

# Washington Water Supply Outlook Report February 1, 2014



January 28, 2014, Rocco Clark of the Yakama Nation takes a bulk sample measurement at Toppenish Ridge snow course, 15 miles SW of White Swan, WA. As seen the crew was able to access the site by vehicle instead of the normal snowmobile trip. Photo by Scott Ladd, Yakama Nation.

# Water Supply Outlook Reports and Federal - State – Private Cooperative Snow Surveys

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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 it 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 prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

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

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

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# Washington Water Supply Outlook

February 2014

## General Outlook

The 12<sup>th</sup> man helped the Seattle Seahawks bring home the Super Bowl XLVIII championship so maybe now that their job is done for the season we can enlist them to champion a comeback for our mountain snowpack. We're not in overtime yet but we are most certainly deep into the second half. In true "Beast Mode" fashion we would need to see 200% of normal snowfall over the next two months to catch up to normal. It can and has happened in the past but at this point in the game we can't count out either possibility. Today's best advice would be conservation and conservative planning for summer water use. Short term forecasts are promising with cool and stormy weather on the horizon. However the latest long term guidance from the Climate Prediction Center still indicates an un-decisive precipitation and temperature forecast for equal chances of below, above or normal conditions.

## Snowpack

The February 1 statewide SNOTEL readings were 55% of normal but vary across the state. So far we should have received about 70% of our annual total snowfall however we fall well short of that at only about 35%. The Olympic Peninsula data reported the lowest readings at 25% of average. Readings from the Pend Oreille, including Idaho and Montana data, reported the highest at 101% of normal. Westside medians from SNOTEL, and February 1 snow surveys, included the North Puget Sound river basins with 72% of normal, the Central and South Puget river basins with 57%, and the Lewis-Cowlitz basins with 54%. Snowpack along the east slopes of the Cascade Mountains included the Yakima and Wenatchee areas with 54%. Snowpack in the Spokane River Basin stood at 74% and the Walla Walla River Basin had 68% of the long term median.

BASIN	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Spokane	92	74
Newman Lake	62	58
Pend Oreille	110	101
Okanogan	73	89
Methow	58	70
Conconully Lake	22	33
Central Columbia	58	54
Upper Yakima	53	52
Lower Yakima	53	57
Ahtanum Creek	47	52
Walla Walla	75	68
Lower Snake	94	80
Cowlitz	52	70
Lewis	25	37
White	46	68
Green	34	30
Puyallup	46	71
Cedar	29	40
Snoqualmie	50	61
Skykomish	50	61
Skagit	54	62
Nooksack	61	72
Olympic Peninsula	18	25

## Precipitation

Once again a particularly warm and dry month with valley stations reporting less than 50% of average and SNOTEL reading 75% and below. The highest percent of average was reported in the South Puget Sound basins with a January total of 87% however water-year average remained below normal at 76%. The Olympic Peninsula suffered the worst with only 40% for the water-year. The wettest spot in the state was reported at Alpine Meadows SNOTEL in the Tolt River Basin with a January accumulation of 21.2 inches, or 89% of average. Salmon Meadows SNOTEL near Conconully recorded no rain for January and only 2.60 inches since October 1.

RIVER BASIN	JANUARY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	74	67
Pend Oreille	69	64
Upper Columbia	45	47
Central Columbia	64	55
Upper Yakima	68	63
Lower Yakima	69	58
Walla Walla	76	82
Lower Snake	79	75
Lower Columbia	71	59
South Puget Sound	87	76
Central Puget Sound	82	76
North Puget Sound	84	61
Olympic Peninsula	65	43

## Reservoir

Seasonal reservoir levels in Washington can vary greatly due to specific watershed management practices required in preparation for irrigation season, fisheries management, power generation, municipal demands and flood control. For the most part water year 2013 ended with decent reservoir carryover. Reservoir storage in the Yakima Basin was 462,000-acre feet, 114% of average for the Upper Reaches and 148,000-acre feet or 121% of average for Rimrock and Bumping Lakes. The power generation reservoirs included the following: Coeur d'Alene Lake, 43,000 acre feet, 45% of average and 18% of capacity; and the Skagit River reservoirs at 58% of average and 41% of capacity. Recent climate impacts and management procedures may affect these numbers on a daily or weekly basis.

BASIN	PERCENT OF CAPACITY	CURRENT STORAGE AS PERCENT OF AVERAGE
Spokane	18	45
Pend Oreille	38	78
Upper Columbia	89	109
Central Columbia		
Upper Yakima	55	114
Lower Yakima	64	121
Lower Snake	67	100
North Puget Sound	41	58

*For more information contact your local Natural Resources Conservation Service office.*

## Streamflow

Forecasts vary from 33% of average for the Methow near Pateros (down 18% from January) to 99% of average for the Pend Oreille. April-September forecasts for some Western Washington streams include the Cedar River near Cedar Falls, 72%; White River, 90%; and Skagit River, 76%. Some Eastern Washington streams include the Yakima River near Parker, 58%; Wenatchee River at Plain, 57% and Spokane River near Post Falls, 71%. Volumetric forecasts are developed using current, historic and average snowpack, precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS. Caution should be used when using early season forecasts for critical water resource management decisions.

<b>BASIN</b>	<b>PERCENT OF AVERAGE FORECAST (50 PERCENT CHANCE OF EXCEEDENCE)</b>
Spokane	47-71
Pend Oreille	63-99
Upper Columbia	33-89
Central Columbia	39-85
Upper Yakima	46-65
Lower Yakima	46-75
Walla Walla	78-92
Lower Snake	74-94
Lower Columbia	58-84
South Puget Sound	66-90
Central Puget Sound	71-84
North Puget Sound	74-88
Olympic Peninsula	70

<b>STREAM</b>	<b>PERCENT OF AVERAGE JANUARY RUNOFF</b>
Pend Oreille at Albeni Fall Dam	73
Kettle at Laurier	89
Columbia at Birchbank	86
Spokane at Spokane	62
Similkameen at Nighthawk	112
Okanogan at Tonasket	103
Methow at Pateros	107
Chelan at Chelan	77
Wenatchee at Pashastin	89
Cle Elum near Roslyn	90
Yakima at Parker	78
Naches at Naches	62
Grande Ronde at Troy	82
Snake below Lower Granite Dam	66
Columbia River at The Dalles	77
Cowlitz below Mayfield Dam	87
Skagit at Concrete	99
Dungeness near Sequim	47

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## Soil Moisture

Current soil moisture data is available from a limited number of SNOTEL sites scattered throughout each basin. As the effort continues to install additional sensors and more years of data are acquired this information will become invaluable to the streamflow forecasting community. Light fall precipitation created drier than optimal soil moisture conditions coming into winter. Not good news with the current state of mountain snowpack. Much more snow will be needed to make up for any soil moisture deficits.

<b>BASIN</b>	<b>ESTIMATED PERCENT SATURATION</b>
Spokane	60
Pend Oreille	66
Upper Columbia	25
Central Columbia	64
Upper Yakima	61
Lower Yakima	74
Walla Walla	68
Lower Snake	68
Lower Columbia	76
South Puget Sound	77
Central Puget Sound	N/A
North Puget Sound	74
Olympic Peninsula	35

*Issued by*

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*Released by*

**Roylene Rides At The Door**  
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## The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work\*:

<b>Canada</b>	Snow Survey Network Program – British Columbia Ministry of Environment River Forecast Center – British Columbia Ministry of Forests, Lands and Natural Resource Operations
<b>State</b>	Washington State Department of Ecology Washington State Department of Natural Resources
<b>Federal</b>	Department of the Army Corps of Engineers U.S. Department of Agriculture Forest Service U.S. Department of Commerce NOAA, National Weather Service U.S. Department of Interior Bonneville Power Administration Bureau of Reclamation Geological Survey National Park Service Bureau of Indian Affairs Recourse Conservation & Development Councils
<b>Local</b>	City of Tacoma City of Seattle Chelan County P.U.D. Pacific Power and Light Company Puget Sound Energy Washington Water Power Company Snohomish County P.U.D. Colville Confederated Tribes Spokane County Yakama Indian Nation Whatcom County Pierce County Kalispel Tribe of Indians Spokane Indian Tribe Jamestown S'klallum Tribe
<b>Private</b>	Okanogan Irrigation District Wenatchee Heights Irrigation District Newman Lake Homeowners Association Whitestone Reclamation District

\*Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.



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# Washington Water Supply Outlook Report

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