WY Conditions & Outlooks:

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

March 20, 2025

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

Presentation Outline

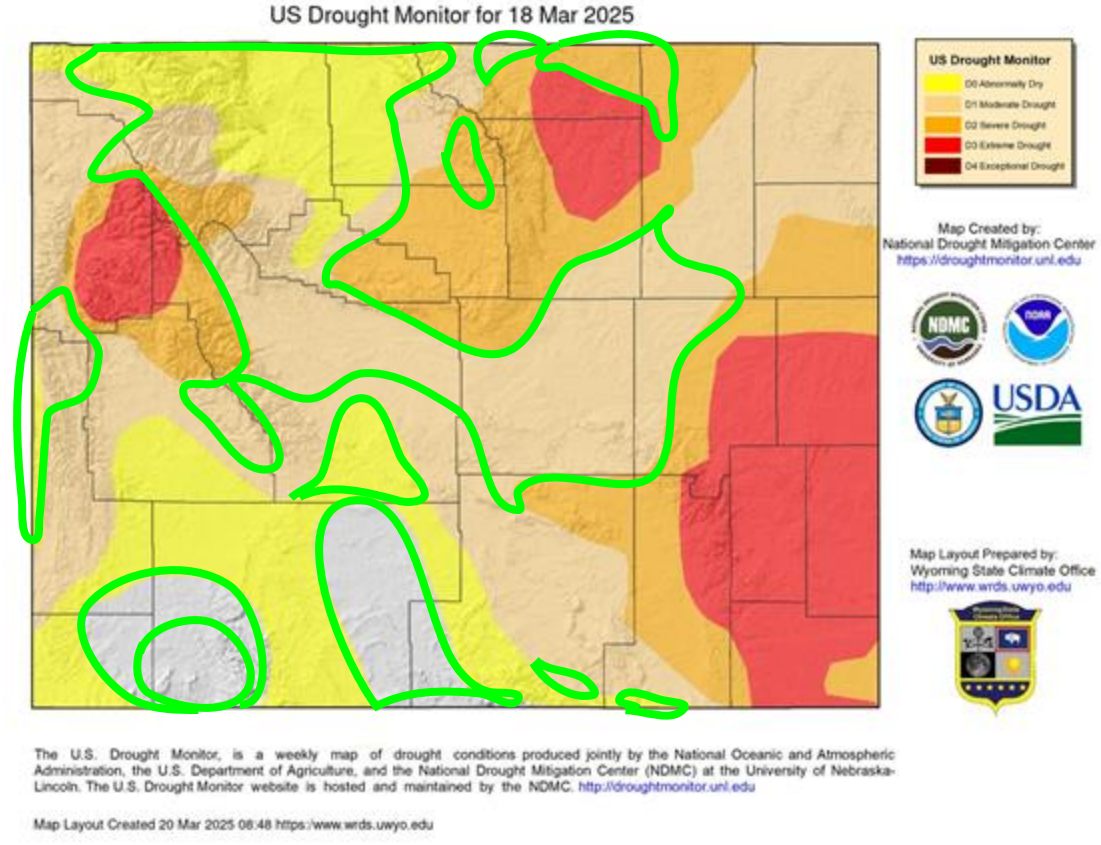
- **Current Conditions:** Overview
  - Drought, Temperature, Precipitation, Soil Moisture, and Snow Water Equivalent
  - Streamflows
  - Reservoir Levels
- **Outlooks:**
  - Temperature & Precipitation
- **Highlight of the Month:**
  - Cold Advisory for Newborn Livestock (CANL)
- **Questions**

Current Conditions

US Drought Monitor for March 18, 2025

(Released Thursday, March 20th, 2025)

Valid 8 a.m. EDT



Drought Level	Percentile
None	>30.01
D0 (Abnormally Dry)	20.01 to 30
D1 (Moderate Drought)	10.01 to 20
D2 (Severe Drought)	5.01 to 10
D3 (Extreme Drought)	2.01 to 5
D4 (Exceptional Drought)	0 to 2

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

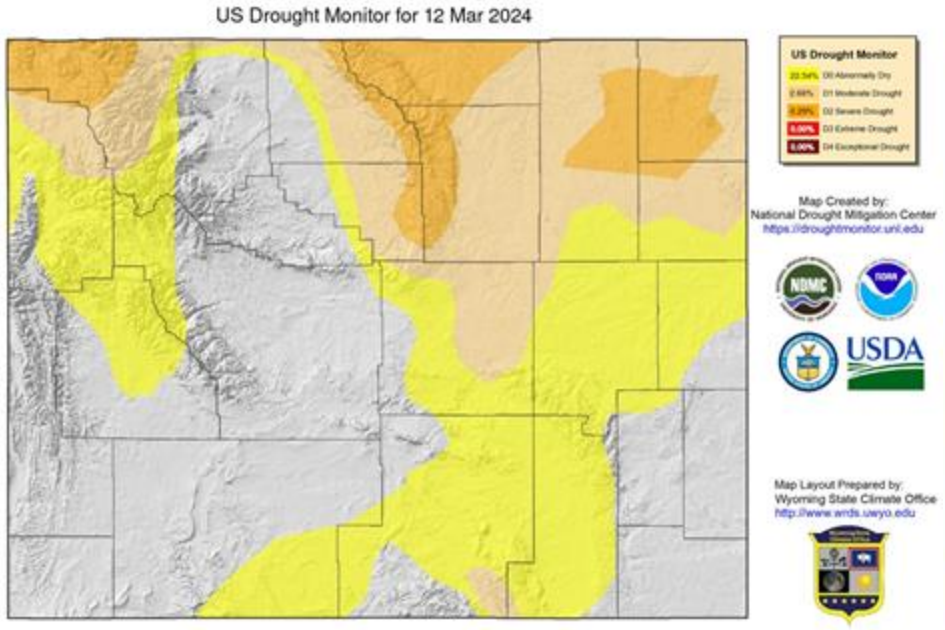
Improvements in much of the state except the southeast thanks to recent snow events contributing to increases in soil moisture across the region.

https://droughtmonitor.unl.edu

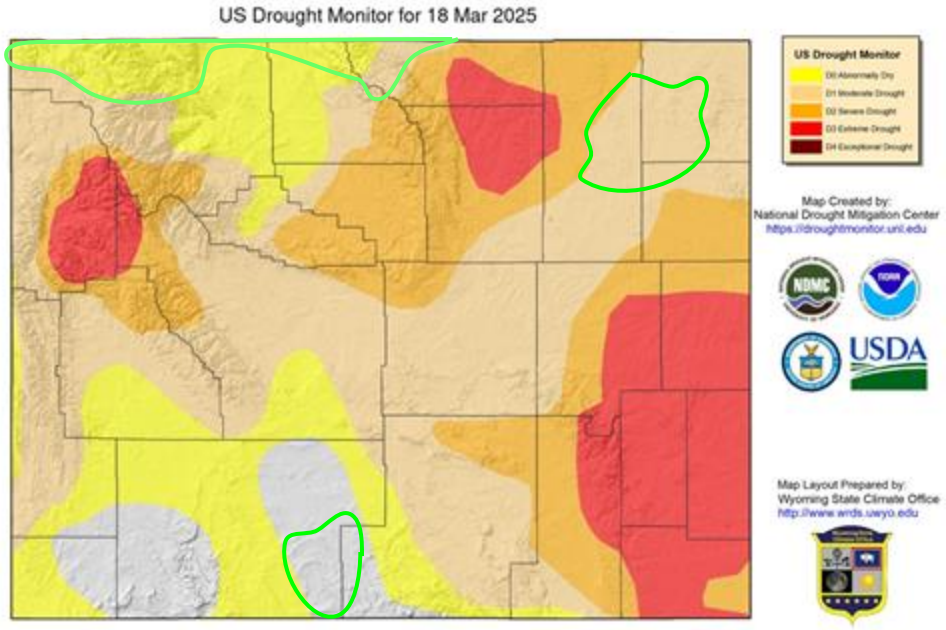
droughtmonitor.unl.edu

WRDS
Water Resources Data System

One Year Ago



Today



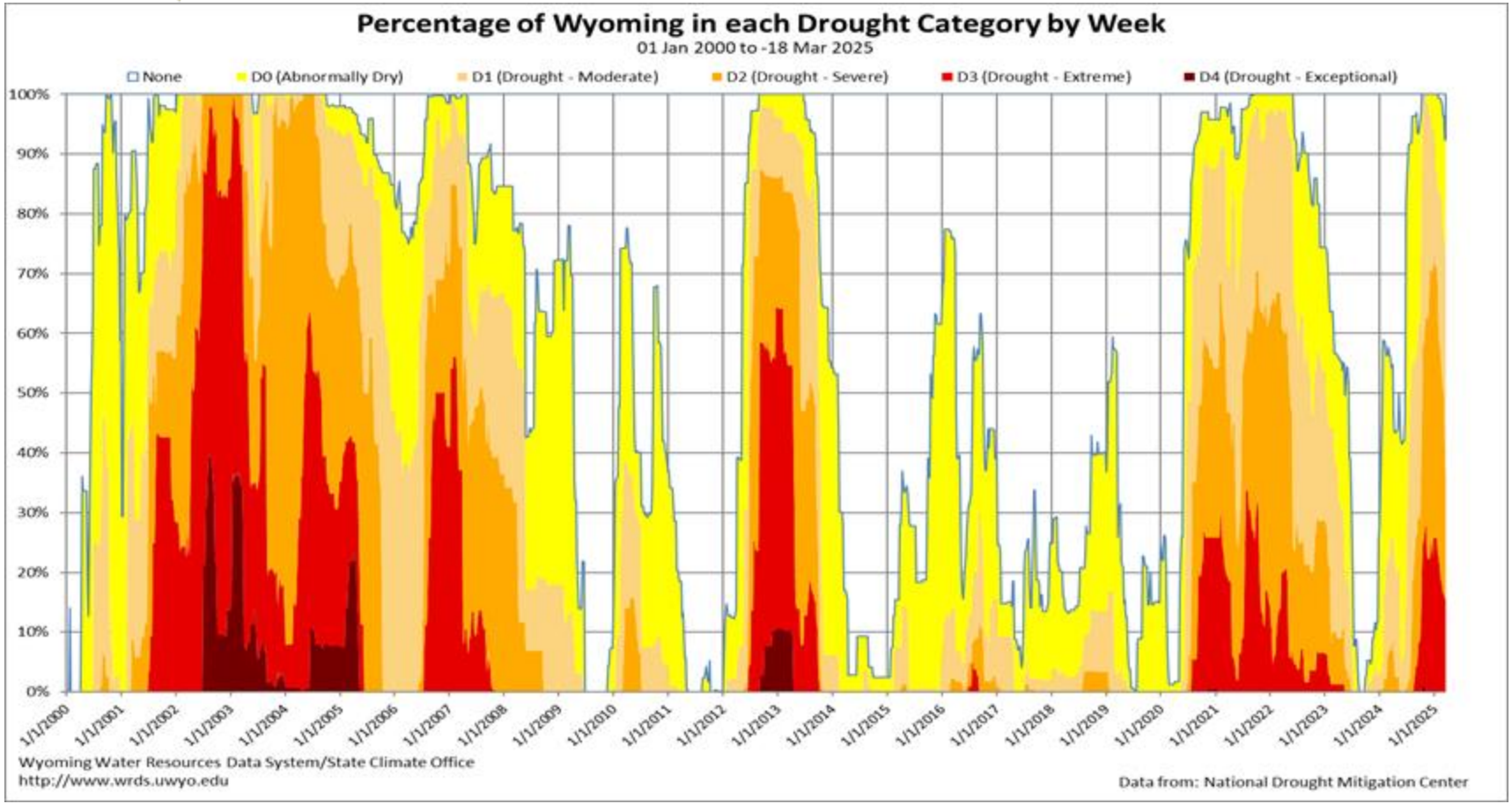
USDA NDMC

droughtmonitor.unl.edu

https://droughtmonitor.unl.edu

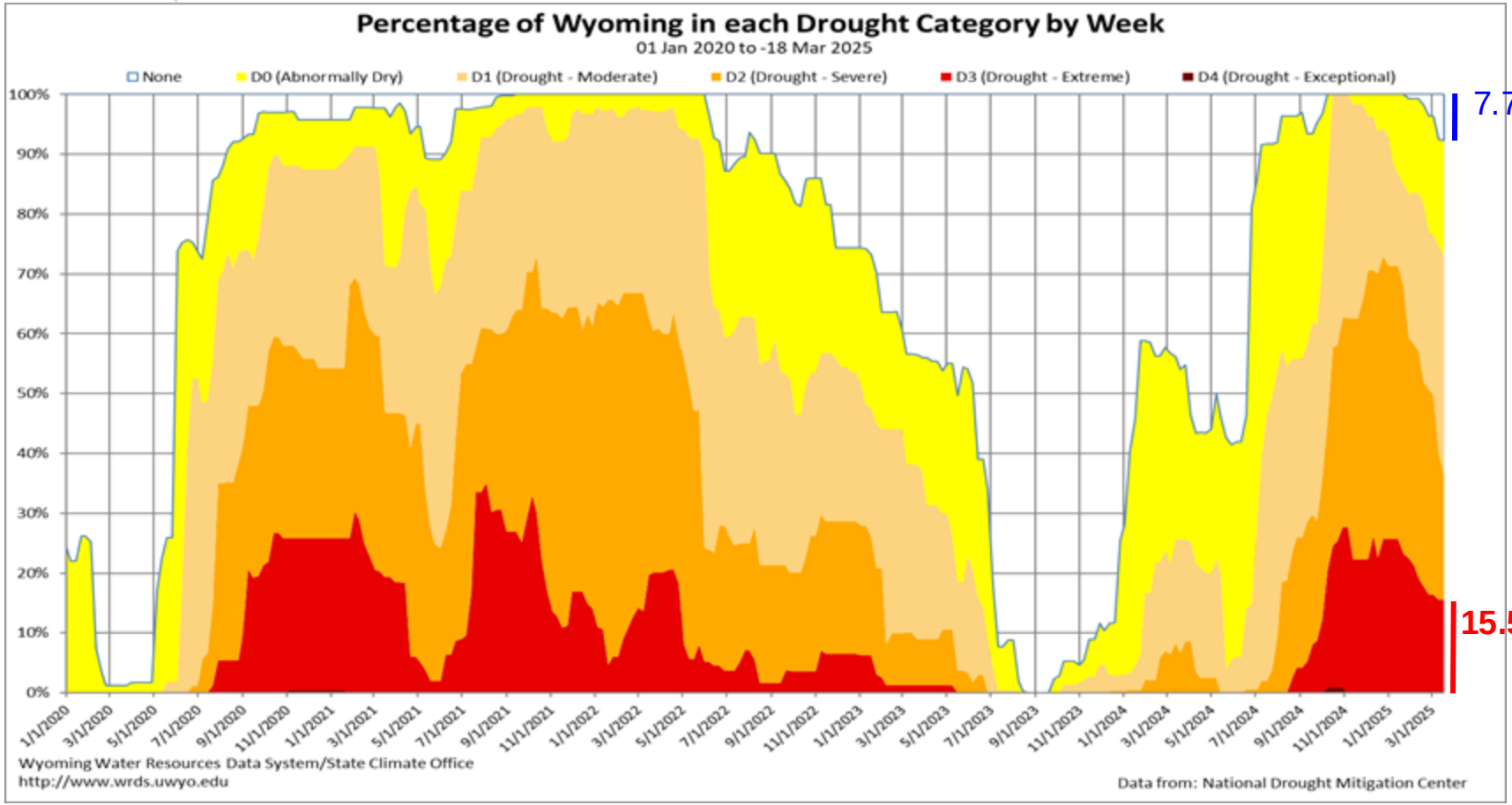
WRDS
Water Resources Data System

Wyoming Area Affected: 92.29% D0-D4 ; 73.28% D1-D4



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

WRDS
Water Resources Data System



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

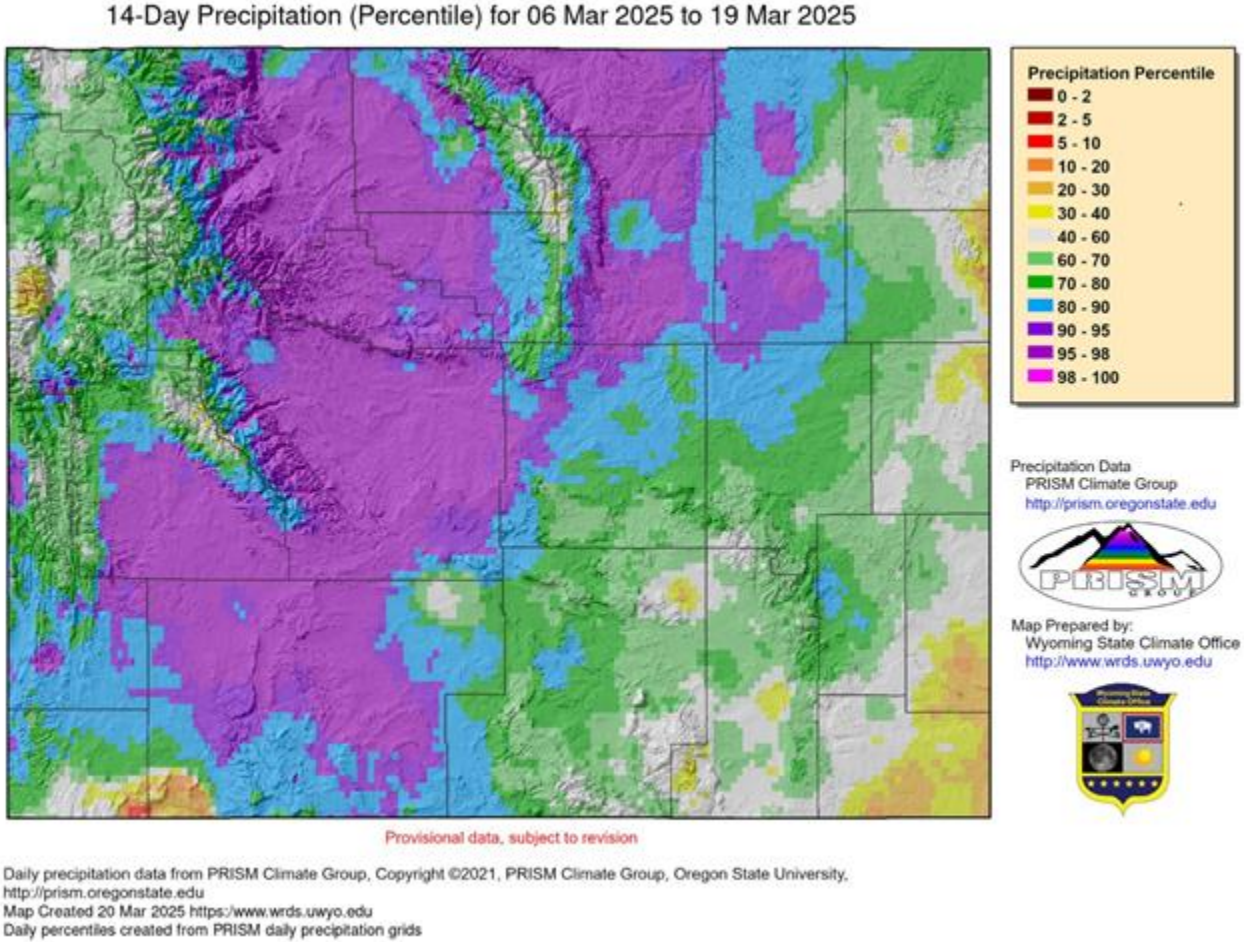
14-Day Precipitation Percentile (06 Mar 2025 to 19 Mar 2025)

Above Median:

- Most of Wyoming

Below Median (*Areas of Concern*):

- Far Southeast
- Far Southwest
- Tetons
- NE Weston & Niobrara Counties



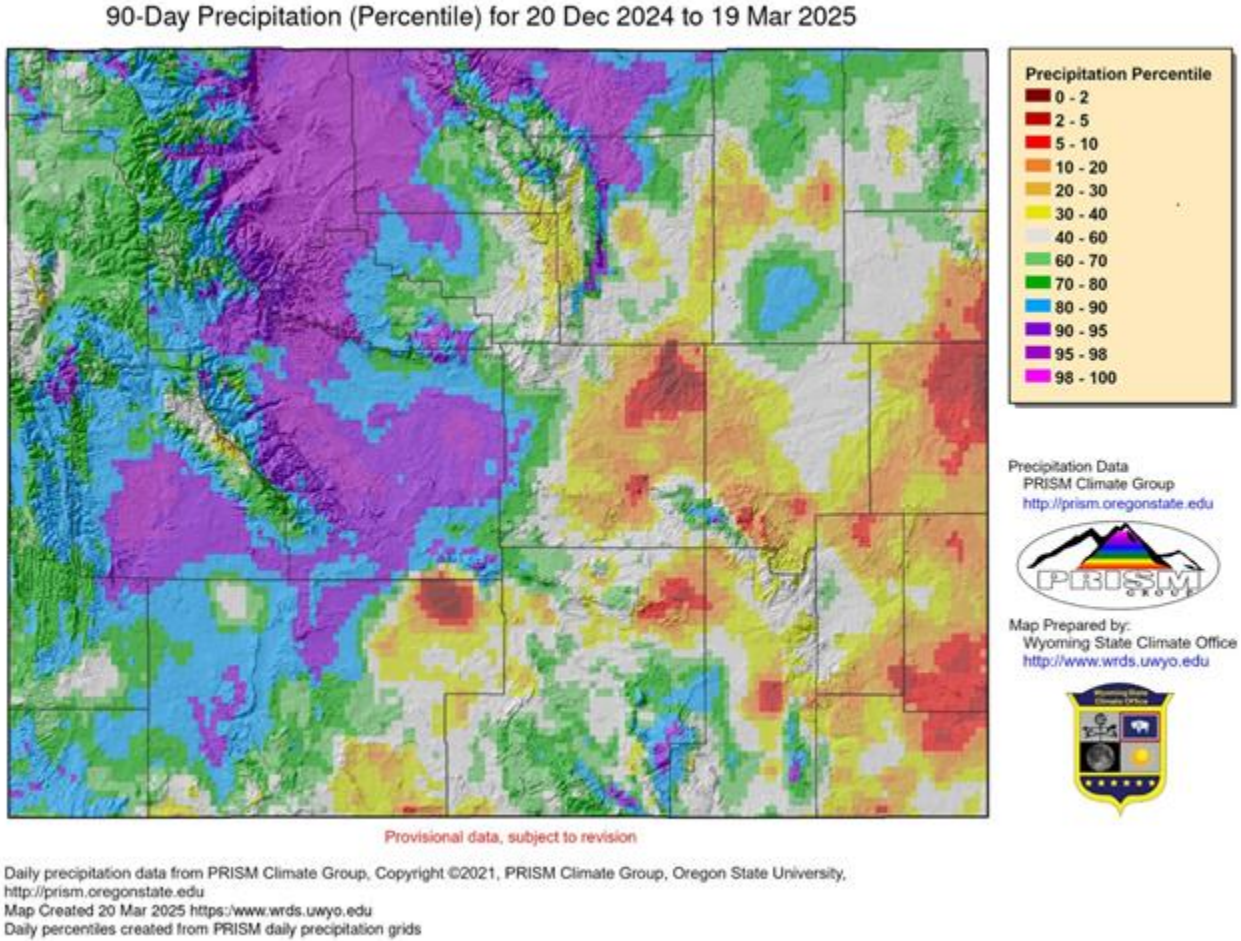
90-Day Precipitation Percentile (20 Dec 2024 to 19 Mar 2025)

At or Above Median:

- West
- Southern Carbon County
- Sheridan & northern Johnson Counties

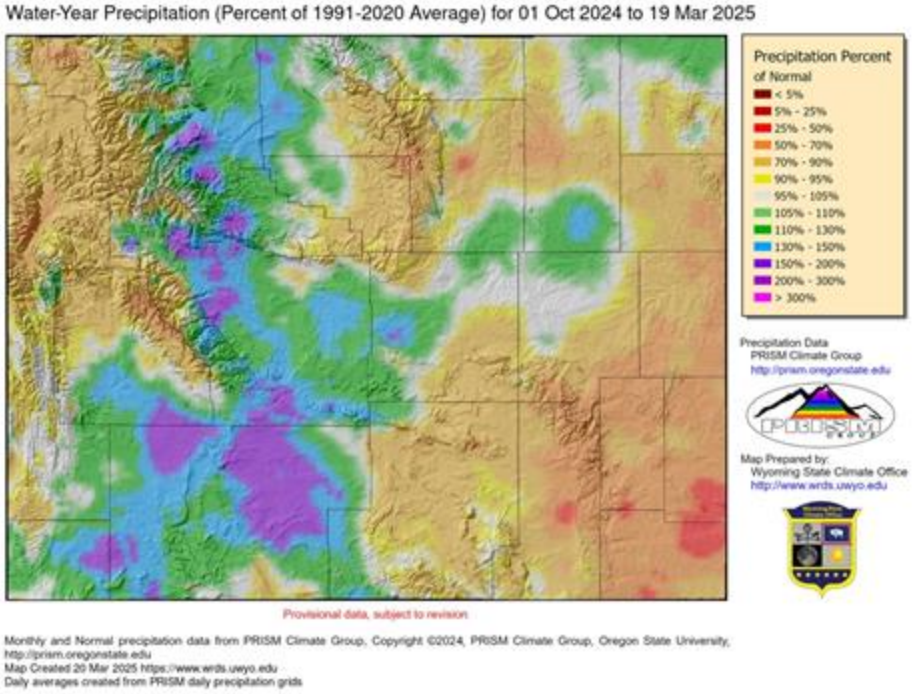
Below Median (*Areas of Concern*):

- Southeast
- Niobrara & SW Weston Counties
- Natrona County
- Northeast Sweetwater County

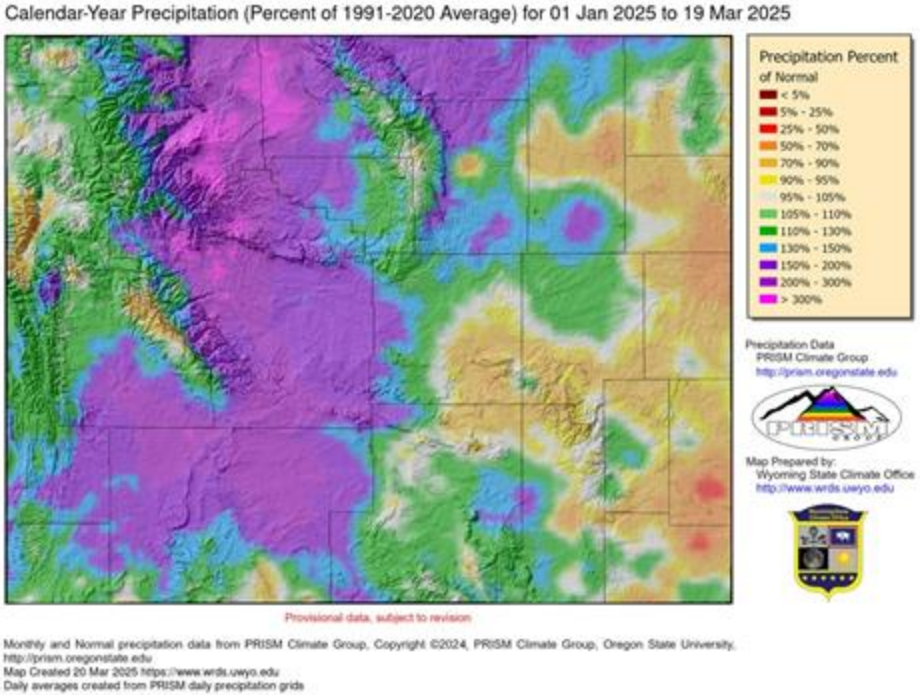


“Year”-to-Date Precipitation (Percent of Average)

Current Water Year



Current Calendar Year

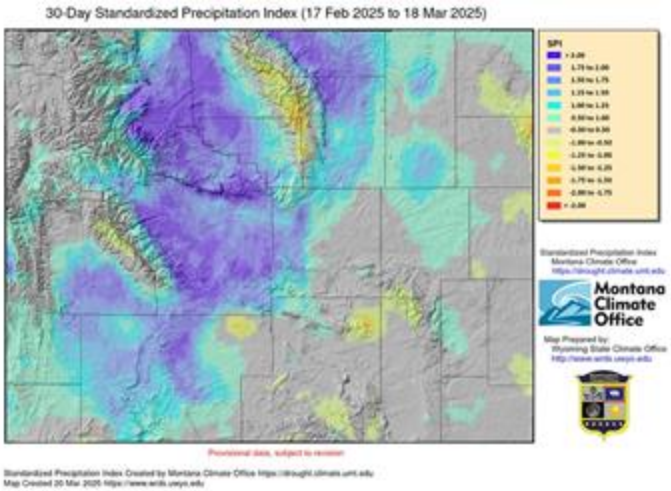


Note: a water year is October 1 through September 30 of the following year.

WRDS
Water Resources Data System

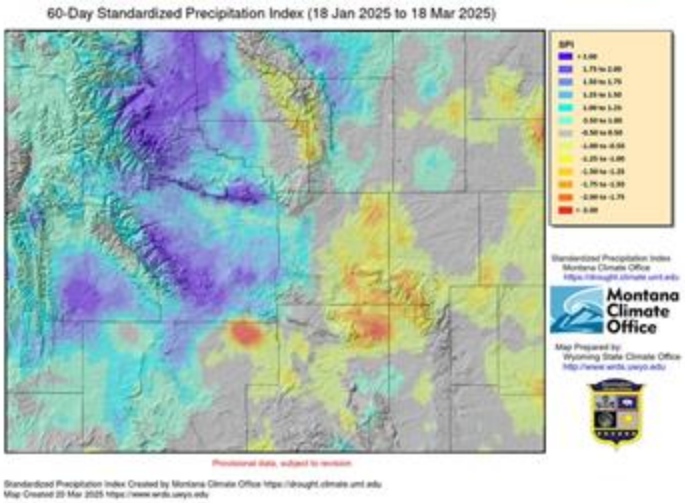
30-Day →

Feb 17 - Mar 18



60-Day →

Jan 18 - Mar 18

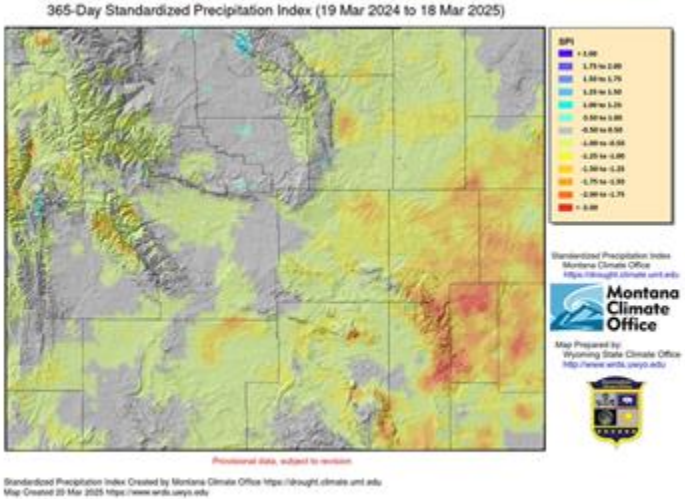


Standardized Precipitation Index (SPI)

Short term: Wet or Normal in the west and western northeast quarter. Drier in east Central Wyoming at 60- vs 30-day timeframes. (Indicating improving conditions there)

Long term: Dry in East extending through Central WY.

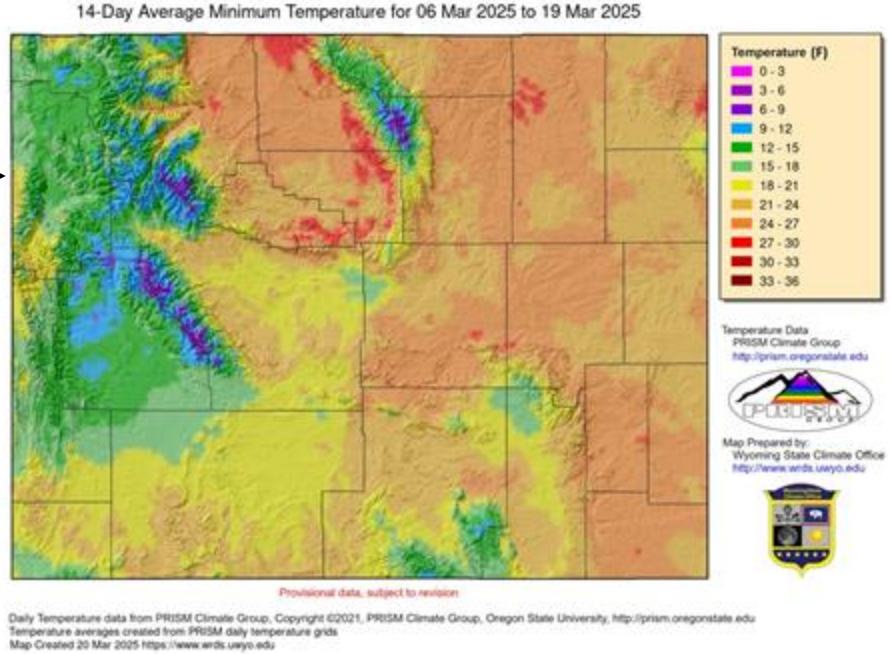
1-Year →

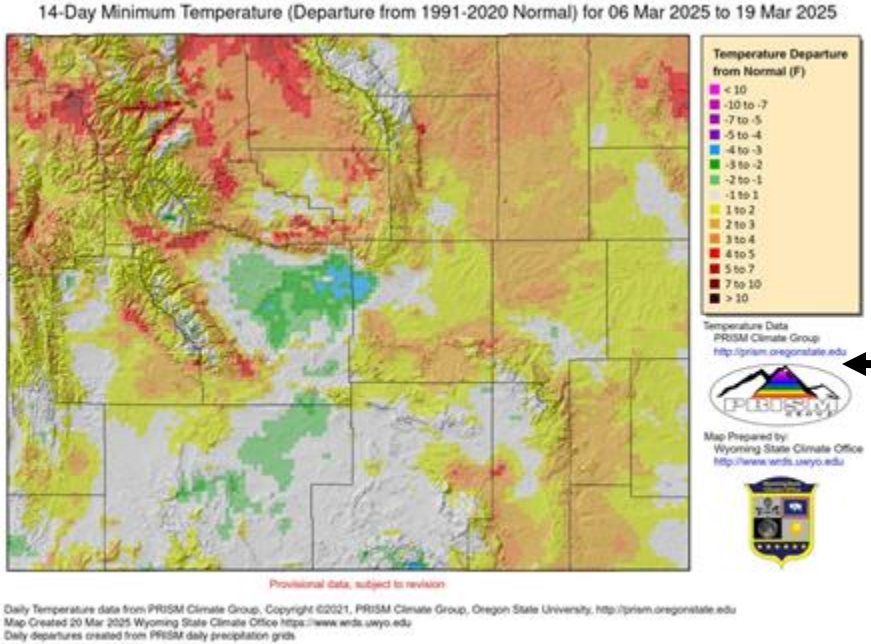


https://drought.climate.umt.edu

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

- Minimums below freezing statewide
- N BH Basin warmest with avg min temps in upper 20s



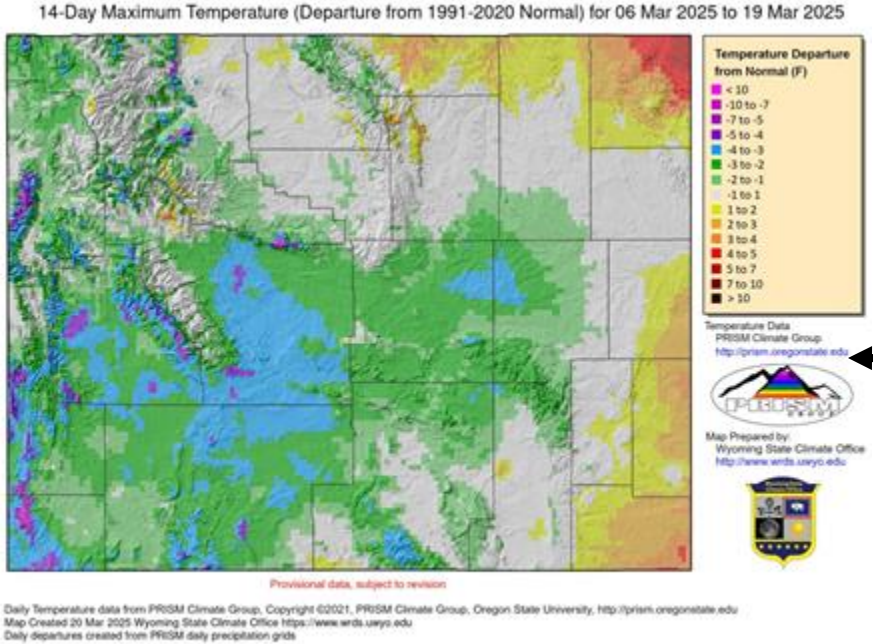


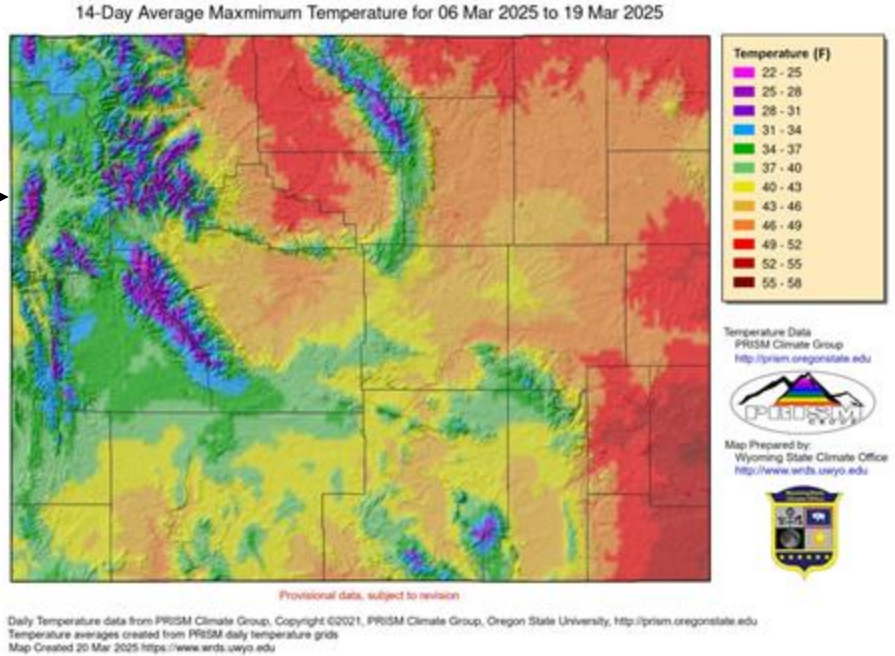
14-Day *Departure from* Normal Average Minimum Temperature

- Northwest as much as 10F above normal
- Lower Wind River Basin coolest 2-4F below normal

14-Day Average Maximum Temperature (06 Mar to 19 Mar)

- All but the highest elevation areas above 32F
- Warmest in southeast



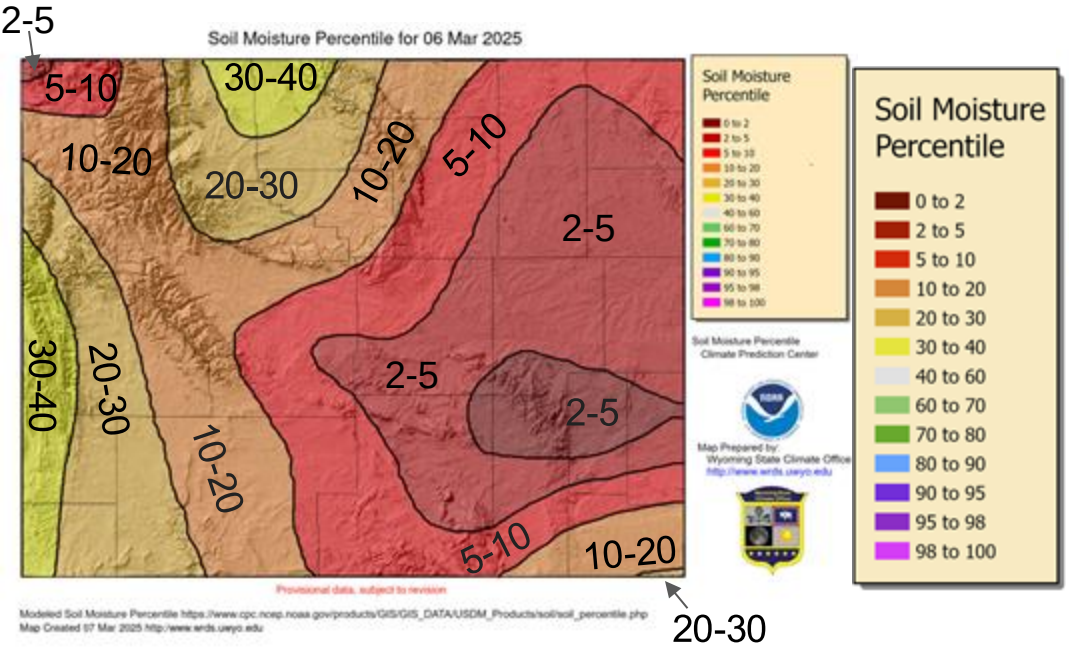


14- Day *Departure from* Normal Average Maximum Temperature

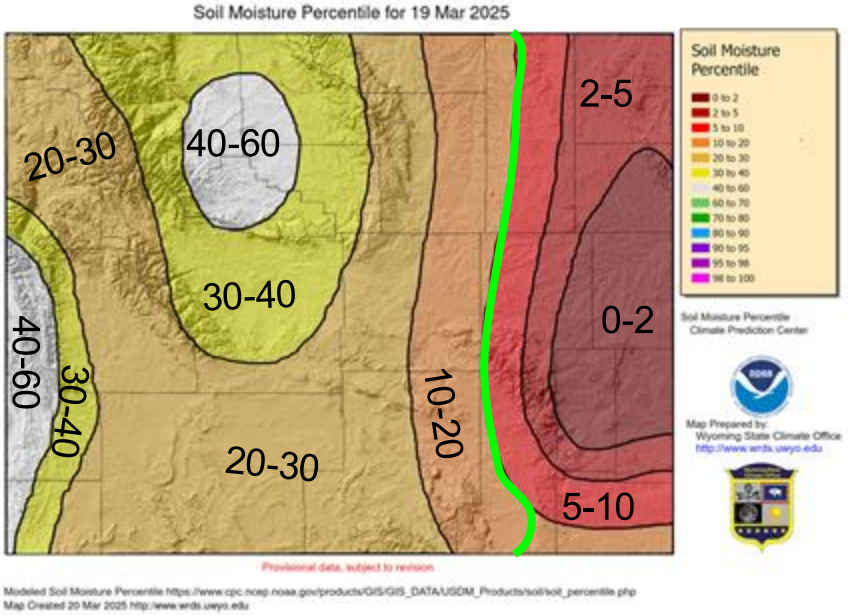
- Northeastern and eastern border areas above normal
- West and Southwestern two-thirds below normal
- Greatest temperature departure above normal in the far northeast

Soil Moisture Percentile

~Two Weeks Ago



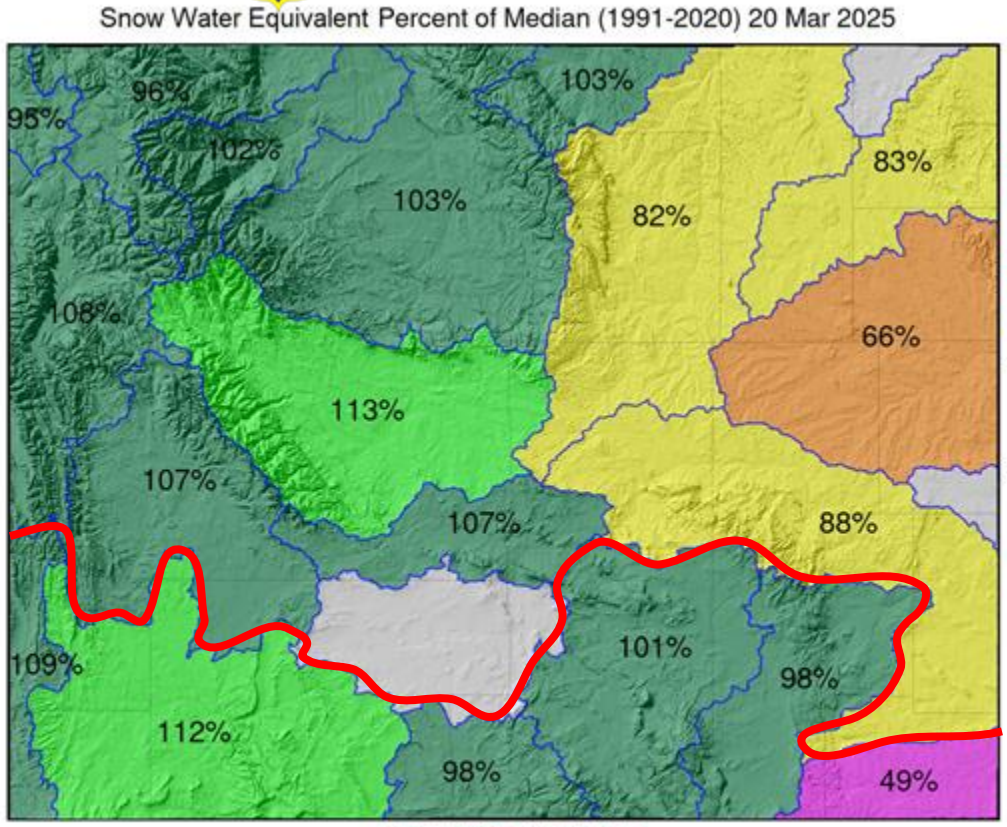
19 Mar 2025



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

Degradations to the east of the green line, Improvements to the west of it.

Basin Snow Water Equivalent - Percent of Median

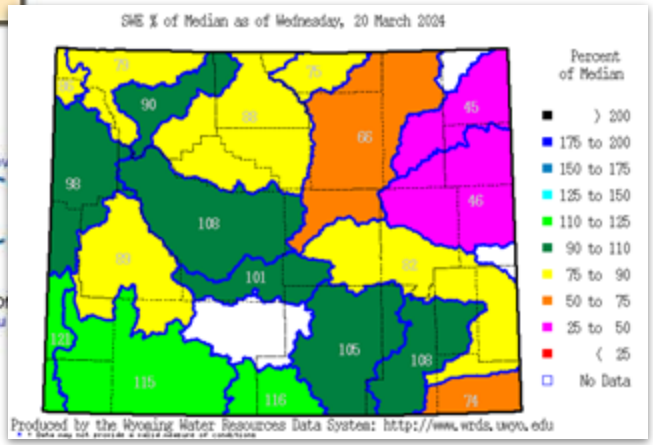




2025 — 20 March

2024

One Year Ago



Snow Water Equivalent Data
NRCS
https://www.nrcs.usda.gov

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

Provisional data, subject to revision

Basin Snow Water Equivalent Data from Natural Resources Conservation Service Water and Climate Center https://www.nrcs.usda.gov
Map created by Wyoming State Climate Office 20 Mar 2025

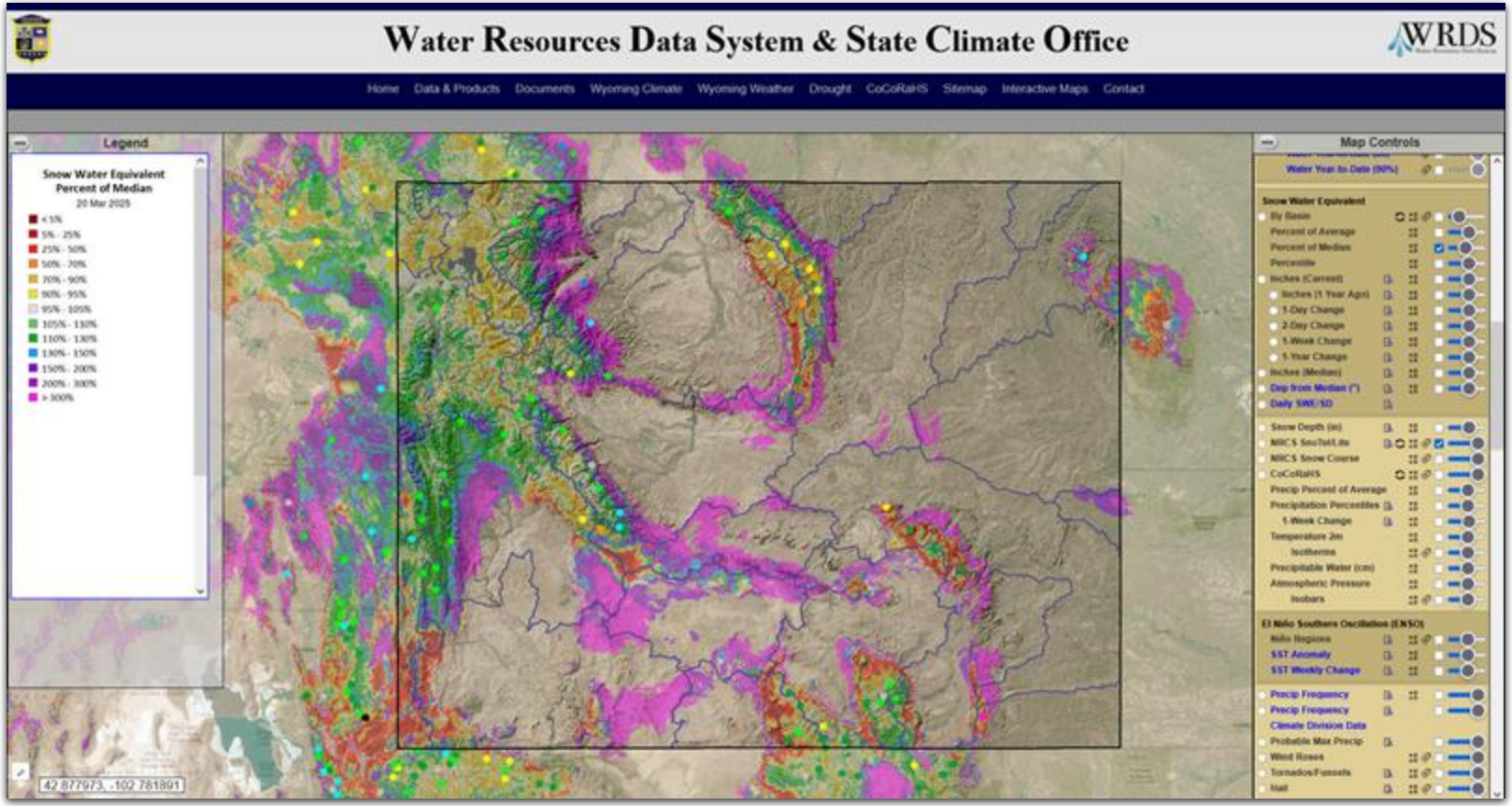
* Percentages denoted by an asterisk represent data that may not provide a valid measure of conditions. This is most usually seen near the end of the snow season where normal values may be very low or the melt out curve is so steep that a slight variation in days may result in abnormally high or low percentages.

Basins above red line: Higher snowpack compared to last year.
Basins below red line: Lower snowpack compared to last year.

https://www.wrds.uwyo.edu/wrds/nrcs/snowmap/snowmap.html

Snow Water Equivalent - Percent of Median

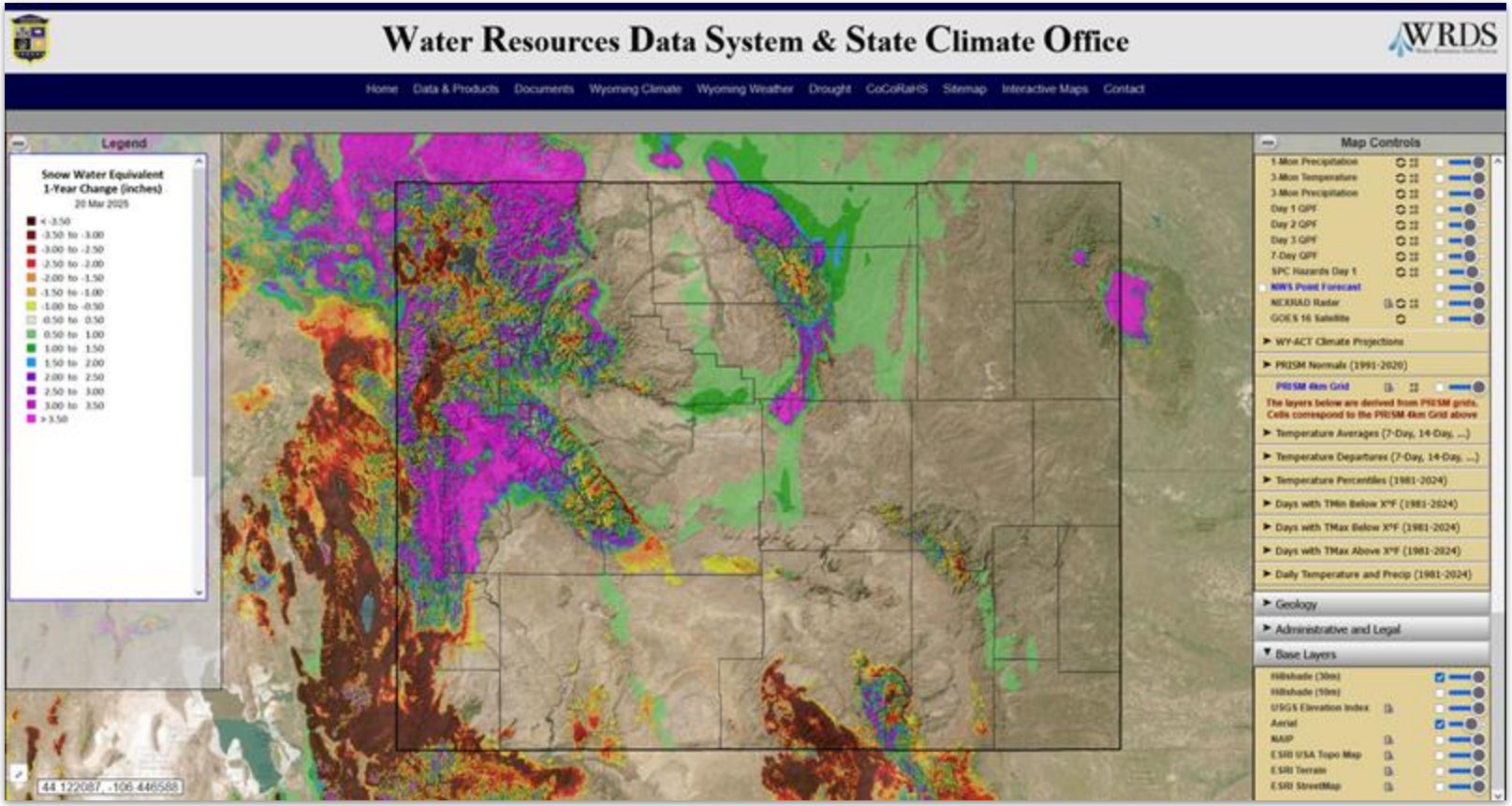
20 Mar 2025



https://www.wrds.uwyo.edu/wace/wacehome.html

Snow Water Equivalent - Percent of Median

1-Year Change



https://www.wrds.uwyo.edu/wace/wacehome.html

Basin Snow Pack Status - 20 Mar 2025

Peak Snow Water Equivalent Dates and Totals by Basin With Meltout Dates

This year's "to-date" peak snow water equivalent (SWE) compared to median.
Red indicates **earlier** peak date or **lower** SWE compared to median
Blue indicates **later** peak date or **higher** SWE compared to median
Click Column Headers to Sort

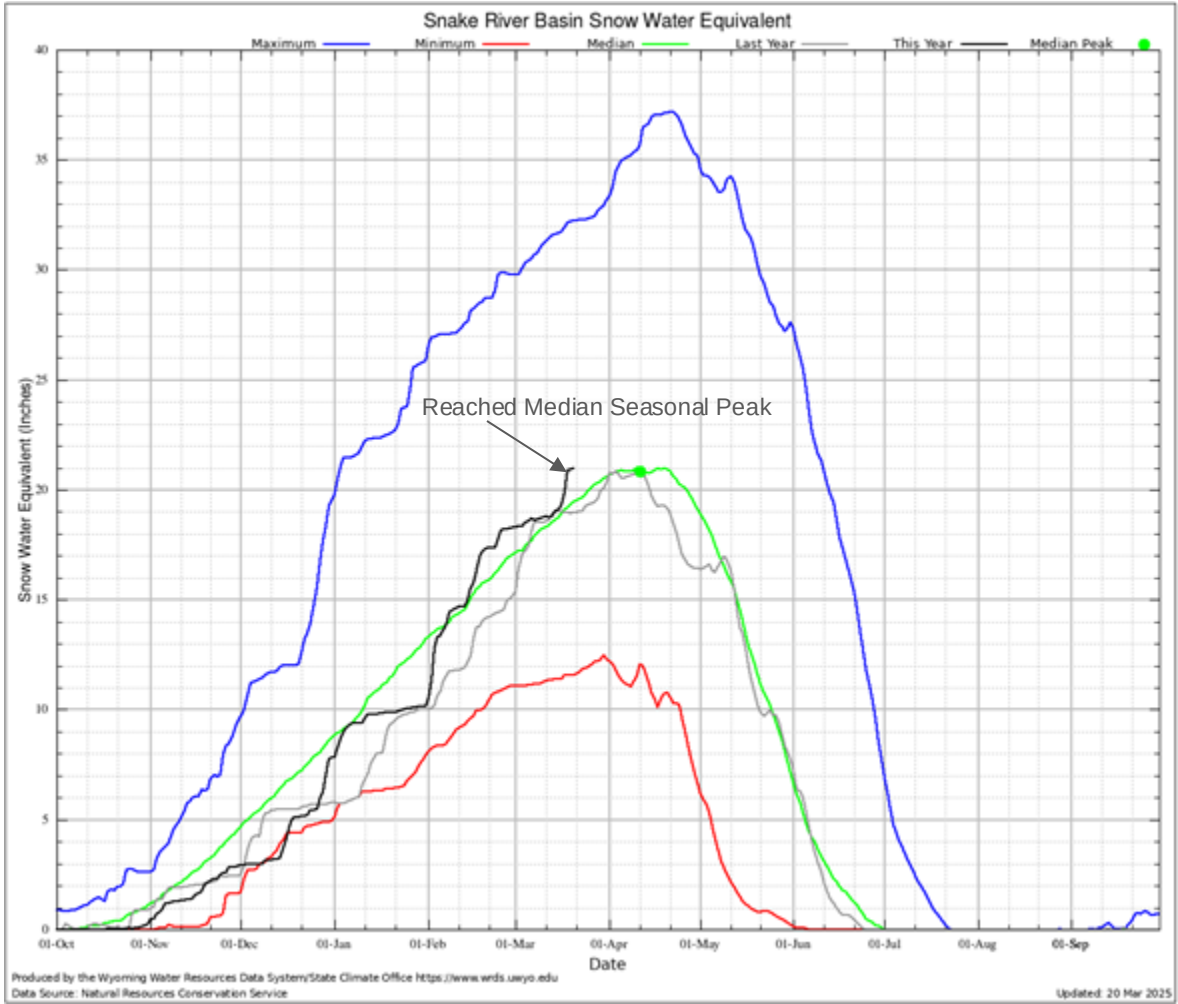
Basin Click to View Chart	This Year Peak Date	This Year Peak SWE (inches)	Days Early/Late	Peak SWE Dif (inches)	Percent of Median Peak SWE	Median Peak Date	Median Peak SWE (inches)	Current SWE	Median Meltout Date
Belle Fourche	11 Mar 2024	5.20	-17	-1.7	76%	28 Mar IMG	6.87 IMG		01 May IMG
Bighorn	20 Mar 2024	9.42	-35	-2.3	80%	24 Apr IMG	11.74 IMG		21 Jun IMG
Cheyenne	11 Mar 2024	4.90	-17	-2.6	65%	28 Mar IMG	7.50 IMG		01 May IMG
Laramie	20 Mar 2024	12.41	-26	-3.5	78%	15 Apr IMG	15.90 IMG		13 Jun IMG
Little Snake	20 Mar 2024	17.50	-17	-3.4	84%	06 Apr IMG	20.90 IMG		20 Jun IMG
Lower Green	20 Mar 2024	12.26	-19	-1.6	89%	08 Apr IMG	13.84 IMG		13 Jun IMG
Lower North Platte	20 Mar 2024	8.65	-25	-4.1	68%	14 Apr IMG	12.75 IMG		29 May IMG
Madison	20 Mar 2024	19.30	-25	-4.4	81%	14 Apr IMG	23.75 IMG		25 Jun IMG
Powder	20 Mar 2024	6.76	-25	-3.8	64%	14 Apr IMG	10.61 IMG		10 Jun IMG
Shoshone	20 Mar 2024	15.95	-35	-2.1	88%	24 Apr IMG	18.08 IMG		29 Jun IMG
Snake	20 Mar 2024	21.00	-22	0.1	101%	11 Apr IMG	20.85 IMG		29 Jun IMG
South Platte	20 Mar 2024	3.20	-12	-3.4	48%	01 Apr IMG	6.60 IMG		26 Apr IMG
Sweetwater	20 Mar 2024	12.93	-29	-2.1	86%	18 Apr IMG	15.03 IMG		06 Jun IMG
Tongue	20 Mar 2024	9.60	-39	-3.7	72%	28 Apr IMG	13.30 IMG		09 Jun IMG
Upper Bear	20 Mar 2024	15.86	-20	-1.9	89%	09 Apr IMG	17.81 IMG		15 Jun IMG
Upper Green	20 Mar 2024	15.38	-22	-0.6	96%	11 Apr IMG	15.96 IMG		19 Jun IMG
Upper North Platte	20 Mar 2024	20.02	-27	-4.3	82%	16 Apr IMG	24.35 IMG		28 Jun IMG
Wind	20 Mar 2024	12.48	-31	-1.5	89%	20 Apr IMG	13.97 IMG		25 Jun IMG
Yellowstone	20 Mar 2024	18.64	-35	-2.6	88%	24 Apr IMG	21.24 IMG		01 Jul IMG

Data from Natural Resources Conservation Service SnoTel Network

https://www.wrds.uwyo.edu/Snow/BasinPeakSWE.html

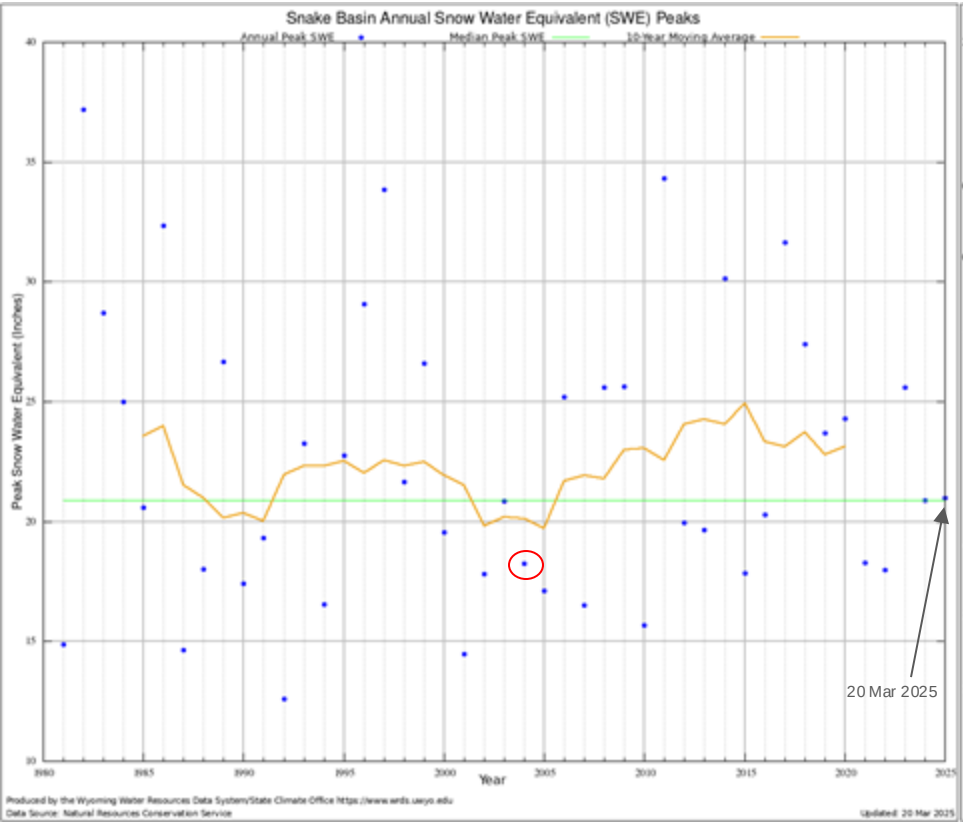
Snake River Basin Snow Water Equivalent

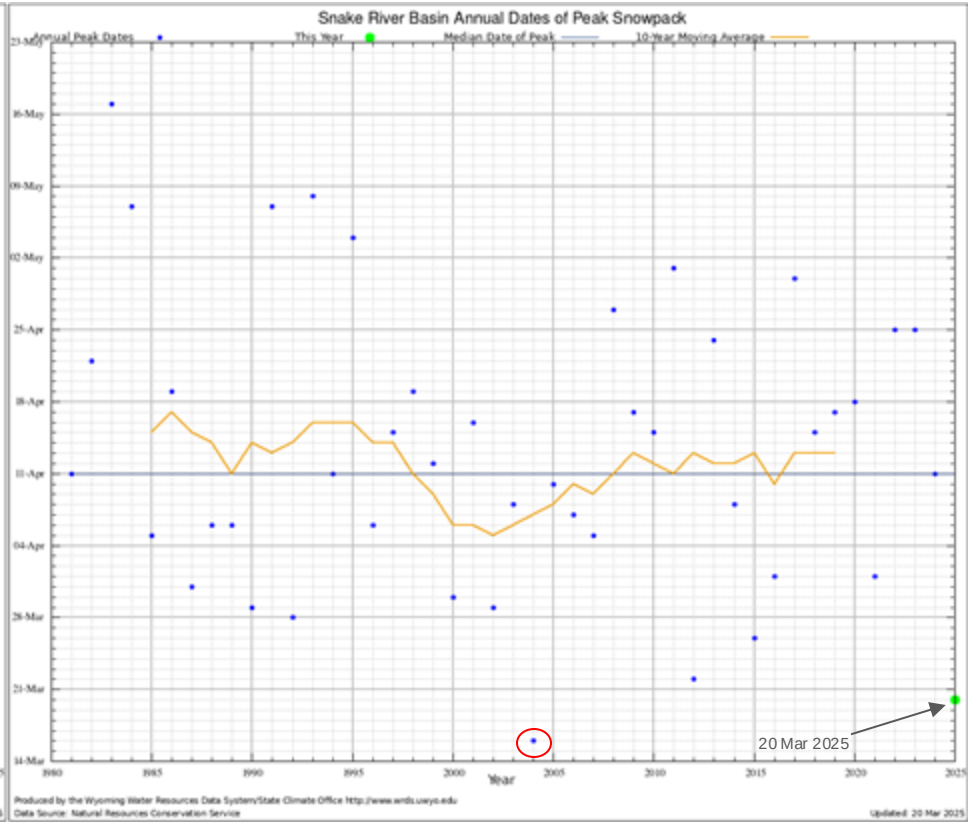
Reached 100% of Median Seasonal Peak SWE 18 March. This was 24 days earlier than the median date of 11 April.



https://www.wrds.uwyo.edu/Snow/BasinPeakSWE.html

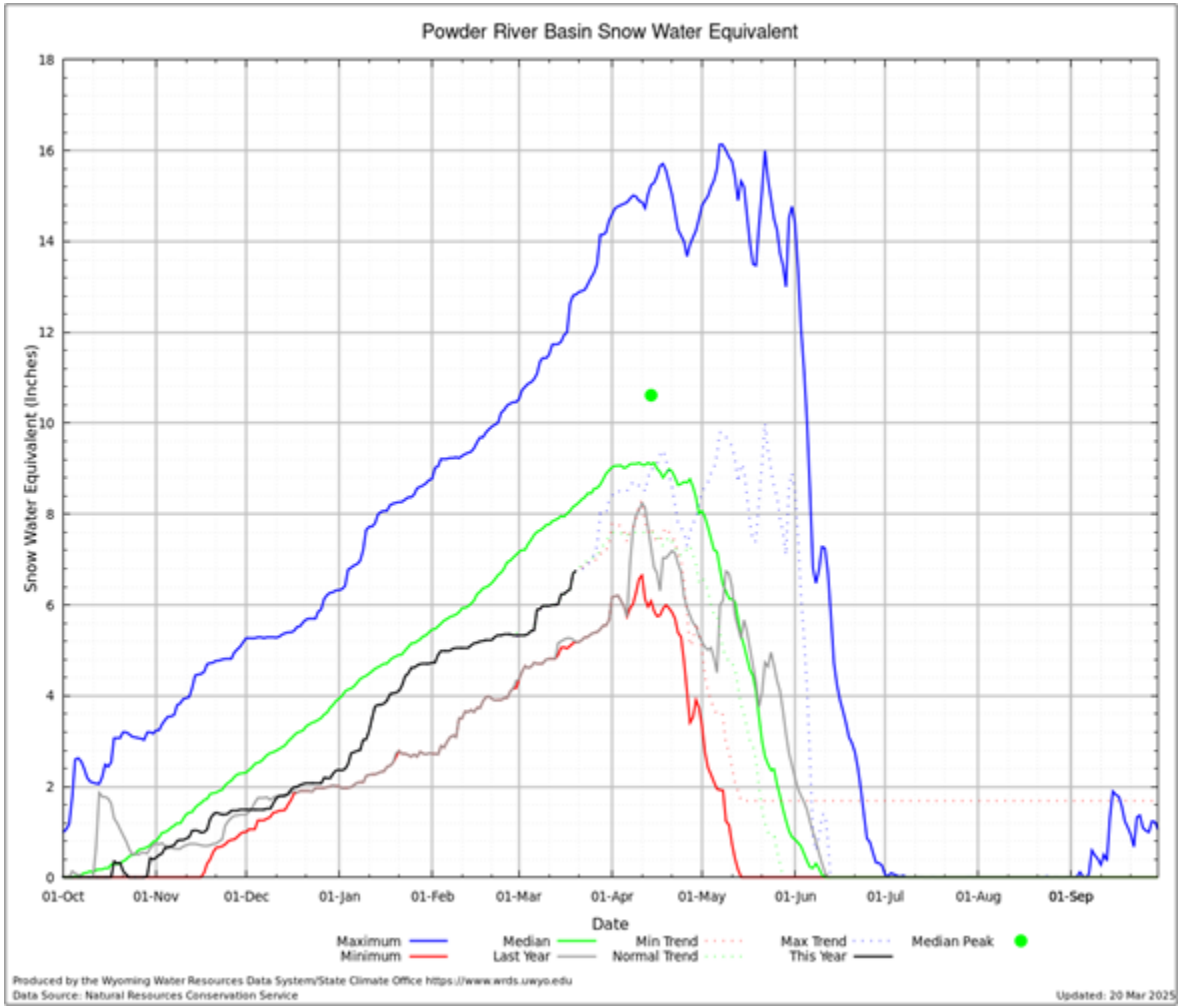
Snake River Basin Snow Water Equivalent
Peak Amounts and Dates





https://www.wrds.uwyo.edu/Snow/BasinPeakSWE.html

Powder River Basin Snow Water Equivalent

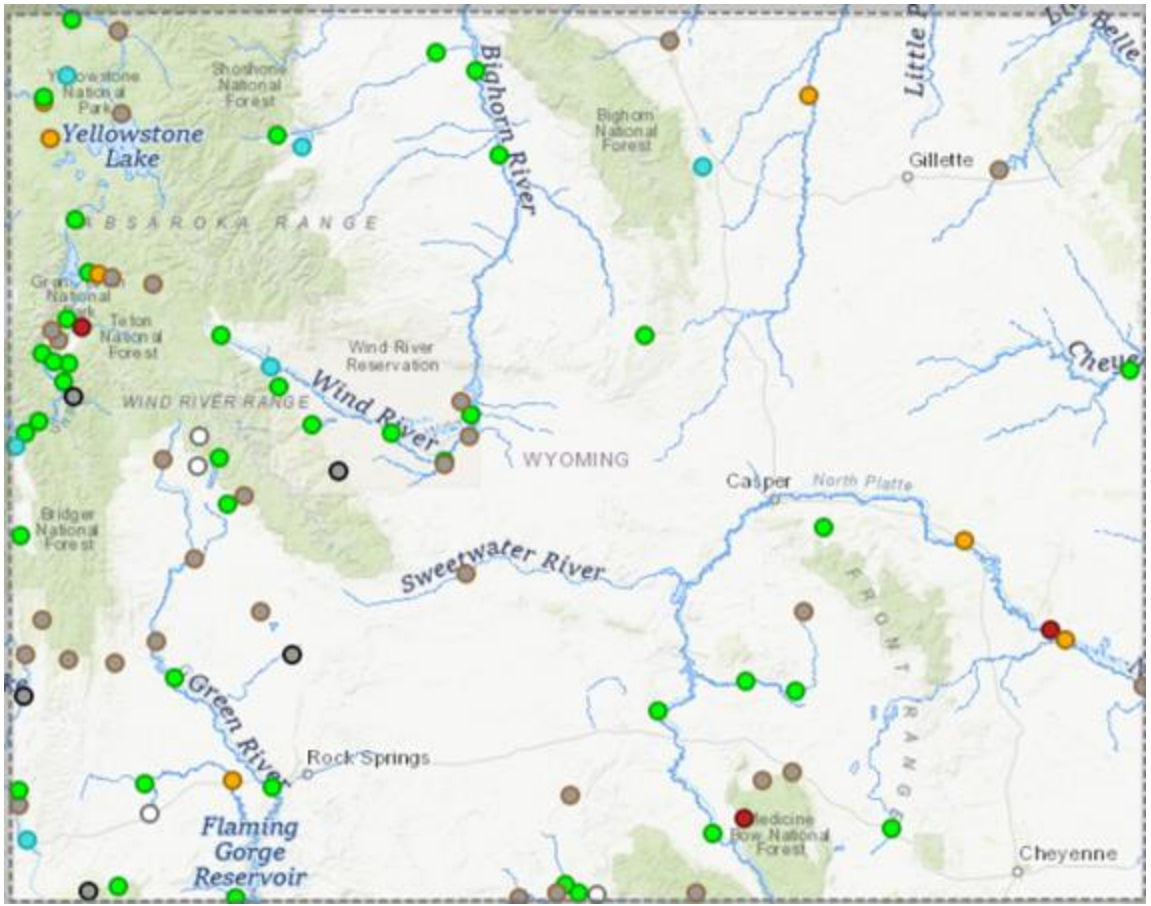


https://www.wrds.uwyo.edu/Snow/BasinPeakSWE.html

Current Streamflow Conditions

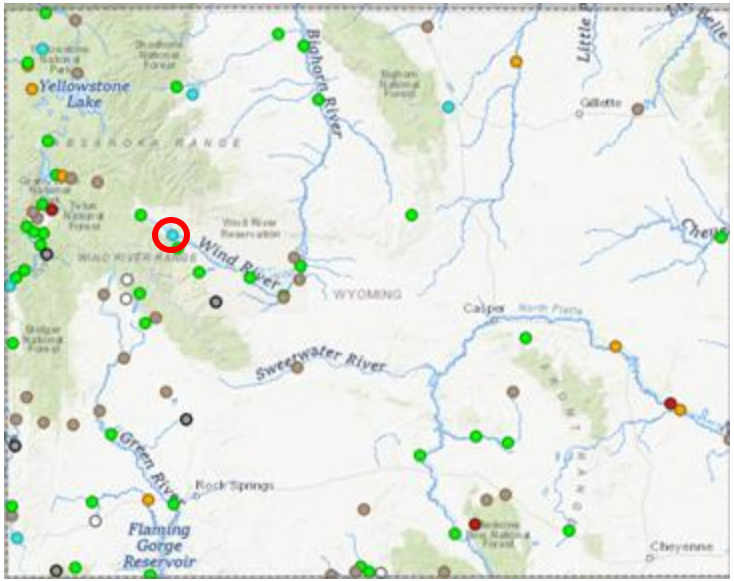
Streamflow Status





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

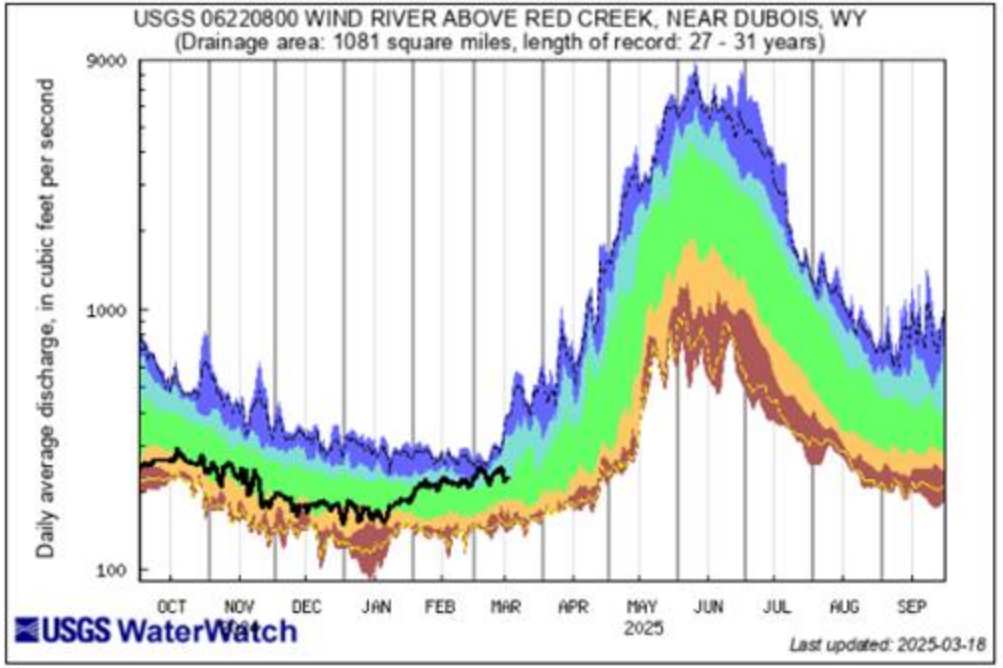
Select WY Streamflows

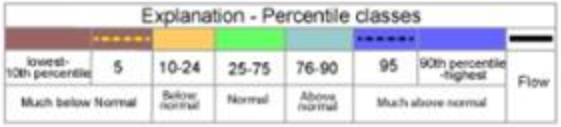


https://dashboard.waterdata.usgs.gov/

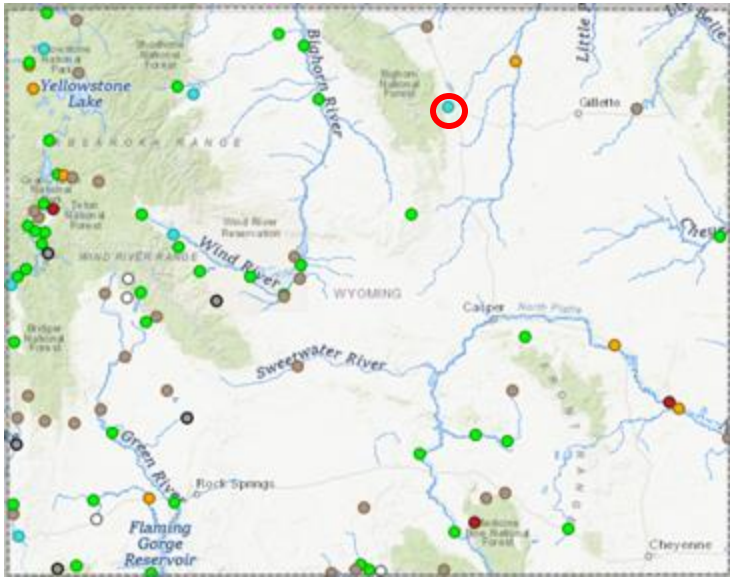
https://waterwatch.usgs.gov/

Wind River above Red Cr, nr Dubois, WY





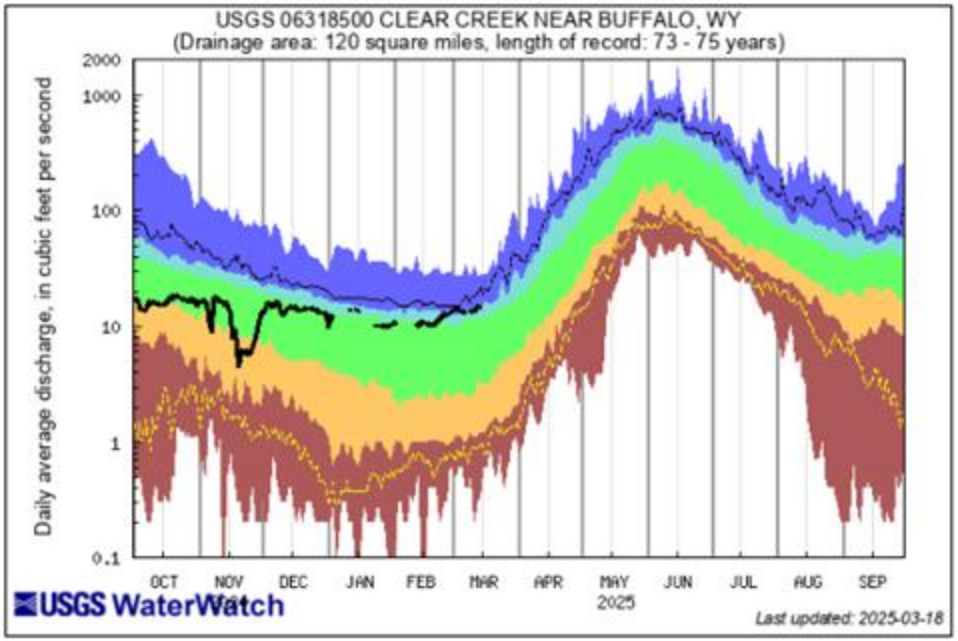
Select WY Streamflows



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

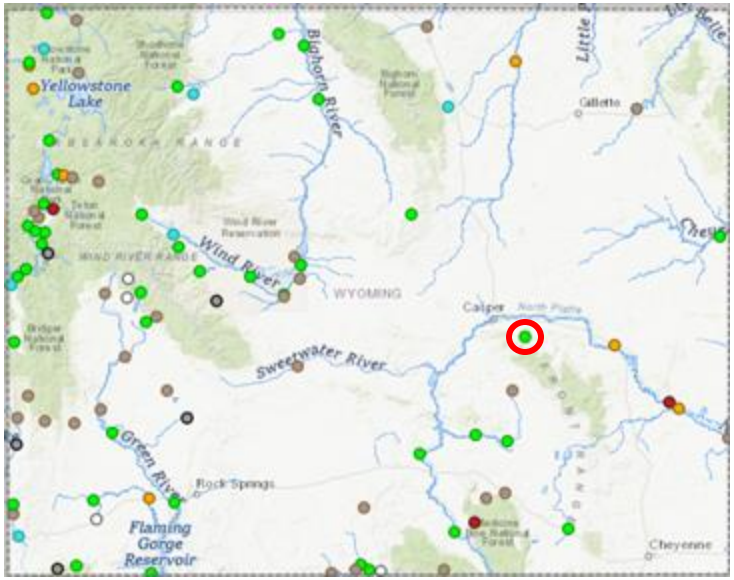
https://waterwatch.usgs.gov/

Clear Creek near Buffalo, WY

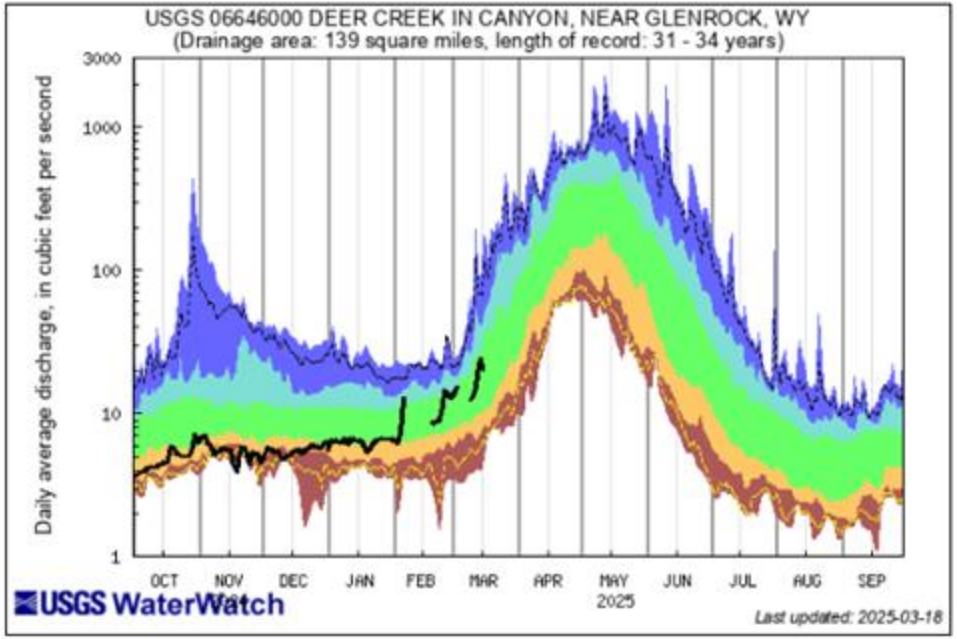




Select WY Streamflows



Deer Creek near Glenrock, WY

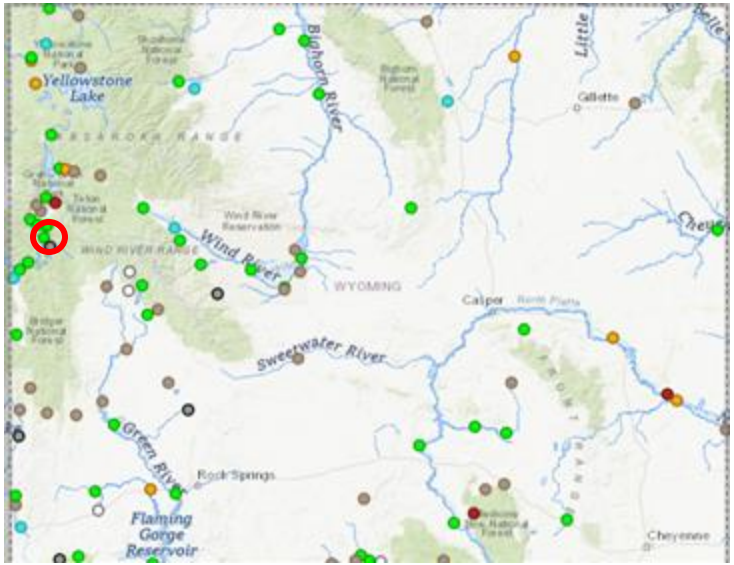




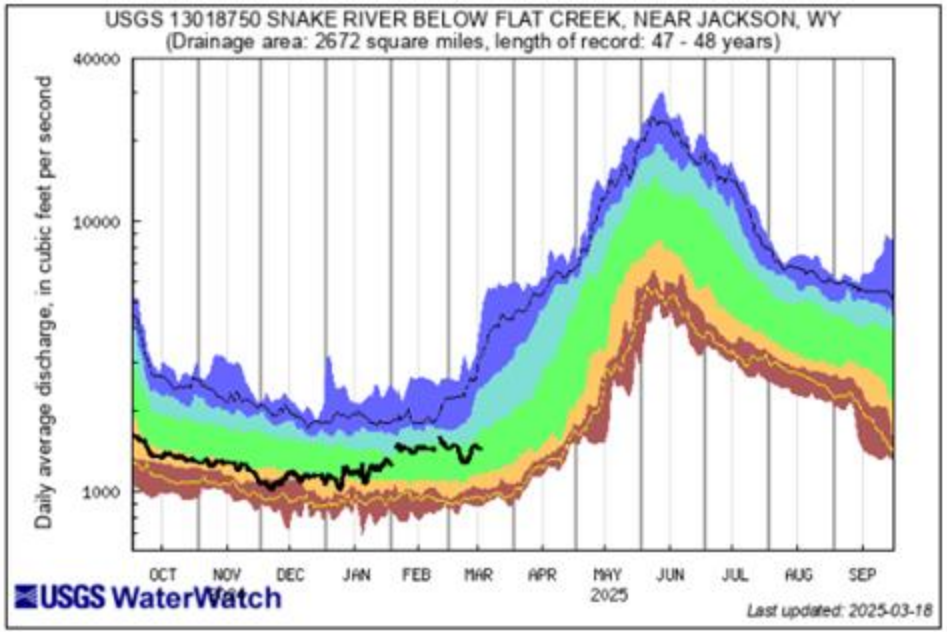
https://dashboard.waterdata.usgs.gov/

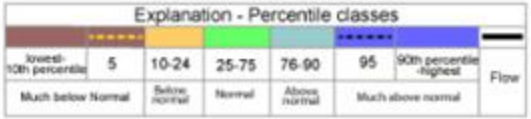
https://waterwatch.usgs.gov/

Select WY Streamflows



Snake River bl Flat Creek, Near Jackson, WY

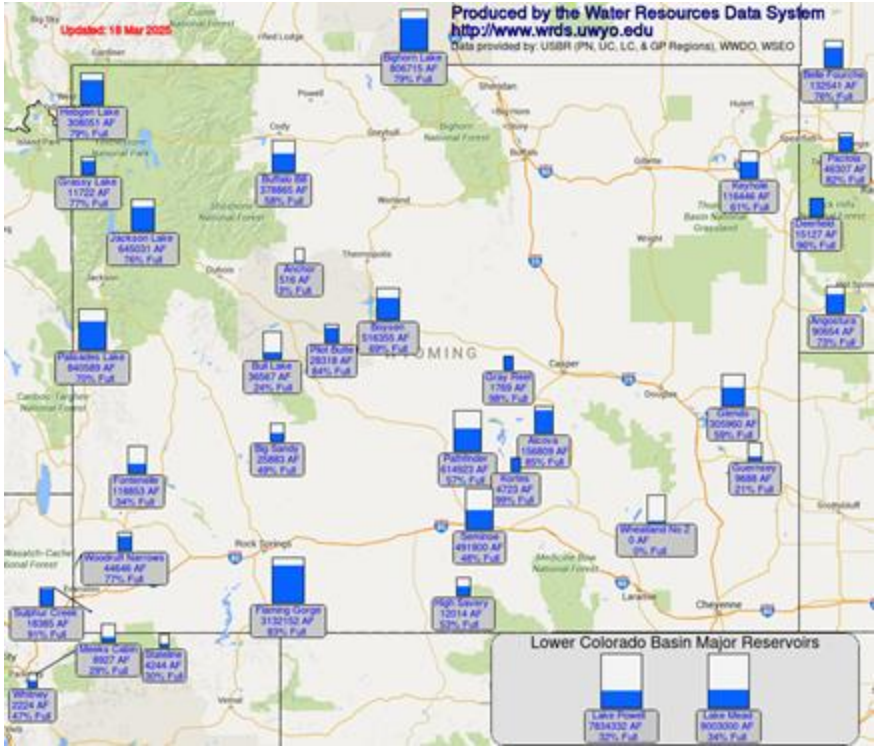




https://dashboard.waterdata.usgs.gov/

https://waterwatch.usgs.gov/

WY Reservoirs



Reservoir Storage

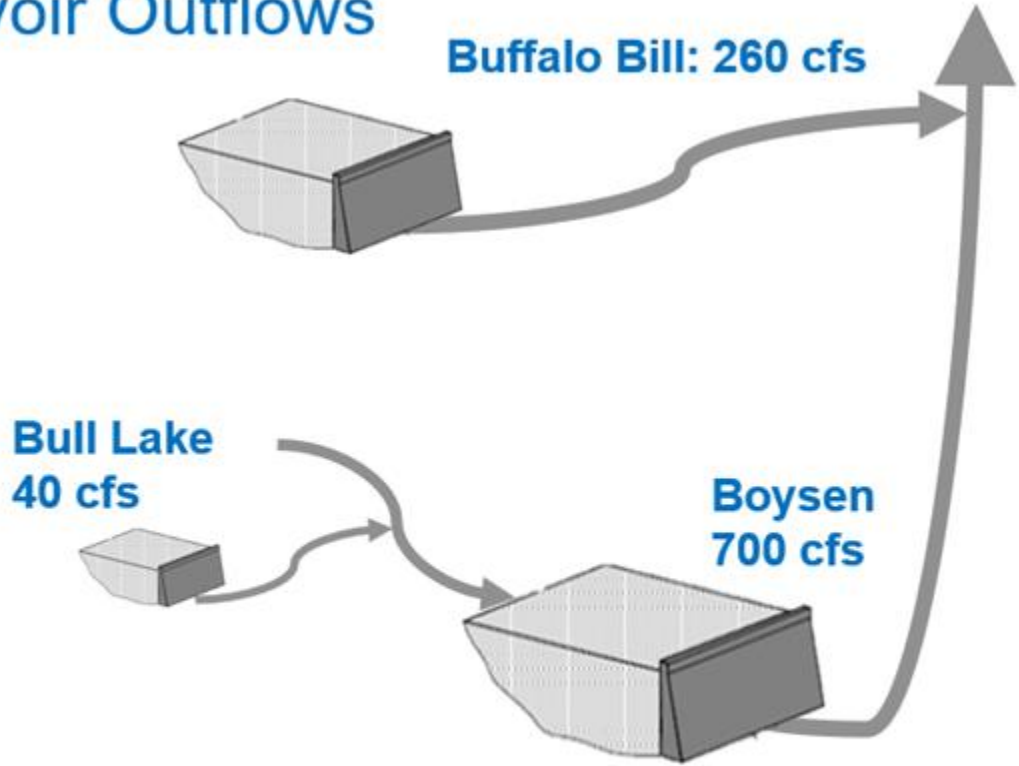
- Mostly minor changes in storage.
- Most major reservoirs are ~ 50-80% full.
- Fontenelle is the exception.

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

— BUREAU OF —
RECLAMATION

Current Reservoir Outflows



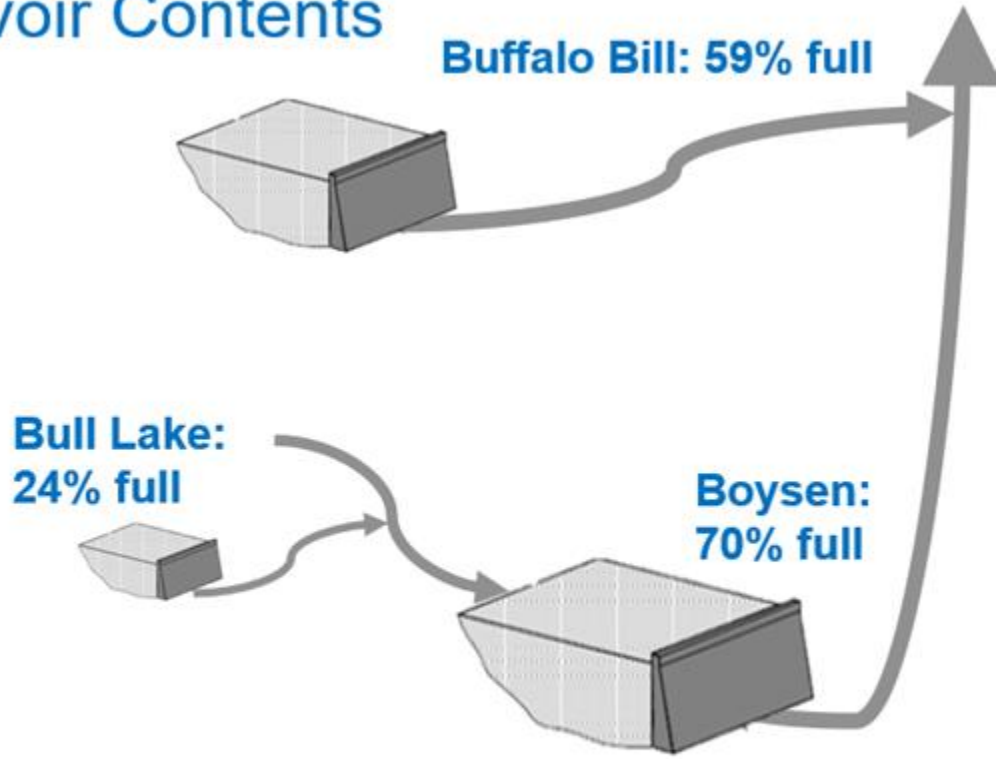


Wyoming Area Office Water Order Changes – https://www.usbr.gov/gp/woc/indexwy.html

Current Reservoir Contents



Buffalo Bill

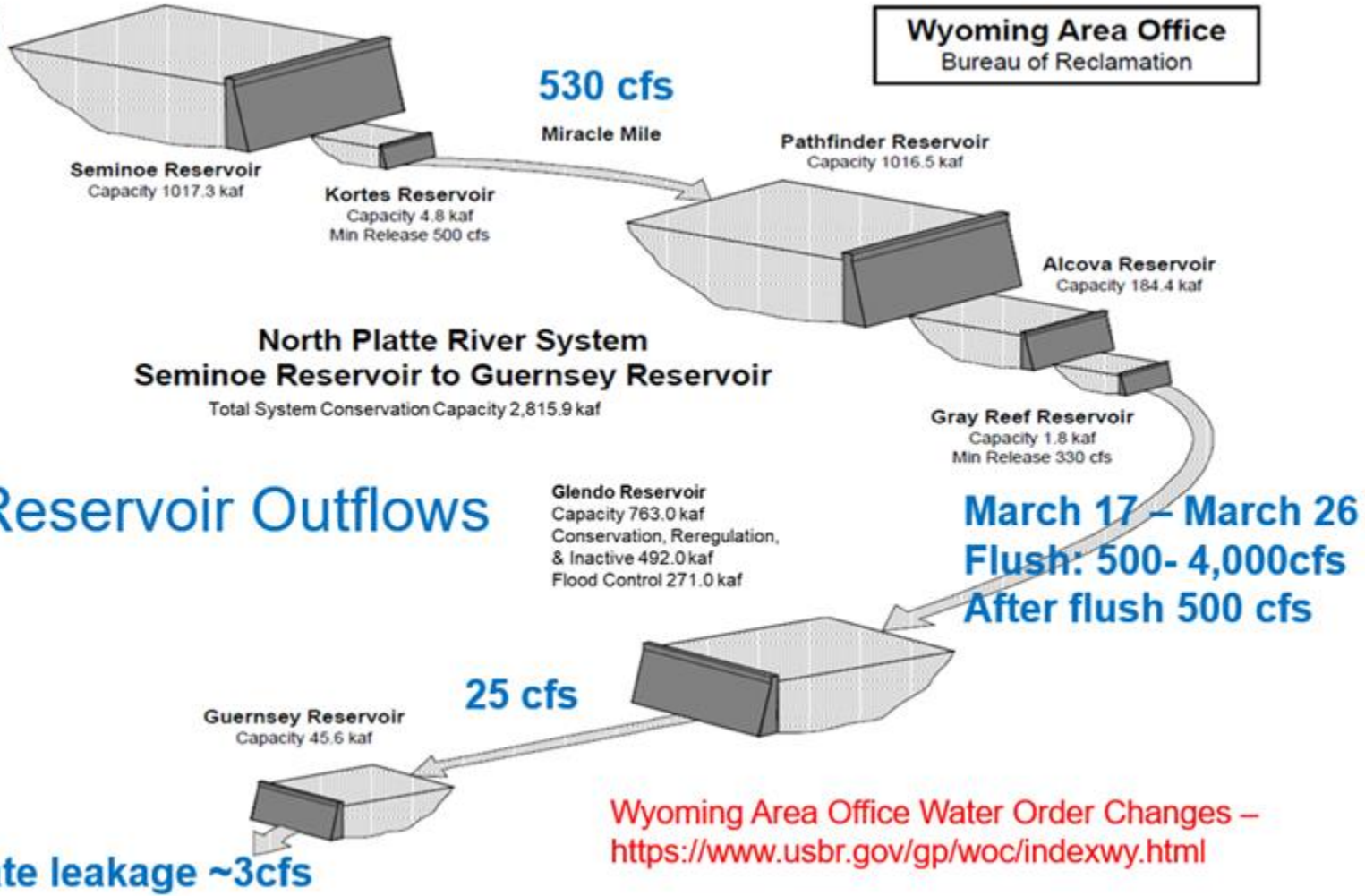


Releases expected to increase mid-April and will be based on irrigaiton demand. No flood releases are anticipated at this time.

— BUREAU OF —
RECLAMATION

Wyoming Area Office
Bureau of Reclamation

Current Reservoir Outflows

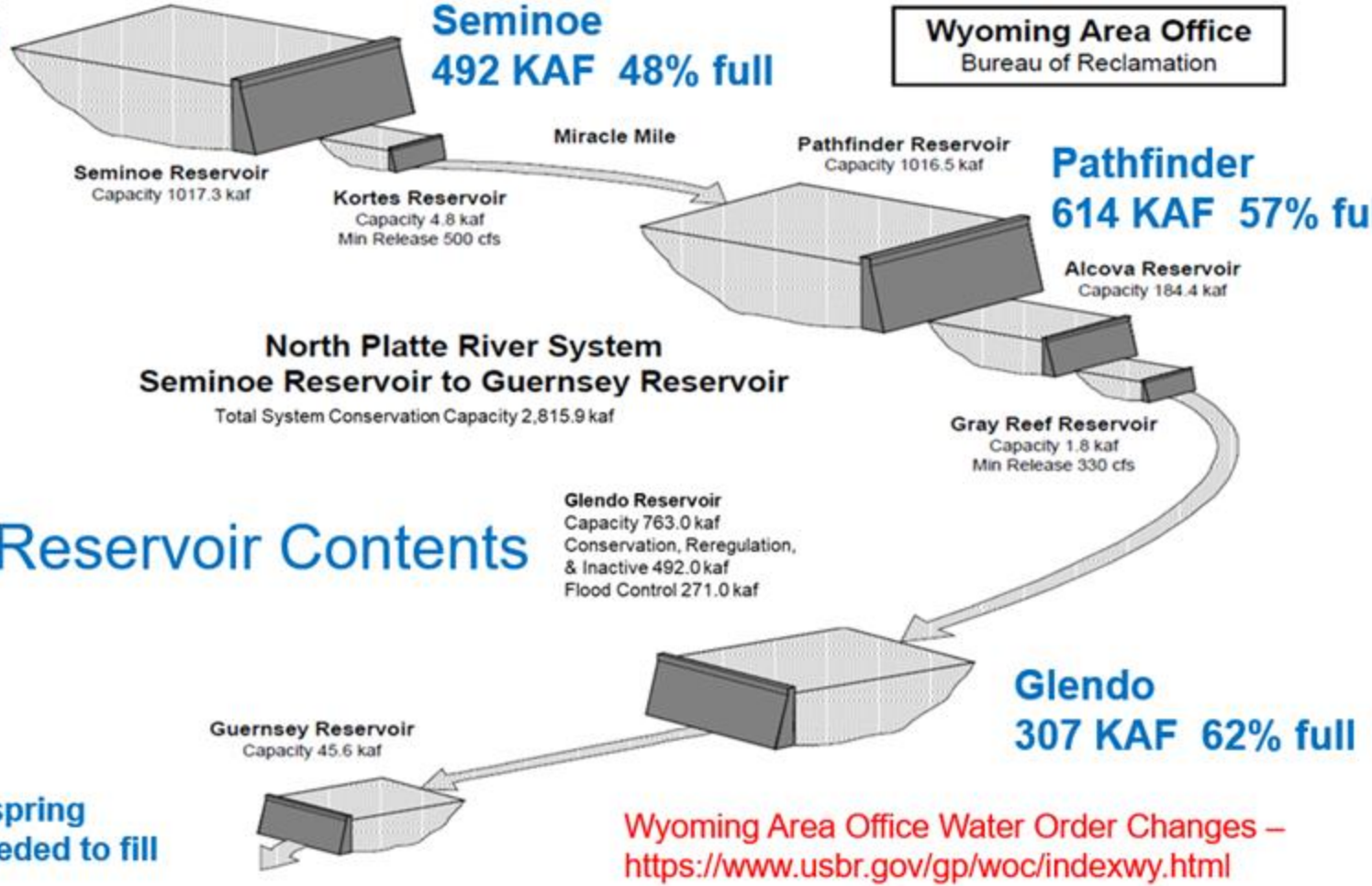


Wyoming Area Office Water Order Changes –
https://www.usbr.gov/gp/woc/indexwy.html

— BUREAU OF —
RECLAMATION

Wyoming Area Office
Bureau of Reclamation

Current Reservoir Contents

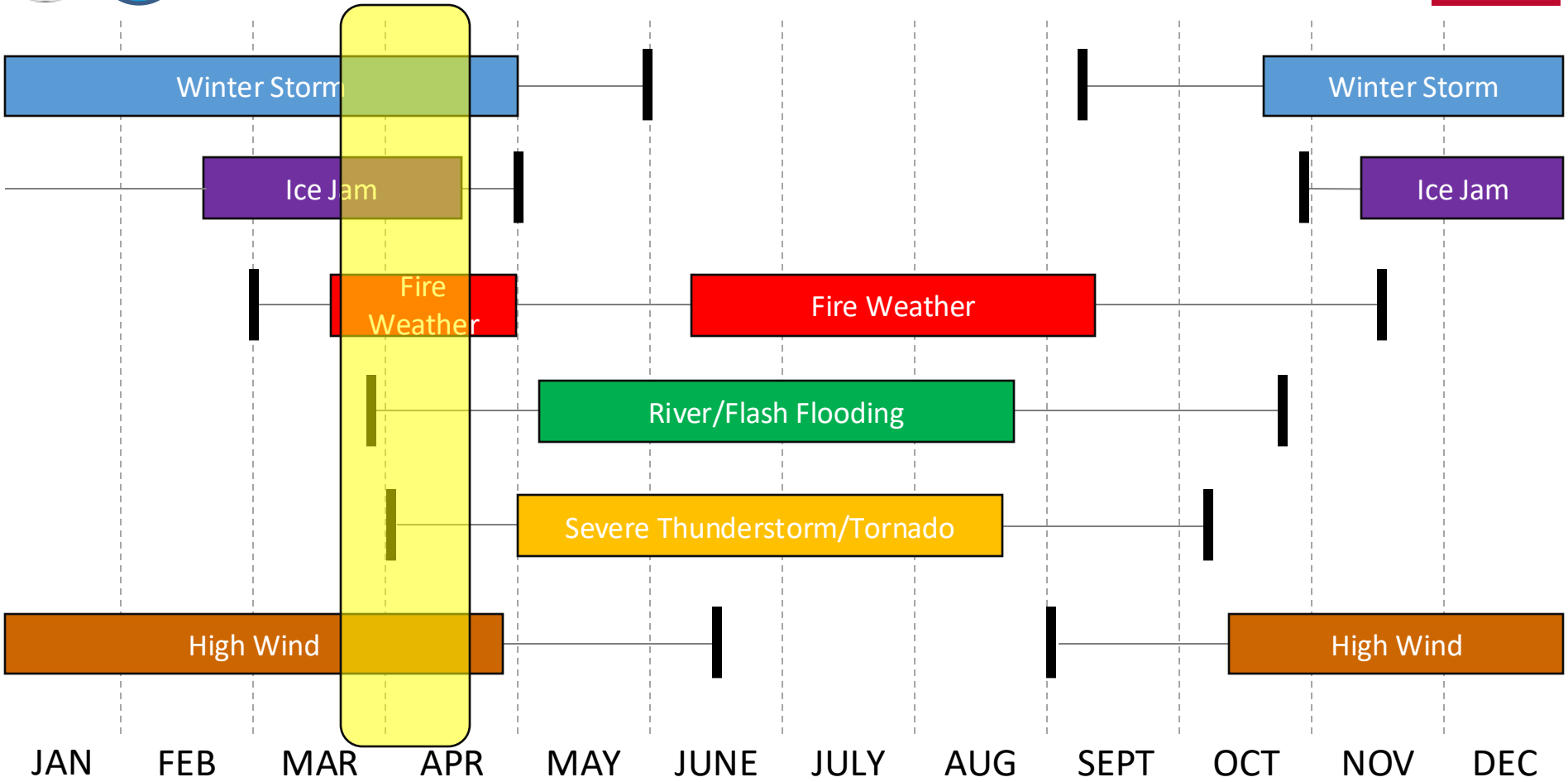


Above average spring runoff will be needed to fill the reservoirs.

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

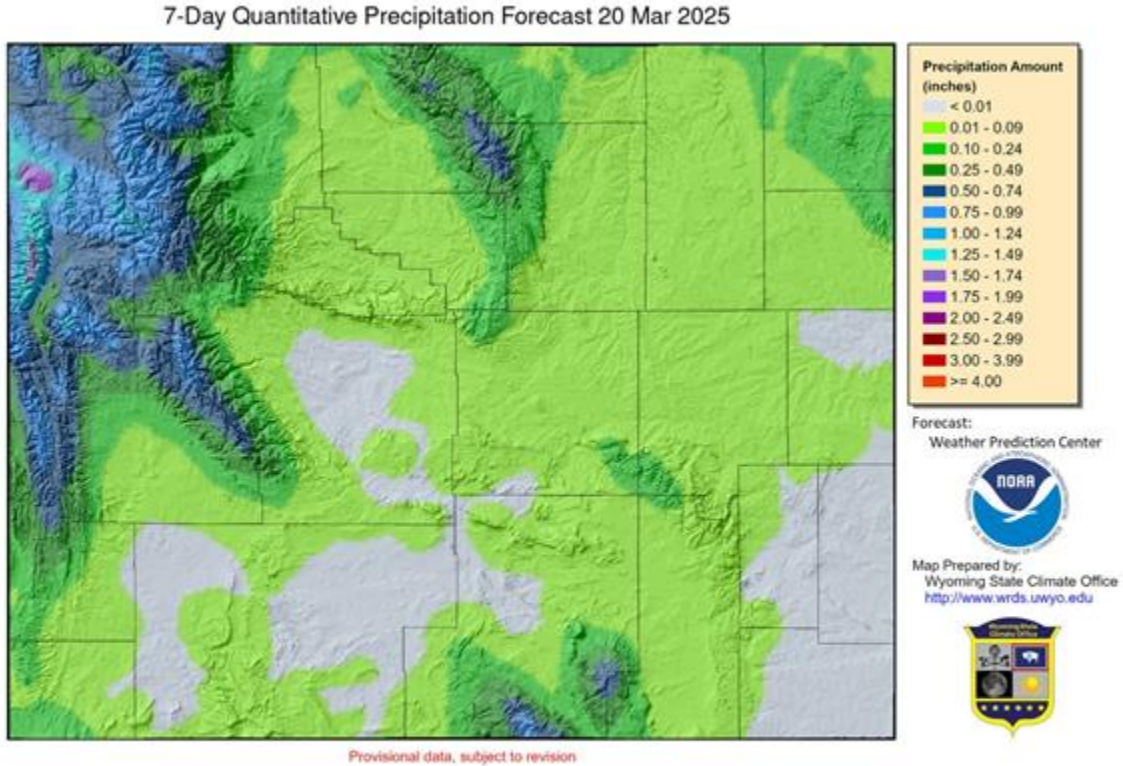
Weather Info & Forecasts

NWS Wyoming - Typical Hazard Calendar



7-Day Total Precipitation Forecast

(March 20 - March 26)



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 Mar 2025 https://www.wrds.uwyo.edu

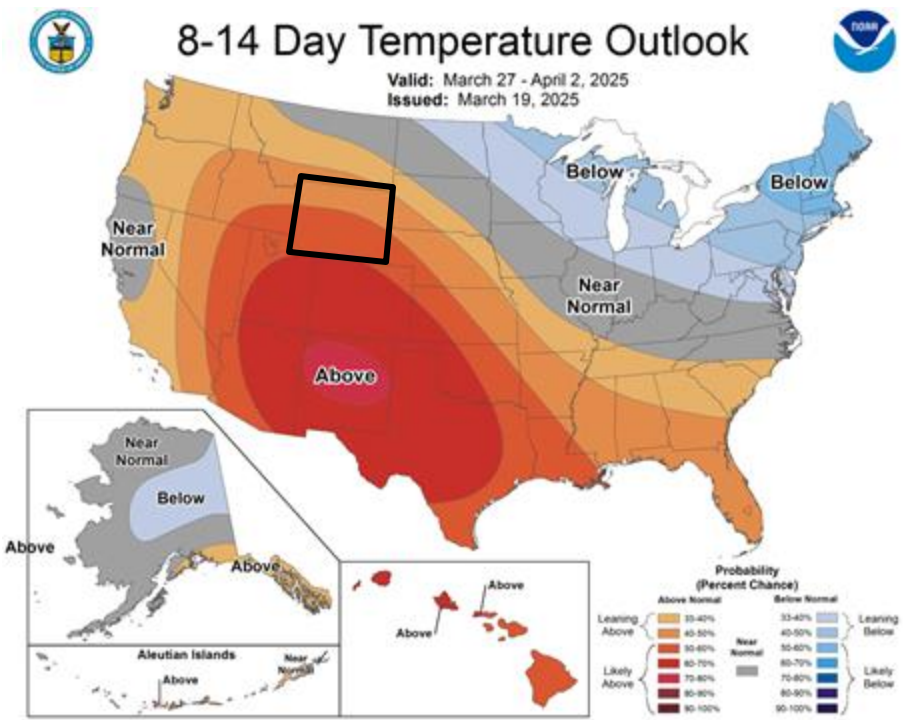
- Snow showers for western valleys and mountains today
- Widespread snowy system Friday night through Saturday
- Dry Sunday through most of next week

https://bit.ly/7_dayQPForecast

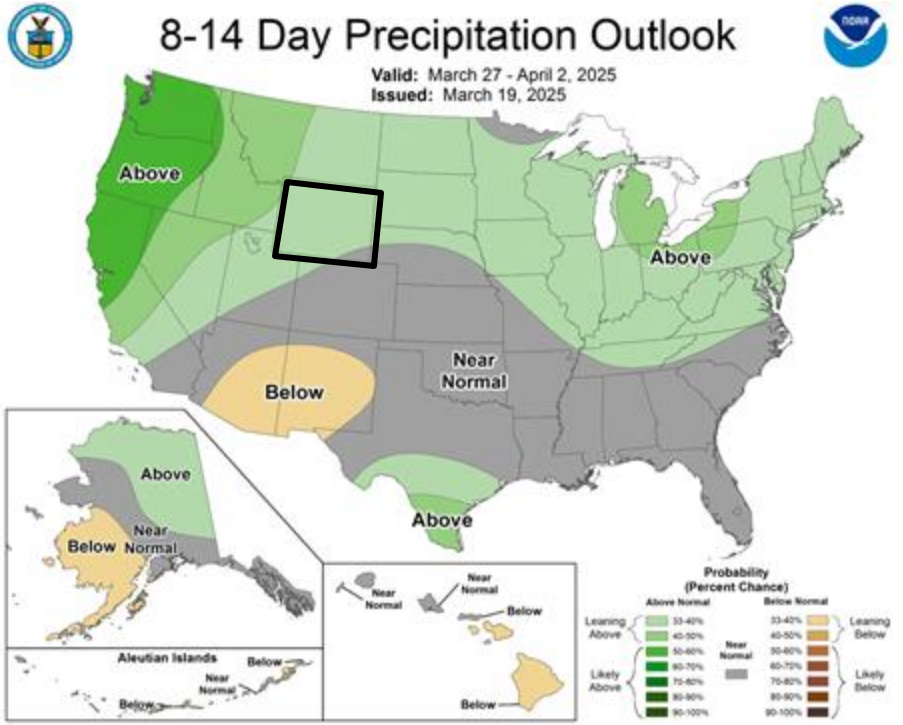
8-14 Day Outlooks

(March 27 - April 2)

https://bit.ly/CPC8_14Day



- Likely above normal temps for Wyoming
- Interactive Version: cpc.ncep.noaa.gov/products/predictions/814day/interactive/index.php

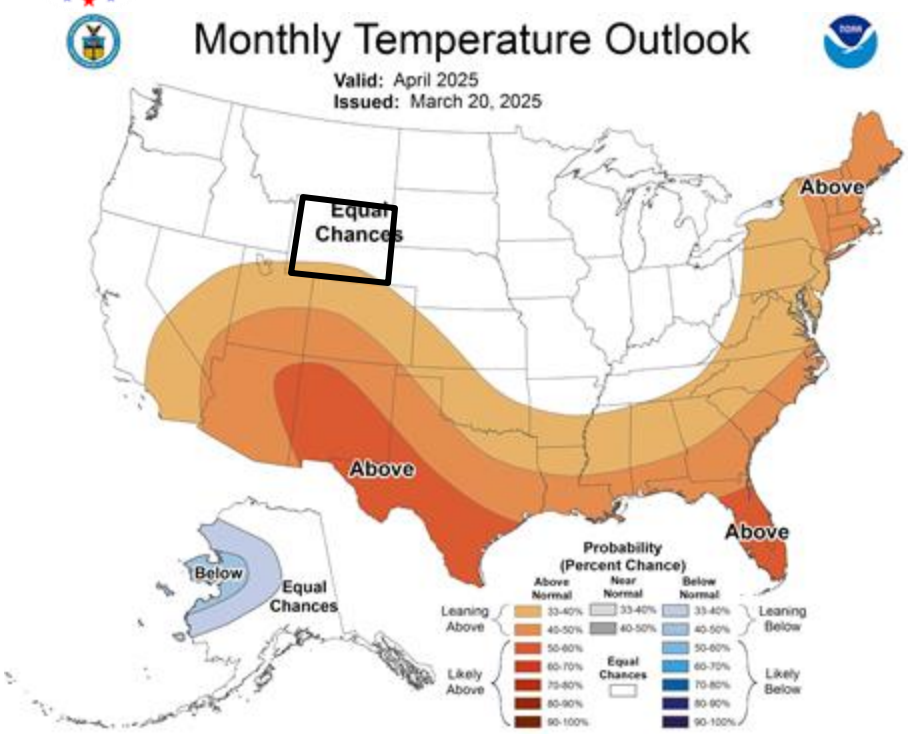


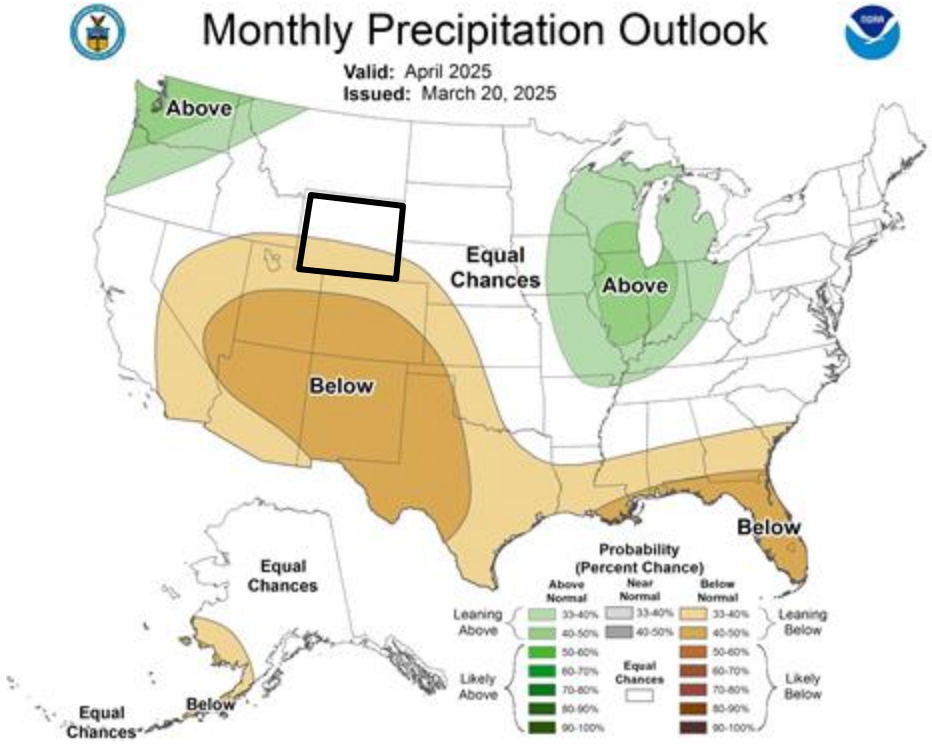
- Slight lean toward wetter for most of the state

1-Month Outlooks

(April)

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





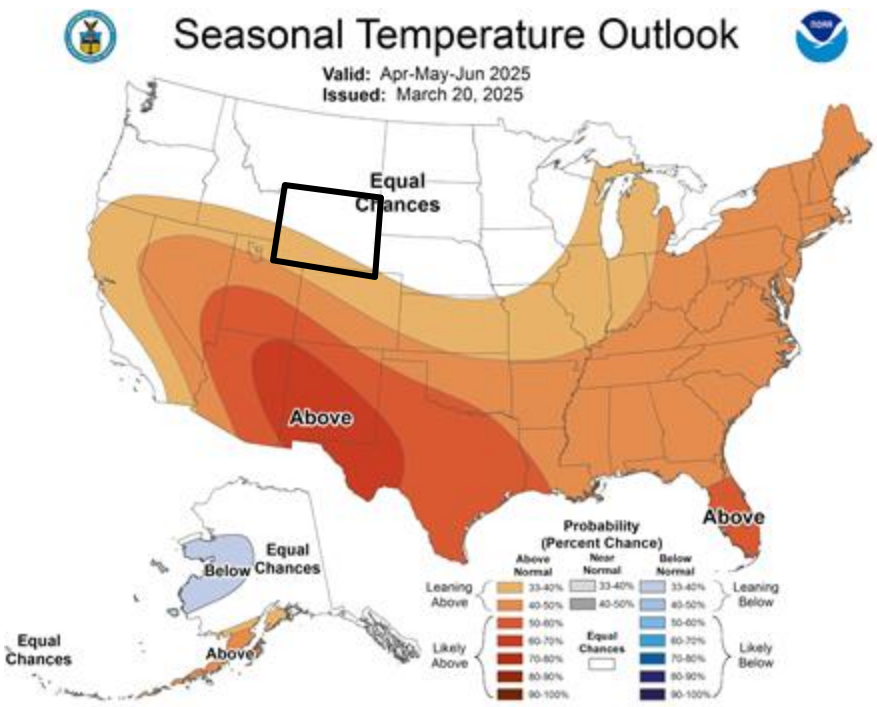
- Equal chances of above, below, or normal temperatures
- Climatology (30-yr averages) are the best bet

- Slight lean toward drier for the the southern half of WY
- Climatology (30-yr averages) are the best bet for northern half of state

Spring Outlook

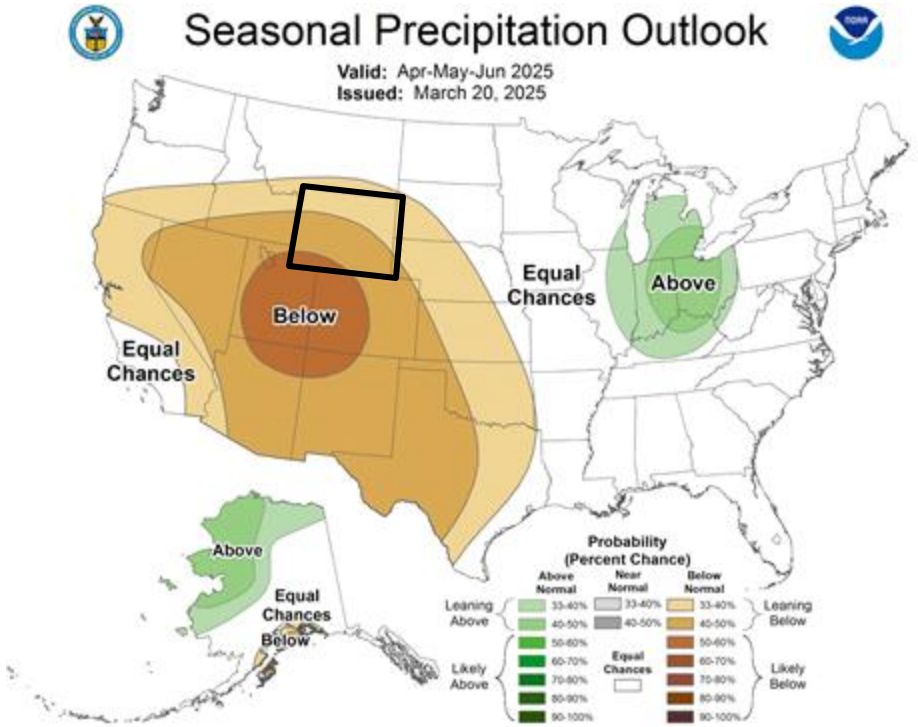
https://bit.ly/CPC_Seasonal

(Apr-May-Jun)



- Slight lean toward warmer for the far southern portion of the state

(Apr-May-Jun)



- Lean toward drier statewide

Highlight of the Month:

Cold Advisory for Newborn Livestock (CANL)

https://www.weather.gov/cys/newbornlivestock

Cold Advisory for Newborn Livestock (CANL) System

Developed by:
NOAA/National Weather Service Glasgow
University of Miami
Dr. Larry Kalkstein
University of Delaware
Dr. Katrina Frank



Photo Credit, Valley County, MT Sheriff Glen Meier

Origins of the CANL System

- Conversation with Lynn Cornwell, a weather spotter and former NCBA President
- 2005-06 WAS*IS Fellowship Project looking at cold weather impacts
- Team identified, grant funding and feasibility begins 2007
  - Dr. Larry Kalkstein: Bio-meteorologist at University of Miami
  - Dr. Katrina Frank: PhD in Bio-climatology from University of Delaware/ Masters in Animal Science from Kansas State University
- COMET Partnership Grant for the feasibility of a cold advisory system as well as the development of the system



Economic Impacts



In 2010, livestock losses directly and indirectly due to weather totaled over $1B/year!!

Nearly 100,00 newborn calves die each year due to weather nationwide. This results in nearly $40-60 million in losses to producers.

In 2005, according to NASS, Montana had $6.3 million in calf losses due to weather. The state had 2.4 million cattle total that year.



Snow-caused livestock losses still unknown

By LORNA THACKERAY
Of The Gazette Staff

A sense of dread tinges the approaching weekend in the rural areas of southeast Montana.

Still knee-deep in snow and cow-deep in drifts, stockmen await a new storm that is forecast to blow in Friday morning. They haven't been able to tally their losses yet from two back-to-back blizzards in the latter part of March. Many still haven't been able to get to cattle and sheep isolated in snow-filled draws, creeks and pastures where they have given birth.

"They say 2 to 4 inches," said Maria Braun of the Farm Service Agency office in Baker. "Out there it can mean anything from 2 inches to 2 feet."

Wariness is understandable across the southern Montana prairie battered by two successive major storms in the middle of calving and lambing season.

"We have snow where we've never seen snow before," Jo Kittelmann said from her Farm Service Agency office in Ekalaka.

"There are still areas where you can't get to," said Dale Barta at the FSA office in adjacent Custer County.

And the last thing they need is more snow.

"It's not a big storm, not like the last two," said Kurt Hooley, meteorologist at the National Weather Service office in Billings.

He expects it to move into southeast Montana early Friday and spread 2 to 4 inches of snow during the day before tapering off Saturday. The chance of snow is forecast at 60 percent. Unlike the previous storms, it probably won't bring big winds.

But forecasting models haven't been holding up well in the past five days, Hooley said Wednesday, and Friday's forecast could be different by today. The system could shift south, away from Montana, or maybe a little north. It was too early to tell.

Plows are still clearing county

Please see Livestock, 7B

This winter snowier than usual

By LORNA THACKERAY
Of The Gazette Staff

Billings residents have every right to be sick of winter.

It's been snowing since October. As of the end of March, this winter has been the sixth-snowiest since record keeping began at Billings Logan International Airport in 1934.

Seventy inches has fallen so far, and more is in the forecast for the rest of the week. The last time a winter had this much snow at the end of March was the winter of 1996-97, when 75.3 inches was recorded. The snowiest October-through-March period was in 1977-78, with 85.2 inches. That winter, icy foot-deep ruts formed on Billings streets and stayed there much of the season.

Average snowfall for the end of March is 49.6 inches.

Normally, Billings can expect another 7.5 inches of snow in

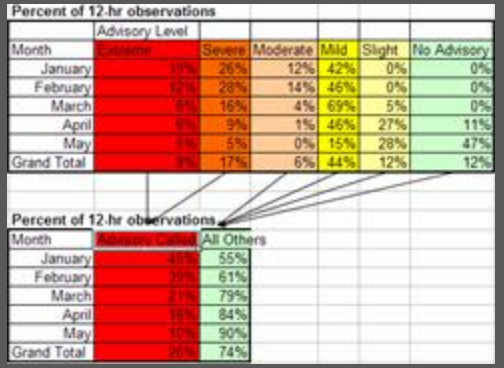
Please see Snow, 7B

"Losses of newborn livestock in three lethal snowstorms in the middle of calving and lambing season will be in the thousands for the counties in Montana's southeast corner. If each calf is worth $600 when it is sold in the fall, the loss could be in the hundreds of thousands of dollars. Mike Riley, FSA executive director for Powder River County, said Thursday that 152 producers had reported the loss of 1,759 calves and cows, and 501 lambs and sheep." Billings Gazette, April 24, 2009



Steps in Development

1. Literature review to identify conditions that threaten newborn livestock
2. Climate data review to identify historical calf-loss events
3. Discussions with ranchers to see if the system is needed
4. Determine feasibility of system based on this knowledge
5. Initial system development: create a decision tree
6. Test the system with 5 years' climate data
7. Users' workshop to get feedback
8. Refine the system - start Phase 2 and expand to other areas
9. Test the system with 10 years' climate data
10. Finalize the decision tree - repeat steps 8 & 9 as necessary
11. Development of forecast tools and websites
12. Train forecasters on the system
13. Education/Public Affairs to the users
14. Final Implementation in January Jan 2010
15. Web based graphics



Percent of 12-hr observations

Month	Advisory Level					
	Extreme	Severe	Moderate	Mild	Slight	No Advisory
January	1%	26%	12%	42%	0%	0%
February	1%	28%	14%	46%	0%	0%
March	0%	16%	4%	69%	5%	0%
April	0%	9%	1%	46%	27%	11%
May	0%	5%	0%	15%	28%	47%
Grand Total	1%	17%	6%	44%	12%	12%

Percent of 12-hr observations

Month	Advisory Called	All Others
January	45%	55%
February	39%	61%
March	21%	79%
April	16%	84%
May	10%	90%
Grand Total	26%	74%



Defining Newborn Livestock

- Targeting livestock less than 24 hours old
- Less able to regulate body temperature
- Not acclimated to the conditions
- Majority of animals are tended to by producers within 24 hours providing dry shelter



Weather Elements Identified as Critical

- Wind Chill
  - (takes into account temperature and wind)
- Wet vs. Dry Snow
  - (Heavy, wet snow vs. Dry fluffy snow)
- Humidity
  - (high humidity makes it hard to dry animals)
- Sky Cover
  - (sunshine helps heat up and dry animals, especially black coated newborn livestock)

Criteria for CANL

NO ADVISORY: Wind Chill above 41 degrees

SLIGHT: Wind Chill less than 41 degrees for 2 or more hours

MILD: Wind Chill less than 32 degrees for 2 or more hours

MODERATE: Wind Chill less than 0 degrees for 2 or more hours or Wind Chill less than 36 degrees and .02" precipitation.

SEVERE: Wind Chill of -9 degrees or colder for two or more hours, or wind chill of less than 34 degrees and .05" of precipitation

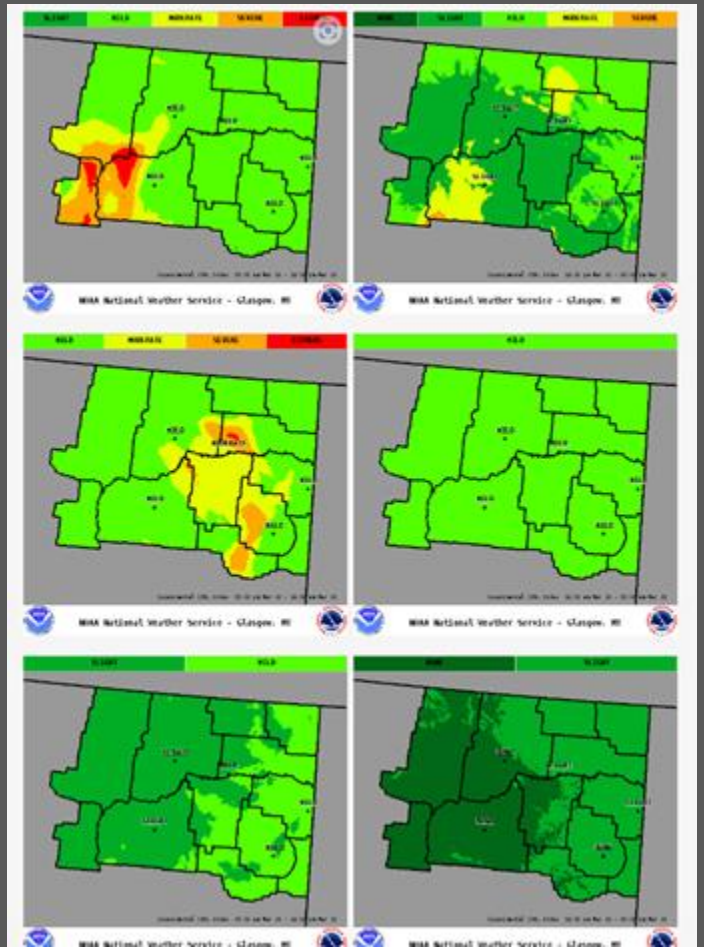
EXTREME: Wind Chill of -18 or colder for two or more hours, or wind chill less than 32 degrees and .1" of precipitation

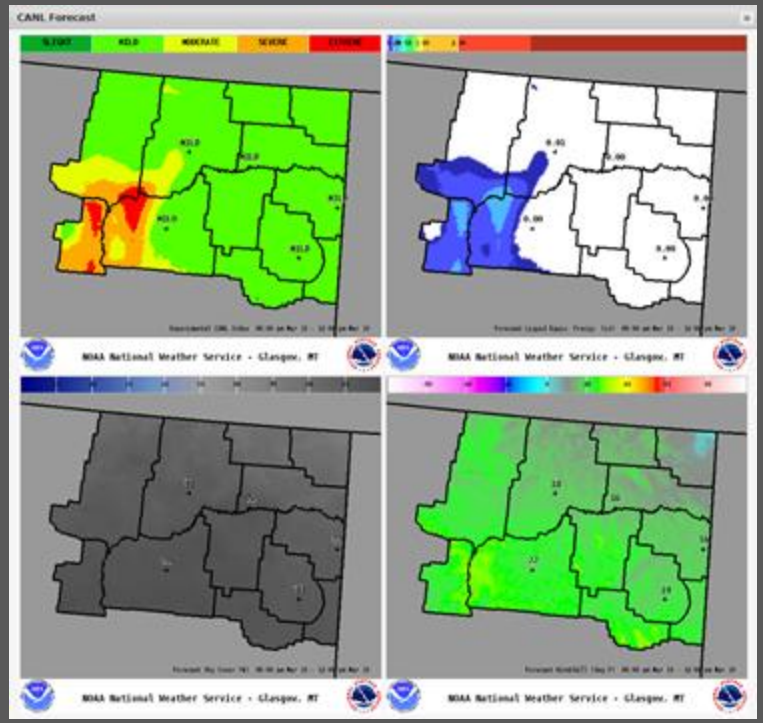
For sunny conditions (cloud cover less than 40%), reduce SLIGHT-EXTREME by one category.

For humid conditions (minimum humidity greater than 95%), increase MODERATE-SEVERE by one category.

For dry snow conditions (Max temp less than 26F), double the precipitation thresholds for MODERATE-EXTREME.

CANL Graphics





Users and Future Opportunities

- Livestock Producers
  - Lambing
  - Calving
  - Hogs
- Assisted MT FWP in assessments of massive wildlife losses
- USDA FSA Offices for post-event verification

- Could easily be put into an app for Livestock Producers to use.
- Nationwide, not just select locations who participated in the original project **(Pop Quiz!! In 2010, this state had the highest % of calf losses due to weather - 66.5%, which state is it?)**
- And could include an archive to go back and look at actual events for post-storm damages



Waiting for a Chinook: Charles M. Russell

Thank you!

Questions?

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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!

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