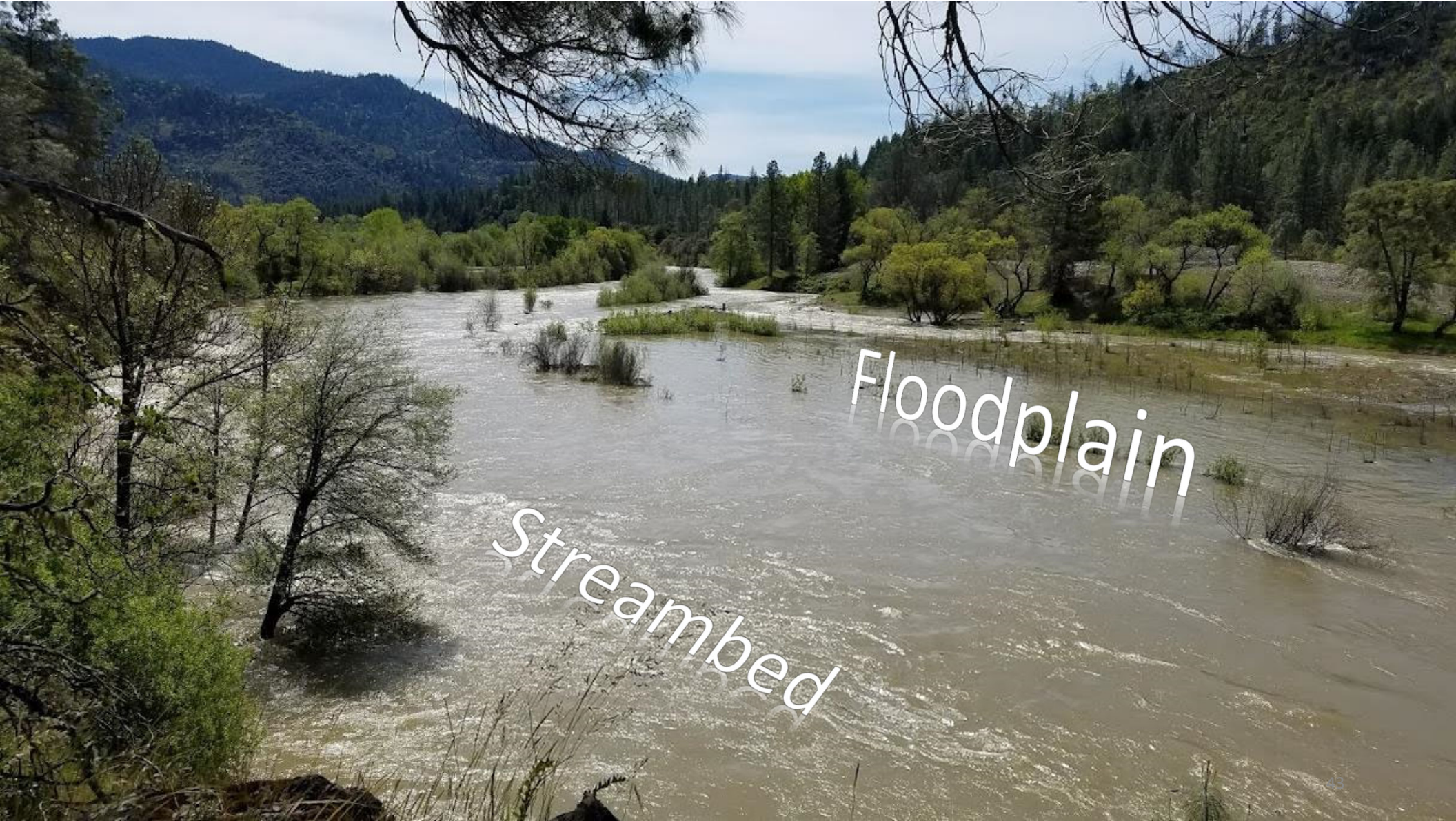
Maximum  
Average  
Minimum  
Before the  
Dams  
Vs  
ROD Flows



Maximum, Minimum, and Average before the dam

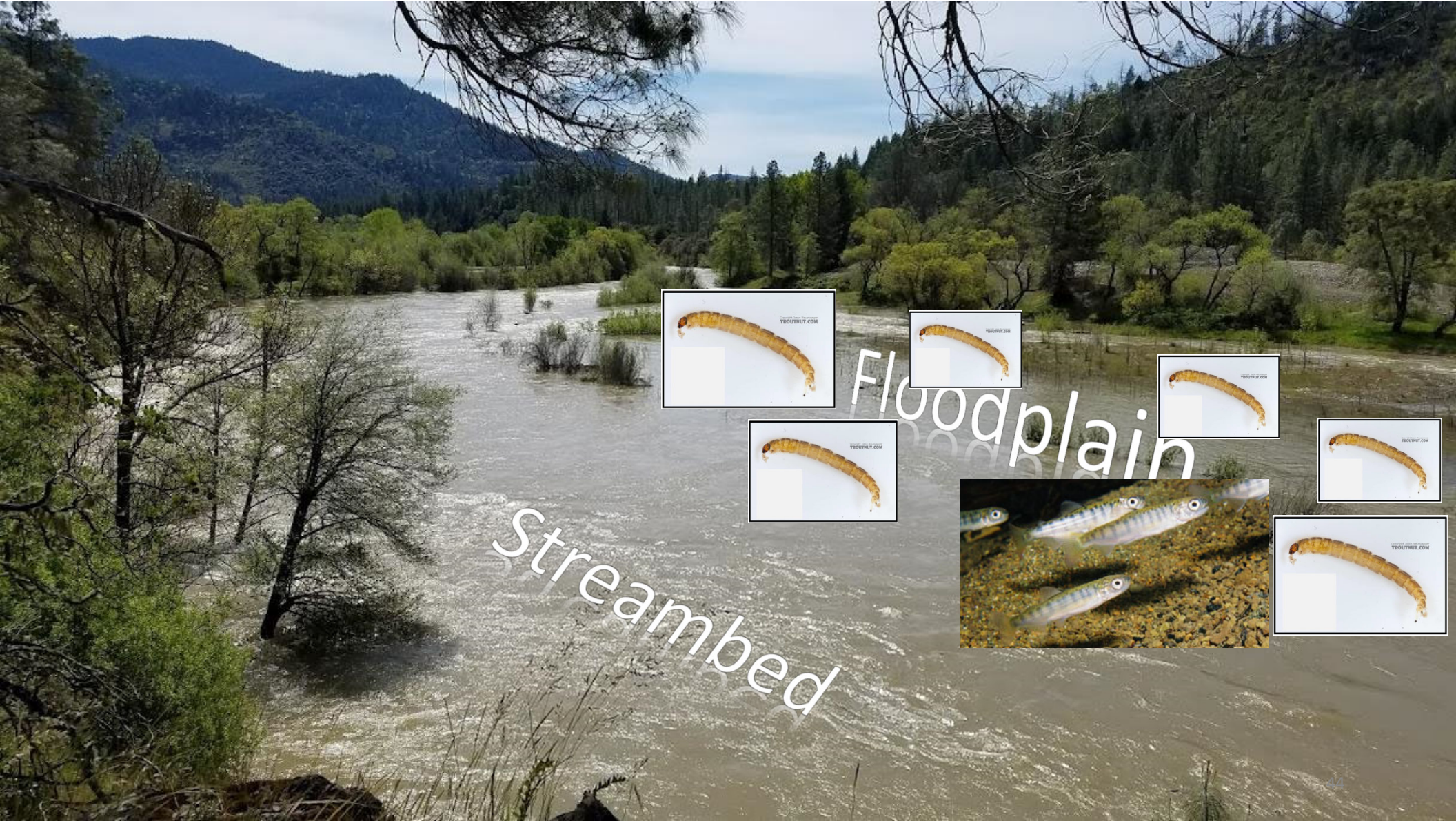






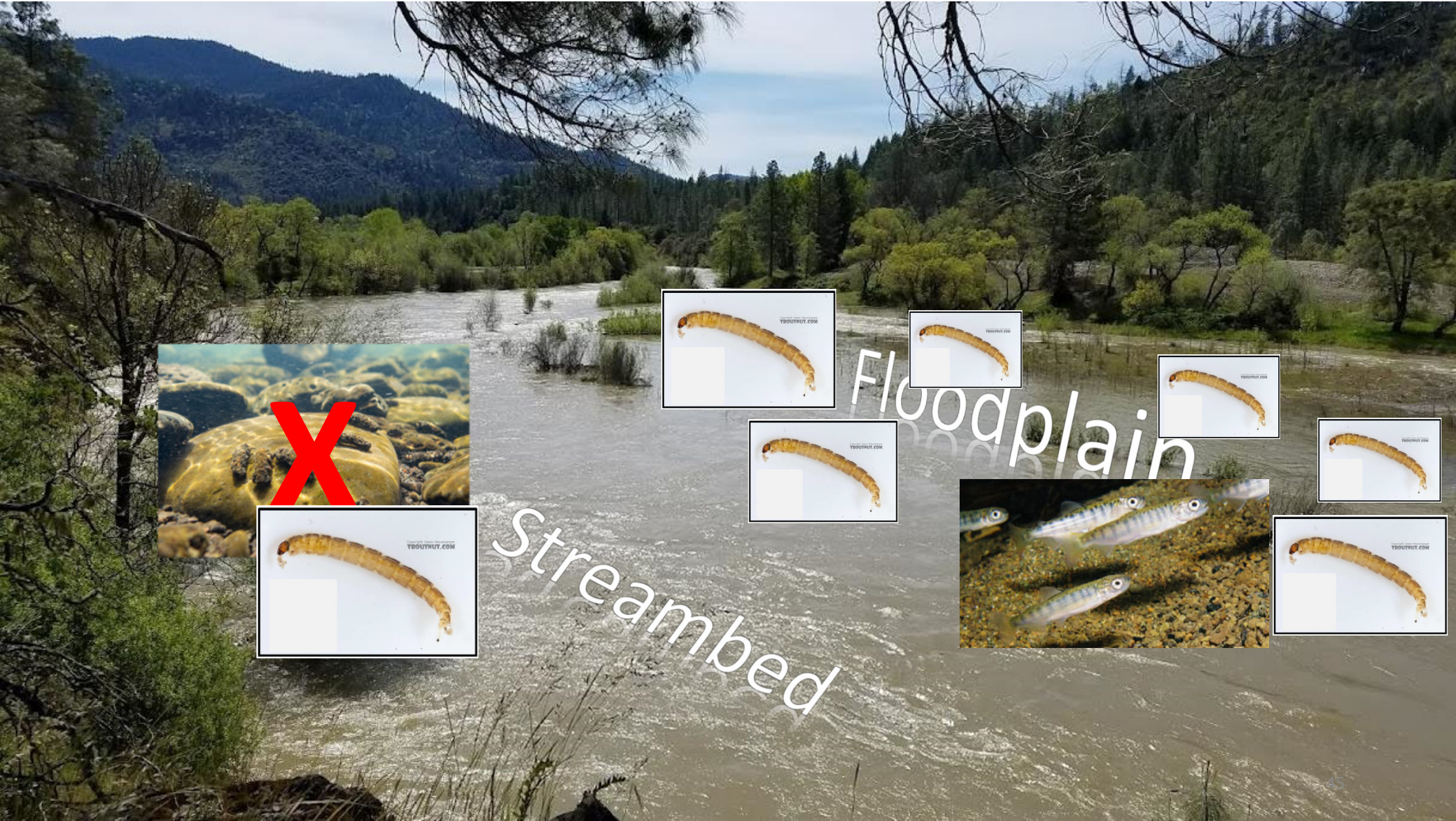
Streambed

Floodplain



Streambed

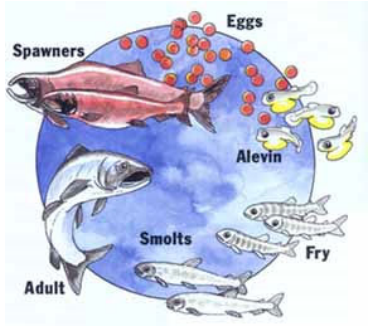
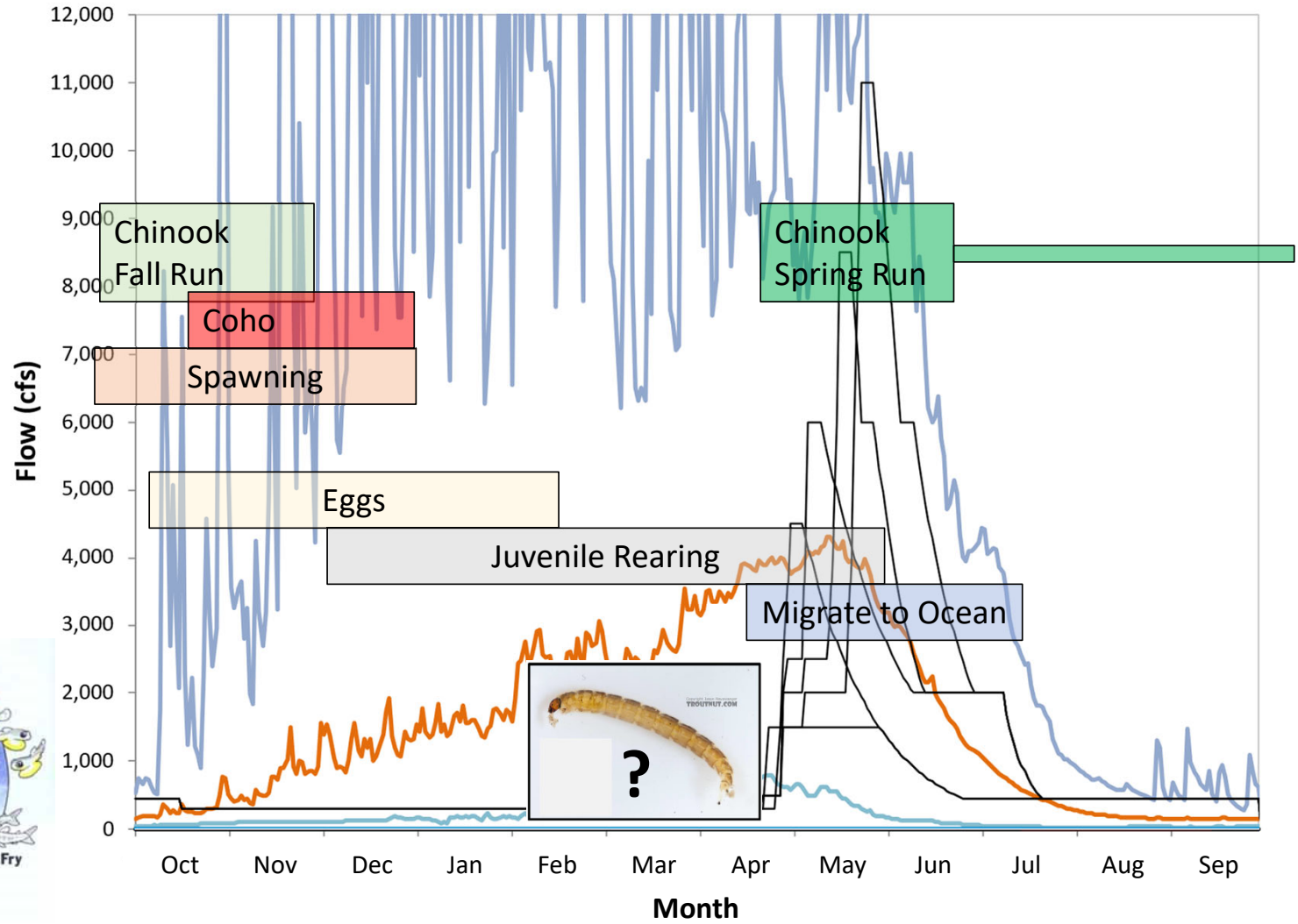
Floodplain



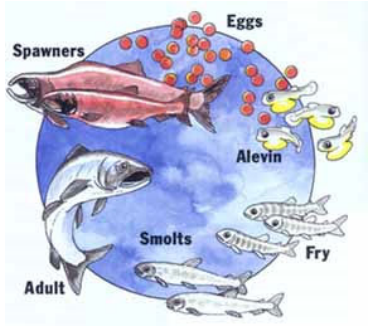
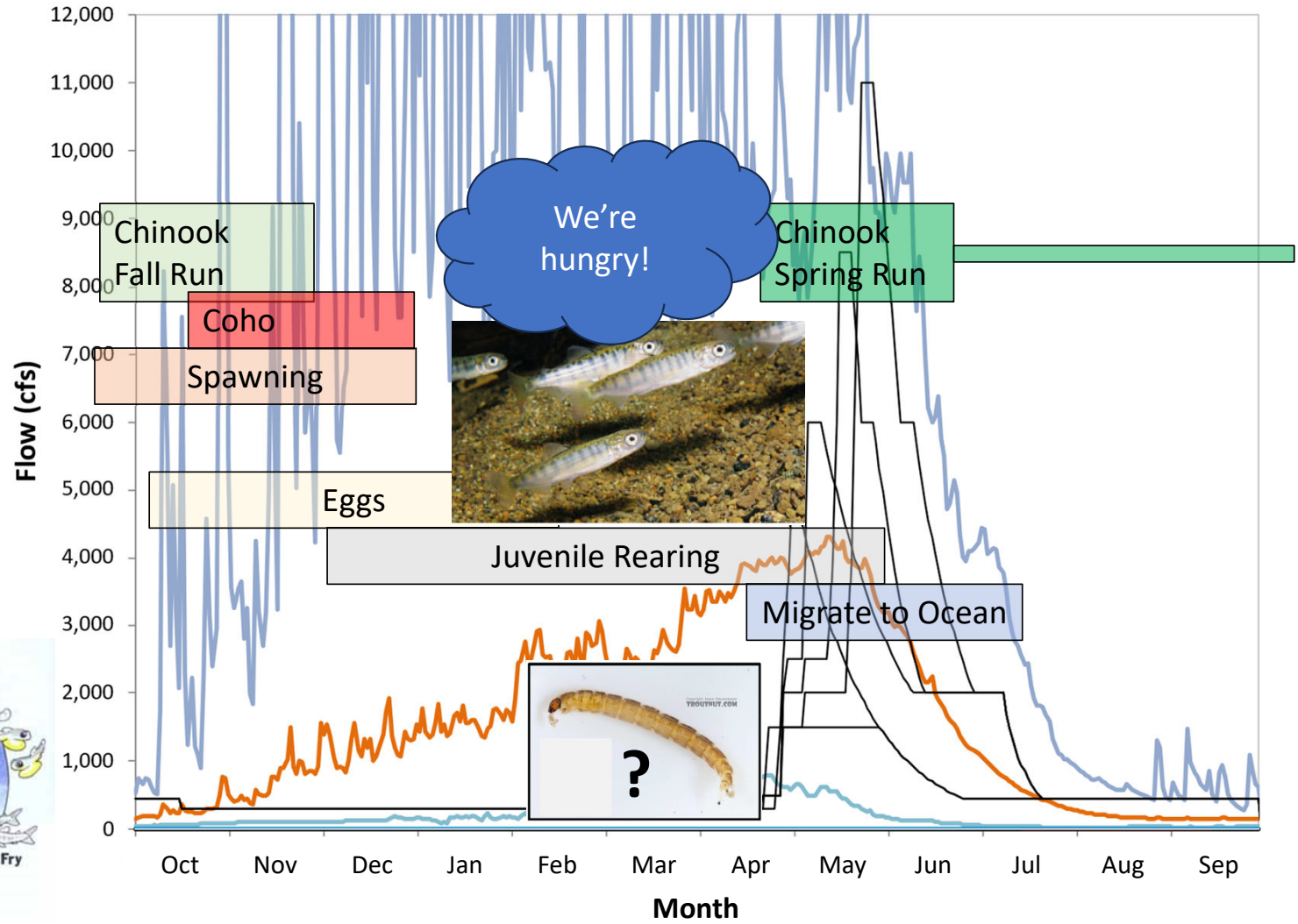
Floodplain

Streambed

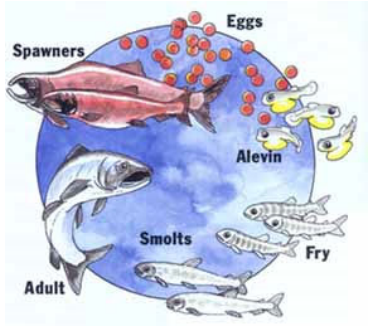
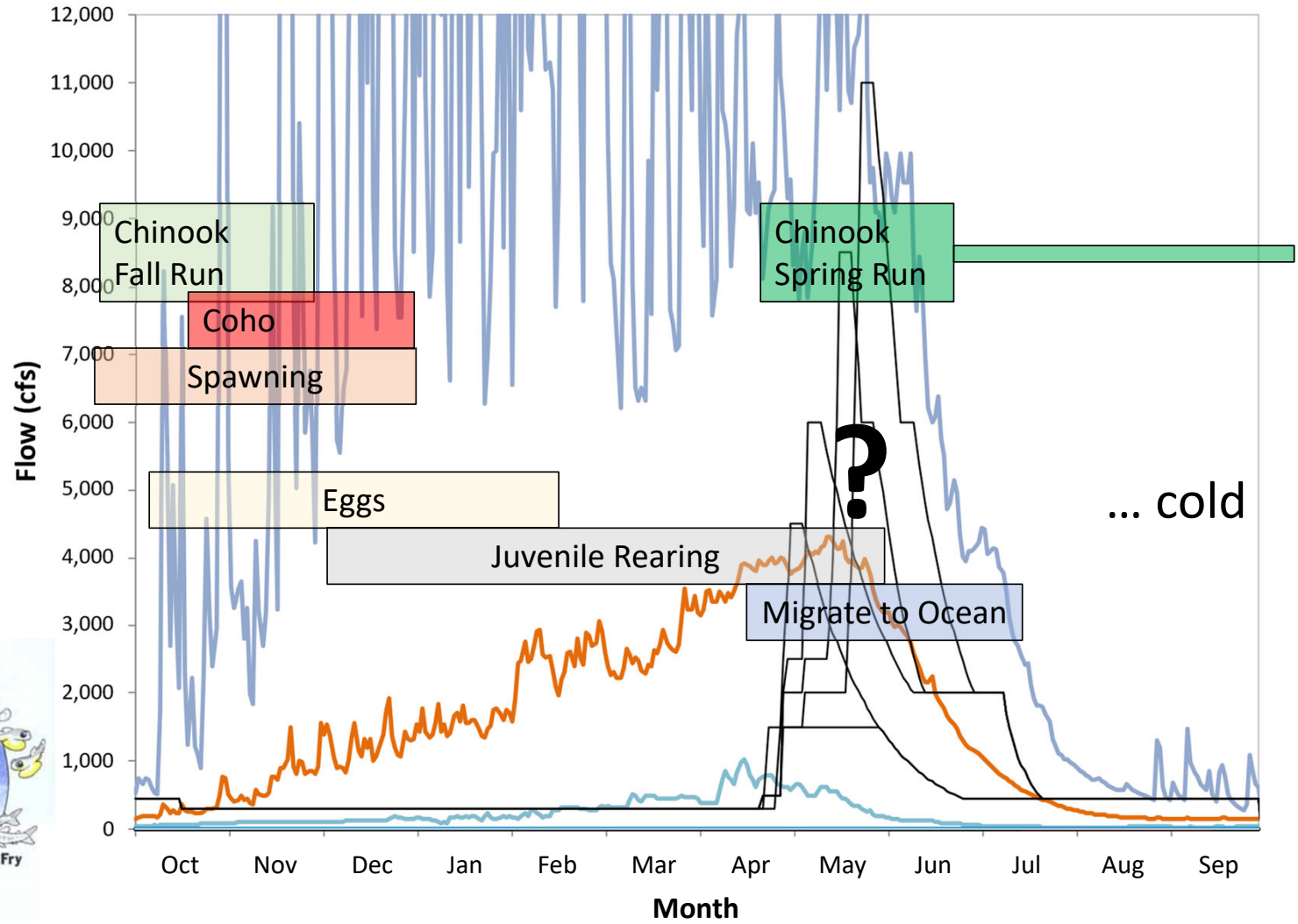
Maximum, Minimum, and Average before the dam



Maximum, Minimum, and Average before the dam



Maximum, Minimum, and Average before the dam



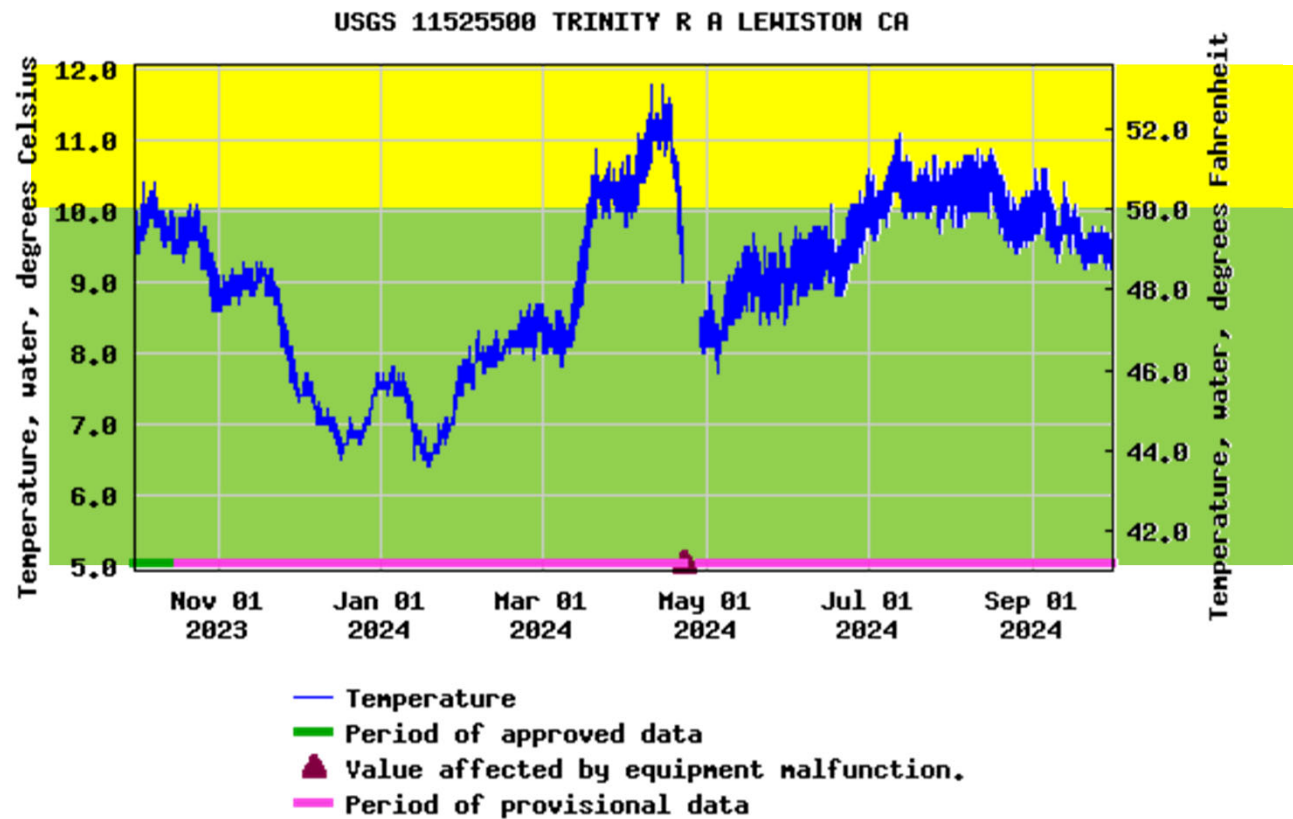
# Juvenile Salmonid Growth Temperatures

	Chinook	Coho	Steelhead			
C				F		
21				70		
20				68		
19				66		
18				64		
17				63		
16				61	Maximum Growth	
15				59		
14				57	Marginally Impaired Growth	
13				55		
12				54	Minimal Growth	
11				52		
10				50	Negative Growth	
9				48		
8				46		
7				45		
6				43		
5				41		
4				39		



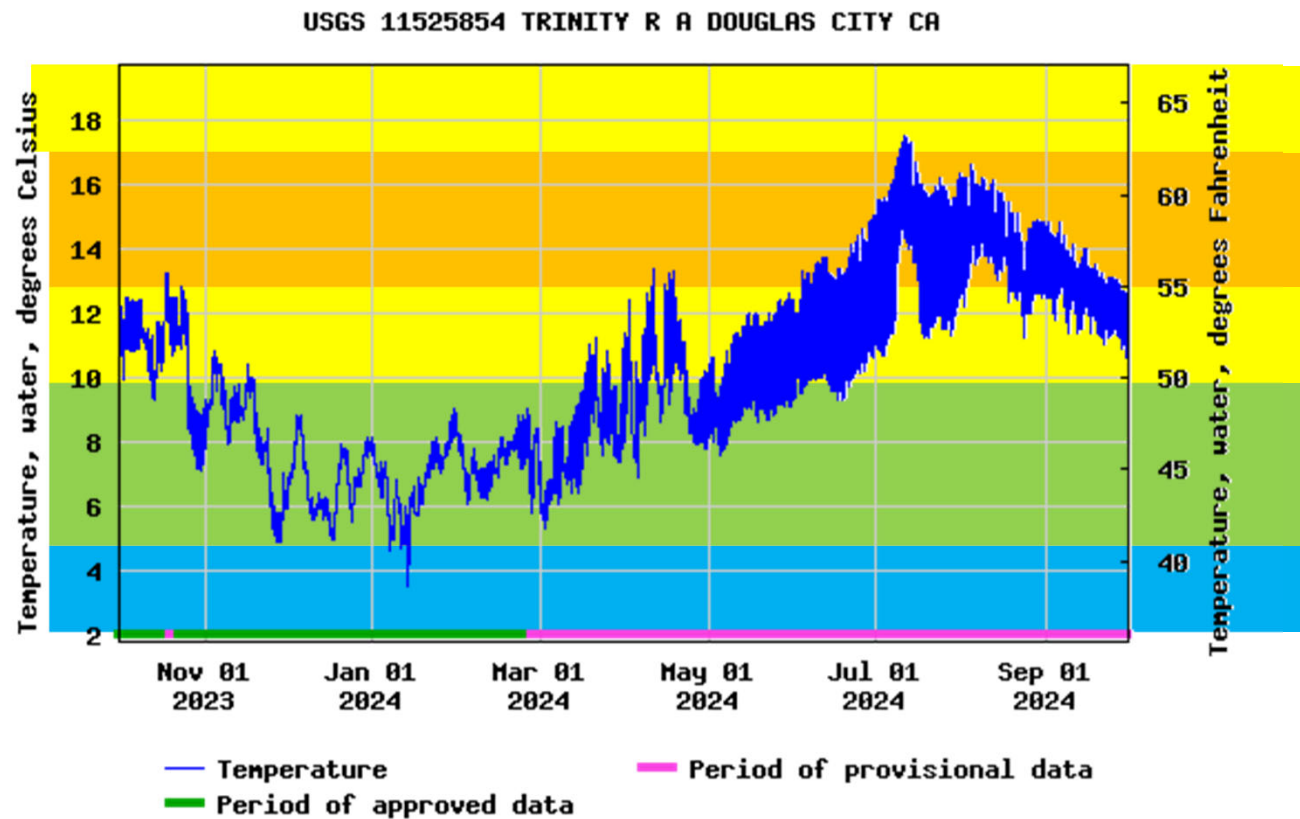
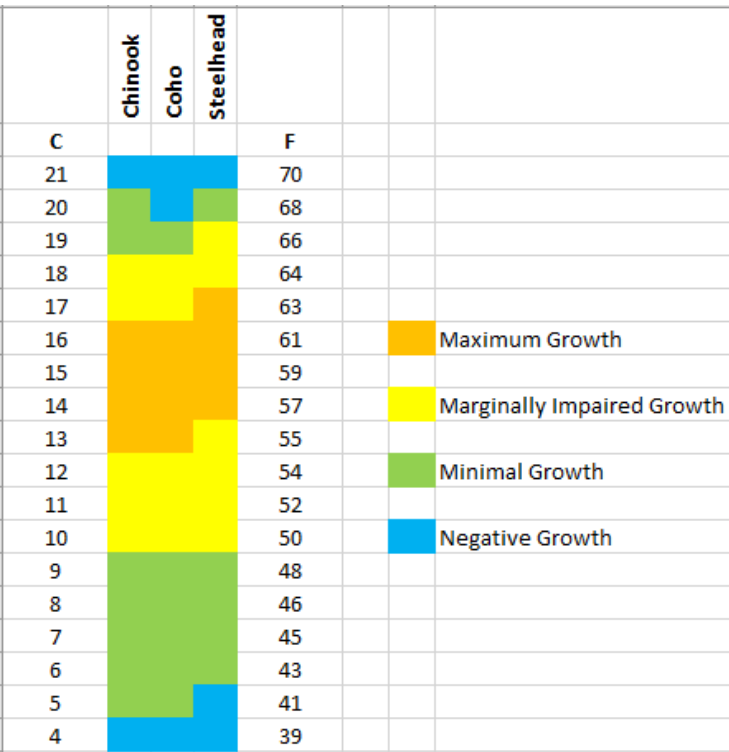
# Juvenile Salmonid Growth Temperatures

	Chinook	Coho	Steelhead			
C				F		
21				70		
20				68		
19				66		
18				64		
17				63		
16				61	Maximum Growth	
15				59		
14				57	Marginally Impaired Growth	
13				55		
12				54	Minimal Growth	
11				52		
10				50	Negative Growth	
9				48		
8				46		
7				45		
6				43		
5				41		
4				39		



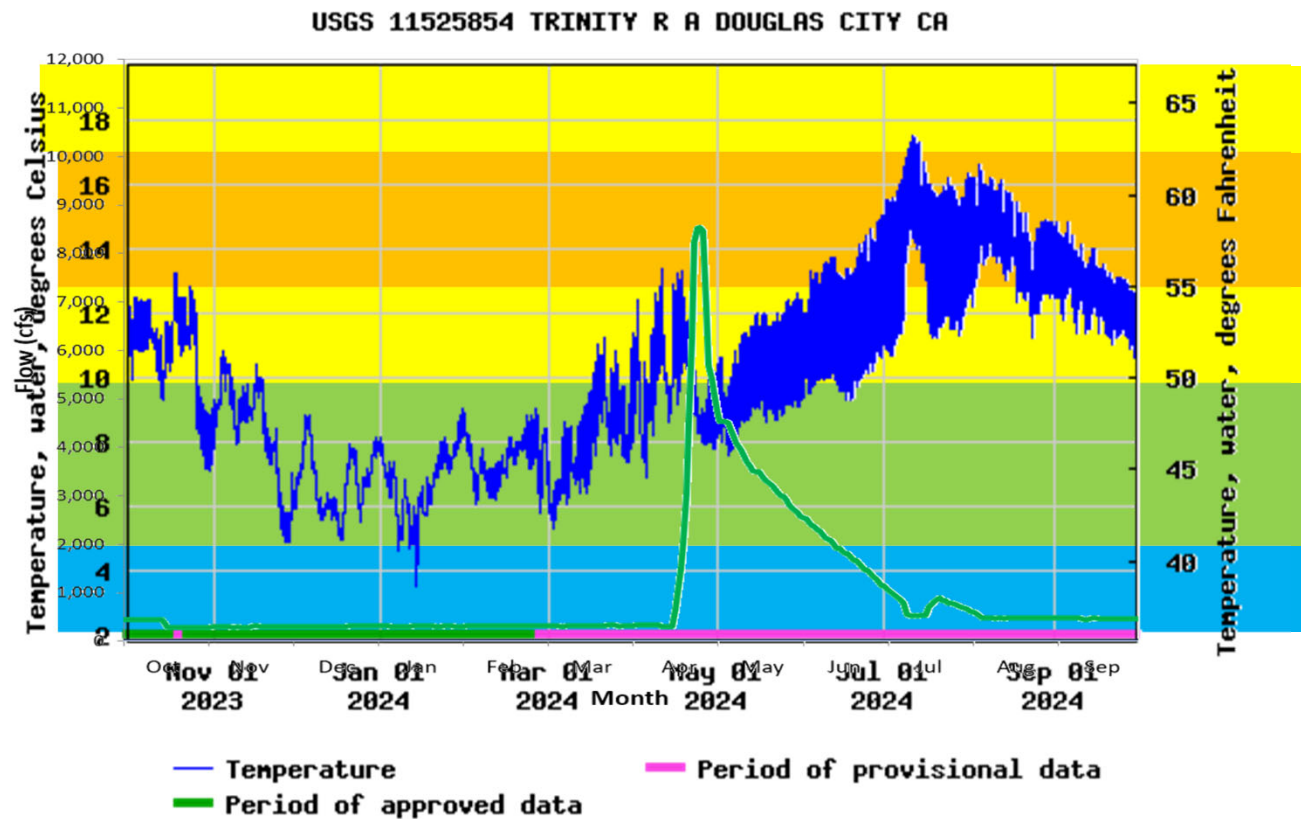


# Juvenile Salmonid Growth Temperatures



# Juvenile Salmonid Growth Temperatures

	Chinook	Coho	Steelhead			
C				F		
21				70		
20				68		
19				66		
18				64		
17				63		
16				61	Maximum Growth	
15				59		
14				57	Marginally Impaired Growth	
13				55		
12				54	Minimal Growth	
11				52		
10				50	Negative Growth	
9				48		
8				46		
7				45		
6				43		
5				41		
4				39		

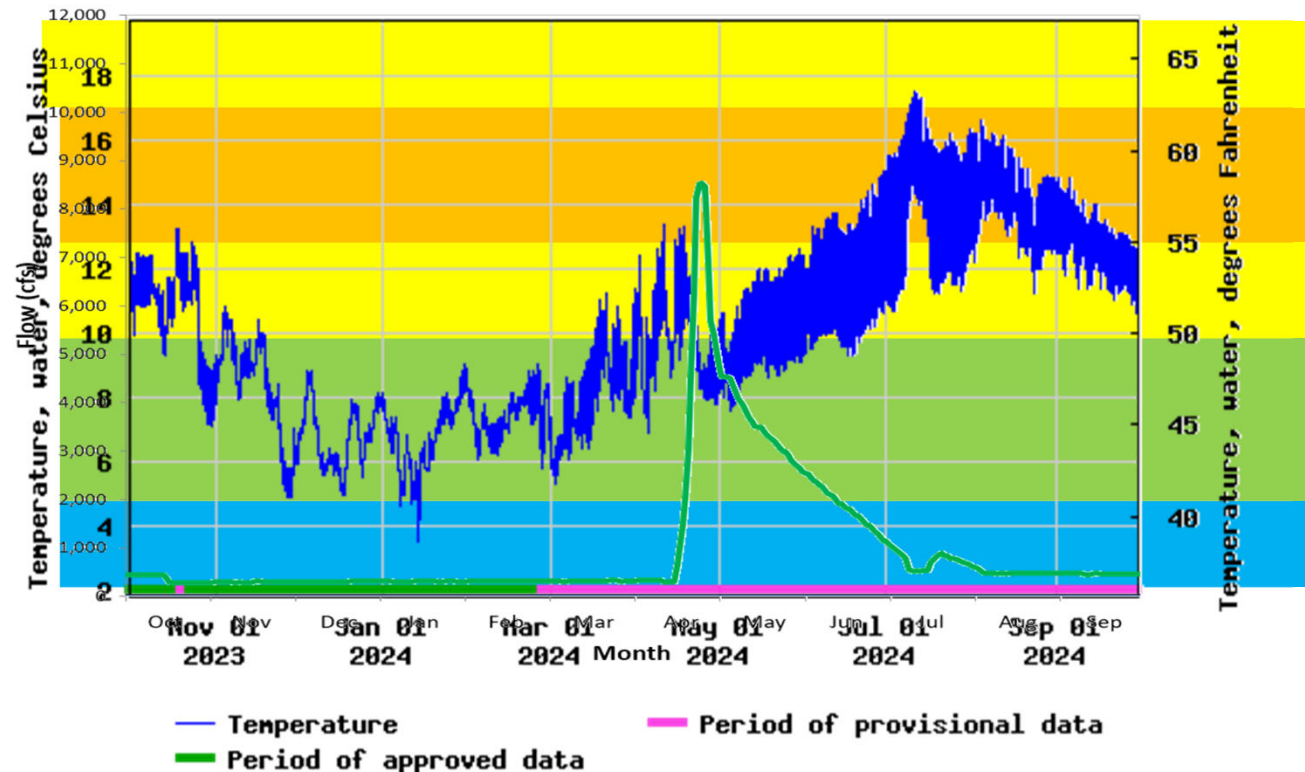


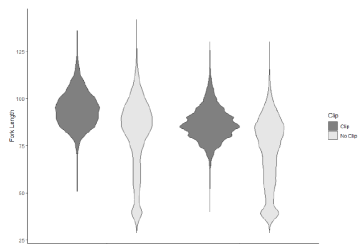
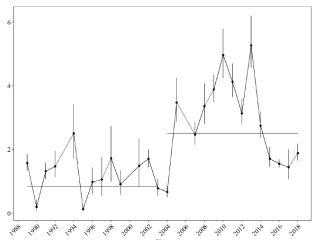
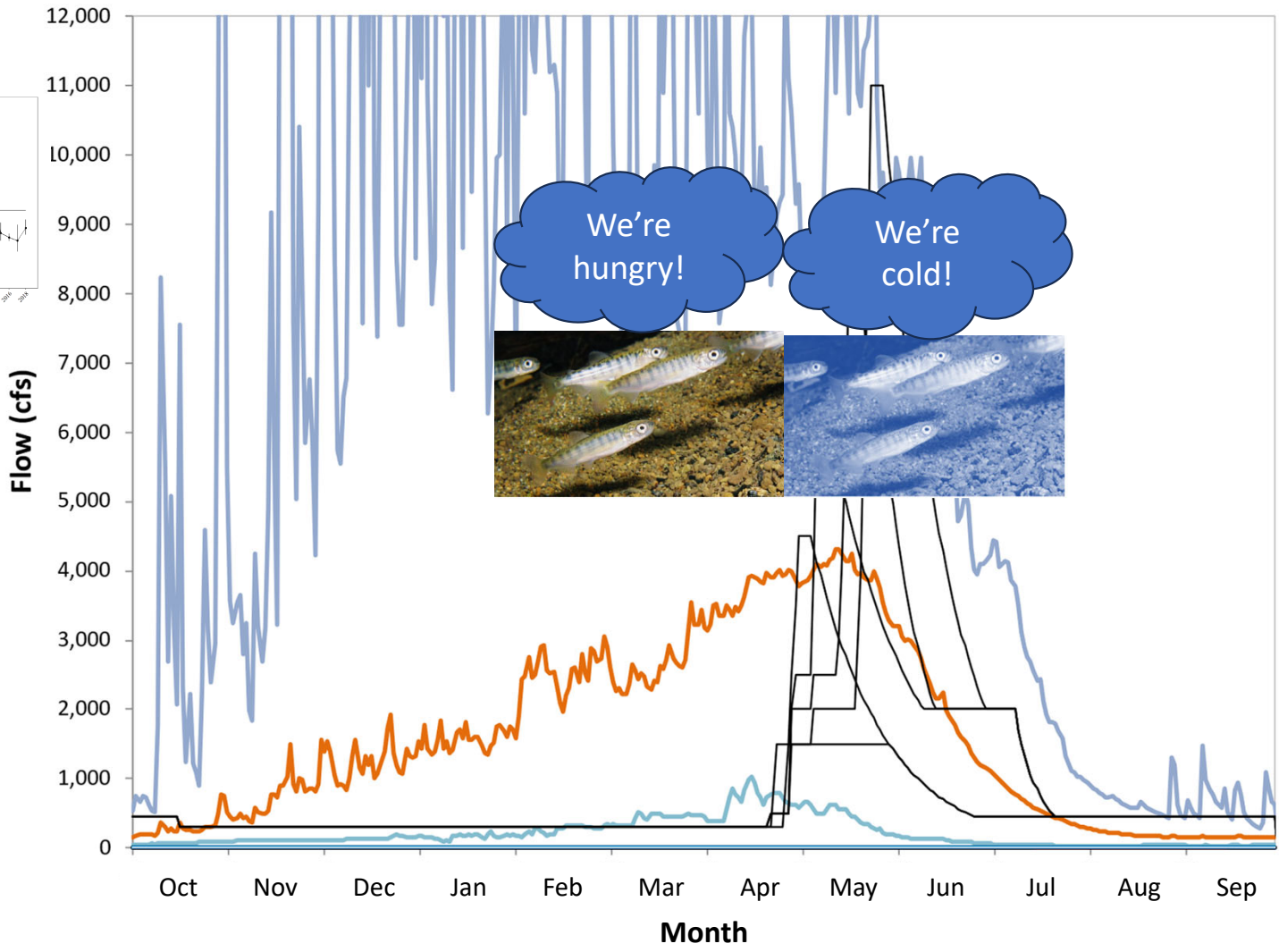
# Juvenile Salmonid Growth Temperatures

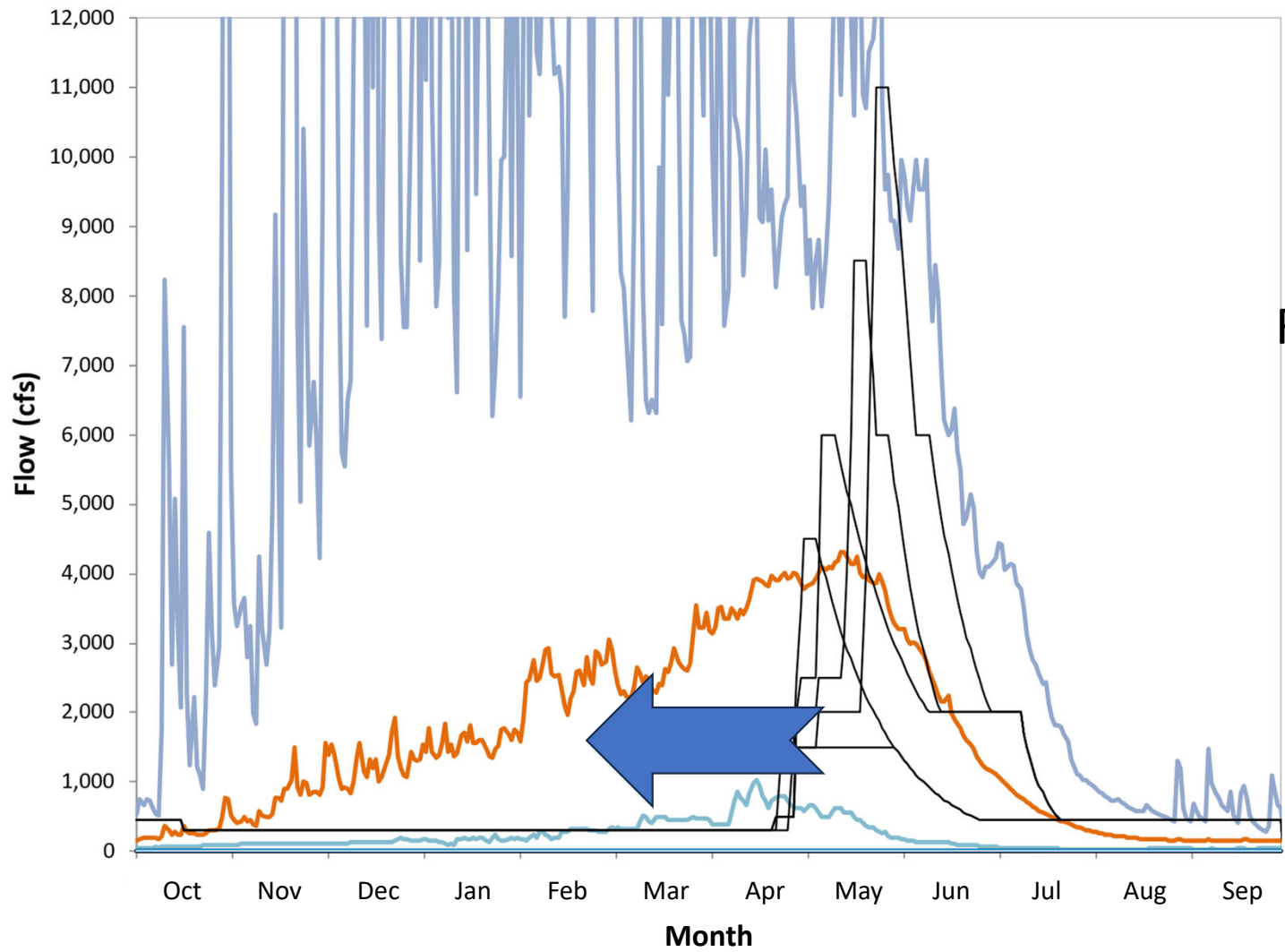


USGS 11525854 TRINITY R A DOUGLAS CITY CA

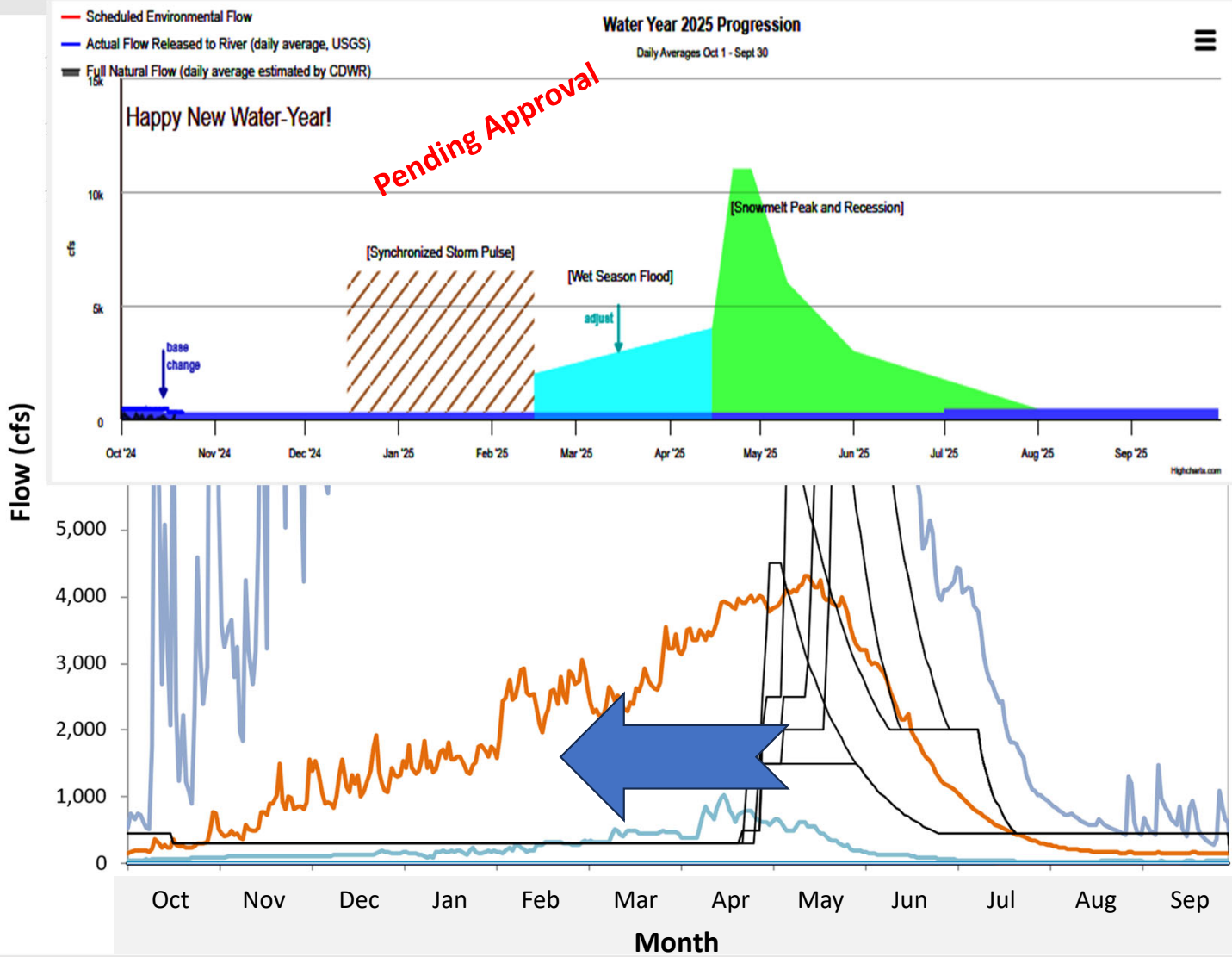
	Chinook	Coho	Steelhead			
C				F		
21				70		
20				68		
19				66		
18				64		
17				63		
16				61	Maximum Growth	
15				59		
14				57	Marginally Impaired Growth	
13				55		
12				54	Minimal Growth	
11				52		
10				50	Negative Growth	
9				48		
8				46		
7				45		
6				43		
5				41		
4				39		

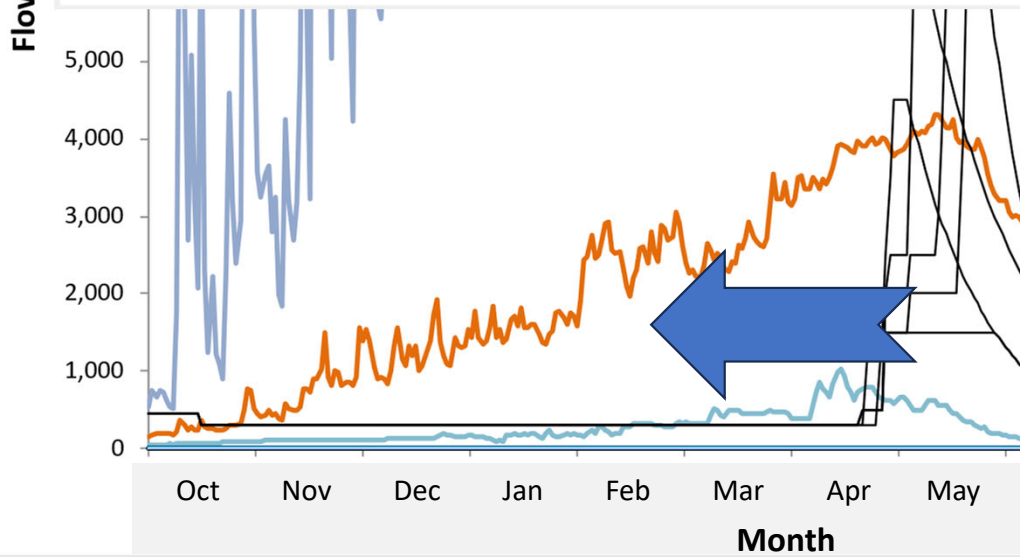
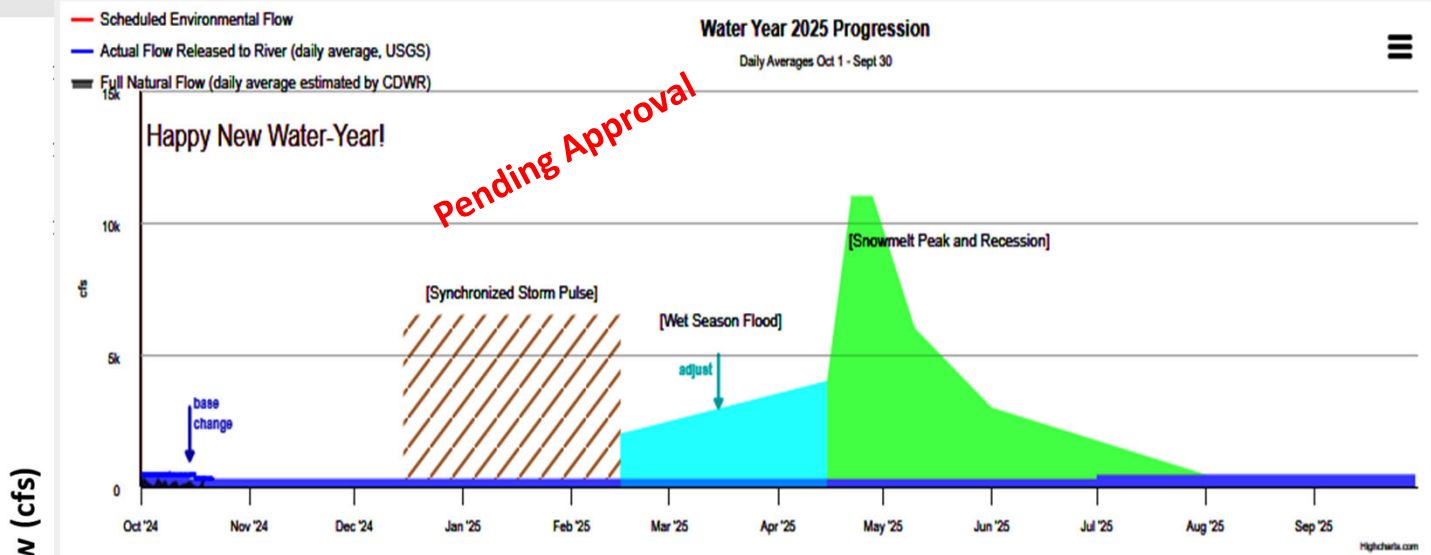




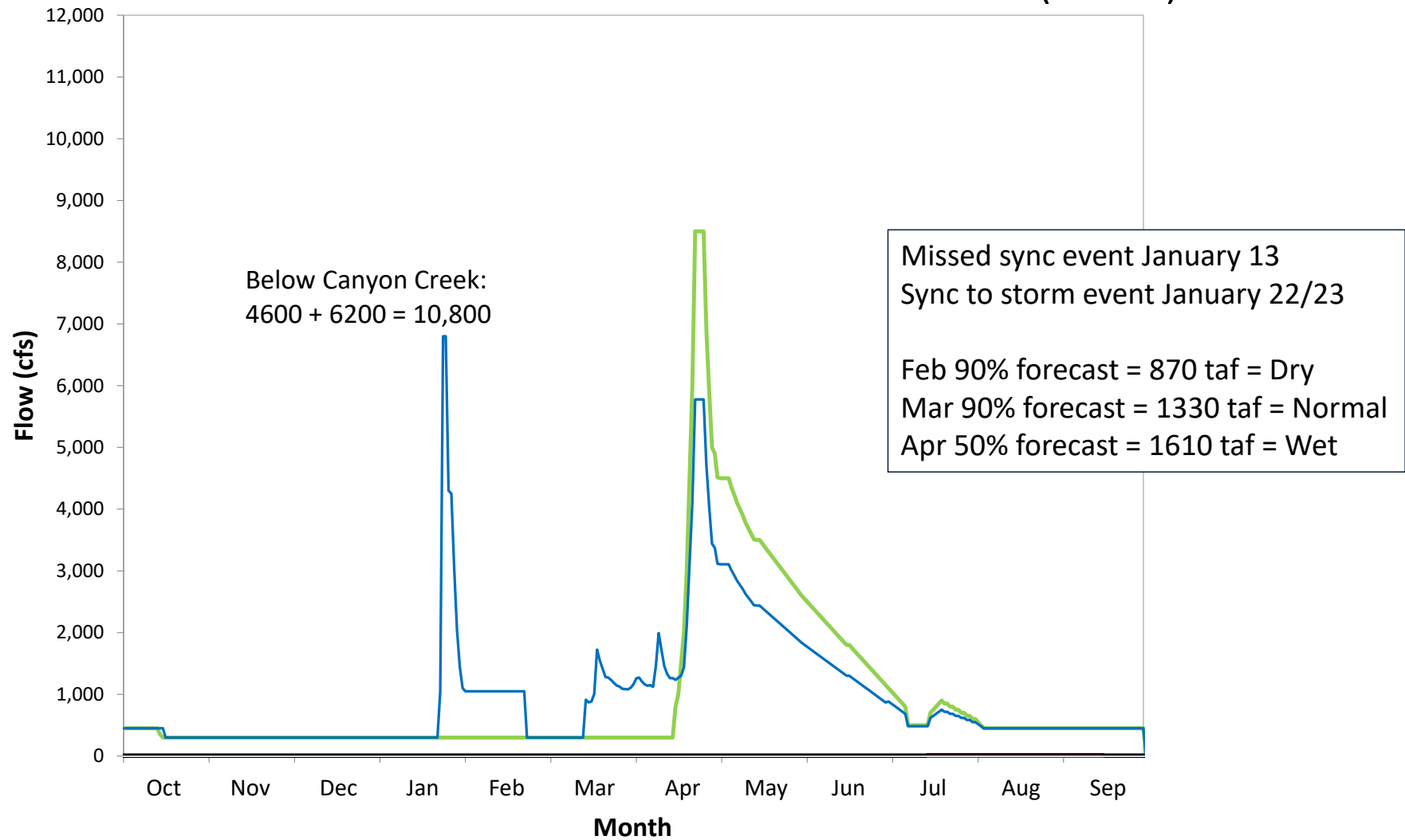


Forecasting has Improved!



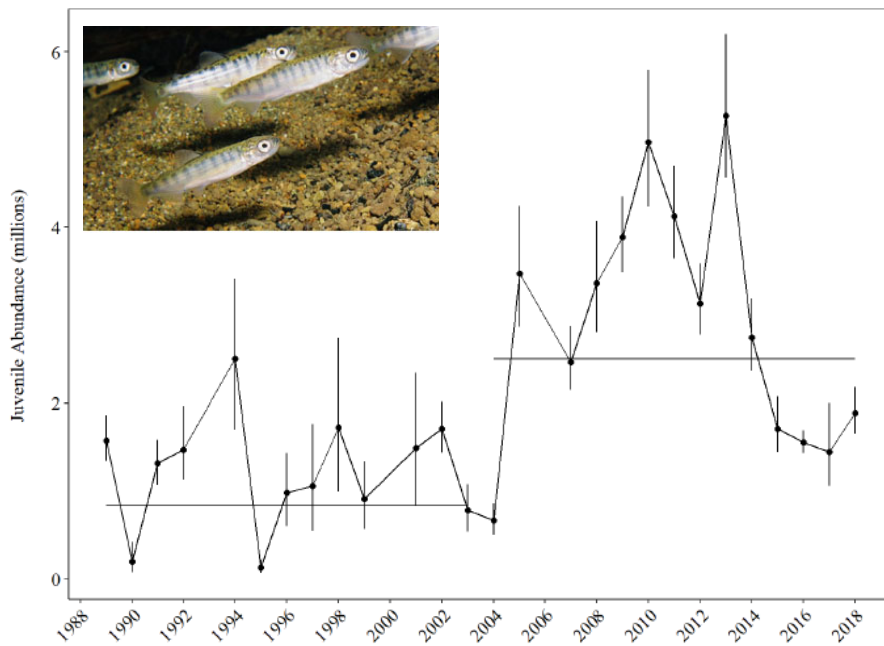


# What Water Year 2024 would have looked like... (blue)



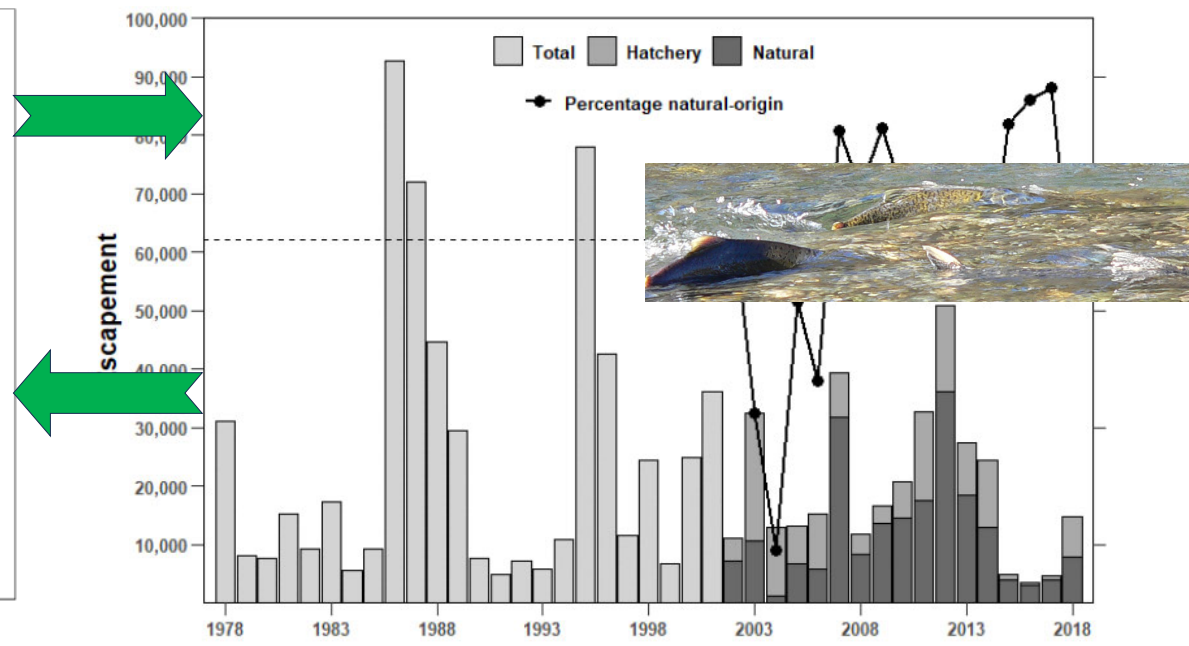


# Environmental Flows should help Optimize the Connections



Years, from 1988 to 2018

Pinnix et al. (2022)

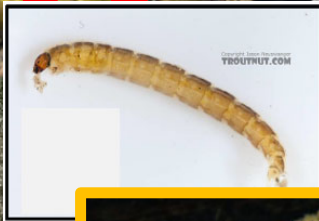


Years, from 1978 to 2018

Gough et al. (pending)

Thank you!

Questions?



Streambed

Floodplain