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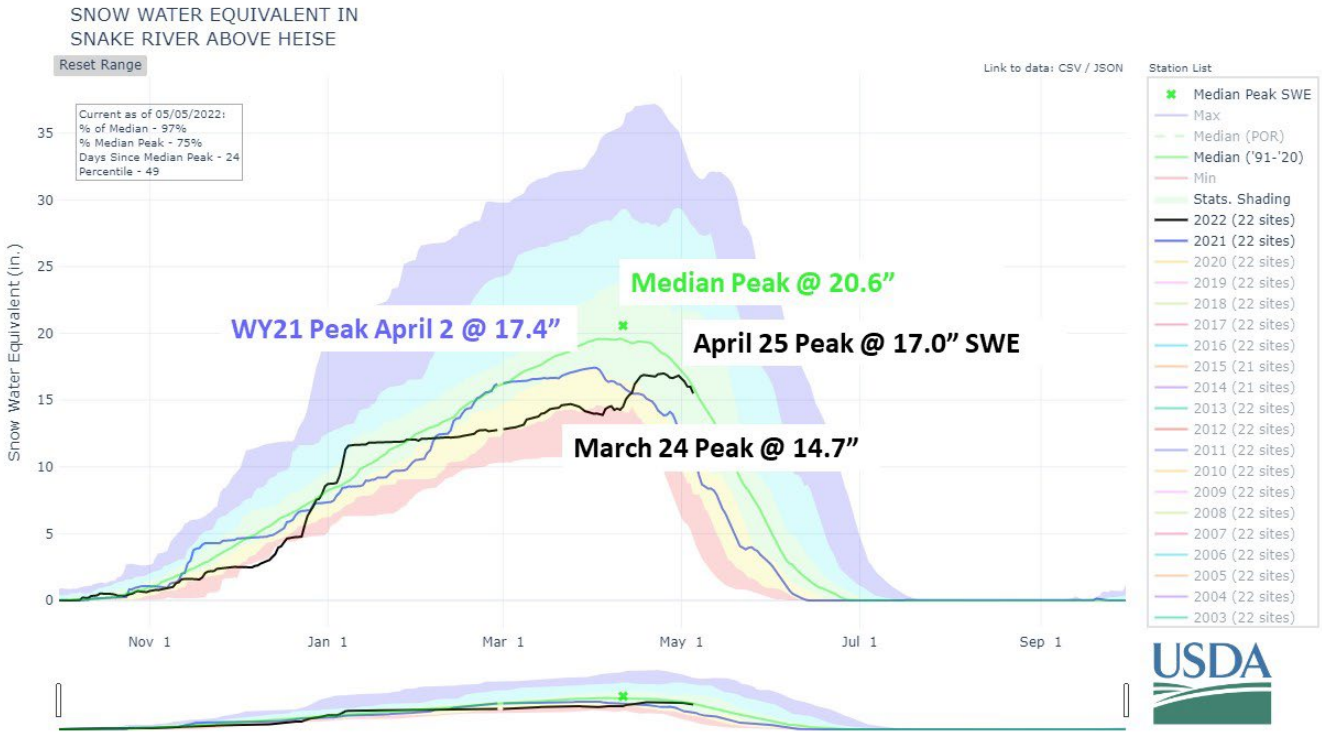
Natural Resources Conservation Service

Idaho Water Supply Outlook Report

May 1, 2022



April storms raised SWE levels by 2.3" in the Snake River headwaters since March 24. However, SWE peaked 3.6" below the 30-year median on April 25, which is 83% of normal for this basin.

The wet and cold April brought sighs of relief across Idaho as storms brought more snow and rain to our drought-afflicted region. Last month it looked as though peak snowpack had come very early across the state. Thankfully, the colder than usual temperatures slowed down snowmelt runoff, and at higher elevations, we saw the snowpack continue to increase. Despite the good news, peak snowpack continues to be below to well below normal across all basins (Fig. 3 & 4). We expect that water supply will continue to be restricted in many watersheds this irrigation season and that drought conditions will persist.

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, ID 83709-1574, (208) 378-5700 ext. 5

To join a free email subscription list, please contact us by email at: idboise-nrcs-snow@usda.gov

How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when the snow melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to produce runoff forecasts. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

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

The wider the spread among these values, the more uncertainty is in the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

Starting in 2020, streamflow forecasts with poor prediction skill (jackknife $r^2 < 0.34$) will no longer be issued. This will primarily affect the January and June forecasts, with little change anticipated for the February, March, April, and May forecasts. For more information, please contact Danny Tappa (daniel.tappa@usda.gov)

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IDAHO WATER SUPPLY OUTLOOK REPORT

May 1, 2022

Overview

We're happy to report that a cold and wet April (Fig. 1) has slightly improved the water supply situation across much of our state. West Central basins, Owyhee Basin, Upper Snake basins, and the western half of the Panhandle were wetter than normal during April. The Wood, Lost, Pend Oreille-Kootenai, and Southern Snake basins were drier than normal. Ubiquitously colder than normal across the entire state, snowpack melting slowed down. Correspondingly, streamflow has been much lower than normal last month. Despite April's welcome reprieve, the big picture hasn't changed significantly. Peak snowpack in all basins, including northern Idaho, is below to well below normal (Fig. 3). In general, irrigation delivery began in April; combined with reduced snowmelt runoff, reservoir fill rates have slowed down. Despite the welcome increases in snowpack and total precipitation since April 1, water supply will likely remain constrained this irrigation season. Atypical wet and cold April conditions with unknown spring weather resulted in greater modeled streamflow forecast uncertainty. We encourage water users to keep the more water-restricted 70% exceedance streamflow forecasts (Fig. 6) in mind during this dynamic spring season.

The one month outlook from NOAA's Climate Prediction Center (CPC) suggest increased odds of cooler than average temperatures in western Idaho. Predictions indicate that northern Idaho may experience above normal precipitation in May with slightly below normal precipitation expected near the southern border. The mid-range forecasts indicate cool conditions projected across Idaho. Forecasts show above-normal precipitation in the West Central, Wood, Lost and Upper Snake basins. Daily conditions are shown here. The CPC three-month for May-June-July outlook predicts warmer and drier conditions than normal these months; drought conditions are expected to persist. Currently, ~82% of Idaho lands are experiencing moderate to extreme drought conditions according to the U.S. Drought Monitor.

Snowpack

Below average temperatures and ample precipitation stalled the snowpack melting trend reported last month. Despite this spring weather windfall, peak snowpack at almost every SNOTEL site south of the Clearwater Basin remains well below average for WY 2022. Basin-wide percent of median peak snowpack is below normal in all basins (Fig. 3). Another way of understanding how this year's snowpack ranks compared to previous winters is to look at percentiles. Current snow water equivalent (SWE) peak compared to the period of record at almost all measurement locations is

near the 30th percentile. Again, the notable exception is the Clearwater Basin sites, which remain slightly above the 50th percentile.

Many water users this month have wondered, “Why do the basin percent of normal snowpack values keep increasing and how beneficial have these storms been for water supply?”. When snowpack is increasing, or at least holding steady during the typical melt season, comparisons to the 30-year normal can be misleading. Essentially, the basin percent of normal calculation compares today’s snowpack to the same day in the 30-year record, not the historical peak snowpack value. We recommend using figure 3 to assess basin-wide peak snowpack compared to median peak snowpack. Water users can also use SNOTEL sites to directly compare this year’s SWE value to the median peak SWE.

In cold, wet springs like this year, the issues with not comparing water year peak snowpack to peak 30-year median values are best illustrated by looking at the snowpack accumulation charts as shown on the cover; we will use the Snake River above Heise as an example. You can access these charts by clicking on any basin or SNOTEL site in the interactive map. Last month, it appeared snowpack peaked in this basin on March 24 with 14.7” SWE (71% of normal compared to the 30-year peak of 20.6” SWE). After a brief warm spell, the snowpack began to increase again, leading to what appears will be the true snowpack peak on April 25 at 17.0” SWE (83% of normal). If this year’s April 25 SWE value is compared to the 30-year median value on April 25 (17.4”), then it looks like snowpack in this basin is healthier than it actually is. Snowpack would appear to be 98% of normal rather than 83% of normal when comparing peak basin snowpack values directly. In other words, because our snowpack isn’t melting as fast as normal for this basin, the difference (gap) between the WY 2022 and historical median snowpack is narrowing and thus appearing like the snowpack is in better shape than it actually is. Moral of the story? Use figure 3 for a true assessment of snowpack health or individual SNOTEL sites this year.

Precipitation

April showers brought total water year precipitation to near normal levels in all major basins. During April, all basins received near to well above normal precipitation (94% to 158%) (Fig. 1). It was highly variable in space and time whether it fell as snow or rain across the state. As previously mentioned, some basins weren’t quite as wet as the rest of the state this past month. Those include: Pend Oreille-Kootenai, Coeur d’Alene-St. Joe, Bruneau, Salmon Falls, Goose Creek Basin, and some sites within the Wood and Lost basins.

Since October 1, water year total precipitation is above 90% in many basins (Fig. 2). Basins with the lowest total water year precipitation are the Weiser (88%), Payette (89%), Boise (91%), Big Wood (88%), Salmon (93%), Henrys Fork-Teton (88%), and Snake River above Heise (92%). All other basins are near or slightly above normal.

Water supply and impacts

Water users should still prepare for a short irrigation season and possible curtailments. Reservoir storage is below normal across Idaho. Total reservoir storage in the Upper Snake system above American Falls Dam is 59% full and well below normal at 80% of average storage on May 1. There is 1.12 million acre-feet less water currently in the system compared to this time last year.

Magic reservoir storage is at 32% of normal with delivery currently scheduled to begin on May 8. The Boise Reservoir system is currently 92% of normal (61% of capacity, 93,760 acre-feet less than WY 2021 levels on May 1), while the neighboring Payette system is 95% of normal (67% of capacity, 42,280 acre-feet less than WY 2021). As cold weather slowed down snowmelt runoff and irrigation demand began, reservoir fill in the Boise system flat-lined the second half of April. If irrigation diversions exceed or balance natural flow, reservoir fill rates will decline with the potential for reservoirs to not fill as the snowpack melts. The Boise system total storage is predicted to reach ~650-750 KAF (thousand acre-feet) by the day of allocation. Reservoirs south of the Snake River are below normal with Salmon Falls (59%), Oakley (71%), Brownlee (81%), and Lake Owyhee at 65% of normal. Bear Lake is at 106% of normal. Reservoirs in the north are doing much better, ranging from 72% to 109% of normal.

The Surface Water Supply Index (SWSI) table below shows which basins are predicted to experience water supply shortages. This year, those include the Big Wood, Big Lost, Little Lost, Snake above Heise, Oakley, Salmon Falls, and Owyhee basins. The 1-month SPEI index show improved conditions across all of Idaho from the 3-month SPEI.

Our standard streamflow forecasts are the 50% exceedance forecasts (Fig. 5). May through July streamflow is predicted to be above normal in northern Idaho and below normal through most of the state. Streamflow forecasts increased slightly from last month. However, south of the Clearwater Basin, most streamflow forecast points are below the 35% percentile. Whether the 50% or 70% exceedance forecasts (Fig. 5 & 6) come to fruition will depend on several factors. We anticipate if warm and dry conditions prevail through the remainder of spring, observed streamflow will more closely mirror the more conservative streamflow predictions (70%). Depending on how quickly the remaining snowpack melts will also influence the amount of runoff that makes it into our reservoirs and streams. At this point, a significant slowdown in the snowpack melt rate could negatively impact total water availability with more water lost to various ecological processes than if rapid melting occurs.

For insight into how current and forecasted weather conditions are influencing the timing of melt and peak streamflow, please consult the Northwest River Forecast Center's website. Streamflow, snowpack, and precipitation data for each basin can be accessed here or on the interactive map here. Check out our new streamflow adjustment tool here

to see how forecast points are adjusted to reservoir operations and diversions. For questions about current conditions and water supply impacts, please contact erin.whorton@usda.gov, (office) 208-685-6983 or (cell) 208-510-7294.

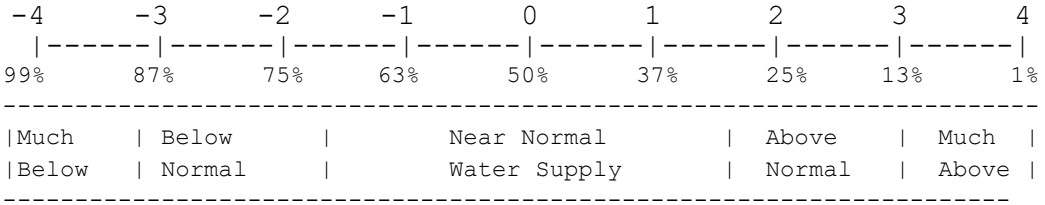
IDAHO SURFACE WATER SUPPLY INDEX (SWSI) May 1, 2022

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 1991 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	**0.9**	**2020**	**NA**
Clearwater	**0.7**	**2012**	**NA**
Salmon	**-0.4**	**2019**	**NA**
Weiser	**-0.4**	**2012**	**NA**
Payette	**-1.2**	**2004**	**NA**
Boise	**-1.7**	**2015**	**- 2.6**
Big Wood above Hailey	**-0.9**	**2000**	**NA**
Big Wood	**-2.2**	**2015**	**0.5**
Camas Creek nr Blaine	**-0.1**	**2012**	**NA**
Little Wood	**-1.4**	**2008**	**- 1.6**
Big Lost	**-2.0**	**2003**	**0.0**
Little Lost	**-0.7**	**2000**	**1.6**
Teton	**-0.9**	**2015**	**- 3.9**
Henrys Fork	**-0.9**	**2003**	**- 3.1**
Snake (Heise)	**-2.2**	**2007**	**- 1.3**
Oakley	**-2.2**	**2021**	**0.3**
Salmon Falls above Jackpot	**-1.2**	**2003**	**NA**
Salmon Falls	**-3.0**	**2015**	**- 0.8**
Bruneau	**-0.4**	**2003**	**NA**
Owyhee	**-2.7**	**1991**	**- 1.0**
Bear River	**-0.3**	**2015**	**- 3.9**

SWSI SCALE, PERCENT CHANCE OF EXCEEDANCE, AND INTERPRETATION



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

Figure 1: Monthly Precipitation for April

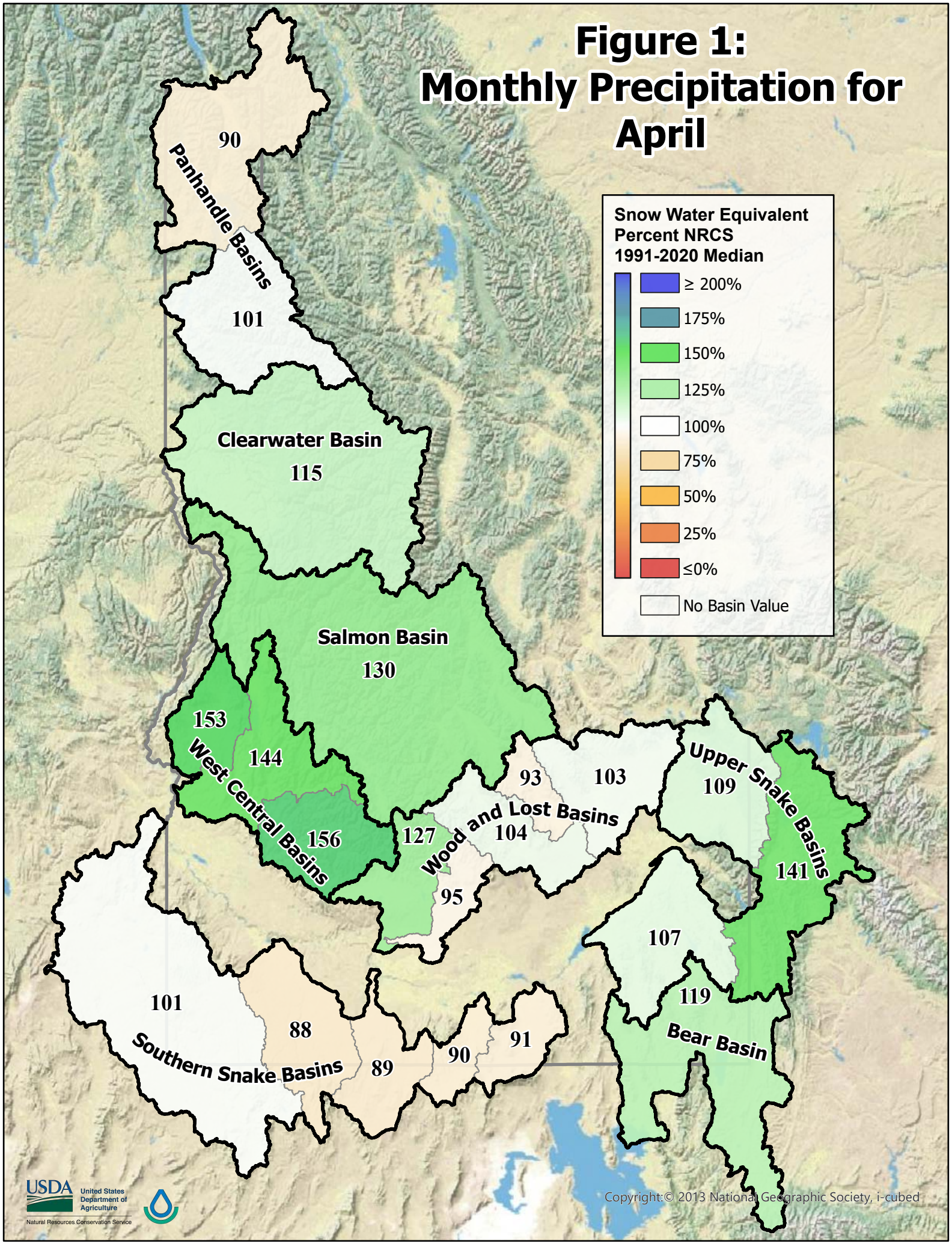


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Figure 2:
May 1, 2022
Water-Year-to-Date-Precipitation

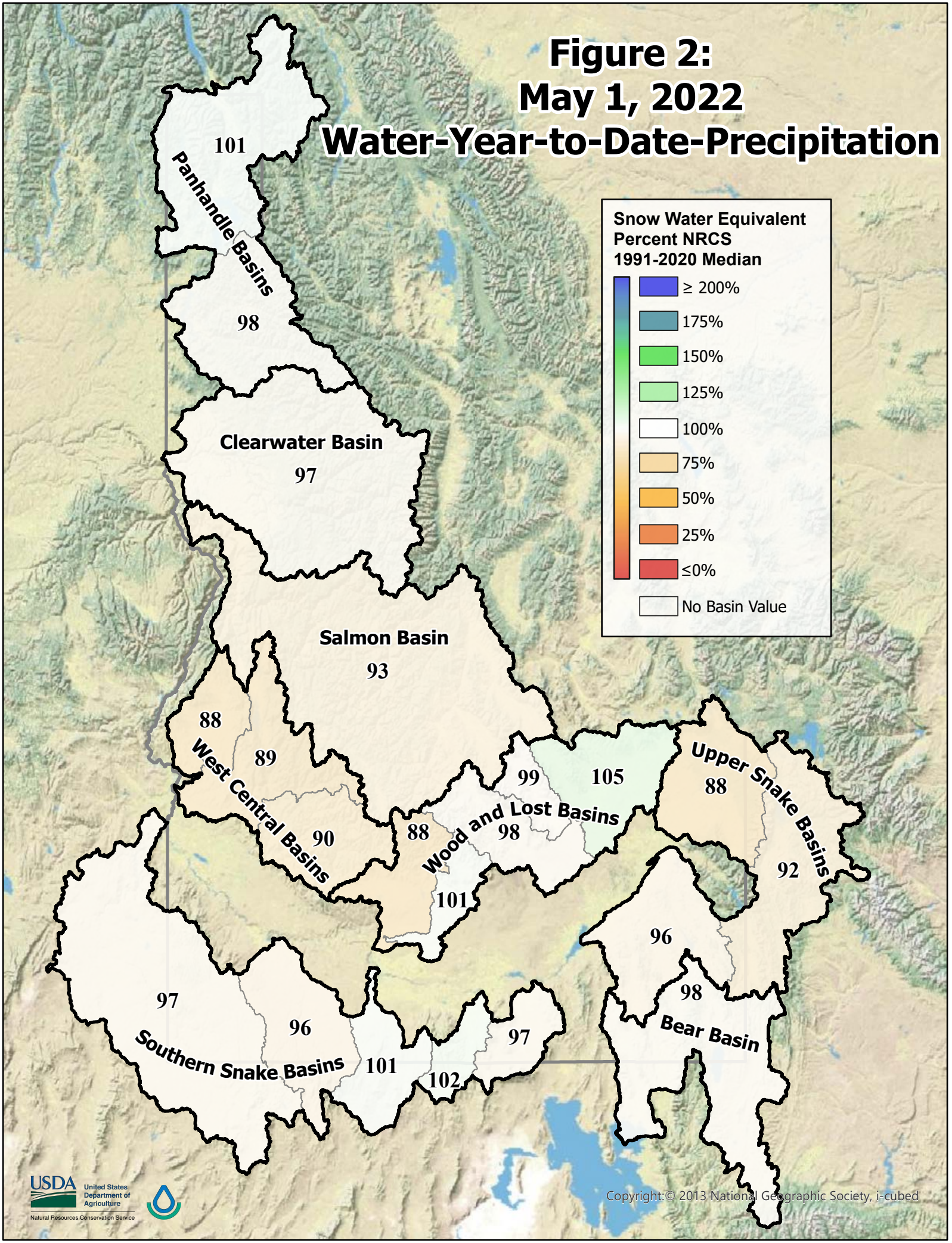

Figure 3: 2022 Percent of Median Peak Snowpack

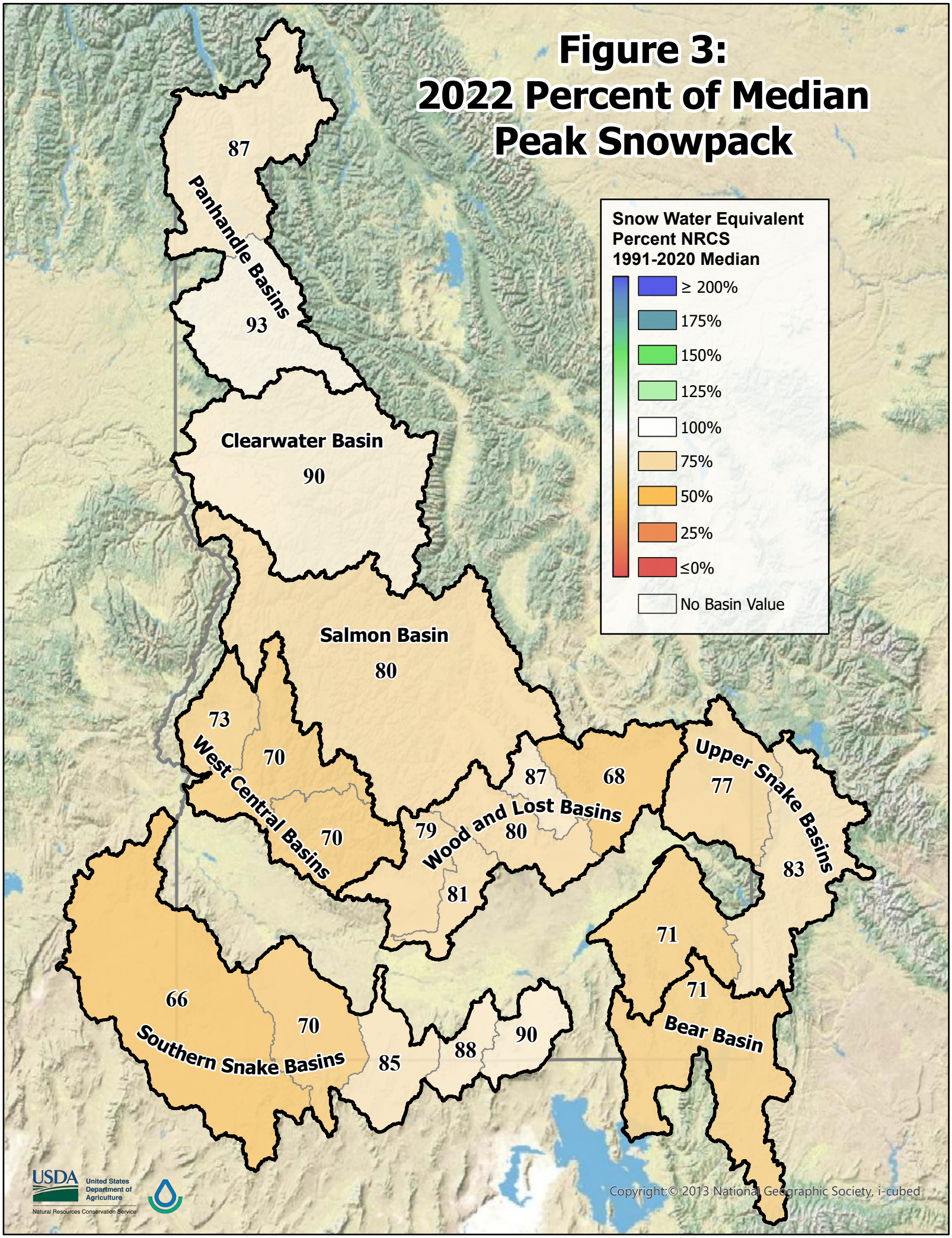

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Figure 4:
May 1, 2022
Percent of Median Snowpack

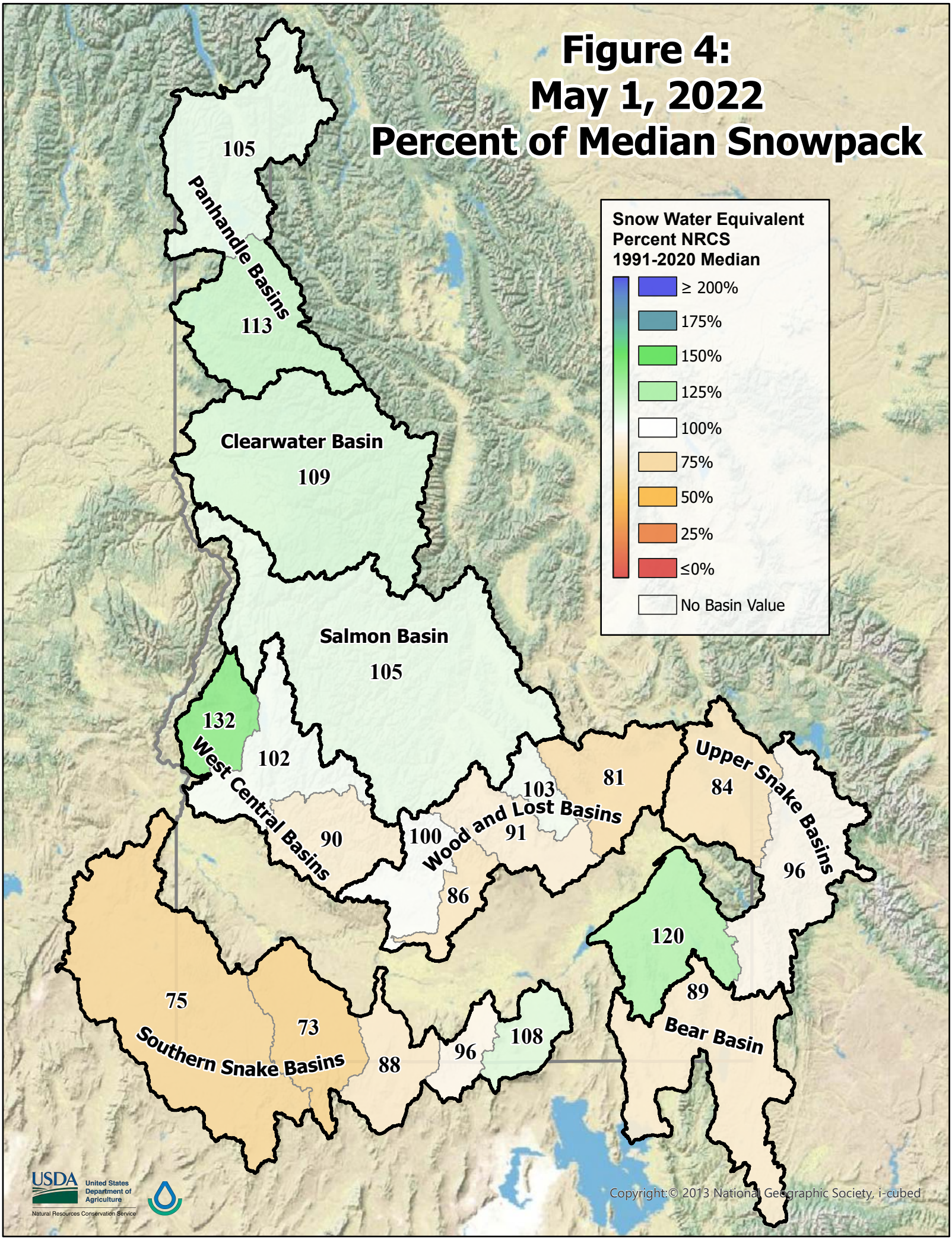

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Figure 5:
50% Exceedance Streamflow Forecast
May 1, 2022

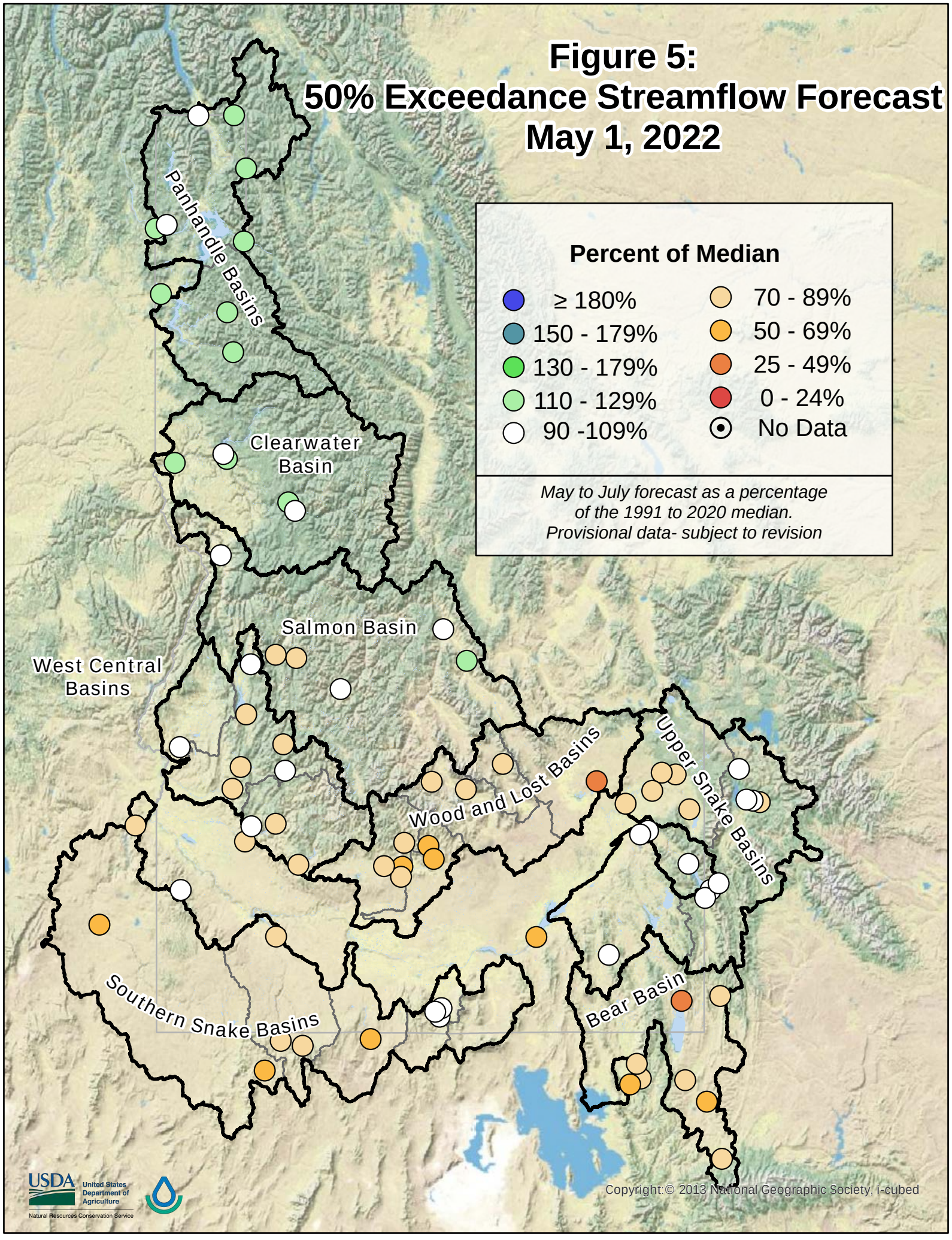
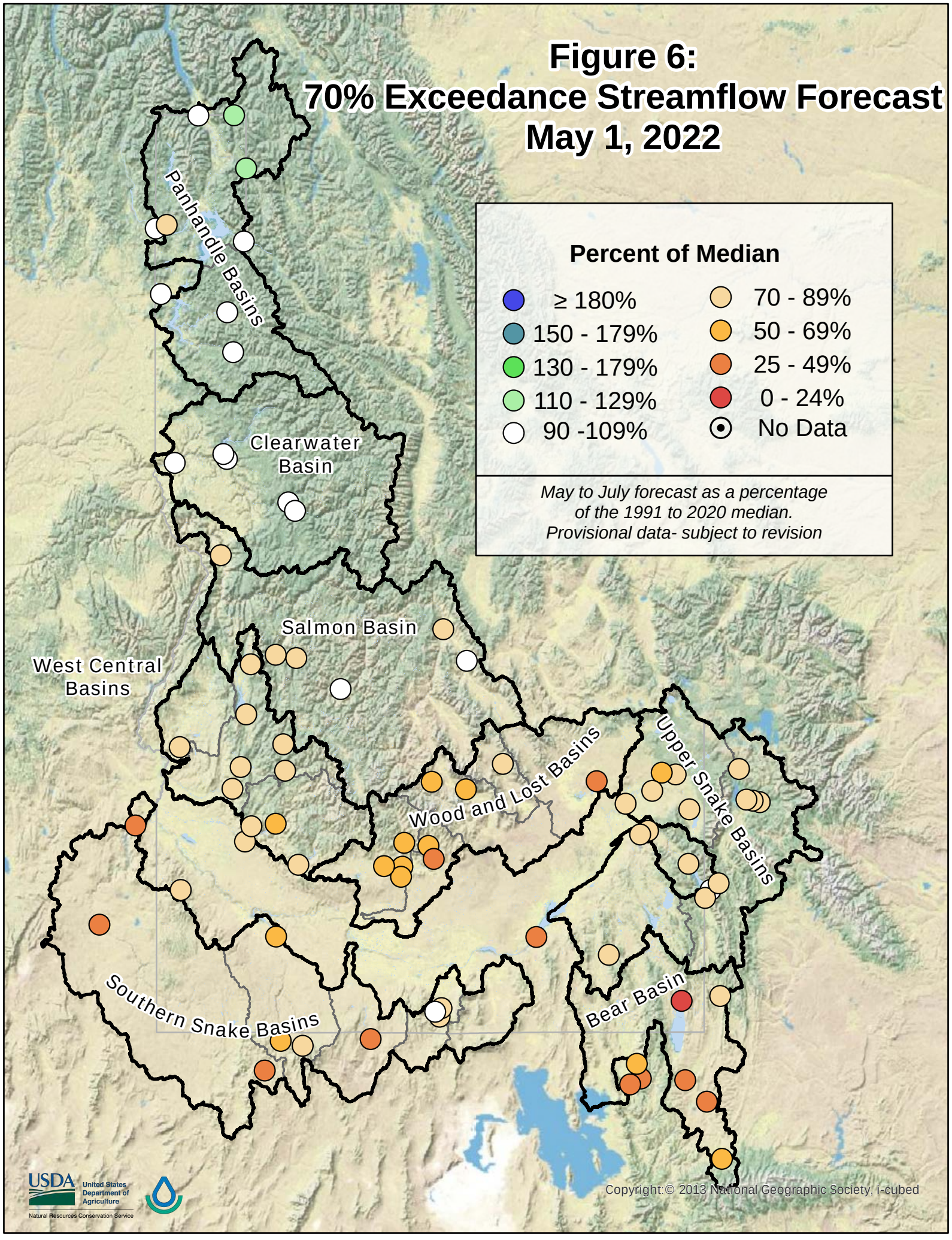
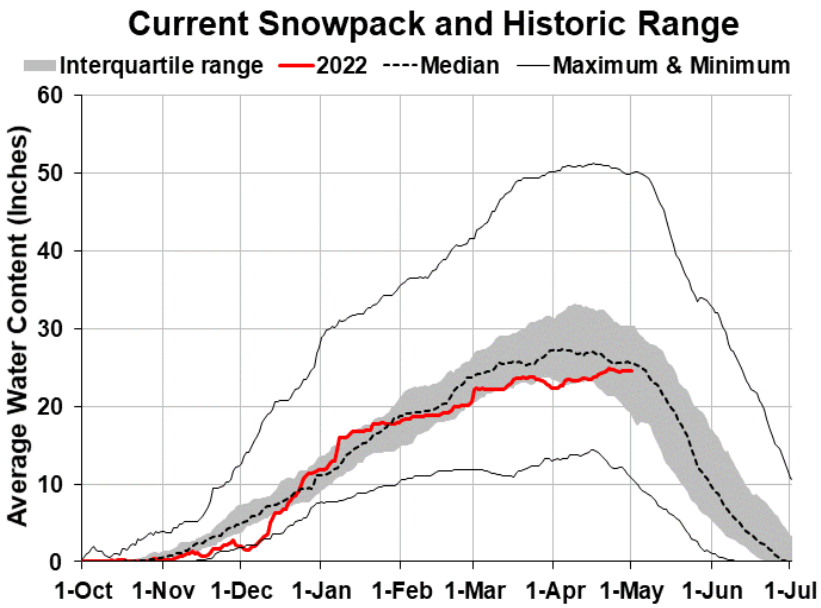


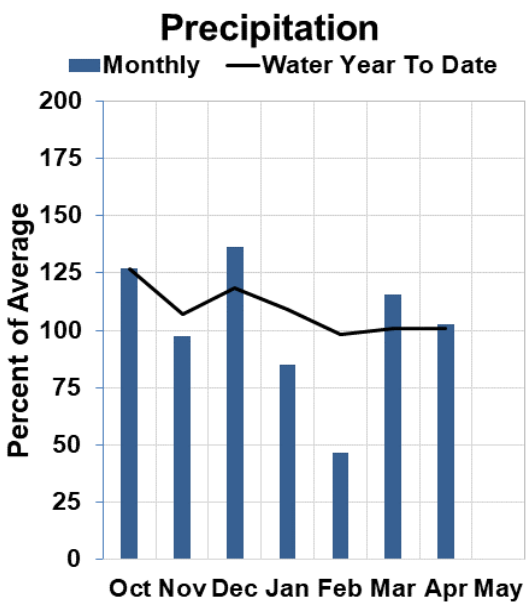
Figure 6:
70% Exceedance Streamflow Forecast
May 1, 2022



Panhandle Basins

May 1, 2022





WATER SUPPLY OUTLOOK

April precipitation was near normal and ranged from ~90 to 100% (Fig. 1). Water Year (WY) 2022 is still trending near normal with May 1 precipitation at ~95 to 100% of normal (Fig. 2). April was cooler than normal, which delayed snowmelt across the Panhandle basins. Because of this, snowpack is near normal and ranges from ~100 to 110% of normal (Fig. 4). Although the snowpack is currently near normal, the seasonal peak snowpack was just below normal at ~90% for the season (Fig. 3). Peak snowpack, or peak SWE, is important because it represents the total amount of water available for springtime runoff, which greatly contributes to our water resources in North Idaho and much of the Western United States. The amount of water that makes it from the snowpack into the local rivers, reservoirs and aquifers depends on many things, but it is largely dictated by springtime air temperature and precipitation. If a cool and wet spring persists, it will help promote continued runoff and normal streamflow into the dry season.

Lakes in the Panhandle are at ~70 to 95% of normal storage: Coeur d'Alene Lake is at 81%, Pend Oreille at 94%, and Priest Lake at 72% of normal. Streamflow forecasts for May through July range from ~90 to 115% of normal at the 70% exceedance level (Fig. 6) and they range from ~90 to 125% of normal at the 50% exceedance level (Fig. 5) for the Panhandle basins. The *70% exceedance forecasts* are conservative and recommended in the case of an abnormally warm and dry spring. NOAA's Official 30-Day Outlook predicts below normal temperatures and above normal precipitation for May in this region.

Panhandle Region Streamflow Forecasts - May 1, 2022

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Med (KAF)
Moyie R at Eastport	MAY-JUL	295	345	380	127%	415	465	300
	MAY-SEP	305	360	395	125%	430	480	315
Kootenai R at Leonia 1 & 2	MAY-JUL	6330	7140	7510	121%	7880	8690	6190
	MAY-SEP	7270	8170	8580	121%	8990	9890	7090
Boundary Ck nr Porthill	MAY-JUL	81	93	102	102%	110	122	100
	MAY-SEP	85	98	106	102%	115	128	104
Clark Fork R bl Cabinet Gorge Dam 2	MAY-JUL	8240	9070	9630	114%	10200	11000	8430
	MAY-SEP	8860	9840	10500	111%	11200	12100	9490
Pend Oreille Lake Inflow 2	MAY-JUL	9110	10100	10700	111%	11400	12300	9640
	MAY-SEP	9810	10900	11700	110%	12500	13600	10600
Priest R nr Priest River 2	MAY-JUL	455	535	590	93%	645	725	635
	MAY-SEP	485	575	635	95%	695	780	670
NF Coeur dAlene R at Enaville	MAY-JUL	325	410	465	122%	525	610	380
	MAY-SEP	355	445	505	122%	560	650	415
St. Joe R at Calder 2	MAY-JUL	595	745	845	114%	945	1100	740
	MAY-SEP	650	805	910	112%	1020	1170	815
Spokane R nr Post Falls 2	MAY-JUL	1210	1510	1710	110%	1920	2220	1560
	MAY-SEP	1270	1590	1800	110%	2010	2320	1640

Normals based on 1991-2020 reference period: streamflow, snowpack, precipitation, & reservoir 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 April

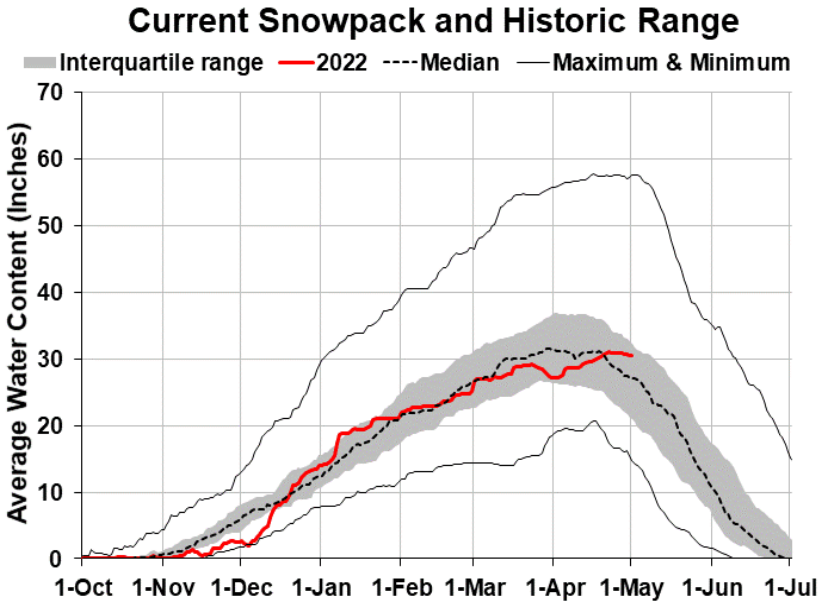
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)
Hungry Horse Lake	2711.4	2686.5	2480.0	3451.0
Flathead Lake	824.5	983.4	1025.0	1791.0
Noxon Rapids Reservoir	288.8	288.9	318.8	335.0
Lake Pend Oreille	866.3	884.2	925.0	1561.3
Priest Lake	71.0	80.8	99.2	119.3
Lake Coeur d' Alene	170.1	154.3	210.3	238.5

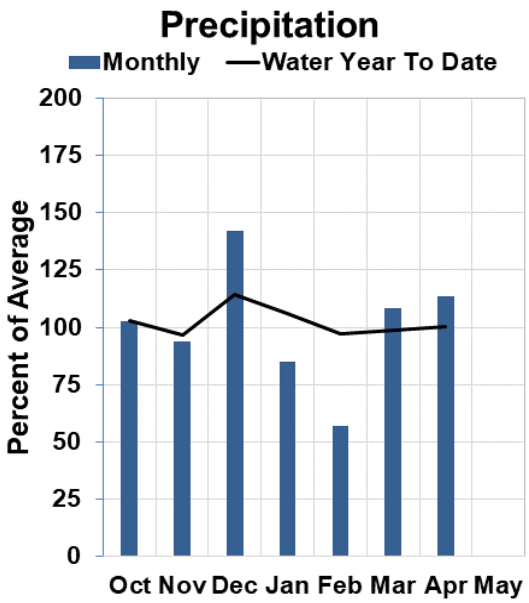
Watershed Snowpack Analysis: May 1, 2022

Basin Name	# of Sites	% of Median 2022	% of Median 2021
Moyie River	1	94%	76%
Priest River	5	108%	73%
Rathdrum Creek	3	119%	45%
Coeur d' Alene River	6	122%	89%
St. Joe River	4	105%	90%
Pend Oreille Lake	5	96%	67%
Palouse River	2	257%	30%
Lower Kootenai	2	112%	81%
Pend Oreille-Kootenai	13	105%	72%
Coeur d' Alene-St. Joe Total	9	115%	90%

Clearwater River Basin

May 1, 2022





WATER SUPPLY OUTLOOK

Monthly precipitation was near normal at ~115% in April (Fig. 1), and WY 2022 is also still trending near normal with May 1 precipitation at ~95% of normal (Fig. 2). Snowpack is near normal at ~110% on May 1 (Fig. 4), and the Clearwater Basin reached ~90% of normal seasonal peak SWE (Fig. 3). Warm, rainy weather leading into April initiated snowmelt across most of North Idaho, but cooler than normal temperatures over the last 30 days delayed snowmelt and helped bolster the snowpack back to near normal conditions. These near normal peak snowpack conditions bode well for water supply because it represents the total amount of water available for springtime runoff which greatly contributes to our water resources. Springtime weather has a large impact on how efficiently water moves from the snowpack into local rivers, reservoirs, and aquifers. If a cool and wet spring continues, it will promote continued runoff and normal streamflow into the summer, which bodes well for this season's water supply.

Dworshak Reservoir is currently at 90% of normal at this time of the year. For the Clearwater River Basin, streamflow forecasts for the May through July period are ~90 to 110% of normal at the 70% exceedance level (Fig. 6) and they range from ~100 to 115% of normal at the 50% exceedance level (Fig. 5). The *70% exceedance forecasts* are conservative and recommended in the case of an abnormally warm and dry spring. NOAA's Official 30-Day Outlook predicts below normal temperatures and above normal precipitation for May.

Clearwater River Basin Streamflow Forecasts - May 1, 2022

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Med (KAF)
Selway R nr Lowell	MAY-JUL	1430	1610	1730	109%	1850	2040	1580
	MAY-SEP	1500	1700	1830	110%	1960	2150	1670
Lochsa R nr Lowell	MAY-JUL	1050	1180	1280	115%	1370	1510	1110
	MAY-SEP	1100	1250	1350	115%	1450	1600	1170
Dworshak Reservoir Inflow 2	MAY-JUL	1390	1610	1760	101%	1900	2120	1740
	MAY-SEP	1510	1750	1910	97%	2070	2310	1960
Clearwater R at Orofino	MAY-JUL	3040	3460	3750	112%	4040	4460	3350
	MAY-SEP	3210	3660	3970	112%	4280	4730	3540
Clearwater R at Spalding 2	MAY-JUL	4570	5220	5660	111%	6100	6750	5120
	MAY-SEP	4840	5550	6030	108%	6520	7230	5560

Normals based on 1991-2020 reference period: streamflow, snowpack, precipitation, & reservoir 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 April

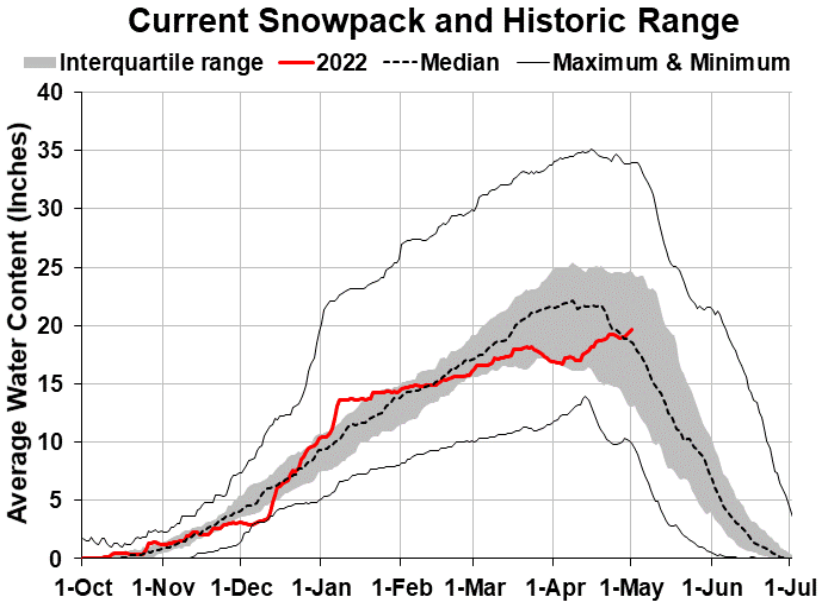
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)
Dworshak Reservoir	2357.6	2276.0	2623.0	3468.0

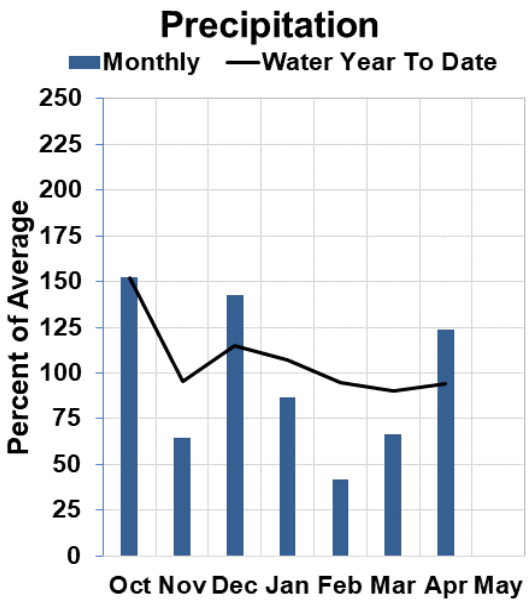
Watershed Snowpack Analysis: May 1, 2022

Basin Name	# of Sites	% of Median 2022	2021
NF Clearwater River	9	107%	87%
Lochsa River	3	122%	80%
Selway River	4	110%	93%
SF Clearwater River	1	118%	82%
Clearwater Basin Total	17	109%	87%

Salmon River Basin

May 1, 2022





WATER SUPPLY OUTLOOK

Wet weather finally made a return, and the Salmon Basin received 130% of normal precipitation in April (Fig. 1). Water year precipitation is now 93% of normal (Fig. 2). The Salmon Basin snowpack is 105% of normal (Fig. 4), which is the first time it has been above normal since mid-February. The typical May 1 snowpack is already well into the melt phase, so the fact that the current snowpack is slightly above normal does not mean that the Salmon Basin will have above normal water supply. It is important to note that the peak snowpack in the Salmon Basin is happening now due to April storms, and the basin is still only 80% of the normal peak snowpack (Fig. 3). In addition to boosting the snowpack to a new seasonal peak, the cool and wet April delayed melt and should help with a later peak streamflow, especially if the cool and wet weather continues.

The Salmon Basin May-July 50% exceedance forecast is 97% of normal for the Salmon River at Salmon and the 102% of normal for the Middle Fork Salmon (Fig. 5). April conditions in the mountains were unusual, from early melt at the beginning of the month to late season snow and more cool, wet weather in the forecast. These conditions likely inject more uncertainty than usual into the streamflow forecasts.

Salmon River Streamflow Forecasts - May 1, 2022

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Med (KAF)
Salmon R at Salmon	MAY-JUL	495	590	660	97%	725	825	680
	MAY-SEP	580	695	770	96%	850	965	805
Lemhi R nr Lemhi	MAY-JUL	31	47	57	110%	67	83	52
	MAY-SEP	41	59	71	109%	84	101	65
MF Salmon R at MF Lodge	MAY-JUL	515	590	640	102%	690	760	625
	MAY-SEP	585	665	720	101%	775	855	710
SF Salmon R nr Krassel Ranger Station	MAY-JUL	147	177	197	82%	215	245	240
	MAY-SEP	161	193	215	83%	235	270	260
Johnson Ck at Yellow Pine	MAY-JUL	111	134	150	79%	165	188	189
	MAY-SEP	120	144	160	80%	177	200	200
Salmon R at White Bird	MAY-JUL	3550	4110	4490	91%	4870	5430	4910
	MAY-SEP	3980	4590	5010	91%	5430	6050	5480

Normals based on 1991-2020 reference period: streamflow, snowpack, precipitation, & reservoir normals are medians.

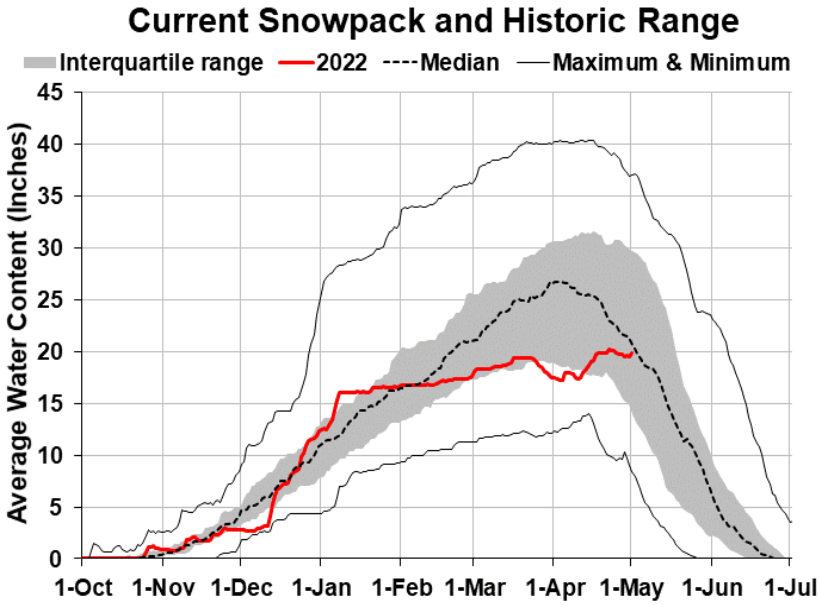
1) 90% and 10% exceedance probabilities are actually 95% and 5%

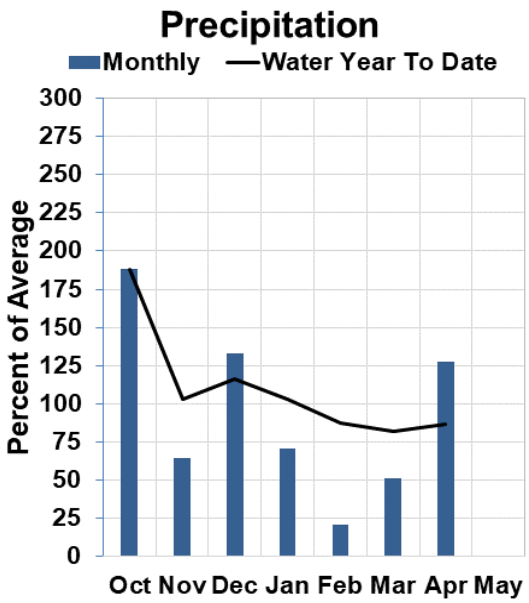
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Watershed Snowpack Analysis: May 1, 2022			
Basin Name	# of Sites	% of Median 2022	2021
Salmon River ab Salmon	7	105%	55%
Lemhi River	4	103%	55%
MF Salmon River	3	104%	59%
SF Salmon River	3	97%	69%
Little Salmon River	4	112%	50%
Lower-Middle Salmon	4	110%	62%
Salmon Basin Total	20	105%	61%

West Central Basins

May 1, 2022





WATER SUPPLY OUTLOOK

Spring precipitation arrived fashionably late to the West Central basins. April precipitation was an impressive ~145 to 155% of normal (Fig. 1), which brings total water year precipitation back up to ~90% of normal (Fig. 2). This has been a unique winter and spring, and rather than focusing on the current snowpack percent of normal (available in Fig. 4 and tables below), we would like to draw attention to peak snowpack values in the West Central basins. The percent of normal *peak snowpack* is a better representation of the total amount of snow available for water supply than simply the percent of normal, since the 'normal' May 1 snowpack is already well below the peak value. Although the snowpack percentages of normal have increased during April, it is important to note that the Weiser, Payette, and Boise basins all peaked at about 70% of normal peak snowpack (Fig. 3). Although these basins are closer to normal now, they still have less total snow volume available for melt than they would have if they reached normal peak. The Weiser basin peaked about a week earlier than normal, and the Payette and Boise basins peaked about two weeks earlier than normal. Even though the West Central basins peaked early, the April storms also delayed melt, and peak streamflow will likely be later than normal.

Reservoir storage in the Boise system (Anderson Ranch, Arrowrock and Lucky Peak combined) is 84% of normal, Cascade Reservoir is 95% of normal, and Mann Creek Reservoir is 74% of normal. The 50% exceedance forecast for the Boise River near Boise is 86% of normal (Fig. 5). Most of the forecast points in the Payette Basin are now ~85 to 90% of normal, and the Weiser is now near normal. Keep in mind that unusual April conditions may lead to additional uncertainty in the streamflow forecasts.

West Central Basins Streamflow Forecasts - May 1, 2022

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Med (KAF)
SF Boise R at Anderson Ranch Dam 2	MAY-JUL	188	240	275	86%	315	365	320
	MAY-SEP	215	270	305	88%	345	400	345
Boise R nr Twin Springs	MAY-JUL	275	330	370	78%	410	470	475
	MAY-SEP	310	370	415	79%	460	520	525
Mores Ck nr Arrowrock Dam	MAY-JUL	26	40	49	96%	59	72	51
	MAY-SEP	28	43	52	96%	62	77	54
Boise R nr Boise 2	MAY-JUL	515	640	725	86%	810	935	845
	MAY-SEP	590	725	815	86%	905	1040	945
Lake Fork Payette R nr McCall	MAY-JUL	53	60	65	92%	70	77	71
	MAY-SEP	55	62	68	93%	73	80	73
NF Payette R at Cascade 2	MAY-JUL	245	290	325	82%	360	410	395
	MAY-SEP	245	300	335	84%	370	425	400
NF Payette R nr Banks 2	MAY-JUL	280	350	395	83%	440	510	475
	MAY-SEP	290	360	410	85%	460	530	485
SF Payette R at Lowman	MAY-JUL	255	285	305	90%	330	360	340
	MAY-SEP	295	330	355	92%	380	415	385
Deadwood Reservoir Inflow 2	MAY-JUL	72	83	90	89%	97	108	101
	MAY-SEP	79	91	99	88%	107	119	112
Payette R nr Horseshoe Bend 2	MAY-JUL	760	905	1000	88%	1100	1240	1140
	MAY-SEP	840	995	1100	89%	1200	1360	1240
Weiser R nr Weiser	MAY-JUL	131	172	205	103%	240	295	200
	MAY-SEP	152	196	230	102%	265	320	225

Normals based on 1991-2020 reference period: streamflow, snowpack, precipitation, & reservoir normals are medians.

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

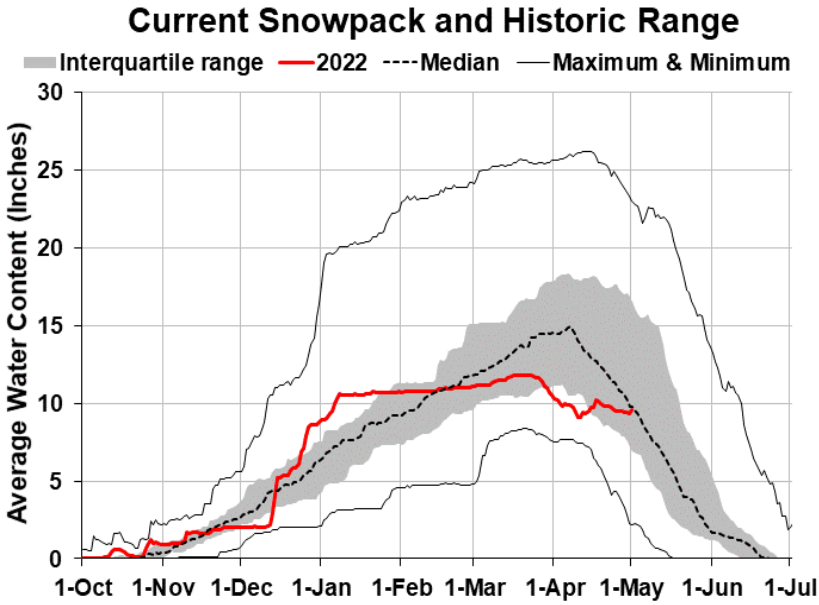
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

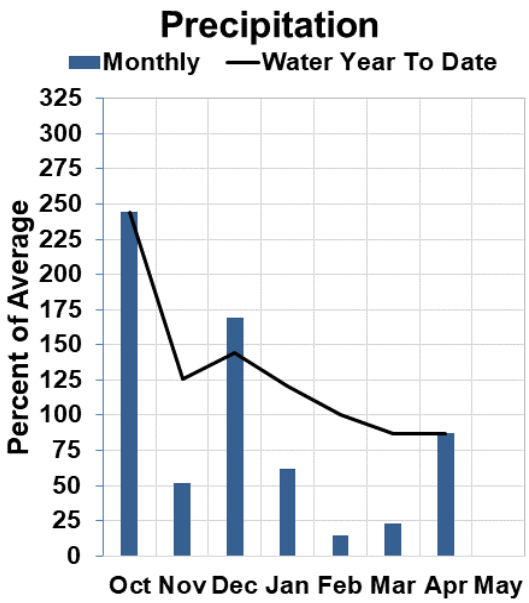
Reservoir Storage (KAF): End of April				
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)
Anderson Ranch Reservoir	226.9	311.4	329.8	450.2
Arrowrock Reservoir	233.4	185.8	210.9	272.2
Lucky Peak Reservoir	185.8	234.5	230.6	293.2
Sub-Basin Total	**646.2**	**731.7**	**771.3**	**1015.6**
Deadwood Reservoir	77.9	96.1	107.6	161.9
Cascade Reservoir	498.9	520.0	523.8	693.2
Sub-Basin Total	**576.8**	**616.1**	**631.4**	**855.1**
Lake Lowell	89.3	129.3	127.9	165.2
Mann Creek Reservoir	8.0	10.9	10.8	11.1

Watershed Snowpack Analysis: May 1, 2022			
Basin Name	# of Sites	% of Median 2022	2021
SF Boise River	7	92%	60%
MF & NF Boise Rivers	6	85%	63%
Mores Creek	5	86%	70%
Canyon Creek	1		
Boise Basin Total	15	90%	68%
NF Payette River	8	104%	70%
SF Payette River	4	102%	69%
Payette Basin Total	16	102%	76%
Mann Creek	1	129%	121%
Weiser Basin Total	4	132%	45%

Wood & Lost River Basins

May 1, 2022





WATER SUPPLY OUTLOOK

Winter made a welcome return in April. Although the northwest flow of storm tracks didn't deliver as much precipitation to the Wood and Lost basins as central Idaho, April precipitation was still near normal (Fig. 1). The storms delivered well above normal precipitation in the Big Wood Basin. Water year precipitation is now ~100 to 105% of normal, except for the Big Wood Basin (Fig. 2). In this unique year, and especially with the cool and wet April boosting the snowpack, this is a reminder that percent of normal *peak snowpack* is a better representation of the total amount of snow available for water supply than simply the percent of normal. Although snowpacks in all the Wood and Lost basins are higher with respect to normal than they were a month ago, it is important to note that the *peak* snowpacks are still all well below normal. The Big Wood, Little Wood, and Big Lost basin snowpacks are similar in that they peaked about 10 days earlier than normal in mid-March at about 80% of normal (Fig. 3). The Little Lost Basin is currently at peak snowpack, but that is still only 87% of a typical peak snowpack. The Birch-Medicine Lodge-Beaver-Camas Basin peaked at only 68% of the normal peak snowpack in mid-April, although it could still reach a new peak with more snow in the forecast. The April snows were a welcome change, but unfortunately are unlikely to drastically improve the larger water supply picture. Peak streamflow was certainly pushed back because of the cool, wet April and will likely be later than normal which does bode well for water supply.

May 1 reservoir storage is well below 30-year normal for Magic Reservoir, which is 32% of normal, Little Wood Reservoir at 96% of normal, and Mackay Reservoir at 85% of normal. The 50% exceedance streamflow forecasts for May 1 are now the lowest for the Little Wood, at 64% of normal, and the Big Wood, at 70% of normal (Fig. 5). The Big Lost forecast is now 76% of normal.

Wood and Lost Basins Streamflow Forecasts - May 1, 2022

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Med (KAF)
Camas Ck at Camas	MAY-JUL	0.78	2.9	5	46%	7.7	12.9	10.9
Little Lost R bl Wet Ck nr Howe	MAY-JUL	12.7	16.7	19.5	85%	22	26	23
	MAY-SEP	14	19.4	23	85%	27	32	27
Big Lost R at Howell Ranch	MAY-JUL	57	84	103	82%	122	149	125
	MAY-SEP	63	94	115	82%	136	167	140
Big Lost R bl Mackay Reservoir	MAY-JUL	23	50	68	76%	86	113	90
	MAY-SEP	35	65	85	76%	105	135	112
Little Wood R ab High Five Ck	MAY-JUL	11.7	19	25	66%	32	43	38
	MAY-SEP	13.3	21	28	67%	35	48	42
Little Wood R nr Carey 2	MAY-JUL	11	18.7	25	64%	32	45	39
	MAY-SEP	11.8	20	27	64%	35	48	42
Big Wood R at Hailey	MAY-JUL	81	113	134	76%	155	187	176
	MAY-SEP	94	129	153	77%	177	210	198
Big Wood R ab Magic Reservoir	MAY-JUL	29	52	71	68%	93	131	105
	MAY-SEP	33	58	78	69%	101	141	113
Camas Ck nr Blaine	MAY-JUL	2.9	8.1	13	84%	19.1	30	15.5
	MAY-SEP	3.2	8.5	13.5	85%	19.7	31	15.8
Big Wood R bl Magic Dam 2	MAY-JUL	35	61	83	70%	107	149	119
	MAY-SEP	41	69	91	69%	118	162	131

Normals based on 1991-2020 reference period: streamflow, snowpack, precipitation, & reservoir 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 April

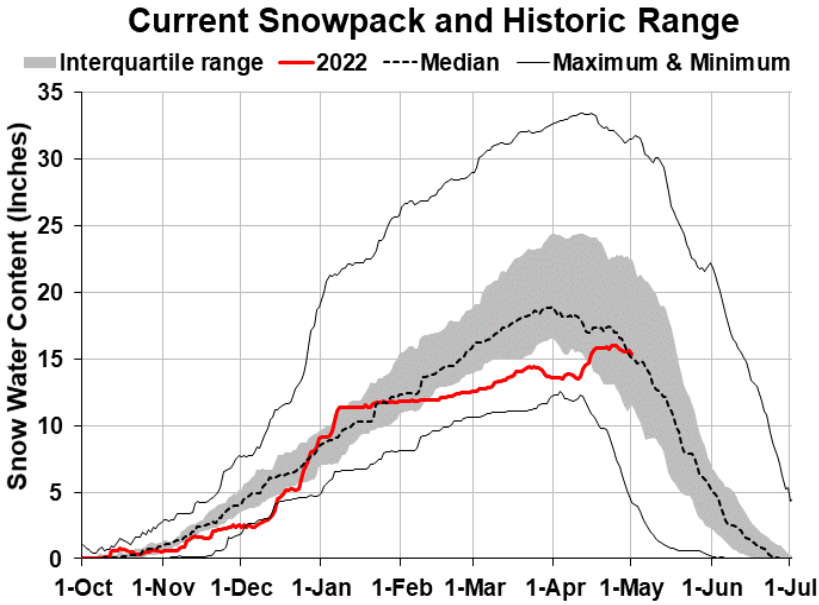
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)
Mackay Reservoir	26.4	32.4	31.0	44.4
Little Wood Reservoir	25.5	20.5	26.7	30.0
Magic Reservoir	47.7	42.8	146.8	191.5

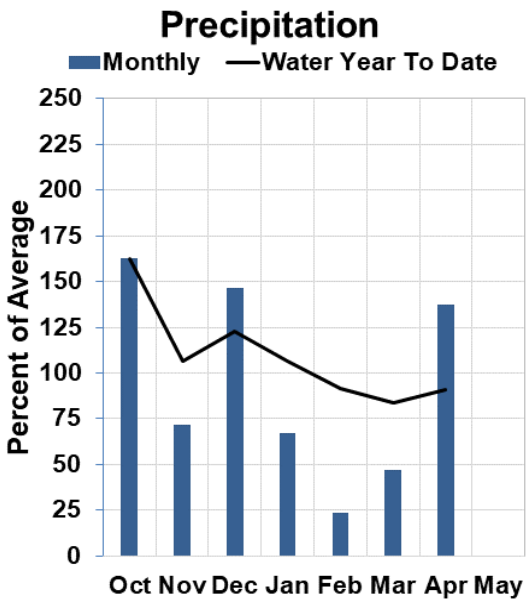
Watershed Snowpack Analysis: May 1, 2022

Basin Name	# of Sites	% of Median 2022	% of Median 2021
Camas-Beaver Creeks	2	43%	16%
Birch-Medicine Lodge Creeks	2	102%	65%
Little Lost River	3	103%	55%
Big Lost River ab Mackay	4	90%	39%
Big Lost Basin Total	5	91%	39%
Fish Creek	0		
Little Wood ab Resv	4	86%	36%
Big Wood River ab Hailey	6	100%	48%
Camas Creek	3	98%	0%
Birch-Medicine Lodge-Camas-Beaver	4	81%	47%
Little Wood Basin Total	4	86%	36%
Big Wood Basin Total	9	100%	46%

Upper Snake River Basins

May 1, 2022





WATER SUPPLY OUTLOOK

Upper Snake precipitation for April ranged from ~105 to 140% of normal (Fig. 1) resulting from a series of storms and below average temperatures throughout the month. This represents an increase of WY precipitation from ~90% to 95% of normal (Fig. 2). Cold temperatures and above normal precipitation caused SWE in the Upper Snake to range from ~80 to 95% in both the Henrys Fork-Teton and Snake above Heise and the Willow-Blackfoot-Portneuf is ~100 to 140% of normal (Fig. 4). Primarily, snowmelt is the driving factor after April 11 in the Upper Snake Basin, but temperatures and precipitation stabilized the snowpack and added small amounts of snow to close out the month. So, while conditions compared to normal look better than April 1, users should consider that peak SWE was only ~70-80% of normal (Fig. 3) and Upper Snake Basins are still melting out earlier than normal.

Reservoir Storage for the Jackson-Palisades system is at 38% capacity which is 63% of normal for May 1. Overall, Upper Snake above Heise storage is 63% of normal. As of last month, the Upper Snake system was not expected to fill above 70% capacity and likely will take a large increase from spring precipitation to fill above this expected level. 50% exceedance streamflow forecasts for the Upper Snake have increased since April 1, ranging from ~70 to 95% (Fig. 5). NOAA's 30-Day Outlook does not show a strong signal for climate conditions in the Upper Snake during May.

Upper Snake River Basin Streamflow Forecasts - May 1, 2022

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Med (KAF)
Henrys Fk nr Ashton 2	MAY-JUL	157	210	245	71%	280	330	345
	MAY-SEP	280	340	380	75%	420	480	510
Falls R nr Ashton 2	MAY-JUL	235	265	285	88%	300	330	325
	MAY-SEP	300	330	355	87%	380	410	410
Teton R nr Driggs	MAY-JUL	75	93	105	84%	117	135	125
	MAY-SEP	102	125	140	89%	155	178	157
Teton R nr St Anthony	MAY-JUL	196	235	260	84%	285	320	310
	MAY-SEP	250	295	325	86%	355	400	380
Henrys Fk nr Rexburg 2	MAY-JUL	565	695	785	81%	870	1000	975
	MAY-SEP	795	955	1070	79%	1170	1340	1350
Snake R at Flagg Ranch	MAY-JUL	325	365	395	95%	425	470	415
	MAY-SEP	355	405	435	96%	470	520	455
Snake R nr Moran 2	MAY-JUL	515	580	625	96%	665	730	650
	MAY-SEP	575	645	695	96%	740	810	725
Pacific Ck at Moran	MAY-JUL	78	107	127	94%	147	176	135
	MAY-SEP	85	115	135	94%	156	185	143
Buffalo Fk ab Lava Ck nr Moran	MAY-JUL	194	220	235	89%	255	280	265
	MAY-SEP	220	250	270	92%	290	320	295
Snake R ab Reservoir nr Alpine 2	MAY-JUL	1500	1650	1750	90%	1850	2000	1950
	MAY-SEP	1760	1930	2040	91%	2150	2320	2250
Greys R ab Reservoir nr Alpine	MAY-JUL	205	235	255	98%	275	305	260
	MAY-SEP	245	280	305	98%	325	360	310
Salt R ab Reservoir nr Etna	MAY-JUL	165	205	235	96%	260	300	245
	MAY-SEP	220	270	300	95%	330	375	315
Snake R nr Irwin 2	MAY-JUL	2000	2240	2400	93%	2560	2790	2590
	MAY-SEP	2380	2660	2840	93%	3030	3300	3060
Snake R nr Heise 2	MAY-JUL	2150	2390	2550	93%	2710	2950	2730
	MAY-SEP	2580	2860	3050	93%	3240	3520	3270
Willow Ck nr Ririe 2	MAY-JUL	12.7	22	29	107%	38	52	27
Portneuf R at Topaz	MAY-JUL	25	31	35	92%	40	47	38
	MAY-SEP	37	44	50	93%	56	65	54
Snake R at Neeley 2	MAY-JUL	460	940	1260	63%	1590	2060	2000
	MAY-SEP	420	930	1280	65%	1630	2150	1980

Normals based on 1991-2020 reference period: streamflow, snowpack, precipitation, & reservoir 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 April

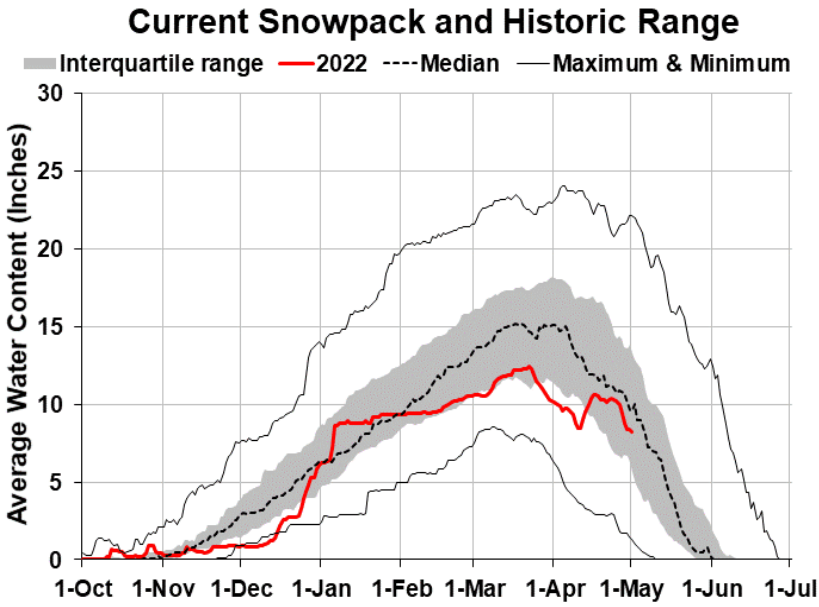
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)
Jackson Lake	184.7	667.1	600.7	847.0
Palisades Reservoir	678.8	1236.7	769.8	1400.0
Sub-Basin Total	**863.5**	**1903.7**	**1370.5**	**2247.0**
Henrys Lake	85.0	88.5	87.2	90.4
Island Park Reservoir	126.6	125.9	123.8	135.2
Grassy Lake	11.2	12.9	13.6	15.2
Sub-Basin Total	**222.8**	**227.2**	**224.6**	**240.8**
Ririe Reservoir	57.0	62.0	63.0	80.5
Blackfoot Reservoir			227.6	337.0
American Falls Reservoir	1423.1	1502.4	1576.0	1672.6
Basin-Wide Total	**2566.4**	**3695.2**	**3461.7**	**4577.9**

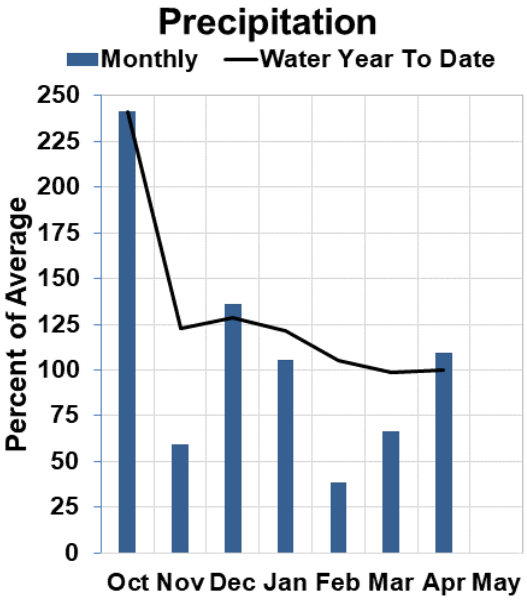
Watershed Snowpack Analysis: May 1, 2022

Basin Name	# of Sites	% of Median 2022	% of Median 2021
Henrys Fork-Falls River	9	83%	74%
Teton River	9	82%	85%
Henrys Fork-Teton	16	83%	77%
Snake River ab Jackson Lake	6	93%	52%
Pacific Creek	2	99%	75%
Buffalo Fork	3	95%	84%
Gros Ventre River	5	93%	85%
Hoback River	5	93%	63%
Greys River	5	99%	75%
Salt River	6	116%	66%
Snake ab Palisades Resv	26	94%	67%
Willow Creek	5	99%	75%
Blackfoot River	4	122%	64%
Portneuf River	6	103%	108%
Willow-Blackfoot-Portneuf	14	120%	89%

Southern Snake River Basins

May 1, 2022





WATER SUPPLY OUTLOOK

April precipitation was near to slightly below normal and ranged from ~90 to 100% (Fig. 1). Similarly, WY total precipitation is near normal (Fig. 2). Cooler than normal temperatures delayed snowmelt during April and a few precipitation events during the month even increased snowpack at higher elevations. This has resulted in increased snowpack levels relative to normal for May 1 compared to conditions on April 1. Snowpack in the Owyhee and Bruneau basins are now ~70 to 75% of normal, and Salmon Falls, Goose Creek, and Raft River Basin snowpacks are ~90 to 110% of normal (Fig. 4). While the increase in snowpack relative to normal is beneficial to the water supply outlook, it's worth noting normal snowpack seasonal peaks were not reached in this region and ranged from ~65 to 90% of normal (Fig. 3).

Reservoir storage in Salmon Falls Reservoir is 59% of normal (19% full), while Lake Owyhee and Oakley Reservoir are 65% (46% full) and 71% of normal (29% full), respectively. The 50% exceedance streamflow forecast is 60% of normal at Salmon Falls Creek near San Jacinto, and reduced allocation is expected (Fig. 5). Oakley reservoir inflow is forecast to be 103% of normal for the May-July period. May is typically our last chance to add meaningful moisture to these basins before hot and dry conditions dominate until next fall. An above normal month of precipitation during May could help to limit some of the impacts of the likely water shortages.

Southside Snake River Basins Streamflow Forecasts - May 1, 2022

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Med (KAF)
Goose Ck ab Trapper Ck nr Oakley	MAY-JUL	3.9	6.7	9	105%	11.7	16.2	8.6
	MAY-SEP	4.2	7.1	9.5	104%	12.3	17	9.1
Trapper Ck nr Oakley	MAY-JUL	2.1	2.6	2.9	100%	3.3	3.8	2.9
	MAY-SEP	3.1	3.6	4	100%	4.4	5.1	4
Oakley Reservoir Inflow	MAY-JUL	6.1	9.4	12	103%	15	19.9	11.7
	MAY-SEP	7.2	10.7	13.5	103%	16.6	22	13.1
Salmon Falls Ck nr San Jacinto	MAY-JUL	10.4	17.8	24	60%	31	43	40
	MAY-SEP	12	19.7	26	60%	33	45	43
Bruneau R nr Hot Spring	MAY-JUL	49	73	92	75%	113	147	123
	MAY-SEP	53	78	98	76%	120	156	129
Reynolds Ck at Tollgate	MAY-JUL	1.75	2.8	3.7	93%	4.7	6.4	4
	MAY-SEP	1.75	2.9	3.8	93%	4.8	6.5	4.1
Owyhee R nr Gold Ck 2	MAY-JUL	1.84	2.3	2.7	53%	3.1	3.7	5.1
Owyhee R nr Rome	MAY-JUL	13.5	44	75	66%	114	186	113
	MAY-SEP	18.7	52	85	67%	125	199	126
Owyhee R bl Owyhee Dam 2	MAY-JUL	27	64	98	70%	139	215	140
	MAY-SEP	43	85	122	73%	166	240	166

Normals based on 1991-2020 reference period: streamflow, snowpack, precipitation, & reservoir 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 April

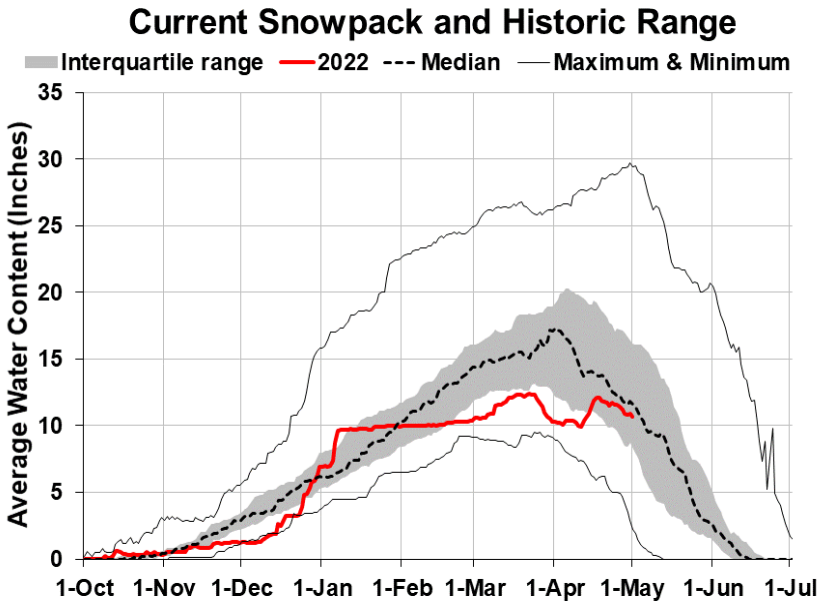
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)
Oakley Reservoir	21.8	28.7	30.6	75.6
Salmon Falls Reservoir	34.5	54.0	58.6	182.6
Wild Horse Reservoir	41.2	54.9	41.1	71.5
Lake Owyhee	327.3	406.6	502.4	715.0
Brownlee Reservoir	1139.6	958.8	1148.0	1420.0

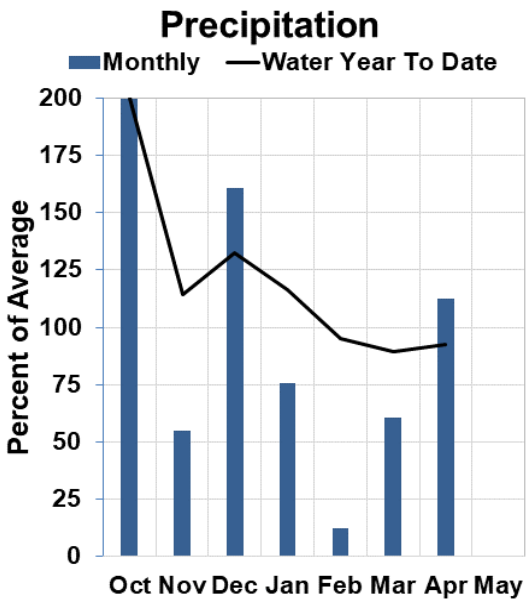
Watershed Snowpack Analysis: May 1, 2022

Basin Name	# of Sites	% of Median 2022	% of Median 2021
Raft River	2	108%	62%
Goose-Trapper Creeks	2	96%	46%
Salmon Falls Creek	4	88%	54%
Bruneau River	5	73%	52%
Reynolds Creek	7	82%	93%
Upper Owyhee	5	53%	57%
Owyhee Basin Total	9	75%	76%

Bear River Basin

May 1, 2022





WATER SUPPLY OUTLOOK

Bear River Basin received 119% of normal monthly precipitation in April (Fig. 1). This above normal precipitation has brought WY precipitation to normal conditions for May 1 (Fig. 2). Cold temperatures during April helped stave off melting snowpack in the Bear River Basin and even added small amounts of SWE later in the month. However, Bear River Basin only saw ~70% of normal peak SWE (Fig. 3) and remains below normal at 87% SWE for May 1 (Fig. 4). This helps explain that the total WY precipitation was being driven by early season precipitation prior to the dry January through March period. Continued spring precipitation, or lack thereof, will be integral for spring runoff and water supply moving forward for the WY.

Reservoir storage remains a bright spot for the Bear River and is currently 106% and 84% of normal at Bear Lake and Montpelier Reservoir, respectively. The above normal precipitation during April resulted in increased 50% exceedance streamflow forecasts for the Bear River Basin for May 1 (Fig. 5). The Bear River below Stewart Dam May-September runoff period forecast is 49%. NOAA's 30-Day Outlook indicates a slightly increased chance of below normal precipitation for May.

Bear River Basin Streamflow Forecasts - May 1, 2022

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	30yr Med (KAF)
Bear R nr UT-WY State Line	APR-JUL	61	74	83	82%	92	105	101
	APR-SEP	69	83	93	82%	103	117	114
	MAY-JUL	53	66	75	77%	84	97	97
Bear R ab Resv nr Woodruff	APR-JUL	27	56	75	82%	94	123	92
	APR-SEP	28	59	80	81%	101	132	99
	MAY-JUL	17.6	45	64	80%	83	110	80
Big Ck nr Randolph	APR-JUL	0.19	1.3	2.5	78%	3.7	5.5	3.2
	MAY-JUL	0.2	0.7	1.9	76%	3.1	4.9	2.5
Smiths Fk nr Border	APR-JUL	52	62	69	80%	76	86	86
	APR-SEP	61	72	80	80%	88	99	100
	MAY-JUL	45	55	62	83%	69	79	75
Bear R bl Stewart Dam 2	APR-JUL	23	44	63	55%	85	123	115
	APR-SEP	24	47	67	55%	91	132	122
	MAY-JUL	12.6	31	49	53%	71	109	92

Normals based on 1991-2020 reference period: streamflow, snowpack, precipitation, & reservoir 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 April

Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)
Bear Lake	608.3	833.1	572.8	1302.0
Montpelier Reservoir	2.7	3.4	3.2	4.0

Watershed Snowpack Analysis: May 1, 2022

Basin Name	# of Sites	% of Median 2022	2021
Smiths-Thomas Forks	5	100%	77%
Bear Lake	8	91%	67%
Montpelier Creek	2	89%	75%
Mink Creek	0		
Cub River	1	77%	54%
Bear River Total	25	89%	64%
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 Dec. 2018).**

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 bl Cabinet Gorge (2)
+ Hungry Horse storage change
+ Flathead Lake storage change
+ Noxon Res storage change
Whitehorse Rapid gage used create longer term record

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 gage used to create longer term record

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 nr Etna, WY - no corrections
Palisades Res Inflow (2)
+ Snake R nr Irwin
+ Jackson Lake storage change
+ Palisades Res storage change
Snake R nr Heise (2)
+ Jackson Lake storage change
+ Palisades Res storage change
Ririe Res Inflow (2)
+ Willow Ck nr Ririe
+ Ririe Res storage change
The forecasted natural volume for Willow Creek nr Ririe does not include Grays Lake water diverted from Willow Creek drainage through the Clarks Cut diversion and into Blackfoot Reservoir.
Blackfoot R ab Res nr Henry (2)
+ Blackfoot Res storage change
The forecasted Blackfoot Reservoir Inflow includes Grays Lake water diverted from the Willow Creek drainage through the Clarks Cut diversion and into Blackfoot Reservoir.
Portneuf R at Topaz - no corrections
American Falls Res Inflow (2)
+ Snake R at Neeley
+ Jackson Lake storage change
+ Palisades Res storage change
+ American Falls storage change
+ Teton Dam for water year 1976 only

Southside Snake River Basins

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

Bear River Basin

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

Reservoir Capacity Definitions (Units in 1,000 Acre-Feet, KAF)

Different agencies use various definitions when reporting reservoir capacity and contents. Reservoir storage terms include dead, inactive, active, and surcharge storage. This table lists the volumes for each reservoir, and defines the storage volumes NRCS uses when reporting capacity and current reservoir storage. In most cases, NRCS reports usable storage which includes active and/or inactive storage. **(Revised Feb. 2015)**

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

Interpreting Water Supply Forecasts

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

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

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

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

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

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

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

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

30-Year Median. The 30-year median streamflow for each forecast period is provided for comparison. The median is based on data from 1991-2020. The % MED column compares the 50% chance of exceedance forecast to the 30-year median streamflow; values above 100% denote when the 50% chance of exceedance forecast would be greater than the 30-year median 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

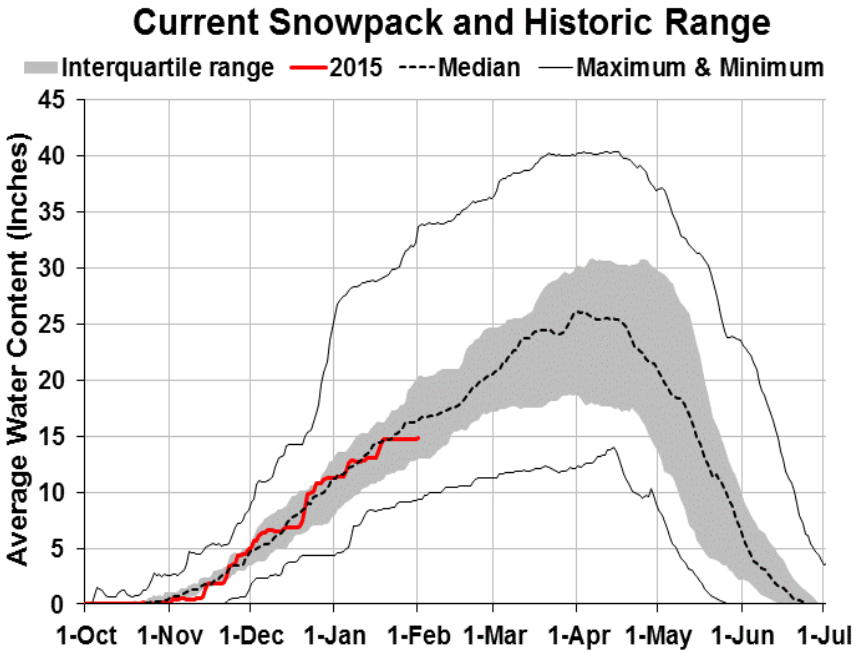
Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <---Drier----------Projected Volume----------Wetter---> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Henrys Fk nr Ashton	JUN-JUL	72	106	129	56	152	186	230
	JUN-SEP	198	245	280	68	315	360	410

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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This publication is dedicated to the people, agencies and organizations utilizing this data, information and forecasts for short and long term water management, planning, preparation, recreation and otherwise, for the enhancement of the economy and enrichment of livelihoods.