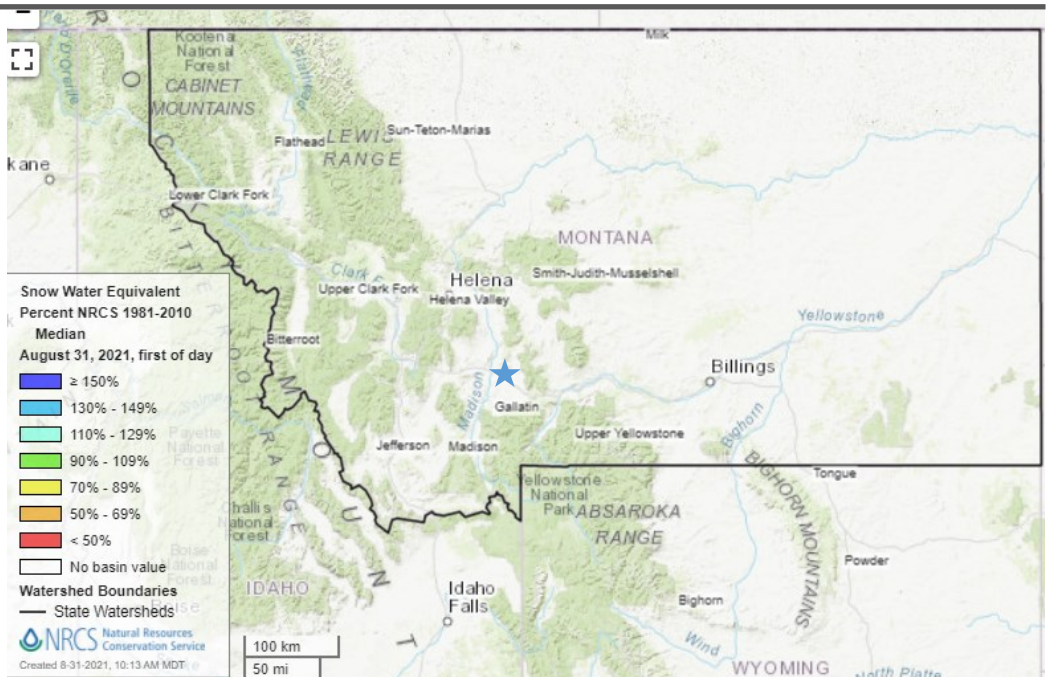
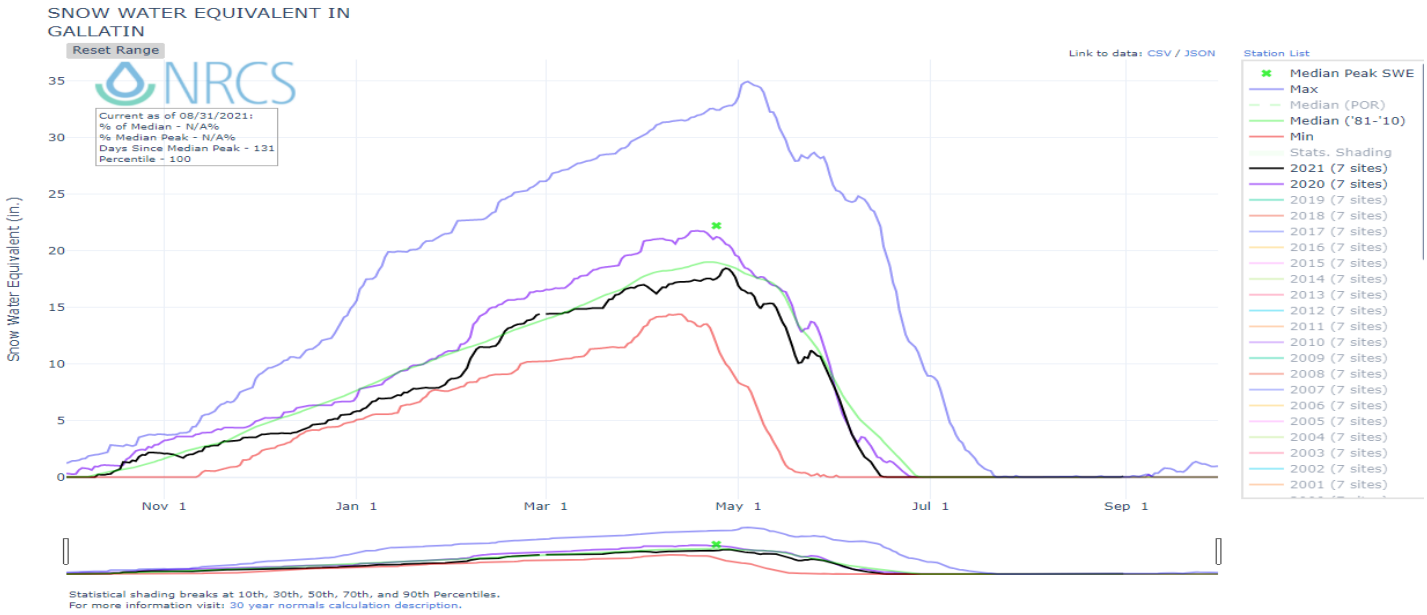
Gallatin County Water Supply Outlook
August 2021

Snowpack Data
Gallatin River Basin

★= Gallatin River Basin





SNOWPACK SUMMARY (Water Year (WY) = October 1st—September 30)

*Data current as of August 31st

We are currently in Water Year 2021 (black line). The Snow Water Equivalent (SWE) was normal (median) within the Gallatin River Basin on August 31st at 0 inches (a 0 inch decrease since last month). The SWE on August 31st, 2020 (central purple line) was at 0 inches. Detailed end-of-month SNOTEL site information follows.

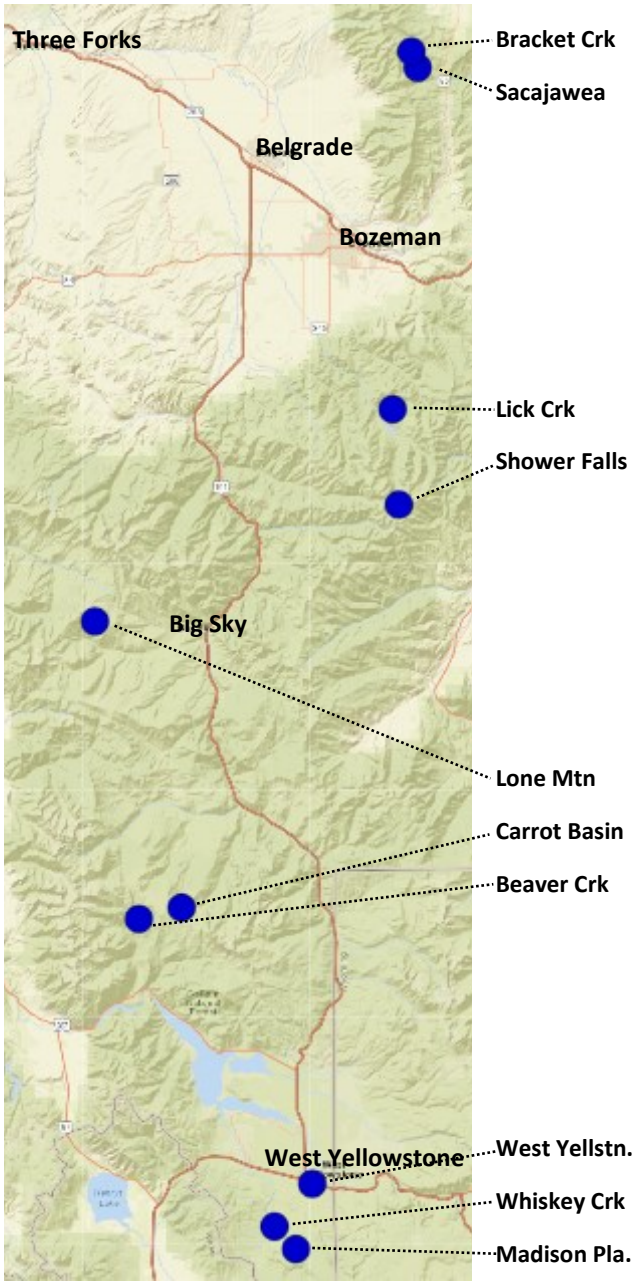
Snowpack Data
Gallatin River Basin—August 2021

Gallatin Valley Region (Bozeman-Belgrade-Four Corners					
Station Name	*Date*	*Snow Depth (in)*	*SWE (in)*	*SWE % Normal*	*Normal SWE 1971-2000 (in)*
Brackett Creek	July 2020	0	0		0
	July 2021	0	0		
Sacajawea	July 2020	0	0		0
	July 2021	0	0		

Hyalite Region (Gallatin Gateway)					
Station Name	*Date*	*Snow Depth (in)*	*SWE (in)*	*SWE % Normal*	*Normal SWE 1971-2000 (in)*
Lick Creek	July 2020	0	0		0
	July 2021	0	0		
Shower Falls	July 2020	0	0		0
	July 2021	0	0		

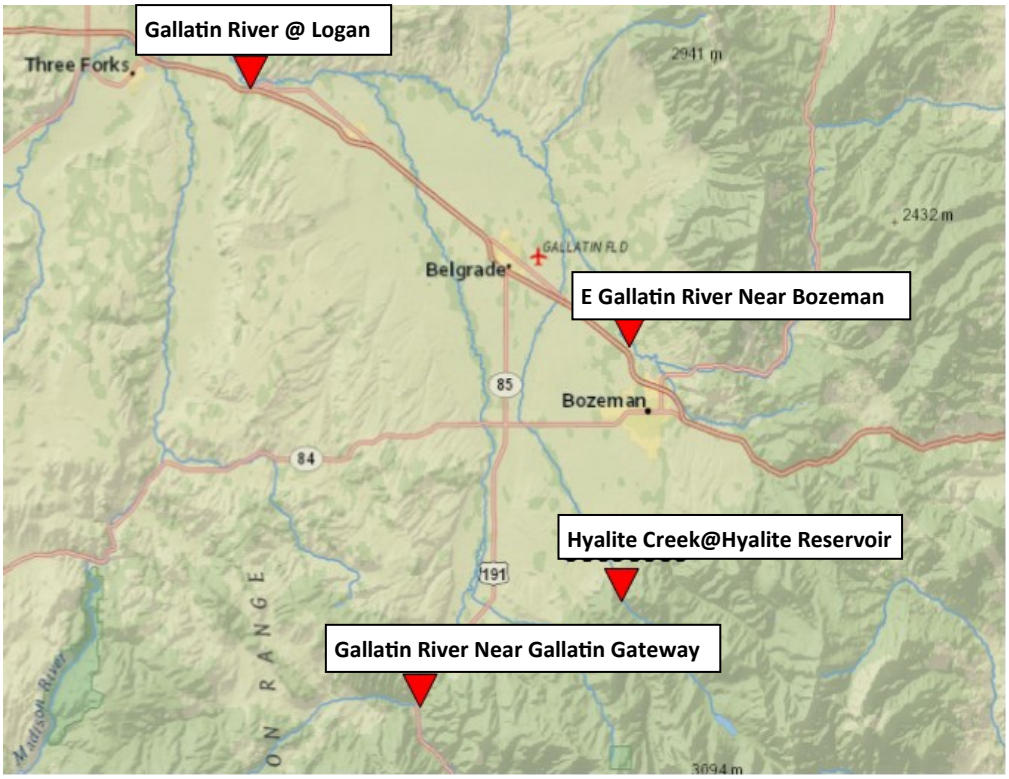
Lee Metcalf Wilderness Region (Big Sky)					
Station Name	*Date*	*Snow Depth (in)*	*SWE (in)*	*SWE % Normal*	*Normal SWE 1971-2000 (in)*
Beaver Creek	July 2020	0	0		0
	July 2021	0	0		
Carrot Basin	July 2020	0	0		0
	July 2021	0	0		
Lone Mountain	July 2020	0	0		0
	July 2021	0	0		

West Yellowstone Region					
Station Name	*Date*	*Snow Depth (in)*	*SWE (in)*	*SWE % Normal*	*Normal SWE 1971-2000 (in)*
Madison Plateau	July 2020	0	0		0
	July 2021	0	0		
West Yellow-stone	July 2020	0	0		0
	July 2021	0	0		
Whiskey Creek	July 2020	0	0		0
	July 2021	0	0		



Streamflow Data

Gallatin River Basin—August 2021



August31st Gallatin Watershed Streamflow					
Station Name	2021 Discharge (cfs)	% Normal	Normal Dis-charge (cfs)	2020 Discharge (cfs)	Period Of Record (Yrs)
Gallatin at Logan	288	58	498	353	105
E Gallatin near Bozeman	45.6	109	42	55.4	6
Hyalite Creek at Hyalite Reservoir	58.5	117	50	65.8	73
Gallatin near Gallatin Gateway	383	77	496	455	92

STREAMFLOW SUMMARY

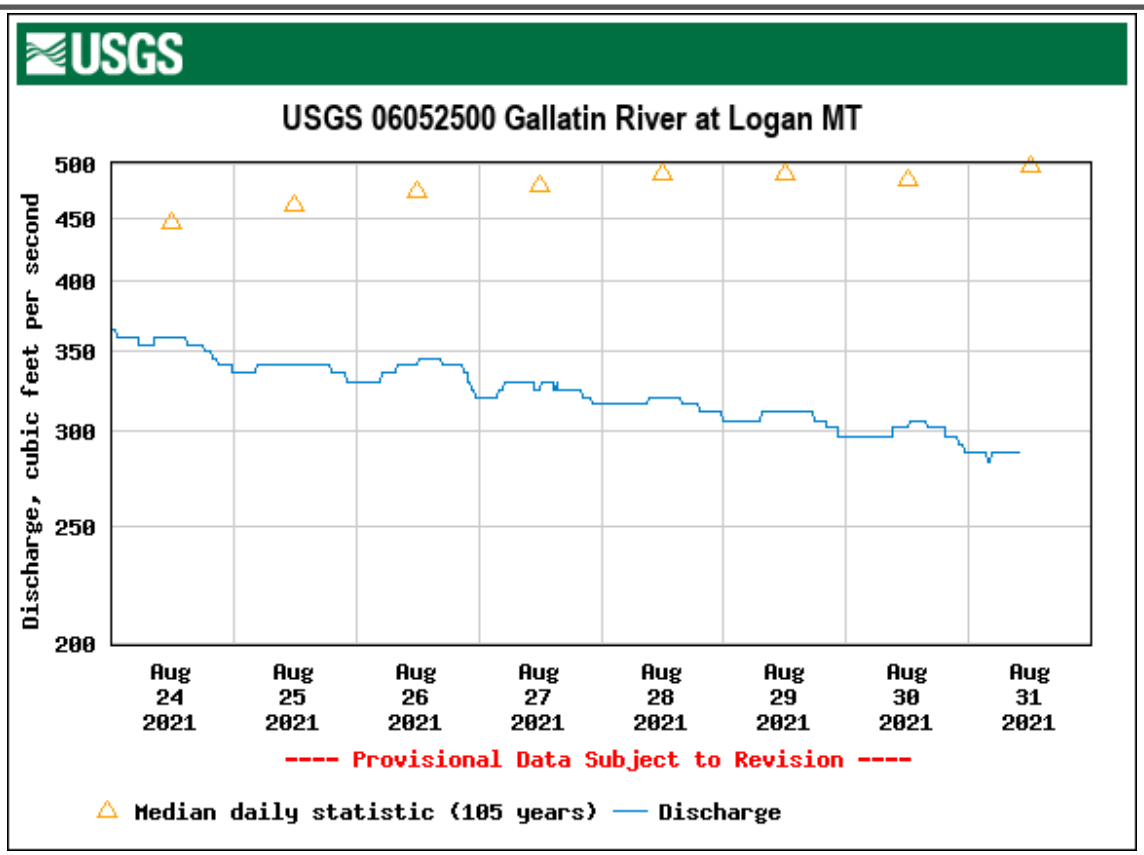
*Data current as of August 31st

Discharge values are below normal for the Gallatin River sites near Gallatin Gateway and Logan. Discharge values are above normal for the East Gallatin site near Bozeman and for Hyalite Creek site at Hyalite Reservoir.

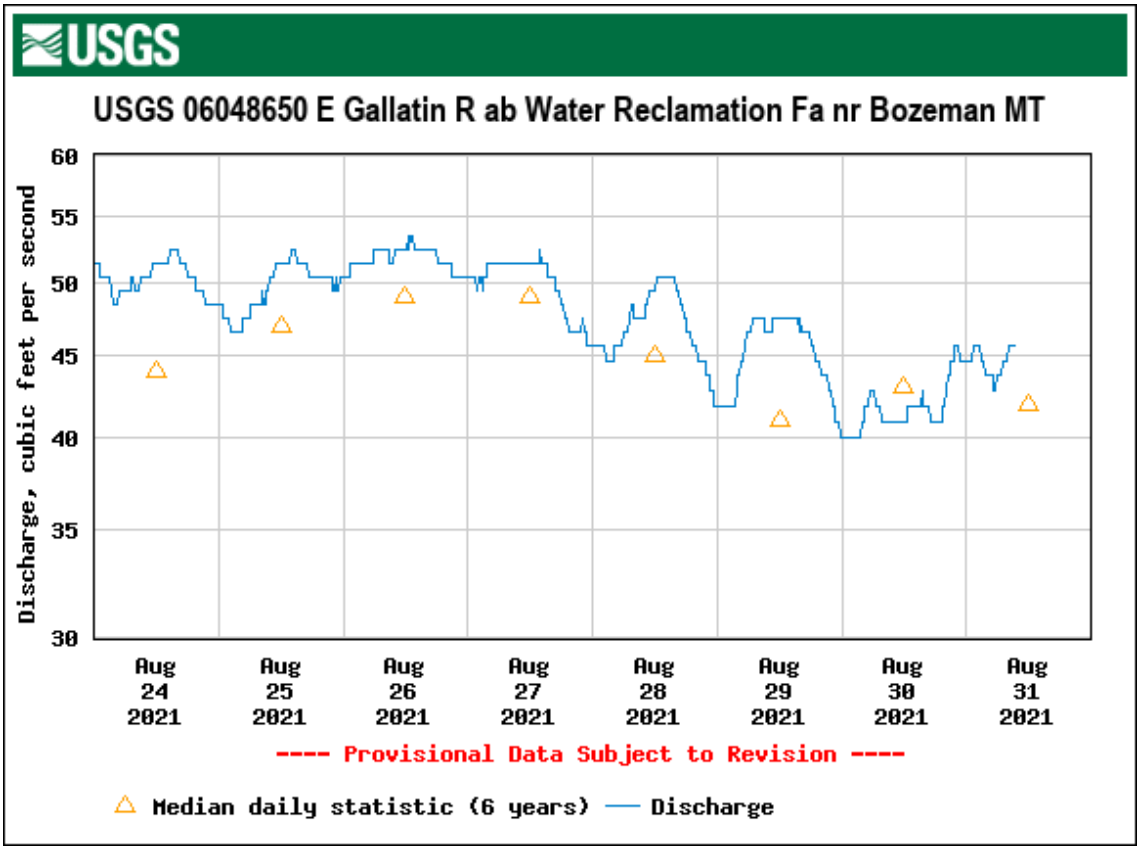
Discharge values at all sites are below what they were in 2020 at this time.

Streamflow Data

Gallatin River Basin—August 2021



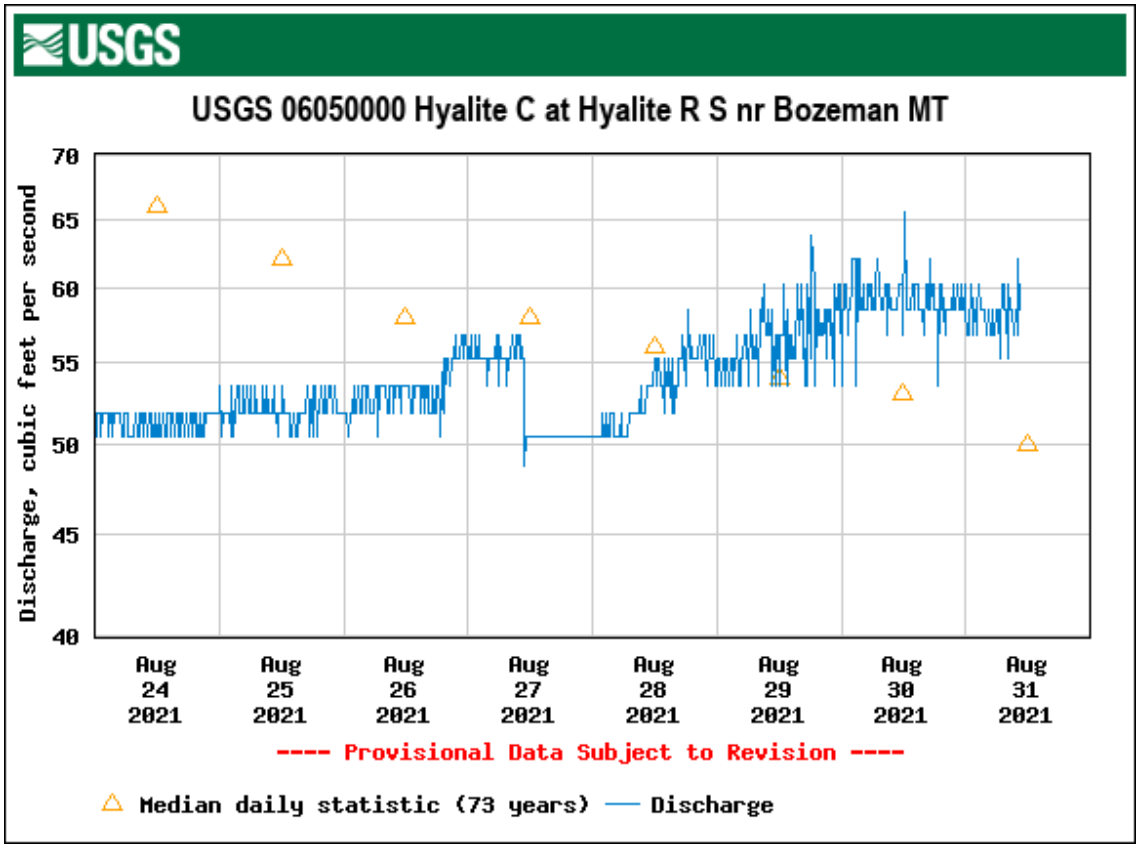
August 31st 10:30:00—Discharge is below normal.



August 31st 10:00:00—Discharge is above normal.

Streamflow Data

Gallatin River Basin—August 2021



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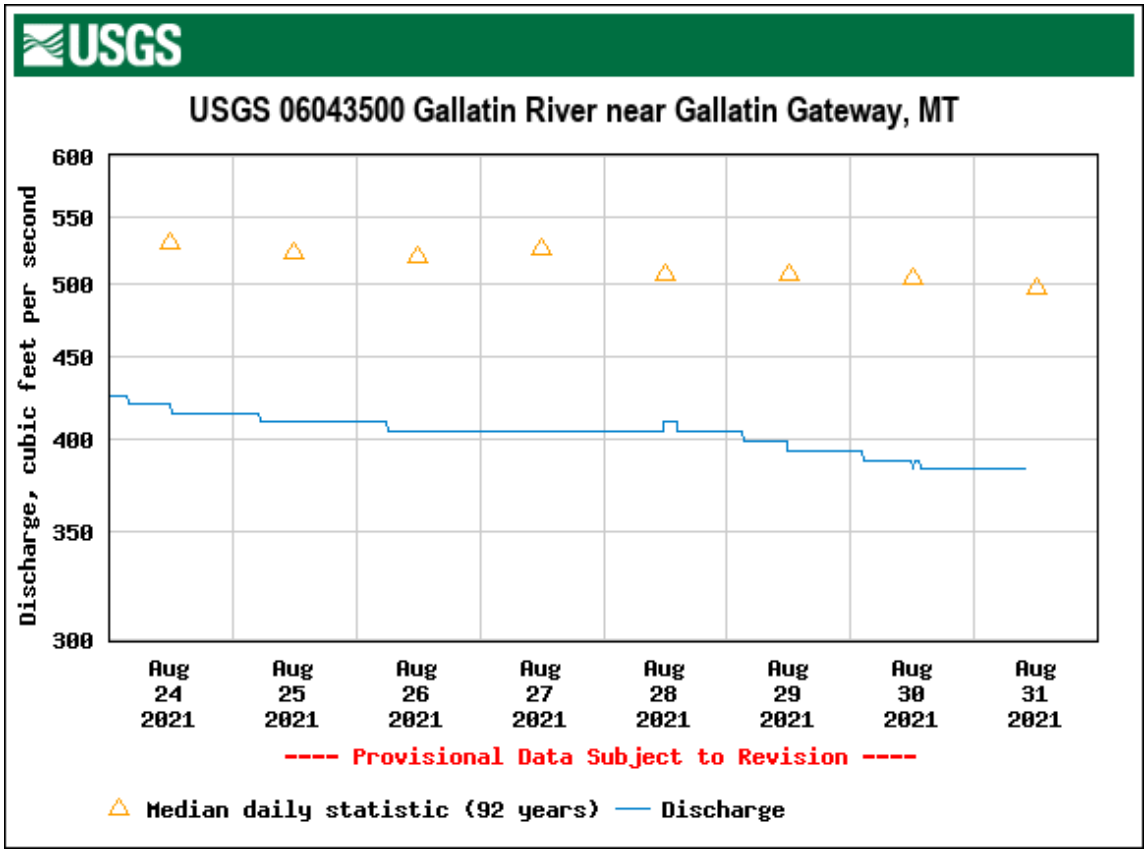
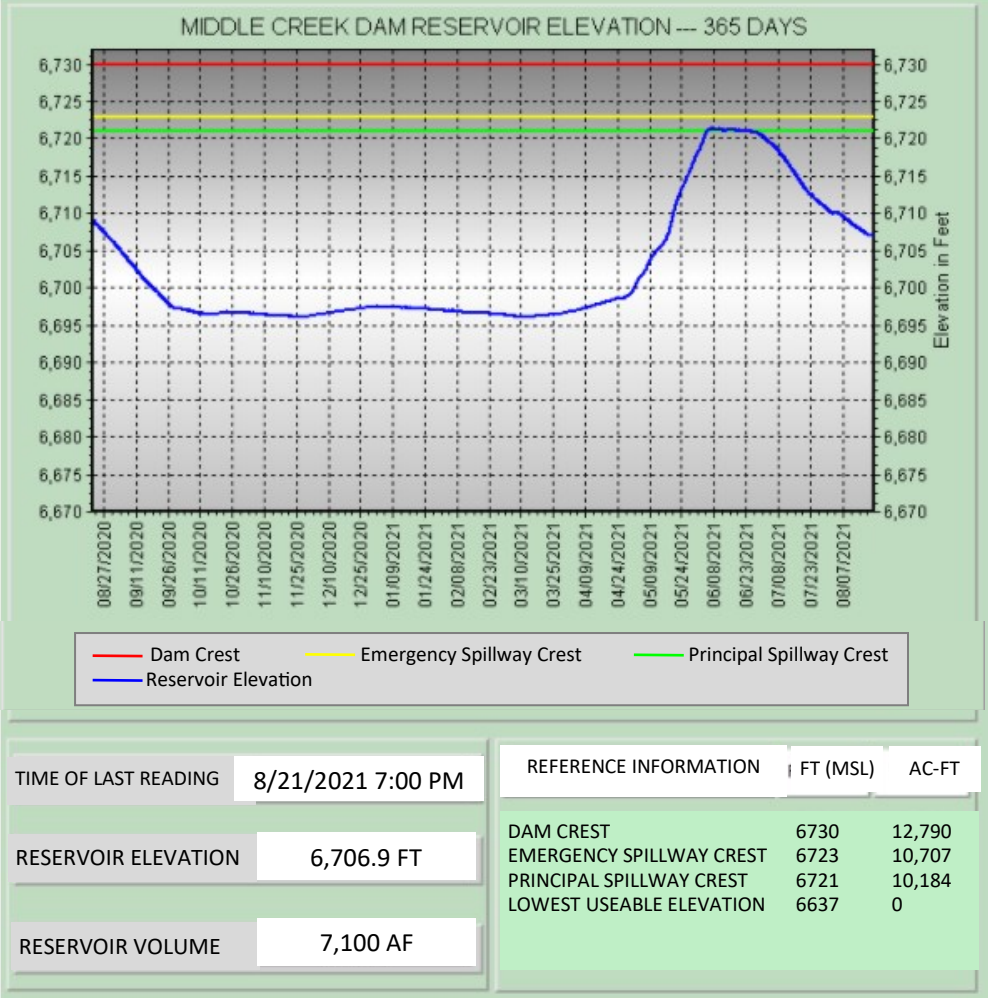


August 31st 10:00:00—Discharge is below normal.

Water Storage Data

Middle Creek Dam, Hyalite Reservoir—August 2021



TIME OF LAST READING	8/21/2021 7:00 PM
RESERVOIR ELEVATION	6,706.9 FT
RESERVOIR VOLUME	7,100 AF

REFERENCE INFORMATION	FT (MSL)	AC-FT
DAM CREST	6730	12,790
EMERGENCY SPILLWAY CREST	6723	10,707
PRINCIPAL SPILLWAY CREST	6721	10,184
LOWEST USEABLE ELEVATION	6637	0

STATION LOCATION	TIME OF LAST READING	STAGE (FT)	DISCHARGE (CFS)
EAST FORK OF HYALITE ABOVE RESERVOIR	8/31/2021 10:15 AM	1.03 FT	2.5 CFS
WEST FORK OF HYALITE ABOVE RESERVOIR	8/31/2021 10:15 AM	1.0 FT	11.08 CFS
MIDDLE CREEK BELOW RESERVOIR	8/31/2021 10:45 AM	1.0 FT	37.95 CFS

PROVISIONAL DATA SUBJECT TO REVISION

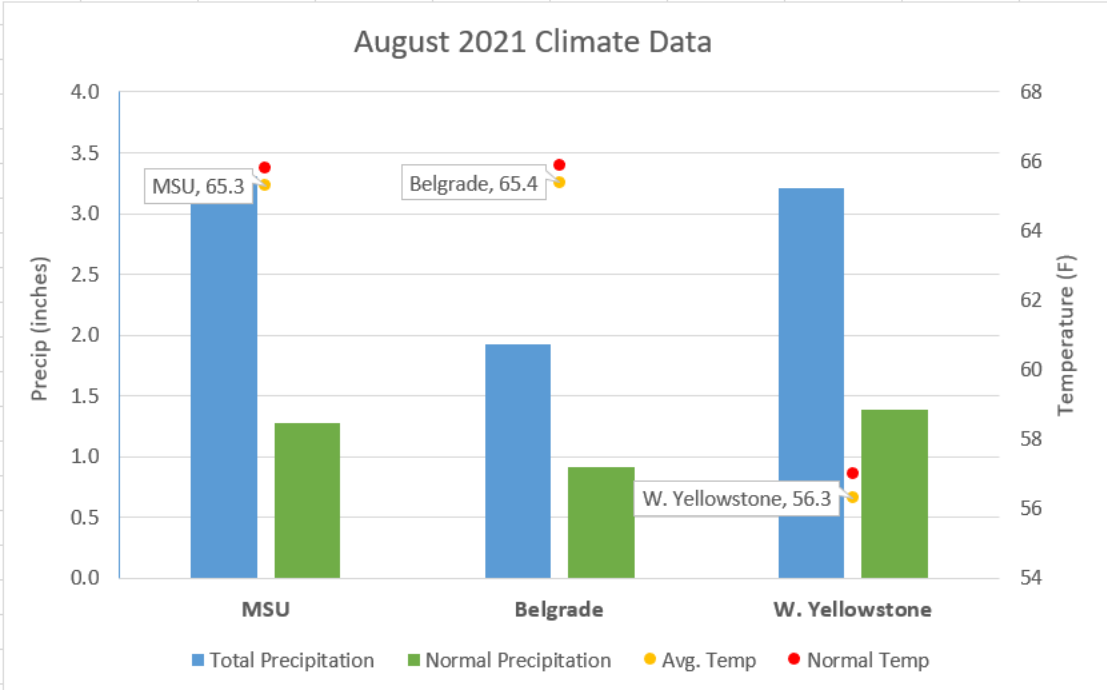
RESERVOIR SUMMARY

*Data current as of August 31st

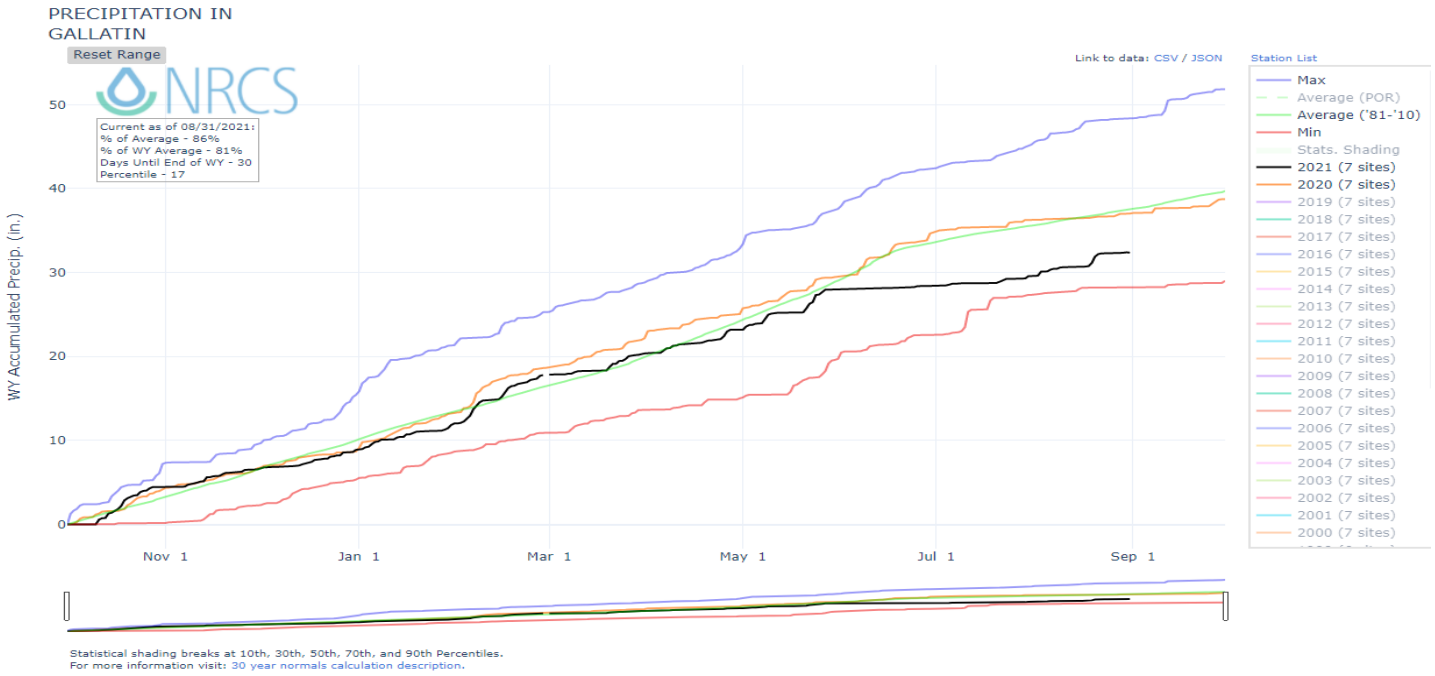
Middle Creek Dam Reservoir elevation is 6,706.9 ft which is under the principal spillway crest (6,721 ft.). The reservoir elevation has decreased by 14.1 ft since August 2nd (date of last WSO report). Reservoir volume 7,100 acre-ft.; which is 588 acre-ft. less than August 2nd.

Climate Data

Gallatin County—August 2021



Above graph depicting ACIS climate data representing the entire month of August.



TEMP & PRECIP SUMMARY (Water Year (WY) = October 1st—September 30)

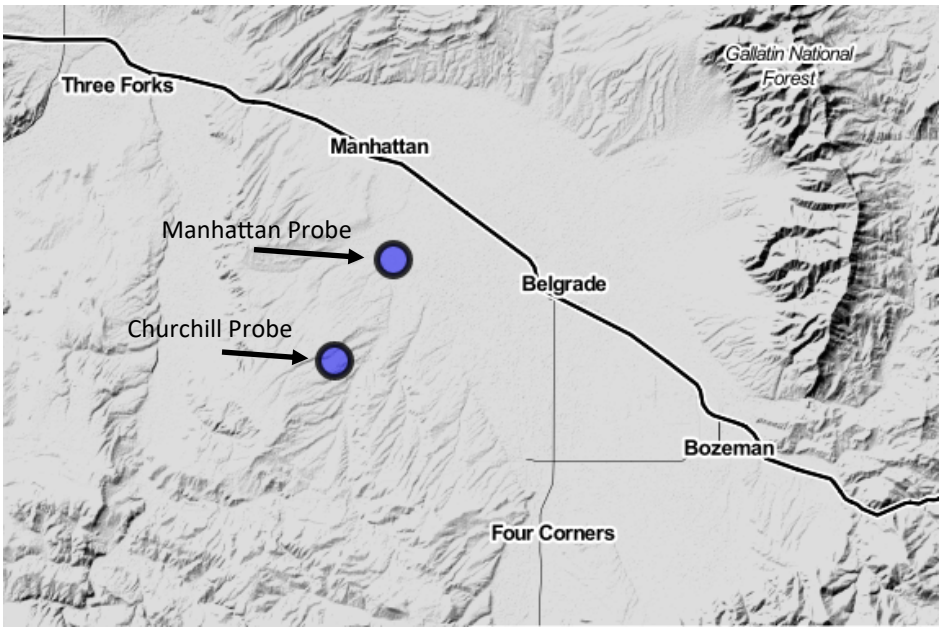
*Data is current as of August 31st

Average temperatures have decreased at all sites since July 2021 (ACIS graph). Precipitation totals for just the month of August are currently above normal for all sites included in the ACIS graph.

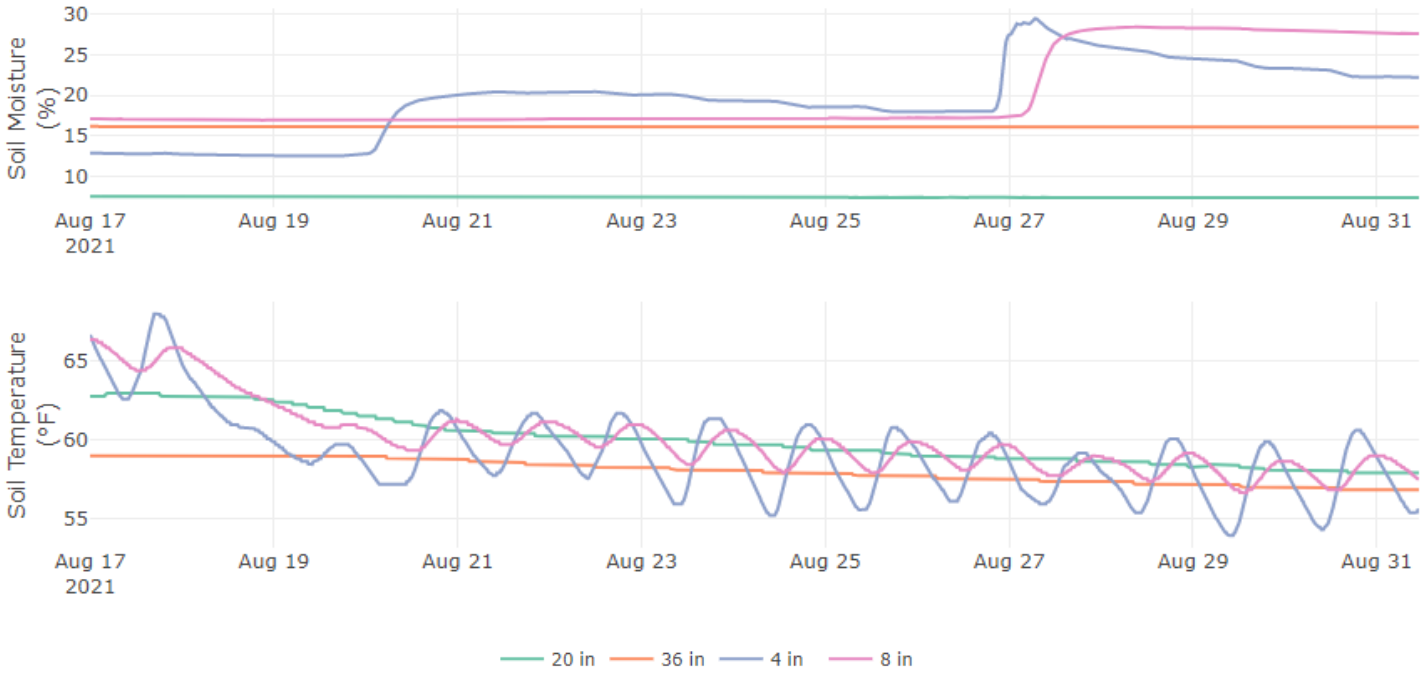
We are currently in Water Year 2021 (black line). The total accrued precipitation for the Gallatin River Basin as of August 31st, 2021 was below average (median) at 32.4 inches (NRCS graph). The total accrued precipitation for WY 2020 on August 31st, 2020 was 37 inches (NRCS graph orange line).

Soil Moisture Data

Mesonet Stations—August 2021



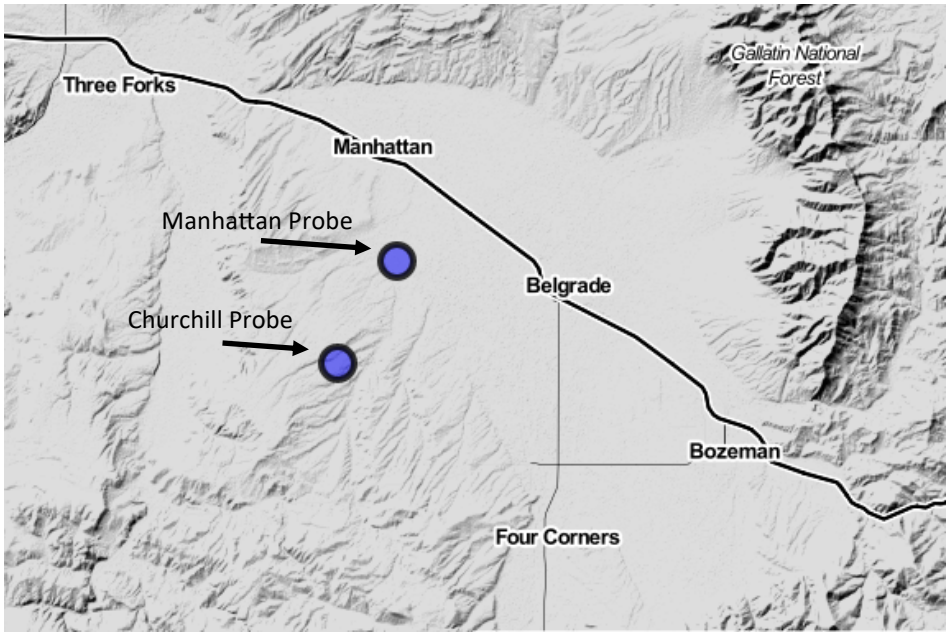
Manhattan Soil Probe Depth (in)	Soil Temp (°F)	Soil Water Content (%)
4" - Surface	55.6	22.21
8" - Shallow rooting	57.56	27.63
20" - Deep Rooting	57.92	7.38



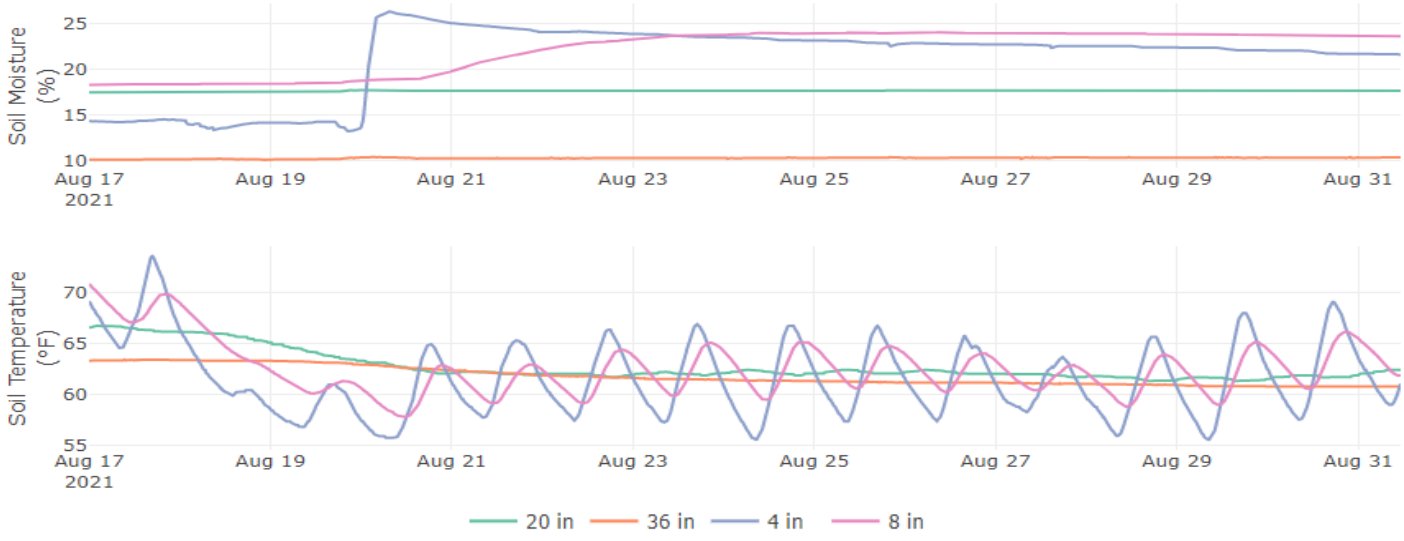
Soil moisture and temperature data for the Manhattan probe on August 31st 2021 is shown in the above table and graphs. See next page for the Churchill probe information for August 31st 2021 and soil moisture summary data.

Soil Moisture Data

Mesonet Stations—August 2021



Churchill Soil Probe Depth (in)	Soil Temp (°F)	Soil Water Content (%)
4" - Surface	59.61	21.65
8" - Shallow rooting	61.95	23.6
20" - Deep Rooting	62.42	19.69



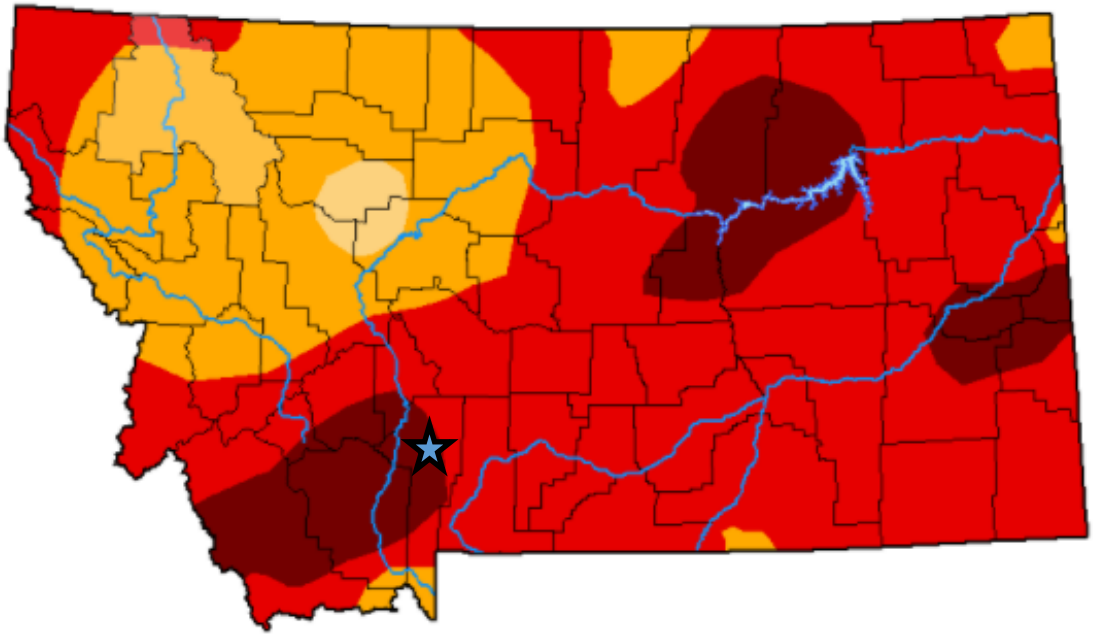
SOIL MOISTURE SUMMARY

*Data current as of August 31st

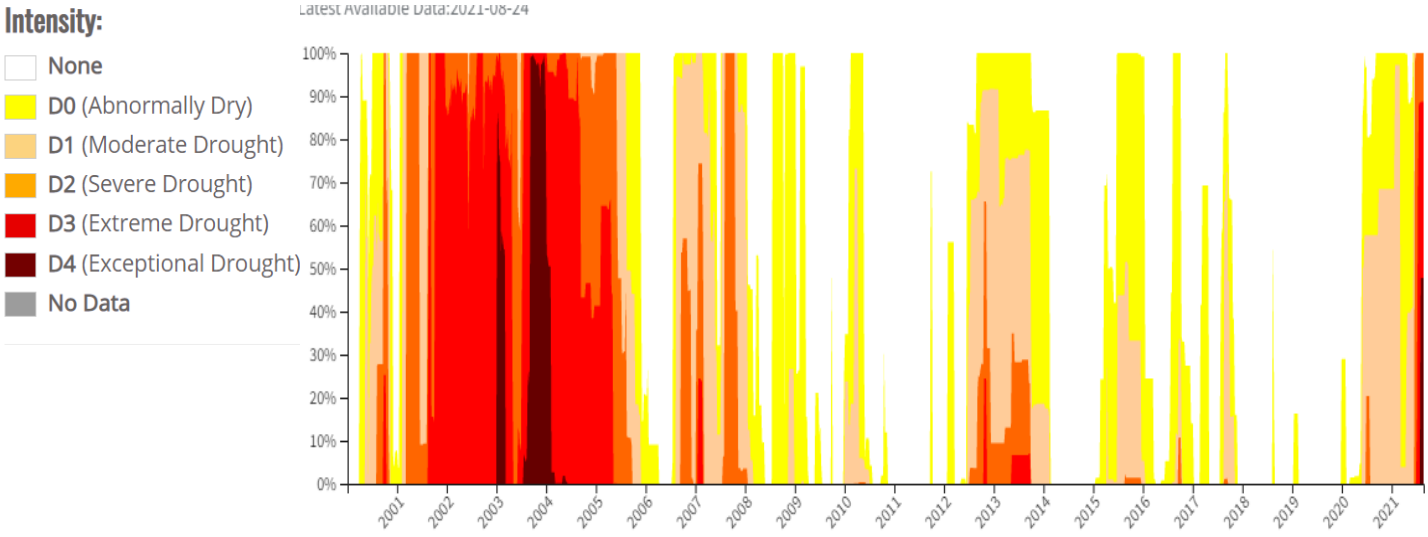
The soil temperatures have decreased at all depths for both stations since July. The soil water content at the Churchill site has increased at all rooting depths. At the Manhattan site, the soil water content has increased at 4” and 8” depths but slightly decreased in the 20” depth since July.

Drought Index Data

Gallatin River Watershed—August 2021



= Gallatin County



DROUGHT INDEX SUMMARY

*Data is current as of August 24th

11.31 % of Gallatin County is experiencing Severe Drought conditions at this time. Impacts include lower hay and crop yields, lower hay quality, non-existent subsoil moisture, high danger and fire count, poor air quality, low to dry livestock ponds and stressed water wells.

40.9% of Gallatin County is experiencing Extreme Drought conditions. Impacts include crops being unharvestable, cracked soil, bare fields, winter pastures are opened for grazing, little water available for livestock, producers may have to haul water, buy supplemental feed, cull or sell cattle early, increased fire restrictions.

52.21% of Gallatin County is experiencing Exceptional Drought conditions. Impacts include widespread pasture loss, destroyed crops, hunting restrictions, extremely high fire risk, widespread fires.

Drought conditions have increased throughout the state and in Gallatin county since July 2021.

Gallatin County Water Supply Outlook

Source Information & Helpful Links

Gallatin Conservation District:

- Archive of Reports
- Understanding the Gallatin Water Supply Outlook Report Guide

Snowpack:

- USDA / NRCS Interactive Map
- Montana Snow Survey Homepage
- NRCS / NWCC National Water & Climate Center

Streamflow:

- USGS Real Time Streamflow
- State of Montana Gaging Stations
- DNRC Water Right Query System

Water Storage:

- DNRC Water Projects—Middle Creek Real Time Data
- Middle Creek Early Warning System
- BOR—Montana Lakes and Reservoirs
- DNRC State Water Projects—Reservoir Storage Data

Climate:

- ACIS Database
- NRCS Montana Basin-Wide Products
- Montana Snow Survey Homepage
- US Climate Data

Soil Moisture:

- Montana Mesonet
- DNRC Drought Status by County

Drought:

- US Drought Portal
- US Drought Monitor

Helpful Partner Websites:

- Association of Gallatin Agricultural Irrigators
- Department of Natural Resources & Conservation
- Gallatin County MSU Extension Office
- Gallatin Local Water Quality District
- Gallatin River Task Force
- Gallatin Watershed Council
- Montana Fish, Wildlife, & Parks
- Natural Resource Conservation Services
- One Montana