BUREAU OF RECLAMATION

# Navajo Unit Operations Coordination Meeting

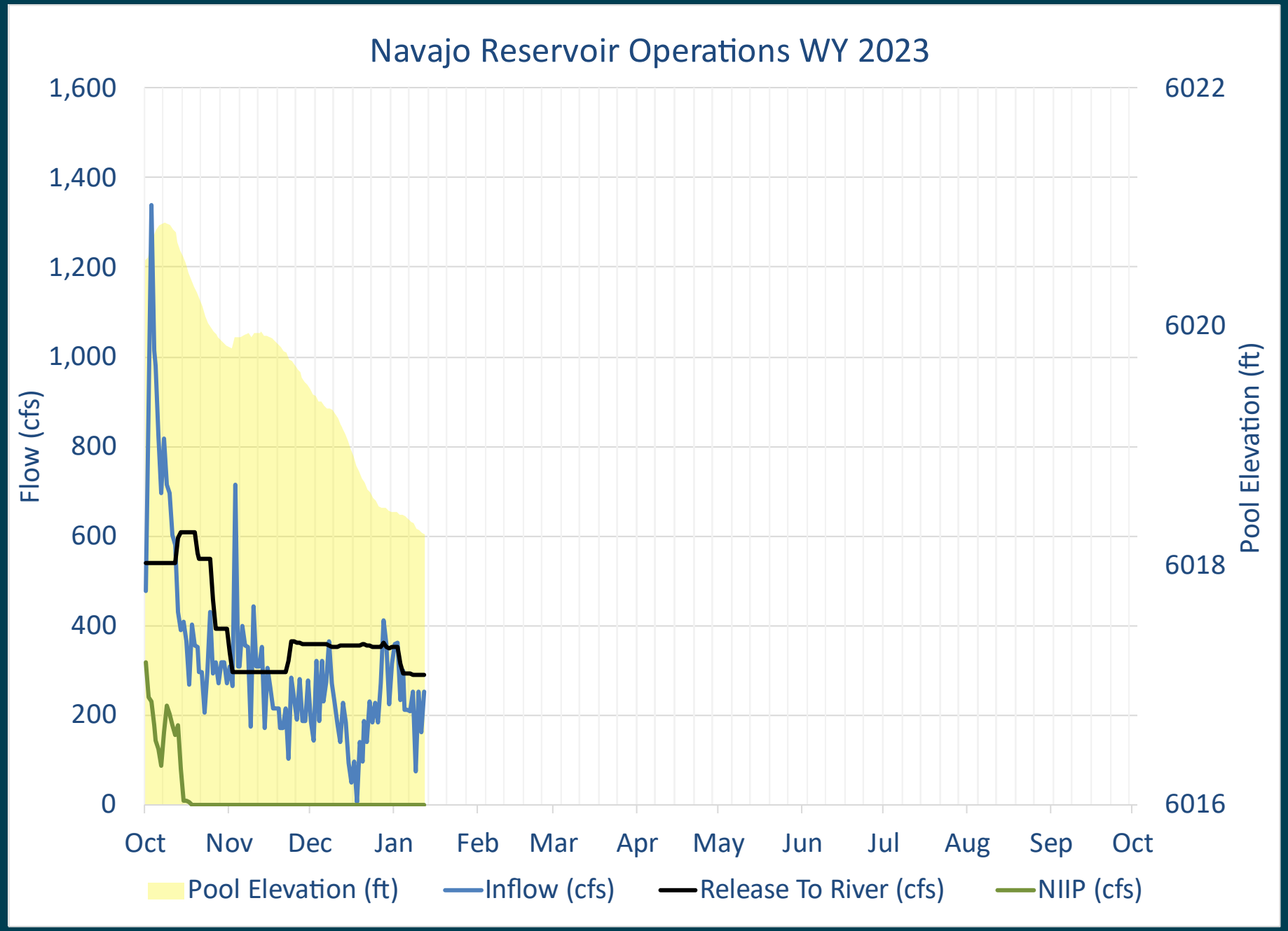
January 17th, 2023

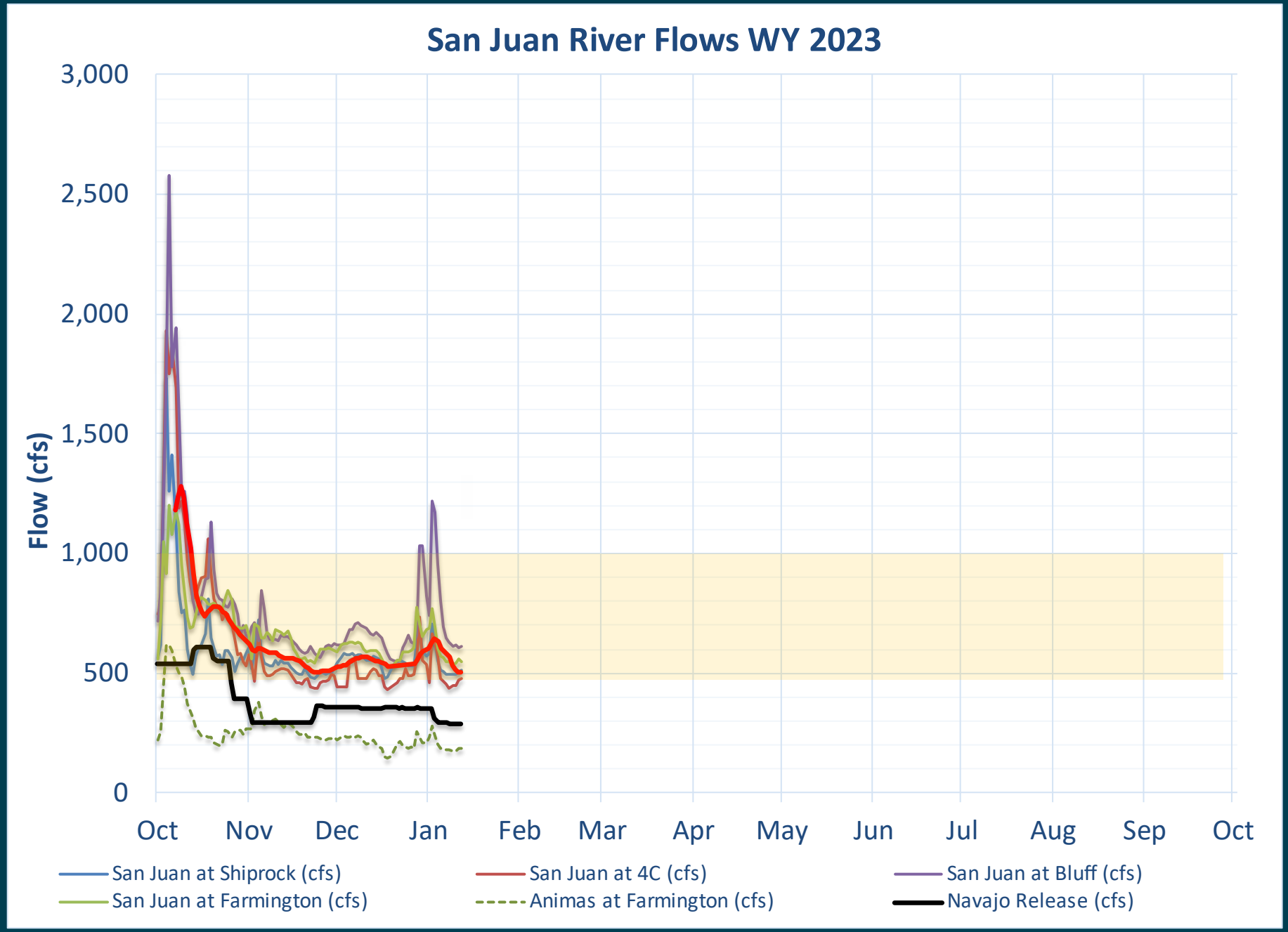
1:00 PM

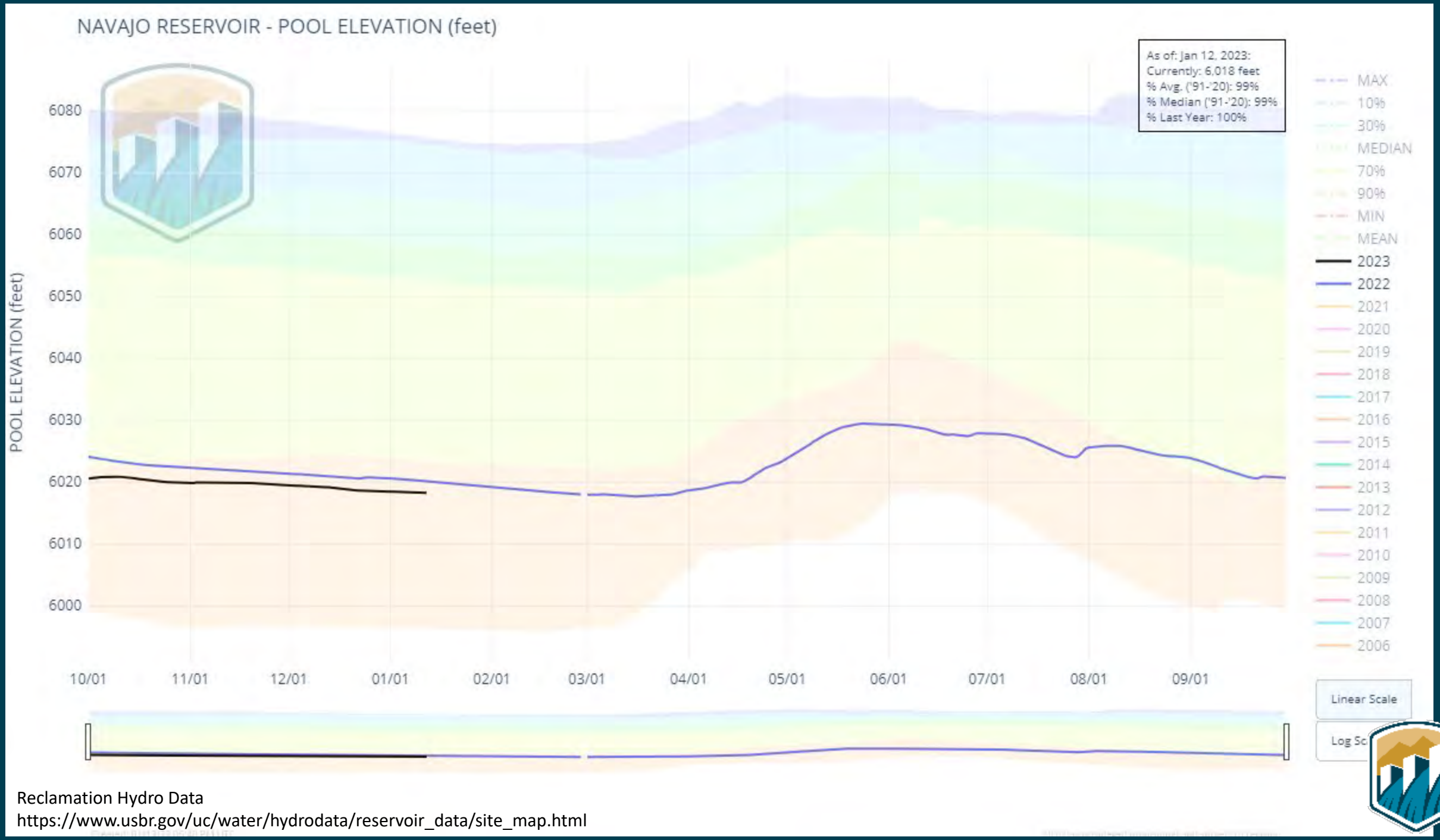
Virtual Meeting via Microsoft Teams

# Agenda

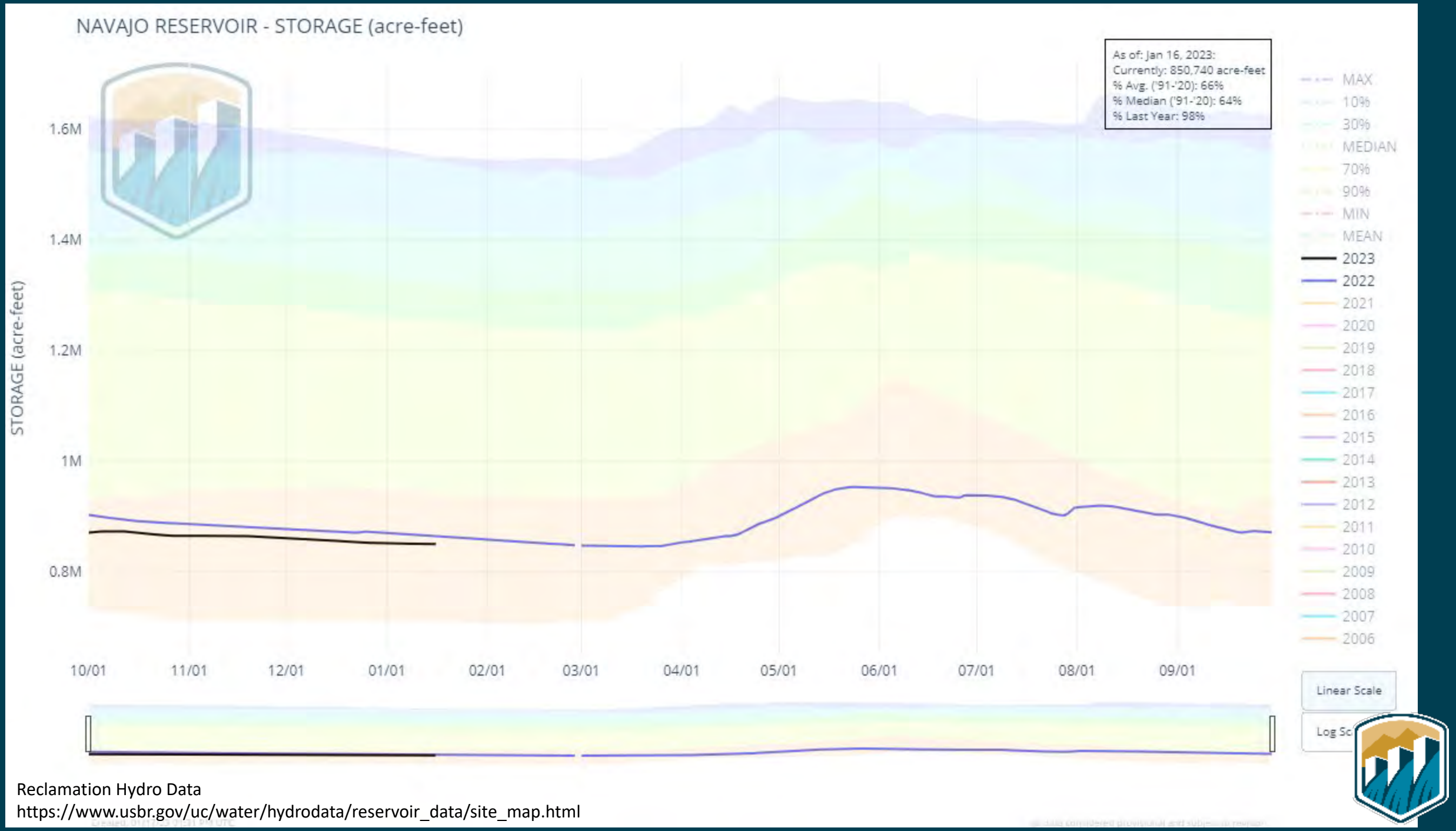
- Introductions
- WY 2023 Review of operations to date
- Weather and Streamflow Forecast – Ashley Nielson, CBRFC
- WY 2023 planned operations
- Comments and Reports


Navajo Reservoir Operations WY 2023
1,600
1,400
1,200
1,000
800
600
400
200
0
Flow (cfs)
6022
6020
6018
6016
Pool Elevation (ft)
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Pool Elevation (ft)
Inflow (cfs)
Release To River (cfs)
NIIP (cfs)


San Juan River Flows WY 2023
3,000
2,500
2,000
1,500
1,000
500
0
Flow (cfs)
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
San Juan at Shiprock (cfs)
San Juan at 4C (cfs)
San Juan at Bluff (cfs)
San Juan at Farmington (cfs)
Animas at Farmington (cfs)
Navajo Release (cfs)




Reclamation Hydro Data
https://www.usbr.gov/uc/water/hydrodata/reservoir_data/site_map.html

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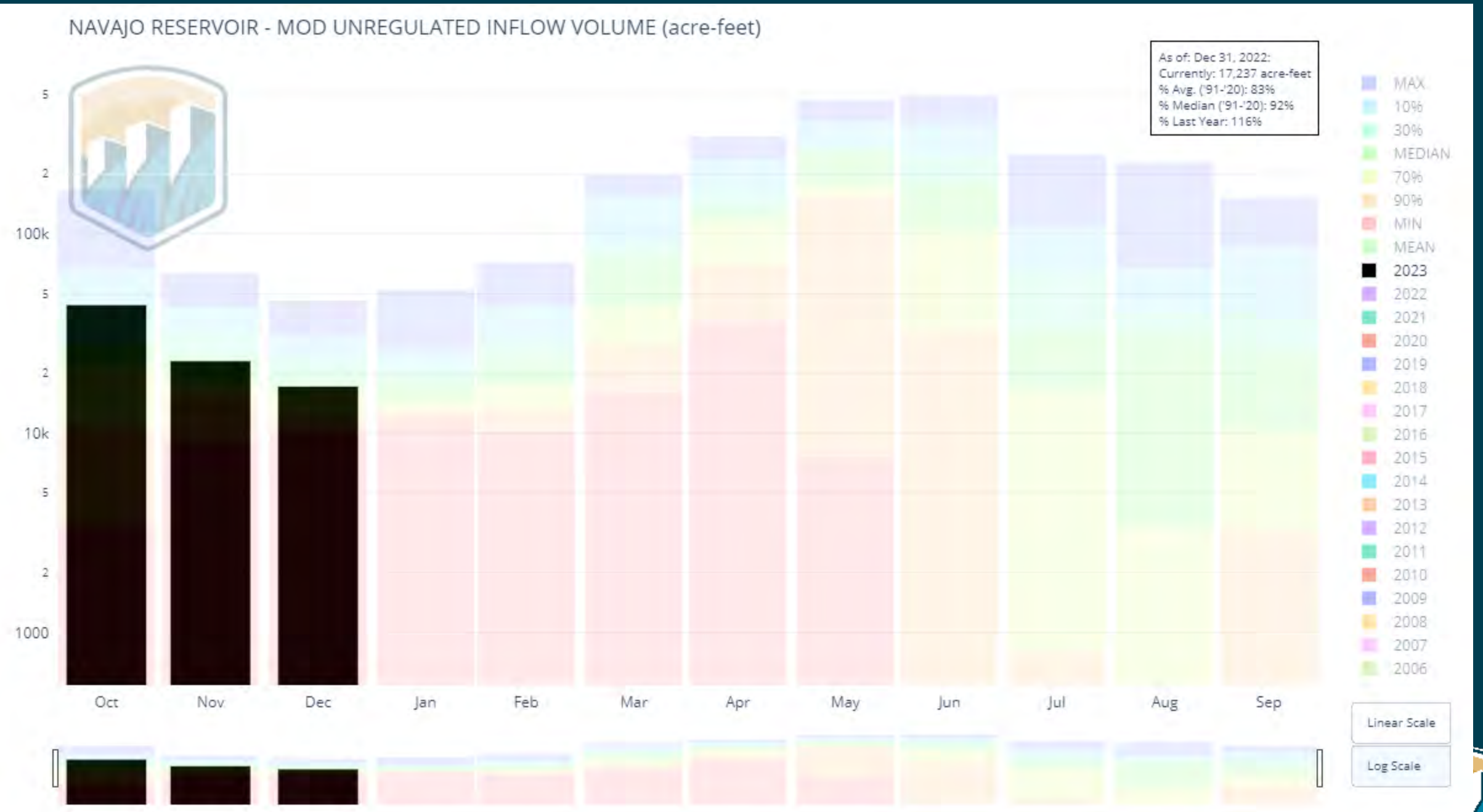


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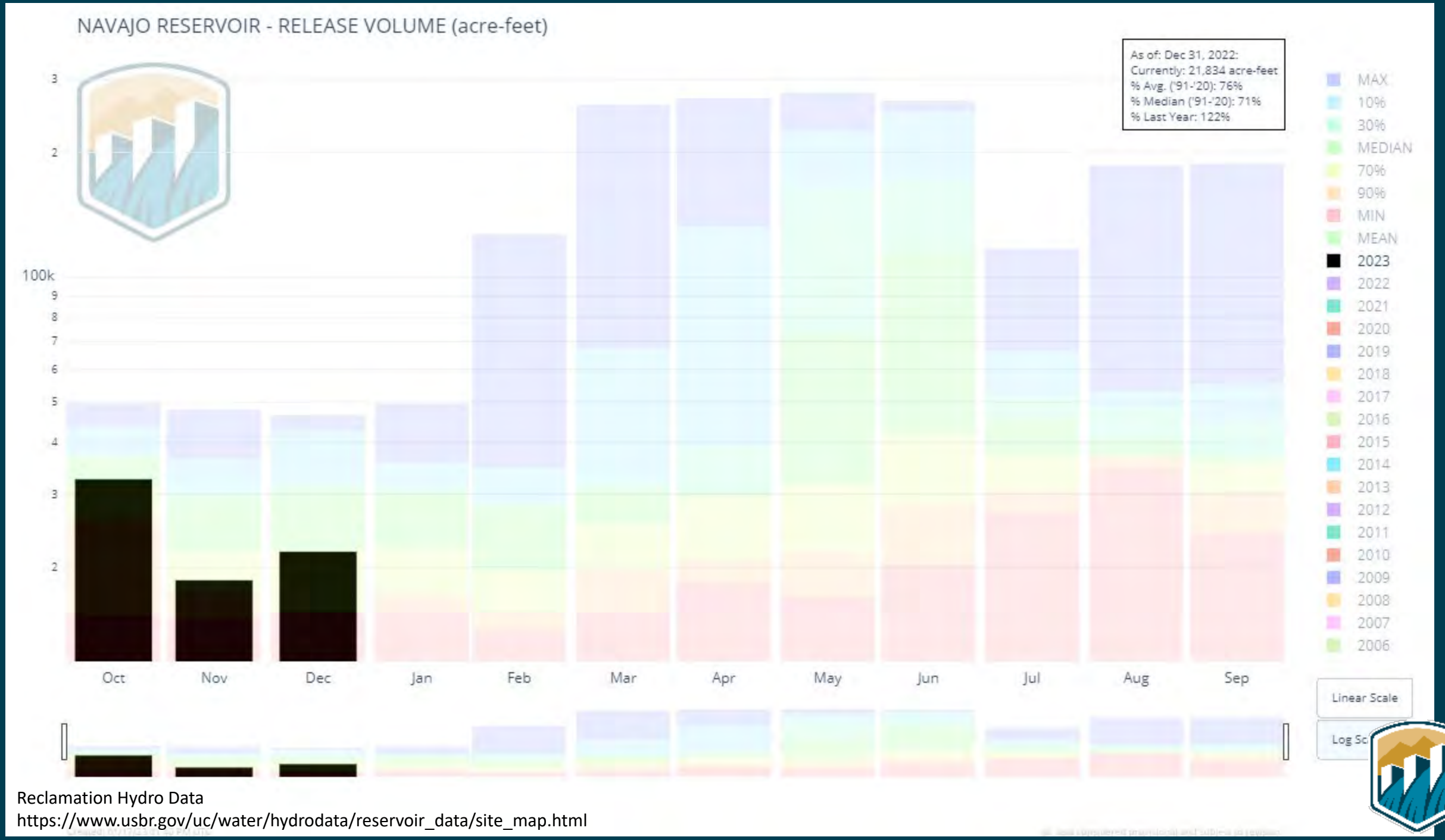


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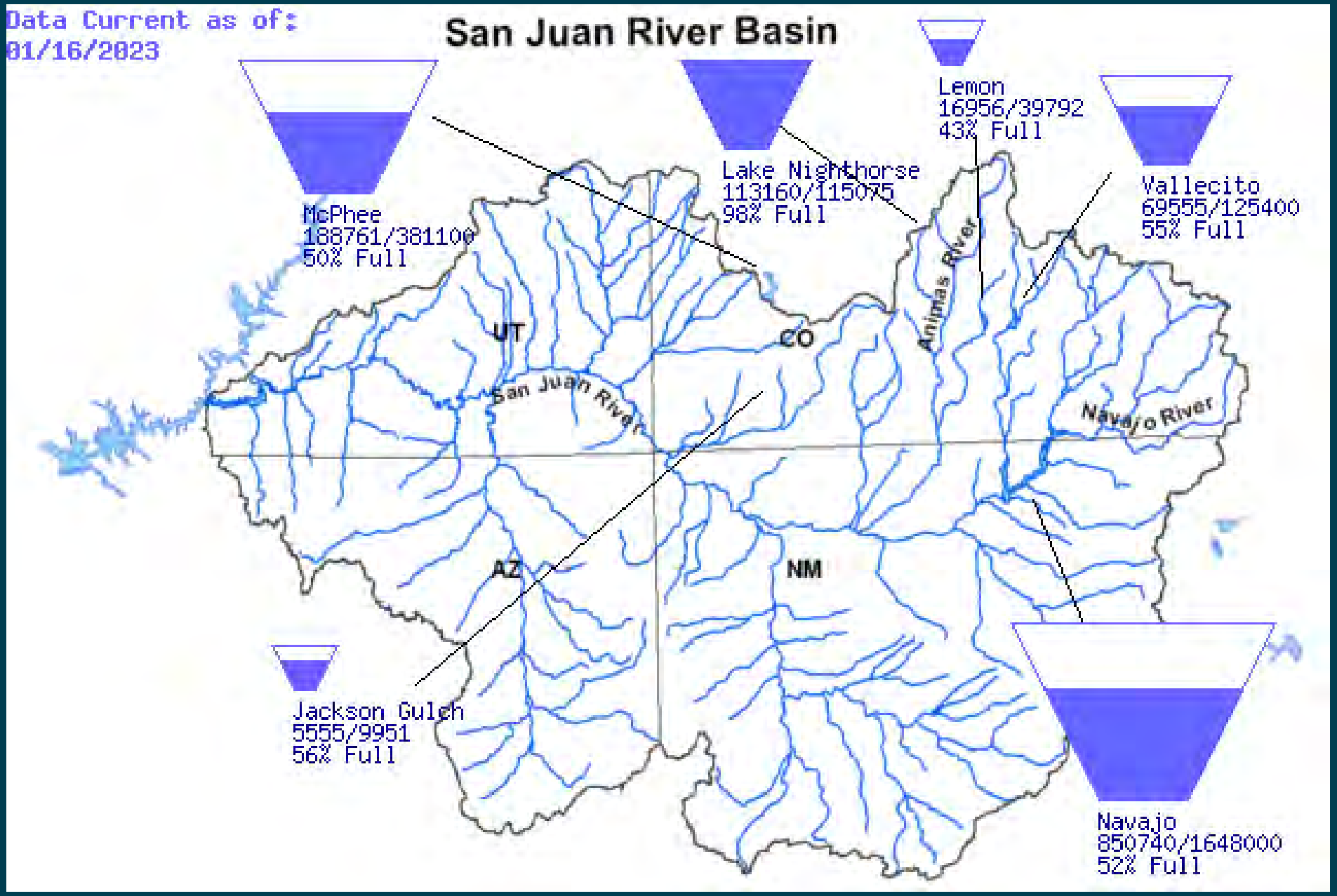
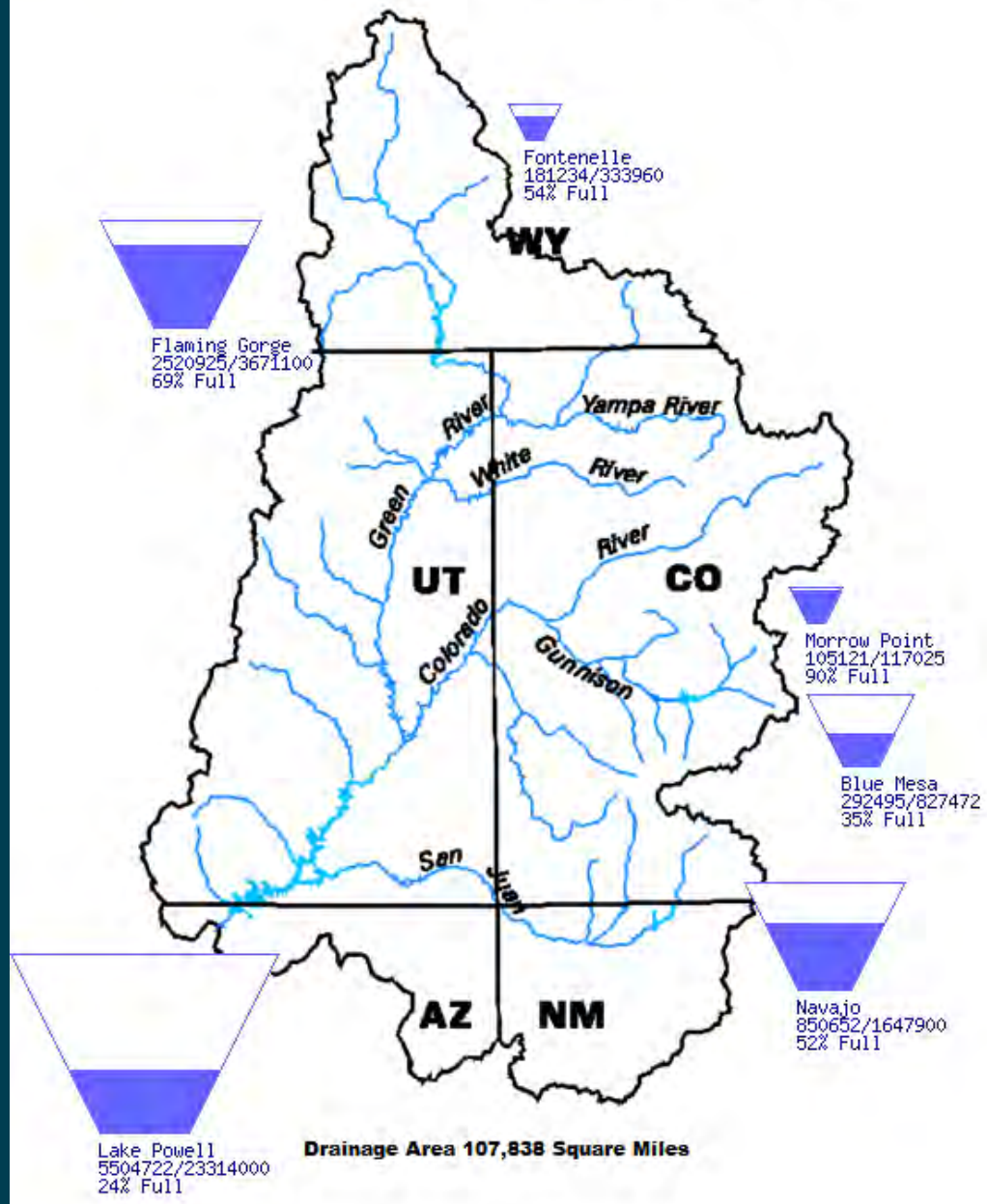

Data Current as of:
01/16/2023
San Juan River Basin
McPhee
188761/381100
50% Full
Lake Nighthorse
113160/115075
98% Full
Lemon
16956/39792
43% Full
Vallecito
69555/125400
55% Full
UT
CO
AZ
NM
San Juan River
Animas River
Navajo River
Jackson Gulch
5555/9951
56% Full
Navajo
850740/1648000
52% Full


Data Current as of:
01/16/2022
San Juan River Basin
McPhee
165715/381100
43% Full
Lake Nighthorse
112378/115075
98% Full
Lemon
13201/39792
33% Full
Vallecito
36982/125400
29% Full
Jackson Gulch
4060/9951
41% Full
Navajo
865744/1696000
51% Full
UT
CO
AZ
NM
Animas River
San Juan River
Navajo River
THIS TIME LAST YEAR

Data Current as of:
01/15/2023

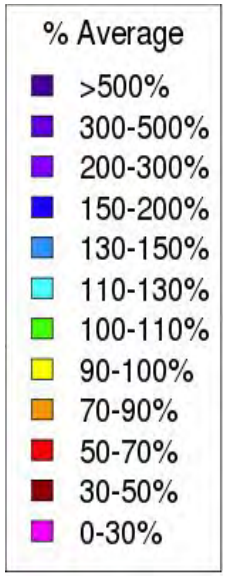
# Upper Colorado River Drainage Basin



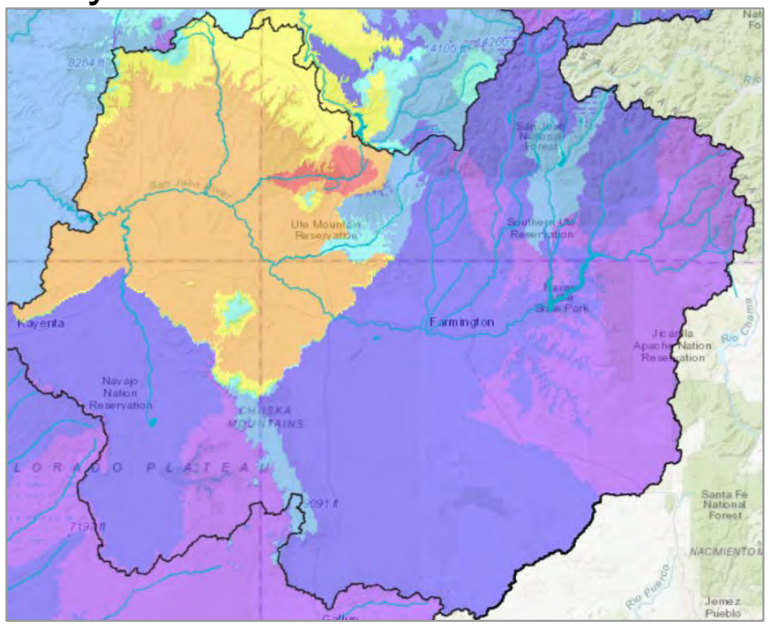
# Navajo Reservoir/San Juan Basin Water Supply Outlook January 2023


Ashley Nielson
Senior Hydrologist
Colorado Basin River Forecast Center
National Weather Service/NOAA

# Water Year 2022:July-September Observed Precipitation

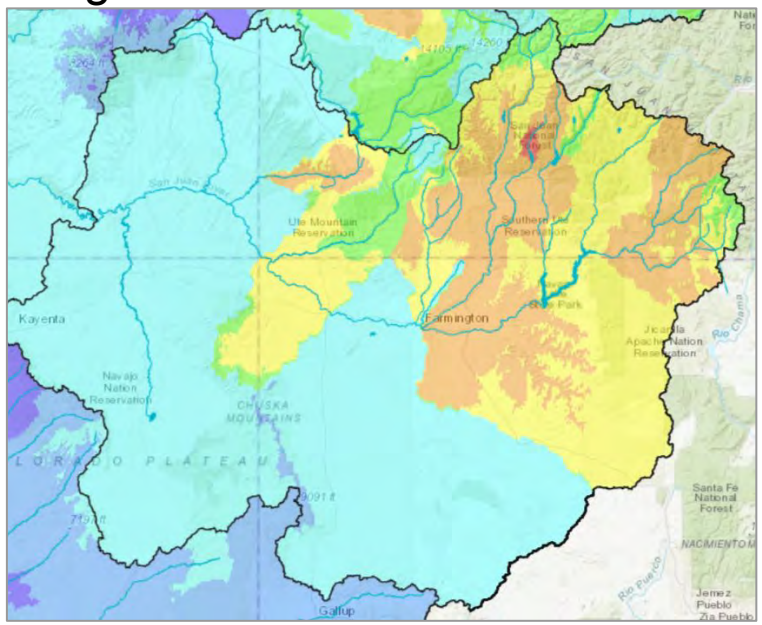



July



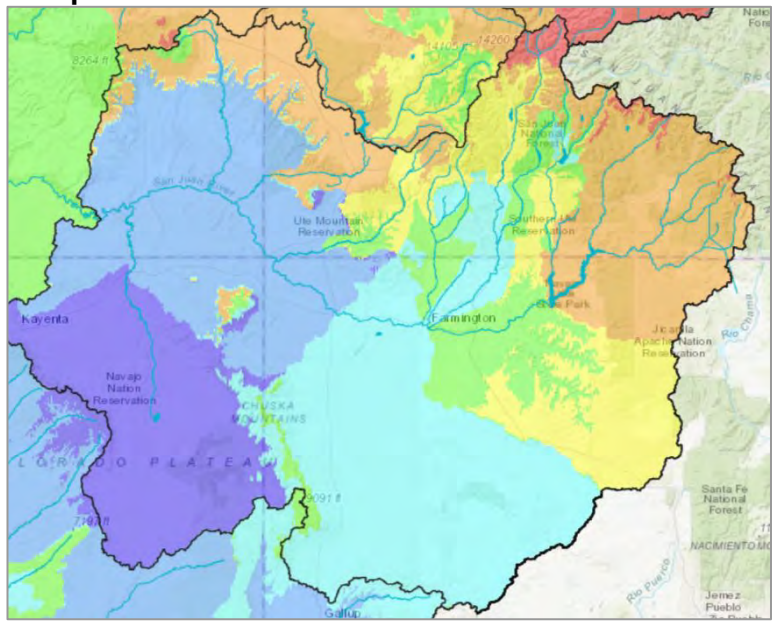

Animas River Basin: 165%
Above Navajo Reservoir: 220%

August




Animas River Basin: 85%
Above Navajo Reservoir: 90%

September

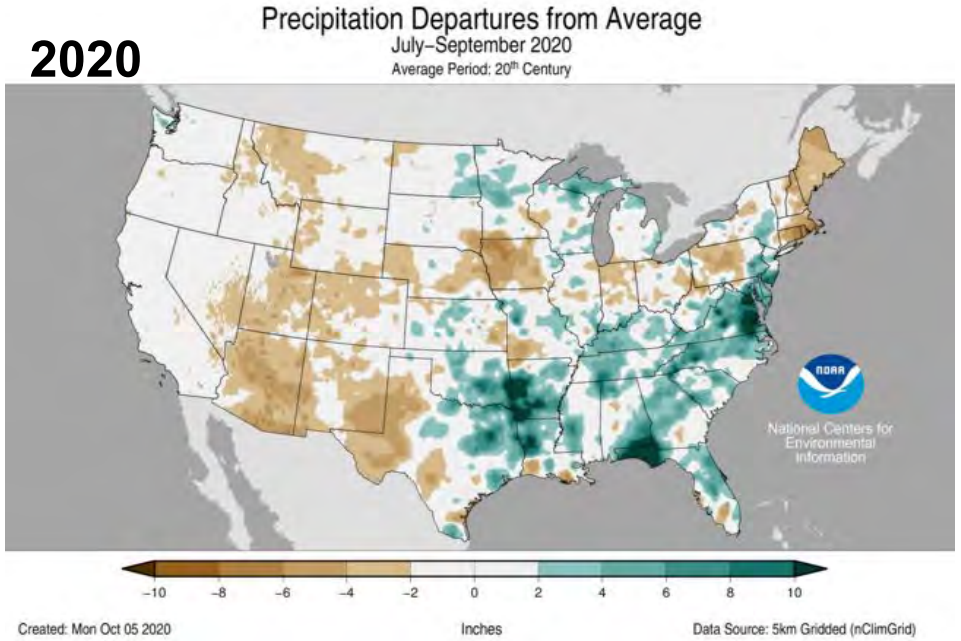



Animas River Basin: 90%
Above Navajo Reservoir: 85%

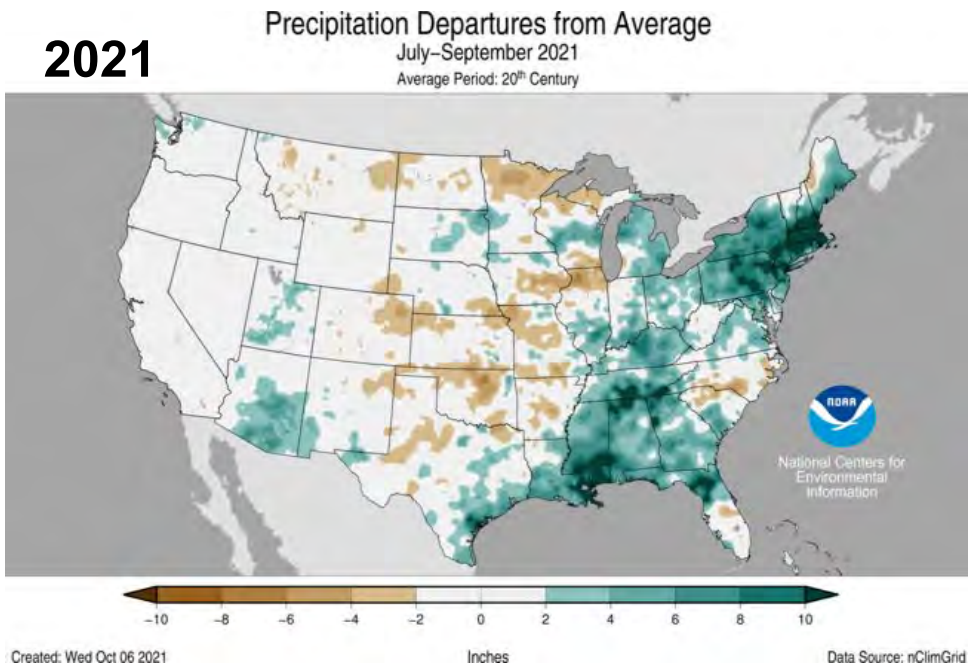
*Observed precipitation is averaged by CBRFC defined basin elevation zones.*

# Monsoon: July-September Precipitation

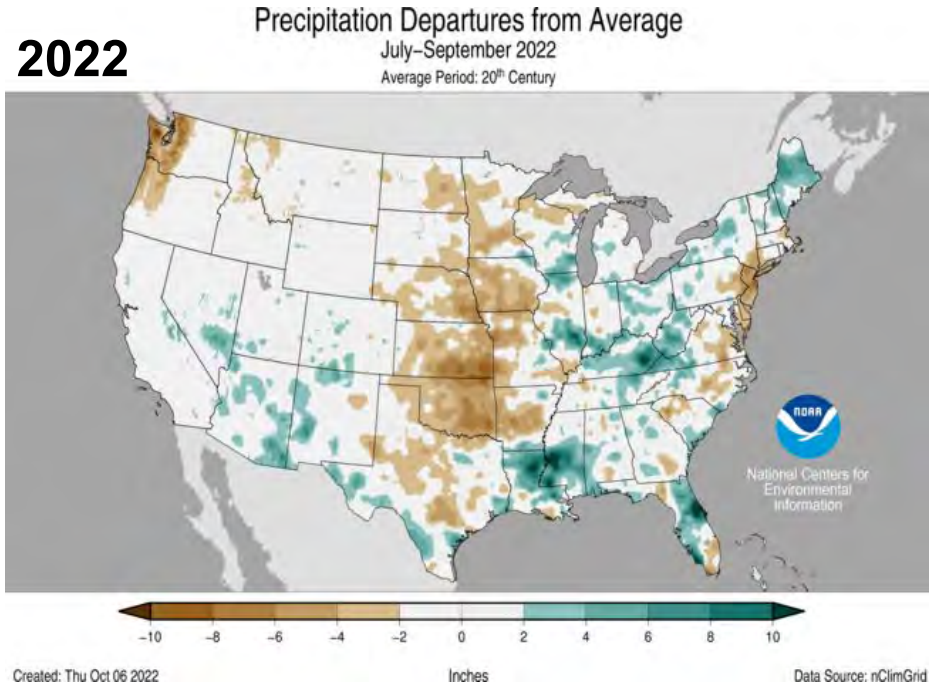
**2020**



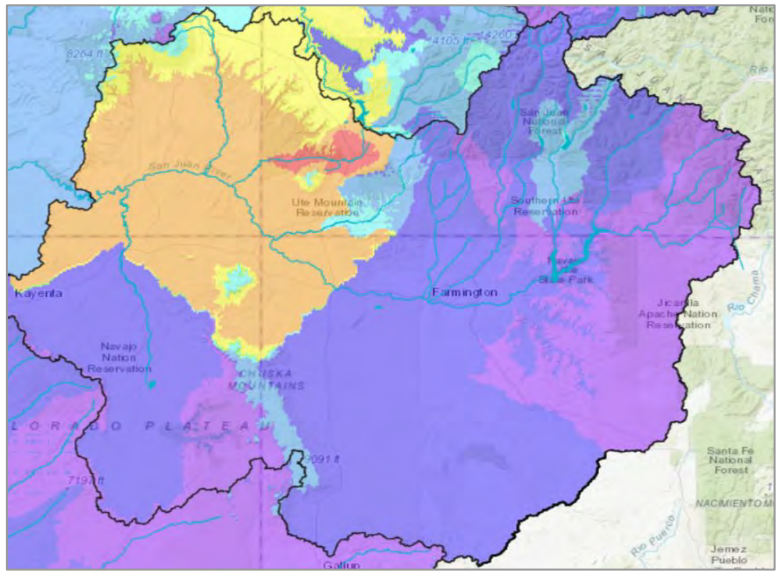

**2021**




**2022**

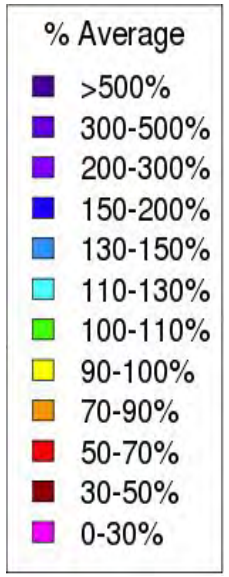



June 2022 Precipitation

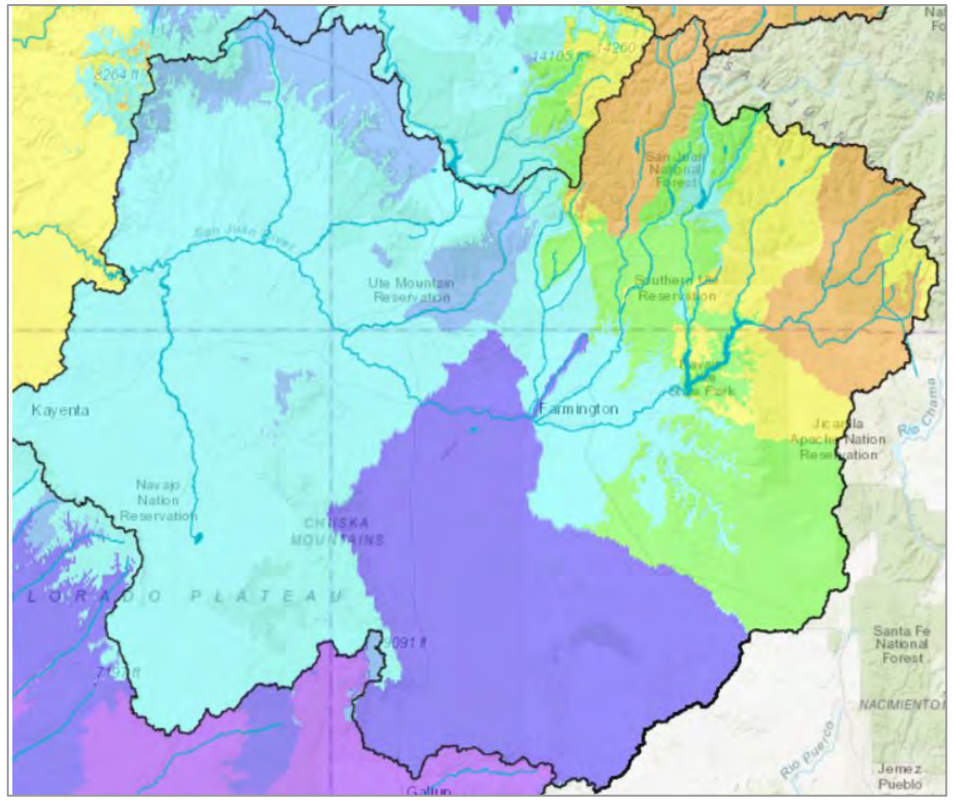



Animas River Basin: 365%
Above Navajo Reservoir: 450%

# Water Year 2023: Observed Precipitation

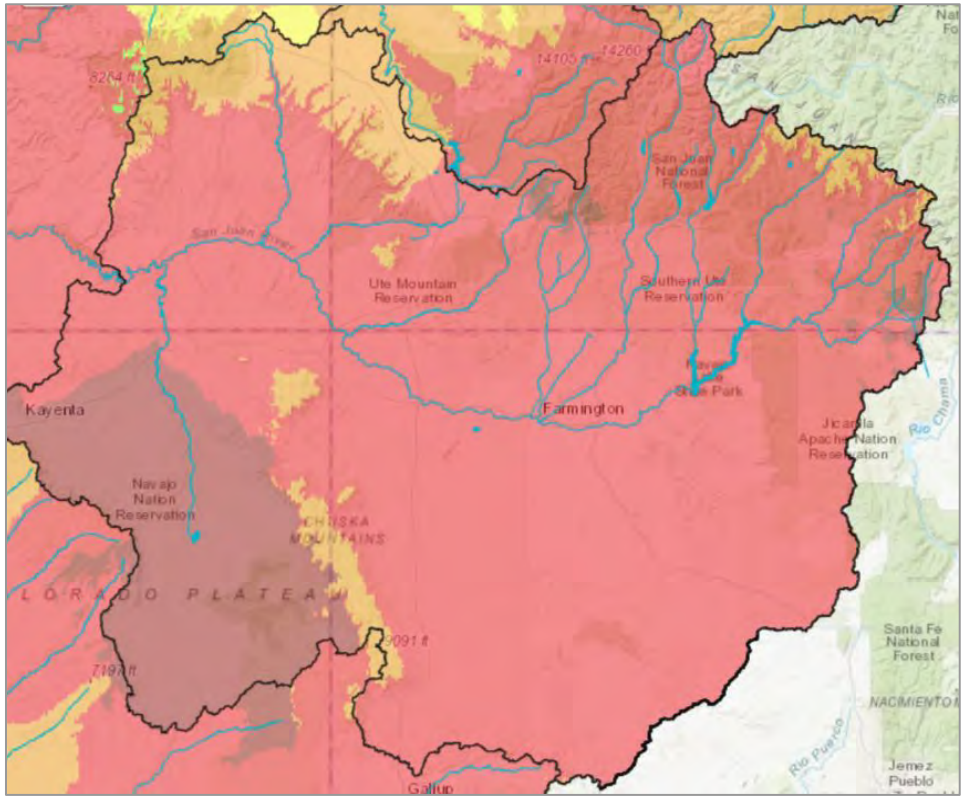



October




Animas River Basin: 95%
Above Navajo Reservoir: 95%

November

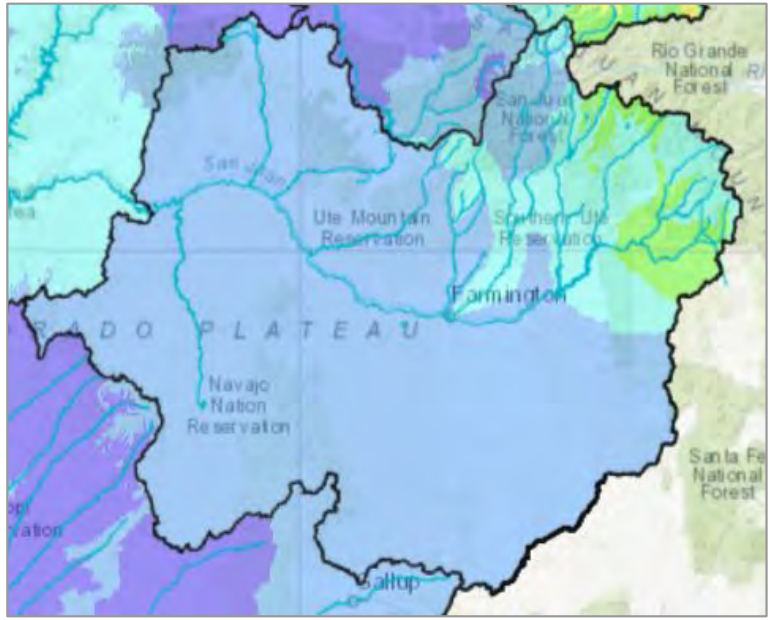



Animas River Basin: 65%
Above Navajo Reservoir: 65%

*Observed precipitation is averaged by CBRFC defined basin elevation zones.*

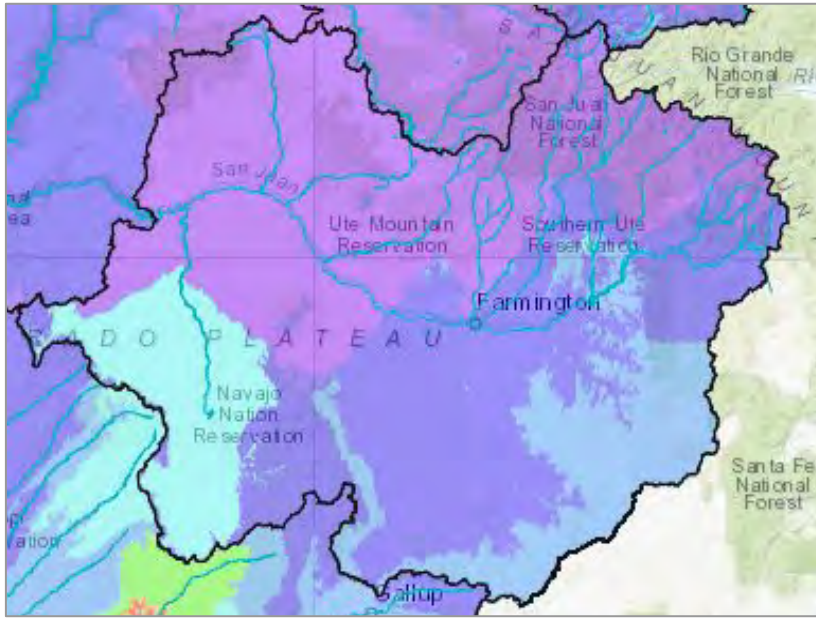
# Water Year 2023: Observed Precipitation

December



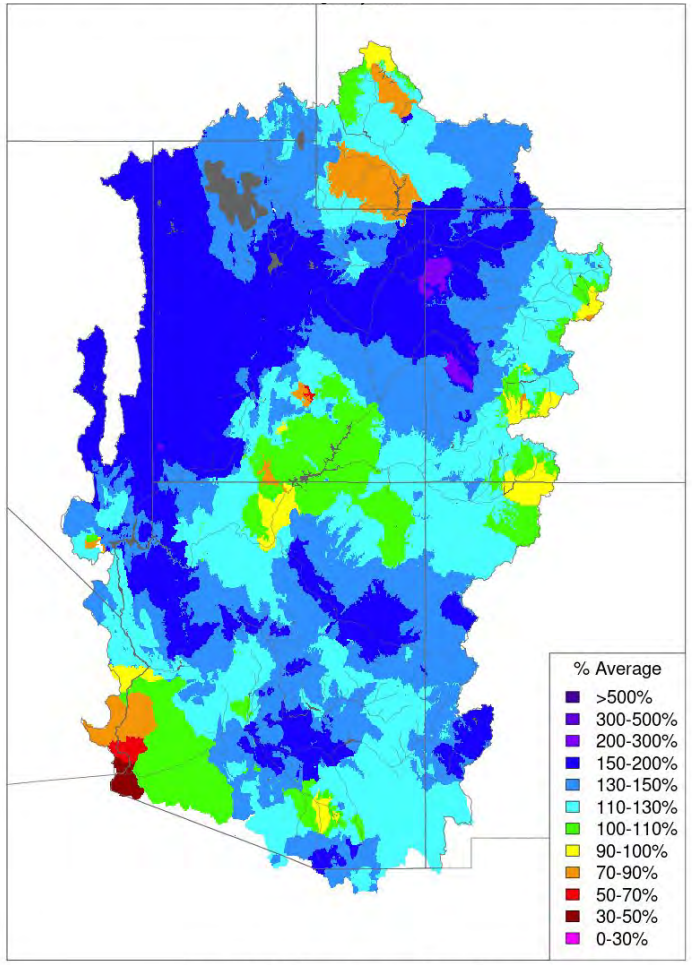

Animas River Basin: 110%
Above Navajo Reservoir: 130%

January 1-16




Animas River Basin: 230%
Above Navajo Reservoir: 205%

Water Year to Date:Oct 1 - Jan 16




*Prepared by NOAA, Colorado Basin River Forecast Center*
*Salt Lake City, Utah, www.cbrfc.noaa.gov*

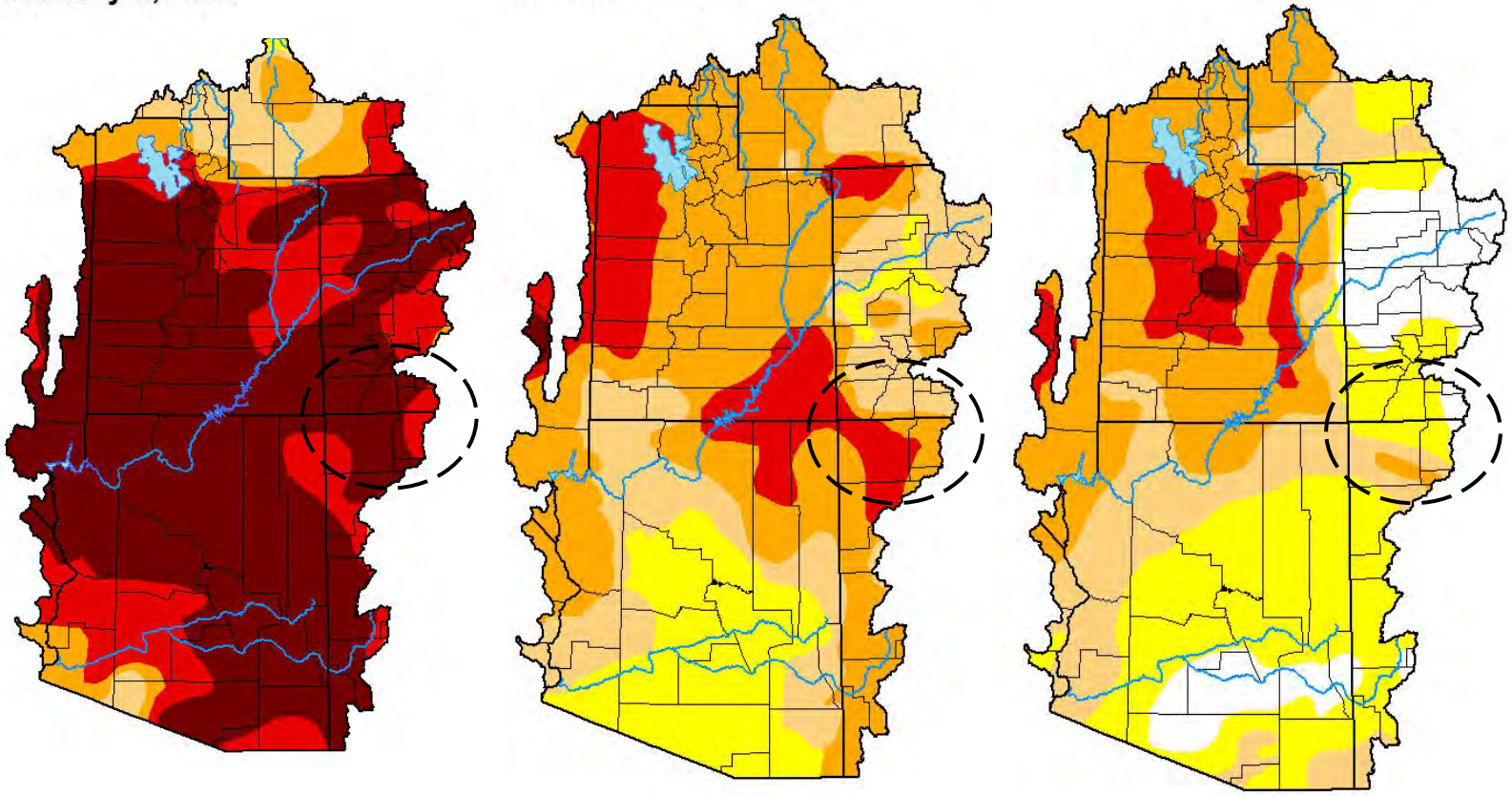
*Observed precipitation is averaged by CBRFC defined basin elevation zones.*

# Drought Conditions: U.S Drought Monitor

**January 5, 2021**

**January 4, 2022**

**January 3, 2023**



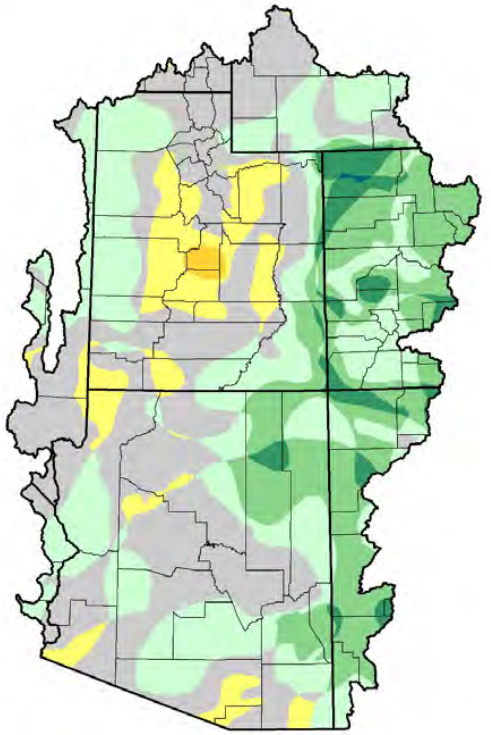
*Intensity:*

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx*

droughtmonitor.unl.edu

**U.S. Drought Monitor Class Change - Colorado Basin RFC**
52 Week

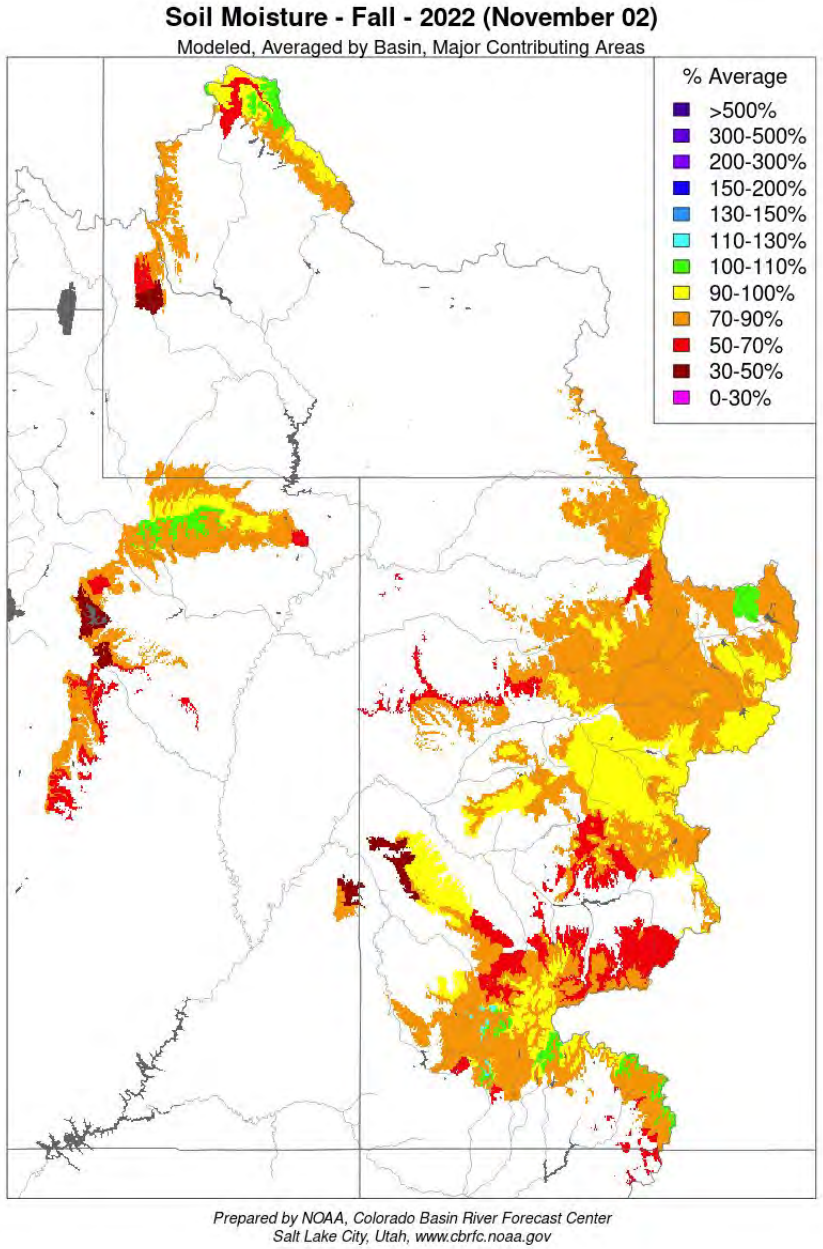


**January 3, 2023 compared to January 4, 2022**

- 5 Class Degradation
- 4 Class Degradation
- 3 Class Degradation
- 2 Class Degradation
- 1 Class Degradation
- No Change
- 1 Class Improvement
- 2 Class Improvement
- 3 Class Improvement
- 4 Class Improvement
- 5 Class Improvement

droughtmonitor.unl.edu

# Upper Colorado River: Fall 2022 Model Soil Moisture Conditions




The map shows the model soil moisture conditions from the lower soil zone in CBRFC's hydrologic model. This zone represents the source of longer-term (weeks-to-years streamflow).

Modeled lower zone soil water content is a result of past hydrologic conditions including but not limited to:

- -previous year(s) runoff
- -summer/fall precipitation

Soil moisture content is adjusted every fall during a dry period after irrigation season has ended and before winter. Forecasters use the following data to make adjustments:

- -Early November streamflow observations (baseflow)
- -Reservoir inflows
- -July-October precipitation
- -Past season(s) runoff conditions

**CBRFC model soil moisture conditions are near to below normal across many of the major runoff producing areas.**

# San Juan River Basin: Fall 2022 Model Soil Moisture Conditions

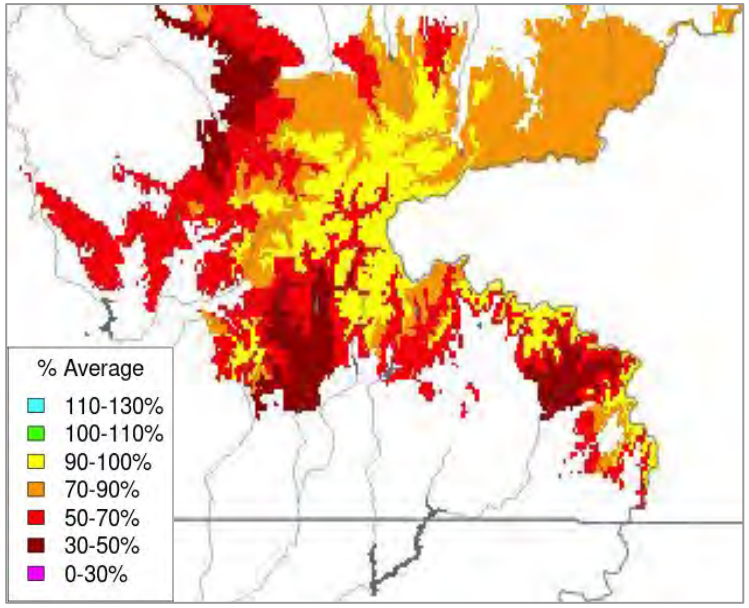
Soil moisture conditions have improved for most runoff producing areas in the San Juan River Basin since last fall. Conditions are below normal to near normal across the basin.

Soil moisture deficits still exist but are less than in previous years.

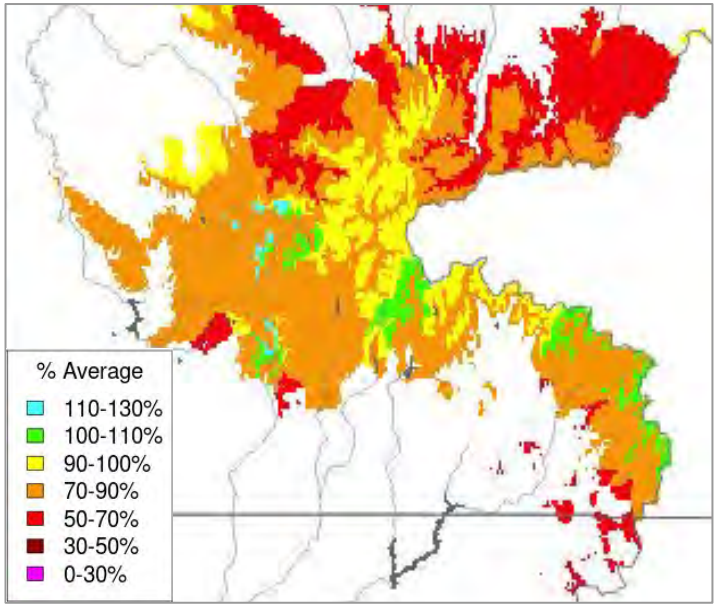
<u>Soil Moisture Impacts:</u>

1. Water Supply Forecasts
   - Below average conditions= lower forecasts
   - Above average conditions= higher forecasts
2. Spring Runoff Efficiency
   - Soil moisture deficit must be fulfilled before runoff can occur.
   - Degree of impact is uncertain in every year.
   - Timing/magnitude of runoff is ultimately a result of:
     - Spring Weather (precipitation/temperature)
     - Snow Conditions
     - Soil Moisture Conditions
     - Dust conditions

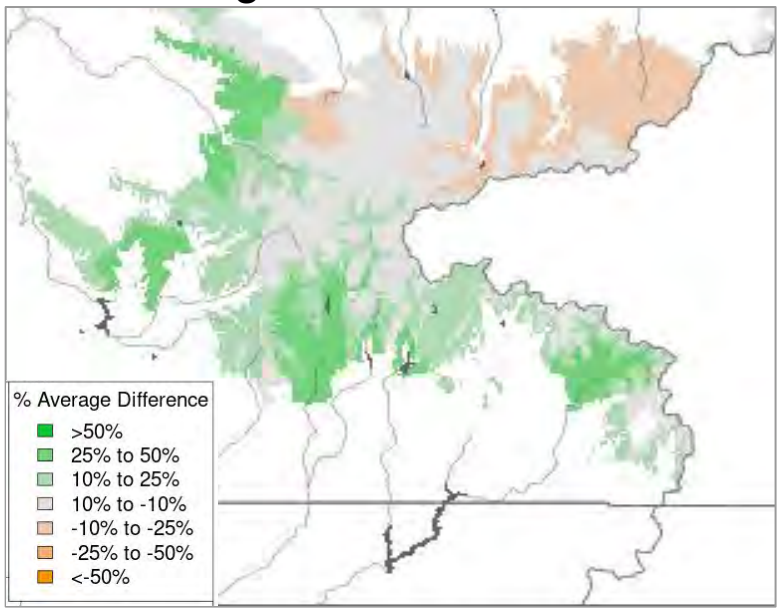
Fall 2021




Fall 2022



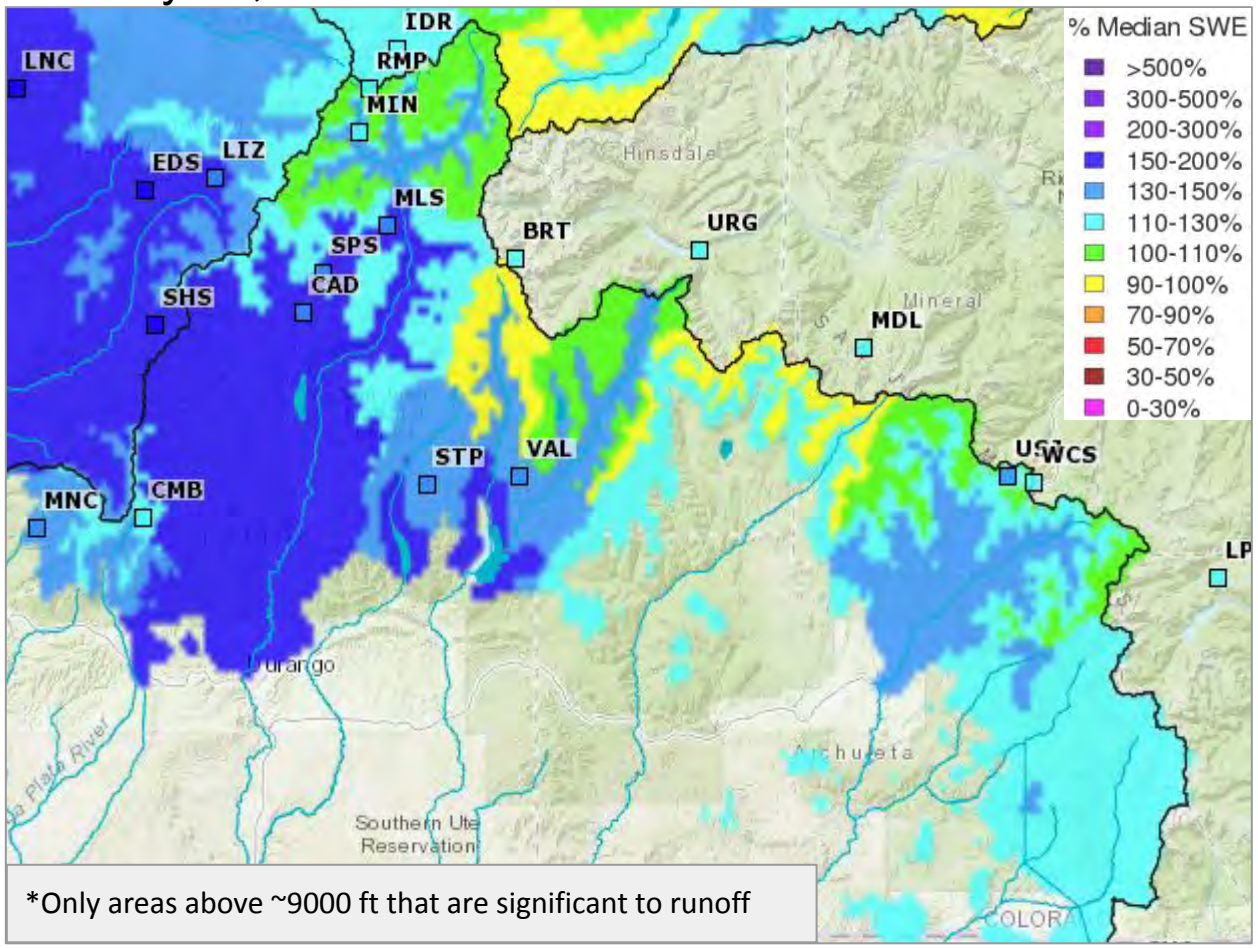

% Change: 2021-2022




*Model soil moisture is averaged by major contributing area within a basin.*

# Snow Conditions: SNOTELS and CBRFC Model Snow Water Equivalent

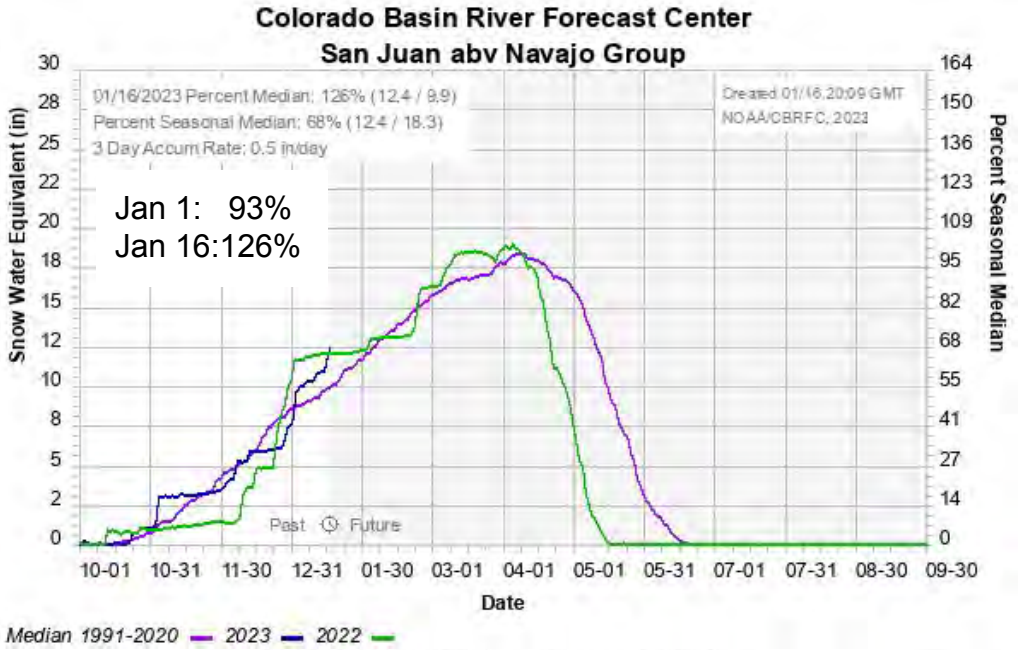
January 16, 2023

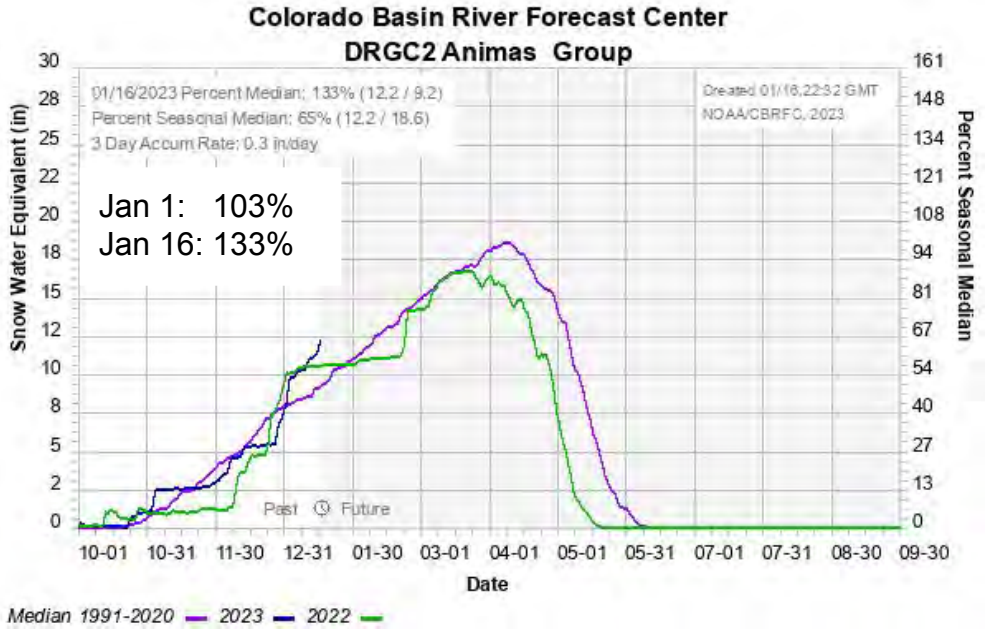



*Only areas above ~9000 ft that are significant to runoff

Model snow includes areas above and below SNOTEL sites.

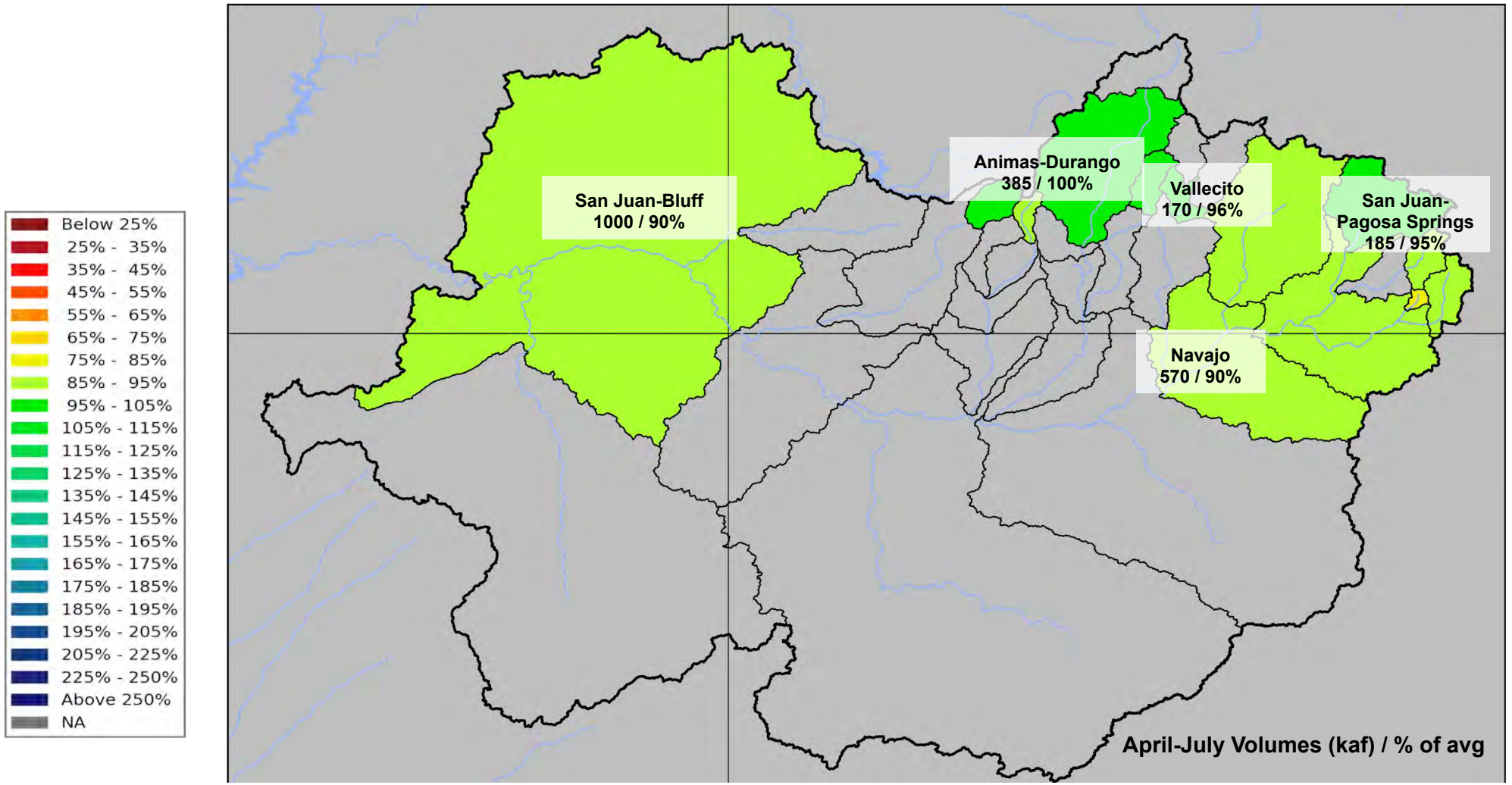
- SNOTEL locations range from ~8,500-11,500’
- Some modeled basins extend to over 13,000’



# January 2023 Water Supply Forecasts: San Juan River Basin

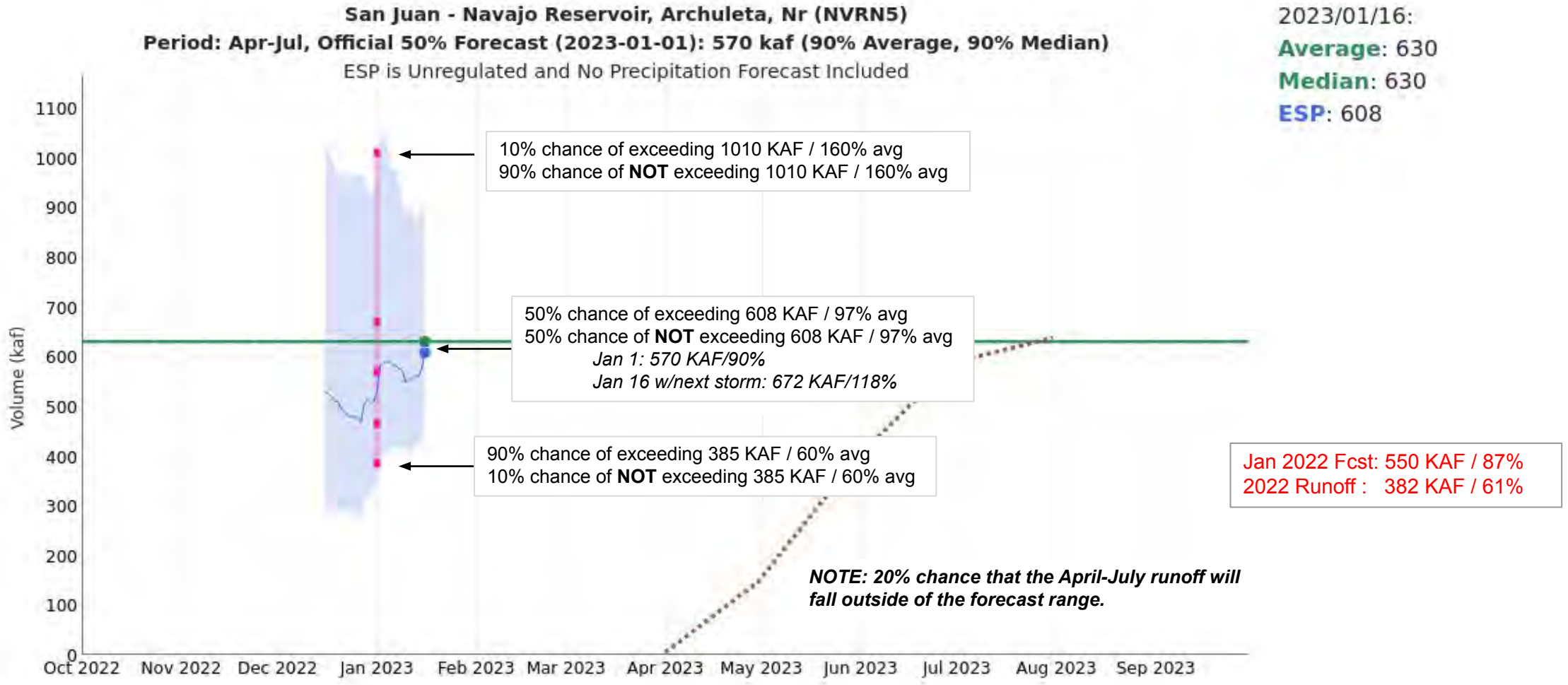
April-July Forecasts
Volume in 1000's acre-feet / Percent of 1991-2020 average




January 1st Forecast Range: 85-100% of average

Mid-January Model Guidance Forecast Range: 90-125% of average

# Forecast Progression: Navajo Reservoir Inflow:




Blue shading: Daily Raw Model Guidance 90% - 10% exceedance range
Blue line: Daily Raw Model Guidance 50% exceedance
Pink line: Official forecast 90%, 70%, 50%, 30%, 10% exceedance

Green solid: 1991-2020 average April-July volume
Green dotted: 1991-2020 median April-July volume

Brown dotted: Average observed

- The forecast has increased since January 1st due to wet conditions.
- If the forecast precipitation from the next storm system verifies, the forecast will continue to increase.
- Still early in the water supply season.

Navajo Inflow Forecast Plot Link

# Early Season Forecast Uncertainty

## January 1st Forecast:

What we know:

- ~40% of snowpack accumulation
- Fall soil moisture conditions

What we **DON'T** know:

- Jan-May weather (4 months)
- ~60% of snowpack accumulation
-

*Navajo Reservoir:*
*Average January Forecast Error: ~200 KAF*

## April 1st Forecast:

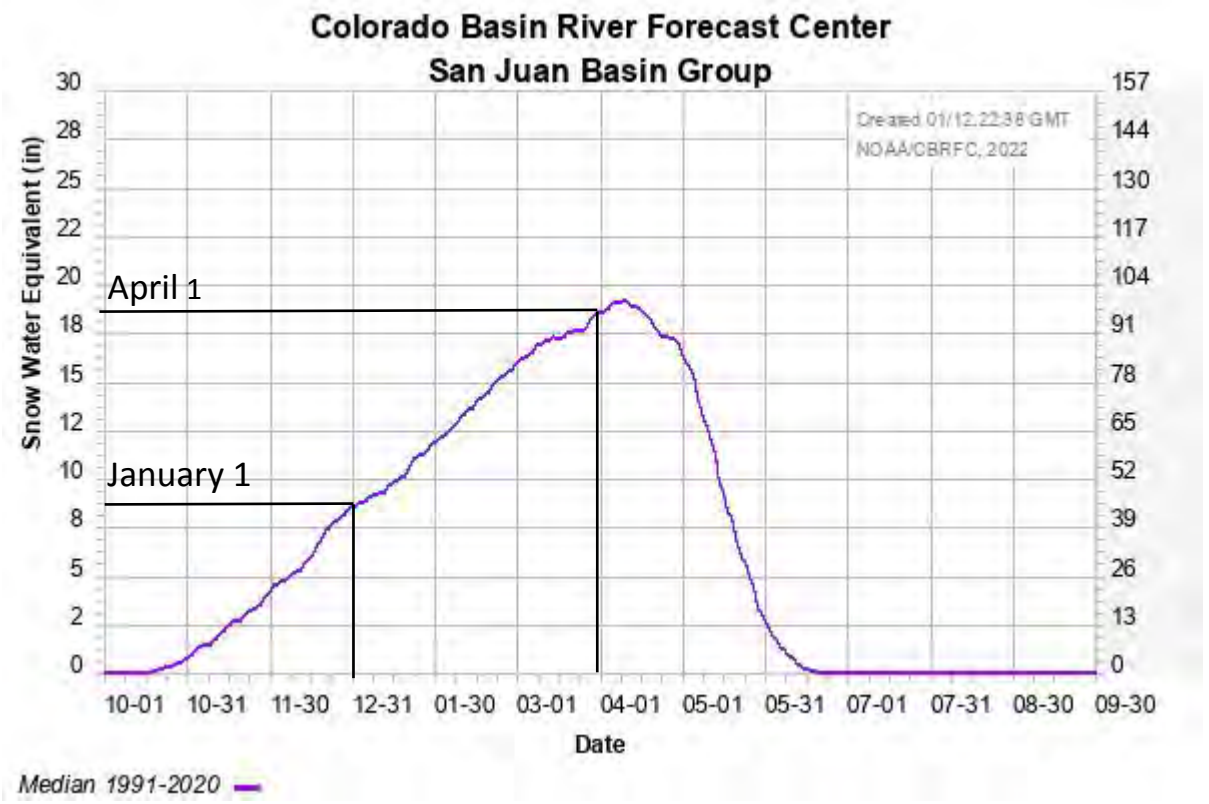
What we **KNOW**:

- ~98% of snowpack accumulation
- Dec-March weather

What we don't know:

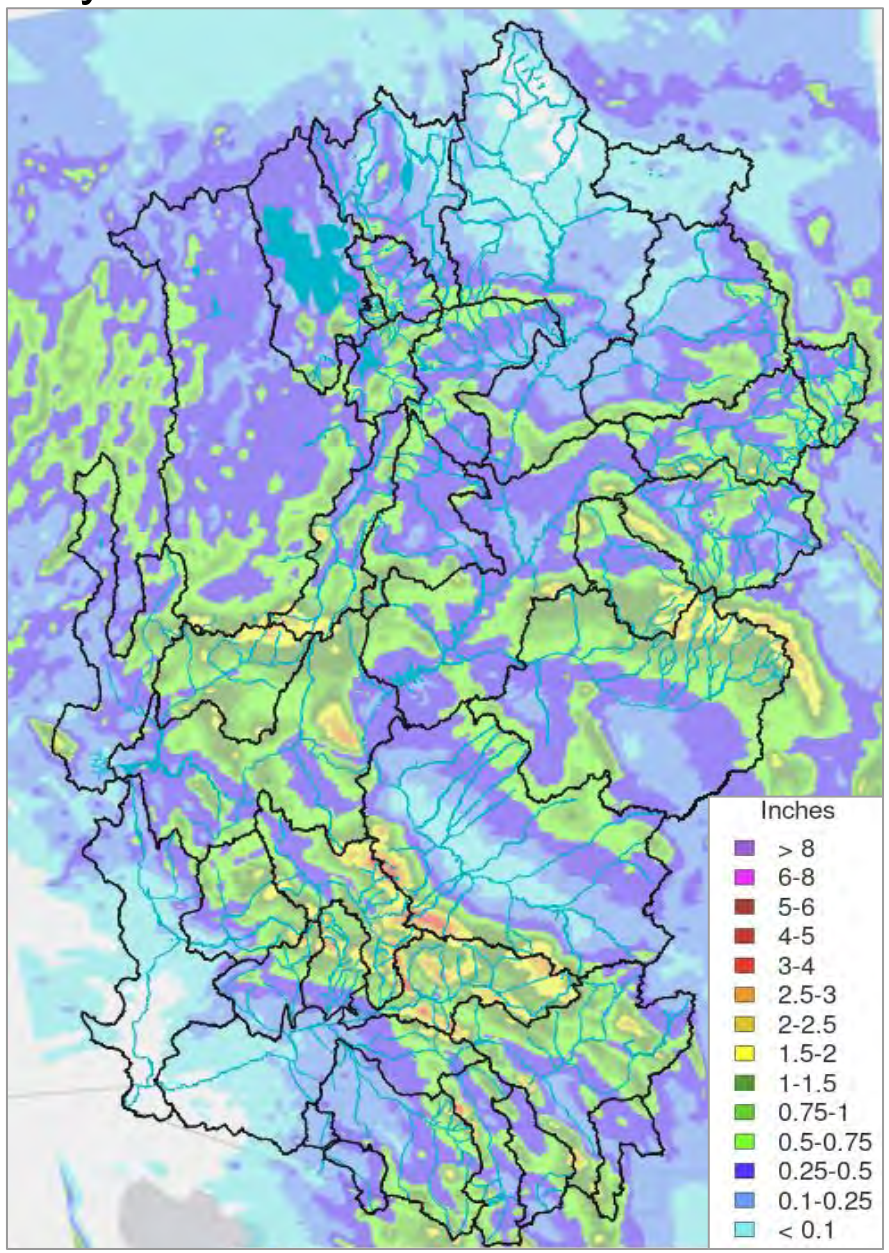
- April-May weather (2 months)
- Snowmelt pattern

*Navajo Reservoir:*
*Average April Forecast Error: ~100 KAF*



# Future Weather: January 16-24 Forecast Precipitation

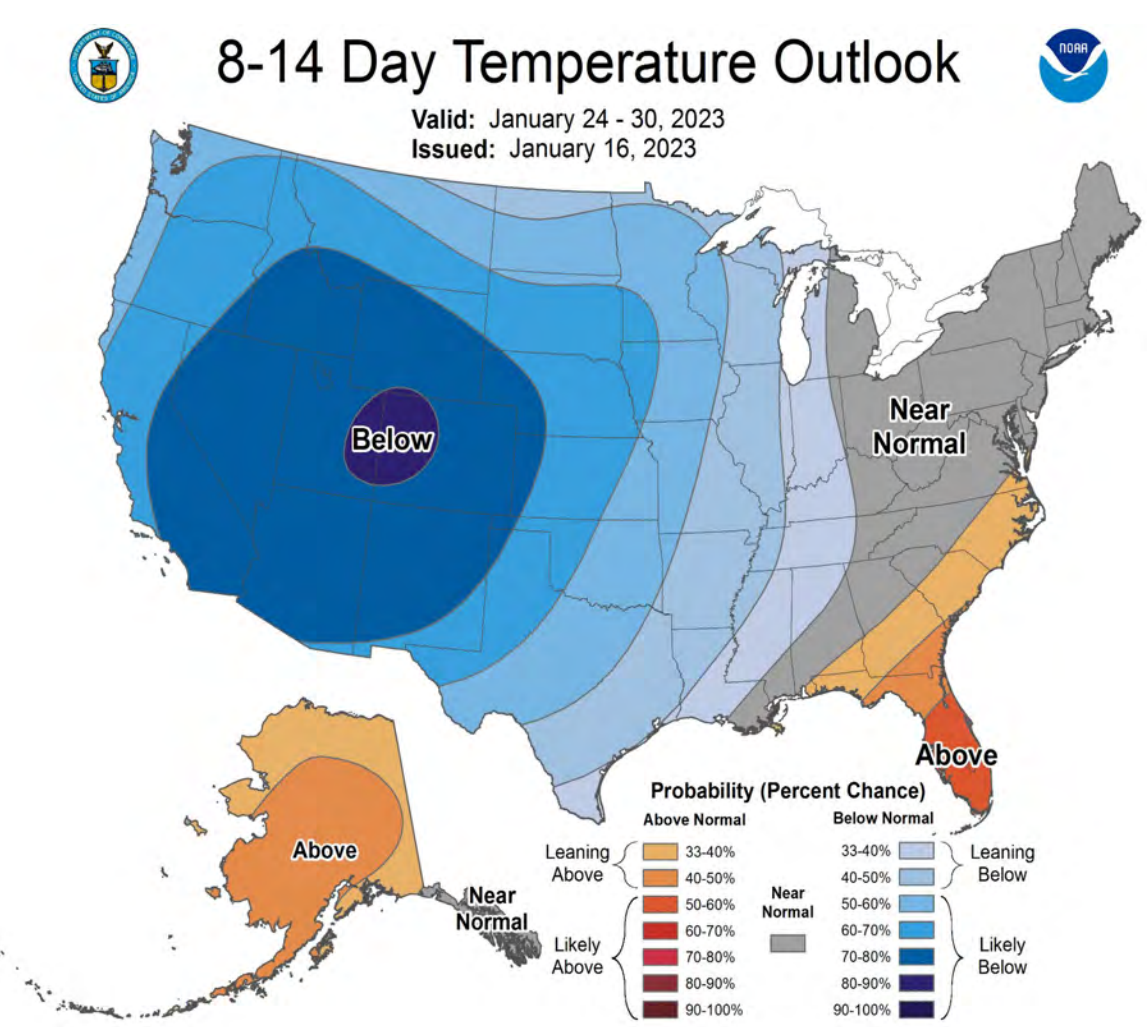
Days 1-7

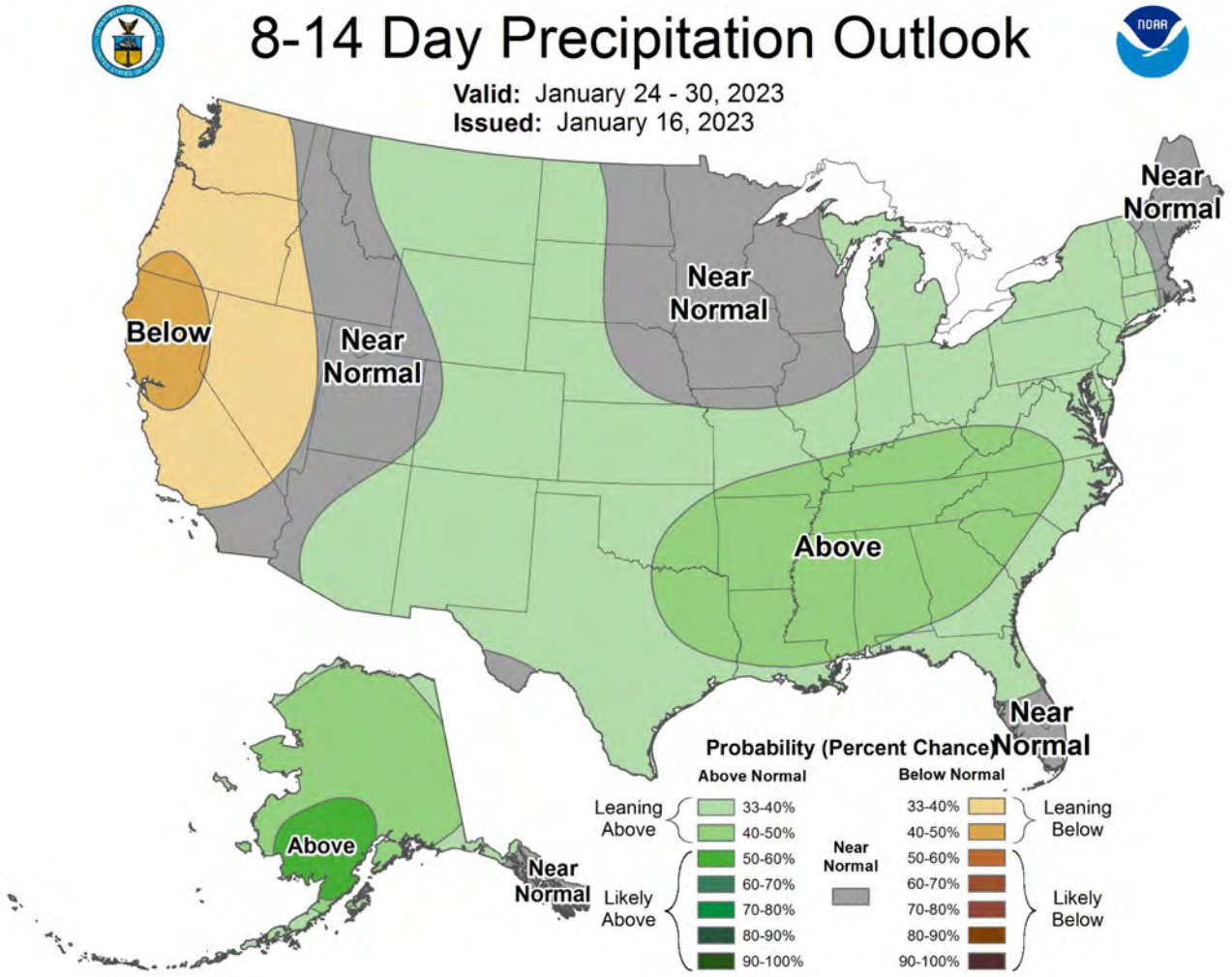



The storm system currently over the area will continue to bring precipitation through at least Wednesday morning.

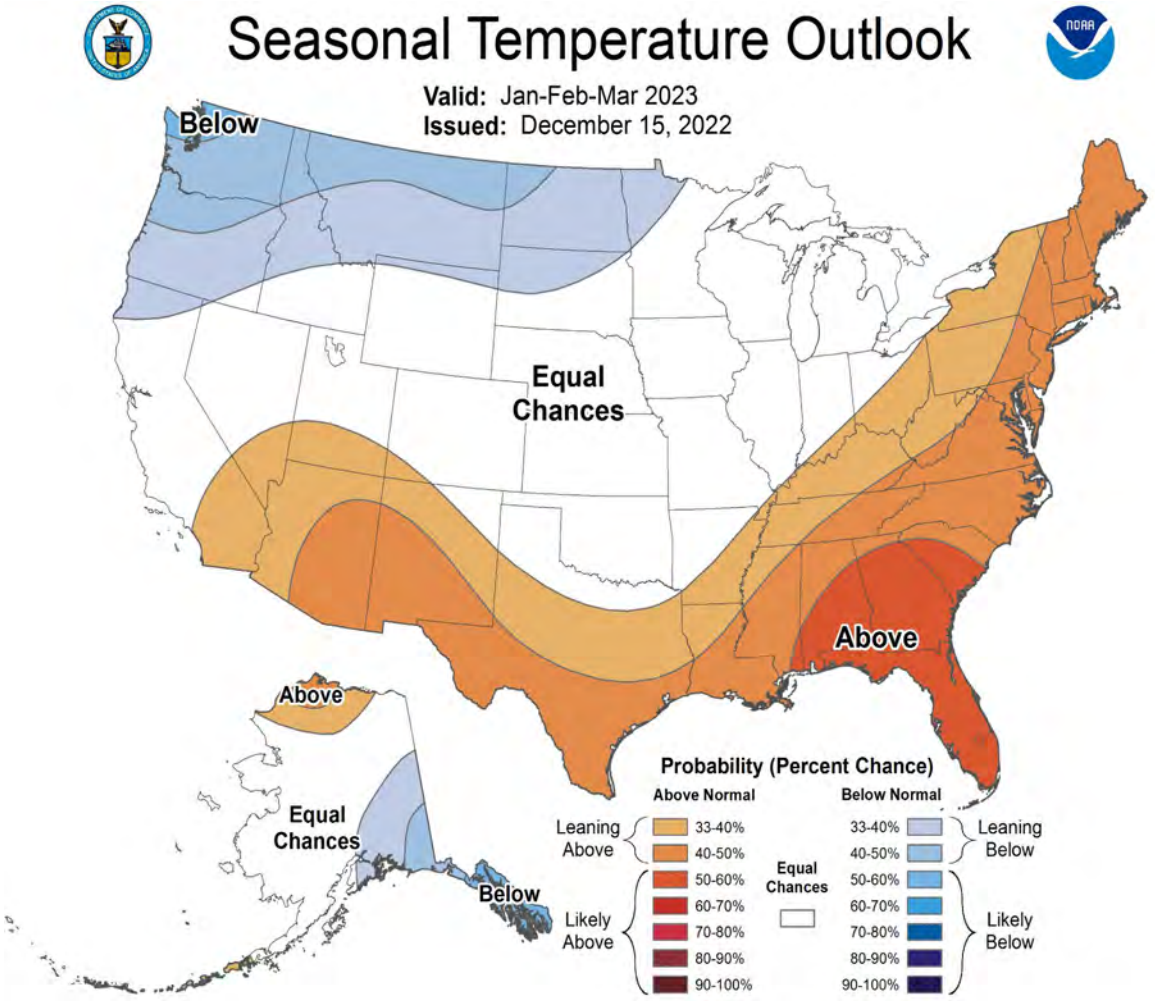
Models are indicating another system late in the week/early weekend but are still lacking agreement in the details.

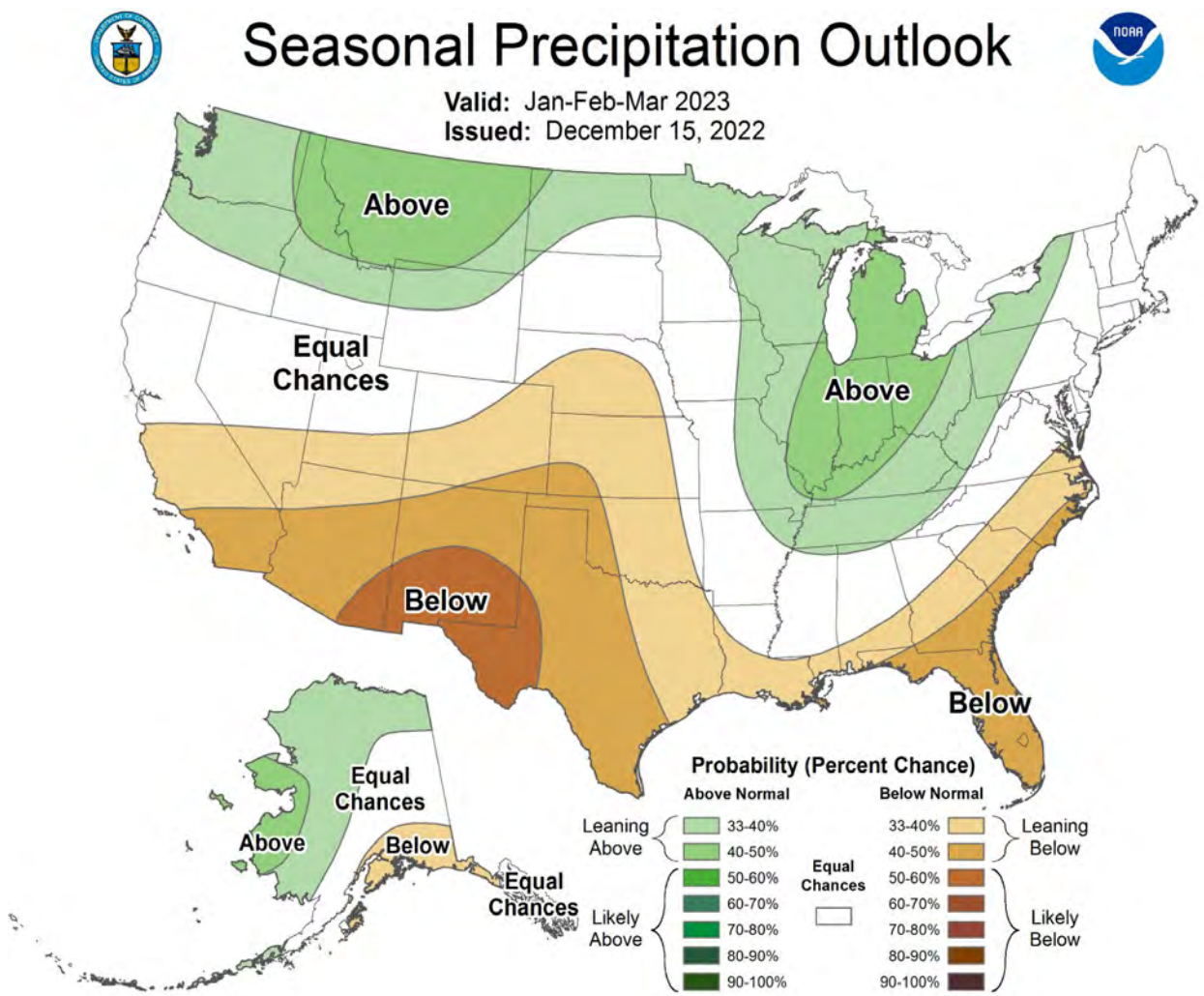
# Future Weather: January 24-30



# Climate Prediction Center: Seasonal (JFM) Outlook



# Summary

- **Soil moisture**
  - Conditions have improved from last year and are below to near normal.
  - Soil moisture deficits still exist.
  - Impact on runoff uncertain and will depend on spring weather and snow conditions.

- **Snow**
  - Snow conditions have improved since early January due to a favorable weather pattern.
  - Above median conditions as of mid-January
  - Mid-January is a little less than halfway (~40-50%) through the snow accumulation season
    - Still early in the snow season

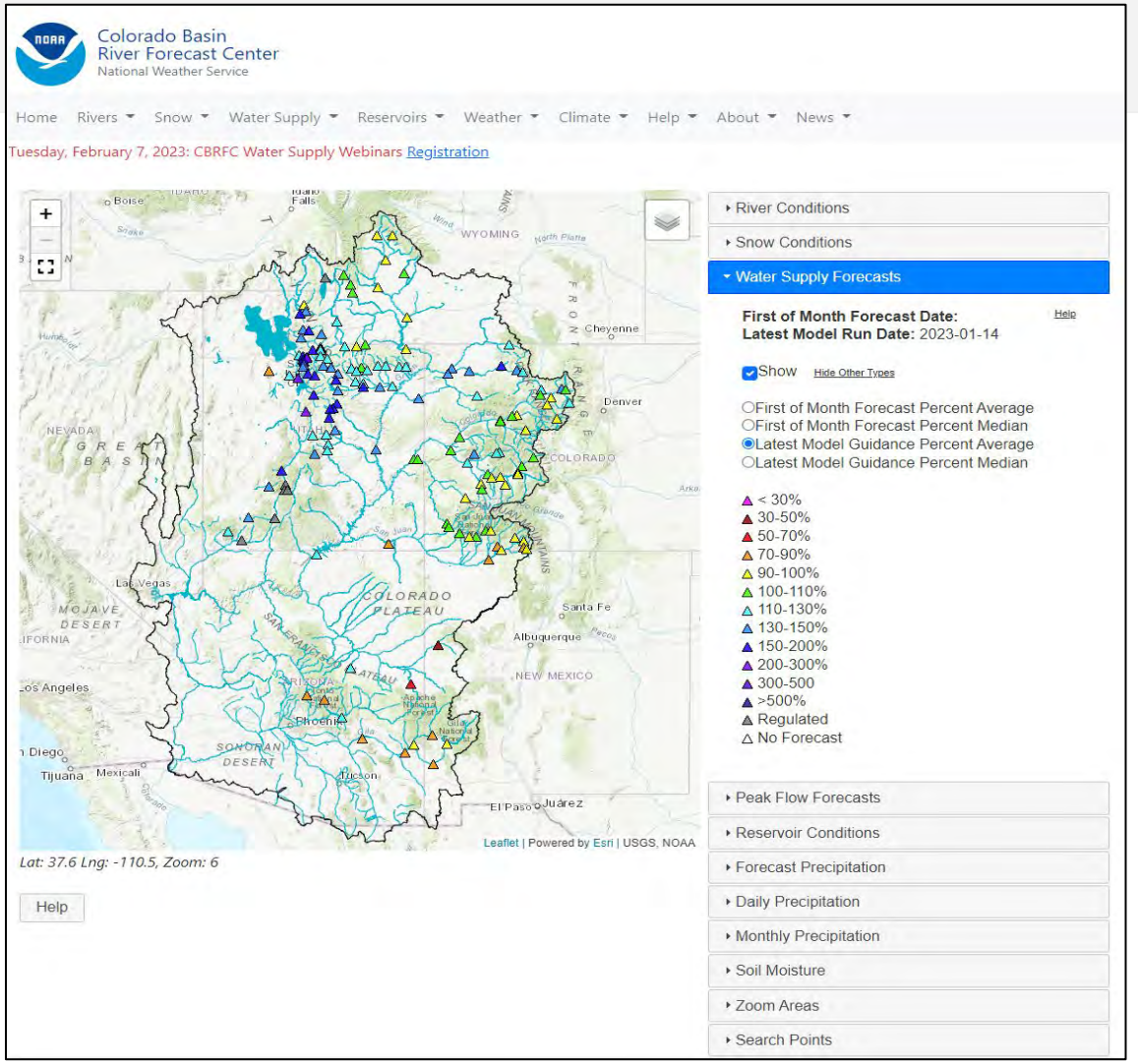
- **January Water Supply Forecasts**
  - Forecasts range from:
    - Early-January: 85-100% of average
    - Mid-January: 90-125% of average
  - Forecast guidance has increased since early January.
  - Expect an increase in February forecasts.

- **Upcoming Weather**
  - Active weather pattern looks to continue through the end of the month.
  - Shift in pattern to colder storm systems.

# Contact Info:

## Contact Information

- Ashley Nielson - San Juan River Forecaster
  - ashley.nielson@noaa.gov
  - 801-524-5130 x333
- Operational Hydrologist: in office
  - 801-524-4004
  - cbrfc.operations@noaa.gov

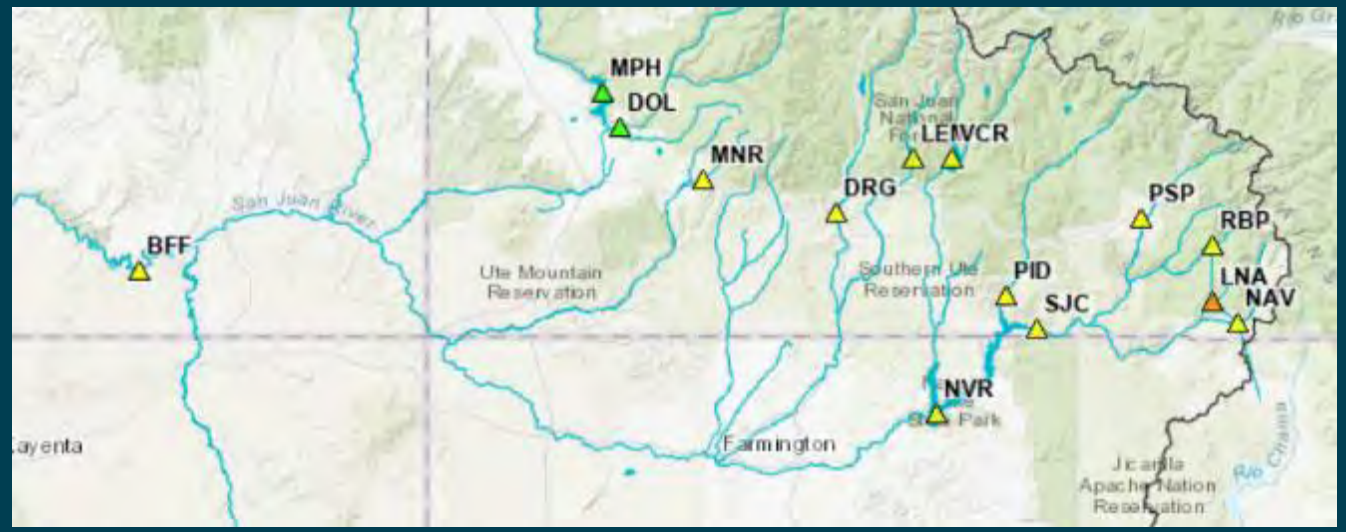



CBRFC Webpage
https://www.cbrfc.noaa.gov/

CBRFC Water Supply Presentations
https://www.cbrfc.noaa.gov/present/present.php

# Official Water Supply Forecast (April-July)

| | |
|---|---|
| Navajo: | 570 kaf (90%* avg) |
| Vallecito: | 170 kaf (96% avg) |
| Lemon: | 48 kaf (100% avg) |
| Animas: | 385 kaf (100% avg) |
| McPhee: | 260 kaf (102% avg) |
| Powell: | 6,700 kaf (105% avg) |




*average of the 1991 – 2020 time period

# Official Water Supply Forecast (April-July)

| | |
|---|---|
| Navajo: | 550 kaf (87%* avg) |
| Vallecito: | 155 kaf (88% avg) |
| Lemon: | 42 kaf (88% avg) |
| Animas: | 360 kaf (94% avg) |
| McPhee: | 235 kaf (92% avg) |
| Powell: | 6,300 kaf (99% avg) |

THIS TIME LAST YEAR

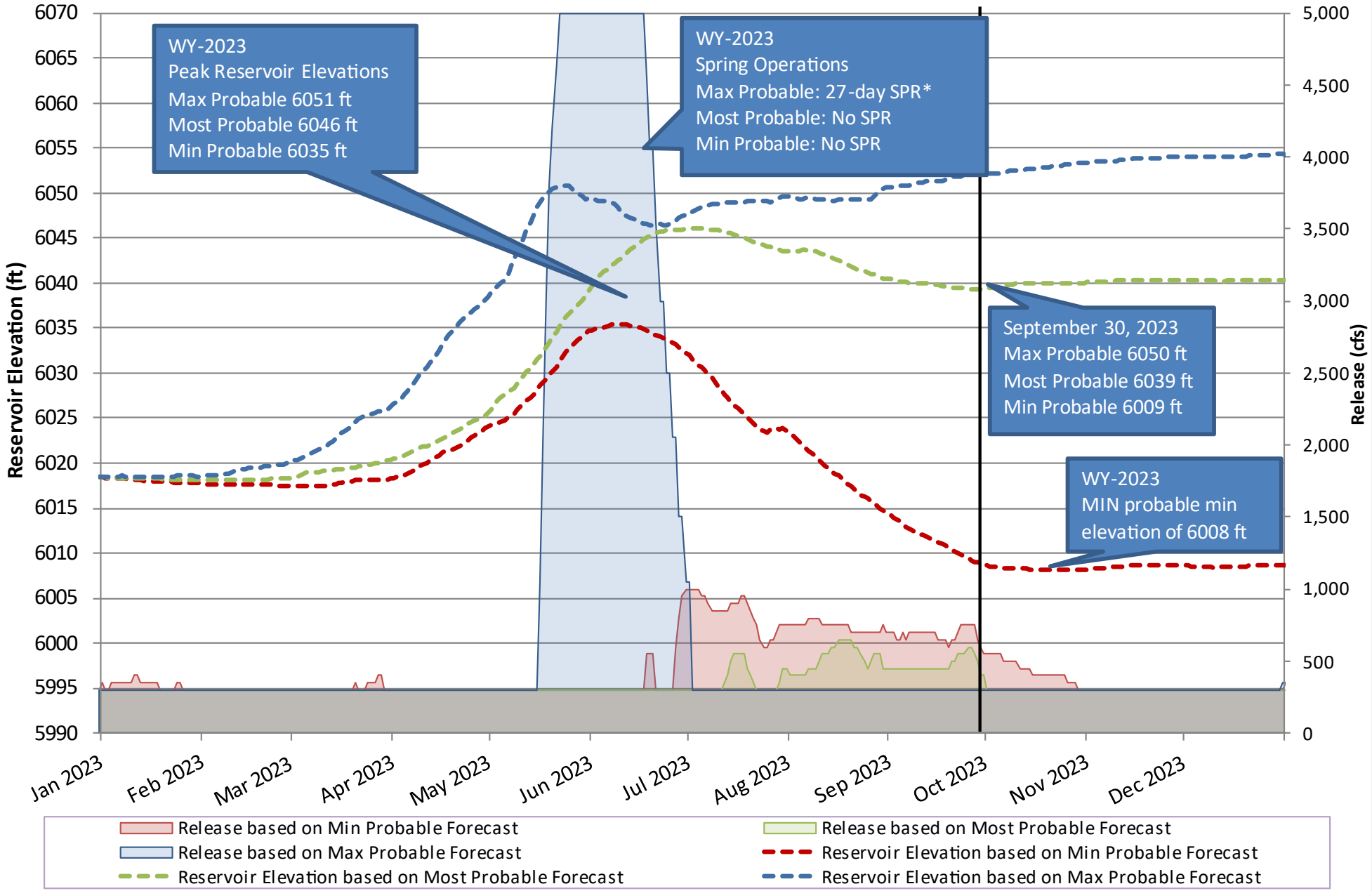

*average of the 1991 – 2020 time period

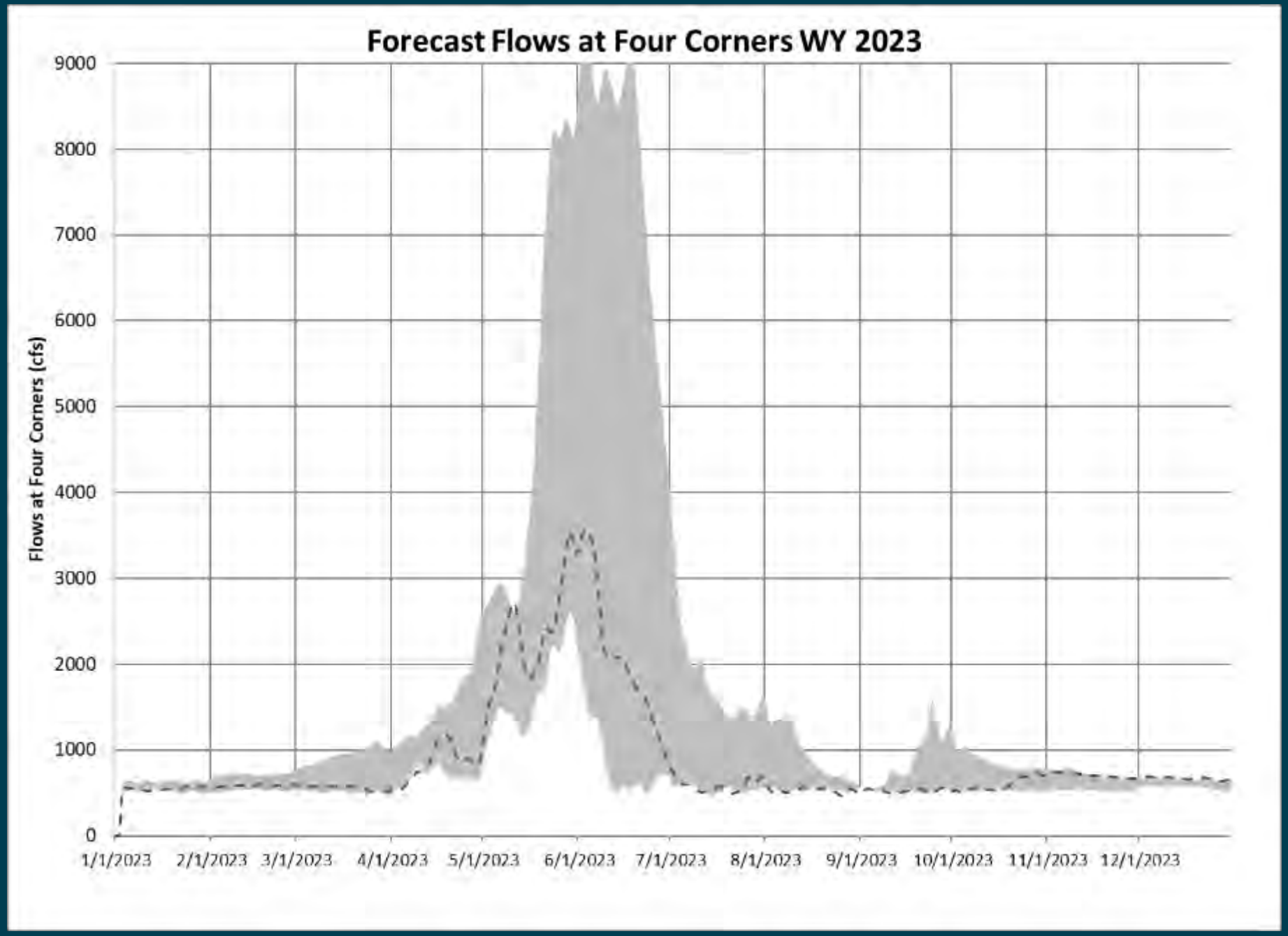
# Reduced release for instream work

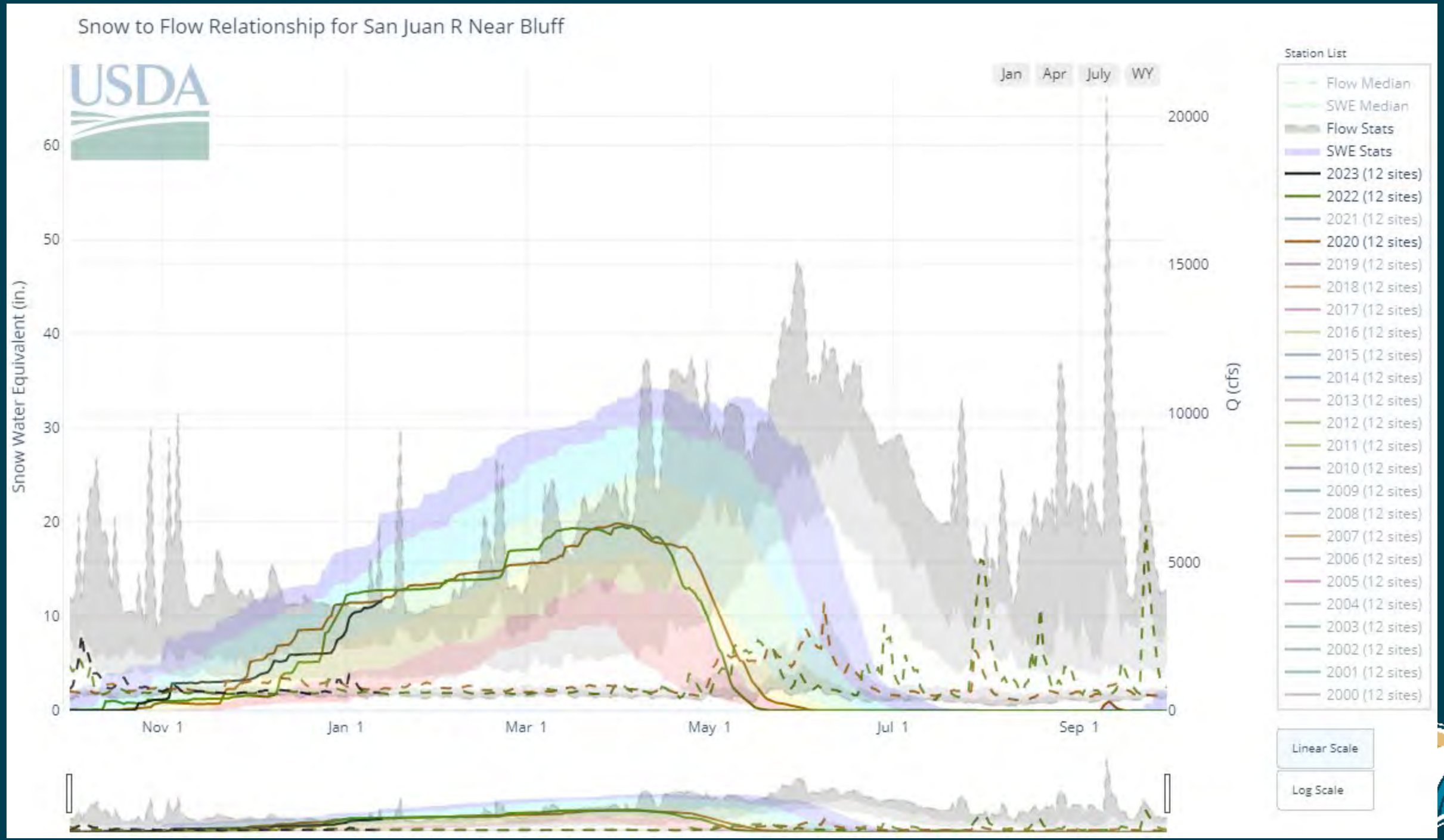
- Project managers for the Turley Manzanares Ditch Company Diversion Dam Rehabilitation Project are planning to request a reduction in the release to 250 cfs for several days this winter for instream work (Dates TBD).
- The City of Farmington Power Plant will take this opportunity to do maintenance as they will not be able to generate power.
- The release will be through the Auxiliary 4x4 during this time.
- Anticipated project completion date is April 1, 2023.
- Contact information for the project will be available in the meeting notes.

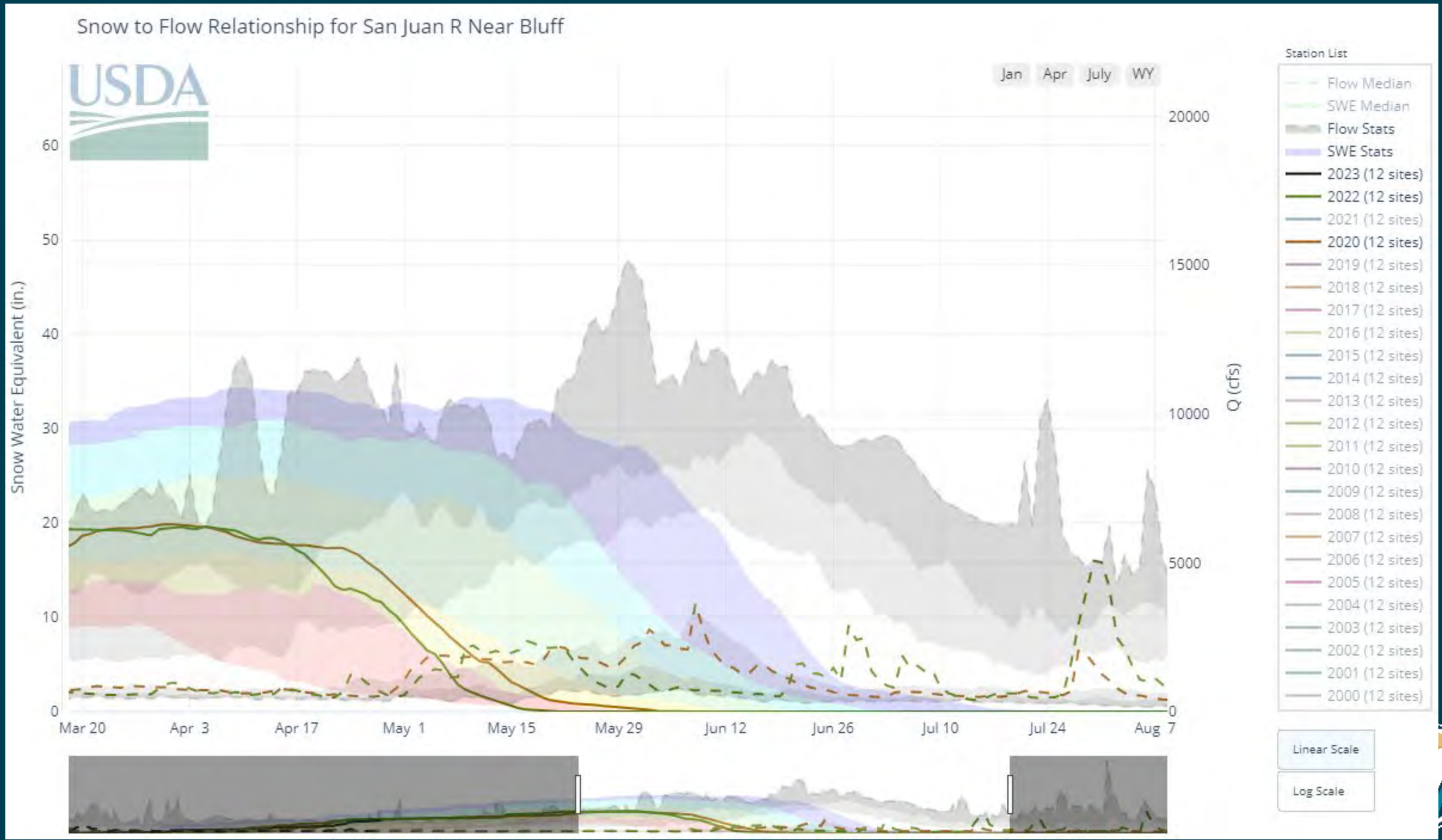
# Navajo Reservoir Forecast Elevation and Release

*as of January 2023 24-Month Study*




Forecast Flows at Four Corners WY 2023
Flows at Four Corners (cfs)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1/1/2023
2/1/2023
3/1/2023
4/1/2023
5/1/2023
6/1/2023
7/1/2023
8/1/2023
9/1/2023
10/1/2023
11/1/2023
12/1/2023


Snow to Flow Relationship for San Juan R Near Bluff
USDA
Jan
Apr
July
WY
Snow Water Equivalent (in.)
Q (cfs)
0
10
20
30
40
50
60
0
5000
10000
15000
20000
Nov 1
Jan 1
Mar 1
May 1
Jul 1
Sep 1
Station List
Flow Median
SWE Median
Flow Stats
SWE Stats
2023 (12 sites)
2022 (12 sites)
2021 (12 sites)
2020 (12 sites)
2019 (12 sites)
2018 (12 sites)
2017 (12 sites)
2016 (12 sites)
2015 (12 sites)
2014 (12 sites)
2013 (12 sites)
2012 (12 sites)
2011 (12 sites)
2010 (12 sites)
2009 (12 sites)
2008 (12 sites)
2007 (12 sites)
2006 (12 sites)
2005 (12 sites)
2004 (12 sites)
2003 (12 sites)
2002 (12 sites)
2001 (12 sites)
2000 (12 sites)
Linear Scale
Log Scale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10000
15000
20000
Mar 20
Apr 3
Apr 17
May 1
May 15
May 29
Jun 12
Jun 26
Jul 10
Jul 24
Aug 7
Station List
Flow Median
SWE Median
Flow Stats
SWE Stats
2023 (12 sites)
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2021 (12 sites)
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2007 (12 sites)
2006 (12 sites)
2005 (12 sites)
2004 (12 sites)
2003 (12 sites)
2002 (12 sites)
2001 (12 sites)
2000 (12 sites)
Linear Scale
Log Scale

# Projected Operations WY 2023

Based on current streamflow conditions, storage levels, and statistical outlooks based on 30 years of historical hydrology,

- Runoff projections range from 385 kaf (61% avg) – 1,010 kaf (161% avg) with a median projection of 570 kaf (91% avg).
- Potential for a spring peak release under the Max Probable forecast. No spring peak under Min or Most Prob forecast.
- Reservoir forecast to peak between 6035 and 6051 ft in spring with a median projection of 6046 ft
- End of Water Year storage range 771 kaf (6009 ft, 47% full) – 1,200 kaf (6050 ft, 73% full) with a median projection of 1,040 kaf (6038 ft, 63% full)

# Projected Operations WY 2023

- Drought Response Operations Plan (DROA)- releases from Initial Units to Lake Powell
- No decisions have been made yet regarding releases
- Meetings and discussions are ongoing regarding any potential DROA releases, accounting, and recovery
- Will have more information by the April Meeting
- Updates from the State of NM

# SJRIP Update

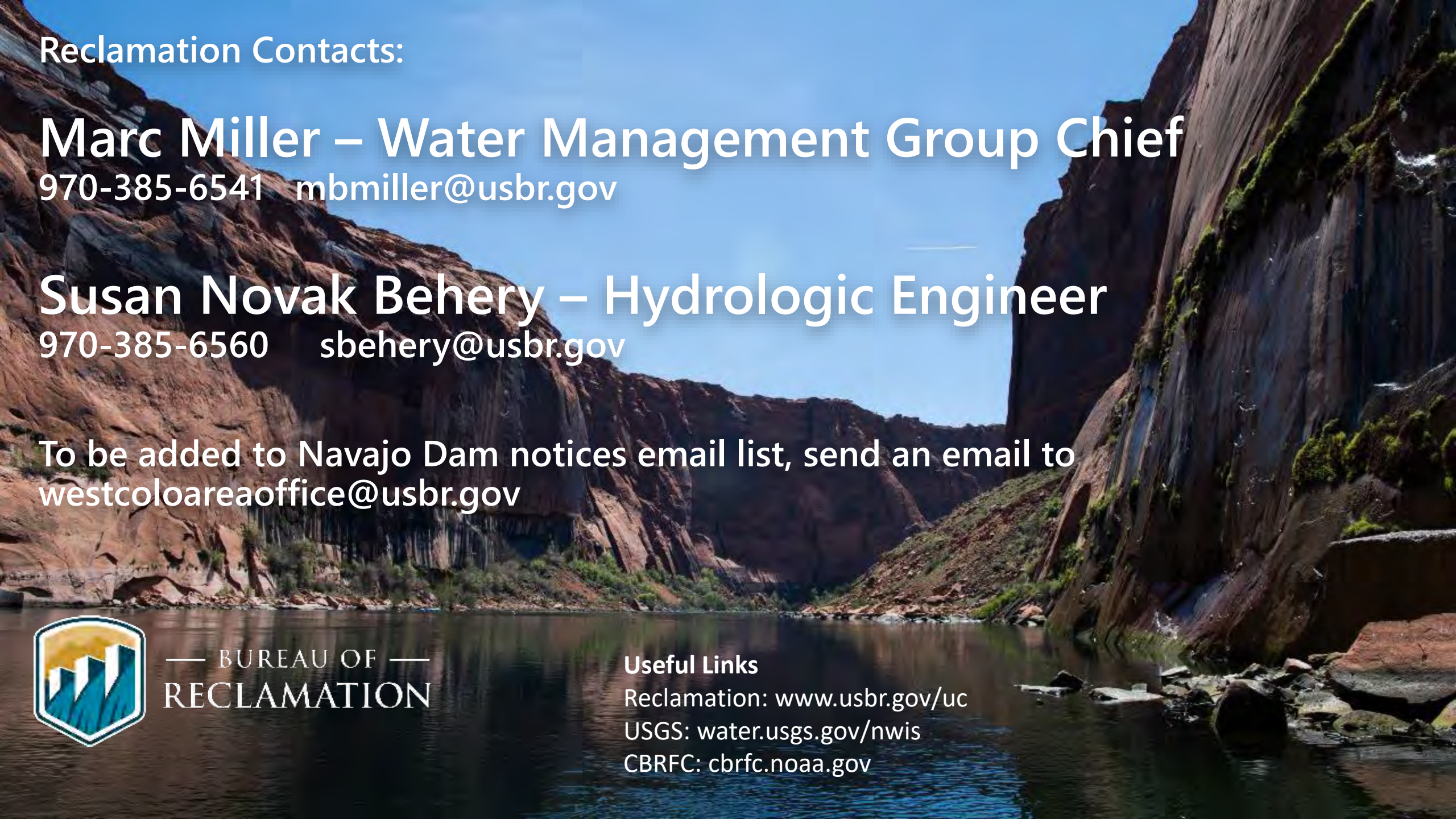
**For more information, please contact**
**james_sykes@fws.gov**

*Next Meeting April 18th or 25th 2023 (?)*

# Links

- Navajo Project Notices: https://www.usbr.gov/uc/wcao/water/rsvrs/notice/nav_rel.html
- Navajo Monthly Forecast Update: https://www.usbr.gov/uc/water/crsp/cs/nvd.html

- UC Water Operations Home: https://www.usbr.gov/uc/water/index.html
- Teacups: https://www.usbr.gov/uc/water/basin/index.html
- 24-Month Study: https://www.usbr.gov/uc/water/crsp/studies/index.html
- DROA: https://www.usbr.gov/dcp/droa.html



Reclamation Contacts:

## Marc Miller – Water Management Group Chief

970-385-6541 mbmiller@usbr.gov

## Susan Novak Behery – Hydrologic Engineer

970-385-6560 sbehery@usbr.gov

To be added to Navajo Dam notices email list, send an email to westcoloareaoffice@usbr.gov

BUREAU OF RECLAMATION

**Useful Links**

Reclamation: www.usbr.gov/uc

USGS: water.usgs.gov/nwis

CBRFC: cbrfc.noaa.gov