WY Conditions & Outlooks:

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

June 16, 2022

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

Presentation Outline

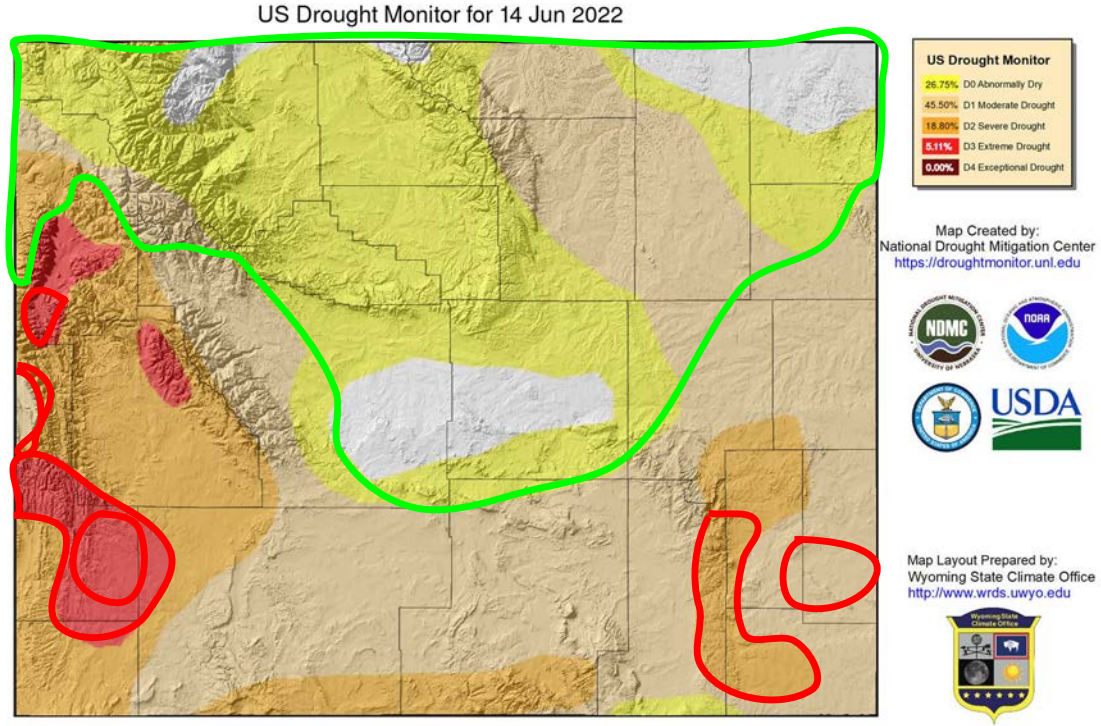
- **Current Conditions:** Overview
  - Streamflow
  - Reservoir Supply
  - Water Calls and Allocations
- **Outlooks:** Temperature & Precipitation
  - Fuels' Status & Wildland Fire Outlook
- **Questions**

Current Conditions

US Drought Monitor for June 14, 2022

(Released Thursday, June 16, 2022)

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

https://youtu.be/45MQ1GB-uTc

Improvements and degradations in the last month. Recent precipitation is starting to erode some of the areas but longer term dryness is filling in others.

https://droughtmonitor.unl.edu

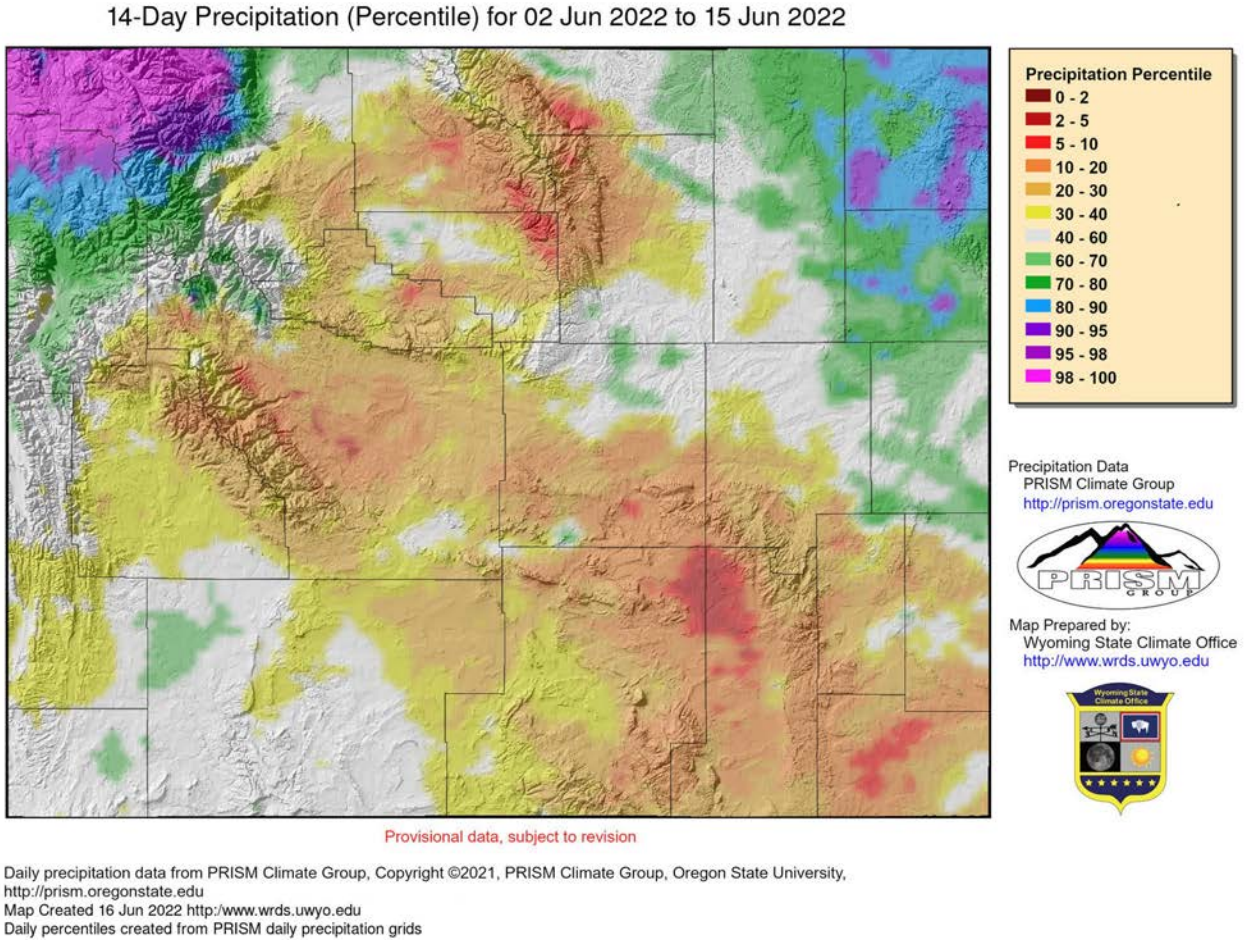
droughtmonitor.unl.edu

14-Day Precipitation Percentile (02 Jun 2022 to 15 Jun 2022)

Above Median:
- Northwest
- Northeast

Below Median (Areas of Concern):
- Southeast
- Bighorns and Bighorn Basin
- Fremont County

Above Median (Areas of Concern):
- Northwest

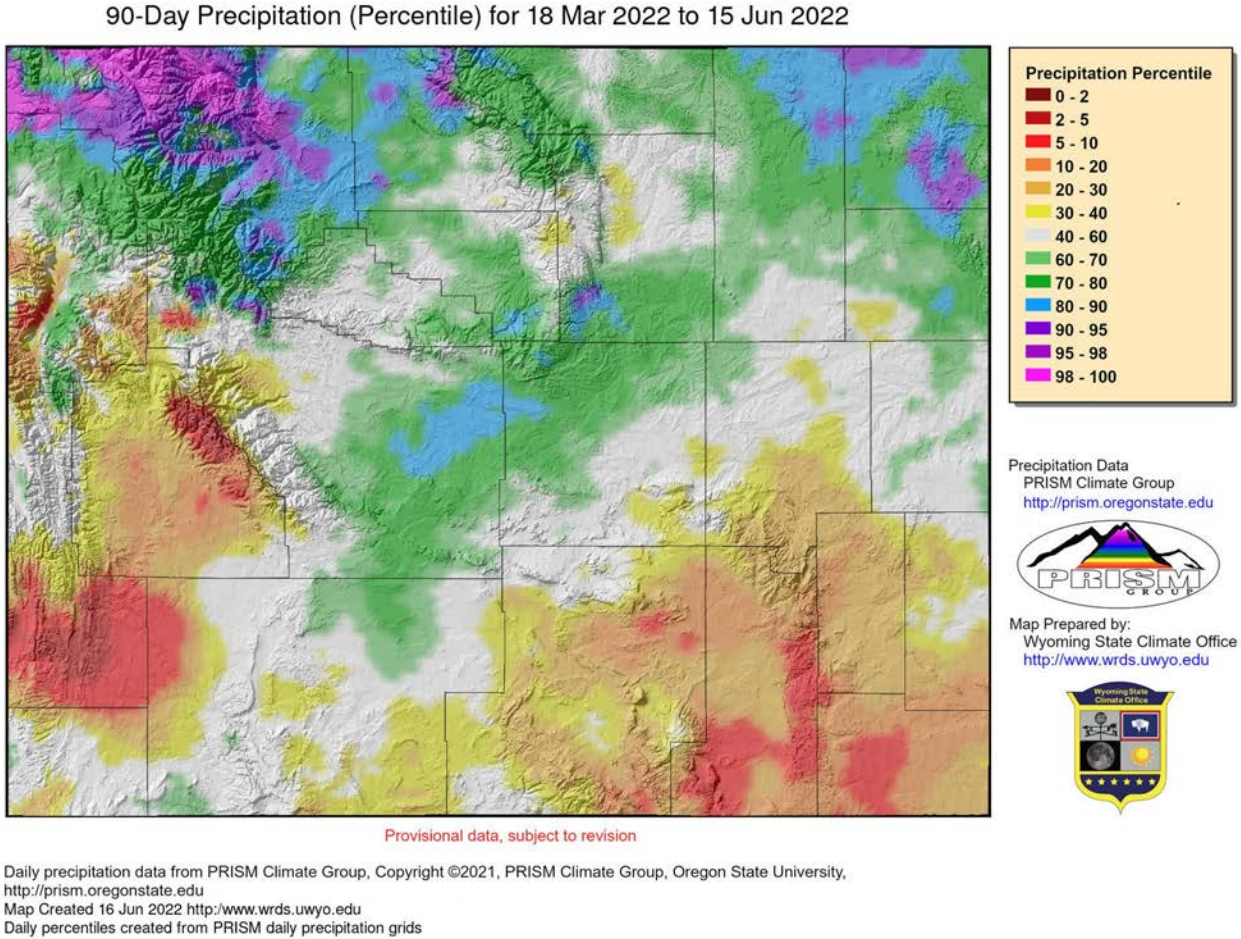


90-Day Precipitation Percentile (18 Mar 2022 to 15 Jun 2022)

Above Median:
- Much of north and central Wyoming

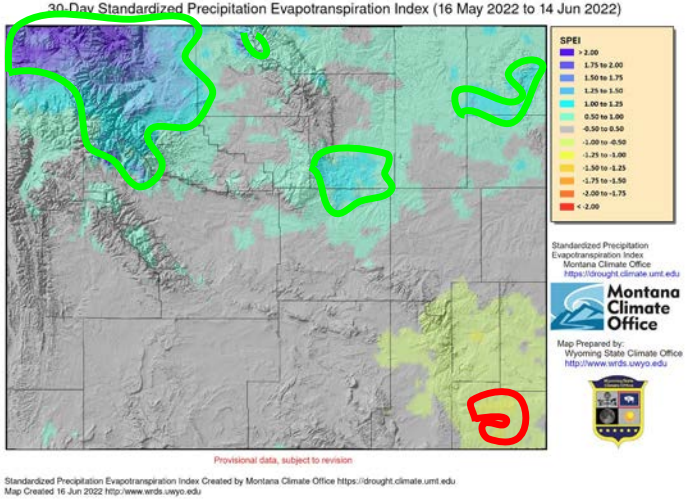
Below Median (Areas of Concern):
- Tetons
- Sublette County (esp Winds)
- Southern Lincoln County
- Western Sweetwater County
- Southeast

Above Median (Areas of Concern):
- Northwest

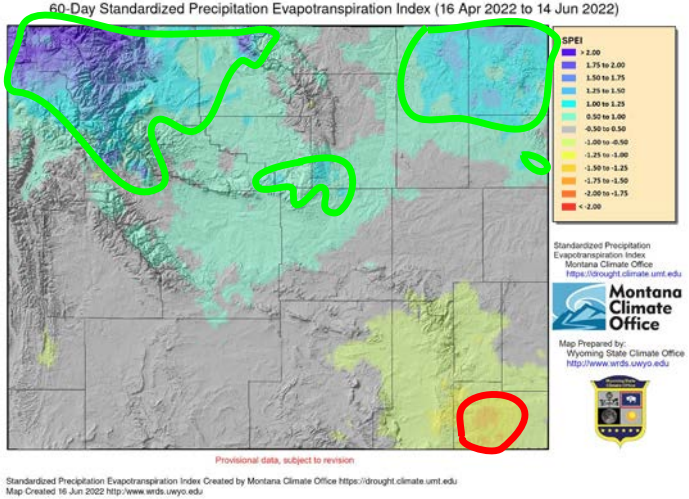


WRDS Water Resources Data System

30-Day



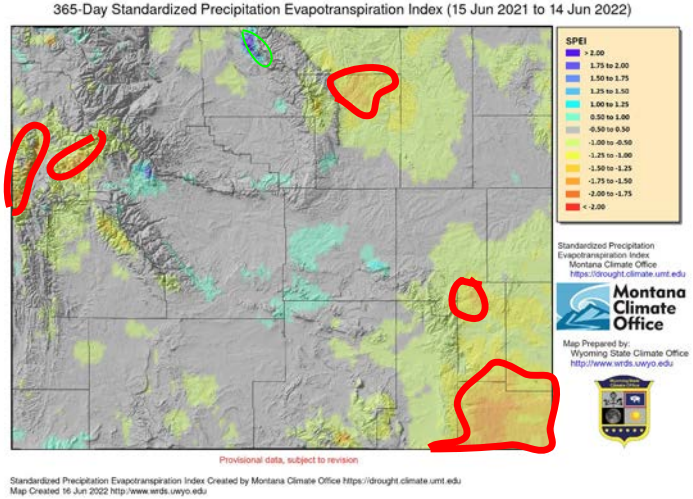
60-Day



Standardized Precipitation Evapotranspiration Index (SPEI)

Medium-term wetness, longer-term dryness with areas improving in the southeast.

1-Year

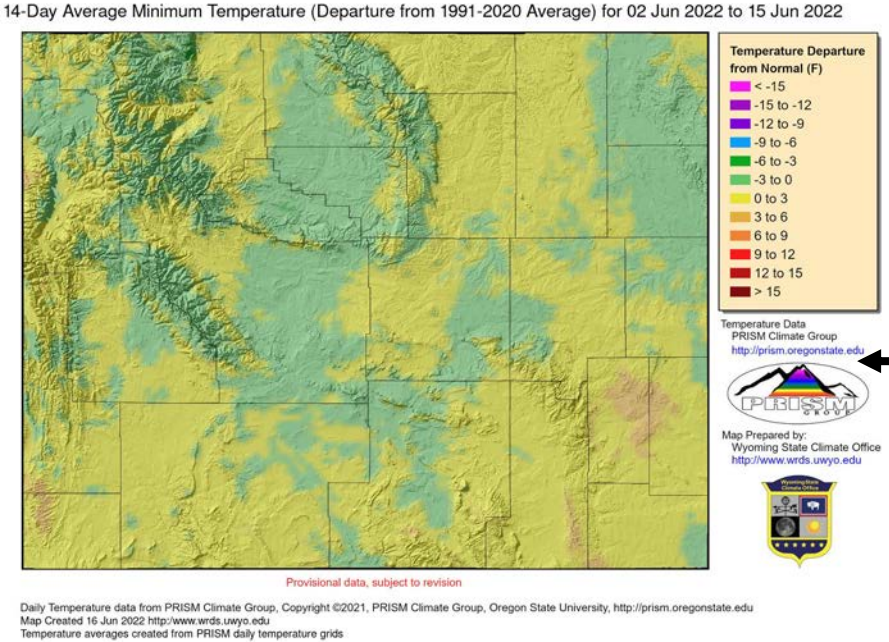


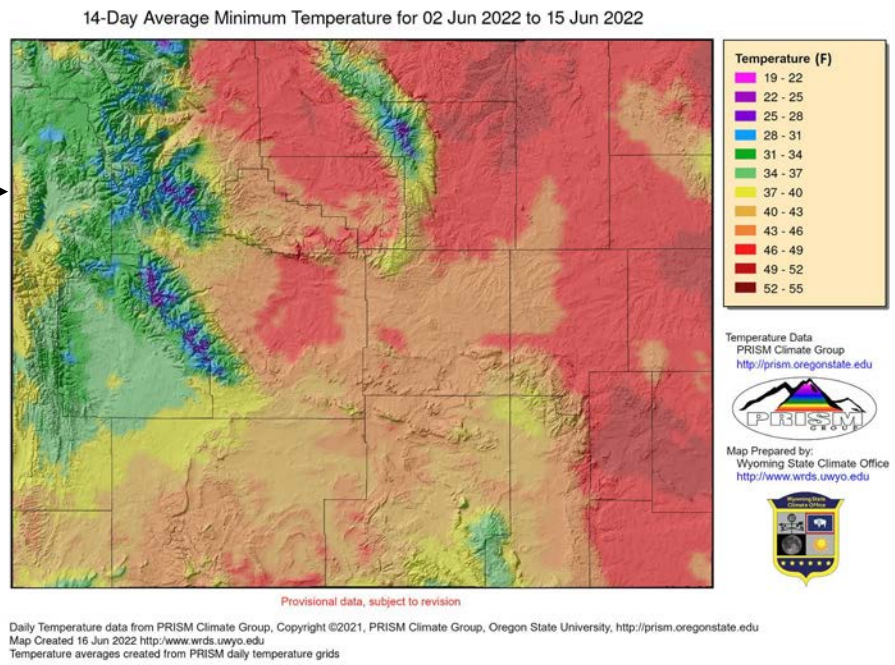
https://drought.climate.umt.edu

WRDS Water Resources Data System

14-Day Average Minimum Temperature (02 Jun to 15 Jun)

- Lows still below 32F at Higher Elevs
- Upper 40s parts of north and east





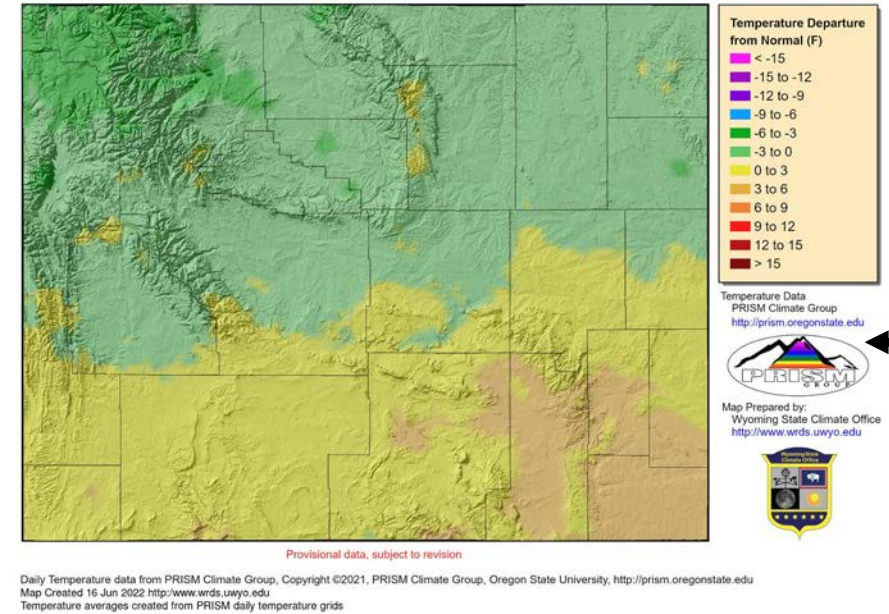
14-Day *Departure from* Normal Average Minimum Temperature

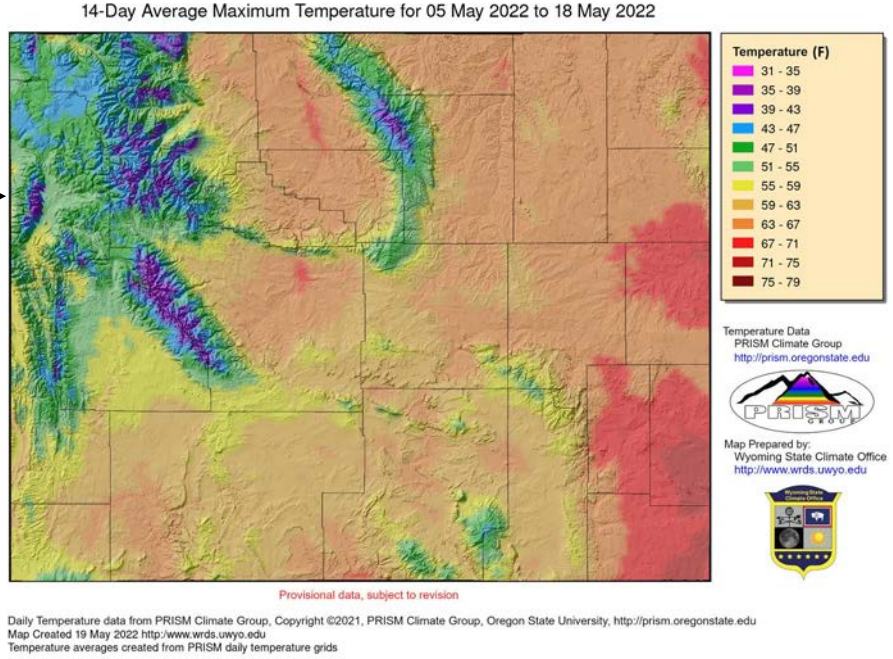
- +/- 3F Statewide with few areas as much as 6F above average

WRDS Water Resources Data System

14-Day Average Maximum Temperature (02 Jun to 15 Jun)

- Average Max above mid-30sF statewide
- Low to Mid 70sF Southeast



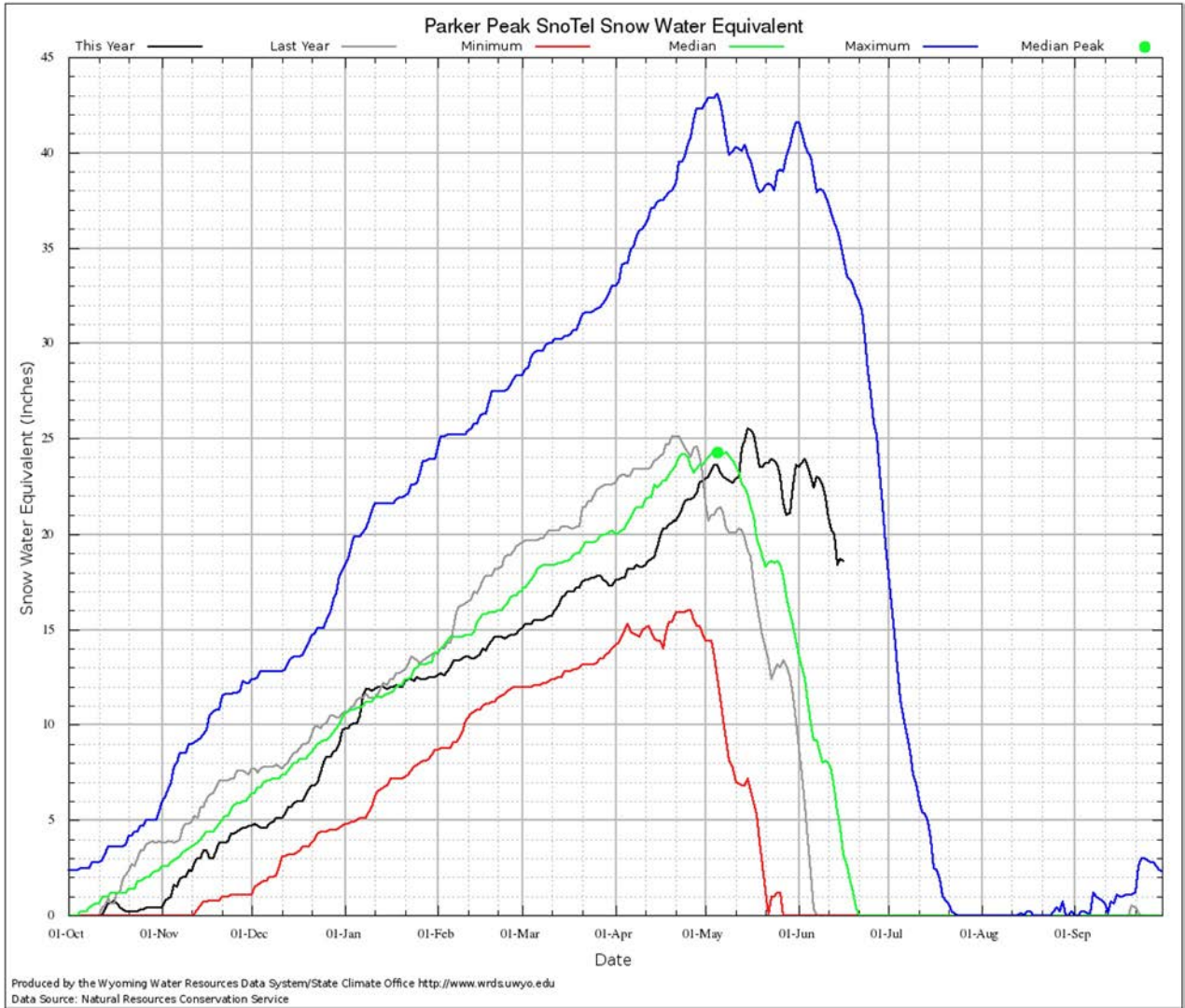


14- Day *Departure from* Normal Average Maximum Temperature

- North 0F to 6F below average
- South 0F to 3F above average
- Southeast 3F to 6F above average

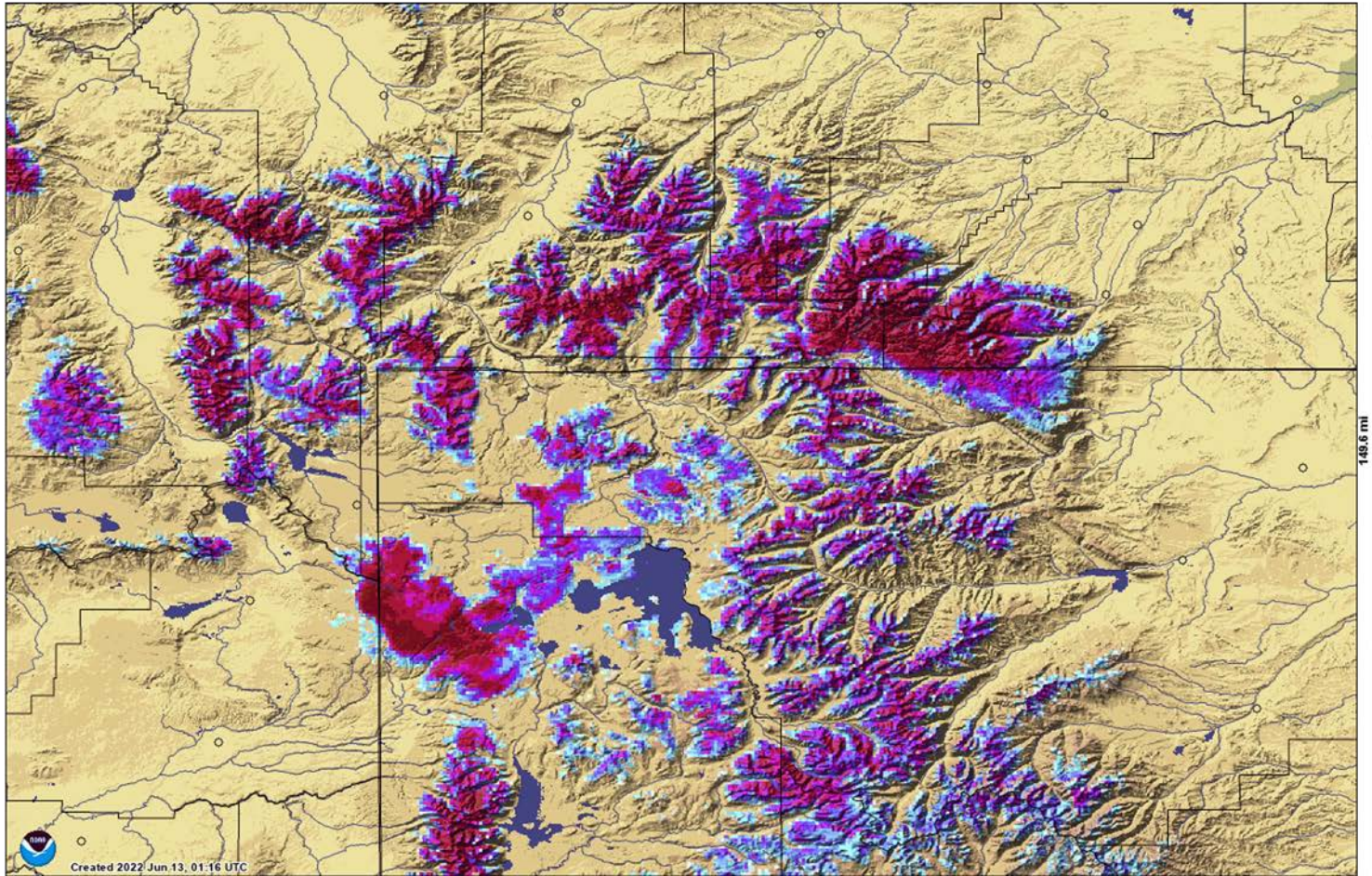
- Though lower than normal basinwide, snowpack stayed longer in season..
- Some Snotels did reach or exceed median snowpack.

https://bit.ly/3HxGW6Q



Snow Water Equivalent at 0900 MDT on 12 June 2022

National Operational Hydrologic Remote Sensing Center Analysis



Inches of water equivalent

>	30
20 to	30
18 to	20
16 to	18
14 to	16
12 to	14
10 to	12
8 to	10
6 to	8
4 to	6
2 to	4
1 to	2
trace to	1

Not Estimated

Elevation in feet

>	13124
8203 to	13124
3281 to	8203
3 to	3281
<	3

Snow Temperature at 0900 MDT on 12 June 2022

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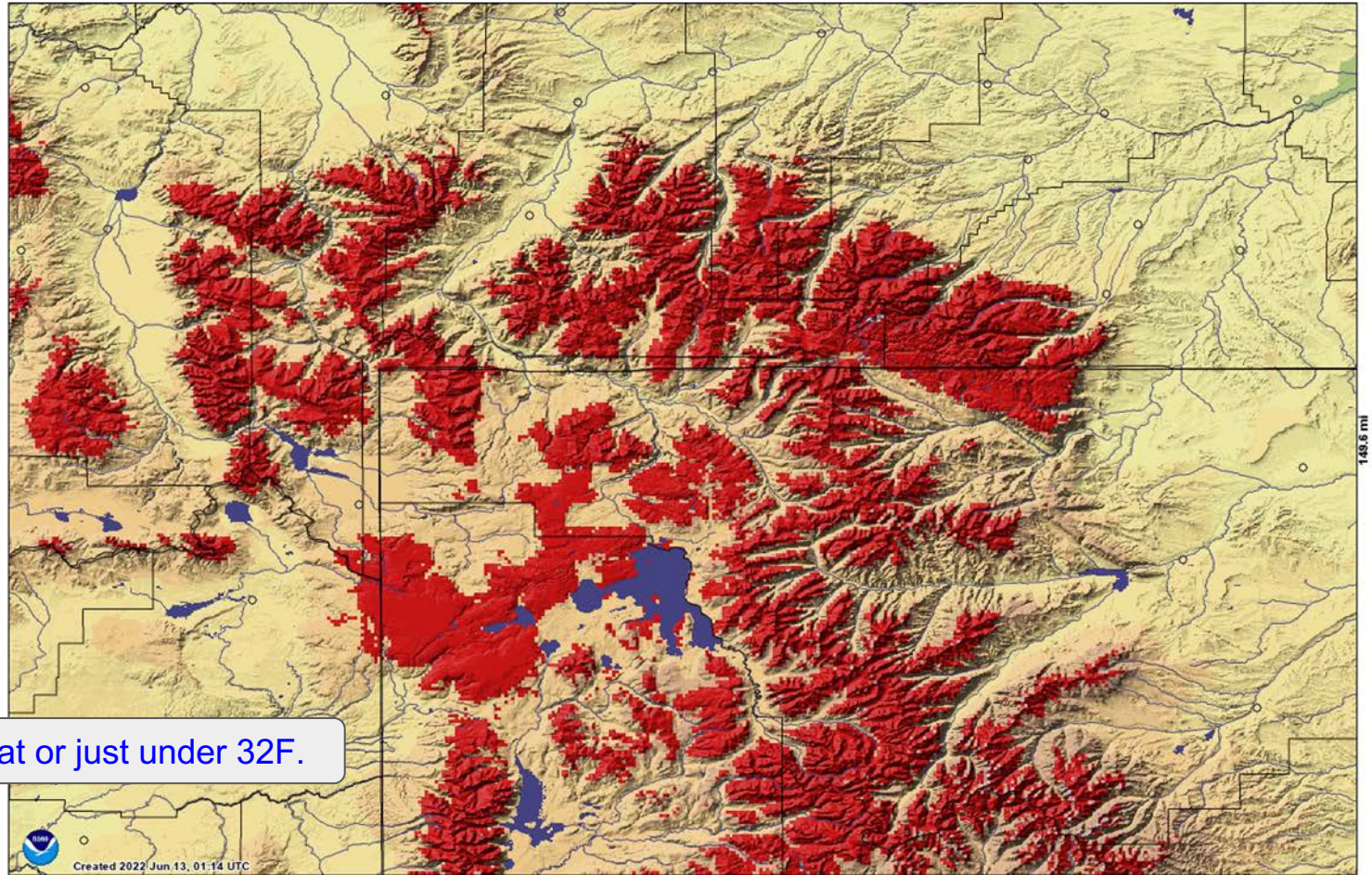


Degrees Fahrenheit

31.9 to 32.0
31.8 to 31.9
31.1 to 31.8
30.2 to 31.1
26.6 to 30.2
24.8 to 26.6
23.0 to 24.8
21.2 to 23.0
17.6 to 21.2
14.0 to 17.6
5.0 to 14.0
-4.0 to 5.0
-22.0 to -4.0
< -22.0

Not Estimated

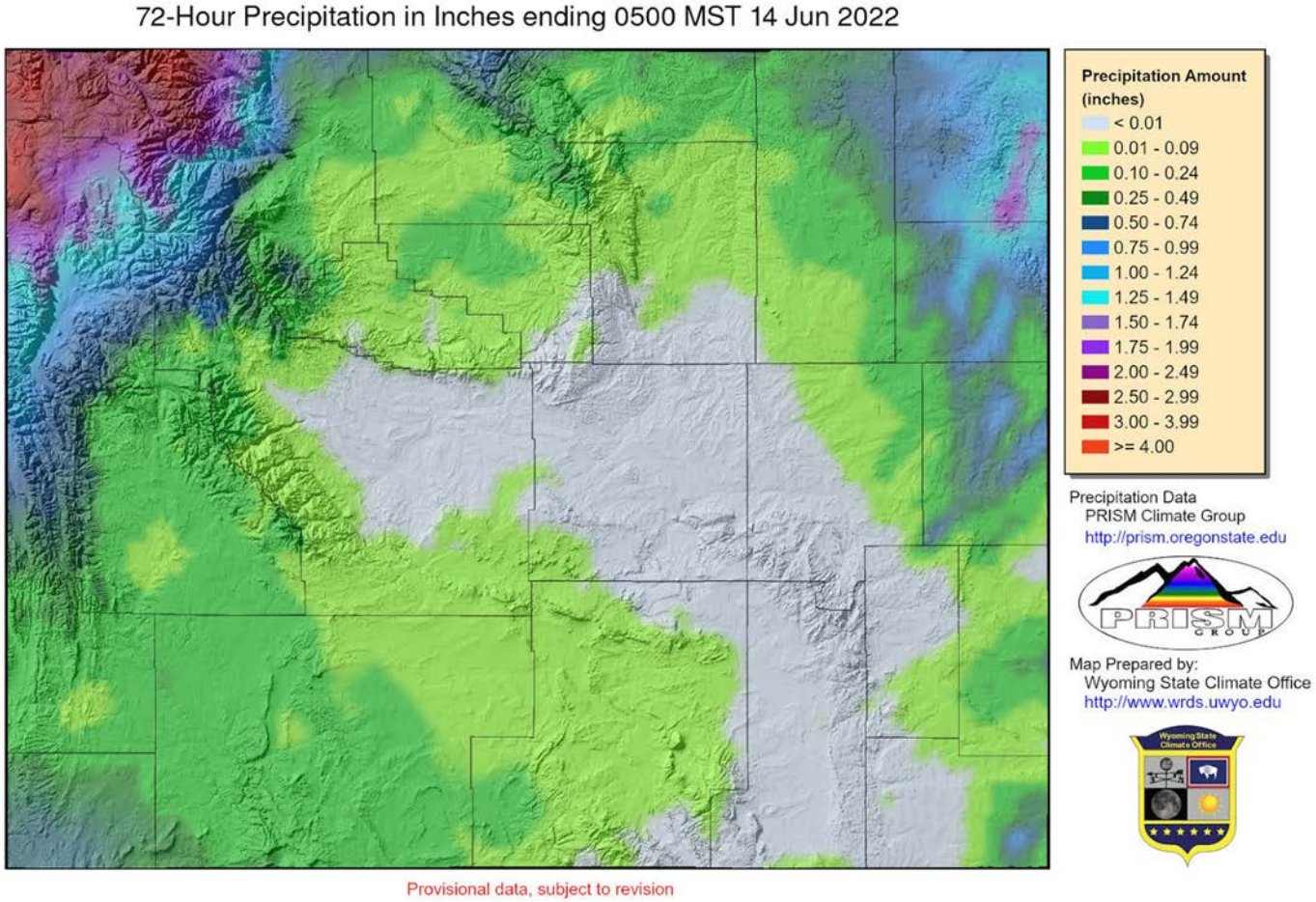
Elevation in feet

> 13124
8203 to 13124
3281 to 8203
3 to 3281
< 3

Snowpack at or just under 32F.

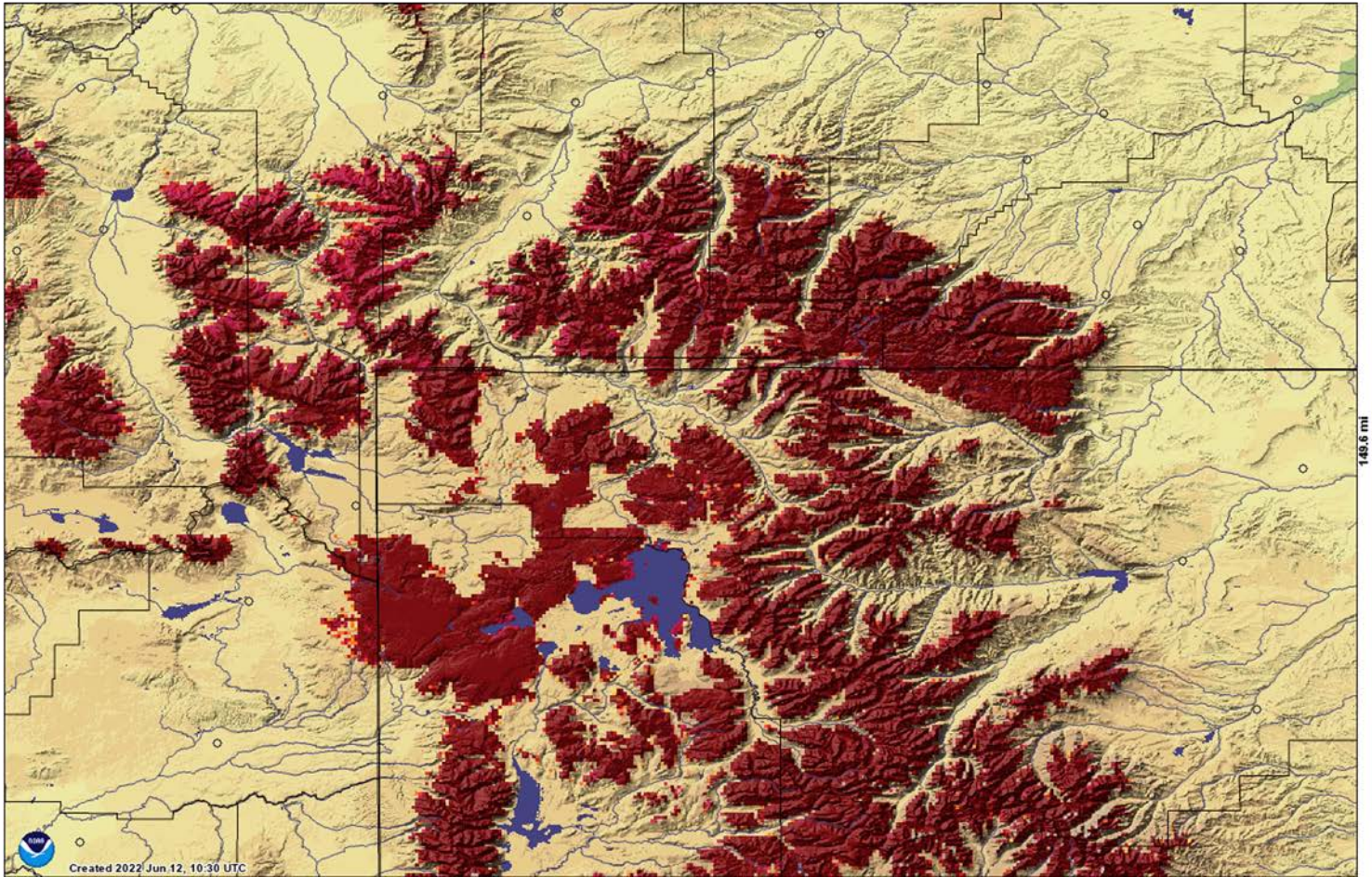
WRDS Water Resources Data System

- Warmer temperatures especially at night quickly melting snow.
- Streams already filling with snowmelt.
- Melting snow and rain the previous week led to increased soil moisture.
- Heavy rains 11-13 June fell on melting snowpack and saturating ground.



Snow Melt in inches during 11 June 2022

National Operational Hydrologic Remote Sensing Center Analysis



Inches of water equivalent

> 2.0
1.4 to 2.0
0.98 to 1.4
0.79 to 0.98
0.59 to 0.79
0.39 to 0.59
0.20 to 0.39
0.16 to 0.20
0.12 to 0.16
0.08 to 0.12
0.04 to 0.08
0.02 to 0.04
trace to 0.02
0.00 to trace

Not Estimated

Elevation in feet

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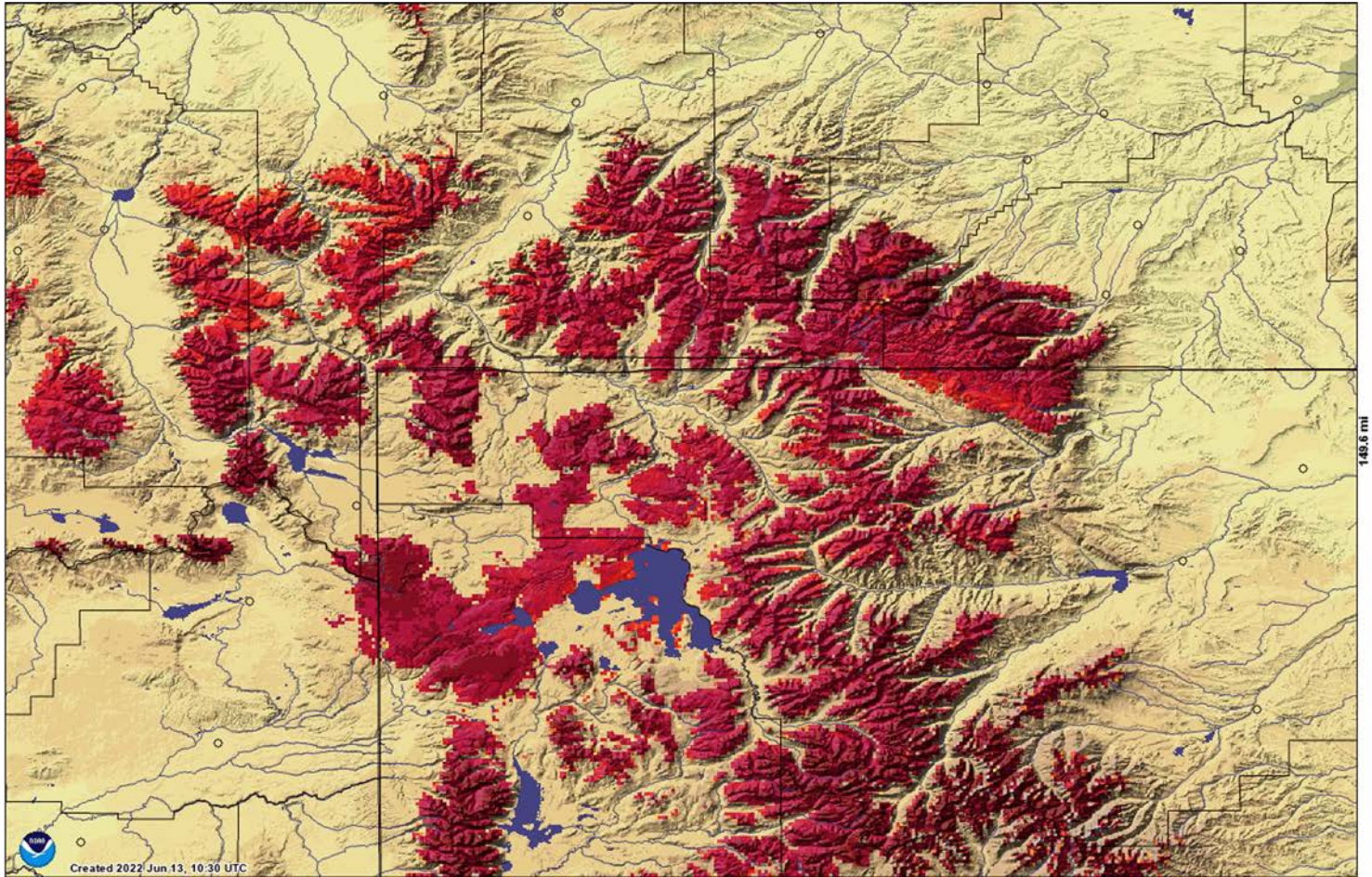
8203 to 13124
3281 to 8203
3 to 3281
< 3

Snow Melt in inches during 12 June 2022

National Operational Hydrologic Remote Sensing Center Analysis



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trace to 0.02
0.00 to trace

Not Estimated

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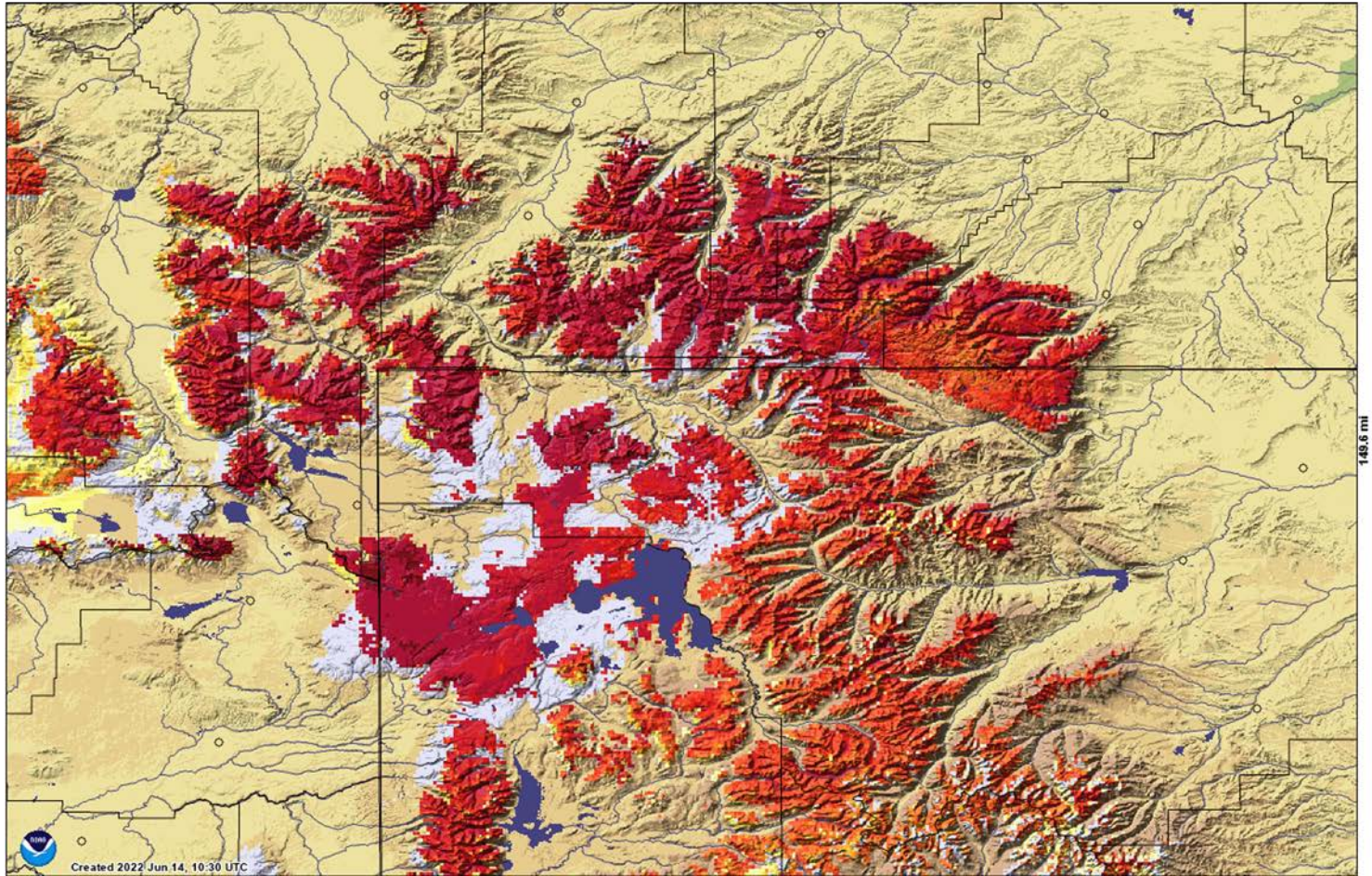
> 13124
8203 to 13124
3281 to 8203
3 to 3281
< 3

Snow Melt in inches during 13 June 2022

National Operational Hydrologic Remote Sensing Center Analysis



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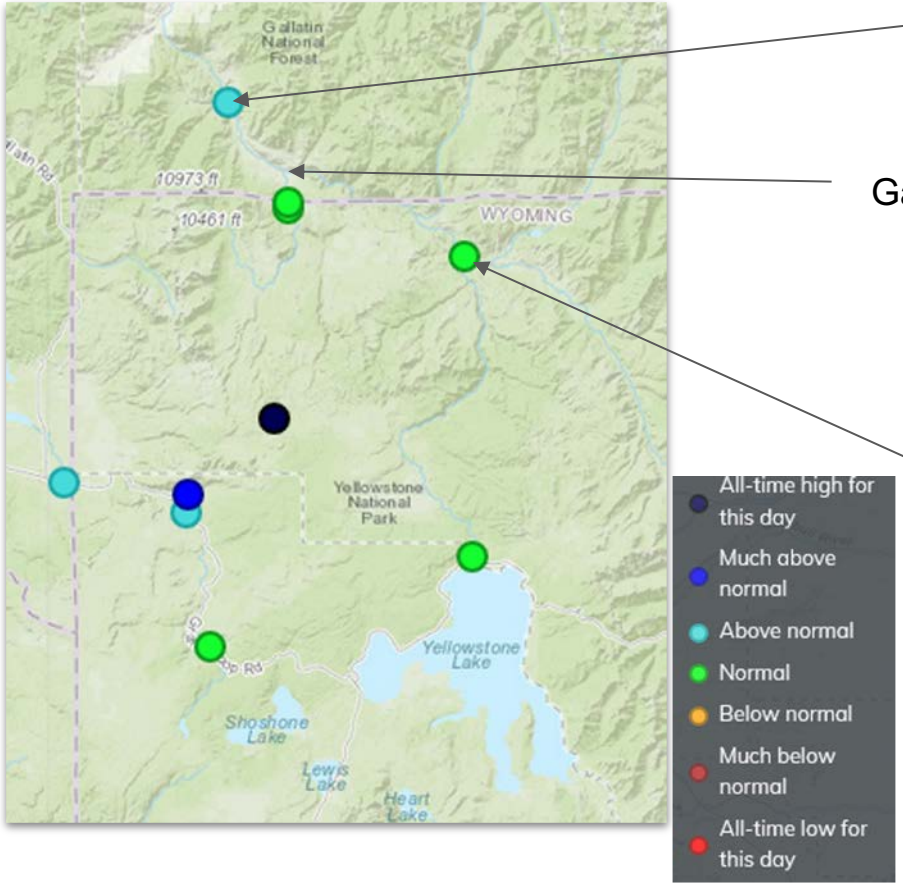
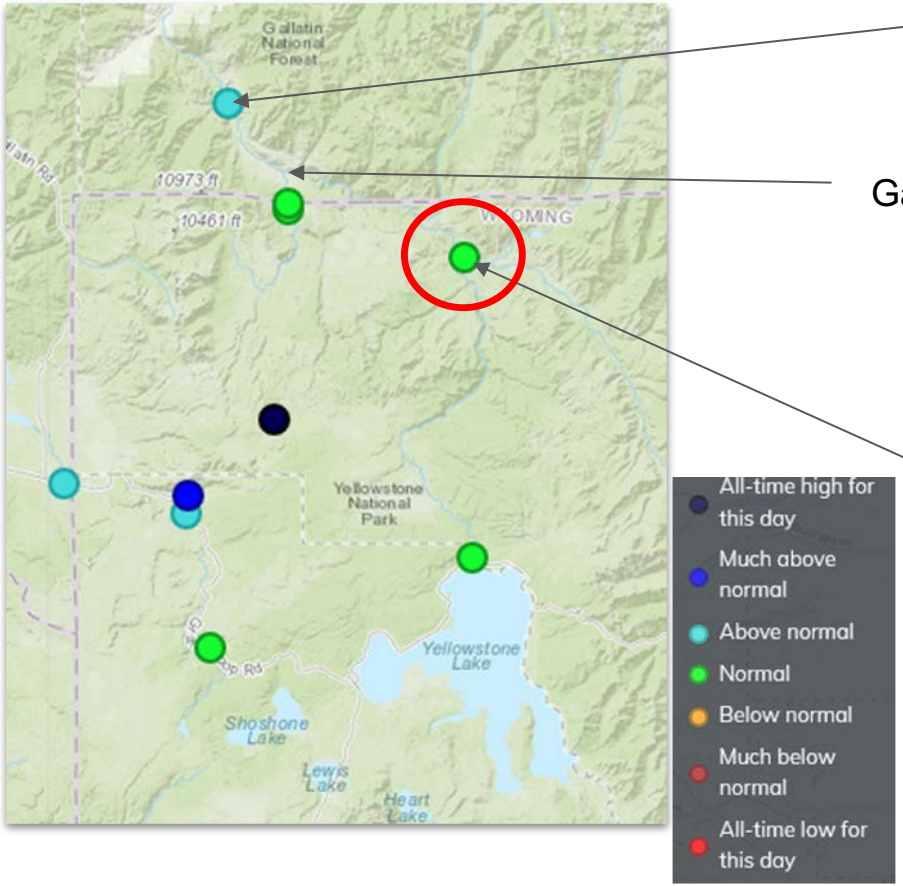


Yellowstone River at Corwin Springs, MT (USGS Gauge 06191500)

Gardiner, MT

Lamar River near Tower Ranger Station (USGS Gauge 06188000)

Several long-term stream gauges saw record high flows



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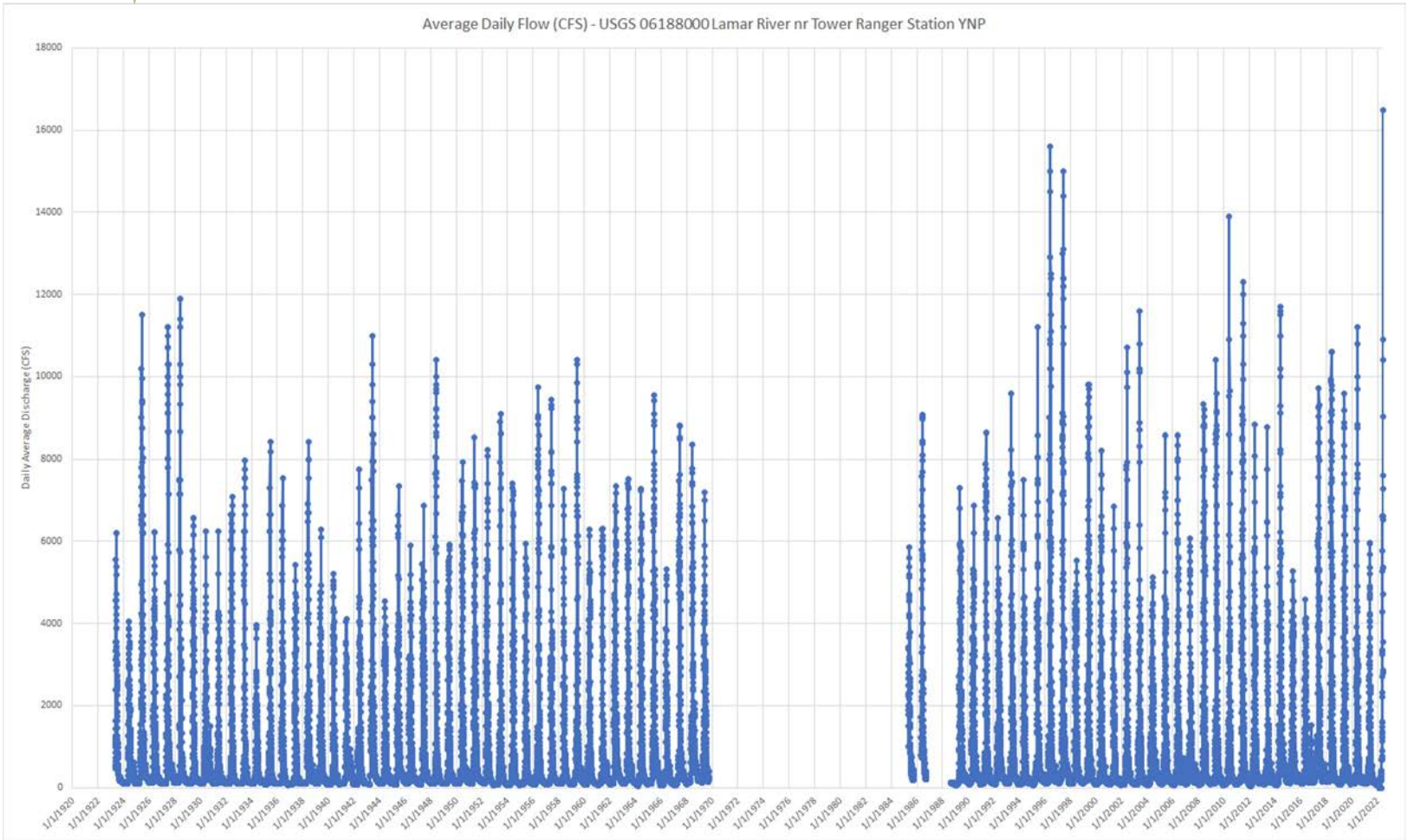
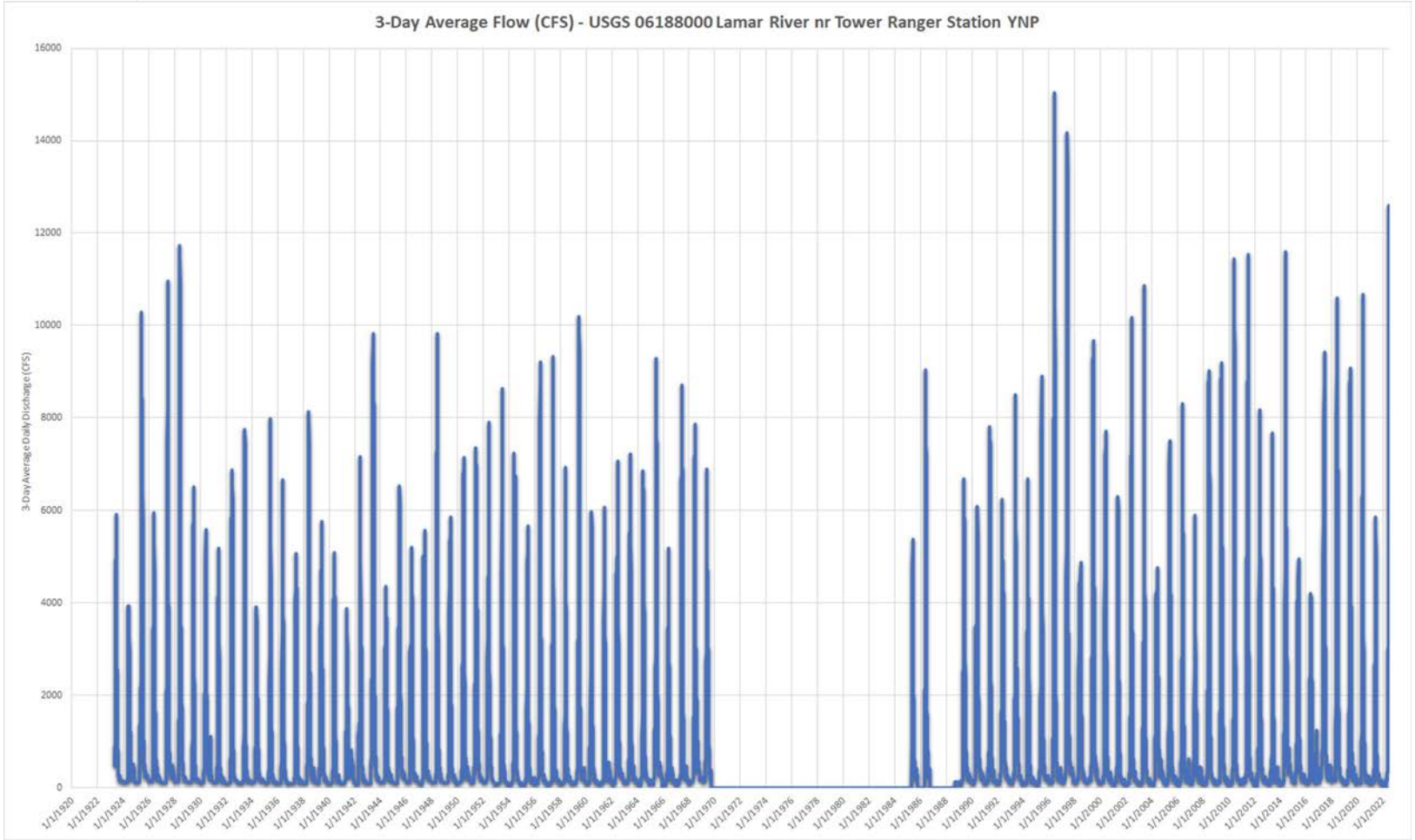
WRDS Water Resources Data System

Average Daily Flows in Cubic Feet per Second - Lamar River near Tower Ranger Station



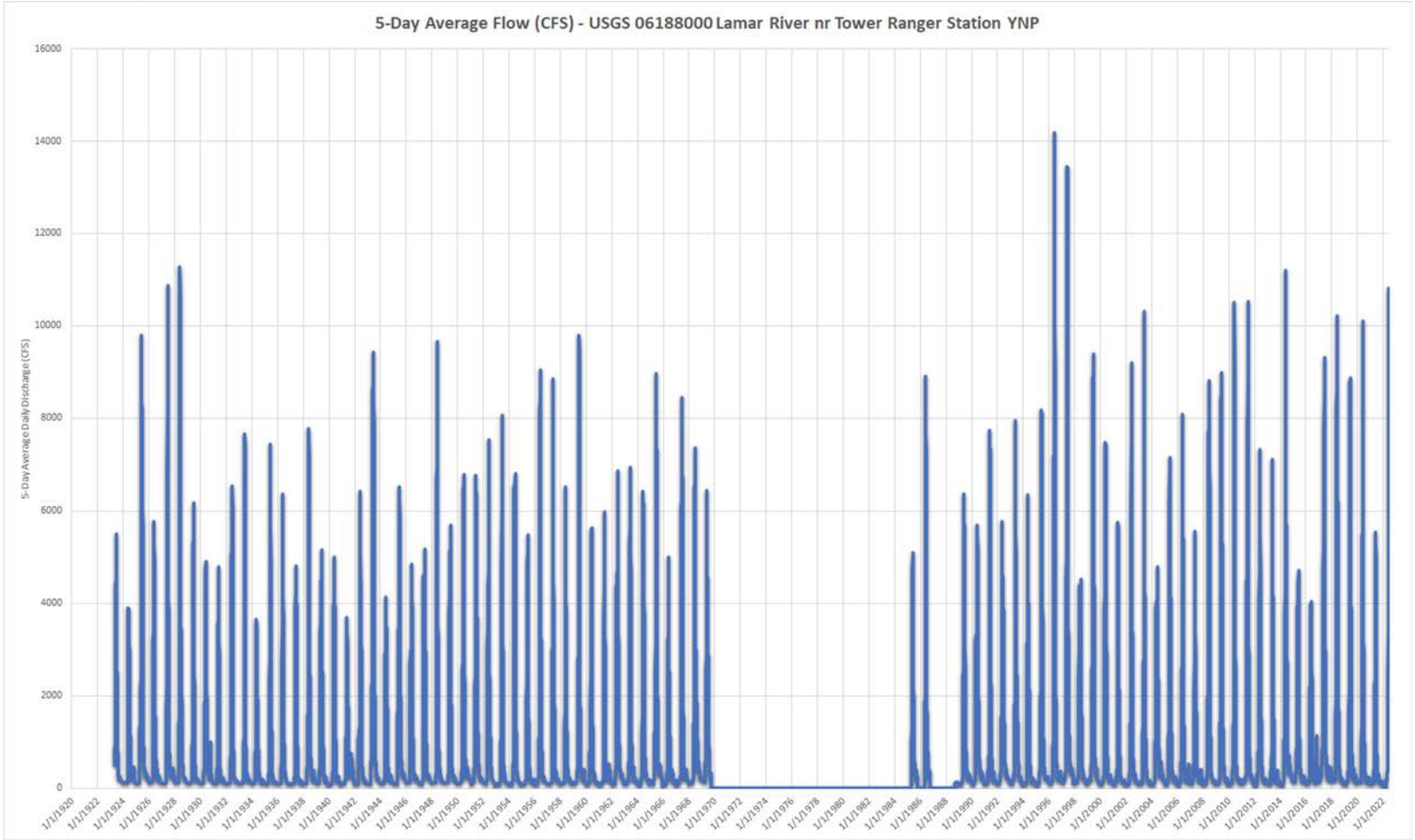
WRDS Water Resources Data System

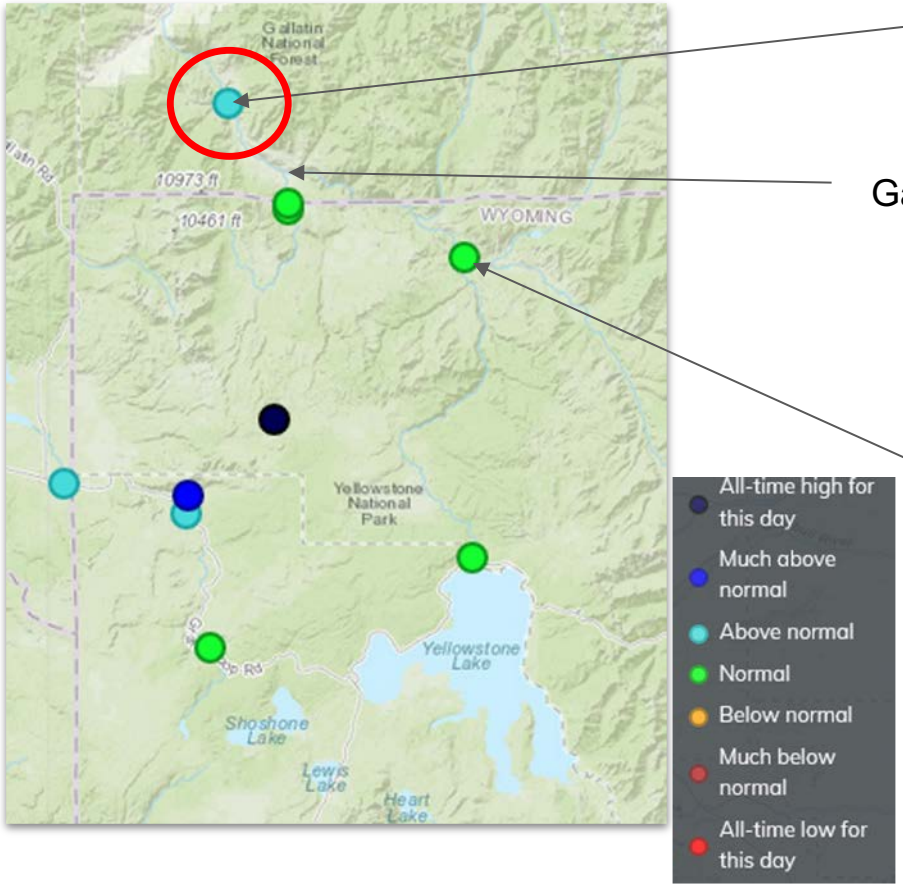
Flows (3-Day Average) in Cubic Feet per Second - Lamar River near Tower Ranger Station



WRDS Water Resources Data System

Flows (5-Day Average) in Cubic Feet per Second - Lamar River near Tower Ranger Station





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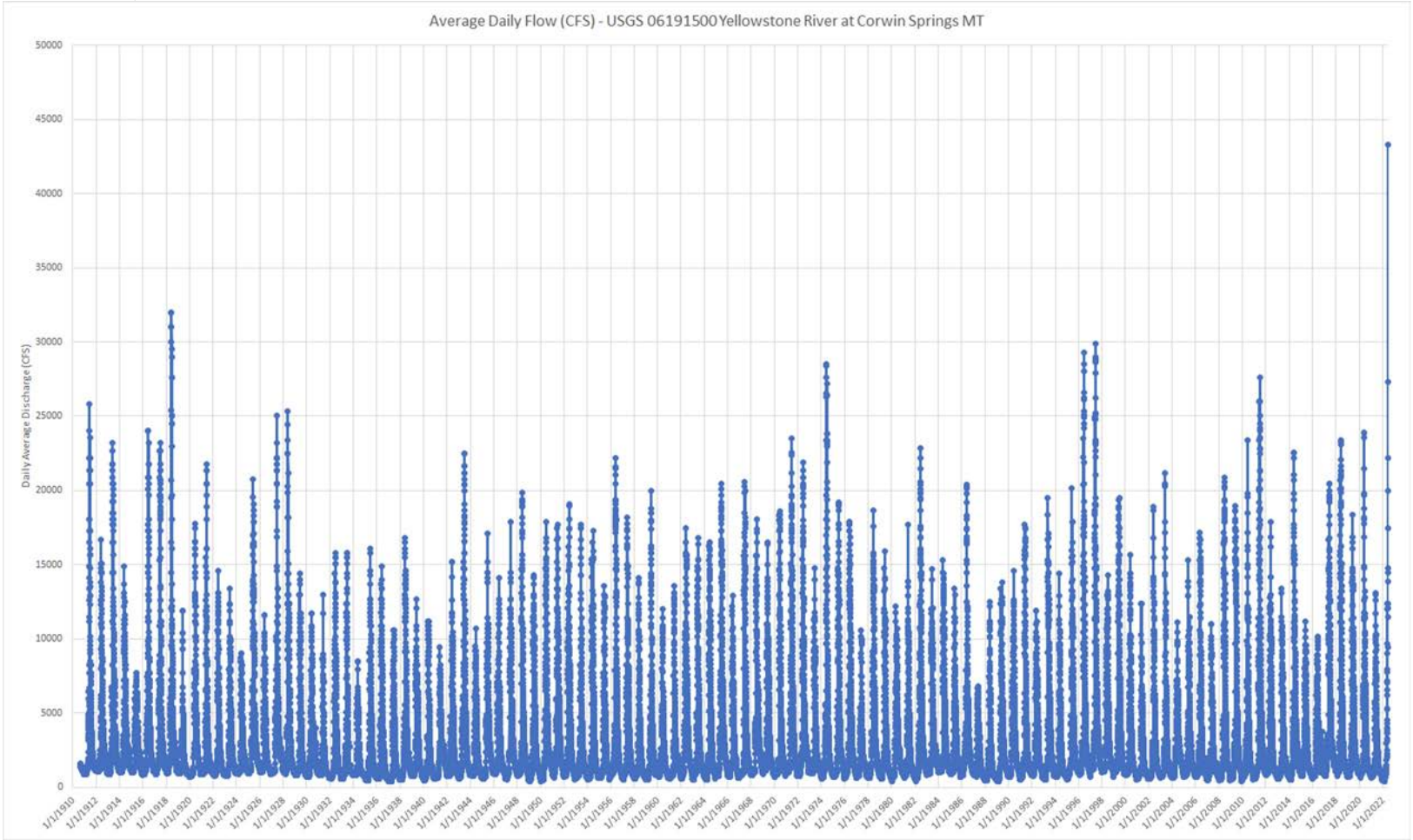
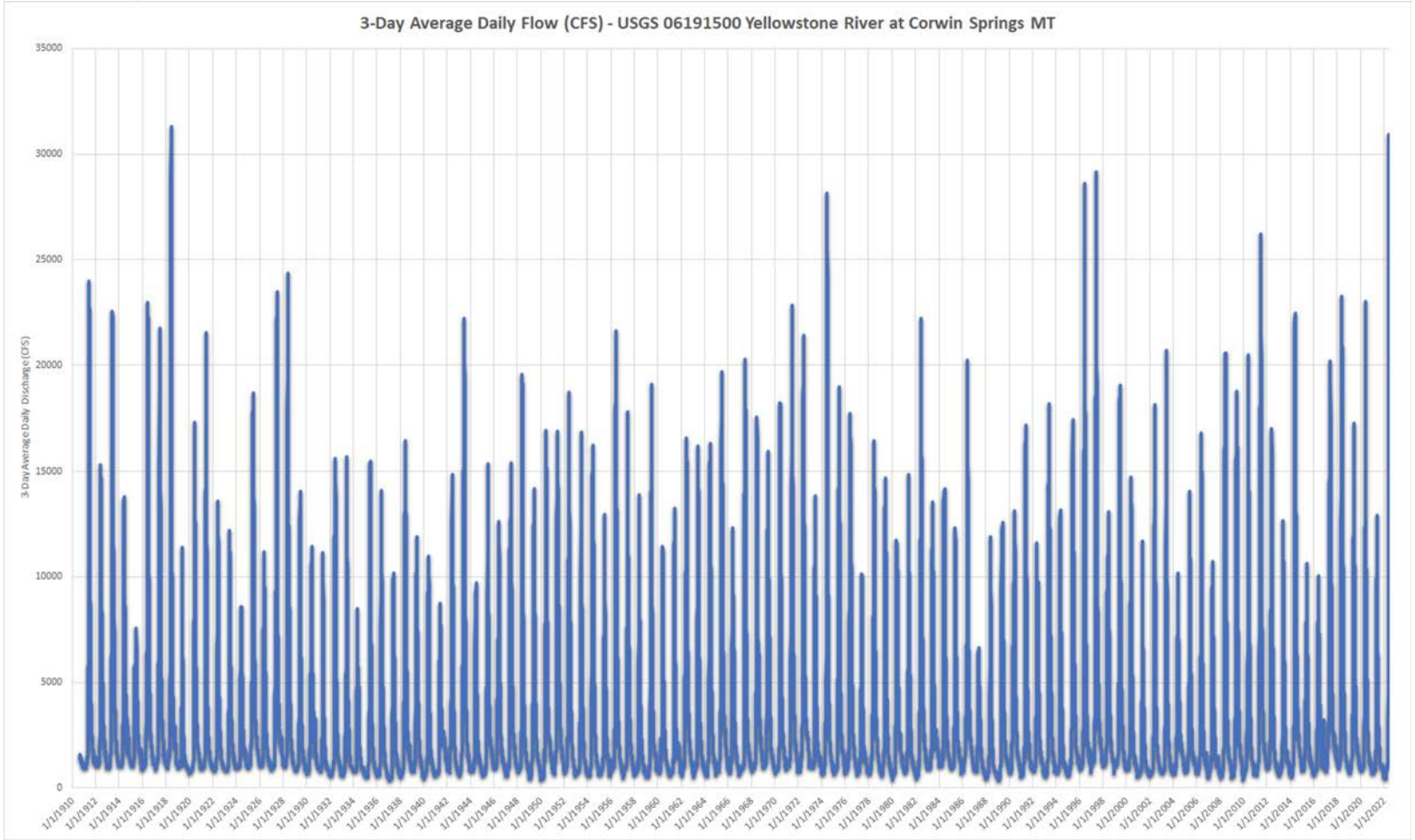


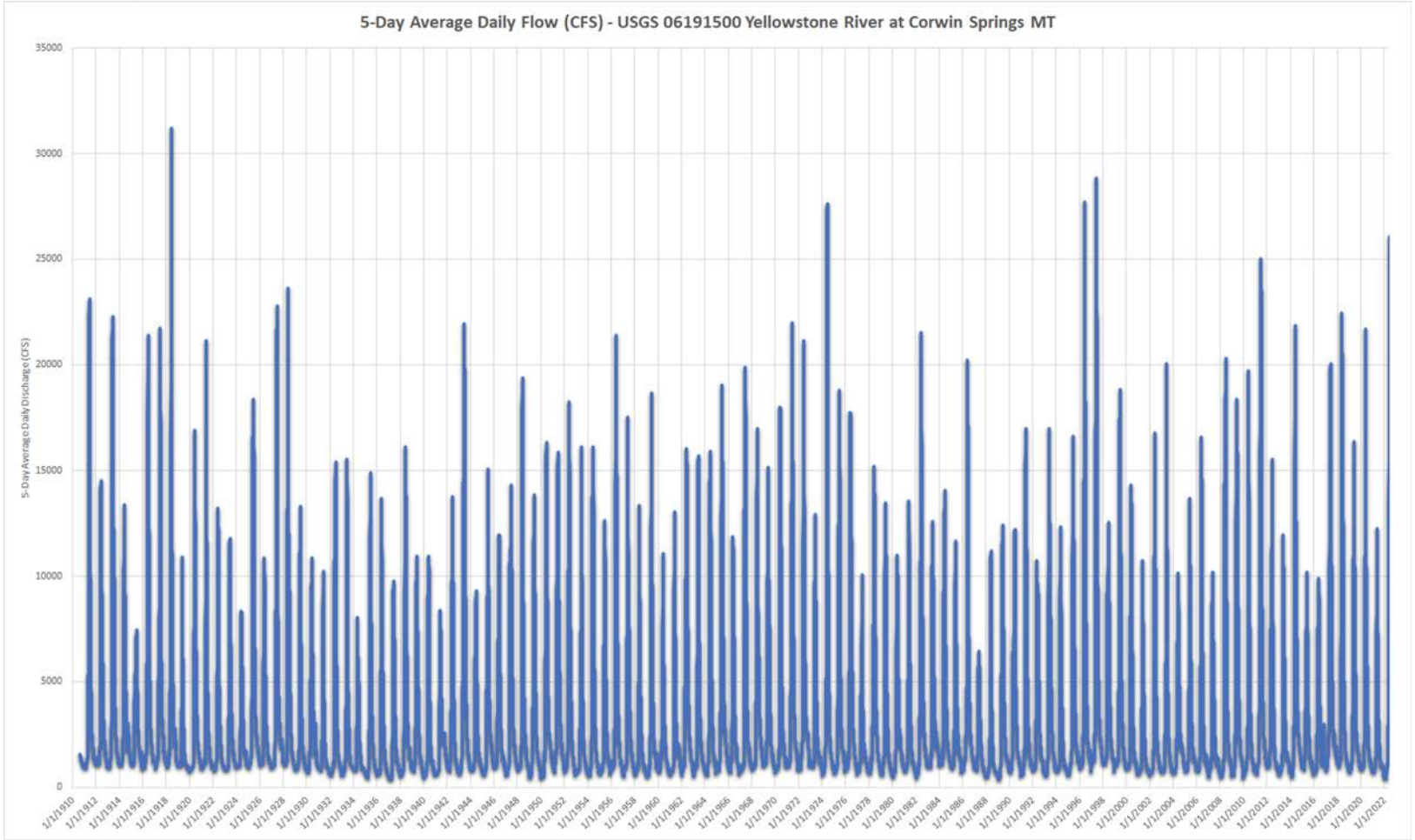
WRDS Water Resources Data System

Flows (3-Day Average) in Cubic Feet per Second - Yellowstone River at Corwin Springs MT



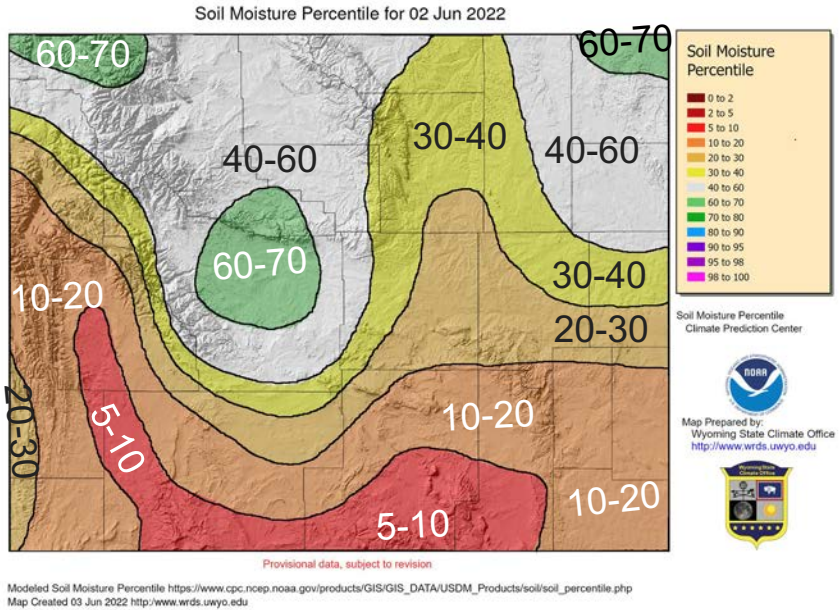
WRDS Water Resources Data System

Flows (5-Day Average) in Cubic Feet per Second - Yellowstone River at Corwin Springs MT

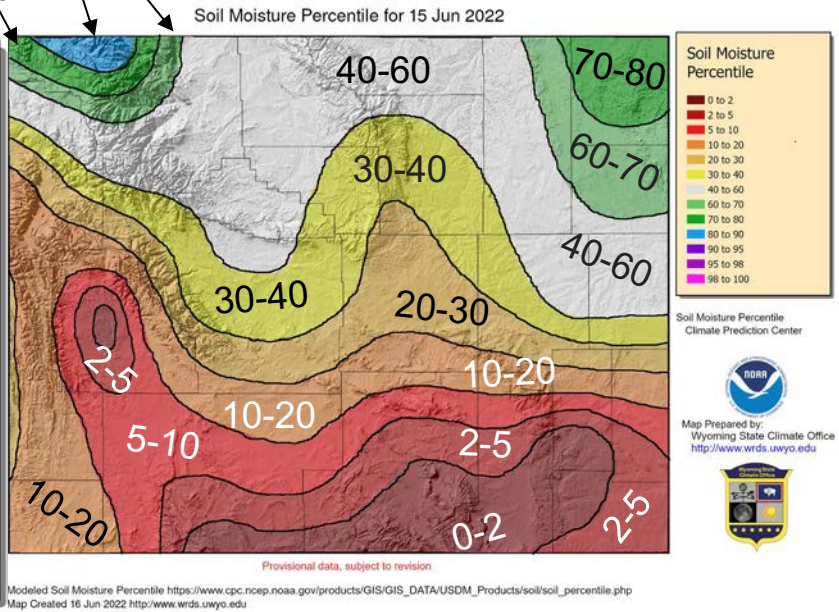


Soil Moisture Percentile

Two Weeks Ago
02 Jun 2022



15 Jun 2022



Conditions better compared to one month ago except Uinta, Lincoln, southern Teton Counties

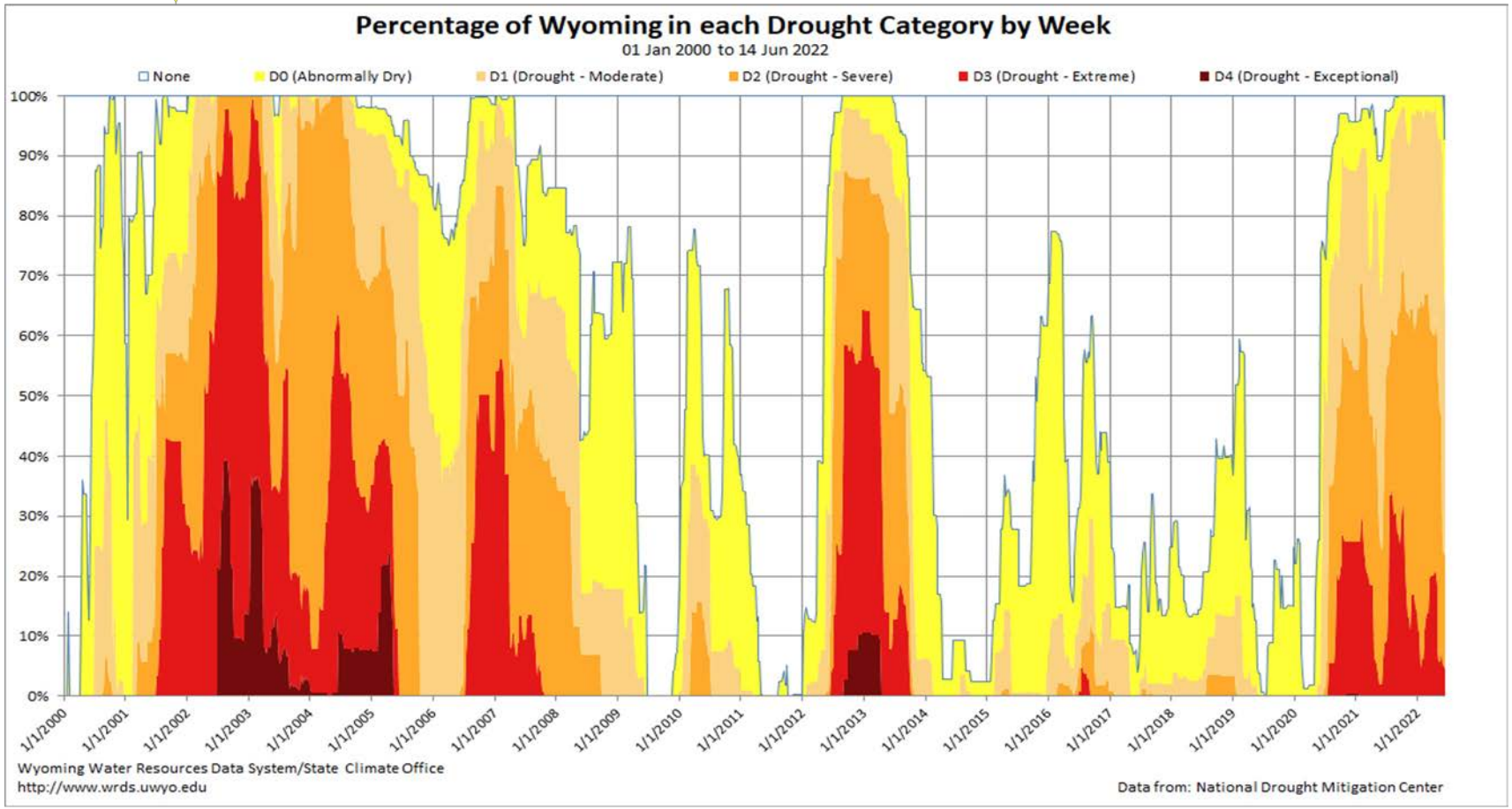
Deteriorating, though, having reached a peak around 05-06 May.

Same or Worse compared to 05-06 May except Park and Northeast

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

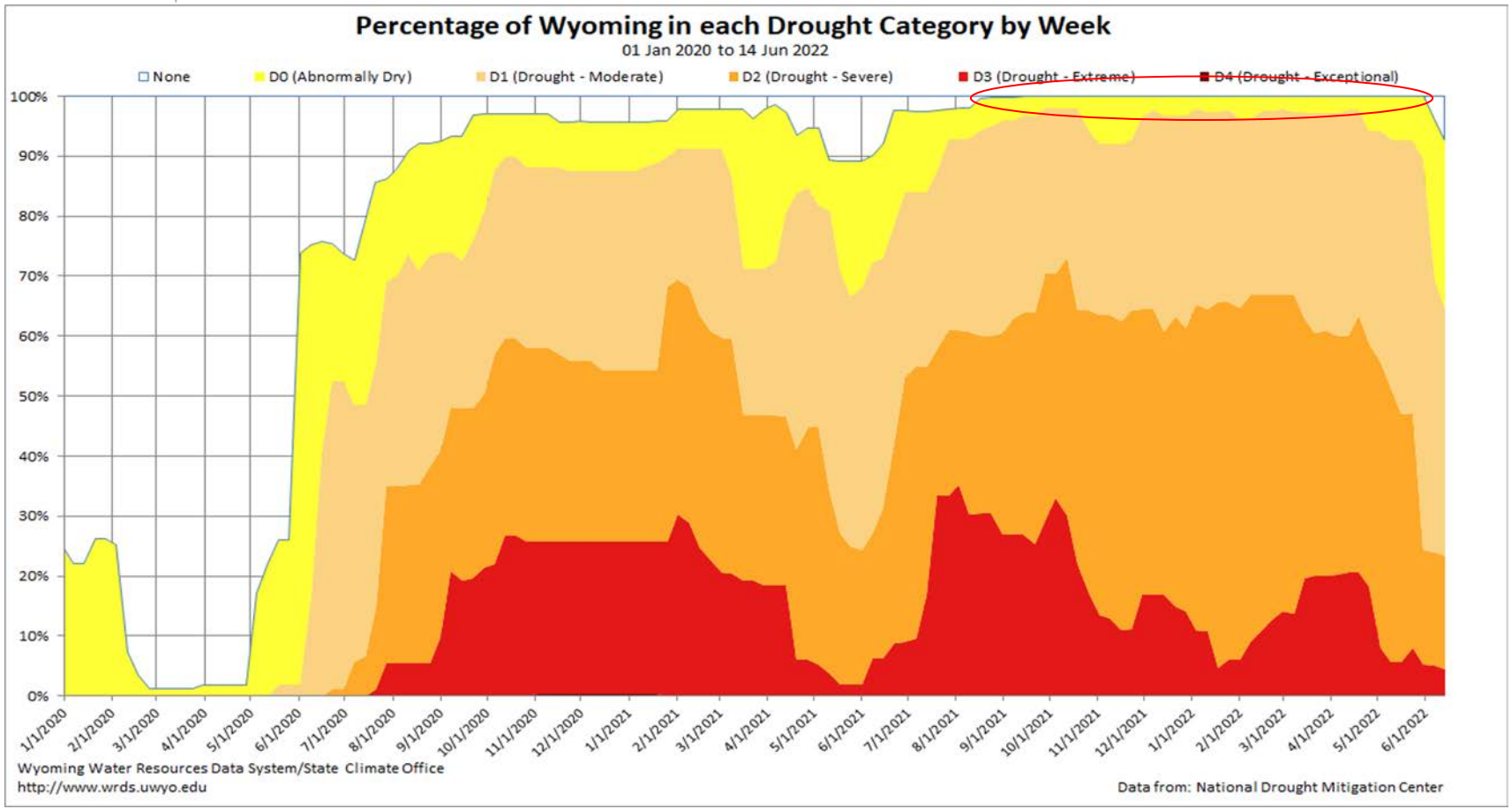
A decrease of 28.03% from last Webinar

Wyoming Area Affected: 92.69% D0-D4 ; 64.56% D1-D4



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

38-week period with entire state in a "D" category ended 07 Jun 2022



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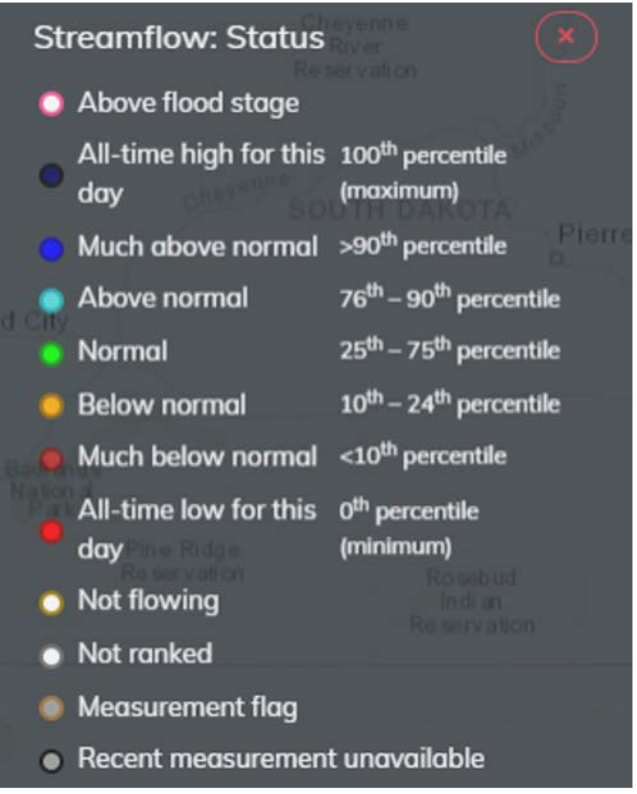
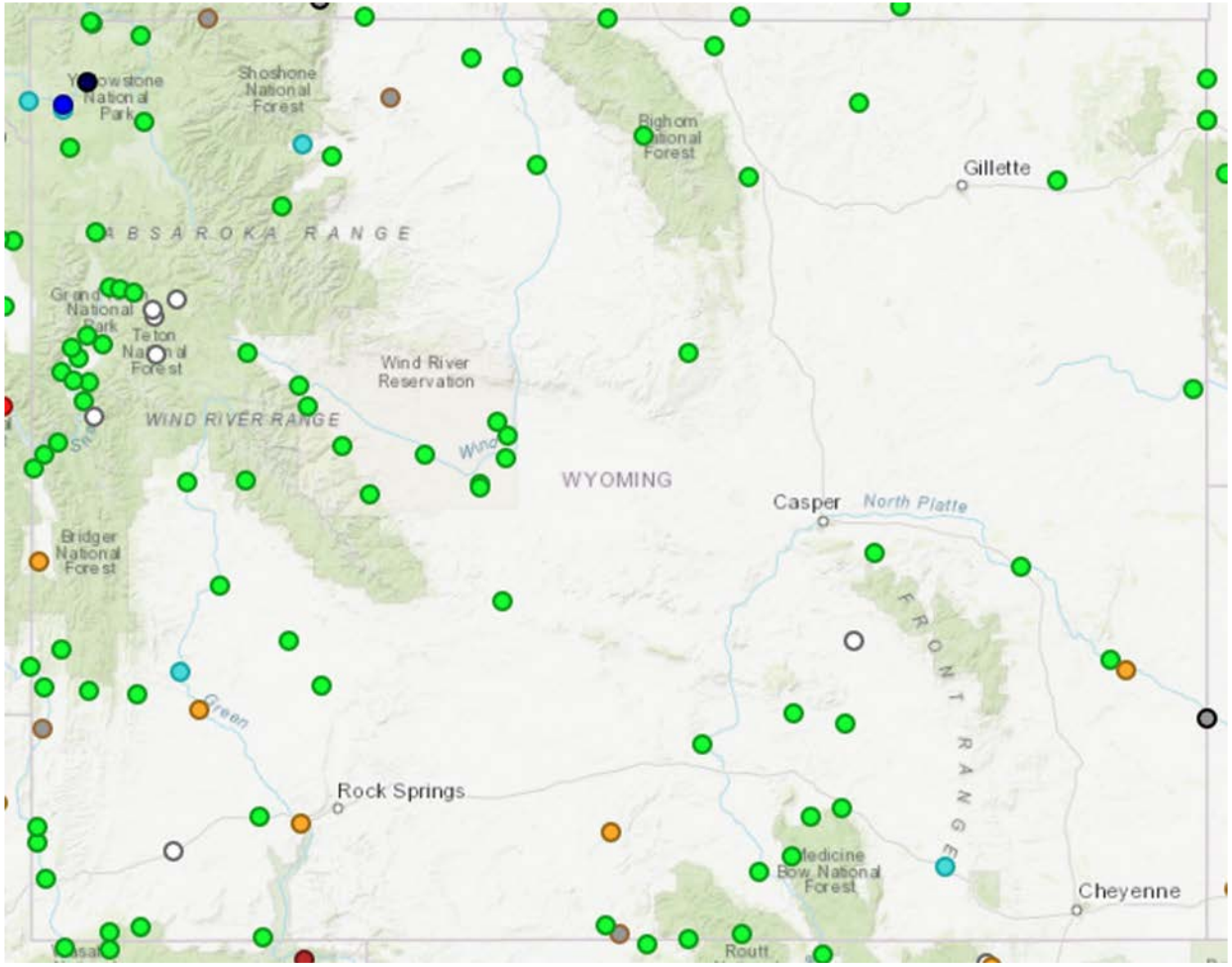
Current Streamflow Conditions (16 June 2022)

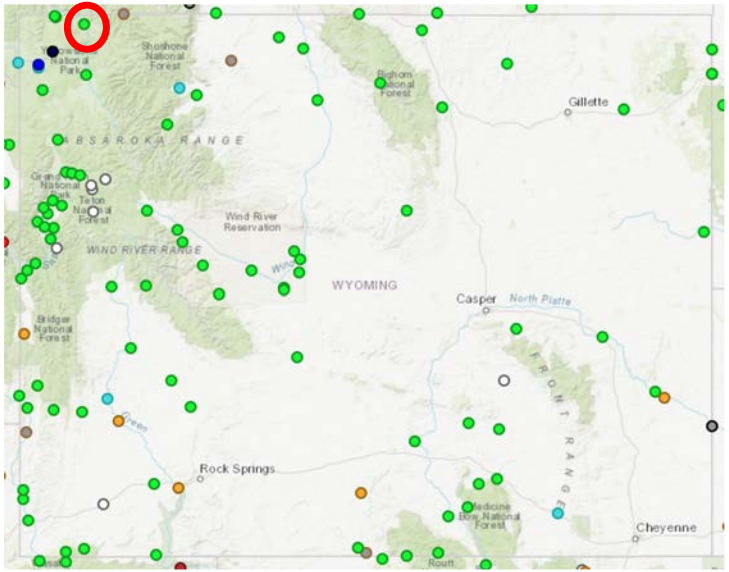
Streamflow Status



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

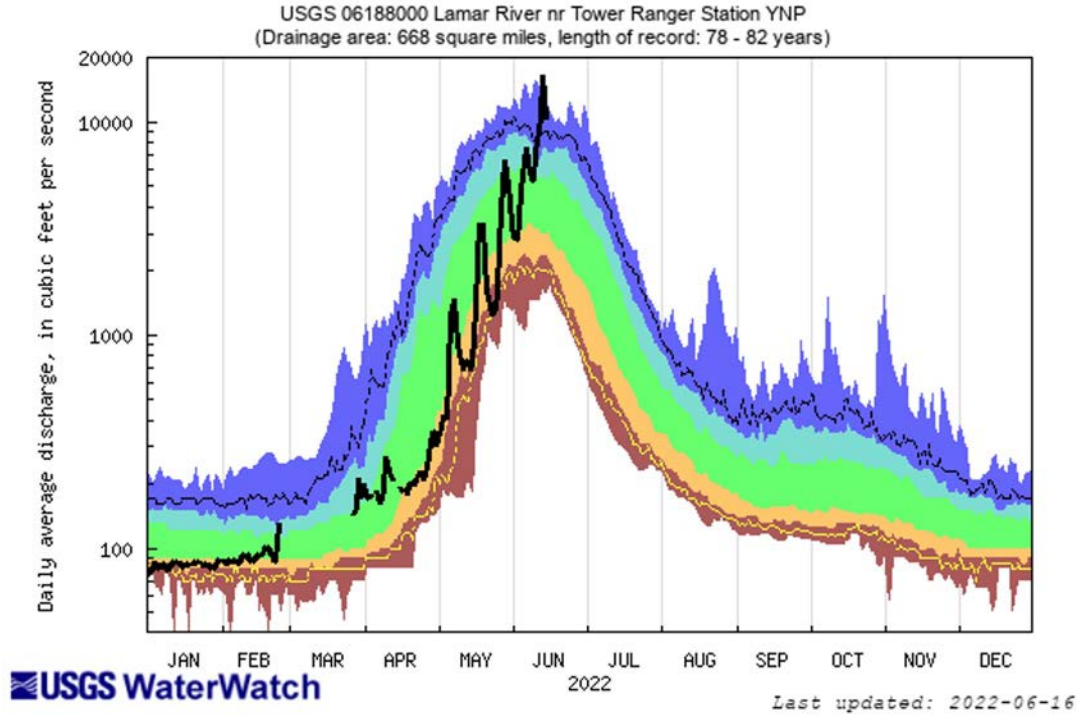


Select WY Streamflows



Lamar River near Tower Ranger Station YNP

Last updated June 16, 2022



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		

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

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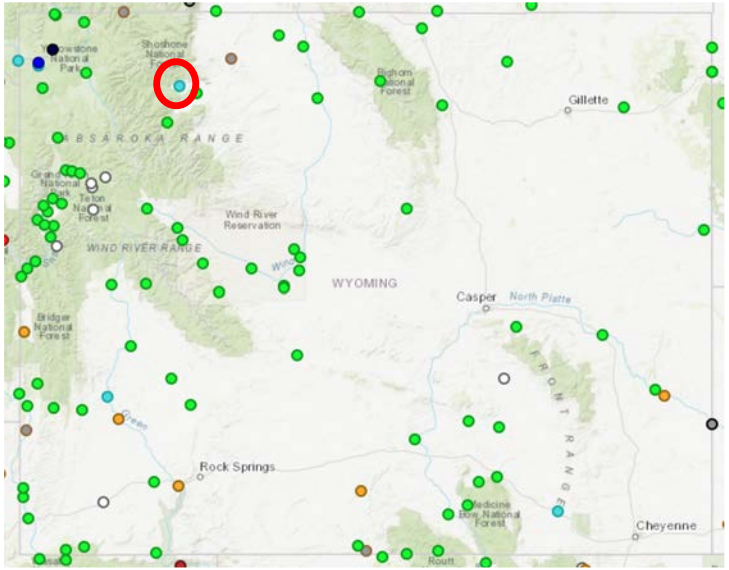
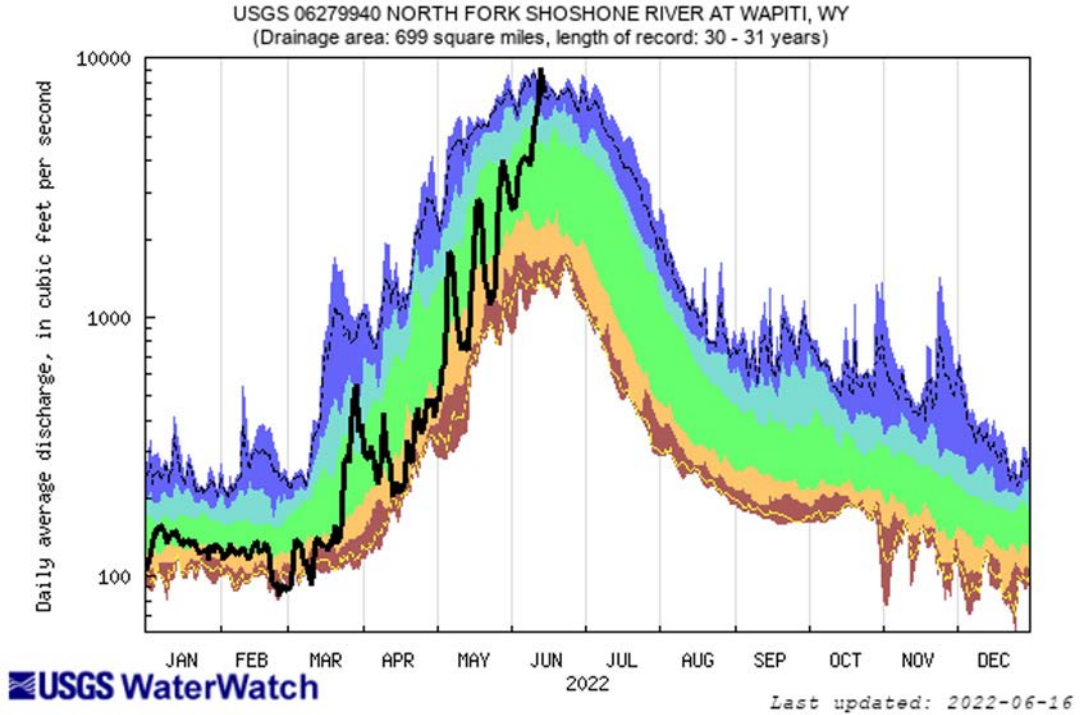


North Fork Shoshone River at Wapiti, WY

Last updated June 16, 2022



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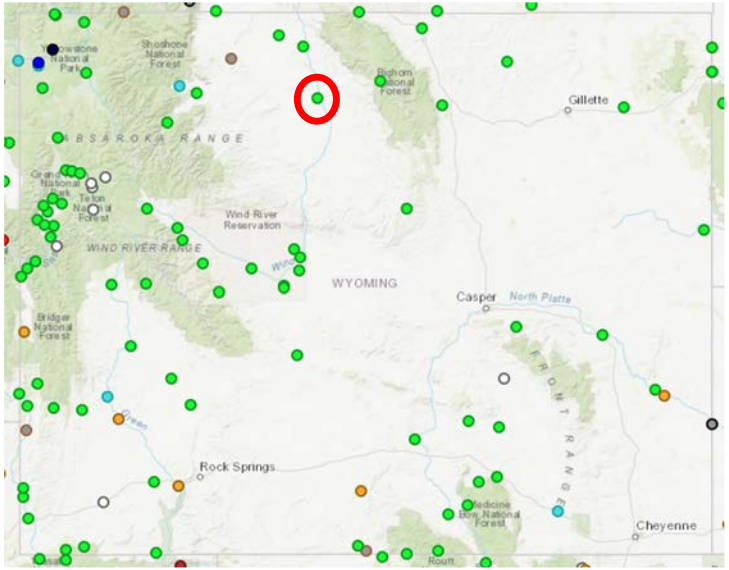
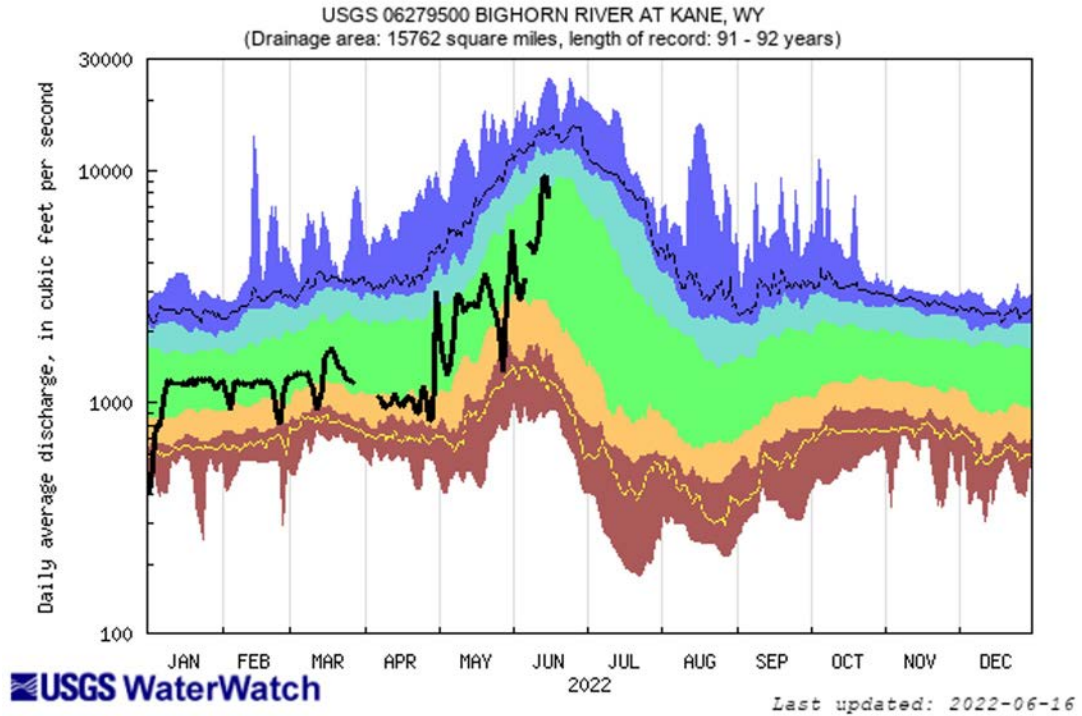


https://dashboard.waterdata.usgs.gov/

https://waterdata.usgs.gov/

Bighorn River at Kane, WY

Last updated June 16, 2022



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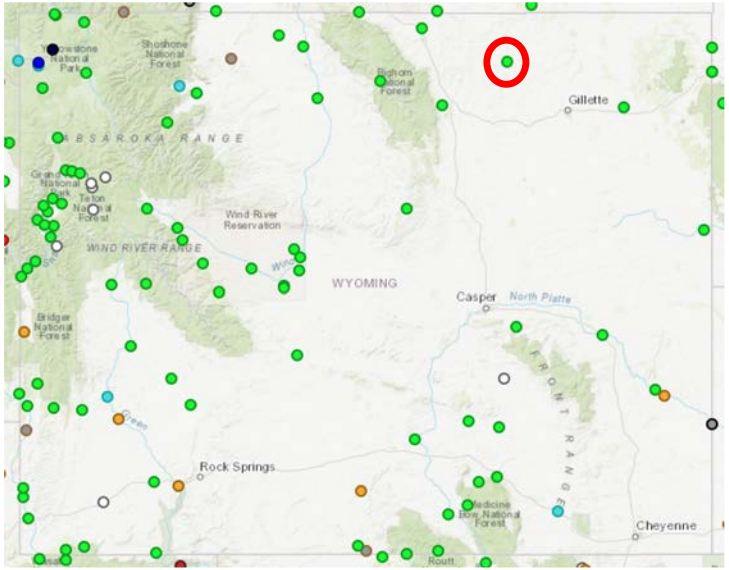
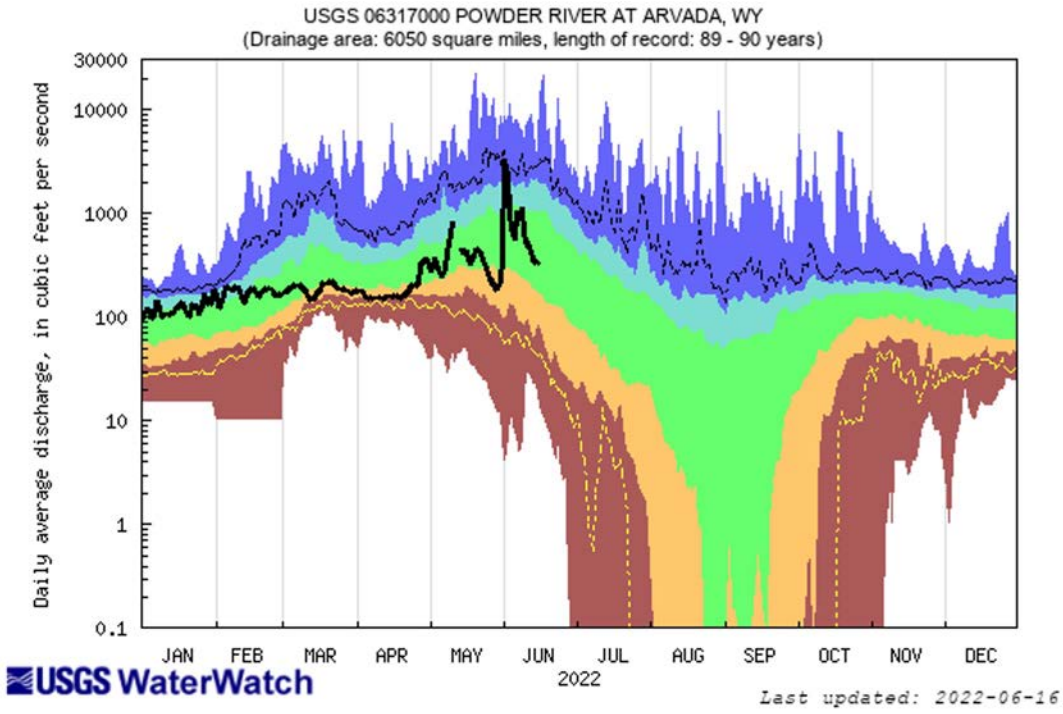


https://dashboard.waterdata.usgs.gov/

https://waterdata.usgs.gov/

Powder River at Arvada, WY

Last updated June 16, 2022



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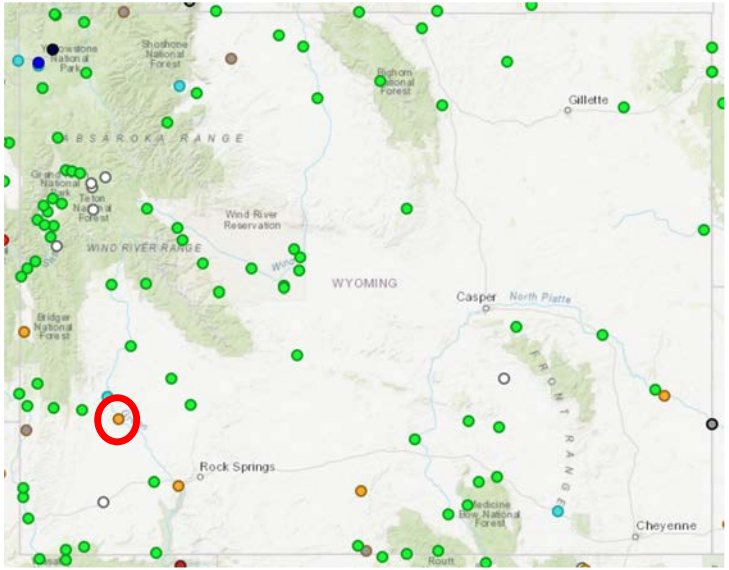

https://dashboard.waterdata.usgs.gov/

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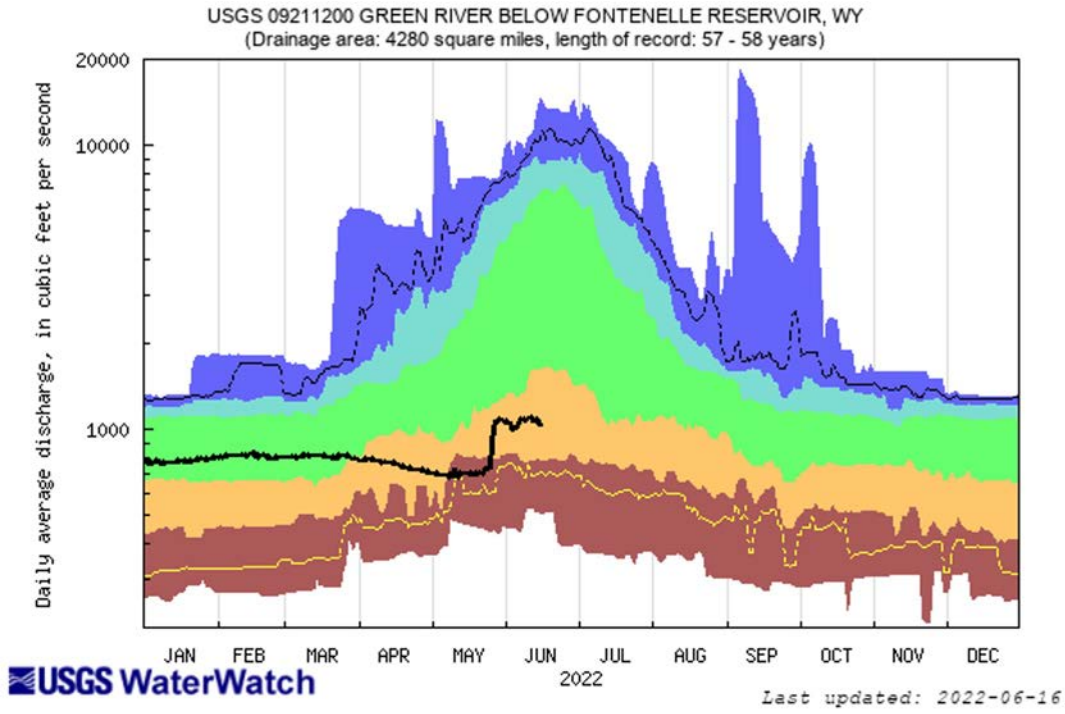
Green River at Below Fontenelle Reservoir, WY

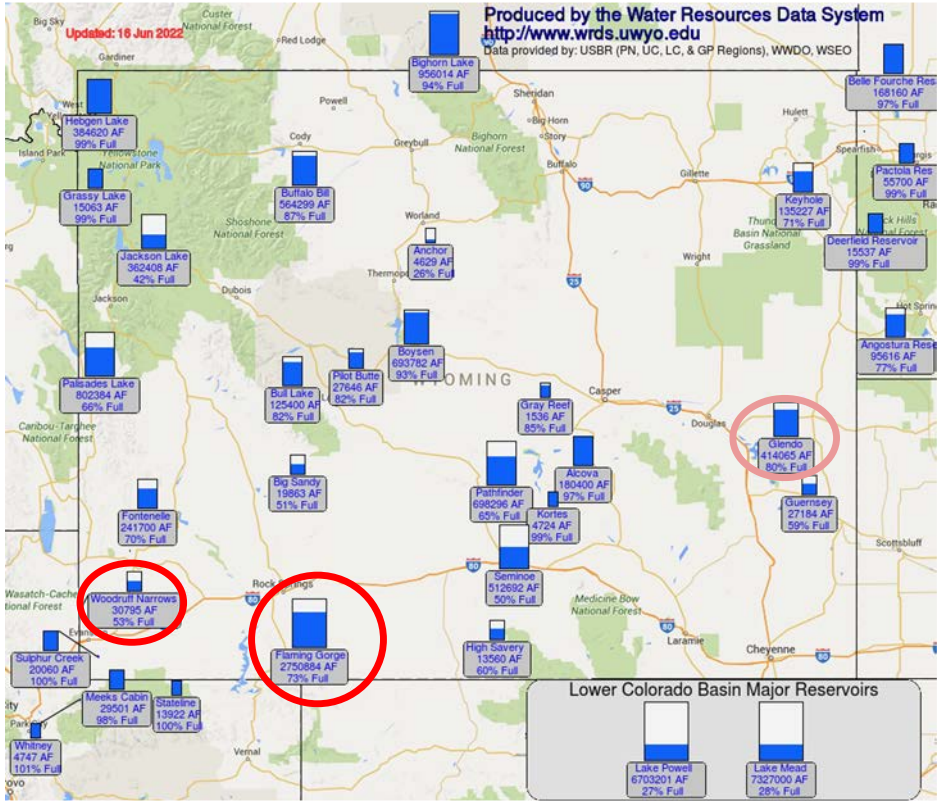
Last updated June 16, 2022



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 (Update 16 Jun 2022)

16 Jun 2022

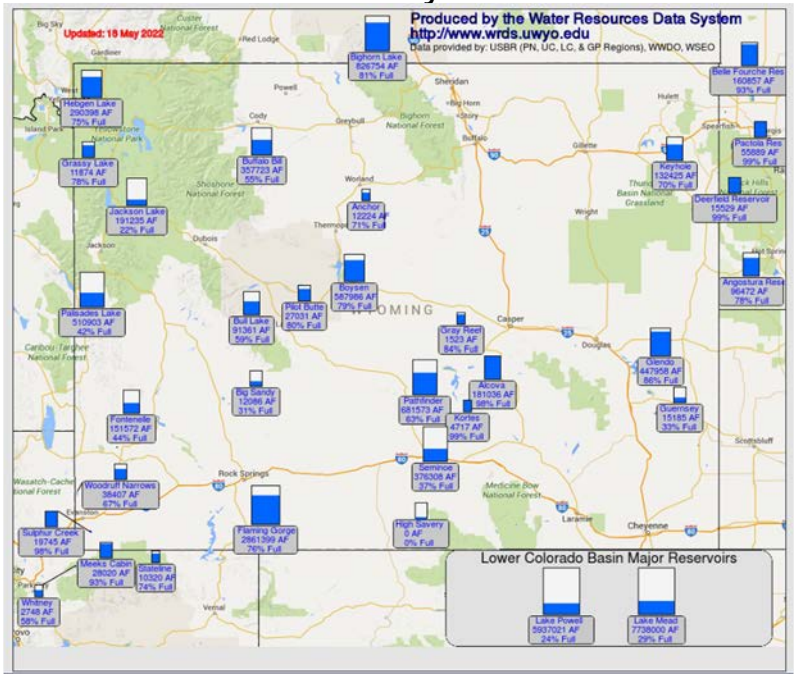


http://www.wrds.uwyo.edu/surface_water/teacups.html

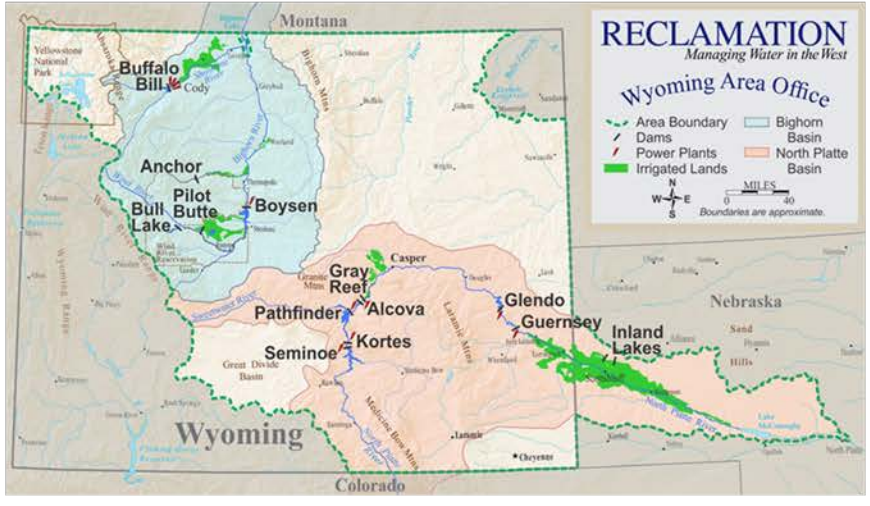
Compared to May

- Increase in storage in most reservoirs

18 May 2022

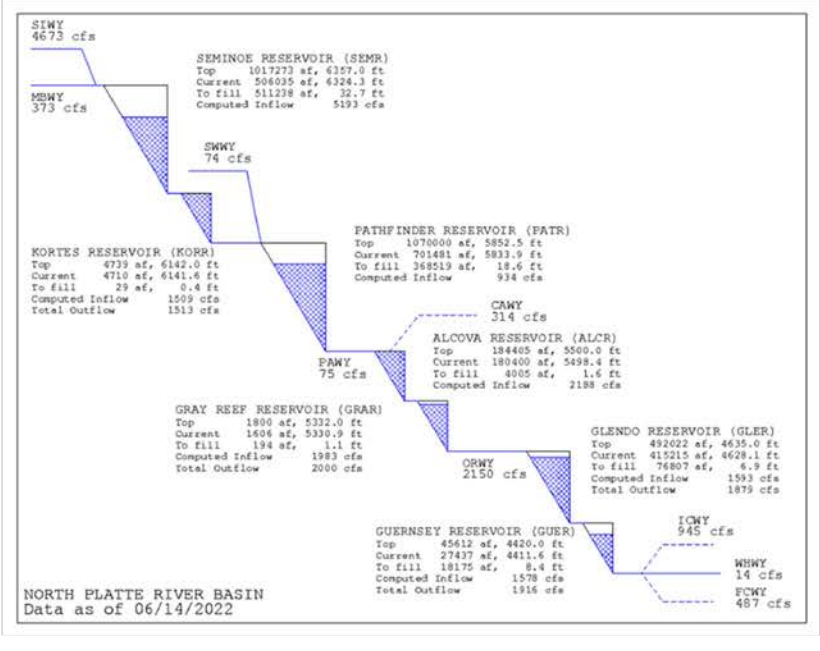


Current Reservoir Conditions: North Platte System



Forecast April – July Runoff:

Forecast Point	Runoff (AF)	% of Avg
Seminoe	510,000	72
Sweetwater above Pathfinder	35,000	66
Alcova to Glendo	95,000	66

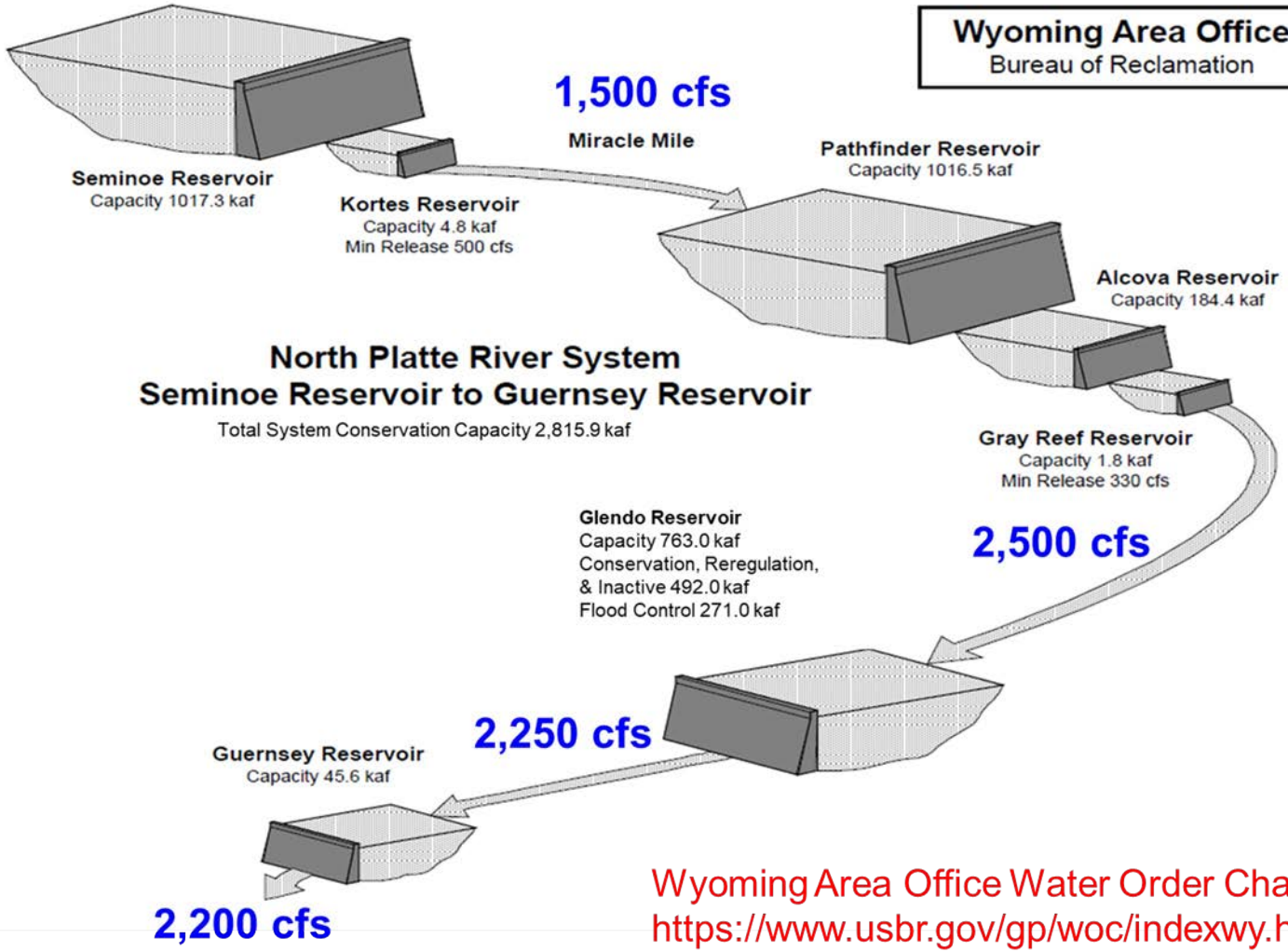


As of June 14, North Platte System:
61% of Full, 90% of Average

Reservoir	Content (AF)	Capacity	% of Full	% of Avg
Seminoe	506,000	1,017,300	50%	71%
Pathfinder	701,500	1,070,000	66%	107%
Glendo	415,200	492,000	84%	84%
Guernsey	27,400	45,600	60%	87%

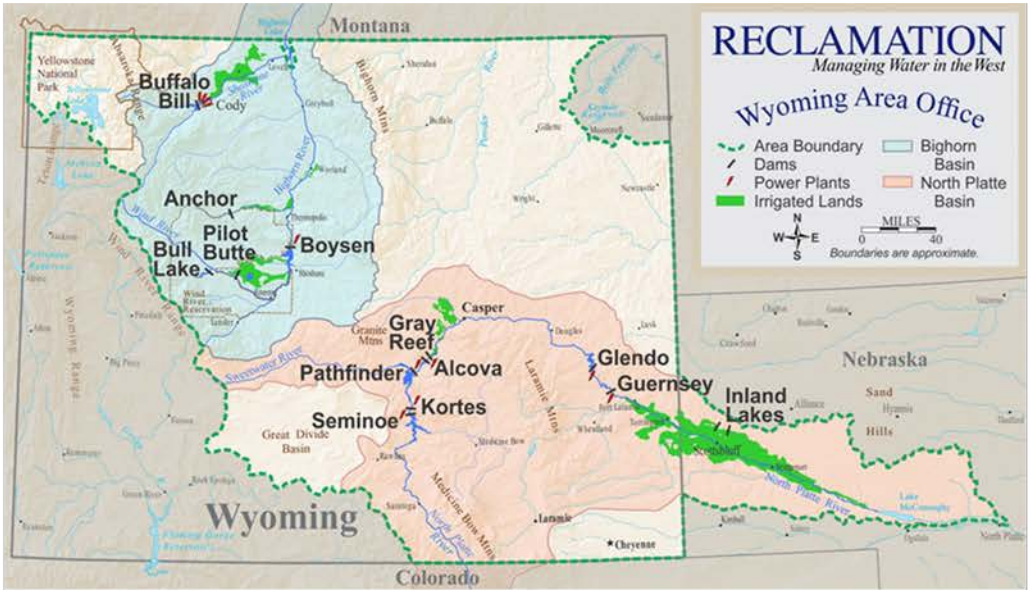
— BUREAU OF —
RECLAMATION

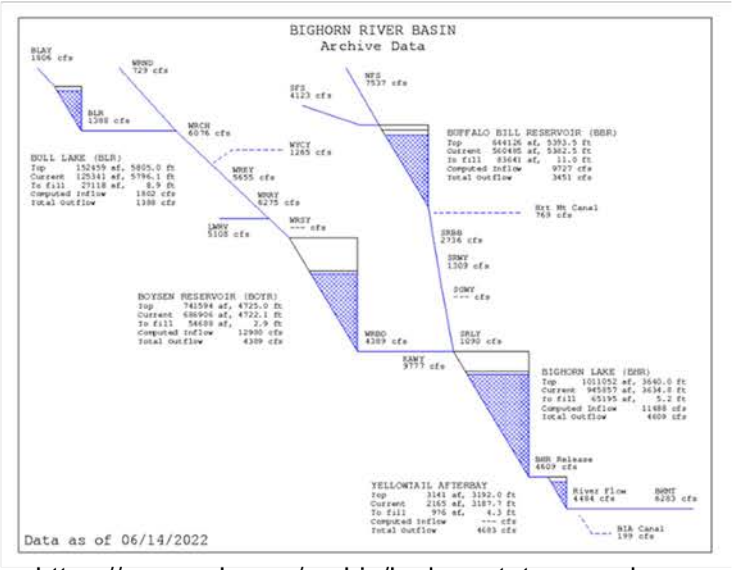
Wyoming Area Office
Bureau of Reclamation



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

Current Reservoir Conditions: Bighorn System





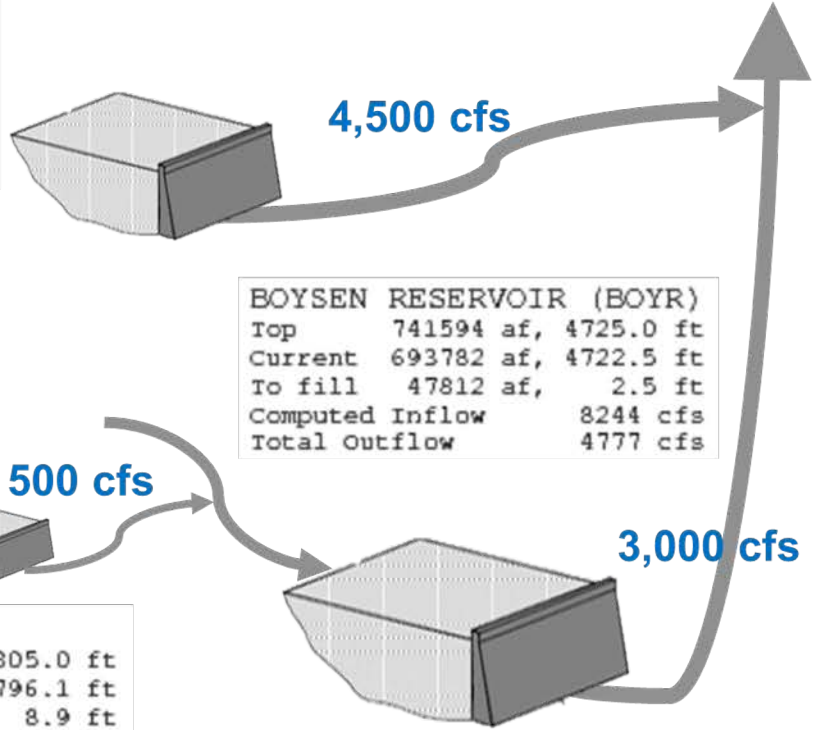
https://www.usbr.gov/gp-bin/hydromet_teacup.pl

As of June 14, Bighorn System: 89% of Full, 96% of Average

Reservoir	Content	Capacity	% of Full	% of Avg
Bull Lake	125,300	152,500	82%	109%
Buffalo Bill	560,500	646,600	87%	106%
Boysen	686,900	741,600	93%	111%

— BUREAU OF —
RECLAMATION

```
BUFFALO BILL RESERVOIR (BBR)
Top       644126 af, 5393.5 ft
Current   564299 af, 5383.0 ft
To fill    79827 af,   10.5 ft
Computed Inflow        6529 cfs
Total Outflow          4606 cfs
```



Forecast April – July Runoff:

Buffalo Bill: 660,000 AF 89% of average
(April – June 14 Runoff: 378,300 AF)

Boysen: 525,000 AF 87% of average
(April – June 14 Runoff: 286,600 AF)

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

— BUREAU OF —
RECLAMATION

Reclamation / Missouri Basin and Arkansas-Rio Grande-Texas Gulf / HydroMet

MB & ART REGIONS

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Reservoirs, Dams & Hydropower

AgriMet
Boat Ramps
HydroMet

- Map of Stations by Type
- Map of Stations by State
- Instant Data Requests
- Daily Data Requests
- Monthly Data Requests
- TEACUP Reservoir Models
- Automated Retrieval Documentation
- Inflow Computations and Plots
- Daily Data Analysis
- Annual Cumulative and Historical Average Plots

Power Levels
Projects & Facilities
Recreation
Safety of Dams

Welcome to the HYDROMET Data System

Program Information

The Bureau of Reclamation operates a network of automated hydrologic and meteorologic monitoring stations (HydroMet) located throughout the Missouri Basin Region. The HydroMet network collects remote field data and transmits it via satellite to provide real-time water management capability. HydroMet data is then integrated with other sources of information to provide streamflow forecasting and current runoff conditions for river and reservoir operations. Please read this important Disclaimer about the real-time, PROVISIONAL data displayed on these pages.

Bighorn Lake from atop Yellowtail Dam

Station Information

- Map of Stations by Type
- Map of Stations by State
- Station Specific Data Links

Data Request Forms

- Instant Data Requests
- Daily Data Requests
- Monthly Data Requests (RES070)
- TEACUP Reservoir Models
- Hydromet Data Query
- Automated Retrieval Documentation (PDF)
- Hydromet Tools Public Version (PDF)

Analysis and Models

- Inflow Computations and Plots
- Daily Data Analysis
- Annual Cumulative and Historical Average Plots (QNAPLT)

Missouri Basin and Arkansas-Rio Grande-Texas Gulf Regions

Reclamation / Missouri Basin and Arkansas-Rio Grande-Texas Gulf / HydroMet / Daily Data / Daily Data Quick Plot

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- Inflow Computations and Plots

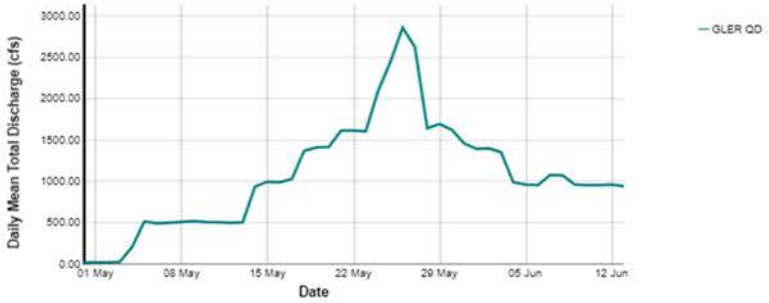
Daily Data Quick Plot

This form outputs an interactive graph displaying daily data. Daily data is obtained once per day and data from the previous day is available after 5:25 AM on the current day. Enter a date range, station, and parameter and then submit your request.

- Start Date (YYYY-MM-DD): 2022-05-01
- End Date (YYYY-MM-DD): 2022-06-14
- Station Code (start typing to search for a station): GLER
- List of parameters at the selected site: QD Daily Mean Total Discharge (cfs)

Parameter: QD

Submit



WY SEO Divisions and Superintendents

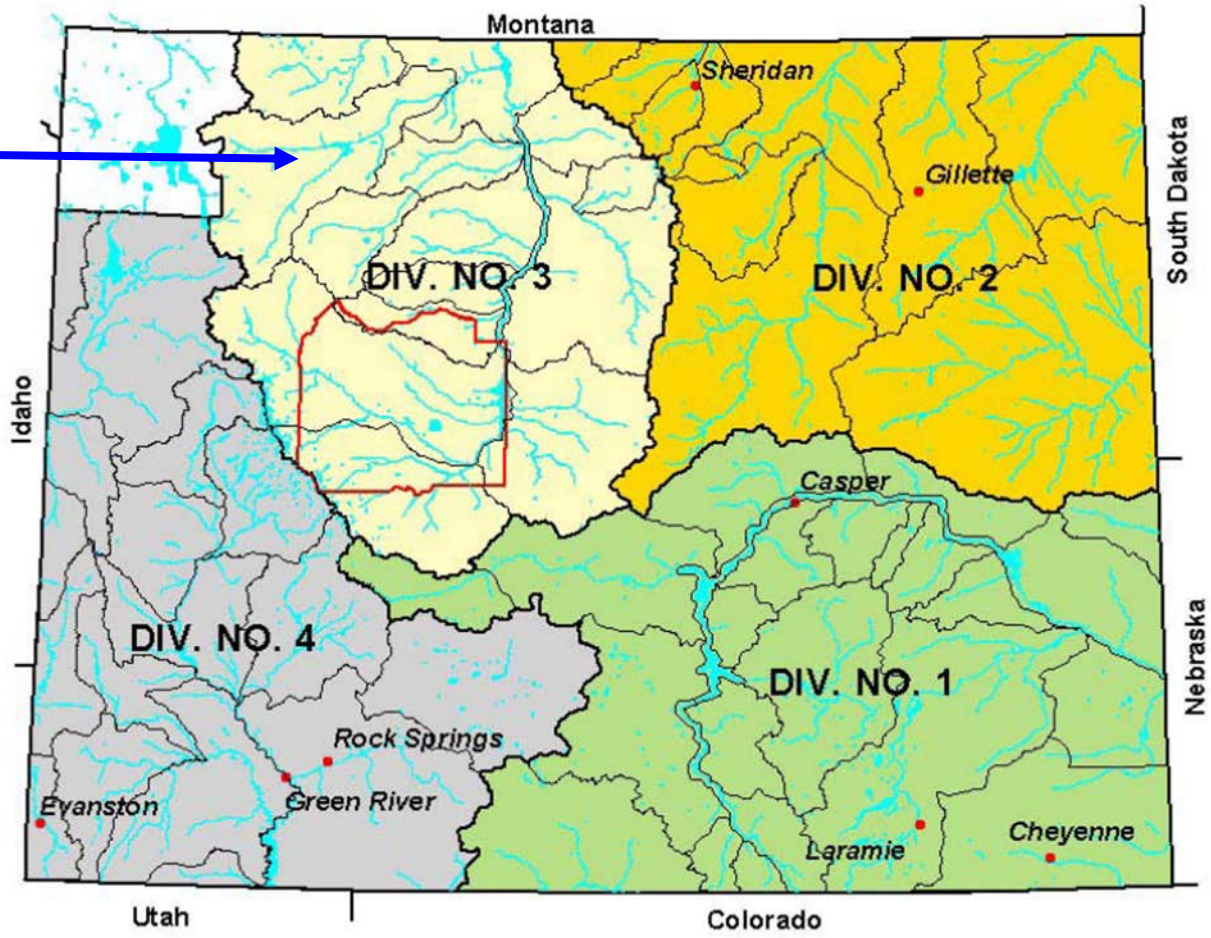
Contact information for calls and administration

Division 3

Joshua Fredrickson, 307-856-0747

Division 2

David Schroeder, 307-674-7012

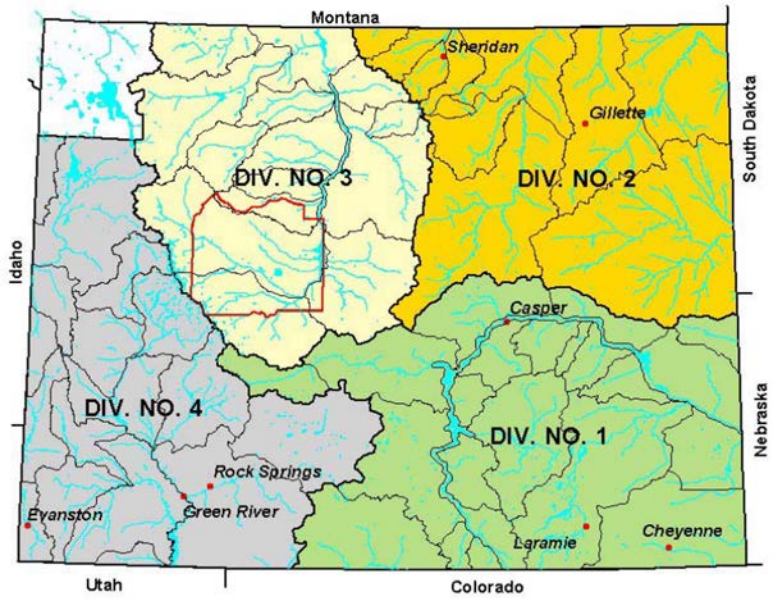


Division 4

Kevin Payne, 307-279-3441

Division 1

Cory Rinehart, 307-532-2248



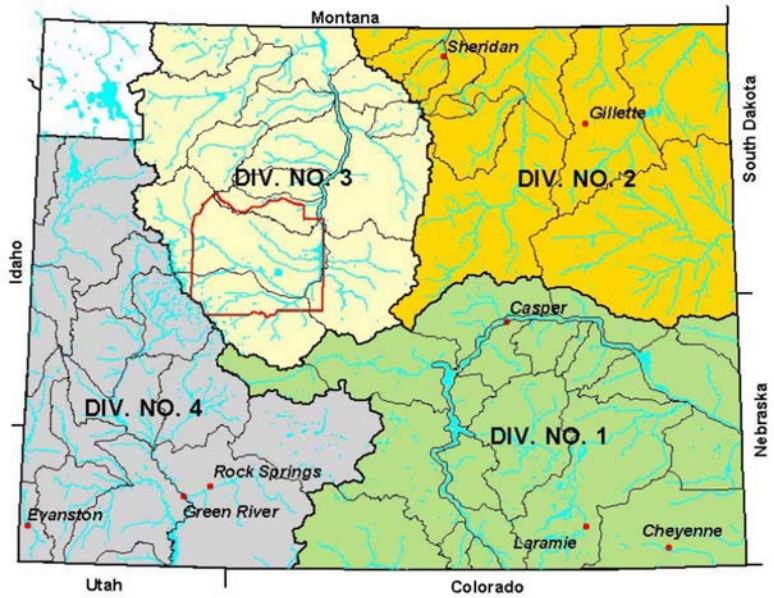
Division 1

1. May 1, 2022 BOR call on North Platte limits Irrigation Pumpers, between Pathfinder and Guernsey, to 6,600 acre feet every 2 weeks, likely to be on through summer.

1. May 6, 2022 call on Jack Creek and tribs, District 6, to a priority date of Spring 1882.

1. May 23, 2022 call on Bates Creek, District 11, to a priority date of 8/9/1886.

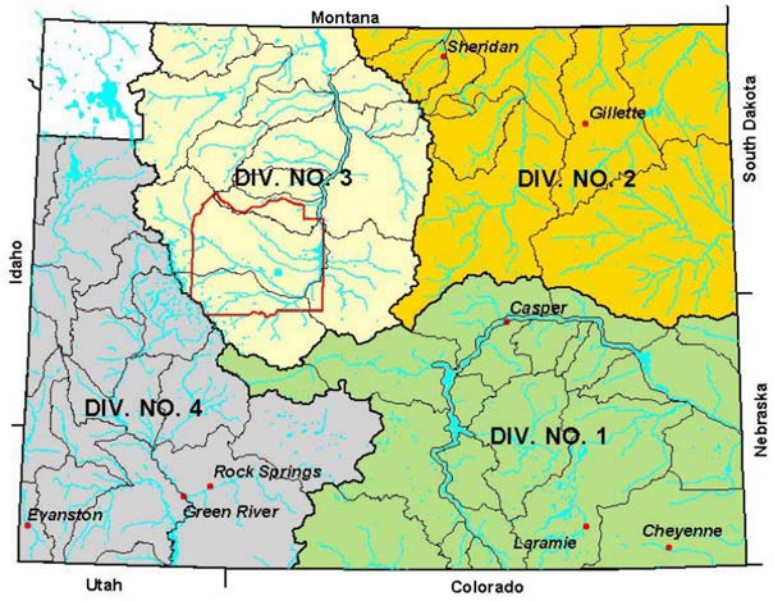
1. June 2, 2022 call on Bear Creek and tribs, District 2, to a priority date of 7/7/1891



Division 2

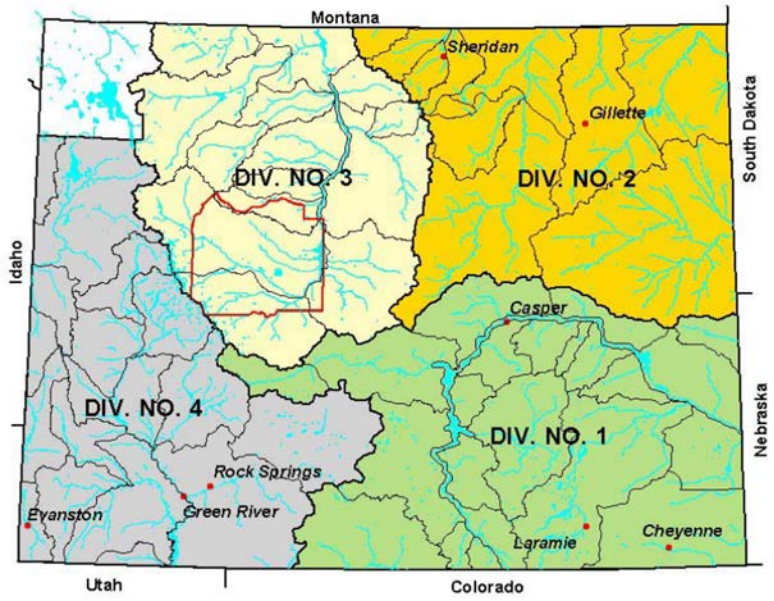
1. May 14, 2022 Call on Big Goose Creek, District 4

1. Some flooding near Sheridan and Buffalo



Division 3

1. All calls suspended at this time.



Division 4

1. April 29, 2022, call on North Piney Creek, District 10, to a priority date of 5/1/1888
1. May 9, 2022, call onf Central Bear River, District 2, multiple dates for interstate call
1. May 16, 2022, call on Fish Creek, District 10, to a priority date of 7/13/1889
1. May 17, 2022, call on Blacks Fork River, District 15, to a priority date of 6/20/1910
1. May 27, 2022, call on South Piney Creek, District 10, to a priority date of 12/31/1886
1. June 8, 2022, call on Smith's Fork, District 3, to a priority date of 3/2/1935

Contact Information for Calls/Administration

Division 1 Superintendent–Cory Rinehart, 532-2248

Division 2 Superintendent–David Schroeder, 674-7012

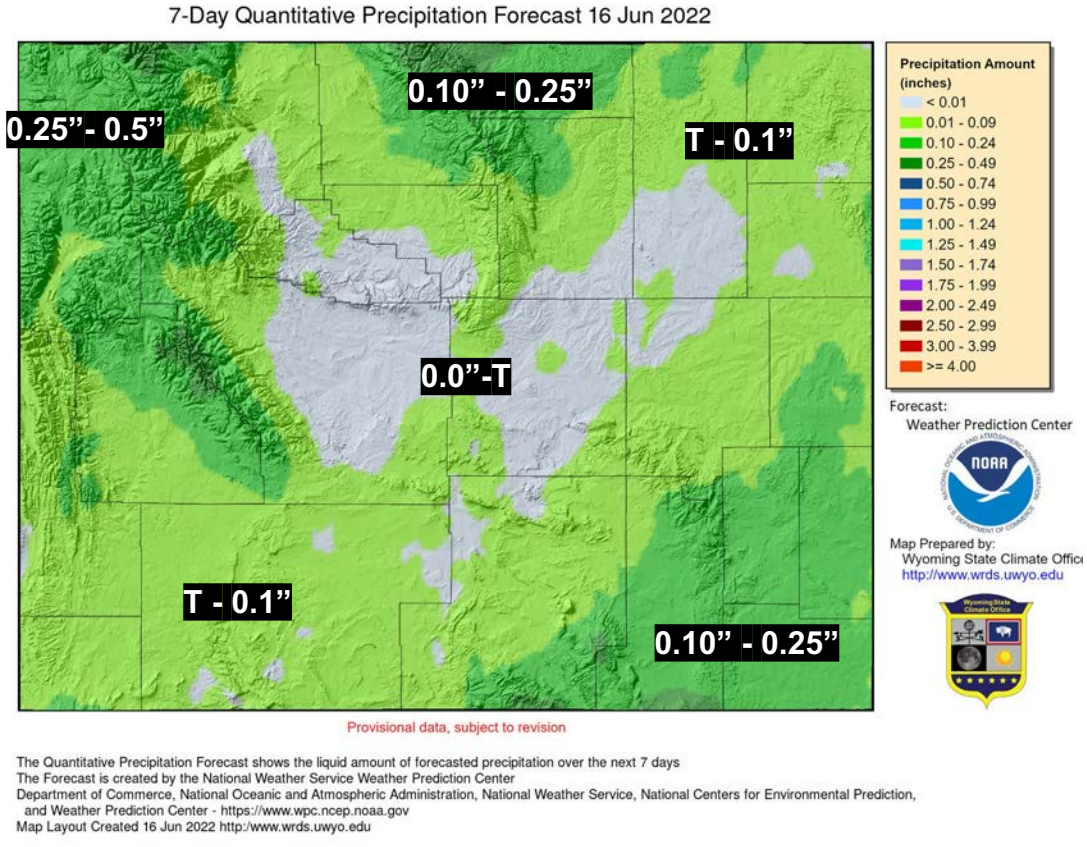
Division 3 Superintendent–Joshua Fredrickson, 856-0747

Division 4 Superintendent–Kevin Payne, 279-3441

Forecasts & Outlooks

7-Day Total Precipitation Forecast

June 16 - June 23



- Warm to near Record Temperatures Friday and Saturday with slight cool down Sunday.
- Scattered showers Friday - Sunday across portions of the state.
- Slightly below average temperatures Monday behind cool front.
- Warming again through mid-next week.

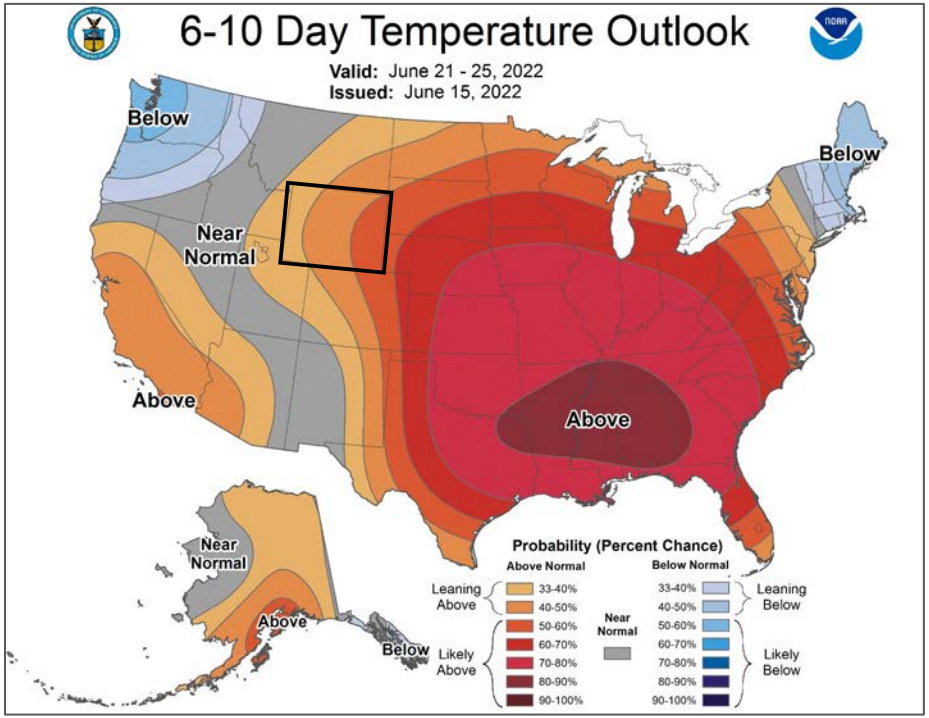
Note: Forecast includes “Snow Water Equivalent” ≈ Rain + Melted Snow

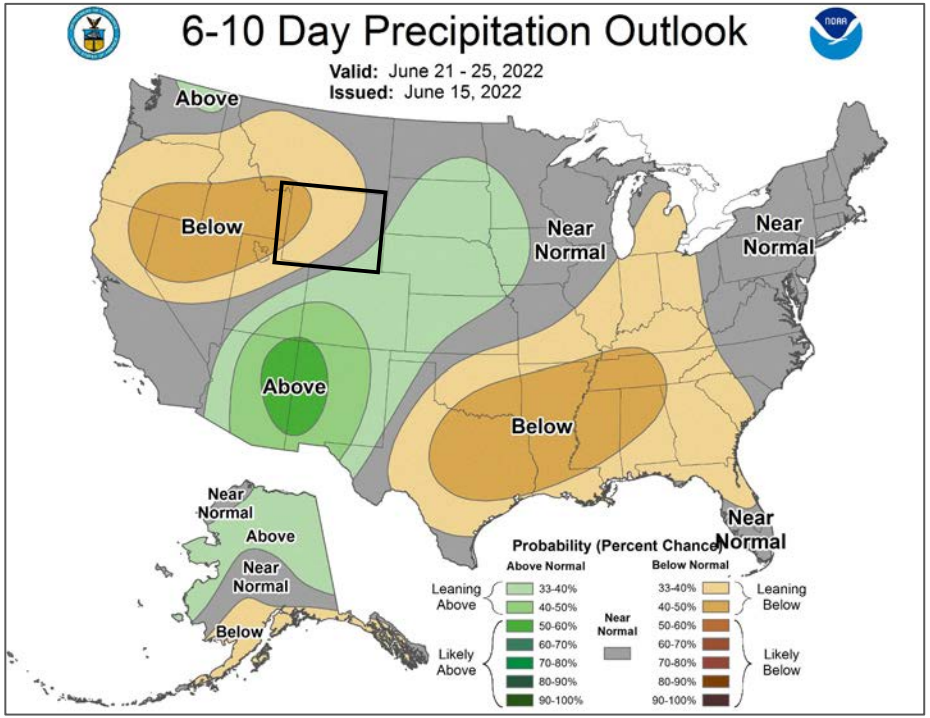
https://bit.ly/7_dayQPForecast

6-10 Day Temp & Precip Outlook

https://bit.ly/CPC6_10Day

June 21 - June 25





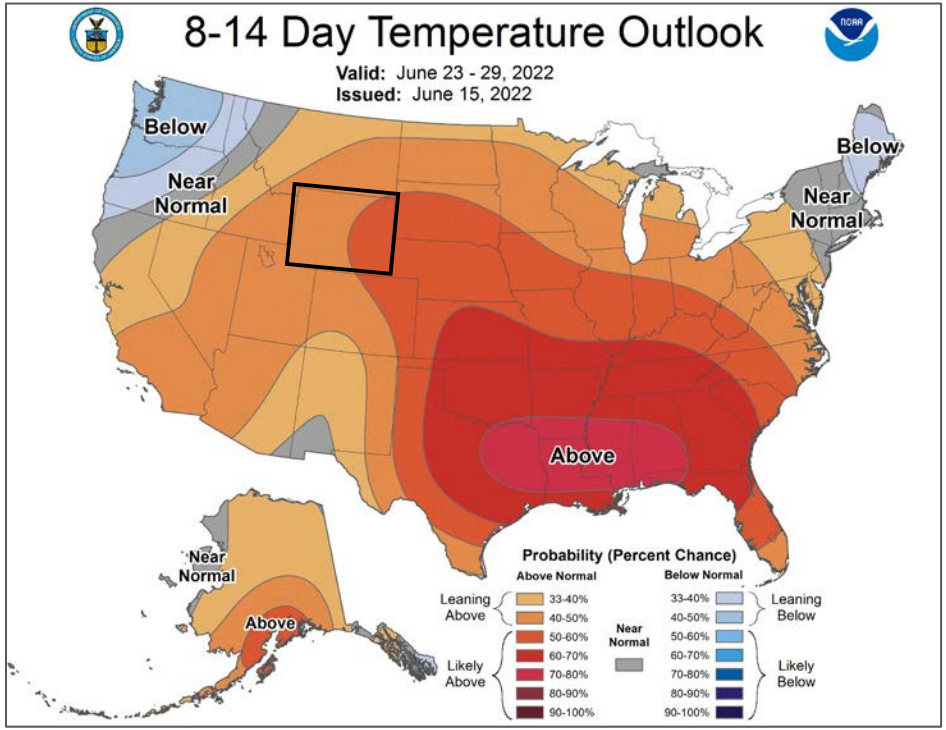
Above normal temperatures favored, especially east WY

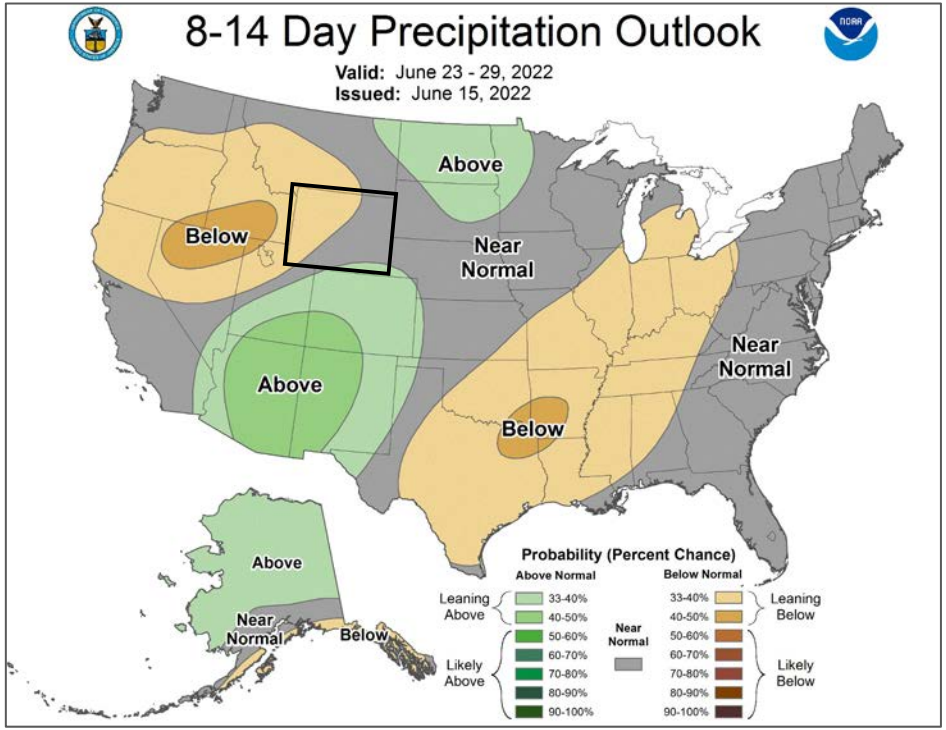
Favored Slightly below normal central & west to near normal east

8-14 Day Temp & Precip Outlook

June 23 - June 29

https://bit.ly/CPC8_14Day





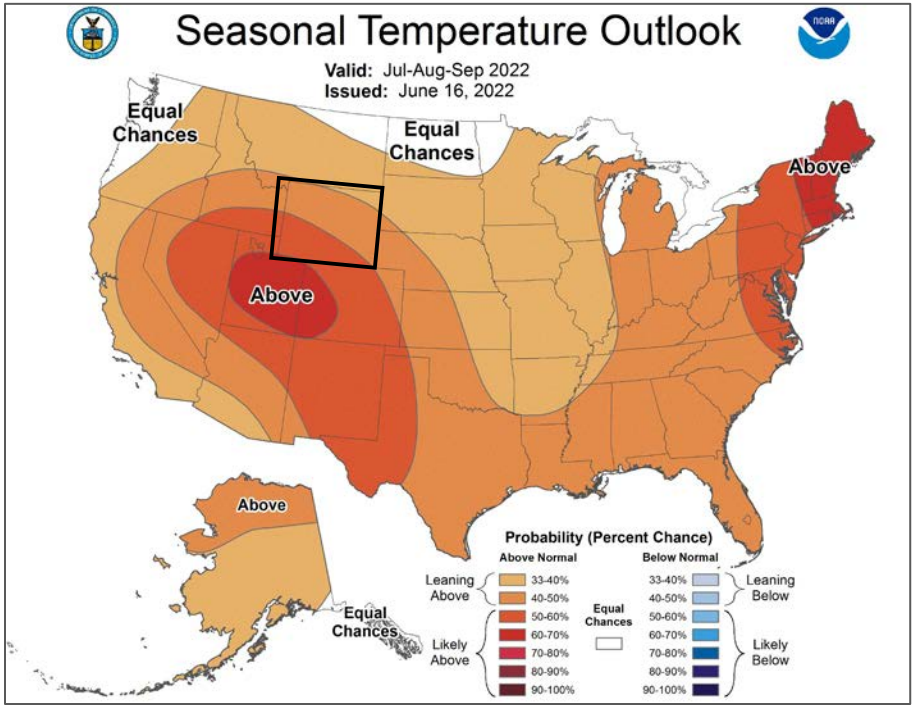
Above normal temperatures favored, especially east WY

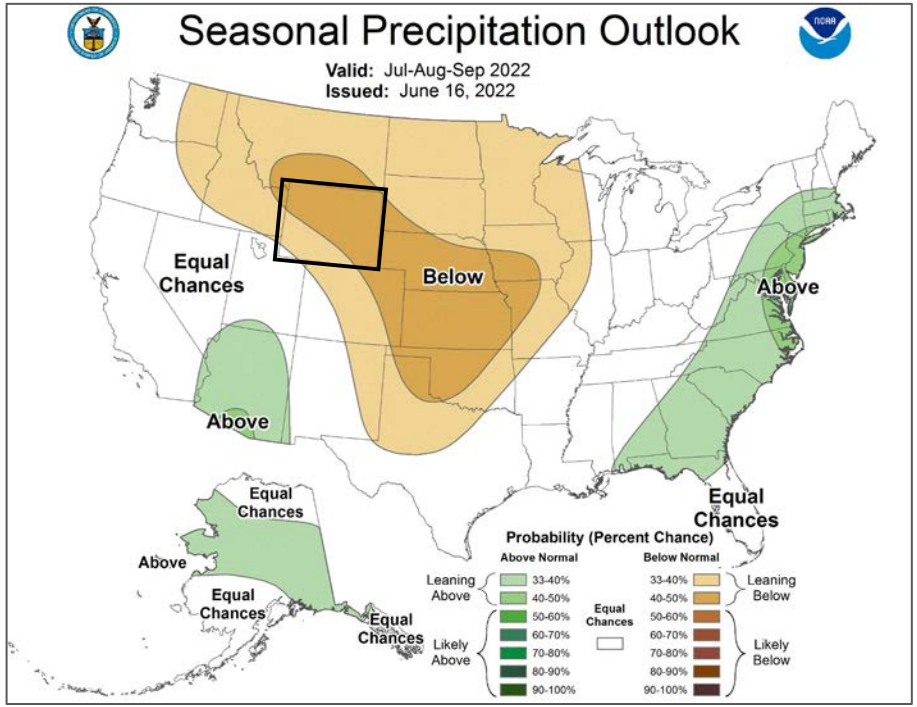
Favored Slightly below normal central & west to near normal east

3-Month Temp & Precip Outlook

https://bit.ly/CPC_Seasonal

June - August 2022



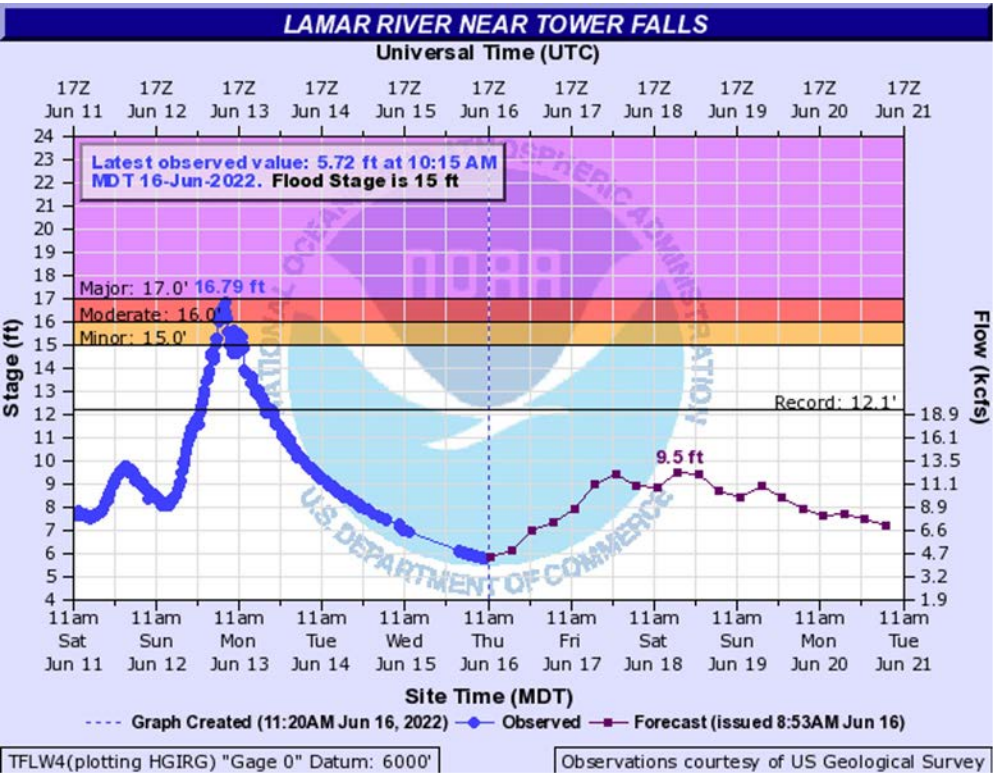


Above normal temperatures favored, especially south/southwest WY

Favored Slightly below normal central & west to near normal east

Lamar River Near Tower Falls

June 9 - June 19 Observations & Forecast



- Heavy rains on a rich snowpack resulted in record flooding in the Lamar and Yellowstone Rivers.
- 2 to 6 inches of rain were recorded in the area. High temps elsewhere brought high river levels across western WY.
- All entrances to Yellowstone closed 6/14 and 6/15, at least.
- Another round of rainfall, near record warmth aiding snowmelt, will likely result in additional rise/streamflow.

Fuel Moistures and Energy Release Component

Energy Release Component (ERC)

- A number related to the available energy (BTU) per unit area (square foot) within the flaming front at the head of a fire.
- It may also be considered a composite fuel moisture value as it reflects the contribution that all live and dead fuels have to potential fire intensity.
- Generally expressed as a Percentile.

1000-Hour Fuel Moisture (1000-hr FM)

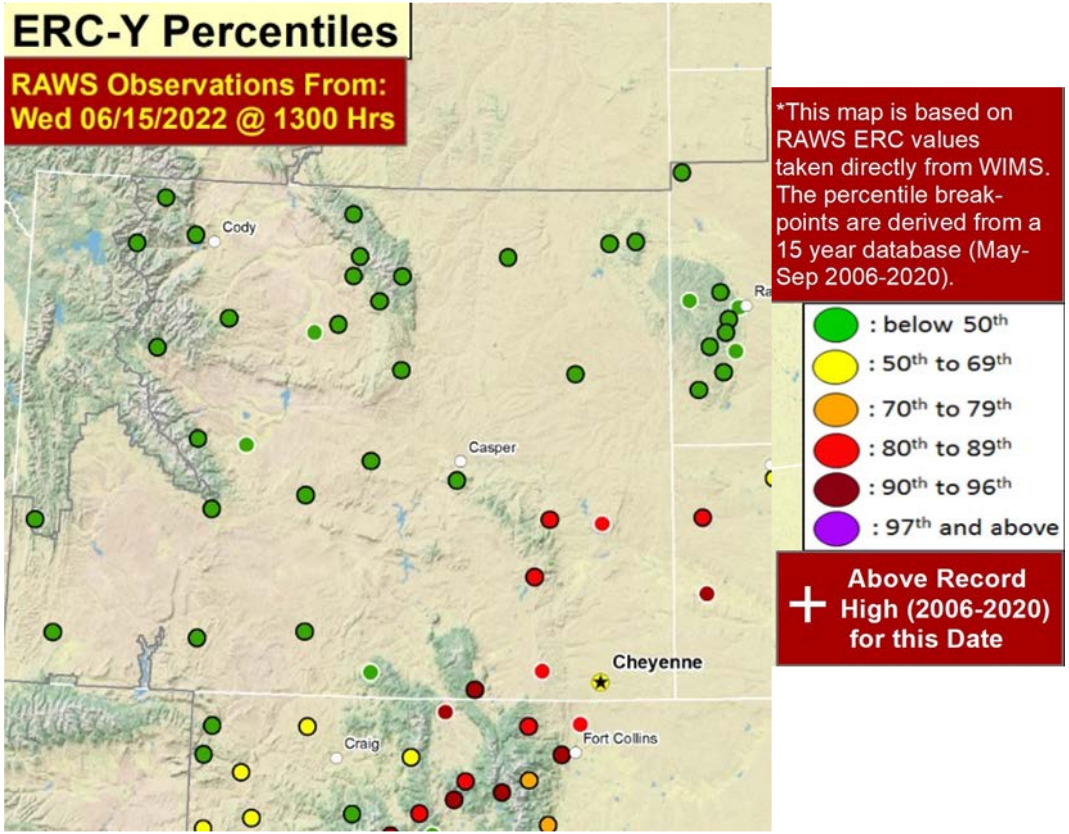
- General indicator of drought and correlates with fire danger for a Fire Danger Rating Area
- Represents the modeled moisture content in dead fuels in the 3 to 8 inch diameter class
- The 1000-hr FM value is based on a running 7-day computed average using length of day, daily temperature and relative humidity extremes (maximum and minimum values) and the 24-hour precipitation duration values.

100-Hour Fuel Moisture (100-hr FM)- 1” to 3” Dead Fuels
10-Hour Fuel Moisture (10-hr FM)- ¼” to 1” Dead Fuels
1-Hour Fuel Moisture (1-hr FM)- 0” to ¼” Dead Fuels

Live Fuel Moisture- Fuels transition from dormancy to green-up in the spring and early summer, then back to dormancy in the fall.

Energy Release Component

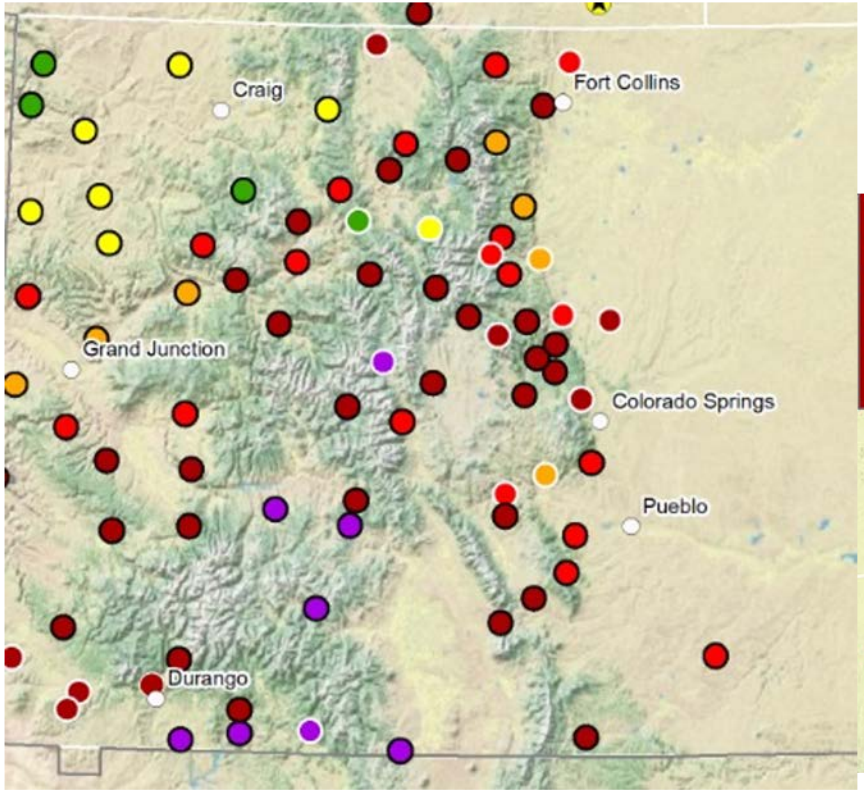
Current Status as of 06/15/2022



- Values are relative to this date in history.
- South-East Wyoming 80th+ Percentiles
- Rest of Wyoming still quite green. Lower ERCs due to live fuel component.

Energy Release Component

Current Status as of 06/16/2022



*This map is based on RAWS ERC values taken directly from WIMS. The percentile break-points are derived from a 15 year database (May-Sep 2006-2020).

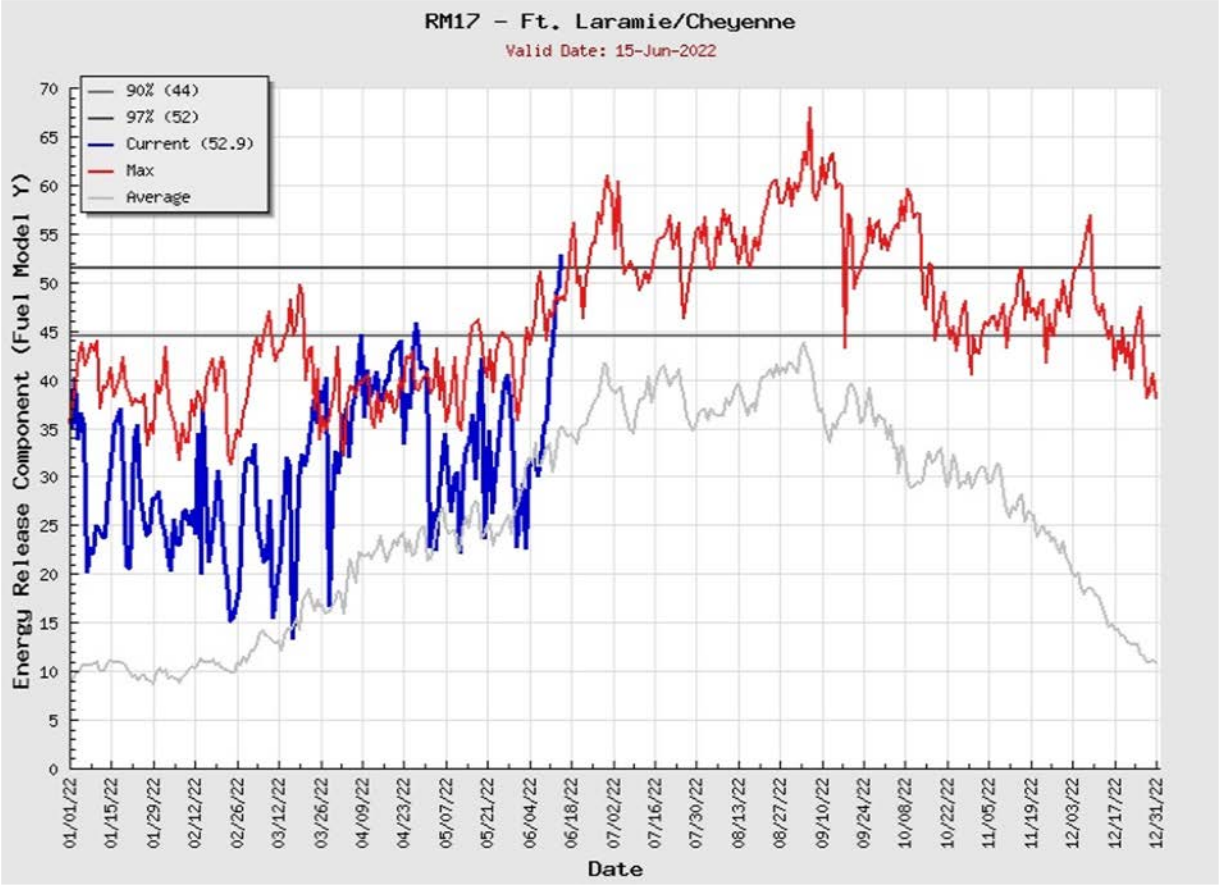
- : below 50th
- : 50th to 69th
- : 70th to 79th
- : 80th to 89th
- : 90th to 96th
- : 97th and above

\+ Above Record High (2006-2020) for this Date

- Values are relative to this date in history.
- Colorado ERC Values- Many areas above 90th and other areas 97th+

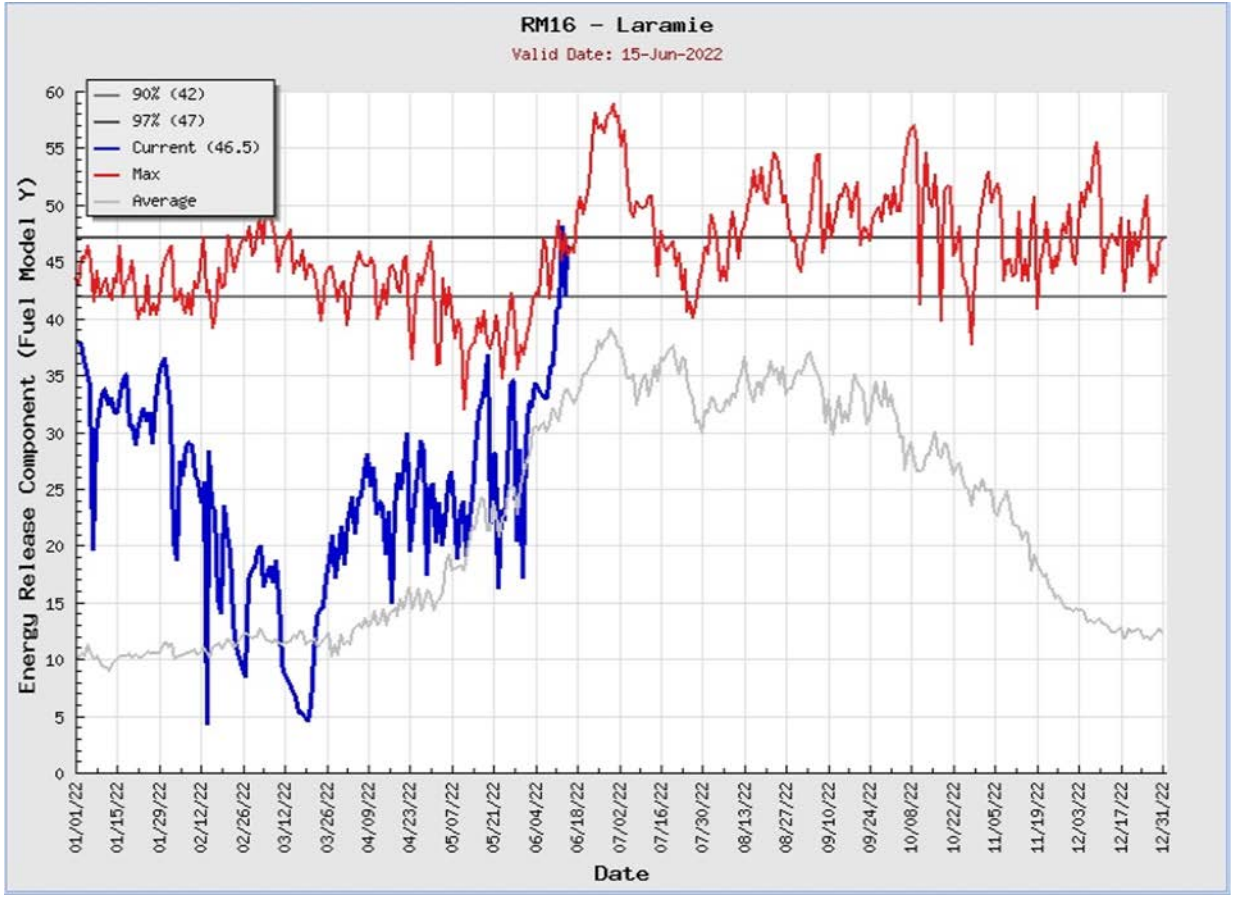
Energy Release Component

Current Status: Ft. Laramie/Cheyenne (valid 6/15/22)



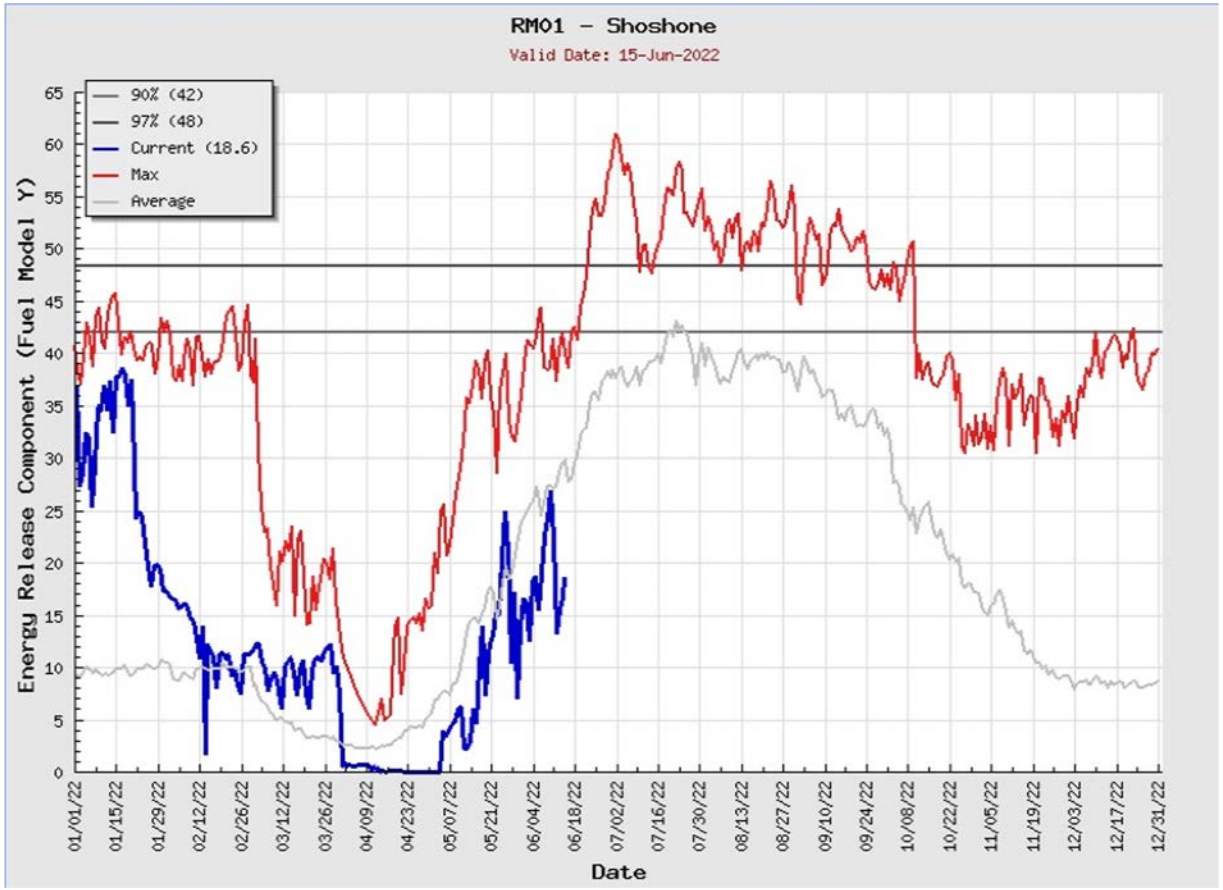
Energy Release Component

Current Status: Laramie (valid 6/15/22)

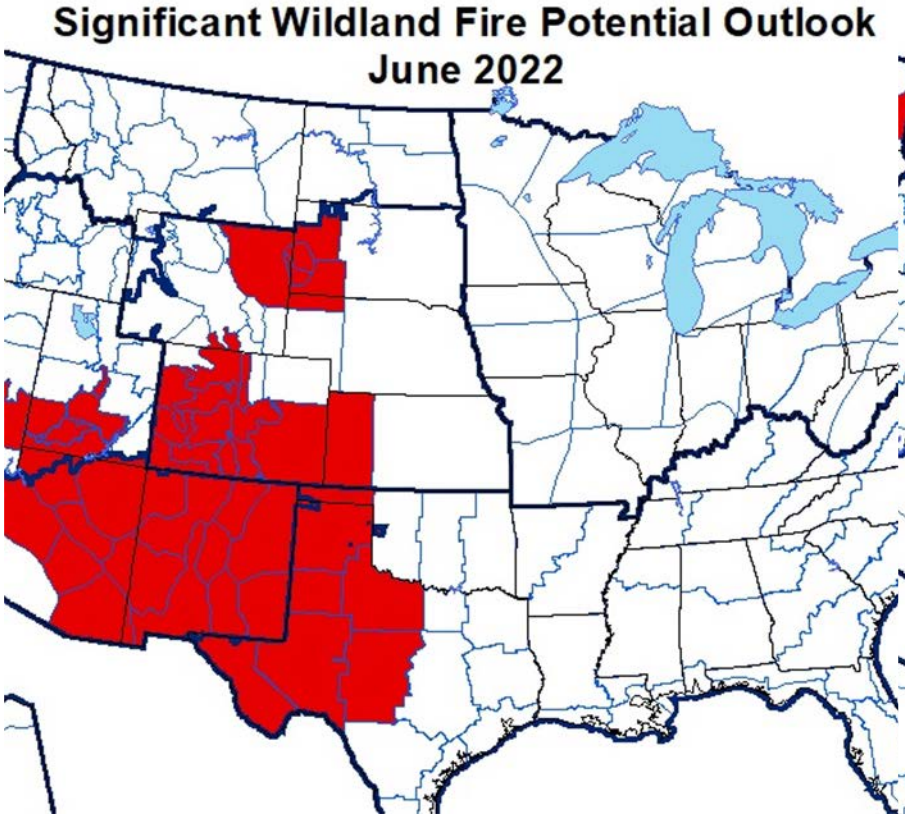


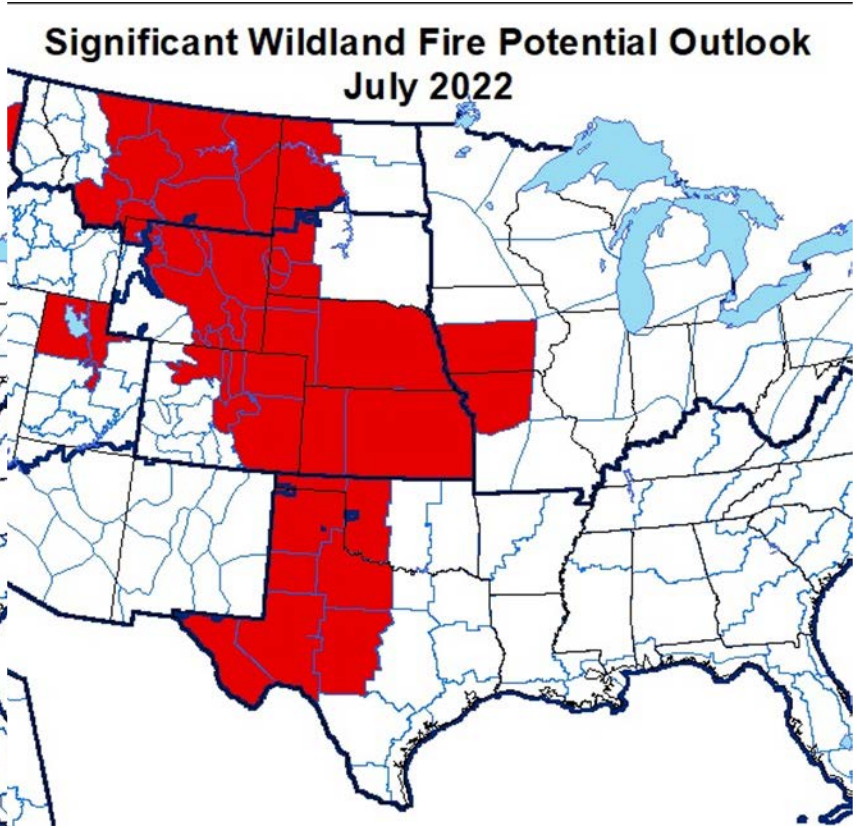
Energy Release Component

Current Status: Shoshone (valid 6/15/22)

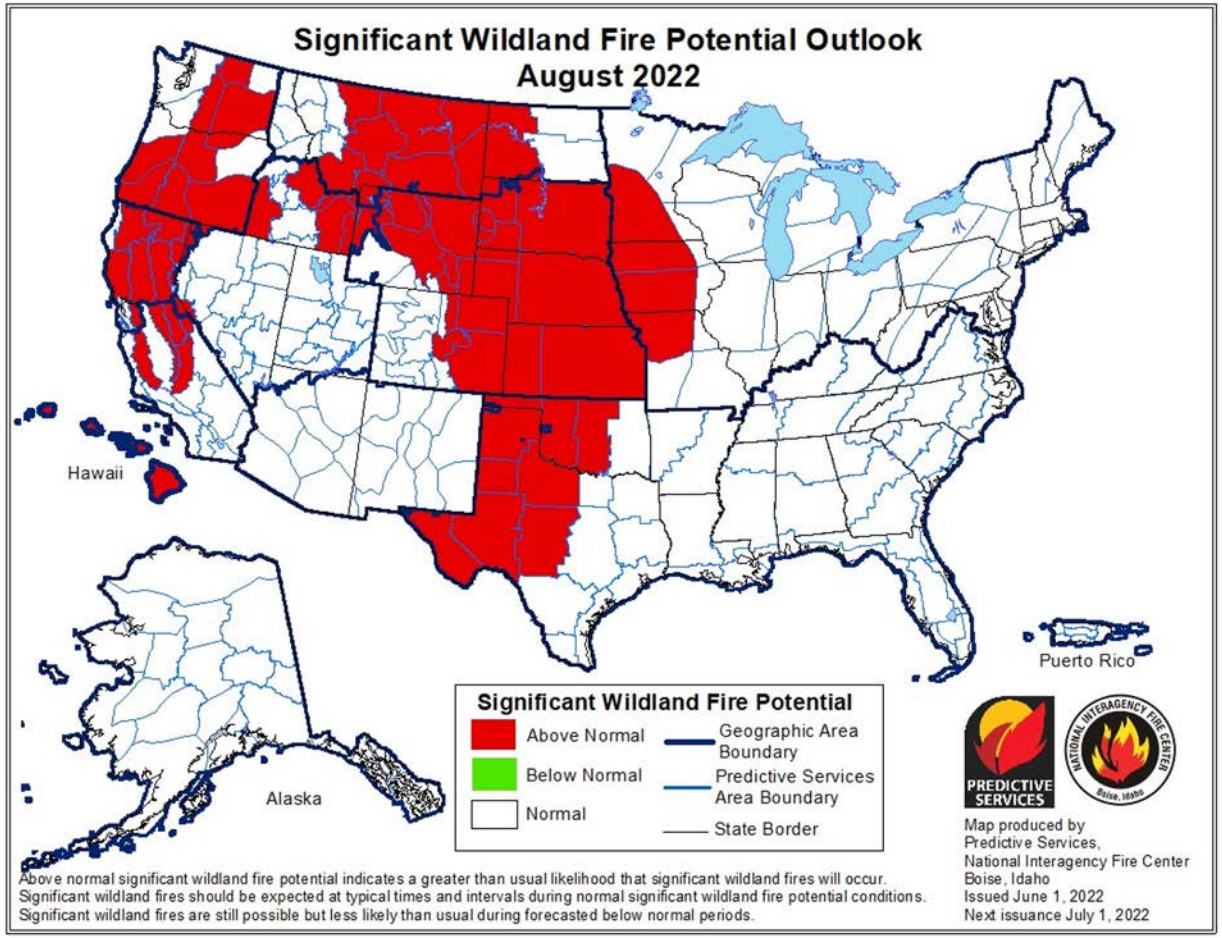


Seasonal Outlooks





Seasonal Outlooks

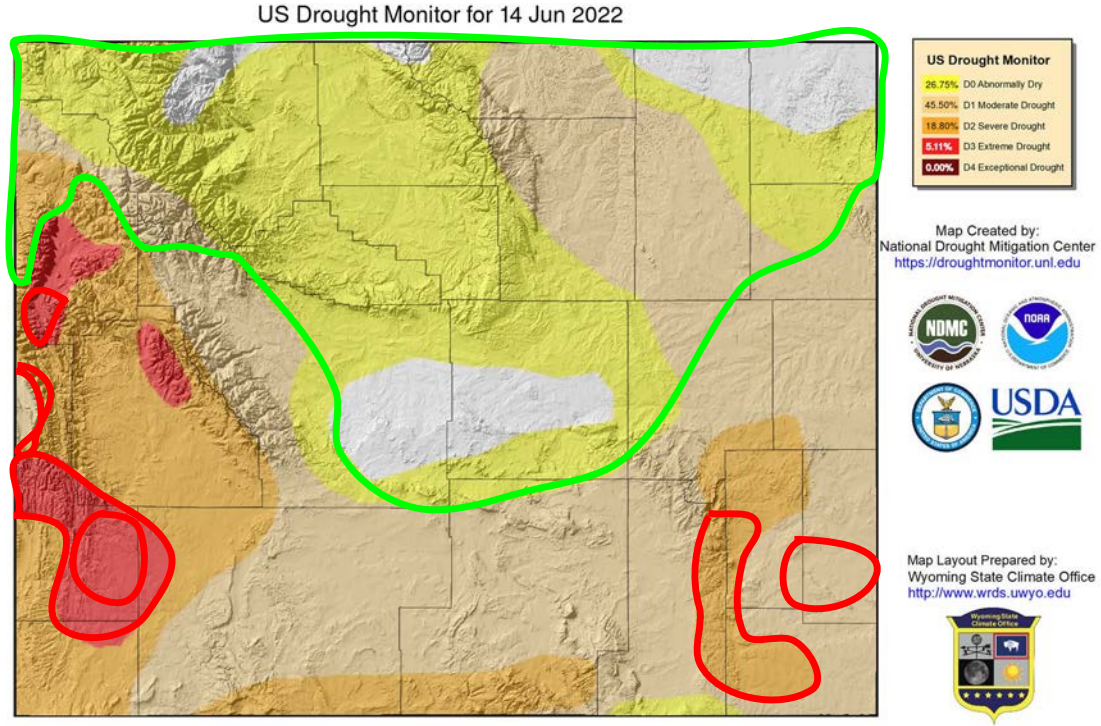


How to get involved ...

US Drought Monitor for June 14, 2022

(Released Thursday, June 16, 2022)

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

https://youtu.be/45MQ1GB-uTc

Improvements and degradations in the last month. Recent precipitation is starting to erode some of the areas but longer term dryness is filling in others.

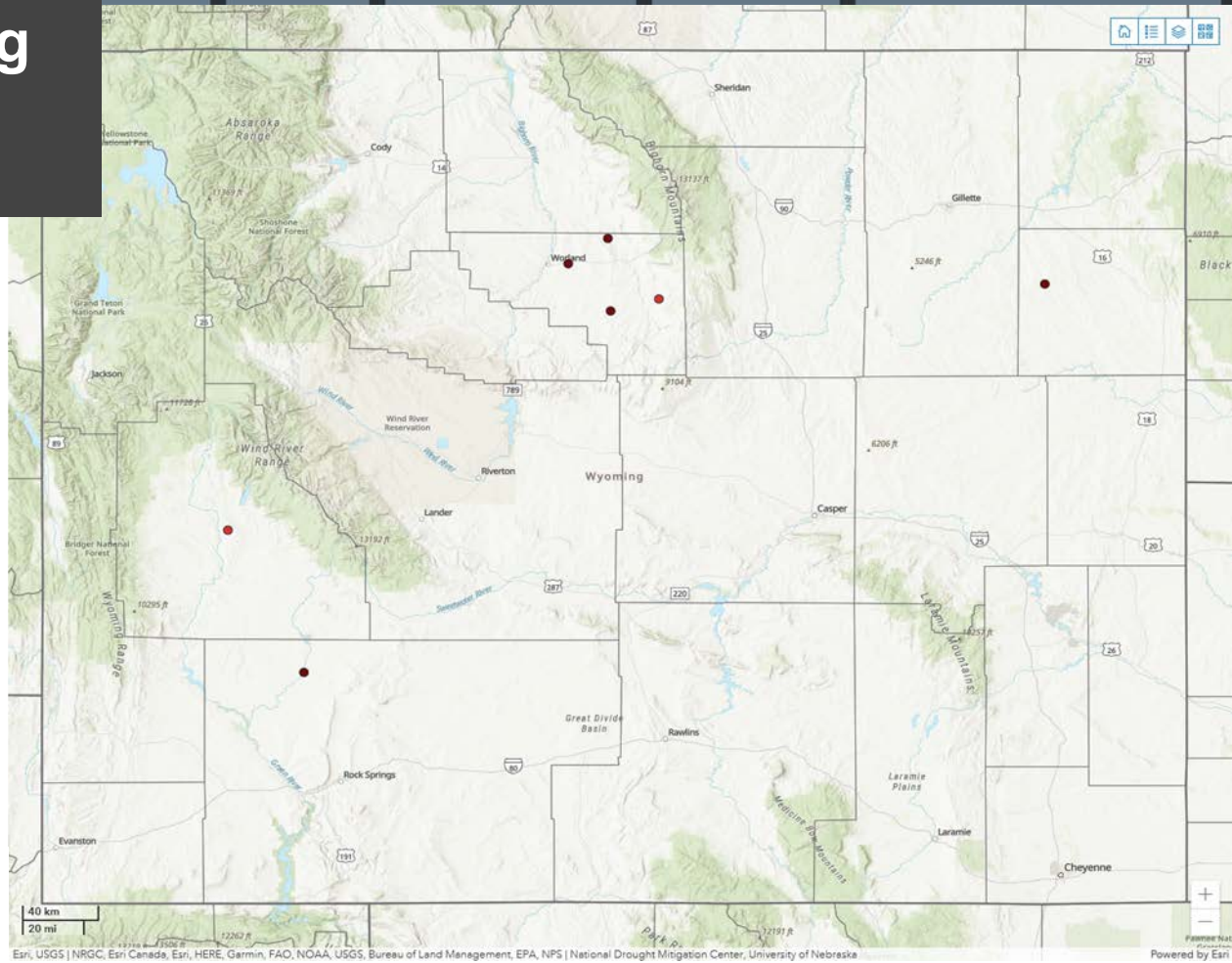
https://droughtmonitor.unl.edu

droughtmonitor.unl.edu

Condition Monitoring Observer Reports

https://bit.ly/CMOReports

- Severely Dry
- Moderately Dry
- Mildly Dry
- Near Normal
- Mildly Wet
- Moderately Wet
- Severely Wet



USDA Northern Plains Climate Hub
U.S. DEPARTMENT OF AGRICULTURE

University of Wyoming Extension

Condition Monitoring Observer Reports

https://bit.ly/CMOReports

- Comparison photos → resource conditions
- Regular reporting is helpful (e.g., monthly)
- ***Note:*** Reports and photos are available to the public.

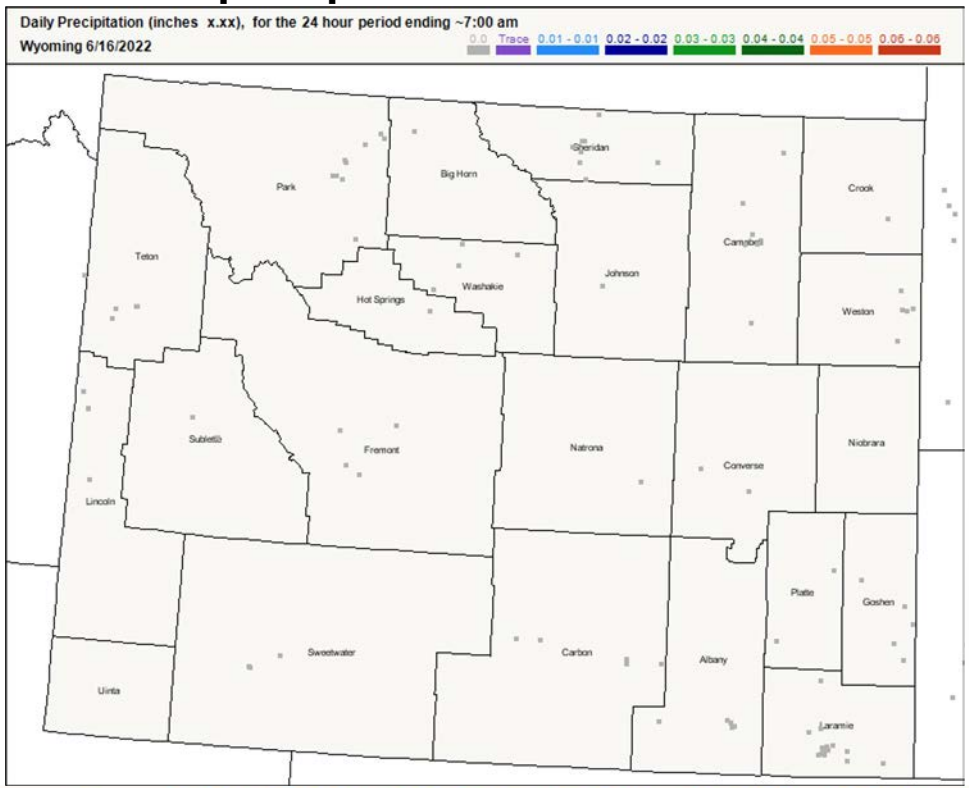
Photo Credit. On Pasture

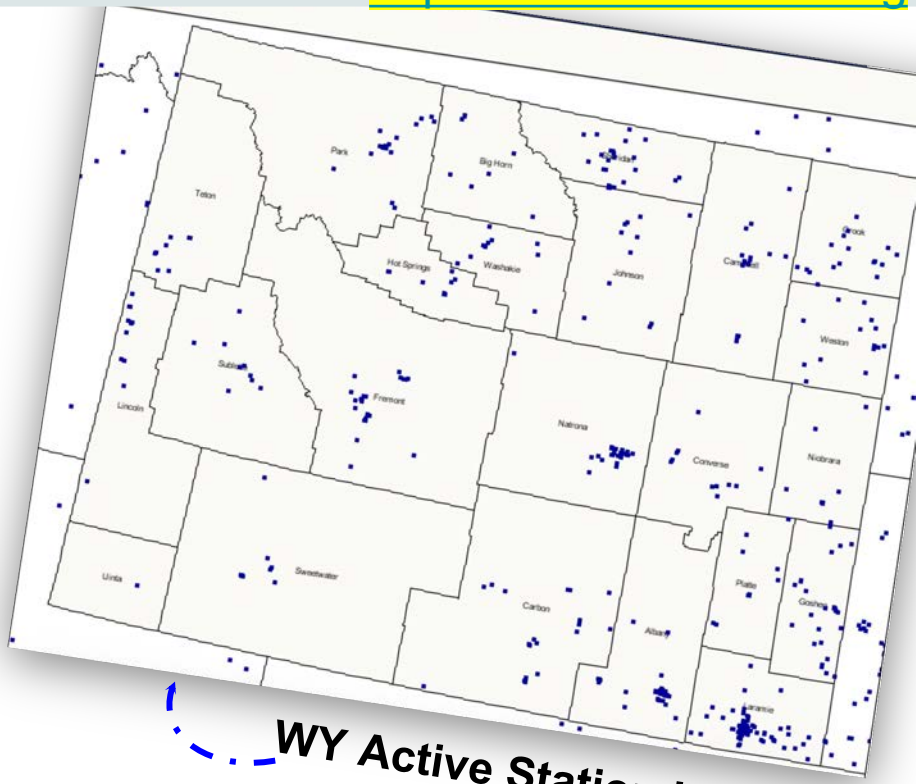
CoCoRaHS Mapping System

https://www.cocorahs.org

WRDS Water Resources Data System

June 16, 2022:
24-hour precip as of ~ 7 am





WY Active Station Locations

0.0 Trace 0.01 - 0.01 0.01 - 0.02 0.02 - 0.03 0.03 - 0.04 0.04 - 0.05 0.05 - 0.06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State Engineer's Office
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Windy Kelley
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Brian Loving
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Jared Allen
National Weather Service
Cheyenne
jared.allen@noaa.gov

Nikki Nielsen
Bureau of Reclamation
nnielsen@usbr.gov

Joel Peters
Bureau of Land Management
jjpeters@blm.gov

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! Questions?