BUREAU OF RECLAMATION

# Klamath Project
# Temporary Operating Procedures

**January 20, 2023**

# Presentation Outline

- Technical input received

- Monitoring Information
- Current Forecasts and Reclamation Interpretation
- Temporary Operating Procedures
- Schedule for Input and Action

- Supplemental Information

# Technical Input Received – Concepts for Improving ESA Compliance

## Diversion reduction strategies

1. Halt out-of-basin diversions to the Rogue River basin
2. Halt diversions from the Keno Impoundment

## Supply augmentation strategies

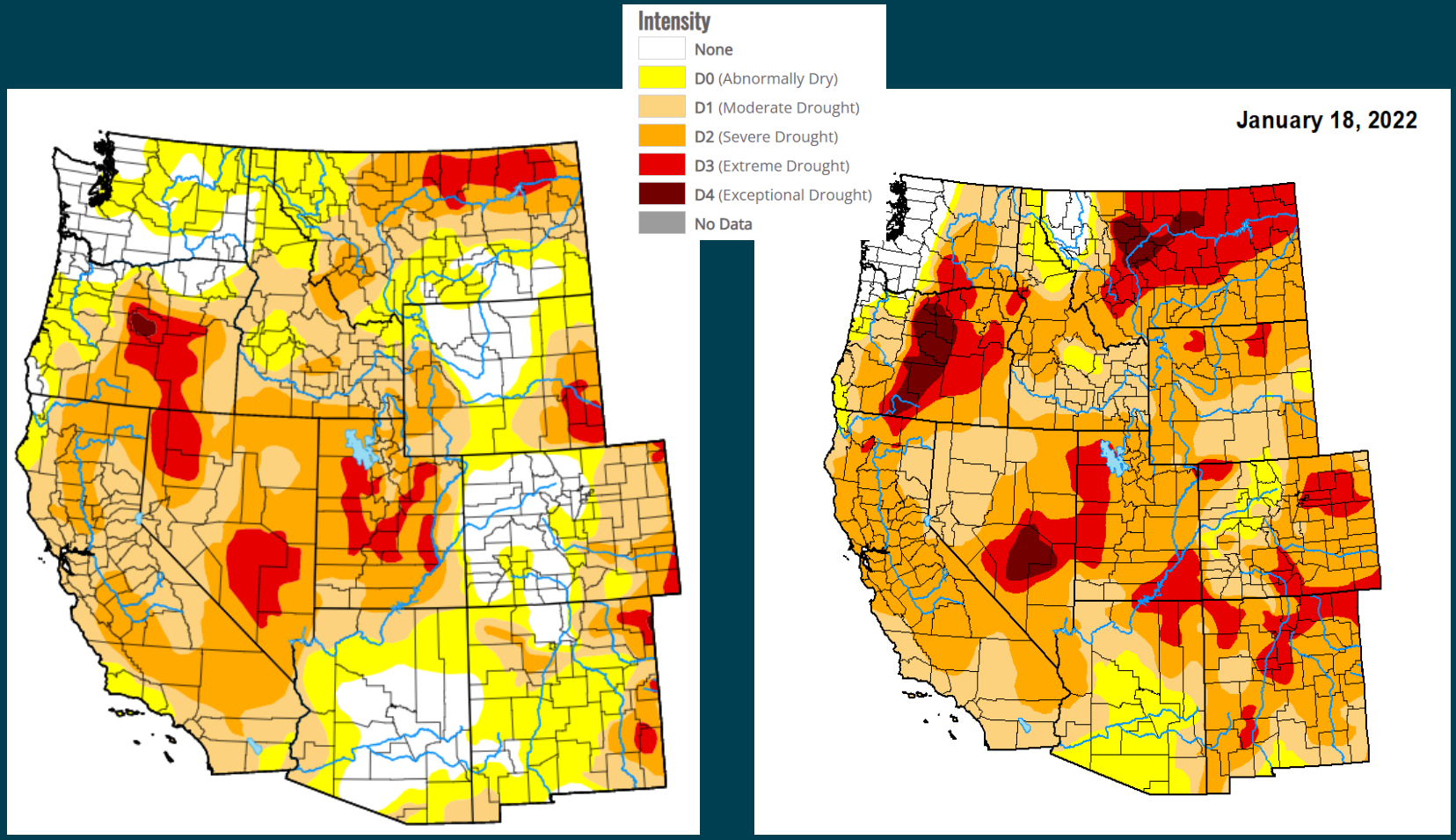
3. Initiate out-of-basin diversions into Klamath River from Lost River
4. Consider planning for a lower volume pulse/flushing flow from Upper Klamath Lake

## Operation modification strategies

5. Borrow or exchange water with KRRC (former PacifiCorp reservoirs)
6. Reduce Link River Dam outflows to make better use of storm events
7. Establish higher end-of-season elevation requirements for Upper Klamath Lake

# Monitoring Information

# United States Drought Monitor – West Region

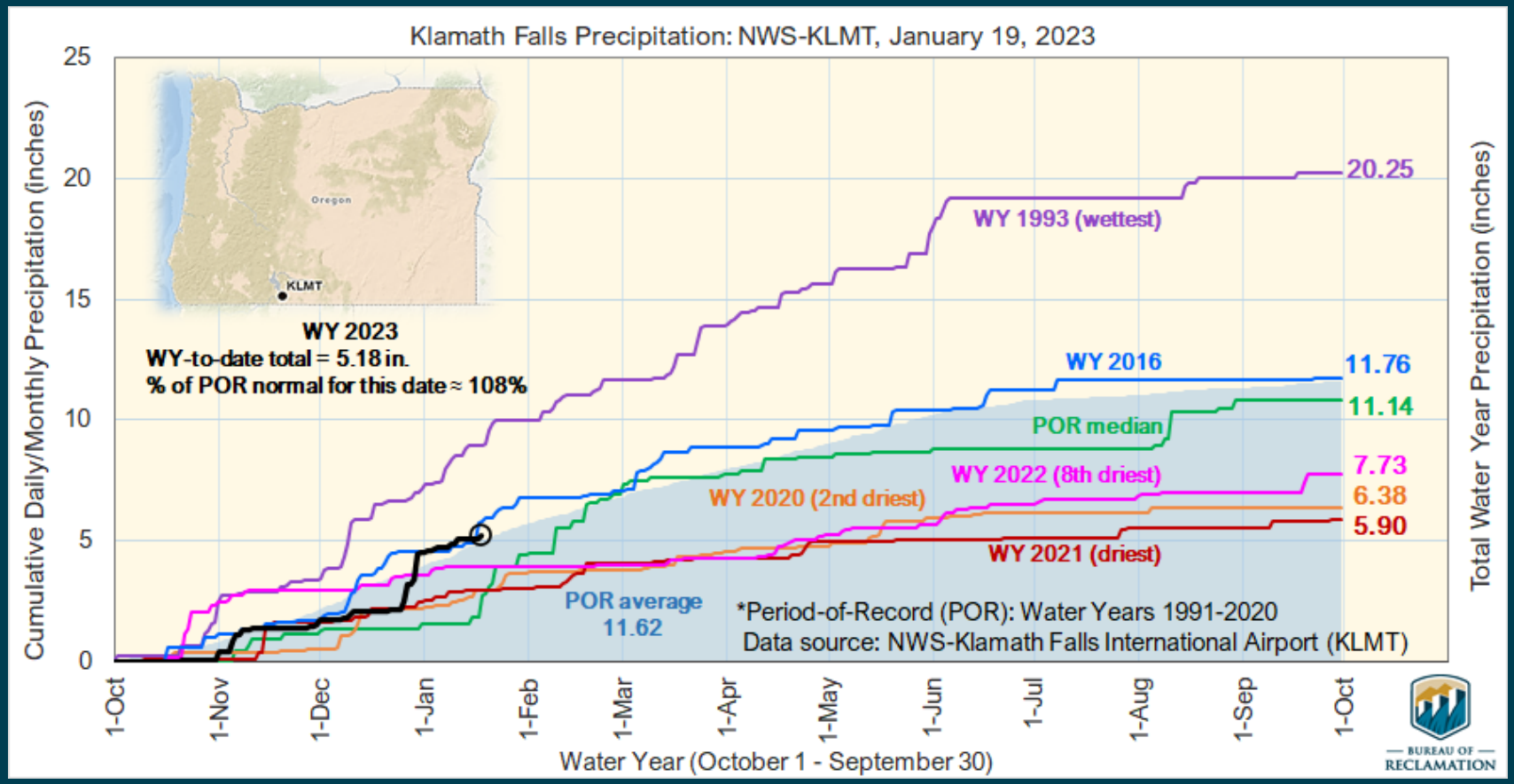



January 19, 2023

January 18, 2022

https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?OR

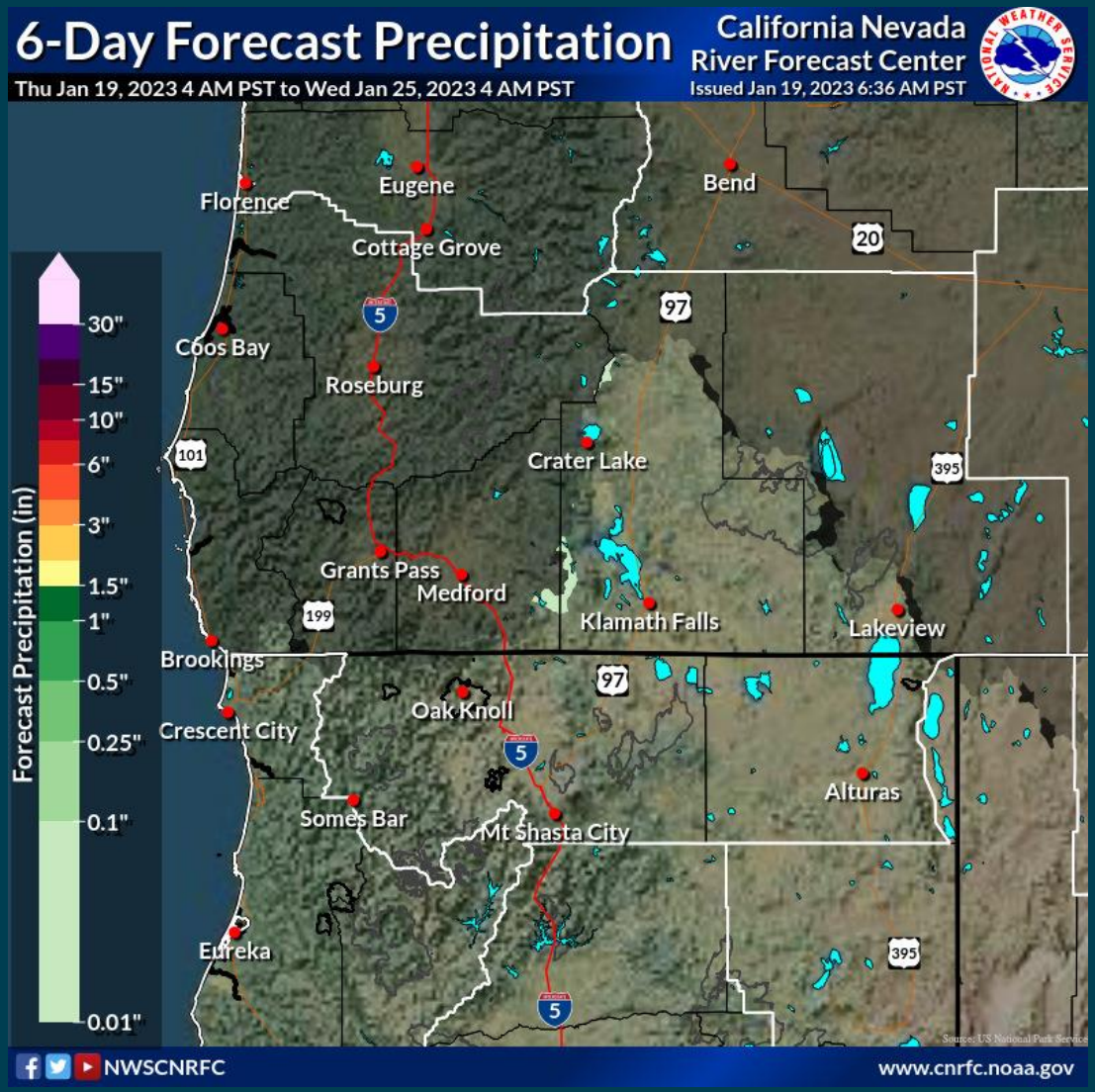
# Klamath Falls Airport Met Station – National Weather Service




https://www.weather.gov/wrh/climate?wfo=MFR

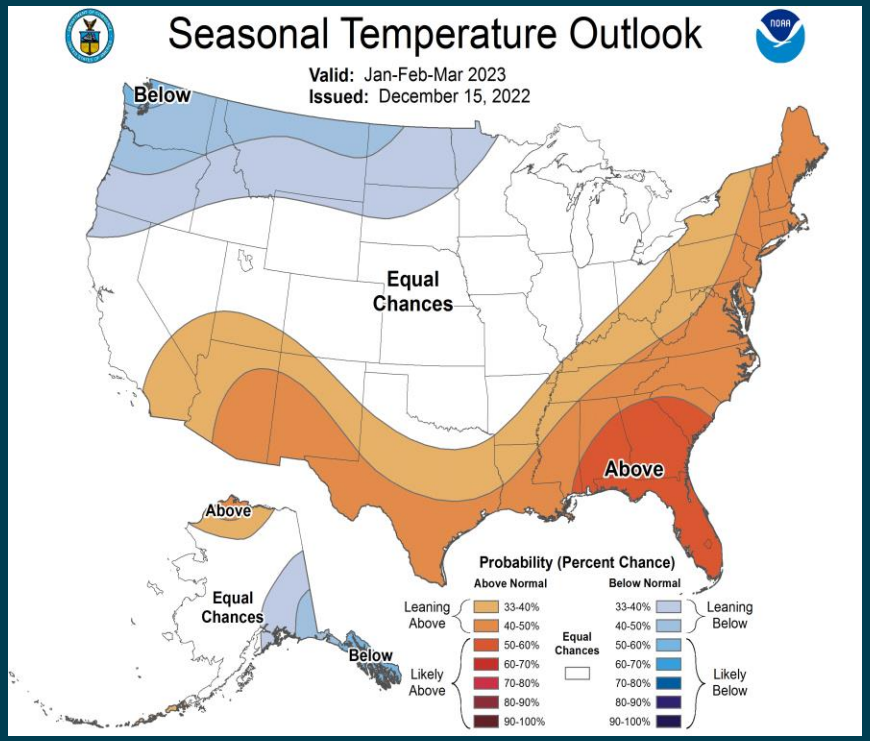
# 6-Day Precipitation Forecast – California Nevada River Forecast Center

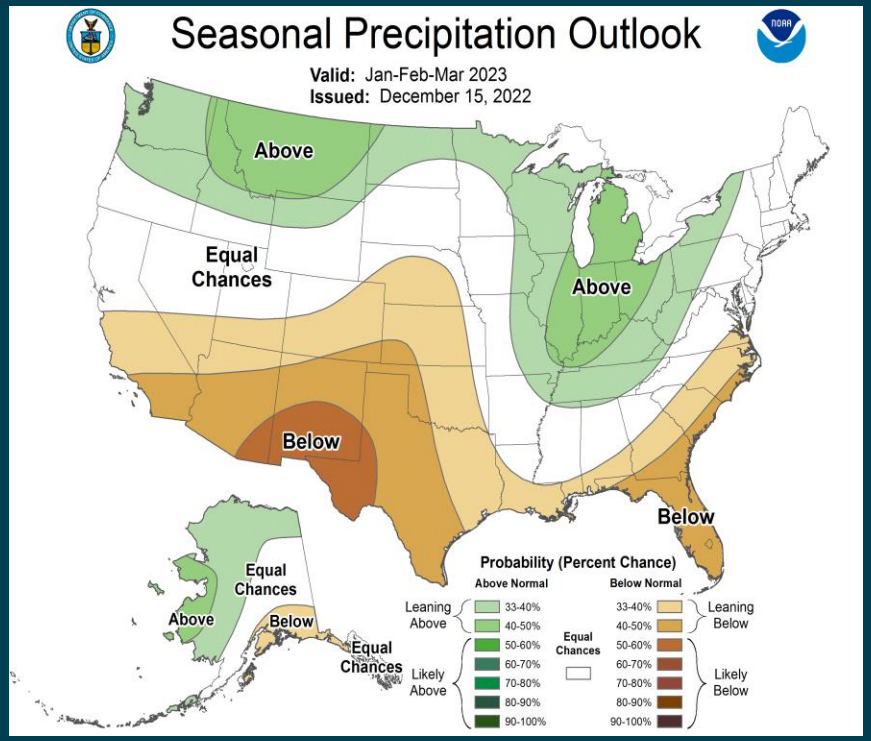
## Accumulated Total




https://www.cnrfc.noaa.gov/precipForecast.php?cwa=MFR&imgNum=1&mobile=0

# January-March Weather Outlook

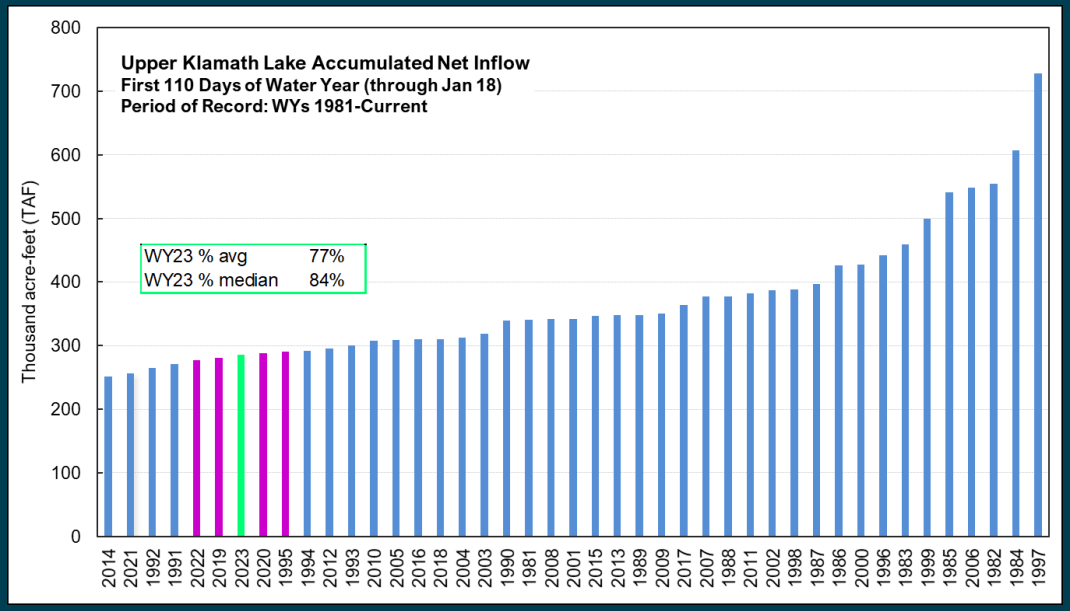


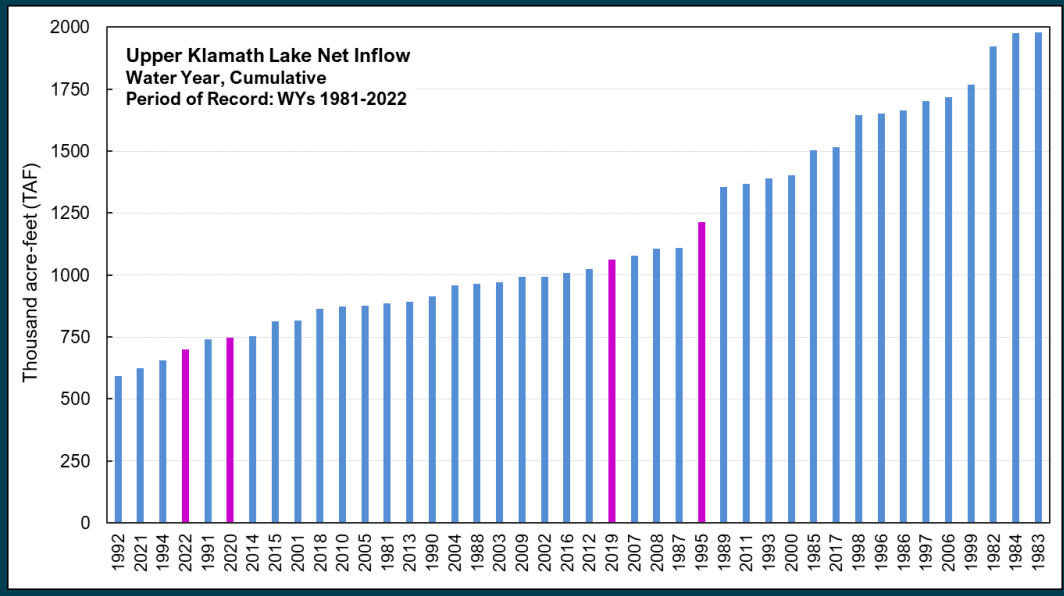



https://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=1

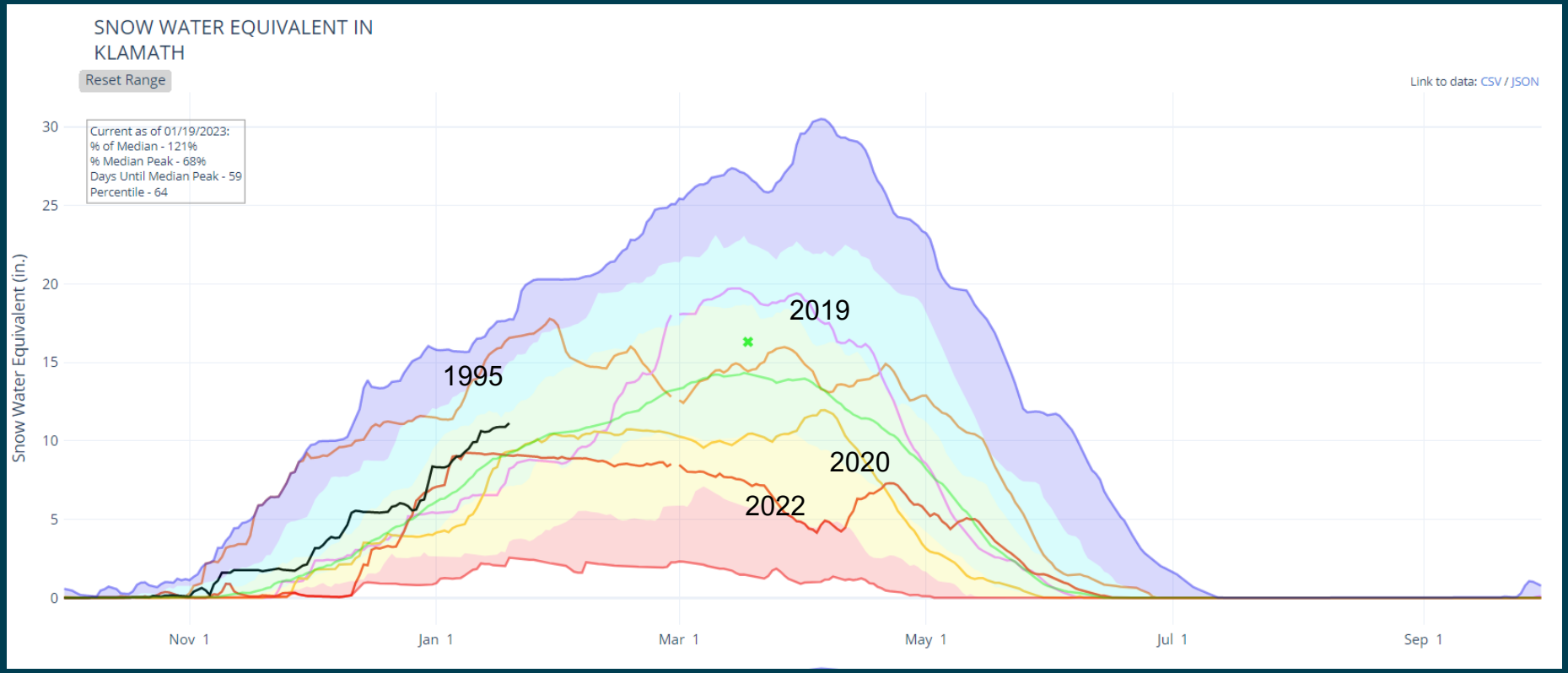
# UKL Net Inflow Water - Year 2023 & Nearest Neighboring Water Years for Net Inflows to-Date




WY2022/2023 data are provisional and subject to revision

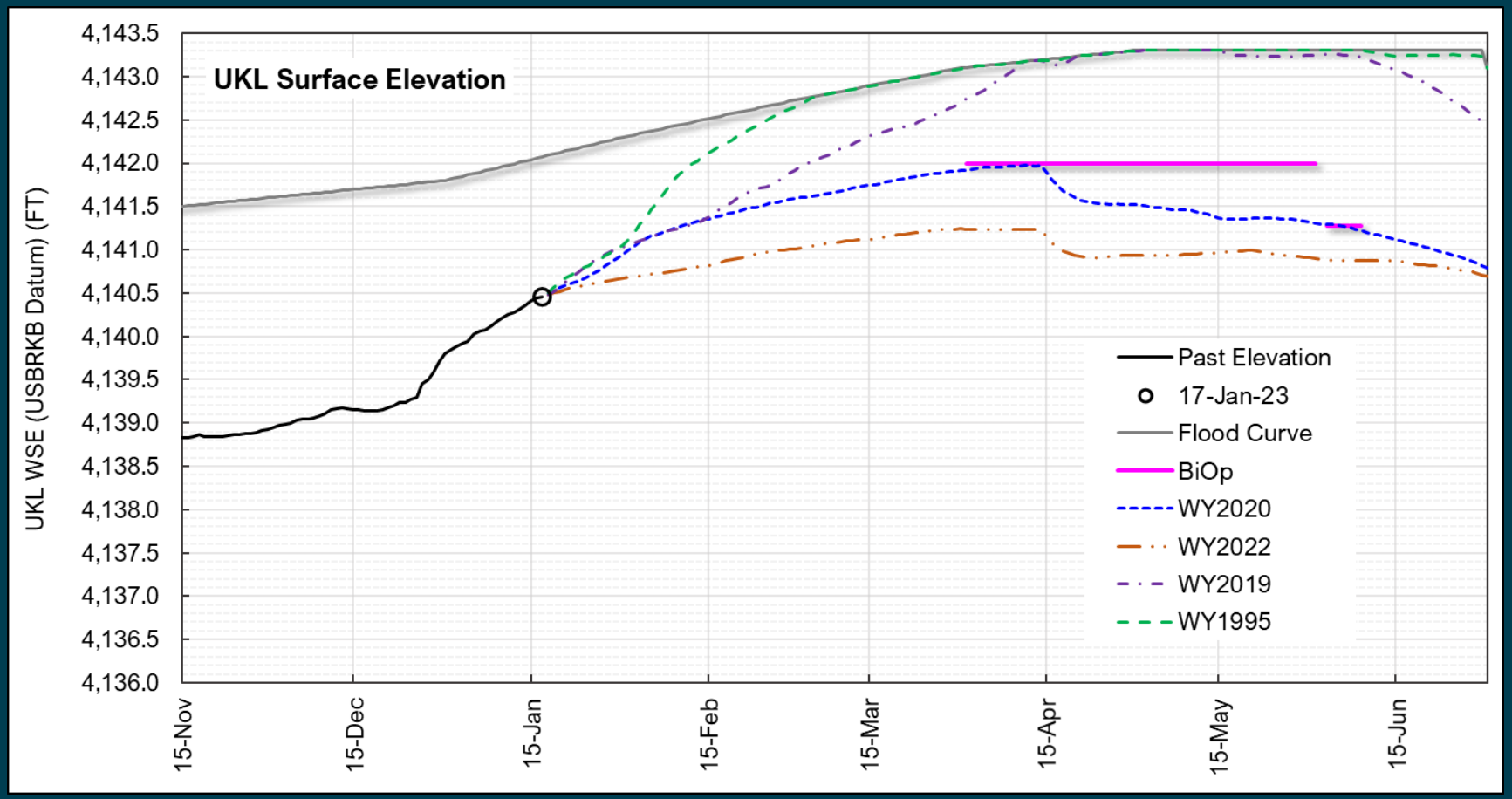


# NRCS Upper Klamath Basin Snow Water Equivalent (SWE) Water Year 2023 & Nearest Neighboring Water Years for Net Inflow-to-date

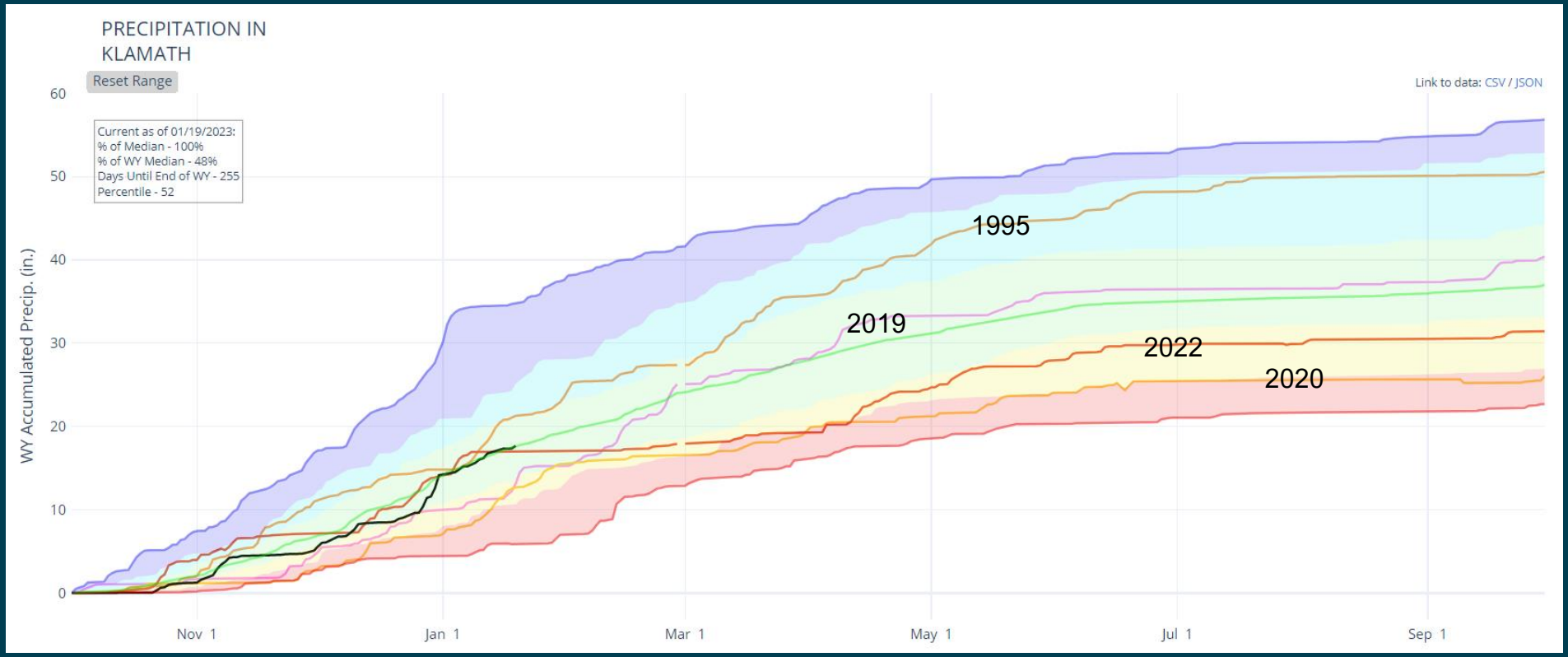



https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/WTEQ/assocHUC6/180102_Klamath.html

# UKL Surface Elevation
# Nearest Neighboring Water Years for Net Inflows to-Date



# Upper Klamath Basin Precipitation - NRCS Water Year 2023

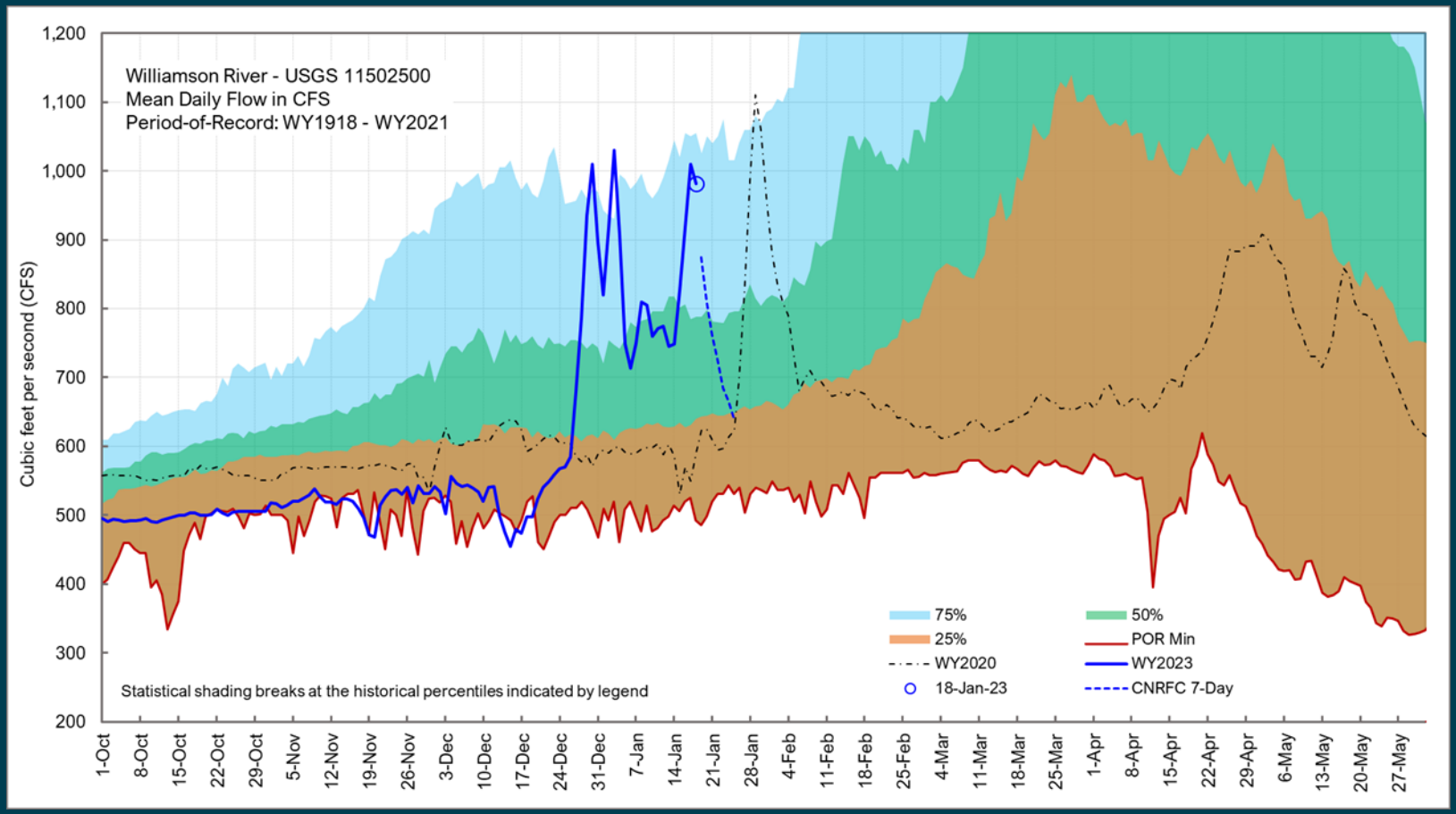



Statistical shading breaks at 10th, 30th, 50th, and 90th Percentiles
WY2023 displayed as black trace



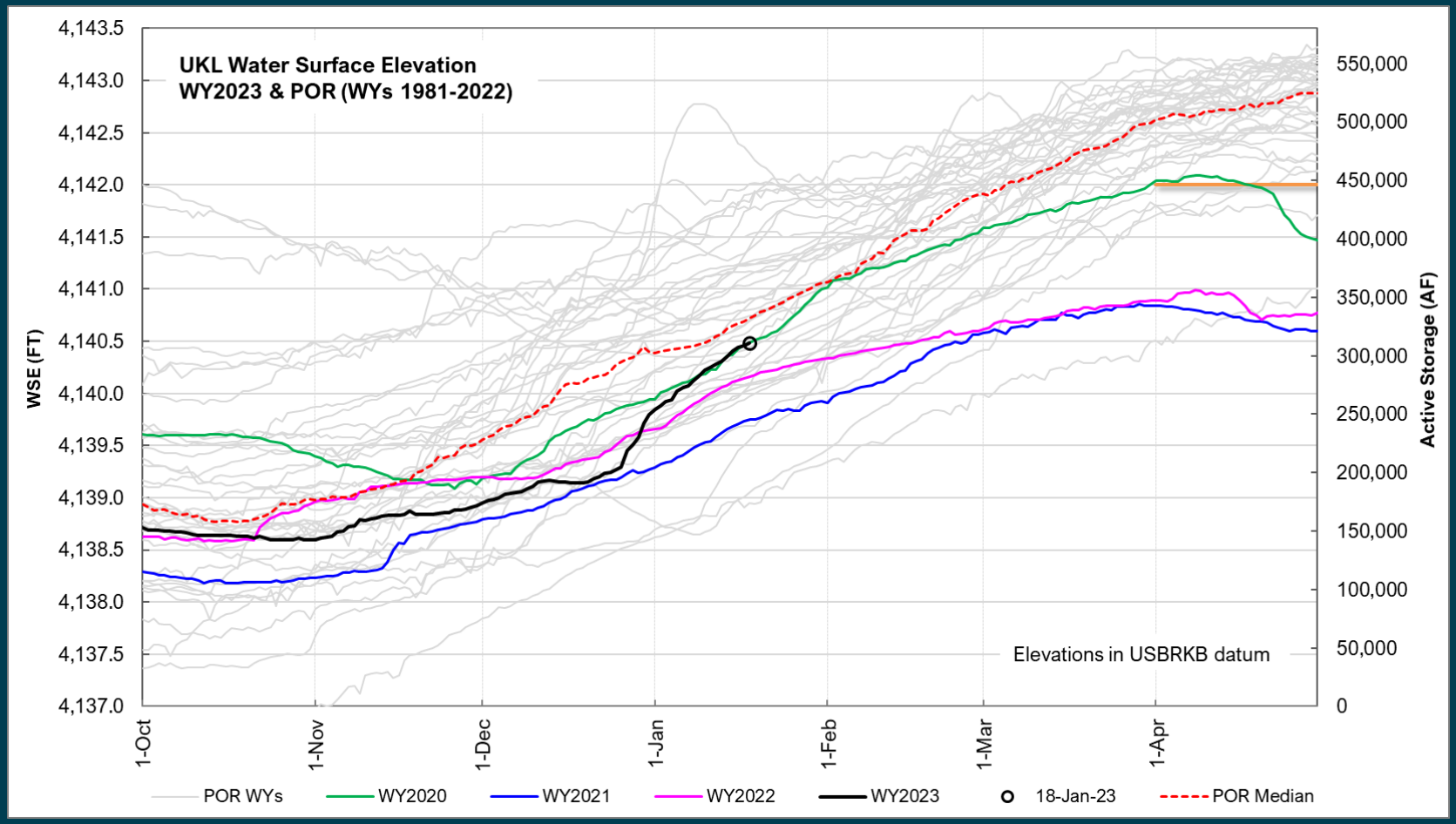
https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/PREC/assocHUC6/180102_Klamath.html

# Williamson River - USGS 11502500




WY2022/2023 data are provisional and subject to revision

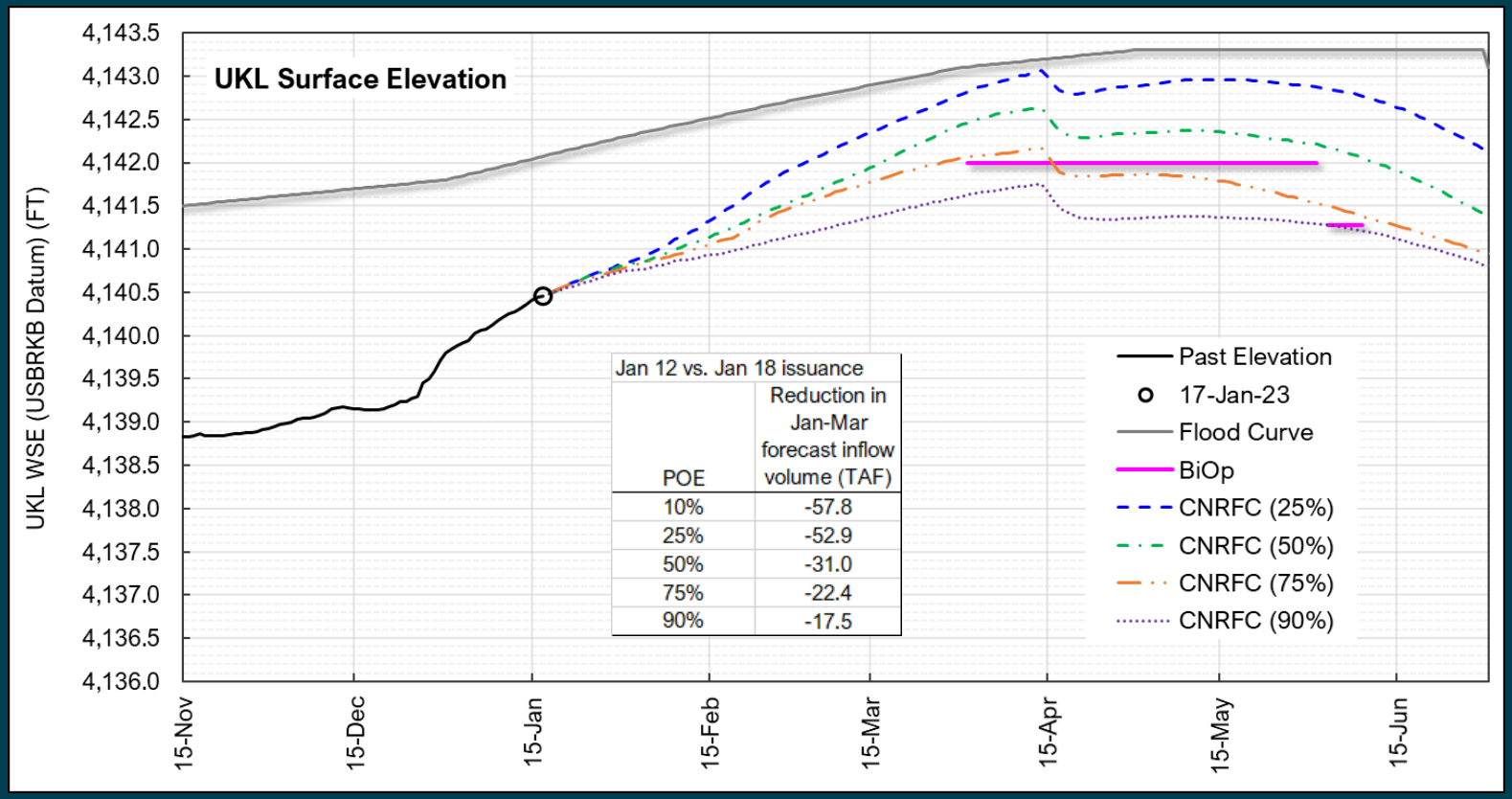
# UKL Water Surface Elevation
# Water Year 2023 & Period-of-Record-to-Date




WY2022/2023 UKL water surface elevation observational data are provisional

# Long-Term Upper Klamath Lake Inflow and Operations Forecasts

# UKL Water Surface Elevation – CNRFC Upper Klamath Lake Net Inflow (UKLNI) Forecast



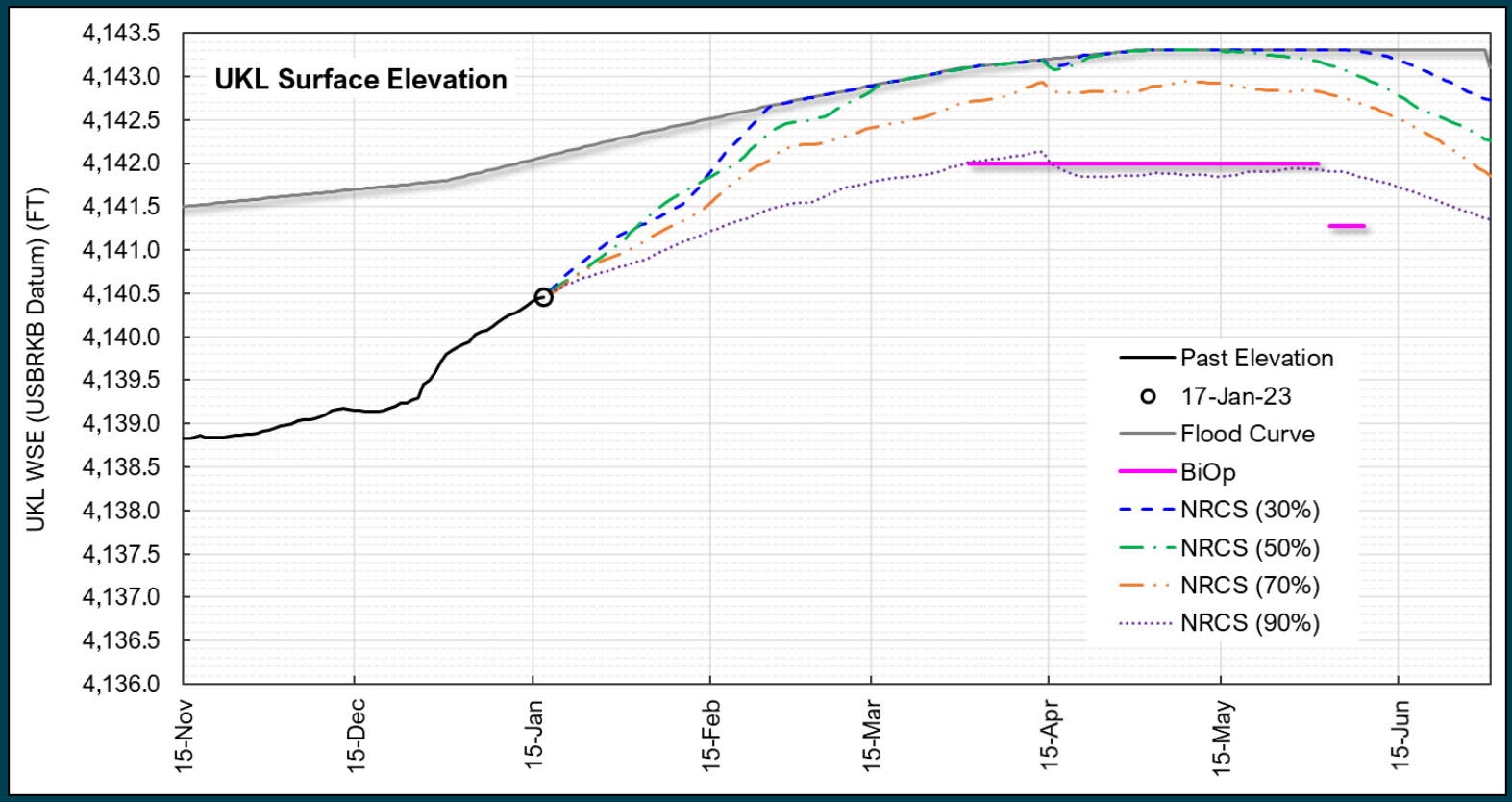

Jan 12 vs. Jan 18 issuance

| POE | Reduction in Jan-Mar forecast inflow volume (TAF) |
|---|---|
| 10% | -57.8 |
| 25% | -52.9 |
| 50% | -31.0 |
| 75% | -22.4 |
| 90% | -17.5 |

Projections, including WY2023 target elevations and surface elevation trajectories, are provisional and subject to revision based on future water supply forecasts, hydrologic conditions, and operational decisions

CNRFC UKL monthly probability net inflow forecast volumes at 25%, 50%, 75% and 90% probability of exceedance (POE) levels used in ensemble

# UKL Water Surface Elevation – NRCS Jan 1 Klamath River Basin (KRB) Water Supply Forecast (WSF)

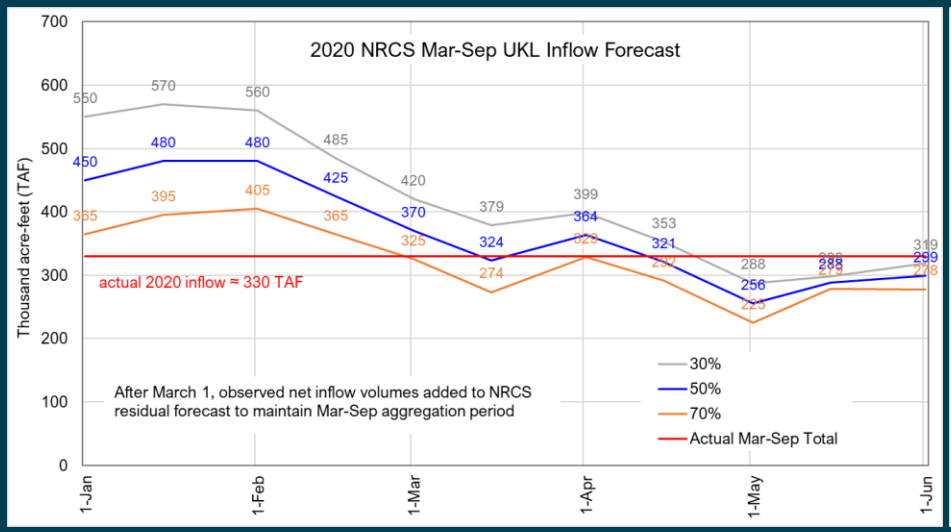


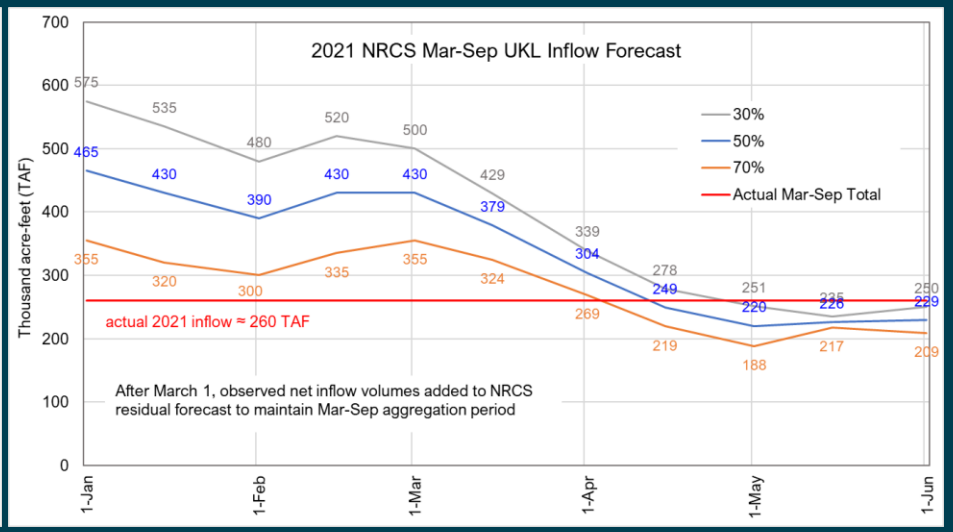

Projections, including WY2023 target elevations and surface elevation trajectories, are provisional and subject to revision based on future water supply forecasts, hydrologic conditions, and operational decisions

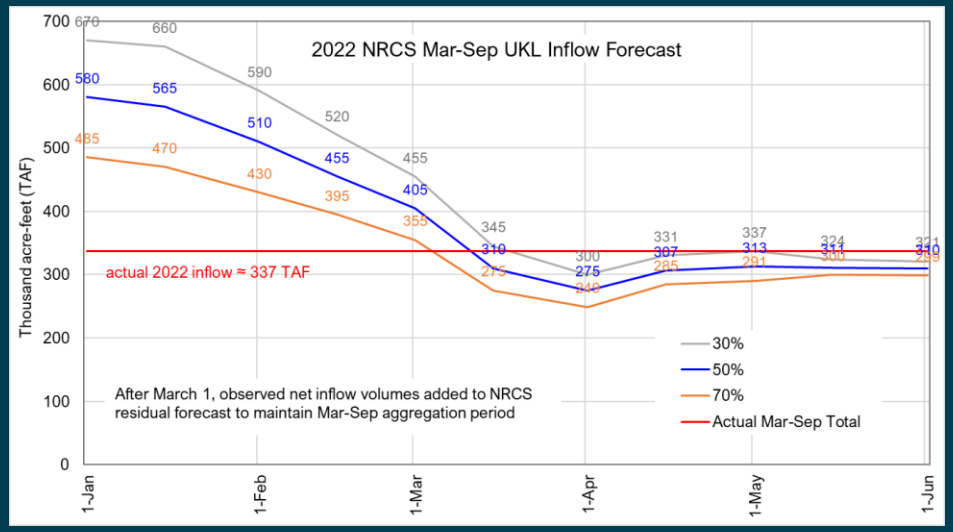
NRCS Jan 1 KRB WSF UKLNI forecast volumes at 30%, 50%, 70% and 90% probability of exceedance (POE) levels used in ensemble

WY2023 observed UKL water surface elevation data are provisional

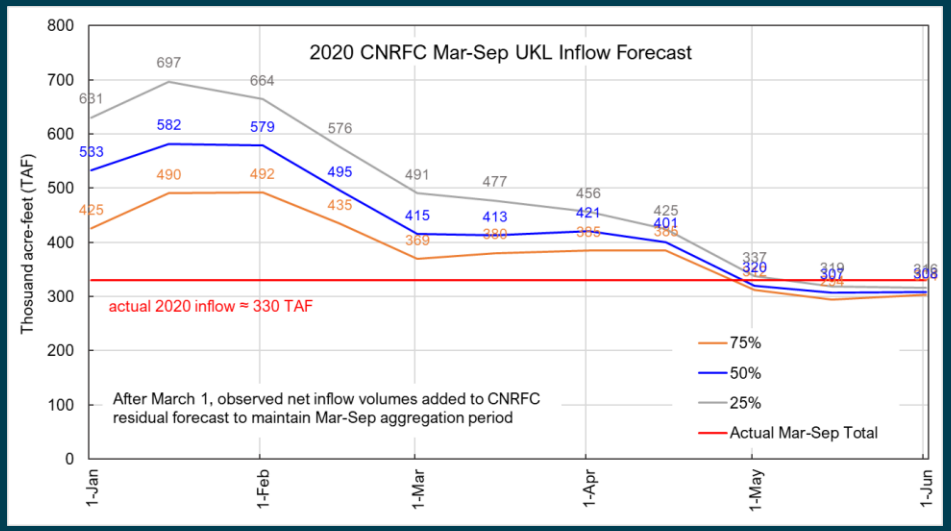
# NRCS Klamath River Basin Water Supply Forecast
# Last Three Water Years – March-September

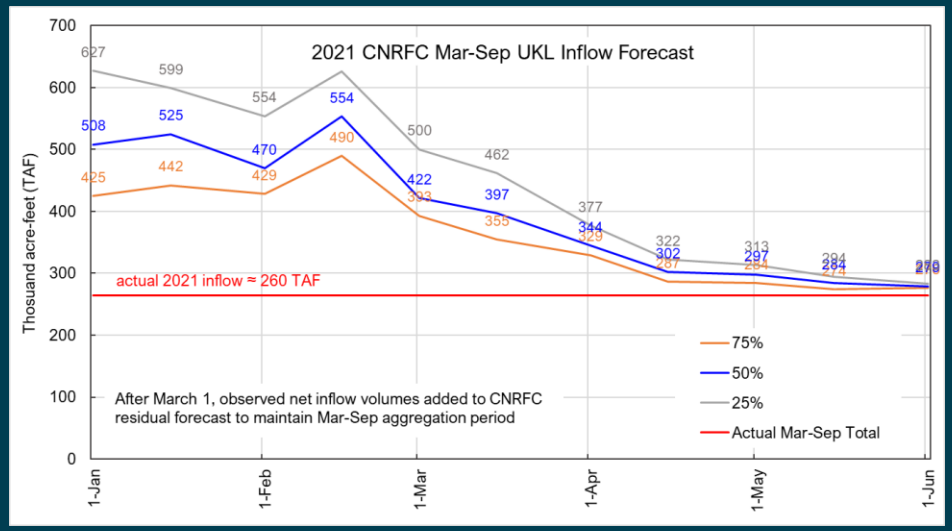


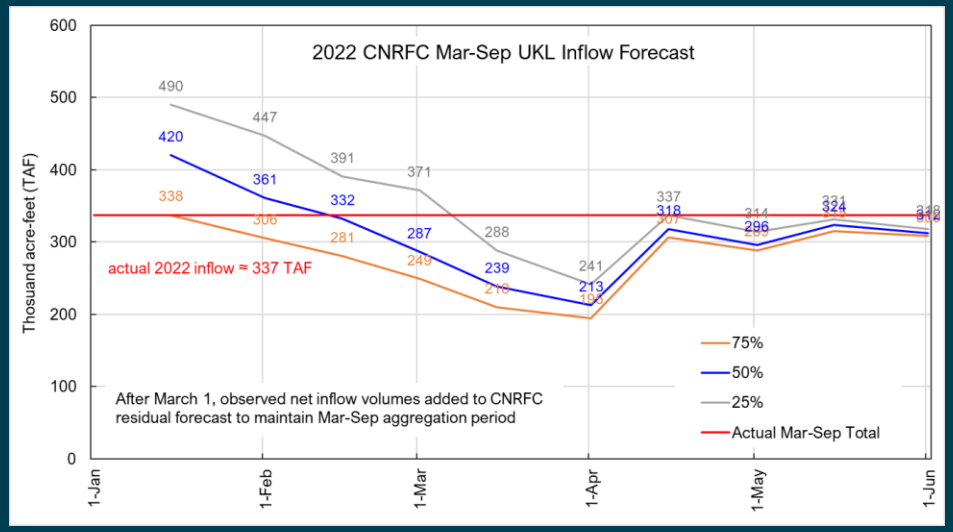



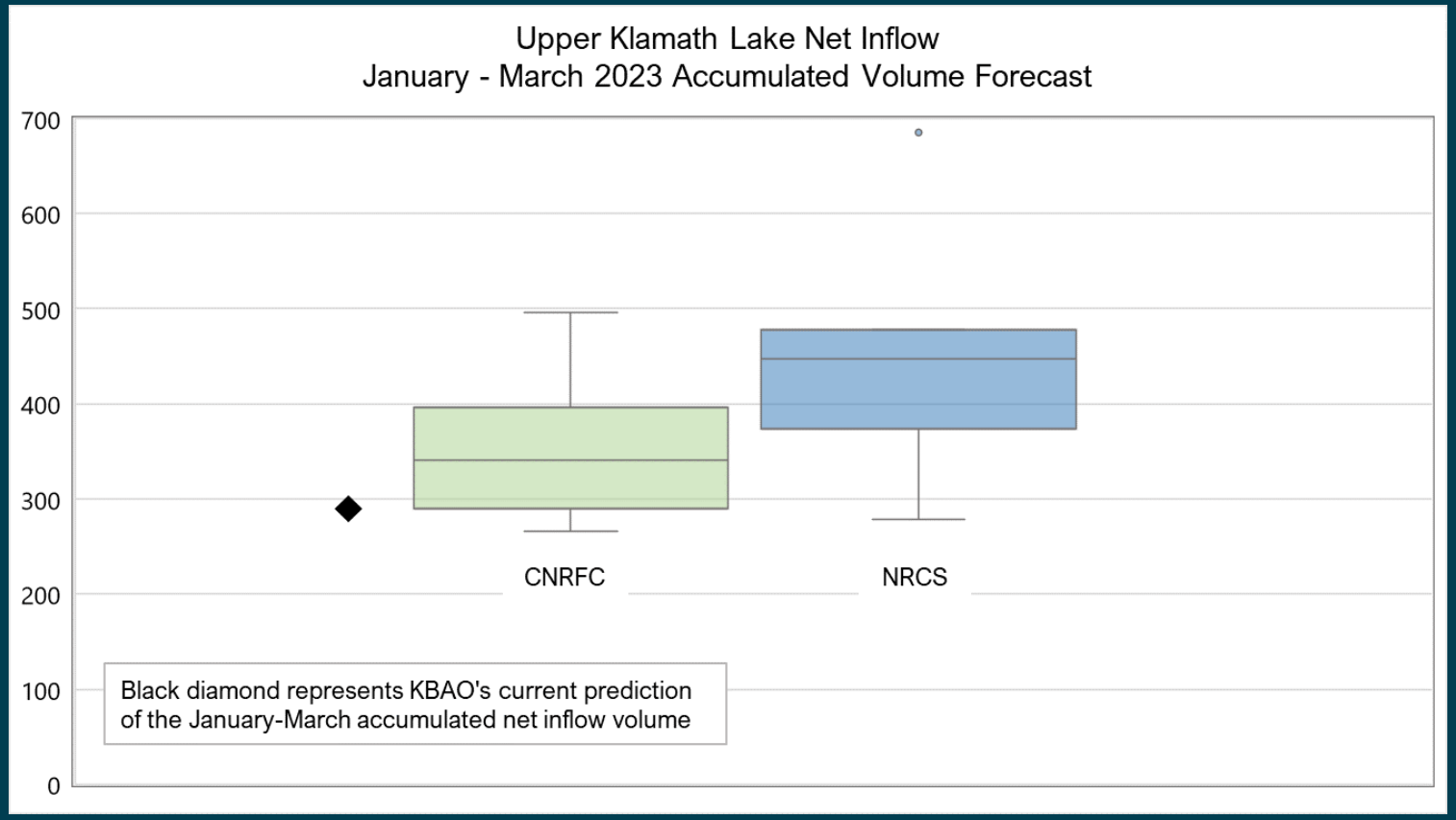
# CNRFC Klamath River Basin Water Supply Forecast
# Last Three Water Years – March-September



# January 2023 Accumulated Net Inflow Forecast CNRFC & NRCS



# Assumptions, Model Input, Basis of Planning

- January 1 – March 31 UKL net inflow volume ≈ 290 TAF
- January 1 – March 31 UKL accretion volume ≈ 78 TAF
- January 1 – March 31 Lake Ewauna accretion volume ≈ 6 TAF
- LKNWR deliveries switched off from January 20 through February
- Project diversions switched off through March
- Analysis of analog year trends that includes but is not limited to the following WYs:
  - WYs 2021, 2020, 2018, 2010, 2009, 2005

# Temporary Operation Procedures

# Reclamation Assessment

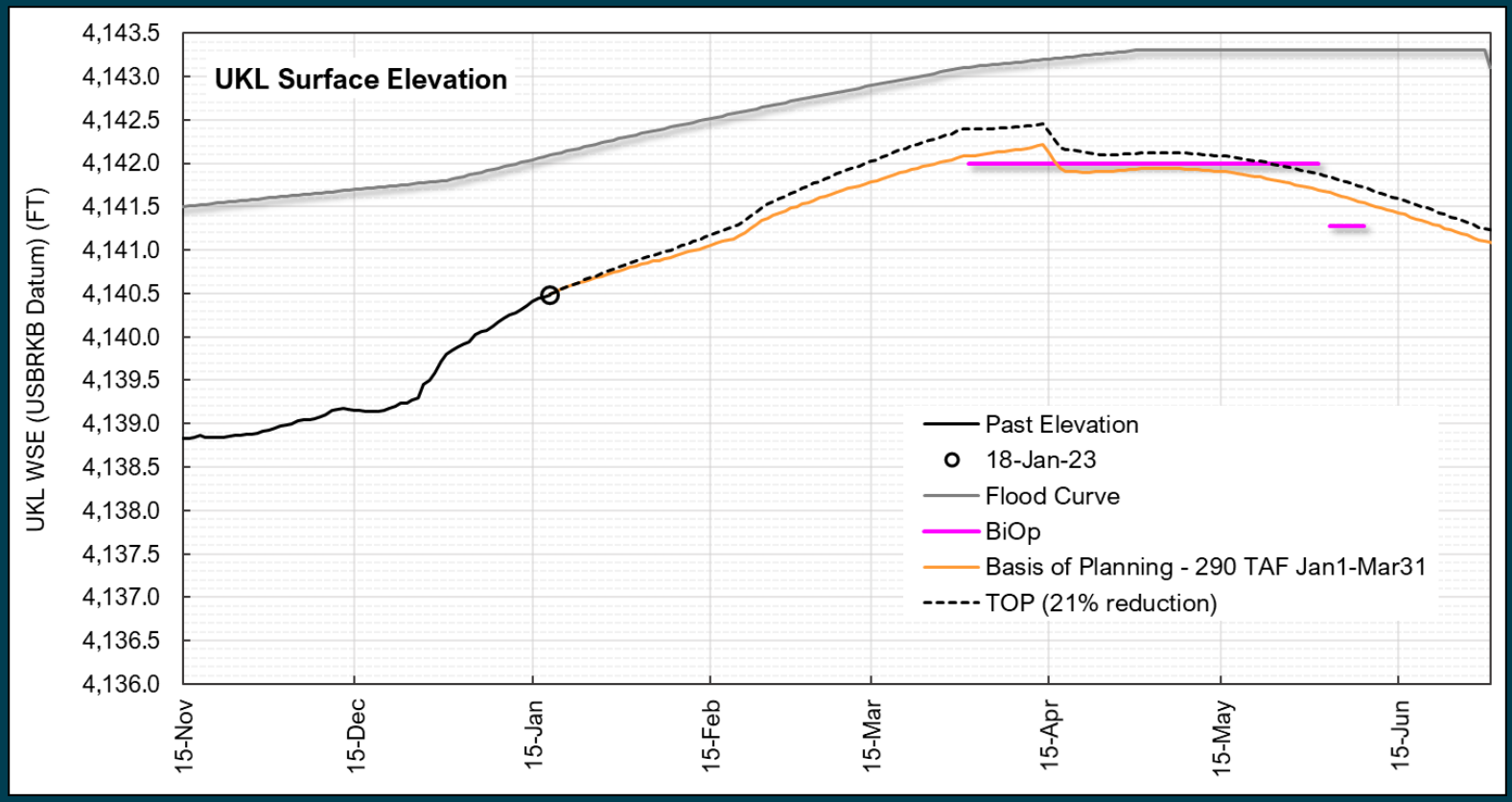
- For the purpose of the TOP at this time, Reclamation intends to balance risk between the ESA requirements by planning for a net inflow to UKL of approximately 290 TAF between Jan 1 and Apr 1.

- Given Basis of Planning assumptions and model input:
  - UKL is projected to be below the TOP goal of 4142.4 ft by approximately 28 TAF on April 1
  - Based on our projected inflow, a reduction at Iron Gate Dam of 21% below BiOp minimum requirements would allow for both maintenance of UKL elevation requirements and for a full pulse flow to address disease in the Klamath River in the Spring.

| Reduction Start Date | 20-Jan | | 10-Feb | |
|---|---|---|---|---|
| Percent IGD Reduction | Average Daily IGD Release (CFS) | Volumetric Gain to UKL by Apr 1 (TAF) | Average Daily IGD Release (CFS) | Volumetric Gain to UKL by Apr 1 (TAF) |
| 10% | 882 | 13.1 | 881 | 9.3 |
| 15% | 829 | 20.4 | 829 | 14.5 |
| 20% | 783 | 27.0 | 782 | 19.2 |
| 25% | 736 | 33.5 | 735 | 23.8 |
| 30% | 684 | 40.9 | 682 | 29.1 |

Data based on 75% POE scenario which includes CNRFC 75% POE forecast UKL inflow volumes

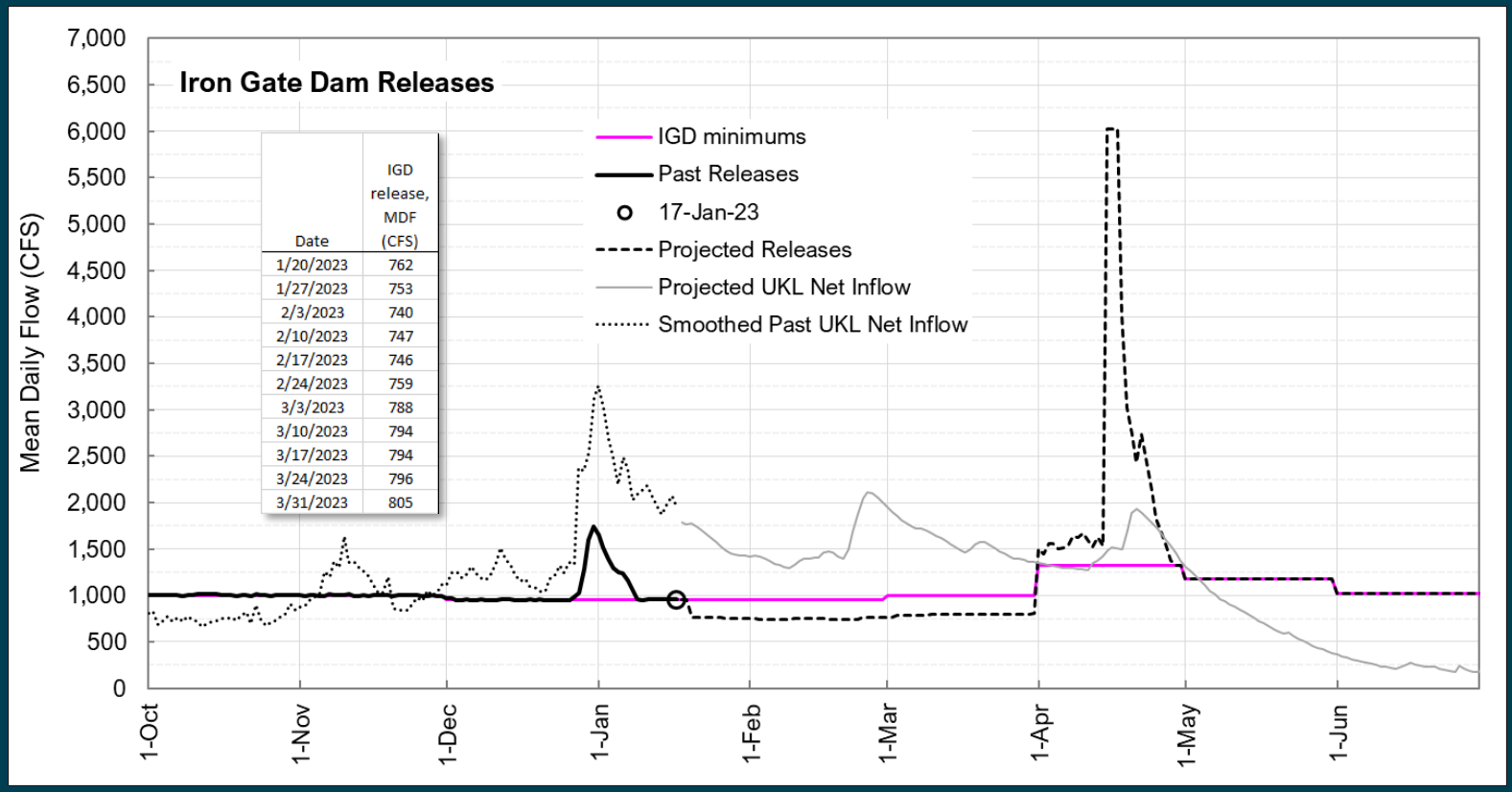
# UKL Water Surface Elevation – TOP




Projections, including WY2023 target elevations and surface elevation trajectories, are provisional and subject to revision based on future water supply forecasts, hydrologic conditions, and operational decisions

WY2023 observed UKL water surface elevation data are provisional

# Iron Gate Dam Releases – TOP




| Date | IGD release, MDF (CFS) |
|---|---|
| 1/20/2023 | 762 |
| 1/27/2023 | 753 |
| 2/3/2023 | 740 |
| 2/10/2023 | 747 |
| 2/17/2023 | 746 |
| 2/24/2023 | 759 |
| 3/3/2023 | 788 |
| 3/10/2023 | 794 |
| 3/17/2023 | 794 |
| 3/24/2023 | 796 |
| 3/31/2023 | 805 |

Projections, including IGD releases, are provisional and subject to revision based on future water supply forecasts, hydrologic conditions, and operational decisions

Current IGD releases reflect an average **21% reduction** to mean daily flows

WY2023 observed IGD release data are provisional

# Estimated River Habitat Spawning Reductions – 950 cfs

| Q (cfs) | Q Red. | Habitat Red. | Pct. Hab. Tot. |
|---|---|---|---|
| 950 | - | - | 85% |
| 855 | 10% | 6% | 80% |
| 760 | 20% | 12% | 75% |
| 665 | 30% | 21% | 67% |
| 570 | 40% | 53% | 40% |

Based on Response to Reclamation Request for Technical Assistance from USFWS

# Estimated River Habitat Rearing Reductions – 950 cfs

| Q (cfs) | Q Red. | Habitat Red. | Pct. Hab. Pot. |
|---|---|---|---|
| 950 | - | - | 45% |
| 855 | 10% | 6% | 42% |
| 760 | 20% | 13% | 39% |
| 665 | 30% | 17% | 37% |
| 570 | 40% | 43% | 26% |

Based on Response to Reclamation Request for Technical Assistance from USFWS

# Estimated River Habitat Rearing Reductions – 1000 cfs

| Q | Q Red. | Habitat Red. | Pct. Hab. Pot. |
|---|---|---|---|
| 1000 | - | - | 46% |
| 900 | 10% | 5% | 43% |
| 800 | 20% | 11% | 40% |
| 700 | 30% | 17% | 38% |
| 600 | 40% | 20% | 36% |

Based on Response to Reclamation Request for Technical Assistance from USFWS

# Proposed Schedule

| | |
|---|---|
| Jan 13 | – Finalization of Temporary Operation Procedures |
| Jan 19 | – Consideration of Iron Gate Dam flow releases below NMFS BiOp minimums |
| Jan 23 or 24 | – Tribal Gov't-to-Gov't with Interior |
| Jan 25 | – First possible day of flow changes |
| Thru Apr 1 | – weekly FASTA to discuss and adjust the TOP, until 4,142.4 in UKL can be assured and the TOP is concluded |

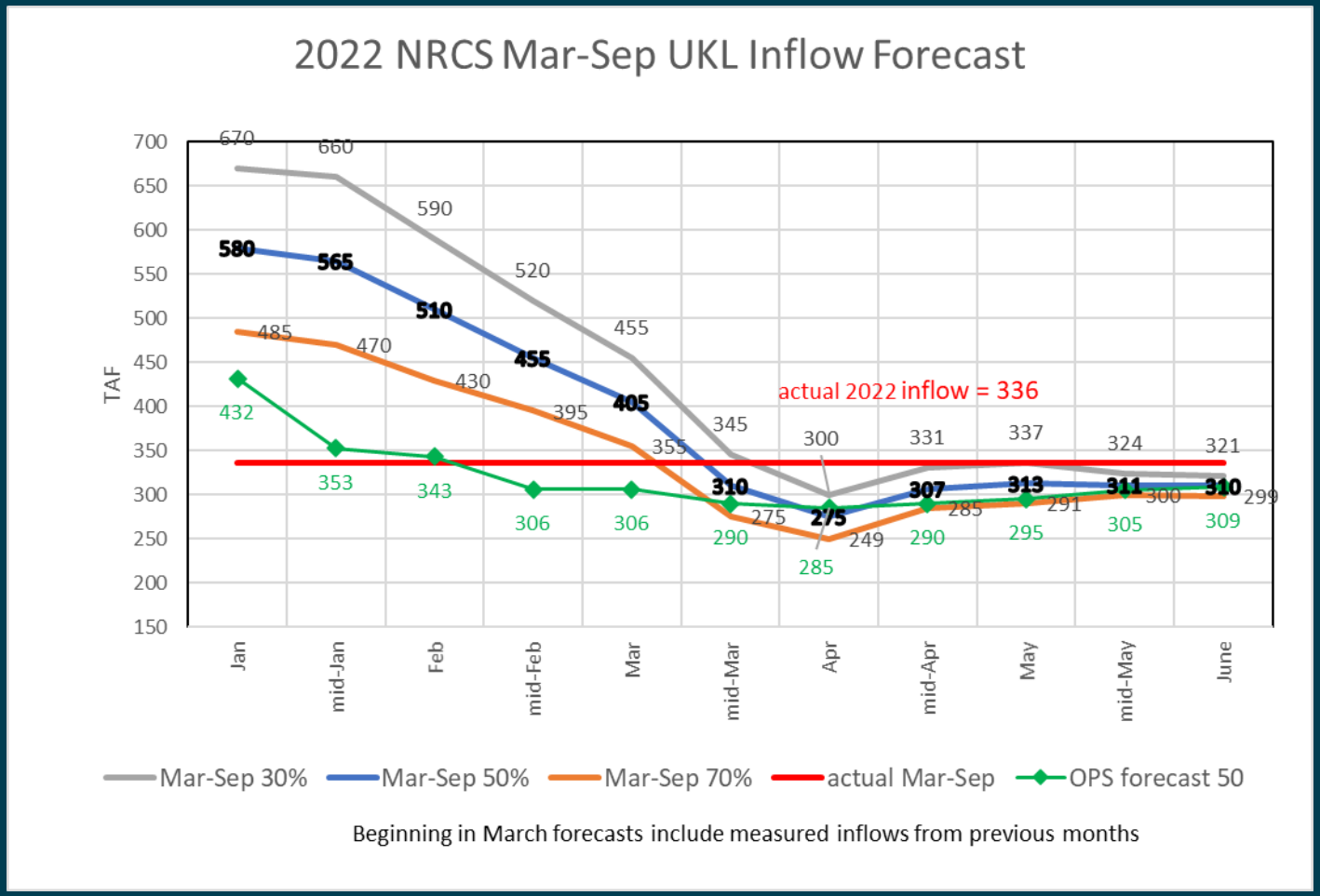
# Technical Input

- **Please submit comments, to Courtney Mathews, cmathews@usbr.gov**

- **Updates and materials can be found at** www.usbr.gov/mp/kbao

# Supplemental Information

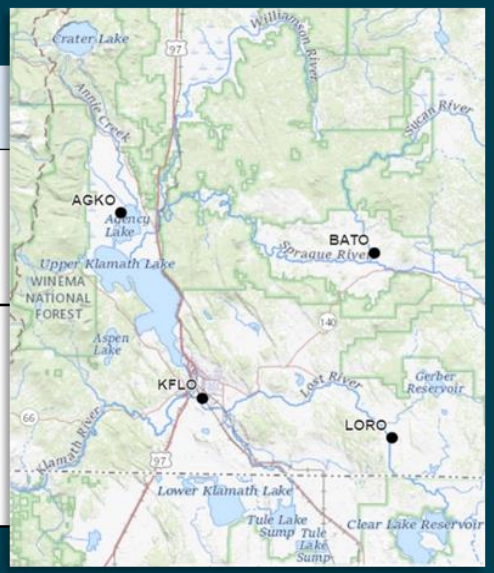
# 2022 NRCS vs. KBAO estimates of UKL inflow



# Klamath Basin AgriMet – USBR Water Year (WY) 2023

**Klamath Basin AgriMet Stations - Water Year-to-date Precipitation (through below date)**
**Wednesday, January 18, 2023**

| Station (POR) | WY2023 Total PREC (in.) | POR Median PREC (in.) | Percent POR Median | CBTT | PCODE | SDI | ELEV (ft.) |
|---|---|---|---|---|---|---|---|
| Lorella (2002-2021) | 4.67 | 4.87 | 96% | LORO | PU | 200586 | 4159 |
| Beatty (2005-2021) | 4.74 | 4.38 | 108% | BATO | PU | 200522 | 4319 |
| Agency (2001-2021) | 8.31 | 7.17 | 116% | AGKO | PU | 200542 | 4149 |
| KFalls (1999-2021) | 6.08 | 4.81 | 127% | KFLO | PU | 200553 | 4099 |




https://www.usbr.gov/lc/region/g4000/riverops/_HdbDataViewer.html?query=svr=kbohdb&sdi=200586%2C200522%2C200542%2C200553&tstp=DY&t1=2021-10-01T00:00&t2=2022-03-01T00:00&table=R&mrid=0&format=json

# NRCS Upper Klamath Basin Snow/Precipitation Report WY2023

**Upper Klamath Basin SNOTEL Snow/Precipitation Update Report**

Based on Mountain Data from NRCS SNOTEL Sites

**Provisional data, subject to revision**

Data based on the first reading of the day (typically 00:00) for Thursday, January 19, 2023

| Basin Site Name | Elev (ft) | Snow Water Equivalent | | | Water Year-to-Date Precipitation | | |
|---|---|---|---|---|---|---|---|
| | | Current (in) | Median (in) | Pct of Median | Current (in) | Median (in) | Pct of Median |
| **KLAMATH** | | | | | | | |
| Fish Lk. | 4660 | 4.4 | 6.9 | 64 | 19.6 | 20.0 | 98 |
| Chemult Alternate | 4850 | 9.5 | 5.8 | 164 | 13.6 | 12.5 | 109 |
| Gerber Reservoir | 4890 | 1.8 | 1.3(22) | 138 | 8.0 | 6.4(22) | 125 |
| Taylor Butte | 5030 | 7.1 | 4.6 | 154 | 10.5 | 9.3 | 113 |
| Crowder Flat | 5170 | 4.2 | 2.7(21) | 156 | 8.2 | 6.7(21) | 122 |
| Billie Creek Divide | 5280 | 13.3 | 11.8 | 113 | 24.1 | 26.2 | 92 |
| Diamond Lake | 5280 | 5.1 | 8.5 | 60 | 20.7 | 22.7 | 91 |
| Sun Pass | 5400 | 15.6 | 11.2(14) | 139 | 19.6 | 19.6(14) | 100 |
| Sevenmile Marsh | 5700 | 18.9 | 16.1 | 117 | 30.0 | 30.7 | 98 |
| Quartz Mountain | 5720 | 4.3 | 1.2(27) | 358 | 10.0 | 7.0(17) | 143 |
| Silver Creek | 5740 | 8.6 | 5.8 | 148 | 11.9 | 12.2 | 98 |
| Strawberry | 5770 | 7.0 | 3.8 | 184 | 11.1 | 8.8 | 126 |
| Cold Springs Camp | 5940 | 14.2 | 15.0 | 95 | 17.9 | 28.0 | 64 |
| Fourmile Lake | 5970 | 14.3 | 16.0 | 89 | 24.4 | 26.5 | 92 |
| Annie Springs | 6010 | 26.5 | 19.6(20) | 135 | 31.5 | 31.8(20) | 99 |
| Crazyman Flat | 6180 | 13.6 | 9.6(19) | 142 | 14.2 | 14.4(19) | 99 |
| Swan Lake Mtn | 6830 | 19.9 | 12.6(14) | 158 | 21.8 | 15.6(14) | 140 |
| Summer Rim | 7080 | 7.8 | 9.3 | 84 | 9.7 | 11.0 | 88 |
| **Basin Index (%)** | | | | **121** | | | **99** |

-M = Missing data.
* = Analysis may not provide a valid measure of conditions.
N/A = Not available.

Footnotes for median and average:
(##) = If less than 30 years are available, this value specifies the number of years used for the median and average calculations. Sites with less than 10 years available do not have medians or averages.

The MONTH-TO-DATE PRECIPITATION Percent of Median (or Average) represents the total precipitation (beginning on the 1st day of the current month) found at selected SNOTEL sites in or near the basin compared to the Median (or Average) value for those sites on this day.

The WATER YEAR-TO-DATE-PRECIPITATION represents total precipitation since October 1st, expressed in inches.

Contact your state water supply staff for assistance.

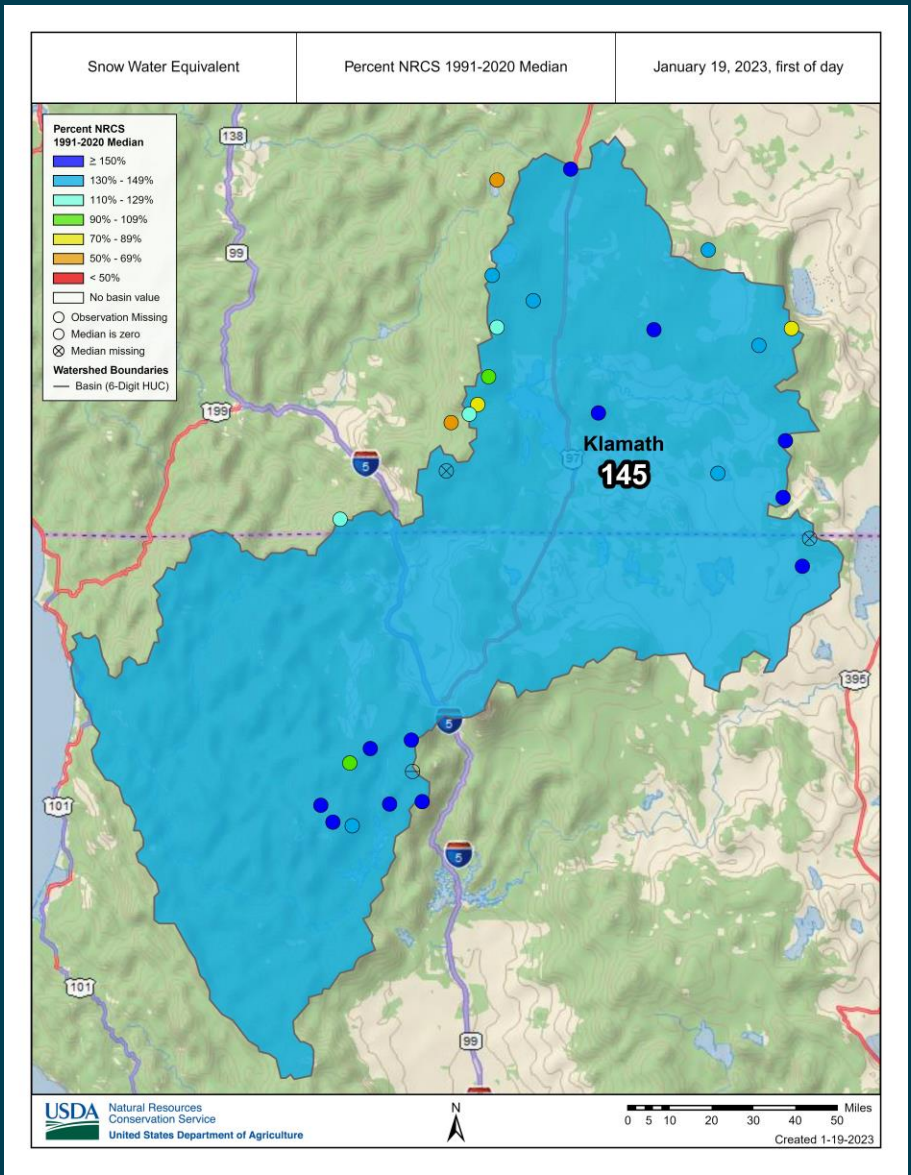
Medians and averages are calculated for the period 1991-2020.

Provisional data, subject to revision.



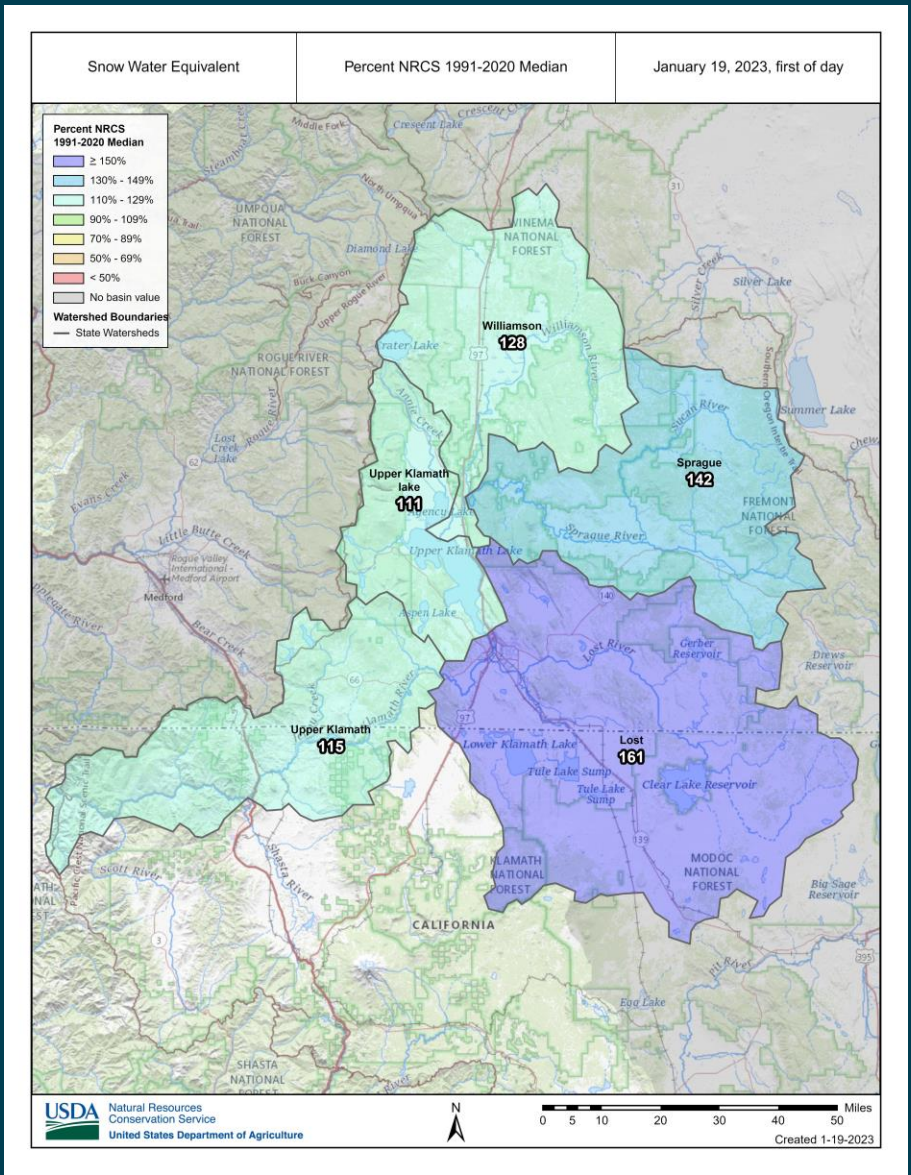
https://wcc.sc.egov.usda.gov/reports/SelectUpdateReport.html

# NRCS Klamath River Basin (KRB) HUC-6 Snow Water Equivalent (SWE) WY2023



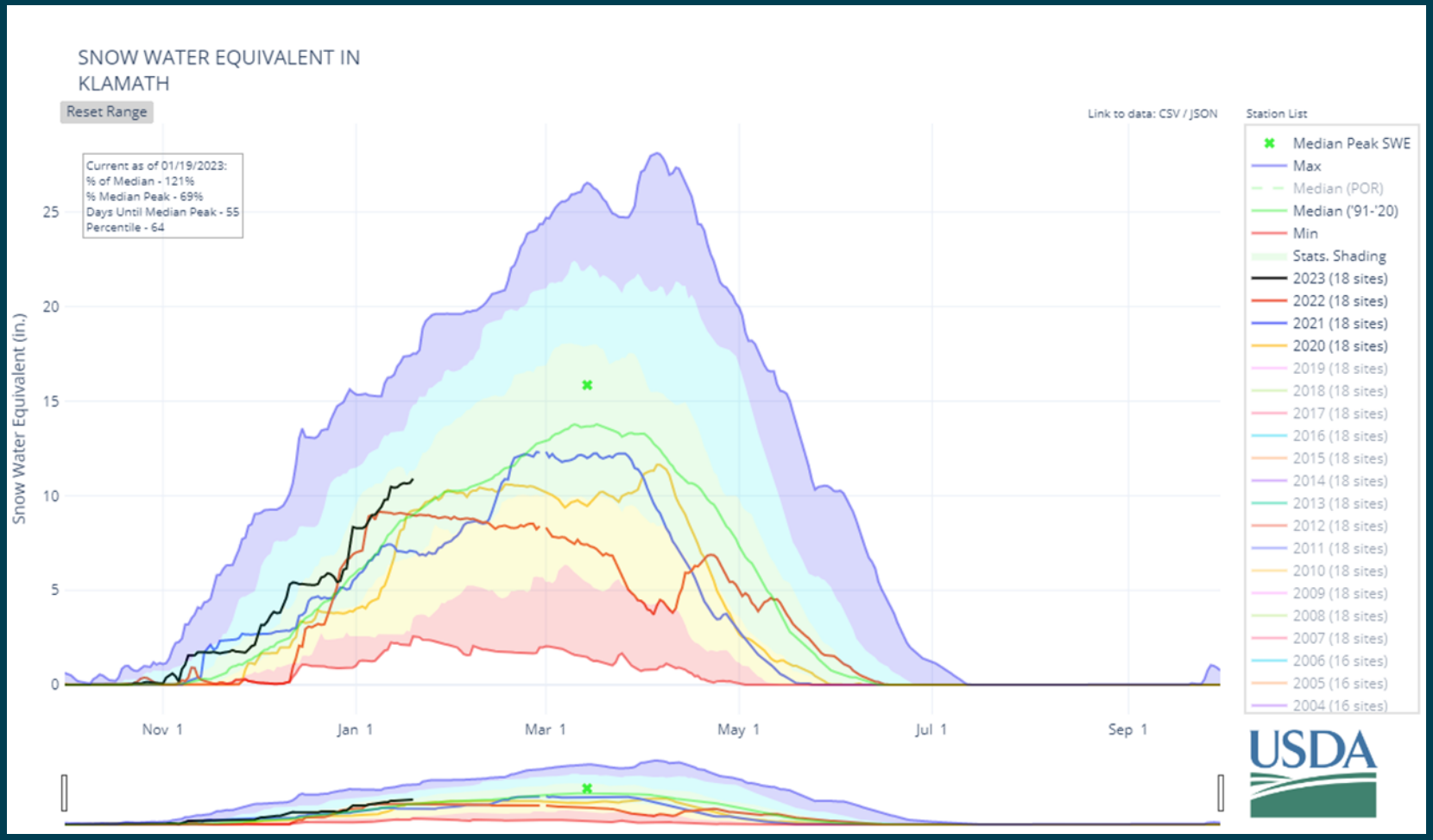

https://www.nrcs.usda.gov/wps/portal/wcc/home/quicklinks/imap

# NRCS Upper Klamath Basin (UKB) HUC-8 Snow Water Equivalent (SWE) WY2023




https://www.nrcs.usda.gov/wps/portal/wcc/home/quicklinks/imap

# NRCS Upper Klamath Basin Snow Water Equivalent (SWE) WY2023- NRCSWY2023 & Last 3 Water Years




https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/WTEQ/assocHUC6/180102_Klamath.html

# Klamath Falls Weather Forecast - NWS
# 19 January 2022

| Today | Tonight | Friday | Friday Night | Saturday | Saturday Night | Sunday | Sunday Night | Monday |
|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |
| Mostly Sunny | Mostly Clear | Sunny | Patchy Freezing Fog | Areas Freezing Fog then Mostly Sunny | Partly Cloudy | Mostly Sunny | Mostly Clear | Sunny |
| High: 36 °F | Low: 10 °F | High: 37 °F | Low: 16 °F | High: 42 °F | Low: 22 °F | High: 42 °F | Low: 20 °F | High: 42 °F |



https://forecast.weather.gov/MapClick.php?lat=42.2292&lon=-121.7842#.YbtneahKjIU

# Klamath Falls Weather Forecast - NWS
# 19 January 2022

## Detailed Forecast

| | |
|---|---|
| **Today** | Mostly sunny, with a high near 36. North northwest wind 3 to 6 mph. |
| **Tonight** | Mostly clear, with a low around 10. North northeast wind 3 to 5 mph. |
| **Friday** | Sunny, with a high near 37. Calm wind. |
| **Friday Night** | Patchy freezing fog after 10pm. Mostly clear, with a low around 16. Calm wind. |
| **Saturday** | Areas of freezing fog before 10am. Mostly sunny, with a high near 42. Light and variable wind. |
| **Saturday Night** | Partly cloudy, with a low around 22. |
| **Sunday** | Mostly sunny, with a high near 42. |
| **Sunday Night** | Mostly clear, with a low around 20. |
| **Monday** | Sunny, with a high near 42. |
| **Monday Night** | Mostly clear, with a low around 21. |
| **Tuesday** | Mostly sunny, with a high near 43. |
| **Tuesday Night** | Mostly clear, with a low around 20. |
| **Wednesday** | Sunny, with a high near 45. |



https://forecast.weather.gov/MapClick.php?lat=42.2292&lon=-121.7842#.YbtneahKjIU

# Orleans Weather Forecast - NWS
# 19 January 2022

| Today | Tonight | Friday | Friday Night | Saturday | Saturday Night | Sunday | Sunday Night | Monday |
|---|---|---|---|---|---|---|---|---|
|  |  |  |  |  |  |  |  |  |
| Areas Frost then Sunny | Mostly Clear then Patchy Fog | Patchy Fog then Sunny | Mostly Clear | Mostly Sunny | Partly Cloudy | Mostly Sunny | Mostly Clear | Sunny |
| High: 46 °F | Low: 26 °F | High: 51 °F | Low: 32 °F | High: 56 °F | Low: 35 °F | High: 55 °F | Low: 34 °F | High: 58 °F |



https://forecast.weather.gov/MapClick.php?lat=41.3026&lon=-123.538#.Ybtn56hKjIU

# Orleans Weather Forecast - NWS
# 19 January 2022

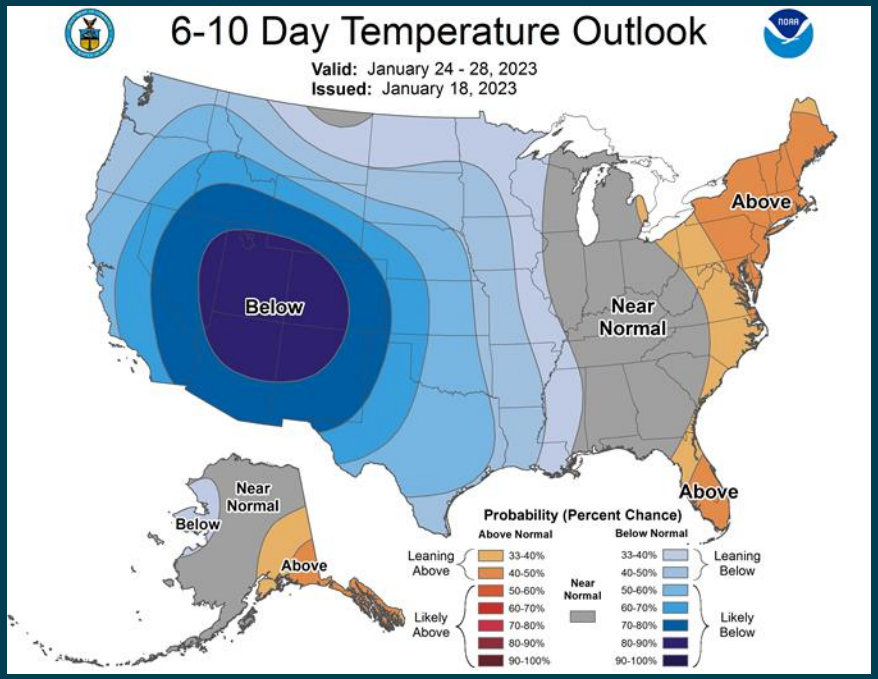
## Detailed Forecast

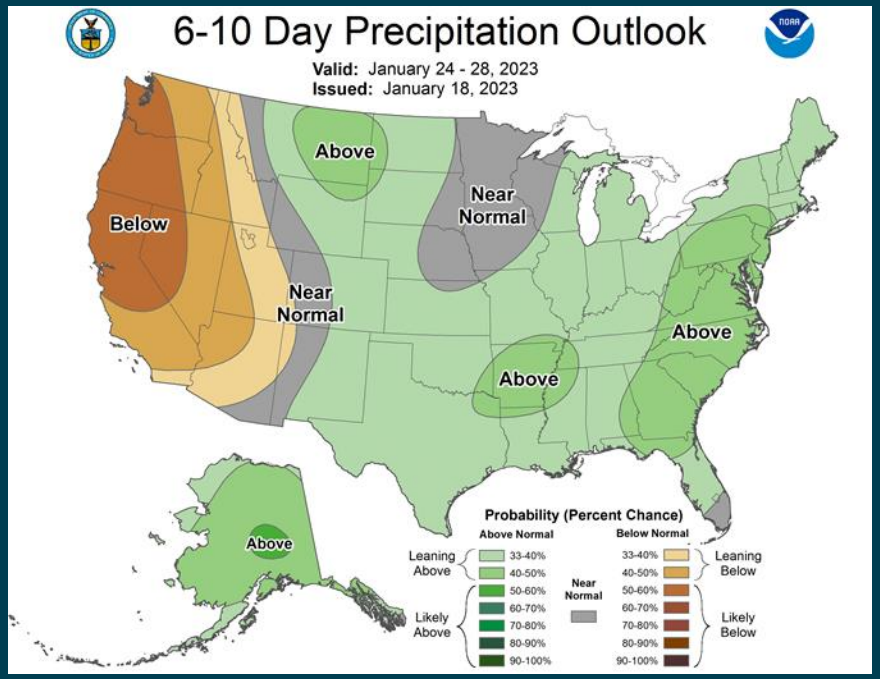
| | |
|---|---|
| **Today** | Areas of frost before 10am. Otherwise, sunny, with a high near 46. Light northeast wind. |
| **Tonight** | Patchy fog after 4am. Otherwise, mostly clear, with a low around 26. North wind 3 to 5 mph. |
| **Friday** | Patchy fog before 10am. Otherwise, partly sunny, then gradually becoming sunny, with a high near 51. Light north northeast wind increasing to 5 to 9 mph in the morning. |
| **Friday Night** | Mostly clear, with a low around 32. Calm wind. |
| **Saturday** | Mostly sunny, with a high near 56. Calm wind. |
| **Saturday Night** | Partly cloudy, with a low around 35. Light east northeast wind. |
| **Sunday** | Mostly sunny, with a high near 55. |
| **Sunday Night** | Mostly clear, with a low around 34. |
| **Monday** | Sunny, with a high near 58. |
| **Monday Night** | Mostly clear, with a low around 38. |
| **Tuesday** | Sunny, with a high near 59. |
| **Tuesday Night** | Mostly clear, with a low around 37. |
| **Wednesday** | Sunny, with a high near 60. |



https://forecast.weather.gov/MapClick.php?lat=41.3026&lon=-123.538#.Ybtn56hKjIU

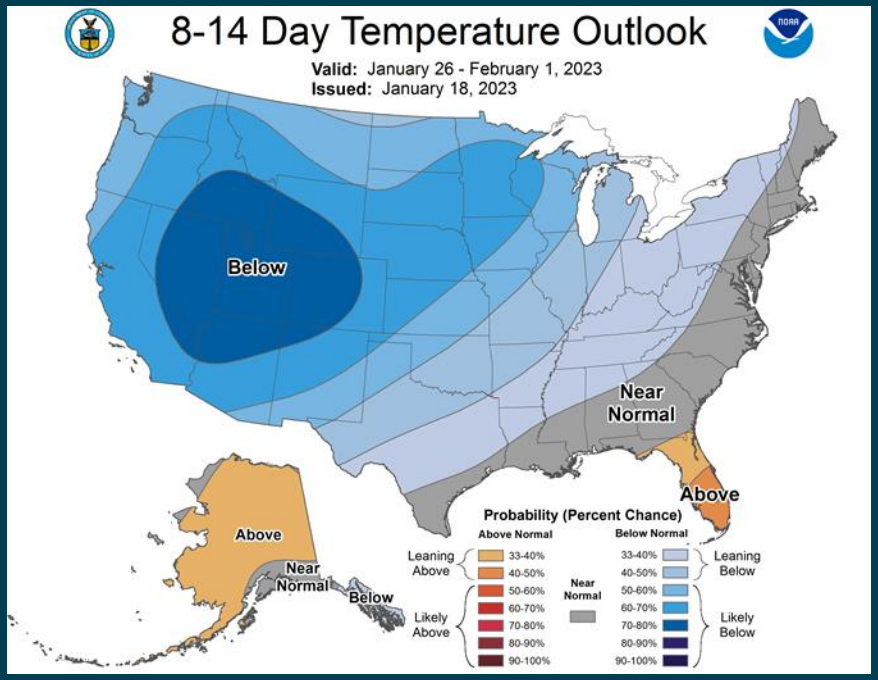
# 6-10 Day Weather Outlook

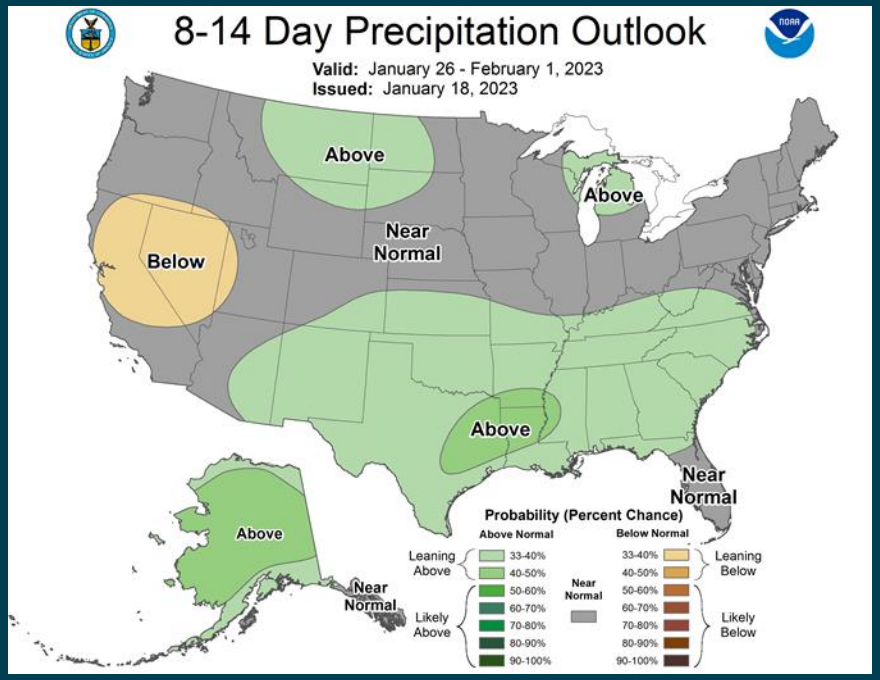



https://www.cpc.ncep.noaa.gov/products/predictions/610day/

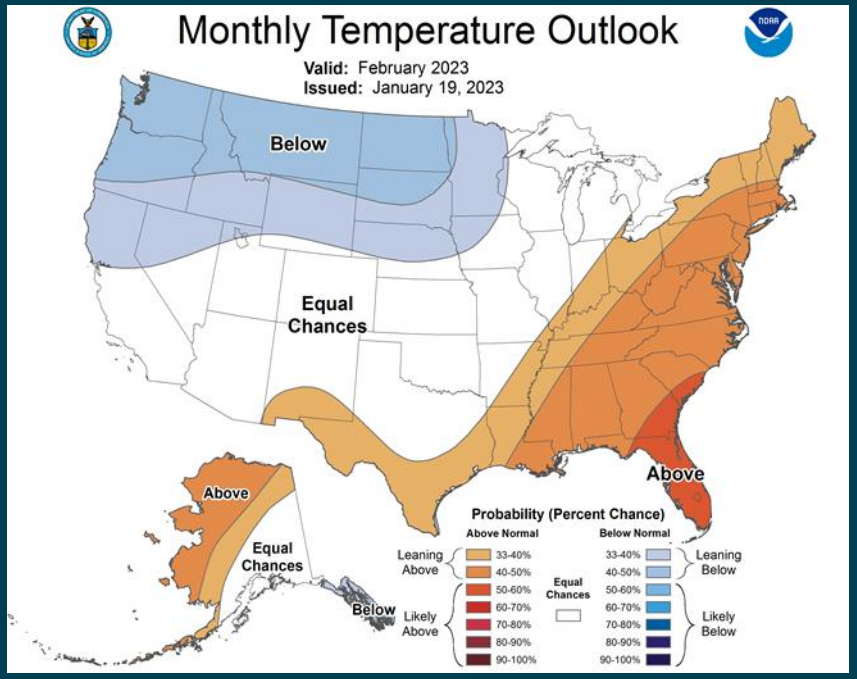
# 8-14 Day Weather Outlook

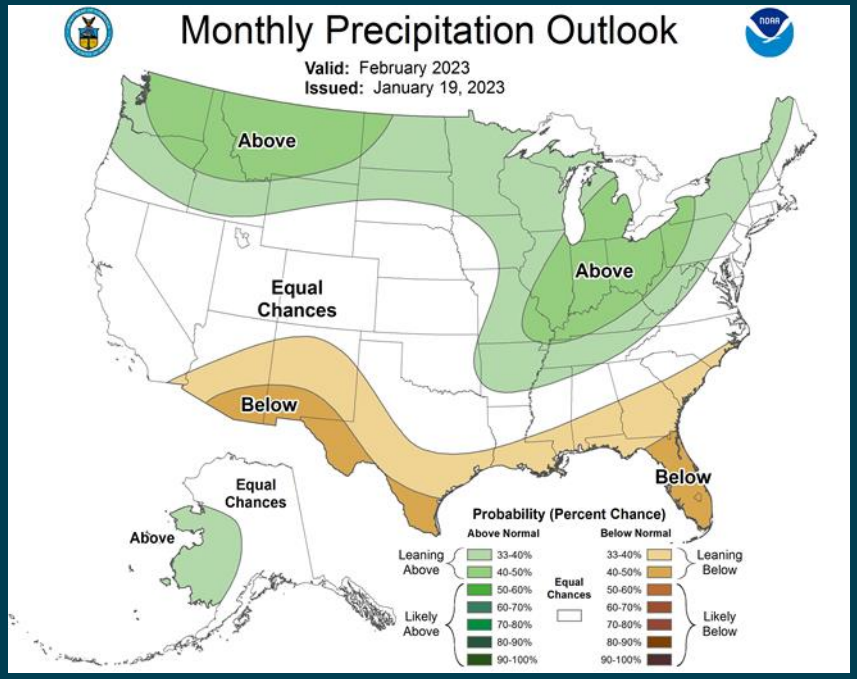



https://www.cpc.ncep.noaa.gov/products/predictions/814day/

# February Weather Outlook

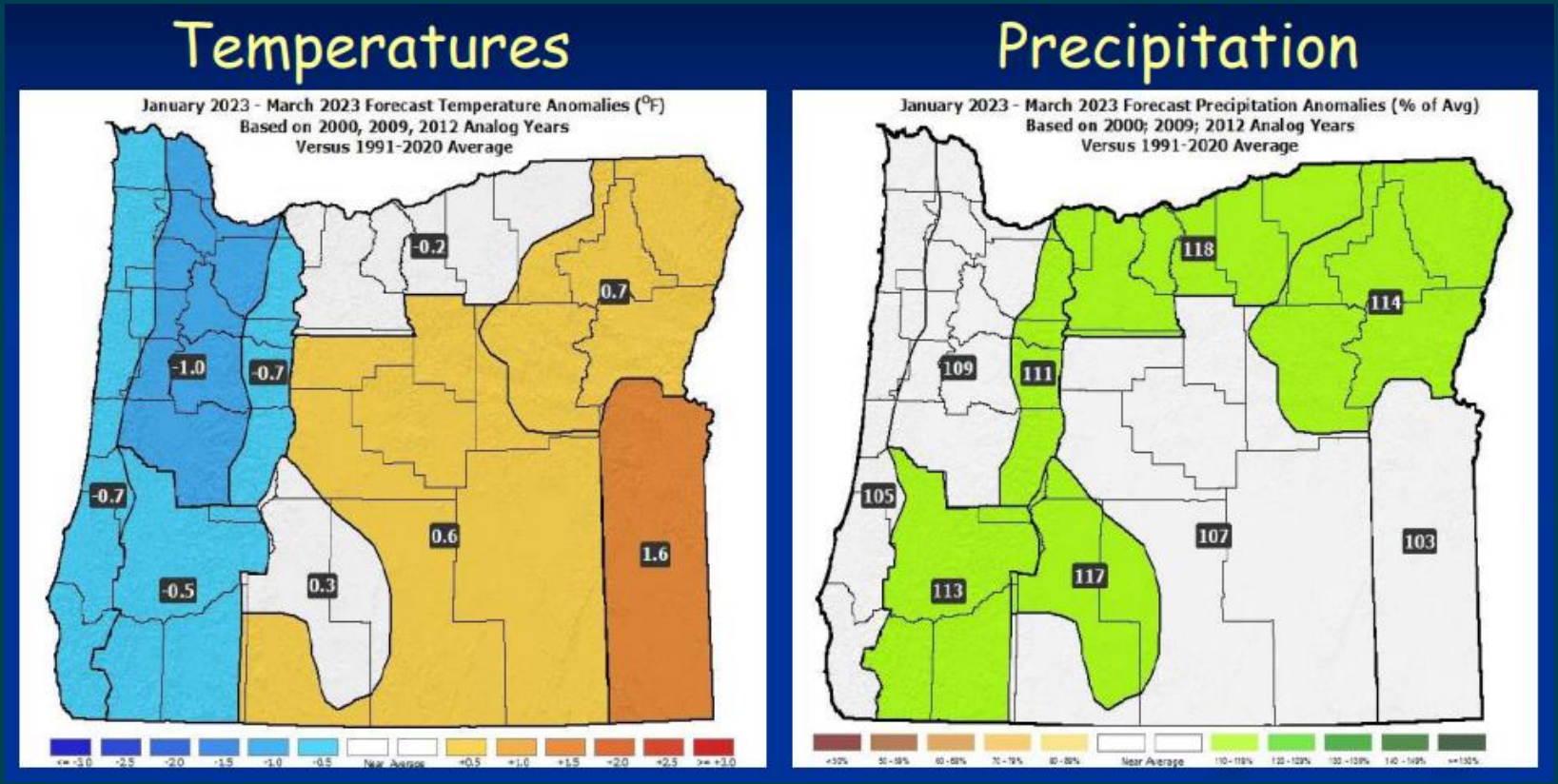





https://www.cpc.ncep.noaa.gov/products/predictions/30day/

# Seasonal Climate Forecast - ODA
# Jan. 2023 – Mar. 2023

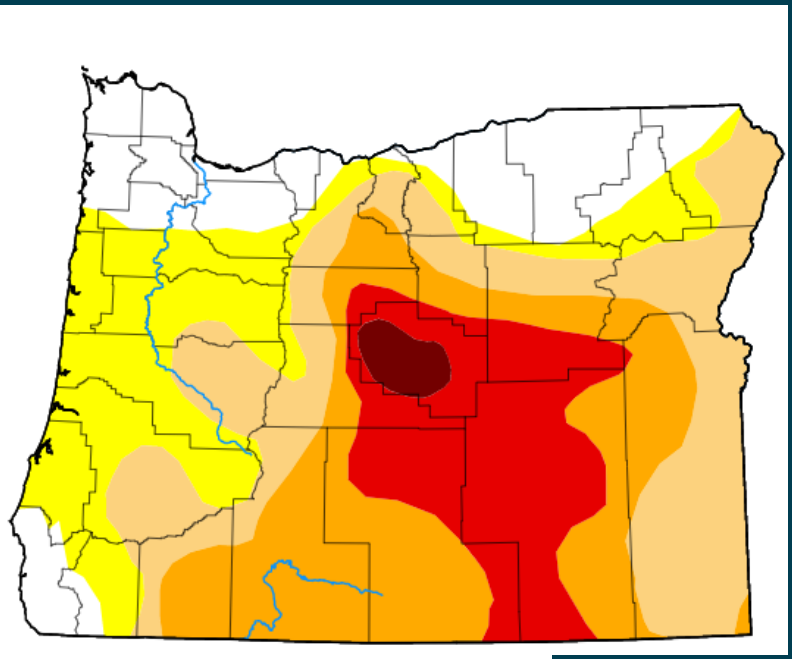


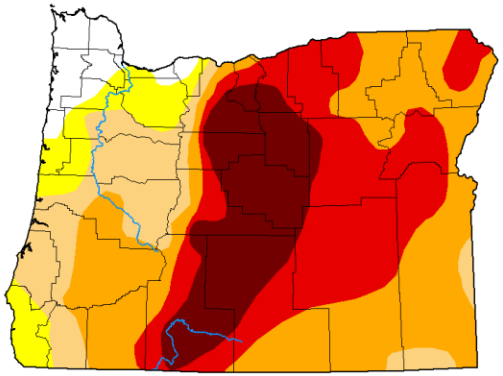

- Large monthly temperature variation is likely. Heightened chances for a cold outbreak in January. Near or above-average precipitation
- Primary analogs (above) didn't have cold snaps. However, January 1957 had a severe cold stretch, so watch out for that possibility



https://www.oregon.gov/oda/programs/NaturalResources/Pages/Weather.aspx

# United States Drought Monitor - Oregon





January 18, 2021

**Map released: Thurs. January 19, 2023**

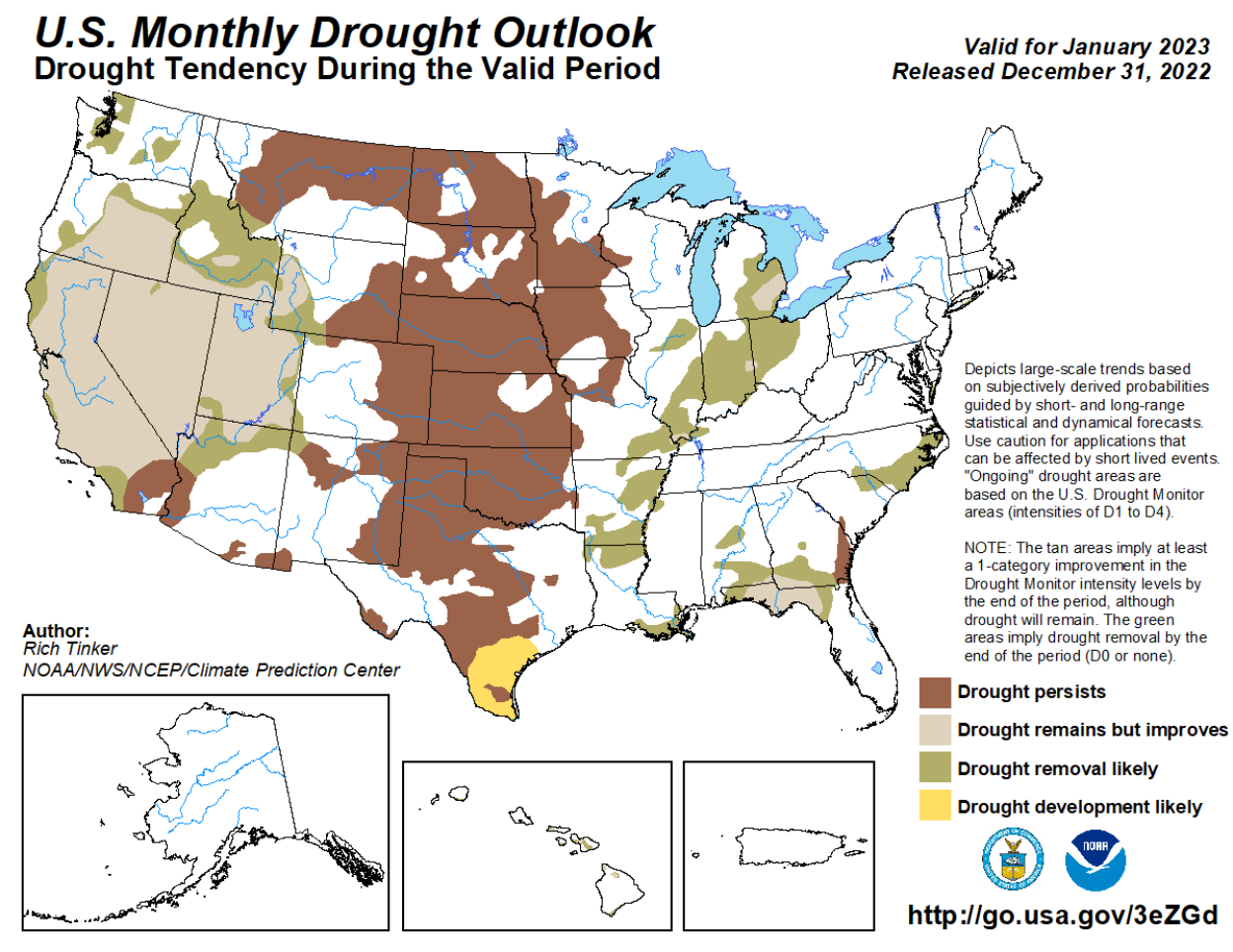
**Data valid: January 17, 2023 at 7 a.m. EST**

**Intensity**

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?OR

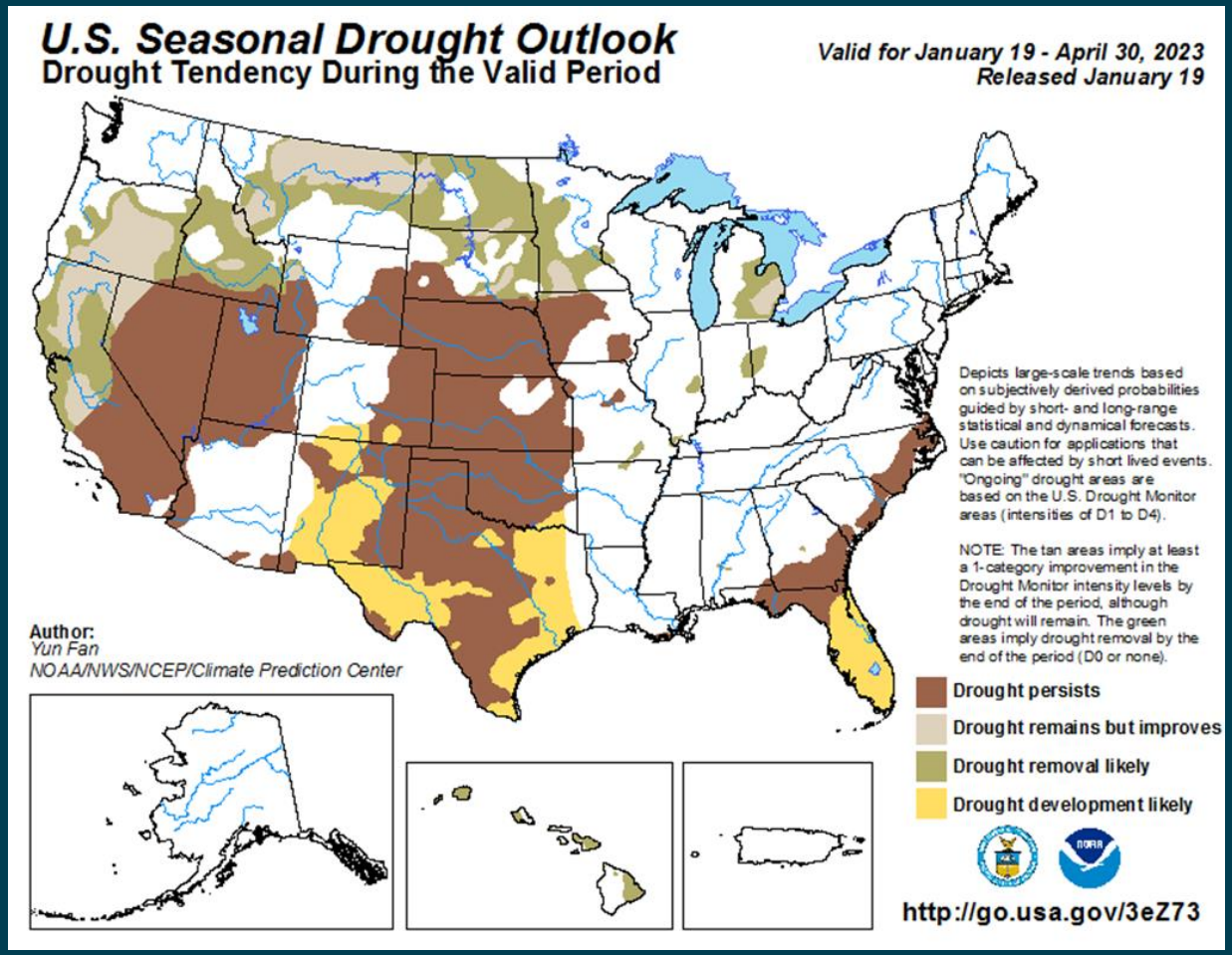
# U.S. Monthly Drought Outlook - January 2023




Next Seasonal Outlook issuance date: **January 31, 2022, at 3:00pm EDT**

https://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php

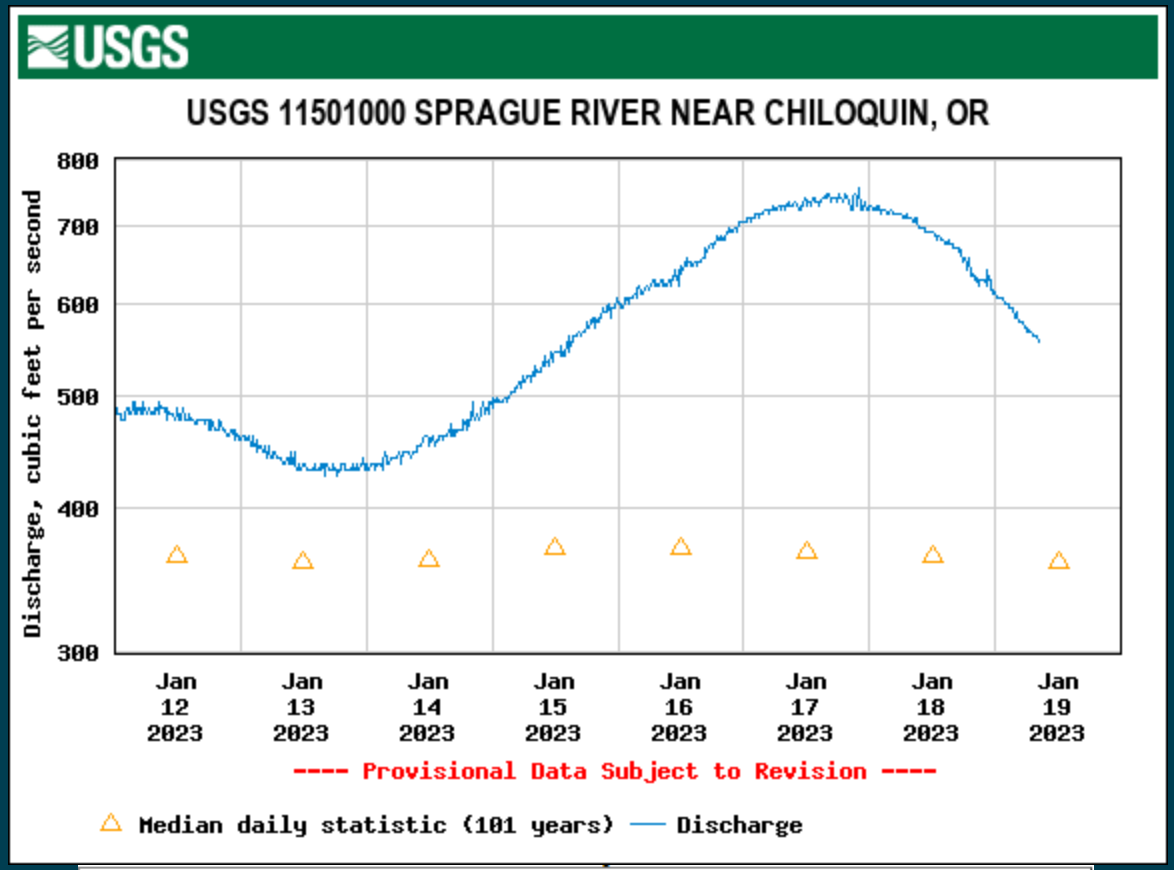
# U.S. Seasonal Drought Outlook
# January 19 – April 30, 2023




Next Seasonal Outlook issuance date: **February 16, 2023, at 8:30am EDT**

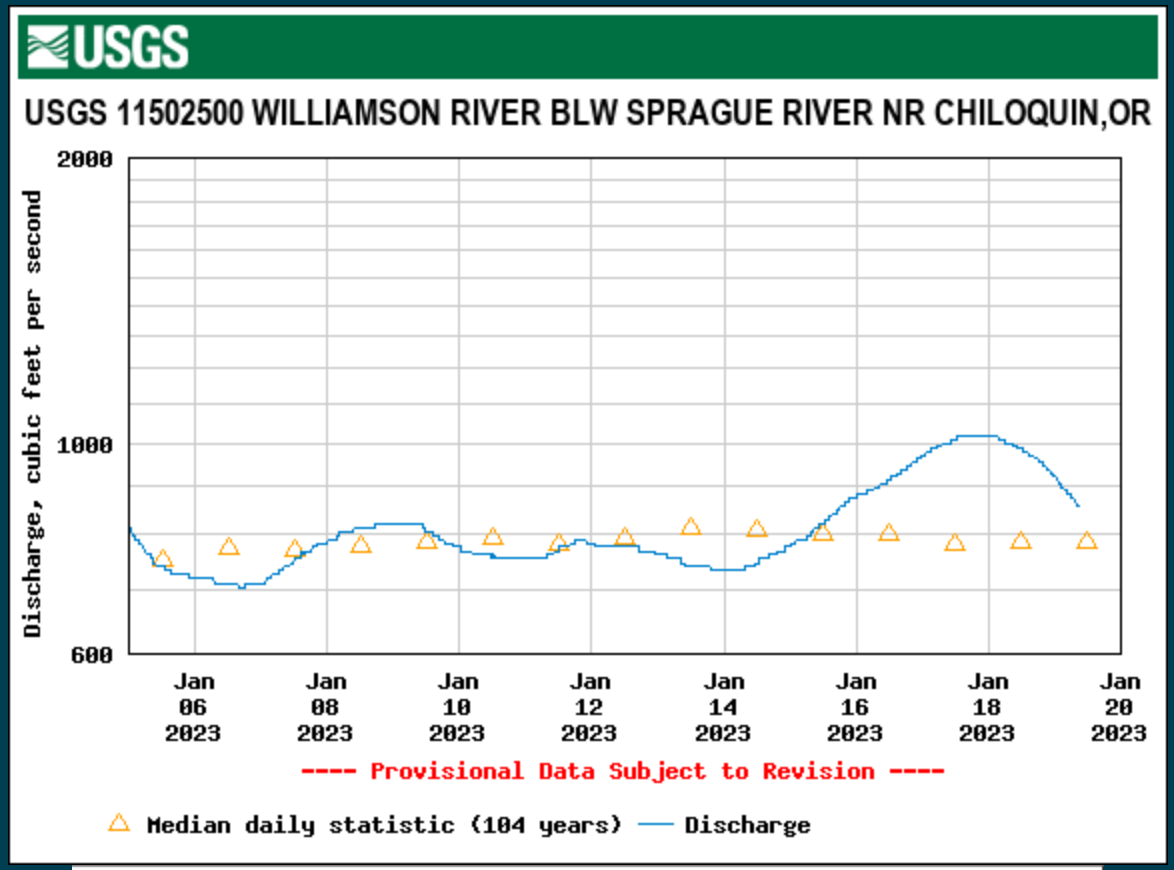
https://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php

# Sprague River - USGS 11501000



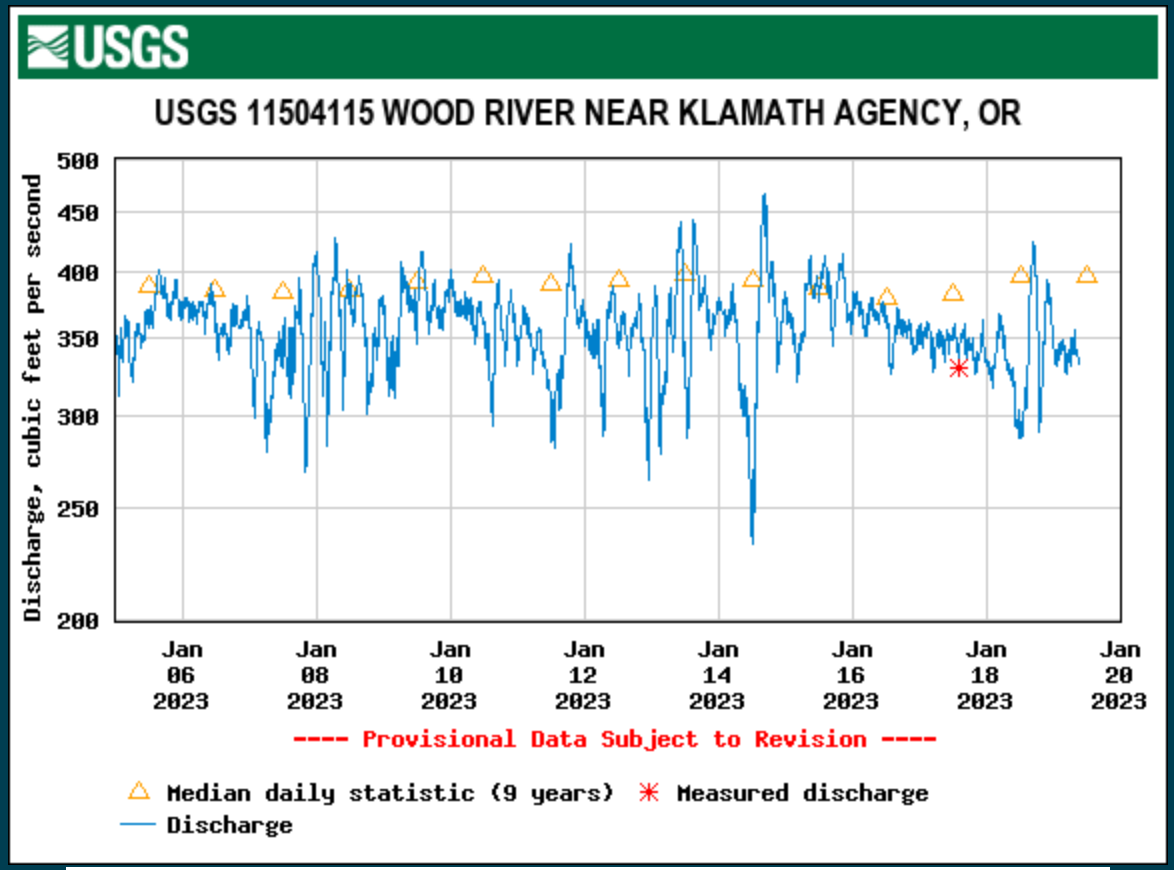

| Min (1935) | 25th percen-tile | Median | 75th percen-tile | Most Recent Instantaneous Value Jan 19 | Mean | Max (1974) |
|---|---|---|---|---|---|---|
| 170 | 298 | 360 | 502 | 557 | 600 | 4840 |

# Williamson River - USGS 11502500



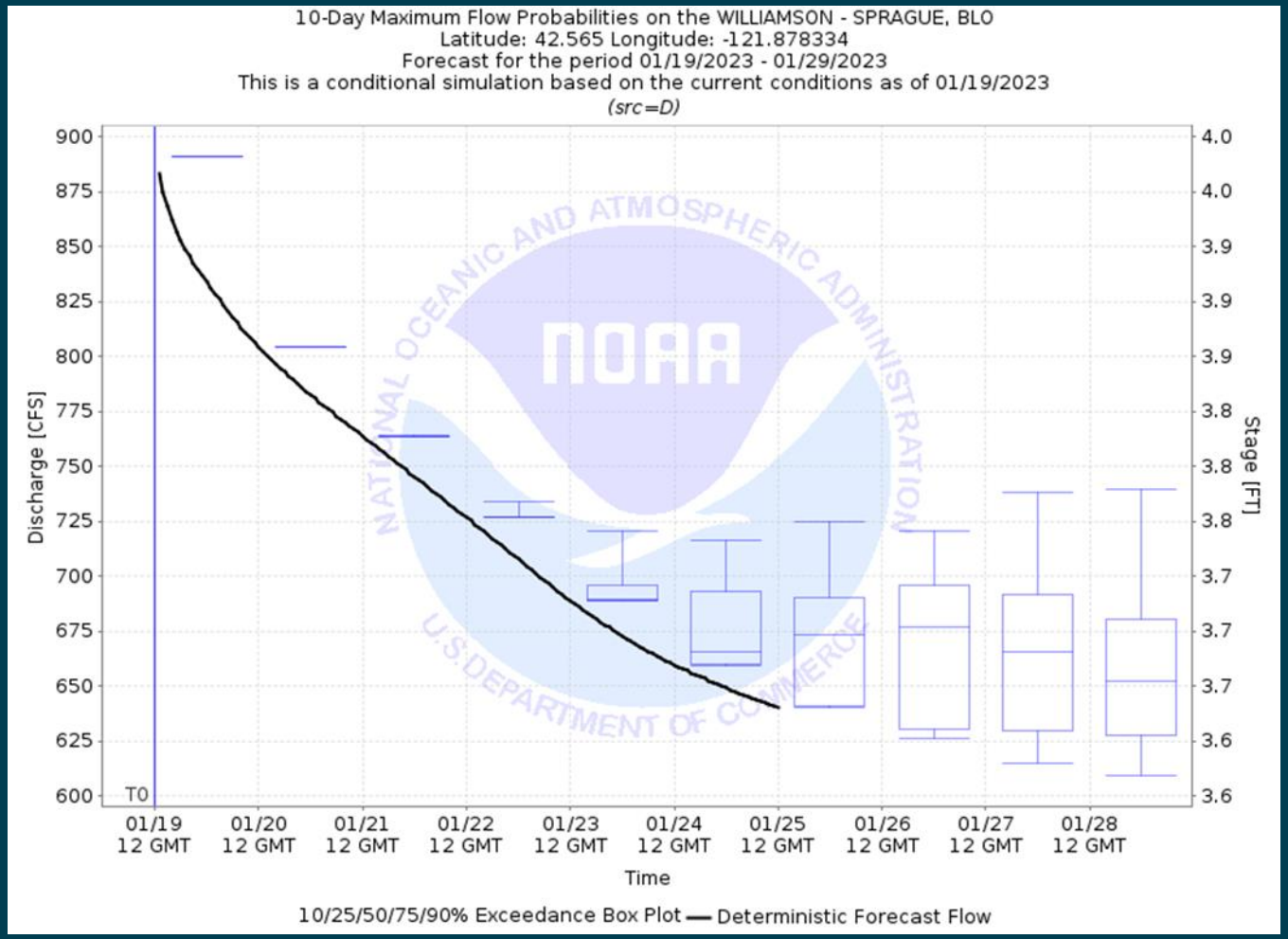

| Min (1935) | 25th percen-tile | Median | Most Recent Instantaneous Value Jan 19 | 75th percen-tile | Mean | Max (1974) |
|---|---|---|---|---|---|---|
| 486 | 636 | 787 | 860 | 1030 | 1050 | 5650 |

# Wood River – USGS 11504115

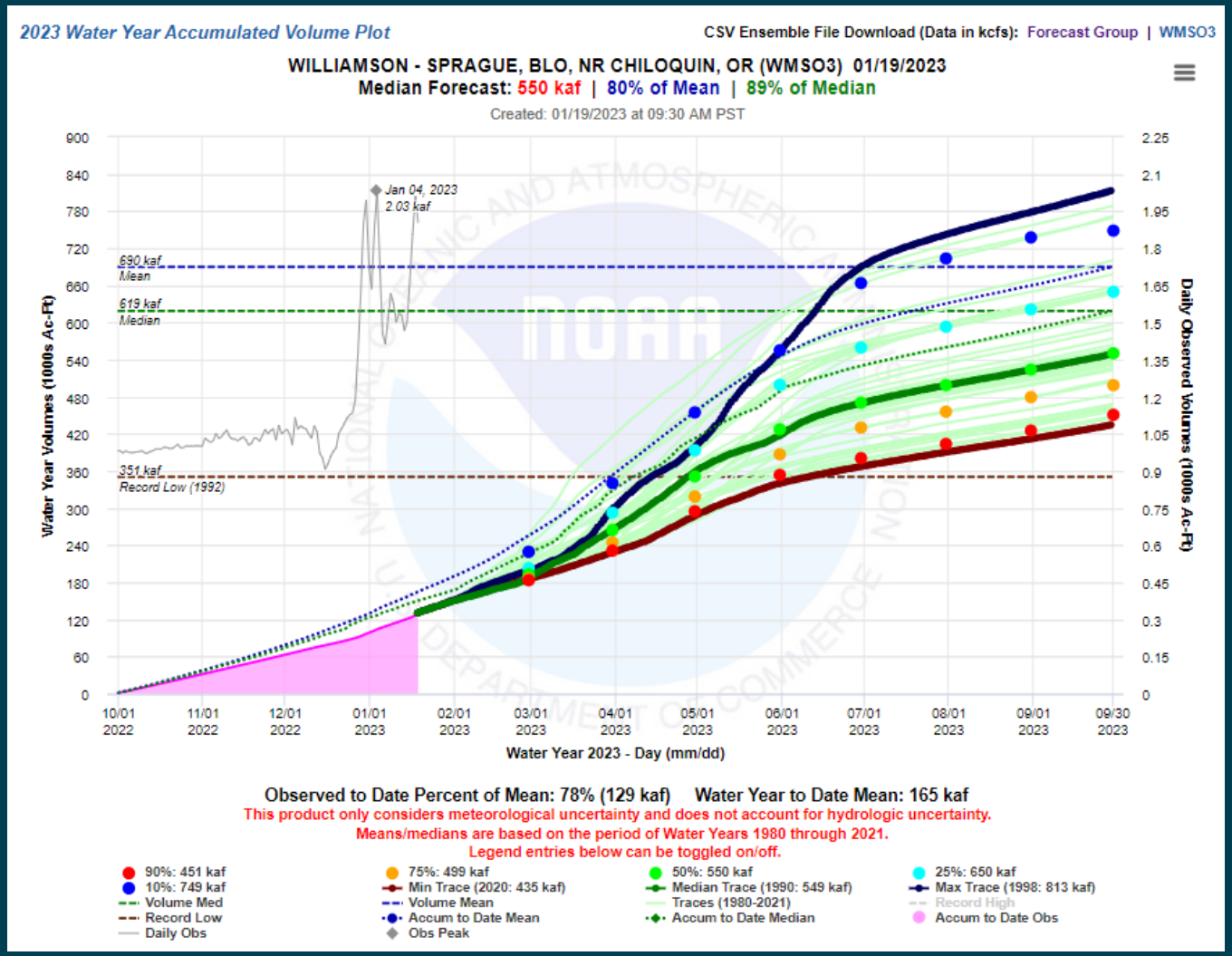



| Most Recent Instantaneous Value Jan 19 | Min (2022) | 25th percen-tile | Median | Mean | 75th percen-tile | Max (2018) |
|---|---|---|---|---|---|---|
| 333 | 333 | 376 | 397 | 408 | 451 | 495 |

# Williamson River Forecast



# Williamson River Forecast – CNRFC
# WY2023



# UKL Cumulative Net Inflow
# WY2023 & Period-of-Record (POR)-to-Date

| WY | Cumulative UKL Net Inflow (TAF) |
|---|---|
| 2014 | 251.08 |
| 2021 | 256.26 |
| 1992 | 265.50 |
| 1991 | 271.09 |
| 2022 | 277.30 |
| 2019 | 280.89 |
| **2023** | **286.25** |
| 2020 | 287.74 |
| 1995 | 290.37 |
| 1994 | 291.28 |
| 2012 | 295.63 |
| 1993 | 300.11 |
| 2010 | 308.06 |
| 2005 | 308.62 |
| 2016 | 309.88 |
| 2018 | 310.48 |
| 2004 | 313.16 |
| 2003 | 318.14 |
| 1990 | 339.01 |
| 1981 | 340.74 |
| 2008 | 341.37 |

% of POR median = 84%
% of POR average = 77%

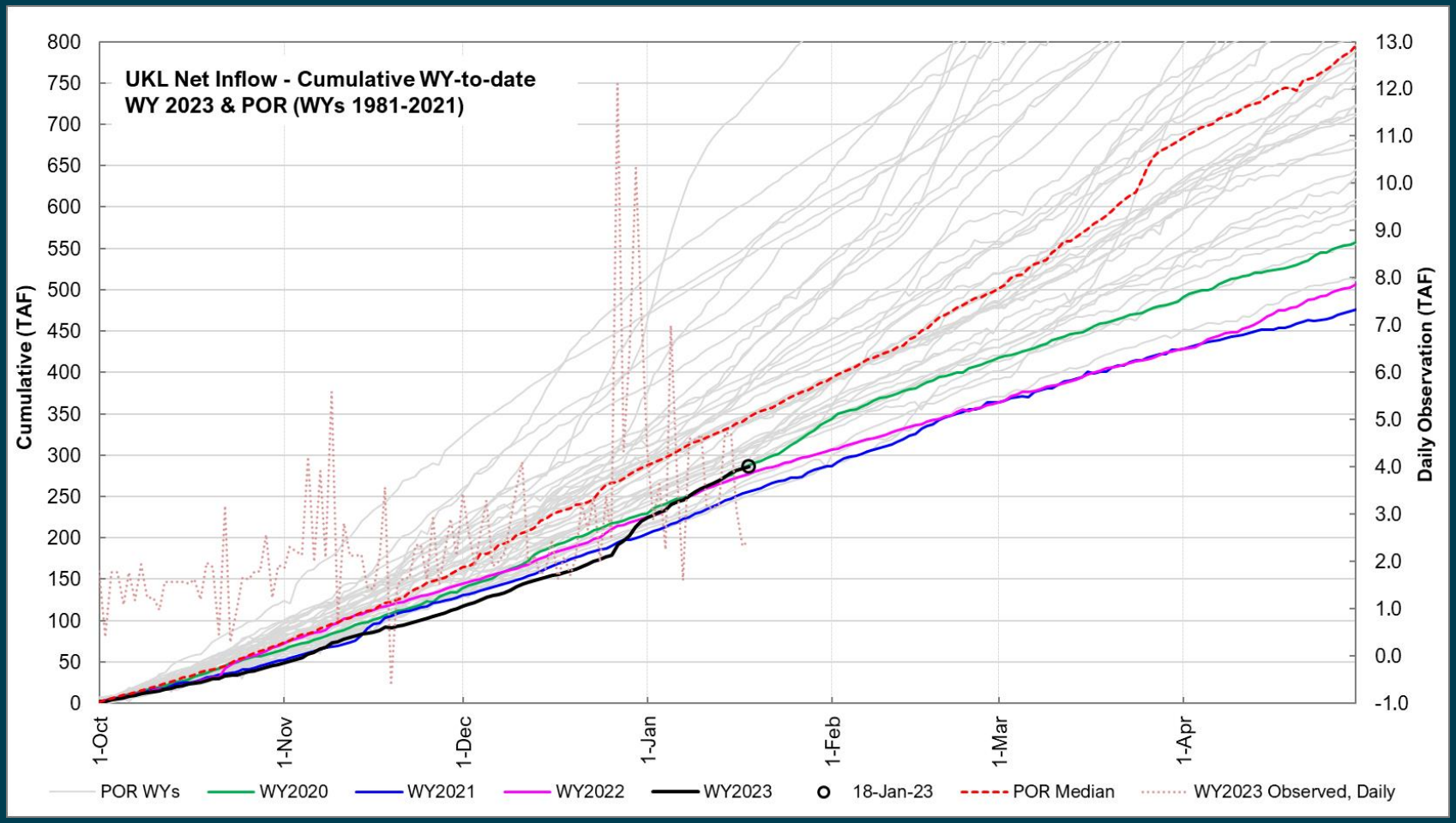
| WY | Cumulative UKL Net Inflow (TAF) |
|---|---|
| 2001 | 341.90 |
| 2015 | 346.22 |
| 2013 | 347.50 |
| 1989 | 348.55 |
| 2009 | 350.28 |
| 2017 | 364.52 |
| 2007 | 376.98 |
| 1988 | 377.14 |
| 2011 | 382.76 |
| 2002 | 386.82 |
| 1998 | 388.43 |
| 1987 | 397.41 |
| 1986 | 425.78 |
| 2000 | 427.52 |
| 1996 | 441.55 |
| 1983 | 459.67 |
| 1999 | 499.05 |
| 1985 | 541.69 |
| 2006 | 547.84 |
| 1982 | 554.53 |
| 1984 | 607.33 |
| 1997 | 727.93 |

POR median



WY2022/2023 data are provisional and subject to revision

# UKL Cumulative Net Inflow
# WY2023 and POR-to-date




WY2022/2023 data are provisional and subject to revision

# Observed UKL Net Inflow
# January 12 – January 18

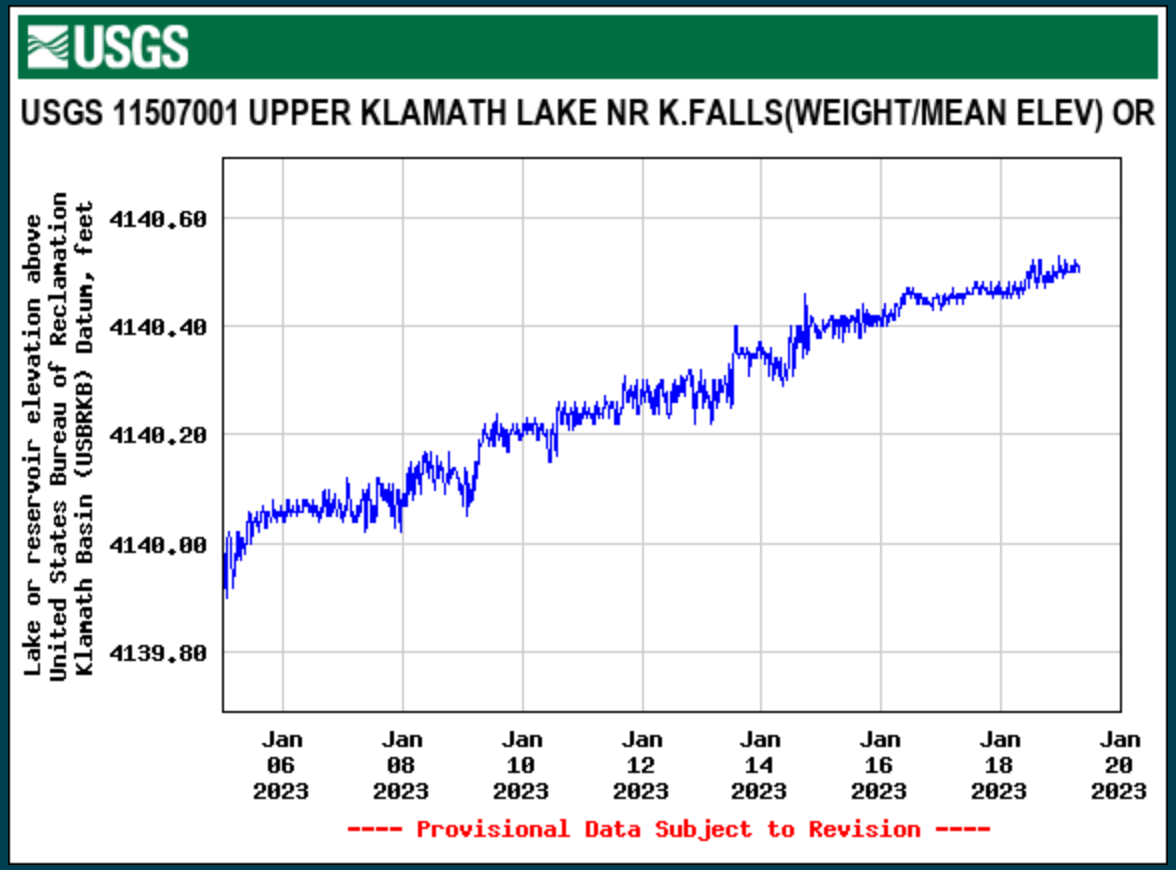
| Date | Observed UKL Net Inflow (CFS) | Observed Percentile** |
|---|---|---|
| 1/12/2023 | 1572 | 26% |
| 1/13/2023 | 1608 | 34% |
| 1/14/2023 | 2380 | 79% |
| 1/15/2023 | 2380 | 76% |
| 1/16/2023 | 1570 | 19% |
| 1/17/2023 | 1171 | 1% |
| 1/18/2023 | 1228 | 4% |
| Average | **1701*** | |

*Above date range: 34th POR percentile (64% exceedance) daily average = 1710 CFS
**POR: WYs 1981-2021



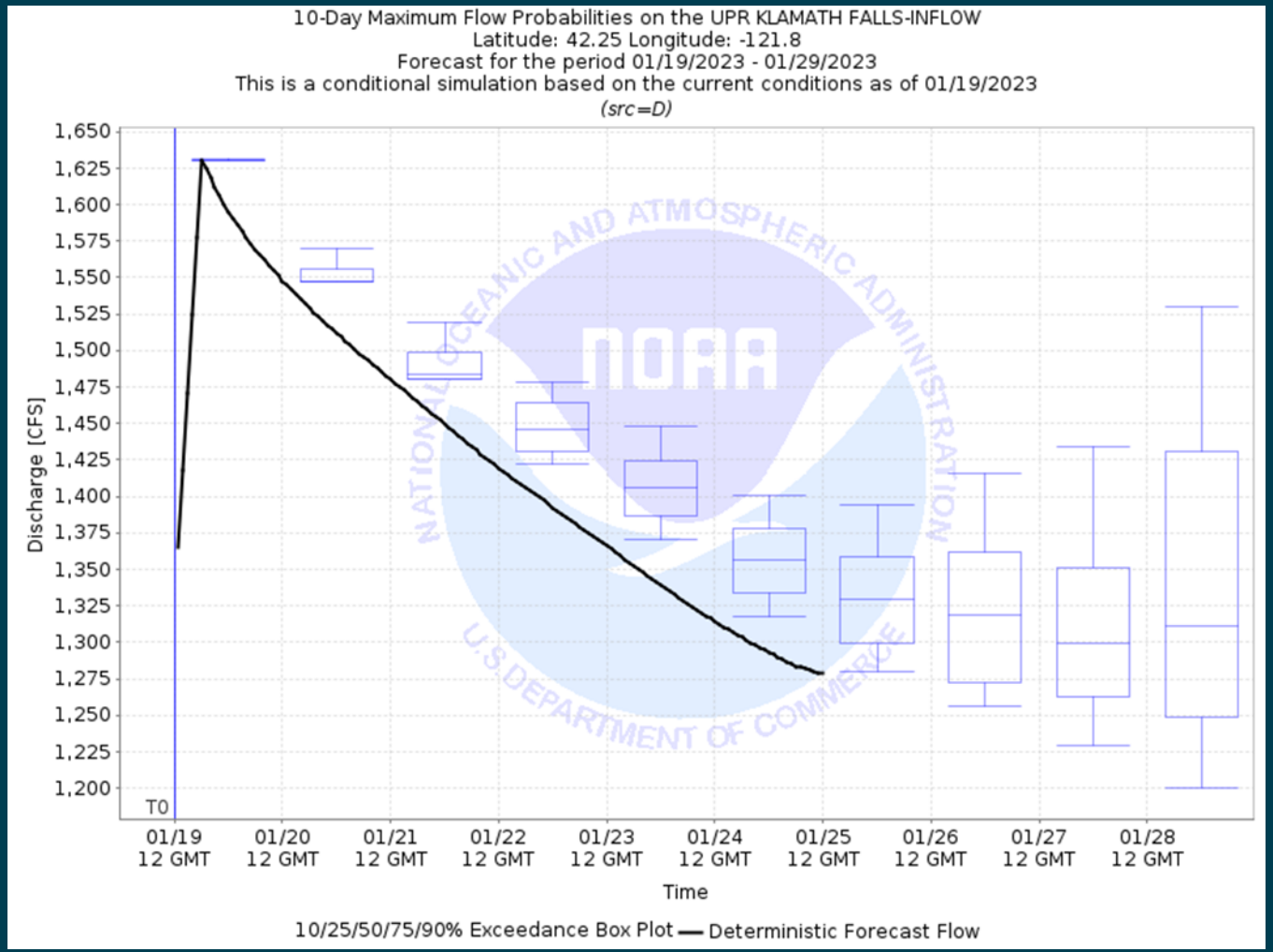
Data are provisional and subject to revision

# UKL Water Surface Elevation
# January 05 – Present Day

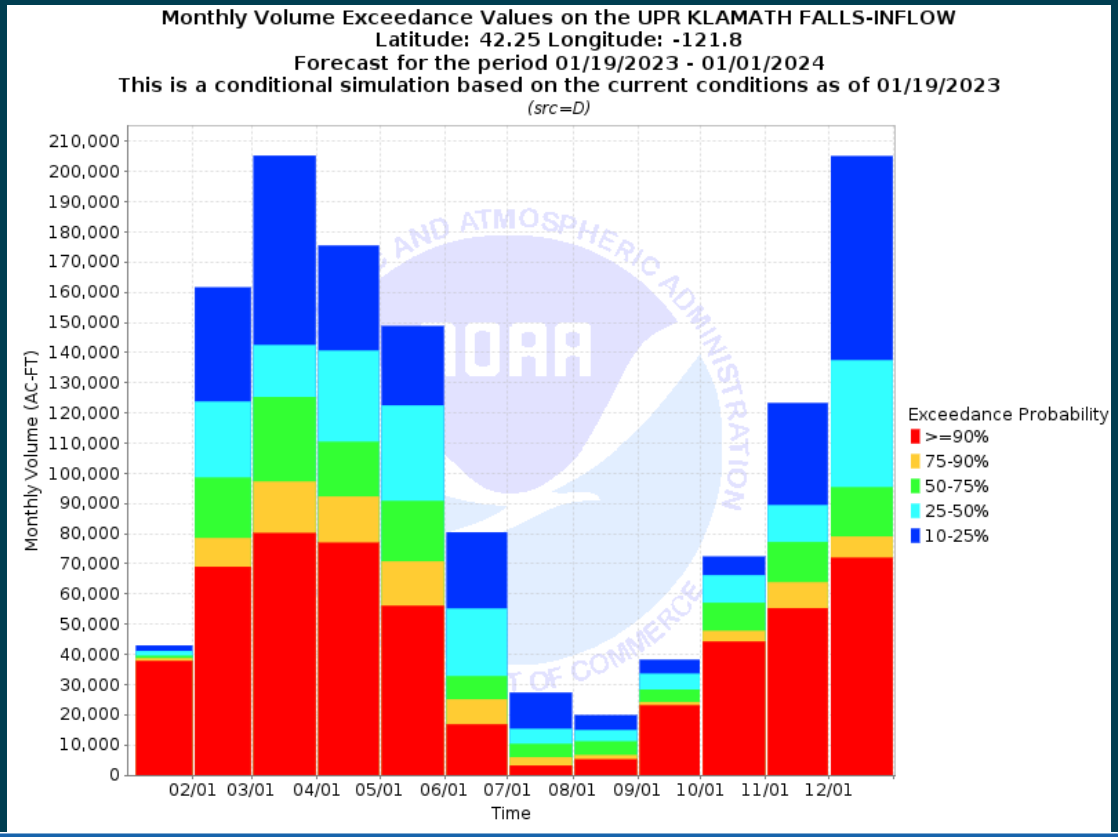



| DATE | ELEVATION (FT) |
|---|---|
| 1/5/2023 | 4140.02 |
| 1/6/2023 | 4140.06 |
| 1/7/2023 | 4140.07 |
| 1/8/2023 | 4140.12 |
| 1/9/2023 | 4140.17 |
| 1/10/2023 | 4140.22 |
| 1/11/2023 | 4140.25 |
| 1/12/2023 | 4140.28 |
| 1/13/2023 | 4140.31 |
| 1/14/2023 | 4140.36 |
| 1/15/2023 | 4140.41 |
| 1/16/2023 | 4140.44 |
| 1/17/2023 | 4140.46 |
| 1/18/2023 | 4140.48 |

# Upper Klamath Lake (UKL) Net Inflow Forecast – CNRFC 10-Day



# Upper Klamath Lake (UKL) Net Inflow Forecast – CNRFC WY2023




| Monthly Streamflow Volume (1000s of Acre-Feet)<br>Data Updated: Jan 19 2023 at 9:28 AM PST | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Prob | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 10% | 118.2 | 161.5 | 205.2 | 175.4 | 148.7 | 80.5 | 27.3 | 19.7 | 38.2 | 72.3 | 123.2 | 205.0 |
| 25% | 116.3 | 123.7 | 142.4 | 140.6 | 122.5 | 55.1 | 15.2 | 14.8 | 33.5 | 66.2 | 89.4 | 137.4 |
| 50% | 114.6 | 98.5 | 125.3 | 110.3 | 90.8 | 32.7 | 10.3 | 11.0 | 28.4 | 57.1 | 77.2 | 95.3 |
| 75% | 113.9 | 78.5 | 97.2 | 92.3 | 70.8 | 25.1 | 5.9 | 6.5 | 24.2 | 47.7 | 63.8 | 79.0 |
| 90% | 113.0 | 69.0 | 80.1 | 76.9 | 56.0 | 16.8 | 3.2 | 5.1 | 23.0 | 44.2 | 55.3 | 71.9 |
| Mean | 136.3 | 136.1 | 171.9 | 152.0 | 124.5 | 62.0 | 22.8 | 25.3 | 46.5 | 72.9 | 97.6 | 124.9 |
| %Mean | 84.1 | 72.4 | 72.9 | 72.6 | 72.9 | 52.7 | 45.2 | 43.5 | 61.1 | 78.3 | 79.1 | 76.3 |

# NRCS Jan 1 Klamath River Basin (KRB) Water Supply Forecast (WSF)

USDA NRCS National Water & Climate Center
 * - DATA CURRENT AS OF: January 05, 2023 09:41:05 AM
   - Based on January 01, 2023 forecast values

KLAMATH RIVER BASIN

| Forecast Point | period | 50% (KAF) | % of med | max (KAF) | 30% (KAF) | 70% (KAF) | min (KAF) | 30-yr med |
|---|---|---|---|---|---|---|---|---|
| Gerber Reservoir Inflow (2) | JAN-JUN | 60 | 182 | 86 | 71 | 50 | 35 | 33 |
| Sprague R nr Chiloquin | JAN-SEP | 370 | 142 | 585 | 450 | 295 | 200 | 260 |
| | MAR-SEP | 280 | 130 | 465 | 350 | 215 | 140 | 215 |
| Williamson R bl Sprague R nr Chiloquin | JAN-SEP | 570 | 121 | 780 | 655 | 480 | 355 | 470 |
| | MAR-SEP | 435 | 121 | 620 | 510 | 360 | 250 | 360 |
| Upper Klamath Lake Inflow (2) | JAN-SEP | 900 | 119 | 1410 | 1050 | 765 | 505 | 755 |
| | MAR-SEP | 615 | 118 | 1030 | 735 | 505 | 305 | 520 |

Max (10%), 30%, 50%, 70% and Min (90%) chance that actual volume will exceed forecast.
Medians are for the 1991-2020 period.
All volumes are in thousands of acre-feet.

footnotes:
1) Max and Min are 5% and 95% chance that actual volume will exceed forecast
2) streamflow is adjusted for upstream storage

# NRCS Jan Mid-Month KRB WSF

KLAMATH RIVER BASIN

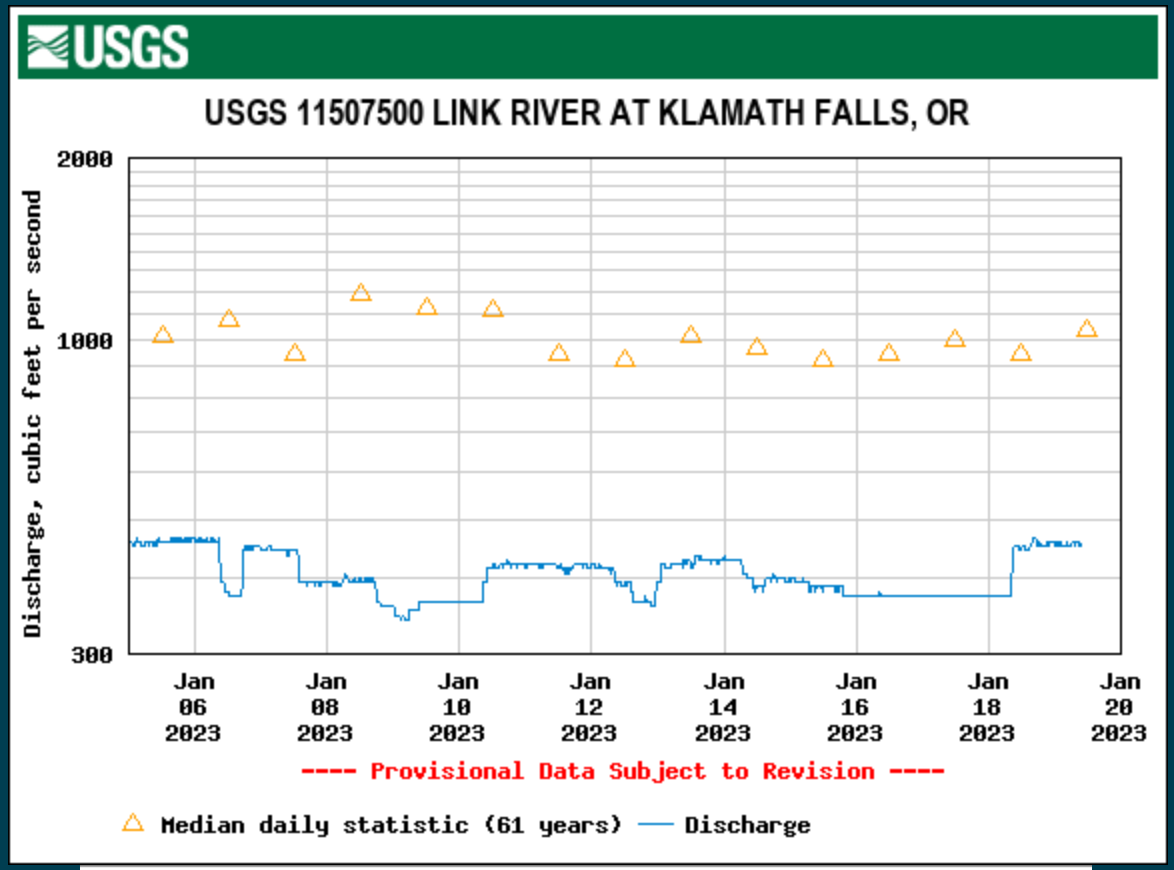
| Forecast Point | period | 50% (KAF) | % of med | max (KAF) | 30% (KAF) | 70% (KAF) | min (KAF) | 30-yr med |
|---|---|---|---|---|---|---|---|---|
| Sprague R nr Chiloquin | FEB-SEP | 330 | 138 | 505 | 395 | 270 | 191 | 240 |
| | MAR-SEP | 285 | 133 | 445 | 345 | 230 | 162 | 215 |
| Williamson R bl Sprague R nr Chiloquin | FEB-SEP | 500 | 119 | 680 | 575 | 430 | 325 | 420 |
| | MAR-SEP | 435 | 121 | 590 | 500 | 370 | 275 | 360 |
| Upper Klamath Lake Inflow (2) | FEB-SEP | 750 | 120 | 1150 | 865 | 640 | 430 | 625 |
| | MAR-SEP | 615 | 118 | 970 | 715 | 520 | 340 | 520 |

Max (10%), 30%, 50%, 70% and Min (90%) chance that actual volume will exceed forecast.
Medians are for the 1991-2020 period.
All volumes are in thousands of acre-feet.

footnotes:
1) Max and Min are 5% and 95% chance that actual volume will exceed forecast
2) streamflow is adjusted for upstream storage

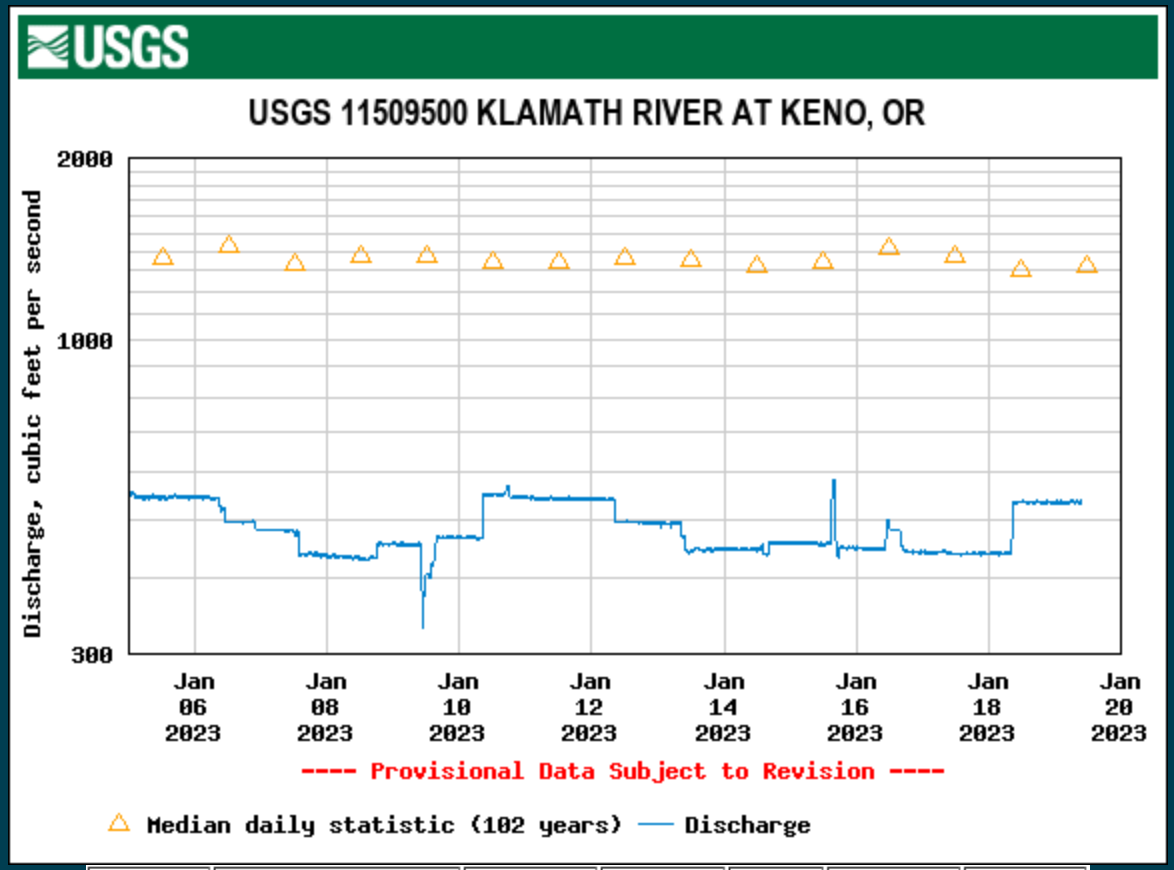
The net outcome remains, overall, a current best-estimate prediction of significantly above-normal spring-summer streamflow volumes reflecting a generally well above-normal mountain snowpack, with some basin-to-basin variability. Please note, however, that early-season forecasts like this January 15 prediction have comparatively low skill, as much of the winter-spring snowpack accumulation, the main source of prediction skill in operational WSF models, has yet to occur. This forecast uncertainty is reflected in the comparatively wide prediction intervals (given as the stated 10%, 30%, 70%, and 90% exceedance flows in the attached file) around the best estimate. Forecast product users should bear those uncertainty estimates in mind when interpreting the WSFs and using them for water resource decision-making.

# Link River Dam- USGS 11507500



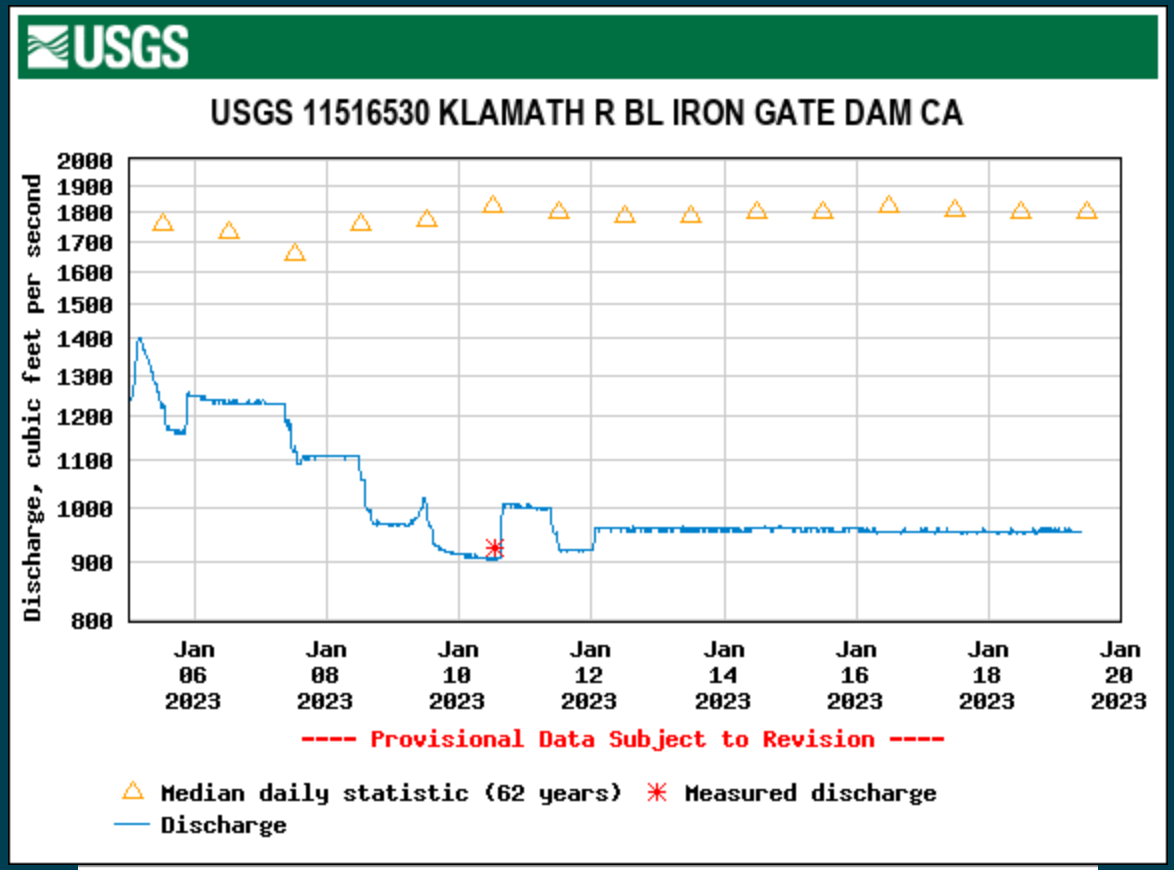

| Min (1935) | 25th percen-tile | Median | Most Recent Instantaneous Value Jan 19 | 75th percen-tile | Mean | Max (1974) |
|---|---|---|---|---|---|---|
| 486 | 636 | 787 | 860 | 1030 | 1050 | 5650 |

# Keno Dam – USGS 11509500



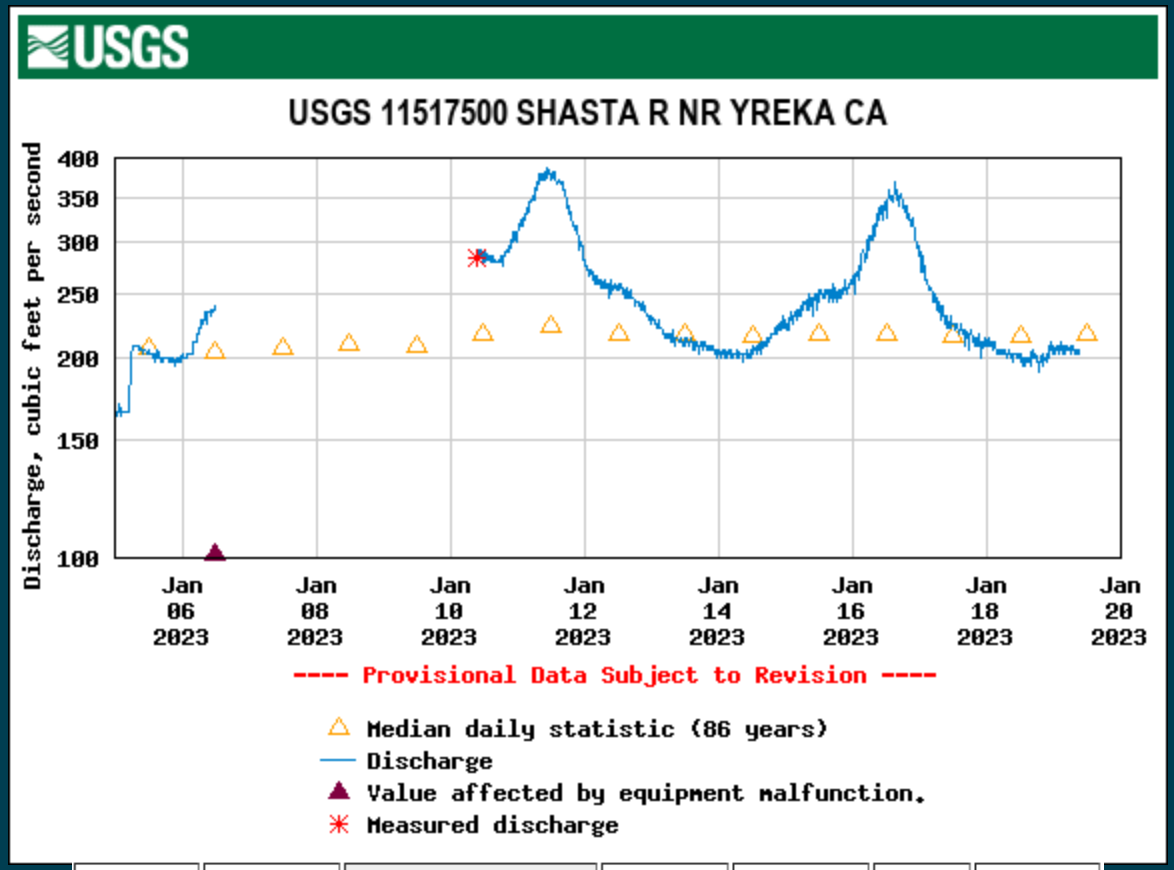

| Min (1991) | Most Recent Instantaneous Value Jan 19 | 25th percen-tile | Median | Mean | 75th percen-tile | Max (1965) |
|---|---|---|---|---|---|---|
| 368 | 537 | 810 | 1320 | 1780 | 2440 | 7700 |

# Iron Gate Dam – USGS 11516530



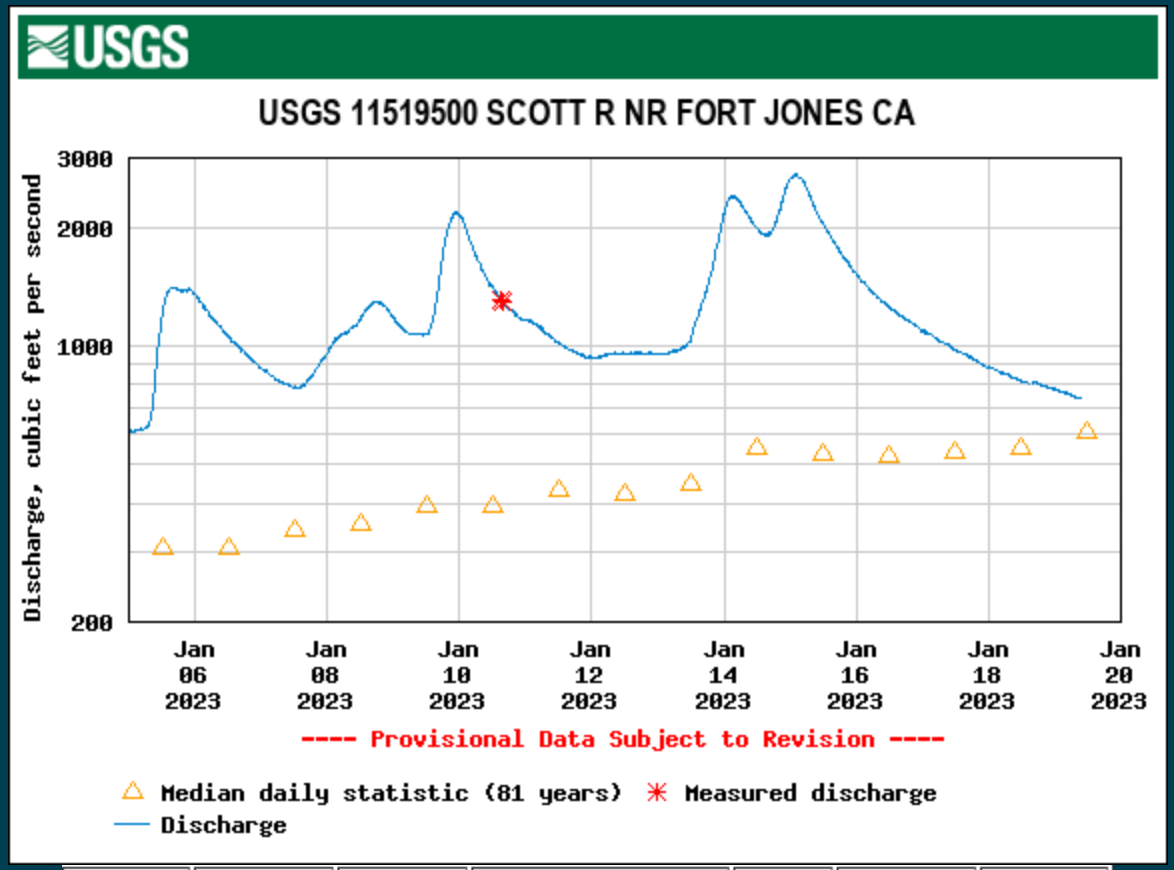

| Min (1991) | Most Recent Instantaneous Value Jan 19 | 25th percen-tile | Median | Mean | 75th percen-tile | Max (1974) |
|---|---|---|---|---|---|---|
| 755 | 954 | 1310 | 1800 | 2540 | 3150 | 9610 |

# Shasta River – USGS 11517500



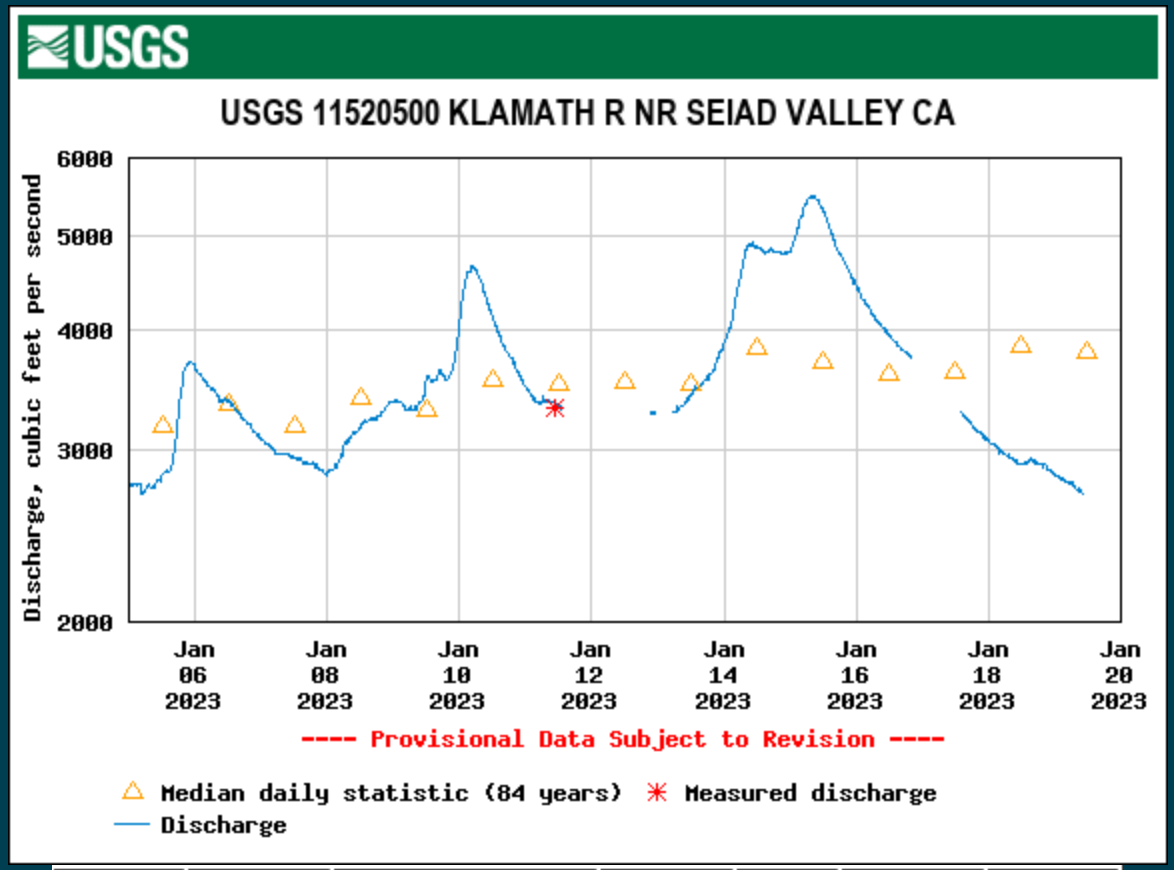

| Min (1937) | 25th percen-tile | Most Recent Instantaneous Value Jan 19 | Median | 75th percen-tile | Mean | Max (1974) |
|---|---|---|---|---|---|---|
| 108 | 180 | 205 | 217 | 350 | 357 | 2950 |

# Scott River – USGS 11519500



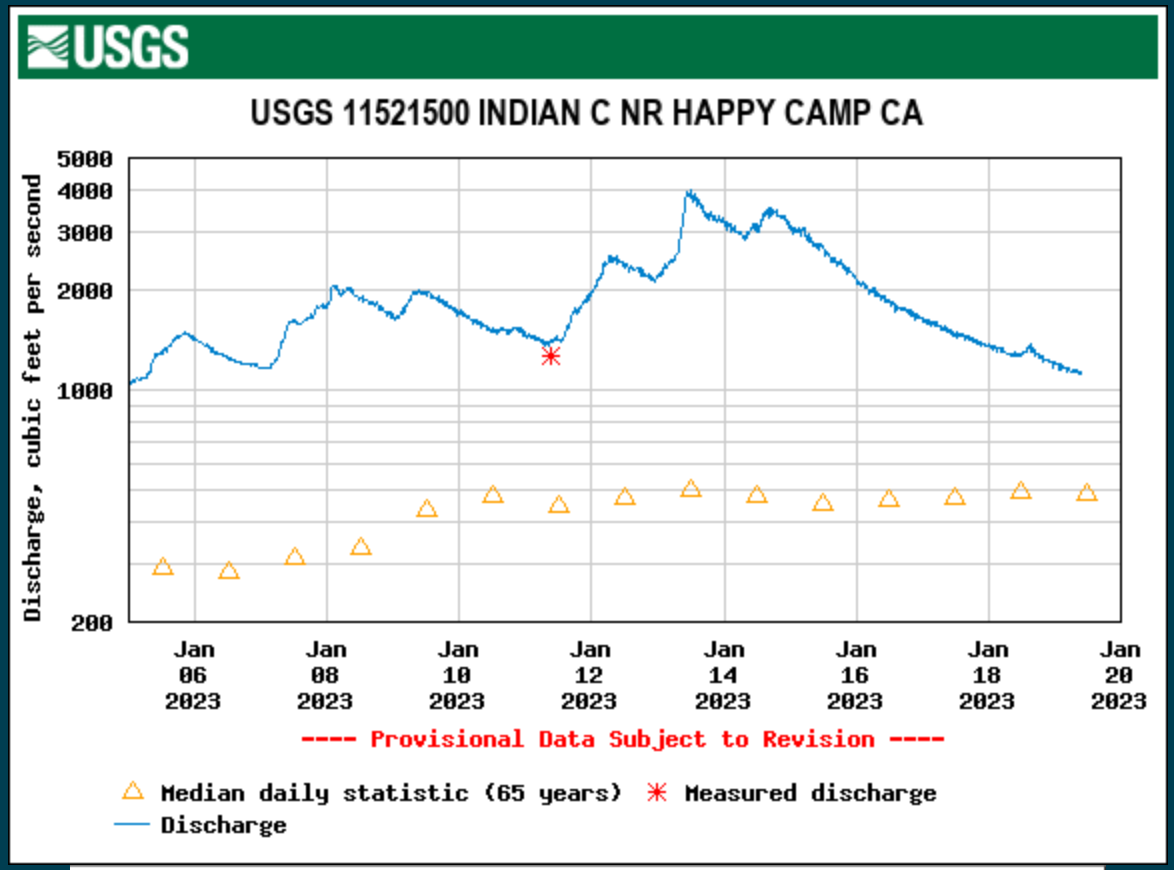

| Min (2014) | 25th percen-tile | Median | Most Recent Instantaneous Value Jan 19 | Mean | 75th percen-tile | Max (1953) |
|---|---|---|---|---|---|---|
| 55.9 | 266 | 609 | 742 | 1230 | 1270 | 12400 |

# Klamath River – USGS 11520500



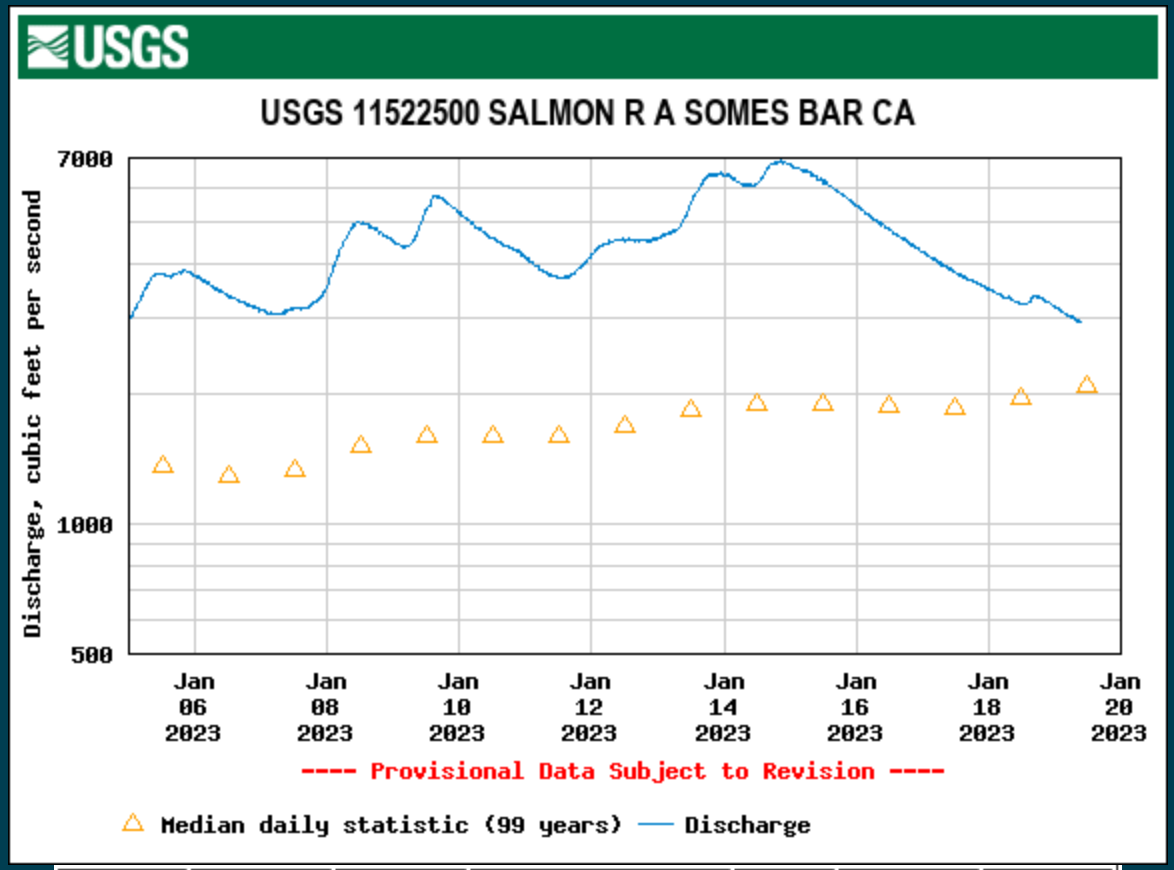

| Min (2014) | 25th percen-tile | Most Recent Instantaneous Value Jan 19 | Median | Mean | 75th percen-tile | Max (1953) |
|---|---|---|---|---|---|---|
| 1300 | 2480 | 2730 | 3800 | 5980 | 6250 | 40100 |

# Indian Creek – USGS 11521500



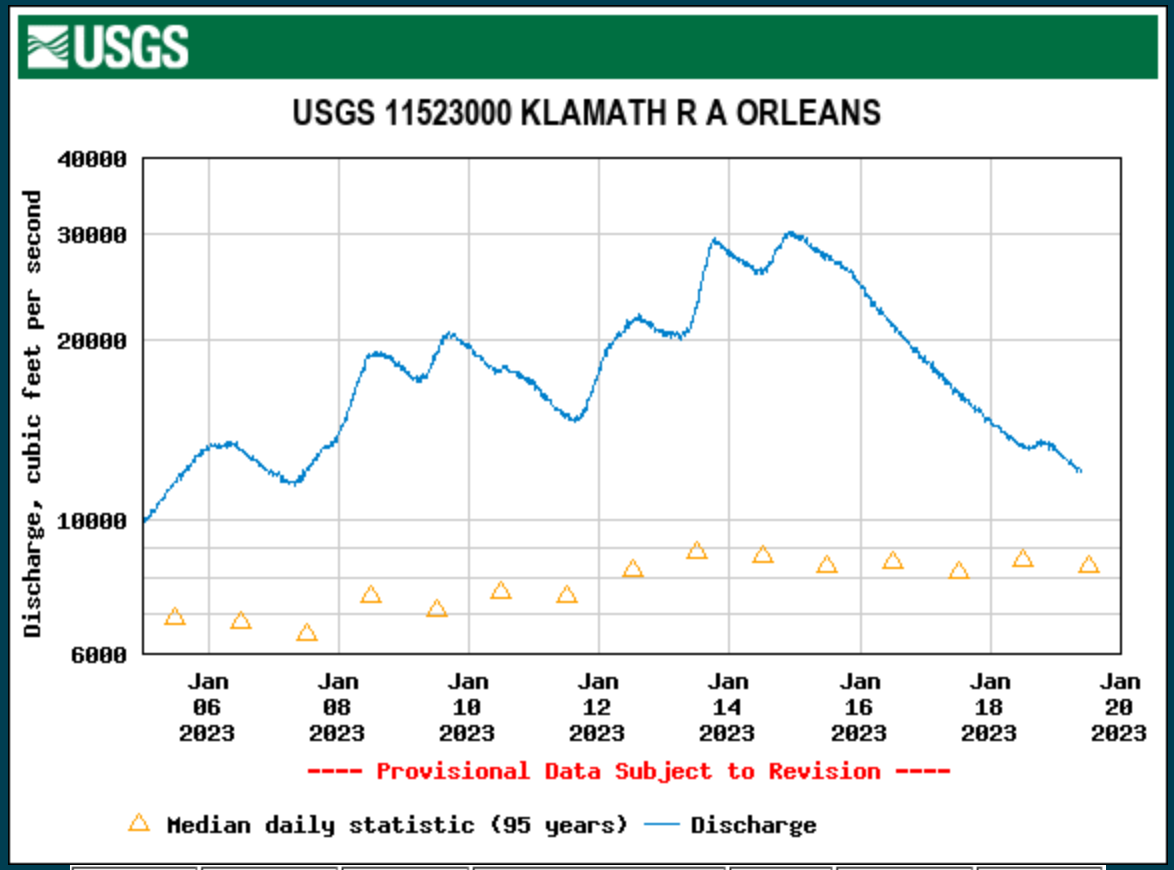

| Min (1977) | 25th percen-tile | Median | Mean | 75th percen-tile | Most Recent Instantaneous Value Jan 19 | Max (1974) |
|---|---|---|---|---|---|---|
| 50.0 | 234 | 485 | 833 | 997 | 1140 | 4180 |

# Salmon River – USGS 11522500



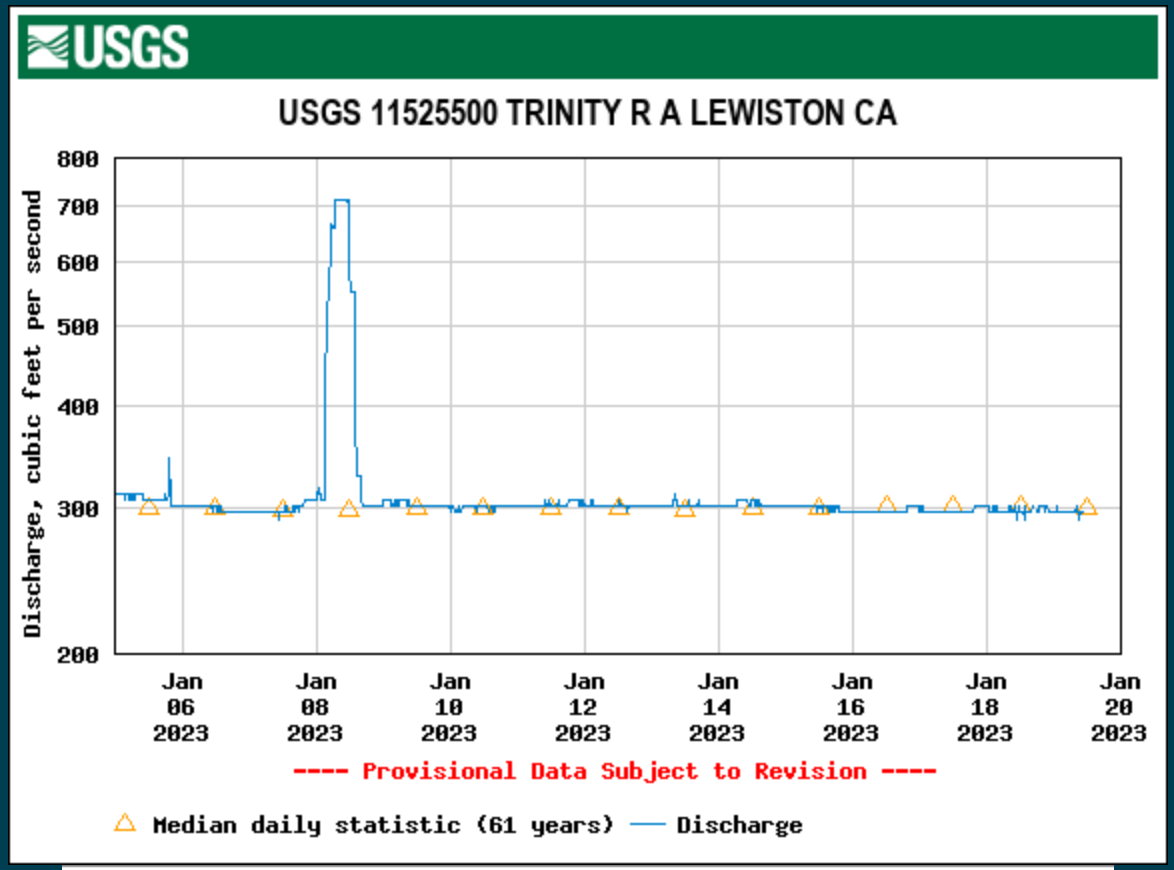

| Min (1937) | 25th percen-tile | Median | Most Recent Instantaneous Value Jan 19 | Mean | 75th percen-tile | Max (1971) |
|---|---|---|---|---|---|---|
| 212 | 1000 | 2080 | 2970 | 3450 | 3950 | 33300 |

# Klamath River – USGS 11523000



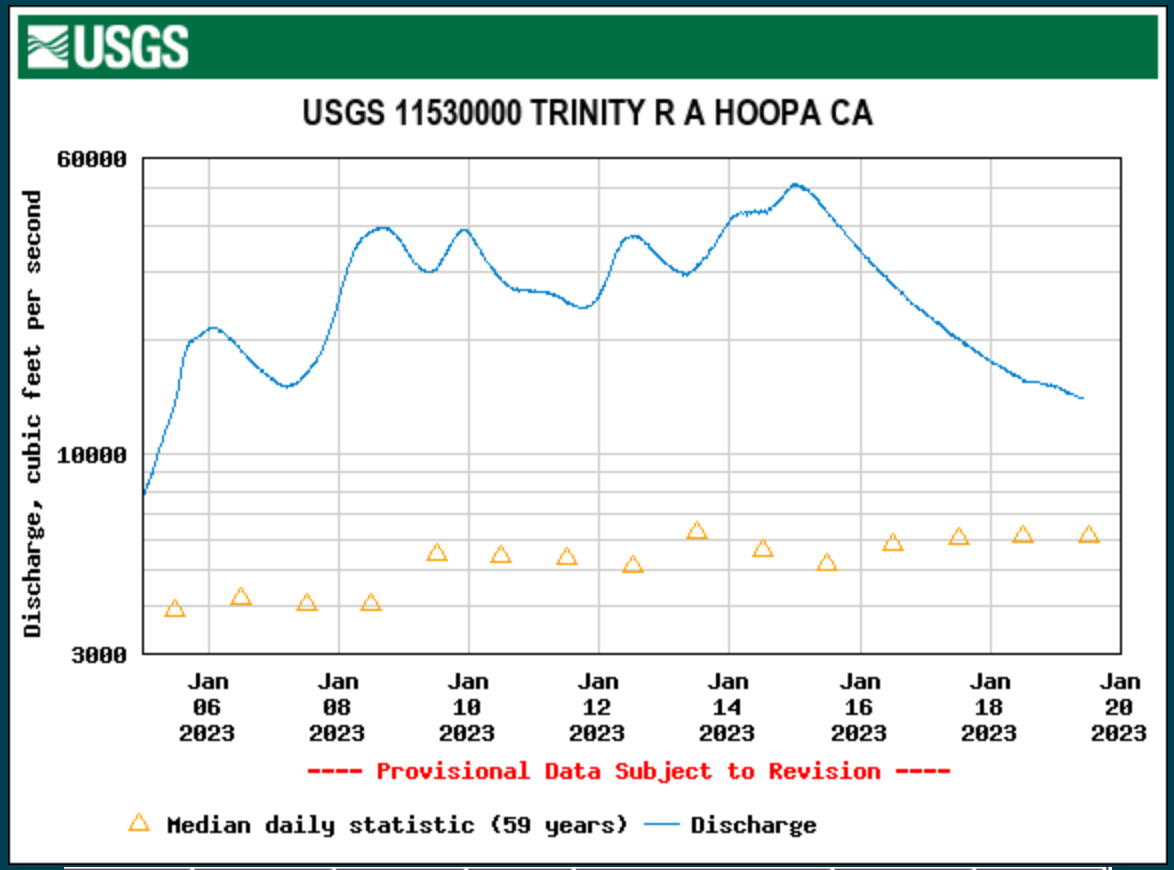

| Min (1937) | 25th percen-tile | Median | Most Recent Instantaneous Value Jan 19 | Mean | 75th percen-tile | Max (1953) |
|---|---|---|---|---|---|---|
| 1840 | 5440 | 8360 | 12200 | 15200 | 18200 | 108000 |

# Trinity River at Lewiston – USGS 11525500



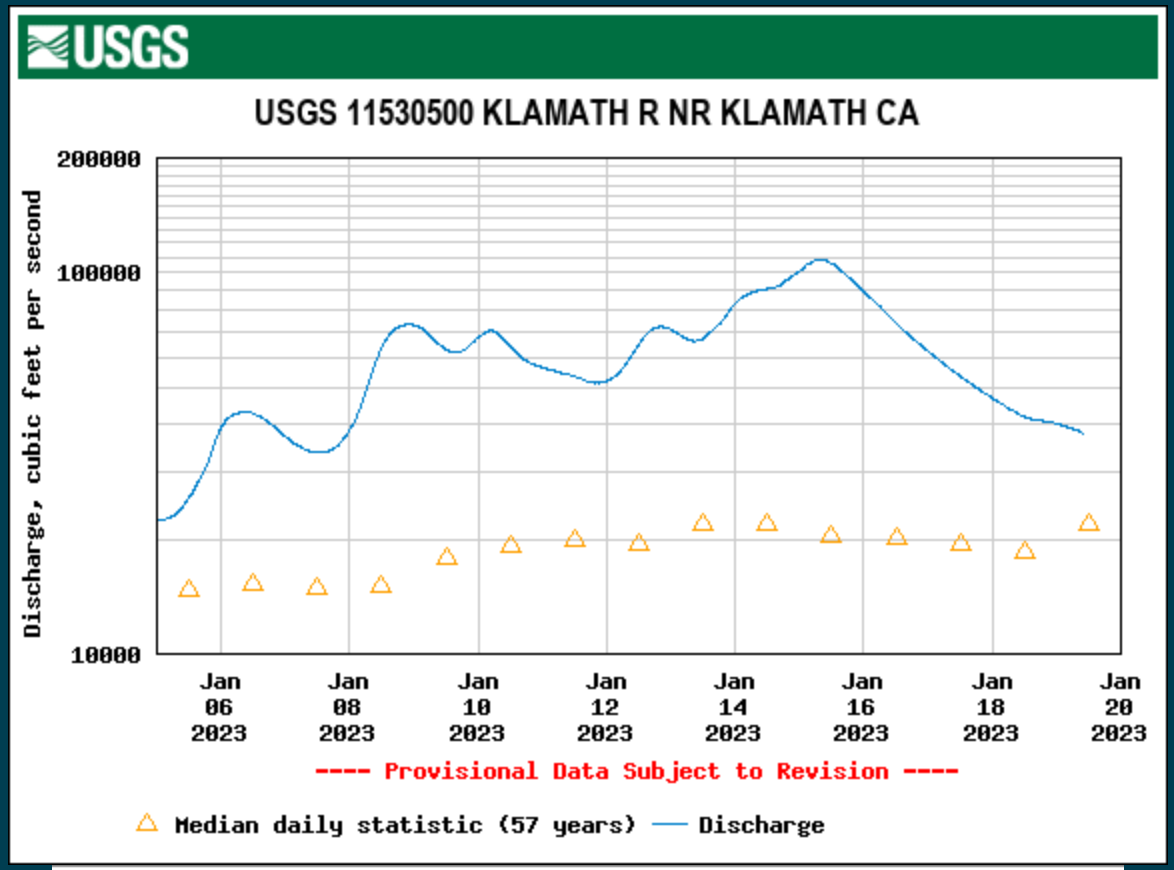

| Min (1977) | 25th percen-tile | Most Recent Instantaneous Value Jan 19 | Median | 75th percen-tile | Mean | Max (1974) |
|---|---|---|---|---|---|---|
| 145 | 240 | 297 | 301 | 314 | 706 | 13800 |

# Trinity River – USGS 11530000



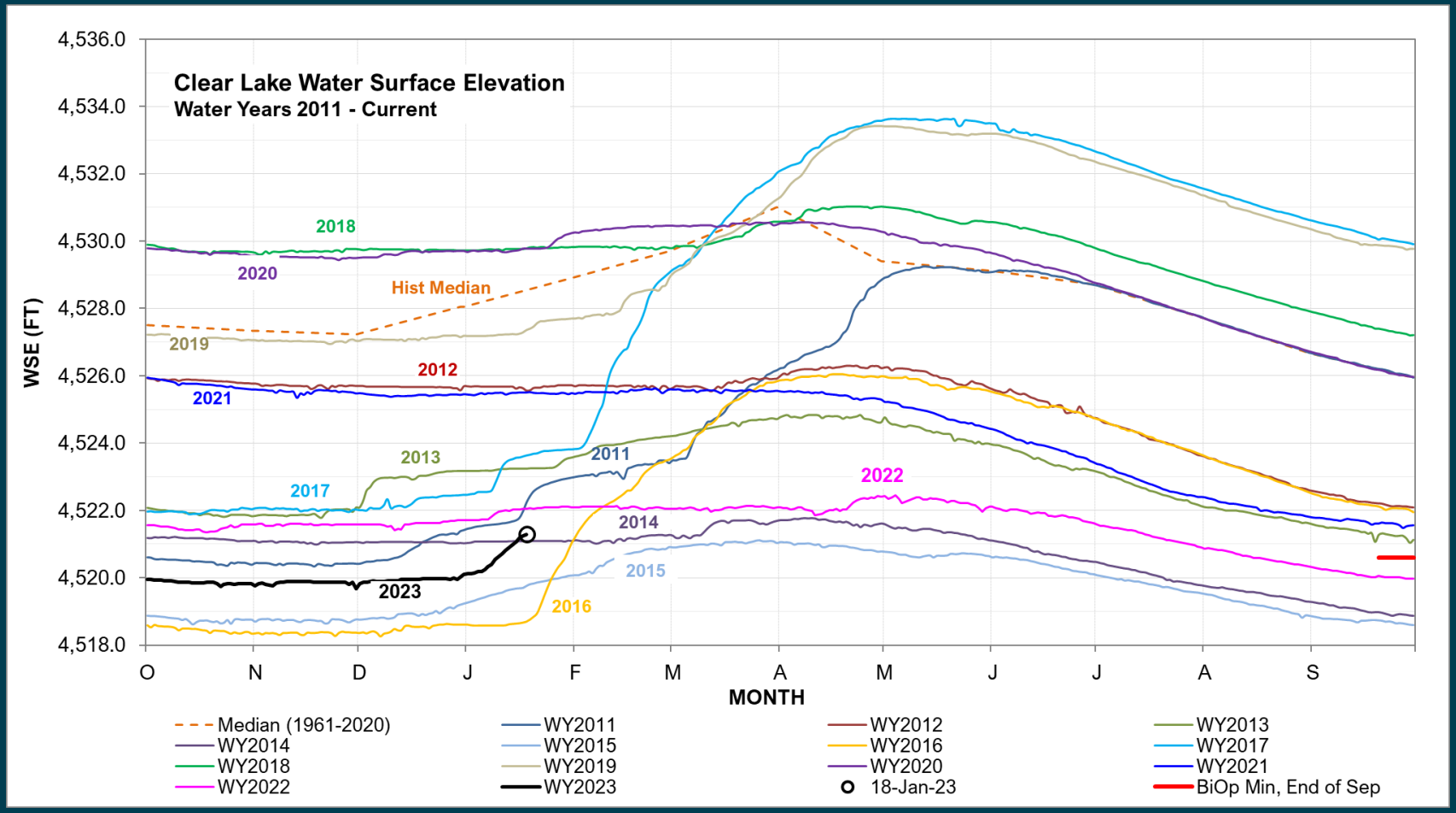

| Min (1977) | 25th percen-tile | Median | Mean | Most Recent Instantaneous Value Jan 19 | 75th percen-tile | Max (1971) |
|---|---|---|---|---|---|---|
| 709 | 3210 | 6110 | 11900 | 14100 | 14200 | 64700 |

# Klamath River – USGS 11530500




| Min (2014) | 25th percen-tile | Median | Most Recent Instantaneous Value Jan 19 | Mean | 75th percen-tile | Max (1974) |
|---|---|---|---|---|---|---|
| 3480 | 12800 | 21800 | 38100 | 38500 | 50500 | 191000 |

# Clear Lake Reservoir – USBR



# Gerber Reservoir – USBR