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*Natural Resources Conservation Service*

# **Idaho Water Supply Outlook Report**

## **May 1, 2023**



Flooding in southeast Idaho near Inkom on May 1 from recent snowmelt. (photo by Kyle Riley, Idaho State Journal).

Warm temperatures at the end of April kicked off widespread snowmelt and increases in streamflow across Idaho. [Rivers and creeks](#) are reaching bank full, and in many places, have reached flood levels. [The Portneuf River](#) in southeast Idaho is projected to near the major flood stage on Saturday. [Flood advisories and warnings have been issued across Idaho](#) due to heavy rain predicted for the first weekend in May. Rain-on-snow events can trigger rapid snowmelt and increase the likelihood of flooding. Check NWS forecasting offices for the latest warnings in your region ([Boise](#), [Pocatello](#), [Spokane](#), [Missoula](#))

# Water Supply Outlook Report

## Federal - State – Private Cooperative Snow Surveys

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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: [idoise-nrcs-snow@usda.gov](mailto:idoise-nrcs-snow@usda.gov)

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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 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 \(daniel.tappa@usda.gov\)](mailto:danny.tappa@usda.gov)\***

## May 2023: Idaho Water Supply Summary

### *Overview*

The snowmelt runoff season is upon us. Warm temperatures in mid to late April finally brought the snowpack to its melting stage. Due to the above normal snowpack, many reservoirs across Idaho began flood risk management operations in early April. Reservoir operators have been releasing water to make room for the incoming snowmelt. [Streamflow increased to normal or above normal levels](#) across the state on approximately April 10. [Current streamflow](#) is normal or above normal. Several rivers are forecasted to approach or reach flood stage, so please keep an eye on flood forecasts [here](#) and [here](#). Rain-on-snow events, which would accelerate snowpack melting, are likely with the [forecasted weekend storms](#).

Water supply is likely sufficient in all basins although uncertainty remains if the entire Upper Snake reservoir system will fill since last year's carryover and winter baseflow were low. As that is a fully allocated basin, some users may still experience water supply limitations. Spring weather will determine the balance between irrigation demand, natural flow, and reservoir storage accrual.

### *Weather and drought outlooks*

The first part of May is expected to be [cooler and wetter than normal](#) before transitioning to [warmer than normal conditions](#) for the remainder of May. Climate outlooks predict increased chances for above normal precipitation in southwest Idaho in late May. [Drought status improved](#) across many parts of Idaho although many parts of Idaho are still classified as [abnormally dry \(DO\)](#). After multiple years of drought conditions, it will take time to fully recover. Northern Idaho remains in moderate drought (D1). The [seasonal drought outlook](#) predicts drought will persist in the Panhandle and may develop further in the Palouse region but will improve across the rest of the state.

### *Snowpack*

Colder than normal temperatures continued in April and delayed the onset and pace of the snowpack melting. The snowpack finally began melting as temperatures warmed in late April. The [snowpack density](#) at most SNOTEL stations has increased past the >40% threshold, suggesting that it would be difficult to reverse the start of runoff season. [Peak snowpack](#) was well above normal in all basins south of the Clearwater Basin (Fig. 4). The snowpack compared to normal remains high even at this point in the spring (Fig. 3). These '[Snow to Flow](#)' graphs are helpful to see the past timing of snowmelt compared to that year's snowpack, the Northwest River Forecast Center (NWRFC) provide [river and flood forecasts](#), and the USGS site shows [real-time streamflow conditions](#).

## *Precipitation*

[April precipitation](#) varied across basins without any discernable pattern (Fig. 1). In general, Southern Snake basins were the driest with wetter conditions towards southeast Idaho. Owyhee River Basin was 72% of normal April precipitation and Raft River Basin was 106% of normal. Southeast Idaho continued to be the wettest part of the state with Bear River basin at 117% of monthly precipitation. The Willow-Blackfoot-Portneuf Basin was the wettest with the Upper Snake watershed at 113%. All other Upper Snake basins received below normal precipitation in April (89% to 96%). Precipitation in the West Central, Salmon, Wood and Lost basins were near to above normal except in the Big Wood which received 85% of the normal April precipitation. Within the Panhandle, conditions were wetter the farther north you were. The Clearwater Basin received 97% of normal April precipitation, Coeur d'Alene-St. Joe Basin was 95%, and Pend Oreille-Kootenai Basin was 116% of normal.

For [total water year precipitation](#) (WYP) on May 1, the pattern that emerged this winter remained the same and will likely continue as we enter the driest period of the water year. This water year, the driest conditions are up north with conditions getting progressively wetter to the south (Fig. 2). WYP ranges from 78% to 80% from the Canadian border to the Clearwater Basin. WYP is 98% to 110% in the West Central basins. The Wood and Lost basins range from 111% to 131%. The Upper Snake basins range from 114% to 142%, with the Snake River above Heise receiving the least amount of precipitation at 106%. Southeast Idaho was extremely wet all winter; Bear River Basin received 142% of the normal total water year precipitation so far. The Southern Snake basins are also very wet this year. Conditions are drier towards the west but are still well above normal. Water year total precipitation ranges from 132% (Raft) to 113% (Owyhee) of normal.

## *Water supply and streamflow forecasts*

[Reservoirs](#) continue to fill as the snowpack melts. Many reservoir operators are trying to strike the delicate balance of filling reservoirs to meet summer irrigation needs and releasing enough water to mitigate flood risk. Flood risk management operations are still continuing for the Boise River. [Reservoir storage in the Boise system](#) is 64% full and the Payette system is 65% full. The above normal snowpack has yielded a good water supply year across Idaho. Whether the Upper Snake River system will fill is still unknown but cool, spring conditions will continue to improve the odds.

On May 1, [reservoir storage in the Upper Snake River](#) system (above Milner Dam) is ~2.38 million acre-feet and is 59% full. The NRCS forecast for [Snake River at Heise](#) during the May through September period is 108% of normal (3,540 KAF). The forecast isn't directly comparable to last month because of the different forecast period unless using the [mixed past](#) (observed + forecasted streamflow volume) feature on our interactive map. The NRCS and NWRFC forecasts for Snake River at Heise both decreased from last month. Downstream, the NWRFC forecast for the [Snake River at](#)

[Milner](#) increased slightly from last month. It is 105% of normal (6,475 KAF) for the April through September time period. Given current storage and streamflow forecasts, available water supply will likely be good but insufficient for all water users in this region.

[Observed April streamflow](#) was well above normal in southwest Idaho, and below normal in northern Idaho and in the Upper Snake basins. Everywhere else, April streamflow was near or slightly below normal. Forecasted streamflow volume decreased in many places but not enough to negatively impact water supply conditions.

For the [May through September](#) period, well above normal streamflow volumes are predicted in the Southern Snake, Boise, Weiser, Wood, Lost, Willow-Blackfoot-Portneuf, and Bear River basins (Fig. 5). In the Upper Snake, forecasted streamflow is near to above normal (96% to 151%). Near normal streamflow is forecasted for the Payette, Salmon and Clearwater basins. Streamflow is forecasted to be below normal in the Panhandle basins. To look at the range of possible streamflow volume outcomes, consult these [forecast graphics](#) for your basin of interest. Streamflow, snowpack, and precipitation data for each basin can be accessed [here](#) or on the NRCS interactive map [here](#).



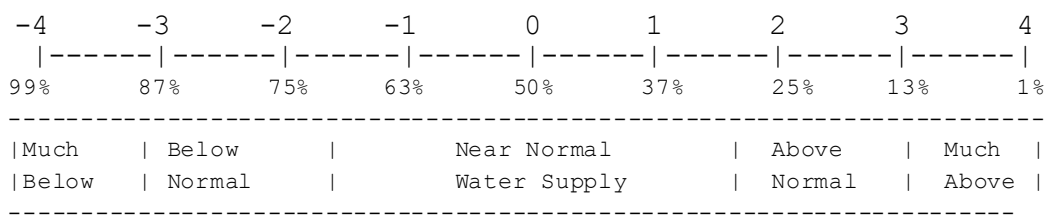
## IDAHO SURFACE WATER SUPPLY INDEX (SWSI) May 1, 2023

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.

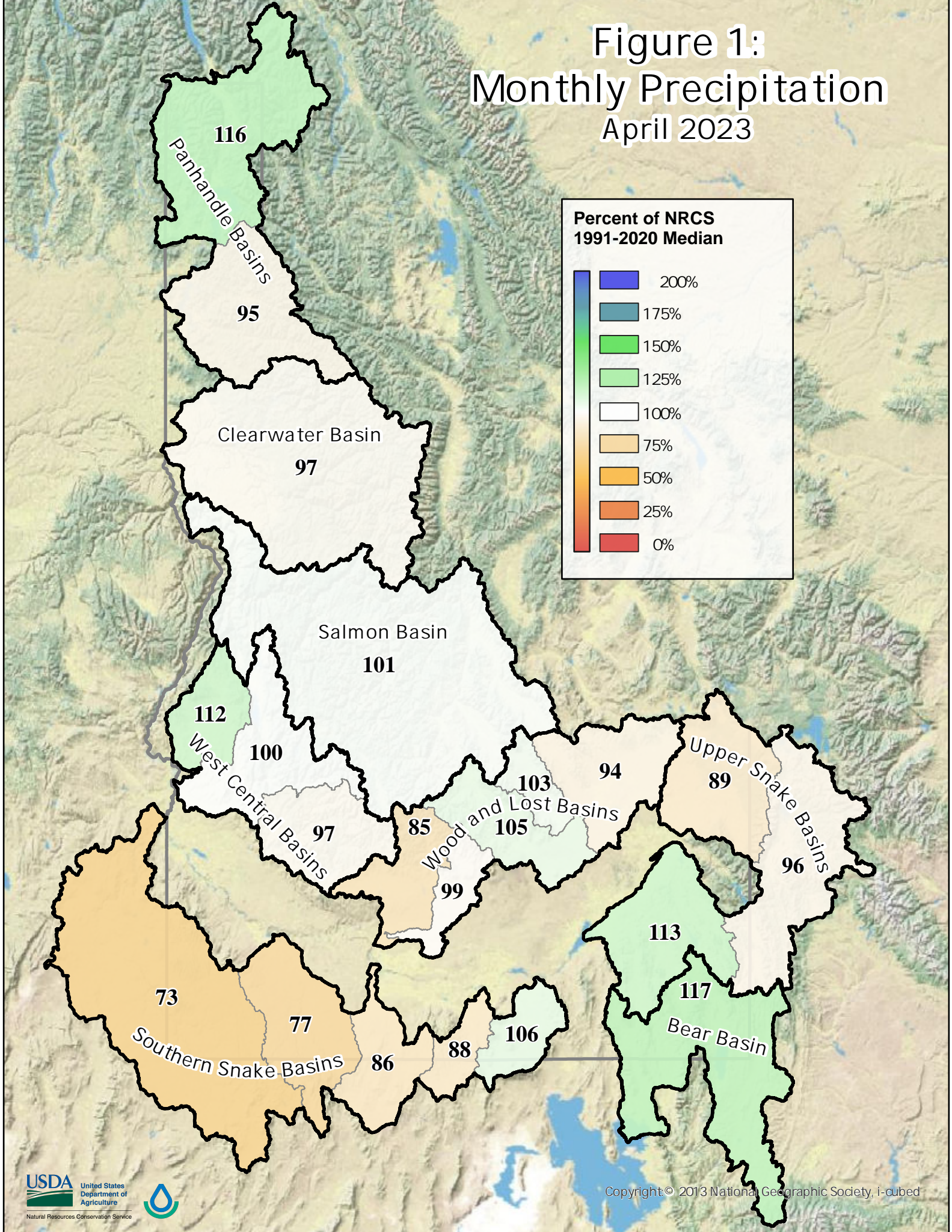
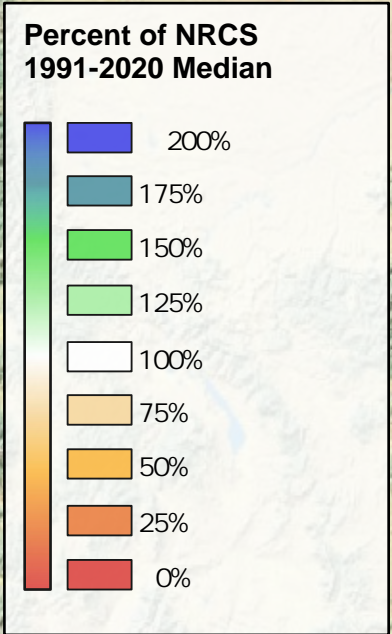
<b>BASIN or REGION</b>	<b>SWSI Value</b>	<b>Most Recent Year With Similar SWSI Value</b>	<b>Agricultural Water Supply Shortage May Occur When SWSI is Less Than</b>
Spokane	-0.8	2004	NA
Clearwater	-1.5	2013	NA
Salmon	1.0	2013	NA
Weiser	1.8	2010	NA
Payette	1.0	2019	NA
Boise	1.5	2012	- 2.7
Big Wood above Hailey	2.3	1993	NA
Big Wood	1.3	2018	0.6
Camas Creek nr Blaine	3.0	2006	NA
Little Wood	4.0	1995	- 1.6
Big Lost	3.0	2006	0.1
Little Lost	2.3	1999	1.6
Teton	1.0	2014	- 3.9
Henry's Fork	1.8	2017	- 2.9
Snake (Heise)	-0.5	2012	- 1.1
Oakley	1.8	2007	0.4
Salmon Falls above Jackpot	3.3	1998	NA
Salmon Falls	0.8	2020	- 0.6
Bruneau	2.5	1997	NA
Owyhee	0.8	2000	- 0.9
Bear River	1.0	2021	- 3.9

### SWSI SCALE, PERCENT CHANCE OF EXCEEDANCE, AND INTERPRETATION



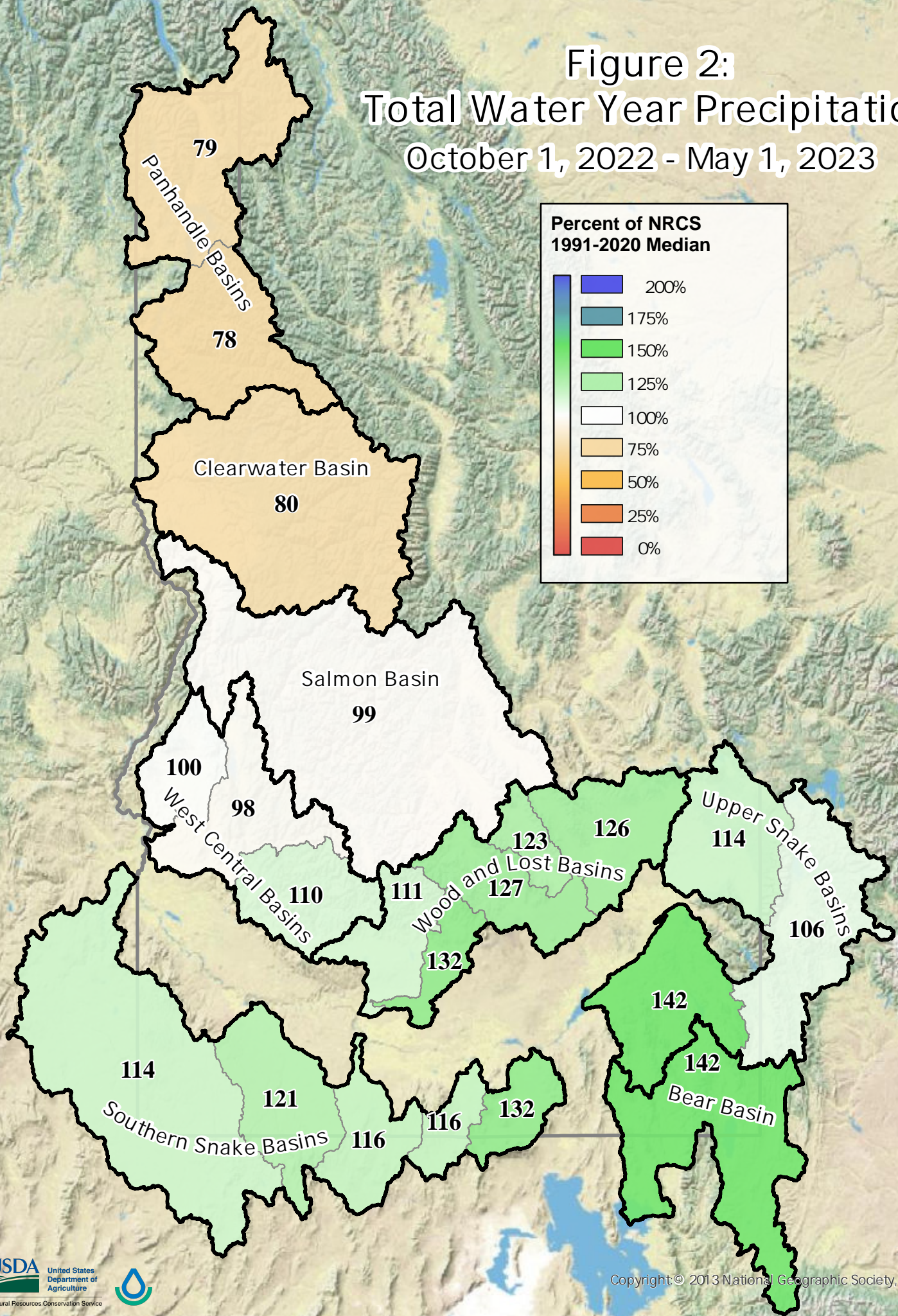
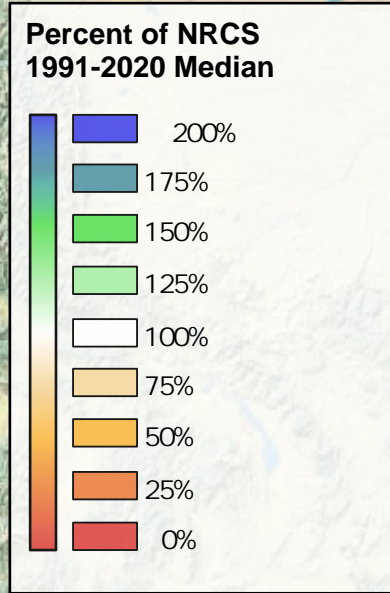
NA=Not Available / Not Applicable; Note: The Percent Chance of Exceedance is an indicator of how often a range of SWSI values might be expected to occur. Each SWSI unit represents about 12% of the historical occurrences. As an example of interpreting the above scale, the SWSI can be expected to be greater 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 April 2023



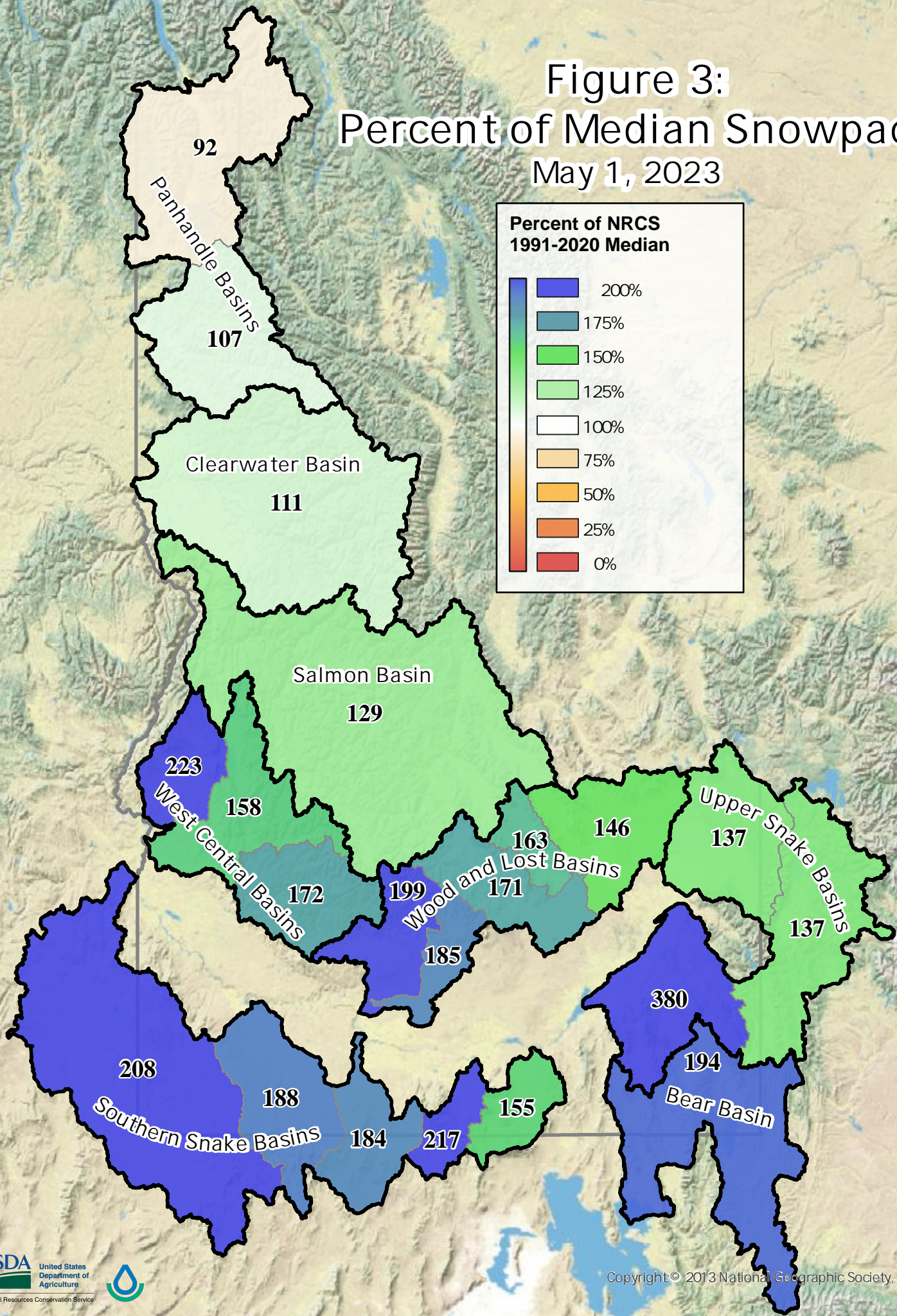
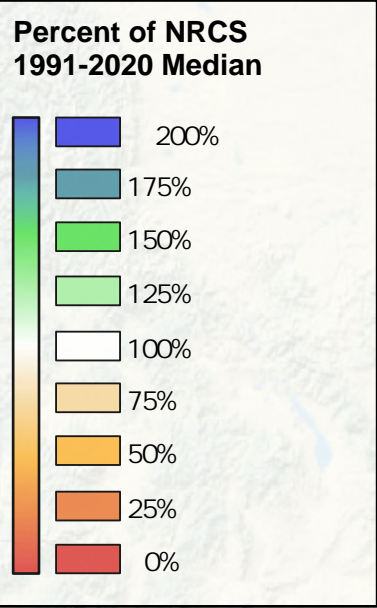


# Figure 2: Total Water Year Precipitation October 1, 2022 - May 1, 2023



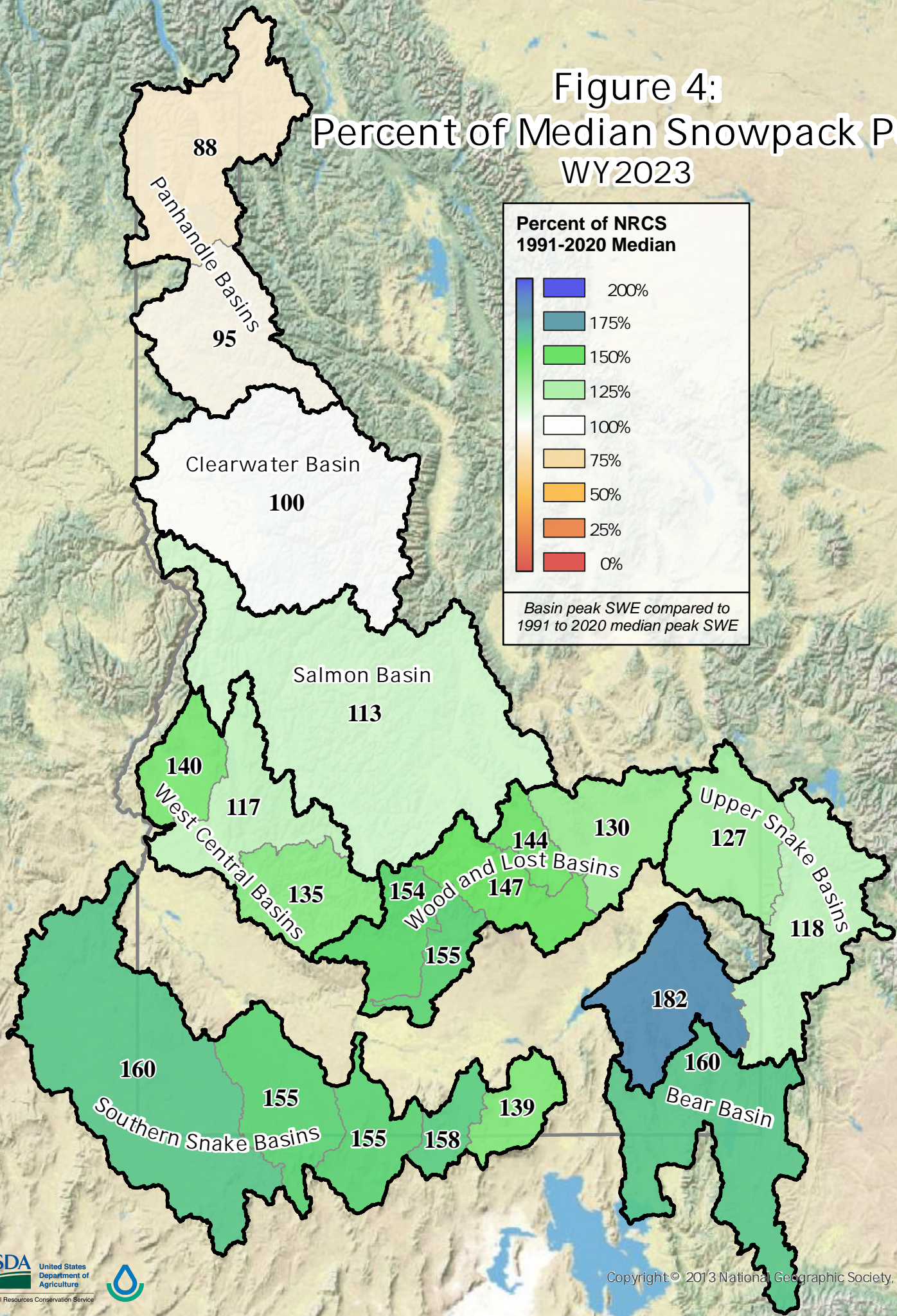
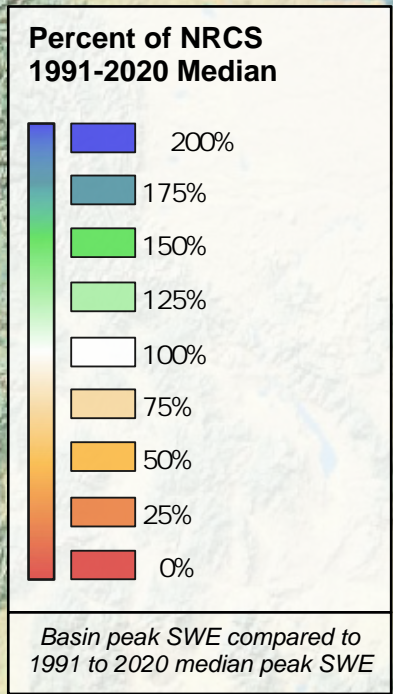


# Figure 3: Percent of Median Snowpack May 1, 2023





# Figure 4: Percent of Median Snowpack Peak WY2023



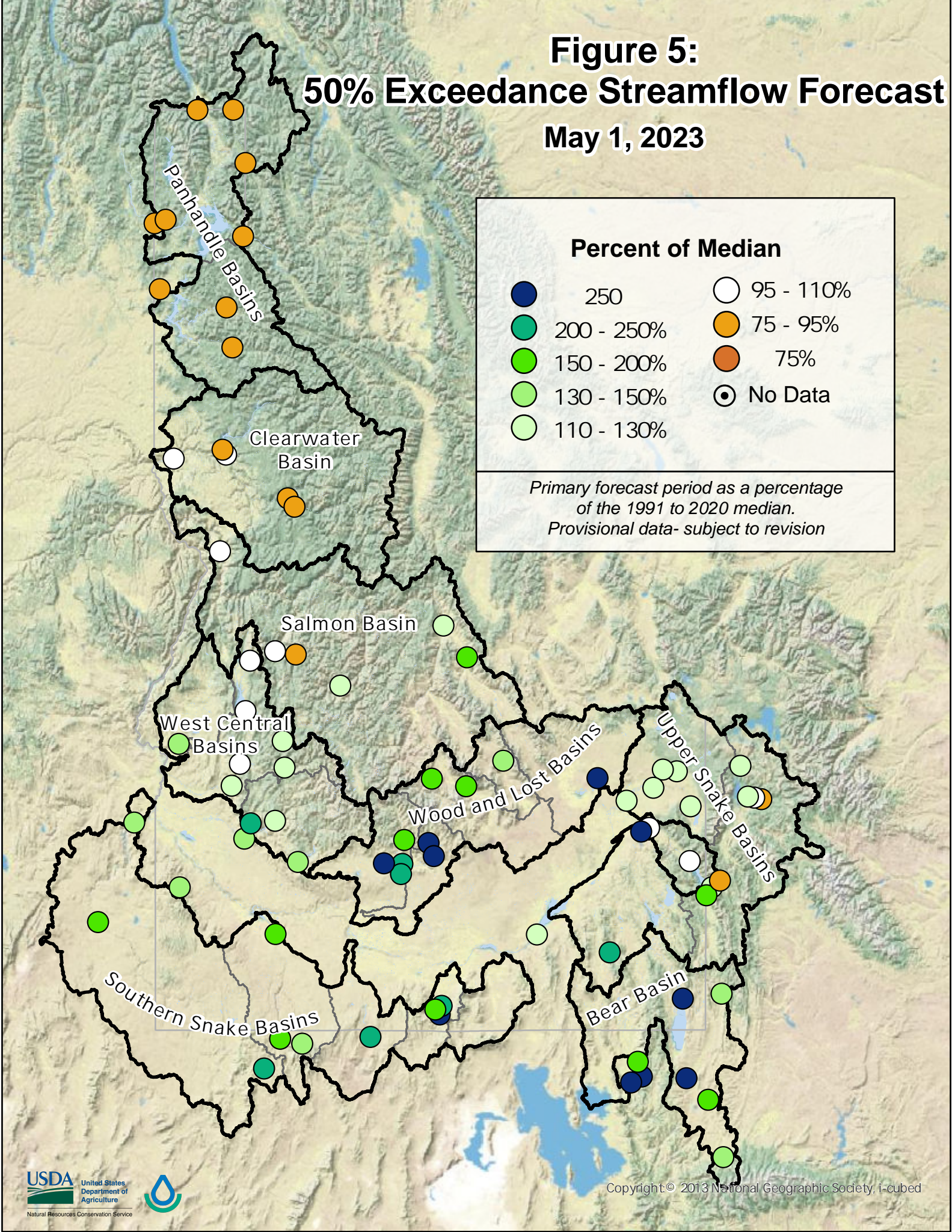


# Figure 5: 50% Exceedance Streamflow Forecast May 1, 2023

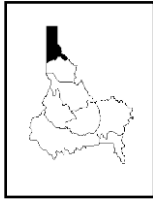
**Percent of Median**

● 250	○ 95 - 110%
● 200 - 250%	● 75 - 95%
● 150 - 200%	● 75%
● 130 - 150%	⊙ No Data
● 110 - 130%	

*Primary forecast period as a percentage of the 1991 to 2020 median.  
Provisional data- subject to revision*



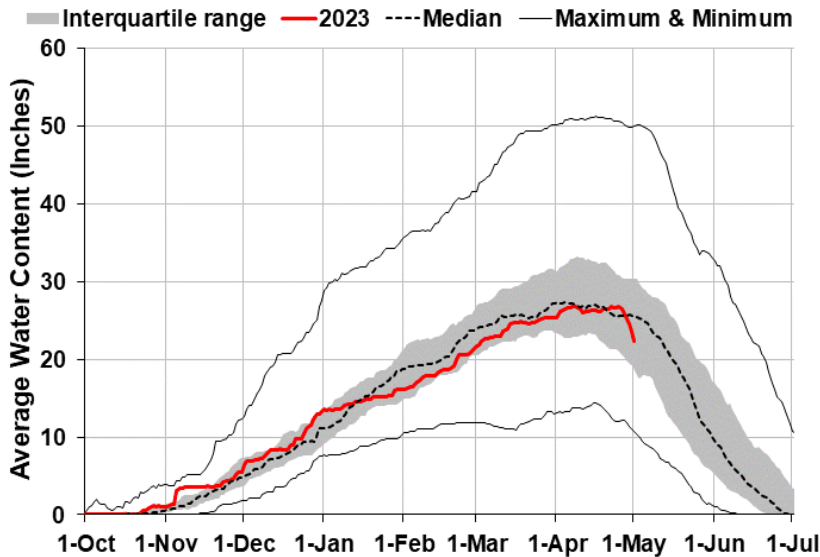




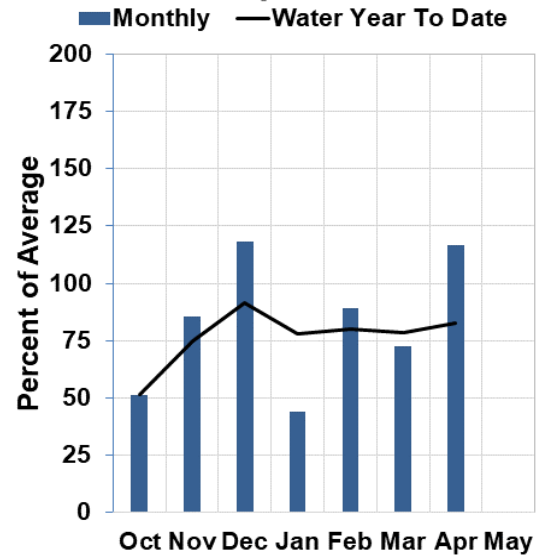
# Panhandle Basins

May 1, 2023

## Current Snowpack and Historic Range



## Precipitation



## WATER SUPPLY OUTLOOK

The Panhandle basins received between ~95 to 115% of normal precipitation in April (Fig. 1), and total water year precipitation continues to hold steady at ~75 to 80% of normal (Fig. 2). The current snowpack ranges from ~90 to 100% of normal (Fig. 3). Early snowmelt runoff began in the first week of April. Shortly following that, storms deposited fresh snow, which continued accumulating until the week of April 22. Peak snowpack occurred about two weeks later than usual, and snowmelt is now well underway in the Panhandle basins. Although the snowpack peaked slightly later than normal, SWE peaked below normal at ~85% in the [Pend Orielle-Kootenai](#), and 95% in the [Coeur d'Alene-St. Joe](#) basins (Fig. 4). Due to below normal water year total precipitation, below normal snowpack, and dry soils, [drought is forecasted to persist in the Panhandle basins](#). [NOAA's Official 30-Day Outlook](#) predicts increased chances of above normal temperatures and equal chances for below or above normal precipitation in May.

Lakes in the Panhandle range from ~85 to 95% of normal storage: Lake Coeur d'Alene is at 84%, Lake Pend Oreille is at 95%, and Priest Lake is at 89%. Streamflow forecasts for May through September range from ~80 to 95% of normal at the 50% exceedance level in the Panhandle basins.



### Panhandle Region Streamflow Forecasts - May 1, 2023

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	187	235	270	90%	305	355	300
	MAY-SEP	194	245	280	89%	315	365	315
Kootenai R at Leonia 1 & 2	MAY-JUL	3720	4580	4970	80%	5370	6230	6190
	MAY-SEP	4250	5220	5650	80%	6090	7060	7090
Boundary Ck nr Porthill	MAY-JUL	65	77	86	86%	94	107	100
	MAY-SEP	68	81	90	87%	99	112	104

Clark Fork R bl Cabinet Gorge Dam 2

Pend Oreille Lake Inflow 2

Priest R nr Priest River 2

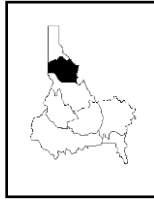
NF Coeur d'Alene R at Enaville	MAY-JUL	220	305	360	95%	415	500	380
	MAY-SEP	250	335	395	95%	455	540	415
St. Joe R at Calder 2	MAY-JUL	400	545	650	88%	750	900	740
	MAY-SEP	445	600	705	87%	810	965	815
Spokane R nr Post Falls 2	MAY-JUL	810	1110	1320	85%	1520	1820	1560
	MAY-SEP	860	1170	1380	84%	1600	1910	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

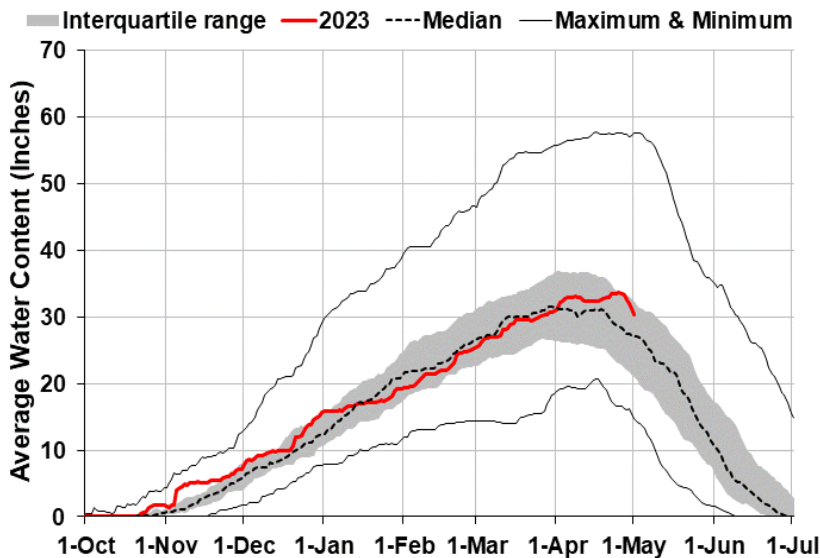
Reservoir Storage (KAF): End of April					Watershed Snowpack Analysis: May 1, 2023			
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)	Basin Name	# of Sites	% of Median 2023	% of Median 2022
Hungry Horse Lake	2439.1	2711.4	2480.0	3451.0	Moyie River	1	79%	94%
Flathead Lake	920.7	824.5	1025.0	1791.0	Priest River	5	96%	108%
Noxon Rapids Reservoir	297.4	288.8	318.8	335.0	Rathdrum Creek	3	153%	119%
Lake Pend Oreille	878.8	866.3	925.0	1561.3	Coeur d' Alene River	6	111%	122%
Priest Lake	88.6	71.0	99.2	119.3	St. Joe River	4	103%	105%
Lake Coeur d' Alene	176.2	170.1	210.3	238.5	Pend Oreille Lake	5	92%	96%
					Palouse River	2	310%	257%
					Lower Kootenai	2	83%	112%
					Pend Oreille-Kootenai	13	92%	105%
					Coeur d' Alene-St. Joe Total	9	110%	115%



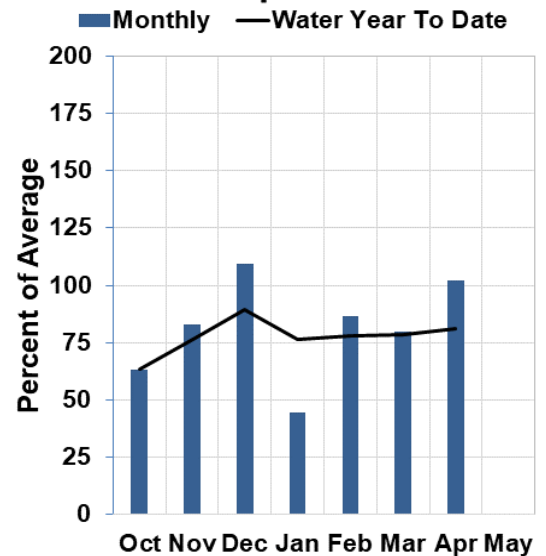
# Clearwater River Basin

May 1, 2023

## Current Snowpack and Historic Range



## Precipitation



## WATER SUPPLY OUTLOOK

The Clearwater Basin received ~95% of normal precipitation in March (Fig. 1). Water year total precipitation is ~80% of normal (Fig. 2). Current snowpack is slightly above normal at ~110% (Fig. 3). Snowmelt runoff began the first week of April. Shortly after the onset of snowmelt, storms deposited fresh snow that continued accumulating until the week of April 22. The [Clearwater Basin reached 100% of its normal peak SWE](#) about two weeks later than usual. Despite the normal precipitation in April and a near normal snowpack, the Climate Prediction Center predicts [drought will persist](#) in this basin. [NOAA's Official 30-Day Outlook](#) predicts increased chances of above normal temperatures and precipitation in May.

Dworshak Reservoir is currently at 64% of its storage capacity, which is 85% of normal at this time of the year. Streamflow forecasts for the May through September period range from ~95 to 100% of normal at the 50% exceedance level for the Clearwater River Basin.



### Clearwater River Basin Streamflow Forecasts - May 1, 2023

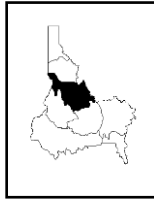
Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment						
		<--Drier-----Projected Volume-----Wetter-->					30yr Med (KAF)	
		90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)		10% (KAF)
Selway R nr Lowell	MAY-JUL	1190	1370	1490	94%	1610	1790	1580
	MAY-SEP	1260	1450	1580	95%	1710	1910	1670
Lochsa R nr Lowell	MAY-JUL	805	945	1040	94%	1130	1270	1110
	MAY-SEP	855	1000	1100	94%	1200	1350	1170
Dworshak Reservoir Inflow 2	MAY-JUL	1280	1500	1650	95%	1800	2020	1740
	MAY-SEP	1450	1690	1850	94%	2010	2250	1960
Clearwater R at Orofino	MAY-JUL	2640	3060	3350	100%	3630	4050	3350
	MAY-SEP	2800	3250	3560	101%	3870	4320	3540
Clearwater R at Spalding 2	MAY-JUL	4040	4690	5130	100%	5570	6220	5120
	MAY-SEP	4340	5060	5540	100%	6020	6740	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

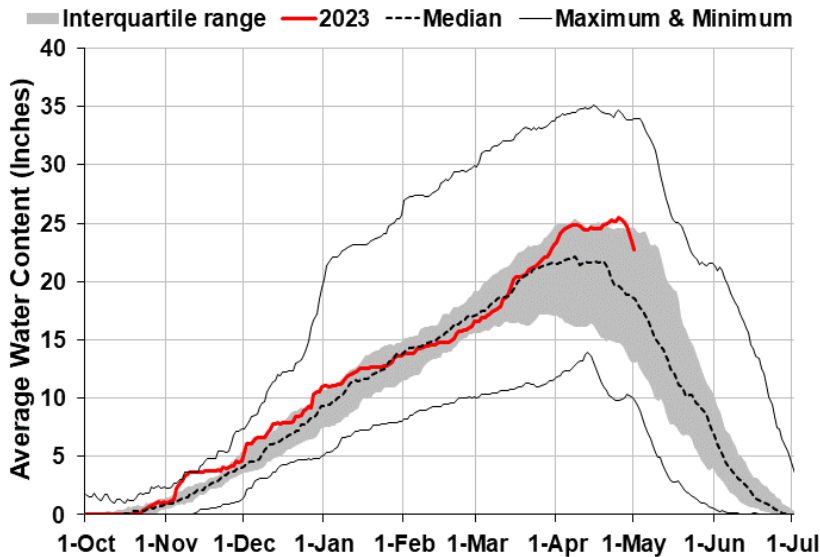
Reservoir Storage (KAF): End of April					Watershed Snowpack Analysis: May 1, 2023			
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)	Basin Name	# of Sites	% of Median 2023	% of Median 2022
Dworshak Reservoir	2229.5	2356.0	2623.0	3468.0	NF Clearwater River	9	109%	108%
					Lochsa River	3	100%	120%
					Selway River	4	110%	110%
					SF Clearwater River	1	120%	118%
					Clearwater Basin Total	17	111%	109%



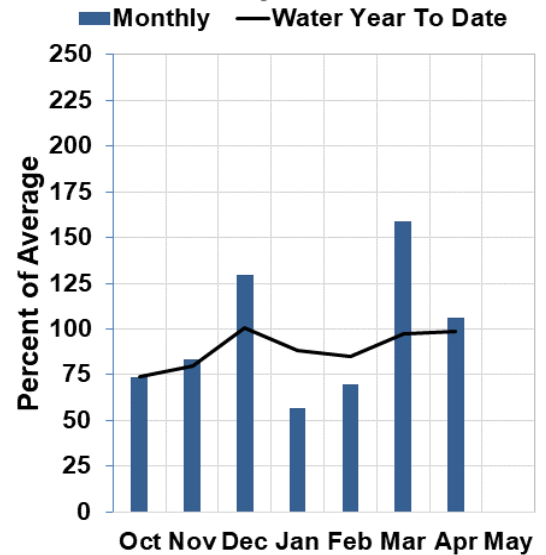
# Salmon River Basin

May 1, 2023

## Current Snowpack and Historic Range



## Precipitation



## WATER SUPPLY OUTLOOK

After a very wet March, near normal precipitation totals were observed in April (101%, Fig. 1), and water year total precipitation is also near normal (99%, Fig. 2). Widespread snowmelt began in late April, corresponding with the first significant stretch of warm weather in 2023, yet the snowpack remains at 128% of normal for May 1 (Fig. 3). As noted last month, the 2023 snowpack was the highest we have observed since the winter of 2017. The peak snowpack exceeded the [30-year median peak](#) at 113% (Fig. 4).

The Salmon River Basin streamflow forecasts are near normal and range from ~95 to 120%, except the Lemhi River (145%) for the May through September time period. The Climate Prediction Center's [30-Day Outlook](#) for May predicts warmer than normal temperatures and above normal precipitation. The unseasonably warm temperatures as April transitioned to May are causing the first major hydrologic response in area streams. Recreationalists with eyes on [peak flow timing](#) will want to keep a keen eye on forthcoming spring weather.

### Salmon River Streamflow Forecasts - May 1, 2023

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment						
		<--Drier-->-----Projected Volume----->>Wetter-->			% Median			30yr Med (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)		30% (KAF)	10% (KAF)	
Salmon R at Salmon	MAY-JUL	680	780	850	125%	915	1010	680
	MAY-SEP	790	905	985	122%	1060	1170	805
Lemhi R nr Lemhi	MAY-JUL	53	68	79	152%	89	105	52
	MAY-SEP	66	84	96	148%	108	126	65
MF Salmon R at MF Lodge	MAY-JUL	570	645	695	111%	745	815	625
	MAY-SEP	645	725	780	110%	835	915	710
SF Salmon R nr Krassel Ranger Station	MAY-JUL	200	230	250	104%	270	300	240
	MAY-SEP	220	250	270	104%	295	325	260
Johnson Ck at Yellow Pine	MAY-JUL	139	162	177	94%	193	215	189
	MAY-SEP	149	173	189	95%	205	230	200
Salmon R at White Bird	MAY-JUL	4420	4980	5360	109%	5740	6300	4910
	MAY-SEP	4910	5530	5950	109%	6370	6990	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, 2023			
Basin Name	# of Sites	% of Median	
		2023	2022
Salmon River ab Salmon	6	129%	104%
Lemhi River	3	136%	100%
MF Salmon River	3	129%	104%
SF Salmon River	3	121%	97%
Little Salmon River	4	152%	112%
Lower-Middle Salmon	4	132%	110%
Salmon Basin Total	19	129%	105%

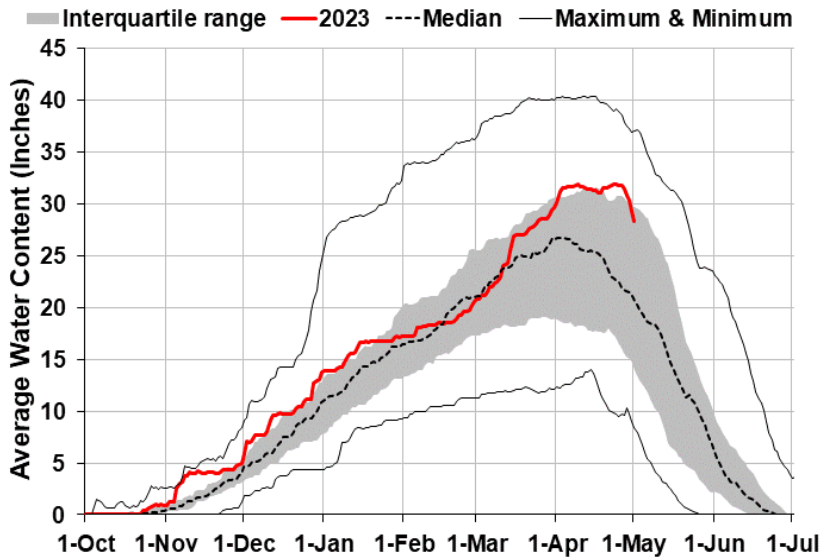




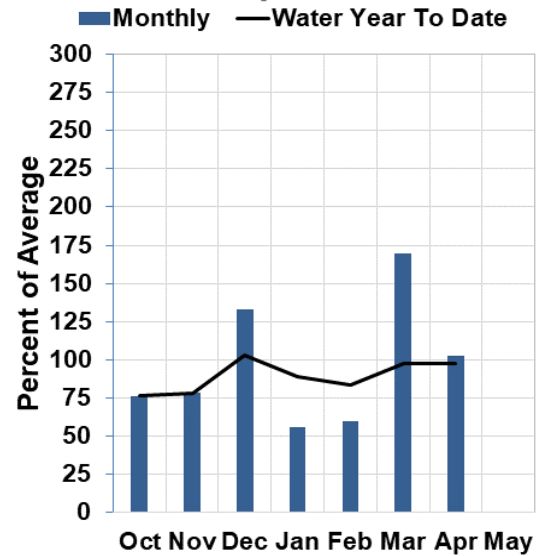
# West Central Basins

May 1, 2023

## Current Snowpack and Historic Range



## Precipitation



## WATER SUPPLY OUTLOOK

The active weather pattern that dominated March changed in April to a drier, more stable pattern. As a result, monthly precipitation in April was ~95 to 110% of normal (Fig. 1). Water year total precipitation is now ~100 to 110% of normal (Fig. 2). Snowpack in the West Central basins is still significantly above normal and ranges from ~160 to 220% of normal on May 1 (Fig. 3). The 2023 snowpack exceeded the normal seasonal peak in each of the [Weiser](#), [Boise](#), and [Payette](#) River basins (Fig. 4) at 140%, 117% and 135% respectively. Widespread snowmelt occurred at nearly all elevations by late April.

Reservoir storage in the Boise system (Anderson Ranch, Arrowrock and Lucky Peak combined) is 80% of normal, and storage in the Payette system is 86% of normal. Flood control releases are being made to ensure safe filling of these systems. Streamflow forecasts for the Boise River system range from ~115 to 220% of normal for the May through September period, and the Payette is ~100 to 130% of normal. The Climate Prediction Center's [30-Day Outlook](#) for May predicts warmer temperatures and above normal precipitation. While the above normal snowpack brings much needed drought relief, it simultaneously carries the potential for spring flooding. NOAA's [Northwest River Forecast Center](#) provides a variety of products related to flood forecasting and awareness.

### West Central Basins Streamflow Forecasts - May 1, 2023

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment						30yr Med (KAF)
		<--Drier-->		Projected Volume		>--Wetter-->		
		90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	
SF Boise R at Anderson Ranch Dam 2	MAY-JUL	330	385	420	131%	455	510	320
	MAY-SEP	360	420	455	132%	495	550	345
Boise R nr Twin Springs	MAY-JUL	445	505	545	115%	585	645	475
	MAY-SEP	495	560	600	114%	645	705	525
Mores Ck nr Arrowrock Dam	MAY-JUL	90	104	113	222%	122	136	51
	MAY-SEP	95	109	119	220%	129	143	54
Boise R nr Boise 2	MAY-JUL	1020	1140	1230	146%	1310	1440	845
	MAY-SEP	1120	1250	1340	142%	1430	1560	945
Lake Fork Payette R nr McCall	MAY-JUL	65	72	77	108%	81	89	71
	MAY-SEP	67	74	79	108%	84	92	73
NF Payette R at Cascade 2	MAY-JUL	310	360	395	100%	430	480	395
	MAY-SEP	315	370	405	101%	445	500	400
NF Payette R nr Banks 2	MAY-JUL	375	445	490	103%	535	605	475
	MAY-SEP	380	450	500	103%	550	620	485
SF Payette R at Lowman	MAY-JUL	385	415	435	128%	455	485	340
	MAY-SEP	435	470	495	129%	520	555	385
Deadwood Reservoir Inflow 2	MAY-JUL	101	112	119	118%	126	137	101
	MAY-SEP	110	122	130	116%	138	150	112
Payette R nr Horseshoe Bend 2	MAY-JUL	1070	1210	1310	115%	1410	1550	1140
	MAY-SEP	1160	1320	1420	115%	1520	1680	1240
Weiser R nr Weiser	MAY-JUL	210	260	300	150%	340	405	200
	MAY-SEP	235	290	330	147%	370	440	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

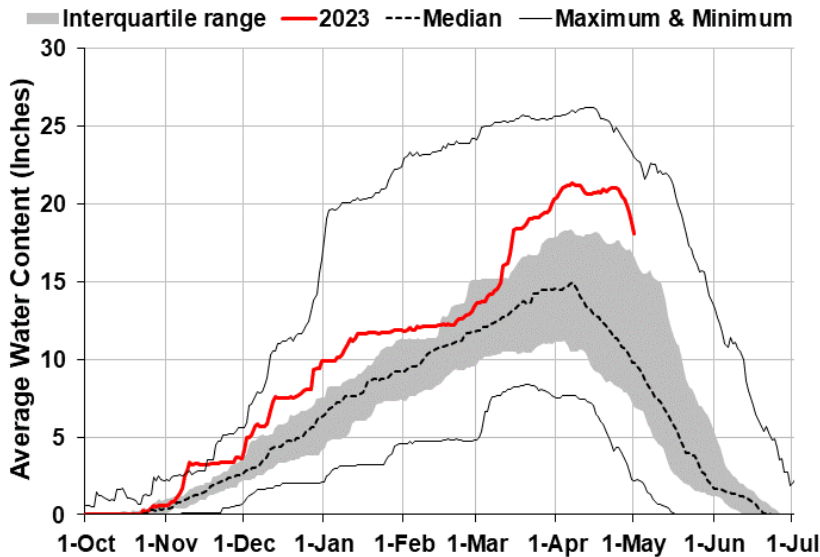
Reservoir Storage (KAF): End of April					Watershed Snowpack Analysis: May 1, 2023			
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)	Basin Name	# of Sites	% of Median 2023	% of Median 2022
Anderson Ranch Reservoir	357.0	226.9	329.8	450.2	SF Boise River	7	152%	92%
Arrowrock Reservoir	96.3	233.4	210.9	272.2	MF & NF Boise Rivers	6	147%	85%
Lucky Peak Reservoir	164.4	185.8	230.6	293.2	Mores Creek	5	203%	86%
<b>Sub-Basin Total</b>	<b>617.7</b>	<b>646.2</b>	<b>771.3</b>	<b>1015.6</b>	Canyon Creek	1		
Deadwood Reservoir	86.3	77.9	107.6	161.9	<b>Boise Basin Total</b>	<b>16</b>	<b>172%</b>	<b>90%</b>
Cascade Reservoir	459.6	498.9	523.8	693.2	NF Payette River	8	147%	104%
<b>Sub-Basin Total</b>	<b>545.9</b>	<b>576.8</b>	<b>631.4</b>	<b>855.1</b>	SF Payette River	4	141%	102%
Lake Lowell	120.8	89.3	127.9	165.2	<b>Payette Basin Total</b>	<b>17</b>	<b>158%</b>	<b>102%</b>
Mann Creek Reservoir	5.5	8.0	10.8	11.1	Mann Creek	1	318%	129%
					<b>Weiser Basin Total</b>	<b>4</b>	<b>223%</b>	<b>132%</b>



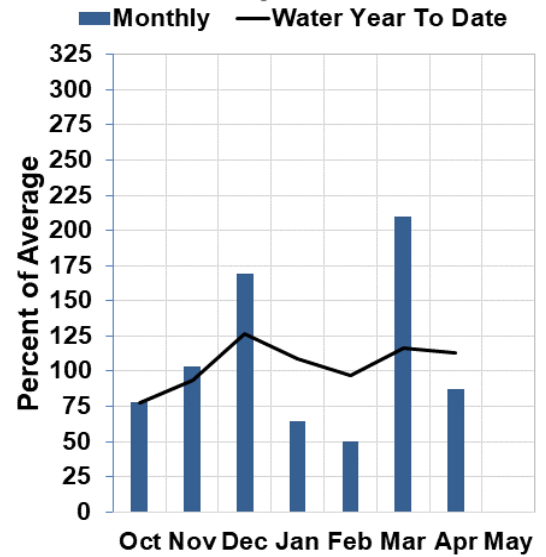
# Wood & Lost River Basins

May 1, 2023

## Current Snowpack and Historic Range



## Precipitation



## WATER SUPPLY OUTLOOK

Monthly precipitation in April was right around normal across the Wood and Lost River basins (Fig. 1). The Big and Little Wood, as well as the Big and Little Lost basins received [~85 to 105%](#) of normal monthly precipitation, while the Birch-Medicine Lodge Basin received [94%](#) of normal. Water year total precipitation remains impressive across the region and now ranges from [~110 to 130%](#) of normal (Fig. 2). Basin snowpack is spectacular, with all basins between [~145 to 200%](#) of normal for May 1 (Fig. 3). The snowpack has begun to melt after peak snowpack (Fig. 4) was reached in mid-April ([Big Wood](#), [Little Wood](#), [Big Lost](#), [Little Lost](#), [Birch-Medicine Lodge](#)).

May 1 reservoir storage is below the 30-year normal for Magic Reservoir (48% normal, 37% full), Mackay Reservoir (62% normal, 43% full), and Little Wood Reservoir (46% normal, 41% full) as operators release water to make room for the incoming runoff. [Streamflow forecasts](#) for the Wood and Lost basins are still significantly above normal and range from ~140 to 280% of normal. The median forecast for Camas Creek near Blaine decreased significantly since last month to 68 KAF for the May through September period; this is still [well above normal at 430%](#). NOAA's [Northwest River Forecast Center](#) provides a variety of products related to flood forecasting and awareness. Big Wood River at Hailey is currently at the minor flood stage with streamflow forecasted to [decrease on Saturday](#). The Little Wood River near Carey is running at bankfull but streamflow levels are predicted to decrease early next week.

### Wood and Lost Basins Streamflow Forecasts - May 1, 2023

Forecast Point	Forecast Exceedance Probabilities for Risk Assessment								
	Forecast Period	<--Drier-->			Projected Volume		>--Wetter-->		30yr Med (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)		
Camas Ck at Camas	MAY-JUL	25	33	40	367%	47	59	10.9	
Little Lost R bl Wet Ck nr Howe	MAY-JUL	24	28	31	135%	34	38	23	
	MAY-SEP	29	35	38	141%	42	47	27	
Big Lost R at Howell Ranch	MAY-JUL	184	210	230	184%	250	275	125	
	MAY-SEP	205	235	255	182%	275	310	140	
Big Lost R bl Mackay Reservoir	MAY-JUL	133	160	178	198%	197	225	90	
	MAY-SEP	159	189	210	188%	230	260	112	
Little Wood R ab High Five Ck	MAY-JUL	79	96	109	287%	123	144	38	
	MAY-SEP	85	104	118	281%	133	157	42	
Little Wood R nr Carey 2	MAY-JUL	78	97	111	285%	125	149	39	
	MAY-SEP	85	105	120	286%	137	162	42	
Big Wood R at Hailey	MAY-JUL	220	255	275	156%	295	325	176	
	MAY-SEP	250	285	305	154%	330	365	198	
Big Wood R ab Magic Reservoir	MAY-JUL	138	183	215	205%	255	315	105	
	MAY-SEP	148	195	230	204%	270	335	113	
Camas Ck nr Blaine	MAY-JUL	40	55	67	432%	80	102	15.5	
	MAY-SEP	41	56	68	430%	82	103	15.8	
Big Wood R bl Magic Dam 2	MAY-JUL	174	225	265	223%	310	380	119	
	MAY-SEP	185	240	280	214%	325	395	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					Watershed Snowpack Analysis: May 1, 2023			
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)	Basin Name	# of Sites	% of Median 2023	% of Median 2022
Mackay Reservoir	19.2	26.4	31.0	44.4	Camas-Beaver Creeks	2	180%	43%
Little Wood Reservoir	12.4	25.5	26.7	30.0	Birch-Medicine Lodge Creeks	2	127%	102%
Magic Reservoir	71.2	46.8	146.8	191.5	Little Lost River	3	163%	103%
					Big Lost River ab Mackay	4	169%	90%
					Big Lost Basin Total	5	171%	91%
					Fish Creek	0		
					Little Wood ab Resv	4	185%	86%
					Big Wood River ab Hailey	6	167%	100%
					Camas Creek	3	720%	98%
					Birch-Medicine Lodge-Camas-Beaver Total	4	146%	81%
					Little Wood Basin Total	4	185%	86%
					Big Wood Basin Total	9	199%	100%

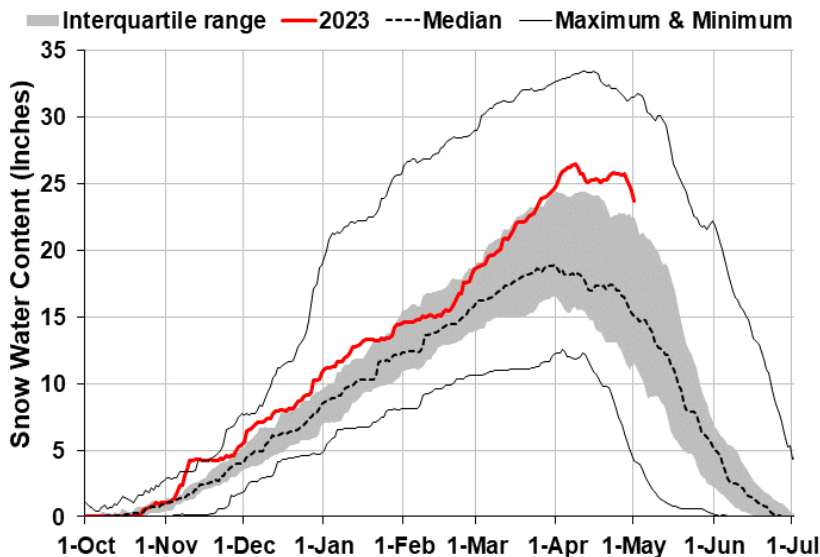




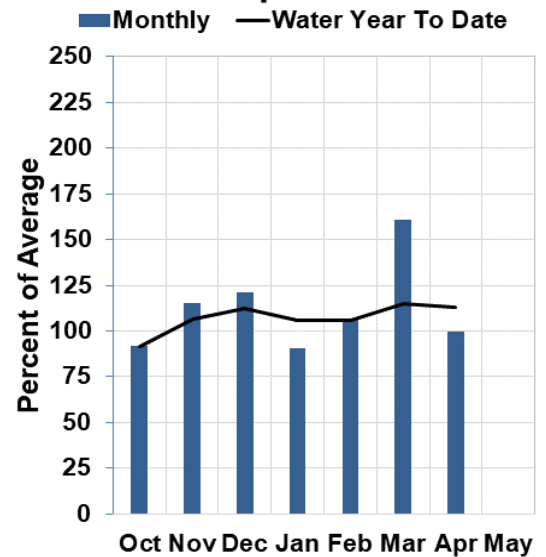
# Upper Snake River Basins

May 1, 2023

## Current Snowpack and Historic Range



## Precipitation



## WATER SUPPLY OUTLOOK

Upper Snake River precipitation for the month of April was 89%, 96%, and 113% in Henrys Fork-Teton, Snake River above Heise, and Willow-Blackfoot-Portneuf respectively (Fig.1). Water year total precipitation decreased slightly since [April 1](#), but all three basins remain well above normal (Fig 2). Snowpack in the region peaked well above normal as well (Fig. 4). Snowpack ranges from 137% in the Snake River above Heise to 380% in the Willow-Blackfoot-Portneuf (Fig. 3), a [record peak](#) for the Willow-Blackfoot-Portneuf Basin. The [drought outlook](#) is predicting removal of drought status along the western edge of Wyoming although drought is still expected to persist in portions of the Snake River headwaters.

Storage is 83% of normal for the Upper Snake system. The Jackson Lake and Palisades reservoirs are 68% of normal (42% of capacity), and Henrys Fork-Teton reservoirs are 95% of normal (88% of capacity). Storage for the lower system, American Falls and Lake Walcott, is ~90% of normal. Median streamflow forecasts for the region range from ~95 to 150%, except in the Willow-Blackfoot-Portneuf (~210%) for the May through September runoff period. While the higher than normal snowpack conditions bring drought relief, it's also bringing flooding to local creeks and rivers in this region. The Portneuf River is predicted to reach its major flood stage on Saturday May 6. [NOAA's Northwest River Forecast Center](#) provides a variety of products related to flood forecasting and awareness, and users should stay up to date throughout the runoff season.

### Upper Snake River Basin Streamflow Forecasts - May 1, 2023

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment						30yr Med (KAF)
		<--Drier-->		-----Projected Volume-----		>--Wetter-->		
		90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	
Henrys Fk nr Ashton 2	MAY-JUL	320	370	405	117%	440	495	345
	MAY-SEP	500	560	600	118%	640	700	510
Falls R nr Ashton 2	MAY-JUL	335	360	380	117%	400	425	325
	MAY-SEP	420	450	475	116%	500	530	410
Teton R nr Driggs	MAY-JUL	117	135	147	118%	159	177	125
	MAY-SEP	147	170	185	118%	200	225	157
Teton R nr St Anthony	MAY-JUL	285	320	345	111%	370	410	310
	MAY-SEP	340	385	415	109%	445	490	380
Henrys Fk nr Rexburg 2	MAY-JUL	950	1080	1170	120%	1250	1380	975
	MAY-SEP	1310	1470	1580	117%	1690	1850	1350
Snake R at Flagg Ranch	MAY-JUL	400	445	475	114%	505	550	415
	MAY-SEP	440	490	525	115%	555	605	455
Snake R nr Moran 2	MAY-JUL	645	710	755	116%	800	865	650
	MAY-SEP	725	795	840	116%	890	960	725
Pacific Ck at Moran	MAY-JUL	93	122	141	104%	161	190	135
	MAY-SEP	100	130	150	105%	170	200	143
Buffalo Fk ab Lava Ck nr Moran	MAY-JUL	210	235	250	94%	270	295	265
	MAY-SEP	235	265	285	97%	305	335	295
Snake R ab Reservoir nr Alpine 2	MAY-JUL	1600	1750	1850	95%	1950	2100	1950
	MAY-SEP	1870	2040	2150	96%	2270	2430	2250
Greys R ab Reservoir nr Alpine	MAY-JUL	280	310	330	127%	350	380	260
	MAY-SEP	330	365	390	126%	410	445	310
Salt R ab Reservoir nr Etna	MAY-JUL	305	350	375	153%	400	445	245
	MAY-SEP	400	445	475	151%	505	550	315
Snake R nr Irwin 2	MAY-JUL	2380	2620	2780	107%	2940	3170	2590
	MAY-SEP	2850	3120	3300	108%	3490	3760	3060
Snake R nr Heise 2	MAY-JUL	2550	2790	2950	108%	3110	3350	2730
	MAY-SEP	3070	3350	3540	108%	3720	4000	3270
Willow Ck nr Ririe 2	MAY-JUL	73	92	107	396%	123	148	27
	MAY-SEP	73	83	90	237%	97	109	38
Portneuf R at Topaz	MAY-JUL	93	105	113	209%	122	136	54
	MAY-SEP	1570	2050	2370	119%	2690	3170	2000
Snake R at Neeley 2	MAY-JUL	1570	2050	2370	119%	2690	3170	2000
	MAY-SEP	1530	2040	2390	121%	2740	3250	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					Watershed Snowpack Analysis: May 1, 2023			
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)	Basin Name	# of Sites	% of Median 2023	% of Median 2022
Jackson Lake	220.4	184.7	600.7	847.0	Henrys Fork-Falls River	9	150%	83%
Palisades Reservoir	715.3	678.8	769.8	1400.0	Teton River	9	130%	82%
<b>Sub-Basin Total</b>	<b>935.7</b>	<b>863.5</b>	<b>1370.5</b>	<b>2247.0</b>	Henrys Fork-Teton	16	137%	83%
Henrys Lake	86.1	85.0	87.2	90.4	Snake River ab Jackson Lake	5	122%	91%
Island Park Reservoir	114.2	126.6	123.8	135.2	Pacific Creek	2	117%	99%
Grassy Lake	12.0	11.2	13.6	15.2	Buffalo Fork	2	93%	95%
<b>Sub-Basin Total</b>	<b>212.3</b>	<b>222.8</b>	<b>224.6</b>	<b>240.8</b>	Gros Ventre River	4	101%	93%
Ririe Reservoir	50.1	57.0	63.0	80.5	Hoback River	4	120%	85%
Blackfoot Reservoir			227.6	337.0	Greys River	5	128%	99%
American Falls Reservoir	1375.6	1423.1	1576.0	1672.6	Salt River	6	199%	116%
<b>Basin-Wide Total</b>	<b>2573.8</b>	<b>2566.4</b>	<b>3461.7</b>	<b>4577.9</b>	Snake ab Palisades Resv	23	126%	93%
					Willow Creek	5	128%	99%
					Blackfoot River	4	295%	122%
					Portneuf River	6	400%	103%
					Willow-Blackfoot-Portneuf	14	380%	120%

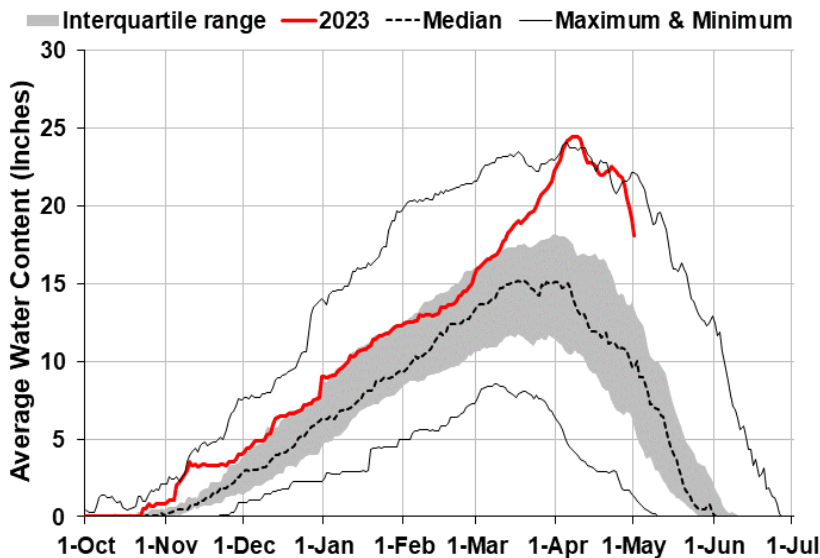




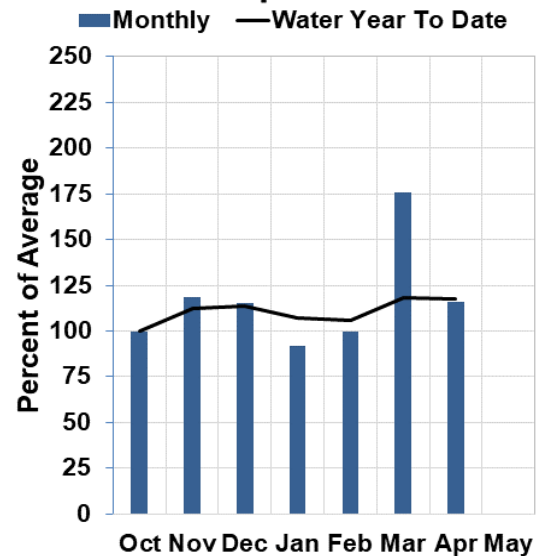
# Southern Snake River Basins

May 1, 2023

## Current Snowpack and Historic Range



## Precipitation



## WATER SUPPLY OUTLOOK

This winter's trend of above normal precipitation did not continue in May. The Southern Snake River basins saw lower than normal monthly precipitation values in four of the five basins. Monthly precipitation ranged between ~70 to 105% with the percentages increasing from west to east (Fig. 1). Water year total precipitation continues to stay above average and is ~115 to 130% of normal across these basins (Fig. 2). The snowpack is currently well above normal and ranges between ~155 to 215% of normal (Fig. 3). All SNOTEL sites in these basins reached peak annual snowpack for the season between April 6 and 25 (Fig. 4). Comparable water years for snowpack at this point in the season are: Owyhee ([1982, 2006](#)), Bruneau ([1982, 2011](#)), Salmon Falls ([1997, 2011](#)), Goose Creek ([1997, 2011](#)), and Raft ([2017, 2019](#)). This current snowpack density is consistent with a [ripe snowpack](#) that has entered its spring melting phase. Streamflow increased significantly across some these basins during April; observed streamflow was 157 to 290% of normal in the Bruneau and Owyhee basins. Streamflow is starting to rise in the Oakley Basin.

Reservoir storage, as a percent of normal, has increased significantly over the past month. Current percent of normal storage in Oakley is 78%, Wild Horse 123%, Lake Owyhee 97%, and Salmon Falls 69%. The current [streamflow volume forecasts](#) are well above normal for the 50% exceedance probability in each basin, they are: Owyhee 154%, Bruneau 160%, Salmon Falls 202%, and Goose Creek 259%. Water supply looks sufficient in all these basins. According to the [Northwest River Forecast Center](#), the Owyhee River and Salmon Falls Creek are both running at bankfull capacity and the Bruneau River is 80% of bankfull.

**Southern Snake River Basins Streamflow Forecasts - May 1, 2023**

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment							30yr Med (KAF)
		<--Drier-----Projected Volume-----Wetter-->							
		90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)		
Goose Ck ab Trapper Ck nr Oakley	MAY-JUL	17.5	23	27	314%	32	39	8.6	
	MAY-SEP	18.9	25	29	319%	34	41	9.1	
Trapper Ck nr Oakley	MAY-JUL	3.9	4.5	5	172%	5.5	6.2	2.9	
	MAY-SEP	5	5.7	6.2	155%	6.7	7.5	4	
Oakley Reservoir Inflow	MAY-JUL	18.3	24	28	239%	32	39	11.7	
	MAY-SEP	21	26	31	237%	35	42	13.1	
Salmon Falls Ck nr San Jacinto	MAY-JUL	54	69	81	203%	94	114	40	
	MAY-SEP	57	73	85	198%	97	117	43	
Bruneau R nr Hot Spring	MAY-JUL	134	172	200	163%	230	280	123	
	MAY-SEP	141	181	210	163%	240	290	129	
Reynolds Ck at Tollgate	MAY-JUL	3	4.4	5.5	138%	6.7	8.7	4	
	MAY-SEP	3	4.4	5.6	137%	6.8	8.8	4.1	
Owyhee R nr Gold Ck 2	MAY-JUL	9.2	10.2	11	216%	11.8	13	5.1	
Owyhee R nr Rome	MAY-JUL	72	131	181	160%	240	340	113	
	MAY-SEP	84	146	198	157%	260	360	126	
Owyhee R bl Owyhee Dam 2	MAY-JUL	92	154	205	146%	265	360	140	
	MAY-SEP	117	183	235	142%	295	395	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

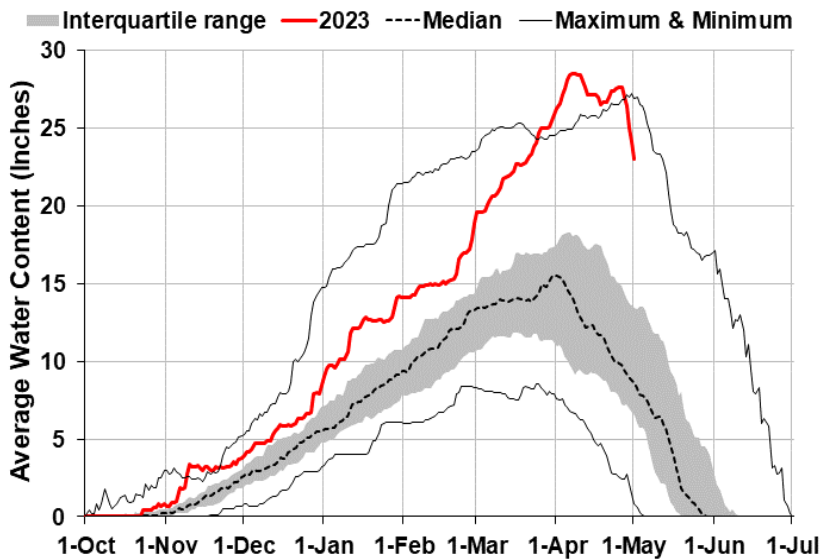
Reservoir Storage (KAF): End of April					Watershed Snowpack Analysis: May 1, 2023			
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)	Basin Name	# of Sites	% of Median 2023	% of Median 2022
Oakley Reservoir	23.8	21.8	30.6	75.6	Raft River	2	155%	108%
Salmon Falls Reservoir	40.4	34.5	58.6	182.6	Goose-Trapper Creeks	2	217%	96%
Wild Horse Reservoir	50.4	41.2	41.1	71.5	Salmon Falls Creek	4	184%	88%
Lake Owyhee	486.1	327.3	502.4	715.0	Bruneau River	5	188%	73%
Brownlee Reservoir		1139.6	1148.0	1420.0	Reynolds Creek	7	172%	82%
					Upper Owyhee	5	189%	53%
					Owyhee Basin Total	9	208%	75%



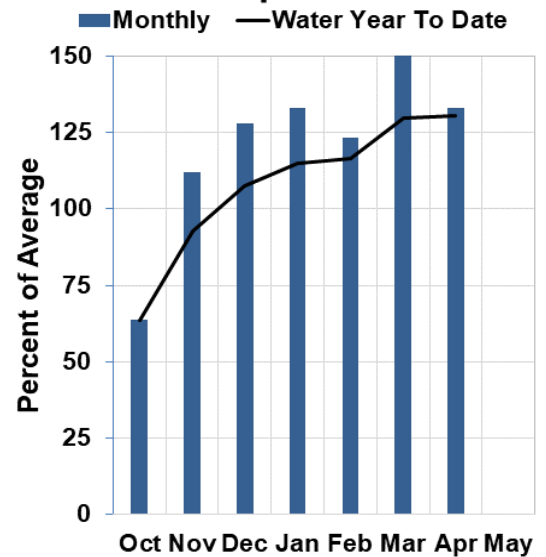
# Bear River Basin

May 1, 2023

## Current Snowpack and Historic Range



## Precipitation



## WATER SUPPLY OUTLOOK

Bear River Basin received ~115% of normal precipitation for April (Fig.1), marking six straight months in which the region received well above normal precipitation. Water year total precipitation in Bear Basin remains 142% of normal (Fig.2), the same as last month. The Bear River snowpack [peaked at ~160% of the median peak](#) (Fig. 4) and there are substantial amounts of SWE at all measurement sites still. While most sites below ~7500' began melting out around the median peak on April 7, cold temperatures and storms in the second half of the month delayed melt at the higher elevation sites until approximately April 25.

Reservoir storage for Bear Lake is 86% of normal (38% full) as of May 1. Streamflow forecasts in the region are predicting very high runoff volumes and range from ~150 to 315% for the May through September period. While the above normal snowpack brings needed drought relief, it simultaneously carries the likelihood for flooding. Some streamflow sites, like the Bear River at both the Wyoming border and Utah state line, are already either within or nearing flood stage. Please stay up to date on conditions. [NOAA's Colorado Basin River Forecast Center](#) provides flood forecasting and awareness products.



### Bear River Basin Streamflow Forecasts - May 1, 2023

Forecast Point	Forecast Exceedance Probabilities for Risk Assessment							
	Forecast Period	<--Drier-->-----Projected Volume----->			<--Wetter-->			30yr Med (KAF)
		90% (KAF)	70% (KAF)	50% (KAF)	% Median	30% (KAF)	10% (KAF)	
Bear R nr UT-WY State Line	APR-JUL	130	144	152	150%	161	175	101
	APR-SEP	142	157	166	146%	176	191	114
	MAY-JUL	124	138	147	152%	155	169	97
Bear R ab Resv nr Woodruff	APR-JUL	140	167	184	200%	200	230	92
	APR-SEP	149	176	194	196%	215	240	99
	MAY-JUL	113	140	157	196%	175	200	80
Big Ck nr Randolph	APR-JUL	6.8	8.5	9.6	300%	10.7	12.4	3.2
	MAY-JUL	6.3	8	9.1	364%	10.2	11.9	2.5
Smiths Fk nr Border	APR-JUL	100	110	117	136%	123	133	86
	APR-SEP	116	127	135	135%	143	154	100
	MAY-JUL	96	106	112	149%	119	129	75
Bear R bl Stewart Dam 2	APR-JUL	245	290	320	278%	350	395	115
	APR-SEP	280	325	360	295%	395	440	122
	MAY-JUL	230	270	300	326%	330	375	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					Watershed Snowpack Analysis: May 1, 2023			
Reservoir Name	Current (KAF)	Last YR	Median (KAF)	Capacity (KAF)	Basin Name	# of Sites	% of Median 2023	% of Median 2022
Bear Lake	492.3	608.3	572.8	1302.0	Smiths-Thomas Forks	5	168%	100%
Montpelier Reservoir		2.7	3.2	4.0	Bear Lake	8	209%	91%
					Montpelier Creek	2	206%	89%
					Mink Creek	0		
					Cub River	1	159%	77%
					Bear River Total	25	194%	89%
					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)**

<b>Basin- Lake or Reservoir</b>	<b>Dead Storage</b>	<b>Inactive Storage</b>	<b>Active Storage</b>	<b>Surcharge Storage</b>	<b>NRCS Capacity</b>	<b>NRCS Capacity Includes</b>
<b><u>Panhandle Region</u></b>						
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
<b><u>Clearwater Basin</u></b>						
Dworshak	Unknown	1452.00	2016.00	---	3468.0	Inactive + Active
<b><u>West Central Basins</u></b>						
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
<b><u>Wood and Lost Basins</u></b>						
Mackay	0.13	---	44.37	---	44.4	Active
Little Wood	Unknown	---	30.00	---	30.0	Active
Magic	Unknown	---	191.50	---	191.5	Active
<b><u>Upper Snake Basin</u></b>						
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
<b><u>Southside Snake Basins</u></b>						
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
<b><u>Bear River Basin</u></b>						
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.

## **Forecast use example:**

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

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

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

**Using the 30 or 10 Percent Exceedance Forecasts.** If an unexpected excess of water could cause problems (such as operating a flood control reservoir), users might plan on receiving 315 KAF between June 1 and

Sept. 30 (from the 30 percent exceedance forecast). There is a 30% chance of receiving *more* than 315 KAF.

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

Upper Snake River Basin Streamflow Forecasts - June 1, 2015								
Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment						
		---Drier---<---Projected Volume--->---Wetter---						
		90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Henrys Fk nr Ashton	JUN-JUL	72	106	129	56	152	186	230
	JUN-SEP	198	245	280	68	315	360	410

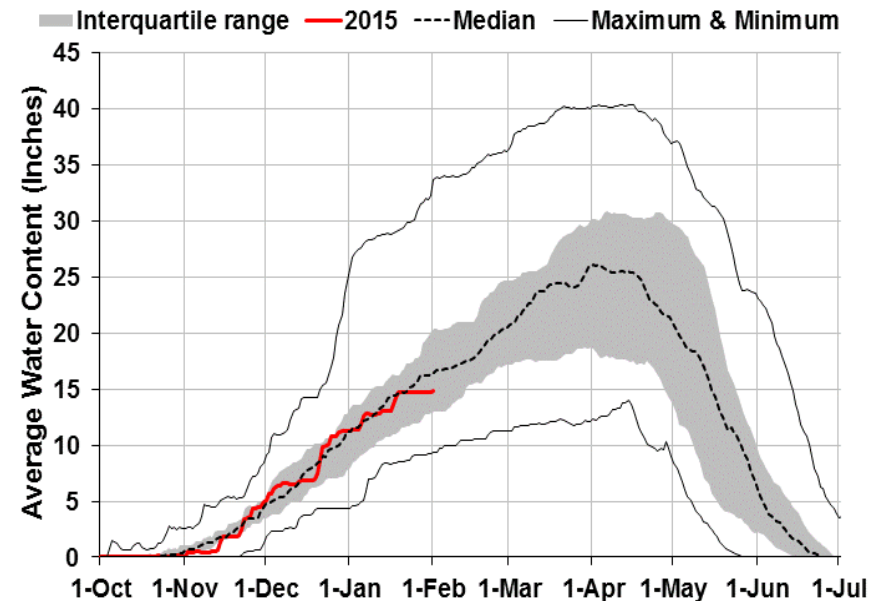
## Interpreting Snowpack Plots

Basin snowpack plots represent snow water equivalent indices using the average daily SNOTEL data<sup>1</sup> 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 25<sup>th</sup> to 75<sup>th</sup> 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 (75<sup>th</sup> 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 (25<sup>th</sup> percentile). This means 50 percent of the time the snowpack index is within the interquartile range (gray area) during the period of record.

<sup>1</sup> 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.

## Current Snowpack and Historic Range



OFFICIAL BUSINESS



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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.

