Utah Water Supply Outlook Report

March, 2011

Karen Vaughan at the Garden City Summit SNOTEL site – February 26, 2011. Photo by Michael Bricco

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

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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 computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. 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
March 1, 2011

SUMMARY

Snowpacks are above and much above average over most of Utah with the lone exception of the Escalante Basin which is near average. Water supply conditions are excellent across all basins of the state. There is only one month remaining in the snow accumulation season and the first part of March has significant storms already occurring and forecasts for more. Snowpacks in northern Utah range from 127% on the Bear to 143% on the Uintah's. In southern Utah, snowpacks range from 121% in southeastern Utah to 159% on the Virgin. February precipitation was near to above normal (96%-124%) in across all of Utah, which brings the year to date precipitation much above normal statewide at 147%. Current soil moisture saturation levels in runoff producing areas are: Bear – 69%, Weber – 67%, Provo – 58%, Uintah Basin – 55%, SE Utah – 64%, Sevier – 62% and SW Utah – 56% of saturation. These are very high values and should lead to higher runoff efficiency. High snowpacks and high soil moisture have the potential for extremely high flows. Reservoir storage is currently at 70% of capacity statewide which is 1% more than last year at this time. General water supply conditions are much above average across the state. Streamflow forecasts range from 115% Ashley Creek nr Veranl to 258% of average for Sevier River nr Kingston. Surface Water Supply Indices range from 42% on the Bear River to 91% for the Weber Watershed. The years with similar SWSI numbers for the Weber Basin are: 1982, 1983 and 1984.

SNOWPACK

March first snowpacks as measured by the NRCS SNOTEL system are as follows: Bear - 127%, Weber - 129%, Provo - 141%, Uintahs - 143%, southeast Utah - 121%, Sevier - 135%, southwest Utah - 159% and the statewide figure is 133% of average. With only March remaining in the snow accumulation season, the range of potential snowpack outcomes is fairly small depending on future climatic conditions. If drought and early melt prevail, snowpacks could range between 69% (SE Utah) and 99% (Provo) of average. Given maximum accumulations, April 1 snowpacks could range between 138% (Bear) and 210% (SW Utah) of average. With normal accumulations, April 1 snowpacks will be between 122% (Bear) and 153% (SW Utah) of average. All snowpacks across the state are currently at or above their April 1 peak values and would actually have to have significant melt during March to get down to an average April 1 value. Thus all storms during March will simply add to the bonus conditions.

PRECIPITATION

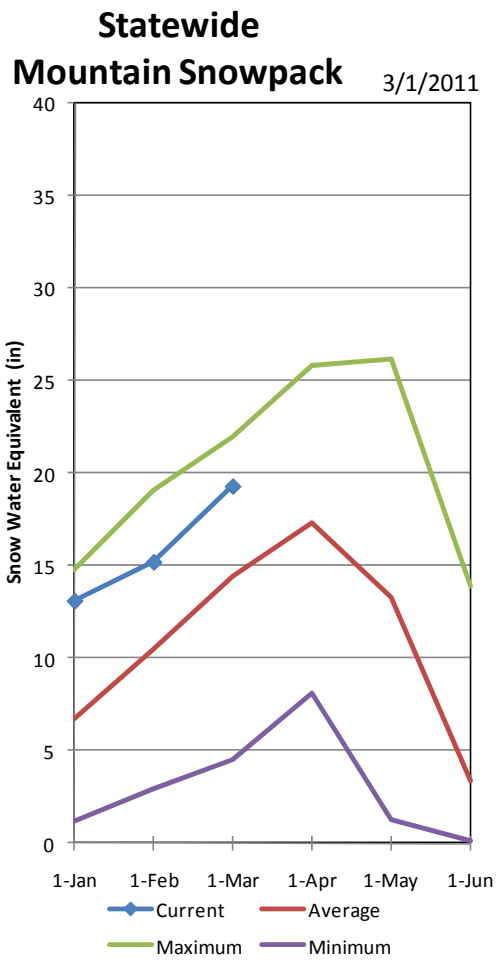
Mountain precipitation during February was: Bear – 98%, Weber – 105%, Provo – 110%, Uintahs – 124%, SE Utah – 96%, Sevier – 105%, SW Utah – 118% and the statewide figure is 104% of average. This brings the seasonal accumulation (Oct-Jan) to 147% of average statewide.

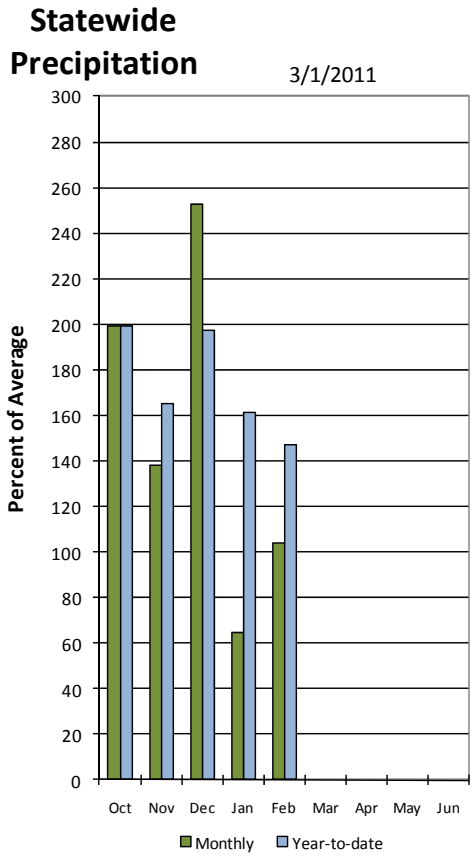
RESERVOIRS

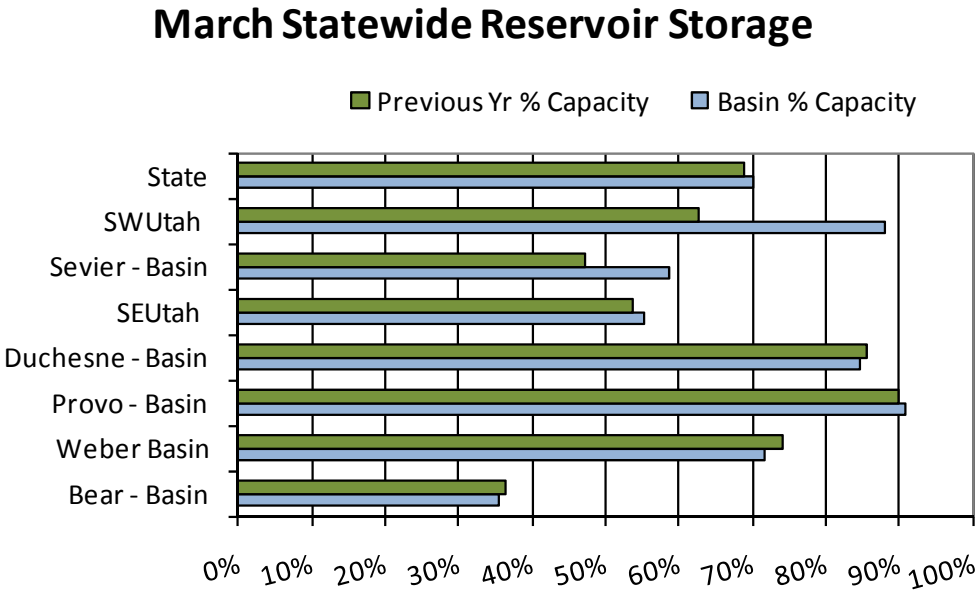
Storage in 41 of Utah's key irrigation reservoirs is at 70% of capacity, 2% more than last year. Reservoir storage by Basin: Bear – 35%, Weber – 72%, Provo – 91%, Uintah Basin – 85%, SE Utah – 55%, Sevier – 59%, SW Utah – 88% of capacity.

STREAMFLOW

Snowmelt streamflows are expected to be above to much above average across the state this year. Forecast streamflows range from 115% Ashley Creek Nr Vernal to 258% on the Sevier River nr Kingston. Most flows are forecast to be in the 120% to 160% range.

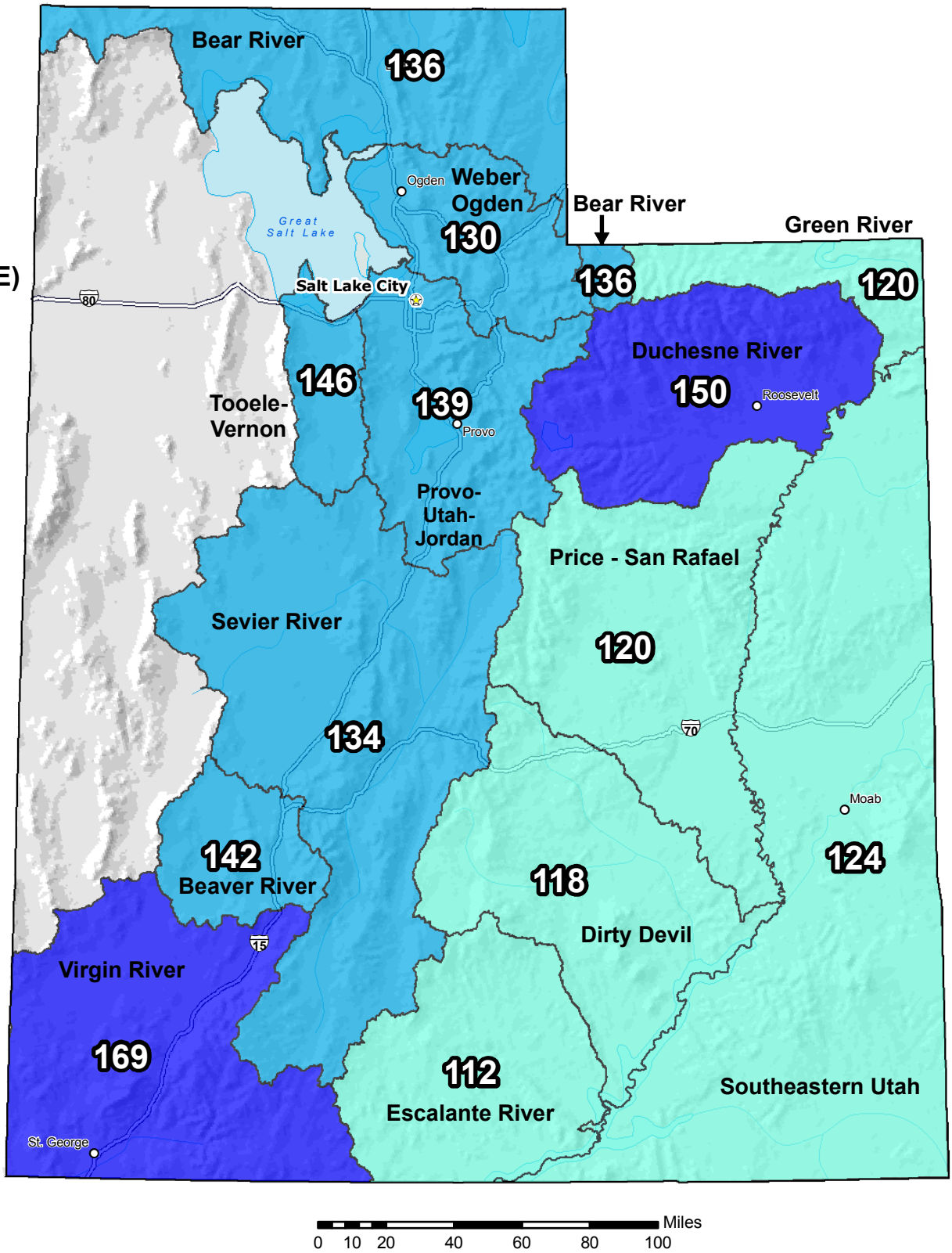

Statewide
Mountain Snowpack
3/1/2011
Snow Water Equivalent (in)
40
35
30
25
20
15
10
5
0
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
Current
Average
Maximum
Minimum


Statewide
Precipitation
3/1/2011
Percent of Average
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Monthly
Year-to-date


March Statewide Reservoir Storage
Previous Yr % Capacity
Basin % Capacity
State
SWUtah
Sevier - Basin
SEUtah
Duchesne - Basin
Provo - Basin
Weber Basin
Bear - Basin
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

Utah
SNOTEL Current Snow Water Equivalent (SWE)
% of Normal

Mar 01, 2011



Snow Water Equivalent (SWE) Basin-wide Percent of 1971-2000 Normal

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

* *Data unavailable at time of posting or measurement is not representative at this time of year*

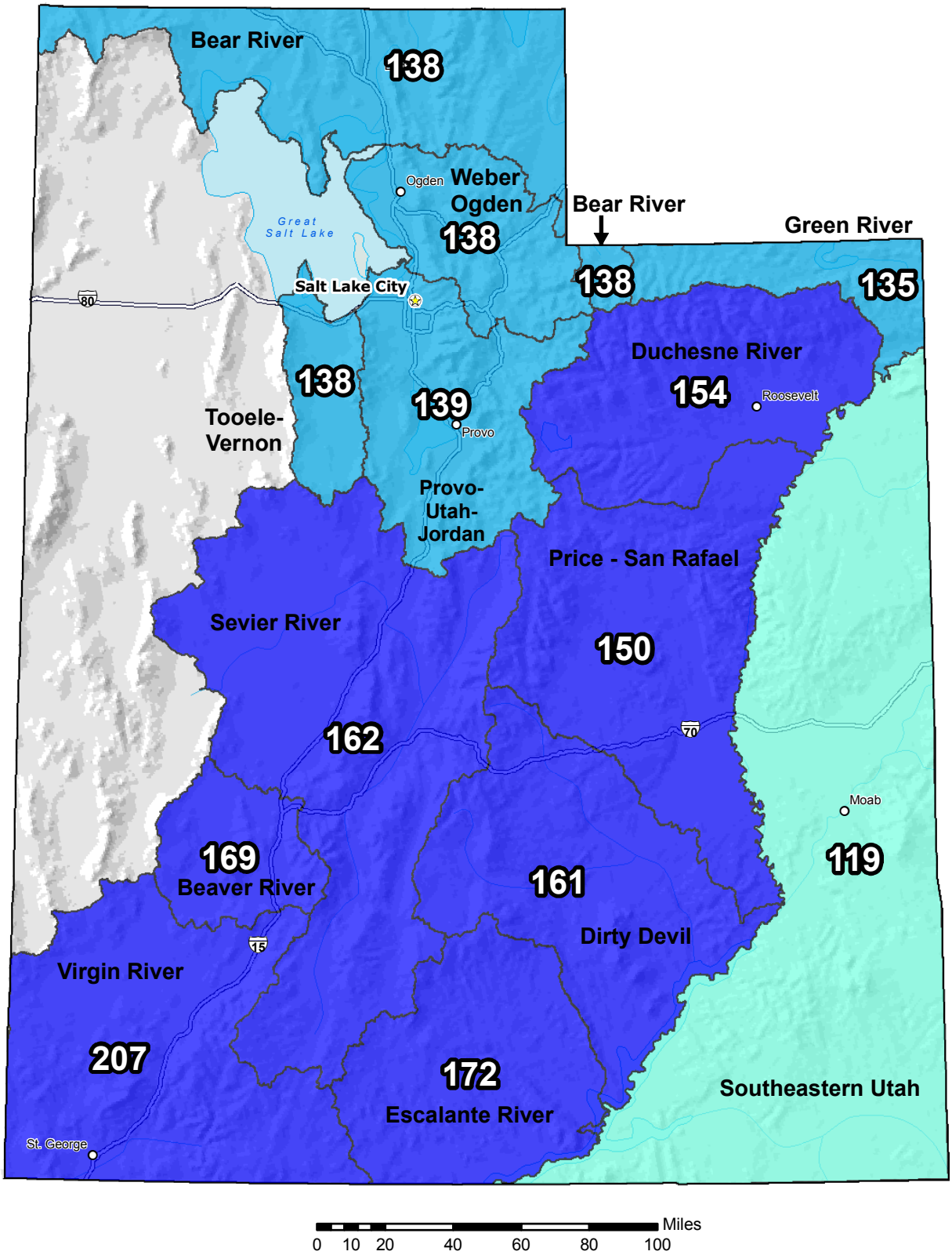
Provisional Data Subject to Revision

The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon http://www.wcc.nrcs.usda.gov/gis/
Based on data from http://www.wcc.nrcs.usda.gov/reports/
Science contact: Jim.Marron@por.usda.gov 503 414 3047

Utah
SNOTEL Water Year (Oct 1) to Date Precipitation
% of Normal

Mar 01, 2011



Water Year (Oct 1) to Date Precipitation Basin-wide Percent of 1971-2000 Normal

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

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Provisional Data Subject to Revision

The water year to date precipitation percent of normal represents the accumulated precipitation found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon http://www.wcc.nrcs.usda.gov/gis/
Based on data from http://www.wcc.nrcs.usda.gov/reports/
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March 1, 2011

Surface Water Supply Index

Basin or Region	January EOM* Resevoirs	April-July Stream Forecast	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Bear River	**413**	**355**	**768**	**-0.63**	**42**	**56,89,96,01**
Ogden River	**67.0**	**180**	**247**	**2.02**	**74**	**82,97,05,06**
Weber River	**325**	**550**	**875**	**3.39**	**91**	**75,82,83,84**
Provo	**364**	**190**	**554**	**2.90**	**85**	**83,98,97,82**
West Uintah Basin	**151**	**275**	**426**	**3.17**	**88**	**83,87,05,97**
East Uintah Basin	**41.2**	**85.0**	**126**	**1.64**	**70**	**93,87,01,99**
Price River	**26.2**	**45.0**	**71.2**	**0.44**	**55**	**05,08,87,76**
Joe's Valley	**42.5**	**70.0**	**113**	**2.43**	**79**	**99,05,06,97**
Ferron Creek	**9.5**	**50.0**	**59.5**	**2.50**	**80**	**82,95,93,06**
Moab	**1.1**	**4.8**	**5.9**	**1.17**	**64**	**07,96,94,97**
Upper Sevier River	**88.2**	**130**	**218**	**3.21**	**89**	**88,89,87,69**
Lower Sevier River	**114.8**	**195**	**310**	**2.44**	**79**	**82,99,97,69**
Beaver River	**12.2**	**45.0**	**57.2**	**2.86**	**84**	**73,82,86,95**
Virgin River	**37.7**	**119**	**156**	**2.56**	**81**	**95,98,10,88**

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

What is a Surface Water Supply Index?

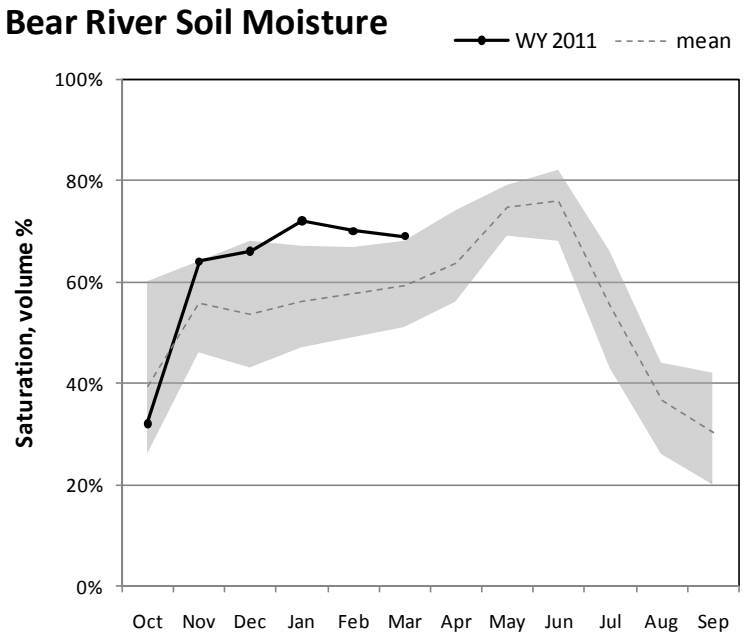
The Surface Water Supply Index (SWSI) is a predictive indicator of total surface water availability within a watershed for the spring and summer water use seasons. The index is calculated by combining pre-runoff reservoir storage (carryover) with forecasts of spring and summer streamflow which are based 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 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 far more intuitive for most people and is totally 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.

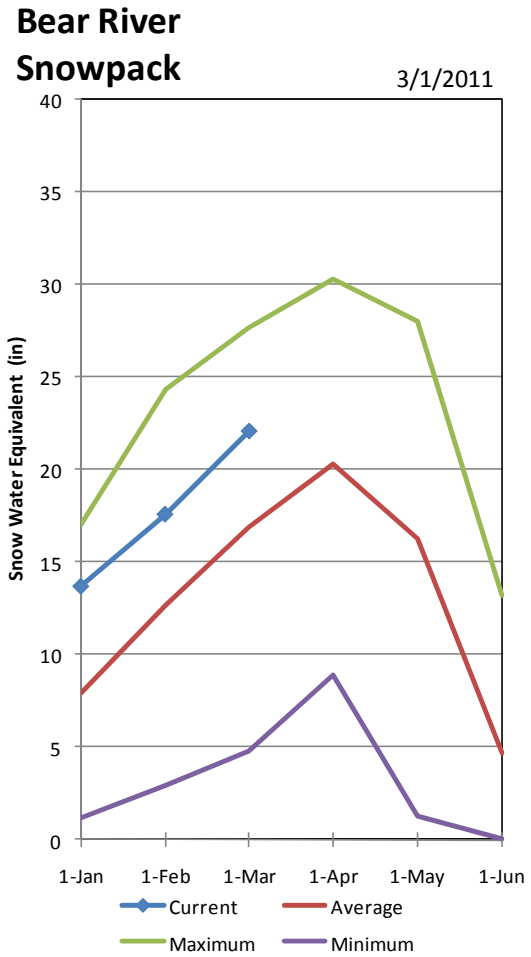
For more information on the SWSI go to: www.ut.nrcs.usda.gov/snow/ on the water supply page. The entire period of historical record for reservoir storage and streamflow is available.

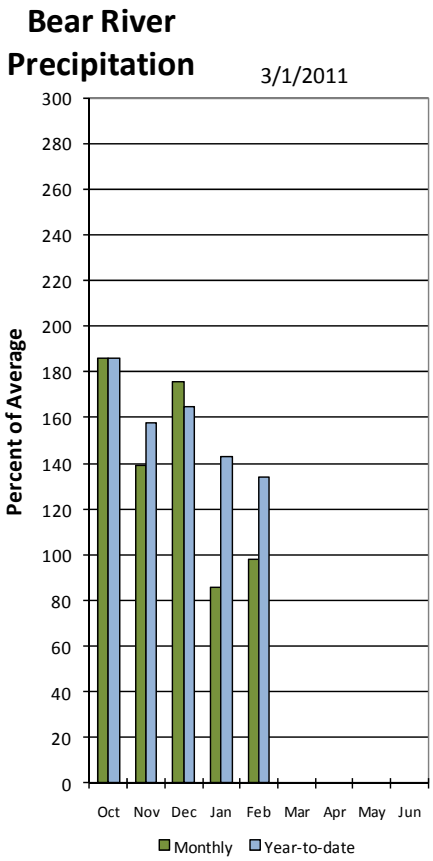
Bear River Basin
March 1, 2011

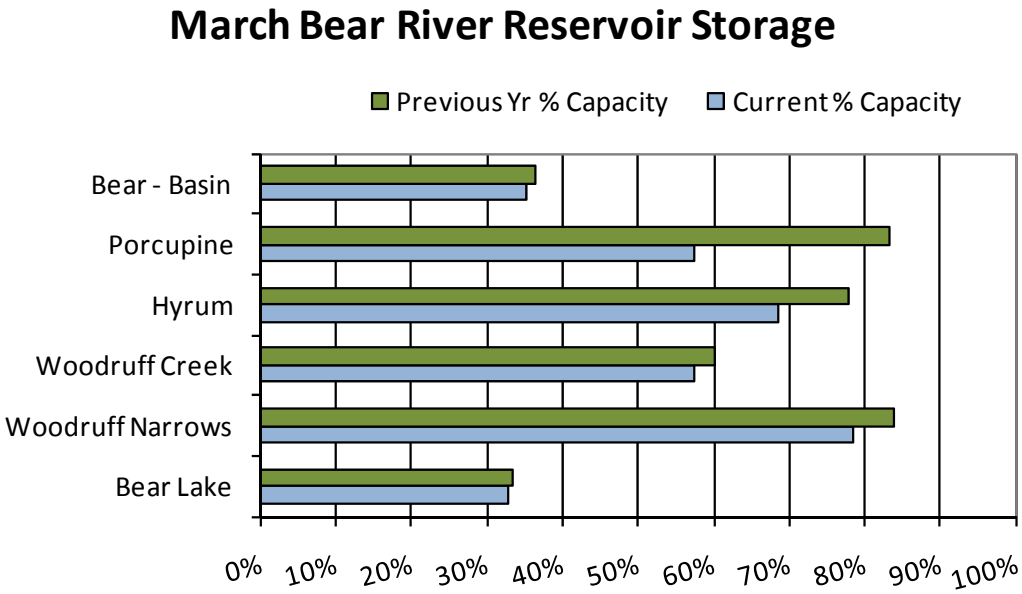
Snowpacks on the Bear River Basin are above average at 126% of normal, about 202% of last year. Individual sites range from 106% of average at Giveout Snotel to 165% at Trial Lake Snotel. February precipitation was average at 98%, which brings the seasonal accumulation (Oct-Feb) to 134% of average. Soil moisture levels in runoff producing areas are at 69% of saturation in the upper 2 feet of soil compared to 51% last year. Forecast streamflows (April-July) are much above average (126%-161%) volumes for this spring and summer. Reservoir storage is low at 35% of capacity, which is down 1% from this time last year. The Surface Water Supply Index is at 42% for the Bear River, in other words, 58% of years have had more total water available. Overall water supply conditions are average.



Percent saturation is calculated using the weighted average of volumetric soil moisture content at 2, 8, and 20-inch depths. Saturation is estimated as 40% volumetric water content. The gray area represents the range in saturation values since 2005.







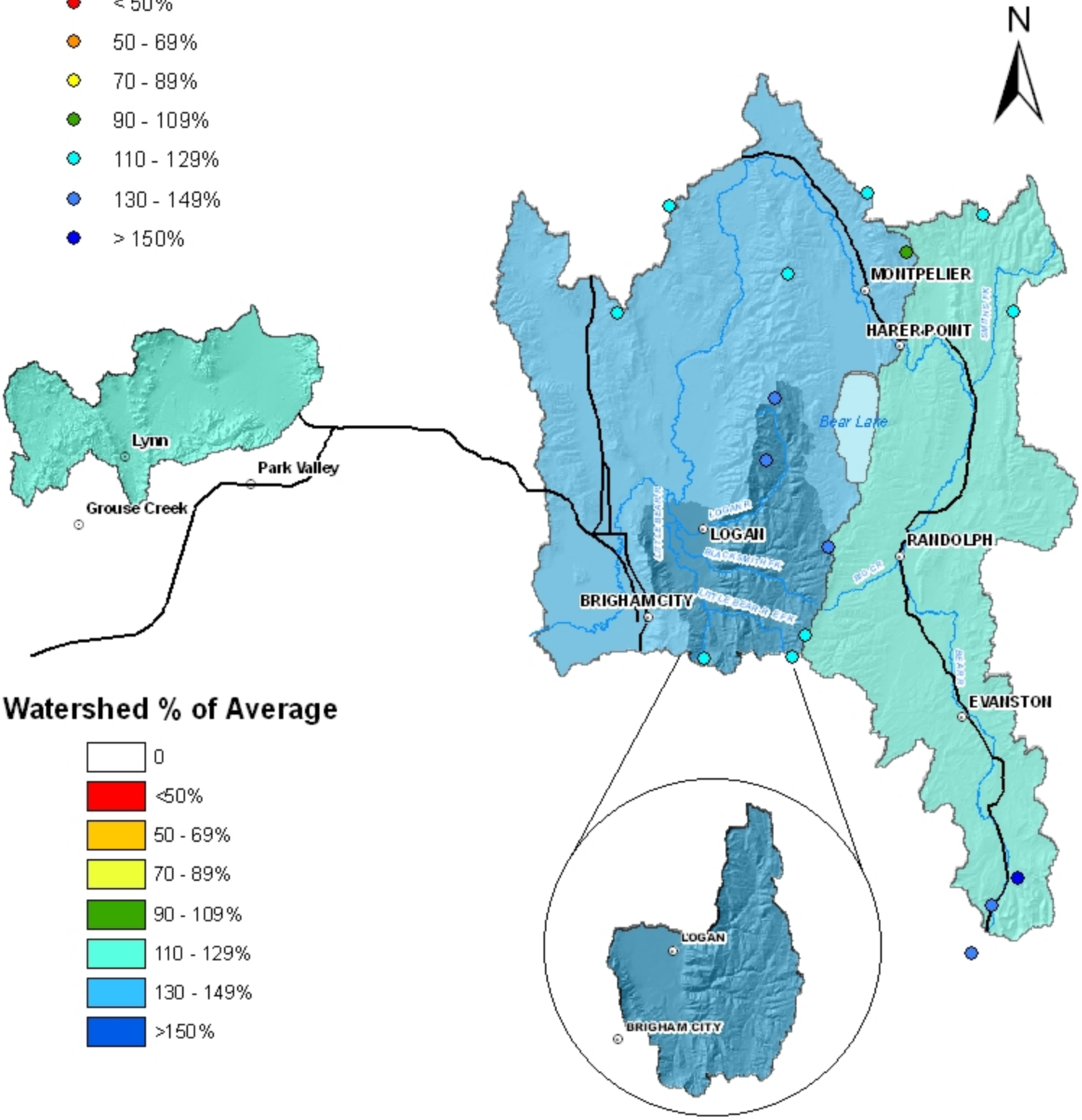
Bear River & Raft River Basins

Basinwide Average

127%

Snotel % of Average

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



Watershed % of Average

- 0
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >150%

Provisional Data Subject to Revision

0 5 10 20 30 40 50 Miles

BEAR RIVER BASIN
Streamflow Forecasts - March 1, 2011

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
Bear R nr UT-WY State Line	APR-JUL	128	147	160	142	173	192	113
Bear R abv Resv nr Woodruff	APR-JUL	138	166	185	136	205	230	136
Big Ck nr Randolph	APR-JUL	5.60	6.80	7.60	155	8.40	9.60	4.90
Smiths Fork nr Border	APR-JUL	103	119	130	126	141	157	103
Bear R bl Stewart Dam	APR-JUL	240	310	355	152	400	470	234
L Bear at Paradise	APR-JUL	46	59	68	148	77	90	46
Logan R nr Logan	APR-JUL	136	155	168	133	181	200	126
Blacksmith Fk nr Hyrum	APR-JUL	56	70	80	167	90	104	48
Dunn Ck nr Park Valley	APR-JUL	2.60	3.70	5.00	161	6.30	7.60	3.10

BEAR RIVER BASIN
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
BEAR LAKE	1302.0	426.7	434.5	---
HYRUM	15.3	10.5	11.9	11.0
PORCUPINE	11.3	6.5	9.4	5.6
WOODRUFF NARROWS	57.3	45.0	48.0	27.6
WOODRUFF CREEK	4.0	2.3	2.4	---

BEAR RIVER BASIN
Watershed Snowpack Analysis - March 1, 2011

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
BEAR RIVER, UPPER	8	221	130
BEAR RIVER, LOWER	9	199	124
LOGAN RIVER	4	198	135
RAFT RIVER	1	127	113
BEAR RIVER BASIN	17	208	127

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

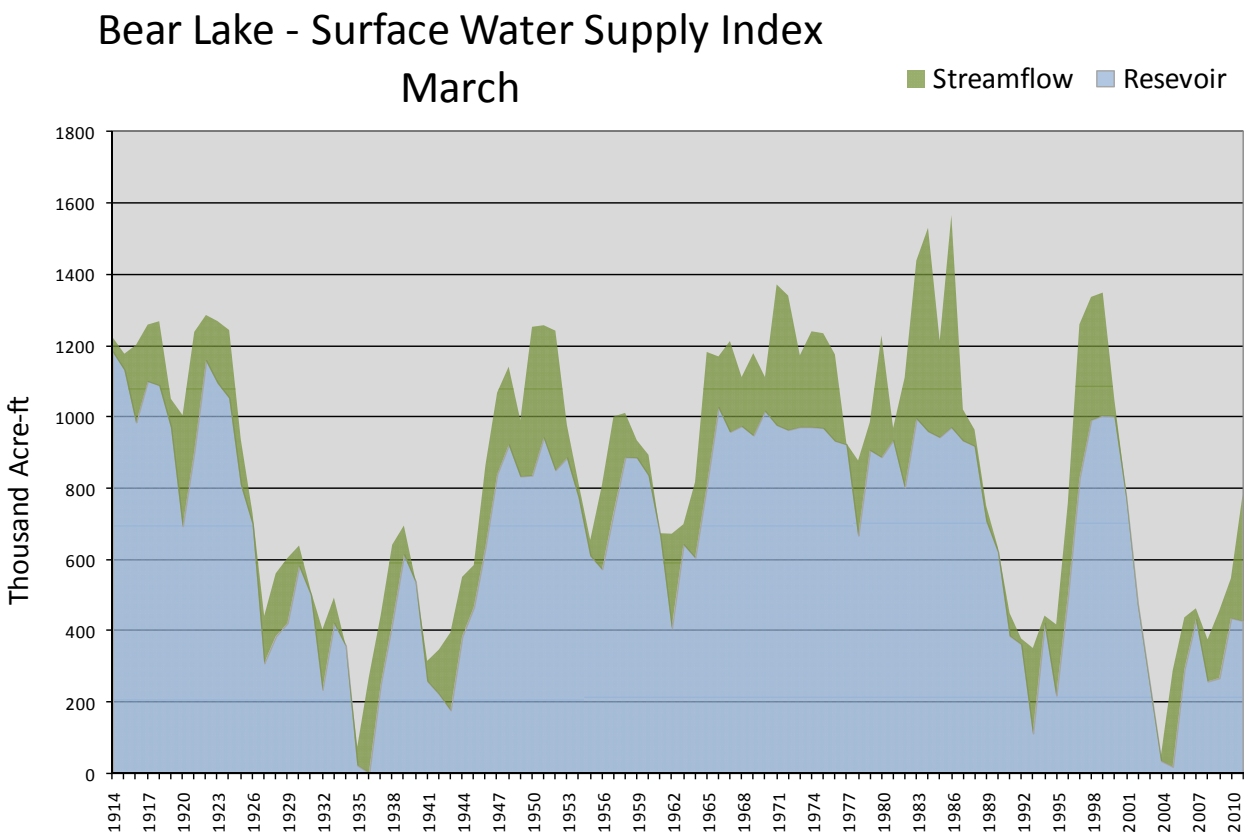
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.
(3) - Median value used in place of average.

March 1, 2011

Surface Water Supply Index

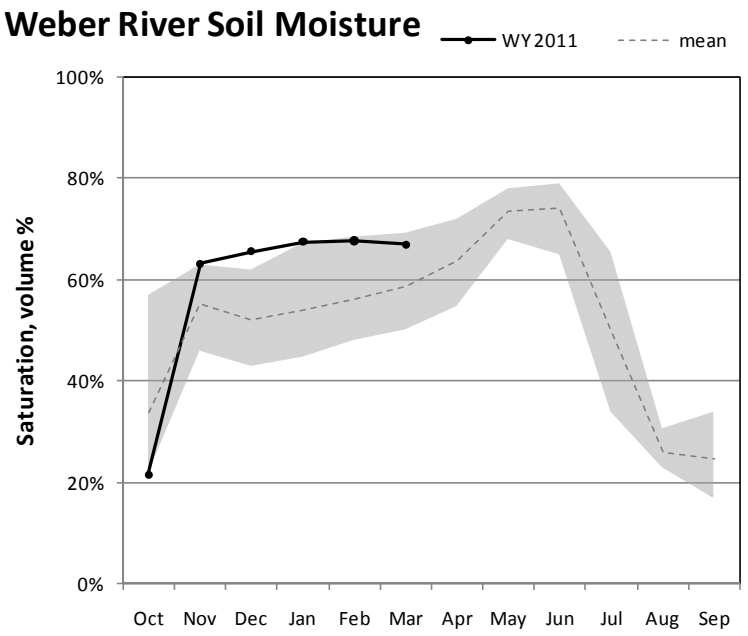
Basin or Region	February EOM* Bear Lake	April-July Forecast below Stewart Dam	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Bear River	**413**	**355**	**768**	**-0.63**	**42**	**56,89,96,01**

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



Weber and Ogden River Basins
March 1, 2011

Snowpacks on the Weber and Ogden Watersheds are average at 129%, about 205% of last year. Individual sites range from 113% of average at Parley's Canyon Snotel to 165% at Trial Lake Snotel. February precipitation was average at 105% bringing the seasonal accumulation (Oct-Feb) to 138% of average. Soil moisture levels in runoff producing areas are at 67% of saturation in the upper 2 feet of soil compared to 50% last year. Streamflow forecasts (April-July) range from 124% to 180% of average. Reservoir storage is at 72% of capacity, 2% lower than last year. The Surface Water Supply Index is at 91% for the Weber River and 74% for the Ogden River indicating that overall water supply conditions are above to much above average.



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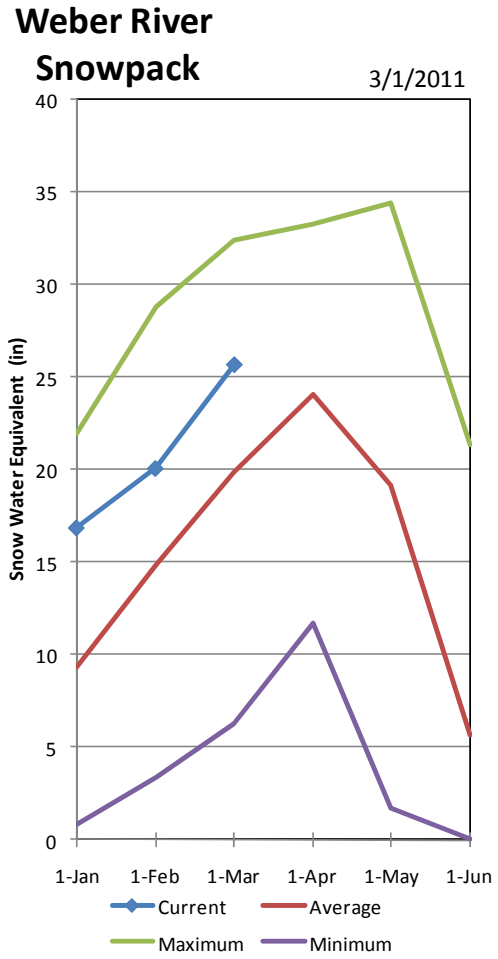
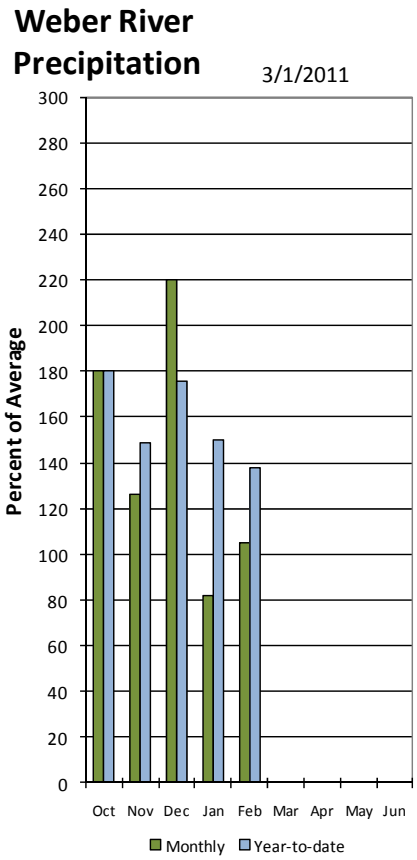
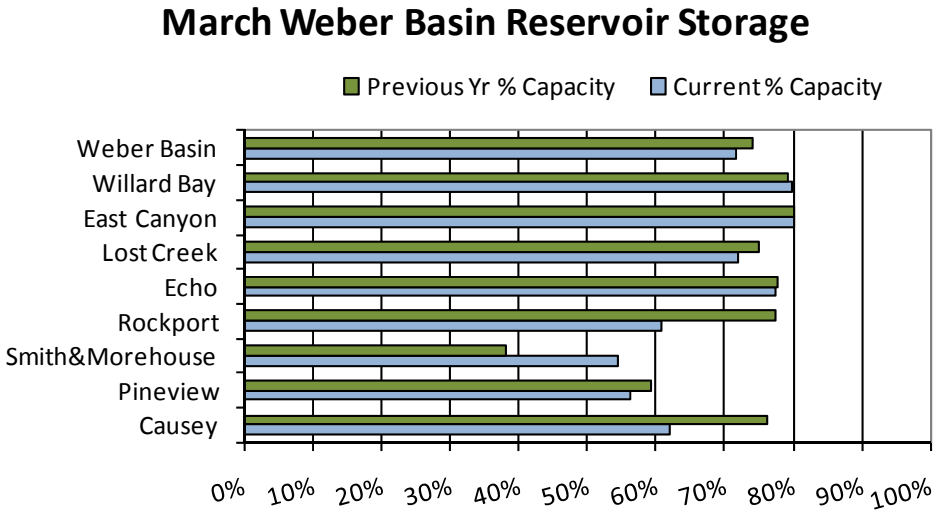






Weber & Ogden Basins

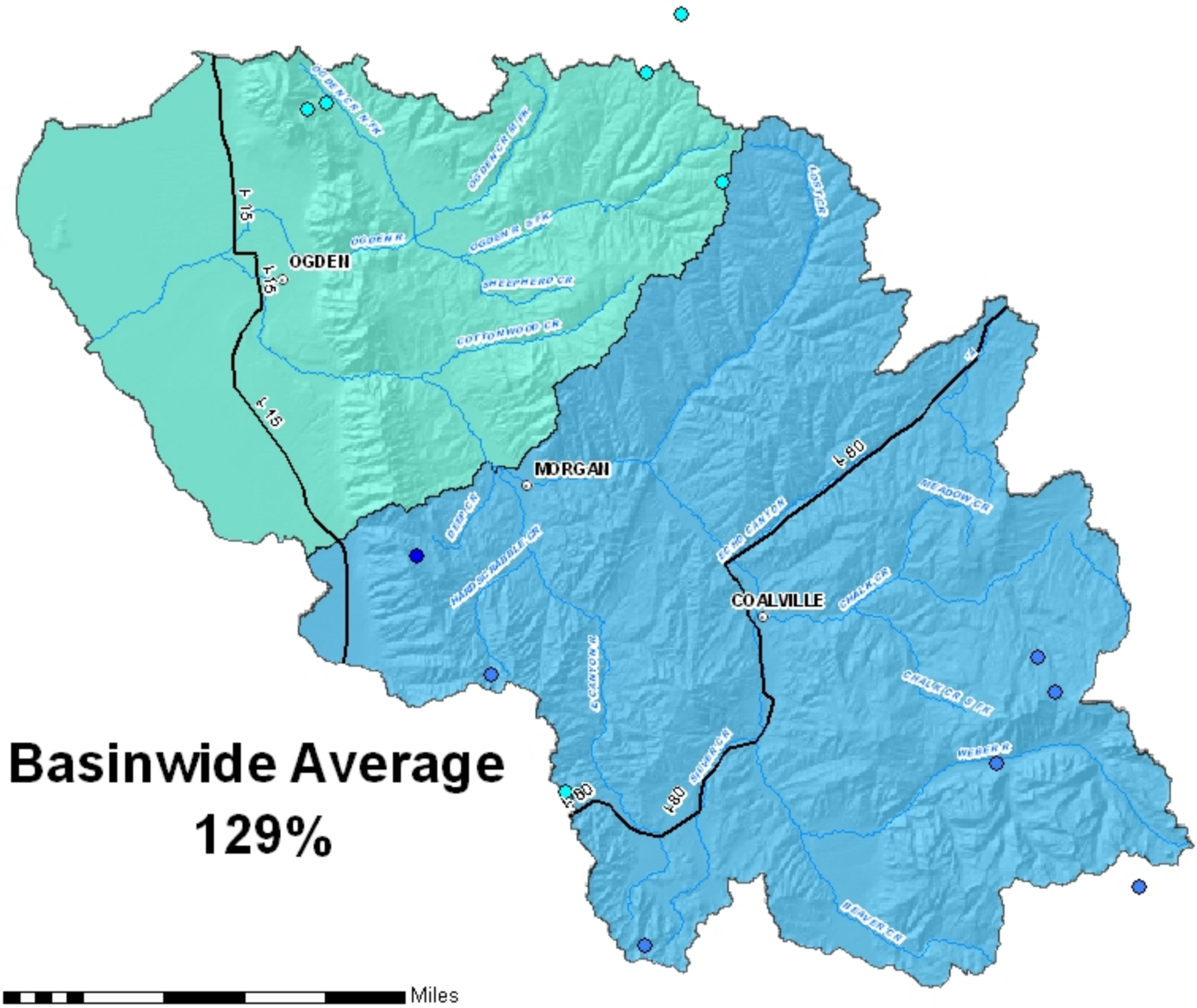
Watershed % of Average

- 0
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >150%

Snotel % of Average

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

N



Basinwide Average 129%

0 2.5 5 10 15 20 25 Miles

Provisional Data Subject to Revision

WEBER & OGDEN WATERSHEDS in Utah
Streamflow Forecasts - March 1, 2011

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
Smith & Morehouse Res Inflow	APR-JUL	34	39	42	124	45	50	34
Weber R nr Oakley	APR-JUL	142	159	170	138	181	198	123
Rockport Res	APR-JUL	151	173	188	140	205	225	134
Weber R nr Coalville	APR-JUL	160	187	205	150	225	250	137
Chalk Ck at Coalville	APR-JUL	47	59	68	151	77	89	45
Echo Res Inflow	APR-JUL	189	235	270	151	305	350	179
Lost Ck Resv Inflow	APR-JUL	15.7	20	23	131	26	30	17.6
East Canyon Ck nr Jeremy Ranch	APR-JUL	11.9	17.9	22	155	26	32	14.2
East Canyon Ck nr Morgan	APR-JUL	29	38	45	145	52	61	31
Weber R at Gateway	APR-JUL	345	465	550	155	635	755	355
SF Ogden R nr Huntsville	APR-JUL	67	79	88	138	97	109	64
Pineview Res Inflow	APR-JUL	126	158	180	135	200	235	133
Centerville Ck	APR-JUL	1.37	1.92	2.30	180	2.70	3.20	1.28
	APR-JUL	1.37	1.92	2.30	180	2.70	3.20	1.28

WEBER & OGDEN WATERSHEDS in Utah
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
CAUSEY	7.1	4.4	5.4	2.6
EAST CANYON	49.5	39.7	39.6	35.4
ECHO	73.9	57.1	57.4	51.0
LOST CREEK	22.5	16.2	16.9	13.9
PINEVIEW	110.1	62.0	65.4	52.6
ROCKPORT	60.9	37.1	47.1	33.2
WILLARD BAY	215.0	171.6	170.3	154.9

WEBER & OGDEN WATERSHEDS in Utah
Watershed Snowpack Analysis - March 1, 2011

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
OGDEN RIVER	4	192	118
WEBER RIVER	9	205	136
WEBER & OGDEN WATERSHEDS	13	200	129

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

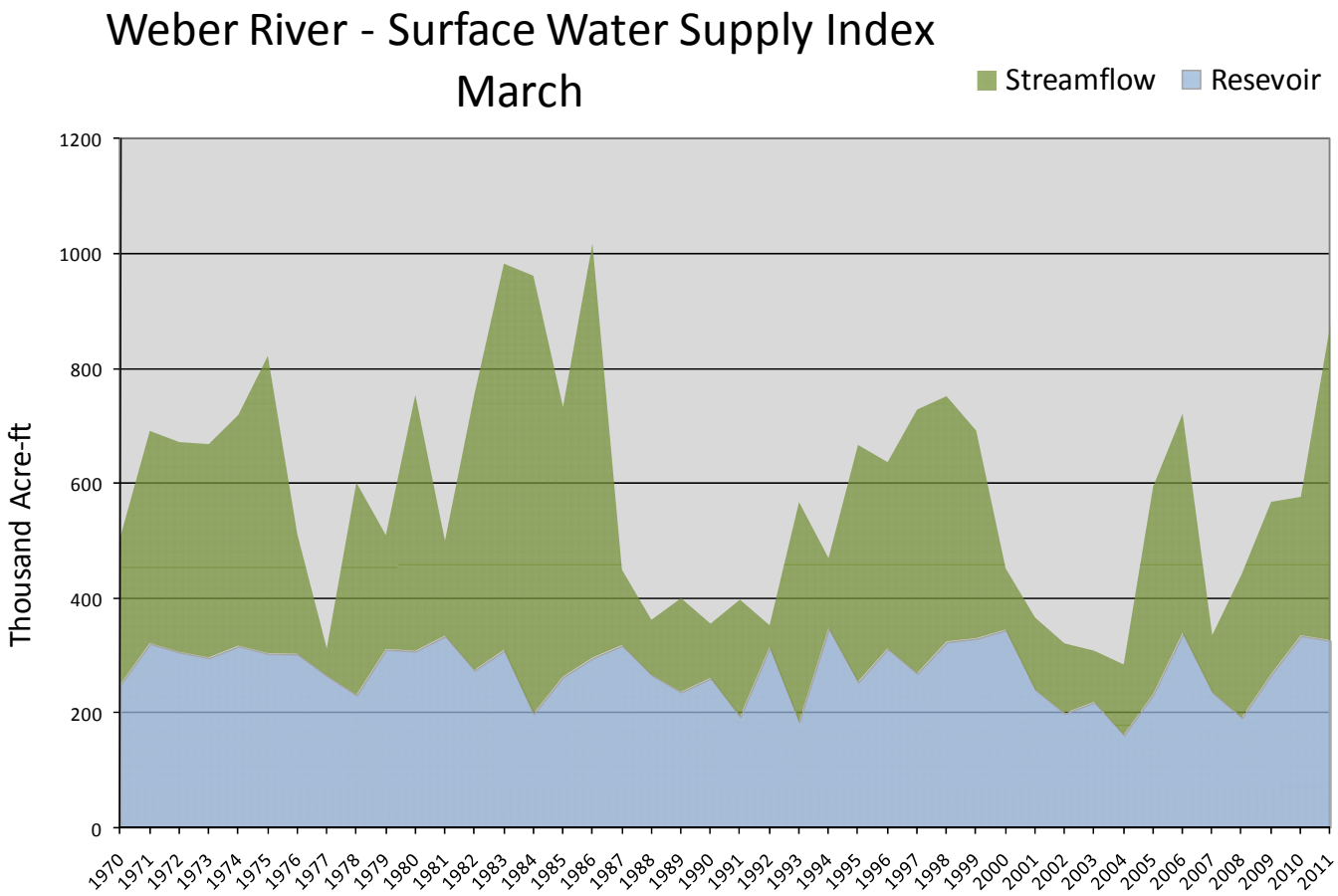
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.
(3) - Median value used in place of average.

March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Reservoirs	April-July Forecast Weber River at Gateway	Reservoirs + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Weber River	**326**	**550**	**876**	**3.39**	**91**	**75,82,83,84**

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

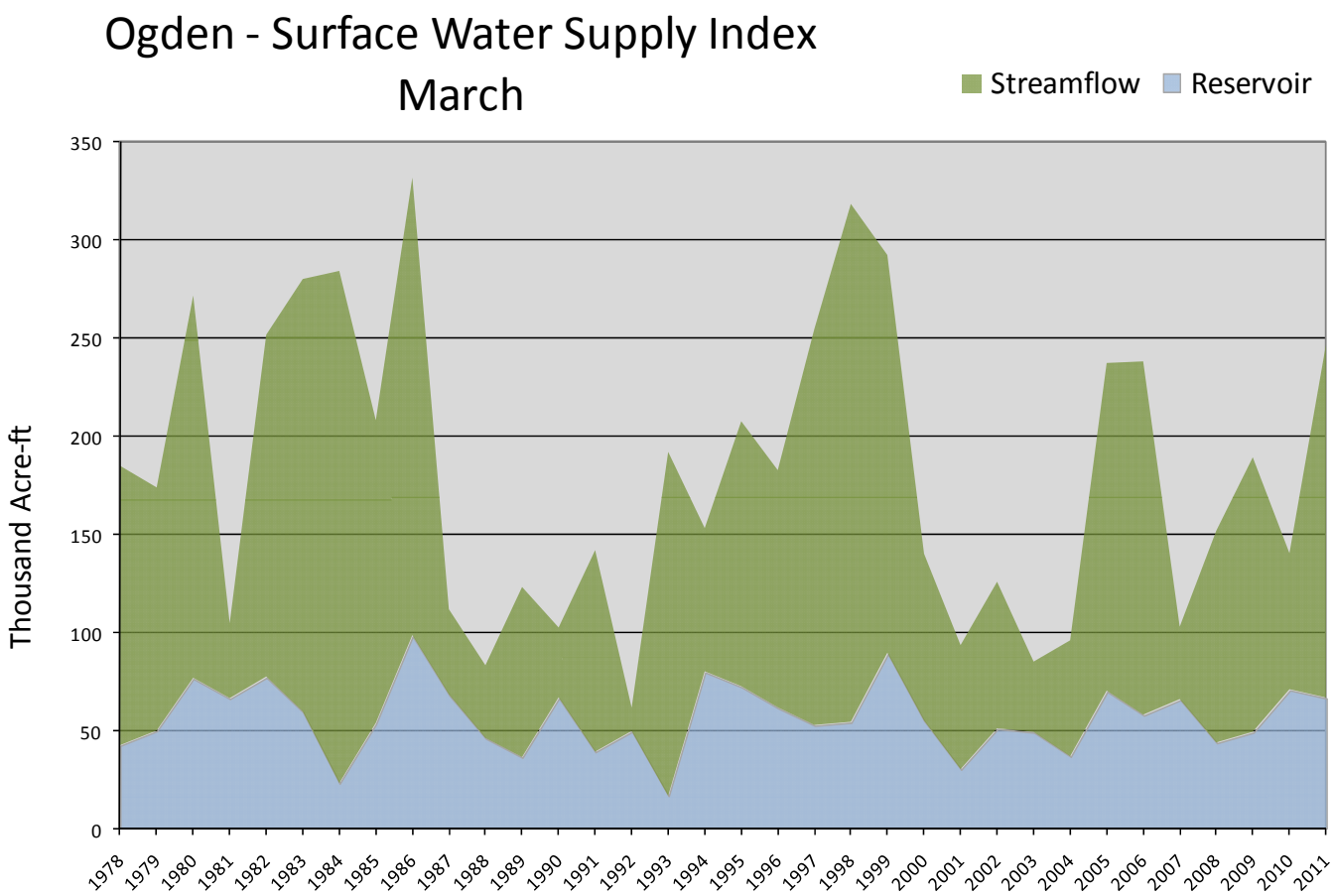


March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Pine View & Causey	April-July Forecast Pineview Reservoir Inflow	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Ogden River	**67**	**180**	**247**	**2.02**	**74**	**82,95,05,06**

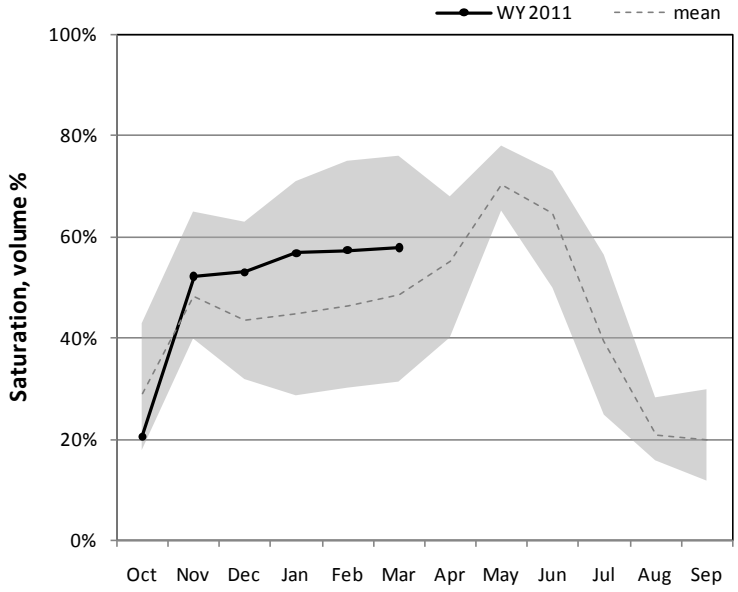
**EOM, end of month; # SWSI, Surface Water Supply Index; ^KAF, thousand acre-feet.*



Utah Lake, Jordan River & Tooele Valley Basins
March 1, 2011

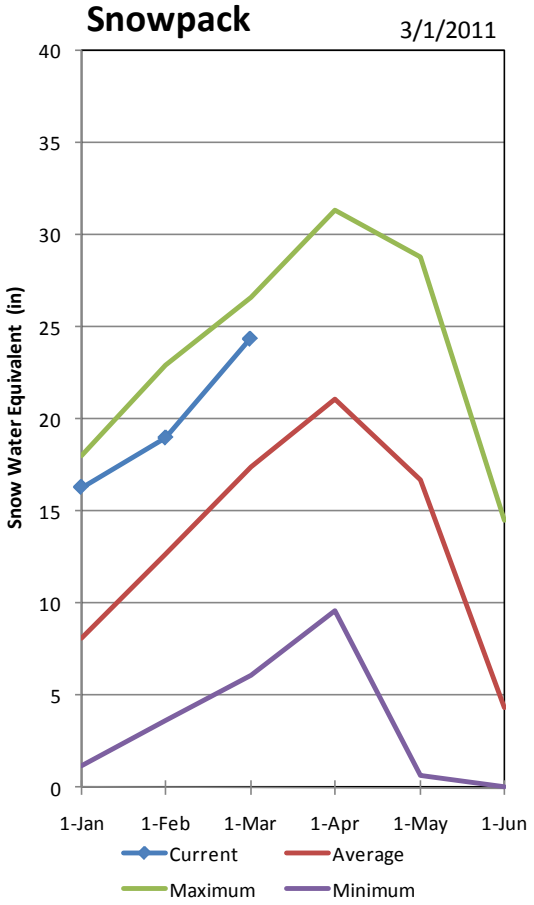
Snowpack over these basins are much above average at 131%, which is 187% of last year. Individual sites range from 90% at Hidden Springs snow course to 179% of average at Timpanogos Divide Snotel. February precipitation was above average at 110%, bringing the seasonal accumulation (Oct-Feb) to 144% of average. Average soil moisture in runoff producing areas is estimated at 58% of saturation in the upper 2 feet of soil compared to 32% at this time last year. Reservoir storage is at 91% of capacity, 1% higher than last year. Streamflow forecasts (Apr-July) range from 121% to 166% of average. The Surface Water Supply Index below Deer Creek reservoir is 85%, indicating general water supply conditions are much above average.

Jordan / Provo River Soil Moisture

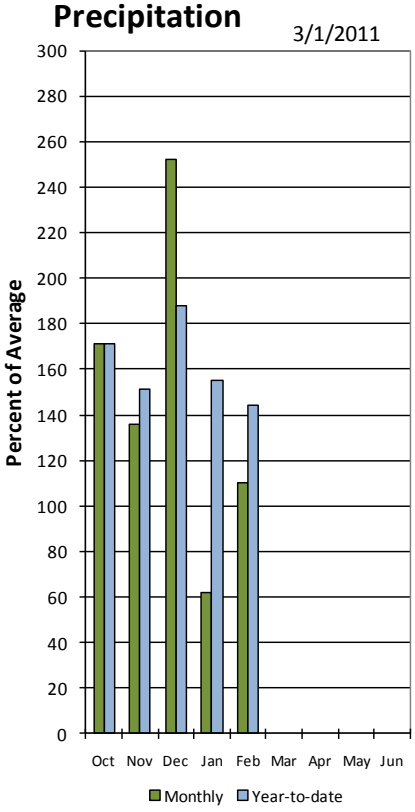


Percent saturation is calculated using the weighted average of volumetric soil moisture content at 2, 8, and 20-inch depths. Saturation is estimated as 40% volumetric water content. The gray area represents the range in saturation values since 2005.

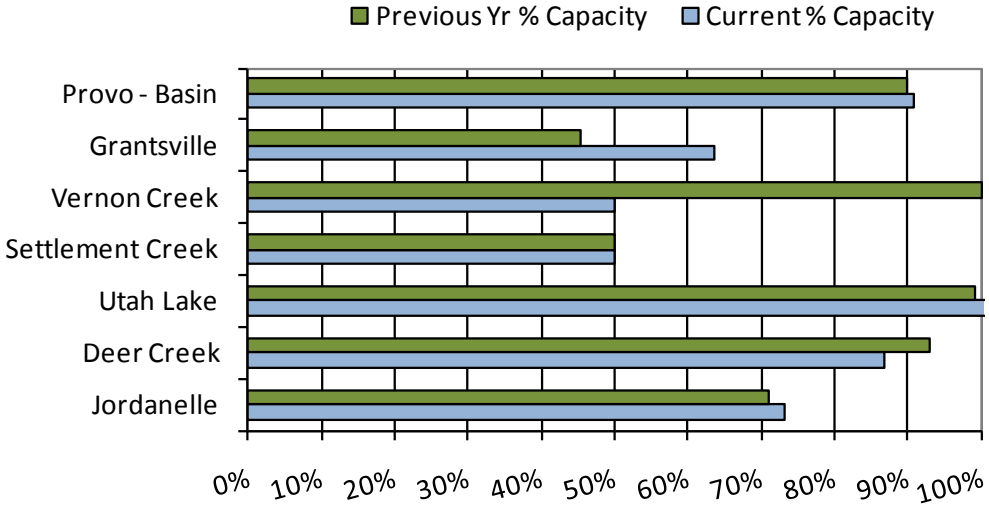
Jordan/Provo River Snowpack



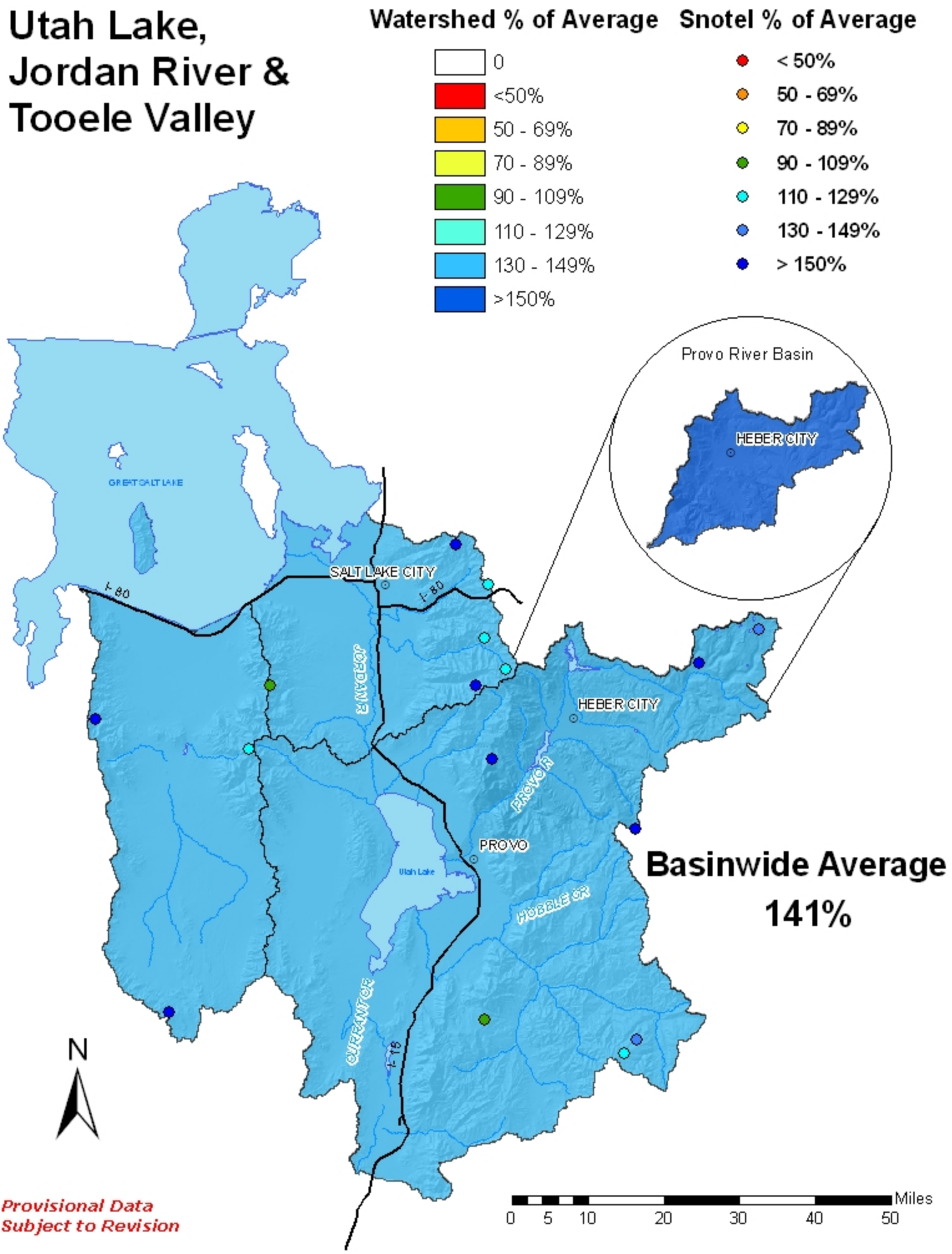
Jordan/Provo River Precipitation



March Provo River Reservoir Storage



Utah Lake, Jordan River & Tooele Valley



UTAH LAKE, JORDAN RIVER & TOOELE VALLEY
Streamflow Forecasts - March 1, 2011

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
Salt Ck at Nephi	APR-JUL	6.60	11.60	15.00	160	18.40	23.00	9.40
Spanish Fk at Castilla	APR-JUL	34	85	120	156	155	205	77
Provo River nr Woodland	APR-JUL	100	126	145	141	166	199	103
Provo River nr Hailstone	APR-JUL	105	133	155	142	178	215	109
Provo R bl Deer Ck Dam	APR-JUL	152	175	190	151	205	230	126
American Fk ab Upper Powerplant	APR-JUL	35	43	48	150	53	61	32
Utah Lake Inflow	APR-JUL	30	360	540	166	720	1150	325
W Canyon Ck nr Cedar Fort	APR-JUL	2.20	2.80	3.20	133	3.60	4.20	2.40
L Cottonwood Ck nr SLC	APR-JUL	37	44	49	123	54	63	40
Big Cottonwood Ck nr SLC	APR-JUL	34	41	46	121	51	58	38
Mill Ck nr SLC	APR-JUL	4.80	7.00	8.50	121	10.00	12.20	7.00
Parley's Ck nr SLC	APR-JUL	12.3	17.5	21	126	25	30	16.7
Dell Fk nr SLC	APR-JUL	1.71	5.60	8.20	121	10.80	14.70	6.80
Emigration Ck nr SLC	APR-JUL	2.70	4.70	6.00	133	7.30	9.30	4.50
City Ck nr SLC	APR-JUL	8.60	11.20	13.00	149	14.80	17.40	8.70
Vernon Ck nr Vernon	APR-JUL	0.92	1.62	2.10	142	2.60	3.30	1.48
Settlement Ck nr Tooele	APR-JUL	1.32	2.40	3.20	152	4.00	5.10	2.10
S Willow Ck nr Grantsville	APR-JUL	3.10	4.00	4.60	142	5.20	6.10	3.23

UTAH LAKE, JORDAN RIVER & TOOELE VALLEY
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
DEER CREEK	149.7	129.8	139.2	107.4
GRANTSVILLE	3.3	2.1	1.5	2.2
SETTLEMENT CREEK	1.0	0.5	0.5	0.6
STRAWBERRY-ENLARGED	1105.9	977.0	974.4	637.8
UTAH LAKE	870.9	885.0	862.9	825.1
VERNON CREEK	0.6	0.3	0.6	---

UTAH LAKE, JORDAN RIVER & TOOELE VALLEY
Watershed Snowpack Analysis - March 1, 2011

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
PROVO RIVER & UTAH LAKE	7	218	143
PROVO RIVER	4	232	161
JORDAN RIVER & GSL	6	192	136
TOOELE & RUSH VALLEY WATE	3	211	146
UTAH LAKE/JORDAN R./TOOEL	16	205	141

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

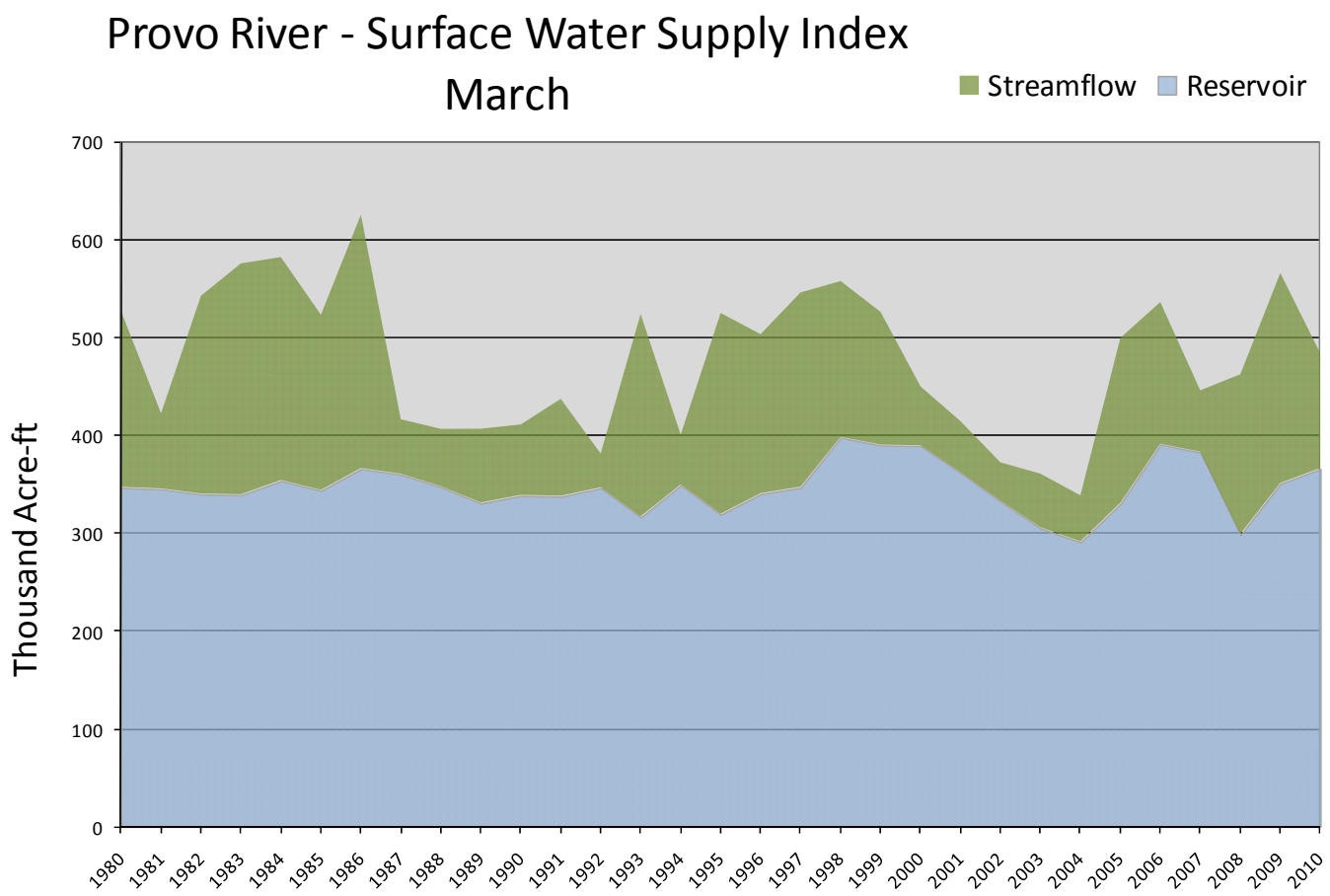
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.
(3) - Median value used in place of average.

March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Deer Creek, Jordanelle	April - July Forecast Provo River below Deer Creek	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Provo	**364**	**190**	**554**	**2.90**	**85**	**83, 98, 97, 82**

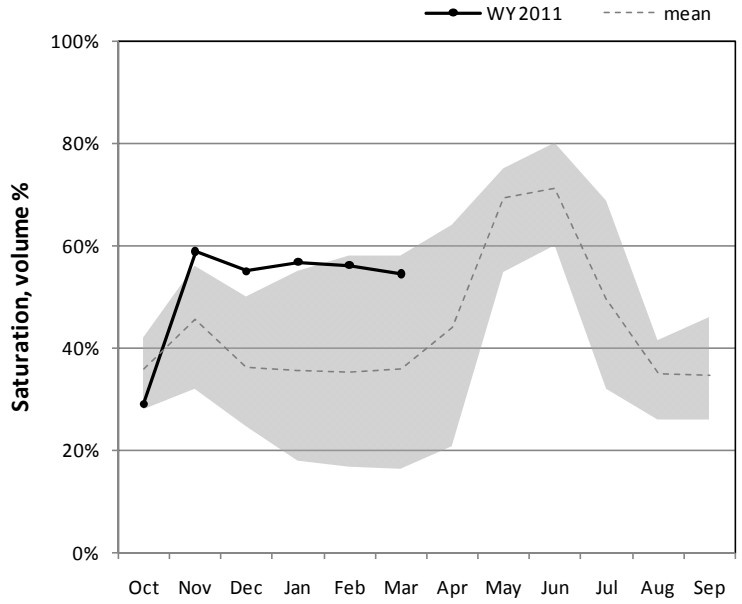
**EOM, end of month; # SWSI, Surface Water Supply Index; ^KAF, thousand acre-feet.*



Uintah Basin and Dagget SCDs
March 1, 2011

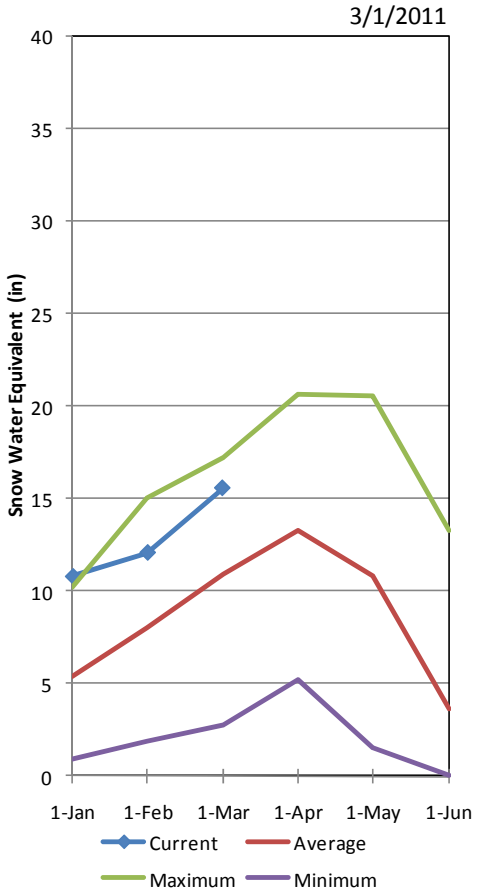
Snowpack across the Uintas is much above average at 143% which is 201% of last year. Percent of average snowpack for individual sites range from 100% to 142% on the North Slope and from 125% to 174% on the South Slope. Precipitation during February was above average at 124% bringing the seasonal accumulation (Oct-Feb) to 153%. Soil moisture values in runoff producing area are at 55% of saturation in the upper 2 feet of soil compared to 16% last year. Reservoir storage is at 85% of capacity, at the same capacity as last year. Streamflow forecasts (April-July) range from 102% to 181% of average. The Surface Water Supply Index for the western area is 88% and for the eastern area it is 70% indicating much above normal conditions on the west side and eastern area. General water supply conditions are much above average.

Uintah Basin Soil Moisture

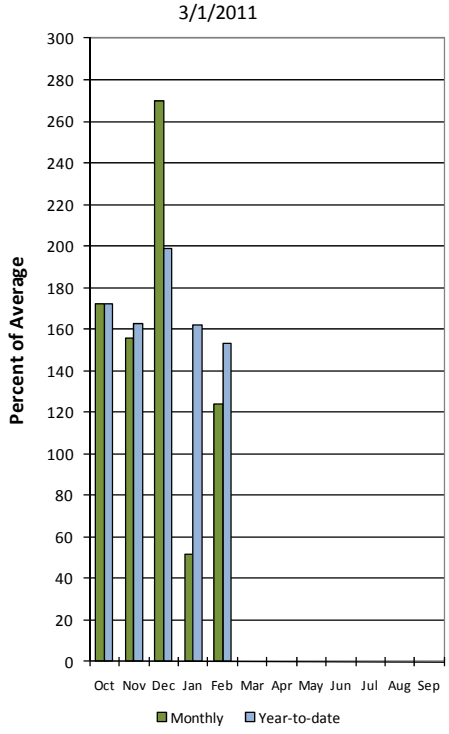


Percent saturation is calculated using the weighted average of volumetric soil moisture content at 2, 8, and 20-inch depths. Saturation is estimated as 40% volumetric water content. The gray area represents the range in saturation values since 2005.

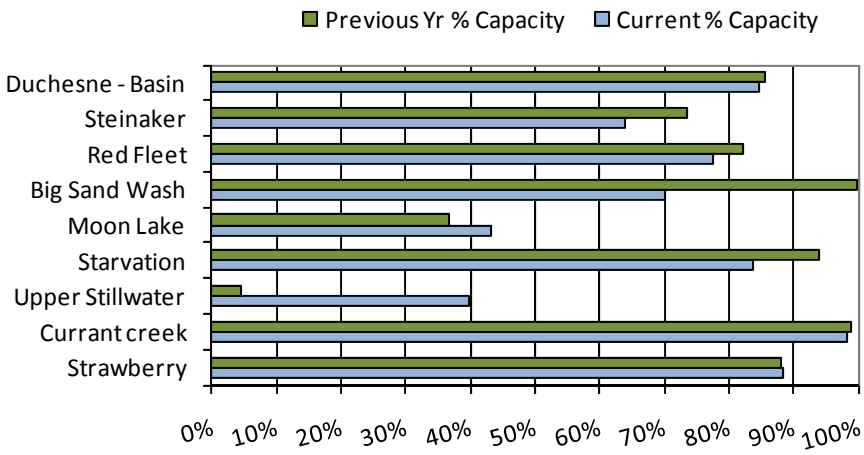
Uinta Snowpack



Uintah Precipitation



March Uintah Basin Reservoir Storage



Uintah Basin & Dagget SCD's

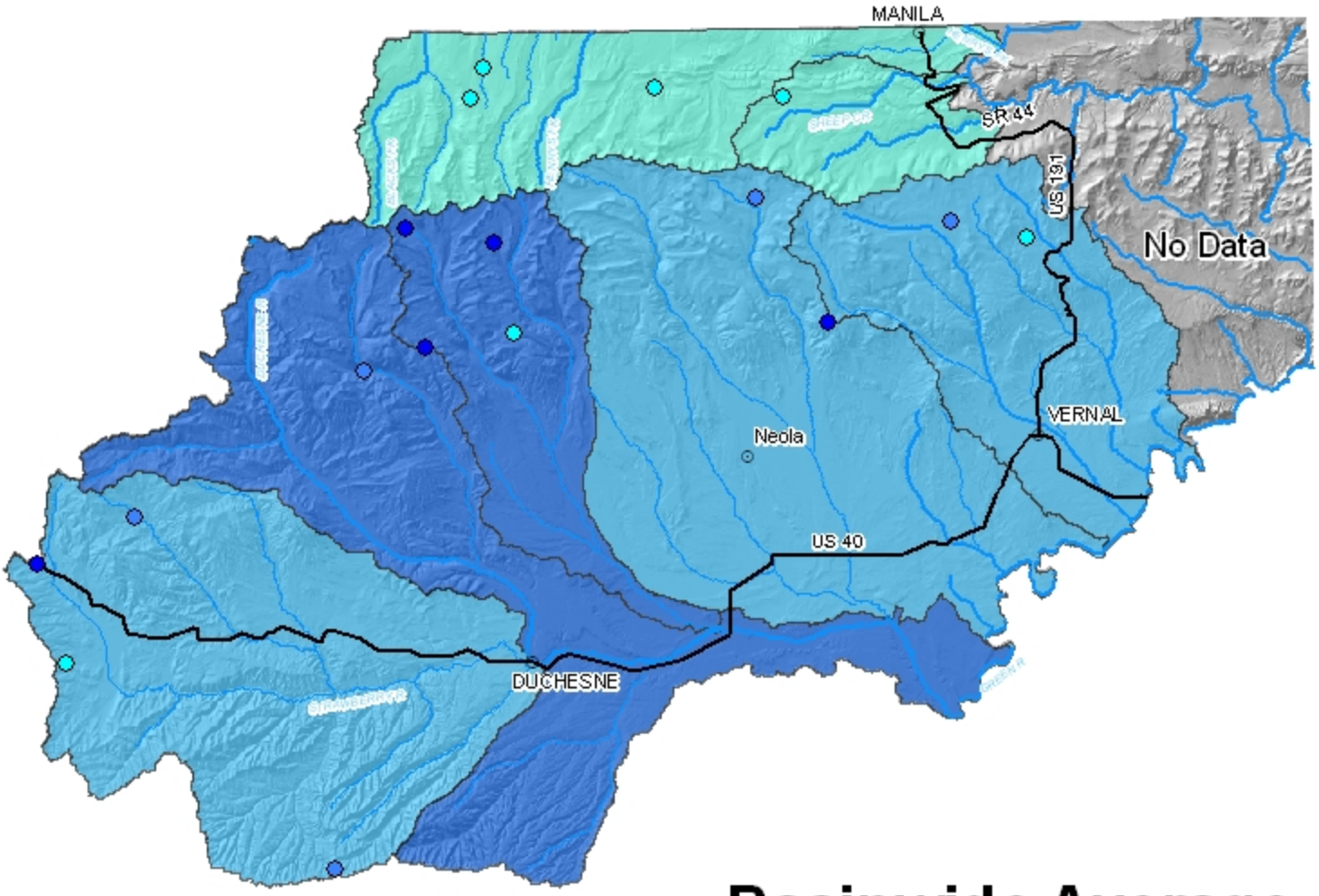
Watershed % of Average

- 0
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >150%

Snotel % of Average

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

N



Basinwide Average 143%

Provisional Data Subject to Revision

0 5 10 20 30 40 50 Miles

UINTAH BASIN & DAGGET SCD'S
Streamflow Forecasts - March 1, 2011

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
Blacks Fk nr Robertson	APR-JUL	79	97	110	116	124	146	95
EF of Smiths Fork nr Robertson (2)	APR-JUL	25	31	36	124	41	49	29
Flaming Gorge Reservoir Inflow (2)	APR-JUL	795	1030	1210	102	1400	1710	1190
Big Brush Ck ab Red Fleet Reservoir	APR-JUL	17.0	22	25	119	29	35	21
Ashley Ck nr Vernal	APR-JUL	39	51	60	115	70	85	52
WF Duchesne R at VAT Diversion	APR-JUL	22	28	32	171	36	43	18.7
Duchesne R nr Tabiona (2)	APR-JUL	115	132	150	143	169	198	105
Upper Stillwater Reservoir Inflow (2	APR-JUL	95	107	115	140	124	137	82
Rock Ck nr Mountain Home (2)	APR-JUL	100	115	125	140	136	152	89
Duchesne R ab Knight Diversion (2)	APR-JUL	198	235	260	138	290	330	188
Strawberry R nr Soldier Springs (2)	APR-JUL	63	84	100	170	117	145	59
Currant Ck Reservoir Inflow (2)	APR-JUL	25	34	40	160	47	58	25
Strawberry R nr Duchesne (2)	APR-JUL	132	171	200	165	230	285	121
Lake Fork R ab Moon Lake Reservoir	APR-JUL	79	91	100	147	109	123	68
Yellowstone R nr Altonah	APR-JUL	73	86	96	155	106	122	62
Duchesne R at Myton (2)	APR-JUL	285	390	470	181	555	700	260
Uinta R bl Powerplant Diversion nr N	APR-JUL	70	93	112	142	132	155	79
Whiterocks R nr Whiterocks	APR-JUL	51	65	75	134	86	104	56
Duchesne R nr Randlett (2)	APR-JUL	350	475	590	182	720	870	324

UINTAH BASIN & DAGGET SCD'S
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
FLAMING GORGE	3749.0	3104.0	3181.0	2919.0
MOON LAKE	49.5	15.5	13.1	29.8
RED FLEET	25.7	19.9	21.1	18.4
STEINAKER	33.4	21.3	24.5	22.8
STARVATION	165.3	138.1	155.1	135.9
STRAWBERRY-ENLARGED	1105.9	977.0	974.4	637.8

UINTAH BASIN & DAGGET SCD'S
Watershed Snowpack Analysis - March 1, 2011

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
UPPER GREEN RIVER in UTAH	6	160	120
ASHLEY CREEK	2	150	133
BLACK'S FORK RIVER	2	181	114
SHEEP CREEK	1	149	112
DUCHESNE RIVER	11	218	151
LAKE FORK-YELLOWSTONE CRE	4	227	161
STRAWBERRY RIVER	4	231	144
UINTAH-WHITEROCKS RIVERS	2	183	143
UINTAH BASIN & DAGGET SCD	17	199	143

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

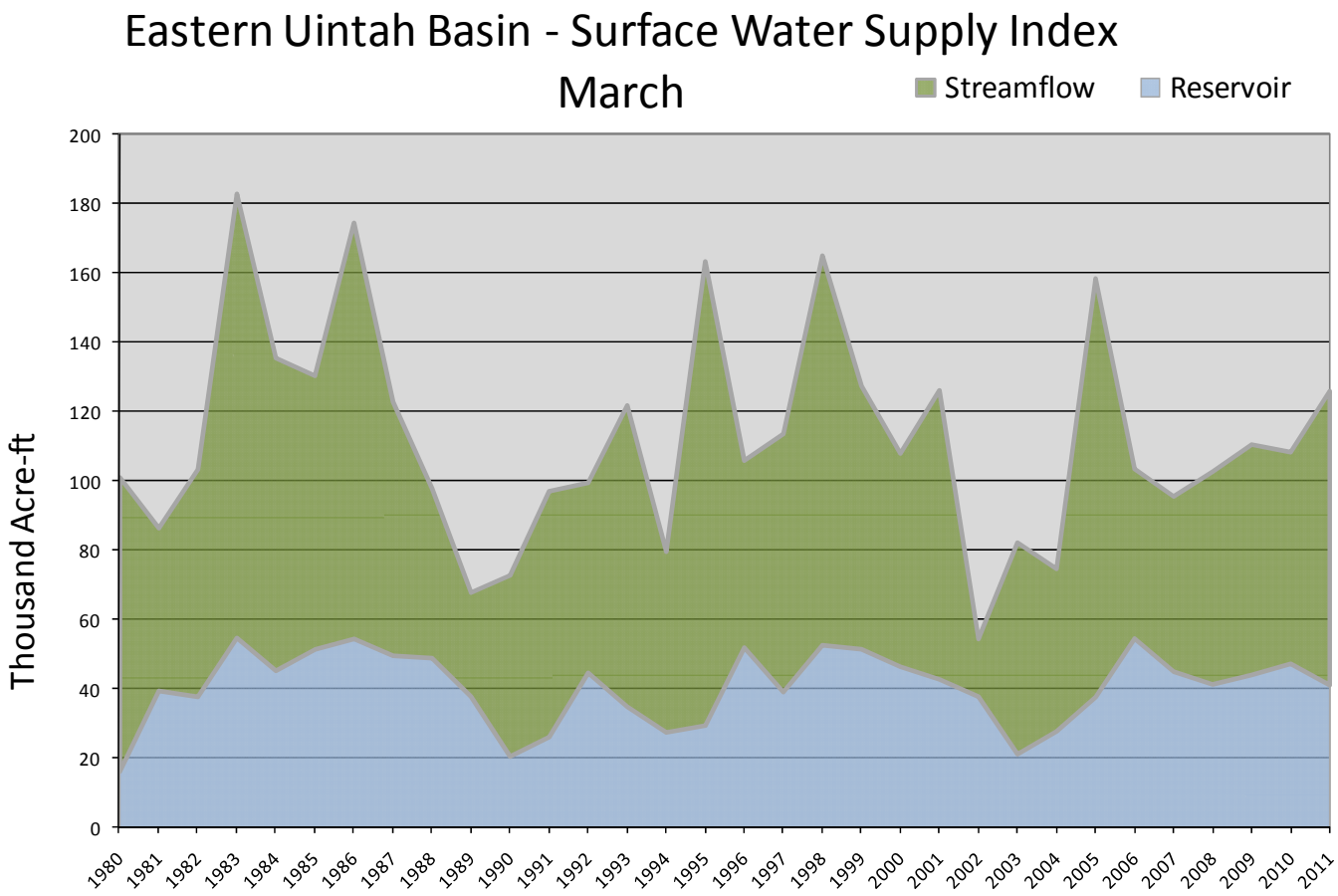
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.
(3) - Median value used in place of average.

March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Red Fleet & Steinaker	April-July Forecast Big Brush & Ashley Creek	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Eastern Uintah	**41.2**	**85.0**	**126**	**1.64**	**70**	**93, 87, 01, 99**

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

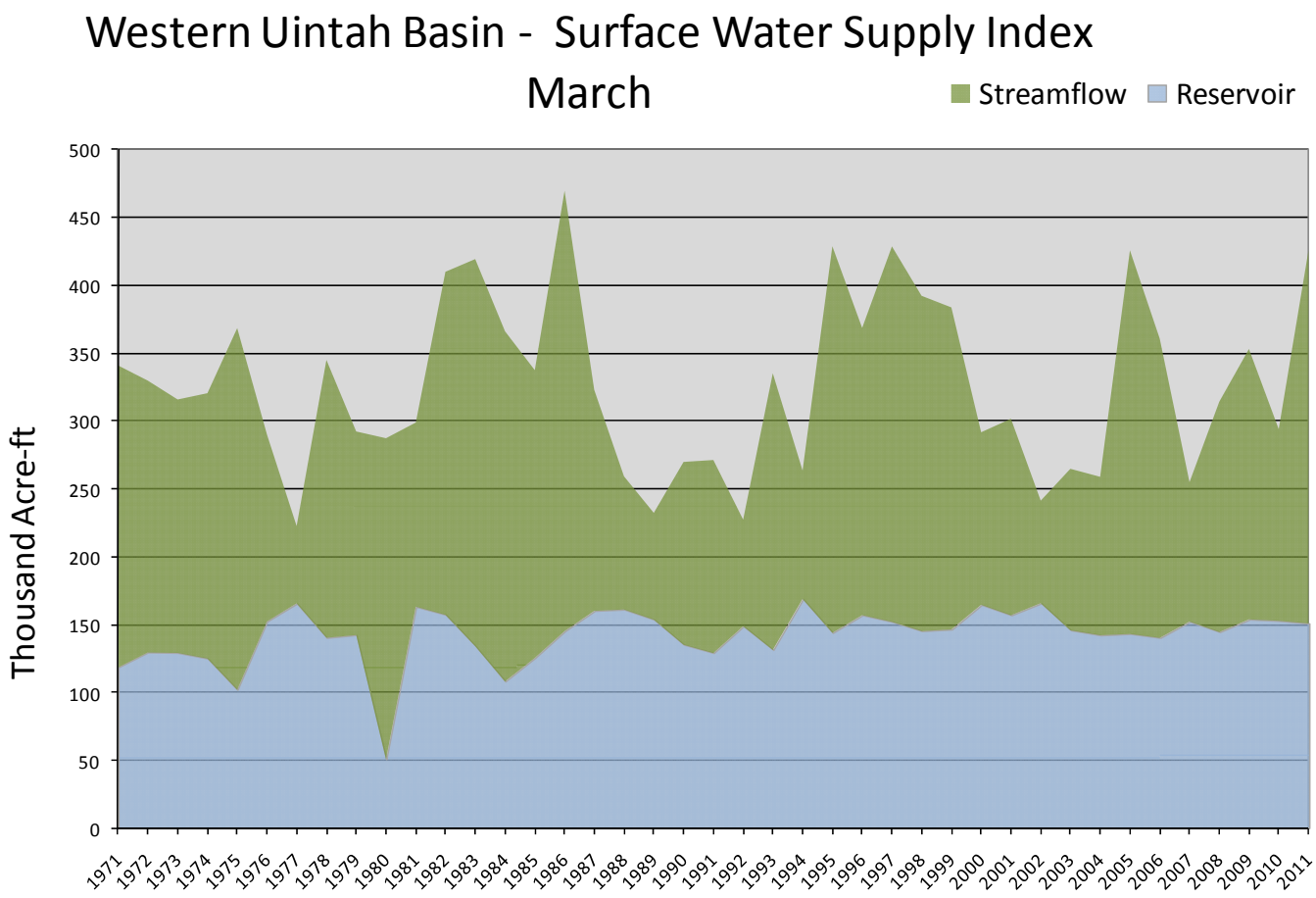


March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Starvation & Upper Stillwater	April-July Forecast Rock Creek & Duchesne River	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Western Uintah	**151**	**275**	**426**	**3.17**	**88**	**83, 87, 05, 97**

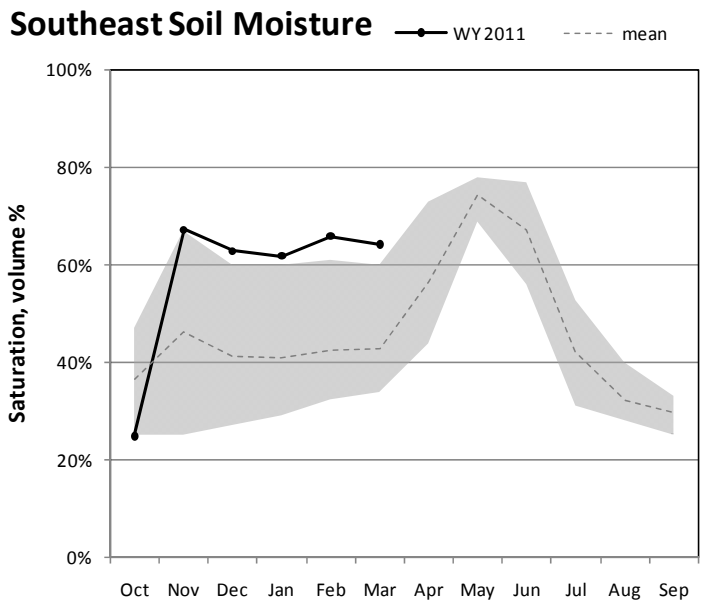
**EOM, end of month; # SWSI, Surface Water Supply Index; ^KAF, thousand acre-feet.*



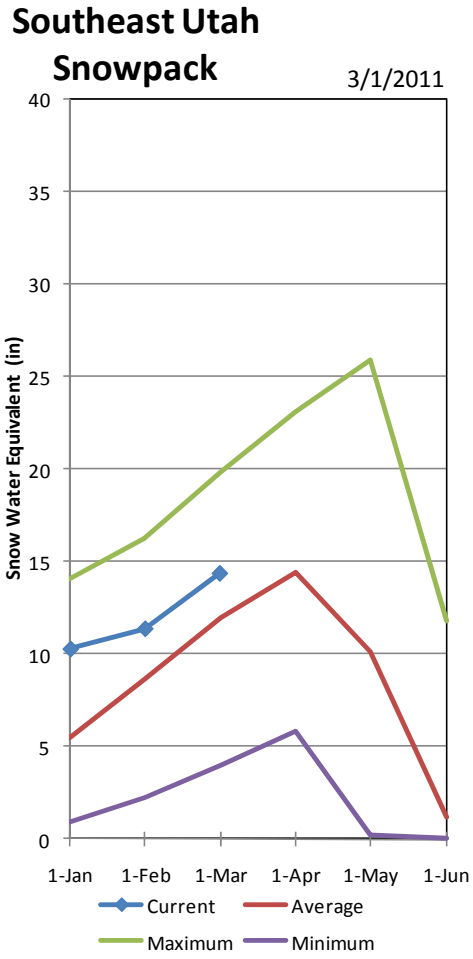
Southeast - Carbon, Emery, Wayne, Grand and San Juan Counties

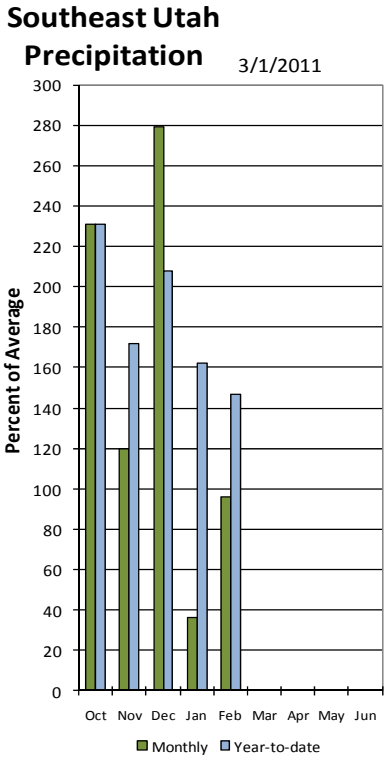
March 1, 2011

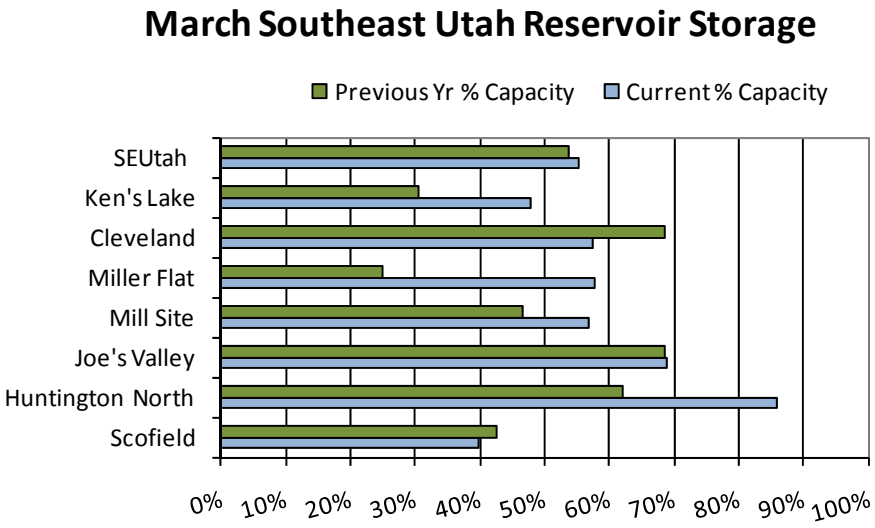
Snowpacks in this region are much above normal at 137% of average, about 121% of last year. Percent of average snowpack for individual sites range from 69% at Lasal Mountain Lower to 168% at East Willow Creek Snotel. Precipitation during February was average at 96%, bringing the seasonal accumulation (Oct-Feb) to 147% of normal. Soil moisture estimates in runoff producing areas are at 64% of saturation in the upper 2 feet of soil, compared to 34% last year at this time. Forecast streamflows (April-July) range from 96% to 151% of average. Reservoir storage is at 55% of capacity, 1% higher than last year at this time. Surface Water Supply Indices for the area are: Price 55%, Joe's Valley 79%, Ferron Creek 80%, and Moab 64%. General runoff and water supply conditions are much above average in Joe's Valley and Ferron Creek areas, average in the Price area, and above average for the Moab area.



Percent saturation is calculated using the weighted average of volumetric soil moisture content at 2, 8, and 20-inch depths. Saturation is estimated as 40% volumetric water content. The gray area represents the range in saturation values since 2005.







Carbon, Emery, Wayne Grand & San Juan Basins

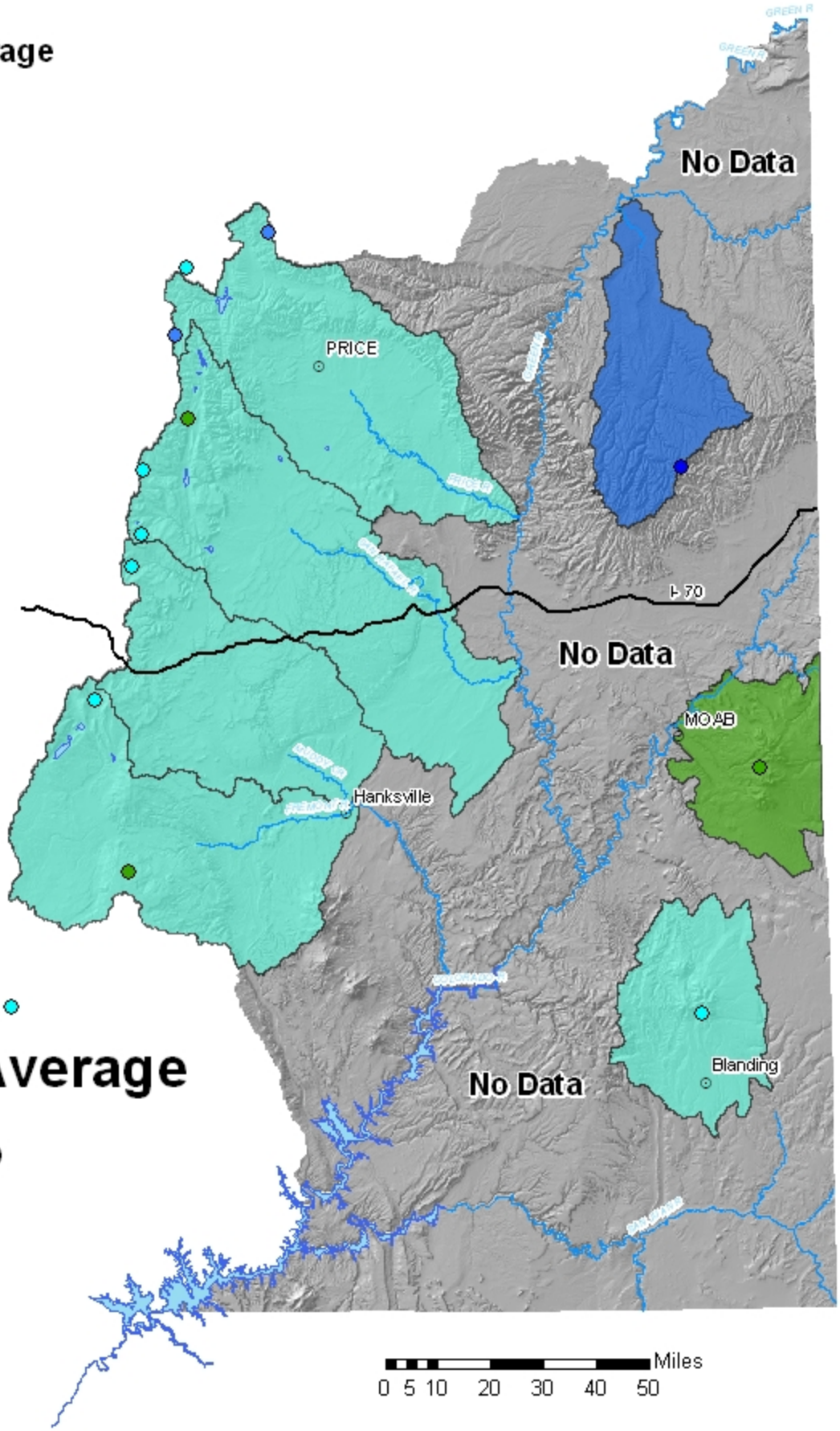
N

Watershed % of Average

- 0
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >150%

Snotel % of Average

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



Basinwide Average
121%

Provisional Data Subject to Revision

CARBON, EMERY, WAYNE, GRAND, & SAN JUAN Co.
Streamflow Forecasts - March 1, 2011

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
Fish Creek ab Reservoir nr Scofield	APR-JUL	30	39	45	140	52	62	32
Price R nr Scofield Reservoir (2)	APR-JUL	46	58	67	149	77	93	45
White R bl Tabbyune Ck	APR-JUL	17.2	22	25	145	29	34	17.3
Green R at Green River, UT (2)	APR-JUL	2700	3460	4090	129	4770	5860	3170
Electric Lake Inflow (2)	APR-JUL	14.5	17.6	20	127	22	26	15.7
Huntington Ck nr Huntington (2)	APR-JUL	41	52	60	122	69	82	49
Joe's Valley Reservoir Inflow (2)	APR-JUL	46	60	70	121	81	100	58
Ferron Ck (Upper Station) nr Ferron	APR-JUL	36	44	50	128	56	66	39
Seven Mile Ck nr Fish Lake	APR-JUL	5.60	7.50	9.00	129	10.60	13.30	7.00
Colorado R nr Cisco (2)	APR-JUL	3800	4760	5500	118	6300	7400	4650
Muddy Ck nr Emery	APR-JUL	20	26	30	151	34	42	19.9
Pine Ck nr Escalante	APR-JUL	1.25	2.20	3.00	125	3.90	5.50	2.40
South Ck ab Lloyd's Reservoir nr Mon	MAR-JUL	0.53	0.90	1.23	89	1.63	2.40	1.38
San Juan R nr Bluff (2)	APR-JUL	650	875	1040	85	1220	1450	1230

CARBON, EMERY, WAYNE, GRAND, & SAN JUAN Co.
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
HUNTINGTON NORTH	4.2	3.6	2.6	3.4
JOE'S VALLEY	61.6	42.5	42.3	41.5
KEN'S LAKE	2.3	1.1	0.7	1.3
MILL SITE	16.7	9.5	7.8	8.4
SCOFIELD	65.8	26.2	28.0	34.8

CARBON, EMERY, WAYNE, GRAND, & SAN JUAN Co.
Watershed Snowpack Analysis - March 1, 2011

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
PRICE RIVER	3	198	128
SAN RAFAEL RIVER	3	165	112
MUDDY CREEK	1	167	126
FREMONT RIVER	3	106	116
LASAL MOUNTAINS	1	71	93
BLUE MOUNTAINS	1	88	125
WILLOW CREEK	1	112	168
SOUTHEASTERN UTAH	13	140	121

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

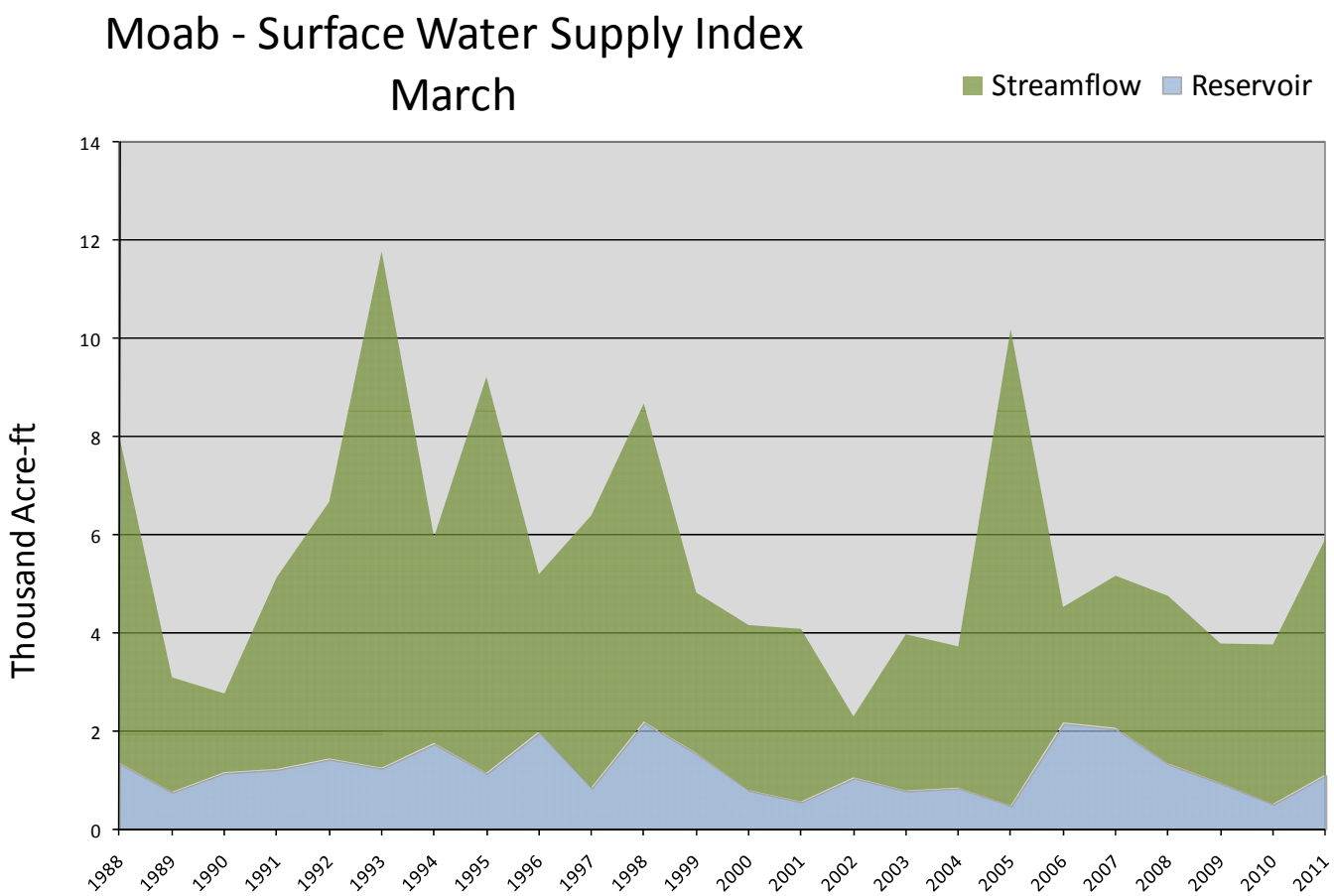
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.
(3) - Median value used in place of average.

March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Ken's Lake Reservoir	April-July Forecast Mill Creek at Sheley	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Moab	**1.1**	**4.8**	**5.9**	**1.17**	**64**	**07, 96, 94, 97**

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

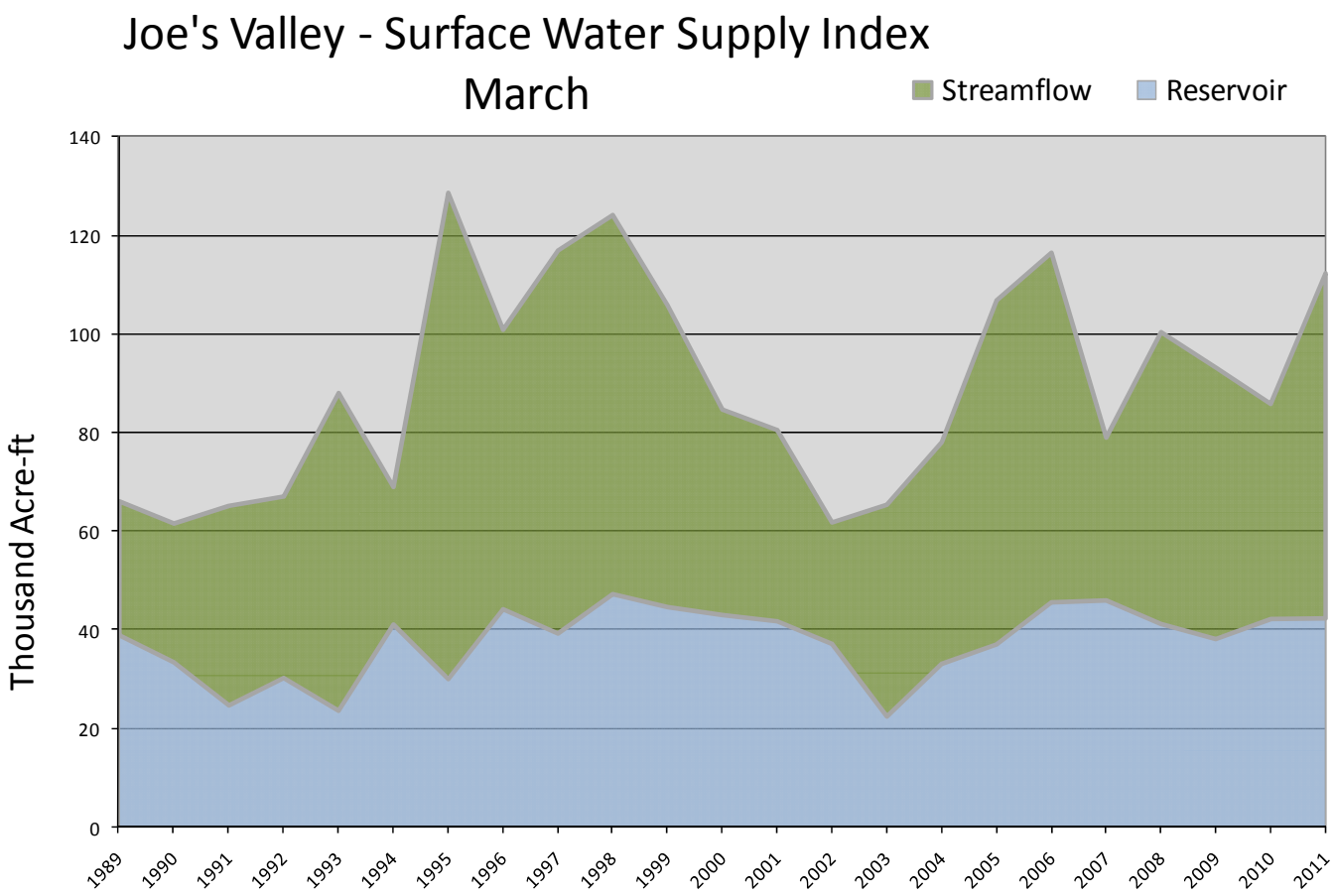


March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Joe's Valley	April-July Forecast Inflow to Joe's Valley	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Joe's Valley	**42.5**	**70.0**	**113**	**2.43**	**79**	**99, 05, 06, 97**

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

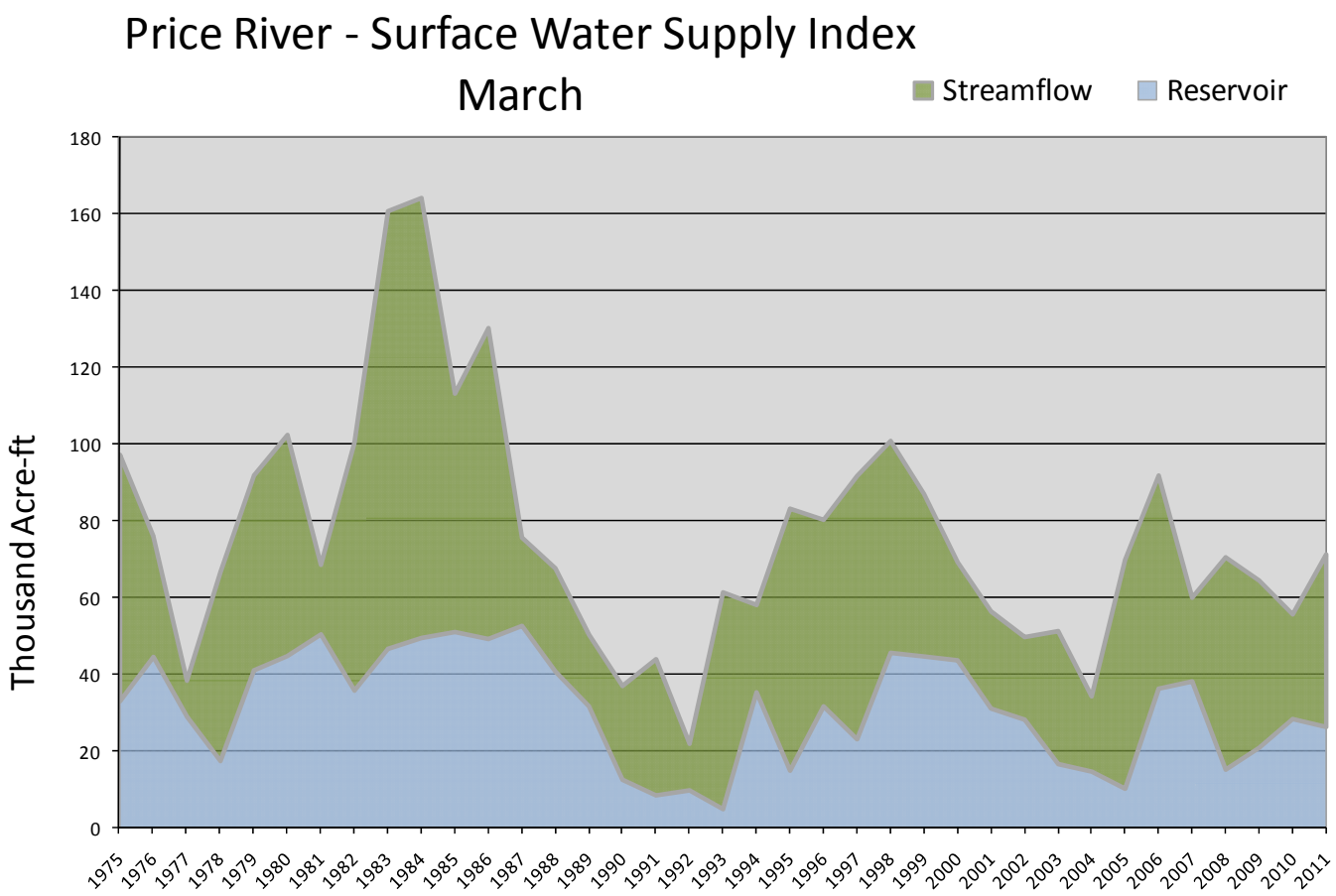


March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Scofield Reservoir	April-July Forecast @ Scofield	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Price River	**26.2**	**45.0**	**71.2**	**0.44**	**55**	**05, 08, 87, 76**

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

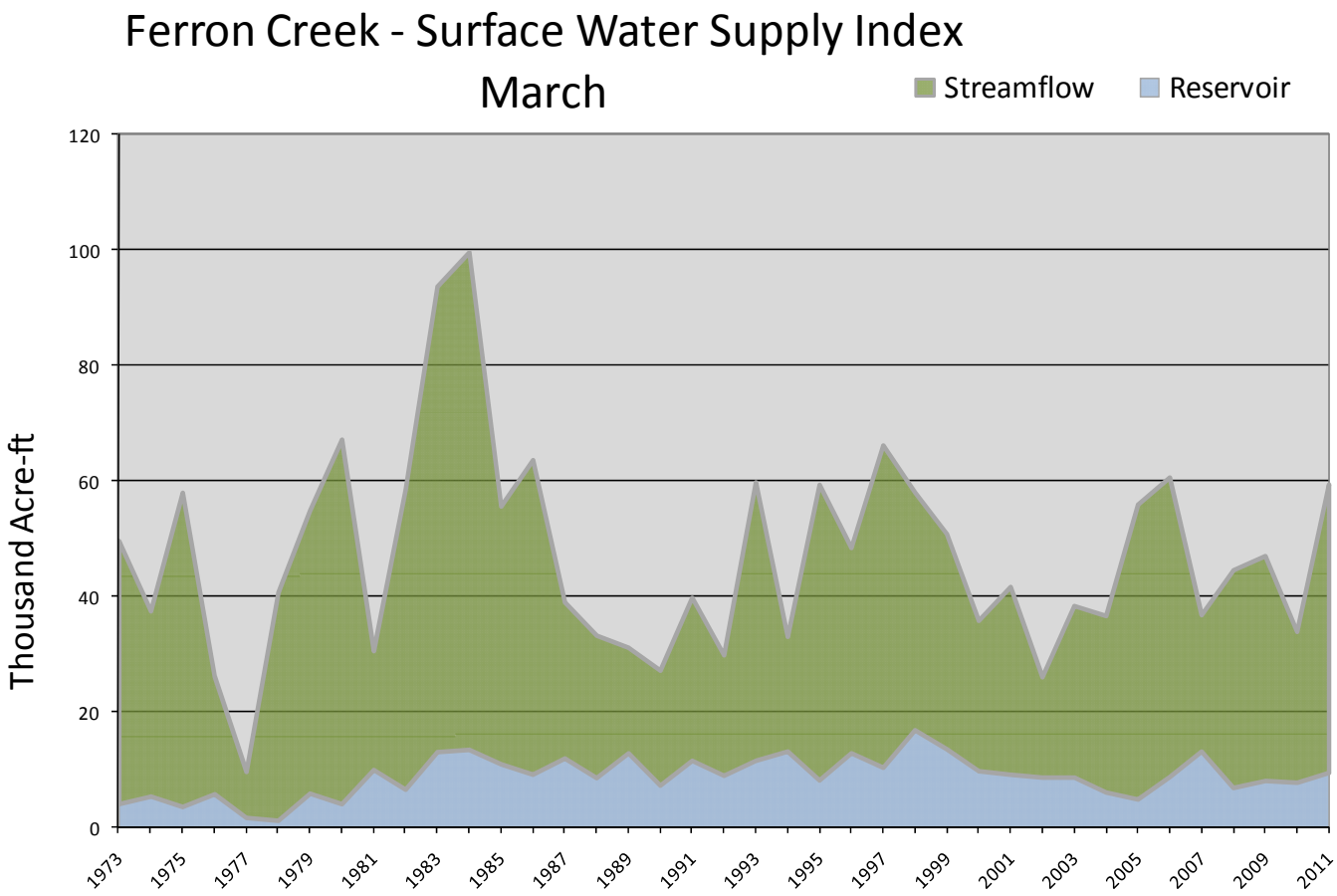


March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Millsite Reservoir	April-July Forecast Ferron creek	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Ferron Creek	**9.5**	**50.0**	**59.5**	**2.50**	**80**	**82, 95, 93, 06**

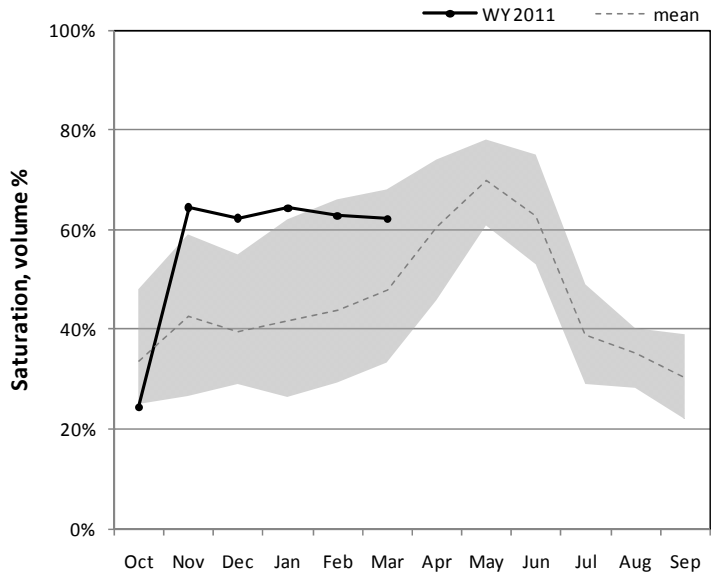
**EOM, end of month; # SWSI, Surface Water Supply Index; ^KAF, thousand acre-feet.*



Sevier and Beaver River Basins
March 1, 2011

Snowpacks on the Sevier River Basin are much above normal at 135% of average, 13% less than last month and 124% more than last year. Individual sites range from 95% at Gooseberry RS to 208% of average at Panguitch Lake. Precipitation during February was near average at 105% of normal, bringing the seasonal accumulation (Oct-Feb) to 163% of average. Soil moisture estimates in runoff producing areas are at 62% of saturation in the upper 2 feet of soil compared to 33% last year. Streamflow forecasts range from 126% to 258% of average. Reservoir storage is at 59% of capacity, 12% more than last year. Surface Water Supply Indices are: Upper Sevier 89%, Lower Sevier 79% and Beaver 84%. Water supply conditions are much above average on the Sevier, and the Beaver River watersheds.

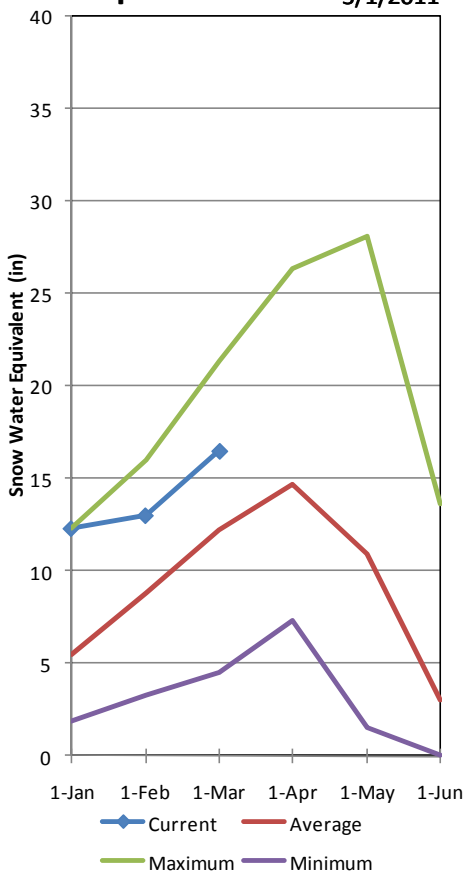
Sevier / Beaver River Soil Moisture



Percent saturation is calculated using the weighted average of volumetric soil moisture content at 2, 8, and 20-inch depths. Saturation is estimated as 40% volumetric water content. The gray area represents the range in saturation values since 2005.

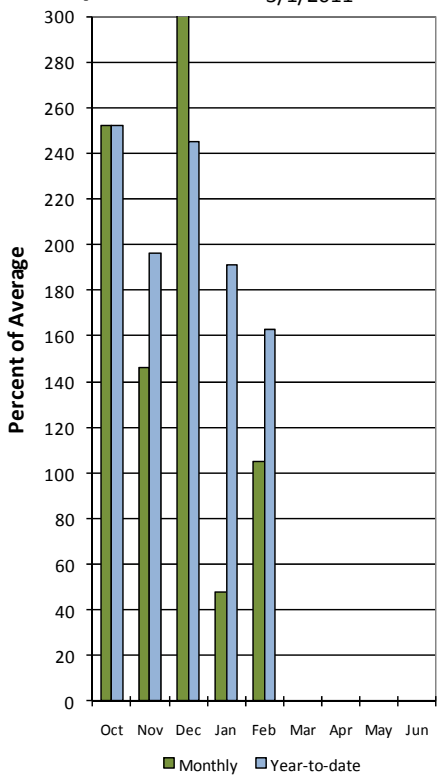
Sevier River Snowpack

3/1/2011

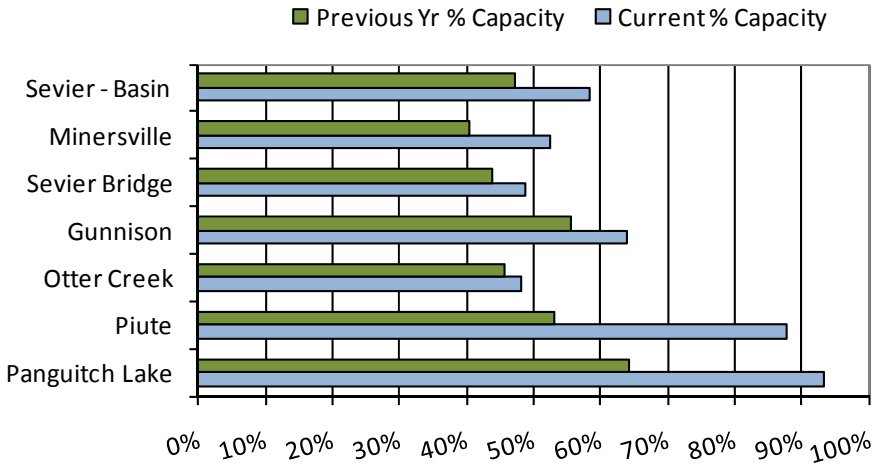


Sevier River Precipitation

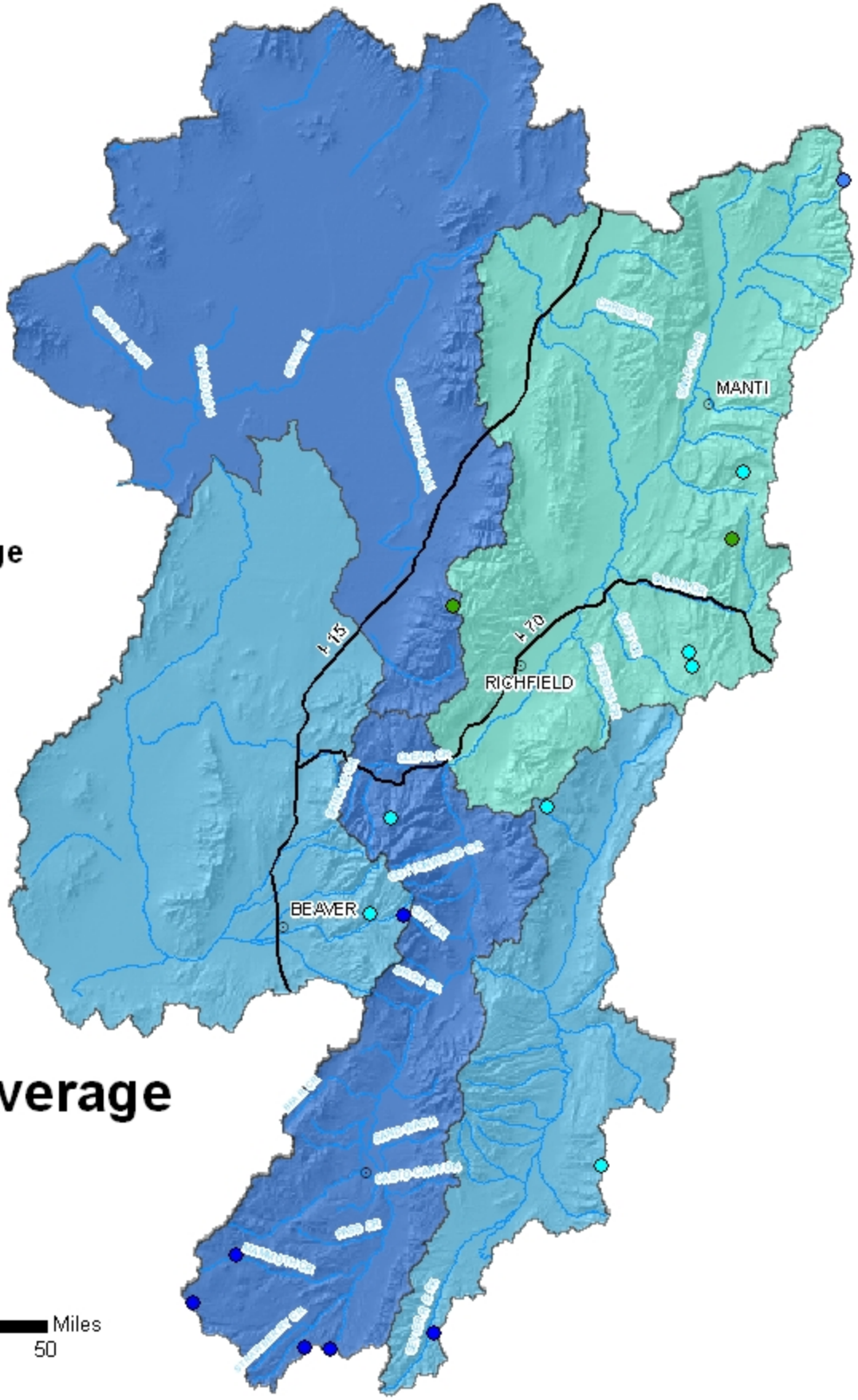
3/1/2011



March Sevier River Reservoir Storage



Sevier & Beaver Basins



Snotel % of Average

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

Watershed % of Average

- 0
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >150%

Basinwide Average 135%

0 5 10 20 30 40 50 Miles

Provisional Data Subject to Revision

SEVIER & BEAVER RIVER BASINS
Streamflow Forecasts - March 1, 2011

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
Mammoth Ck nr Hatch	APR-JUL	3.3	29	45	175	59	79	26
Sevier R at Hatch	APR-JUL	83	96	105	191	114	127	55
Sevier R nr Kingston	APR-JUL	48	70	85	258	100	122	33
EF Sevier R nr Kingston	APR-JUL	22	36	45	129	54	68	35
Sevier R bl Piute Dam	APR-JUL	77	109	130	197	151	183	66
Clear Ck ab Diversions nr Sevier	APR-JUL	17.5	24	29	132	34	40	22
Salina Ck nr Emery	APR-JUL	9.70	13.40	16.00	178	18.60	22.00	9.00
Salina Ck at Salina	APR-JUL	14.2	28	39	198	52	76	19.7
Manti Ck Blw Dugway Ck Nr Manti	APR-JUL	15.6	19.8	23	126	26	32	18.3
Sevier R nr Gunnison	APR-JUL	144	174	195	184	215	245	106
Chicken Ck nr Levan	APR-JUL	4.90	7.10	9.00	200	11.20	15.00	4.50
Oak Creek nr Oak City	APR-JUL	1.80	2.30	2.70	163	3.10	3.80	1.66
Beaver R nr Beaver	APR-JUL	31	39	45	167	51	59	27
Minersville Res Inflow	APR-JUL	12.2	22	32	193	44	66	16.6

SEVIER & BEAVER RIVER BASINS
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
GUNNISON	20.3	14.5	11.3	14.6
MINERSVILLE (RkyFd)	23.3	12.2	9.4	16.2
OTTER CREEK	52.5	25.2	24.0	40.0
PIUTE	71.8	63.0	38.2	53.3
SEVIER BRIDGE	236.0	114.8	103.7	175.6
PANGUITCH LAKE	22.3	20.8	14.3	146.8

SEVIER & BEAVER RIVER BASINS
Watershed Snowpack Analysis - March 1, 2011

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
UPPER SEVIER RIVER	8	114	154
EAST FORK SEVIER RIVER	3	113	142
SOUTH FORK SEVIER RIVER	5	115	161
LOWER SEVIER RIVER	6	145	113
BEAVER RIVER	2	121	142
SEVIER & BEAVER RIVER BAS	16	124	135

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

The average is computed for the 1971-2000 base period.

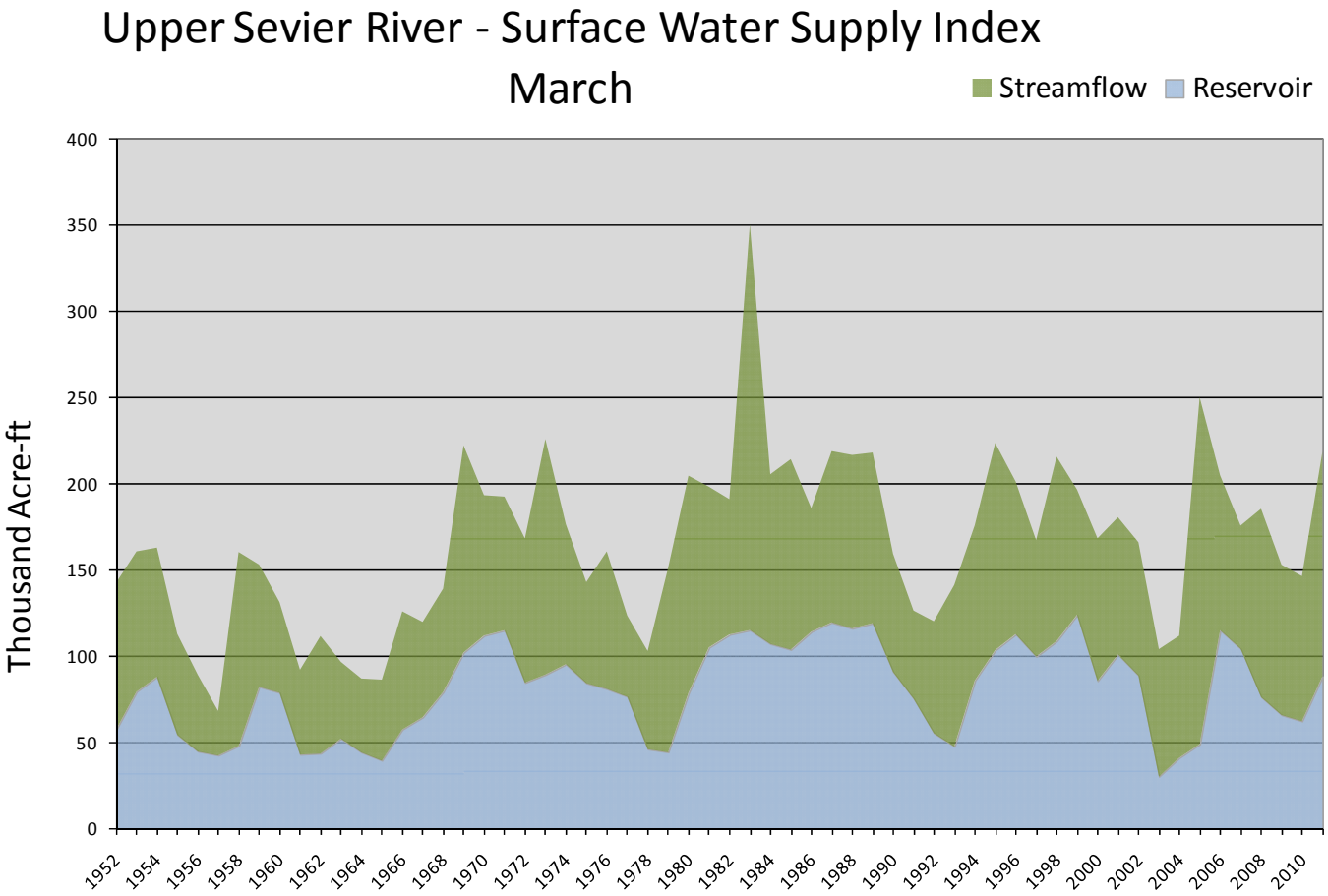
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.
(3) - Median value used in place of average.

March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Piute & Otter Creek Reservoir	April-July Forecast Inflow to Piute Reservoir	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Upper Sevier	**88.2**	**130**	**218**	**3.21**	**89**	**88,89,87,69**

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

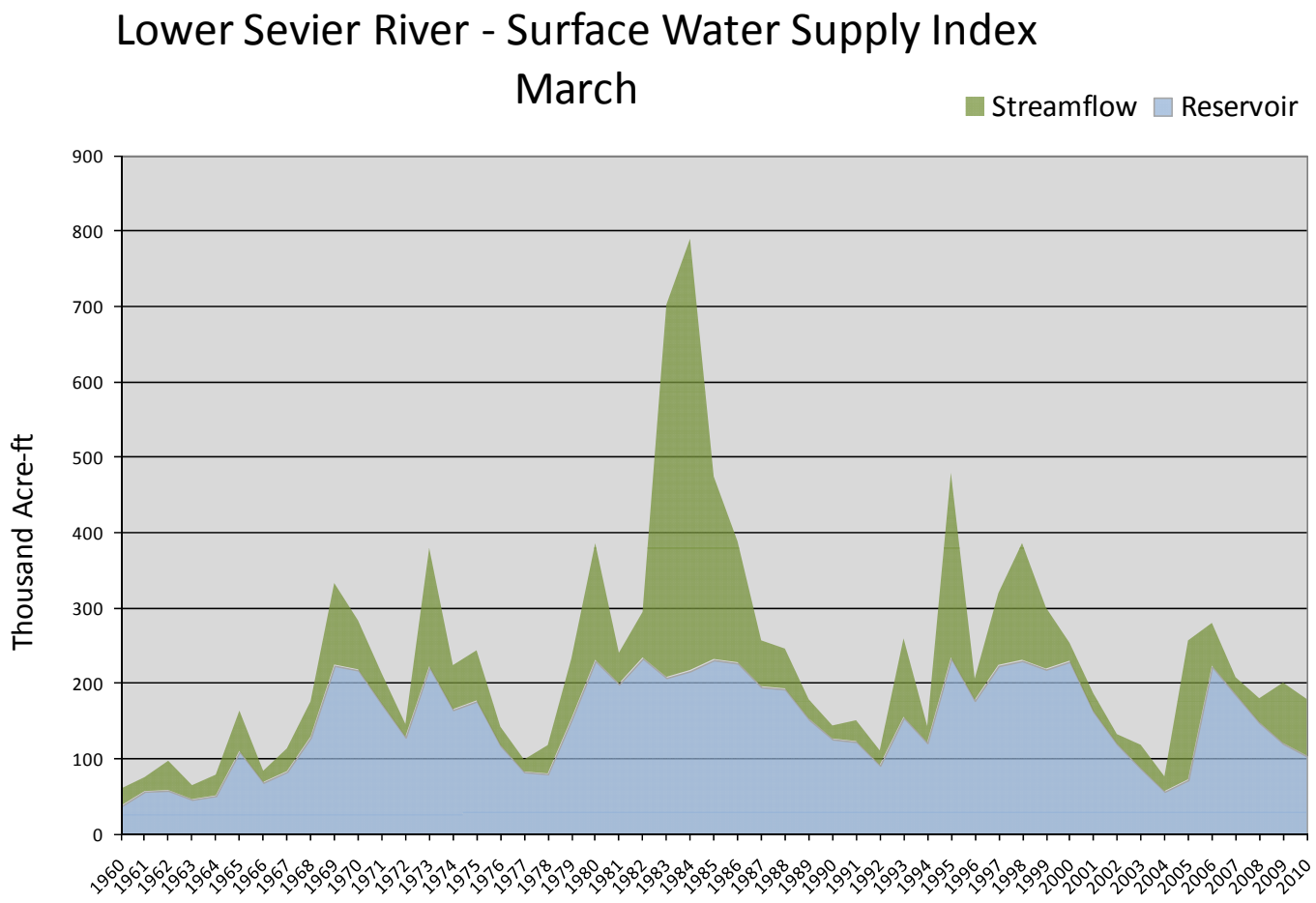


March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Sevier Bridge Reservoir	April-July Forecast Inflow to Sevier Bridge Reservoir	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Lower Sevier	**114.8**	**195**	**310**	**2.44**	**79**	**69,97,99,73**

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

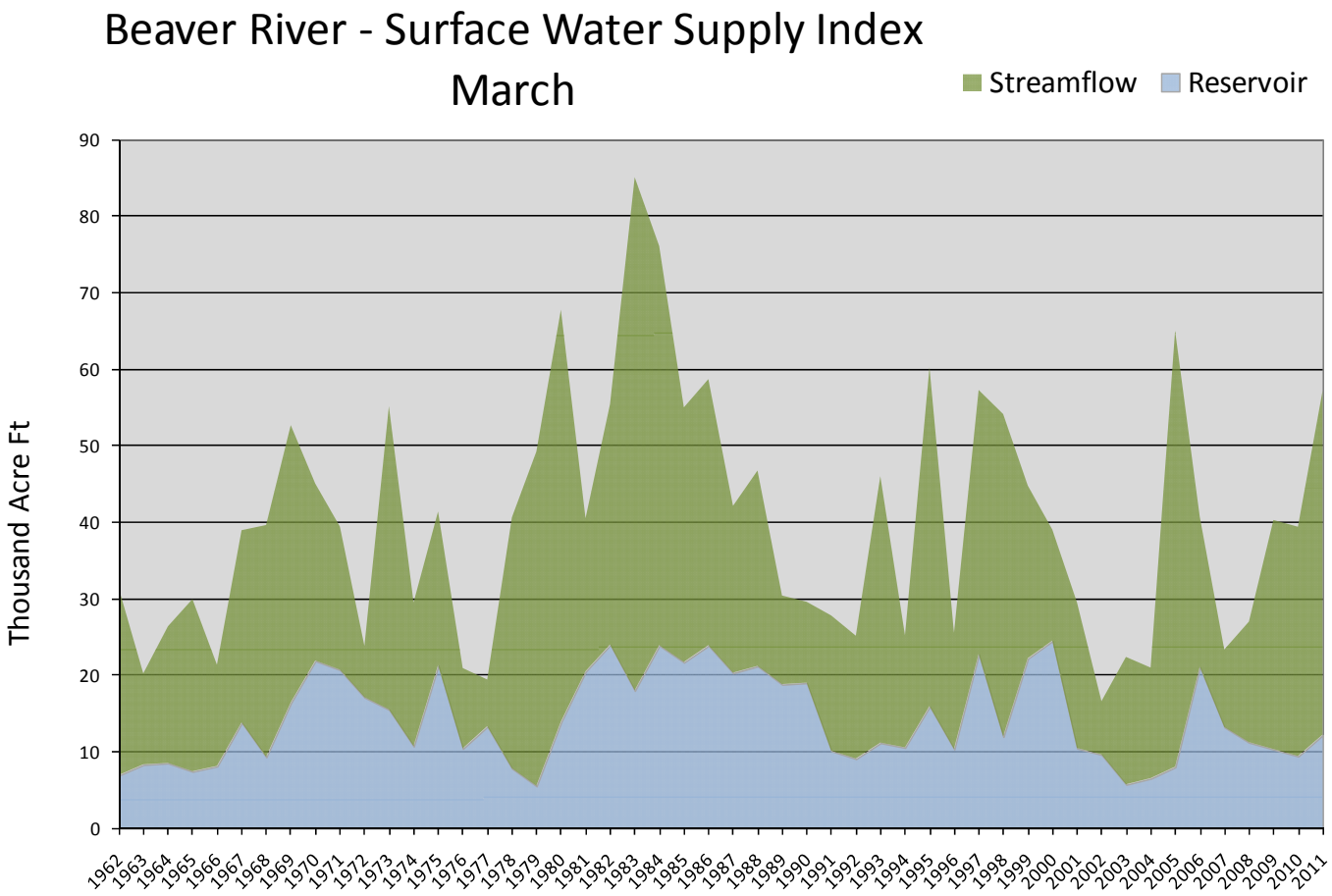


March 1, 2011

Surface Water Supply Index

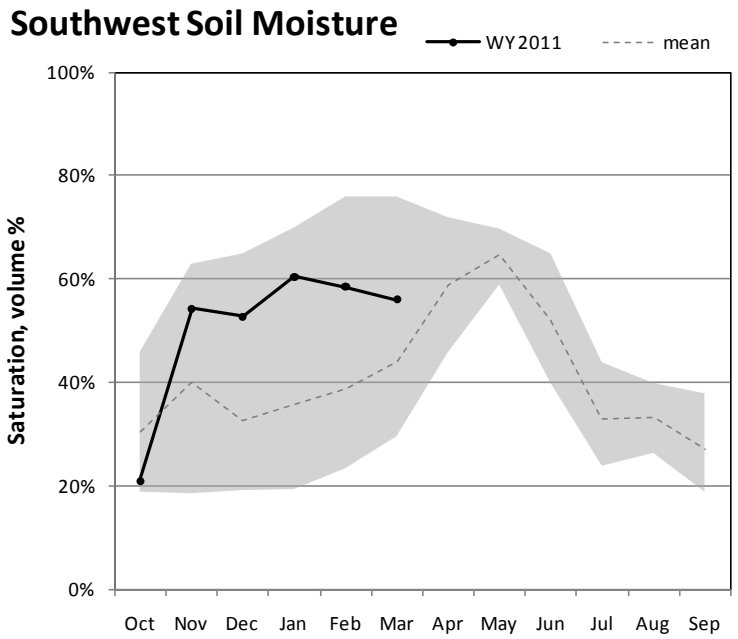
Basin or Region	February EOM* Minersville Reservoir	April-July forecast Beaver River at Beaver	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Beaver	**12.2**	**45.0**	**57.2**	**2.86**	**84**	**73,82,86,95**

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

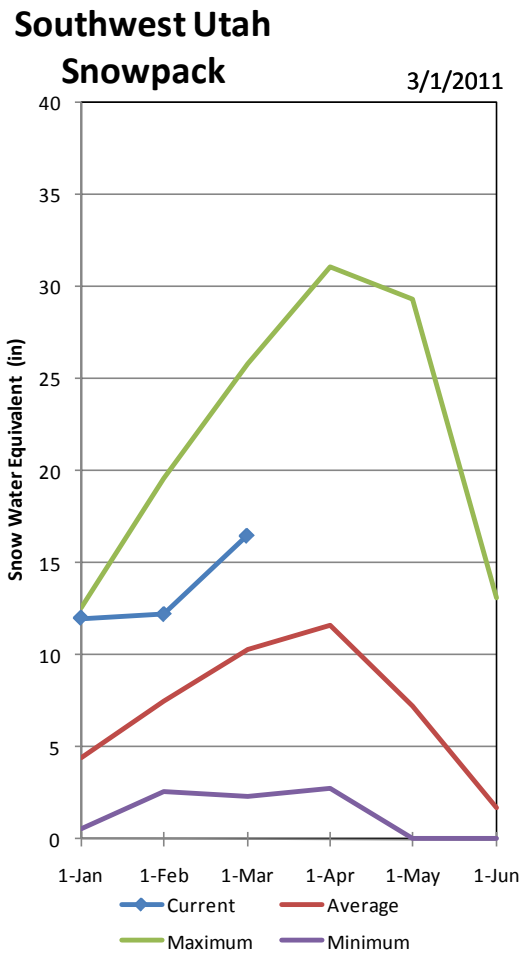


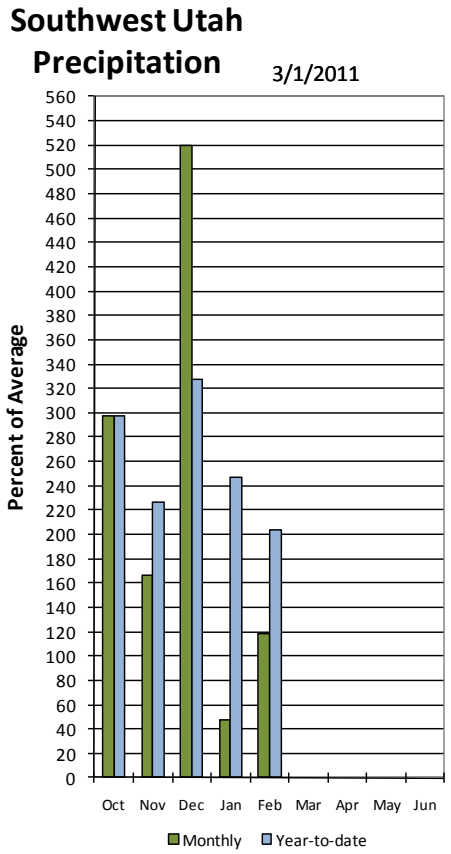
E. Garfield, Kane, Washington, & Iron Co.
February 1, 2011

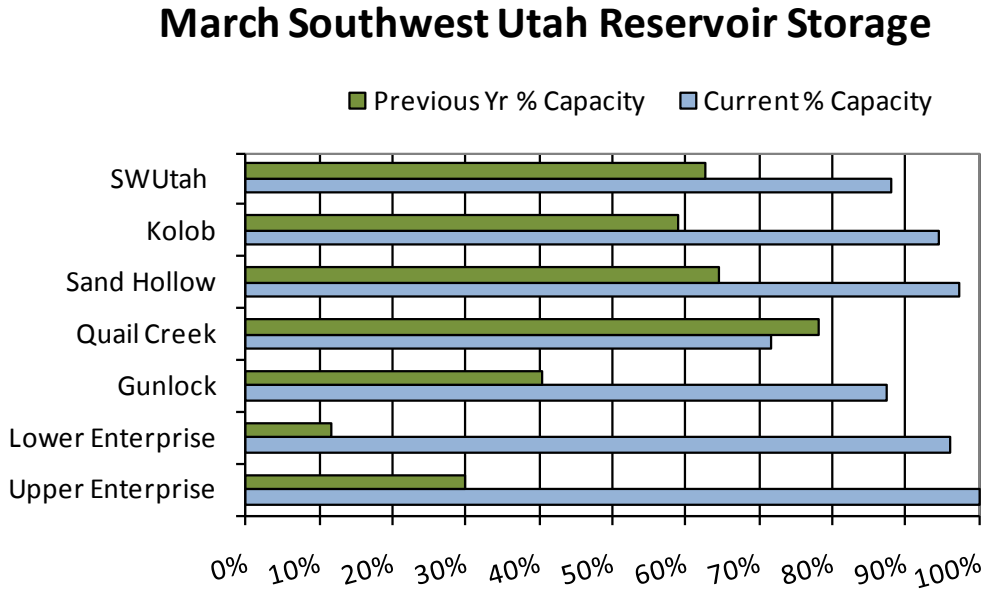
Snowpacks in this region are much above normal at 150% of average, which is 103% of last year. Individual sites range from 92% at Donkey Reservoir Snotel, to 206% of average at Harris Flat Snotel. Precipitation during the month of February was above average at 118%, bringing the seasonal accumulation (Oct-Feb) to 204% of average. The average soil moisture estimate in runoff producing areas is at 56% of saturation within the upper 2 feet of soil, compared to 30% last year. Forecast streamflows (Apr–July) range from 187% to 114% of average. Reservoir storage is at 88% of capacity, 25% higher than last year at this time. The Surface Water Supply Index is at 81%, indicating much above average water supply conditions.



Percent saturation is calculated using the weighted average of volumetric soil moisture content at 2, 8, and 20-inch depths. Saturation is estimated as 40% volumetric water content. The gray area represents the range in saturation values since 2005.







E. Garfield, Kane, Washington & Iron County

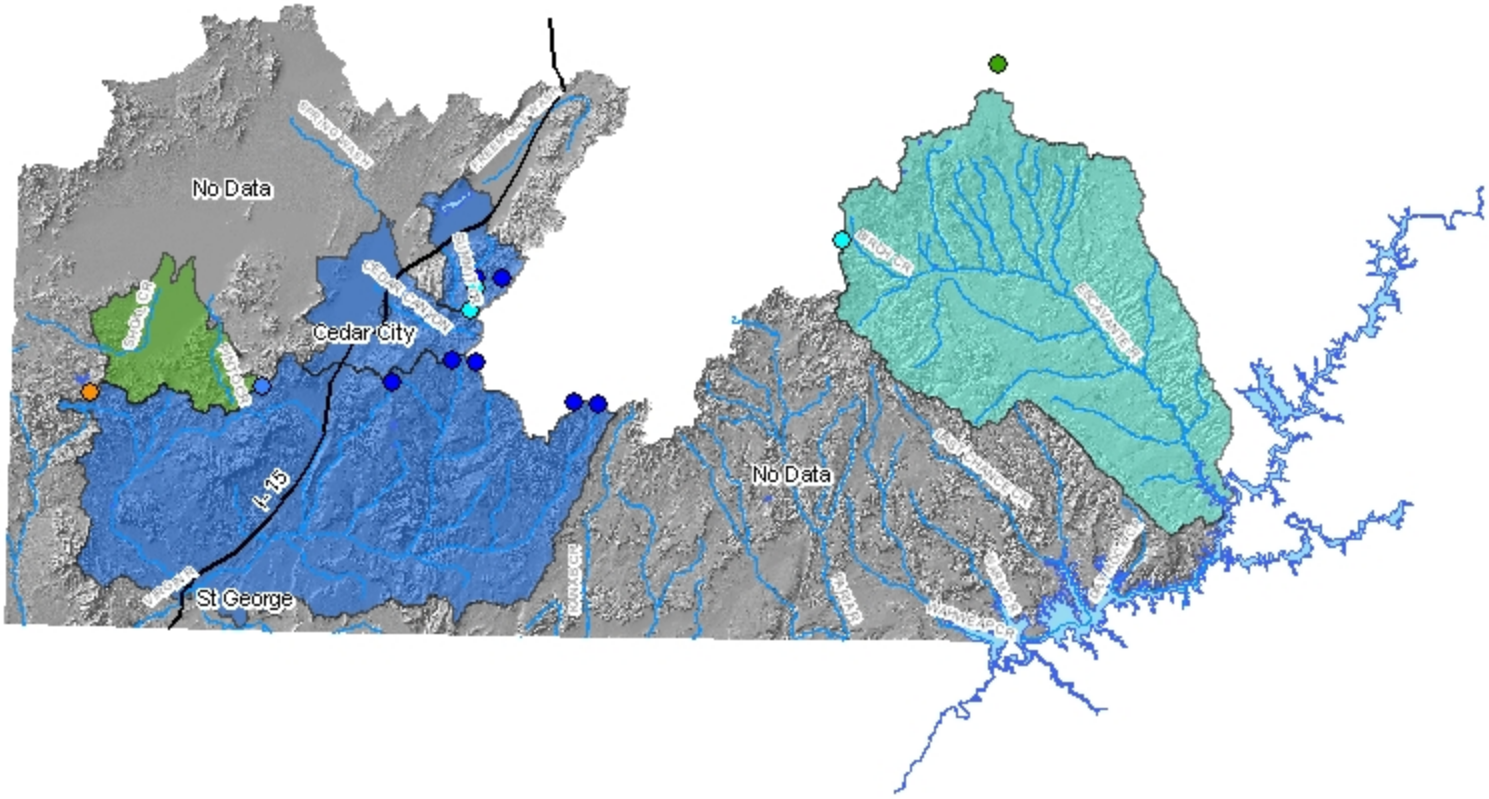
Watershed % of Average

- 0
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >150%

Snotel % of Average

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

N



Basin Average
160%

Provisional Data
Subject to Revision

Miles
0 5 10 20 30 40 50

E. GARFIELD, KANE, WASHINGTON, & IRON Co.
Streamflow Forecasts - March 1, 2011

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (1000AF)	50% (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
Lake Powell Inflow (2)	APR-JUL	6200	7720	9200	116	10800	12500	7930
Virgin R at Virgin	APR-JUL	77	96	110	172	125	149	64
Virgin R nr Hurricane	APR-JUL	77	101	119	173	139	170	69
Santa Clara R nr Pine Valley	APR-JUL	5.40	7.20	8.50	155	10.00	12.30	5.50
Coal Ck nr Cedar City	APR-JUL	29	34	38	197	42	47	19.3

E. GARFIELD, KANE, WASHINGTON, & IRON Co.
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
GUNLOCK	10.4	9.1	4.2	4.9
LAKE POWELL	24322.0	13249.0	13786.0	---
QUAIL CREEK	40.0	28.6	31.2	29.7
UPPER ENTERPRISE	10.0	10.0	0.3	---
LOWER ENTERPRISE	2.6	2.5	0.2	90.0

E. GARFIELD, KANE, WASHINGTON, & IRON Co.
Watershed Snowpack Analysis - March 1, 2011

Watershed	Number of Data Sites	This Year as % of Average: Last Yr	Average
VIRGIN RIVER	5	110	182
PAROWAN	2	129	164
ENTERPRISE TO NEW HARMONY	2	53	108
COAL CREEK	2	129	174
ESCALANTE RIVER	2	106	112
SOUTHWESTERN UTAH	9	101	159

* 90%, 70%, 50%, 30%, and 10% chances of exceeding are the probabilities that the actual volume will exceed the volumes in the table.

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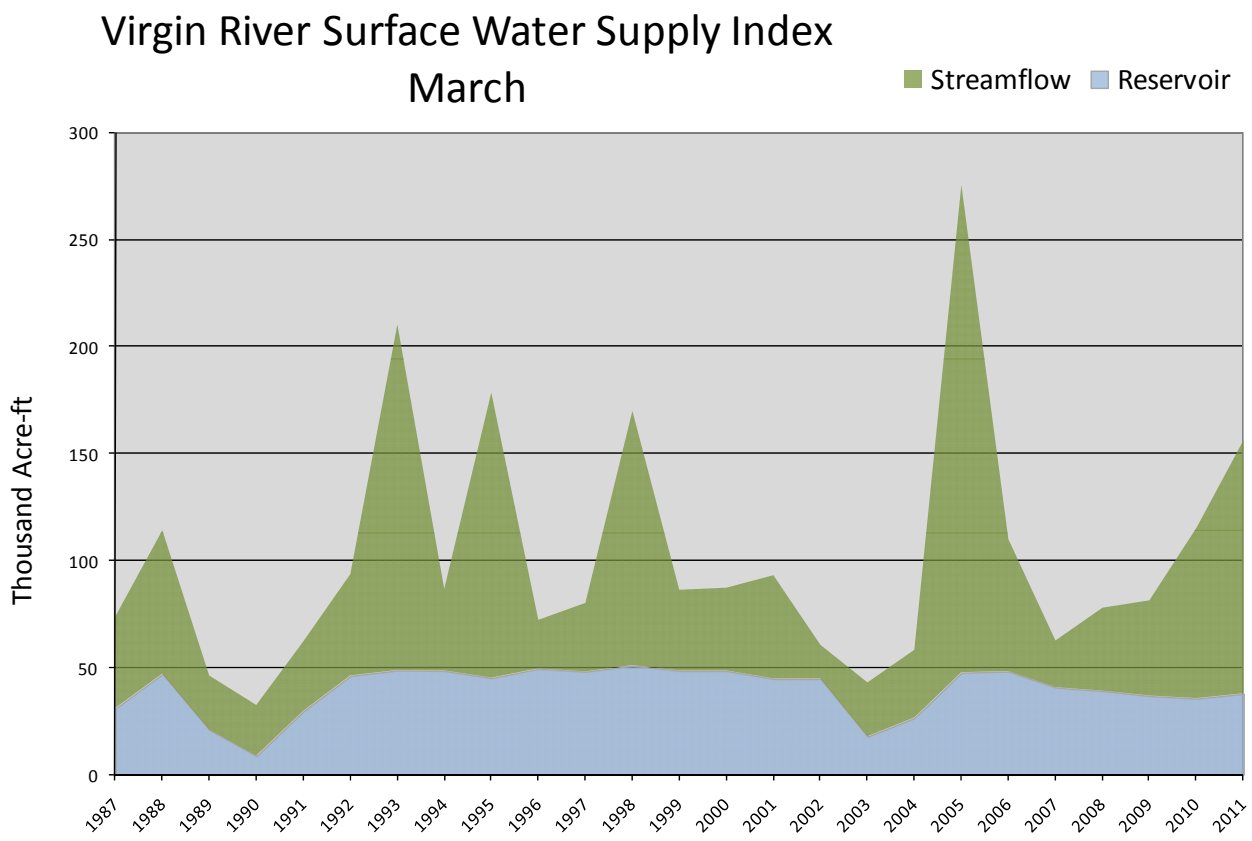
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural volume - actual volume may be affected by upstream water management.
(3) - Median value used in place of average.

March 1, 2011

Surface Water Supply Index

Basin or Region	February EOM* Quail Creek and Gunlock Reservoirs	April-July forecast Virgin and Santa Clara Rivers	Reservoir + Streamflow	SWSI#	Percentile	Years with similar SWSI
	*KAF^*	*KAF*	*KAF*		*%*	
Southwest	**37.7**	**119**	**156**	**2.56**	**81**	**95, 98, 10, 88**

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



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Utah Water Supply Outlook Report

Natural Resources Conservation Service
Salt Lake City, UT