USDA United States Department of Agriculture

Natural Resources Conservation Service

Idaho Water Supply Outlook Report

January 1, 2018

2017 runoff is setting the stage for the 2018 runoff season. The picture of the Big Lost River near Arco (above) taken on December 21, 2017, illustrates the high streamflows going into this winter. Baseflows and springs are flowing above normal across most of the state. Resulting, reservoir storage is in good shape across the state. Magic Reservoir is pictured below on December 21, 2017, with ice at the confluence of the Big Wood River and Camas Creek.

High baseflows and reservoir carryover storage is good news for Idaho's numerous water users and provides a cushion for parts of the state if the current drier weather pattern persists. Current snowpacks range from near normal in the northern half of Idaho to only 40% of normal in the Weiser and Owyhee basins.

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

The wider the spread among these values, the more 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

January 1, 2018

SUMMARY

The good news about this year's water supply outlook pertains to 2017's abundant runoff. Last year's high snowpacks and runoff primed the hydrologic system and has kept rivers and springs flowing above normal well into this fall and early winter. As a result, reservoir carryover storage is well above normal and probably the highest since the fall of 2011. This is the good news for Idaho's water users as winter storm tracks have been missing most of southern Idaho. Keep in mind that the high elevation mountains in the Big Lost and Upper Snake basins captured more snow than normal in early autumn storms. October through December precipitation and snow accumulation has been highly variable across the state.

Water year-to-date precipitation ranges from a high of 115% of average in the Spokane and Clearwater basin to 75% of average in the Weiser, Mud Lake and Bear River watersheds. Snowpacks got off to a good start thanks to a wet November, but the relatively dry December has affected current total snowpack percentages. The Upper Snake hosts the highest snowpack at 114% of normal followed by near normal snowpacks in northern Idaho, Salmon, Big Lost, Little Lost and Henrys Fork basins. The snow is only 60 to 85% of normal across Idaho's central and southern basins and only 40% in the Weiser and Owyhee basins.

Reservoir storage is in good shape across the state with nearly all reporting normal to well above normal storage for this time of year. Streamflow forecasts mirror the snowpack with normal or higher volumes predicted in the Spokane, Clearwater, MF Salmon, and tributaries in the Upper Snake basins. Central Idaho streams from the Weiser to the Little Wood and Bruneau to the Oakley drainages are forecast at 60 to 80% of normal while the Owyhee streams are only forecast at 40 to 50%.

Stay tuned for the second half of winter, as large-scale climate patterns currently suggest a shift towards cooler temperatures and increased precipitation in the coming months. Here is what we know: the weather patterns are very active bringing abundant snow and very cold temperatures to the basins near the US/Canada border from Washington to the Great Lakes and beyond. La Nina conditions are present in the Pacific Ocean. This typically means wetter conditions in the second half of winter in the Pacific Northwest. Southern Idaho needs the jet stream to bring more storms and moisture into this region.

SNOWPACK

Idaho's snowpack got off to a good start with late September storms bringing cooler temperatures and the first fall moisture as snow in Idaho and Wyoming's high country. November brought more storms and snow to the high country that allowed some ski areas to open before Thanksgiving. However, the Thanksgiving storm also put a damper on the accumulation of Idaho's snowpack in some areas of the state by bringing rain to the valleys and as high as 9,000 feet. This was followed by a dry December that brought only a third of normal precipitation across Idaho's west central and central mountains.

As of January 1, only a few basins are reporting near normal snowpacks. The Upper Snake above Palisades Reservoir hosts the highest snowpack at 114% of normal. Near normal snowpacks (95-105%) can be found in the Panhandle Region, Clearwater, Salmon, Big Lost, Little Lost, and Henrys Fork. The snowpacks drop to between 55% and 85% of normal in the Payette, Boise, Big Wood, Mud Lake, eastern Idaho and across southern Idaho from the Bruneau basin to the Bear River basin. The lowest snowpacks in the state are 35% to 40% of normal in Idaho's lower elevations in the Weiser, Owyhee and Little Wood basins. Much more snow is needed in the second half of winter to maintain the normal snow levels in northern Idaho and increase the snowpack in central and southern Idaho to more respectable levels.

PRECIPITATION

The new water year started October 1, 2017, with October bringing 95 to 130% of normal precipitation to the Boise basin and basins to the north while the rest of the state only received 40 to 80% of normal amounts. November brought normal to above-normal precipitation across the state with the highest amounts (180% of normal) in the Little Wood and Big Lost basins. November also got the higher elevation snowpacks off to an early start, however, warmer temperatures around Thanksgiving brought rain to most elevations. The higher elevations continued building mountain snowpack, though. Then December arrived. Only the Clearwater basin received above normal amounts, 121%, followed by the Spokane basin at 94%. Eastern and southern Idaho received 40 to 70% of normal amounts. The least amount of December precipitation fell in the west central and central Idaho mountains, ranging from only 15% of normal in the Little Wood basin to 40% in the Payette basin. Water year-to-date precipitation since October is above normal in the Spokane and Clearwater basins. The lowest water year-to-date precipitation is 75% of normal in the Weiser, Little Wood, Mud Lake and Bear River basins.

RESERVOIRS

Idaho's reservoirs are the bright spot right now for next year's water supply outlook. Nearly all of Idaho's reservoirs, reservoir systems or lakes are reporting average to well above average for this time of year. This is like money already deposited in the bank account, just waiting to be spent. The high carryover storage is a result of last year's record or near-record high runoff across most of the state because of wise use and careful water management. With the current snowpack levels at only 40 to 110% of normal across the state, reservoir releases will be made as needed depending upon future snowfall. If snowpacks and projected streamflow volumes remain below normal, above normal reservoir storage will be critical to make up the difference and should help to provide adequate irrigation supplies in most areas.

STREAMFLOW

Streamflow forecasts vary across the region ranging from 40% of average in the Owyhee basin to 125% in the headwaters streams of the Snake River in Wyoming, Pacific Creek and Buffalo Fork. With more than half the winter still to come and potential for La Nina type weather patterns to still occur, these streamflow forecasts will likely change, but the exceedance forecasts can be used as guidance in your decision making process. Combining the forecasts with the current reservoir storage in the Surface Water Supply Index (SWSI), shows that most basins will have adequate supplies based on the 50% chance of exceedance forecasts. If the dry conditions continue, and the minimum streamflow forecasts occur (90% chance of exceeding minimum forecasted volumes), shortages may start to occur in the Big Wood, Big Lost and Little Lost basins.

Note: The helicopter snow survey flight to measure the snow courses in the Teton basin did not happen this month. As a result, the Teton River forecasts are based on SNOTEL data only.

Note: The NRCS is proposing to discontinue the volume forecasts for the Portneuf River at Topaz. This forecast point has no adjustments to correct the observed streamflow data to the natural flow that would occur. This gaging station is down streamflow of Chesterfield Reservoir that has limited data and there are several upstream diversions that account for approximately 10% of the streamflow. Without these corrections for natural flow, the NRCS is not able to accurately forecast the natural volume that would occur from snowmelt during the spring and summer runoff season. If you use the Portneuf River forecast or have the upstream diversion or reservoir data, please contact the local NRCS Field Office or Idaho NRCS Snow Survey Office.

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

After a good early start to building this winter's Idaho snowpack, Mother Nature took a break in December by delivering the snow and cold weather to the mid-west and eastern states. However, northern Idaho ski resorts and eastern Idaho are benefiting from the storm track this year. Elsewhere, snowpacks remain thin and horses are still grazing on grass in the Weiser basin. Avalanche conditions are present because of the extended dry, and warm spells, so play it safe and check conditions locally before venturing out to enjoy Idaho's mountains.

WESTERN SNOW CONFERENCE

Registration and the Call for Papers are 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/

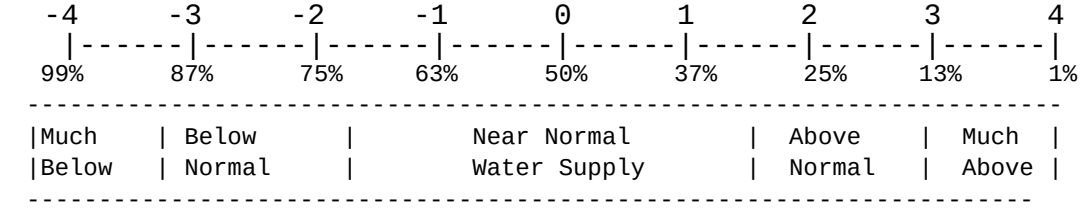
IDAHO SURFACE WATER SUPPLY INDEX (SWSI) January 1, 2018

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.

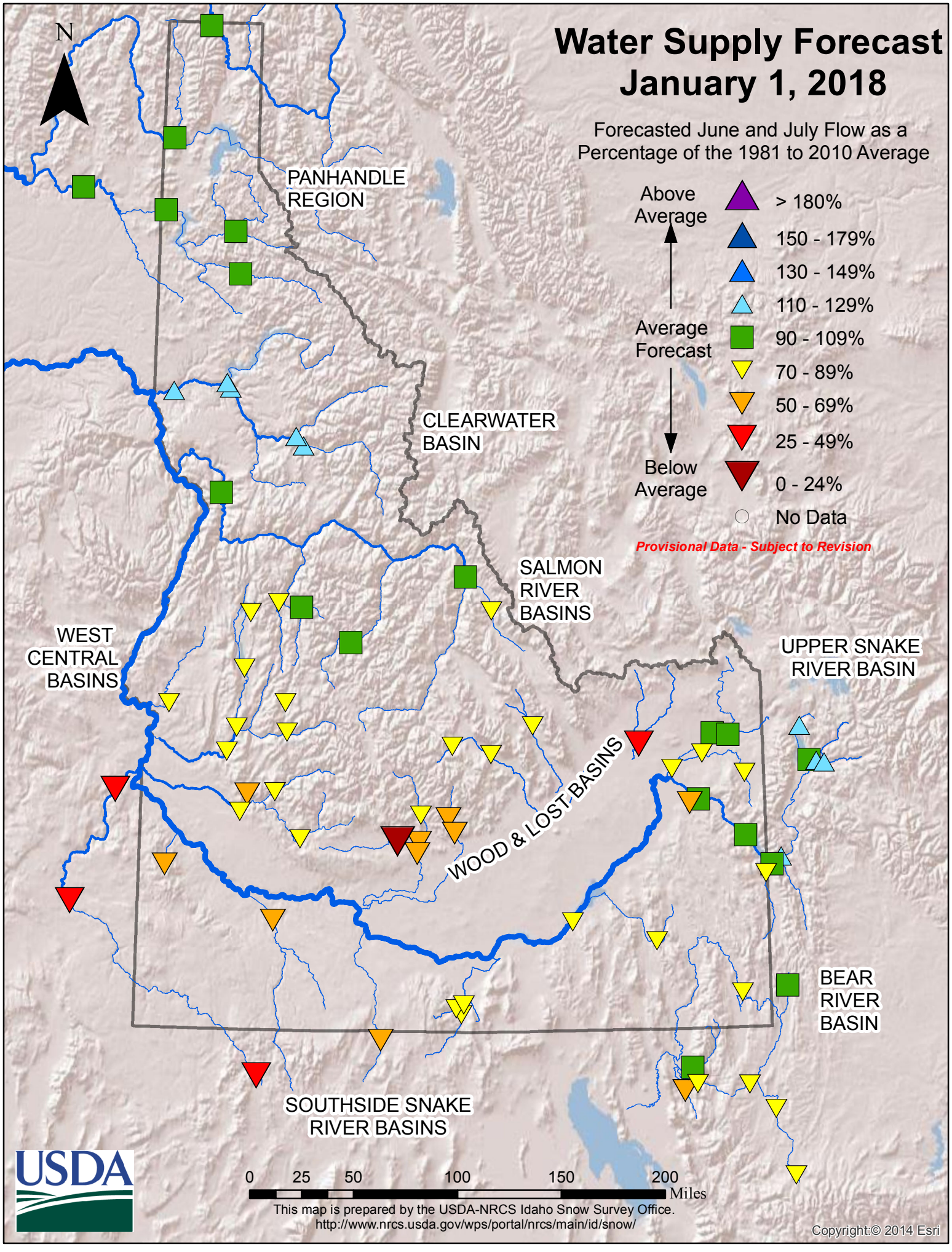
SWSI values provide a more comprehensive outlook of water availability by combining streamflow forecasts and reservoir storage where appropriate. The SWSI index allows comparison of water availability between basins for drought or flood severity analysis. Threshold SWSI values have been determined for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

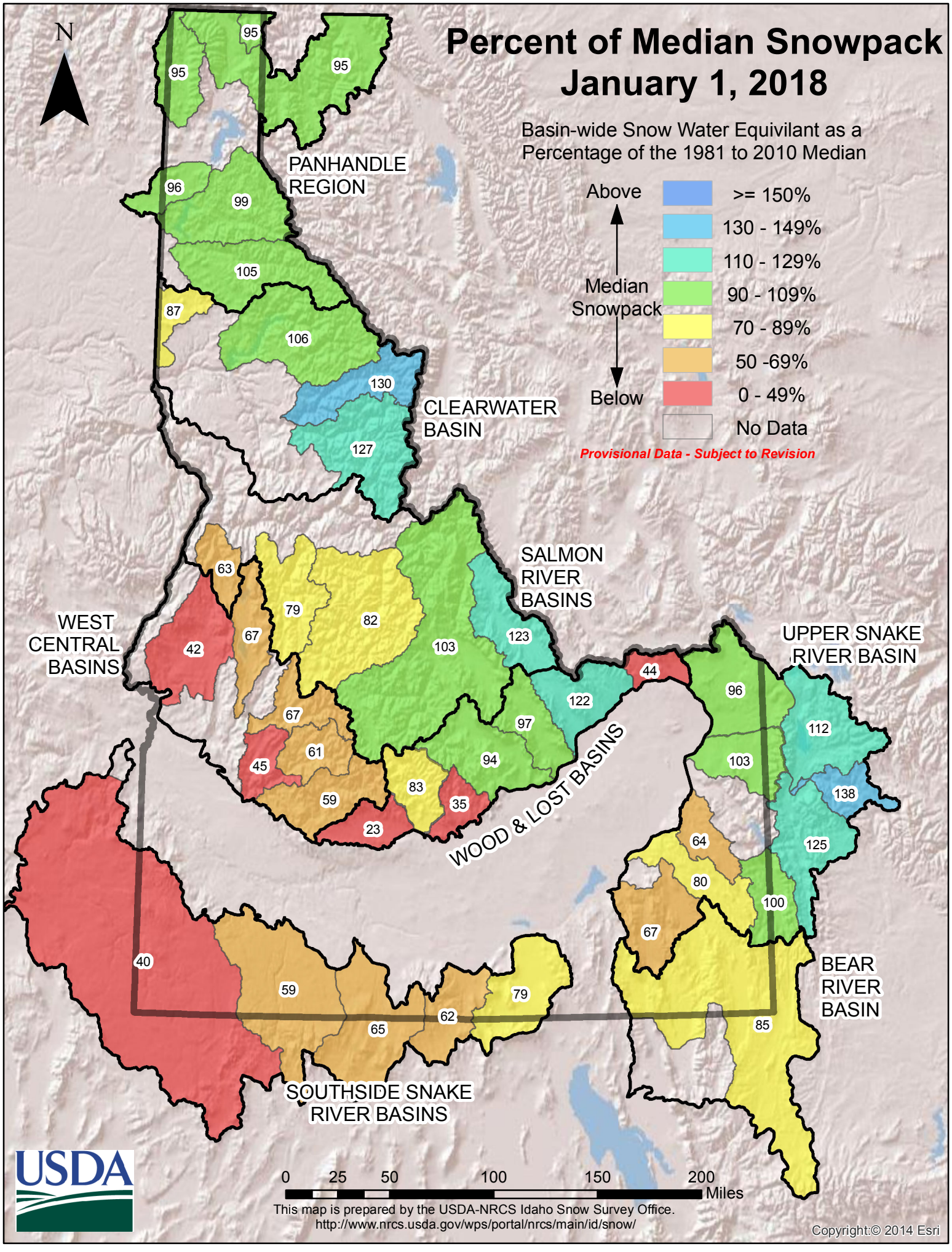
BASIN or REGION	*SWSI Value*	*Most Recent Year With Similar SWSI Value*	*Agricultural Water Supply Shortage May Occur When SWSI is Less Than*
Spokane	**-0.3**	**1981**	**NA**
Clearwater	**1.6**	**2017**	**NA**
Salmon	**0.1**	**2010**	**NA**
Weiser	**-1.9**	**2014**	**NA**
Payette	**-1.0**	**2016**	**NA**
Boise	**0.1**	**2016**	**-1.5**
Big Wood	**0.8**	**2012**	**0.7**
Little Wood	**-0.1**	**2010**	**-1.3**
Big Lost	**-0.1**	**2005**	**0.7**
Little Lost	**0.1**	**2012**	**1.3**
Teton	**0.8**	**2015**	**-3.9**
Henrys Fork	**0.8**	**2000**	**-1.5**
Snake (Heise)	**1.7**	**2009**	**-1.8**
Oakley	**1.4**	**2007**	**0.7**
Salmon Falls	**1.7**	**1996**	**-0.7**
Bruneau	**-0.5**	**2004**	**NA**
Owyhee	**0.5**	**2012**	**-2.2**
Bear River	**2.5**	**1997**	**-3.7**

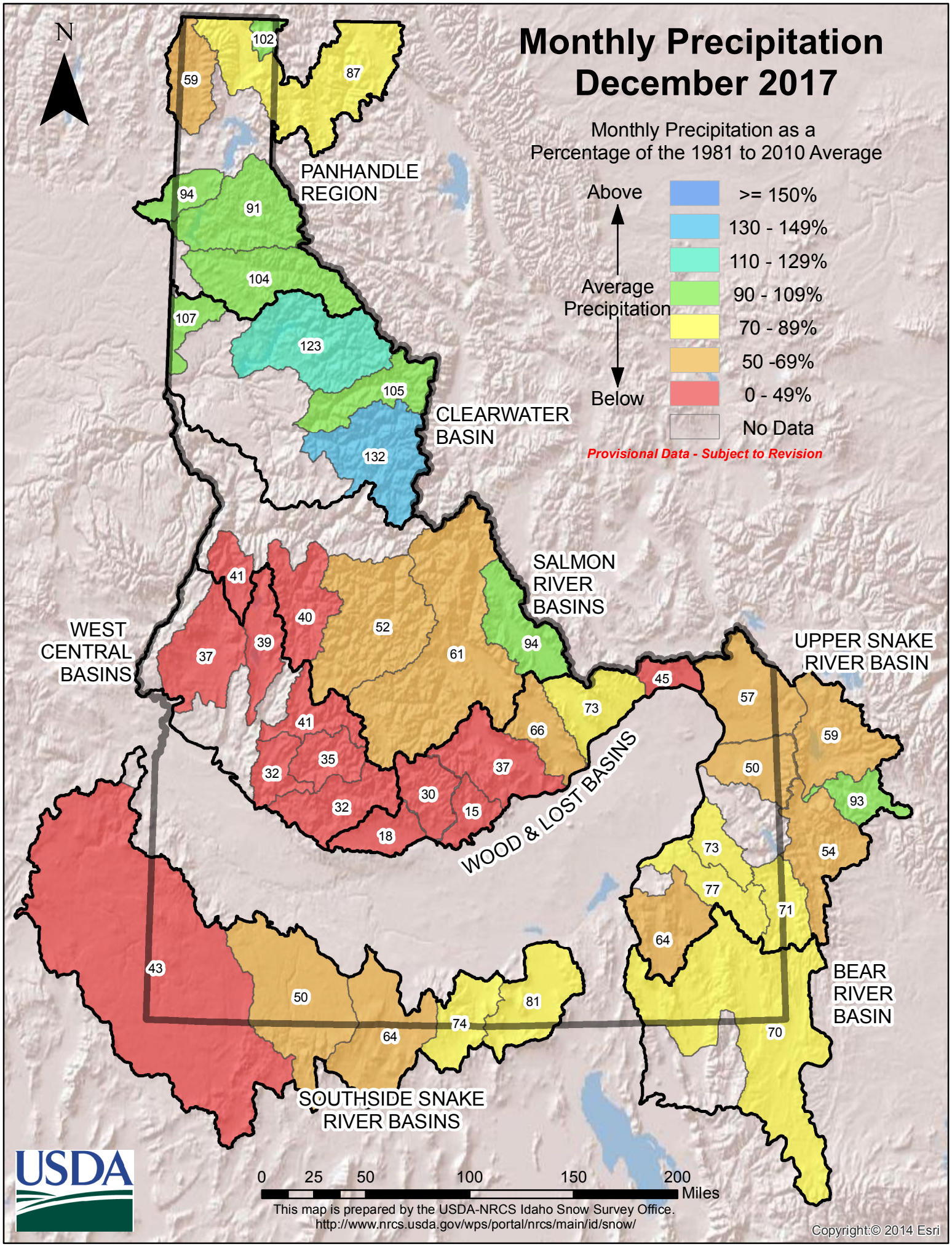
SWSI SCALE, PERCENT CHANCE OF EXCEEDANCE, AND INTERPRETATION

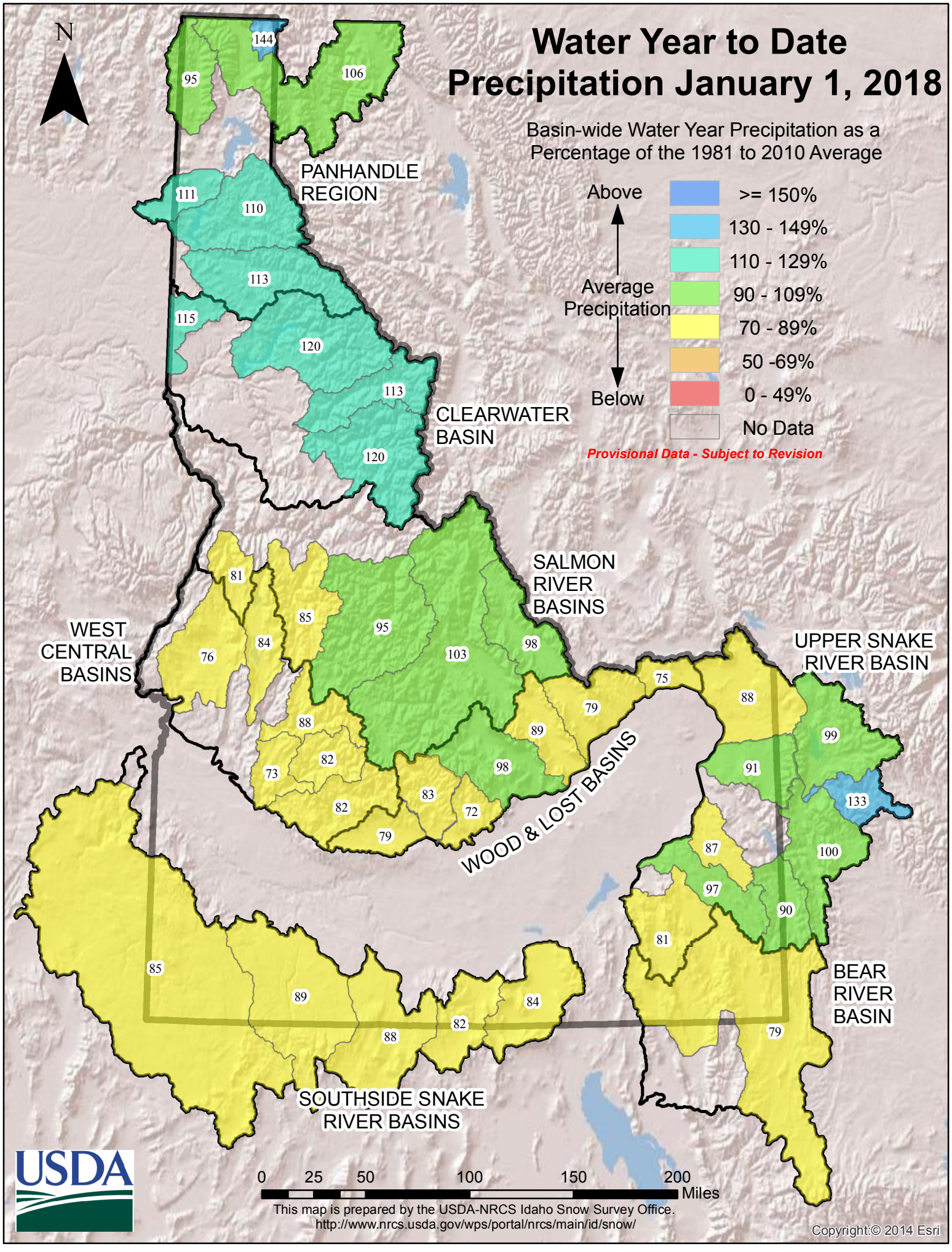


NA=Not Available / Not Applicable; Note: The Percent Chance of Exceedance is an indicator of how often a range of SWSI values might be expected to occur. Each SWSI unit represents about 12% of the historical occurrences. As an example of interpreting the above scale, the SWSI can be expected to be greater 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.


Water Supply Forecast
January 1, 2018
Forecasted June and 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
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
USDA
0 25 50 100 150 200
Miles
This map is prepared by the USDA-NRCS Idaho Snow Survey Office.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/
Copyright:© 2014 Esri

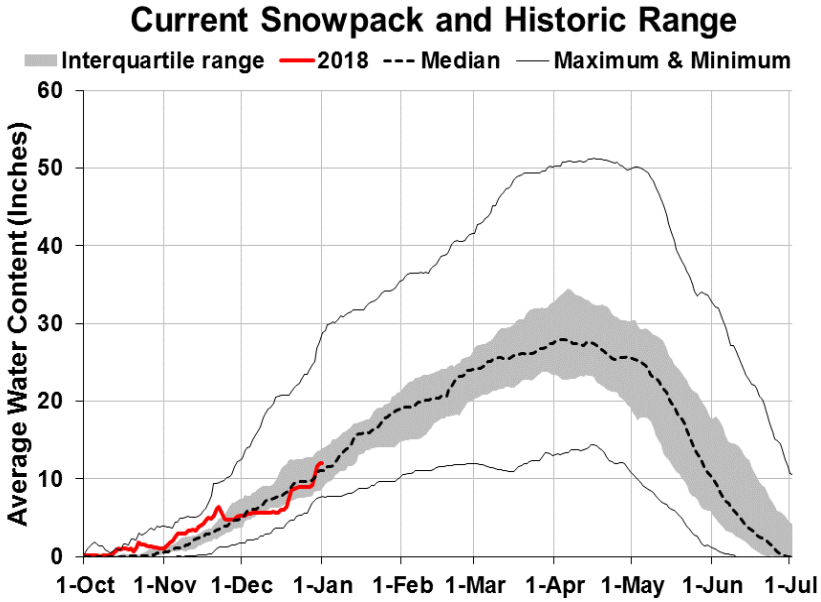

Percent of Median Snowpack
January 1, 2018
Basin-wide Snow Water Equivilant as a
Percentage of the 1981 to 2010 Median
Above
Median Snowpack
Below
>= 150%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 -69%
0 - 49%
No Data
Provisional Data - Subject to Revision
N
PANHANDLE REGION
CLEARWATER BASIN
SALMON RIVER BASINS
WEST CENTRAL BASINS
WOOD & LOST BASINS
UPPER SNAKE RIVER BASIN
BEAR RIVER BASIN
SOUTHSIDE SNAKE RIVER BASINS
95
95
95
96
99
105
87
106
130
127
63
79
82
67
42
103
123
44
96
122
97
67
61
45
94
112
103
83
59
35
23
138
125
64
80
100
67
40
59
79
62
65
85
0 25 50 100 150 200
Miles
This map is prepared by the USDA-NRCS Idaho Snow Survey Office.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/
USDA
Copyright:© 2014 Esri

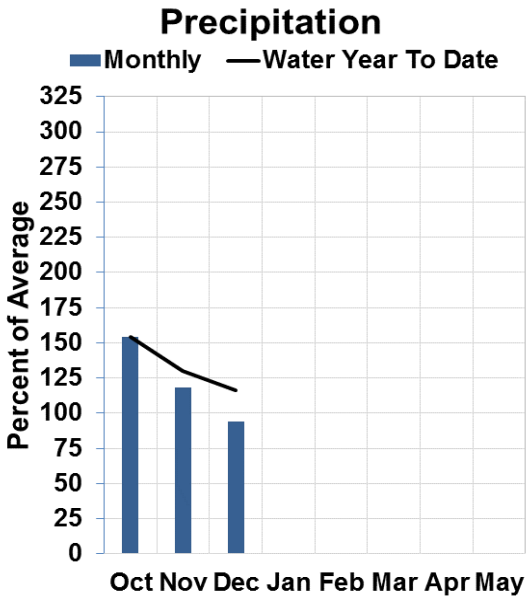

N
Monthly Precipitation
December 2017
Monthly Precipitation as a
Percentage of the 1981 to 2010 Average
Above
Average
Precipitation
Below
>= 150%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 -69%
0 - 49%
No Data
Provisional Data - Subject to Revision
PANHANDLE
REGION
CLEARWATER
BASIN
SALMON
RIVER
BASINS
WEST
CENTRAL
BASINS
UPPER SNAKE
RIVER BASIN
WOOD & LOST BASINS
BEAR
RIVER
BASIN
SOUTHSIDE SNAKE
RIVER BASINS
59
102
87
94
91
104
107
123
105
132
41
40
39
37
52
61
94
45
57
73
66
59
50
41
35
32
37
30
32
15
18
93
54
73
77
71
64
43
50
81
74
64
70
0
25
50
100
150
200
Miles
USDA
This map is prepared by the USDA-NRCS Idaho Snow Survey Office.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/
Copyright:© 2014 Esri


N
Water Year to Date
Precipitation January 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
144
95
106
111
110
113
115
120
113
120
81
85
84
76
95
103
98
88
82
73
83
72
82
79
98
89
79
75
88
99
91
133
87
100
97
90
81
85
89
84
82
88
79
0
25
50
100
150
200
Miles
This map is prepared by the USDA-NRCS Idaho Snow Survey Office.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/
USDA
Copyright© 2014 Esri

Panhandle Region

January 1, 2018





WATER SUPPLY OUTLOOK

Early fall was exceptionally wet across the Panhandle region, with higher than normal amounts of precipitation falling in October and November. At higher elevations, much of this precipitation fell as snow, until around Thanksgiving when warm temperatures resulted in rain across all elevations, melting some of this early season snow. Mid- and late-December storms restored the snowpack back to normal or near-normal levels in most basins. Current snowpack totals are within 10% of normal in all basins except Priest River (88% of normal), Rathdrum Creek (69% of normal), and Palouse River (87% of normal). Despite near-normal or above-normal October through December precipitation in all basins, the Thanksgiving warm-up and the dry period that followed stalled expected snow accumulation in these regions.

All reservoirs in the Panhandle Region are at or above normal capacity, except Priest Lake (85% of average) and Lake Pend Oreille (91% of average). Spring and summer streamflow runoff is currently expected to be near normal, with forecasts ranging from approximately 90 to 110% of average. There's a lot of forecast uncertainty this early in the season. As we progress into winter, the clearer the water supply outlook will become.

Panhandle Region Streamflow Forecasts - January 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		*These forecasts are not available for January 1st, but will be continued						
Kootenai R at Leonia 1 & 2		on February 1st.						
Boundary Ck nr Porthill	APR-JUL	83	102	115	98%	128	146	117
	APR-SEP	87	106	120	98%	133	152	123
Clark Fork R at Whitehorse Rapids 1 & 2		*These forecasts are not available for January 1st, but will be continued						
Pend Oreille Lake Inflow 2		on February 1st.						
Priest R nr Priest River 2	APR-JUL	480	620	715	92%	810	955	780
	APR-SEP	510	660	760	92%	860	1010	830
NF Coeur dAlene R at Enaville	APR-JUL	390	565	685	98%	805	980	700
	APR-SEP	425	600	720	97%	845	1020	740
St. Joe R at Calder 2	APR-JUL	745	950	1090	104%	1230	1430	1050
	APR-SEP	805	1010	1150	103%	1290	1500	1120
Spokane R nr Post Falls 2	APR-JUL	1490	2020	2390	100%	2760	3290	2390
	APR-SEP	1550	2100	2470	100%	2840	3390	2480
Spokane R at Long Lake	APR-JUL	1660	2270	2680	102%	3090	3700	2620
	APR-SEP	1830	2460	2890	101%	3320	3950	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 December

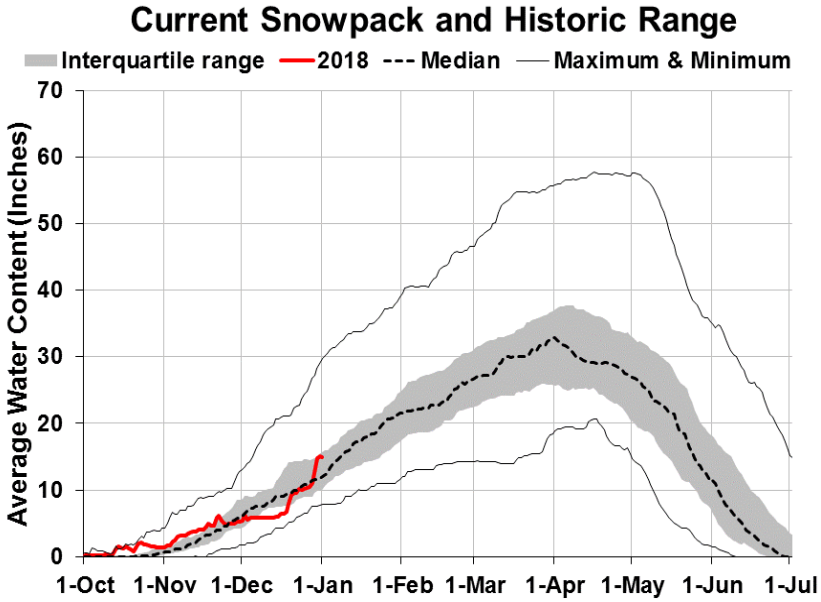
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Hungry Horse Lake	3000.5	3114.1	2537.0	3451.0
Flathead Lake	1161.1	1297.7	1158.0	1791.0
Noxon Rapids Reservoir	314.1	323.7	317.9	335.0
Lake Pend Oreille	645.4	590.8	708.2	1561.3
Priest Lake	48.2	57.5	56.5	119.3
Lake Coeur d' Alene	95.0	54.9	93.7	238.5

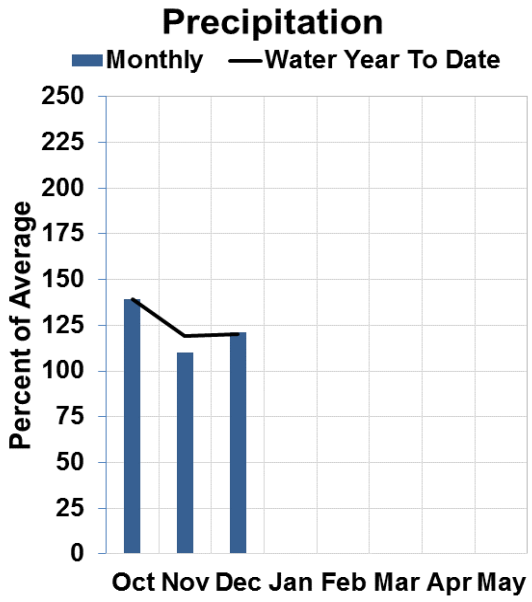
Watershed Snowpack Analysis: January 1, 2018

Basin Name	# of Sites	% of Median 2018	2017
Moyie River	6	95%	79%
Priest River	4	95%	68%
Rathdrum Creek	2	69%	66%
Coeur d' Alene River	6	99%	84%
St. Joe River	4	105%	85%
Spokane River	12	96%	81%
Palouse River	2	87%	136%
Kootenai ab Bonners Ferry	15	95%	84%

Clearwater River Basin

January 1, 2018





WATER SUPPLY OUTLOOK

October and early November precipitation across the Clearwater Basin was well above normal, allowing above normal snowpack accumulation until Thanksgiving. Warmer temperatures then brought rain at all elevations across the region for a few days, melting out some of the accumulated snow. After a three week stretch of minimal precipitation, large mid- and late-December storms allowed the snowpack to rebound in all basins, leaving the region with an above normal current snowpack. As a whole, the Clearwater Basin received 119% of normal precipitation for the October through December period. The Lochsa River basin snowpack is at 122% of normal, the Selway River at 127%, and the North Fork Clearwater River at 106%. Dworkshak Reservoir is currently at 65% total capacity, which is 94% of average for this time of year. As of January 1, streamflow forecasts are slightly above normal for the runoff season.

Clearwater River Basin Streamflow Forecasts - January 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	1700	2000	2200	115%	2410	2710	1920
	APR-SEP	1800	2100	2310	114%	2520	2830	2020
Lochsa R nr Lowell	APR-JUL	1190	1410	1560	111%	1710	1930	1410
	APR-SEP	1260	1490	1640	111%	1790	2020	1480
Dworshak Reservoir Inflow 2	APR-JUL	1870	2370	2710	112%	3050	3560	2410
	APR-SEP	2010	2530	2880	112%	3230	3740	2570
Clearwater R at Orofino	APR-JUL	3700	4440	4950	115%	5450	6190	4310
	APR-SEP	3930	4690	5200	115%	5720	6470	4540
Clearwater R at Spalding 2	APR-JUL	5740	7030	7900	115%	8770	10000	6890
	APR-SEP	6110	7420	8310	114%	9200	10500	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%

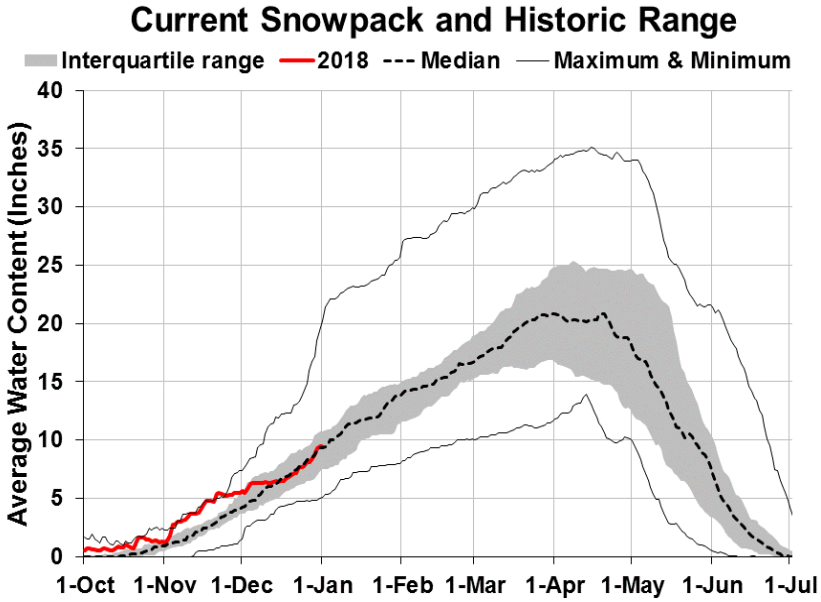
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

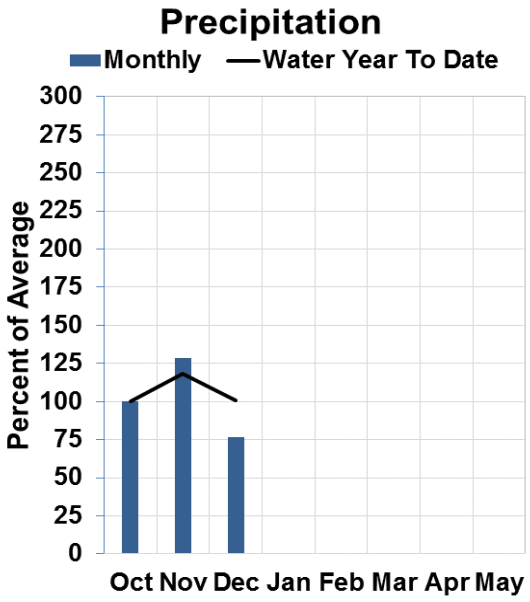
Reservoir Storage (KAF): End of December				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	2247.5	2470.4	2403.0	3468.0

Watershed Snowpack Analysis: January 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
NF Clearwater River	8	106%	91%
Lochsa River	3	130%	96%
Selway River	4	127%	96%
Clearwater Basin Total	17	111%	96%

Salmon River Basin

January 1, 2018





WATER SUPPLY OUTLOOK

The Salmon River drainage, as is often the case in Idaho, is serving as the dividing line between above and below normal snowpack conditions to start 2018. The Idaho Snow Survey have noticed and written about the “Salmon River divide” phenomenon for several years. It’s likely a result of geography, which allows the Salmon River drainage more than any other in Idaho to cash in on storms from southwest origins (typical El Nino) and northwest flow (La Nina), while also benefitting in its eastern most fringes from closed low pressure systems that track east of the Continental Divide. The shaded gray portion of the snowpack graph above reflects the consistent nature of the snowpack in the Salmon River drainage. Between December 1 and March 1, the shaded gray portion is quite narrow relative to other basins (50% of the time the snowpack is within the gray shaded area). Predictably to start 2018, the Salmon River drainage snowpack is within the shaded gray portion and is about 100% of normal. Similarly, water year to date precipitation is about 100% of normal, even after below normal precipitation in December (~75% of normal).

The Salmon River, famous for having no major dams on the entirety of its main stem, has no major reservoirs to report on. Streamflow volumes are expected to be near normal for the spring and summer runoff season. There’s still plenty of winter left to change streamflow forecasts, and we don’t have to look very far in the past to see an example of how much conditions can change after January 1. On January 1, 2017, expected April-September streamflow for the Salmon River was near normal, but that changed dramatically by April 1 after a very wet February and March, and observed streamflow was 160% of average for the Salmon River at White Bird. For the river runners looking to submit their dates for the Four River Lottery, near normal flows are predicted but you should reference future monthly Water Supply Outlook Reports for a clearer outlook as conditions change.

Salmon River Streamflow Forecasts - January 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	425	610	740	95%	865	1050	775
	APR-SEP	495	710	855	95%	1000	1210	900
Lemhi R nr Lemhi	APR-JUL	30	49	62	84%	75	94	74
	APR-SEP	40	61	76	84%	91	112	90
MF Salmon R at MF Lodge	APR-JUL	430	595	710	103%	825	995	690
	APR-SEP	485	670	790	103%	915	1100	770
Sf Salmon R nr Krassel Ranger Station	APR-JUL	122	188	235	87%	275	345	270
	APR-SEP	134	205	250	86%	295	365	290
Johnson Ck at Yellow Pine Id	APR-JUL	101	144	174	91%	205	245	191
	APR-SEP	109	154	185	90%	215	260	205
Salmon R at White Bird	APR-JUL	3440	4660	5490	102%	6310	7530	5370
	APR-SEP	3850	5160	6050	102%	6940	8250	5940

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

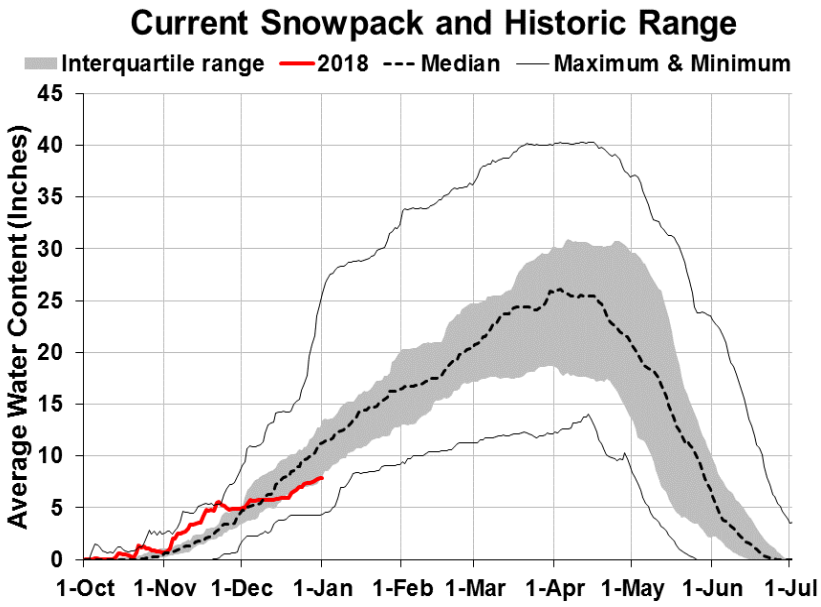
1) 90% and 10% exceedance probabilities are actually 95% and 5%

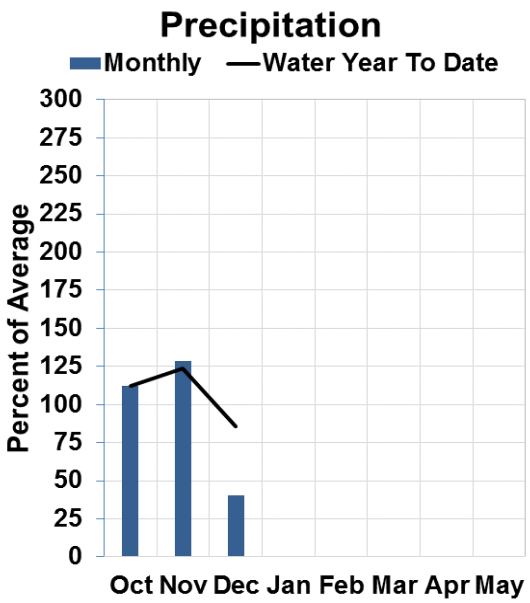
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Watershed Snowpack Analysis: January 1, 2018 Basin Name	# of Sites	% of Median 2018	2017
Salmon River ab Salmon	7	103%	108%
Lemhi River	7	123%	106%
MF Salmon River	3	82%	82%
SF Salmon River	3	79%	75%
Little Salmon River	4	63%	70%
Salmon Basin Total	24	98%	90%

West Central Basins

January 1, 2018





WATER SUPPLY OUTLOOK

December precipitation was scarce throughout the West Central basins, with the Weiser, Payette, and Boise basins receiving 35 to 40% of normal. However, water year to date precipitation is closer to normal (75 to 85%) because of plentiful precipitation during October and November. Autumn precipitation commenced the onset of seasonal snowpack above 6,000 feet, which is earlier than normal and reflected by the red line in the snowpack chart above. The early snowpack building was abruptly stopped around Thanksgiving, when record to near-record temperatures covered the Intermountain West. The Thanksgiving heat wave was followed by a persistent and impressively strong high-pressure ridge that blocked meaningful moisture from entering the West Coast through mid-December. Resulting, the snowpack in the West Central basins is much below normal. The Payette River drainage is highest at 68% of normal, while the Boise River is 56% and the Weiser is 42% of normal, respectively. Early indications point toward a return to wetter weather in January. If this is realized, snowpack numbers should improve by February 1.

Reservoir storage is much above normal for the major projects in the West Central basins, resulting from exceptional 2017 water year carryover. Currently, the Payette system (Deadwood & Cascade) is a combined 121% of average (77% capacity), while the Boise system (Anderson Ranch, Arrowrock, and Lucky Peak) is 142% of average (71% capacity). Much less than normal streamflow is needed to provide adequate irrigation supplies for users on these systems. Streamflow forecasts for the 2018 runoff season are below normal, ranging from 70 to 85% of average across the region. As noted in other basins, these numbers are subject to change with the onset of a wetter weather pattern, which is looking increasingly likely for the second half of January.

West Central Basins Streamflow Forecasts - January 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	JAN-JUL	174	325	430	77%	530	680	560
	APR-JUL	127	260	355	75%	445	580	475
	APR-SEP	142	285	380	75%	475	620	510
Boise R nr Twin Springs	JAN-JUL	310	470	575	81%	680	840	710
	APR-JUL	250	380	470	80%	560	690	585
	APR-SEP	280	420	510	80%	605	745	635
Mores Ck nr Arrowrock Dam	JAN-JUL	44	77	106	63%	138	194	167
	APR-JUL	27	51	72	63%	96	137	115
	APR-SEP	28	53	74	62%	99	142	119
Boise R nr Boise 2	JAN-JUL	660	980	1200	75%	1420	1740	1590
	APR-JUN	475	700	850	75%	1000	1230	1140
	APR-JUL	490	765	955	76%	1140	1420	1260
Lake Fork Payette R nr McCall	APR-JUL	47	59	67	84%	77	92	80
	APR-SEP	48	60	70	84%	80	95	83
NF Payette R at Cascade 2	APR-JUL	195	310	390	80%	470	585	485
	APR-SEP	192	315	400	81%	485	605	495
NF Payette R nr Banks 2	APR-JUL	270	405	500	80%	590	725	625
	APR-SEP	265	410	505	79%	600	745	640
SF Payette R at Lowman	APR-JUL	197	265	315	79%	375	465	400
	APR-SEP	230	305	360	79%	425	525	455
Deadwood Reservoir Inflow 2	APR-JUL	55	83	101	82%	120	147	123
	APR-SEP	59	89	108	82%	128	158	131
Payette R nr Horseshoe Bend 2	APR-JUL	670	985	1200	81%	1410	1720	1480
	APR-SEP	730	1050	1270	78%	1480	1800	1630
Weiser R nr Weiser	FEB-JUL	162	305	430	70%	580	835	615
	APR-JUL	94	181	255	69%	345	500	370
	APR-SEP	107	199	275	69%	370	530	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 December

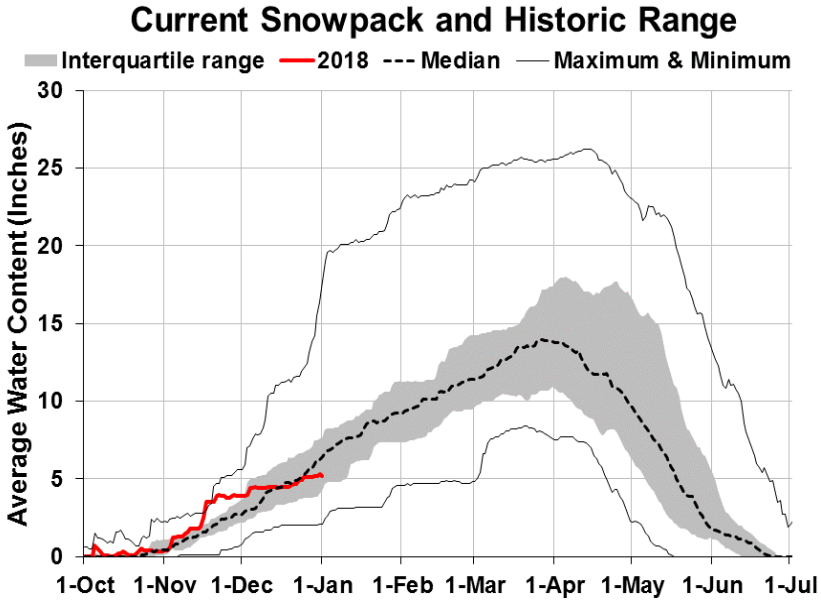
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Anderson Ranch Reservoir	356.4	253.6	262.5	450.2
Arrowrock Reservoir	250.2	169.7	146.3	272.2
Lucky Peak Reservoir	112.9	77.8	99.5	293.2
Sub-Basin Total	**719.5**	**501.2**	**508.3**	**1015.6**
Deadwood Reservoir	116.1	92.7	85.4	161.9
Cascade Reservoir	539.5	429.2	456.7	693.2
Sub-Basin Total	**655.6**	**521.9**	**542.1**	**855.1**
Lake Lowell	118.6	96.9	90.6	165.2
Mann Creek Reservoir	1.0	.8	2.6	11.1

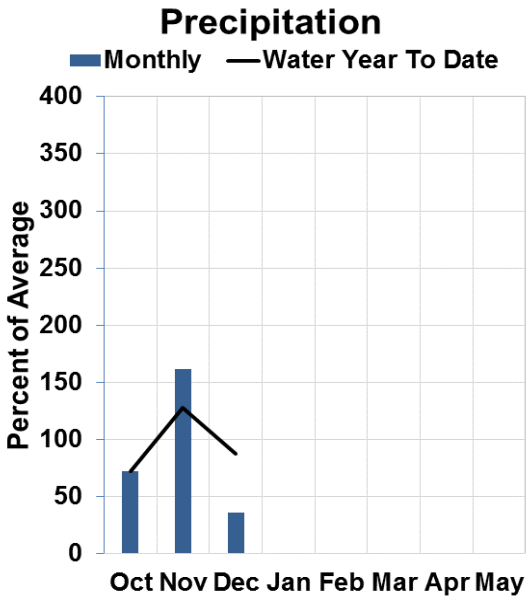
Watershed Snowpack Analysis: January 1, 2018

Basin Name	# of Sites	% of Median 2018	2017
SF Boise River	8	59%	95%
MF & NF Boise Rivers	6	61%	94%
Mores Creek	4	45%	111%
Canyon Creek	4	40%	126%
Boise Basin Total	17	55%	98%
NF Payette River	9	67%	82%
SF Payette River	5	67%	92%
Payette Basin Total	16	65%	84%
Mann Creek	1	32%	73%
Weiser Basin Total	7	42%	108%

Wood & Lost River Basin

January 1, 2018





WATER SUPPLY OUTLOOK

Similar to the West Central basins, the Wood and Lost River basins received little precipitation during December, totaling 28% of normal in the Big Wood and 37% of normal in the Big Lost. Water year-to-date precipitation is closer to normal, and is presently 82% of normal in the Big Wood and 98% of normal in the Big Lost. Expectedly, with below normal precipitation during a key snowpack building month (December), the snowpack is below normal in these two central Idaho basins. This is a major change from mid-November, when snowpack conditions were approaching the historic maximum (see snowpack chart above where red line intersects maximum line). The good news is the early snow helped ride out the December dry spell and we're only a few potent storms from being back to normal. The bad news is if drier than normal conditions persist in January a below normal seasonal snowpack peak becomes much more likely. Short and long-term weather models point toward favorable storm tracks for these Central Idaho basins, where moist southwest flow can quickly pile up snow.

After the record to near record 2017 snowpack, reservoir carryover to 2018 is impressive. From highest to lowest, Magic Reservoir is 233% of average (79% full), Little Wood Reservoir is 155% of average (71% full), and Mackay Reservoir is 154% of average (76% full). Streamflow forecasts range from 60 to 90% of average in these basins, with a noticeable increase in expected runoff from west to east. These forecasts can, and likely will, move with changing precipitation and snowpack conditions. Currently, irrigation water supplies look adequate for the many water users in the Wood and Lost River basins.

Wood and Lost Basins Streamflow Forecasts - January 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	1.41	6.7	12.4	44%	20	34	28
Little Lost R nr Howe	APR-JUL	13.7	20	25	89%	30	37	28
	APR-SEP	15.7	24	30	88%	36	45	34
Big Lost R at Howell Ranch	APR-JUL	55	101	132	83%	163	210	159
	APR-SEP	62	114	149	83%	184	235	180
Big Lost R bl Mackay Reservoir	APR-JUL	20	65	96	78%	127	172	123
	APR-SEP	33	85	120	80%	155	205	150
Little Wood R ab High Five Ck	MAR-JUL	16.7	34	50	65%	68	100	77
	MAR-SEP	18.3	37	54	66%	73	108	82
	APR-JUL	12.7	29	43	62%	61	92	69
Little Wood R nr Carey 2	MAR-JUL	16.7	36	53	62%	74	110	86
	MAR-SEP	18.3	39	57	62%	79	117	92
	APR-JUL	12	29	45	58%	65	99	77
Big Wood R at Hailey	APR-JUL	77	126	167	71%	210	290	235
	APR-SEP	88	143	188	71%	240	325	265
Big Wood R ab Magic Reservoir	APR-JUL	17.4	56	95	56%	144	235	170
	APR-SEP	20	62	103	57%	154	250	182
Camas Ck nr Blaine	APR-JUL	0.09	7.5	19.3	24%	37	72	82
	APR-SEP	0.11	7.7	19.7	24%	37	73	83
Big Wood R bl Magic Dam 2	APR-JUL	24	81	139	56%	210	350	250
	APR-SEP	28	89	149	56%	225	365	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 December

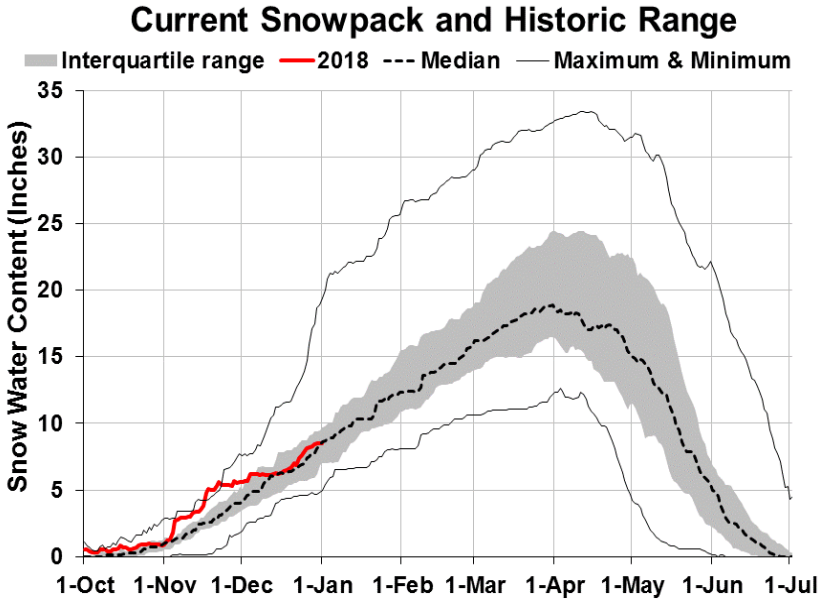
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Mackay Reservoir	33.6	34.0	21.8	44.4
Little Wood Reservoir	21.4	20.2	13.8	30.0
Magic Reservoir	150.4	83.3	64.5	191.5

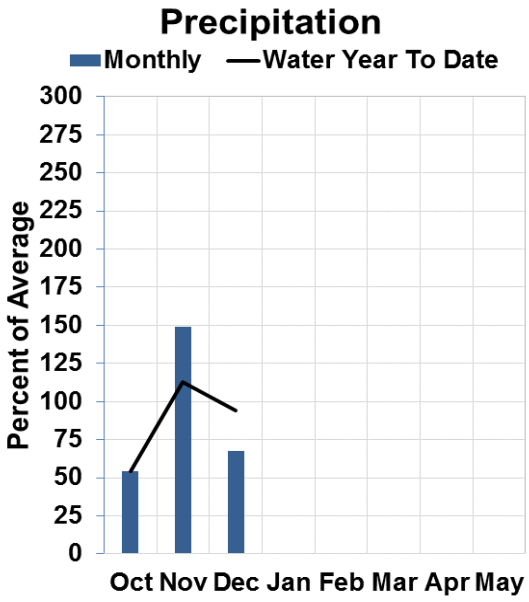
Watershed Snowpack Analysis: January 1, 2018

Basin Name	# of Sites	% of Median 2018	% of Median 2017
Camas-Beaver Creeks	4	44%	88%
Birch-Medicine Lodge Creeks	2	122%	109%
Little Lost River	3	97%	105%
Big Lost River ab Mackay	5	96%	91%
Big Lost Basin Total	6	94%	91%
Fish Creek	0		
Little Wood River	4	35%	102%
Big Wood River ab Hailey	7	83%	102%
Camas Creek	5	23%	97%
Big Wood Basin Total	12	63%	100%

Upper Snake River Basin

January 1, 2018





WATER SUPPLY OUTLOOK

Fall snowpack in the Upper Snake River basin accumulated quickly in November, setting records for the highest snow water equivalent (SWE) ever measured at Two Ocean Plateau, Grand Targhee and Base Camp SNOTEL sites, and second highest at Togwotee Pass and Snake River Station for November 15. Subsequent storms have not been as substantial and frequent, resulting in the near normal January 1 snowpack while the water year-to-date precipitate is 94% of normal. The Snake River above Palisades Reservoir snowpack is above normal at 115% and 100% of normal precipitation, while the Henrys Fork snowpack is 95% of normal, and the total precipitation is 89% of normal. The helicopter snow survey flight of the Teton basin was not able to be made this month to measure the snow courses. As a result, the Teton River forecasts are based on SNOTEL data only. The snowpack in the Portneuf, Willow and Blackfoot basins are below normal at 69%, while the water year-to-date precipitation is 83% of normal.

Last winter's above average snowpack helped reservoir managers carry over storage to this winter, resulting in record high levels as of January 1. The Upper Snake reservoir system is currently at 87% of capacity, 150% of average for the end of December! The Upper Snake forecasts range from 75 to 125% of average and when combined with the reservoir storage, should provide ample spring and summer water supplies for the numerous users.

Upper Snake River Basin Streamflow Forecasts - January 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	325	415	475	90%	535	625	530
	APR-SEP	465	570	645	91%	715	820	710
Falls R nr Ashton 2	APR-JUL	260	310	345	95%	380	435	365
	APR-SEP	315	375	415	95%	460	520	435
Teton R nr Driggs	APR-JUL	67	100	123	80%	145	179	154
	APR-SEP	85	126	154	80%	182	225	193
Teton R nr St Anthony	APR-JUL	177	255	305	84%	355	430	365
	APR-SEP	215	305	360	83%	420	510	435
Henrys Fk nr Rexburg 2	APR-JUL	830	1070	1230	88%	1400	1640	1400
	APR-SEP	1070	1370	1580	88%	1790	2090	1790
Snake R at Flagg Ranch	APR-JUL	375	455	510	110%	570	650	465
	APR-SEP	415	500	560	110%	620	710	510
Snake R nr Moran 2	APR-JUL	615	740	820	107%	905	1030	765
	APR-SEP	680	815	910	108%	1000	1140	845
Pacific Ck at Moran	APR-JUL	148	184	210	128%	230	270	164
	APR-SEP	157	194	220	127%	245	280	173
Buffalo Fk ab Lava Ck nr Moran	APR-JUL	255	305	340	121%	375	425	280
	APR-SEP	290	350	390	122%	430	485	320
Snake R ab Reservoir nr Alpine 2	APR-JUL	1880	2260	2520	116%	2780	3150	2170
	APR-SEP	2170	2600	2890	116%	3180	3610	2500
Greys R ab Reservoir nr Alpine	APR-JUL	198	255	300	98%	340	395	305
	APR-SEP	230	300	345	96%	395	460	360
Salt R ab Reservoir nr Etna	APR-JUL	109	190	245	82%	300	380	300
	APR-SEP	149	245	305	82%	370	465	370
Snake R nr Irwin 2	APR-JUL	2190	2730	3100	103%	3470	4010	3010
	APR-SEP	2550	3160	3590	103%	4010	4630	3500
Snake R nr Heise 2	APR-JUL	2370	2940	3330	103%	3720	4300	3240
	APR-SEP	2780	3440	3880	103%	4330	4990	3780
Willow Ck nr Ririe 2	MAR-JUL	10.8	26	39	58%	56	86	67
Portneuf R at Topaz	MAR-JUL	27	45	57	75%	70	88	76
	MAR-SEP	34	56	72	77%	87	109	93
Snake R at Neeley 2	APR-JUL	460	1390	2020	76%	2650	3580	2650
	APR-SEP	395	1410	2100	75%	2790	3800	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%

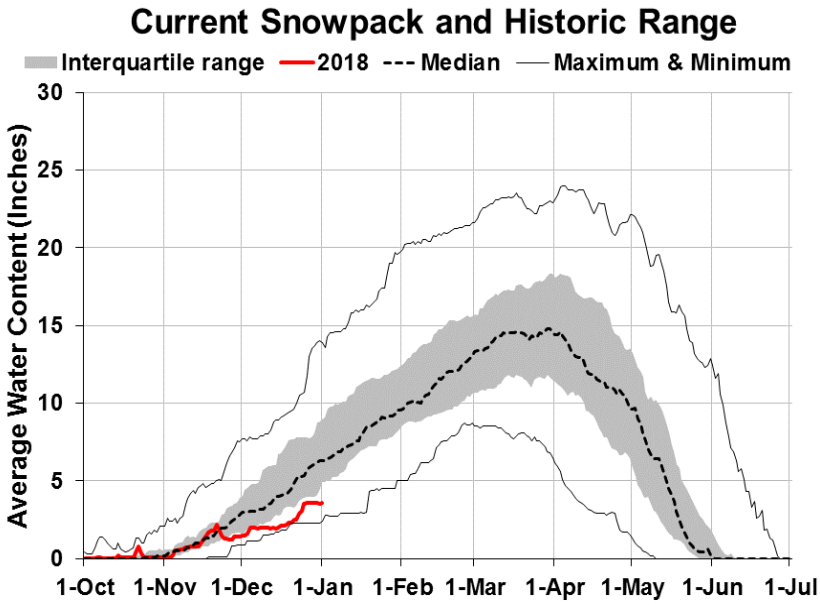
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

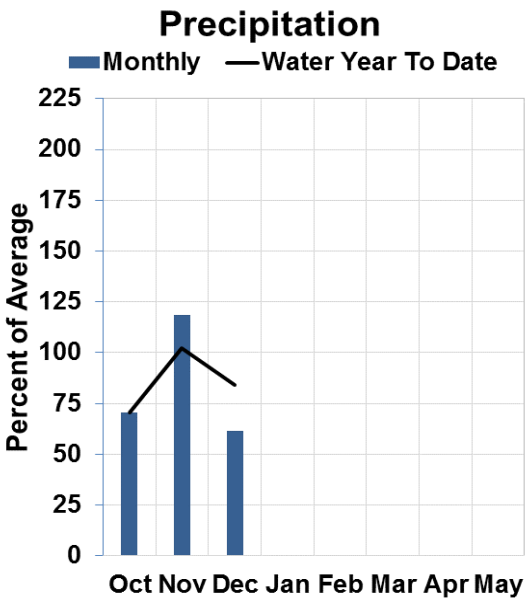
Reservoir Storage (KAF): End of December				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Jackson Lake	655.7	533.8	424.1	847.0
Palisades Reservoir	1354.3	552.9	882.5	1400.0
Sub-Basin Total	**2009.9**	**1086.7**	**1306.6**	**2247.0**
Henrys Lake	82.0	80.4	79.3	90.4
Island Park Reservoir	118.3	77.5	93.5	135.2
Grassy Lake	13.0	13.8	11.6	15.2
Sub-Basin Total	**213.3**	**171.6**	**184.4**	**240.8**
Ririe Reservoir	43.5	45.6	36.0	80.5
Blackfoot Reservoir	263.4	209.0	171.3	337.0
American Falls Reservoir	1432.9	875.8	948.5	1672.6
Basin-Wide Total	**3963.0**	**2388.7**	**2646.8**	**4577.9**

Watershed Snowpack Analysis: January 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Henrys Fork-Falls River	9	96%	104%
Teton River	4	103%	125%
Henrys Fork ab Rexburg	13	97%	110%
Snake River ab Jackson Lake	13	112%	127%
Pacific Creek	4	122%	150%
Buffalo Fork	2	152%	131%
Gros Ventre River	5	138%	128%
Hoback River	5	125%	142%
Greys River	4	117%	122%
Salt River	3	100%	109%
Snake ab Palisades Resv	29	114%	128%
Willow Creek - Ririe	2	64%	119%
Blackfoot River	2	80%	106%
Portneuf River	3	67%	120%
Snake River ab American Falls	37	105%	122%

Southside Snake River Basins

January 1, 2018





WATER SUPPLY OUTLOOK

October and November snowpack was in line with normal but very little snowfall in December left the Southside Snake River basins snowpack well below normal. As a whole, the Southside Snake basin is currently 55% of normal with Goose-Trapper Creeks at 62%, Salmon Falls Creek 64%, Bruneau River 59%, and Owyhee basin 40%. No SNOTEL site is reporting snow water equivalent (SWE) greater than 90% of normal; Reynolds Creek is the highest at exactly 90%, but only has 2 inches of SWE. Pole Creek R.S. in the upper Bruneau River drainage is reporting the highest total SWE at 6.9 inches. Precipitation in the Southside Snake River Basins has been hovering close to 90% of normal with the exception of a wet November that saw precipitation from 106% up to 120%. Current water year-to-date precipitation in the Southside Snake basins is 90% of normal. It's still early, but weather models are pointing toward a favorable storm track for the Southside Snake basins in January. If this comes to fruition, February 1 snowpack and precipitation numbers should improve.

The reservoirs of the Southside Snake are still benefitting from last year's snow. With the exception of Brownlee Reservoir at 98% of average, all reservoirs are well above normal storage levels for this time of the year. Salmon Falls Reservoir is currently at 229% of average, which is 51% capacity. With streamflow forecasts ranging from 80% of average near Oakley, to as low as 30% of average at Owyhee River near Gold Creek, the higher than normal reservoir storage should allow for sufficient water supply for the 2018 runoff season for those that have reservoir storage water. With more than half the winter still to come, the water supply outlook is likely to change.

Southside Snake River Basins Streamflow Forecasts - January 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	6	11	15.3	70%	20	29	22
	MAR-SEP	6.2	11.6	16.2	68%	22	31	24
Trapper Ck nr Oakley	MAR-JUL	3.1	4.1	4.8	81%	5.6	6.9	5.9
	MAR-SEP	4.1	5.1	5.9	83%	6.8	8.2	7.1
Oakley Reservoir Inflow	MAR-JUL	8.9	15	20	71%	26	36	28
	MAR-SEP	10.1	16.7	22	71%	28	39	31
Salmon Falls Ck nr San Jacinto	MAR-JUL	24	38	49	60%	62	84	81
	MAR-SEP	26	41	53	62%	66	88	85
Bruneau R nr Hot Spring	MAR-JUL	49	104	141	69%	178	230	205
	MAR-SEP	53	109	147	68%	186	240	215
Reynolds Ck at Tollgate	MAR-JUL	1	2.9	5	57%	7	10	8.8
Owyhee R nr Gold Ck 2	MAR-JUL	1.12	5.6	10.5	38%	17	29	28
	APR-JUL	0.03	2.5	6.5	30%	12.3	24	22
Owyhee R nr Rome	FEB-JUL	50	151	250	43%	375	605	580
	FEB-SEP	56	161	265	45%	390	625	595
	APR-JUL	13.8	73	140	41%	230	395	345
Owyhee R bl Owyhee Dam 2	FEB-JUL	70	185	295	46%	425	670	635
	FEB-SEP	87	210	320	48%	460	705	665
	APR-JUL	25	95	167	45%	260	435	375
Snake R bl Lower Granite Dam 1								

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 December

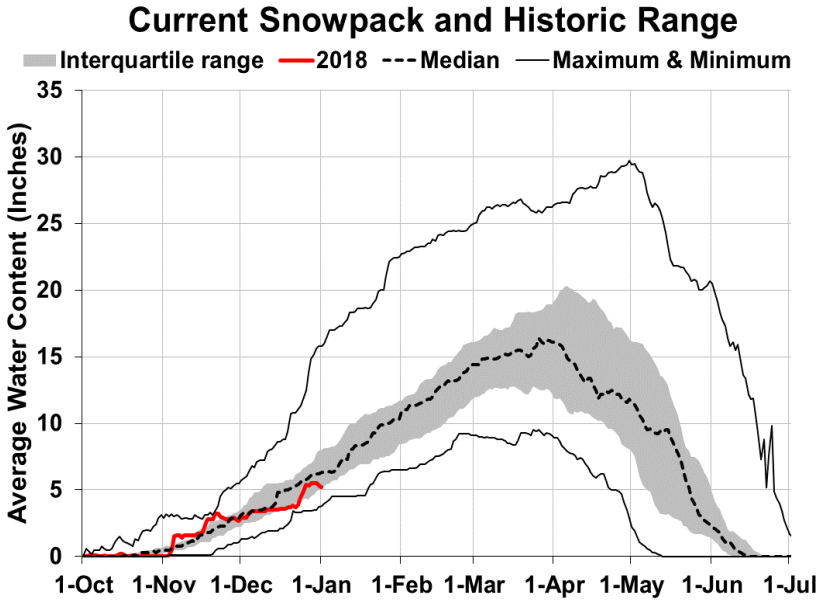
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Oakley Reservoir	33.4	16.2	20.3	75.6
Salmon Falls Reservoir	93.1	39.3	40.6	182.6
Wild Horse Reservoir	59.8	31.7	32.4	71.5
Lake Owyhee	461.4	212.9	312.7	715.0
Brownlee Reservoir	1290.3	1291.7	1317.0	1420.0

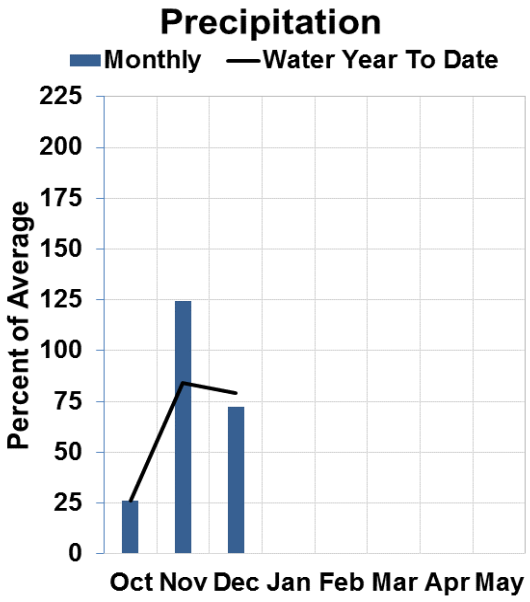
Watershed Snowpack Analysis: January 1, 2018

Basin Name	# of Sites	% of Median 2018	2017
Raft River	1	79%	129%
Goose-Trapper Creeks	2	62%	110%
Salmon Falls Creek	6	65%	97%
Bruneau River	5	59%	111%
Reynolds Creek	1	90%	130%
Owyhee Basin Total	8	40%	132%
Owyhee Basin Snotel Total	8	40%	132%

Bear River Basin

January 1, 2018





WATER SUPPLY OUTLOOK

The Bear River basin snowpack is currently 85% of normal with 79% of normal precipitation (water year-to-date). A very dry October with only 29% of normal precipitation followed by a wetter November (126% of normal precipitation) has put the Bear River basin below average for January 1. The Smith and Thomas forks are currently 84% of normal precipitation and 86% of normal SWE. The Malad and Cub rivers are below average with 60% and 75% of normal precipitation and 28% and 120% of normal SWE, respectfully.

The good news is that both Bear Lake and Montpelier Reservoir are well above average December capacity at 178% and 167%, respectfully. Last winter's above average snow-water runoff allowed reservoir managers to carry over water supplies for this season and will be used to mitigate the possible effects of a drier 2017/2018 winter. For example, snowpacks in southern Utah are below the 1977 levels which is remembered by many as the year without snow. Streamflow forecasts currently range from 70% to 90% of average in the Bear River basin, excluding the Little Bear River which is predicted at 62% of average. Water users who rely on natural flow water rights in the area still need more snow in the coming months to ensure adequate irrigation supplies in 2018.

Bear River Basin Streamflow Forecasts - January 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	48	75	92	82%	110	136	112
	APR-SEP	54	83	102	83%	121	149	123
Bear R ab Resv nr Woodruff	APR-JUL	7.6	60	95	79%	130	182	121
	APR-SEP	11.7	67	105	82%	143	198	128
Big Ck nr Randolph	APR-JUL	0.3	1.44	2.8	74%	4.2	6.2	3.8
Smiths Fk nr Border	APR-JUL	45	66	81	91%	95	117	89
	APR-SEP	54	78	95	91%	111	136	104
Bear R bl Stewart Dam 2	FEB-JUL	2.2	108	180	84%	250	360	215
	FEB-SEP	9.6	117	197	82%	275	395	240
	APR-JUL	5.5	78	145	79%	210	310	183
Little Bear at Paradise	APR-JUL	1.35	15.9	28	62%	41	59	45
Logan R nr Logan	APR-JUL	52	82	102	92%	122	152	111
Blacksmith Fk nr Hyrum	APR-JUL	13.6	27	35	81%	44	57	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 December				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Bear Lake	1035.5	459.1	580.6	1302.0
Montpelier Reservoir	2.8	1.9	1.7	4.0

Watershed Snowpack Analysis: January 1, 2018			
Basin Name	# of Sites	% of Median 2018	2017
Smiths-Thomas Forks	3	86%	121%
Bear River ab WY-ID Line	9	89%	127%
Montpelier Creek	1	24%	142%
Mink Creek	1	69%	115%
Cub River	1	120%	138%
Bear River ab ID-UT Line	15	85%	126%
Malad River	1	28%	126%

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

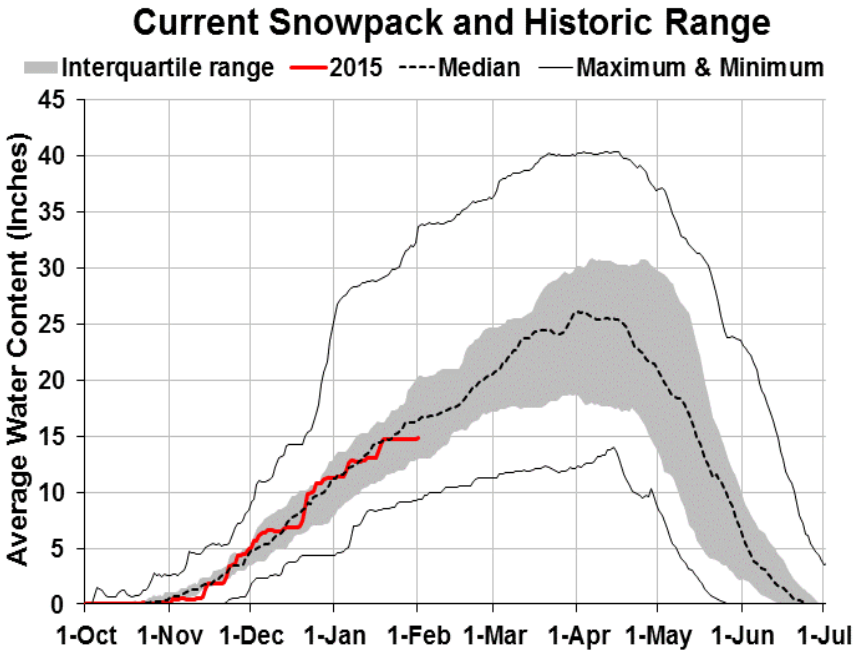
Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <---Drier----------Projected Volume----------Wetter---> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Henrys Fk nr Ashton	JUN-JUL	72	106	129	56	152	186	230
	JUN-SEP	198	245	280	68	315	360	410

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.



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

Numerous other groups and agencies provide funding and/or cooperative support for the collection, operation and maintenance of the Cooperative Idaho Snow Survey Program. Your cooperation is greatly appreciated!