WY Conditions & Outlooks:

Precipitation, Temperatures, Drought, Floods, & Everything In-between

July 18, 2024

The University of Wyoming is an equal opportunity/affirmative action institution.

Presentation Outline

- **Current Conditions:** Overview
  - Drought, Temperature, Precipitation, and Soil Moisture
  - Streamflows
  - Reservoir Levels
  - Water Calls & Allocations
- **Outlooks:**
  - Temperature & Precipitation
  - Wildland Fire Potential & Outlook
- **Highlight of the Month:**
  - Harmful Cyanobacterial Bacteria
- **Questions**

Current Conditions

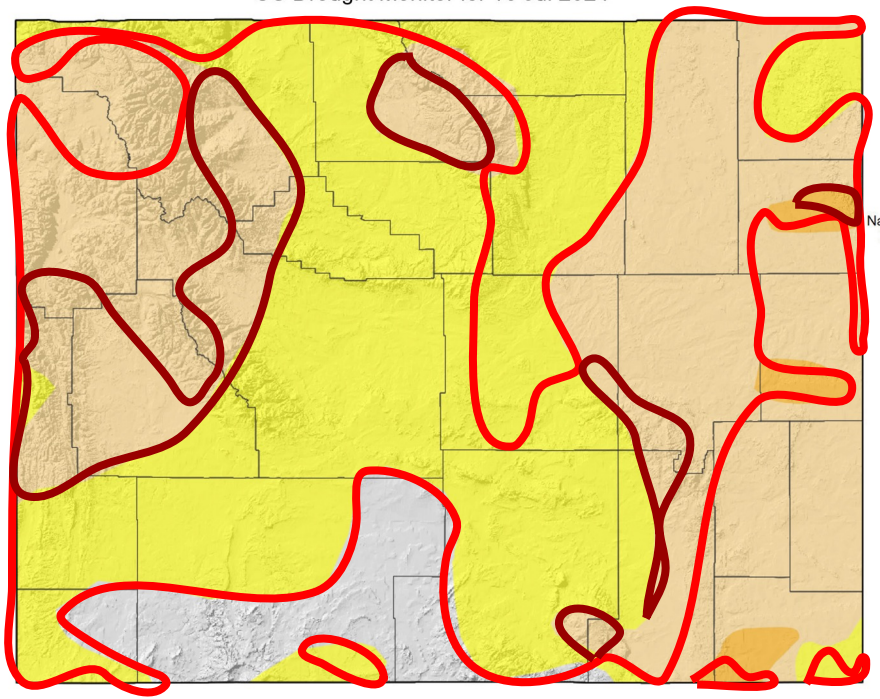
US Drought Monitor for July 16, 2024

(Released Thursday, July 18th, 2024)

Valid 8 a.m. EDT

Drought Level	Percentile
None	>30
D0 (Abnormally Dry)	21 to 30
D1 (Moderate Drought)	11 to 20
D2 (Severe Drought)	6 to 10
D3 (Extreme Drought)	3 to 5
D4 (Exceptional Drought)	0 to 2

US Drought Monitor for 16 Jul 2024



Map Created by:
National Drought Mitigation Center
https://droughtmonitor.unl.edu

Map Layout Prepared by:
Wyoming State Climate Office
http://www.wrds.uwyo.edu

The U.S. Drought Monitor, is a weekly map of drought conditions produced jointly by the National Oceanic and Atmospheric Administration, the U.S. Department of Agriculture, and the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln. The U.S. Drought Monitor website is hosted and maintained by the NDMC. http://droughtmonitor.unl.edu

Map Layout Created 18 Jul 2024 http:/www.wrds.uwyo.edu

How are Drought categories assigned?
https://youtu.be/45MQ1GB-uTc

One-category degradations in all parts of the state. Areas in dark red represent locations where **two-category degradations** were made since last webinar.

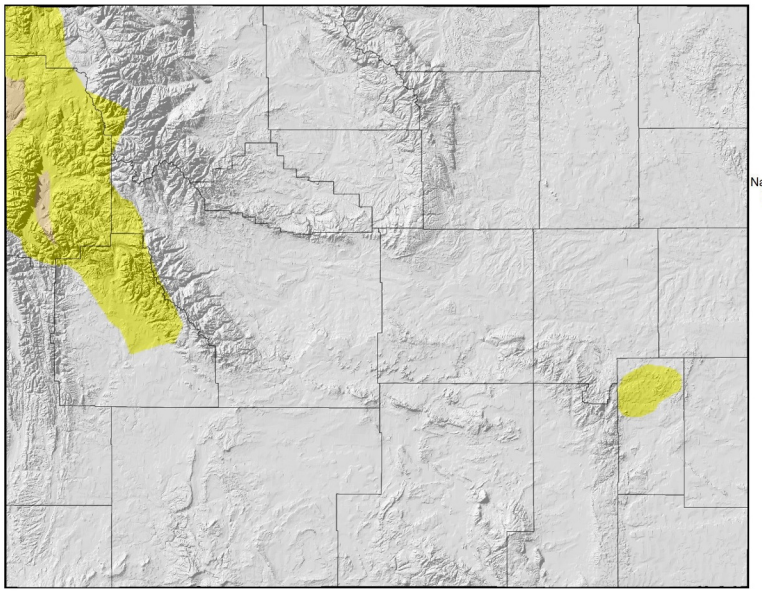
https://droughtmonitor.unl.edu

droughtmonitor.unl.edu

WRDS Water Resources Data System

One Year Ago

US Drought Monitor for 18 Jul 2023



US Drought Monitor

7.27%	D0 Abnormally Dry
0.40%	D1 Moderate Drought
0.00%	D2 Severe Drought
0.00%	D3 Extreme Drought
0.00%	D4 Exceptional Drought

Map Created by:
National Drought Mitigation Center
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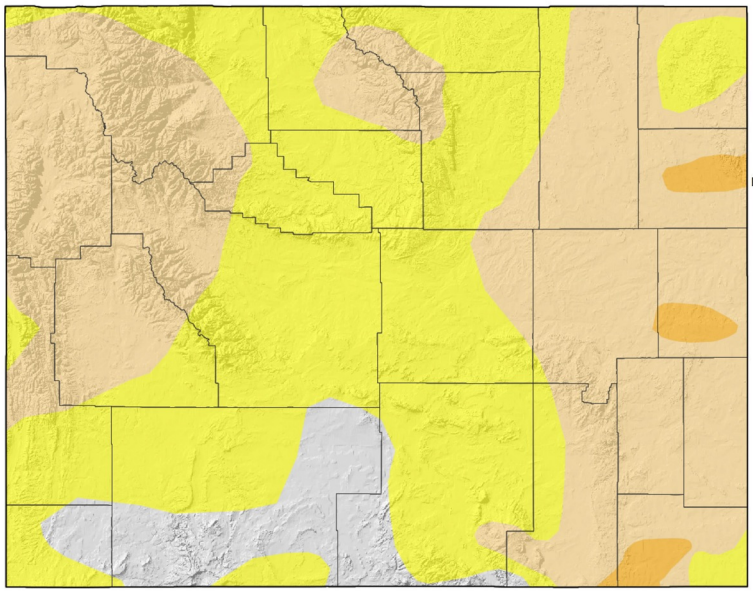
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Map Layout Created 20 Jul 2023 http:/www.wrds.uwyo.edu

Today

US Drought Monitor for 16 Jul 2024



US Drought Monitor

45.58%	D0 Abnormally Dry
44.22%	D1 Moderate Drought
1.91%	D2 Severe Drought
0.00%	D3 Extreme Drought
0.00%	D4 Exceptional Drought

Map Created by:
National Drought Mitigation Center
https://droughtmonitor.unl.edu

Map Layout Prepared by:
Wyoming State Climate Office
http://www.wrds.uwyo.edu

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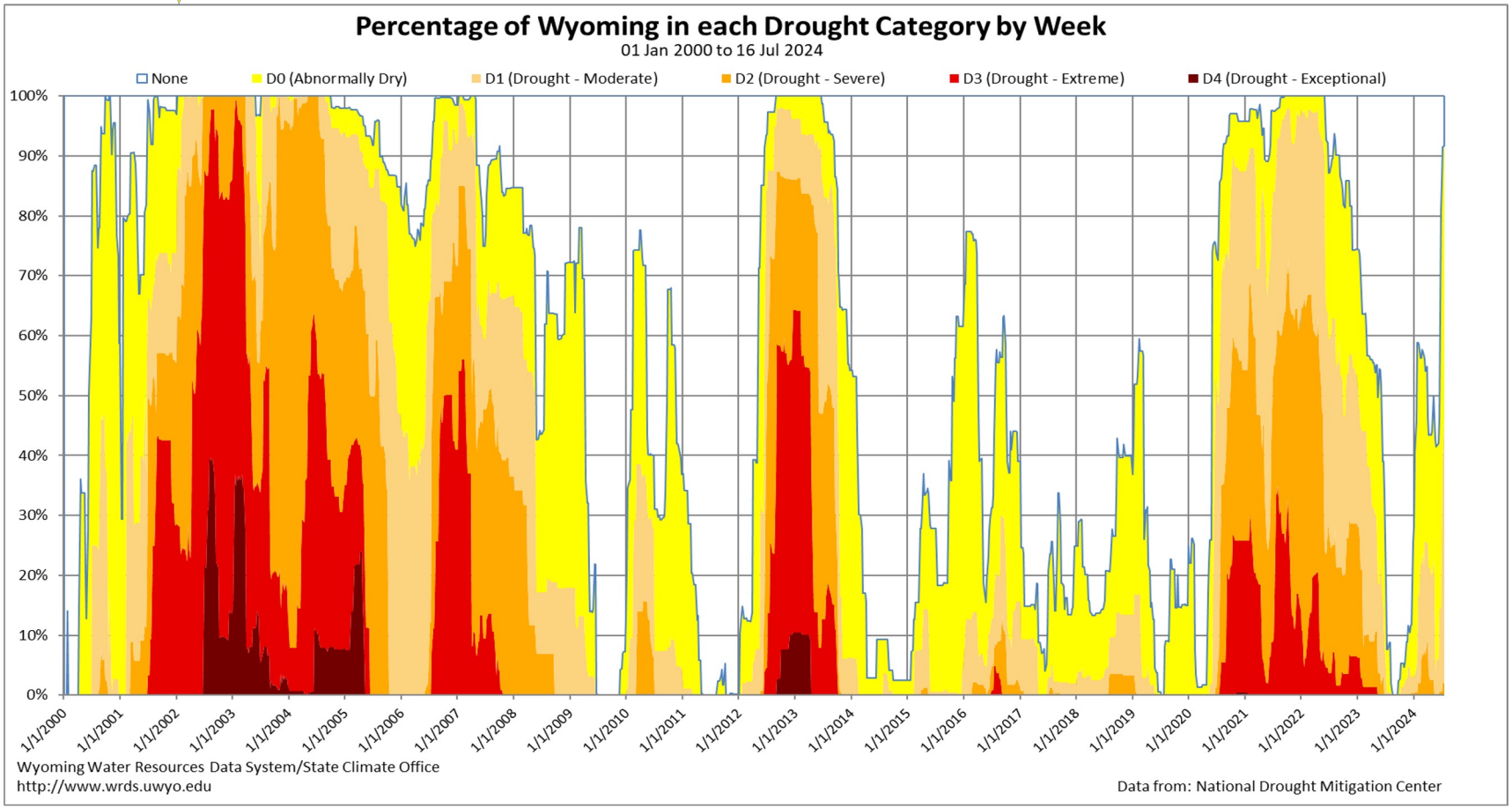
Map Layout Created 18 Jul 2024 http:/www.wrds.uwyo.edu

https://droughtmonitor.unl.edu

droughtmonitor.unl.edu

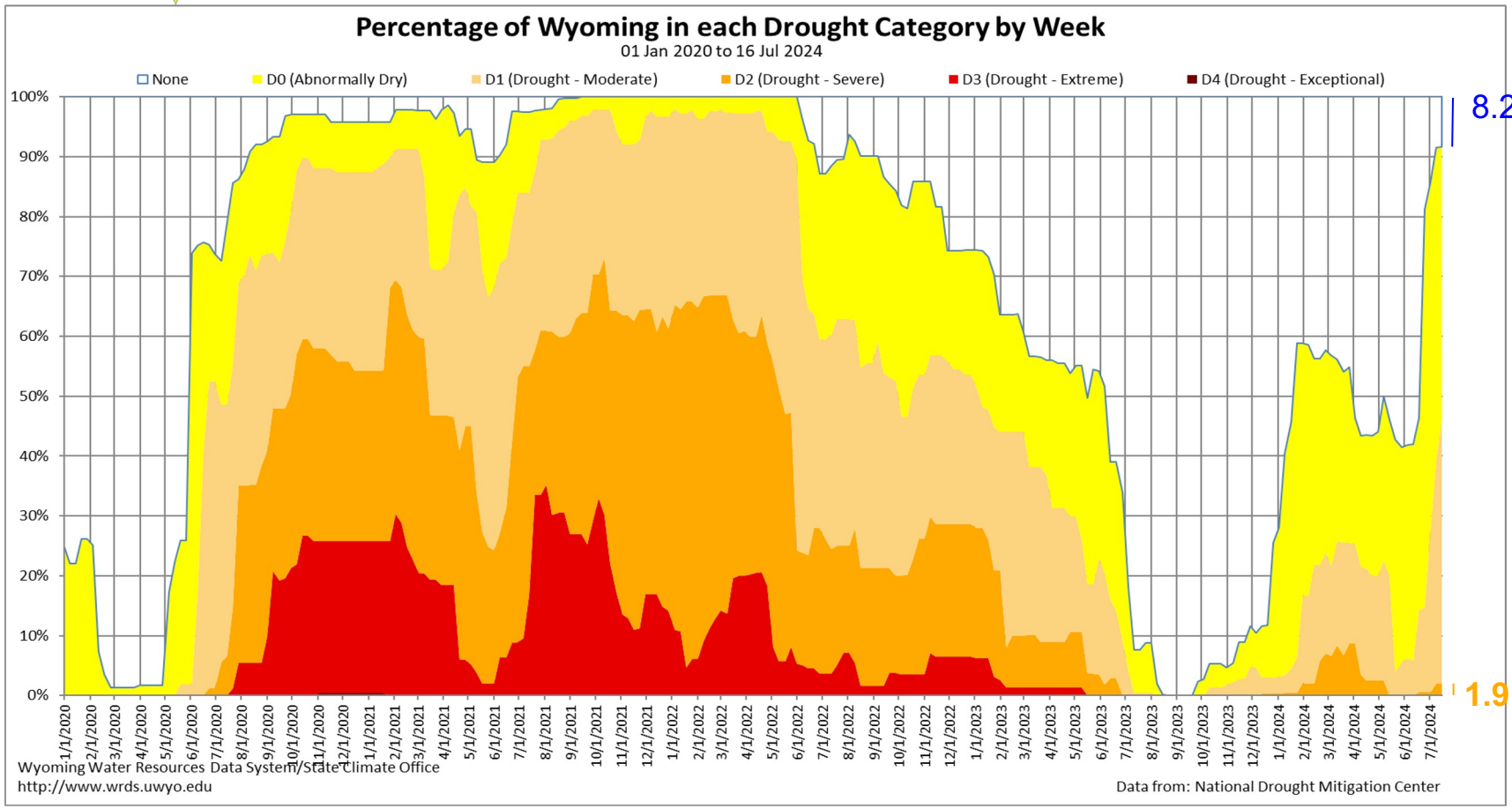
WRDS
Water Resources Data System

Wyoming Area Affected: 91.71% D0-D4 ; 46.13% D1-D4



http://www.wrds.uwyo.edu/drought/droughttimeline.html

WRDS
Water Resources Data System



http://www.wrds.uwyo.edu/drought/droughttimeline.html

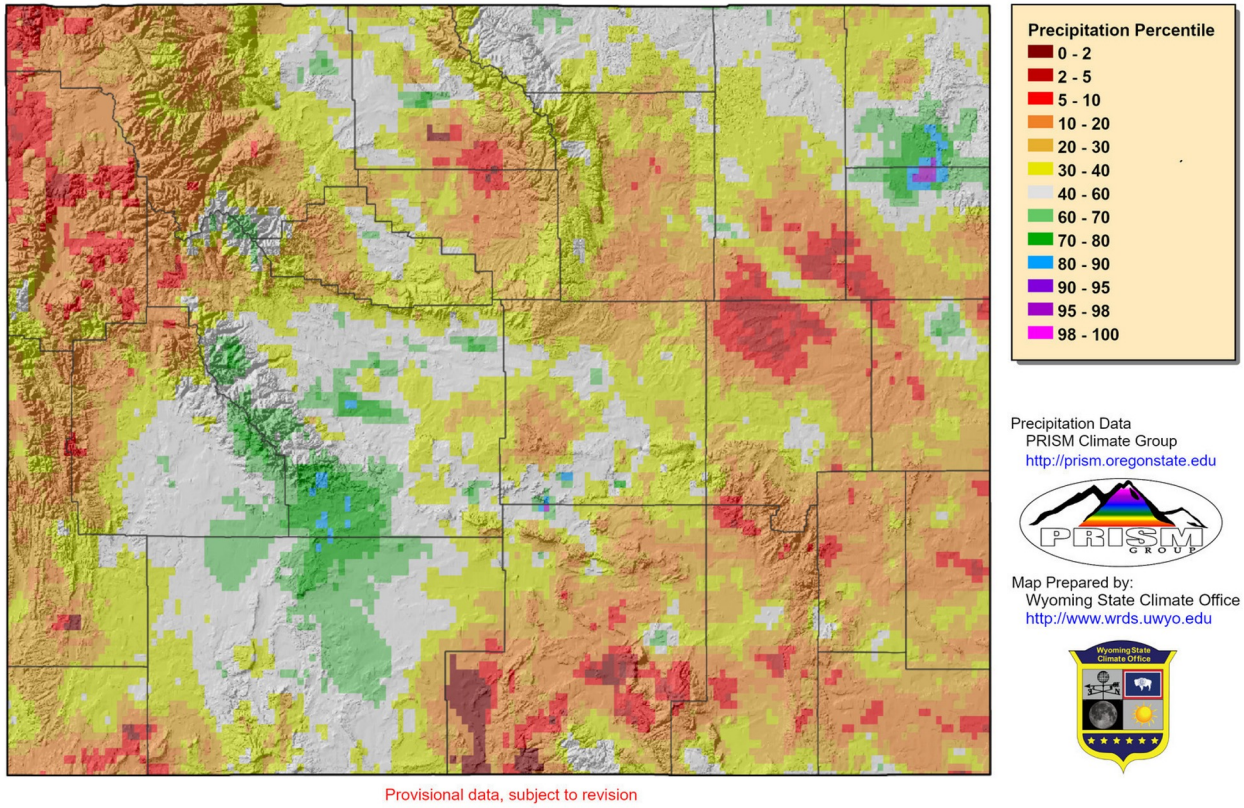
14-Day Precipitation Percentile (04 Jul 2024 to 17 Jul 2024)

Above Median:

- Some areas of the Southwest Quarter along with southern Crook/northern Weston counties

Below Median (Areas of Concern):

- Southeast, Far Southwest, Carbon County, North Central



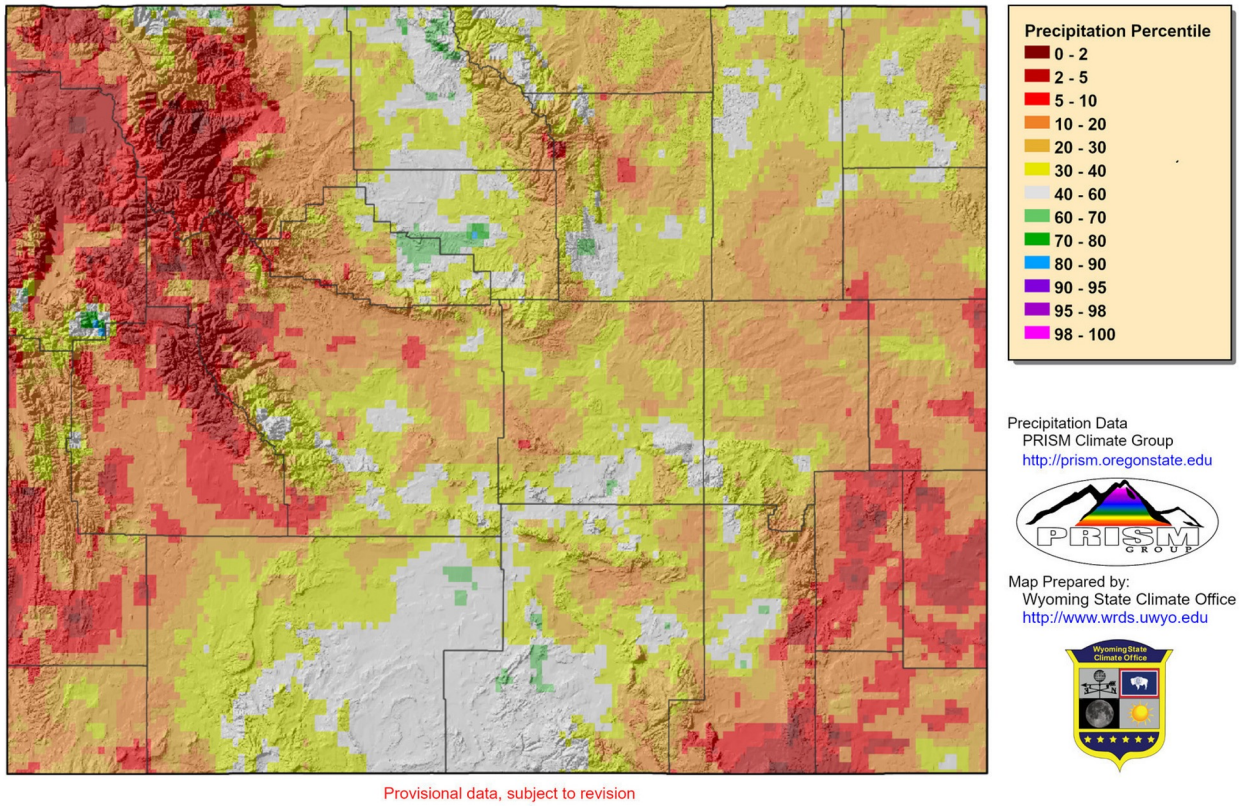
90-Day Precipitation Percentile (19 Apr 2024 to 17 Jul 2024)

At or Above Median:

- Scattered areas in south central and north central

Below Median (Areas of Concern):

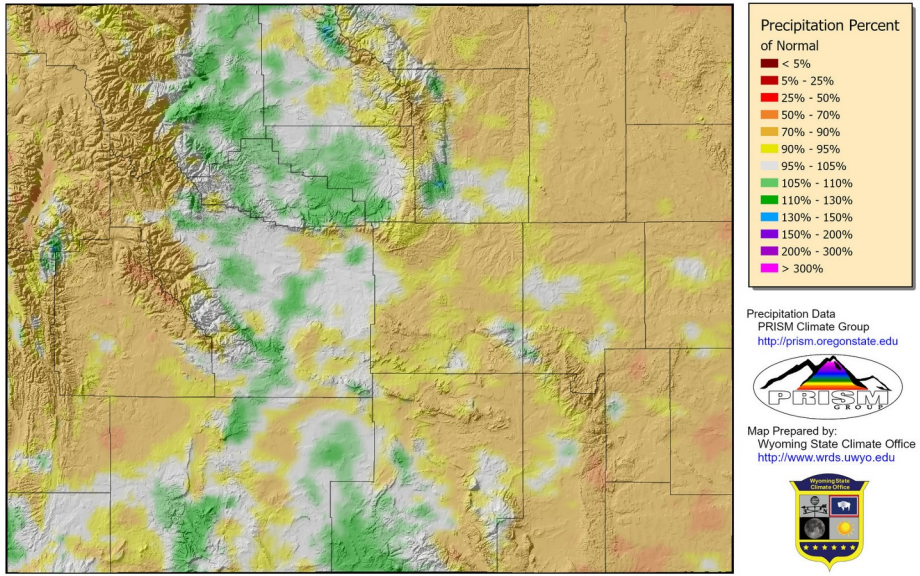
- East, especially southeast
- West



“Year”-to-Date Precipitation (Percent of Average)

Current Water Year

Water-Year Precipitation (Percent of 1991-2020 Average) for 01 Oct 2023 to 17 Jul 2024

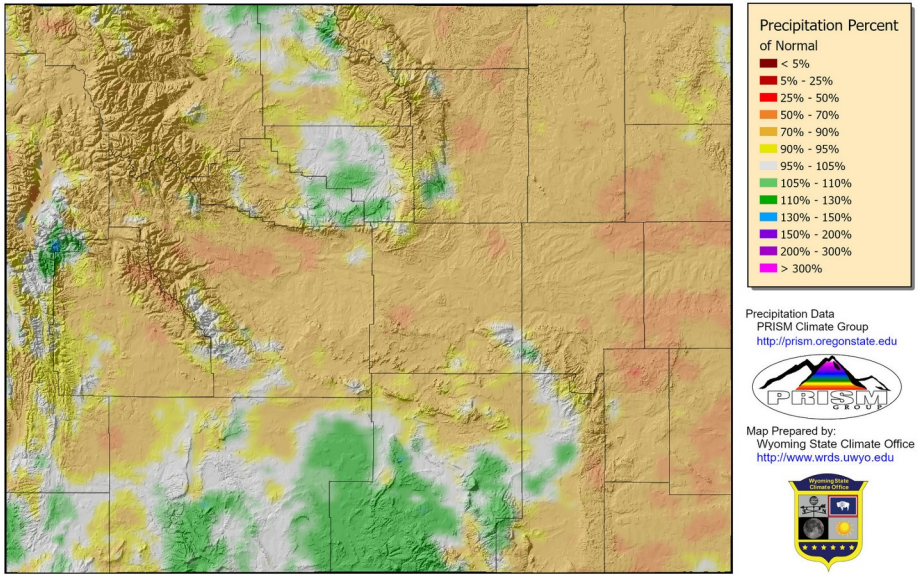


Provisional data, subject to revision

Monthly and Normal precipitation data from PRISM Climate Group, Copyright ©2024, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu
Map Created 18 Jul 2024 http://www.wrds.uwyo.edu
Daily averages created from PRISM daily precipitation grids

Current Calendar Year

Calendar-Year Precipitation (Percent of 1991-2020 Average) for 01 Jan 2024 to 17 Jul 2024



Provisional data, subject to revision

Monthly and Normal precipitation data from PRISM Climate Group, Copyright ©2024, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu
Map Created 18 Jul 2024 http://www.wrds.uwyo.edu
Daily averages created from PRISM daily precipitation grids

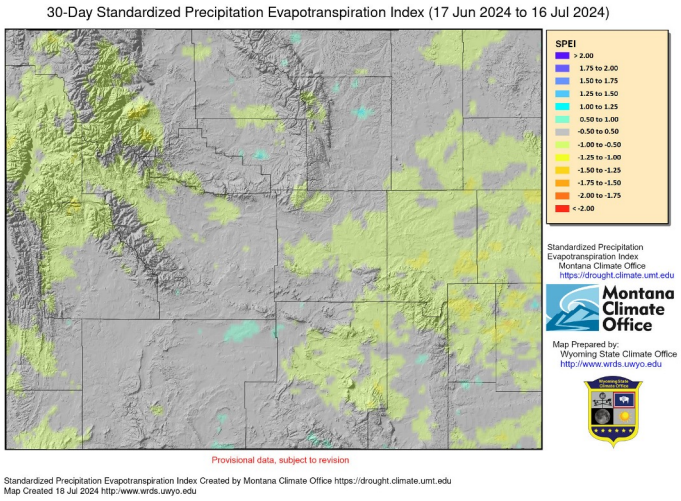
Note: a water year is October 1 through September 30 of the following year.

WRDS Water Resources Data System

Standardized Precipitation Evapotranspiration Index (SPEI)

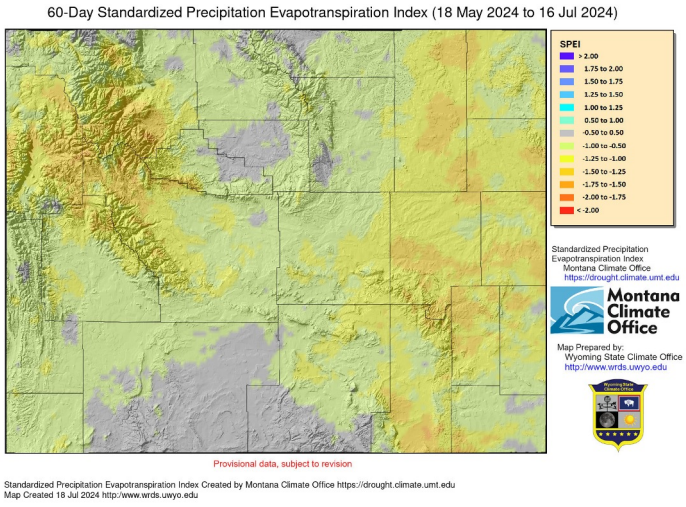
30-Day →

Jun 17 - Jul 16



60-Day →

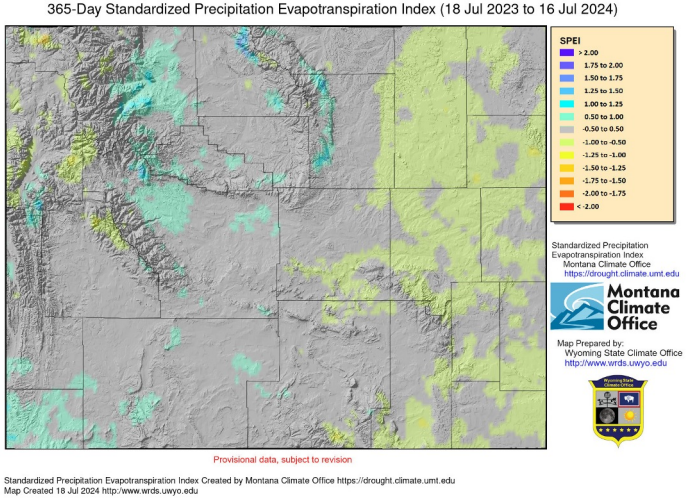
May 18 - Jul 16



Short term: Dryness emerging statewide, but tempered in the near term. 60-Day showing drier conditions in the east and northwest, lesser intensity at the 30-Day.

Long term: Fairly neutral statewide, some slightly moist in north central and southeast, and some areas of dryness in the east.

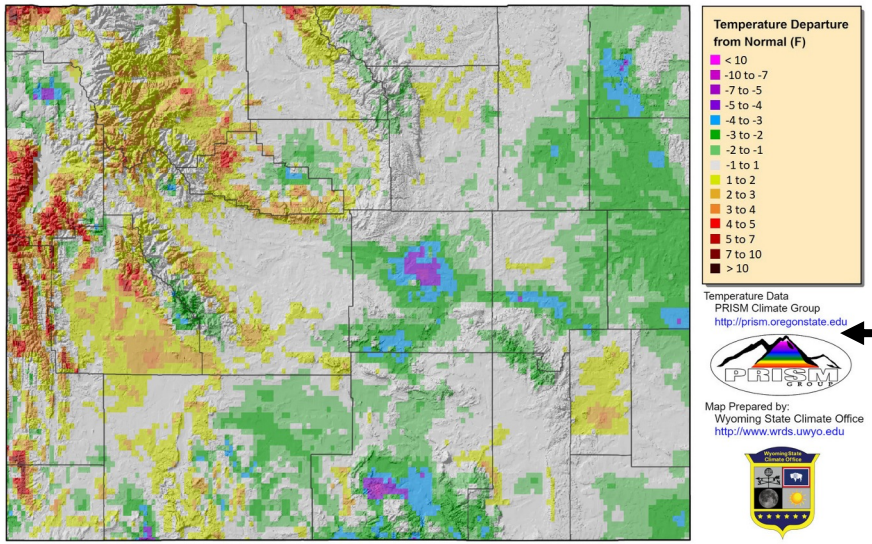
1-Year →



14-Day Average Minimum Temperature (04 Jul to 17 Jul)

- All but highest elevation areas seeing mins >= 32F
- Warmest in East, Powder, Bighorn, and Lower Wind River Basins

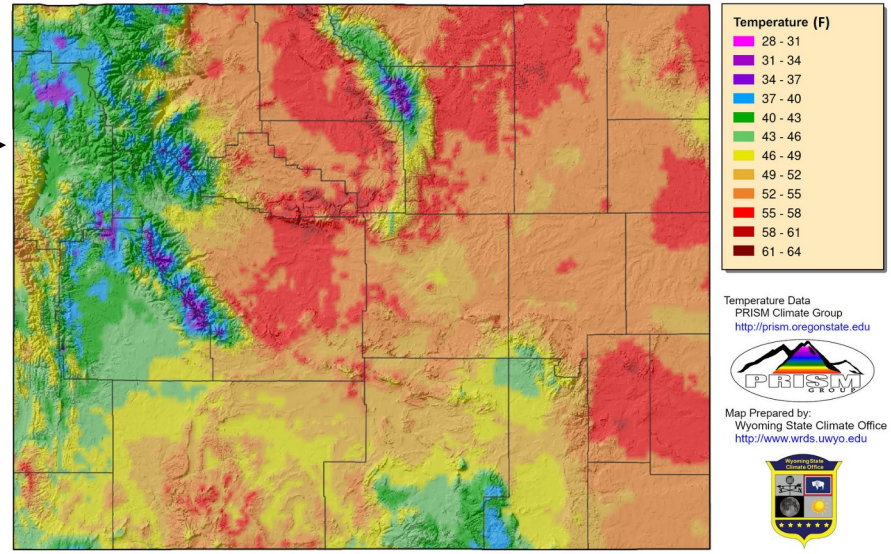
14-Day Minimum Temperature (Departure from 1991-2020 Normal) for 04 Jul 2024 to 17 Jul 2024



Provisional data, subject to revision

Daily Temperature data from PRISM Climate Group, Copyright ©2021, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu
Map Created 18 Jul 2024 Wyoming State Climate Office http://www.wrds.uwyo.edu
Daily departures created from PRISM daily precipitation grids

14-Day Average Minimum Temperature for 04 Jul 2024 to 17 Jul 2024



Provisional data, subject to revision

Daily Temperature data from PRISM Climate Group, Copyright ©2021, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu
Temperature averages created from PRISM daily temperature grids
Map Created 18 Jul 2024 http://www.wrds.uwyo.edu

14-Day *Departure from* Normal Average Minimum Temperature

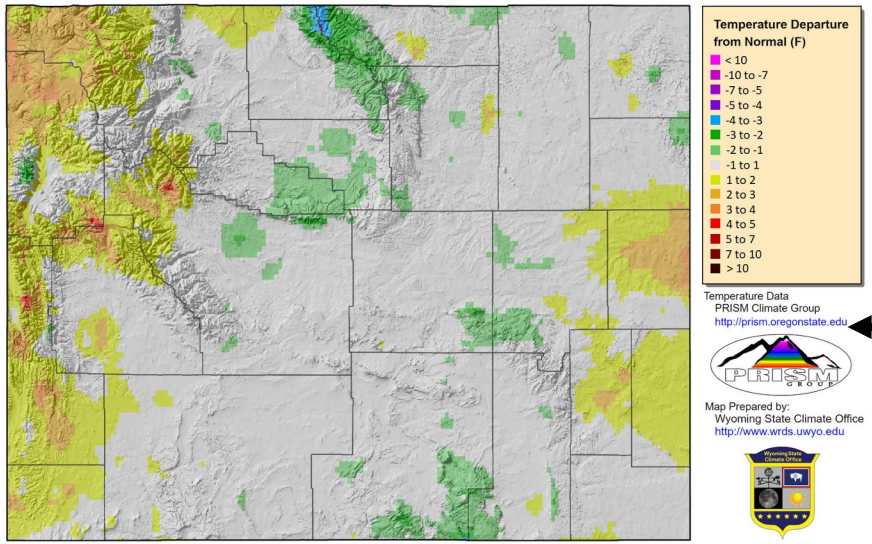
- Western Mountains, Upper Green 2-5F above average
- South central, Natrona Co, Eastern NE 1-3F below average with pockets to as much as 5F below average
- Remainder +/-1F of average

WRDS Water Resources Data System

14-Day Average Maximum Temperature (04 Jul to 17 Jul)

- Highs 70F & above except for higher elevations
- Platte/Goshen, Weston/Niobrara, Wind Basin in Upper-80s+

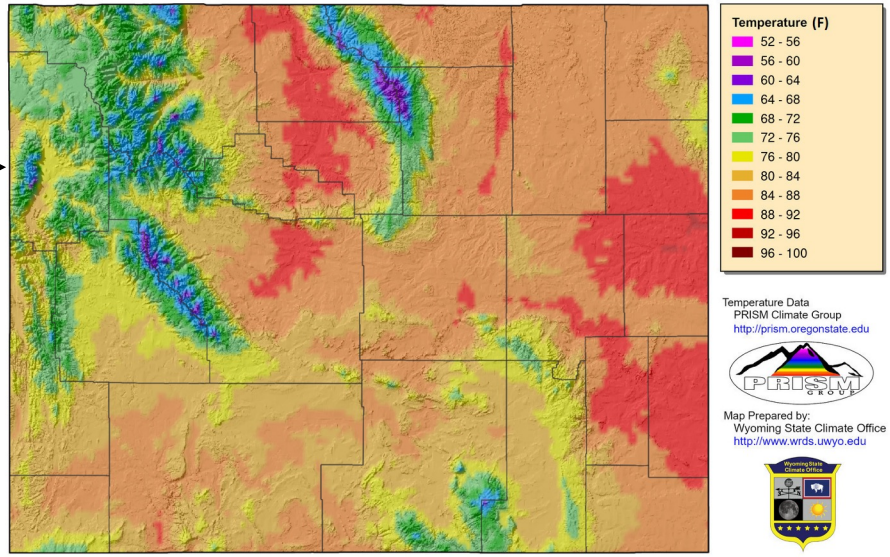
14-Day Maximum Temperature (Departure from 1991-2020 Normal) for 04 Jul 2024 to 17 Jul 2024



Provisional data, subject to revision

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Map Created 18 Jul 2024 Wyoming State Climate Office http://www.wrds.uwyo.edu
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14-Day Average Maxmimum Temperature for 04 Jul 2024 to 17 Jul 2024



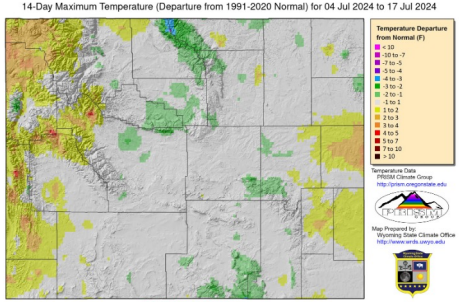
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Temperature averages created from PRISM daily temperature grids
Map Created 18 Jul 2024 http://www.wrds.uwyo.edu

14- Day *Departure from* Normal Average Maximum Temperature

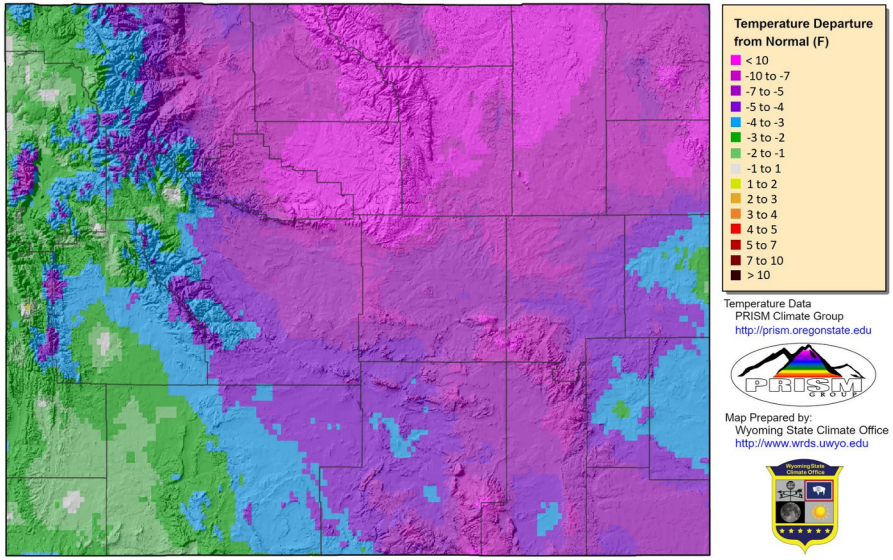
- Northern Bighorns 3 to 4F below average
- Scattered central pockets 1 to 2F below average
- West and some East Central 1 to 4F above average

7-Day Maximum Temperature Departure from Normal



04 Jul 2024 to 10 Jul 2024

7-Day Maximum Temperature (Departure from 1991-2020 Normal) for 04 Jul 2024 to 10 Jul 2024

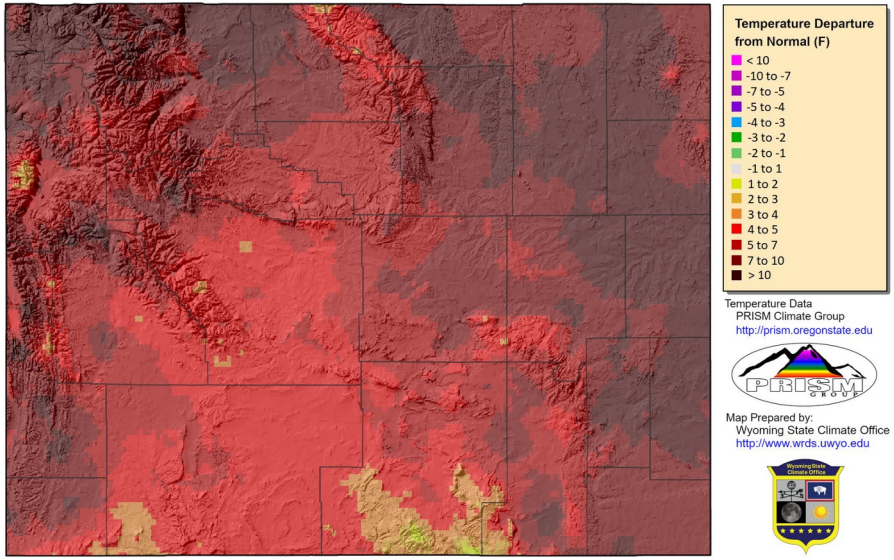


Provisional data, subject to revision

Daily Temperature data from PRISM Climate Group, Copyright ©2021, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu
Map Created 11 Jul 2024 Wyoming State Climate Office http://www.wrds.uwyo.edu
Daily departures created from PRISM daily precipitation grids

11 Jul 2024 to 17 Jul 2024

7-Day Maximum Temperature (Departure from 1991-2020 Normal) for 11 Jul 2024 to 17 Jul 2024

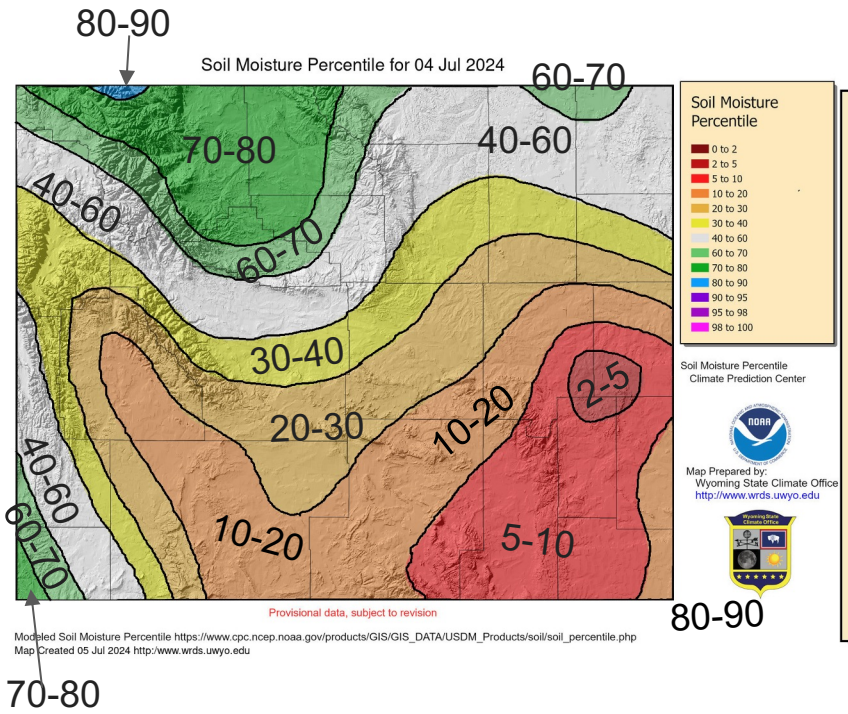


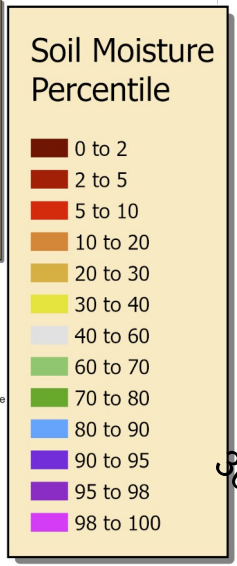
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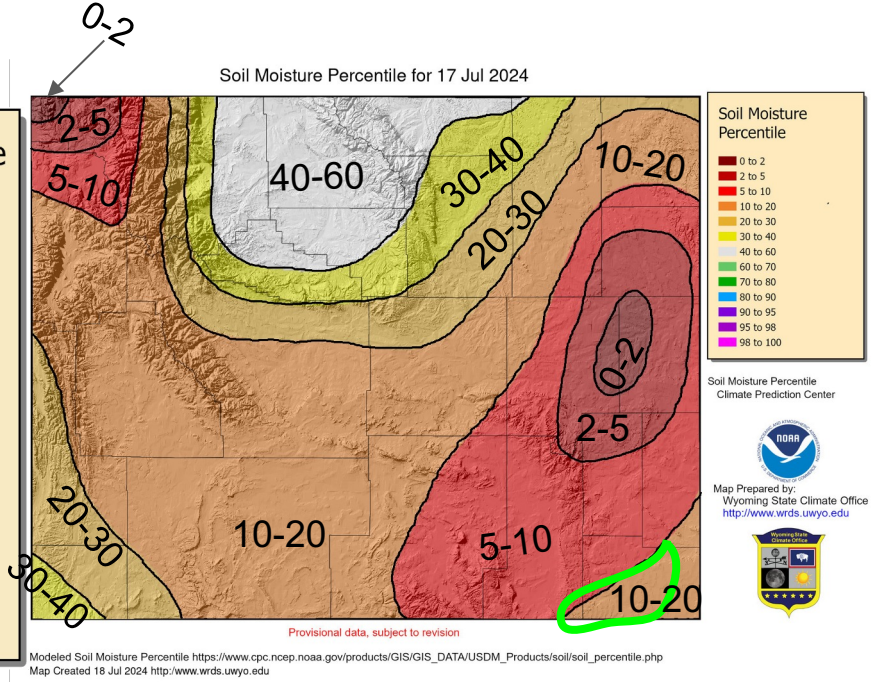
Soil Moisture Percentile

~Two Weeks Ago





17 Jul 2024

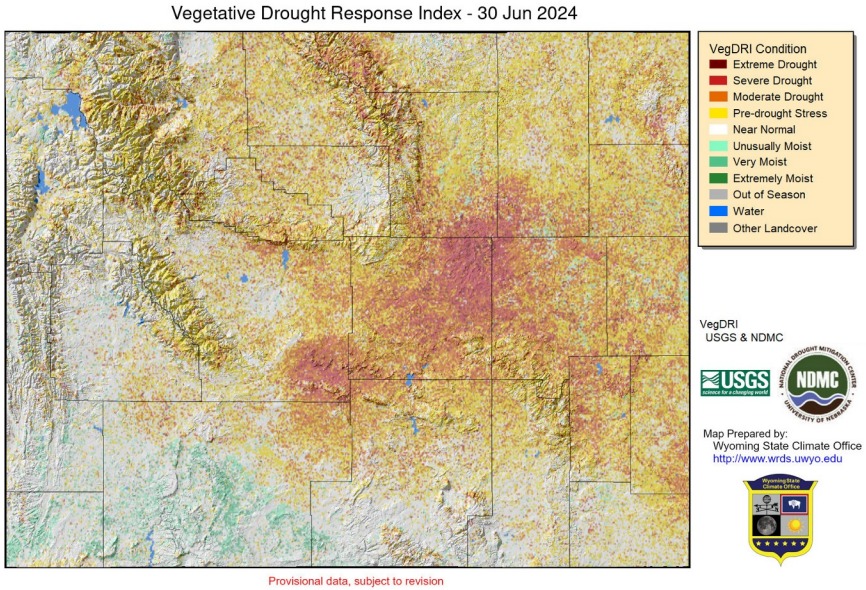


http://www.wrds.uwyo.edu/Soil/Current_SoilMoisture_Ptile.html

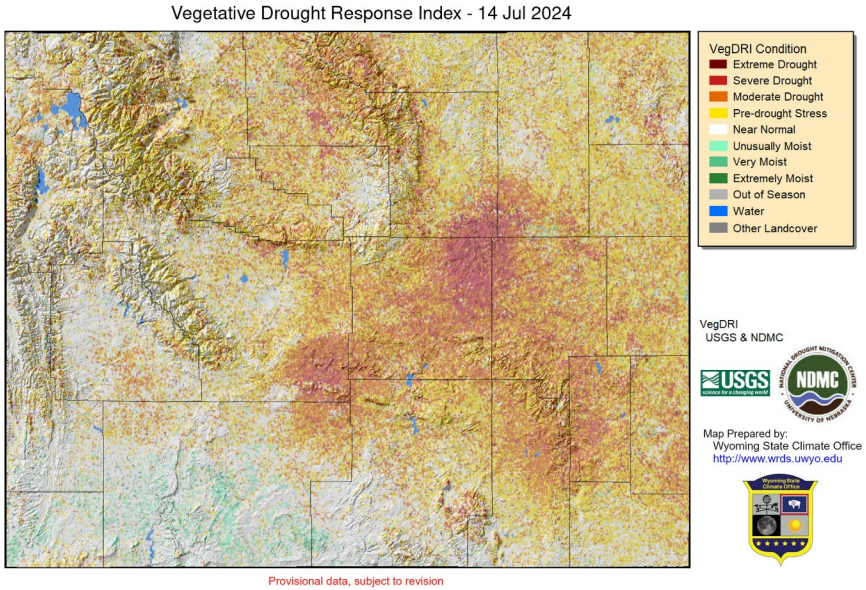
Declines or Status Quo statewide except for very minor improvements in the southeast.

Vegetation Drought Response Index

~Two Weeks Ago



14 Jul 2024

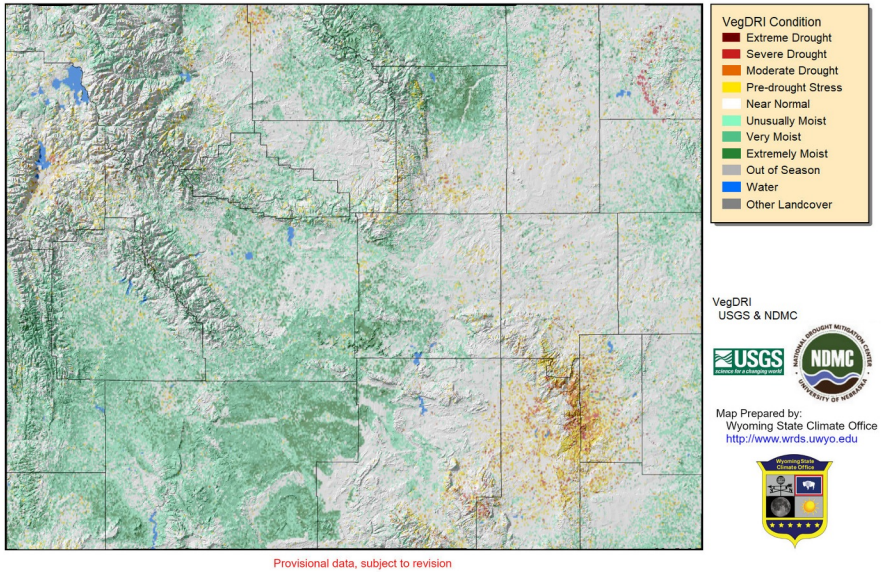


http://www.wrds.uwyo.edu/drought/VegDRI-Current.html

Generally conditions similar to two weeks ago, but a decline in the northern Albany and Platte County areas.

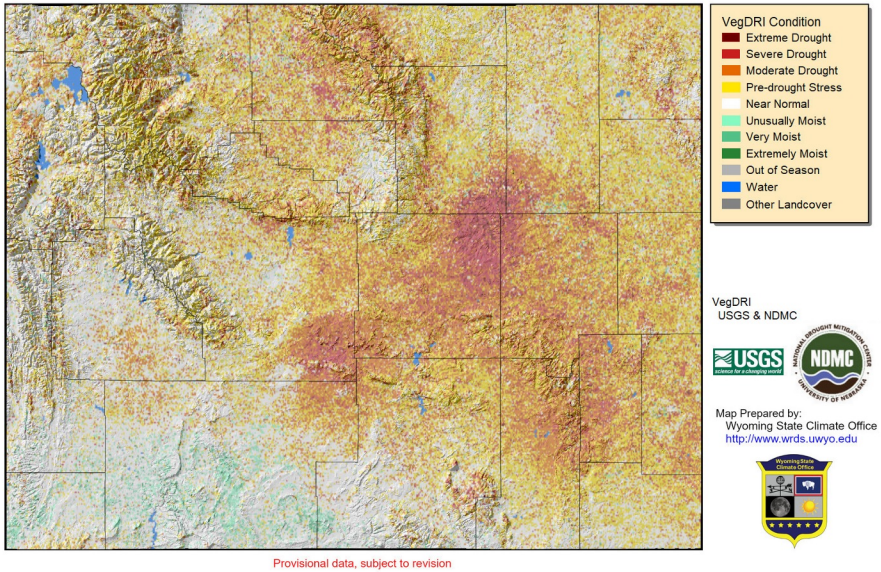
Vegetation Drought Response Index

~One Year Ago



Vegetative Drought Response Index (VegDRI). US Geological Survey and National Drought Mitigation Center
https://doi.org/10.2747/1548-1603.45.1.16
Map created by Wyoming State Climate Office, http://www.wrds.uwyo.edu
Created: 17 Jul 2023

14 Jul 2024



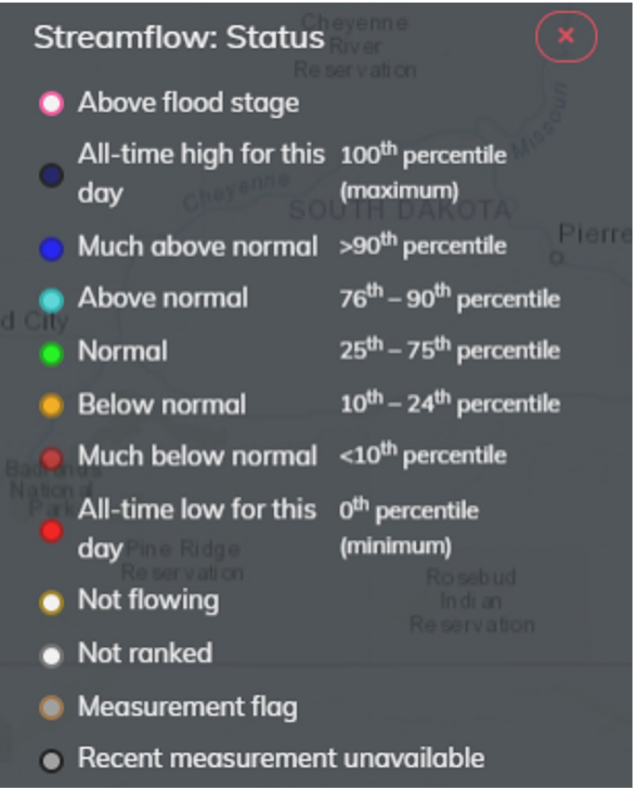
Vegetative Drought Response Index (VegDRI). US Geological Survey and National Drought Mitigation Center
https://doi.org/10.2747/1548-1603.45.1.16
Map created by Wyoming State Climate Office, http://www.wrds.uwyo.edu
Created: 16 Jul 2024

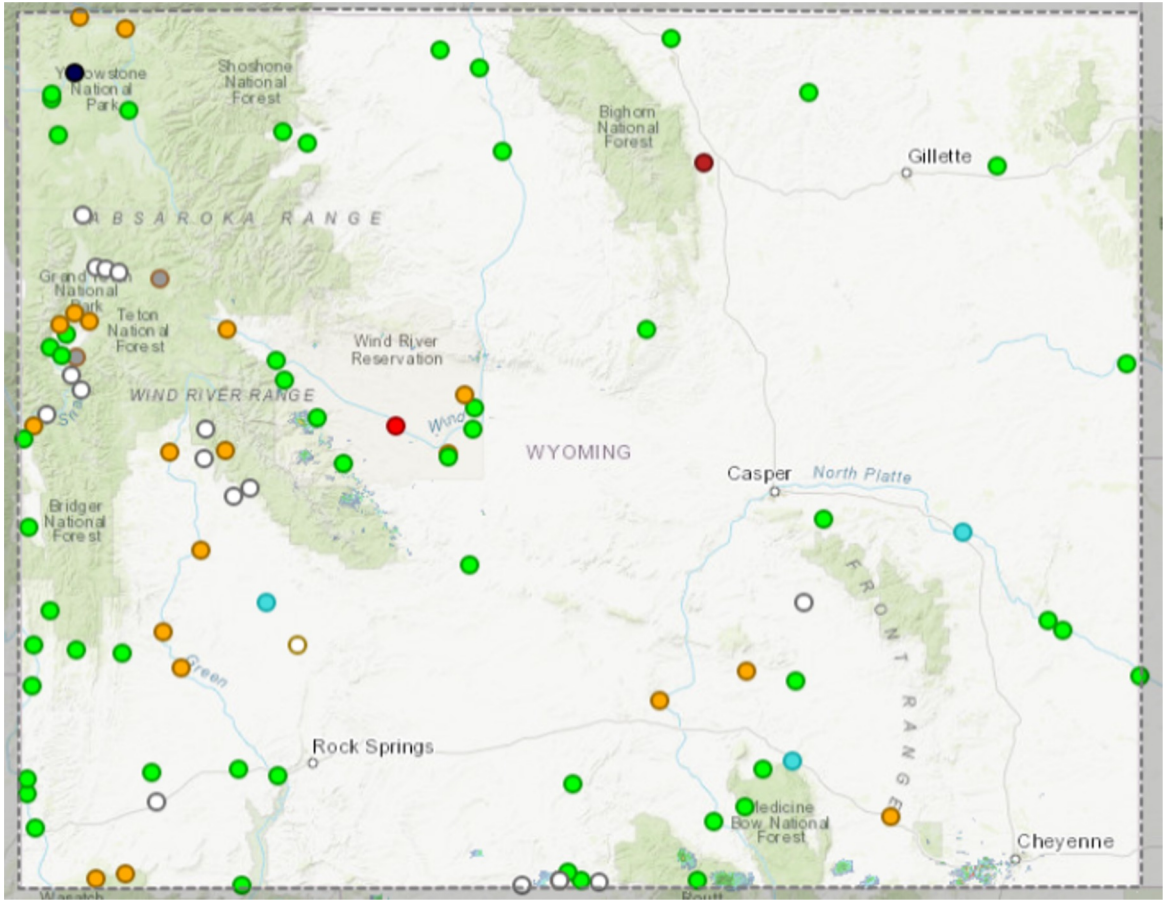
Generally, conditions worse than this time last year statewide.

http://www.wrds.uwyo.edu/drought/VegDRI-Current.html

Current Streamflow Conditions (July 18, 2024)

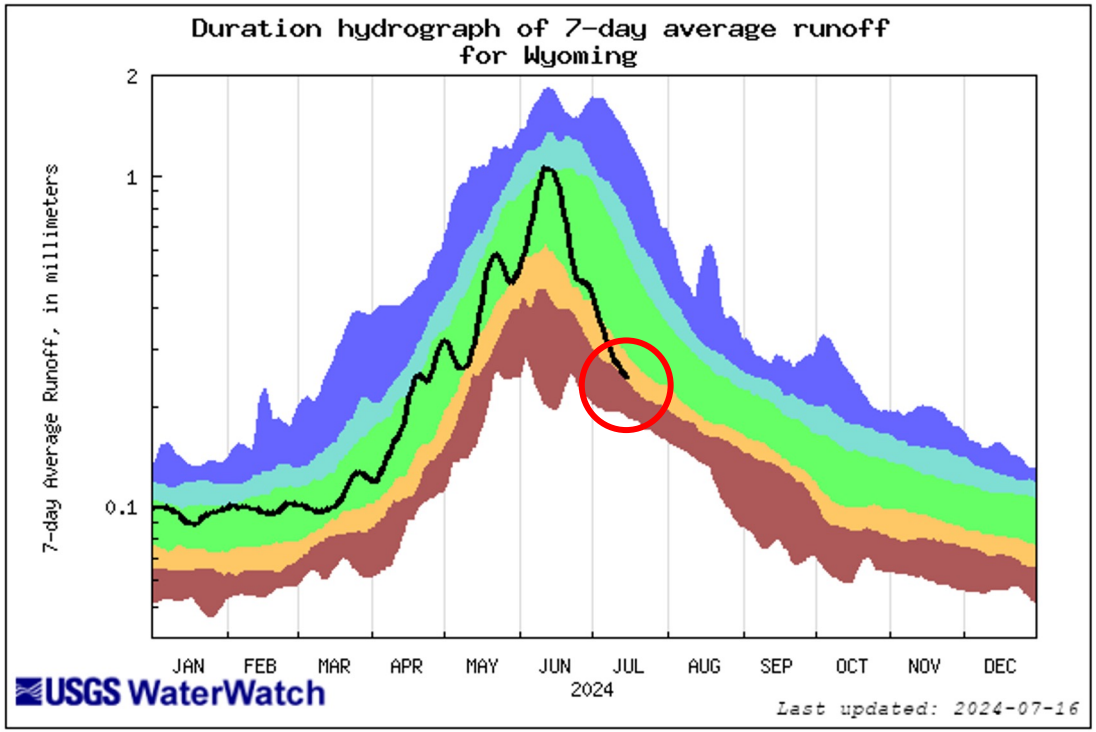
Streamflow Status





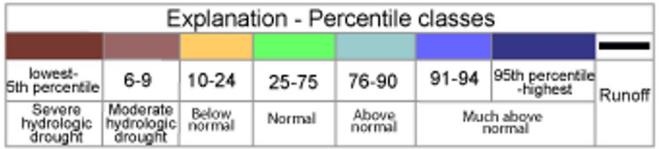
https://dashboard.waterdata.usgs.gov/

WY Duration Hydrograph of 7-day runoff



Post Runoff

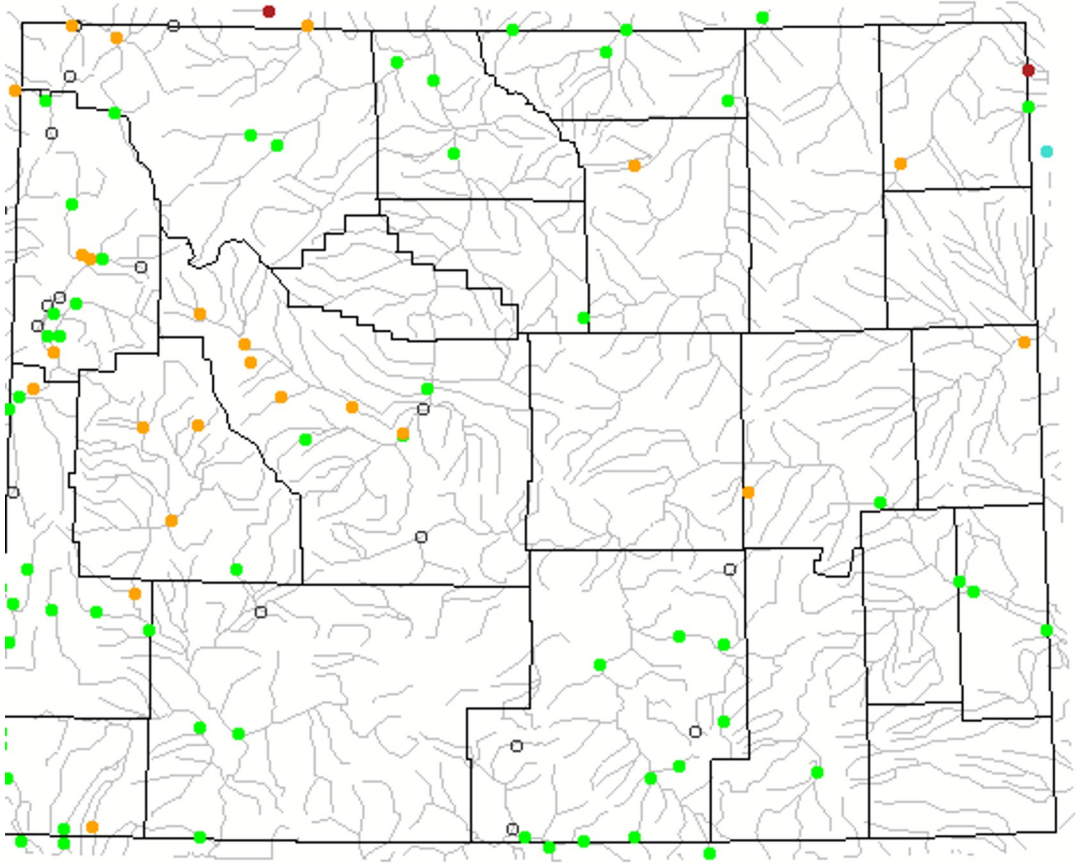
- The peak has past
- “Good” water supply for sites supplied by high mountains
- Transition to summer lower flow for other sites.



https://dashboard.waterdata.usgs.gov/

https://waterdata.usgs.gov/

WY 28-Day Average Flow Compared to Historical



Average June 16 - July 15 Flows

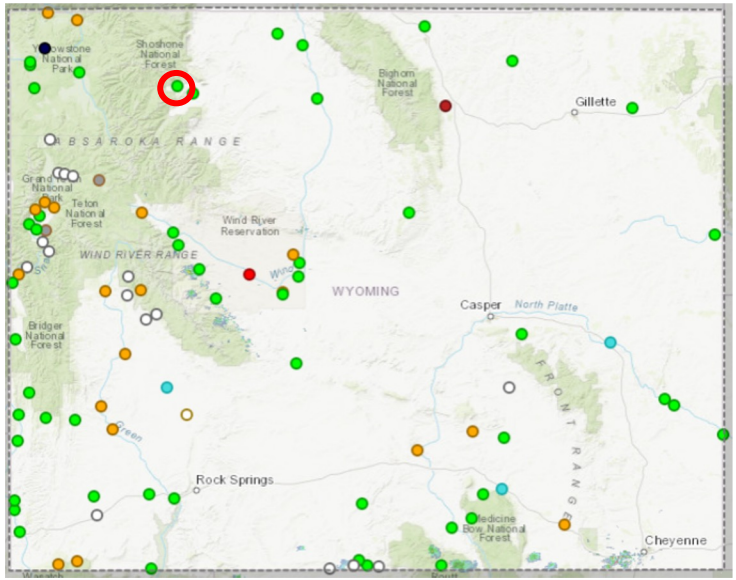
- Indicates conditions after peak runoff
- Most “Normal Sites” are below the median
- Sites around the Wind River Range below 25th percentile

Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
	Much below normal	Below normal	Normal	Above normal	Much above normal		

https://dashboard.waterdata.usgs.gov/

https://waterdata.usgs.gov/

Select WY Streamflows

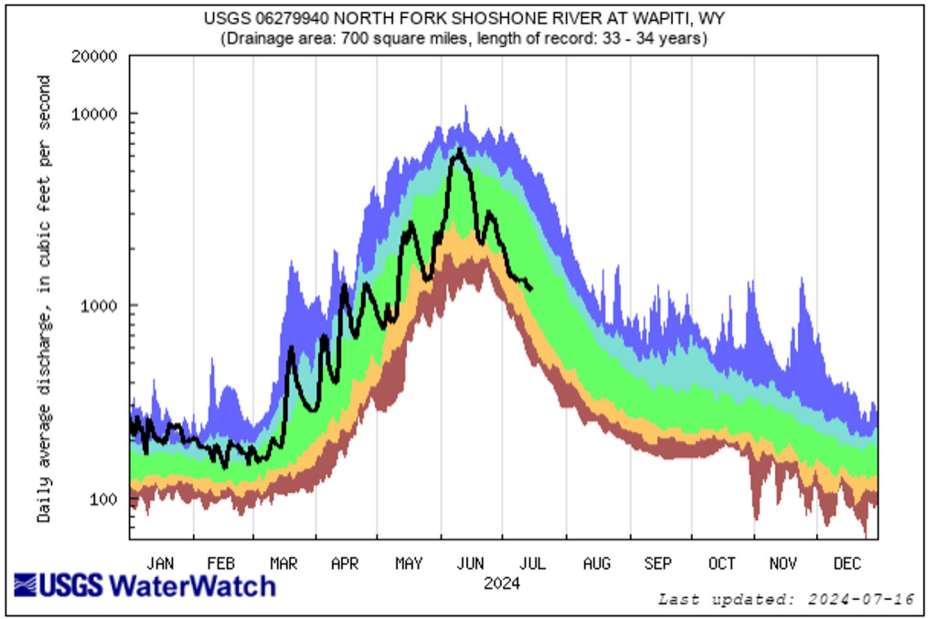


https://dashboard.waterdata.usgs.gov/

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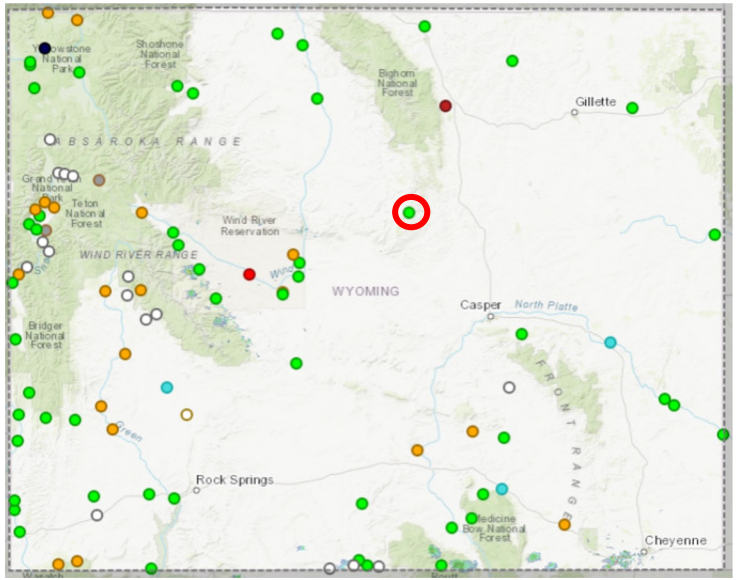
North Fork Shoshone, at Wapiti, WY

July 16, 2024



Explanation - Percentile classes							
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Flow
Much below Normal		Below normal	Normal	Above normal	Much above normal		

Select WY Streamflows

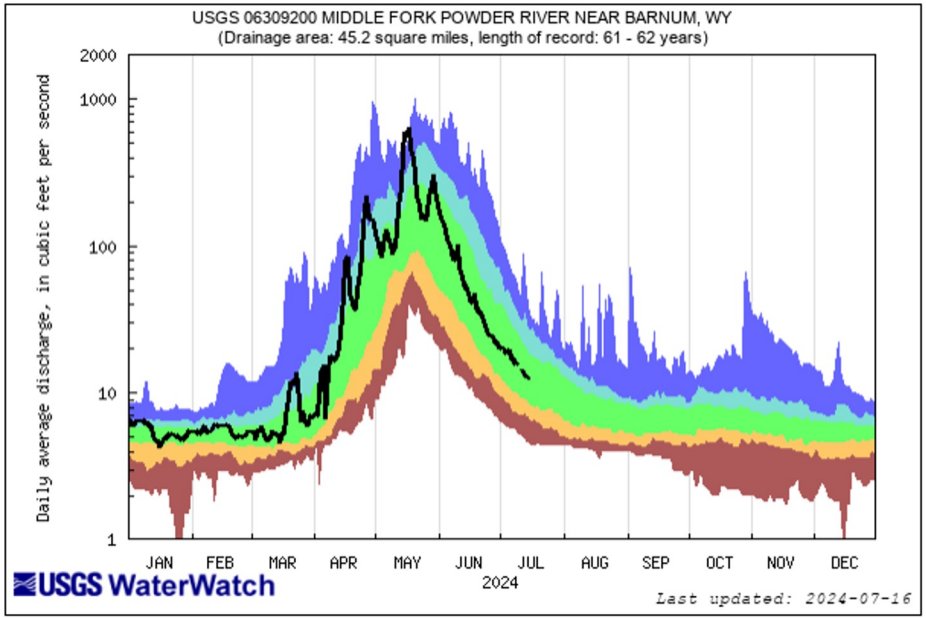


https://dashboard.waterdata.usgs.gov/

https://waterdata.usgs.gov/

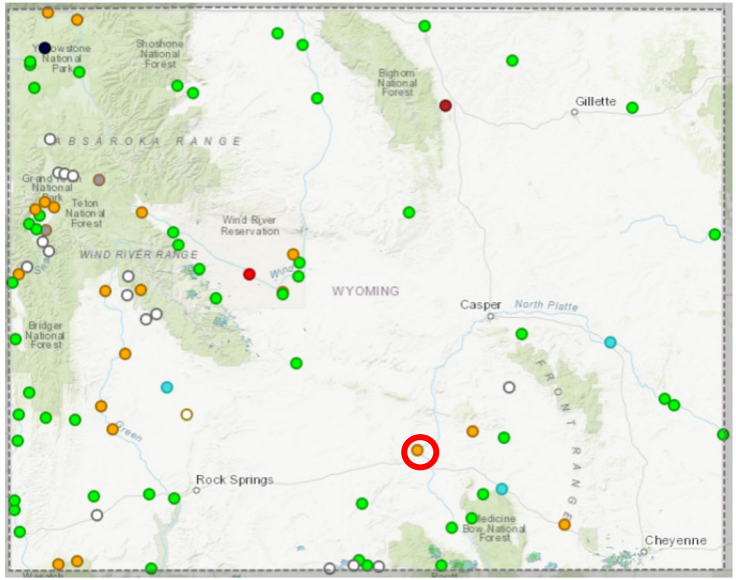
Middle Fork Powder River, Near Barum, WY

July 16, 2024



Explanation - Percentile classes							
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Flow
Much below Normal		Below normal	Normal	Above normal	Much above normal		

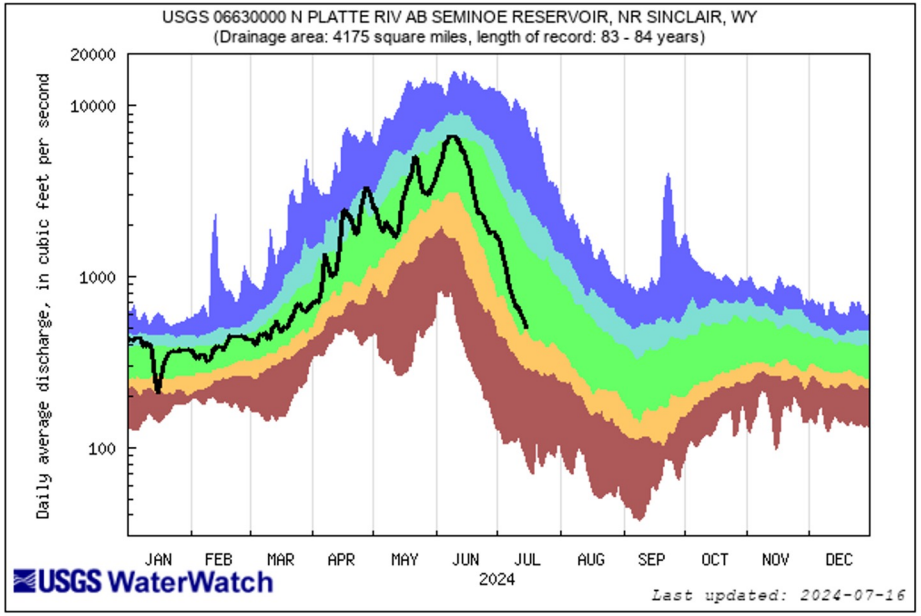
Select WY Streamflows



https://dashboard.waterdata.usgs.gov/

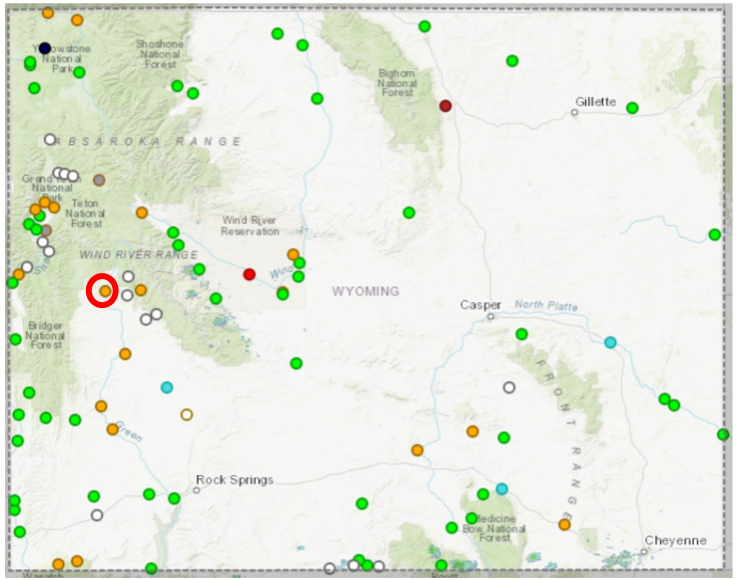
https://waterdata.usgs.gov/

North Platte River above Seminoe Reservoir, Sinclair, WY
July 16, 2024



Explanation - Percentile classes							
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Flow
Much below Normal		Below normal	Normal	Above normal	Much above normal		

Select WY Streamflows

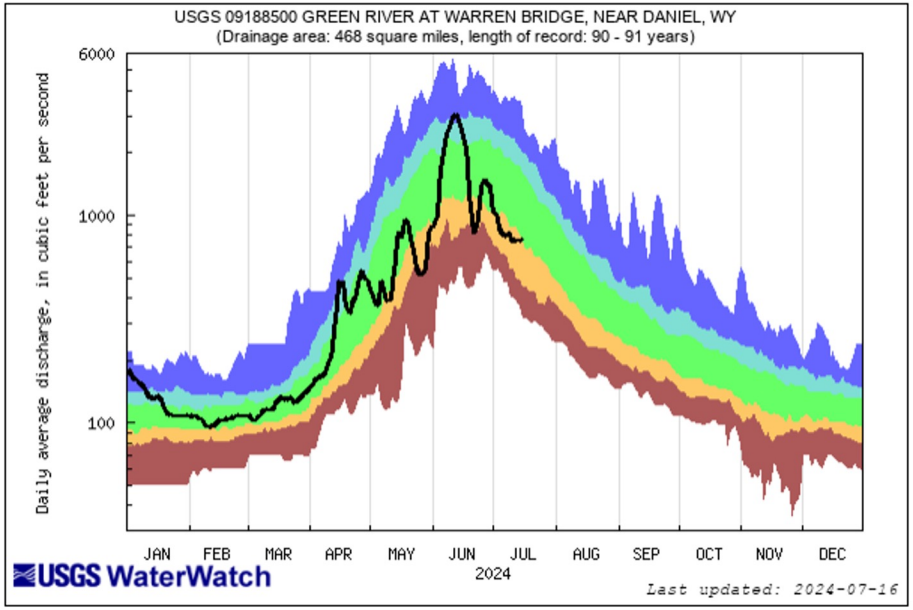


https://dashboard.waterdata.usgs.gov/

https://waterdata.usgs.gov/

Green River at Warren Bridge, Daniel, WY

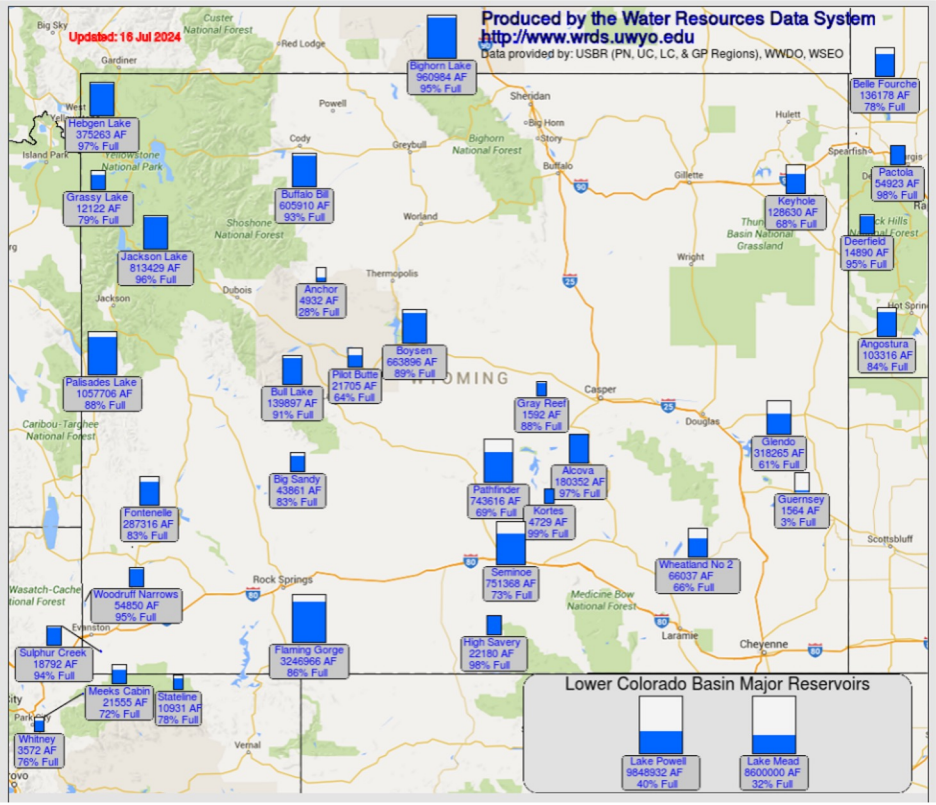
July 16, 2024



Explanation - Percentile classes							
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Flow
Much below Normal		Below normal	Normal	Above normal	Much above normal		

WY Reservoirs

July 18, 2024

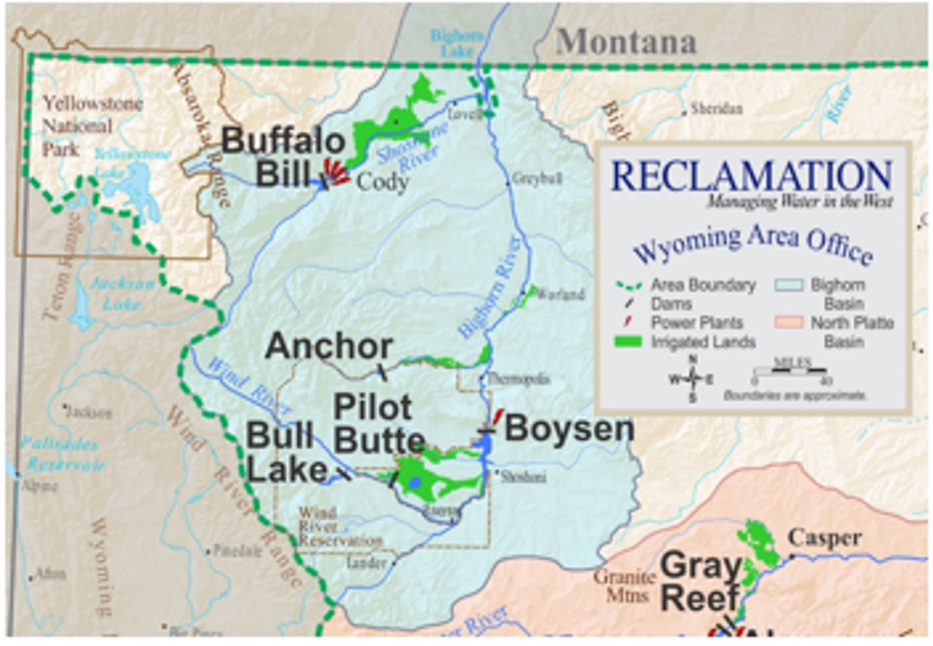


http://www.wrds.uwyo.edu/surface_water/teacups.html

Reservoir Storage

- Minor changes +/- since June 20
- Most major reservoirs in NW are 90% full or more.
- Reservoir in NE/SE are 60 to 90% full.

Current Reservoir Conditions: Bighorn System



Bighorn System (July 16):

Reservoir	Content	Capacity	% of Full	% of Avg	Releases
Bull Lake	139,897	152,500	92%	103%	950 cfs
Buffalo Bill	605,910	646,600	94%	101%	1,300 cfs
Boysen	663,896	741,600	90%	104%	1,300 cfs

— BUREAU OF —
RECLAMATION

BUFFALO BILL RESERVOIR (BBR)

Top	644126 af,	5393.5 ft
Current	605910 af,	5388.4 ft
To fill	38216 af,	5.1 ft
Computed Inflow		1551 cfs
Total Outflow		2183 cfs

1,300 cfs

BOYSEN RESERVOIR (BOYR)

Top	741594 af,	4725.0 ft
Current	663896 af,	4720.9 ft
To fill	77698 af,	4.1 ft
Computed Inflow		843 cfs
Total Outflow		1296 cfs

BULL LAKE (BLR)

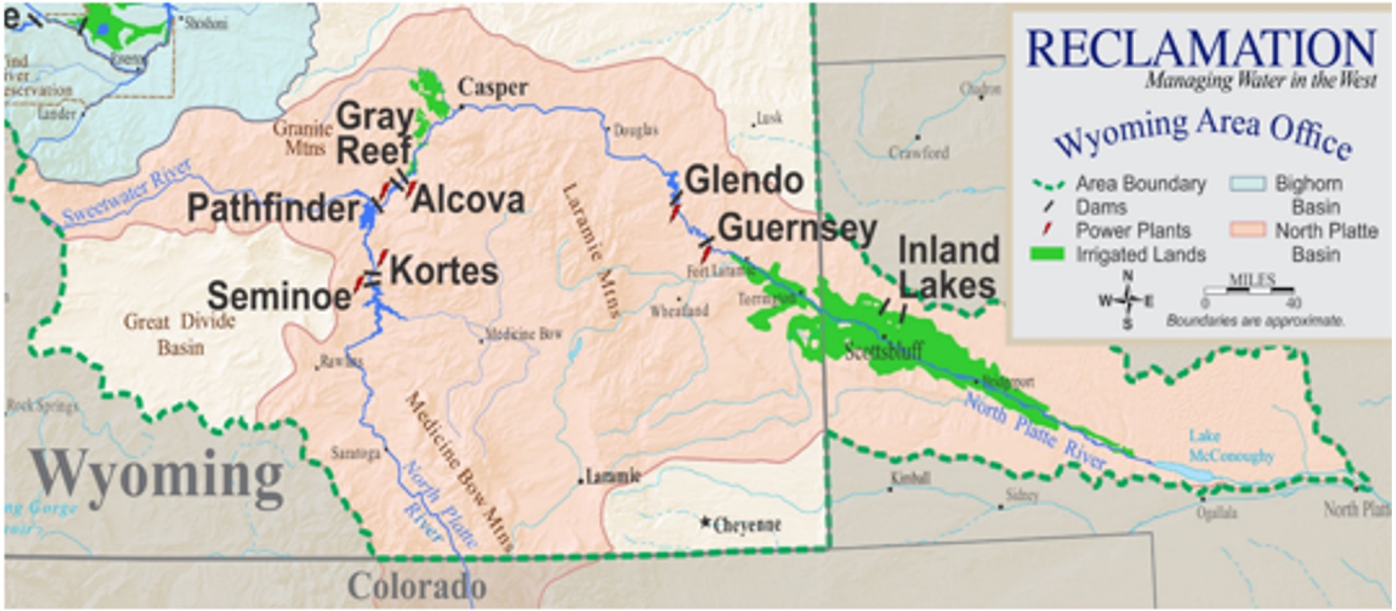
Top	152459 af,	5805.0 ft
Current	139897 af,	5801.0 ft
To fill	12562 af,	4.0 ft
Computed Inflow		592 cfs
Total Outflow		948 cfs

950 cfs

1,300 cfs

Wyoming Area Office Water Order Changes – https://www.usbr.gov/gp/woc/indexwy.html

Current Reservoir Conditions: North Platte System

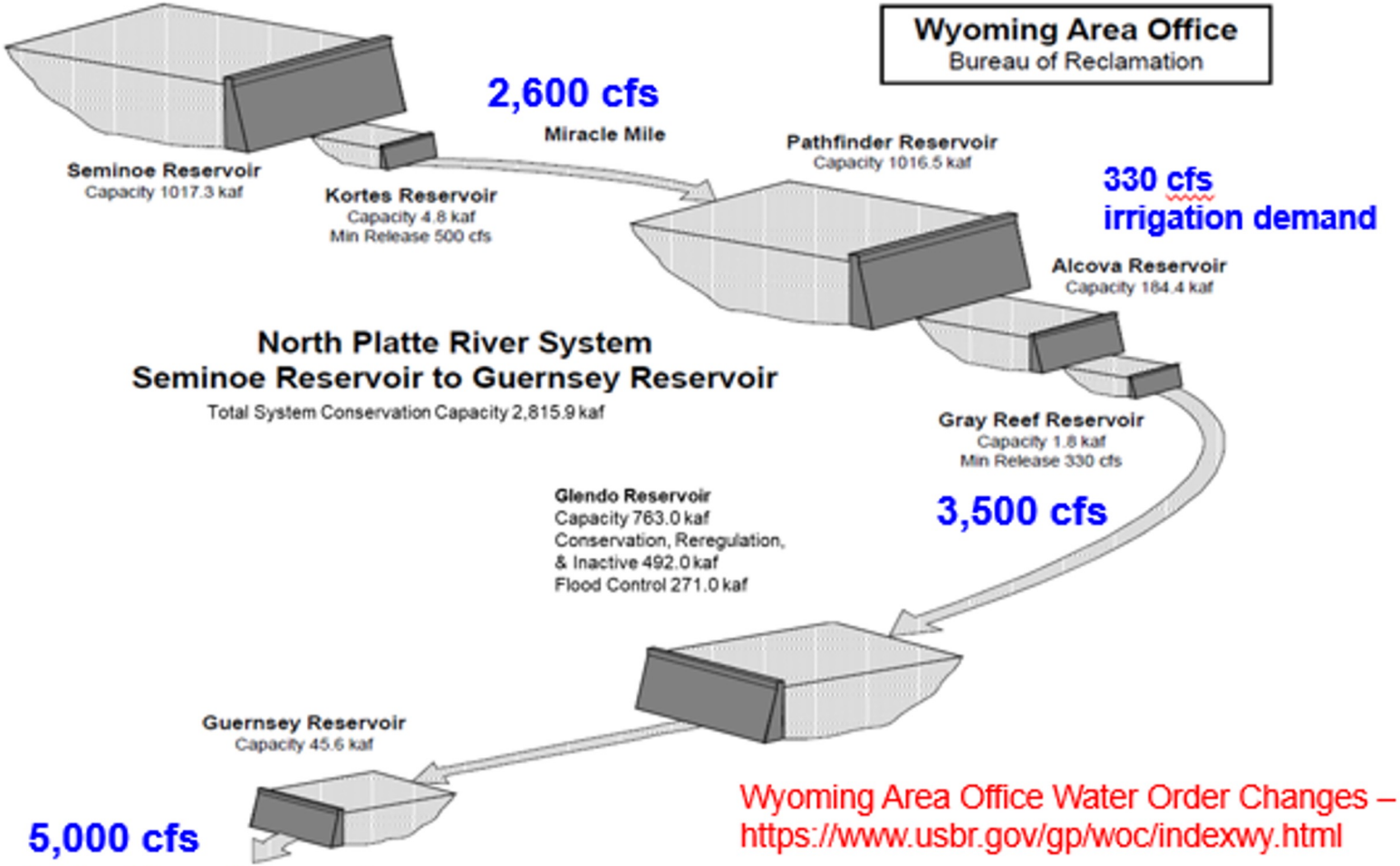


North Platte System (July 16):

Reservoir	Content	Capacity	% of Full	% of Avg
Seminoe	746,920	1,017,300	73%	102%
Pathfinder	740,452	1,070,000	69%	117%
Glendo	315,798	492,000	85%	76%

— BUREAU OF —
RECLAMATION

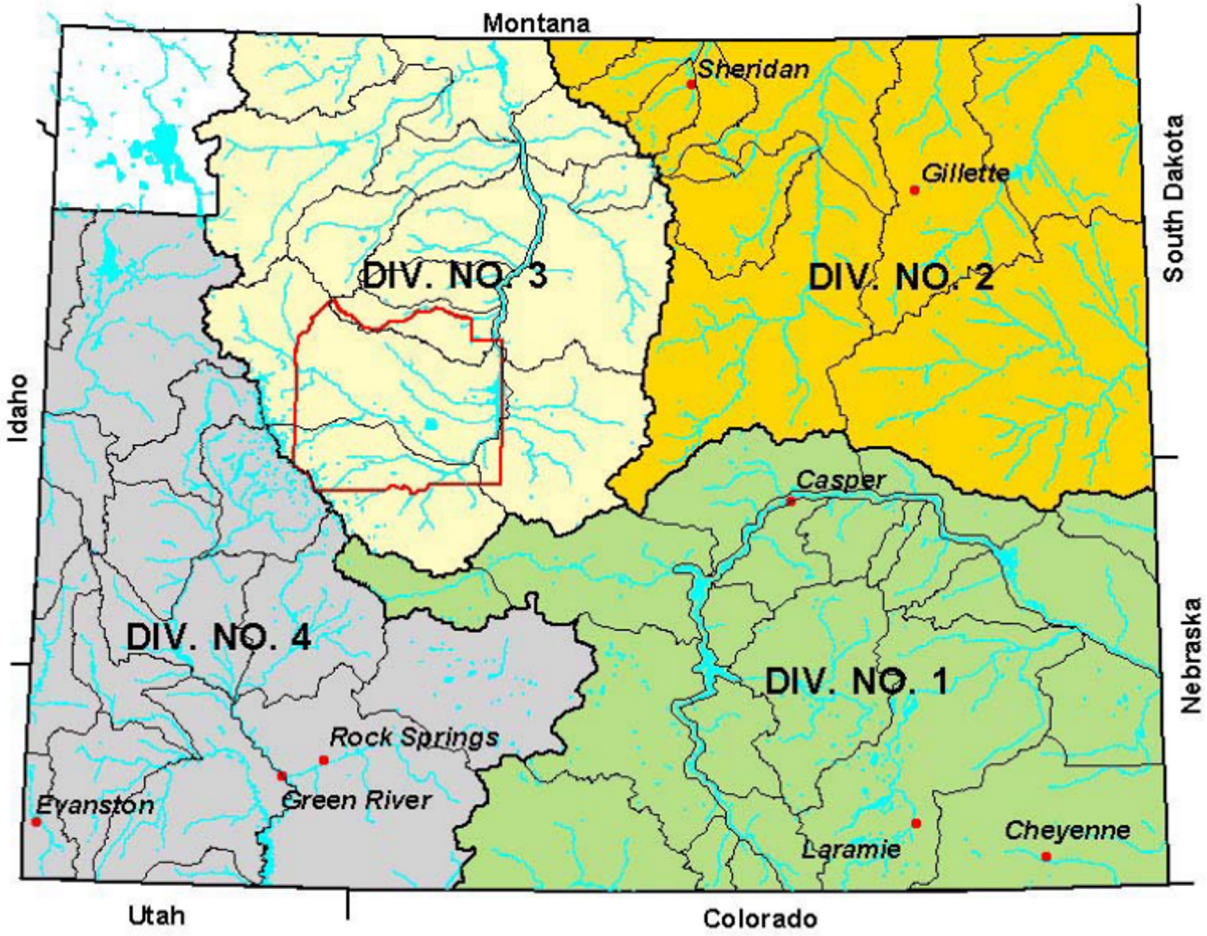
Wyoming Area Office
Bureau of Reclamation



Wyoming Area Office Water Order Changes –
https://www.usbr.gov/gp/woc/indexwy.html

WY SEO Divisions and Superintendents

Contact information for calls and administration



Division 3

Joshua Fredrickson, 856-0747

Division 2

David Schroeder, 674-7012

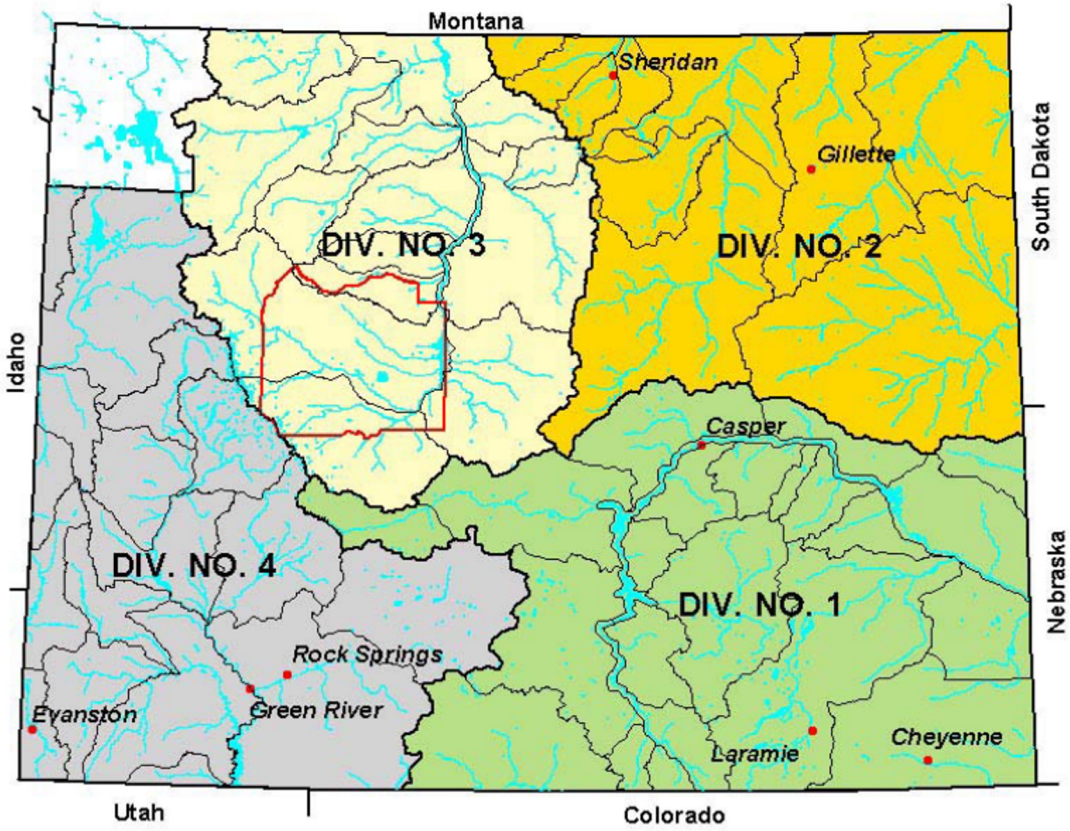
Division 4

Kevin Payne, 279-3441

Division 1

Cory Rinehart, 532-2248

WY SEO Divisions

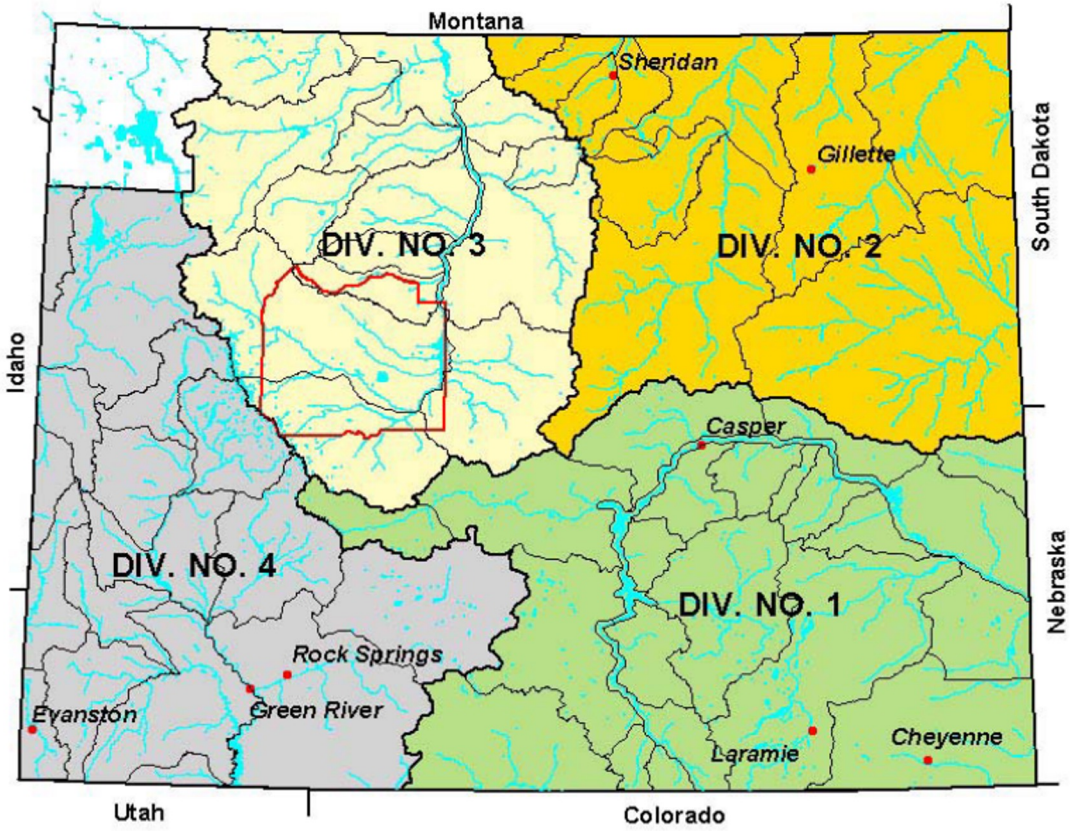


As of July 18,

Streams in **Division 1**:

- **Laramie River District 4A**: regulated to 1898 and 1883 Court Decree
- **Soldier Creek Dist 4A**: reg to 1884
- **Horse Creek Dist 2**: reg to 1884
- **Collins Creek Dist 18**: reg to 1912
- **Sand Creek Dist 4A**: reg to 1897

WY SEO Divisions

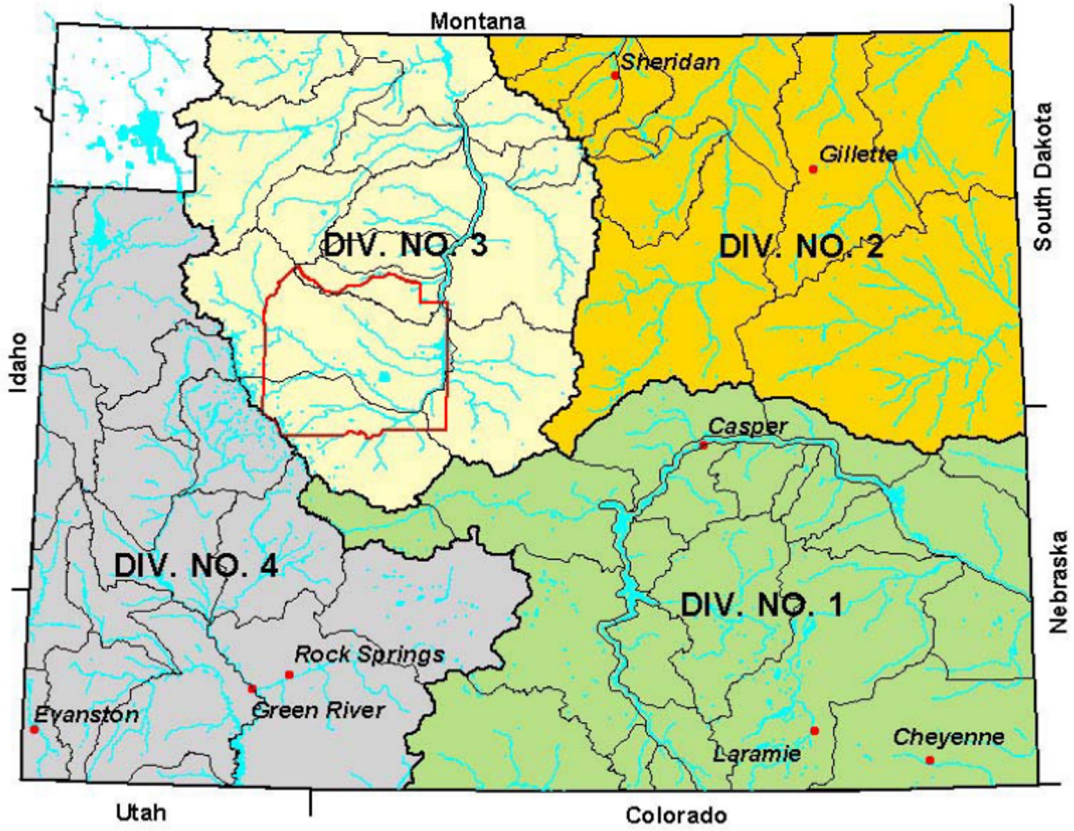


As of July 18,

Streams in **Division 1**:

- **O Bar O Reservoir District 4C**: regulated to 1969
- **Bates Creek Dist 9**: reg to 1886
- **Horseshoe Creek Dist 3**: reg to 1879 and 1880

WY SEO Divisions

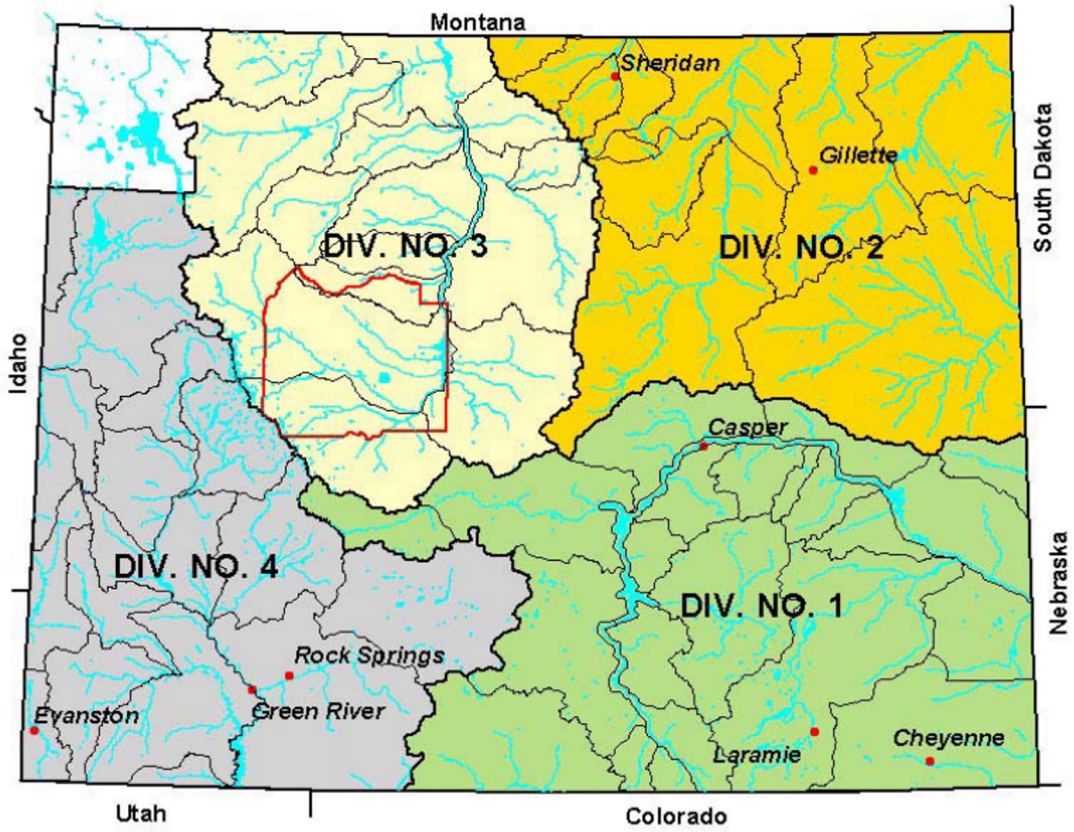


As of July 18,

Streams in **Division 2**:

- **Swaim Draw District 4**: regulated to 2001
- **Little Goose Creek Dist 4**: reg to 1883
- **Belle Fourche River Dist 7**: reg for compact compliance

WY SEO Divisions

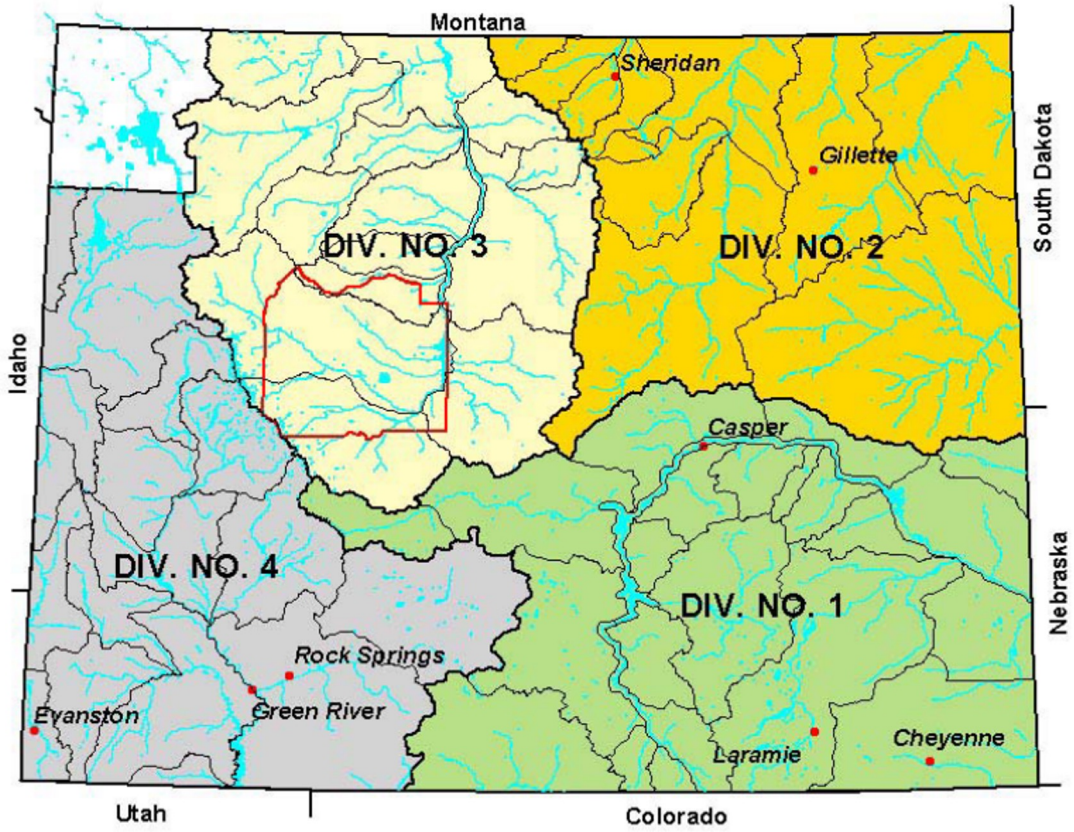


As of July 18,

Streams in **<u>Division 3</u>**:

- **Bennett-Little Rock District 10**: reg to 1900
- **South Fork Owl Creek District 5**: reg to 1868
- **Greybull River District 8**: reg to 1888
- **Owl Creek District 5**: regulated to 1901
- **Gooseberry Creek District 13**: reg to 1906

WY SEO Divisions



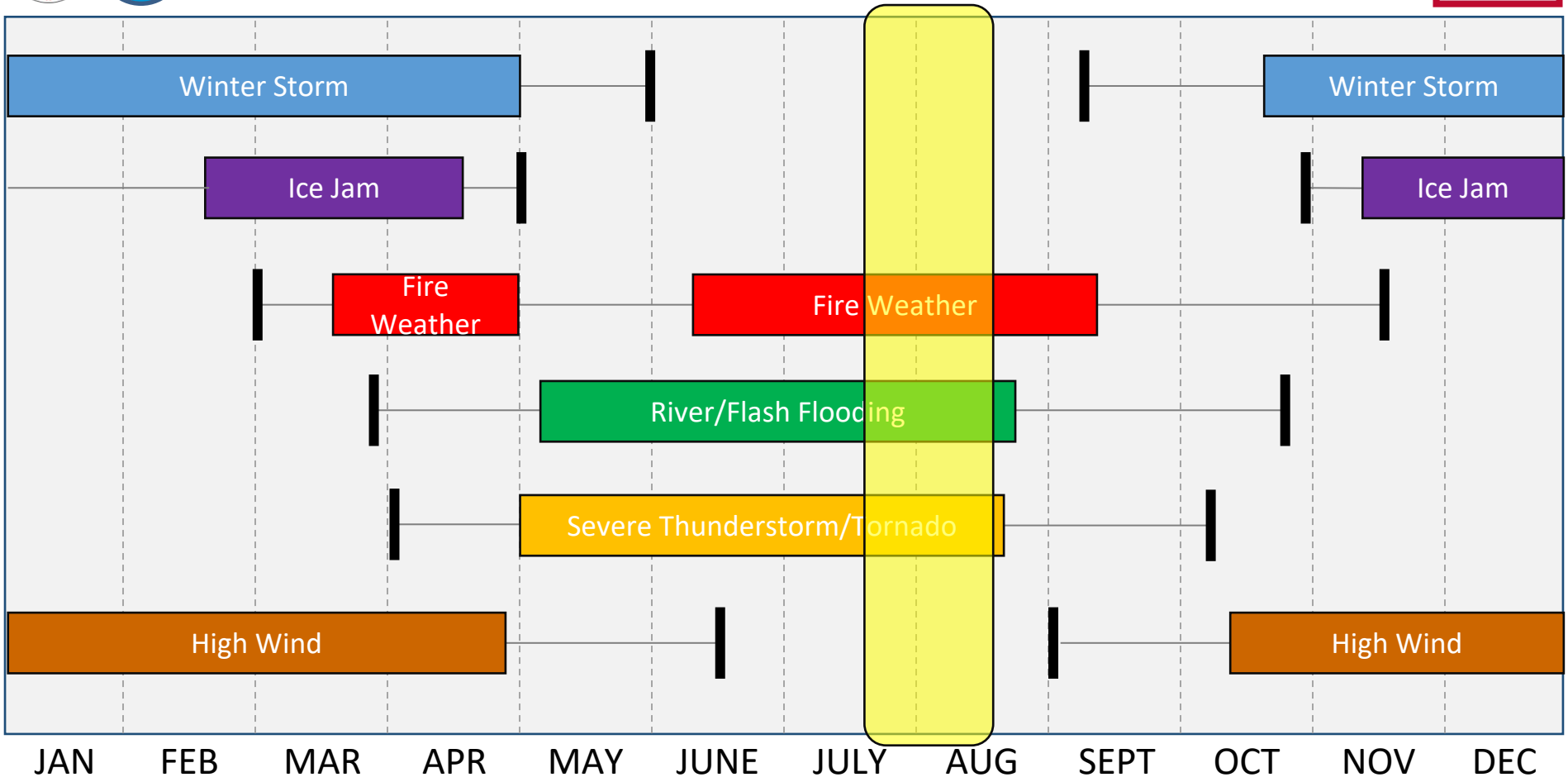
As of July 18,

Streams in **Division 4**:

- **Corral Creek District 9**: reg to 1890
- **Black's Fork River District 15**: reg to 1887
- **South Piney Creek District 10**: reg to 1886
- **Bear River District 4**: reg to 1879
- **Smith's Fork River District 3**: reg to 1910

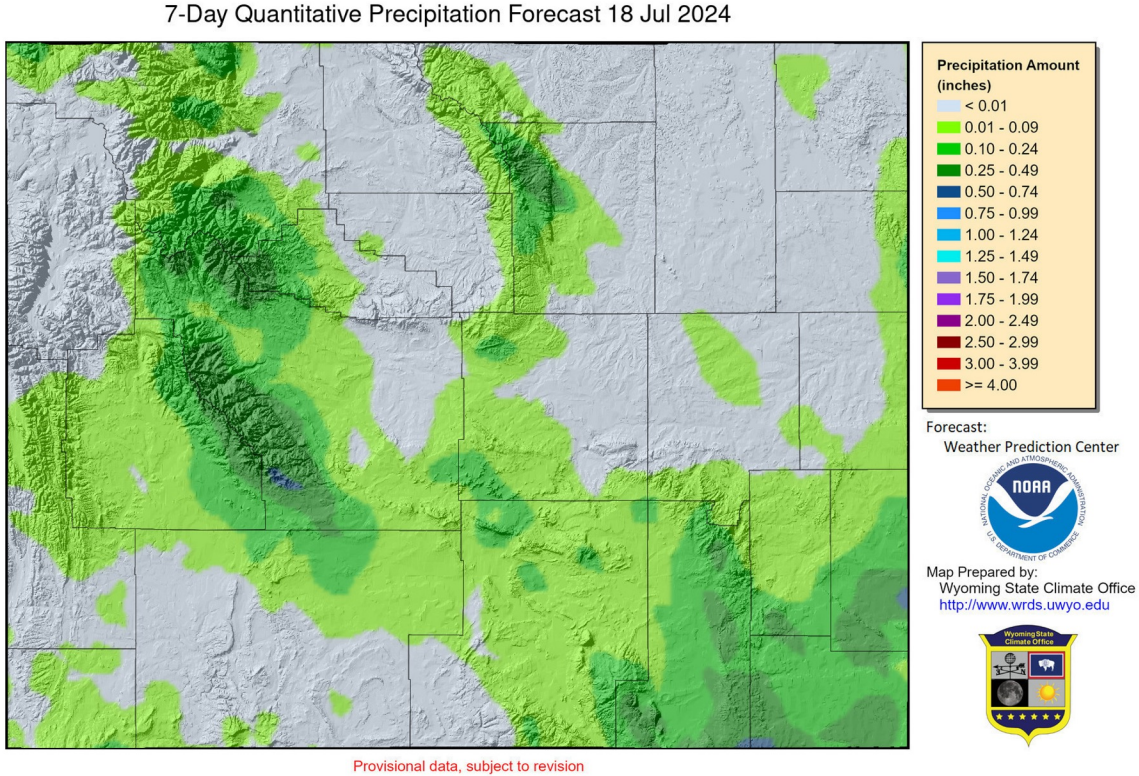
Weather Info & Forecasts

NWS Wyoming Typical Hazard Calendar



7-Day Total Precipitation Forecast

(July 18 - July 24)



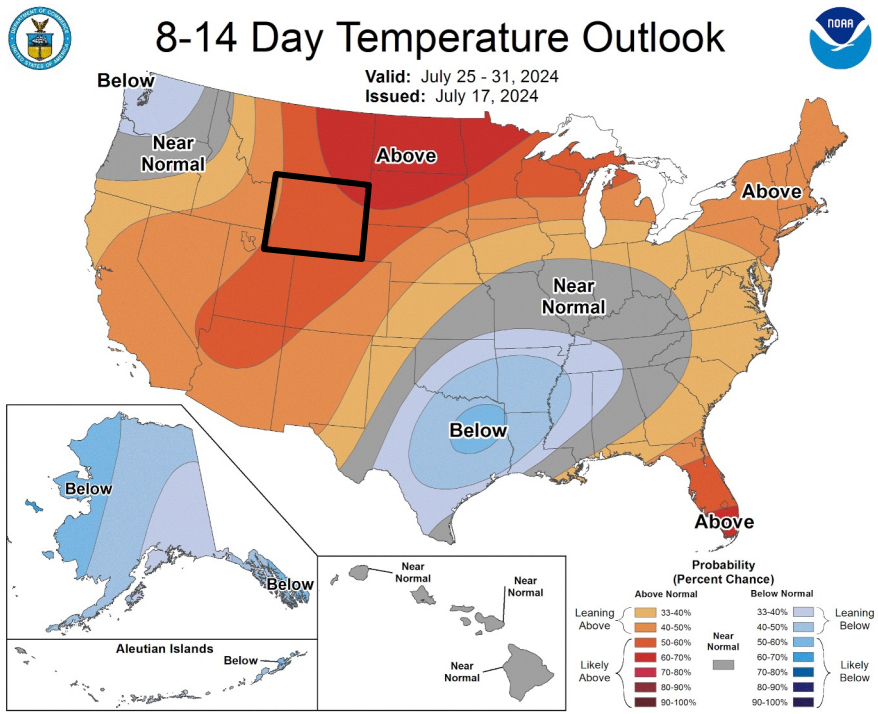
The Quantitative Precipitation Forecast shows the liquid amount of forecasted precipitation over the next 7 days
The Forecast is created by the National Weather Service Weather Prediction Center
Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, National Centers for Environmental Prediction, and Weather Prediction Center - https://www.wpc.ncep.noaa.gov
Map Layout Created 18 Jul 2024 http:/www.wrds.uwyo.edu

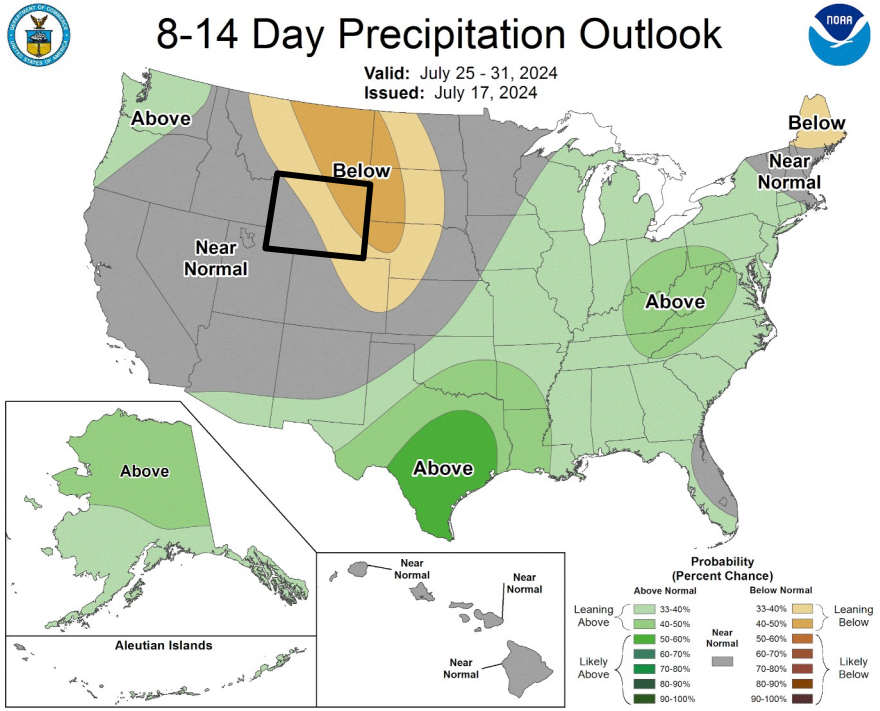
- No large wet systems
- Precipitation from localized afternoon Tstorms
- In 1 week, the actual map will be more spotty/streaky than what is shown
- High mountain ranges and SE corner of state with best probabilities for over 0.25”

https://bit.ly/7_dayQPForecast

8-14 Day Outlooks
(July 24 to July 30)

https://bit.ly/CPC8_14Day



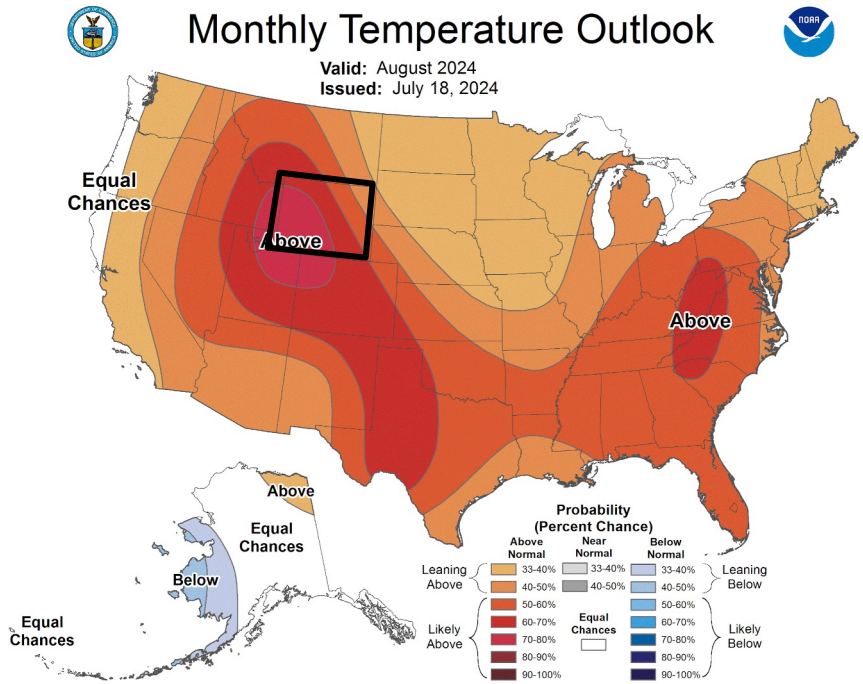


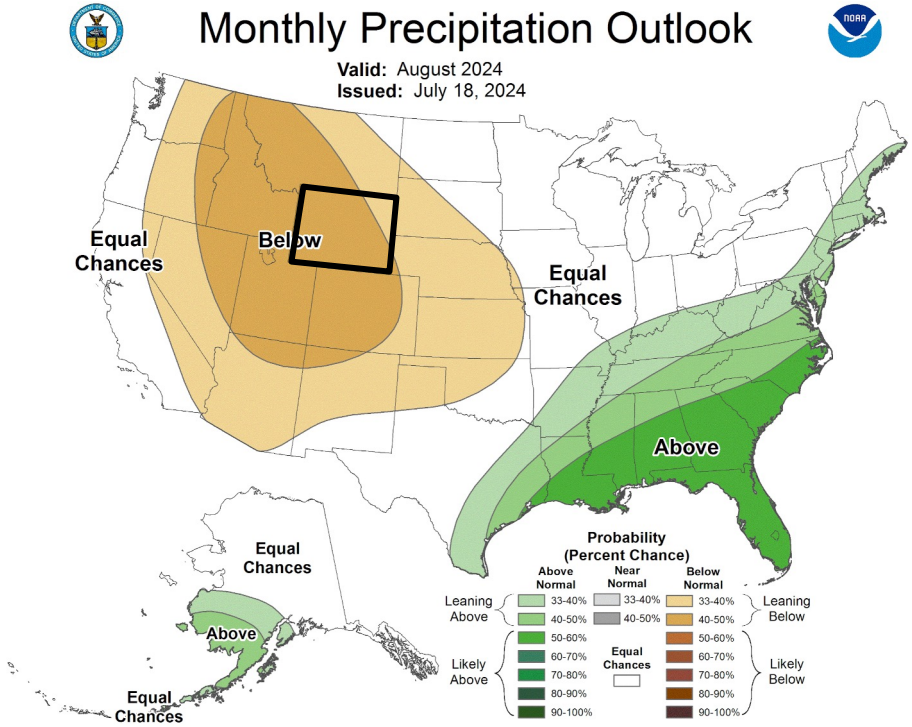
- Likely above normal temperatures
- Lean toward below normal for eastern side of state

1-Month Outlooks

(August)

cpc.ncep.noaa.gov/products/predictions/30day/

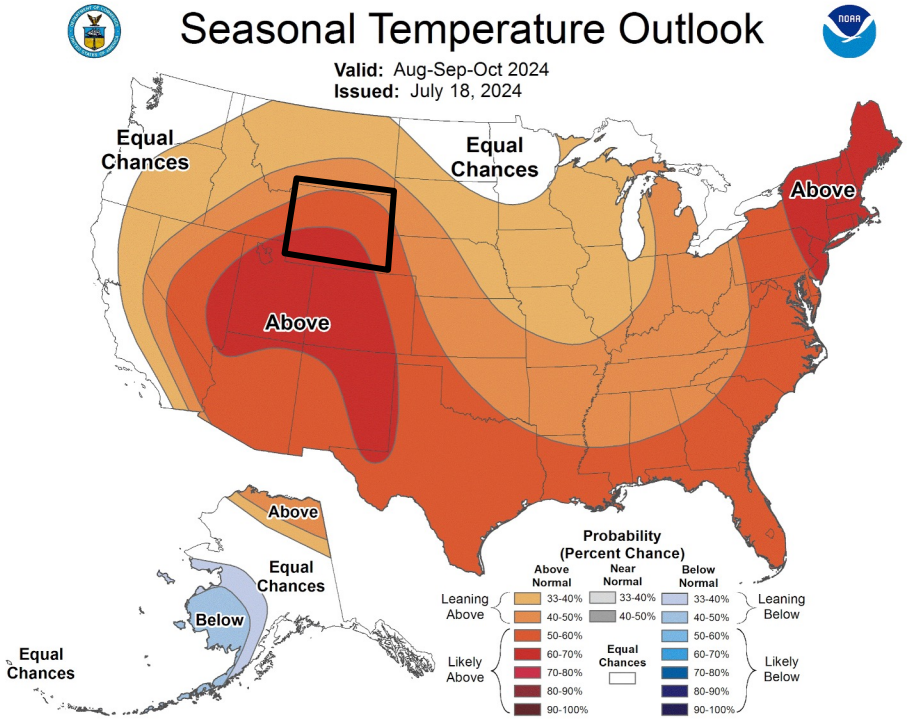




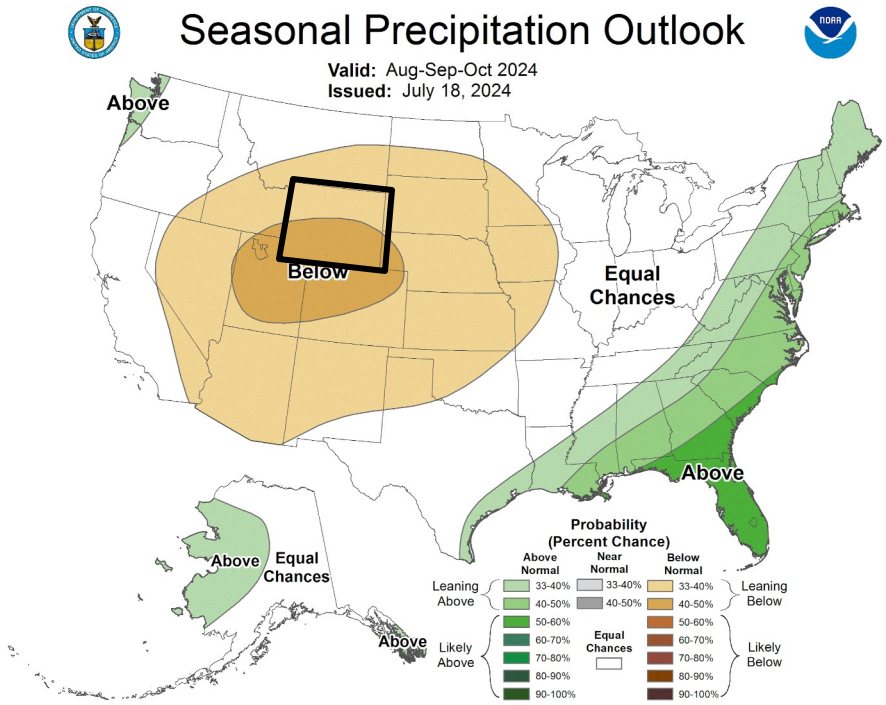
- Notably high confidence in above normal heat for August
- Lean towards a drier than normal August

Summer Outlooks
(Aug-Sep-Oct)

https://bit.ly/CPC_Seasonal



- Relatively high confidence in continued above average temps through autumn



- Lean toward drier than normal later summer and autumn

Wildland Fire Potential and Outlook

Fuel Moisture Content Basics

- **Fuel Moisture Content -** A key contributor to fire behavior along with weather and topography. Measures the amount of water in a fuel, expressed as a percentage of the dry weight.

- **Two Main Types of Wildland Fuel**

    - **Live Fuels-** Moisture content changes based on a number of factors, including plant phenology, time of year, and soil moisture. During dormancy, live fuels may resemble dead.

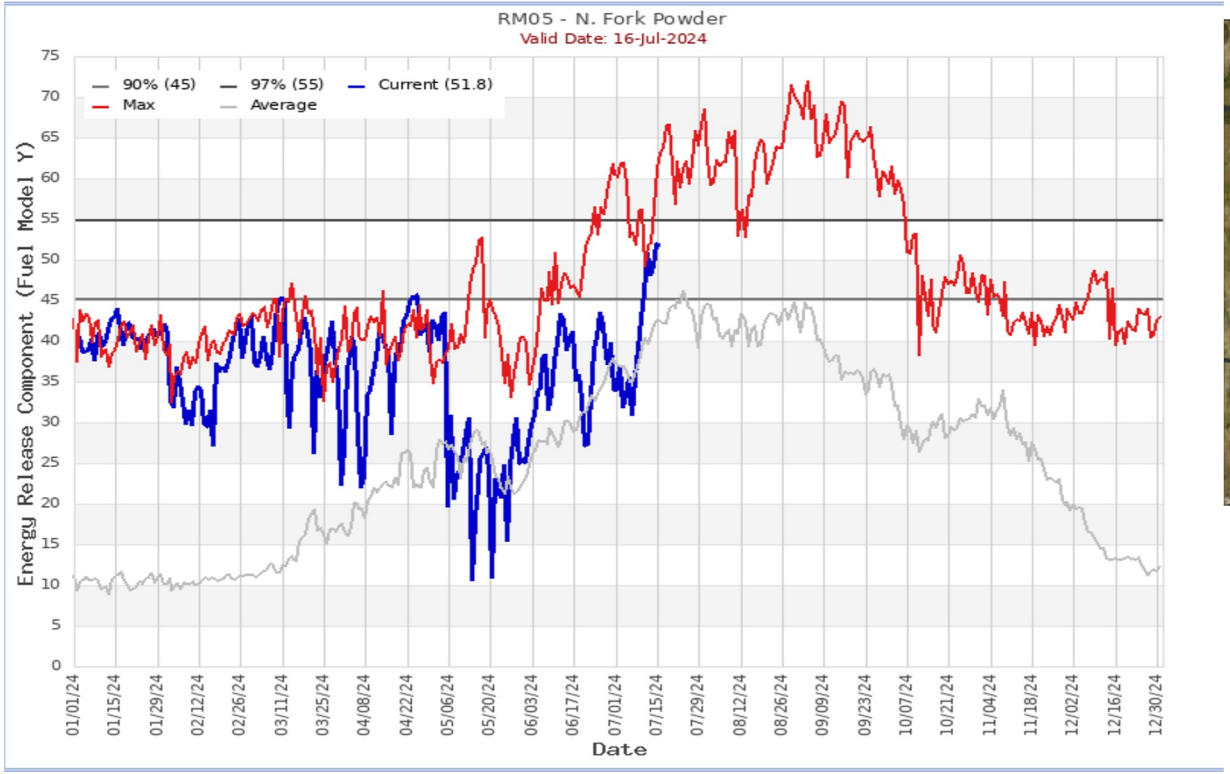
    - **Dead Fuels-** Absorb moisture from humidity in the air around them at variable rates depending on size. Classified by “time lag”, amount of time it takes for the fuel to gain or lose substantial moisture.

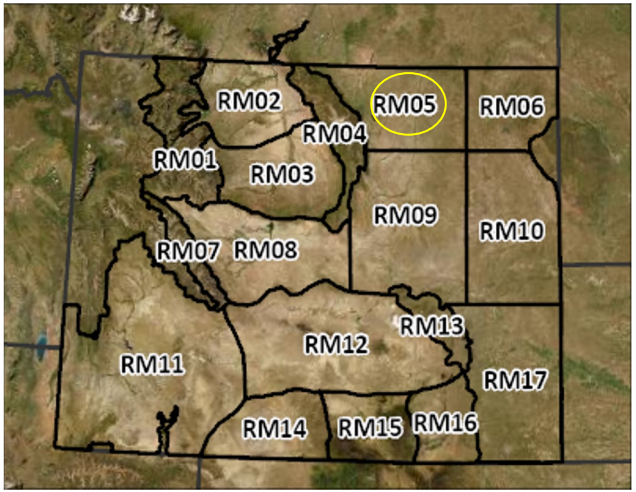
        - **1 Hour - < ¼” -** grasses, forbs etc…
        - **10 Hour - ¼” to 1”** - small twigs and branches
        - **100 Hour- 1” to 3” -** larger branches and small trees
        - **1000 Hour- > 3” -** downed logs, large branches

- **Fuel Loading-** Measured in tons per acre, highly variable depending on predominant vegetation.

Wildland Fire Potential and Outlook

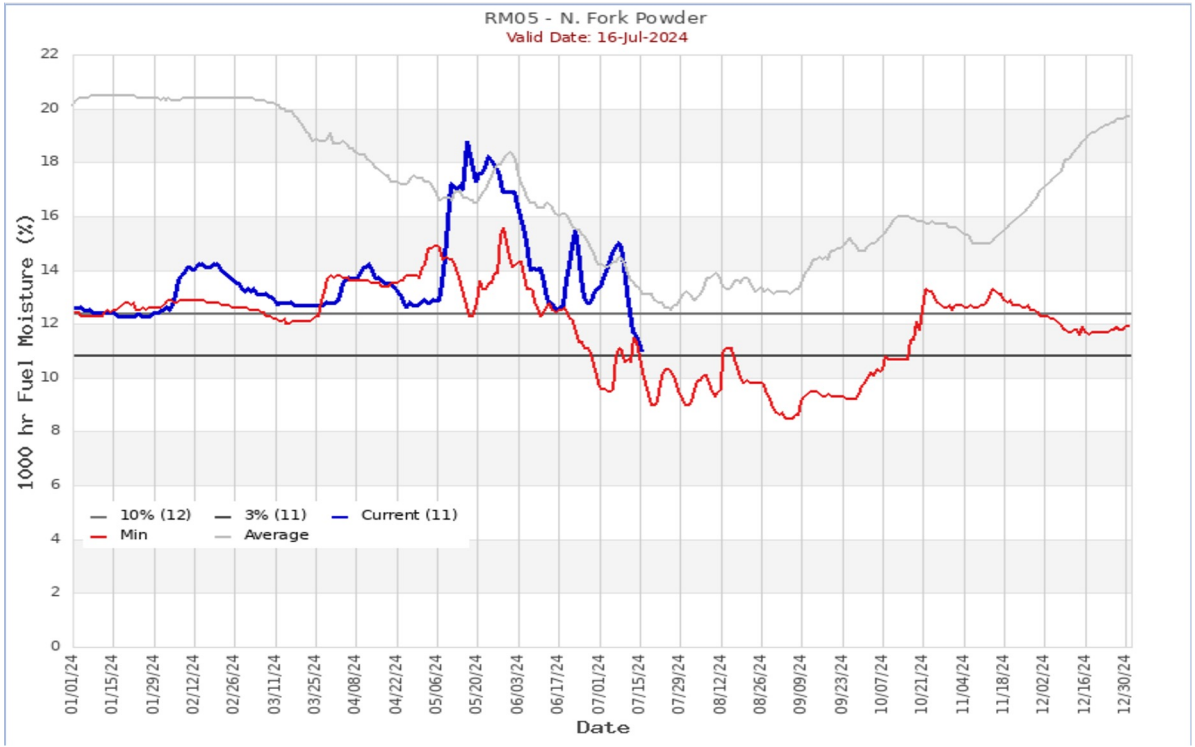
Energy Release Component:
N Fork Powder – Valid July 16

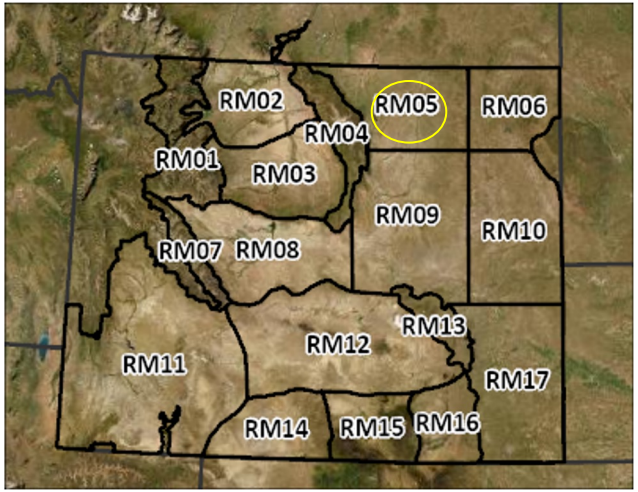




Wildland Fire Potential and Outlook

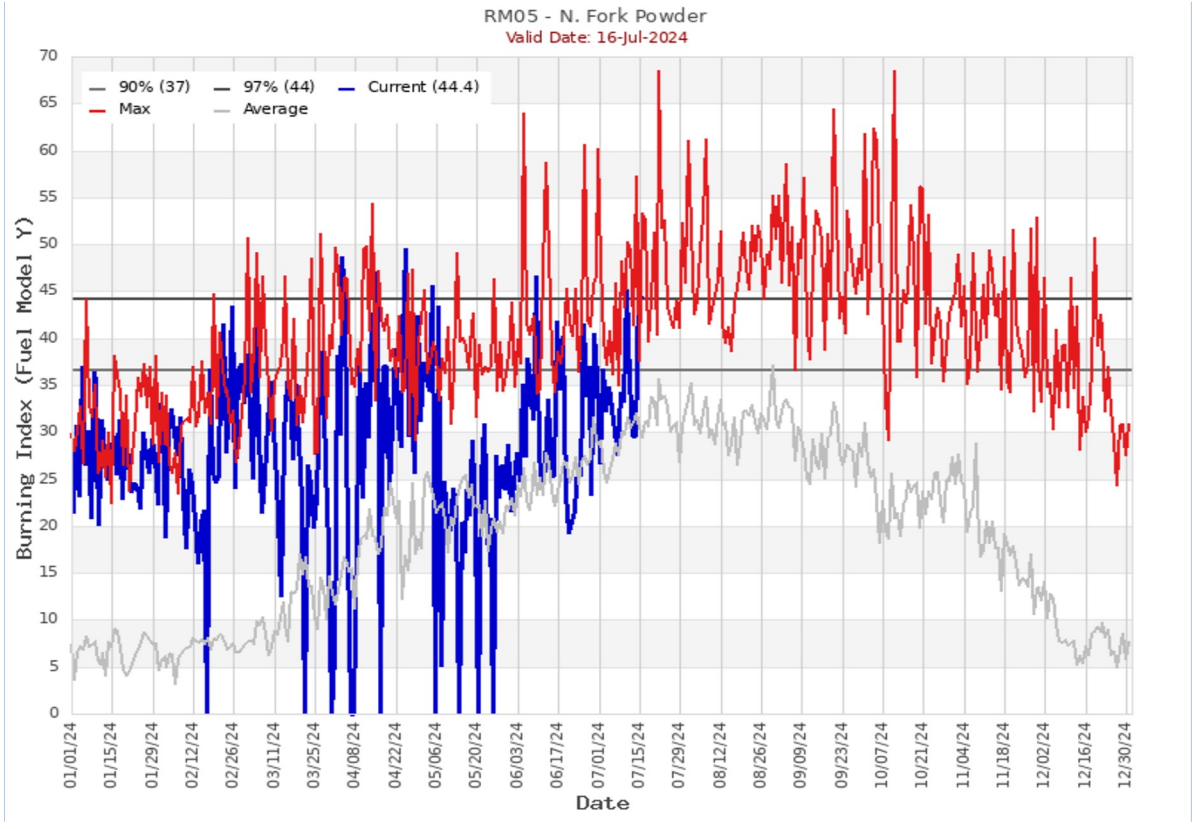
1,000-Hour Fuel Moistures:
N Fork Powder – Valid July 16

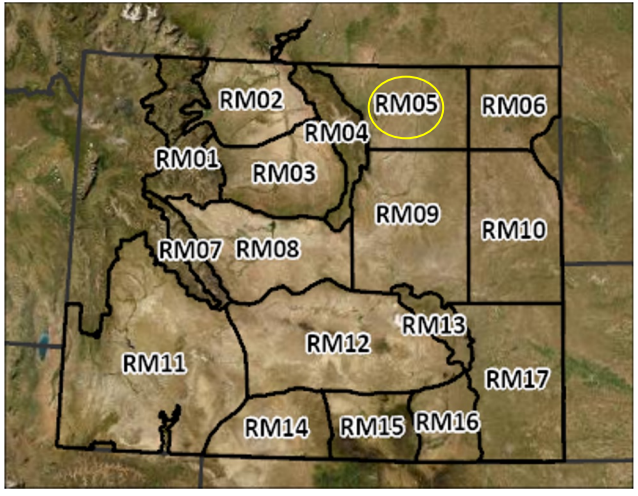




Wildland Fire Potential and Outlook

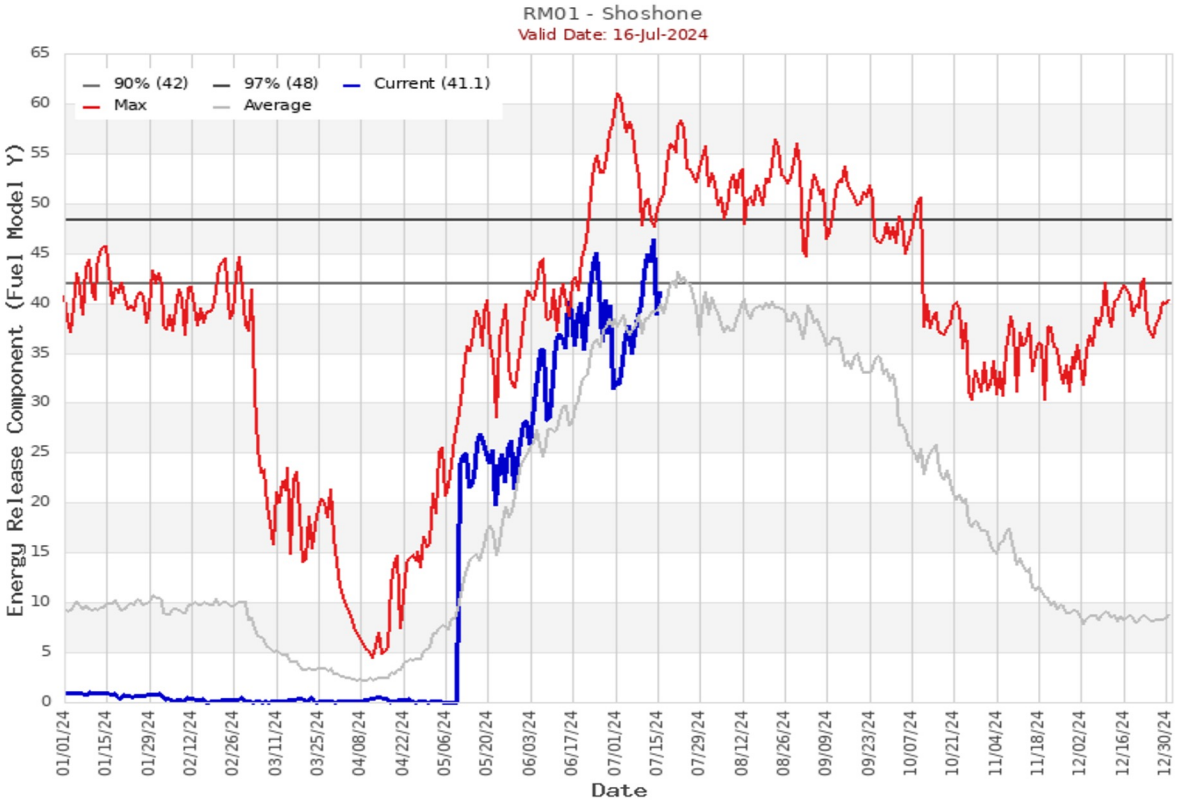
Burning Index:
N Fork Powder – Valid July 16

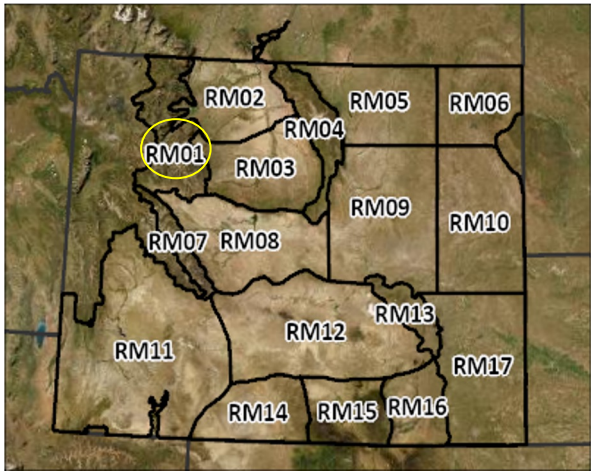




Wildland Fire Potential and Outlook

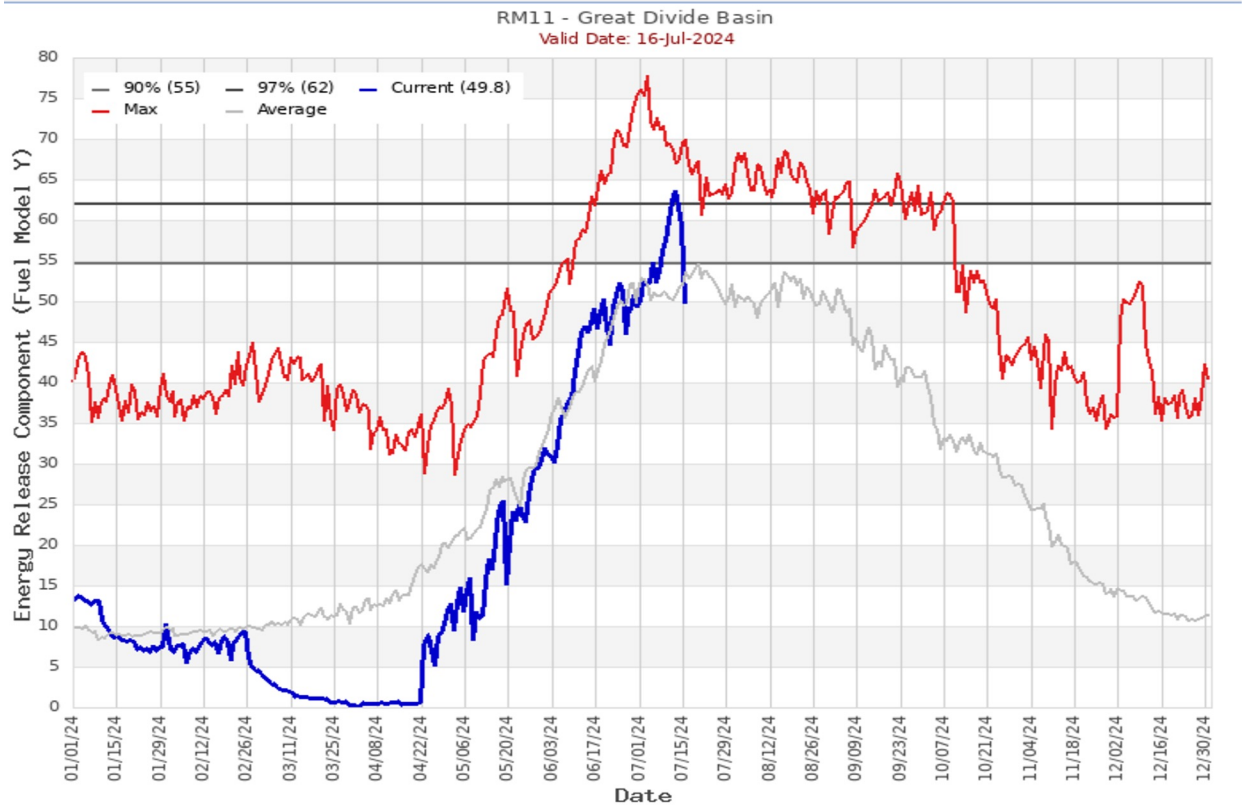
Energy Release Component:
Shoshone – Valid July 16

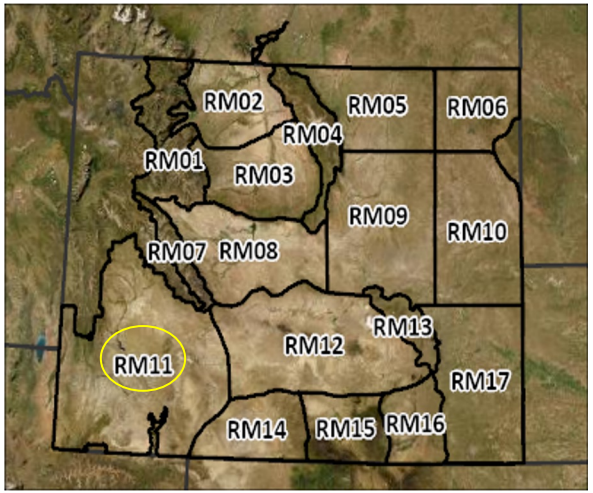




Wildland Fire Potential and Outlook

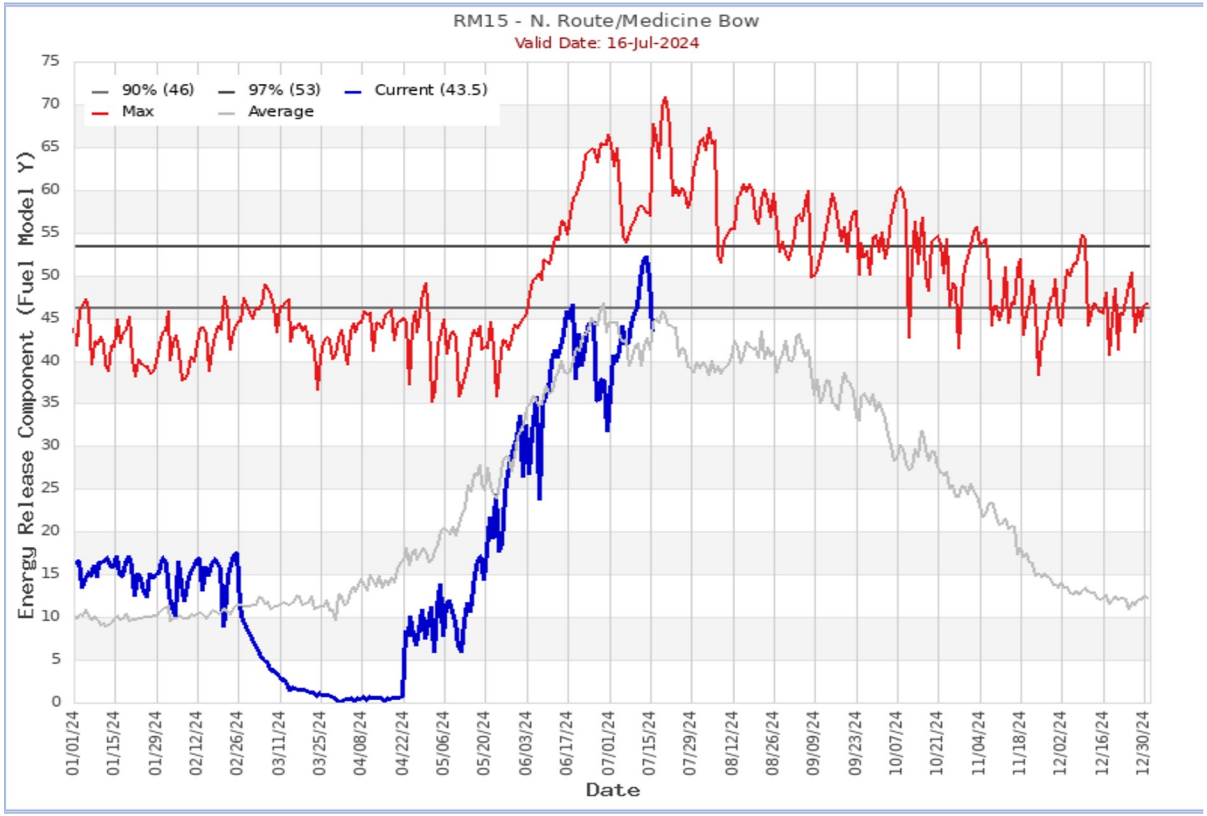
Energy Release Component:
Great Divide Basin – Valid July 16

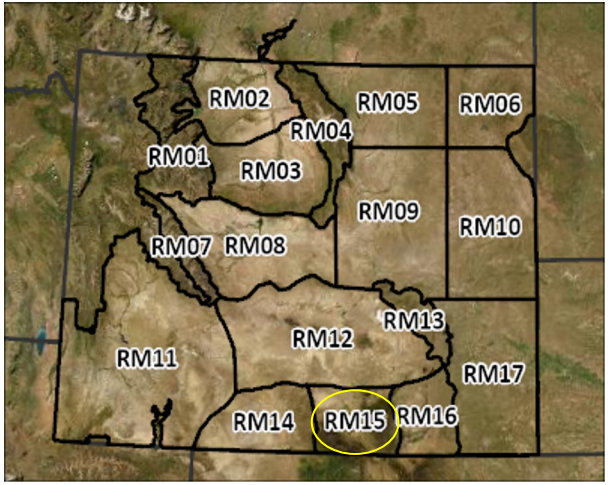




Wildland Fire Potential and Outlook

Energy Release Component:
N Route/Medicine Bow – Valid July 16

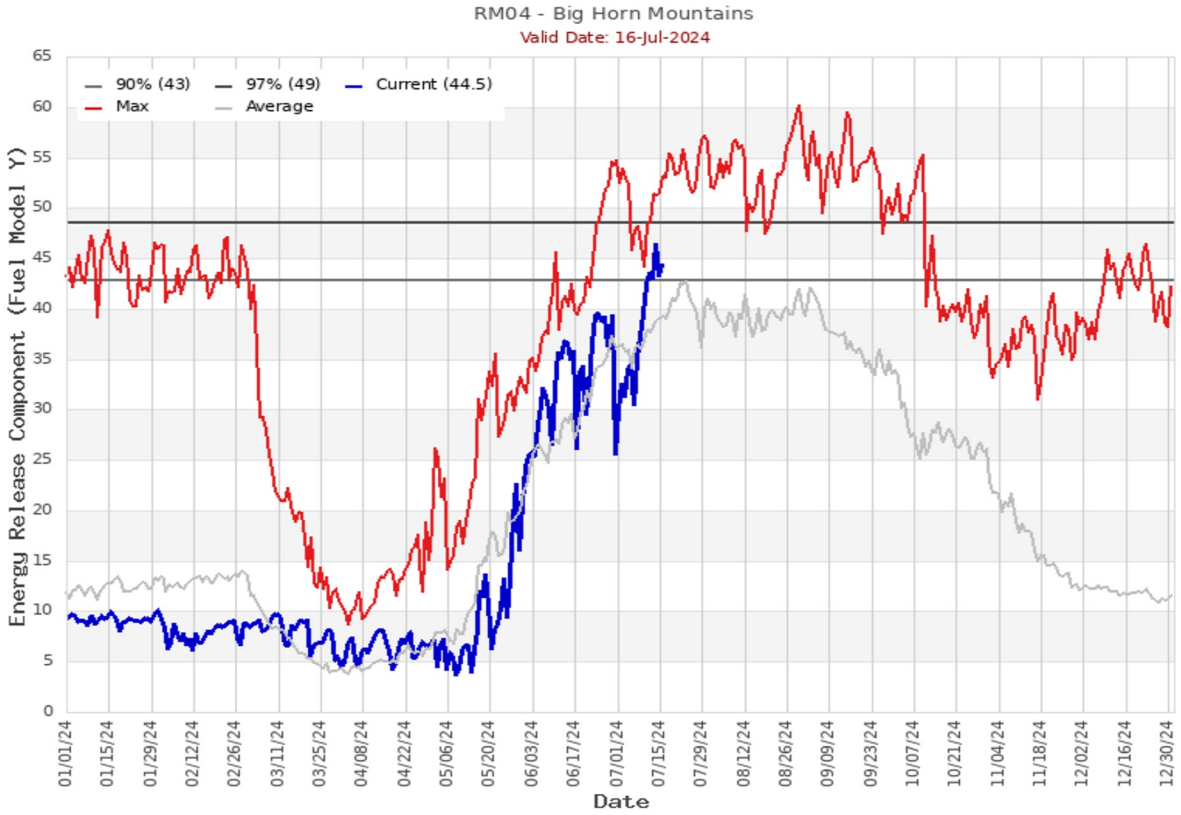


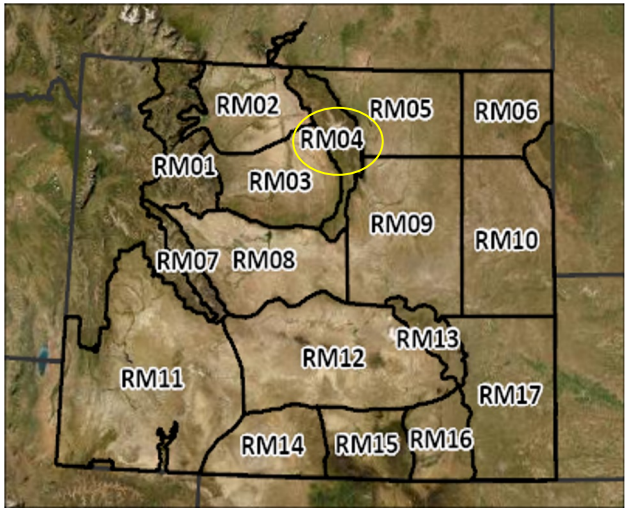


Wildland Fire Potential and Outlook

Energy Release Component:

Big Horn Mountains – Valid July 16

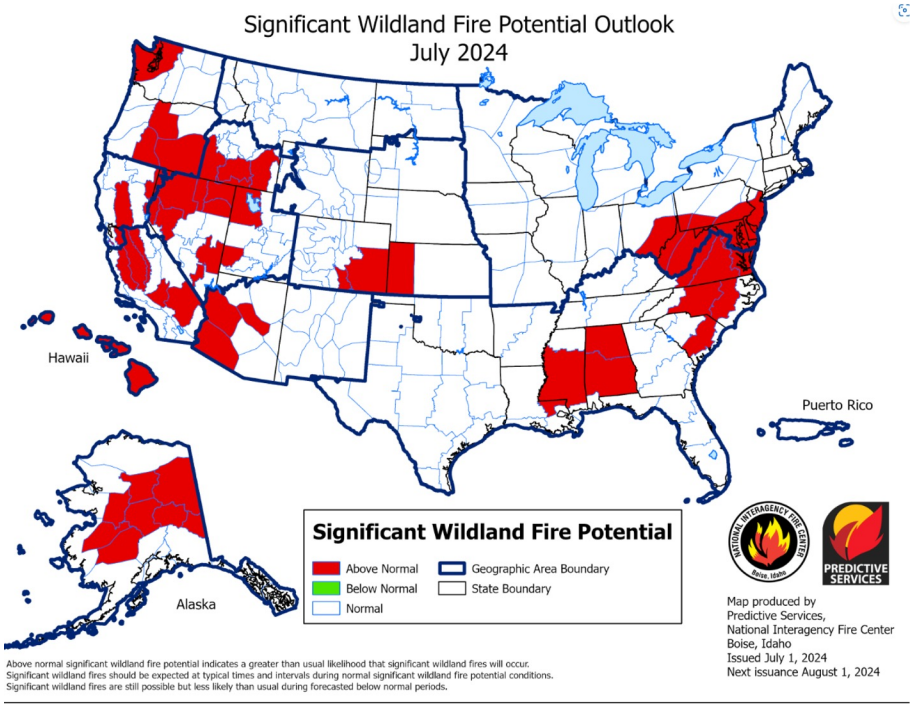




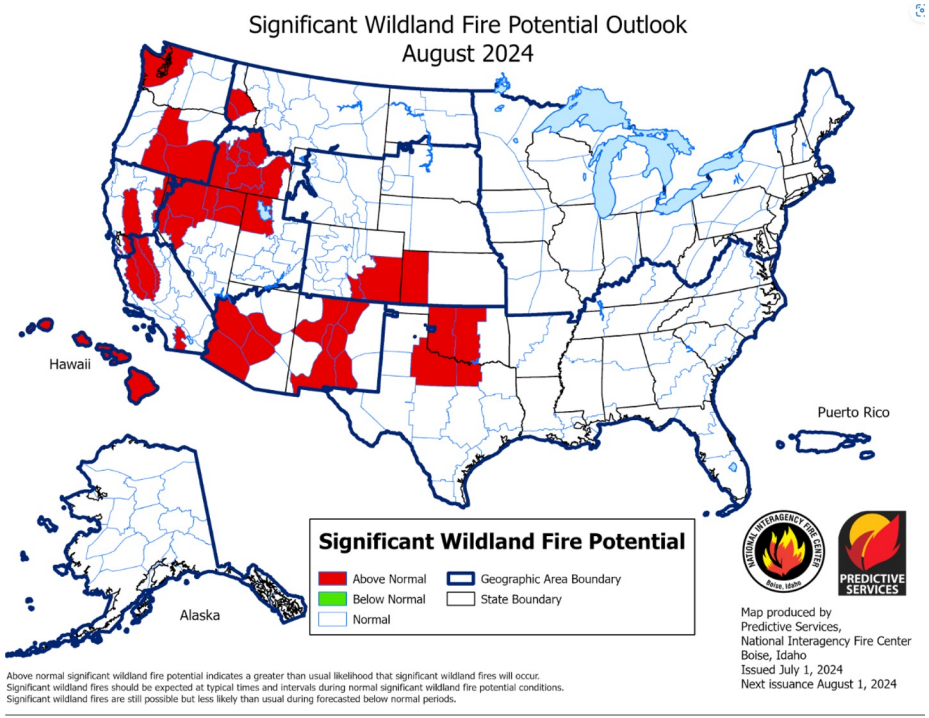
Wildland Fire Potential and Outlook

National Outlook- Released Monthly on 1st of the month

June 2024



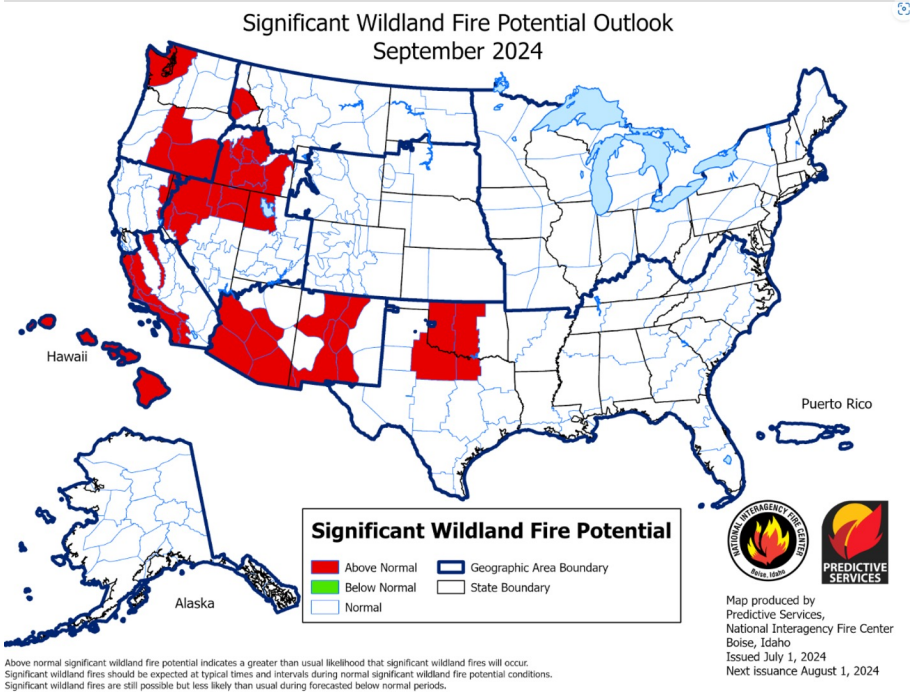
July 2024



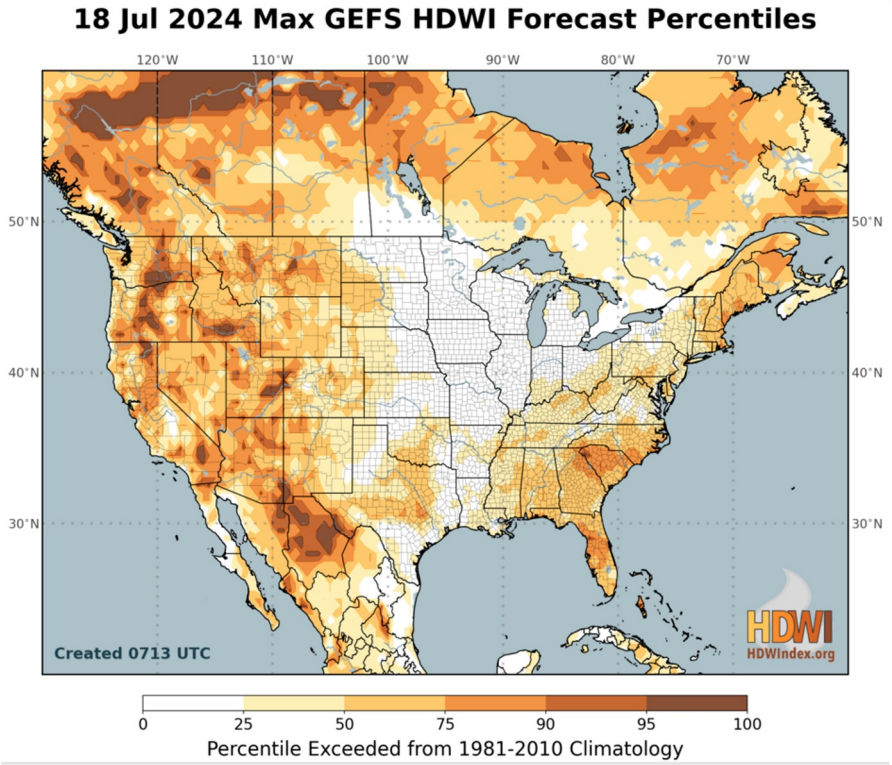
Wildland Fire Potential and Outlook

National Outlook- Released Monthly on 1st of the month

August 2024



September 2024



Highlight of the Month:

Harmful Cyanobacterial Blooms



Wyoming Department of Health

Harmful Cyanobacterial Blooms (HCBs)

Courtney Tillman, MPH
Wyoming Department of Health

What are Harmful Cyanobacterial Blooms (HCBs)?

Wyoming Department of Health

Dense concentrations of cyanobacteria or blue-green algae

Can be blue, green, brown, or tan in color

Appear as scum, mats, or spilled paint in water

Can produce toxins

Can affect people, animals, and agriculture





What causes HCBs?

Wyoming Department of Health









What causes HCBs?

Wyoming Department of Health



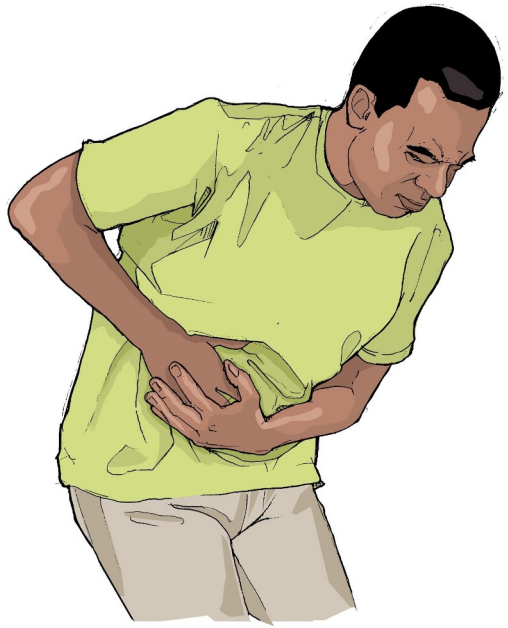


Can HCBs make you sick?

Wyoming Department of Health

People may experience:

Stomach pain
Rash
Headache
Coughing
Nose irritation
Watery eyes
Sore throat
Liver damage
Seizures
Irregular heart beat

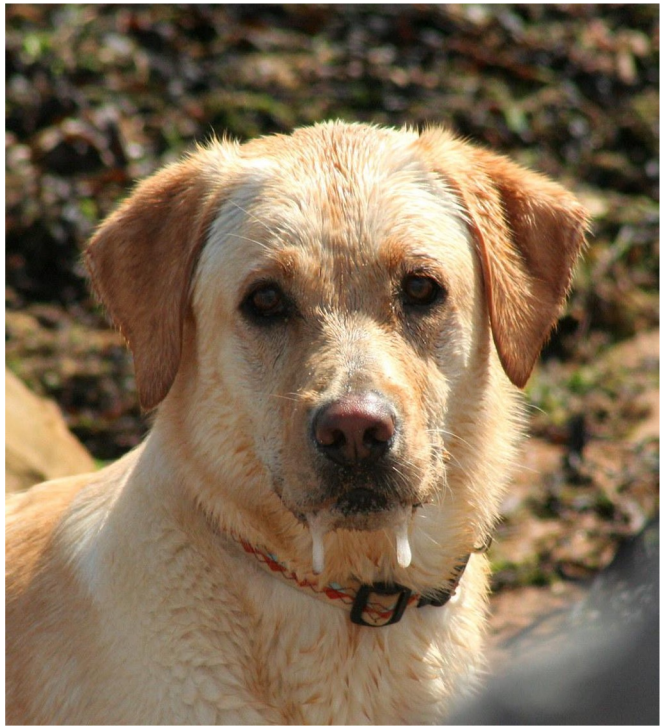


Can HCBs make animals sick?

Wyoming Department of Health

Animals may experience:

Excessive salivation
Vomiting
Fatigue
Staggered walking
Difficulty breathing
Convulsions
Liver failure
Death



What do we do about HCBs?

Wyoming Department of Health

Monitor Human and Animal Illness Reports



Monitor & Test Recreational Water Bodies

Issue Health Advisories

-Be on the lookout

-Bloom Advisory

-Toxin Advisory

What should you do if you see a bloom?

Wyoming Department of Health



Do not swim



Do not ingest the water



Do not let pets or livestock enter or drink the water



Rinse fish with clean water and only eat the fillet



Avoid water spray

When in doubt, **stay out!**

Wyoming Department of Health

No great forecasting tools for HCBs

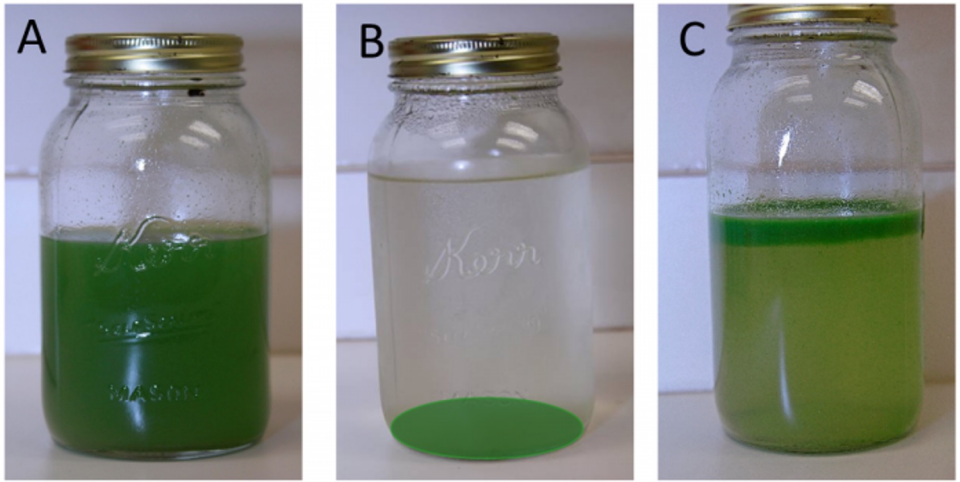
Always check current signage and advisories

Visual inspection

Jar and stick test

Tests for purchase





Cyanobacteria

Pictures from: https://hcb-1.itrcweb.org/monitoring/#_Jar_and_stick

WDH Website:



https://bit.ly/3zS04fV

Current HCB Advisories:



https://bit.ly/3SfN35Y

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The Wyoming Conditions Monitoring Team (WCMT) organized and hosted this webinar. The WCMT is a collaborative effort of state, federal, tribal, and university partners that monitor conditions & impacts throughout the state on a weekly basis – and communicate this information to the U.S. Drought Monitor among others.

Learn more at:
https://drought.wyo.gov

Thank you!