

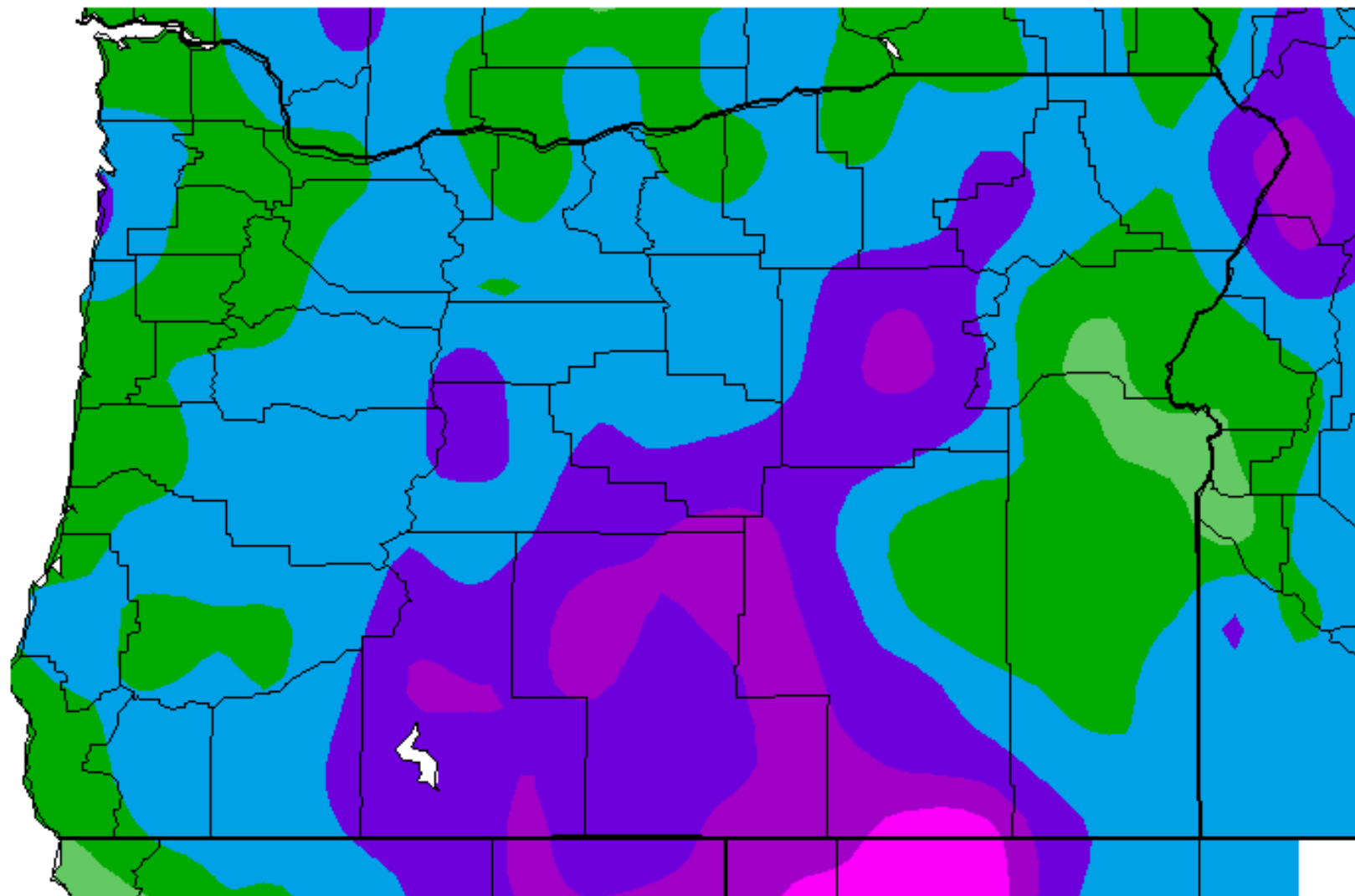
# Water Conditions Report

# Drought Readiness Council



**Ken Stahr**  
**Oregon Water Resources**  
**Department**  
**March 14, 2018**

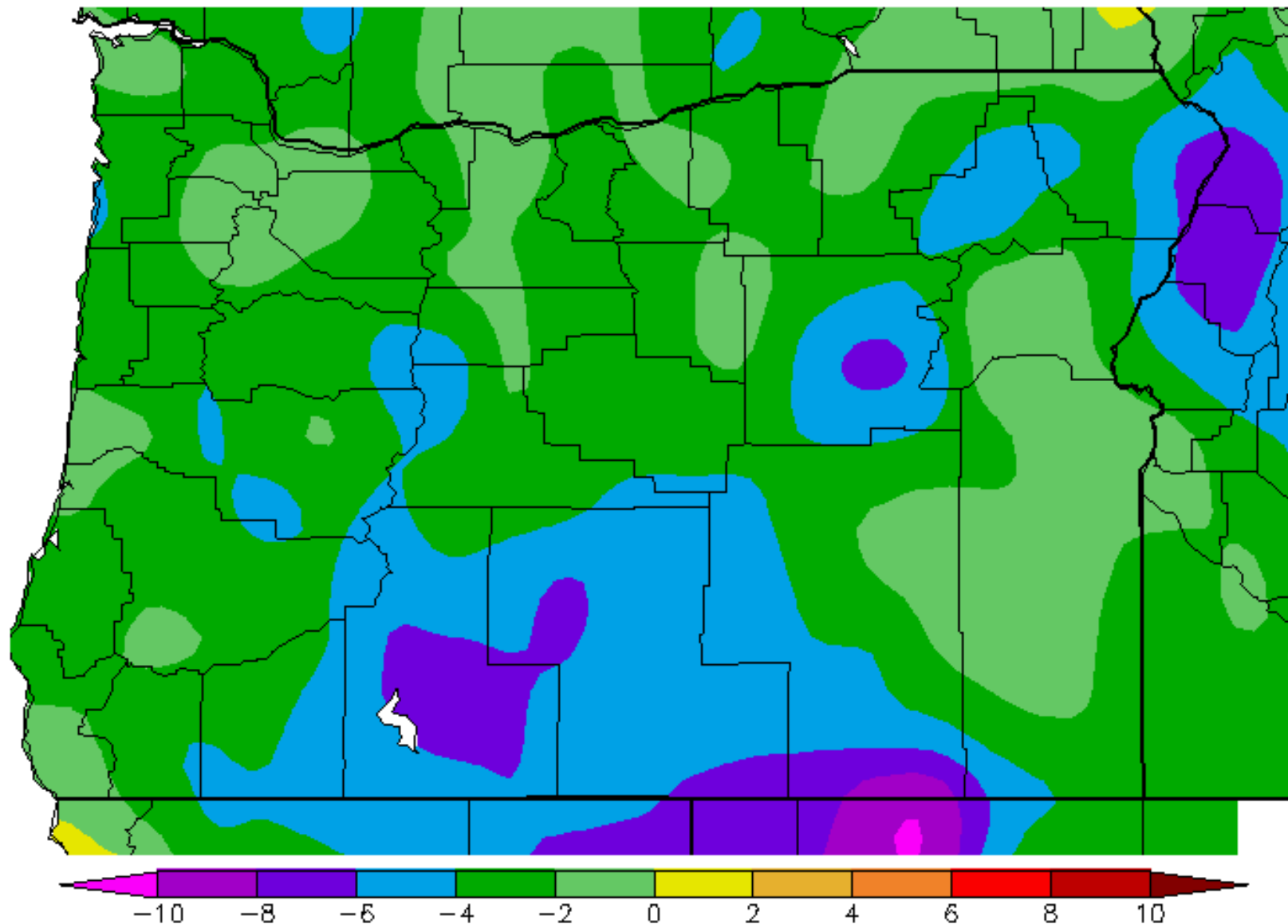
Ave. Temperature dep from Ave (deg F)  
2/11/2018 – 3/12/2018



Generated 3/13/2018 at WRCC using provisional data.

NOAA Regional Climate Centers

Ave. Temperature dep from Ave (deg F)  
2/27/2018 - 3/12/2018

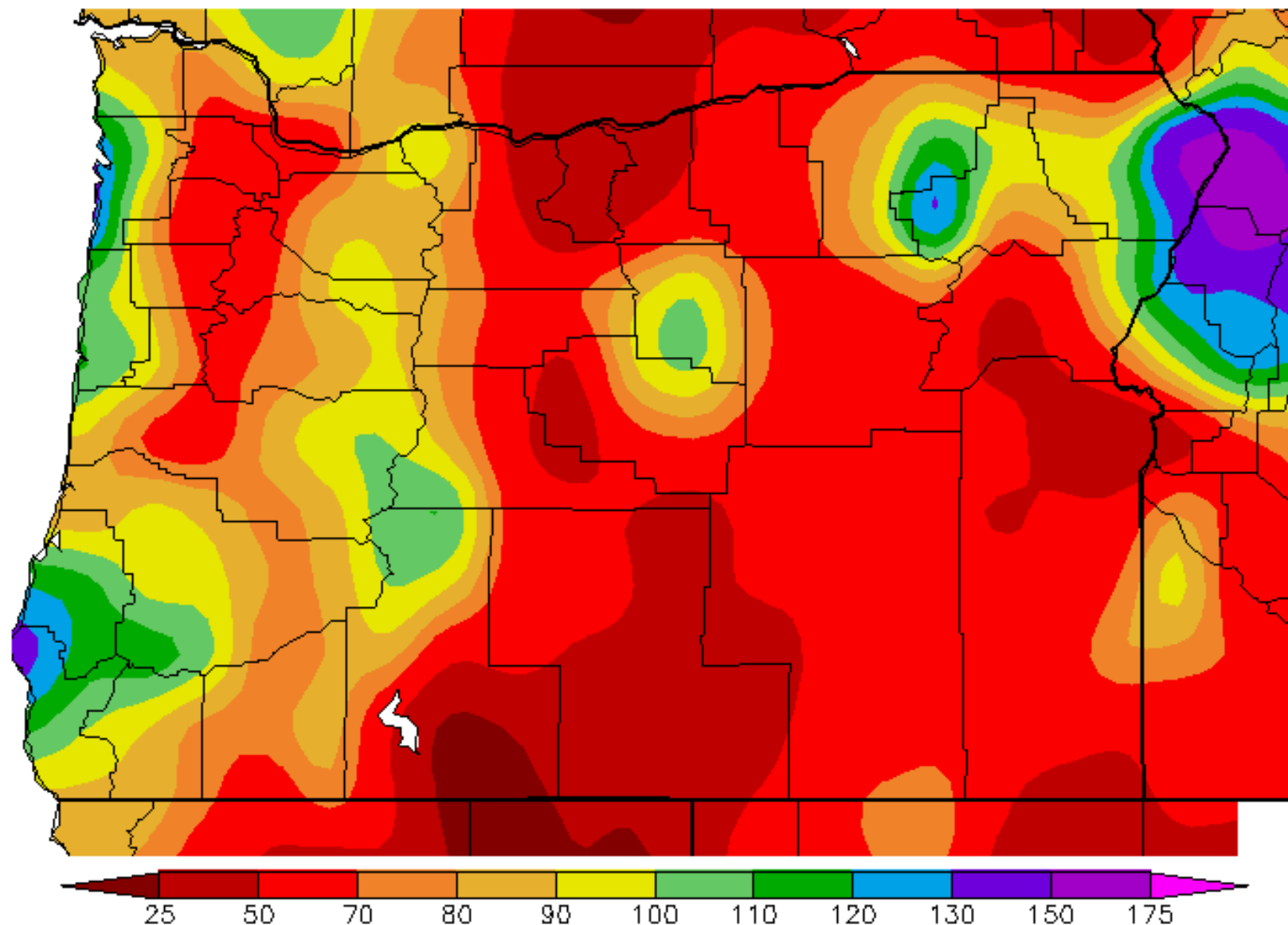


Generated 3/13/2018 at WRCC using provisional data.

NOAA Regional Climate Centers

# Percent of Average Precipitation (%)

2/11/2018 – 3/12/2018



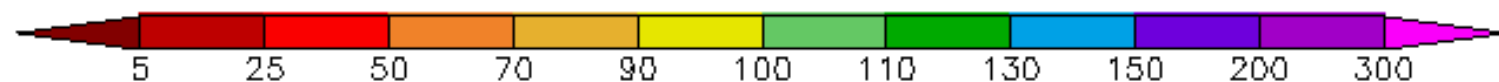
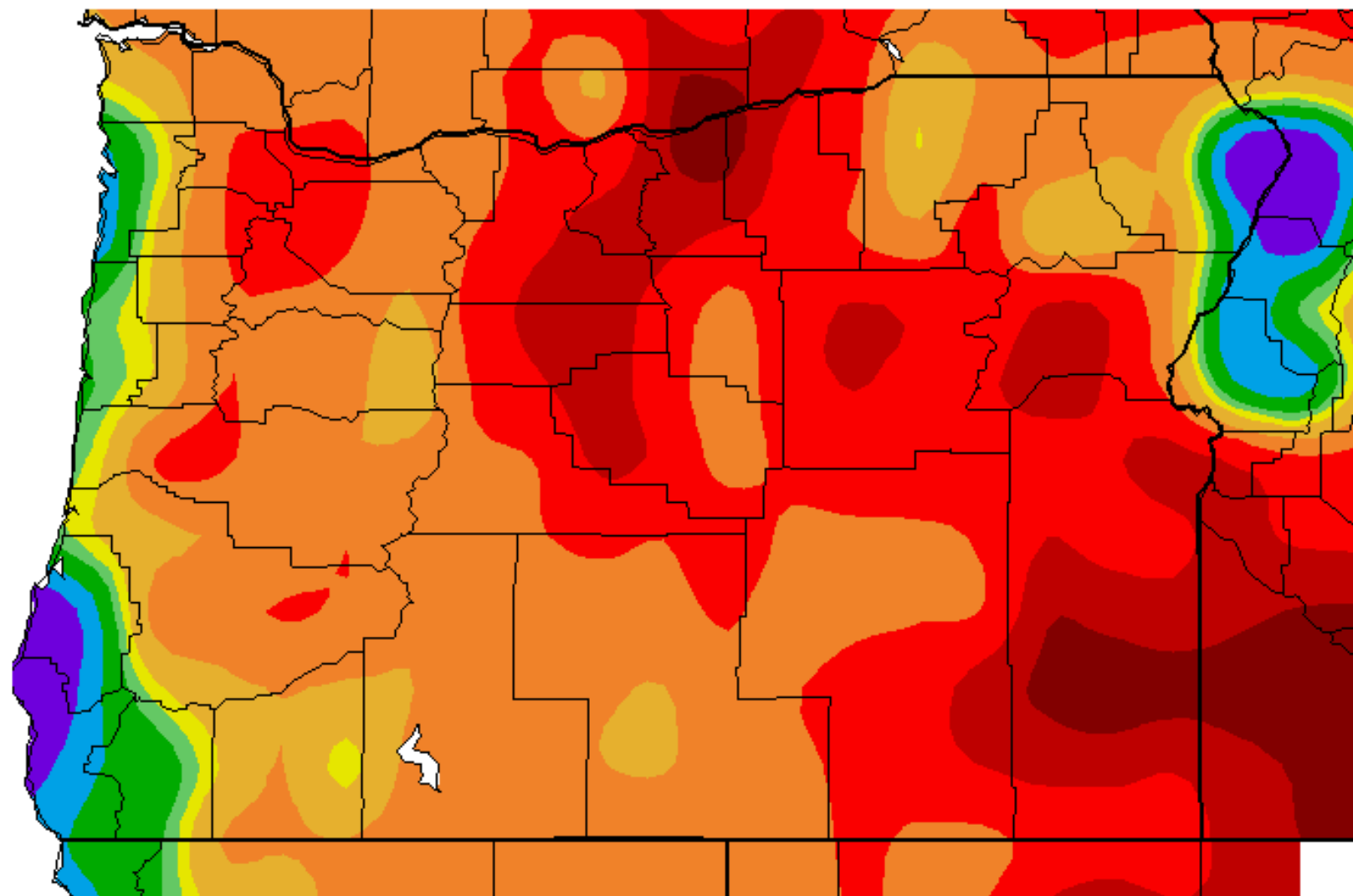
Generated 3/13/2018 at WRCC using provisional data.

NOAA Regional Climate Centers



# Percent of Average Precipitation (%)

2/27/2018 – 3/12/2018



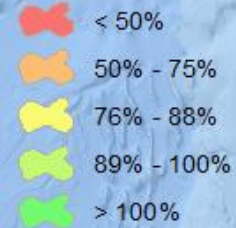
Generated 3/13/2018 at WRCC using provisional data.

NOAA Regional Climate Centers

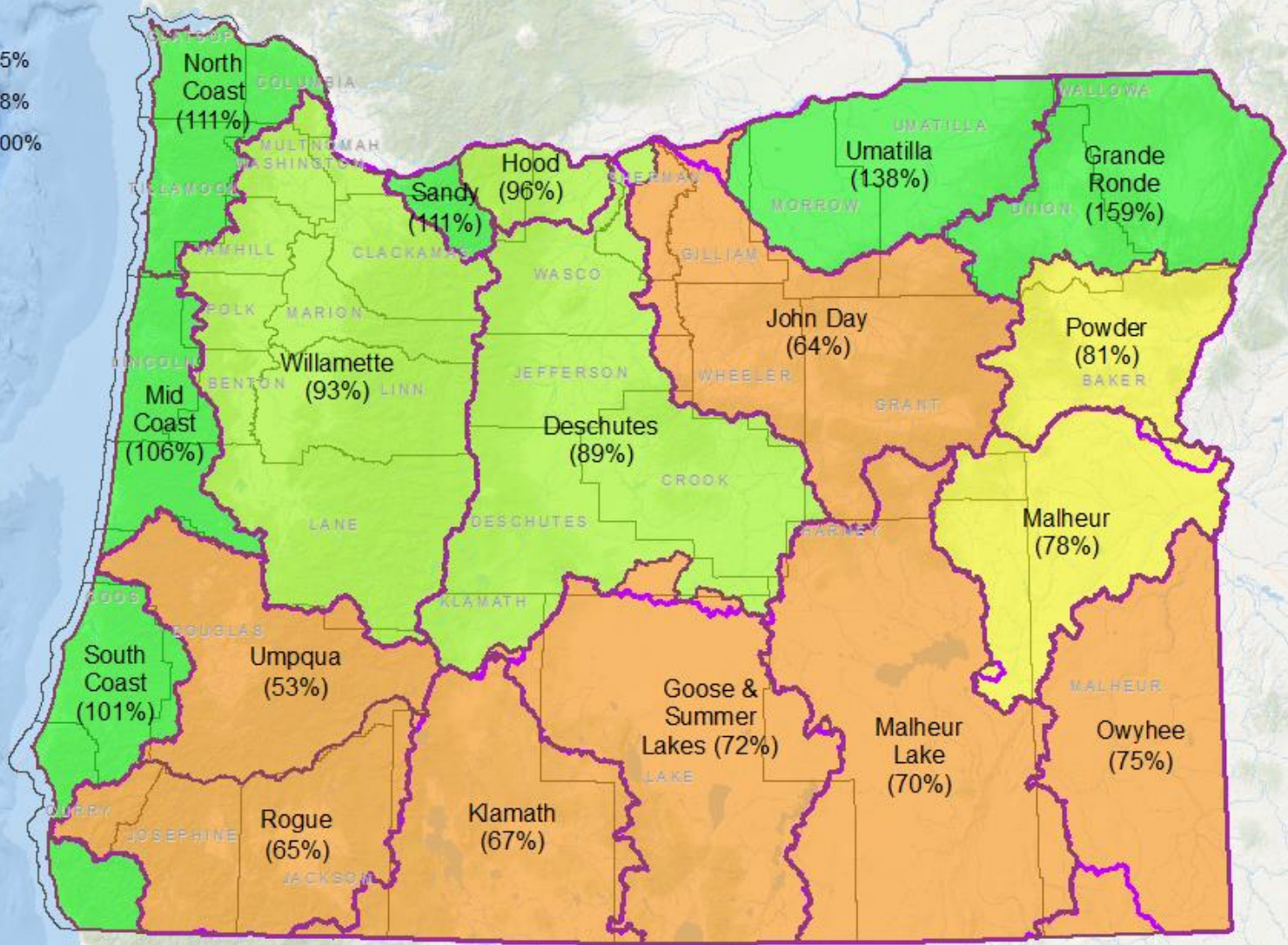
# Percent of Average Streamflow Month of January, 2018

## Percent of Average Streamflow

### WRD Basin



### NRCS Basin



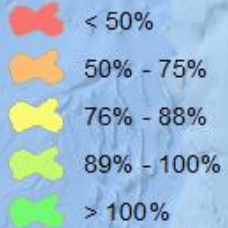
Average streamflow data are based on 30 years of record (1981-2010). All data represent free-flowing streams unaffected by significant man-made control structures such as dams or diversion works.



# Percent of Average Streamflow Month of February, 2018

## Percent of Average Streamflow

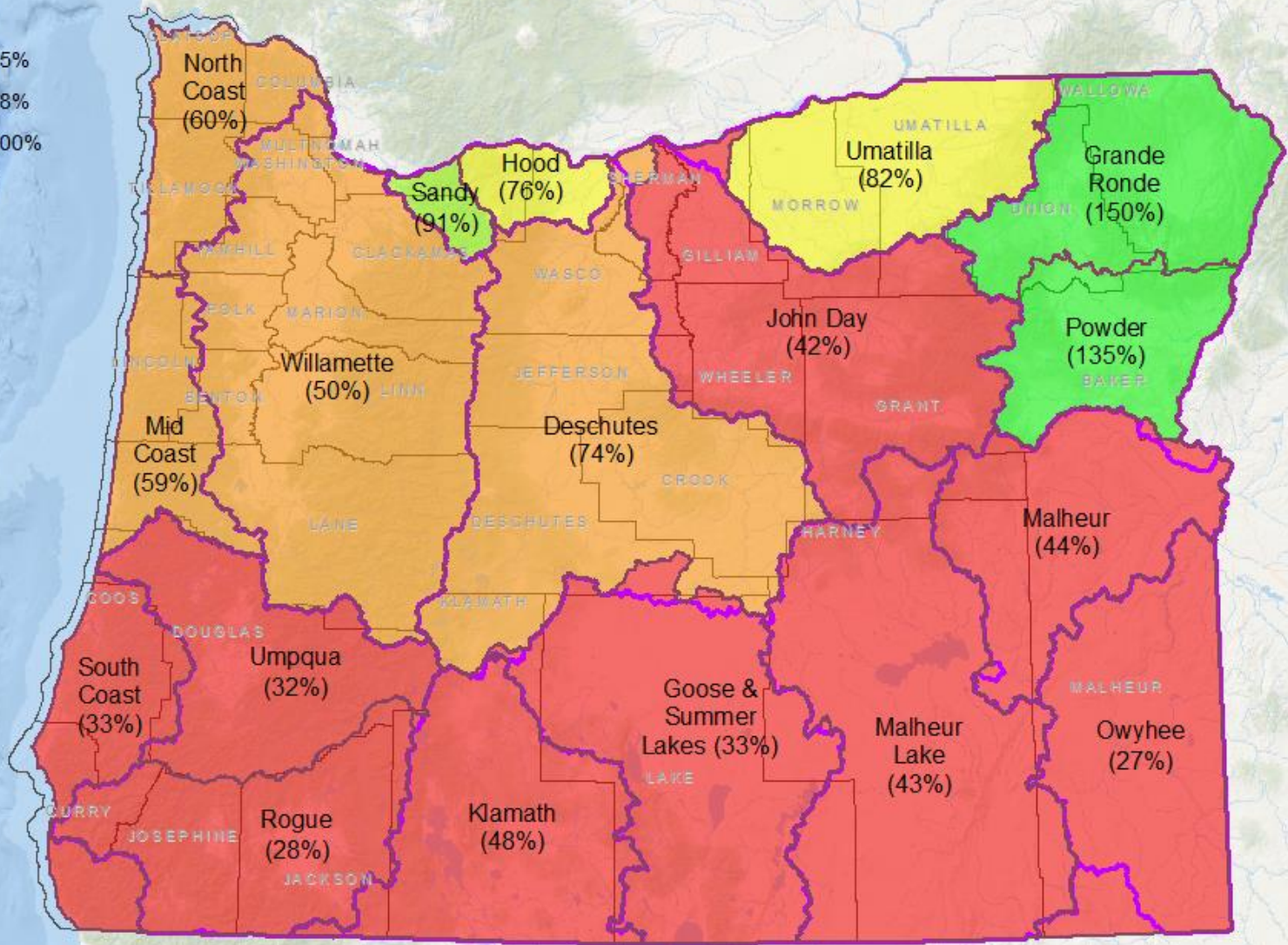
### WRD Basin



### NRCS Basin

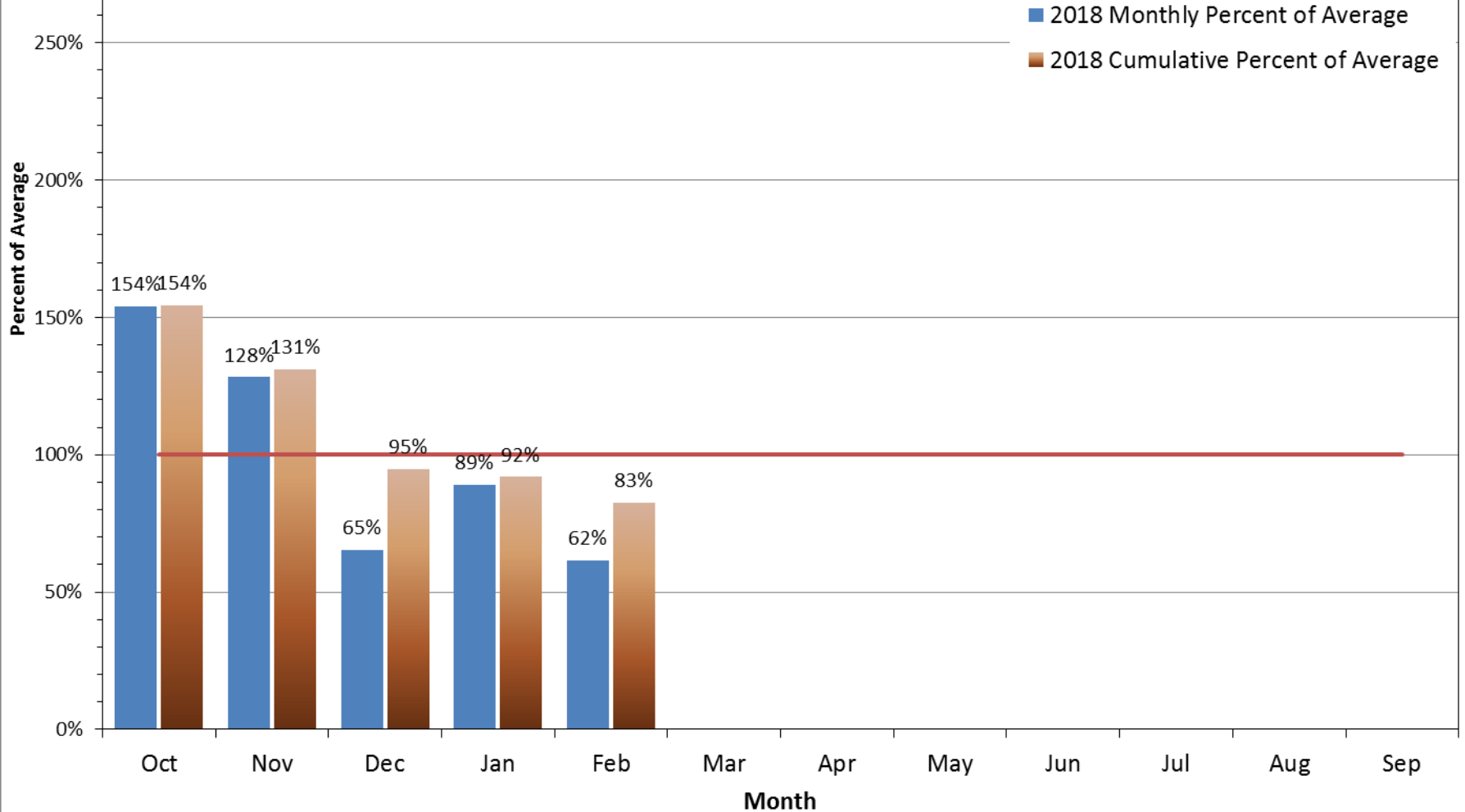


### County

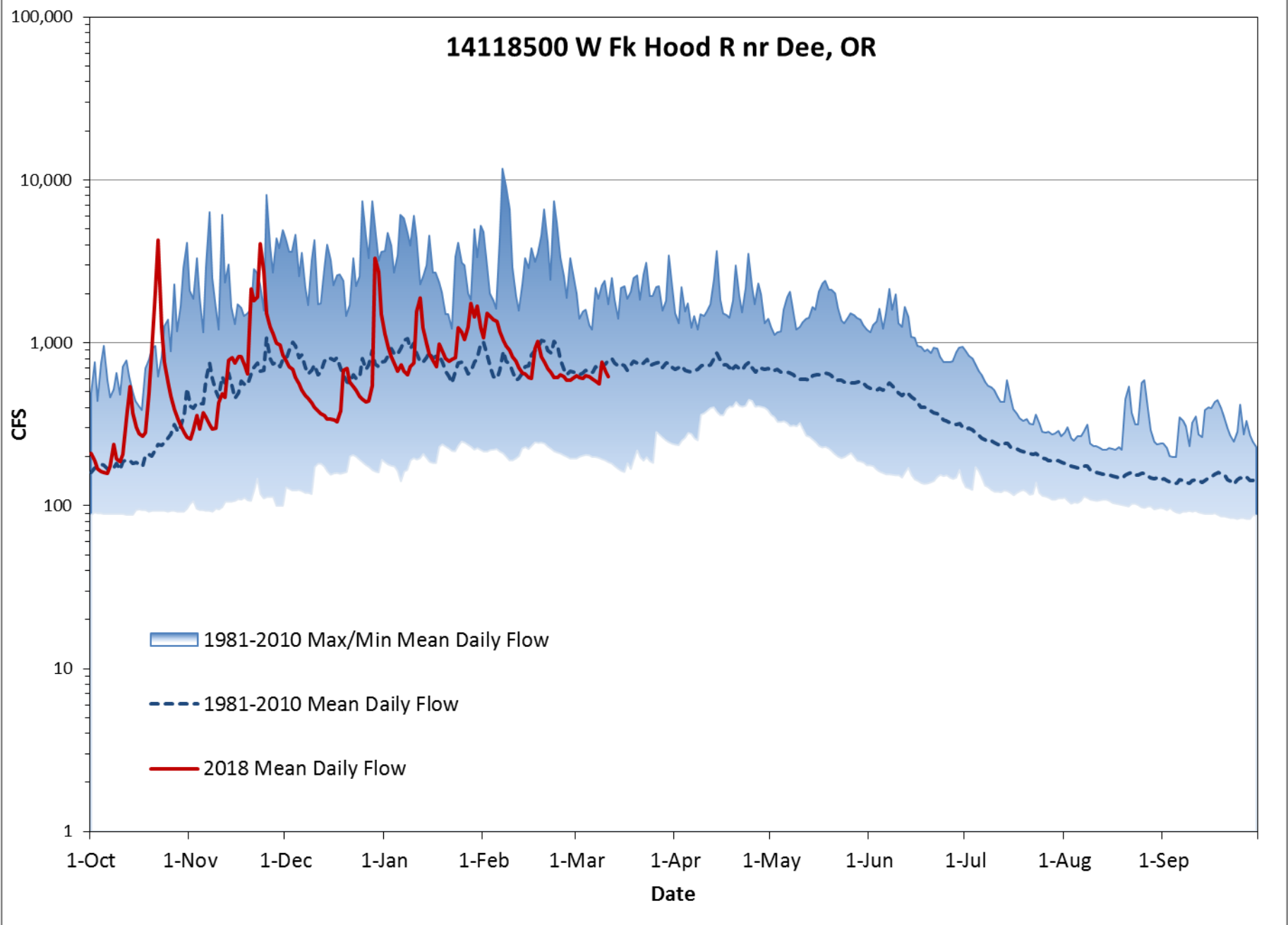


Average streamflow data are based on 30 years of record (1981-2010). All data represent free-flowing streams unaffected by significant man-made control structures such as dams or diversion works.

## 2018 Statewide Percent of Average Stream Flow

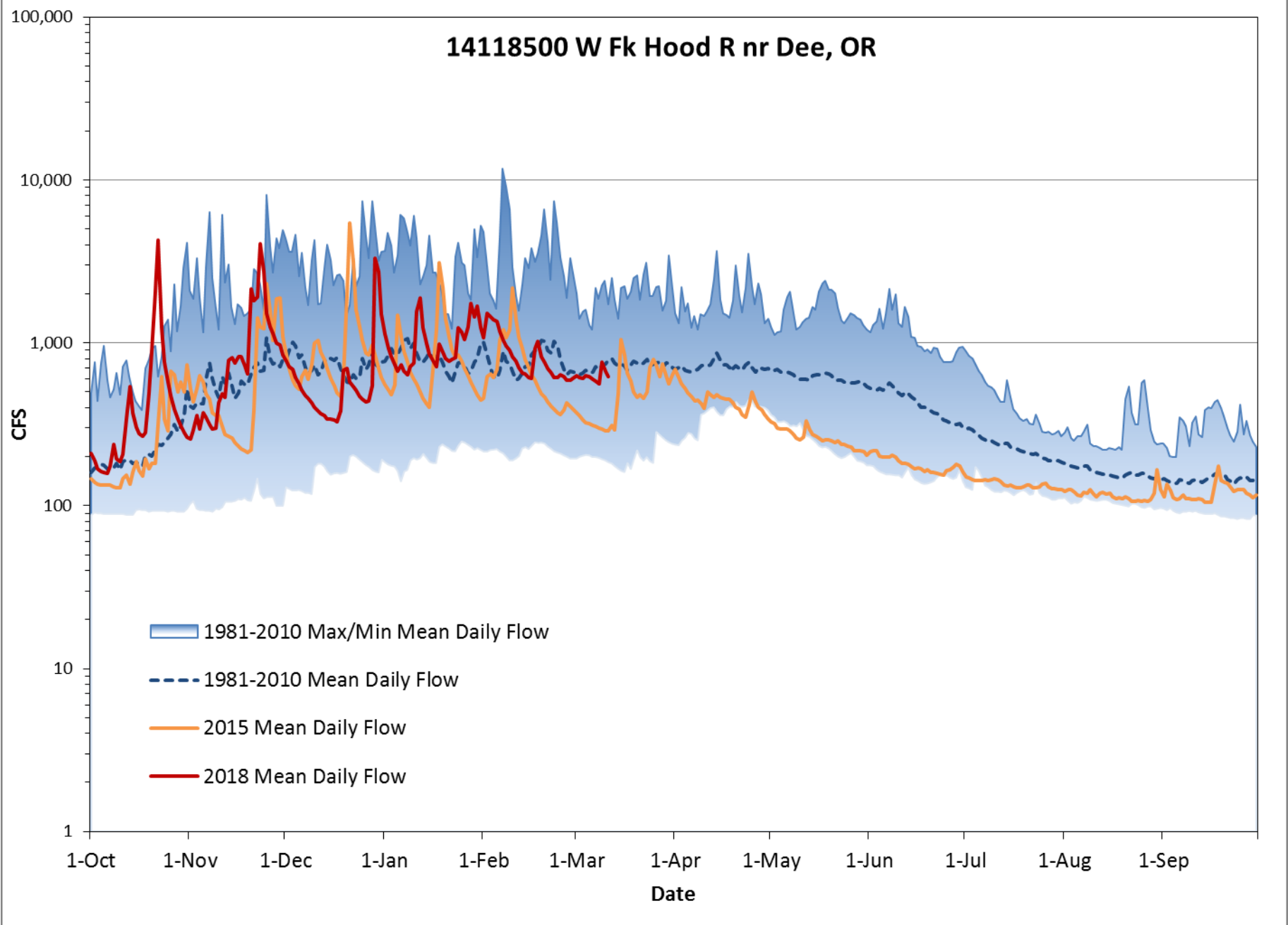


# 14118500 W Fk Hood R nr Dee, OR

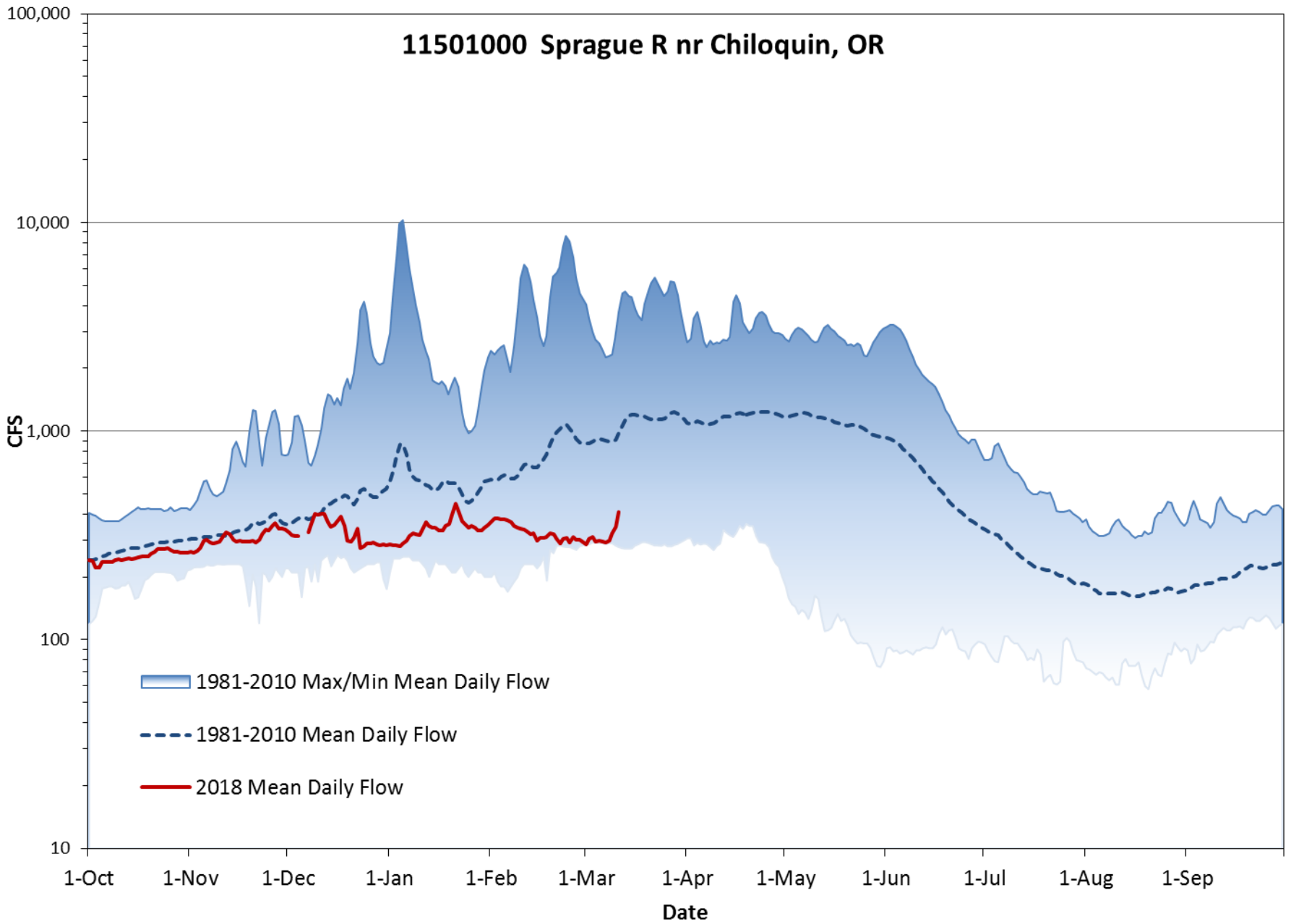




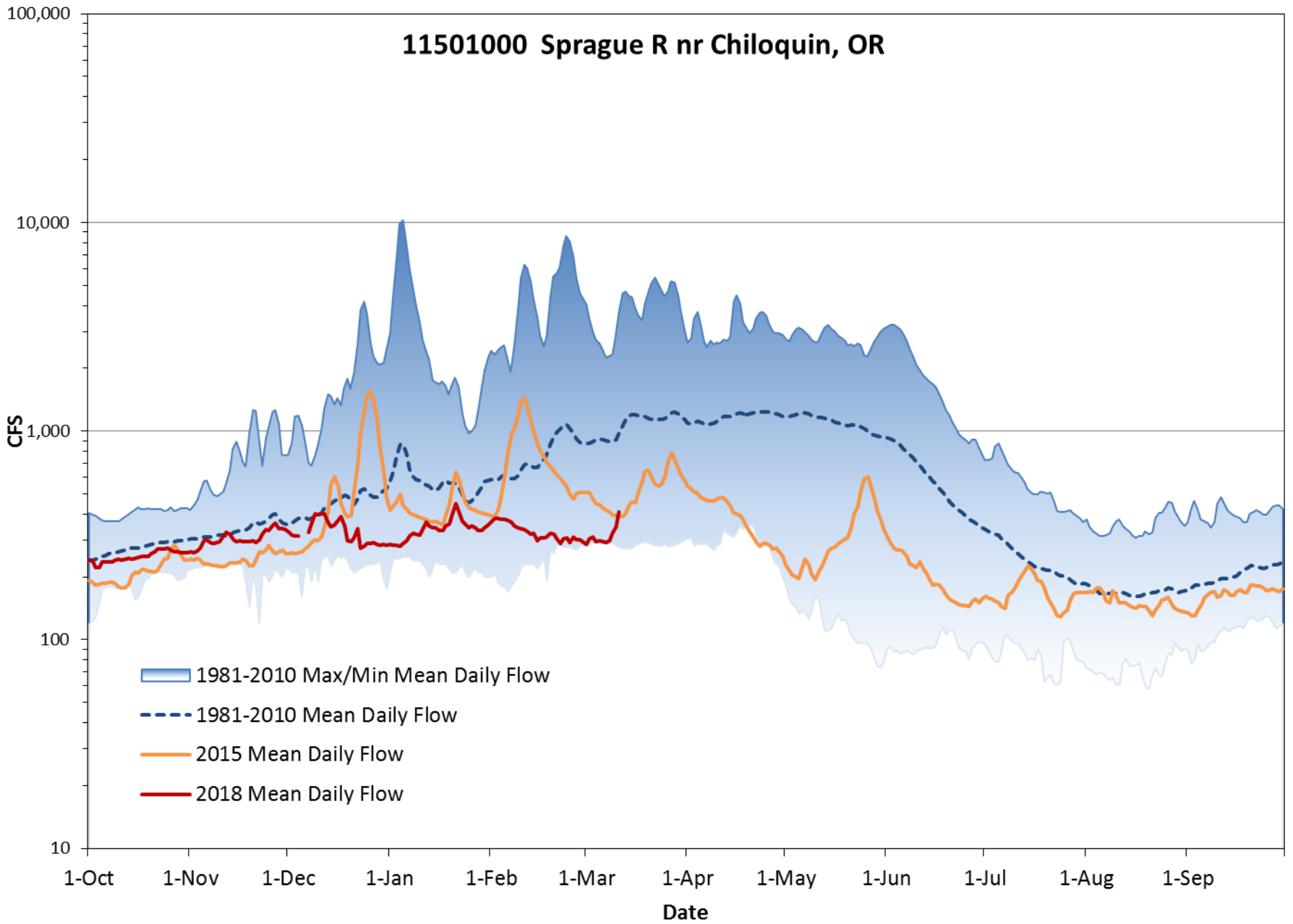
# 14118500 W Fk Hood R nr Dee, OR



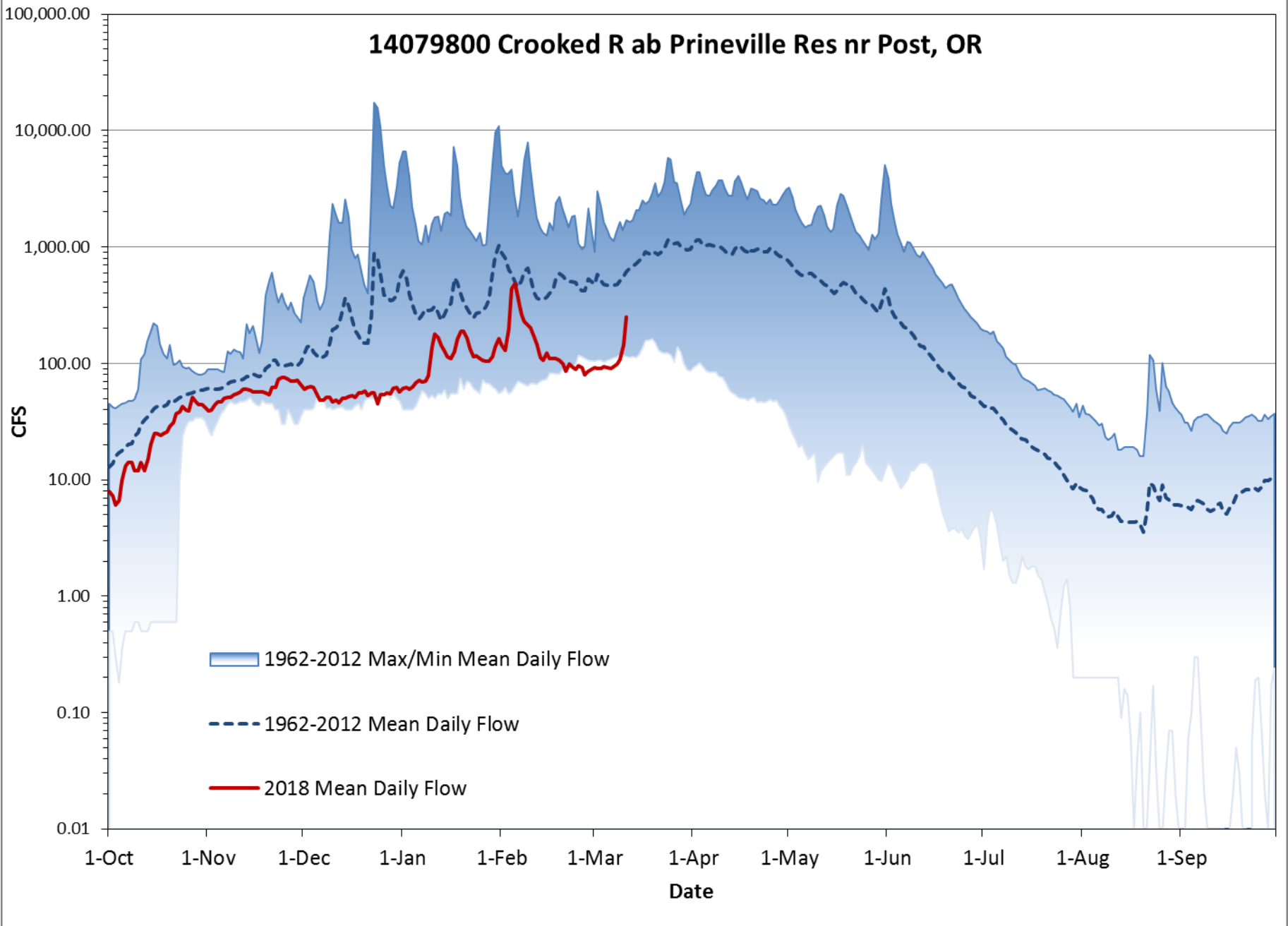
# 11501000 Sprague R nr Chiloquin, OR



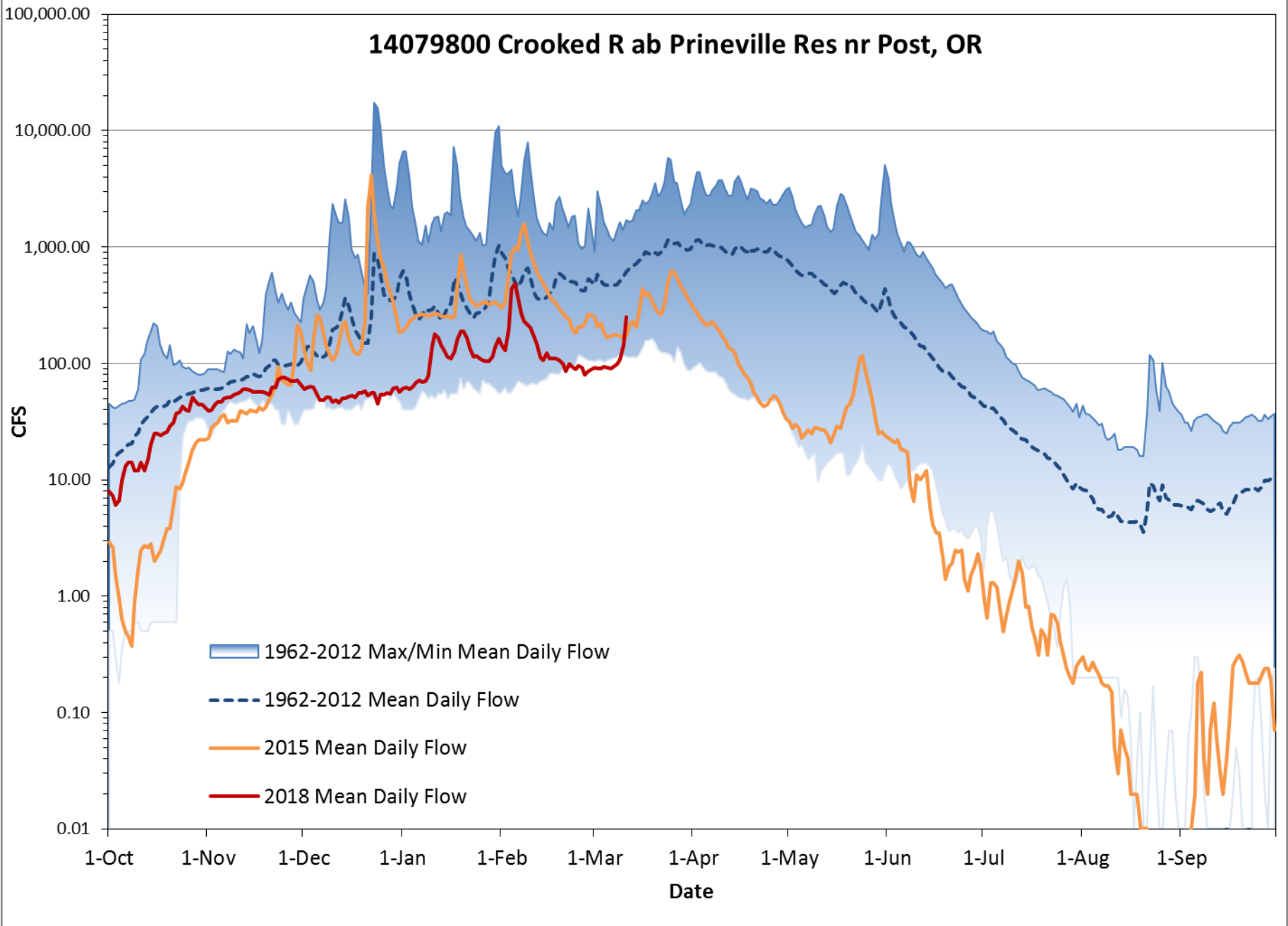
# 11501000 Sprague R nr Chiloquin, OR



# 14079800 Crooked R ab Prineville Res nr Post, OR

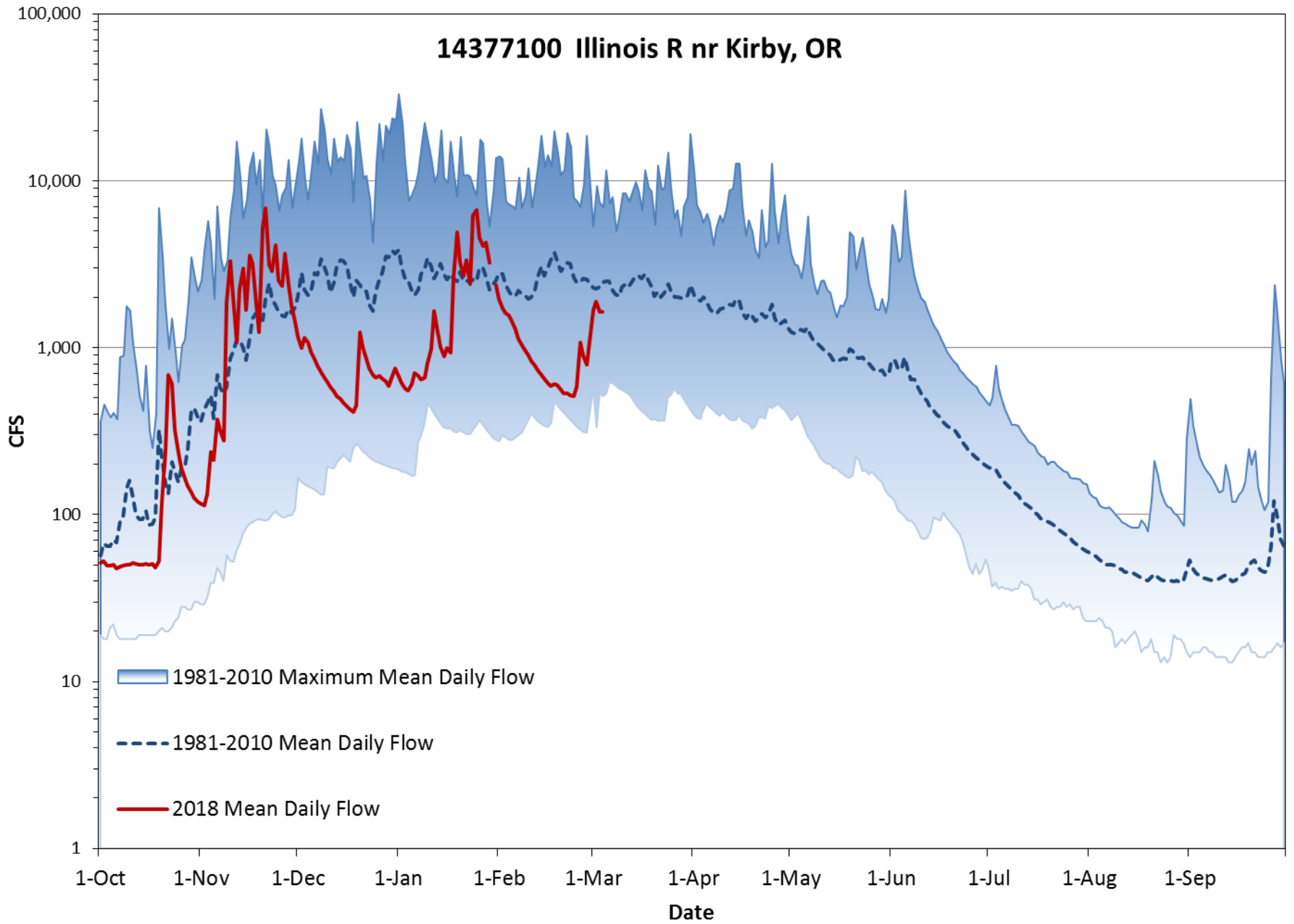


# 14079800 Crooked R ab Prineville Res nr Post, OR

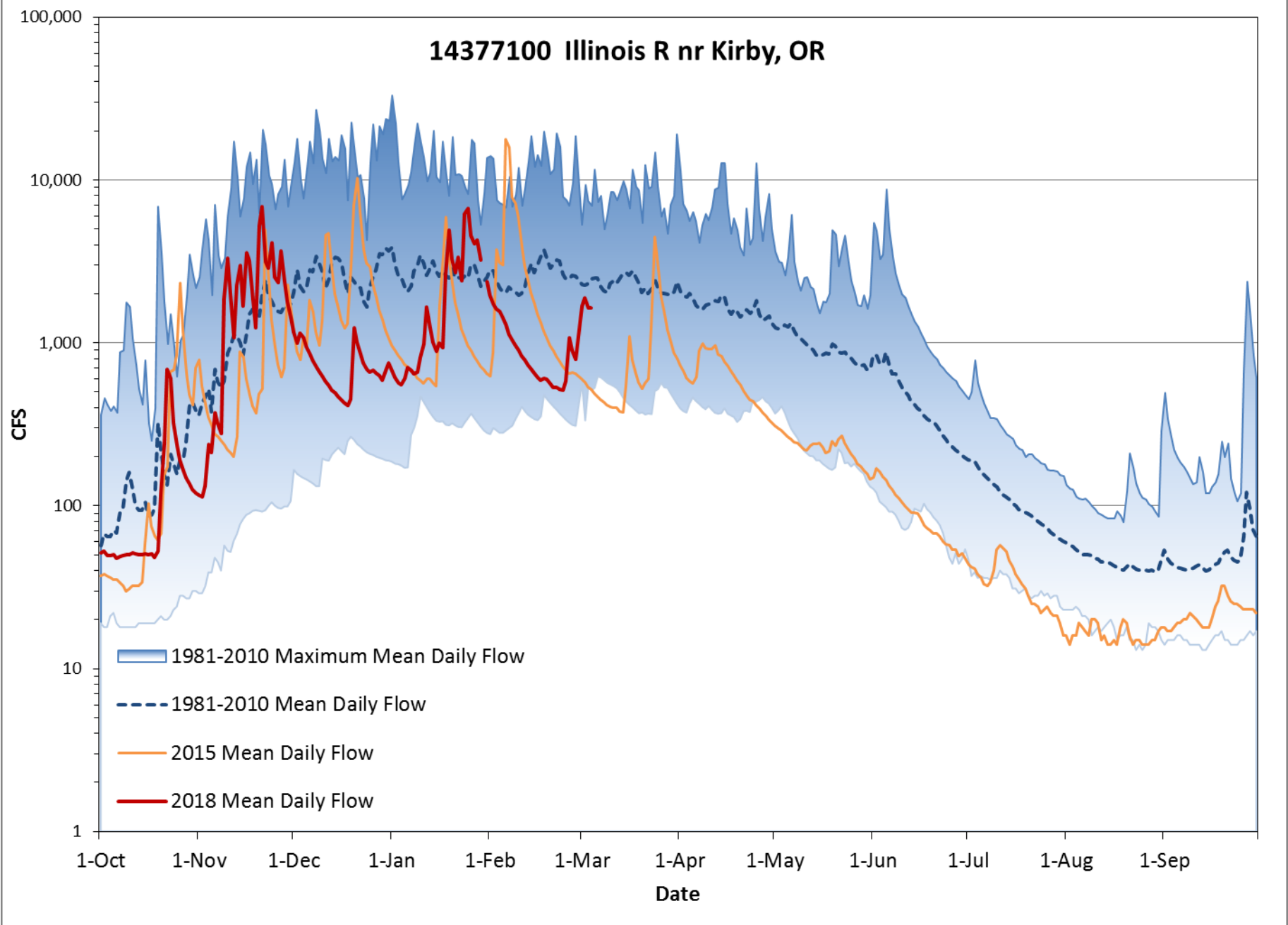




# 14377100 Illinois R nr Kirby, OR



# 14377100 Illinois R nr Kirby, OR



# Reservoir Storage Summary for the end of February, 2018

## Percent of Average Storage

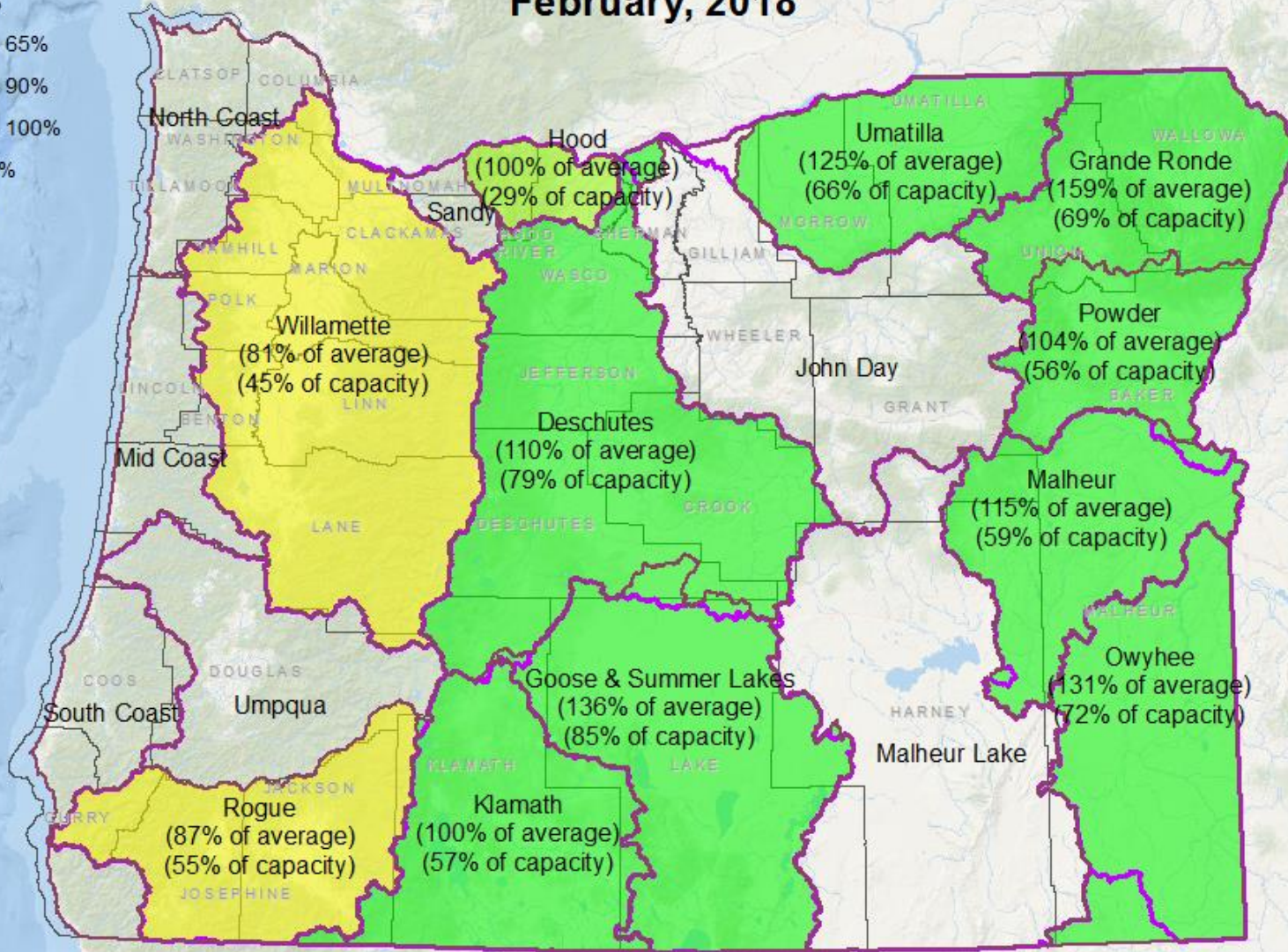
Current\_Average / none

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

NRCS Basin



County



NRCS Basinwide Summary: March 1, 2018  
(averages based on 1981-2010 reference period)



OREGON



WATER RESOURCES  
DEPARTMENT

Thank you.

# Oregon Drought Readiness Council

## March 14, 2018



**H. Scott Oviatt**  
Snow Survey Supervisory Hydrologist  
USDA Natural Resources Conservation Service  
[Scott.Oviatt@or.usda.gov](mailto:Scott.Oviatt@or.usda.gov)  
503-414-3271  
<http://www.nrcs.usda.gov/wps/portal/nrcs/main/or/snow/>



# TOPICS

1. What is USDA-NRCS Snow Survey and Water Supply Forecasting Program
2. Basic Terms and Concepts
3. Examples of Data and Products Generated

# INTRODUCTION

- Approximately 50-80% of western water supply comes from snowmelt run-off
- Measurement of snow water content for determination of water supply has been on-going for over 100 years
- Due to the significance of snowmelt run-off as a major contributor to streamflow, the federal government funded a program to measure western snowpack and ultimately forecast future streamflows volumes
- Snow measurements are conducted using several methods, both manual and automated
- Forecasts and numerous other products generated from snow data are used for water supply, drought identification, recreation, flood forecasting, and many other applications

# Brief History - Snow Survey Measurement and Water Supply Forecasting in the West

- Snow has been measured and data disseminated in the Western United States for over 100 years, beginning with Dr. James Church in Lake Tahoe Region in 1906-1910.
- Snow surveys were initiated with the concept that streamflow could be forecast using snow data as a primary input. Cooperative snow survey programs were established in:
  - California 1917
  - Nevada, Wyoming 1919
  - Washington 1920
  - Montana 1922
  - Utah 1923
  - Oregon 1928
- These programs were administered by cooperators, such as State Engineers, Irrigation Districts, Power and Utility Companies, Universities

# COMMON TERMINOLGY

**SWE = Snow Water Equivalent, the depth of water in inches if snow was melted to liquid**

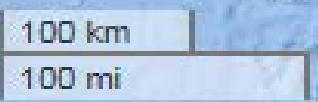
**Water Year Precipitation = The amount of precipitation (liquid and frozen) Accumulated from October 1 through date of reference. Water year 2018 is the period – October 1, 2017 through September 30, 2018**

**Streamflow Forecast = A water supply forecast issued on the first of each month From January through June. Refers to the volume of water (Thousands of Acre Feet) forecast to pass by a real-time gaging station operated by OWRD or USGS.**

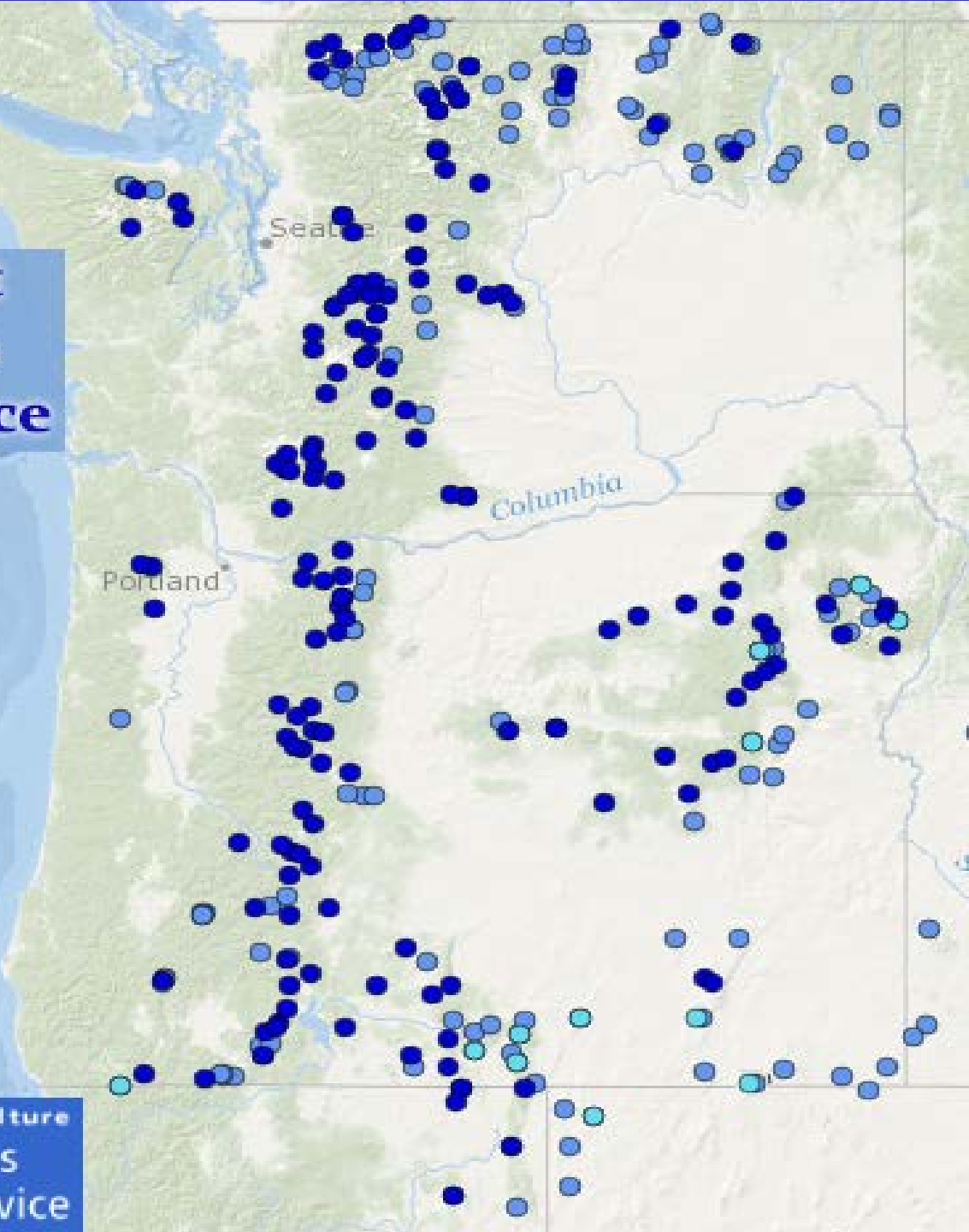
# Snow Measurement Sites in the Oregon Data Collection Office

**Stations by Network**

- SNOTEL
- SNOLITE
- Snow Course/Aerial Marker



1347





# Data Collection Efforts

- **Snow Courses:**  
Site maintenance, data collection, quality control and archival
- **SNOTEL Sites:**  
Site maintenance/repair, data collection, quality control and archival
- **Snow and water supply data analysis, interpretation, and dissemination:**
  - Develop and release state water supply outlook reports
  - Handle media contacts and issue news releases
  - Work with state and federal entities in assessing/mitigating flood and drought conditions

# SNOW COURSES

155 Snow Courses & Aerial Markers

Manual Monthly Measurements:  
Snow Water Equivalent (SWE)  
Snow Depth









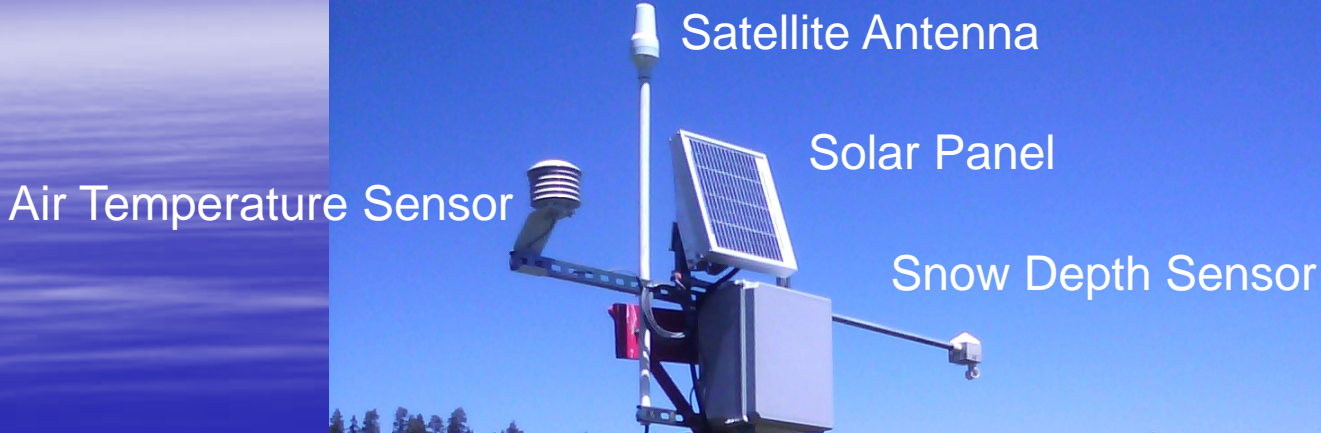
# Aerial Markers



**Manually  
Measured  
Monthly  
Data**



# SNOLITE SITES



**12 SNOLITE (Automated Aerial Marker) Sites**  
**Automated Telemetered Measurements:**  
Snow Water Equivalent (SWE)  
Air Temperature  
(Max, Min, Current, Average)  
Snow Depth



# SNOTEL

Air Temperature  
Sensor

Snow Depth  
Sensor

Antenna and  
Solar Panel

Automated  
Daily &  
Hourly Data

156 Automated SNOWpack TELelemetry (SNOTEL) Sites

Automated Telemetered Measurements:

Snow Water Equivalent (SWE)

Precipitation (Rain and Frozen)

Air Temperature (Max, Min, Current, Average)

Snow Depth

Wind Speed and Direction\*

Relative Humidity\*

Solar Radiation\*

Soil Moisture and Soil Temperature\*

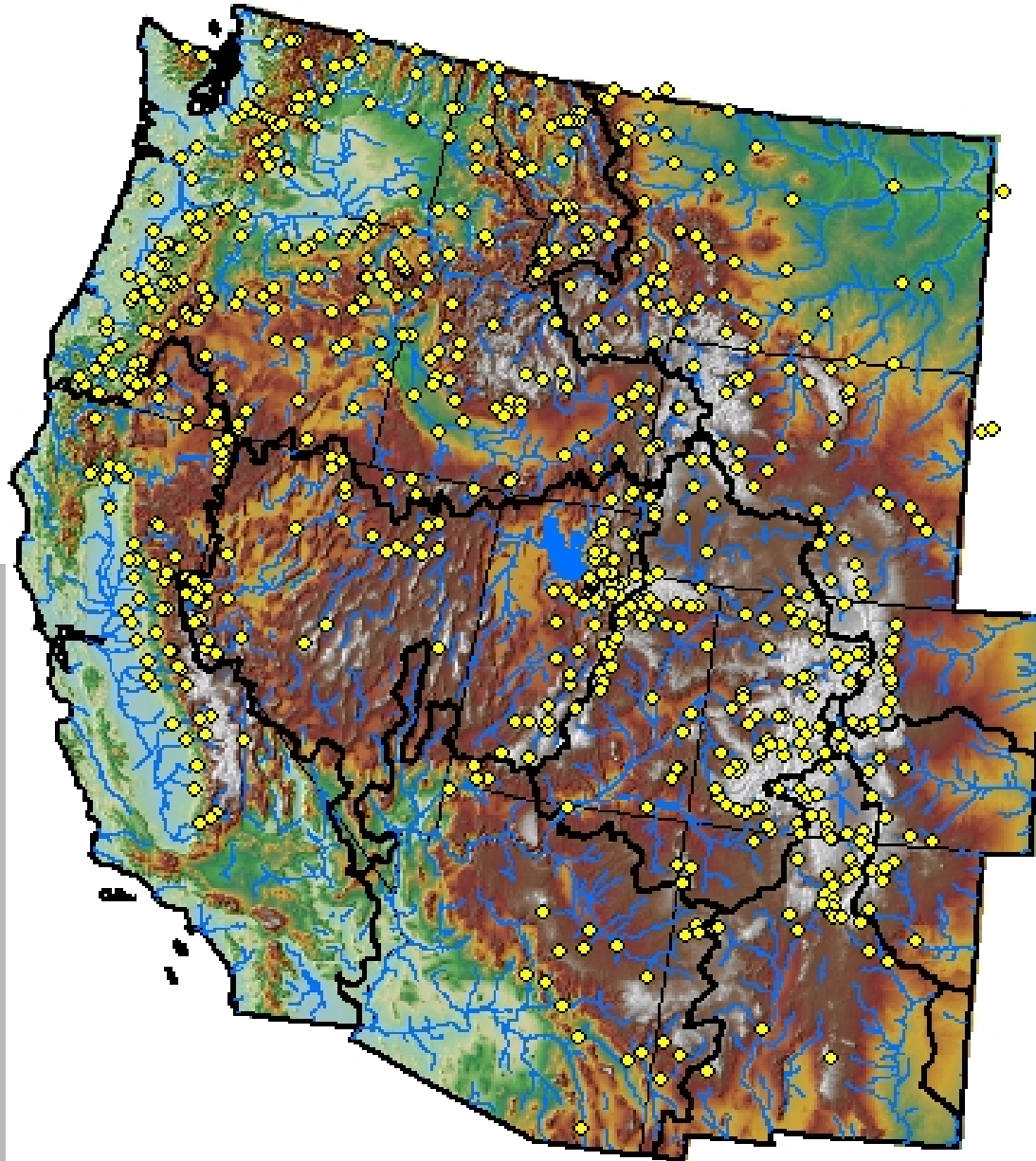
\*Parameters measured at select sites

Snow Pillow

Precipitation  
Storage Gage



# NRCS Forecast Points



**OVER 10,000  
NRCS  
Forecasts  
Issued  
Westwide**

**NRCS uses  
statistical  
forecasting  
models to  
relate SWE and  
Water Year  
Precipitation at  
SNOTEL sites  
to USGS or  
OWRD real-  
time stream  
gaging Stations**

# USERS and USES of NRCS Data, Forecasts, Products, and Reports

## Federal Agencies

- USGS
- USFS
- Other USDA
- USACE
- USBR
- National Weather Service
- NWS - River Forecast Centers
- NOAA
- NASA
- NPS

**Irrigation is critical to agriculture in the US. Nearly 50% of the value of commodities sold comes from the 16% of irrigated cropland.**

## State and Local Groups

- OWRD
- ODF
- ODFW
- ODA
- Local Water Managers
- Irrigation Districts and Companies
- Municipalities
- State Water Supply Availability Committee
- State Drought Readiness Council
- Power Companies
- University Researchers
- Avalanche Centers
- Producers and Ranchers
- Recreationists and Tourism Groups



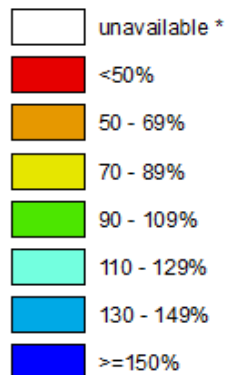
# Statewide SNOTEL Snowpack is 63% of normal

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

Mar 14, 2018

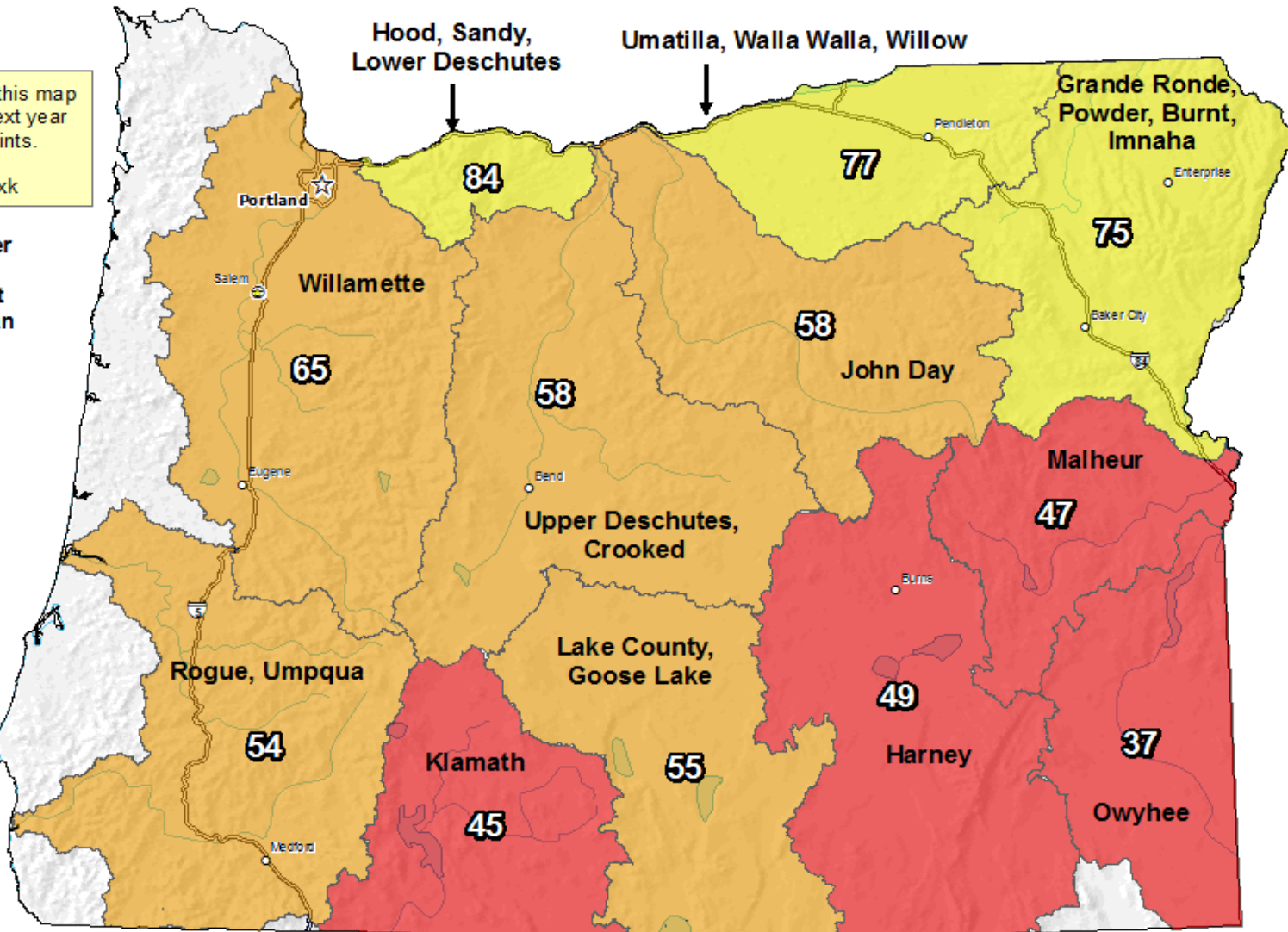
Notice: We anticipate this map will not be available next year due to staffing constraints. Alternate maps: <https://go.usa.gov/xnzxk>

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

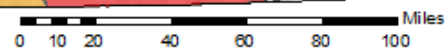


\* Data unavailable at time of posting or measurement is not representative at this time of year

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).



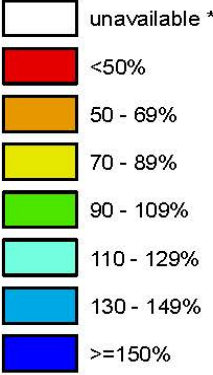
Prepared by:  
USDA/NRCS National Water and Climate Center  
Portland, Oregon  
<http://www.wcc.nrcs.usda.gov>

# Statewide SNOTEL Snowpack was 18% of normal

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

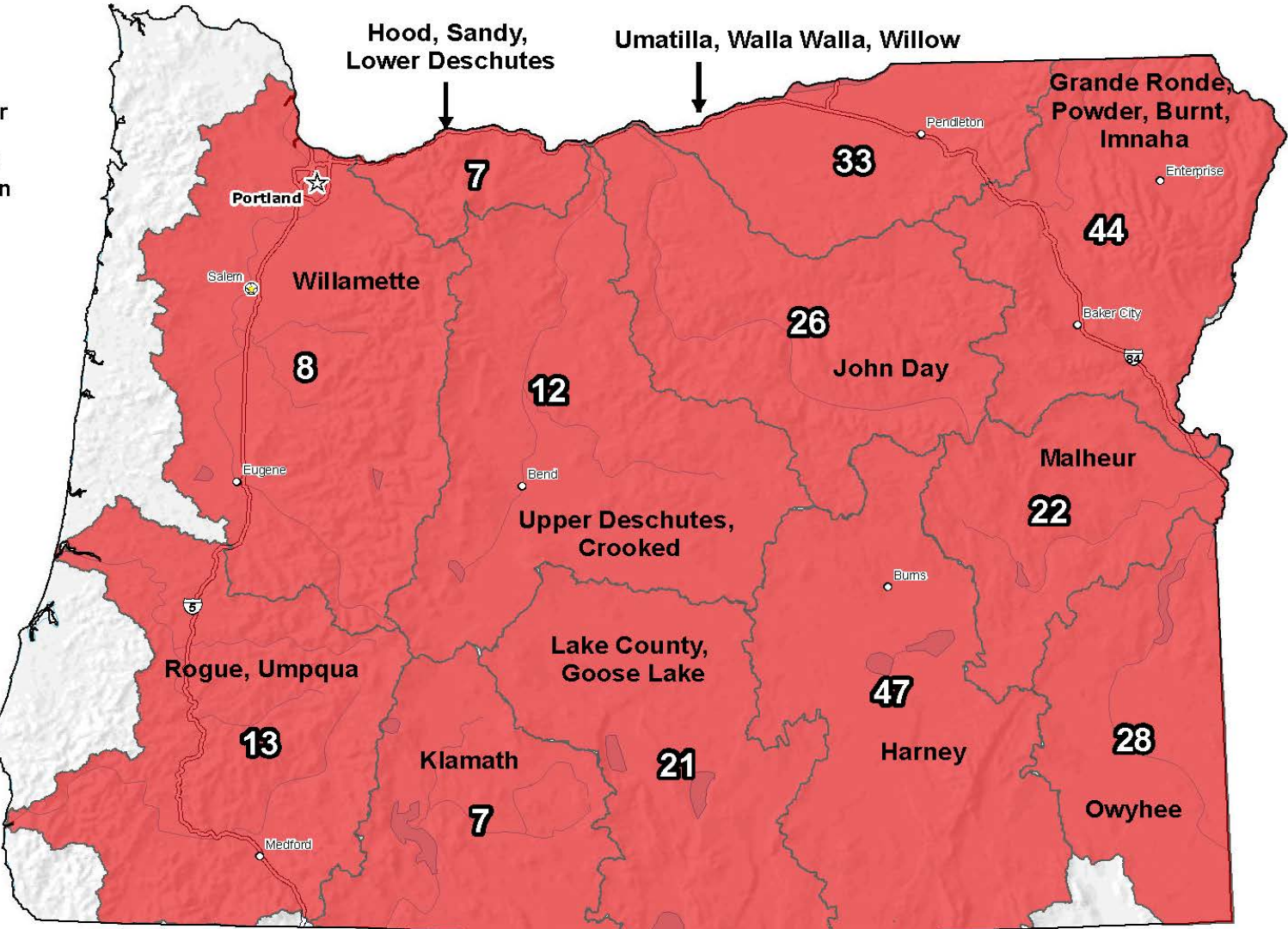
Mar 14, 2015

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

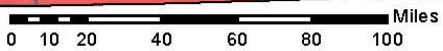


\* Data unavailable at time of posting or measurement is not representative at this time of year

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>

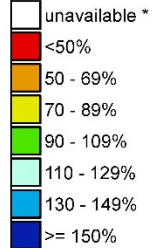


# Westwide SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Mar 14, 2018

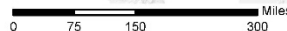
Notice: We anticipate this map will not be available next year due to staffing constraints.  
Alternate maps:  
<https://go.usa.gov/xnzxk>

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



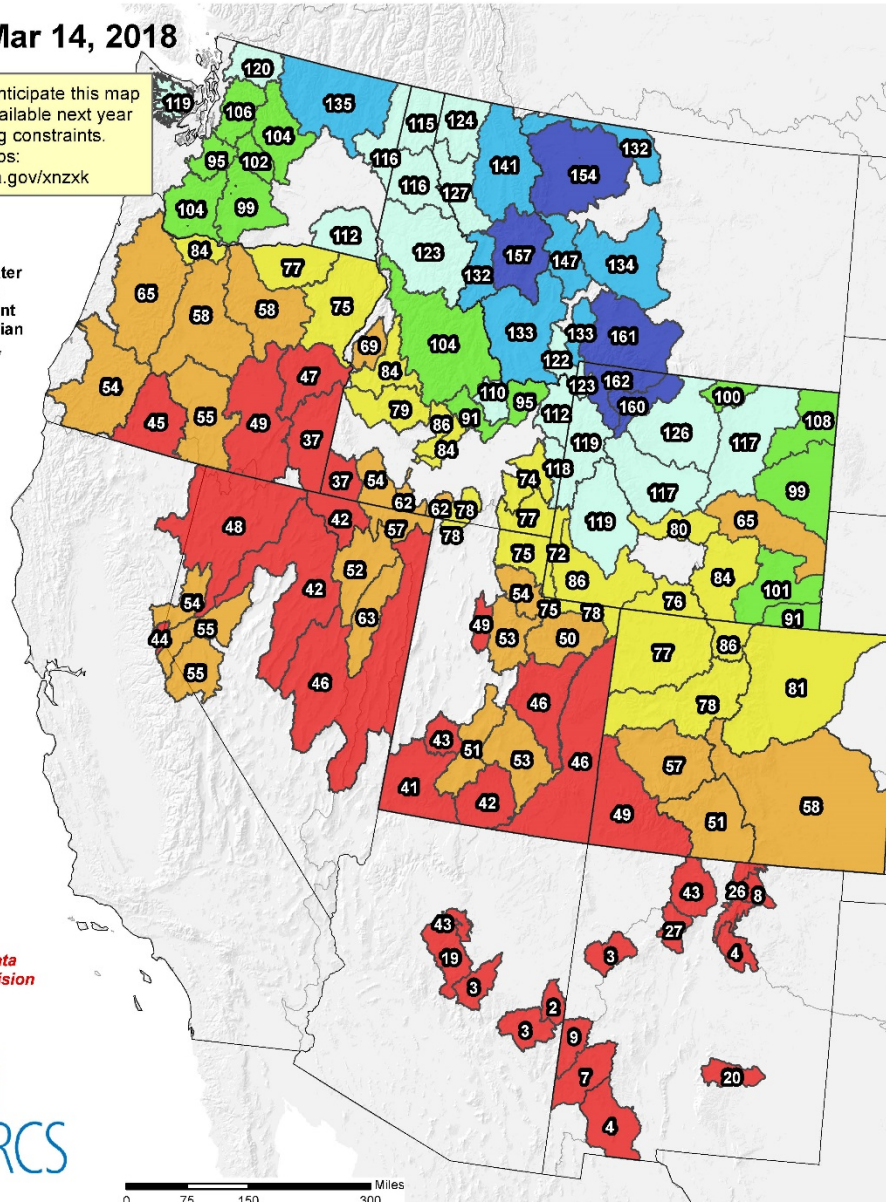
\* Data unavailable at time of posting or measurement is not representative at this time of year

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).

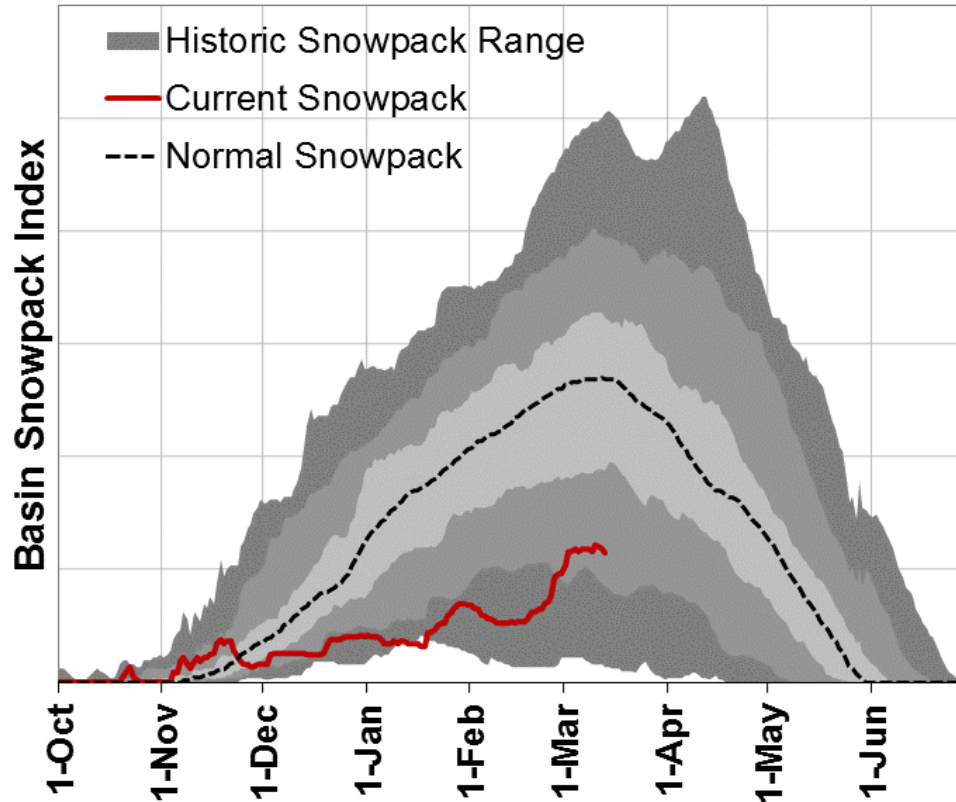
Prepared by:  
USDA/NRCS National Water and Climate Center  
Portland, Oregon  
<http://www.wcc.nrcs.usda.gov>



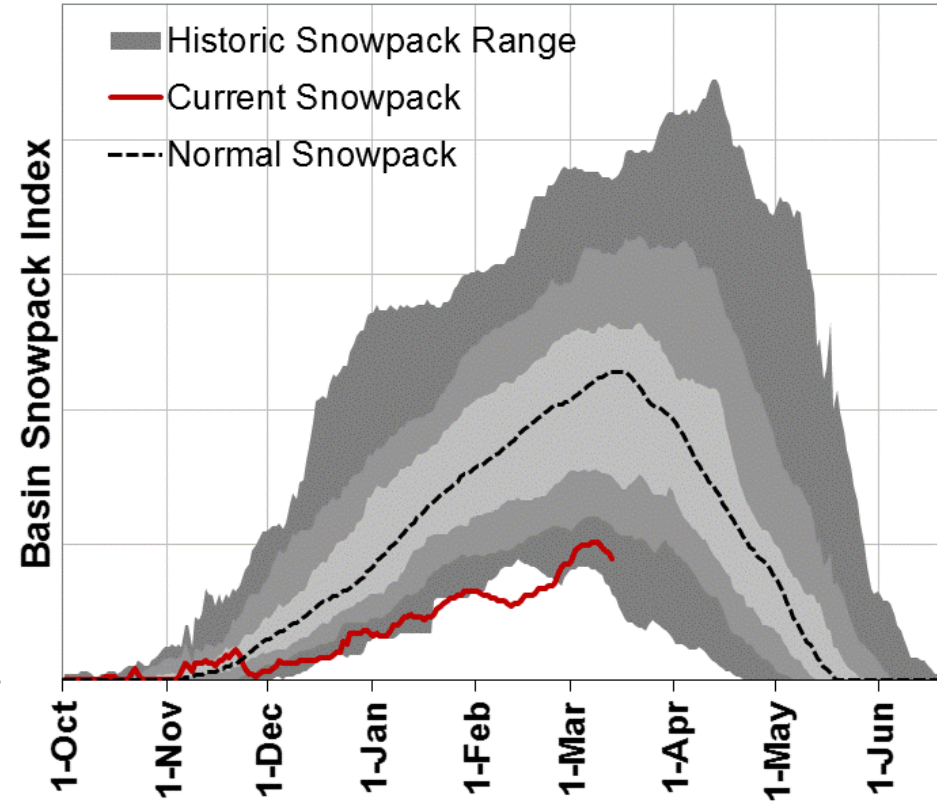
## Water Year 2018 Klamath Snowpack

## Water Year 2018 Owyhee Snowpack

### Mountain Snowpack



### Mountain Snowpack





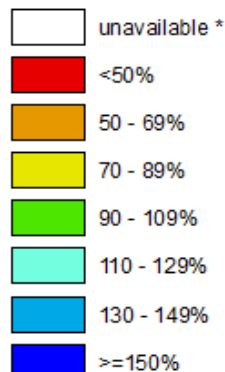
# Statewide SNOTEL Water Year Precipitation is 90% of average

## Oregon SNOTEL Water Year (Oct 1) to Date Precipitation % of Normal

Mar 14, 2018

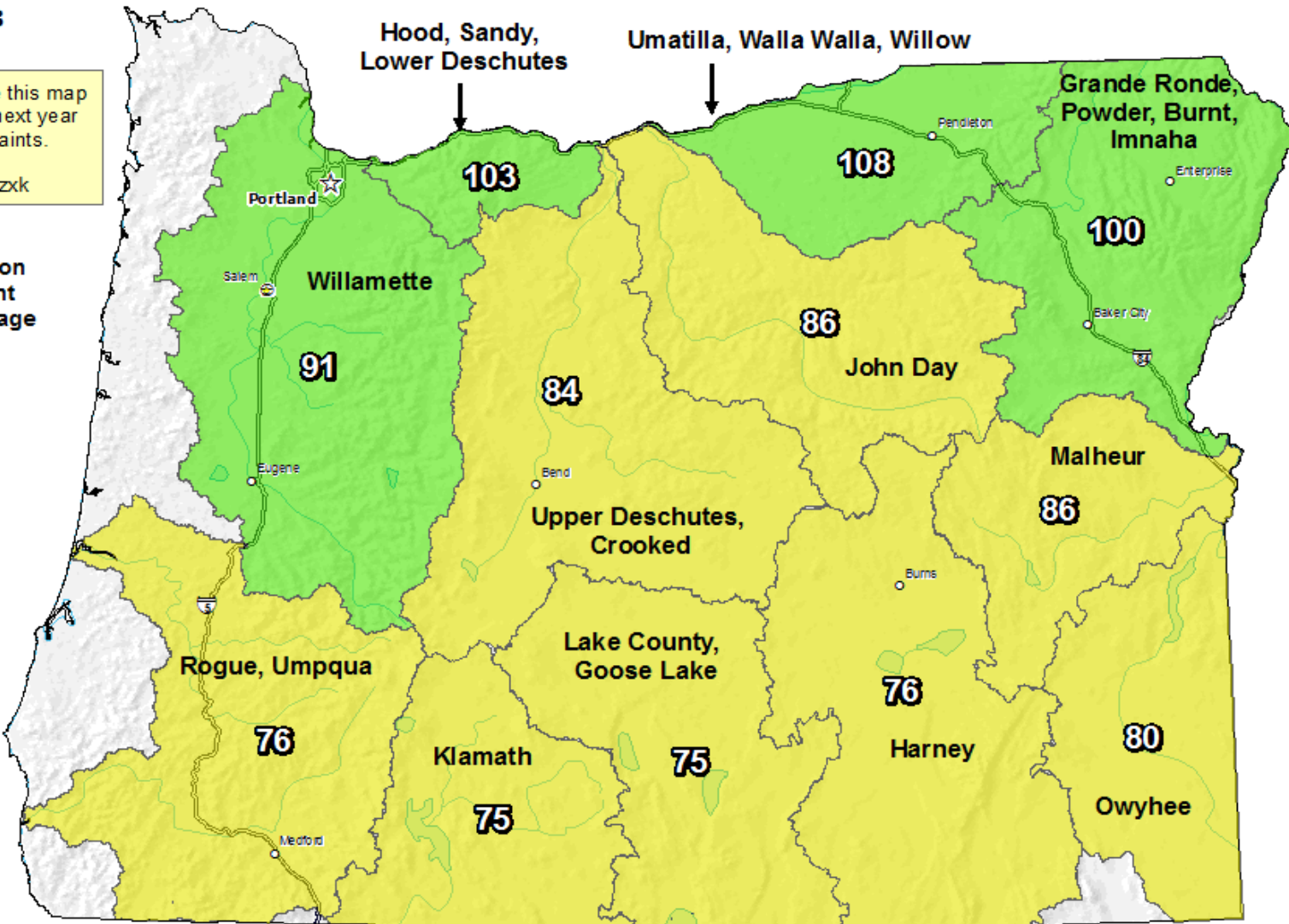
Notice: We anticipate this map will not be available next year due to staffing constraints. Alternate maps: <https://go.usa.gov/xnzxk>

Water Year (Oct 1) to Date Precipitation Basin-wide Percent of 1981-2010 Average

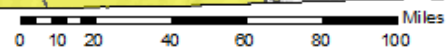


\* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional Data  
Subject to Revision



The water year to date precipitation percent of normal represents the accumulated precipitation 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).

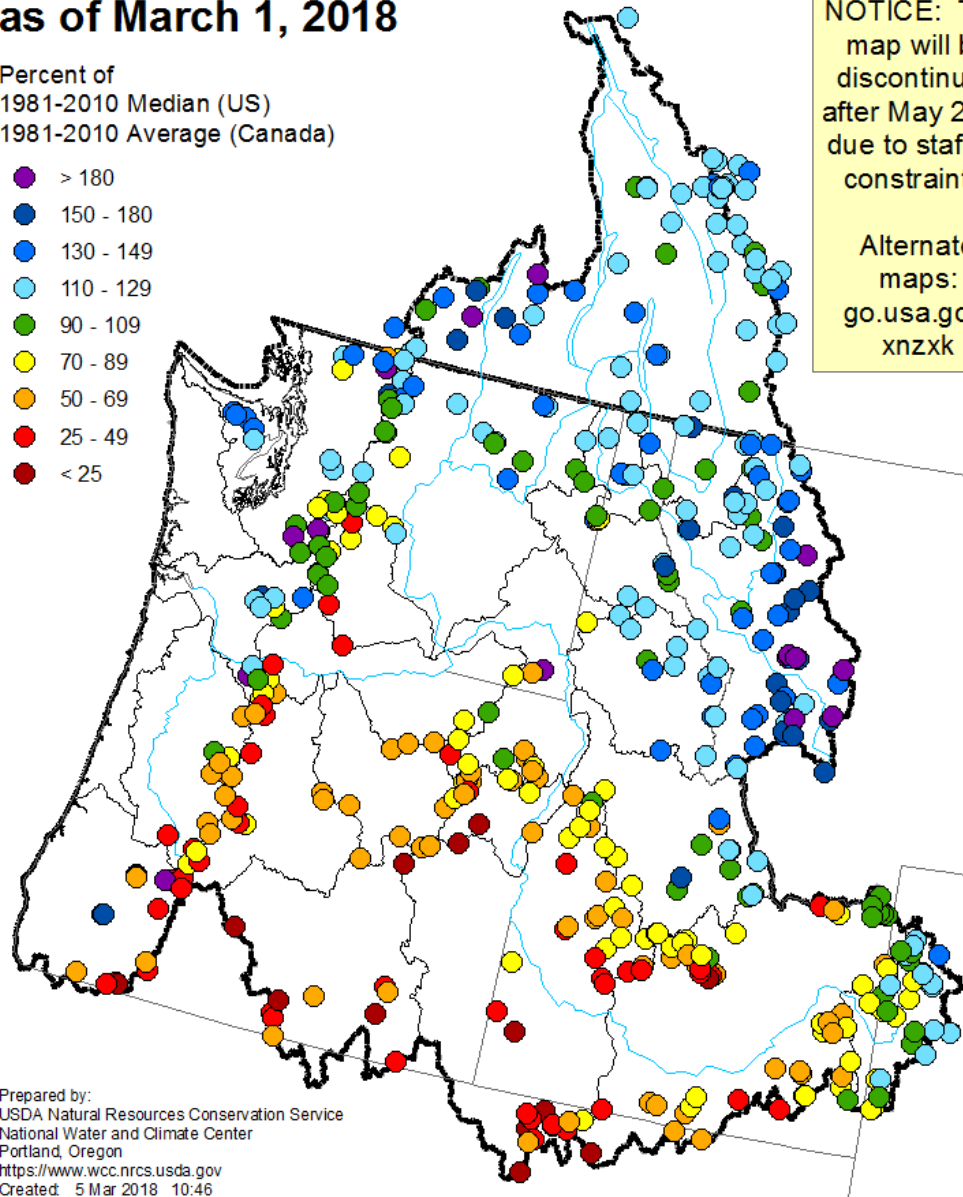


Prepared by:  
USDA/NRCS National Water and Climate Center  
Portland, Oregon  
<http://www.wcc.nrcs.usda.gov>

# Columbia River and Pacific Coastal Basins Mountain Snowpack as of March 1, 2018

Percent of  
1981-2010 Median (US)  
1981-2010 Average (Canada)

- > 180
- 150 - 180
- 130 - 149
- 110 - 129
- 90 - 109
- 70 - 89
- 50 - 69
- 25 - 49
- < 25

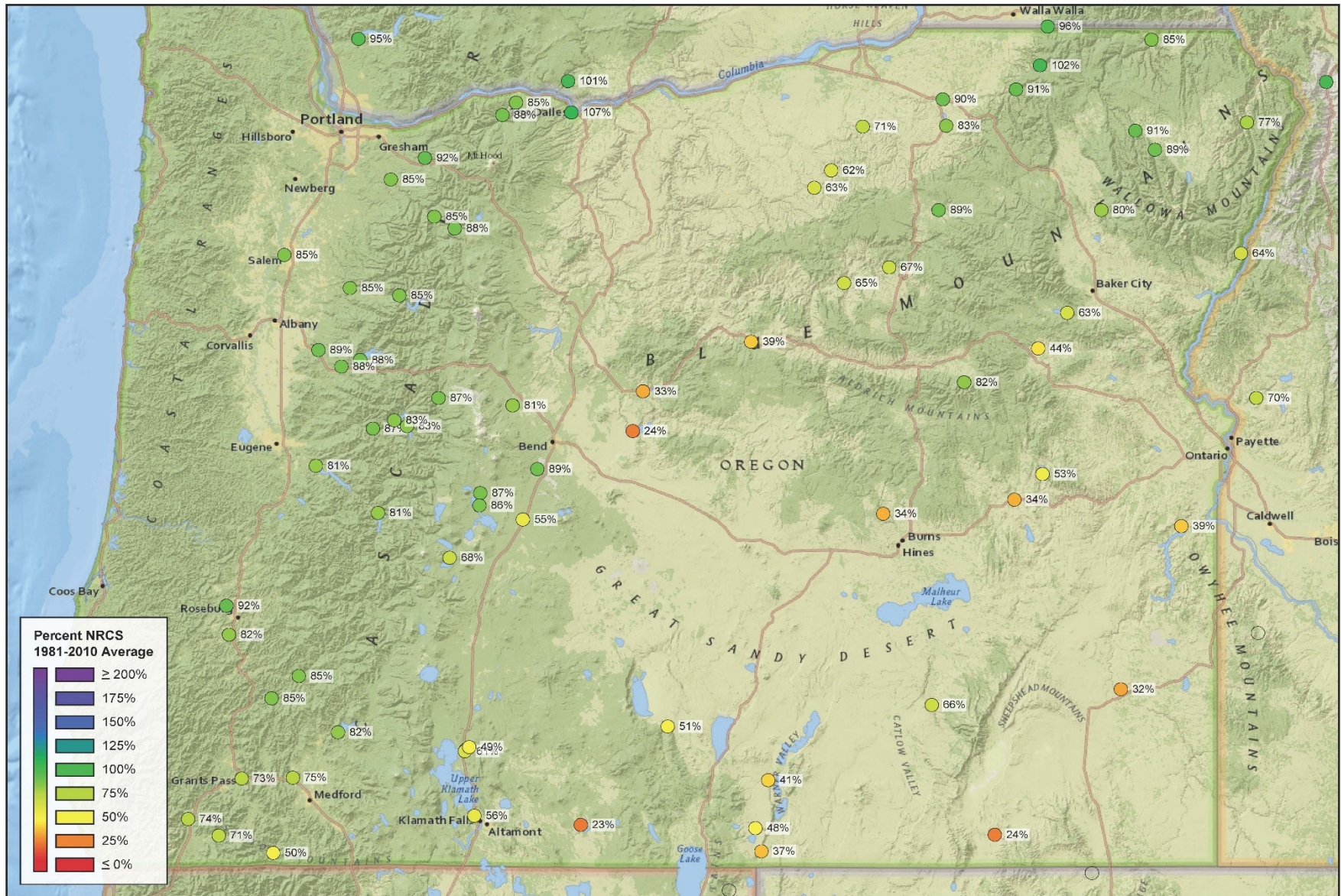


NOTICE: This map will be discontinued after May 2018 due to staffing constraints.

Alternate maps:  
[go.usa.gov/xnzxk](http://go.usa.gov/xnzxk)

Prepared by:  
USDA Natural Resources Conservation Service  
National Water and Climate Center  
Portland, Oregon  
<https://www.wcc.nrcs.usda.gov>  
Created: 5 Mar 2018 10:46





0 100 mi

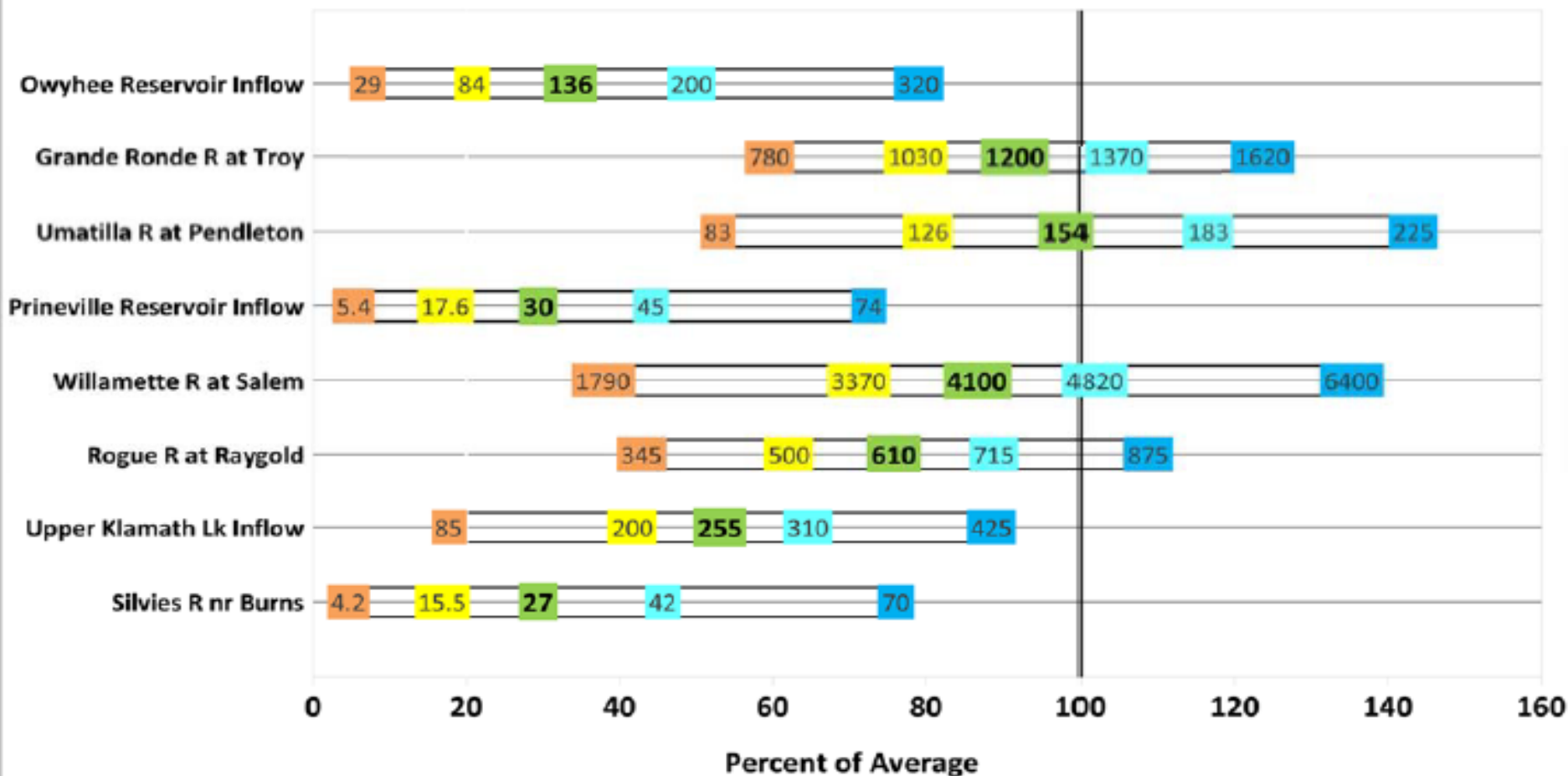
Created 3-06-2018, 09:08 AM PST



March 1, 2018

# Summary of Streamflow Forecasts across Oregon

April through September Forecast Volumes at a Selection of Streamflow Points  
(Volumes listed in KAF)



Legend: ←-----Drier-----Future Conditions-----Wetter-----→

**90% Exceedance Forecast (KAF)**

There is a 90% chance that flows will exceed this volume.

**70% Exceedance Forecast (KAF)**

There is a 70% chance that flows will exceed this volume.

**50% Exceedance Forecast (KAF)**

There is a 50% chance that flows will exceed this volume.

**30% Exceedance Forecast (KAF)**

There is a 30% chance that flows will exceed this volume.

**10% Exceedance Forecast (KAF)**

There is a 10% chance that flows will exceed this volume.



# Thank you!

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

**Subject:** Governor Kate Brown Visits Klamath Falls to Declare Drought, Provide Relief

Governor Kate Brown today signed an Executive Order declaring a drought in Klamath County and directed state agencies to coordinate and prioritize assistance to the region.

Is this email not displaying correctly?  
[View it in your browser.](#)



**NEWS RELEASE**

**March 13, 2018**

**Media Contact:**

[Bryan Hockaday](#), 503-580-7836

## **Governor Kate Brown Visits Klamath Falls to Declare Drought, Provide Relief**

(Klamath Falls, OR) — Governor Kate Brown today signed an Executive Order declaring a drought in Klamath County and directed state agencies to coordinate and prioritize assistance to the region. Additionally, Governor Brown meet with Klamath County officials, tribal members, and water users to discuss options for immediate drought relief. At the meeting, Governor Brown committed the state to a locally supported, comprehensive resolution to conflicts over water and land in the Klamath Basin, and asked federal officials to commit to the same.

"We know 2018 is shaping up to be a very difficult year for the Klamath Basin, and we're closely monitoring drought conditions here and statewide," Governor Brown said. "I am committed to doing everything possible to make state resources available to provide immediate relief and assistance to water users throughout Klamath County. As we brace for another record-breaking drought year, collaborating with our federal partners will also be critical as we work towards locally supported, long-term solutions."

### **The Impacts of Drought**

At the end of February, the snow-water equivalent in Klamath County was 40 percent of a normal water year, and forecasted water conditions are not expected to improve. Drought, severe weather conditions, and the upcoming fire season pose significant threats to the local economy, agriculture and livestock, natural resources, and recreation in Klamath County. Local officials predict conditions this year could result in losses exceeding \$557 million and impacting 4,500 jobs.

### **What a Drought Declaration Means**

Governor Brown's drought declaration unlocks a number of drought-related emergency tools for water users, including assistance to local water users. Drought declarations also allow the Water Resources Department to expedite review processes and reduce fee schedules. Declarations are intended to be short-term emergency authorizations to address water supply challenges. More information is available at [Oregon Drought Watch](#).

A request for federal assistance was also made and supported by members of Oregon's congressional delegation. Interior Department Deputy Commissioner of Reclamation, Alan Mikkelsen, attended the Governor's meeting with Klamath officials and committed federal assistance to the Klamath Basin.

As state and local officials coordinate with federal partners, conditions will be closely monitored by the state's natural resource and public safety agencies, including the [Oregon Water Resources Department](#) and the [Oregon Office of Emergency Management](#).

### **The Drought Declaration Process**

Requests for drought declarations typically go through a three-part process before securing a state drought declaration from the governor. On Feb. 20, the [Klamath County Commission](#) declared a drought emergency due to low snowpack, low precipitation, low streamflows and warmer than normal temperature, and a state drought declaration was requested. State officials subsequently met, and the [Oregon Drought Readiness Council](#) ultimately recommended that the governor's drought declaration will provide a critical tool to confront current water conditions and future climatic forecasts.

### **DOWNLOAD:**

[Klamath Falls Drought Declaration](#)  
[Oregon Water Conditions Report \(Feb. 2018\)](#)  
[Oregon Drought Readiness Council Recommendation](#)  
[State Drought Declaration Process & Emergency Tools](#)  
[Congressional Drought Relief Letter](#)  
[Photos](#)

###

[www.governor.oregon.gov](http://www.governor.oregon.gov)  
[Previous Press Releases](#)

[Chris Pair](#) • Communications Director, Office of Governor Kate Brown • (503) 378-5965