USDA United States Department of Agriculture

Natural Resources Conservation Service

Idaho Water Supply Outlook Report

March 1, 2018

Winter Returns to Idaho February 25, 2018
Photo courtesy of Ron Abramovich (NRCS-Idaho Snow Survey)

Late February storms brought cold temperatures and abundant snowfall that resulted in “cold smoke snow” across Idaho. Snowfall was measured in feet in many mountainous locations with densities that were only 4 to 6%. Cold smoke is some of the lightest, fluffiest snow that can be found on Earth and brings smiles to skiers, riders and winter recreationists as illustrated in picture above. After an extended period of dry and warm weather, abundant snowfall with low densities was a welcome sight, but don’t let the snow depths lead you to think the snow water content is as healthy as the snow depths. Continue reading the Water Supply Outlook Report to learn more information about the diverse snowpacks across Idaho that range from 35% of median in the Owyhee basin to 120% in the Clearwater basin.

Water Supply Outlook Report
Federal - State – Private Cooperative Snow Surveys

For more water supply and resource management information:

Contact: Your local county Natural Resources Conservation Service Office
Internet Web Address: http://www.id.nrcs.usda.gov/snow/
Natural Resources Conservation Service Snow Surveys
9173 West Barnes Drive, Suite C
Boise, Idaho 83709-1574 (208) 378-5700 ext. 5

To join a free email subscription list contact us by email at: IDBOISE-NRCS-SNOW@one.usda.gov

How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when the snow melts. Measurements of snow water equivalent at selected manual snow courses 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 produce runoff forecasts. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind 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 uncertainty is in 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.

IDAHO WATER SUPPLY OUTLOOK REPORT

March 1, 2018

SUMMARY

A change in the weather in late February brought cold temperatures and allowed abundant low density snow to fall across Idaho's higher elevations. As a result, the depth of snow on the ground measured at numerous SNOTEL sites may look healthier than the snow water content. The cold temperatures allowed the light, dry snow to fall meaning it contained more air and less water than normal. The snow is settling each day and as new snow falls on top of it. As of March 1, the Lost Lake SNOTEL site in the Clearwater basin has the deepest snow in Idaho at 160 inches – that's more than 13 feet deep. Many other sites, from Hidden Lake in the Idaho Panhandle to Deadwood Summit in central Idaho and Lewis Lake Divide in Yellowstone National Park, are also reporting snow depths of more than 100 inches.

Snow water equivalent amounts have increased from a month ago but are not proportional to the larger snow depth increases. This is because the majority of the state received below-normal February precipitation totals. Near normal or better February precipitation amounts fell in the Salmon basin, Clearwater and Panhandle Region, Henrys Fork and Upper Snake basin in Wyoming. The least amount of precipitation was about 55% of normal in Idaho central mountains. Current snowpacks vary significantly across the state, ranging from 35% of normal in the Owyhee basin to 130% in Idaho's famous Lochsa and Selway basins and a few basins in the Snake River headwater in Wyoming.

Streamflow forecasts mirror the current snowpacks, and when combined with the high reservoir carryover storage, they will provide adequate irrigation supplies for most users. Supplies may be marginal in the Big Wood, Big Lost and Little Lost basins, however, the early March storm added much needed water to the snowpack. Another March storm or two, or a wet spring, will help ensure supplies are adequate in these basins while providing additional aquifer recharge water and reservoir carryover storage for next year.

SNOWPACK

Snow water content levels on March 1 are following the trends established earlier this winter. The La Nina storm track is favoring the Clearwater basin with the whole basin at 123% of normal. Above normal snowpacks are still present in the Panhandle Region, and along the continental divide all the way to Yellowstone National Park. The Salmon basin snowpack is near normal and continues as the divide between above normal snowpacks to the north and below normal to the south. Snowpacks from the Weiser to the Little Lost and Salmon Falls to the Bear River are 60% to 80% of normal as of March 1. The Owyhee snowpack is the lowest at 35% of normal while the Bruneau is slightly better at 45%. As mentioned last month, more snow is needed across central and southern Idaho and colder temperatures would help to keep the snow in place until spring arrives.

PRECIPITATION

February precipitation totals range from a high of 177% of normal in the Clearwater basin to only 55% in the Little Wood and Big Lost basins. The February storm track continued bringing above normal precipitation amounts to the Clearwater basin with the Selway and Lochsa basins receiving nearly

twice their normal precipitation amounts. The Little Wood and Big Lost basins were in a doughnut hole and only received 55% of normal amounts, unlike the basins around them that received 65% to 80%. However, an early March storm track from the southwest brought abundant snow into central Idaho with these basins already receiving 50% to 60% of their normal March precipitation totals in the first 5 days of March! **Keep in mind, the snow that has fallen since March 1 is not included in this month's report or water supply forecasts.**

Water year-to-date precipitation for October 1 through February 28 ranges from a high of 125% of normal in the Clearwater basin to 70% to 90% for across central and southern Idaho while the Upper Snake is at normal. It is interesting to note that a year ago many basins across southern Idaho were starting to exceed their average annual precipitation amounts. So far this year, the Clearwater basin, which is the highest, has received 72% of its average annual precipitation while the Little Wood, Big Lost, Little Lost and Mud Lake region have only received 35% to 40% of their average annual precipitation amounts so far this water year.

RESERVOIRS

The unusually high winter streamflows have provided high inflows and allowed nearly all of Idaho's reservoirs to store average to well above average storage amounts. The exceptions are the natural lakes in northern Idaho (Pend Oreille, Priest and Coeur d' Alene) which are about 85% of average and 45% of their winter storage levels, and Mann Creek at 54% of average, 25% full. Idaho's southern reservoirs, Owyhee, Salmon Falls, Oakley and Bear Lake, are not expected to fill this year, unless conditions become much wetter, but are in good shape to provide adequate irrigation supplies this summer.

Elsewhere, from the Payette basin to the Upper Snake, reservoir operators will be watching the weather closely to determine if and when flood control releases are needed. Weather outlooks show, cool and wet conditions could continue in March for most of Idaho and especially northern Idaho for the March-April-May period. The Payette system is 77% full, 120% of average, while the Boise is 82% full, 150% of average. Magic Reservoir is 90% full, 237% of average and will start passing water in mid-March based on current inflows. Little Wood Reservoir is 94% full, 162% of average, and started releasing water in late February. Mackay Reservoir is 84% full, 128% of average and is still providing enough water for the river to flow past Arco, and past the highway rest area where the river disappears into the Lost River sinks and reappears in the Eastern Snake River Plain Aquifer. Jackson Lake is 78% full and will fill in early June. Palisades Reservoir is 95% full and will fill by mid-to late June. American Falls Reservoir is passing inflow and at 87% full is scheduled to fill in early April and then remain near full depending upon irrigation demand.

STREAMFLOW

After the January warm spell that stretched into February, colder than normal temperatures in late February brought the coldest temperatures of the season and caused many streams to freeze again. These National Weather Service temperature and precipitation graphs illustrate the return to winter in mid-February with colder than normal temperatures in the second half of February and snowfall in many valley locations:
NWS Valley Precipitation and Temperature Graphs: Boise | McCall | Jerome | Twin Falls

Streams across Idaho continue flowing above to much-above average and are pushing record high levels around Yellowstone National Park. Idaho's mountains and the hydrologic system are still primed and saturated from last year's abundant snowfall and continue to feed the reservoirs even

with colder than normal temperatures. These elevated baseflows will provide a higher starting level and additional runoff to the predicted volumes when the snow starts melting. Streamflow graphs on this page reflect these above baseflows: Peak Streamflow Information

Changes in volume streamflow forecasts from a month ago vary across the state depending upon February precipitation. Forecasts in the Panhandle Region and Clearwater basin increased about 15 percentage points and now range from 110% to 130% of average. Streams in the Salmon River basin increased slightly and now call for near normal runoff ranging from 85% to 105% of average. Forecasts from the Weiser to the Upper Snake basin and Bear River basin basically stayed the same and range from 50% to 120% of average. Streamflow forecasts across the Southside Snake River basins decreased about 8 percentage points and range from a low of 25% of average in the Owyhee basin to 70% in Oakley basin.

A major winter storm in early March likely will improve streamflow forecasts even more, but we'll have to wait and see if March's total precipitation are above average or not by month's end. The current official forecasts are based on March 1 data, so the latest storm is not accounted for in the monthly forecast numbers. However, users can monitor changes in their water supply forecasts since March 1 and throughout the month with these daily water supply forecasts:

- Streamflow Forecasts - Daily Water Supply Forecasts (DWSF) keep water users aware of the changing conditions between the 1st of month forecasts published in these monthly reports. They are updated daily using today's current snow water equivalent and precipitation data.

Note: The volumes referenced in these narratives are the 50% Chance of Exceeding Forecast, unless otherwise noted. Users may wish to use a different forecast to reduce their risk of having too much or too little water.

RECREATION

Winter returned in February with the coldest temperatures of the year bringing low-density snowfall and "cold smoke snow" for skiers to enjoy. However, the high intensity snowfall rates increased avalanche danger. Avalanche conditions vary across the state, so check your local conditions before heading out, and remember your goal is to return to ski and ride another day.

For the river runner hoping to float the Owyhee River, you better have the boats ready when the snow melts or rains come. It will be a short Owyhee floating season without the snow to sustain the flows like we've seen in recent springs. With the Bruneau basin snowpack at only 57% of normal, it will also have a short season, but as you know, spring rains can make or break these streamflow forecasts in these high desert basins. Elsewhere, river running opportunities keep improving with every passing storm. With Jackson Lake, Palisades and American Falls reservoirs nearly full, there should be plenty of Wyoming snowmelt water from the upper basin to pass all the way down through Hells Canyon to the Columbia River. The better-than-normal snowpack in the Salmon basin will provide ideal flows and an extended family boating levels after the snowmelt peak flows occur. Idaho's Lochsa and Selway rivers, which have capitalized on this winter's La Nina storm track, will be rocking and flowing above average all summer along with the St. Joe, Coeur d'Alene, Moyie and your other favorite rivers and creeks in northern Idaho. Play it safe and know your boating skills and limits as spring river flows closely follow spring weather and both can change rapidly as was just observed in February.

WESTERN SNOW CONFERENCE

Registration is open. Please join us April 16-19, 2018 for the 86th annual Western Snow Conference in Albuquerque, N.M. The conference venue offers the opportunity to interact with other professionals while enjoying the unique ambience of the desert Southwest http://www.westernsnowconference.org/

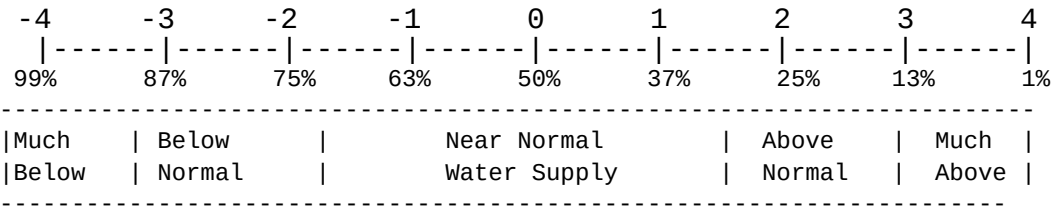
IDAHO SURFACE WATER SUPPLY INDEX (SWSI) March 1, 2018

The Surface Water Supply Index (SWSI) is a predictive indicator of surface water availability within a watershed for the spring and summer water use season. The index is calculated by combining pre-runoff reservoir storage (carryover) with forecasts of spring and summer streamflow. SWSI values are scaled from +4.0 (abundant supply) to -4.0 (extremely dry), with a value of zero indicating a median water supply as compared to historical occurrences. The SWSI analysis period is from 1981 to present.

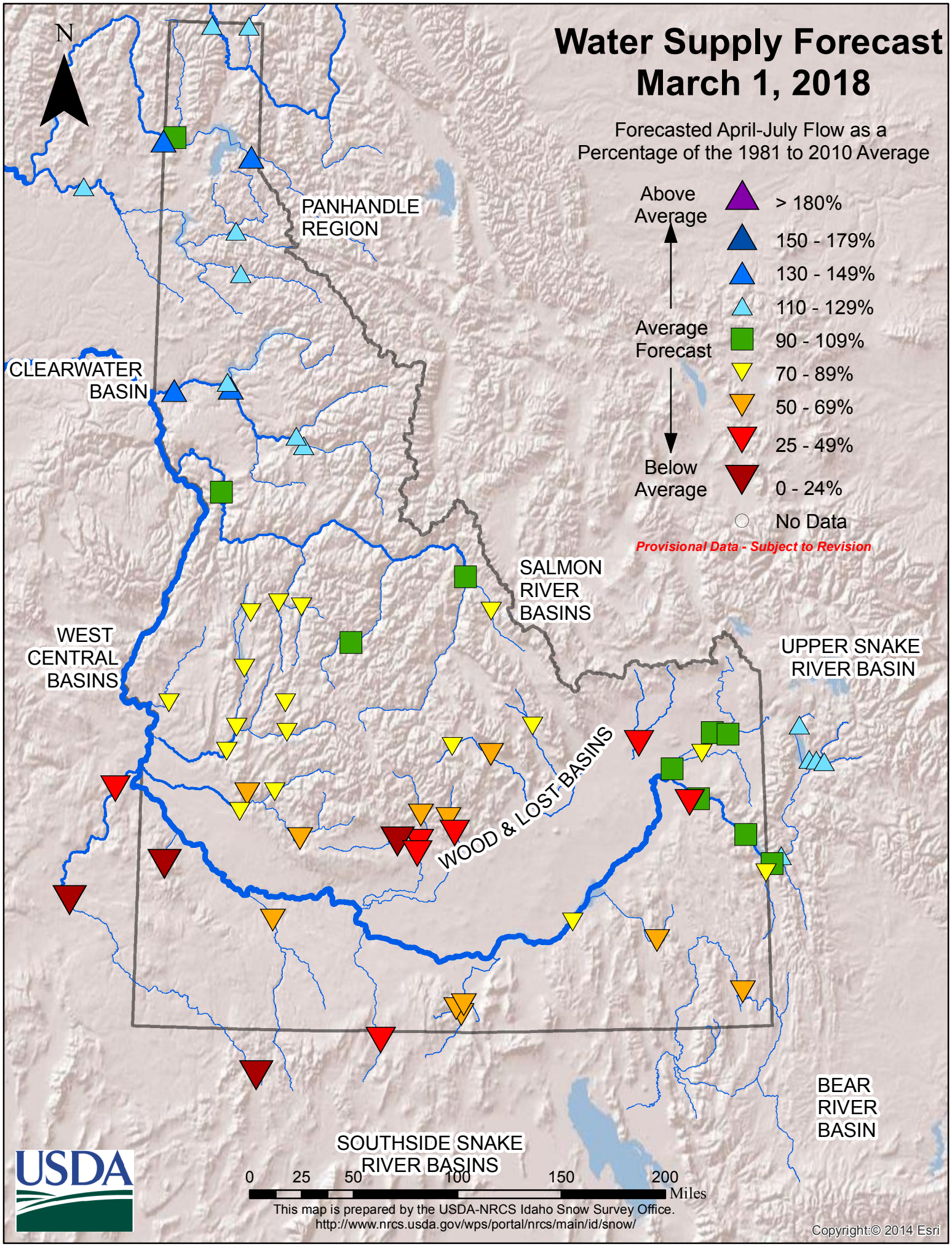
SWSI values provide a more comprehensive outlook of water availability by combining streamflow forecasts and reservoir storage where appropriate. The SWSI index allows comparison of water availability between basins for drought or flood severity analysis. Threshold SWSI values have been determined for some basins to indicate the potential for agricultural irrigation water shortages.

BASIN or REGION	*SWSI Value*	*Most Recent Year With Similar SWSI Value*	*Agricultural Water Supply Shortage May Occur When SWSI is Less Than*
Spokane	**1.2**	**2017**	**NA**
Clearwater	**2.3**	**2012**	**NA**
Salmon	**0.1**	**2010**	**NA**
Weiser	**-1.6**	**2014**	**NA**
Payette	**-1.2**	**2016**	**NA**
Boise	**-0.3**	**2016**	**-1.8**
Big Wood	**0.7**	**2000 / 2012**	**0.2**
Big Wood above Hailey	**-1.4**	**2014**	**NA**
Little Wood	**-1.0**	**2003 / 2008**	**-1.5**
Big Lost	**-0.5**	**2016**	**0.7**
Little Lost	**-0.8**	**2012**	**1.3**
Teton	**-0.5**	**2005 / 2010**	**-3.9**
Henrys Fork	**1.3**	**2012**	**-1.5**
Snake (Heise)	**1.7**	**2009**	**-1.8**
Oakley	**0.8**	**2012**	**0.0**
Salmon Falls	**0.8**	**2016**	**-0.9**
Bruneau	**-1.9**	**2013**	**NA**
Owyhee	**-0.8**	**2008**	**-2.6**
Bear River	**2.3**	**2011**	**-3.7**

SWSI SCALE, PERCENT CHANCE OF EXCEEDANCE, AND INTERPRETATION



NA=Not Available / Not Applicable; Note: The Percent Chance of Exceedance is an indicator of how often a range of SWSI values might be expected to occur. Each SWSI unit represents about 12% of the historical occurrences. As an example of interpreting the above scale, the SWSI can be expected to be greater than -3.0, 87% of the time and less than -3.0, 13% of the time. Half the time, the SWSI will be below and half the time above a value of zero. The interval between -1.5 and +1.5 described as "Near Normal Water Supply," represents three SWSI units and would be expected to occur about one-third (36%) of the time.


N
Water Supply Forecast
March 1, 2018
Forecasted April-July Flow as a
Percentage of the 1981 to 2010 Average
Above Average
Average Forecast
Below Average
> 180%
150 - 179%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 - 69%
25 - 49%
0 - 24%
No Data
Provisional Data - Subject to Revision
PANHANDLE REGION
CLEARWATER BASIN
SALMON RIVER BASINS
WEST CENTRAL BASINS
UPPER SNAKE RIVER BASIN
WOOD & LOST BASINS
BEAR RIVER BASIN
SOUTHSIDE SNAKE RIVER BASINS
0 25 50 100 150 200
Miles
USDA
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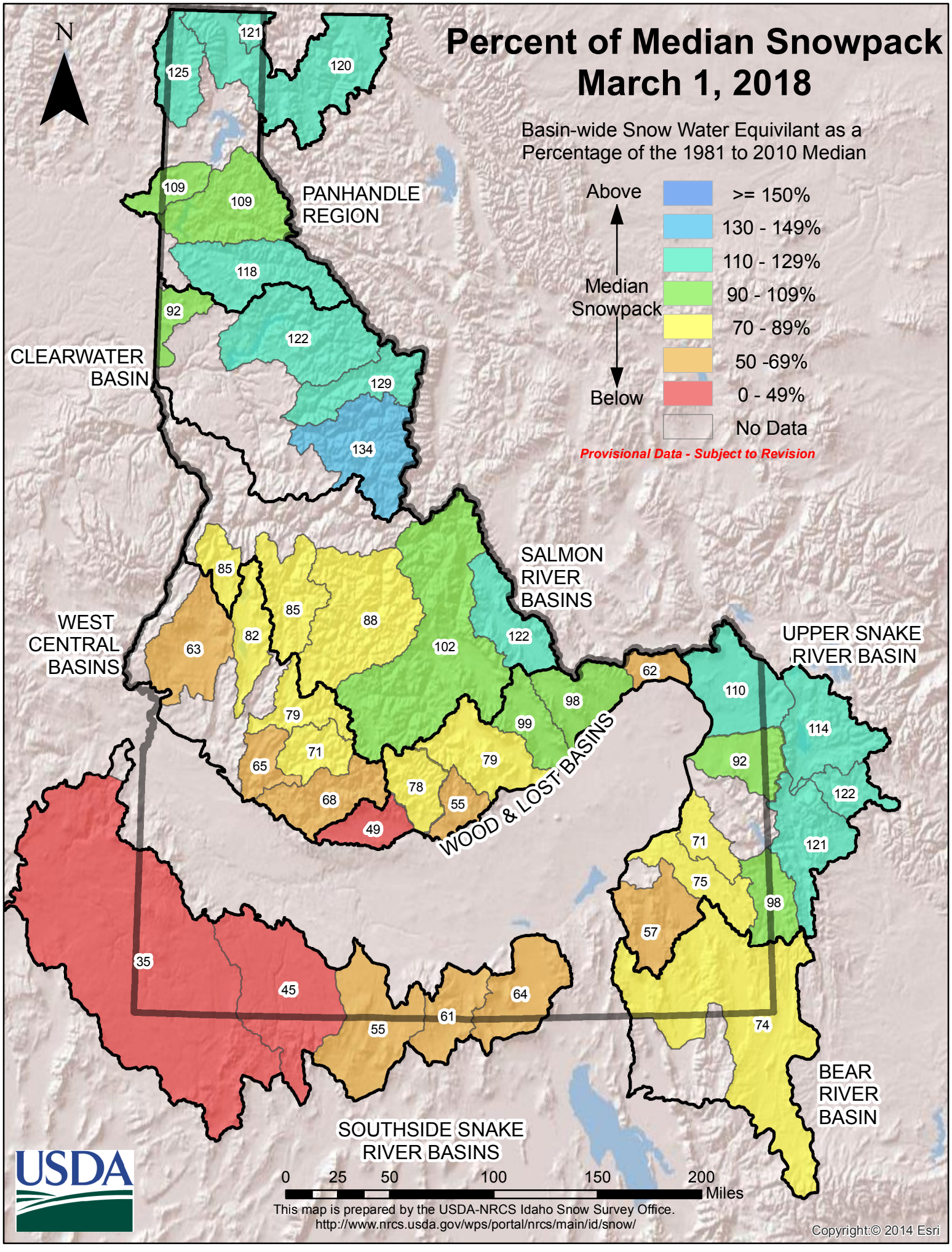
Percent of Median Snowpack
March 1, 2018
Basin-wide Snow Water Equivilant as a Percentage of the 1981 to 2010 Median
Above
Median Snowpack
Below
>= 150%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 -69%
0 - 49%
No Data
Provisional Data - Subject to Revision
N
PANHANDLE REGION
CLEARWATER BASIN
SALMON RIVER BASINS
WEST CENTRAL BASINS
WOOD & LOST BASINS
UPPER SNAKE RIVER BASIN
BEAR RIVER BASIN
SOUTHSIDE SNAKE RIVER BASINS
125
121
120
109
109
118
92
122
129
134
85
85
88
63
82
102
122
62
110
98
79
99
114
71
65
79
92
68
78
55
122
49
71
121
75
98
57
35
45
64
61
74
55
0 25 50 100 150 200
Miles
USDA
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http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/
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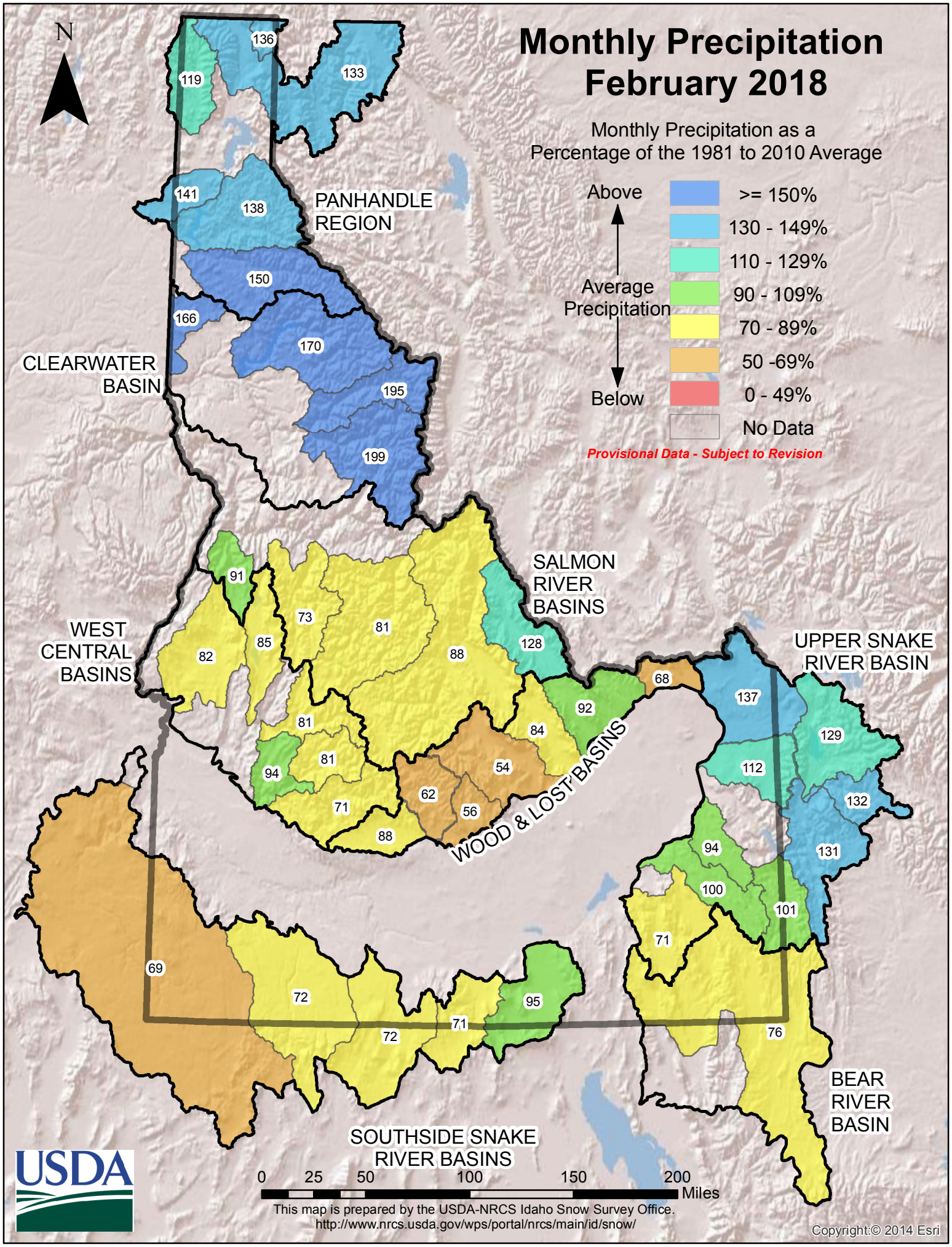
N
Monthly Precipitation
February 2018
Monthly Precipitation as a
Percentage of the 1981 to 2010 Average
Above
Average Precipitation
Below
>= 150%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 -69%
0 - 49%
No Data
Provisional Data - Subject to Revision
PANHANDLE REGION
CLEARWATER BASIN
SALMON RIVER BASINS
WEST CENTRAL BASINS
UPPER SNAKE RIVER BASIN
WOOD & LOST BASINS
BEAR RIVER BASIN
SOUTHSIDE SNAKE RIVER BASINS
136
133
119
141
138
150
166
170
195
199
91
73
81
85
82
88
128
68
92
84
81
81
94
54
62
56
71
88
137
129
112
132
131
94
100
101
71
69
72
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72
76
0 25 50 100 150 200
Miles
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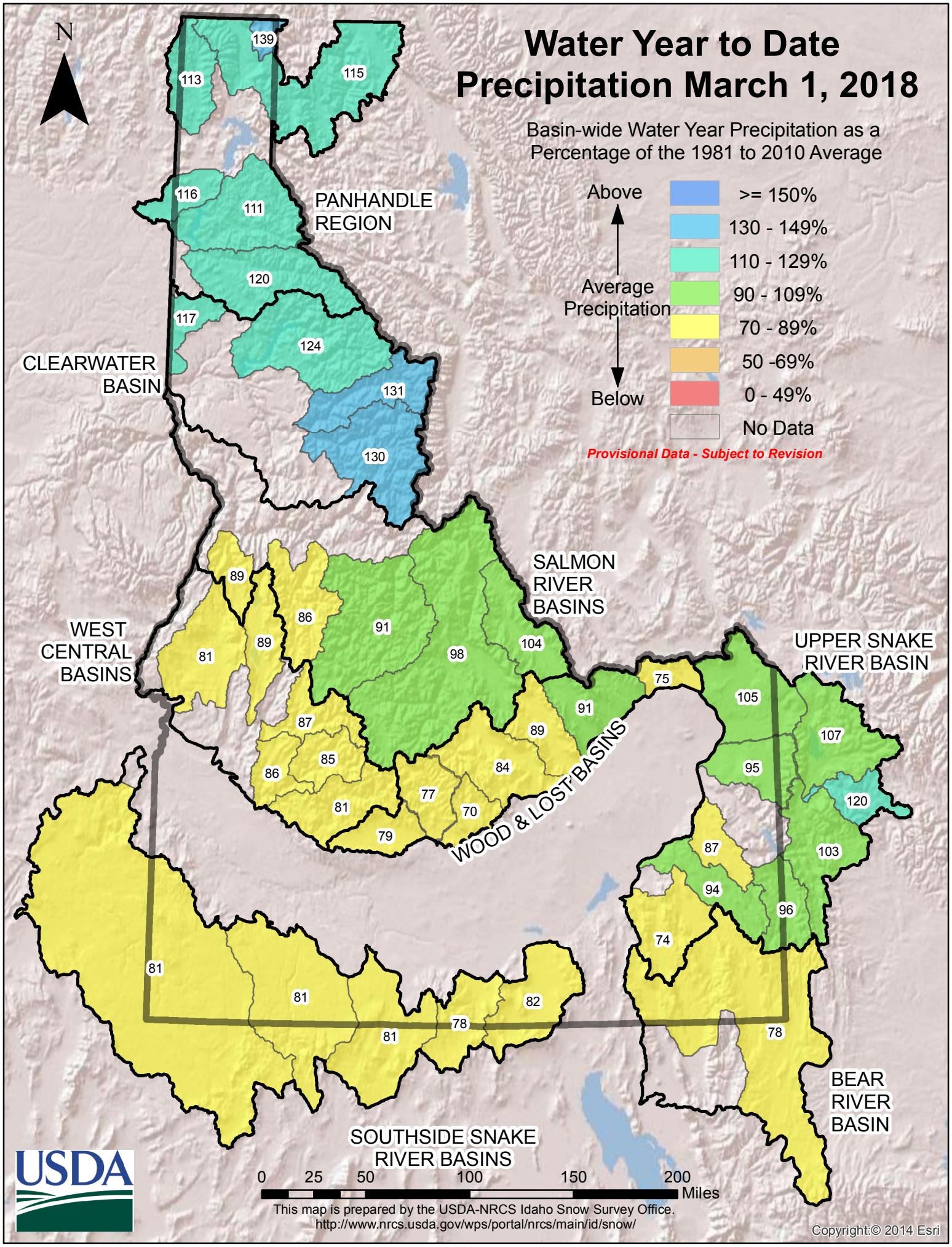
N
Water Year to Date Precipitation March 1, 2018
Basin-wide Water Year Precipitation as a Percentage of the 1981 to 2010 Average
Above
Average Precipitation
Below
>= 150%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 -69%
0 - 49%
No Data
Provisional Data - Subject to Revision
PANHANDLE REGION
CLEARWATER BASIN
SALMON RIVER BASINS
WEST CENTRAL BASINS
UPPER SNAKE RIVER BASIN
WOOD & LOST BASINS
BEAR RIVER BASIN
SOUTHSIDE SNAKE RIVER BASINS
139
115
113
116
111
120
117
124
131
130
89
86
91
81
89
98
104
75
105
91
87
89
107
85
84
95
86
77
120
81
70
79
87
103
94
96
74
81
81
82
78
81
78
0 25 50 100 150 200
Miles
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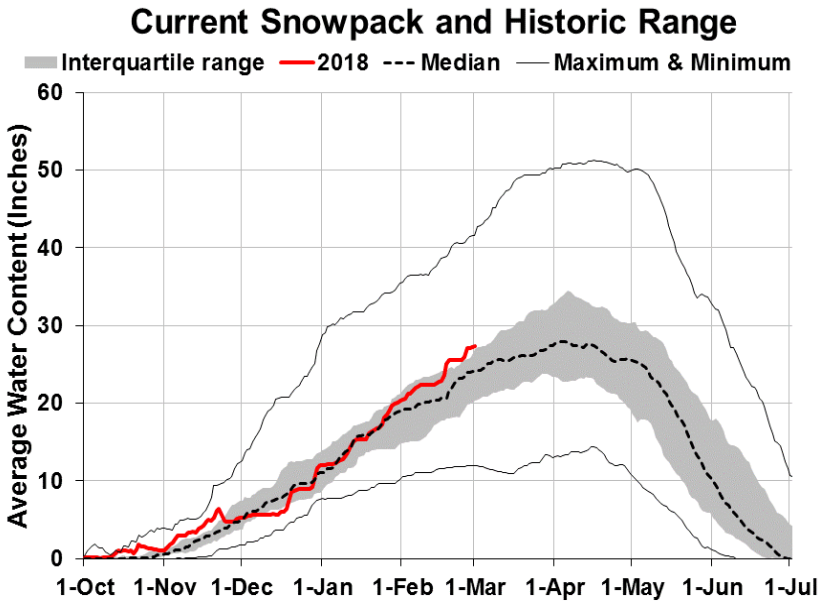
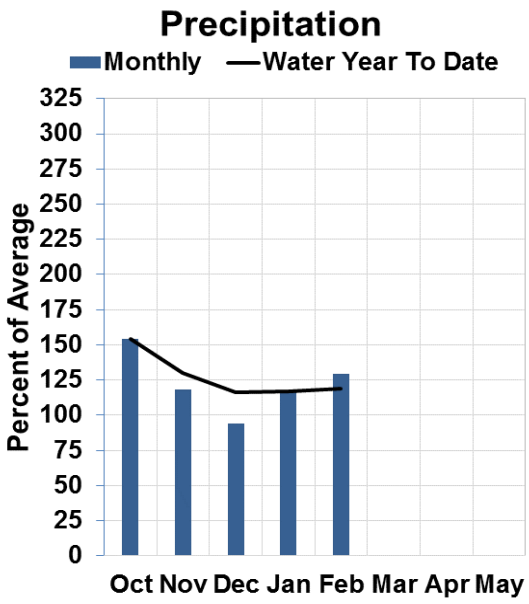
Panhandle Region

March 1, 2018





WATER SUPPLY OUTLOOK

A continuous series of storms rolled through the Panhandle region last month, bringing several feet of snow to most basins. February precipitation totals were between 120% and 150% of normal and water year-to-date precipitation totals remain above normal across the region. Similarly, the March 1 snowpack is above normal in all basins except Rathdrum Creek (84% of normal) and the Palouse River (92% of normal).

Natural lakes in the Idaho Panhandle Region are currently 84% of average. Streamflow forecasts range from 110% to 135% average. NOAA is forecasting continued above normal precipitation for 1-month and 3 month outlook, which would improve the runoff even more. Winter recreationalists are enjoying the abundant snowfall and water supplies will be adequate for all this summer.

Panhandle Region Streamflow Forecasts - March 1, 2018

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Moyie R at Eastport	APR-JUL	385	430	465	124%	500	550	375
	APR-SEP	395	445	480	125%	515	565	385
Kootenai R at Leonia 1 & 2	APR-JUL	6770	7510	7850	119%	8190	8930	6600
	APR-SEP	7810	8540	8880	117%	9210	9940	7590
Boundary Ck nr Porthill	APR-JUL	110	123	131	112%	140	152	117
	APR-SEP	114	128	137	111%	146	159	123
Clark Fork R at Whitehorse Rapids 1 & 2	APR-JUL	11700	13400	14100	134%	14900	16600	10500
	APR-SEP	12800	14600	15400	134%	16200	18100	11500
Pend Oreille Lake Inflow 2	APR-JUL	13800	15000	15900	135%	16700	17900	11800
	APR-SEP	15000	16300	17200	134%	18100	19500	12800
Priest R nr Priest River 2	APR-JUL	705	790	850	109%	905	990	780
	APR-SEP	745	840	900	108%	965	1060	830
NF Coeur dAlene R at Enaville	APR-JUL	540	680	775	111%	870	1010	700
	APR-SEP	580	720	815	110%	910	1050	740
St. Joe R at Calder 2	APR-JUL	1040	1170	1260	120%	1360	1490	1050
	APR-SEP	1100	1240	1340	120%	1430	1570	1120
Spokane R nr Post Falls 2	APR-JUL	2060	2480	2760	115%	3040	3460	2390
	APR-SEP	2170	2590	2870	116%	3160	3580	2480
Spokane R at Long Lake	APR-JUL	2320	2770	3080	118%	3390	3840	2620
	APR-SEP	2550	3010	3330	117%	3640	4100	2850

Normals based on 1981-2010 reference period: streamflow, precipitation, & reservoir normals are averages, SWE normals are medians.

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

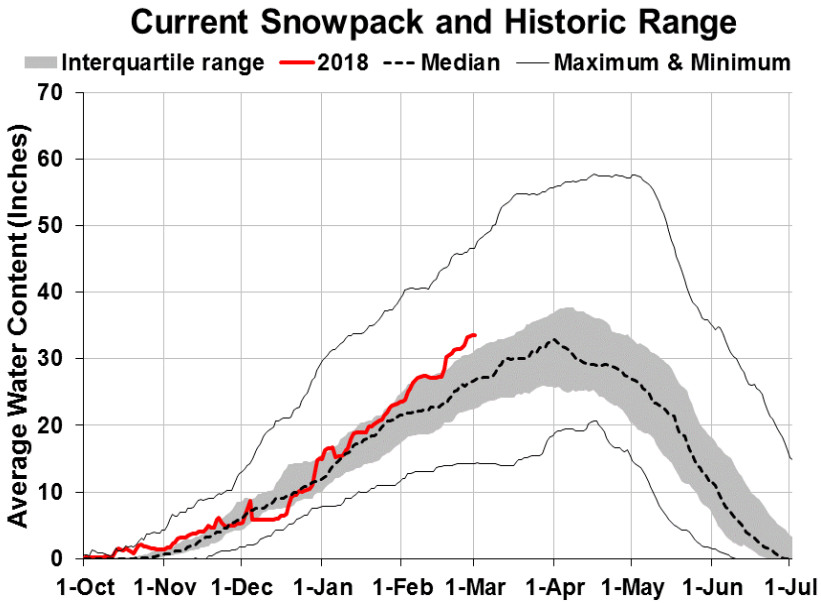
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

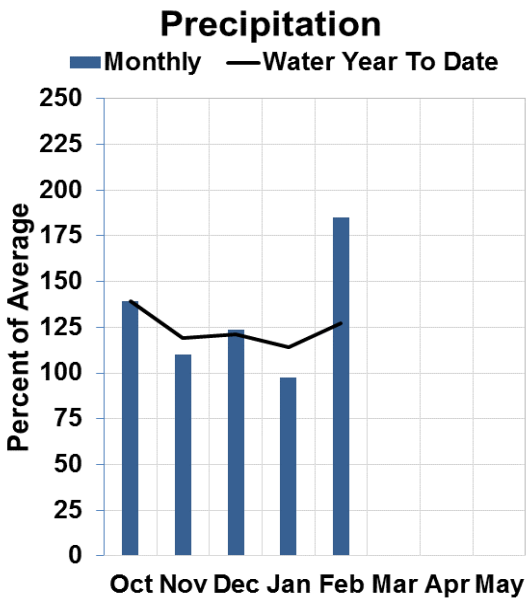
Reservoir Storage (KAF): End of February				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Hungry Horse Lake	2666.5	3014.5	2209.0	3451.0
Flathead Lake	816.1	756.4	812.8	1791.0
Noxon Rapids Reservoir	316.9	303.3	313.9	335.0
Lake Pend Oreille	668.3	700.0	792.6	1561.3
Priest Lake	49.4	61.3	57.1	119.3
Lake Coeur d' Alene	109.2	202.3	132.8	238.5

Watershed Snowpack Analysis: March 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Moyie River	8	121%	96%
Priest River	5	125%	99%
Rathdrum Creek	4	84%	87%
Coeur d' Alene River	9	109%	90%
St. Joe River	5	118%	96%
Spokane River	17	109%	91%
Palouse River	2	92%	111%
Kootenai ab Bonners Ferry	24	120%	94%

Clearwater River Basin

March 1, 2018





WATER SUPPLY OUTLOOK

February 2018 looked a lot like February 2017 in the Clearwater basin with impressive monthly precipitation totals at 177% of normal. Water year-to-date precipitation totals remain well above normal at 125% of average. The snowpack is also in good shape after some big storms and cold temperatures in February left the region at 123% of normal snow water equivalent on March 1.

Current storage in the Dworshak Reservoir is at 60% capacity, or 88% of average for this time of year. Streamflow forecasts are consistent in these basins and range from 124% to 130% of average for the spring and summer runoff season. The above normal snowpacks provide the possibility of high peak flows, but will also provide an extended river running season on the Lochsa and Selway rivers.

Clearwater River Basin Streamflow Forecasts - March 1, 2018

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Selway R nr Lowell	APR-JUL	2120	2330	2480	129%	2630	2840	1920
	APR-SEP	2210	2440	2590	128%	2750	2970	2020
Lochsa R nr Lowell	APR-JUL	1490	1650	1760	125%	1870	2040	1410
	APR-SEP	1560	1730	1840	124%	1960	2130	1480
Dworshak Reservoir Inflow 2	APR-JUL	2440	2780	3010	125%	3240	3580	2410
	APR-SEP	2600	2950	3190	124%	3420	3770	2570
Clearwater R at Orofino	APR-JUL	4630	5210	5600	130%	5990	6560	4310
	APR-SEP	4850	5450	5850	129%	6260	6850	4540
Clearwater R at Spalding 2	APR-JUL	7330	8260	8890	129%	9520	10400	6890
	APR-SEP	7700	8660	9310	128%	9970	10900	7270

Normals based on 1981-2010 reference period: streamflow, precipitation, & reservoir normals are averages, SWE normals are medians.

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

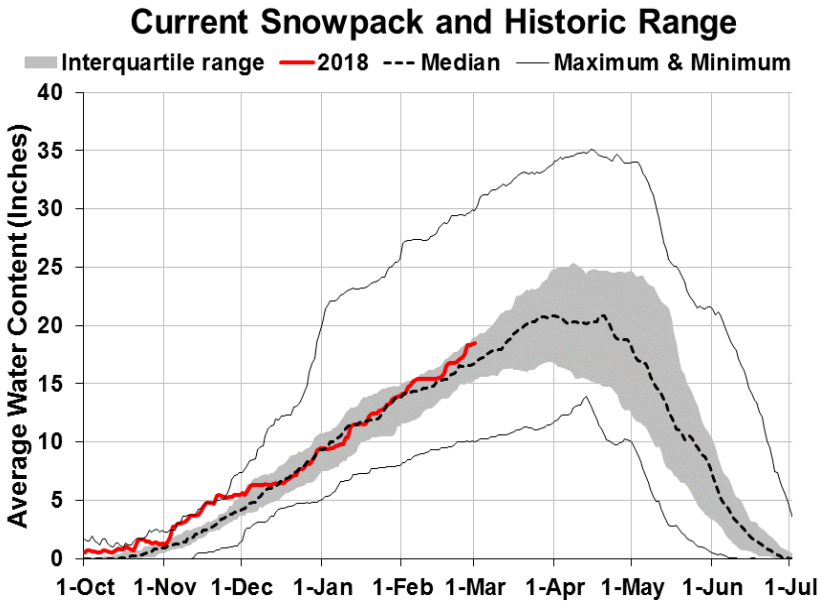
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

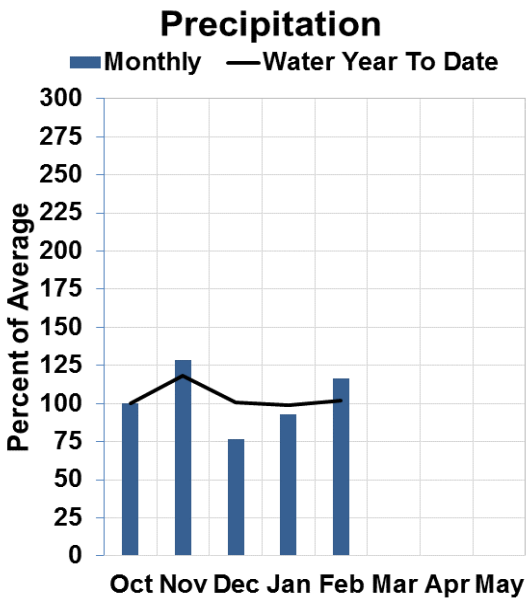
Reservoir Storage (KAF): End of February				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	2065.1	2286.0	2358.0	3468.0

Watershed Snowpack Analysis: March 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
NF Clearwater River	8	122%	99%
Lochsa River	3	129%	102%
Selway River	4	134%	97%
Clearwater Basin Total	17	123%	100%

Salmon River Basin

March 1, 2018





WATER SUPPLY OUTLOOK

After a lull in active weather through the first half of February, storm activity picked up towards the end of the month. Resulting, the Salmon River basin snowpack is above normal. Similarly, monthly precipitation was slightly above normal during February and water year to date precipitation is near normal. At this point, a normal to above normal snowpack peak appears likely for the Salmon River basin. The eastern most portions of the Salmon River basin near the Idaho-Montana border has the highest snowpack with respect to normal, while the western most parts of the drainage (Little Salmon River) is below normal.

Streamflow volumes are expected to be near normal for all forecast points in the Salmon River drainage, including the world famous Middle Fork and Main Salmon whitewater runs. With each passing month, forecast confidence increases. Future monthly Water Supply Outlook Reports will provide an even clearer outlook as conditions change. Spring temperature and precipitation will determine timing and magnitude of the peak flows, but river runners can be assured of a good rafting season based on the current snowpacks and weather patterns.

Salmon River Streamflow Forecasts - March 1, 2018

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Salmon R at Salmon	APR-JUL	465	615	720	93%	825	975	775
	APR-SEP	545	715	835	93%	955	1130	900
Lemhi R nr Lemhi	APR-JUL	33	52	65	88%	78	97	74
	APR-SEP	44	65	80	89%	95	116	90
MF Salmon R at MF Lodge	APR-JUL	485	620	715	104%	810	945	690
	APR-SEP	550	695	795	103%	895	1040	770
Sf Salmon R nr Krassel Ranger Station	APR-JUL	138	190	225	83%	260	310	270
	APR-SEP	153	210	245	84%	280	335	290
Johnson Ck at Yellow Pine Id	APR-JUL	104	140	164	86%	188	225	191
	APR-SEP	112	150	175	85%	200	240	205
Salmon R at White Bird	APR-JUL	3960	4880	5500	102%	6120	7040	5370
	APR-SEP	4380	5380	6060	102%	6740	7740	5940

Normals based on 1981-2010 reference period: streamflow, precipitation, & reservoir normals are averages, SWE normals are medians.

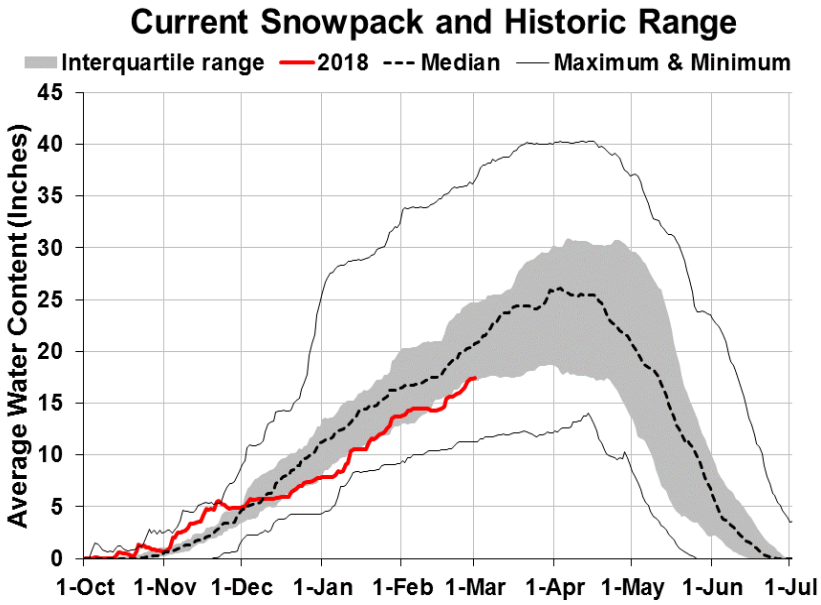
1) 90% and 10% exceedance probabilities are actually 95% and 5%

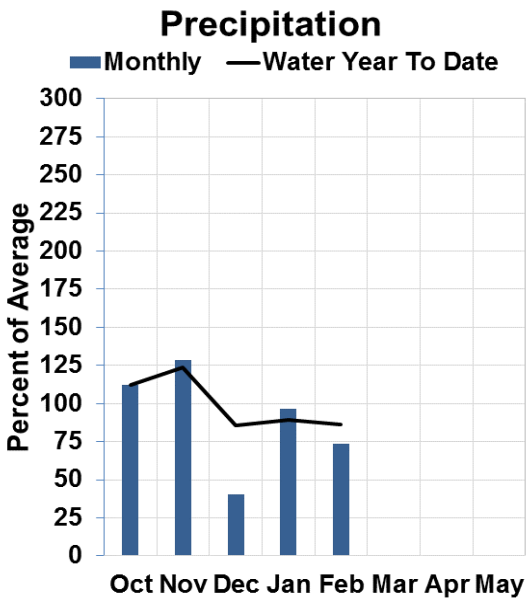
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Watershed Snowpack Analysis: March 1, 2018 Basin Name	# of Sites	% of Median 2018	2017
Salmon River ab Salmon	9	102%	164%
Lemhi River	9	122%	141%
MF Salmon River	3	88%	142%
SF Salmon River	3	85%	119%
Little Salmon River	4	85%	118%
Salmon Basin Total	28	103%	135%

West Central Basins

March 1, 2018





WATER SUPPLY OUTLOOK

Much above normal temperatures and below normal precipitation plagued the West Central basins through the first half of February. The second half of February was the opposite, and to the delight of winter recreationalists several storms deposited very low density (as low as 4% water!) snow. From highest to lowest; Payette River basin is 78% of normal, Boise River basin is 66%, and the Weiser River basin is 63%. The beginning of March is actively bringing plentiful moisture to boost snowpack numbers, especially for the Weiser and Boise River basins.

Reservoirs are still holding much above average water for this time of year. The combined Boise system (Anderson Ranch + Arrowrock + Lucky Peak) is 82% full and 150% of average. The Payette system (Deadwood + Cascade) is 77% full and 120% of average. Streamflow volumes are forecast to be below normal for all streamflow points in the Weiser, Payette, and Boise River basins. The lowest expected volumes are currently the SF Boise River, and the Boise system in general is forecast on the low end at 65 to 75% of average. The Payette River system is expected to be closer to normal, with streamflow forecasts ranging from 75 to 85% of average. Due to the much above average reservoir carryover, shortages are not expected for users on the major projects in the West Central basins.

West Central Basins Streamflow Forecasts - March 1, 2018

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
SF Boise R at Anderson Ranch Dam 2	MAR-JUL	205	285	340	65%	390	470	520
	APR-JUL	175	250	305	64%	355	435	475
	APR-SEP	192	275	330	65%	385	465	510
Boise R nr Twin Springs	MAR-JUL	365	445	500	77%	555	635	650
	APR-JUL	315	395	450	77%	505	585	585
	APR-SEP	345	430	490	77%	550	635	635
Mores Ck nr Arrowrock Dam	MAR-JUL	53	76	93	63%	112	144	147
	APR-JUL	38	57	73	63%	90	119	115
	APR-SEP	40	60	76	64%	94	124	119
Boise R nr Boise 2	MAR-JUL	700	880	1000	70%	1120	1300	1430
	APR-JUL	545	735	865	69%	995	1180	1260
	APR-SEP	630	820	945	69%	1080	1270	1360
Lake Fork Payette R nr McCall	APR-JUL	52	62	68	85%	76	87	80
	APR-SEP	53	63	71	86%	78	90	83
NF Payette R at Cascade 2	APR-JUL	270	355	410	85%	470	550	485
	APR-SEP	260	340	395	80%	445	525	495
NF Payette R nr Banks 2	APR-JUL	370	465	525	84%	590	680	625
	APR-SEP	335	435	500	78%	570	665	640
SF Payette R at Lowman	APR-JUL	230	275	305	76%	340	390	400
	APR-SEP	265	315	350	77%	385	445	455
Deadwood Reservoir Inflow 2	APR-JUL	67	84	97	79%	109	126	123
	APR-SEP	71	91	104	79%	117	136	131
Payette R nr Horseshoe Bend 2	APR-JUL	905	1090	1220	82%	1340	1530	1480
	APR-SEP	870	1100	1250	77%	1400	1620	1630
Weiser R nr Weiser	MAR-JUL	200	295	370	70%	455	590	530
	APR-JUL	132	200	255	69%	320	425	370
	APR-SEP	147	220	280	70%	345	450	400

Normals based on 1981-2010 reference period: streamflow, precipitation, & reservoir normals are averages, SWE normals are medians.

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

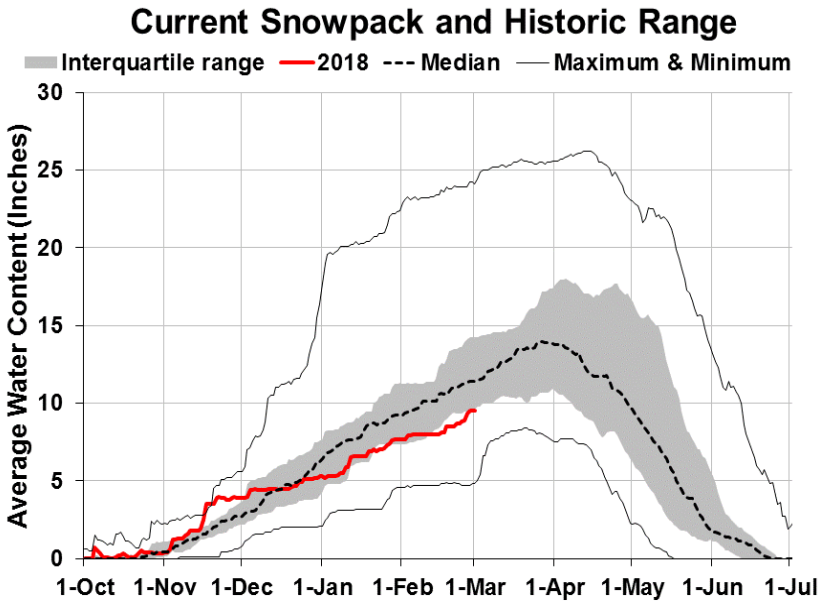
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

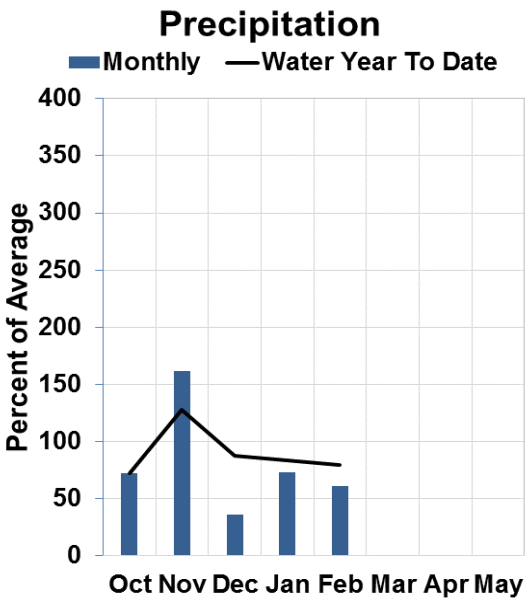
Reservoir Storage (KAF): End of February				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Anderson Ranch Reservoir	366.2	276.8	247.0	450.2
Arrowrock Reservoir	247.0	216.3	185.9	272.2
Lucky Peak Reservoir	215.4	125.8	120.5	293.2
Sub-Basin Total	**828.6**	**618.9**	**553.4**	**1015.6**
Deadwood Reservoir	113.4	101.7	88.9	161.9
Cascade Reservoir	542.5	508.4	457.6	693.2
Sub-Basin Total	**655.8**	**610.2**	**546.5**	**855.1**
Lake Lowell	116.7	99.1	97.7	165.2
Mann Creek Reservoir	2.8	3.9	5.2	11.1

Watershed Snowpack Analysis: March 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
SF Boise River	8	68%	160%
MF & NF Boise Rivers	6	71%	140%
Mores Creek	4	65%	127%
Canyon Creek	4	59%	149%
Boise Basin Total	17	66%	142%
NF Payette River	8	82%	111%
SF Payette River	5	79%	137%
Payette Basin Total	15	78%	122%
Mann Creek	1	54%	103%
Weiser Basin Total	8	63%	110%

Wood & Lost River Basin

March 1, 2018





WATER SUPPLY OUTLOOK

Look no further than the Wood & Lost River basins to see the difference one year can make. One year ago, on March 1 2017, these basins were holding nearly 200% of normal snowpack; on March 1 2018, these basins are hovering around 70-80% of normal. Conditions improve farther to the east, where the Little Lost River basin is 99% of normal. Early March storms have already improved snowpack numbers in these areas, and some SNOTEL sites are reporting more accumulated snow during the first 4 days of March than the entire month of February! Monthly precipitation continued the pattern of being below normal, as the precipitation graph above illustrates. Resulting, water year to date precipitation is only 70 to 90% of normal.

Mackay Reservoir is holding 84% of capacity (128% of average), Little Wood is 94% full (162% of average), and Magic is 90% full (237% of average). The system is still fairly full from last winter's abundant precipitation, so it's probably a good thing current snow conditions aren't similar to 2017. Streamflow forecasts generally range from 40 to 70% of average, except for the Little Lost (82%) and Camas Creek near Blaine (10%). Above normal winter flows and exceptional reservoir carryover should help to mitigate a lower than normal snow-driven seasonal runoff, and as a result, irrigation supplies are expected to be marginally adequate.

Wood and Lost Basins Streamflow Forecasts - March 1, 2018

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Camas Ck at Camas	APR-JUL	2.4	6.4	10.4	37%	15.2	24	28
Little Lost R nr Howe	APR-JUL	12.1	18.6	23	82%	27	34	28
	APR-SEP	19.1	24	28	82%	33	39	34
Big Lost R at Howell Ranch	APR-JUL	65	91	111	70%	133	169	159
	APR-SEP	73	103	126	70%	151	192	180
Big Lost R bl Mackay Reservoir	APR-JUL	29	54	75	61%	101	145	123
	APR-SEP	43	73	97	65%	125	173	150
Little Wood R ab High Five Ck	MAR-JUL	16.3	29	40	52%	53	75	77
	MAR-SEP	17.8	32	44	54%	57	81	82
	APR-JUL	12.1	24	35	51%	47	69	69
Little Wood R nr Carey 2	MAR-JUL	15.7	30	42	49%	56	80	86
	MAR-SEP	17.7	33	45	49%	60	86	92
	APR-JUL	11.7	25	36	47%	50	74	77
Big Wood R at Hailey	APR-JUL	84	118	144	61%	172	220	235
	APR-SEP	95	133	162	61%	195	250	265
Big Wood R ab Magic Reservoir	APR-JUL	17.9	45	70	41%	101	156	170
	APR-SEP	20	49	76	42%	108	167	182
Camas Ck nr Blaine	APR-JUL	0.7	2.6	8.5	10%	17.8	38	82
	APR-SEP	0	2.8	8.8	11%	18.1	38	83
Big Wood R bl Magic Dam 2	APR-JUL	26	66	103	41%	149	230	250
	APR-SEP	28	71	111	42%	160	250	265

Normals based on 1981-2010 reference period: streamflow, precipitation, & reservoir normals are averages, SWE normals are medians.

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

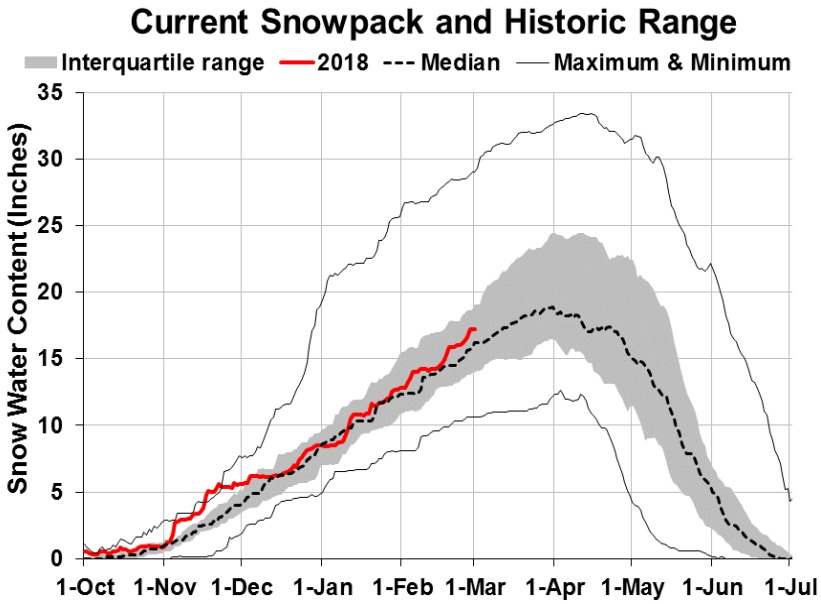
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

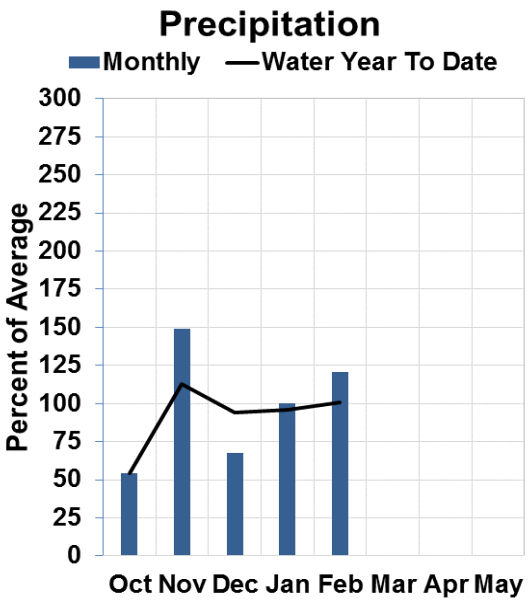
Reservoir Storage (KAF): End of February				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Mackay Reservoir	37.5	35.5	29.3	44.4
Little Wood Reservoir	28.1	11.5	17.4	30.0
Magic Reservoir	171.6	98.9	72.5	191.5

Watershed Snowpack Analysis: March 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Camas-Beaver Creeks	4	62%	117%
Birch-Medicine Lodge Creeks	4	98%	143%
Little Lost River	4	99%	168%
Big Lost River ab Mackay	6	79%	198%
Big Lost Basin Total	7	79%	192%
Fish Creek	3	44%	197%
Little Wood River	4	55%	199%
Big Wood River ab Hailey	7	78%	184%
Camas Creek	5	49%	168%
Big Wood Basin Total	12	68%	178%

Upper Snake River Basin

March 1, 2018





WATER SUPPLY OUTLOOK

February in the Upper Snake River region was marked by large, consistent storms which are well exemplified by Lewis Lake Divide SNOTEL data. This consistency, which has prevailed the majority of the winter, puts snowpack above average at 112% of normal and precipitation at 104% of normal. The Teton River is at 92% of normal, and 95% of average precipitation, while the Buffalo Fork holds 128% of normal snowpack, and 131% of normal precipitation. The Portneuf, Blackfoot and Willow Creek Basins range from 60-75% of normal snowpack, comprising the lowest in the region, which NOAA had predicted a continuation of these conditions at the beginning of the month. Warmer temperatures and average precipitation in lower elevations along the Idaho/Utah border led to the below average snowpack observed in the region this month.

Reservoir storage is currently 130% of average, with Jackson Lake at 151% of average. Water managers began aquifer recharge in August and are up to 255 KAF and counting, diverting water from the reservoir system into the ground to make space for upcoming snow water runoff. With next month's NOAA predictions looking colder than average, with normal precipitation, the region is likely to see even more gains in snow water storage. Forecasts for spring runoff range from 80% to 120% of normal for most basins.

Upper Snake River Basin Streamflow Forecasts - March 1, 2018

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Henrys Fk nr Ashton 2	APR-JUL	385	465	520	98%	575	660	530
	APR-SEP	535	635	700	99%	765	860	710
Falls R nr Ashton 2	APR-JUL	305	350	380	104%	415	460	365
	APR-SEP	370	425	460	106%	495	550	435
Teton R nr Driggs	APR-JUL	78	108	129	84%	149	179	154
	APR-SEP	99	137	163	84%	188	225	193
Teton R nr St Anthony	APR-JUL	205	270	315	86%	365	430	365
	APR-SEP	250	325	380	87%	435	510	435
Henrys Fk nr Rexburg 2	APR-JUL	985	1190	1340	96%	1480	1690	1400
	APR-SEP	1270	1540	1720	96%	1910	2180	1790
Snake R at Flagg Ranch	APR-JUL	430	495	540	116%	585	650	465
	APR-SEP	475	545	595	117%	640	710	510
Snake R nr Moran 2	APR-JUL	710	805	870	114%	935	1030	765
	APR-SEP	785	890	965	114%	1040	1140	845
Pacific Ck at Moran	APR-JUL	154	182	200	122%	220	250	164
	APR-SEP	163	192	210	121%	230	260	173
Buffalo Fk ab Lava Ck nr Moran	APR-JUL	265	305	335	120%	360	400	280
	APR-SEP	300	345	380	119%	410	460	320
Snake R ab Reservoir nr Alpine 2	APR-JUL	2040	2290	2460	113%	2630	2890	2170
	APR-SEP	2330	2620	2820	113%	3020	3320	2500
Greys R ab Reservoir nr Alpine	APR-JUL	240	280	305	100%	330	370	305
	APR-SEP	275	325	355	99%	385	435	360
Salt R ab Reservoir nr Etna	APR-JUL	134	199	245	82%	290	355	300
	APR-SEP	176	255	305	82%	355	435	370
Snake R nr Irwin 2	APR-JUL	2490	2880	3140	104%	3400	3790	3010
	APR-SEP	2880	3340	3650	104%	3960	4410	3500
Snake R nr Heise 2	APR-JUL	2680	3100	3380	104%	3660	4070	3240
	APR-SEP	3130	3620	3950	104%	4280	4770	3780
Willow Ck nr Ririe 2	MAR-JUL	9.6	20	30	45%	42	62	67
Portneuf R at Topaz	MAR-JUL	16.4	32	43	57%	53	69	76
	MAR-SEP	21	40	54	58%	67	86	93
Snake R at Neeley 2	APR-JUL	685	1420	1930	73%	2430	3170	2650
	APR-SEP	595	1420	1980	70%	2540	3360	2810

Normals based on 1981-2010 reference period: streamflow, precipitation, & reservoir normals are averages, SWE normals are medians.

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

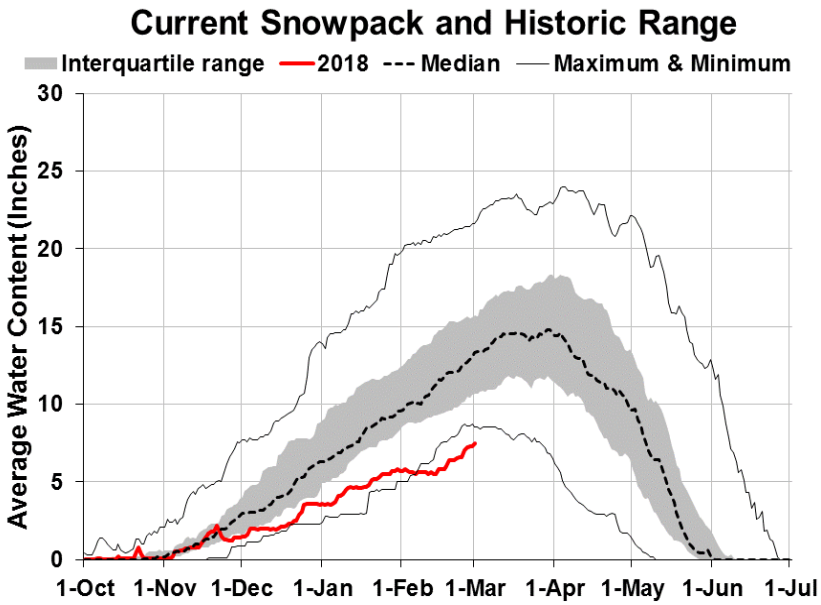
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

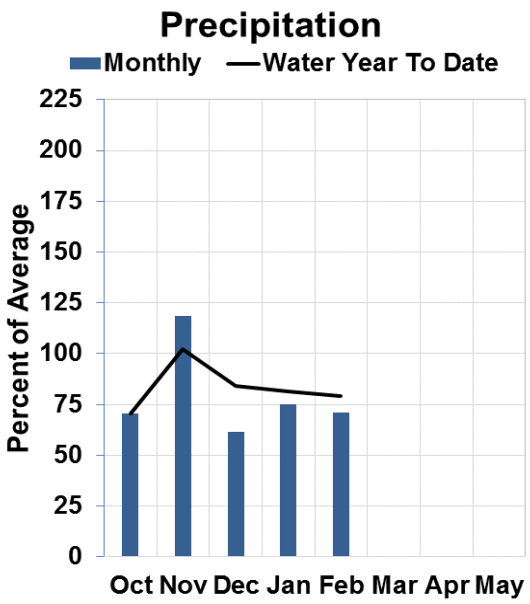
Reservoir Storage (KAF): End of February				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Jackson Lake	656.6	586.5	434.7	847.0
Palisades Reservoir	1334.8	726.0	925.7	1400.0
Sub-Basin Total	**1991.4**	**1312.5**	**1360.4**	**2247.0**
Henrys Lake	81.7	84.9	80.6	90.4
Island Park Reservoir	119.5	98.7	104.7	135.2
Grassy Lake	13.6	14.5	12.1	15.2
Sub-Basin Total	**214.8**	**198.1**	**197.4**	**240.8**
Ririe Reservoir	50.6	50.1	41.2	80.5
Blackfoot Reservoir	281.5	235.4	181.3	337.0
American Falls Reservoir	1450.9	1458.9	1296.0	1672.6
Basin-Wide Total	**3989.2**	**3255.1**	**3076.3**	**4577.9**

Watershed Snowpack Analysis: March 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Henrys Fork-Falls River	10	110%	123%
Teton River	9	92%	126%
Henrys Fork ab Rexburg	19	102%	124%
Snake River ab Jackson Lake	12	114%	146%
Pacific Creek	4	121%	182%
Buffalo Fork	4	128%	156%
Gros Ventre River	5	122%	159%
Hoback River	6	121%	202%
Greys River	4	120%	166%
Salt River	5	98%	151%
Snake ab Palisades Resv	34	112%	159%
Willow Creek - Ririe	7	71%	144%
Blackfoot River	5	75%	148%
Portneuf River	7	57%	160%
Snake River ab American Falls	55	99%	152%

Southside Snake River Basins

March 1, 2018





WATER SUPPLY OUTLOOK

The Southside Snake benefitted significantly from the storms over the last few weeks. Nearly 75% of February precipitation for Southside basin sites fell after February 15th. In spite of recent precipitation February was the 3rd consecutive month the Southside Snake received below normal precipitation. Snowpack similarly increased steadily in the second half of the month. In spite of late February snow, the Southside Snake basin is currently well below normal for snow water equivalent. Owyhee basin ended February at 35% of normal and the high for the Southside Snake is the Raft River basin at 64% of normal. With a storm track appearing like it will benefit these basins and a 1-month outlook for above average precipitation hopefully the outlook will approach normal by the end of March.

Forecasts for the Southside Snake continue to be below normal. Owyhee River is the lowest with a forecast ~25%, and the high forecast for Southside Snake basins is Trapper Creek at 72% of normal. The forecasts across the Southside snake basins are all below normal. Reservoir storage continues to be a bright spot in the Southside Snake. Reservoir storage for the end of February ranges from 145% (Oakley Reservoir) to 199% of normal (Salmon Falls Reservoir) with the exception of Brownlee Reservoir which is currently at 84% of normal. Despite low forecasts for the runoff season water supply should be adequate due to above normal reservoir storage.

Southside Snake River Basins Streamflow Forecasts - March 1, 2018

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Goose Ck abv Trapper Ck nr Oakley	MAR-JUL	4.7	8.4	11.5	52%	15.1	21	22
	MAR-SEP	4.9	8.8	12.2	51%	16	23	24
Trapper Ck nr Oakley	MAR-JUL	2.9	3.6	4	68%	4.6	5.4	5.9
	MAR-SEP	3.8	4.6	5.1	72%	5.7	6.6	7.1
Oakley Reservoir Inflow	MAR-JUL	7.3	11.8	15.5	55%	19.7	27	28
	MAR-SEP	8.4	13.3	17.3	56%	22	29	31
Salmon Falls Ck nr San Jacinto	MAR-JUL	17.1	27	36	44%	45	61	81
	MAR-SEP	19.1	30	38	45%	48	64	85
Bruneau R nr Hot Spring	MAR-JUL	25	75	109	53%	142	192	205
	MAR-SEP	28	79	114	53%	149	200	215
Reynolds Ck at Tollgate	MAR-JUL	0.6	1.1	2	23%	3.6	6	8.8
Owyhee R nr Gold Ck 2	MAR-JUL	0.77	3.2	5.9	21%	9.3	15.8	28
	APR-JUL	0	1.03	3.2	15%	6.6	13.9	22
Owyhee R nr Rome	MAR-JUL	29	78	125	24%	183	290	515
	MAR-SEP	35	87	136	26%	195	305	530
	APR-JUL	6.6	43	85	25%	141	250	345
Owyhee R bl Owyhee Dam 2	MAR-JUL	39	100	157	28%	225	355	555
	MAR-SEP	56	122	182	31%	255	380	585
	APR-JUL	16.5	63	112	30%	174	290	375
Snake R bl Lower Granite Dam 1	APR-JUL	18000		22200	112%		27100	19800
	APR-SEP	20300		24700	111%		30000	22300

Normals based on 1981-2010 reference period: streamflow, precipitation, & reservoir normals are averages, SWE normals are medians.

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

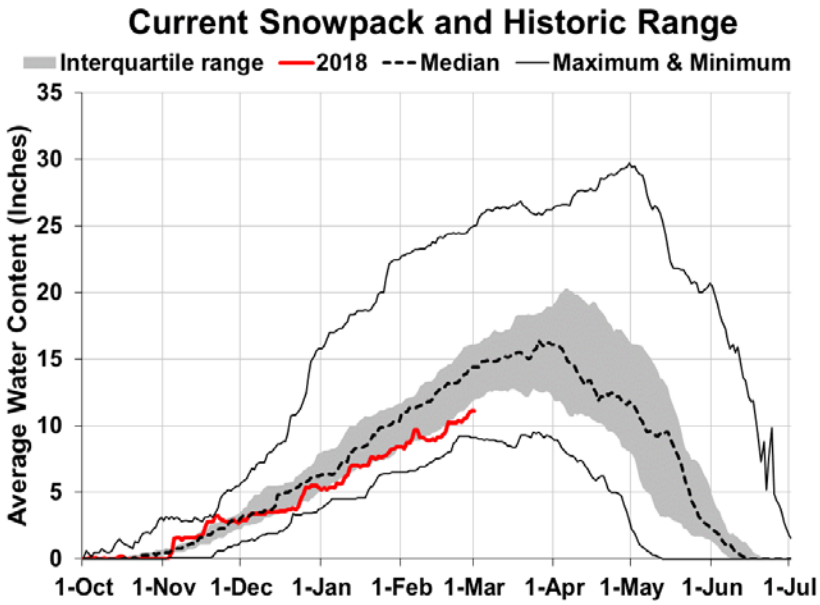
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

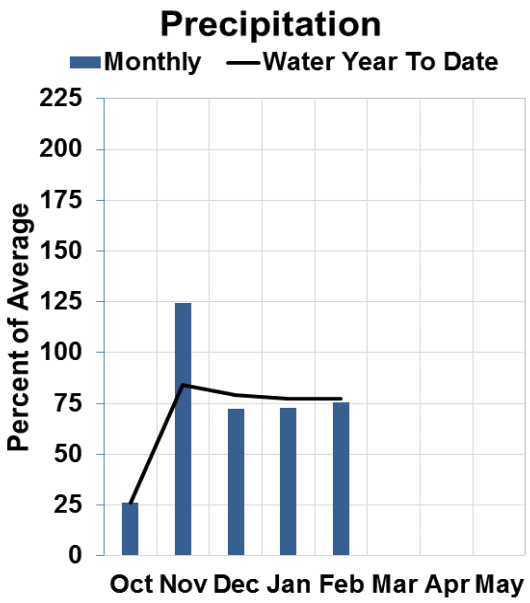
Reservoir Storage (KAF): End of February				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Oakley Reservoir	36.7	38.2	25.3	75.6
Salmon Falls Reservoir	93.5	81.4	47.1	182.6
Wild Horse Reservoir	61.3	39.5	34.5	71.5
Lake Owyhee	513.8	504.4	392.6	715.0
Brownlee Reservoir	948.8	1072.7	1129.0	1420.0

Watershed Snowpack Analysis: March 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Raft River	6	64%	141%
Goose-Trapper Creeks	6	61%	137%
Salmon Falls Creek	8	55%	129%
Bruneau River	8	45%	136%
Reynolds Creek	1	71%	295%
Owyhee Basin Total	11	35%	135%
Owyhee Basin Snotel Total	8	41%	137%

Bear River Basin

March 1, 2018





WATER SUPPLY OUTLOOK

The Bear River basin continues to see below average snowpacks with the northerly storm track that has prevailed so far this winter. SNOTEL sites in the region received anywhere from a third of normal precipitation for the month of February, to above average in the northern reaches of the drainage. The Malad River still holds the lowest snowpack with 51% of normal and 57% of normal precipitation, while the Smiths-Thomas Forks hold the highest at near average (95% of normal snowpack and 88% of normal precipitation).

Both Bear Lake and Montpelier Reservoir are well above average capacity at 167% and 186%, respectfully, which continues to be the ace up our sleeve. Last year's storms are really paying dividends this winter, helping to mitigate the effects of a low snow year. Forecasts range from 40-85% of average, the highest of the range predicted in the Smiths and Thomas Forks. Remember that these forecast numbers are natural flow predictions without added water from reservoir releases. Reservoir managers will supplement further needs for irrigation and water supply, but water users relying on natural flows in the smaller tributaries should plan accordingly.

Bear River Basin Streamflow Forecasts - March 1, 2018

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Bear R nr UT-WY State Line	APR-JUL	35	56	71	63%	86	107	112
	APR-SEP	39	63	79	64%	96	120	123
Bear R ab Resv nr Woodruff	APR-JUL	12.1	36	68	56%	100	148	121
	APR-SEP	7.7	34	70	55%	106	158	128
Big Ck nr Randolph	APR-JUL	0.23	0.61	1.6	42%	3	5	3.8
Smiths Fk nr Border	APR-JUL	47	64	75	84%	86	103	89
	APR-SEP	58	77	90	87%	103	122	104
Bear R bl Stewart Dam 2	MAR-JUL	5.1	74	120	59%	166	235	205
	MAR-SEP	4.2	82	135	59%	188	265	230
	APR-SEP	12.3	62	115	56%	168	246	205
Little Bear at Paradise	APR-JUL	1.8	8.9	18	40%	27	41	45
Logan R nr Logan	APR-JUL	39	56	68	61%	80	98	111
Blacksmith Fk nr Hyrum	APR-JUL	7.1	19.8	28	65%	37	50	43

Normals based on 1981-2010 reference period: streamflow, precipitation, & reservoir normals are averages, SWE normals are medians.

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

Reservoir Storage (KAF): End of February				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Bear Lake	991.5	540.9	594.1	1302.0
Montpelier Reservoir	3.3	2.0	1.8	4.0

Watershed Snowpack Analysis: March 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Smiths-Thomas Forks	4	95%	183%
Bear River ab WY-ID Line	10	82%	180%
Montpelier Creek	2	80%	173%
Mink Creek	4	63%	152%
Cub River	3	68%	149%
Bear River ab ID-UT Line	24	74%	166%
Malad River	3	51%	159%

Streamflow Adjustment List for All Forecasts Published in Idaho Water Supply Outlook Report: Streamflow forecasts are projections of runoff volumes that would occur without influences from upstream reservoirs or diversions. These values are referred to as natural, unregulated or adjusted flows. To make these adjustments, changes in reservoir storage, diversions, and inter-basin transfers are added or subtracted from the observed (actual) streamflow volumes. The following list documents the adjustments made for each forecast point. **(Revised Feb. 2015).**

Panhandle Region

Kootenai R at Leonia, MT (2)
+ Lake Koocanusa storage change

Moyie R at Eastport – no corrections

Boundary Ck nr Porthill – no corrections

Clark Fork R at Whitehorse Rapids (2)
+ Hungry Horse storage change
+ Flathead Lake storage change
+ Noxon Res storage change

Pend Oreille Lake Inflow (2)
+ Pend Oreille R at Newport, WA
+ Hungry Horse Res storage change
+ Flathead Lake storage change
+ Noxon Res storage change
+ Lake Pend Oreille storage change
+ Priest Lake storage change

Priest R nr Priest R (2)
+ Priest Lake storage change

NF Coeur d' Alene R at Enaville - no corrections

St. Joe R at Calder- no corrections

Spokane R nr Post Falls (2)
+ Lake Coeur d' Alene storage change

Spokane R at Long Lake, WA (2)
+ Lake Coeur d' Alene storage change
+ Long Lake, WA storage change

Clearwater River Basin

Selway R nr Lowell - no corrections

Lochsa R nr Lowell - no corrections

Dworshak Res Inflow (2)
+ Clearwater R nr Peck
- Clearwater R at Orofino
+ Dworshak Res storage change

Clearwater R at Orofino - no corrections

Clearwater R at Spalding (2)
+ Dworshak Res storage change

Salmon River Basin

Salmon R at Salmon - no corrections

Lemhi R nr Lemhi – no corrections

MF Salmon R at MF Lodge – no corrections

SF Salmon R nr Krassel Ranger Station – no corrections

Johnson Creek at Yellow pine – no corrections

Salmon R at White Bird - no corrections

West Central Basins

Boise R nr Twin Springs - no corrections

SF Boise R at Anderson Ranch Dam (2)
+ Anderson Ranch Res storage change

Mores Ck nr Arrowrock Dam – no corrections

Boise R nr Boise (2)
+ Anderson Ranch Res storage change
+ Arrowrock Res storage change
+ Lucky Peak Res storage change

SF Payette R at Lowman - no corrections

Deadwood Res Inflow (2)
+ Deadwood R bl Deadwood Res nr Lowman
+ Deadwood Res storage change

Lake Fork Payette R nr McCall – no corrections

NF Payette R at Cascade (2)
+ Payette Lake storage change
+ Cascade Res storage change

NF Payette R nr Banks (2)
+ Payette Lake storage change
+ Cascade Res storage change

Payette R nr Horseshoe Bend (2)
+ Deadwood Res storage change
+ Payette Lake storage change
+ Cascade Res storage change

Weiser R nr Weiser - no corrections

Wood and Lost Basins

Little Lost R bl Wet Ck nr Howe - no corrections

Big Lost R at Howell Ranch - no corrections

Big Lost R bl Mackay Res nr Mackay (2)
+ Mackay Res storage change

Little Wood R ab High Five Ck – no corrections

Little Wood R nr Carey (2)
+ Little Wood Res storage change

Big Wood R at Hailey - no corrections

Big Wood R ab Magic Res (2)
+ Big Wood R nr Bellevue (1912-1996)
+ Big Wood R at Stanton Crossing nr Bellevue (1997 to present)
+ Willow Ck (1997 to present)

Camas Ck nr Blaine – no corrections

Magic Res Inflow (2)
+ Big Wood R bl Magic Dam
+ Magic Res storage change

Upper Snake River Basin

Falls R nr Ashton (2)
+ Grassy Lake storage change
+ Diversions from Falls R ab nr Ashton

Henrys Fork nr Ashton (2)
+ Henrys Lake storage change
+ Island Park Res storage change

Teton R nr Driggs - no corrections

Teton R nr St. Anthony (2)
- Cross Cut Canal into Teton R
+ Sum of Diversions for Teton R ab St. Anthony
+ Teton Dam for water year 1976 only

Henrys Fork nr Rexburg (2)
+ Henrys Lake storage change
+ Island Park Res storage change
+ Grassy Lake storage change
+ 3 Diversions from Falls R ab Ashton-Chester
+ 6 Diversions from Falls R abv Ashton
+ 7 Diversions from Henrys Fk btw Ashton to St. Anthony
+ 21 Diversions from Henrys Fk btw St. Anthony to Rexburg
Snake R nr Flagg Ranch, WY – no corrections
Snake R nr Moran, WY (2)
+ Jackson Lake storage change
Pacific Ck at Moran, WY - no corrections
Buffalo Fork ab Lava nr Moran, WY - no corrections
Snake R ab Res nr Alpine, WY (2)
+ Jackson Lake storage change
Greys R nr Alpine, WY - no corrections
Salt R R nr Etna, WY - no corrections
Palisades Res Inflow (2)
+ Snake R nr Irwin
+ Jackson Lake storage change
+ Palisades Res storage change
Snake R nr Heise (2)
+ Jackson Lake storage change
+ Palisades Res storage change
Ririe Res Inflow (2)
+ Willow Ck nr Ririe
+ Ririe Res storage change
The forecasted natural volume for Willow Creek nr Ririe <u>does not include</u> Grays Lake water diverted from Willow Creek drainage through the Clarks Cut diversion and into Blackfoot Reservoir.
Blackfoot R ab Res nr Henry (2)
+ Blackfoot Res storage change
The forecasted Blackfoot Reservoir Inflow <u>includes</u> Grays Lake water diverted from the Willow Creek drainage through the Clarks Cut diversion and into Blackfoot Reservoir.
Portneuf R at Topaz - no corrections
American Falls Res Inflow (2)
+ Snake R at Neeley
+ Jackson Lake storage change
+ Palisades Res storage change
+ American Falls storage change
+ Teton Dam for water year 1976 only

<u>Southside Snake River Basins</u>
Goose Ck nr Oakley - no adjustments
Trapper Ck nr Oakley - no adjustments
Oakley Res Inflow - *<u>flow does not include</u> Birch Creek*
+ Goose Ck
+ Trapper Ck
Salmon Falls Ck nr San Jacinto, NV - no corrections
Bruneau R nr Hot Springs - no corrections
Reynolds Ck at Tollgate - no corrections
Owyhee R nr Gold Ck, NV (2)
+ Wildhorse Res storage change
Owyhee R nr Rome, OR – no Corrections
Owyhee Res Inflow (2)
+ Owyhee R bl Owyhee Dam, OR
+ Lake Owyhee storage change
+ Diversions to North and South Canals

<u>Bear River Basin</u>
Bear R nr UT-WY Stateline, UT- no corrections
Bear R abv Res nr Woodruff, UT- no corrections
Big Ck nr Randolph, UT - no corrections
Smiths Fork nr Border, WY - no corrections
Bear R bl Stewart Dam (2)
+ Bear R bl Stewart Dam
+ Rainbow Inlet Canal
Little Bear R at Paradise, UT - no corrections
Logan R nr Logan, UT - no corrections
Blacksmith Fk nr Hyrum, UT - no corrections

<u>Reservoir Capacity Definitions</u> (Units in 1,000 Acre-Feet, KAF)
Different agencies use various definitions when reporting reservoir capacity and contents. Reservoir storage terms include dead, inactive, active, and surcharge storage. This table lists the volumes for each reservoir, and defines the storage volumes NRCS uses when reporting capacity and current reservoir storage. In most cases, NRCS reports usable storage which includes active and/or inactive storage. **(Revised Feb. 2015)**

Basin- Lake or Reservoir	Dead Storage	Inactive Storage	Active Storage	Surcharge Storage	NRCS Capacity	NRCS Capacity Includes
<u>Panhandle Region</u>						
Hungry Horse	39.73	---	**3451.00**	---	**3451.0**	Active
Flathead Lake	Unknown	---	**1791.00**	---	**1791.0**	Active
Noxon	Unknown	---	**335.00**	---	**335.0**	Active
Lake Pend Oreille	**406.20**	**112.40**	**1042.70**	**---**	**1561.3**	Dead + Inactive + Active
Lake Coeur d'Alene	Unknown	13.50	**225.00**	**---**	**238.5**	Inactive + Active
Priest Lake	**20.00**	**28.00**	**71.30**	**---**	**119.3**	Dead + Inactive + Active
<u>Clearwater Basin</u>						
Dworshak	Unknown	**1452.00**	**2016.00**	**---**	**3468.0**	Inactive + Active
<u>West Central Basins</u>						
Anderson Ranch	24.90	**37.00**	**413.10**	---	450.1	Inactive + Active
Arrowrock	Unknown	---	**272.20**	**---**	**272.2**	Active
Lucky Peak	Unknown	**28.80**	**264.40**	13.80	**293.2**	Inactive + Active
Lake Lowell	7.90	**5.80**	**159.40**	---	165.2	Inactive + Active
Deadwood	Unknown	---	**161.90**	**---**	**161.9**	Active
Cascade	Unknown	**46.70**	**646.50**	**---**	**693.2**	Inactive + Active
Mann Creek	1.61	0.24	**11.10**	**---**	**11.1**	Active
<u>Wood and Lost Basins</u>						
Mackay	0.13	---	**44.37**	**---**	**44.4**	Active
Little Wood	Unknown	---	**30.00**	**---**	**30.0**	Active
Magic	Unknown	---	**191.50**	**---**	**191.5**	Active
<u>Upper Snake Basin</u>						
Jackson Lake	Unknown	---	**847.00**	**---**	**847.0**	Active
Palisades	44.10	**155.50**	**1200.00**	**---**	**1400.0**	Dead + Inactive+Active
Henrys Lake	Unknown	---	**90.40**	**---**	**90.4**	Active
Island Park	0.40	---	**127.30**	**7.90**	**135.2**	Active + Surcharge
Grassy Lake	Unknown	---	**15.18**	**---**	**15.2**	Active
Ririe	4.00	6.00	**80.54**	10.00	**80.5**	Active
Blackfoot	0.00	---	**333.50**	3.50	**333.50**	Active (rev. 2/1/2015)
American Falls	Unknown	---	**1672.60**	**---**	**1672.6**	Active
<u>Southside Snake Basins</u>						
Oakley	0.00	---	**75.60**	**---**	**75.6**	Active
Salmon Falls	48.00	**5.00**	**182.65**	**---**	**182.6**	Active
Wild Horse	Unknown	---	**71.50**	**---**	**71.5**	Active
Lake Owyhee	406.83	---	**715.00**	**---**	**715.0**	Active
Brownlee	0.45	**444.70**	**975.30**	**---**	**1420.0**	Inactive + Active
<u>Bear River Basin</u>						
Bear Lake	5000.00	119.00	**1302.00**	**---**	**1302.0**	Active:
Capacity does not include 119 KAF that can be used, historic values below this level are rounded to zero						
Montpelier	**0.21**	**---**	**3.84**	**---**	**4.0**	Dead + Active

Interpreting Water Supply Forecasts

Each month, five forecasts are issued for each forecast point and each forecast period. Unless otherwise specified, all streamflow forecasts are for streamflow volumes that would occur naturally without any upstream influences. Water users need to know what the different forecasts represent if they are to use the information correctly when making operational decisions. The following is an explanation of each of the forecasts.

90 Percent Chance of Exceedance Forecast. There is a 90 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 10 percent chance that the actual streamflow volume will be less than this forecast value.

70 Percent Chance of Exceedance Forecast. There is a 70 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 30 percent chance that the actual streamflow volume will be less than this forecast value.

50 Percent Chance of Exceedance Forecast. There is a 50 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 50 percent chance that the actual streamflow volume will be less than this forecast value. Generally, this forecast is the middle of the range of possible streamflow volumes that can be produced given current conditions.

30 Percent Chance of Exceedance Forecast. There is a 30 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 70 percent chance that the actual streamflow volume will be less than this forecast value.

10 Percent Chance of Exceedance Forecast. There is a 10 percent chance that the actual streamflow volume will exceed this forecast value, and there is a 90 percent chance that the actual streamflow volume will be less than this forecast value.

*Note: There is still a 20 percent chance that actual streamflow volumes will fall either below the 90 percent exceedance forecast or above the 10 percent exceedance forecast.

These forecasts represent the uncertainty inherent in making streamflow predictions. This uncertainty may include sources such as: unknown future weather conditions, uncertainties associated with the various prediction methodologies, and the spatial coverage of the data network in a given basin.

30-Year Average. The 30-year average streamflow for each forecast period is provided for comparison. The average is based on data from 1981-2010. The % AVG. column compares the 50% chance of exceedance forecast to the 30-year average streamflow; values above 100% denote when the 50% chance of exceedance forecast would be greater than the 30-year average streamflow.

AF - Acre-feet, forecasted volume of water are typically in thousands of acre-feet (KAF).

These forecasts are given to users to help make risk-based decisions. Users can select the forecast corresponding to the level of risk they are willing to accept in order to minimize the negative impacts of having more or less water than planned for.

To Decrease the Chance of Having Less Water than Planned for
A user might determine that making decisions based on a 50 percent chance of exceedance forecast is too much risk to take (there is still a 50% chance that the user will receive less than this amount). To reduce the risk of having less water than planned for, users can base their operational decisions on one of the forecasts with a greater chance of being exceeded such as the 90 or 70 percent exceedance forecasts.

To Decrease the Chance of Having More Water than Planned for
A user might determine that making decisions based on a 50 percent chance of exceedance forecast is too much risk to take (there is still a 50% chance that the user will receive more than this amount). To reduce the risk of having more water than planned for, users can base their operational decisions on one of the forecasts with a lesser chance of being exceeded such as the 30 or 10 percent exceedance forecasts.

Forecast use example:

Using the 50 Percent Exceedance Forecast. Using the example forecasts shown on the next page, there is a 50% chance that actual streamflow volume at the Henry's Fork near Ashton will be less than 280 KAF between June 1 and Sept. 30. There is also a 50% chance that actual streamflow volume will be greater than 280 KAF.

Using the 90 and 70 Percent Exceedance Forecasts. If an unexpected shortage of water could cause problems (such as irrigated agriculture), users might want to plan on receiving 245 KAF during Jun 1 through September 30 (from the 70 percent exceedance forecast). There is a 30% chance of receiving *less* than 245 KAF.

Alternatively, if users determine the risk of using the 70 percent exceedance forecast is too great, then they might plan on receiving 198 KAF (from the **90** percent exceedance forecast). There is 10% chance of receiving less than 72 KAF.

Using the 30 or 10 Percent Exceedance Forecasts. If an unexpected excess of water could cause problems (such as operating a flood control reservoir), users might plan on receiving 315 KAF between June 1 and Sept. 30 (from the 30 percent exceedance forecast). There is a 30% chance of receiving *more* than 315 KAF.

Alternatively, if users determine the risk of using the 30 percent exceedance forecast is too great, then they might plan on receiving 360 KAF (from the 10 percent exceedance forecast). There is a 10% chance of receiving more than 360 KAF. Users could also choose a volume in between any of these values to reflect their desired risk level.

Upper Snake River Basin Streamflow Forecasts - June 1, 2015

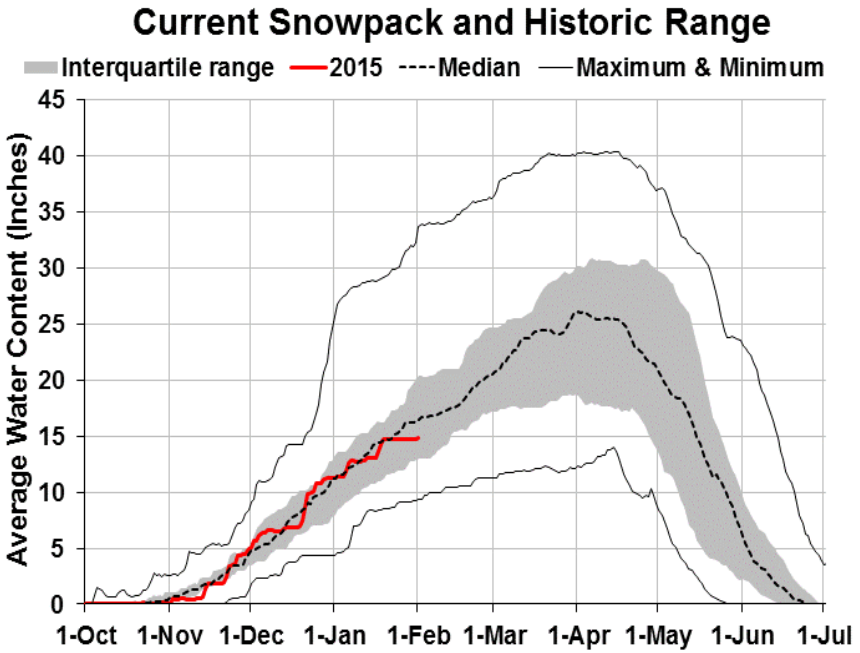
Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <---Drier----------Projected Volume----------Wetter---> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Henrys Fk nr Ashton	JUN-JUL	72	106	129	56	152	186	230
	JUN-SEP	198	245	280	68	315	360	410

Interpreting Snowpack Plots

Basin snowpack plots represent snow water equivalent indices using the average daily SNOTEL data[1] from several sites in or near individual basins. The solid red line (2015), which represents the current water year snowpack water content, can be compared to the normal dashed black line (Median) which is considered "normal", as well as the SNOTEL observed historical snowpack range for each basin. This allows users to gather important information about the current year's snowpack as well as the historical variability of snowpack in each basin.

The gray shaded area represents the interquartile range (also known as the "middle fifty"), which is the 25th to 75th percentiles of the historical daily snowpack data for each basin. Percentiles depict the value of the average snowpack below which the given percent of historical years fall. For example, the top part of the interquartile range (75th percentile) indicates that the snowpack index has been below this line for 75 percent of the period of record, whereas the reverse is true for the lower part of the interquartile range (25th percentile). This means 50 percent of the time the snowpack index is within the interquartile range (gray area) during the period of record.

[1] All data used for these plots come from daily SNOTEL data only and does not include snow course data (collected monthly), whereas the official basin snowpack percent of normal includes both SNOTEL and snow course data, potentially leading to slight discrepancies between plots and official basin percent of normal.



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