

Surface Water Conditions Report

Drought Readiness Council

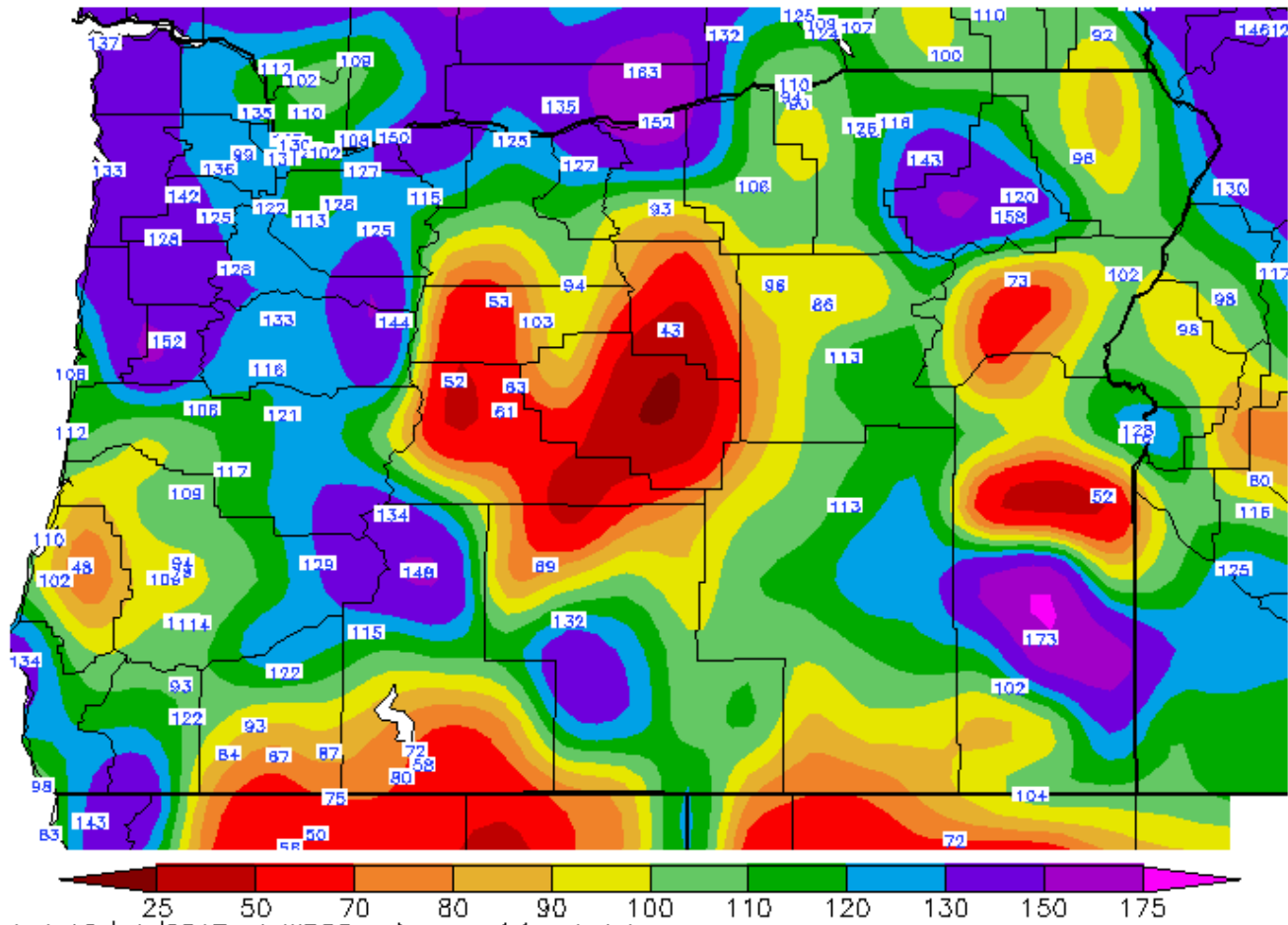


Ken Stahr
Oregon Water Resources
Department
December 14, 2017



WY2018 Precipitation thus far

Percent of Average Precipitation (%)
10/1/2017 - 11/30/2017



Generated 12/ 1/2017 at WRCC using provisional data.
NOAA Regional Climate Centers



November Precipitation

Observed Amounts (inches)

% of Average

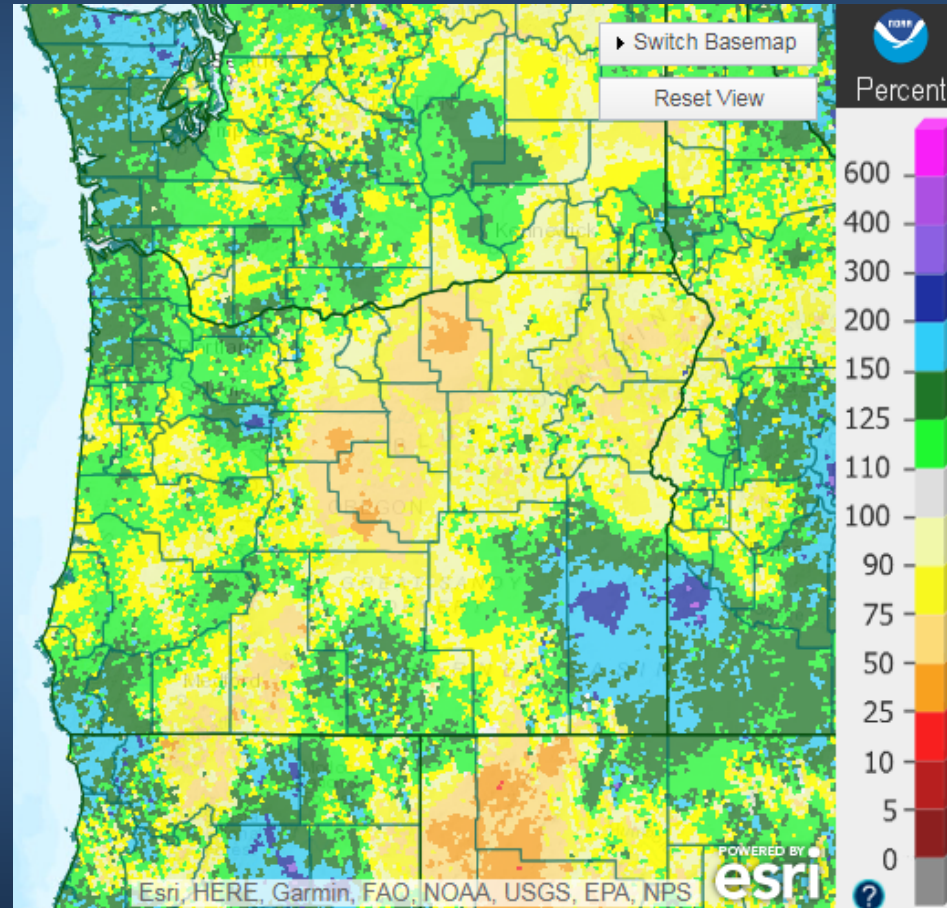
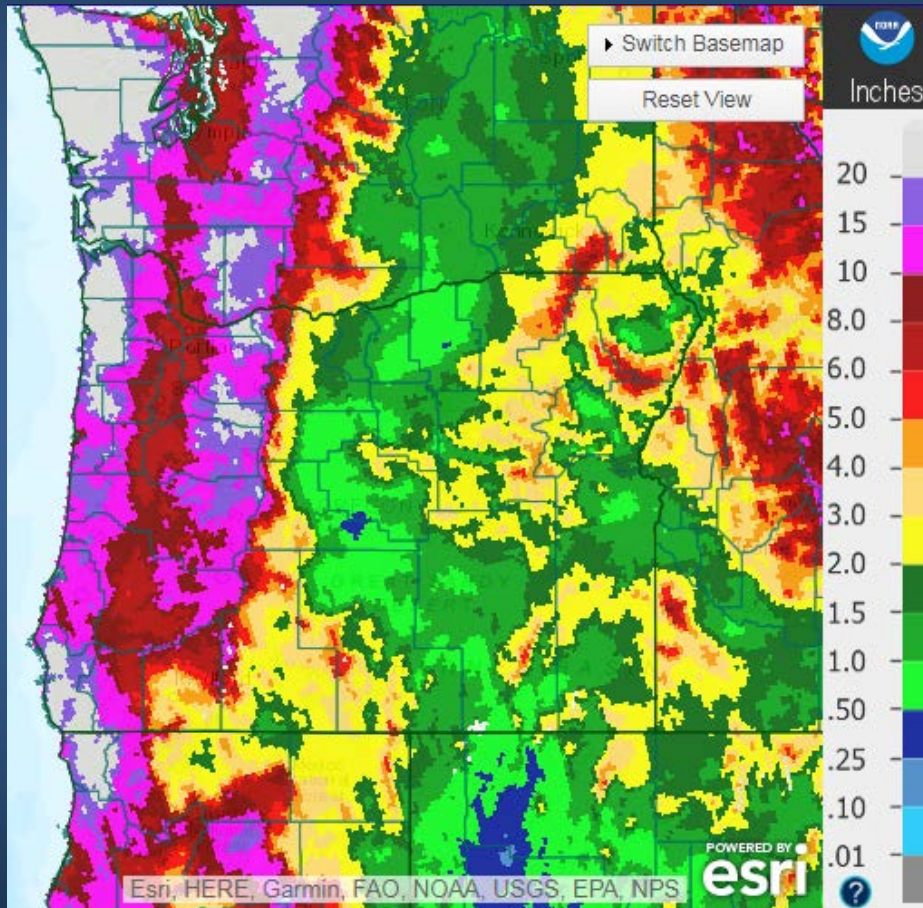


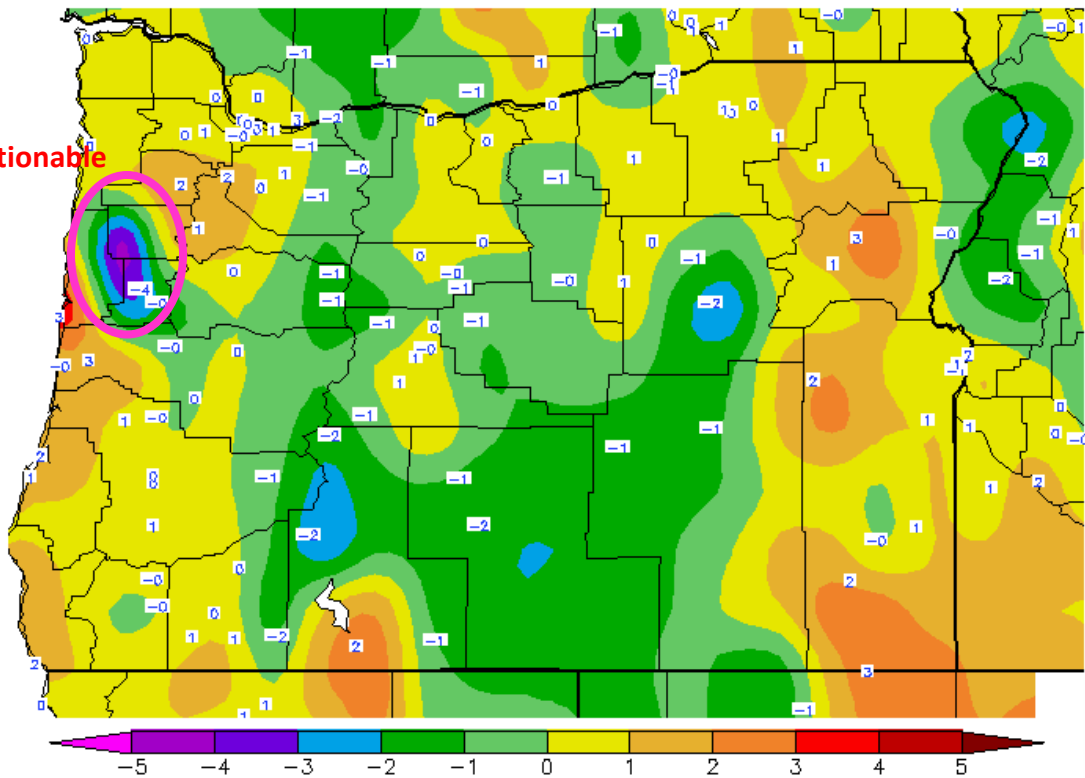
Image sources: water.weather.gov/precip/index.php



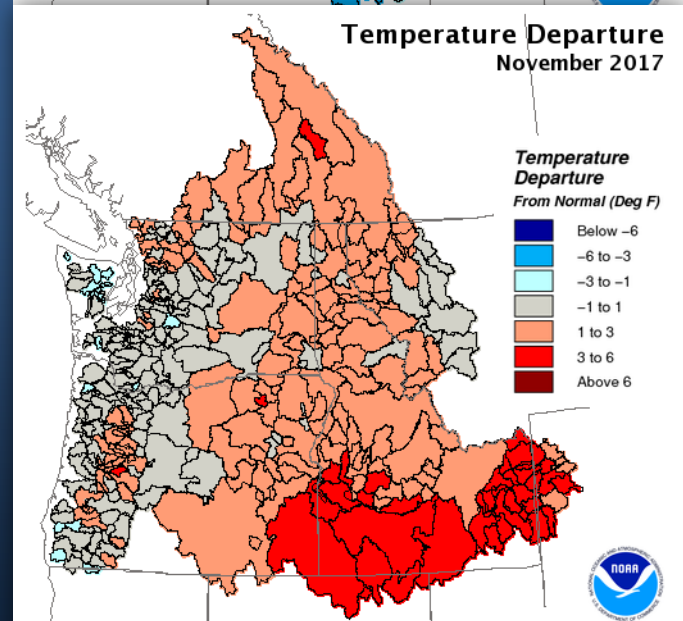
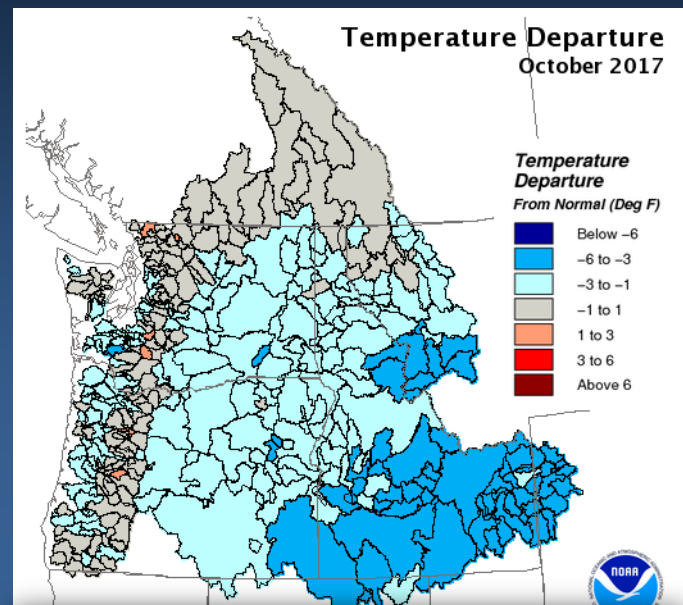
Temperatures Oct & Nov

Ave. Temperature dep from Ave (deg F)
10/1/2017 - 11/30/2017

Questionable Data

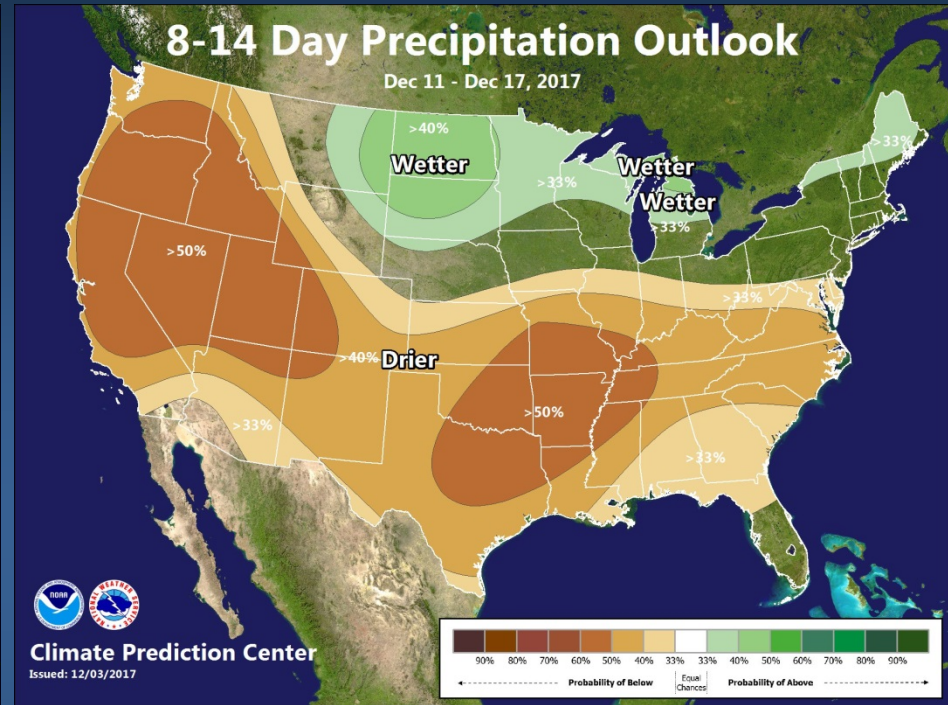
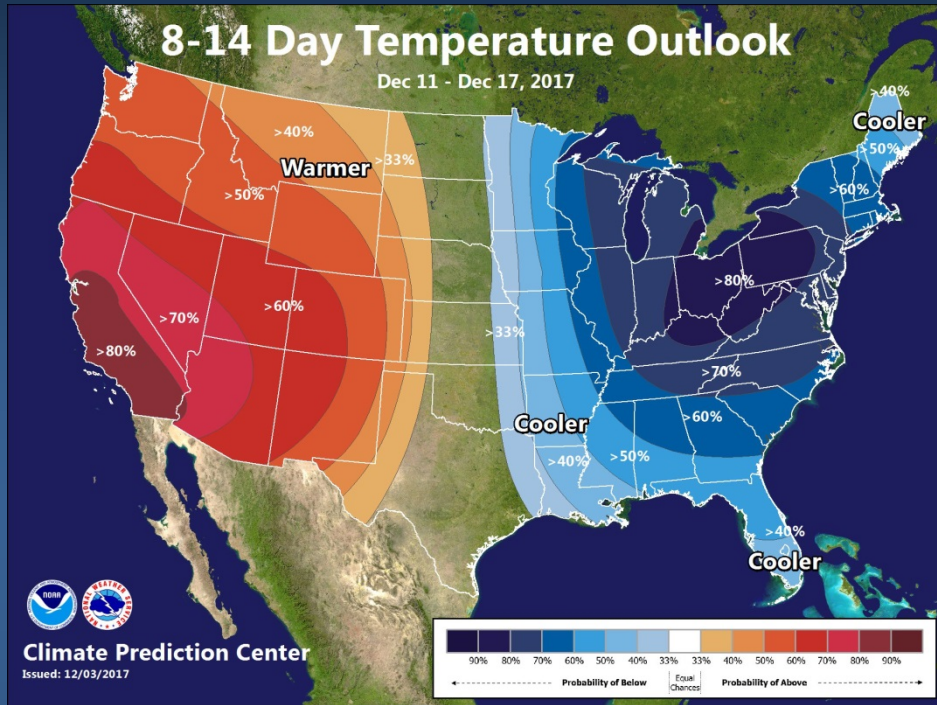


Generated 12/ 1/2017 at WRCC using provisional data.
NOAA Regional Climate Centers





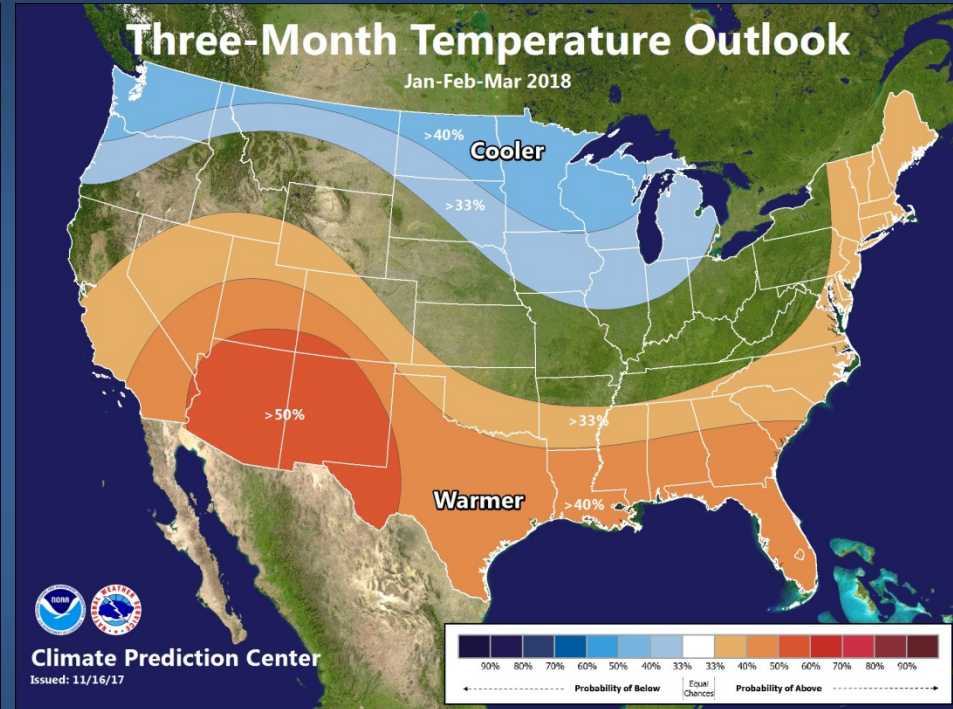
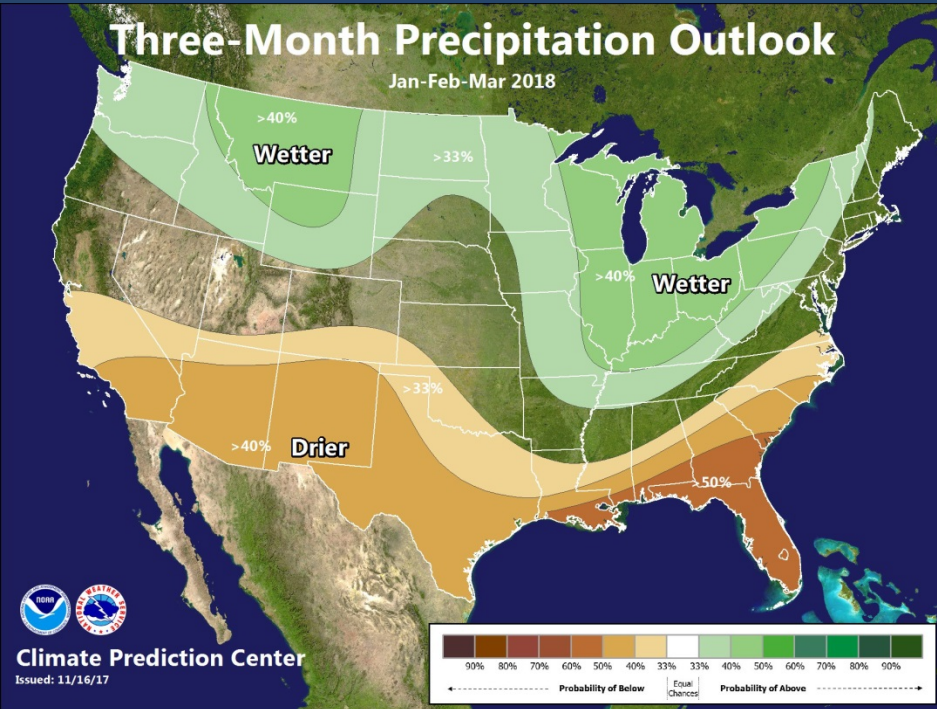
December Outlook



Dry and warm (except for valley inversion) conditions are expected through mid December, likely resulting in below-average precipitation and above-average temperatures for the month, barring a drastic change to wetter and/or cooler conditions in late December.



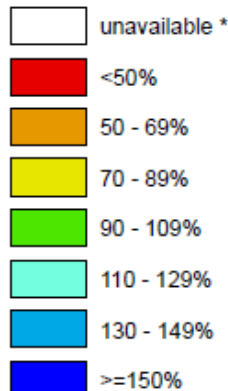
Outlook for January-February-March



Oregon SNOTEL Current Snow Water Equivalent (SWE) % of Normal

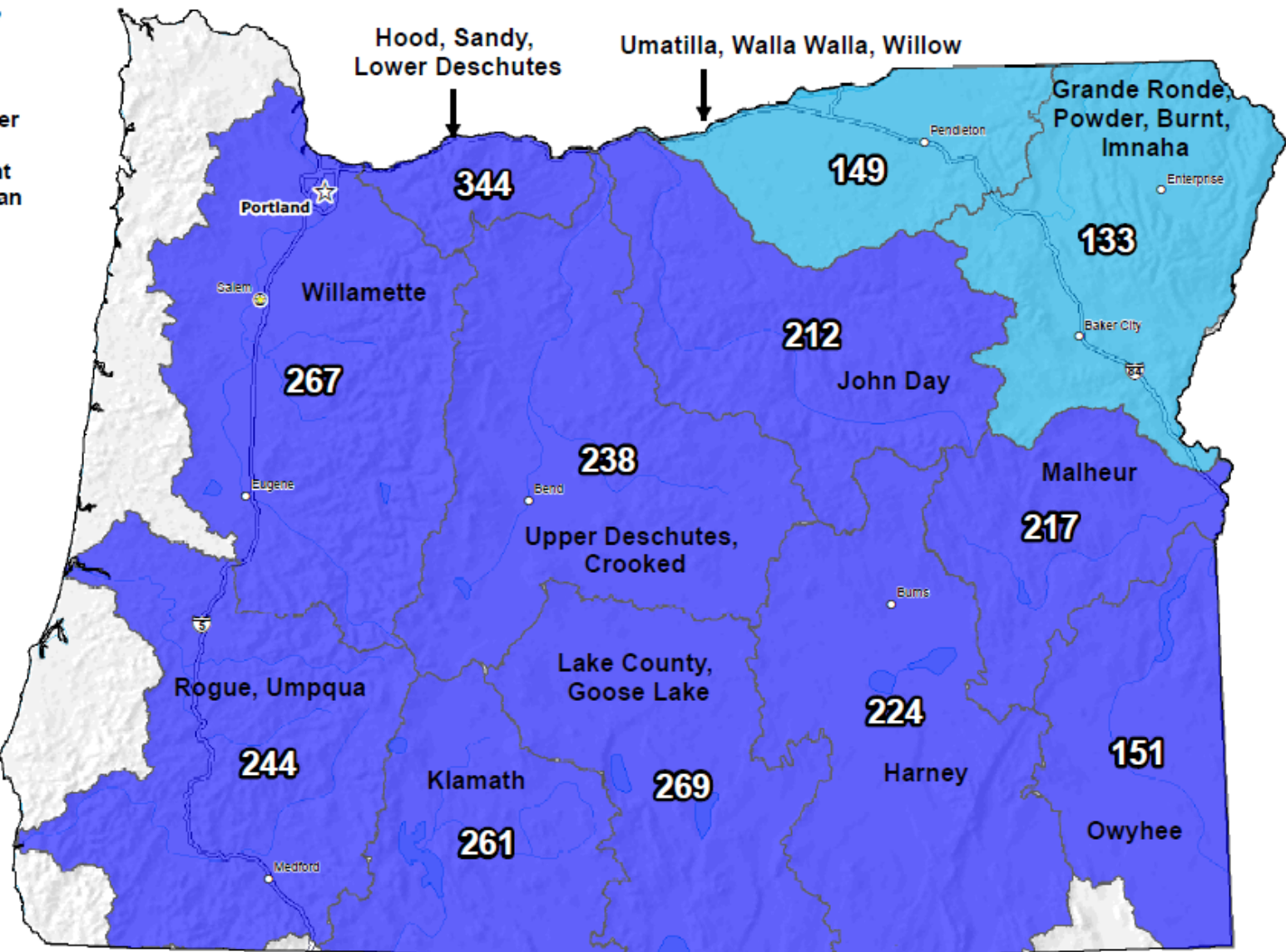
Nov 20, 2017

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median

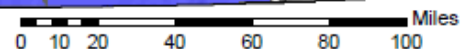


* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional Data
Subject to Revision



The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

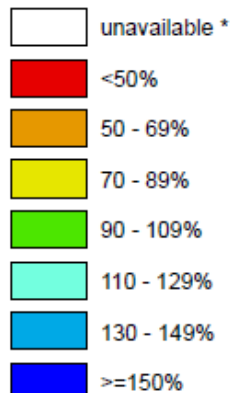


Prepared by:
USDA/NRCS National Water and Climate Center
Portland, Oregon
<http://www.wcc.nrcs.usda.gov>

Oregon SNOTEL Current Snow Water Equivalent (SWE) % of Normal

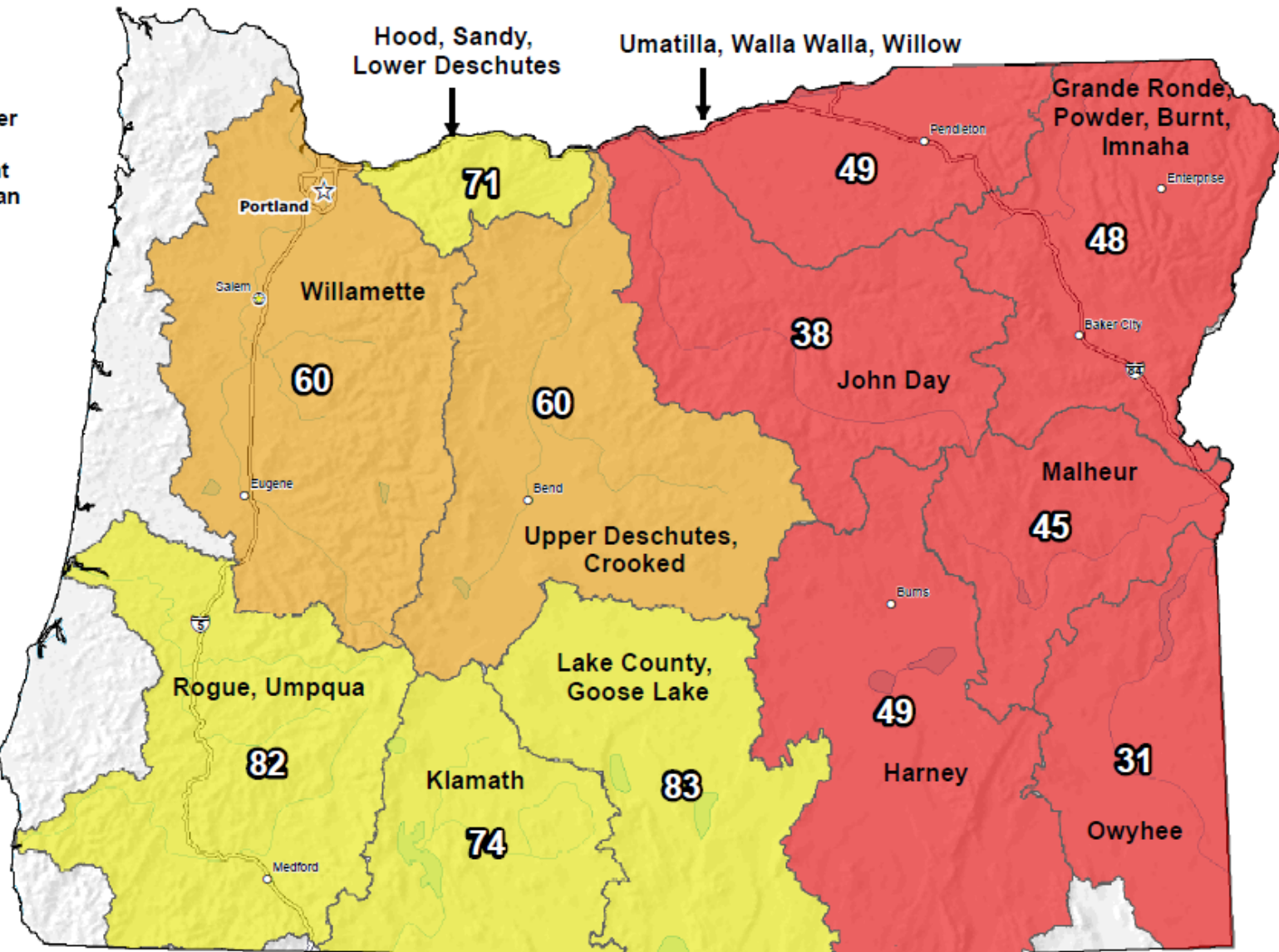
Dec 05, 2017

Current Snow Water Equivalent (SWE) Basin-wide Percent of 1981-2010 Median



* Data unavailable at time of posting or measurement is not representative at this time of year

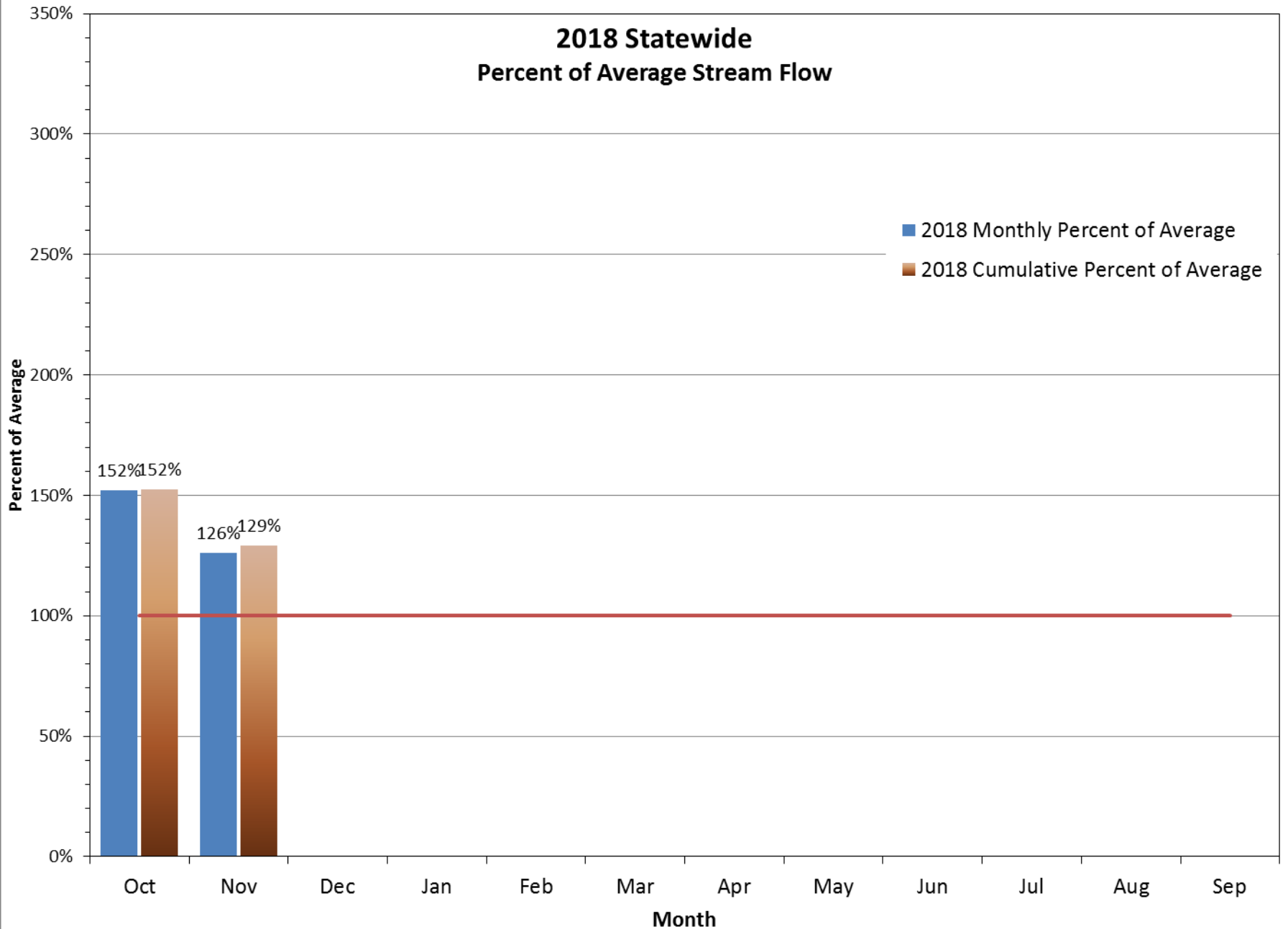
Provisional Data
Subject to Revision



The snow water equivalent percent of normal represents the current snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

0 10 20 40 60 80 100 Miles
Prepared by:
USDA/NRCS National Water and Climate Center
Portland, Oregon
<http://www.wcc.nrcs.usda.gov>






2018 Statewide Percent of Average Stream Flow



Percent of Average Streamflow Month of November, 2017

Percent of Average Streamflow

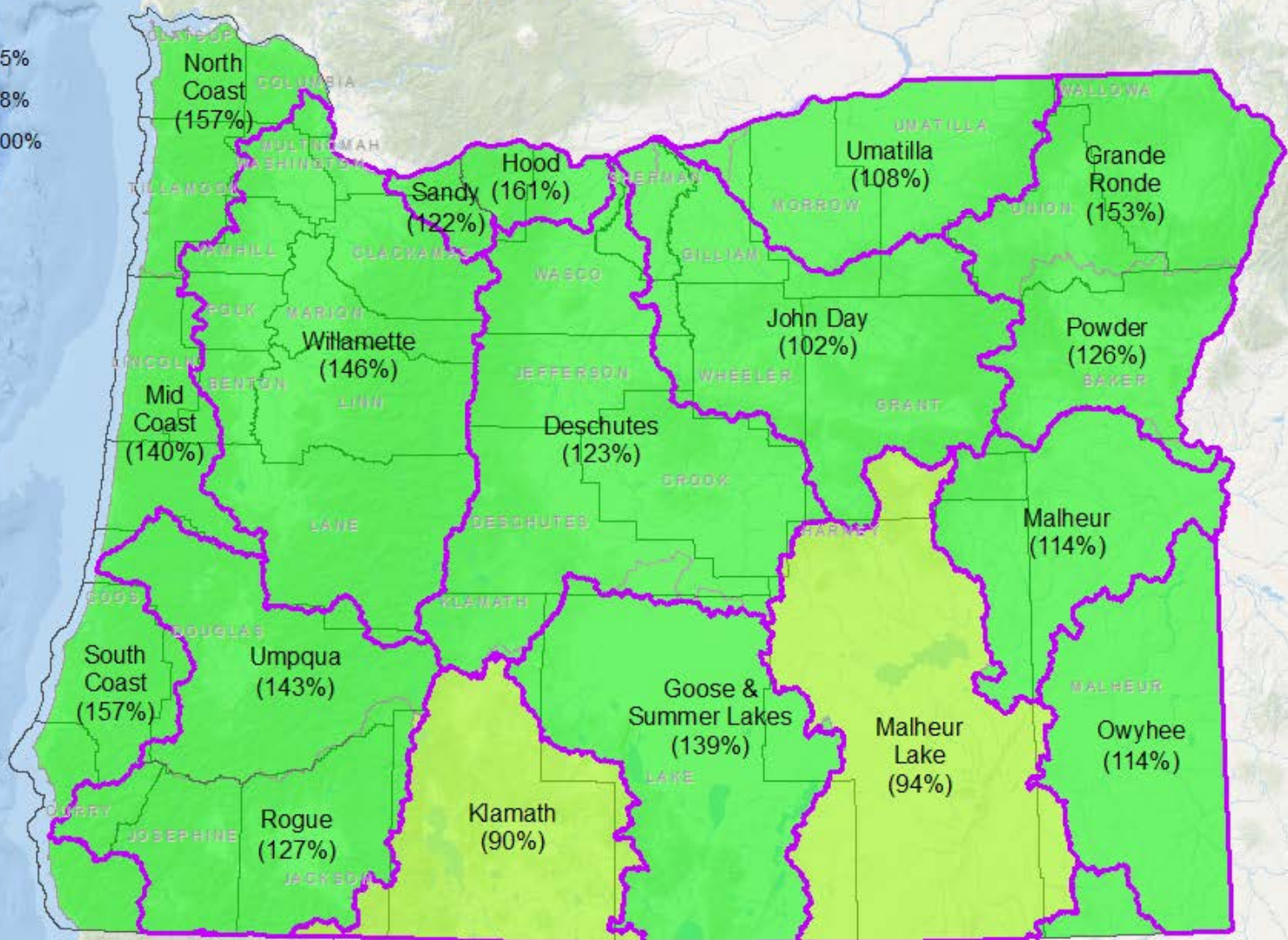
WRD Basin

-  < 50%
-  50% - 75%
-  76% - 88%
-  89% - 100%
-  > 100%

NRCS Basin

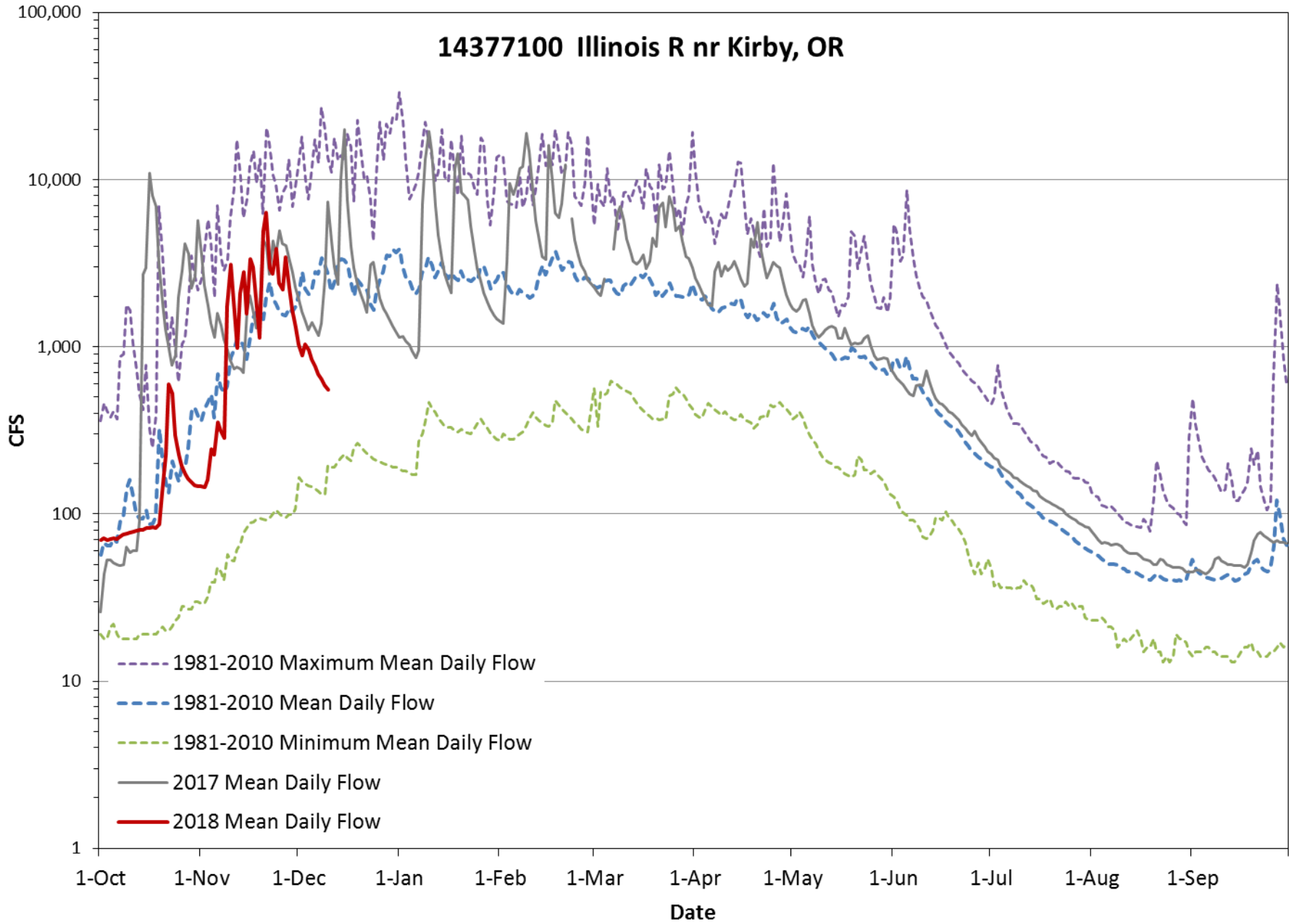


County

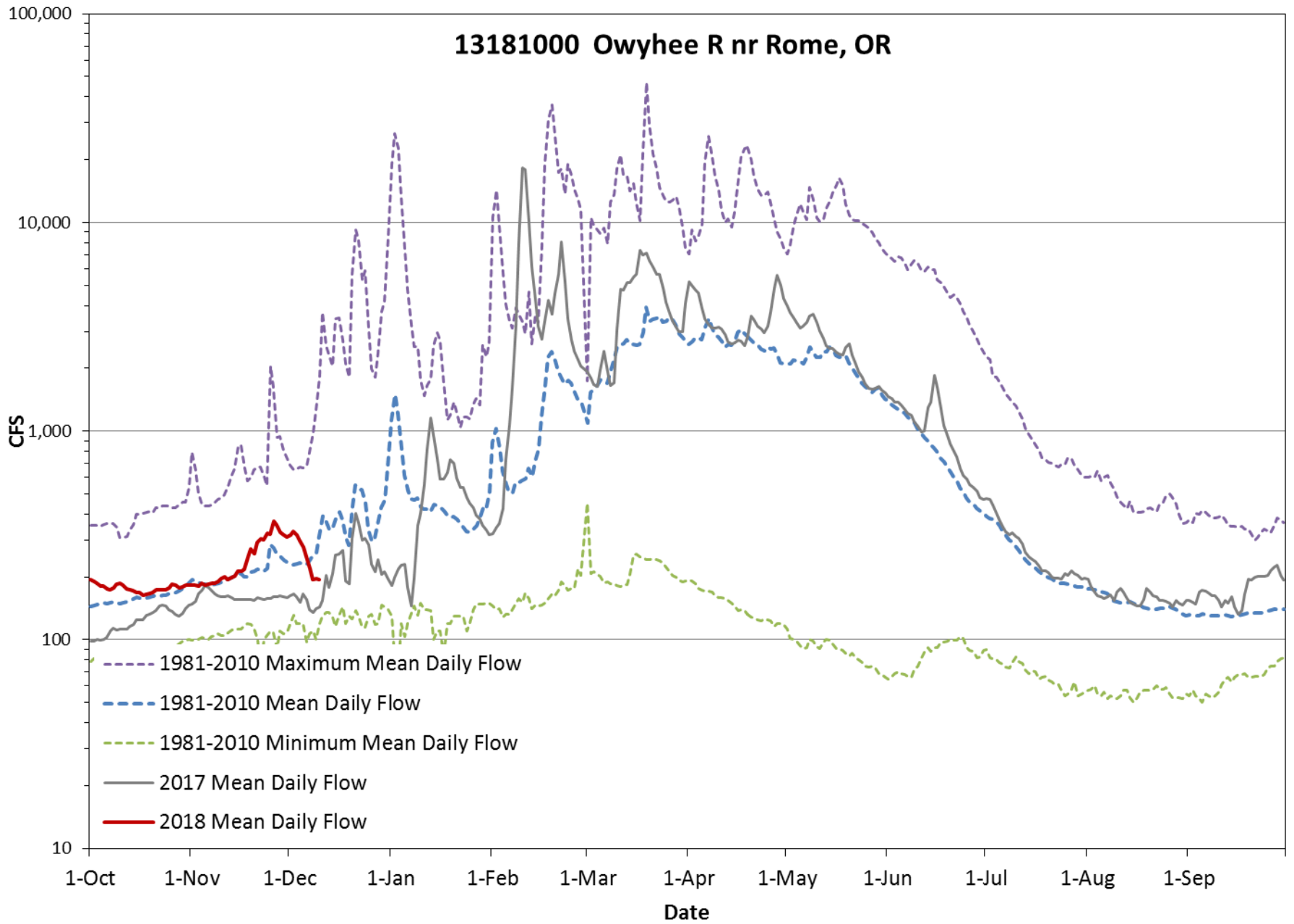


Average streamflow data are based on 30 years of record (1981-2010). All data represent free-flowing streams unaffected by significant man-made control structures such as dams or diversion works.

14377100 Illinois R nr Kirby, OR



13181000 Owyhee R nr Rome, OR



Reservoir Storage Summary for the end of November, 2017

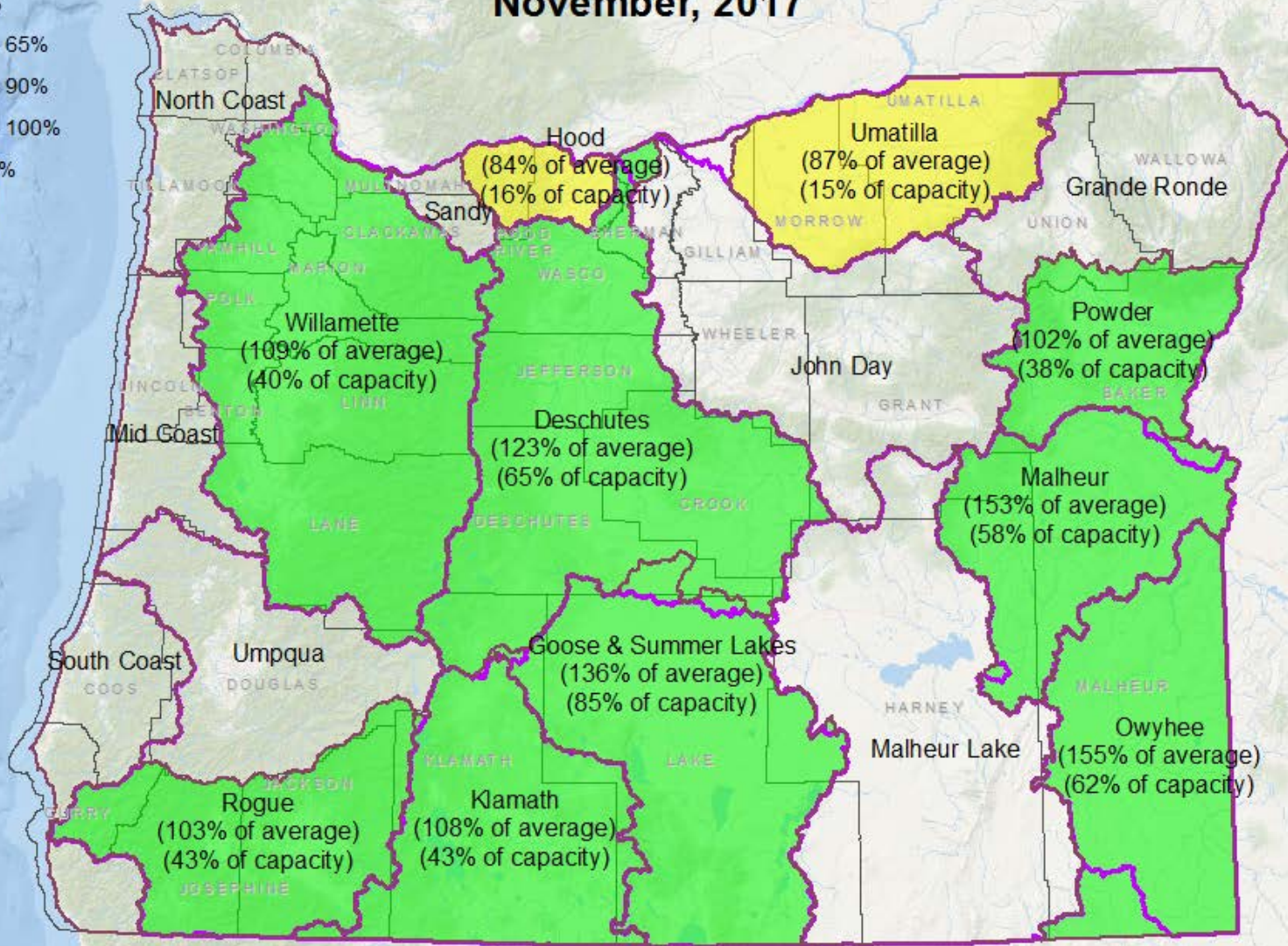
Percent of Average Storage

Current_Average

- < 50%
- 50% - 65%
- 66% - 90%
- 91% - 100%
- > 100%

NRCS Basin

County



NRCS Basinwide Summary: December 1, 2017
(averages based on 1981-2010 reference period)



Oregon Water Resources Department
Co-Chair, Oregon Drought Readiness Council
725 Summer Street NE, Suite A
Salem, OR 97301

Oregon Office of Emergency Management
Co-Chair, Oregon Drought Readiness Council
P.O. Box 14370
Salem, OR 97309



To: Heather Moawad, Jason Miner, Lauri Aunan, Office of the Governor
Patrick Allen, Director, Oregon Health Authority
Janine Benner, Director, Oregon Department of Energy
Tom Byler, Director, Oregon Water Resources Department
Peter Daugherty, Director, Oregon Department of Forestry
Curt Melcher, Director, Oregon Department of Fish and Wildlife
Phil Mote, Director, Oregon Climate Change Research Institute
Andrew Phelps, Director, Oregon Office of Emergency Management
Alexis Taylor, Director, Oregon Department of Agriculture
Richard Whitman, Director, Oregon Department of Environmental Quality

From: Oregon's Drought Readiness Council, via
Brenda Bateman, Drought Readiness Council Co-Chair
Sonya Andron, Drought Readiness Council Co-Chair
Ken Stahr, Water Supply Availability Committee Chair
Tom Elliot, Oregon Department of Energy
Jim Johnson, Oregon Department of Agriculture
Anna Pakenham-Stevenson, Oregon Department of Fish & Wildlife
Wade Peerman, Oregon Department of Environmental Quality
Kari Salis, Oregon Health Authority, Drinking Water Program
Nick Yonker, Oregon Department of Forestry

Date: January 4, 2018

Re: The Importance of Continuing AgriMet Stations in the Field

The Oregon Drought Readiness Council is a standing body comprised of federal and state natural resource, public health, and emergency response agencies. During a drought, the Council reviews local requests for assistance and makes recommendations to the Governor. The Council meets regularly to discuss current water conditions and likely upcoming conditions for the growing season.

Recently, the Council became aware that the Bonneville Power Administration has pulled its funding support for a network of agricultural meteorology, or AgriMet, sites in the Columbia River Basin. These sites provide critical, on-the-ground data points for weather and soil moisture conditions. These data are used by the public and private sector alike to efficiently manage Oregon's precious natural resources, to plan for the future, and to track trends in crop water use over time. For more detail, please see the attached one-page briefer.

The potential loss of this valuable data was important enough to the Council that it is reaching out to you today in the hopes that you can help alert Oregon's Congressional Delegation to this situation. Federal funding to continue to maintain and operate these stations is crucial to all of the above agencies and our partners. In the absence of federal funding, we would ask the Directors and Governor's Office to consider proposing a joint budget package in the upcoming Legislative sessions to continue to support the AgriMet network.

Should you require any additional information, please do not hesitate to contact us at:
brenda.o.bateman@oregon.gov (503-986-0879) or Sonya.Andron@state.or.us (503-378-4025).

Oregon's AgriMet Stations and BPA Funding

The Bureau of Reclamation (BOR) started the agricultural meteorology (AgriMet) program in 1983 with a network of three automatic agricultural weather stations in the Pacific Northwest, in cooperation with the Bonneville Power Administration (BPA). The original intent of the AgriMet network was to provide near real-time information for crop water use modeling and irrigation scheduling applications. It operates as part of the regional HydroMet network, using weather data collected from almost 200 agricultural weather stations from multiple federal and state evapotranspiration (ET) networks, including 33 stations in Oregon (Figure 1).

The stations (Figure 2) collect weather and soil data, including air temperature and humidity, solar radiation, wind speed and direction, total precipitation, and soil moisture to estimate ET and crop water requirements. The weather observations are updated on BOR's AgriMet website (<http://www.usbr.gov/pn/agrimet>) every hour shortly after collection, with quality control routines performed daily, providing a meteorological data base for a variety of applications. Reclamation updates AgriMet crop water use charts each morning to reflect ET based on the previous day's weather conditions.

ET information provides irrigation districts, farmers, resource conservation agencies, municipal entities, and agricultural consultants with crop consumptive water use for irrigation scheduling and related uses. Users can also calculate field-specific crop consumptive water use, using the Irrigation Scheduler developed by Washington State University and the AgriMet program available via webpage, iOS app, or Android app. AgriMet data are used to calibrate METRIC, a widely used satellite-based model used to make accurate maps of spatially distributed ET that can be summarized on a field-by-field basis—the spatial scale required to manage water rights. The data are also used by both the public and private sector for reservoir operations, water supply forecasting, water quality models, weather models, solar and wind models (BPA, Idaho Power), pest models, pesticide and herbicide applications.

AgriMet receives about \$97,000 (\$82,500 to Pacific Northwest Region and \$15,750 to Great Plains Region) from BPA; this is about 35 percent of the Pacific Northwest Region's overall budget. AgriMet receives funds from other private, state, local and federal sources for specific stations. New stations require a sponsor for the yearly funding for maintenance and operations, and BPA funds covered the earlier stations that did not have a sponsor. BPA announced its intent to cease funding support of AgriMet in 2017. Without funding, stations with as much as 34 years of data will be decommissioned and no longer provide data in key areas across the Columbia River watershed.

For more information contact Jordan Beamer, Hydrologist (OWRD), 503-986-0836 or Jordan.P.Beamer@oregon.gov.

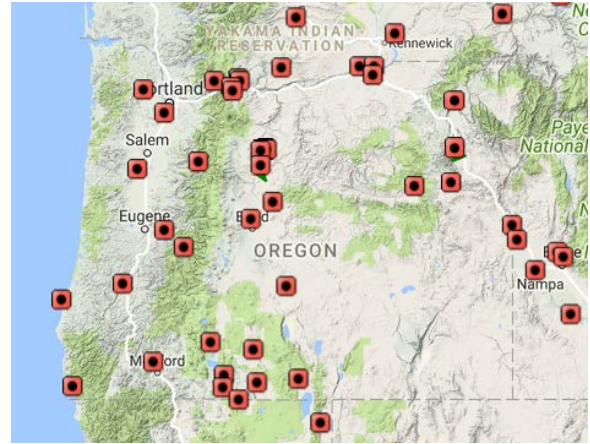


Figure 1. Map of AgriMet stations in Oregon.



Figure 2. Baker Valley, Oregon AgriMet Weather Station.

REGARDING RESPONSE TO HARMFUL ALGAE BLOOMS (HABS) TO PROTECT PUBLIC HEALTH

MEMORANDUM OF UNDERSTANDING

AMONG:

**OREGON HEALTH AUTHORITY (OHA) AND
OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY (ODEQ) AND
OREGON DEPARTMENT OF AGRICULTURE (ODA) AND
OREGON DEPARTMENT OF FORESTRY (ODF) AND
OREGON DEPARTMENT OF FISH AND WILDLIFE (ODFW) AND
DEPARTMENT OF STATE LANDS (DSL) AND
OREGON PARKS AND RECREATION DEPARTMENT (OPRD) AND
OREGON WATER RESOURCES DEPARTMENT (OWRD)**

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Purpose

This MOU defines the process, roles, responsibilities and actions of Oregon’s public health and natural resource agencies regarding surveillance and monitoring of Harmful Algae Blooms (HABs) and issuance and removal of health advisories.

What are harmful algae blooms (HABs), how are they formed and why do we care?

Harmful algae blooms are formed when cyanobacteria, naturally occurring in the water, get the nutrients they need (nitrogen and phosphorous) to multiply into what is called a bloom. HABs can form in any waterbody under the right conditions.

Cyanobacteria have the potential to produce toxins at levels that can be harmful to people and animals. These toxins have been known to cause sickness in people and confirmed deaths of pets, livestock, and wildlife. The major route of exposure is through ingestion of affected water. HABs and toxins may affect waterbodies used for recreation and drinking water sources.

A number of different types of blooms have been identified in Oregon in the past. Blooms look different depending on the genera of cyanobacteria present. They can appear green, blue-green or reddish brown and form foam, slicks, scum or mats. They commonly last for several weeks or more depending on nutrient loading.

HABs are likely to become more common given predictions for lower stream flows and warmer water temperatures due to climate change. Blooms typically form in nutrient rich (eutrophic) waterbodies and in areas where water is slow moving or stagnant. In most cases river systems are not an ideal habitat, but blooms have formed in these areas. This trend is likely to continue.

When a waterbody is identified as having a harmful algae bloom, DEQ is responsible for investigating the causes, identifying sources of pollution and writing a pollution reduction plan.

Protecting public health

The Oregon Health Authority (OHA) issues public health advisories as necessary based on water sampling analysis supplied by partner agencies. OHA works to educate the public about HABs and toxins so that people can avoid illness when recreating. Advisories are lifted when sampling data indicates low or no risk to public health. At lakes or river reaches with known recurring problems, management agencies may post year-round signs with educational information about HABs.

In many cases, lakes and reservoirs fall under the jurisdiction of a designated land or reservoir management agency (DMA). These DMA's include the U.S. Forest Service, U.S. Army Corp of Engineers, Metro, PGE, lake associations and local government agencies. When no DMA is identified, or when the DMA is not willing to respond, the OHA can request that the Department of Environmental Quality (DEQ) coordinate or collect environmental data to interpret if a HAB advisory is warranted. A monitoring response may utilize DEQ staff or request support from other state natural resource agency staff to collect and ship environmental samples to an appropriate lab for analysis. The appropriate state natural resource agency may also be asked to post educational and advisories signs if staff are available to assist.

OHA will prioritize monitoring requests to DEQ on waterbodies where recreational use is promoted, where public access is available, areas upstream of municipal drinking water intakes, and when a human or animal illness is believed to have been associated with a bloom.

Process

When OHA requests DEQ coordination of sampling, DEQ will take the following approach:

1. OHA will work with DEQ's laboratory to determine which, if any, state natural resource agency could assist with sample collection. Consideration will be based on jurisdictional authority or proximity to the bloom and the availability of the identified natural resource agency staff to collect and ship samples from the bloom. ¹
2. Visual monitoring and bloom sampling will be coordinated or conducted by the DEQs staff and/or the appropriate state natural resource agency.

¹ If other natural resource agencies do not have the time or resources to participate, they may contact OHA to request HABs advisory sampling from DEQ. The final determination on a monitoring response will be made by OHA in collaboration with DEQ.

3. Initial monitoring will focus on characterizing the extent of the bloom, and may include information on potential toxins production using Elisa strip tests (if available).
4. Samples may be collected by an identified state natural resource agency or DEQ in coordination with the DEQ and shipped to an appropriate lab for cyanobacteria identification and quantification or cyanotoxin analysis. Training, sample collection supplies and mailing information will be supplied by DEQ.
5. During a bloom, monitoring will involve intermittent visual monitoring and strip testing (if available) to track bloom status and extent.
6. When visual monitoring indicates that the of the bloom has dissipated, the appropriate state natural resource agency in coordination with DEQ may collect samples to verify that cell counts **and** toxins are below guideline values so that the advisory can be lifted.
7. Environmental data associated with HABs monitoring will be shared with state natural resource agencies when it becomes final. OHA will issue or lift a health advisory as appropriate.

The advisory process includes issuing a news release, updating advisory information on the OHA website, multi-media outreach, and documents to be printed to alert the public of the advisory.

Note: Local entities may engage in sampling during the course of the bloom to collect more timely or site-specific information to meet local needs, to determine if the water is safe for swimming or holding water-based sporting events.

Agency Roles and Responsibilities around Harmful Algae Bloom Response:

OHA (Public Health: Healthy Environments): Oregon Health Authority is the lead agency for issuing harmful algae bloom advisories. OHA reviews cyanobacteria cell count or toxin data to assess whether issuing or lifting an advisory is warranted. OHA does not collect HAB environmental data. They rely on partners to provide them with environmental data to do their assessment. They also work with partners including other state agencies to post advisory information on waterbodies with a HAB.

ODEQ: Oregon Department of Environmental Quality is the lead state agency for coordinating the collection HAB data to inform advisories. In many cases partners such as United States Forest Service, Army Corps of Engineers, Public Health Department, private lake management groups or others groups actively collect HABs data that are used to inform the advisory process. When there is no clearly identified party to collect HABs data, OHA may request that the DEQ to coordinate sampling to provide data to inform the HAB advisory process. DEQ assists with coordination or data collection if required.

ODA: Oregon Department of Agriculture has jurisdiction over water quality on agricultural lands. ODA is responsible for ensuring that farmers and ranchers help achieve water quality standards. HABs are a violation of state water quality standards and may lead to agricultural pollution allocations for land owners if assigned by DEQ.

If a HABs occurs adjacent to, or on, agriculture property, DEQ would coordinate monitoring with both OHA and ODA. If ODA has available field staff in the vicinity of a HAB, DEQ may ask for sample collection assistance. If ODA does not have staff available to collect a sample, the may request that DEQ staff collect a sample in consultation with OHA.

ODF: Forestland covers almost half of Oregon. The Oregon Department of Forestry administers the Oregon Forest Practices Act (FPA) on Oregon's forest lands. One of the elements of the act to understand if the FPA is meeting, among other objectives, the protection of water quality standards.

If a HAB occurs adjacent to, or on, forest lands administers by ODF, DEQ would attempt to coordinate monitoring with both OHA and ODF. If ODF has available field staff in the vicinity of a HAB, DEQ may ask for sample collection assistance. If ODF does not have staff available to collect a sample, the may request that DEQ staff collect a sample in consultation with OHA.

ODFW: Oregon Department of Fish and Wildlife administer rules related to the protection and propagation of fish in the state. As a primary agency for the protection of sensitive fish species, DEQ frequently consults with ODFW on water quality issues related to the protection of fish. Water quality conditions created by HABs may create water quality impairments that result in fish kills and resource damage assessments.

If ODFW has available field staff in the vicinity of a HAB, DEQ may ask for sample collection assistance. If ODFW does not have staff available to collect a sample, the may request that DEQ staff collect a sample in consultation with OHA.

DSL: The Department of State Lands, Aquatic Resource Management program provides for the regulation of removal-fill activities in the waters of the state. In addition, the program oversees mitigation programs to restore or replace wetland function, manages the state's aquatic resource planning program and implements the proprietary waterways program. DSL's regulatory authority over dredge and fill activities and meandered rivers including the Willamette, Klamath and Umpqua and meandered lakes such as Cullaby, Klamath, Tenmile and others waterbodies where HABs routinely occur.

It is unlikely that a request for sampling or advisory posting assistance would be requested from DSL. However the importance of DSL in management decisions that influence the development of HABs make them an important part of this MOU.

OPRD: Oregon Parks and Recreation Department administers almost 200 state parks, recreation areas, trails, scenic corridors, waysides, natural areas, heritage sites and interpretive centers across Oregon. Many of these areas provide public access or are adjacent to waterways that provide recreational opportunities such as swimming, wading or boating. HABs can create health concerns in some of these access areas. OAR 736-070-0070 discusses how "the Department will coordinate with state agencies, federal agencies, and others on land use issues of concern to the Department. Generally, this type of coordination is to provide to state agencies, federal agencies and others, the Department's perspective on the compatibility of programs or actions that others have proposed with the policies and programs of the Department."

If OPRD has available field staff in the vicinity of a HAB, DEQ may ask for sample collection assistance. If OPRD does not have staff available to collect a sample, they may request that DEQ staff collect a sample in consultation with OHA. In addition, if a HAB advisory is warranted and OPRD staff are available to assist, OHA may request assistance with posting advisory signs.

OWRD: Oregon Water Resources Department is the agency charged with administration of the laws governing surface and ground water resources. An important part of their mission is evaluating the demands on Oregon's water resources and, where possible, facilitating in-stream flow restoration to enhance water quality conditions for aquatic life. Stream flow is an important factor influencing the development and growth of HABs. When in-stream flow velocities are low, the physical stream environment can favor the development of cyanobacteria. With adequate flow, HABs cannot form or are their intensity is greatly reduced.

If OWRD has available field staff in the vicinity of a HAB, DEQ may ask for sample collection assistance. If OWRD does not have staff available to collect a sample, they may request that DEQ staff collect a sample in consultation with OHA. In addition, if a HAB advisory is warranted and OPRD staff are available to assist, OHA may request assistance with posting advisory signs.

Agency Contacts

OHA: Rebecca Hillwig, 971-673-0431 rebecca.hillwig@state.or.us

OHA Back-up: Dave Farrer or Julie Sifuentes

DEQ: Aaron Borisenko, 503-693-5723 borisenko.aaron@deq.state.or.us

DEQ Back-up Mike Mulvey

ODA: Sheila Marcoe (503) 986-4707 smarcoe@oda.state.or.us

ODF: Terry Frueh

ODFW: Anna Pakenham Stevenson

OPRD: ???

DSL: Dana Hicks

OWRD: Mellony Hoskinson

Signatures Pages

DRAFT

**REGARDING RESPONSE TO HARMFUL ALGAE BLOOMS (HABS) TO PROTECT
PUBLIC HEALTH**

Oregon Health Authority (OHA)

???, Center for Health Protection Administrator

Date

DRAFT

**REGARDING RESPONSE TO HARMFUL ALGAE BLOOMS (HABS) TO PROTECT
PUBLIC HEALTH**

Oregon Department of Environmental Quality (ODEQ)

Brian Boling, DEQ Laboratory Program Manager

Date

DRAFT

**REGARDING RESPONSE TO HARMFUL ALGAE BLOOMS (HABS) TO PROTECT
PUBLIC HEALTH**

Oregon Department of Agriculture (ODA)

????, Director of Natural Resources Program

DRAFT

**REGARDING RESPONSE TO HARMFUL ALGAE BLOOMS (HABS) TO PROTECT
PUBLIC HEALTH**

Oregon Department of Forestry (ODF)

Peter Daugherty ??????????

DRAFT

**REGARDING RESPONSE TO HARMFUL ALGAE BLOOMS (HABS) TO PROTECT
PUBLIC HEALTH**

Oregon Department of Fish and Wildlife (ODFW)

Anna Pakenham? Lisa Sumption?

Date

DRAFT

**REGARDING RESPONSE TO HARMFUL ALGAE BLOOMS (HABS) TO PROTECT
PUBLIC HEALTH**

Department of State Lands (DSL)

Eric Metz?

Date

DRAFT

**REGARDING RESPONSE TO HARMFUL ALGAE BLOOMS (HABS) TO PROTECT
PUBLIC HEALTH**

Oregon Parks and Recreation Department (OPRD)

Trevor Rigmaiden?

Date

DRAFT

**REGARDING RESPONSE TO HARMFUL ALGAE BLOOMS (HABS) TO
PROTECT PUBLIC HEALTH**

Oregon Water Resource Department (OWRD)

Tom Byler?

Date

DRAFT