



# Collaborative Water Quality Monitoring and Modeling in the Yakima River Basin

Jim Carroll and Evan Newell

June 18, 2025

Yakima Basin Science and Management Conference

## Yakima River

> 200 Miles

5 Major Reservoirs  
(Bureau of Reclamation)

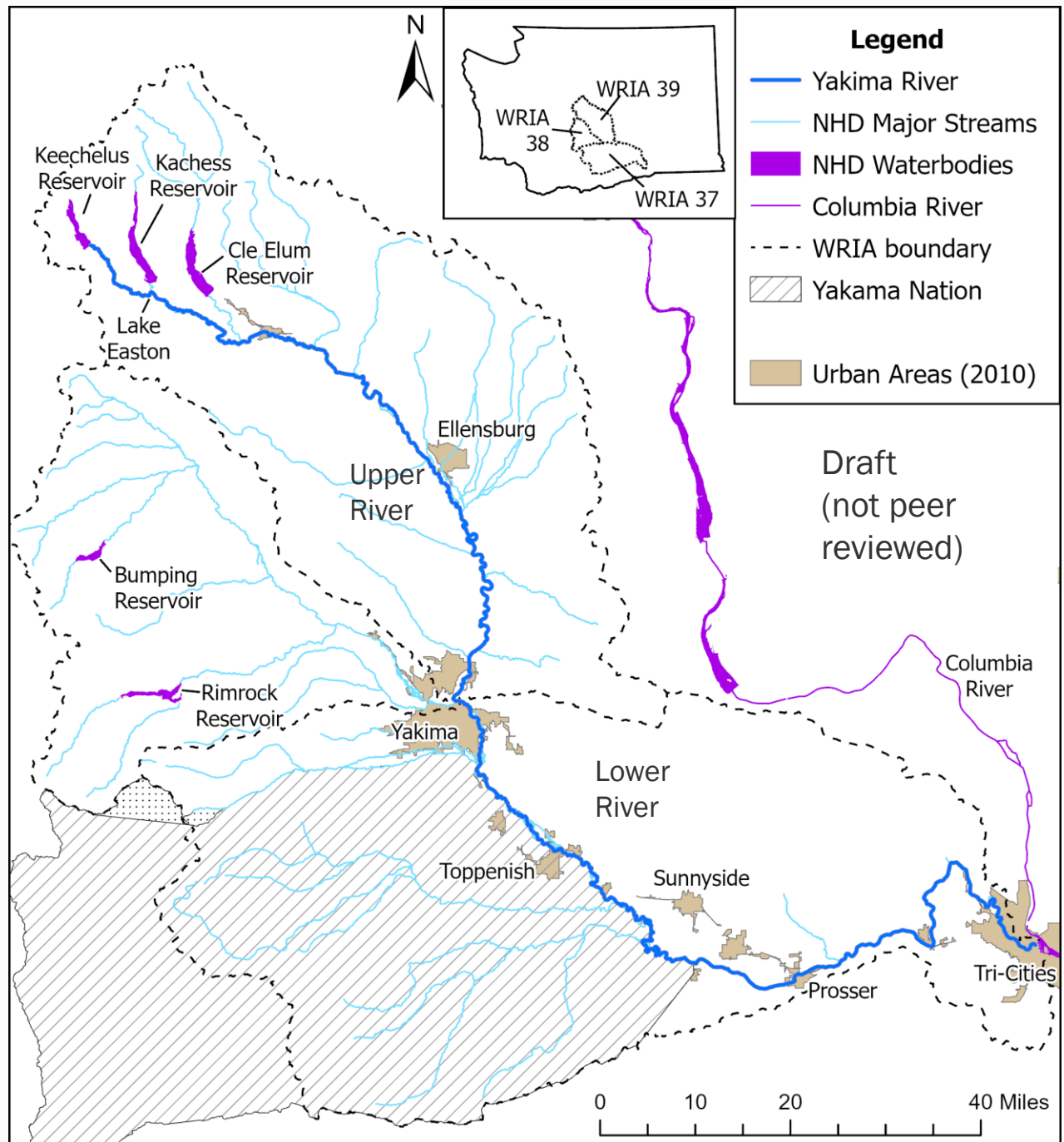
Large diversions  
to irrigation canals

Simulated entire length  
flow & temperature

March to early Nov.  
2019, 2022, 2023  
(hourly)



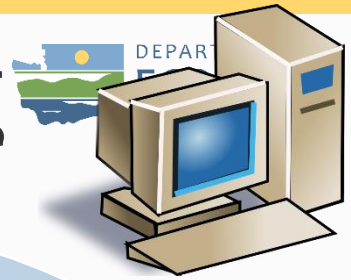
DEPARTMENT OF  
**ECOLOGY**  
State of Washington





# Monitoring

# Modeling



## Measure

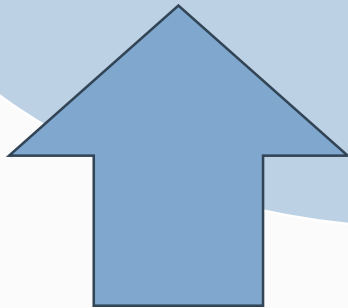
Flow  
Water depth/velocity  
Weather  
Water temperature  
Shade

## Calibrate

Fit observed  
data

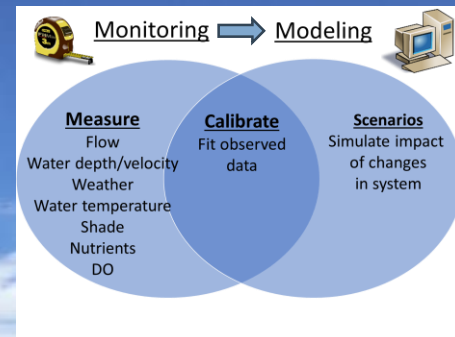
## Scenarios

Simulate impact  
of changes  
in system



# Collaborative WQ Monitoring Yakima River Basin

Almost 100 sites.....  
>million time series logs of DO and temp  
>15K discrete samples and  
measurements



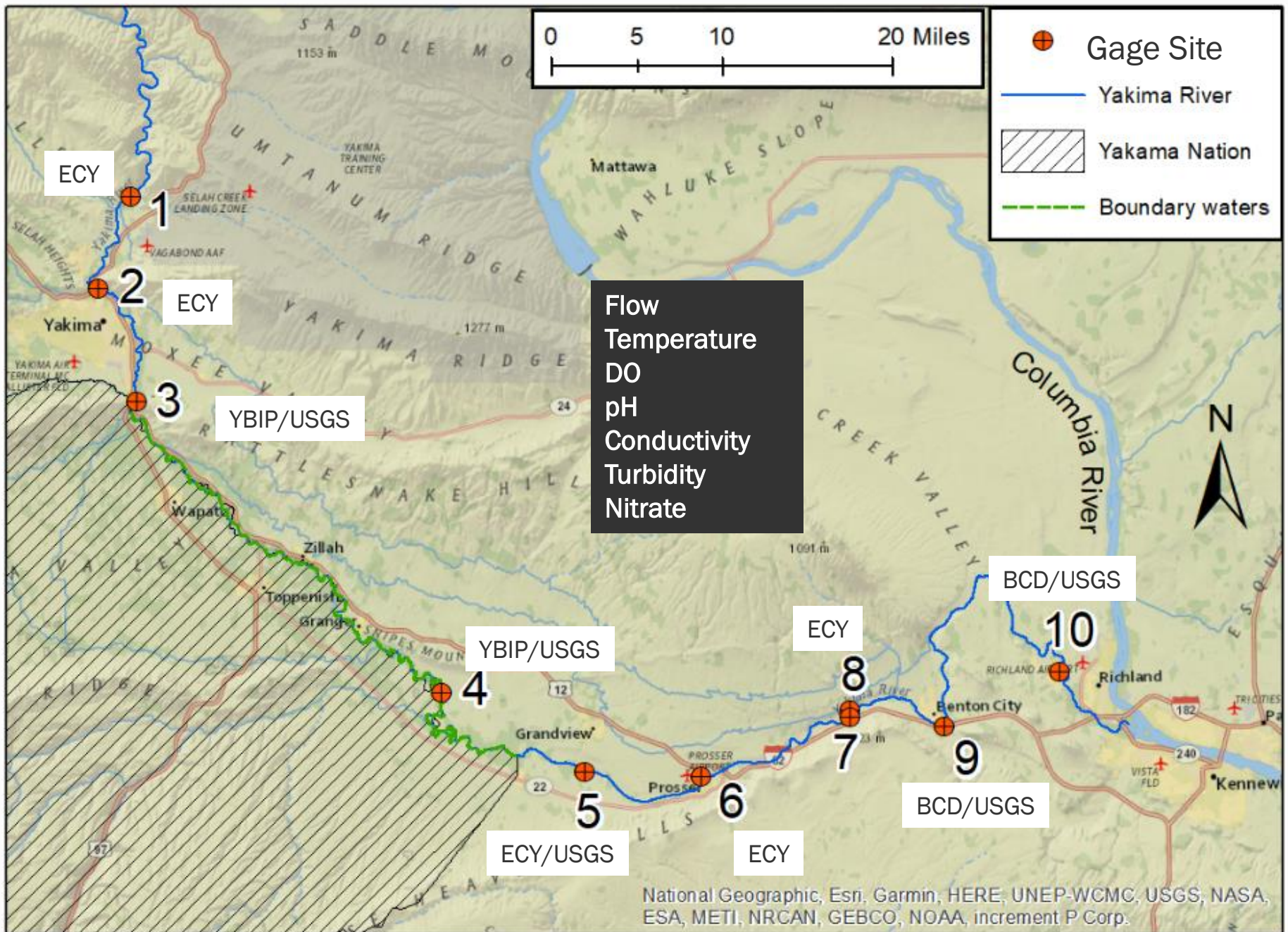
Yakama Nation

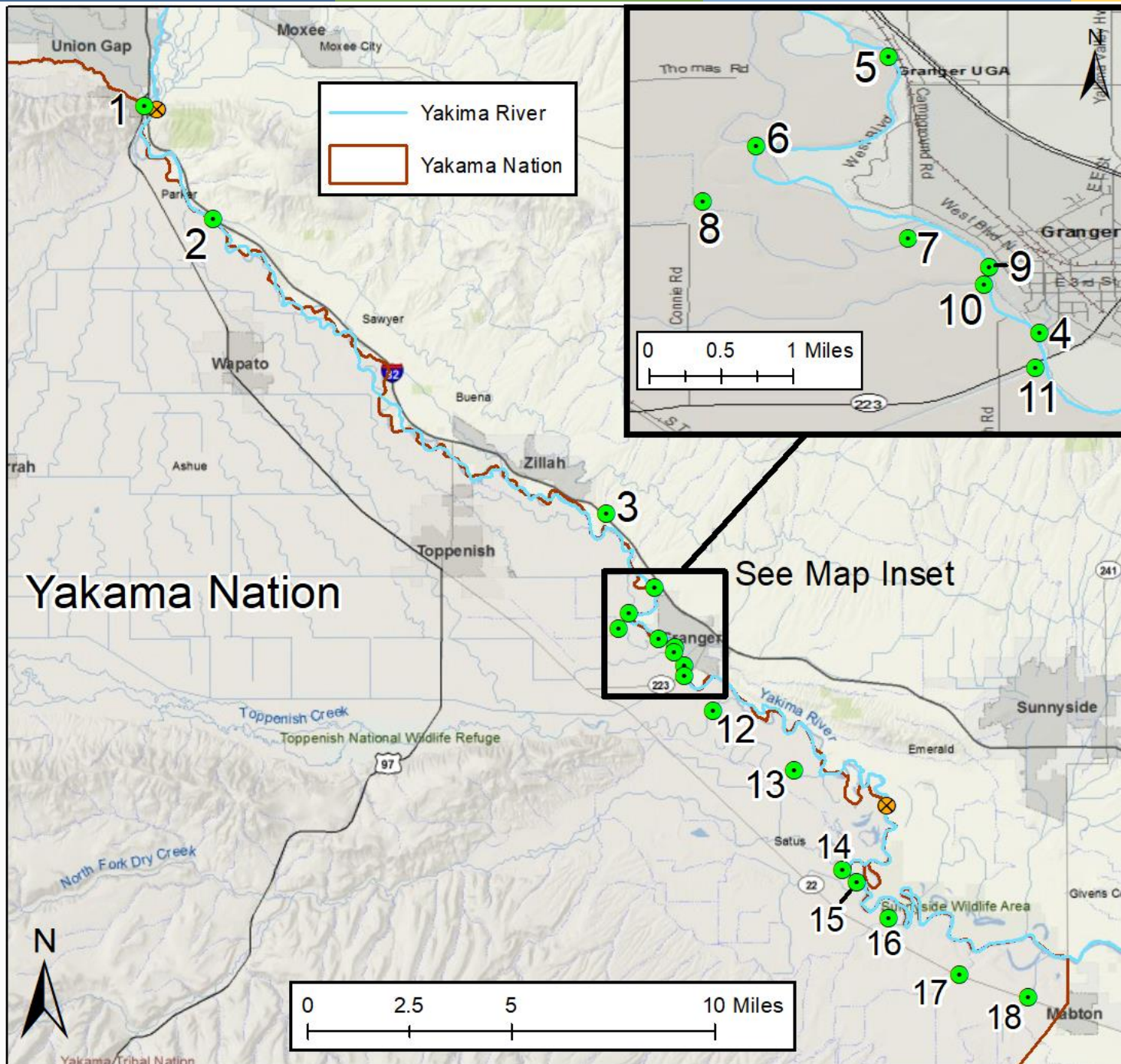


US Geological Survey



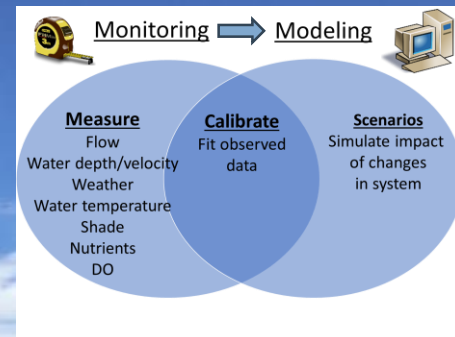
WA Ecology  
Agriculture,  
Fish & Wildlife





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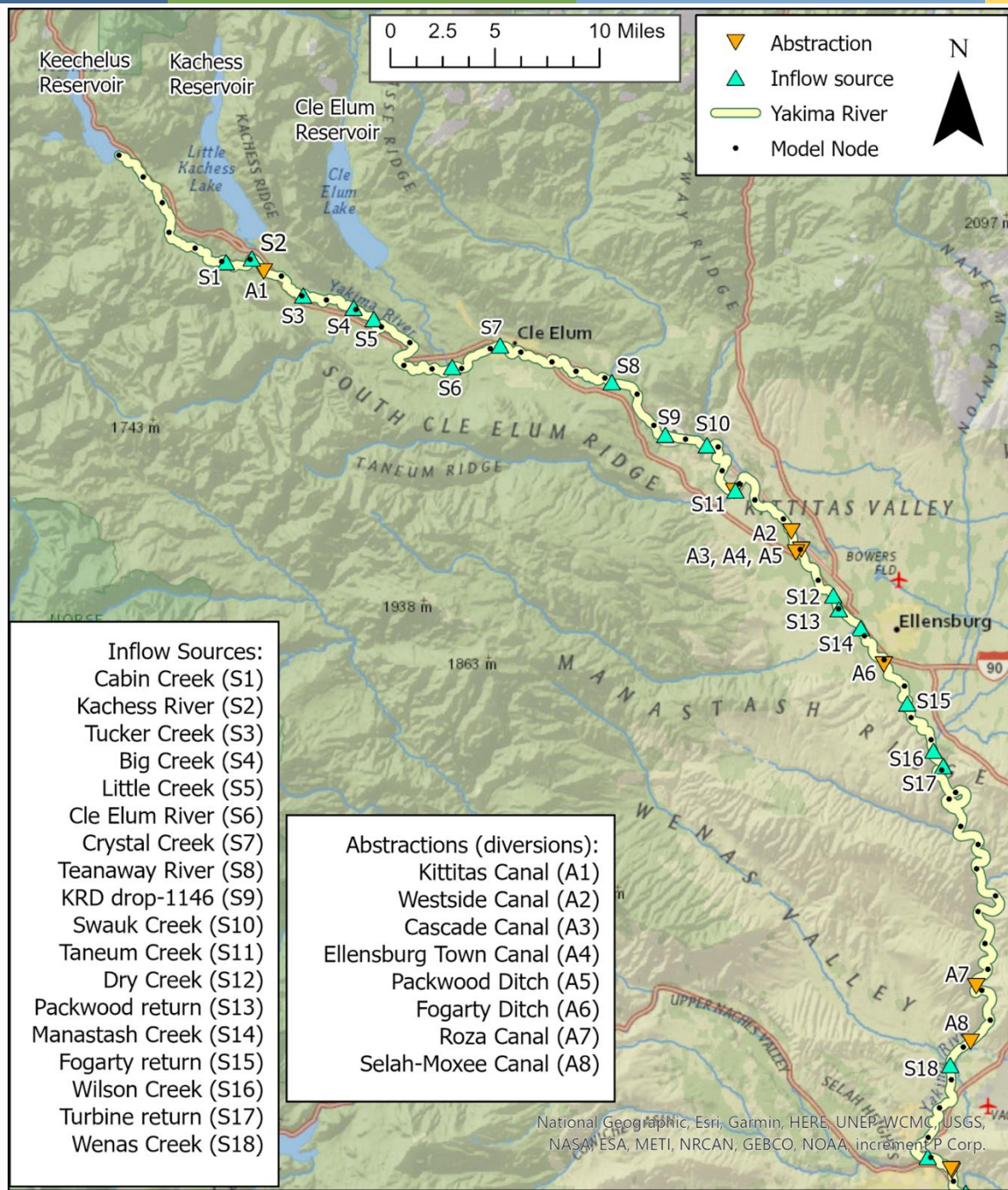
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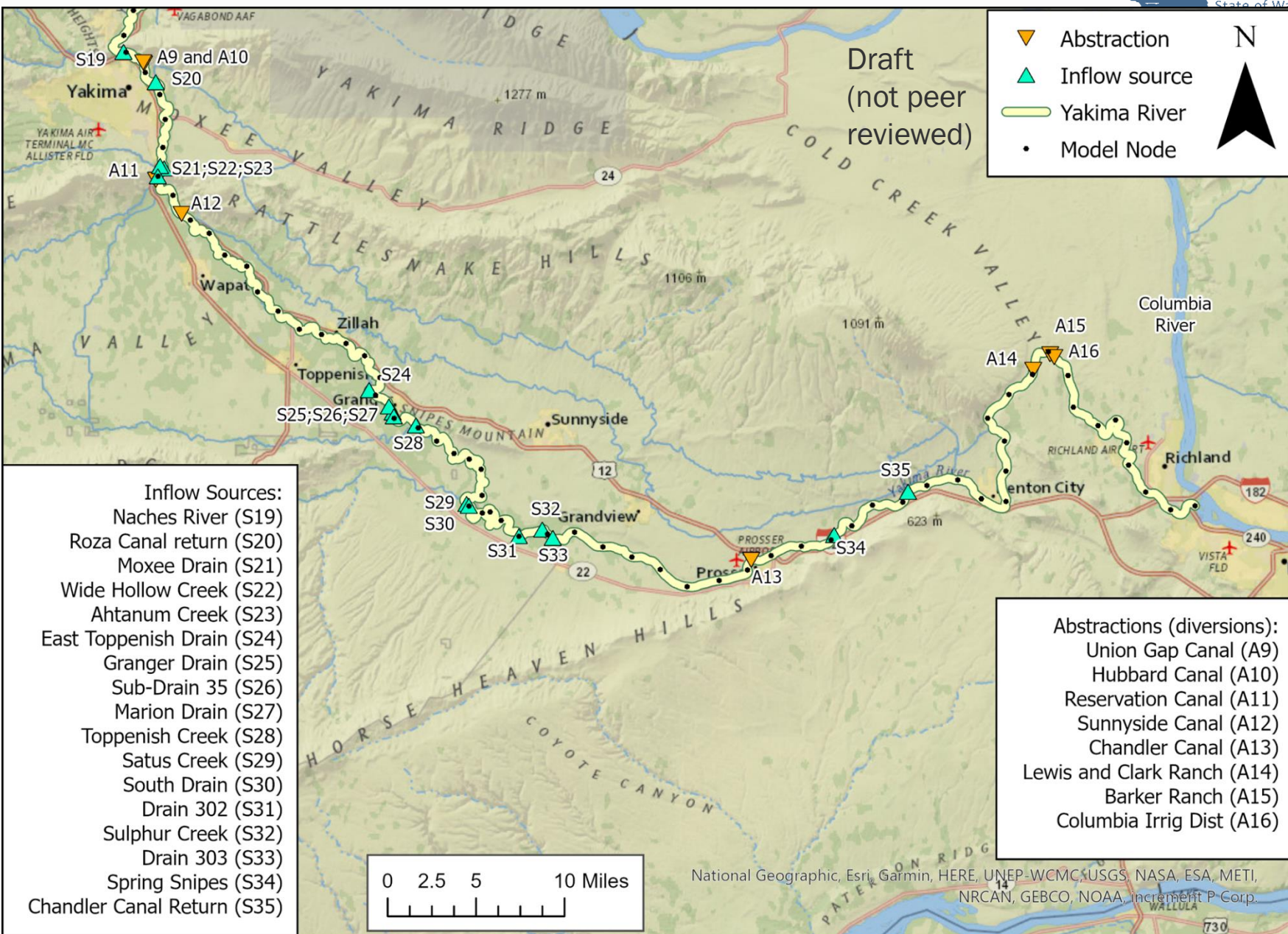
WA Ecology  
Agriculture,  
Fish & Wildlife

# Timeline for collecting calibration data





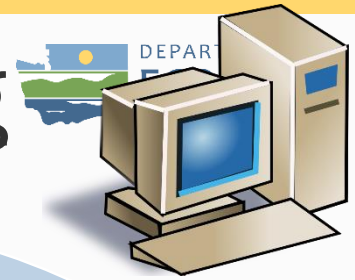
Draft  
(not peer  
reviewed)





# Monitoring

# Modeling



## Measure

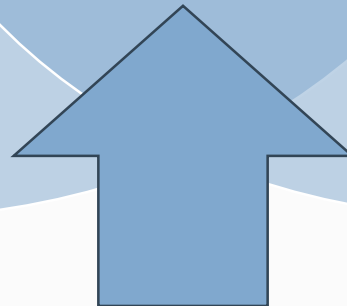
Flow  
Water depth/velocity  
Weather  
Water temperature  
Shade

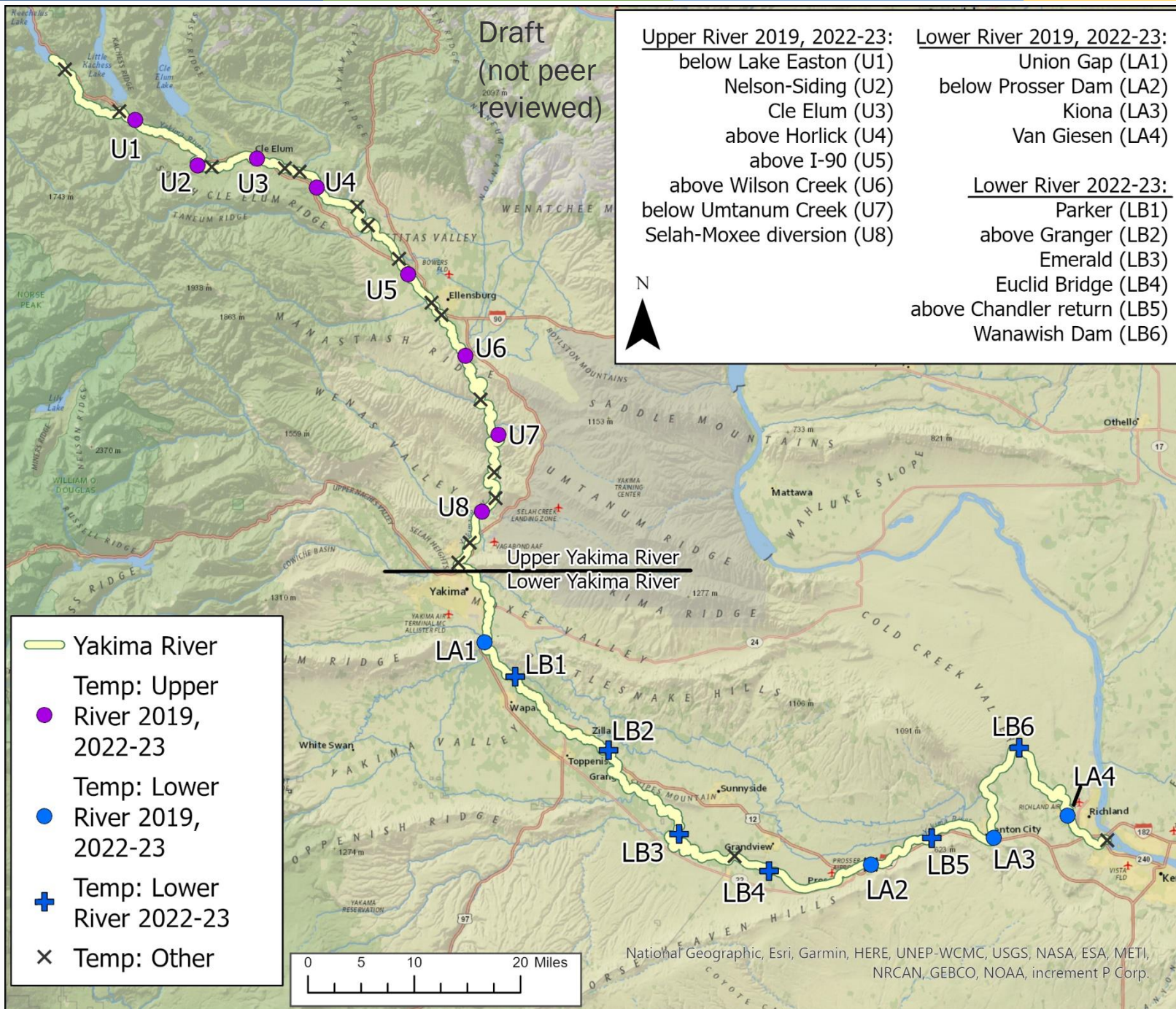
## Calibrate

Fit observed  
data

## Scenarios

Simulate impact  
of changes  
in system





Temp degC

2019

datatype

Simulated

sim\_timeseries

Observed

obs\_timeseries

Reach# 56 ( YakRiverNobHill )

Yakima

Reach# 101 ( YakRiverKiona )

Kiona

Reach# 93 ( YakRiverBelowProsser )

Prosser

Reach# 113 ( YakRiverVanGiesen )

Van Giesen

Temp degC

Apr

Jul

Oct

Apr

Jul

Oct

Apr

Jul

Oct

Apr

Jul

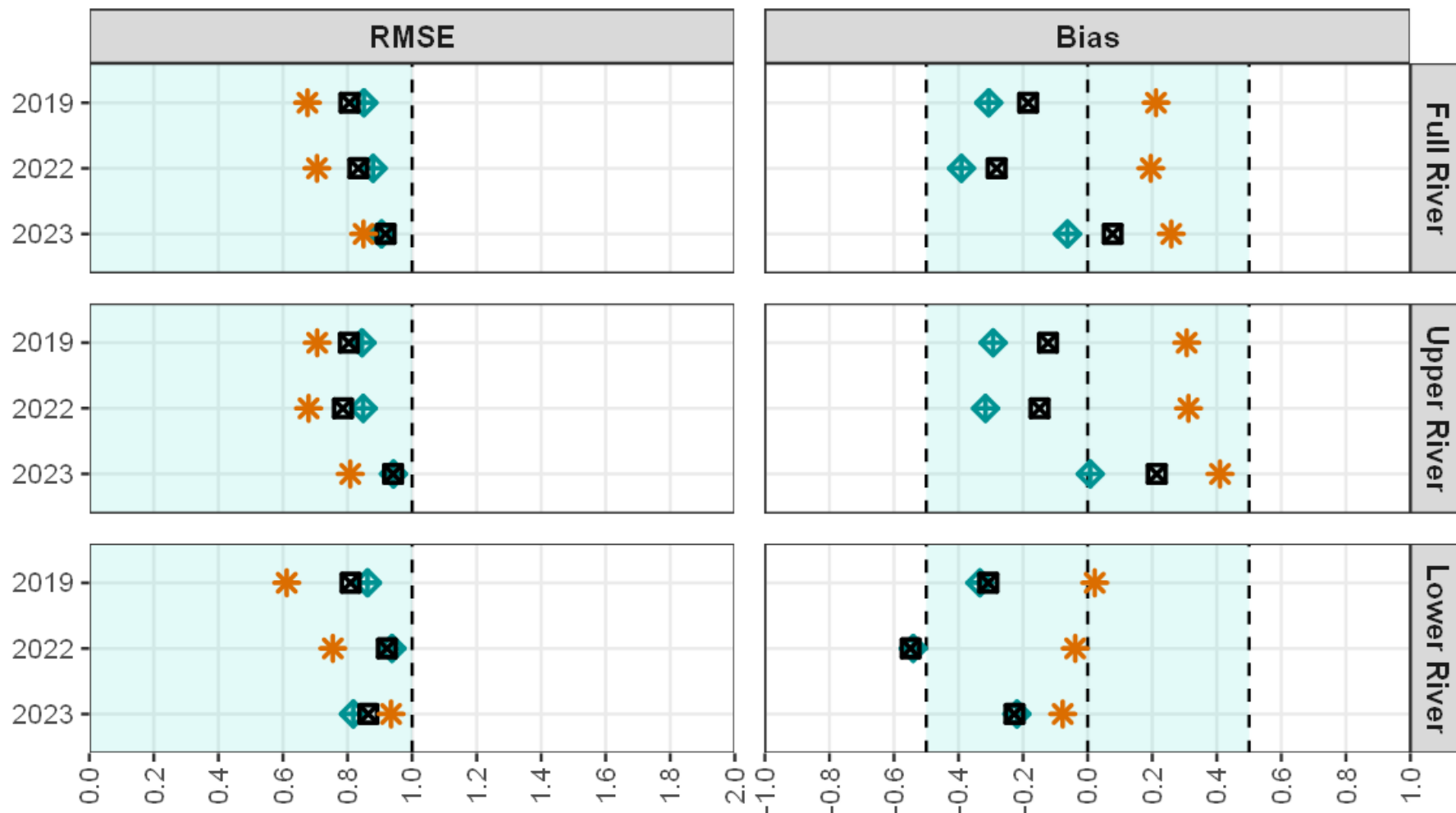
Oct

datetime

## Statistics for 'Compare 3 years' monitoring data:

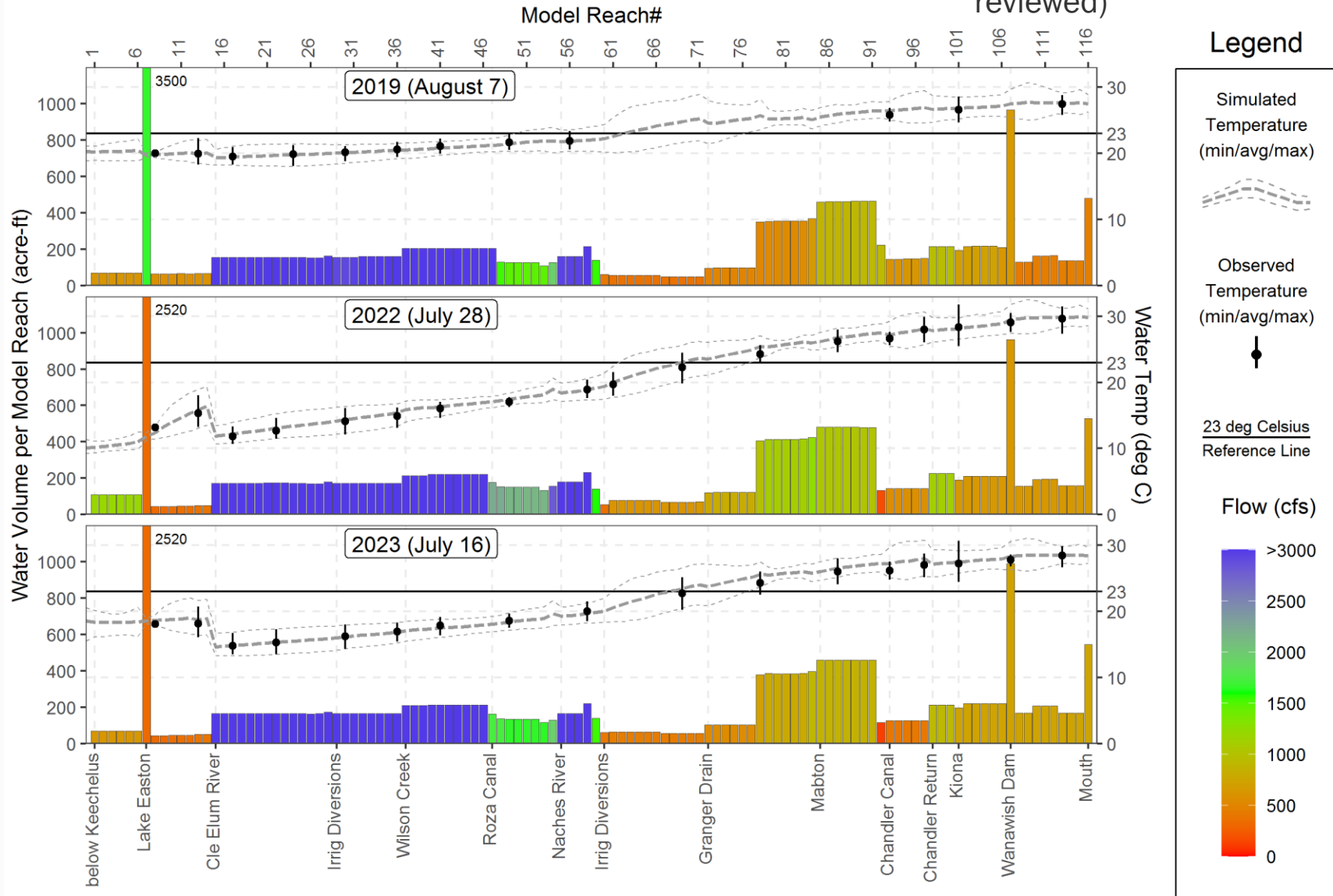
Draft  
(not peer  
reviewed)

StatType    DailyMax    DailyRange    Hourly



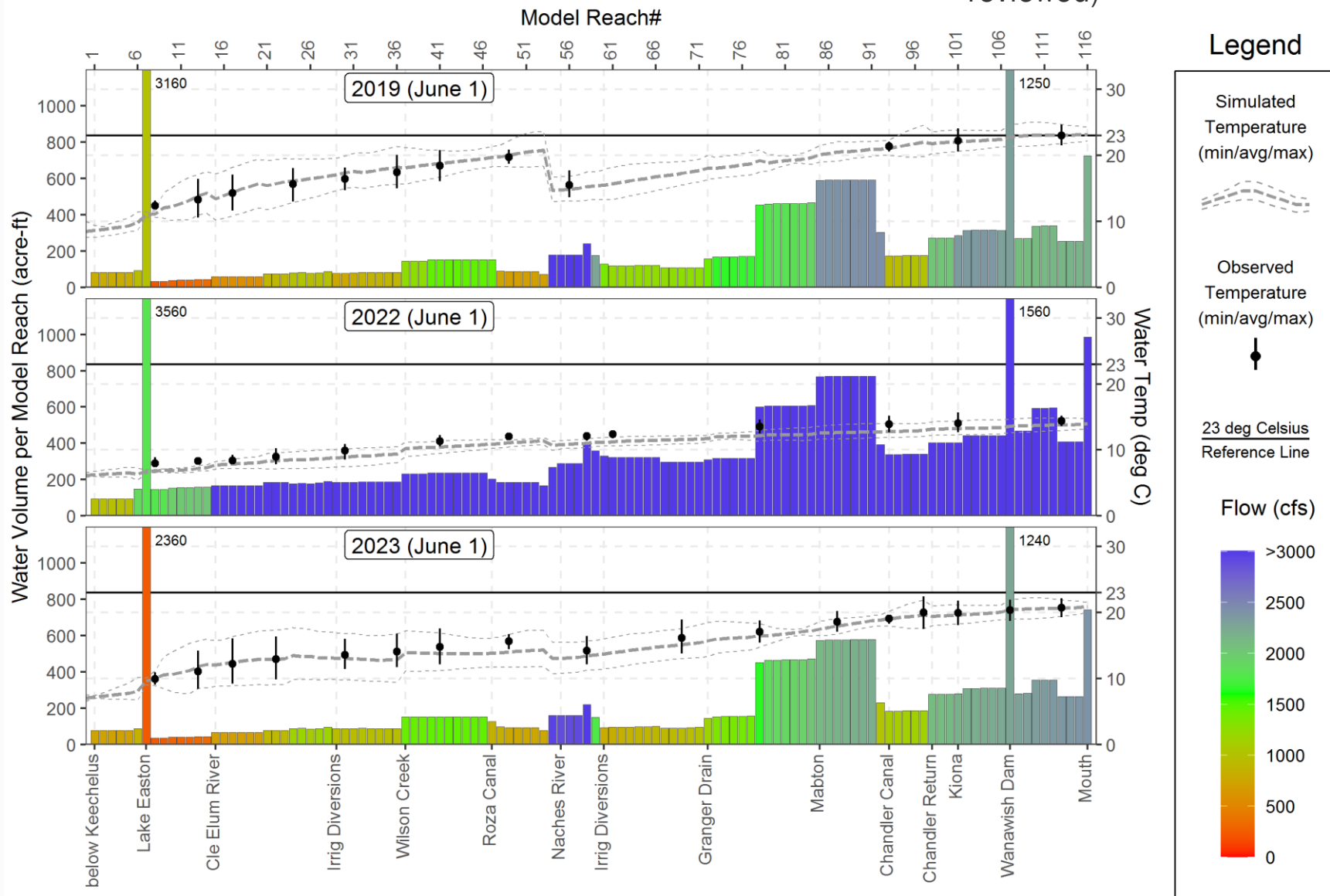
# Dates of Max Temperatures

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(not peer  
reviewed)



# June 1<sup>st</sup> (2019, 2022, 2023)

Draft  
(not peer  
reviewed)



# Thank you!



## Our Mission

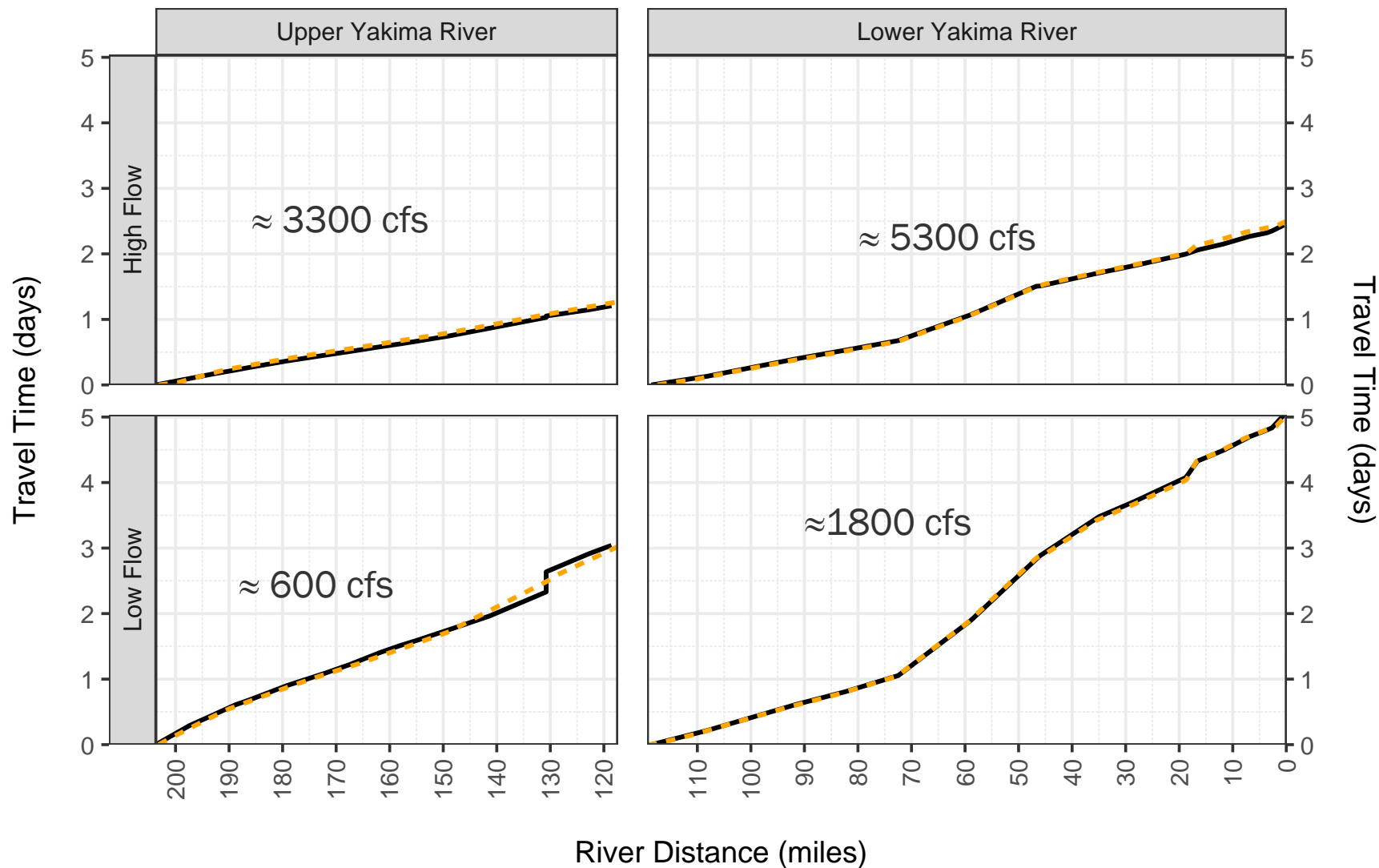
To protect, preserve,  
and enhance  
Washington's  
environment for current  
and future generations.

## Our Vision

Our innovative  
partnerships protect  
and sustain healthy  
land, air, and water  
in harmony with a  
strong economy.

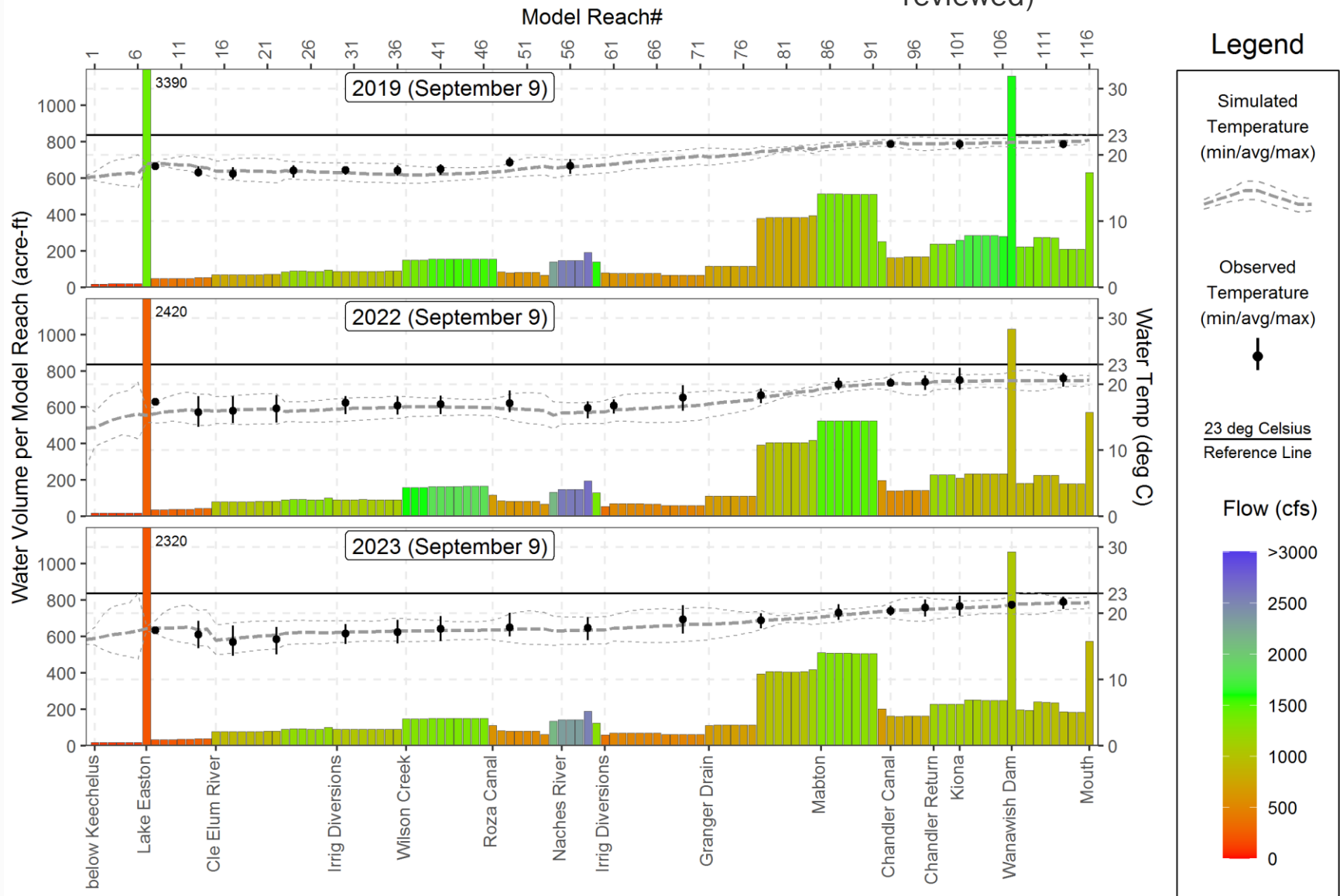
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(not peer  
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Data Type — Observed — Simulation

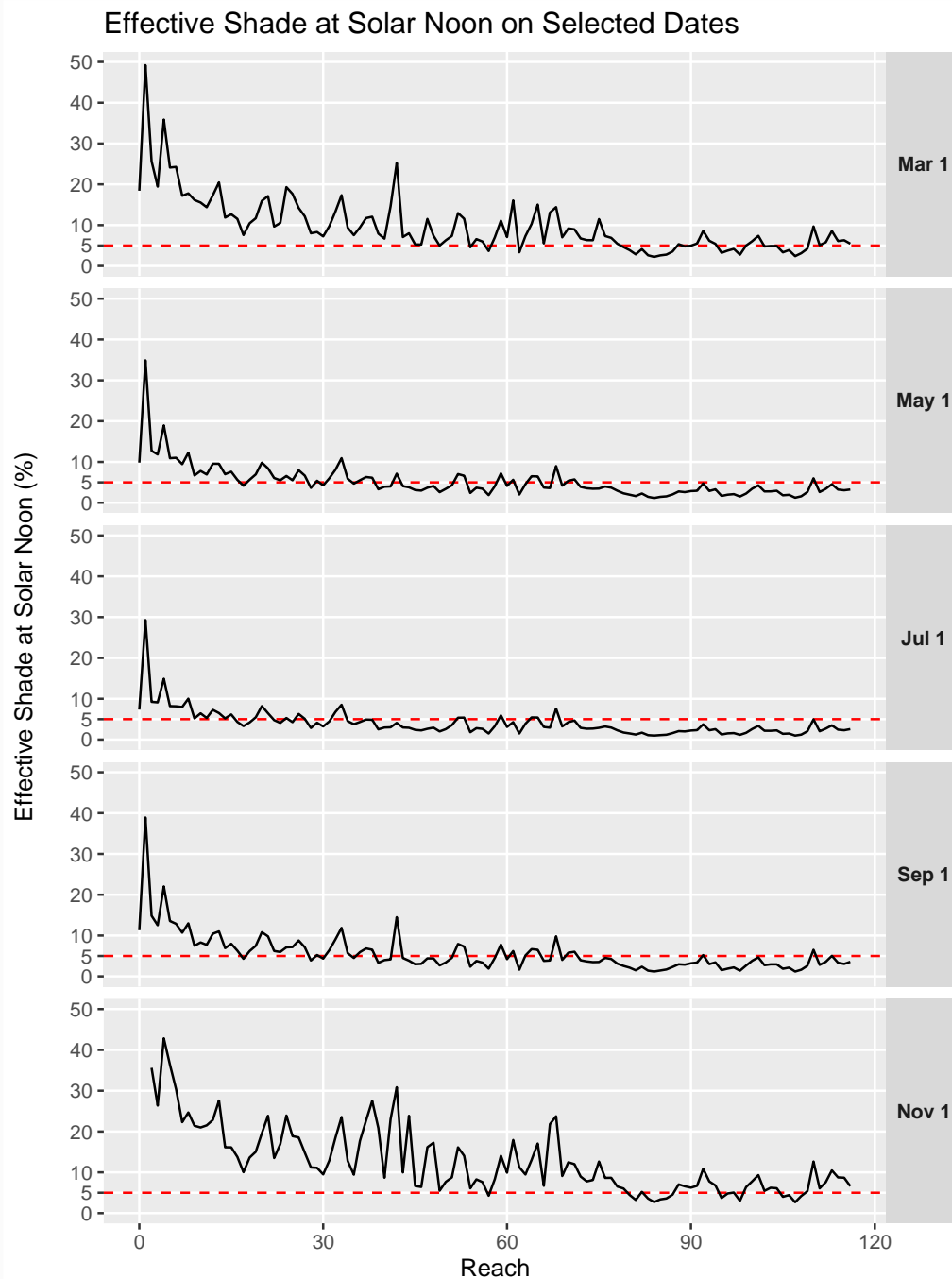


# Flip-Flop

Draft  
(not peer  
reviewed)



Draft  
 (not peer  
 reviewed)



## Bureau of Reclamation, Pacific Northwest Region Major Storage Reservoirs in the Yakima River Basin

04/29/2018

