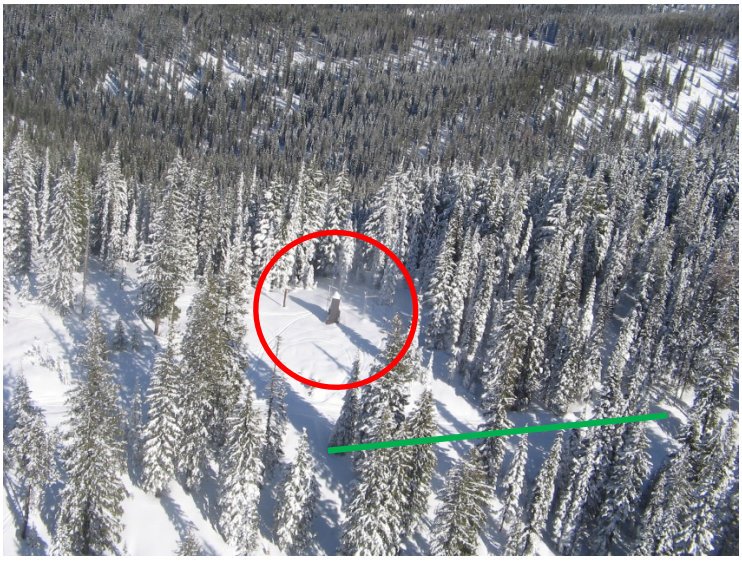
United States Department of Agriculture

Natural Resources Conservation Service

Idaho Water Supply Outlook Report

June 1, 2016

January 28, 2010 **June 1, 2016**



Hemlock Butte SNOTEL station 30 miles east of Orofino at 5,810 feet elevation, as observed on a cooperative snow survey flight with the U.S. Army Corp of Engineers and the Natural Resources Conservation Service on 6/1/2016 (right), and 1/28/2010 (left). The red circle is around Hemlock Butte SNOTEL site, while the green line marks the Forest Service Road. The immediate area shows the effects of the 2015 Motorway Complex fires which nearly burned the station, but quick work involving both hand crews and retardant drops saved this valuable data site. The strong role of aspect on snow melt can also be seen in the right photo, with north facing slopes still holding onto the last remaining snow, while south facing slopes to the right of the road are completely snow free. The site completely melted out on May 27th this year, which is **5th earliest** recorded melt out in the 33 year record. The earliest recorded melt out at Hemlock Butte occurred on May 17th in 1987. Photographer: Phil Morrisey

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

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How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when 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.

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IDAHO WATER SUPPLY OUTLOOK REPORT

June 1, 2016

SUMMARY

The warm April weather continued into May, but luckily temperatures were not as much above average as they were in April. This helped to keep some of snow in the mountains longer. However streamflow forecasts still dropped significantly in some basins due to a combination of early melt, and a dry and warm spring. It is a challenge to forecast the remaining runoff this year with so much of the melt behind us but we know there is still more water to come down the rivers. The other challenge is determining the influence of water year to date precipitation which is near normal or better across the state.

May precipitation ranged from a low of only about 65% of average in the Owyhee, Weiser and Boise basins to a high of 150% in the Bear River basin. Most of the rest of the basins were in the 75-105% of average range. Based on the PRISM precipitation maps the April-May amounts are 50-90% of average in western and northern Idaho and closer to normal across Idaho's southern border. Only the higher elevation SNOTEL sites still have snow. This snow, and the snow at elevations above our measuring sites provide the summer baseflows. Streamflow forecasts for the June-July residual period range from a high of 95% of average in the Bruneau River to low of 30-45% in some tributaries across the state. Based on the Surface Water Supply Index (SWSI) potential shortages may occur by the end of the season in the Big Wood, Big Lost, Little Lost and Oakley basins.

To summarize this year, snow water content amounts peaked near normal or better, but earlier than normal. Warm April temperatures jumped the melting of the snow causing many or most rivers to peak early which allowed reservoirs to fill early. Only a few streams in eastern Idaho and upper Snake along with the Big Lost River will reach their snowmelt peaks in early June while northern Idaho streams have already receded to summer baseflow levels with some rivers just above last year's level. How this early melt and runoff affects you depends upon how you use the water and if you have natural streamflow or reservoir storage rights. We do know the record high temperatures in early June increased melt from the remaining snow generating another increase in streamflow. These flows won't remain high for long with minimal snow remaining to feed the streams and a cool spell expected by week's end. We also know irrigation demand is increasing, which means reservoir storage levels will start decreasing because of the low projected residual summer flows.

SNOWPACK

Remember that near normal snowpack we reported back on April 1st? Well, above normal temperatures in April and May melted the snow rapidly this year. As of June 1, only the highest snow measuring sites still have snow; the elevation of the remaining snow varies by basin, see the full June 1 snow report for detailed information. A few noteworthy sites with snow are Pole Creek RS at 8,330 feet in the headwaters of Bruneau and Salmon Falls basins with 14.4 inches of snow water; June 1 median is 1.2 inches. The past 4 years this site was melted out by June 1, but had 27.1 inches of snow water on June 1, 2011. Interesting to note that the strong La Nina year of 2011 allowed the snow to continue accumulating in the higher elevations until late May. This is in sharp contrast to the

strong El Nino for this year which resulted in an early peak and rapid melt. Another site is Grand Targhee SNOTEL site at 9,260 feet in the Teton basin with 33.1 inches of snow water; June 1 median is 40.0 inches. In 2011, the snow water content at Grand Targhee was just reaching its peak around June 1 with 70 inches. All eyes are on the potential La Nina conditions developing in the Pacific Ocean for next year, for more information see: **El Niño Advisory Continues; La Niña Watch Issued**

> Synopsis: La Niña is favored to develop during the Northern Hemisphere summer 2016, with about a 75% chance of La Nina during the fall and winter 2016-17.
>
> **NOAA's 2016 Eastern Pacific Hurricane Season Outlook Released**
> *a. Possible La Niña*
> El Niño is currently dissipating . The recent sub-surface temperature anomalies show that the El Niño-related warming is now confined to the upper 30m of the central and east-central equatorial Pacific Ocean. Also seen is an extensive area of below-average SSTs at depth extending across most of the equatorial Pacific, with those cool anomalies reaching the surface in the eastern Pacific. If the trade winds strengthen in the next few months, the resulting upwelling will bring enough colder water to the surface to produce La Niña. A similar scenario was observed during May-August 1998 in association with the rapid demise of the 1997-98 El Niño. That El Niño was followed by a significant La Niña during the 1998 hurricane season.

PRECIPITATION

May moisture varied across the state. Highest amounts were 150% of average in the Bear River basin because of storms that brought twice the normal amounts into southwest Wyoming. The lowest May percentages in Idaho were 60-67% of average in the Owyhee, Boise and Weiser basins. 71-79% of normal amounts fell in Oakley, Big Wood and Payette basins. 85-95% of normal amounts fell in the Clearwater, Salmon, Henrys Fork, Salmon Falls and Bruneau basins. Normal or slightly above normal amounts fell in May in eastern Idaho, the upper Snake basin in Wyoming, Mud Lake, Big Lost, Little Wood and Spokane basins. The northern Panhandle Region received 125% of normal May amounts, which helped, but not enough as the St Joe and Spokane rivers are already flowing near their 90th percentile and just above last year at this time.

Water year to date precipitation remains encouraging at near to above average across the state, but does not paint the true picture of this year's streamflow across parts of the state. The lowest water year to date totals are 93% and 95% of average in the Henrys Fork and Snake basin above Palisades Reservoir. The highest amounts received since October 1, 2015 are 130% of average in the Salmon Falls and Bruneau drainages whose streams are have been flowing above average since February 1, a sign of the good moisture received throughout the water year.

As mentioned last month, several basins such as the Bruneau and Salmon Falls have already received more than their normal annual precipitation amounts. These two basins have received 105-110% of the average annual precipitation amounts – this is great news for these basins and is reflected in the above normal streamflow levels since early February. On the dry side, a handful of basins (Big Lost, Little Lost, Mud Lake area, Henrys Fork and Snake above Palisades Reservoir) have only received 73-79% of their annual precipitation amounts. The basins along the Montana and Wyoming border can receive additional spring precipitation. This is not the case for the rest of the state where summer monthly precipitation amounts typically are in the 0.5 to 1.5 inch range and account for only about 15% of the annual precipitation.

RESERVOIRS

Because of the early runoff, Idaho's reservoirs are currently in good shape across the state when compared to average May 31 storage levels. The only lakes and reservoirs not storing near or above average amounts are Lake Owyhee, Wild Horse, Oakley and Bear Lake. However, when the May 31 storage is compared to the capacity of the reservoir, there are a few that are only 45-65% full, mainly because of the size of the reservoir. They are listed here from lowest percent of capacity to highest: Oakley, Bear Lake, Salmon Falls, Wild Horse, and Lake Owyhee. A few reservoirs have already peaked in storage like American Falls and Lake Owyhee. A few other reservoirs like Little Wood, Oakley and Salmon Falls are reaching their peak storage level now as inflows decrease and irrigation demand increases. A snowline helicopter flight above Dworshak Reservoir on June 1st showed the snowline was about 6,000 feet, which means about 5% of basin is snow covered. Reservoir outflows are set at minimal level to allow Dworshak to fill in June. For our full reservoir storage summary report see: Reservoir Storage

STREAMFLOW

Current streamflow levels and projected streamflow forecasts vary across Idaho like spring weather. Some northern Idaho streams are low and just above last year at this time. Most central Idaho streams have peaked but getting a boost in early June from the combination of remaining snow and record high early June temperatures. The exception is the Big Lost basin, home of some of the highest mountains in the state with only a few high elevation snow measuring stations. The Big Lost River is now peaking from the snow above 9,000 feet. The Teton River and a few Wyoming tributaries are also increasing from the hot temperatures melting the remaining high elevation snow. The Bruneau, Salmon Falls and Oakley Reservoir inflow are forecast at 80-95% of average and even with the well above average snowpacks and precipitation for the water year, summer baseflows may only be near normal because of the early melt and runoff.

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

Enjoy Idaho - spring & summer recreation season is here! You can still hike to find some snow, many rivers are flowing at ideal floating levels, while other rivers are low enough now for great fishing, and trails are open for biking and hiking. River runners and water users can watch for updates on remaining peak flows and projected recession streamflow graphs on our **Peak Streamflow Information** page.

American Whitewater has an interesting and useful color coded display of Idaho's rivers based on the current flow levels and which ones are recommended as runnable or not. This link may even help your fishing. http://www.americanwhitewater.org/content/River/search-limited/

IDAHO SURFACE WATER SUPPLY INDEX (SWSI) June 1, 2016

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

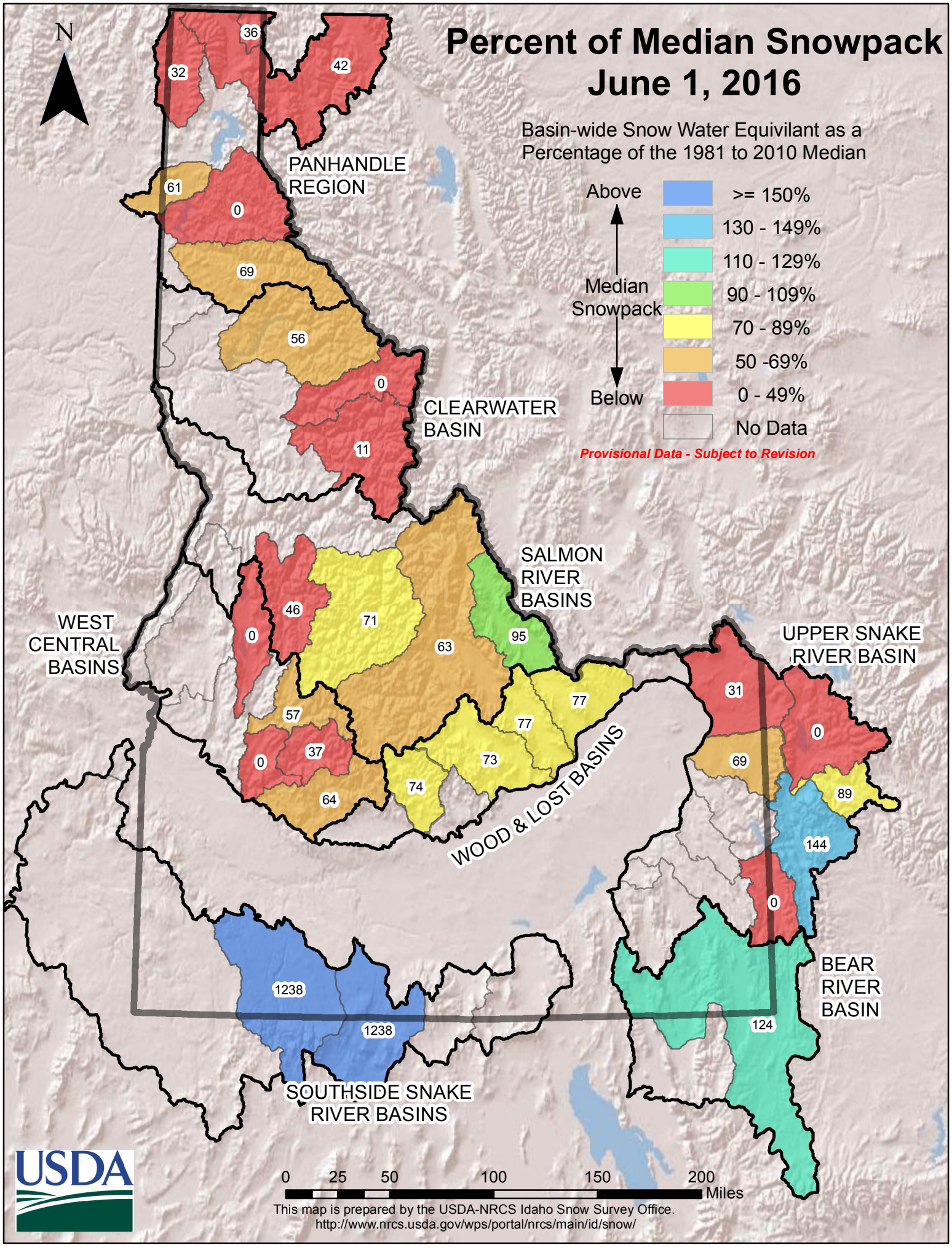
SWSI values provide a more comprehensive outlook of water availability by combining streamflow forecasts and reservoir storage where appropriate. The SWSI index allows comparison of water availability between basins for drought or flood severity analysis. Threshold SWSI values have been determined for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

BASIN or REGION	***SWSI Value***	***Most Recent Year With Similar SWSI Value***	***Agricultural Water Supply Shortage May Occur When SWSI is Less Than***
Spokane	**-1.7**	**2003**	**NA**
Clearwater	**-2.4**	**2005**	**NA**
Salmon	**-0.8**	**2002**	**NA**
Weiser	**-1.7**	**2014**	**NA**
Payette	**-2.6**	**2007**	**NA**
Boise	**-0.8**	**2014**	**-2.3**
Big Wood	**0.1**	**2009 / 2010**	**0.5**
Little Wood	**-0.6**	**2012**	**-1.6**
Big Lost	**-1.3**	**2015**	**0.5**
Little Lost	**-1.3**	**2014**	**1.2**
Teton	**-2.0**	**2013**	**-3.9**
Henrys Fork	**NA**	**NA**	**NA**
Snake (Heise)	**-0.1**	**2012**	**-1.4**
Oakley	**0.1**	**2008**	**0.7**
Salmon Falls	**1.0**	**2009**	**-0.7**
Bruneau	**0.8**	**2009**	**NA**
Owyhee	**-0.8**	**2009**	**-3.0**
Bear River	**-0.3**	**2014 / 2015**	**-3.9**

SWSI SCALE, PERCENT CHANCE OF EXCEEDANCE, AND INTERPRETATION

```
 -4      -3      -2      -1       0       1       2       3       4
  |------|------|------|------|------|------|------|------|
 99%     87%     75%     63%     50%     37%     25%     13%     1%
-----------------------------------------------------------------------
|Much    | Below      |        Near Normal        |  Above    |  Much  |
|Below   | Normal     |        Water Supply       |  Normal   |  Above |
-----------------------------------------------------------------------
```

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.


Percent of Median Snowpack
June 1, 2016
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
36
32
42
61
0
69
56
0
11
46
0
71
63
95
57
37
0
64
74
73
77
77
31
0
69
89
144
0
124
1238
1238
0 25 50 100 150 200 Miles
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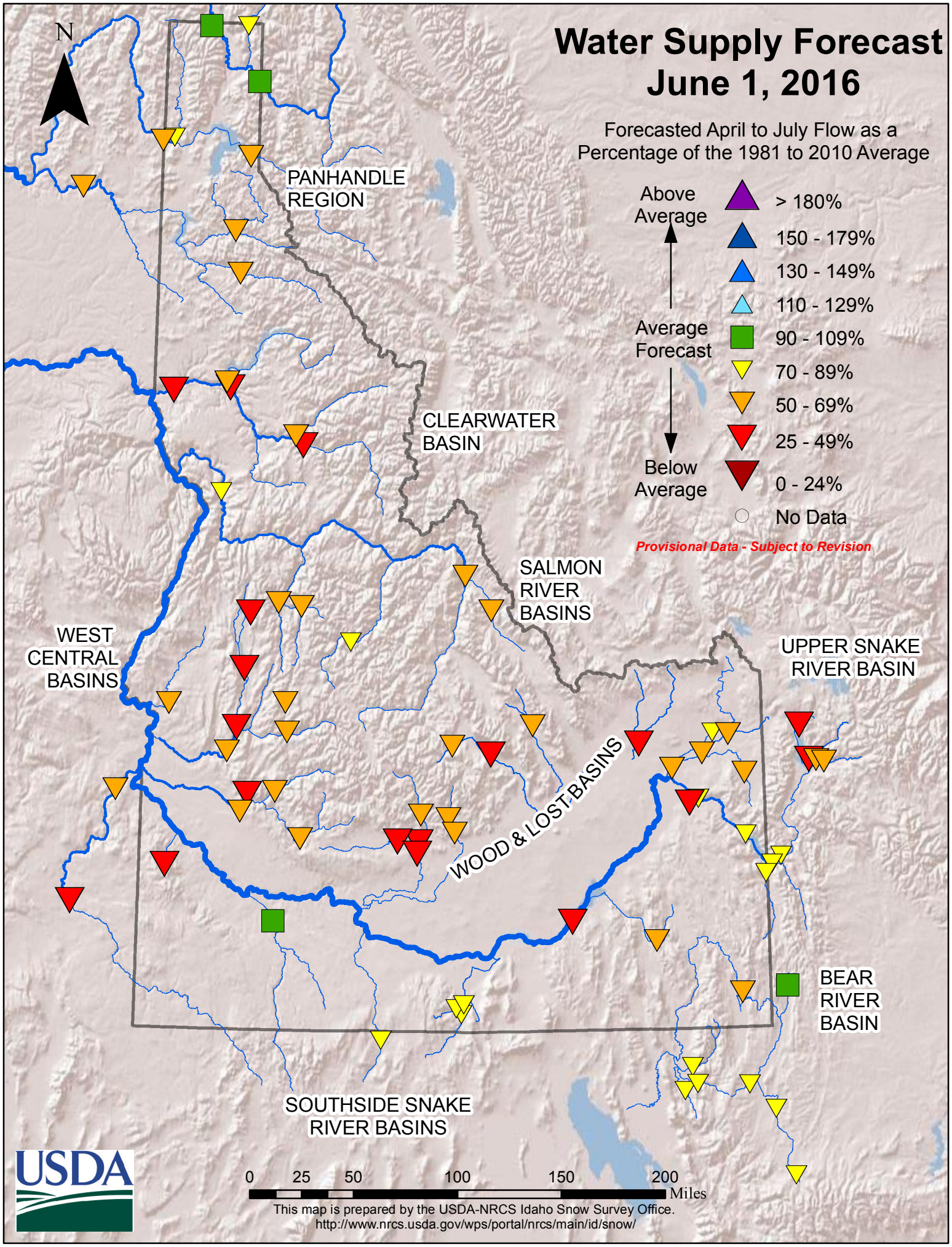
This map is prepared by the USDA-NRCS Idaho Snow Survey Office.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/id/snow/


Water Supply Forecast
June 1, 2016
Forecasted April to 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
0 25 50 100 150 200 Miles
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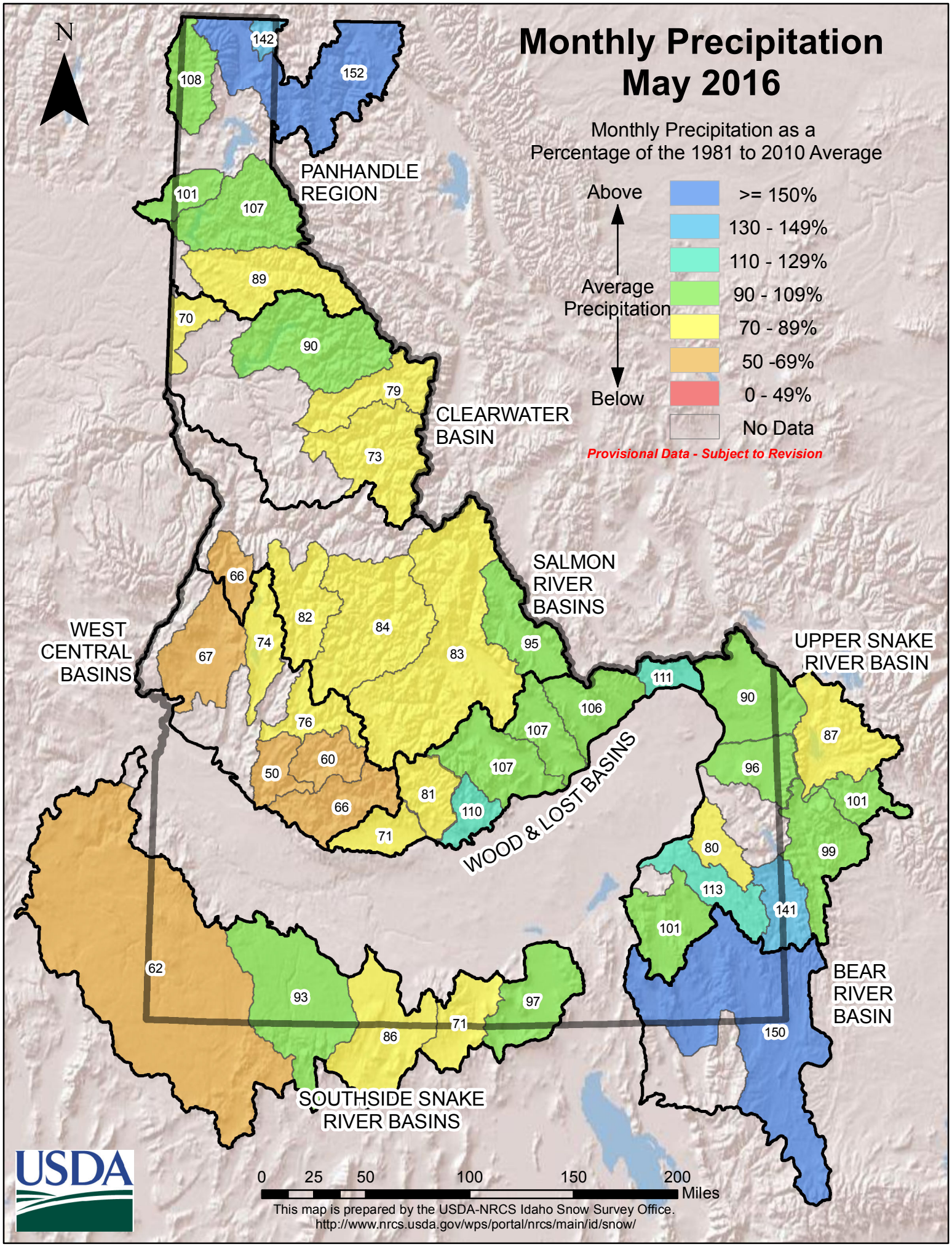

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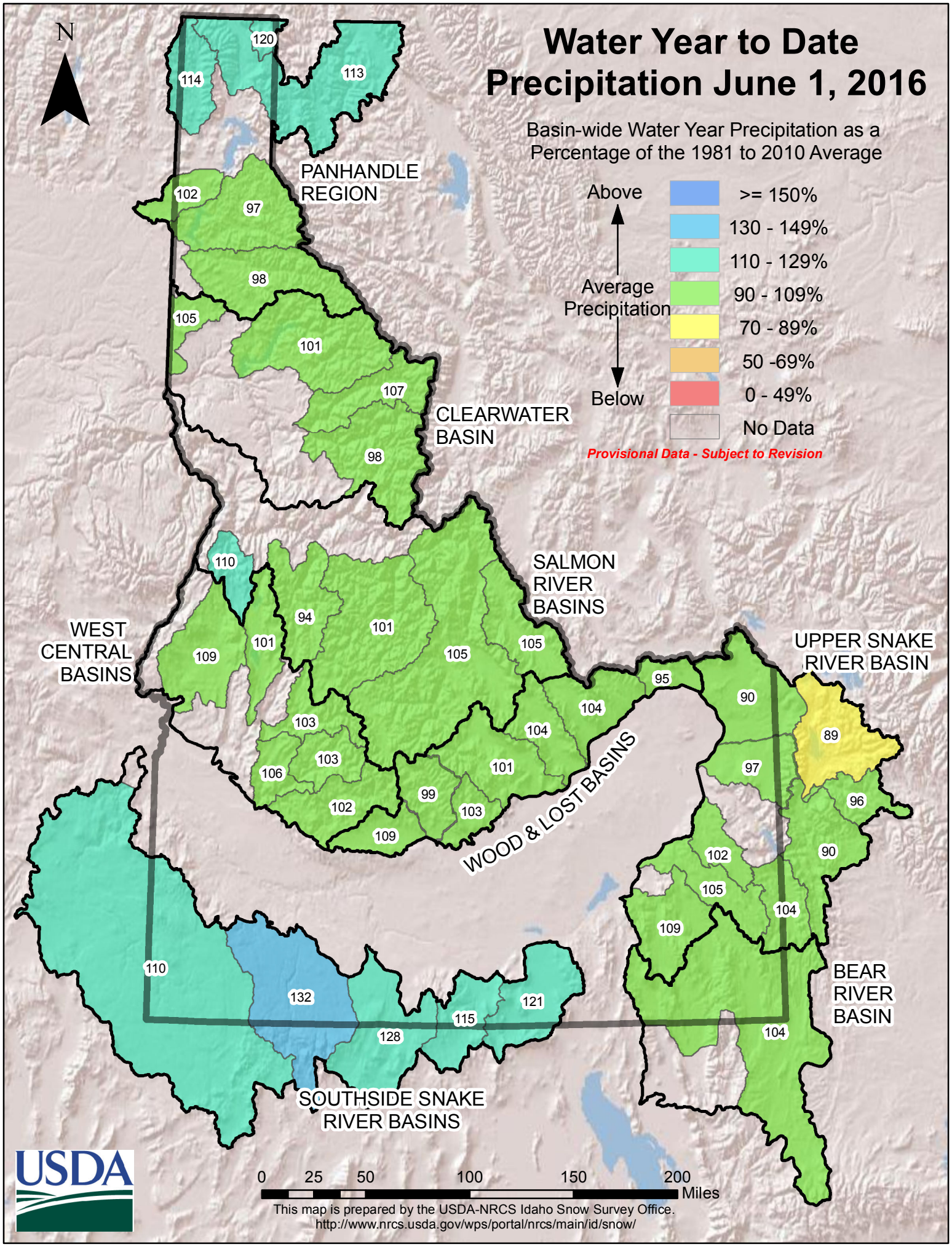
Water Year to Date
Precipitation June 1, 2016
Basin-wide Water Year Precipitation as a Percentage of the 1981 to 2010 Average
Above
Average Precipitation
Below
>= 150%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 -69%
0 - 49%
No Data
Provisional Data - Subject to Revision
N
PANHANDLE REGION
CLEARWATER BASIN
SALMON RIVER BASINS
WEST CENTRAL BASINS
UPPER SNAKE RIVER BASIN
WOOD & LOST BASINS
BEAR RIVER BASIN
SOUTHSIDE SNAKE RIVER BASINS
120
114
113
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107
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97
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110
132
121
115
128
104
0 25 50 100 150 200 Miles
This map is prepared by the USDA-NRCS Idaho Snow Survey Office.
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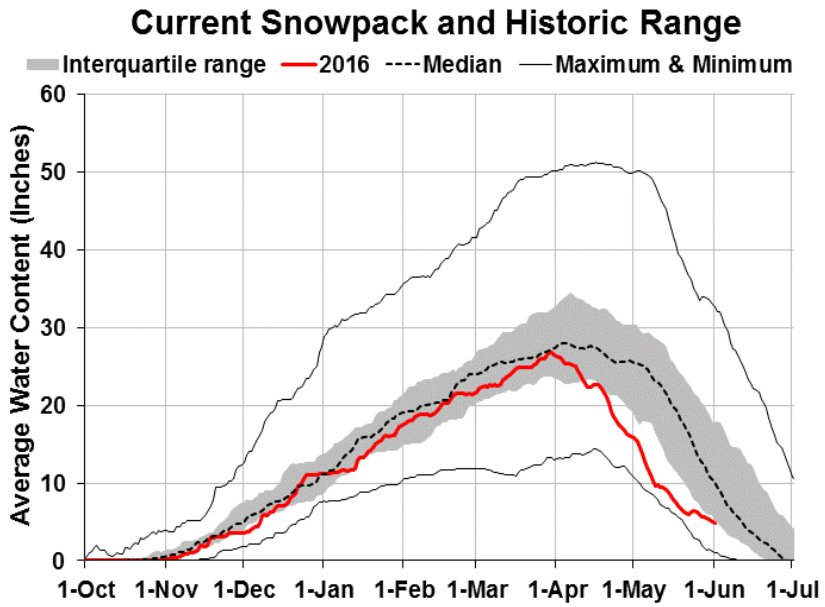
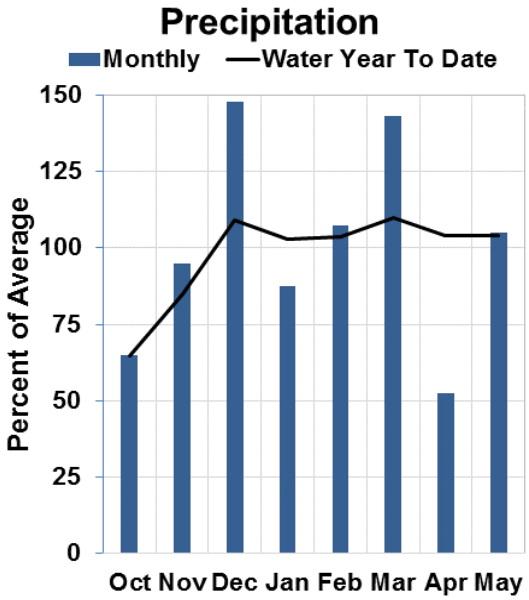
Panhandle Region

June 1, 2016





WATER SUPPLY OUTLOOK

May precipitation throughout the Panhandle Region as a whole was near average, but showed significant variability from north to south, ranging from a low of 70% of average for the Palouse to a high of 153% for the Kootenai above Bonners Ferry. Water year to date precipitation totals range from a low of 97% in the Coeur d' Alene basin to a high of 122% for the Rathdrum Creek drainage. Following the record snowmelt observed at many sites during April, May came through with temperatures that were again above average across the Panhandle. As a result, nearly all basins with remaining snowpack have seen substantial reductions (relative to the median) since the May 1st report. Current snowpack percentages range from a high of 69% of median in the St. Joe, to a low of 0% for the Coeur d' Alene River. Reservoirs across the Panhandle finished April ranging from a low of 88% of average storage for Lake Coeur d' Alene to a high of 116% for Hungary Horse.

Even with near normal water year to date precipitation, the lack of snow in the high country is taking its toll on the residual streamflow volumes for this summer. Volumes will be below average, but should be a little higher than last year. Any additional rain will help the soils and vegetation recover from last summer's fires and keep the forests damp going into this summer.

Panhandle Region Streamflow Forecasts - June 1, 2016

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	JUN-JUL	75	102	119	89%	137	164	133
	JUN-SEP	85	113	133	90%	152	181	147
Kootenai R at Leonia [1 & 2]	JUN-JUL	2560	3160	3420	94%	3690	4290	3640
	JUN-SEP	3330	4060	4380	94%	4710	5430	4640
Boundary Ck nr Porthill	JUN-JUL	25	34	40	95%	46	55	42
	JUN-SEP	29	39	46	96%	53	63	48
Clark Fork R at Whitehorse Rapids [1 & 2]	JUN-JUL	2400	3150	3490	69%	3830	4580	5070
	JUN-SEP	2950	3850	4250	70%	4650	5550	6090
Pend Oreille Lake Inflow [2]	JUN-JUL	2740	3330	3720	68%	4110	4700	5480
	JUN-SEP	3330	4030	4500	69%	4970	5670	6520
Priest R nr Priest River [2]	JUN-JUL	146	193	225	82%	255	305	275
	JUN-SEP	171	225	265	82%	305	360	325
NF Coeur dAlene R at Enaville	JUN-JUL	53	78	96	64%	114	139	150
	JUN-SEP	69	100	120	64%	140	171	187
St. Joe R at Calder [2]	JUN-JUL	119	183	225	65%	270	335	345
	JUN-SEP	158	225	270	66%	315	380	410
Spokane R nr Post Falls [2]	JUN-JUL	230	315	375	60%	435	520	620
	JUN-SEP	215	330	410	58%	490	605	705
Spokane R at Long Lake	JUN-JUL	360	455	520	65%	585	680	795
	JUN-SEP	450	585	675	66%	765	900	1030

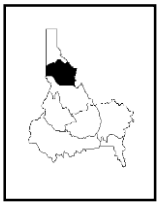
Normals based on 1981-2010 reference period: streamflow, precipitation, & reservoir normals are averages, SWE normals are medians.

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

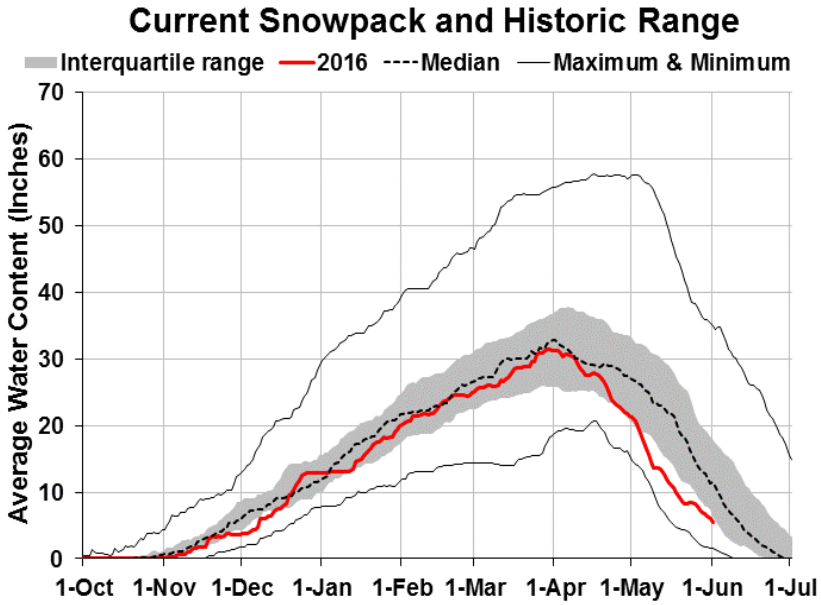
Reservoir Storage (KAF): End of May				
Reservoir Name	Current (KAF)	Last Yr (KAF)	Average (KAF)	Capacity (KAF)
Hungry Horse Lake	3160.2	3048.6	2733.0	3451.0
Flathead Lake	1641.4	1584.4	1538.0	1791.0
Noxon Rapids Reservoir	327.9	324.4	324.2	335.0
Lake Pend Oreille	1308.5	1388.7	1337.0	1561.3
Priest Lake	132.3	123.0	137.2	119.3
Lake Coeur d' Alene	233.3	216.7	265.5	238.5

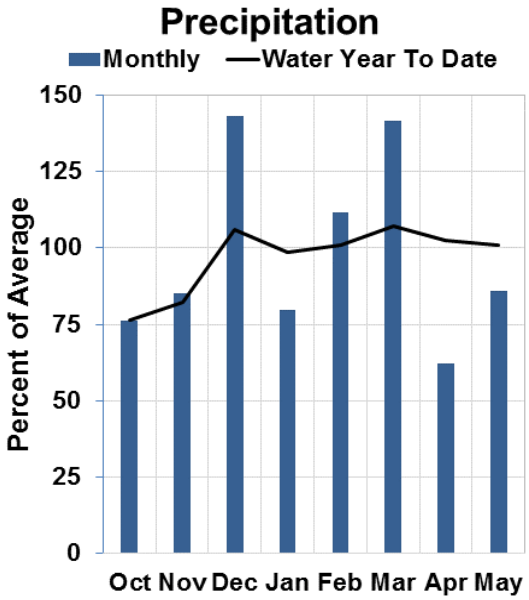
Watershed Snowpack Analysis: June 1, 2016			
Basin Name	# of Sites	% of Median 2016	% of Median 2015
Moyie River	3	36%	46%
Priest River	2	32%	0%
Rathdrum Creek	2		
Coeur d' Alene River	4	0%	0%
St. Joe River	4	69%	19%
Spokane River	10	61%	17%
Palouse River	2		
Kootenai ab Bonners Ferry	11	42%	12%



Clearwater River Basin

June 1, 2016





WATER SUPPLY OUTLOOK

May precipitation in the Clearwater was slightly below normal, ranging from a high of 91% of average for the NF Clearwater to a low of 73% of average for the Selway. The basin as a whole received 84% of average precipitation for May. Water year to date totals are right on target, with the Clearwater as a whole at 101% of average, while individual basins range from a low of 98% to a high of 107% of average. Snowpack percentages since May 1st have also declined substantially (relative to the median) with the NF Clearwater at 56% of the median while the Clearwater as a whole is at 48%. Both the Lochsa and the Selway are substantially lower as a percentage of the median, but this is likely an artifact of SNOTEL site location and elevation, rather than a true difference in snowpack relative to surrounding basins. At the end of May, Dworshak Reservoir held 333,280 ac-ft, which is 96% of capacity and 107% of average for this time of year.

Forecasts for the remainder of the summer represent the rapid declines in snowpack observed during the April-May time period and range from 44-65% of average for the June-July and June-September periods. Dworshak Reservoir inflows for the remainder of the season are projected at 60% of average volumes. Streams have peaked and are in recession from this year's snowpack.

Clearwater River Basin Streamflow Forecasts - June 1, 2016

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	JUN-JUL	155	275	360	44%	445	565	820
	JUN-SEP	210	345	435	48%	530	660	915
Lochsa R nr Lowell	JUN-JUL	152	240	300	53%	355	445	565
	JUN-SEP	200	295	360	56%	420	515	640
Dworshak Reservoir Inflow [2]	JUN-JUL	265	410	510	60%	610	755	845
	JUN-SEP	375	535	645	65%	755	915	1000
Clearwater R at Orofino	JUN-JUL	355	650	855	49%	1050	1350	1730
	JUN-SEP	475	810	1040	53%	1260	1600	1960
Clearwater R at Spalding [2]	JUN-JUL	640	1080	1390	53%	1690	2140	2610
	JUN-SEP	850	1360	1700	57%	2050	2550	2990

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%

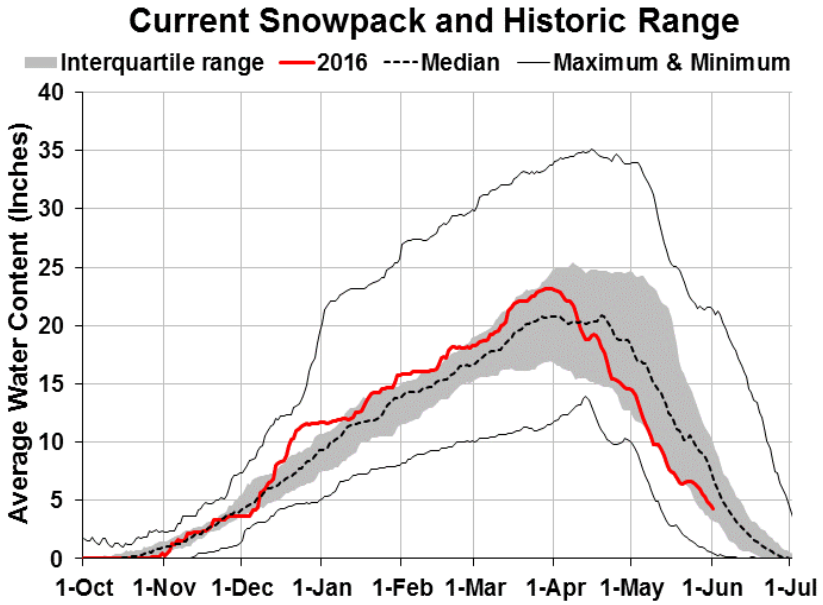
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

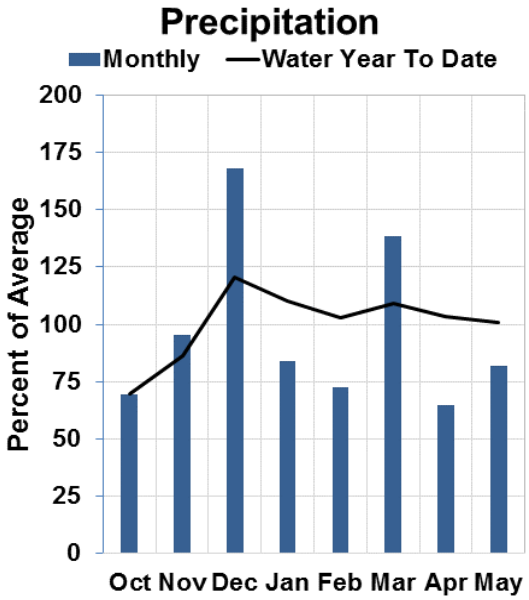
Reservoir Storage (KAF): End of May				
Reservoir Name	Current (KAF)	Last Yr (KAF)	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	3332.8	3420.3	3113.0	3468.0

Watershed Snowpack Analysis: June 1, 2016			
Basin Name	# of Sites	% of Median 2016	% of Median 2015
NF Clearwater River	8	56%	16%
Lochsa River	2	0%	0%
Selway River	4	11%	0%
Clearwater Basin Total	15	48%	14%

Salmon River Basin

June 1, 2016





WATER SUPPLY OUTLOOK

The Salmon River basin as a whole received 83% of average May precipitation, with individual drainages ranging from a low of 66% in the Little Salmon to a high of 92% in the Lemhi. The water year to date totals range from a low of 93% of average (SF Salmon) to a high of 110% for the Little Salmon, while the Salmon as a whole has received 102% of average precipitation for this point in the water year. Snowpack on the Salmon shows a strong east-west trend with the Lemhi having 95% of median while the SF Salmon shows 46%, the Salmon as a whole has 66% of median snowpack.

Streamflow forecasts across the Salmon range from a low of 55% of average for the SF Salmon River, to a high of 76% for the Salmon at White Bird. Despite the early onset of runoff, Middle Fork boaters are still forecasted to have roughly 75% of average June-July and June-September volumes, and water supplies should be adequate to meet recreation and irrigations needs.

Salmon River Streamflow Forecasts - June 1, 2016

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	JUN-JUL	225	270	300	65%	330	375	460
	JUN-SEP	280	340	380	65%	420	480	585
Lemhi R nr Lemhi	JUN-JUL	15.9	22	26	59%	31	39	44
	JUN-SEP	24	31	37	62%	43	53	60
MF Salmon R at MF Lodge	JUN-JUL	134	192	230	73%	270	330	315
	JUN-SEP	167	240	290	74%	340	415	390
Sf Salmon R nr Krassel Ranger Station	JUN-JUL	30	51	65	55%	79	100	119
	JUN-SEP	52	68	79	57%	90	106	138
Johnson Ck at Yellow Pine Id	JUN-JUL	27	41	51	54%	61	75	94
	JUN-SEP	39	52	60	56%	68	81	107
Salmon R at White Bird	JUN-JUL	1450	1820	2080	75%	2340	2710	2760
	JUN-SEP	1780	2230	2530	76%	2830	3280	3330

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

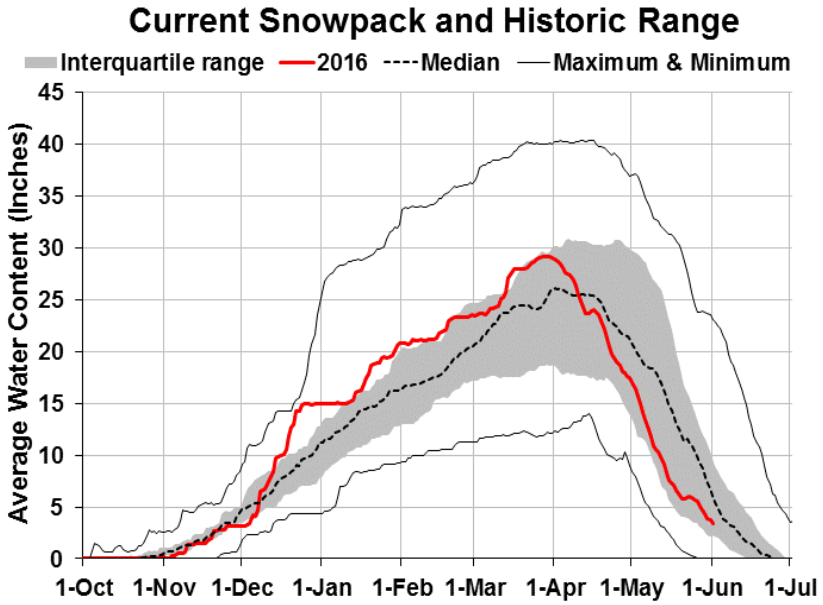
1) 90% and 10% exceedance probabilities are actually 95% and 5%

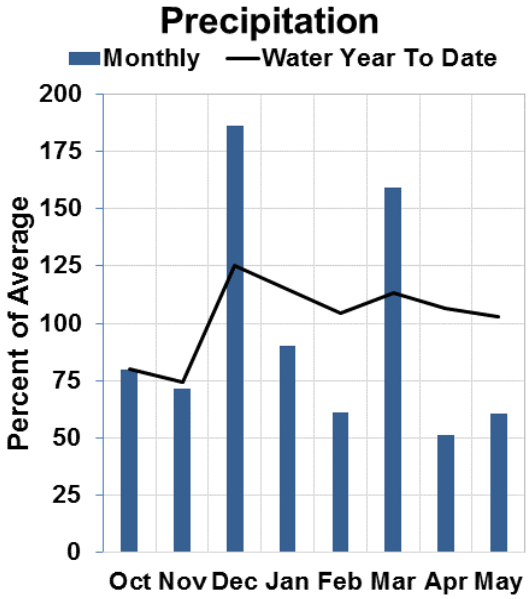
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Watershed Snowpack Analysis: June 1, 2016 Basin Name	# of Sites	% of Median 2016	2015
Salmon River ab Salmon	6	63%	11%
Lemhi River	7	95%	66%
MF Salmon River	3	71%	0%
SF Salmon River	3	46%	0%
Little Salmon River	3		
Salmon Basin Total	22	66%	23%

West Central Basins

June 1, 2016





WATER SUPPLY OUTLOOK

During May the West Central basins received below average precipitation. The Payette River basin was closest to average monthly precipitation at 75%, while the Weiser River and the Boise River basins received 67% and 62% of average. May continued the boom-or-bust monthly precipitation pattern we have observed in the West Central basins during the 2016 water year. We're now eight months into the water year and above normal monthly precipitation has only occurred twice (December and March), yet the water year to date precipitation total is still above 100% of average. Very few SNOTEL sites have snow remaining, the snowpack peak and snowmelt timing occurred earlier than normal this year. The highest elevation SNOTEL site in these basins is Vienna Mine (8,960 ft), which has 18.8" of SWE and is 96% of normal.

Reservoir storage in the West Central basins looks promising for water users. The Bureau of Reclamation's Boise River project (Anderson Ranch, Arrowrock, and Lucky Peak Reservoirs) is nearly full at 96% of capacity at 116% of average to begin June. Correspondingly, the Payette River project (Cascade and Deadwood Reservoirs) is 96% full and 106% of average. Lower than average precipitation and earlier than normal snowmelt has resulted in significant declines for streamflow forecasts. Reservoir storage in the West Central basins should provide enough of a buffer to supply adequate irrigation supplies to water users. The greater impact of lower than normal summer streamflows may be felt in 2017 resulting from less reservoir carry-over.

West Central Basins Streamflow Forecasts - June 1, 2016

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]	JUN-JUL	58	80	95	51%	110	132	186
	JUN-SEP	74	99	117	53%	135	160	220
Boise R nr Twin Springs	JUN-JUL	120	143	159	66%	175	198	240
	JUN-SEP	147	175	194	67%	215	240	290
Mores Ck nr Arrowrock Dam	JUN-JUL	6.1	9.4	12	44%	15	19.9	27
	JUN-SEP	6.5	10.1	13	42%	16.3	22	31
Boise R nr Boise [2]	JUN-JUL	200	245	280	58%	310	355	480
	JUN-SEP	265	315	350	60%	390	440	580
Lake Fork Payette R nr McCall	JUN-JUL	10.5	13.6	16	42%	18.6	23	38
	JUN-SEP	12.4	15.9	18.5	45%	21	26	41
NF Payette R at Cascade [2]	JUN-JUL	20	38	55	31%	75	104	179
	JUN-SEP	15	36	57	30%	78	110	192
NF Payette R nr Banks [2]	JUN-JUL	17.6	42	64	29%	103	160	220
	JUN-SEP	19.2	46	70	29%	111	172	240
SF Payette R at Lowman	JUN-JUL	100	114	124	59%	134	150	210
	JUN-SEP	127	144	156	60%	169	188	260
Deadwood Reservoir Inflow [2]	JUN-JUL	16.9	24	28	52%	32	39	54
	JUN-SEP	21	29	34	54%	39	47	63
Payette R nr Horseshoe Bend [2]	JUN-JUL	173	255	315	50%	370	455	625
	JUN-SEP	250	340	400	52%	460	545	775
Weiser R nr Weiser	JUN-JUL	32	46	58	59%	71	92	99
	JUN-SEP	49	66	79	62%	93	116	127

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%

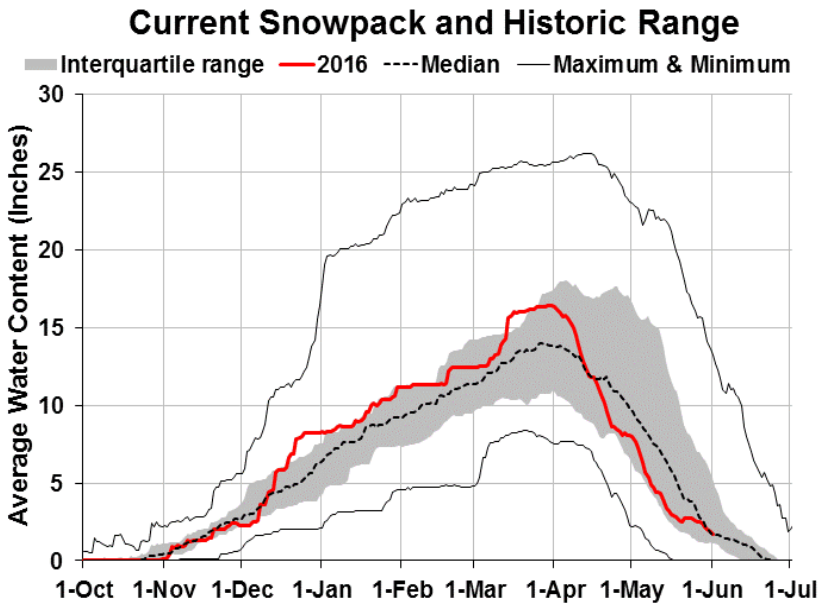
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

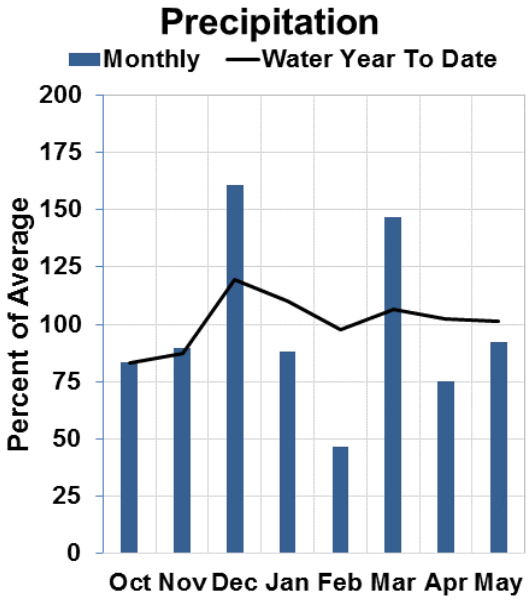
Reservoir Storage (KAF): End of May				
Reservoir Name	Current (KAF)	Last Yr (KAF)	Average (KAF)	Capacity (KAF)
Anderson Ranch Reservoir	443.1	436.3	375.3	450.2
Arrowrock Reservoir	243.8	214.1	198.1	272.2
Lucky Peak Reservoir	283.5	290.7	262.1	293.2
Sub-Basin Total	**970.4**	**941.1**	**835.5**	**1015.6**
Deadwood Reservoir	150.0	156.4	145.5	161.9
Cascade Reservoir	670.0	683.7	625.3	693.2
Sub-Basin Total	**820.0**	**840.2**	**770.8**	**855.1**
Lake Lowell	150.9	144.7	122.9	165.2
Mann Creek Reservoir	10.5	8.3	10.5	11.1

Watershed Snowpack Analysis: June 1, 2016			
Basin Name	# of Sites	% of Median 2016	% of Median 2015
SF Boise River	5	64%	8%
MF & NF Boise Rivers	6	37%	0%
Mores Creek	2	0%	0%
Canyon Creek	1		
Boise Basin Total	11	56%	7%
NF Payette River	5	0%	0%
SF Payette River	4	57%	0%
Payette Basin Total	11	37%	0%
Mann Creek	1		
Weiser Basin Total	4		

Wood & Lost River Basin

June 1, 2016





WATER SUPPLY OUTLOOK

Precipitation in the Wood and Lost River basins was about 90% of average as a whole during May. Basins farther to the east received more precipitation relative to average than basins in the west. Generally, 105-110% of average precipitation occurred in the Little Wood and east of the Little Wood, while basins to the west of the Little Wood received about 75-80% of average. Water year to date precipitation continues to stay near 100% of average. Few sites have snowpack remaining as of June 1st and most sites have historical median values of zero, so it's normal to not have snow. The two remaining SNOTEL sites with snow remaining are Meadow Lake in the Lemhi Range (3.4 inches of snow water, 77% of median), and Smiley Mountain in the Pioneer Mountains (8.2 inches of snow water, 73% of median). These are the two highest elevation SNOTEL sites in Idaho, so it takes longer for the season's snowmelt to complete.

Major reservoirs in the Wood and Lost basins are nearly full. From east to west, Mackay is 94% full and 121% of average, Little Wood is 99% full and 109% of average, and Magic is 94% full and 138% of average. Since April 1st and May 1st streamflow forecasts have decreased with respects to averages during the runoff season. Forecasts ranged from 90-110% of average as of April 1st, then 70-90% of average on May 1st, now June 1st forecasts are calling for only 40-60% of average. The forecast decreases are a result of unusually warm temperatures during most of April and part of May combined with below normal precipitation during the same months. Similar to last month's outlook, water supplies look to be marginally adequate for irrigation users in the Big Wood, Big Lost, and Little Lost basins.

Wood and Lost Basins Streamflow Forecasts - June 1, 2016

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	MAY-JUL	2	5.9	11.1	44%	16.4	24	25
	JUN-JUL	0.7	1.8	4.1	48%	7	11.2	8.6
Little Lost R nr Howe	JUN-JUL	6	8.2	9.7	63%	11.2	13.4	15.5
	JUN-SEP	8.5	11.7	13.9	63%	16.1	19.3	22
Big Lost R at Howell Ranch	JUN-JUL	24	42	54	53%	66	84	102
	JUN-SEP	28	50	65	53%	80	102	122
Big Lost R bl Mackay Reservoir	JUN-JUL	9.4	26	38	46%	50	67	82
	JUN-SEP	19.6	42	57	52%	72	94	109
Little Wood R ab High Five Ck	JUN-JUL	9.1	12.7	15.6	54%	18.7	24	29
	JUN-SEP	11.1	15.6	19.1	55%	23	29	35
Little Wood R nr Carey [2]	JUN-JUL	4.1	11.1	15.9	55%	21	28	29
	JUN-SEP	6	13.8	19.1	55%	24	32	35
Big Wood R at Hailey	JUN-JUL	50	64	74	58%	84	98	127
	JUN-SEP	63	81	94	61%	107	125	155
Big Wood R ab Magic Reservoir	JUN-JUL	5.3	21	36	40%	51	74	89
	JUN-SEP	8.1	25	43	43%	61	87	101
Camas Ck nr Blaine	JUN-JUL	1.08	3.3	5.4	49%	8.1	13	11.1
	JUN-SEP	1.23	3.5	5.8	50%	8.6	13.8	11.7
Big Wood R bl Magic Dam [2]	JUN-JUL	8.4	28	41	42%	54	74	97
	JUN-SEP	12.9	35	50	45%	65	87	111

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%

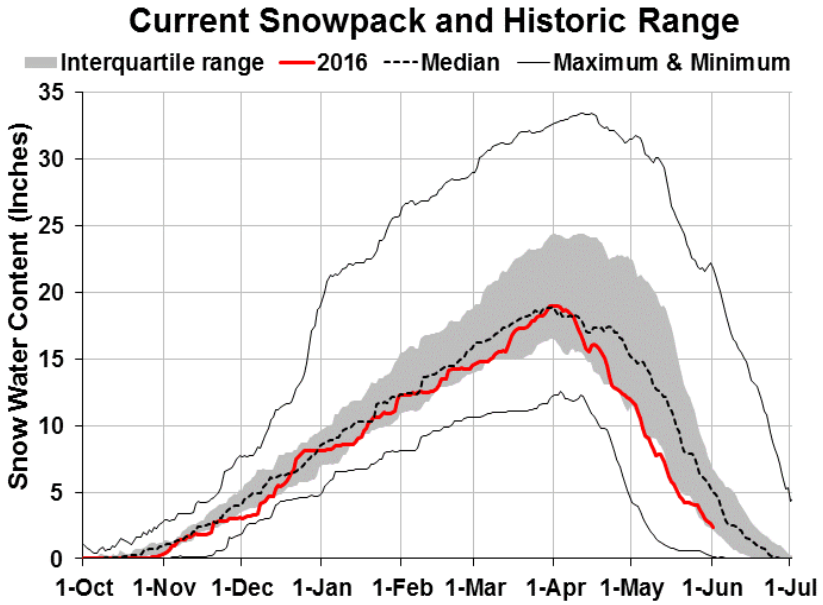
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

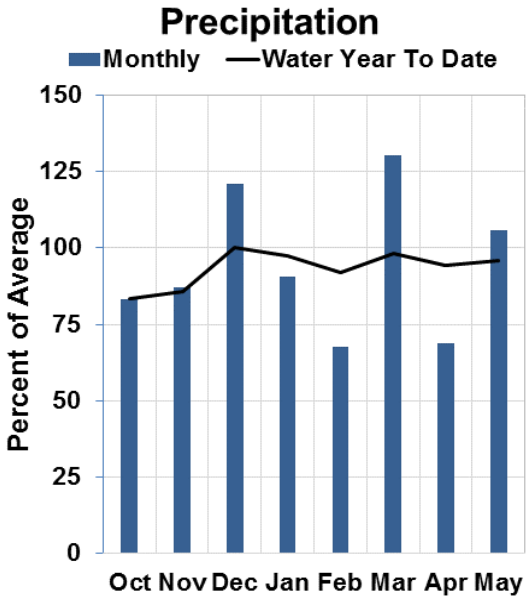
Reservoir Storage (KAF): End of May				
Reservoir Name	Current (KAF)	Last Yr (KAF)	Average (KAF)	Capacity (KAF)
Mackay Reservoir	41.7	35.6	34.6	44.4
Little Wood Reservoir	29.6	19.9	27.3	30.0
Magic Reservoir	179.2	80.1	130.3	191.5

Watershed Snowpack Analysis: June 1, 2016			
Basin Name	# of Sites	% of Median 2016	% of Median 2015
Camas-Beaver Creeks	2		
Birch-Medicine Lodge Creeks	2	77%	0%
Little Lost River	3	77%	0%
Big Lost River ab Mackay	4	73%	21%
Big Lost Basin Total	5	73%	21%
Fish Creek	0		
Little Wood River	3		
Big Wood River ab Hailey	6	74%	17%
Camas Creek	2		
Big Wood Basin Total	8	74%	17%

Upper Snake River Basin

June 1, 2016





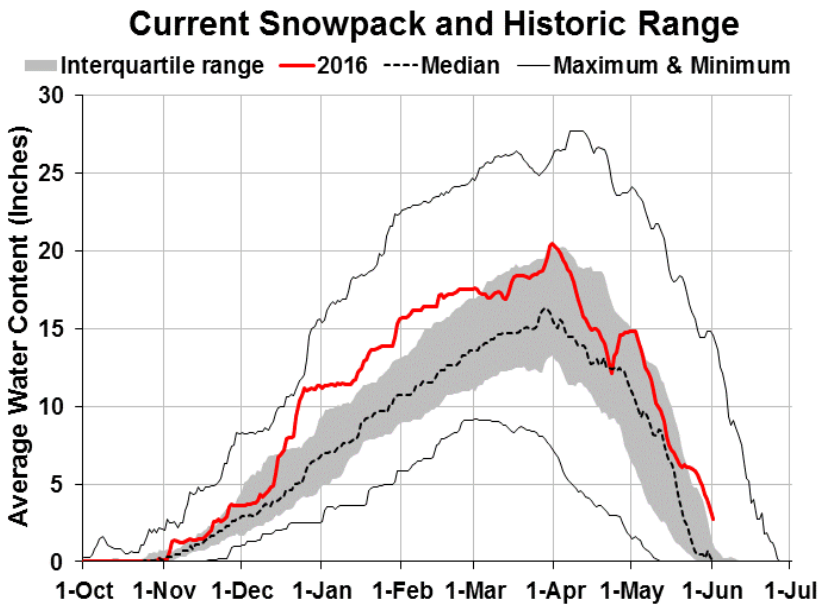
WATER SUPPLY OUTLOOK

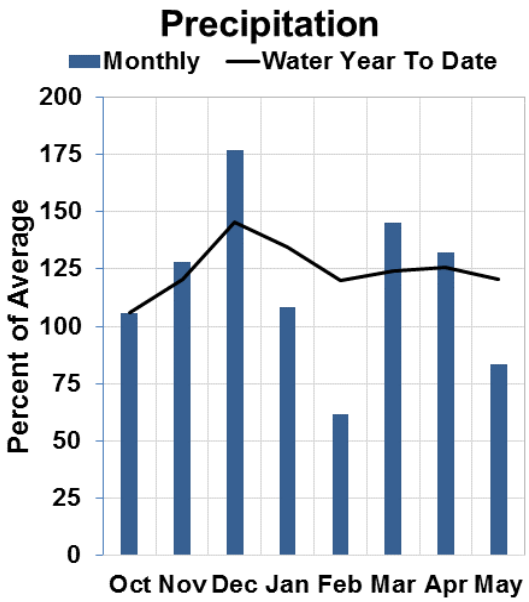
During the month of May the Upper Snake River basin received 104% of average precipitation, while individual basins showed a wide range of variability, from a low of 72% for Pacific Creek in the north, to a high of 141% for the Salt River in the south. Water year to date precipitation totals for the Upper Snake are at 97% of average, with nearly all basins within +/- 10% of average. Since the May 1st report, accelerated melt rates have persisted, and most basins show significant percentage reductions in snowpack (relative to the median). Current snowpack percentages are displayed on the following page and show an incredible amount of variability, ranging from 0% up to 144%. These numbers should be taken with a grain of salt though, as the snowpack melts away small changes in SWE can result in large percent alterations due to low median values, and basin index numbers can become very sensitive to individual site locations and values. The combined storage of Jackson Lake and Palisades Reservoir is at 121% of average for the end of May, while Ririe (115%), Blackfoot (116%), and American Falls (94%) remained roughly constant (as a percent of average) during May.

The forecasts on the following page for the Upper Snake show significant variability reflecting both heterogeneous snowpack and precipitation, as well as accelerated melt rates that have varied substantially by elevation. This has left many of the headwaters basins with better forecasts than their downstream counterparts. For an overall picture of the Upper Snake, the forecast point at Heise is projected to have 80% of average June-July volumes, and when combined with reservoir storage water supplies should be adequate to meet surface irrigation demand.

Southside Snake River Basins

June 1, 2016





WATER SUPPLY OUTLOOK

Precipitation was below average during May for most of the Southside Snake River basins. Salmon Falls Creek, Bruneau River and Raft River drainages were closest to average precipitation at about 90-95% during May, while Goose-Trapper Creeks and the Owyhee Basin were about 60-70% of average. The region still leads the state in highest water year precipitation with respect to averages, at 110-130% of average. Very few SNOTEL sites still have snow, but there is still snow remaining above 8,000 ft (Pole Creek SNOTEL, George Creek SNOTEL).

Major reservoir storage entering the hot and dry summer months is the highest in several years. Oakley, Salmon Falls, Wild Horse, and Owyhee reservoirs are 44-64% full and 84-111% of average. These reservoirs are all holding nearly double or higher compared to June 1st, 2015. Lake Owyhee is holding nearly three times more water than it was at this time last year! Forecasts have dropped since May 1st, mostly resulting from the impressive early season runoff. Water supplies could be marginally adequate for users in the Oakley basin, while water supplies for irrigation users in all the other major basins look to be sufficient. The lengthy rafting season for the Bruneau River is now stretching into early June with flows increasing again because of the record high temperatures pushing the remaining snowmelt out of the basin.

Upper Snake River Basin Streamflow Forecasts - June 1, 2016

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]	JUN-JUL	105	139	162	70%	185	220	230
	JUN-SEP	240	285	320	78%	355	400	410
Falls R nr Ashton [2]	JUN-JUL	78	104	121	66%	138	164	182
	JUN-SEP	122	154	176	70%	198	230	250
Teton R nr Driggs	JUN-JUL	40	54	63	63%	72	86	100
	JUN-SEP	61	79	91	65%	103	121	139
Teton R nr St Anthony	JUN-JUL	84	117	139	66%	161	194	210
	JUN-SEP	128	167	193	69%	220	260	280
Henrys Fk nr Rexburg [2]	JUN-JUL	305	410	480	68%	545	650	710
	JUN-SEP	525	675	780	71%	880	1030	1100
Snake R at Flagg Ranch	JUN-JUL	50	83	106	45%	129	162	235
	JUN-SEP	76	112	137	49%	162	198	280
Snake R nr Moran [2]	JUN-JUL	110	163	200	47%	235	290	425
	JUN-SEP	148	210	255	50%	300	360	505
Pacific Ck at Moran	JUN-JUL	17.6	33	44	51%	55	70	86
	JUN-SEP	23	40	51	53%	62	79	96
Buffalo Fk ab Lava Ck nr Moran	JUN-JUL	100	122	138	67%	154	176	205
	JUN-SEP	117	144	163	68%	182	210	240
Snake R ab Reservoir nr Alpine [2]	JUN-JUL	770	885	960	75%	1040	1150	1280
	JUN-SEP	1010	1140	1230	76%	1320	1460	1610
Greys R ab Reservoir nr Alpine	JUN-JUL	106	121	131	80%	141	156	164
	JUN-SEP	138	157	170	79%	183	200	215
Salt R ab Reservoir nr Etna	JUN-JUL	67	90	106	74%	122	145	143
	JUN-SEP	112	141	160	76%	179	210	210
Snake R nr Irwin [2]	JUN-JUL	940	1090	1190	70%	1290	1440	1700
	JUN-SEP	1260	1440	1560	71%	1680	1870	2190
Snake R nr Heise [2]	JUN-JUL	1180	1330	1440	80%	1540	1690	1800
	JUN-SEP	1600	1790	1910	81%	2040	2230	2350
Willow Ck nr Ririe [2]	JUN-JUL	1.19	3.6	6.1	42%	9.1	14.7	14.4
Portneuf R at Topaz	JUN-JUL	11.2	15.8	19	68%	22	27	28
	JUN-SEP	16.7	25	30	67%	35	43	45
Snake R at Neeley [2]	JUN-JUL	140	260	370	33%	490	705	1130
	JUN-SEP	115	245	365	28%	505	760	1290

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%

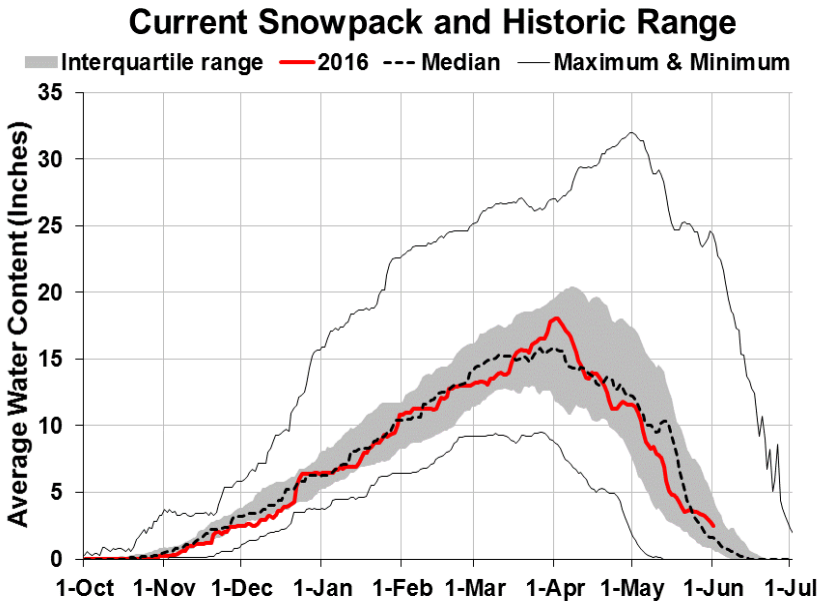
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

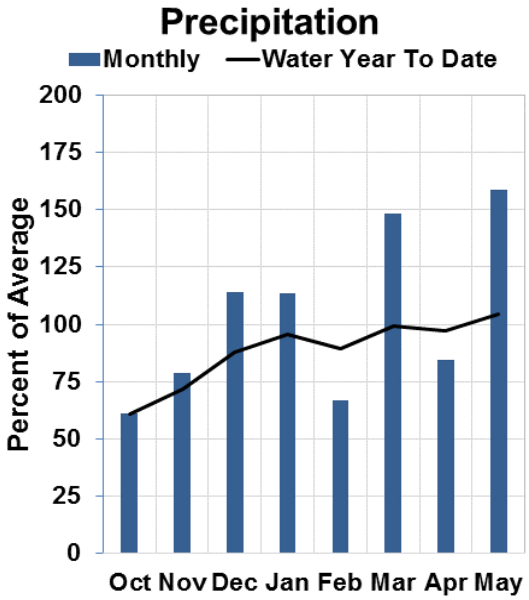
Reservoir Storage (KAF): End of May				
Reservoir Name	Current (KAF)	Last Yr (KAF)	Average (KAF)	Capacity (KAF)
Jackson Lake	791.7	847.5	605.7	847.0
Palisades Reservoir	1187.4	1194.1	1027.0	1400.0
Sub-Basin Total	**1979.1**	**2041.6**	**1632.7**	**2247.0**
Henrys Lake	89.3	89.8	85.6	90.4
Island Park Reservoir	134.6	132.8	133.4	135.2
Grassy Lake	15.3	15.4	14.3	15.2
Sub-Basin Total	**239.2**	**238.0**	**233.3**	**240.8**
Ririe Reservoir	80.0	62.9	69.6	80.5
Blackfoot Reservoir	272.7	199.7	235.2	337.0
American Falls Reservoir	1368.3	1420.4	1459.0	1672.6
Basin-Wide Total	**3939.3**	**3962.5**	**3629.8**	**4577.9**

Watershed Snowpack Analysis: June 1, 2016			
Basin Name	# of Sites	% of Median 2016	% of Median 2015
Henrys Fork-Falls River	5	31%	2%
Teton River	3	69%	55%
Henrys Fork ab Rexburg	8	51%	30%
Snake River ab Jackson Lake	4	0%	0%
Pacific Creek	1		
Buffalo Fork	2	78%	64%
Gros Ventre River	4	89%	64%
Hoback River	5	144%	131%
Greys River	4	127%	114%
Salt River	3	0%	0%
Snake ab Palisades Resv	18	76%	61%
Willow Creek - Ririe	2		
Blackfoot River	2		
Portneuf River	3		
Snake River ab American Falls	27	66%	48%

Bear River Basin

June 1, 2016





WATER SUPPLY OUTLOOK

Impressive precipitation totals were recorded in southeastern Idaho and the greater Bear River basin area during May. Smiths-Thomas Forks in the Wyoming Range received about 200% of average monthly precipitation, while the Bear River above the UT-ID line received 150%. Similar high precipitation totals were observed during May of 2015 for all of the Bear River basin. NOAA seasonal outlooks yields an increased probability of above normal precipitation for the June-August period. After somewhat of a slow start to the water year, the precipitation totals have rebounded and are now above 100% of average for the water year. All of the SNOTEL sites that normally have snow remaining as of June 1st still have snow, and these sites all exceed their median values. The highest Snow Water Equivalent (SWE) remaining is 17.4" (as of June 1st) at Spring Creek Divide SNOTEL in the Wyoming Range.

Bear Lake is currently holding 632.9 KAF, which is 49% of capacity and 89% of average. The much smaller Montpelier Reservoir is full at 4.0 KAF, which is 118% of average. Forecasts range from 75-100% of average for all forecast points and all periods except for the Bear River below Stewart dam, which is forecast at 69 KAF for June-September, which is 60% of average. Thanks to the May rains, near normal snowpack and good carryover storage in Bear Lake, water supplies should be adequate and similar to last year for the Bear River basin irrigators.

Southside Snake River Basins Streamflow Forecasts - June 1, 2016

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	JUN-JUL	1.74	2.8	3.6	77%	4.5	6.1	4.7
	JUN-SEP	2.5	3.8	4.8	80%	6	7.9	6
Trapper Ck nr Oakley	JUN-JUL	1.07	1.32	1.5	81%	1.69	2	1.85
	JUN-SEP	2.1	2.4	2.6	87%	2.8	3.2	3
Oakley Reservoir Inflow	JUN-JUL	3	4.2	5.1	78%	6.1	7.8	6.5
	JUN-SEP	4.7	6.3	7.4	82%	8.6	10.7	9
Salmon Falls Ck nr San Jacinto	JUN-JUL	11	15	17.8	89%	21	25	20
	JUN-SEP	13.9	18.1	21	88%	24	28	24
Bruneau R nr Hot Spring	JUN-JUL	45	56	63	95%	70	81	66
	JUN-SEP	51	63	71	95%	79	91	75
Reynolds Ck at Tollgate	JUN-JUL	0.21	0.39	0.58	36%	0.92	1.42	1.61
Owyhee R nr Rome	JUN-JUL	2.2	18.7	30	48%	41	58	63
	JUN-SEP	9.5	28	41	51%	54	73	80
Owyhee R bl Owyhee Dam [2]	JUN-JUL	23	33	42	55%	50	65	76
	JUN-SEP	42	55	65	61%	75	92	106

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 May				
Reservoir Name	Current (KAF)	Last Yr (KAF)	Average (KAF)	Capacity (KAF)
Oakley Reservoir	33.1	24.3	37.4	75.6
Salmon Falls Reservoir	91.7	36.1	82.7	182.6
Wild Horse Reservoir	43.7	16.3	52.0	71.5
Lake Owyhee	454.3	153.4	536.2	715.0
Brownlee Reservoir	1341.5	1386.5	1343.0	1420.0

Watershed Snowpack Analysis: June 1, 2016			
Basin Name	# of Sites	% of Median 2016	% of Median 2015
Raft River	1		
Goose-Trapper Creeks	2		
Salmon Falls Creek	5	1238%	0%
Bruneau River	5	1238%	0%
Reynolds Creek	6	0%	0%
Owyhee Basin Total	8		
Owyhee Basin Snotel Total	8		

Bear River Basin Streamflow Forecasts - June 1, 2016

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	76	88	96	86%	104	116	112
	APR-SEP	82	96	106	86%	116	130	123
	JUN-JUL	37	47	54	82%	60	70	66
Bear R ab Resv nr Woodruff	APR-JUL	75	93	106	88%	119	137	121
	APR-SEP	77	96	108	84%	121	140	128
	JUN-JUL	26	39	47	82%	56	68	57
Big Ck nr Randolph	APR-JUL	2.6	3	3.3	87%	3.6	4	3.8
	JUN-JUL	0.86	1.26	1.56	94%	1.86	2.3	1.66
Smiths Fk nr Border	APR-JUL	74	83	88	99%	94	103	89
	APR-SEP	85	96	102	98%	110	120	104
	JUN-JUL	29	38	43	86%	49	58	50
Bear R bl Stewart Dam [2]	APR-JUL	35	86	120	66%	154	205	183
	APR-SEP	40	97	135	66%	173	230	205
	JUN-JUL	2.8	33	56	60%	79	112	93
Little Bear at Paradise	APR-JUL	18.7	27	33	80%	39	47	41
	JUN-JUL	3.3	6.1	8	78%	9.9	12.7	10.2
Logan R nr Logan	APR-JUL	64	81	92	83%	103	120	111
	JUN-JUL	30	38	43	70%	48	56	61
Blacksmith Fk nr Hyrum	APR-JUL	17.5	30	38	88%	46	58	43
	JUN-JUL	9	13.8	17	105%	20	25	16.2

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 May				
Reservoir Name	Current (KAF)	Last Yr (KAF)	Average (KAF)	Capacity (KAF)
Bear Lake	632.9	640.3	710.6	1302.0
Montpelier Reservoir	4.0	4.1	3.4	4.0

Watershed Snowpack Analysis: June 1, 2016			
Basin Name	# of Sites	% of Median 2016	% of Median 2015
Smiths-Thomas Forks	3	151%	135%
Bear River ab WY-ID Line	9	144%	79%
Montpelier Creek	1		
Mink Creek	1		
Cub River	1	0%	0%
Bear River ab ID-UT Line	15	124%	68%
Malad River	1		

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 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.

<u>Forecast use example:</u>

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

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

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

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

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

Upper Snake River Basin Streamflow Forecasts - June 1, 2015

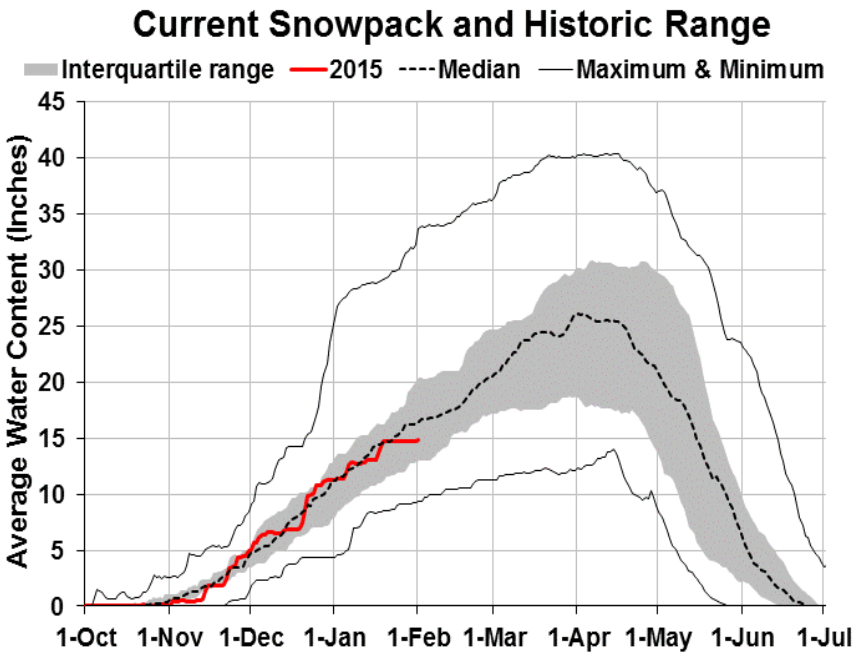
Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <---Drier----------Projected Volume----------Wetter---> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Henrys Fk nr Ashton	JUN-JUL	72	106	129	56	152	186	230
	JUN-SEP	198	245	280	68	315	360	410

Interpreting Snowpack Plots

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

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

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



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