TRINITY RIVER WATERSHED COUNCIL

Mission Statement

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

Tuesday, December 13th, 2022
Zoom, 10:00AM – 12:00PM

This meeting will be held in person and via zoom.

Meeting Location:
Trinity County Resource Conservation District Conference Room
Address: 30 Horseshoe Ln, Weaverville, CA 96093

COVID Note: As this meeting is at TCRCD's place of work we will follow their COVID guidelines. Anyone that tests positive or has a recent COVID-19 exposure must follow guidelines listed under CalOSHA. Here is a link to the guidelines: https://covid19.ca.gov/workers-and-businesses/ Currently there is no masking requirement at their office.

Join Zoom Meeting:
https://us02web.zoom.us/j/89707228772?pwd=WUo1VW5hS2x0UC85ODE4dFViNEFYUT09
Meeting ID: 897 0722 8772 Passcode: 96093
One tap mobile
+16694449171,,89707228772#,,,,*96093# US
+16699009128,,89707228772#,,,,*96093# US (San Jose)

In Attendance:

In Person:

- Nathan McCanne- WRTC
- Charlie Curtin – TCRCD
- Kyle De Juilio – Yurok Tribal Fisheries

Via Zoom:

- Amelia Fleitz – TCRCD
- Maya Williams – TCRCD
- Cindy Buxton – WRTC
- Josh Smith – WRTC
- Denise Wesley
- Liam Gogan – Trinity County Board of Supervisors
- Kate Blanchard – CDFW
- AJ Donnell – SRNF
- Brennan Michaels – SRNF
- James Lee – TRRP
- Mike Dixon – TRRP
- Chad Abel – TRRP
- Karla Avila – TCAA
- Chris Losi – Flowra
- Eric Wiseman – STNF
- Tiffany Perez – NRC
- David Colbeck – TCDOT
- Ellen Mcgehee – WRTC

1. 10:00-10:10 Introductions
2. 10:10-10:20 Additions/Changes
    - Nathan McCanne's last meeting as the coordinator of TRWC, Annyssa Interrante will be stepping in in 2023
    - There will be no grant update since Tracy McFadin could not make the meeting.
3. 10:20-10:50 Presentation: Getting water temperature just right: what Goldilocks and the Three Bears can teach us about river management - Kyle De Juilio -Yurok Tribal Fisheries Program
        - Getting water temperature just right: what goldilocks and the three bears can teach us about river management
            - Biggest difference between us and salmon is that they are cold blooded, affects almost every aspect of their lives (cognition, avoiding predators)
            - Cold-blooded classifications- stenotherm vs eurytherm
                - Stenotherm- only survive a narrow range of temps
                    - Incubation of eggs only occurs over a very narrow range of temps.
                - Eurytherms- can tolerate and function over a wide range of temps
            - Eggs and alevin can only survive between mid-30s to 50s (°F), juveniles can survive between mid-30s to 70s,
            - Coho salmon are the least temperature tolerant of salmon, chinook are the most temperature tolerant,
            - Eggs and alevin live upstream in winter in colder temperatures, juveniles move downriver in spring to warmer water
            - Yurok study of adult salmon migration requirements
                - Shows effects of salmon moving or stopping due to thermal barrier at 23 degrees C
                - Water temperature can create a barrier to migration over the year
            - Other cold-blooded aquatic animals- turtles, yellow-legged frogs may also be affected by these thermal barriers.
            - Midge, mayfly, and caddis are cold-blooded, life cycle time to completion can double based on colder water temperatures
                - Their life cycles affect availability of food to salmon
            - 4 dimensions of stream temperature: Seasonal, longitudinal, vertical, and
                - 3 standard dimensions plus 4th dimension of seasonal (time)
                - Seasonal dimension- strong seasonal variability on the trinity river
                    - Consistent, predictable temperature pattern over the course of the year on the trinity river watershed
                    - Dams can alter these seasonal patterns (trinity dam), affecting flows over the year
                    - Pre-dam flows on the trinity entailed high flows between November and June
                    - Full-diversion era- strong seasonal pattern with diversions, but not flows
                    - Dam transitional era (starting to manage fisheries)- seasonal pattern somewhat restored but not as prominent
                    - With dam ROD era- strong seasonal pattern, but shift in strong flows to may through July
                    - Changes to temperature even more significant than changes to flow

        - Lewiston dam caused a less extreme range of temperatures over the year, the river is generally colder over the year
- Longitudinal dimension
    - Pre-dam pattern: colder water temperatures upstream, warmer water temperatures downstream, it took a while for temperature to change longitudinally
    - Current: warmer water upstream, cooler water downstream due to latent heat held in Trinity lake
        - Steep longitudinal gradient from Lewiston dam downstream over summer, means far less river length available at each temperature
        - Less available suitable habitat for aquatic organisms
    - Cold water fish need temperature that vary throughout the year to be productive
    - Juvenile growth affected by too cold temperatures
        - Natural flow and temperature regime carried optimal temperatures during juvenile rearing period
    - Fish are smaller from restoration flow release, growth suppression from temperature regime change
    - 90 mm length is the threshold at which fish are better able to survive the transition from fresh to saltwater
        - Important to grow fish large before leaving freshwater
    - Pre-restoration flows were producing less fish, smaller fish before restoration flows
    - 2.6 times greater abundance in the number of out-migrating juveniles in ROD, but haven't seen the same trend in returning adults
        - One contributing factor with adults could be that they're of a smaller size
- Vertical dimension
    - Thermal differences in the water column
    - Todd Buxton study- thermal stratification in pools
        - Above trinity dam- low flows during summer time
        - Stratification occurs with low flows and less turbulent mixing
    - warmer water is traveling across the top of pools over the course of the day, causing stratification
    - trinity lake- stratification generally forms around April and persists until December, affects release temperature
    - Both Coho and Chinook spawning temperatures were not met (too high) in both 2020 and 2021
        - Fisheries still persisted, but not under ideal conditions
- Lateral dimension
    - River temperatures in floodplain are warmer than temperatures in the riverbed.

        - Warmer floodplains in the Sacramento can have up to 149 times more food for juvenile fishes than that in the stream channel.
            - Trinity's floodplains are mostly mining tailings, which do not allow for water to spread and provide habitat
                - Trinity River Restoration Program is trying to open up more of this habitat.
    - climate change- rapidly losing extent of snow coverage, will change runoff patterns as a result
        - snowpack models are showing a large decline in coverage.
            - This results in less cool water delivery throughout the year, resulting in less suitable habitat for salmonids.
    - changes to management to deal with issues
        - shift in water temperatures over the year from changes to slow
        - re-investment in infrastructure- infrastructure in hatcheries and dam defunct, should be removed or restored to previous functions
- Questions:
    - How does the temperature variation throughout the year effects the separation between spring and fall chinook, and if the current flows are helping with hybridization?
        - There are many factors that influence hybridization. The current flows allow upstream migration within the mainstem. If fall run, spring run, and hybrids are within the system they are able to move up. To their spawning grounds. There are current studies being done by the Yurok Tribe and Academia to look at when integration is occurring.

4. 11:00-12:00 Round Robin Updates
    - Yurok fisheries
        - Oregon gulch project implementation ongoing on behalf of TRRP
        - South fork Heliwood p2 project implementation finished in October October
            - Located upstream of Forest Glen, upstream extent of project is near Silver Creek.
            - Partnership with WRTC and USFS
            - Used 2 different methods of loading wood into the river by helicopter and tree tipping
            - Just under 200 trees installed by helicopter (30-40 inch dbh), 20 yarder trees tipped into the river (up to 50-60 inch dbh) (233 trees total)
        - Monitoring- wrapping up mainstem carcass surveys, starting carcass introduction project in grass valley creek
    - WRTC
        - Salt creek flood plain restoration- 65% design complete, working on environmental compliance and working towards implementation
        - Tanks for forbearance project on Browns creek and Tule creek- 6 tanks projects installed, 3-4 in the works, waiting on funds from 2 implementation grants
        - Indian valley/corral gulch- NEPA in the works for floodplain/meadow restoration project

- Upper trinity works- watershed assessment partnership with TCRCD and other agencies
    - Modeling work- modeling inventory and meadows in the upper trinity
        a. The next stage will be restoration opportunities within the upper trinity
- Trust for public lands- purchasing 6 sections of land in upper trinity from SPI, want to decommission all the roads and restore to wilderness
    - 10-12 miles of road with ~300 stream crossings
    - New permitting process with CDFW (SERP)
- Been working with Klamath Meadows Partnership to host a coordinator position for the next three years
- Working with USFS to conduct chinook surveys for fall spawning season in Hyampom
    - Nearly 4 times the amount of redds this year as last year—highest amount since 2017
    - Hayfork creek fish ladder project- assessing with CalTrout to see what species are present around there and the feasibility of reworking the fishway
        a. Pacific lamprey were observed above and below the fish ladder
            i. Looking to get landowner contacts in wildwood for access to creek to see lamprey distribution
    - CDFW cannabis restoration grant to do trash cleanup in post mountain on public lands
    - Additional grant for barker creek roads and sediment
    - Back in November the Salmon Gathering youth day and community day in Hyampom to learn about salmonids and bring the community together.

- Six Rivers NF
    - Lightning complex road restoration for this summer
        - Funding to do illegal grow cleanups within the burn footprint to remove pesticides and trash.
    - Restoration work on cedar creek
    - Monitoring fall chinook in the Lower Trinity has not been looking too good, but it is ongoing and hoping for more fish
- TCRCD
    - Weaver creek watershed- moon lee ditch project to move the water from an open ditch line to a pipeline, waiting on cultural approval to move forward
        - Installing interpretive sign about the moon lee ditch and its history at young family ranch
    - Oak woodlands restoration with BLM on little browns creek
    - Treated scotch broom on west weaver creek this year, monitoring ongoing
    - Upper trinity partnership with WRTC- granted an extension to continue to work on it, still waiting on modeling on for project areas, modeling for suitable areas to install Beaver Dam analogues in upper trinity watershed
    - Travis ranch riparian element
        - South county Ranch in the Eel River watershed
    - 20,000 awarded for vehicle abatement in Shasta Trinity NF

- West weaver creek cleanup is rescheduled due to snow
- Trinity river salmon festival- around 500 attendees
- Annyssa will be leading
- Maya Williams will be transition out of her role and Duncan McIntosh will be taking over that role

- Shasta Trinity NF
  - USFS working with partners on several restoration projects still in planning
  - Shasta Trinity NF looking to create a watershed programmatic environmental assessment to make it easier to coordinate projects with partners in the watershed
- TRRP
  - Oregon gulch- going well, started in summer, will be mostly done including revegetation in 2023
    - Largest excavation that TRRP has worked on – $10 million cost
  - Working with NFWF to give out award notices by the end of may for summer implementation to occur
  - Watershed programmatic environmental assessment- tributaries on public ,and private land, public draft document to be completed later in 2023
  - Trinity management council- passed recommendation for winter flow ruleset
  - Passed a 7 to 1 vote to recommendation the winter flow variability ruleset for 2023. Now resting on the Department of the Interior if they agree with the recommendation
  - Participating in reconsultation with NOAA on trinity river section of, interested parties meeting on Thursday, looking for ideas for conservation measures or alternative actions for reoperation dams with different rulesets for storage, flow
  - Brand Guetermuth retiring at the end of this month
  - Chad Abel taking a position with USFWS – National Program Office
    - Watershed and permitting questions can be directed to Mike until those positions are filled.
- Trinity County
  - Introduced new environmental compliance specialist who is helping push forward new projects
  - DOT- canyon creek slide work continues to have issues.
  - Coffee creek debris flow nearing closing out, help from Yurok with reveg and erosion control
  - Other disaster relief like monument fire- replacing culverts on roads
  - Working with USFS on a good neighbor agreement to promote other project agreements
    - Will allow work on county roads leading to forest service
    - Looking to develop more projects under this agreement with other partners
  - Regional transportation plan- still in updates phase, comment section closing soon, looking for specific county road projects and can include fisheries work
    - Hoping to finish during January
  - Lorenz road Sydney gulch- comments close the 15th
  - County grading permit might work for partners projects
  - County bridge over Hayfork creek in Wildwood

- Flowra
  - Engaged with qualified cultivator program
  - Will be applying with cannabis for conservation for an EPA 319 grant for nonpoint source pollution
  - Hoping to assist some growers get licensed to ensure their impact being reduced by following all regulations
  - Applying to some grants that will focus on watershed restoration work
    - Road inventories and restoration, sediment inventories, and more.
- Trinity County Agricultural Alliance
  - Gearing up to assit farmers participate in the Sustainable CA pilot program in 2023-24
  - They have a growing list of sustainable farms eager to participate, and looking forward to that pilot program and a new body of data around sustainable farming manifest.

5. Next Meeting: March 14th, 2023 10:00AM – 12:00PM

   Meeting adjourned 11:46

science on tap

AN EDUCATIONAL SERIES
EVERY 4TH WEDNESDAY AT
Trinity County Brewing Company
301 Main Street, Weaverville CA

Wednesday, August 24 6:00-7:00 pm

Getting water temperature just right:
What Goldilocks and the Three Bears can teach us about river management.

Presented by Kyle DeJuilio, Yurok Tribal Fisheries

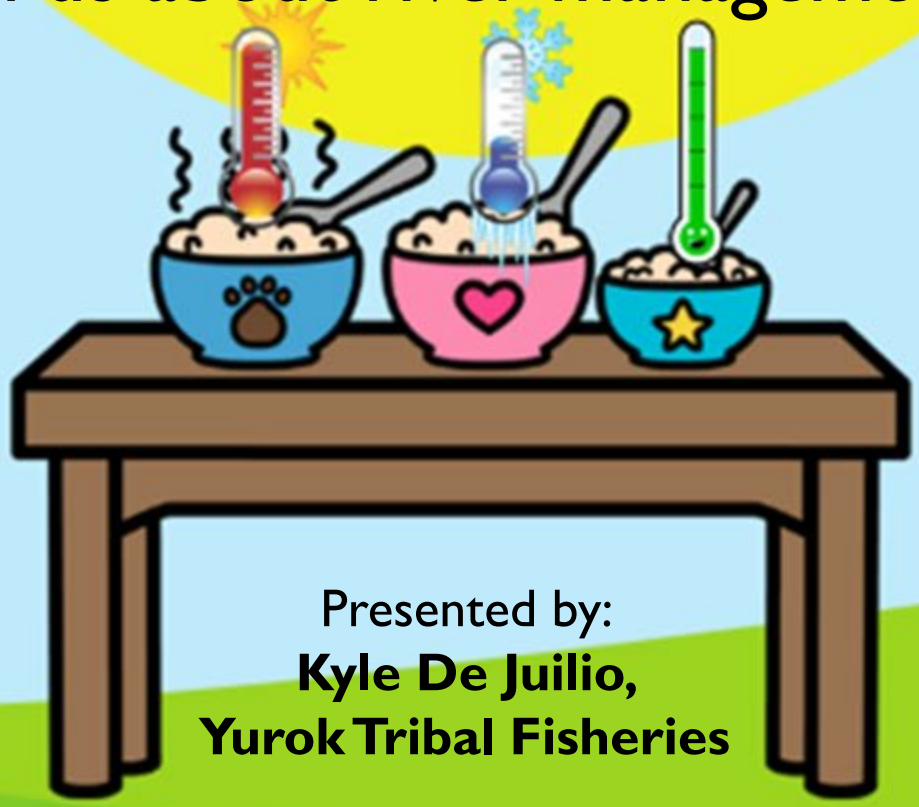

Photo Credit: Thomas Dunklin

GRAB A BEER AND LEARN ABOUT LOCAL SCIENCE

This event is facilitated by the Trinity County Resource Conservation District

Getting water temperature just right:

What Goldilocks and the Three Bears can teach us about river management.

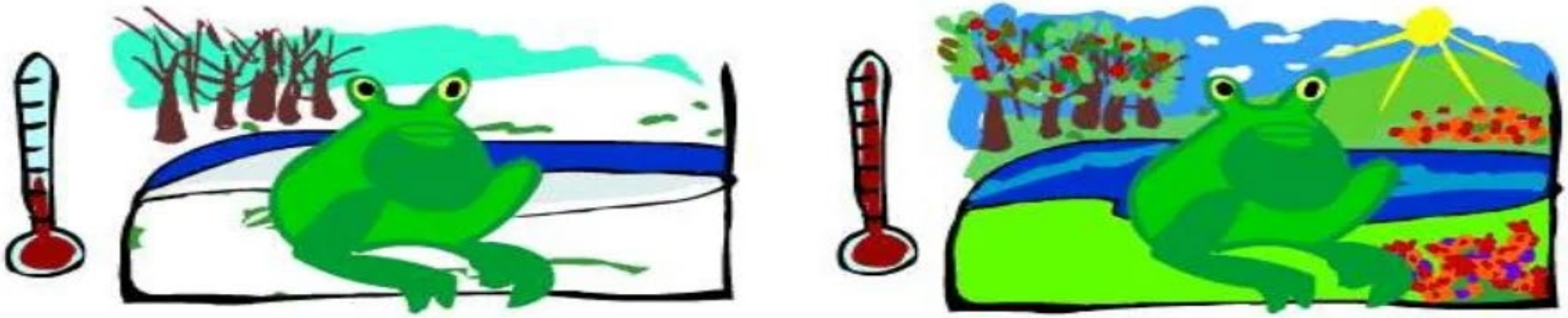


Presented by:
Kyle De Juilio,
Yurok Tribal Fisheries

warm-blooded ANIMALS

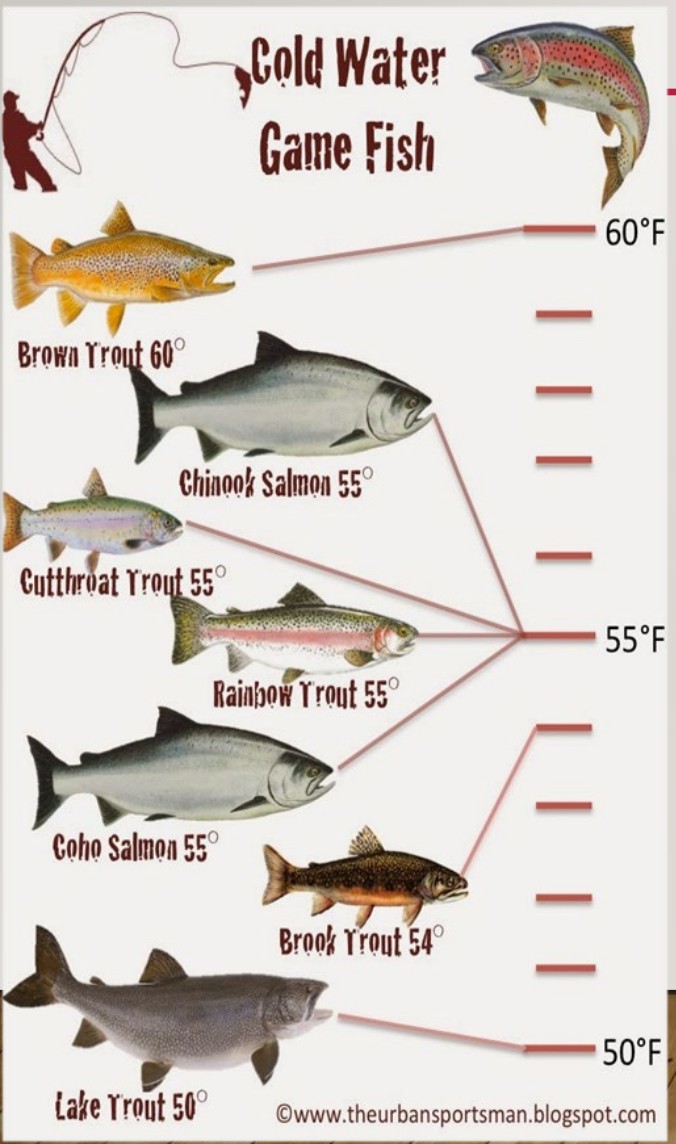
Body temperature stays the same when its cold or hot outside.

cold-blooded ANIMALS



Body temperature depends on whether its cold or hot outside.

STENOTHERM VS. EURYTHERM



- Stenotherm – only survive over a narrow range of temperature

- Eurytherm – animals that can function over a wide range of temperature
  - Usually, warm blooded animals or endotherms
  - Must consider all life stages

Adult Chinook

Eggs

Smolt

Pacific Salmon Life Cycle

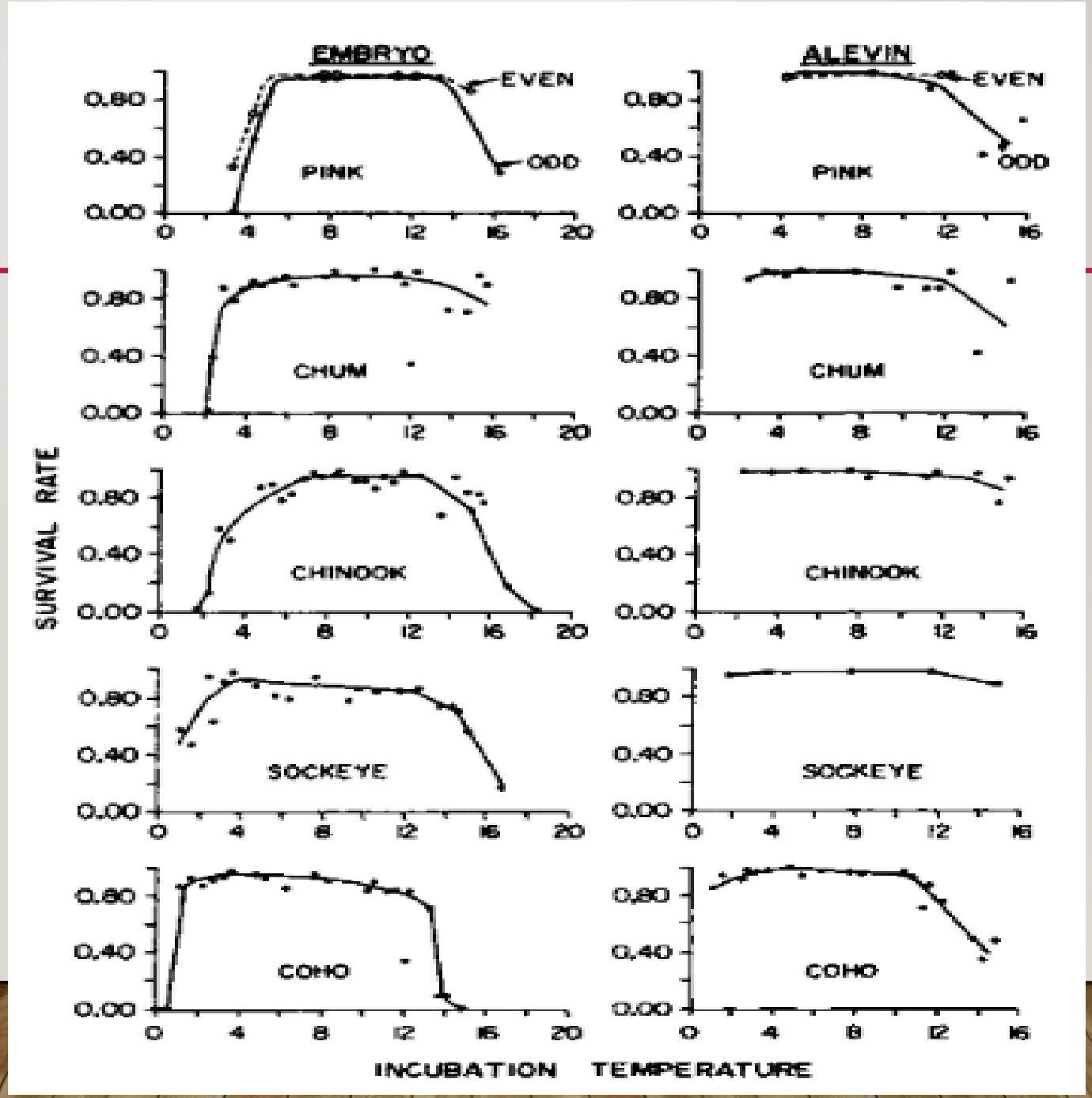
Alevin

Parr

Fry

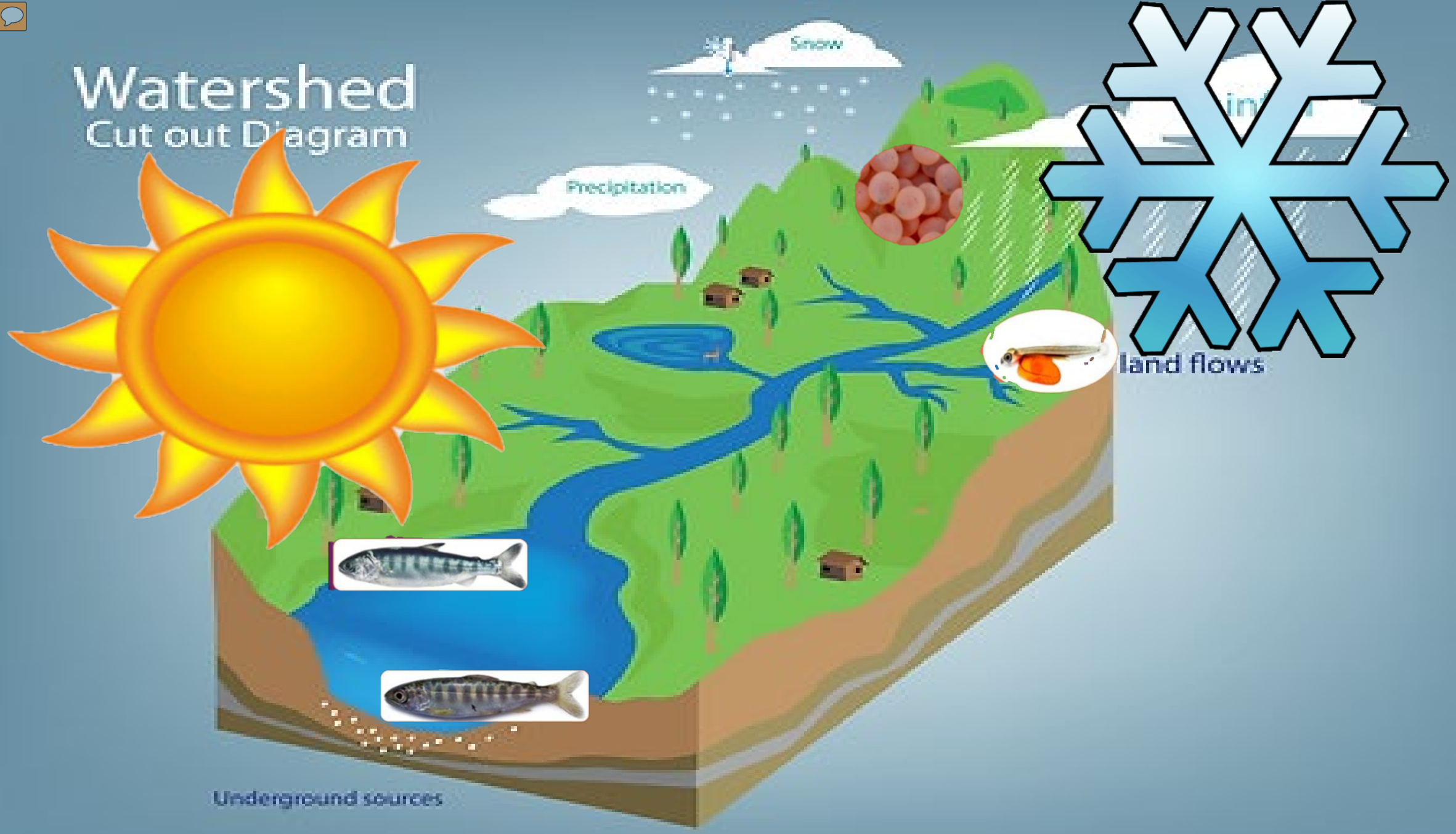
Squamish Streamkeepers

SALMON EGG REQUIREMENTS



Beecham and Murray (1990)

Watershed
Cut out Diagram



3-6 weeks

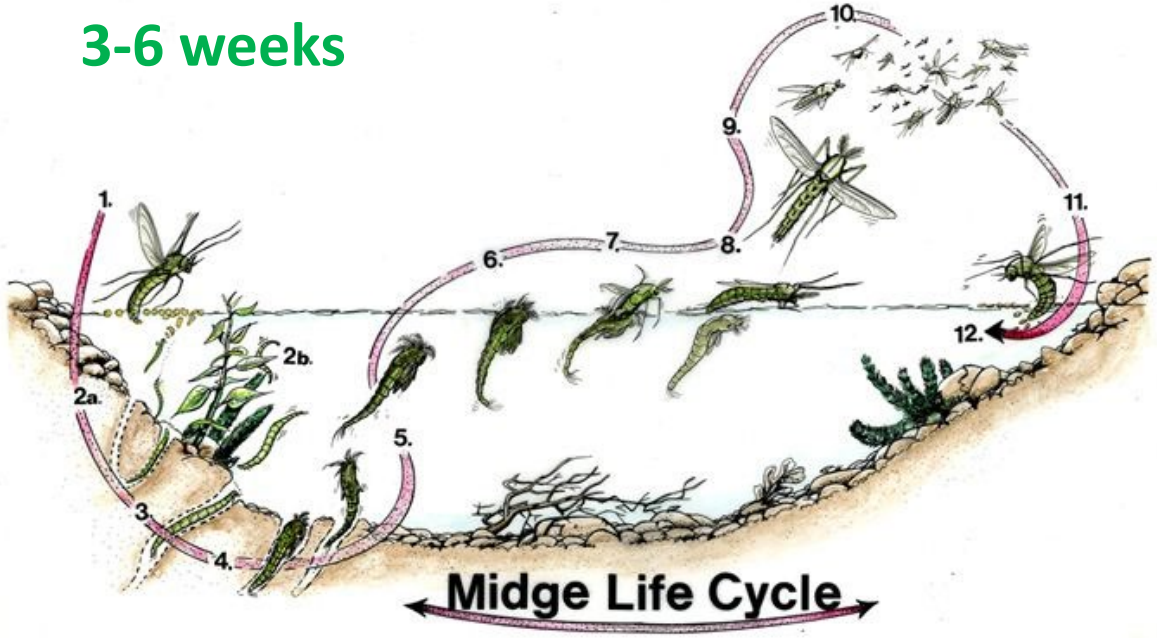


Image from Dave Whitlock's Guide to Aquatic Trout Food

5-10 weeks

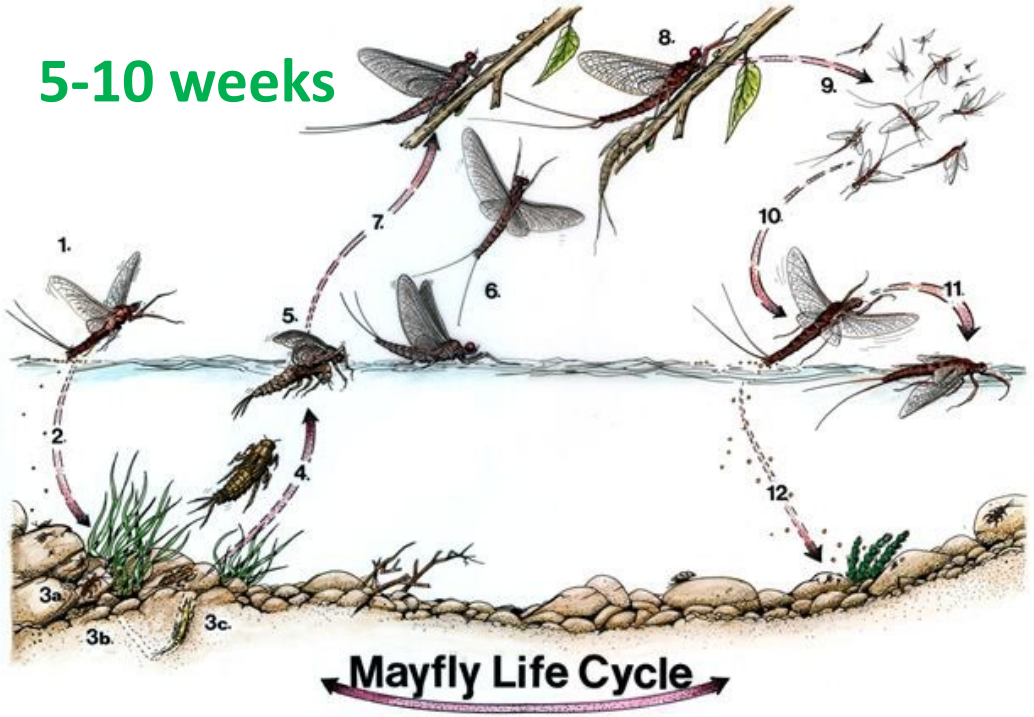


Image from Dave Whitlock's Guide to Aquatic Trout Foods

1-2 Years

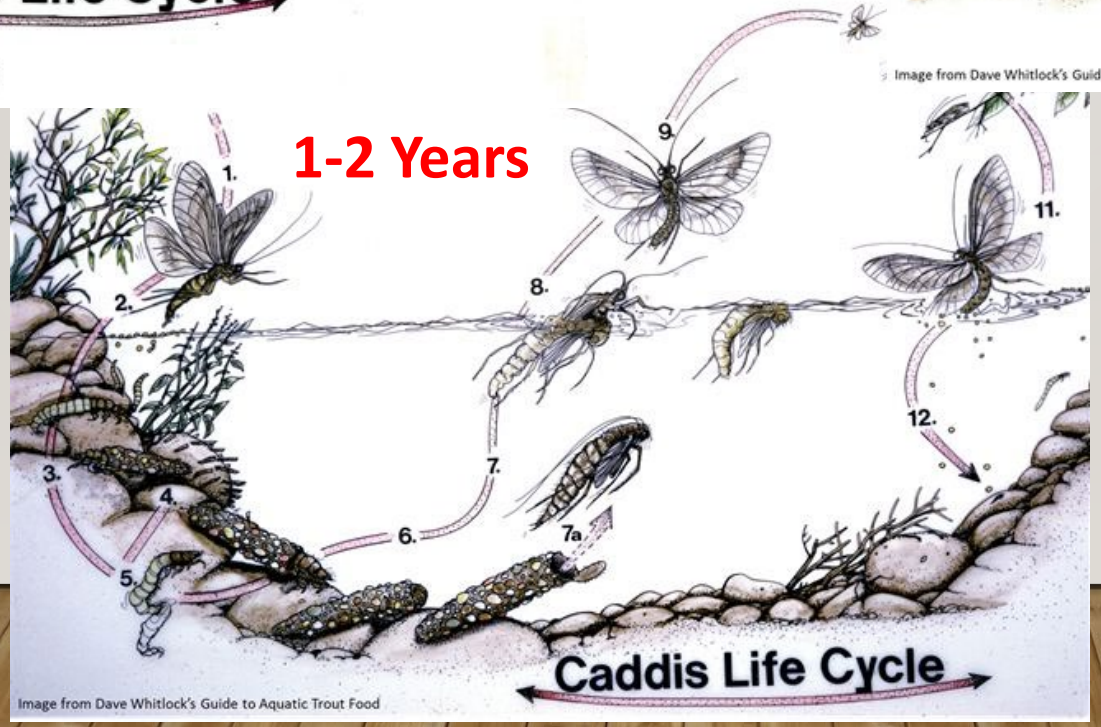


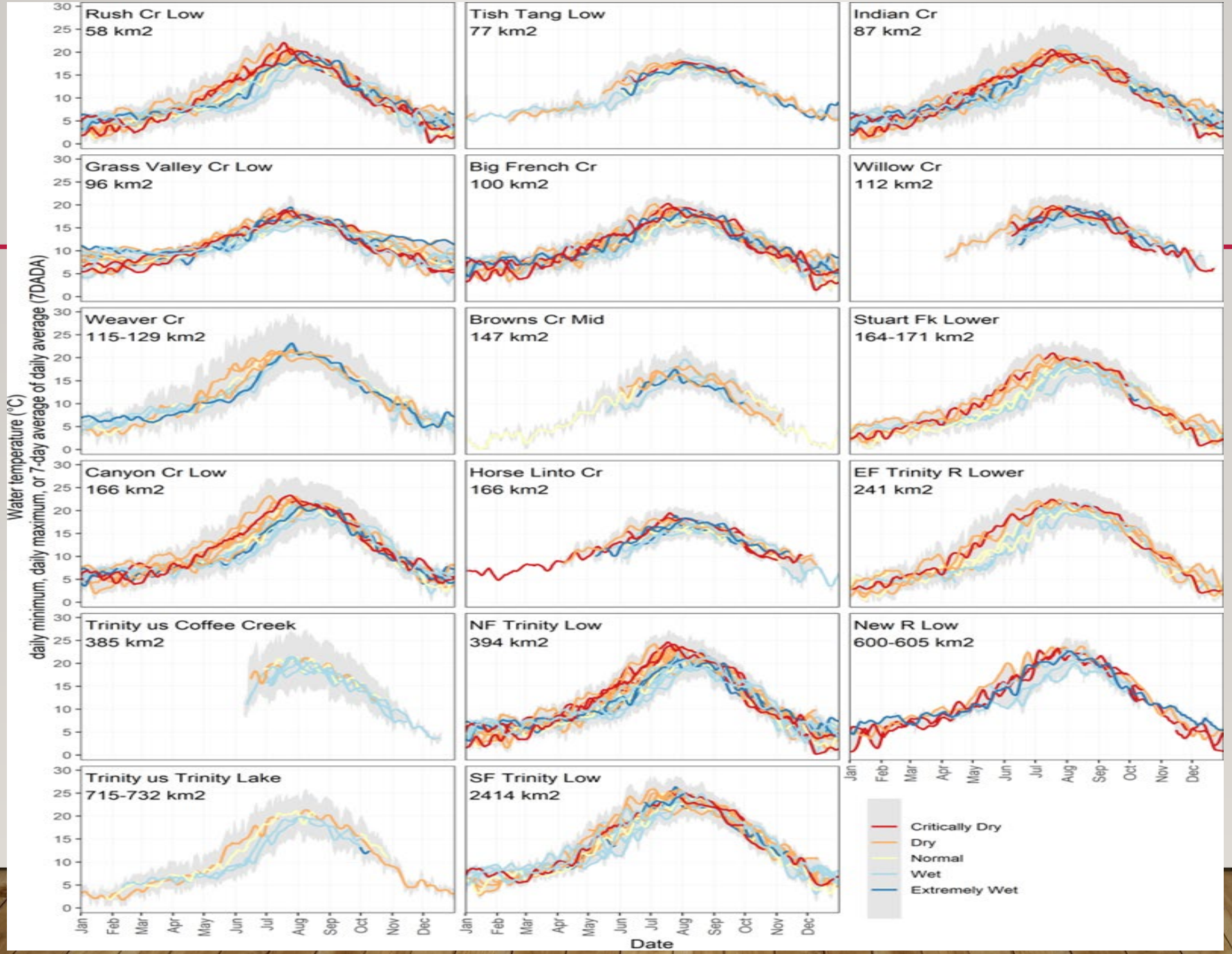
Image from Dave Whitlock's Guide to Aquatic Trout Food

Goldilocks & The Three Bears

THE 4-DIMENSIONS OF STREAM TEMPERATURE

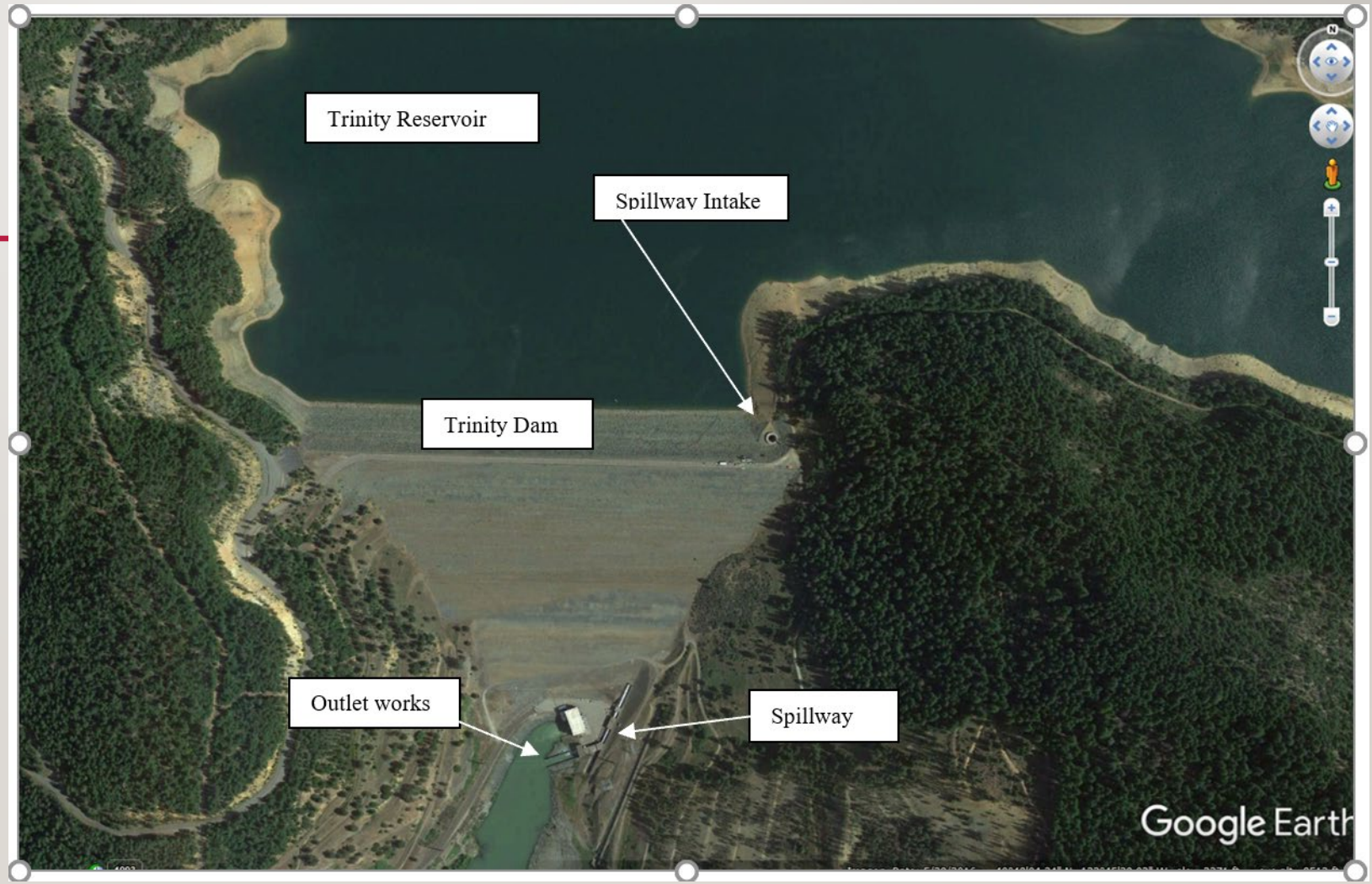
- **Seasonal** – At higher latitudes strong seasonal shifts in day length and sun angel cause a warm summer and a cold winter.
- **Longitudinal** – watersheds start at high elevation in the mountains where it is cool, fed by snow melt and springs and end downstream in mainstem river valleys where temperatures are often much higher.
- **Vertical** – water has a high specific heat capacity, and it is a good thermal insulator. If water is not mixed and is exposed to the warm air at its surface and the cool ground, cool air, or has a cold-water source, it will separate vertically
- **Lateral** – when water spreads out and has varying depths and velocities and reduced mixing it begins to thermally differentiate with slow shallow areas easily warmed and deep areas remaining cool

SEASONAL DIMENSION

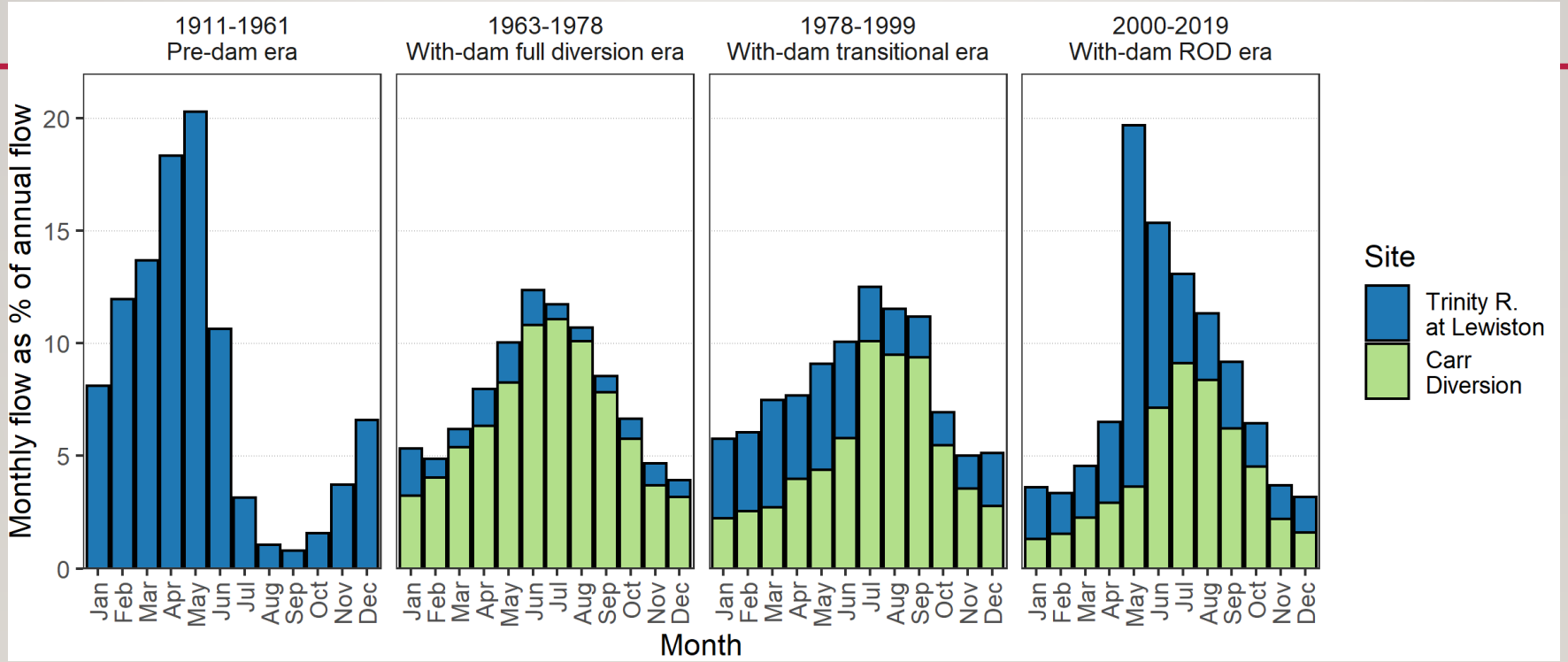

Rush Cr Low
58 km2
Tish Tang Low
77 km2
Indian Cr
87 km2
Grass Valley Cr Low
96 km2
Big French Cr
100 km2
Willow Cr
112 km2
Weaver Cr
115-129 km2
Browns Cr Mid
147 km2
Stuart Fk Lower
164-171 km2
Canyon Cr Low
166 km2
Horse Linto Cr
166 km2
EF Trinity R Lower
241 km2
Trinity us Coffee Creek
385 km2
NF Trinity Low
394 km2
New R Low
600-605 km2
Trinity us Trinity Lake
715-732 km2
SF Trinity Low
2414 km2
Water temperature (°C)
daily minimum, daily maximum, or 7-day average of daily average (7DADA)
0
5
10
15
20
25
30
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Date
Critically Dry
Dry
Normal
Wet
Extremely Wet

TRINITY DAM

- Congressional Authorization for construction in 1955 Trinity River Act
- Built In 1962
- 537.5 ft tall / hydraulic height 440 ft

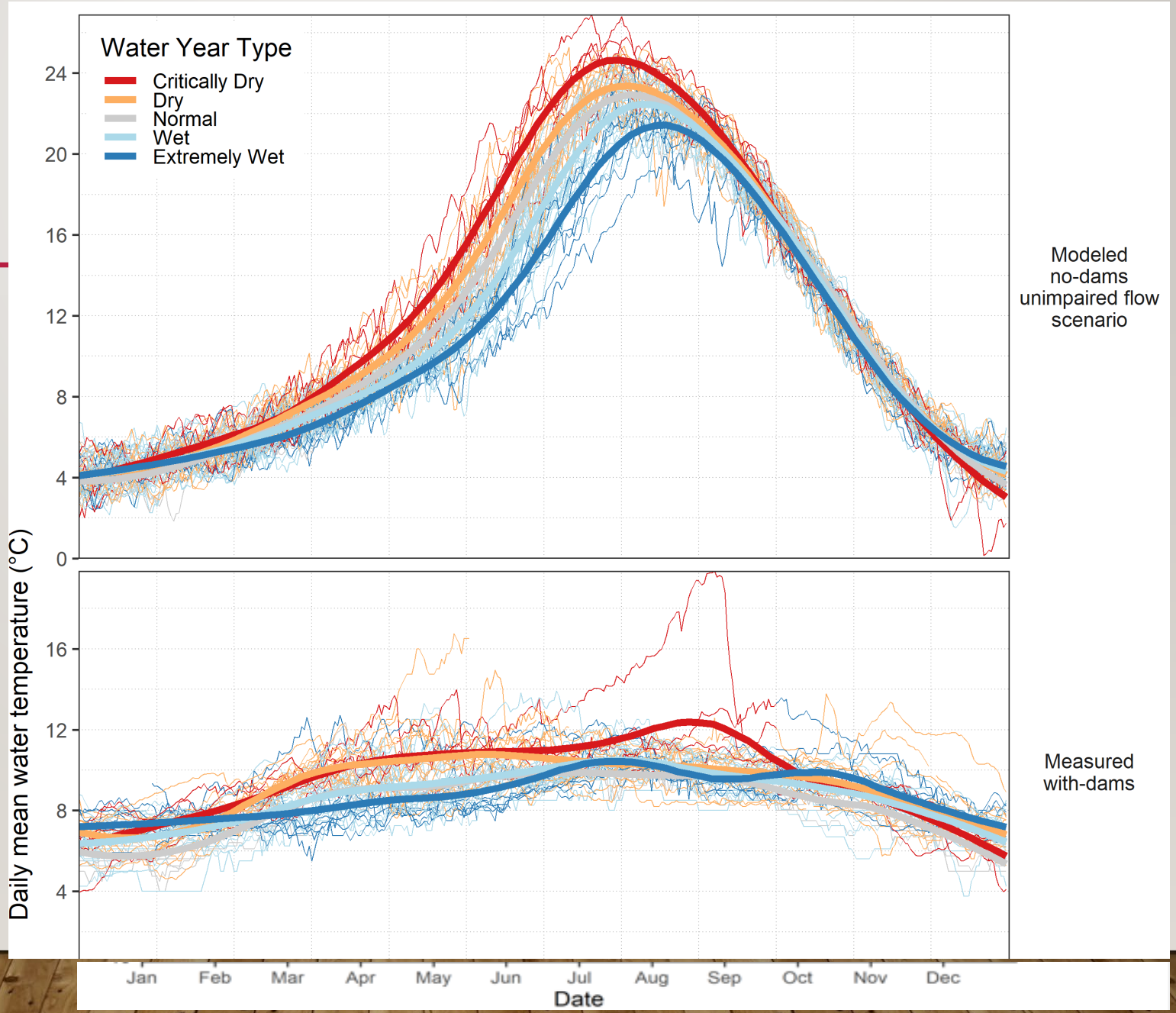


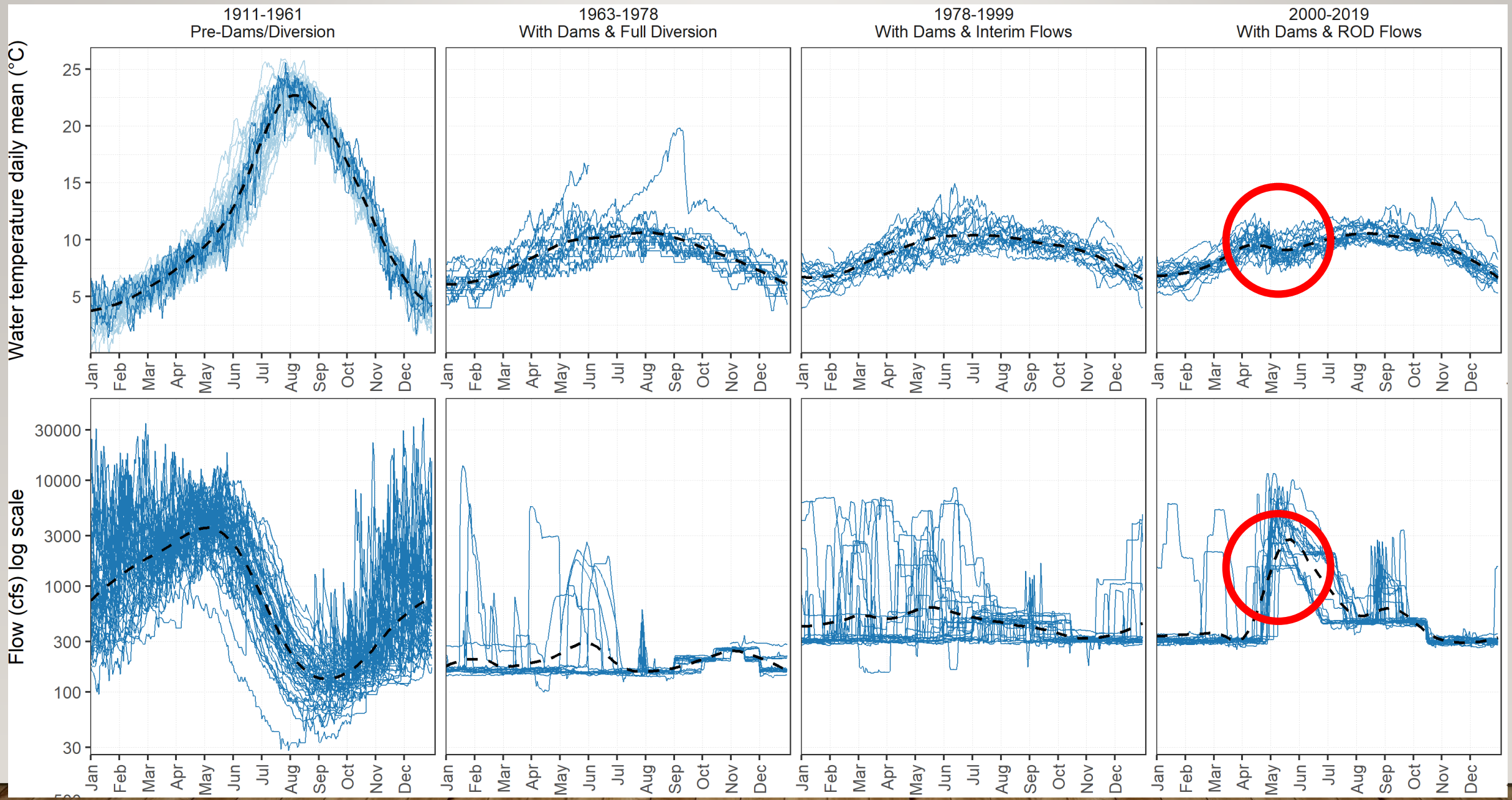
PROPORTION OF TRINITY RIVER FLOWS BY MONTH



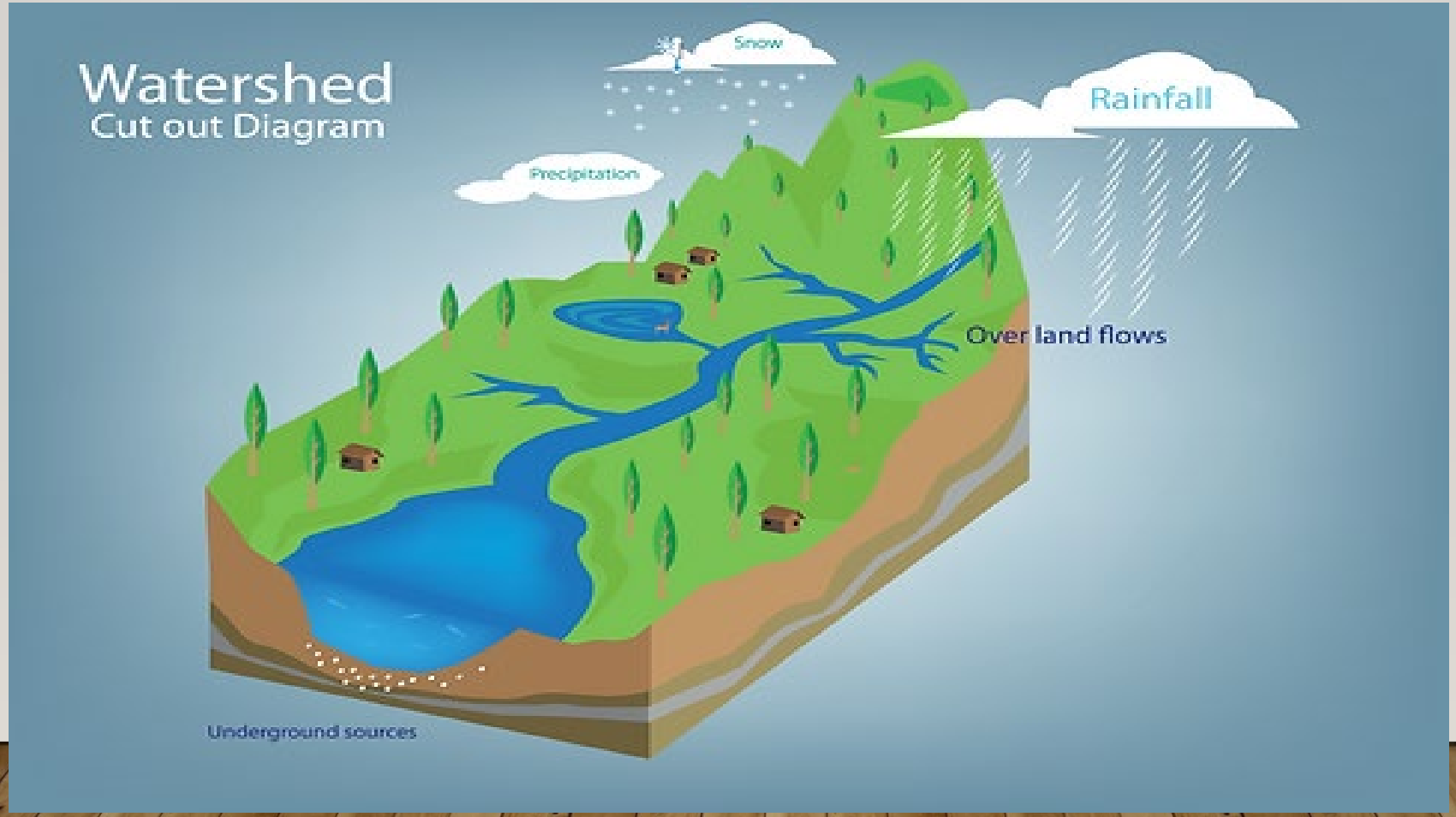
- Shifting water volume through time has had impacts to the river and water users

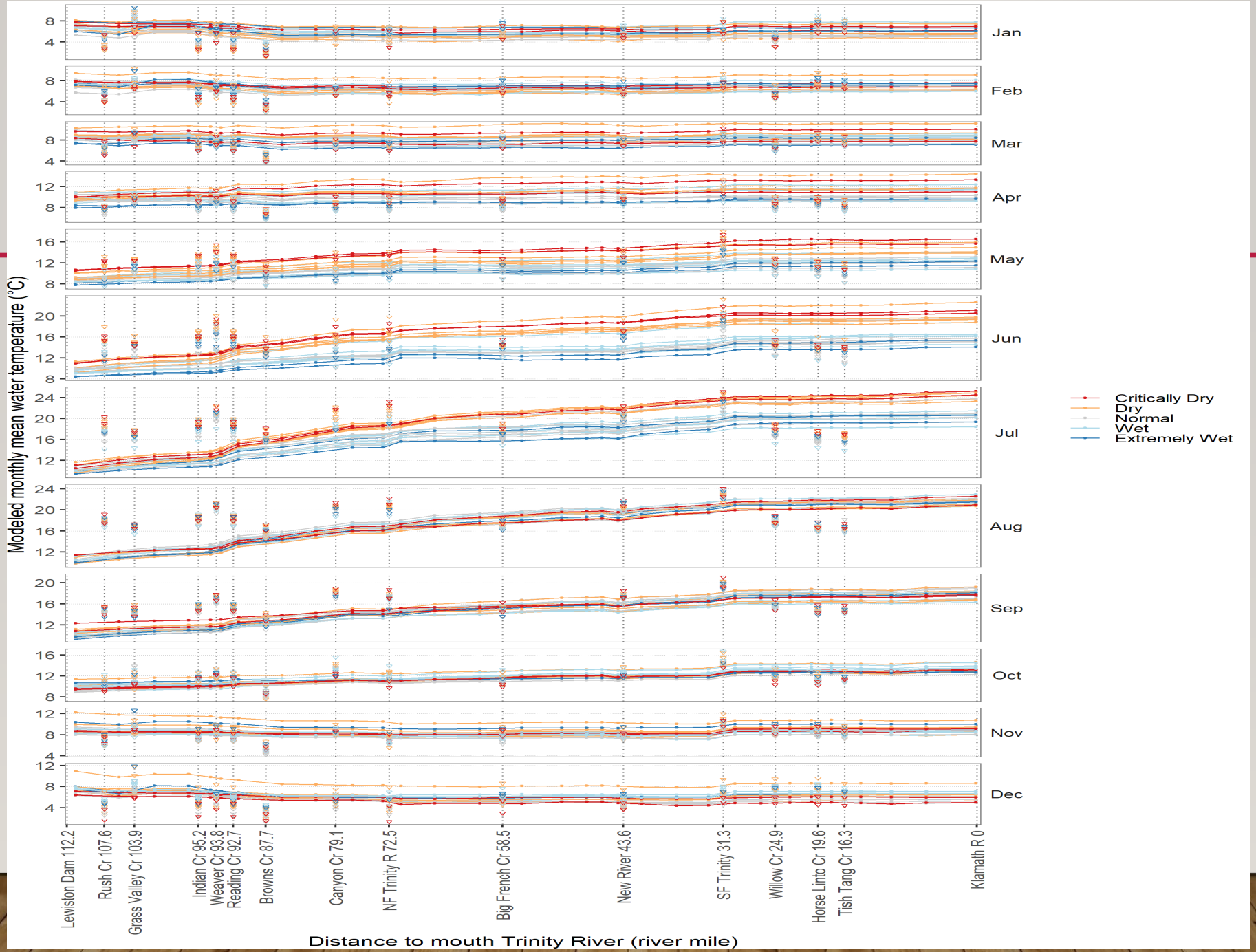
CHANGE TO TEMPERATURE AT LEWISTON AFTER DAM

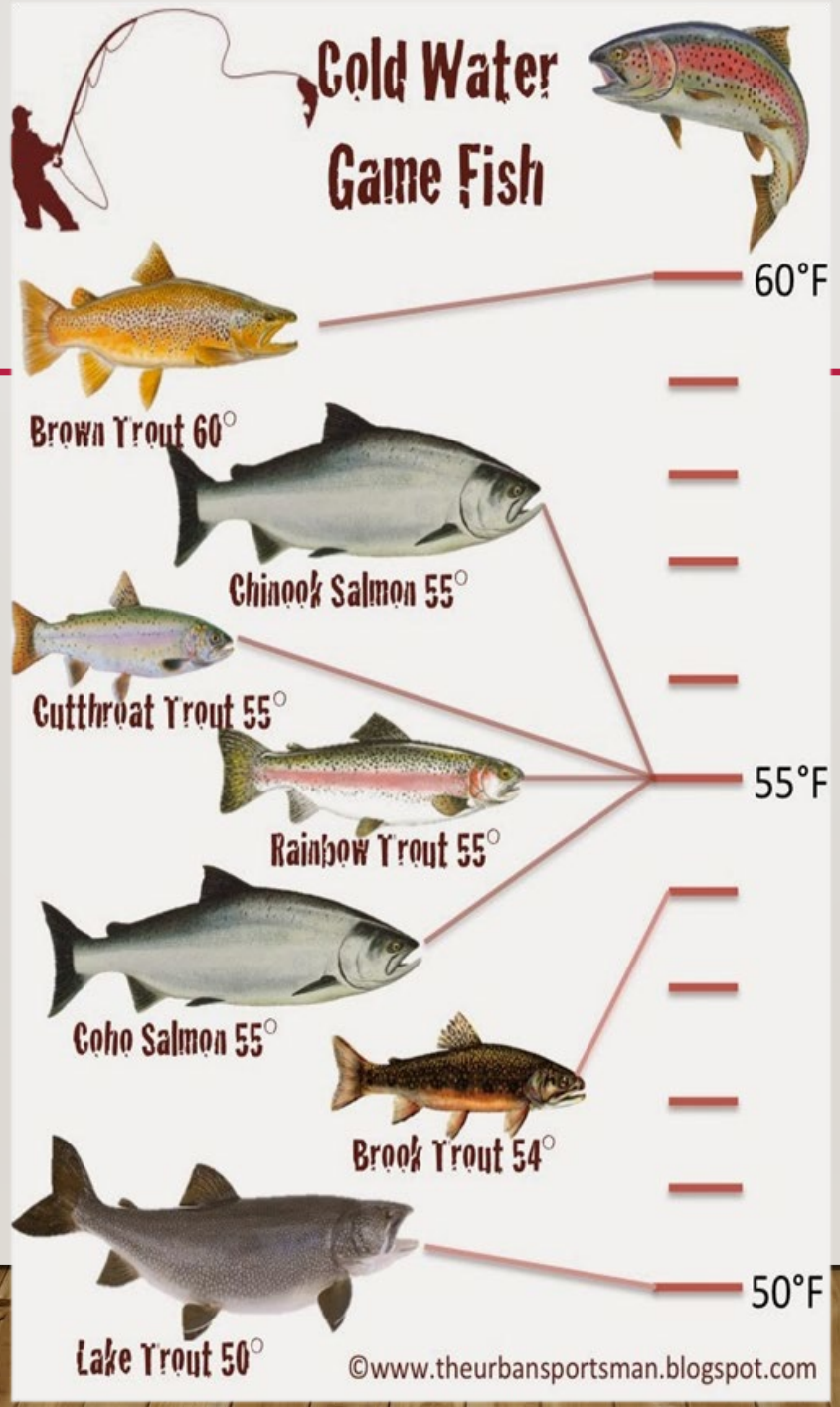



1911-1961
Pre-Dams/Diversion
1963-1978
With Dams & Full Diversion
1978-1999
With Dams & Interim Flows
2000-2019
With Dams & ROD Flows
Water temperature daily mean (°C)
25
20
15
10
5
Flow (cfs) log scale
30000
10000
3000
1000
300
100
30
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

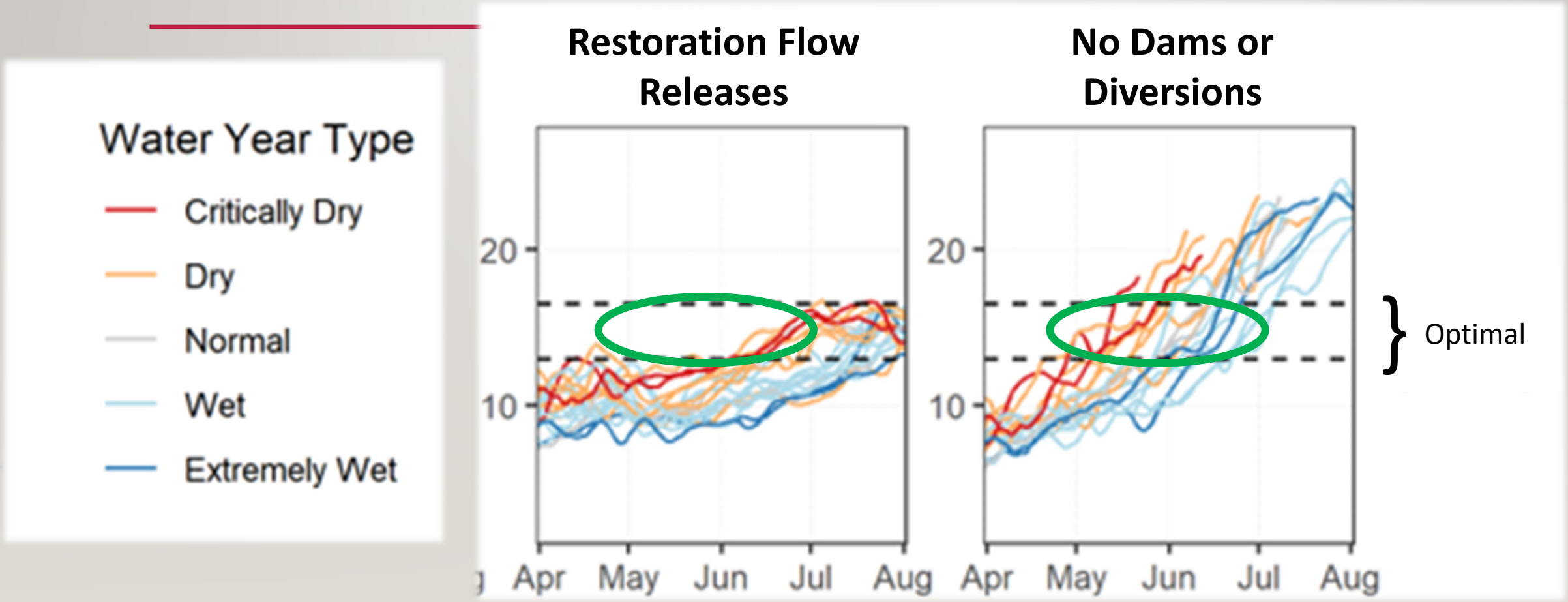
LONGITUDINAL DIMENSION



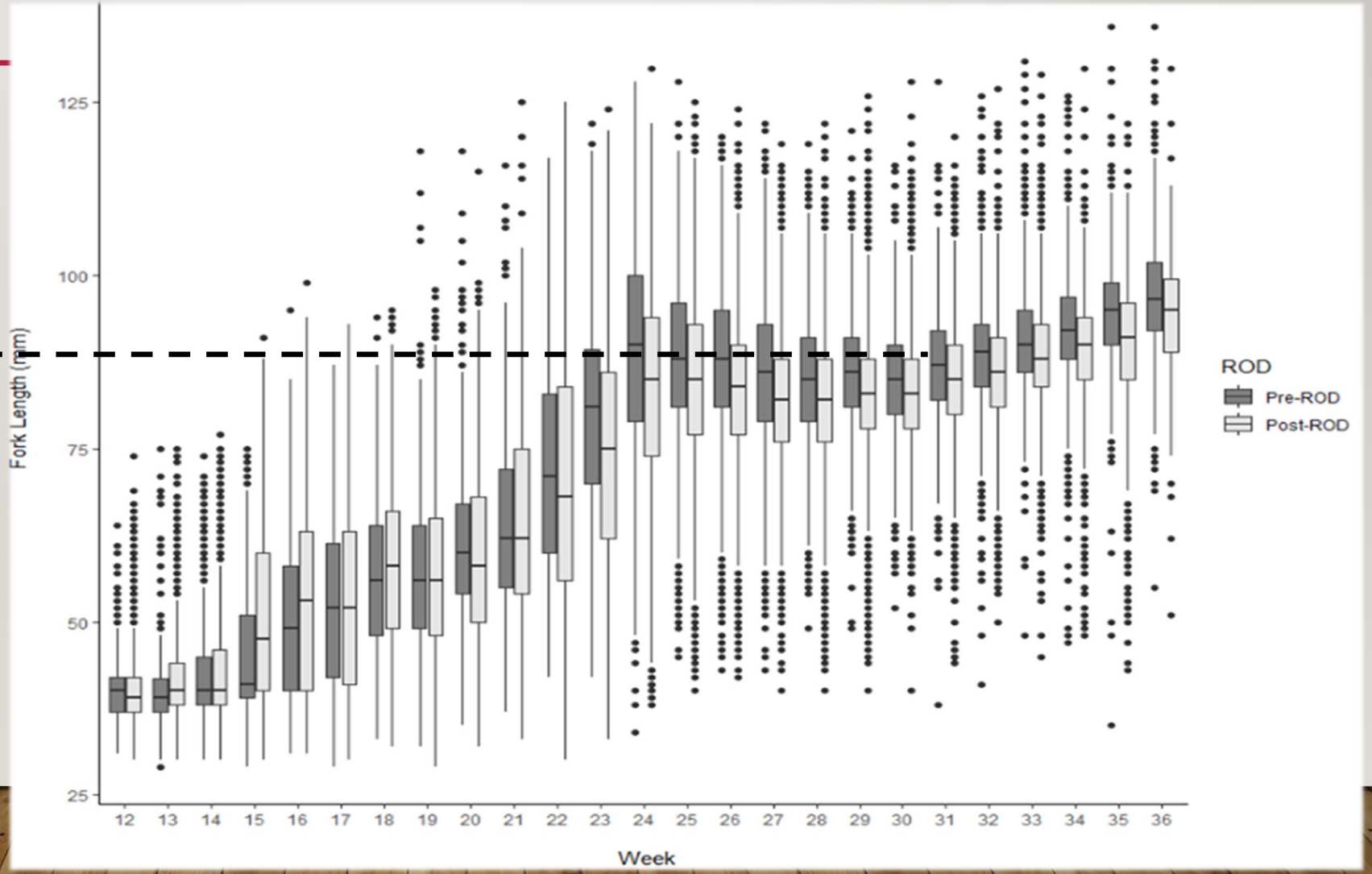

Modeled monthly mean water temperature (°C)
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Critically Dry
Dry
Normal
Wet
Extremely Wet
Lewiston Dam 112.2
Rush Cr 107.6
Grass Valley Cr 103.9
Indian Cr 95.2
Weaver Cr 93.8
Reading Cr 92.7
Browns Cr 87.7
Canyon Cr 79.1
NF Trinity R 72.5
Big French Cr 58.5
New River 43.6
SF Trinity 31.3
Willow Cr 24.9
Horse Linto Cr 19.6
Tish Tang Cr 16.3
Klamath R 0
Distance to mouth Trinity River (river mile)


Cold Water
Game Fish
60°F
Brown Trout 60°
Chinook Salmon 55°
Cutthroat Trout 55°
55°F
Rainbow Trout 55°
Coho Salmon 55°
Brook Trout 54°
50°F
Lake Trout 50°
©www.theurbansportsman.blogspot.com

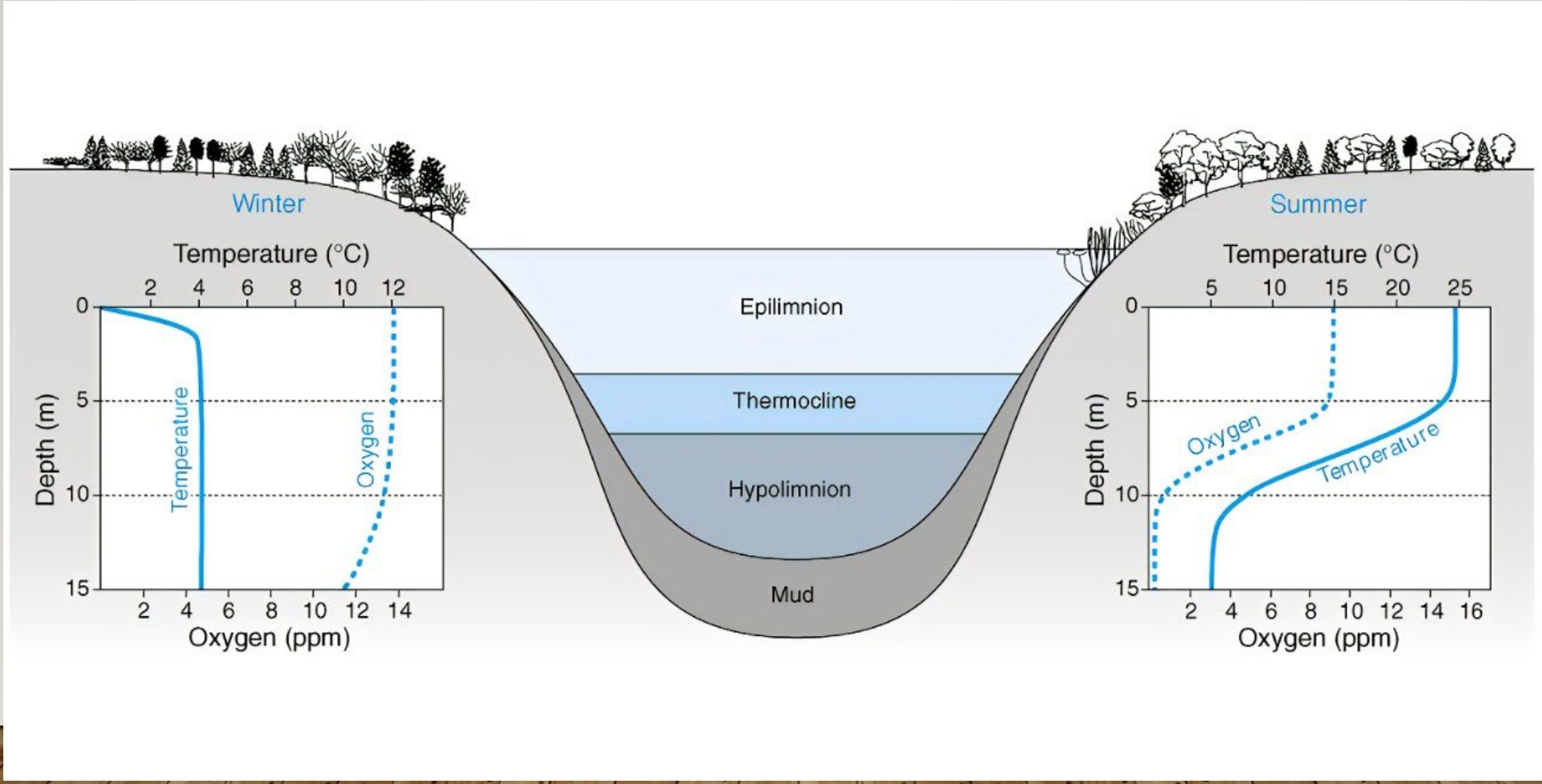
Water Temperature:
too hot - too cold… just, right?

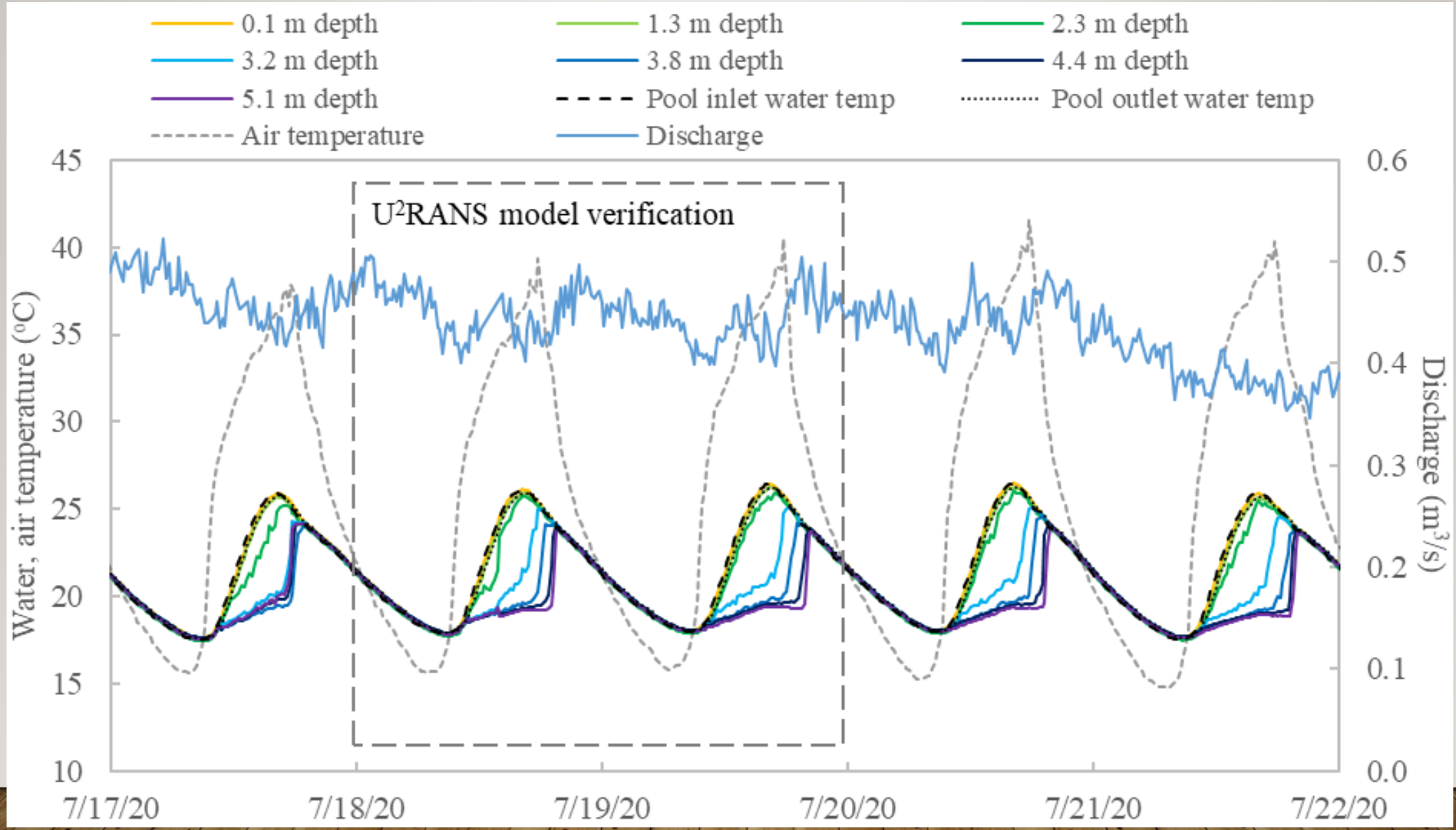


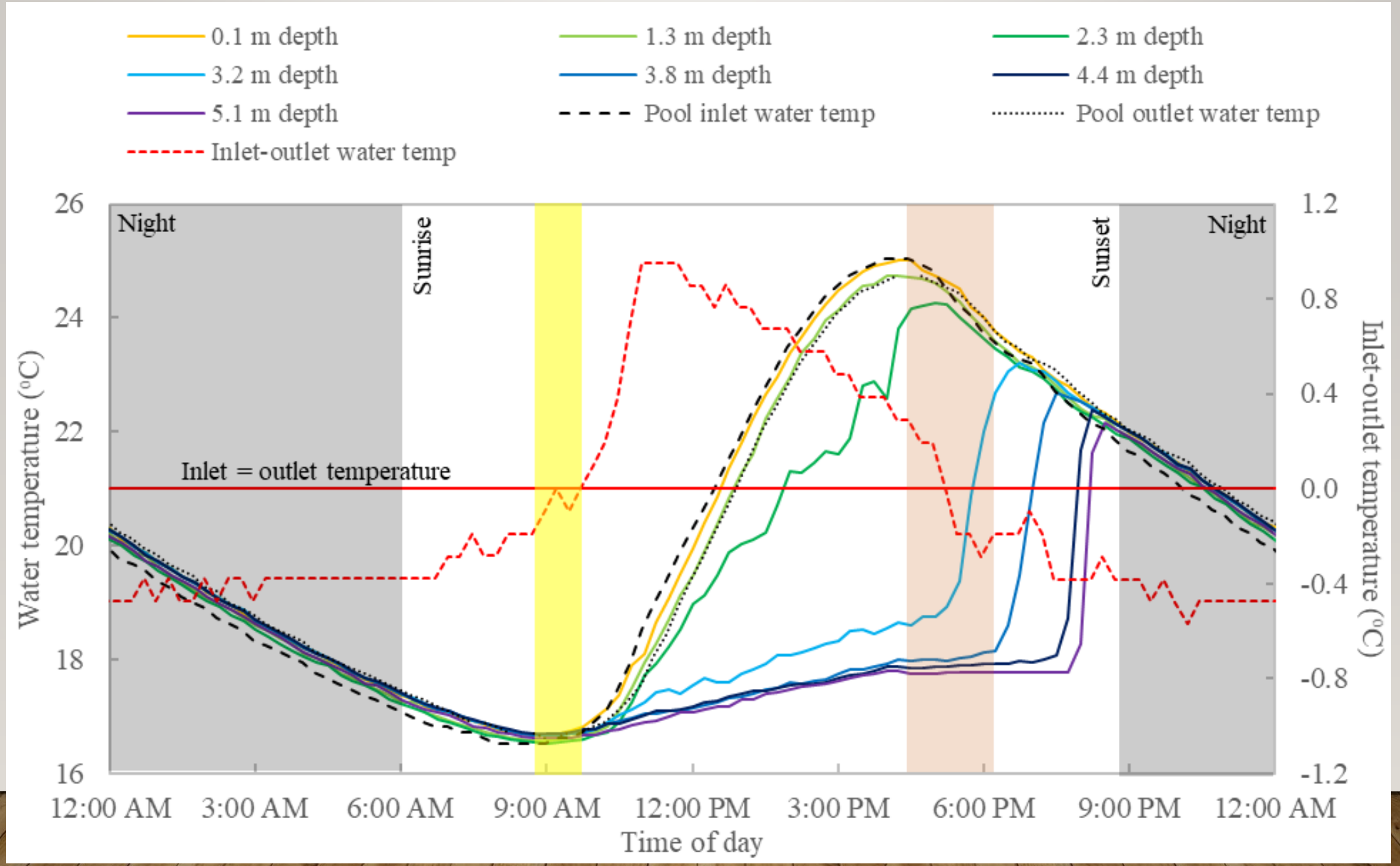
WATER TEMPERATURE: FISH GROWTH



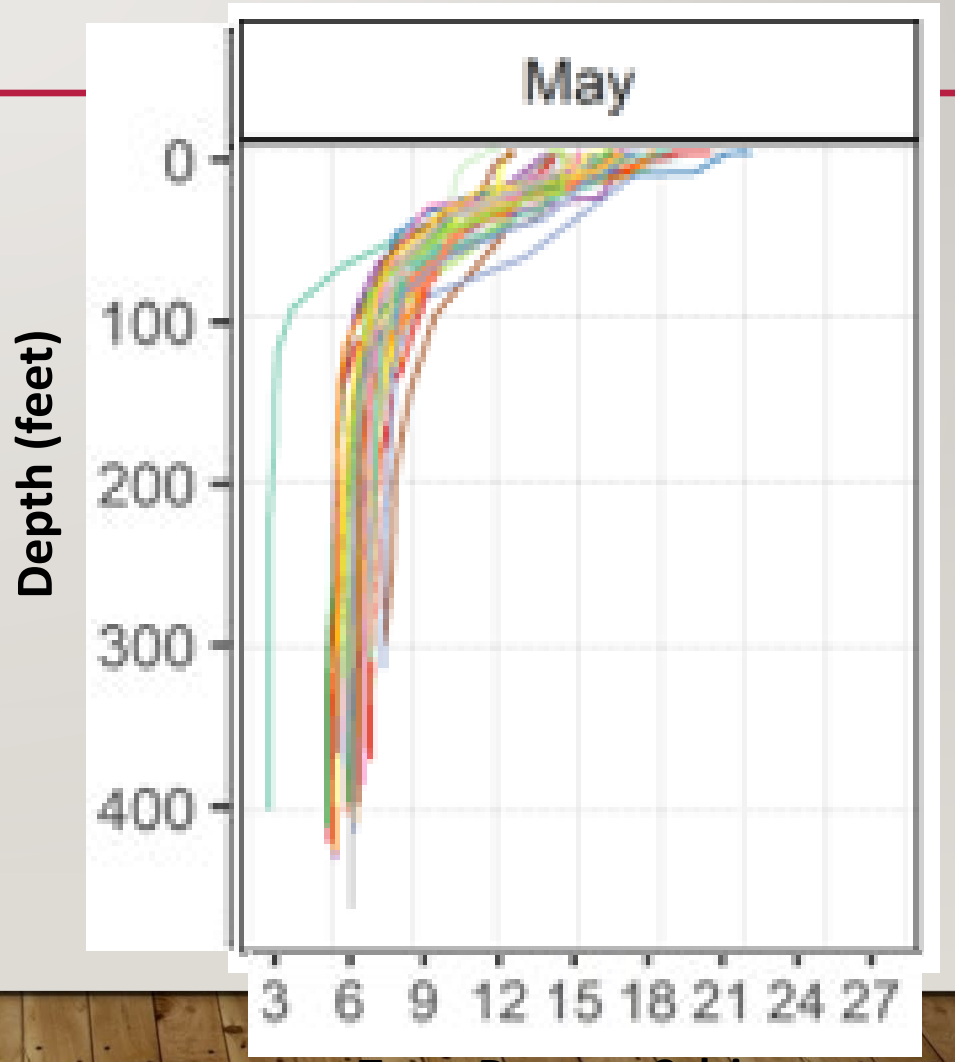
VERTICAL DIMENSION



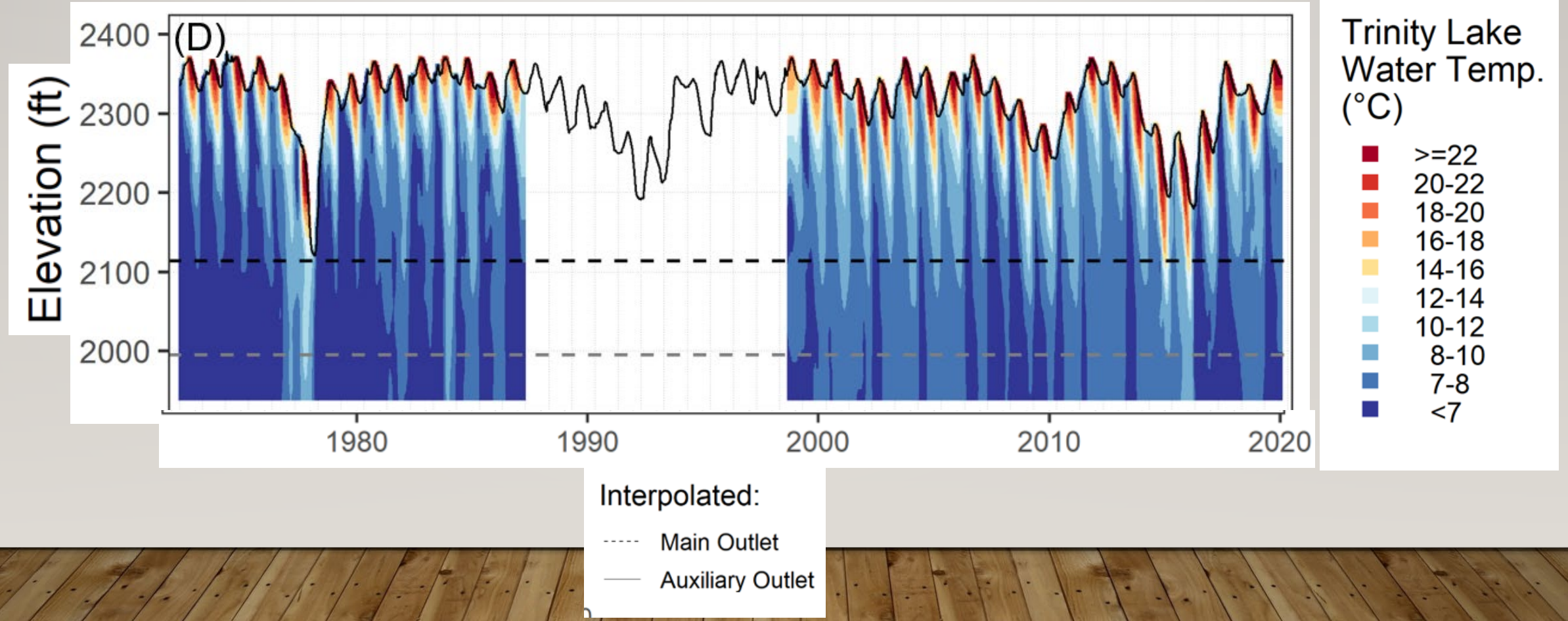

0.1 m depth
1.3 m depth
2.3 m depth
3.2 m depth
3.8 m depth
4.4 m depth
5.1 m depth
Pool inlet water temp
Pool outlet water temp
Air temperature
Discharge
U²RANS model verification
Water, air temperature (°C)
Discharge (m³/s)
45
40
35
30
25
20
15
10
0.6
0.5
0.4
0.3
0.2
0.1
0.0
7/17/20
7/18/20
7/19/20
7/20/20
7/21/20
7/22/20


0.1 m depth
1.3 m depth
2.3 m depth
3.2 m depth
3.8 m depth
4.4 m depth
5.1 m depth
Pool inlet water temp
Pool outlet water temp
Inlet-outlet water temp
Night
Sunrise
Sunset
Night
Inlet = outlet temperature
Water temperature (°C)
Inlet-outlet temperature (°C)
26
24
22
20
18
16
1.2
0.8
0.4
0.0
-0.4
-0.8
-1.2
12:00 AM
3:00 AM
6:00 AM
9:00 AM
12:00 PM
3:00 PM
6:00 PM
9:00 PM
12:00 AM
Time of day

TEMPERATURE – DAM RELEASE

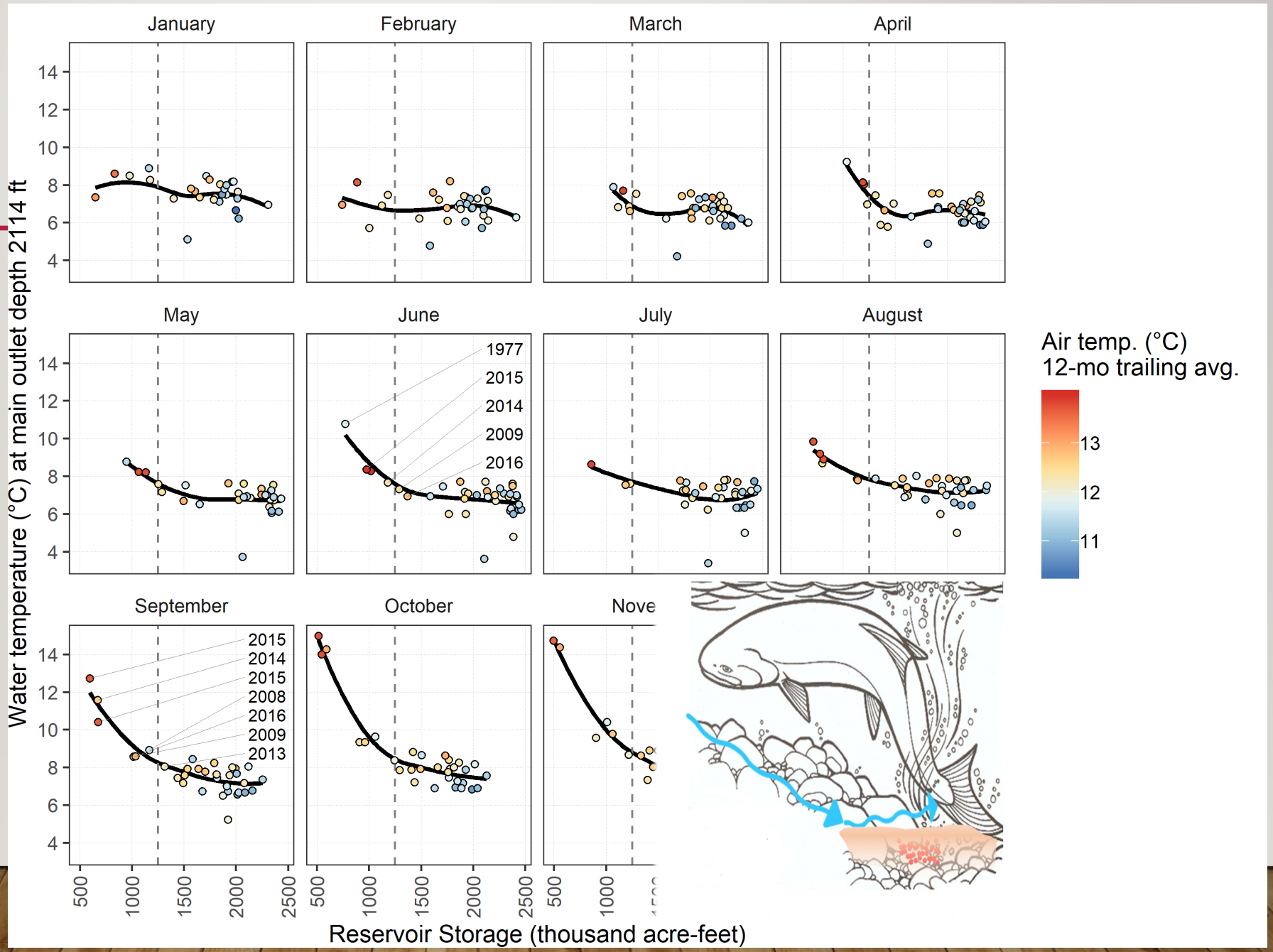


STORAGE HISTORY AND TEMPERATURE PROFILES

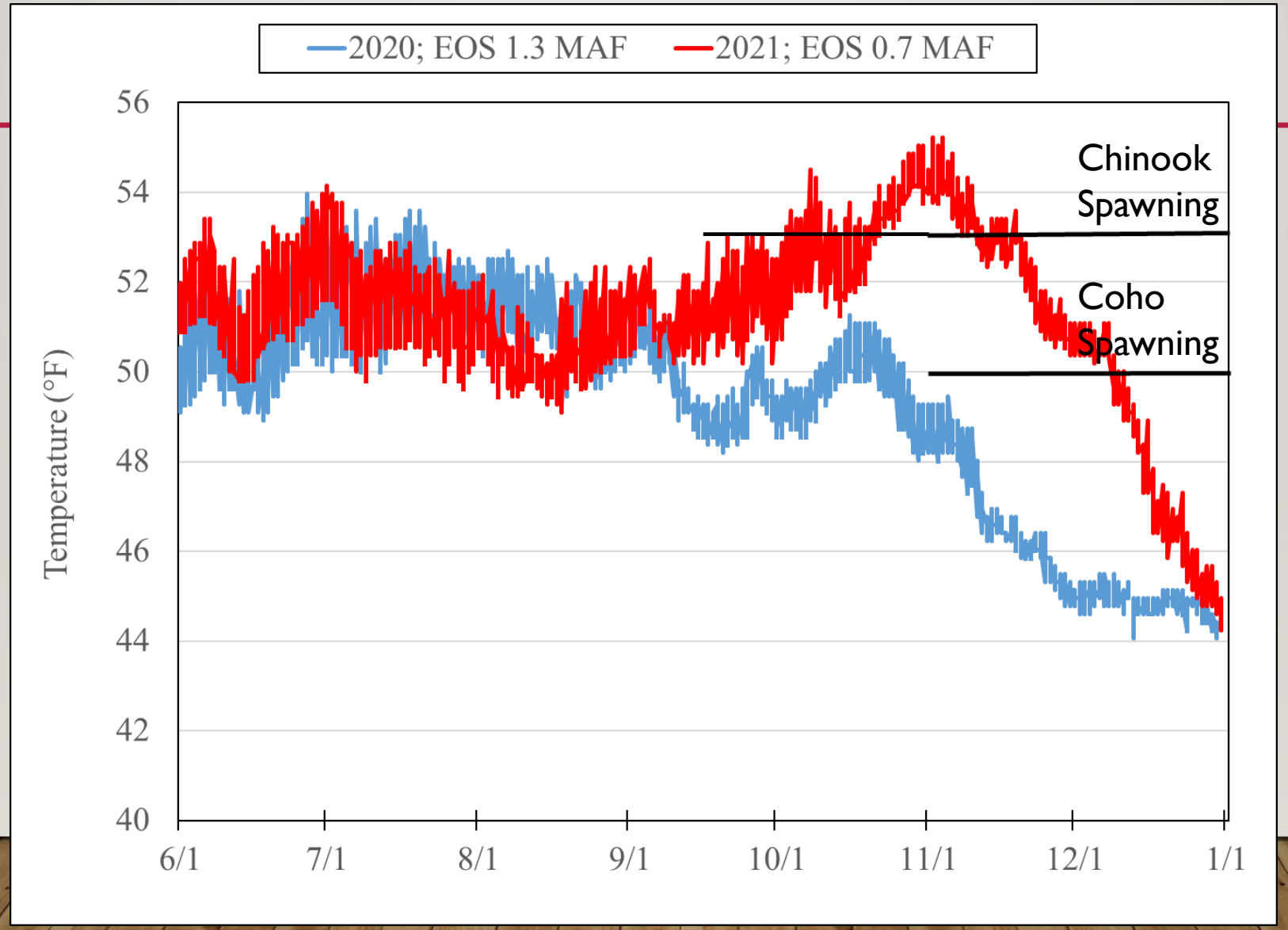


TEMPERATURE OF RELEASE

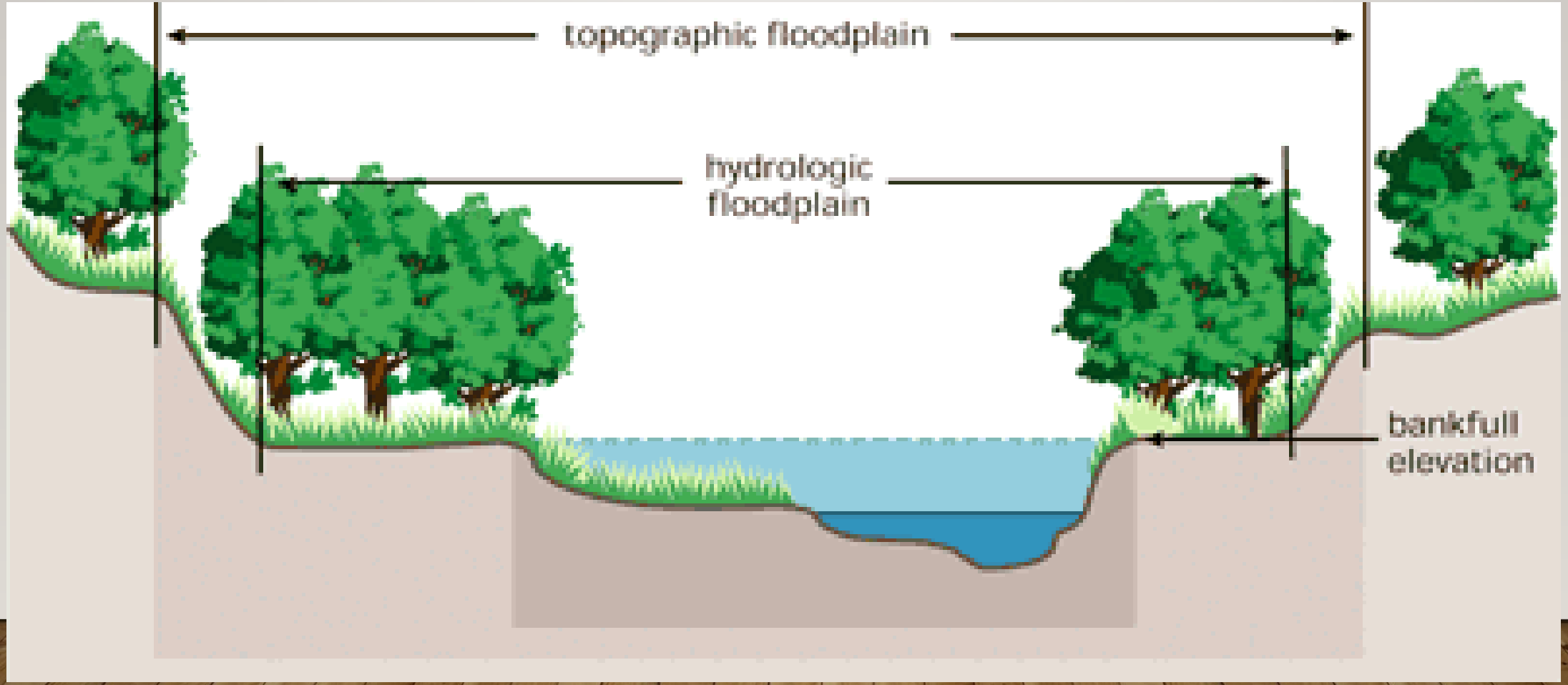
- Highest impacts at lowest storage
- Lowest storage occurs in fall during salmon spawning
- Spawning and incubation are the least tolerant life stage of elevated temps



2020 VS. 2021 LEWISTON WATER TEMPERATURE

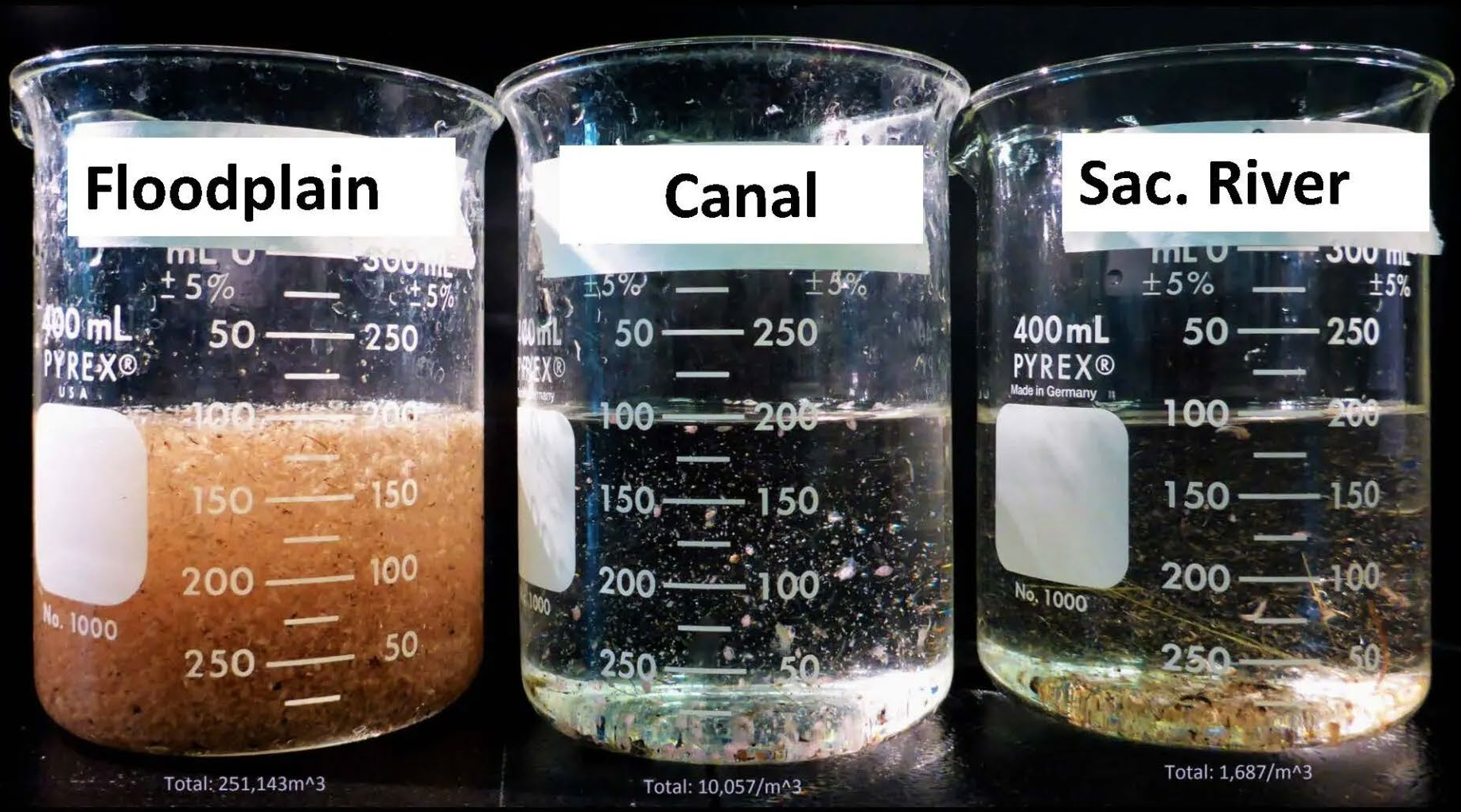


LATERAL DIMENSION




Floodplain
Streambed

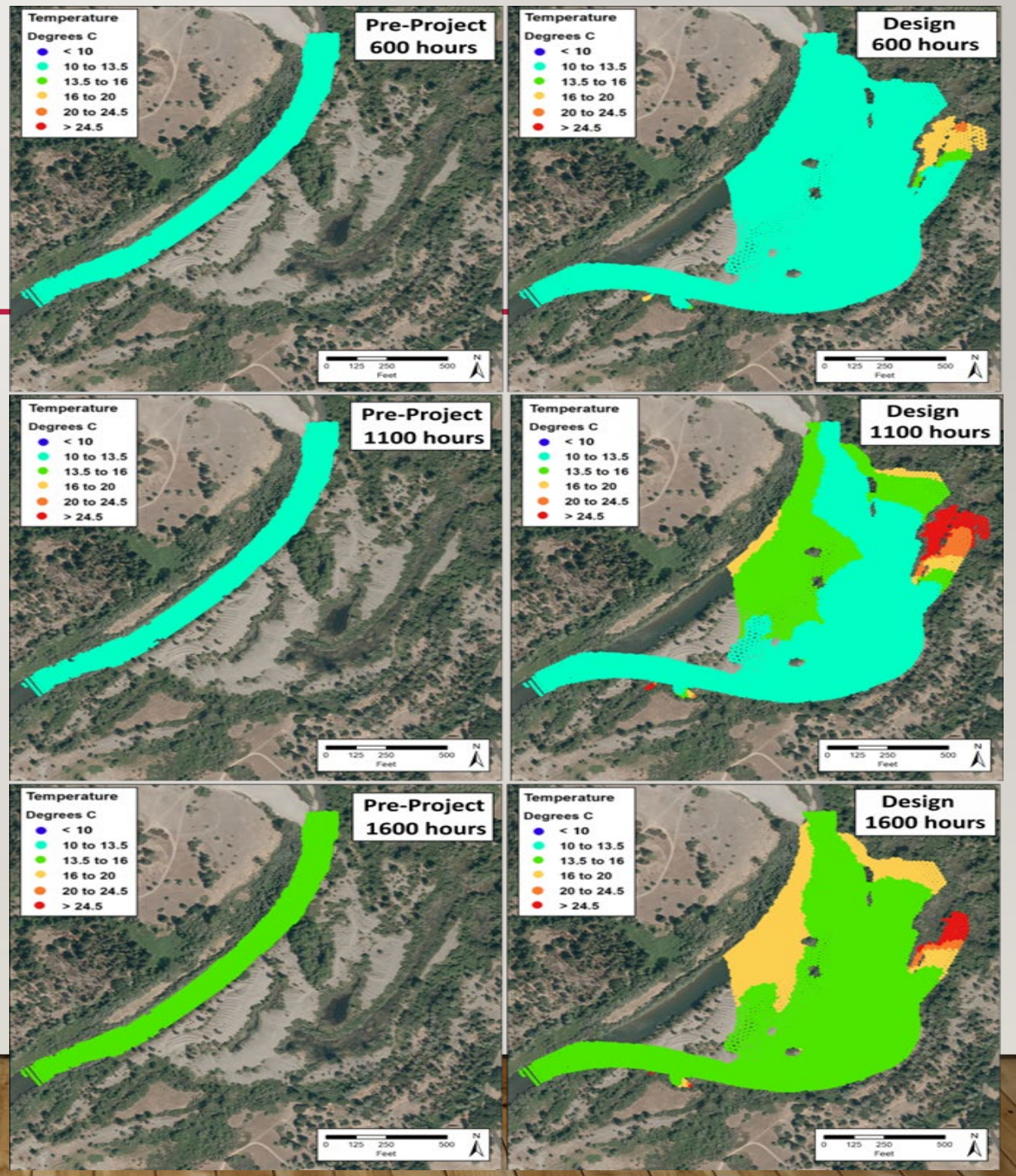
The Food is on the Floodplain



Bug Density	149x	6x	X

LATERAL THERMAL DIVERSITY

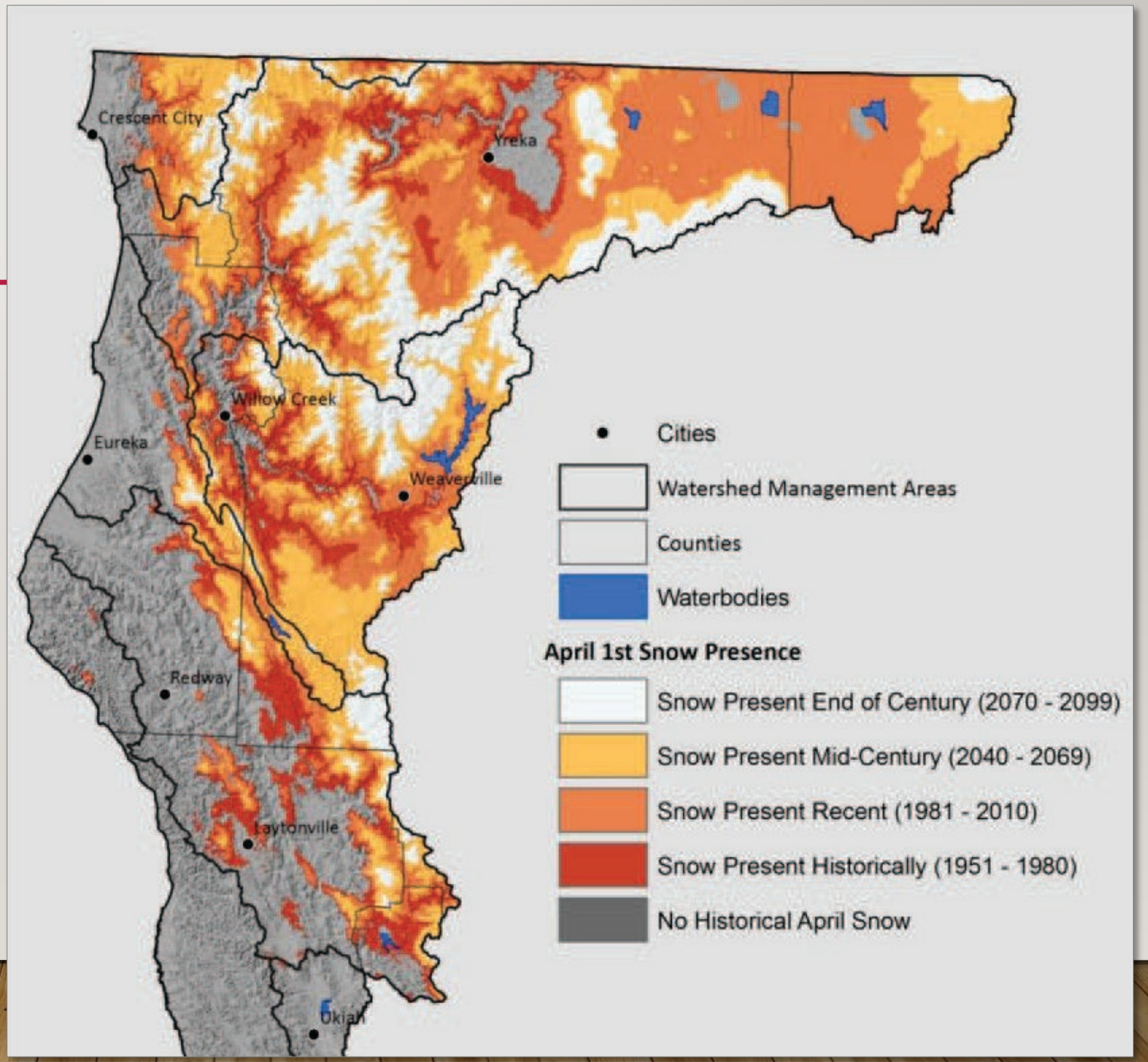
- Channel form can influence local thermal diversity
- The impaired channel offers little choice for mobile ectothermic organisms
- Topographically influenced thermal diversity could be substantial at channel rehab sites

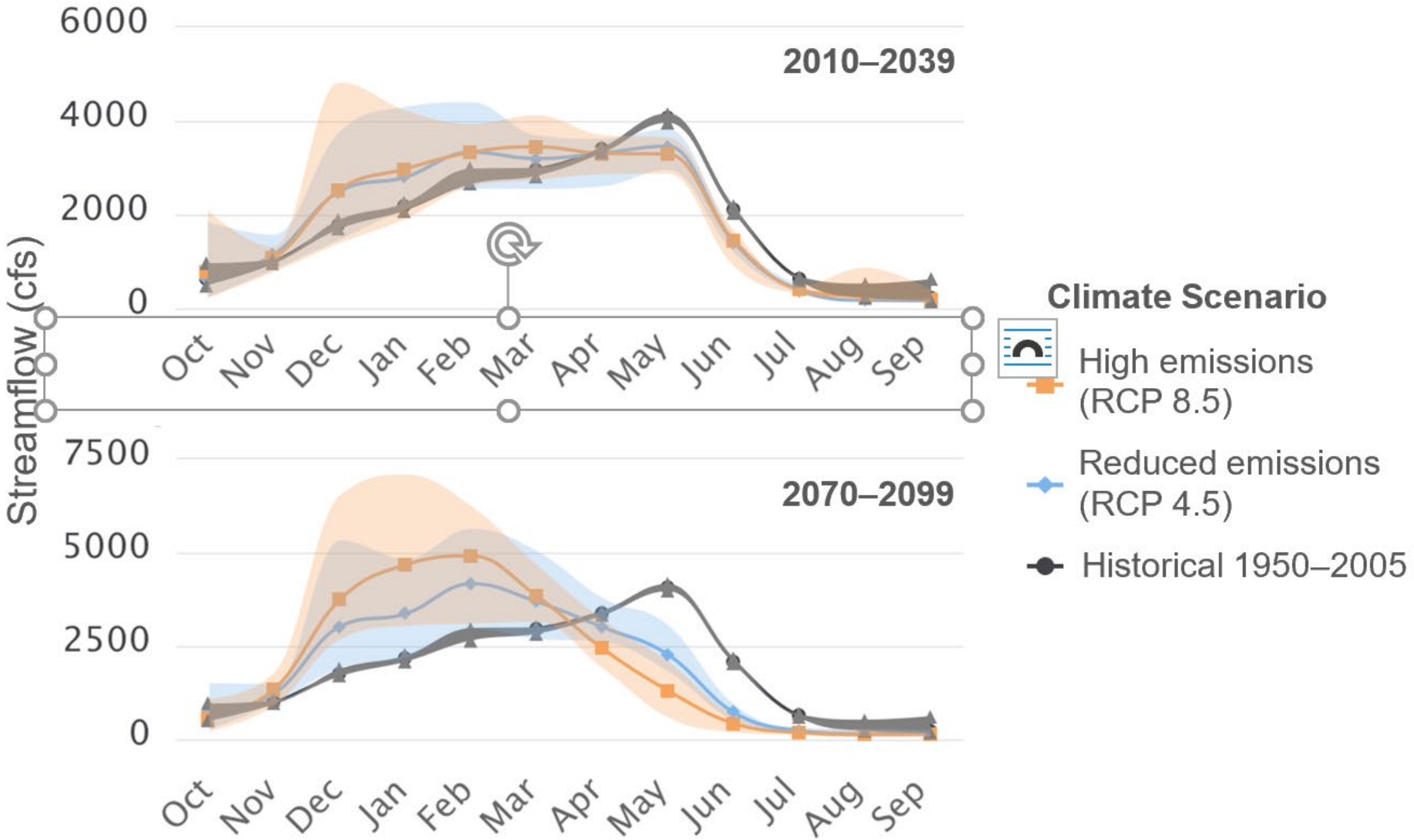


CLIMATE CHANGE

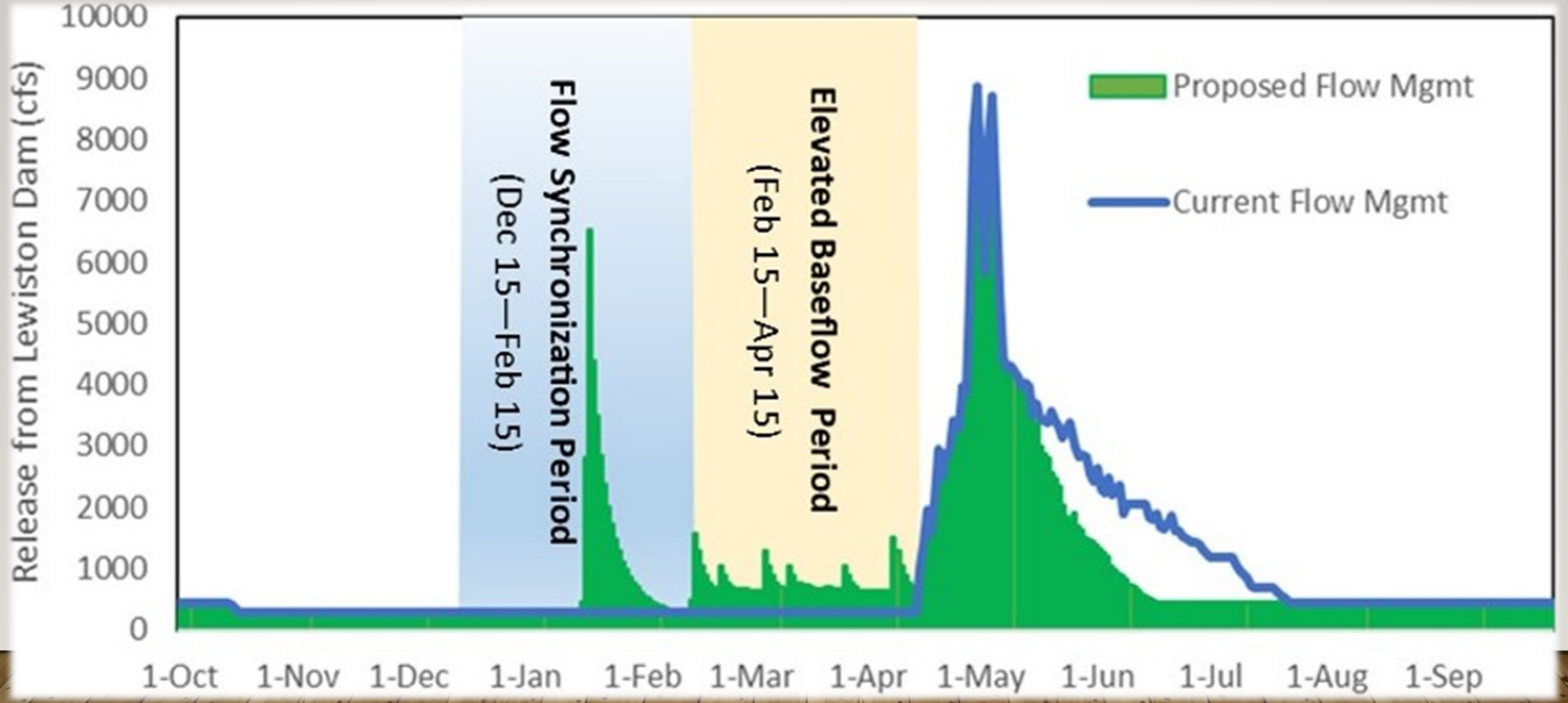
CLIMATE DRIVEN CHANGES TO PRECIPITATION

- Even if over all precipitation remains the same changes from Rain to Snow will impact the ability to capture runoff
- This is due to the timing and duration of runoff over the course of a single year




6000
4000
2000
0
2010–2039
Streamflow (cfs)
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
7500
5000
2500
0
2070–2099
Climate Scenario
High emissions (RCP 8.5)
Reduced emissions (RCP 4.5)
Historical 1950–2005

CHANGES TO MANAGEMENT



RE-INVESTMENT IN INFRASTRUCTURE

QUESTIONS

Do salmon ever get cold???

Some like it hot,
Salmon like it cold?