











WY Conditions & Outlooks:

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

November 18, 2021













Presentation Outline

- Current Conditions
- Outlooks
- How to Get Involved













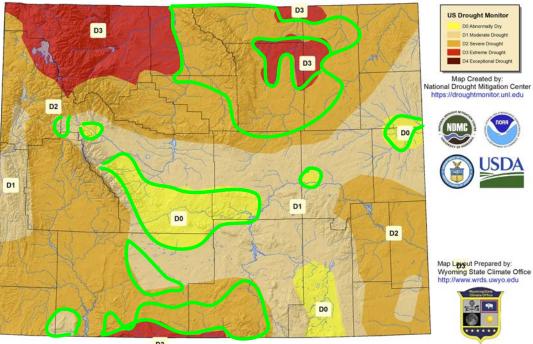
Current Conditions



US Drought Monitor for November 16, 2021

(Released Thursday, November 18, 2021) Valid 8 a.m. EDT

US Drought Monitor as of 16 November 2021



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

D0 Abnormally Dry

D1 Moderate Drought D2 Severe Drought 04 Exceptional Drough

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

Improvements throughout the state as soil moisture improves, partly because the ground is still thawed and melting snow has been able to infiltrate the soil column.

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











14-Day Precipitation Percentile (04 Nov 2021 to 17 Nov 2021)

20 - 30

30 - 40 40 - 60

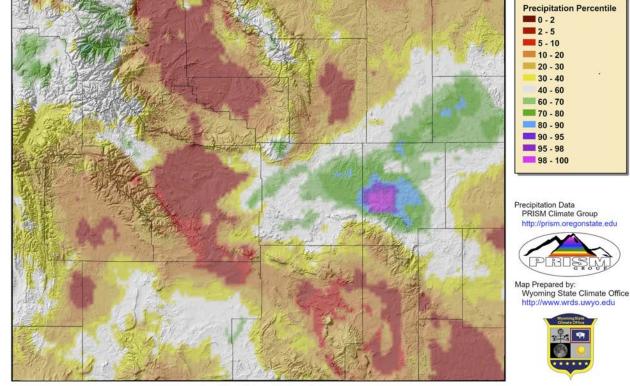
14-Day Precipitation (Percentile) for 04 Nov 2021 to 17 Nov 2021

Above Median:

- Northwest
- East-central plains

Below Median (Areas of Concern):

- Bighorn Basin
- **Central Fremont County**
- Sublette County
- Laramie Valley
- Johnson County
- E Lincoln/W Sweetwater Counties



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 18 Nov 2021 http://www.wrds.uwyo.edu

Daily percentiles created from PRISM daily precipitation grids



90-Day Precipitation Percentile (20 Aug 2021 to 17 Nov 2021)

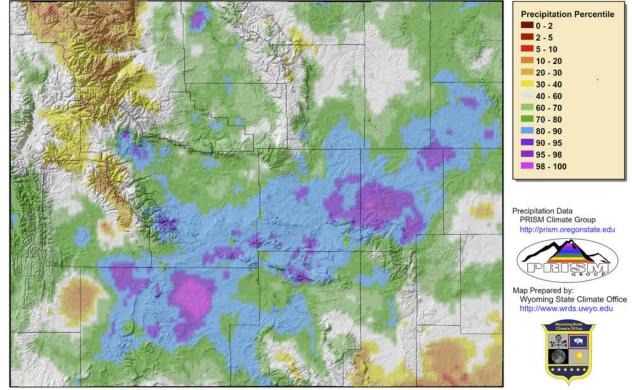
90-Day Precipitation (Percentile) for 20 Aug 2021 to 17 Nov 2021

Above Median:

Much of Wyoming

Below Median (Areas of Concern):

- **Laramie County**
- Park County

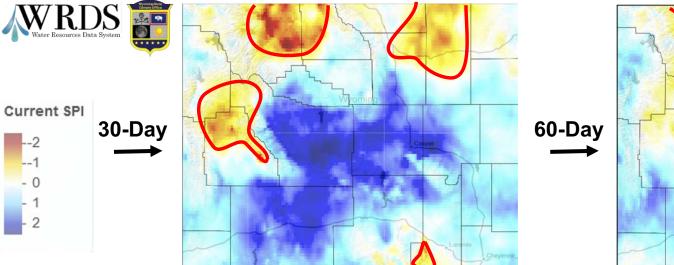


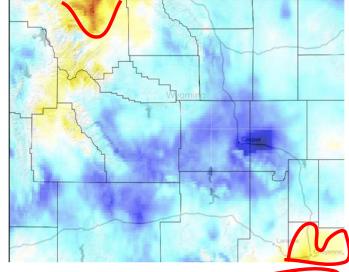
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Daily precipitation data from PRISM Climate Group, Copyright ©2021, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu

Map Created 18 Nov 2021 http://www.wrds.uwyo.edu

Daily percentiles created from PRISM daily precipitation grids

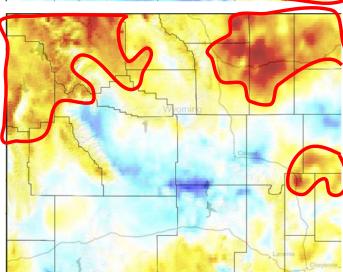




Standardized Precipitation Index (SPI)

 While some recent precipitation over the last month has allowed for some improvement, there are still lingering and re-emerging areas of concern.





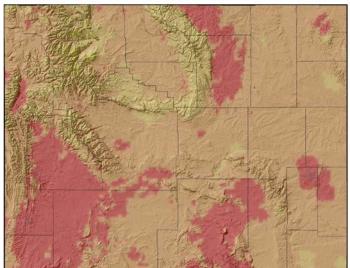
https://drought.climate.umt.edu



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

- Lows mostly below freezing
- Colder in Northwest and West Central

14-Day Average Minimum Temperature (Departure from 1991-2020 Average) for 04 Nov 2021 to 17 Nov 2021





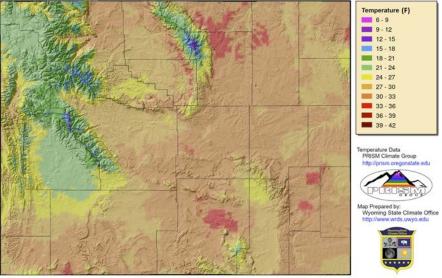
Temperature Data
PRISM Climate Group
http://prism.oregonstate.edu

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



Provisional data, subject to revision

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



Provisional data, subject to revision

Daily Temperature data from PRISM Climate Group, Copyright @2021, PRISM Climate Group, Oregon State University, http://prism.oregonstate.edu Map Created 18 Nov 2021 http://www.wds.uwyo.edu Temperature servages created from PRISM daily temperature grids

14-Day *Departure from* Normal Average Minimum Temperature

- 9F to 12F above average for southwest and south central (and just east of Bighorns)
- 6F to 9F above average for most of remainder of Wyoming except higher elevations

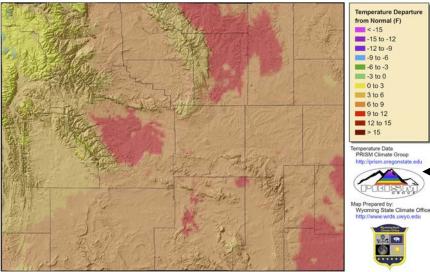


14-Day Average Maximum

Temperature (04 Nov to 17 Nov)

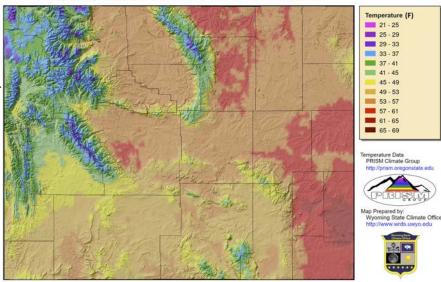
 Upper Green and higher elevation highs about 50F or less

14-Day Average Maximum Temperature (Departure from 1991-2020 Average) for 04 Nov 2021 to 17 Nov 2021



Provisional data, subject to revision

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



Provisional data, subject to revision

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

14- Day Departure from Normal

Average Maximum

Western quarter of Wyoming up to 3F above average (and Weston County)

• 3F to 6F above average for remainder



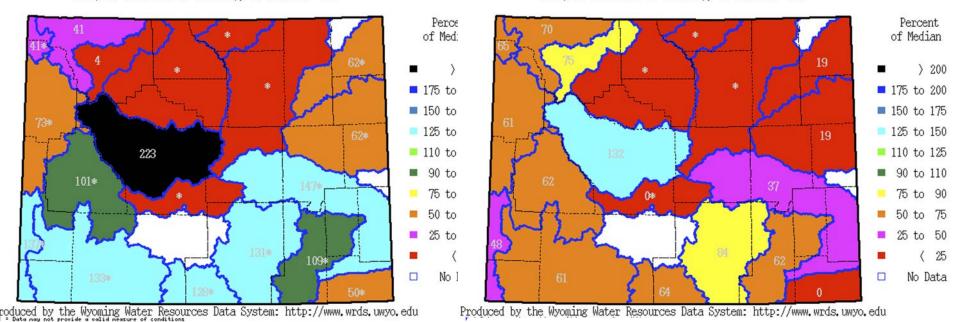
Basin Snow Water Equivalent (SWE) Percent of Median

2 Weeks Ago (04 Nov 2021)

SWE % of Median as of Thursday, 04 November 2021

Today (18 Nov 2021)

SWE % of Median as of Thursday, 18 November 2021



Still early in season but snowpack numbers are starting to settle in

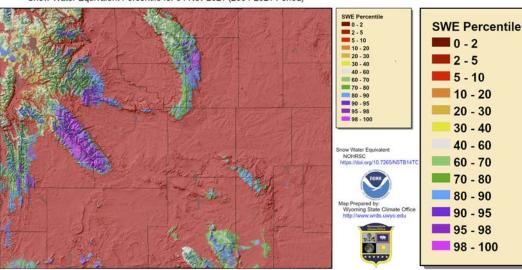


Modeled Snow Water Equivalent (SWE)

2-Week Comparison

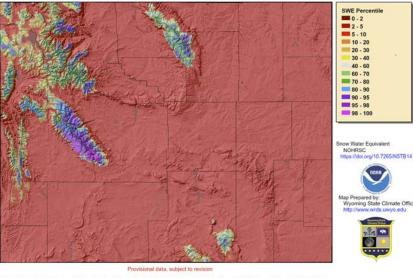
04 Nov 2021

Snow Water Equivalent Percentile for 04 Nov 2021 (2004-2021 Period)



18 Nov 2021

Snow Water Equivalent Percentile for 18 Nov 2021 (2004-2021 Period)



Provisional data, subject to revision

Modeled Snow Water Equivalent from National Operational Hydrologic Remote Sensing Center, 2004. Snow Data Assimilation System (SNODAS) Data Products at NSIDC, Version 1. Boulder, Colorado USA. NSIDC: National Snow and Ice Data Center. doi: https://doi.org/10.2565/NSTB141TC.

Daily Percentiles and Percents created by Wyoming State Climate Office Map Created 04 Nov 2021 - http://www.wrds.uwyo.edu Modeled Snow Water Equivalent from National Operational Hydrologic Remote Sensing Center. 2004. Snow Data Assimilation System (SNDOAS) Data Products at NSIDIC, Version 1, Boulder, Colorado USA, NSIDC: National Snow and Ice Data Center. doi: https://doi.org/10.7265/NSTB14TC.
Daily Perconfiles and Percents created by Wyoming State Climate Office

Map Created 18 Nov 2021 - http://www.wrds.uwyo.edu

Lost some ground compared to two weeks ago



Modeled Snow Water Equivalent (SWE)

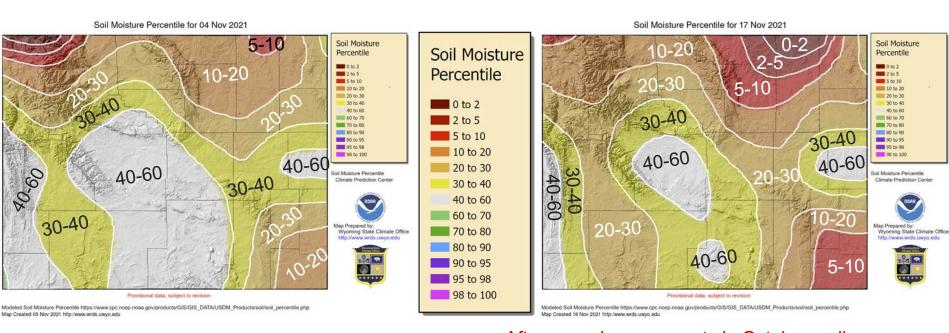
18 November 2021





Soil Moisture Percentile

Two Weeks Ago 04 Nov 2021



After some improvements in October, soil moisture once again starting to deteriorate

17 Nov 2021



Input to the US Drought Monitor

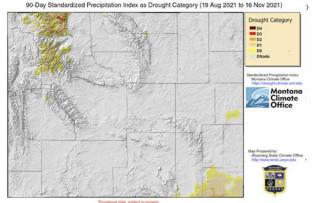
90-Day Precipitation Percentile (as Drought Category) for 20 Aug 2021 to 17 Nov 2021



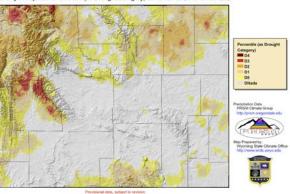


Map Programme http://www.

Daily precipitation data from PRISM Climate Group, Copyright 02021, PRISM Climate Group, Cregon State University, http://giram.cregonstate.edu Map Created 18 Nov 2021 http://www.mds.vnye.edu Colly precentles created trom PRISM daily precipitation grids:

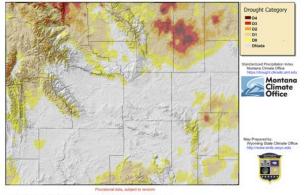


365-Day Precipitation Percentile (as Drought Category) for 18 Nov 2020 to 17 Nov 2021



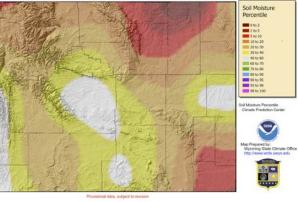
Daily procipitation data from PRESM Climate Group, Copyright 02021, PRISM Climate Group, Cregon State University, 18th (Primare organizate etc.)
May Created 18 Nov 2021 http://www.wisu.wym.edu
Daily percentific screated from PRESM daily precipitation girds.

365-Day Standardized Precipitation Index as Drought Category (17 Nov 2020 to 16 Nov 2021)



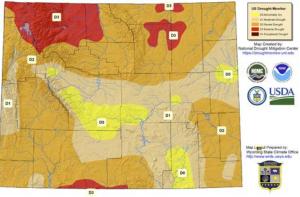
Standardized Precipitation Index Created by Montana Climate Office https://drought.climate.umt.edu Map Created 18 Nov 2021 http://www.wrds.uwyo.edu

Soil Moisture Percentile for 17 Nov 2021

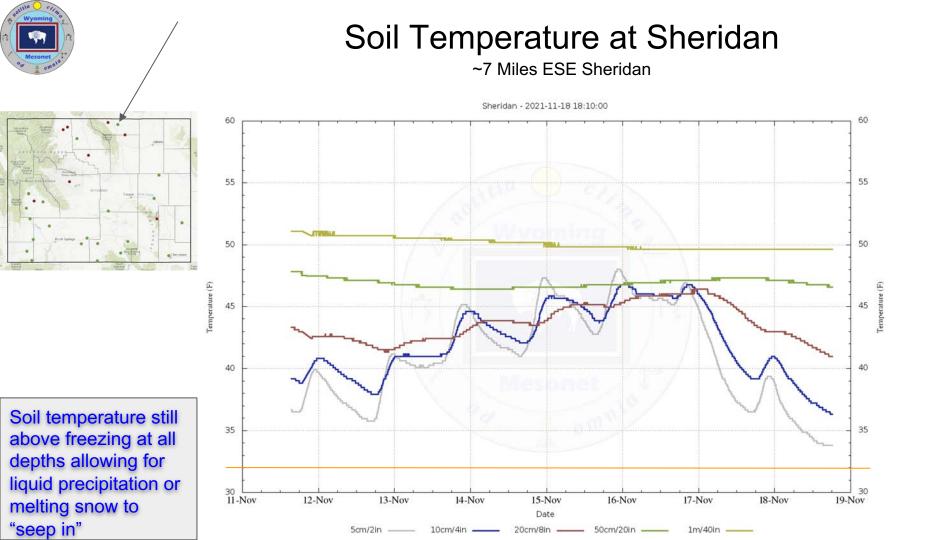


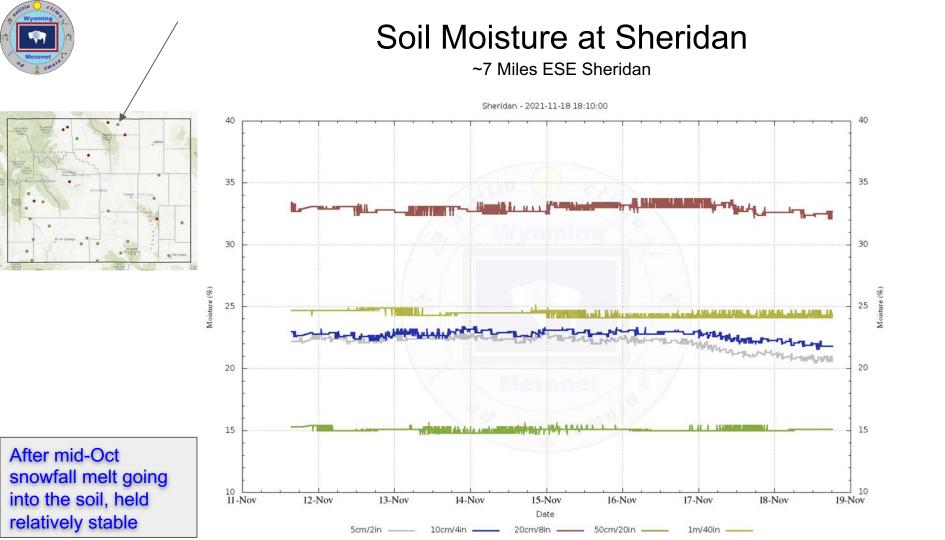
Modeled Soil Moisture Percentile https://www.cpc.noep.noea.gov/products/GIS/GIS_DATA/USDM_Products/soil/soil_percentile.php Map Created 18 Nov 2021 http://www.seds.uwyo.edu

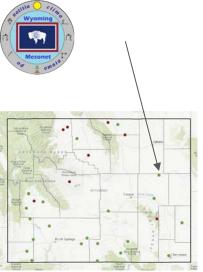
US Drought Monitor as of 16 November 2021



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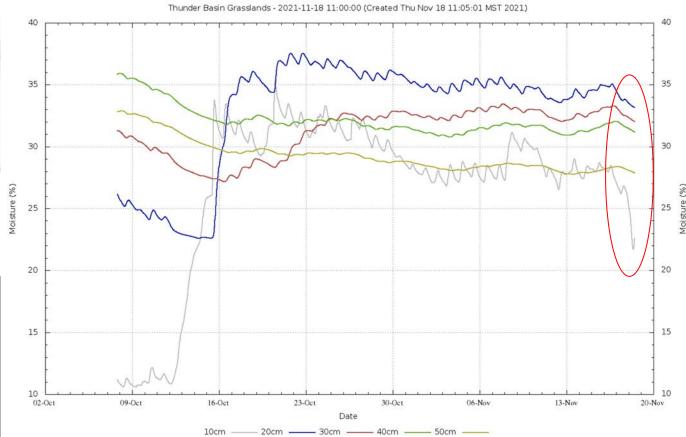
Good increase in soil moisture at 10, 20, and 30 cm from Oct

12 snows. Leveled out and maintained moisture levels after,

but...

Soil Moisture at Thunder Basin Grasslands

Campbell/Converse County Line Area

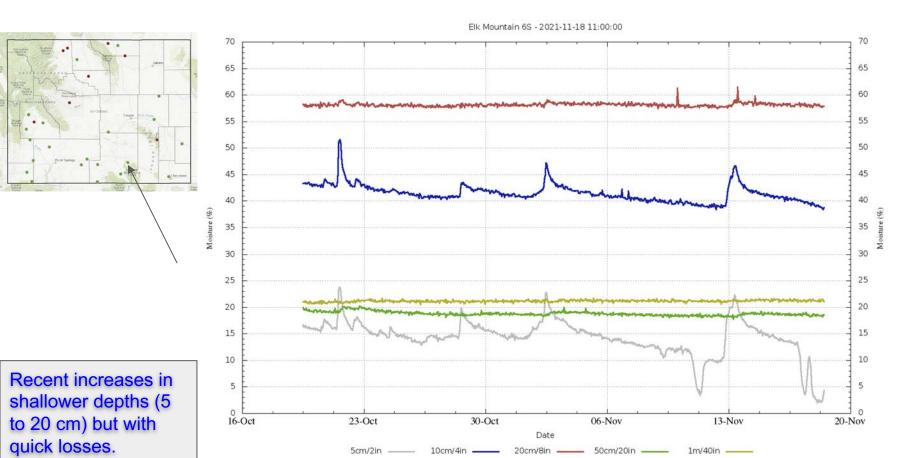






Soil Moisture at Elk Mountain

Elk Mountain

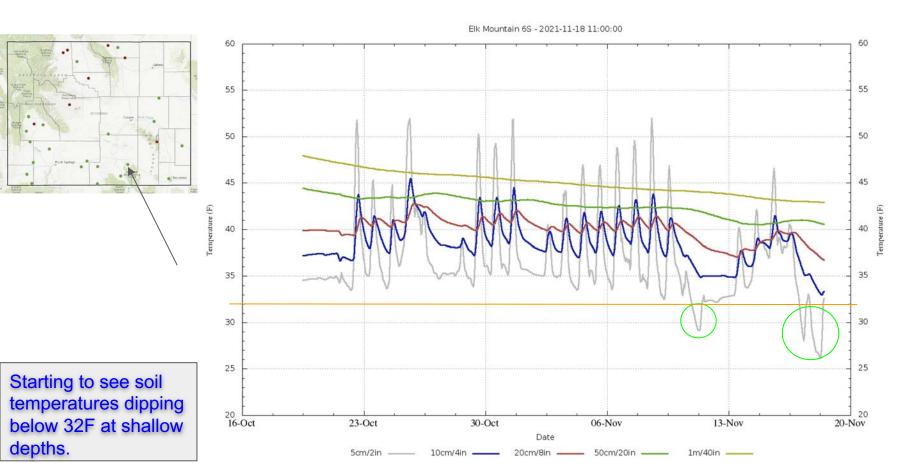






Soil Temperature at Elk Mountain

Elk Mountain

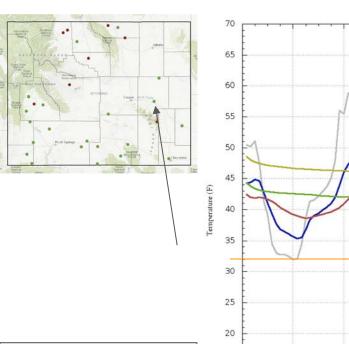


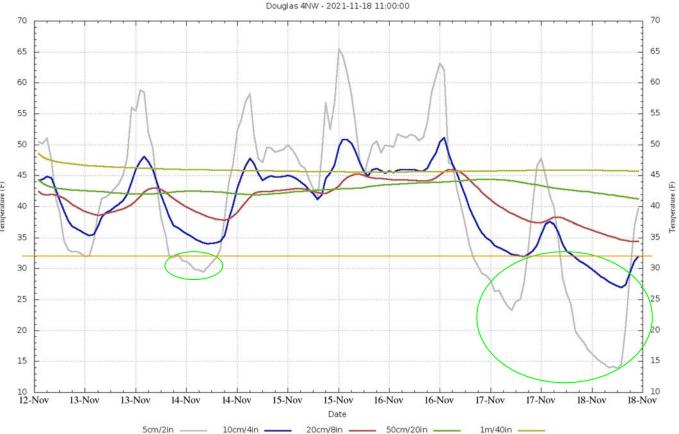




Soil Temperature at Douglas

Douglas





Soil temperature colder and for longer durations.





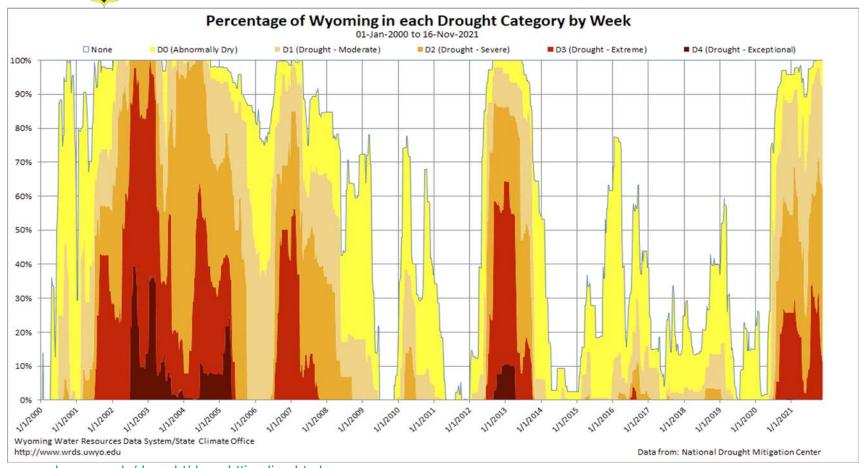
Frost Depth at Douglas

Douglas

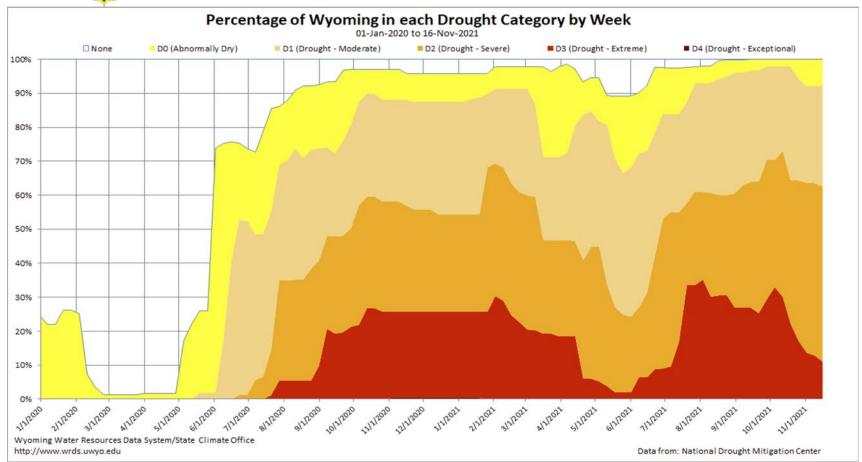




Wyoming Area Affected: 100% D0-D4; 92.07% D1-D4









1-Year Precipitation Percentile (01 Oct 2020 to 30 Sep 2021)

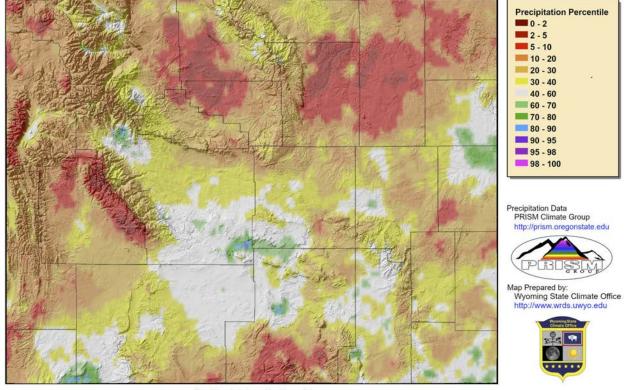
365-Day Precipitation (Percentile) for 01 Oct 2020 to 30 Sep 2021

Above Median:

Small scattered pockets

Well Below Median (<=10th Ptile):

- Western Wind River Range
- Bighorn Basin
- Johnson, Campbell, & Crook Counties
- Southern Carbon County
- Far western 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

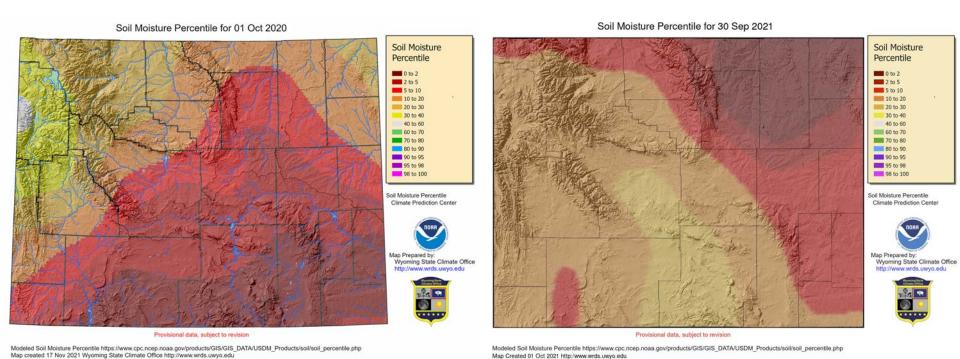
Map Created 01 Oct 2021 http://www.wrds.uwyo.edu Daily percentiles created from PRISM daily precipitation grids



Soil Moisture Percentile

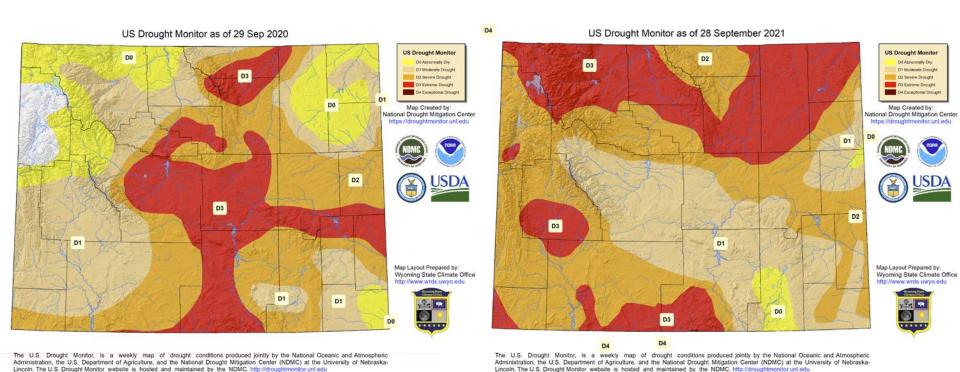
01 Oct 2020

30 Sep 2021





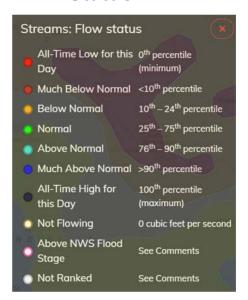
Drought at Start and End of Water Year 2021

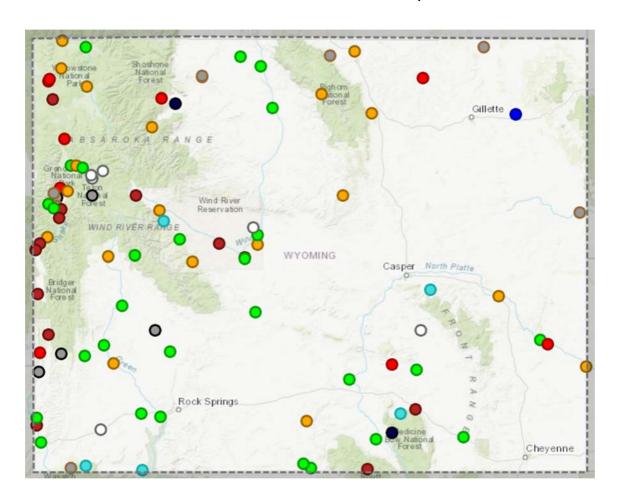




Current Streamflow Conditions (November 18, 2021)

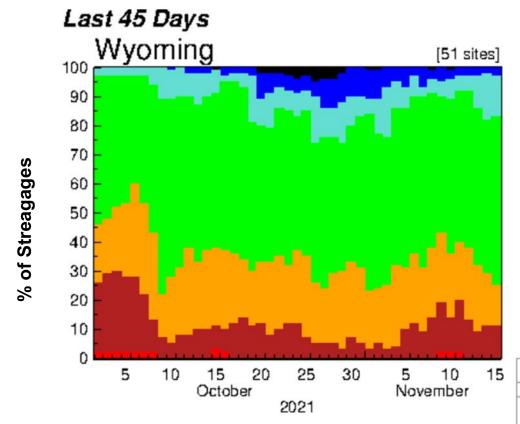
Streamflow Status







Flow Trends since early October



Only sites with 30 yrs record and no missing values.

Trend since mid/late October Increase in higher flows (Mostly **Mountain tributaries**)

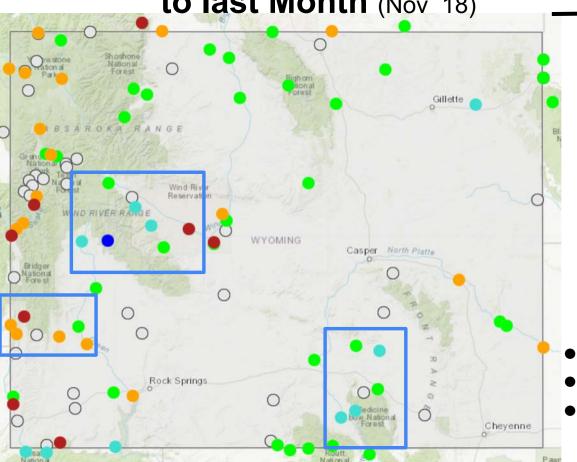
Record Daily Low Flow

Firehole near W.Yellowstone

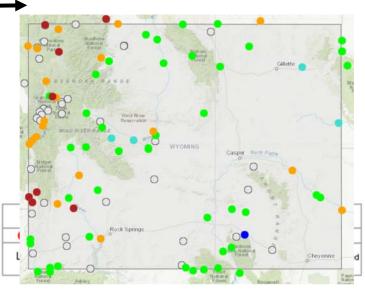
Explanation - Percentile classes										
•	•	•	•		•	•	0			
Low	<10	10-24	25-75	76-90	>90	High	Not maked			
	Much below normal	Below normal	Normal	Above normal	Much above normal		Not-ranked			

https://waterwatch.usgs.gov





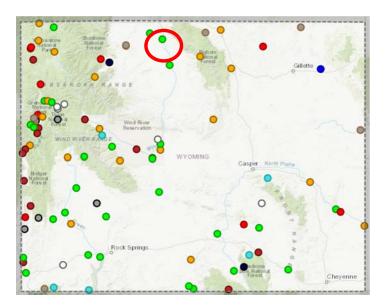




https://waterwatch.usgs.gov

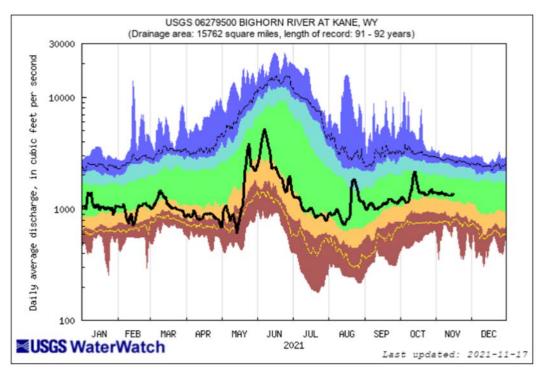
- Very similar to last month
- Higher flows- Mtn tributaries
- NW, WC Still dry





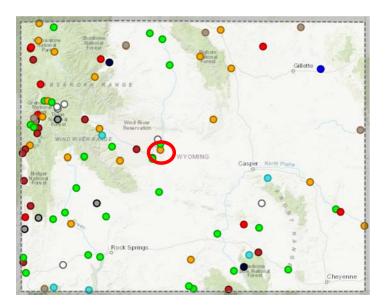
https://dashboard.waterdata.usgs.gov/ https://waterdata.usgs.gov/

BigHorn River at Kane, WY



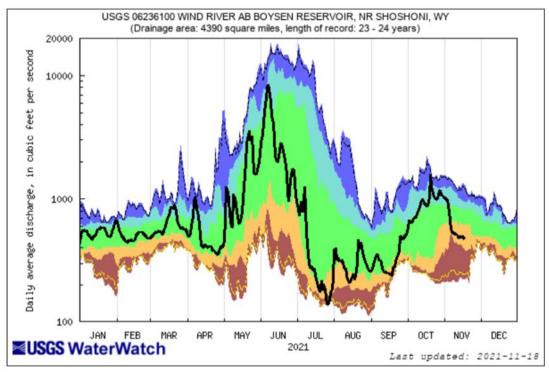
	E	xplana	tion - Pe	ercentile	classes	S	
lowest- 10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Flow
Much below Normal		Below normal	Normal	Above normal	Much a	bove normal	Flow





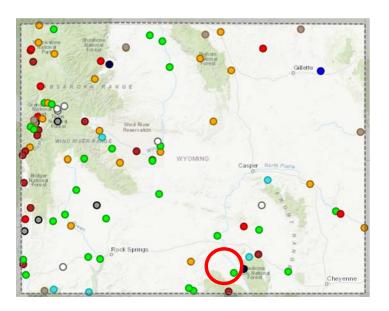
https://dashboard.waterdata.usgs.gov/ https://waterdata.usgs.gov/

Wind River above Boysen Reservoir



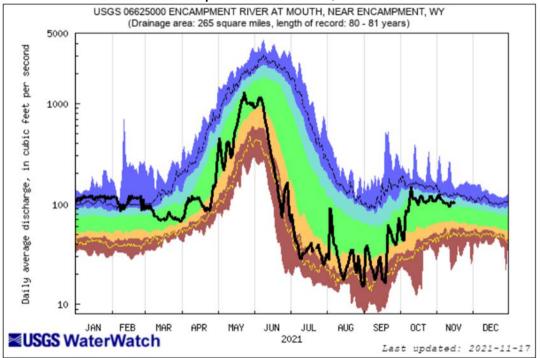
	E	xplana	tion - Pe	ercentile	classe	s	
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lowest- 10th percentile 5		10-24	25-75	76-90	95	90th percentile -highest	Flow
Much below Normal		Below normal	Normal	Above normal	Much above normal		riow





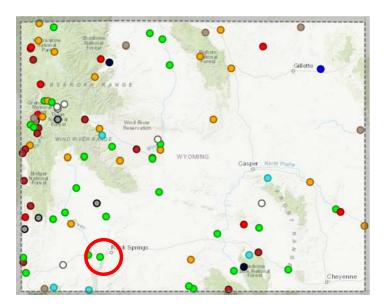
https://dashboard.waterdata.usgs.gov/ https://waterdata.usgs.gov/

Encampment River Near Encampment, WY



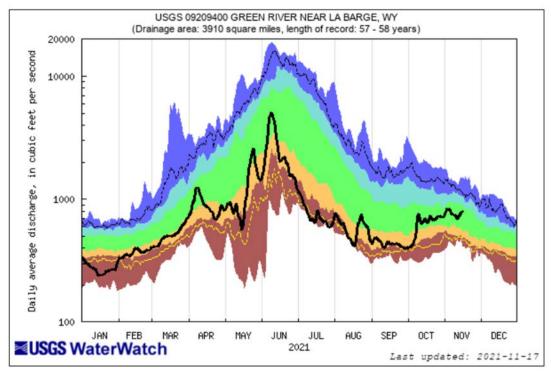
	E	xplana	tion - Pe	ercentile	classes	S	
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lowest- 10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Flow
Much below Normal		Below normal	Normal	Above normal	Much a	bove normal	riow





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

Green River near La Barge, WY



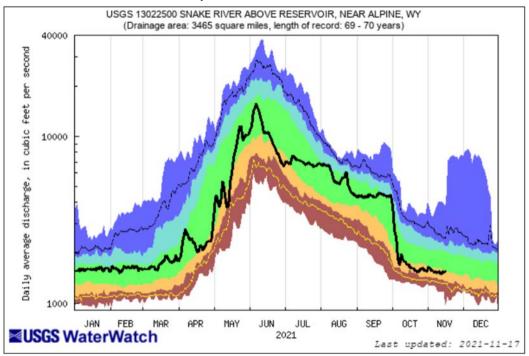
	E	xplana	tion - Pe	ercentile	classe	S	
						•	
lowest- 10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Flow
Much below Normal		Below normal	Normal	Above normal	Much above normal		FIOW



Wind River

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

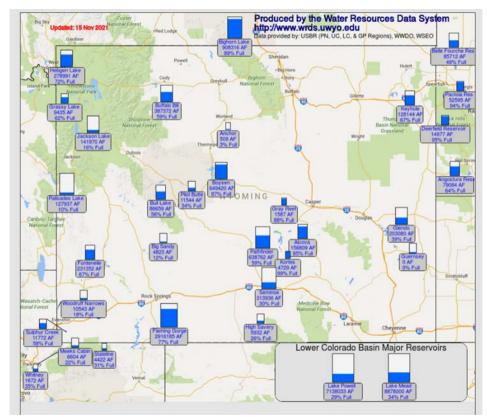
Snake River Above Reservoir Near Alpine, WY



	Е	xplana	tion - Pe	ercentile	classes	ŝ	
							_
lowest- 10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Flow
Much below Normal		Below normal	Normal	Above normal	Much	bove normal	riow



WY Reservoirs (Updated 11/18/21)

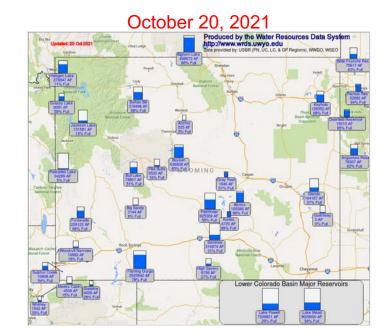


November 15, 2021

http://www.wrds.uwyo.edu/surface water/teacups.html

Compared to October

- No significant changes
- Some minor increases and decreases in storage.















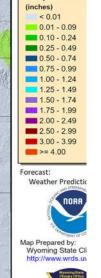
Forecasts & Outlooks



7-Day Quantitative Precipitation Forecast November 18-24

7-Day Quantitative Precipitation Forecast 18 Nov 2021





Quantitative Precipitation Forecast = Liquid Precipitation Forecast

- Minimal precipitation on the
- Snow showers Friday -Saturday morning

lower elevations

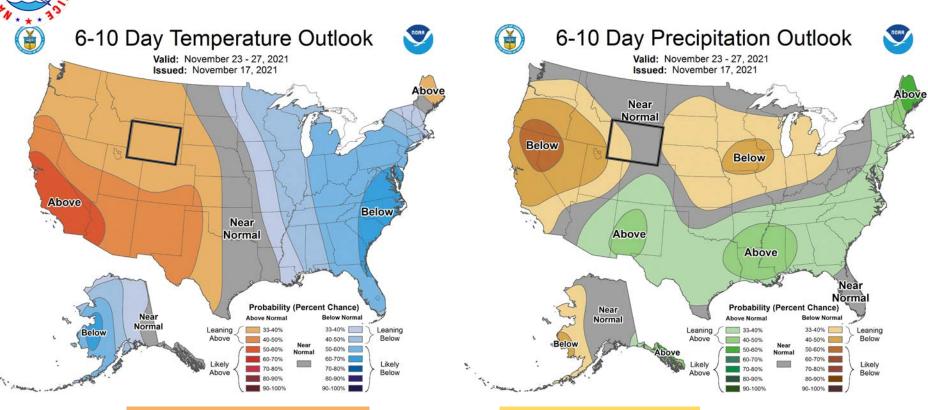
- Chance of snow Tuesday -Wednesday
- Temperatures remain warm over eastern WY, cool over the west
- Windy tonight Friday

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

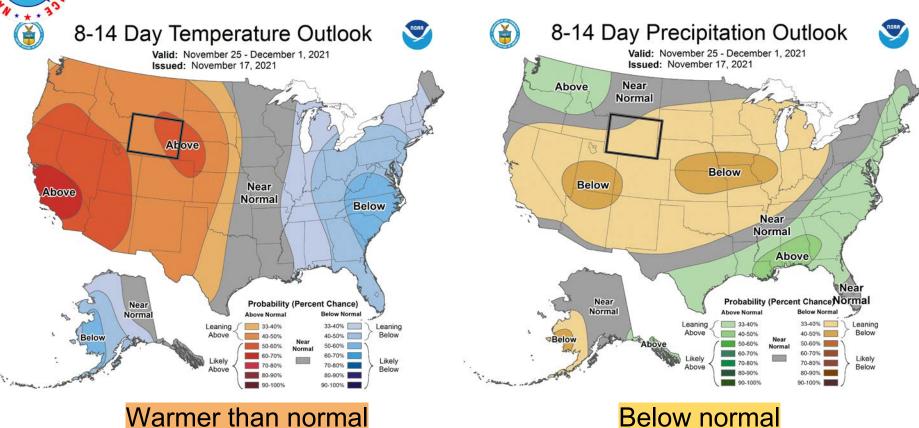
6-10 Day Outlooks November 23 - 27



Warmer than normal

Below southwest, near normal rest

8-14 Day Outlooks November 25 - December 1

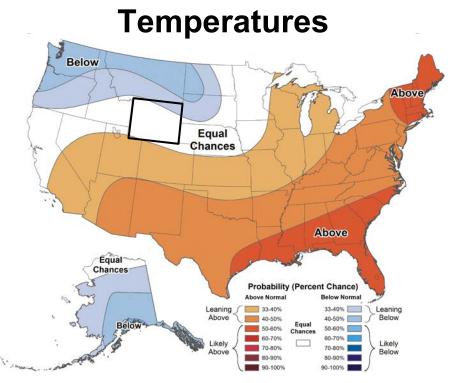


Below normal

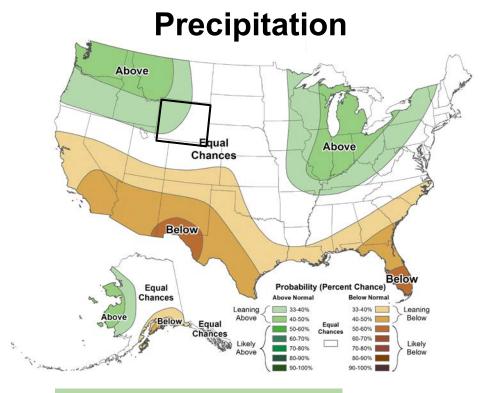


Winter Outlook

December 2021 - February 2022



Equal Chances



Above normal northwest, EC rest













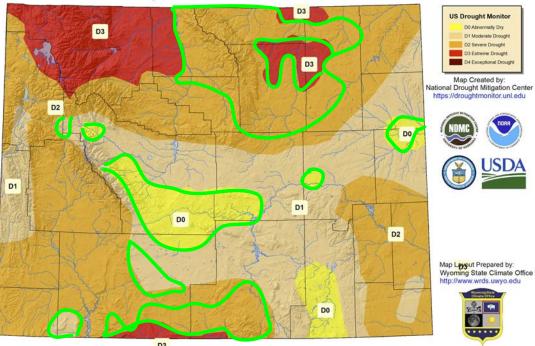
How to get involved ...



US Drought Monitor for November 16, 2021

(Released Thursday, November 18, 2021) Valid 8 a.m. EDT

US Drought Monitor as of 16 November 2021



D1 Moderate Drought D2 Severe Drought Map Created by: National Drought Mitigation Center https://droughtmonitor.unl.edu

US Drought Monitor

D0 Abnormally Dry

Improvements throughout the state as soil moisture improves, partly because the ground is still thawed and melting snow has been able to infiltrate the soil

Drought Level

D0 (Abnormally Dry)

D2 (Severe Drought)

D3 (Extreme Drought)

D4 (Exceptional Drought)

D1 (Moderate Drought)

None

column.

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Percentile

>30

21 to 30

11 to 20

6 to 10

3 to 5

0 to 2



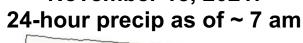


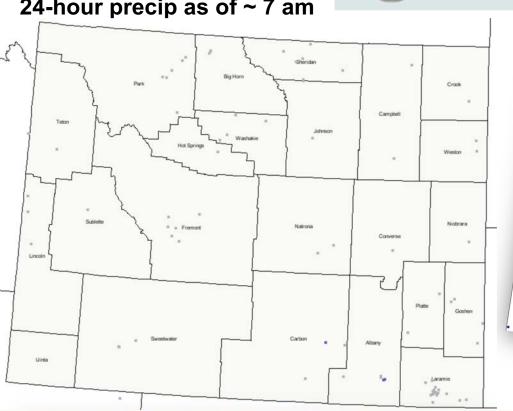


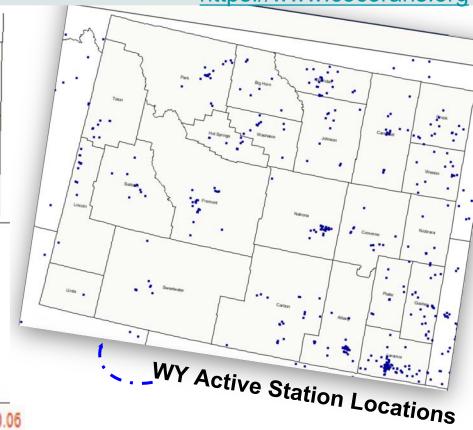
CoCoRaHS Mapping System

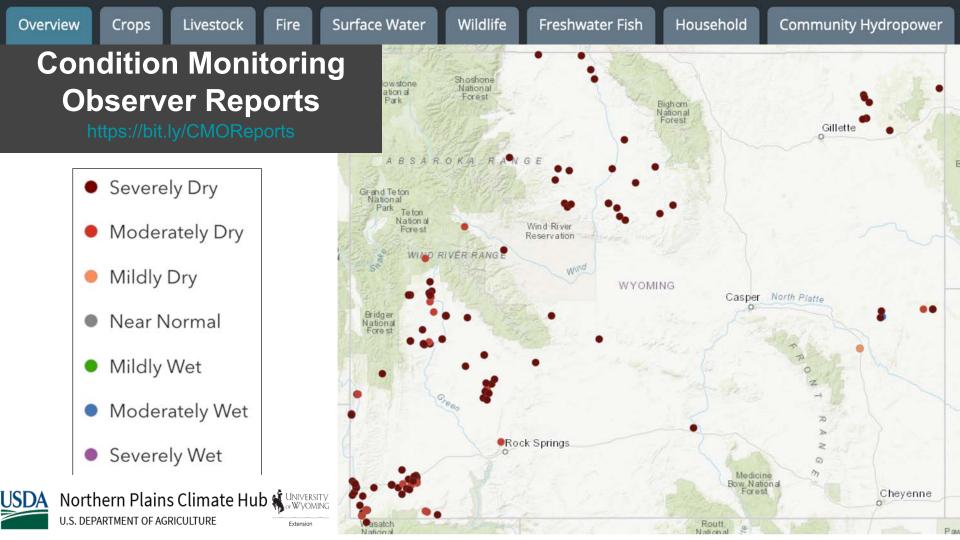
https://www.cocorahs.org

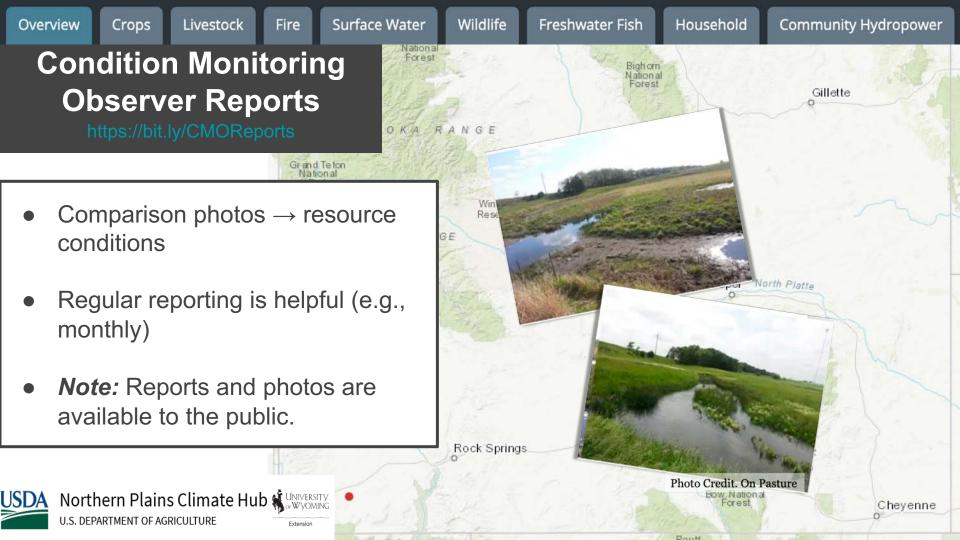
November 18, 2021:























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WY Drought Info & Resources

https://drought.wyo.gov

CoCoRaHS

https://www.cocorahs.org

Condition Monitoring Observer Reports (CMOR)

https://bit.ly/CMOReports

Thank you! Questions?