



— BUREAU OF —
RECLAMATION

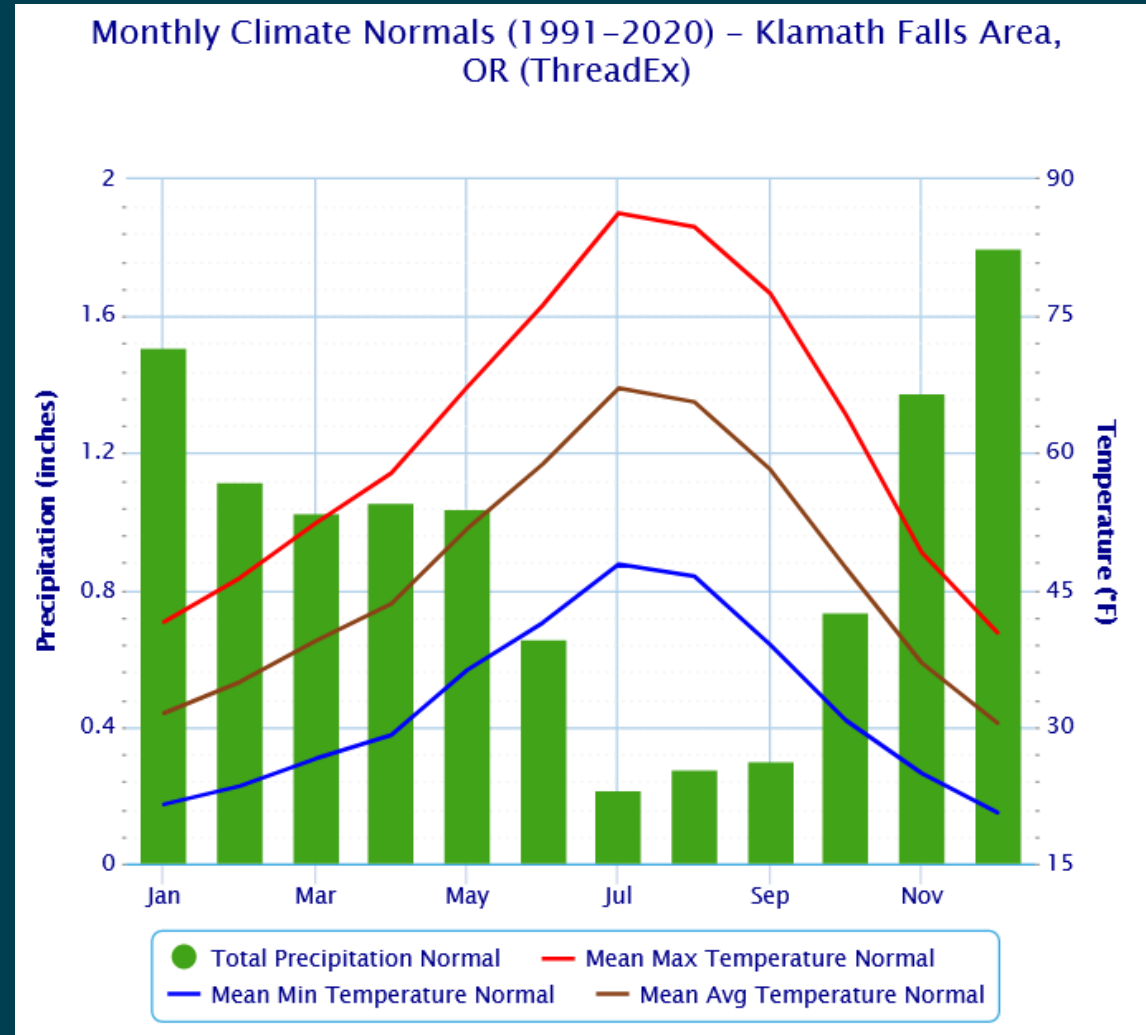
Klamath River Basin Climate

December 14, 2022

Dave Felstul, Water Ops Chief, KBAO Reclamation

Klamath Basin Considerations

- Precipitation 70% less in Upper Basin (east of mtns) than downriver
- Annual 11.14"
- 42% Nov-Jan
- 7% Jul-Sep



Klamath Basin Considerations

- Upper Klamath Lake cannot store full season of water supply
 - Active storage = 4143.3 ft = 561,838 AF
 - Min UKL elev = 4138.0 ft = 134,367 AF
 - Usable = 427,471 AF
- Min Mar-Sep Klamath River flows from UKL = 400,000 - 407,000 AF
- Full project supply = 350,000 – 400,000 AF

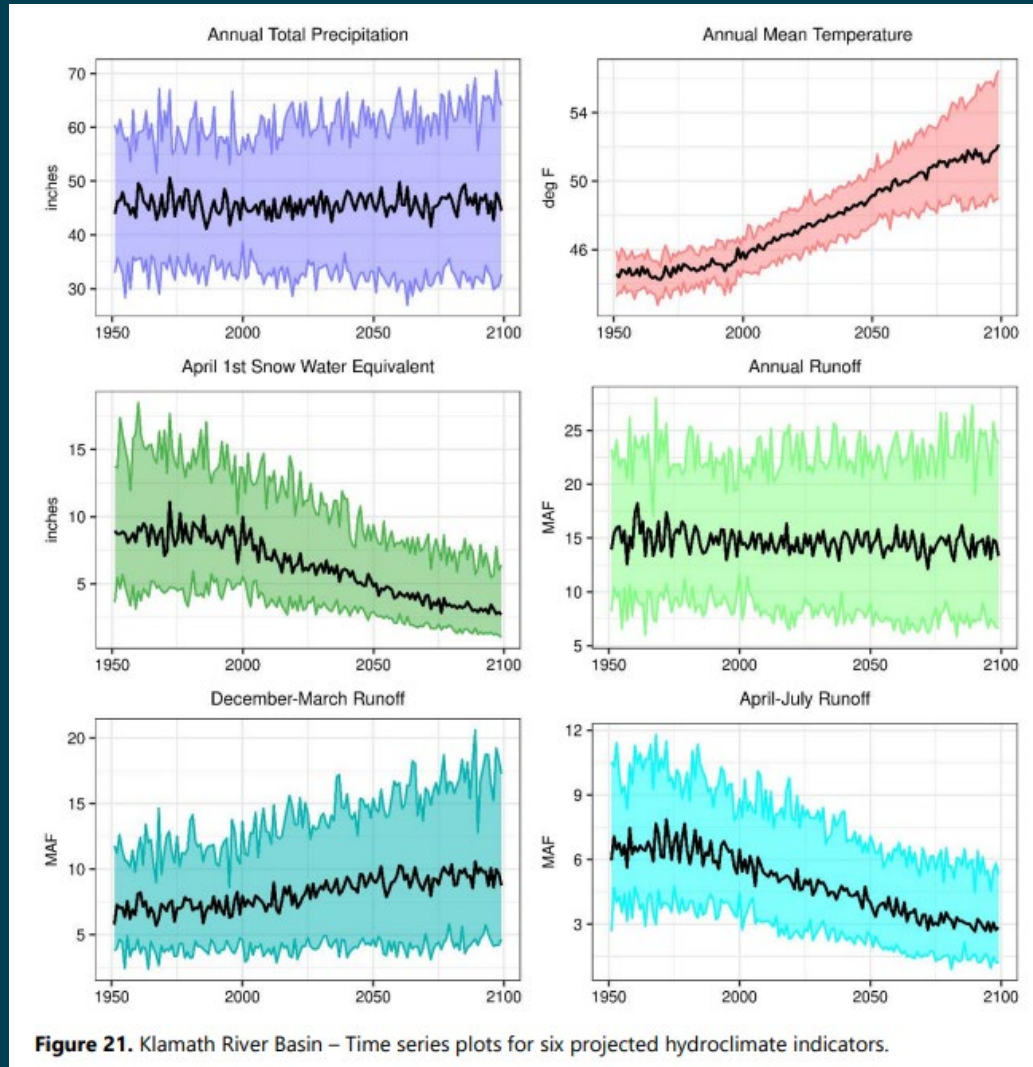


Studies

- Klamath River Basin Study (2016)
- 2021 SECURE Water Act Report to Congress
- Natural Flow Study (2021-2024)
- New UKL bathymetry
- Evaporation monitoring



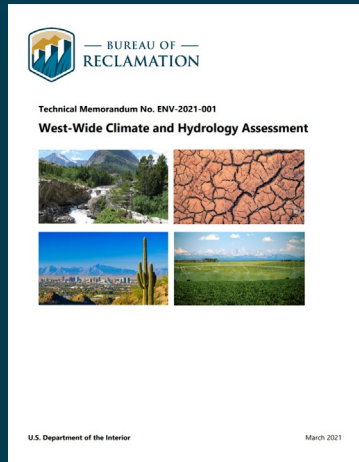
'Future' climate in the Klamath Basin – Basin-wide projected changes



Precipitation - end of century:
Average annual precipitation:
+5.5% (-2% to +6%)

Temperature – end of century:
+4.5 degrees F (2 degrees F to 10
degrees F).

April 1st Snowpack - 2070's -
Average change in snowpack:
-60%

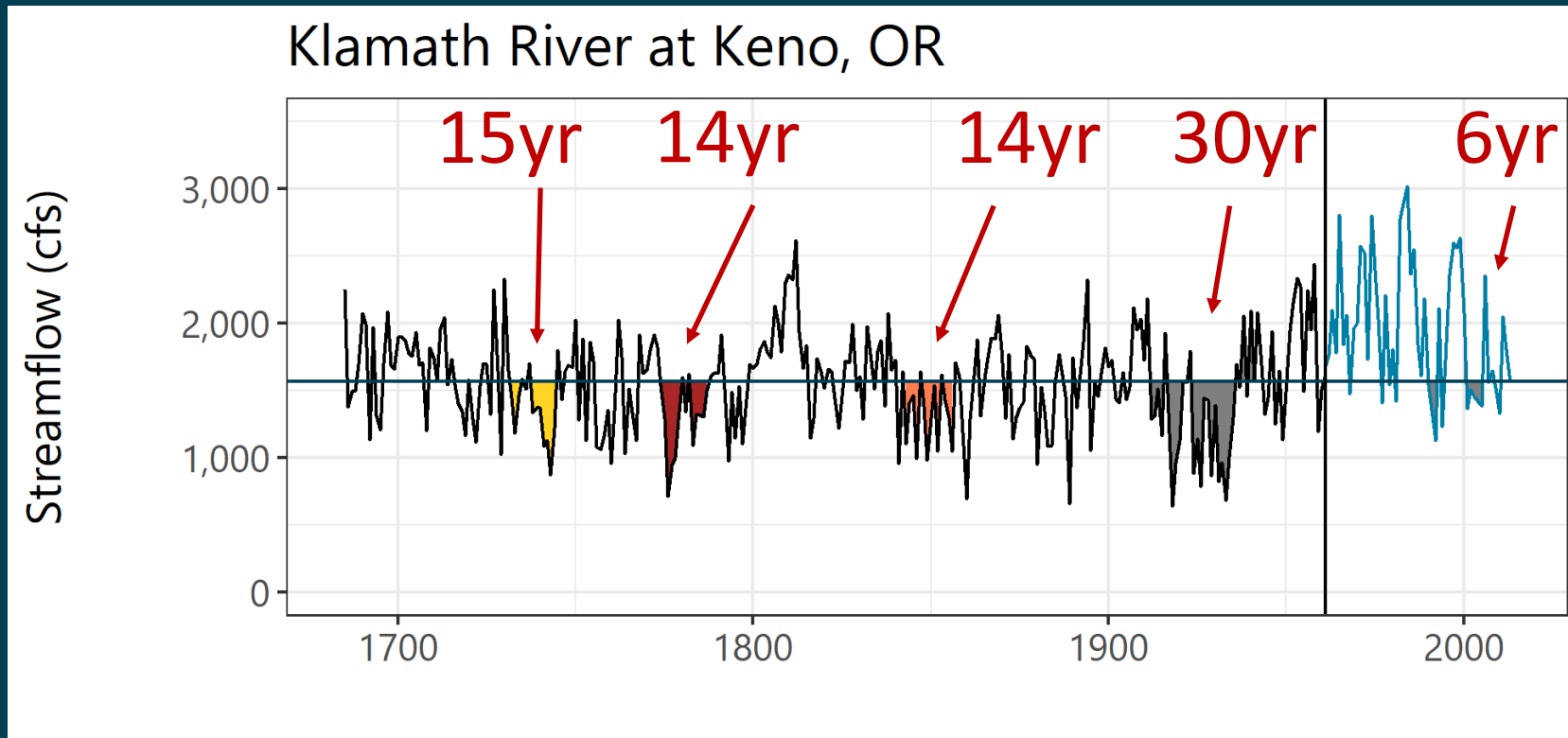
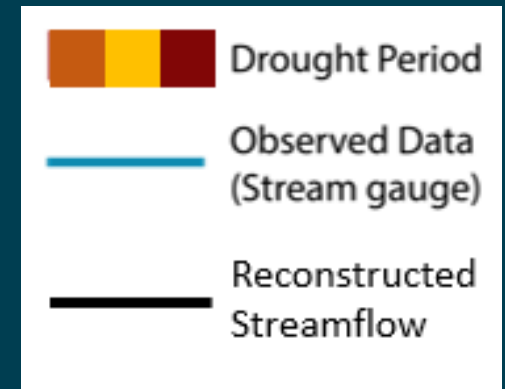


Water Supply Reliability Assessment

Case Study Basins



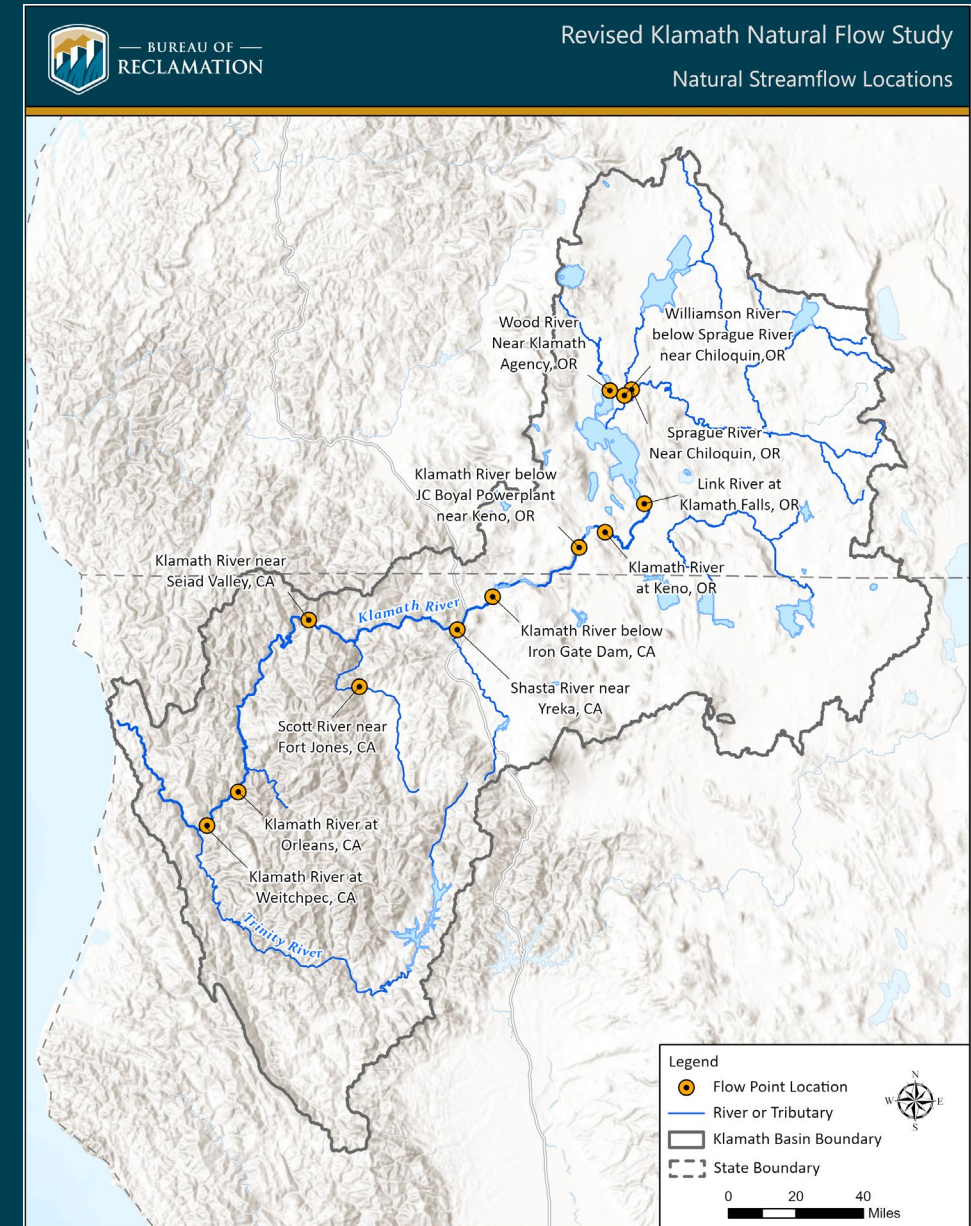
Paleo droughts are more impactful than more recent historical droughts (e.g. 2000-2005), but the dustbowl drought is the most impactful.



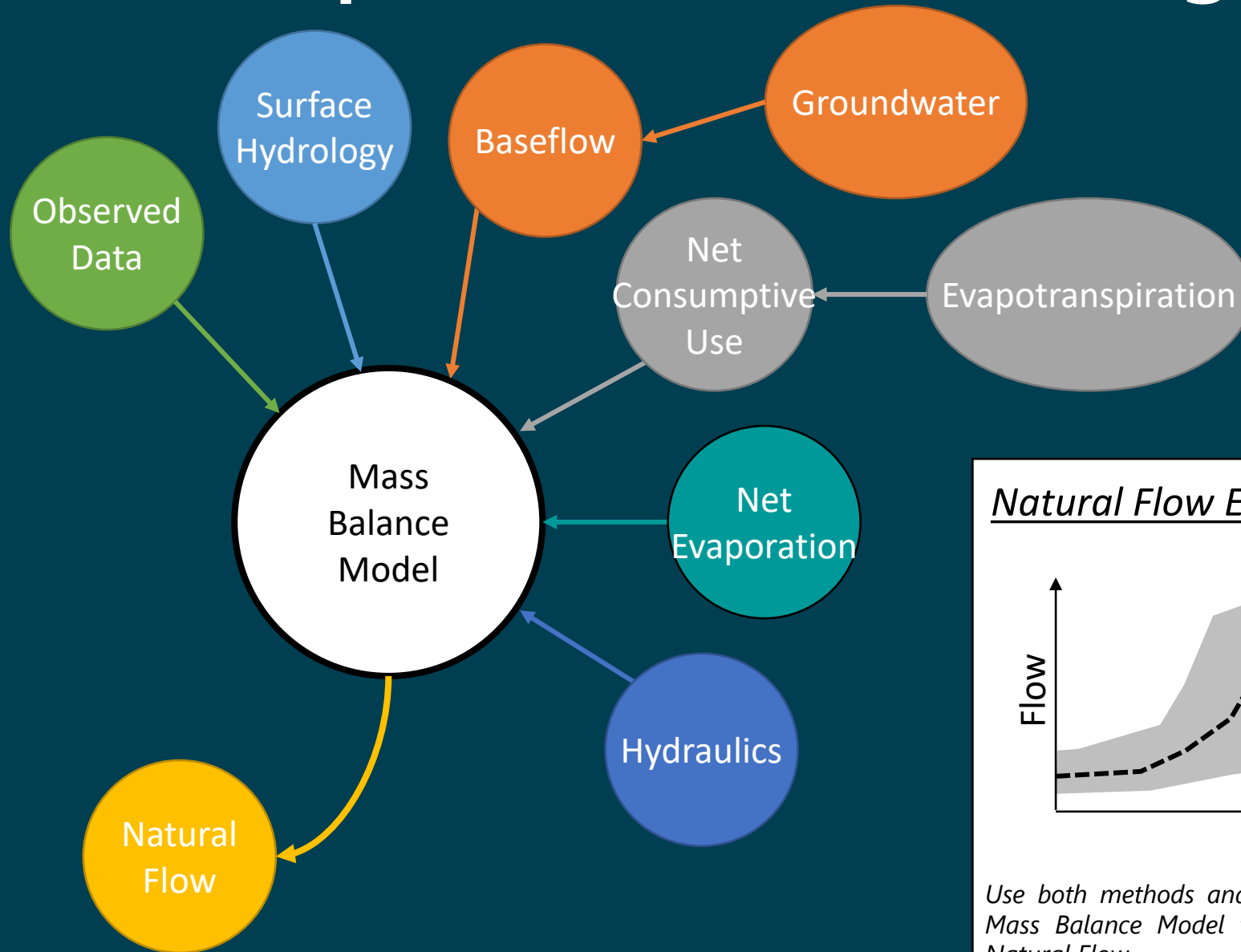
NFS Study Objective

*“To develop the most **scientifically thorough** estimate of **natural flows** possible in the Klamath Basin.”*

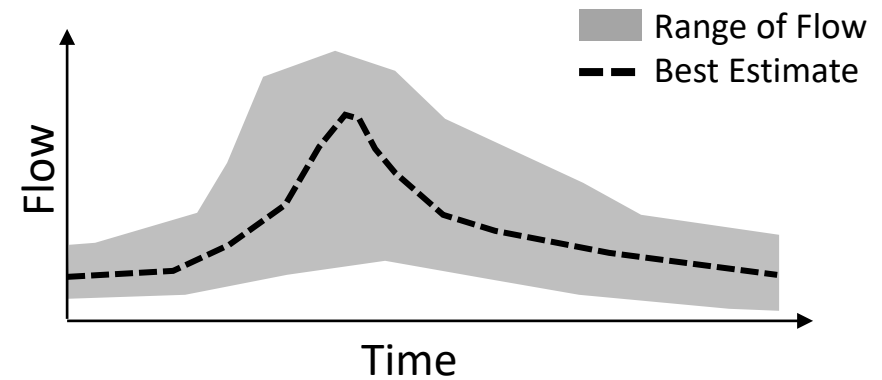
- Natural **Flow or Pre-development Flow**: “flow of water caused by nature. Water that would exist in a watercourse absent of human intervention/development.”
- Estimate **daily** flows at chosen locations on the mainstem Klamath River, removing the significant effects of human development (**pre-development**).
- Simulate flows assuming pre-development landscape/hydraulic conditions, and weather data for water years **1981-2020**.



Simplified NFS Modeling Schematic



Natural Flow Estimates



Use both methods and multiple parametrizations of RiverWare Mass Balance Model to generate range and best estimate of Natural Flow.

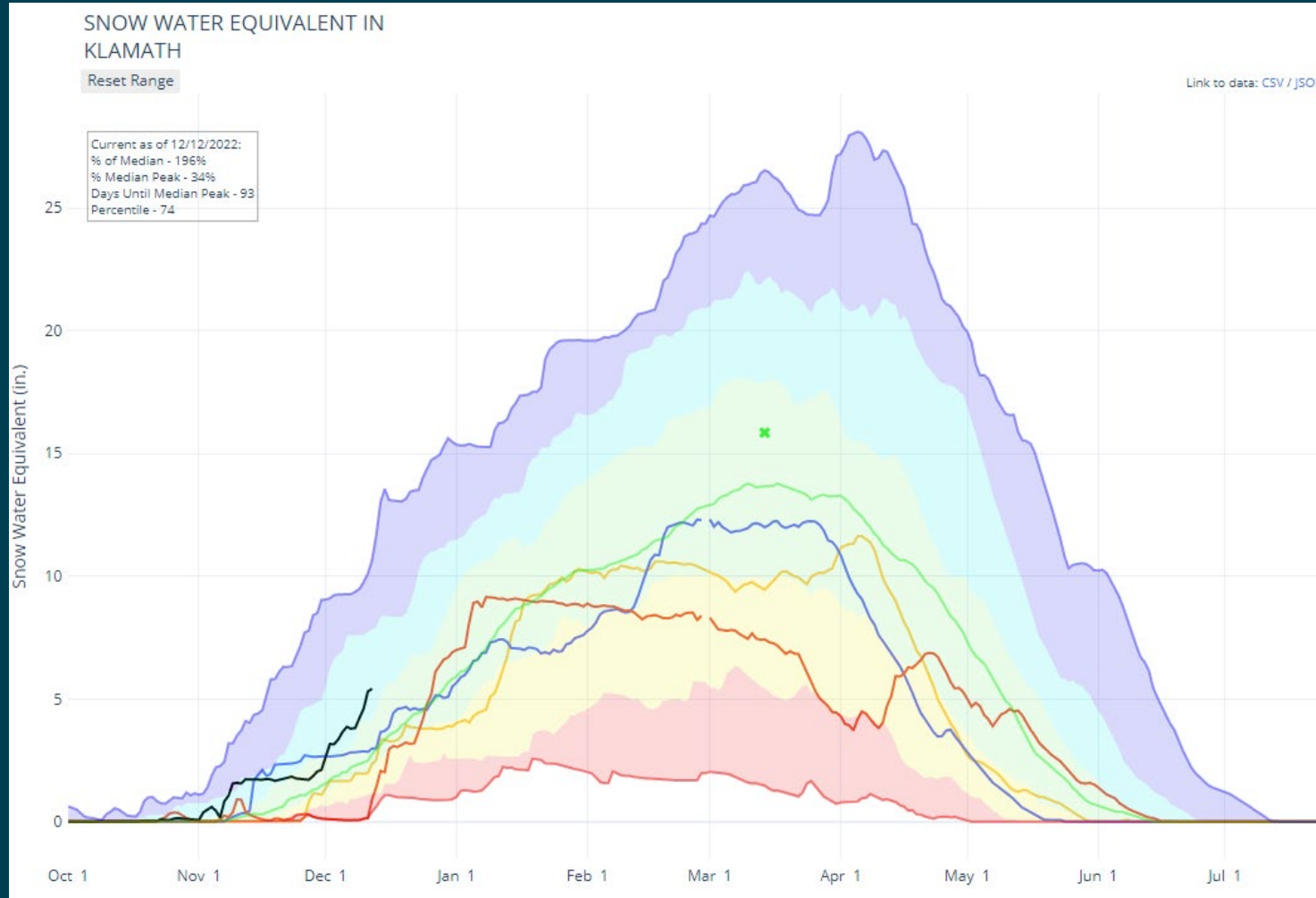


How are we doing so far in WY2023?

- Basin Floor, Klamath Falls Airport – Dec 10
 - 2022 = 1.96" or 71% of normal = 2.76"
- High elevation (18 SNOTEL sites – Dec 11)
 - Snow Water Equivalent 5.3" = 214% of median
 - Precipitation = 89% of median



Upper Klamath Basin Snow Water Equivalent – NRCS WY2023 & Last 3 Water Years



WY2023 in black; WY2022 in orange; WY2021 in blue; WY2020 in yellow



U.S. Drought Monitor

Map released: Thurs. December 8,
2022

Data valid: December 6, 2022 at 7 a.m. EST

Intensity

