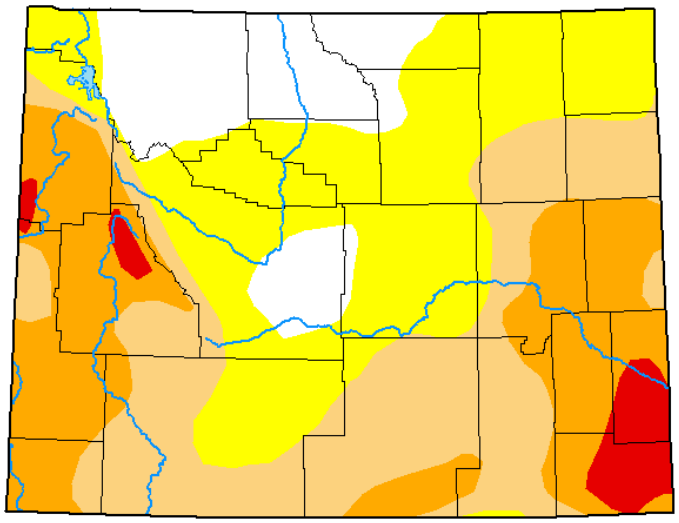
Sheridan County Water Supply Report

November - 2022

U.S. Drought Monitor

Wyoming



October 25, 2022

(Released Thursday, Oct. 27, 2022)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	14.07	85.93	53.51	26.16	3.54	0.00
Last Week *10-18-2022*	14.18	85.82	51.33	22.83	3.51	0.00
3 Months Ago *07-26-2022*	10.40	89.60	62.89	24.96	7.11	0.00
Start of Calendar Year *01-04-2022*	0.00	100.00	97.93	65.27	10.98	0.00
Start of Water Year *09-27-2022*	15.67	84.33	52.52	20.01	3.71	0.00
One Year Ago *10-26-2021*	0.00	100.00	94.11	64.23	17.04	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:

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NOAA/NWS/NCEP/CPC

droughtmonitor.unl.edu

Compiled by The Sheridan Community Land Trust and Iris Kurz of The Ruckelshaus Institute at the University of Wyoming. Contact water@sheridanclt.org for questions and concerns.

Map Source: The U.S. Drought Monitor is jointly produced by the National Drought Mitigation Center (NDMC) at the University of Nebraska-Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration.

Sheridan Community LAND TRUST

Conservation | History | Recreation

Connecting people to land and history

Table of Contents

Instead of combing the internet and clicking a million links to learn about water supply let us do the work for you! This report compiles a large range of resources into an easy to access format. It includes information about streamflow, snowpack, drought, soil moisture, and precipitation for the Tongue and Powder Rivers. This report is a one-stop shop that can help you make decisions for your ranch and your land.

Helpful Hints:

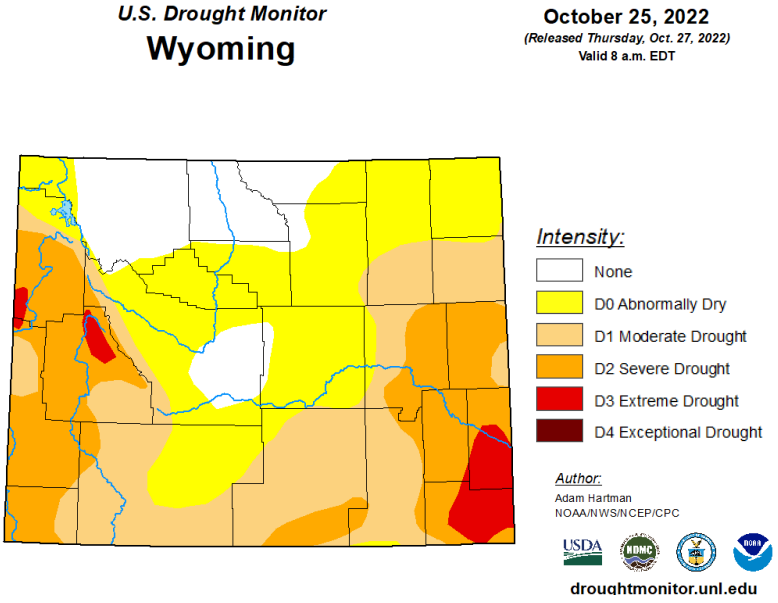
All forecasts have the word forecast underlined in the page's title.

Each page has a little blurb at the top that gives you some helpful information.

Sources are precise and bring you as close as possible to the original source.

Drought Index and Change

The U.S. Drought Monitor gives you a broad overview of the drought conditions in the US. Its strength is bringing together many ways of determining drought. It is useful as a large-scale view of drought, but local drought resiliency efforts are not considered.

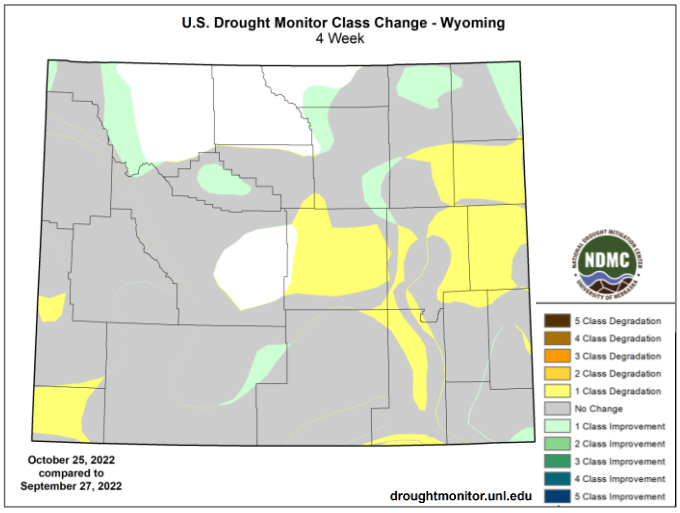


Current Drought Monitor:

30% of Sheridan County is experiencing abnormally dry (D0) conditions and the other 70% is not in drought conditions. This is an improvement from last month, as abnormally dry areas (D0)shrank by 20% and most of the country experiences less drought symptoms. Possible Impacts: D0 (Abnormally Dry) can cause slowing of plant growth.

Change in Drought Monitor:

Comparing the beginning and end of October, drought in the county has seen slight improvement. A good portion of southern Sheridan County saw some improvement with no degradation present across the entire county. To the east, Campbell County saw some degradation and some improvement. Johnson County to the south experienced slight degradation, but overall little change.



Cooler tones represent improvement. Warm tones represent degradation.

Sources: https://droughtmonitor.unl.edu/Maps/MapArchive.aspx
https://droughtmonitor.unl.edu/Maps/ChangeMaps.aspx
https://droughtmonitor.unl.edu/Summary.aspx

Drought History and Forecast

Current and historical data is based on known measured data, while the outlook is a prediction of the future. When using forecasts consider the addition level of uncertainty and the consequences of different outcomes in your decisions.

Drought in Sheridan County Over Time: Shown in Percentage Area in Drought

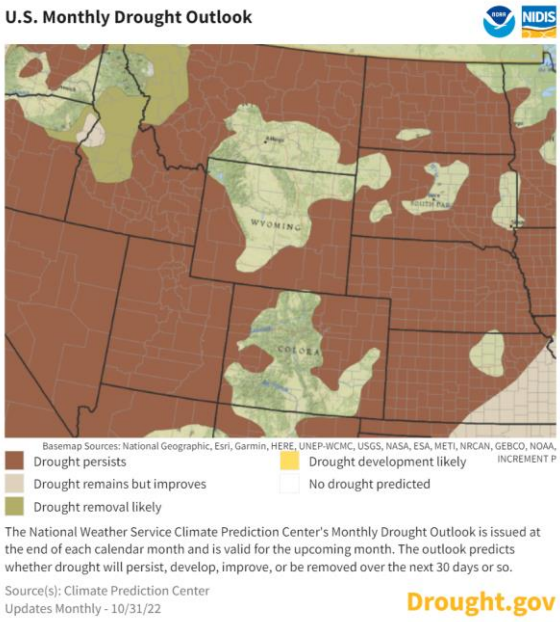
Week	Date	None	D0	D1	D2	D3	D4	DSCI
Current	2022-10-25	62.25	37.75	0.00	0.00	0.00	0.00	38
Last Week	2022-10-18	62.25	37.75	0.00	0.00	0.00	0.00	38
3 Months Ago	2022-07-26	6.35	61.58	32.07	0.00	0.00	0.00	126
Start of Calendar Year	2021-12-28	0.00	0.00	0.00	76.21	23.79	0.00	324
Start of Water Year	2022-09-27	49.02	50.98	0.00	0.00	0.00	0.00	51
One Year Ago	2021-10-26	0.00	0.00	0.00	55.00	45.00	0.00	345

DSCI stands for Drought Severity and Coverage Index. It is "an experimental method for converting drought levels from the U.S. Drought Monitor map to a single value for an area."

History of Drought Monitor: In October of 2021 Sheridan county was experiencing severe - extreme drought conditions (D2-D3), which persisted into the new year. The majority of the county is now out of drought, a significant improvement.

Forecast for Drought Monitor:

"Following a very dry September which persisted well into October, a major pattern change occurred over western North America during the final week of October[…]A secondary area of improvement/removal is forecast for the northern Rockies where heavier precipitation amounts are expected during the first week of the month, with a continuation of above-normal precipitation through at least mid-November[…]Given the long-term duration of the drought across Wyoming, broad-scale persistence is forecast although northwest parts of the state have the highest chance for improvement."[1]

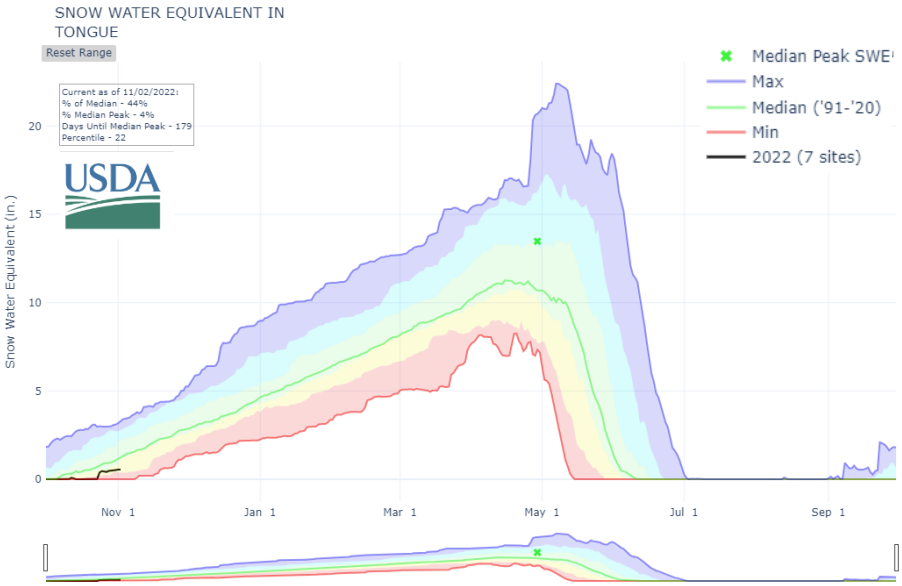


Forecast confidence is moderate to high for the Western and High Plains Regions.

Sources: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?fips_56033
https://www.drought.gov/forecasts
https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_summary.php
1 https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php

Precipitation - Tongue River

These graphs represent precipitation in the Big Horn Mountains that affect the Tongue River. Snow water equivalent (SWE) represents the amount of water contained within the snowpack when it melts.

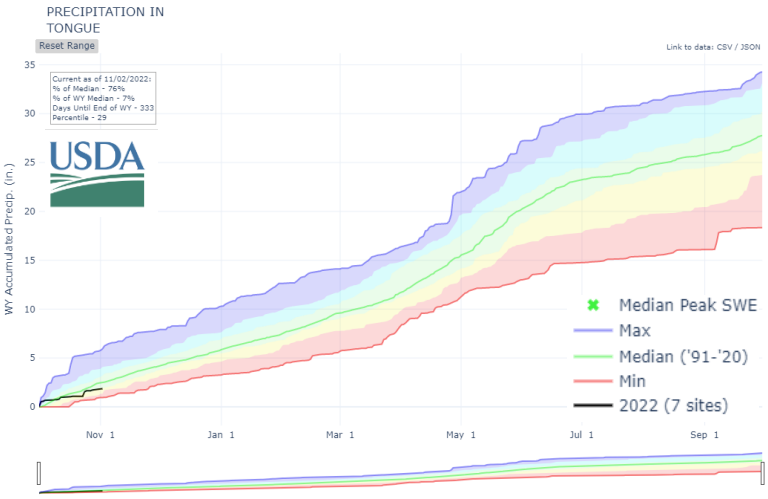


Snowpack in Tongue River Watershed:

The USDA's water year annually begins on October 1st. Since the beginning of the water year snow has begun to accumulate in the Tongue River watershed. Across the watershed there is 0.9 in of SWE, which is below median.

Precipitation in Tongue River Watershed:

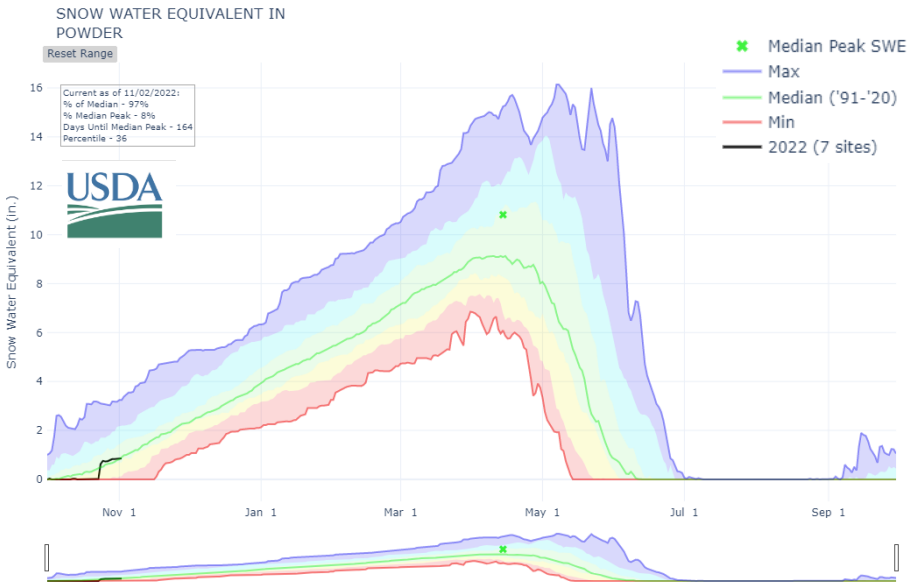
Precipitation in the Bighorn Mountains for the Tongue River watershed has dropped below the median. It is currently just 90% of the median which is in the 38th percentile. As of November 2nd, the stations have recorded approximately 2.5 inches of precipitation for the water year.



Sources:
https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/WTEQ/assocHUC6/100901_Tongue.html
https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/PREC/assocHUC6/100901_Tongue.html

Precipitation - Powder River

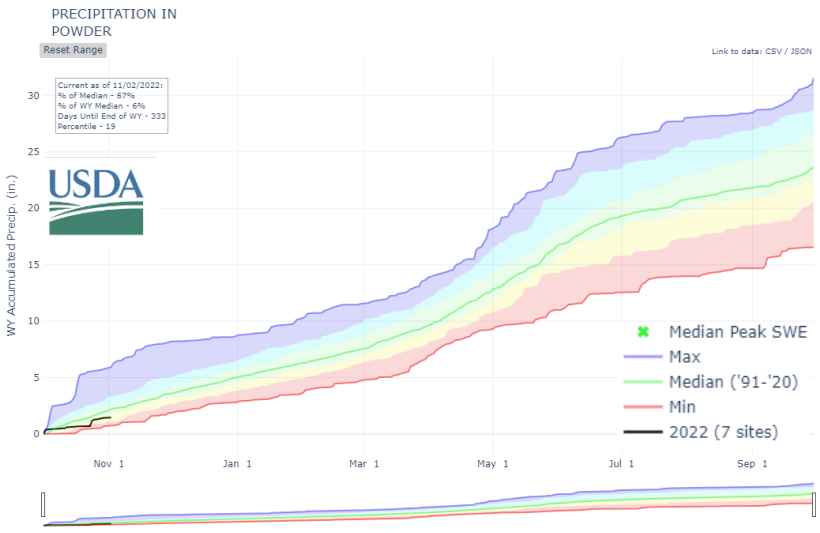
These graphs represent precipitation in the Big Horn Mountains that affect the Powder River. Snow water equivalent represents the amount of water contained within the snowpack when it melts.



Snowpack in Powder River Watershed:

The Powder River watershed has accumulated approximately 1 in. of snowpack by November 1st, leaving the overall at 111% of the median snowpack for this time of year.

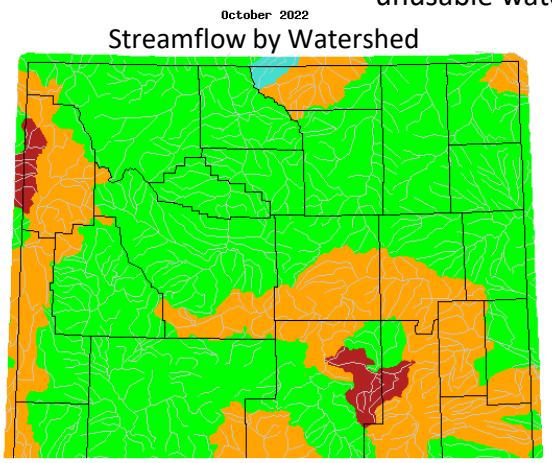
Precipitation in Powder River Watershed: Precipitation in the Bighorn Mountains for the Powder River watershed is below median. It is currently 78% of median which is in the 24th percentile. The start of October represents the start of a new water year, and so far, the stations have recorded close to 1.5 inches of precipitation.



Sources:
https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/WTEQ/assocHUC6/100902_Powder.html
https://www.nrcs.usda.gov/Internet/WCIS/AWS_PLOTS/basinCharts/POR/PREC/assocHUC6/100902_Powder.html

Stream Flow and Reservoirs

The total capacity of reservoirs and current water storage includes all the water in the reservoir including unusable water beneath the outtake.



Explanation - Percentile classes							
Low	<10	10-24	25-75	76-90	>90	High	No Data
	Much below normal	Below normal	Normal	Above normal	Much above normal		

Stream Flow: In October, stream flow in the Tongue watershed was, generally, below average. In the Powder River watershed streamflow was below average in the headwaters, but as the Powder River flows through Sheridan County it was within its normal range.

Lake DeSmet

As of November 1, 2022, Lake DeSmet has 198,755 A.F. in storage, which is 84.5% of its total capacity.

Tongue River Reservoir

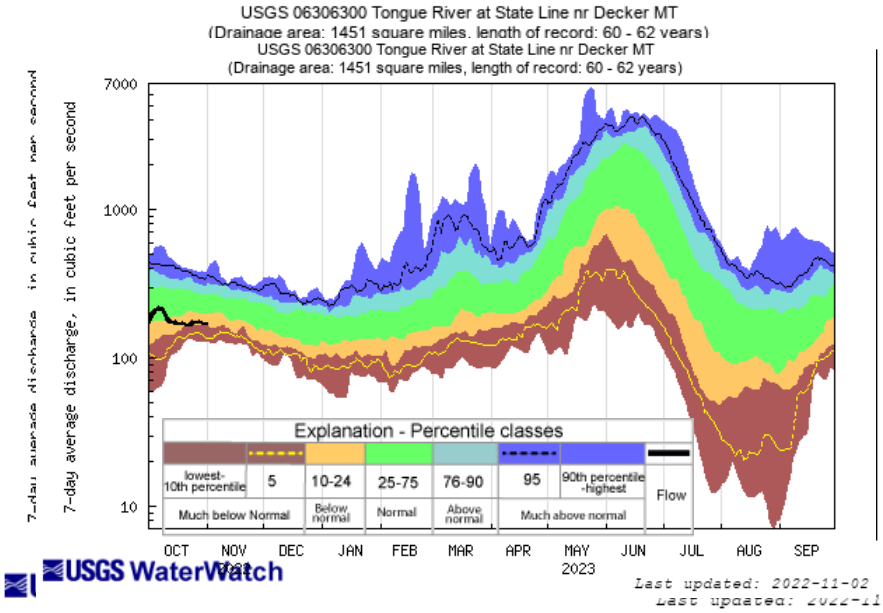
Tongue River Reservoir has 42,947 acre-ft of water stored. Its maximum capacity is 79,071 acre-ft. In the spring, Tongue River Reservoir can call on post 1950s water rights if it is not predicted to fill to 72,500 acre-ft of water.

Reservoir	Current Storage (Acre-ft)	Total Capacity (Acre-ft)	Total Storage (%)
Bighorn	1,220	4,624	26.4
Cross Creek	44	798	5.5
Dome Lake No.1	1,158	1,506	76.9
Kearney Lake	1,536	6,324	24.3
Park	3,825	10,362	36.9
Sawmill	883	1,275	69.3

Sources: https://waterwatch.usgs.gov/index.php?id=mv01d
Lake DeSmet Operating Department at lakedesmet@johnsoncowy.us
http://dnrc.mt.gov/divisions/water/projects/tongue-river
https://seoflow.wyo.gov/Data/Map/Parameter/Total%20Storage/Location/Identifier/Interval/Latest

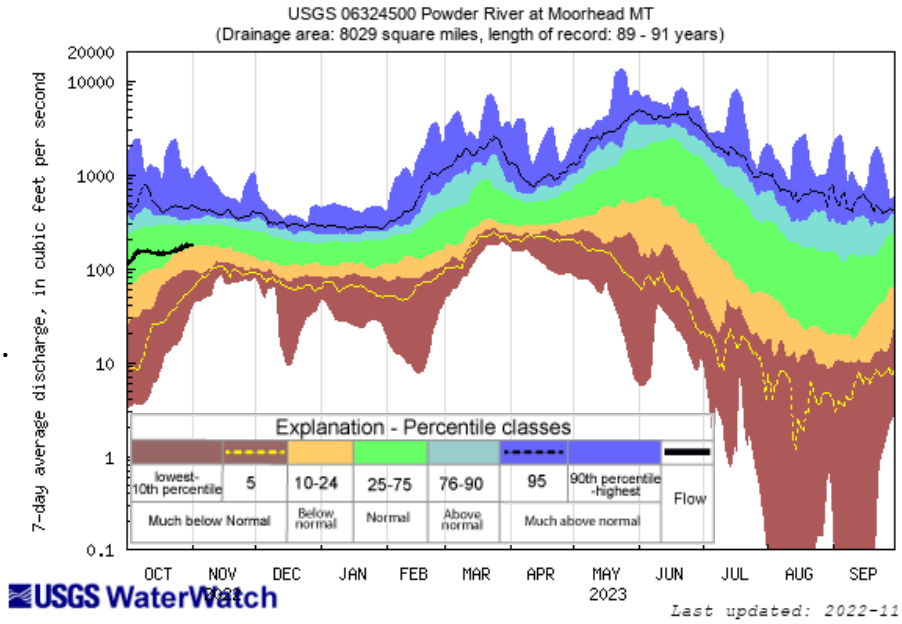
Select Stream Flow Stations

These graphs give context to stream flow percentile classes. The selected USGS stream gauges are on the stateliness with Montana, being the downstream end of the Tongue and Powder within our region. The flow represent average 7-day flows. The vertical axis is logarithmic meaning it goes up by 10x for each major tik mark. Instead of going from 10 to 20 to 30 it goes from 10 to 100 to 1000 in the same distance.



Tongue River Border Station Stream Flow: The average stream flow for October was in the 25th percentile with a discharge that averaged 198 cfs. Streamflow was within normal for most of October.

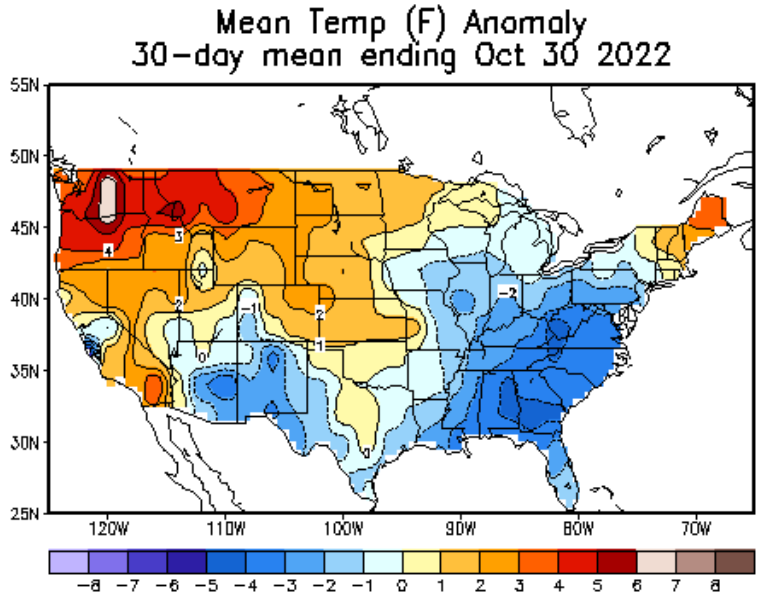
Powder River Border Station Stream Flow: The average stream flow for October was in the 30th percentile with a discharge that averaged 184 cfs. Streamflow stayed within its normal range.



Sources: https://waterwatch.usgs.gov/index.php?id=mv01d
https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06306300
https://waterwatch.usgs.gov/?id=wwchart_sitedur&ofmt=plot_mvbg&site_no=06324500

Temperature and Precipitation

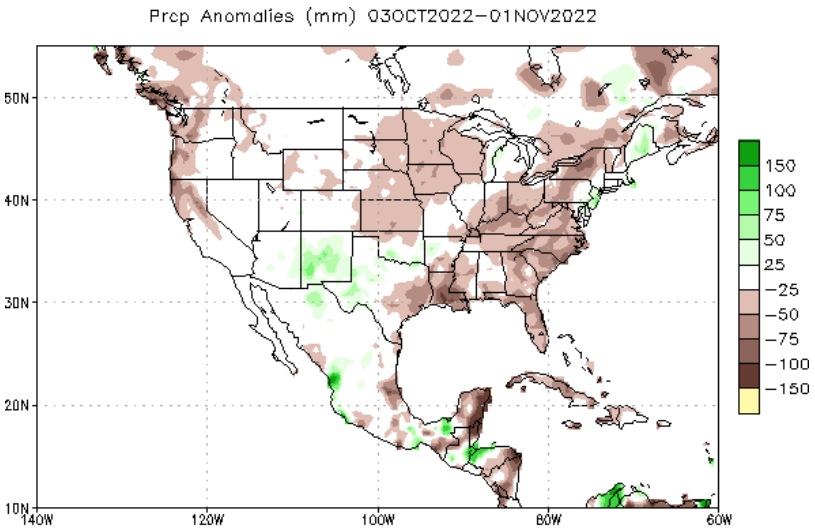
Temperature and precipitation are large drivers of changes in drought conditions. It might not shock you to learn hot and dry is bad for drought while cold and wet helps improve it.



Temperature Anomaly: In October, the average temperature was 2-3°F above what we generally see in Sheridan County. This increases evaporation and the transpiration rate of plants.

Precipitation: The rainfall for October in Sheridan County is within 25 mm (~1 inch) of what is average. Sustained monthly precipitation has alleviated drought in Sheridan County, and a continuation of this pattern could lead to a further decrease of drought-like conditions.

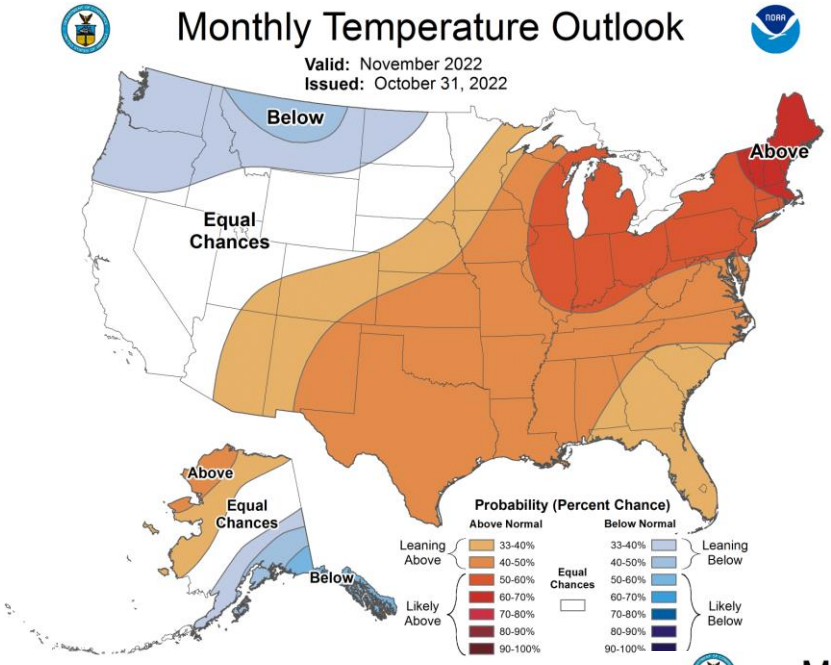
"Given the long-term duration of the drought across Wyoming, broad-scale persistence is forecast although northwest parts of the state have the highest chance for improvement."[2]



Sources: https://www.cpc.ncep.noaa.gov/products/tanal/temp_analyses.php
https://www.cpc.ncep.noaa.gov/products/Global_Monsoons/American_Monsoons/NAMS_precip_monitoring.shtml
2 https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php

Temperature Forecast and Precipitation Forecast

https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/interactive/index.php
Explore link above for an Interactive map that displays percentage chance above and below normal for any point in US.



Temperature: Sheridan County has equal chances of seeing temperatures above or below the average.

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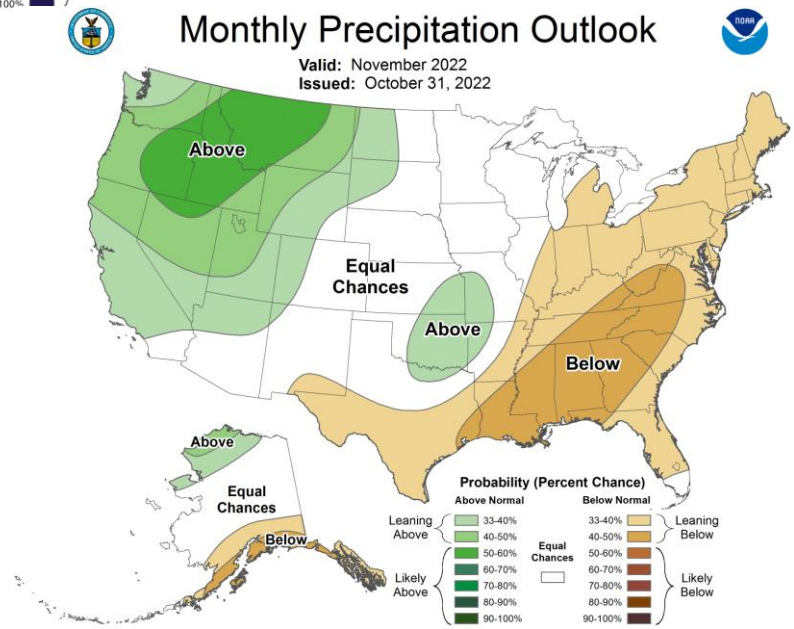
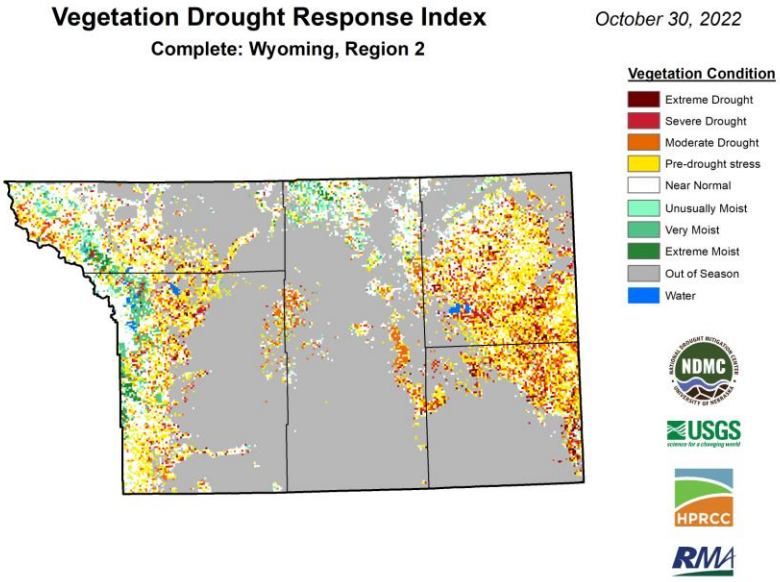
Precipitation: Sheridan has 30-50% chances of being above normal precipitation.



Sources: https://www.cpc.ncep.noaa.gov/
https://www.cpc.ncep.noaa.gov/products/predictions/long_range/lead14/interactive/index.php – Interactive with percentages
https://www.cpc.ncep.noaa.gov/products/expert_assessment/mdo_discussion.php

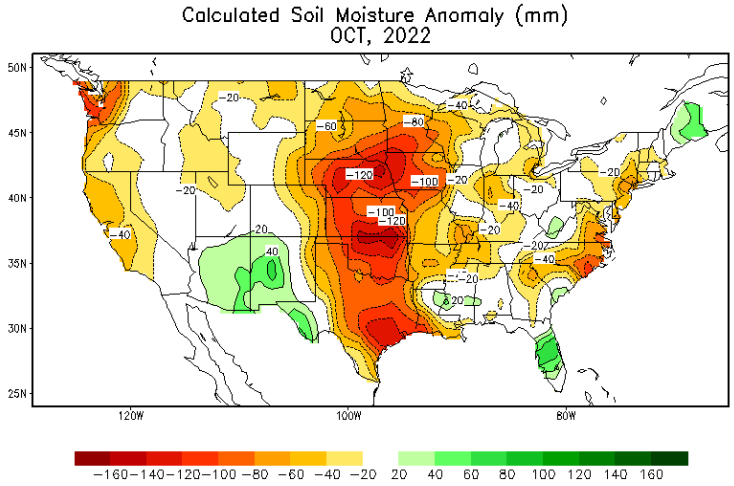
Vegetation Drought Response and Soil Moisture

The graphs below are two ways of visualizing on-ground conditions. The vegetation Drought Response Index (Vegdri) uses a satellite to estimate vegetative stress. Soil moisture is helpful when looking at many things. Soil acts as a bank for moisture and can buffer drought degradation or improvement. It is also the water that plants have available to them so is linked to vegetative stress.



Vegetation Drought Response:.
The Vegetation Drought Response Index shows that although portions the county is still feeling the affects of drought, a good area of it is near normal. A large portion of the county is now out-of-season, although the western end is still experiencing vegetative response.

Soil Moisture:
Soil moisture is normal in Sheridan County, a constant from last month, but eastern Wyoming is still on the edge and surrounded by poor soil moisture. Additionally, poor soil conditions across the region—specifically in the north and west--can indicate sustained drought.



Sources: https://vegdri.unl.edu/Home/VegDRIQuad.aspx?WY,2
https://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml