Utah Water Assessment & Conditions Monitoring
(Drought Webinar)

The meeting will begin shortly

Thank you to our contributors
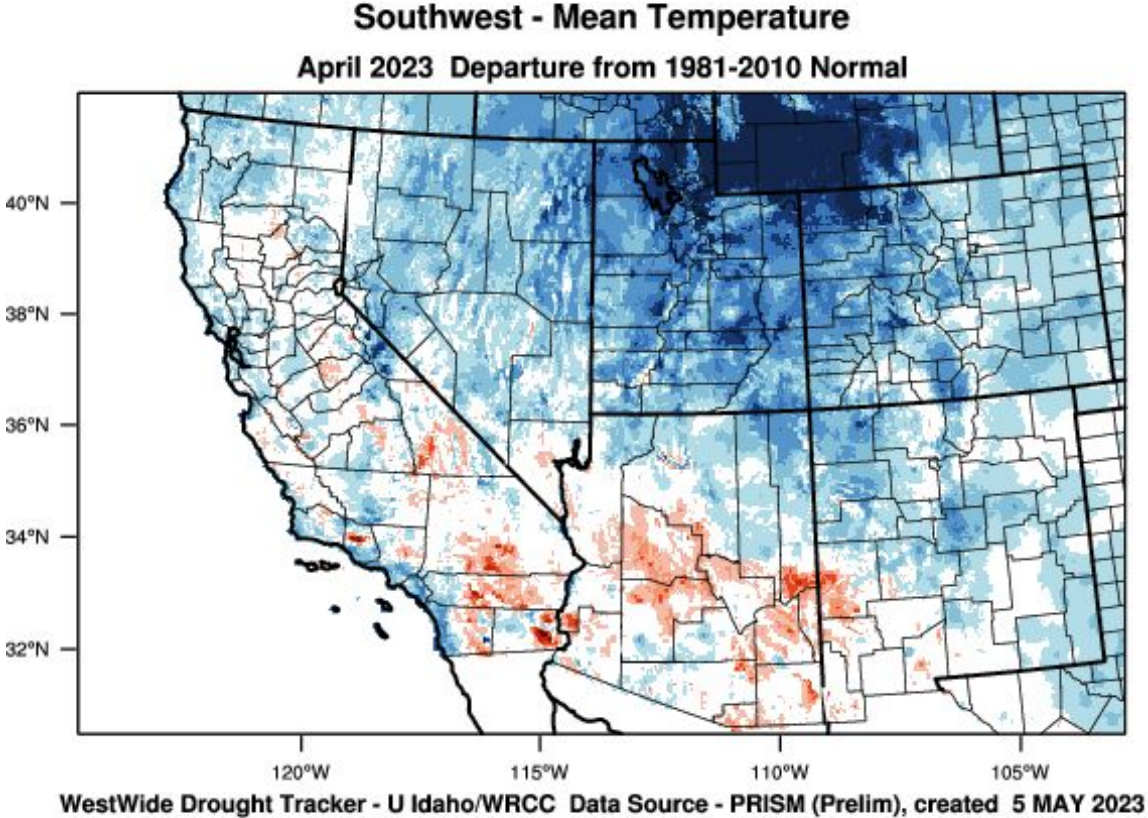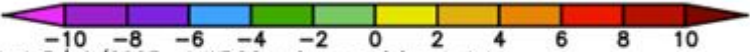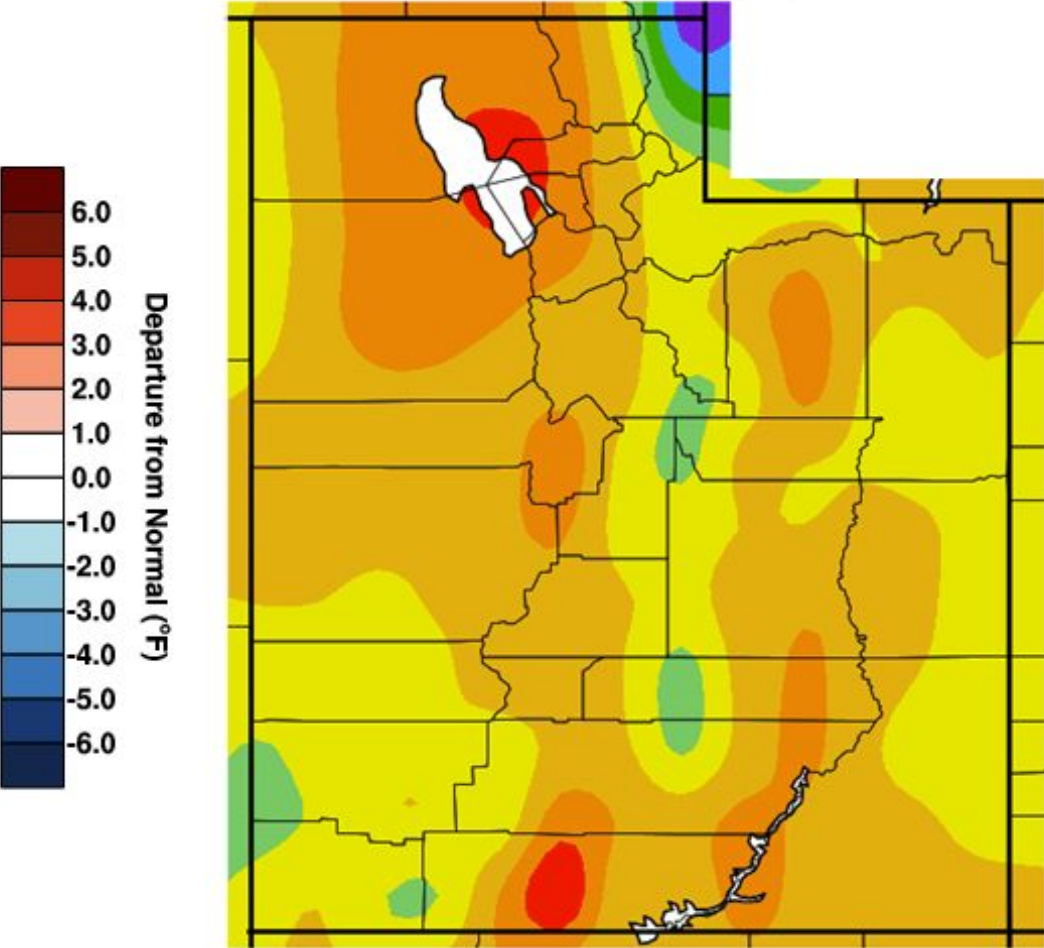
Utah Water Assessment & Conditions Monitoring Webinar

May 9, 2023

Temperatures

Southwest - Mean Temperature
April 2023 Departure from 1981-2010 Normal

WestWide Drought Tracker - U Idaho/WRCC Data Source - PRISM (Prelim), created 5 MAY 2023

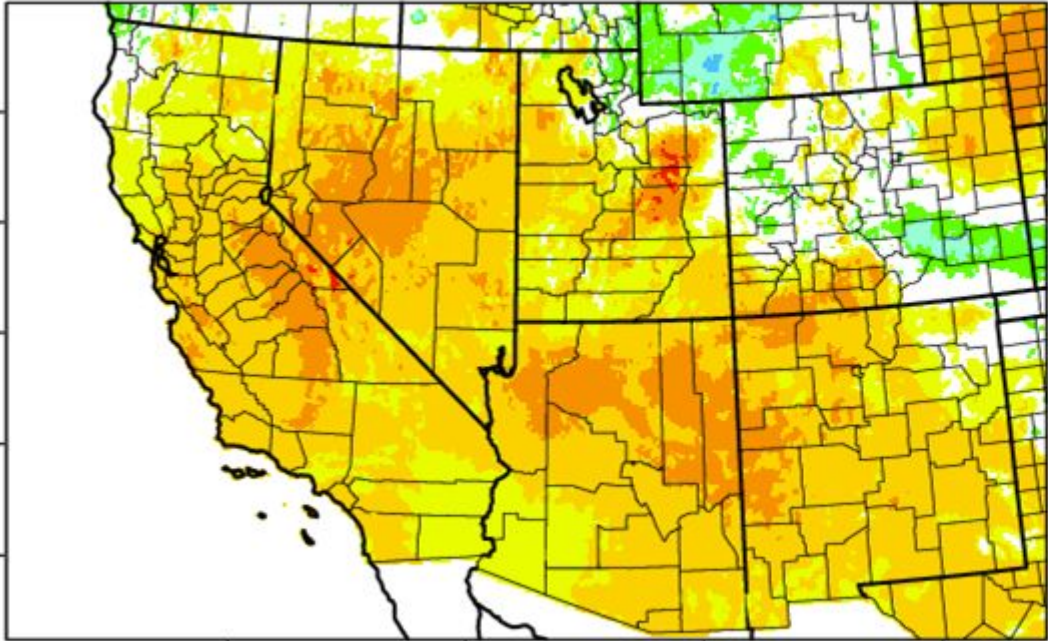Av. Max. Temperature dep from Ave (deg F)
4/25/2023 – 5/8/2023

Generated 5/ 9/2023 at WRCC using provisional data.
NOAA Regional Climate Centers

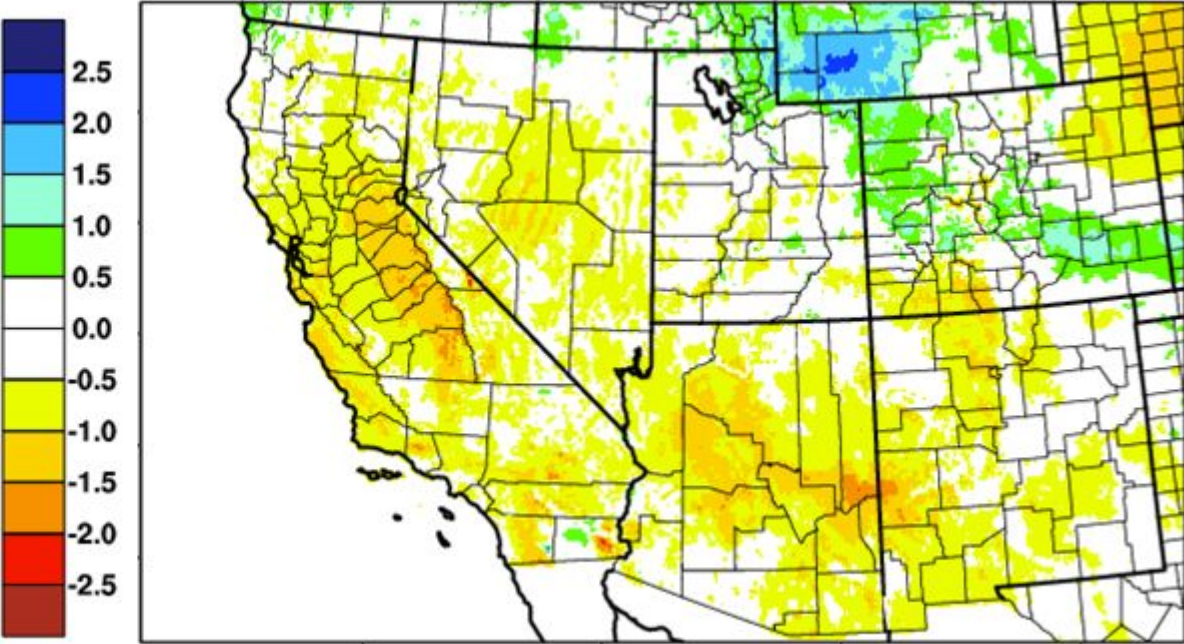Agency - Utah Climate Center
Presenter - Jon Meyer

April Precipitation (SPI vs SPEI)

Agency - Utah Climate Center
Presenter - Jon Meyer

30-day Precipitation (SPI)

30-day Standardized Precipitation Index: 2023/04/08 - 2023/05/07
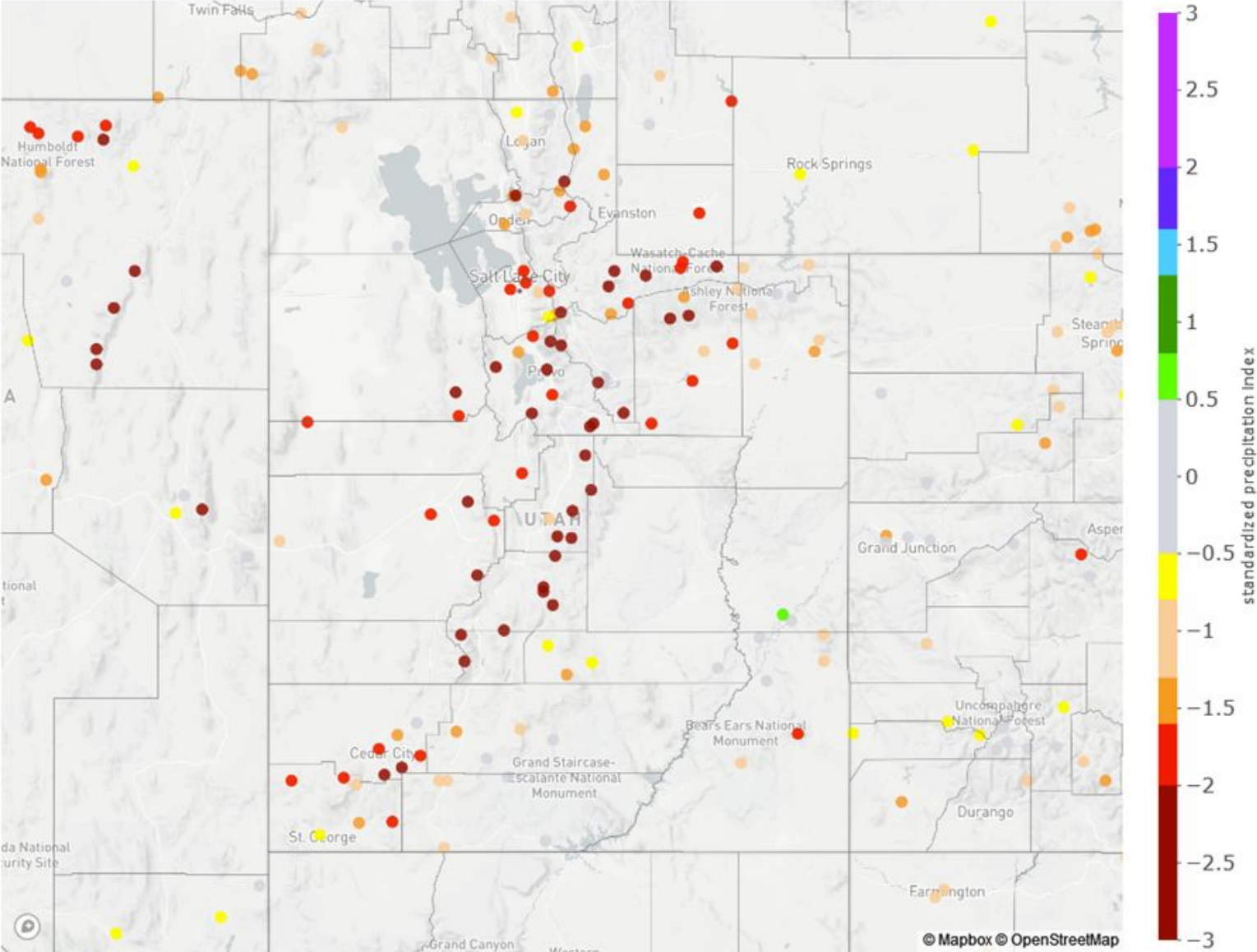
Agency - Utah Climate Center
Presenter - Jon Meyer
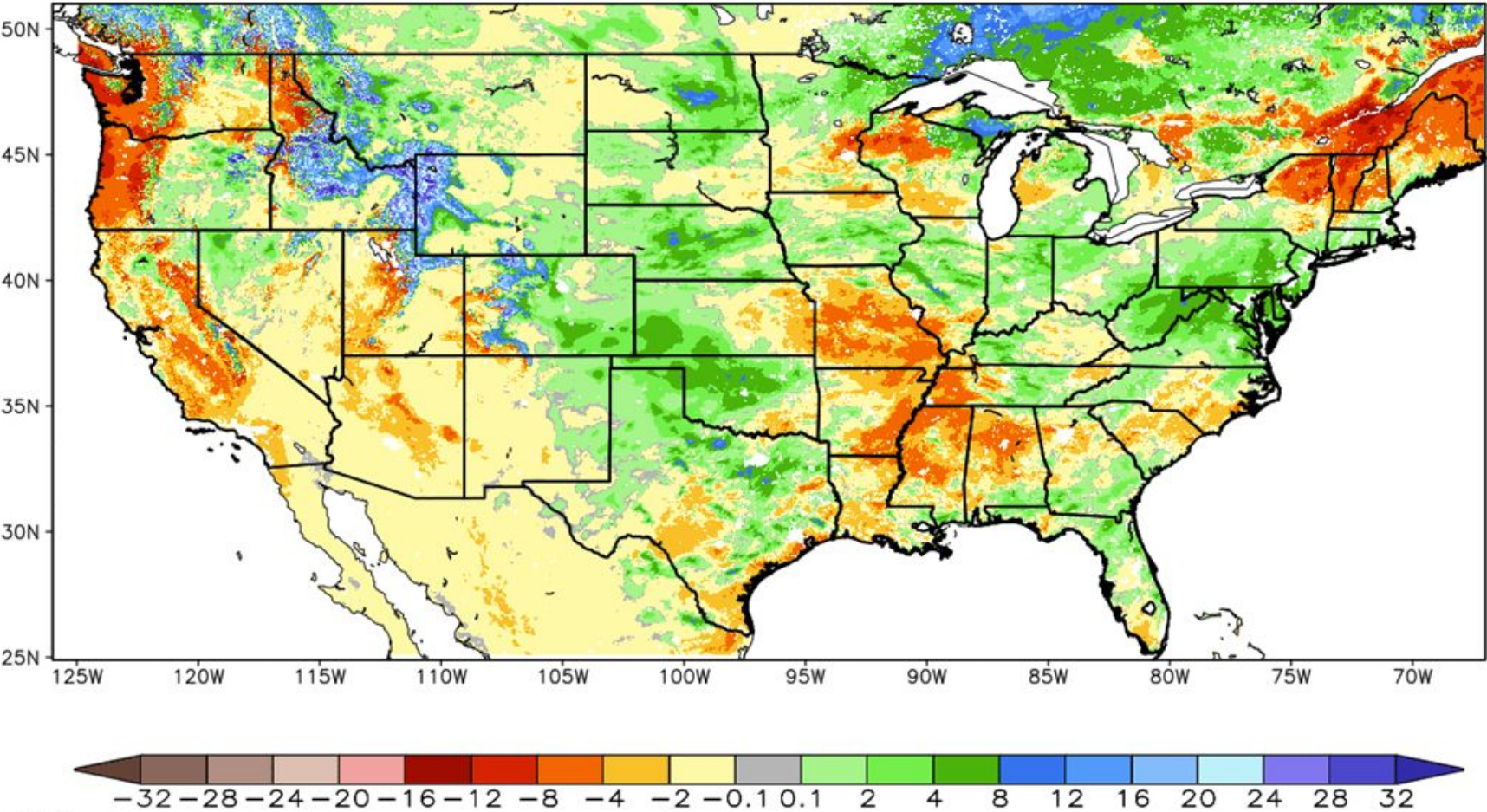
Evaporative Drought Demand Index (EDDI)

Agency - Utah Climate Center
Presenter - Jon Meyer
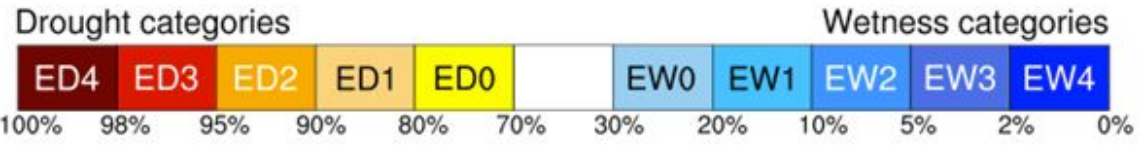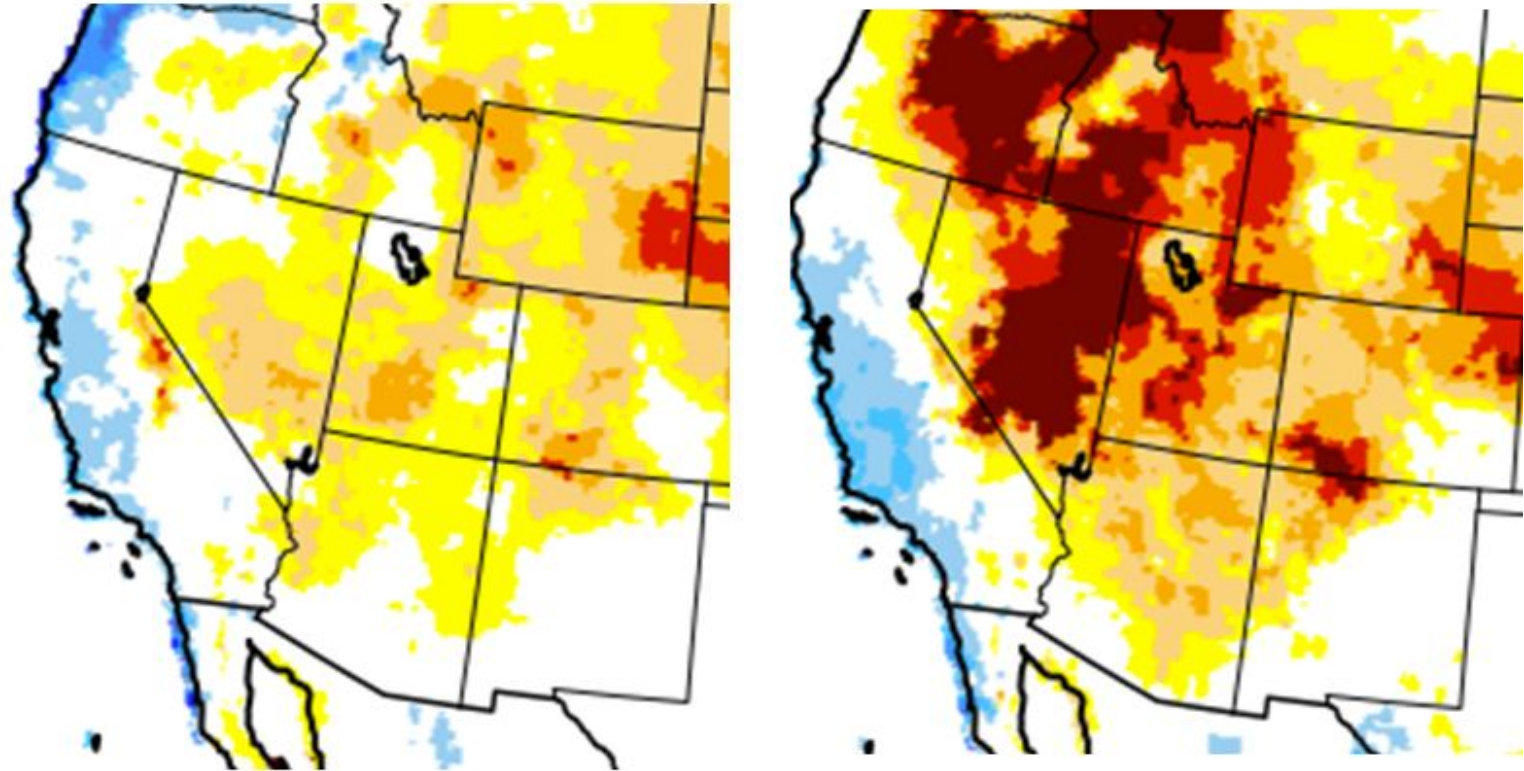
NASA Sport Modeled 2-Week Soil Moisture Changes

2-Week Difference in Column Relative Soil Moisture (%) valid 00z 09 May 2023
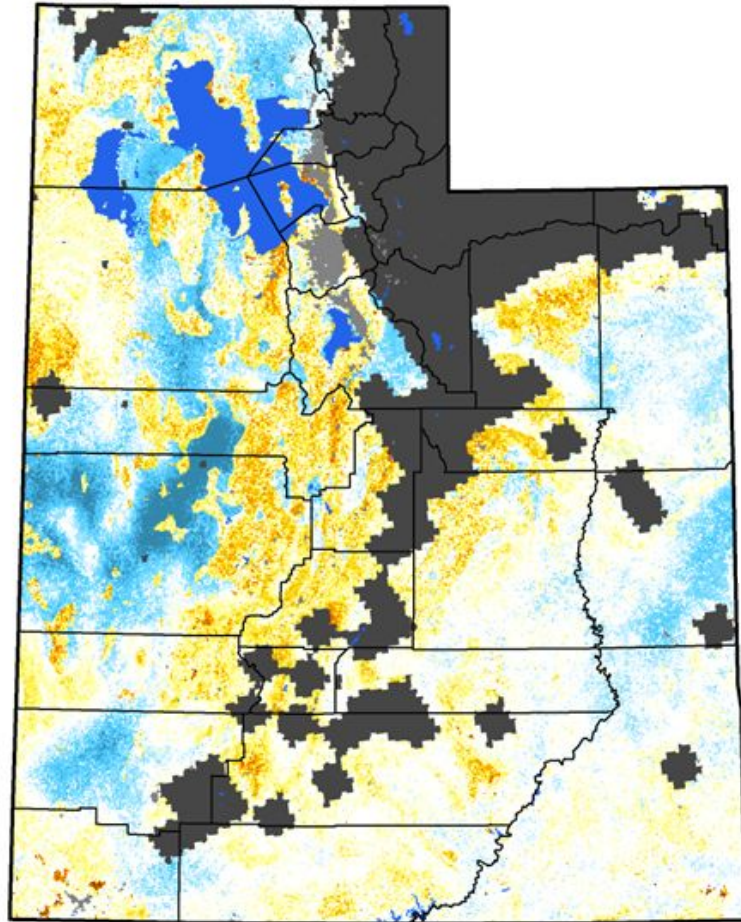
NOTE
Experimental

Agency - Utah Climate Center
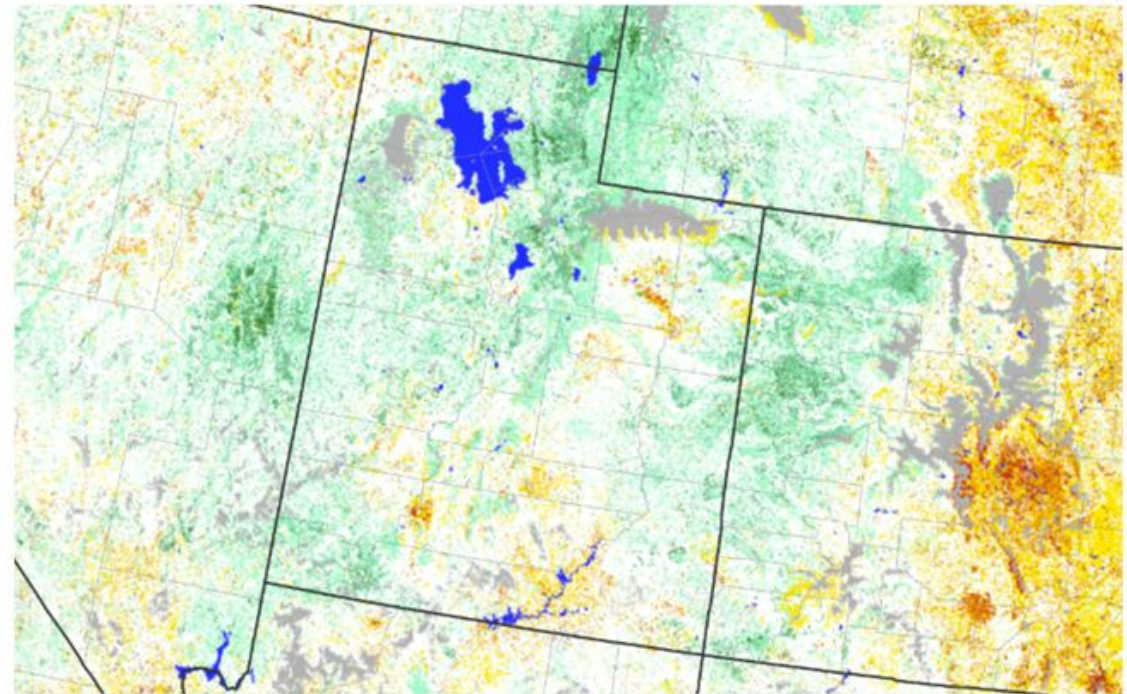Presenter - Jon Meyer

Drought Metrics

Agency - Utah Climate Center
Presenter - Jon Meyer
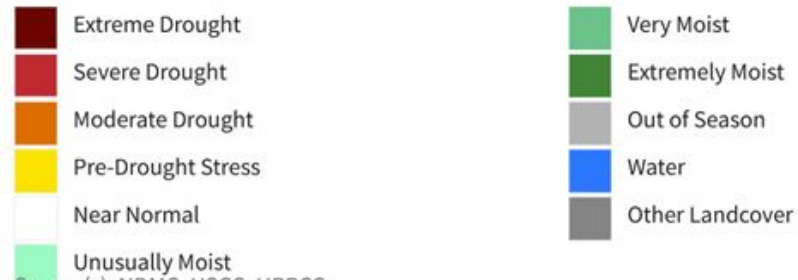
CPC Outlook
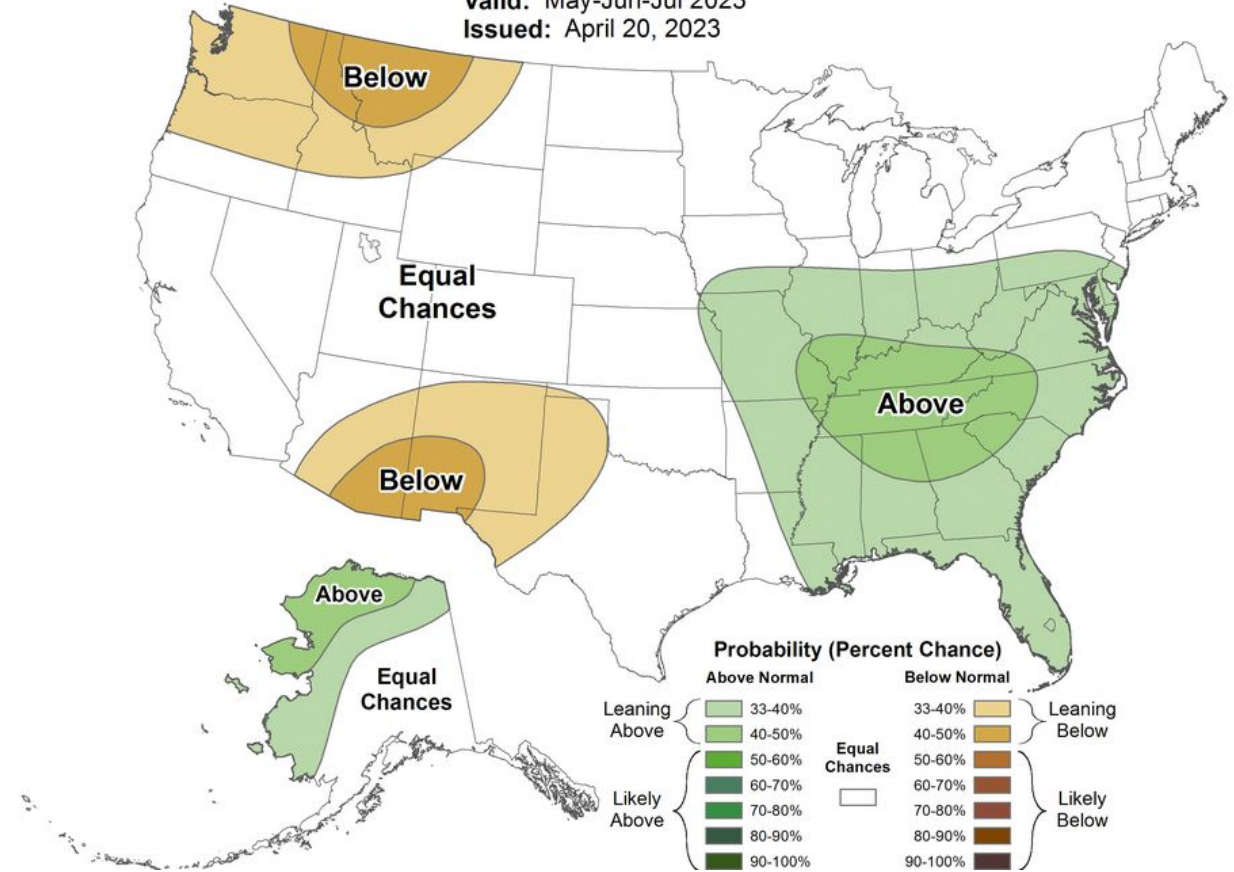
UCC Monsoon Outlook

Three ingredients right now pushing for delayed monsoon onset:
1) High soil moisture delays summer heating

2) Summer El Nino Development (no published Utah correlation, but dry conditions for AZ likely translates to UT)

3) Madden-Julian Oscillation (MJO) in eastern Pacific Ocean not projected to be active during early monsoon period.

July-August monsoon rainfall and ENSO
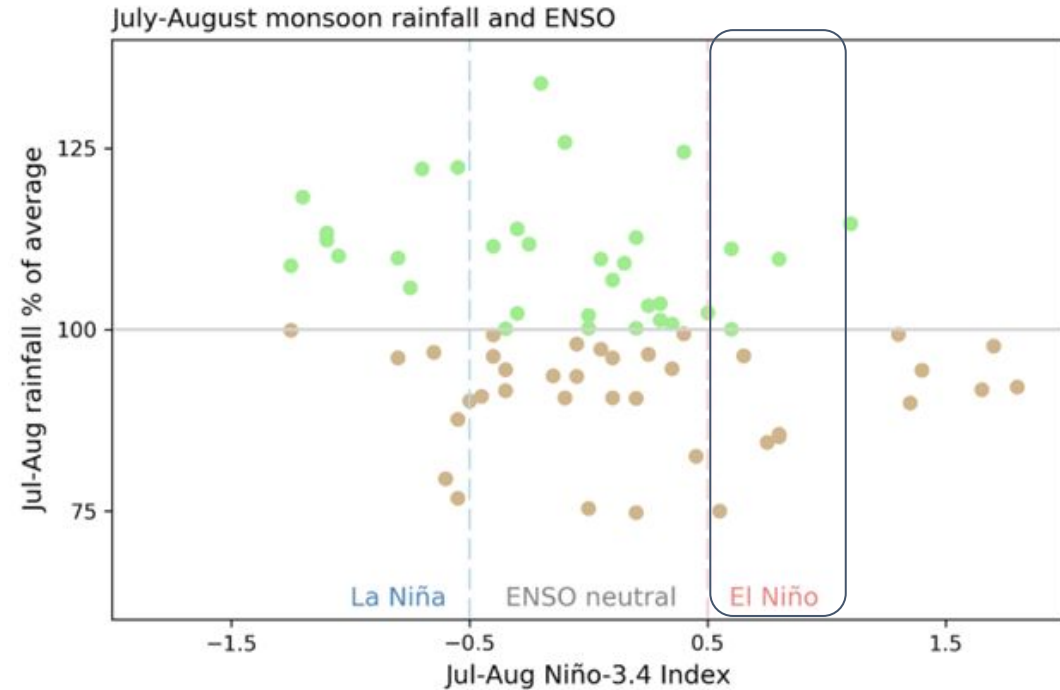
El Nino is a wild card for overall monsoon intensity!

Tends to create active Eastern Pacific Tropical Cyclone Season which brings unpredictable moisture and precipitation events our deterministic and probabilistic models won't be able to account for.

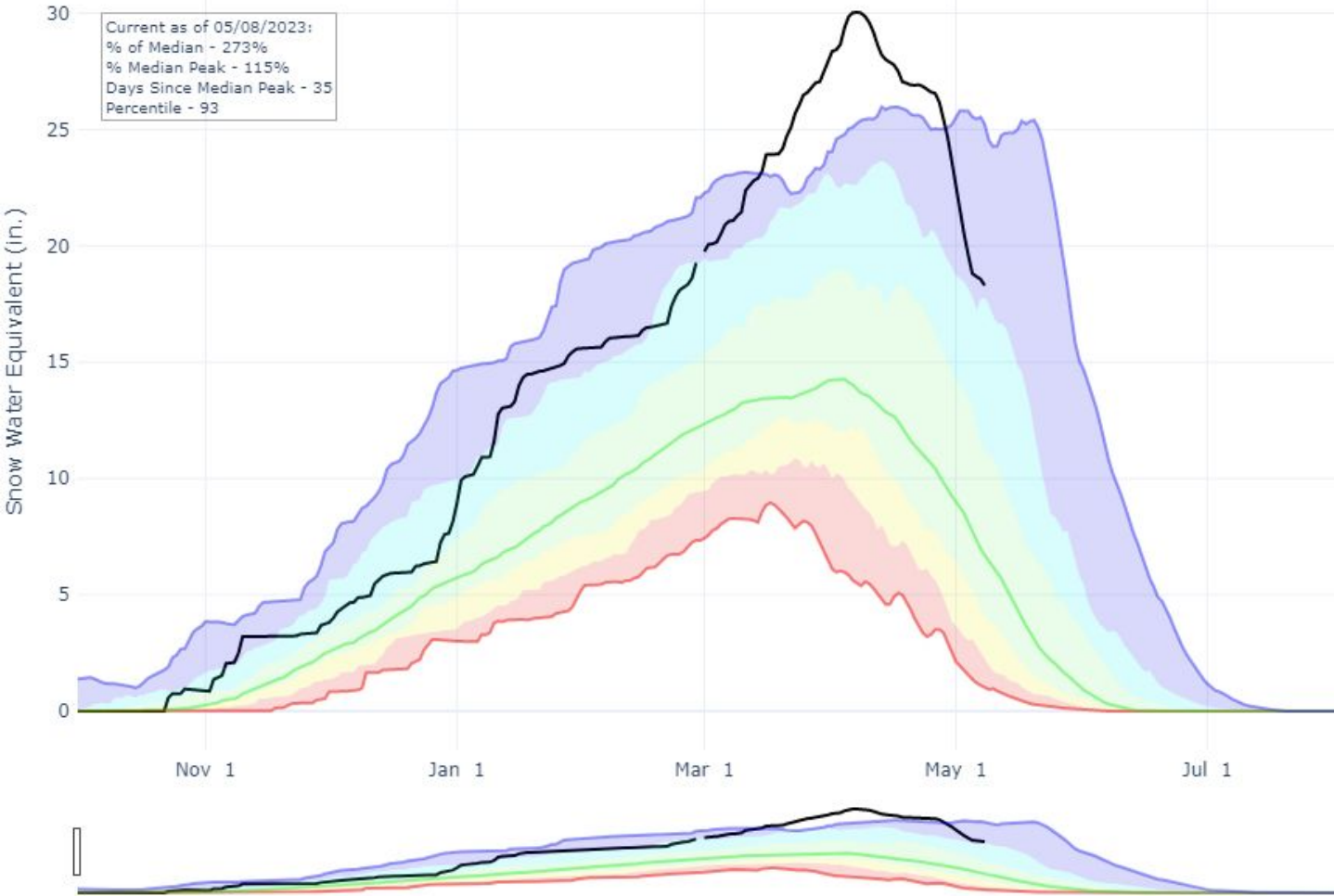Agency - Utah Climate Center
Presenter - Jon Meyer

Snowpack

Current SWE at SNOTEL sites shown at right. Note the significant remaining SWE along the Wasatch Front, but values are high elsewhere as well. Be careful of %normal values as we get deeper into spring…
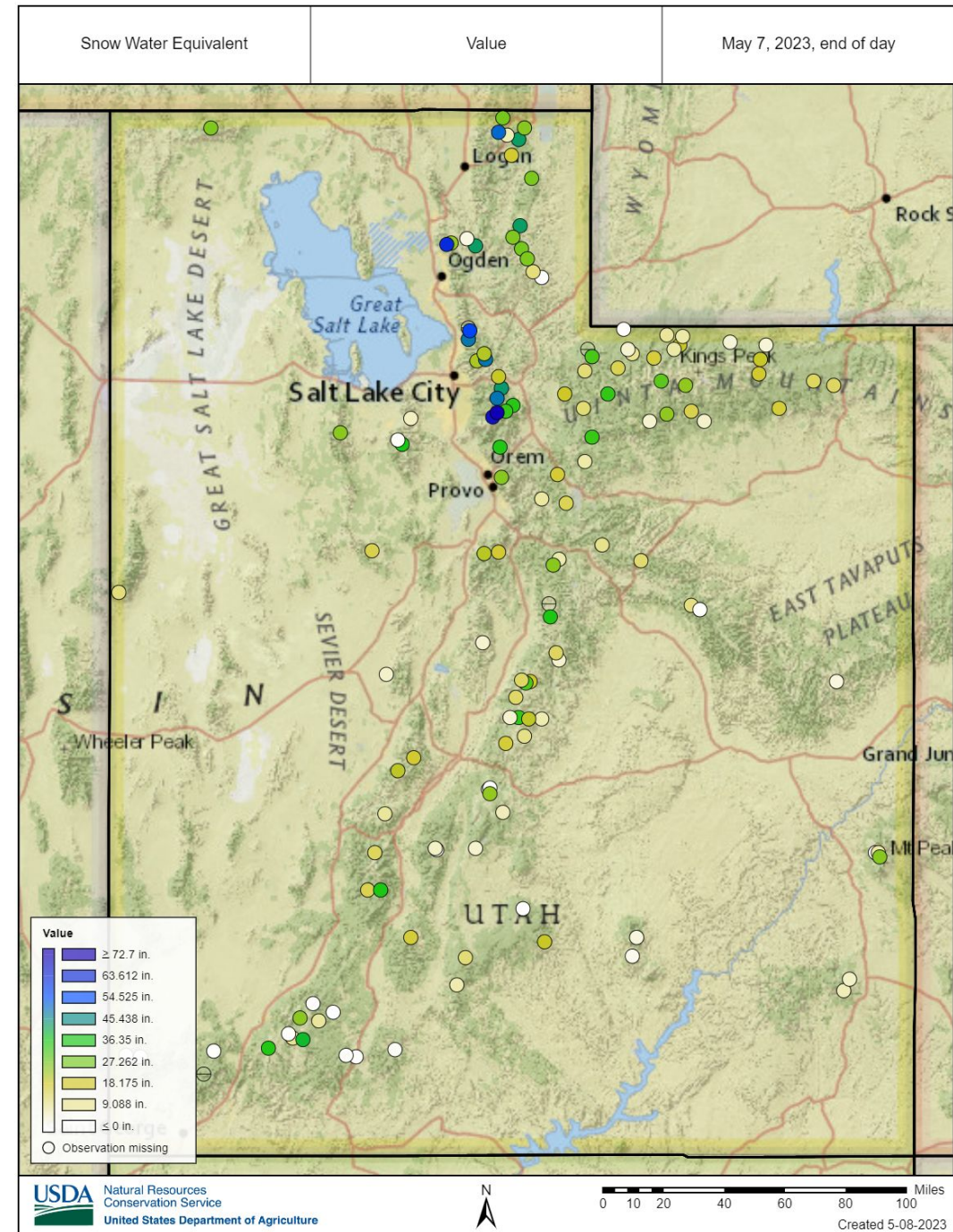
SNOW WATER EQUIVALENT IN STATE OF UTAH

Reset Range

Current as of 05/08/2023:
% of Median - 273%
% Median Peak - 115%
Days Since Median Peak - 35
Percentile - 93

Agency - NRCS Snow Survey
Slide prepared by J. Clayton

| Snow Water Equivalent | Value | May 7, 2023, end of day |

Value
≥ 72.7 in.
63.612 in.
54.525 in.
45.438 in.
36.35 in.
27.262 in.
18.175 in.
9.088 in.
≤ 0 in.
○ Observation missing

USDA Natural Resources Conservation Service
United States Department of Agriculture
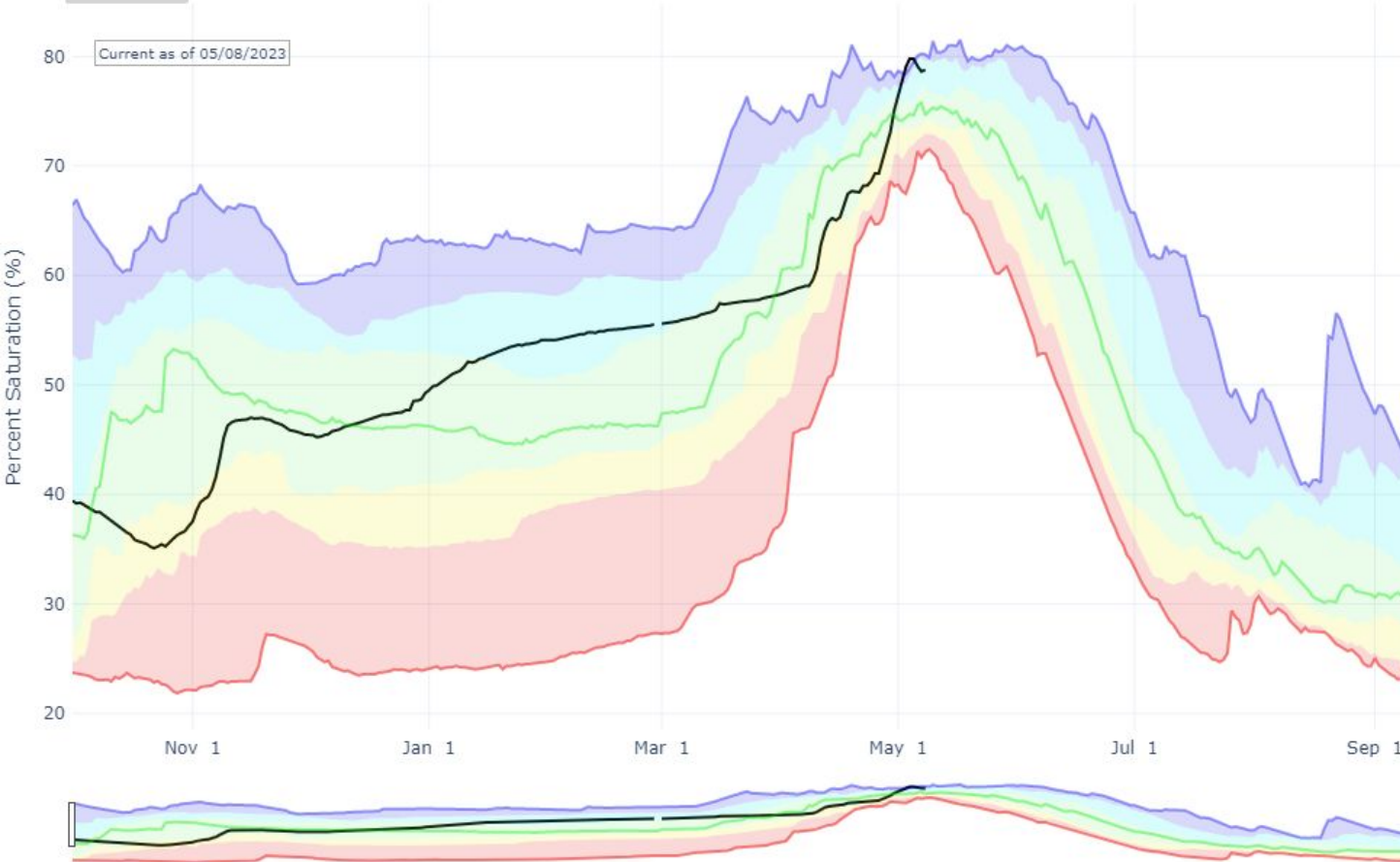
Created 5-08-2023

Soil Moisture

Soils around the state are very wet. Depth-averaged statewide value is the graph below, and 8" sensor data are shown at right, as % of saturation.

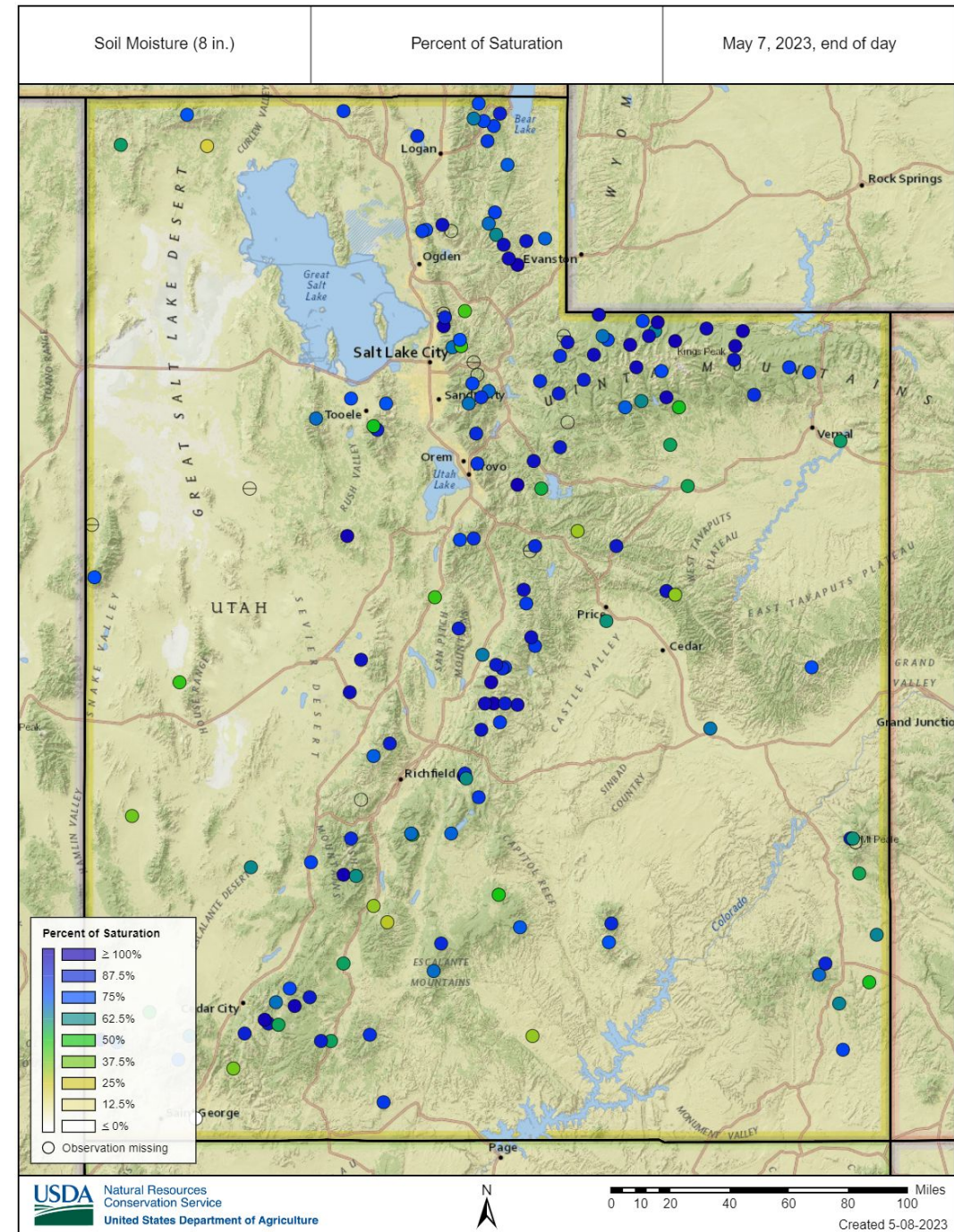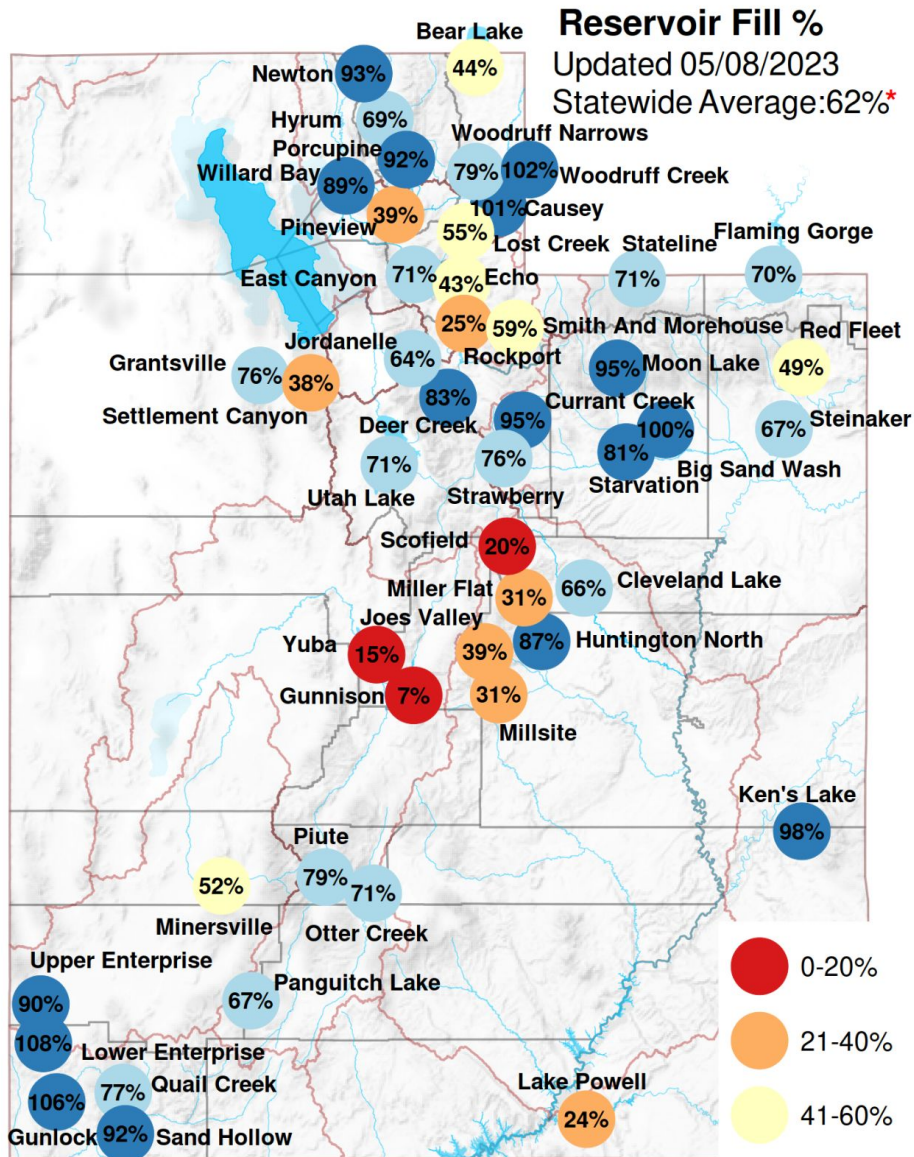DEPTH AVERAGED SOIL SATURATION IN STATE OF UTAH

Agency - NRCS Snow Survey
Slide prepared by J. Clayton

Reservoir Fill % — May 9 vs April 18 (Utah DNR Water Resources)

May 9 map — Reservoir Fill %
Updated 05/08/2023
Statewide Average: 62%*

Bear Lake 44%
Newton 93%
Hyrum 69%
Porcupine 92%
Willard Bay 89%
Pineview 39%
Woodruff Narrows 79%
Woodruff Creek 102%
Causey 101%
Lost Creek 55%
East Canyon 71%
Echo 43%
Smith And Morehouse 59%
Rockport 25%
Stateline 71%
Flaming Gorge 70%
Grantsville 76%
Jordanelle 38%
Red Fleet 49%
Moon Lake 95%
Currant Creek 95%
Deer Creek 83%
Strawberry 76%
Starvation 81%
Big Sand Wash 100%
Steinaker 67%
Utah Lake 71%
Scofield 20%
Miller Flat 31%
Cleveland Lake 66%
Joes Valley 39%
Huntington North 87%
Yuba 15%
Gunnison 7%
Millsite 31%
Ken's Lake 98%
Minersville 52%
Piute 79%
Otter Creek 71%
Upper Enterprise 90%
Panguitch Lake 67%
108%
Lower Enterprise
Quail Creek 77%
Gunlock 106%
Sand Hollow 92%
Lake Powell 24%

Data Sources: water.utah.gov/reservoirlevels

*State average excludes Lake Powell & Flaming Gorge to better represent the state's water supply.
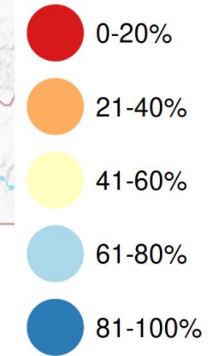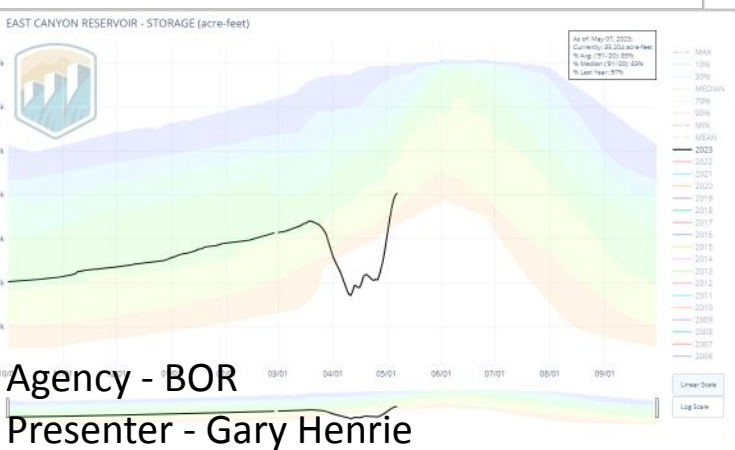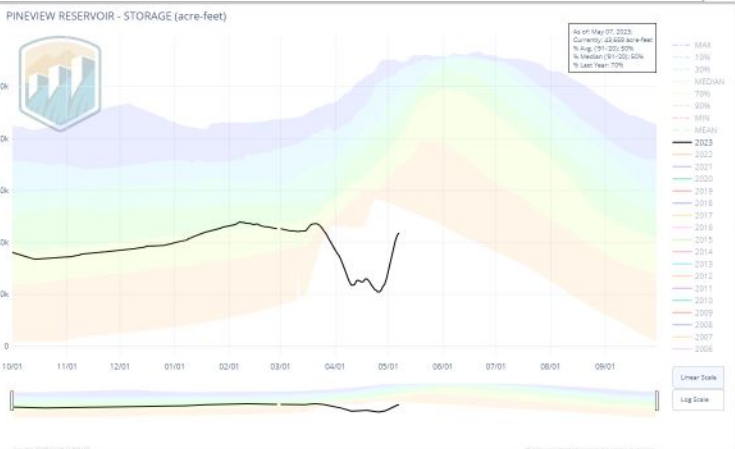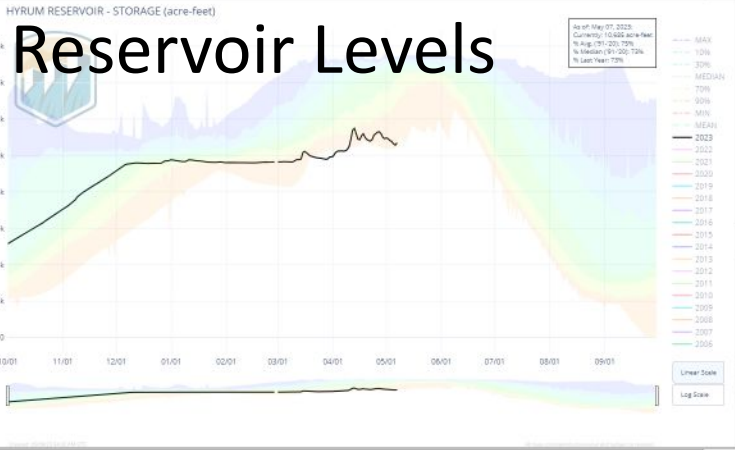
Total capacity including these is 35%

April 18 map — Reservoir Fill %
Updated 04/18/2023
Statewide Average: 57%*

Bear Lake 41%
Newton 61%
Hyrum 72%
Porcupine 61%
Willard Bay 77%
Pineview 23%
Woodruff Narrows 70%
Woodruff Creek 43%
Causey 43%
Lost Creek 44%
East Canyon 50%
Echo 35%
Smith And Morehouse 52%
Rockport 35%
Stateline 59%
Flaming Gorge 67%
Grantsville 51%
Jordanelle 32%
Red Fleet 44%
Moon Lake 84%
Currant Creek 95%
Deer Creek 65%
Strawberry 75%
Starvation 84%
Big Sand Wash 100%
Steinaker 59%
Utah Lake 75%
Scofield 25%
Miller Flat 27%
Cleveland Lake 63%
Joes Valley 48%
Huntington North 98%
Yuba 23%
Gunnison 5%
Millsite 43%
Ken's Lake 78%
Minersville 40%
Piute 56%
Otter Creek 55%
Panguitch Lake 45%
Upper Enterprise 89%
92%
Lower Enterprise
Quail Creek 75%
Gunlock 106%
Sand Hollow 90%
Lake Powell 22%

Data Sources: water.utah.gov/reservoirlevels

*State average excludes Lake Powell & Flaming Gorge to better represent the state's water supply.

Total capacity including these is 33%

Legend:
0-20%
21-40%
41-60%
61-80%
81-100%

UTAH DNR WATER RESOURCES

Reservoir Levels

Reservoir Storage
5/7/2023

70% full
(Excluding Fontenelle, Flaming Gorge, Lake Powell)
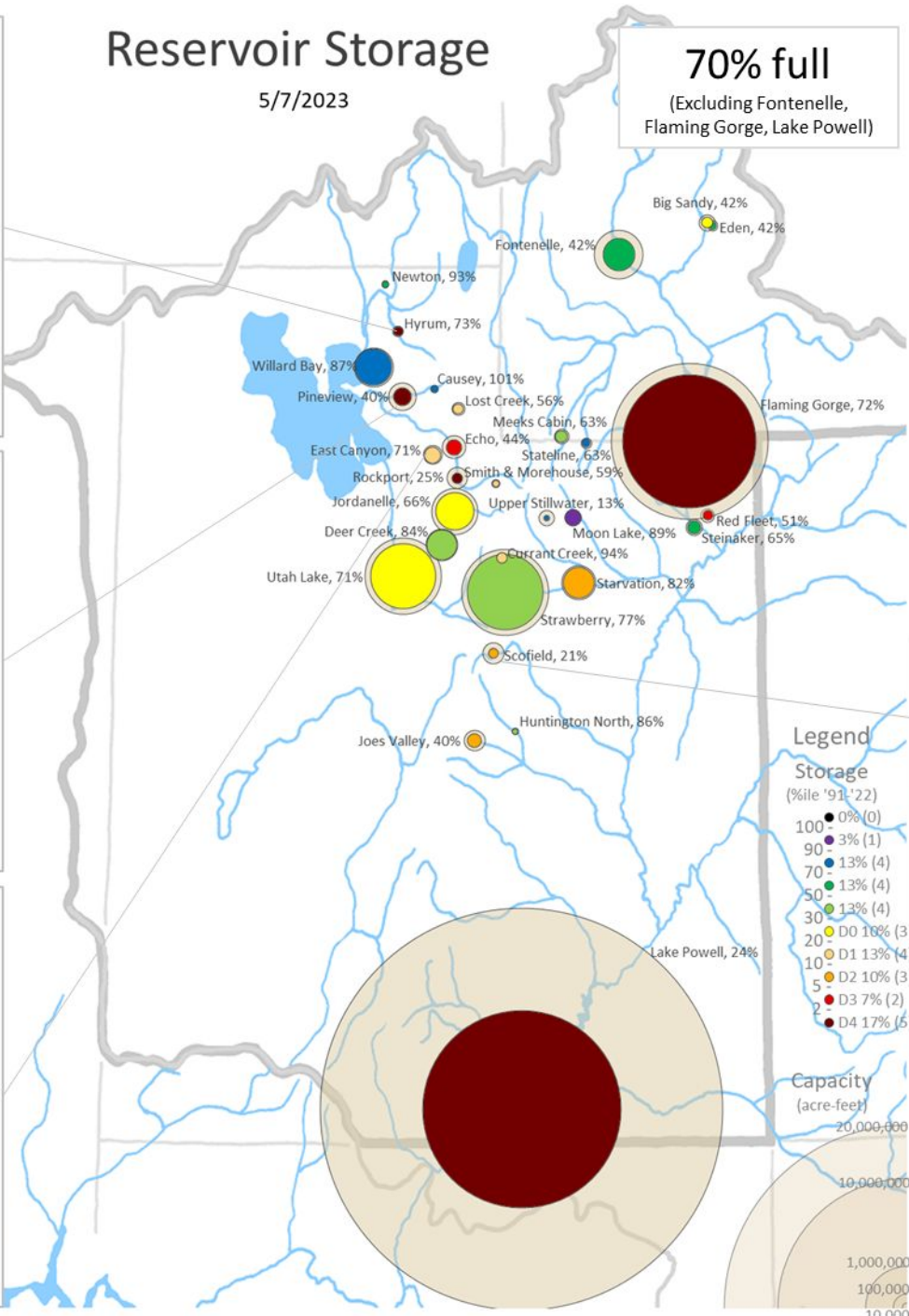
Since last meeting:
- 10's of thousands of acre-feet released from reservoirs.
- High runoff inflows into lower elevation reservoirs.
- Rain-on-snow concerns for low elevation reservoirs?

Agency - BOR
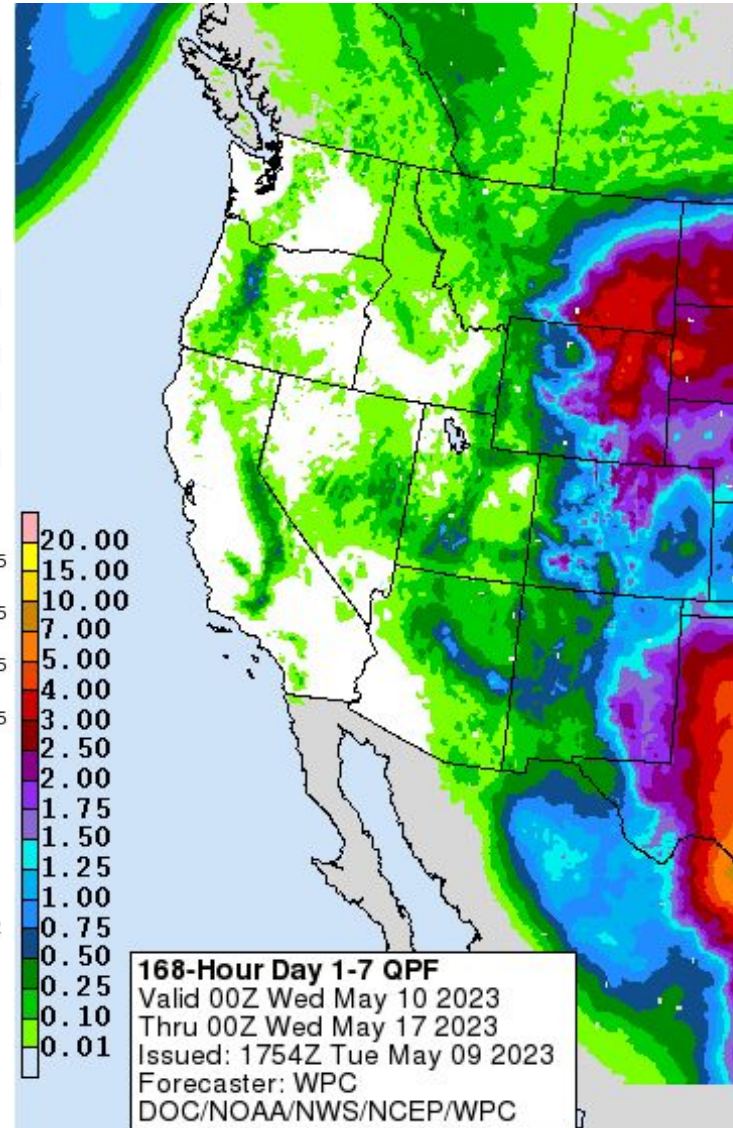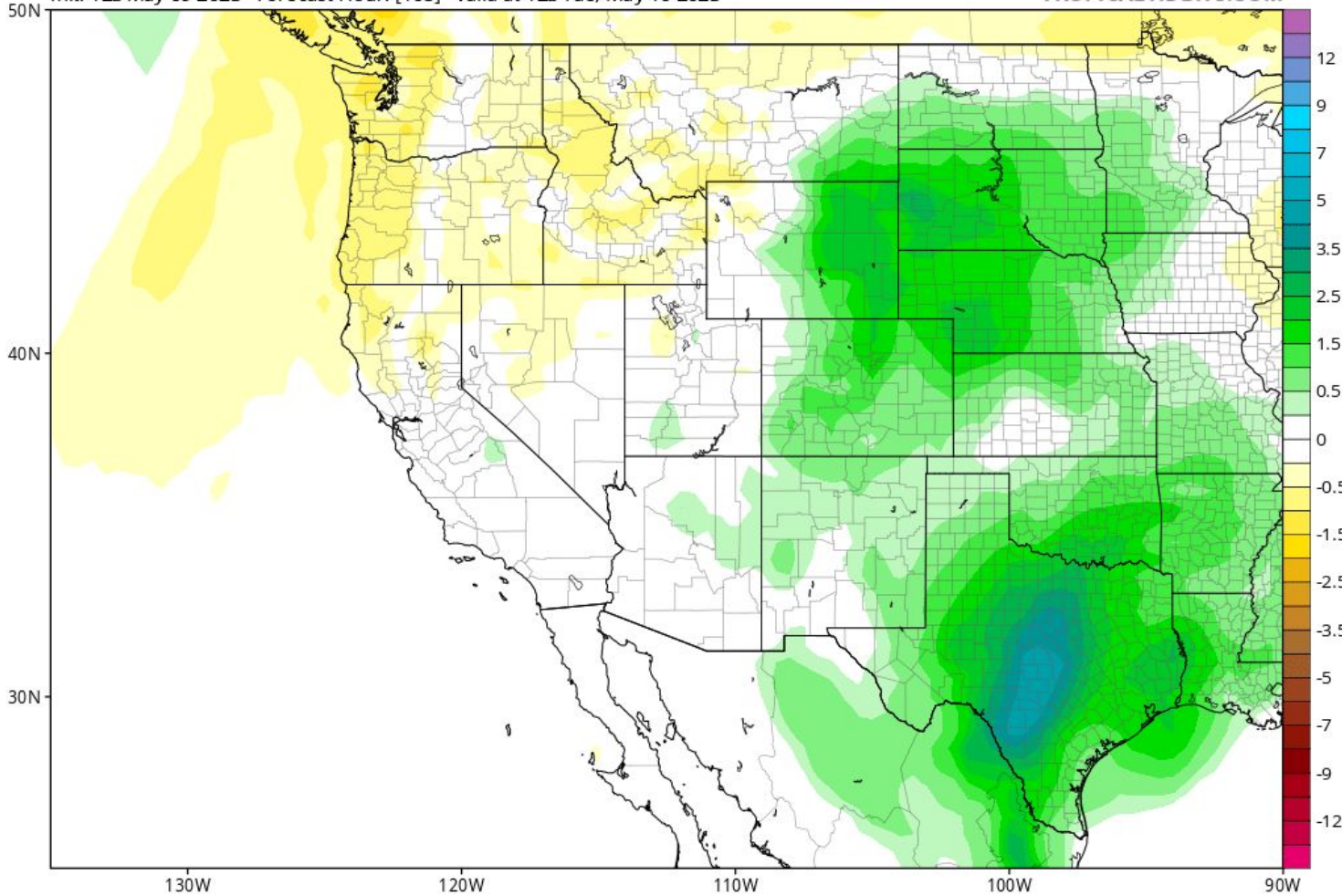Presenter - Gary Henrie

BUREAU OF RECLAMATION

Weather Forecast Office Utah Day 1-7 Outlook

GEFS Accumulated Precip. Anomaly (in) from 12z09May2023 to 12z16May2023 (Days 1-7)
Init: 12z May 09 2023   Forecast Hour: [168]   valid at 12z Tue, May 16 2023

TROPICALTIDBITS.COM

168-Hour Day 1-7 QPF
Valid 00Z Wed May 10 2023
Thru 00Z Wed May 17 2023
Issued: 1754Z Tue May 09 2023
Forecaster: WPC
DOC/NOAA/NWS/NCEP/WPC

Agency - National Weather Service Weather Forecast Office
Presenter - Glen Merrill

Weather Prediction Center U.S. Day 3-7 Hazards Outlook
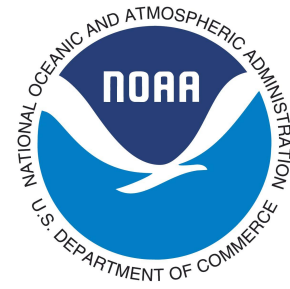
Day 3-7 U.S. Hazards Outlook
Valid: 05/11/2023-05/15/2023

Heavy Rain 5/11

Much Above Normal Temperatures 5/13 - 5/15

Severe Weather 5/11

Heavy Rain 5/12 - 5/14

Heavy Precipitation 5/12

For the latest information on flooding - https://www.wpc.ncep.noaa.gov/nationalfloodoutlook/index.html

Flooding Likely   Flooding Occurring/Imminent   Flooding Possible   Severe Drought
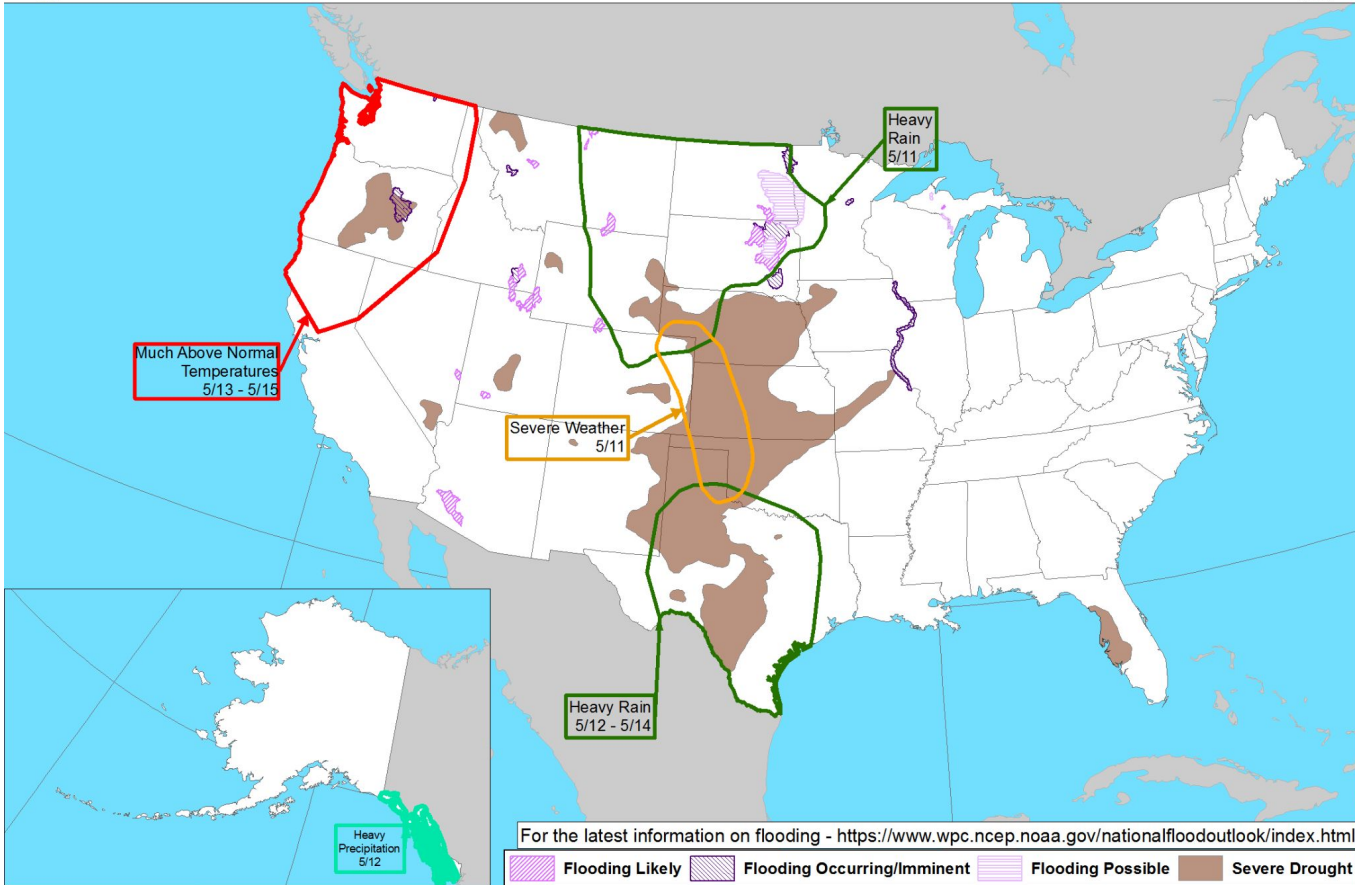
Weather Prediction Center
Made: 05/08/2023 3PM EDT

Follow us: f
www.wpc.ncep.noaa.gov
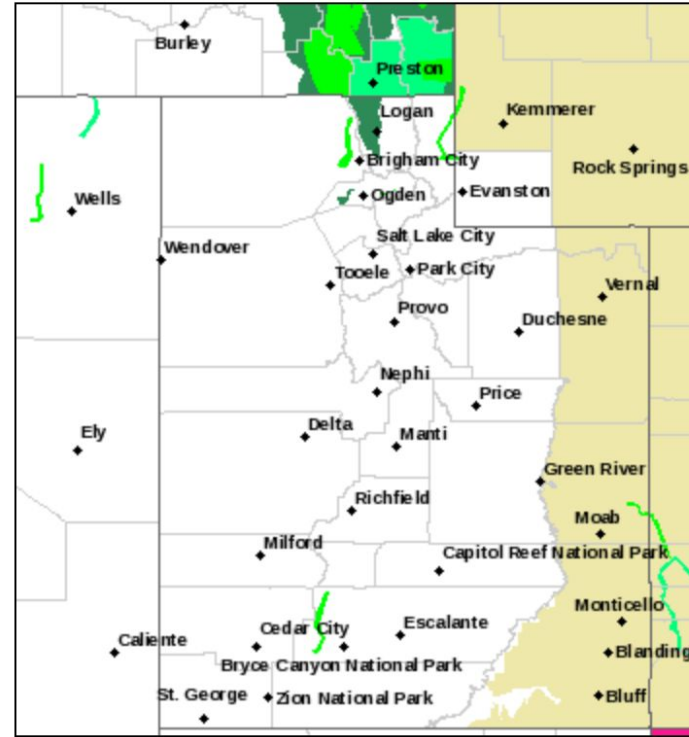
Watches, Warnings & Advisories

Zoom Out

Flood Warning

Red Flag Warning

Flood Advisory

Flood Watch

Hazardous Weather Outlook

Hydrologic Outlook

Last Map Update: Tue, May. 9, 2023 at 8:55:47 am MDT

Burley · Preston · Logan · Kemmerer · Brigham City · Rock Springs · Ogden · Evanston · Wells · Wendover · Salt Lake City · Tooele · Park City · Vernal · Provo · Duchesne · Nephi · Price · Ely · Delta · Manti · Green River · Richfield · Moab · Milford · Capitol Reef National Park · Caliente · Cedar City · Escalante · Monticello · Bryce Canyon National Park · Blanding · St. George · Zion National Park · Bluff

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Agency - National Weather Service Weather Forecast Office
Presenter - Glen Merrill

Climate Prediction Center 8 to 14 Day Outlooks - Temperature
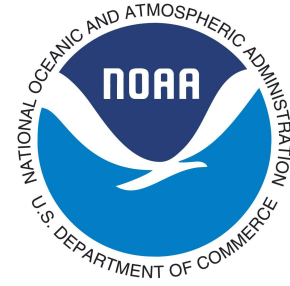
Agency - National Weather Service Weather Forecast Office
Presenter - Glen Merrill
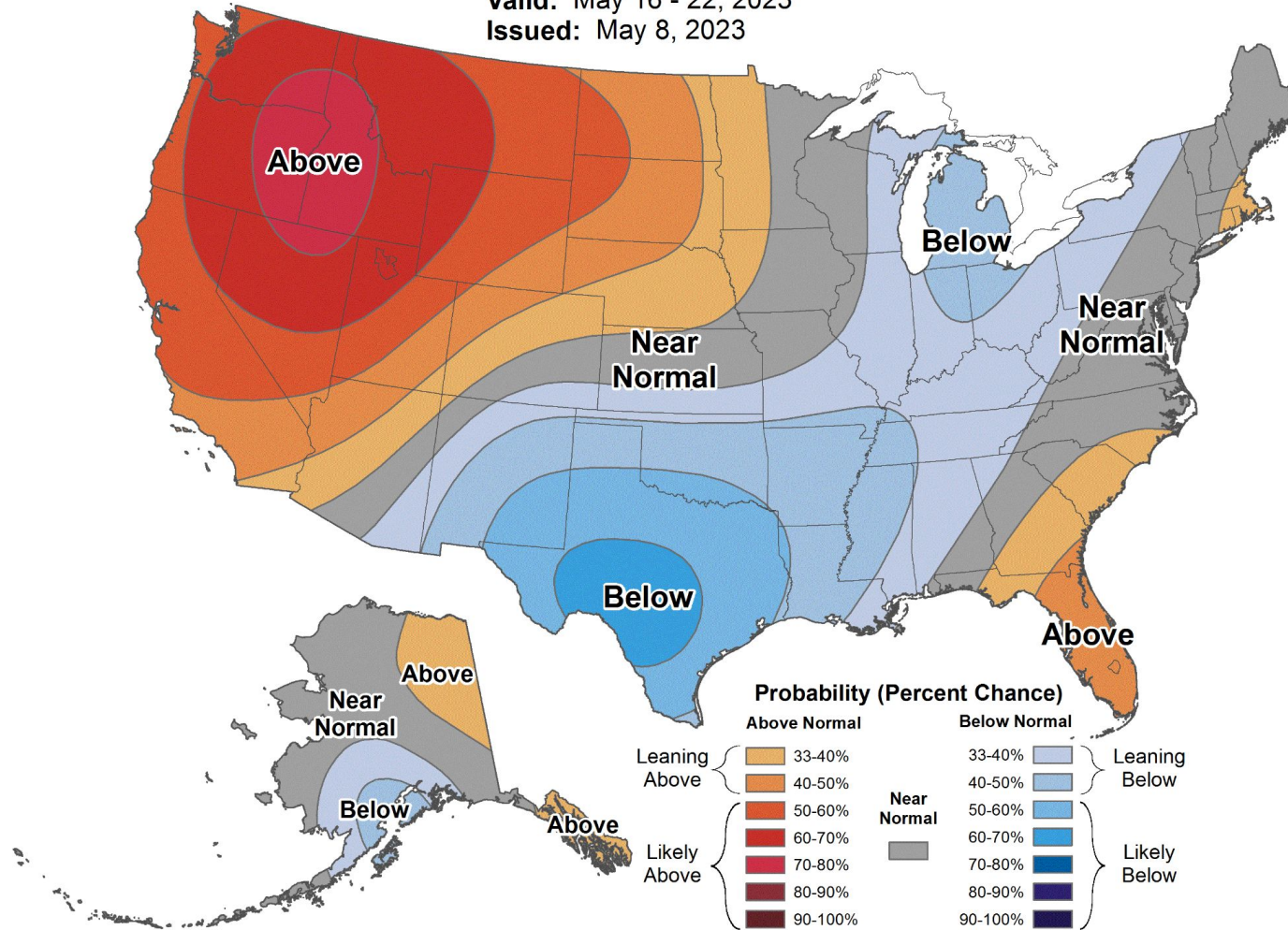
Climate Prediction Center 8 to 14 Day Outlooks - Precipitation
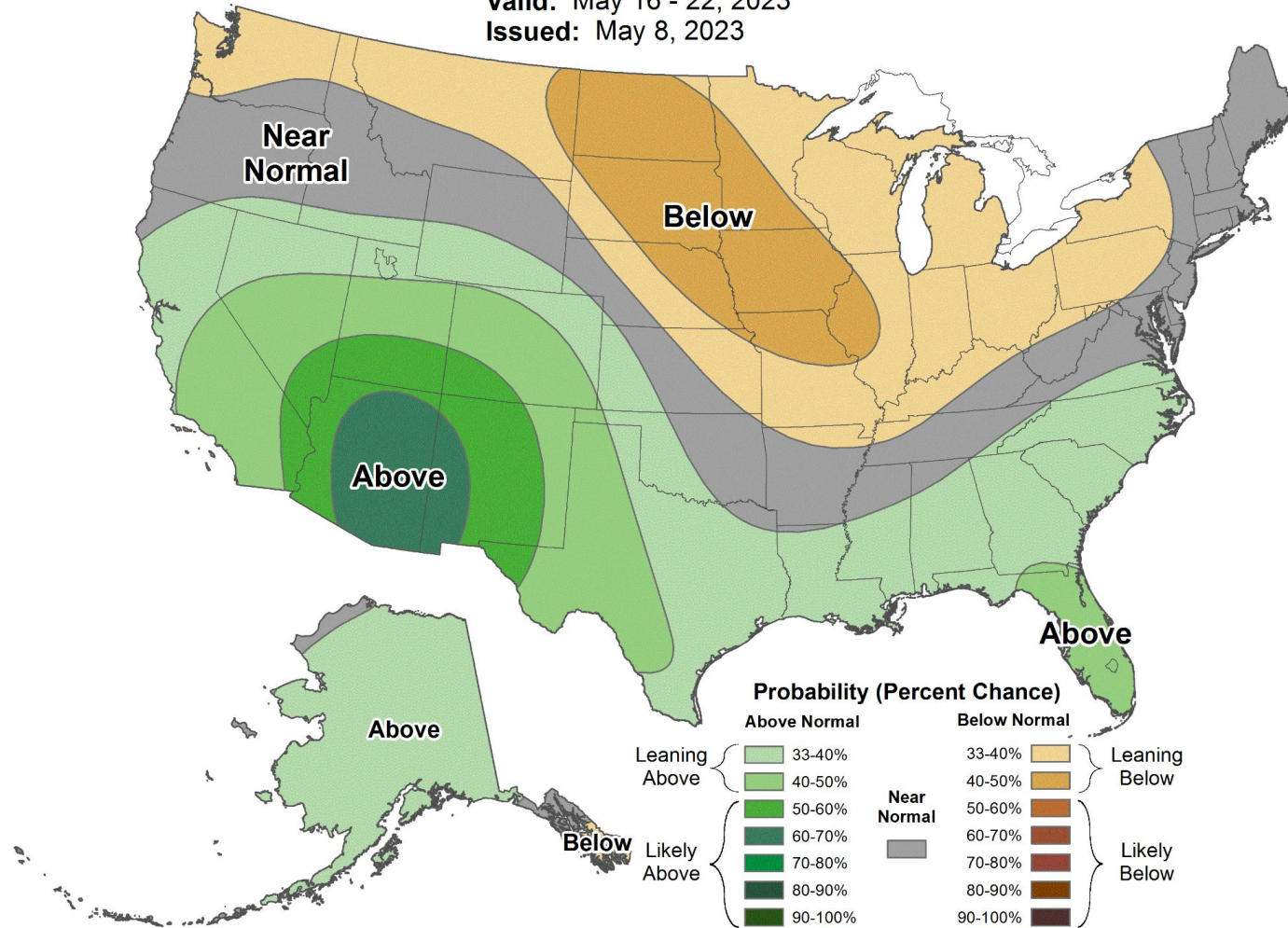
Agency - National Weather Service Weather Forecast Office

Presenter - Glen Merrill

Climate Prediction Center U.S. Week-2 Hazards Outlook
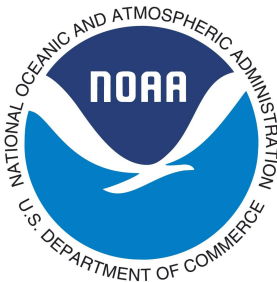
Day 8-14 U.S. Hazards Outlook
Valid: 05/16/2023-05/22/2023

NO HAZARDS POSTED

Flooding Possible
Rapid Onset Drought Risk
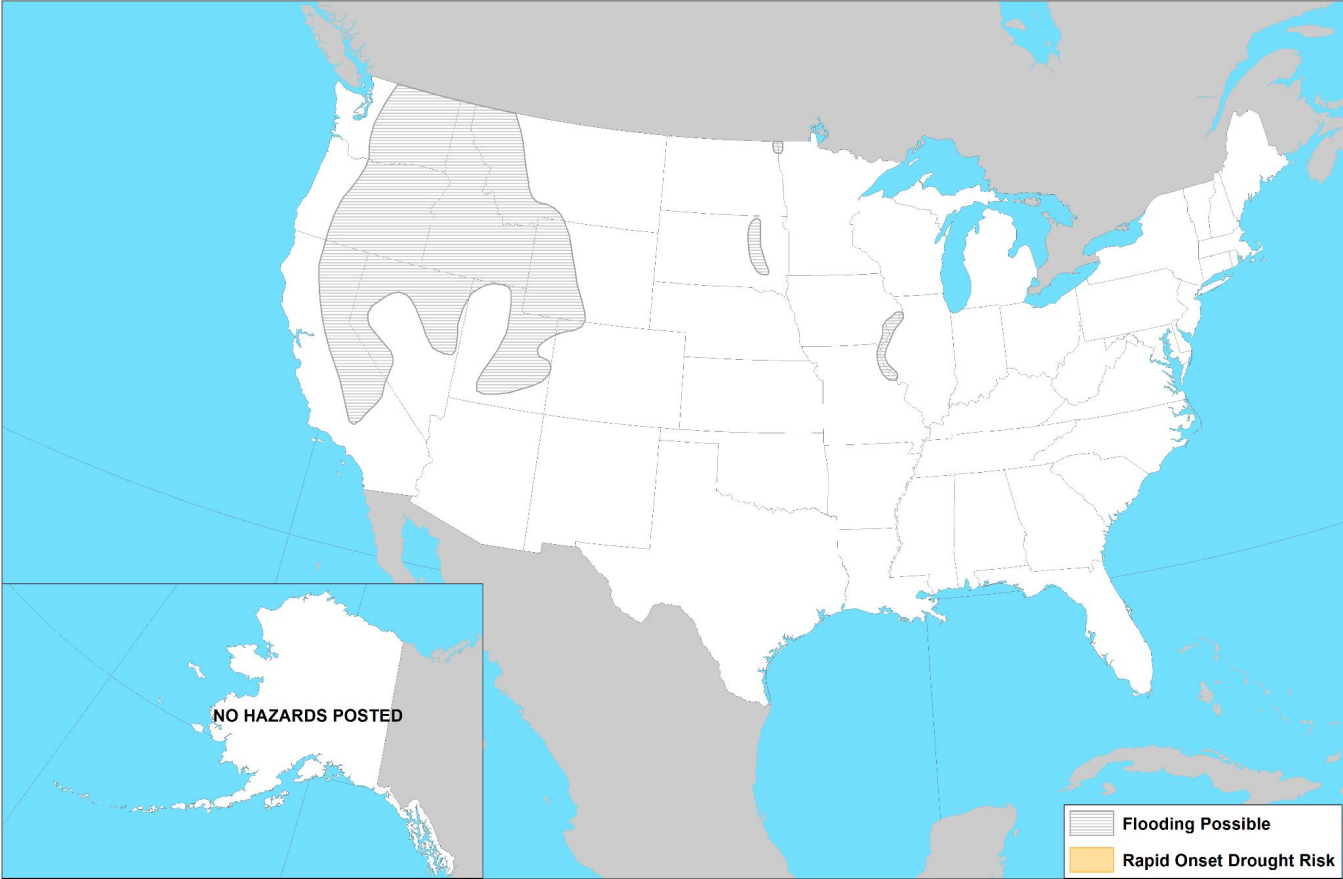
Climate Prediction Center
Made: 05/08/2023 3PM EDT

Follow us:
www.cpc.ncep.noaa.gov

Agency - National Weather Service Weather Forecast Office
Presenter - Glen Merrill

Sevier River at Hatch - Observed and Forecast Flow

Forecast Hydrograph – Sevier – Hatch (HATU1) – NOAA/CBRFC

Fcst Date: 05/09/14Z – Latest Ob: 3.56 ft, 899 cfs (05/09/17Z) – Flood: 3.9 ft, 1046 cfs – Action: 3.5 ft, 881 cfs
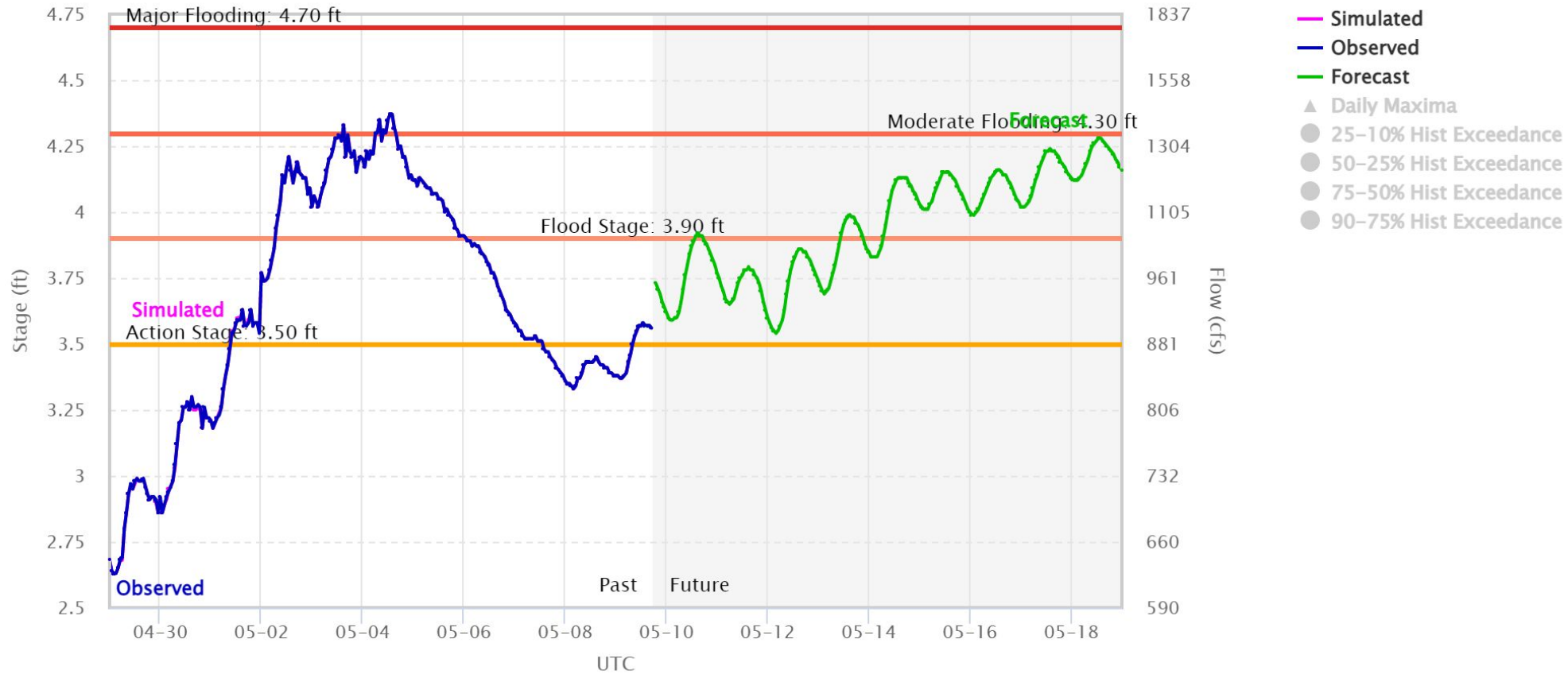
Agency - National Weather Service Weather Forecast Office
Presenter - Glen Merrill
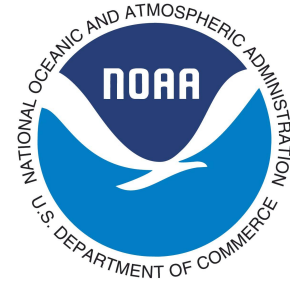
Utah Current Snowpack: May 8th

SNOTEL conditions
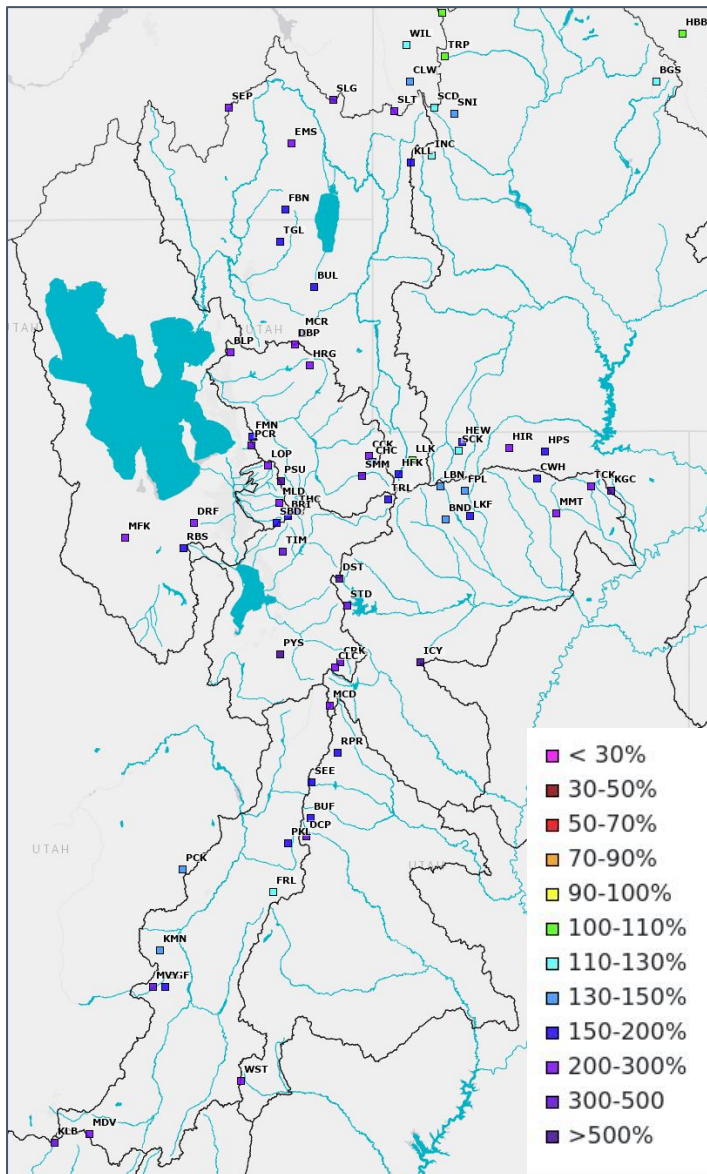
Snow Conditions - May 08 2023
Modeled, Averaged by Basin, Major Contributing Areas

% Median SWE
- >500%
- 300-500%
- 200-300%
- 150-200%
- 130-150%
- 110-130%
- 100-110%
- 90-100%
- 70-90%
- 50-70%
- 30-50%
- 0-30%
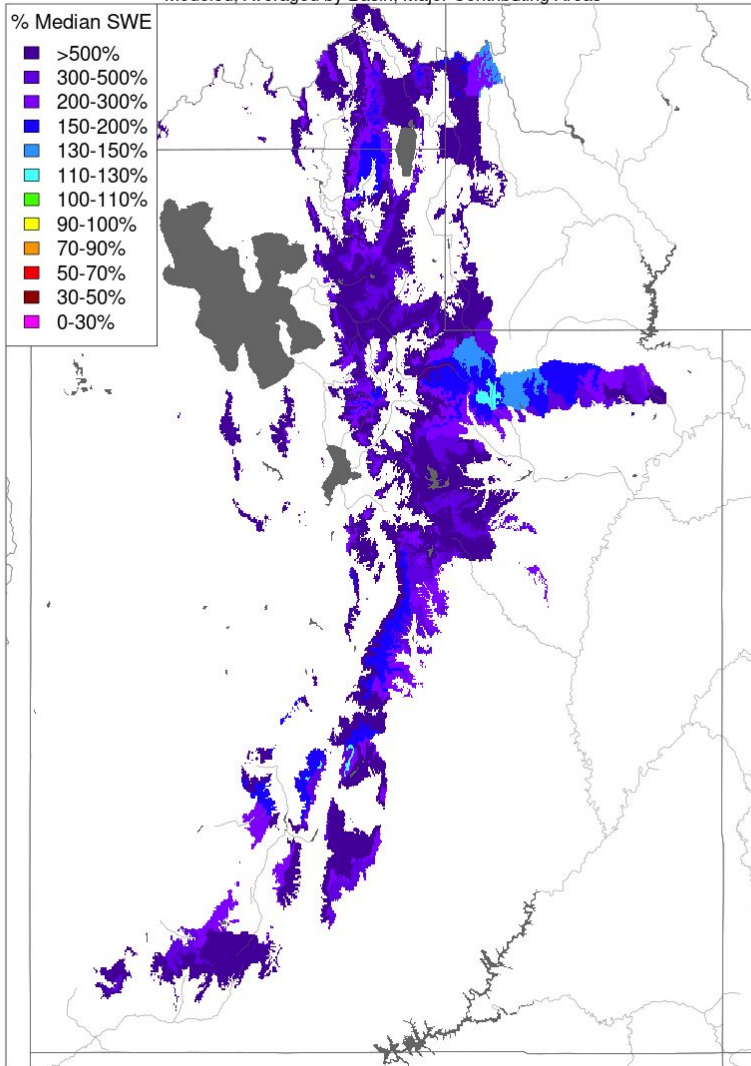
Prepared by NOAA, Colorado Basin River Forecast Center
Salt Lake City, Utah, www.cbrfc.noaa.gov

CBRFC Model Snow by Forecast Group (Significant Areas)

	5/4
Bear	237
Weber	250
Six Creeks	252
Provo	298
Duchesne	194
Sevier	206
Virgin	466

Increased % median snow in southern Utah due more to lack of melt than to significant additional accumulation.

Utah Water Supply Forecasts - Percentile Map
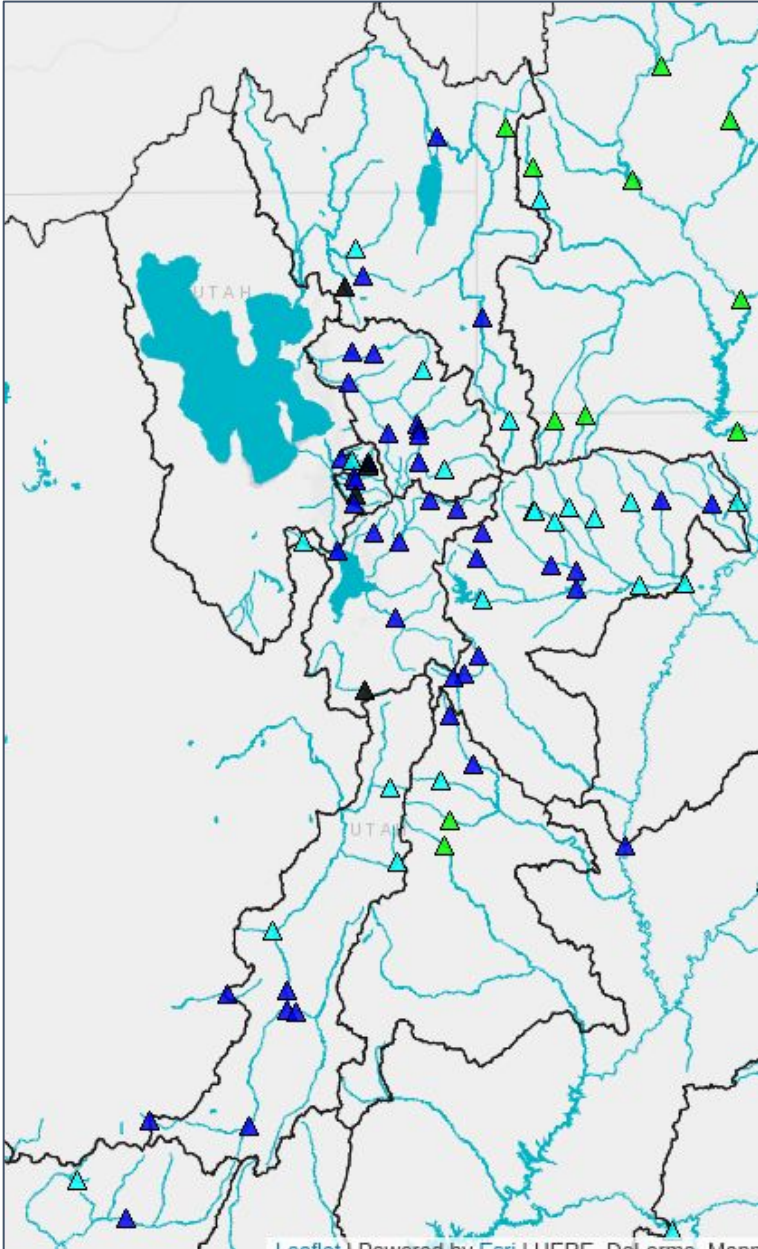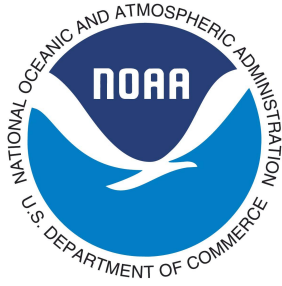
Locations Forecast to have Record High April - July Volumes

- Little Bear Paradise
- Big Cottonwood Creek
- Salt Creek Nephi

Utah Water Supply Forecasts

- May 1 forecast for April-July volume

- April-July forecast streamflow volumes are in percent of <u>1991-2020 average</u>.

Median forecasts by forecast group.

Percent of Average

■	< 30%
■	30-50%
■	50-70%
■	70-90%
■	90-100%
■	100-110%
■	110-130%
■	130-150%
■	150-200%
■	200-300%
■	300-500
■	>500%

Bear	180
Weber	220
Six Creeks	230
Provo / Utah Lake	245
Sevier	225
Duchesne	160
Virgin	280

Historical Forecast Verification

May 1 Forecast Error: April-July Volume
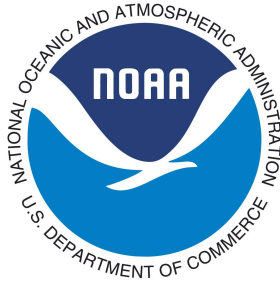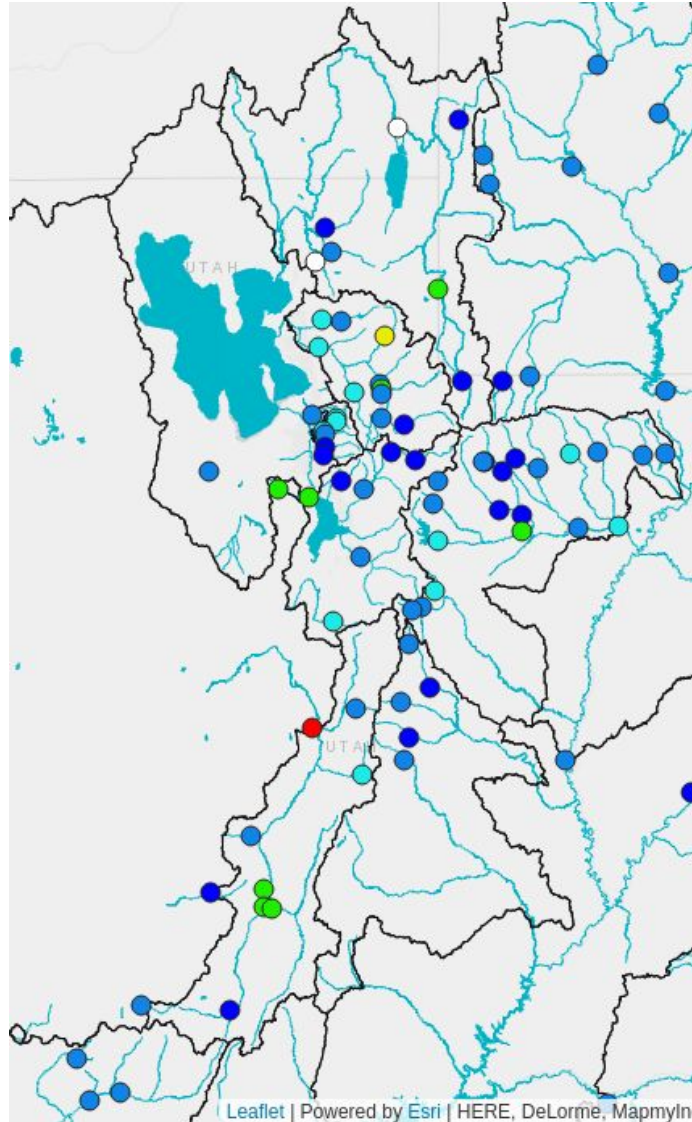
Location	May 1 Forecast Error
BEAR - UTAH-WYOMING STATE	13%
BEAR - WOODRUFF NARROWS	27%
LOGAN - LOGAN- NR	12%
WEBER - OAKLEY- NR	11%
WEBER - ROCKPORT RES	16%
BIG COTTONWOOD CK	13%
PROVO - WOODLAND- NR	14%
PROVO - DEER CK RES	18%
VIRGIN - VIRGIN	15%

Error tends to decrease each month into the spring

Where Forecasts are Better:
 -Headwaters
 -Primarily snow melt basins
 -Known diversions / demands

Where Forecasts are Worse:
 -Lower elevations (rain or early melt)
 -Downstream of diversions / irrigation
 -Little is known about diversions / demands

Future weather is a decreasing portion of the May 1 water supply forecast error/uncertainty.

Peak Flow Forecast Information - Map View
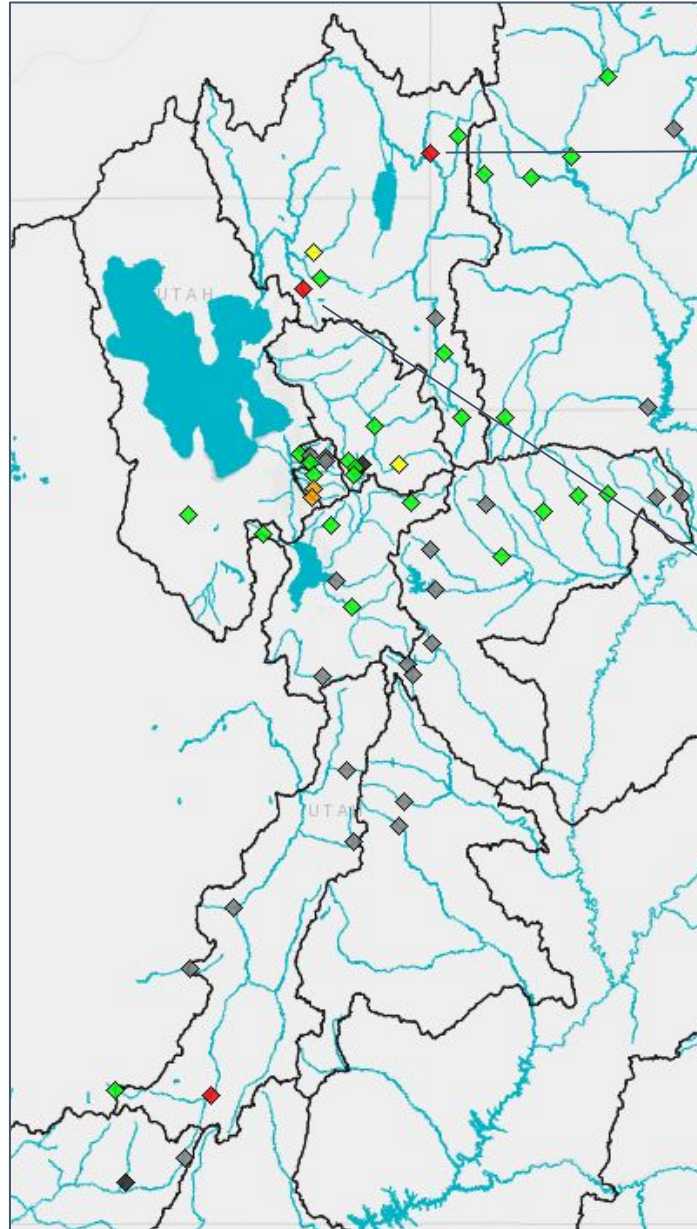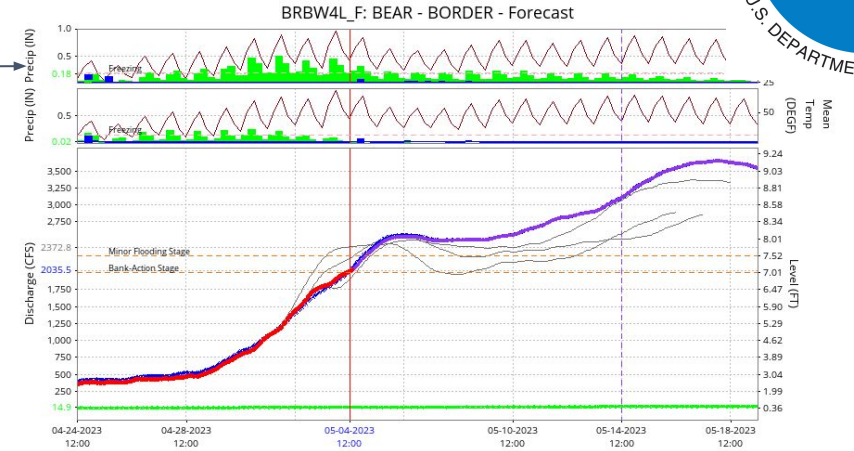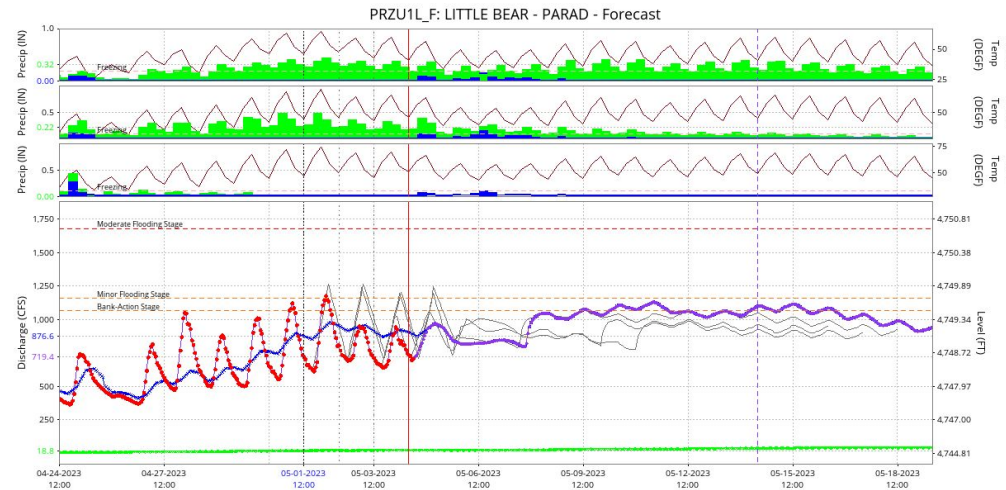
May 1ˢᵗ Water Supply Forecast - Lake Powell
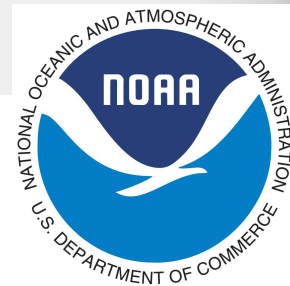
Period: Apr-Jul, Official 50% Forecast (2023-05-01): 11000 kaf (172% Average, 179% Median)

ESP is Unregulated and No Precipitation Forecast Included

← Volume that has a 10% chance of being exceeded
  (wetter future weather scenario)
← 50% chance of being above/below this volume
← Volume that has a 90% chance of being exceeded
  (drier future weather scenario)
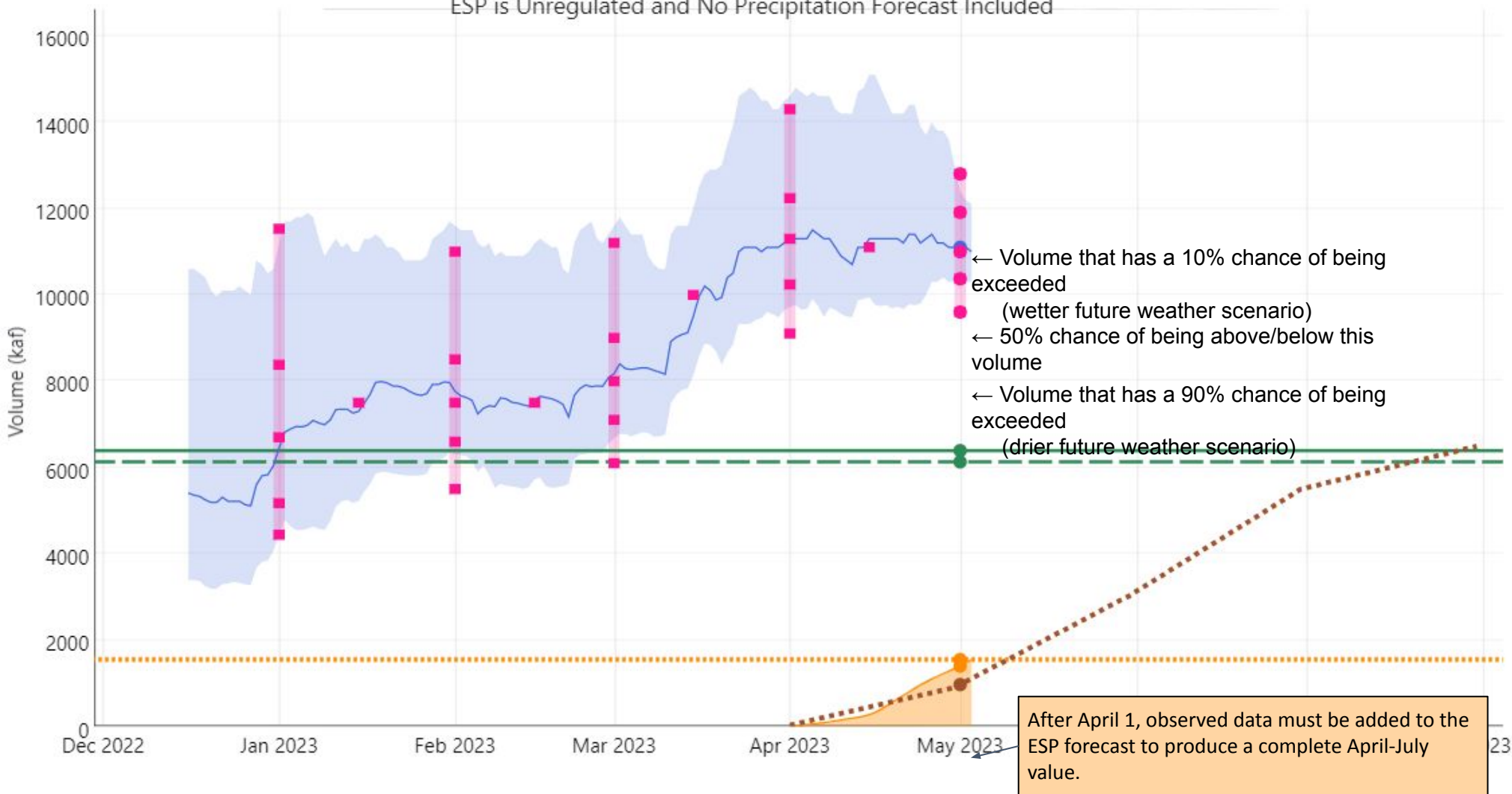
2023/05/01:
Average: 6390
Median: 6130
Observed Accumulation: 1400
Observed Total: 1550
Normal Accumulation: 971
ESP: 11100
Official 10: 12800
Official 30: 11910
Official 50: 11000
Official 70: 10370
Official 90: 9600

After April 1, observed data must be added to the ESP forecast to produce a complete April-July value.

*20% chance observed runoff volume could be outside of the 10/90 forecast range.*

Current Streamflow Conditions

May 9 (09:15)

National Water Dashboard

*Sites must have at least 10 years of streamflow record to be ranked on this graphic

Day-of-Year Status	Apr 17 % Gages	May 9 % Gages
All-time high for this day-of-year	13.1% ■	7.3% ■
Much above normal for this day-of-year	21.2% ■	19.0% ■
Above normal for this day-of-year	23.4% ■	30.7% ■
Normal for this day-of-year	20.4% ■	29.2% ■
Below normal for this day-of-year	2.9% ▮	1.5% ▮
Much below normal for this day-of-year	2.9% ▮	1.5% ▮
All-time low for this day-of-year	1.5% ▮	0.7% ▮
Not ranked - insufficient record	7.3% ▮	7.3% ▮
Not ranked - no measurement	4.4% ▮	0.7% ▮
Not ranked - stream not flowing	0.7% ▮	0.7% ▮
Not ranked - no recent measurement	2.2% ▮	1.5% ▮

Provisional data, subject to revision
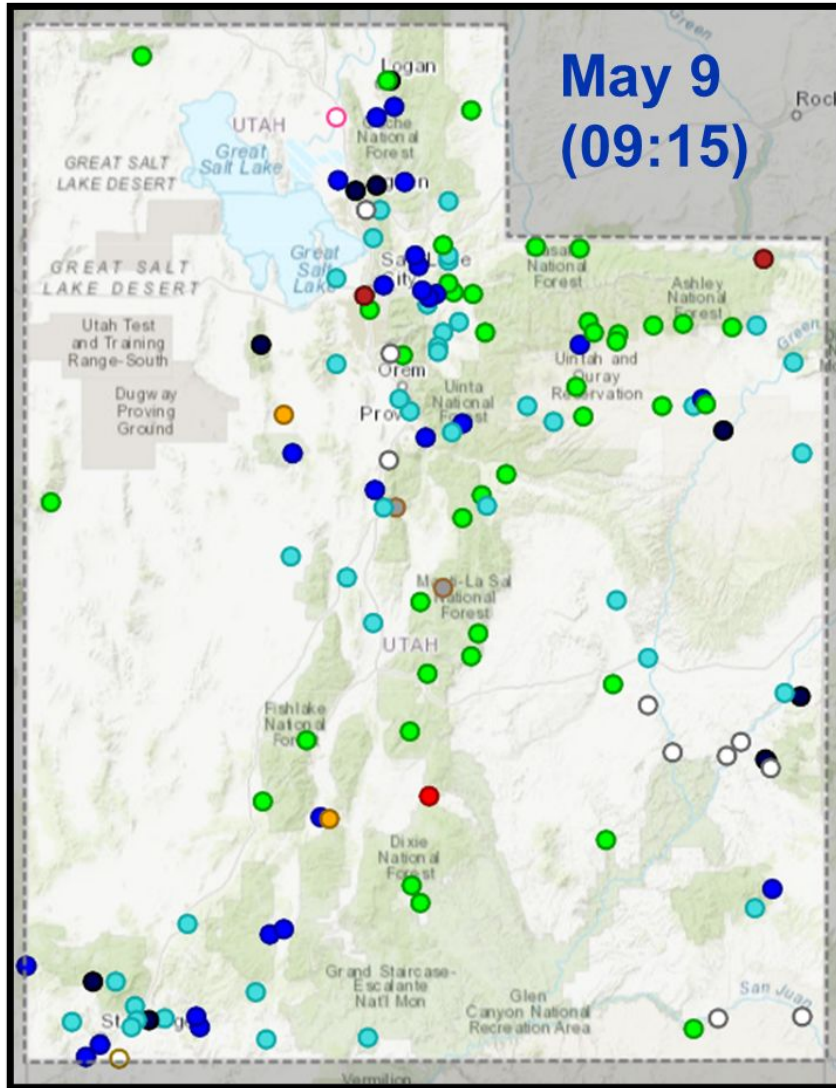
Streamflow: Status

○	Above flood stage	
●	All-time high for this day	100th percentile (maximum)
●	Much above normal	>90th percentile
●	Above normal	76th – 90th percentile
●	Normal	25th – 75th percentile
●	Below normal	10th – 24th percentile
●	Much below normal	<10th percentile
●	All-time low for this day	0th percentile (minimum)
○	Not flowing	
○	Not ranked	
●	Measurement flag	
●	Recent measurement unavailable	

Agency - USGS Utah WSC
Presenter - Ryan Rowland

USGS
science for a changing world
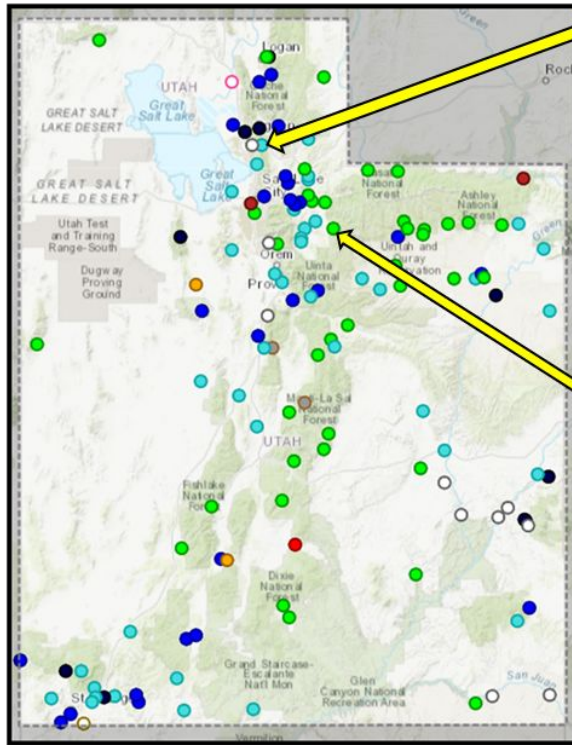
Utah Area-Based Runoff Duration Hydrograph
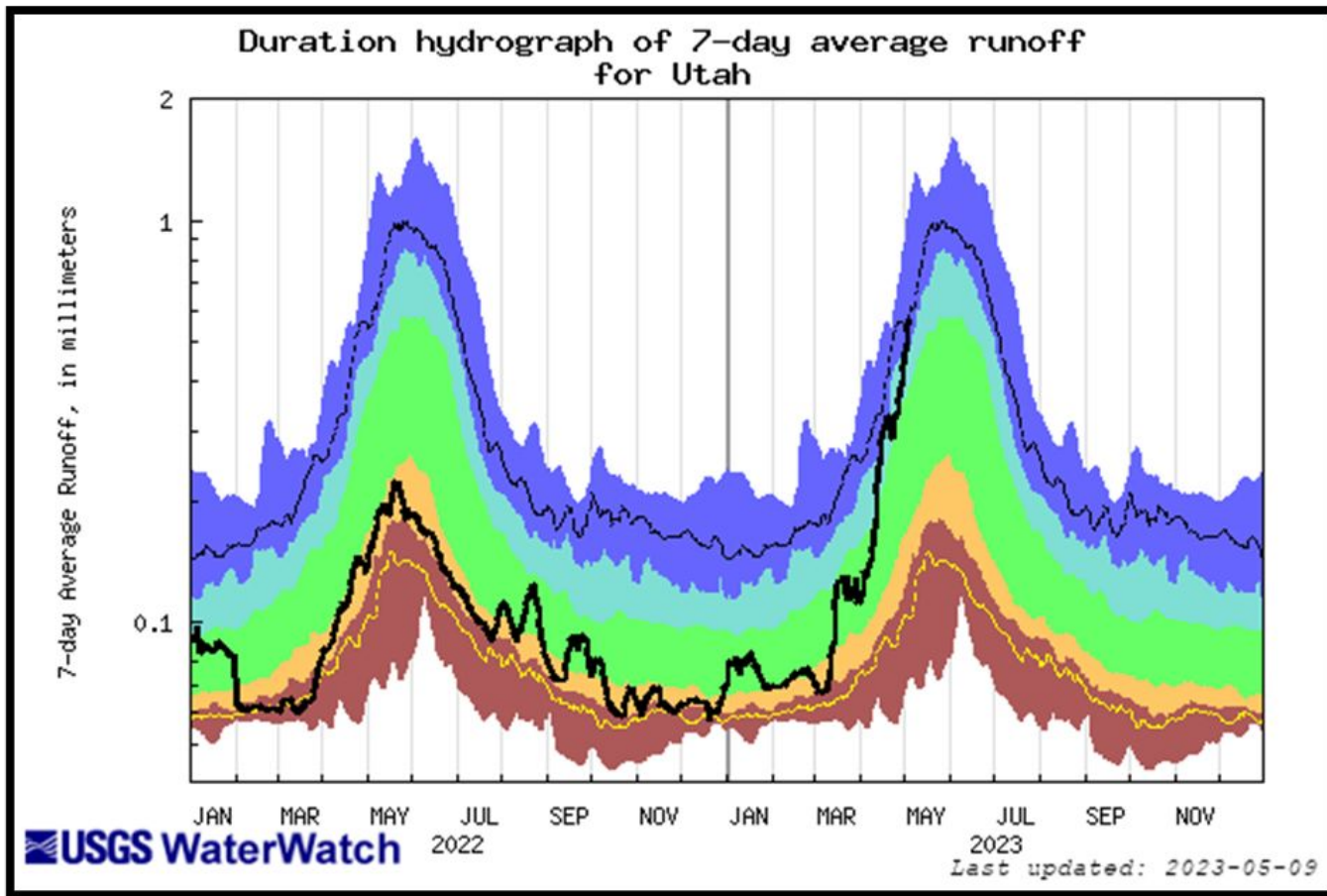
❑ **The Runoff Duration Hydrograph is a graphical presentation of area-based runoff (the black line) calculated as a weighted average of HUC 8-runoff, plotted over the long-term statistics of runoff for each day or month of the year for each area.**
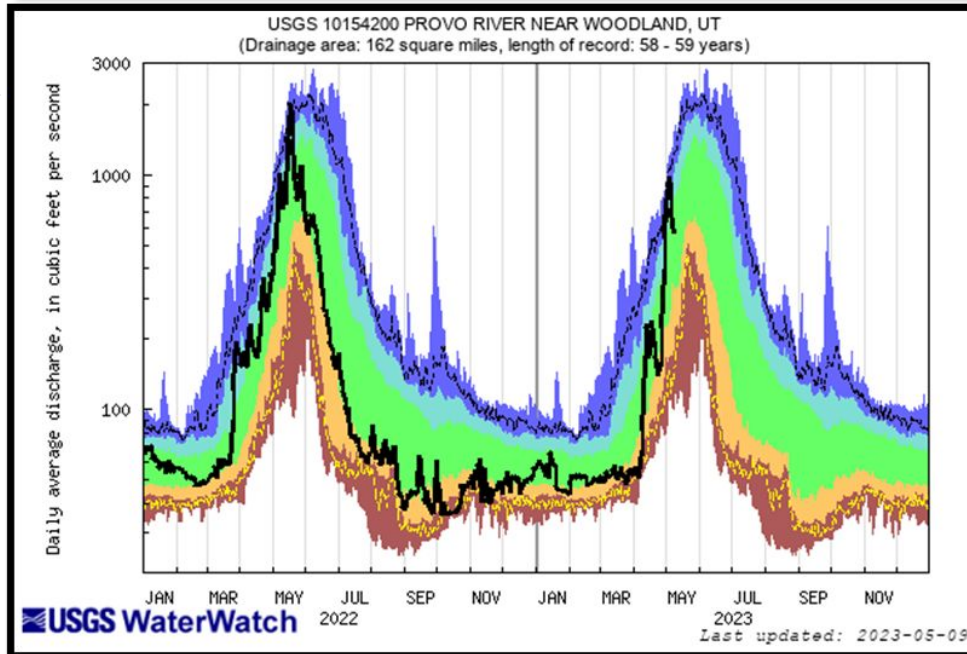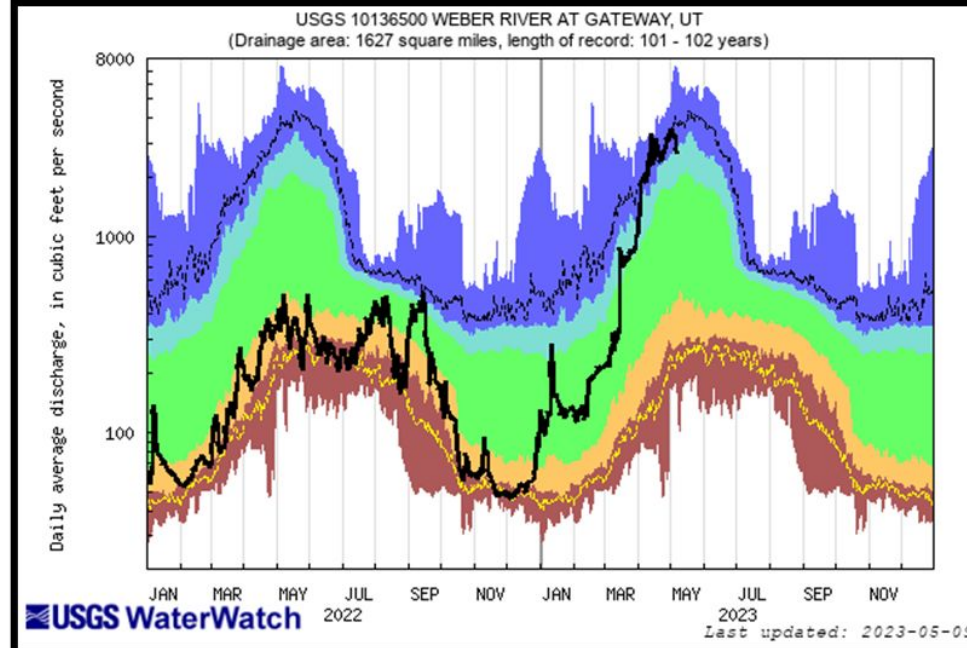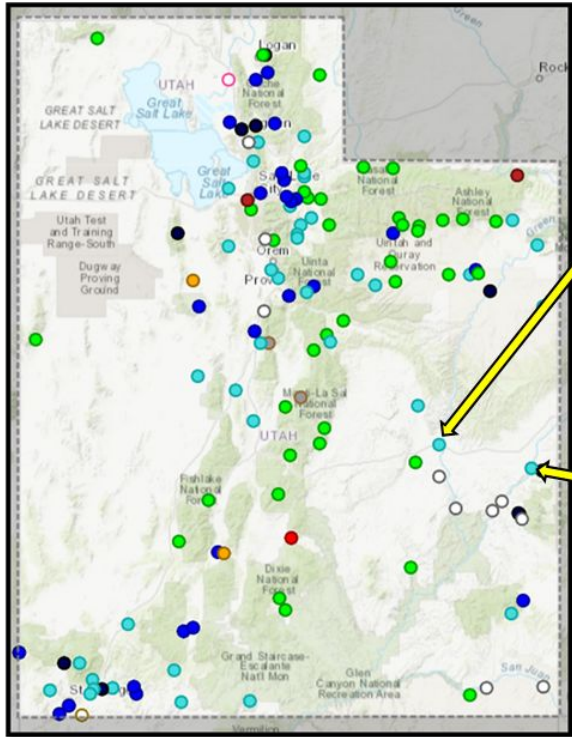
Provisional data, subject to revision
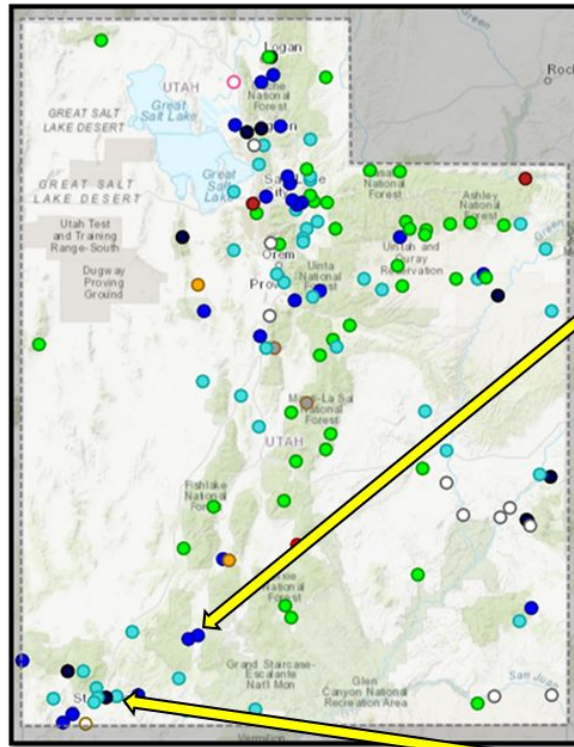
Agency - USGS Utah WSC
Presenter - Ryan Rowland

Duration Hydrograph for Selected Gages

Agency - USGS Utah WSC
Presenter - Ryan Rowland

Duration Hydrograph for Selected Gages

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Duration Hydrograph for Selected Gages
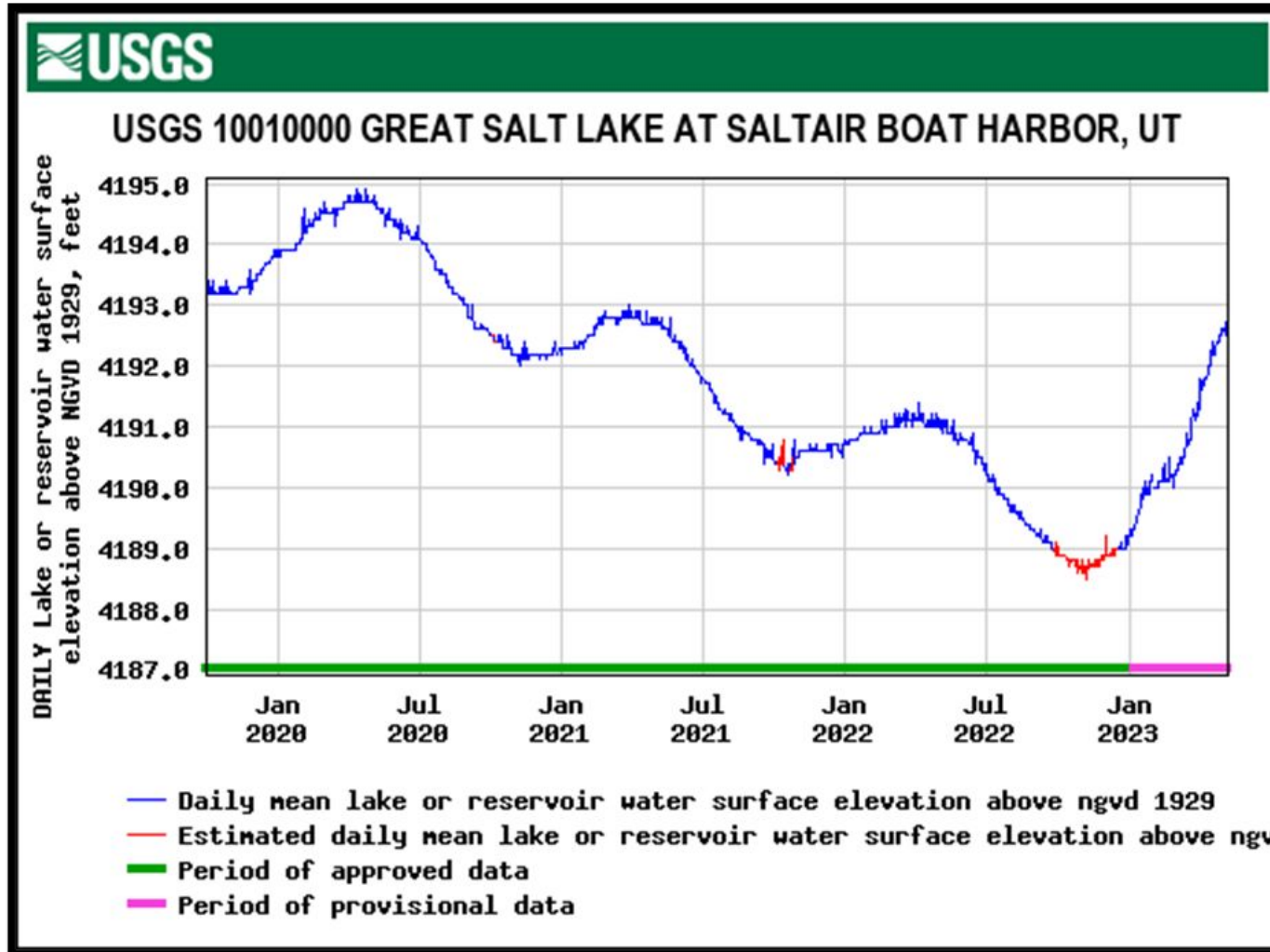

Provisional data, subject to revision

Agency - USGS Utah WSC
Presenter - Ryan Rowland

Great Salt Lake Water Surface Elevation - South Arm

USGS 10010000 GREAT SALT LAKE AT SALTAIR BOAT HARBOR, UT

- ❑ **Daily value 5/8/2023 = 4,192.8'**
- ❑ **Daily value 4/16/2023 = 4,192.0'**
- ❑ **Up 4.3' since November**
- ❑ **Berm at causeway breach raised to 4,192' 2/9/2023**

Great Salt Lake Water Surface Elevation - North Arm

USGS 10010100 GREAT SALT LAKE NEAR SALINE, UT
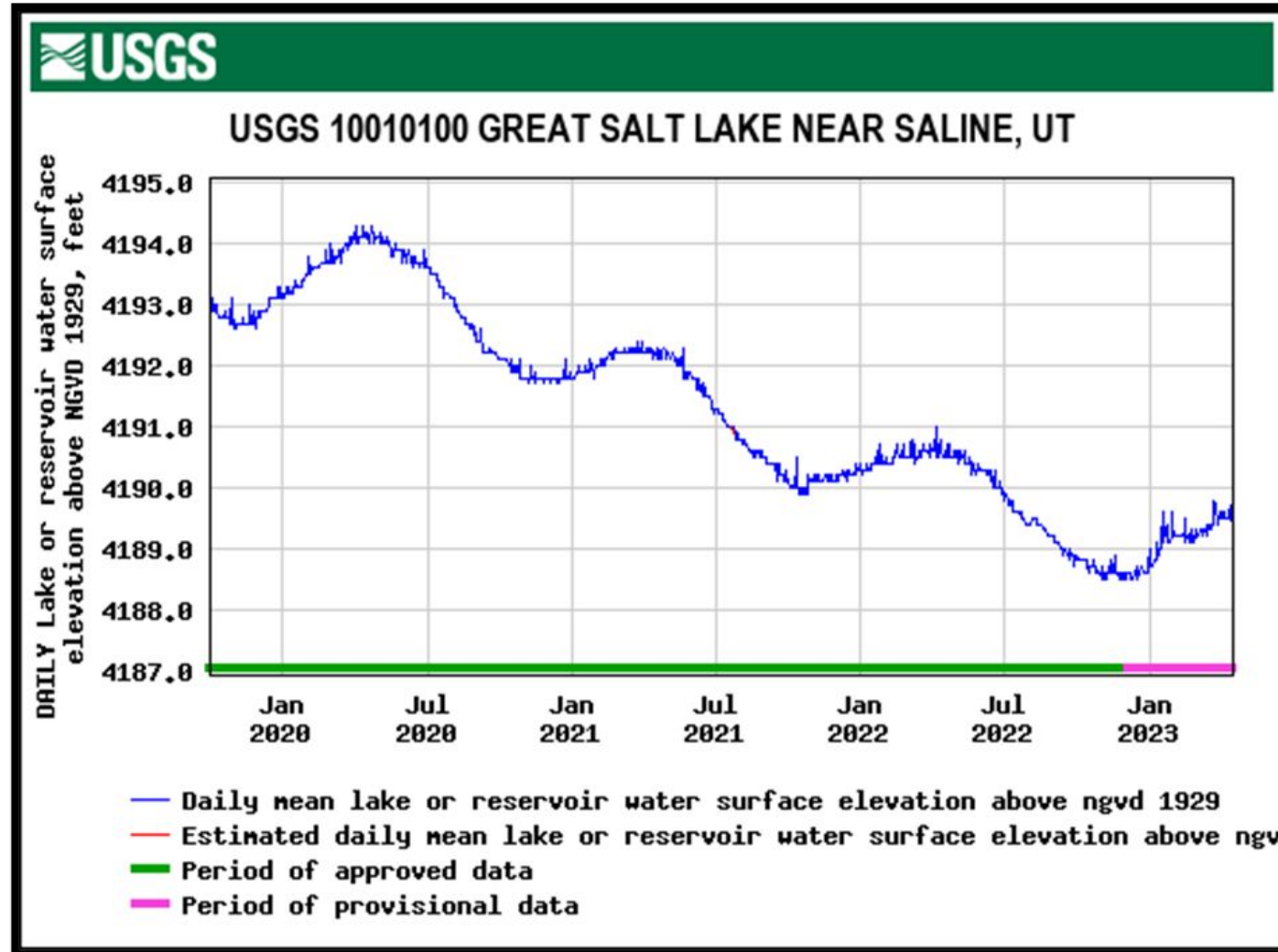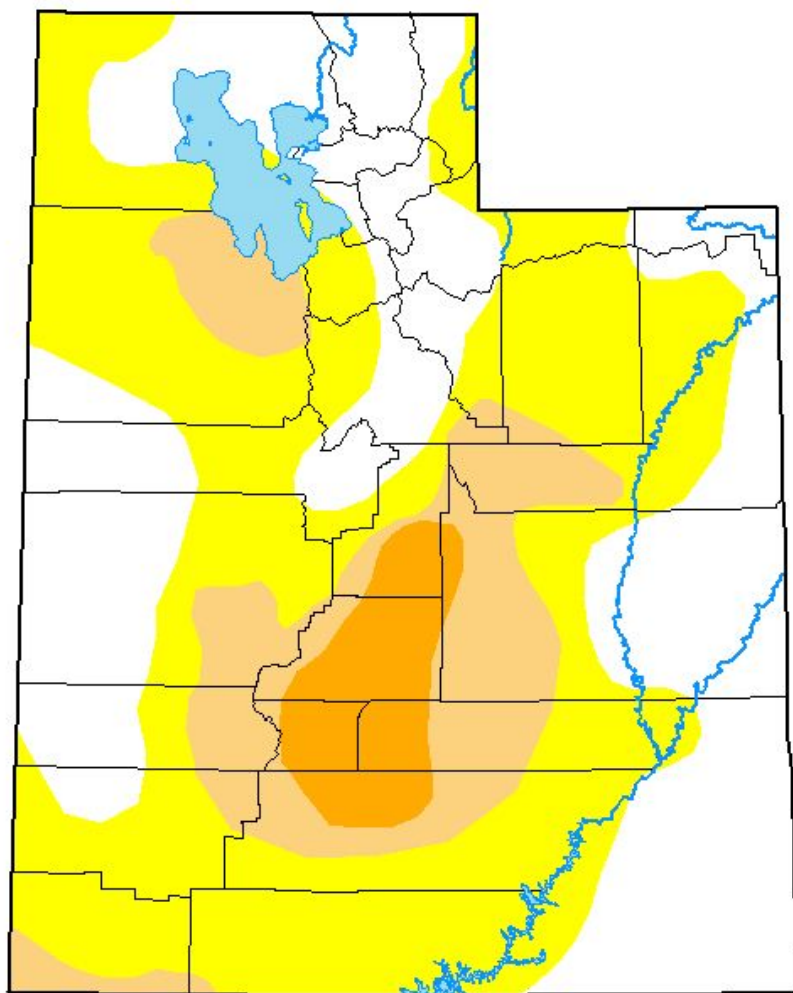
- ❑ **Daily value 5/8/2023 = 4,189.4'**
- ❑ **Daily value 4/16/2023 = 4,189.4'**
- ❑ **Up 0.9' since November**
- ❑ **Berm at causeway breach raised to 4,192' 2/9/2023**

U.S. Drought Monitor
Utah

May 2, 2023
(Released Thursday, May. 4, 2023)
Valid 8 a.m. EDT

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

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CPC/NOAA

droughtmonitor.unl.edu