BUREAU OF RECLAMATION

Klamath Project
Temporary Operating Procedures

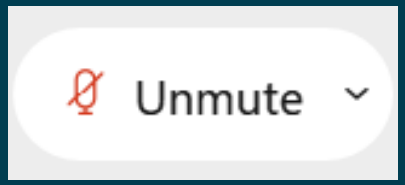
February 17, 2023

Webex Guidelines

Mute function

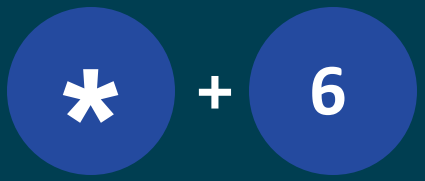
Desktop App

Click button



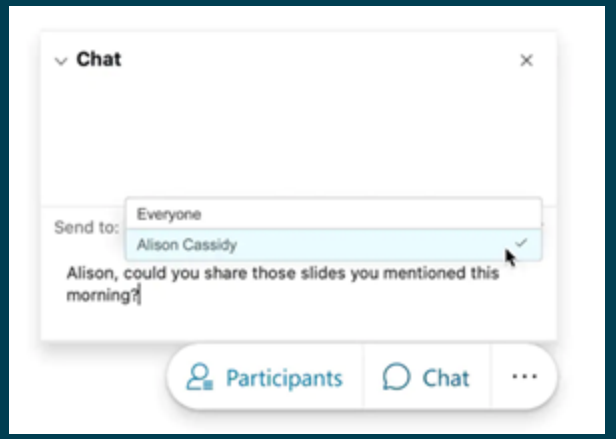
Phone

Dial * 6



Browser

Chat us with issues

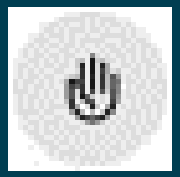


Webex Guidelines

Raise Hand Function

Desktop App

Click button

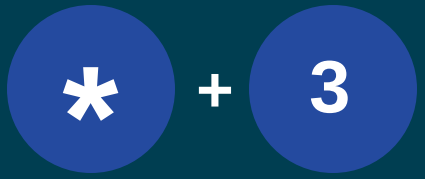


OFF

ON

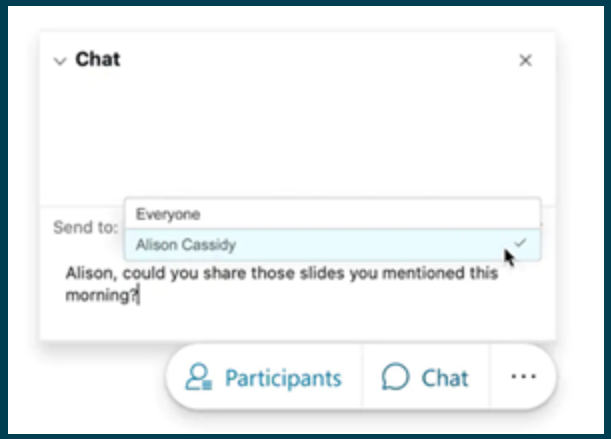
Phone

Dial * 3



Browser

Chat us!



Meeting Guidelines

- Listen first
- Share the airtime
- Allow speakers to finish
- Respect agenda topics and times

- *This meeting is <u>not</u> being recorded.*

Outline

- TOP Operations Changes, Feb 14
- Concepts for improving ESA compliance

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

- Supplemental Information

TOP Operations Changes, Feb 14

- February 13 – NMFS, FWS and Reclamation finalized a coordination plan for Winter/Spring 2023 Klamath Project Operations. (See https://www.usbr.gov/mp/kbao/)
- Balance of risks based on real time hydrologic conditions, minimizing some of the short-term impacts based on conditions of redds and as hydrology requires it.
- Initial reduction in NMFS BiOp-required minimum flows by 11% started on February 14, additional adjustments possible based on monitoring and hydrology
- Conserved water in UKL will only be used for ESA purposes.
- Continued adaptive management with weekly technical input, continued monitoring of changes from the initial trim, future increase or decrease depending on impacts to redds and forecasts.
- Longer term – work with agency experts and stakeholders to better understand forecasting tools

Concepts for Improving ESA Compliance

Diversion reduction strategies

1. Halt out-of-basin diversions to the Rogue River basin
   IN PROGRESS - Data posted to KBAO website, Workshop being scheduled for technical questions
2. Halt diversions from the Keno Impoundment
   COMPLETED – Action taken per TOP to halt diversions at Ady Canal for refuges, gate closed on (02/16/2023@1300)

Supply augmentation strategies

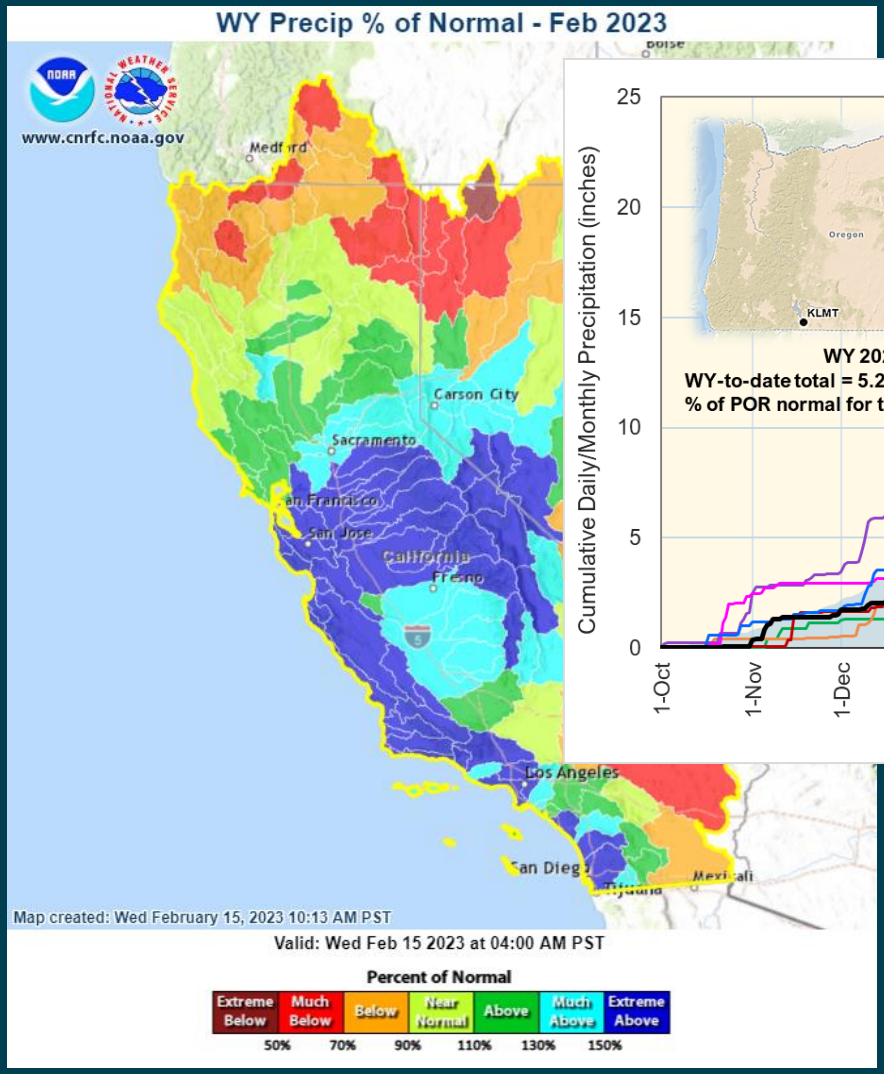
3. Initiate out-of-basin diversions into Klamath River from Lost River
   COMPLETED – Not available as a discretionary action to Reclamation
4. Consider planning for a lower volume pulse/flushing flow from Upper Klamath Lake
   COMPLETED – Plans for pulse flow will be limited to supply available
5. Consider use of Klamath Drainage District drainage supplies
   COMPLETED – Reclamation and USFWS are working with KDD to understand plans for said supplies

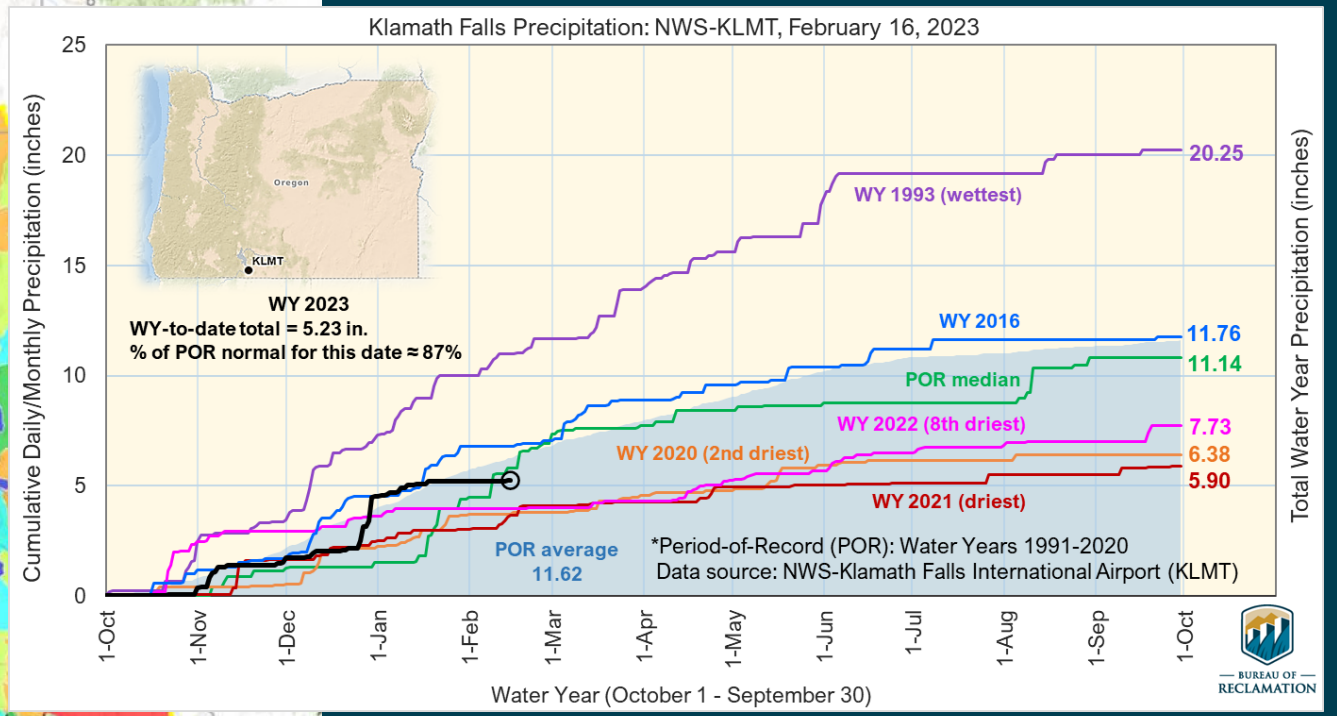
Operation modification strategies

5. Borrow or exchange water with KRRC (former PacifiCorp reservoirs)
   COMPLETED – KRRC and States have told Reclamation that supply flexibility is not available this year
6. Reduce Link River Dam outflows to make better use of storm events
   COMPLETED – Reclamation has made all preparations to maximize inflow from any future storms
7. Establish higher end-of-season elevation requirements for Upper Klamath Lake
   IN PROGRESS – Reclamation is evaluating the effect of ESA requirements on 2023 Project supplies

Monitoring Information

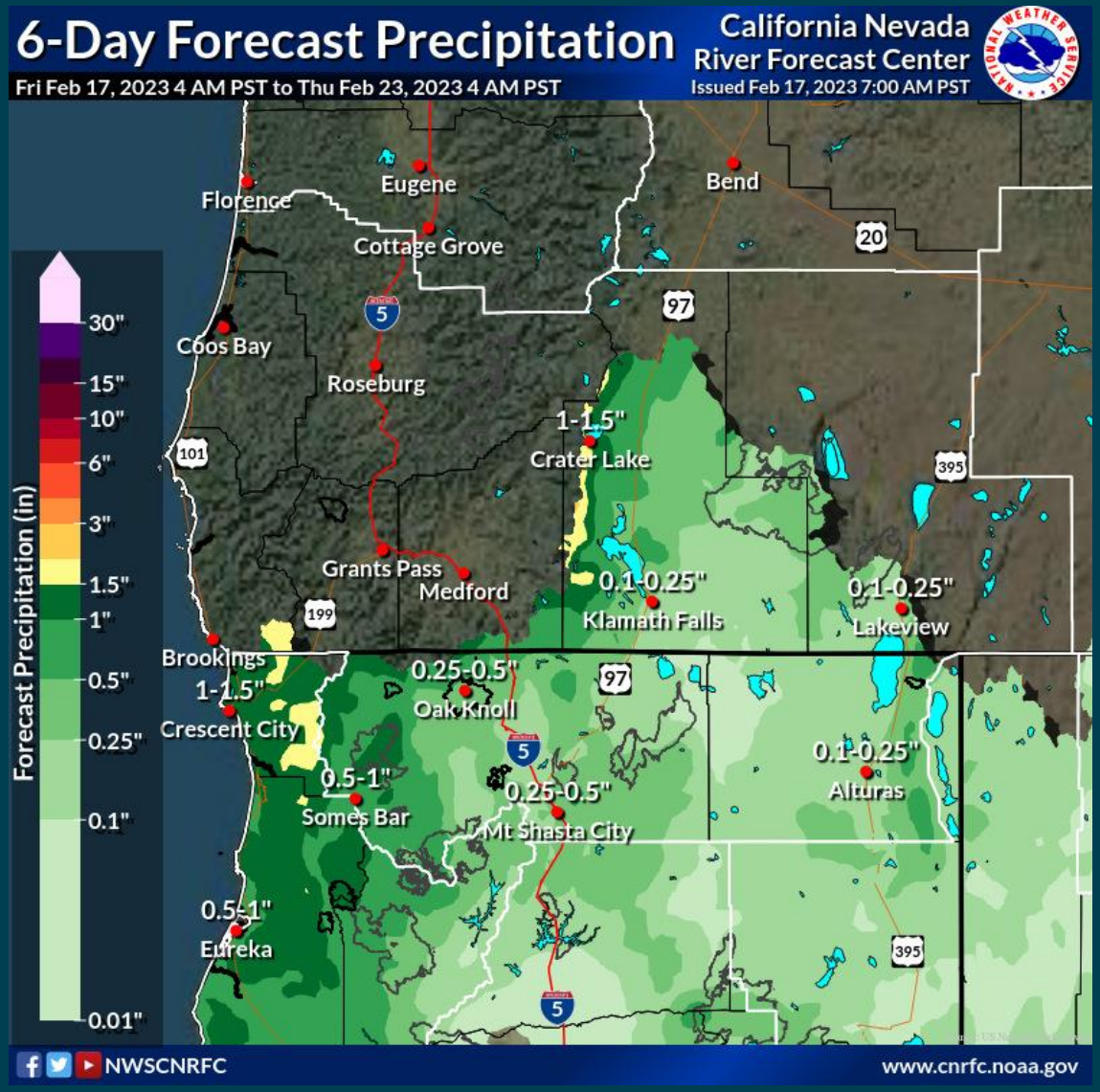
Precipitation To-Date Compared with Normal
February 15, 2023





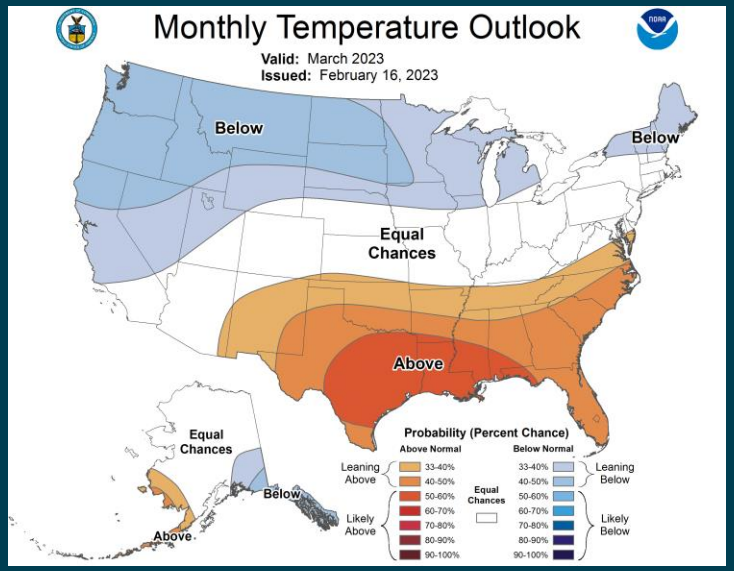
https://www.cnrfc.noaa.gov/precipForecast.php?cwa=MFR&imgNum=1&mobile=0

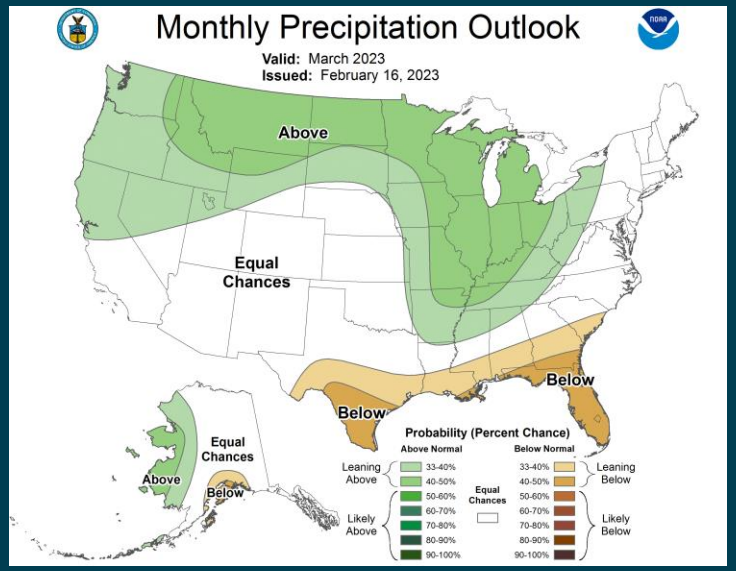
6-Day Precipitation Forecast – California Nevada River Forecast Center

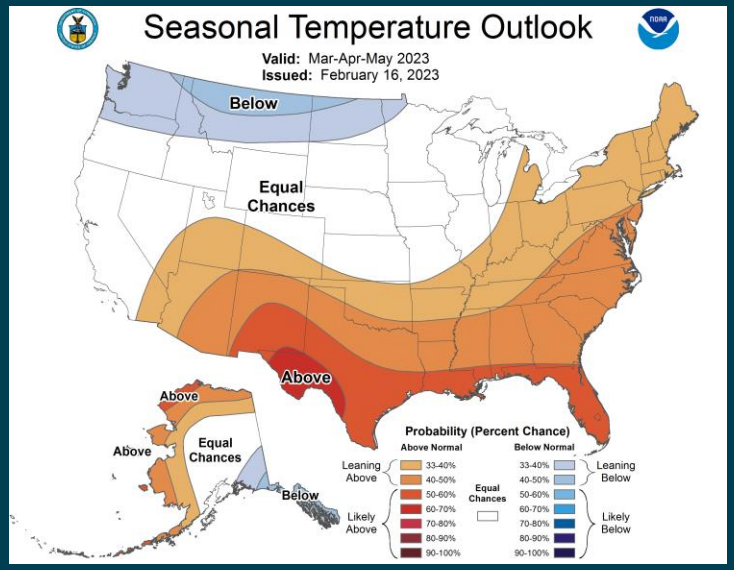


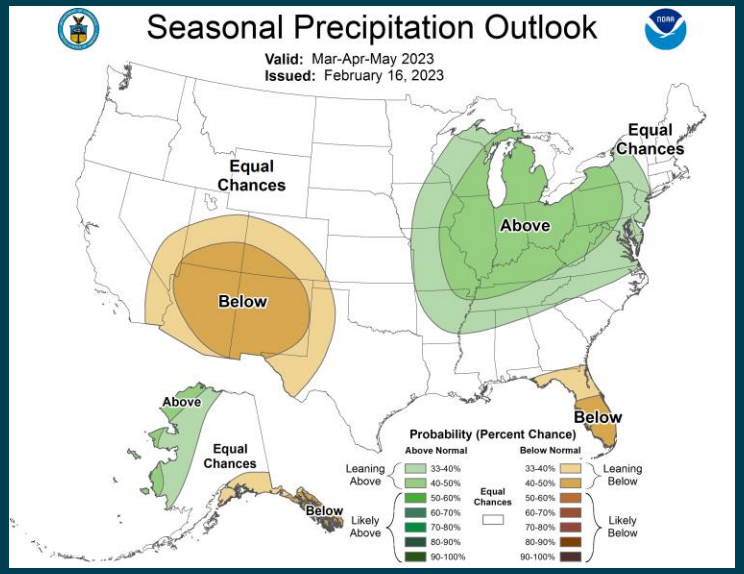
https://www.cnrfc.noaa.gov/precipForecast.php?cwa=MFR&imgNum=1&mobile=0

March/Seasonal Monthly Weather Outlook



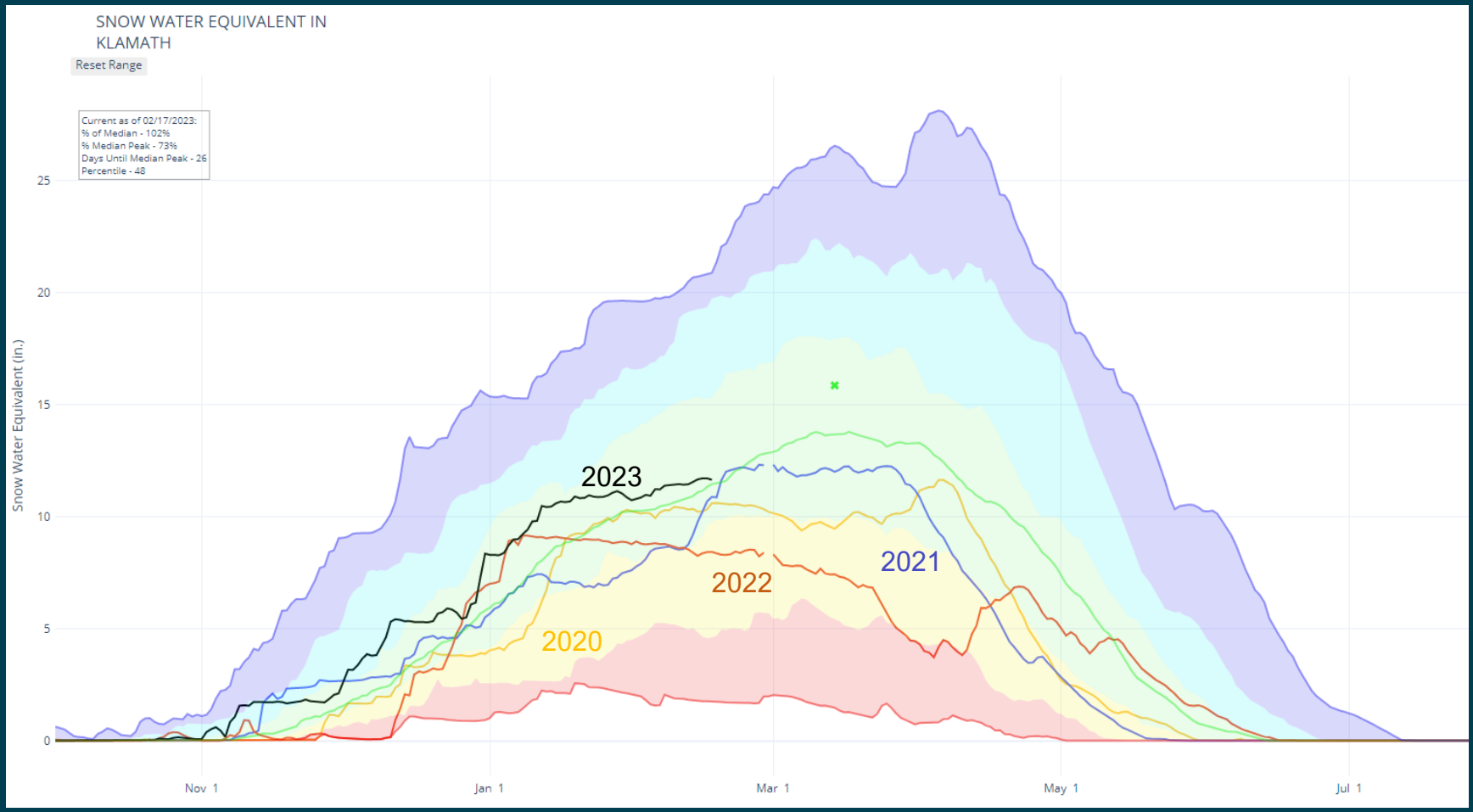






https://www.cpc.ncep.noaa.gov/products/predictions/long_range/seasonal.php?lead=1

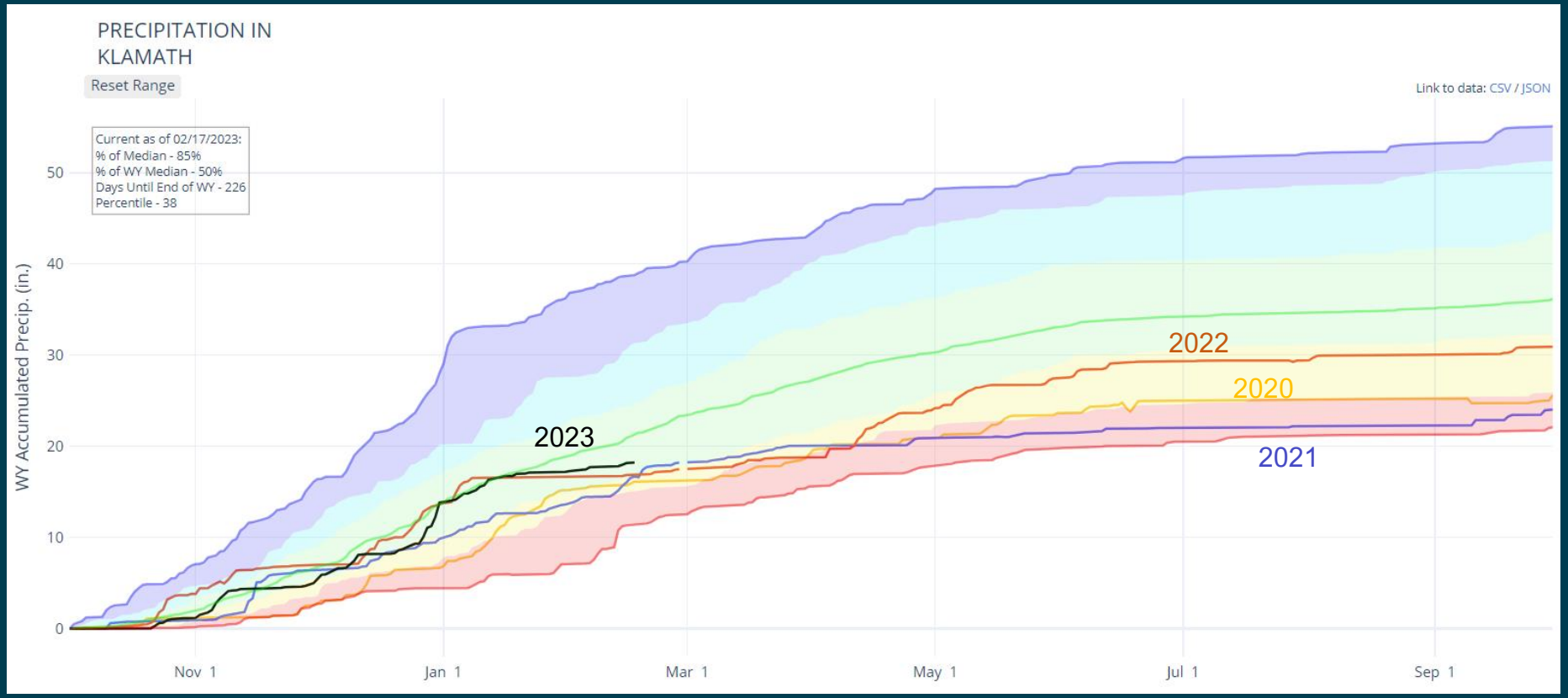
NRCS Upper Klamath Basin Snow Water Equivalent (SWE) Water Year 2023 & Last 3 Water Years



Statistical shading breaks at the 10th, 30th, 50th, 70th, and 90th percentiles

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

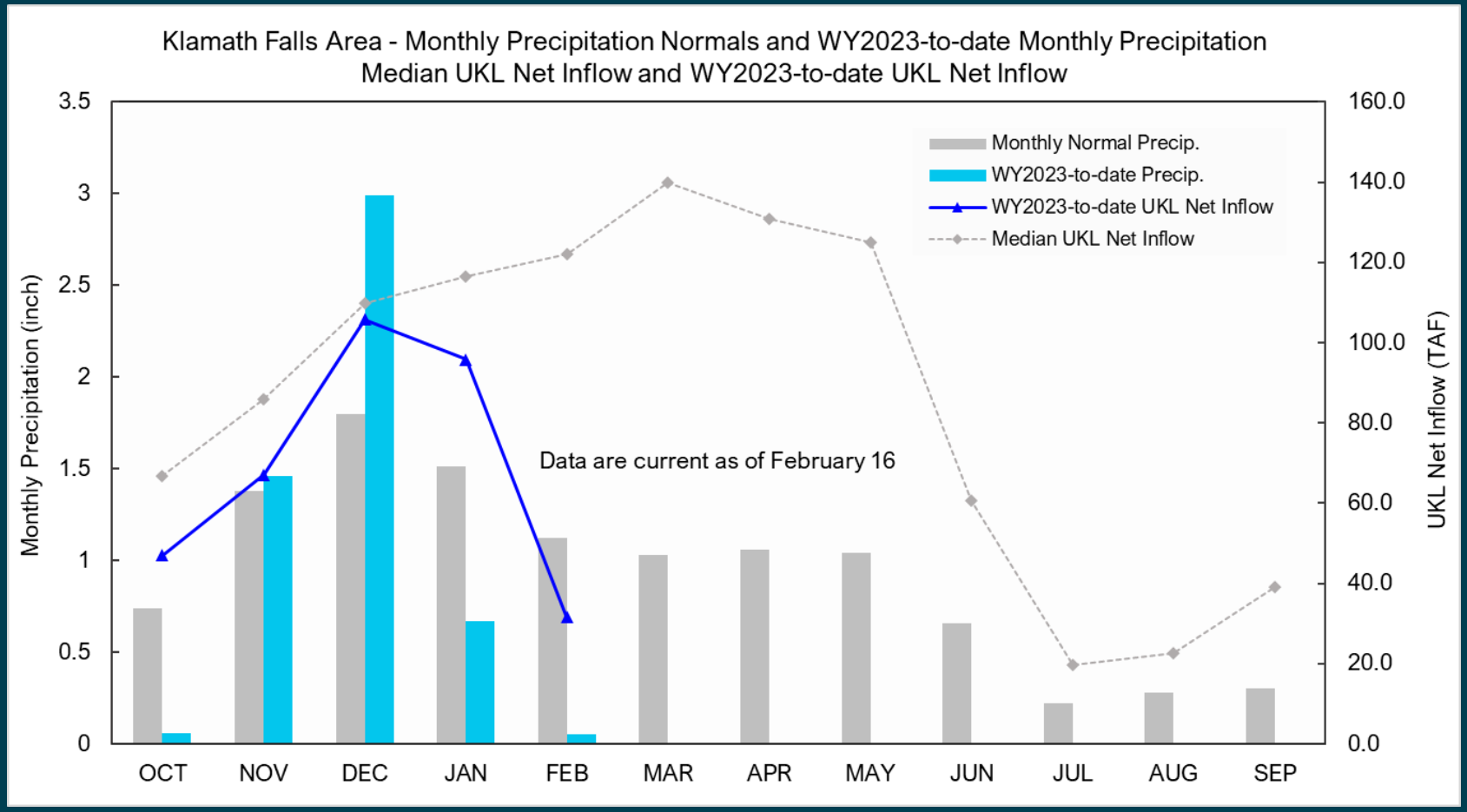
NRCS Upper Klamath Basin Snow Water Equivalent (SWE) Water Year 2023 & Last 3 Water Years



Statistical shading breaks at the 10th, 30th, 50th, 70th, and 90th percentiles

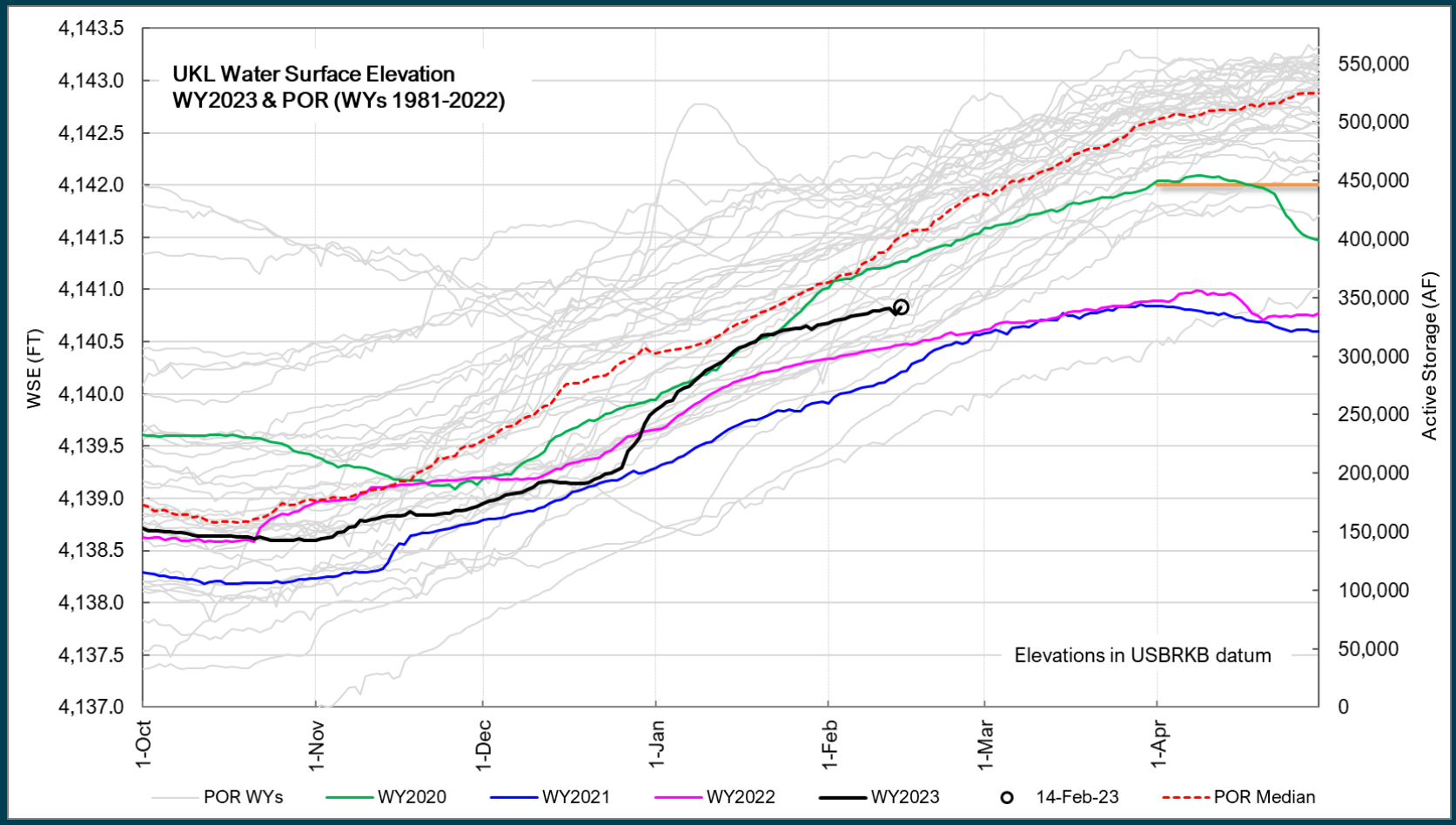
https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/PREC/assocHUC6/180102_Klamath.html

Klamath Falls Area - Monthly Precipitation Normals and WY2023 Monthly Precipitation Median UKL Net Inflow and WY2023-to-date UKL Net Inflow



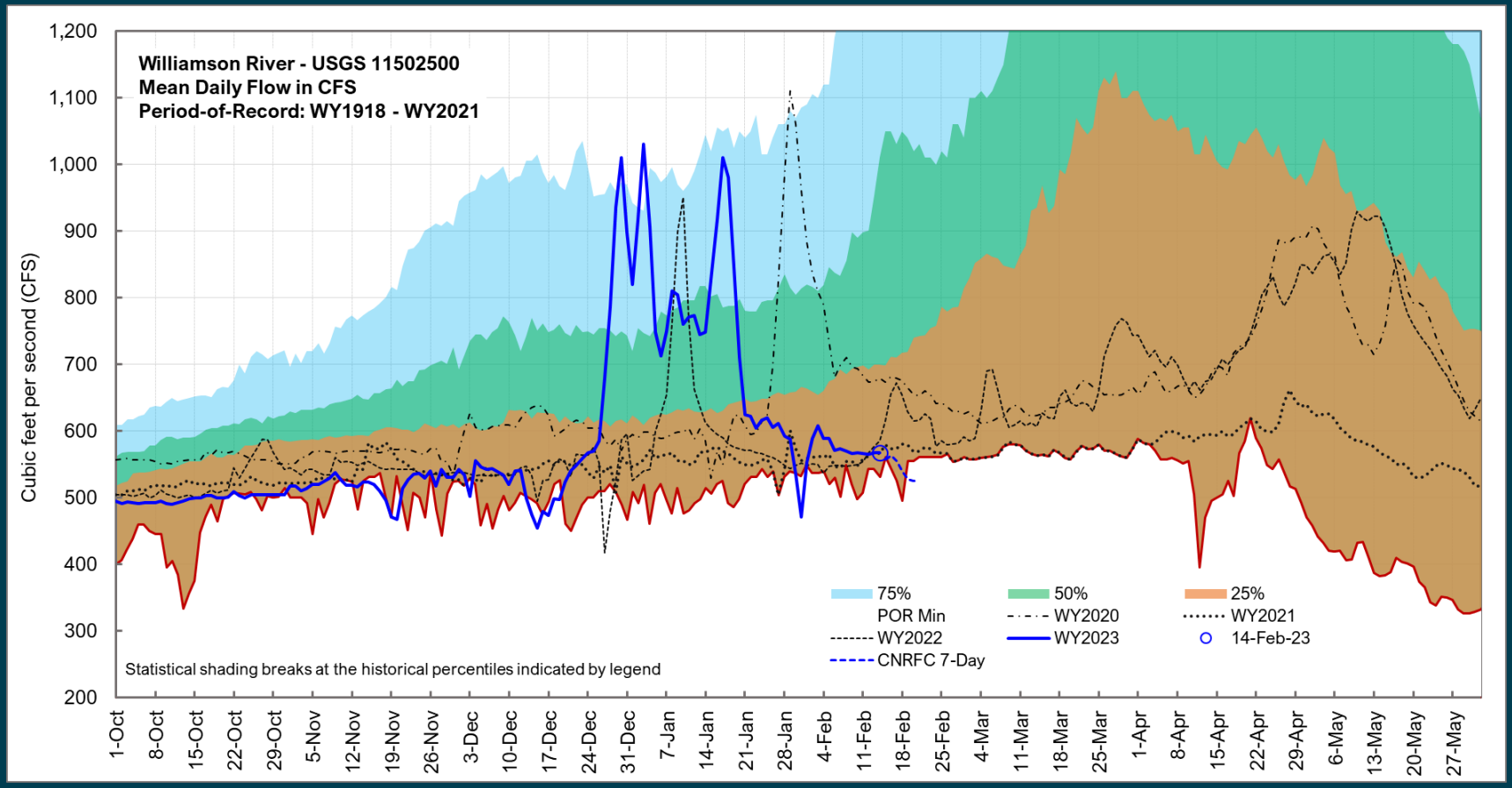
Feb 16 0.05"/0.59" normal = 8%

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



WY2022/2023 UKL water surface elevation observational data are provisional

Williamson River is a Strong Indicator of Net Inflow at UKL

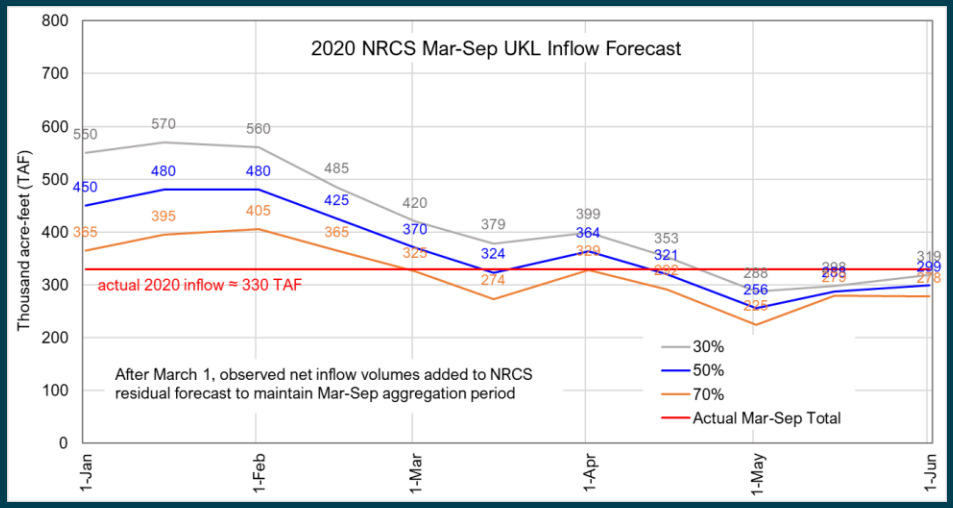


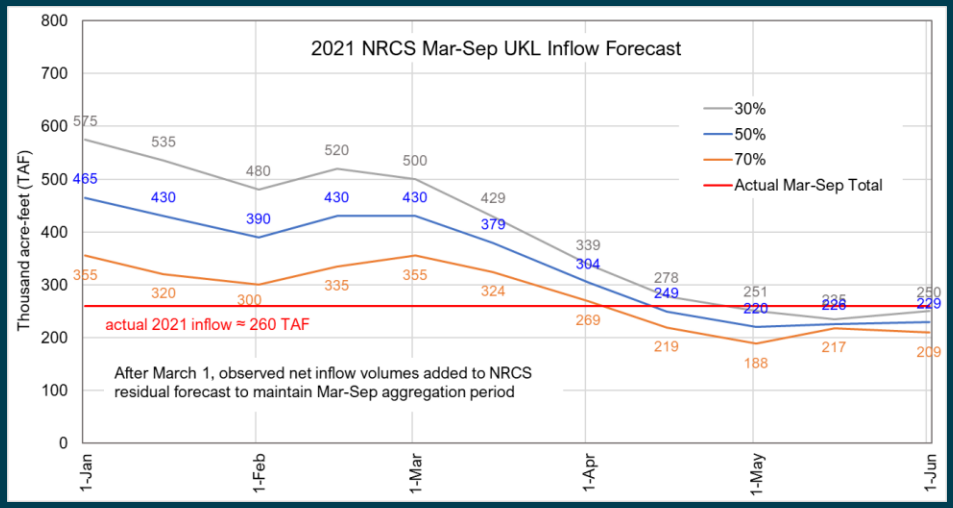
WY2022/2023 data are provisional and subject to revision

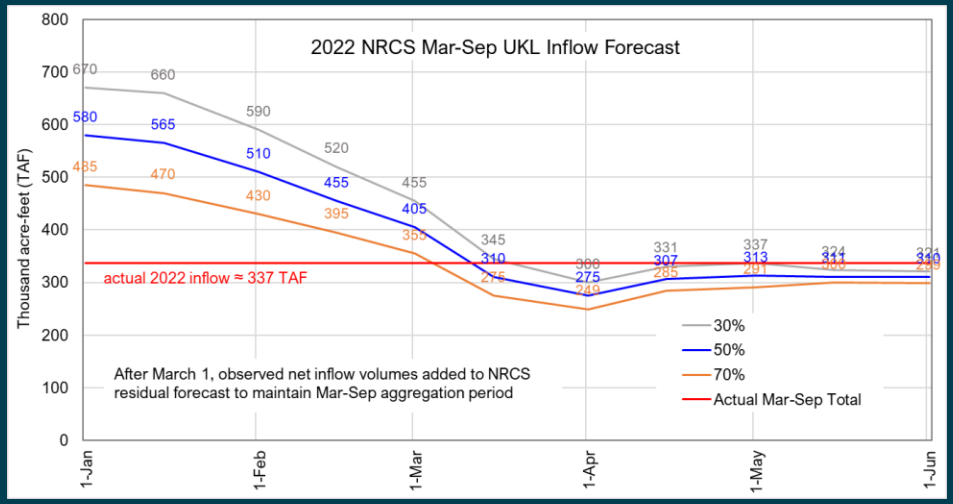
Redd Survey Locations

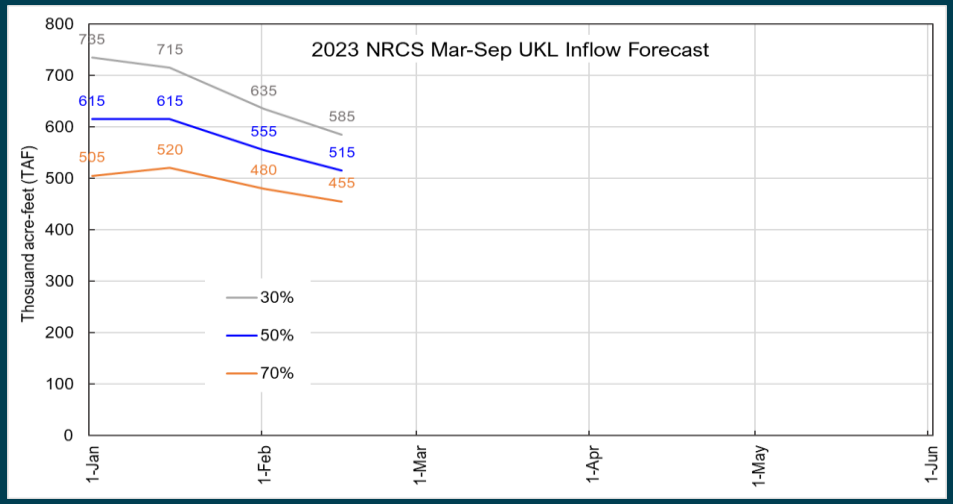
Long-Term Upper Klamath Lake Inflow and Operations Forecasts

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

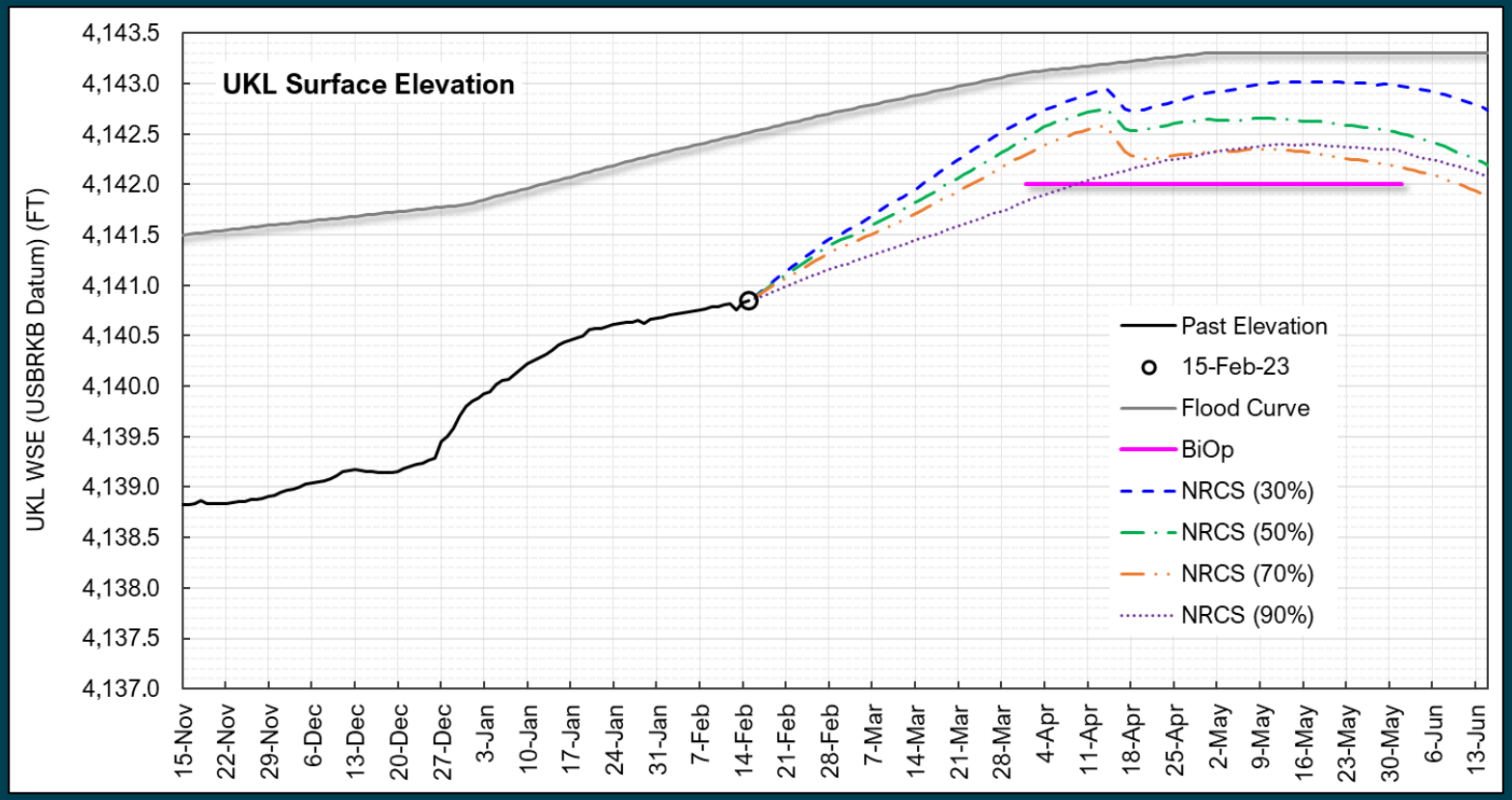








UKL Water Surface Elevation – NRCS mid-February Klamath River Basin (KRB) Water Supply Forecast (WSF)

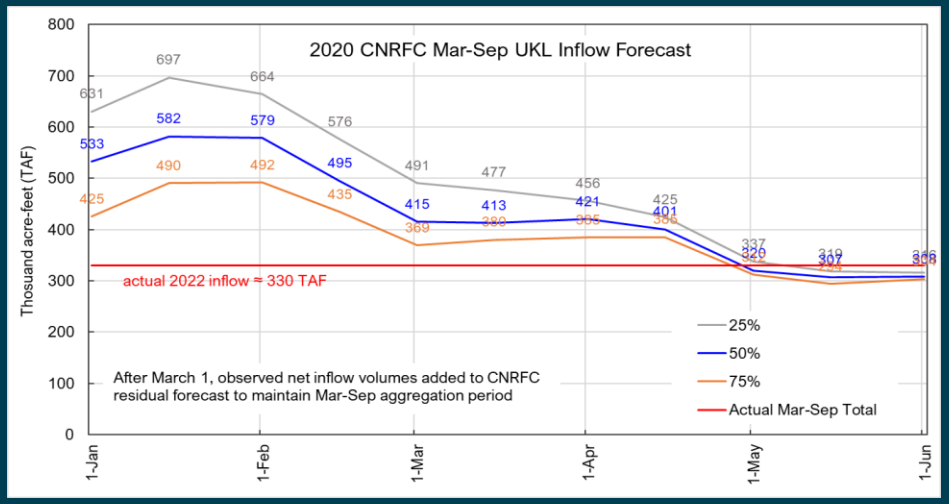


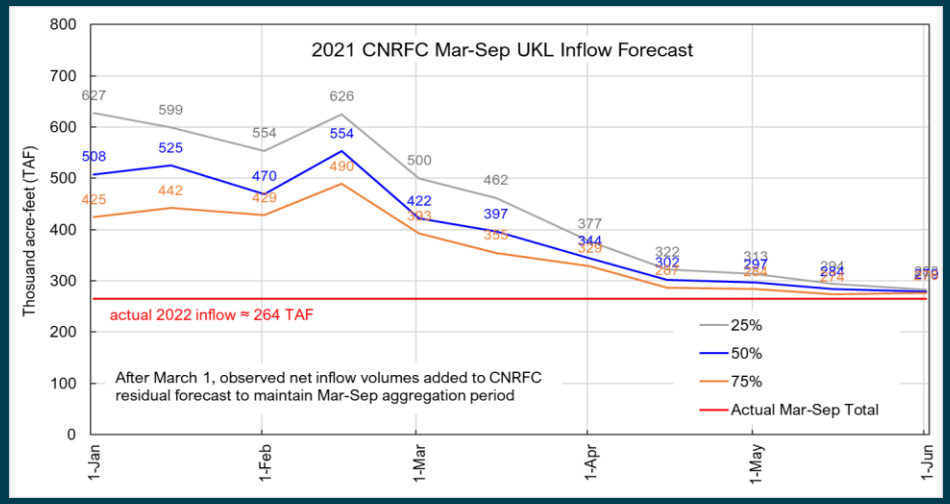
Projections, including WY2023 target elevations and surface elevation trajectories, are provisional and subject to revision based on future water supply forecasts, hydrologic conditions, and operational decisions

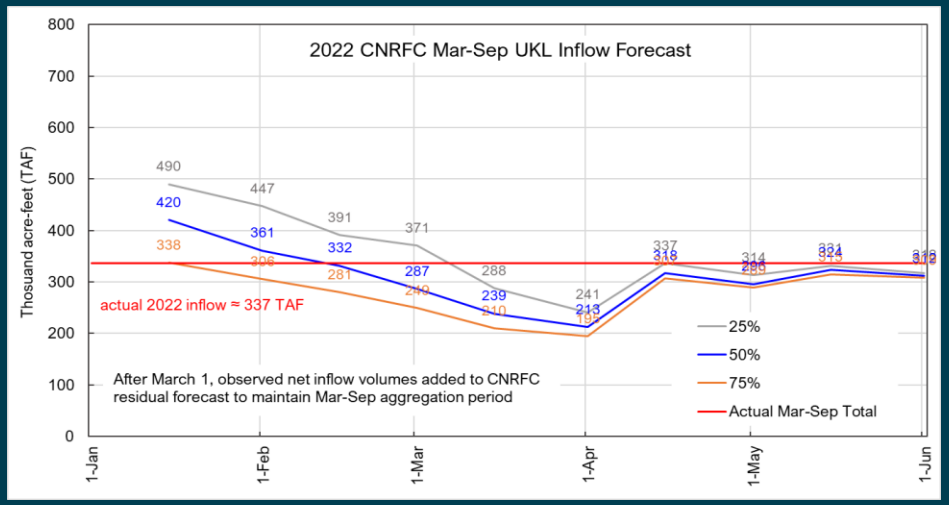
NRCS mid-February KRB WSF UKLNI forecast volumes at 30%, 50%, 70% and 90% probability of exceedance (POE) levels used in ensemble

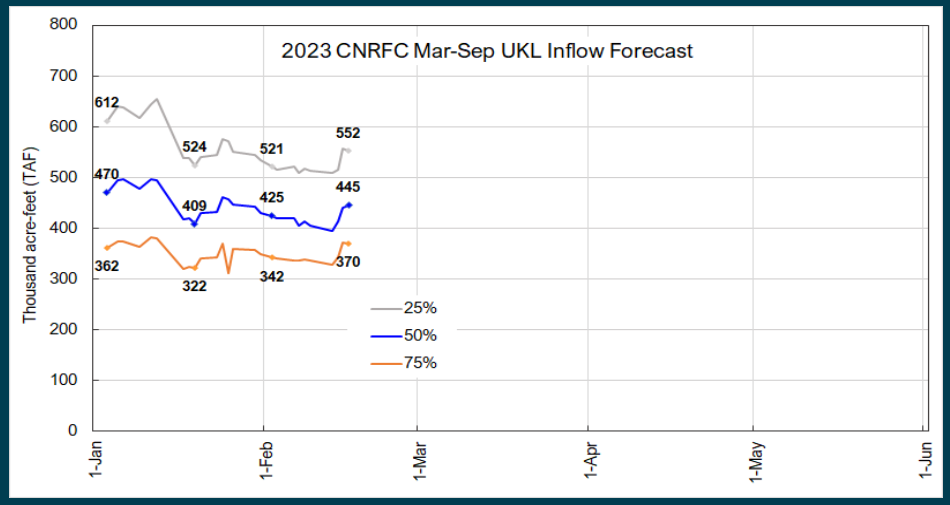
WY2023 observed UKL water surface elevation data are provisional

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

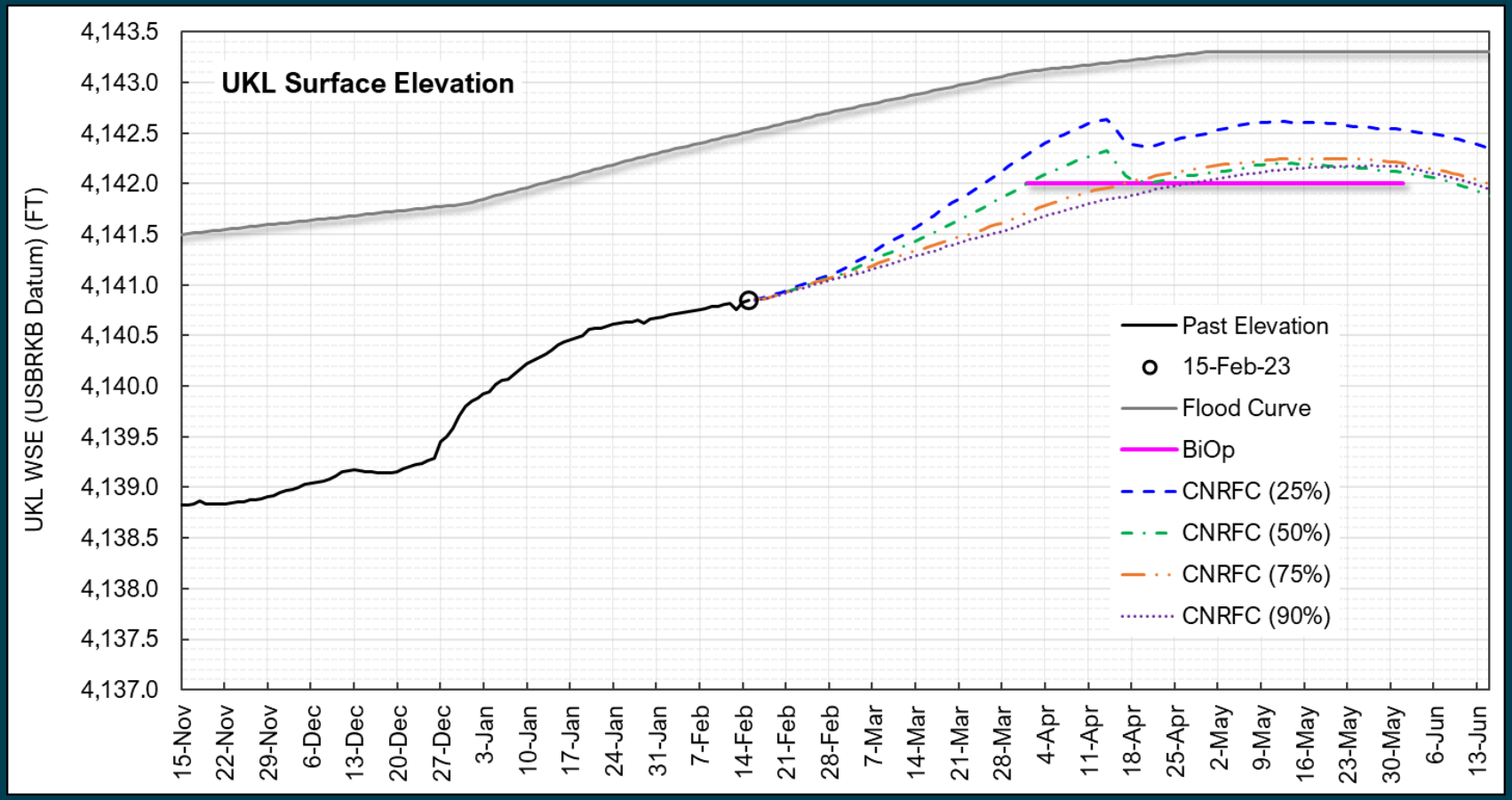








UKL Water Surface Elevation – CNRFC Upper Klamath Lake Net Inflow (UKLNI) Forecast

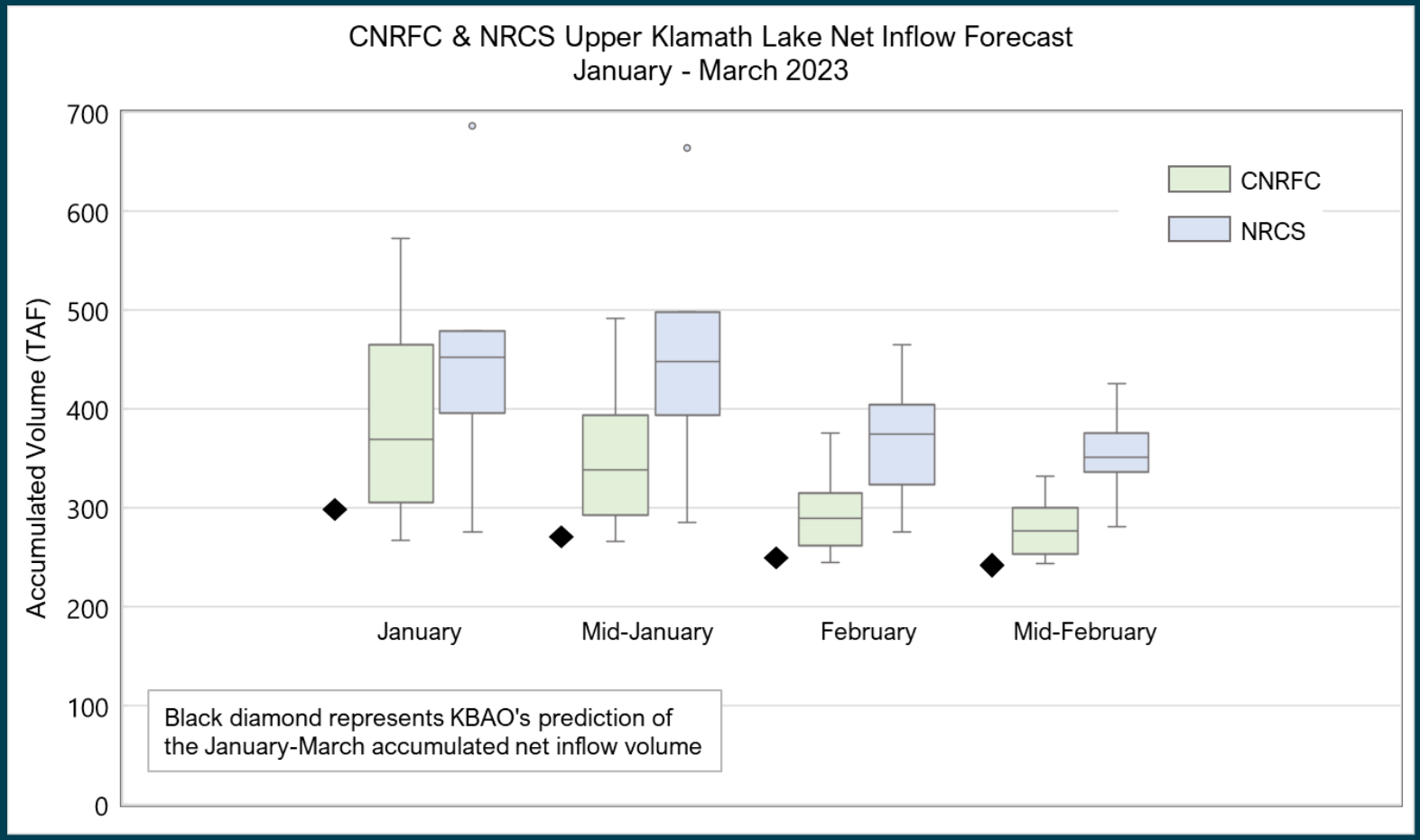


CNRFC UKL monthly probability net inflow forecast volumes at 25%, 50%, 75% and 90% probability of exceedance (POE) levels used in ensemble

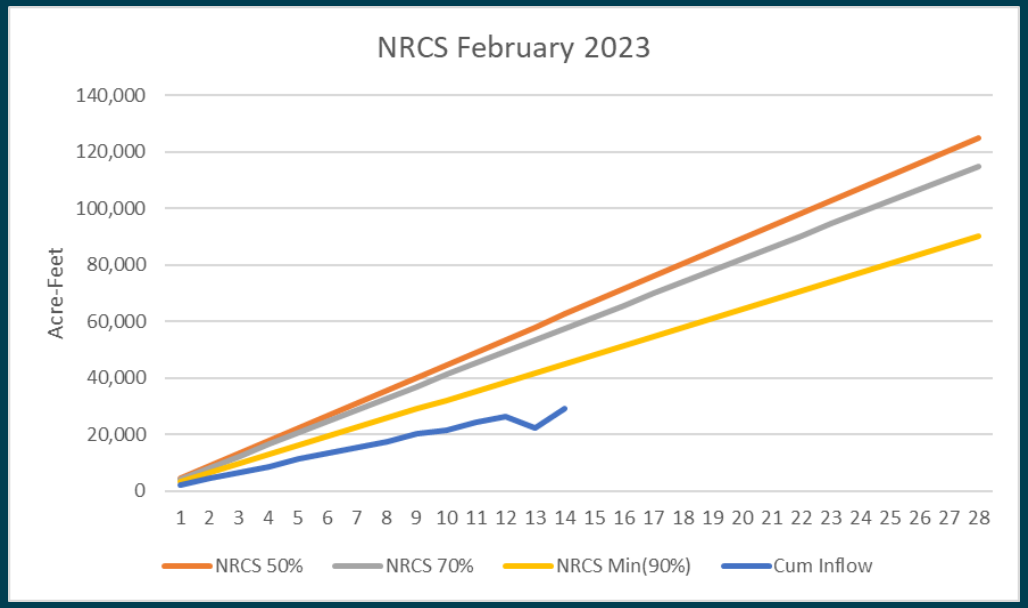
Ag diversions switched off through May for 75% and 90% POE scenarios; LKNWR deliveries switched off through Feb for 75% and 90% POE scenarios

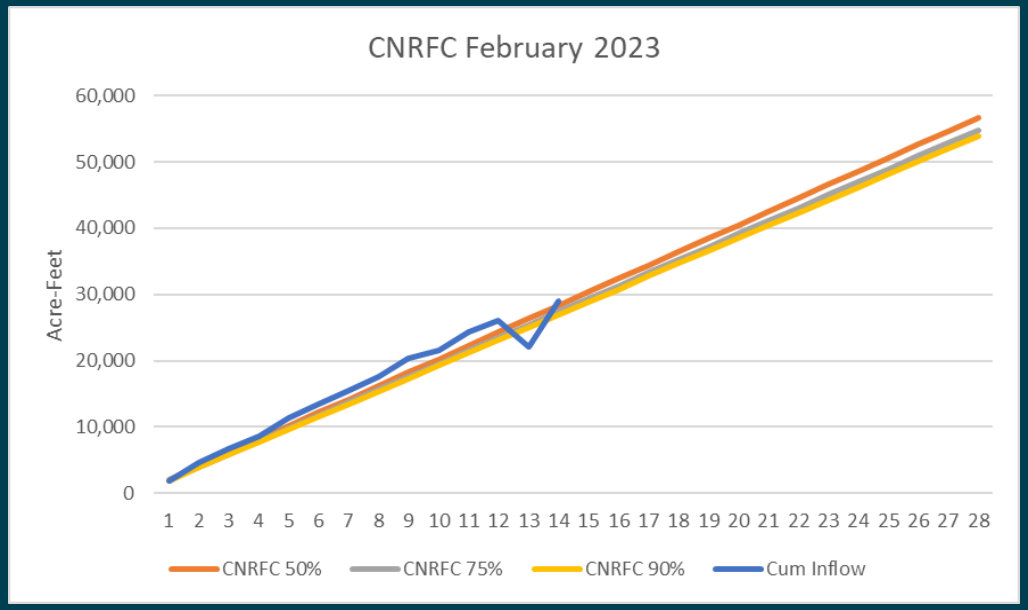
Surface flushing flow switched off if simulated Apr 1 elevation is below 4142.00'

January 2023 Accumulated Net Inflow Forecast
CNRFC & NRCS



Upper Klamath Lake Net Inflow vs 2023 February 1 Forecasts





Mass Balance – Today through April 1, 2023

Future UKL Inflow through 4/1 = ?

CNRFC 50% 6-wk avg – 24 TAF/wk	NRCS 50% 6-wk avg – 38 TAF/wk
CNRFC 75% 6-wk avg – 20 TAF/wk	NRCS 75% 6-wk avg – 33 TAF/wk
CNRFC 90% 6-wk avg – 19 TAF/wk	NRCS 90% 6-wk avg – 23 TAF/wk

KBAO Scenario – 19 TAF/wk

Volume needed to achieve 4,142.0' in UKL as of 2/15/23

102.5 TAF

54 TAF for full IGD Min Flows

54 + 102.5 = 156.5 TAF

26 TAF/wk on avg. *needed*

44 TAF for 89% IGD Min Flows

44 + 102.5 = 146.5 TAF

24 TAF/wk on avg. *needed*

Net Inflow to UKL, previous 7 days	≈ 981 cfs	≈ 13,600 ac-ft for previous 7 days
50% near-term forecast Net Inflow*	≈ 1,083 cfs	≈ 15,000 ac-ft for previous 7 days

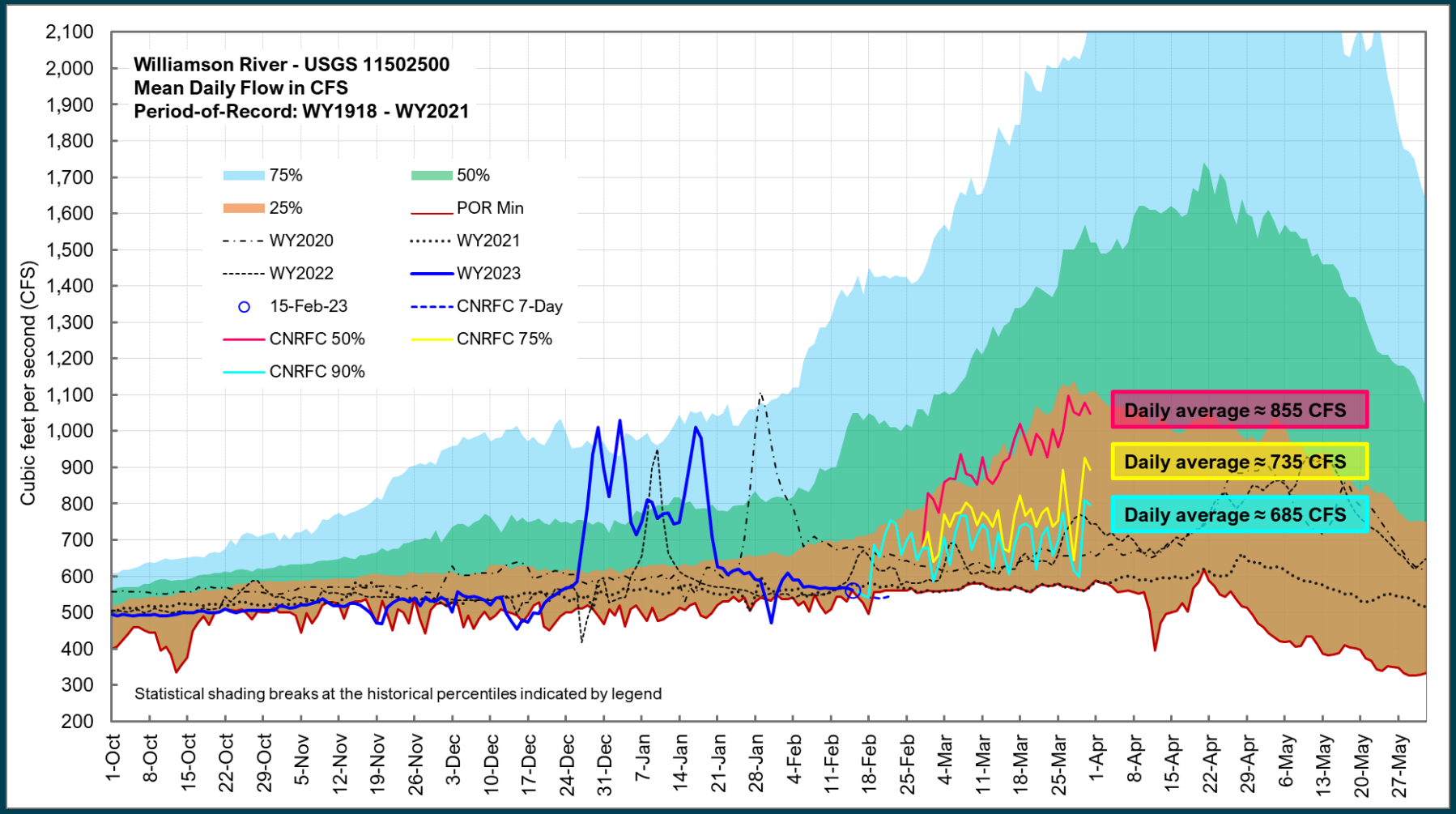
*CNRFC February 8 issuance

Williamson River - CNRFC Forecast

CNRFC 50% 6-wk avg – 24 TAF/wk

CNRFC 75% 6-wk avg – 20 TAF/wk

CNRFC 90% 6-wk avg – 19 TAF/wk



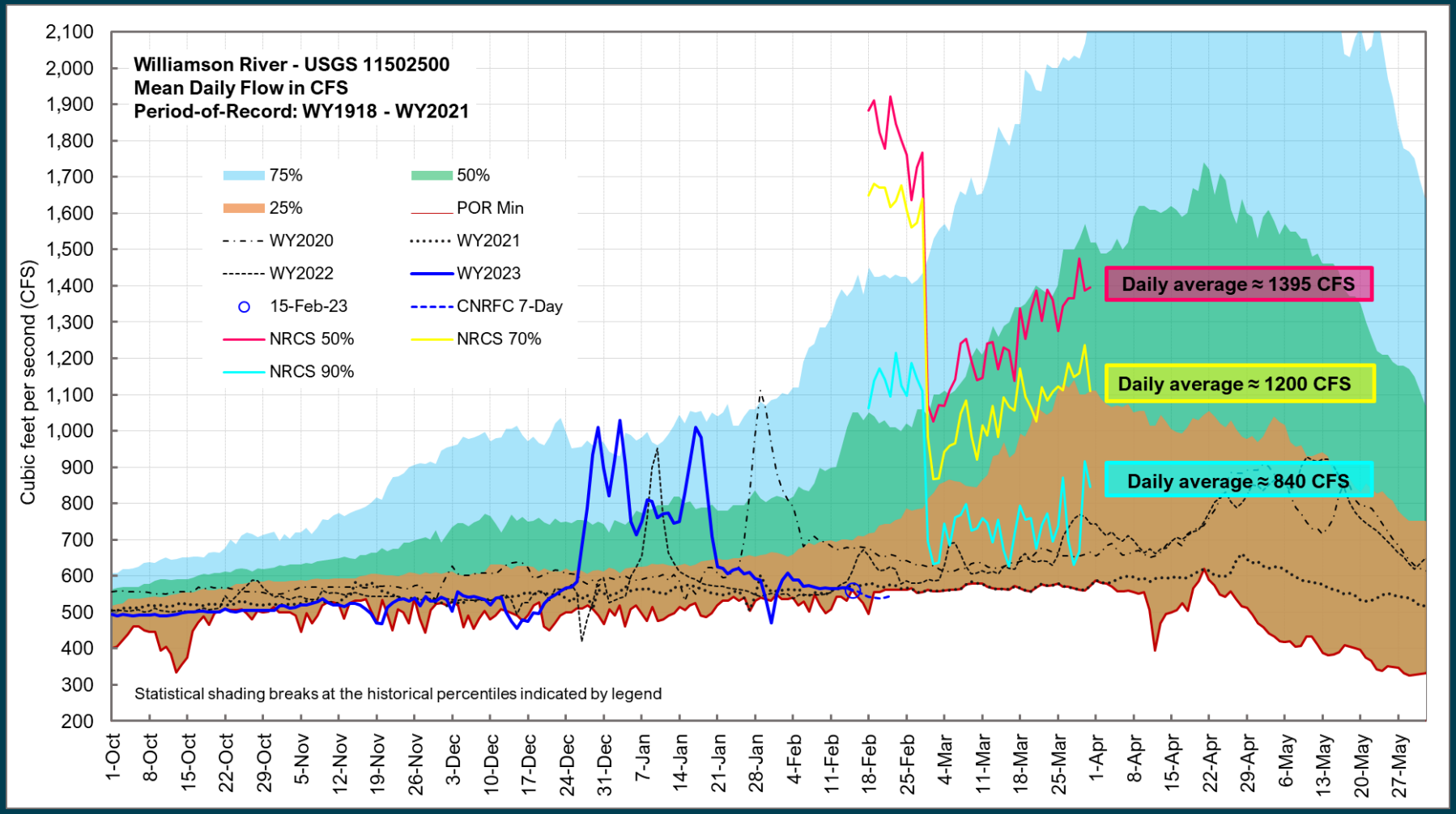
- Williamson River average percent contribution to total UKL net inflow for Jan-Mar (POR WYs: 1981-2022) ≈ 50% (ranges between 42% and 62%)
- Williamson River flow projections at the given CNRFC exceedance level UKL net inflow forecast start February 16 and end April 1

Williamson River - NRCS

NRCS 50% 6-wk avg – 38 TAF/wk

NRCS 75% 6-wk avg – 33 TAF/wk

NRCS 90% 6-wk avg – 23 TAF/wk



- Williamson River average percent contribution to total UKL net inflow for Jan-Mar (POR WYs: 1981-2022) ≈ 50% (ranges between 42% and 62%)
- Williamson River flow projections at the given NRCS exceedance level UKL net inflow forecast start February 16 and end April 1

Assumptions, Model Input, Basis of Planning

- January 1 – March 31 UKL net inflow volume ≈ 245 TAF
  - Jan 1 - Feb 15 ≈ 127.4 TAF

UKL Net Inflow			
TAF	WY2020	WY2021	WY2022
Jan-Mar	260.9	228.7	207.3

- January 1 – April 31 UKL KIG accretion volume ≈ 101 TAF
- January 1 – March 31 Lake Ewauna accretion volume ≈ 2 TAF
- LKNWR deliveries switched off from February 11 through February
- Project diversions switched off until May
- Analysis of analog year trends that includes but is not limited to the following WYs:
  - WYs 2022, 2021, 2020, 2018, 2010, 2009, 2005, 2004, 1991, 1981

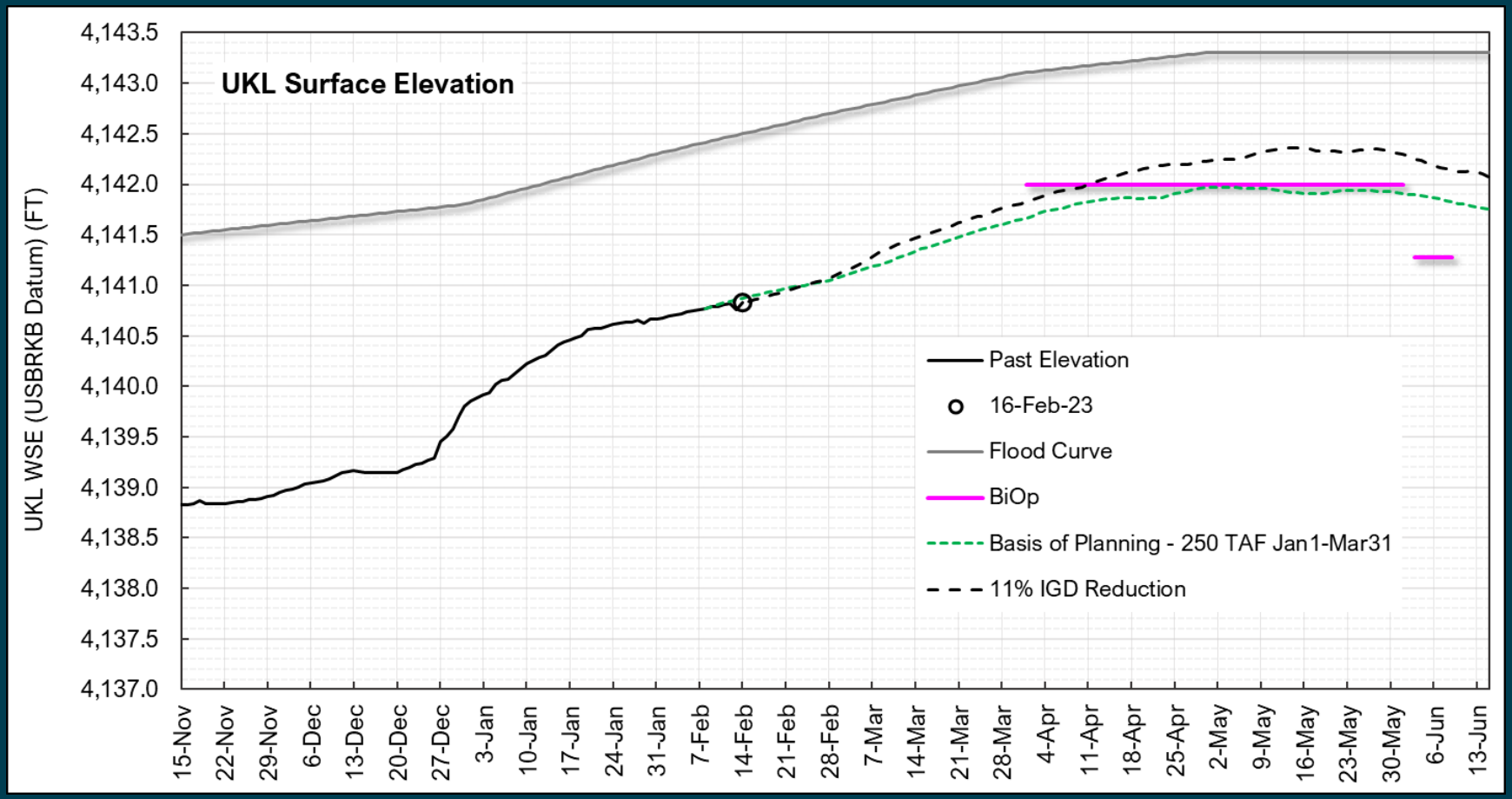
Temporary Operation Procedures

Reclamation Assessment

- Reclamation intends to balance risk between the ESA requirements by planning for a net inflow to UKL of approximately 245 TAF between Jan 1 and Apr 1.

- Consistent with the NMFS-USFWS-Reclamation agreement, Reclamation will take the following actions under the TOP
  - Beginning Wednesday 2/15, flows at Iron Gate Dam will be reduced 11% below minimum flow rates in the NMFS Biological Opinion
  - Monitoring (ongoing) will establish the number of known redds that are dewatered by the 11% reduction
  - If monitoring shows that three or fewer of the known redds are dewatered, an additional 5% reduction will be implemented (for a total reduction of 16%)
  - Reclamation will continue weekly adaptive management measures to adjust to information on hydrologic and biological conditions, as it becomes available

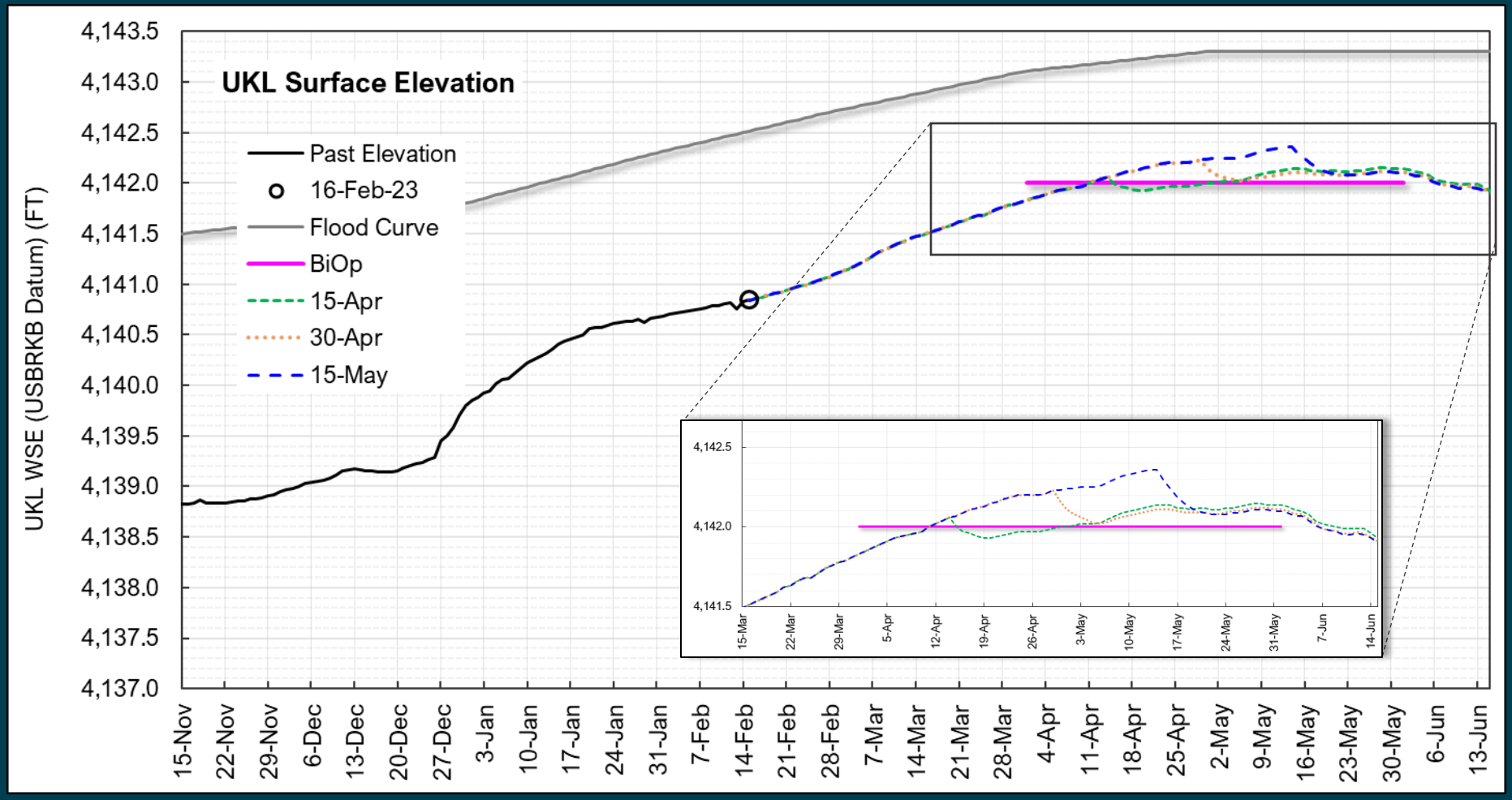
UKL Water Surface Elevation – TOP



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

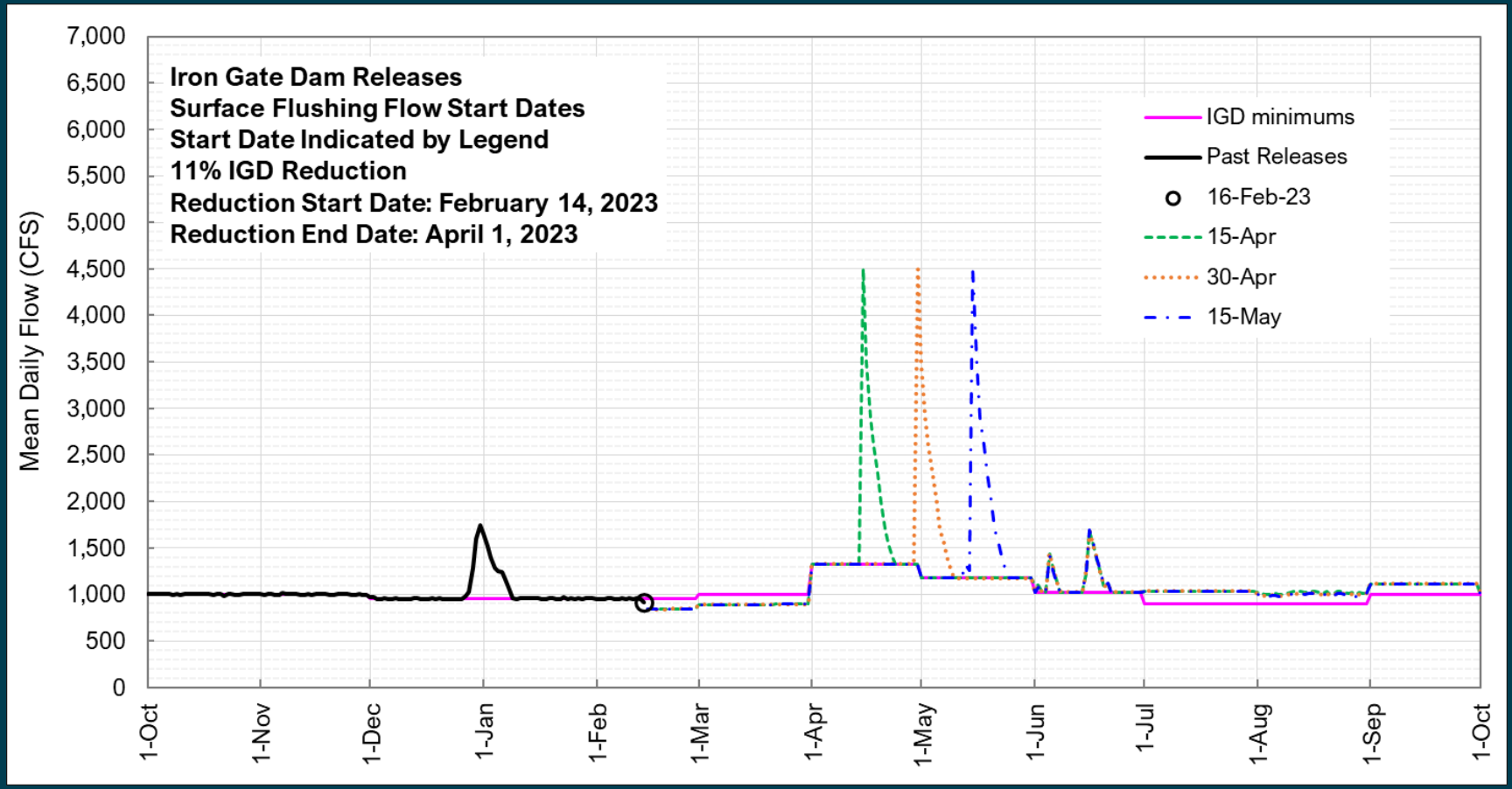
UKL Water Surface Elevation – TOP (Surface Flushing Flow)



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



Surface flushing flow Day 1 flow rate = 4500 CFS across each trigger date; each iteration follows BiOp-required rampdown rates following flushing flow event

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

WY2023 observed IGD release data are provisional

Proposed Schedule

Jan 26 – Finalization of Temporary Operating Procedures

Feb 01 – Nation to Nation meeting convened

Feb 08 – Nation to Nation meeting with the Department of the Interior

Feb 15 – Flows reduced by 11% at IGD

Thru Apr 1 – continue monitoring redds, weekly FASTA to discuss and adjust the TOP, to achieve and remain above 4,142.00 ft. on UKL in April and May

Technical Input Requests

Reclamation is seeking input on the following technical topics:

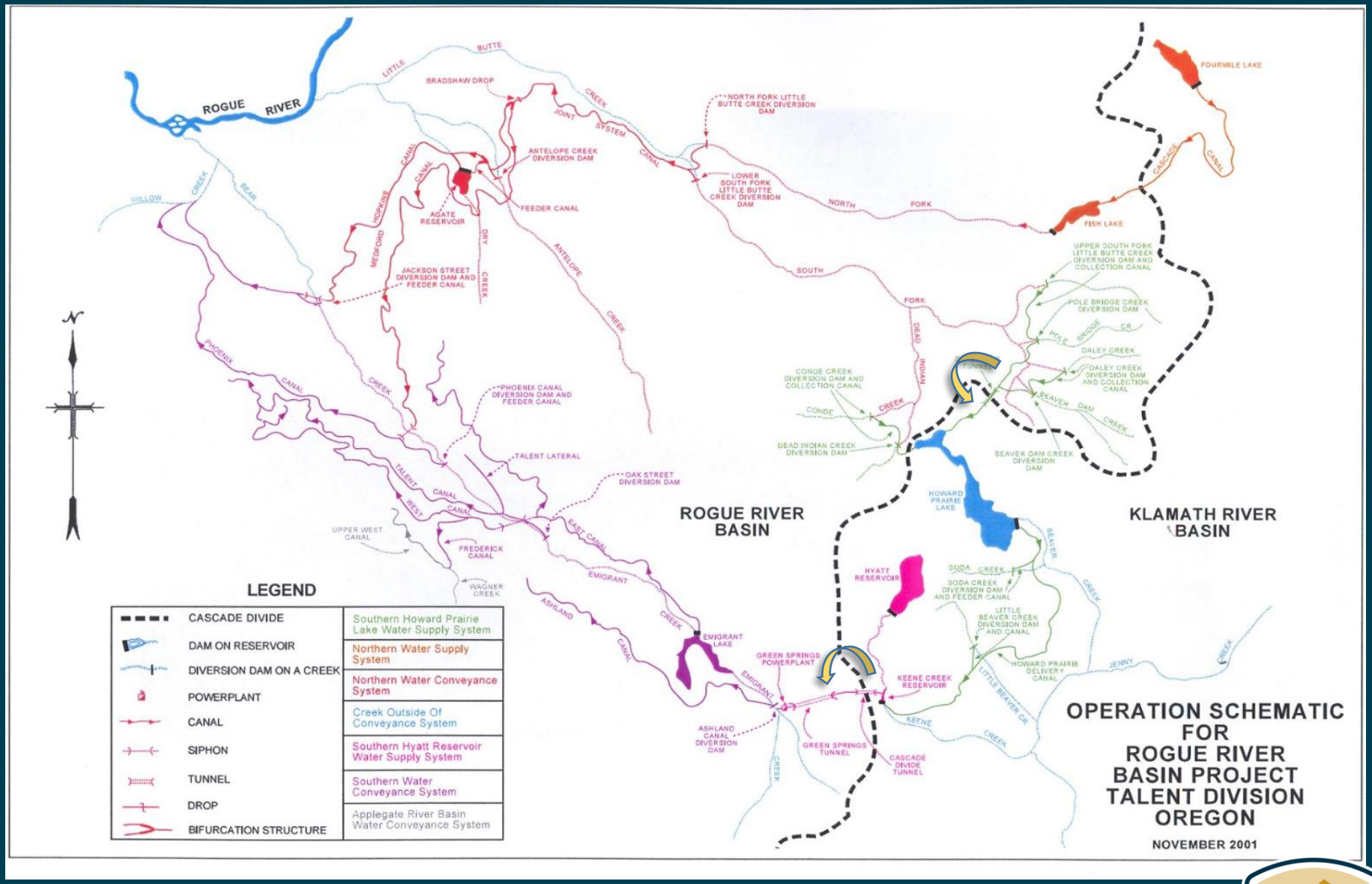
- **The stated objective of exceeding 4,142.00 feet in Upper Klamath Lake by April 1, as a means of balancing risks to all ESA species**
- **The assessment of what the likely conditions on April 1 will be, based on available information**
- **The timing and magnitude of reductions to minimum flows that would minimize risks to salmon, as it relates to attaining 4,142.00 in Upper Klamath Lake by April 1**

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


ROGUE RIVER
BUTTE
LITTLE
BRADSHAW DROP
CREEK
JOINT SYSTEM CANAL
NORTH FORK LITTLE BUTTE CREEK DIVERSION DAM
ANTELOPE CREEK DIVERSION DAM
FEEDER CANAL
AGATE RESERVOIR
HOPKINS CANAL
MEDFORD CANAL
DRY CREEK
JACKSON STREET DIVERSION DAM AND FEEDER CANAL
ANTELOPE CREEK
LOWER SOUTH FORK LITTLE BUTTE CREEK DIVERSION DAM
NORTH FORK
SOUTH FORK
FOURMILE LAKE
CASCADE CANAL
FISH LAKE
UPPER SOUTH FORK LITTLE BUTTE CREEK DIVERSION DAM AND COLLECTION CANAL
POLE BRIDGE CREEK DIVERSION DAM
POLE BRIDGE CR
DALEY CREEK
DALEY CREEK DIVERSION DAM AND COLLECTION CANAL
BEAVER DAM CREEK
BEAVER DAM CREEK DIVERSION DAM
DEAD INDIAN CREEK
TUNNEL
CONDE CREEK DIVERSION DAM AND COLLECTION CANAL
CONDE CREEK
DEAD INDIAN CREEK DIVERSION DAM
WILLOW CREEK
BEAR CREEK
PHOENIX CANAL
PHOENIX CANAL DIVERSION DAM AND FEEDER CANAL
TALENT LATERAL
OAK STREET DIVERSION DAM
TALENT WEST CANAL
UPPER WEST CANAL
FREDERICK CANAL
WAGNER CREEK
EAST CANAL
EMIGRANT CREEK
ASHLAND CANAL
EMIGRANT LAKE
ASHLAND CANAL DIVERSION DAM
GREEN SPRINGS POWERPLANT
GREEN SPRINGS TUNNEL
CASCADE DIVIDE TUNNEL
ROGUE RIVER BASIN
KLAMATH RIVER BASIN
HOWARD PRAIRIE LAKE
BEAVER CREEK
HYATT RESERVOIR
SODA CREEK
SODA CREEK DIVERSION DAM AND FEEDER CANAL
LITTLE BEAVER CREEK DIVERSION DAM AND CANAL
HOWARD PRAIRIE DELIVERY CANAL
JENNY CREEK
KEENE CREEK RESERVOIR
LITTLE BEAVER CR
KEENE CREEK
LEGEND
CASCADE DIVIDE
DAM ON RESERVOIR
DIVERSION DAM ON A CREEK
POWERPLANT
CANAL
SIPHON
TUNNEL
DROP
BIFURCATION STRUCTURE
Southern Howard Prairie Lake Water Supply System
Northern Water Supply System
Northern Water Conveyance System
Creek Outside Of Conveyance System
Southern Hyatt Reservoir Water Supply System
Southern Water Conveyance System
Applegate River Basin Water Conveyance System
OPERATION SCHEMATIC
FOR
ROGUE RIVER
BASIN PROJECT
TALENT DIVISION
OREGON
NOVEMBER 2001

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, February 16, 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	6.1	8.0	76	21.5	24.8	87
Chemult Alternate	4850	8.5	6.8	125	14.1	16.2	87
Gerber Reservoir	4890	1.3	0.4(22)	325	8.0	7.6(22)	105
Taylor Butte	5030	7.2	6.2	116	10.7	11.6	92
Crowder Flat	5170	-M	3.5(21)	*	8.6	9.1(21)	95
Billie Creek Divide	5280	17.7	15.6	113	27.0	31.4	86
Diamond Lake	5280	6.6	11.2	59	22.7	28.0	81
Sun Pass	5400	16.0	13.8(14)	116	20.9	22.9(14)	91
Sevenmile Marsh	5700	20.8	21.5	97	32.2	37.0	87
Quartz Mountain	5720	3.5	1.0(27)	350	10.4	7.7(17)	135
Silver Creek	5740	8.9	8.2	109	12.2	13.8	88
Strawberry	5770	6.9	4.3	160	11.4	11.9	96
Cold Springs Camp	5940	16.9	21.0	80	19.7	34.2	58
Fourmile Lake	5970	15.4	18.2	85	26.6	32.4	82
Annie Springs	6010	28.6	25.7(20)	111	33.9	38.8(20)	87
Crazyman Flat	6180	13.8	10.7(19)	129	14.3	18.6(19)	77
Swan Lake Mtn	6830	20.4	15.7(14)	130	22.7	19.5(14)	116
Summer Rim	7080	7.6	12.0	63	10.3	13.9	74
Basin Index (%)				**103**			**86**

-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.

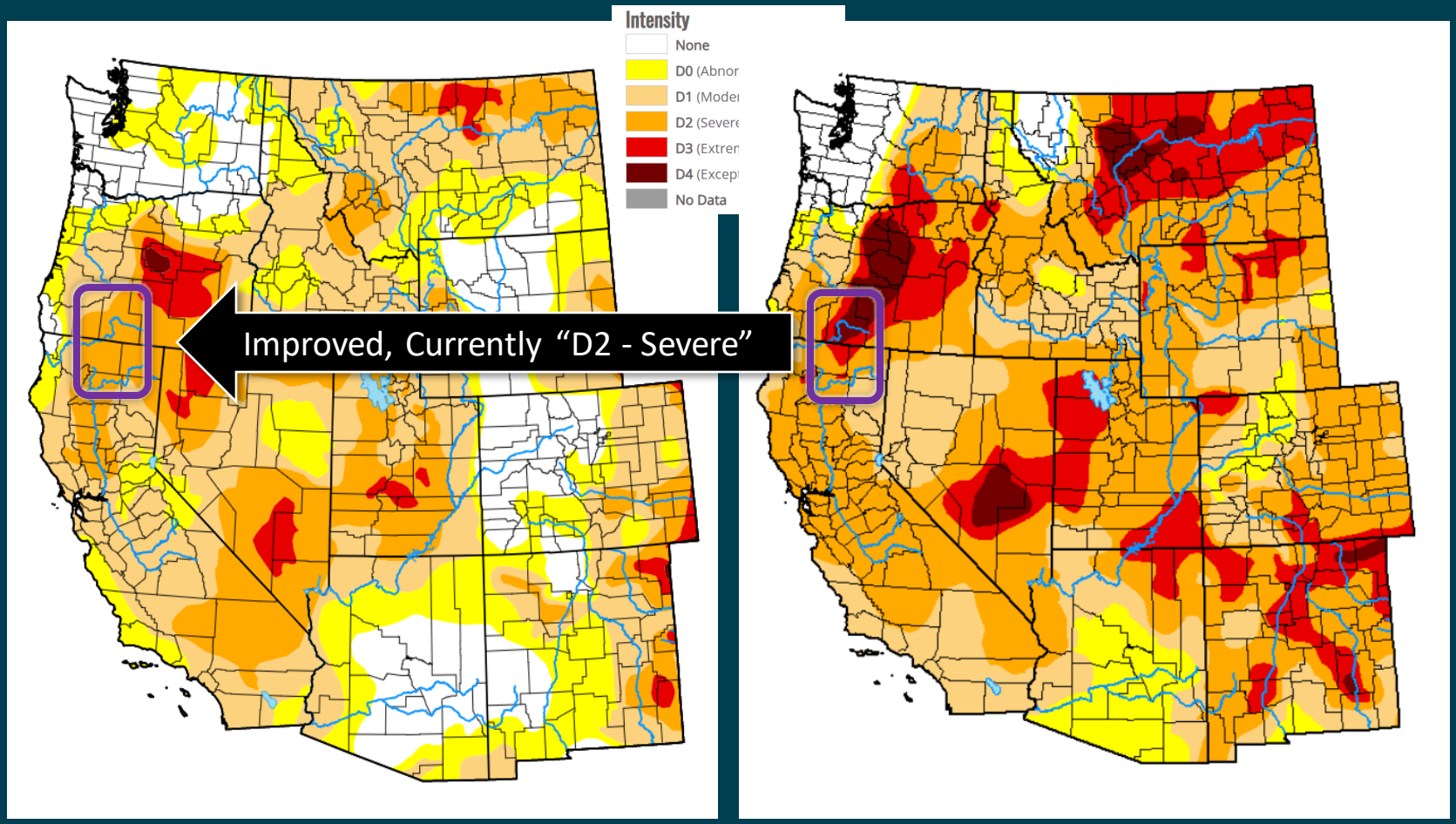
The WATER YEAR-TO-DATE-PRECIPITATION represents total precipitation since October 1st, expressed in inches.

Contact your state water supply staff for assistance.

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

Provisional data, subject to revision.

United States Drought Monitor – West Region

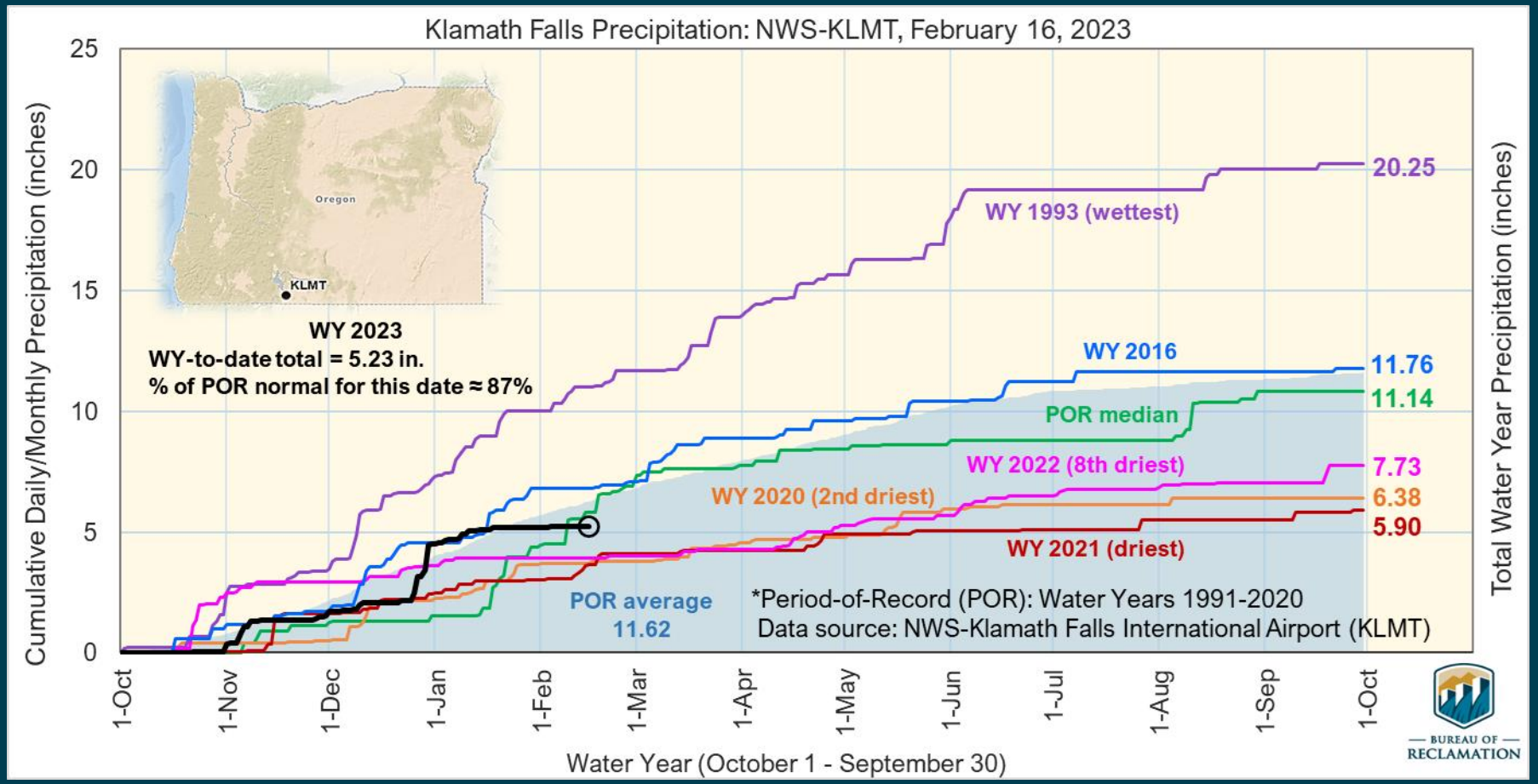


February 09, 2023

February 08, 2022

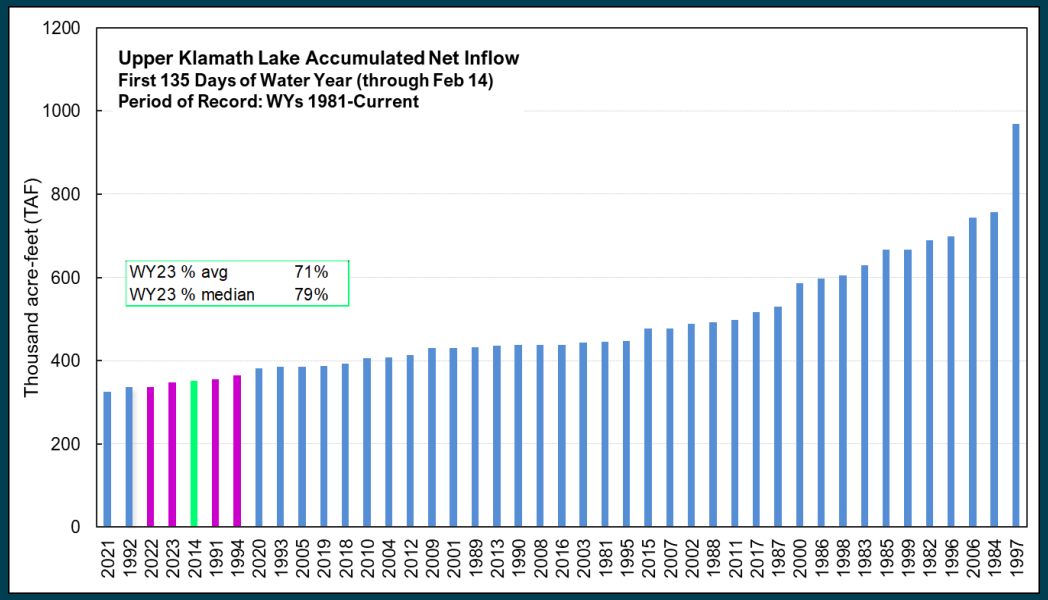
https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?OR

Klamath Falls Airport Met Station – National Weather Service



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

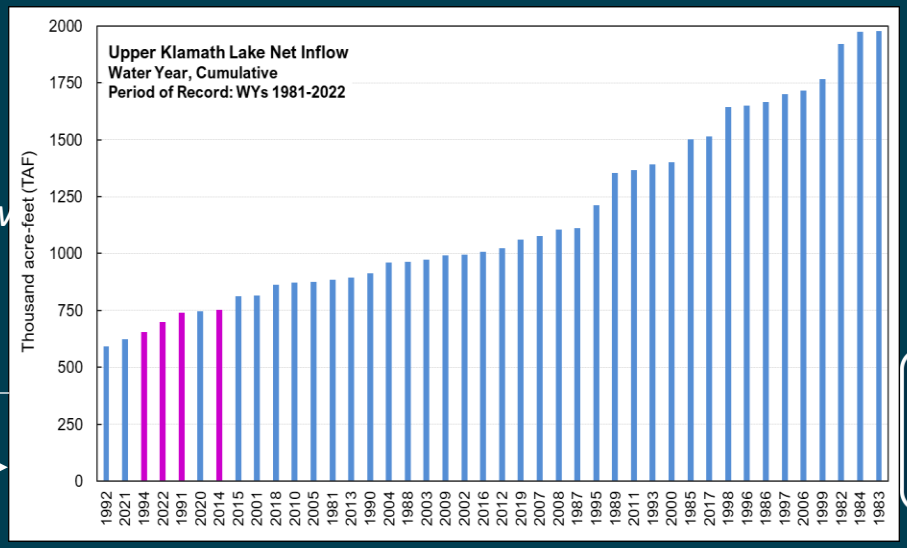
UKL Net Inflow Water - Year 2023 & Nearest Neighboring Water Years for Net Inflows to-Date



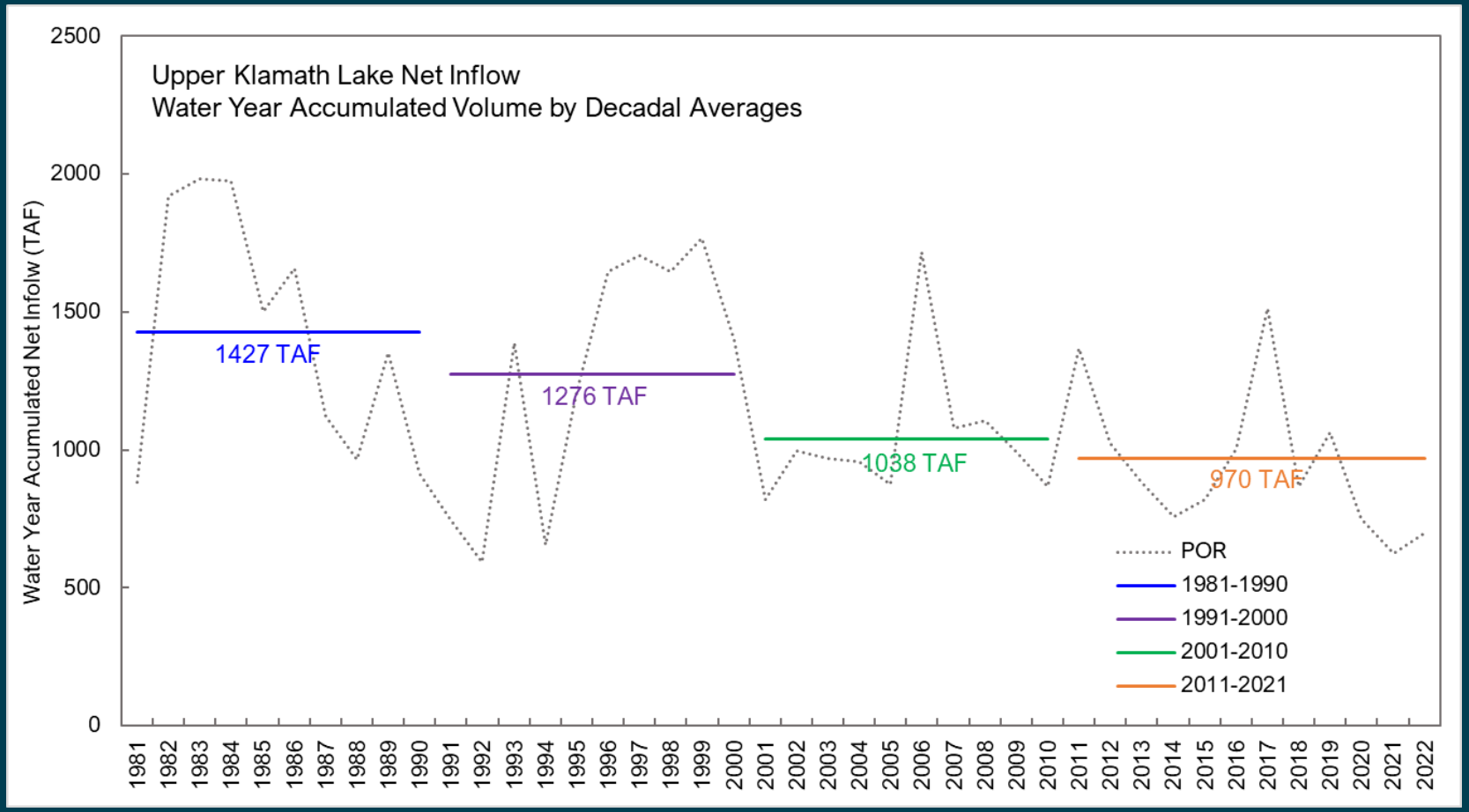
*Total **Precip** is somewhat below normal but **Inflow** has remained well outside of the Historical **standard deviation**. Our hypothesis for why is related to dry conditions that have intercepted and retain moisture, as evidenced in baseflow levels into UKL (See upcoming slide on Williamson River).*

WY2022/2023 data are provisional and subject to revision

While not intended to be a forecast, it is often helpful to recall what happened in years that had equivalent volumes of inflow at this point in the year.

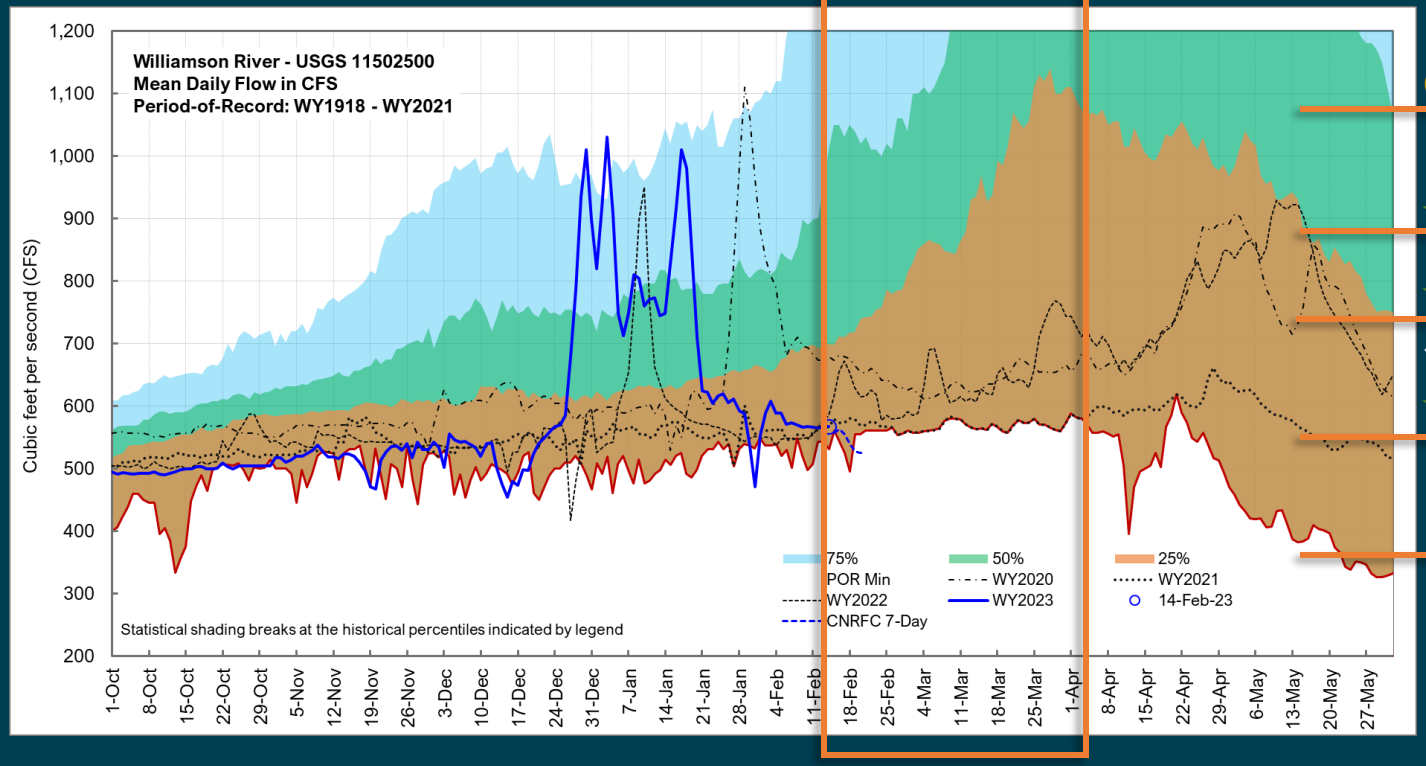


Upper Klamath Lake Net Inflow



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

Williamson River is a Strong Indicator of Net Inflow at UKL



NRCS 50% 6-wk avg – 36 TAF

35 TAF/wk, NET inflow to UKL

NRCS 75% 6-wk avg – 31 TAF

30 TAF/wk

CNRFC 50% 6-wk avg – 24 TAF

CNRFC 75% 6-wk avg – 21 TAF

20 TAF/wk

KBAO Scenario – 19 TAF

CNRFC 90% 6-wk avg – 18 TAF

15 TAF/wk

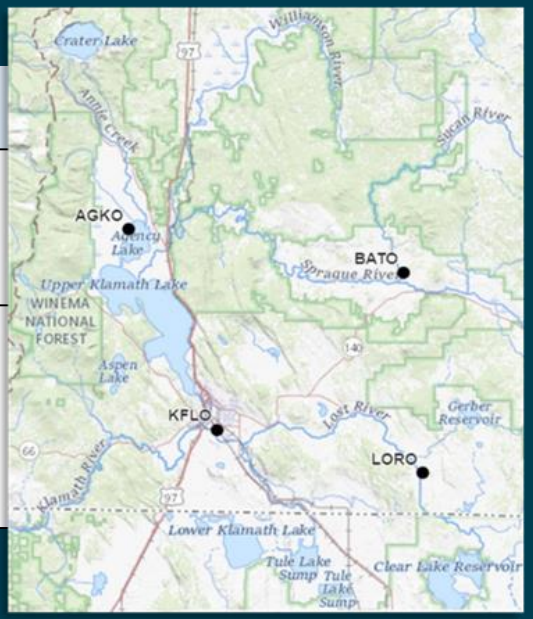
10 TAF/wk

WY2022/2023 data are provisional and subject to revision

Klamath Basin AgriMet – USBR Water Year (WY) 2023

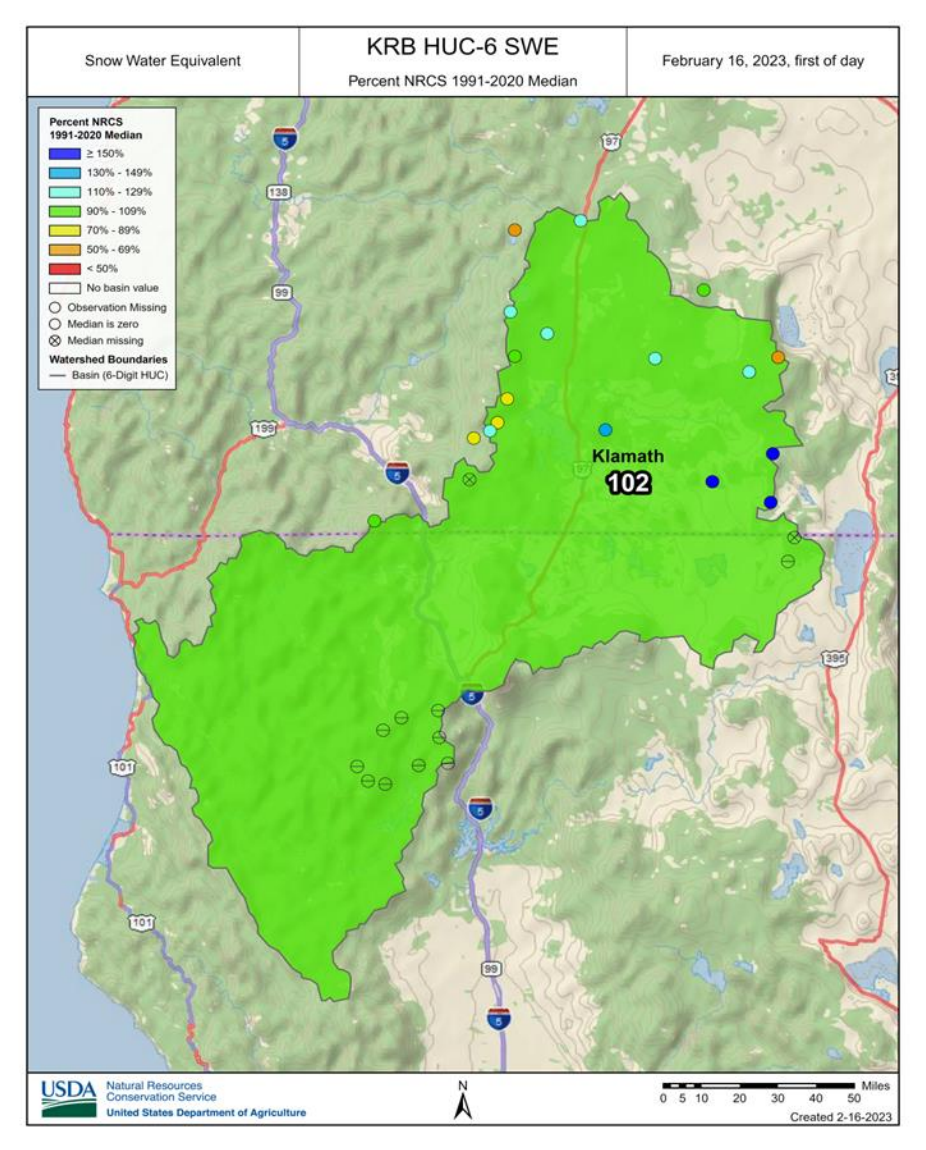
Klamath Basin AgriMet Stations - Water Year-to-date Precipitation (through below date)
Wednesday, February 15, 2023

Station (POR)	WY2023 Total PREC (in.)	POR Median PREC (in.)	Percent POR Median	CBTT	PCODE	SDI	ELEV (ft.)
Lorella (2002-2021)	4.78	5.40	89%	LORO	PU	200586	4159
Beatty (2005-2021)	4.82	4.98	97%	BATO	PU	200522	4319
Agency (2001-2021)	8.57	8.06	106%	AGKO	PU	200542	4149
KFalls (1999-2021)	6.21	6.20	100%	KFLO	PU	200553	4099



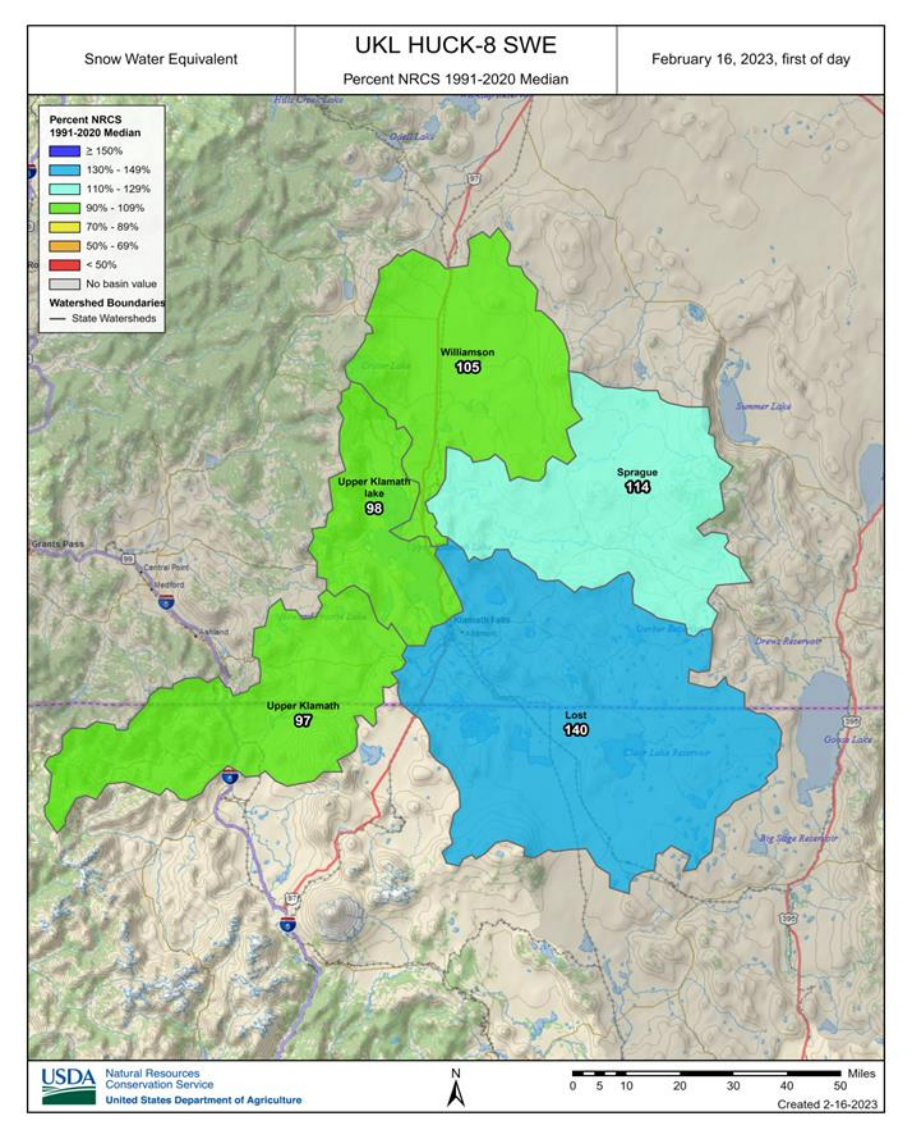
https://www.usbr.gov/lc/region/g4000/riverops/_HdbDataViewer.html?query=svr=kbohdb&sdi=200586%2C200522%2C200542%2C200553&tstp=DY&t1=2022-10-01T00:00&t2=2023-09-30T00:00&table=R&mrid=0&format=json

NRCS Klamath River Basin (KRB) HUC-6 SWE WY2023



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

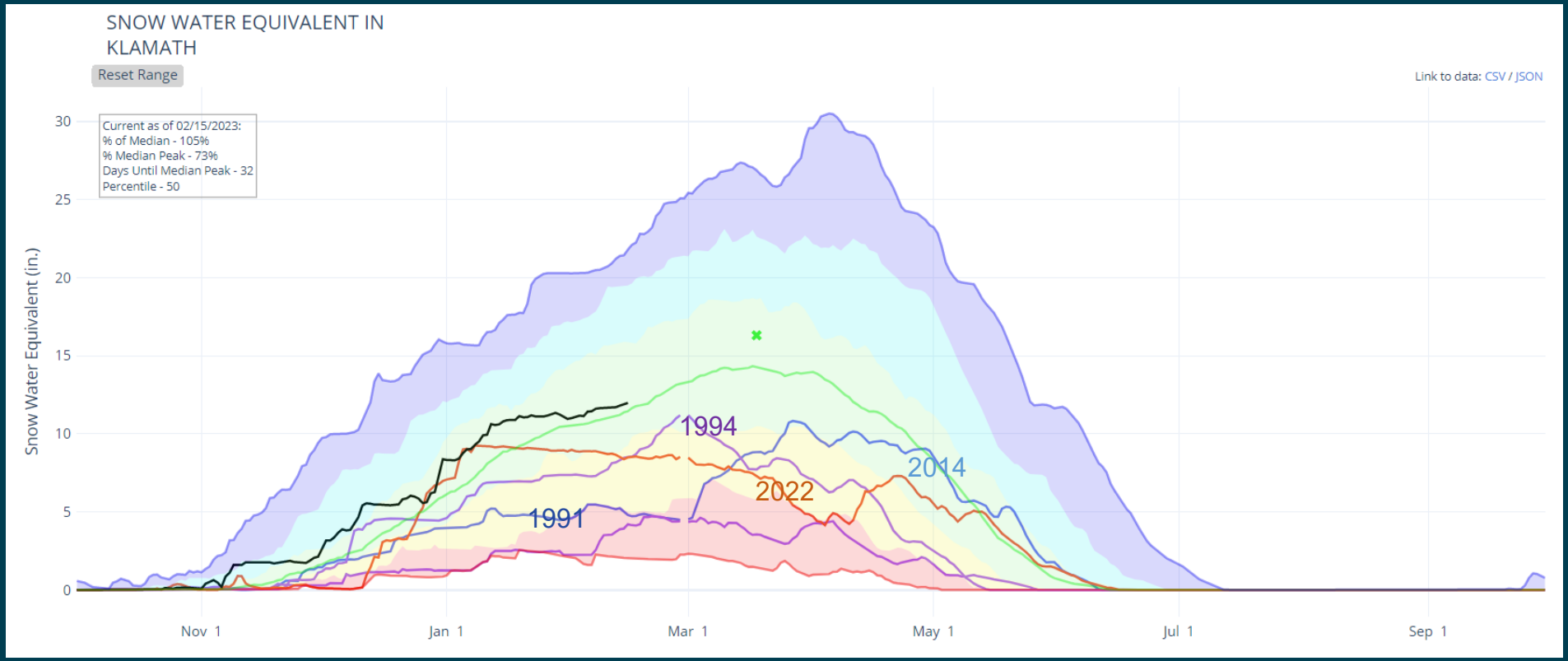
NRCS Upper Klamath Basin (UKB) HUC-8 SWE WY2023



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

Klamath Falls Weather Forecast - NWS
16 February 2022

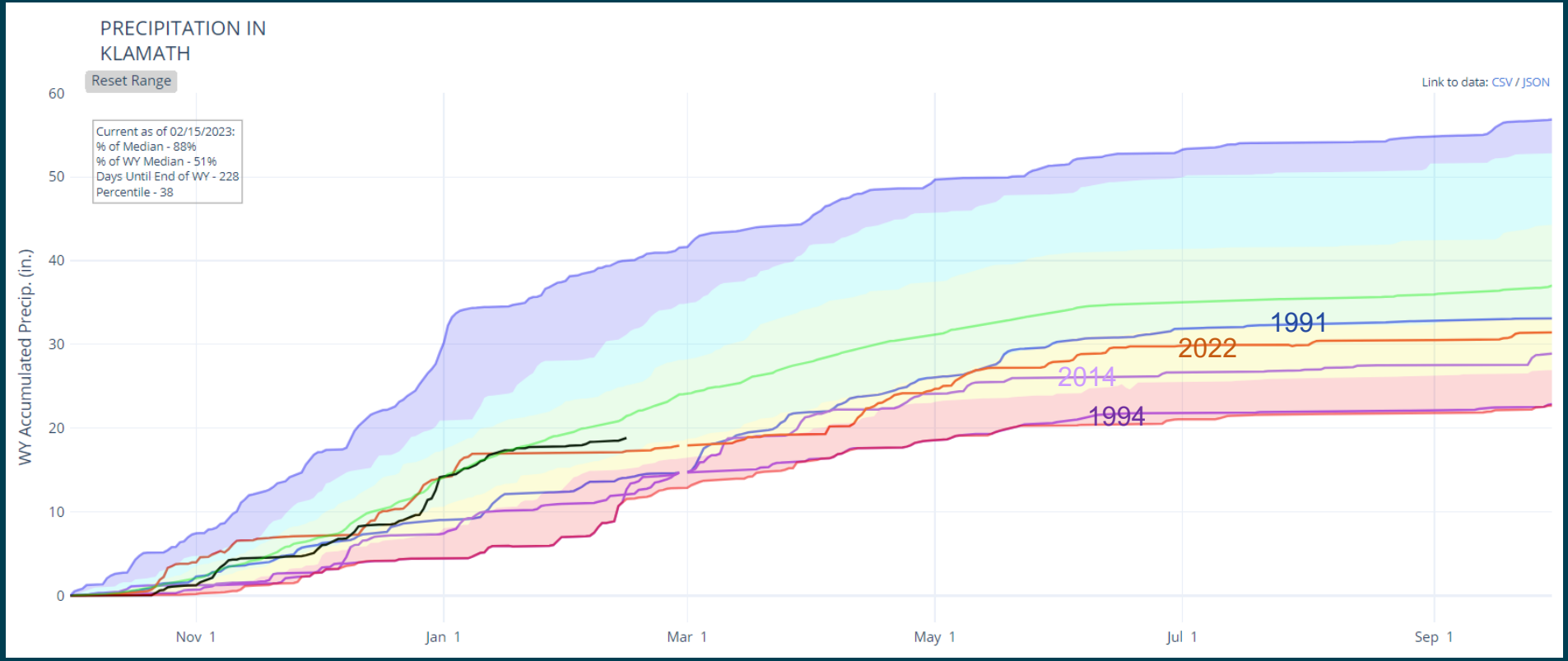
NRCS Upper Klamath Basin Snow Water Equivalent (SWE) Water Year 2023 & Nearest Neighboring Water Years for Net Inflow-to-date



Statistical shading breaks at the 10th, 30th, 50th, 70th, and 90th percentiles

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

Upper Klamath Basin Precipitation - NRCS Water Year 2023 & Nearest Neighboring Water Years for Net Inflows to-Date



Statistical shading breaks at the 10th, 30th, 50th, 70th, and 90th percentiles

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

Klamath Falls Weather Forecast - NWS
16 February 2022

Detailed Forecast

Today	Mostly sunny, with a high near 45. East northeast wind around 7 mph becoming south southeast in the afternoon.
Tonight	Mostly cloudy, with a low around 20. East wind 5 to 7 mph.
Friday	Sunny, with a high near 48. Northeast wind around 6 mph becoming calm in the morning.
Friday Night	Mostly clear, with a low around 19. North wind 3 to 5 mph.
Saturday	Mostly sunny, with a high near 50. Calm wind becoming west around 6 mph in the afternoon.
Saturday Night	Partly cloudy, with a low around 23.
Sunday	Mostly sunny, with a high near 53.
Sunday Night	Partly cloudy, with a low around 28.
Washington's Birthday	Partly sunny, with a high near 50.
Monday Night	A slight chance of snow after 4am. Mostly cloudy, with a low around 29.
Tuesday	A chance of snow. Partly sunny, with a high near 43.
Tuesday Night	A chance of snow. Mostly cloudy, with a low around 20.
Wednesday	A chance of snow. Partly sunny, with a high near 35.

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

Orleans Weather Forecast - NWS
16 February 2022

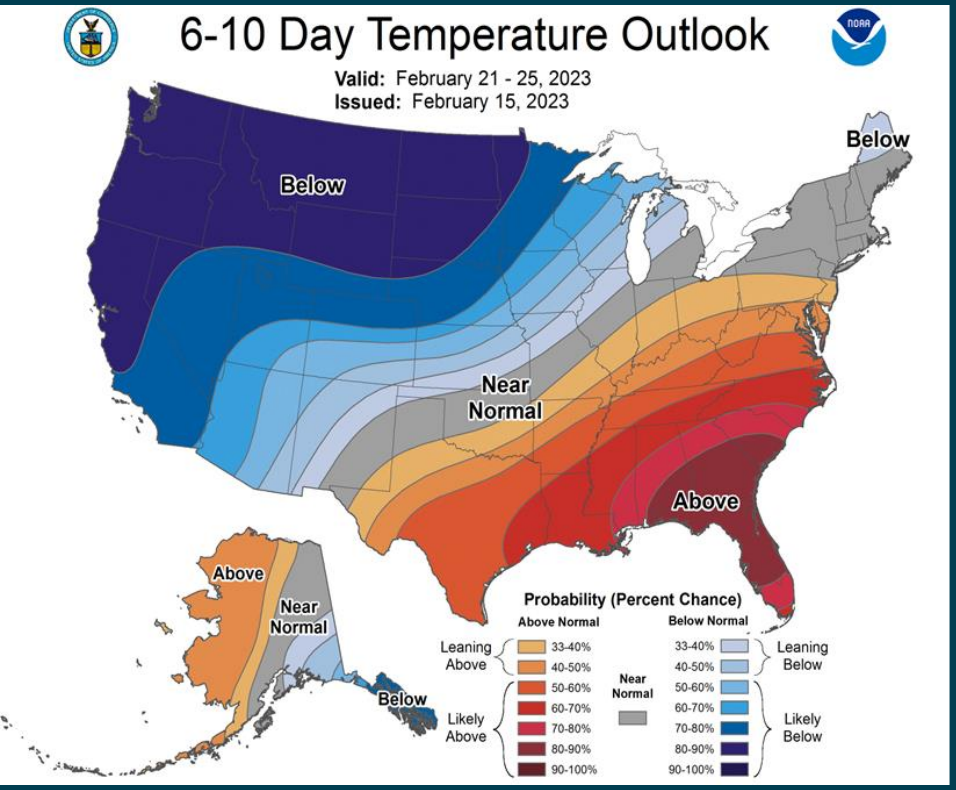
Today	Tonight	Friday	Friday Night	Saturday	Saturday Night	Sunday	Sunday Night	Washington's Birthday
								
Mostly Cloudy	Decreasing Clouds	Sunny	Mostly Clear	Mostly Sunny	Partly Cloudy	Sunny	Partly Cloudy	Partly Sunny
High: 51 °F	Low: 34 °F	High: 57 °F	Low: 34 °F	High: 61 °F	Low: 38 °F	High: 66 °F	Low: 43 °F	High: 62 °F

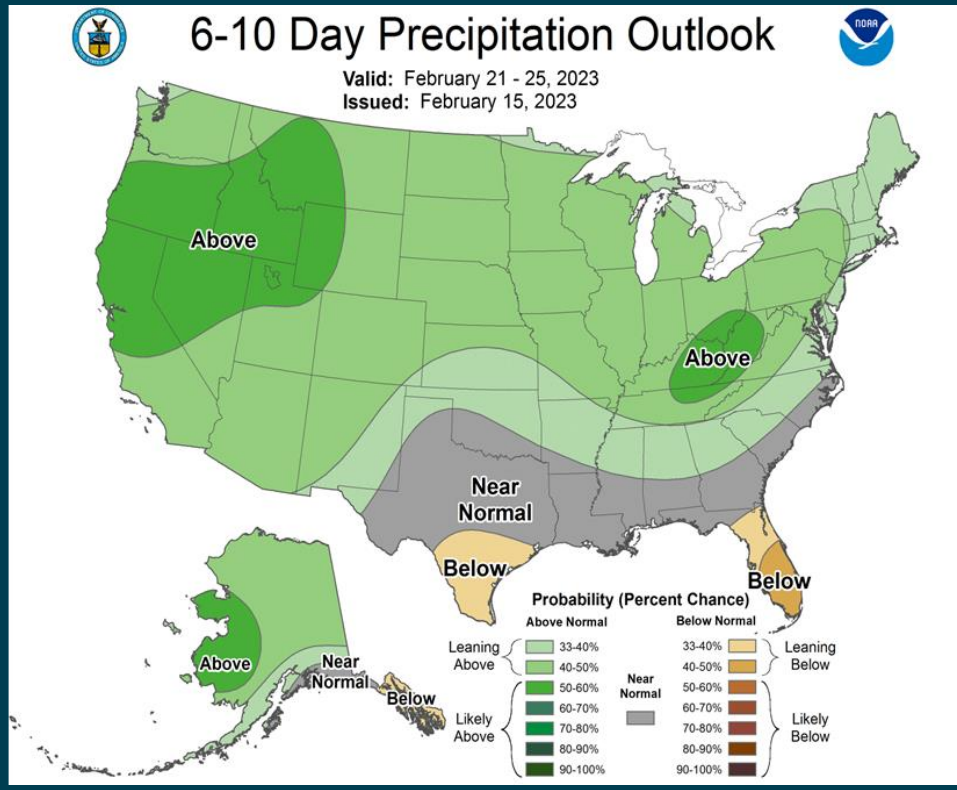
Orleans Weather Forecast - NWS
16 February 2022

Detailed Forecast	
Today	Mostly cloudy, with a high near 51. Light and variable wind.
Tonight	Cloudy, then gradually becoming partly cloudy, with a low around 34. North northeast wind 3 to 5 mph.
Friday	Sunny, with a high near 57. North northeast wind 5 to 8 mph.
Friday Night	Mostly clear, with a low around 34. North wind 9 to 11 mph.
Saturday	Mostly sunny, with a high near 61. North wind 3 to 6 mph.
Saturday Night	Partly cloudy, with a low around 38. East northeast wind 5 to 8 mph.
Sunday	Sunny, with a high near 66.
Sunday Night	Partly cloudy, with a low around 43.
Washington's Birthday	Partly sunny, with a high near 62.
Monday Night	A slight chance of rain after 4am. Mostly cloudy, with a low around 43.
Tuesday	Rain likely. Partly sunny, with a high near 51.
Tuesday Night	Rain and snow likely. Mostly cloudy, with a low around 34.
Wednesday	Rain and snow likely. Mostly cloudy, with a high near 42.

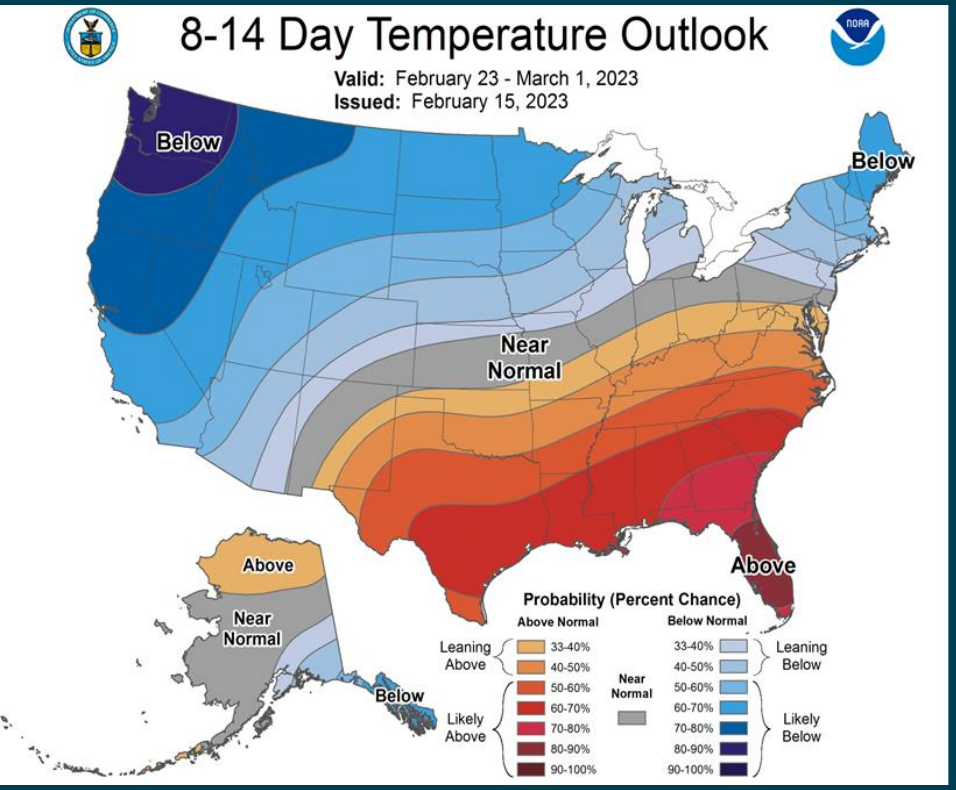
https://forecast.weather.gov/MapClick.php?lat=41.3026&lon=-123.538#.Ybtn56hKjlU

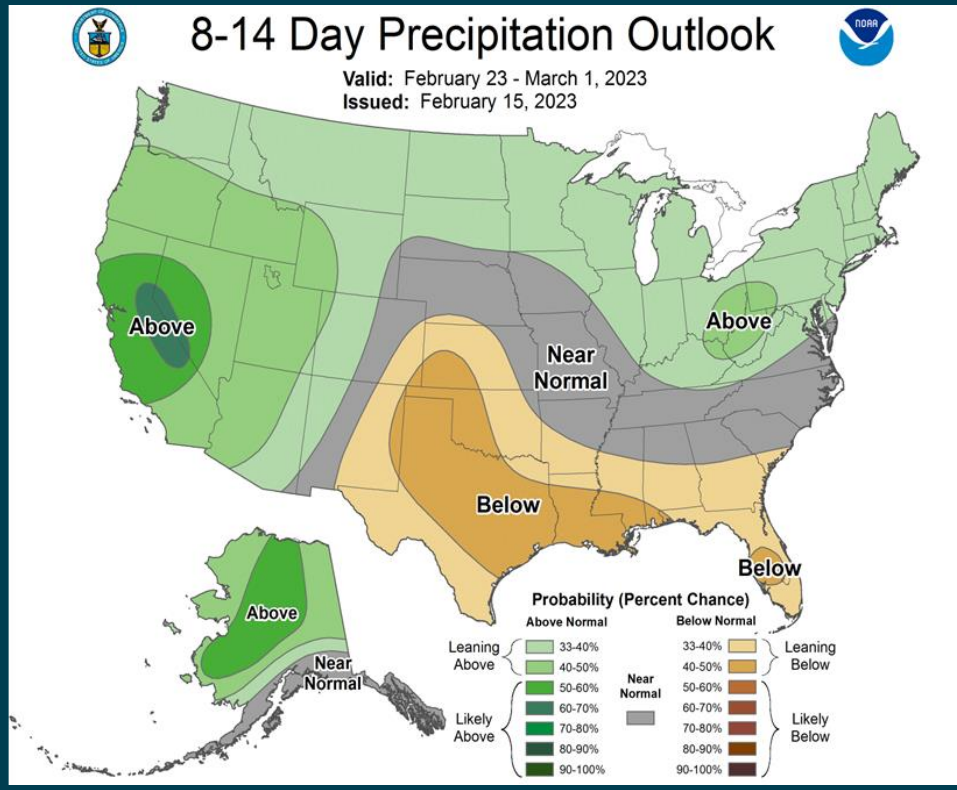
6-10 Day Weather Outlook



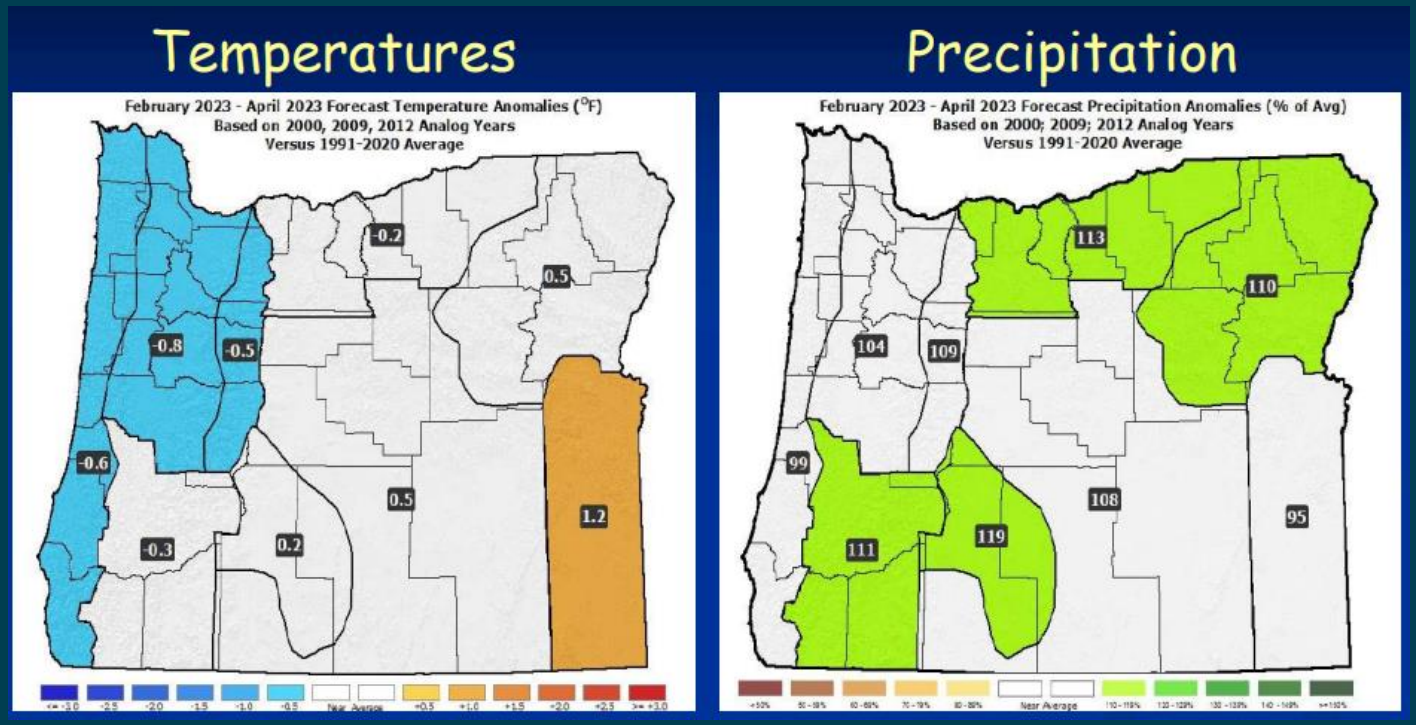


8-14 Day Weather Outlook





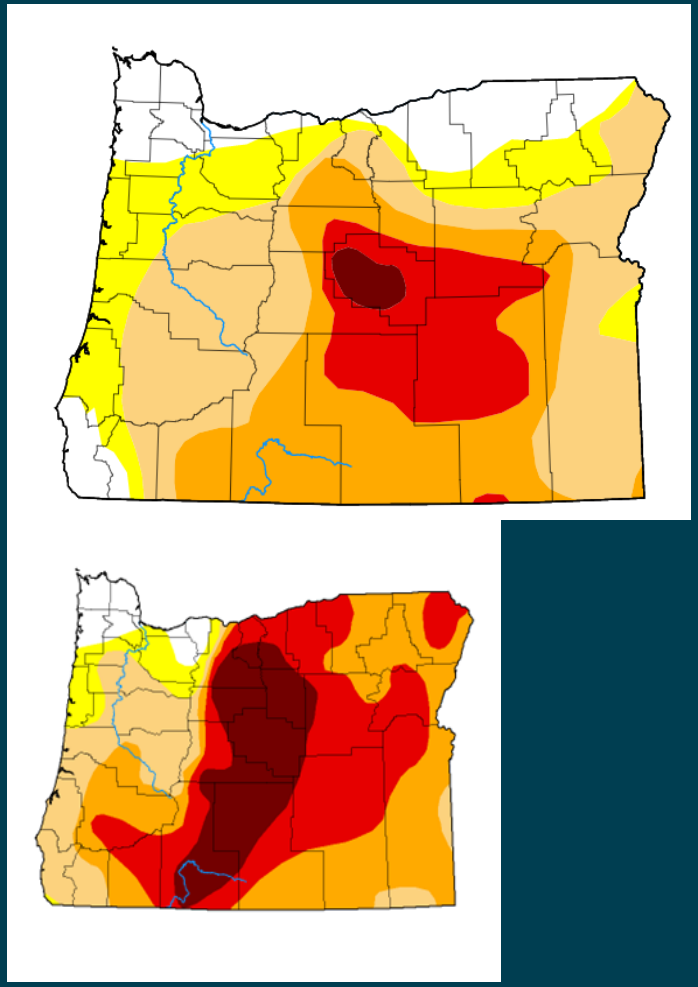
Seasonal Climate Forecast - ODA
Feb 2023 – Apr 2023



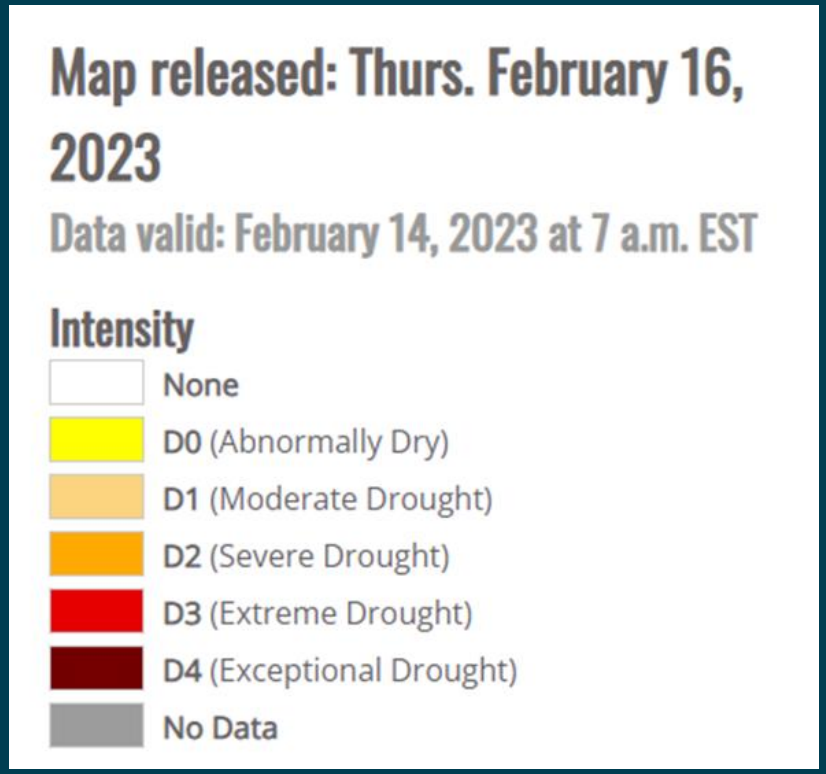
Large monthly temperature variations likely, but those may "balance out" over the 3-month period. Heightened chances for a cold outbreak in February, which would skew temperatures colder than those shown. Near or slightly above-average precipitation

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

United States Drought Monitor - Oregon

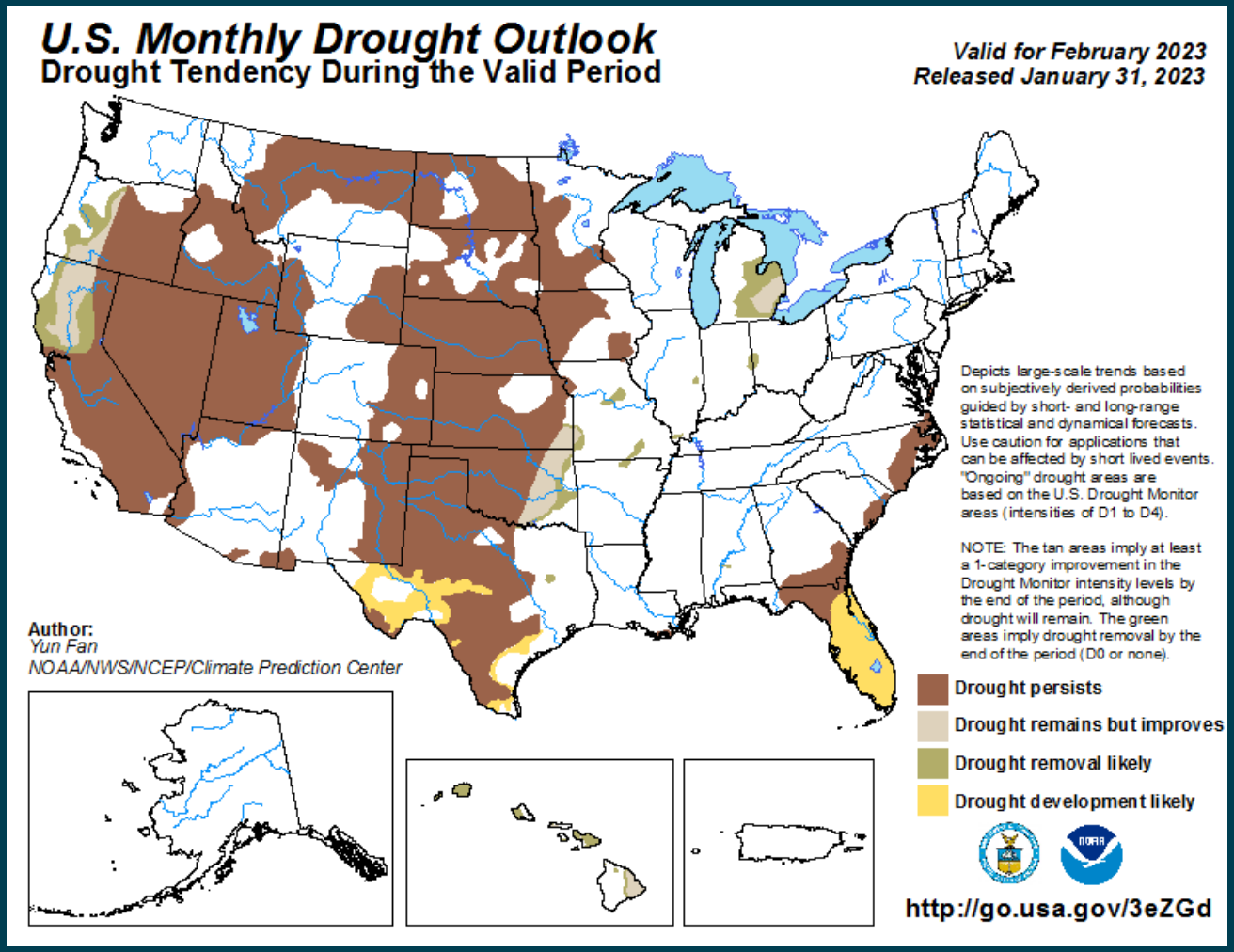


February 15,2022



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

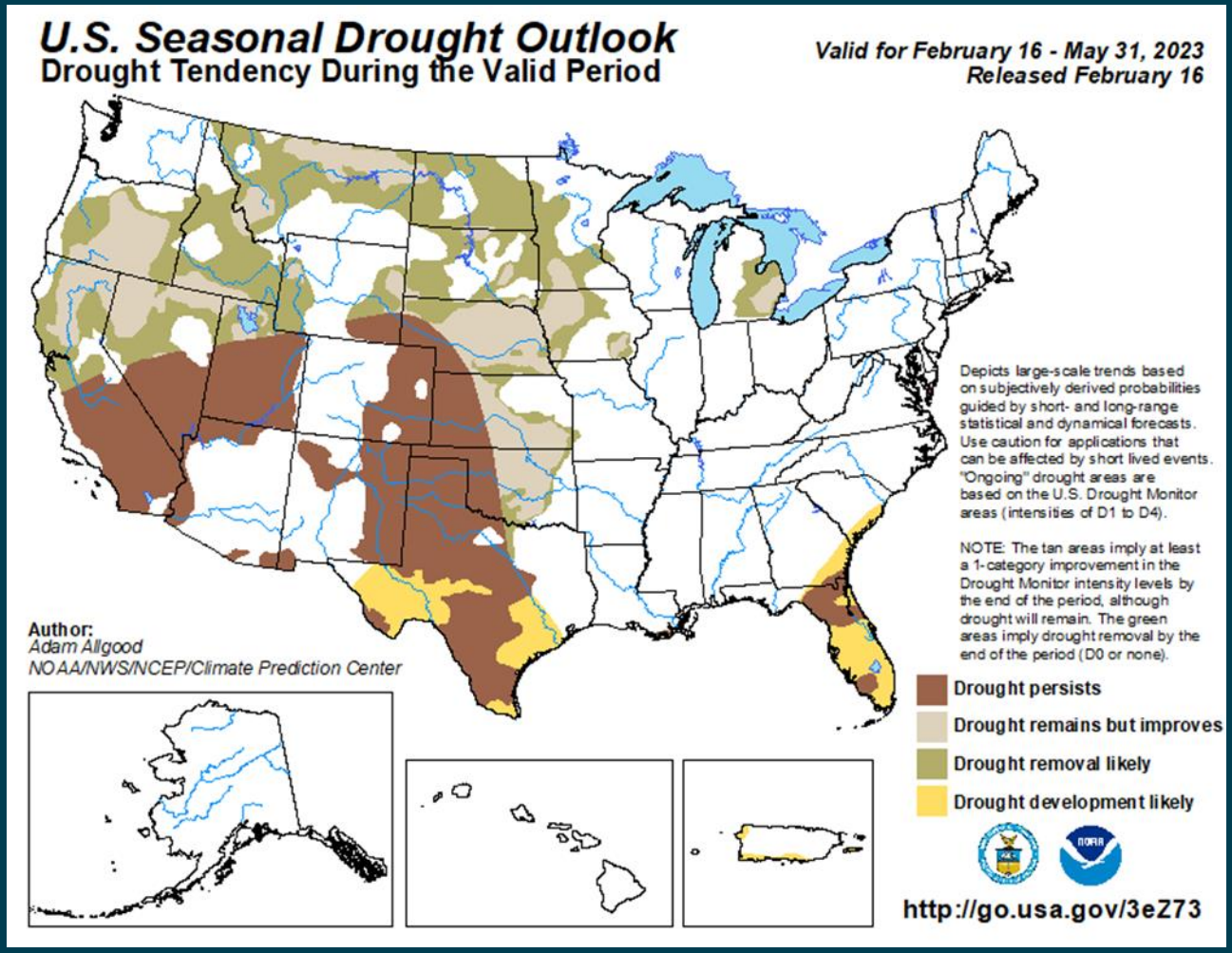
U.S. Monthly Drought Outlook - February 2023



Next Seasonal Outlook issuance date: **February 28, 2023, at 3:00pm EDT**

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

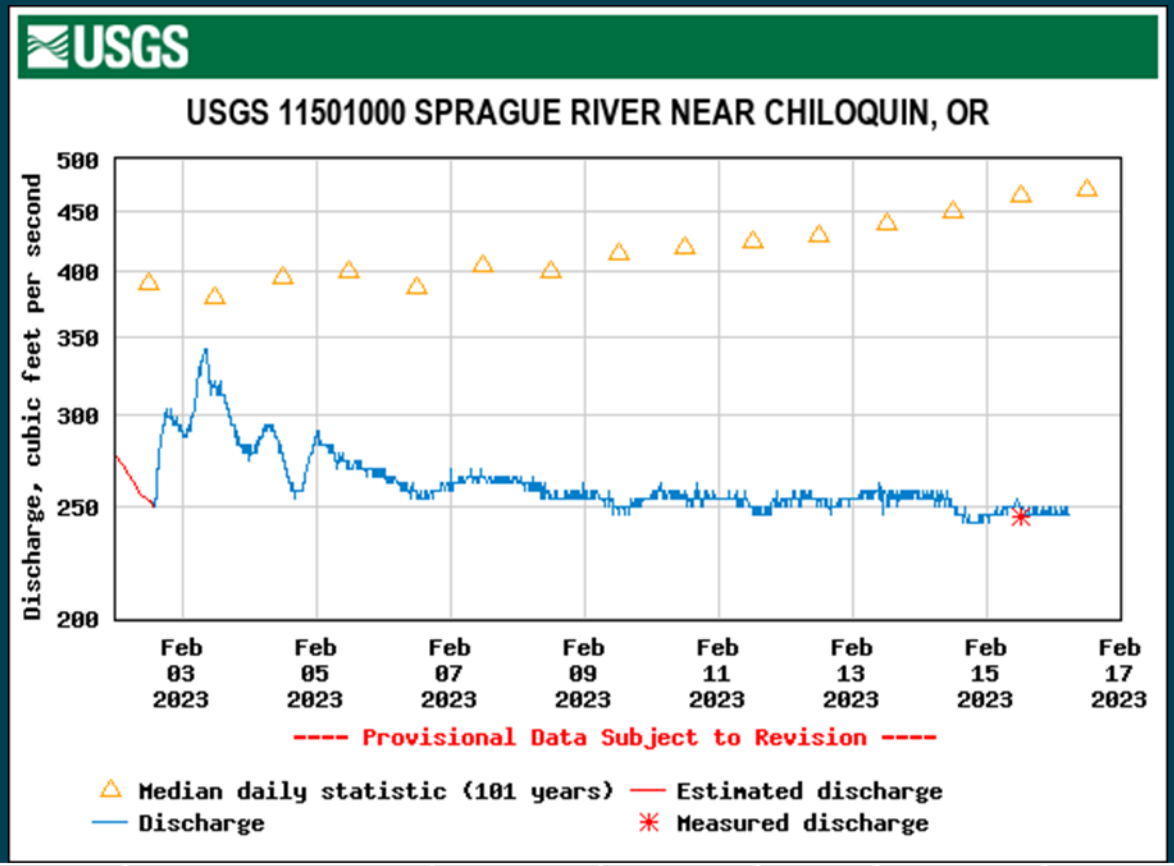
U.S. Seasonal Drought Outlook
February 1– April 30, 2023



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

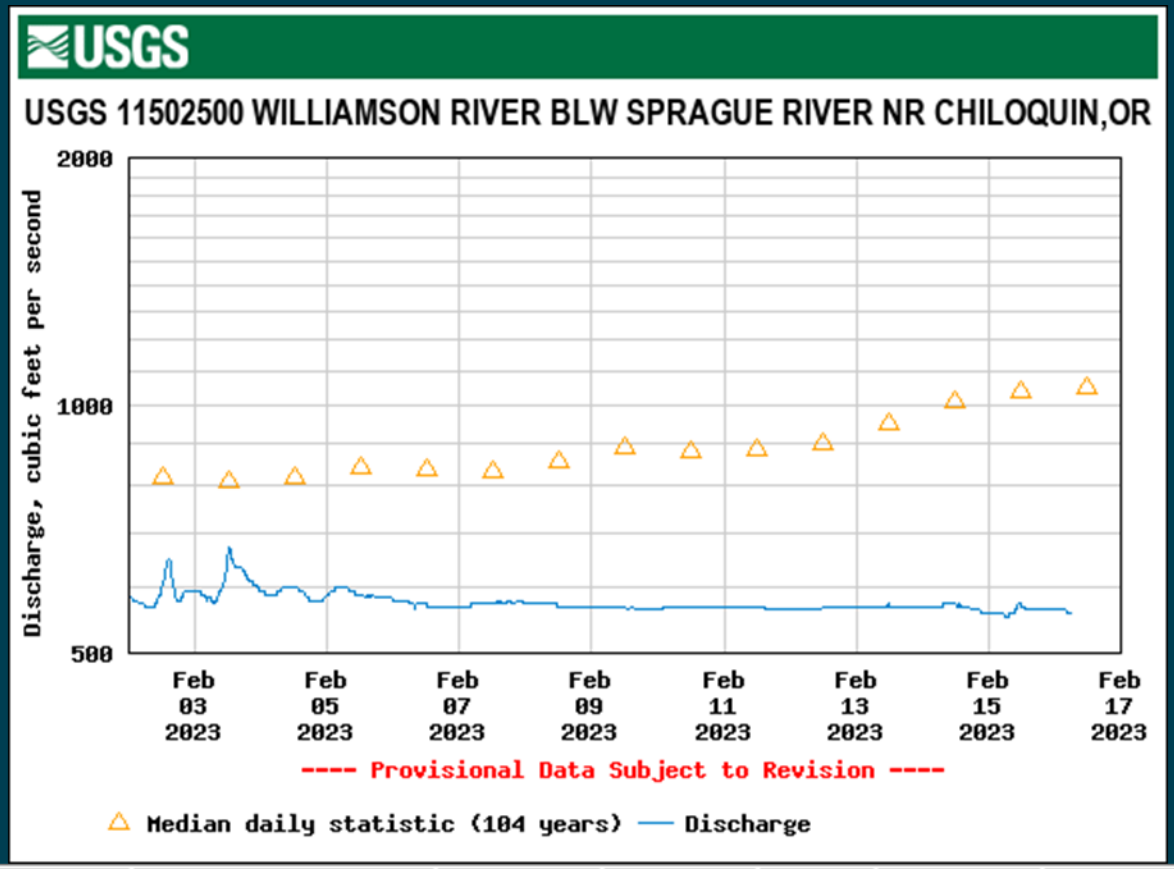
https://www.cpc.ncep.noaa.gov/products/expert_assessment/sdo_summary.php

Sprague River - USGS 11501000



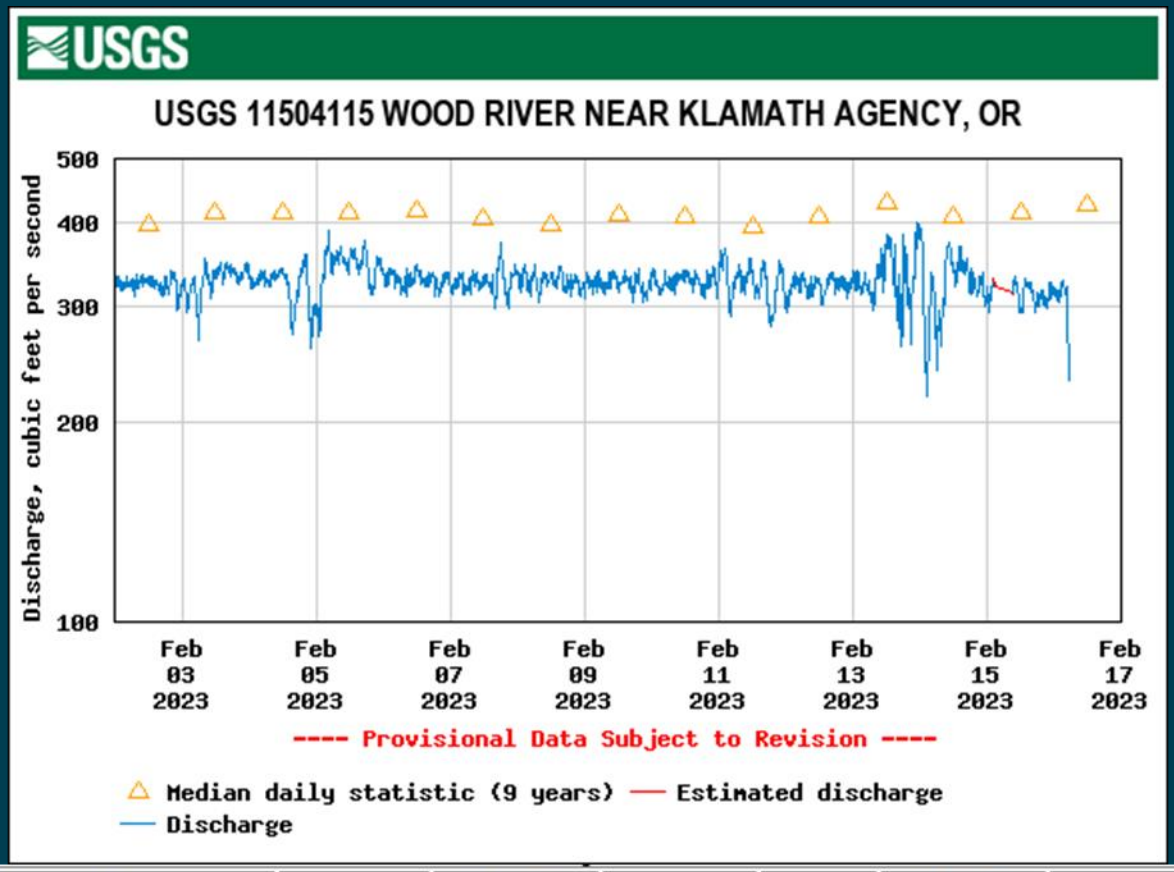
Min (1932)	Most Recent Instantaneous Value Feb 16	25th percen-tile	Median	Mean	75th percen-tile	Max (1996)
210	246	325	470	656	803	2870

Williamson River - USGS 11502500



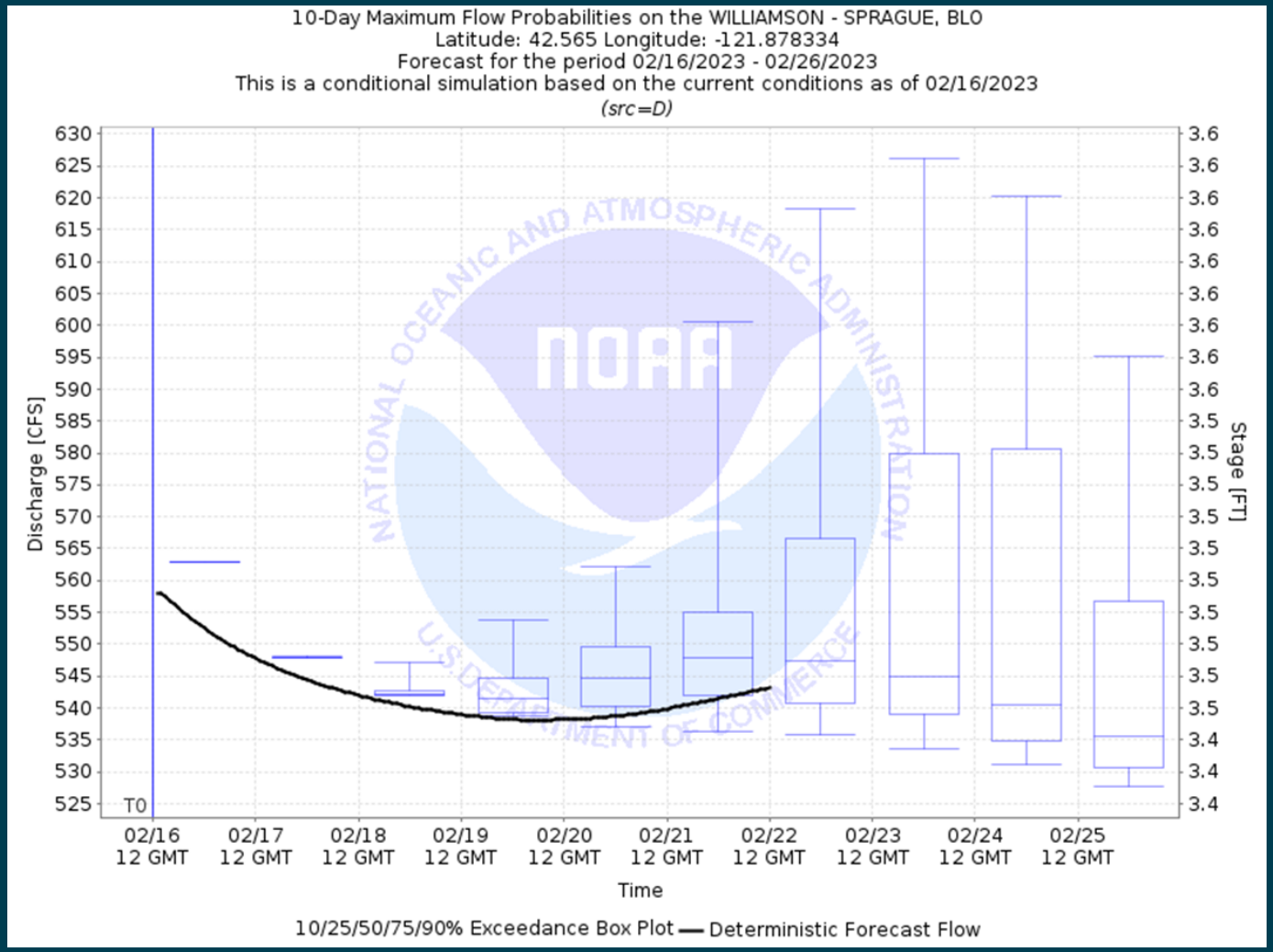
Min (1932)	Most Recent Instantaneous Value Feb 16	25th percen-tile	Median	Mean	75th percen-tile	Max (1958)
543	558	705	1050	1180	1440	3800

Wood River – USGS 11504115

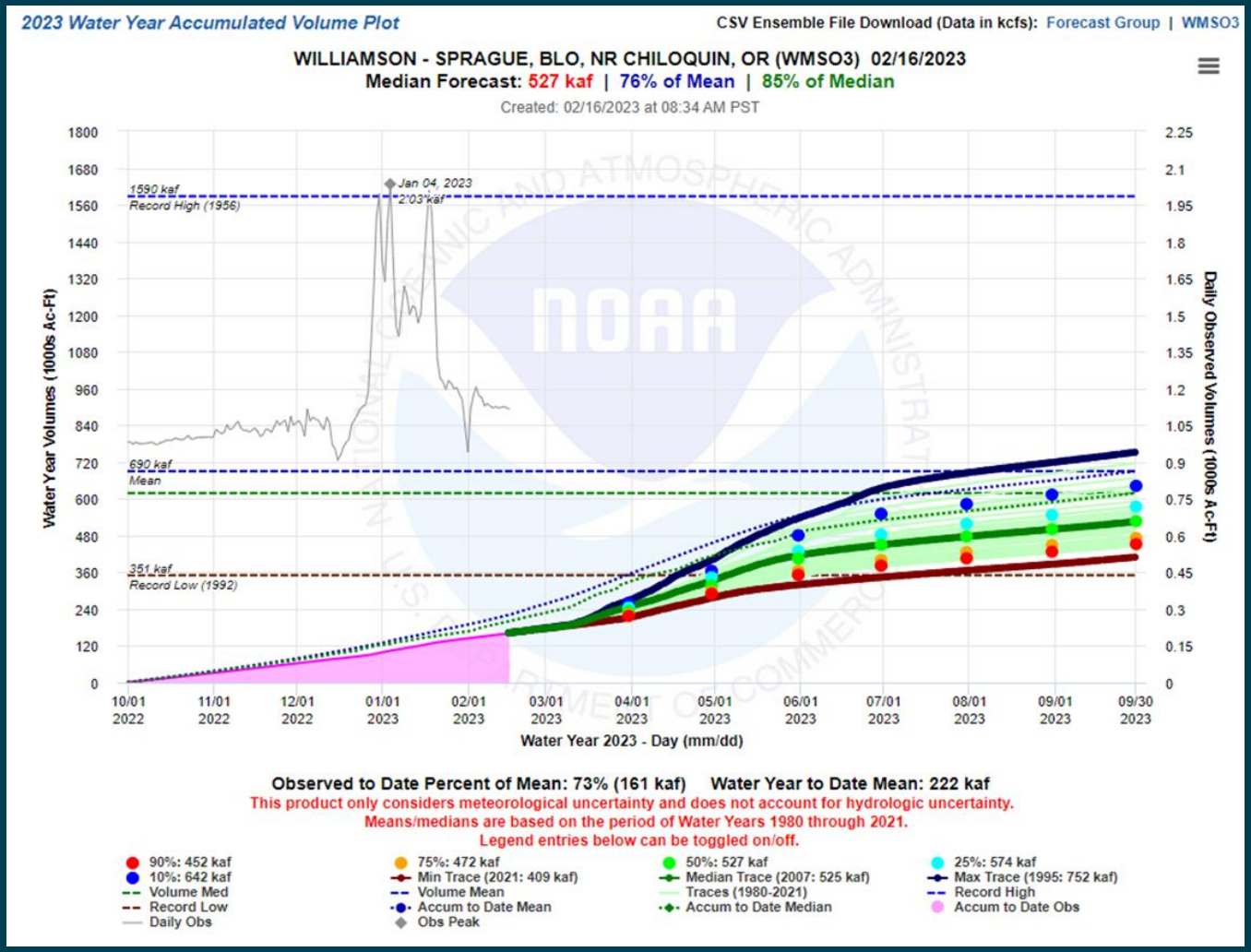


Most Recent Instantaneous Value Feb 16	Min (2022)	25th percen-tile	Median	Mean	75th percen-tile	Max (2014)
232	340	397	426	441	493	573

Williamson River Forecast – CNRFC 10-Day



Williamson River Forecast – CNRFC WY2023



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

WY	Cumulative UKL Net Inflow (TAF)
2021	306.61
2014	307.70
1992	320.40
2022	320.88
2023	333.25
1991	334.62
1994	354.23
2019	356.95
1993	361.75
2020	366.42
2005	367.83
2018	375.47
2010	383.03
2004	387.73
2012	388.86
2001	409.69
1989	413.67
1990	414.26
2016	415.08
2013	415.73
2009	416.55

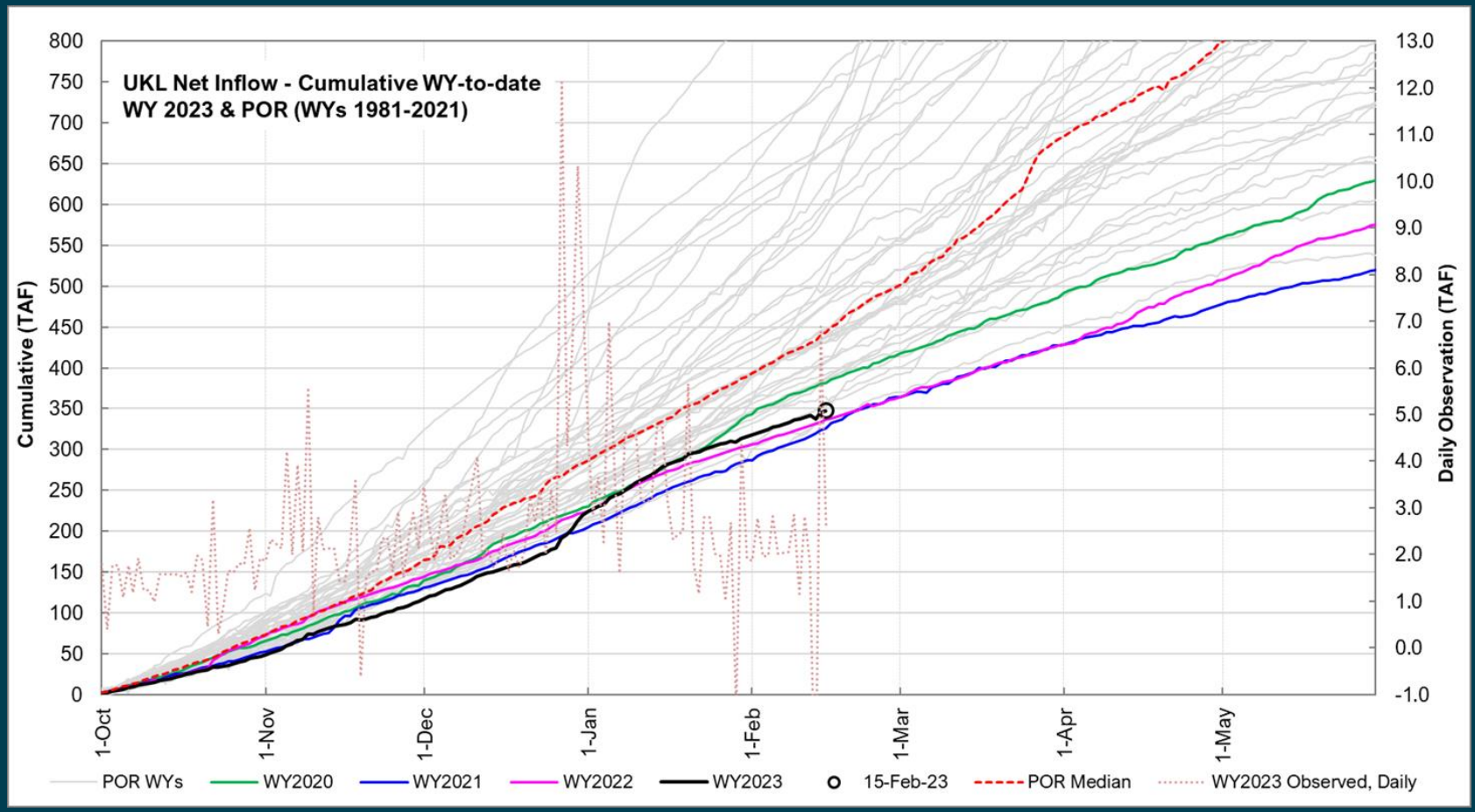
% of POR median = 80%
% of POR average = 72%

WY	Cumulative UKL Net Inflow (TAF)
2008	417.86
1981	418.03
2003	419.77
1995	423.14
2015	431.69
2007	443.70
2017	449.01
1988	457.17
2002	466.46
2011	488.39
1987	495.91
2000	539.58
1986	555.26
1998	560.85
1983	575.01
1996	583.01
1999	629.89
1985	635.81
1982	646.52
2006	700.30
1984	709.91
1997	918.48

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

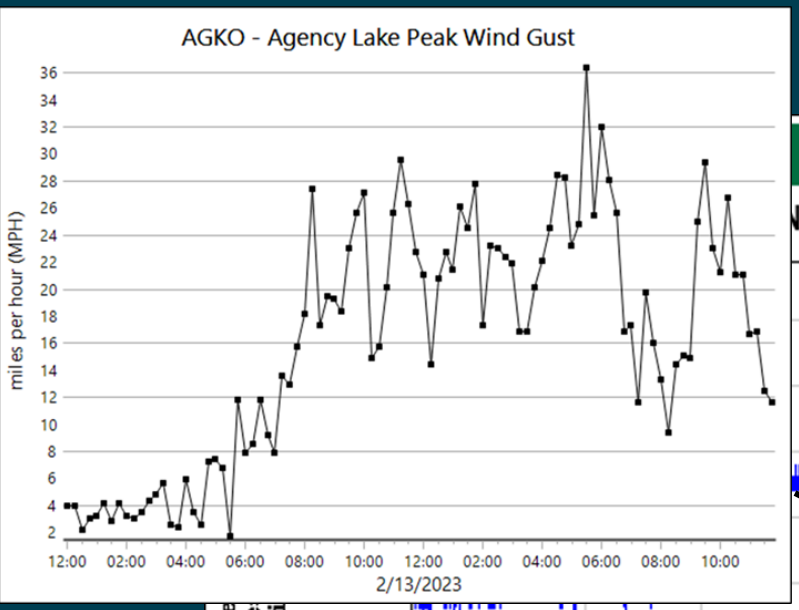
Observed UKL Net Inflow February 9 – February 15

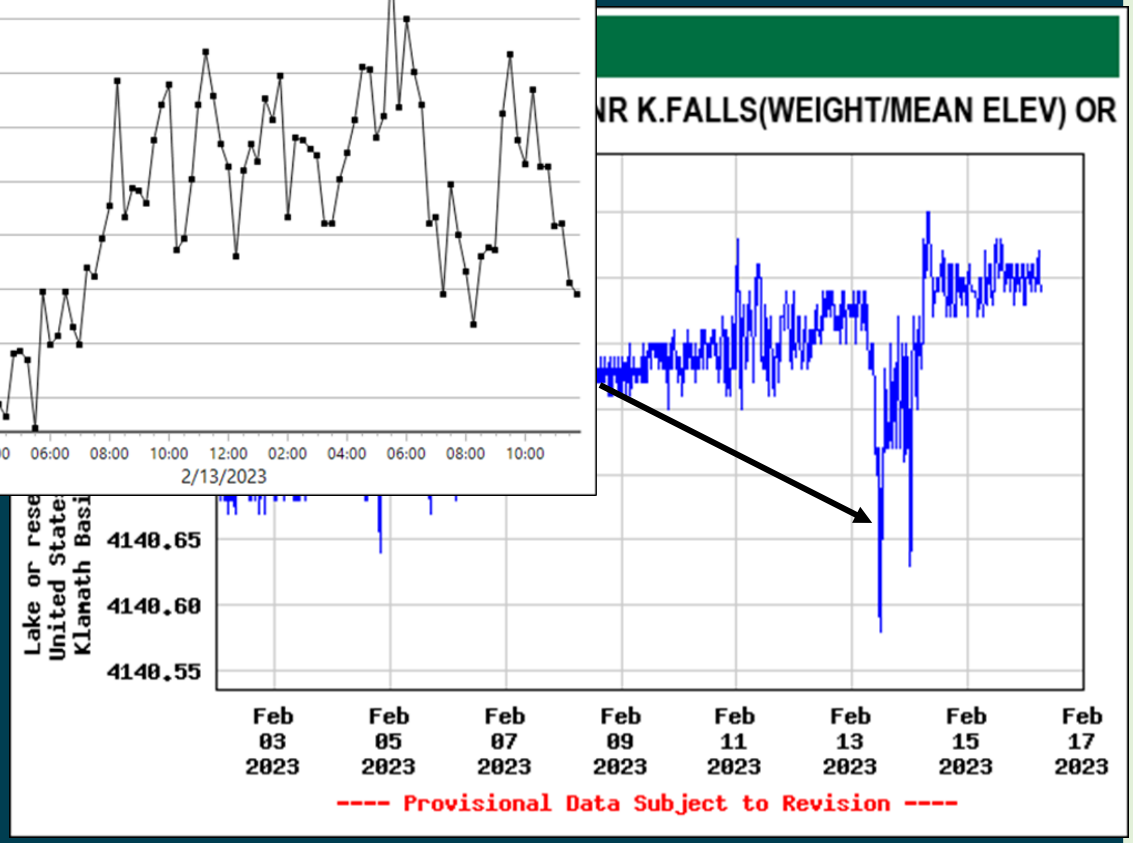
Date	Observed UKL Net Inflow (CFS)	Observed Percentile**
2/9/2023	1438	9%
2/10/2023	589	Min
2/11/2023	1417	14%
2/12/2023	900	Min
2/13/2023	-2013	Min
2/14/2023	3498	91%
2/15/2023	1311	11%
Average	1020*	

*Above date range: 2nd historical percentile (98% exceedance) 7-day daily average = 1059 CFS
**POR: WYs 1981-2021

Data are provisional and subject to revision

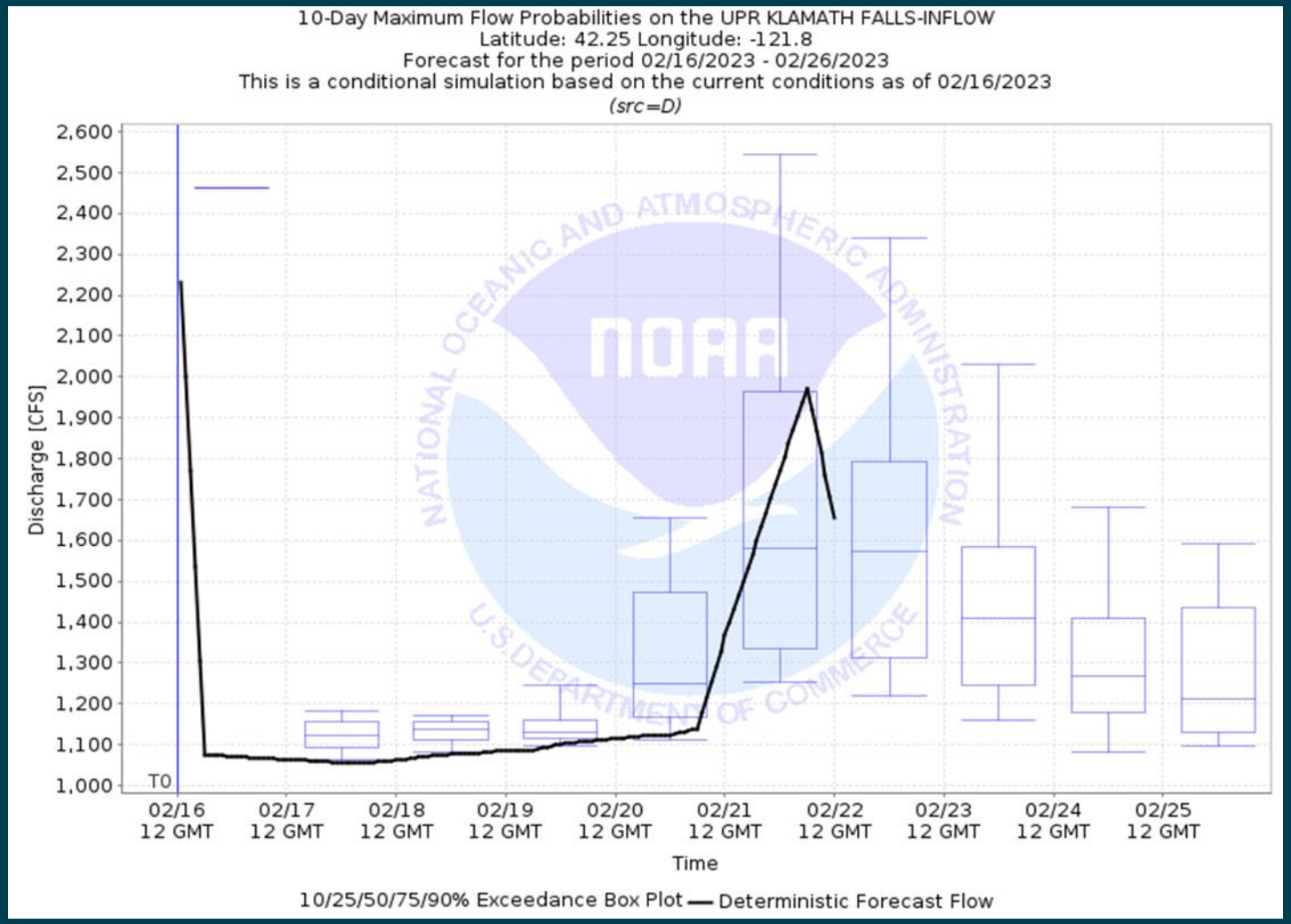
UKL Water Surface Elevation
February 2– Present Day



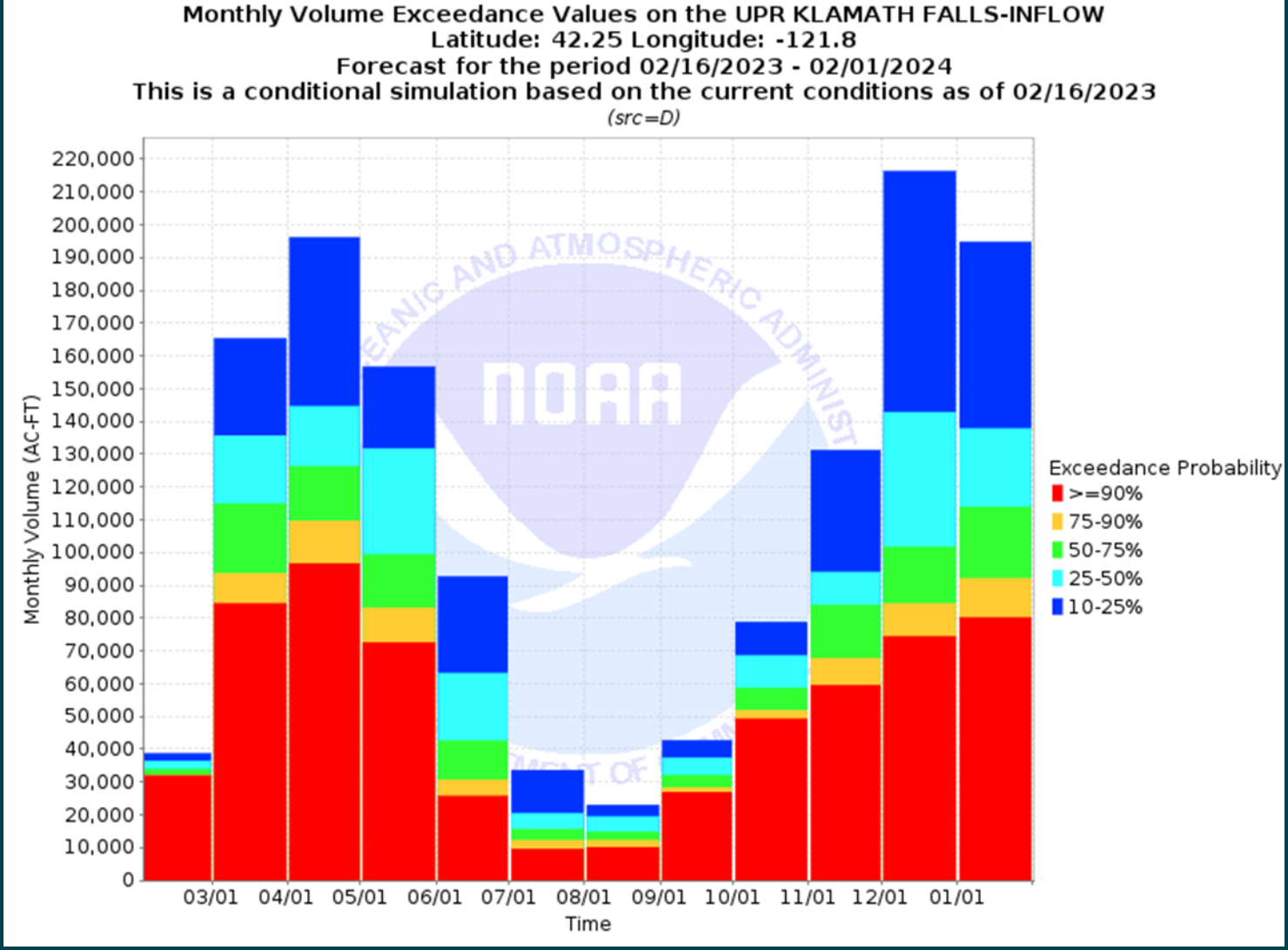


DATE	ELEVATION (FT)
2/02/2022	4140.70
2/03/2022	4140.71
2/04/2022	4140.72
2/05/2022	4140.74
2/06/2022	4140.75
2/07/2022	4140.76
2/08/2022	4140.77
2/09/2022	4140.79
2/10/2022	4140.79
2/11/2022	4140.81
2/12/2023	4140.82
2/13/2023	4140.76
2/14/2023	4140.83
2/15/2023	4140.85

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



Upper Klamath Lake (UKL) Net Inflow Forecast - CNRFC WY2023



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.

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

USDA NRCS National Water & Climate Center
 * - DATA CURRENT AS OF: February 02, 2023 10:38:29 AM
   - Based on February 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)	FEB-JUN	41	158	60	49	34	23	26
Sprague R nr Chiloquin	FEB-SEP	275	115	405	325	230	173	240
	MAR-SEP	240	112	360	285	198	144	215
Williamson R bl Sprague R nr Chiloquin	FEB-SEP	455	108	600	515	395	305	420
	MAR-SEP	395	110	530	450	340	260	360
Upper Klamath Lake Inflow (2)	FEB-SEP	680	109	990	770	595	425	625
	MAR-SEP	555	107	830	635	480	335	520
Clear Lake Inflow (2)	FEB-JUN	46	253	93	65	27	-1.49	18.2

 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 Feb Mid-Month KRB WSF

USDA NRCS National Water & Climate Center
 * - DATA CURRENT AS OF: February 16, 2023 01:54:58 PM
   - Based on February 15, 2023 forecast values

KLAMATH RIVER BASIN

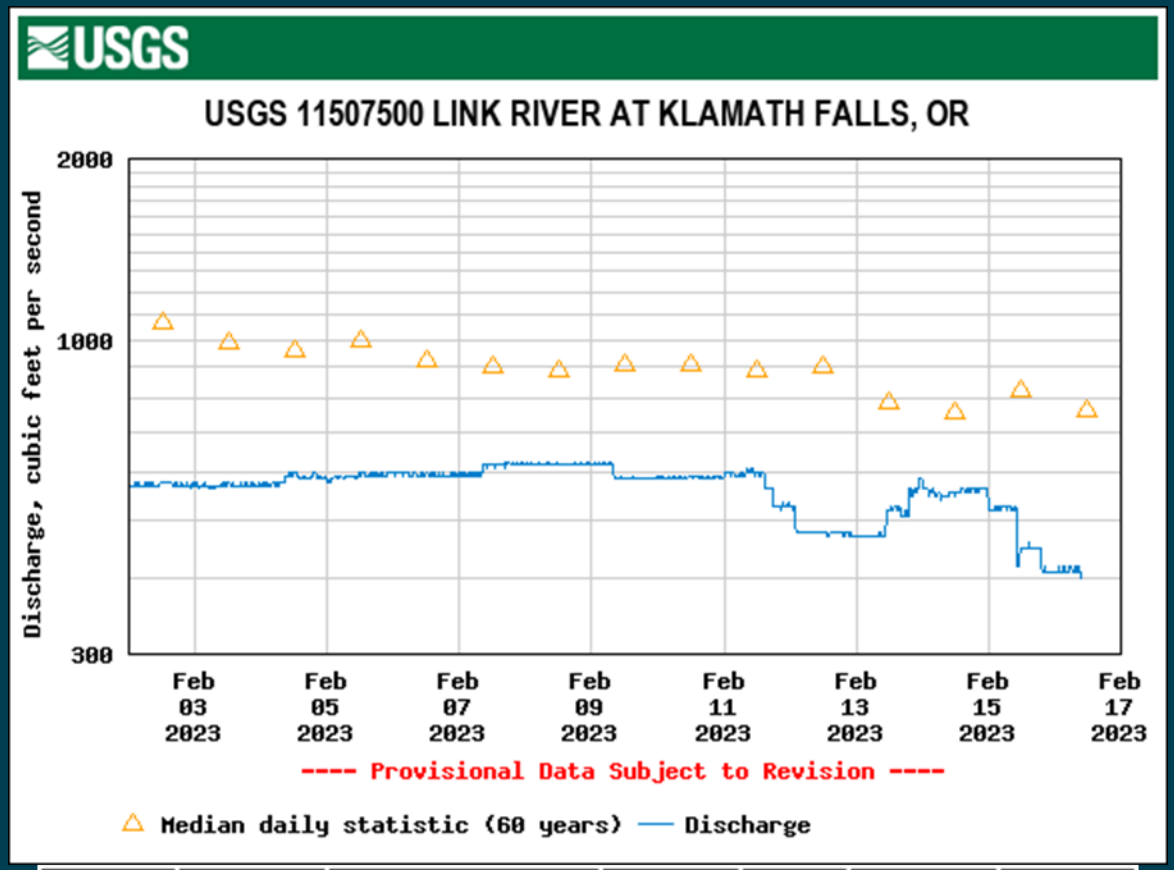
Forecast Point	period	50% (KAF)	% of med	max (KAF)	30% (KAF)	70% (KAF)	min (KAF)	30-yr med
Sprague R nr Chiloquin	MAR-SEP	215	100	315	255	182	136	215
	APR-SEP	166	104	250	197	137	100	159
Williamson R bl Sprague R nr Chiloquin	MAR-SEP	370	103	485	420	325	260	360
	APR-SEP	295	104	390	335	255	198	285
Upper Klamath Lake Inflow (2)	MAR-SEP	515	99	750	585	455	325	520
	APR-SEP	385	105	580	440	330	230	365

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

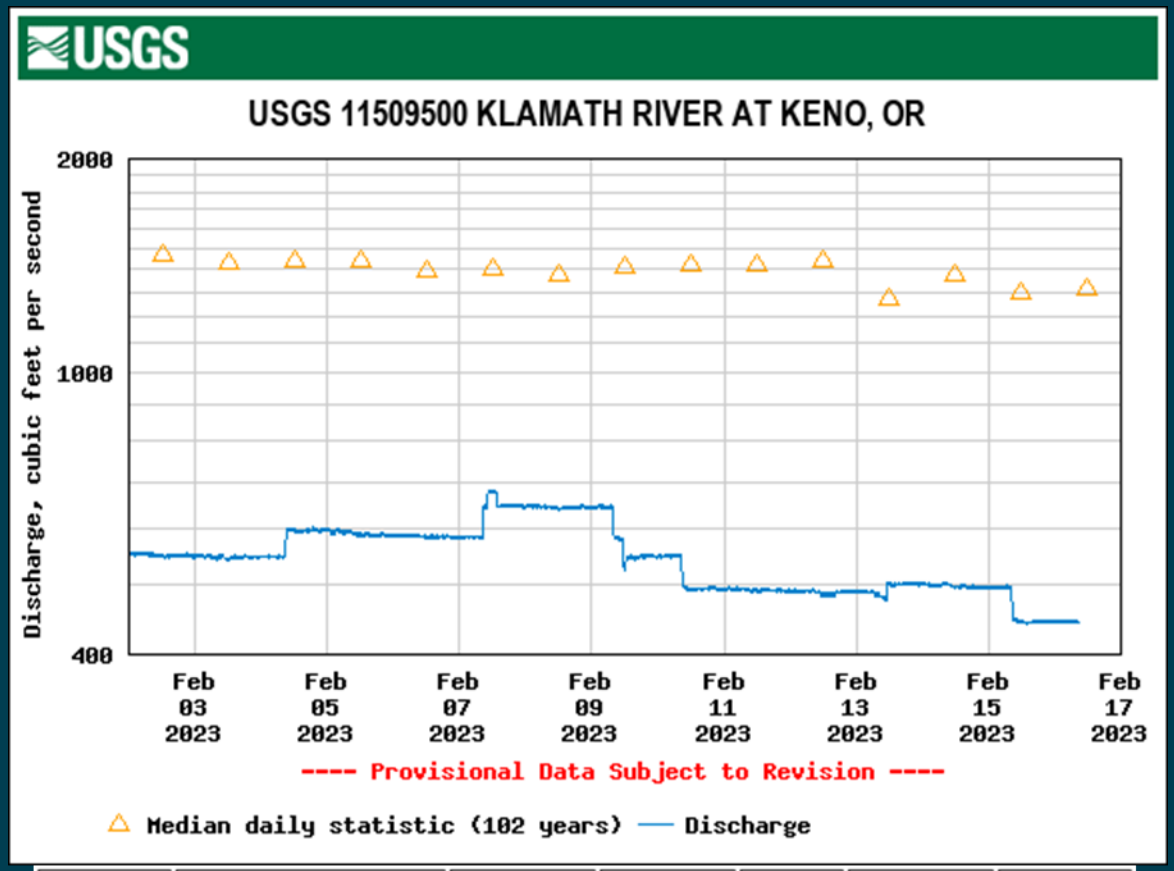
Observational data on mountain snowpack is the primary source of seasonal WSF skill in the Klamath region. Current snowpack conditions are generally near-normal to slightly above-normal in the basin overall, with localized strongly below- and above-normal SWE at some sites. SWE conditions reflect, to first order, a combination of precipitation and temperature effects. Overall, the water year to date has been somewhat drier than normal to somewhat wetter than normal, depending on location within the basin. Antecedent streamflow, which is currently near- to slightly below-normal, is also used as a predictor variate at some forecast locations, serving as an index of soil moisture and other internal watershed storages. Direct observational soil moisture data in the basin is sparse and current values show very strong spatial variability, with individual stations reporting strongly above-normal, strongly below-normal, and near-normal conditions at 8" depth. Overall, conditions have not changed greatly since the February 1 forecast, but the last two weeks have been relatively dry, leading to moderate declines in the Klamath volume forecasts, which generally remain near-normal.

Link River Dam- USGS 11507500



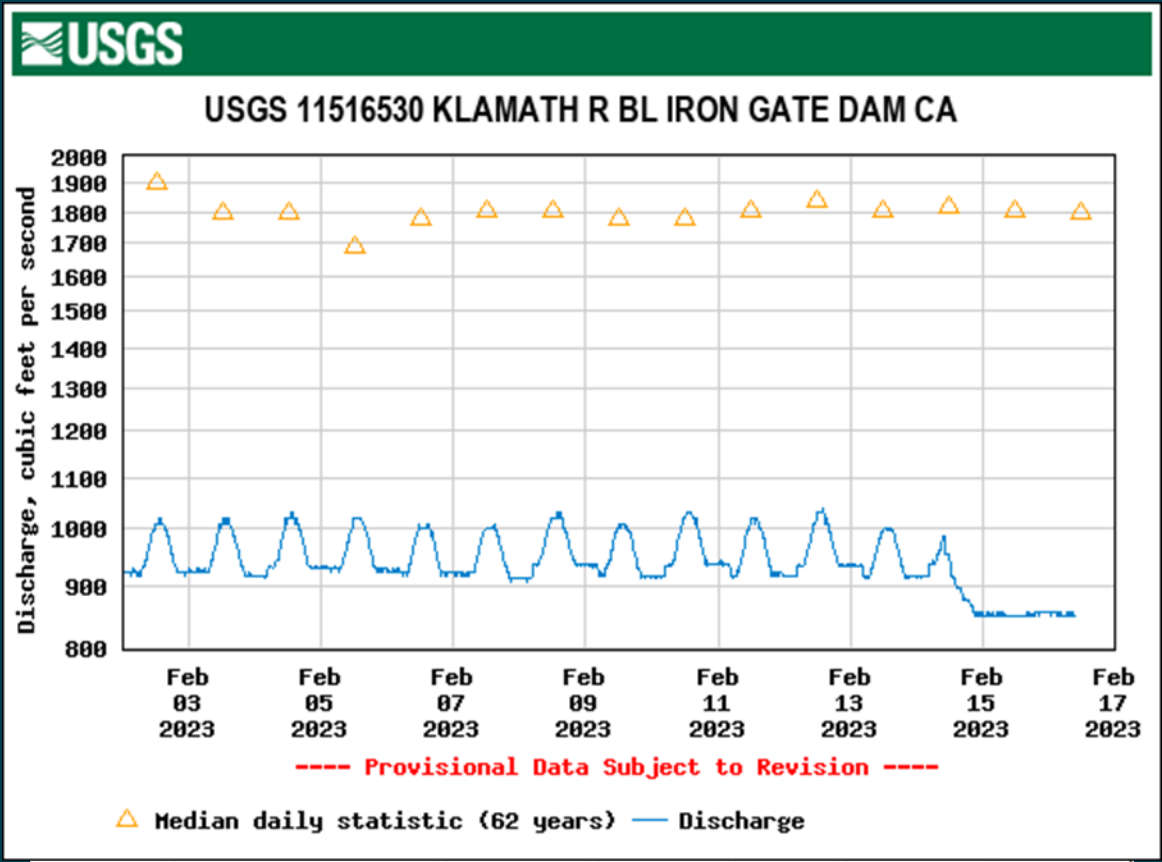
Min (1992)	25th percen-tile	Most Recent Instantaneous Value Feb 16	Median	Mean	75th percen-tile	Max (1965)
102	344	401	763	1260	1870	6280

Keno Dam – USGS 11509500



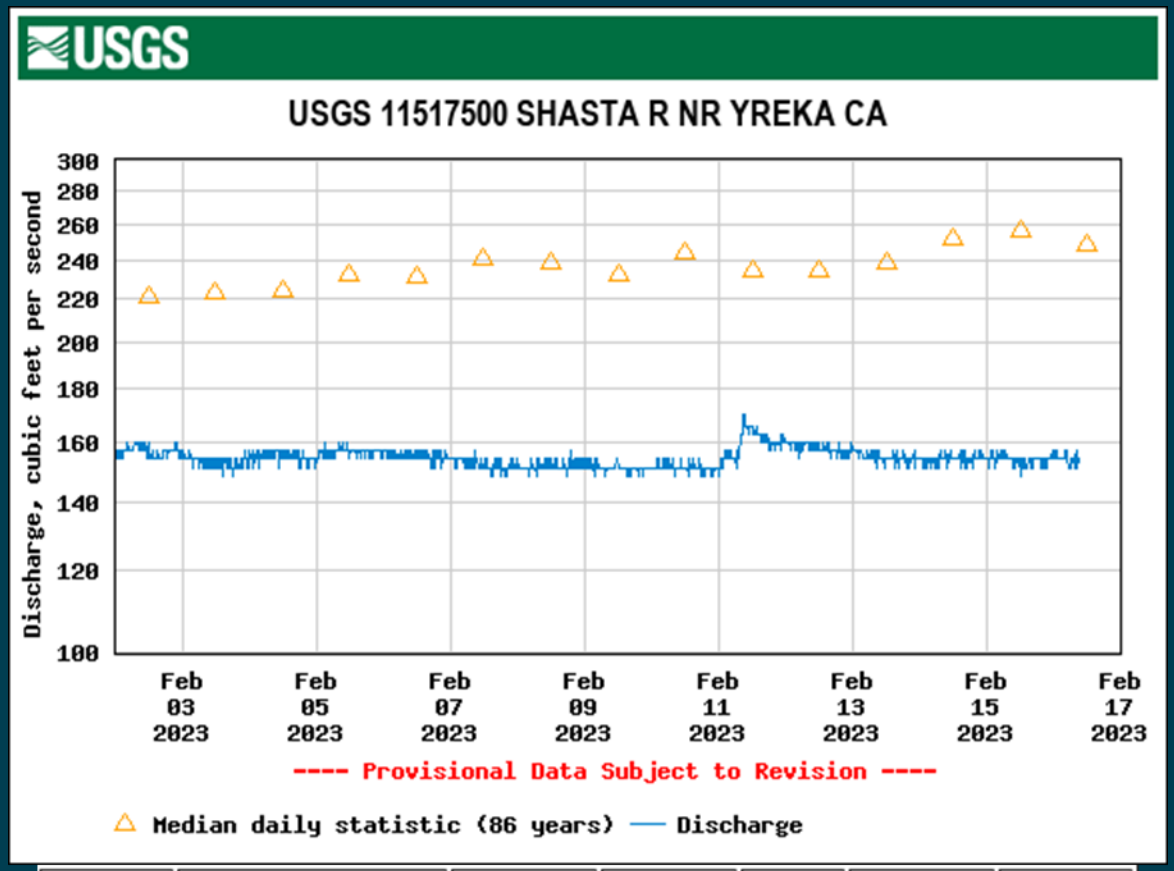
Min (1992)	Most Recent Instantaneous Value Feb 16	25th percen-tile	Median	Mean	75th percen-tile	Max (1965)
186	442	786	1310	1910	2610	7360

Iron Gate Dam – USGS 11516530



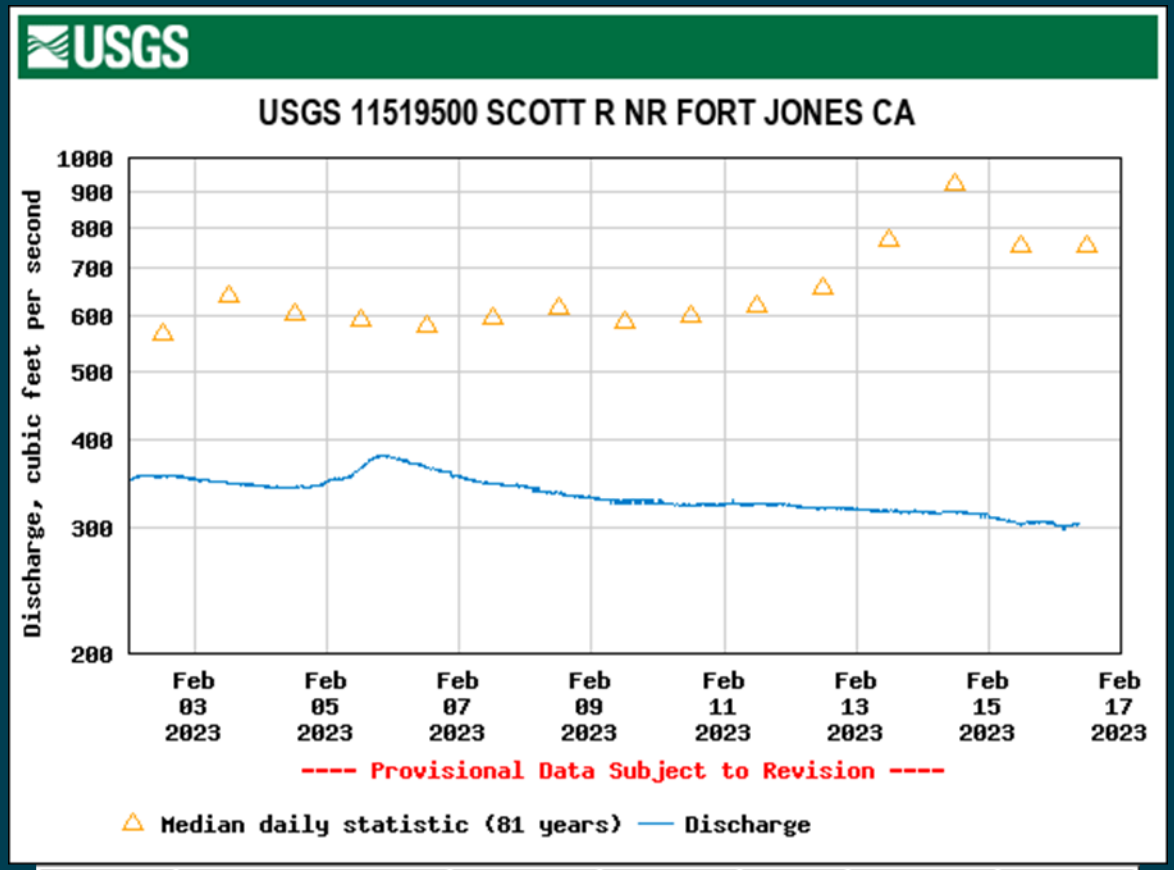
Min (1992)	Most Recent Instantaneous Value Feb 16	25th percen-tile	Median	Mean	75th percen-tile	Max (1996)
511	850	1130	1800	2520	3460	8940

Shasta River – USGS 11517500



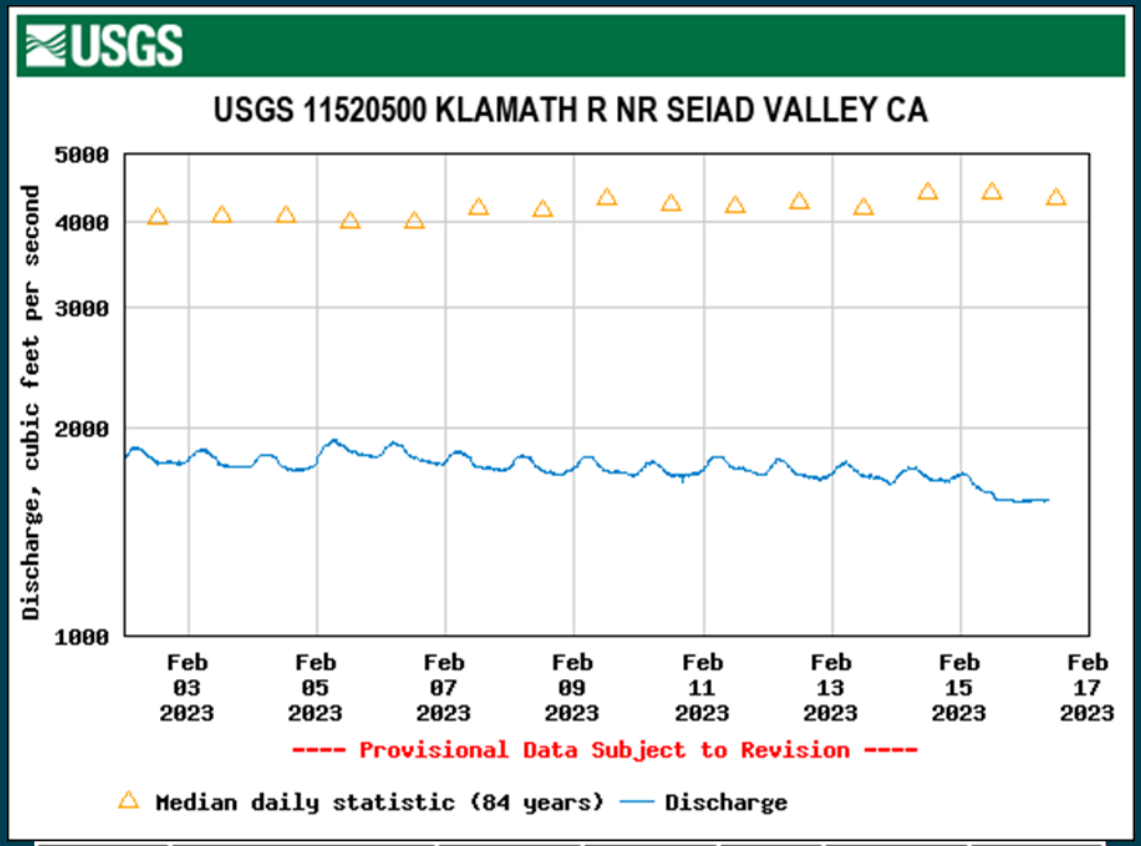
Min (1934)	Most Recent Instantaneous Value Feb 16	25th percen-tile	Median	Mean	75th percen-tile	Max (1958)
128	154	186	248	322	356	1600

Scott River – USGS 11519500



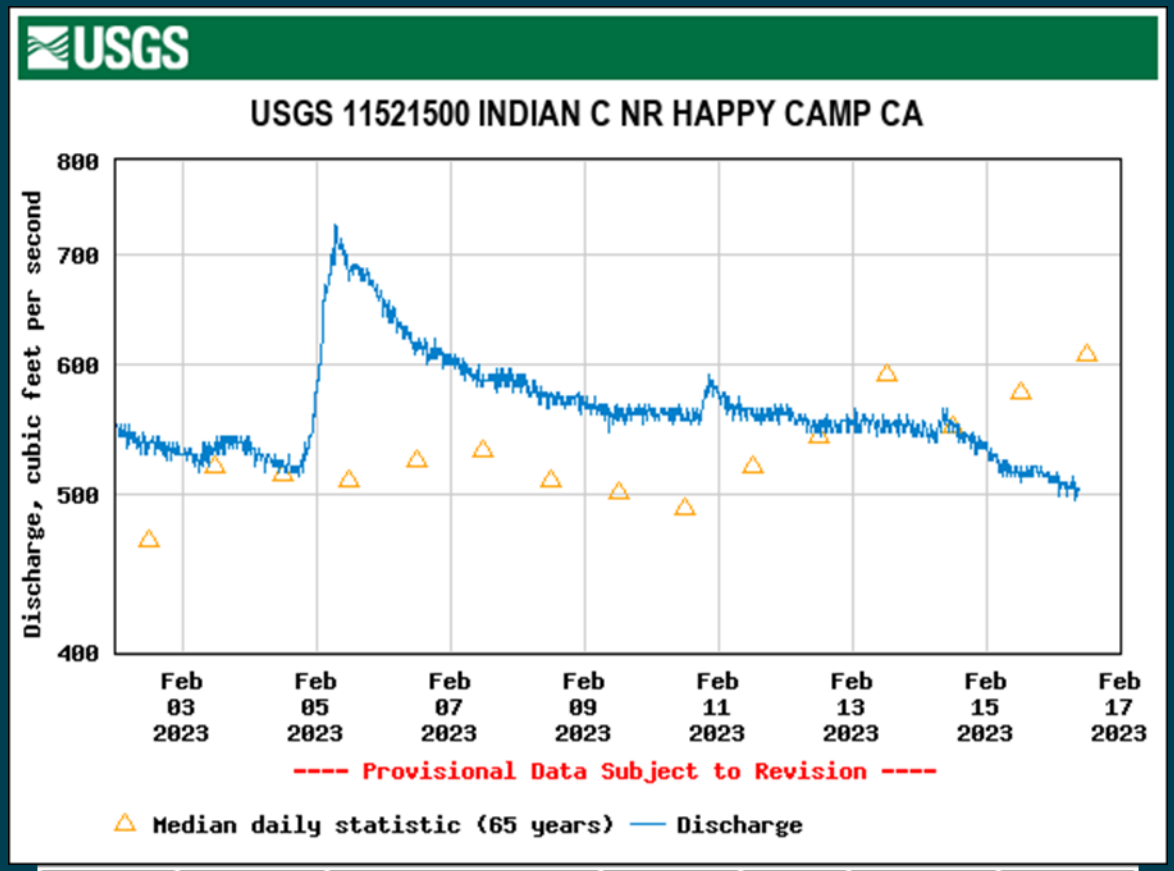
Min (1977)	Most Recent Instantaneous Value Feb 16	25th percen-tile	Median	Mean	75th percen-tile	Max (1958)
98.0	304	410	752	1160	1380	10000

Klamath River – USGS 11520500



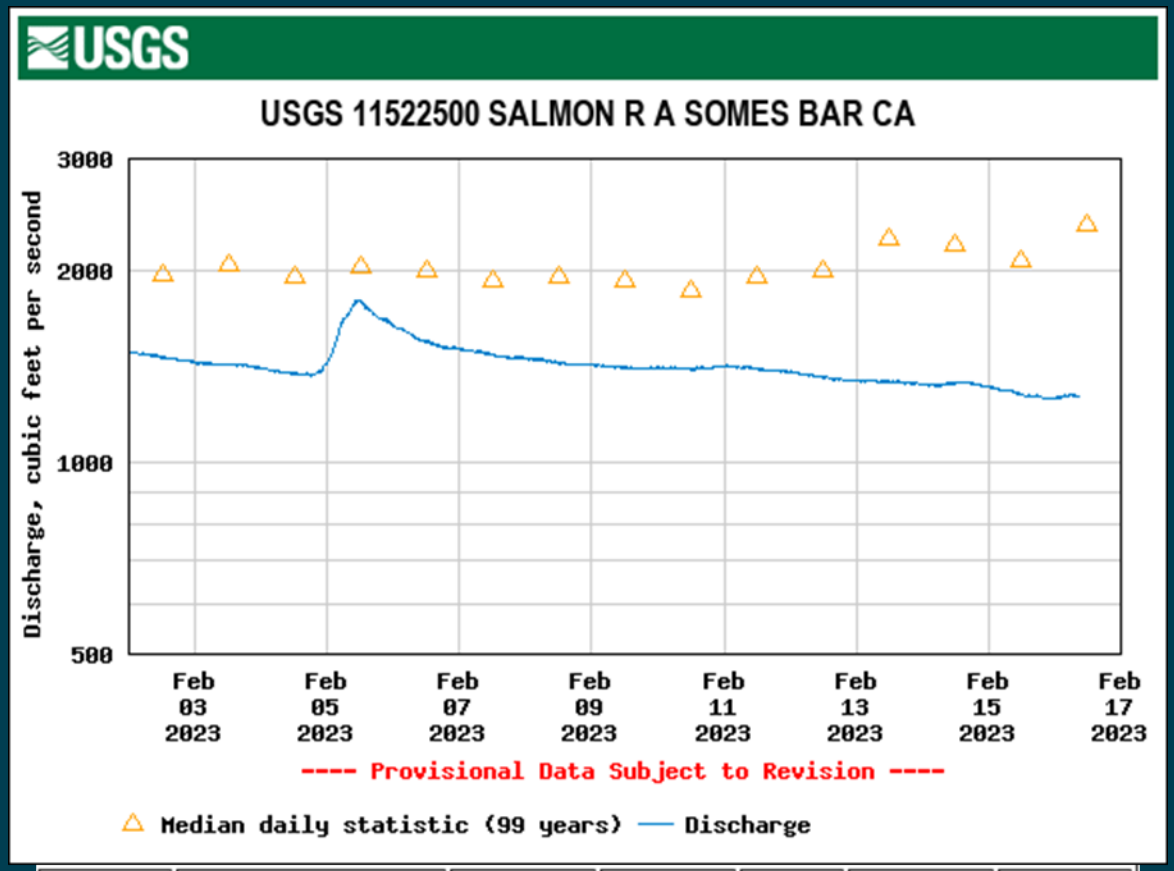
Min (1994)	Most Recent Instantaneous Value Feb 16	25th percen-tile	Median	Mean	75th percen-tile	Max (1958)
1280	1570	2860	4320	5740	6750	32800

Indian Creek – USGS 11521500



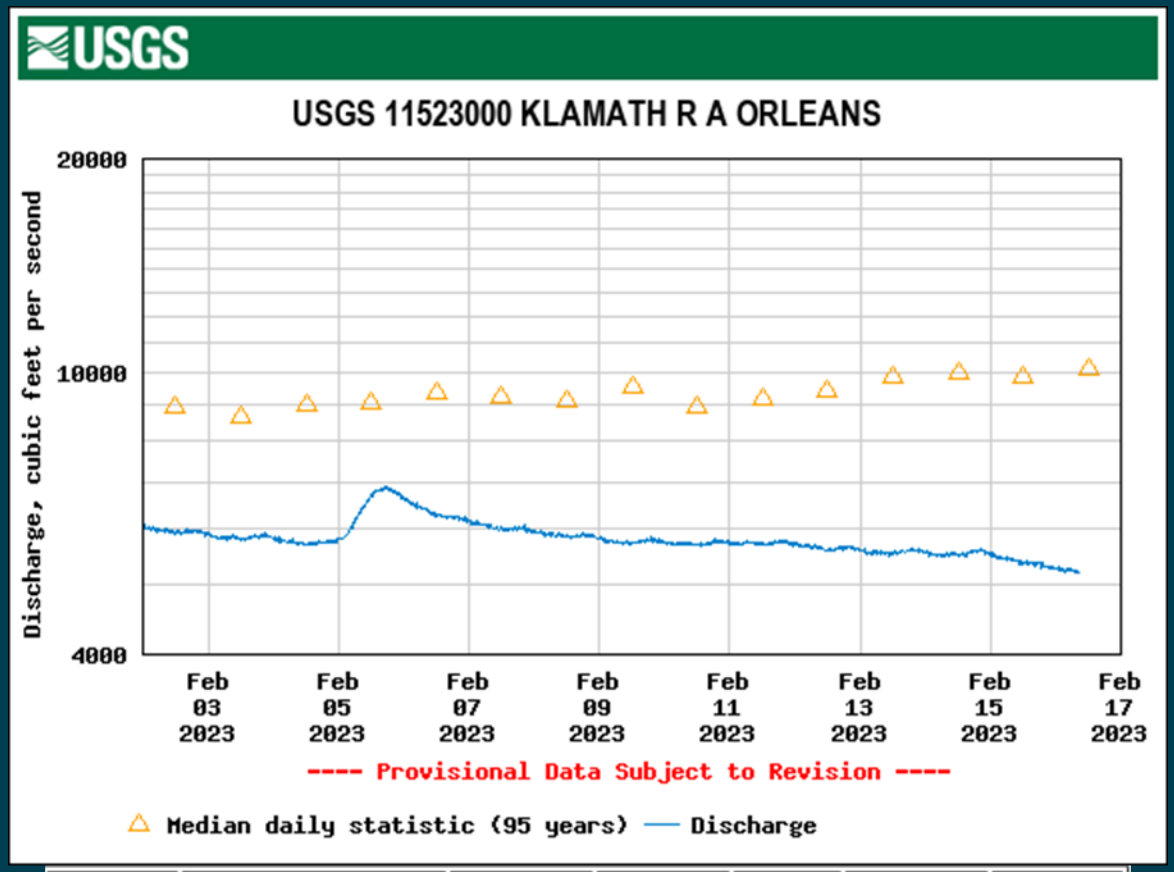
Min (1977)	25th percen-tile	Most Recent Instantaneous Value Feb 16	Median	Mean	75th percen-tile	Max (1958)
76.0	411	504	609	917	961	6140

Salmon River – USGS 11522500



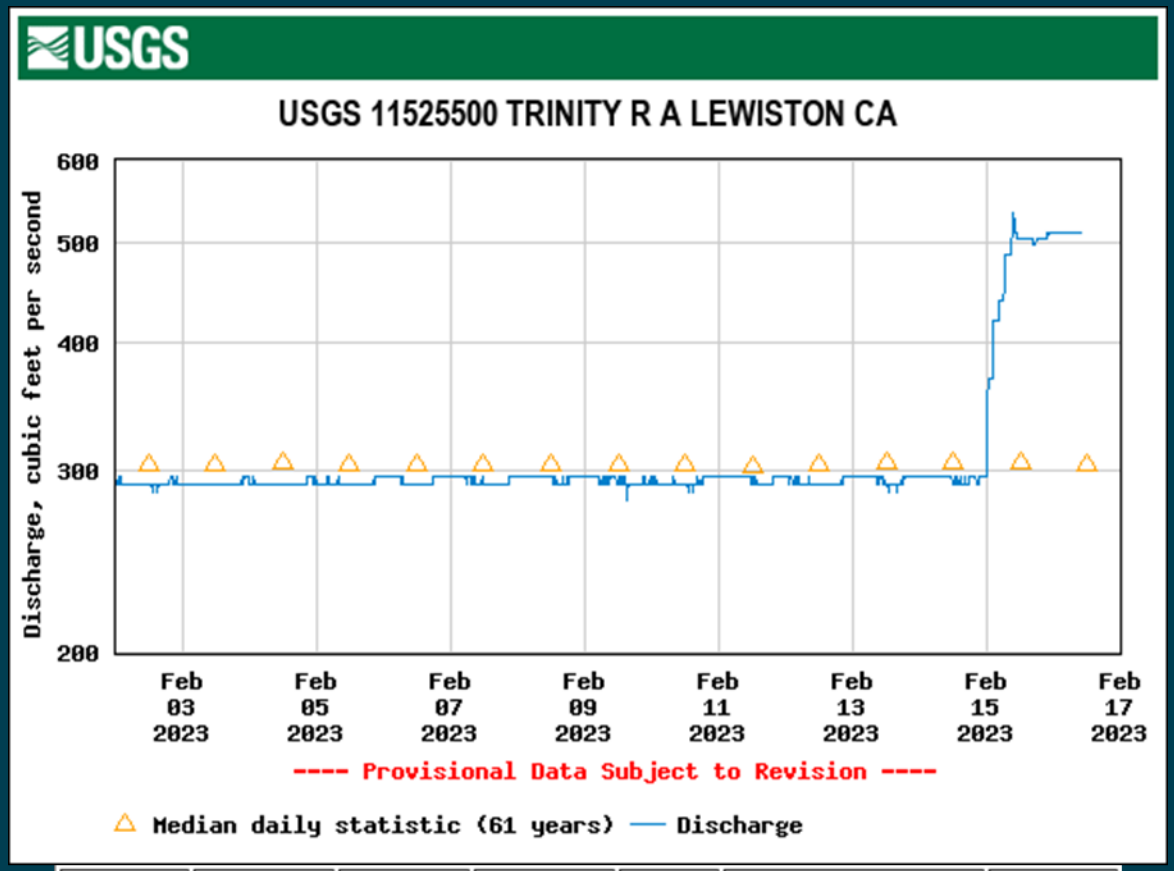
Min (1977)	Most Recent Instantaneous Value Feb 16	25th percen-tile	Median	Mean	75th percen-tile	Max (1958)
214	1270	1320	2370	3180	3520	24200

Klamath River – USGS 11523000



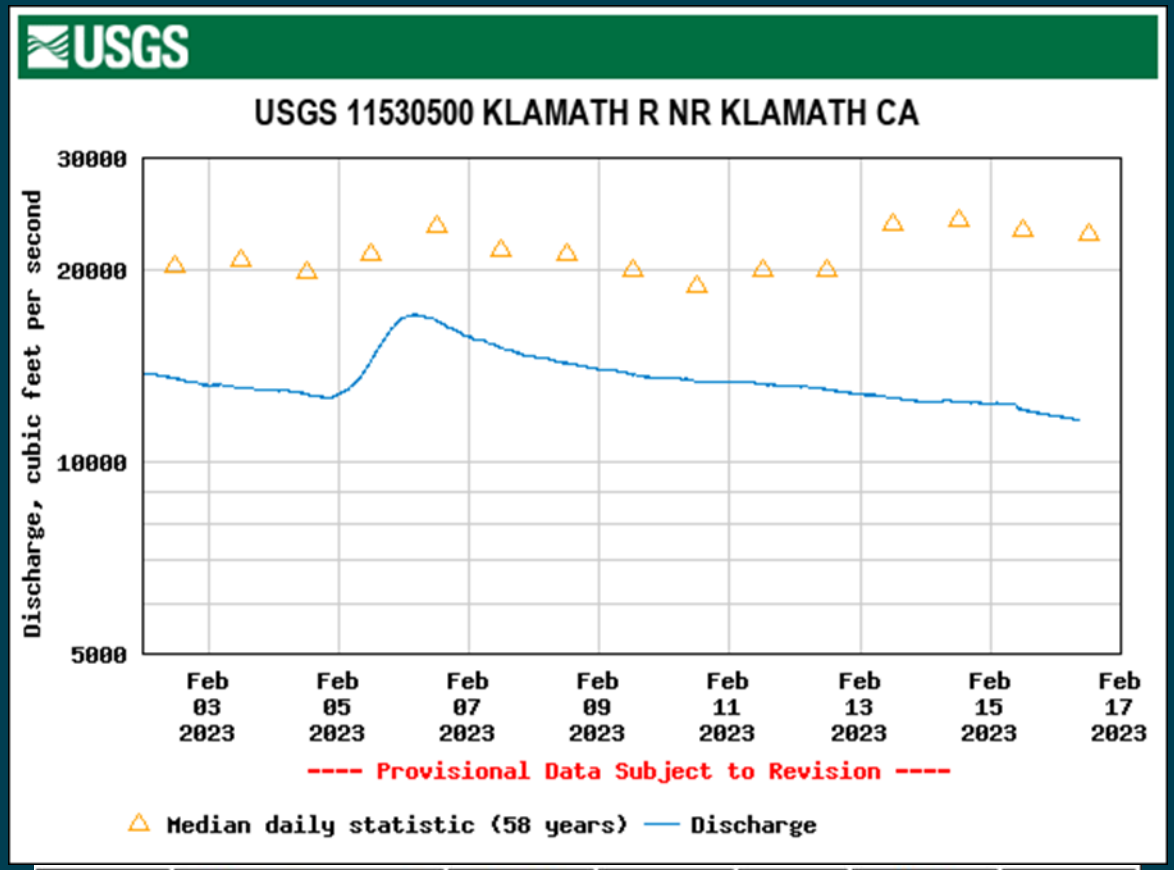
Min (1977)	Most Recent Instantaneous Value Feb 16	25th percen-tile	Median	Mean	75th percen-tile	Max (1982)
2390	5210	6040	10100	14000	16100	87600

Trinity River at Lewiston – USGS 11525500



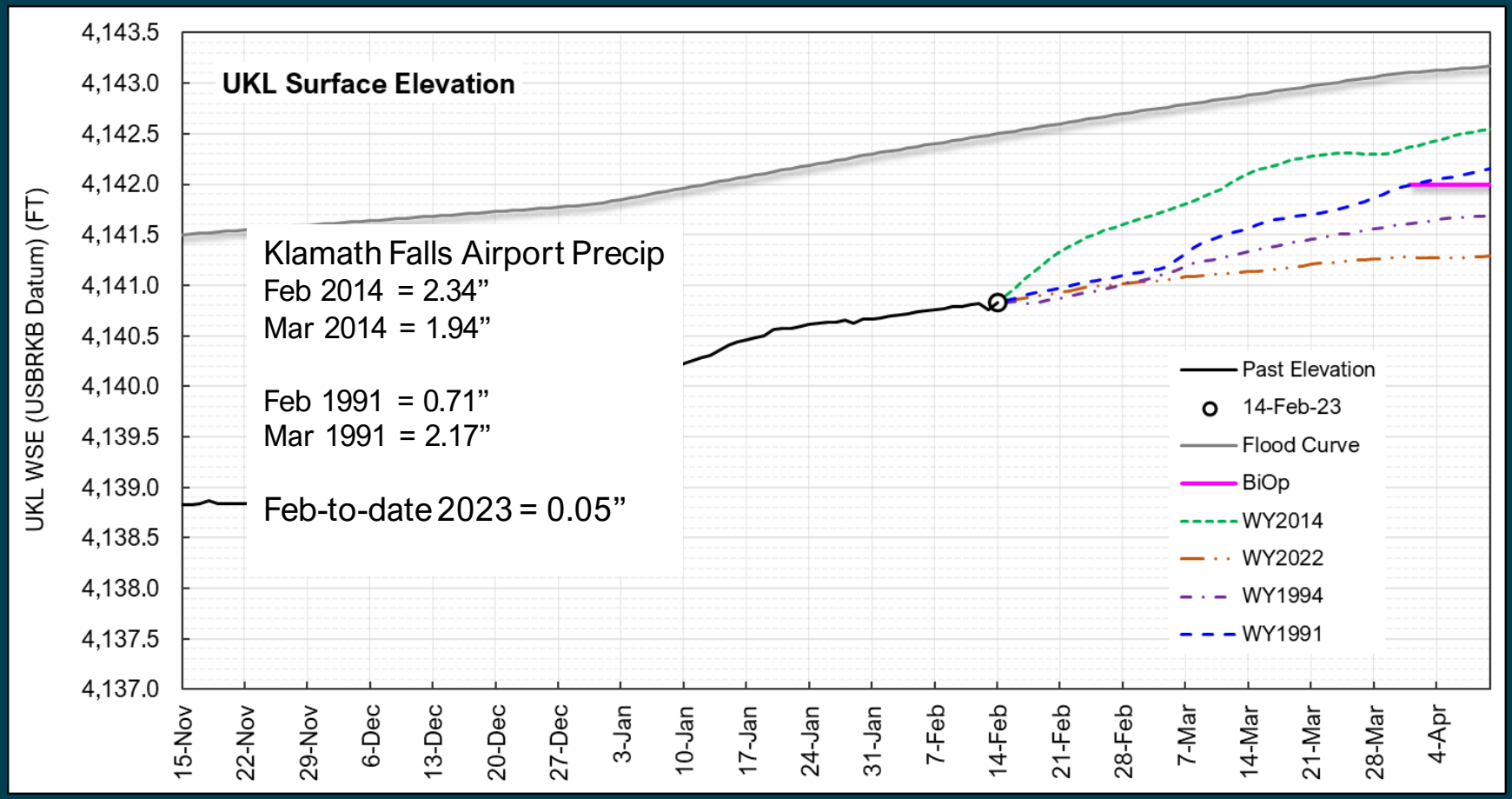
Min (1977)	25th percen-tile	Median	75th percen-tile	Mean	Most Recent Instantaneous Value Feb 16	Max (1998)
146	285	305	335	505	509	4400

Klamath River – USGS 11530500



Min (1977)	Most Recent Instantaneous Value Feb 16	25th percen-tile	Median	Mean	75th percen-tile	Max (1982)
3470	11600	16100	22900	32600	36400	174000

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



UKL Water Surface Elevation – TOP

% IGD Reduction	Projected Apr 1 UKL elev (FT)	Retained UKL Storage (TAF)	Average IGD Release, MDF (CFS)	SFF, Day 1 magnitude (CFS)	SFF, Day 2/3 magnitude (CFS)
0	4141.72	0	BiOp	NA	NA
11	4141.90	9.7	876		

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

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%

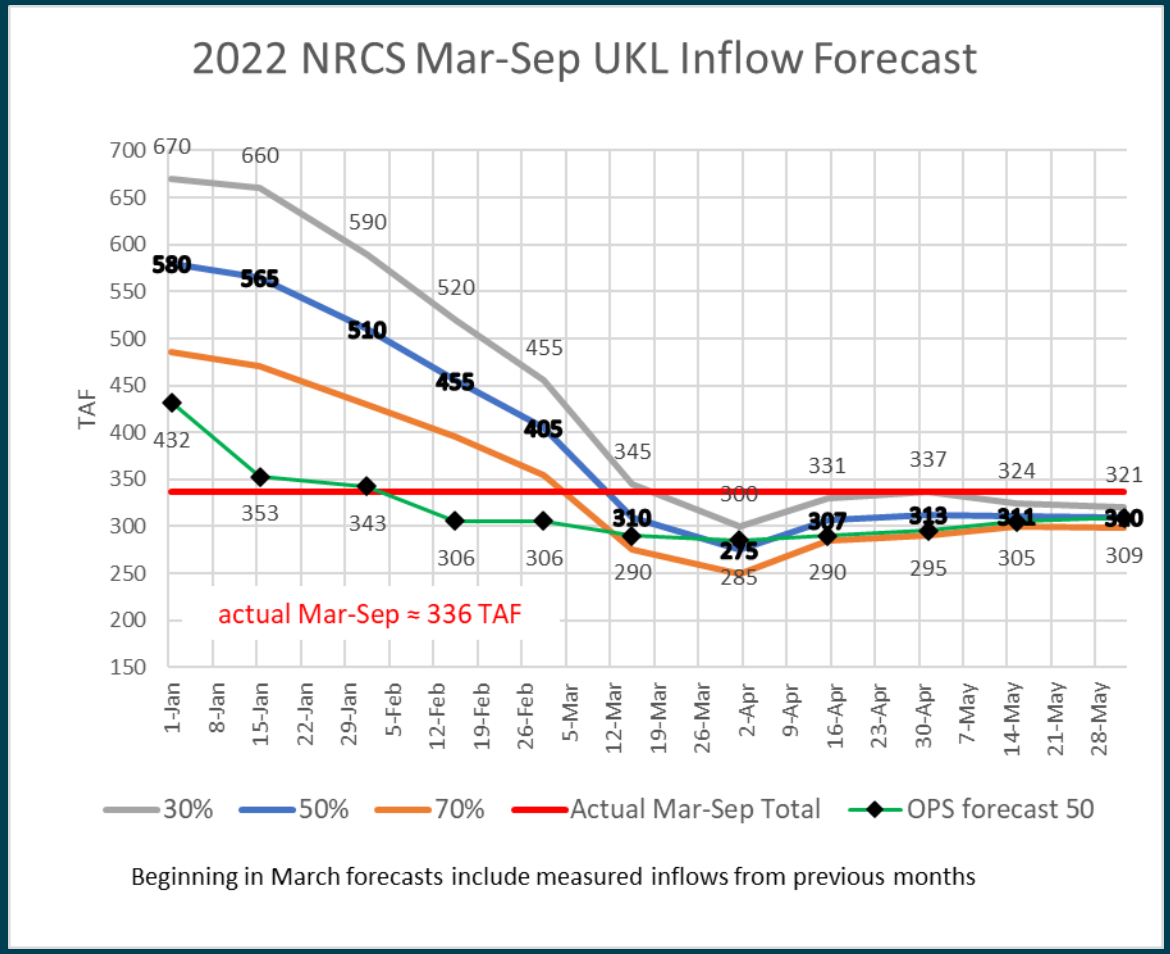
Based on Response to Reclamation Request for Technical Assistance from USFWS

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%

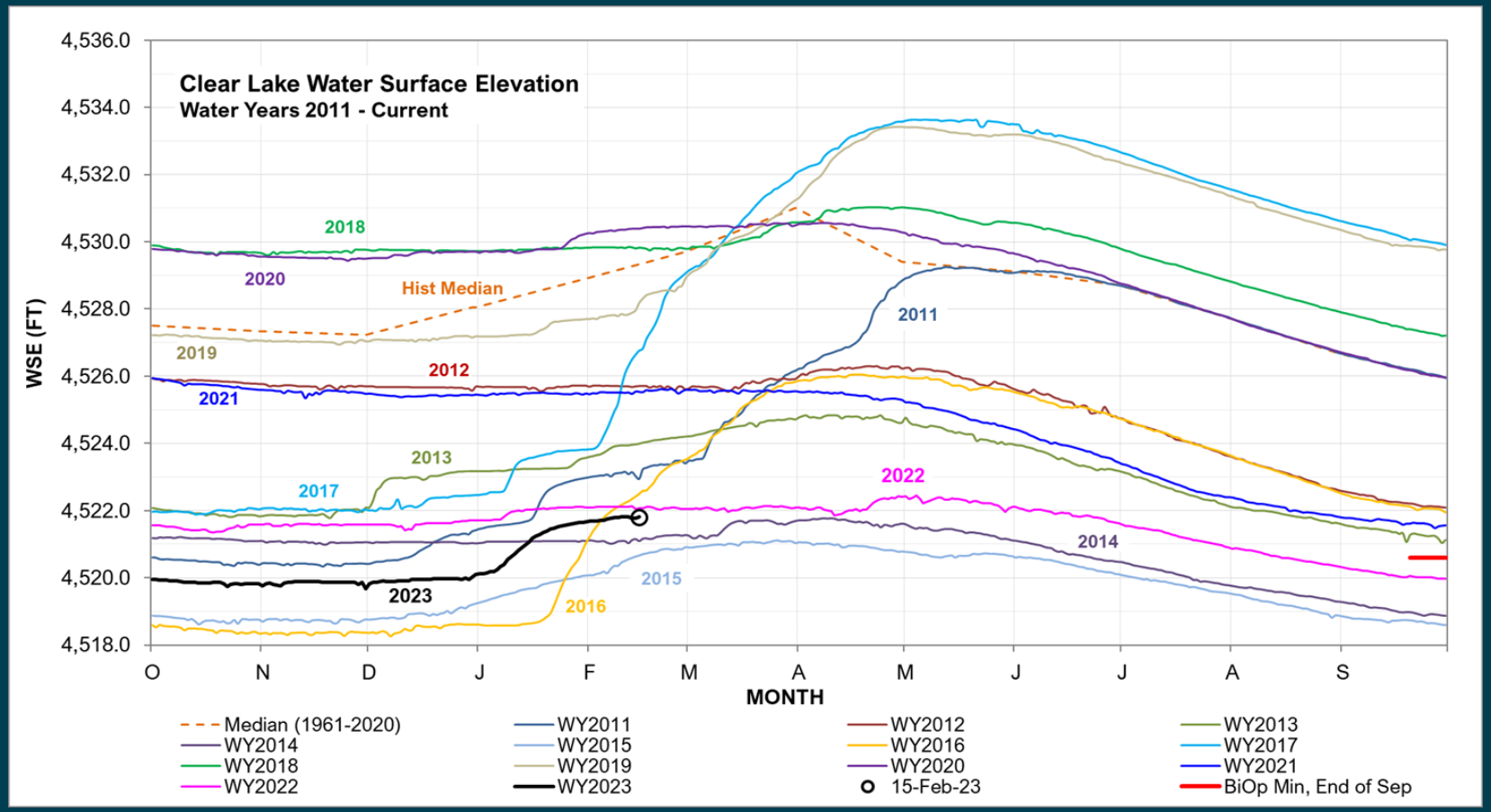
Based on Response to Reclamation Request for Technical Assistance from USFWS

2022 NRCS vs. KBAO estimates of UKL inflow

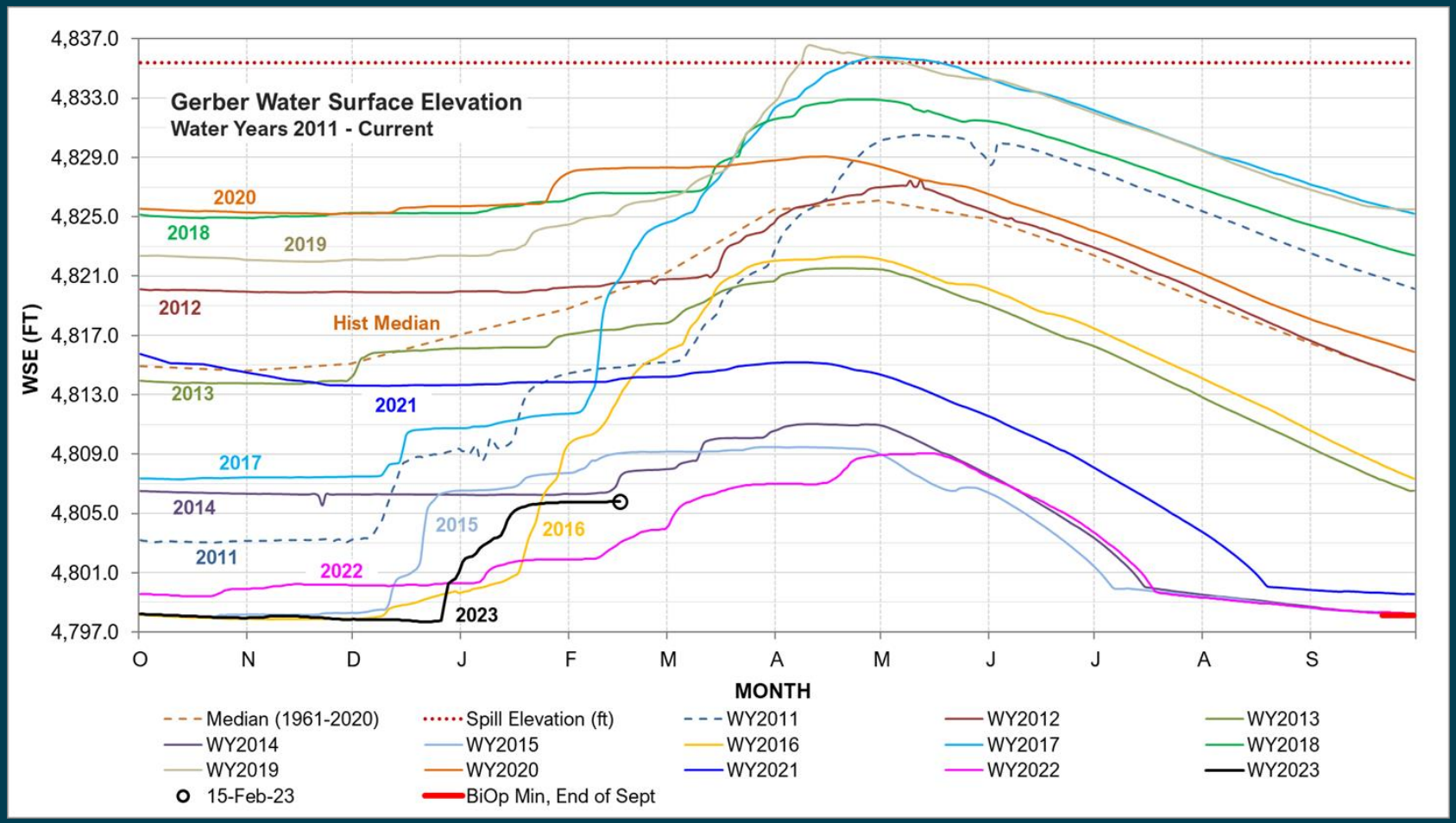


Beginning in March forecasts include measured inflows from previous months

Clear Lake Reservoir – USBR



Gerber Reservoir – USBR



Scott and Shasta River Juvenile Salmonid Outmigration Monitoring

Scott and Shasta River Juvenile Salmonid Outmigration Monitoring

In-Season Update

February 13, 2023

Since 2001, the California Department of Fish and Wildlife has operated rotary screw traps (RST) on the Scott and Shasta Rivers to estimate abundances of outmigrating Chinook Salmon (*Oncorhynchus tshawytscha*), Coho Salmon (*Oncorhynchus kisutch*) and rainbow trout/steelhead (*Oncorhynchus mykiss*). The Scott River RST's are located approximately 7 river kilometers (RK) upstream from the confluence with the Klamath River, while the Shasta River RST is located approximately 0.2 RK from the confluence with the Klamath River. The data presented below is preliminary and subject to revision.

The Shasta River RST has been operational since January 30, 2023. Mark-recapture trials have been conducted on age 0+ Chinook Salmon with a trap efficiency of 22%, and preliminary population estimate of 2691 for JW6. Limited mark-recapture trials have begun for age 1+ Coho Salmon and steelhead. Preliminary population estimates will be provided as data allows.

The raw catch at the Shasta RST is as follows:

Chinook Salmon		**Coho Salmon**		***Oncorhynchus mykiss***			
Age 0+	Age 1+	Age 0+	Age 1+	Age 0+	Age 1+	Age 2+	Age 3+
439	1	0	2	0	2	12	0

Raw catch numbers are not population estimates.

The Scott River 8-foot RST is not yet operational for 2023.

The raw catch from **both** Scott RST's is as follows:

Chinook Salmon		**Coho Salmon**		***Oncorhynchus mykiss***			
Age 0+	Age 1+	Age 0+	Age 1+	Age 0+	Age 1+	Age 2+	Age 3+
—	—	—	—	—	—	—	—

Raw catch numbers are not population estimates.

Note: Preliminary population estimates and figures will be provided when sufficient data have been collected.