

# Utah Climate and Water Report

November 1, 2023



View from Blue Creek SCAN site, near Snowville, Utah Photo by Shari Rockenbach

## Utah General Summary November 1, 2023

\*\*NOTE: The webpage for the NRCS-Utah Snow Survey has been updated and has a new location. Please use this link: <a href="https://www.nrcs.usda.gov/utah/snow-survey">https://www.nrcs.usda.gov/utah/snow-survey</a>. There is an automatic redirect from the old webpage for now, but please update your links accordingly. The new webpage has the same functionality as the previous version, but the layout is different. Please reach out if we can help you find content on the new site.\*\*

<u>Valley Conditions (SCAN)</u> as of November 1<sup>st</sup>: Precipitation in Utah's valley locations was below normal for the month of October and favored the northern half of the state. Utah's SCAN sites received 0.6 inches of precipitation this last month, which is roughly 75% of normal for that period. Statewide soil moisture at Utah's SCAN sites ended the month below normal at 34% of saturation, which was 3% lower than last year at this time. The statewide picture glosses over important geographic differences, however. Whereas soil moisture levels at SCAN sites in northern Utah are generally above normal for this time of year, elsewhere conditions are drier- particularly so for the Western Utah and Uinta regions where soil moisture levels are at about the bottom 10<sup>th</sup> percentile of observations.

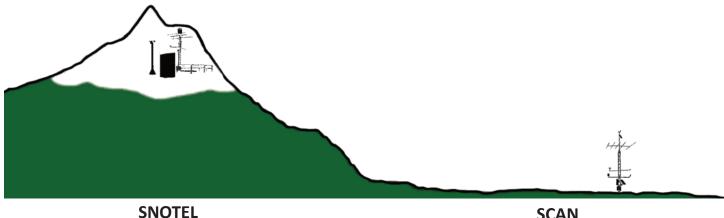
Mountain Conditions (SNOTEL) as of November 1<sup>st</sup>: October started off with significant storm activity and then quieted down. Utah's mountains received 1.9" of precipitation for the month, which was 83% of normal. This pattern was mirrored in Utah's soil moisture levels as well, where above normal conditions at the beginning of the month transitioned to below normal by month's end. Currently, statewide soil moisture in our mountains is at 46% of saturation, which is roughly 94% of normal for this time of year. The generally snow-free conditions for much of Utah's mountains also means that temperatures in the ground are not being insulated by a snowpack. As a result, soil temperatures are below normal for most of the state. Utah's reservoir storage has remained high; as of November 1<sup>st</sup> the state was at 74% of capacity, which is up one percent from last month and 32% higher than last year's November 1<sup>st</sup> value. Water Availability Indices (WAIs) for Utah basins combine current reservoir conditions with observed streamflow for each region. WAIs are in the top 20<sup>th</sup> percentile for 15 of Utah's 18 major basins, reflecting both the lasting benefit of last year's amazing winter as well as Utah's efforts at conserving our available water supplies.

This report is organized to reflect two distinct geographic areas being monitored – the low elevation valley sites (Soil Climate Analysis Network) that are critical for agricultural production and operations, and the high elevation mountainous areas where water supply is generated (SNOw TELemetry).

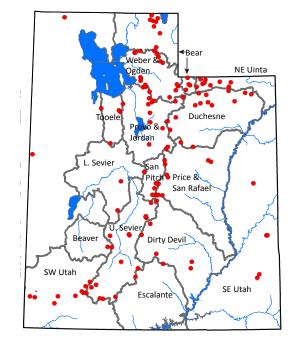
Questions, comments and suggestions are welcome and should be directed to jordan.clayton@usda.gov.

#### **Utah Climate and Water Report**

The purpose of the Climate and Water Report is to provide a snapshot of current and immediate past climatic conditions and other information useful to agricultural and water user interests in Utah. The report utilizes data from several sources that represent specific parameters (streamflow data from the United States Geological Survey, reservoir data from the Bureau of Reclamation, and other sources), geography including high elevation United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) Snowpack Telemetry (SNOTEL) data, and agriculturally important data from the USDA-NRCS Soil Climate Analysis Network (SCAN). Data on precipitation, soil moisture, soil temperature, reservoir storage, and streamflow are analyzed and presented. These data analyses can be used to increase irrigation efficiency and agricultural production. As with all data and analyses, there are limitations due to data quality, quantity, and spatial application.

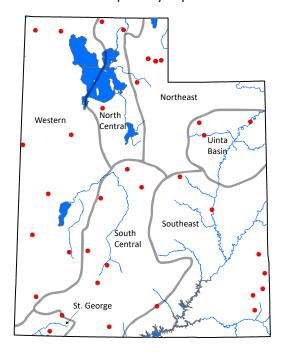


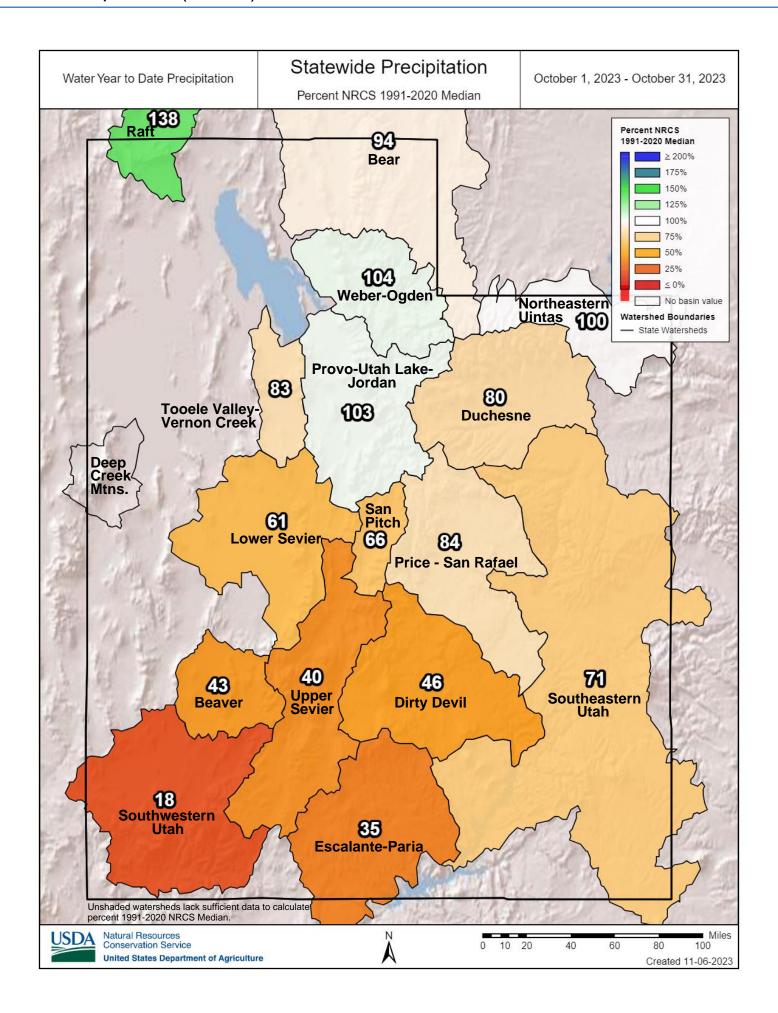
- Mountainous areas
- High elevation (>6,000 ft)
- Water supply forecasting
- Installed where snow pack represents the water supply



#### **SCAN**

- Agricultural and range lands
- Mid elevation (3 7,000 ft).
- Irrigation efficiency and rangeland productivity
- Installed on spatially representative soils





Nov 1, 2023 | Utah Reservoir Summary

Watershed/Region	Current Storage (Basinwide KAF)	Reservoir Capacity (Basinwide KAF)	Last Yr % Capacity (Basinwide)	This Yr % Capacity (Basinwide)
Utah (Statewide)	4067	5465	42	74
Utah (Statewide) Incl. Flaming G. & Lk. Powell	16025	33536	32	47
Bear	863	1389	27	62
Weber-Ogden	438	547	40	80
Northeastern Uintas	3294	3852	68	85
Tooele Valley	1	4	23	40
Duchesne	1195	1379	69	86
Provo	1130	1334	43	84
San Pitch	4	20	0	24
Price	119	158	33	75
Upper Sevier	138	382	5	36
Southeast UT	2	2	68	89
Beaver	14	23	4	61
Southwest Utah	97	118	54	82

Red (green) shading indicates >5% decrease (increase) in % capacity from this time last year.

Reservoir	Current Storage (KAF)	Reservoir Capacity (KAF)	Last Yr % Capacity	This Yr % Capacity
Bear Lake	794	1302	27	61
Big Sand Wash Reservoir	15	25	25	61
Causey Reservoir	3	7	36	43
Cleveland Lake	3	5	54	68
Currant Creek Reservoir	14	15	95	94
Deer Creek Reservoir	129	149	40	86
East Canyon Reservoir	40	49	51	81
Echo Reservoir	60	73	53	81
Flaming Gorge Reservoir	3233	3749	70	86
Grantsville Reservoir	1	3	24	35
Gunlock	8	10	36	81
Gunnison Reservoir	4	20	0	24
Huntington North Reservoir	2	4	51	66
Hyrum Reservoir	12	15	45	83
Joes Valley Reservoir	48	61	47	79
Jordanelle Reservoir	259	314	60	82
Ken's Lake	2	2	68	89
Kolob Reservoir	4	5	95	89
Lake Powell	8723	24322	23	35
Lost Creek Reservoir	16	22	39	74
Lower Enterprise	1	2	13	61
Meeks Cabin Reservoir	12	32	16	37
Miller Flat Reservoir	3	5	21	68
Millsite	8	16	45	53
Minersville Reservoir	14	23	4	61
Moon Lake Reservoir	27	35	51	76
Otter Creek Reservoir	39	52	10	74
Panguitch Lake	20	22	26	89
Pineview Reservoir	82	110	31	74
Piute Reservoir	44	71	3	61
Porcupine Reservoir	10	11	48	89
Quail Creek	29	40	61	74
Red Fleet Reservoir	19	25	30	77
Rockport Reservoir	45	60	57	74
Sand Hollow Reservoir	46	50	59	92
Scofield Reservoir	52	65	14	79
Settlement Canyon Reservoir	0	1	21	55
Sevier Bridge Reservoir	34	236	2	14
Smith and Morehouse	4	8	49	55
Starvation Reservoir	136	164	64	83
Stateline Reservoir	6	12	40	55
Steinaker Reservoir	22	33	29	66
Strawberry Reservoir	974	1105	72	88
Upper Enterprise	6	10	5	66
Upper Stillwater Reservoir	25	32	42	78
Utah Lake	742	870	37	85
Willard Bay	186	215	32	86
Woodruff Creek	1	4	43	28
Woodruff Narrows Reservoir	44	57	19	77

Red (green) shading indicates >5% decrease (increase) in % capacity from this time last year.

Nov 1, 2023 | Water Availability Index (WAI)

Basin or	Reservoir	Monthly Flow	Flow +	WAI <sup>3</sup>	Percentile⁴	Similar Years
Region	Storage¹ (KAF)²		Storage (KAF) <sup>2</sup>		(%)	
Bear	794.8	5.4	800.1	1.52	68	[2018, 2020]
Woodruff Narrows	44.7	5.5	50.1	2.65	82	[1995, 1998]
Little Bear	12.8	3.4	16.2	3.39	91	[1997, 2011]
Ogden	85.4	4.7	90.1	3.6	93	[1984, 2011]
Weber	167.1	9.8	176.9	3.94	97	[1995, 2011]
Provo	388.4	3.4	391.8	3.12	88	[1997, 2019]
Western Uintas	189.8	8.0	197.8	3.22	89	[1998, 2011]
Eastern Uintas	42.2	8.3	50.5	2.08	75	[1985, 2016]
Blacks Fork	12.1	5.2	17.4	2.74	83	[1997, 2011]
Smiths Fork	6.6	2.6	9.2	3.15	88	[1986, 1997]
Price	52.1	0.7	52.8	3.98	98	[1982, 1984]
Joes Valley	48.9	3.6	52.4	3.22	89	[1982, 2011]
Ferron Creek	8.9	0.0	8.9	0.95	61	[2012, 2015]
Moab	2.0	0.5	2.6	3.72	95	[1997, 2005]
Upper Sevier	83.6	8.9	92.4	3.03	86	[1982, 1995]
San Pitch	4.9	0.5	5.4	1.14	64	[1981, 2019]
Lower Sevier	34.8	7.3	42.1	-2.65	18	[1992, 2017]
Beaver River	14.4	1.9	16.3	3.22	89	[1984, 1995]
Virgin River	38.1	7.8	45.9	2.86	84	[1999, 2006]

<sup>&</sup>lt;sup>1</sup> End of Month Reservoir Storage; <sup>2</sup> KAF, Thousand Acre-Feet; <sup>3</sup> WAI, Water Availability Index; <sup>4</sup> Threshold for coloring: >75% Green, <25% Red

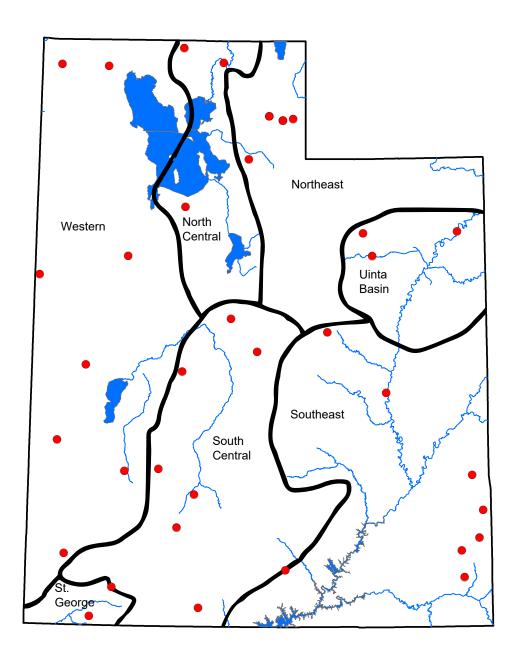
#### What is a Water Availability Index?

The Water Availability Index (WAI) is an observed hydrologic indicator of current surface water availability within a watershed. The index is calculated by combining current reservoir storage with the previous month's streamflow. Note that starting in June, 2022, un-adjusted streamflow values are used in this calculation. Prior to this date, 'naturalized' or 'adjusted' values were used. Please contact Jordan Clayton for details and rationale concerning this methodological change. See Appendix A for details on specific stream gauges and reservoirs used in WAI calculations.

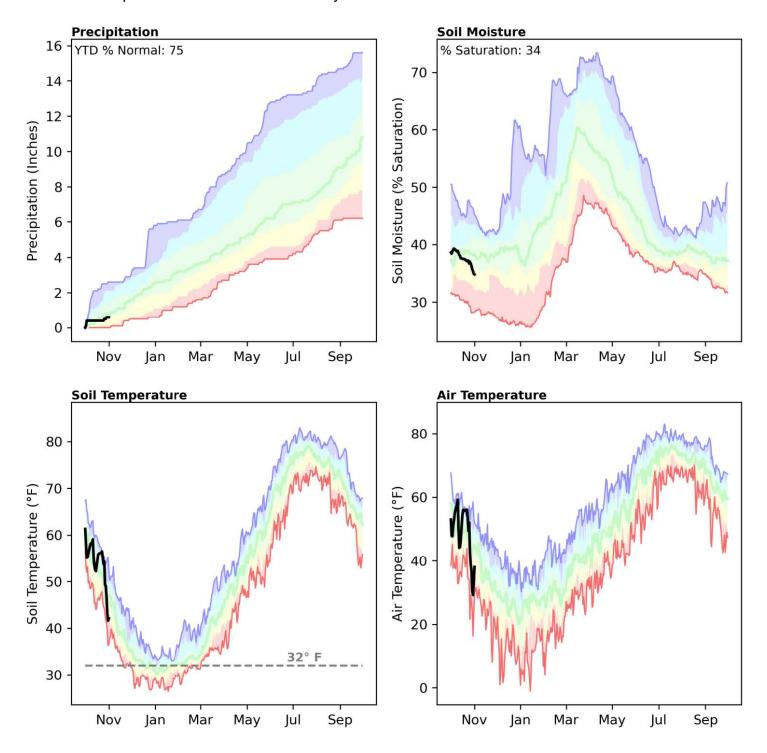
WAI values are scaled from +4.1 (abundant supply) to -4.1 (extremely dry) with a value of zero (0) indicating median water supply as compared to historical analysis. WAI's are calculated in this fashion to be consistent with other hydroclimatic indicators such as the Palmer Drought Index and the Precipitation index.

The Utah Snow Survey has also chosen to display the WAI value as well as a PERCENT CHANCE OF NON-EXCEEDANCE. While this is a cumbersome name, it has a simple application. It can be best thought of as a scale of 1 to 99 with 1 being the drought of record (driest possible conditions) and 99 being the flood of record (wettest possible conditions) and a value of 50 representing average conditions. This rating scale is a percentile rating as well, for example a WAI of 75% means that this years water supply is greater than 75% of all historical events and that only 25% of the time has it been exceeded. Conversely a WAI of 10% means that 90% of historical events have been greater than this one and that only 10% have had less total water supply. This scale is comparable between basins: a WAI of 50% means the same relative ranking on watershed A as it does on watershed B, which may not be strictly true of the +4 to -4 scale.

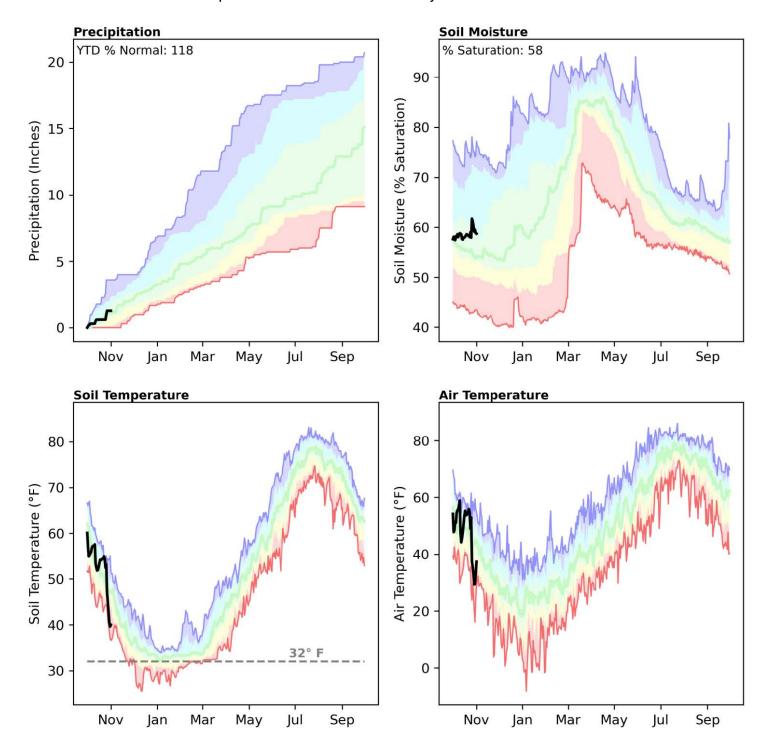
## **SCAN** portion of report



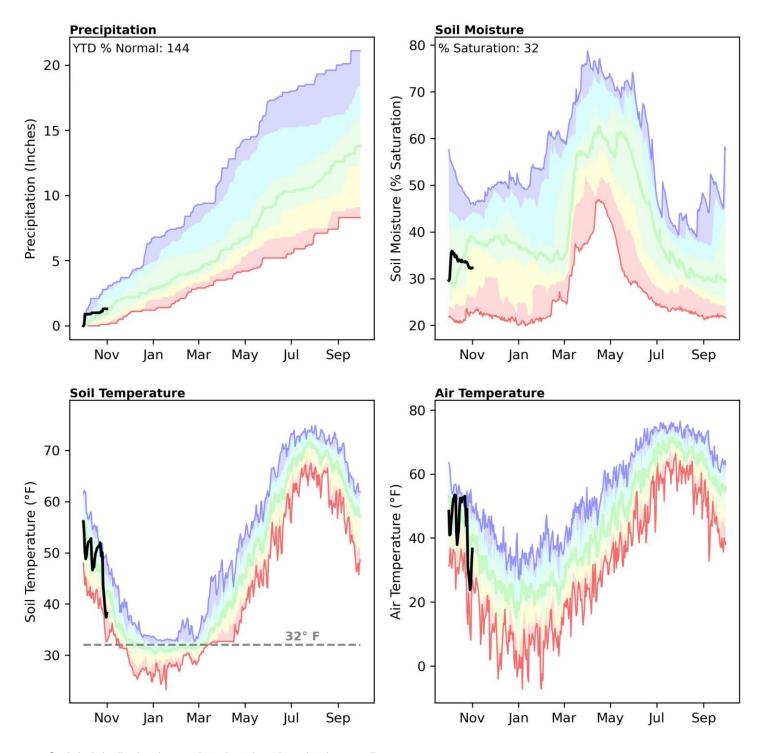
Precipitation in October was below normal, with an average of 0.6" falling region-wide. This brings the water year accumulation to 75% of median. Depth averaged soil moisture was calculated to be 34% of saturation compared to 37% at this time last year.



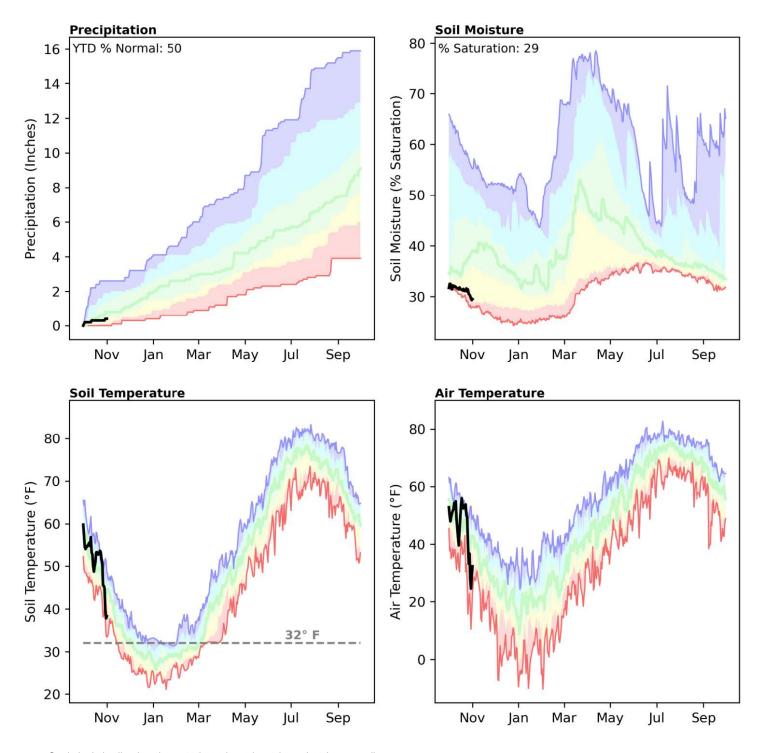
Precipitation in October was well above normal, with an average of 1.3" falling region-wide. This brings the water year accumulation to 118% of median. Depth averaged soil moisture was calculated to be 58% of saturation compared to 62% at this time last year.



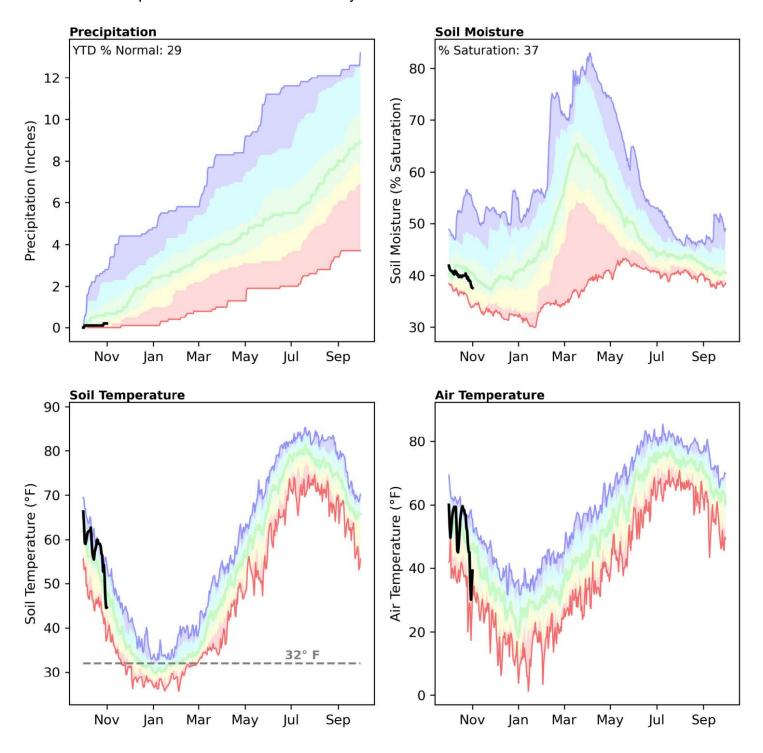
Precipitation in October was well above normal, with an average of 1.3" falling region-wide. This brings the water year accumulation to 144% of median. Depth averaged soil moisture was calculated to be 32% of saturation compared to 25% at this time last year.



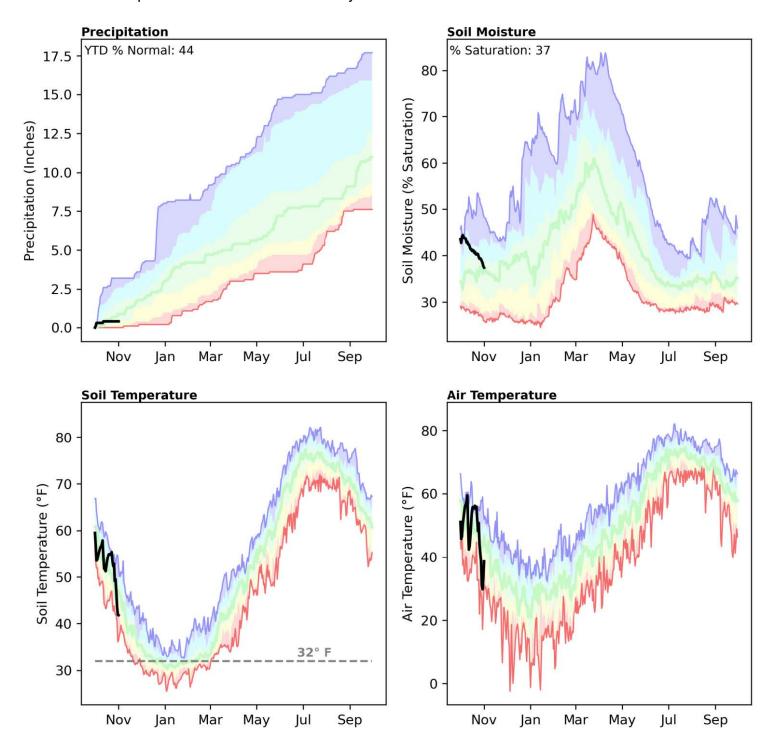
Precipitation in October was well below normal, with an average of 0.4" falling region-wide. This brings the water year accumulation to 50% of median. Depth averaged soil moisture was calculated to be 29% of saturation compared to 45% at this time last year.



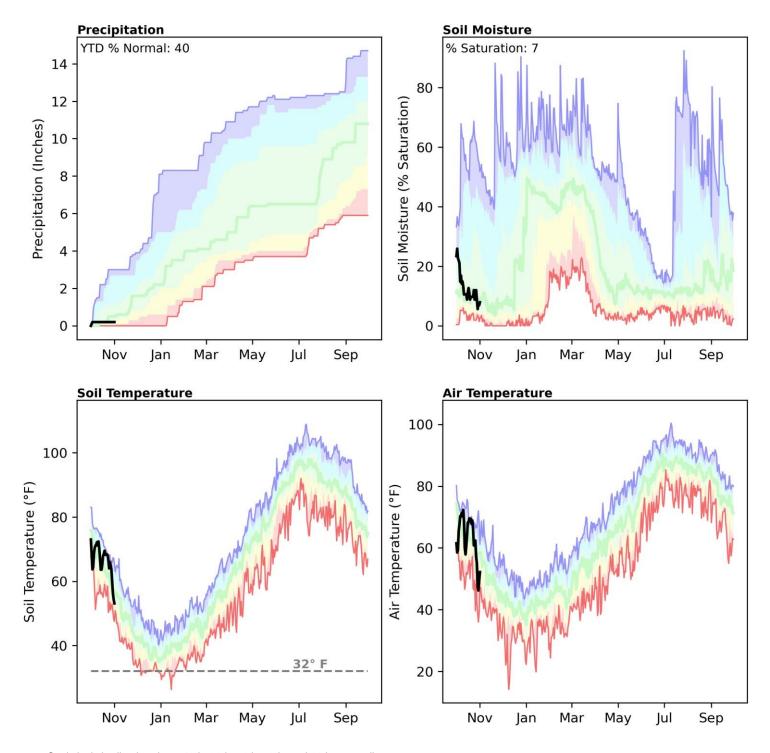
Precipitation in October was well below normal, with an average of 0.2" falling region-wide. This brings the water year accumulation to 29% of median. Depth averaged soil moisture was calculated to be 37% of saturation compared to 40% at this time last year.



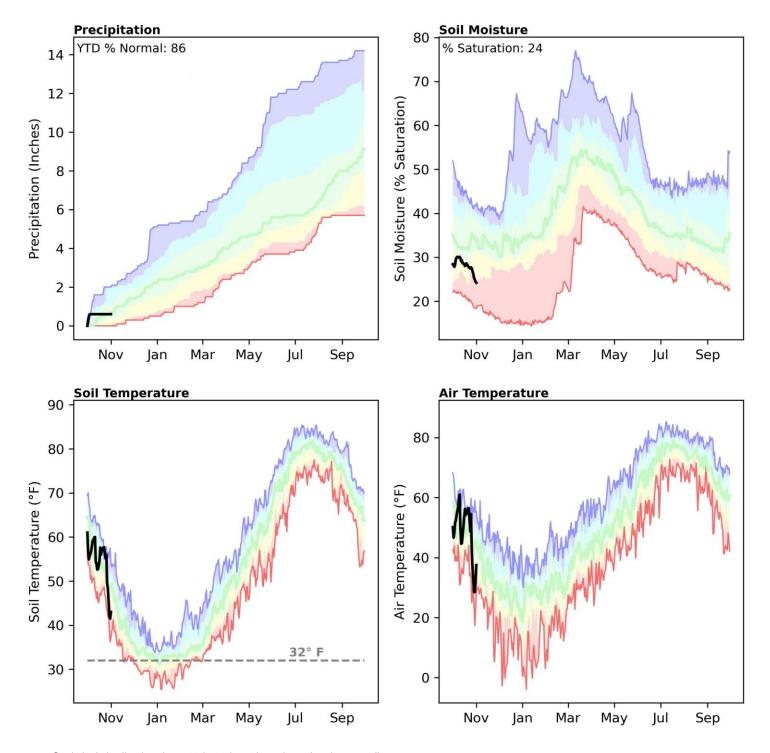
Precipitation in October was well below normal, with an average of 0.4" falling region-wide. This brings the water year accumulation to 44% of median. Depth averaged soil moisture was calculated to be 37% of saturation compared to 37% at this time last year.



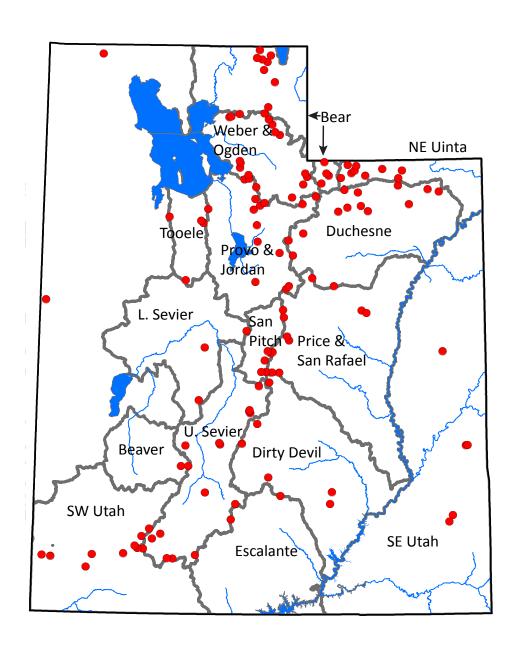
Precipitation in October was well below normal, with an average of 0.2" falling region-wide. This brings the water year accumulation to 40% of median. Depth averaged soil moisture was calculated to be 7% of saturation compared to 31% at this time last year.



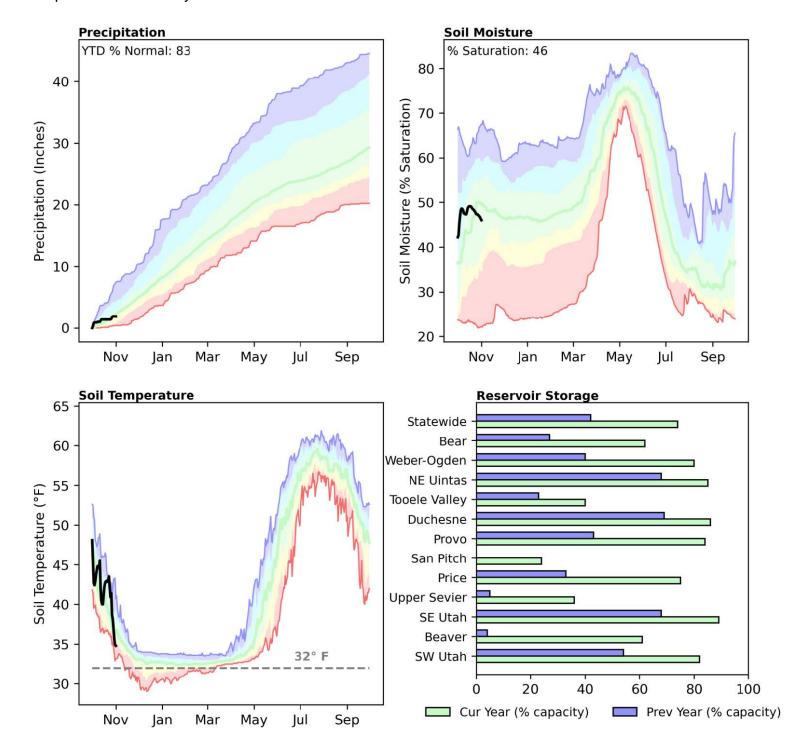
Precipitation in October was about normal, with an average of 0.6" falling region-wide. This brings the water year accumulation to 86% of median. Depth averaged soil moisture was calculated to be 24% of saturation compared to 25% at this time last year.



## **SNOTEL** portion of report

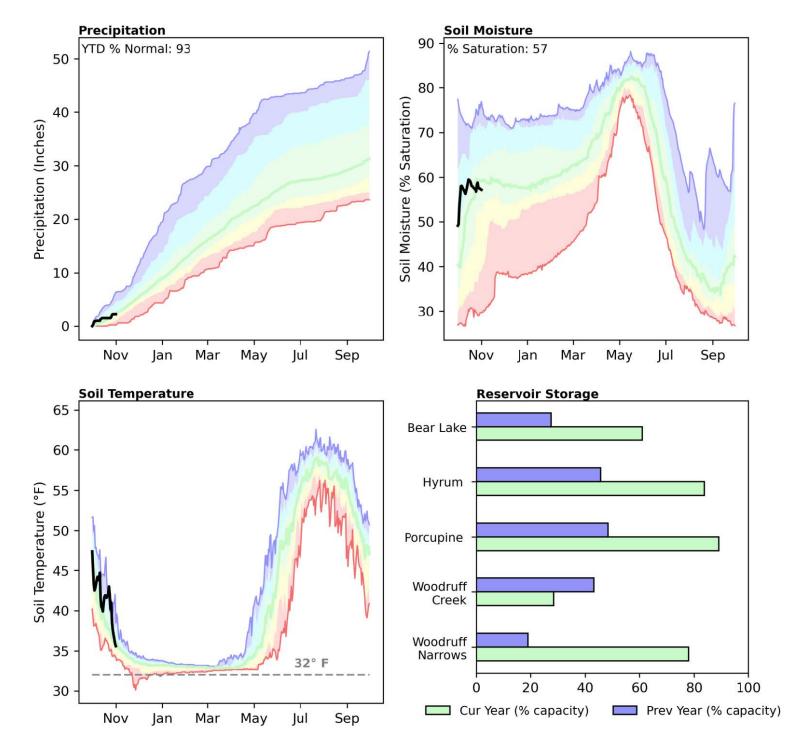


Precipitation in October was below normal, with an average of 1.9" falling region-wide. This brings the water year accumulation to 83% of median. Depth averaged soil moisture was calculated to be 46% of saturation compared to 37% at this time last year. Statewide, reservoir storage is 74% of capacity, compared to 42% last year<sup>1</sup>.

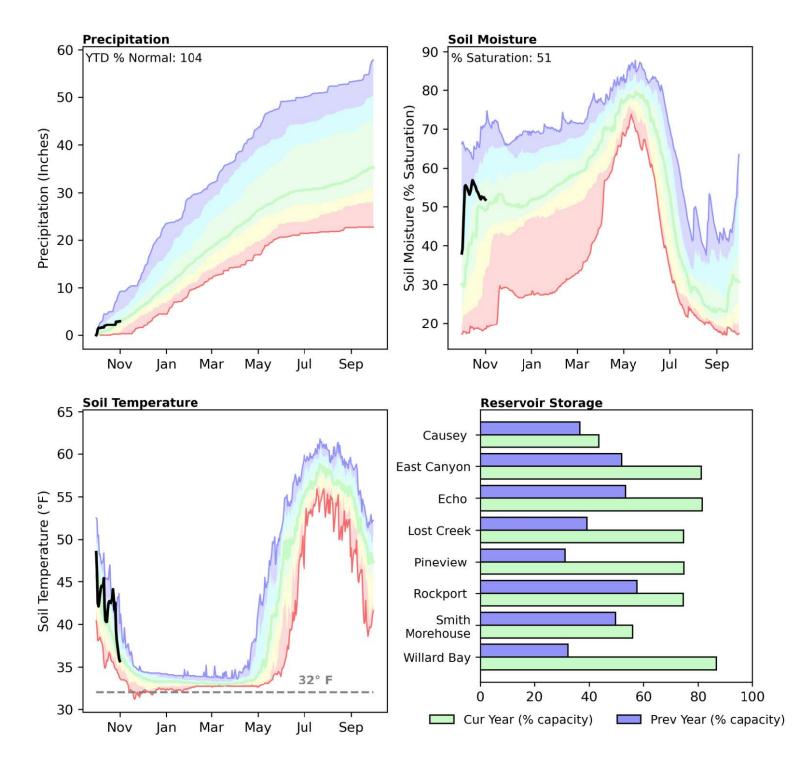


<sup>&</sup>lt;sup>1</sup>Statewide reservoir percentages exclude Lake Powell and Flaming Gorge Reservoirs.

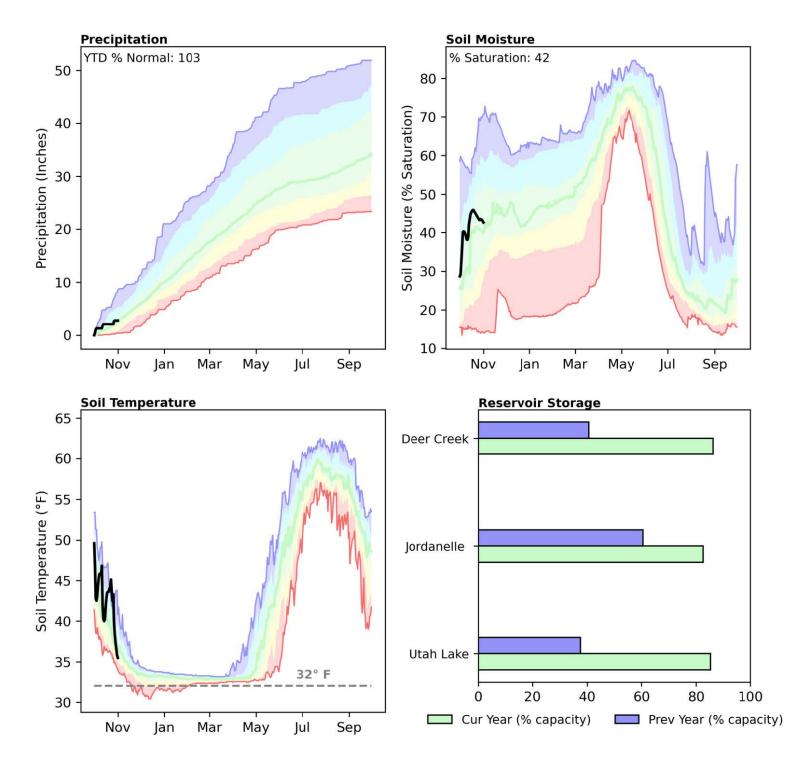
Precipitation in October was about normal, with an average of 2.3" falling region-wide. This brings the water year accumulation to 93% of median. Depth averaged soil moisture was calculated to be 57% of saturation compared to 39% at this time last year. Reservoir storage is 62% of capacity, compared to 27% last year. The Water Availability Index percentiles are 68% for the Bear, 91% for the Little Bear, and 82% for Woodruff Narrows.



Precipitation in October was about normal, with an average of 3.0" falling region-wide. This brings the water year accumulation to 104% of median. Depth averaged soil moisture was calculated to be 51% of saturation compared to 28% at this time last year. Reservoir storage is 80% of capacity, compared to 40% last year. The Water Availability Index percentiles are 97% for the Weber, and 93% for the Ogden.

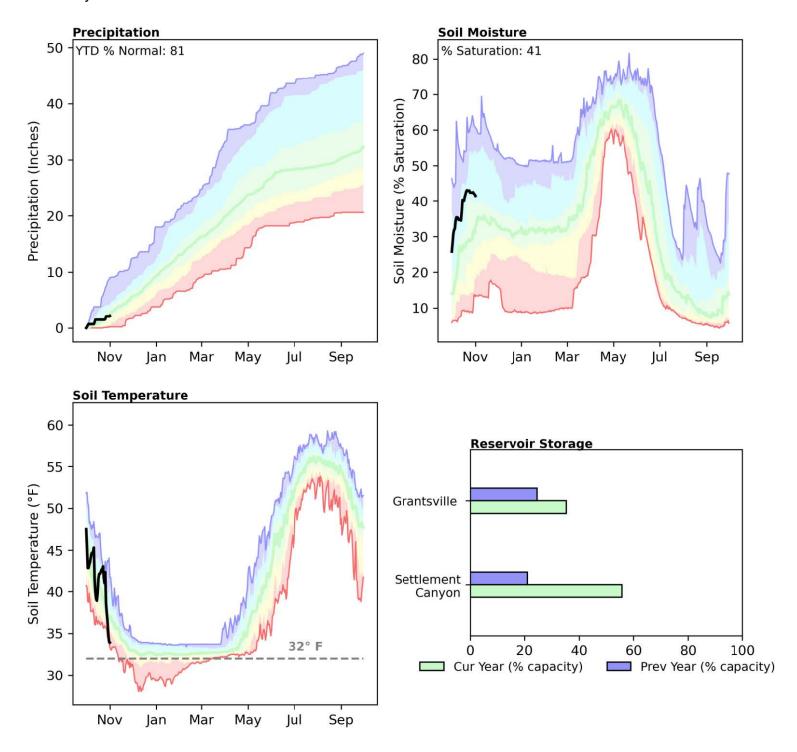


Precipitation in October was about normal, with an average of 2.8" falling region-wide. This brings the water year accumulation to 103% of median. Depth averaged soil moisture was calculated to be 42% of saturation compared to 26% at this time last year. Reservoir storage is 84% of capacity, compared to 43% last year. The Water Availability Index percentile is 88% for the Provo.

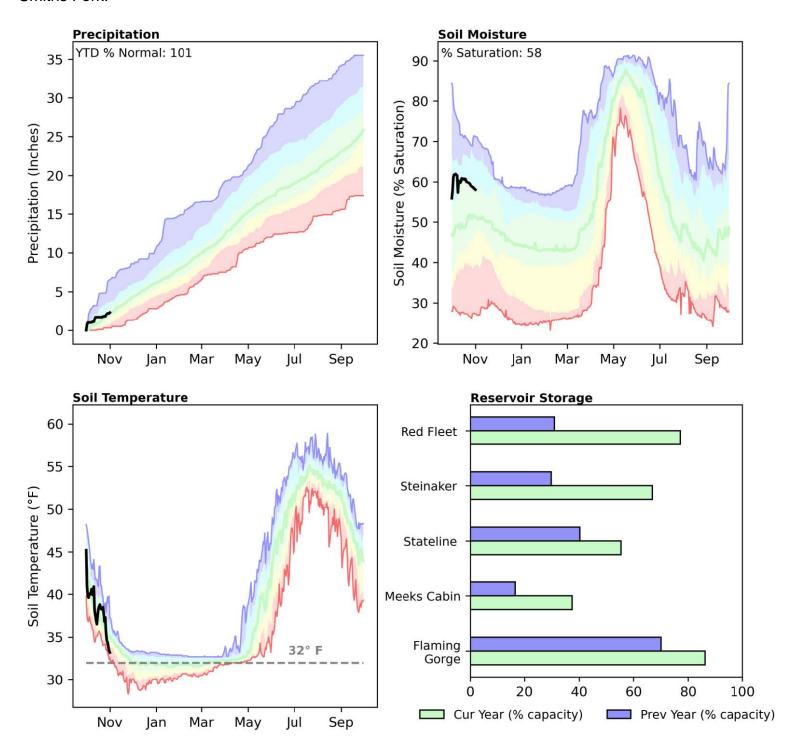


### Tooele Valley-Vernon Creek | November 1, 2023

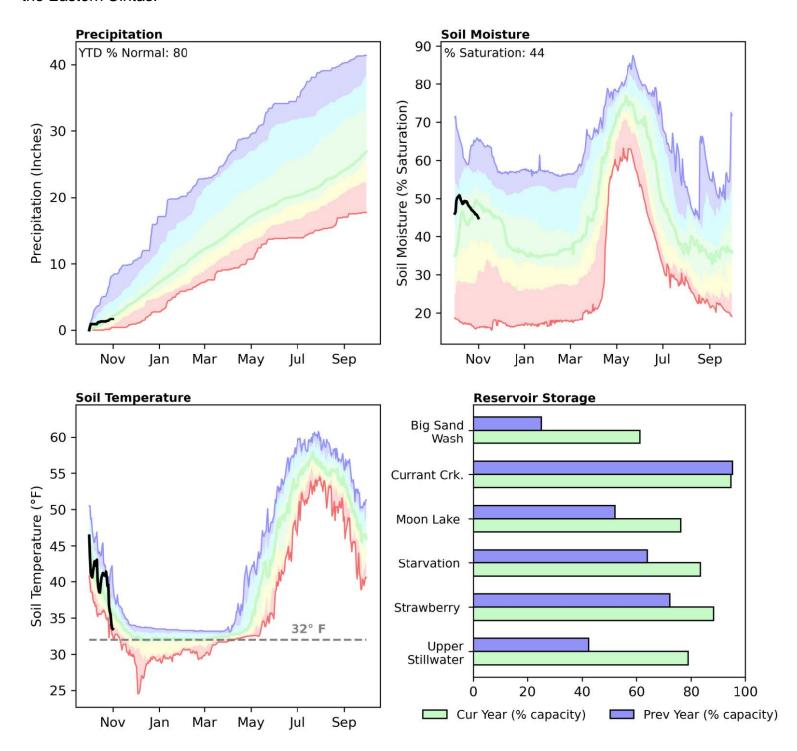
Precipitation in October was below normal, with an average of 2.2" falling region-wide. This brings the water year accumulation to 81% of median. Depth averaged soil moisture was calculated to be 41% of saturation compared to 18% at this time last year. Reservoir storage is 40% of capacity, compared to 23% last year.



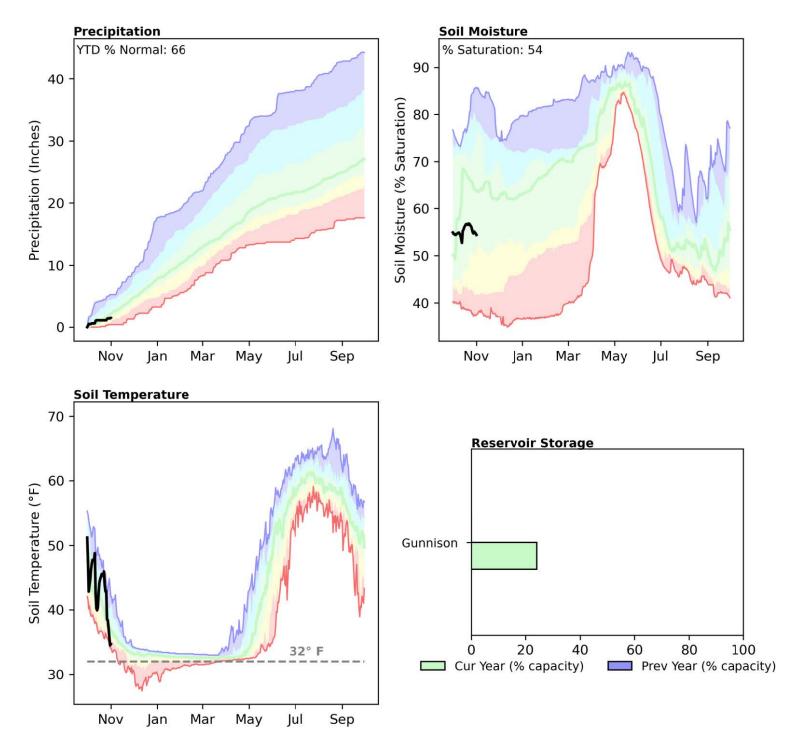
Precipitation in October was about normal, with an average of 2.3" falling region-wide. This brings the water year accumulation to 101% of median. Depth averaged soil moisture was calculated to be 58% of saturation compared to 48% at this time last year. Reservoir storage is 85% of capacity, compared to 68% last year. The Water Availability Index percentiles are 83% for the Blacks Fork, and 88% for the Smiths Fork.



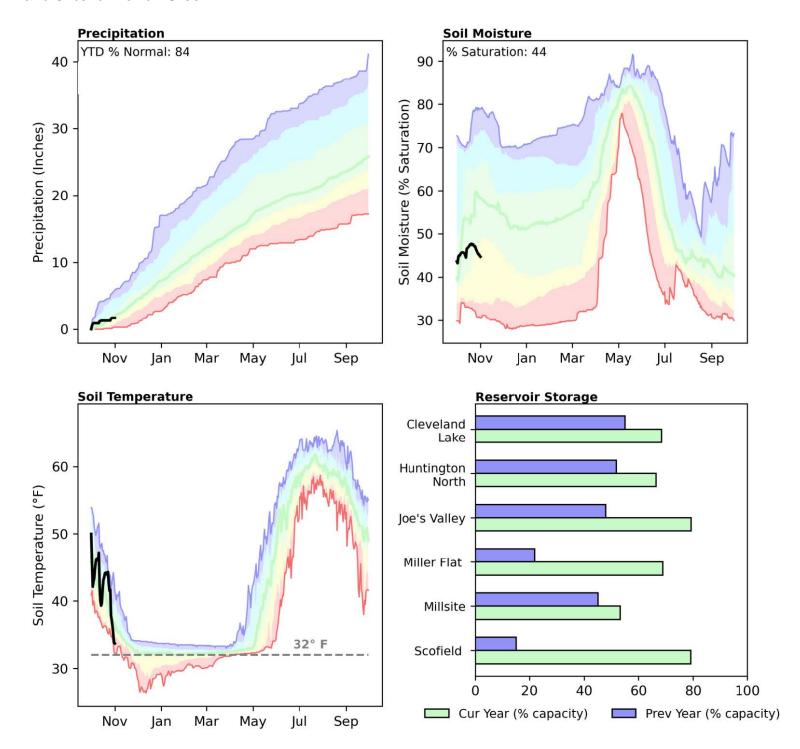
Precipitation in October was below normal, with an average of 1.7" falling region-wide. This brings the water year accumulation to 80% of median. Depth averaged soil moisture was calculated to be 44% of saturation compared to 45% at this time last year. Reservoir storage is 86% of capacity, compared to 69% last year. The Water Availability Index percentiles are 89% for the Western Uintas, and 75% for the Eastern Uintas.



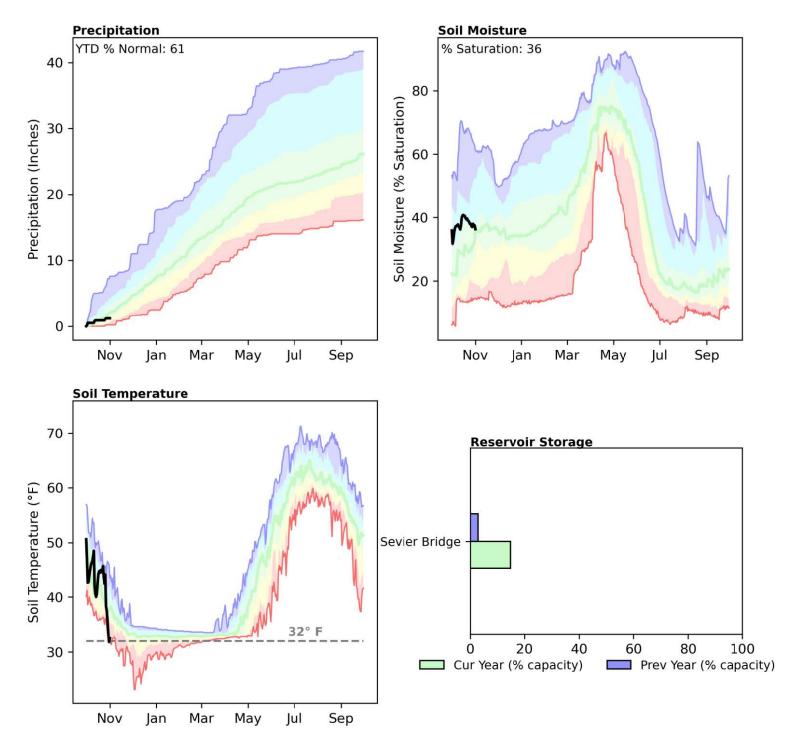
Precipitation in October was well below normal, with an average of 1.5" falling region-wide. This brings the water year accumulation to 66% of median. Depth averaged soil moisture was calculated to be 54% of saturation compared to 55% at this time last year. Reservoir storage is 24% of capacity, compared to 0% last year. The Water Availability Index percentile is 64% for the San Pitch.



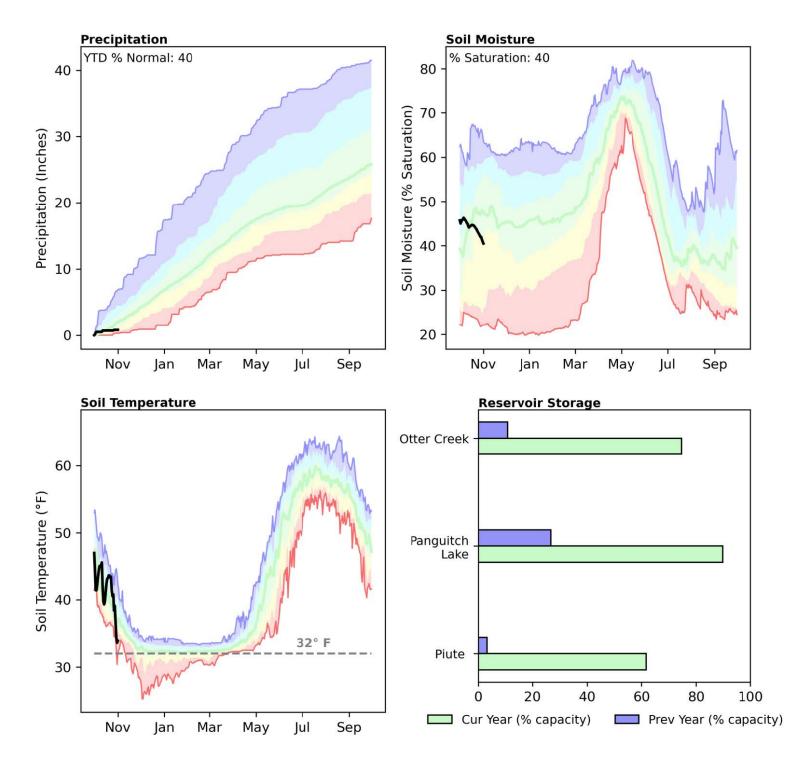
Precipitation in October was below normal, with an average of 1.7" falling region-wide. This brings the water year accumulation to 84% of median. Depth averaged soil moisture was calculated to be 44% of saturation compared to 48% at this time last year. Reservoir storage is 75% of capacity, compared to 33% last year. The Water Availability Index percentiles are 98% for the Price, 89% for Joes Valley, and 61% for Ferron Creek.



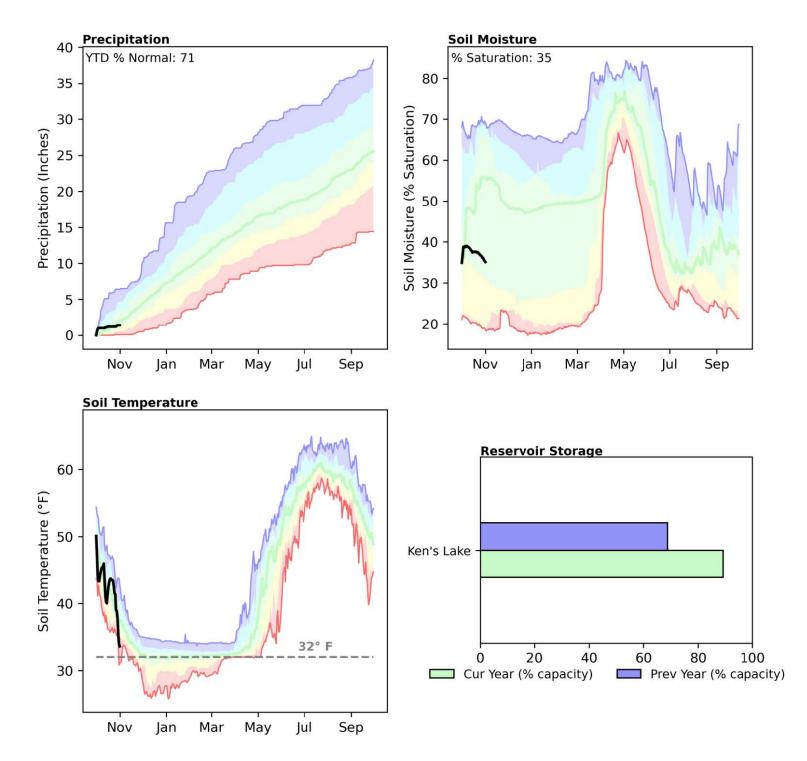
Precipitation in October was well below normal, with an average of 1.2" falling region-wide. This brings the water year accumulation to 61% of median. Depth averaged soil moisture was calculated to be 36% of saturation compared to 34% at this time last year. Reservoir storage is 14% of capacity, compared to 2% last year. The Water Availability Index percentile is 18% for the Lower Sevier.



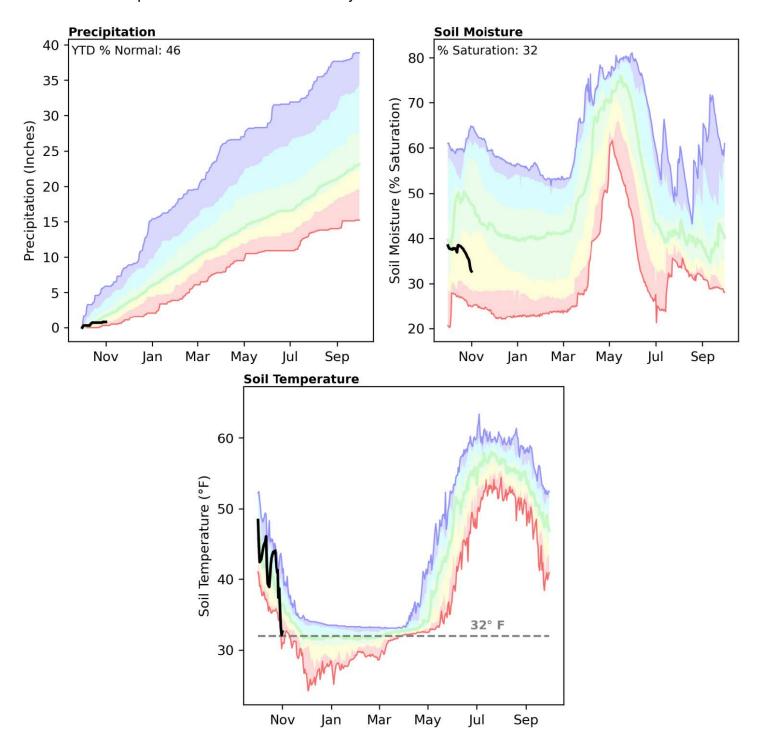
Precipitation in October was well below normal, with an average of 0.8" falling region-wide. This brings the water year accumulation to 40% of median. Depth averaged soil moisture was calculated to be 40% of saturation compared to 40% at this time last year. Reservoir storage is 70% of capacity, compared to 9% last year. The Water Availability Index percentile is 86% for the Upper Sevier.



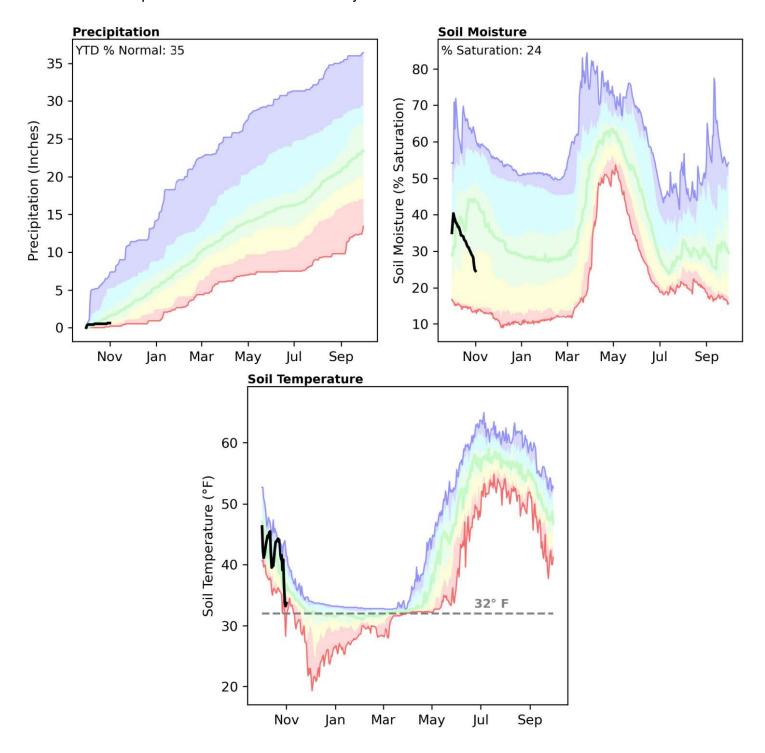
Precipitation in October was below normal, with an average of 1.4" falling region-wide. This brings the water year accumulation to 71% of median. Depth averaged soil moisture was calculated to be 35% of saturation compared to 45% at this time last year. Reservoir storage is 89% of capacity, compared to 68% last year. The Water Availability Index percentile is 95% for Moab.



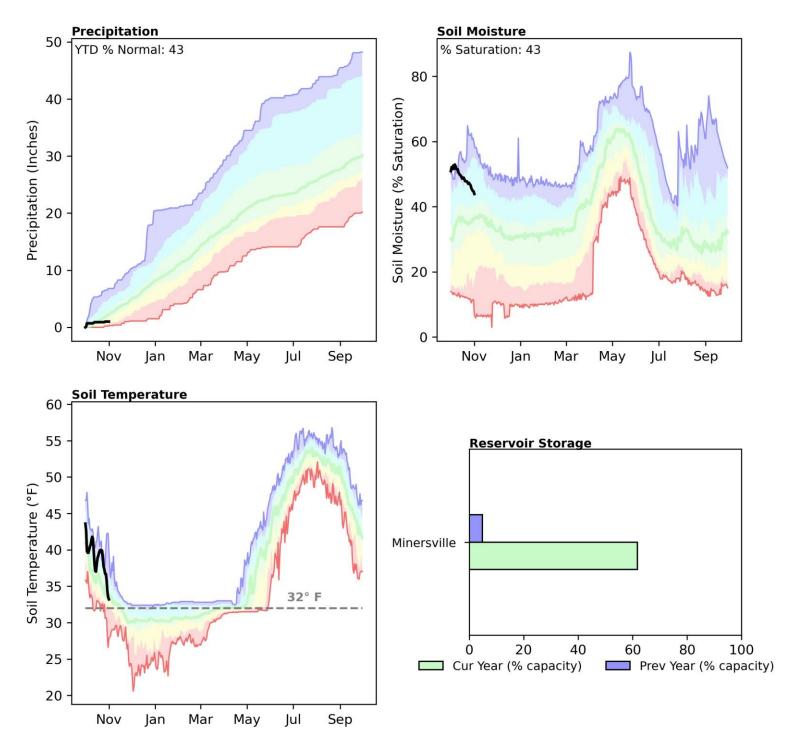
Precipitation in October was well below normal, with an average of 0.8" falling region-wide. This brings the water year accumulation to 46% of median. Depth averaged soil moisture was calculated to be 32% of saturation compared to 34% at this time last year.



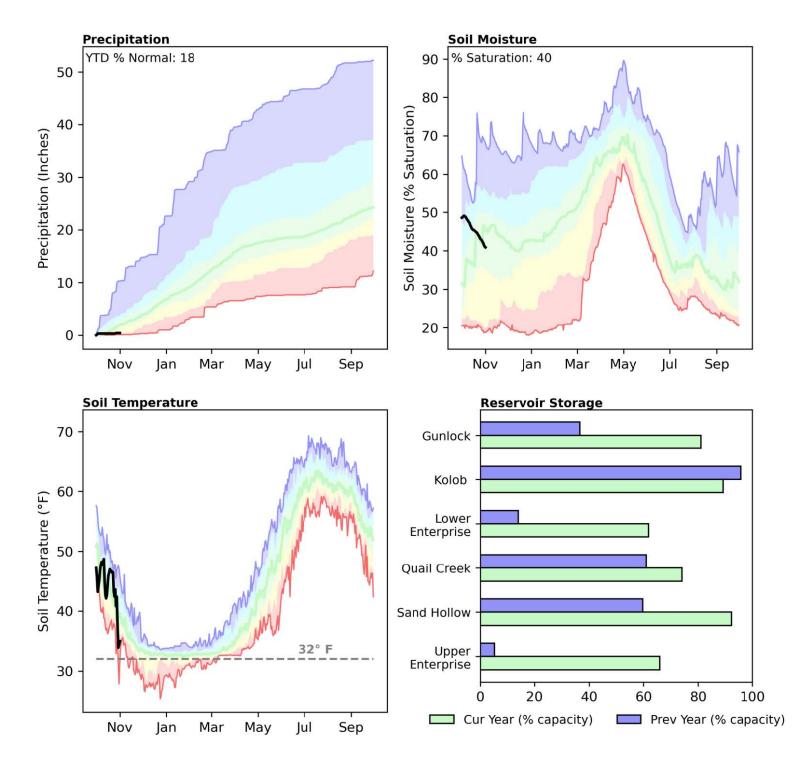
Precipitation in October was well below normal, with an average of 0.6" falling region-wide. This brings the water year accumulation to 35% of median. Depth averaged soil moisture was calculated to be 24% of saturation compared to 30% at this time last year.



Precipitation in October was well below normal, with an average of 1.0" falling region-wide. This brings the water year accumulation to 43% of median. Depth averaged soil moisture was calculated to be 43% of saturation compared to 35% at this time last year. Reservoir storage is 61% of capacity, compared to 4% last year. The Water Availability Index percentile is 89% for the Beaver River.



Precipitation in October was well below normal, with an average of 0.4" falling region-wide. This brings the water year accumulation to 18% of median. Depth averaged soil moisture was calculated to be 40% of saturation compared to 42% at this time last year. Reservoir storage is 82% of capacity, compared to 54% last year. The Water Availability Index percentile is 84% for the Virgin River.



## Appendix A: Data used in WAI Calculations

Watershed/	USGS Gauging	Reservoir(s)	Start Date
Region Bear	Station(s)  Bear R nr Ut-Wy State Line	Bear Lake	1981
Woodruff Narrows	Bear R ab Resv nr Woodruff	Woodruff Narrows Reservoir	1981
Little Bear	Little Bear R at Paradise	Hyrum Reservoir	1993
Ogden	SF Ogden R nr Huntsville	Pineview Reservoir, Causey Reservoir	1981
Weber	Weber R nr Oakley, Chalk Ck at Coalville, East Canyon Ck nr Morgan	East Canyon Reservoir, Echo Reservoir, Lost Creek Reservoir, Rockport Reservoir, Smith And Morehouse Reservoir	1989
Provo	Provo R at Woodland	Deer Creek Reservoir, Jordanelle Reservoir	1993
Western Uintas	Lake Fk R ab Moon Lk nr Mountain Home, Rock Ck nr Mountain Home, Yellowstone R nr Altonah	Starvation Reservoir, Moon Lake Reservoir, Upper Stillwater Reservoir	1988
Eastern Uintas	Big Brush Ck ab Red Fleet Reservoir, Ashley Ck nr Vernal, Whiterocks R nr Whiterocks	Red Fleet Reservoir, Steinaker Reservoir	1981
Blacks Fork	Blacks Fk nr Robertson	Meeks Cabin Reservoir	1984
Smiths Fork	EF of Smiths Fork nr Robertson	Stateline Reservoir	1984
Price	Fish Ck ab Reservoir nr Scofield	Scofield Reservoir	1981
Joes Valley	Seely Ck bl Joes Valley Resv	Joes Valley Reservoir	1981
Ferron Creek	Ferron Ck Upper Station nr Ferron	Millsite	1981
Moab	Mill Ck at Sheley Tunnel nr Moab	Ken's Lake	1988
Upper Sevier	Sevier R nr Kingston	Piute Reservoir, Otter Creek Reservoir	1981
San Pitch	Manti Ck bl Dugway Ck nr Manti	Gunnison Reservoir	1981
Lower Sevier	Sevier R nr Gunnison	Sevier Bridge Reservoir	1981
Beaver River	Beaver R nr Beaver	Minersville Reservoir	1981
Virgin River	Virgin R at Virgin, Santa Clara R nr Pine Valley	Quail Creek, Gunlock	1993

Issued by

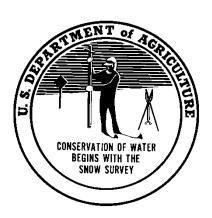
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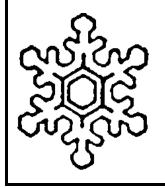
Kent Sutcliffe, West Region SCAN Coordinator Shari Rockenbach, Data Quality Analyst Released by
Emily Fife
State Conservationist
Natural Resources Conservation
Service Salt Lake City, Utah



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Natural Resources Conservation Service Salt Lake City, UT

