

Utah Water Supply Outlook Report

January 1, 2023



Wasatch Plateau, near the GBRC Meadows SNOTEL site

Photo by Dave Eiriksson

STATE OF UTAH GENERAL OUTLOOK

January 1, 2023

SUMMARY

What a great start to our winter snowpack season! As of January 1st, the statewide snow water equivalent (SWE) measured at our SNOTEL sites was 153% of normal, with all major basins above 135%. It's fantastic to see the entire state doing this well! Statewide SWE was 8.9" as of January 1st, suggesting that Utah only needs to receive about 5.4" additional SWE this winter to reach "normal" peak snowpack conditions, with about 90 days to go. The San Pitch, Price-San Rafael, and Tooele Valley-Vernon Creek regions are faring the best at ~170% of normal SWE or higher, though several other basins are close behind. Since January 1st, significant storms have impacted Utah, so these numbers have continued to climb through the first week of 2023. Happy New Year, Utah! With storms forecast at least through mid-January, it is increasingly likely that we will end up with greater-than-average snowpack conditions by the end of March.

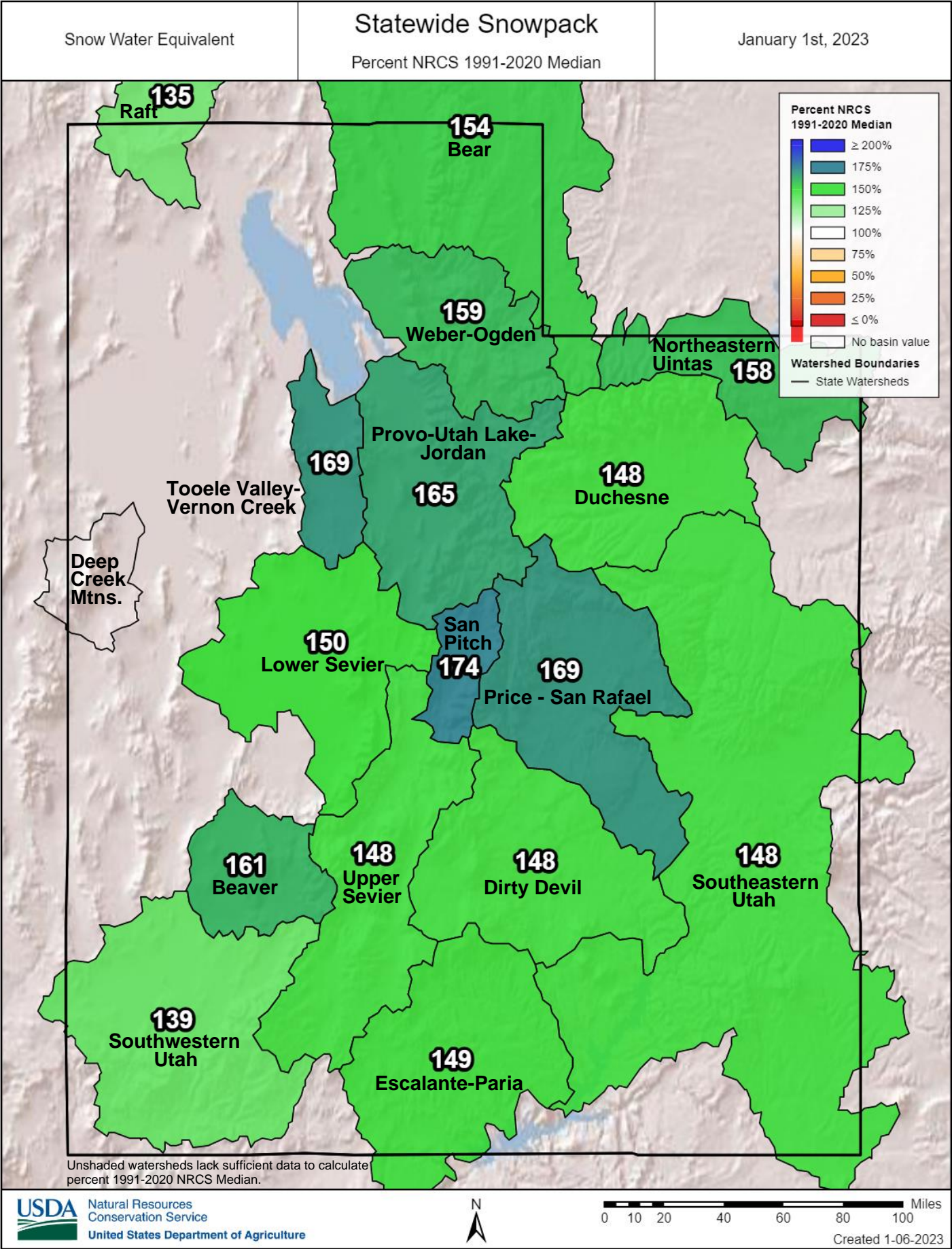
Precipitation has been strong the last few months, which is reflected in the 123% of normal water-year-to-date precipitation value for Utah as of January 1st. December precipitation was well above normal at 161% of median! As of January 1st, all of Utah's major watersheds are above 110% of normal precipitation for the 2023 water year.

Statewide soil moisture is at 49% of saturation. While slightly lower than last year, this is still above normal for this time of year, which bodes well for our runoff season. Based on current soil moisture conditions, we expect that a normal proportion of the water stored in our snowpack will make it to our streams and reservoirs instead of the large headwater losses we saw a couple runoff seasons ago due to the historically dry soils at that time.

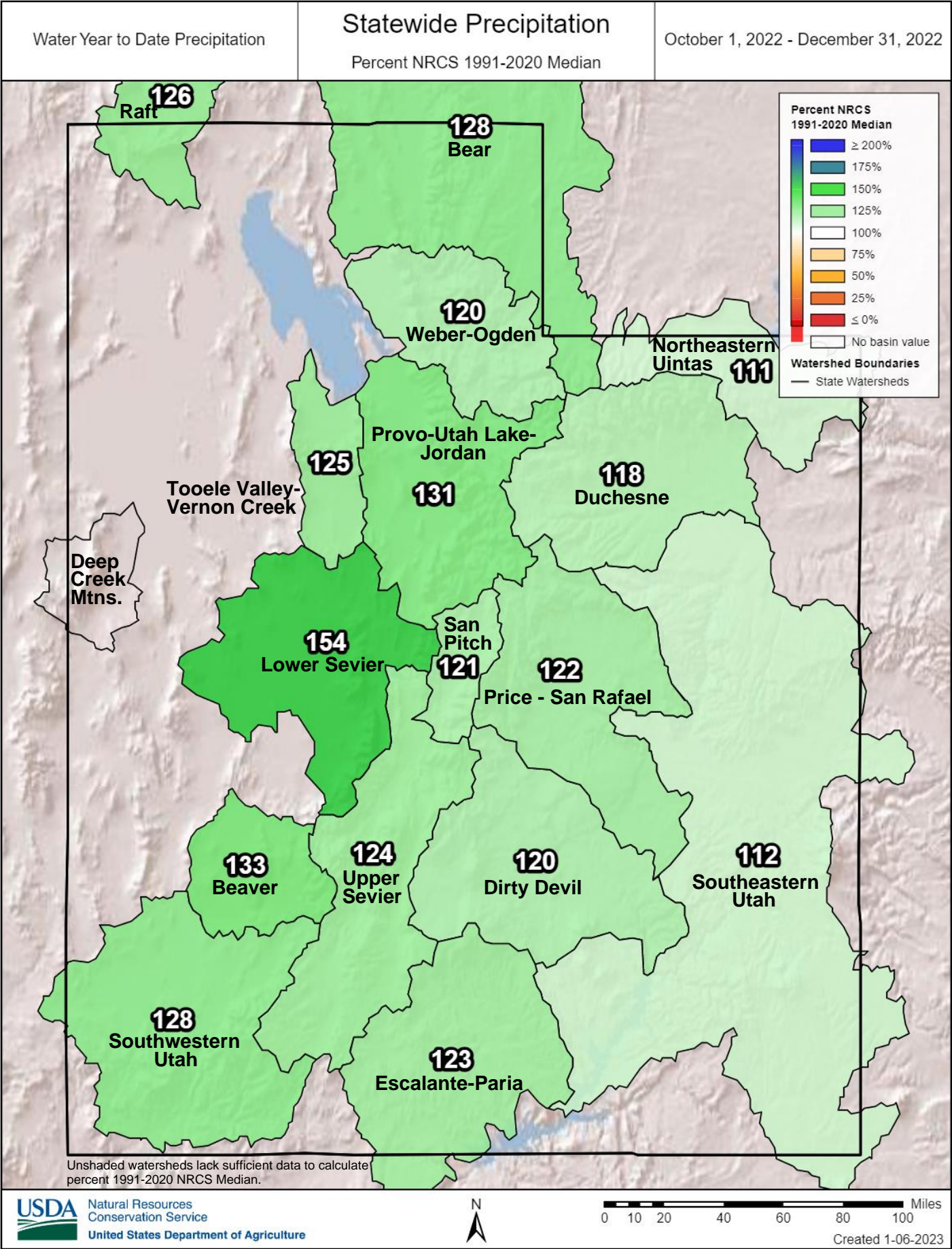
As a result of all the factors listed above, streamflow forecasts for April to July snowmelt runoff volume are quite high—between 98 and 291% of normal. However, January 1 forecasts have significant uncertainty compared with those issued during spring months (closer to peak snowpack conditions) and are meant to be advisory only. Recall, for example, last year's January 1 forecasts (which were optimistic and reflected a similarly excellent start to that snowpack season) compared with the April 1 predictions (which had dropped substantially due to the extended dry period we experienced last January and February). Still, we have reason to be hopeful that this year's forecasts will continue to be for above-normal flow. NOAA's Climate Prediction Center's outlook includes above normal precipitation for January, so let's hope they are proven correct, and that the snow keeps falling all winter!

Utah's reservoir storage is currently only at 45% of capacity, down 5% from this time last year. This storage level reflects several recent years of generally poor hydrologic conditions—especially snowpack and (until recently) soil moisture. With both of those parameters above normal right now, we are optimistic that the snowmelt runoff from this winter's snowpack will move the needle in the other direction and help some of our reservoirs rebound from current levels. Surface Water Supply Indices (SWSI) for Utah basins combine our current reservoir levels with the additional volume of water anticipated for each watershed based on these January 1 streamflow forecasts. Some areas of the state with significant ground to make up (due to large amounts of depleted reservoir storage) have low SWSI values, such as the Provo and Lower Sevier basins. Other areas have much higher SWSI values, such as the Smith Fork, Blacks Fork, Moab, Woodruff Narrows, Weber, Little Bear, Price, Beaver, and Virgin River watersheds, which are all above the 60th percentile. That said, please recall that January 1 forecasts are meant to be advisory only; forecast accuracy improves as we approach peak snowpack accumulation (typically near April 1st).

Utah (statewide) Snowpack



Utah (statewide) Precipitation



January 1, 2023 | Surface Water Supply Index (SWSI)

Basin or Region	Reservoir Storage ¹ (KAF) ²	Apr-July Forecast (KAF) ²	Forecast + Storage (KAF) ²	SWSI ³	Percentile ⁴ (%)	Similar Years
Bear	372.0	133.0	505.0	-1.7	30	[2007, 2010]
Woodruff Narrows	13.5	135.0	148.5	1.18	64	[2008, 2016]
Little Bear	9.7	52.0	61.7	1.04	62	[1993, 2009]
Ogden	43.3	135.0	178.3	0.76	59	[1993, 1994]
Weber	198.9	415.0	613.9	1.33	66	[1993, 2019]
Provo	646.0	118.0	764.0	-3.61	7	[2004, 2016]
Western Uintas	153.0	65.0	218.0	0.38	55	[2010, 2022]
Eastern Uintas	22.7	123.0	145.7	0.38	55	[1996, 2010]
Blacks Fork	7.7	100.0	107.7	1.52	68	[1985, 2014]
Smiths Fork	5.6	30.0	35.6	1.93	73	[1996, 2005]
Price	12.6	52.0	64.6	1.14	64	[1987, 2017]
Joes Valley	29.8	58.0	87.8	0.57	57	[1993, 2010]
Ferron Creek	7.7	38.0	45.7	0.38	55	[2001, 2008]
Moab	1.7	4.0	5.7	1.46	68	[1994, 2017]
Upper Sevier	33.3	56.0	89.3	-0.95	39	[1997, 2017]
San Pitch	0.0	17.0	17.0	-0.57	43	[1993, 2017]
Lower Sevier	20.3	70.0	90.3	-2.84	16	[2003, 2016]
Beaver River	4.3	35.0	39.3	1.14	64	[1987, 1988]
Virgin River	30.1	59.0	89.1	1.56	69	[2001, 2006]

¹ End of Month Reservoir Storage; ² KAF, Thousand Acre-Feet; ³ SWSI, Surface Water Supply Index; ⁴ Threshold for coloring: >75% Green, <25% Red

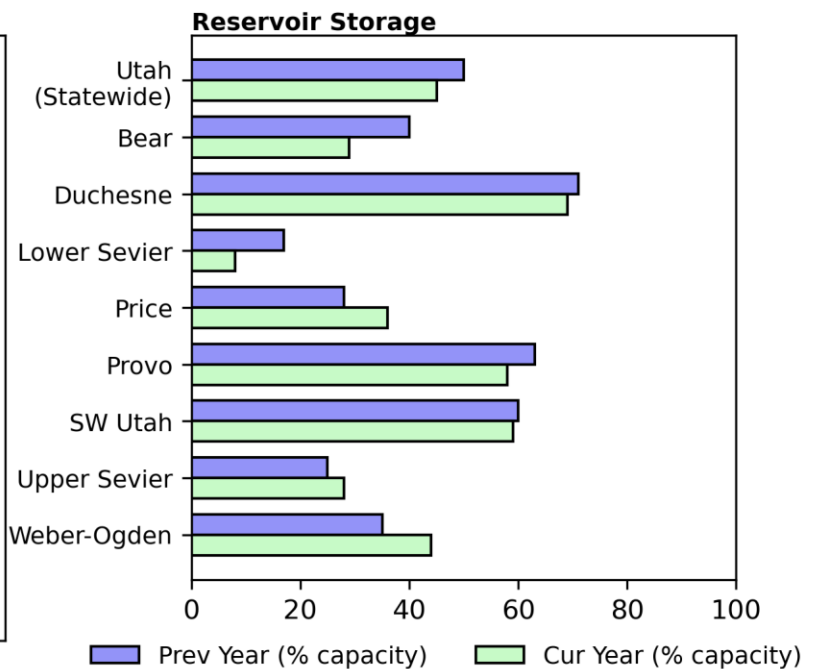
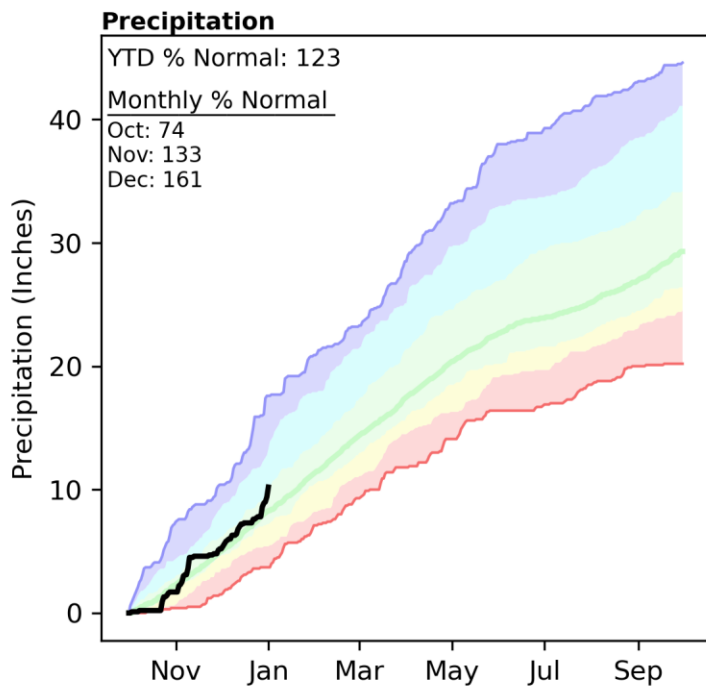
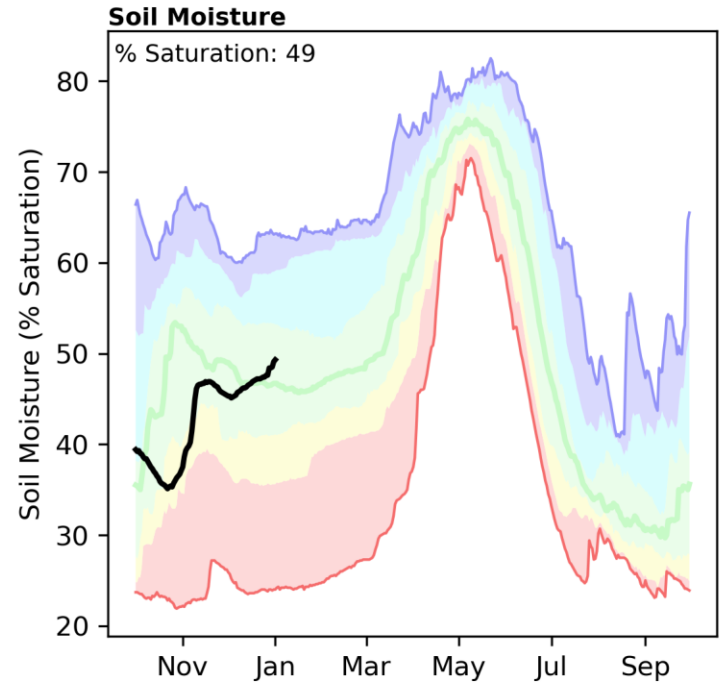
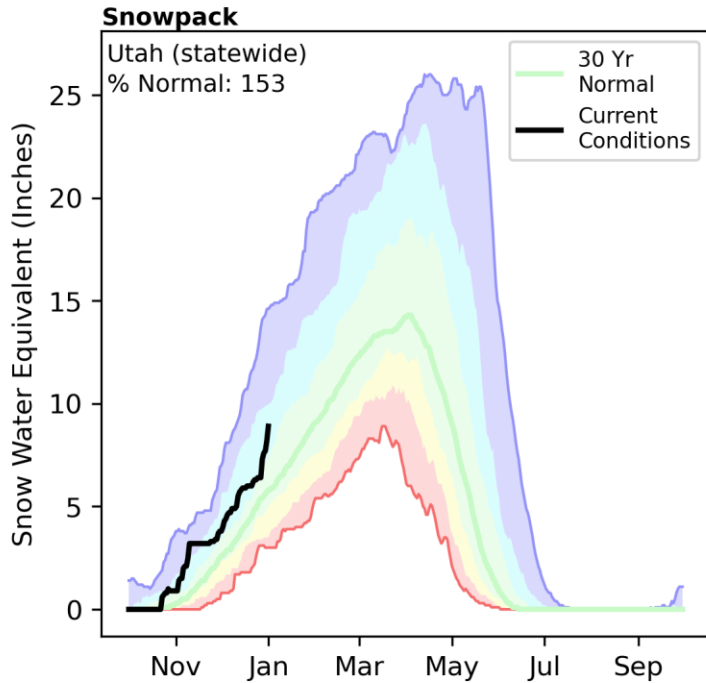
What is a Surface Water Supply Index?

The Surface Water Supply Index (SWSI) is a predictive indicator of total surface water availability within a watershed for the spring and summer water use seasons. The index is calculated by combining pre-runoff reservoir storage (carryover) with forecasts of spring and summer streamflow which are based on current snowpack and other hydrologic variables. SWSI 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. SWSI's are calculated in this fashion to be consistent with other hydroclimatic indicators such as the Palmer Drought Index and the Precipitation index. See Appendix A for details on forecast points and reservoirs used in SWSI calculations.

The Utah Snow Survey has also chosen to display the SWSI 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 SWSI 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 SWSI 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 SWSI 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.

Utah (statewide) | January 1, 2023

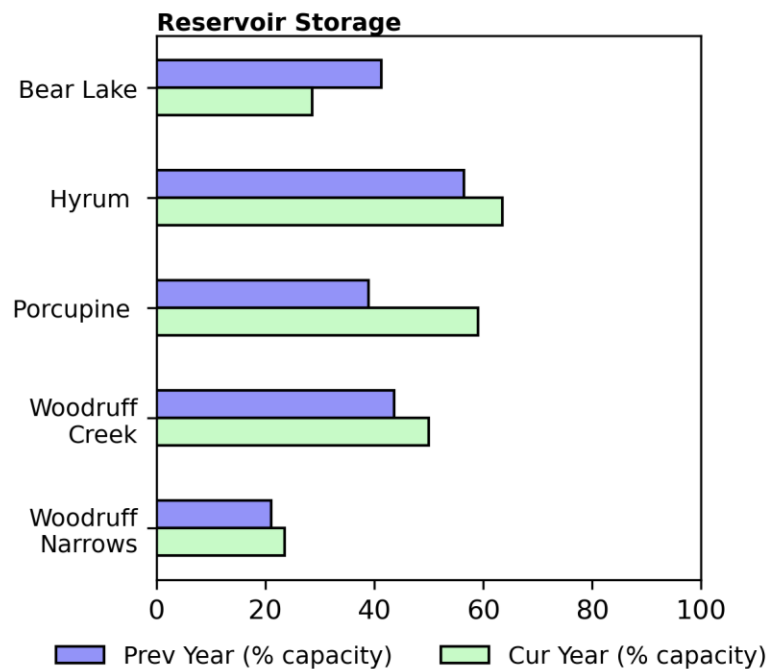
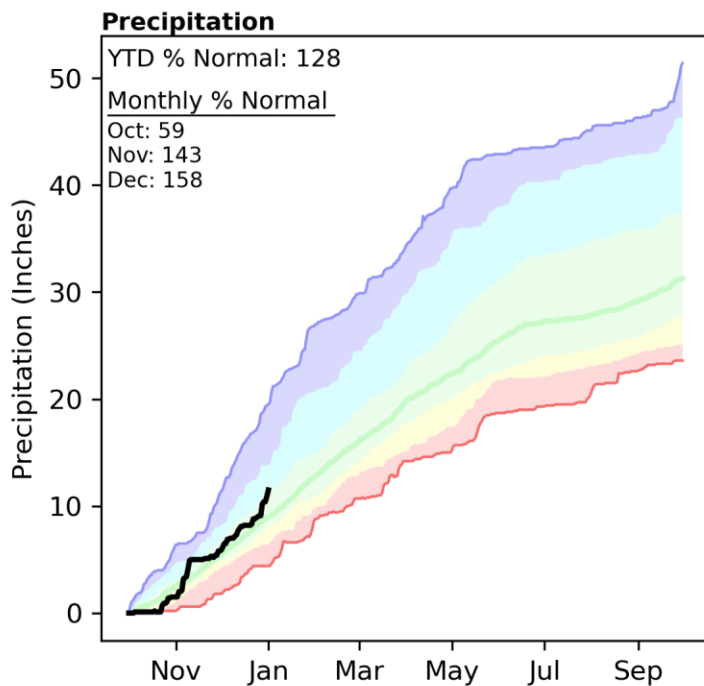
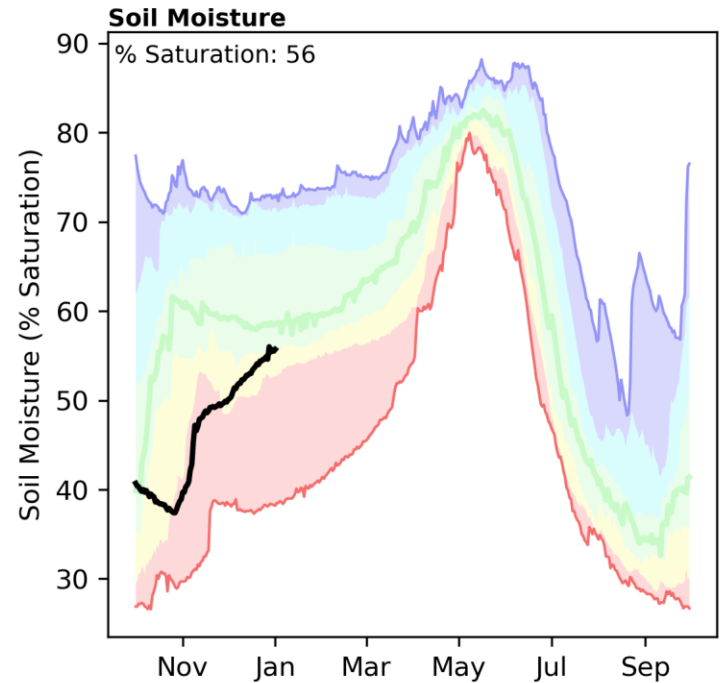
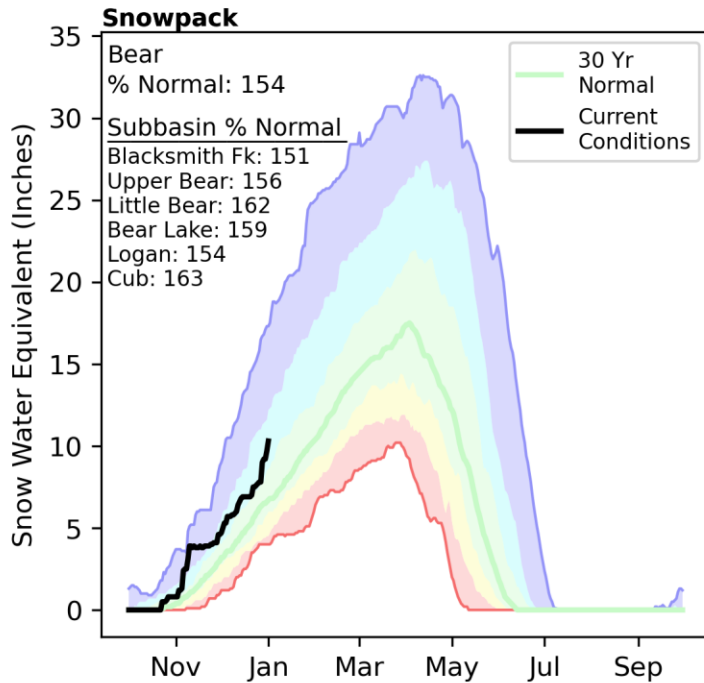
Snowpack in Utah (statewide) is well above normal at 153% of median, compared to 131% at this time last year. Precipitation in December was well above normal at 161%, which brings the seasonal accumulation (October-December) to 123% of median. Soil moisture is at 49% saturation compared to 56% saturation last year. Statewide, reservoir storage is 45% of capacity, compared to 50% last year¹. Forecast streamflow volumes (50% exceedence, April-July) range from 98% to 291% of normal.

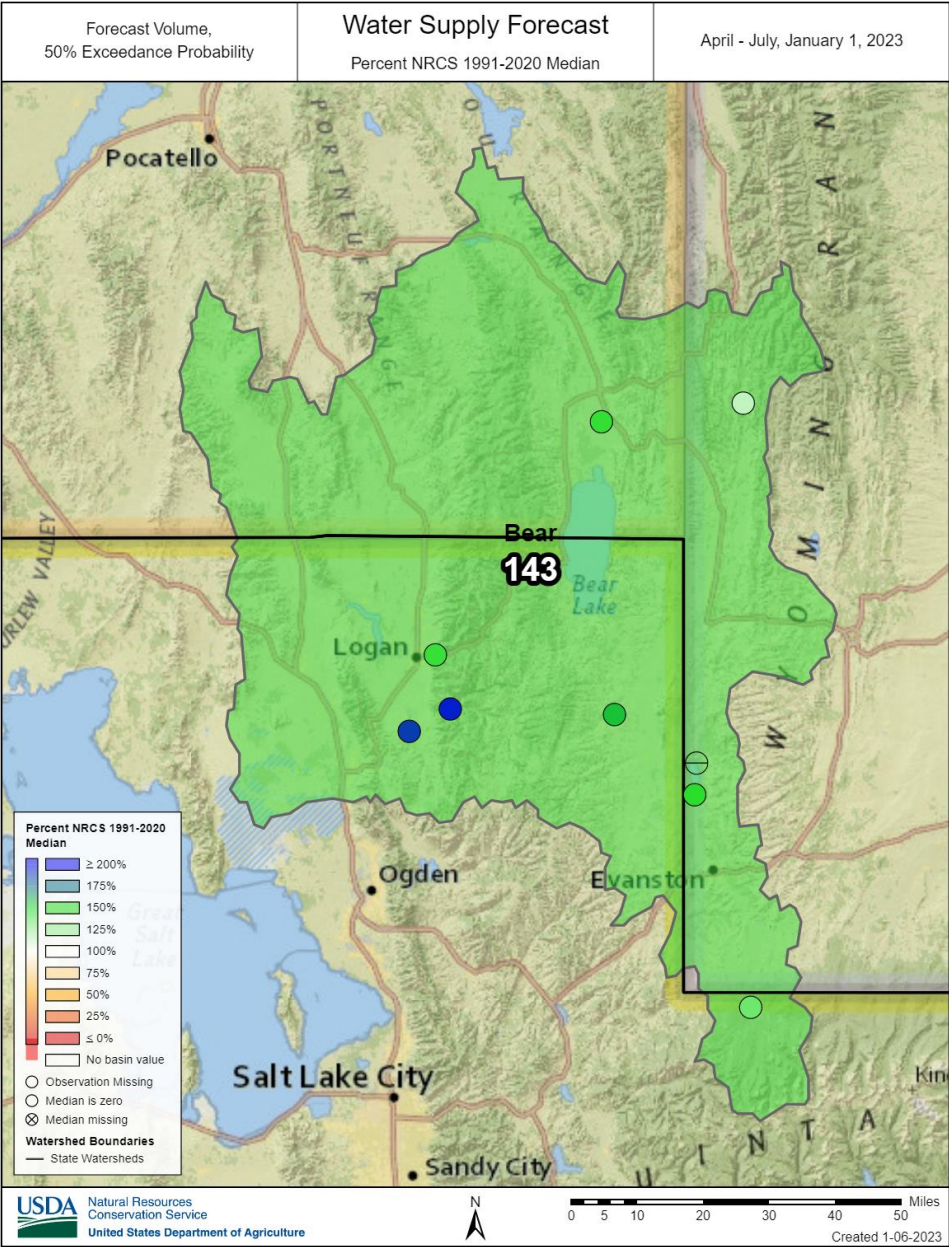
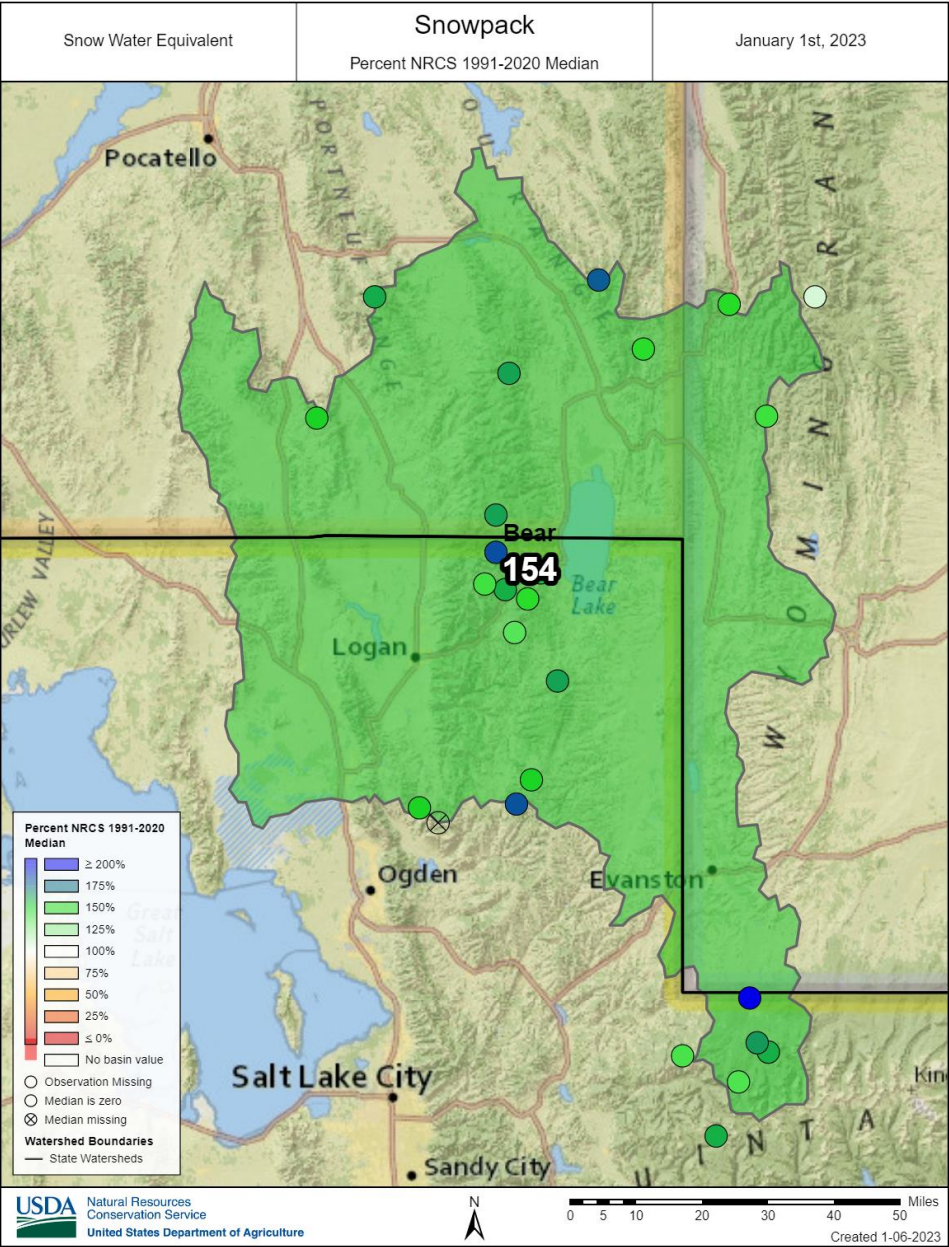


Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

¹Statewide reservoir percentages exclude Lake Powell and Flaming Gorge Reservoirs.

Snowpack in the Bear River Basin is well above normal at 154% of median, compared to 118% at this time last year. Precipitation in December was well above normal at 158%, which brings the seasonal accumulation (October-December) to 128% of median. Soil moisture is at 56% saturation compared to 66% saturation last year. Reservoir storage is 29% of capacity, compared to 40% last year. Forecast streamflow volumes (50% exceedence, April-July) range from 114% to 193% of normal. The Surface Water Supply Index percentiles are 30% for the Bear, 62% for the Little Bear, and 64% for Woodruff Narrows.



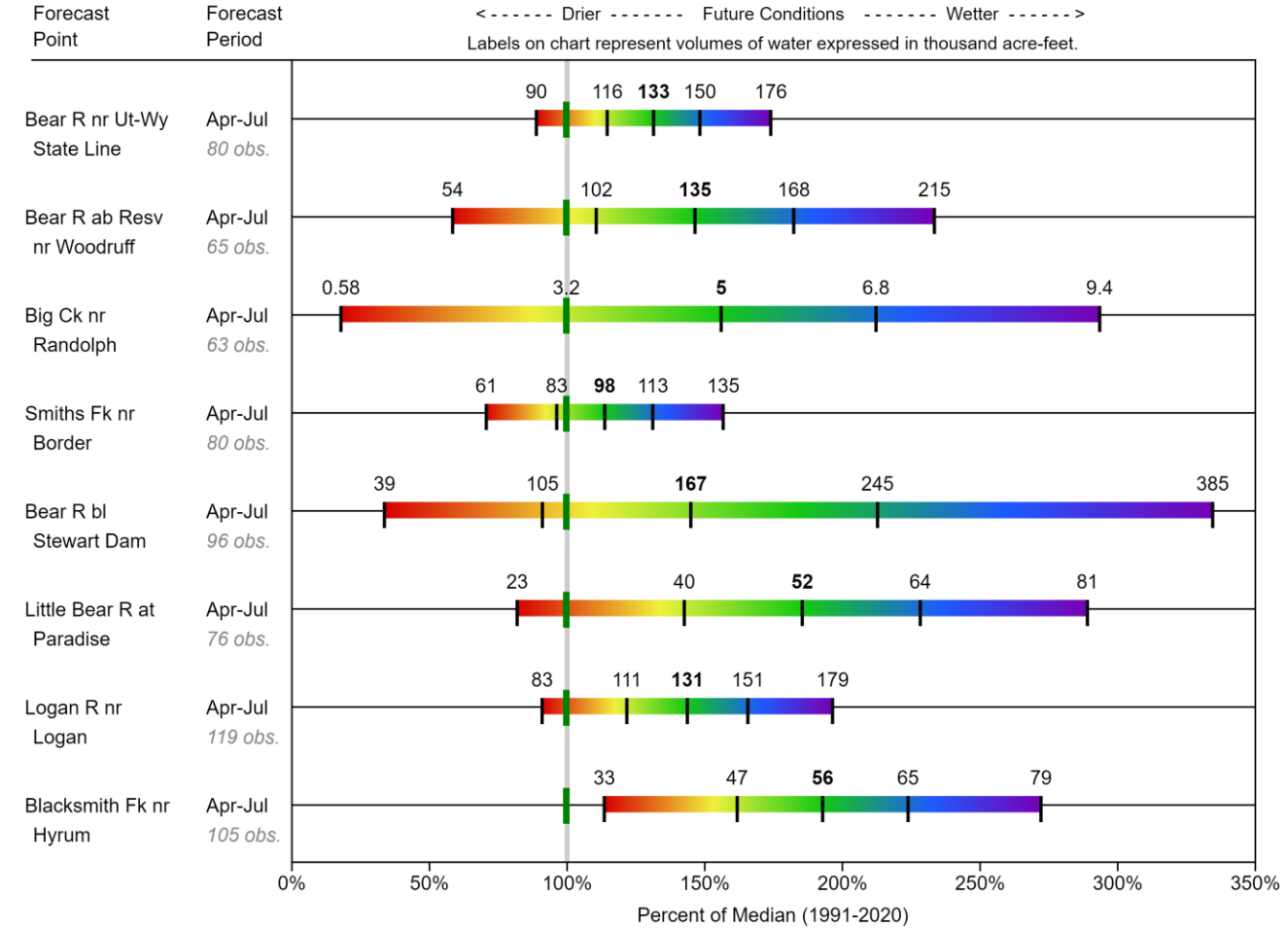


Bear River

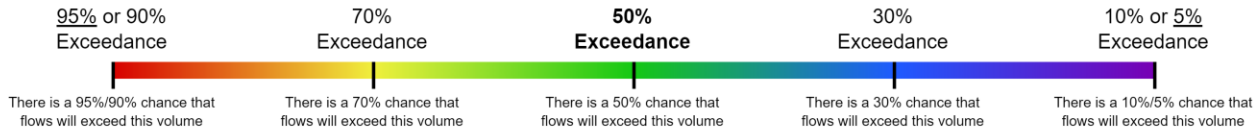
Water Supply Forecasts

January 1, 2023

<----- Drier ----- Future Conditions ----- Wetter ----->
Labels on chart represent volumes of water expressed in thousand acre-feet.



Legend

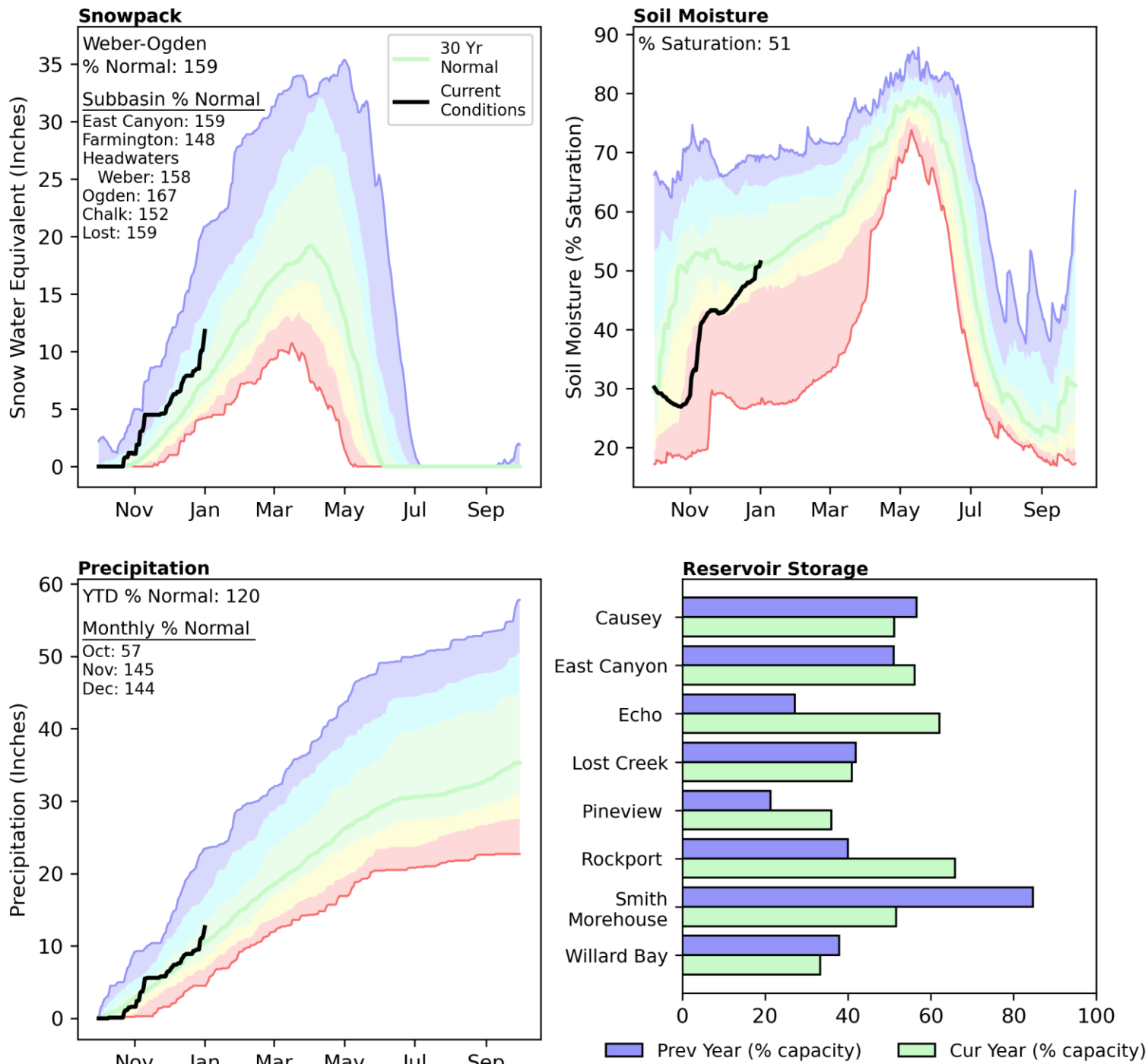


When selected, the following historic streamflow values and statistics will be shown.



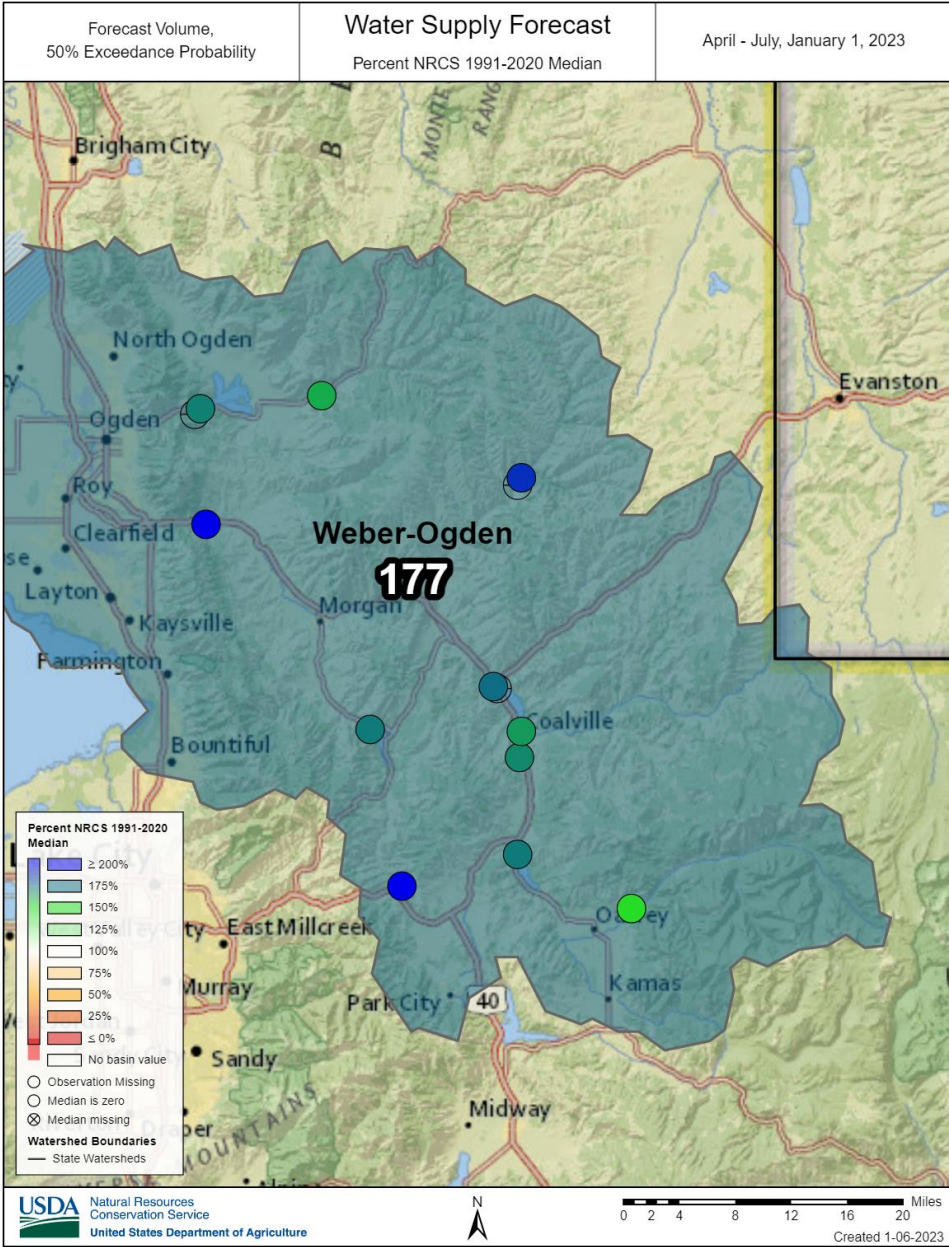
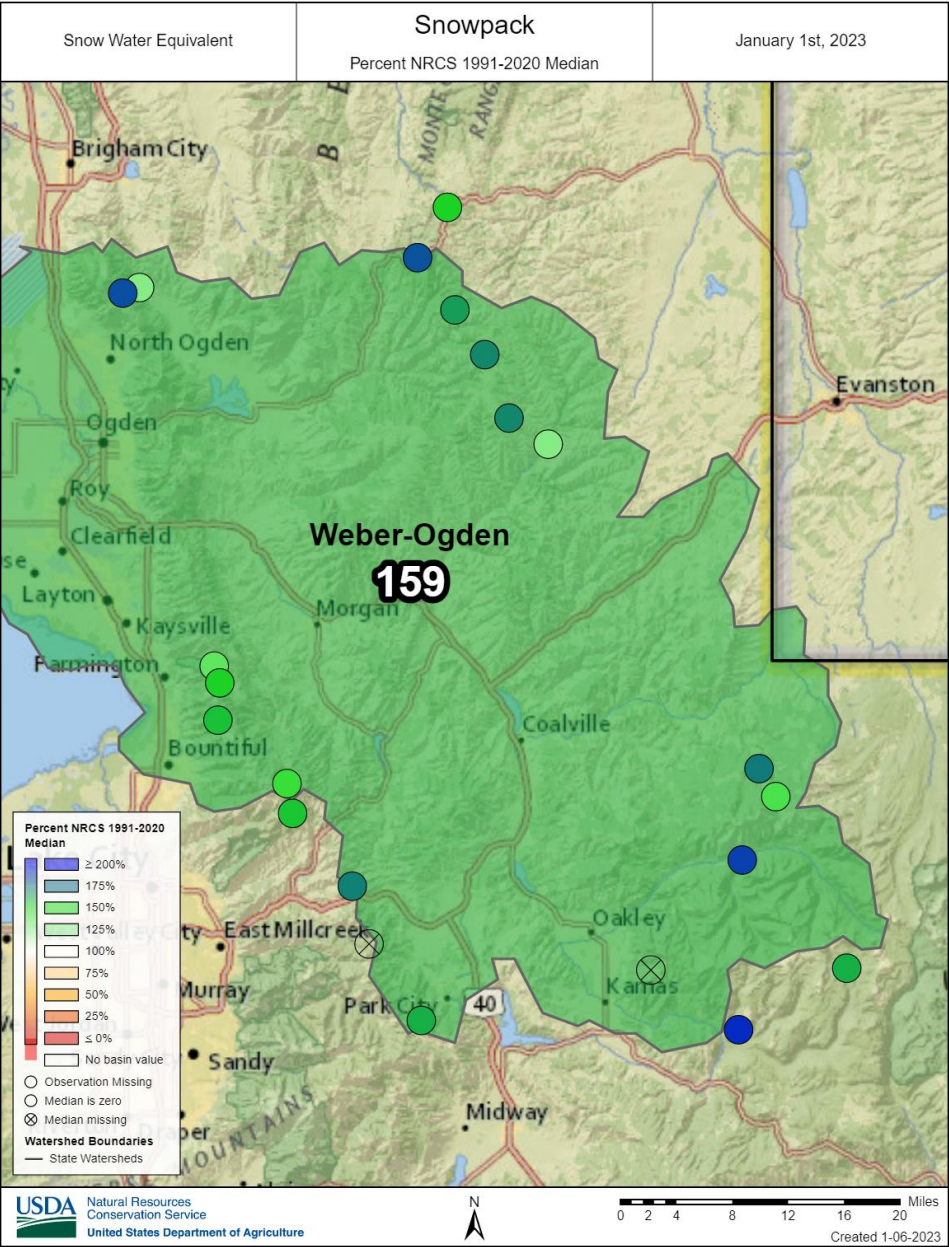
Some forecasts may be for volumes that are regulated or influenced by diversions and water management.

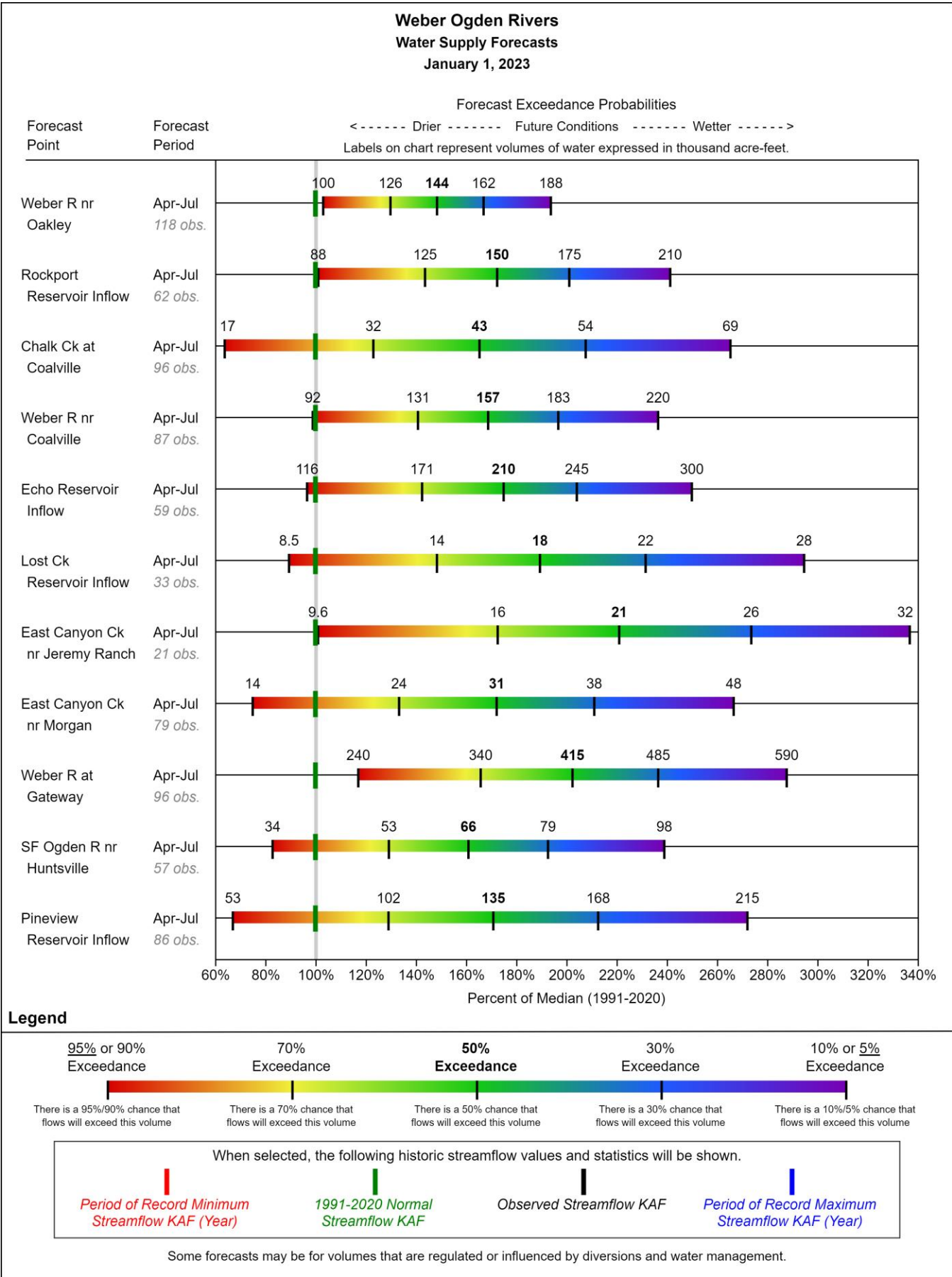
Snowpack in the Weber and Ogden River Basins is well above normal at 159% of median, compared to 112% at this time last year. Precipitation in December was well above normal at 144%, which brings the seasonal accumulation (October-December) to 120% of median. Soil moisture is at 51% saturation compared to 62% saturation last year. Reservoir storage is 44% of capacity, compared to 35% last year. Forecast streamflow volumes (50% exceedence, April-July) range from 148% to 221% of normal. The Surface Water Supply Index percentiles are 66% for the Weber, and 59% for the Ogden.



Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

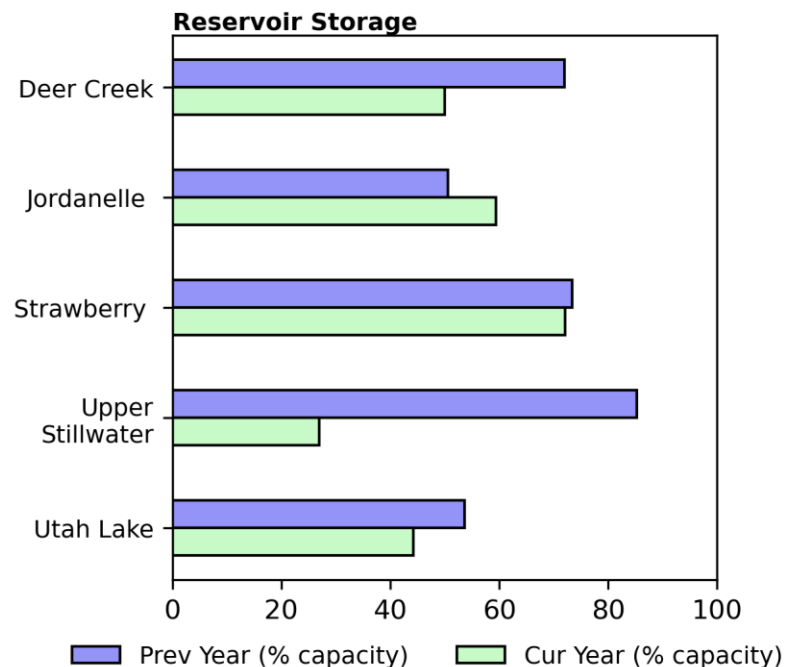
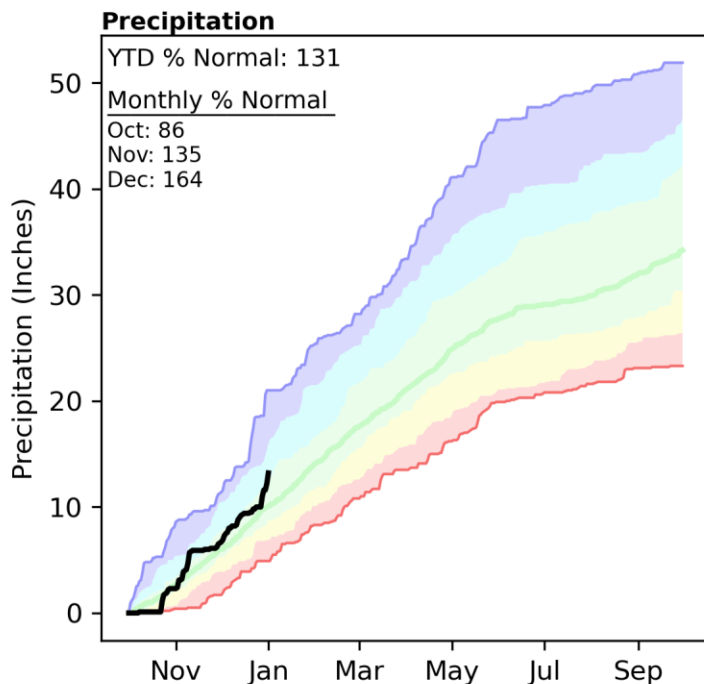
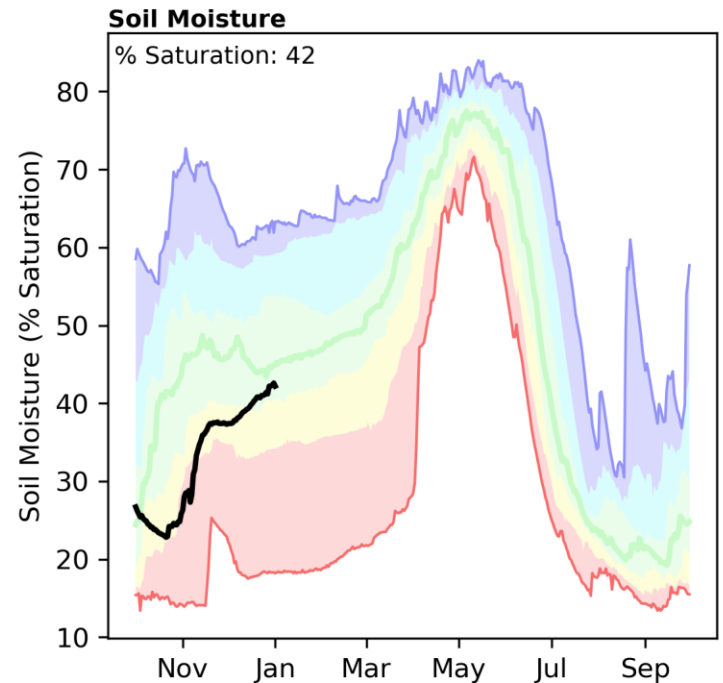
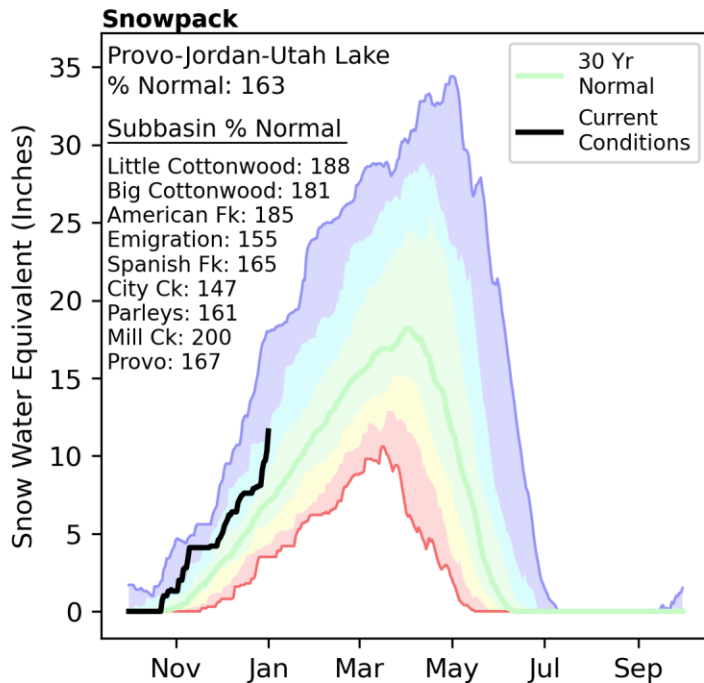
Weber-Ogden





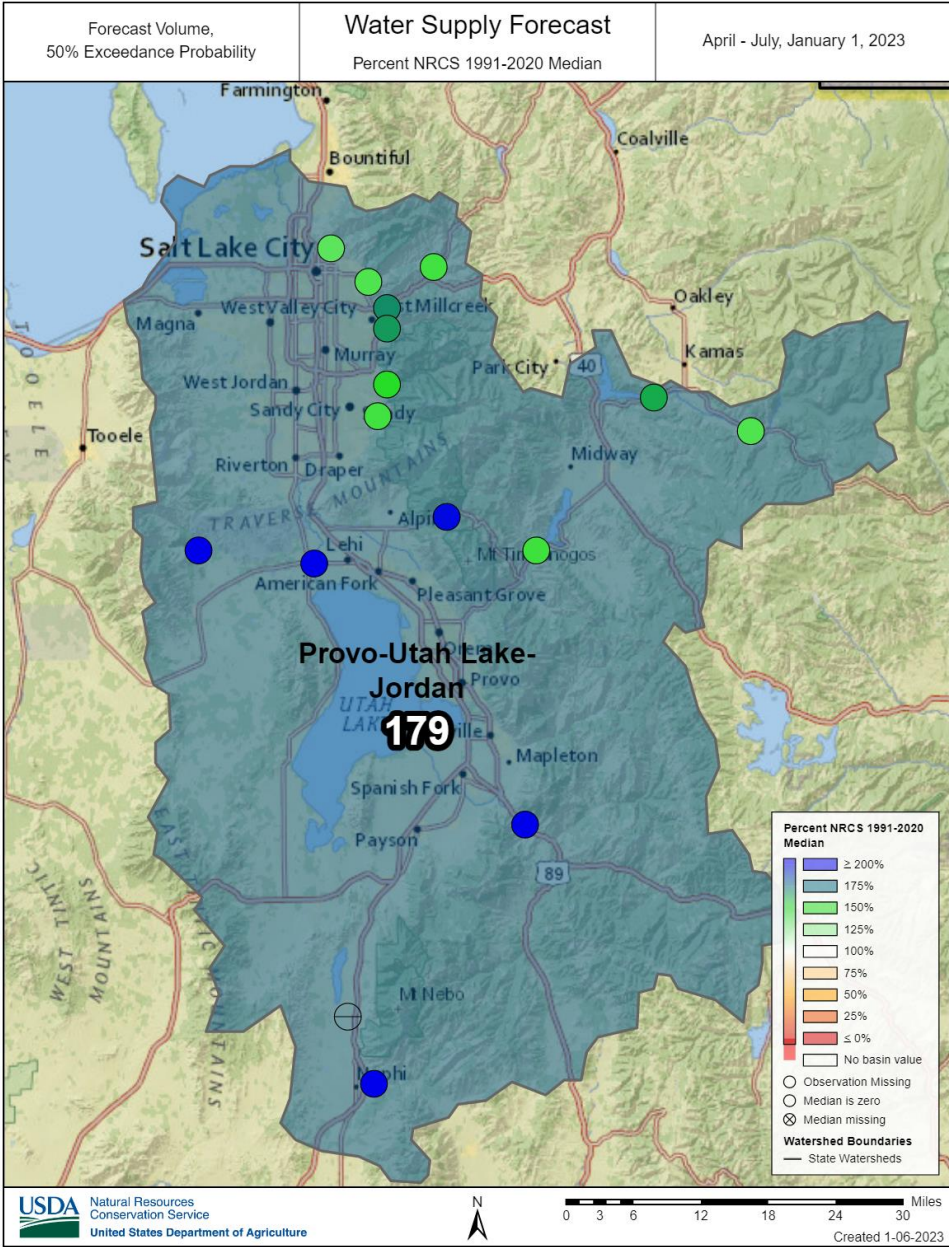
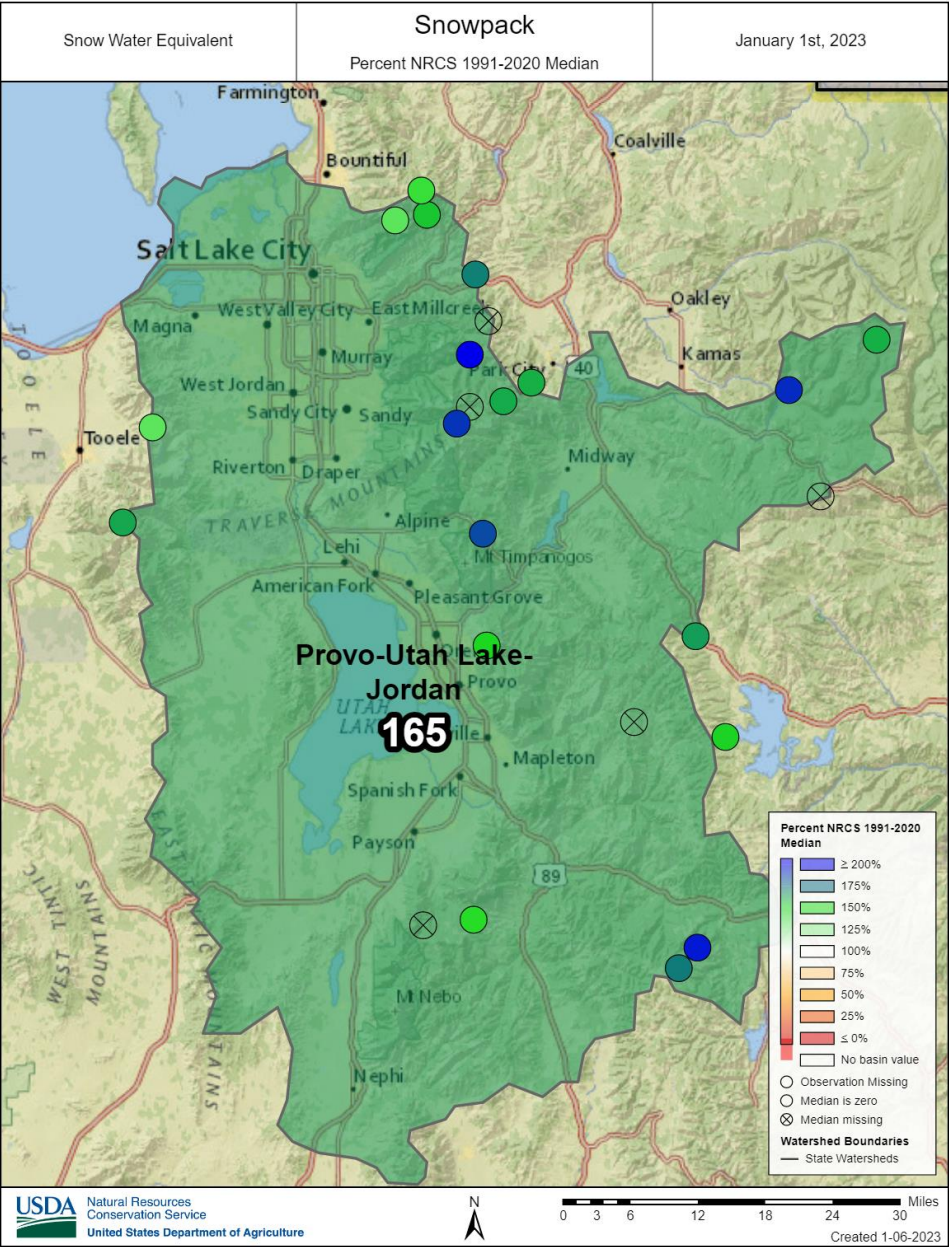
Provo-Jordan-Utah Lake | January 1, 2023

Snowpack in the Provo and Jordan River Basins is well above normal at 163% of median, compared to 121% at this time last year. Precipitation in December was well above normal at 164%, which brings the seasonal accumulation (October-December) to 131% of median. Soil moisture is at 42% saturation compared to 60% saturation last year. Reservoir storage is 58% of capacity, compared to 63% last year. Forecast streamflow volumes (50% exceedence, April-July) range from 136% to 291% of normal. The Surface Water Supply Index percentile is 7% for the Provo.

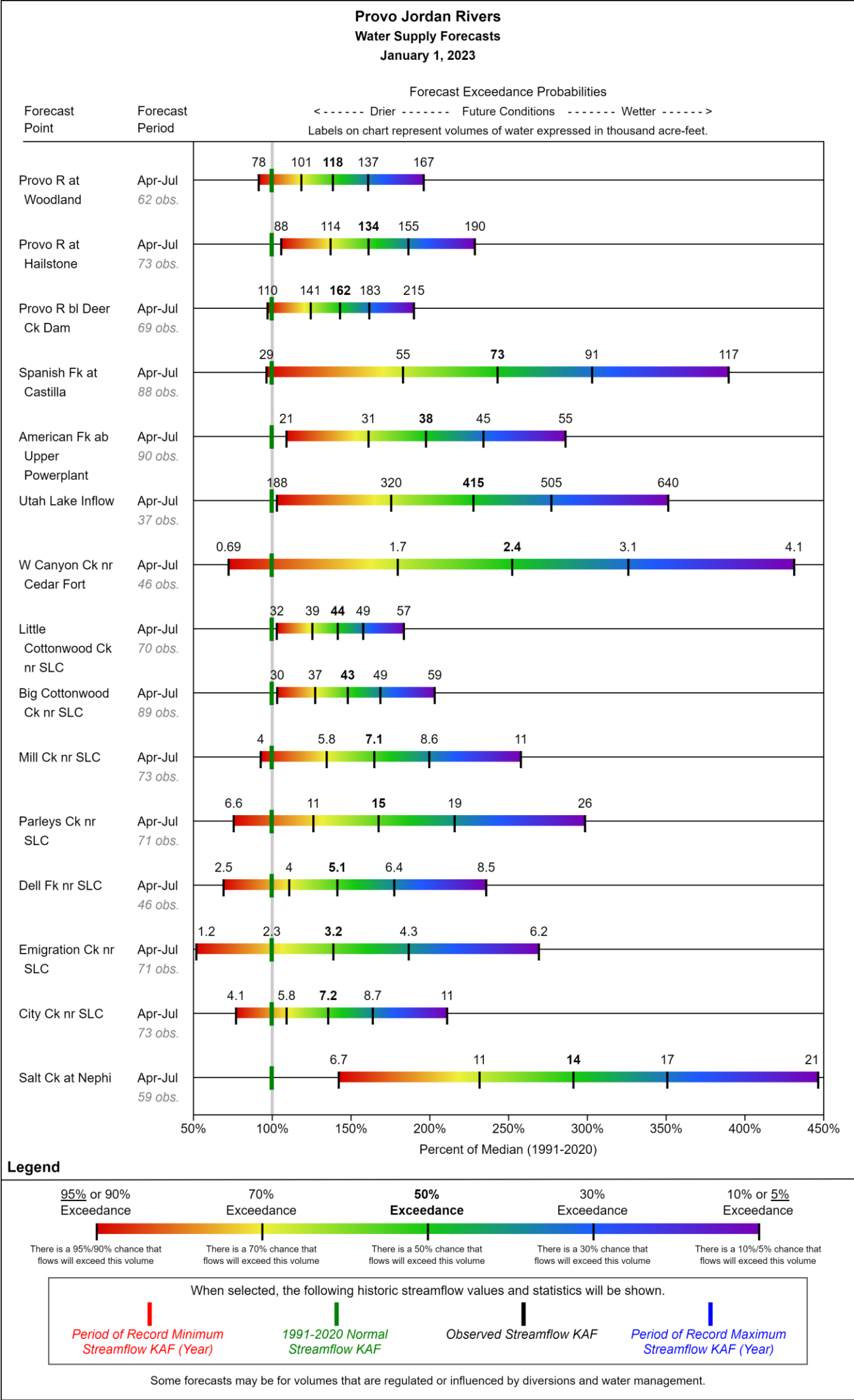


Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
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Provo-Utah Lake-Jordan

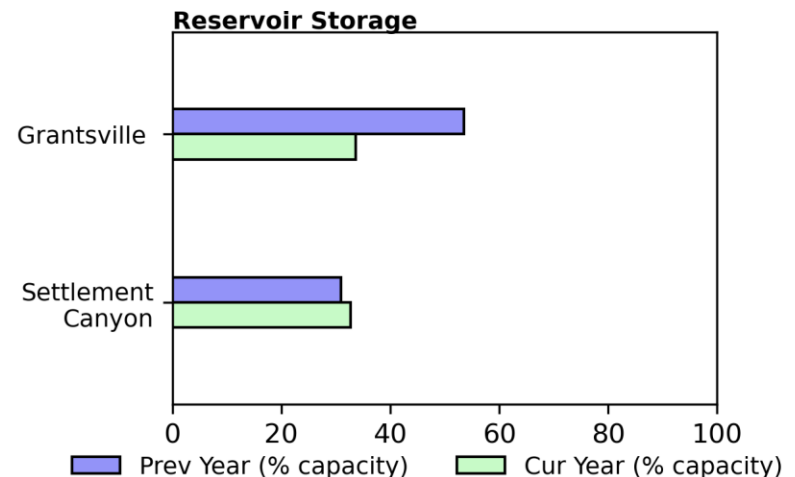
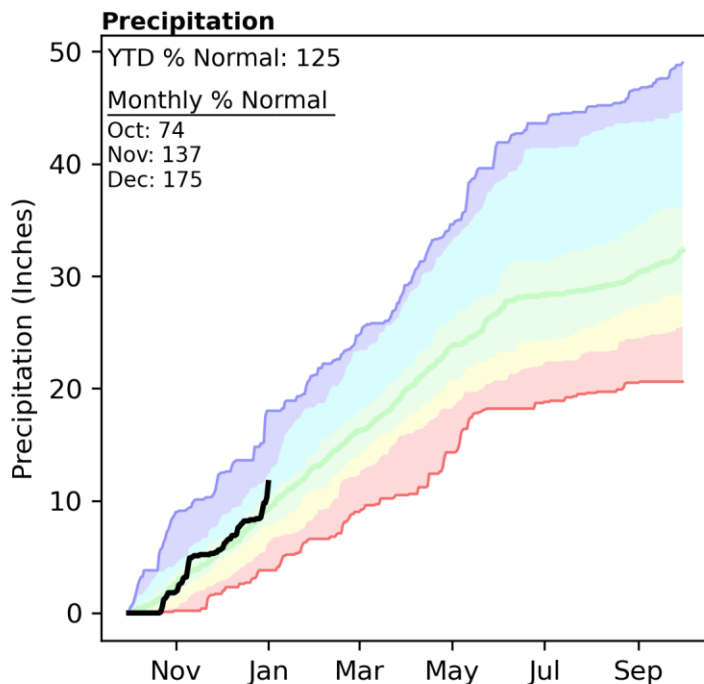
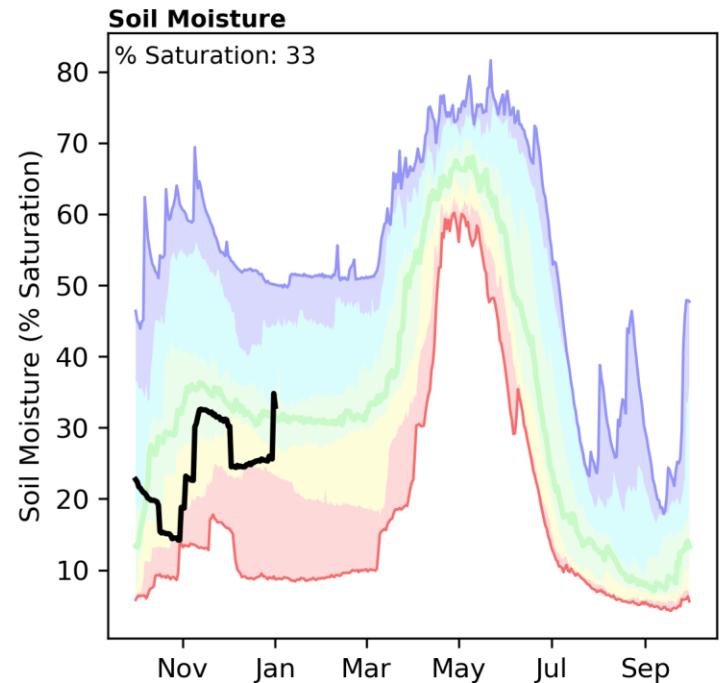
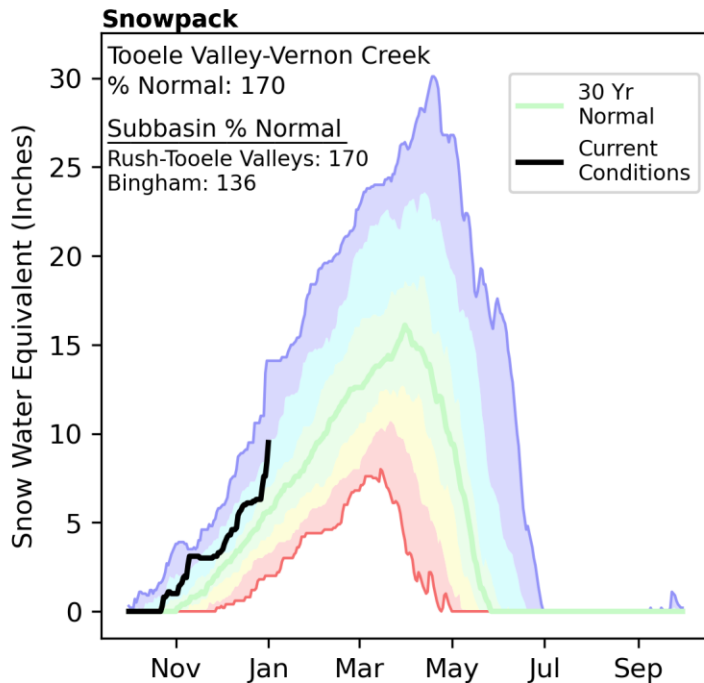


Provo-Utah Lake-Jordan



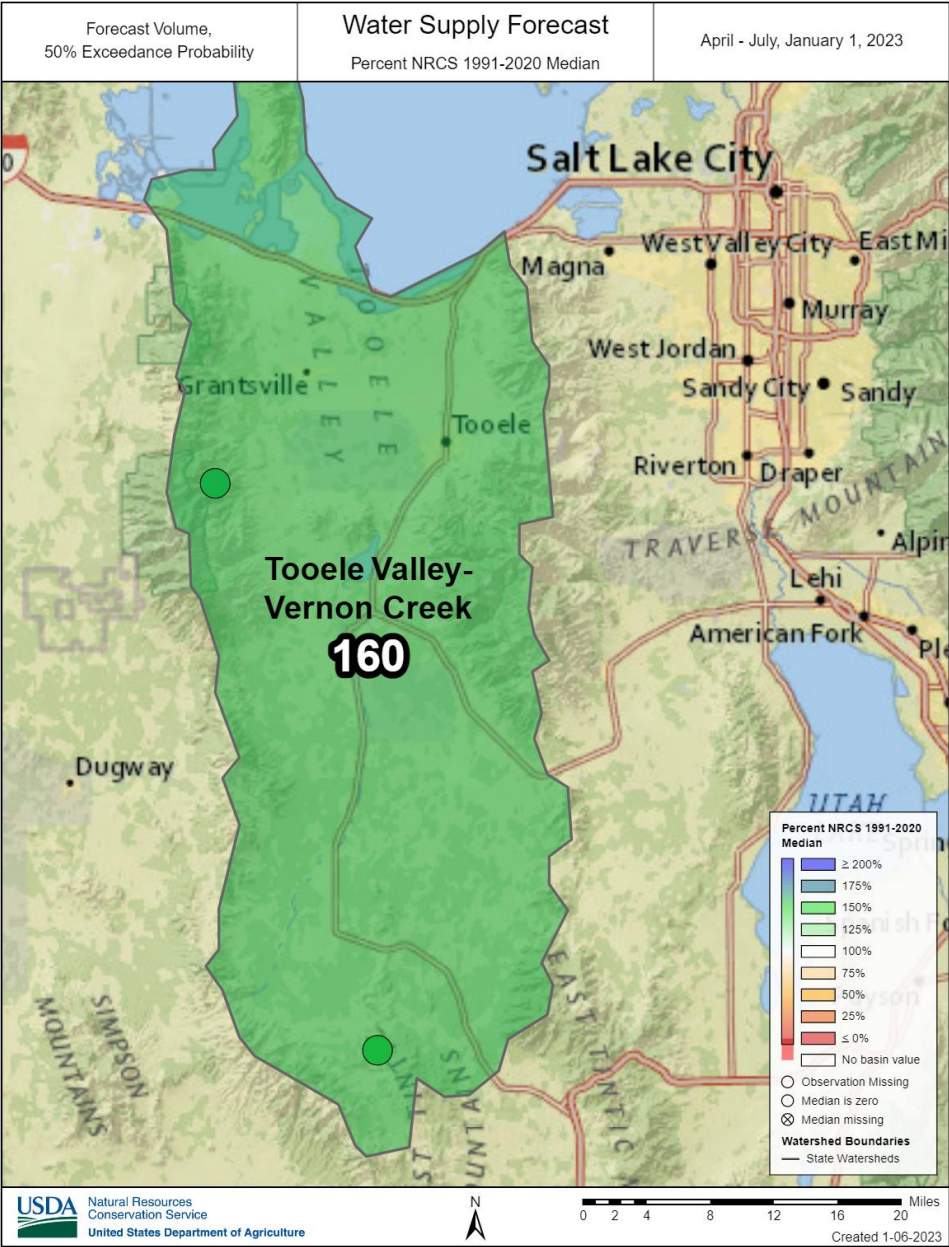
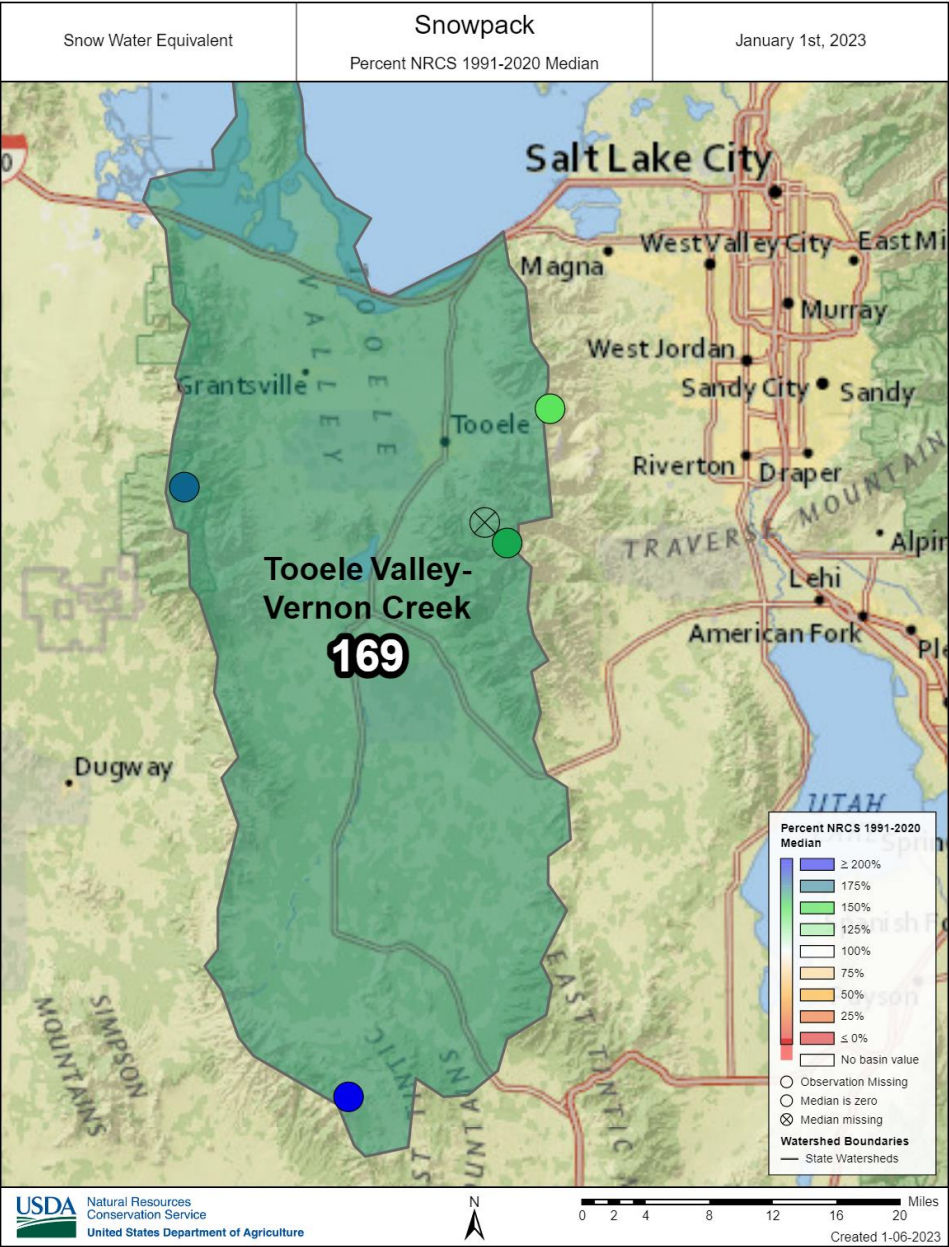
Tooele Valley-Vernon Creek | January 1, 2023

Snowpack in the Tooele Valley and West Desert Region is well above normal at 170% of median, compared to 112% at this time last year. Precipitation in December was well above normal at 175%, which brings the seasonal accumulation (October-December) to 125% of median. Soil moisture is at 33% saturation compared to 42% saturation last year. Reservoir storage is 33% of capacity, compared to 48% last year. Forecast streamflow volumes (50% exceedence, April-July) range from 129% to 160% of normal.

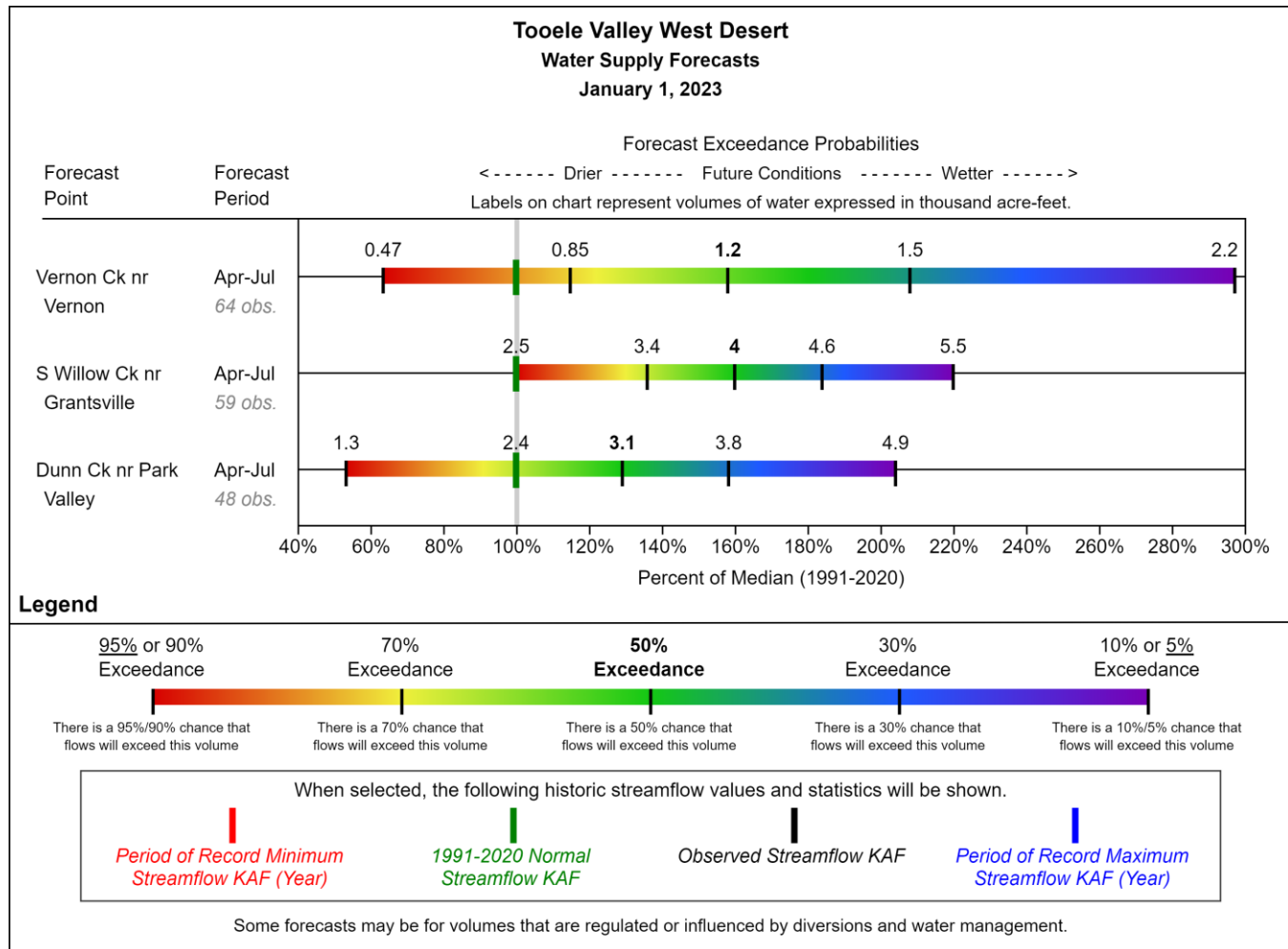


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Tooele Valley-Vernon Creek

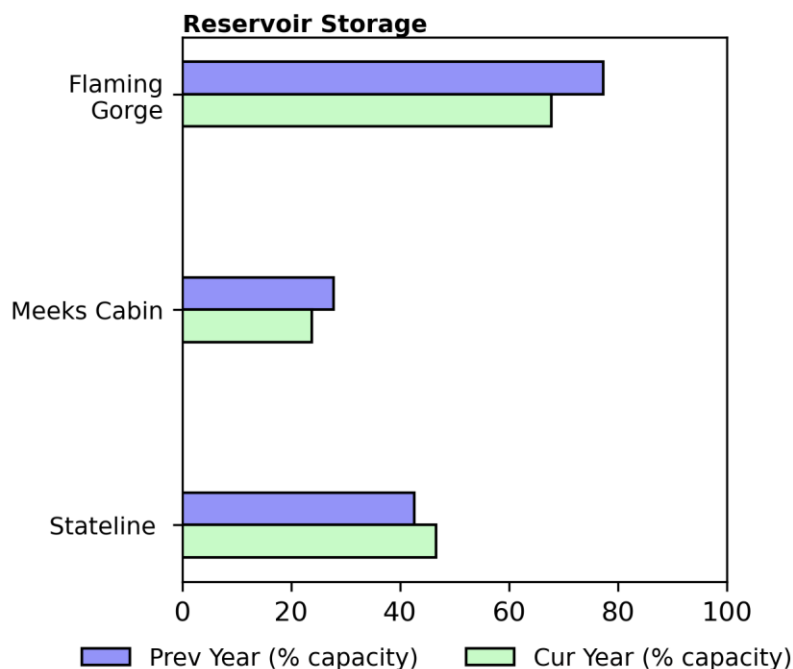
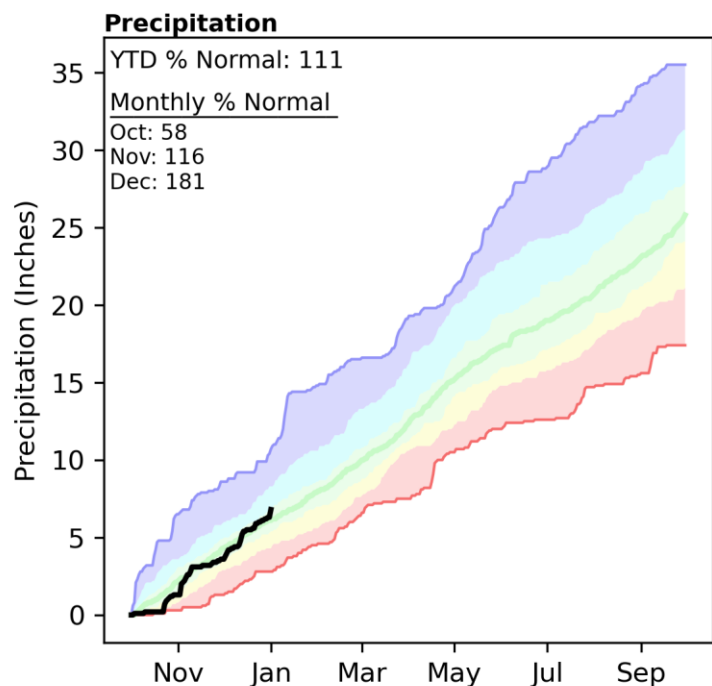
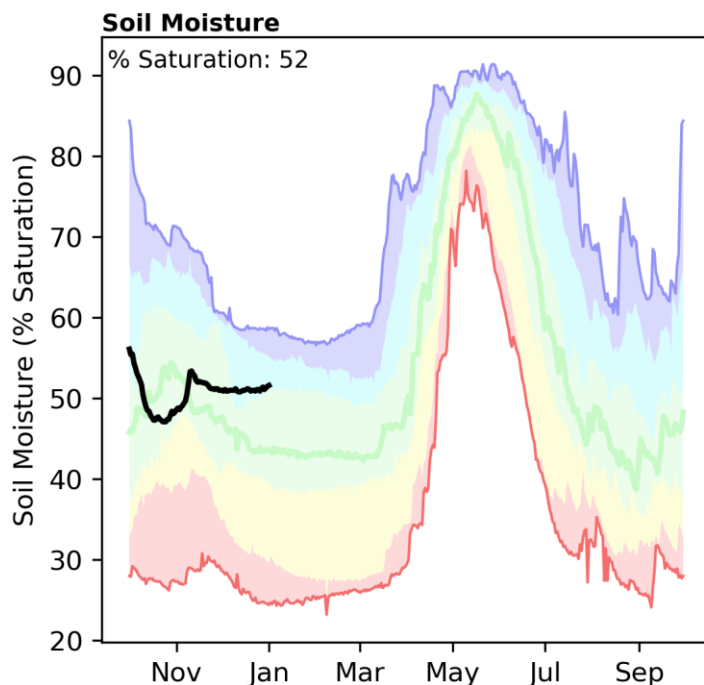
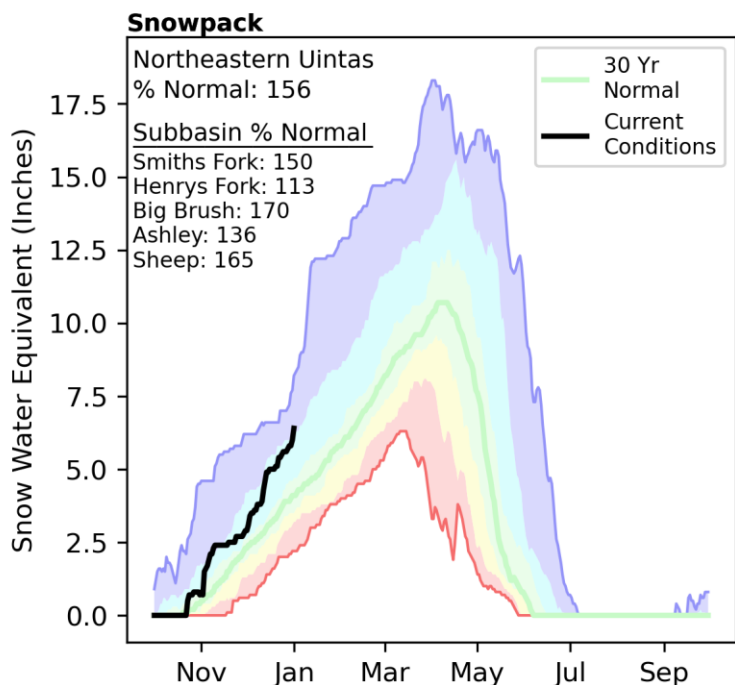


Tooele Valley-Vernon Creek



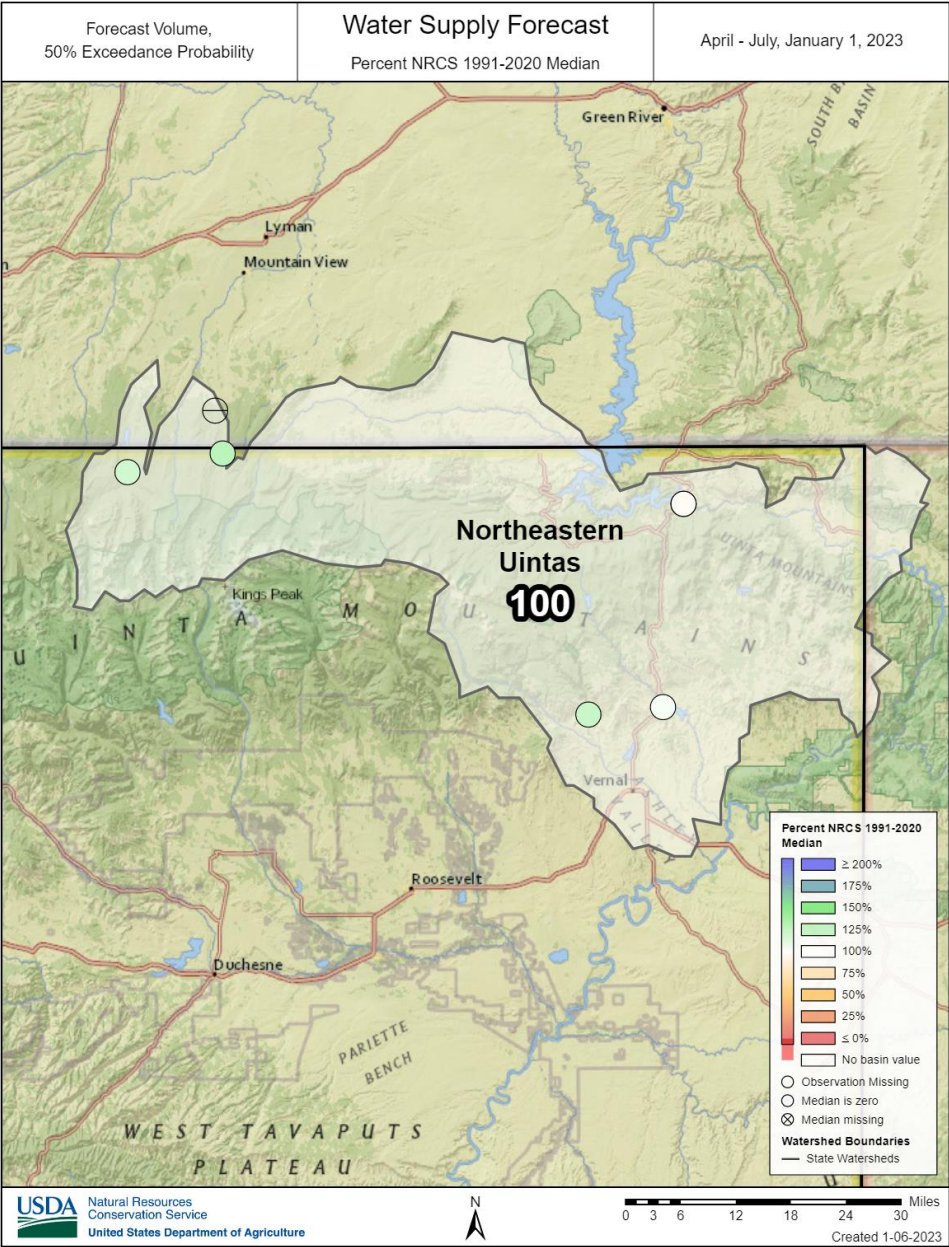
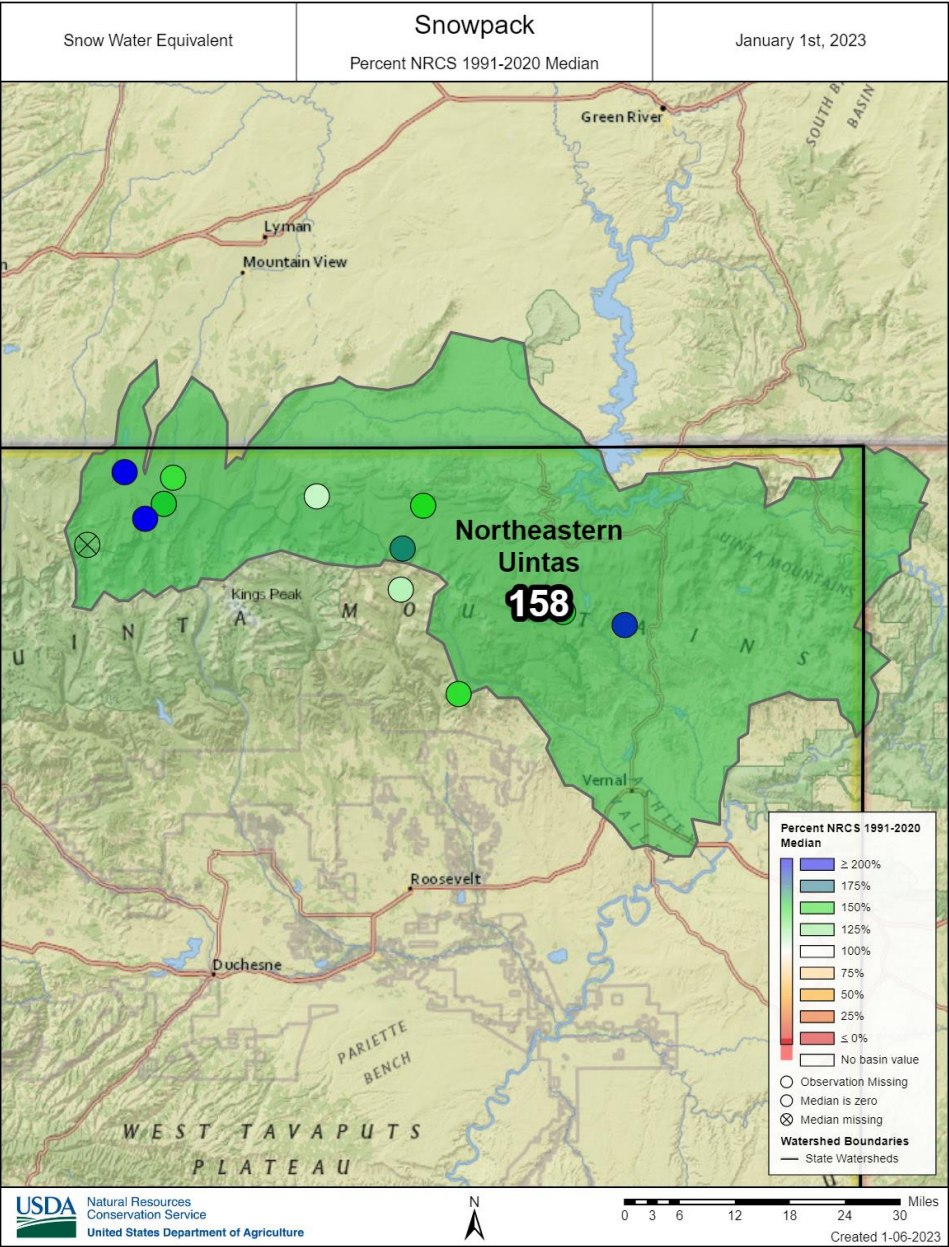
Northeastern Uintas | January 1, 2023

Snowpack in the Northeastern Uintas is well above normal at 156% of median, compared to 134% at this time last year. Precipitation in December was well above normal at 181%, which brings the seasonal accumulation (October-December) to 111% of median. Soil moisture is at 52% saturation compared to 53% saturation last year. Reservoir storage is 67% of capacity, compared to 76% last year. Forecast streamflow volumes (50% exceedence, April-July) range from 98% to 115% of normal. The Surface Water Supply Index percentiles are 68% for the Blacks Fork, and 73% for the Smiths Fork.

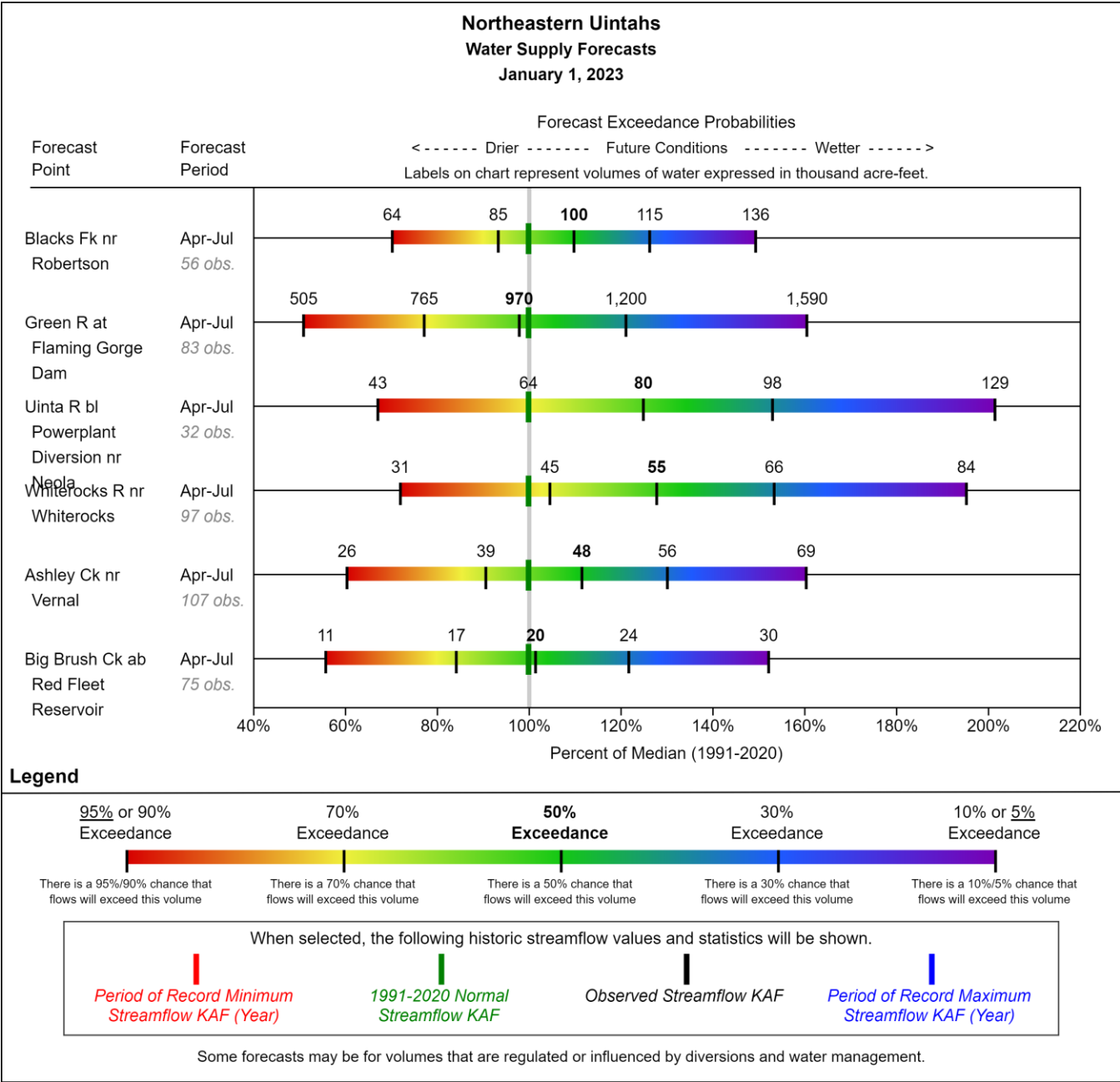


Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
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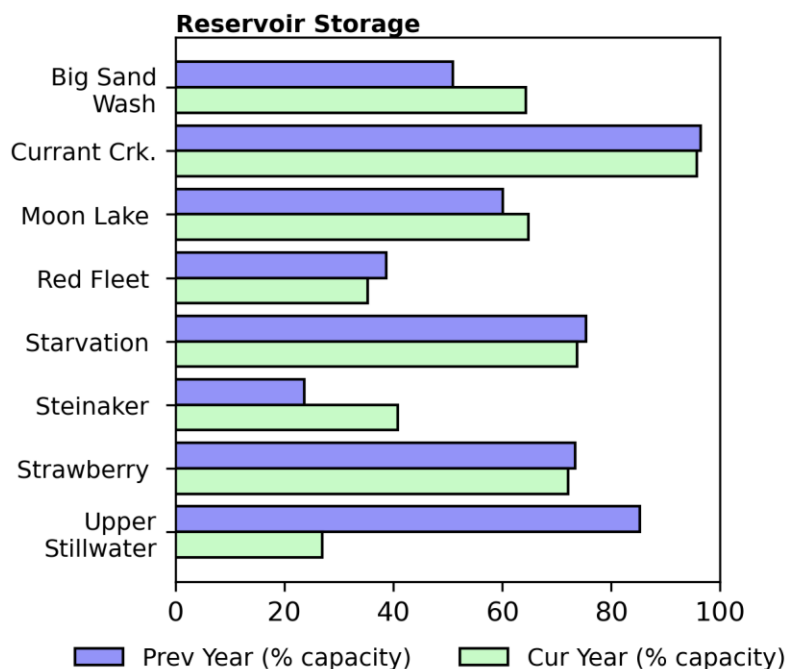
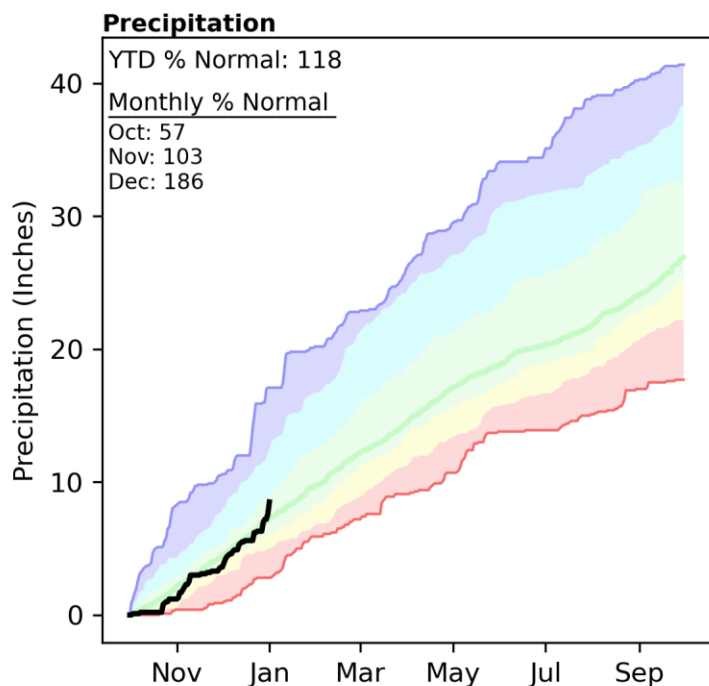
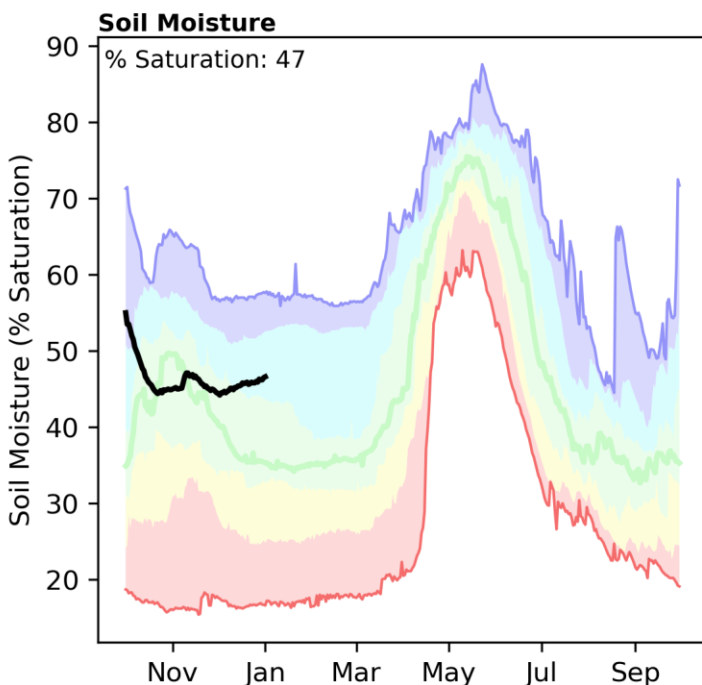
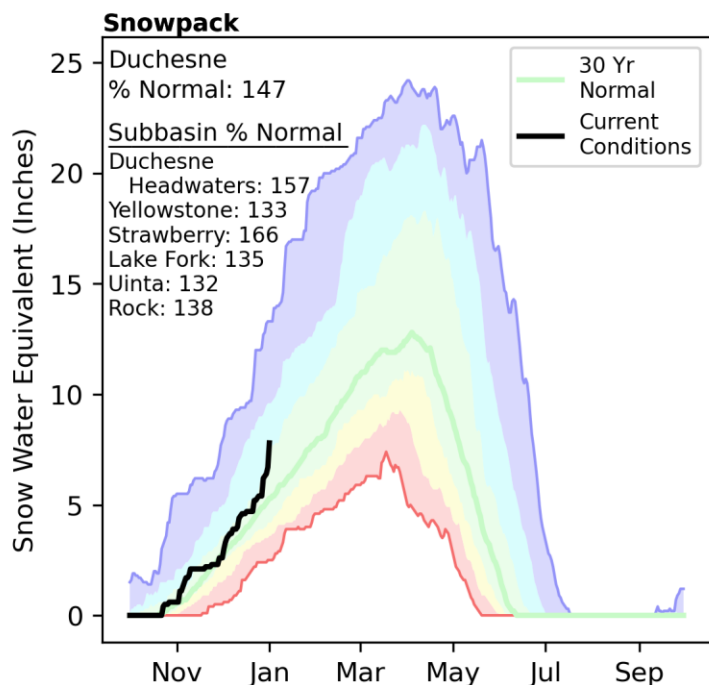
Northeastern Uintas



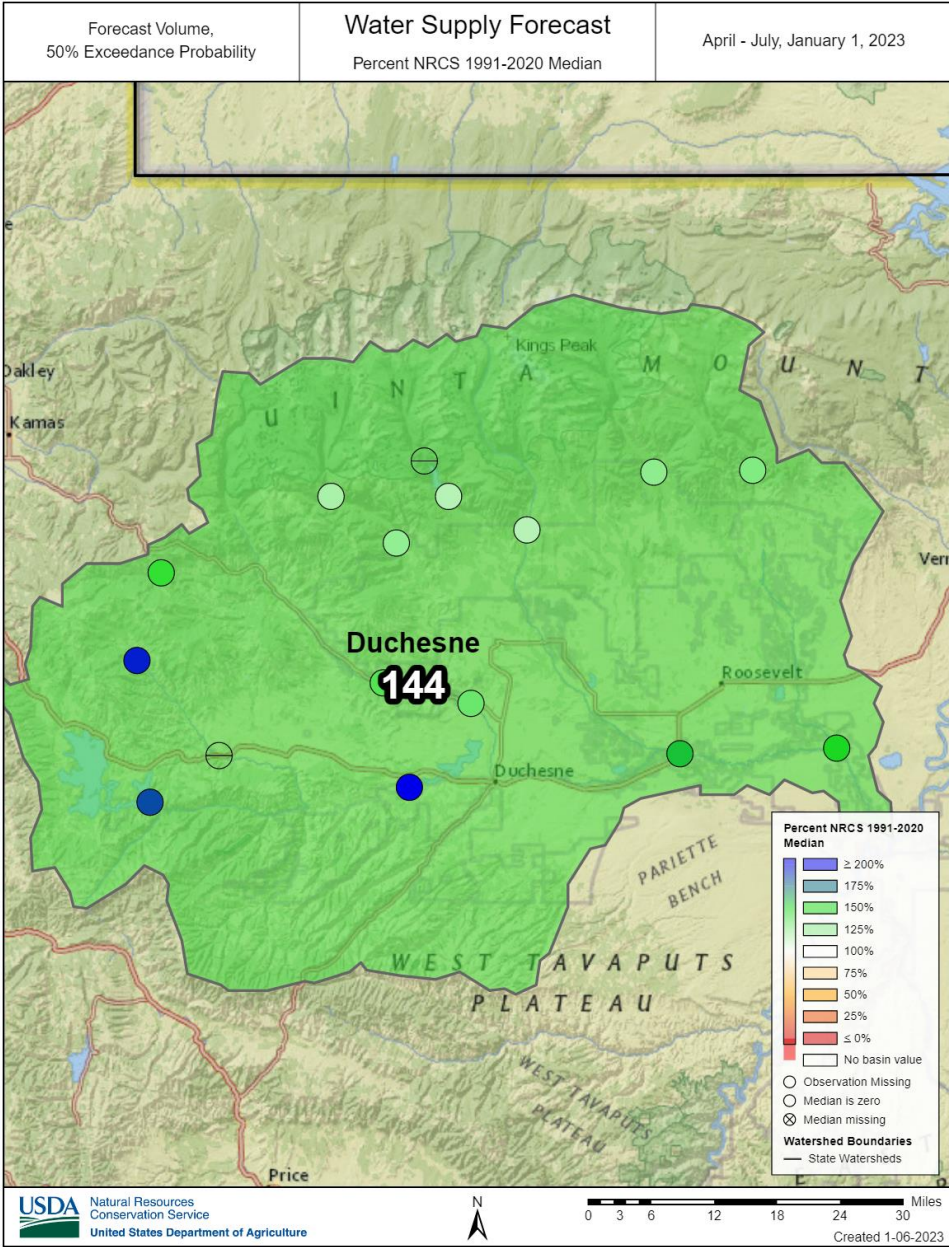
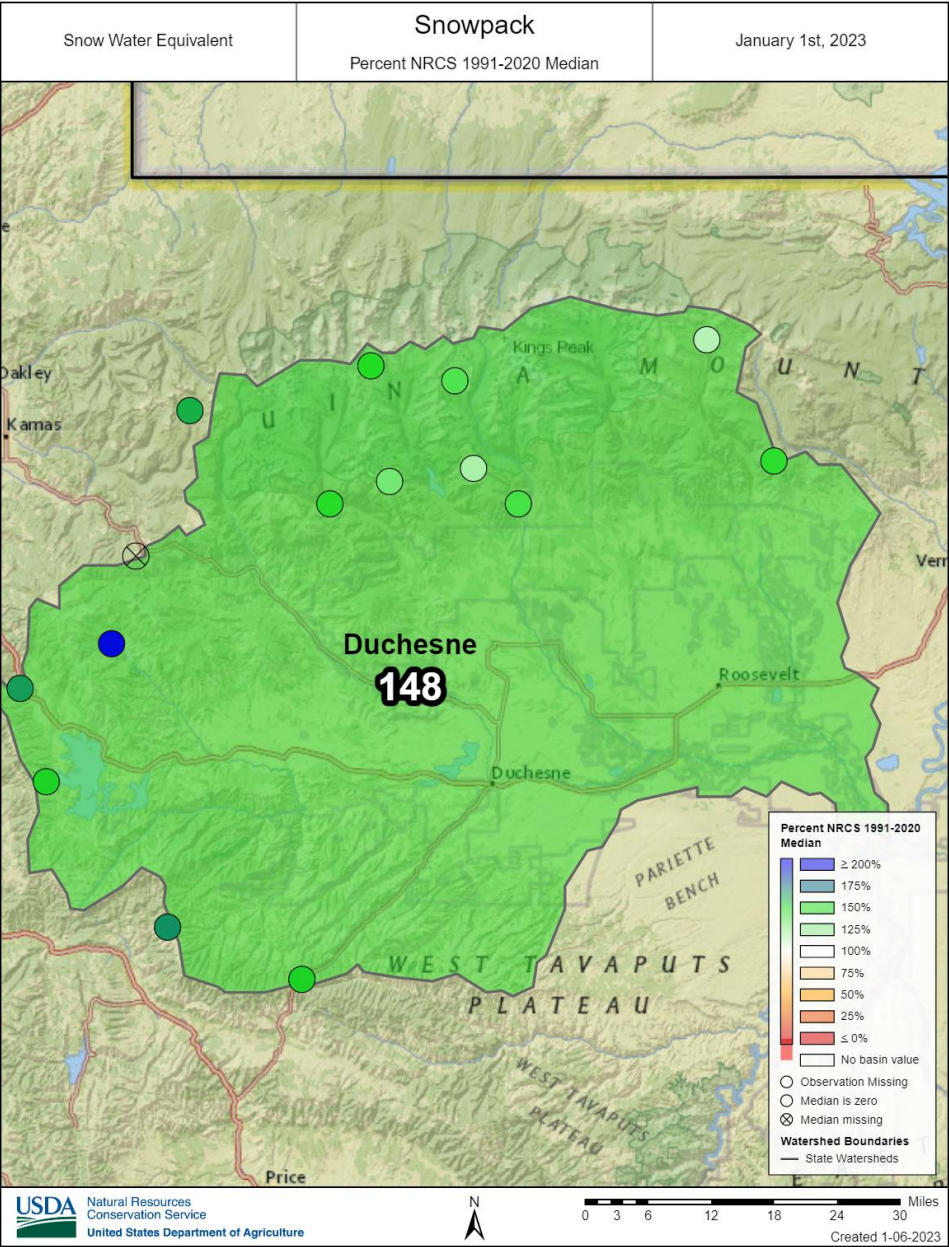
Northeastern Uintas

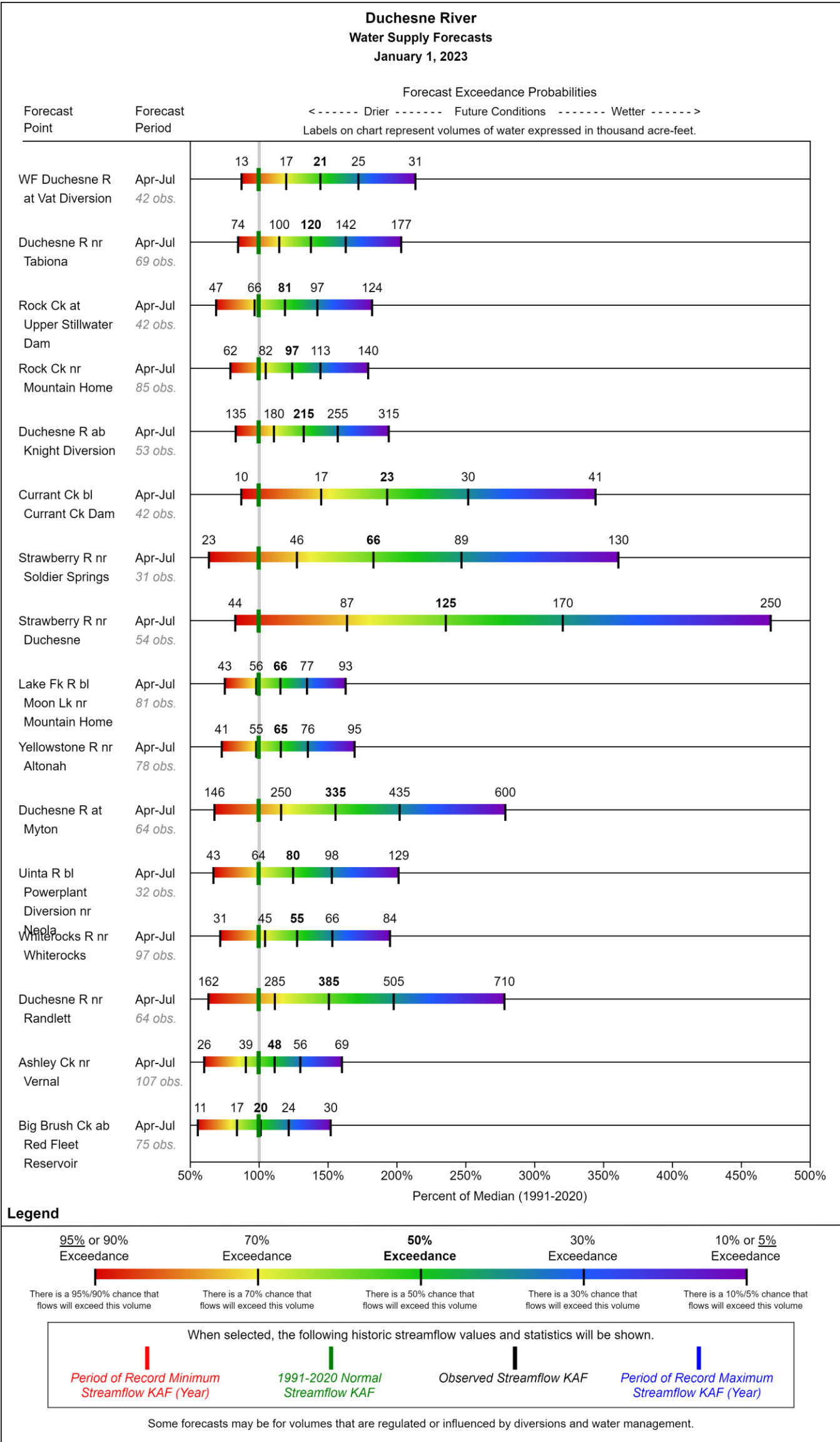


Snowpack in the Duchesne River Basin is well above normal at 147% of median, compared to 157% at this time last year. Precipitation in December was well above normal at 186%, which brings the seasonal accumulation (October-December) to 118% of median. Soil moisture is at 47% saturation compared to 52% saturation last year. Reservoir storage is 69% of capacity, compared to 71% last year. Forecast streamflow volumes (50% exceedence, April-July) range from 116% to 236% of normal. The Surface Water Supply Index percentiles are 55% for the Western Uintas, and 55% for the Eastern Uintas.



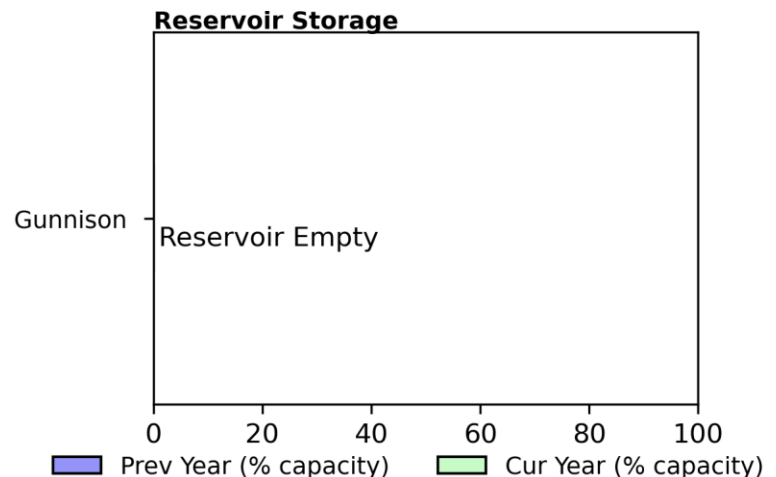
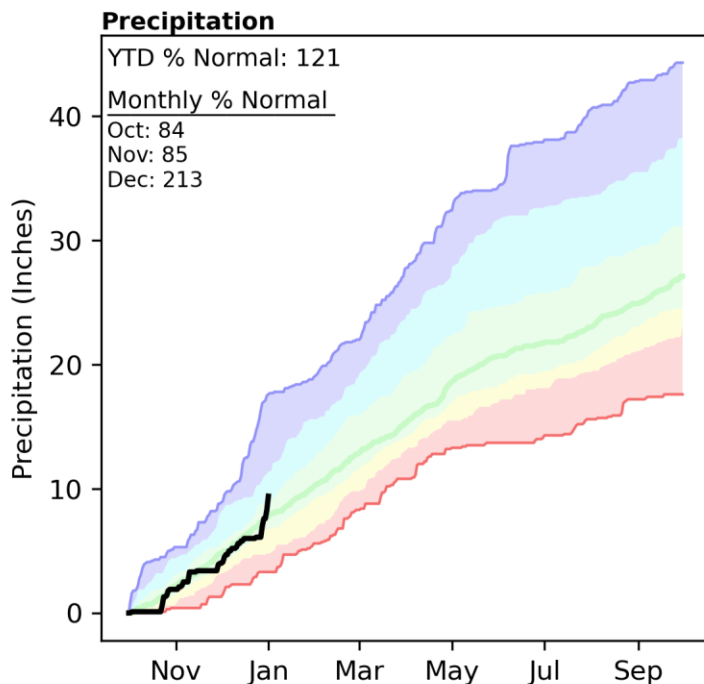
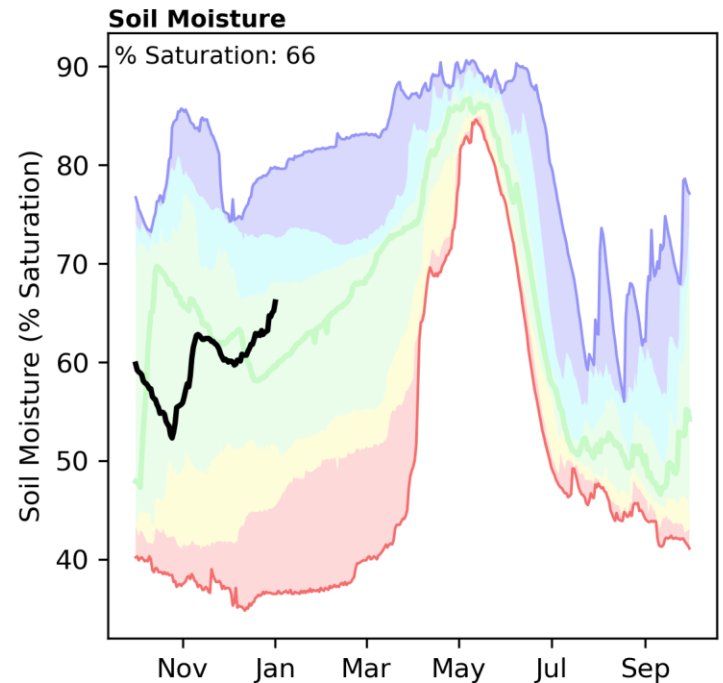
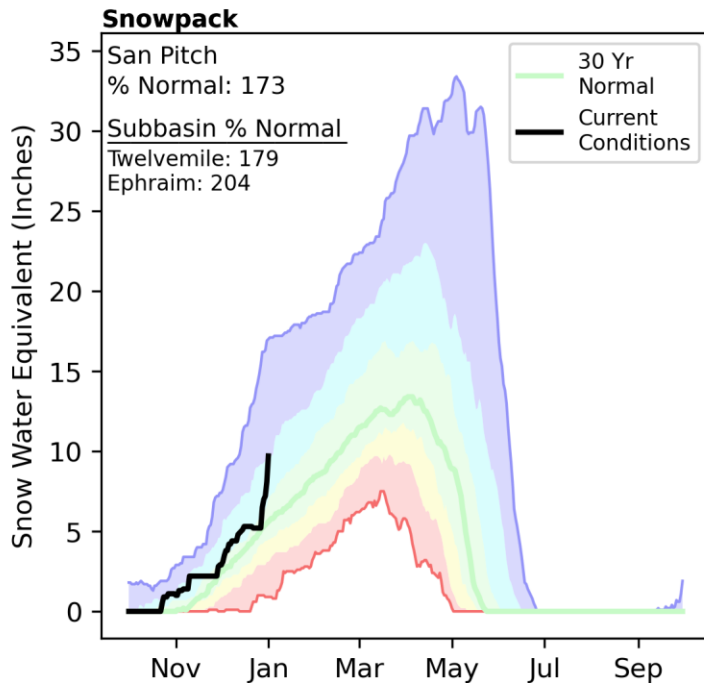
Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)





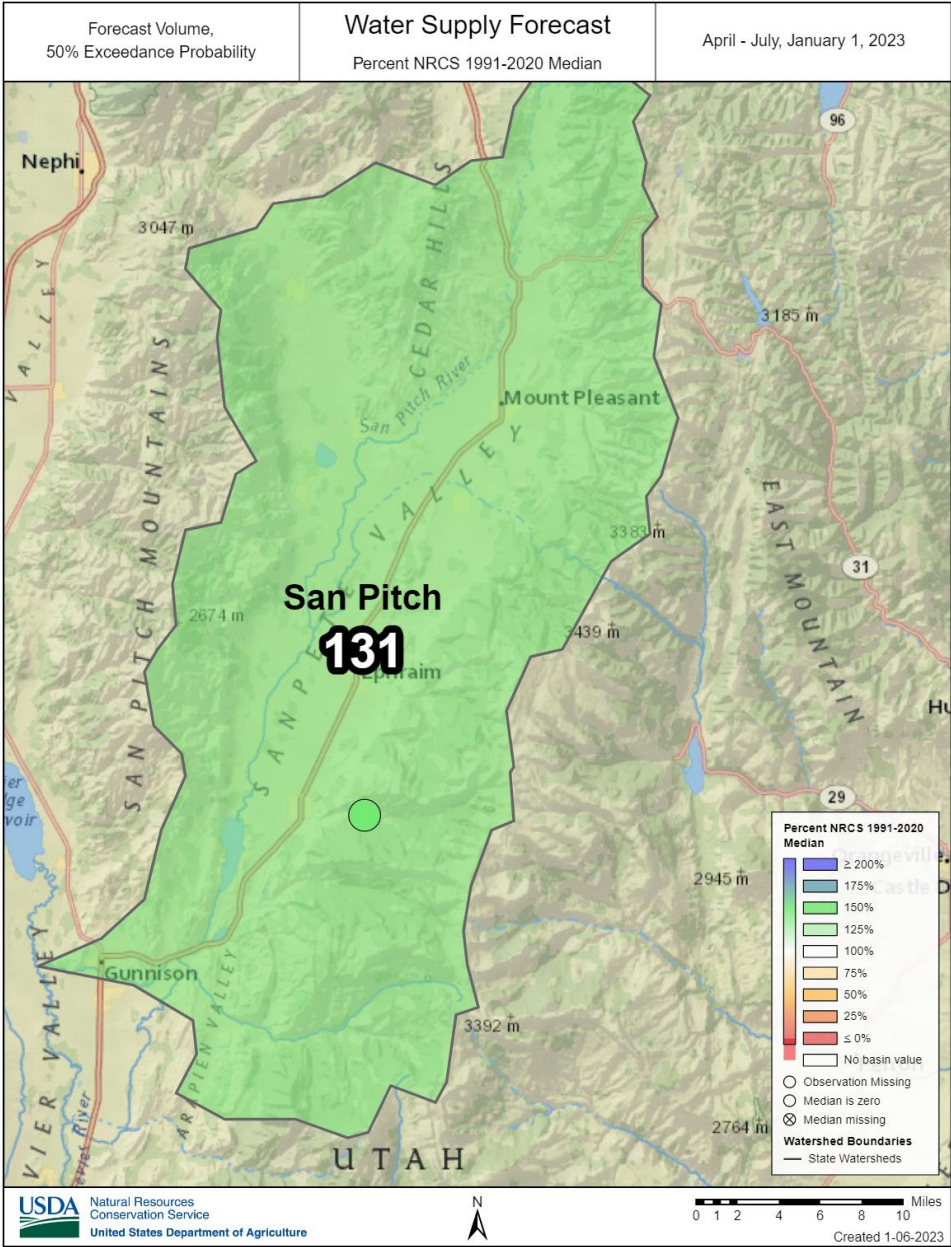
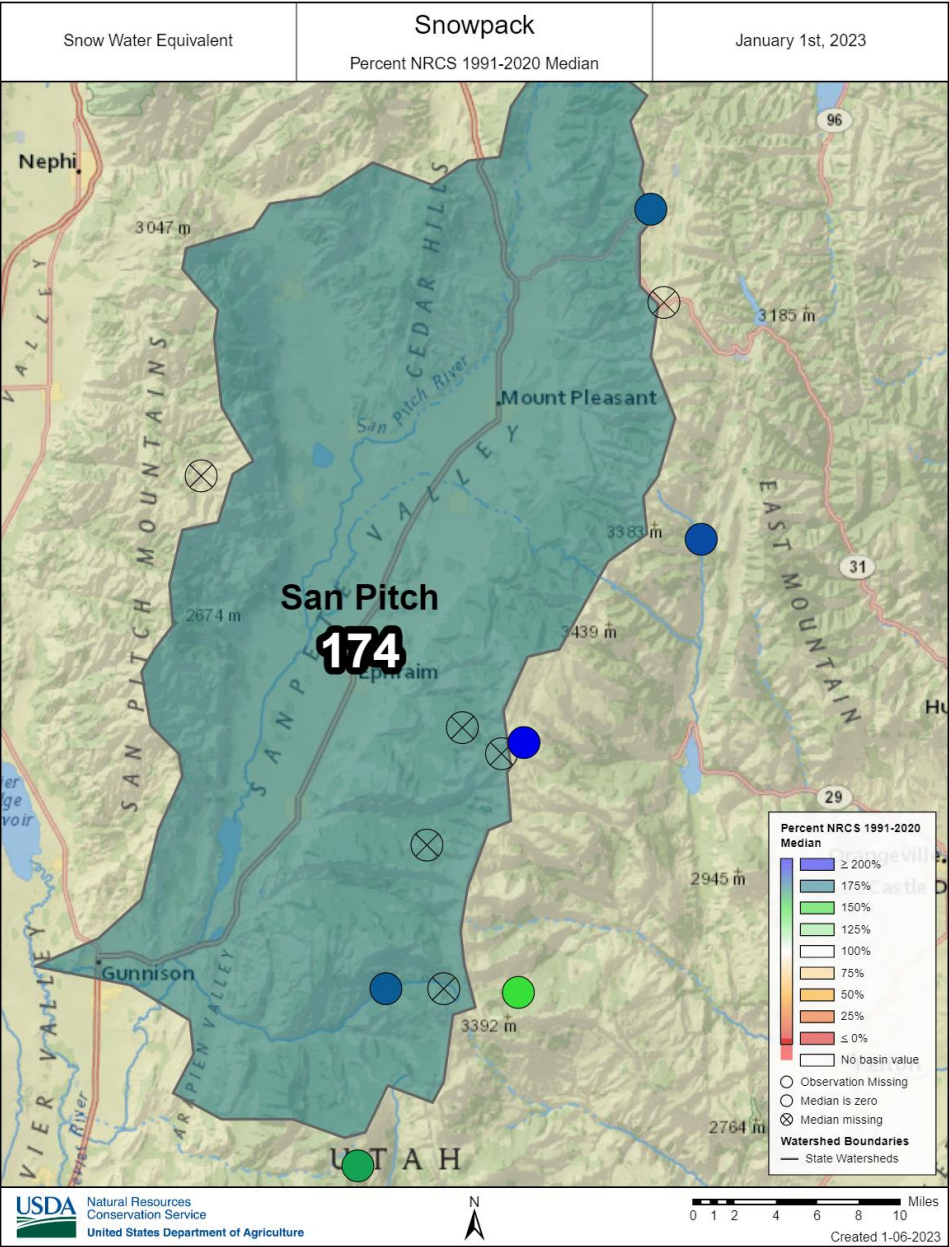
San Pitch | January 1, 2023

Snowpack in the San Pitch River Basin is well above normal at 173% of median, compared to 132% at this time last year. Precipitation in December was well above normal at 213%, which brings the seasonal accumulation (October-December) to 121% of median. Soil moisture is at 66% saturation compared to 72% saturation last year. Reservoir storage is 0% of capacity, compared to 0% last year. The forecast streamflow volume (50% exceedence, April-July) for Manti Creek is 131% of normal. The Surface Water Supply Index percentile is 43% for the San Pitch.



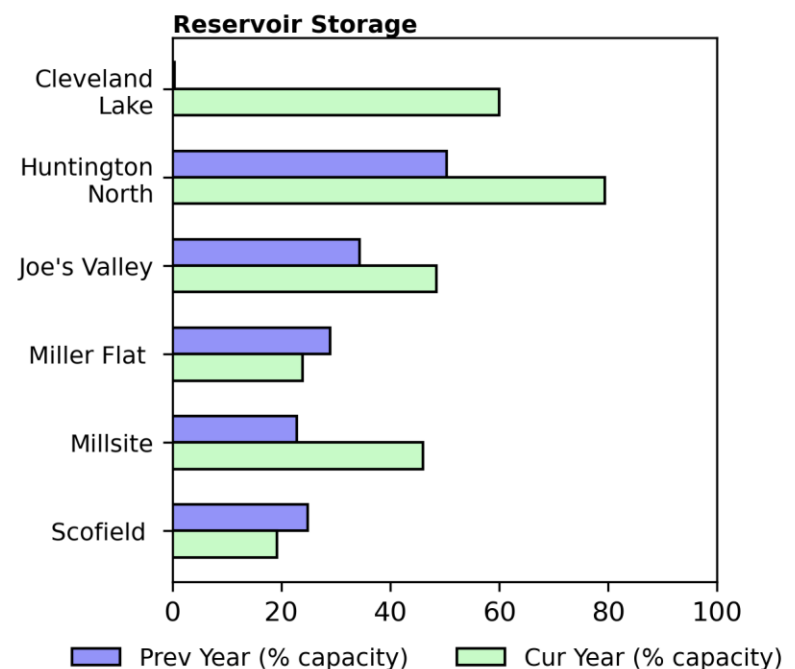
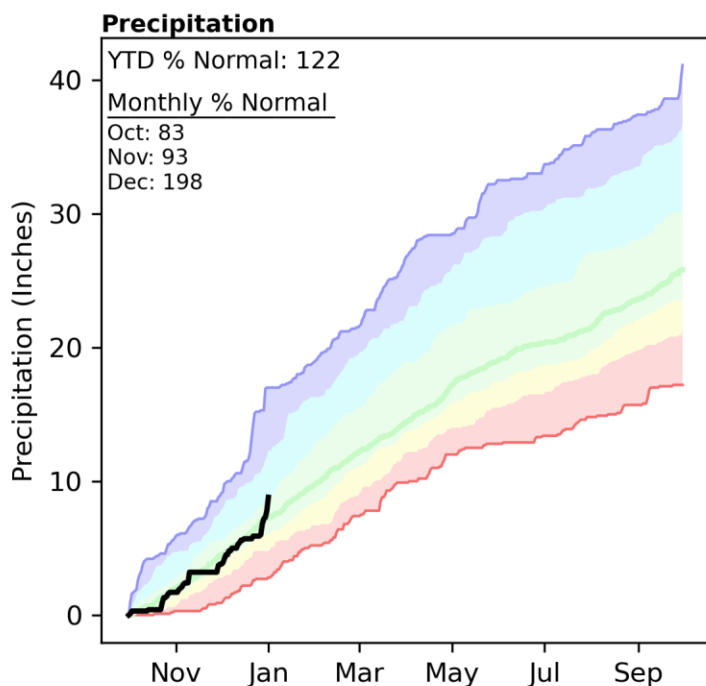
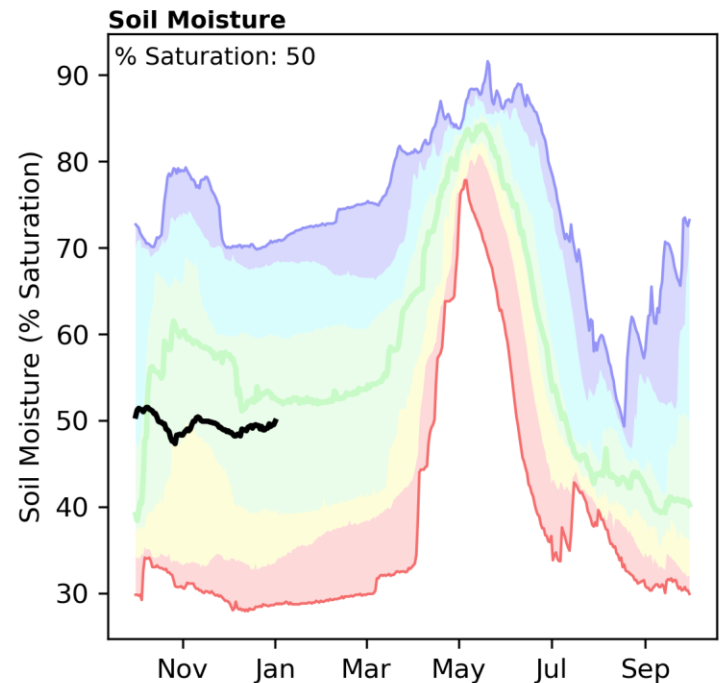
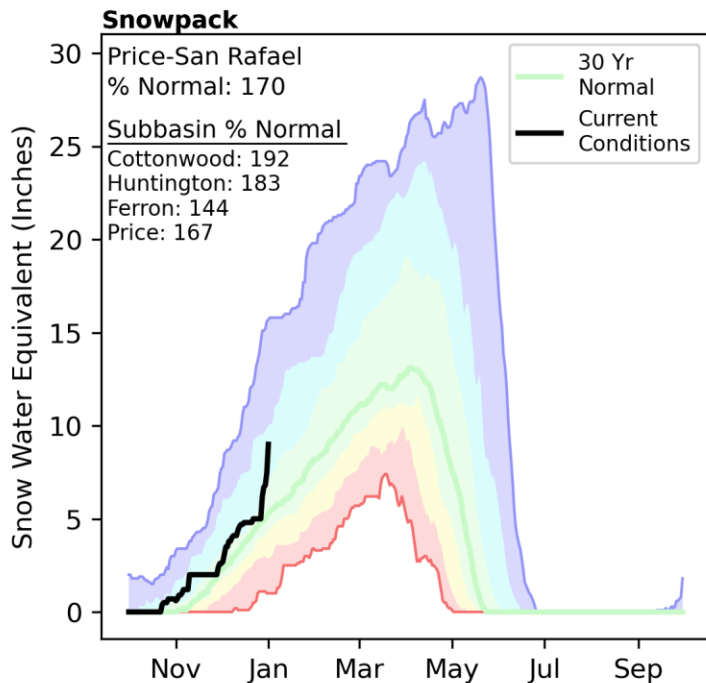
Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

San Pitch



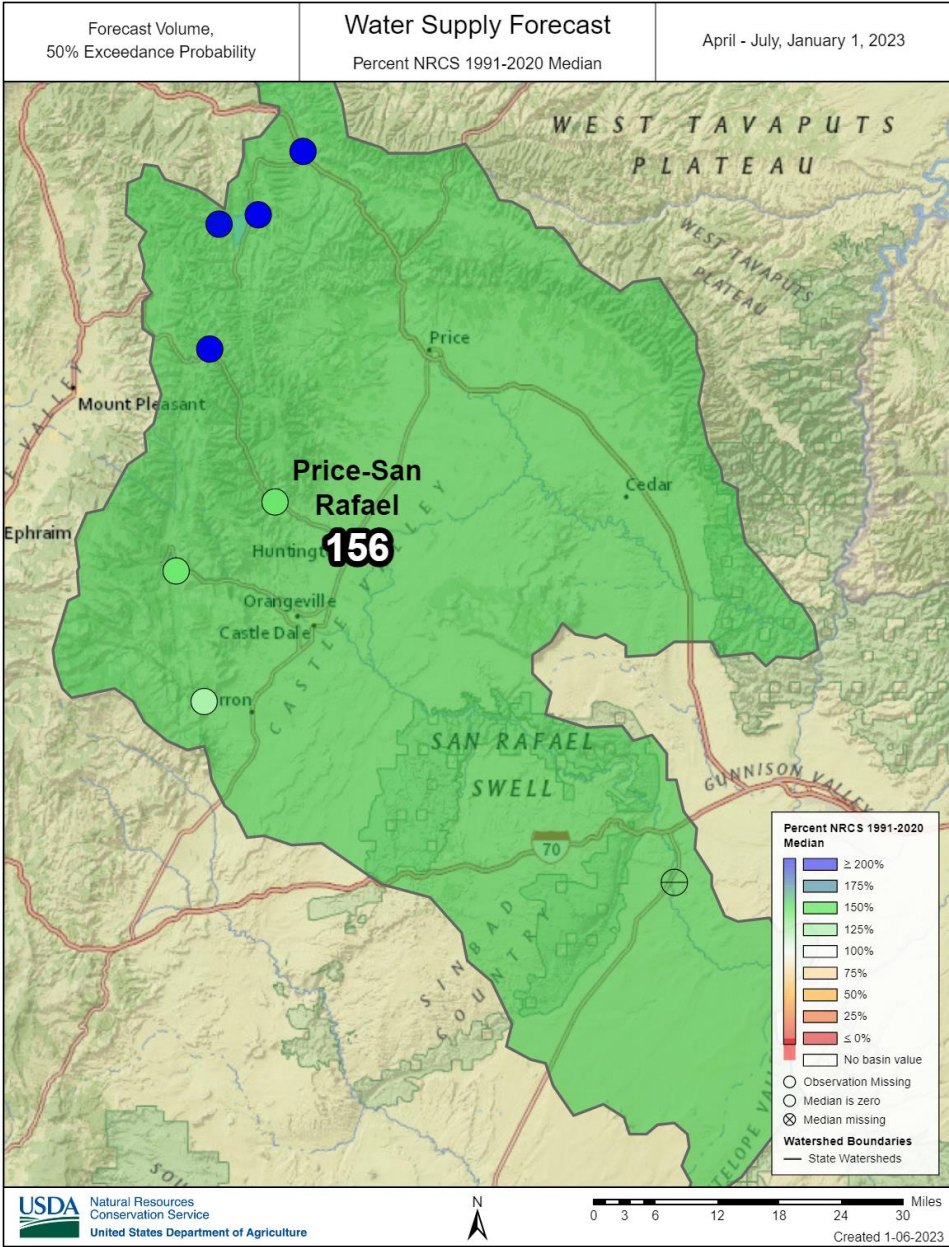
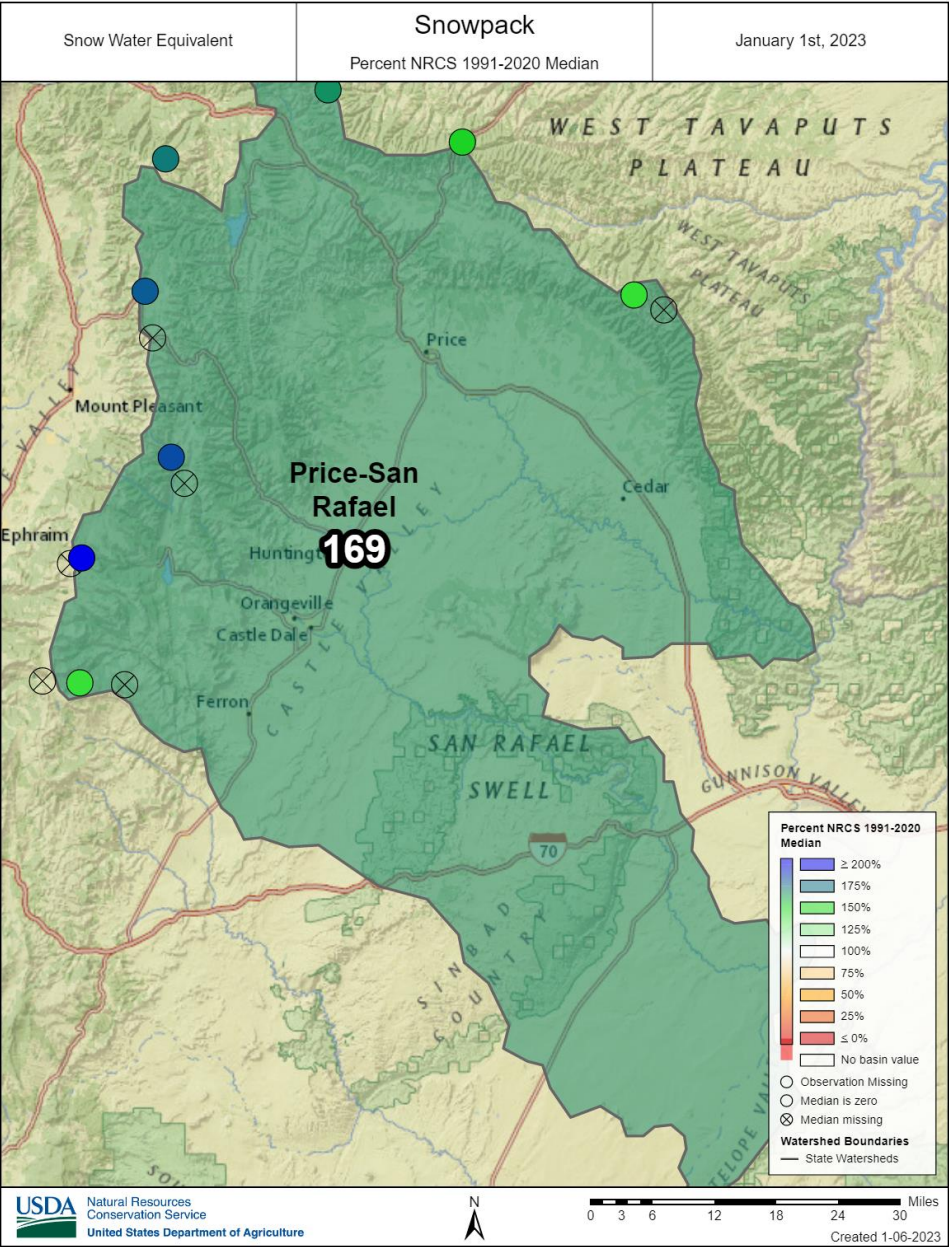
Price-San Rafael | January 1, 2023

Snowpack in the Price and San Rafael River Basins is well above normal at 170% of median, compared to 147% at this time last year. Precipitation in December was well above normal at 198%, which brings the seasonal accumulation (October-December) to 122% of median. Soil moisture is at 50% saturation compared to 65% saturation last year. Reservoir storage is 36% of capacity, compared to 28% last year. Forecast streamflow volumes (50% exceedence, April-July) range from 119% to 264% of normal. The Surface Water Supply Index percentiles are 64% for the Price, 57% for Joes Valley, and 55% for Ferron Creek.

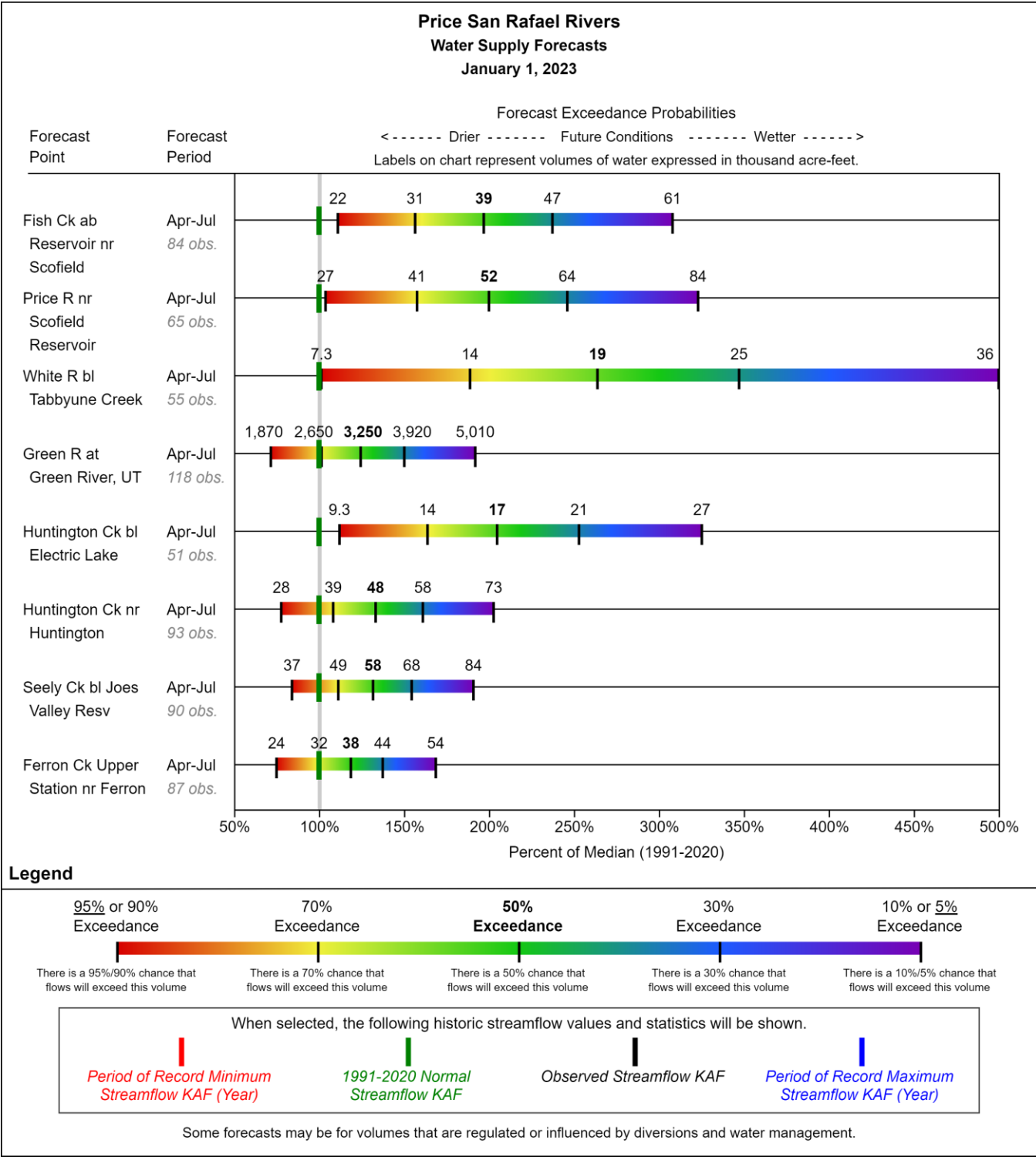


Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

Price San-Rafael

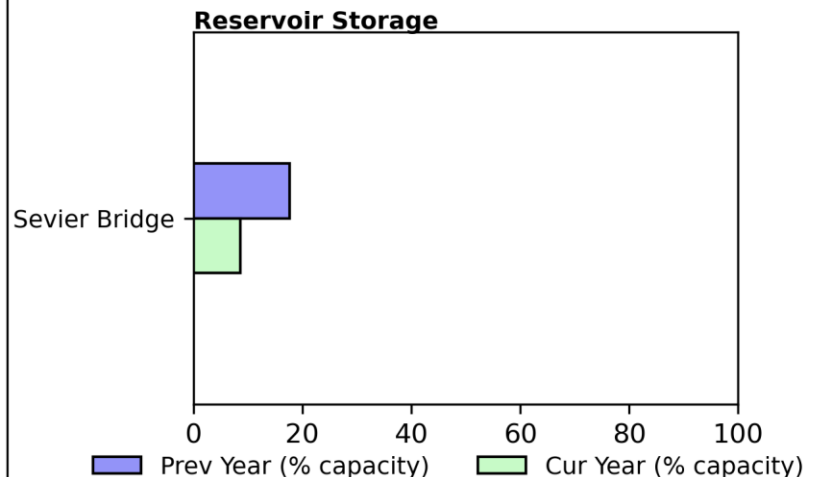
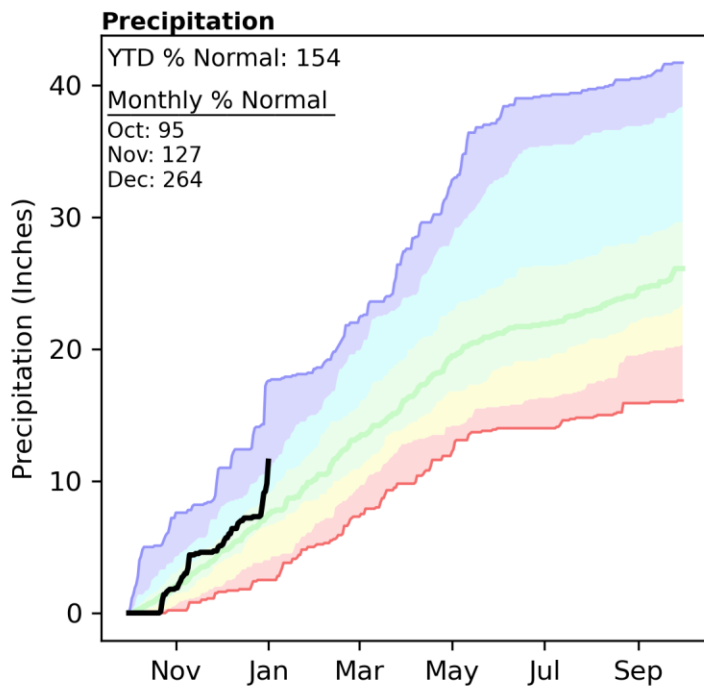
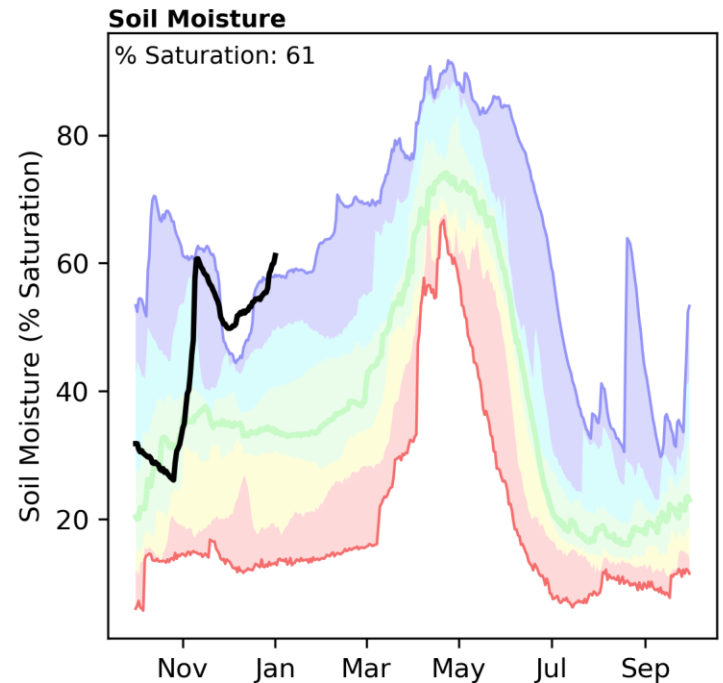
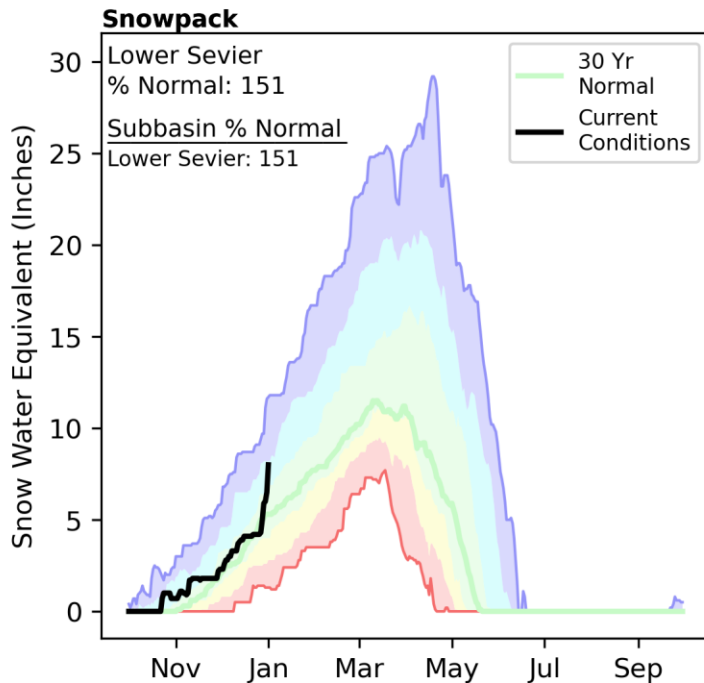


Price-San Rafael



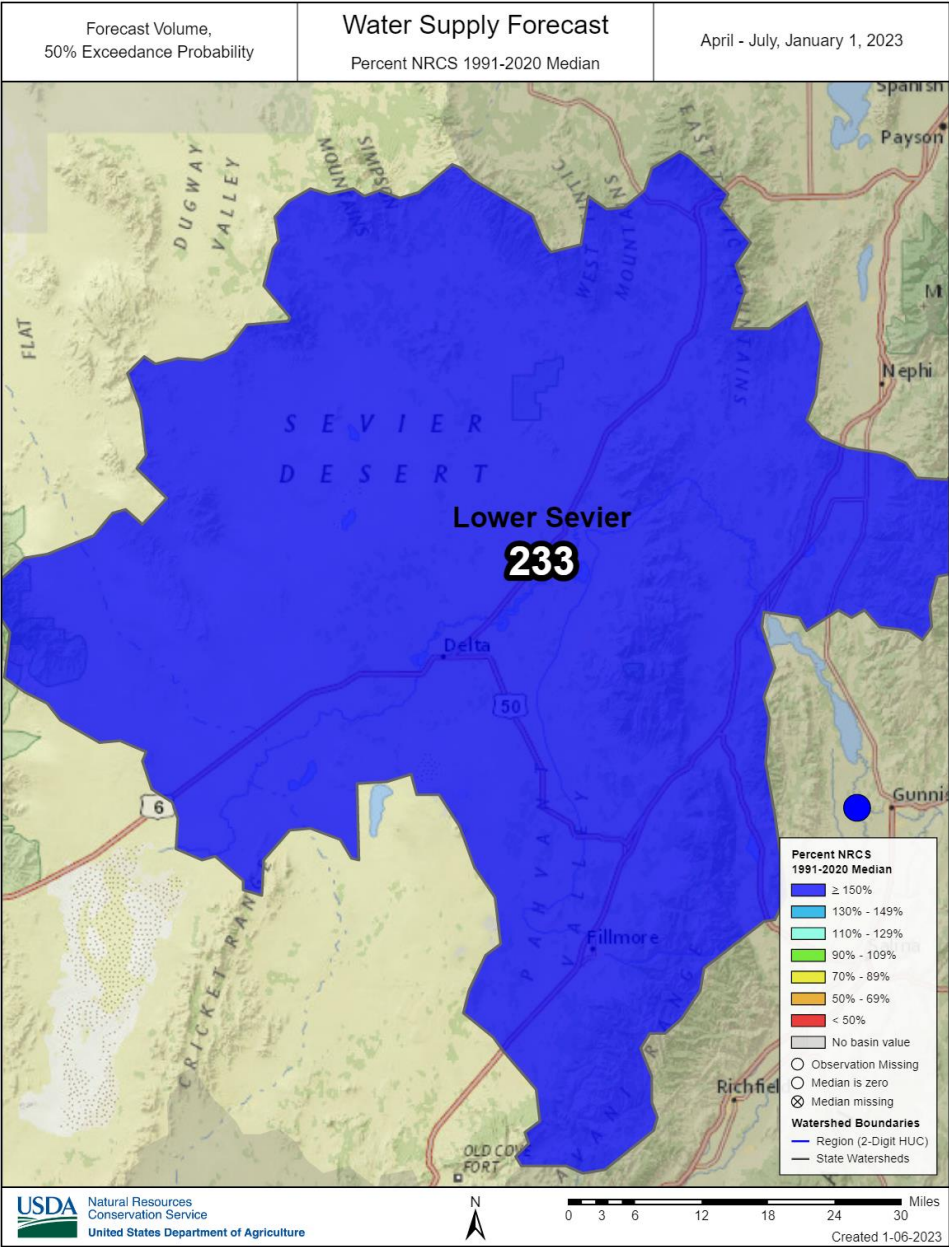
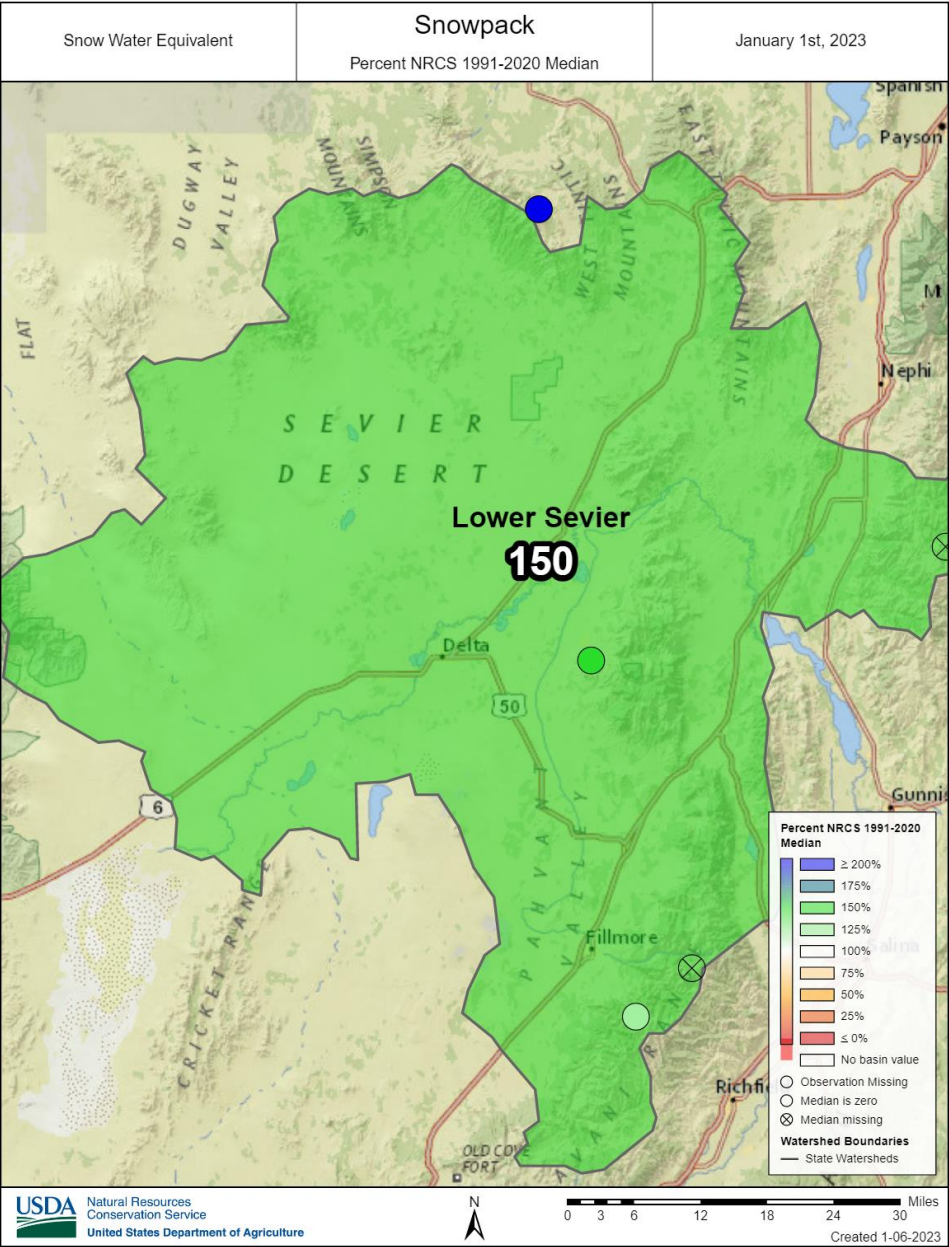
Lower Sevier | January 1, 2023

Snowpack in the Lower Sevier River Basin is well above normal at 151% of median, compared to 142% at this time last year. Precipitation in December was well above normal at 264%, which brings the seasonal accumulation (October-December) to 154% of median. Soil moisture is at 61% saturation compared to 50% saturation last year. Reservoir storage is 8% of capacity, compared to 17% last year. Forecast streamflow volume (50% exceedence, April-July) for the Sevier River near Gunnison is 233% of normal. The Surface Water Supply Index percentile is 16% for the Lower Sevier.

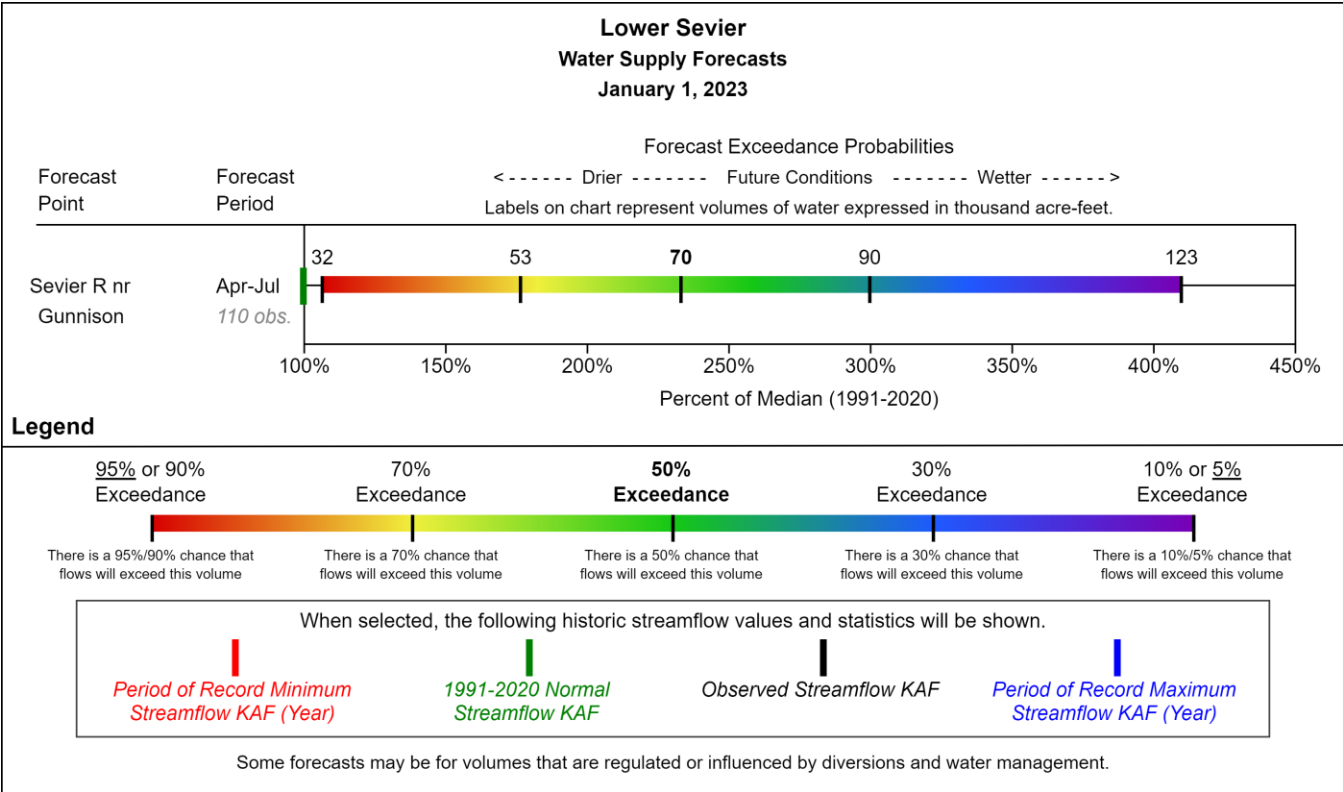


Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

Lower Sevier

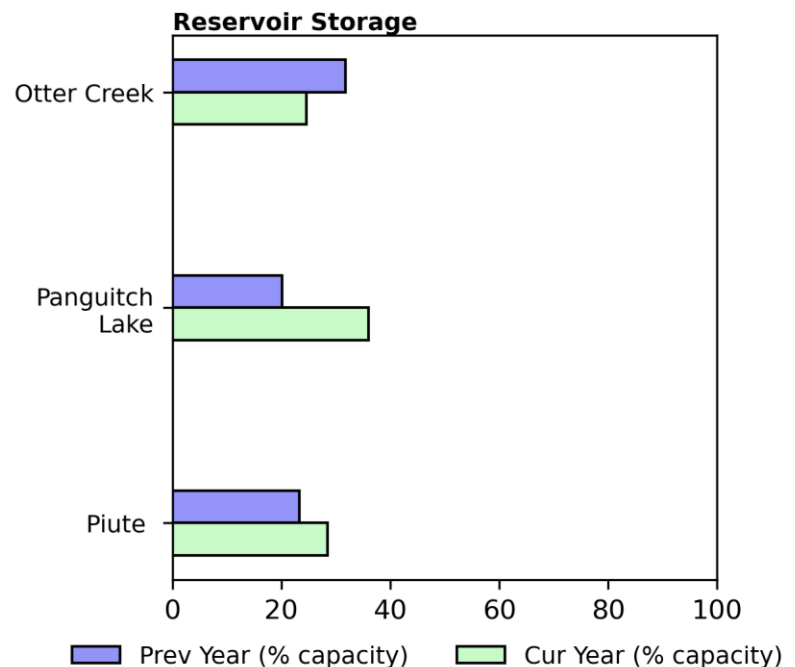
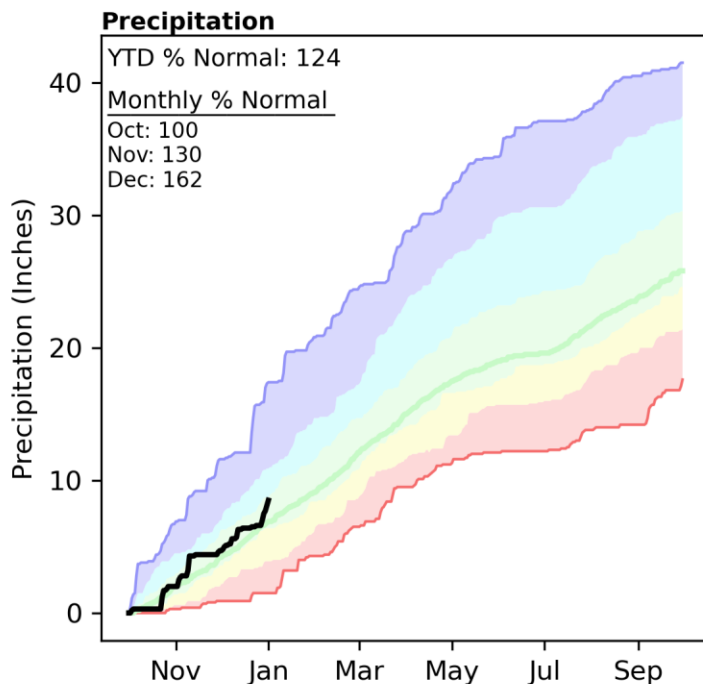
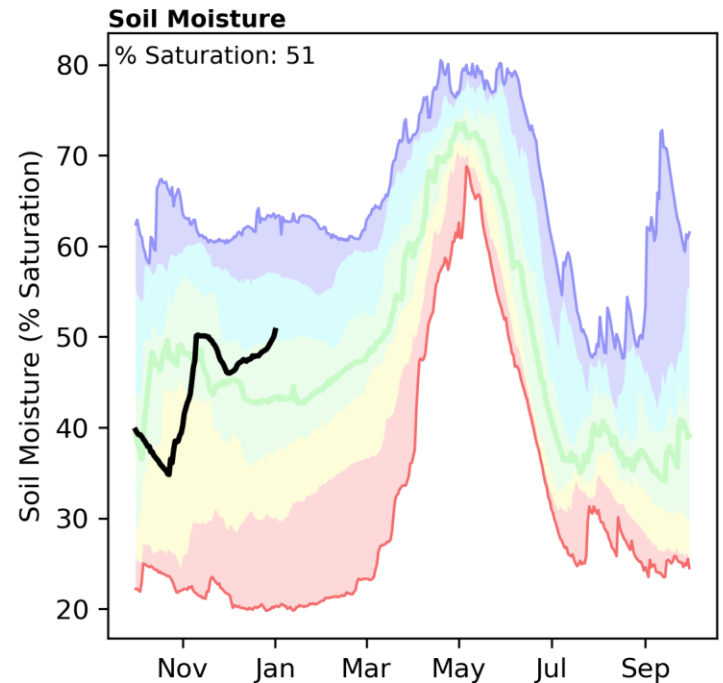
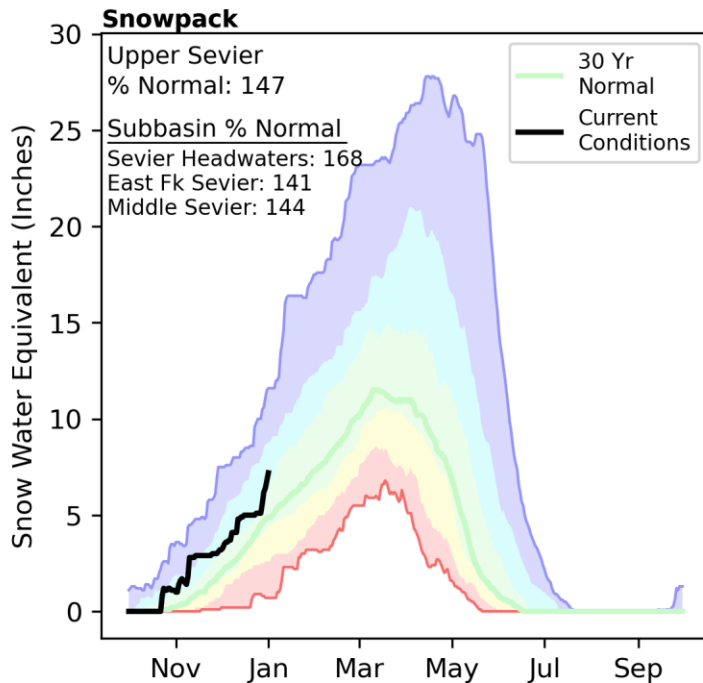


Lower Sevier



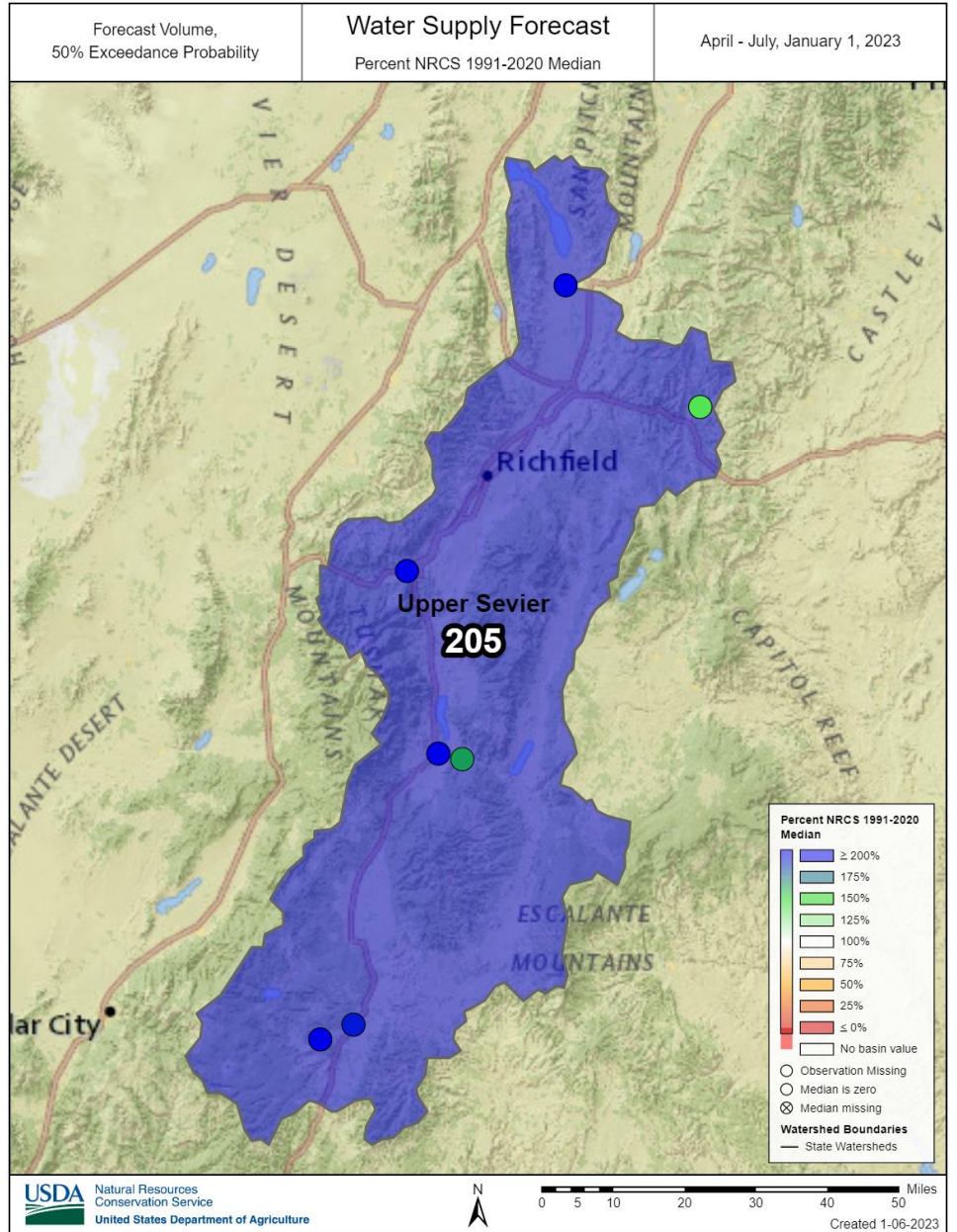
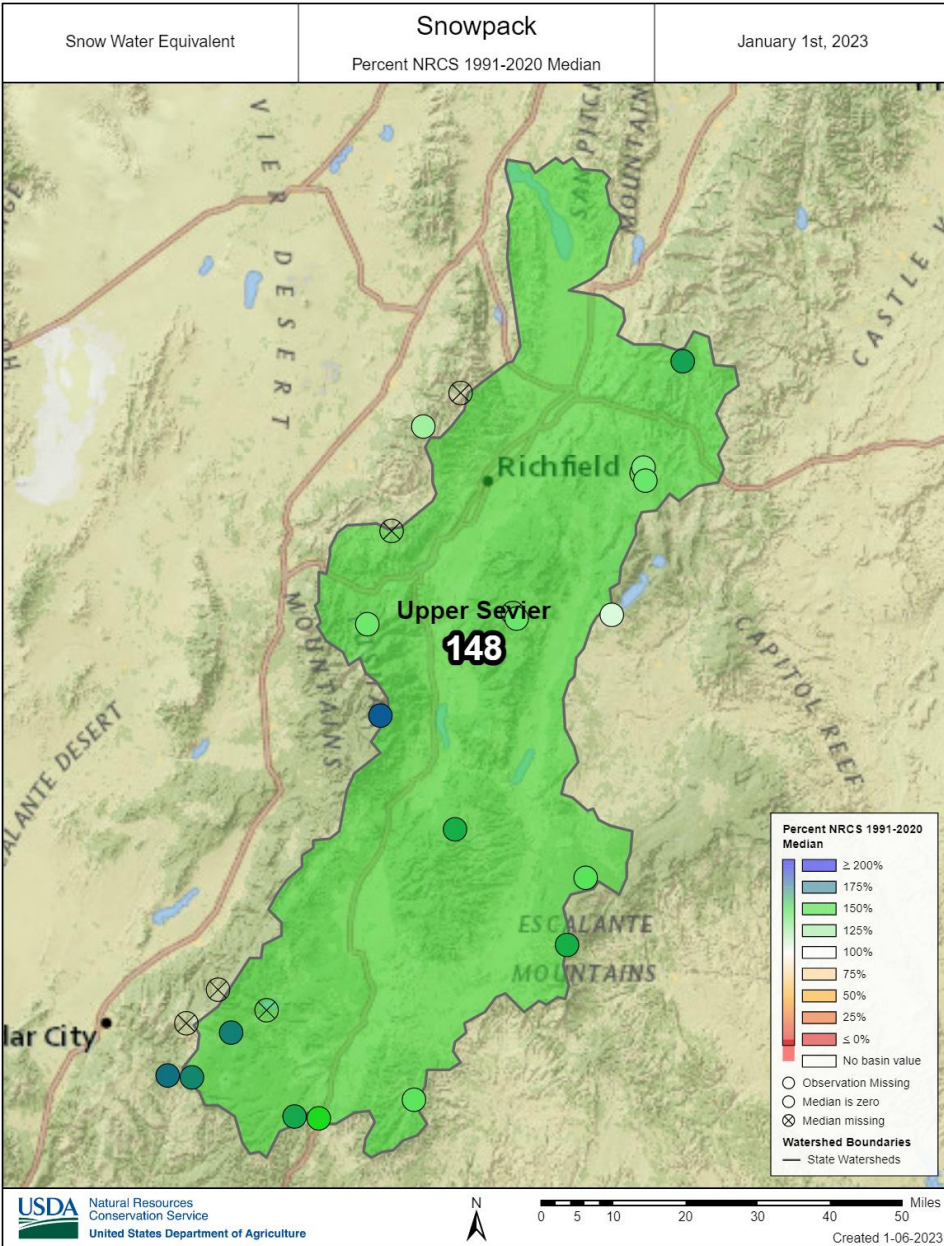
Upper Sevier | January 1, 2023

Snowpack in the Upper Sevier River Basin is well above normal at 147% of median, compared to 159% at this time last year. Precipitation in December was well above normal at 162%, which brings the seasonal accumulation (October-December) to 124% of median. Soil moisture is at 51% saturation compared to 48% saturation last year. Reservoir storage is 28% of capacity, compared to 25% last year. Forecast streamflow volumes (50% exceedence, April-July) range from 138% to 233% of normal. The Surface Water Supply Index percentile is 39% for the Upper Sevier.

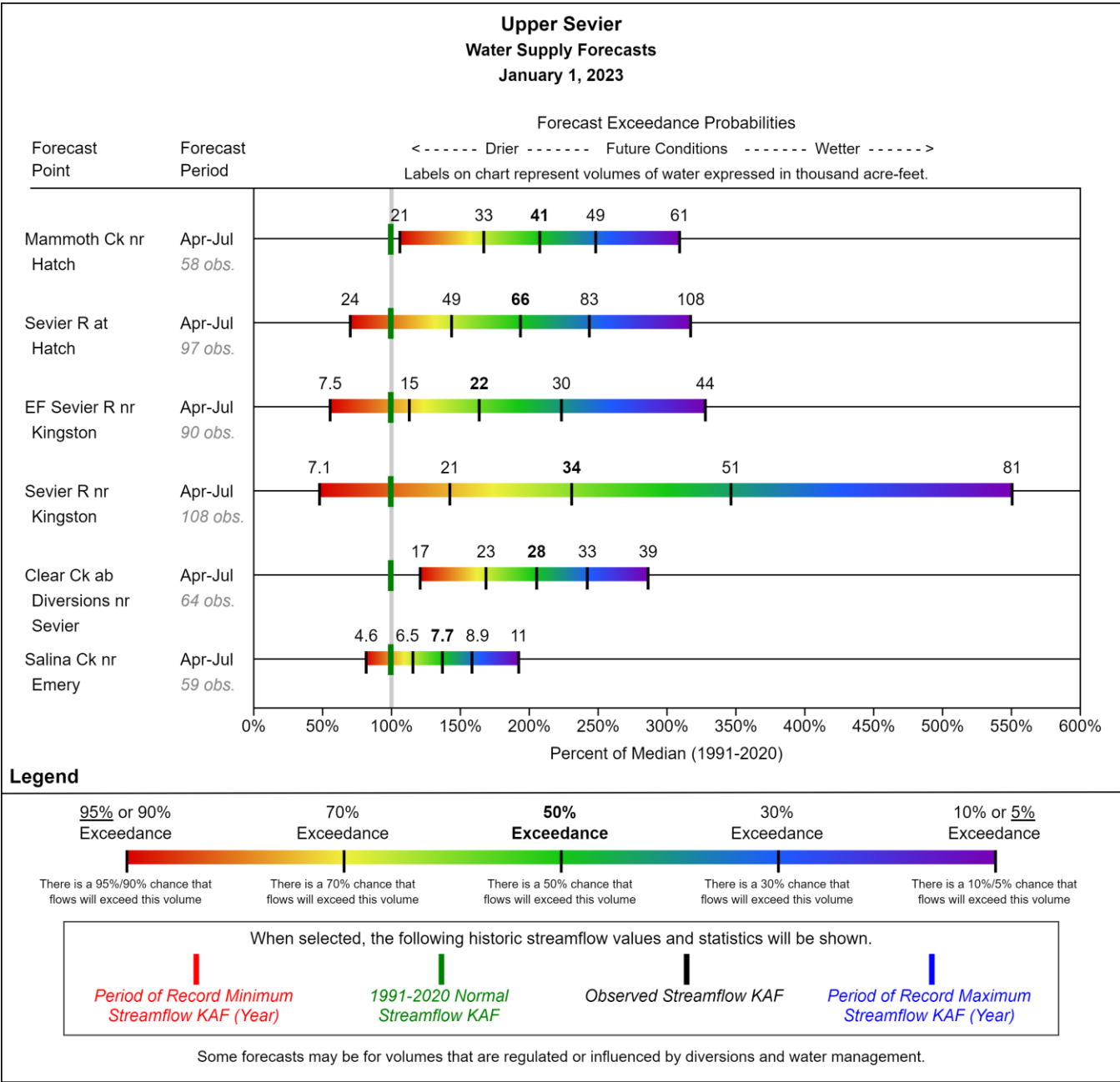


Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

Upper Sevier

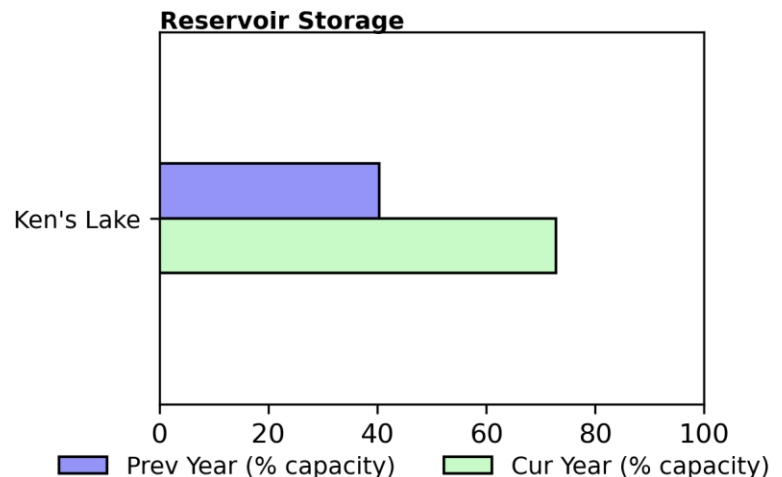
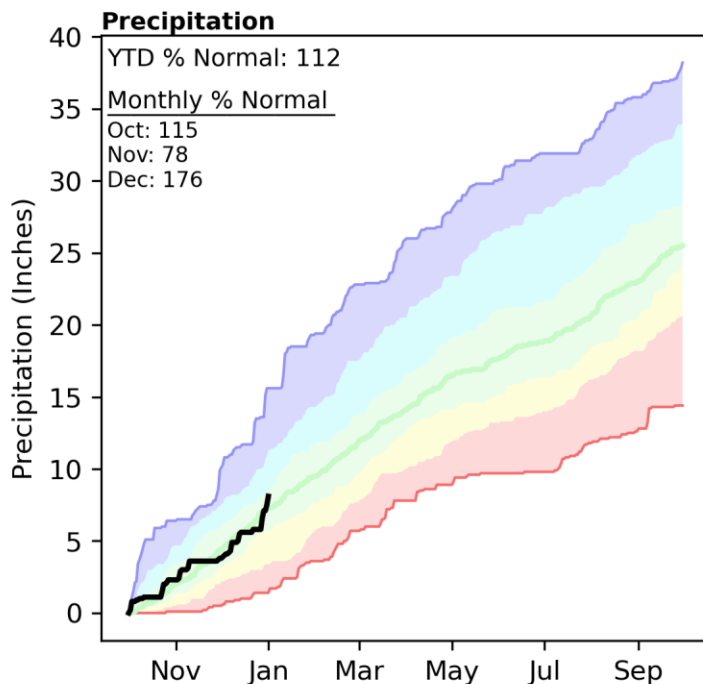
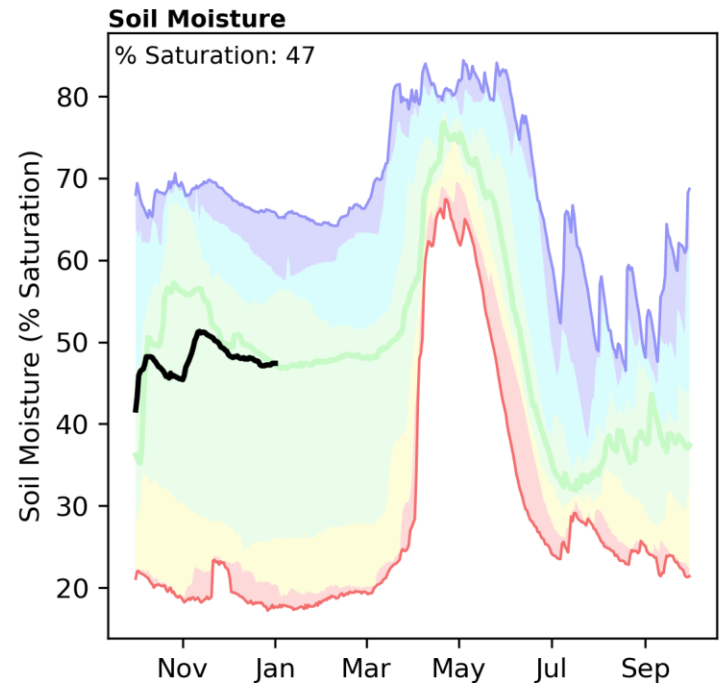
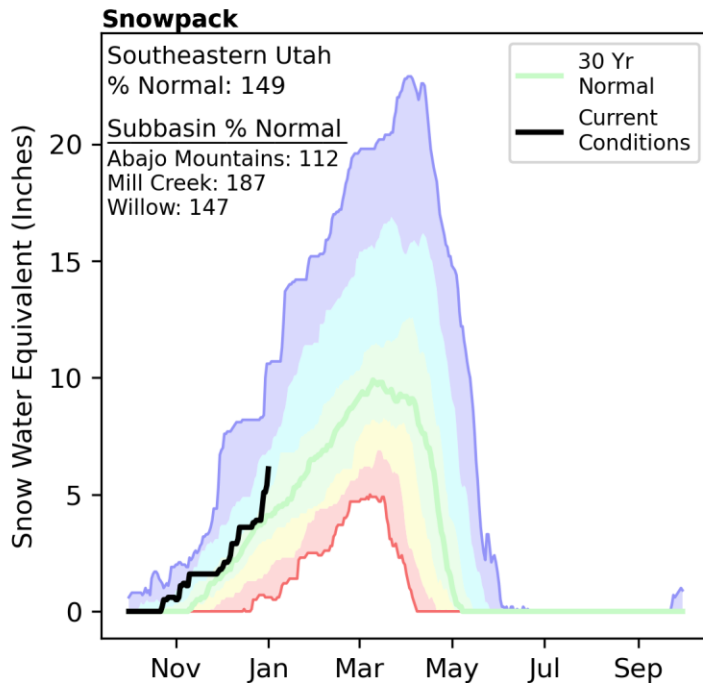


Upper Sevier



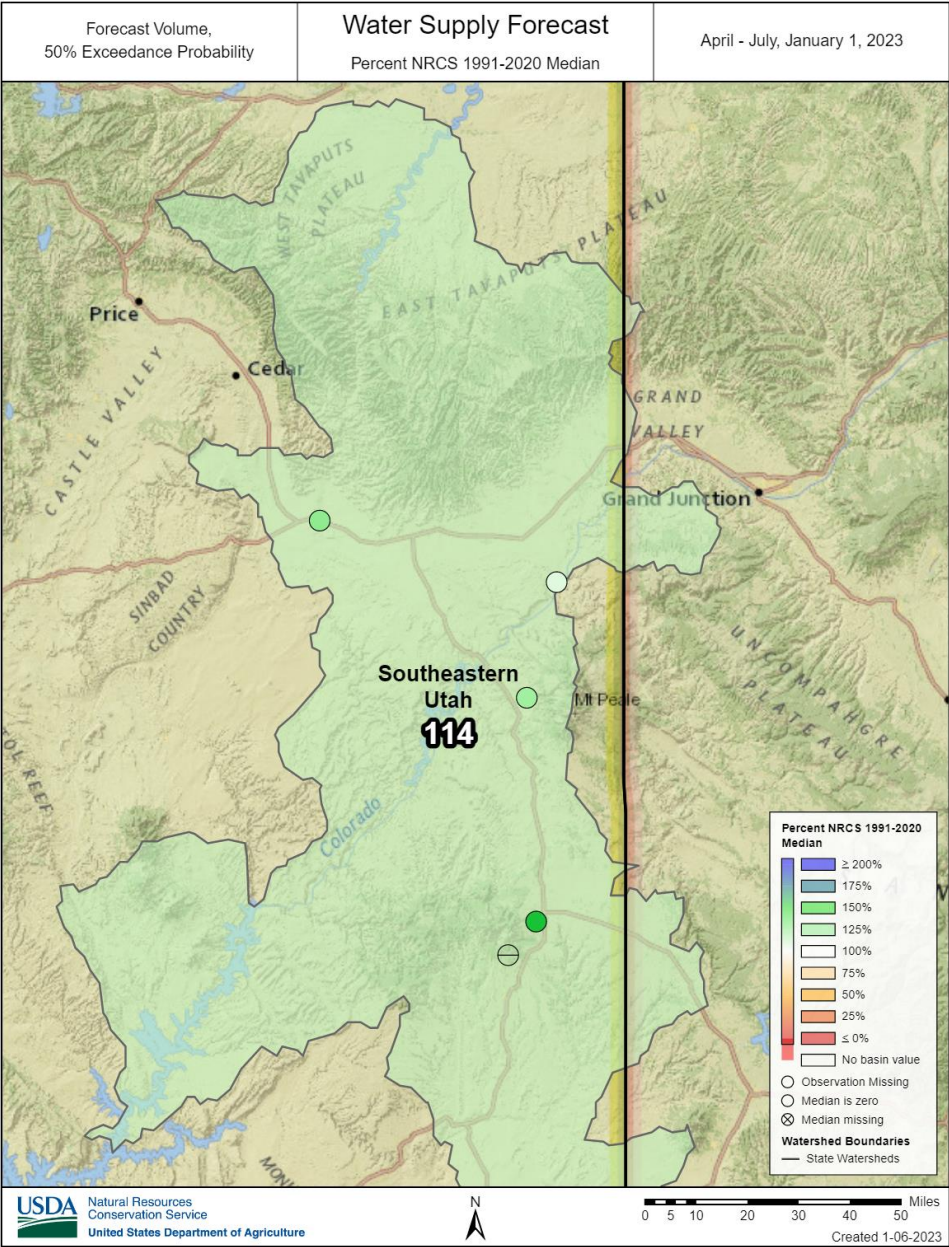
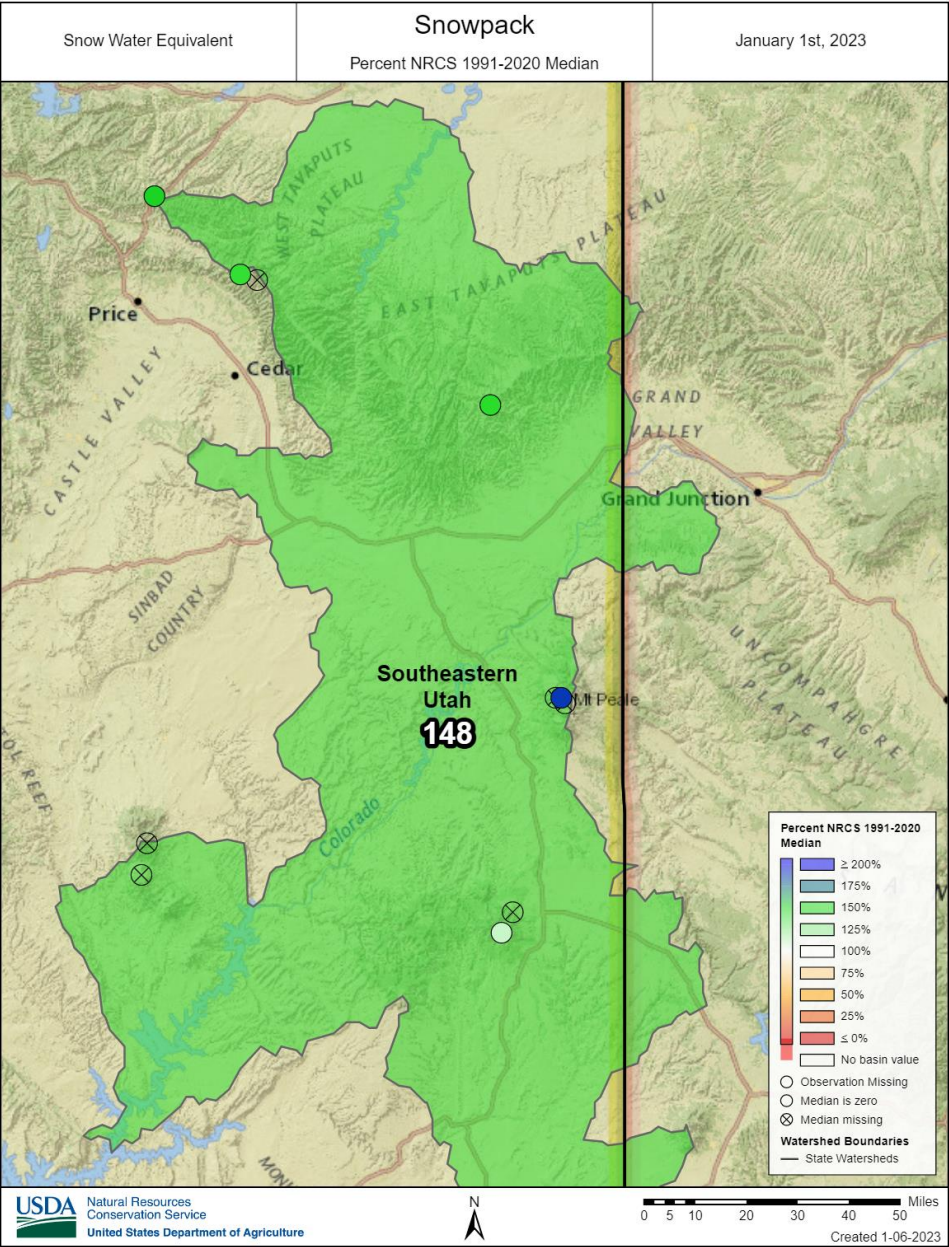
Southeastern Utah | January 1, 2023

Snowpack in Southeastern Utah is well above normal at 149% of median, compared to 163% at this time last year. Precipitation in December was well above normal at 176%, which brings the seasonal accumulation (October-December) to 112% of median. Soil moisture is at 47% saturation compared to 56% saturation last year. Reservoir storage is 72% of capacity, compared to 40% last year. Forecast streamflow volumes (50% exceedence, April-July) range from 107% to 156% of normal. The Surface Water Supply Index percentile is 68% for Moab.



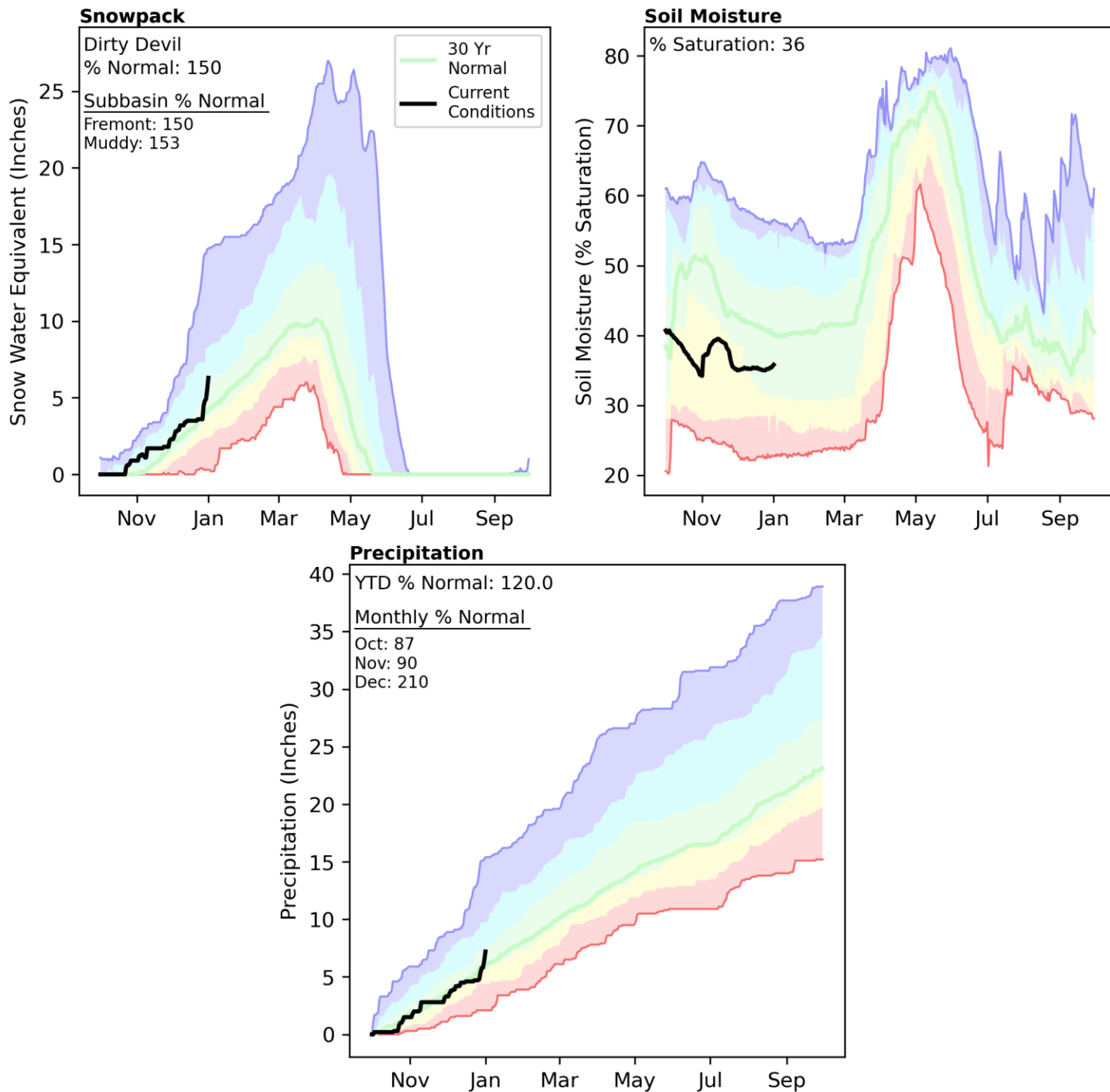
Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

Southeastern Utah



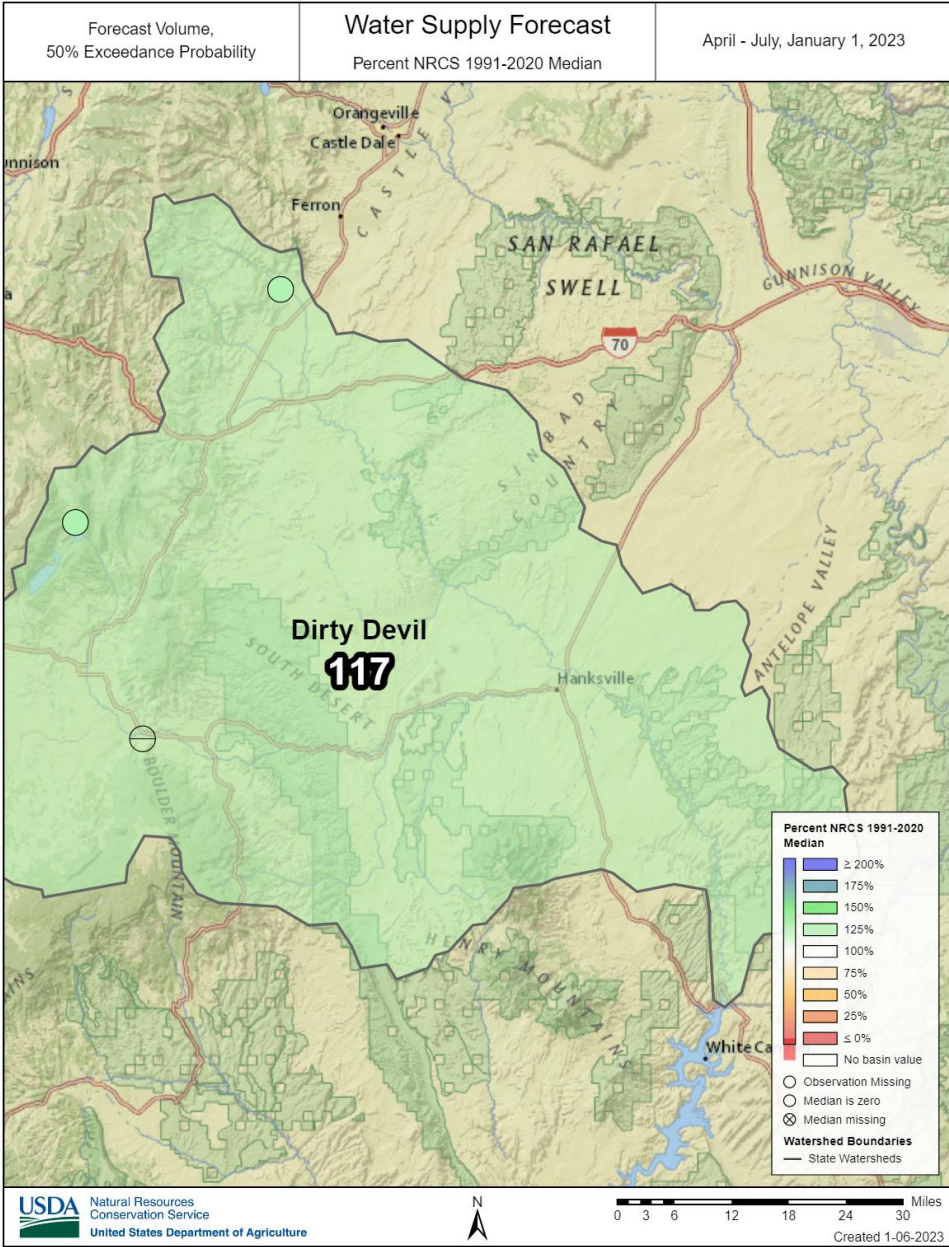
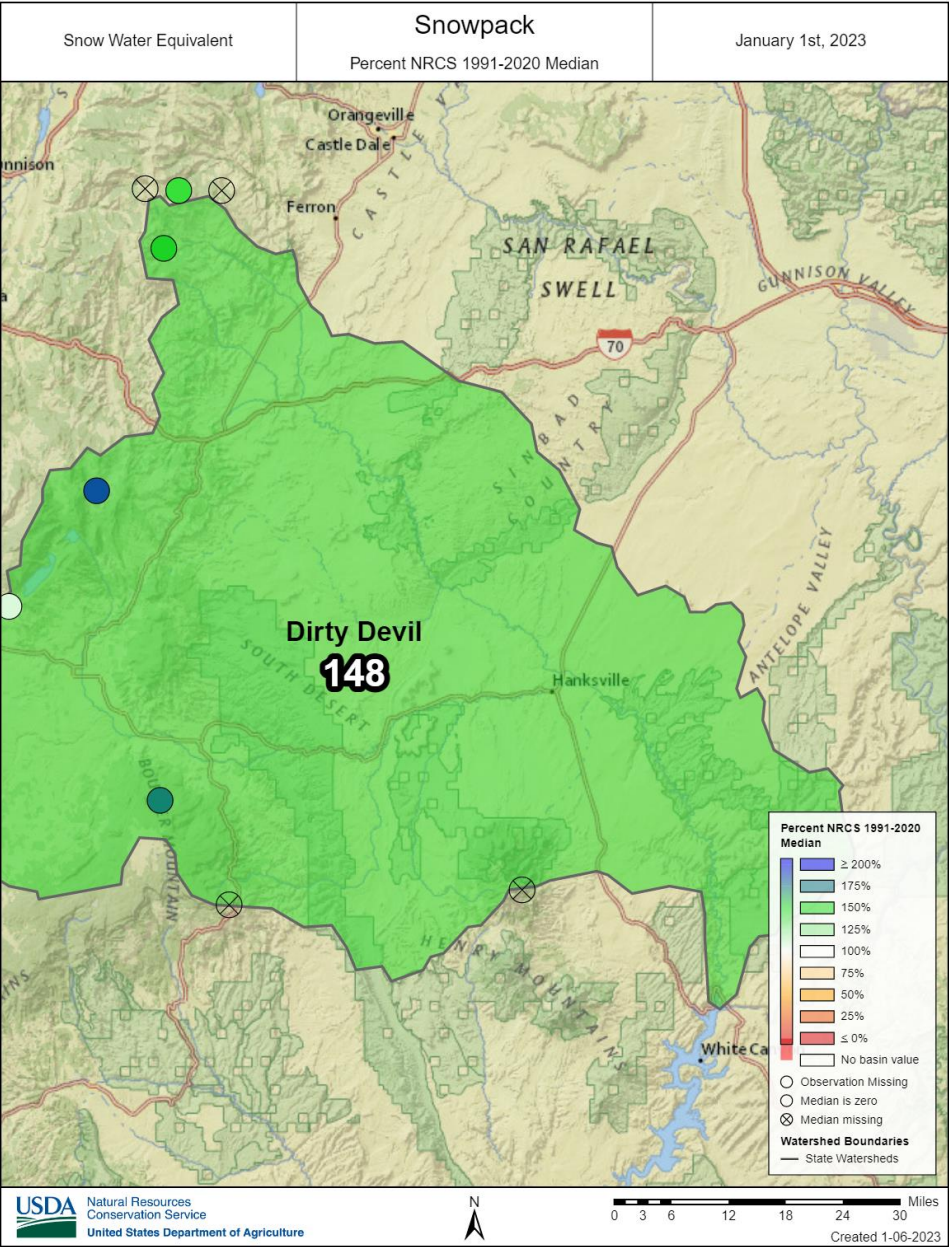


Snowpack in the Dirty Devil River Basin is well above normal at 150% of median, compared to 136% at this time last year. Precipitation in December was well above normal at 210%, which brings the seasonal accumulation (October-December) to 120% of median. Soil moisture is at 36% saturation compared to 48% saturation last year. Forecast streamflow volumes (50% exceedence, April-July) range from 117% to 118% of normal.

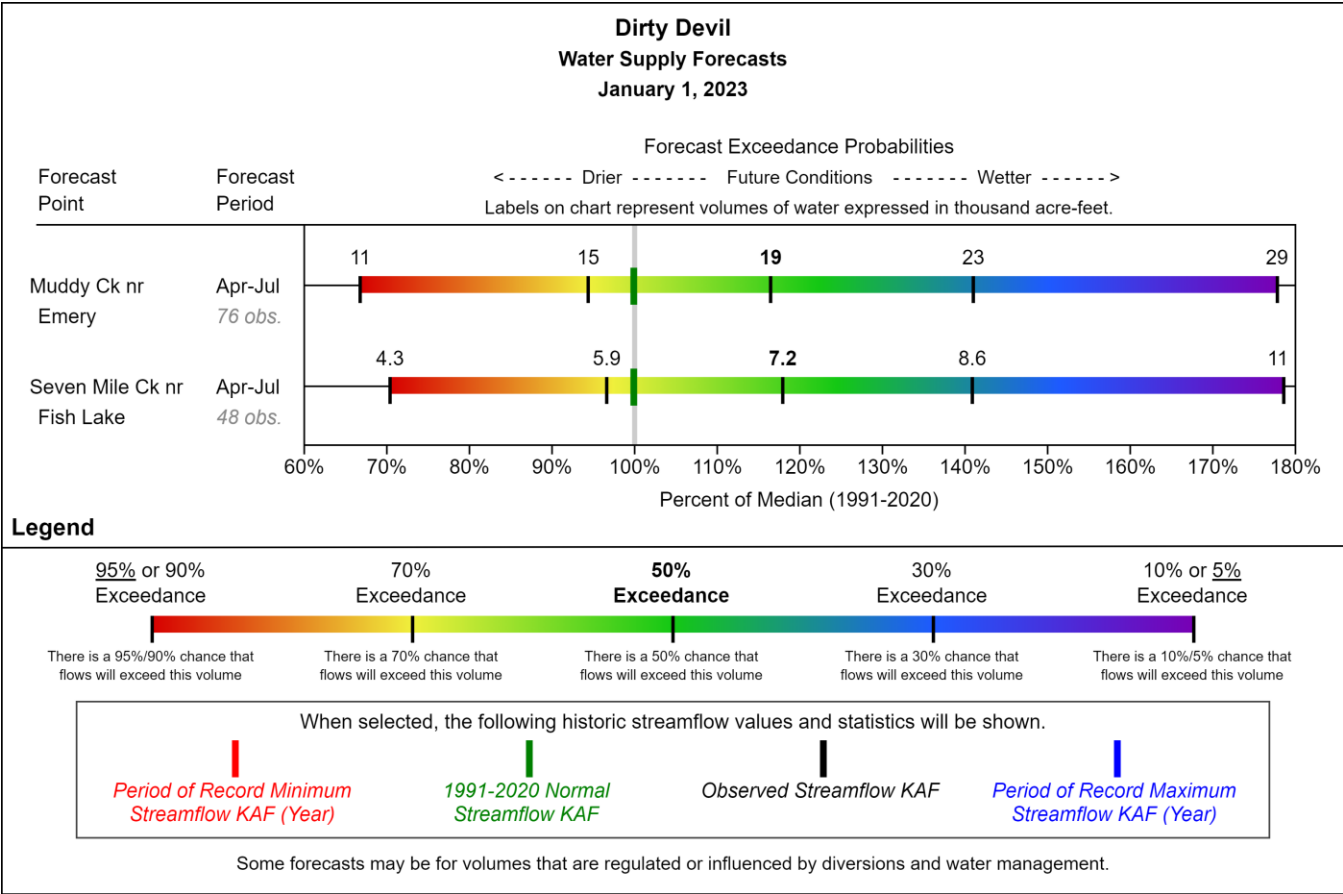


Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

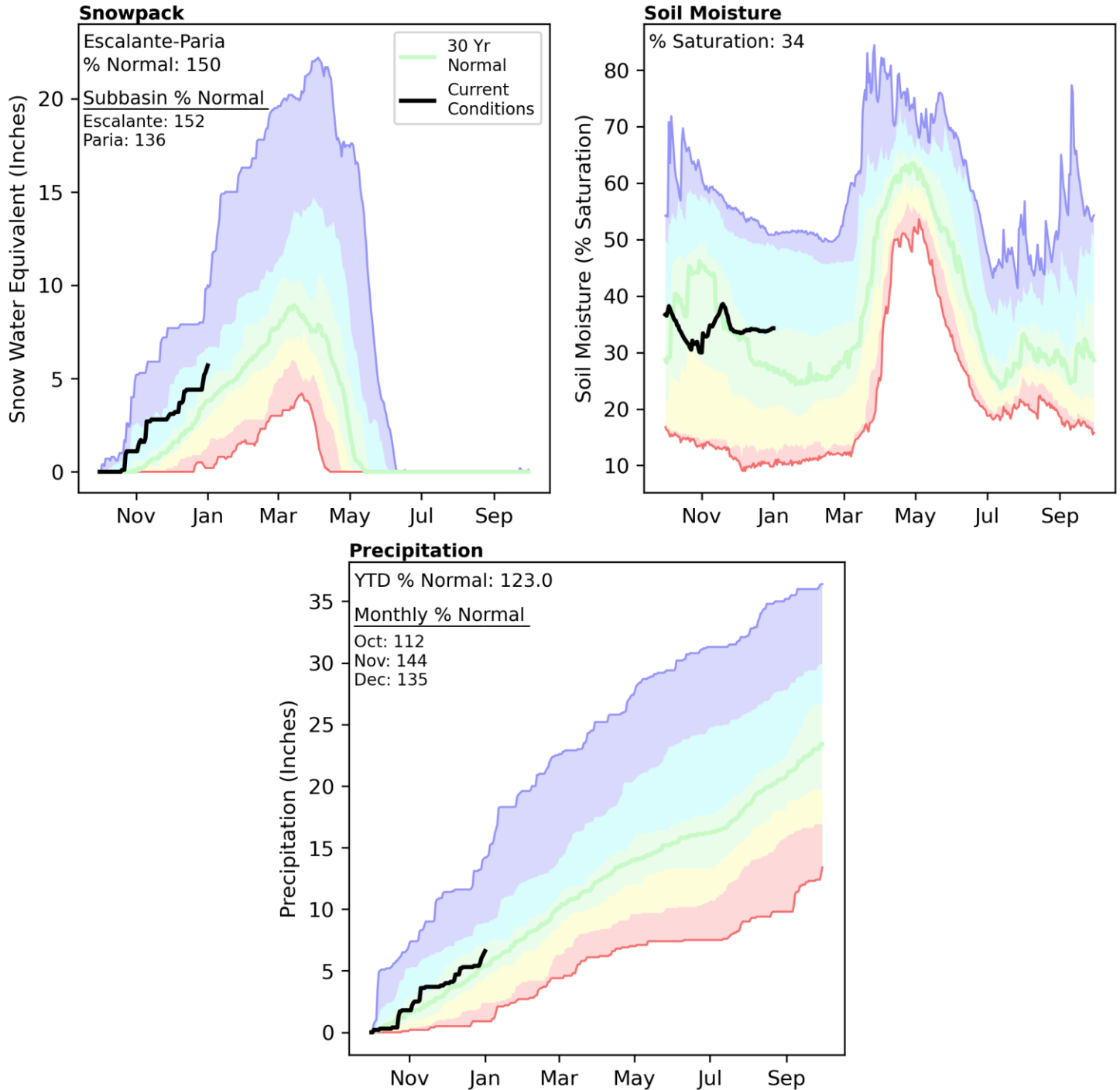
Dirty Devil



Dirty Devil

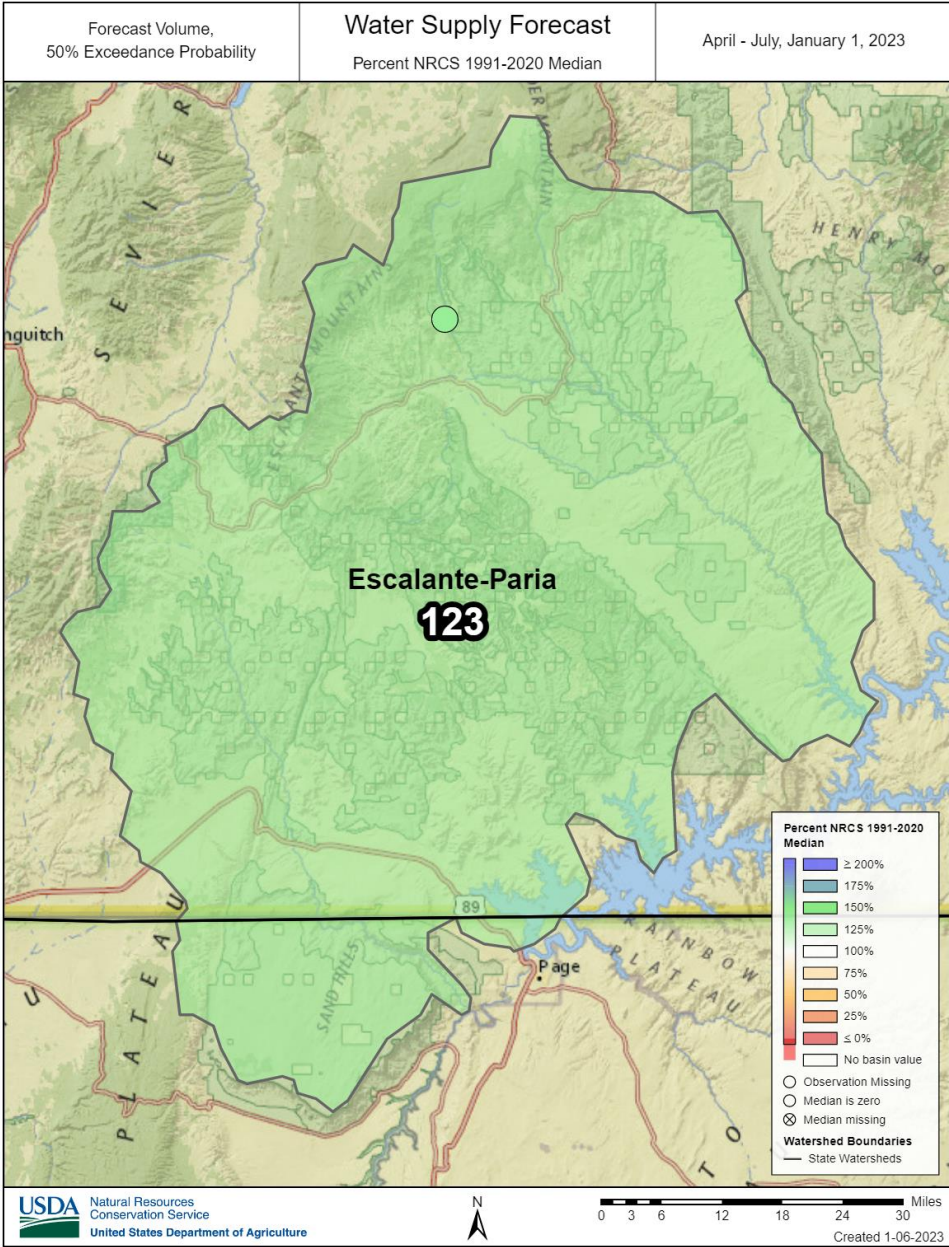
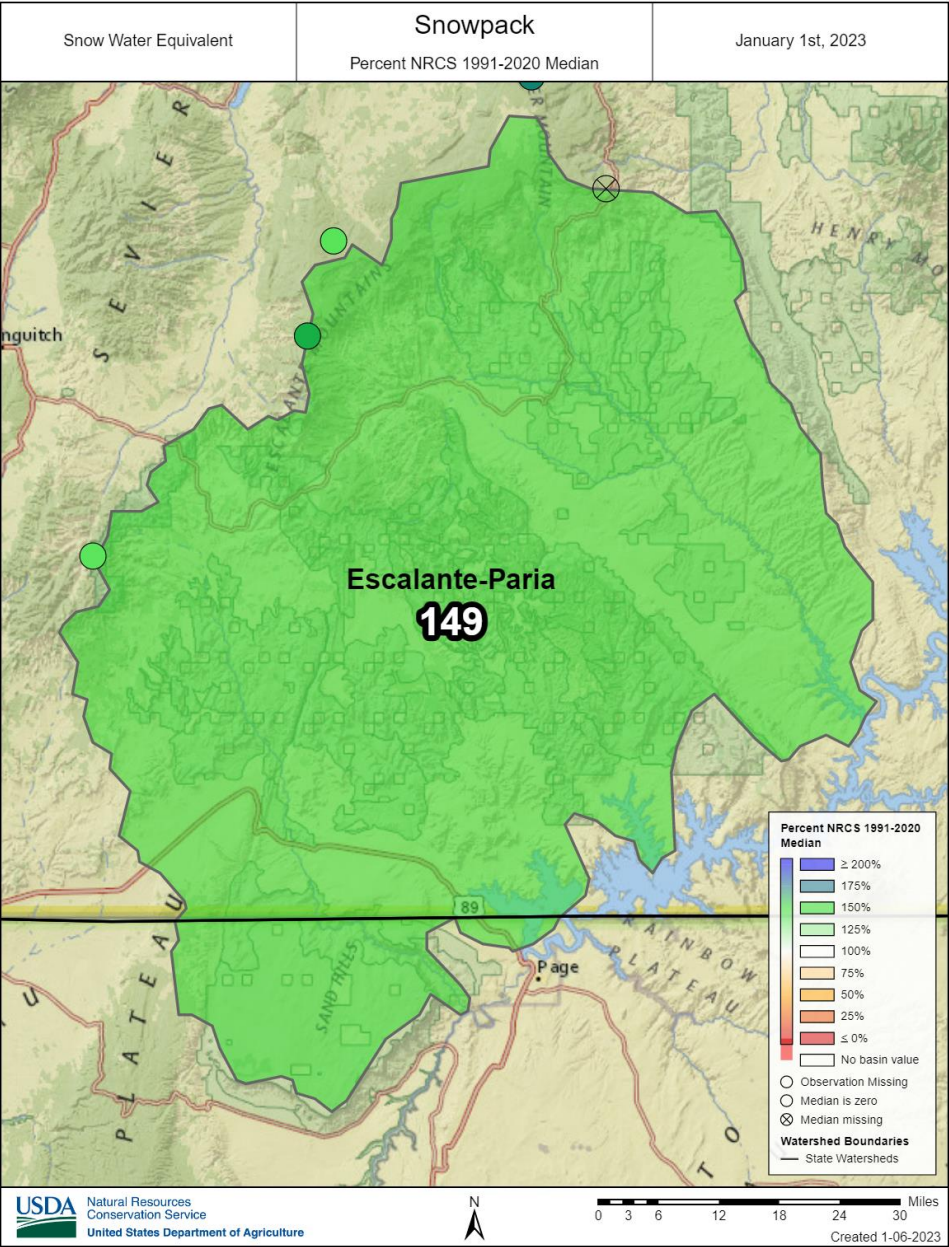


Snowpack in the Escalante and Paria River Basins is well above normal at 150% of median, compared to 142% at this time last year. Precipitation in December was well above normal at 135%, which brings the seasonal accumulation (October-December) to 123% of median. Soil moisture is at 34% saturation compared to 32% saturation last year. The forecast streamflow volume (50% exceedence, April-July) for Pine Creek is 123% of normal.

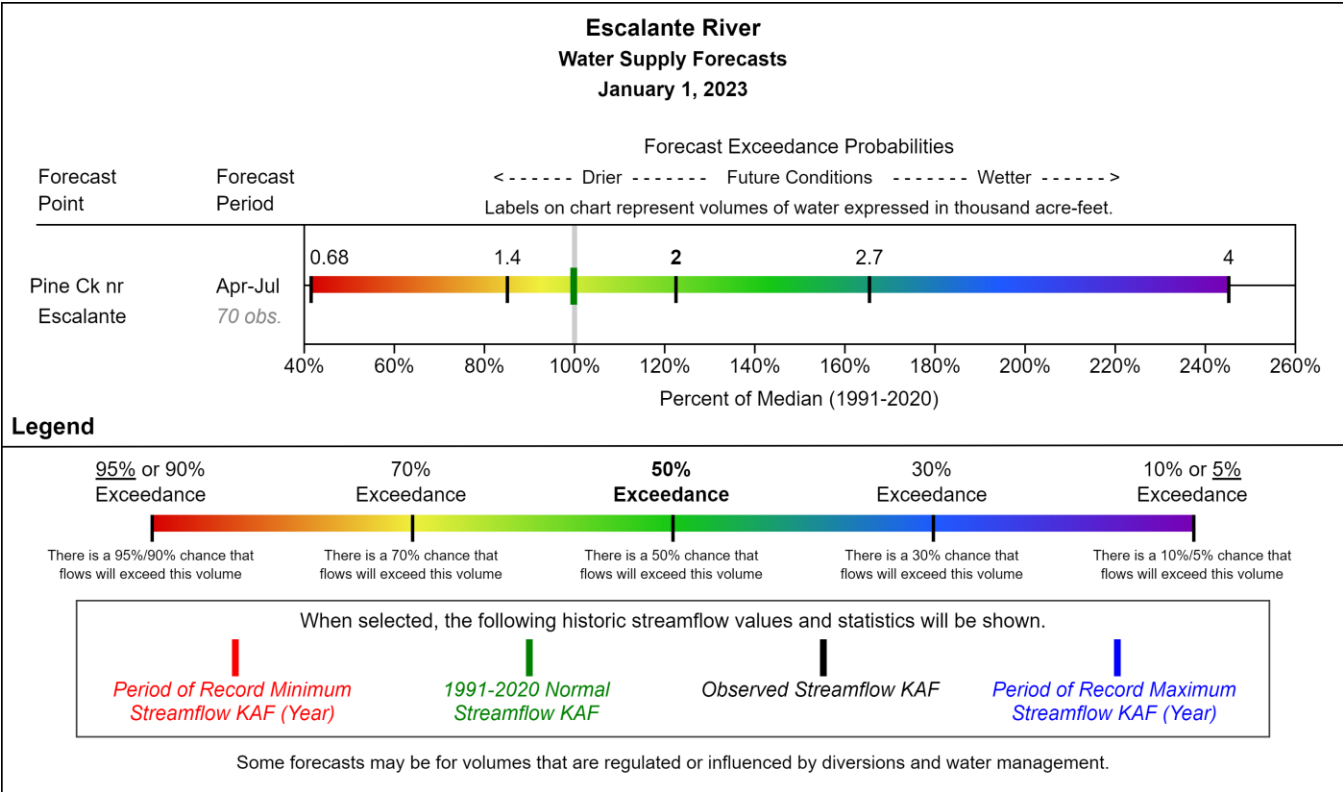


Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

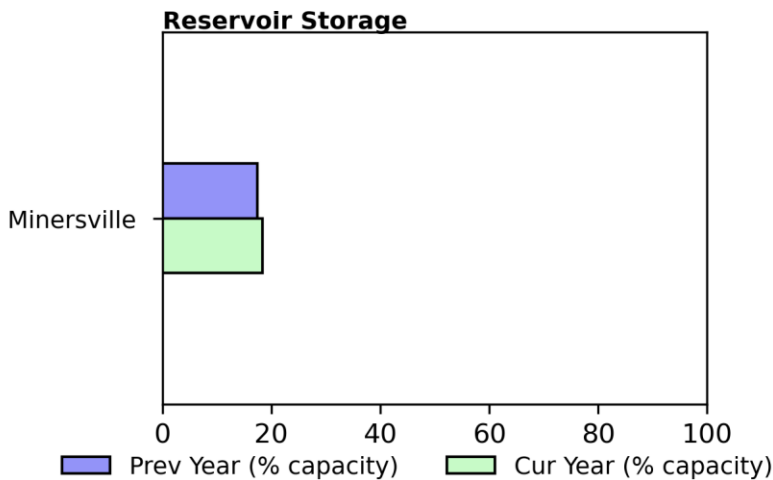
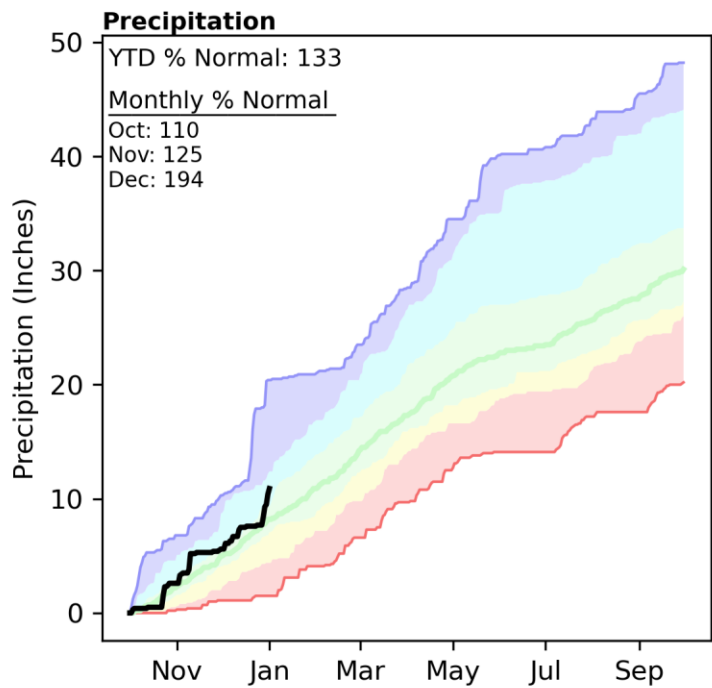
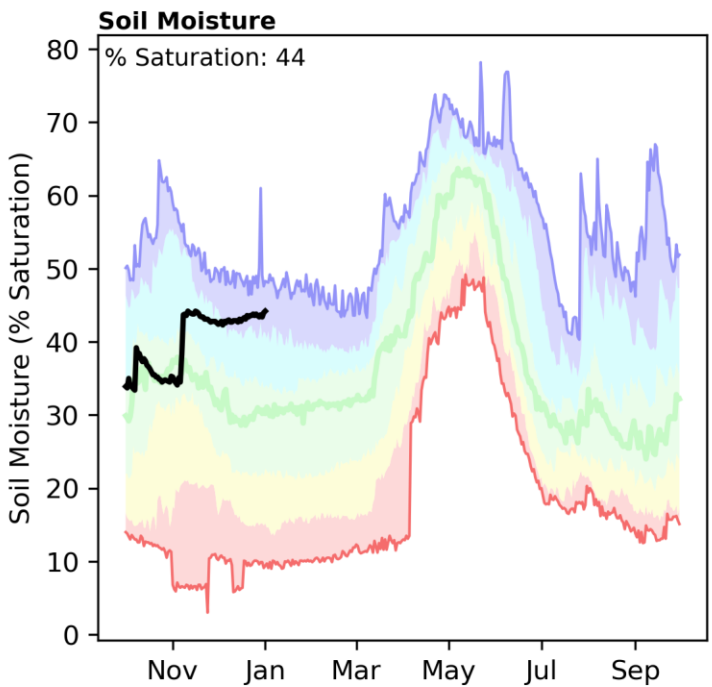
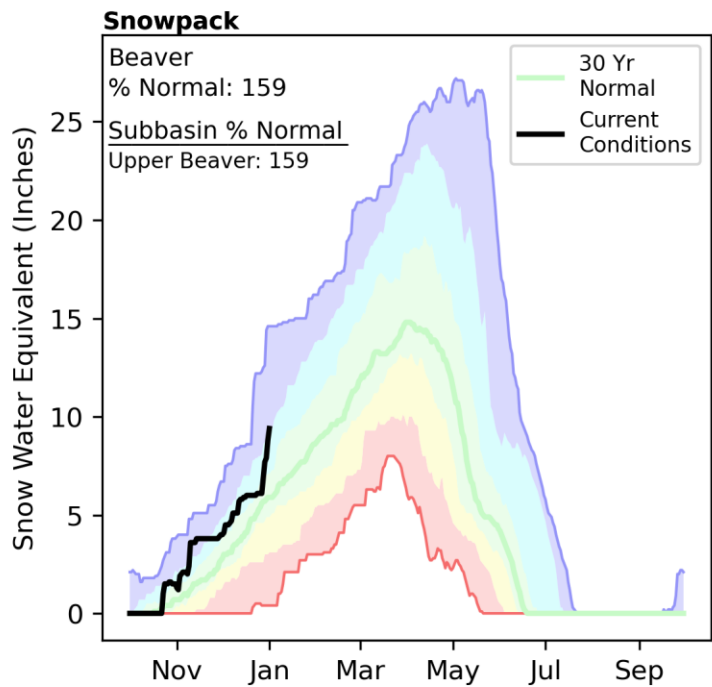
Escalante-Paria



Escalante-Paria

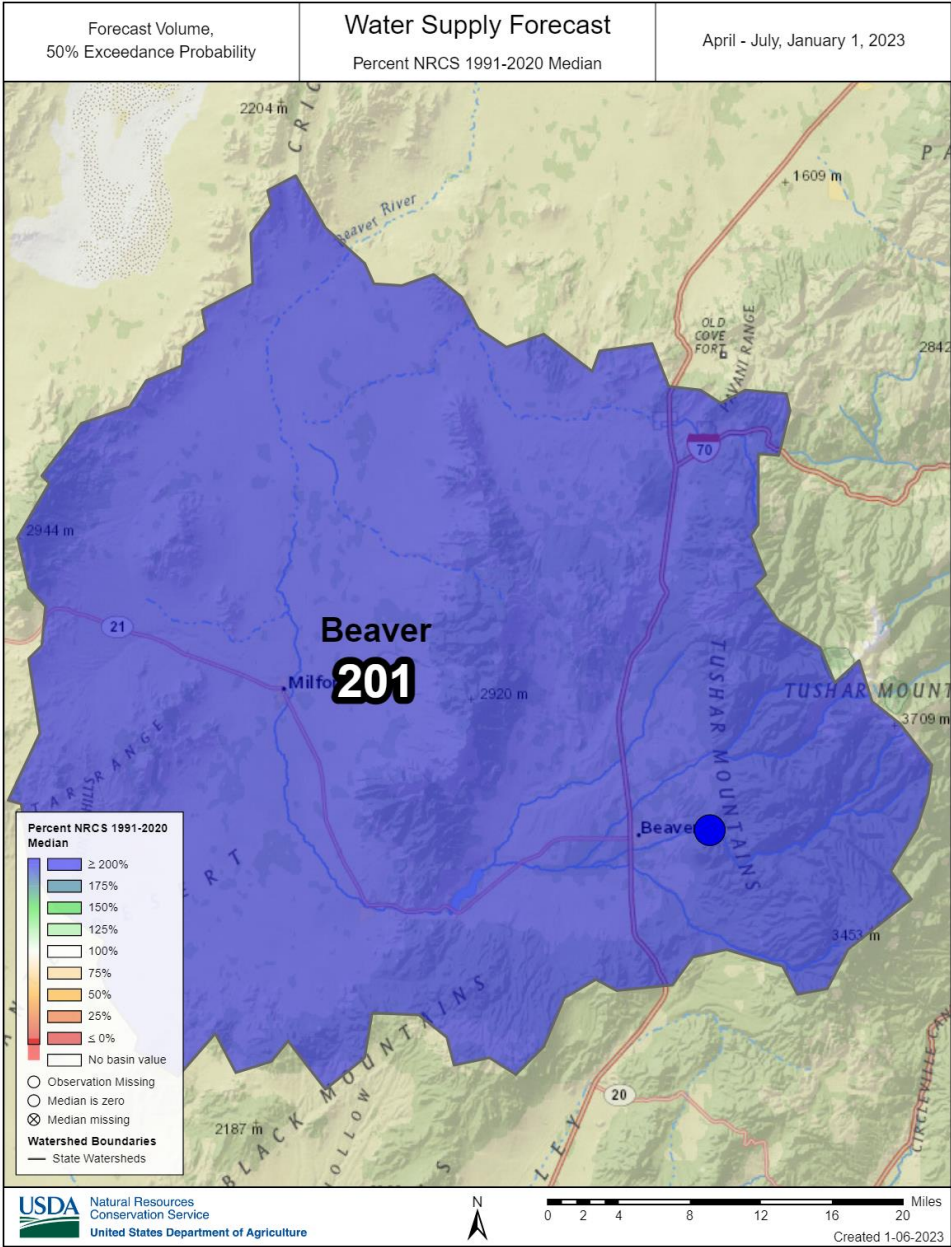
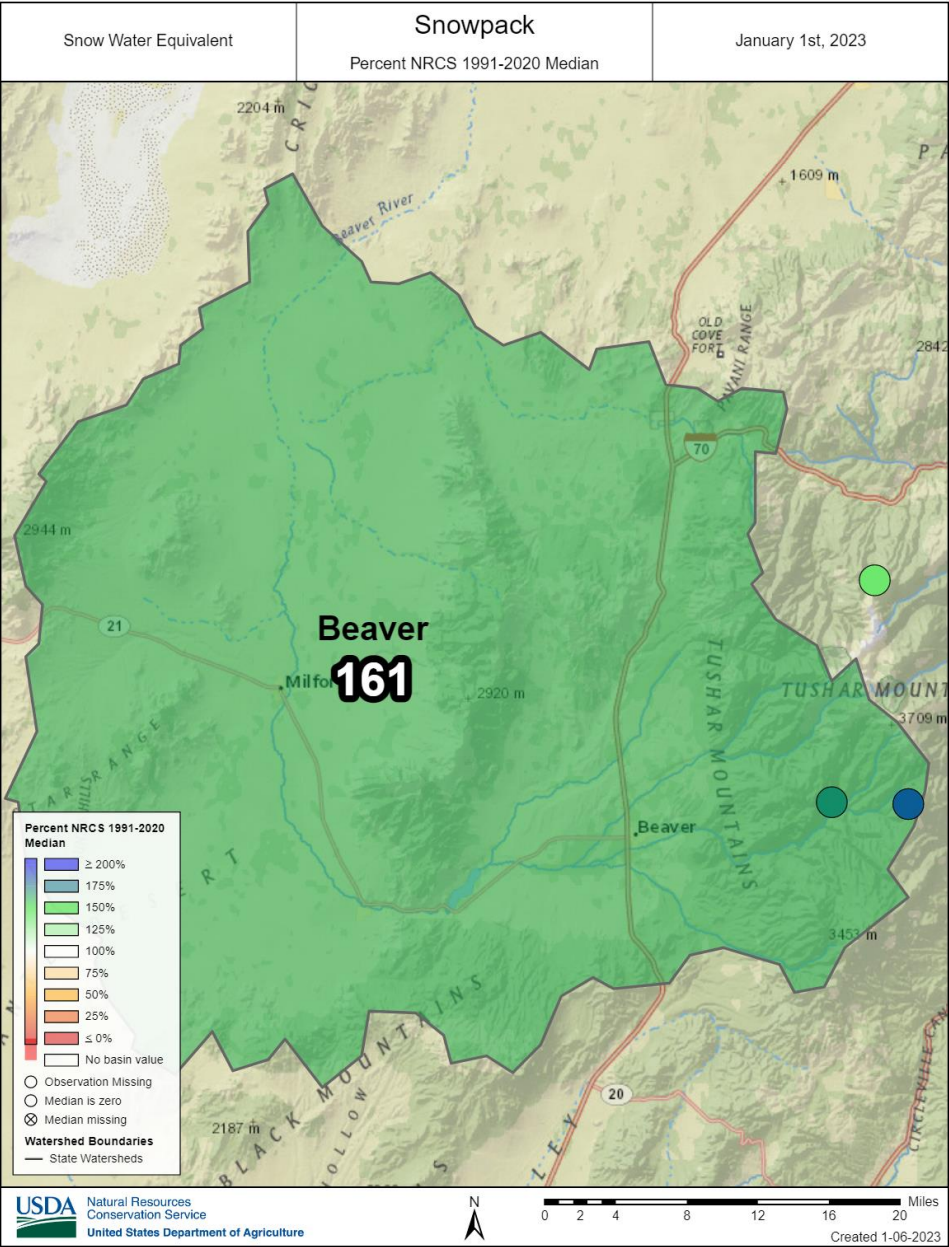


Snowpack in the Beaver River Basin is well above normal at 159% of median, compared to 190% at this time last year. Precipitation in December was well above normal at 194%, which brings the seasonal accumulation (October-December) to 133% of median. Soil moisture is at 44% saturation compared to 43% saturation last year. Reservoir storage is 18% of capacity, compared to 17% last year. The forecast streamflow volume (50% exceedence, April-July) for the Beaver River is 201% of normal. The Surface Water Supply Index percentile is 64% for the Beaver River.

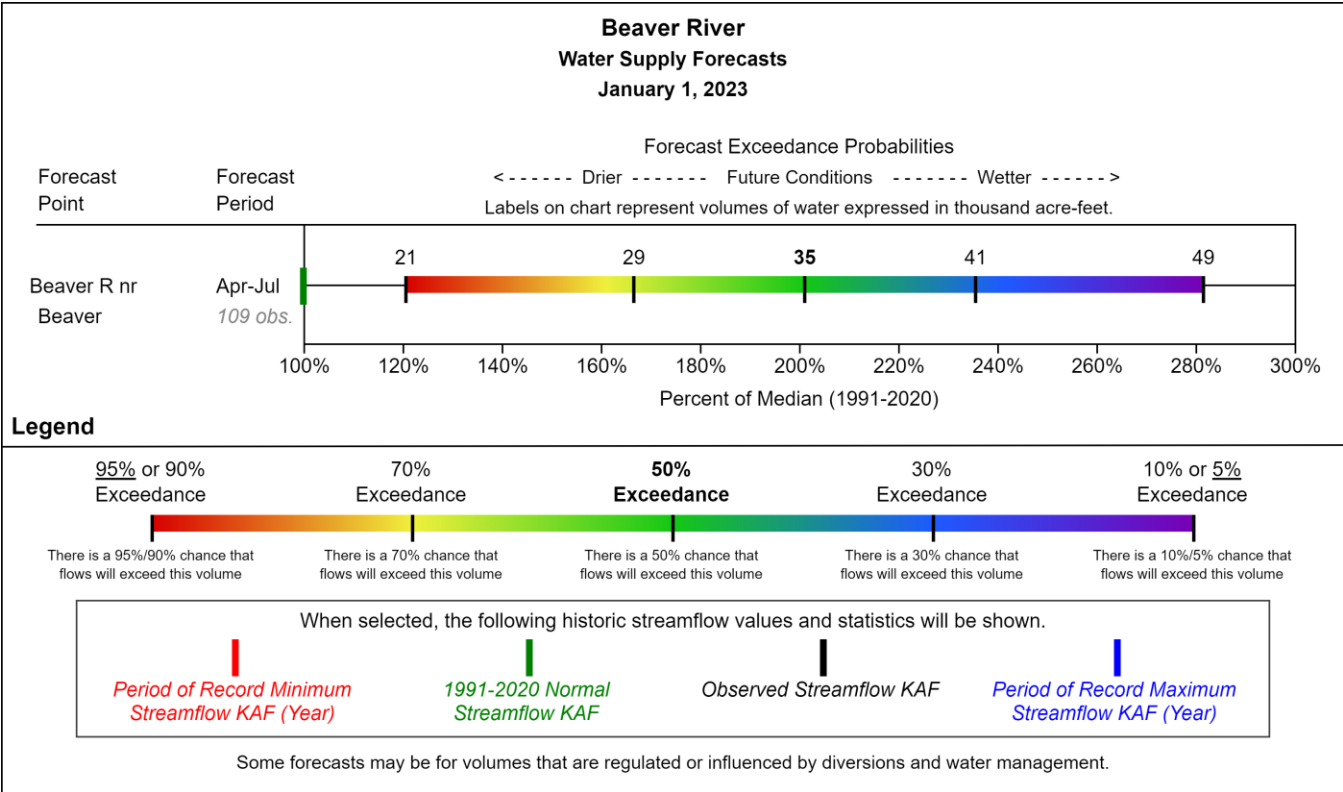


Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

Beaver

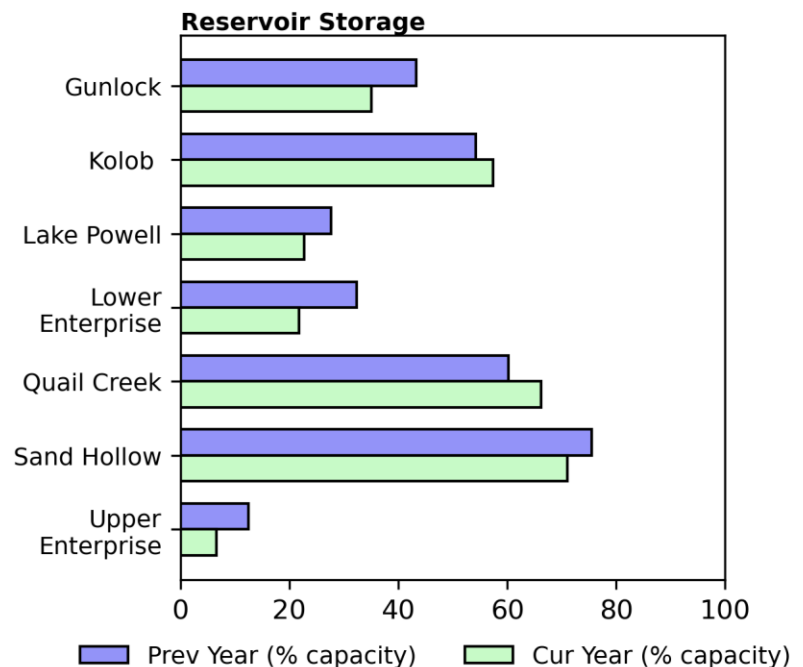
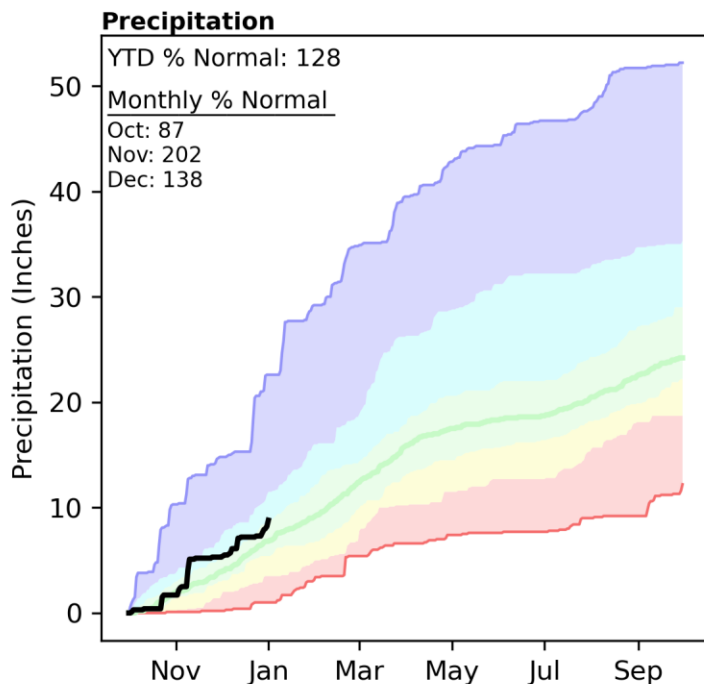
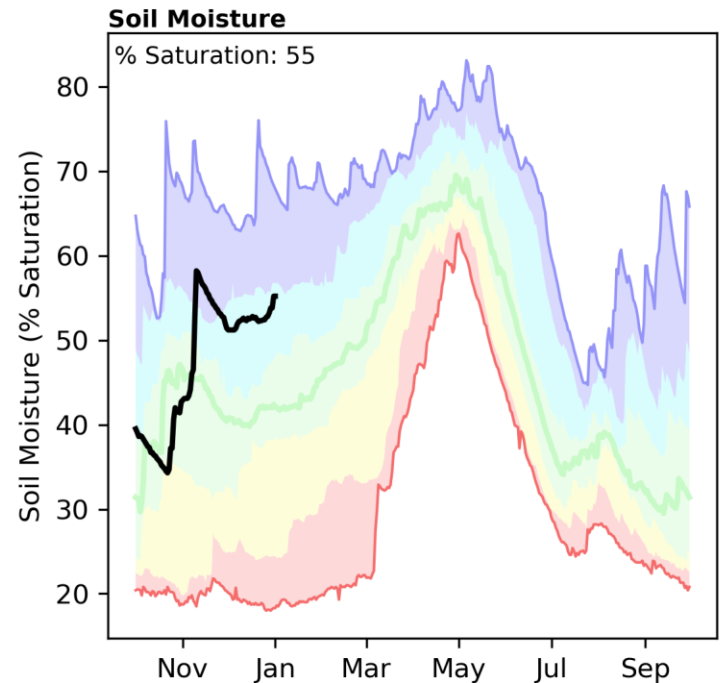
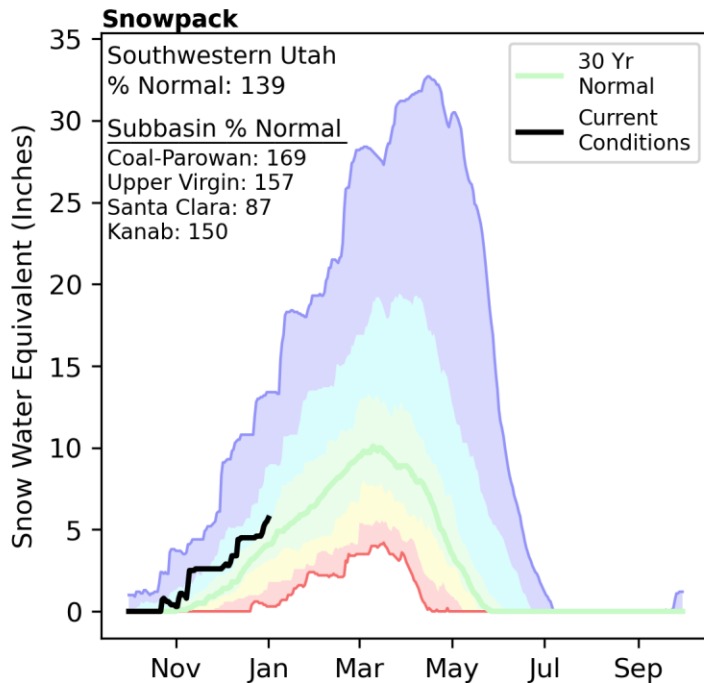


Beaver



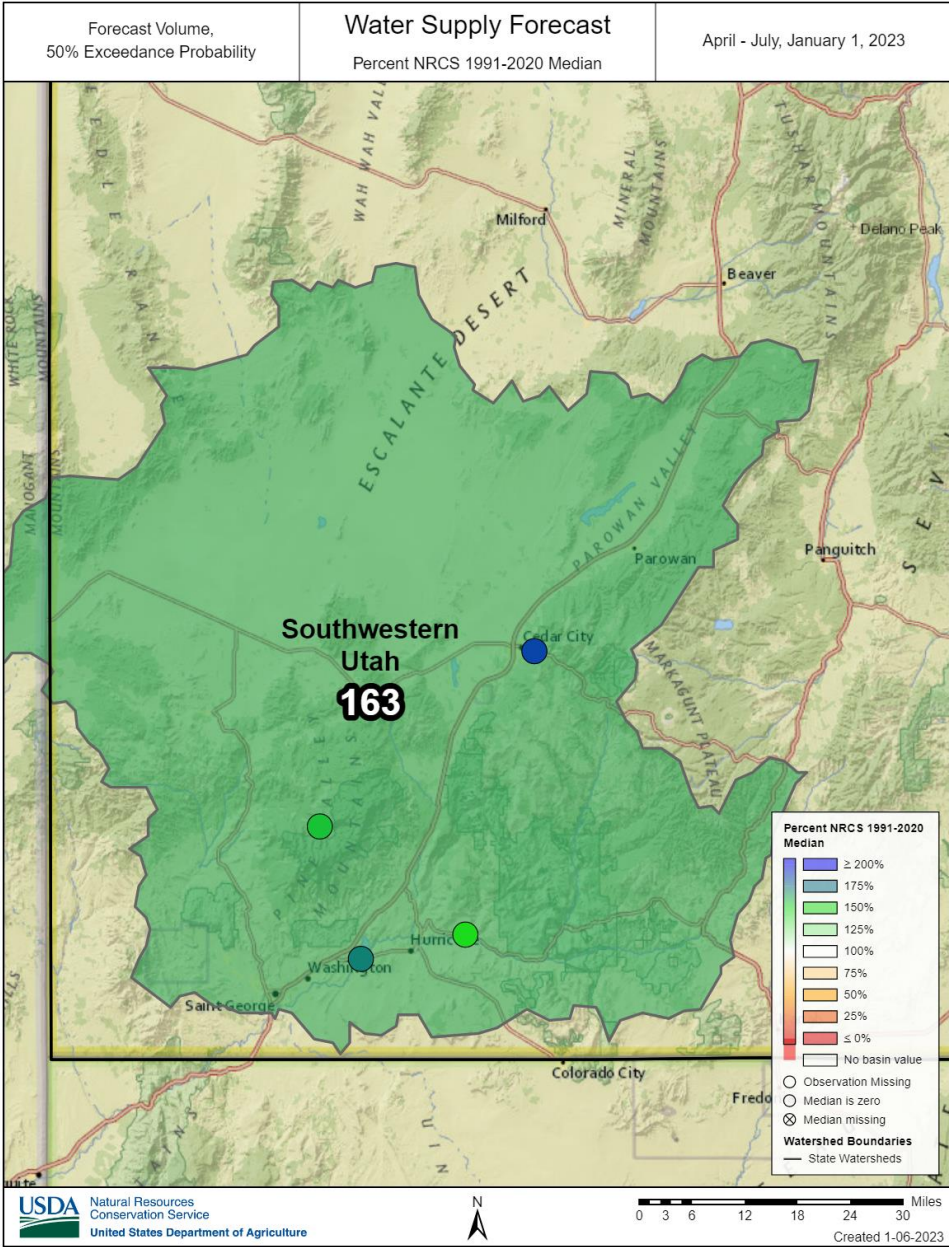
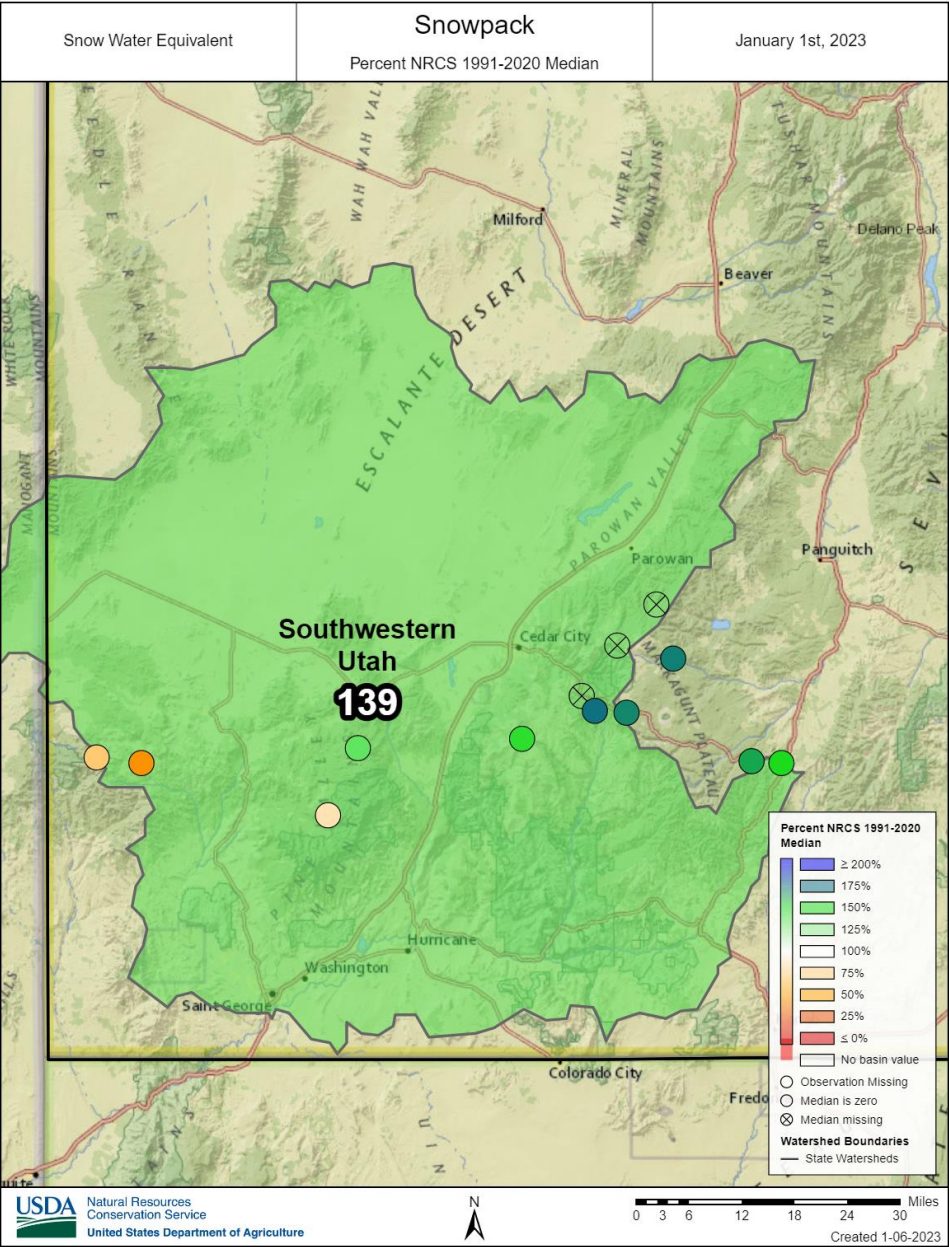
Southwestern Utah | January 1, 2023

Snowpack in Southwestern Utah is well above normal at 139% of median, compared to 207% at this time last year. Precipitation in December was well above normal at 138%, which brings the seasonal accumulation (October-December) to 128% of median. Soil moisture is at 55% saturation compared to 48% saturation last year. Reservoir storage is 22% of capacity, compared to 27% last year. Forecast streamflow volumes (50% exceedence, April-July) range from 150% to 184% of normal. The Surface Water Supply Index percentile is 69% for the Virgin River.

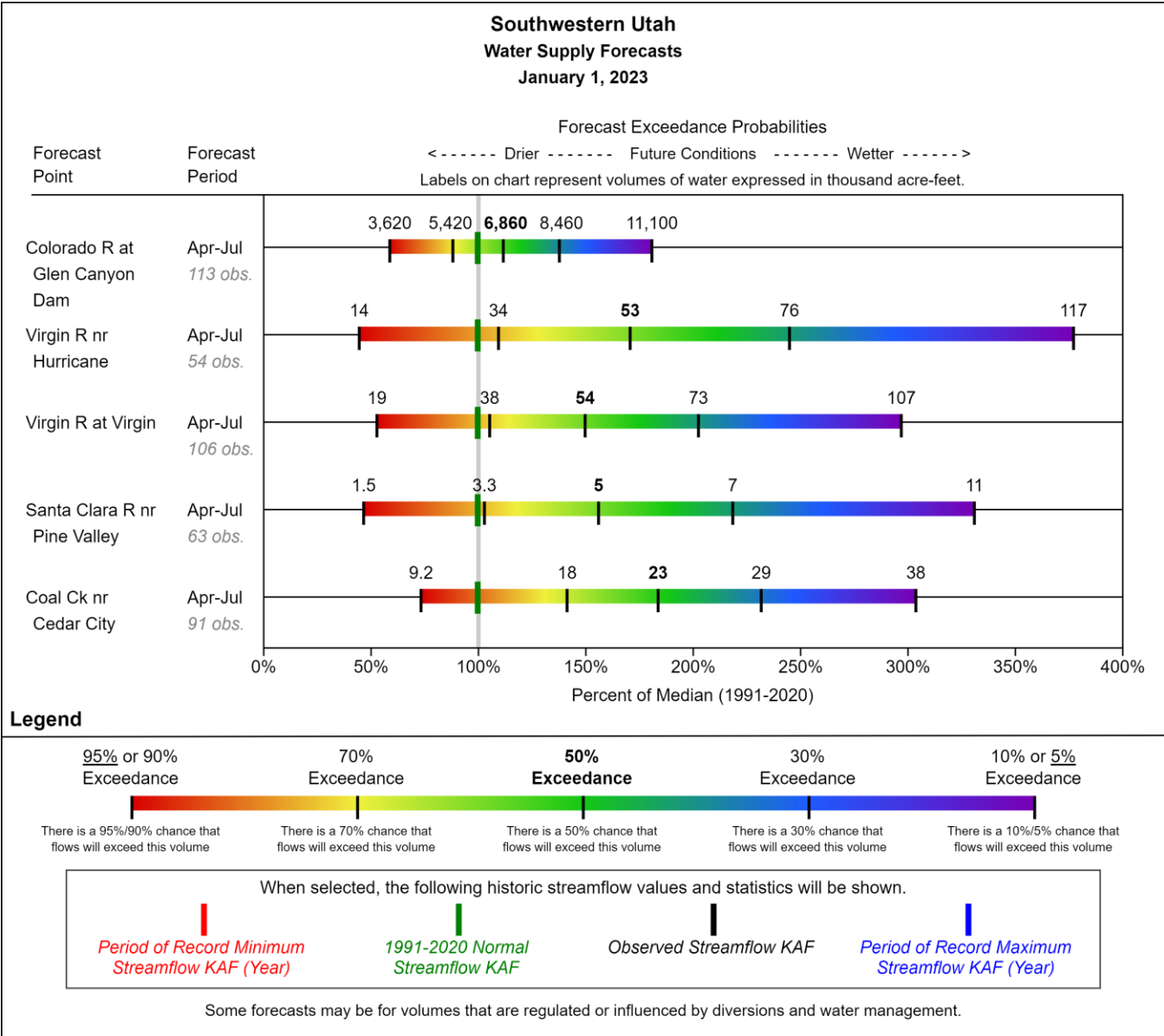


Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th percentiles.
For more information visit: [30 year normal calculation description](#)

Southwestern Utah



Southwestern Utah



January 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)	2506	5465	50	45
Utah (Statewide) Incl. Flaming G. & Lk. Powell	10577	33536	36	31
Bear	403	1389	40	29
Weber-Ogden	242	547	35	44
Northeastern Uintas	2576	3852	76	66
Tooele Valley	1	4	48	33
Duchesne	981	1379	73	71
Provo	645	1334	54	48
San Pitch	0	20	0	0
Price	57	158	28	36
Upper Sevier	61	382	20	16
Southeast UT	1	2	40	72
Beaver	4	23	17	18
Southwest Utah	70	118	60	59

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	371	1302	41	28
Big Sand Wash Reservoir	16	25	50	64
Causey Reservoir	3	7	56	51
Cleveland Lake	3	5	0	59
Currant Creek Reservoir	14	15	96	95
Deer Creek Reservoir	74	149	71	49
East Canyon Reservoir	27	49	51	56
Echo Reservoir	45	73	27	62
Flaming Gorge Reservoir	2540	3749	77	67
Grantsville Reservoir	1	3	53	33
Gunlock	3	10	43	35
Gunnison Reservoir	0	20	0	0
Huntington North Reservoir	3	4	50	79
Hyrum Reservoir	9	15	56	63
Joes Valley Reservoir	29	61	34	48
Jordanelle Reservoir	186	314	50	59
Ken's Lake	1	2	40	72
Kolob Reservoir	3	5	54	57
Lake Powell	5530	24322	27	22
Lost Creek Reservoir	9	22	41	40
Lower Enterprise	0	2	32	21
Meeks Cabin Reservoir	7	32	27	23
Miller Flat Reservoir	1	5	28	23
Millsite	7	16	22	46
Minersville Reservoir	4	23	17	18
Moon Lake Reservoir	23	35	60	64
Otter Creek Reservoir	12	52	31	24
Panguitch Lake	8	22	20	35
Pineview Reservoir	39	110	21	36
Piute Reservoir	20	71	23	28
Porcupine Reservoir	6	11	38	58
Quail Creek	26	40	60	66
Red Fleet Reservoir	9	25	38	35
Rockport Reservoir	40	60	40	65
Sand Hollow Reservoir	35	50	75	71
Scofield Reservoir	12	65	24	19
Settlement Canyon Reservoir	0	1	30	32
Sevier Bridge Reservoir	20	236	17	8
Smith and Morehouse	4	8	84	51
Starvation Reservoir	121	164	75	73
Stateline Reservoir	5	12	42	46
Steinaker Reservoir	13	33	23	40
Strawberry Reservoir	797	1105	73	72
Upper Enterprise	0	10	12	6
Upper Stillwater Reservoir	8	32	85	27
Utah Lake	384	870	53	44
Willard Bay	71	215	37	33
Woodruff Creek	2	4	43	50
Woodruff Narrows Reservoir	13	57	21	23

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

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Streamflow Forecast Summary: January 1, 2023
(Medians based On 1991-2020 reference period)

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast								
Raft	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Dunn Ck nr Park Valley	APR-JUL	1.28	2.4	3.1	129%	3.8	4.9	2.4

- 1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast								
Bear	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Logan R nr Logan	APR-JUL	83	111	131	144%	151	179	91
Bear R bl Stewart Dam	FEB-JUL	61	134	200	150%	280	420	133
	FEB-SEP	67	147	220	152%	305	460	145
	APR-JUL	39	105	167	145%	245	385	115
	APR-SEP	44	117	186	152%	270	425	122
Smiths Fk nr Border	APR-JUL	61	83	98	114%	113	135	86
	APR-SEP	72	96	113	113%	130	154	100
Blacksmith Fk nr Hyrum	APR-JUL	33	47	56	193%	65	79	29
Little Bear at Paradise	APR-JUL	23	40	52	186%	64	81	28
Bear R nr UT-WY State Line	APR-JUL	90	116	133	132%	150	176	101
	APR-SEP	97	125	144	126%	163	191	114
Big Ck nr Randolph	APR-JUL	0.58	3.2	5	156%	6.8	9.4	3.2
Bear R ab Resv nr Woodruff	APR-JUL	54	102	135	147%	168	215	92
	APR-SEP	56	107	141	142%	175	225	99

- 1) 90% And 10% exceedance probabilities are actually 95% And 5%
2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast								
Weber-Ogden	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
East Canyon Ck nr Morgan	APR-JUL	13.5	24	31	172%	38	48	18
Chalk Ck at Coalville	APR-JUL	16.6	32	43	165%	54	69	26
Rockport Reservoir Inflow	APR-JUL	88	125	150	172%	175	210	87
Pineview Reservoir Inflow	APR-JUL	53	102	135	171%	168	215	79
SF Ogden R nr Huntsville	APR-JUL	34	53	66	161%	79	98	41
Weber R at Gateway								

Lost Ck Reservoir Inflow	APR-JUL	240	340	415	202%	485	590	205
Echo Reservoir Inflow	APR-JUL	8.5	14.1	18	189%	22	28	9.5
Weber R nr Coalville	APR-JUL	116	171	210	175%	245	300	120
East Canyon Ck nr Jeremy Ranch	APR-JUL	92	131	157	169%	183	220	93
Weber R nr Oakley	APR-JUL	9.6	16.4	21	221%	26	32	9.5
	APR-JUL	100	126	144	148%	162	188	97

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Northeastern Uintas	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Flaming Gorge Resvr Local BI Fontenelle ²								
Stateline Reservoir Inflow ²								
	APR-JUL	19.8	26	30	115%	35	42	26
Big Brush Ck ab Red Fleet Reservoir								
	APR-JUL	11	16.6	20	102%	24	30	19.7
Ashley Ck nr Vernal								
	APR-JUL	26	39	48	112%	56	69	43
Blacks Fk nr Robertson								
	APR-JUL	64	85	100	110%	115	136	91
Flaming Gorge Reservoir Inflow ²								
	APR-JUL	505	765	970	98%	1200	1590	990

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Tooele Valley-Vernon Creek	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
S Willow Ck nr Grantsville								
	APR-JUL	2.5	3.4	4	160%	4.6	5.5	2.5
Vernon Ck nr Vernon								
	APR-JUL	0.47	0.85	1.17	158%	1.54	2.2	0.74

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Duchesne	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Rock Ck nr Mountain Home ²								
	APR-JUL	62	82	97	124%	113	140	78
Whiterocks R nr Whiterocks								
	APR-JUL	31	45	55	128%	66	84	43

Strawberry R nr Soldier Springs ²							
APR-JUL	23	46	66	183%	89	130	36
Currant Ck Reservoir Inflow ²							
APR-JUL	10.4	17.3	23	193%	30	41	11.9
Lake Fk R bl Moon Lk nr Mountain Home ²							
APR-JUL	43	56	66	116%	77	93	57
Duchesne R ab Knight Diversion ²							
APR-JUL	135	180	215	133%	255	315	162
Strawberry R nr Duchesne ²							
APR-JUL	44	87	125	236%	170	250	53
Upper Stillwater Reservoir Inflow ²							
APR-JUL	47	66	81	119%	97	124	68
Duchesne R nr Randlett ²							
APR-JUL	162	285	385	151%	505	710	255
Duchesne R nr Tabiona ²							
APR-JUL	74	100	120	138%	142	177	87
WF Duchesne R at VAT Diversion ²							
APR-JUL	12.7	17.4	21	145%	25	31	14.5
Uinta R bl Powerplant Diversion nr Neola							
APR-JUL	43	64	80	125%	98	129	64
Duchesne R at Myton ²							
APR-JUL	146	250	335	156%	435	600	215
Yellowstone R nr Altonah							
APR-JUL	41	55	65	116%	76	95	56

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Provo-Utah Lake-Jordan	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Parleys Ck nr SLC	APR-JUL	6.6	11	14.6	168%	18.8	26	8.7
Provo R at Hailstone	APR-JUL	88	114	134	161%	155	190	83
Provo R at Woodland	APR-JUL	78	101	118	139%	137	167	85
Emigration Ck nr SLC	APR-JUL	1.2	2.3	3.2	139%	4.3	6.2	2.3
City Ck nr SLC	APR-JUL	4.1	5.8	7.2	136%	8.7	11.2	5.3
Spanish Fk at Castilla	APR-JUL	29	55	73	243%	91	117	30
Salt Ck at Nephi	APR-JUL	6.7	10.9	13.7	291%	16.5	21	4.7
Provo R bl Deer Ck Dam	APR-JUL	110	141	162	143%	183	215	113
Utah Lake Inflow	APR-JUL	188	320	415	228%	505	640	182
Big Cottonwood Ck nr SLC	APR-JUL	30	37	43	148%	49	59	29
W Canyon Ck nr Cedar Fort	APR-JUL	0.69	1.71	2.4	253%	3.1	4.1	0.95
Dell Fk nr SLC	APR-JUL	2.5	4	5.1	142%	6.4	8.5	3.6
American Fk ab Upper Powerplant	APR-JUL	21	31	38	198%	45	55	19.2
Little Cottonwood Ck nr SLC								

Mill Ck nr SLC	APR-JUL	32	39	44	142%	49	57	31
	APR-JUL	4	5.8	7.1	165%	8.6	11.1	4.3

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Lower Sevier	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Sevier R nr Gunnison								
	APR-JUL	32	53	70	233%	90	123	30

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

San Pitch	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Manti Ck bl Dugway Ck nr Manti								
	APR-JUL	12.8	15.3	17	131%	18.7	21	13

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Price-San Rafael	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Price R nr Scofield Reservoir ²								
	APR-JUL	27	41	52	200%	64	84	26
Electric Lake Inflow ²								
	APR-JUL	9.3	13.6	17	205%	21	27	8.3
Huntington Ck nr Huntington ²								
	APR-JUL	28	39	48	133%	58	73	36
White R bl Tabbyune Creek								
	APR-JUL	7.3	13.6	19	264%	25	36	7.2
Joes Valley Reservoir Inflow ²								
	APR-JUL	37	49	58	132%	68	84	44
Fish Ck ab Reservoir nr Scofield								
	APR-JUL	22	31	39	197%	47	61	19.8
Ferron Ck (Upper Station) nr Ferron								
	APR-JUL	24	32	38	119%	44	54	32

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Upper Sevier	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
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Sevier R nr Kingston								
	APR-JUL	7.1	21	34	231%	51	81	14.7
Sevier R at Hatch								
	APR-JUL	24	49	66	194%	83	108	34
Clear Ck ab Diversions nr Sevier								
	APR-JUL	16.5	23	28	206%	33	39	13.6
Sevier R nr Gunnison								
	APR-JUL	32	53	70	233%	90	123	30
EF Sevier R nr Kingston								
	APR-JUL	7.5	15.2	22	164%	30	44	13.4
Mammoth Ck nr Hatch								
	APR-JUL	21	33	41	208%	49	61	19.7
Salina Ck nr Emery								
	APR-JUL	4.6	6.5	7.7	138%	8.9	10.8	5.6

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Southeastern Utah	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Green R at Green River, UT ²								
	APR-JUL	1870	2650	3250	125%	3920	5010	2610
Mill Ck at Sheley Tunnel nr Moab								
	APR-JUL	1.5	2.8	4	121%	5.4	7.7	3.3
Colorado R nr Cisco ²								
	APR-JUL	2300	3270	4030	107%	4870	6250	3750
South Ck ab Resv nr Monticello								
	APR-JUL	0.01	0.27	0.64	156%	1.17	2.2	0.41

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Dirty Devil	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Seven Mile Ck nr Fish Lake								
	APR-JUL	4.3	5.9	7.2	118%	8.6	10.9	6.1
Muddy Ck nr Emery								
	APR-JUL	10.9	15.4	19	117%	23	29	16.3

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Beaver	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Beaver R nr Beaver								
	APR-JUL	21	29	35	201%	41	49	17.4

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Southwestern Utah	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Virgin R nr Hurricane								
Santa Clara R nr Pine Valley								
Virgin R at Virgin								
Coal Ck nr Cedar City	APR-JUL	9.2	17.7	23	184%	29	38	12.5

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

Escalante-Paria	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Pine Ck nr Escalante	APR-JUL	0.68	1.39	2	123%	2.7	4	1.63

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Forecast Exceedance Probabilities For Risk Assessment Chance that actual volume will exceed forecast

State of Utah	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Median (KAF)
Provo R at Hailstone	APR-JUL	88	114	134	161%	155	190	83
Chalk Ck at Coalville	APR-JUL	16.6	32	43	165%	54	69	26
Currant Ck Reservoir Inflow ²	APR-JUL	10.4	17.3	23	193%	30	41	11.9
Huntington Ck nr Huntington ²	APR-JUL	28	39	48	133%	58	73	36
Big Cottonwood Ck nr SLC	APR-JUL	30	37	43	148%	49	59	29
Ferron Ck (Upper Station) nr Ferron	APR-JUL	24	32	38	119%	44	54	32
Upper Stillwater Reservoir Inflow ²	APR-JUL	47	66	81	119%	97	124	68
Duchesne R nr Randlett ²	APR-JUL	162	285	385	151%	505	710	255
Strawberry R nr Duchesne ²	APR-JUL	44	87	125	236%	170	250	53
Emigration Ck nr SLC	APR-JUL	1.2	2.3	3.2	139%	4.3	6.2	2.3
Little Bear at Paradise	APR-JUL	23	40	52	186%	64	81	28
Uinta R bl Powerplant Diversion nr Neola	APR-JUL	43	64	80	125%	98	129	64
EF Sevier R nr Kingston								

Dell Fk nr SLC	APR-JUL	7.5	15.2	22	164%	30	44	13.4
Dunn Ck nr Park Valley	APR-JUL	2.5	4	5.1	142%	6.4	8.5	3.6
Strawberry R nr Soldier Springs ²	APR-JUL	1.28	2.4	3.1	129%	3.8	4.9	2.4
Virgin R nr Hurricane	APR-JUL	23	46	66	183%	89	130	36
Lake Fk R bl Moon Lk nr Mountain Home ²	APR-JUL	43	56	66	116%	77	93	57
S Willow Ck nr Grantsville	APR-JUL	2.5	3.4	4	160%	4.6	5.5	2.5
Bear R nr UT-WY State Line	APR-JUL	90	116	133	132%	150	176	101
Utah Lake Inflow	APR-SEP	97	125	144	126%	163	191	114
Beaver R nr Beaver	APR-JUL	188	320	415	228%	505	640	182
Yellowstone R nr Altonah	APR-JUL	21	29	35	201%	41	49	17.4
American Fk ab Upper Powerplant	APR-JUL	41	55	65	116%	76	95	56
Bear R bl Stewart Dam	APR-JUL	21	31	38	198%	45	55	19.2
Weber R at Gateway	FEB-JUL	61	134	200	150%	280	420	133
Blacksmith Fk nr Hyrum	FEB-SEP	67	147	220	152%	305	460	145
Coal Ck nr Cedar City	APR-JUL	39	105	167	145%	245	385	115
Salt Ck at Nephi	APR-SEP	44	117	186	152%	270	425	122
Flaming Gorge Reservoir Inflow ²	APR-JUL	240	340	415	202%	485	590	205
City Ck nr SLC	APR-JUL	33	47	56	193%	65	79	29
Logan R nr Logan	APR-JUL	9.2	17.7	23	184%	29	38	12.5
South Ck ab Resv nr Monticello	APR-JUL	6.7	10.9	13.7	291%	16.5	21	4.7
Vernon Ck nr Vernon	APR-JUL	505	765	970	98%	1200	1590	990
Big Ck nr Randolph	APR-JUL	4.1	5.8	7.2	136%	8.7	11.2	5.3
Bear R ab Resv nr Woodruff	APR-JUL	83	111	131	144%	151	179	91
East Canyon Ck nr Morgan	APR-JUL	0.01	0.27	0.64	156%	1.17	2.2	0.41
Parleys Ck nr SLC	APR-JUL	0.47	0.85	1.17	158%	1.54	2.2	0.74
East Canyon Ck nr Jeremy Ranch	APR-JUL	0.58	3.2	5	156%	6.8	9.4	3.2
Spanish Fk at Castilla	APR-JUL	54	102	135	147%	168	215	92
Sevier R nr Gunnison	APR-SEP	56	107	141	142%	175	225	99
	APR-JUL	13.5	24	31	172%	38	48	18
	APR-JUL	6.6	11	14.6	168%	18.8	26	8.7
	APR-JUL	9.6	16.4	21	221%	26	32	9.5
	APR-JUL	29	55	73	243%	91	117	30
	APR-JUL	32	53	70	233%	90	123	30

Blacks Fk nr Robertson								
	APR-JUL	64	85	100	110%	115	136	91
Price R nr Scofield Reservoir ²								
	APR-JUL	27	41	52	200%	64	84	26
Pineview Reservoir Inflow								
	APR-JUL	53	102	135	171%	168	215	79
Duchesne R ab Knight Diversion ²								
	APR-JUL	135	180	215	133%	255	315	162
Salina Ck nr Emery								
	APR-JUL	4.6	6.5	7.7	138%	8.9	10.8	5.6
Rockport Reservoir Inflow								
	APR-JUL	88	125	150	172%	175	210	87
Mammoth Ck nr Hatch								
	APR-JUL	21	33	41	208%	49	61	19.7
Santa Clara R nr Pine Valley								
WF Duchesne R at VAT Diversion ²								
	APR-JUL	12.7	17.4	21	145%	25	31	14.5
Duchesne R nr Tabiona ²								
	APR-JUL	74	100	120	138%	142	177	87
Seven Mile Ck nr Fish Lake								
	APR-JUL	4.3	5.9	7.2	118%	8.6	10.9	6.1
W Canyon Ck nr Cedar Fort								
	APR-JUL	0.69	1.71	2.4	253%	3.1	4.1	0.95
Fish Ck ab Reservoir nr Scofield								
	APR-JUL	22	31	39	197%	47	61	19.8
Weber R nr Oakley								
	APR-JUL	100	126	144	148%	162	188	97
SF Ogden R nr Huntsville								
	APR-JUL	34	53	66	161%	79	98	41
Weber R nr Coalville								
	APR-JUL	92	131	157	169%	183	220	93
Virgin R at Virgin								
Little Cottonwood Ck nr SLC								
	APR-JUL	32	39	44	142%	49	57	31
Green R at Green River, UT ²								
	APR-JUL	1870	2650	3250	125%	3920	5010	2610
Electric Lake Inflow ²								
	APR-JUL	9.3	13.6	17	205%	21	27	8.3
Rock Ck nr Mountain Home ²								
	APR-JUL	62	82	97	124%	113	140	78
Flaming Gorge Resvr Local BI Fontenelle ²								
Mill Ck nr SLC								
	APR-JUL	4	5.8	7.1	165%	8.6	11.1	4.3
Muddy Ck nr Emery								
	APR-JUL	10.9	15.4	19	117%	23	29	16.3
Smiths Fk nr Border								
	APR-JUL	61	83	98	114%	113	135	86
	APR-SEP	72	96	113	113%	130	154	100
Lost Ck Reservoir Inflow								
	APR-JUL	8.5	14.1	18	189%	22	28	9.5
Colorado R nr Cisco ²								
	APR-JUL	2300	3270	4030	107%	4870	6250	3750
Ashley Ck nr Vernal								
	APR-JUL	26	39	48	112%	56	69	43
Whiterocks R nr Whiterocks								
	APR-JUL	31	45	55	128%	66	84	43
Sevier R at Hatch								
	APR-JUL	24	49	66	194%	83	108	34
Provo R bl Deer Ck Dam								

Big Brush Ck ab Red Fleet Reservoir	APR-JUL	110	141	162	143%	183	215	113
White R bl Tabbyune Creek	APR-JUL	11	16.6	20	102%	24	30	19.7
Manti Ck bl Dugway Ck nr Manti	APR-JUL	7.3	13.6	19	264%	25	36	7.2
Echo Reservoir Inflow	APR-JUL	12.8	15.3	17	131%	18.7	21	13
Joes Valley Reservoir Inflow ²	APR-JUL	116	171	210	175%	245	300	120
Sevier R nr Kingston	APR-JUL	37	49	58	132%	68	84	44
Pine Ck nr Escalante	APR-JUL	7.1	21	34	231%	51	81	14.7
Provo R at Woodland	APR-JUL	0.68	1.39	2	123%	2.7	4	1.63
Mill Ck at Sheley Tunnel nr Moab	APR-JUL	78	101	118	139%	137	167	85
Clear Ck ab Diversions nr Sevier	APR-JUL	1.5	2.8	4	121%	5.4	7.7	3.3
Stateline Reservoir Inflow ²	APR-JUL	16.5	23	28	206%	33	39	13.6
Duchesne R at Myton ²	APR-JUL	19.8	26	30	115%	35	42	26
	APR-JUL	146	250	335	156%	435	600	215

1) 90% And 10% exceedance probabilities are actually 95% And 5%

2) Forecasts are For unimpaired flows. Actual flow will be dependent On management of upstream reservoirs And diversions

Appendix A: Data used in SWSI Calculations

Watershed/ Region	USGS Gauging Station(s)	Reservoir(s)	Start Date
Bear	Bear R nr Ut-Wy State Line	Bear Lake	1981
Woodruff Narrows	Bear R ab Resv nr Woodruff	Woodruff Narrows Reservoir	1986
Little Bear	Little Bear R at Paradise	Hyrum Reservoir	1993
Ogden	Pineview Reservoir Inflow	Pineview Reservoir, Causey Reservoir	1981
Weber	Weber R at Gateway	East Canyon Reservoir, Echo Reservoir, Lost Creek Reservoir, Rockport Reservoir, Smith And Morehouse Reservoir, Willard Bay	1981
Provo	Provo R at Woodland	Utah Lake, Deer Creek Reservoir, Jordanelle Reservoir	1995
Western Uintas	Yellowstone R nr Altonah	Starvation Reservoir, Moon Lake Reservoir, Upper Stillwater Reservoir	1981
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	East Fork Smiths Fork bl Stateline Res	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, EF 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

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Email Address: jordan.clayton@usda.gov

How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snowcourses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in statistical and simulation models to prepare runoff forecasts. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

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Utah Water Supply Outlook Report

Natural Resources Conservation Service
Salt Lake City, UT

