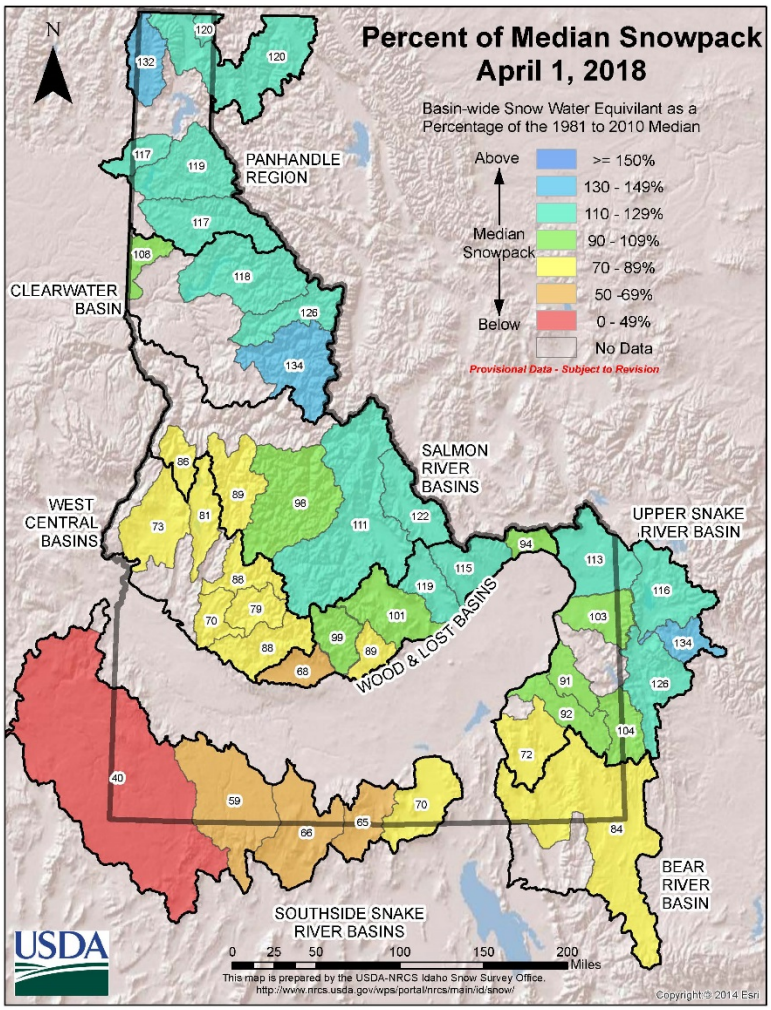
United States Department of Agriculture

Natural Resources Conservation Service

Idaho Water Supply Outlook Report

April 1, 2018



April 1, 2018 Idaho Snow Survey Summary

The West is different than the Midwest and East because approximately 75% of our annual precipitation falls as snow in the West during our non-growing season, this is why we measure the western mountain snowpack. Snow gradually melts in the spring and early summer feeding streams that fill rivers and reservoirs. The April 1 snow survey is the most important survey because this is typically when the seasonal snowpack reaches its peak snow water equivalent. These first of month surveys provide a more comprehensive inventory of the mountain snowpack and includes information from over 120 SNOTEL sites in our region and over 100 manually measured snow courses. These snow courses are measured timely at the end of the month by more than 40 trained snow surveyors (Thank you!). Continue reading the Water Supply Outlook Report to find out if we have reached normal peak snow water equivalent amounts, and how snow and water supply outlooks vary across Idaho this year.

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

April 1, 2018

SUMMARY

It's springtime in Idaho; the stage is set; and things are looking interesting for the water supply picture. Here is what we know and why we monitor snow in Idaho and the western U.S. Last year's abundant snowpack and runoff primed Idaho's hydrologic system and have kept streams flowing above normal since last February. Winter came early in the higher elevations with a few snow measuring sites starting to build winter snowpack in late September 2017. Cold temperatures' early arrival also sealed in the soil moisture in the higher elevations, which means less melt water is required to fill the soil moisture voids this spring. The La Nina weather pattern set up, bringing a steady stream of storms into the Clearwater basin and along the continental divide to Yellowstone National Park most of winter. A return to winter in late February and March brought the coldest temperatures of the season along with above normal precipitation and powder to delight Idaho's winter recreationists.

Overall, Idaho's mountain snowpack generally reaches its peak snow water content in early April. Mid-elevation sites may peak in the middle of March while higher elevation sites can peak in mid-April or May depending upon spring weather. Current snowpacks range from half of normal in the Owyhee basin to 120% of normal in the Clearwater and Upper Snake. These amounts are much less than last year, except in the Clearwater and north, where there is more snow than a year ago.

Now for the interesting part – we may not have seen the peak snow water content amounts yet, as additional storms are predicted to move into Idaho in April. Follow these links from our **Related Links** page to monitor current weather outlooks.

- **24-48 Hour Winter Precipitation Probability Forecast for Snowfall or Freezing Rain**
- **1 to 7 Day NWS Precipitation Forecast**
- **7 and 14 Day Climatic Outlook Forecasts - Precipitation, Temperature**
- **6-10 Day to 3 Month Outlooks from NWS Climate Prediction Center**

Prior to the February and March precipitation events, reservoir managers were storing water because Idaho's snowpacks were tracking below normal south of the Salmon River basin. Many reservoirs, including the Boise, Magic, Little Wood, Mackay, Palisades, Jackson and American Falls, are now releasing water or passing inflow. There will be plenty of snow melt water to fill these reservoirs later this spring or early summer. The challenge is releasing enough water to mitigate flood concerns while ensuring refill of the reservoirs. Spring weather can be the wild card in determining snow melt timing while rain adds more water to runoff. Some of the key factors that determine the timing and magnitude of snowmelt streamflow peaks are spring rainfall amounts and intensities, and air temperatures – daytime highs and whether overnight mountain temperatures dip below freezing. On the bright side, spring rains from mid-April to mid-May can increase rangeland foliage. However, rains the second week of April as temperatures start to warm up helps range conditions the most.

Streamflow forecasts mirror the current snowpacks ranging from 40% of average in the Owyhee basin to 120% in the Clearwater and Upper Snake basins. Combining these runoff volumes with current reservoir storage, will provide adequate irrigation supplies for nearly all users (farmers, fish, power producers, river runners and more). March brought abundant high elevation snow to the central mountains and those will hopefully be enough to sustain streamflows in the later summer months for the water users in the Big Wood, Big Lost and Little Lost basins. Bear Lake, Lake

Owyhee, Oakley, and Salmon Falls reservoirs are not expected to fill, but will provide adequate irrigation supplies for their water users.

SNOWPACK

Idaho's highest snowpacks relative to normal remain along the Idaho-Montana border and Upper Snake with a few basins pushing 130% of normal. This includes the Selway drainage in Idaho's Clearwater basin, and Pacific, Buffalo and Gros Venture drainages in the Snake River headwaters of Wyoming. The lowest snowpack is half of normal in the Owyhee basin while the Bruneau, Oakley and Salmon Falls basins are not much better at about 60% of normal. Overall, the Salmon basin is 107%, Henrys Fork is 109%, and Snake above Palisades Reservoir is 117%. The Payette and Boise are 80% while the Bear River snowpack is slightly more. With more storms projected to move into Idaho in early to mid-April, the higher elevation snow measuring sites, especially in northern Idaho, may not have peaked yet. Lower to-mid elevations sites across the state have started melting and a few even melted out.

The 5-day delta reports which are on this web page **Current Water Year** are an excellent way to monitor 24-hour precipitation amounts, snow melt rates, and snow depth changes:

- SNOTEL SWE, Snow Depth and Precipitation Rates of Change Last 5 Days (Idaho Region)

PRECIPITATION

The precipitation trend established in the fall appears to have changed in March and brought only 71% of normal amounts to the Spokane basin and 84% to the Clearwater basin. The winners were in central Idaho from the Big Wood to Medicine Lodge / Beaver / Camas basins that received 165% to 200% of normal amounts. The Crab Creek SNOTEL site, elevation 6,900 feet, in Clark County received 2.1 inches of precipitation on March 22, mostly in the form of rain, which produced some flooding in the area. Elsewhere around the state, March precipitation was near normal with the exception of eastern Idaho and the Bruneau basins which received about 150% of average.

Water year-to-date totals follow the La Nina pattern that was established in the fall with the Clearwater basin at 120% of average, followed by the Northern Panhandle and Spokane basin at 111%. Near normal water year-to-date totals can be found in the Salmon basin and from the Payette to the Upper Snake, and the Bruneau basin. The lowest totals for the water year follow Idaho's southern border along with the Weiser basin at about 85% of average amounts. The Clearwater basin has received 83% of its annual precipitation with five months still to go. Idaho's Panhandle Region is not far behind at 78%. However, Idaho's southern basins have only received about 55% to 65% of their annual total so far as we head into the drier summer season.

RESERVOIRS

As we approach the peak snow water content amounts for the season, reservoir operators can better visualize how much snow is in the mountains waiting to melt. Flood control releases are being made from Dworshak, the Boise system, Little Wood, Mackay, many of the Upper Snake reservoirs, Brownlee, and Lake Pend Oreille to ensure room for this year's snowmelt while ensuring re-fill of the reservoirs later this spring. This is a delicate and challenging operation that requires knowing how much snow is in the mountains and closely watching the spring weather.

Releases will soon start out of Montpelier Reservoir as it is nearly full at 3,900 acre-feet. Many locals say they have not seen Montpelier Reservoir this full so early, and they are right. It has the highest end-of-March storage amounts since it started filling in 1971. This scenario for this small reservoir in

southeast Idaho illustrates how so many reservoirs were operated this year across the state. The snowpack is not huge above Montpelier Reservoir at 86% of median. A lot of the lower snow has already melted and gone into the ground, but the high snow is still waiting to melt that will provide the runoff to top off the reservoir and help ensure adequate water supplies through the drier summer months.

Magic Reservoir is nearly full, passing inflow and storing 184,906 acre-feet at the end of March, its 4th highest amount since it was built 1917. Bear Lake at 76% full, 162% of average released some water but have closed the outlet canal gates to start storing the snowmelt runoff. The gates will re-open when storage water is needed to meet irrigation demand after the spring runoff. Lake Owyhee, Oakley, and Salmon Falls reservoirs do not normally fill and are not expected to fill, but will provide adequate irrigation supplies as they are storing 115% to 176% of average. Wild Horse Reservoir is 92% full, 168% of average while Mann Creek Reservoir is 70% full, 89% of average.

STREAMFLOW

Just like water users get excited when they turn the water out in canals each spring, hydrologists and river watchers get excited with the beginning of the spring runoff season. A late March storm brought rain up to 7,000 feet and generated an increase in streamflows across the state. However, a cold front quickly followed reducing temperatures and snowmelt that would have kept feeding the streams. As a result, streams peaked once and primed the system again.

Idaho's mountains and the hydrologic system were already primed from last year and flowing above to much-above average across most of the state. The elevated baseflows will provide a higher starting level and additional runoff to the predicted volumes when this season's snow starts melting. Streamflow graphs on this page reflect these above normal baseflows: Peak Streamflow Information

Streamflow forecasts increased from last month in the central mountains because of the greater than normal precipitation and now range from 75% to 100% of average. The Snake River near Heise is forecast at 109% of average. The lowest volumes forecasts remain across southern Idaho with the Owyhee basin forecast at only 15% to 45% of the normal April-July volume. Overall, water supplies will be adequate when combined with reservoir storage. Any excess water will be put to use recharging Idaho's aquifers, producing power, benefiting fish and wildlife, and providing ideal flows for river runners.

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

The rivers are rising and will again in early April as the forecast calls for a wet start in April. With above normal snowpacks in the northern half of Idaho, river runners will have an extended season. The near normal snowpack in the Salmon River basin will provide an adequate high water boating season and family friendly flows well into the summer. Keep your eye on the sky and watching the weather as we have seen a greater degree of climatic variability across the country this winter and it may not be over. As you know spring rain and temperatures will determine the timing and magnitude of snowmelt peak flow. Play it safe and know your boating skills and limits as rivers rise. The rivers will stay high as long as there is snow to feed them. Keep your mouse on these snow-to-flow relationship graphs to monitor and better understand when the snowmelt peaks may occur and if the potential has passed: **Peak Streamflow Information**

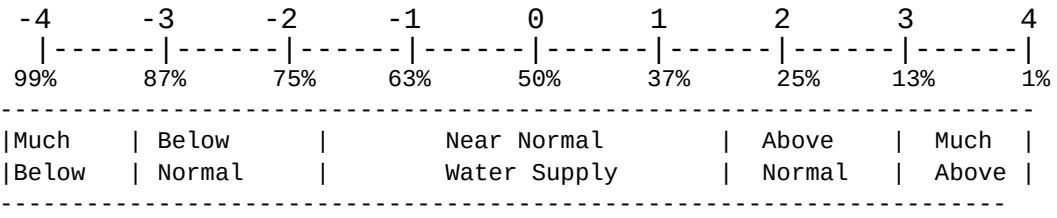
IDAHO SURFACE WATER SUPPLY INDEX (SWSI) April 1, 2018

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.

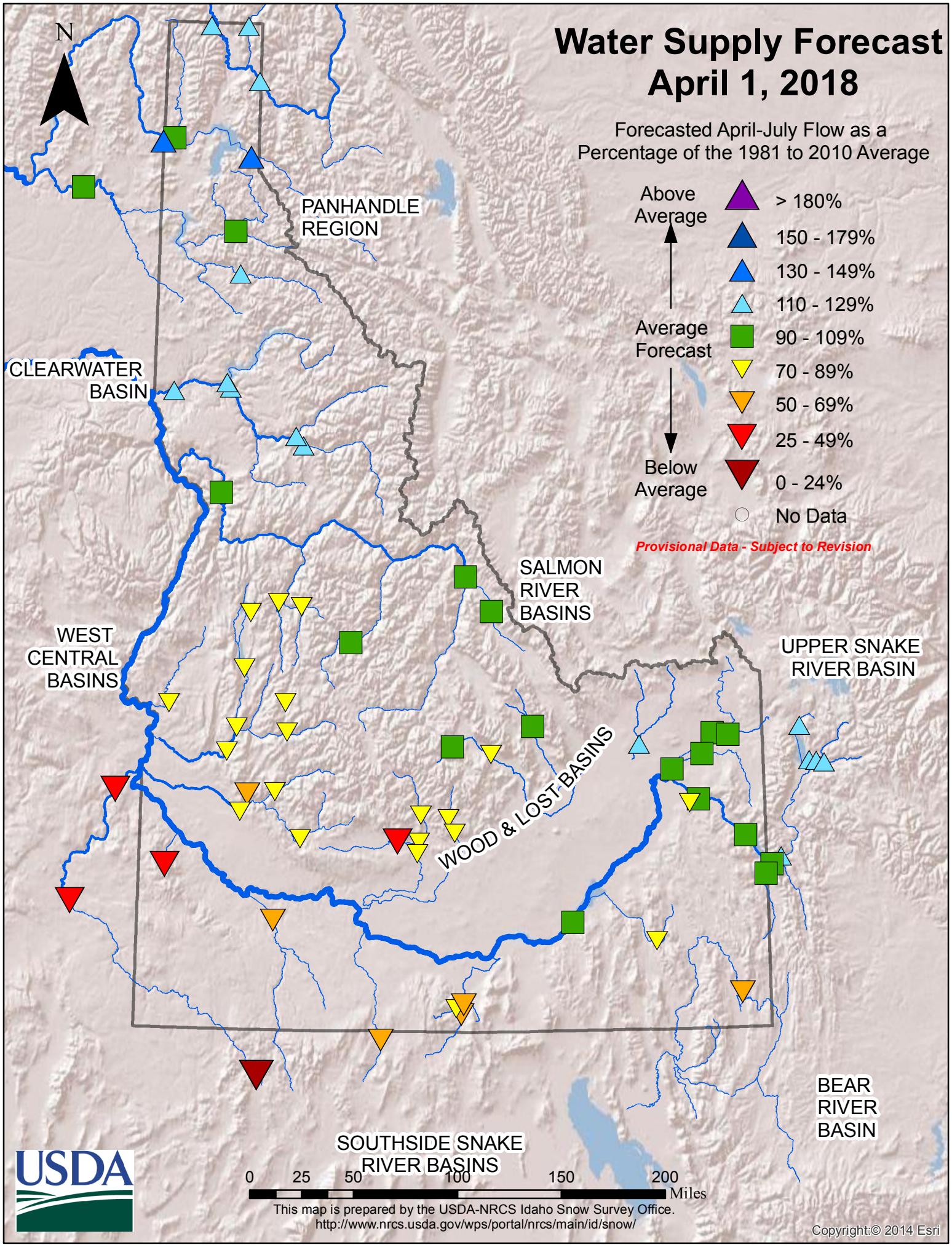
SWSI values provide a more comprehensive outlook of water availability by combining streamflow forecasts and reservoir storage where appropriate. The SWSI index allows comparison of water availability between basins for drought or flood severity analysis. Threshold SWSI values have been determined for 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	**-0.1**	**2006**	**NA**
Clearwater	**1.9**	**2009**	**NA**
Salmon	**0.1**	**2010**	**NA**
Weiser	**-1.4**	**2016**	**NA**
Payette	**-1.2**	**2016**	**NA**
Boise	**0.8**	**2016**	**-2.2**
Big Wood above Hailey	**0.1**	**2016**	**NA**
Big Wood	**1.0**	**2012**	**0.0**
Little Wood	**0.8**	**2009**	**-1.3**
Big Lost	**0.1**	**2012**	**0.7**
Little Lost	**0.8**	**2010**	**1.3**
Teton	**0.5**	**2014**	**-3.9**
Henrys Fork	**1.7**	**2009**	**-1.5**
Snake (Heise)	**1.7**	**1998**	**-1.8**
Oakley	**1.0**	**2005**	**0.0**
Salmon Falls	**1.4**	**2016**	**-0.9**
Bruneau	**-0.5**	**2002**	**NA**
Owyhee	**-0.1**	**2012**	**-2.6**
Bear River	**1.9**	**2011**	**-3.9**

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
April 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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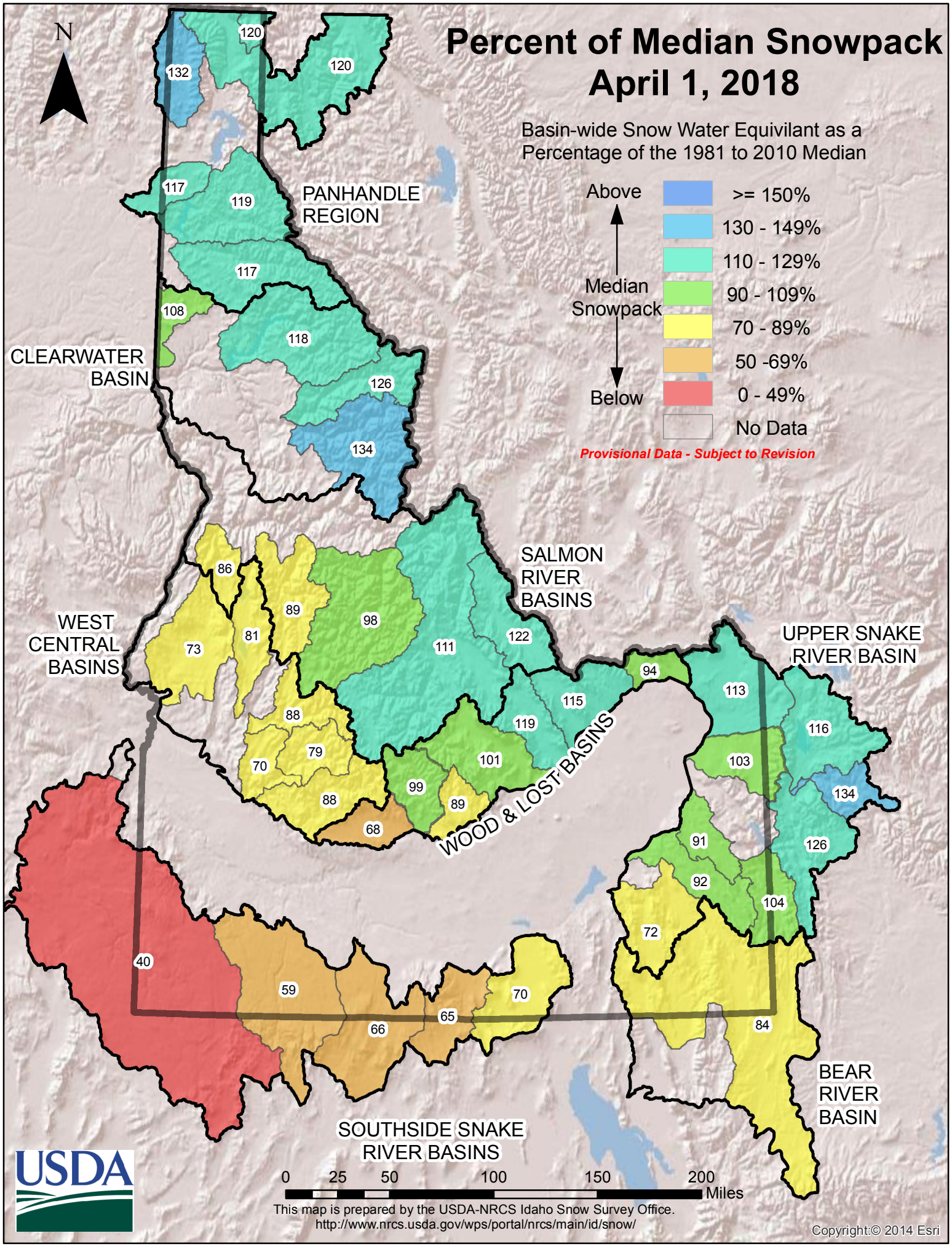
Percent of Median Snowpack
April 1, 2018
Basin-wide Snow Water Equivilant as a Percentage of the 1981 to 2010 Median
Above
Median Snowpack
Below
>= 150%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 -69%
0 - 49%
No Data
Provisional Data - Subject to Revision
N
PANHANDLE REGION
CLEARWATER BASIN
SALMON RIVER BASINS
WEST CENTRAL BASINS
UPPER SNAKE RIVER BASIN
WOOD & LOST BASINS
BEAR RIVER BASIN
SOUTHSIDE SNAKE RIVER BASINS
120
132
120
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108
118
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89
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73
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0 25 50 100 150 200
Miles
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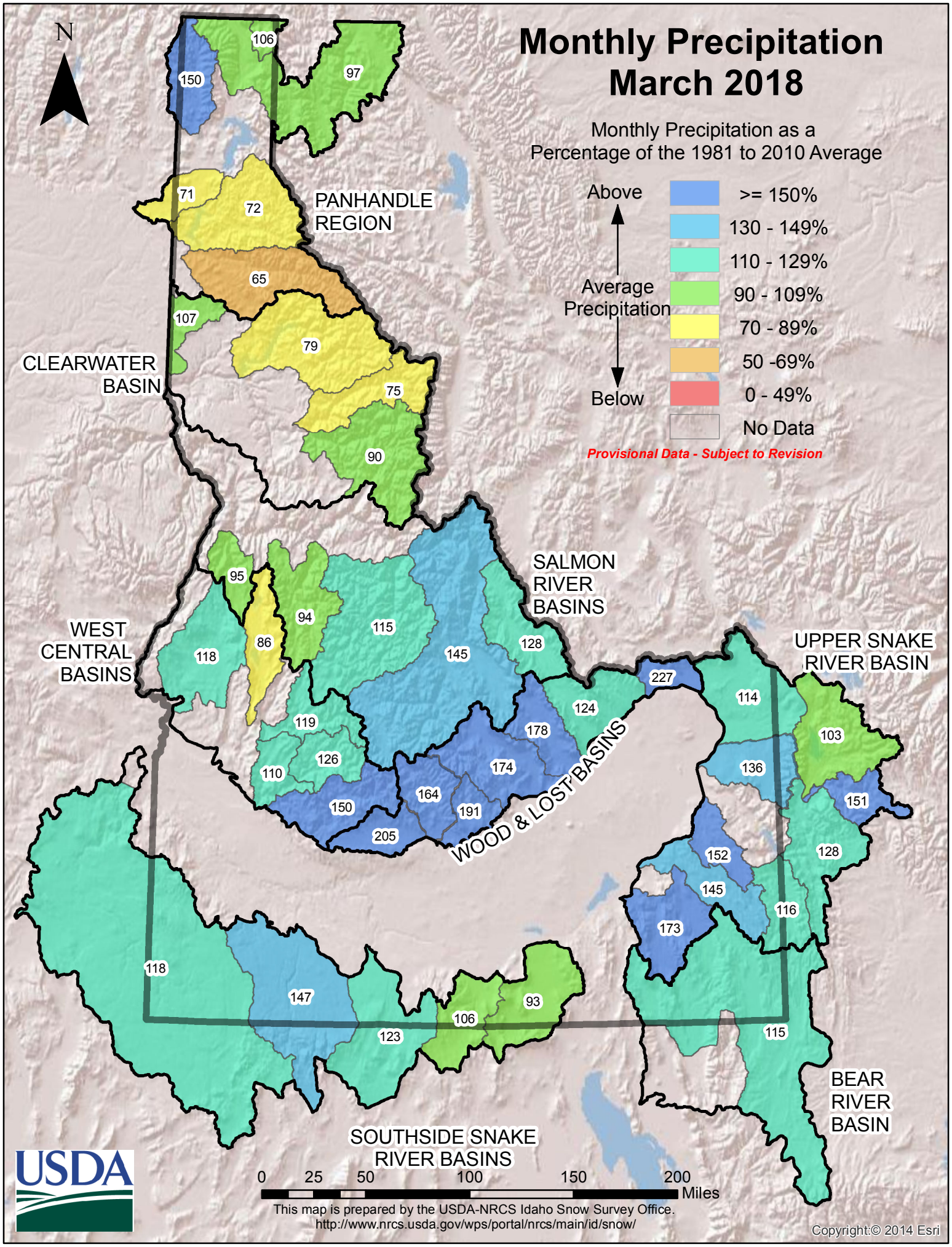
N
Monthly Precipitation
March 2018
Monthly Precipitation as a
Percentage of the 1981 to 2010 Average
Above
Average
Precipitation
Below
>= 150%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 -69%
0 - 49%
No Data
Provisional Data - Subject to Revision
PANHANDLE
REGION
CLEARWATER
BASIN
SALMON
RIVER
BASINS
WEST
CENTRAL
BASINS
UPPER SNAKE
RIVER BASIN
WOOD & LOST BASINS
SOUTHSIDE SNAKE
RIVER BASINS
BEAR
RIVER
BASIN
150
106
97
71
72
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107
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174
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150
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205
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151
152
128
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116
173
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147
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106
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0
25
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200
Miles
USDA
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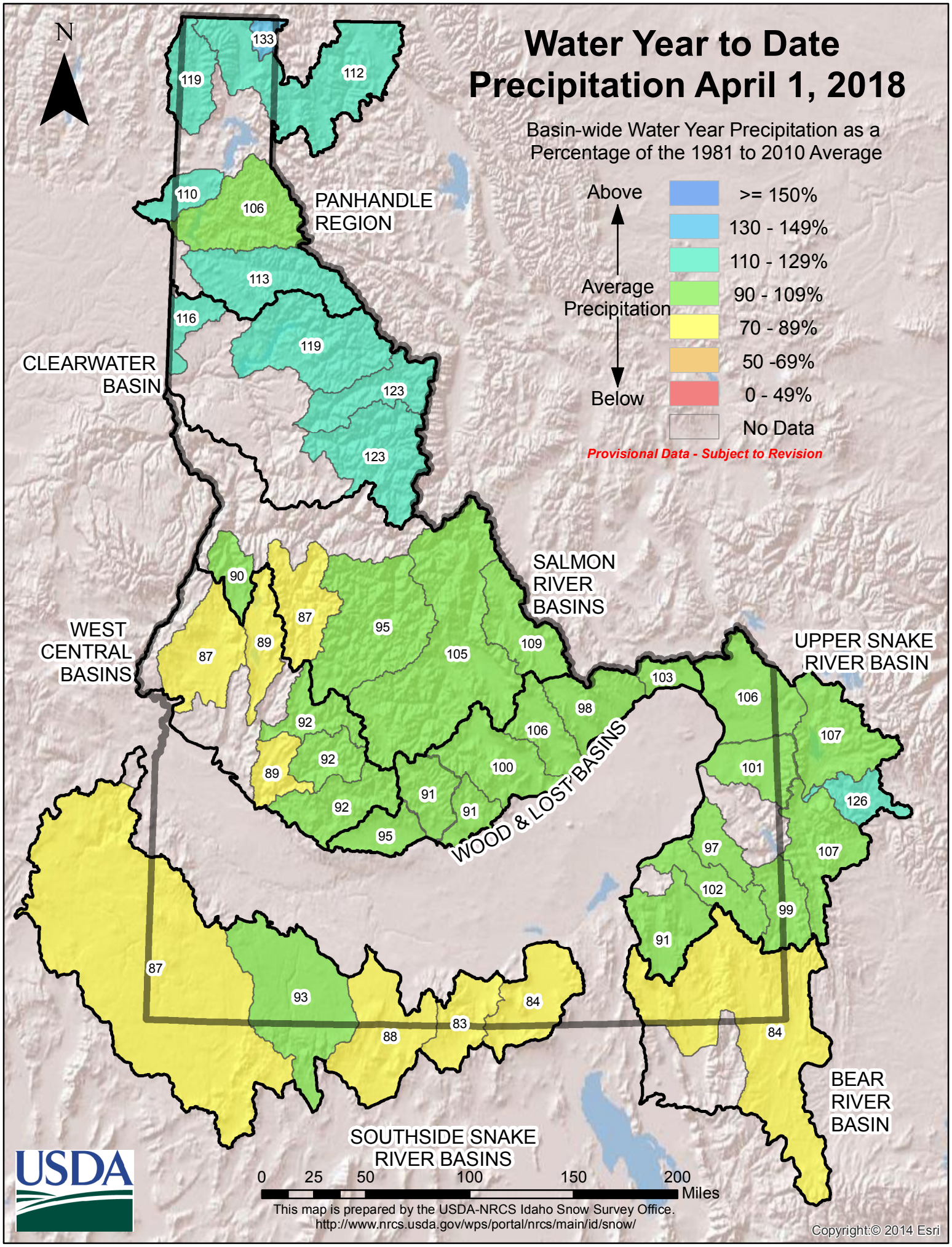
N
Water Year to Date Precipitation April 1, 2018
Basin-wide Water Year Precipitation as a Percentage of the 1981 to 2010 Average
Above
Average Precipitation
Below
>= 150%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 -69%
0 - 49%
No Data
Provisional Data - Subject to Revision
PANHANDLE REGION
CLEARWATER BASIN
SALMON RIVER BASINS
WEST CENTRAL BASINS
UPPER SNAKE RIVER BASIN
WOOD & LOST BASINS
BEAR RIVER BASIN
SOUTHSIDE SNAKE RIVER BASINS
133
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100
92
91
91
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87
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88
84
0 25 50 100 150 200
Miles
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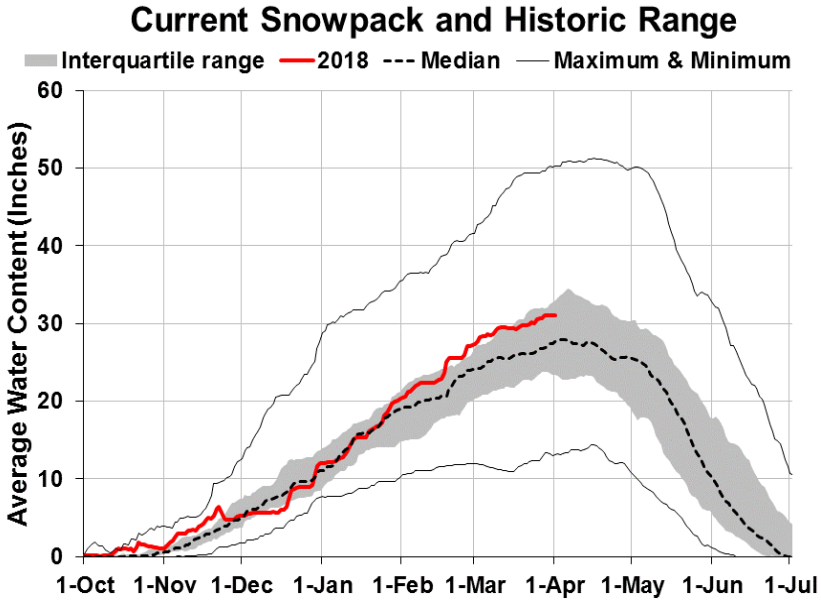
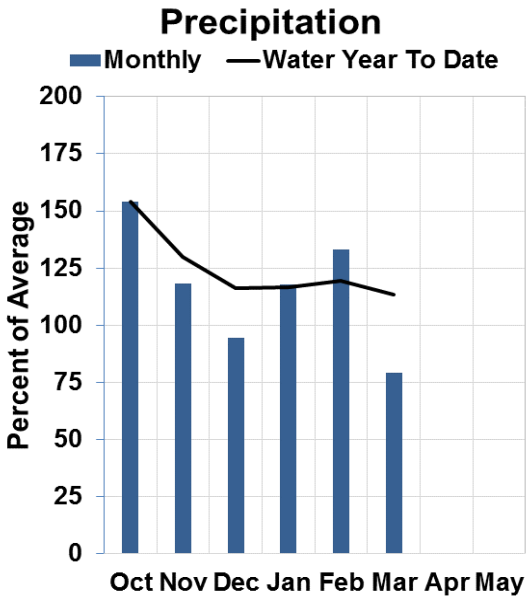
Panhandle Region

April 1, 2018





WATER SUPPLY OUTLOOK

March brought below normal precipitation to the Idaho Panhandle Region for only the second month this water year. The St. Joe basin only received 65% of normal precipitation, which was also the lowest across the state while the northern part of the Panhandle received a little more. One month with below normal precipitation will not significantly influence the water supplies as the snowpacks range from 110% to 130% of normal and more precipitation expected in early April. Weather forecasts are calling for abundant moisture, over 5 inches in 7 days, to fall in parts of the Panhandle and Clearwater basins.

The Panhandle's lakes (Pend Oreille, Priest and Coeur d'Alene) are currently 40% to 55% of capacity and will be able to store or delay some of the runoff moving through the lakes. After the early April storm event, streamflows will probably remain above average for some time as the April-July runoff volumes call for 108% of average in the Spokane and Priest drainages. Streamflow forecasts increase to 113% and 119% of average for Boundary Creek and Moyie River, respectively, and to 135% for the Clark Fork coming in from Montana. Water supplies will be plentiful this year, and peak flows could be depending upon rainfall amounts as there is still plenty of snow to melt in the mid-elevations. The higher snow will sustain flows well into summer.

Panhandle Region Streamflow Forecasts - April 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	360	410	445	119%	480	530	375
	APR-SEP	370	425	460	119%	495	550	385
Kootenai R at Leonia 1 & 2	APR-JUL	7090	7830	8170	124%	8500	9240	6600
	APR-SEP	7980	8730	9070	119%	9410	10200	7590
Boundary Ck nr Porthill	APR-JUL	110	123	132	113%	141	153	117
	APR-SEP	114	128	137	111%	147	160	123
Clark Fork R at Whitehorse Rapids 1 & 2	APR-JUL	12200	13600	14300	136%	14900	16300	10500
	APR-SEP	13200	14800	15500	135%	16300	17900	11500
Pend Oreille Lake Inflow 2	APR-JUL	14400	15400	16100	136%	16800	17800	11800
	APR-SEP	15300	16500	17300	135%	18100	19300	12800
Priest R nr Priest River 2	APR-JUL	720	795	845	108%	895	975	780
	APR-SEP	755	840	895	108%	955	1040	830
NF Coeur dAlene R at Enaville	APR-JUL	540	650	725	104%	800	910	700
	APR-SEP	570	685	760	103%	840	950	740
St. Joe R at Calder 2	APR-JUL	1000	1110	1190	113%	1260	1380	1050
	APR-SEP	1060	1180	1260	113%	1340	1450	1120
Spokane R nr Post Falls 2	APR-JUL	2030	2360	2590	108%	2810	3150	2390
	APR-SEP	2100	2440	2680	108%	2910	3250	2480
Spokane R at Long Lake	APR-JUL	2210	2570	2820	108%	3070	3430	2620
	APR-SEP	2440	2820	3080	108%	3340	3720	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%

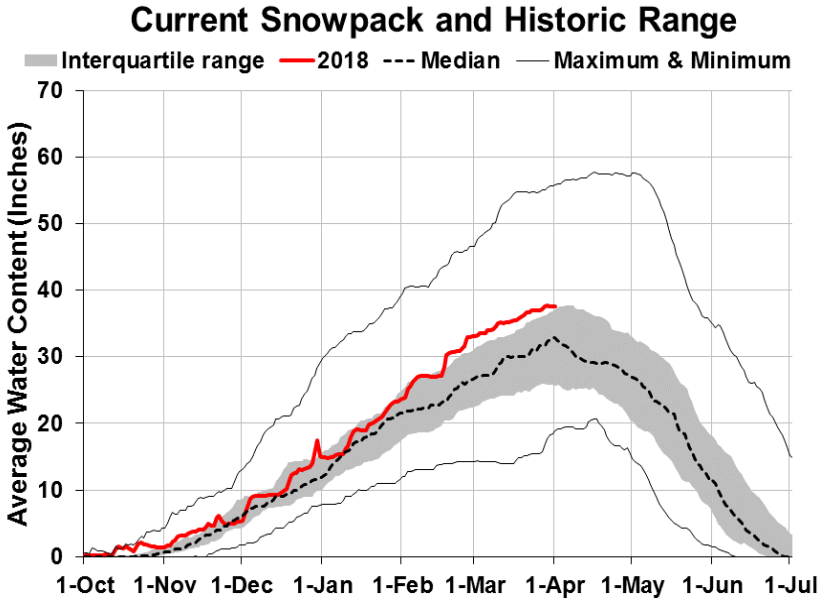
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

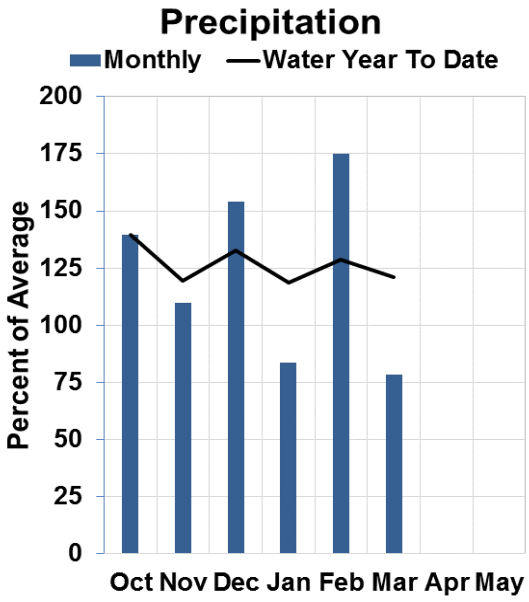
Reservoir Storage (KAF): End of March				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Hungry Horse Lake	2109.2	2918.5	2081.0	3451.0
Flathead Lake	884.6	1080.0	762.6	1791.0
Noxon Rapids Reservoir	310.8	330.1	309.9	335.0
Lake Pend Oreille	586.6	1011.9	773.0	1561.3
Priest Lake	53.0	100.9	67.6	119.3
Lake Coeur d' Alene	133.4	463.6	165.5	238.5

Watershed Snowpack Analysis: April 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Moyie River	5	120%	143%
Priest River	5	132%	106%
Rathdrum Creek	4	106%	84%
Coeur d' Alene River	10	119%	98%
St. Joe River	6	117%	103%
Spokane River	18	117%	97%
Palouse River	2	108%	111%
Kootenai ab Bonners Ferry	24	120%	112%

Clearwater River Basin

April 1, 2018





WATER SUPPLY OUTLOOK

March precipitation was below normal for only the second month this water year with amounts ranging from 75% to 90% across the Clearwater basins. Precipitation since the water year started for the basin as a whole is 120% of normal, highest in the state, and 83% of the annual precipitation total with five more months still to go. Snowpacks range from 118% of normal in the NF Clearwater basin to 134% in the Selway basin, one of the highest in our monitoring region. This year's snowpack is the highest since 2014 and more similar to 2012. Abundant moisture is forecast for northern Idaho in early April that will melt the remaining low elevation snow and start melting the mid-elevation snow at sites like Crooked Fork, 3,610 feet, and Pierce RS, 3,080 feet, which have about 10 inches of snow water and are about 160% of normal.

In anticipation of the above average runoff, Dworshak Reservoir managers have been actively releasing water, decreasing from 60% of capacity a month ago to 45% of capacity. Streamflow forecasts remain consistent across these basins ranging from 120% of average for Dworshak Reservoir Inflow to 127% for the Selway River and Clearwater River at Orofino. This means there will be plenty of water for all and the Idaho Fish and Game just approved a spring chinook fishing season on the Clearwater, Snake and Salmon Rivers. The Lochsa and Selway rivers will be rocking and rollin', so keep your eye on the sky and the weather forecasts as spring arrives.

Clearwater River Basin Streamflow Forecasts - April 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	2140	2320	2440	127%	2550	2730	1920
	APR-SEP	2230	2420	2550	126%	2670	2860	2020
Lochsa R nr Lowell	APR-JUL	1500	1630	1710	121%	1800	1920	1410
	APR-SEP	1570	1700	1790	121%	1880	2020	1480
Dworshak Reservoir Inflow 2	APR-JUL	2400	2690	2880	120%	3080	3360	2410
	APR-SEP	2550	2850	3050	119%	3250	3550	2570
Clearwater R at Orofino	APR-JUL	4690	5170	5500	128%	5820	6300	4310
	APR-SEP	4900	5410	5750	127%	6100	6610	4540
Clearwater R at Spalding 2	APR-JUL	7350	8130	8650	126%	9170	9940	6890
	APR-SEP	7700	8510	9070	125%	9620	10400	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%

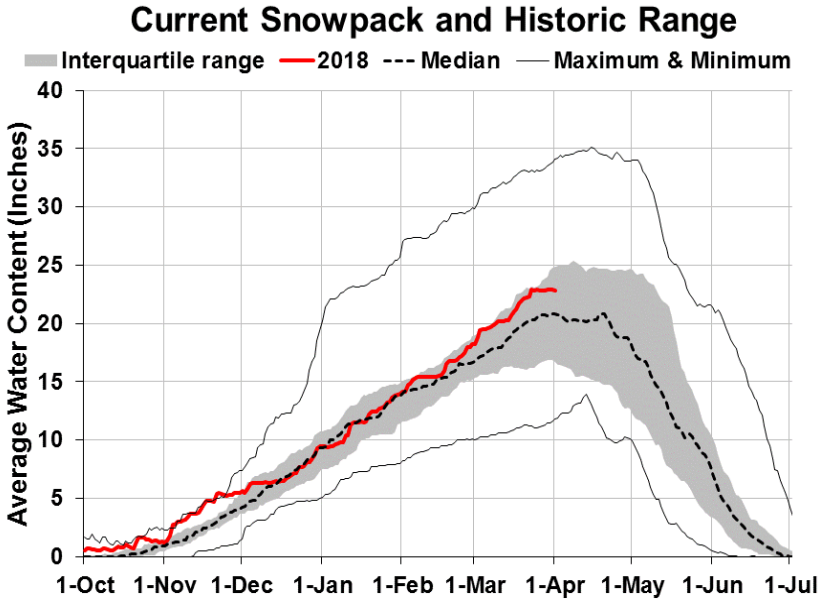
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

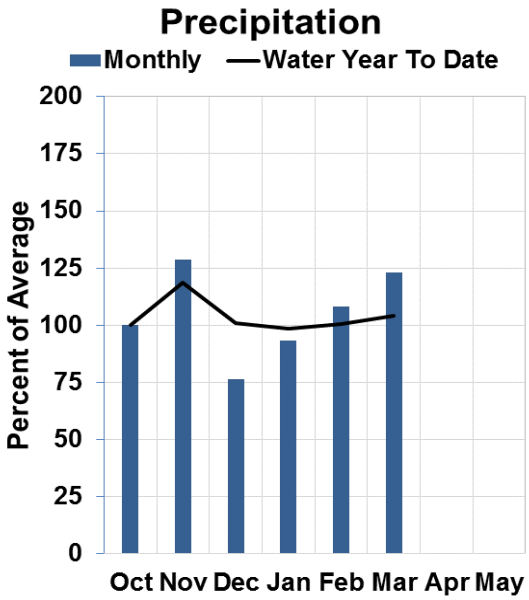
Reservoir Storage (KAF): End of March				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	1554.1	2336.9	2417.0	3468.0

Watershed Snowpack Analysis: April 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
NF Clearwater River	8	118%	102%
Lochsa River	2	126%	107%
Selway River	4	134%	103%
Clearwater Basin Total	16	122%	103%

Salmon River Basin

April 1, 2018





WATER SUPPLY OUTLOOK

For the 2nd consecutive month, monthly precipitation was above normal in the Salmon River basin. The highest precipitation amounts with respect to normal were in the Salmon River headwaters (Sawtooth Mountains, and Lost & Lemhi Ranges). Snowpack is above normal, and continues to vary substantially across the basin. Sites in the mountains that feed the Little Salmon River are reporting slightly below normal snowpack, whereas sites closer to the Idaho-Montana border are reporting much above normal snowpack (up to 140%). As a whole, the Salmon River snowpack has exceeded its normal seasonal snowpack peak, so we can classify 2018 as an above normal snowpack year. As of April 1, the snowpack is slightly above normal but a wet and cool April could make 2018 a substantially above normal snowpack.

Streamflow volume for the Salmon River along its main stem is forecast to be near normal. There is some forecast variability between sub-drainages; the median forecast for the MF Salmon is nearly 108% of average while the SF Salmon and Johnson creek are ~85% of average. It's worth noting we still have 2 full months of active weather (April and May) before high pressure begins its seasonal domination in June. Wetter than normal weather during April and May will likely increase the seasonal magnitude of streamflow runoff. Additionally, the whitewater community interested in peak flows should keep track of weather conditions in April-June. While the timing of peak flows is still in question, river runners are all but guaranteed a healthy whitewater season based on current snow conditions.

Salmon River Streamflow Forecasts - April 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	610	725	805	104%	885	1000	775
	APR-SEP	705	840	930	103%	1020	1160	900
Lemhi R nr Lemhi	APR-JUL	50	66	77	104%	87	103	74
	APR-SEP	63	80	92	102%	104	122	90
MF Salmon R at MF Lodge	APR-JUL	595	685	745	108%	805	895	690
	APR-SEP	665	760	830	108%	895	995	770
Sf Salmon R nr Krassel Ranger Station	APR-JUL	162	200	225	83%	250	290	270
	APR-SEP	176	215	245	84%	270	310	290
Johnson Ck at Yellow Pine Id	APR-JUL	120	147	165	86%	183	210	191
	APR-SEP	128	156	176	86%	195	225	205
Salmon R at White Bird	APR-JUL	3960	4880	5500	102%	6130	7040	5370
	APR-SEP	4380	5390	6060	102%	6740	7750	5940

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

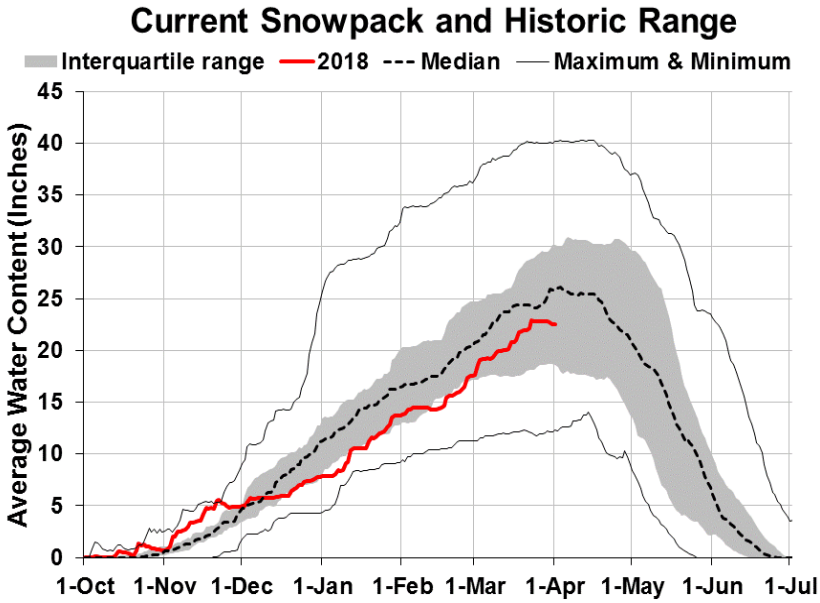
1) 90% and 10% exceedance probabilities are actually 95% and 5%

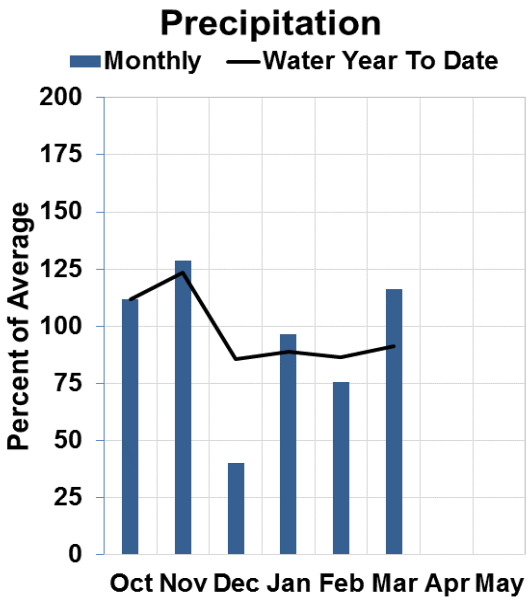
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Watershed Snowpack Analysis: April 1, 2018 Basin Name	# of Sites	% of Median 2018	2017
Salmon River ab Salmon	10	111%	151%
Lemhi River	10	122%	131%
MF Salmon River	3	98%	145%
SF Salmon River	3	89%	123%
Little Salmon River	4	86%	117%
Salmon Basin Total	30	107%	130%

West Central Basins

April 1, 2018





WATER SUPPLY OUTLOOK

Monthly precipitation was above normal across the West Central basins, with the Boise River drainage receiving the most at nearly 140% of normal. Water year (Oct. 1 through March 31) precipitation is about 90% of average. April 1st is approximately the time when snow water equivalent (SWE) reaches its seasonal peak in this region, which is a critical determining factor for expected spring runoff. Currently, snowpack in the Payette basin is 82% of the normal seasonal peak, while the Boise basin is 79% and Weiser is 73%. Cooler and wetter than normal weather in April would push these snowpack numbers closer to seasonal normal peaks.

Reservoirs continue to hold above average water for this time of year. The combined Boise system (Anderson Ranch + Arrowrock + Lucky Peak) is 86% full and 146% of average. The Payette system (Deadwood + Cascade) is 77% full and 119% of average. With the exception of the Weiser River and Mores Creek, which are forecast at about 70% of average, all median streamflow forecasts in the West Central basin are between 80 to 85% of average. These median forecasts don't mean this is what will happen 50% of the time, the background principles of our forecast method suggests 50% of the time the observed flow should be above these forecast values and 50% of the time below, and the most likely scenario is nearest the median forecast value. Even with below average streamflow, shortages are not expected for users on the major projects in the West Central basins due to much above average current reservoir storage.

West Central Basins Streamflow Forecasts - April 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	APR-JUL	295	350	385	81%	420	475	475
	APR-SEP	315	375	415	81%	450	510	510
Boise R nr Twin Springs	APR-JUL	390	455	495	85%	540	600	585
	APR-SEP	430	495	540	85%	590	655	635
Mores Ck nr Arrowrock Dam	APR-JUL	48	64	77	67%	90	112	115
	APR-SEP	50	67	80	67%	94	117	119
Boise R nr Boise 2	APR-JUN	790	870	920	81%	975	1050	1140
	APR-JUL	795	935	1030	82%	1120	1250	1260
	APR-SEP	890	1030	1120	82%	1210	1350	1360
Lake Fork Payette R nr McCall	APR-JUL	56	63	68	85%	73	82	80
	APR-SEP	57	65	70	84%	76	85	83
NF Payette R at Cascade 2	APR-JUL	295	355	395	81%	435	495	485
	APR-SEP	295	360	405	82%	445	510	495
NF Payette R nr Banks 2	APR-JUL	380	455	505	81%	555	630	625
	APR-SEP	375	460	515	80%	570	650	640
SF Payette R at Lowman	APR-JUL	275	310	335	84%	360	395	400
	APR-SEP	315	350	380	84%	410	450	455
Deadwood Reservoir Inflow 2	APR-JUL	82	95	104	85%	113	126	123
	APR-SEP	87	102	112	85%	122	137	131
Payette R nr Horseshoe Bend 2	APR-JUL	1010	1150	1240	84%	1340	1480	1480
	APR-SEP	1030	1210	1320	81%	1440	1610	1630
Weiser R nr Weiser	APR-JUL	164	225	275	74%	325	415	370
	APR-SEP	181	245	295	74%	350	440	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%

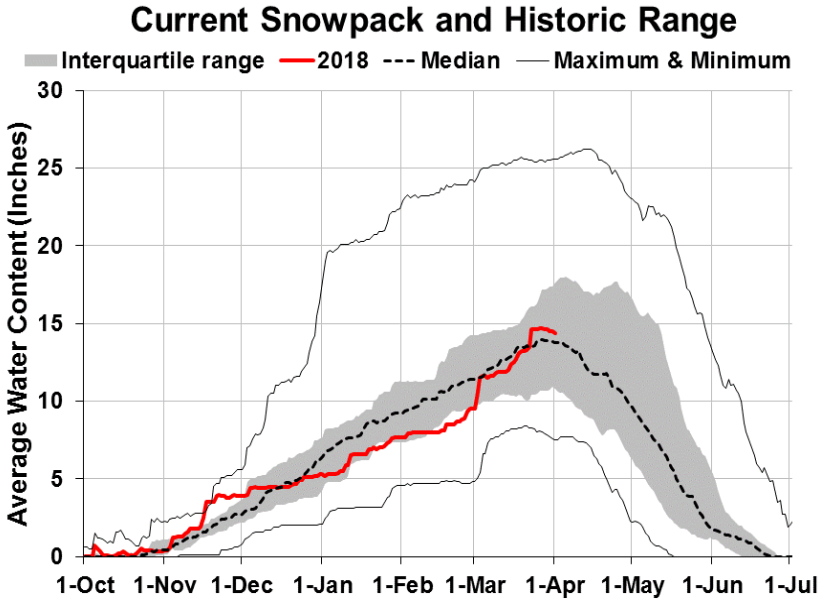
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

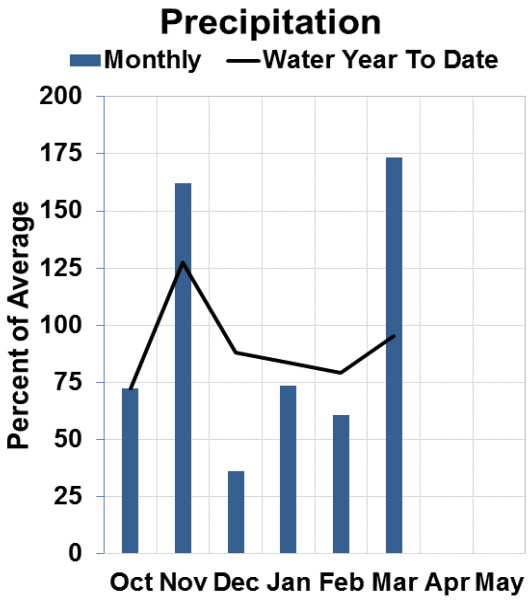
Reservoir Storage (KAF): End of March				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Anderson Ranch Reservoir	388.9	376.7	245.3	450.2
Arrowrock Reservoir	252.1	128.8	190.4	272.2
Lucky Peak Reservoir	236.8	170.3	167.5	293.2
Sub-Basin Total	**877.8**	**675.8**	**603.2**	**1015.6**
Deadwood Reservoir	114.0	120.1	90.6	161.9
Cascade Reservoir	541.3	557.9	462.1	693.2
Sub-Basin Total	**655.3**	**678.0**	**552.7**	**855.1**
Lake Lowell	143.1	145.6	113.0	165.2
Mann Creek Reservoir	7.7	7.8	8.7	11.1

Watershed Snowpack Analysis: April 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
SF Boise River	7	88%	160%
MF & NF Boise Rivers	6	79%	137%
Mores Creek	4	70%	114%
Canyon Creek	2	77%	119%
Boise Basin Total	16	79%	133%
NF Payette River	9	81%	104%
SF Payette River	5	88%	139%
Payette Basin Total	16	82%	116%
Mann Creek	1	71%	107%
Weiser Basin Total	8	73%	110%

Wood & Lost River Basin

April 1, 2018





WATER SUPPLY OUTLOOK

A favorable and familiar storm-track returned during March. Resulting, monthly precipitation was much above normal and ranged from 160 to 200%. Other than one late March high elevation rain event, most of monthly precipitation arrived as snow to these mountains. Snowpack in every sub-basin that make up the greater Wood & Lost River watersheds increased by 20 percentage points or more with respect to normal and now stand at 70 to 120%. Basins farther to the east (Little Lost, Birch-Medicine Lodge) hold the most snow with respect to normal. Weather outlooks for early April point to wet conditions, so it's likely that the highest sites haven't yet reached their seasonal snowpack peak.

Mackay Reservoir is holding 85% of capacity (120% of average), Little Wood is 89% full (135% of average), and Magic is 97% full (207% of average). Reservoir operators for Little Wood and Mackay have been passing inflows for most of March, and abundant monthly precipitation has all but guaranteed these systems will fill. Streamflow forecasts generally range from 75 to 90% of average, except for the Little Lost (104%) and Camas Creek near Blaine (29%). Above normal precipitation during March secured plentiful irrigation supplies for users in the Wood & Lost River drainages.

Wood and Lost Basins Streamflow Forecasts - April 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	15.7	25	32	114%	38	48	28
Little Lost R nr Howe	APR-JUL	20	26	29	104%	33	38	28
	APR-SEP	24	31	36	106%	40	47	34
Big Lost R at Howell Ranch	APR-JUL	98	125	143	90%	161	188	159
	APR-SEP	112	142	162	90%	182	210	180
Big Lost R bl Mackay Reservoir	APR-JUL	60	88	107	87%	126	154	123
	APR-SEP	77	110	132	88%	155	188	150
Little Wood R ab High Five Ck	APR-JUL	29	46	57	83%	68	84	69
	APR-SEP	32	49	62	83%	74	91	75
Little Wood R nr Carey 2	APR-JUL	31	49	61	79%	73	90	77
	APR-SEP	34	53	65	78%	78	97	83
Big Wood R at Hailey	APR-JUL	146	177	199	85%	220	250	235
	APR-SEP	165	200	225	85%	250	285	265
Big Wood R ab Magic Reservoir	APR-JUL	57	100	130	76%	159	200	170
	APR-SEP	48	94	125	69%	156	200	182
Camas Ck nr Blaine	APR-JUL	5.4	14.7	24	29%	35	55	82
	APR-SEP	5.5	15	24	29%	35	55	83
Big Wood R bl Magic Dam 2	APR-JUL	94	152	191	76%	230	290	250
	APR-SEP	104	164	205	77%	245	305	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%

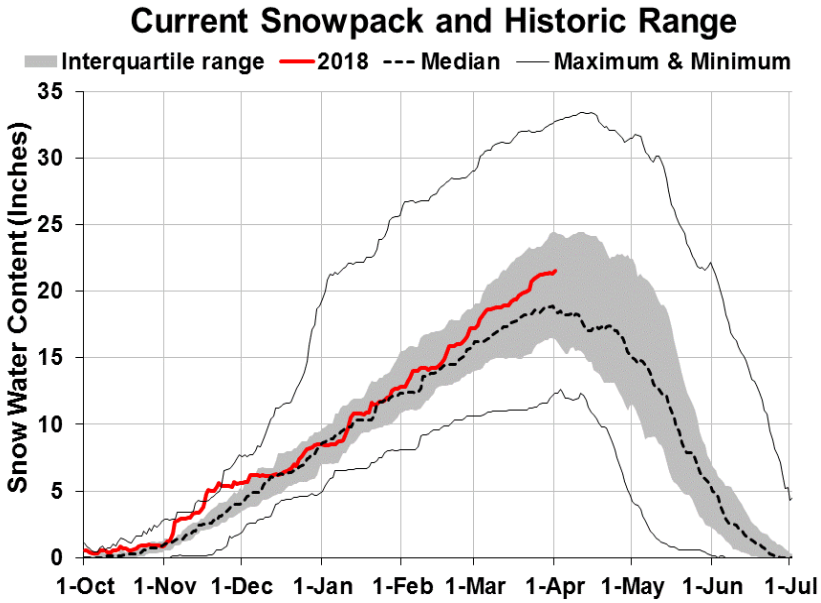
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

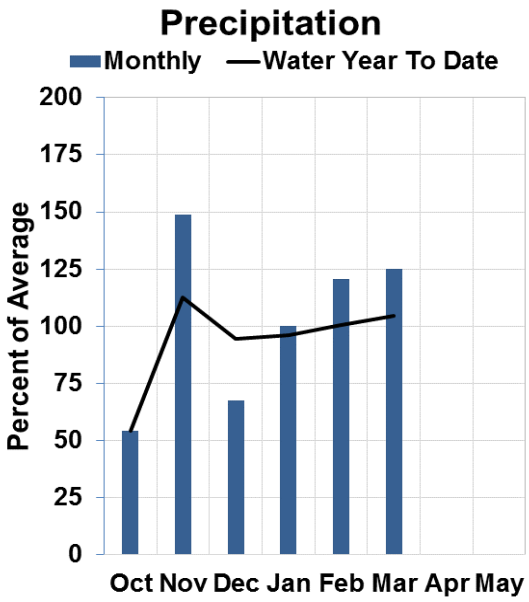
Reservoir Storage (KAF): End of March				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Mackay Reservoir	37.5	20.5	31.2	44.4
Little Wood Reservoir	26.7	12.8	19.8	30.0
Magic Reservoir	184.9	186.0	89.3	191.5

Watershed Snowpack Analysis: April 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Camas-Beaver Creeks	4	94%	85%
Birch-Medicine Lodge Creeks	4	115%	120%
Little Lost River	4	119%	143%
Big Lost River ab Mackay	6	99%	178%
Big Lost Basin Total	7	101%	172%
Fish Creek	3	73%	187%
Little Wood River	4	89%	174%
Big Wood River ab Hailey	7	99%	178%
Camas Creek	4	68%	146%
Big Wood Basin Total	11	92%	171%

Upper Snake River Basin

April 1, 2018





WATER SUPPLY OUTLOOK

The Upper Snake River drainage remained above normal for the month of March, at 108% of normal snowpack and 104% of normal precipitation. Some drainages received much more than average precipitation as a result of colder temperatures at lower elevations (see PRISM Reanalysis). The Portneuf was badly in need of a few good storms and Mother Nature did not disappoint! With 173% of normal precipitation in March hitting the drainage, water year to date numbers have increased from 74% of normal to 91% (see Sedgewick Peak SNOTEL Data). Portneuf snowpack, as part of this precipitation total, increased from 57% of normal to 72%. Willow Creek and the Blackfoot River received similar amounts, and their near normal numbers (up from ~70% of normal) reflect these snow storms. The Buffalo Fork and Gros Ventre River hold the highest percentages in the drainage at 137% and 134% of normal snowpack and 133% and 126% of normal precipitation.

Many reservoirs are starting to match or exceed inflows with spillage to make room for the upcoming melt off season. The lower elevation drainages such as Willow Creek, Portneuf, and the Blackfoot River are nearing their median water year peak (early April) while, on average, the higher elevation drainages to the north still have two weeks to a month to go. Reservoir managers are trying to retain as much water as possible before the melt season begins in preparation for this summer's water supply. Streamflow Forecasts for the Upper Snake River Region range from 90% to 120% of average; Upper Snake River water users should rest assured that there will be ample supply this summer.

Upper Snake River Basin Streamflow Forecasts - April 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	420	490	545	103%	595	665	530
	APR-SEP	570	660	725	102%	785	875	710
Falls R nr Ashton 2	APR-JUL	315	360	385	105%	415	455	365
	APR-SEP	380	430	465	107%	500	550	435
Teton R nr Driggs	APR-JUL	105	131	149	97%	167	193	154
	APR-SEP	133	165	188	97%	210	240	193
Teton R nr St Anthony	APR-JUL	265	320	360	99%	395	450	365
	APR-SEP	320	385	430	99%	475	540	435
Henrys Fk nr Rexburg 2	APR-JUL	1100	1290	1420	101%	1550	1740	1400
	APR-SEP	1400	1640	1810	101%	1980	2230	1790
Snake R at Flagg Ranch	APR-JUL	455	505	535	115%	570	620	465
	APR-SEP	495	550	590	116%	625	680	510
Snake R nr Moran 2	APR-JUL	730	810	860	112%	915	990	765
	APR-SEP	805	895	955	113%	1020	1110	845
Pacific Ck at Moran	APR-JUL	158	184	200	122%	220	245	164
	APR-SEP	166	193	210	121%	230	255	173
Buffalo Fk ab Lava Ck nr Moran	APR-JUL	280	315	335	120%	360	390	280
	APR-SEP	315	355	380	119%	410	450	320
Snake R ab Reservoir nr Alpine 2	APR-JUL	2300	2480	2610	120%	2730	2920	2170
	APR-SEP	2610	2840	2990	120%	3140	3360	2500
Greys R ab Reservoir nr Alpine	APR-JUL	265	295	315	103%	340	370	305
	APR-SEP	305	345	370	103%	395	435	360
Salt R ab Reservoir nr Etna	APR-JUL	181	240	280	93%	315	375	300
	APR-SEP	230	300	345	93%	390	455	370
Snake R nr Irwin 2	APR-JUL	2730	3060	3280	109%	3510	3840	3010
	APR-SEP	3190	3560	3820	109%	4070	4440	3500
Snake R nr Heise 2	APR-JUL	2940	3290	3530	109%	3760	4120	3240
	APR-SEP	3470	3860	4130	109%	4400	4790	3780
Willow Ck nr Ririe 2	APR-JUL	20	33	44	72%	56	77	61
Portneuf R at Topaz	APR-JUL	26	38	46	72%	55	67	64
	APR-SEP	34	49	60	74%	71	86	81
Snake R at Neeley 2	APR-JUL	1350	1970	2400	91%	2820	3450	2650
	APR-SEP	1320	2030	2510	89%	2990	3690	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%

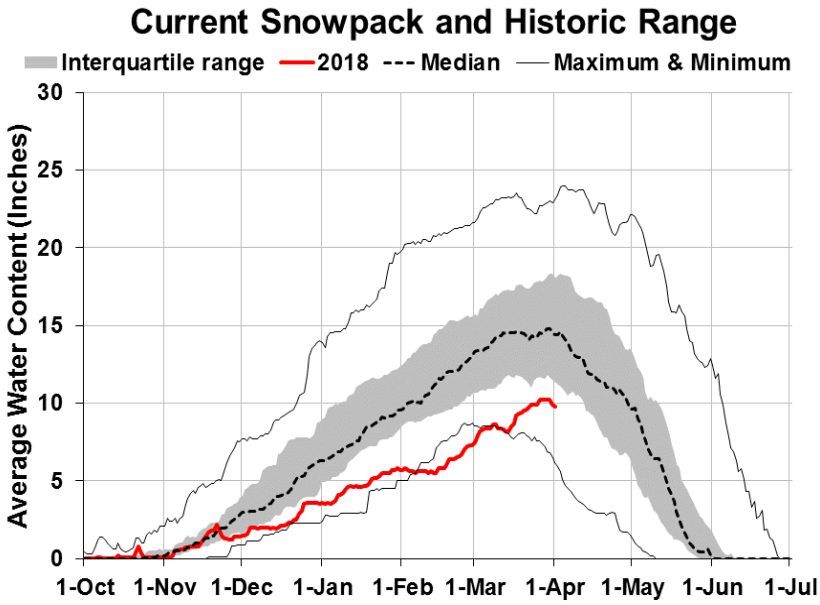
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

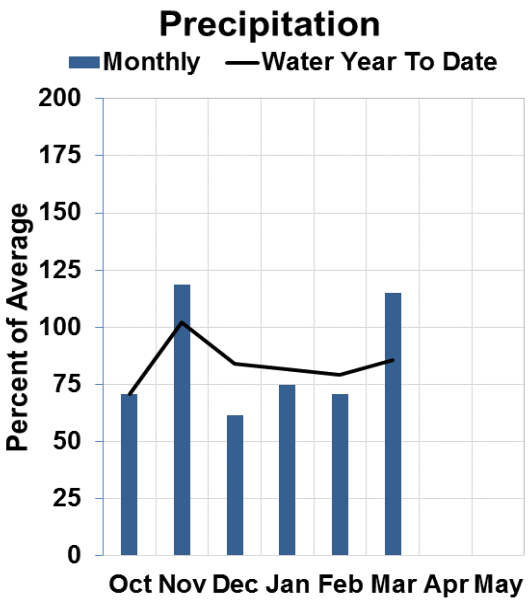
Reservoir Storage (KAF): End of March				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Jackson Lake	655.7	536.6	430.7	847.0
Palisades Reservoir	1109.4	461.9	902.8	1400.0
Sub-Basin Total	**1765.0**	**998.5**	**1333.5**	**2247.0**
Henrys Lake	82.3	87.5	81.3	90.4
Island Park Reservoir	119.5	116.4	111.8	135.2
Grassy Lake	13.8	13.5	12.3	15.2
Sub-Basin Total	**215.7**	**217.4**	**205.4**	**240.8**
Ririe Reservoir	57.5	63.8	44.8	80.5
Blackfoot Reservoir	296.8	276.3	186.4	337.0
American Falls Reservoir	1575.0	1462.8	1497.0	1672.6
Basin-Wide Total	**3910.0**	**3018.9**	**3267.1**	**4577.9**

Watershed Snowpack Analysis: April 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Henrys Fork-Falls River	11	113%	115%
Teton River	9	103%	112%
Henrys Fork ab Rexburg	20	109%	114%
Snake River ab Jackson Lake	13	116%	135%
Pacific Creek	4	121%	166%
Buffalo Fork	4	137%	137%
Gros Ventre River	4	134%	145%
Hoback River	6	126%	179%
Greys River	4	119%	154%
Salt River	5	104%	129%
Snake ab Palisades Resv	34	117%	144%
Willow Creek - Ririe	7	91%	92%
Blackfoot River	5	92%	103%
Portneuf River	7	72%	120%
Snake River ab American Falls	55	108%	130%

Southside Snake River Basins

April 1, 2018





WATER SUPPLY OUTLOOK

Southside Snake saw persistent storms during March and finally had a month with above normal precipitation for the first time since November. Water year to date precipitation across all basins is below normal, ranging from 83% in Goose-Trapper Creeks to a high of 93% in the Bruneau River drainage. Snowpack is still low across the Southside Snake basins ranging from a low of 40% in the Owyhee basin to 70% of normal in Raft River. While snow conditions are below normal, significant increases were observed during March, as the red line in the snowpack chart above illustrates.

Southside Snake area reservoir levels, with the exception of Brownlee and Oakley, are all well above average. As mentioned in the introduction Brownlee is currently releasing to prepare for runoff and Oakley does not typically fill, so the below normal capacity should not be a cause for concern. Streamflow forecasts generally range from 55 to 75% of average, with the exception being forecast points in the Owyhee River drainage, which range from 15 to 45% of average. Irrigation supplies are expected to be adequate for users on reservoir systems across the region.

Southside Snake River Basins Streamflow Forecasts - April 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	APR-JUL	4.2	7.5	10.2	55%	13.4	18.8	18.7
	APR-SEP	4.6	8.1	11	55%	14.4	20	20
Trapper Ck nr Oakley	APR-JUL	2.6	3.2	3.6	72%	4.1	4.8	5
	APR-SEP	3.6	4.2	4.7	77%	5.2	6	6.1
Oakley Reservoir Inflow	APR-JUL	6.7	10.6	13.8	58%	17.4	23	24
	APR-SEP	7.9	12.2	15.7	60%	19.6	26	26
Salmon Falls Ck nr San Jacinto	APR-JUL	16.1	31	41	59%	51	66	70
	APR-SEP	18.7	34	44	59%	55	70	74
Bruneau R nr Hot Spring	APR-JUL	55	97	125	68%	153	195	183
	APR-SEP	59	102	132	69%	161	205	192
Reynolds Ck at Tollgate	APR-JUL	0.35	2	3.2	42%	4.3	6	7.6
Owyhee R nr Gold Ck 2	APR-JUL	0.36	1.86	3.5	16%	5.7	9.9	22
Owyhee R nr Rome	APR-JUL	38	84	126	37%	177	265	345
	APR-SEP	46	95	139	38%	191	280	365
Owyhee R bl Owyhee Dam 2	APR-JUL	55	107	153	41%	205	300	375
	APR-SEP	74	131	180	44%	235	330	405
Snake R bl Lower Granite Dam 1	APR-JUL	18900		21500	109%		25600	19800
	APR-SEP	21400		23900	107%		28300	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%

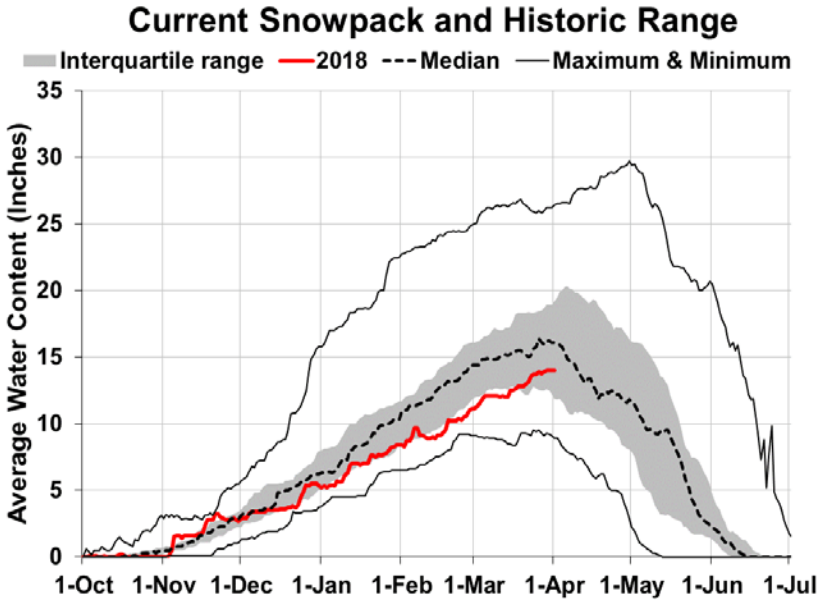
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

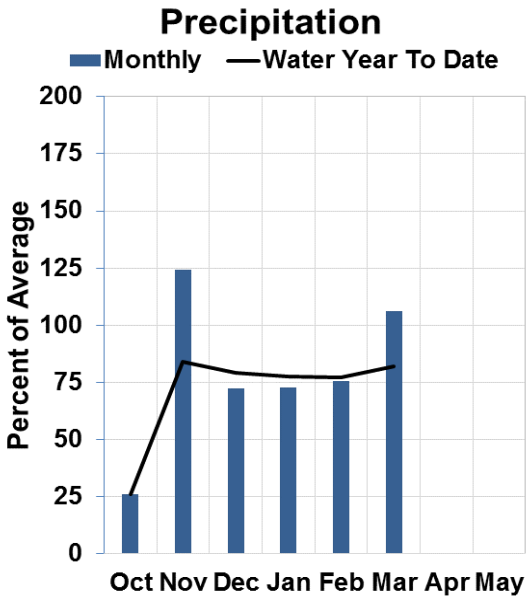
Reservoir Storage (KAF): End of March				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Oakley Reservoir	40.3	46.8	29.6	75.6
Salmon Falls Reservoir	98.8	111.2	56.0	182.6
Wild Horse Reservoir	65.8	64.3	39.2	71.5
Lake Owyhee	569.8	675.4	495.8	715.0
Brownlee Reservoir	937.8	832.3	1102.0	1420.0

Watershed Snowpack Analysis: April 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Raft River	6	70%	111%
Goose-Trapper Creeks	6	65%	107%
Salmon Falls Creek	8	66%	105%
Bruneau River	8	59%	113%
Reynolds Creek	1	100%	800%
Owyhee Basin Total	11	40%	96%
Owyhee Basin Snotel Total	8	47%	100%

Bear River Basin

April 1, 2018





WATER SUPPLY OUTLOOK

The Bear River Basin received above average precipitation in March at 115% of normal, bringing water year to date from 78% to 84% of normal during March. Snowpack through the basin has also improved since March 1st with an increase from 74% of normal to 84% of normal. The Malad River also caught several storms to aid an otherwise dry winter. With 176% of normal precipitation in the month of March, the Malad River has increased from 57% to 78% of normal for the water year to date, and snowfall made up the majority of the precipitation increase (snowpack increased from 51% to 65% of normal). The Smith and Thomas Forks still hold the highest percentage of normal snowpack in the basin at 102%.

The NOAA one month outlook calls for above average temperatures in the region with average precipitation amounts, which could be a recipe for rain on snow events. Bear Lake is currently at 76% of capacity and 162% of average, with plenty of space to catch a quick melt off season, if it occurs. Streamflow forecasts for the region vary from 40 to 90% of average. Users in smaller drainages not moderated by reservoirs concerned about flooding should look at the 30% exceedance forecasts, while folks concerned about water supply shortages should observe the 70% exceedance forecast for conservative estimates.

Bear River Basin Streamflow Forecasts - April 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	40	59	72	64%	85	104	112
	APR-SEP	44	65	80	65%	94	116	123
Bear R ab Resv nr Woodruff	APR-JUL	7.3	39	69	57%	99	144	121
	APR-SEP	6.4	40	73	57%	106	154	128
Big Ck nr Randolph	APR-JUL	0.11	0.87	1.9	50%	3.3	3.9	3.8
Smiths Fk nr Border	APR-JUL	54	69	79	89%	89	104	89
	APR-SEP	66	83	94	90%	105	122	104
Bear R bl Stewart Dam 2	APR-JUL	5.3	68	110	60%	152	215	183
	APR-SEP	6.7	77	125	61%	173	245	205
Little Bear at Paradise	APR-JUL	1.27	11.8	19	42%	26	37	45
Logan R nr Logan	APR-JUL	51	67	78	70%	89	105	111
Blacksmith Fk nr Hyrum	APR-JUL	9.9	22	31	72%	40	52	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 March				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Bear Lake	994.3	663.7	611.9	1302.0
Montpelier Reservoir	3.9	1.3	1.9	4.0

Watershed Snowpack Analysis: April 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Smiths-Thomas Forks	4	102%	165%
Bear River ab WY-ID Line	11	88%	156%
Montpelier Creek	2	86%	142%
Mink Creek	4	74%	119%
Cub River	3	76%	134%
Bear River ab ID-UT Line	25	84%	142%
Malad River	3	65%	109%

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 does not include 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 includes 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

Southside Snake River Basins
Goose Ck nr Oakley - no adjustments
Trapper Ck nr Oakley - no adjustments
Oakley Res Inflow - *flow does not include 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

Bear River Basin
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

Reservoir Capacity Definitions (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
Panhandle Region						
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
Clearwater Basin						
Dworshak	Unknown	**1452.00**	**2016.00**	**---**	**3468.0**	Inactive + Active
West Central Basins						
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
Wood and Lost Basins						
Mackay	0.13	---	**44.37**	**---**	**44.4**	Active
Little Wood	Unknown	---	**30.00**	**---**	**30.0**	Active
Magic	Unknown	---	**191.50**	**---**	**191.5**	Active
Upper Snake Basin						
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
Southside Snake Basins						
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
Bear River Basin						
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

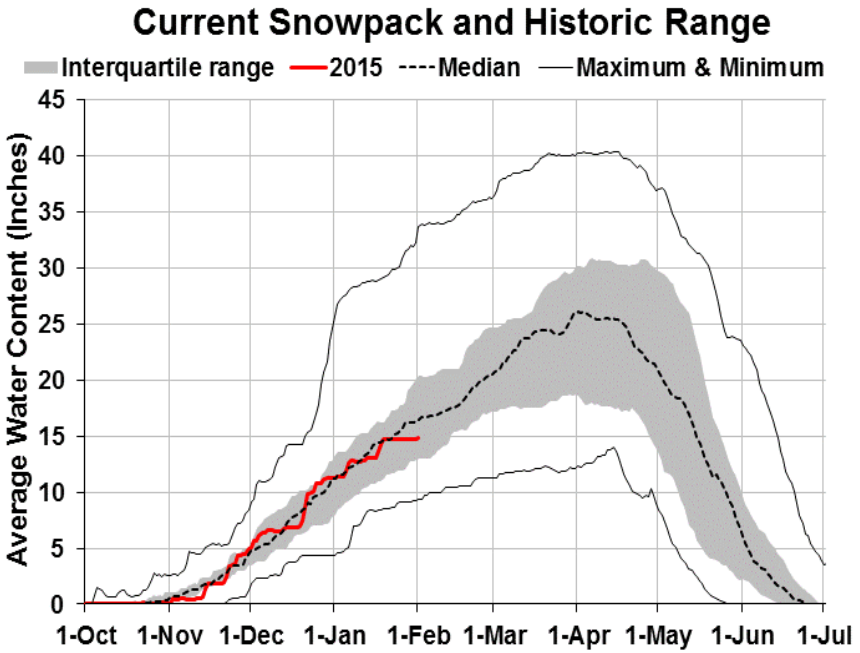
Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <---Drier----------Projected Volume----------Wetter---> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Henrys Fk nr Ashton	JUN-JUL	72	106	129	56	152	186	230
	JUN-SEP	198	245	280	68	315	360	410

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.



USDA Natural Resources Conservation Service
9173 West Barnes Drive, Suite C
Boise ID 83709-1574

OFFICIAL BUSINESS

Issued by
Leonard Jordan, Acting Chief
Natural Resources Conservation Service
Washington, DC

Released by
Jerry Raynor, Acting State Conservationist
Shawn Nield, State Soil Scientist
Natural Resources Conservation Service
Boise, Idaho

Prepared by
Idaho Snow Survey Staff
Ron Abramovich, Water Supply Specialist
Danny Tappa, Hydrologist
John Wilford, Electronics Technician
Tom Beers, Field Hydrologist
Earl Adsley, Trainee Hydrologist
Tina Andry, Trainee Hydrologist

Forecasts and Assistance provided by
Rashawn Tama, Forecast Hydrologist
Jolyne Lea, Forecast Hydrologist
NRCS, National Water and Climate Center, Portland, Oregon

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