





WY Conditions & Outlooks:

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

June 20, 2024

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









Presentation Outline

- **Current Conditions:** Overview
 - Drought, Temperature, Precipitation, and Soil Moisture Ο
 - Streamflows \bigcirc
 - Reservoir Levels \bigcirc
 - Water Calls & Allocations \cap
- **Outlooks:**
 - Temperature & Precipitation Ο
 - Ο
 - Water Supply & Flood Risk Wildland Fire Potential & Outlook \bigcirc
- Highlight of the Month:
 - Happy summer solstice! 0
- Questions







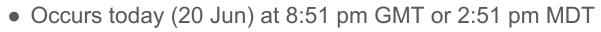




Current Conditions



Happy Summer Solstice



- Marks the northernmost position of the sun in the sky
- Longest Day of the Year (but **not** the earliest nor latest sunsets which occur about a week before and after the Solstice respectively) [Earth's orbit is an ellipse, not a circle]
- Earliest Summer Solstice since 1796 (228 years ago)
- Often regarded as the official start of "Summer"



Credit: Diane Bergantino

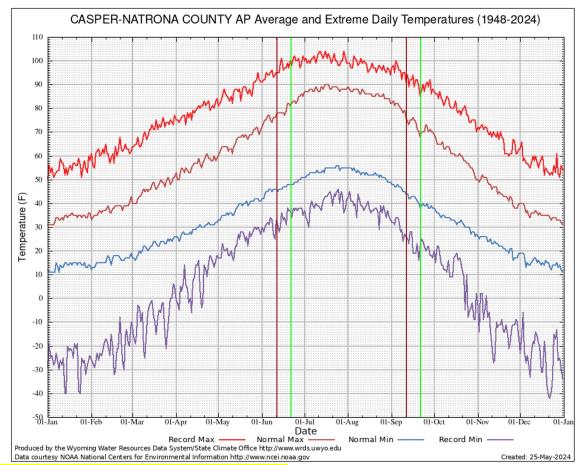


Start of Summer?

• The period between the Summer Solstice and the Autumn Equinox

BUT

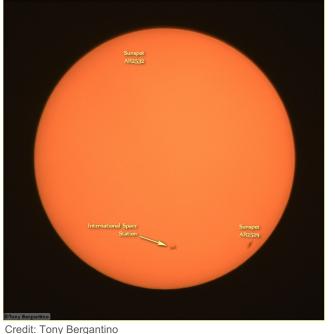
• The period containing 25% of the warmest days of the year



http://www.wrds.uwyo.edu/temperature/extremes/citylist.html



Dates for the Average Start of the Top 25% Warmest Days around Wyoming



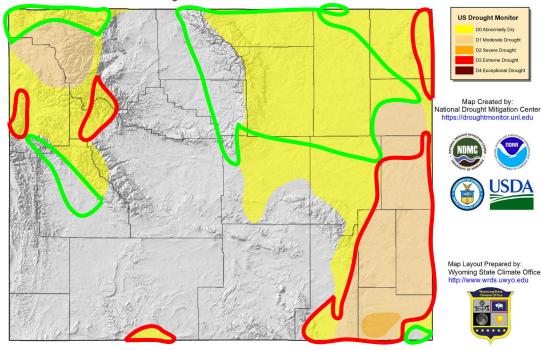
Buffalo 10 Jun Casper Airport 10 Jun Cheyenne AP 10 Jun Cody 12SE 09 Jun **Evanston 1E** 11 Jun Gillette 4SE 11 Jun http://www.wrds.uwyo.edu/temperature/extremes/citylist.html



US Drought Monitor for June 18, 2024

(Released Thursday, June 20th, 2024) Valid 8 a.m. EDT

US Drought Monitor for 18 Jun 2024



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 20 Jun 2024 http://www.wrds.uwyo.edu

Drought LevelPercentileNone>30D0 (Abnormally Dry)21 to 30D1 (Moderate Drought)11 to 20D2 (Severe Drought)6 to 10D3 (Extreme Drought)3 to 5D4 (Exceptional Drought)0 to 2

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

Degradations in the east, northwest, and southwest/central since the last webinar. Several Improvements in the northwest and northeast.



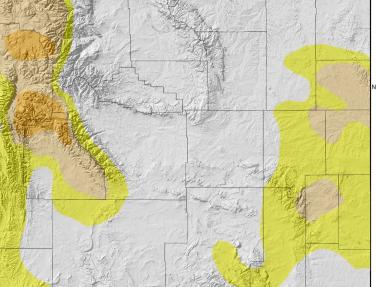
https://droughtmonitor.unl.edu



One Year Ago

Today







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

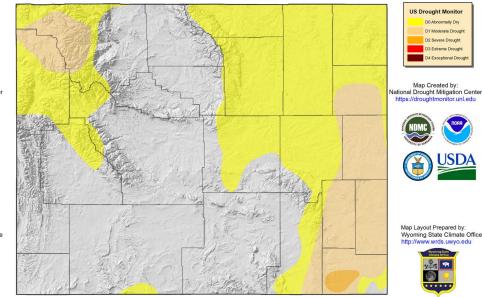




Map Layout Prepared by: Wyoming State Climate Office http://www.wrds.uwyo.edu



US Drought Monitor for 18 Jun 2024



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Map Layout Created 20 Jun 2024 http://www.wrds.uwyo.edu



droughtmonitor.unl.edu

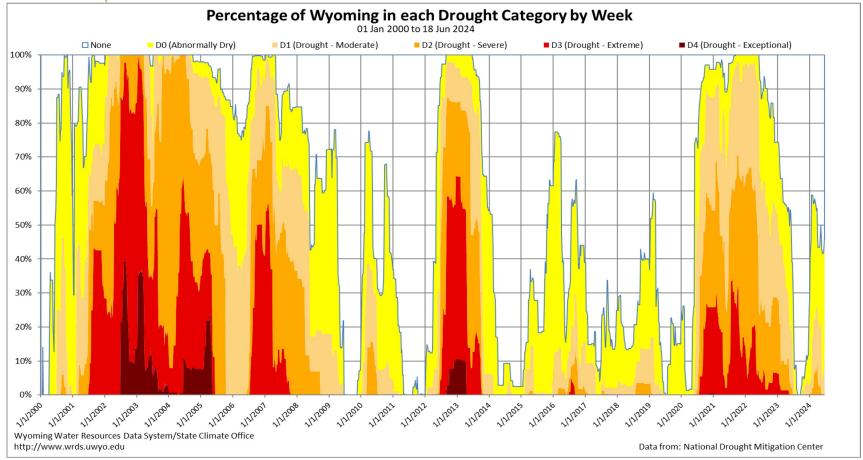
The U.S. Drought Monitor, is a weekly map of drought conditions produced jointly by the National Oceanic and Atmospheric Administration, the U.S. Department of Agriculture, and the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln. The U.S. Drought Monitor website is hosted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

Map Layout Created 22 Jun 2023 http://www.wrds.uwyo.edu

https://droughtmonitor.unl.edu

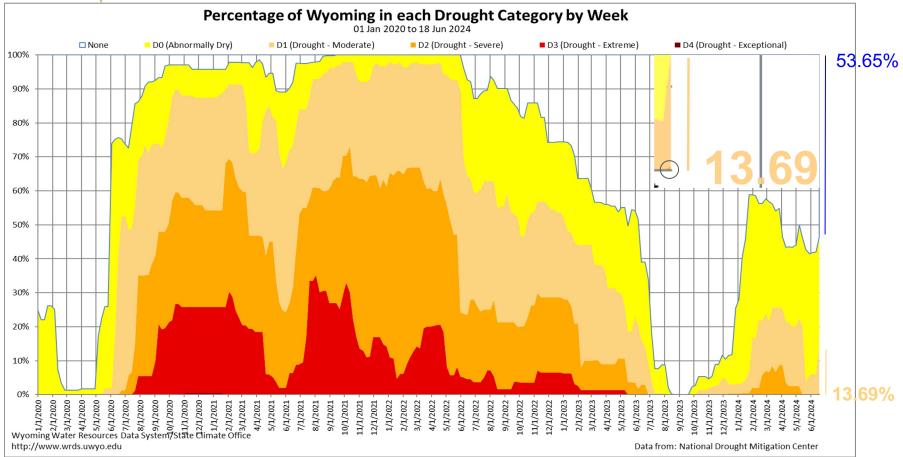


Wyoming Area Affected: 46.35% D0-D4 ; 13.69% D1-D4



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







14-Day Precipitation Percentile (06 Jun 2024 to 19 Jun 2024)

14-Day Precipitation (Percentile) for 06 Jun 2024 to 19 Jun 2024

Precipitation Percentile 0 - 2 2 - 5 5 - 10 10 - 20 20 - 30 30 - 40 40 - 60 60 - 70 70 - 80 80 - 90 90 - 95 95 - 98 98 - 100 Precipitation Data PRISM Climate Group http://prism.oregonstate.edu Map Prepared by: Wyoming State Climate Office http://www.wrds.uwyo.edu

Above Median:

• VERY minor scattered spots

Below Median (Areas of Concern):

 Northeast and North Central especially but really much of Wyoming

Provisional data, subject to revision

Daily precipitation data from PRISM Climate Group, Copyright ©2021, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu Map Created 20 Jun 2024 http://www.wrds.uwyo.edu Daily percentiles created from PRISM daily precipitation grids



At or Above Median:

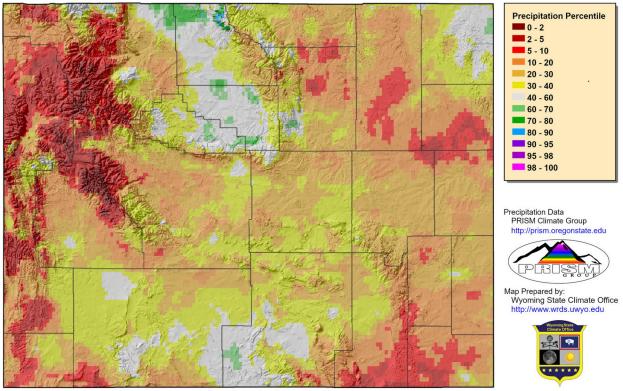
- Bighorn Basin
- Little Snake
- Far Northeast

Below Median (Areas of Concern):

- Southeast
- Northwest
- Northeast
- West

90-Day Precipitation Percentile (22 Mar 2024 to 19 Jun 2024)

90-Day Precipitation (Percentile) for 22 Mar 2024 to 19 Jun 2024



Provisional data, subject to revision

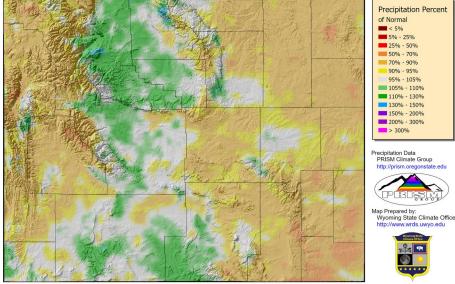
Daily precipitation data from PRISM Climate Group, Copyright ©2021, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu Map Created 20 Jun 2024 http://www.wrds.uwyo.edu Daily percentiles created from PRISM daily precipitation grids



"Year"-to-Date Precipitation (Percent of Average)

Current Water Year

Water-Year Precipitation (Percent of 1991-2020 Average) for 01 Oct 2023 to 19 Jun 2024



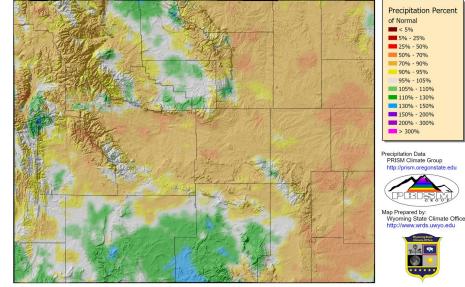
Provisional data, subject to revision

Monthly and Normal precipitation data from PRISM Climate Group, Copyright ©2024, PRISM Climate Group, Oregon State University, http://prism.orgonstate.edu Map Created 20 Jun 2024 http://www.wrds.uwyo.edu Dai/a versages created from PRISM dai/ versionatiation arids

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

Current Calendar Year

Calendar-Year Precipitation (Percent of 1991-2020 Average) for 01 Jan 2024 to 19 Jun 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.orgonstate.edu Map Created 20 Jun 2024 http://www.wrds.uwyo.edu Daily averages created from PRISM daily precipitation grids



30-Day Standardized Precipitation Evapotranspiration Index (20 May 2024 to 17 Jun 2024)

1.75 to 2.0 1.50 to 1.75 1.25 to 1.50 1.00 to 1.25 0.50 to 1.00 -0.50 to 0.50 -1.00 to -0.50 -1 75 to -1 00 -1.50 to -1.25 -1.75 to -1.50 -2.00 to -1.75 <-2.00 **30-Day** tandardized Precinitatio 60-Dav vapotranspiration Index Montana Climate Office https://drought.climate.umt.edu Montana Climate Office Map Prepared by Apr 20 -Wyoming State Climate Office http://www.wrds.uwyo.edu Jun 17

May 20 - Jun 17

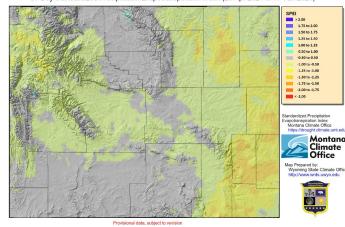
Standardized Precipitation Evapotranspiration Index (SPEI)

Map Created 20 Jun 2024 http://www.wrds.uwvo.edu

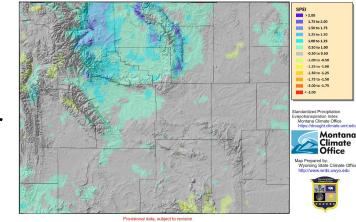
Standardized Precipitation Evapotranspiration Index Created by Montana Climate Office https://drought.climate.umt.edu

Short term: Dryness emerging statewide. 60-Day showing longer-term dry conditions in the east. Long term: Lost ground but Wind/Bighorn Basins along with Powder/Tongue and scattered other areas still on the wet side

1-Year



Standardized Precipitation Evapotranspiration Index Created by Montana Climate Office https://drought.climate.umt.edu Map Created 20 Jun 2024 http://www.wrds.uwvo.edu



Standardized Precipitation Evapotranspiration Index Created by Montana Climate Office https://drought.climate.umt.edu Man Created 20 Jun 2024 http://www.wrds.uwvp.edu

365-Day Standardized Precipitation Evapotranspiration Index (20 Jun 2023 to 17 Jun 2024)

https://drought.climate.umt.edu

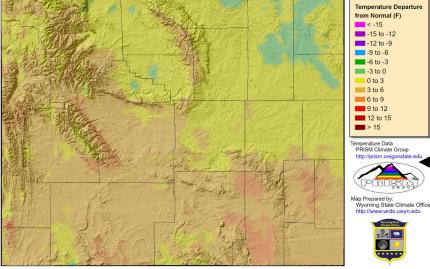
60-Day Standardized Precipitation Evapotranspiration Index (20 Apr 2024 to 17 Jun 2024)



14-Day Average Minimum Temperature (06 Jun to 19 Jun)

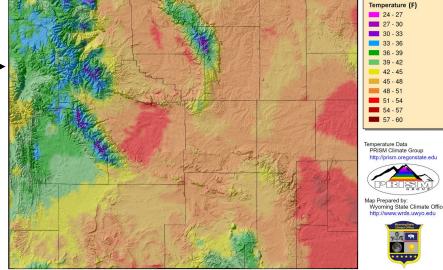
- Most lower elevation areas seeing mins >= 32F
- Warmest in East and Lower Wind River Basin

14-Day Average Minimum Temperature (Departure from 1991-2020 Average) for 06 Jun 2024 to 19 Jun 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 20 Jun 2024 http://www.wrds.uwyo.edu Temperature averages created from PRISM daily temperature grids 14-Day Average Minimum Temperature for 06 Jun 2024 to 19 Jun 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 20 Jun 2024 http://www.wrds.uwyo.edu Temperature averages created from PRISM daily temperature grids

14-Day Departure from Normal

Average Minimum Temperature

- Much of the south and Wind Basin 3-6F above average
- BH Basin and Northeast 0-3F above average
- Areas of Northeast up to 3F below average

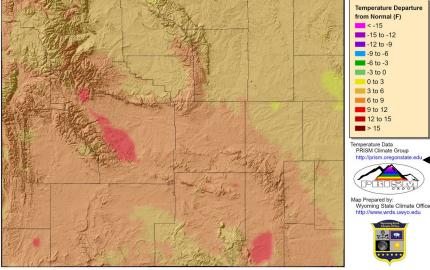


14-Day Average Maximum

Temperature (06 Jun to 19 Jun) Highs 70F & above except for higher elevations

- Platte/Goshen, Wind Basin in Mid-80s+

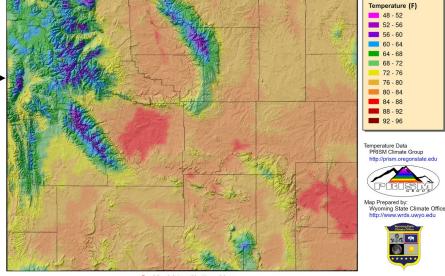
14-Day Average Maximum Temperature (Departure from 1991-2020 Average) for 06 Jun 2024 to 19 Jun 2024



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 20 Jun 2024 http://www.wrds.uwyo.edu Temperature averages created from PRISM daily temperature grids

14-Day Average Maximum Temperature for 06 Jun 2024 to 19 Jun 2024



Provisional data, subject to revision

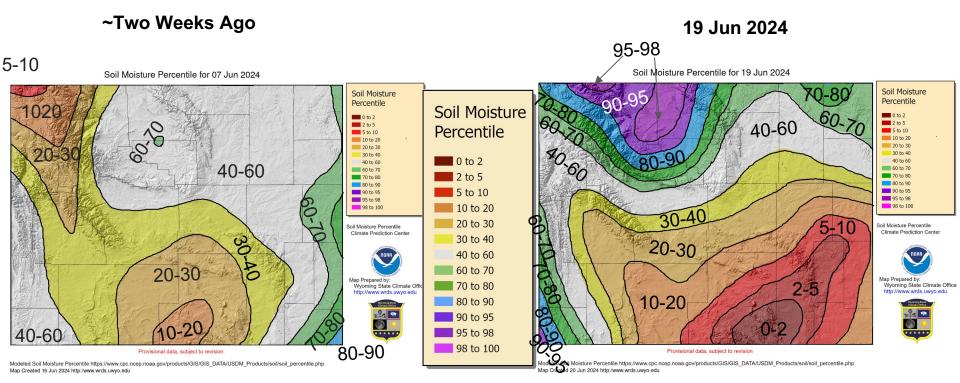
Daily Temperature data from PRISM Climate Group, Copyright @2021, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu Map Created 20 Jun 2024 http://www.wrds.uwyo.edu Temperature averages created from PRISM daily temperature grids

14- Day *Departure from* Normal

- Average Maximum North, Northeast, East 3 to FF above average Remainder with some exceptions 9 to 12F above average



Soil Moisture Percentile



http://www.wrds.uwyo.edu/Soil/Current_SoilMoisture_Ptile.html areas and impro

Declines in conditions in the southeast and southcentral areas and improvements across the north and west.

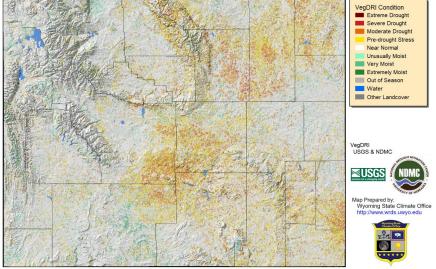


Vegetation Drought Response Index

16 Jun 2024

~Two Weeks Ago

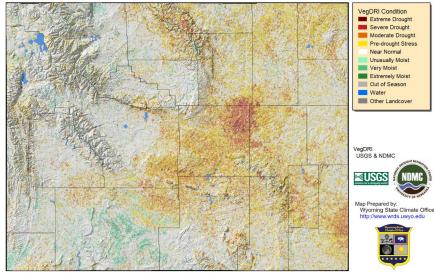




Provisional data, subject to revision

Vegetative Drought Response Index (VegDRI). US Geological Survey and National Drought Mitigation Center https://doi.org/10.2747/1548-1630.345.1.16 Map created by Wyoming Slate Climate Office, http://www.wrds.uwyo.edu Created: 03 Jun 2024

Vegetative Drought Response Index - 16 Jun 2024



Provisional data, subject to revision

Vegetative Drought Response Index (VegDRI). US Geological Survey and National Drought Mitigation Center https://doi.org/10.274/11548-1403.45.1.16 Map created by Wyoming State Climate Office, http://www.wrds.uwyo.edu Created:17.0.12024

Some declines in conditions in the southeast and far northwest and improvements or status quo elsewhere.

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

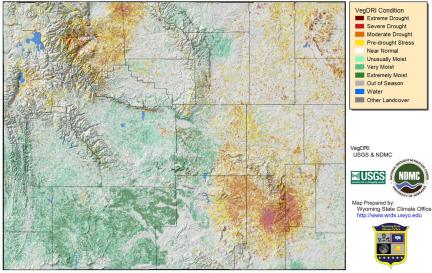


Vegetation Drought Response Index

16 Jun 2024

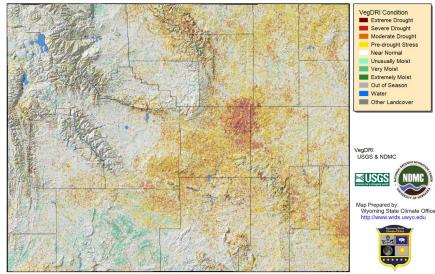
Vegetative Drought Response Index - 18 Jun 2023

~One Year Ago



Provisional data, subject to revision

Vegetative Drough Response Index (VegDRI). US Geological Survey and National Drought Mitigation Center https://doi.org/10.27471/1548-1030.45.1.16 Map created by Wyoming State Climate Office, http://www.wrds.uwyo.edu Created:20 Jun 2023 Vegetative Drought Response Index - 16 Jun 2024



Provisional data, subject to revision

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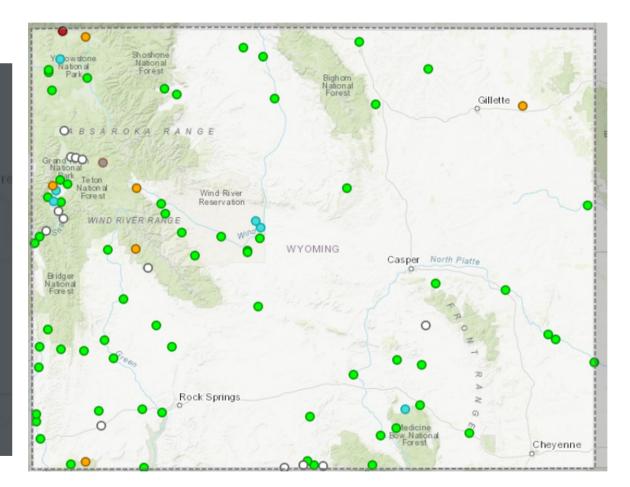
Current Streamflow Conditions (June 20, 2024)

Streamflow Status

Streamflow: Status Above flood stage All-time high for this 100th percentile (maximum) dav Much above normal >90th percentile Above normal 76th – 90th percentile Normal 25th – 75th percentile 10th - 24th percentile **Below normal** Much below normal <10th percentile All-time low for this 0th percentile (minimum) day Pine Ridge Not flowing

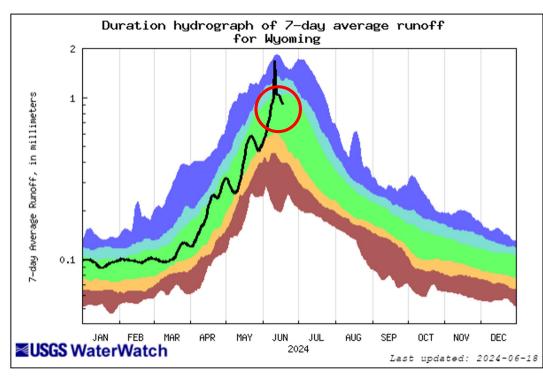
- Not ranked
- Measurement flag
- Recent measurement unavailable

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





WY Duration Hydrograph of 7-day runoff



Mid- Runoff

- Runoff continues
- Transition to falling limb of hydrograph.
- Past the Peak?

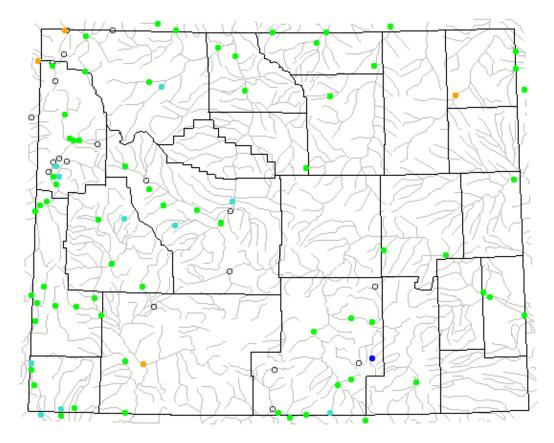
	E	xplana	tion - Pe	ercentile	classe	s	
lowest- 5th percentile	6-9	10-24	25-75	76-90	91-94	95th percentile -highest	Runoff
Severe hydrologic drought	Moderate hydrologic drought	Below normal	Normal	Above normal	Much above normal		

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



WY 28-Day Average Flow Compared to Historical

Monday, June 17, 2024



Average May 21- June 17 Flows?

- Indicates conditions near the peak runoff
- Most sites near the median
- Above normal for select gages in the NW

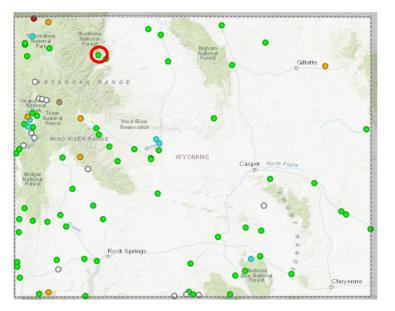
Explanation - Percentile classes							
•		•	•			•	0
Low	<10	10-24	25-75	76-90	>90	High	Not-ranked
LOW	Much below normal	Below normal	Normal	Above	Much above normal		Not-ranked

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

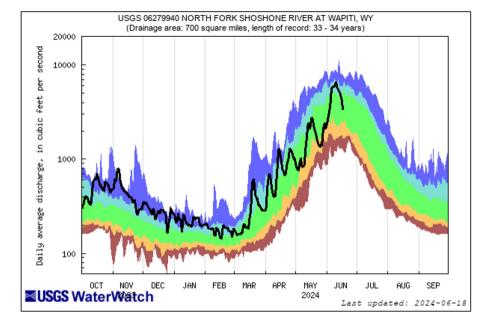


North Fork Shoshone, at Wapiti, WY

Select WY Streamflows



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

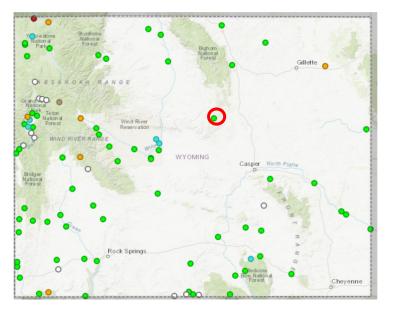


	E	xplana	tion - Pe	ercentile	classes	8	
							_
lowest- 10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Flow
Much below Normal		Below	Normal	Above normal	Much above normal		1104

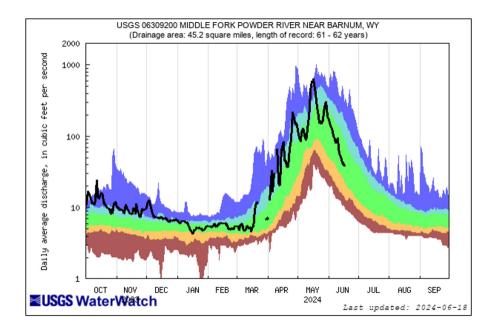


Middle Fork Powder River, Near Barum, WY

Select WY Streamflows



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

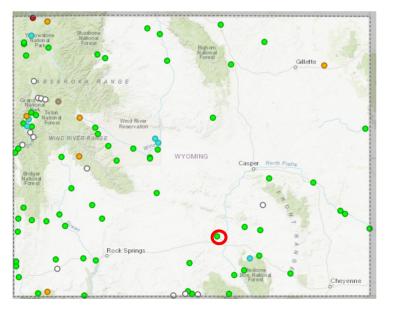


	E	xplana	tion - Pe	ercentile	classes	3	
							_
lowest- 10th percentile	5	10-24	25-75	76-90	95	95 90th percentile -highest	
Much below Normal		Below	Normal	Above	Much above normal		Flow

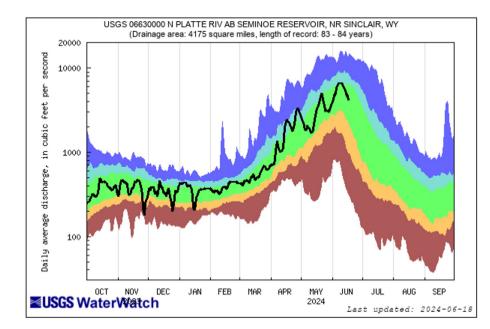


North Platte River ab Seminoe Reservoir, Sinclair, WY

Select WY Streamflows



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

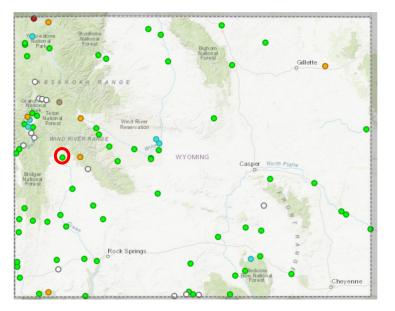


	E	xplana	tion - Pe	ercentile	classes	8	
							_
lowest- 10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Flow
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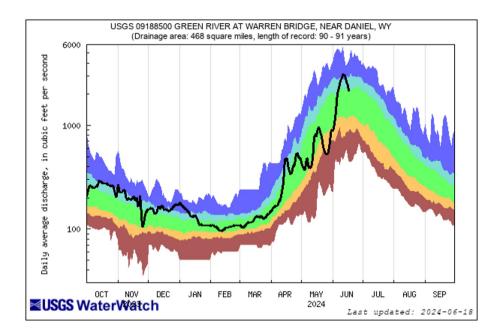


Green River at Warren Bridge, Daniel, WY

Select WY Streamflows



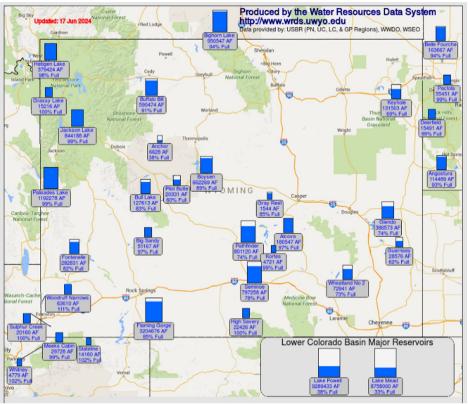
https://dashboard.waterdata.usgs.gov/



	E	xplana	tion - Pe	ercentile	classes	5	
lowest- 10th percentile	5	10-24	25-75	76-90	95	5 90th percentile -highest	
Much below Normal		Below normal	Normal	Above normal	Much above normal		Flow



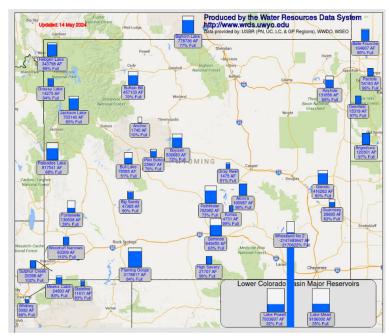
June 20, 2024



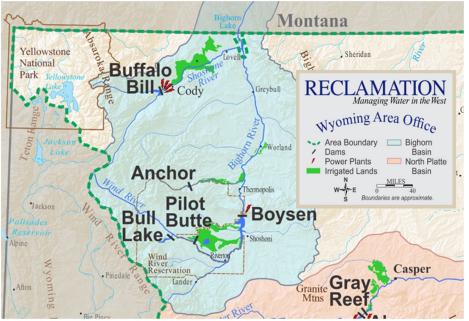
http://www.wrds.uwyo.edu/surface_water/teacups.html

- Most gained significant storage since last month
- Most major reservoirs in NW are near full
- Reservoir in NE/SE are 70 to 80% full.

May 15, 2024



Current Reservoir Conditions: Bighorn System



Bighorn System (June 19):ReservoirContentContentCapacity% of Full% of AvgReleases								
<u>Reservoir</u>	<u>Content</u>	<u>Capacity</u>	<u>% of Full</u>	<u>% of Avg</u>	<u>Releases</u>			
Bull Lake	131,780	152,500	86%	108%	60 cfs			
Buffalo Bill	586,950	646,600	90%	106%	3,000 cfs			
Boysen	673,130	741,600	90%	107%	1,800 cfs			

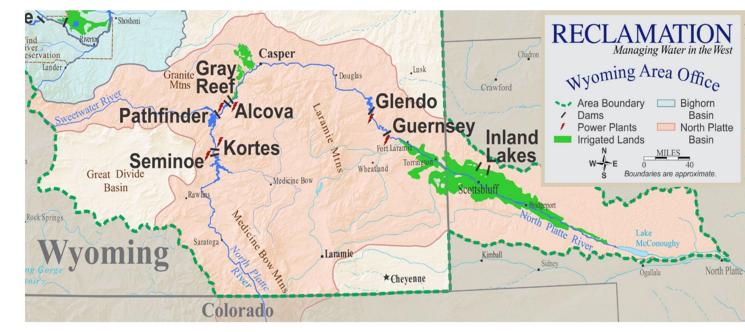




BUFFALO BILL RESERVOIR (BBR) Top 644126 af, 5393.5 ft Current 457133 af, 5368.5 ft To fill 186993 af, 25.0 ft Computed Inflow 3321 cfs Total Outflow 1759 cfs	3,000 cfs
	BOYSEN RESERVOIR (BOYR) Top 741594 af, 4725.0 ft Current 536883 af, 4713.1 ft To fill 204711 af, 11.9 ft Computed Inflow 1232 cfs Total Outflow 2206 cfs
58 BULL LAKE (BLR) Top 152459 af, 5805.0 ft Current 78585 af, 5778.9 ft To fill 73874 af, 26.1 ft Computed Inflow 288 cfs Total Outflow 38 cfs	s cfs 1,800 cfs

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

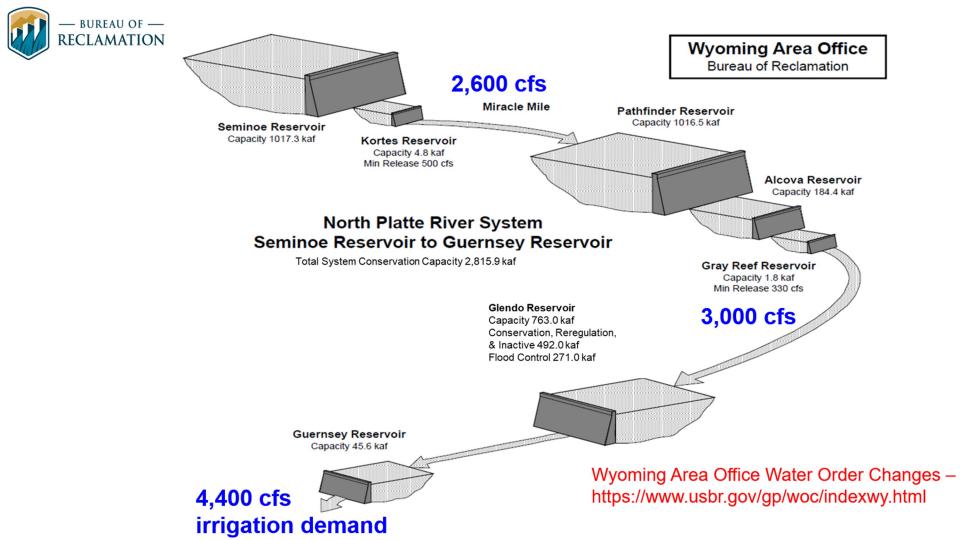
Current Reservoir Conditions: North Platte System



North Platte System (June 20):

<u>Reservoir</u>	<u>Content</u>	<u>Capacity</u>	<u>% of Full</u>	<u>% of Avg</u>
Seminoe	806,338	1,017,300	79%	110%
Pathfinder	796,463	1,070,000	74%	121%
Glendo	377,940	492,000	85%	76%







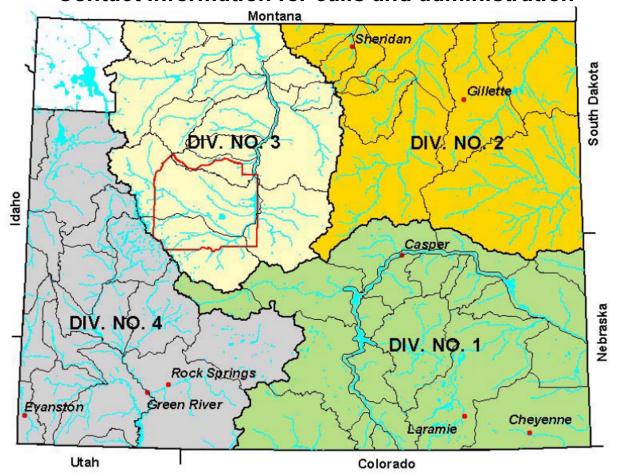
Division 3

Joshua Fredrickson, 856-0747

Division 4

Kevin Payne, 279-3441

WY SEO Divisions and Superintendents Contact information for calls and administration

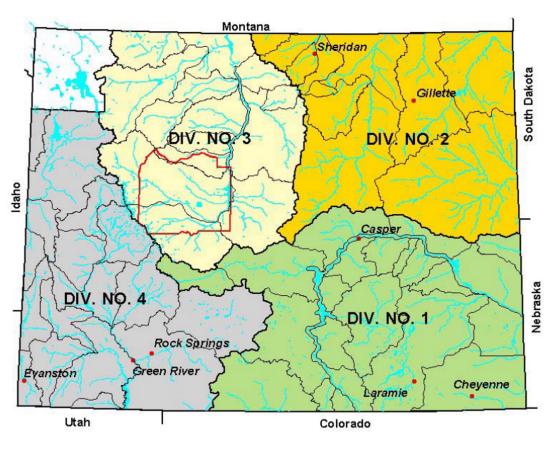


Division 2 David Schroeder, 674-7012

Cory Rinehart, 532-2248

Division 1



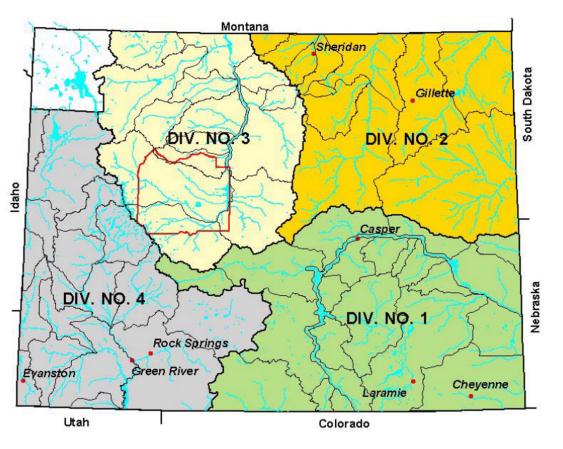


As of June 14,

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

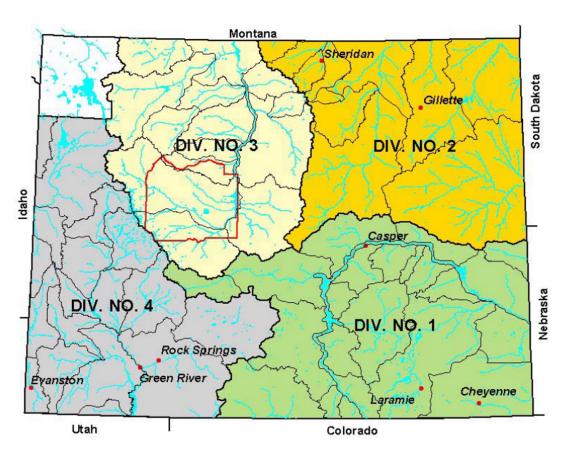




As of June 14,

No Streams in **Division 2** under regulation



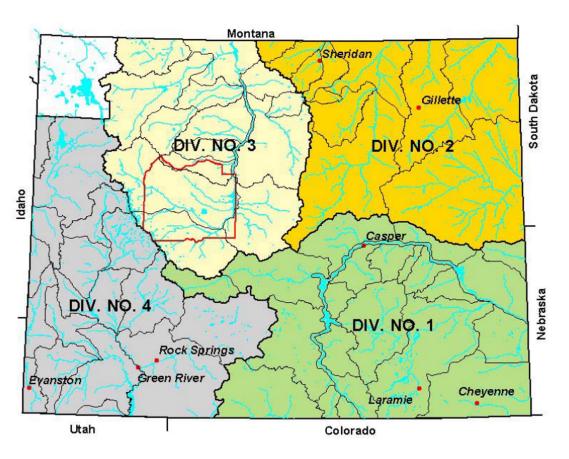


As of June 14,

Streams in **Division 3**:

• Bennett-Little Rock District 10: regulated to 1900





As of June 14,

• No Streams in **Division 4** under regulation







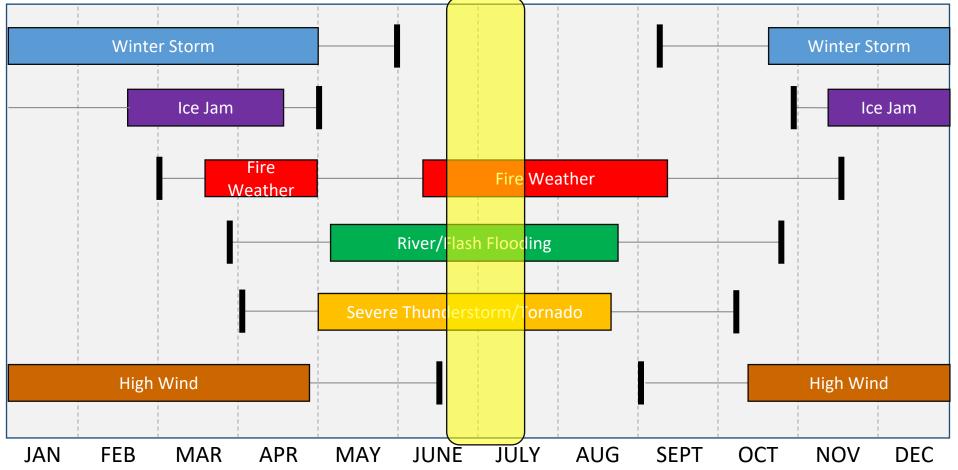


Weather Info & Forecasts



NWS Wyoming Typical Hazard Calendar

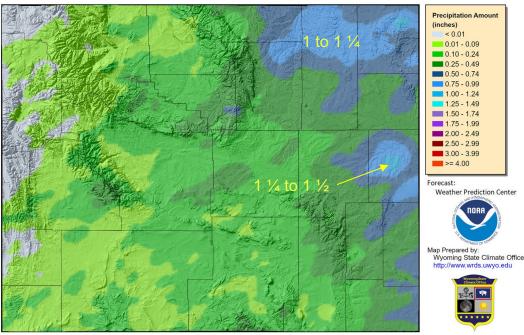






7-Day Total Precipitation Forecast (June 20 - June 27)

7-Day Quantitative Precipitation Forecast 20 Jun 2024



Provisional data, subject to revision

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 20 Jun 2024 http://www.wrds.uwyo.edu

- Chance of precipitation today through Friday night
- Saturday starts a stretch of dry, windy and warm weather across the state
- Widespread temperatures into the 90s by Sunday
- A few places in the NE and E likely to get more than 1" of precipitation



8-14 Day Outlooks (June 27 to July 3)



Probability

Below Normal

Leaning

Below

Likely

Below

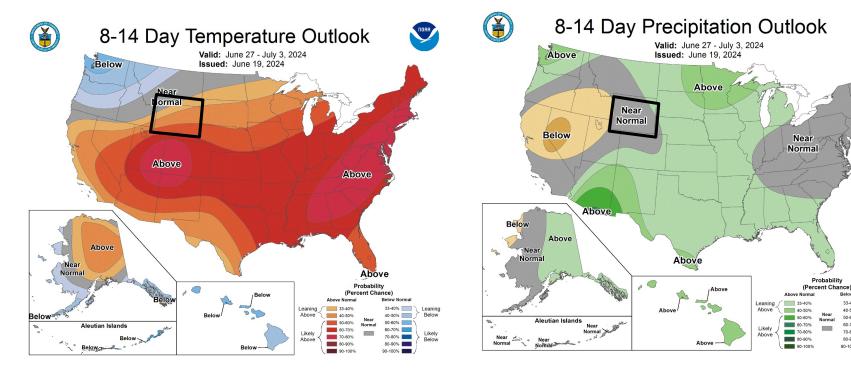
33-40%

\$0-50%

0-90%

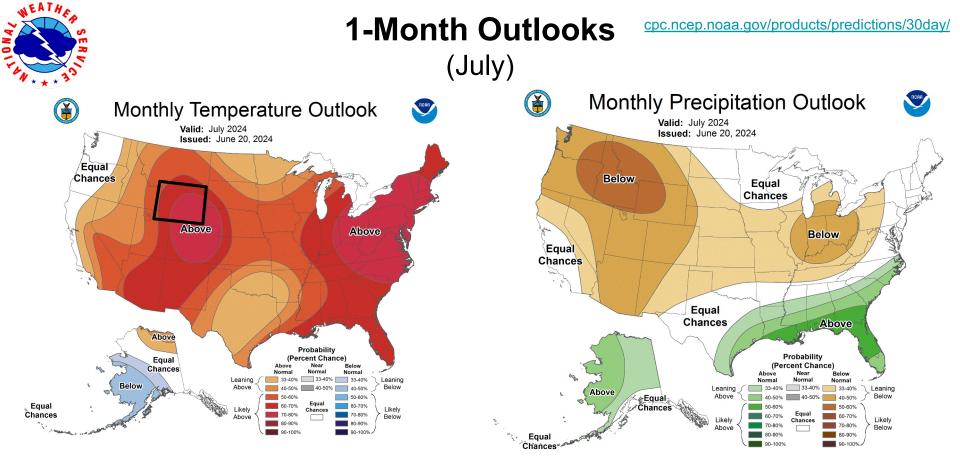
00.100%

NOAR

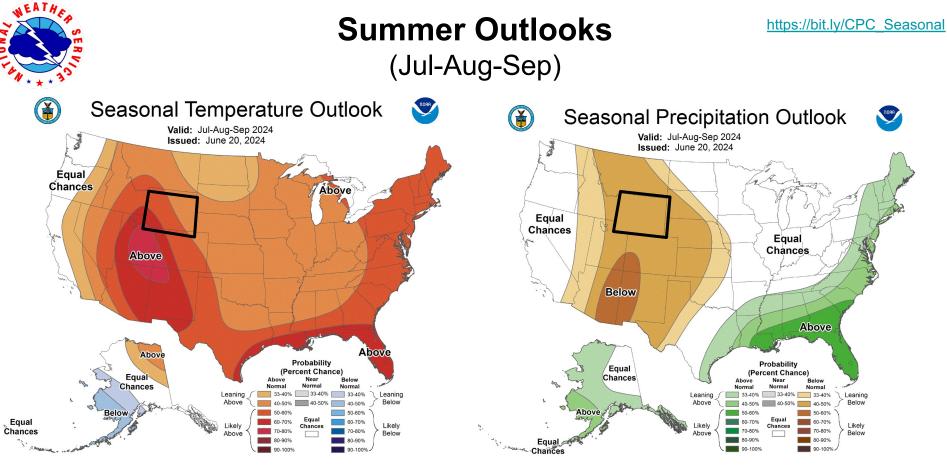


Moderate above-normal signal across most of the state. Strengthening from weak in NW to strong in SE.

Near Normal precipitation signal across the state.



- Strong above-normal signal across the entire state. 60-80%
- Below-normal signals of 50-60% across the west and 40-50% below in the east.

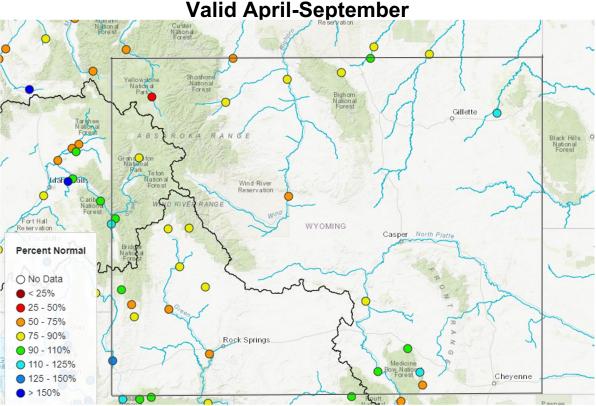


• Higher confidence in above average temperatures (40-70%)

• Higher confidence in below average precipitation (40-50%)



Wyoming Water Supply Outlook



https://www.cbrfc.noaa.gov/wsup/graph/west/map/esp_map.html

April thru September runoff volumes expected to be below normal.

This graphic depicts the NWS water supply outlook locations, colored by the percent of April-thru-September volumetric normal.

Most locations are expected to see belownormal volumes this season (yellow, orange, and red colors).

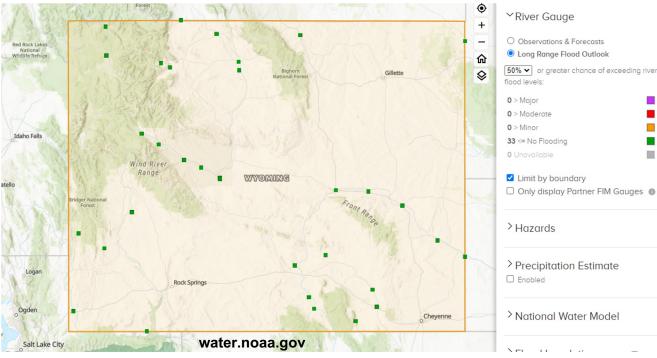
The Snake, Bear, and North Platte systems doing well (blue and green colors).

*Please note that the Colorado River basin colors reflect April-thru-July percent-of-normals.



Wyoming Flood Potential Update

Valid June, July and August



No riverine flooding is expected through August

— ~

This graphic depicts the NWS river forecast locations. colored by the highest flood category expected during the next 90-days.

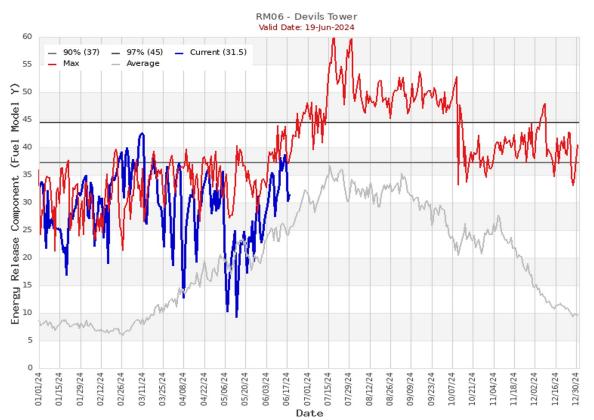
Snowmelt runoff peak flow has now passed.

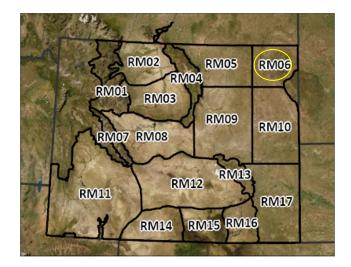


Fuel Moisture Content Basics

- **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 -** ¹/₄" **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.

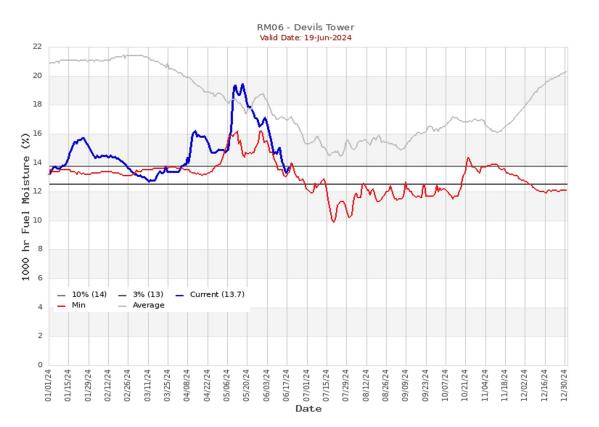


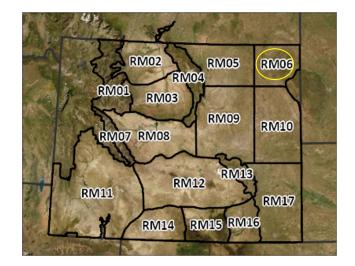






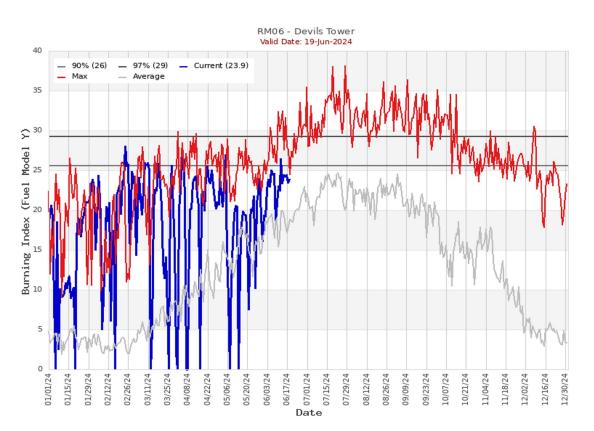
1000 Hour Fuel Moistures

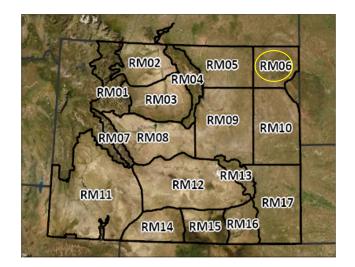




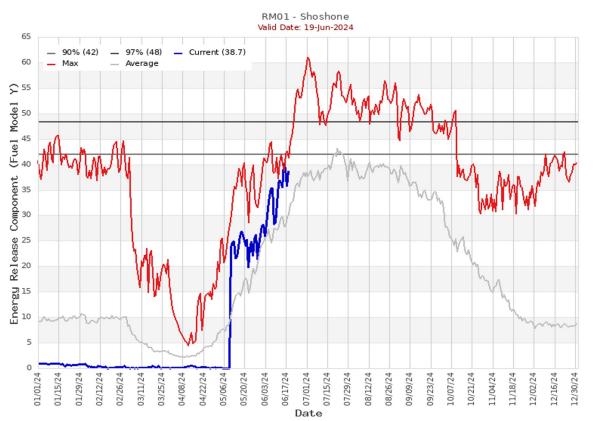


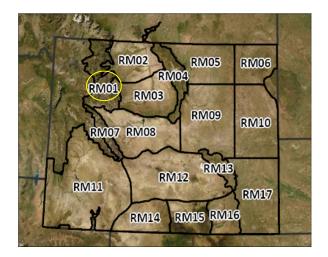
Burning Index



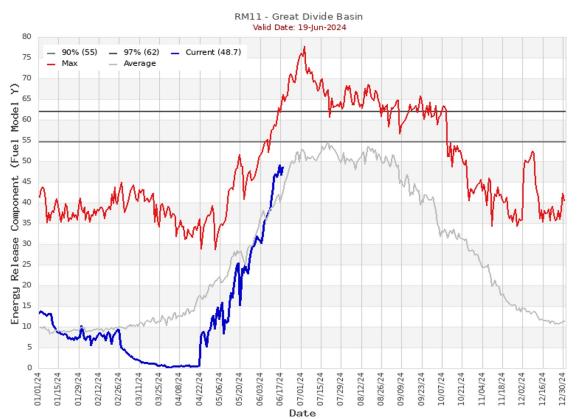


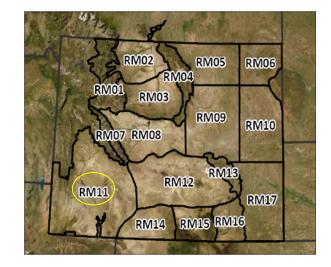




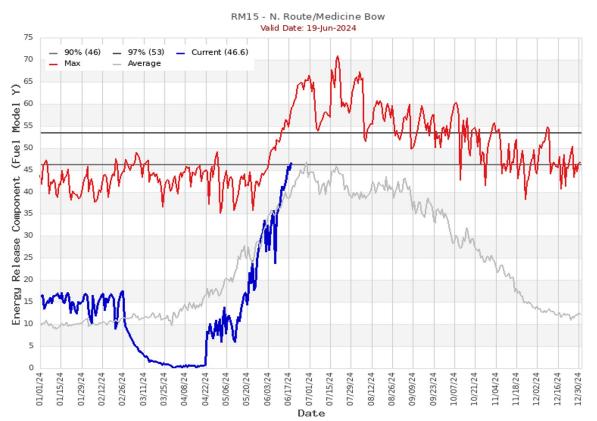


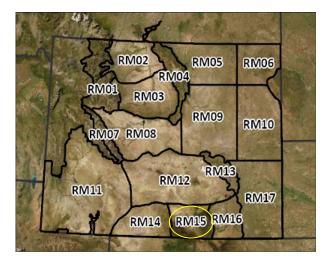




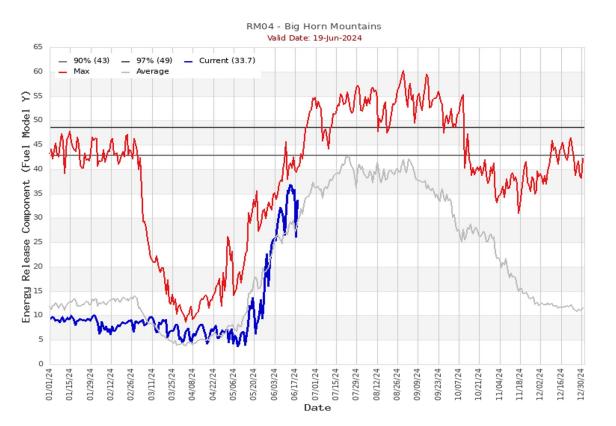


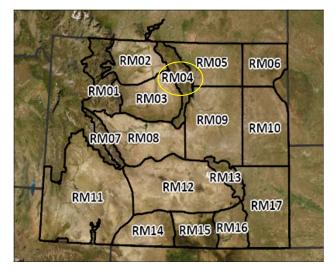












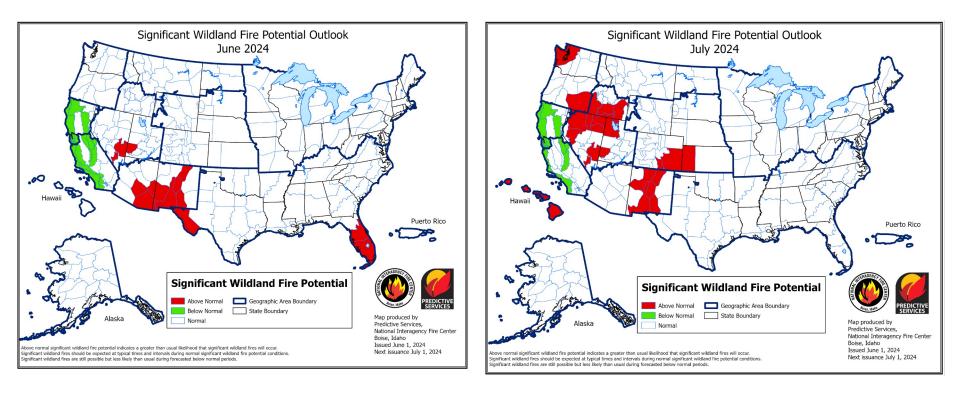


June 2024

Wildland Fire Potential and Outlook

National Outlook- Released Monthly on 1st of the month

July 2024

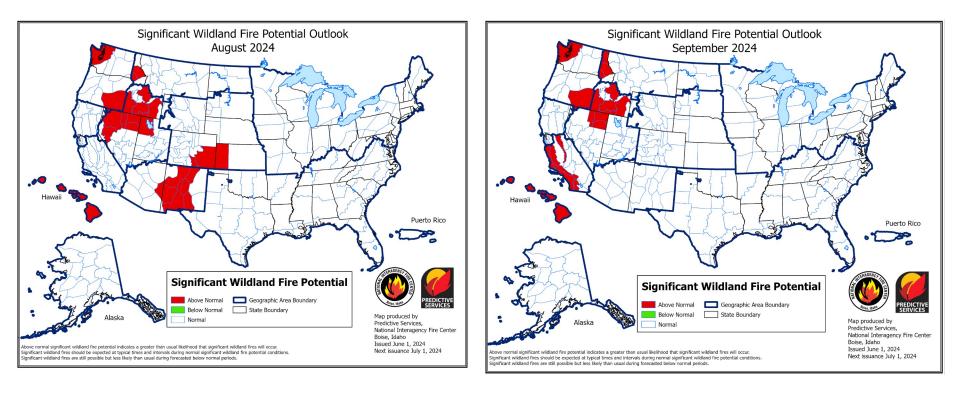




August 2024

National Outlook- Released Monthly on 1st of the month

September 2024















Geri Swanson **Tony Bergantino** The Wyoming Conditions National Weather Service WRDS & State Climate Office Monitoring Team (WCMT) Riverton organized and hosted this webinar. antonius@uwyo.edu geri.swanson@noaa.gov The WCMT is a collaborative effort of state, federal, tribal, and Aaron Fiaschetti Kevin Low university partners that monitor conditions & impacts throughout the NOAA NWS MBRFC USGS state on a weekly basis - and afiaschetti@usgs.gov kevin.low@noaa.gov communicate this information to the U.S. Drought Monitor among Chase Lane George Finnegan others. Learn more at: **Bureau of Reclamation** Bureau of Land Management https://drought.wyo.gov gsfinnegan@usbr.gov clane@blm.gov **Jeff Cowley** Windy Kelley **Thank you!** WY State Engineer's Office **UW Extension & USDA NPCH** jeff.cowley@wyo.gov wkelley1@uwyo.edu

Name of Website	Brief Description + Frequency Updated	URL
Vegetation Drought Response Index	Weekly	http://www.wrds.uwyo.edu/drought/VegDRI- Current.html
Daily Mean and Extreme temperatures for Wyoming Cities	Monthly	http://www.wrds.uwyo.edu/temperature/extre mes/citylist.html