United States Department of Agriculture

Natural Resources Conservation Service

Idaho Water Supply Outlook Report

June 1, 2021

North Fork of the Coeur d'Alene River
Photo by Peter Youngblood, May 1, 2021

The abnormally warm and dry spring conditions continued throughout May with only a brief respite from a much needed storm system. This resulted in faster snowmelt, diminished streamflow, and earlier peak streamflow than normal across many basins. Short and long-term weather forecasts predict that warm and dry weather are here to stay for the foreseeable future. As we head into summer, which is typically our dry season, it's likely that drought conditions will intensify and persist across our region.

IDAHO WATER SUPPLY OUTLOOK REPORT

June 1, 2021

Overview

This spring has been one of the driest on record, leading to earlier and higher irrigation demand. Idaho Department of Water Resources has declared drought emergencies in eight counties in Idaho and more southern counties could follow suit. The NRCS snow-monitoring network shows that snow remains only at the highest elevation sites across our state. Streamflow conditions vary by basin with some rivers experiencing below normal flow levels for this time of year. It's likely this week's hot weather will melt most of the remaining snow and lead to streamflow peaking soon.

According to the U.S. Drought Monitor, ~61% of Idaho land is in drought status compared to 20% one year ago. Drought conditions are expected to persist in counties already experiencing drought this summer, while drought conditions are expected to develop in the Treasure Valley, northern and eastern Idaho. The one month outlook from NOAA's Climate Prediction Center (CPC) forecasts below normal precipitation and warmer than average temperatures across Idaho and western Wyoming. The three month outlook predicts warmer and drier conditions than normal throughout Idaho and the Snake River headwaters.

Water supply across the state varies depending on local drought intensity, duration, and reservoir carryover storage from last year. Without additional late spring or early summer precipitation, unregulated rivers will be at minimum or near record low flow levels by mid-to-late summer. We anticipate the combination of dry weather conditions, and the early and strong onset of irrigation demand, will cause reservoirs to reach minimal levels and have minimal carryover into water year 2022.

Snowpack

The snowpack has melted out at the majority of SNOTEL sites across Idaho and the headwaters of the Snake River. Located primarily on north-facing aspects, SNOTEL sites provide an accurate picture of conditions in the places where snow lingers the longest. As of June 1, only the highest elevation SNOTEL sites have snow remaining. In the Upper Snake Basin, only sites above 8,100 feet have snow. In the Payette River Basin, snow remains above 6,860 feet, and in the Boise River, above 8,960 feet. Moving farther north, snow persists above 5,690 feet in the Clearwater Mountains, and above 5,400 feet in the Pend Oreille-Kootenai basins.

At report time, the Pacific Northwest is experiencing record high temperatures. We anticipate this week will lead to accelerated snowmelt across the region, with corresponding increases in streamflow over the next few weeks.

Precipitation

May was a mostly dry month across Idaho with the exception of one storm cycle during the third week of May. During May, only the Henrys Fork-Teton and Snake River above Palisades basins received above normal precipitation (116% and 117% respectively). The remainder of Idaho received below normal monthly total precipitation with basin totals ranging from 27% to 86% (Fig. 1).

Water year precipitation (Fig. 2) continues to follow the same below normal pattern observed all year: the wettest basins are north of the Salmon-Clearwater divide and the Upper Snake headwaters (81% to 89%), the driest are the Owyhee, Wood and Lost basins (59% to 70%), and the rest of the state's basins are below normal (73% to 76%). The rain events during the third week of May did not make up for the impact of another dry month on water year precipitation levels. Marginal increases in water year total precipitation occurred in only a few basins: Little Lost (+1%), Birch Medicine (+3%), Henrys Fork (+3%), Snake River above Palisades (+4%). In the rest of the state, dry weather further decreased water year precipitation levels.

Water supply

In general, forecasted streamflow volume continues to decline in response to the warm and dry spring weather (Fig. 4). The spring runoff has peaked in lower elevation basins. In areas with high elevation snowpack remaining, this week's hot weather should bring increases in streamflow with levels peaking in early to mid June. Rivers controlled by reservoir releases like the Payette, Snake, and Boise for example, will continue to fluctuate with reservoir operations and environmental releases. We recommend water users concerned about water shortages use the 70% exceedance probability forecasts for natural streamflow predictions. Dry spring conditions suggest streamflow volumes will likely be lower than the April and May forecasts predicted.

Reservoir storage in the Upper Snake system peaked in April with 409 thousand acre-feet (KAF) less than last year's peak storage volume. This system is currently at 79% of capacity with 194.5 KAF more than the 30-year average peak storage. Jackson and Palisades Reservoirs are likely to fill by mid-June. Island Park, Henrys Lake, and Grassy Lake are full. Ririe is unlikely to fill this year as the snow has melted and peak runoff has passed. Reservoir storage in the Upper Snake system will likely reach minimum levels by the end of the irrigation season if dry conditions and high demand continue.

The Boise River storage system is at ~75% of capacity and 106.6 KAF less than the 30-year average peak storage. Although reservoir levels will be low by the end of the irrigation season, near normal water supply is expected for Boise system water users. The Payette River system is at 88% of capacity and fill levels haven't peaked yet; reservoir storage is closely tracking the historical average. Shortages are not expected for water users in the Payette system. The Weiser River has lower than average streamflow, so those reliant on natural streamflow from this river may experience reduced water availability.

Water users in drought afflicted counties in the southern part of the state will likely be affected by agricultural irrigation water shortages if reservoir storage is insufficient. For example, those reliant on Magic Reservoir can expect a ~30 day delivery season; this is far less than a comparably dry year (2002) with a 72-day delivery period. Big Lost water users hope to have sufficient water through early July; Oakley reservoir water users have a 66% water share this season and although tight, will be okay. Salmon Falls users expect a shorter delivery season with a 0.23 allotment compared to a full allocation of 1.25 acre-feet (18% of normal). Bear Lake Reservoir users have sufficient supply this year, but peak irrigation demand may not be met. Owyhee reservoir storage peaked with 93 KAF less than the 30 year average.

For insight into how current weather conditions will influence the timing of 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 NRCS interactive map here. For questions about current conditions and water supply impacts, please contact: erin.whorton@usda.gov, (office) 208-685-6983 or (cell) 208-510-7294.

Water Supply Outlook Report
Federal - State – Private Cooperative Snow Surveys

For more water supply and resource management information:

Contact: Your local county Natural Resources Conservation Service Office
Internet Web Address: http://www.id.nrcs.usda.gov/snow/
Natural Resources Conservation Service Snow Surveys
9173 West Barnes Drive, Suite C
Boise, Idaho 83709-1574 (208) 378-5700 ext. 5

To join a free email subscription list contact us by email at: IDBOISE-NRCS-SNOW@one.usda.gov

How forecasts are made

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

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

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

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

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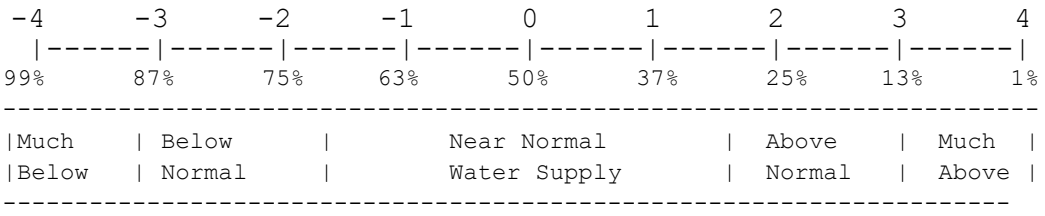
IDAHO SURFACE WATER SUPPLY INDEX (SWSI) June 1, 2021

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

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

BASIN or REGION	*SWSI Value*	*Most Recent Year With Similar SWSI Value*	*Agricultural Water Supply Shortage May Occur When SWSI is Less Than*
Spokane	**-1.6**	**2018**	**NA**
Clearwater	**-2.2**	**2005**	**NA**
Salmon	**-3.2**	**2007**	**NA**
Weiser	**-2.4**	**2013**	**NA**
Payette	**-3.2**	**2015**	**NA**
Boise	**-2.8**	**1991**	**- 2.8**
Big Wood above Hailey	**-4.0**	**1994**	**- 2.8**
Big Wood	**-3.8**	**1992**	**- 0.7**
Little Wood	**-4.0**	**1992**	**- 1.7**
Big Lost	**-4.0**	**1992**	**0.4**
Little Lost	**-4.0**	**1994**	**1.2**
Teton	**-2.9**	**2003**	**- 3.9**
Henrys Fork	**-0.8**	**2002**	**- 3.4**
Snake (Heise)	**-1.3**	**2000**	**- 1.7**
Oakley	**-2.7**	**2004**	**0.7**
Salmon Falls above Jackpot	**-3.8**	**1992**	**NA**
Salmon Falls	**-2.7**	**2008**	**- 0.9**
Bruneau	**-3.2**	**1992**	**NA**
Owyhee	**-2.5**	**1994**	**- 2.6**
Bear River	**0.8**	**2001**	**- 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 May 2021

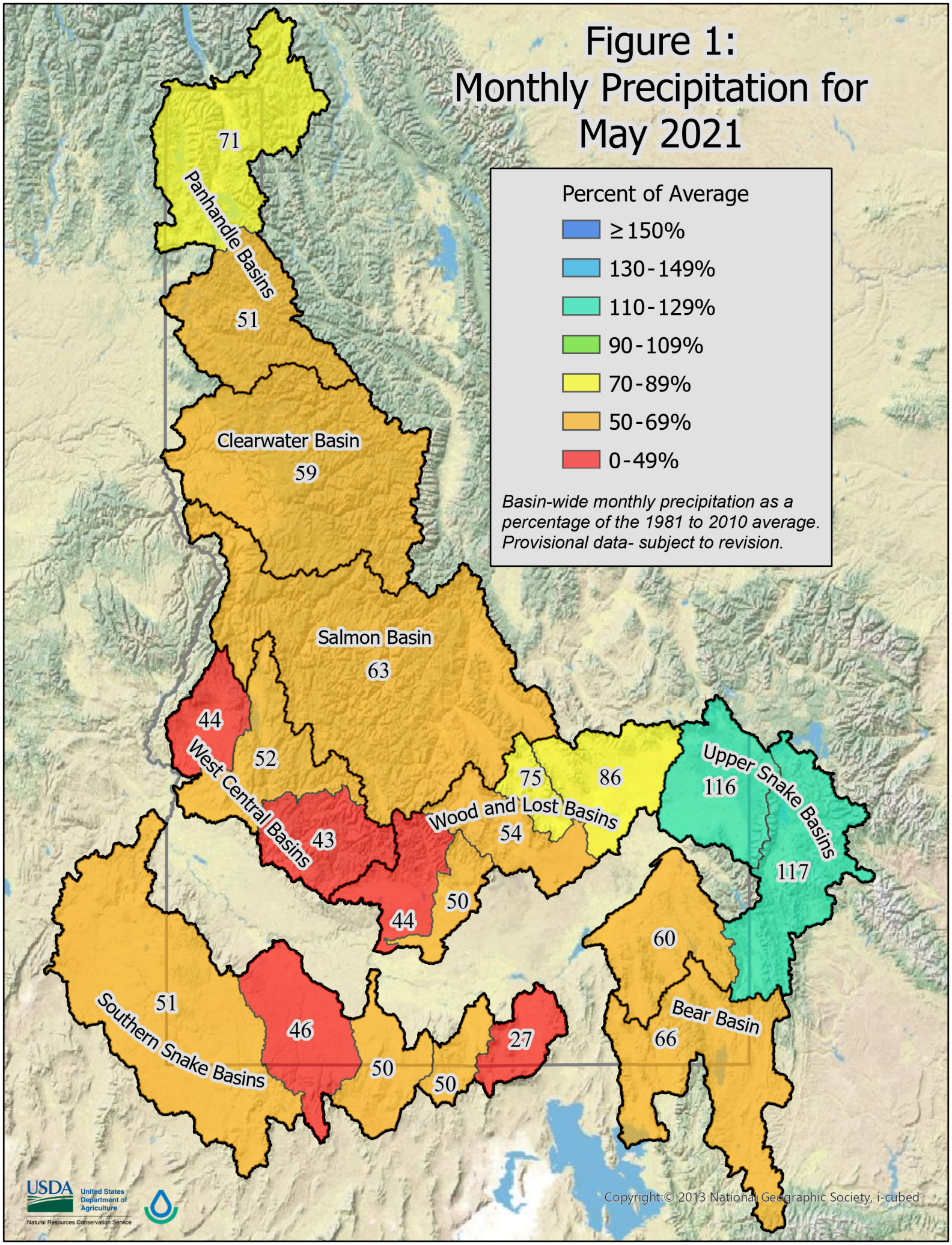
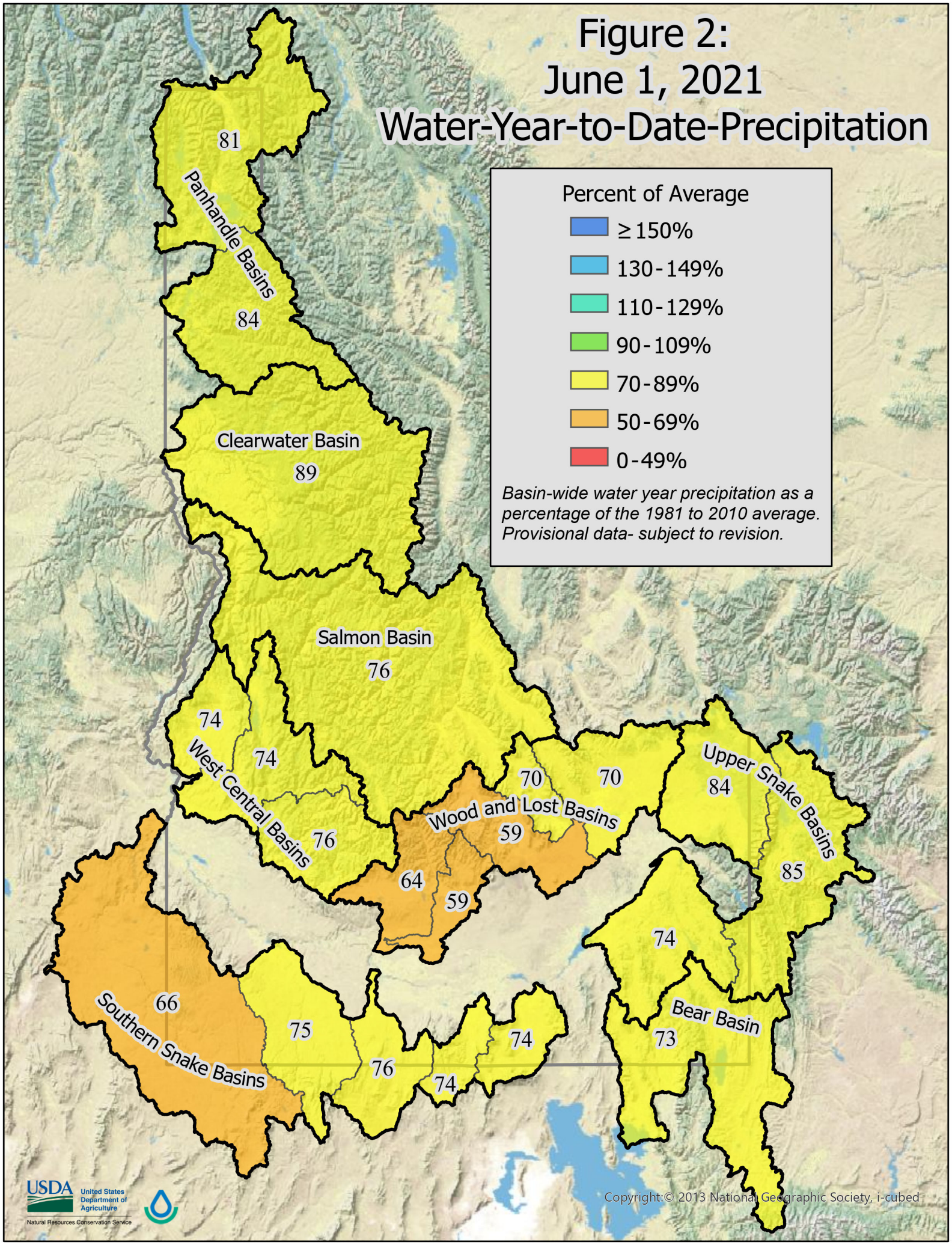


Figure 2:
June 1, 2021
Water-Year-to-Date-Precipitation



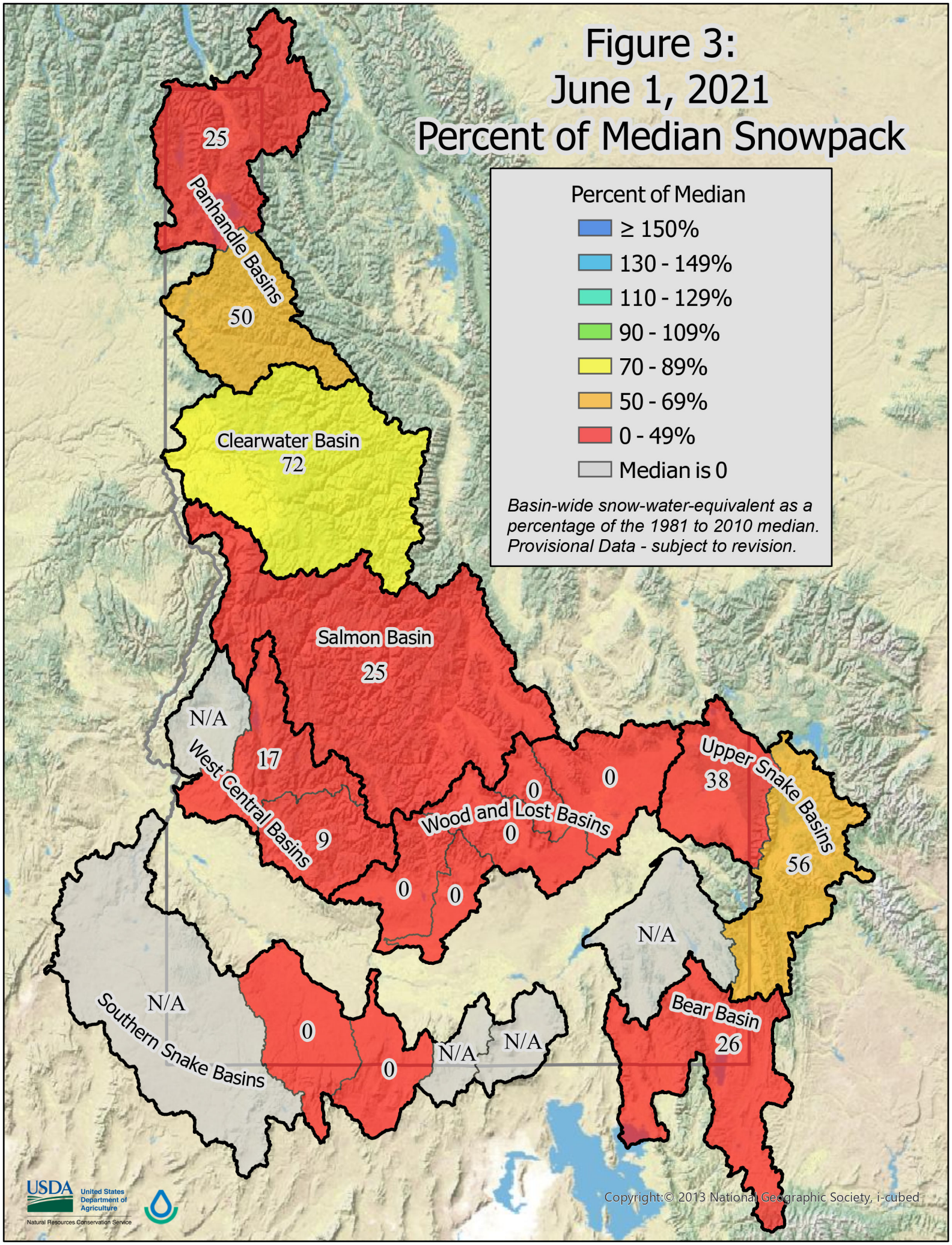


Figure 3:
June 1, 2021
Percent of Median Snowpack
Percent of Median
≥ 150%
130 - 149%
110 - 129%
90 - 109%
70 - 89%
50 - 69%
0 - 49%
Median is 0
Basin-wide snow-water-equivalent as a percentage of the 1981 to 2010 median.
Provisional Data - subject to revision.
25
Panhandle Basins
50
Clearwater Basin
72
Salmon Basin
25
N/A
West Central Basins
17
9
Wood and Lost Basins
0
0
0
0
0
Upper Snake Basins
38
56
N/A
N/A
Southern Snake Basins
0
0
N/A
N/A
Bear Basin
26
USDA United States Department of Agriculture
Natural Resources Conservation Service
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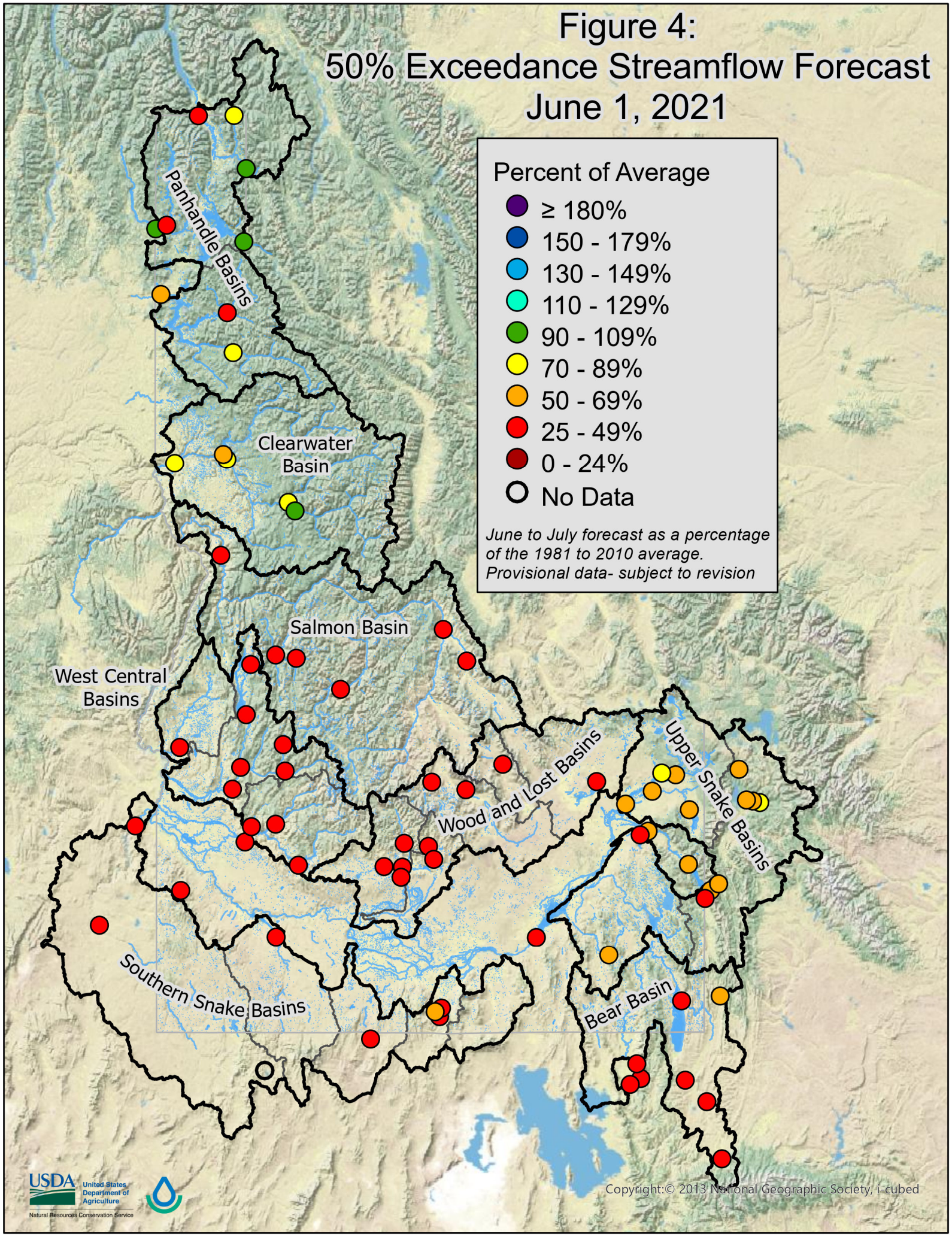
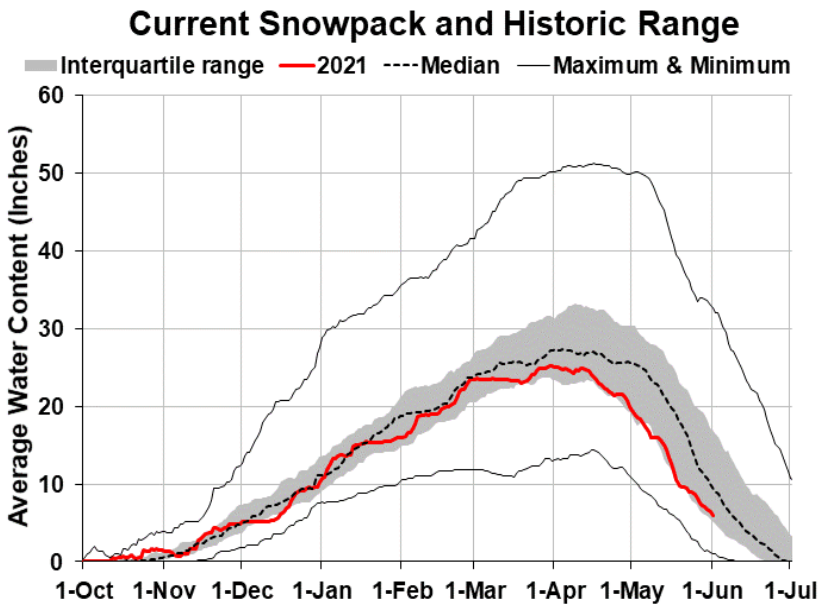
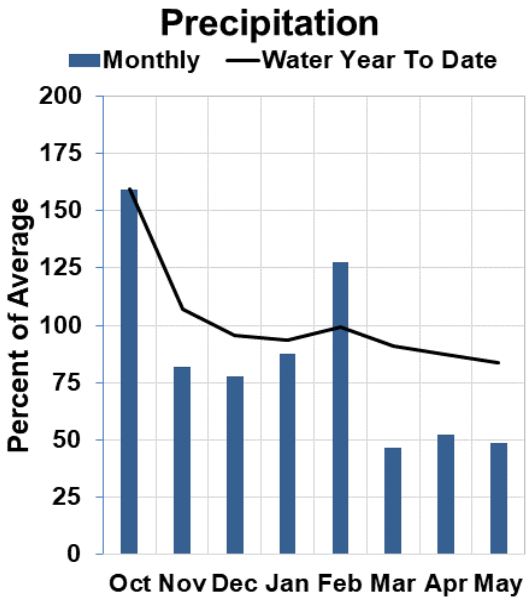
Figure 4:
50% Exceedance Streamflow Forecast
June 1, 2021



Panhandle Basins

June 1, 2021





WATER SUPPLY OUTLOOK

The month of May was a continuation of an abnormally warm and dry spring in the Panhandle basins. Last month's precipitation was ~40% to 70% of normal across the Panhandle sub basins (Fig. 1), except for the Moyie which was 113% of normal. As of June 1, total water year precipitation within the Panhandle sub basins is 75% to 90% of normal (Fig. 2). Snowpack ranges from ~25% to 50% of normal across the Panhandle basins (Fig. 3). As of June 1, snowpack at nearly all sites in the region below 6,000 feet elevation has melted. According to the U.S Drought Monitor report released in late May, nearly the entire Panhandle region is in a stage of abnormally dry or moderate drought conditions. The Seasonal Drought Outlook projects that drought conditions will persist in Bonner and Boundary counties and drought development is more than likely to occur in the remaining areas of the Panhandle basins.

Percent of normal storage among the region's reservoirs are: Coeur d'Alene at 88% (98% capacity), Pend Oreille at 103% (89% capacity), and Priest Lake at 94% (108% capacity). Streamflow forecasts for the June through July period range from 35% to 95% of normal (Fig. 4). The majority of the major streams and rivers have likely hit their peak streamflow based on Bureau of Reclamations snow to flow graphs. For example, the St. Joe and the North Fork Coeur d'Alene rivers peaked in early to mid May. Above normal temperature and below normal precipitation are predicted for June according to the NOAA Climate Prediction Center's 30-day forecast.

Panhandle Region Streamflow Forecasts - June 1, 2021

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Moyie R at Eastport	JUN-JUL	44	75	96	72%	116	147	133
	JUN-SEP	51	85	107	73%	130	163	147
Kootenai R at Leonia 1 & 2	JUN-JUL	2010	2890	3290	90%	3700	4580	3640
	JUN-SEP	2780	3770	4220	91%	4670	5660	4640
Boundary Ck nr Porthill	JUN-JUL	2.9	10.4	15.6	37%	21	28	42
	JUN-SEP	5.3	13.6	19.1	40%	25	33	48
Clark Fork R bl Cabinet Gorge Dam 2	JUN-JUL	2950	4030	4760	95%	5500	6570	5000
	JUN-SEP	3600	4810	5620	94%	6440	7650	5950
Pend Oreille Lake Inflow 2	JUN-JUL	2930	4180	5030	92%	5880	7140	5480
	JUN-SEP	3630	5040	5990	92%	6940	8340	6520
Priest R nr Priest River 2	JUN-JUL	22	85	127	46%	170	235	275
	JUN-SEP	45	115	163	50%	210	280	325
NF Coeur dAlene R at Enaville	JUN-JUL	3	37	68	45%	99	144	150
	JUN-SEP	6.3	54	87	47%	120	168	187
St. Joe R at Calder 2	JUN-JUL	85	189	260	75%	330	435	345
	JUN-SEP	132	245	320	78%	395	505	410
Spokane R nr Post Falls 2	JUN-JUL	9.3	186	320	52%	450	645	620
	JUN-SEP	38	245	385	55%	525	730	705

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

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

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

Reservoir Storage (KAF): End of May

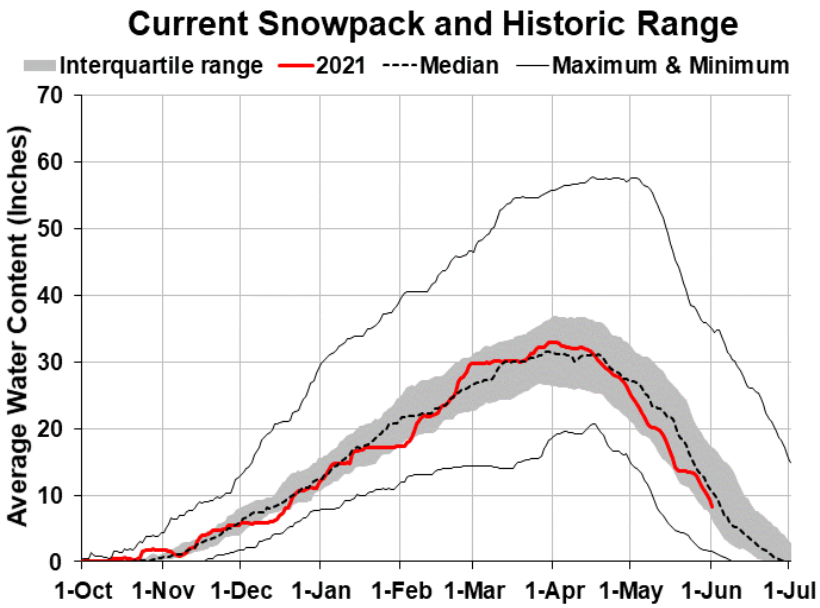
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Hungry Horse Lake	3096.4	3048.1	2733.0	3451.0
Flathead Lake	1519.9	1444.3	1538.0	1791.0
Noxon Rapids Reservoir	332.2	331.1	324.2	335.0
Lake Pend Oreille	1382.9	1302.2	1337.0	1561.3
Priest Lake	128.7	151.0	137.2	119.3
Lake Coeur d' Alene	234.5	231.1	265.5	238.5

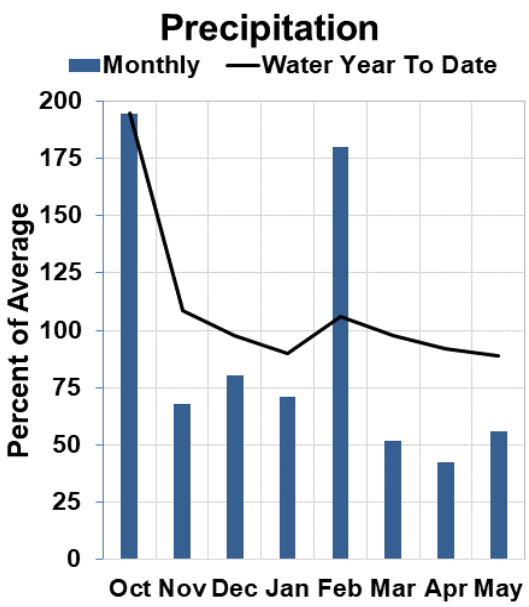
Watershed Snowpack Analysis: June 1, 2021

Basin Name	# of Sites	% of Median 2021	2020
Moyie River	1	0%	16%
Priest River	3	24%	126%
Rathdrum Creek	2		
Coeur d' Alene River	4	0%	184%
St. Joe River	4	87%	110%
Pend Oreille Lake	4	34%	143%
Palouse River	2		
Lower Kootenai	2	0%	338%
Pend Oreille-Kootenai	9	25%	128%
Coeur d' Alene-St. Joe Total	7	66%	118%

Clearwater River Basin

June 1, 2021





WATER SUPPLY OUTLOOK

Below normal monthly precipitation continued for the third straight month in the Clearwater Basin. Precipitation during May was 40% to 95% of normal in the Clearwater sub basins (Fig. 1). As of June 1, total water year precipitation is 80% to 105% of normal in the sub basins (Fig. 2). The snowpack in the Clearwater sub basins are 0% to 75% of normal (Fig. 3). Sites above ~6,000 feet elevation have between 60% to 90% of normal snowpack remaining, all other sites below 6,000 feet are nearing or have melted out as of June 1. The Clearwater Basin is in abnormally dry, moderate drought, or severe drought conditions along the Washington border of the basin, while the eastern half is designated as not having drought conditions according to the U.S Drought Monitor report released in late May. However, drought conditions are projected to develop in the eastern part of the basin and persist along the Washington border this summer.

Dworshak Reservoir is 97% of normal (88% capacity). The Clearwater River at Spalding streamflow forecast for June through July is 71% of normal (Fig. 4). The Clearwater, Lochsa, and Selway rivers have likely hit their peak streamflow for the year based on established relationships between snowpack and peak streamflow. Above normal temperature and below normal precipitation are predicted for June according to the NOAA Climate Prediction Center's 30-day forecast. With record setting temperatures expected in early June, rapid snowmelt is anticipated, which will likely result in additional 'flashy' streamflow runoff increases.

Clearwater River Basin Streamflow Forecasts - June 1, 2021

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Selway R nr Lowell	JUN-JUL	485	650	760	93%	870	1030	820
	JUN-SEP	560	735	850	93%	970	1140	915
Lochsa R nr Lowell	JUN-JUL	250	360	435	77%	510	620	565
	JUN-SEP	300	420	500	78%	580	695	640
Dworshak Reservoir Inflow 2	JUN-JUL	310	470	580	69%	690	850	845
	JUN-SEP	420	600	720	72%	840	1020	1000
Clearwater R at Orofino	JUN-JUL	795	1070	1250	72%	1430	1700	1730
	JUN-SEP	955	1250	1450	74%	1650	1950	1960
Clearwater R at Spalding 2	JUN-JUL	1120	1560	1860	71%	2160	2600	2610
	JUN-SEP	1390	1870	2200	74%	2520	3000	2990

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

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

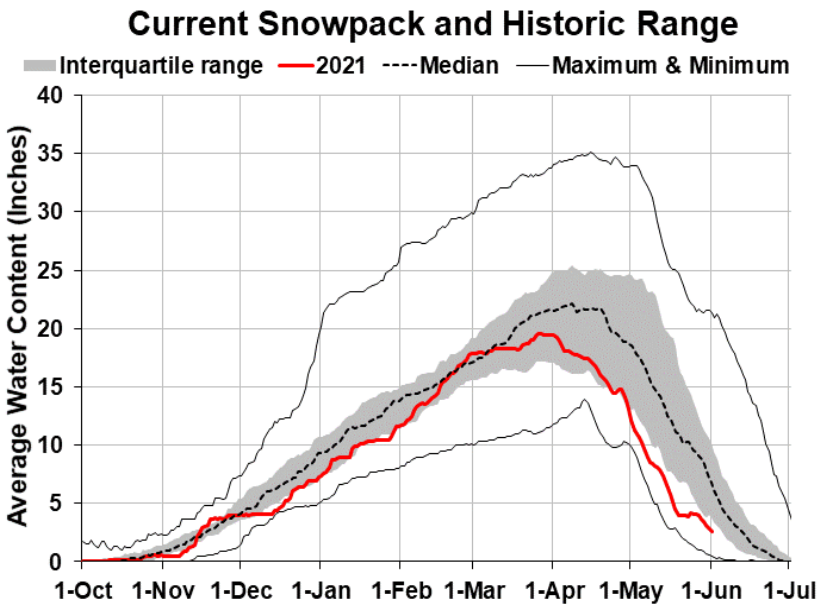
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

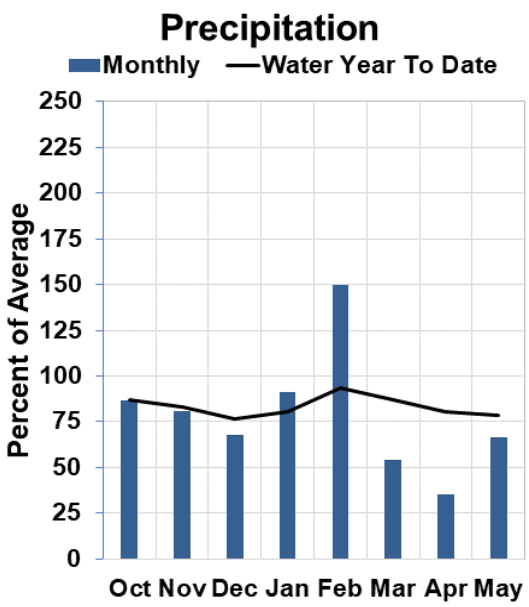
Reservoir Storage (KAF): End of May				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Dworshak Reservoir	3034.7	3231.0	3113.0	3468.0

Watershed Snowpack Analysis: June 1, 2021			
Basin Name	# of Sites	% of Median 2021	2020
NF Clearwater River	8	73%	101%
Lochsa River	2	63%	51%
Selway River	4	67%	64%
SF Clearwater River	1	0%	126%
Clearwater Basin Total	15	72%	94%

Salmon River Basin

June 1, 2021





WATER SUPPLY OUTLOOK

Although May was wetter than April in the Salmon Basin, it was still only 63% of normal (Fig. 1). The continuing dry spring conditions has dropped the total water year precipitation to 76% of normal (Fig. 2). Although relatively cool temperatures and a few storms arrived in late May, all but two SNOTEL sites in the basin were snow-free by June 1. The basin-wide snowpack is 25% of normal (Fig. 3), and despite the late May storms, SNOTEL sites in the Salmon Basin will likely completely melt out about 10 days earlier than normal. It should be noted snow still remains in the high-country (above ~8,000 ft.), especially on north aspects.

The June to July streamflow forecasts are very low across the Salmon Basin. The 50% exceedance forecast for the Salmon River at Salmon is 33% of normal, the Middle Fork Salmon is 46% of normal, and the South Fork Salmon is 42% of normal (Fig. 4). Peak streamflow for the Salmon River at Salmon will likely occur in early June as a result of the record-setting warm temperatures. Early June streamflow is increasing in the Middle Fork of the Salmon and South Fork of the Salmon, although it isn't clear if peaks will surpass those in May. Much of the Salmon Basin is now in moderate to severe drought according to the U.S. Drought Monitor, and the NOAA Climate Prediction Center's 30-day outlook indicates increased chances of above normal temperature and below normal precipitation across the Salmon Basin.

Salmon River Streamflow Forecasts - June 1, 2021

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Salmon R at Salmon	JUN-JUL	54	111	150	33%	189	245	460
	JUN-SEP	108	177	225	38%	270	340	585
Lemhi R nr Lemhi	JUN-JUL	0.13	10.2	17	39%	24	34	44
	JUN-SEP	2.7	14.8	23	38%	31	43	60
MF Salmon R at MF Lodge	JUN-JUL	76	117	145	46%	173	215	315
	JUN-SEP	122	167	198	51%	230	275	390
SF Salmon R nr Krassel Ranger Station	JUN-JUL	14.1	36	50	42%	65	86	119
	JUN-SEP	26	49	64	46%	80	103	138
Johnson Ck at Yellow Pine	JUN-JUL	13.5	25	33	35%	42	53	94
	JUN-SEP	20	33	42	39%	51	64	107
Salmon R at White Bird	JUN-JUL	550	895	1130	41%	1360	1710	2760
	JUN-SEP	865	1250	1520	46%	1780	2170	3330

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

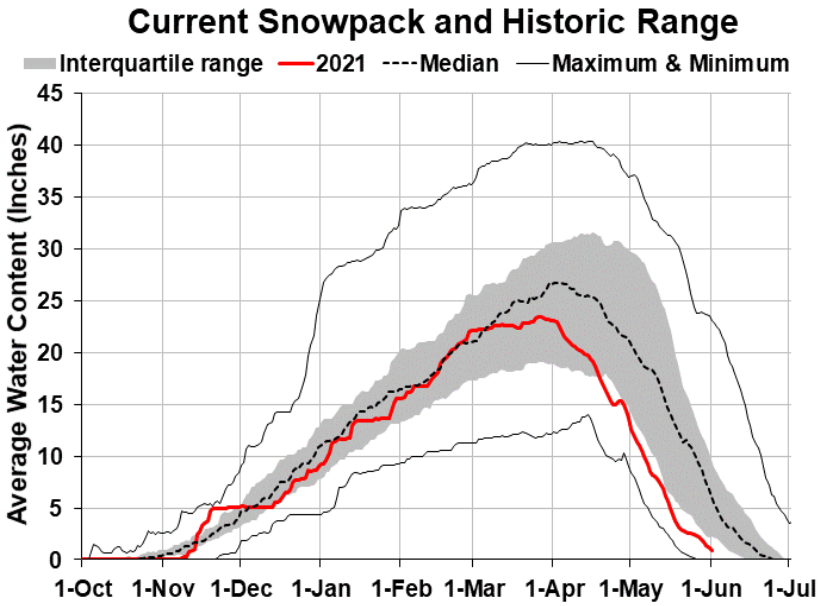
1) 90% and 10% exceedance probabilities are actually 95% and 5%

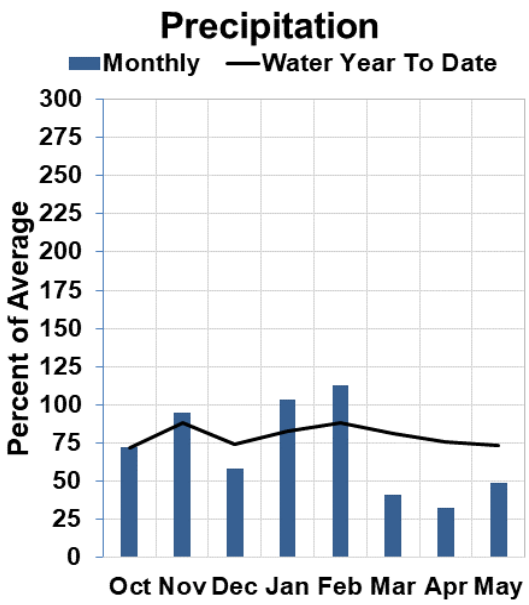
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

Watershed Snowpack Analysis: June 1, 2021 Basin Name	# of Sites	% of Median 2021	2020
Salmon River ab Salmon	7	13%	29%
Lemhi River	4	0%	0%
MF Salmon River	3	37%	48%
SF Salmon River	3	24%	42%
Little Salmon River	4		
Lower-Middle Salmon	4	0%	66%
Salmon Basin Total	20	25%	43%

West Central Basins

June 1, 2021





WATER SUPPLY OUTLOOK

The dry spring continued in the West Central basins; May precipitation was only ~45% to 50% of normal (Fig. 1). Water year precipitation is ~75% of normal (Fig. 2). Although relatively cool temperatures and some precipitation arrived in late May, all but three SNOTEL sites in the basin were snow-free by June 1. The Payette Basin snowpack is 17% of normal, the Boise Basin snowpack is 9% of normal, and all measurement sites in the Weiser Basin have melted out (Fig. 3). Some storms in late May slowed the snowpack melt rate in the Boise and Payette basins, but the Payette Basin is still on pace for stations to be snow-free about a week earlier than normal, and stations in the Boise Basin is on pace to be snow-free about two weeks early.

Reservoir storage in the Boise system is 88% of normal at Anderson Ranch (73% capacity), 79% of normal at Arrowrock (57% capacity) and 108% of normal at Lucky Peak (96% capacity). In the Payette, Deadwood is 90% of normal (81% capacity) and Cascade is 100% of normal. Mann Creek Reservoir is 100% of normal. June to July streamflow forecasts are low across the West Central basins. The June to July 50% exceedance streamflow forecasts for the Boise Basin are all between 30% and 44% of normal, the Payette is similar at 35% and 48% of normal, and the Weiser is 44% (Fig. 4). The dry spring and early snowpack melt out in the Weiser Basin indicates that peak streamflow has already occurred. Streamflow will likely peak in early June in the Payette and Boise basins. Much of the West Central basins are now in moderate to severe drought according to the U.S. Drought Monitor, and the NOAA Climate Prediction Center's 30-day outlook indicates increased chances of above normal temperature and below normal precipitation across Idaho.

West Central Basins Streamflow Forecasts - June 1, 2021

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
SF Boise R at Anderson Ranch Dam 2	JUN-JUL	8.9	37	56	30%	75	104	186
	JUN-SEP	27	58	79	36%	99	130	220
Boise R nr Twin Springs	JUN-JUL	48	82	105	44%	128	162	240
	JUN-SEP	77	114	140	48%	165	205	290
Mores Ck nr Arrowrock Dam	JUN-JUL	1.21	7	10.9	40%	14.9	21	27
	JUN-SEP	2.4	8.9	13.2	43%	17.6	24	31
Boise R nr Boise 2	JUN-JUL	83	142	181	38%	220	280	480
	JUN-SEP	136	205	255	44%	300	375	580
Lake Fork Payette R nr McCall	JUN-JUL	6.8	13.3	17.7	47%	22	29	38
	JUN-SEP	7.9	14.7	19.4	47%	24	31	41
NF Payette R at Cascade 2	JUN-JUL	4.3	40	65	36%	90	126	179
	JUN-SEP	0.41	41	68	35%	95	136	192
NF Payette R nr Banks 2	JUN-JUL	3.5	48	78	35%	109	153	220
	JUN-SEP	2.6	52	85	35%	118	167	240
SF Payette R at Lowman	JUN-JUL	66	87	101	48%	116	137	210
	JUN-SEP	96	121	138	53%	155	180	260
Deadwood Reservoir Inflow 2	JUN-JUL	5.5	13.3	18.6	34%	24	32	54
	JUN-SEP	10.8	19.3	25	40%	31	39	63
Payette R nr Horseshoe Bend 2	JUN-JUL	101	178	230	37%	280	360	625
	JUN-SEP	148	235	295	38%	355	445	775
Weiser R nr Weiser	JUN-JUL	21	34	44	44%	55	75	99
	JUN-SEP	35	51	63	50%	77	99	127

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

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

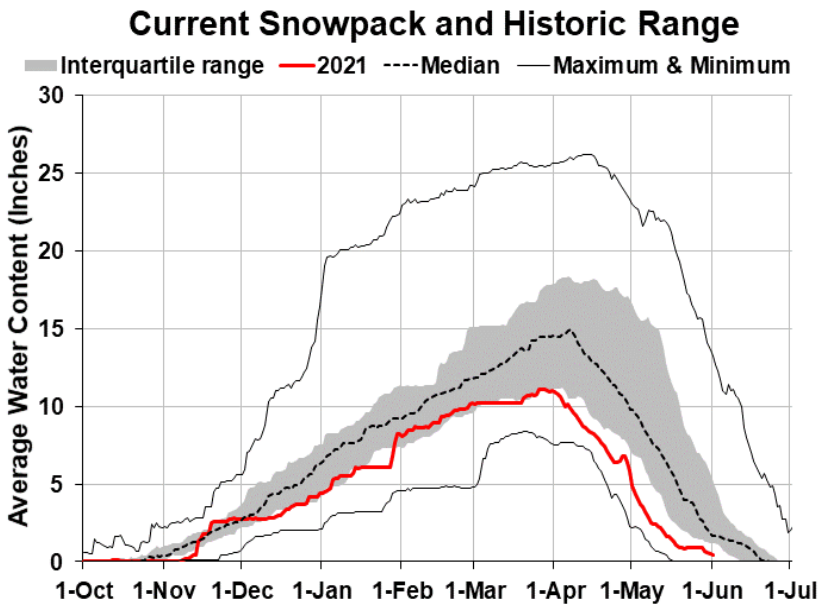
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions

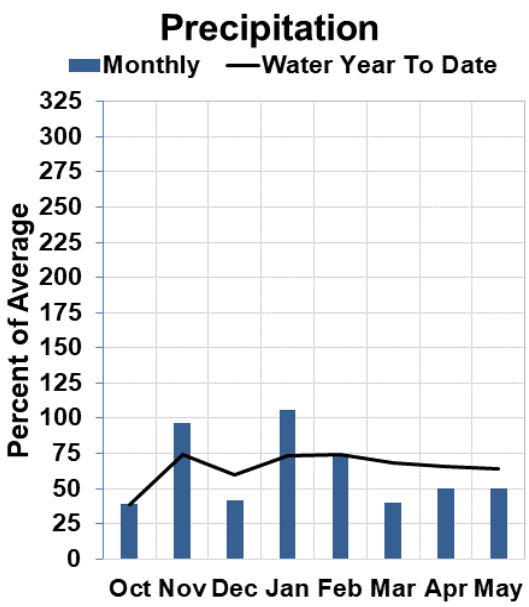
Reservoir Storage (KAF): End of May				
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Anderson Ranch Reservoir	329.7	380.0	375.3	450.2
Arrowrock Reservoir	156.2	215.9	198.1	272.2
Lucky Peak Reservoir	282.9	288.0	262.1	293.2
Sub-Basin Total	**768.8**	**883.9**	**835.5**	**1015.6**
Deadwood Reservoir	131.2	146.2	145.5	161.9
Cascade Reservoir	623.7	680.1	625.3	693.2
Sub-Basin Total	**754.9**	**826.3**	**770.8**	**855.1**
Lake Lowell	129.3	143.3	122.9	165.2
Mann Creek Reservoir	10.5	10.9	10.5	11.1

Watershed Snowpack Analysis: June 1, 2021			
Basin Name	# of Sites	% of Median 2021	2020
SF Boise River	5	10%	26%
MF & NF Boise Rivers	5	1%	19%
Mores Creek	2		
Canyon Creek	1		
Boise Basin Total	9	9%	23%
NF Payette River	6	0%	22%
SF Payette River	4	27%	36%
Payette Basin Total	12	17%	31%
Mann Creek	1		
Weiser Basin Total	4		

Wood & Lost River Basins

June 1, 2021





WATER SUPPLY OUTLOOK

Although May precipitation was only ~45% to 75% of normal in the Wood and Lost basins, and 86% of normal in the Birch-Medicine Lodge-Beaver-Camas basins (Fig. 1), it was still closer to normal than April. Water year precipitation in the Wood and Lost basins is now ~60 to 70% of normal (Fig. 2). Relatively cool temperatures and precipitation in late May slowed the rapid pace of snowmelt; but even so, all SNOTEL sites in the Wood and Lost basins were melted out by June 1 (Fig. 3). Snowpack melt out occurred nearly three weeks earlier than normal in the Big Wood Basin, and about 10 days earlier than normal in the rest of the Wood and Lost basins. That being said, the Wood & Lost basins are home to the highest mountains in Idaho, so high-country snowmelt will continue during June across the Pioneer, Lost-River, and Lemhi Mountains.

Reservoir storage reflects the ongoing drought conditions. Mackay Reservoir is currently 63% of normal (49% capacity), Little Wood Reservoir is 51% of normal (47% capacity) and Magic Reservoir is 17% of normal (11% capacity). Unsurprisingly, the streamflow picture has not improved in the Wood and Lost basins. The June to July 50% exceedance forecast for the Big Lost River is ~20% of normal, Little Lost is 36% of normal, Big Wood is 20% of normal, and Little Wood is ~30% to 50% of normal (Fig. 4). Despite the low snowpack and early melt out, peak streamflow will likely occur in early June in the Big Lost and Little Wood systems. All of the Wood and Lost basins are in moderate to severe drought according to the U.S. Drought Monitor, and areas around the Pioneer Mountains are facing extreme drought conditions. With the NOAA Climate Prediction Center's 30-day outlook indicating increased chances of above normal temperatures and below normal precipitation across Idaho, unfortunately dry conditions will likely continue.

Wood and Lost Basins Streamflow Forecasts - June 1, 2021

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Camas Ck at Camas	JUN-JUL	0	0.35	0.9	10%	1.72	3.4	8.6
Little Lost R bl Wet Ck nr Howe	JUN-JUL	1.52	4	5.6	36%	7.3	9.8	15.5
	JUN-SEP	2.9	6.3	8.7	40%	11	14.5	22
Big Lost R at Howell Ranch	JUN-JUL	3	9.4	22	22%	35	54	102
	JUN-SEP	5	14.9	31	25%	46	70	122
Big Lost R bl Mackay Reservoir	JUN-JUL	1	7	13	16%	26	44	82
	JUN-SEP	3	10.2	26	24%	42	65	109
Little Wood R ab High Five Ck	JUN-JUL	8.3	11.5	14.1	49%	16.8	21	29
	JUN-SEP	4.4	7.4	9.8	28%	12.7	17.5	35
Little Wood R nr Carey 2	JUN-JUL	3.2	5.6	7.7	27%	10.1	14.2	29
	JUN-SEP	4.1	7.2	9.7	28%	12.6	17.7	35
Big Wood R at Hailey	JUN-JUL	5.2	13.4	26	20%	39	57	127
	JUN-SEP	7	16.3	32	21%	48	71	155
Big Wood R ab Magic Reservoir	JUN-JUL	1.73	6.7	12	13%	18.8	32	89
	JUN-SEP	2.7	8.8	15	15%	23	37	101
Camas Ck nr Blaine	JUN-JUL	0	0.32	0.98	9%	2	4.2	11.1
	JUN-SEP	0.01	0.5	1.27	11%	2.4	4.6	11.7
Big Wood R bl Magic Dam 2	JUN-JUL	2.5	6.9	11	11%	16.1	25	97
	JUN-SEP	4.4	9.9	15	14%	21	32	111

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

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

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

Reservoir Storage (KAF): End of May

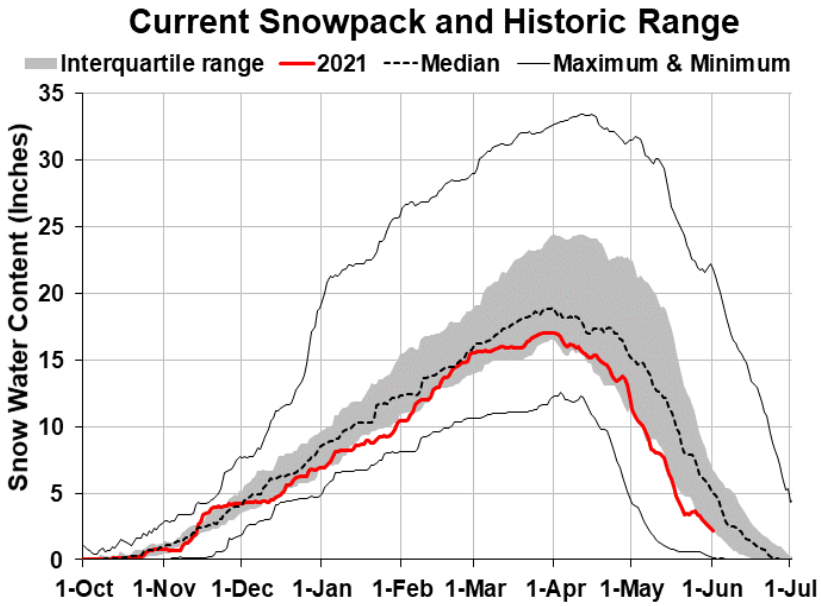
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Mackay Reservoir	21.8	40.3	34.6	44.4
Little Wood Reservoir	14.1	26.1	27.3	30.0
Magic Reservoir	21.7	130.5	130.3	191.5

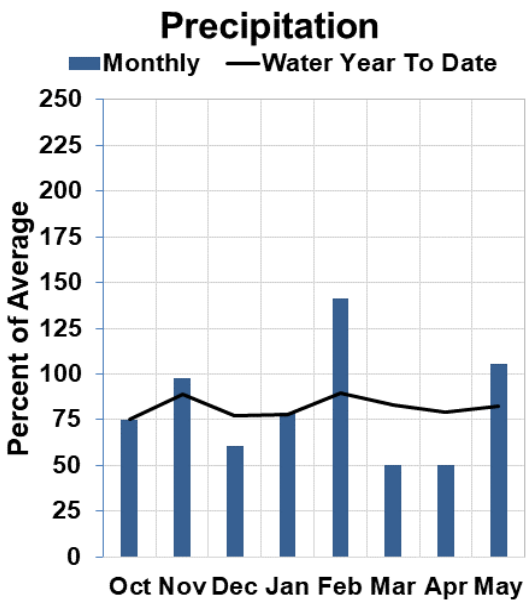
Watershed Snowpack Analysis: June 1, 2021

Basin Name	# of Sites	% of Median 2021	2020
Camas-Beaver Creeks	2		
Birch-Medicine Lodge Creeks	2	0%	0%
Little Lost River	3	0%	0%
Big Lost River ab Mackay	4	0%	0%
Big Lost Basin Total	5	0%	0%
Fish Creek	0		
Little Wood ab Resv	4	0%	0%
Big Wood River ab Hailey	5	0%	0%
Camas Creek	2		
Birch-Medicine Lodge-Camas-Beaver Total	4	0%	0%
Little Wood Basin Total	4	0%	0%
Big Wood Basin Total	7	0%	0%

Upper Snake River Basins

June 1, 2021





WATER SUPPLY OUTLOOK

Near normal to well above normal precipitation occurred throughout the Upper Snake during May except for the Portneuf, which received 31% of normal precipitation (Fig. 1). As of June 1, water year total precipitation in the Upper Snake is ~85% of normal (Fig. 2). A month of near normal temperatures slowed the rate of snowmelt in the Upper Snake. Snow remains above 8,100 feet; with more snow remaining at higher elevation sites on the eastern side of the Wyoming Range, the Bridger-Teton, and the Yellowstone areas.

Reservoir storage in the Upper Snake system is ~80% capacity—this is normal storage for this time of year as water operators release water to accommodate remaining snowmelt runoff. As of June 1, the Jackson-Palisades system is at ~125% of normal storage. Streamflow forecasts are below normal but have increased slightly since May forecasts for the Upper Snake basins and range from ~15% to 80% for the remaining runoff period (Fig. 4). The Snake River near Heise forecast is 66% of normal. While above normal May precipitation increased basin water totals, Upper Snake water users would benefit from late Spring and Summer precipitation to bolster soil moisture and carryover storage. NOAA's official 30-day outlook predicts above normal temperatures and below average precipitation.

Upper Snake River Basin Streamflow Forecasts - June 1, 2021

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Henrys Fk nr Ashton 2	JUN-JUL	121	150	170	74%	189	220	230
	JUN-SEP	270	305	330	80%	355	390	410
Falls R nr Ashton 2	JUN-JUL	80	101	115	63%	130	151	182
	JUN-SEP	131	157	176	70%	194	220	250
Teton R nr Driggs	JUN-JUL	31	47	57	57%	67	82	100
	JUN-SEP	50	69	83	60%	96	116	139
Teton R nr St Anthony	JUN-JUL	66	101	125	60%	148	183	210
	JUN-SEP	107	148	176	63%	205	245	280
Henrys Fk nr Rexburg 2	JUN-JUL	335	415	475	67%	530	615	710
	JUN-SEP	600	710	785	71%	860	970	1100
Snake R at Flagg Ranch	JUN-JUL	71	105	128	54%	152	186	235
	JUN-SEP	99	135	160	57%	185	220	280
Snake R nr Moran 2	JUN-JUL	141	191	225	53%	260	310	425
	JUN-SEP	193	245	285	56%	320	375	505
Pacific Ck at Moran	JUN-JUL	21	41	54	63%	68	88	86
	JUN-SEP	27	48	62	65%	76	97	96
Buffalo Fk ab Lava Ck nr Moran	JUN-JUL	120	142	158	77%	173	195	205
	JUN-SEP	144	170	188	78%	205	235	240
Snake R ab Reservoir nr Alpine 2	JUN-JUL	705	815	885	69%	960	1070	1280
	JUN-SEP	930	1060	1140	71%	1230	1360	1610
Greys R ab Reservoir nr Alpine	JUN-JUL	85	100	110	67%	121	136	164
	JUN-SEP	119	138	150	70%	163	182	215
Salt R ab Reservoir nr Etna	JUN-JUL	13.2	45	67	47%	89	121	143
	JUN-SEP	50	89	116	55%	143	182	210
Snake R nr Irwin 2	JUN-JUL	870	1010	1110	65%	1210	1350	1700
	JUN-SEP	1200	1370	1490	68%	1610	1780	2190
Snake R nr Heise 2	JUN-JUL	930	1080	1180	66%	1280	1430	1800
	JUN-SEP	1310	1490	1610	69%	1740	1920	2350
Willow Ck nr Ririe 2	JUN-JUL	0.17	1.23	2.5	17%	4.2	7.6	14.4
Portneuf R at Topaz	JUN-JUL	13	15.3	17	61%	18.8	22	28
	JUN-SEP	20	25	28	62%	31	36	45
Snake R at Neeley 2	JUN-JUL	66	152	230	20%	325	500	1130
	JUN-SEP	50	135	220	17%	320	505	1290

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

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

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

Reservoir Storage (KAF): End of May

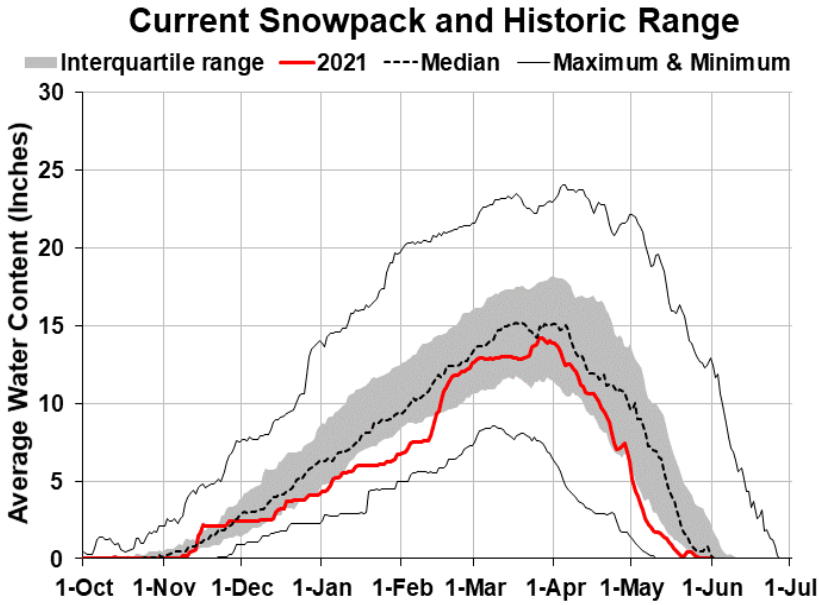
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Jackson Lake	799.3	775.9	605.7	847.0
Palisades Reservoir	1219.9	1133.7	1027.0	1400.0
Sub-Basin Total	**2019.2**	**1909.6**	**1632.7**	**2247.0**
Henrys Lake	90.8	90.6	85.6	90.4
Island Park Reservoir	135.4	135.0	133.4	135.2
Grassy Lake	15.4	15.4	14.3	15.2
Sub-Basin Total	**241.5**	**241.1**	**233.3**	**240.8**
Ririe Reservoir	67.5	81.3	69.6	80.5
Blackfoot Reservoir		337.0	235.2	337.0
American Falls Reservoir	1034.5	1667.9	1459.0	1672.6
Basin-Wide Total	**3362.8**	**4237.0**	**3629.8**	**4577.9**

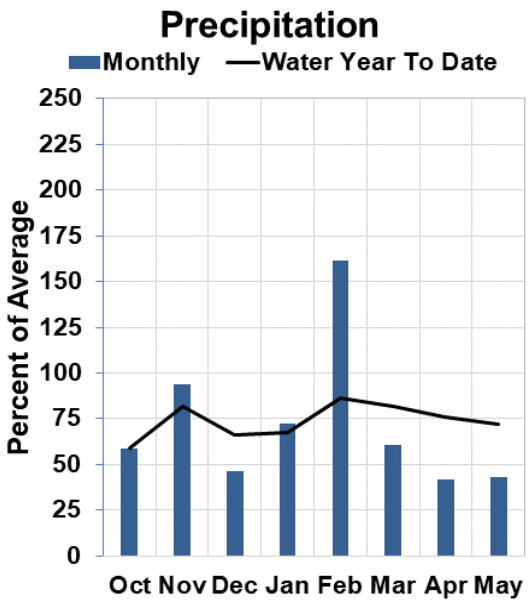
Watershed Snowpack Analysis: June 1, 2021

Basin Name	# of Sites	% of Median 2021	2020
Henrys Fork-Falls River	5	21%	65%
Teton River	3	54%	88%
Henrys Fork-Teton	8	38%	77%
Snake River ab Jackson Lake	5	38%	87%
Pacific Creek	2	63%	103%
Buffalo Fork	2	71%	92%
Gros Ventre River	3	87%	114%
Hoback River	4	93%	133%
Greys River	5	83%	128%
Salt River	4	0%	176%
Snake ab Palisades Resv	19	56%	104%
Willow Creek	5	83%	128%
Blackfoot River	2		
Portneuf River	3		
Willow-Blackfoot-Portneuf	6		

Southern Snake River Basins

June 1, 2021





WATER SUPPLY OUTLOOK

Monthly precipitation in the Southern Snake River basins was well below normal and ranges from ~25% to 50% (Fig. 1). As of June 1, water year total precipitation in the Southern Snake basins ranges from ~65% to 75% of normal (Fig. 2). Although there were short periods of cool, wet weather, overall May was warm and dry and lead to earlier than normal complete snowpack melt out. As these basins transition into the dry season, it looks very unlikely that total water year precipitation will recover to normal conditions. Additionally, NOAA's official 30-day outlook predicts above normal temperature and lower than normal precipitation throughout this region. Recent reports of very dry soil conditions have verified the well below normal precipitation.

June 1 reservoir storage as compared to the historical average are: Oakley 68%, Salmon Falls 55%, Wild Horse 99% and Lake Owyhee 66%. Streamflow 50% exceedance forecasts for the June through July period range from ~10% to 55% of normal, and ~5% to 50% of normal for the 70% exceedance forecast (Fig. 4). As expected with the spring conditions described above, spring streamflow is well below normal and it is likely that many of these south Snake River tributaries already reached peak streamflow for the season. This can be seen in the Bureau of Reclamation snow to flow graphs: Salmon Falls Creek, Bruneau River near Hot Spring, and Owyhee River near Rome.

Southside Snake River Basins Streamflow Forecasts - June 1, 2021

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Goose Ck ab Trapper Ck nr Oakley	JUN-JUL	0.22	0.79	1.37	29%	2.1	3.5	4.7
	JUN-SEP	0.41	1.19	1.95	33%	2.9	4.6	6
Trapper Ck nr Oakley	JUN-JUL	0.73	0.91	1.05	57%	1.19	1.43	1.85
	JUN-SEP	1.63	1.88	2.1	70%	2.3	2.6	3
Oakley Reservoir Inflow	JUN-JUL	0.66	1.28	1.81	28%	2.4	3.5	6.5
	JUN-SEP	1.56	2.5	3.2	36%	4	5.4	9
Salmon Falls Ck nr San Jacinto	JUN-JUL	0.79	2.2	3.5	18%	5.1	8	20
	JUN-SEP	1.92	3.9	5.6	23%	7.7	11.3	24
Bruneau R nr Hot Spring	JUN-JUL	7.5	13	17.6	27%	23	32	66
	JUN-SEP	10.4	16.8	22	29%	28	38	75
Reynolds Ck at Tollgate	JUN-JUL	0.01	0.09	0.2	13%	0.35	0.65	1.56
	JUN-SEP	0.03	0.16	0.3	#DIV/0!	0.48	0.83	0
Owyhee R nr Gold Ck 2								
Owyhee R nr Rome	JUN-JUL	7	15.3	23	37%	32	48	63
	JUN-SEP	14.2	25	35	44%	45	64	80
Owyhee R bl Owyhee Dam 2	JUN-JUL	15.5	27	36	47%	46	64	76
	JUN-SEP	35	50	61	58%	74	96	106

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

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

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

Reservoir Storage (KAF): End of May

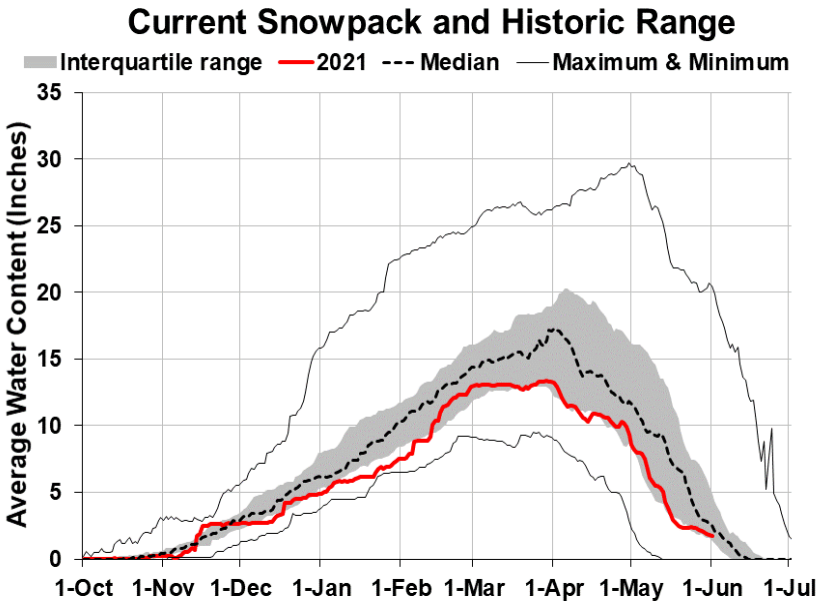
Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Oakley Reservoir	25.5	42.5	37.4	75.6
Salmon Falls Reservoir	45.8	107.8	82.7	182.6
Wild Horse Reservoir	51.6	73.4	52.0	71.5
Lake Owyhee	352.7	576.5	536.2	715.0
Brownlee Reservoir	1339.5	1379.5	1343.0	1420.0

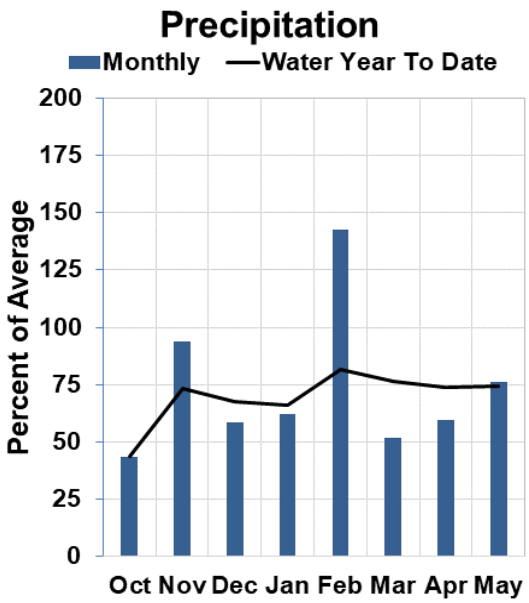
Watershed Snowpack Analysis: June 1, 2021

Basin Name	# of Sites	% of Median 2021	% of Median 2020
Raft River	1		
Goose-Trapper Creeks	2		
Salmon Falls Creek	4	0%	0%
Bruneau River	5	0%	0%
Reynolds Creek	1		
Upper Owyhee	5		
Owyhee Basin Total	7		

Bear River Basin

June 1, 2021





WATER SUPPLY OUTLOOK

Last month was a continuation of the dry water year conditions. Monthly precipitation was ~65% of normal (Fig. 1) and total water year precipitation is ~70% of normal as of June 1 (Fig. 2). Although there were short periods of cool, wet weather, overall May was warm and dry, and this led to earlier than normal complete snowpack melt out. One storm in late May brought precipitation and snow to some areas above 8,000 feet, but it mostly hit the north eastern region of this basin which resulted in a small area with near normal monthly precipitation. NOAA's official 30-day outlook predicts above normal temperature and below normal precipitation. It looks very unlikely that total water year precipitation will recover to normal conditions before the summer, or even during the summer.

Bear Lake Reservoir storage is at 113% (62% capacity). Streamflow 50% exceedance forecasts for the June through July period range from ~5% to 50% of normal, and 0% to 45% of normal for the 70% exceedance forecast (Fig. 4). Spring streamflow is well below normal and it's is likely many of the Bear River tributaries have already reached peak streamflow for the season. This can be seen in the Bureau of Reclamation snow to flow graphs: Bear River above reservoir near Woodruff, and Smiths Fork near Border. A complete list of these products can be found here.

Bear River Basin Streamflow Forecasts - June 1, 2021

Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <--Drier----------Projected Volume----------Wetter--> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Bear R nr UT-WY State Line	APR-JUL	34	51	63	56%	74	91	112
	APR-SEP	37	56	70	57%	83	102	123
	JUN-JUL	1.32	7.6	17	26%	26	40	66
Bear R ab Resv nr Woodruff	APR-JUL	0	0	21	17%	34	70	121
	APR-SEP	0	0	19	15%	41	77	128
	JUN-JUL	0	0	3	5%	12.5	29	57
Big Ck nr Randolph	APR-JUL	0	0.12	1.5	39%	2.9	3.8	3.8
	JUN-JUL	0	0.05	0.3	18%	0.75	1.48	1.66
Smiths Fk nr Border	APR-JUL	28	38	44	49%	50	60	89
	APR-SEP	36	46	53	51%	60	70	104
	JUN-JUL	16.1	22	26	52%	30	36	50
Bear R bl Stewart Dam 2	APR-JUL	0	0	9.9	5%	40	84	183
	APR-SEP	0	0	10.8	5%	39	88	205
	JUN-JUL	0	0	2.3	2%	31	41	93

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

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

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

Reservoir Storage (KAF): End of May

Reservoir Name	Current (KAF)	Last YR	Average (KAF)	Capacity (KAF)
Bear Lake	804.3	1122.4	710.6	1302.0
Montpelier Reservoir		4.1	3.4	4.0

Watershed Snowpack Analysis: June 1, 2021

Basin Name	# of Sites	% of Median 2021	% of Median 2020
Smiths-Thomas Forks	4	100%	108%
Bear Lake	4		
Montpelier Creek	1		
Mink Creek	0		
Cub River	1	0%	0%
Bear River Total	16	26%	39%
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 Average. The 30-year average streamflow for each forecast period is provided for comparison. The average is based on data from 1981-2010. The % AVG. column compares the 50% chance of exceedance forecast to the 30-year average streamflow; values above 100% denote when the 50% chance of exceedance forecast would be greater than the 30-year average streamflow.

AF - Acre-feet, forecasted volume of water are typically in thousands of acre-feet (KAF).

These forecasts are given to users to help make risk-based decisions. Users can select the forecast corresponding to the level of risk they are willing to accept in order to minimize the negative impacts of having more or less water than planned for.

To Decrease the Chance of Having Less Water than Planned for
A user might determine that making decisions based on a 50 percent chance of exceedance forecast is too much risk to take (there is still a 50% chance that the user will receive less than this amount). To reduce the risk of having less water than planned for, users can base their operational decisions on one of the forecasts with a greater chance of being exceeded such as the 90 or 70 percent exceedance forecasts.

To Decrease the Chance of Having More Water than Planned for
A user might determine that making decisions based on a 50 percent chance of exceedance forecast is too much risk to take (there is still a 50% chance that the user will receive more than this amount). To reduce the risk of having more water than planned for, users can base their operational decisions on one of the forecasts with a lesser chance of being exceeded such as the 30 or 10 percent exceedance forecasts.

<u>Forecast use example:</u>

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

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

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

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

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

Upper Snake River Basin Streamflow Forecasts - June 1, 2015

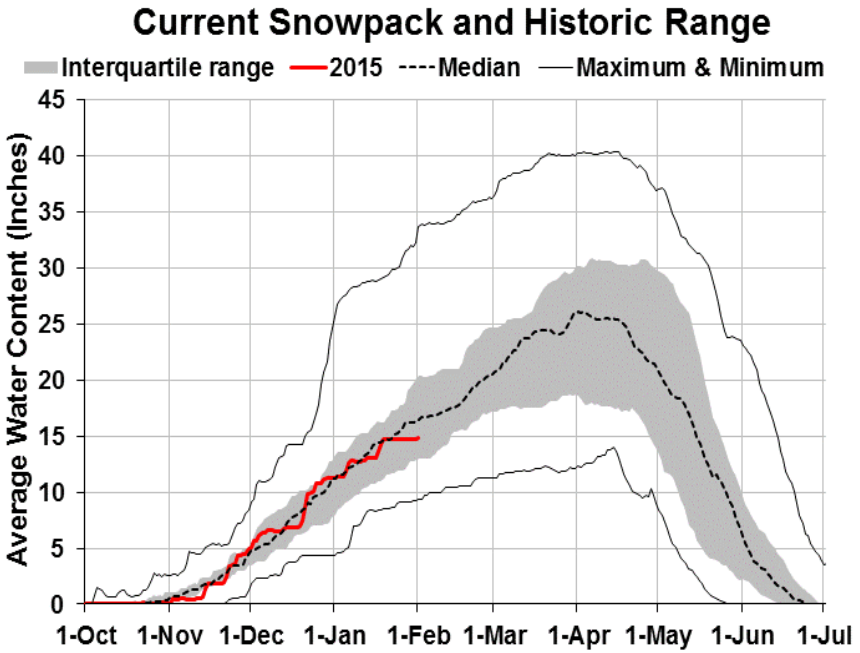
Forecast Point	Forecast Period	Forecast Exceedance Probabilities for Risk Assessment <---Drier----------Projected Volume----------Wetter---> 90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
Henrys Fk nr Ashton	JUN-JUL	72	106	129	56	152	186	230
	JUN-SEP	198	245	280	68	315	360	410

Interpreting Snowpack Plots

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

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

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



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

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.