

Utah Water Supply Outlook Report

February 1, 2019



Sunflower SNOTEL, Boulder Mountain, Utah

Photo by Lynn Kitchen

Water Supply Outlook Reports and Federal - State - Private Cooperative Snow Surveys

*For more water supply and resource management information, contact: your local Natural Resources Conservation Service Office or:
Snow Surveys
245 N Jimmy Doolittle Rd, SLC Utah, 84116. Phone (385)285-3114
Internet Address: <http://www.ut.nrcs.usda.gov/snow/>*

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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STATE OF UTAH GENERAL OUTLOOK

February 1, 2019

SUMMARY

So far so good. Water year 2019 is right on track for normal snowpack conditions across Utah*. Based on February 1 snowpack numbers most streamflow forecasts are a bit below normal ranging in the 70 to 100% but there's still a few months of winter left and if the current weather pattern holds up then we could end up with a good runoff that would go a long way to help improve our depleted reservoir storage. Surface Water Supply Index (SWSI) numbers range from 18% in the Eastern Uinta to 68% in Price River. It should be noted that the Eastern Uinta SWSI is much lower due to intentional storage drawn-down at Steinaker Reservoir for structural repairs.

*All the numbers in this report reflect conditions as of February 1st, but while compiling this report we've experienced a slew of early February storms. We felt it would be appropriate to discuss these recent storms in this summary. As of February 6th, the state snow water equivalent (SWE) percent normal improved from 102% to 123% with most basins increasing by up to 15%. Across the state we saw up to 2 to 3 inches of SWE added to our snowpack (that's about 1 to 3 feet of snow depth). Kolob SNOTEL, at the headwaters of the Virgin River, gained 3.8 inches of SWE in one day and a total of 8 inches over the six-day storm period. Wow! The following page displays a map of SNOTEL sites with SWE increases from February 1 to February 6, showing snowpack conditions across the entire state. Fantastic storms – great for our water supply and not so great if you had to be somewhere on time. Hopefully the pattern continues and we accumulate more mountain snow over the next couple months.

SNOWPACK

As of February 1, snowpack continues to be near normal at 102% compared to 57% last year. Overall, the entire state has benefited from the current storm pattern with the lowest numbers on the Bear River Basin and Escalante at 88% and 83% respectively. The remaining basins range from 99% to 115% of normal.

PRECIPITATION

January precipitation across the state ranged from above average at 161% on the Lower Sevier to near average in the Bear River at 92% of average with most basins ranging in the 100 to 120% range. This brings the statewide seasonal accumulation (Oct-Jan) to 109% of average.

RESERVOIRS

Reservoir storage is at 59% of capacity statewide compared to 74% of capacity last year. A normal to above normal peak snowpack would improve reservoir levels and top off many of the smaller ones. Hopefully the storm pattern continues, and we reach a normal peak snowpack with no fuss and no mus.

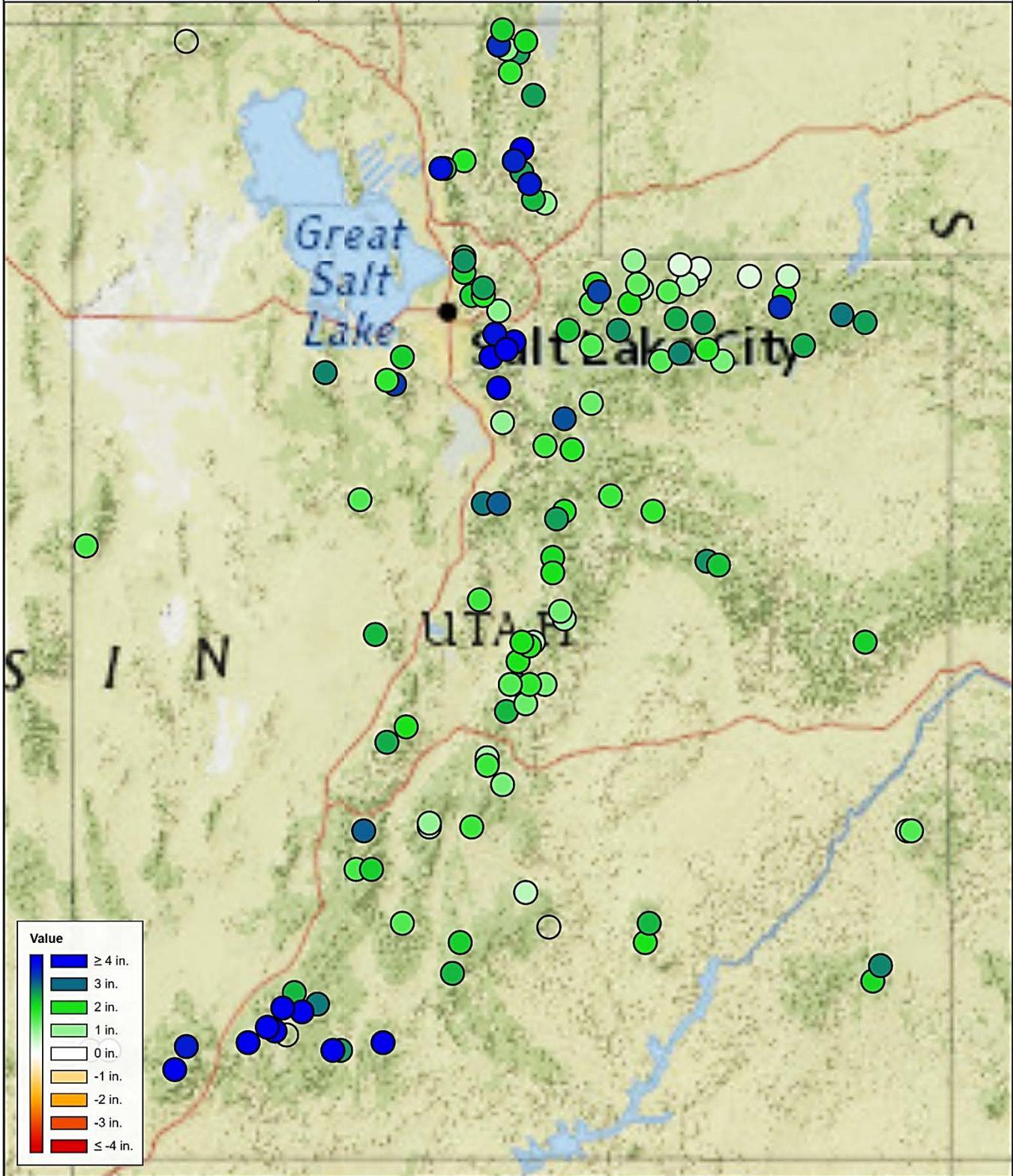
STREAMFLOW

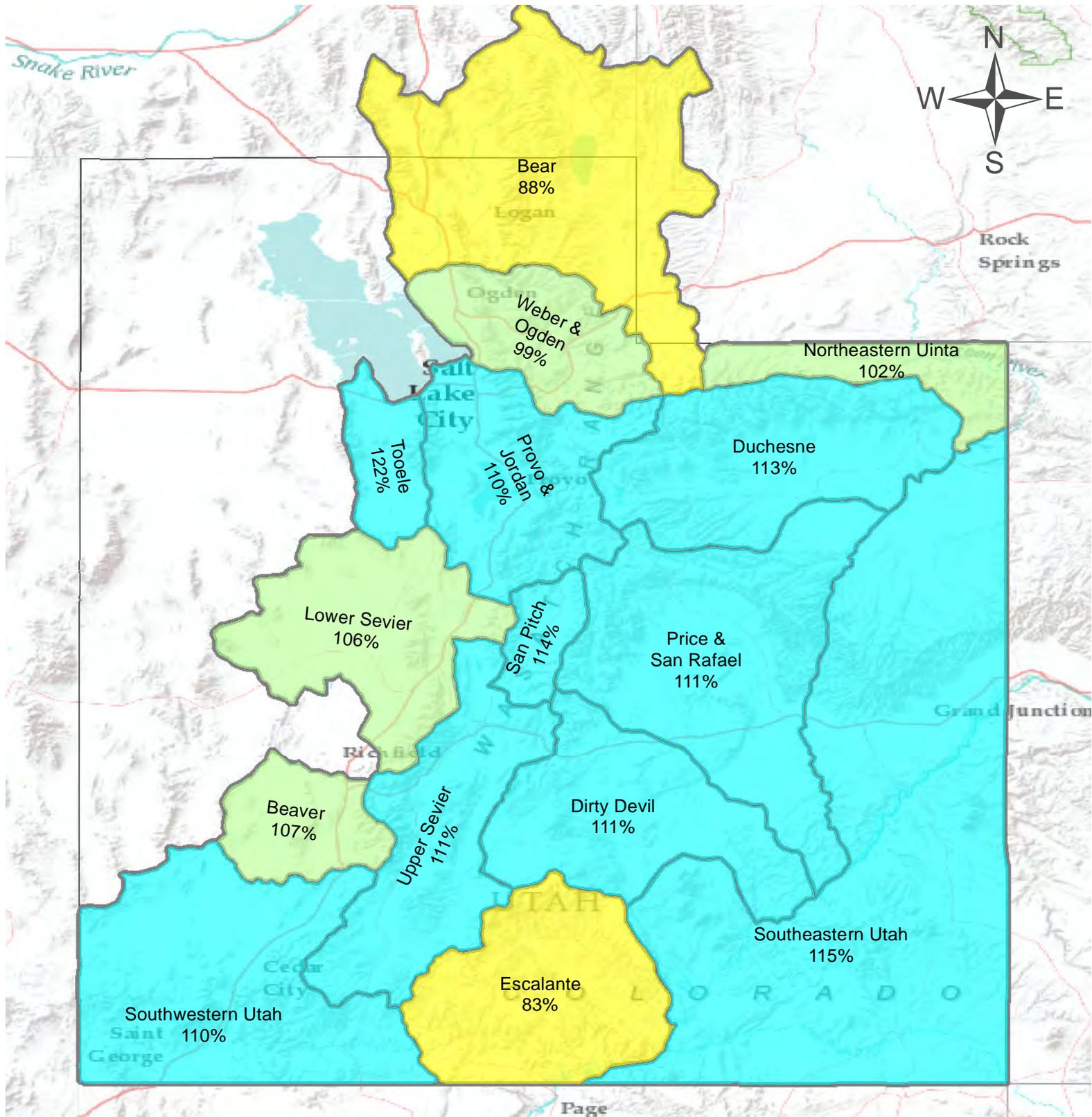
Streamflow forecasts across the state range from 65% to 115%. Bear River has the lowest forecasts numbers range from 65% to 88% due to its February 1 snowpack numbers but with another 2-3 snowpack months to go there's still a reasonable chance for a normal runoff in the Bear and across the state in general. The remaining basin forecasts are in the 70% to 100% range.

Snow Water Equivalent Delta

Value

February 6, 2019 - February 1, 2019,
end of day



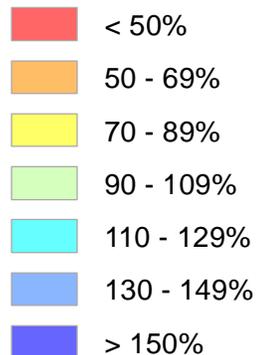


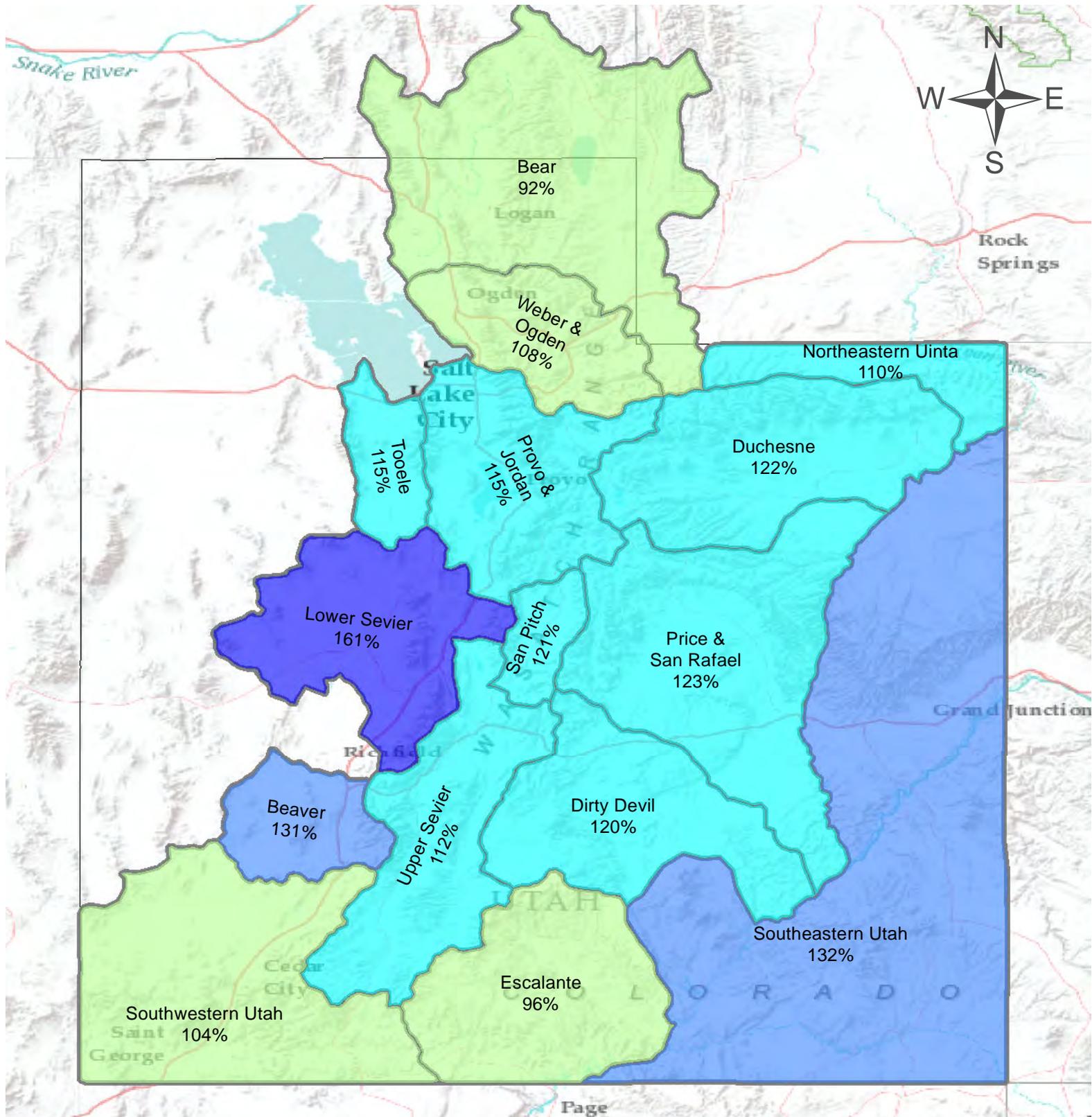
Statewide Snow Water Equivalent

As of February 1, 2019:

102% of Normal Snow Water Equivalent

% of Normal





Statewide Precipitation

As of February 1, 2019:

109% of Normal Precipitation

117% of Normal Precipitation Last Month

% of Normal

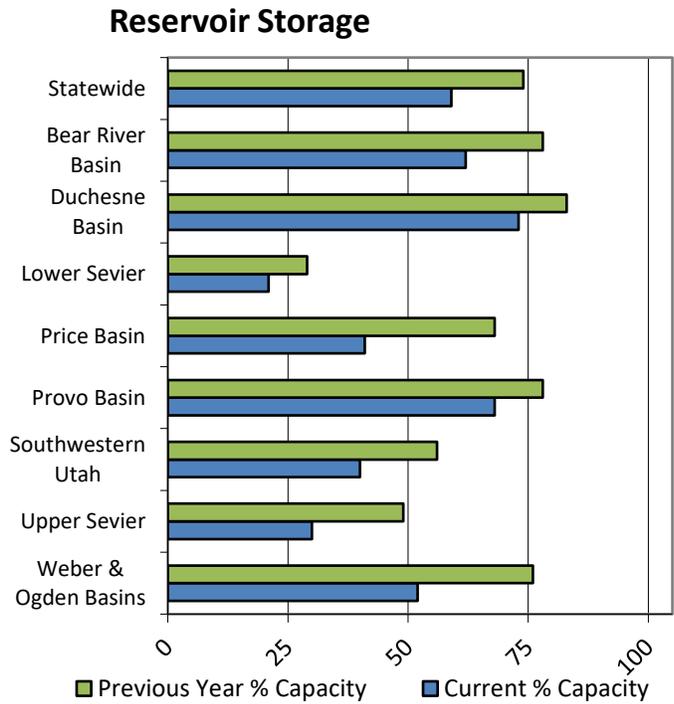
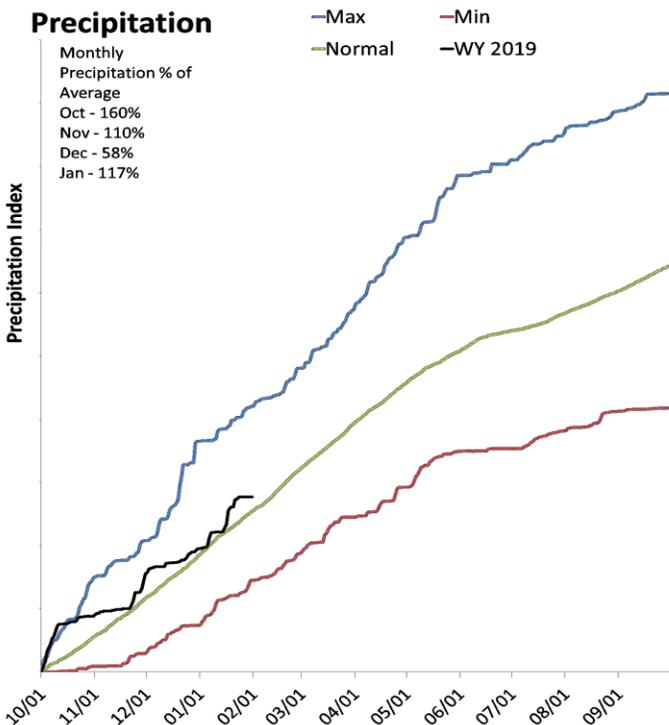
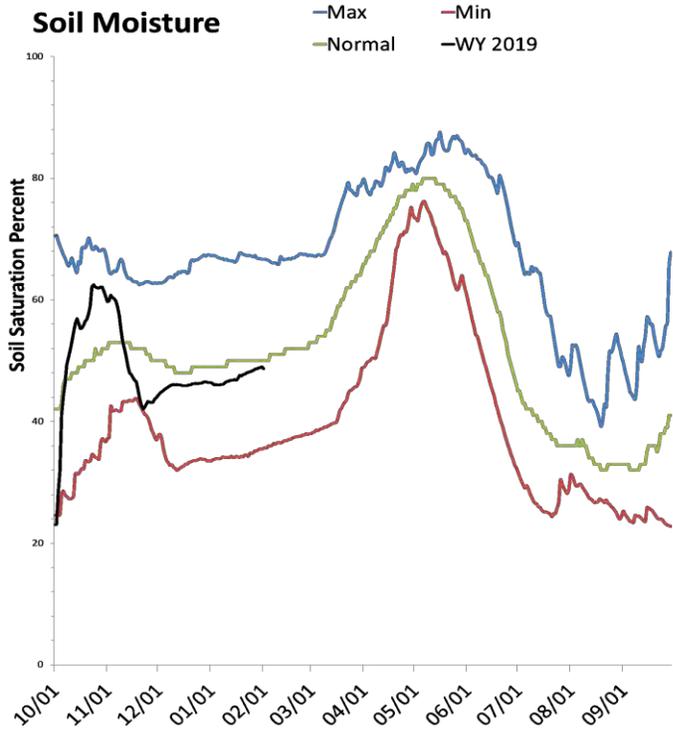
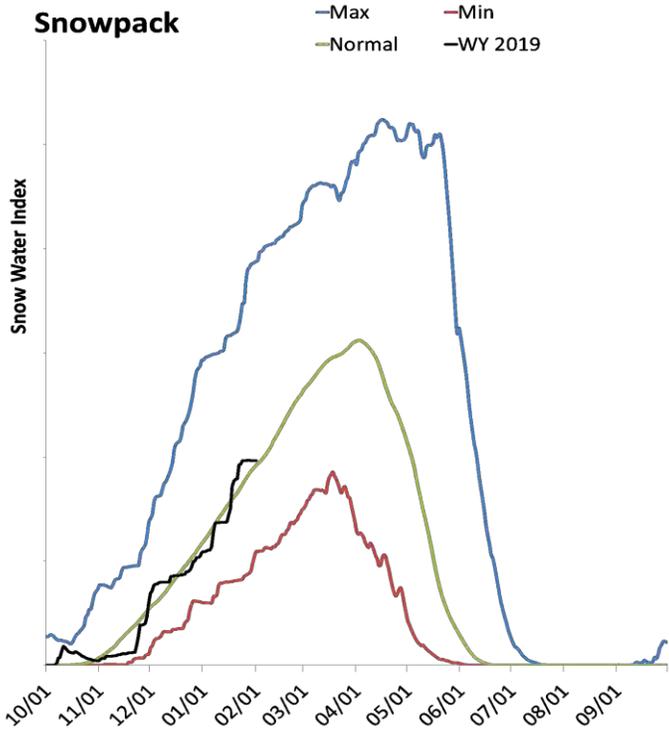
- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%

0 10 20 40 60 80 100 Miles

Statewide Utah

February 1, 2019

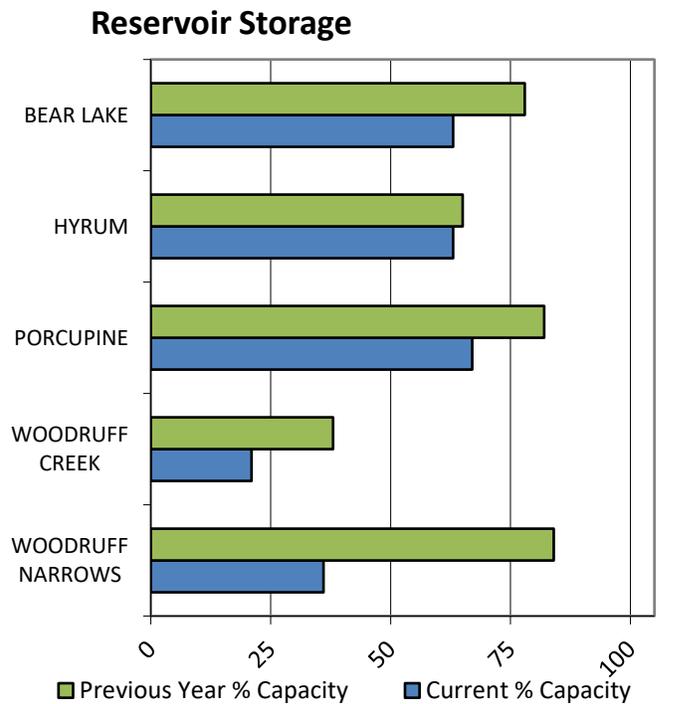
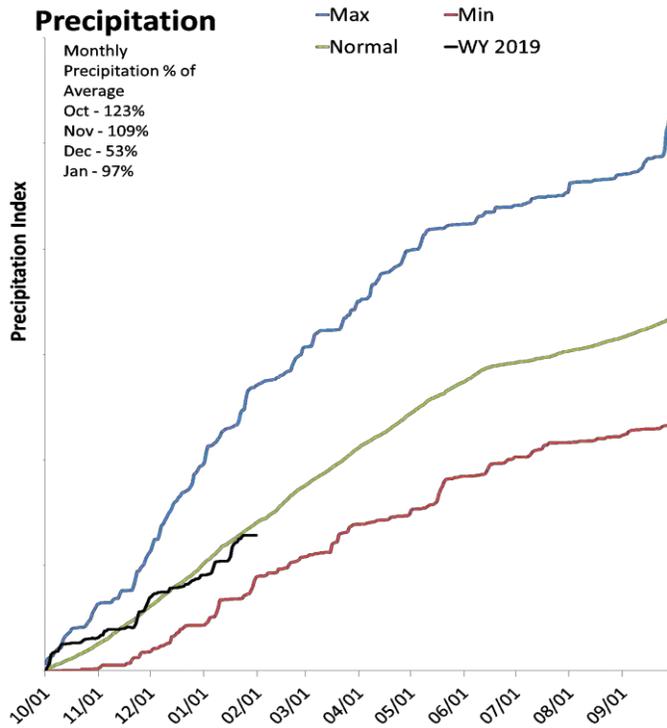
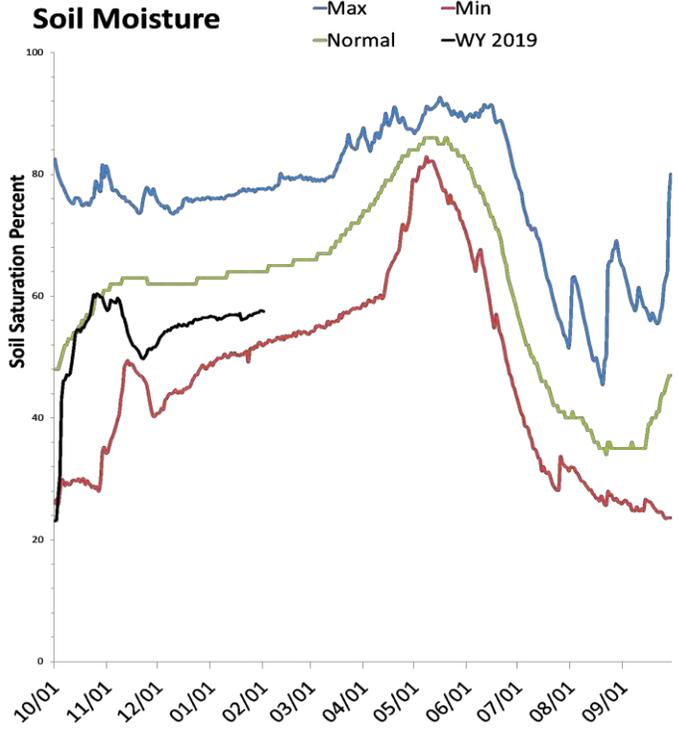
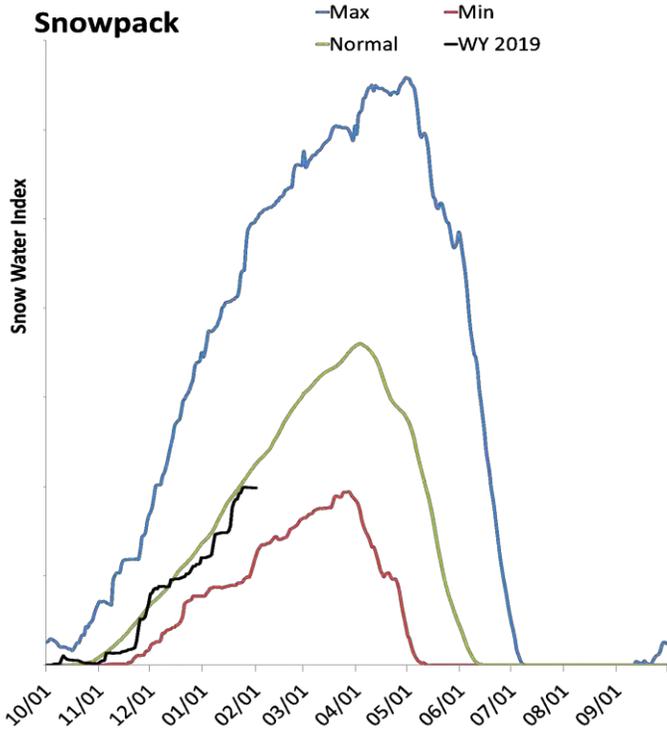
Snowpack in Utah is near normal at 102% of normal, compared to 57% last year. Precipitation in January was above average at 117%, which brings the seasonal accumulation (Oct-Jan) to 109% of average. Soil moisture is at 49% compared to 42% last year. Reservoir storage is at 59% of capacity, compared to 74% last year. Forecast streamflow volumes range from 65% to 115% of average.



Bear River Basin

February 1, 2019

Snowpack in the Bear River Basin is below normal at 88% of normal, compared to 78% last year. Precipitation in January was near average at 96%, which brings the seasonal accumulation (Oct-Jan) to 92% of average. Soil moisture is at 58% compared to 71% last year. Reservoir storage is at 62% of capacity, compared to 78% last year. Forecast streamflow volumes range from 65% to 88% of average. The surface water supply index is 58% for the Bear River, 40% for the Woodruff Narrows, 54% for the Little Bear.



Bear River Streamflow Forecasts - February 1, 2019

Bear River	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						30yr Avg (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	
Bear R nr UT-WY State Line	APR-JUL	56	80	96	86%	112	136	112
	APR-SEP	60	87	105	85%	123	150	123
Bear R ab Resv nr Woodruff	APR-JUL	18.2	70	106	88%	142	194	121
	APR-SEP	14.2	71	110	86%	149	205	128
Big Ck nr Randolph	APR-JUL	0.23	1.69	3.3	87%	4.9	7.3	3.8
Smiths Fk nr Border	APR-JUL	42	59	71	80%	83	100	89
	APR-SEP	48	68	82	79%	96	116	104
Bear R bl Stewart Dam	FEB-JUL	8.5	101	163	76%	225	315	215
	FEB-SEP	12.6	115	185	77%	255	355	240
	MAR-JUL	6.2	91	152	74%	215	305	205
	MAR-SEP	13.8	99	168	73%	235	340	230
	APR-JUL	9.2	61	119	65%	177	265	183
	APR-SEP	12.3	68	133	65%	198	295	205
Little Bear at Paradise	APR-JUL	13.2	29	39	87%	49	65	45
Logan R nr Logan	APR-JUL	46	72	89	80%	106	132	111
Blacksmith Fk nr Hyrum	APR-JUL	14.9	28	37	86%	46	59	43

- 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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bear Lake	820.7	1011.7	584.8	1302.0
Hyrum Reservoir	9.7	9.9	10.2	15.3
Porcupine Reservoir	7.6	9.3	6.0	11.3
Woodruff Creek	0.9	1.5	2.4	4.0
Woodruff Narrows Reservoir	20.7	48.0	29.0	57.3
Basin-wide Total	859.6	1080.3	632.4	1389.9
# of reservoirs	5	5	5	5

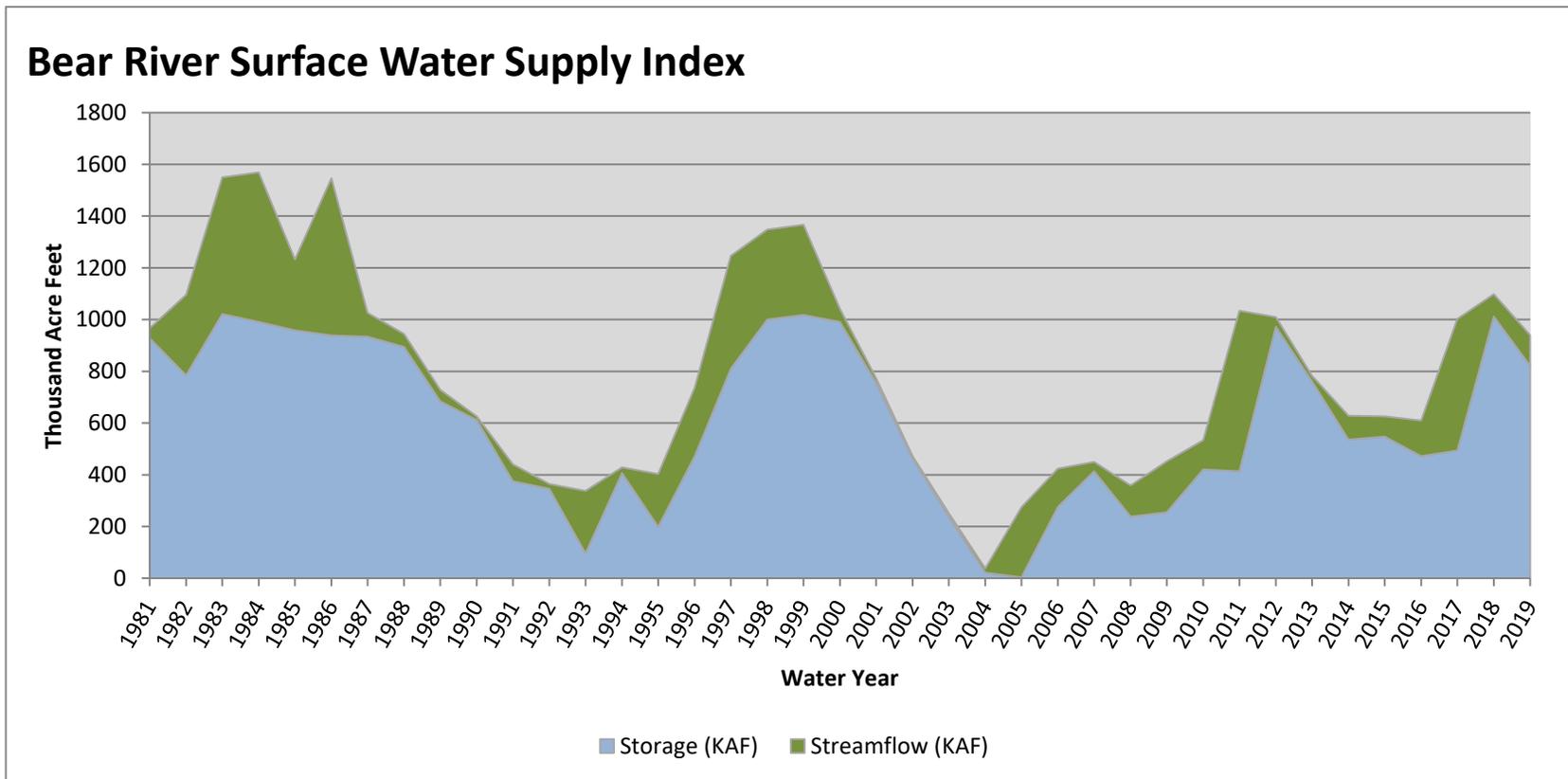
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Upper Bear	3	111%	87%
Middle Bear	7	86%	83%
Lower Bear	3	73%	60%
Logan River	7	87%	77%

February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Bear River	820.74	119.00	939.74	58	0.62	01, 13, 88, 81

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.

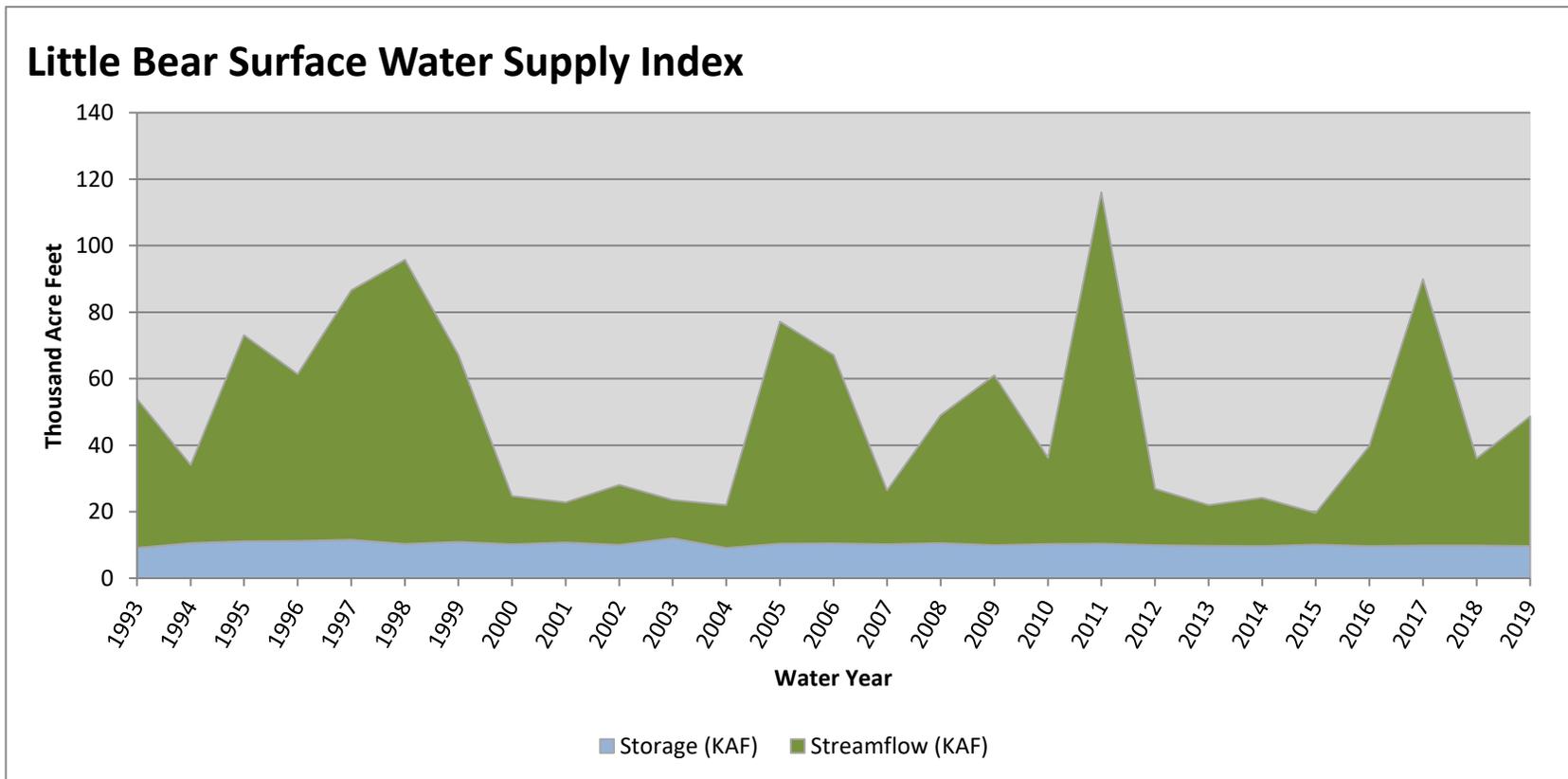


February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Little Bear	9.68	39.00	48.68	54	0.3	10, 16, 08, 93

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.

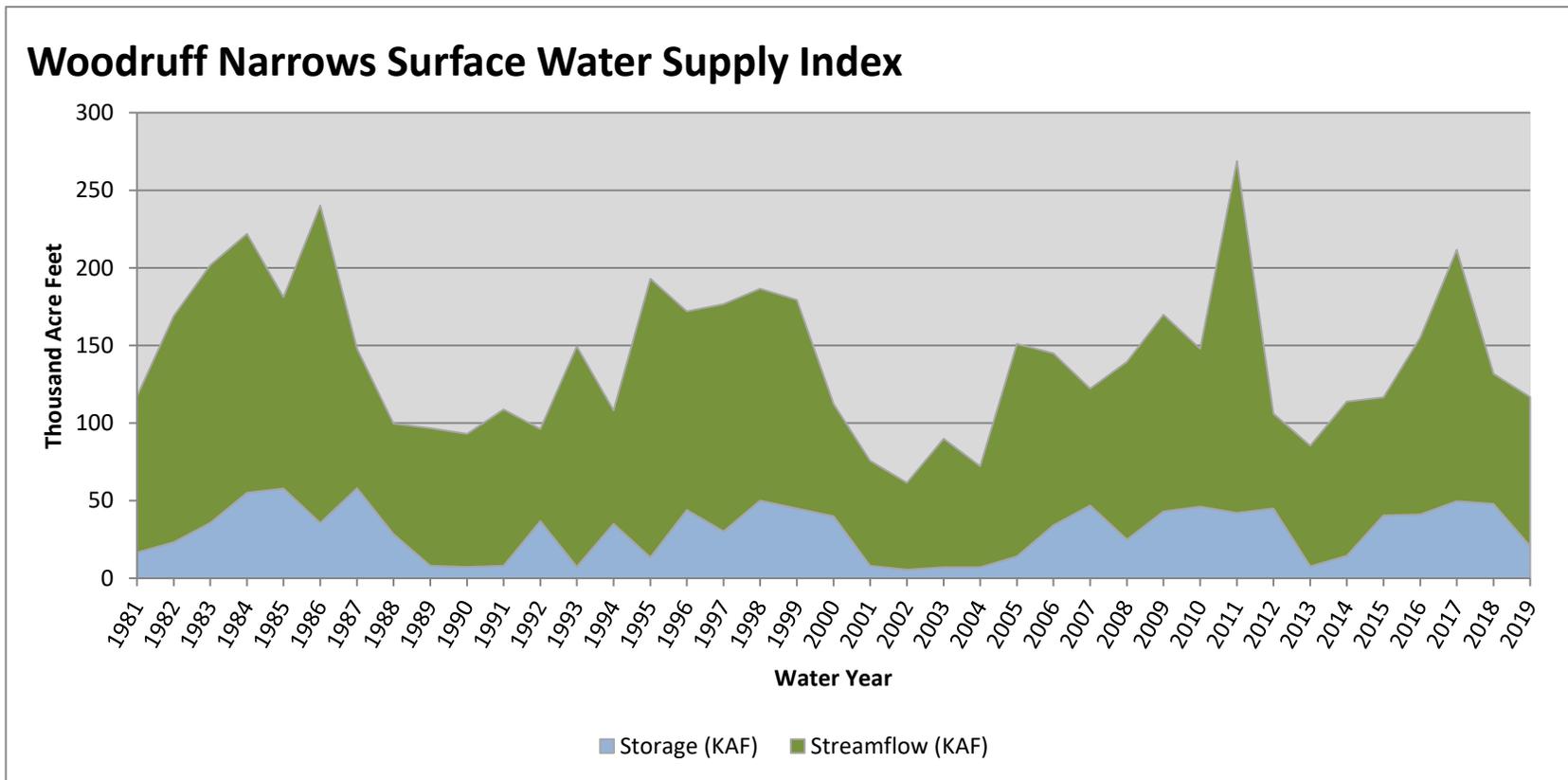


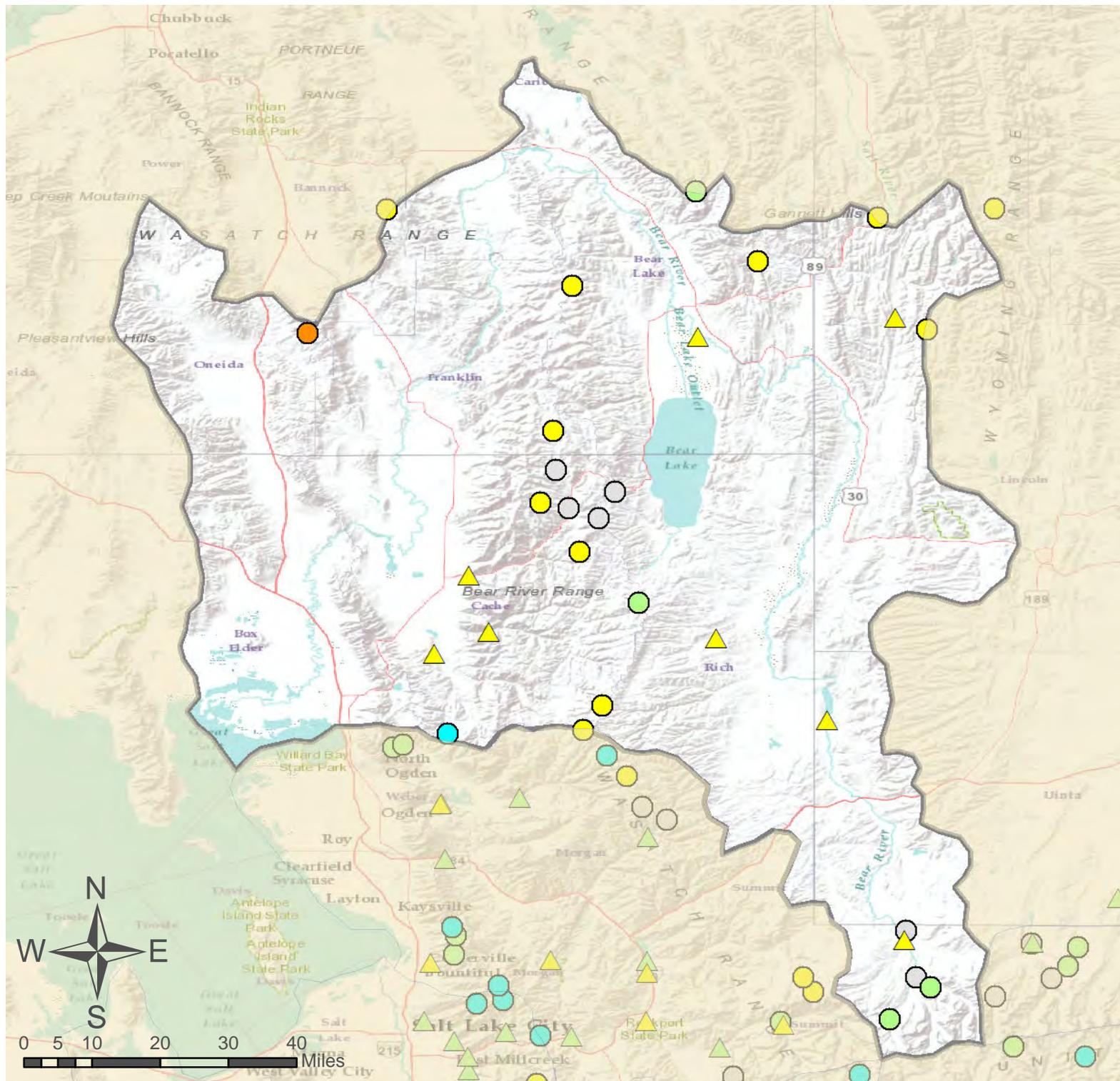
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Woodruff Narrows	20.68	96.00	116.68	40	-0.83	14, 15, 81, 07

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.





Bear River Basin

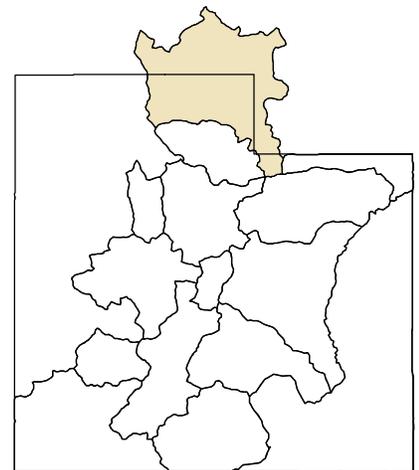
- SNOTEL Site
- △ Forecast Point

As of February 1, 2019:

- 88% of Normal SWE
- 92% of Normal Precipitation
- 96% of Normal Precipitation Last Month
- 58% Saturation Soil Moisture
- Bear River Basin

% of Normal

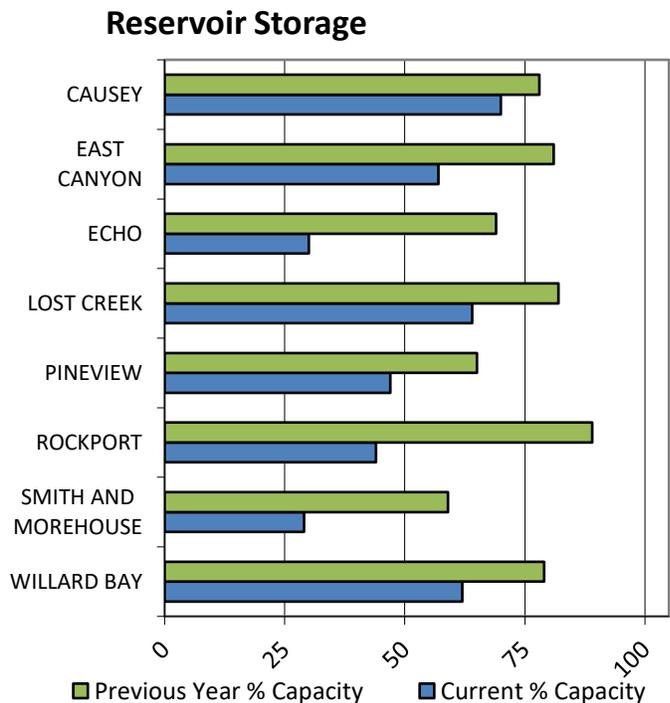
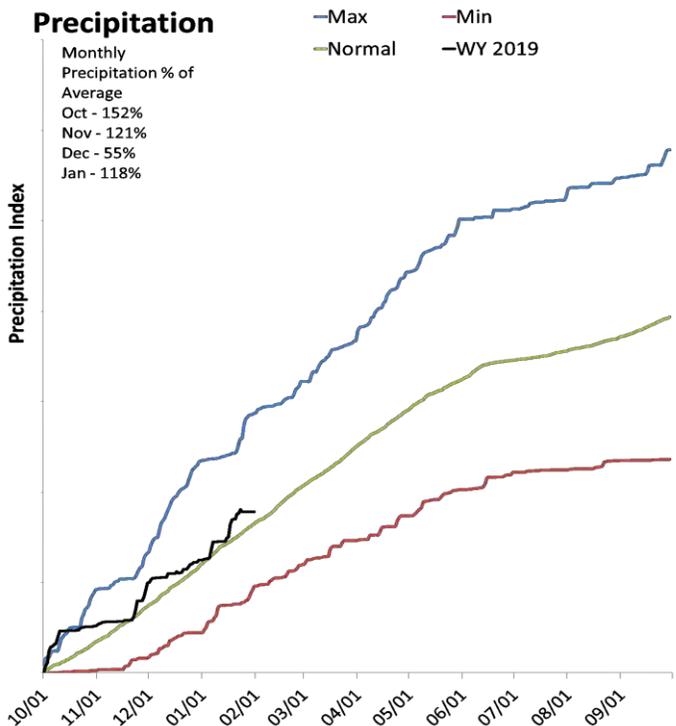
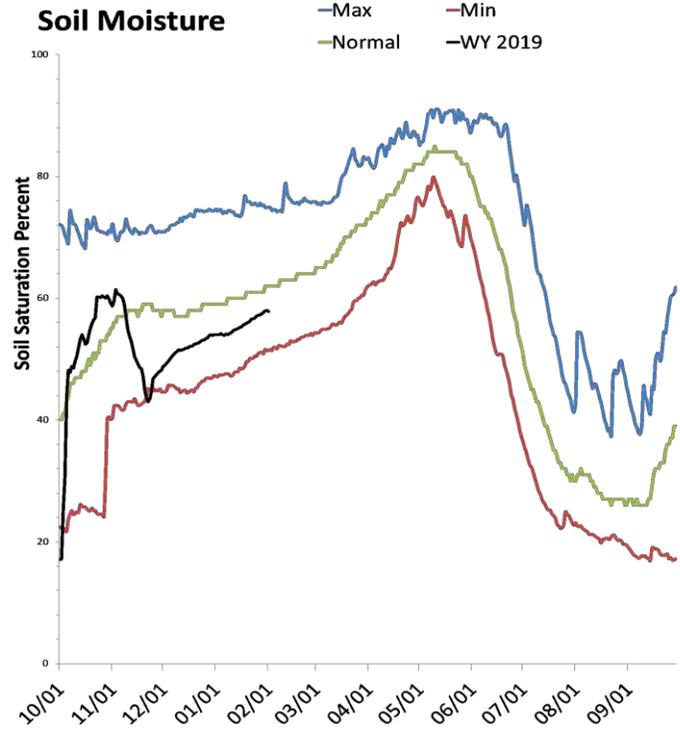
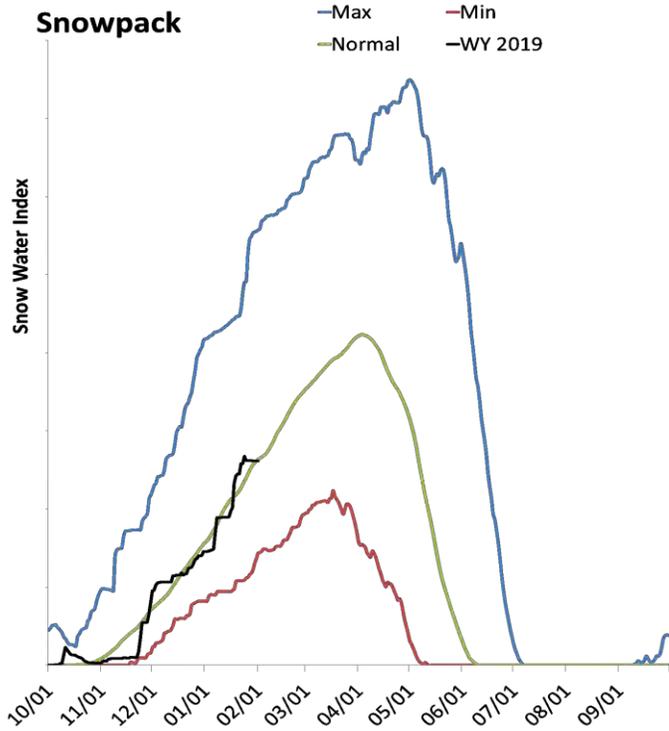
- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal



Weber & Ogden River Basins

February 1, 2019

Snowpack in the Weber & Ogden River Basins is near normal at 99% of normal, compared to 58% last year. Precipitation in January was above average at 117%, which brings the seasonal accumulation (Oct-Jan) to 108% of average. Soil moisture is at 58% compared to 65% last year. Reservoir storage is at 52% of capacity, compared to 76% last year. Forecast streamflow volumes range from 83% to 95% of average. The surface water supply index is 58% for the Ogden River, 55% for the Weber River.



Weber Ogden Rivers Streamflow Forecasts - February 1, 2019

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

Weber Ogden Rivers	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Smith & Morehouse Resv Inflow	APR-JUL	21	26	30	88%	34	39	34
Weber R nr Oakley	APR-JUL	64	90	108	92%	126	152	117
Rockport Reservoir Inflow	APR-JUL	41	77	102	83%	127	163	123
Chalk Ck at Coalville	APR-JUL	10.1	26	37	90%	48	64	41
Weber R nr Coalville	APR-JUL	44	81	106	84%	131	168	126
Echo Reservoir Inflow	APR-JUL	54	114	155	93%	196	255	166
Lost Ck Reservoir Inflow	APR-JUL	1.45	7.2	11.1	92%	15	21	12.1
East Canyon Ck nr Jeremy Ranch	APR-JUL	3.2	9.9	14.5	95%	19.1	26	15.2
East Canyon Ck nr Morgan	APR-JUL	8.2	18.2	25	89%	32	42	28
Weber R at Gateway	APR-JUL	50	190	285	90%	380	520	315
SF Ogden R nr Huntsville	APR-JUL	18.3	38	52	93%	66	86	56
Pineview Reservoir Inflow	APR-JUL	31	74	104	88%	134	177	118
Wheeler Ck nr Huntsville	APR-JUL	2.1	4.1	5.5	87%	6.9	8.9	6.3
Centerville Ck	APR-JUL	0.66	0.98	1.2	89%	1.42	1.74	1.35

- 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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Causey Reservoir	5.0	5.5	3.2	7.1
East Canyon Reservoir	28.4	39.8	34.7	49.5
Echo Reservoir	22.5	51.4	46.3	73.9
Lost Creek Reservoir	14.4	18.4	12.3	22.5
Pineview Reservoir	51.4	71.9	51.4	110.1
Rockport Reservoir	27.0	54.4	34.5	60.9
Willard Bay	132.2	169.2	133.7	215.0
Smith And Morehouse Reservoir	2.4	4.8	3.6	8.1
Basin-wide Total	283.4	415.5	319.7	547.1
# of reservoirs	8	8	8	8

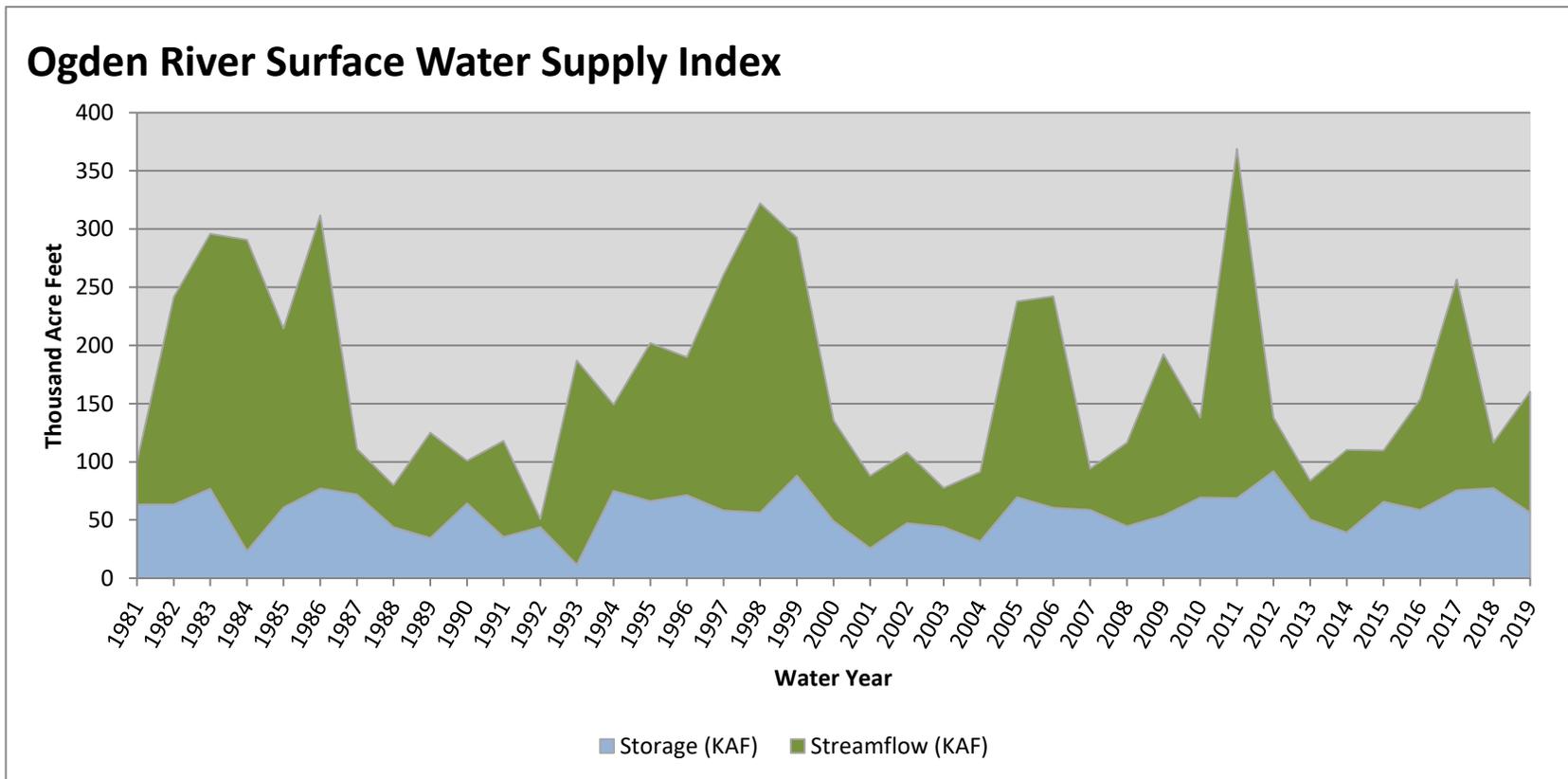
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Upper Weber	9	97%	68%
Lower Weber	7	106%	53%
Ogden River	5	95%	53%
Lost Creek	3	93%	73%

February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Ogden River	56.41	104.00	160.41	58	0.62	94, 16, 93, 96

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.

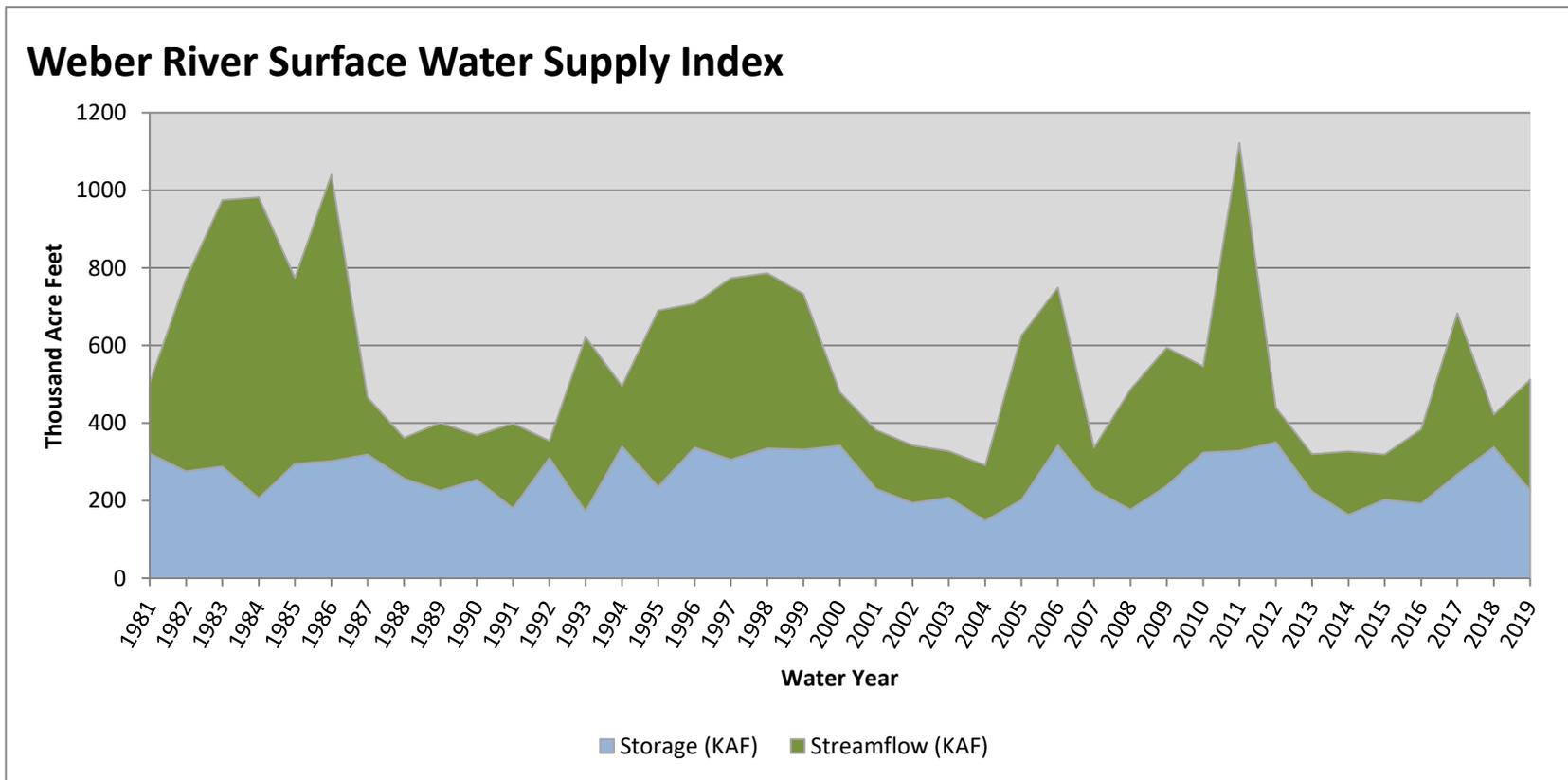


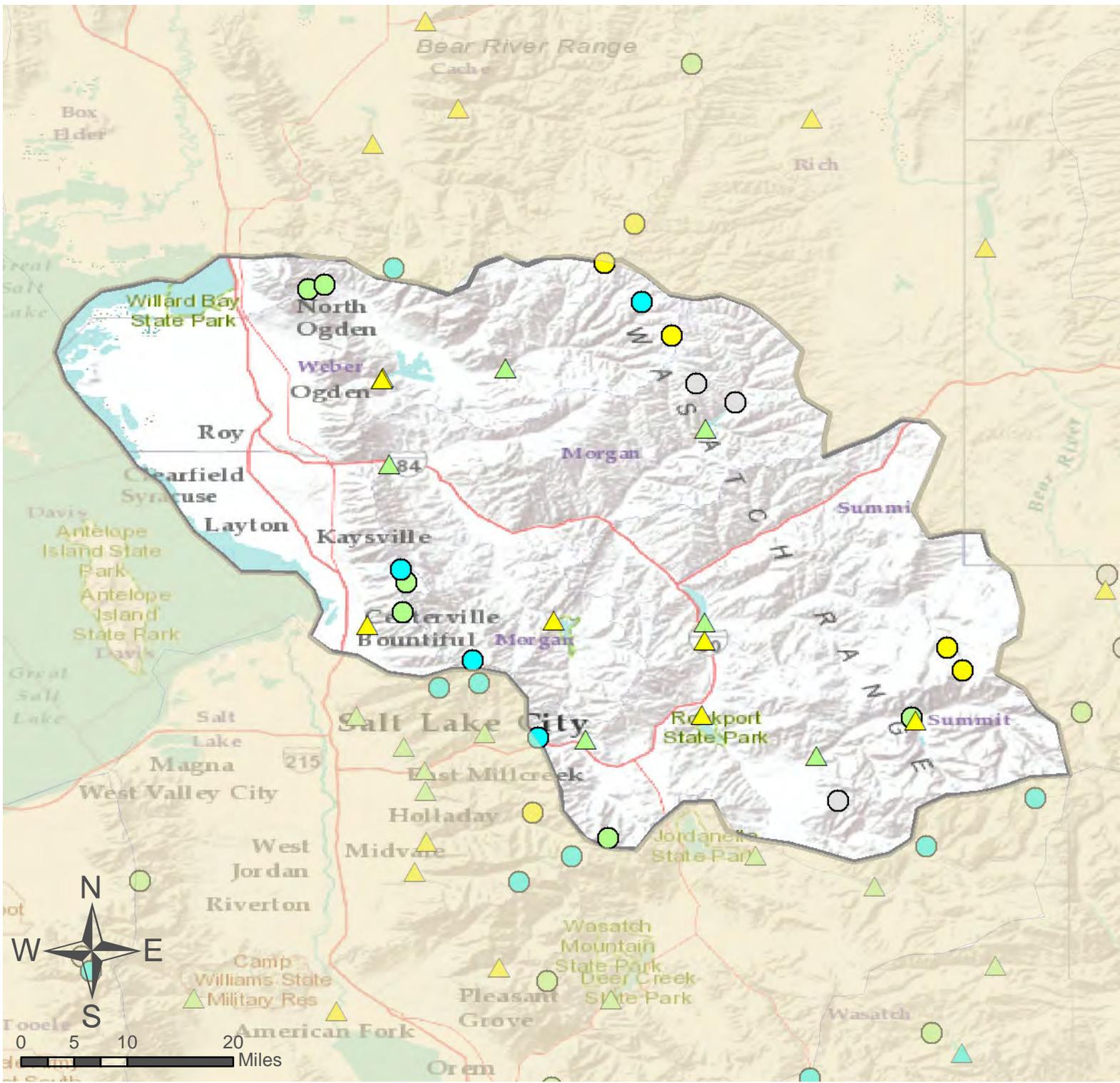
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Weber River	226.97	285.00	511.97	55	0.42	94, 81, 10, 09

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.



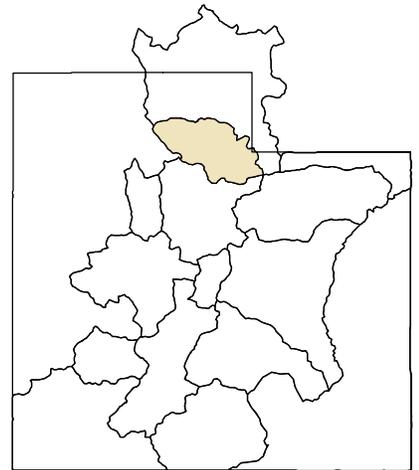


Weber & Ogden River Basins

- SNOTEL Site
- △ Forecast Point

% of Normal

- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal



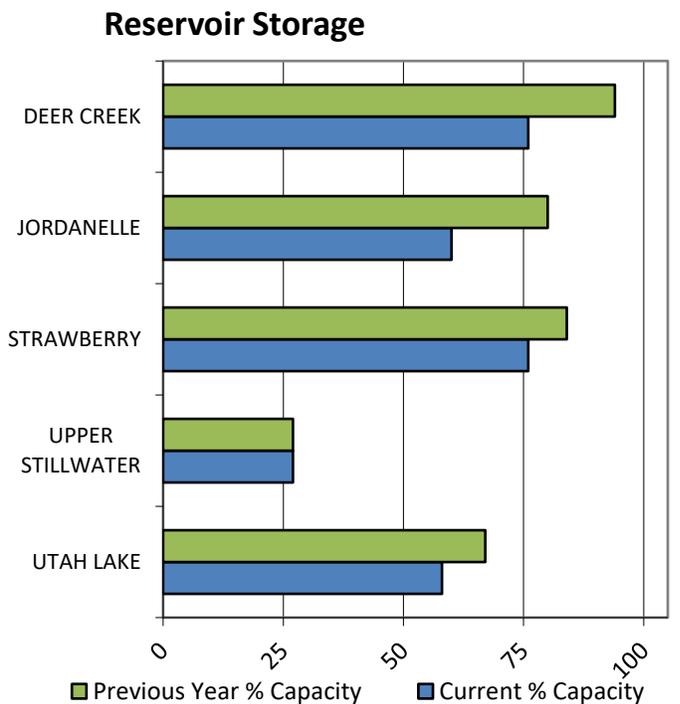
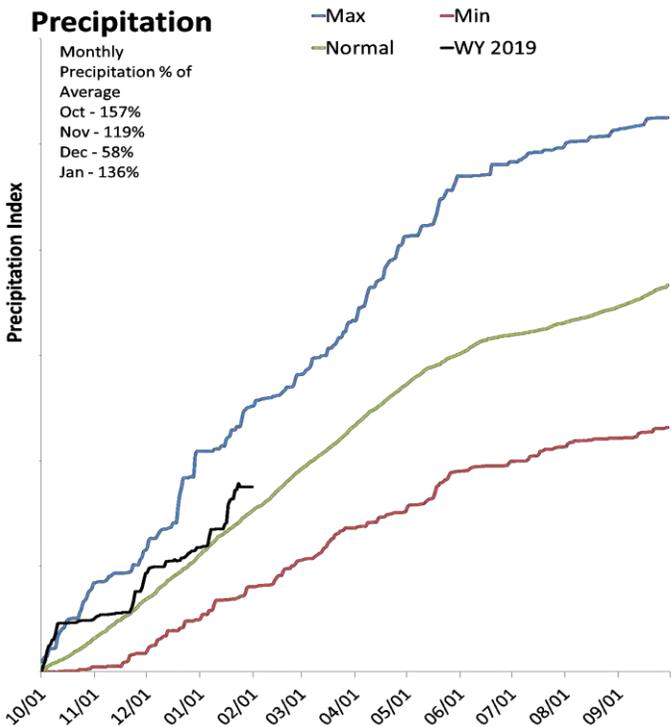
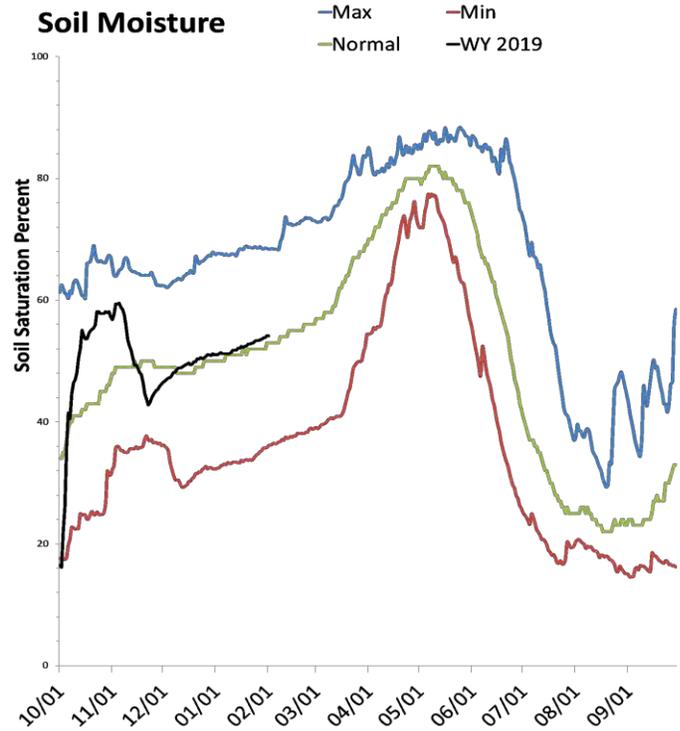
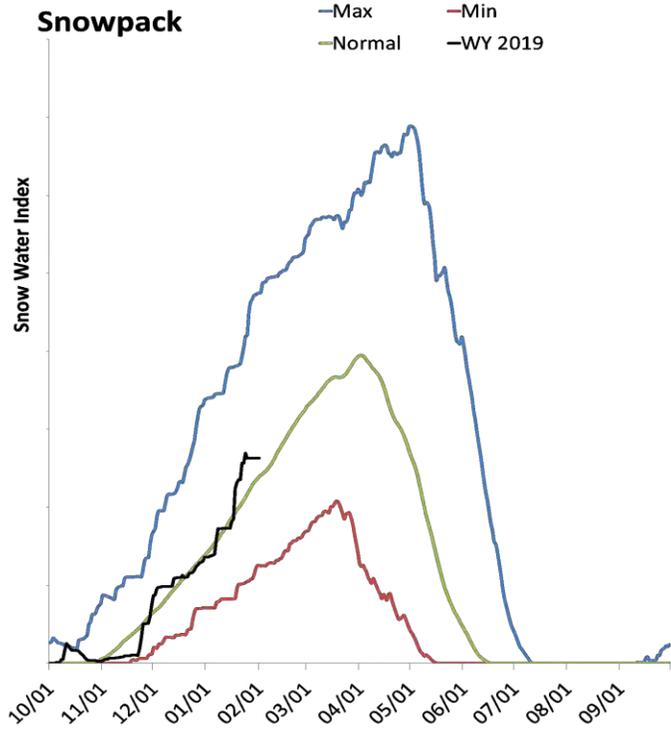
As of February 1, 2019:

- 99% of Normal SWE
- 108% of Normal Precipitation
- 117% of Normal Precipitation Last Month
- 58% Saturation Soil Moisture
- Weber & Ogden River Basins

Provo & Jordan River Basins

February 1, 2019

Snowpack in the Provo & Jordan River Basins is above normal at 110% of normal, compared to 52% last year. Precipitation in January was much above average at 136%, which brings the seasonal accumulation (Oct-Jan) to 115% of average. Soil moisture is at 54% compared to 44% last year. Reservoir storage is at 68% of capacity, compared to 78% last year. Forecast streamflow volumes range from 87% to 103% of average. The surface water supply index is 23% for the Provo River.



Provo Jordan Rivers Streamflow Forecasts - February 1, 2019

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

Provo Jordan Rivers	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Provo R at Woodland	APR-JUL	54	76	93	93%	112	143	100
Provo R at Hailstone	APR-JUL	56	79	97	90%	117	150	108
Provo R bl Deer Ck Dam	APR-JUL	62	88	106	91%	124	150	116
Spanish Fk at Castilla	APR-JUL	3.4	35	71	103%	100	131	69
American Fk ab Upper Powerplant	APR-JUL	12.2	22	28	88%	34	44	32
Utah Lake Inflow	APR-JUL	15.9	77	230	87%	350	480	265
W Canyon Ck nr Cedar Fort	APR-JUL	0.39	1.17	1.7	97%	2.2	3	1.76
Little Cottonwood Ck nr SLC	APR-JUL	25	30	34	89%	38	43	38
Big Cottonwood Ck nr SLC	APR-JUL	18.4	26	32	89%	37	44	36
Mill Ck nr SLC	APR-JUL	2.1	4.4	5.9	92%	7.4	9.7	6.4
Parleys Ck nr SLC	APR-JUL	4.2	9.8	13.7	96%	17.5	23	14.2
Dell Fk nr SLC	APR-JUL	0.16	2.8	5.3	96%	7.8	11.6	5.5
Emigration Ck nr SLC	APR-JUL	0.04	2.2	3.6	90%	5	7.2	4
City Ck nr SLC	APR-JUL	2.8	5.5	7.4	96%	9.3	12.1	7.7
Salt Ck at Nephi	APR-JUL	0.66	4.5	8.6	91%	12.7	18.8	9.5

- 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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Deer Creek Reservoir	113.8	140.4	107.7	149.7
Strawberry Reservoir	845.5	930.5	658.4	1105.9
Utah Lake	508.8	587.8	752.5	870.9
Jordanelle Reservoir	191.5	254.9	242.0	314.0
Basin-wide Total	1659.6	1913.6	1760.6	2440.5
# of reservoirs	4	4	4	4

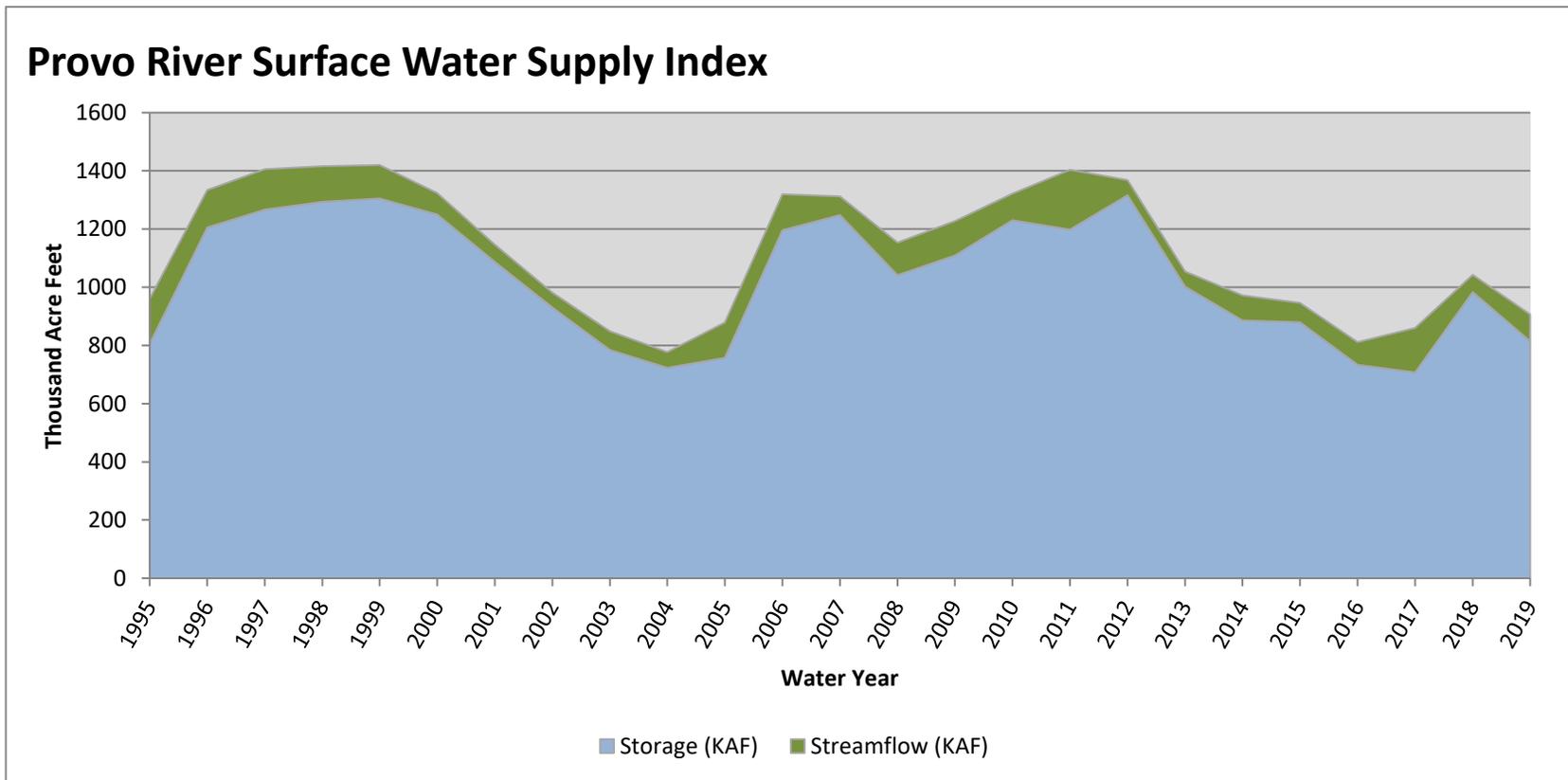
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Provo River	6	109%	53%
Jordan River	16	102%	54%
Utah Lake	13	107%	50%
Spanish Fork River	5	111%	42%
Six Creeks	15	103%	54%
Cottonwood Creeks	7	96%	54%

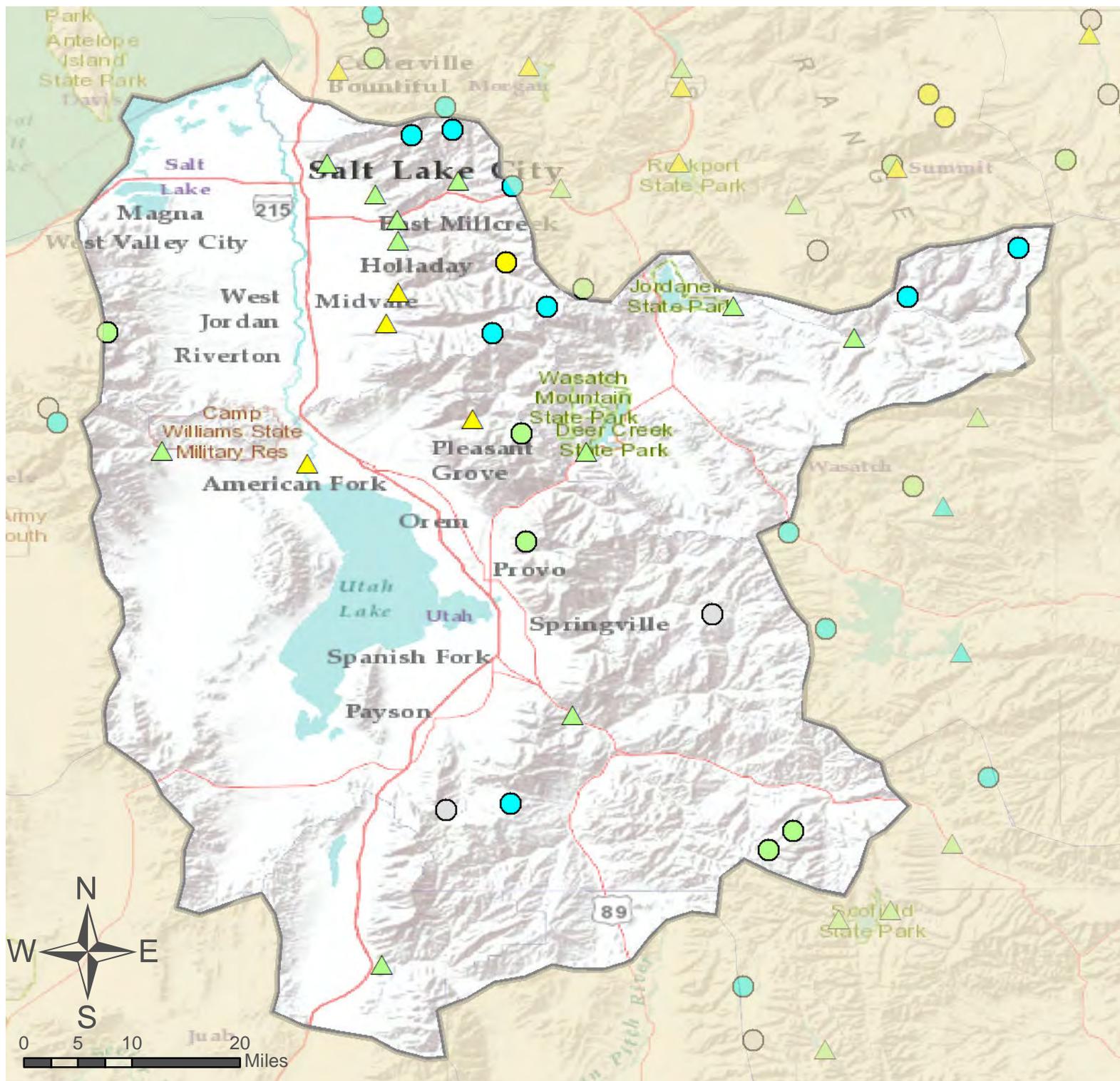
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM* Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI#	Years with similiar SWSI
	KAF^	KAF^	KAF^	%		
Provo River	814.10	93.00	907.10	23	-2.24	17, 05, 15, 95

*EOM, end of month; #SWSI, Surface Water Supply Index; ^KAF, thousand acre-feet.





Provo & Jordan River Basins

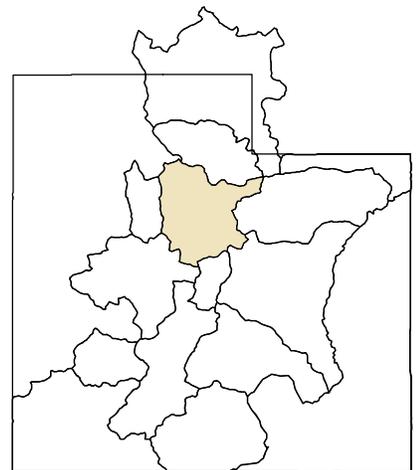
- SNOTEL Site
- △ Forecast Point

% of Normal

- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal

As of February 1, 2019:

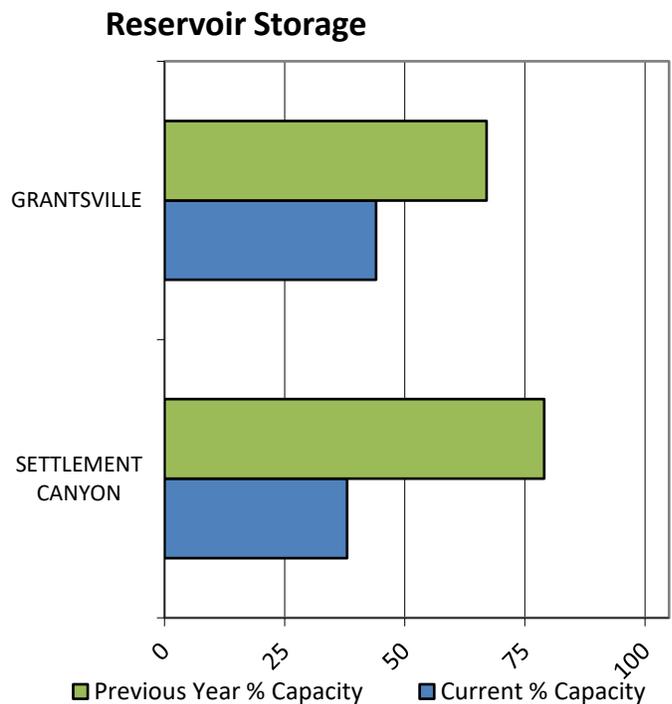
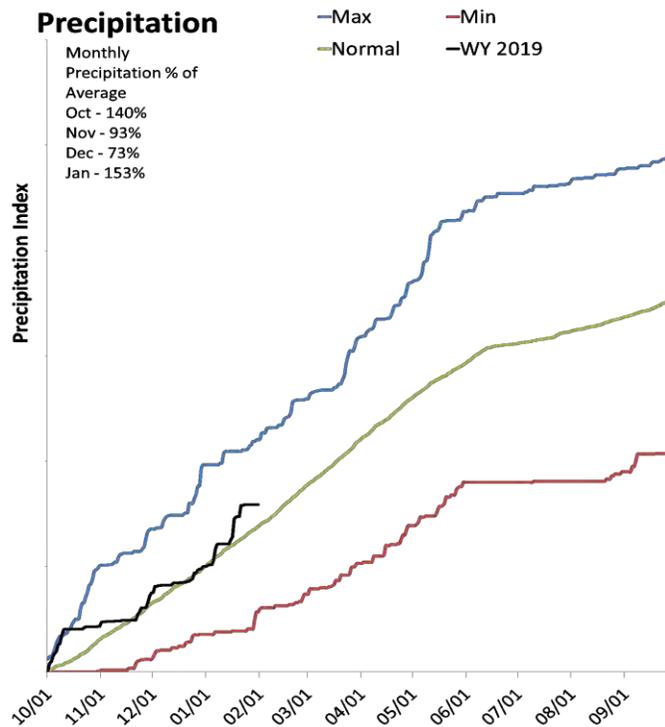
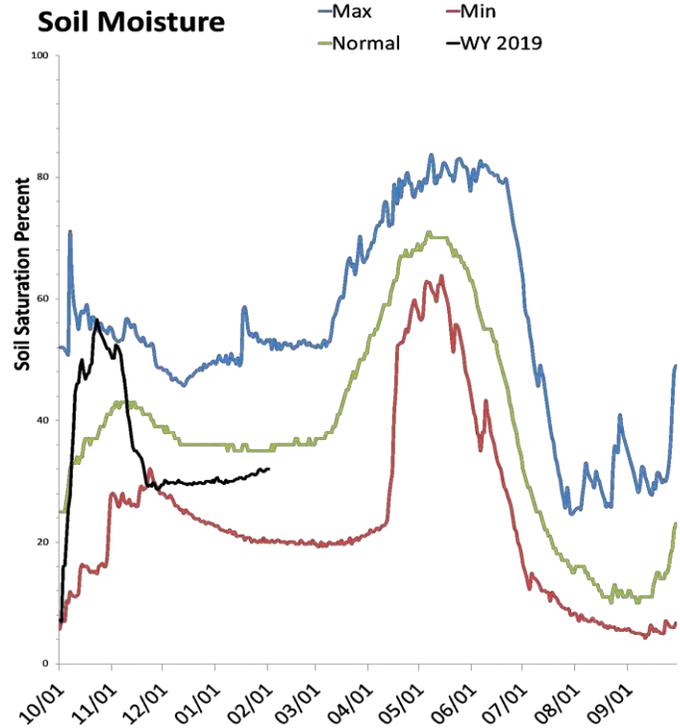
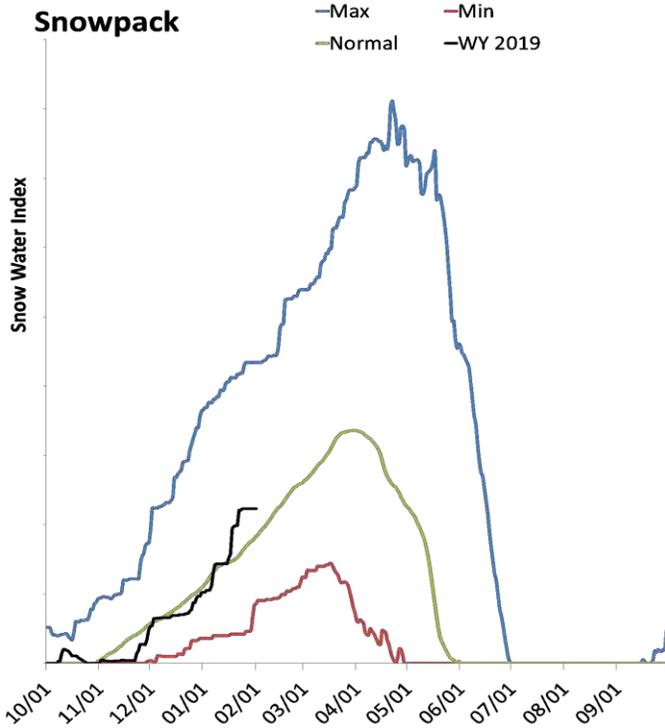
- 110% of Normal SWE
- 115% of Normal Precipitation
- 136% of Normal Precipitation Last Month
- 54% Saturation Soil Moisture
- Provo & Jordan River Basins



Tooele Valley & West Desert Basins

February 1, 2019

Snowpack in the Tooele Valley & West Desert Basins is above normal at 122% of normal, compared to 49% last year. Precipitation in January was much above average at 152%, which brings the seasonal accumulation (Oct-Jan) to 115% of average. Soil moisture is at 32% compared to 23% last year. Reservoir storage is at 43% of capacity, compared to 70% last year. Forecast streamflow volumes range from 73% to 97% of average.



Tooele Valley West Desert Streamflow Forecasts - February 1, 2019

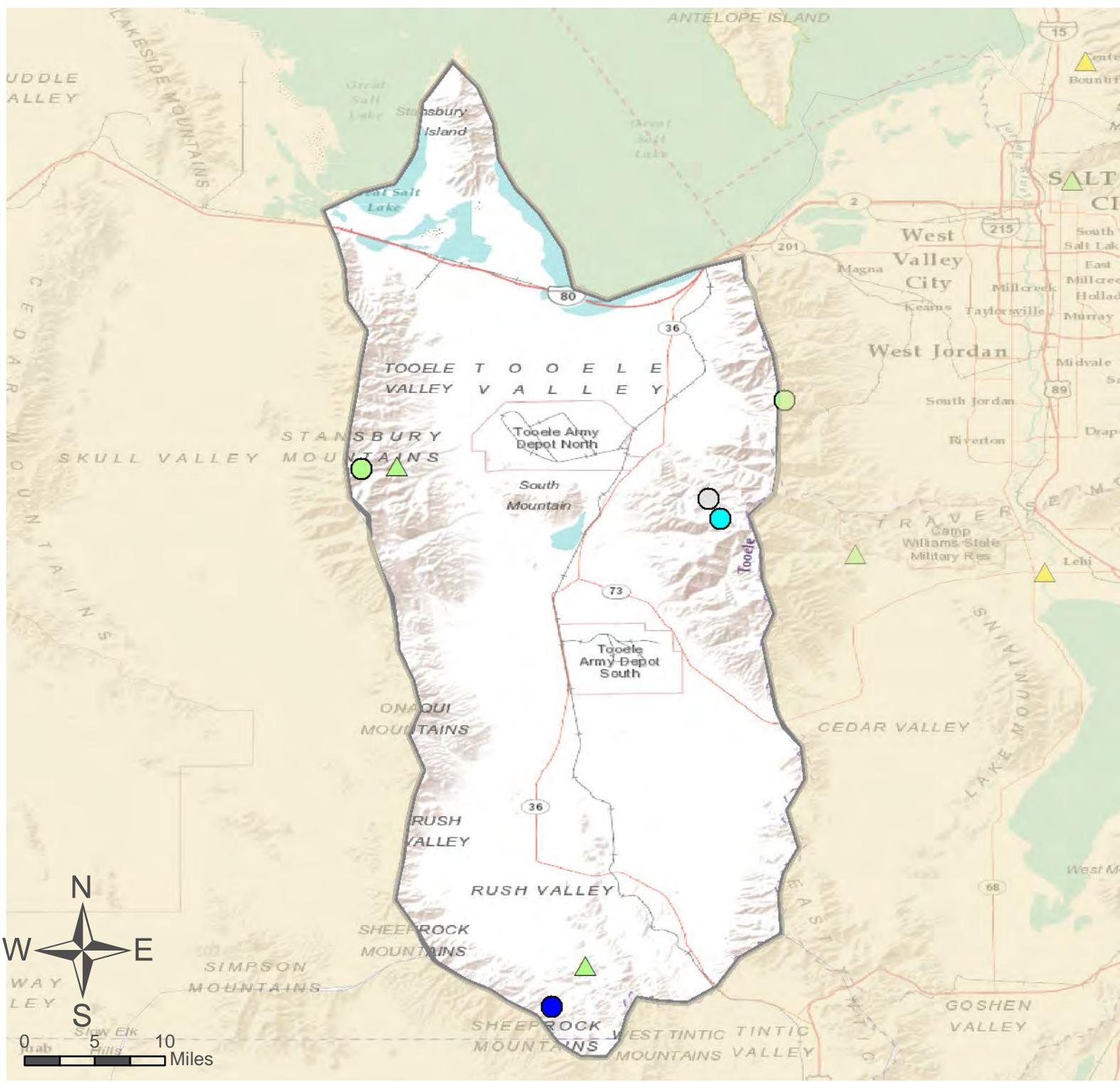
Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Tooele Valley West Desert	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Vernon Ck nr Vernon	APR-JUL	0.1	0.67	1.3	94%	1.93	2.8	1.39
S Willow Ck nr Grantsville	APR-JUL	0.96	2.1	2.8	90%	3.5	4.6	3.1
Dunn Ck nr Park Valley	APR-JUL	0.49	1.51	2.2	76%	2.9	3.9	2.9
W Canyon Ck nr Cedar Fort	APR-JUL	0.39	1.17	1.7	97%	2.2	3	1.76

- 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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Settlement Canyon Reservoir	0.4	0.8	0.7	1.0
Grantsville Reservoir	1.5	2.2	1.8	3.3
Basin-wide Total	1.8	3.0	2.5	4.3
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Tooele Valley	3	107%	50%
Raft River	1	81%	85%
Deep Creek	0		
Northwestern Utah	2	120%	49%

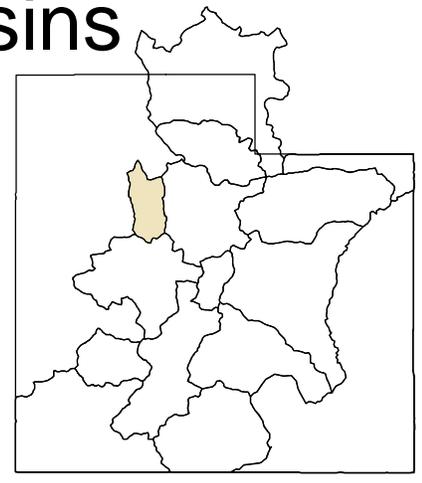


Tooele Valley & West Desert Basins

- SNOTEL Site
- △ Forecast Point

% of Normal

- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal



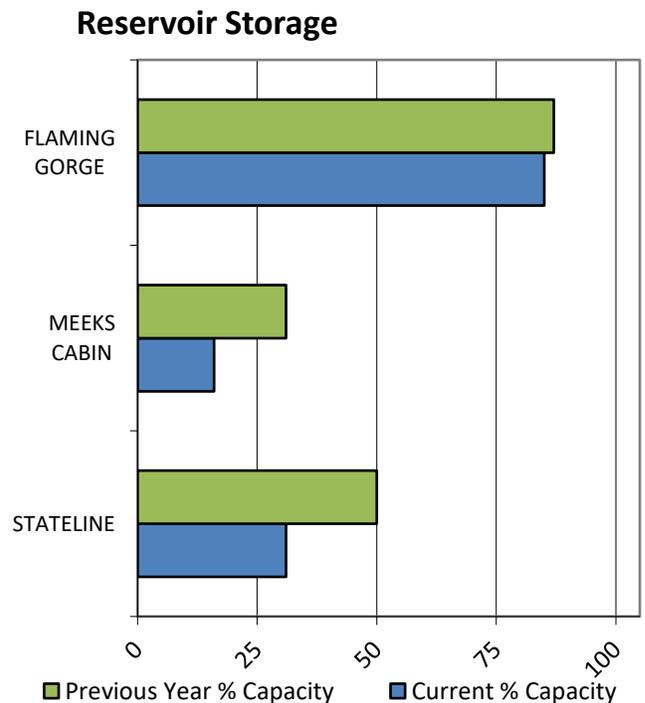
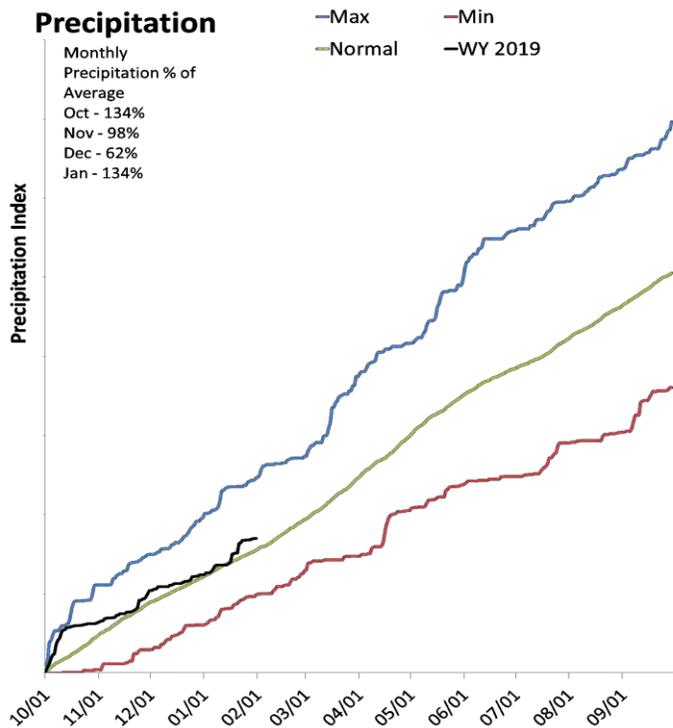
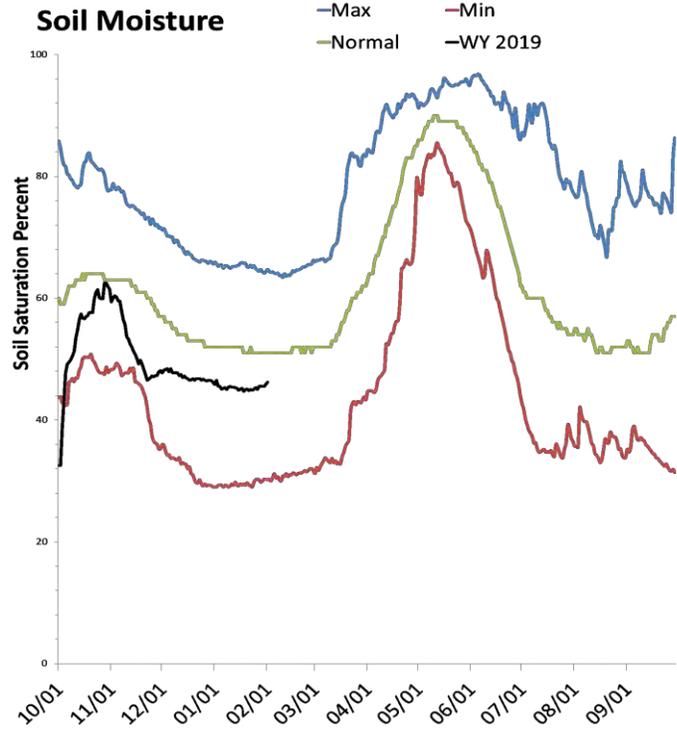
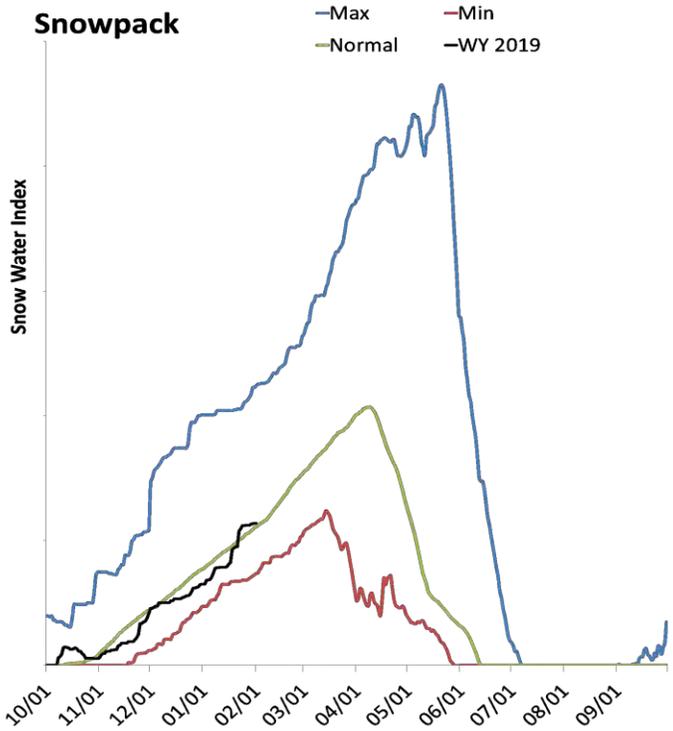
As of February 1, 2019:

- 122% of Normal SWE
 - 115% of Normal Precipitation
 - 152% of Normal Precipitation Last Month
 - 32% Saturation Soil Moisture
- Tooele Valley & West Desert Basins

Northeastern Uinta Basin

February 1, 2019

Snowpack in the Northeastern Uinta Basin is near normal at 102% of normal, compared to 88% last year. Precipitation in January was much above average at 137%, which brings the seasonal accumulation (Oct-Jan) to 110% of average. Soil moisture is at 44% compared to 47% last year. Reservoir storage is at 85% of capacity, compared to 86% last year. Forecast streamflow volumes range from 73% to 107% of average. The surface water supply index is 46% for the Blacks Fork, 51% for the Smiths Creek.



Northeastern Uintas Streamflow Forecasts - February 1, 2019

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

Northeastern Uintas	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Blacks Fk nr Robertson	APR-JUL	60	78	92	107%	107	131	86
EF of Smiths Fork nr Robertson ²	APR-JUL	16.5	22	26	96%	31	38	27
Flaming Gorge Reservoir Inflow ²	APR-JUL	350	555	715	73%	900	1210	980
Ashley Ck nr Vernal	APR-JUL	23	33	42	84%	52	67	50
Big Brush Ck ab Red Fleet Reservoir	APR-JUL	8.9	14.3	18	86%	22	27	21

- 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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Flaming Gorge Reservoir	3197.7	3259.2	3049.0	3749.0
Stateline Reservoir	3.7	6.0	5.4	12.0
Meeks Cabin Reservoir	5.1	10.0	11.9	32.5
Basin-wide Total	3206.4	3275.3	3066.3	3793.5
# of reservoirs	3	3	3	3

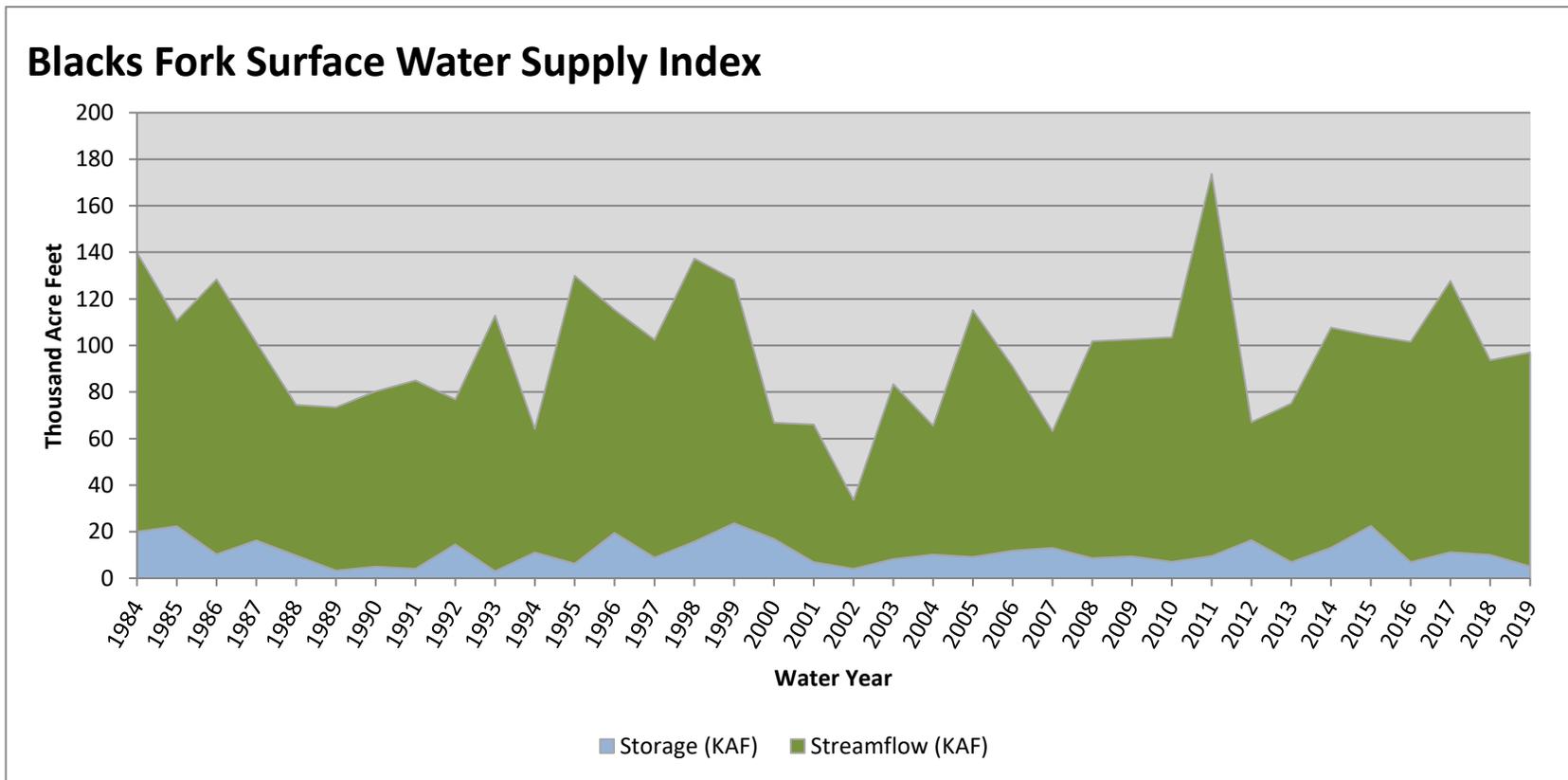
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Blacks Fork River	3	106%	86%
Upper Green	2	104%	109%
Ashley Brush Creeks	4	97%	57%

February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Blacks Fork	5.08	92.00	97.08	46	-0.34	06, 18, 87, 16

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.

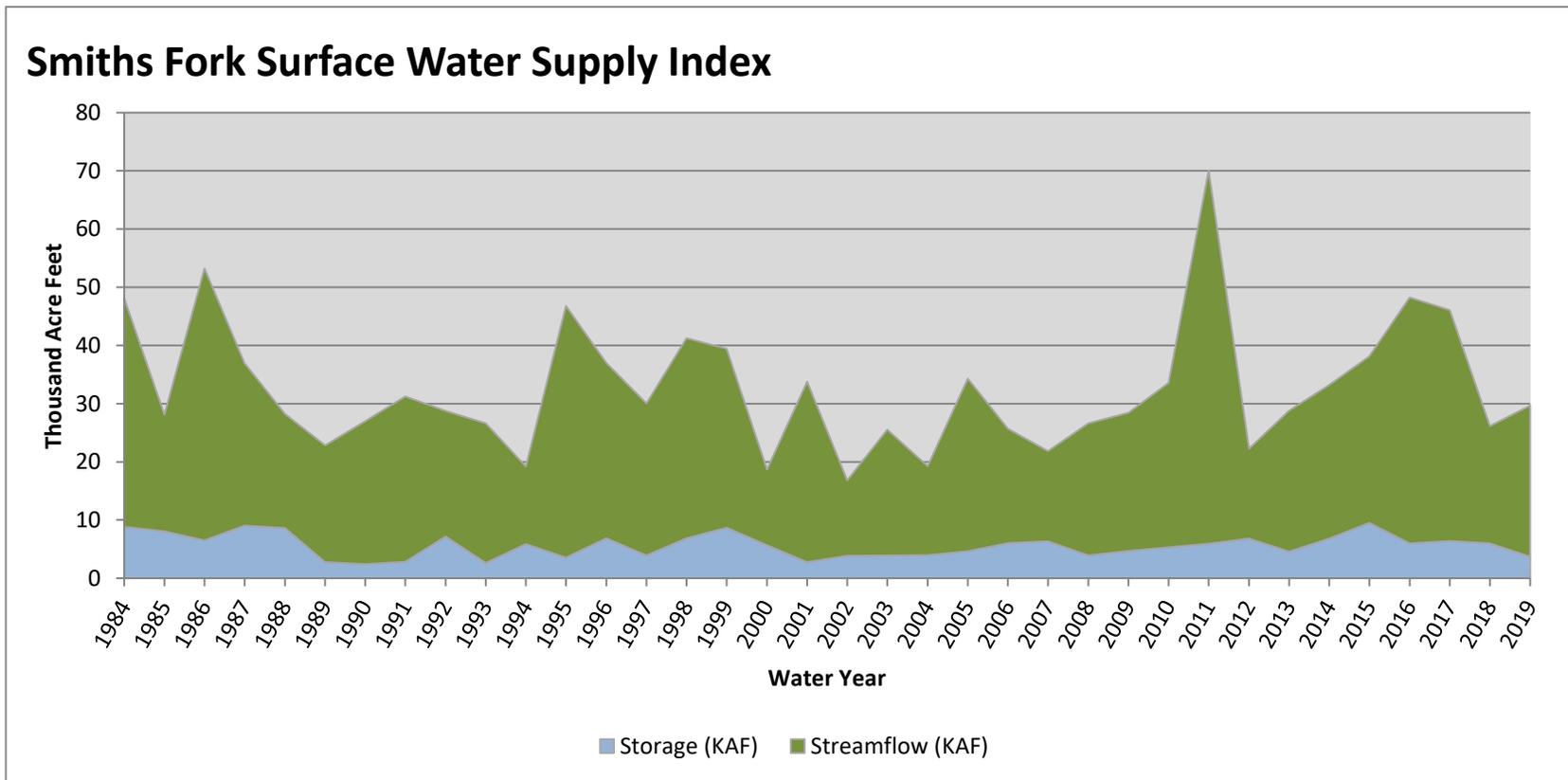


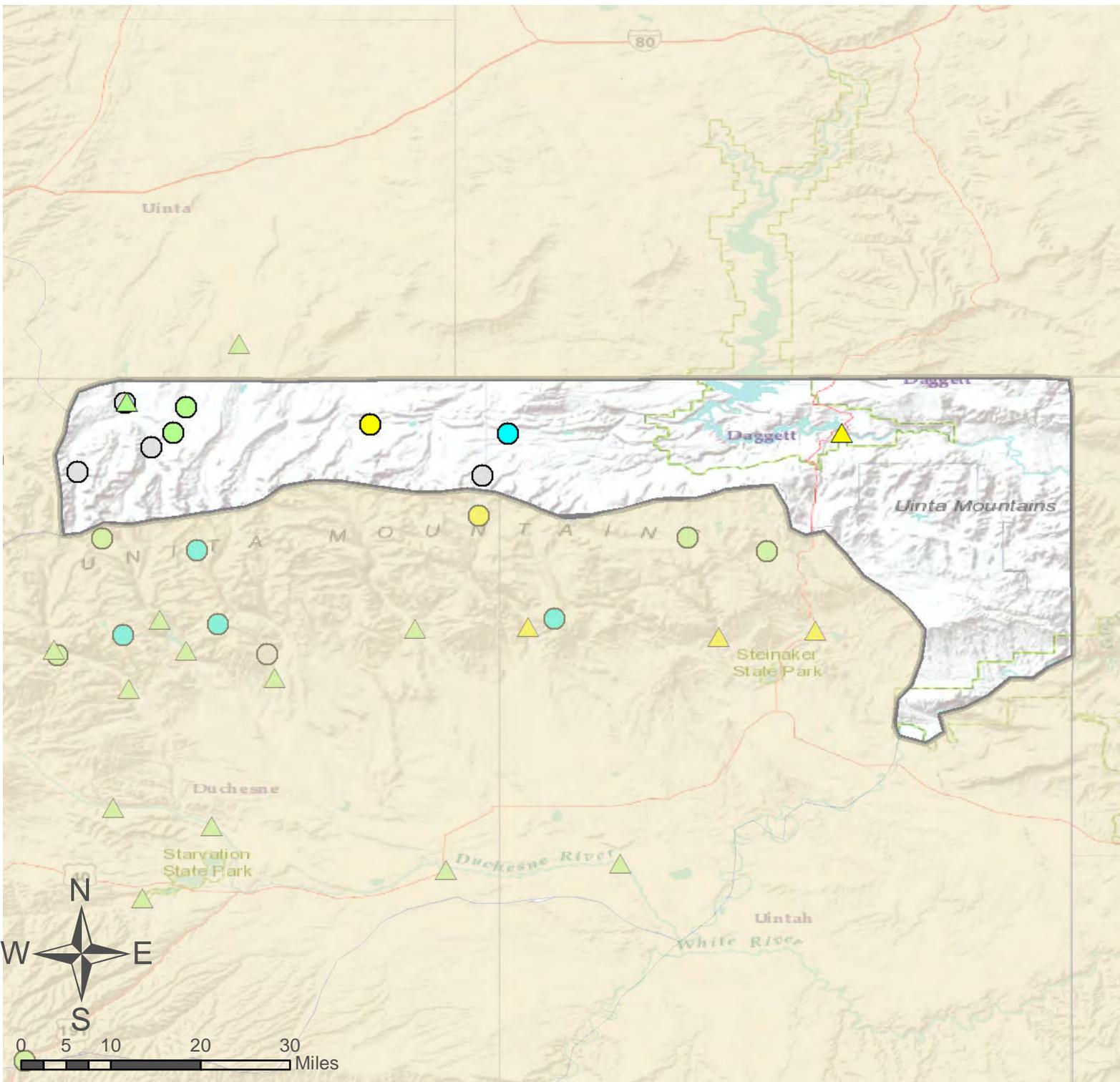
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Smiths Fork	3.68	26.00	29.68	51	0.11	92, 13, 97, 91

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.



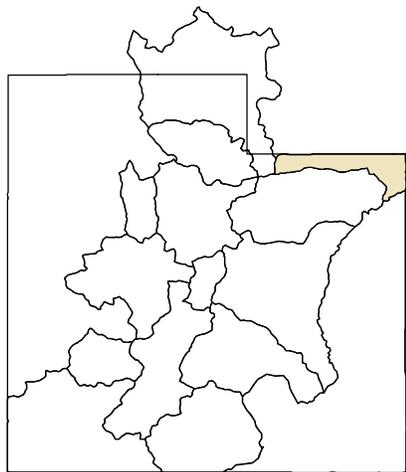


Northeastern Uinta Basin

- SNOTEL Site
- △ Forecast Point

% of Normal

- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal



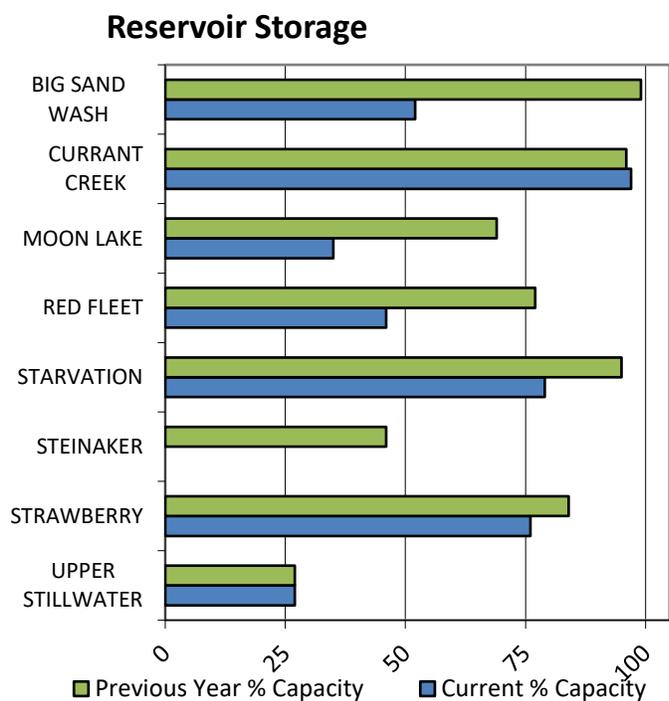
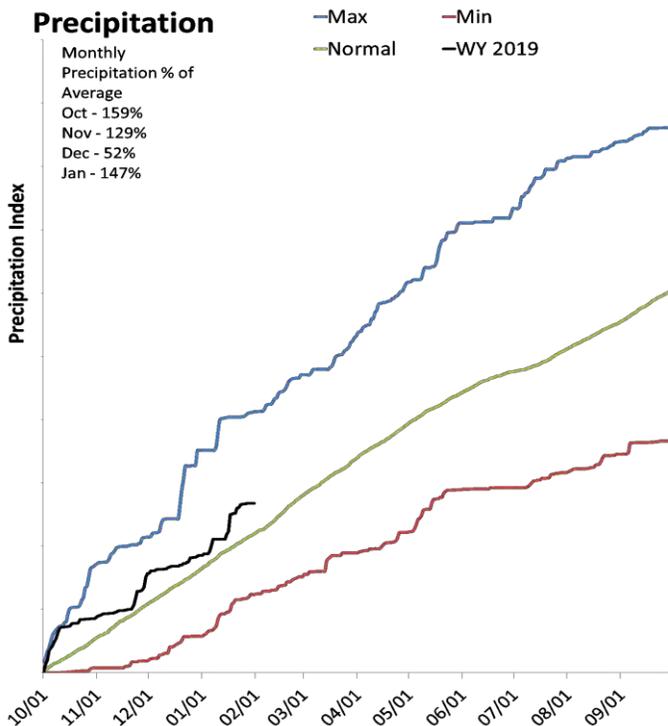
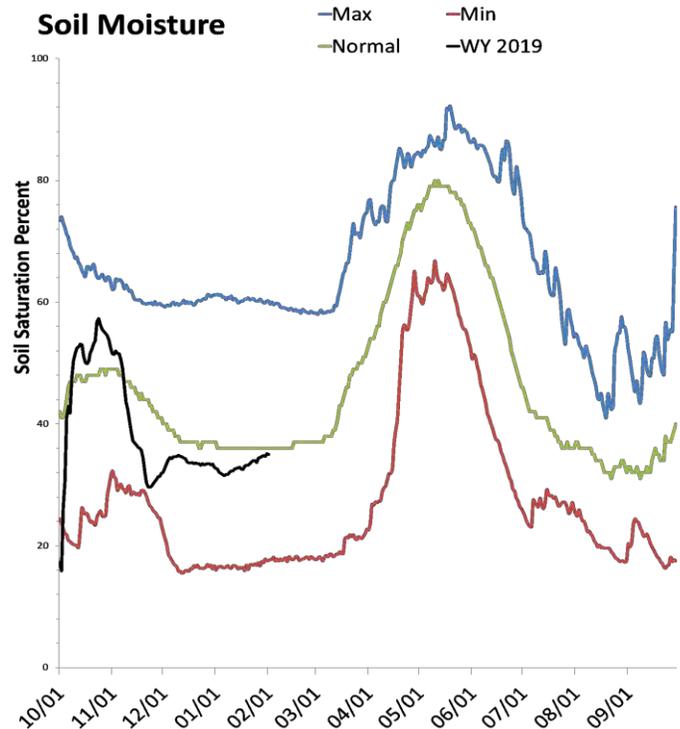
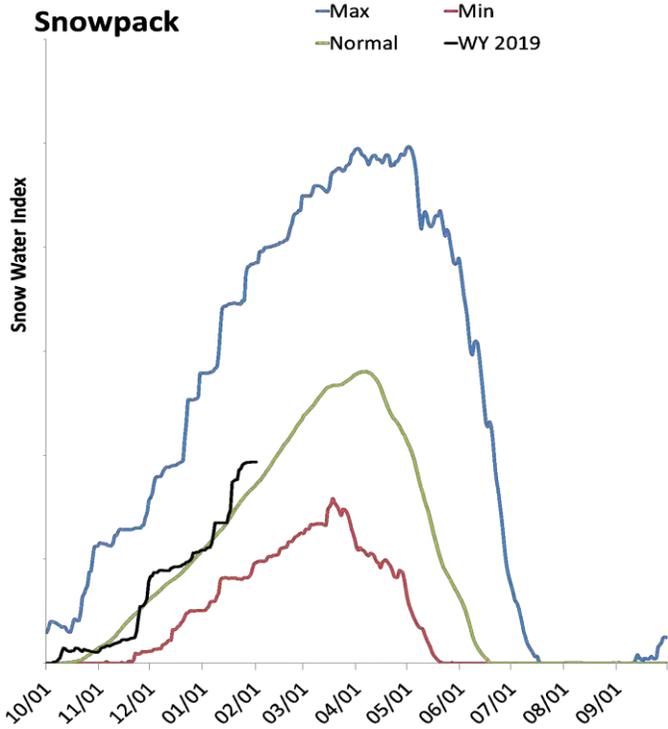
As of February 1, 2019:

- 102% of Normal SWE
- 110% of Normal Precipitation
- 137% of Normal Precipitation Last Month
- 44% Saturation Soil Moisture
- Northeastern Uinta Basin

Duchesne River Basin

February 1, 2019

Snowpack in the Duchesne River Basin is above average at 113% of normal, compared to 58% last year. Precipitation in January was much above average at 147%, which brings the seasonal accumulation (Oct-Jan) to 122% of average. Soil moisture is at 35% compared to 26% last year. Reservoir storage is at 73% of capacity, compared to 83% last year. Forecast streamflow volumes range from 84% to 115% of average. The surface water supply index is 50% for the Western Uintas, 18% for the Eastern Uintas.



Duchesne River Streamflow Forecasts - February 1, 2019

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

Duchesne River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
WF Duchesne R at VAT Diversion	APR-JUL	12.4	16.7	20	108%	24	29	18.6
Duchesne R nr Tabiona ²	APR-JUL	73	94	110	102%	127	155	108
Upper Stillwater Reservoir Inflow ²	APR-JUL	50	63	73	99%	84	100	74
Rock Ck nr Mountain Home ²	APR-JUL	61	76	87	99%	99	118	88
Duchesne R ab Knight Diversion ²	APR-JUL	132	168	195	100%	225	270	195
Currant Ck Reservoir Inflow ²	APR-JUL	13.1	18.5	23	115%	27	35	20
Strawberry R nr Soldier Springs ²	APR-JUL	28	50	65	112%	80	102	58
Strawberry R nr Duchesne ²	APR-JUL	59	90	115	103%	143	190	112
Lake Fork R ab Moon Lake Reservoir	APR-JUL	39	53	63	103%	74	92	61
Lake Fk R BI Moon Lk nr Mountain Home ²	APR-JUL	45	58	67	102%	77	93	66
Yellowstone R nr Altonah	APR-JUL	40	52	62	102%	72	89	61
Duchesne R at Myton ²	APR-JUL	189	270	335	102%	405	525	330
Uinta R bl Powerplant Diversion nr Neola ²	APR-JUL	36	56	72	97%	90	120	74
Whiterocks R nr Whiterocks	APR-JUL	25	37	46	85%	56	74	54
Duchesne R nr Randlett ²	APR-JUL	165	280	375	97%	485	670	385
Ashley Ck nr Vernal	APR-JUL	23	33	42	84%	52	67	50
Big Brush Ck ab Red Fleet Reservoir	APR-JUL	8.9	14.3	18	86%	22	27	21

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

3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Steinaker Reservoir	0.0	15.4	21.7	33.4
Red Fleet Reservoir	11.9	19.8	17.9	25.7
Big Sand Wash Reservoir	13.4	25.5		25.7
Upper Stillwater Reservoir	8.8	8.8	8.6	32.5
Starvation Reservoir	130.9	157.0	138.8	164.1
Moon Lake Reservoir	12.5	24.8	24.4	35.8
Currant Creek Reservoir	15.0	14.8	14.9	15.5
Strawberry Reservoir	845.5	930.5	658.4	1105.9
Basin-wide Total	1024.5	1171.1	884.7	1412.9
# of reservoirs	7	7	7	7

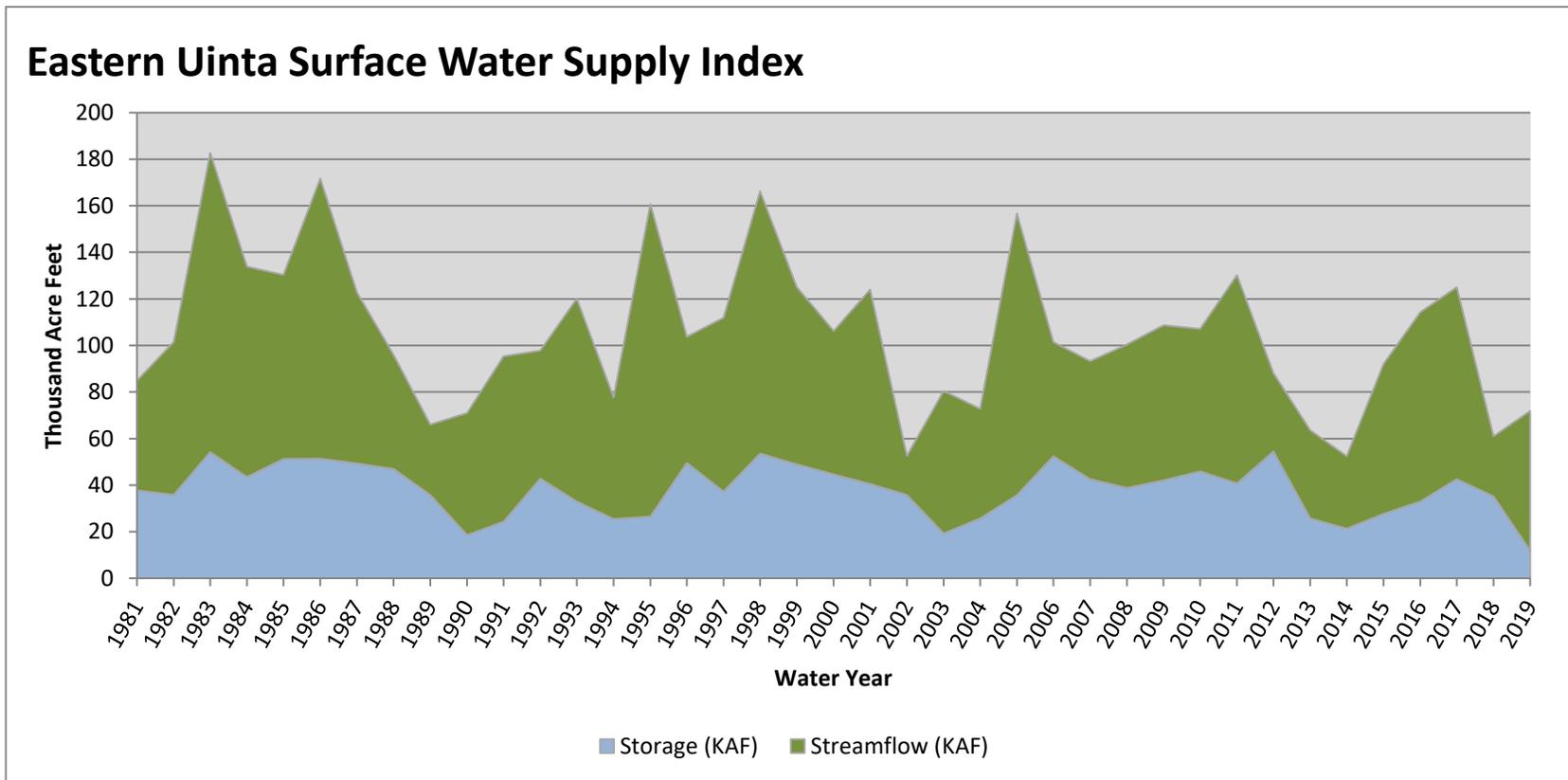
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Strawberry River	5	113%	45%
Lakefork Yellowstone Rivers	6	117%	67%
Uinta Whiterocks River	2	96%	51%

February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Eastern Uinta	11.87	60.00	71.87	18	-2.71	89, 90, 04, 94

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.

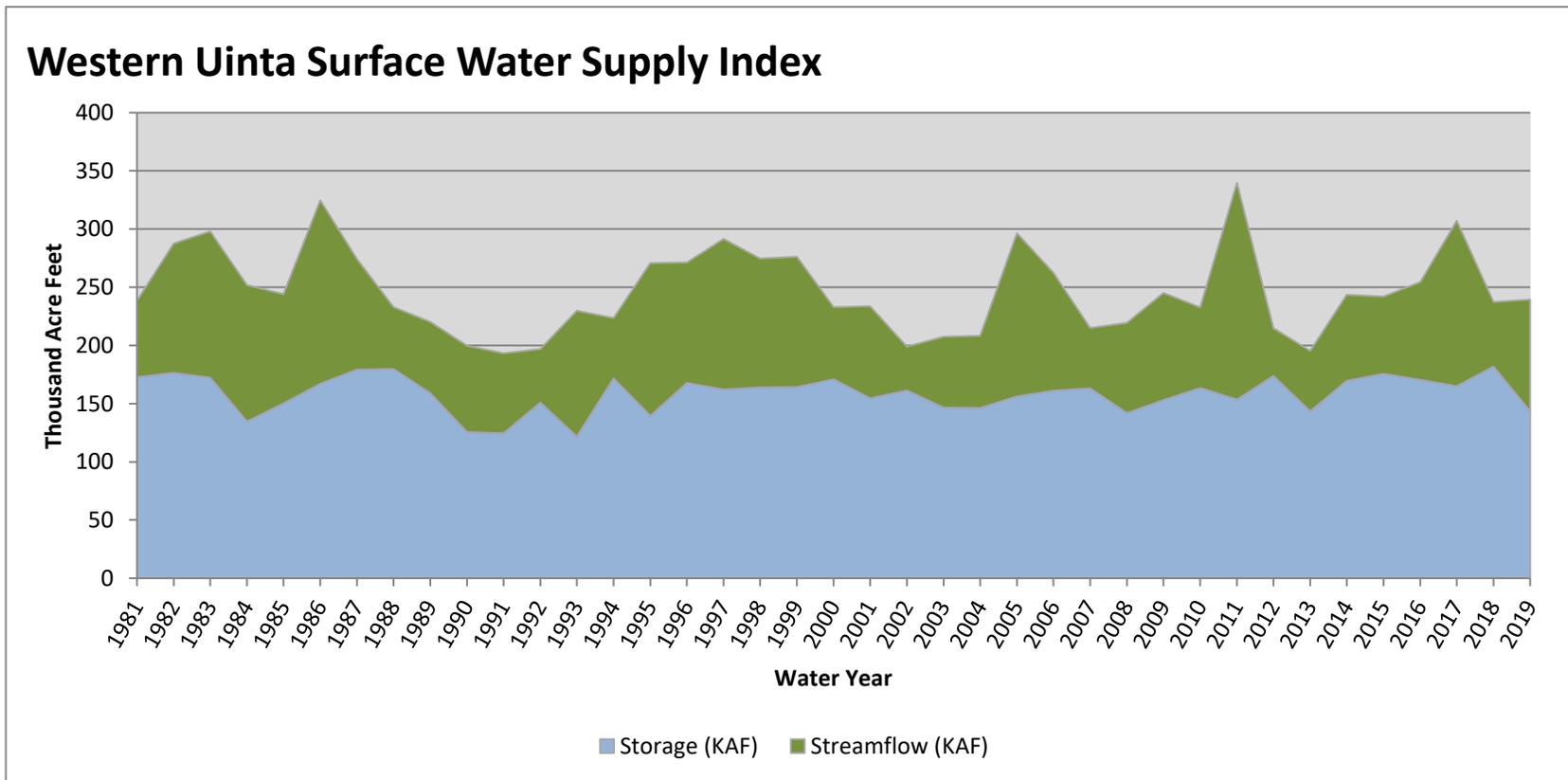


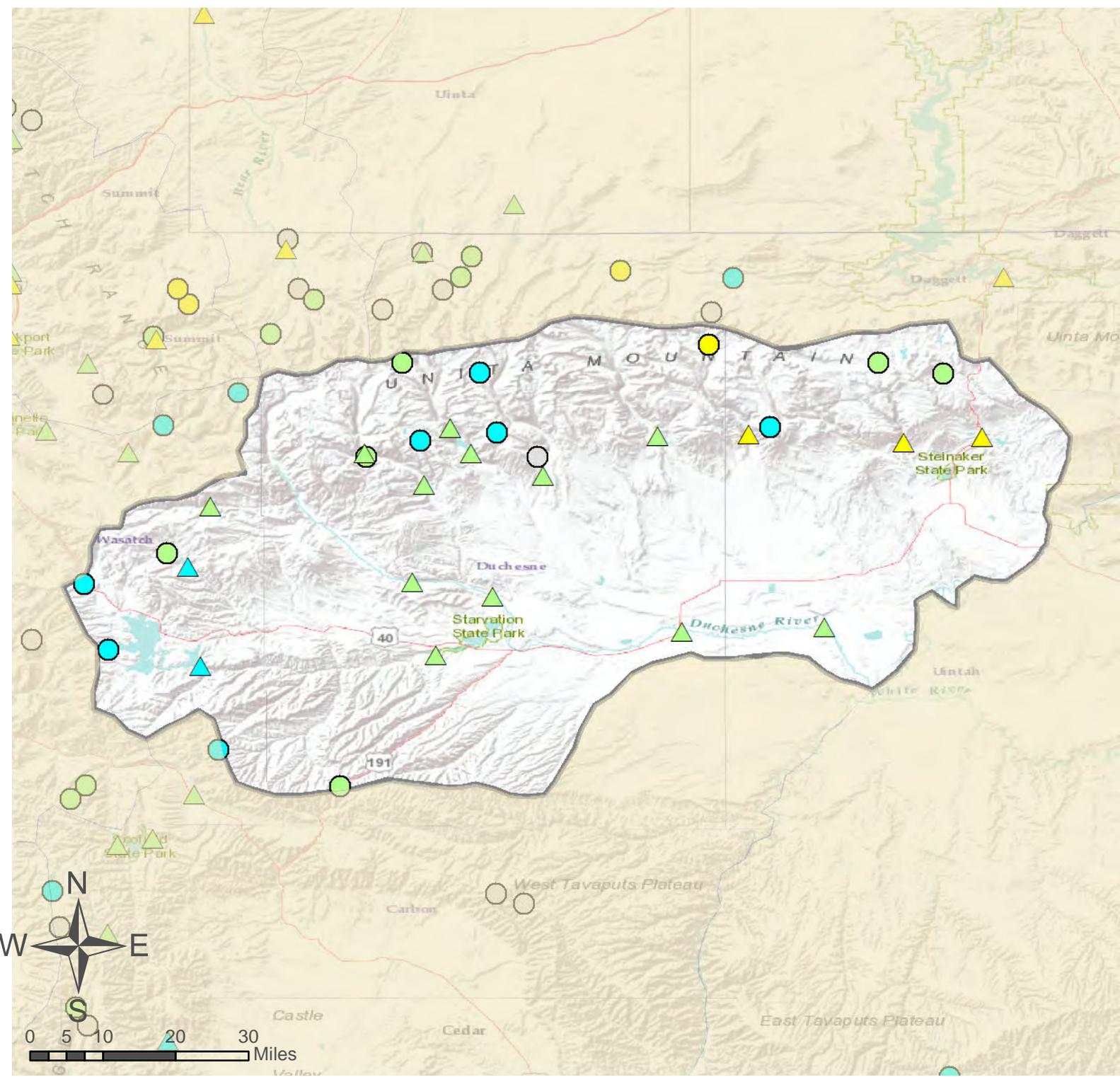
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Western Uinta	143.40	96.00	239.40	50	0	18, 81, 15, 14

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.



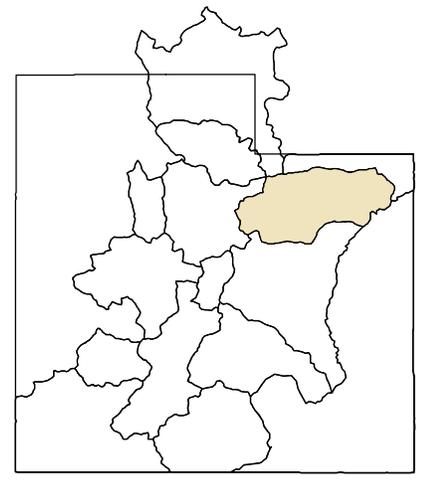
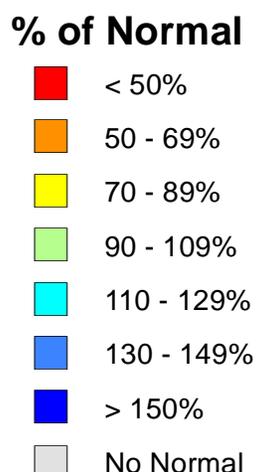


Duchesne River Basin

- SNOTEL Site
- △ Forecast Point

As of February 1, 2019:

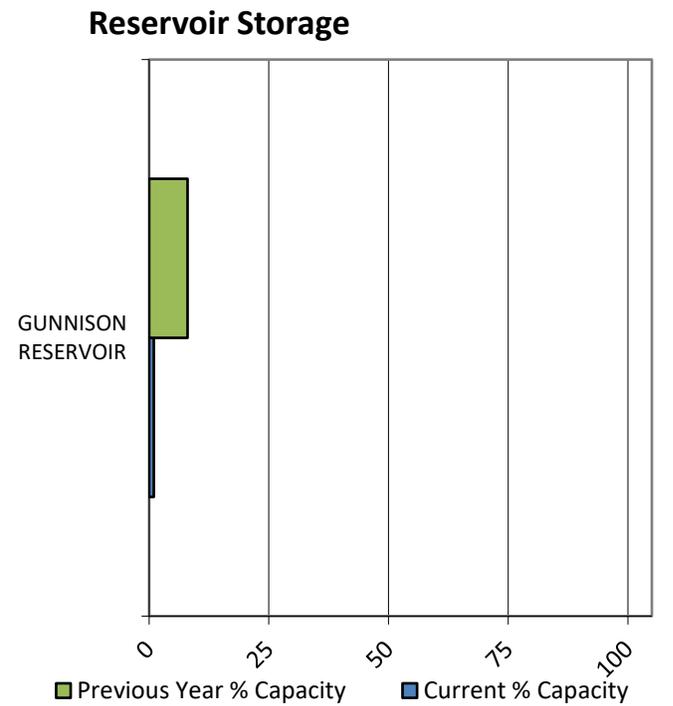
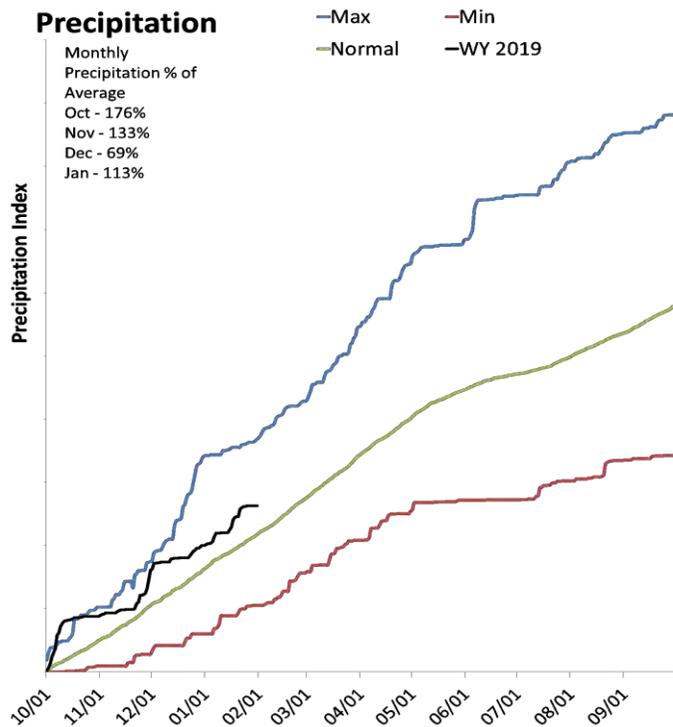
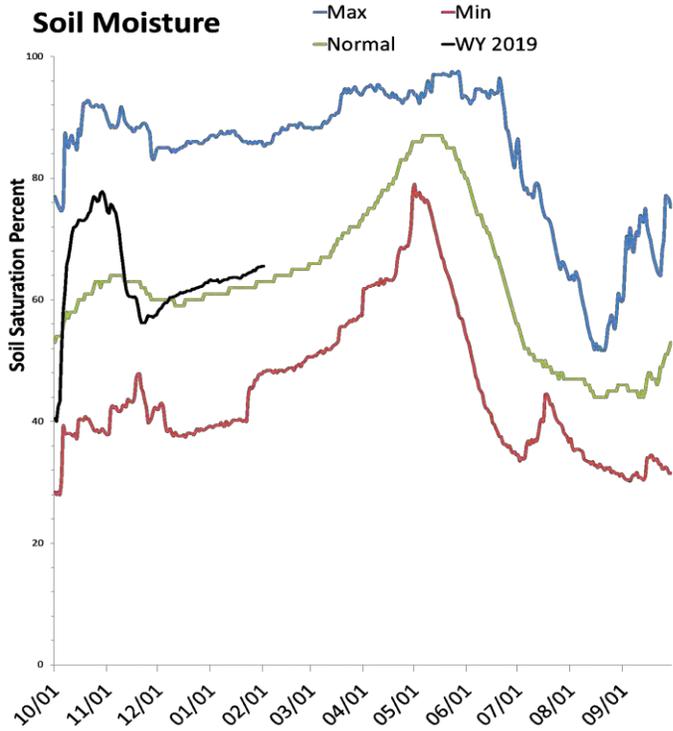
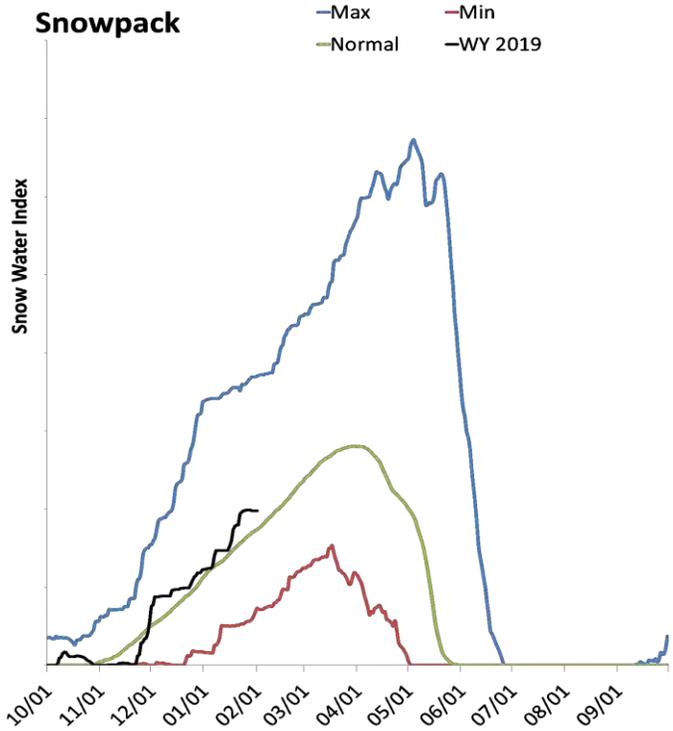
- 113% of Normal SWE
- 122% of Normal Precipitation
- 147% of Normal Precipitation Last Month
- 35% Saturation Soil Moisture
- Duchesne River Basin



San Pitch River Basin

February 1, 2019

Snowpack in the San Pitch River Basin is above normal at 114% of normal, compared to 42% last year. Precipitation in January was above average at 112%, which brings the seasonal accumulation (Oct-Jan) to 121% of average. Soil moisture is at 65% compared to 50% last year. Reservoir storage is at 1% of capacity, compared to 8% last year. The forecast streamflow volume for Manti Creek is 96% of average. The surface water supply index is 30% for the San Pitch.



San Pitch River Streamflow Forecasts - February 1, 2019

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

San Pitch River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Manti Ck bl Dugway Ck nr Manti	APR-JUL	9.3	13.1	16	96%	19.2	24	16.7
Sevier R nr Gunnison	APR-JUL	42	74	95	96%	116	148	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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Gunnison Reservoir	0.2	1.6	11.4	20.3
Basin-wide Total	0.2	1.6	11.4	20.3
# of reservoirs	1	1	1	1

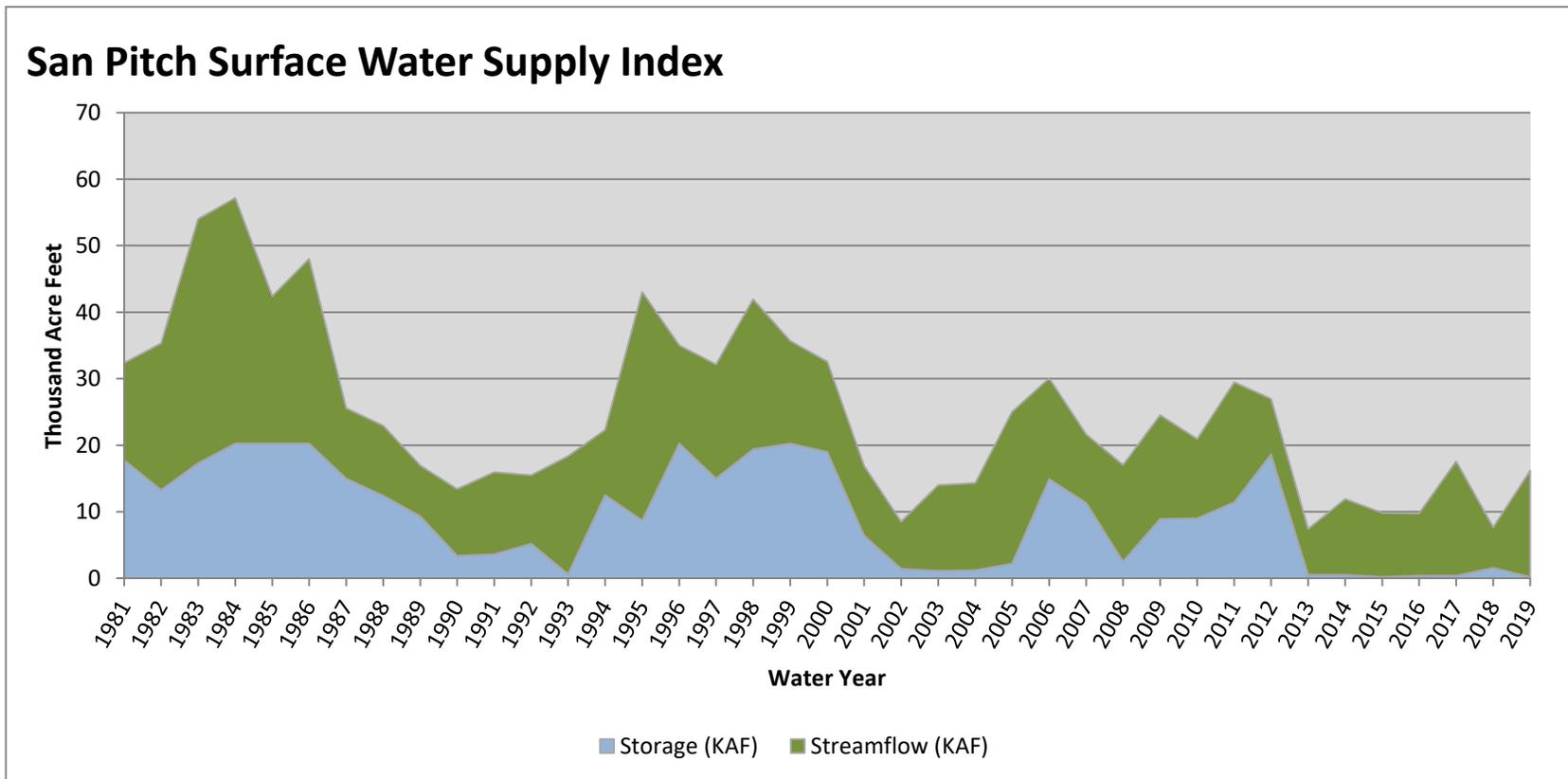
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Upper San Pitch	2	117%	40%
Lower San Pitch	5	108%	42%

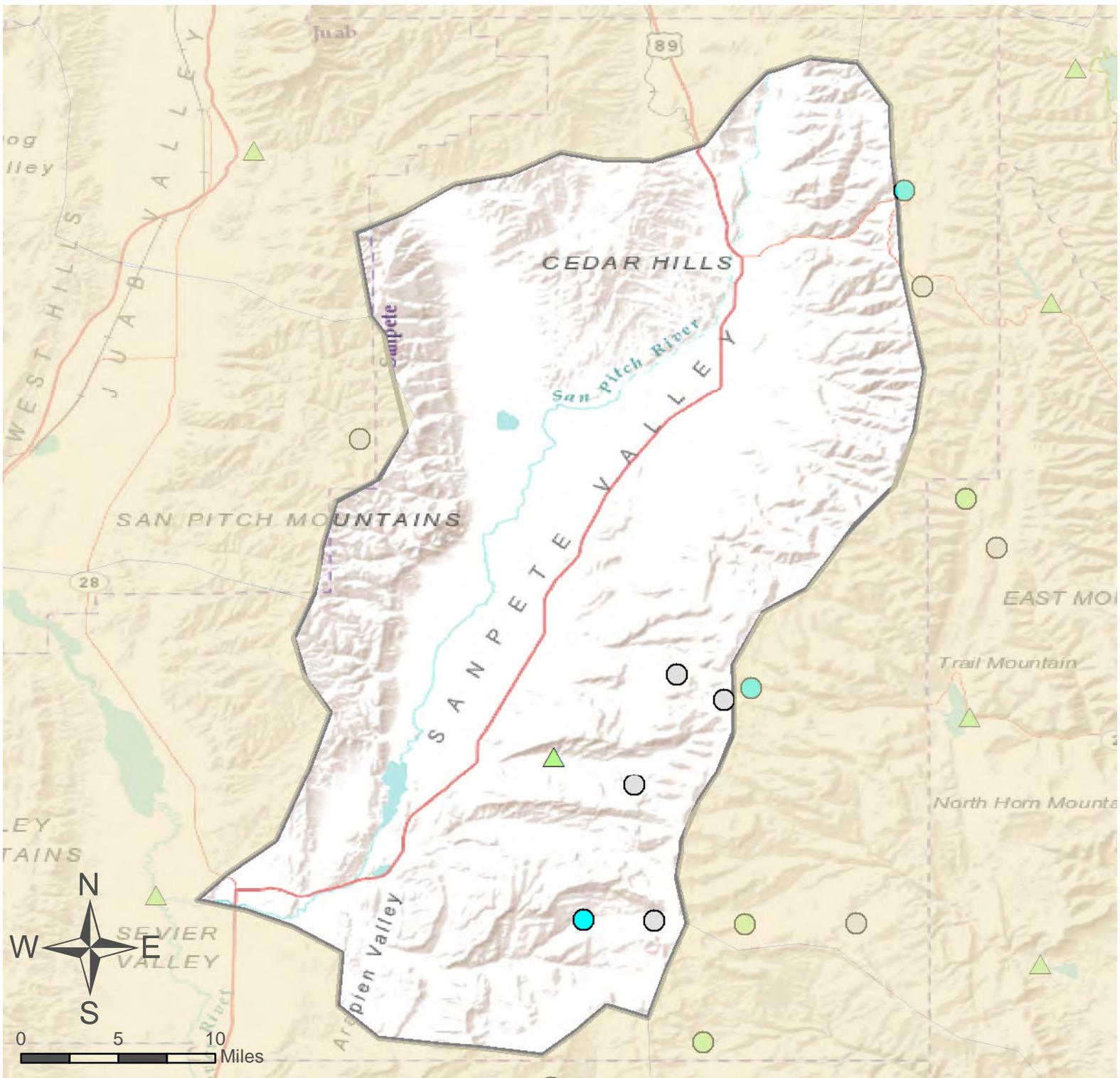
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
San Pitch	0.19	16.00	16.19	30	-1.67	92, 91, 01, 89

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.





San Pitch River Basin

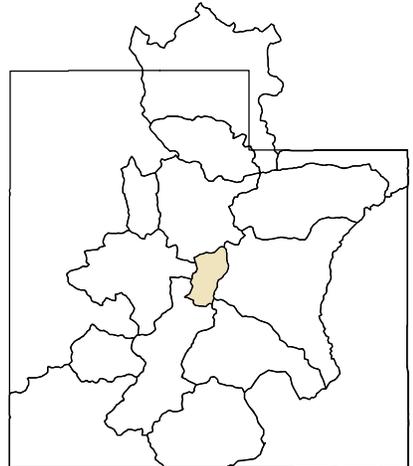
- SNOTEL Site
- △ Forecast Point

As of February 1, 2019:

114% of Normal SWE
 121% of Normal Precipitation
 112% of Normal Precipitation Last Month
 65% Saturation Soil Moisture
 San Pitch River Basin

% of Normal

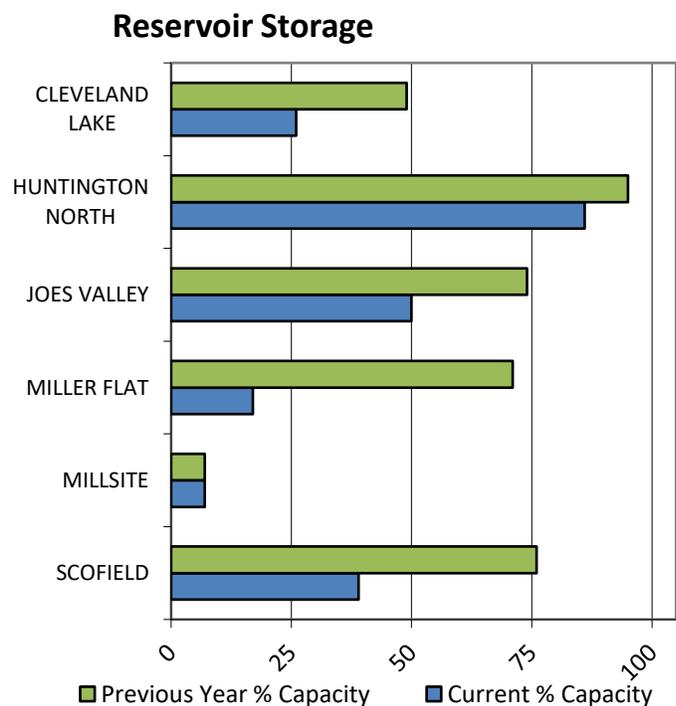
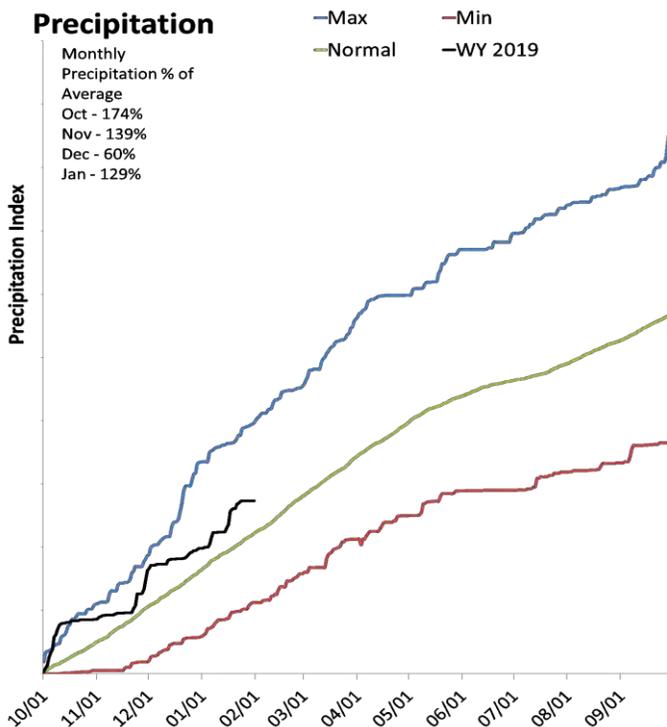
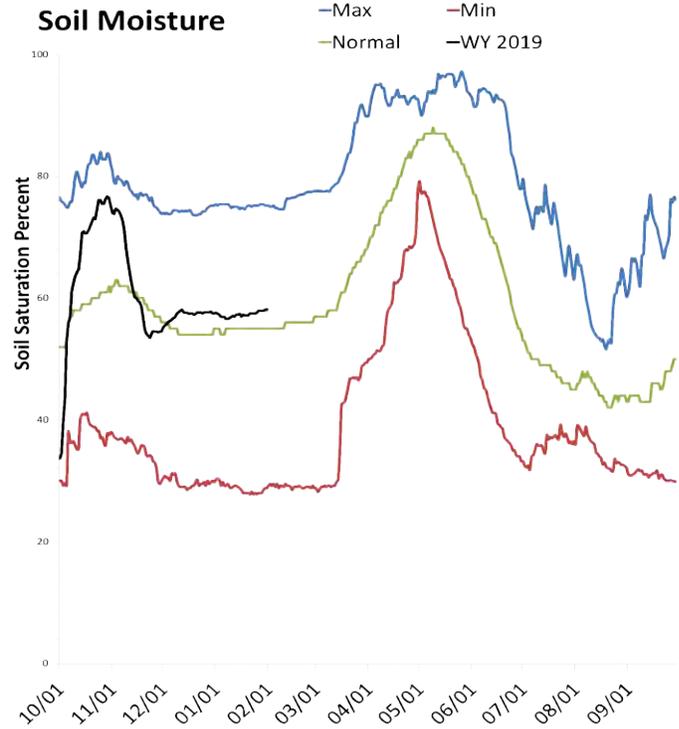
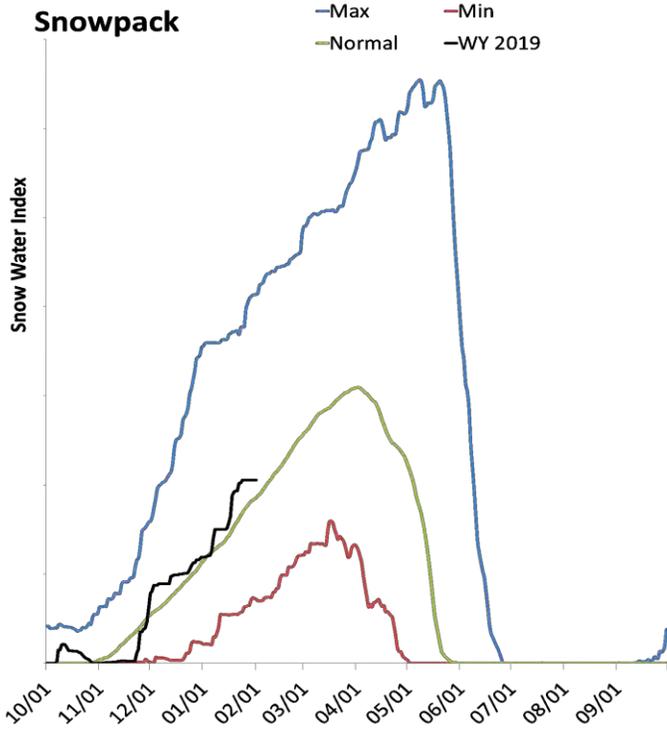
- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal



Price & San Rafael Basins

February 1, 2019

Snowpack in the Price & San Rafael Basins is above normal at 111% of normal, compared to 39% last year. Precipitation in January was above average at 129%, which brings the seasonal accumulation (Oct-Jan) to 123% of average. Soil moisture is at 58% compared to 42% last year. Reservoir storage is at 41% of capacity, compared to 68% last year. Forecast streamflow volumes range from 89% to 113% of average. The surface water supply index is 68% for the Price River, 55% for Joe's Valley, 50% for Ferron Creek.



Price San Rafael Rivers Streamflow Forecasts - February 1, 2019

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

Price San Rafael Rivers	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Fish Ck ab Reservoir nr Scofield	APR-JUL	18.5	26	32	107%	39	49	30
Price R nr Scofield Reservoir ²	APR-JUL	23	35	44	107%	55	72	41
White R bl Tabbyune Creek	APR-JUL	9	12.9	16	103%	19.4	25	15.5
Green R at Green River, UT ²	APR-JUL	1590	2180	2640	89%	3140	3950	2960
Electric Lake Inflow ²	APR-JUL	7.9	11.3	14	105%	17	22	13.3
Huntington Ck nr Huntington ²	APR-JUL	29	38	45	113%	53	65	40
Joes Valley Reservoir Inflow ²	APR-JUL	36	48	56	100%	65	80	56
Ferron Ck (Upper Station) nr Ferron	APR-JUL	28	35	40	105%	45	54	38

- 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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Joes Valley Reservoir	30.8	45.3	39.9	61.6
Millsite	1.2	1.2	10.1	16.7
Huntington North Reservoir	3.6	4.0	2.7	4.2
Cleveland Lake	1.4	2.7		5.4
Miller Flat Reservoir	0.9	3.7		5.2
Scofield Reservoir	25.7	50.0	29.9	65.8
Basin-wide Total	61.2	100.4	82.6	148.3
# of reservoirs	4	4	4	4

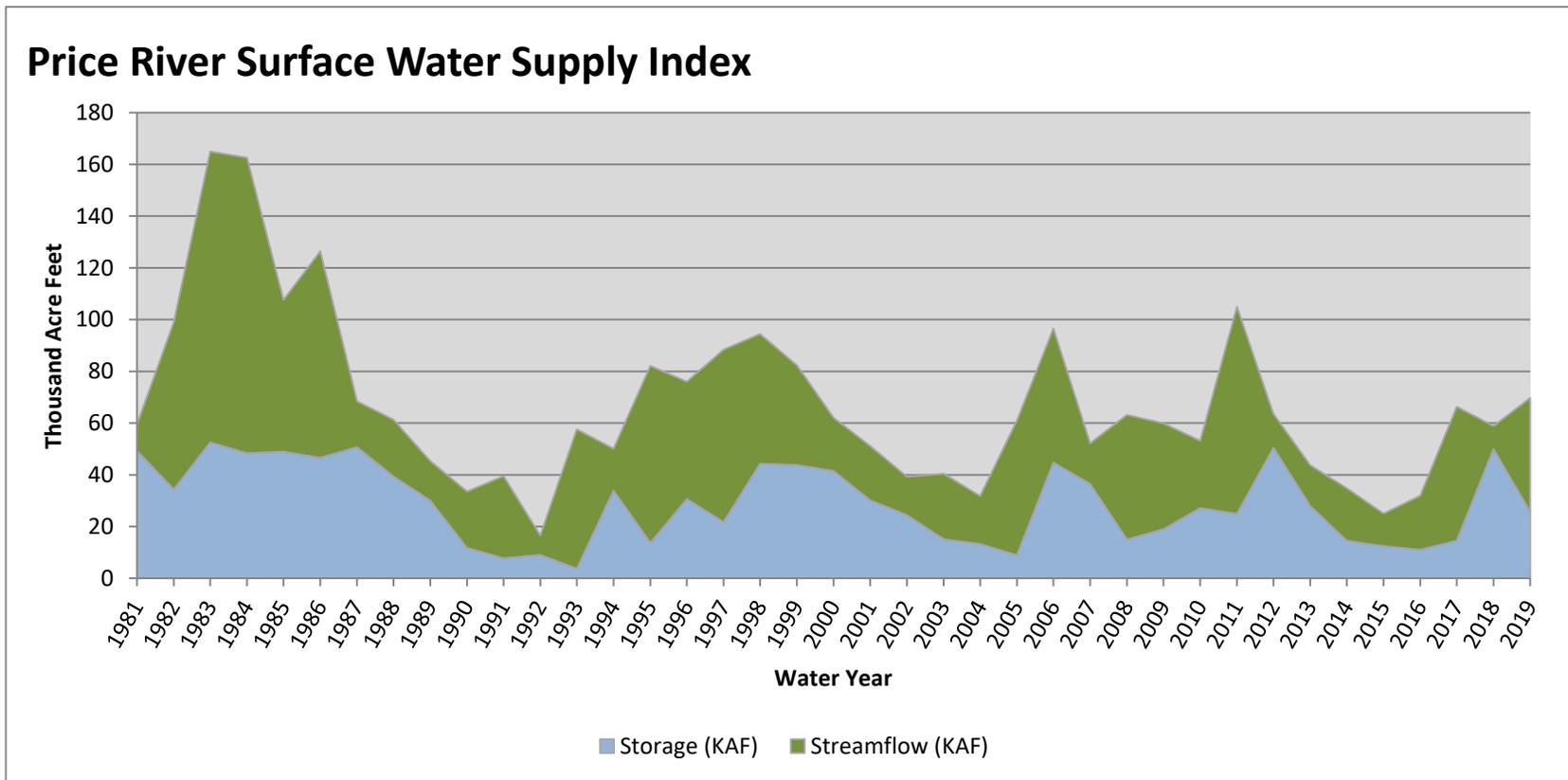
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Price River	4	114%	42%
San Rafael	4	111%	37%

February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Price River	25.69	44.00	69.69	68	1.46	17, 87, 96, 95

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.

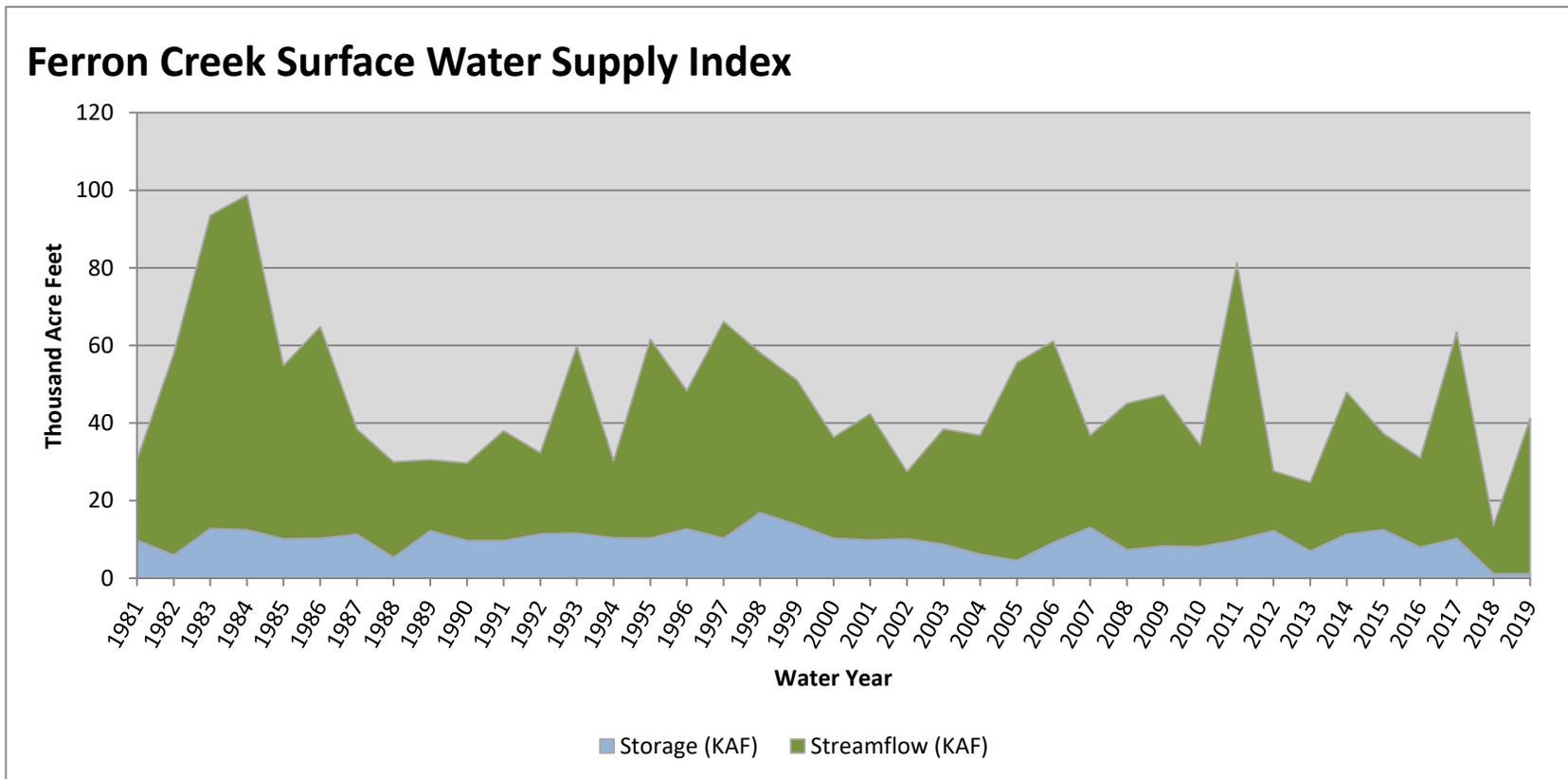


February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Ferron Creek	1.15	40.00	41.15	50	0	87, 03, 01, 08

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.

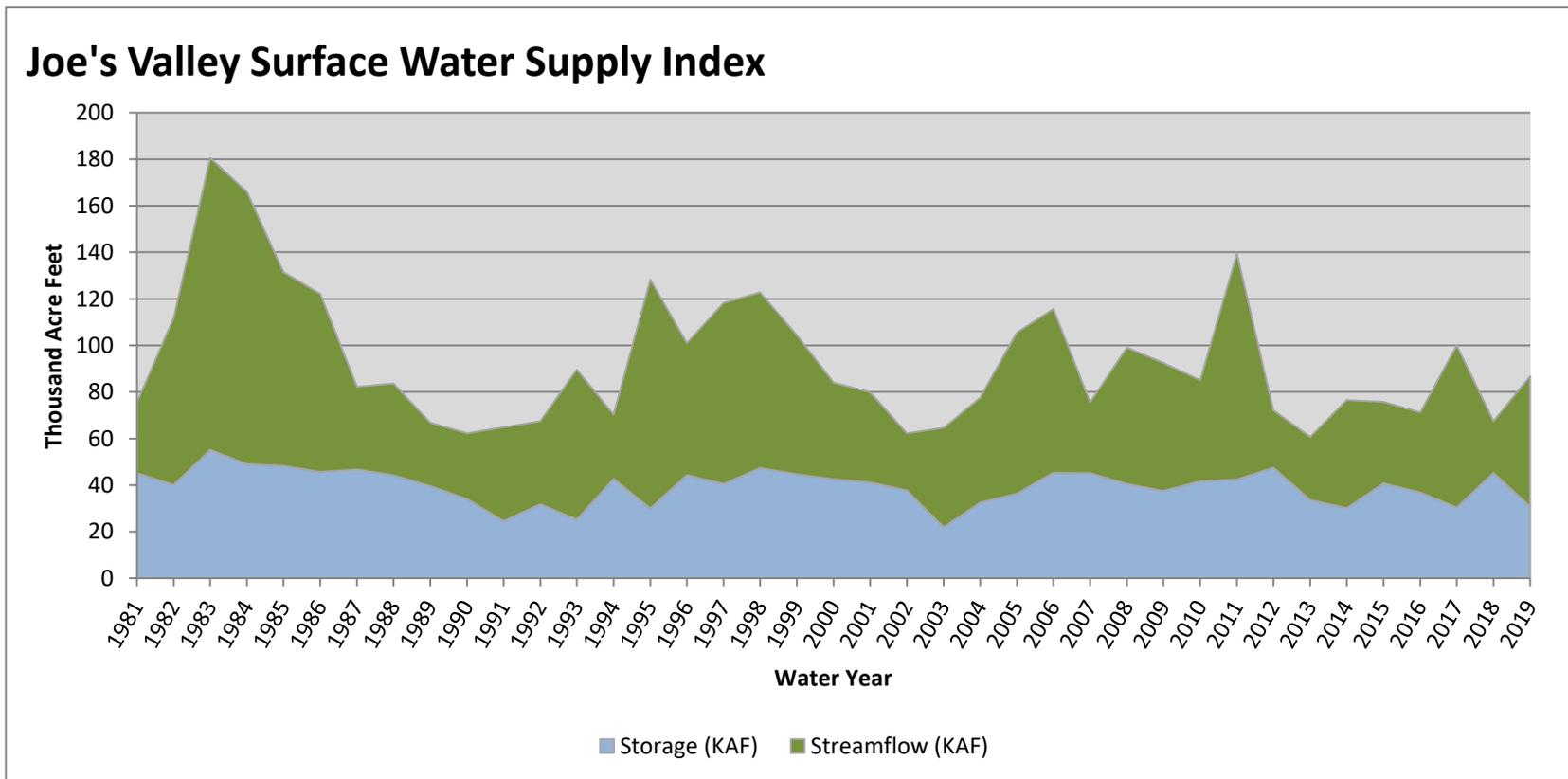


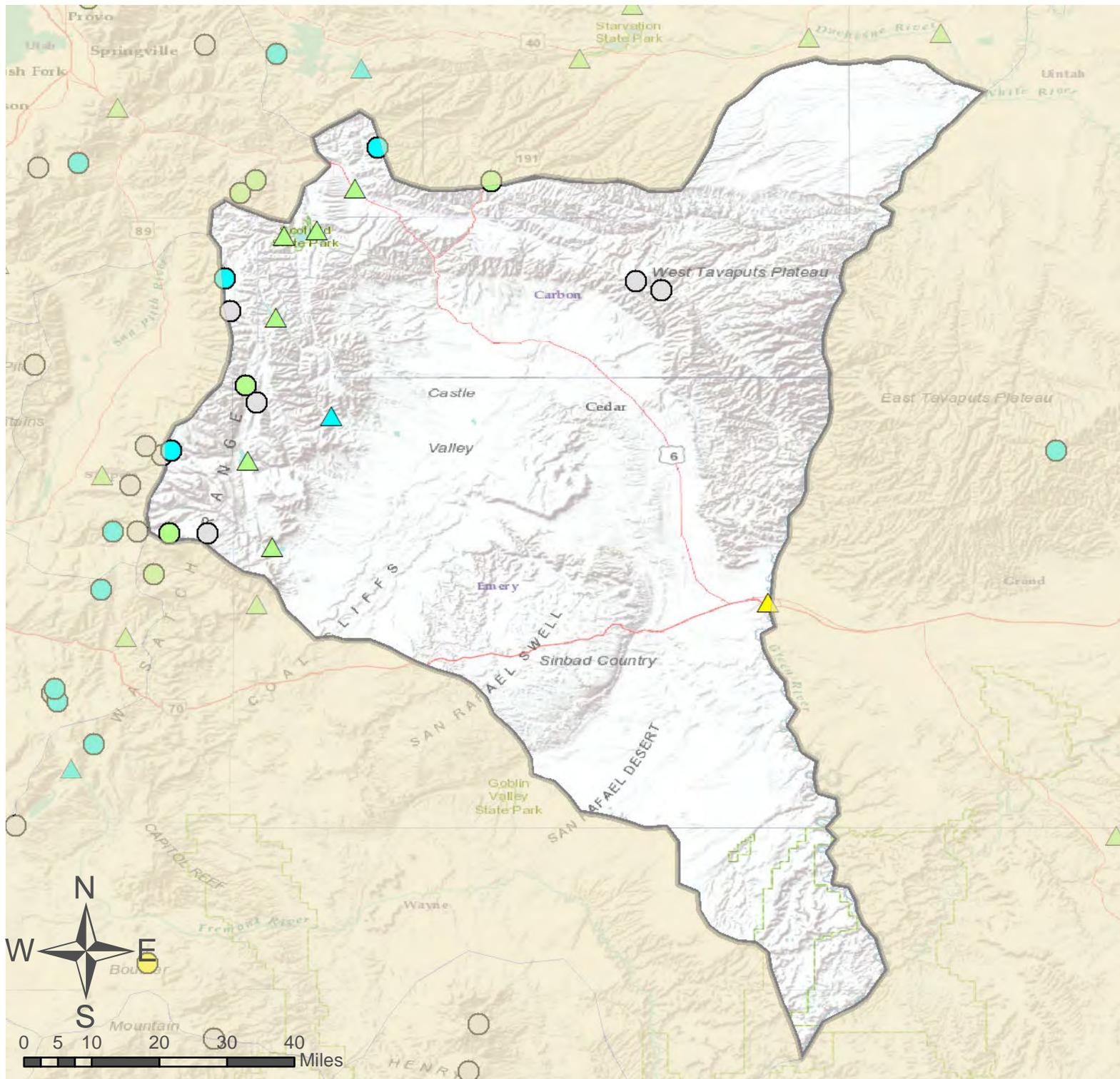
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Joe's Valley	30.77	56.00	86.77	55	0.42	00, 10, 93, 09

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.



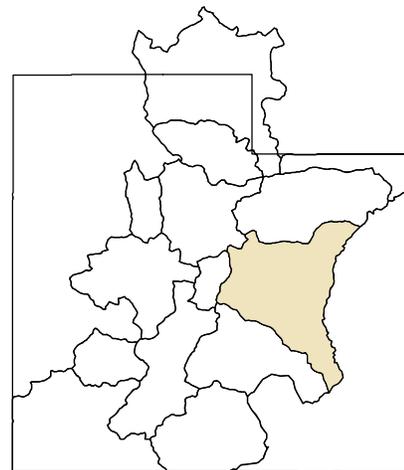


Price & San Rafael Basins

- SNOTEL Site
- △ Forecast Point

% of Normal

- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal



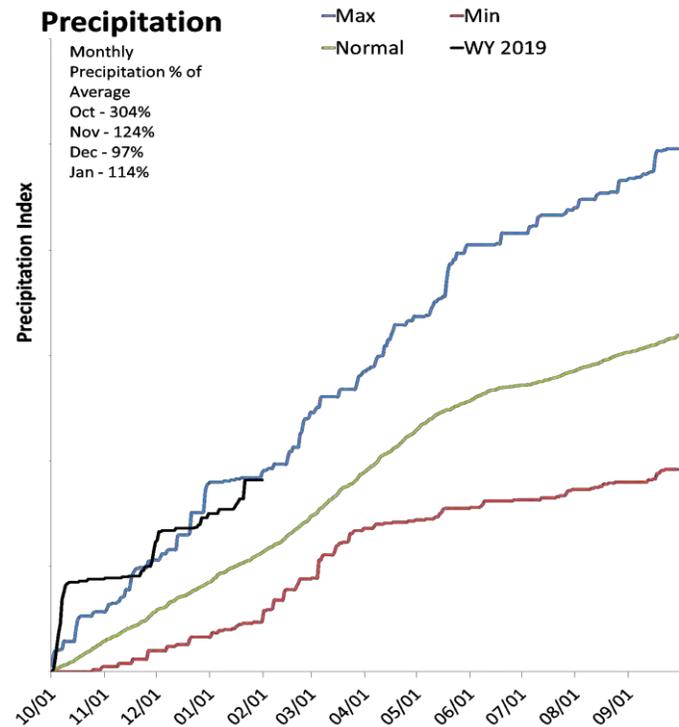
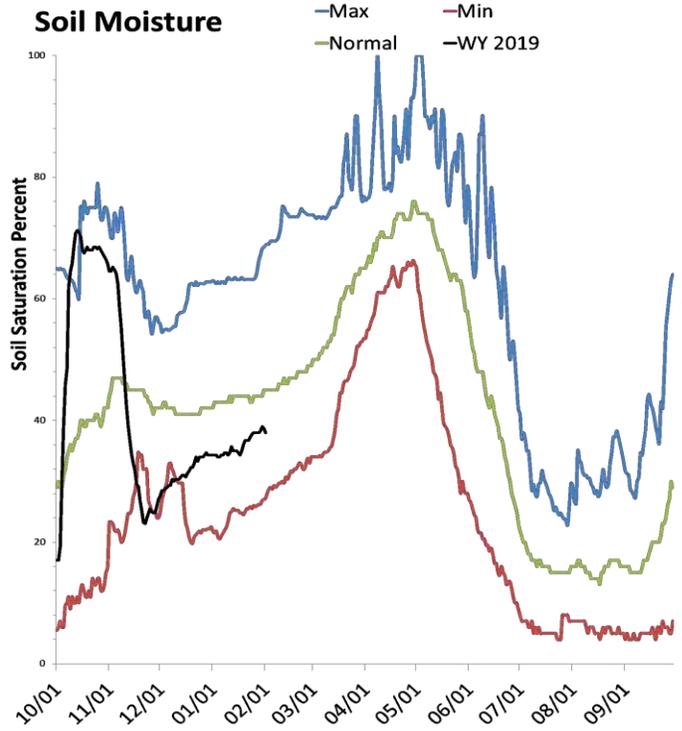
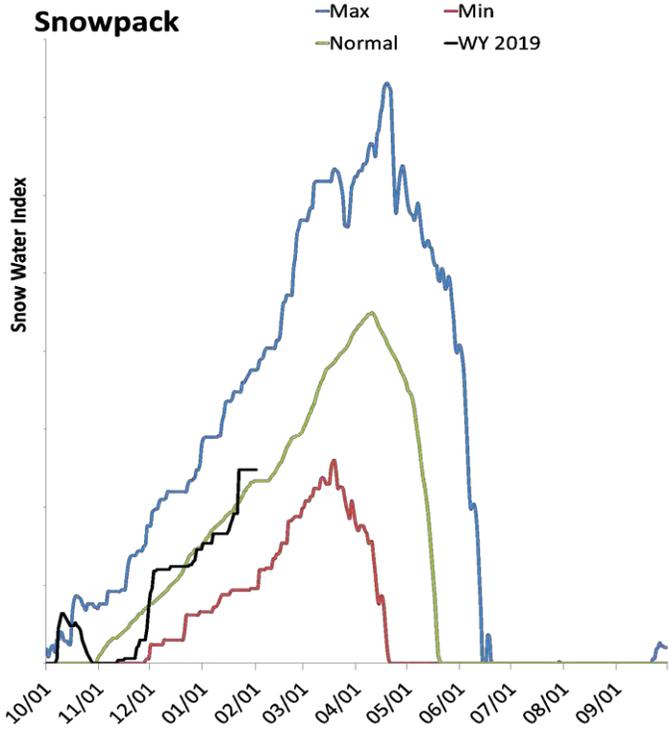
As of February 1, 2019:

- 111% of Normal SWE
 - 123% of Normal Precipitation
 - 129% of Normal Precipitation Last Month
 - 58% Saturation Soil Moisture
- Price & San Rafael Basins

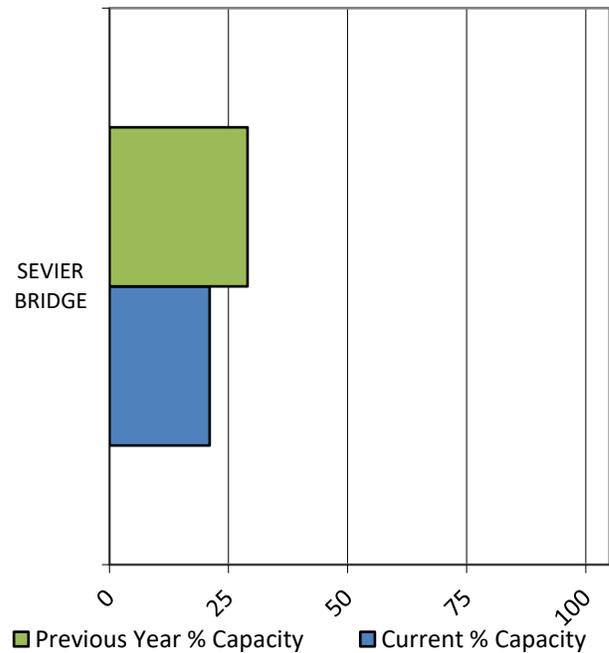
Lower Sevier Basin

February 1, 2019

Snowpack in the Lower Sevier Basin is near normal at 106% of normal, compared to 51% last year. Precipitation in January was above average at 114%, which brings the seasonal accumulation (Oct-Jan) to 161% of average. Soil moisture is at 38% compared to 27% last year. Reservoir storage is at 21% of capacity, compared to 29% last year. Forecast streamflow volume is at 96% of average. The surface water supply index is 33% for the Lower Sevier.



Reservoir Storage



Lower Sevier Streamflow Forecasts - February 1, 2019

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

Lower Sevier	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Chicken Ck nr Levan								
Sevier R nr Gunnison	APR-JUL	42	74	95	96%	116	148	99
Oak Ck nr Oak City								

- 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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Sevier Bridge Reservoir	49.2	67.8	155.7	236.0
Basin-wide Total	49.2	67.8	155.7	236.0
# of reservoirs	1	1	1	1

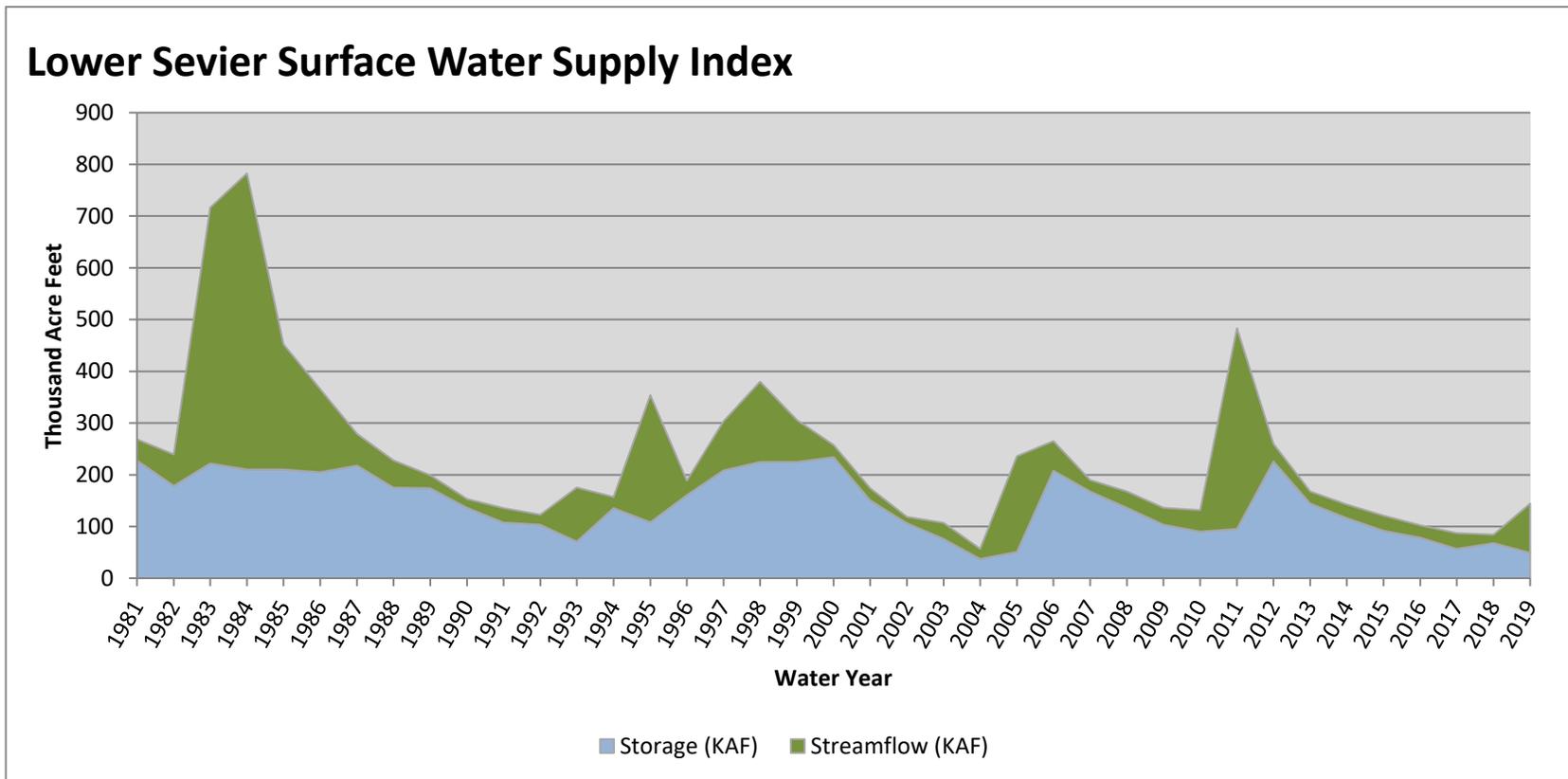
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Lower Sevier	1	106%	51%

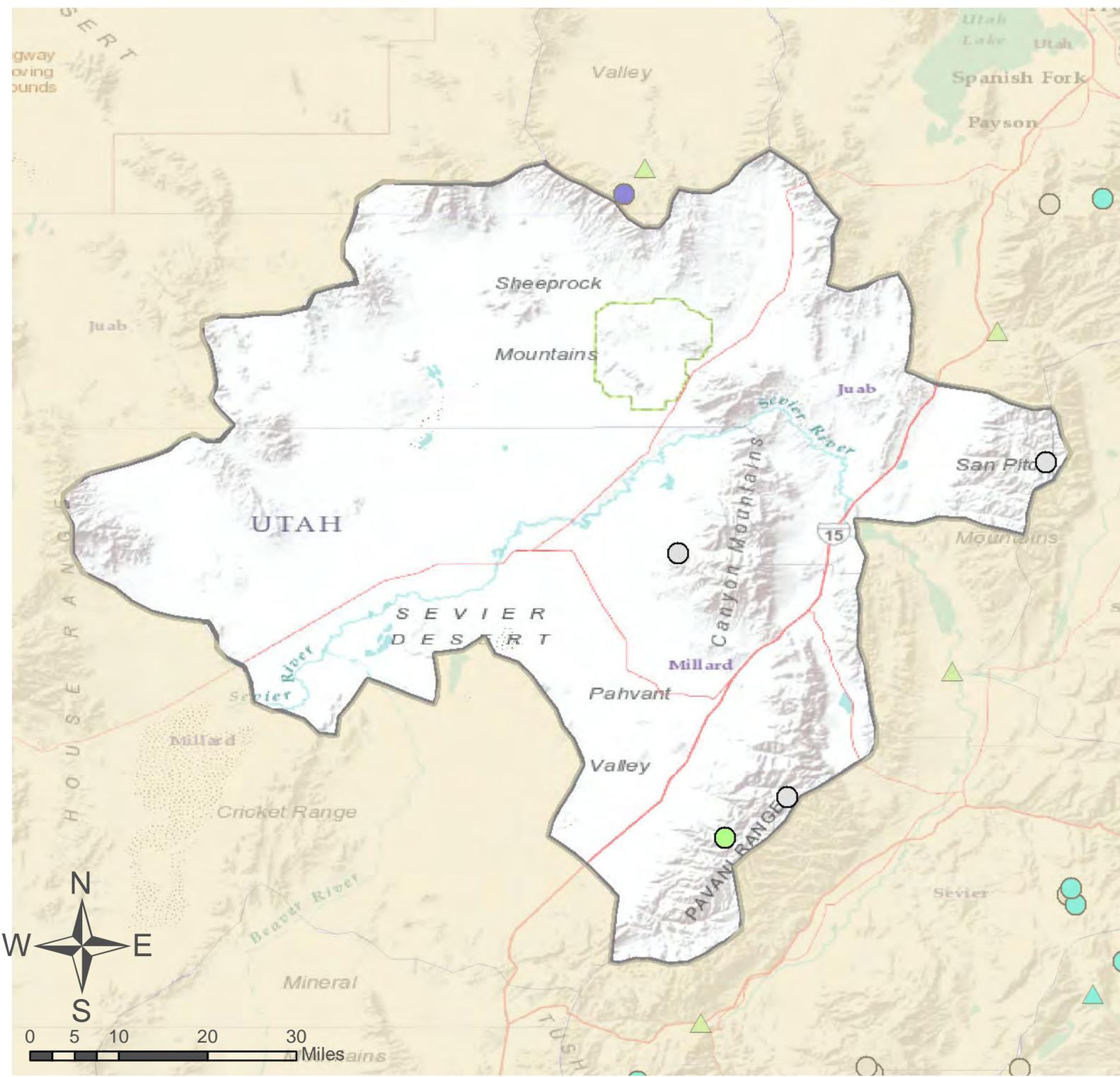
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Lower Sevier	49.21	95.00	144.21	33	-1.46	09, 14, 90, 94

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.





Lower Sevier Basin

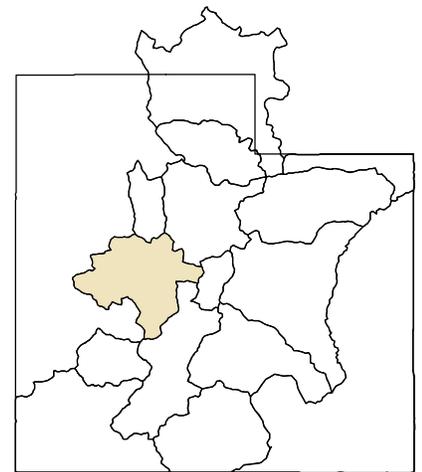
- SNOTEL Site
- △ Forecast Point

As of February 1, 2019:

- 106% of Normal SWE
- 161% of Normal Precipitation
- 114% of Normal Precipitation Last Month
- 38% Saturation Soil Moisture
- Lower Sevier Basin

% of Normal

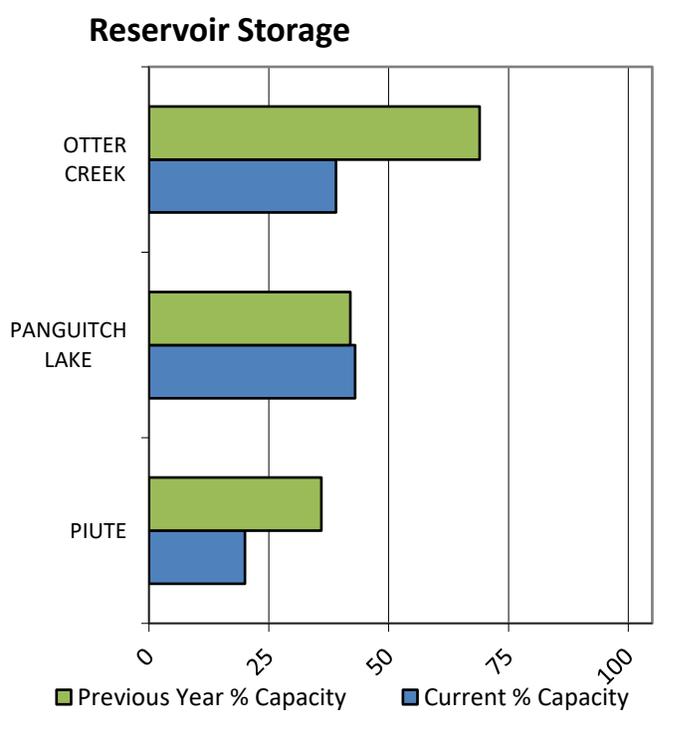
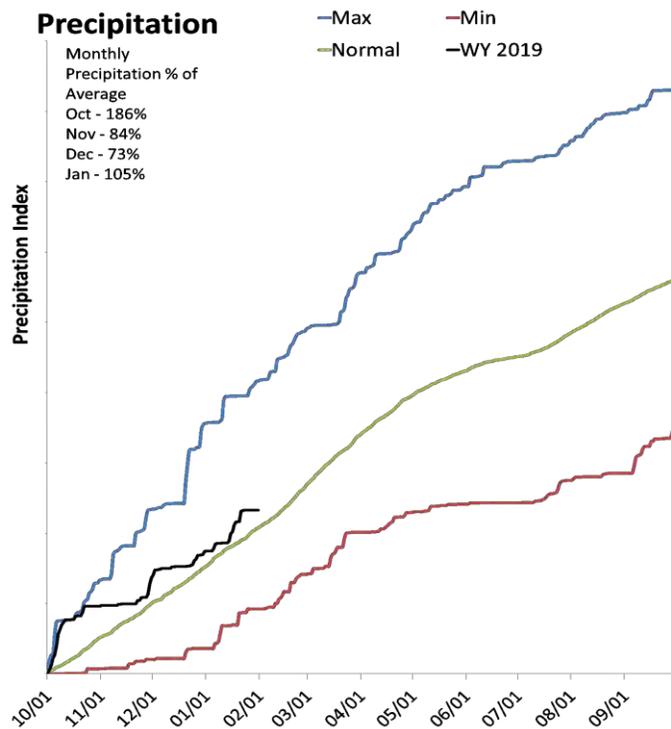
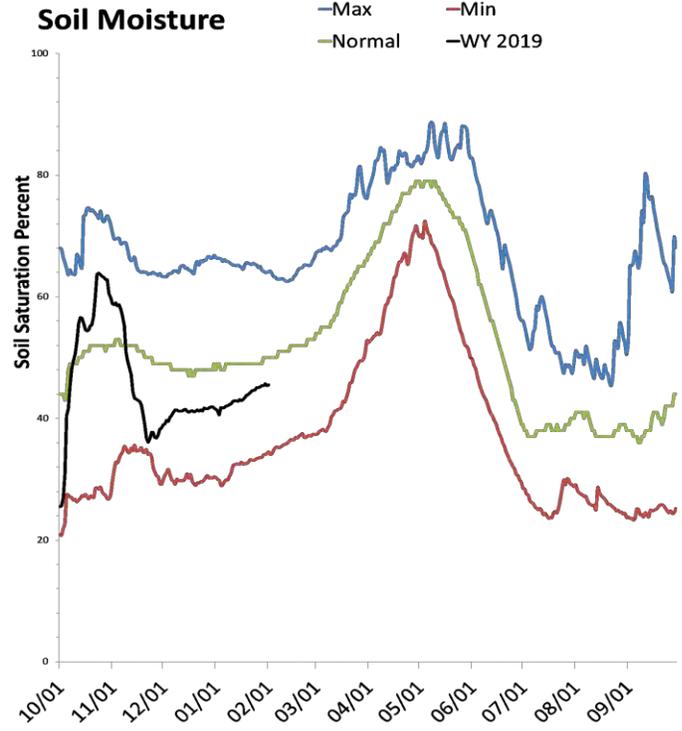
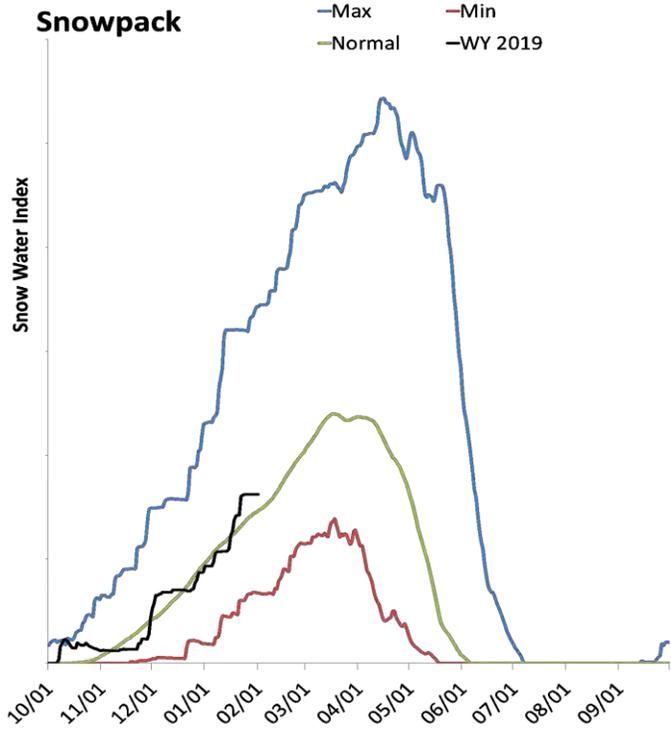
- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal



Upper Sevier Basin

February 1, 2019

Snowpack in the Upper Sevier Basin is above normal at 111% of normal, compared to 46% last year. Precipitation in January was near average at 104%, which brings the seasonal accumulation (Oct-Jan) to 112% of average. Soil moisture is at 44% compared to 34% last year. Reservoir storage is at 30% of capacity, compared to 49% last year. Forecast streamflow volumes range from 91% to 96% of average. The surface water supply index is 23% for the Upper Sevier.



Upper Sevier Streamflow Forecasts - February 1, 2019

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

Upper Sevier	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Mammoth Ck nr Hatch	APR-JUL	0.81	9.4	25	93%	42	59	27
Sevier R at Hatch	APR-JUL	22	36	46	96%	56	70	48
EF Sevier R nr Kingston	APR-JUL	9.6	23	32	91%	41	54	35
Sevier R nr Kingston	APR-JUL	1.98	16.7	31	94%	45	66	33
Sevier R bl Piute Dam	APR-JUL	6.9	39	61	92%	83	115	66
Clear Ck ab Diversions nr Sevier	APR-JUL	7.9	15.1	20	95%	25	32	21
Salina Ck nr Emery	APR-JUL	1.14	4.9	7.4	94%	9.9	13.7	7.9

- 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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Piute Reservoir	14.6	25.6	49.2	71.8
Otter Creek Reservoir	20.4	36.2	35.0	52.5
Panguitch Lake	9.7	9.4	12.7	22.3
Basin-wide Total	44.7	71.2	96.9	146.6
# of reservoirs	3	3	3	3

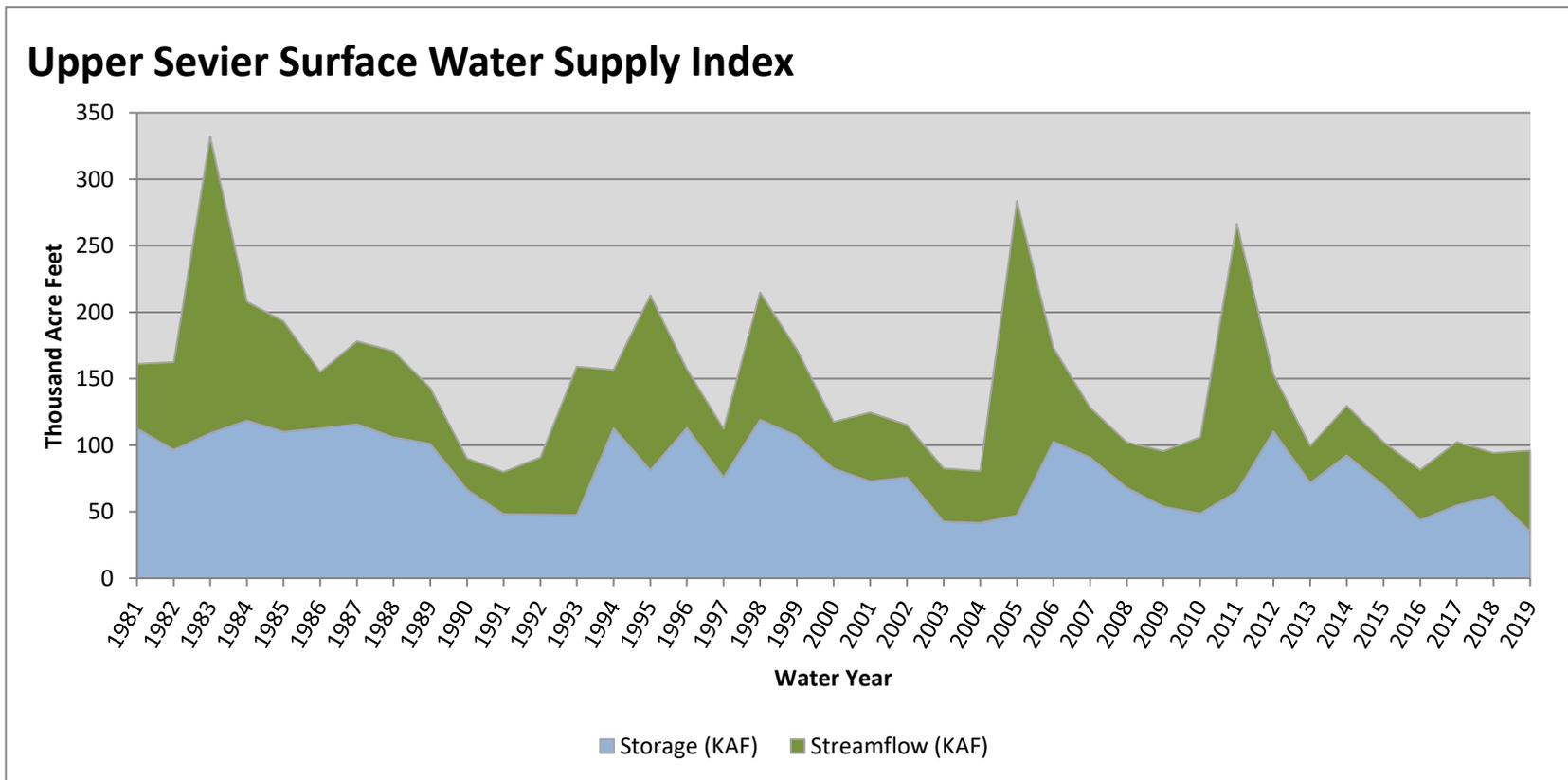
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Upper Sevier	12	111%	46%
Middle Sevier	7	113%	49%
East Fork Sevier River	3	94%	35%

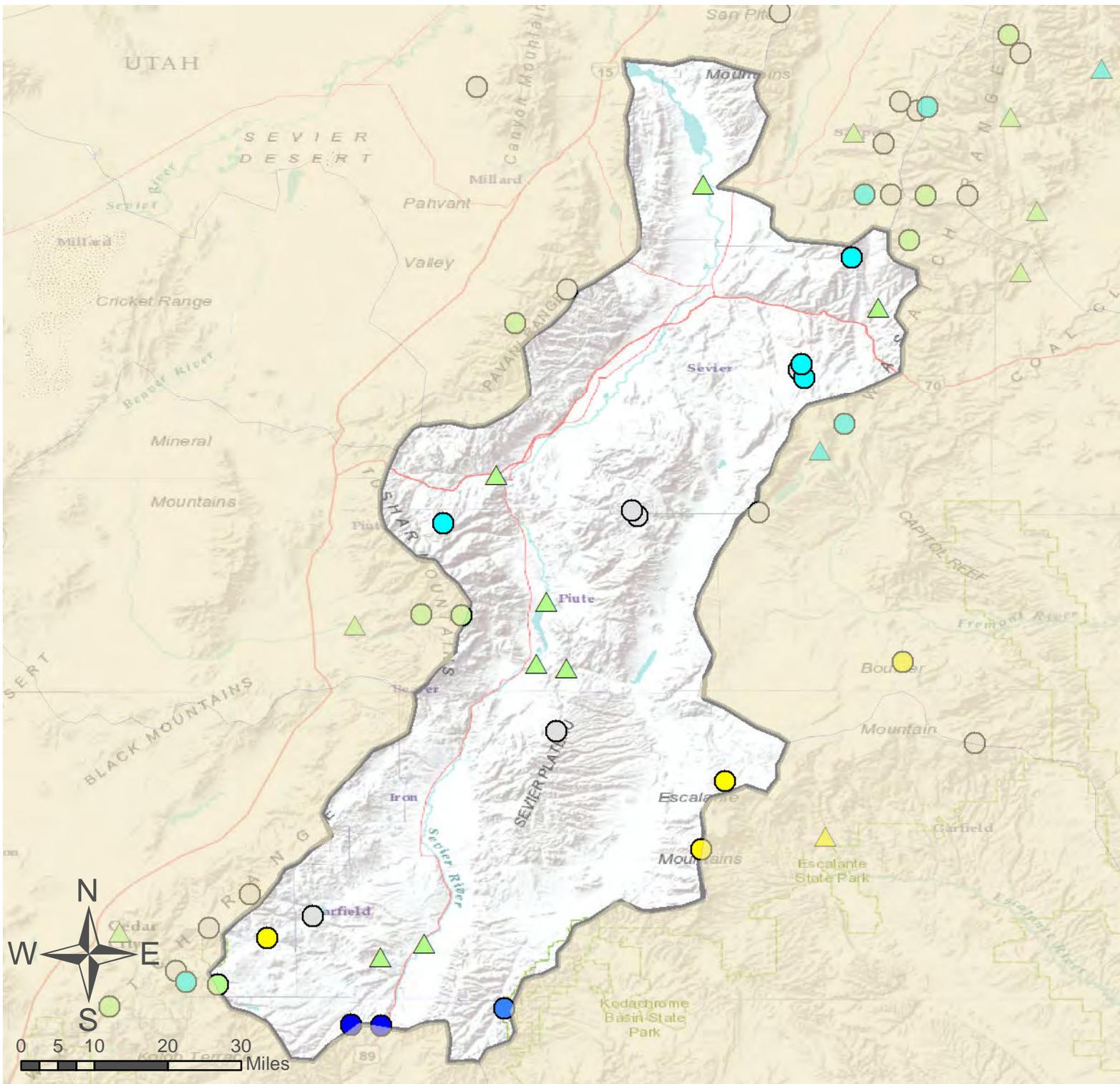
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Upper Sevier	35.04	61.00	96.04	23	-2.29	18, 09, 13, 08

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.





Upper Sevier Basin

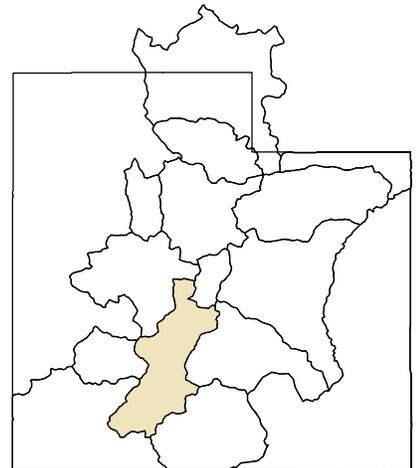
- SNOTEL Site
- △ Forecast Point

As of February 1, 2019:

- 111% of Normal SWE
- 112% of Normal Precipitation
- 104% of Normal Precipitation Last Month
- 44% Saturation Soil Moisture
- Upper Sevier Basin

% of Normal

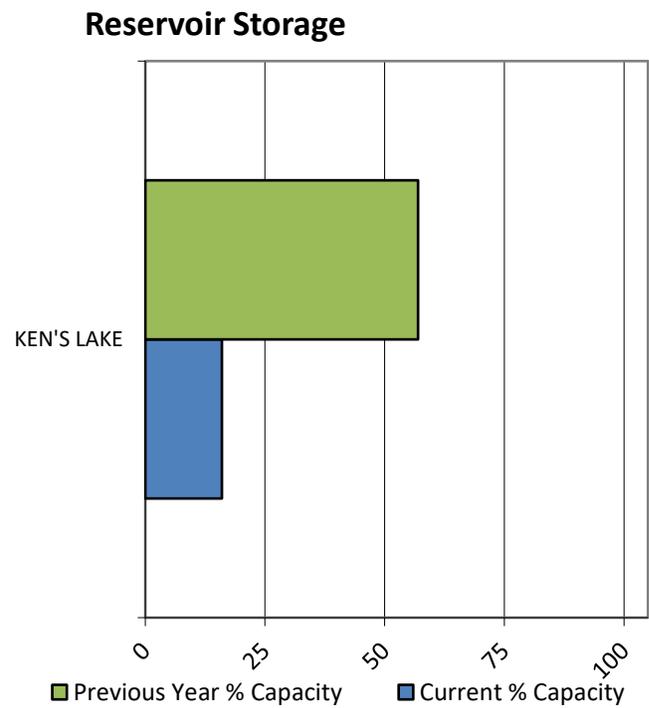
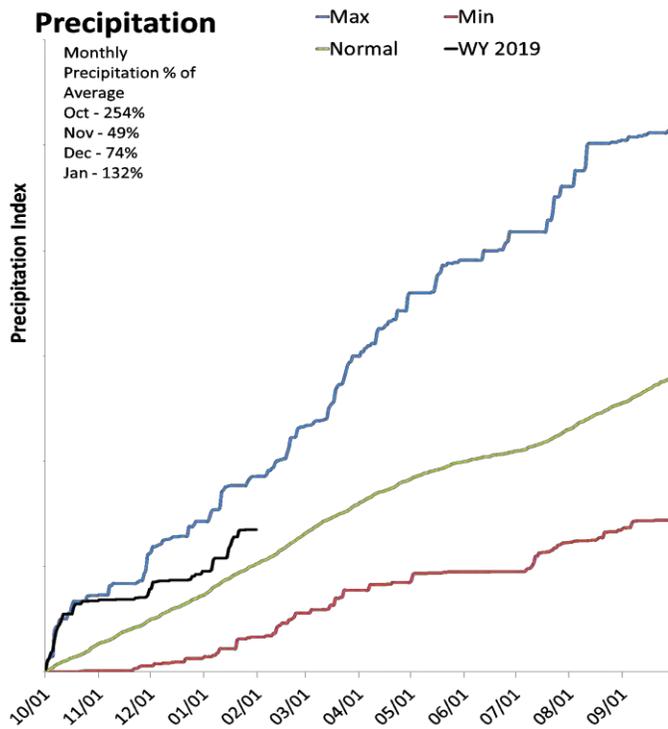
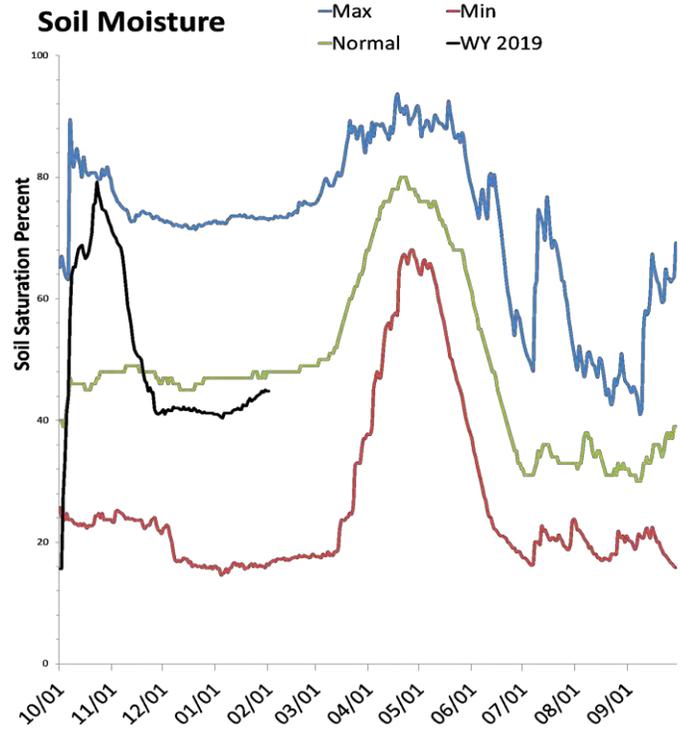
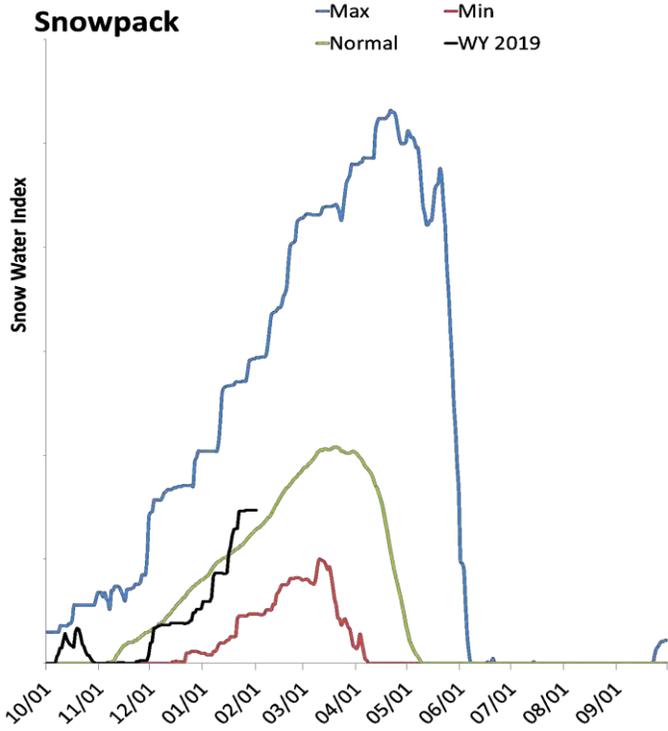
- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal



Southeastern Utah

February 1, 2019

Snowpack in the Southeastern Utah is above normal at 115% of normal, compared to 37% last year. Precipitation in January was much above average at 133%, which brings the seasonal accumulation (Oct-Jan) to 132% of average. Soil moisture is at 45% compared to 16% last year. Reservoir storage is at 16% of capacity, compared to 57% last year. Forecast streamflow volumes range from 78% to 105% of average. The surface water supply index is 55% for Moab.



Southeastern Utah Streamflow Forecasts - February 1, 2019

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

Southeastern Utah	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Mill Ck at Sheley Tunnel nr Moab	APR-JUL	2.5	3.6	4.5	105%	5.5	7.1	4.3
South Ck ab Resv nr Monticello	MAR-JUL	0.36	0.7	1.01	93%	1.41	2.2	1.09
Colorado R nr Cisco ²	APR-JUL	2490	3320	3960	93%	4650	5770	4280
San Juan R near Bluff ²	APR-JUL	500	700	855	78%	1030	1310	1100

- 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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Ken's Lake	0.4	1.3	1.1	2.3
Basin-wide Total	0.4	1.3	1.1	2.3
# of reservoirs	1	1	1	1

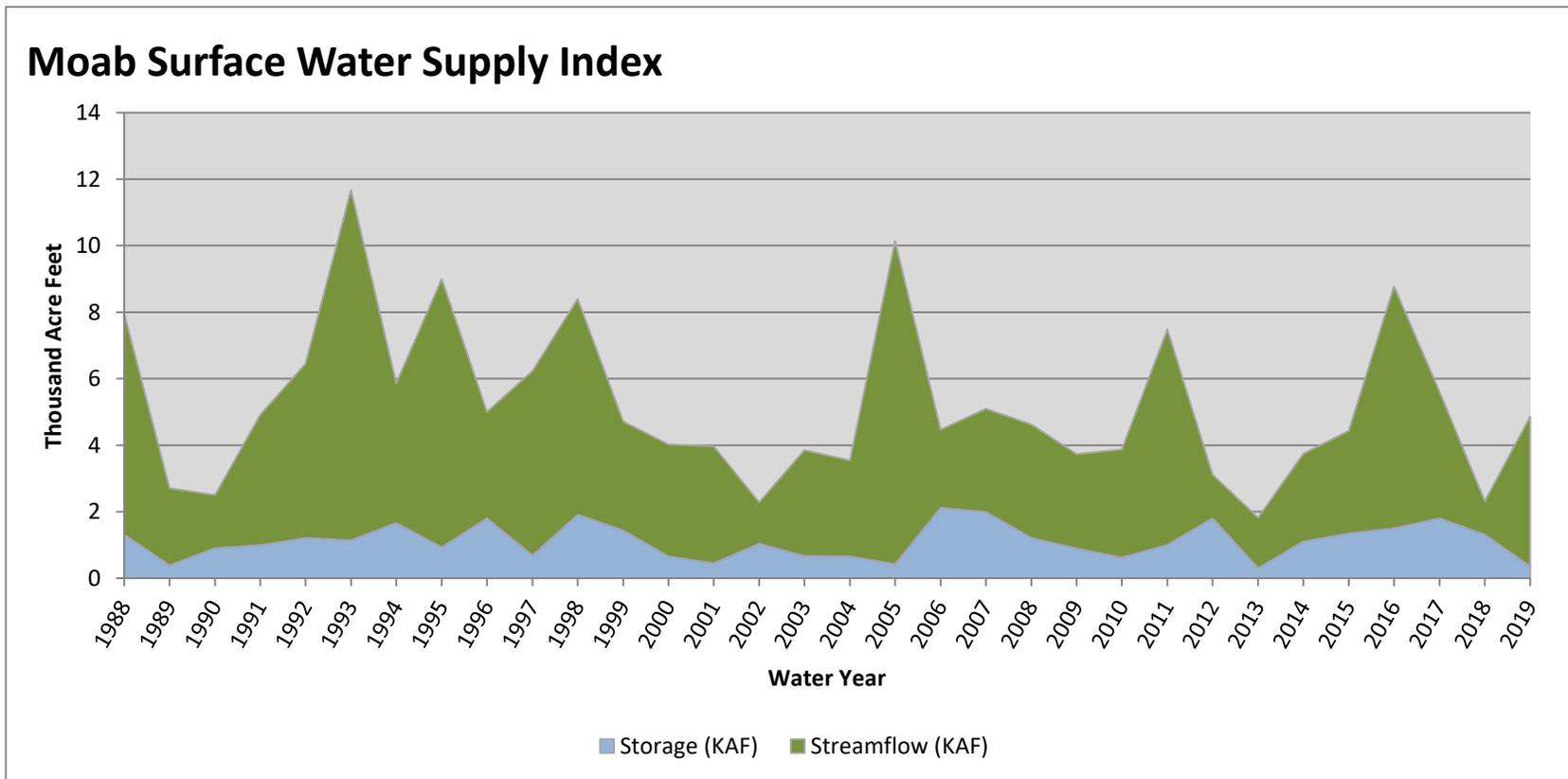
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Lasal Mountains	1	104%	45%
Lower San Juan	1	128%	25%
Lower Green	2	108%	47%
Henry Mountains	0		

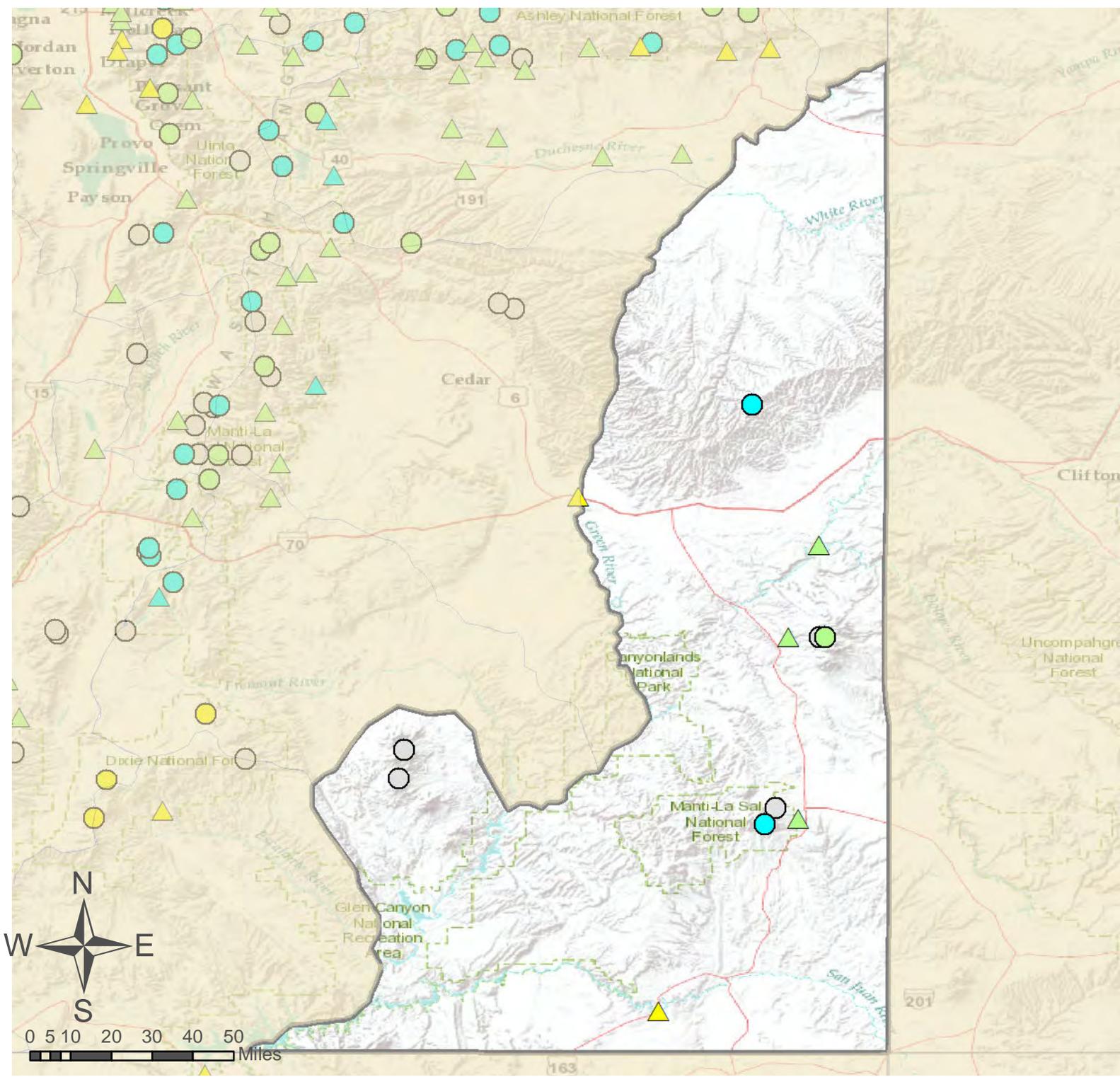
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Moab	0.36	4.50	4.86	55	0.38	08, 99, 91, 96

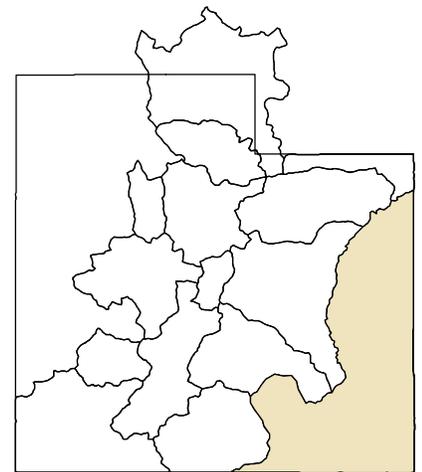
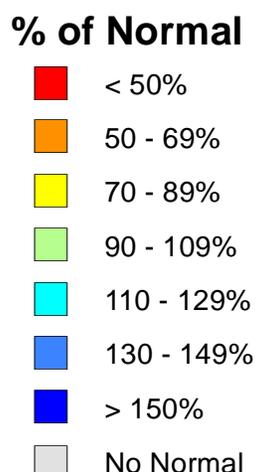
^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.





Southeastern Utah

- SNOTEL Site
- △ Forecast Point



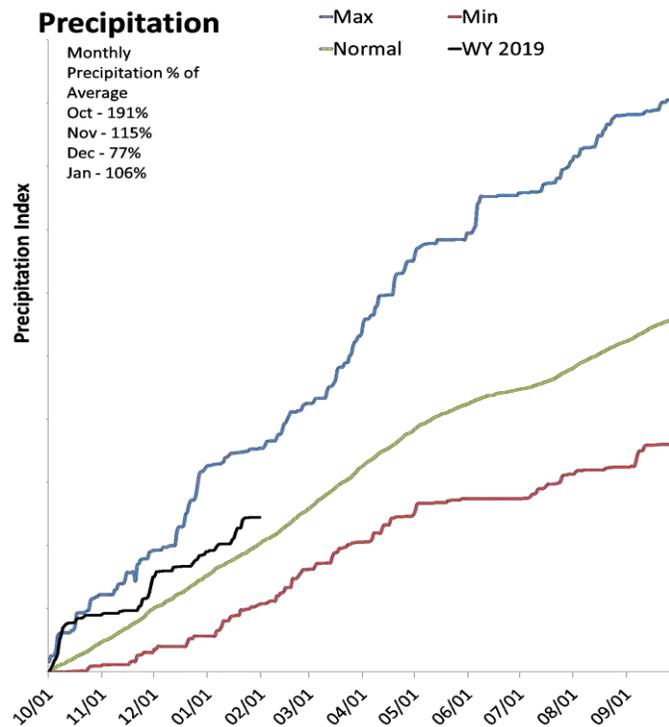
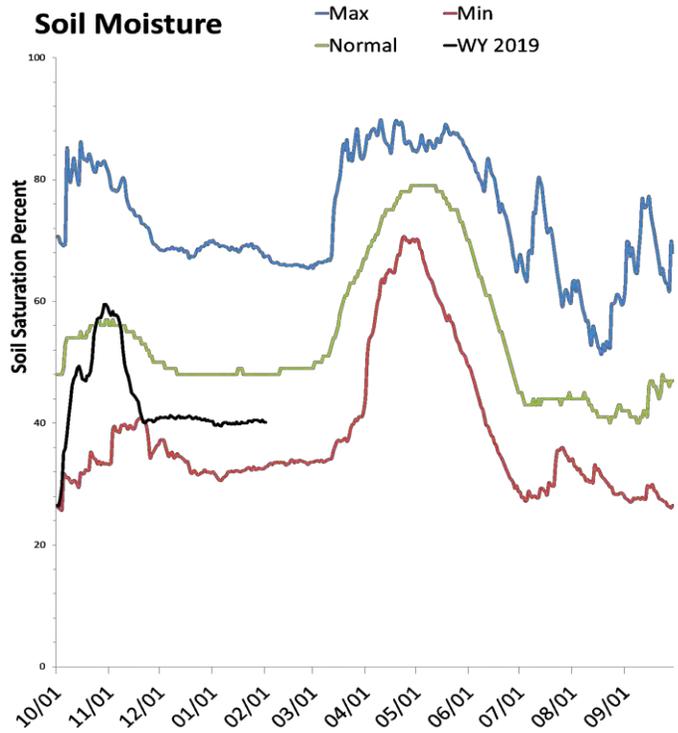
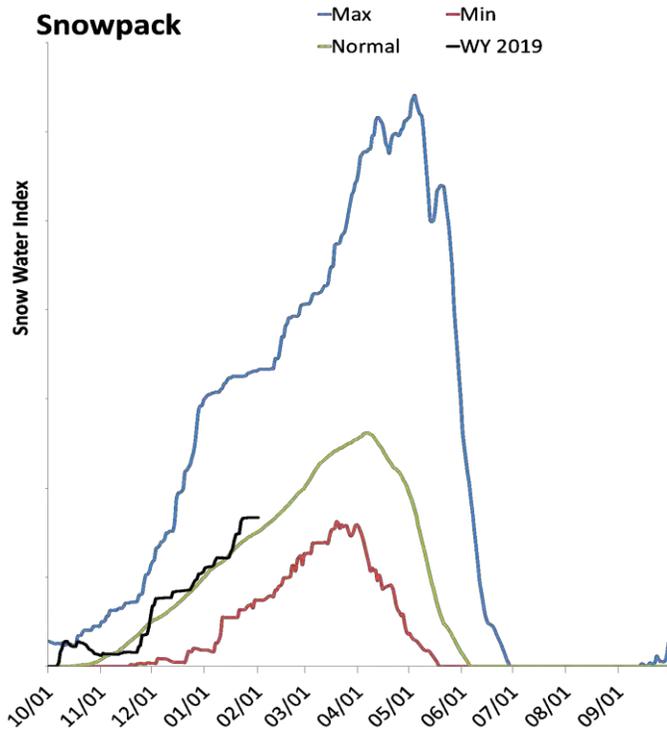
As of February 1, 2019:

- 115% of Normal SWE
- 132% of Normal Precipitation
- 133% of Normal Precipitation Last Month
- 45% Saturation Soil Moisture
- Southeastern Utah

Dirty Devil Basin

February 1, 2019

Snowpack in the Dirty Devil Basin is above normal at 111% of normal, compared to 49% last year. Precipitation in January was near average at 106%, which brings the seasonal accumulation (Oct-Jan) to 120% of average. Soil moisture is at 40% compared to 33% last year. Forecast streamflow volumes range from 101% to 110% of average.



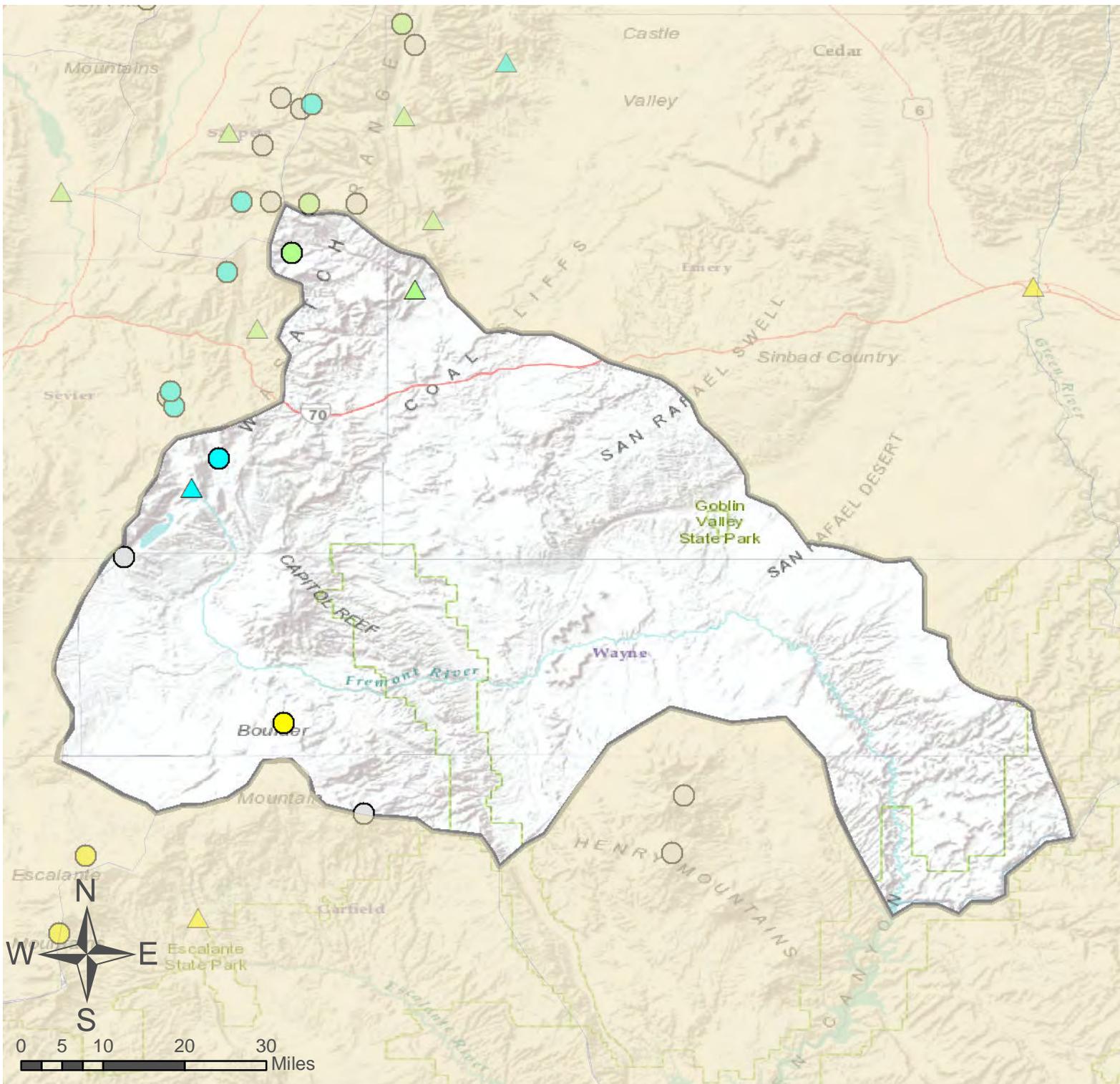
Dirty Devil Streamflow Forecasts - February 1, 2019

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

Dirty Devil	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Muddy Ck nr Emery	APR-JUL	12.2	16.6	20	101%	24	30	19.9
Seven Mile Ck nr Fish Lake	APR-JUL	4.5	6.5	8	110%	9.7	12.5	7.3

- 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
- 3) Median value used in place of average

Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Muddy Creek	3	107%	42%
Fremont River	3	116%	59%
Henry Mountains	0		



Dirty Devil Basin

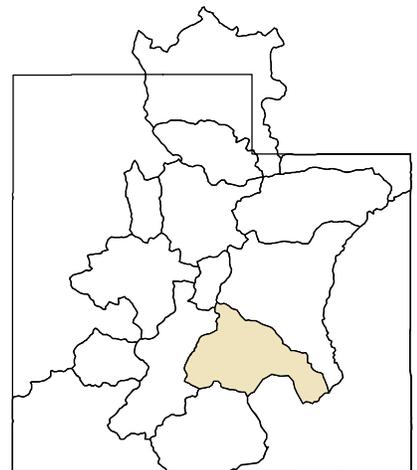
- SNOTEL Site
- △ Forecast Point

As of February 1, 2019:

- 111% of Normal SWE
- 120% of Normal Precipitation
- 106% of Normal Precipitation Last Month
- 40% Saturation Soil Moisture
- Dirty Devil Basin

% of Normal

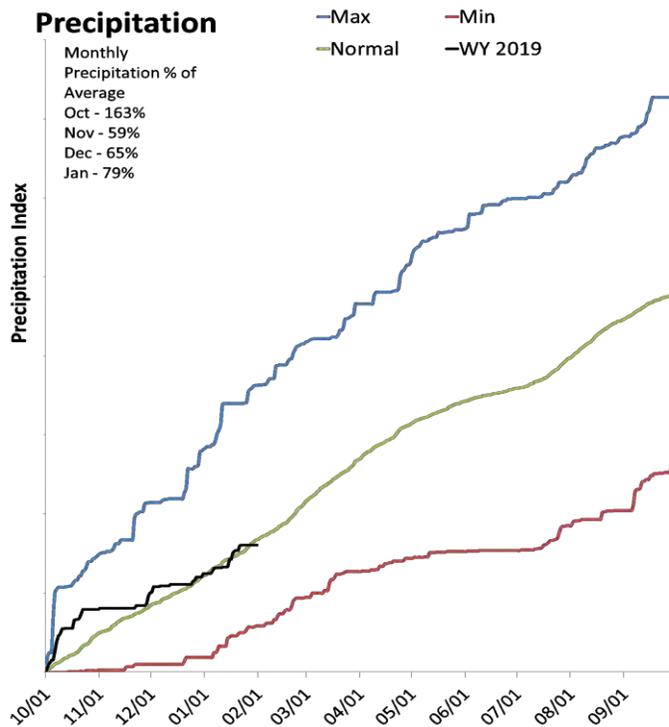
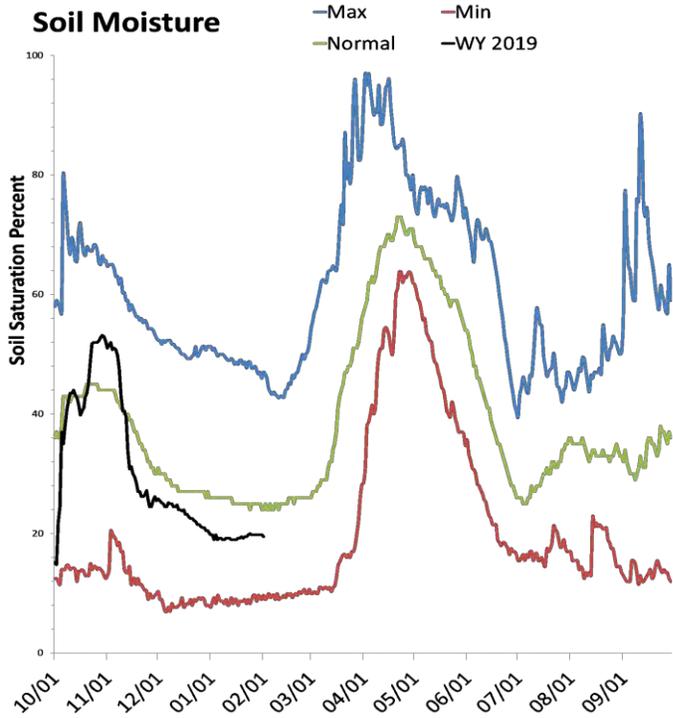
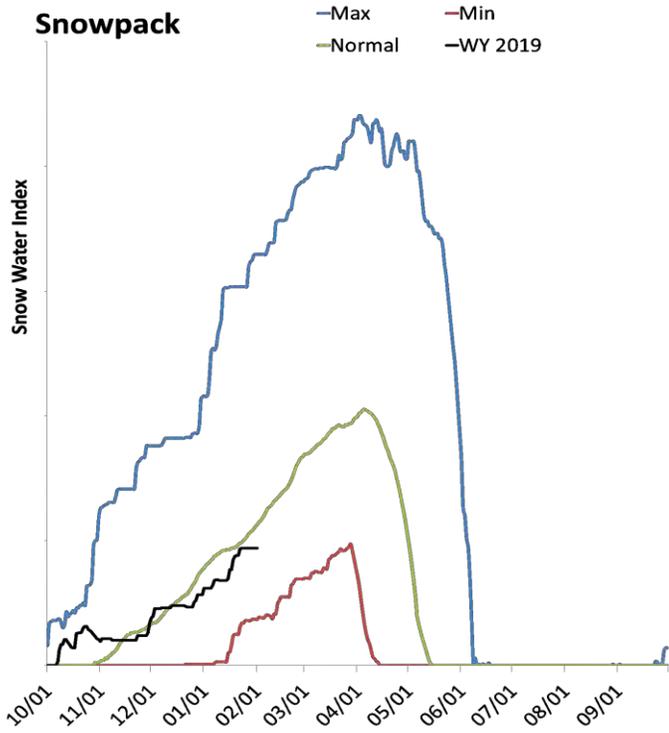
- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal



Escalante River Basin

February 1, 2019

Snowpack in the Escalante River Basin is below normal at 83% of normal, compared to 34% last year. Precipitation in January was below average at 78%, which brings the seasonal accumulation (Oct-Jan) to 96% of average. Soil moisture is at 19% compared to 13% last year. The forecast streamflow volume for Pine Creek is 75% of average.



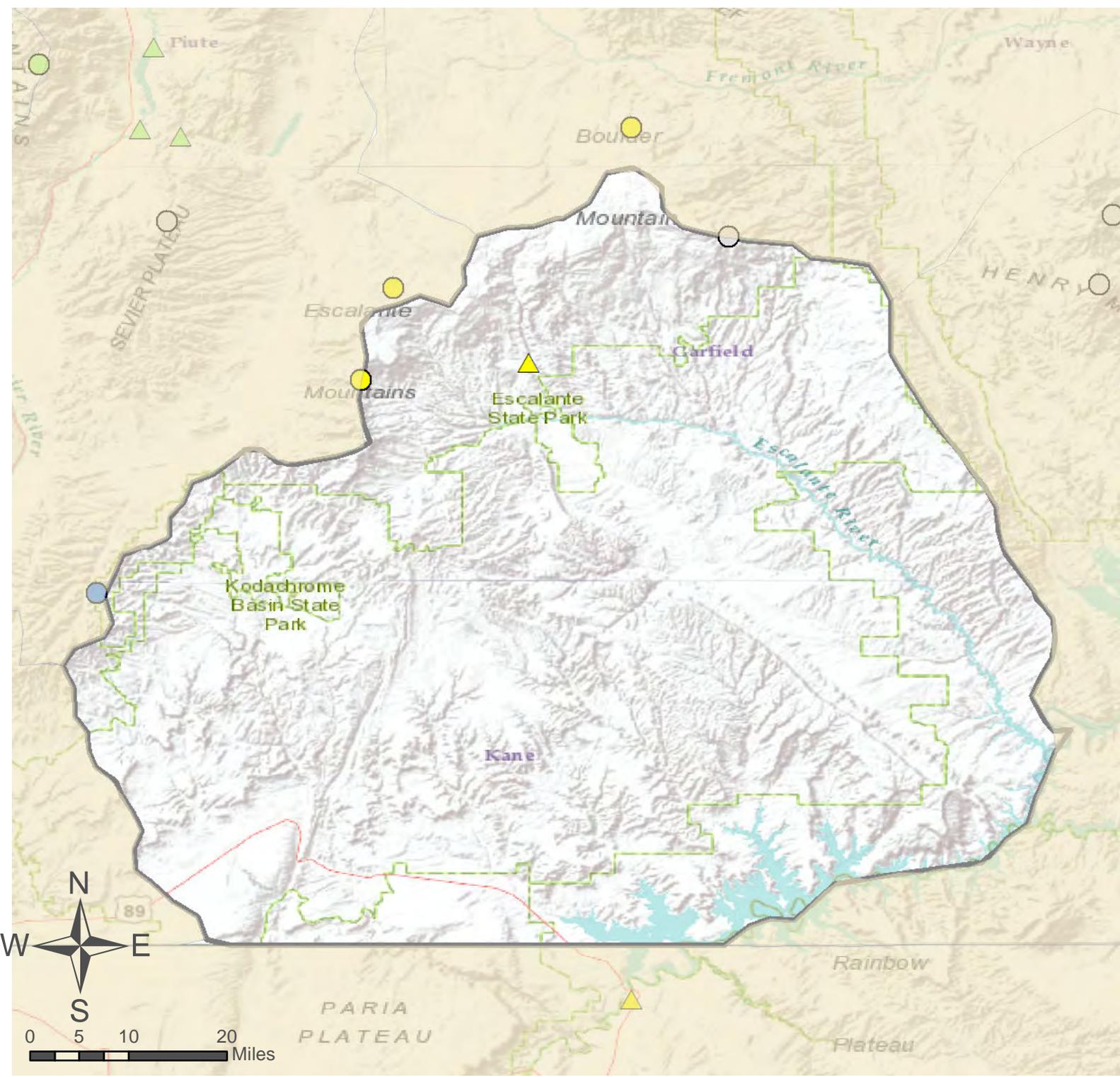
Escalante River Streamflow Forecasts - February 1, 2019

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

Escalante River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Pine Ck nr Escalante	APR-JUL	0.64	1.27	1.81	75%	2.5	3.6	2.4

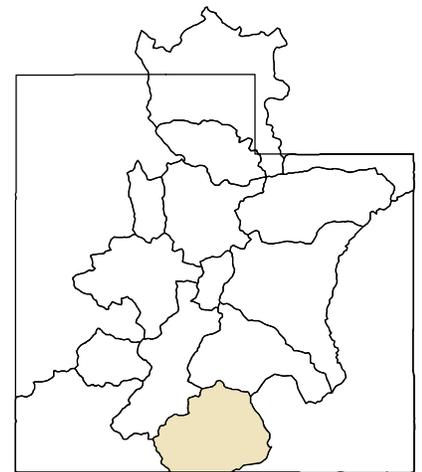
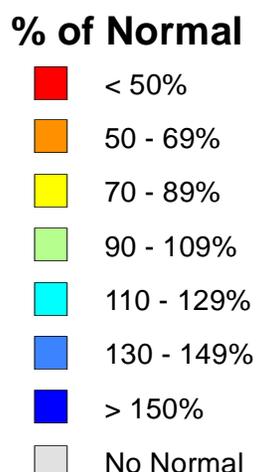
- 1) 90% and 10% exceedance probabilities are actually 95% and 5%
- 2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
- 3) Median value used in place of average

Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Escalante River	3	83%	34%
Paria River	2	101%	30%



Escalante River Basin

- SNOTEL Site
- △ Forecast Point



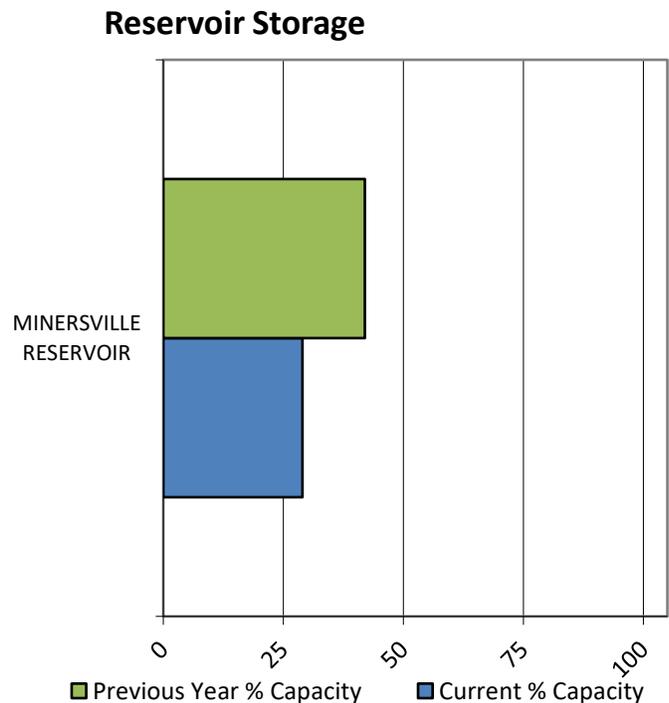
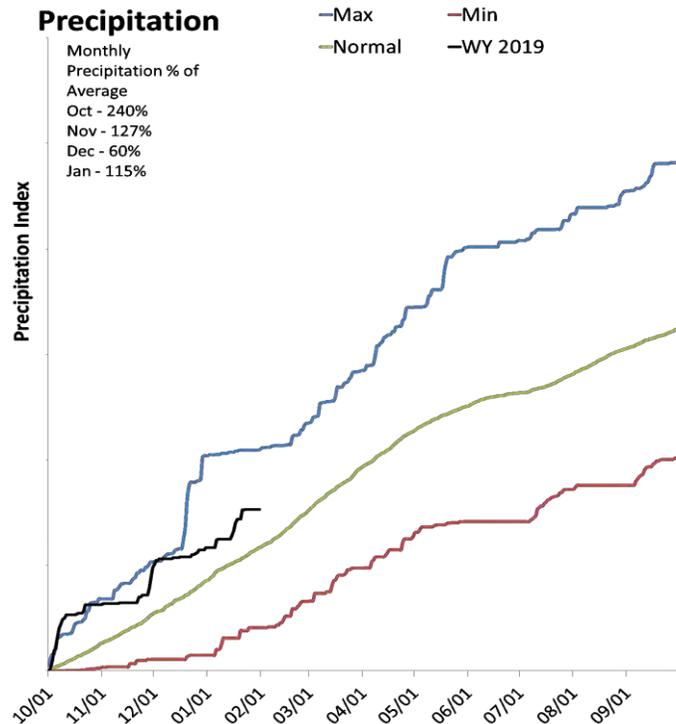
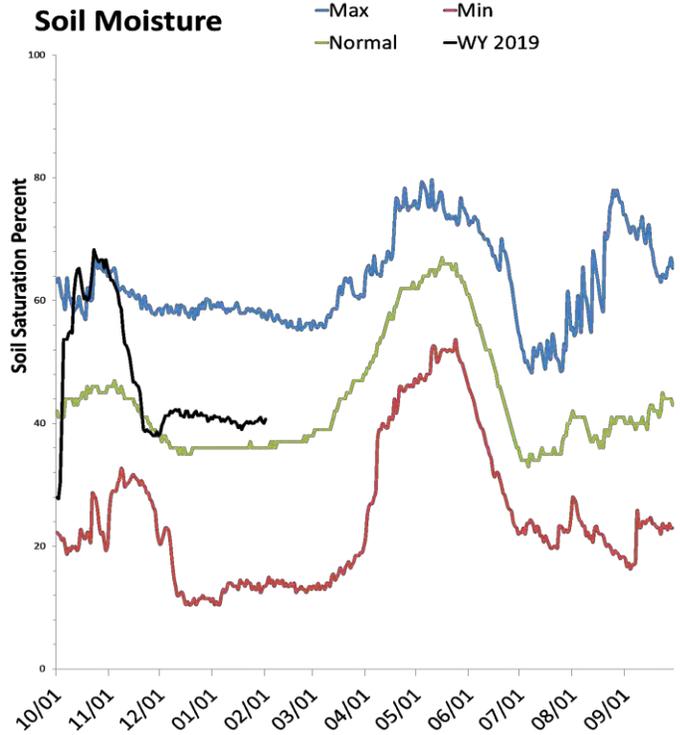
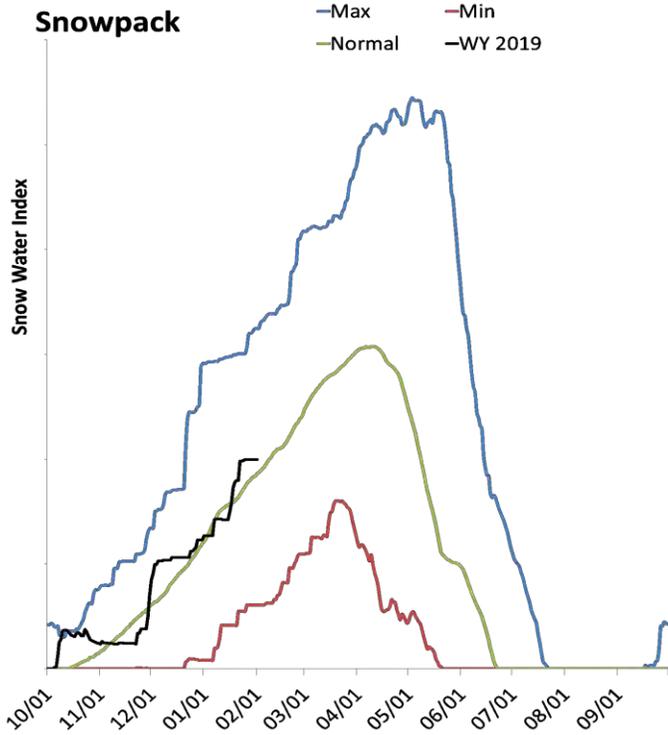
As of February 1, 2019:

- 83% of Normal SWE
- 96% of Normal Precipitation
- 78% of Normal Precipitation Last Month
- 19% Saturation Soil Moisture
- Escalante River Basin

Beaver River Basin

February 1, 2019

Snowpack in the Beaver River Basin is near normal at 107% of normal, compared to 33% last year. Precipitation in January was above average at 116%, which brings the seasonal accumulation (Oct-Jan) to 131% of average. Soil moisture is at 40% compared to 23% last year. Reservoir storage is at 29% of capacity, compared to 42% last year. The forecast streamflow volume for the Beaver River is 100% of average. The surface water supply index is 48% for the Beaver River.



Beaver River Streamflow Forecasts - February 1, 2019

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

Beaver River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Beaver River	APR-JUL	11.1	20	26	100%	32	41	26

- 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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Minersville Reservoir	6.7	9.8	13.4	23.3
Basin-wide Total	6.7	9.8	13.4	23.3
# of reservoirs	1	1	1	1

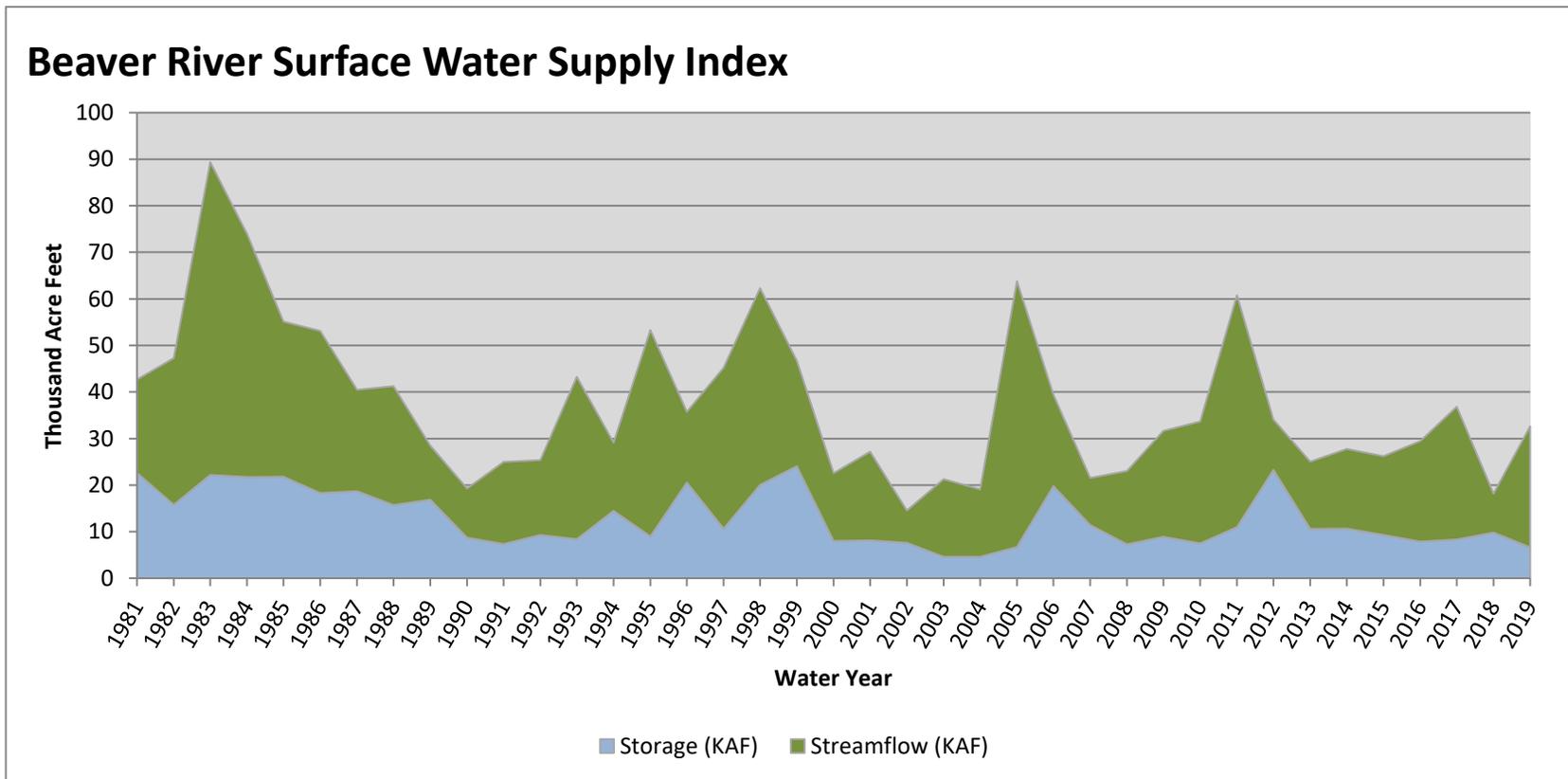
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Beaver River	3	107%	33%

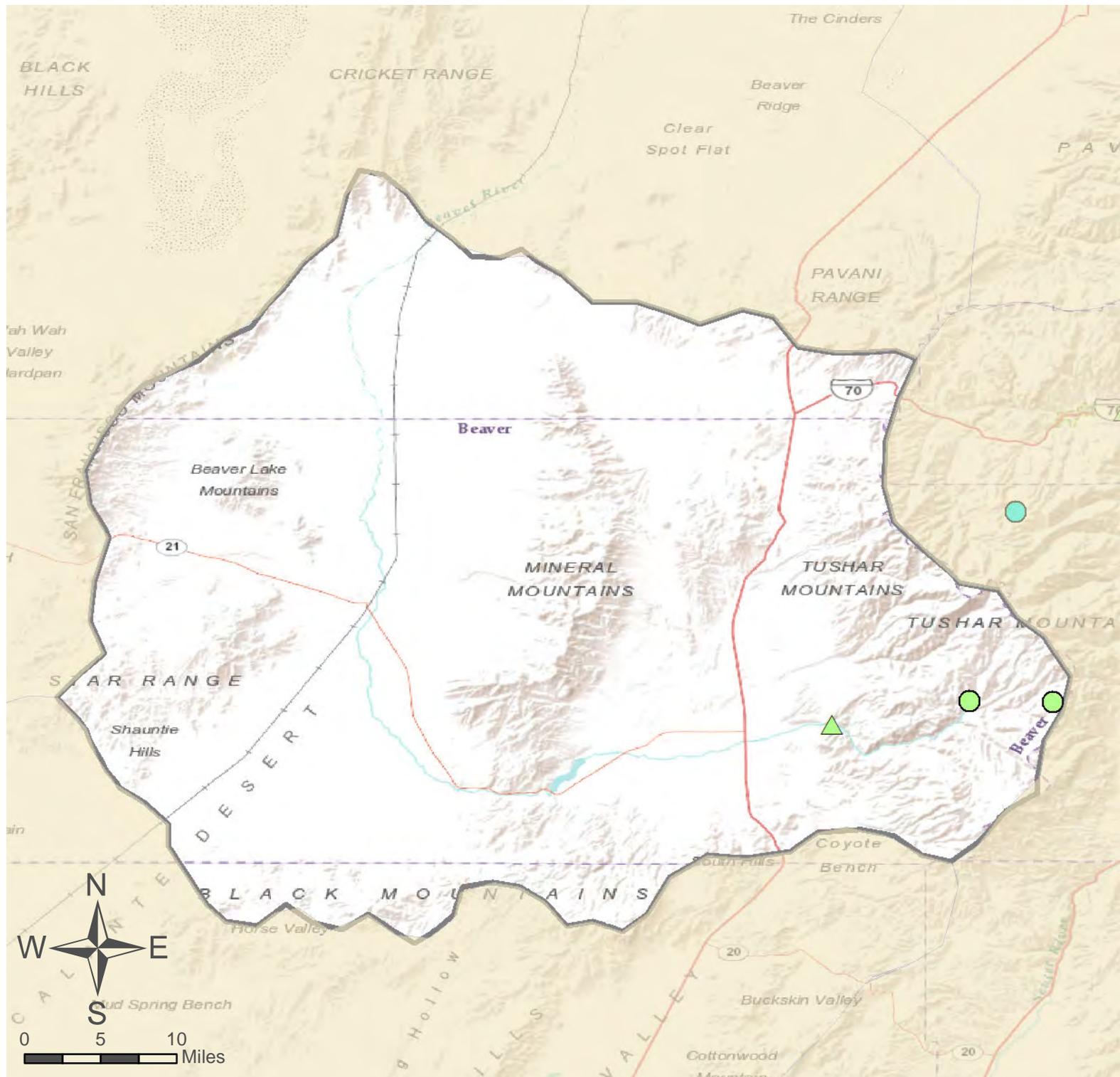
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Beaver River	6.65	26.00	32.65	48	-0.21	16, 09, 10, 12

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.



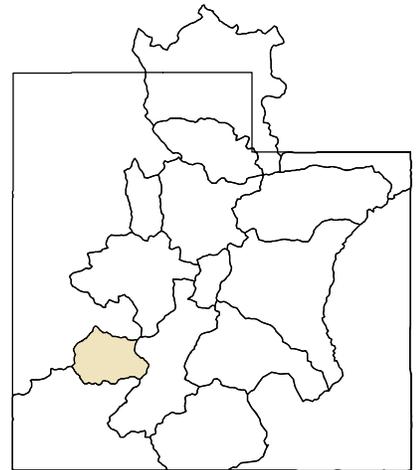


Beaver River Basin

- SNOTEL Site
- △ Forecast Point

% of Normal

- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal



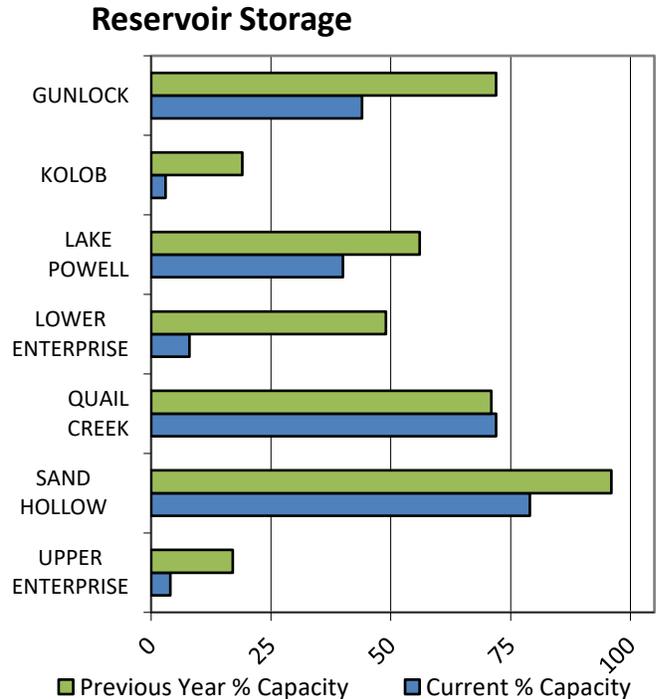
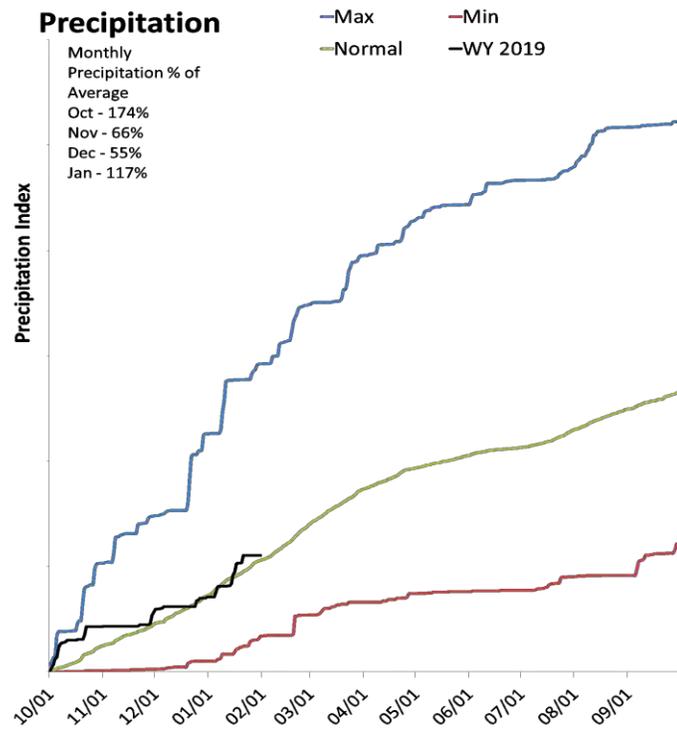
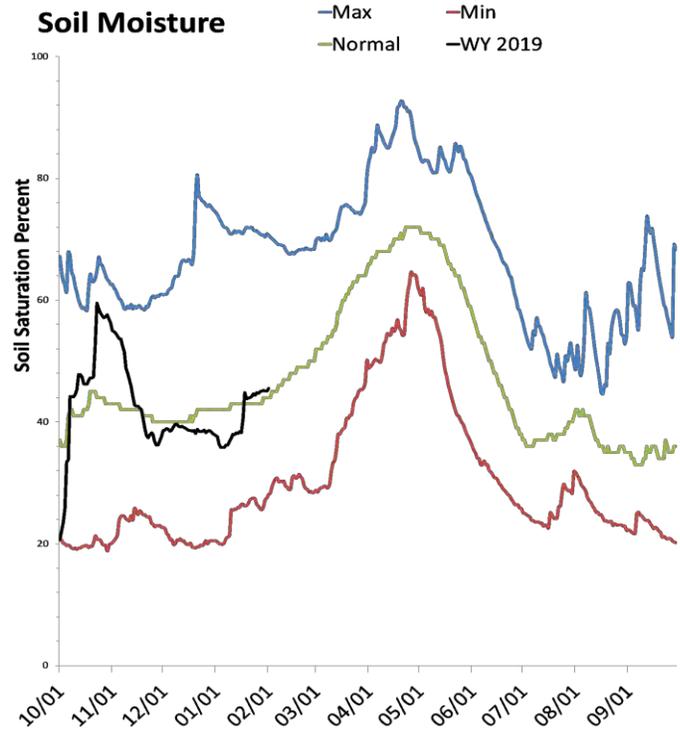
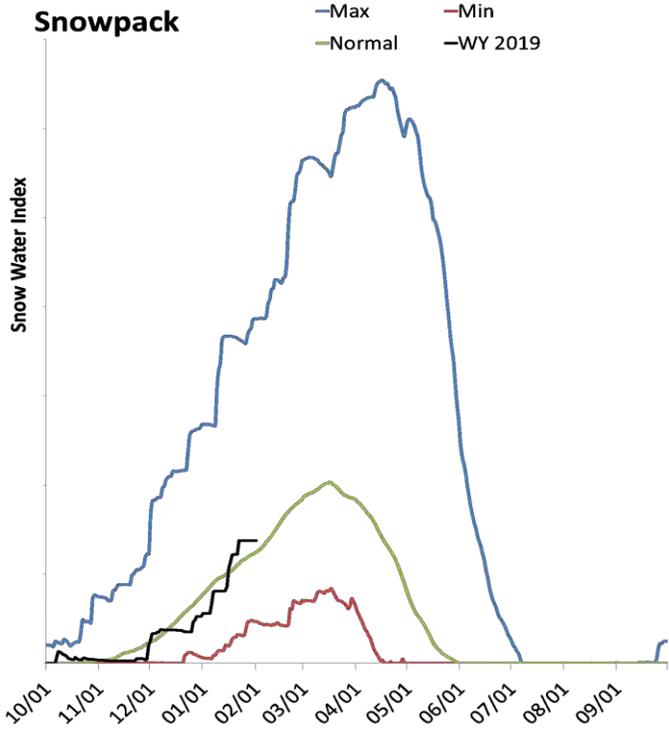
As of February 1, 2019:

- 107% of Normal SWE
- 131% of Normal Precipitation
- 116% of Normal Precipitation Last Month
- 40% Saturation Soil Moisture
- Beaver River Basin

Southwestern Utah

February 1, 2019

Snowpack in the Southwestern Utah is above normal at 110% of normal, compared to 38% last year. Precipitation in January was above average at 116%, which brings the seasonal accumulation (Oct-Jan) to 104% of average. Soil moisture is at 45% compared to 28% last year. Reservoir storage is at 40% of capacity, compared to 56% last year. Forecast streamflow volumes range from 76% to 101% of average. The surface water supply index is 64% for the Virgin River.



Southwestern Utah Streamflow Forecasts - February 1, 2019

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

Southwestern Utah	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Lake Powell Inflow ²	APR-JUL	3490	5010	6200	87%	7510	9680	7160
Virgin R nr Hurricane	APR-JUL	4.8	36	57	90%	78	109	63
Virgin R at Virgin	APR-JUL	24	38	50	86%	63	86	58
Santa Clara R nr Pine Valley	APR-JUL	1.33	2.6	3.8	76%	5.2	7.5	5
Coal Ck nr Cedar City	APR-JUL	9.1	15.4	19.6	101%	24	30	19.4

- 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
- 3) Median value used in place of average

Reservoir Storage End of January, 2019	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Lake Powell	9629.2	13672.3	17338.0	24322.0
Lower Enterprise	0.2	1.3	0.6	2.6
Upper Enterprise	0.4	1.7	3.1	10.0
Kolob Reservoir	0.2	1.1		5.6
Gunlock	4.6	7.5	6.5	10.4
Sand Hollow Reservoir	39.5	48.0		50.0
Quail Creek	28.8	28.4	26.0	40.0
Basin-wide Total	9663.2	13711.1	17374.2	24385.0
# of reservoirs	5	5	5	5

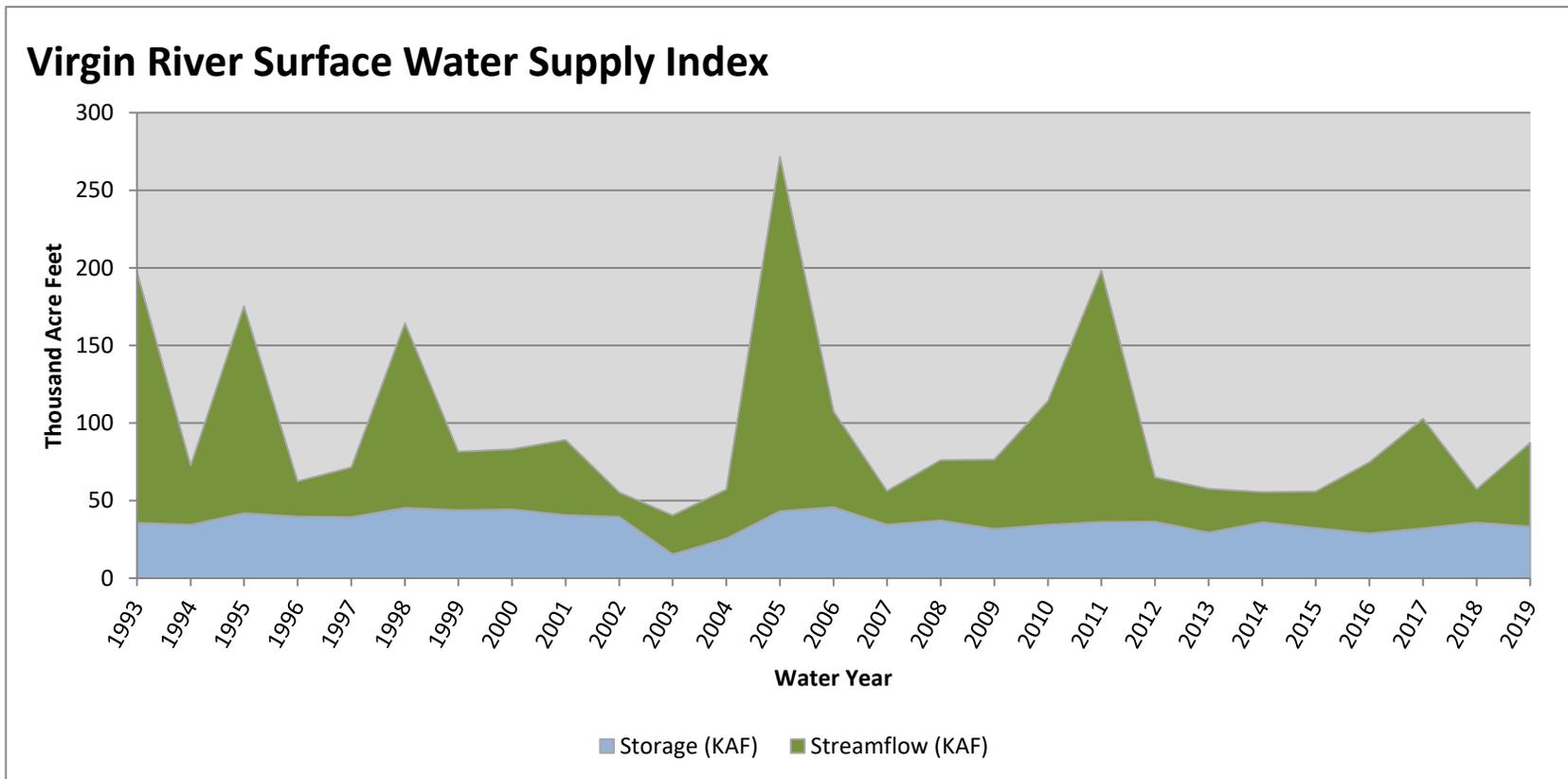
Watershed Snowpack Analysis February 1, 2019	# of Sites	% Median	Last Year % Median
Upper Virgin	8	115%	34%
Lower Virgin	2	131%	21%
Coal Parowan Creeks	4	97%	46%

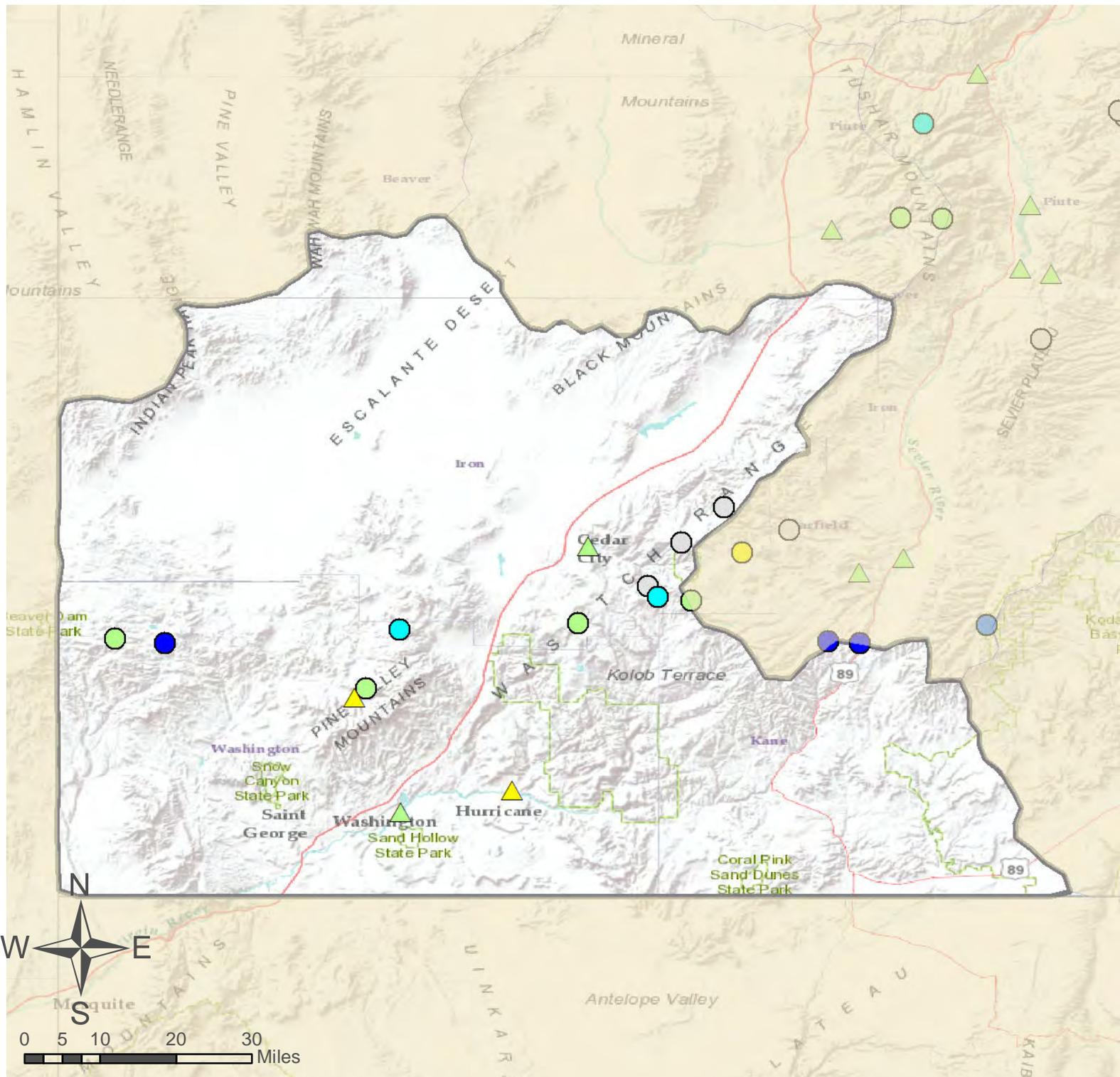
February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage	APR-JUL Forecast	Storage + Forecast	Percentile	SWSI [#]	Years with similiar SWSI
	KAF [^]	KAF [^]	KAF [^]	%		
Virgin River	33.38	53.80	87.18	64	1.19	99, 00, 01, 17

^{*}EOM, end of month; [#]SWSI, Surface Water Supply Index; [^]KAF, thousand acre-feet.



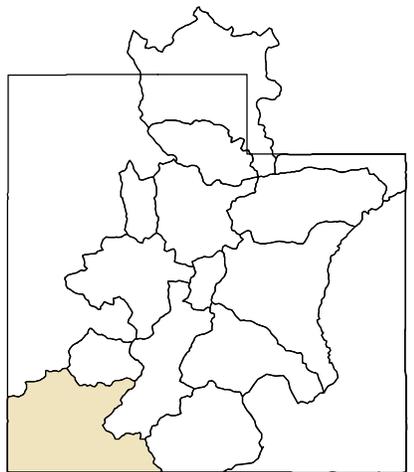


Southwestern Utah

- SNOTEL Site
- △ Forecast Point

% of Normal

- < 50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- > 150%
- No Normal



As of February 1, 2019:

- 110% of Normal SWE
- 104% of Normal Precipitation
- 116% of Normal Precipitation Last Month
- 45% Saturation Soil Moisture
- Southwestern Utah

February 1, 2019

Surface Water Supply Index

Basin or Region	Jan EOM [*] Storage <i>KAF</i> [^]	APR-JUL Forecast <i>KAF</i> [^]	Storage + Forecast <i>KAF</i> [^]	Percentile %	SWSI [#]	Years with similar SWSI
Bear River	820.7	119.0	939.7	58	0.62	01, 13, 88, 81
Woodruff Narrows	20.7	96.0	116.7	40	-0.83	14, 15, 81, 07
Little Bear	9.7	39.0	48.7	54	0.3	10, 16, 08, 93
Ogden River	56.4	104.0	160.4	58	0.62	94, 16, 93, 96
Weber River	227.0	285.0	512.0	55	0.42	94, 81, 10, 09
Provo River	814.1	93.0	907.1	23	-2.24	17, 05, 15, 95
Western Uinta	143.4	96.0	239.4	50	0	18, 81, 15, 14
Eastern Uinta	11.9	60.0	71.9	18	-2.71	89, 90, 04, 94
Blacks Fork	5.1	92.0	97.1	46	-0.34	06, 18, 87, 16
Smiths Fork	3.7	26.0	29.7	51	0.11	92, 13, 97, 91
Price River	25.7	44.0	69.7	68	1.46	17, 87, 96, 95
Joe's Valley	30.8	56.0	86.8	55	0.42	00, 10, 93, 09
Ferron Creek	1.2	40.0	41.2	50	0	87, 03, 01, 08
Moab	0.4	4.5	4.9	55	0.38	08, 99, 91, 96
Upper Sevier	35.0	61.0	96.0	23	-2.29	18, 09, 13, 08
San Pitch	0.2	16.0	16.2	30	-1.67	92, 91, 01, 89
Lower Sevier	49.2	95.0	144.2	33	-1.46	09, 14, 90, 94
Beaver River	6.7	26.0	32.7	48	-0.21	16, 09, 10, 12
Virgin River	33.4	53.8	87.2	64	1.19	99, 00, 01, 17

^{*}EOM, end of month; [#]SWSI, surface water supply index; [^]KAF, thousand acre-feet.

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.

Utah Snow Surveys 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 the simplest 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.

For more information on the SWSI go to: www.ut.nrcs.usda.gov/snow/ on the water supply page. The entire period of historical record for reservoir storage and streamflow is available.

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<https://www.nrcs.usda.gov/wps/portal/nrcs/main/ut/snow/>

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Utah Water Supply Outlook Report

Natural Resources Conservation Service
Salt Lake City, UT

