October 11, 2018 Drought Readiness Council Meeting Materials

Oregon's Drought Readiness Council
Sept. 13, 2018 Meeting Notes
Needs Council Approval

Participants in the Room:
Brenda Bateman, Chair, Oregon Drought Readiness Council & Water Resources Department
Ken Stahr, Chair, Water Supply Availability Committee & Water Resources Department
Anna Pakenham Stevenson, Oregon Department of Fish and Wildlife
Daniel Stoelb, Oregon Office of Emergency Management
Jim Johnson, Oregon Department of Agriculture

On the Phone:
Tom Elliott, Oregon Department of Energy
Bruce Gilles, Department of Environmental Quality
Jason Miner, Governor's Natural Resources Office
Roxy Nayar, Oregon Department of Environmental Quality
Kari Salis, Oregon Health Authority, Drinking Water Program
Nick Yonker, Oregon Department of Forestry

---

1. Welcome and Introductions
Brenda Bateman welcomed participants and everyone introduced themselves.

2. Agenda Check
No additions proposed.

3. Approval of August 2018 Meeting Notes
Group approved with the following edits:

Correct Roxy's affiliation; should be DEQ.
Remove question mark after first instance of "wildfires".
Fix the spelling of Haines Index.
Attribute the sentences regarding "heavy rigs for firefighting" to Brenda.
Remove sentence on Prineville.

4. Water Conditions
Ken Stahr, Chair of Oregon's Water Supply Availability Committee, briefed participants on recent and current water conditions. See handouts for details. Highlights are summarized below.

- At close to the end of the water year, precipitation is now at 85 percent of normal for the state. Precipitation for August as well as the entire summer was way below normal.
- Wetter weather passed to the north of us through the year.
- Of note, the north central and northeast part of the state had close-to-adequate snowpack, and ended the season with average levels.
- Soil moisture at SNOTEL sites is well below normal and in some instances, setting low records.
- For August, temperatures have been up to four degrees warmer than normal in some areas.
- The short-term (8-14 day) outlook is drier and warmer than normal across the Pacific Northwest.
- The long term outlook for October through December indicates drier and warmer than normal weather that may reflect a transition to El Niño-like conditions this fall and winter.
- If conditions shape up as forecast, it could create difficult water supply conditions in 2019.

- Fortunately, some communities had access to storage this year, which they fully utilized. The Bureau of Reclamation is forecasting that end-of-year water levels, in Prineville particularly, will be zero (no carry-over).
- Little precipitation in 2019 could prevent reservoirs from refilling and supplying water during summer 2019.
- Streamflow is 54 percent of normal for this time of year across the state.
- The USGS seven-day average runoff (streamflow) for the state is also way below normal.
- Oregon has 12 counties under primary drought designation at the federal level.
- There are nine counties with governor-declared drought at the state level.
- With regard to the U.S. Drought Monitor – Oregon lobbied hard for them to consider our observations.
  - Letter-writing campaign to NRCS re dust and fire.
  - Frustrated with lack of response.
  - Senators Wyden and Merkley sent a letter to the US Departments of Agriculture and Commerce (group asked for a copy).
  - Lobbied to get D3 drought designation expanded in Malheur County, but saw no change.
- As of today, the U.S. Drought Monitor shows this percent of Oregon in drought status:
  - D0 (abnormally dry) - 100%
  - D1 (moderate drought) - 93%
  - D2 (severe drought) - 84%
  - D3 (extreme drought) - 23%
- The U.S. Dept. of Agriculture and NOAA notes that only 3 percent of rangeland in Oregon is in good or very good condition. This ranking is among the worst in the nation.
- Looking at Oregon Department of Forestry's Fire Condition Map, rain and cooler temperatures have brought down fire potential across the state. It's low in the Willamette Valley, moderate in the south and east, and high potential in south central and north central. The Klondike and Terwilliger fires are still underway with no relief from moisture. This is compared to last year, when rains extinguished fires in mid-September. Starting to see frost and lower temperatures in some regions, helping to reduce fire potential along with the lower probability of lightning in September.

5. Consideration of County Requests for Drought Declarations

Gilliam County has submitted a request for Governor's drought declaration. The Water Supply Availability Committee unanimously agreed that hydrologic conditions in Gilliam County warranted drought declaration.

Gilliam County has no stream gages, but it is sandwiched between two counties that have experienced very low streamflow conditions this summer. The best indicator is a stream gage on the Sherman County side of the John Day River for streamflow observations.

Q&A: What does a drought declaration this late in the season get you? They could be setting themselves up for funding under new the farm bill. It is as-yet unknown how the bill will work, but there may be automatic funding eligibility depending on your county's status. This is wheat country, they are not going to drill any wells.

Watermaster comments submitted in support of the request noted earlier regulation and water distribution this season.

Will this be the last request of 2018? No, we wouldn't be surprised to see more, for the reason noted above.

Participated asked that any recommendations to the governor's office note that:

- hydrologic conditions warrant support of this request
- droughts have long-term, cumulative effects. Yes, Gilliam County is in drought.
- All season, precipitation passed to our north, leaving hot, dry conditions.

6. Roundtable and Discussion

Ken Stahr: Q: Should we invite others from USDA (National Ag Statistics Service) to sit in on these discussions? A: We already have FSA at the table. Let's put more energy into inviting OSU Extension.

Jim Johnson: Recent work has centered on documenting impacts of fires, looking at GIS layers.

Anna Pakenham Stevenson: ODFW is hosting workshop Sept. 25-26 to look at fish species distribution, as well as their flow and temperature needs. We're trying to understand current needs; and how they'll change under climate change scenarios. Technical workshop, with a first priority to identify data sources.

Daniel Stoelb. Stay tuned for a national test of the emergency broadcast/alert system. Mobile devices will buzz alerts if providers are network participants. Expect the broadcast to last for 30 minutes.

Brenda Bateman: Gibson Farms in Lincoln County received a temporary drought permit recently, allowing them to move water from low value crops to high value blueberries. This was a drought declaration success story. Response: make sure this gets into the *Capital Press!*

Also, WRD's summer intern collected 30-40 drought impact stories this summer. She's building a story map that we will present to the Water Resources Commission during its November 16 meeting here in Salem. Thank you all, for allowing her to interview you and gather valuable information. Are there others who would like to hear this presentation?

Ken Stahr: The City of Vernonia monitoring streamflows, because low flows trigger outdoor watering and other curtailment programs. Folks are relying on our near real-time data and we don't always know it!

Roxy Nayar: DEQ's groundwater technical advisory committee met this week, and heard about potential new areas of study. The group plans to meet again in early 2019.

Tom Elliott: DOE has its biennial energy report due November. There's some water nexus. Hopefully, we can build in more cross reference to water in the next report.

7. Next Meeting Date
October 11 from 10:00 to noon at OEM.

8. Adjourned at 11:20

Water Supply Conditions Report

Drought Readiness Council

OREGON
WATER RESOURCES
DEPARTMENT

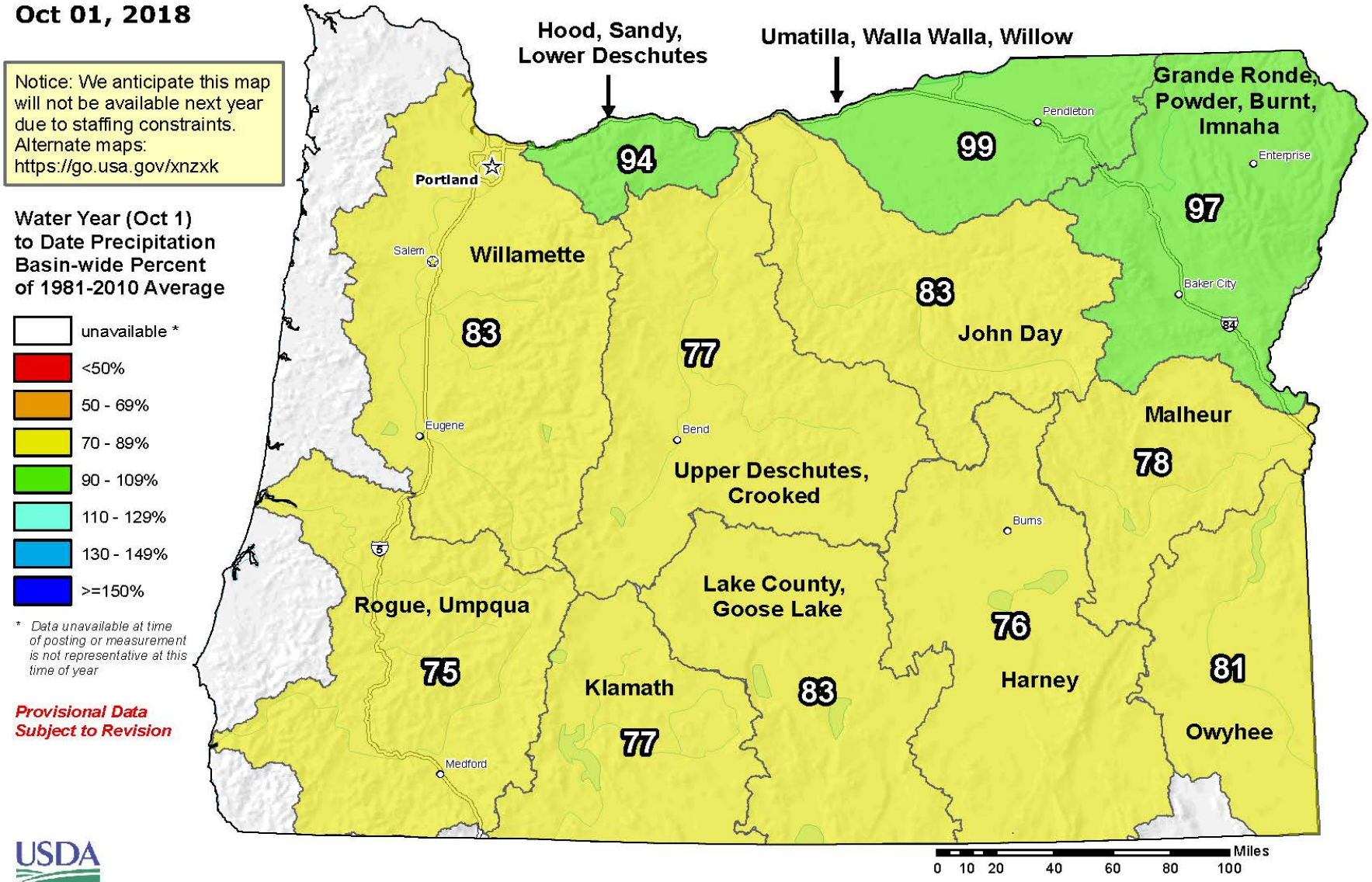
Ken Stahr
Oregon Water Resources Department

October 11, 2018

H. Scott Oviatt
Snow Survey Supervisory Hydrologist
USDA Natural Resources Conservation Service
Scott.Oviatt@or.usda.gov
503-414-3271
http://www.nrcs.usda.gov/wps/portal/nrcs/main/or/snow/

Statewide SNOTEL Precipitation is 85% of normal

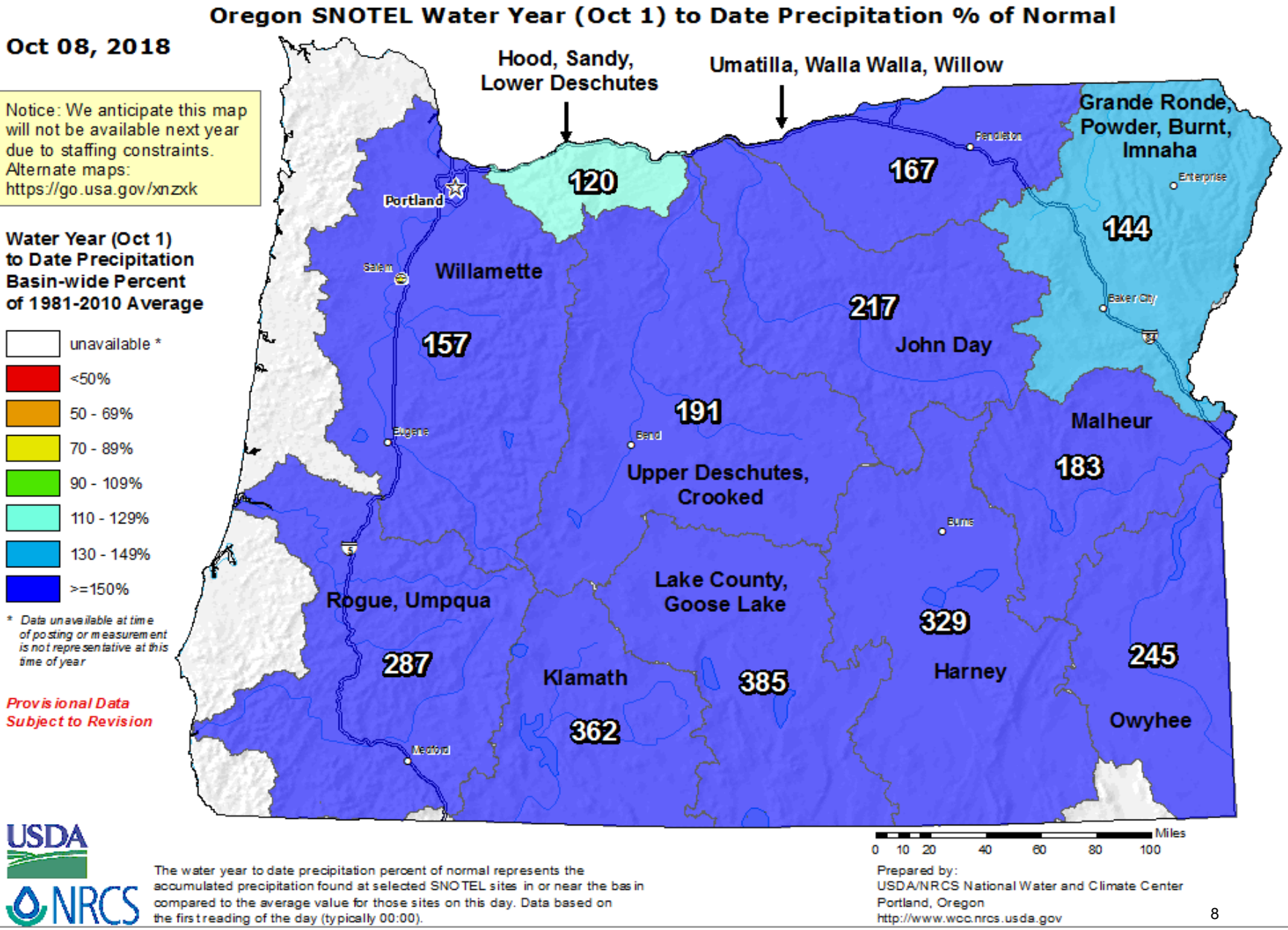
Oregon SNOTEL Water Year (Oct 1) to Date Precipitation % of Normal



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).

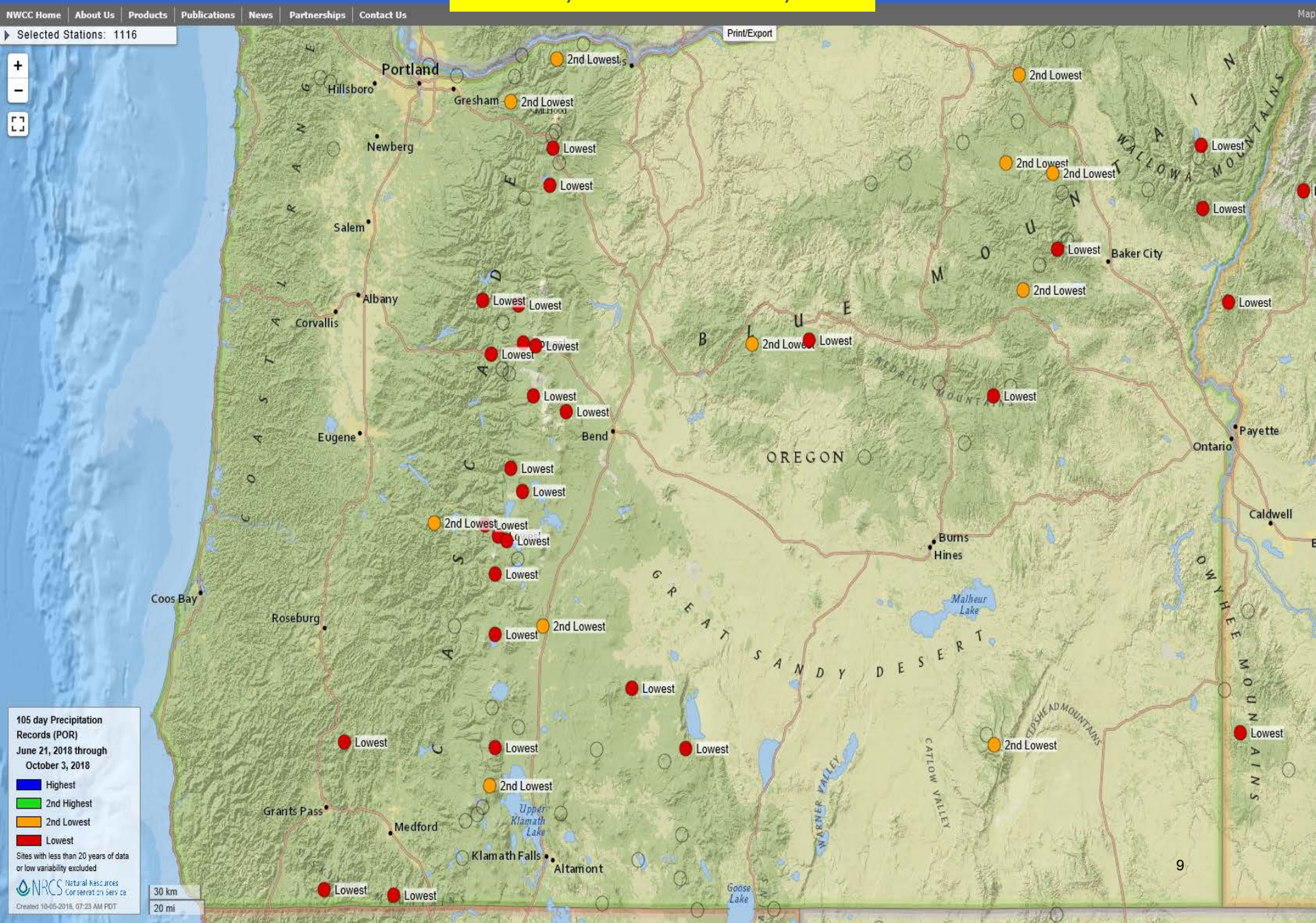
Prepared by:
USDA/NRCS National Water and Climate Center
Portland, Oregon
http://www.wcc.nrcs.usda.gov

Statewide SNOTEL Precipitation is 195% of normal

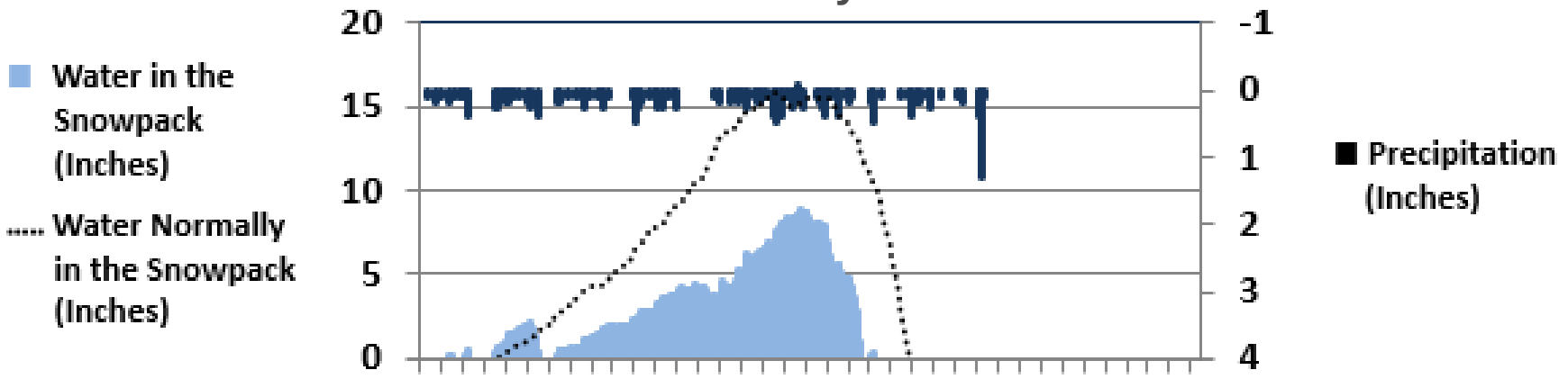


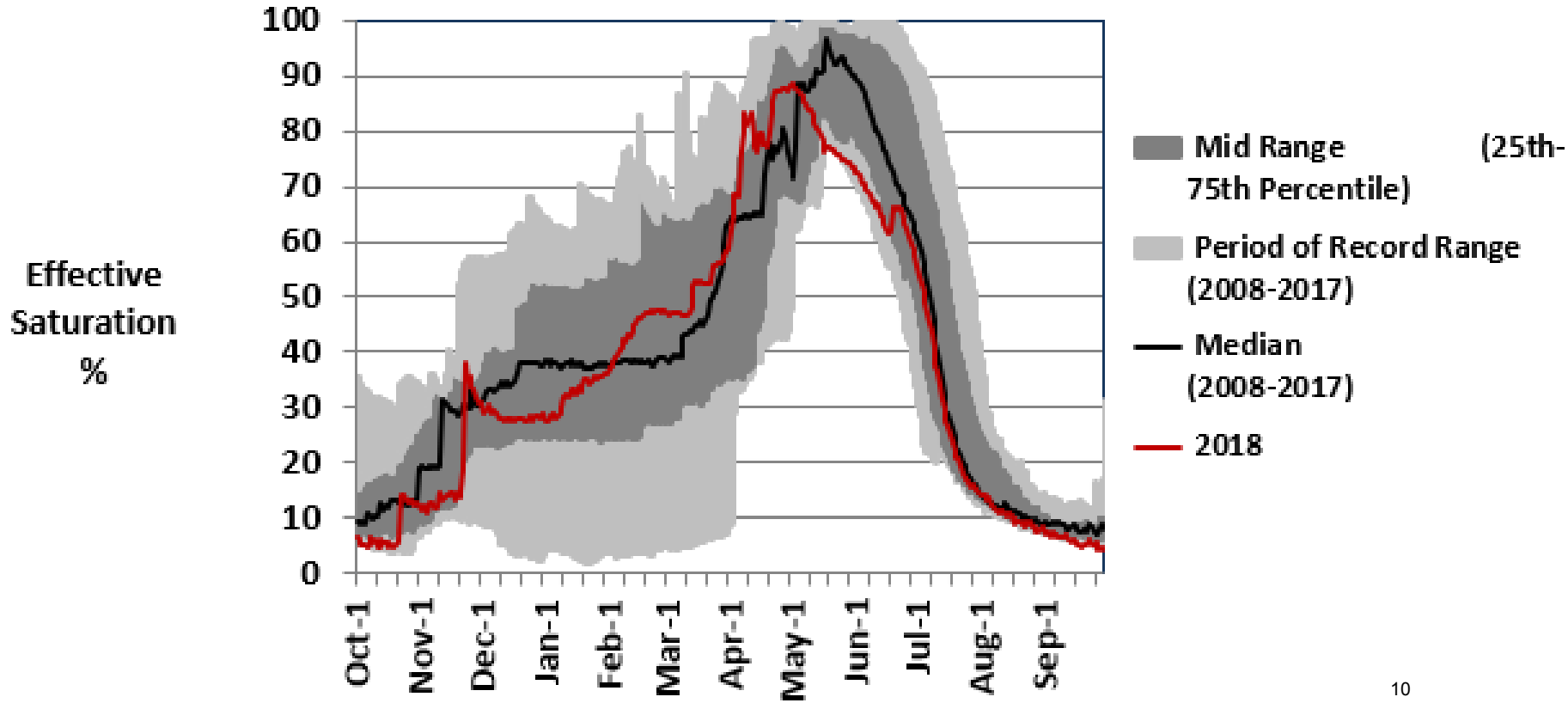
United States Department of Agriculture
NRCS Natural Resources Conservation Service
National Water and Climate Center

SNOTEL Precipitation Records
June 21, 2018 – October 3, 2018

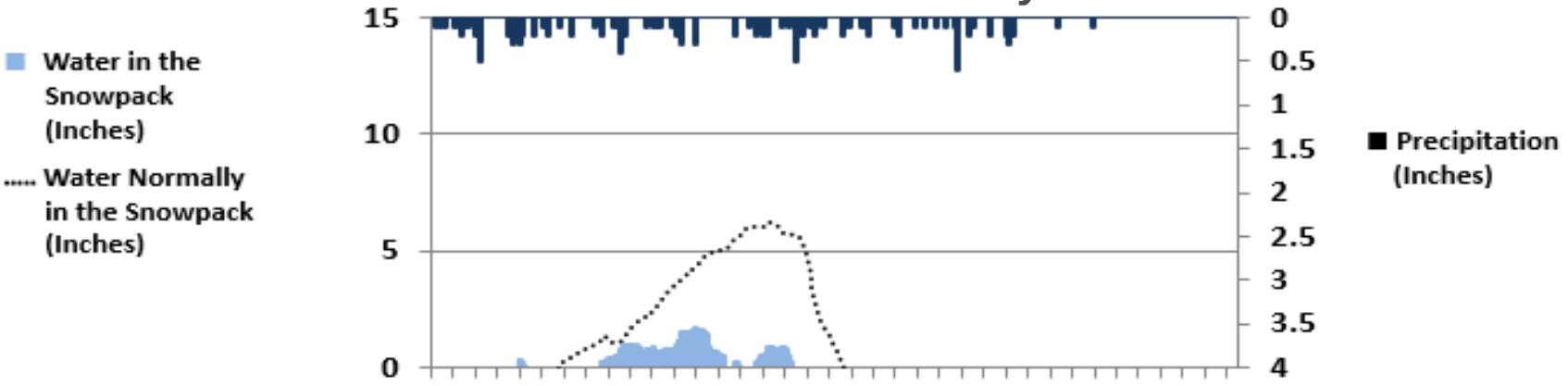


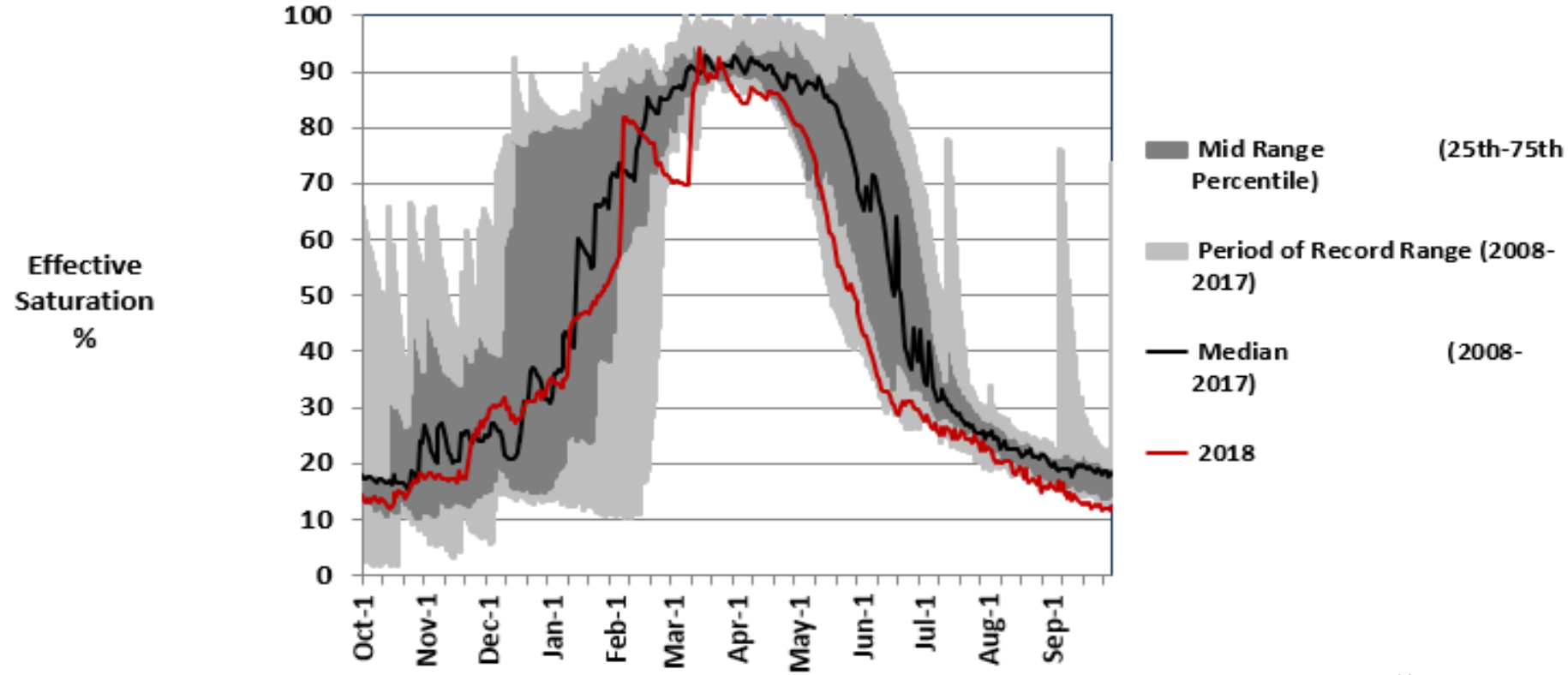
SILVIES – Harney – Elev = 6990’



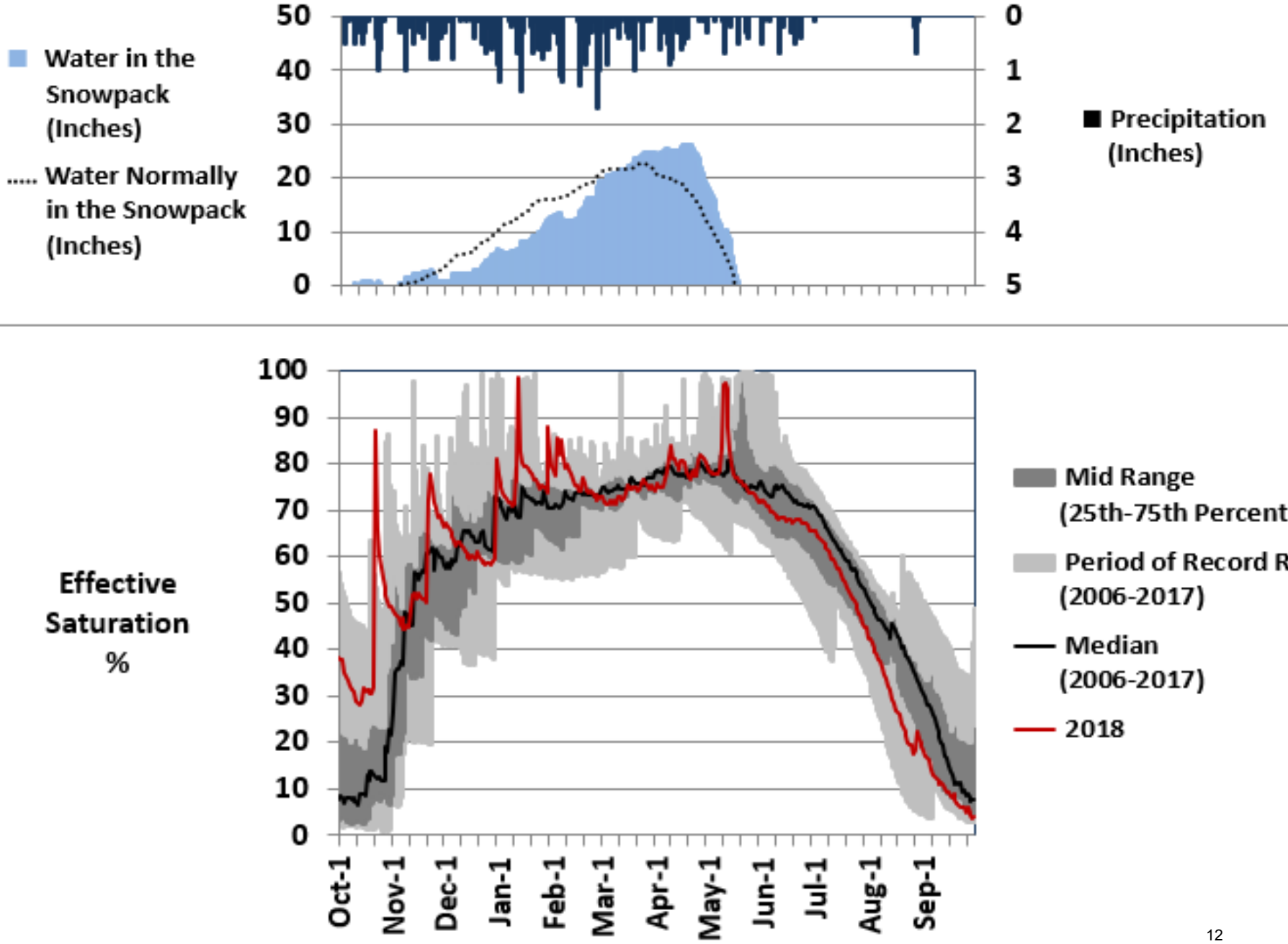


ROCK SPRINGS – Grant/Harney – Elev = 5290’



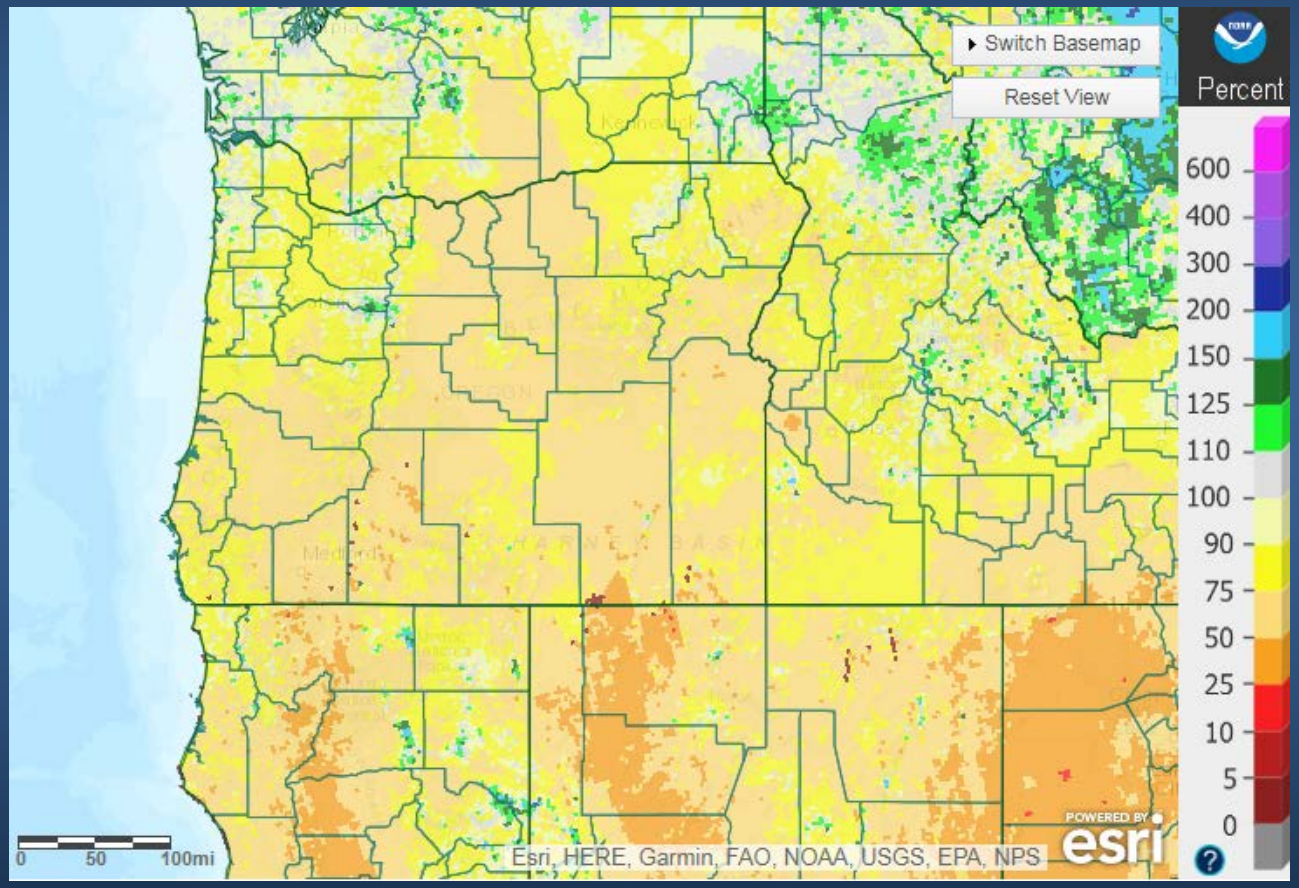


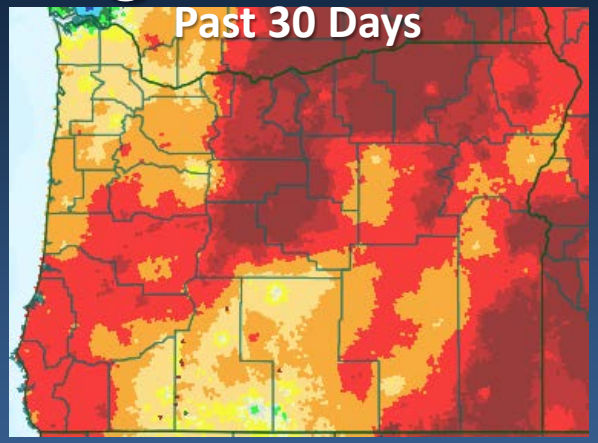
HIGH RIDGE – Umatilla/Union – Elev = 4920’

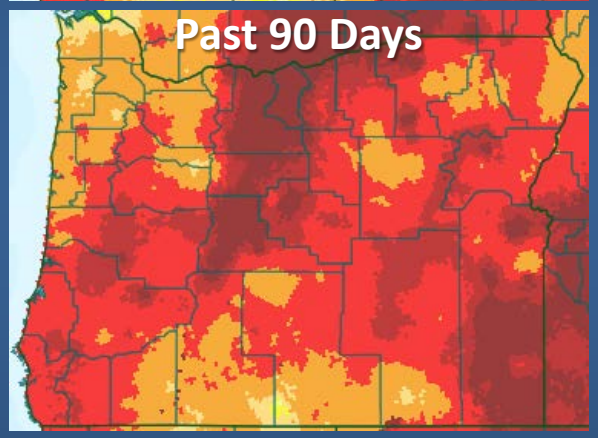


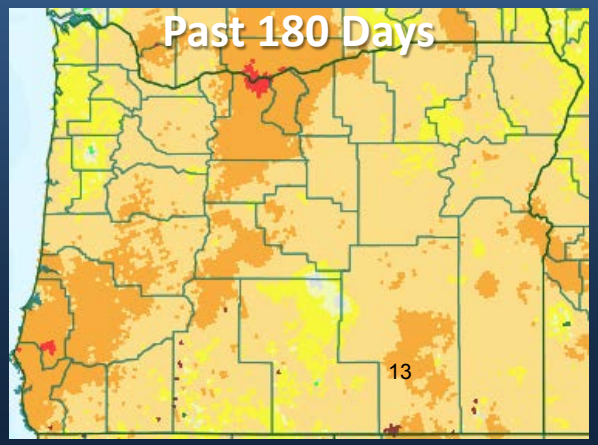
Precipitation % of Average

2018 Water Year







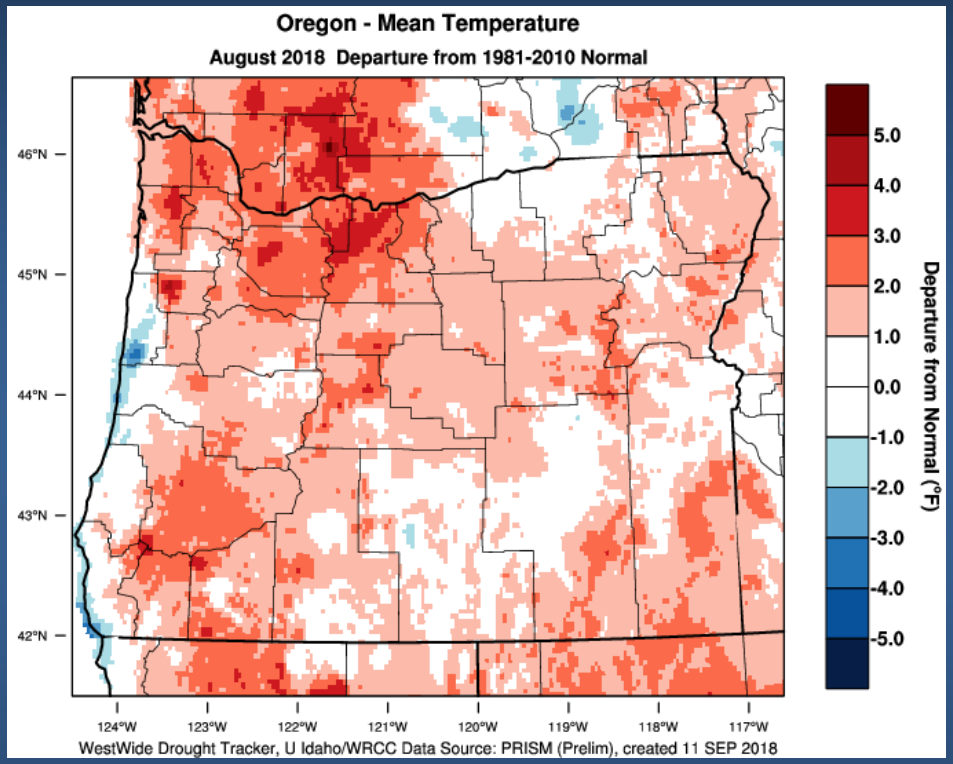


Precipitation Data as of October 4, 2018

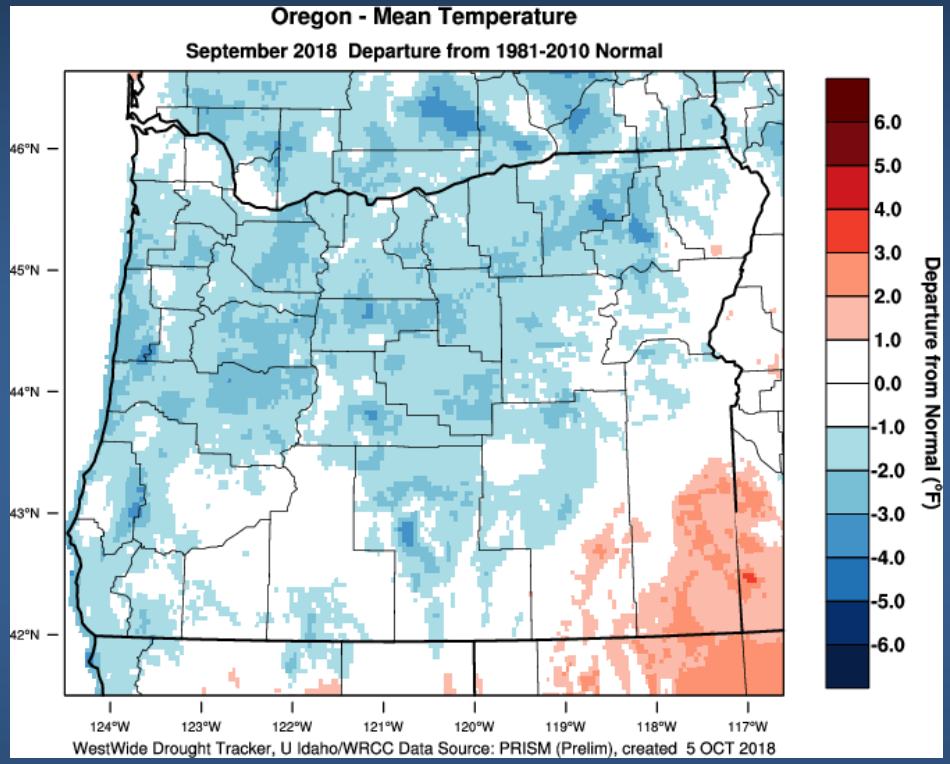
Source: water.weather.gov/precip/index.php?location_type=wfo&location_name=pqr

Recent Temperatures

August 2018

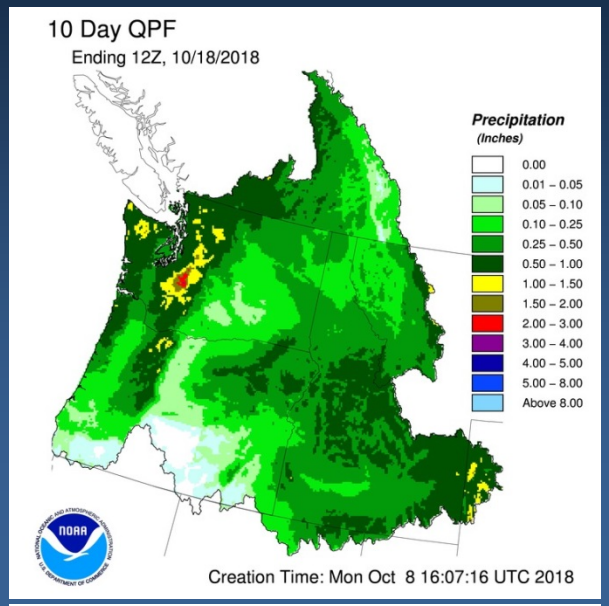


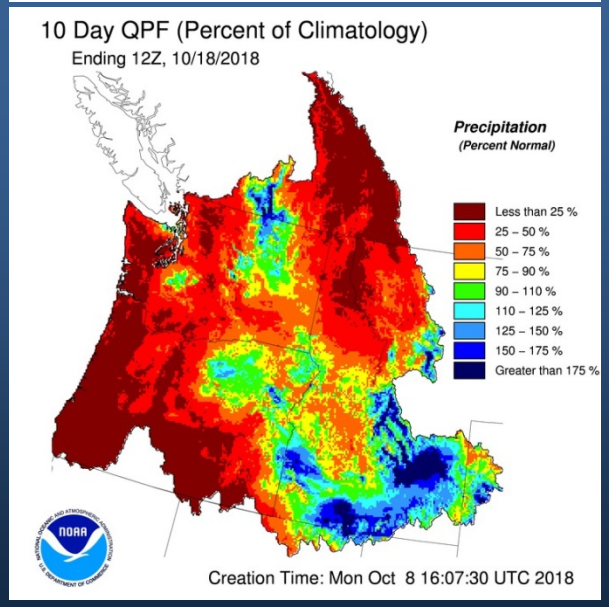
September 2018

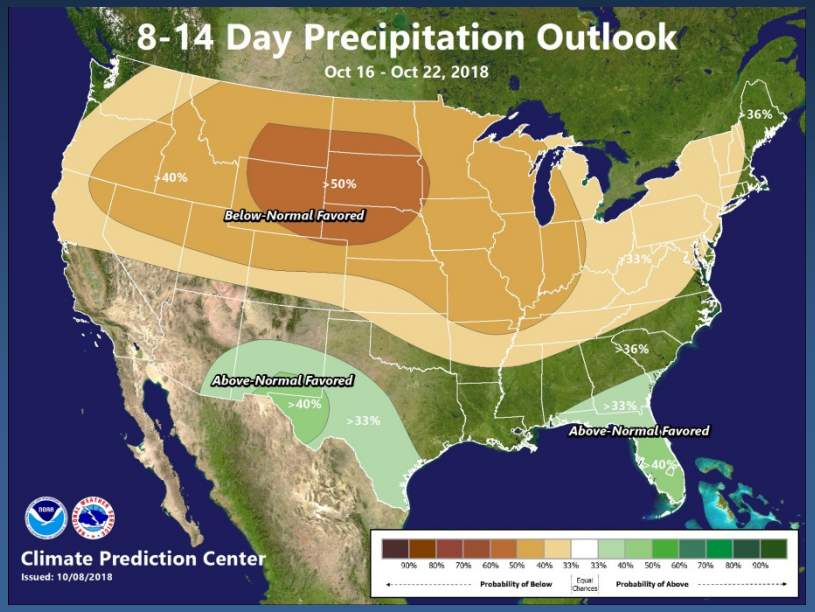


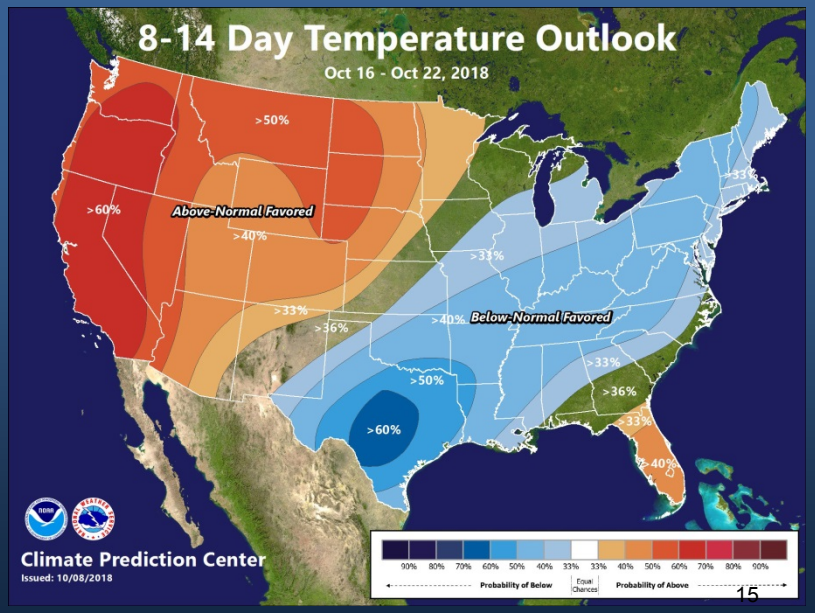
https://wrcc.dri.edu/wwdt/current.php?folder=mdn1

Mid/Late-October Outlook





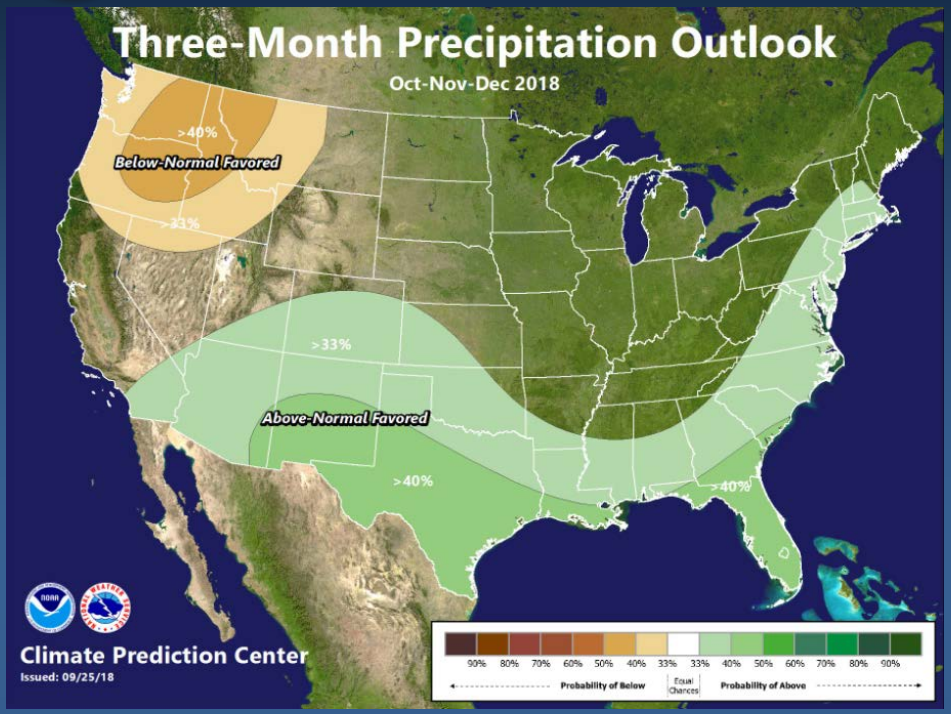


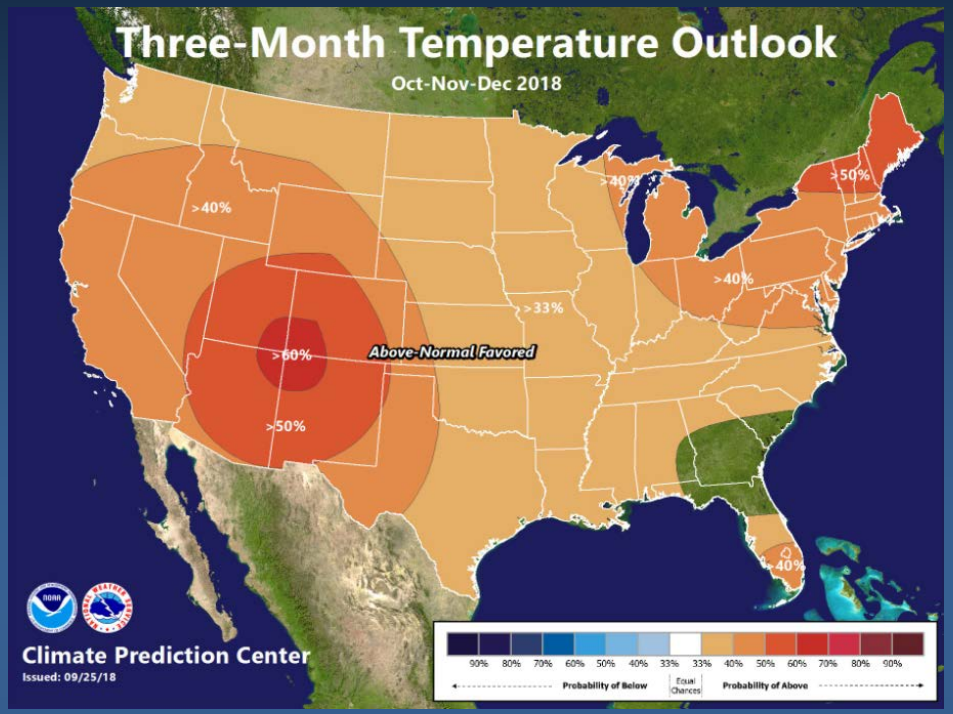


https://www.nwrfc.noaa.gov/water_supply/wy_summary/wy_summary.php?tab=3

https://www.wrh.noaa.gov/images/sto/GIS_NEW/

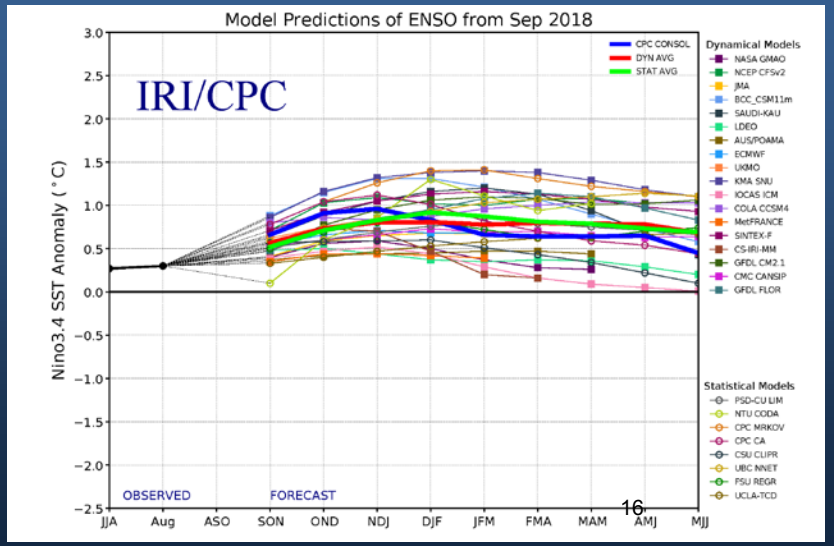
Outlook for October-November-December 2018





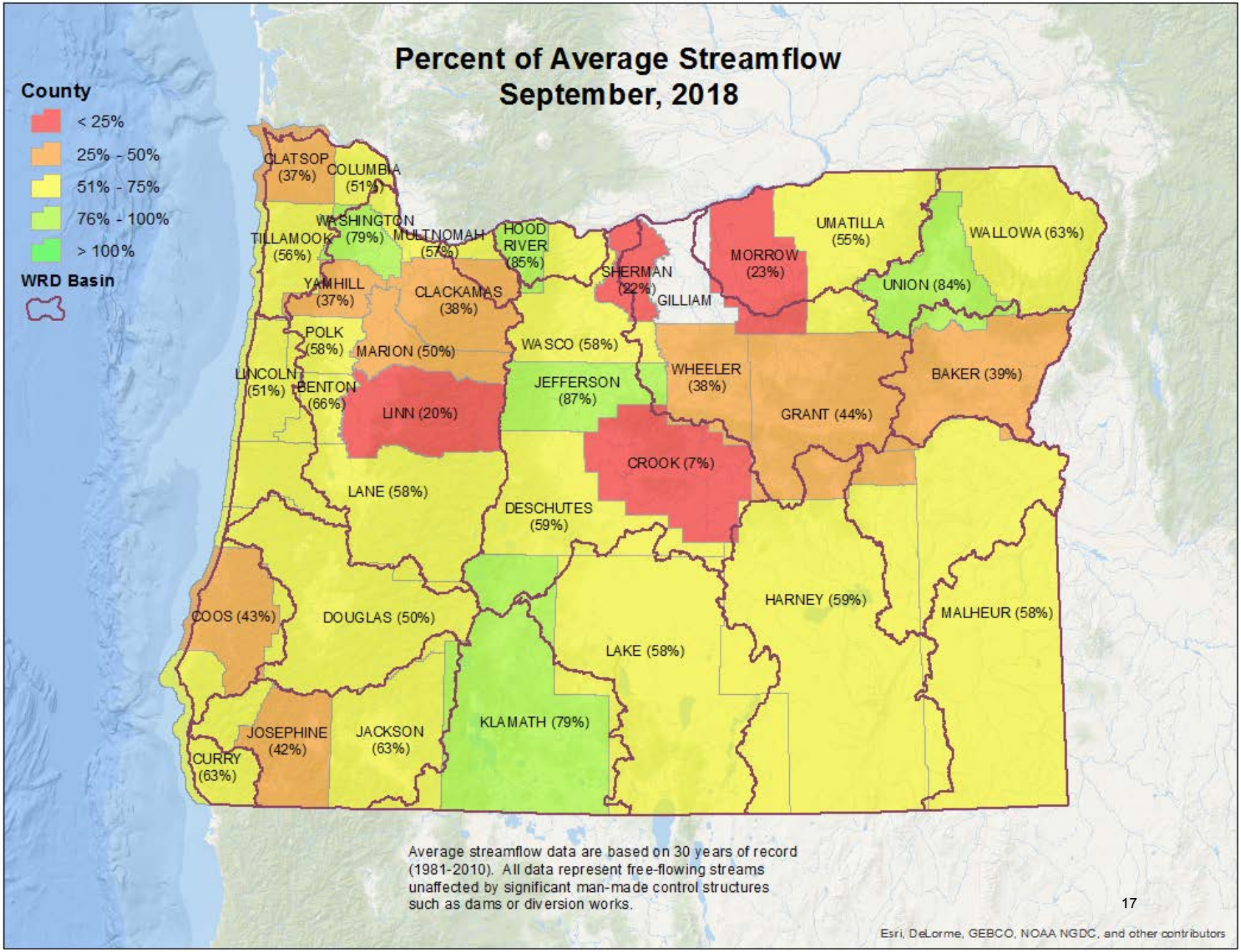
https://www.wrh.noaa.gov/images/sto/GIS_NEW/

ENSO Prediction based on consensus of model guidance



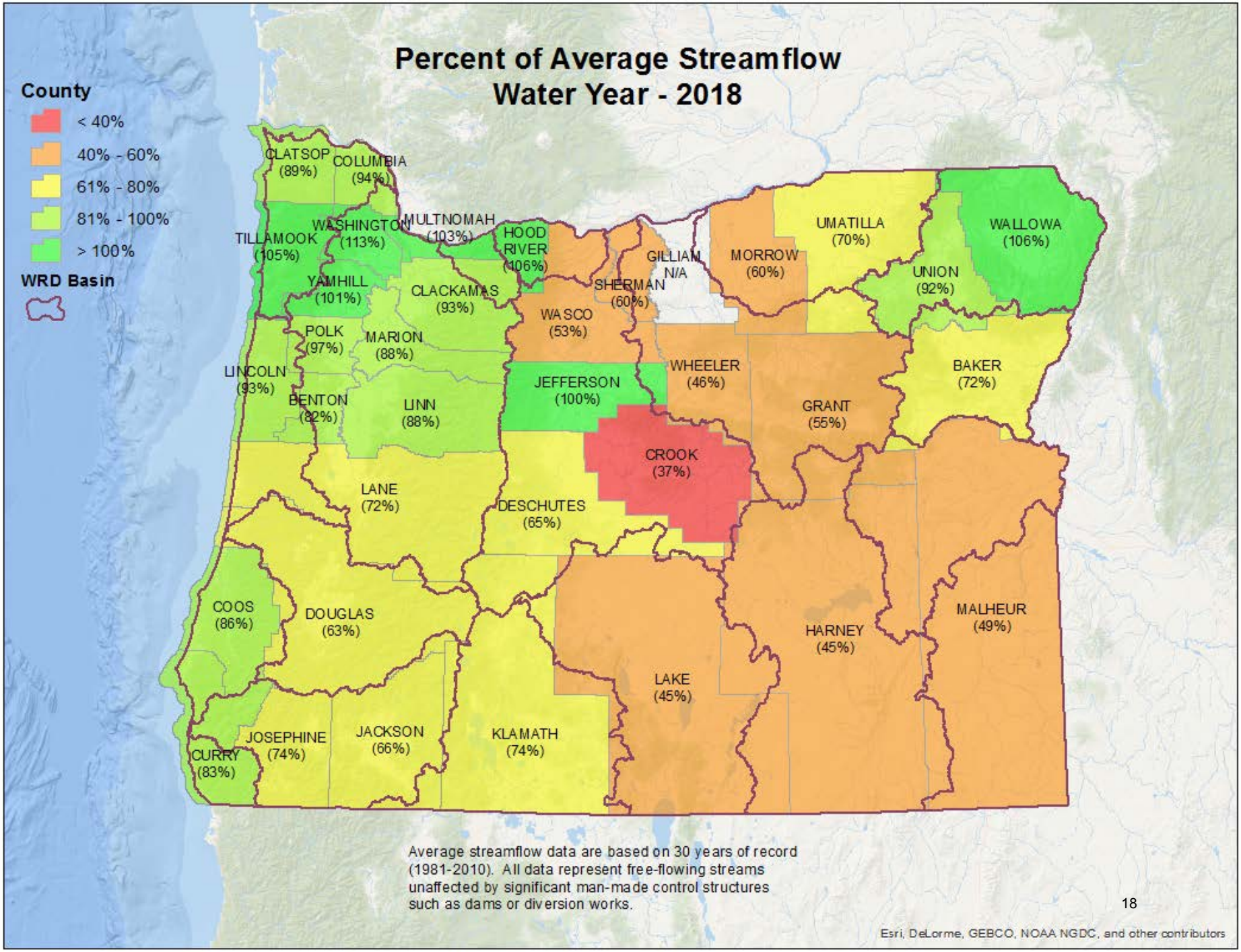
iri.columbia.edu/our-expertise/climate/forecasts/enso/current/

Percent of Average Streamflow
September, 2018

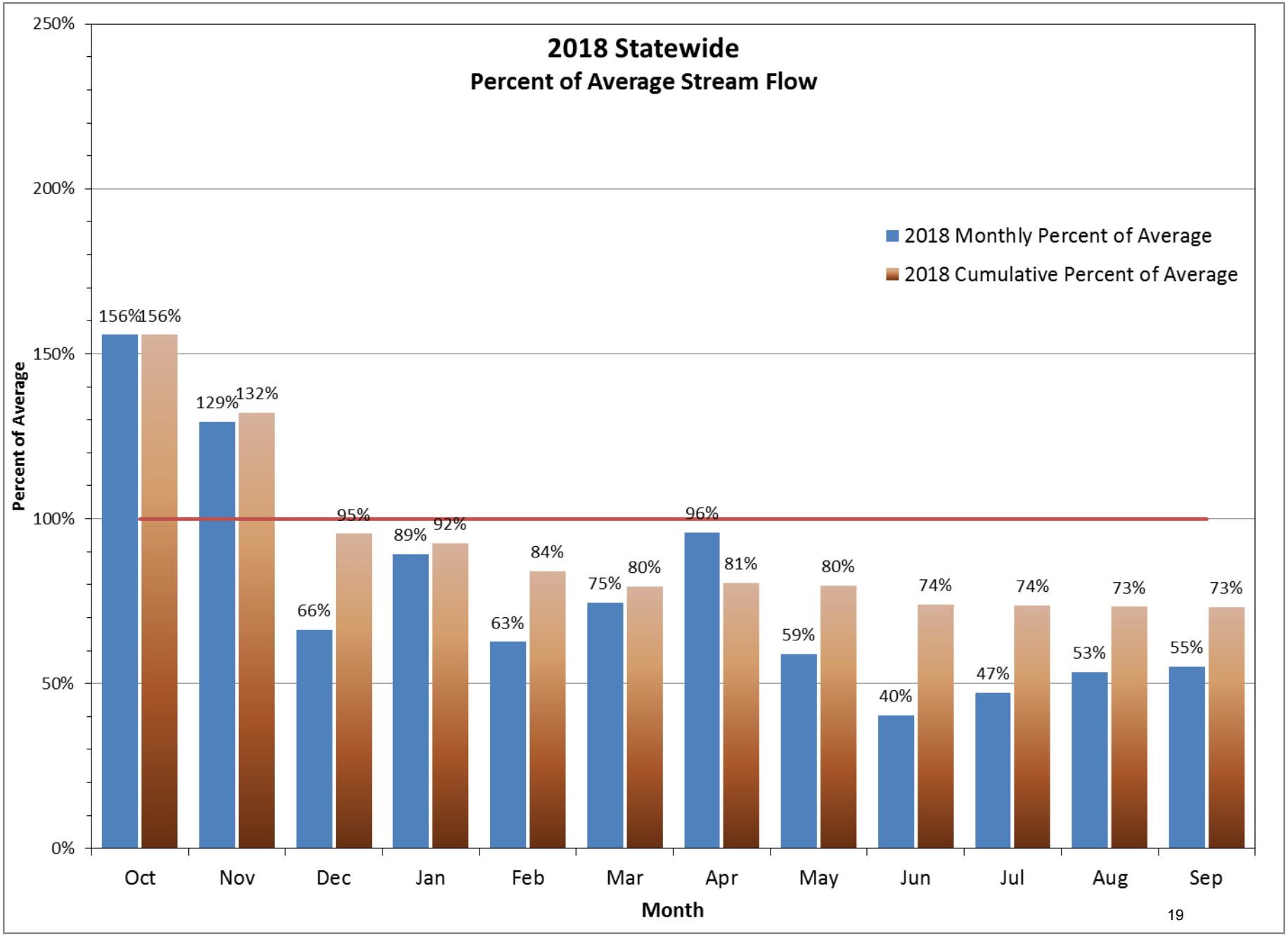


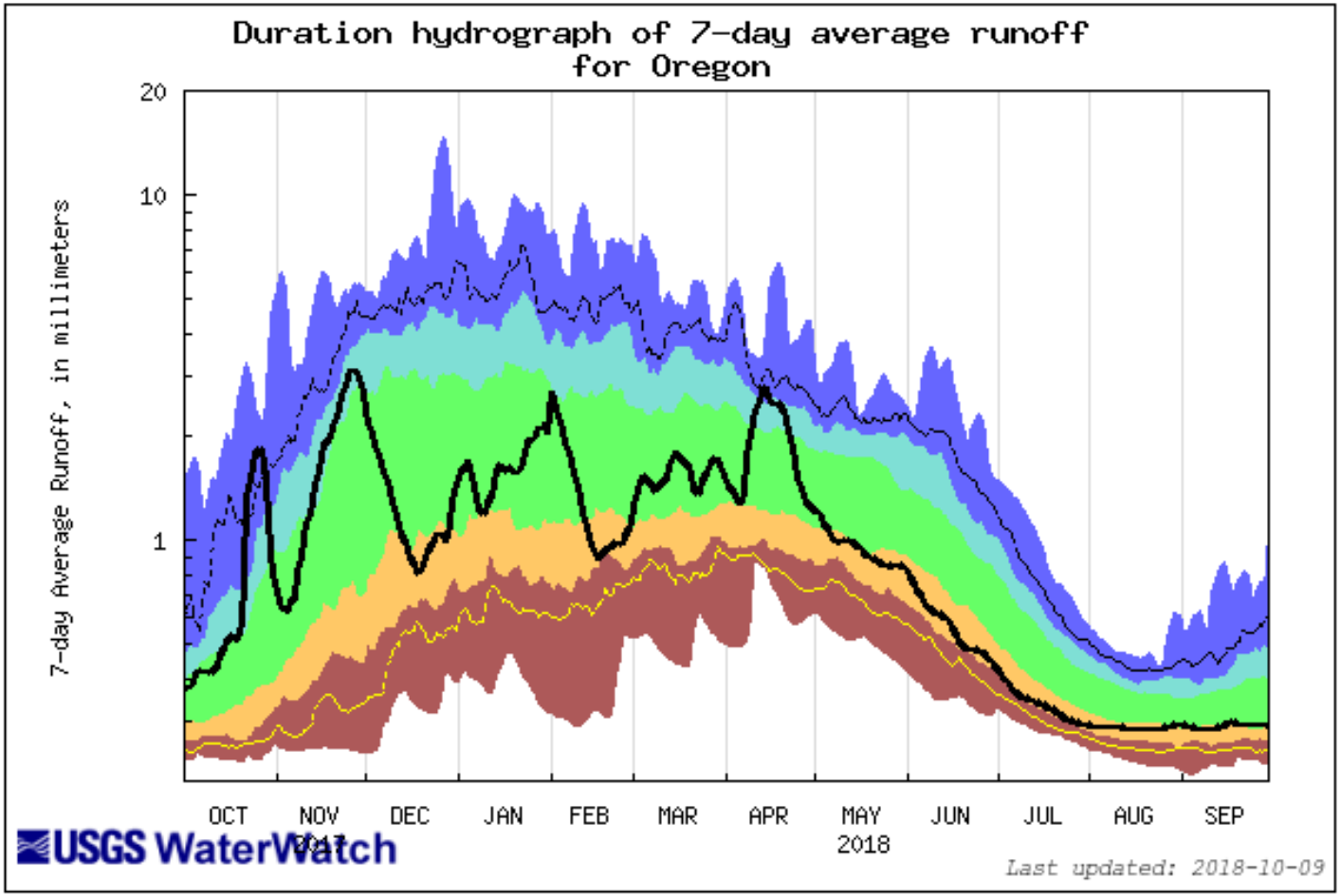
Average streamflow data are based on 30 years of record (1981-2010). All data represent free-flowing streams unaffected by significant man-made control structures such as dams or diversion works.

Percent of Average Streamflow
Water Year - 2018

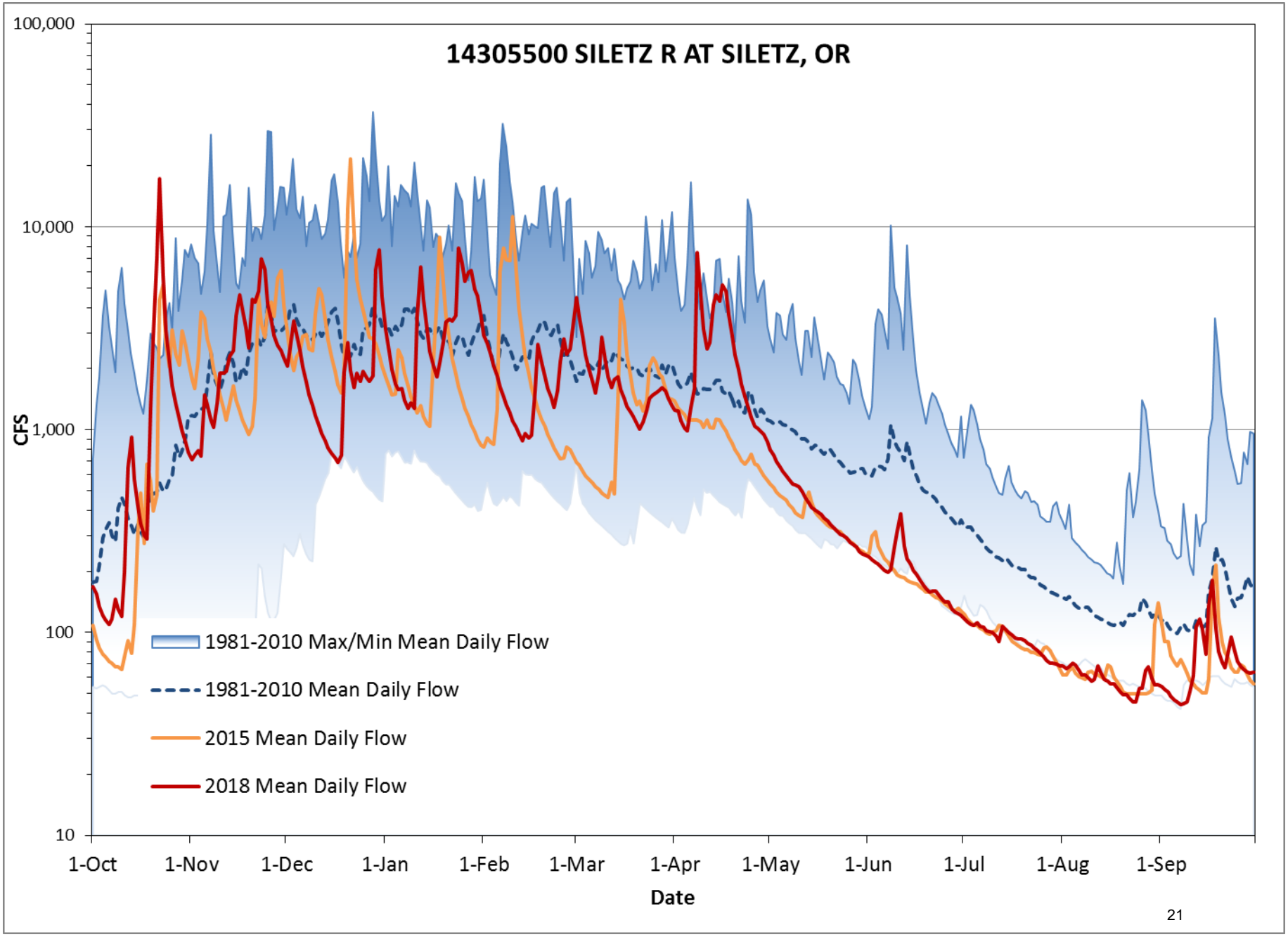


Average streamflow data are based on 30 years of record (1981-2010). All data represent free-flowing streams unaffected by significant man-made control structures such as dams or diversion works.


2018 Statewide
Percent of Average Stream Flow
2018 Monthly Percent of Average
2018 Cumulative Percent of Average
Percent of Average
250%
200%
150%
100%
50%
0%
156%
156%
129%
132%
66%
95%
89%
92%
63%
84%
75%
80%
96%
81%
59%
80%
40%
74%
47%
74%
53%
73%
55%
73%
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Month



Explanation - Percentile classes							
lowest-10th percentile	5	10-24	25-75	76-90	95	90th percentile -highest	Runoff
Much below Normal		Below normal	Normal	Above normal	Much above normal		


14305500 SILETZ R AT SILETZ, OR
100,000
10,000
1,000
100
10
CFS
1981-2010 Max/Min Mean Daily Flow
1981-2010 Mean Daily Flow
2015 Mean Daily Flow
2018 Mean Daily Flow
1-Oct
1-Nov
1-Dec
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
Date

RECLAMATION

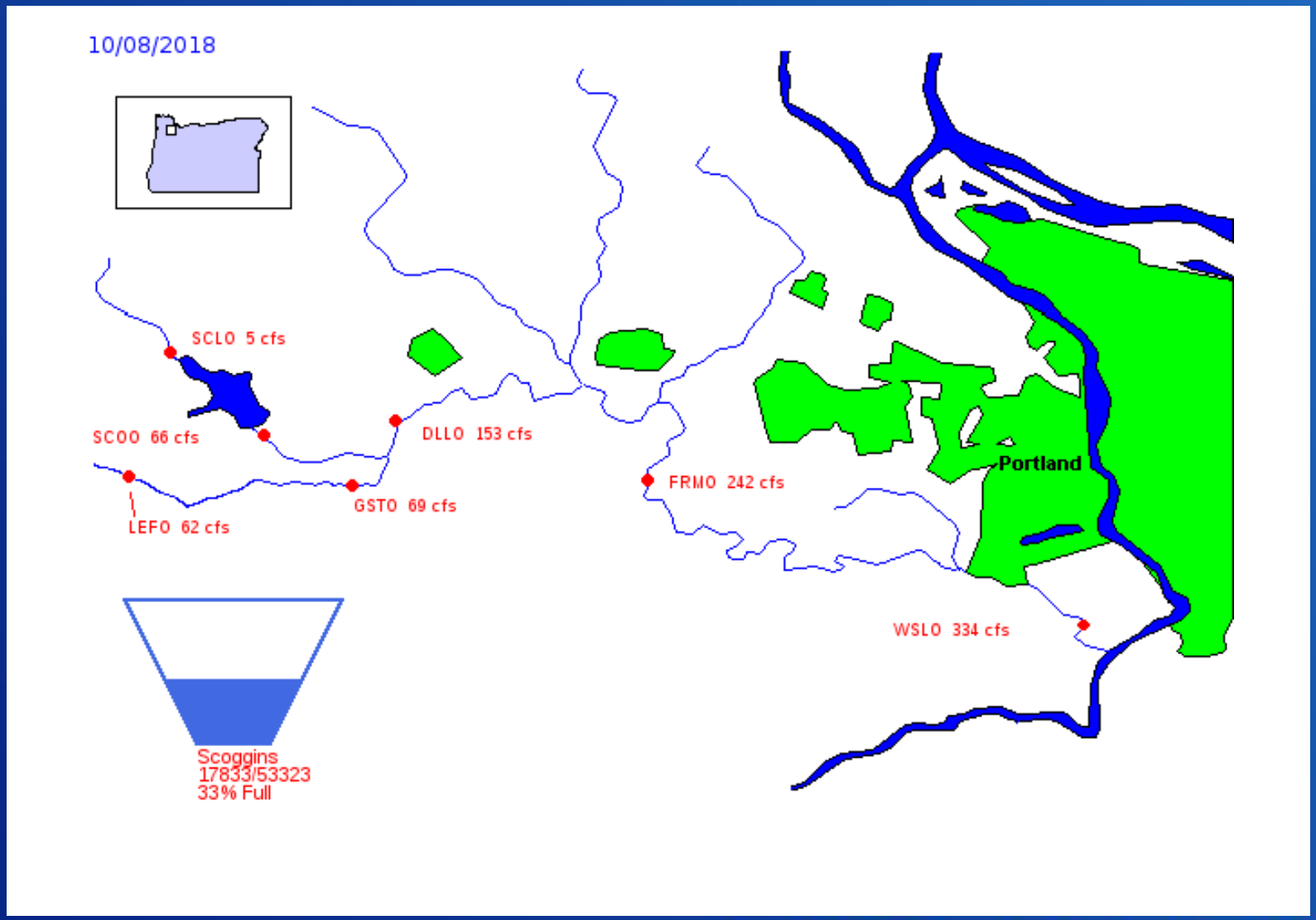
Managing Water in the West

Oregon Water Supply Availability Committee Meeting

Pacific Northwest Regional Office
River and Reservoir Operations
October 8, 2018

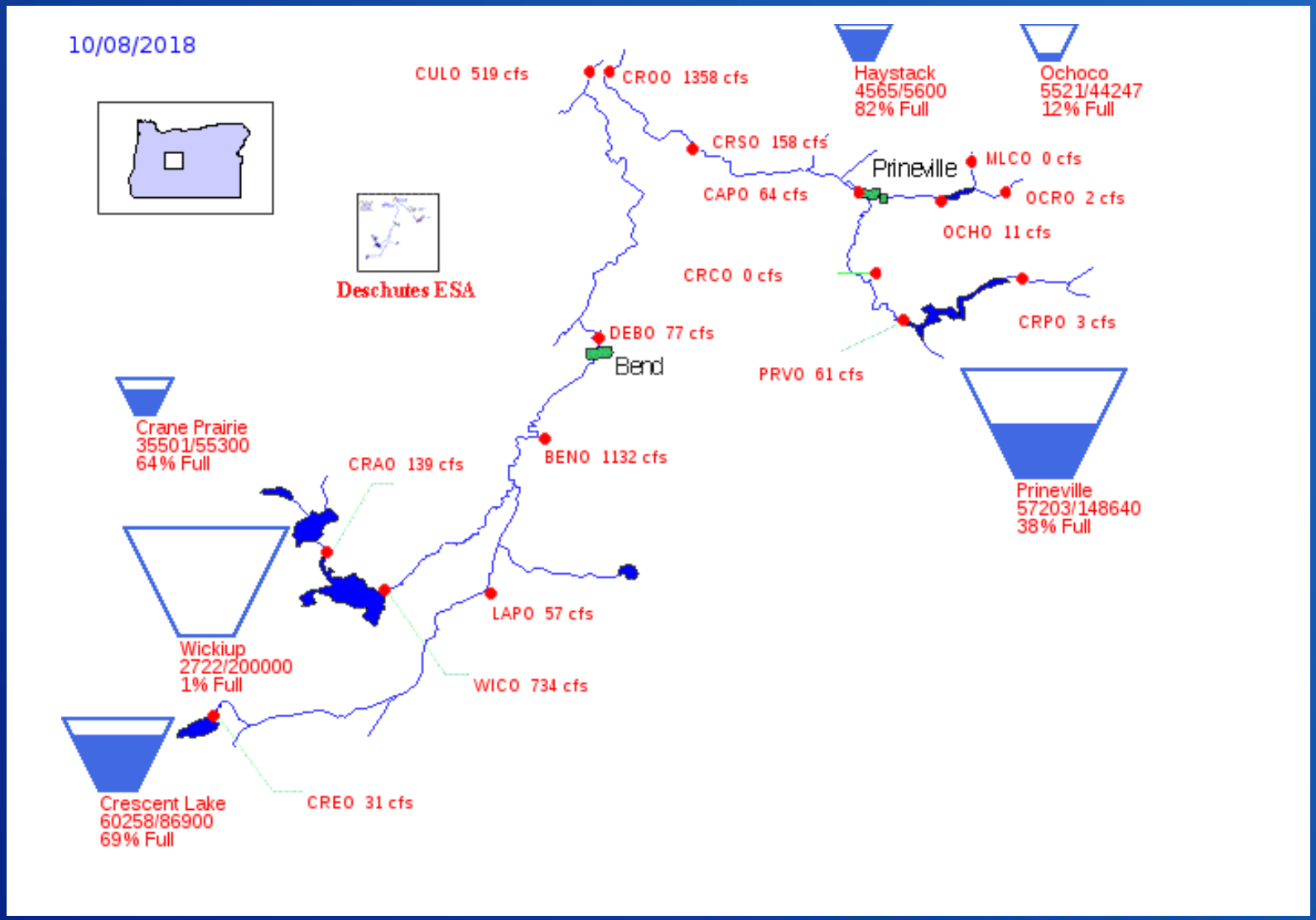
U.S. Department of the Interior
Bureau of Reclamation

Tualatin River Basin



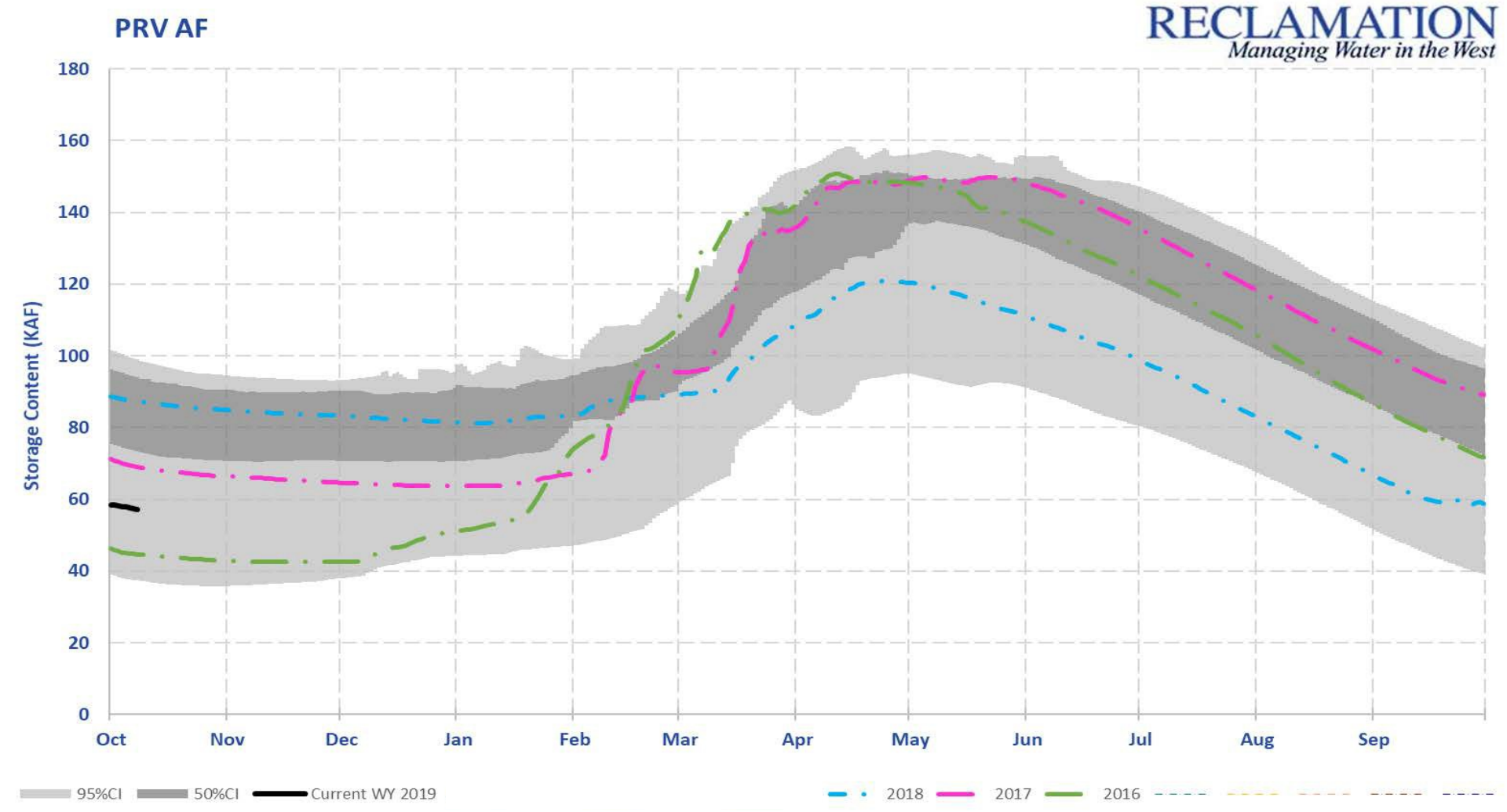
RECLAMATION

Deschutes River Basin



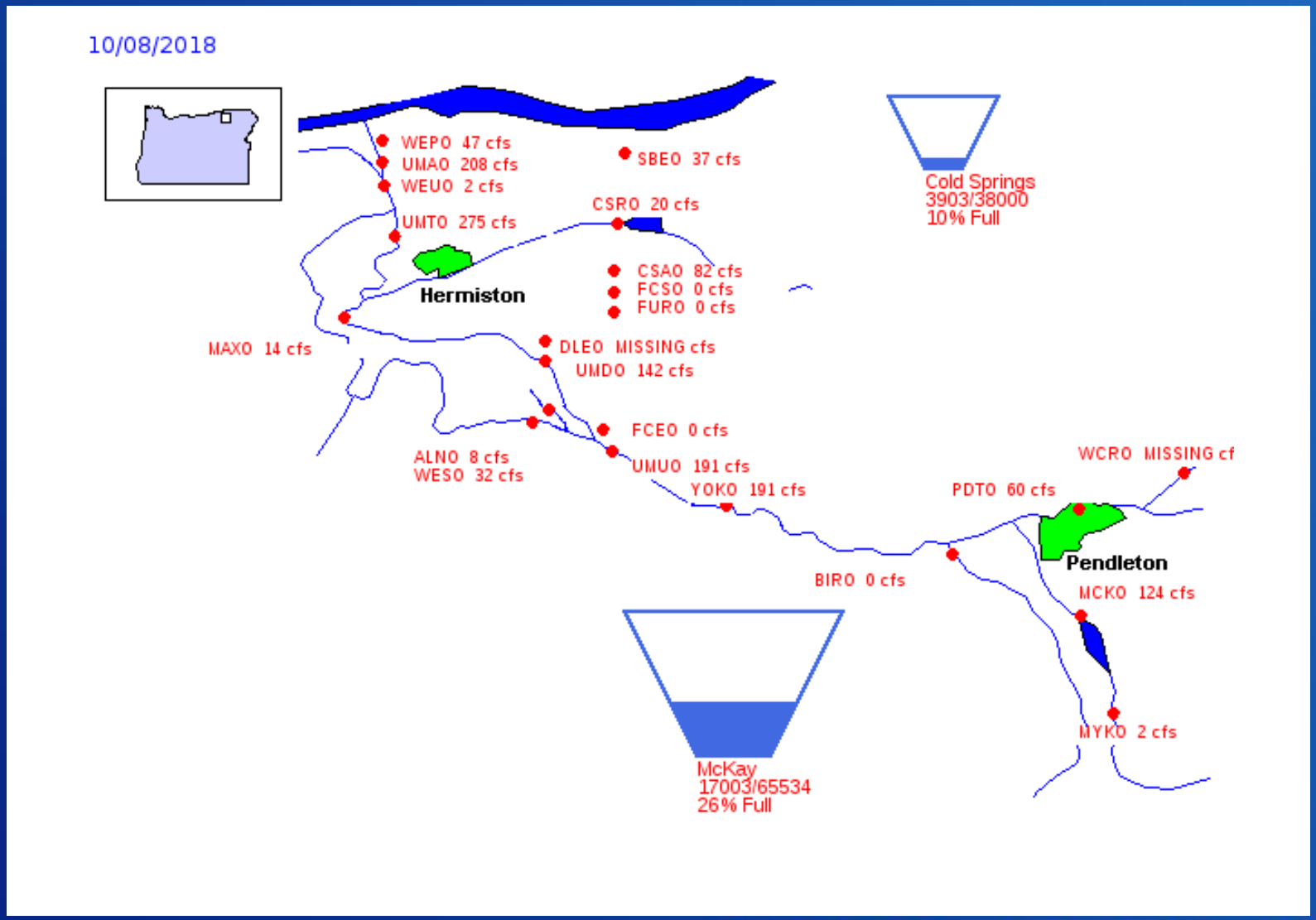
RECLAMATION

Deschutes River Basin: Prineville



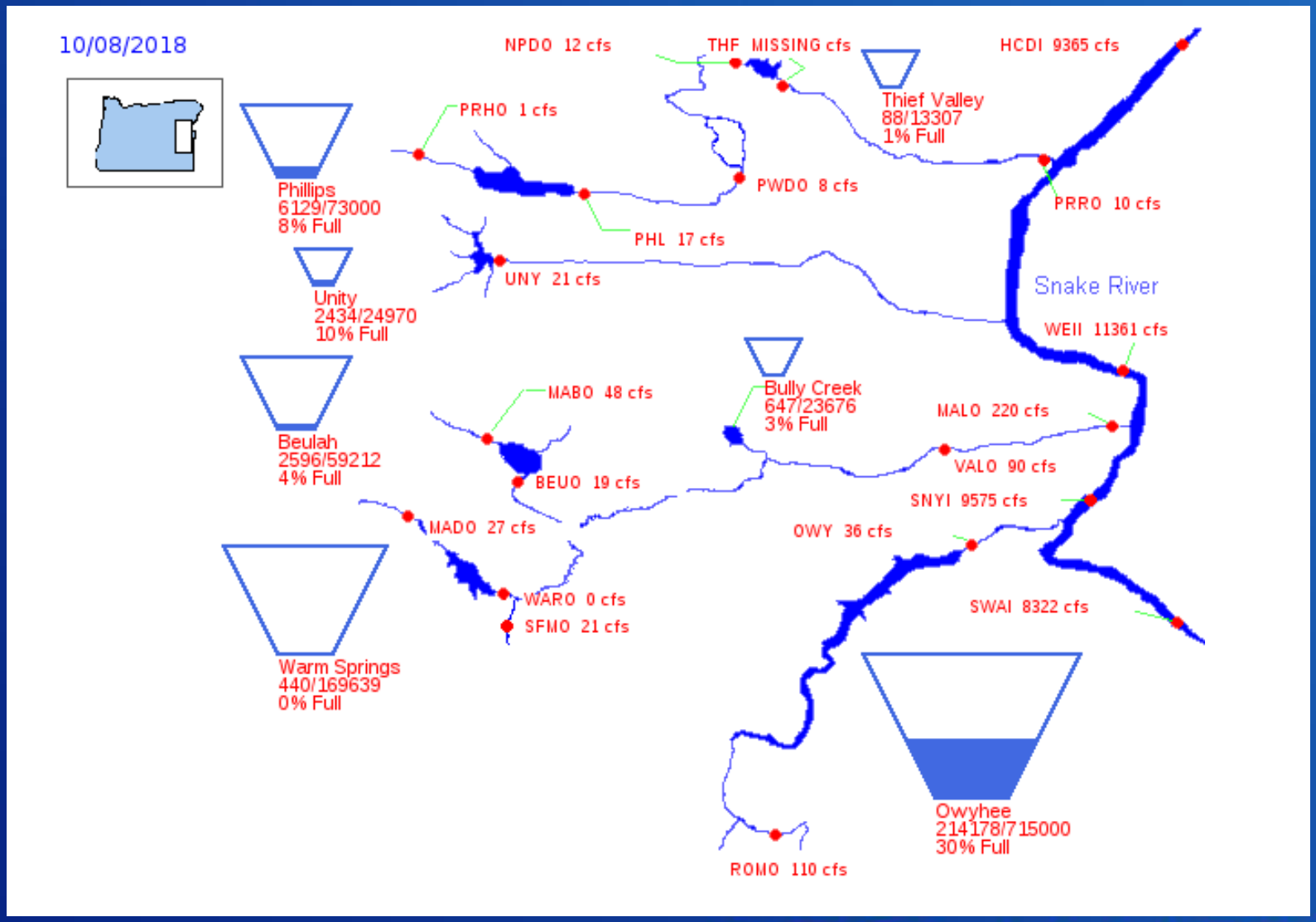
RECLAMATION

Umatilla River Basin



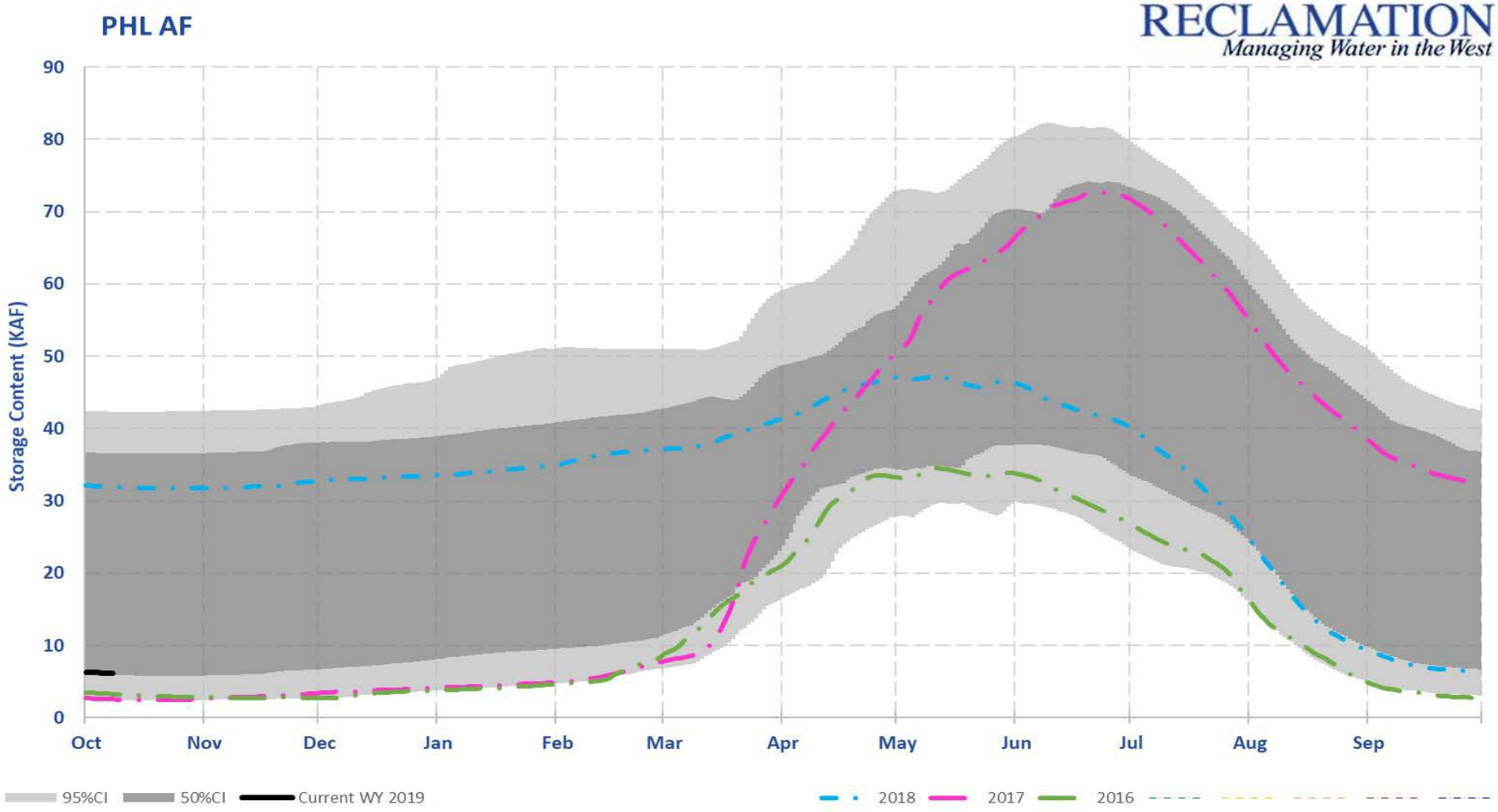
RECLAMATION

Southeastern Oregon



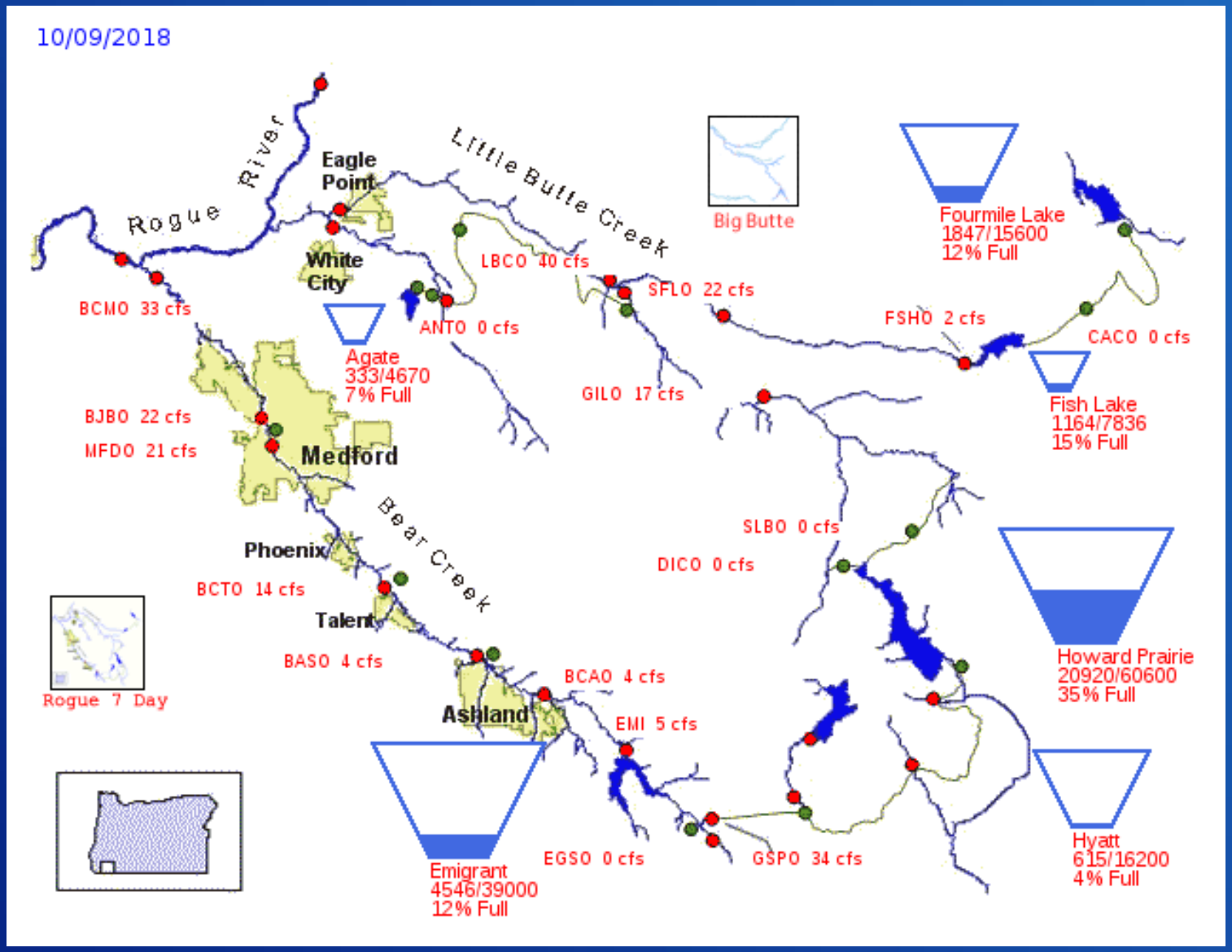
RECLAMATION

Powder River Basin: Phillips



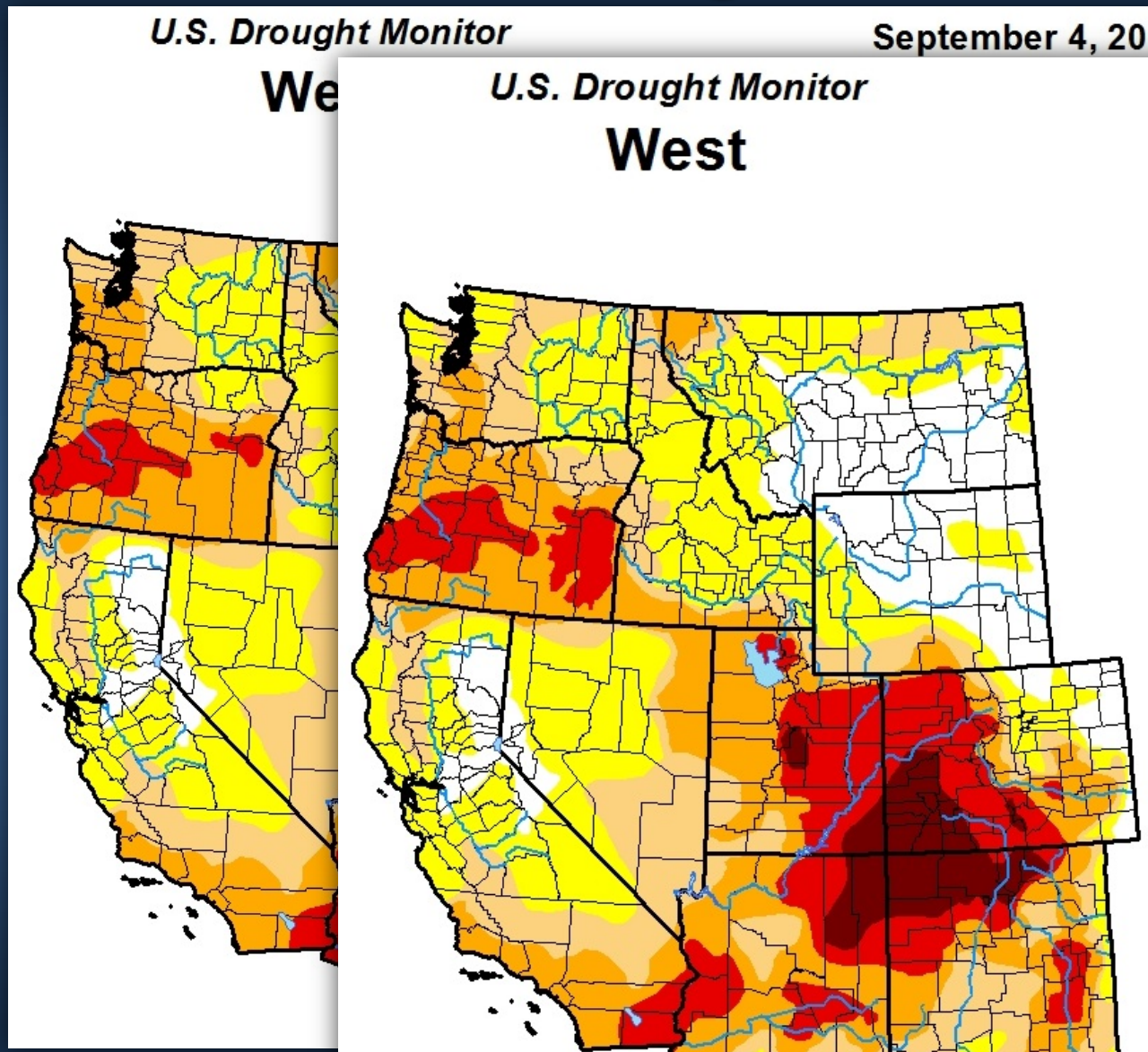
RECLAMATION

Rogue Basin



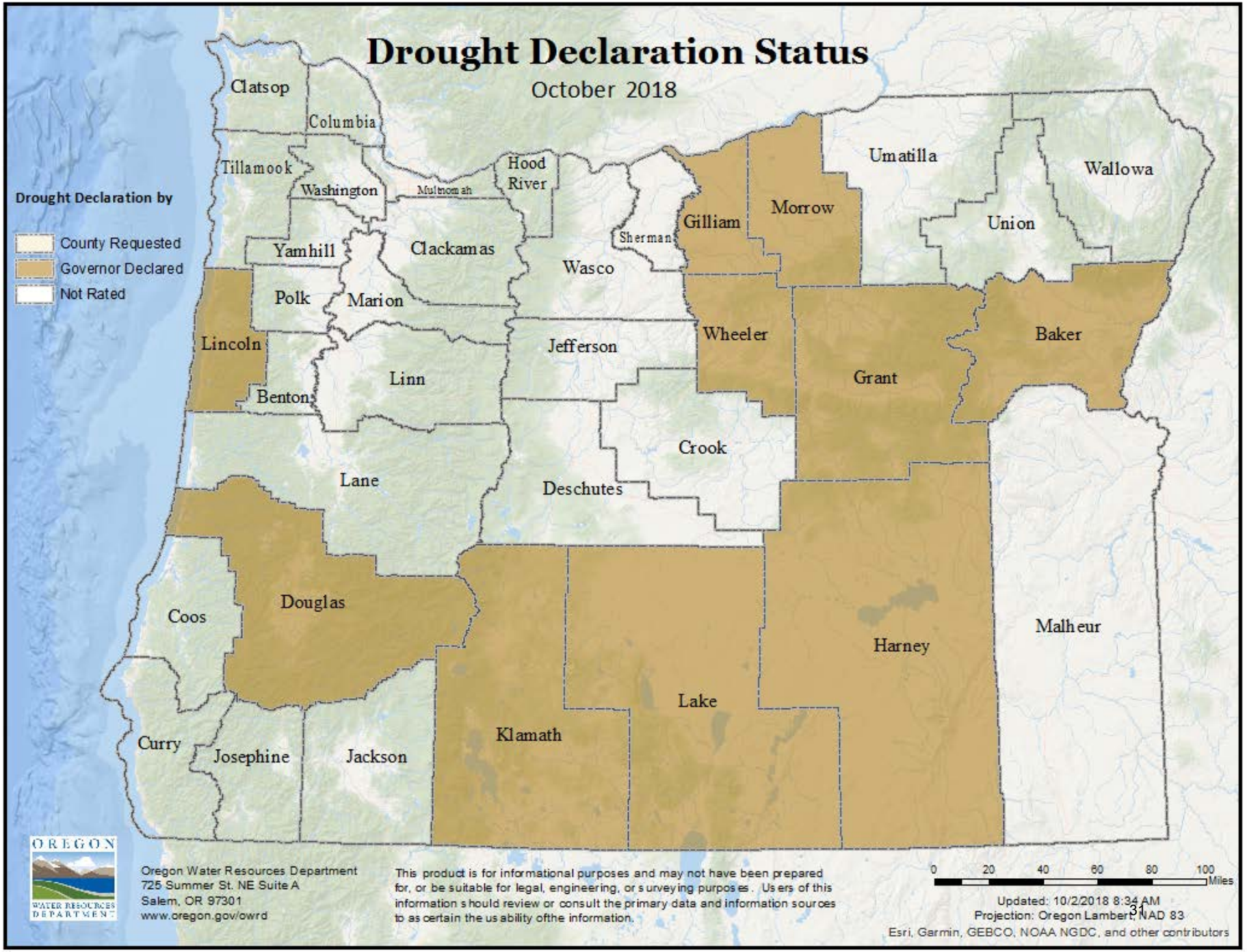
RECLAMATION

Drought Monitor



Drought Declaration Status

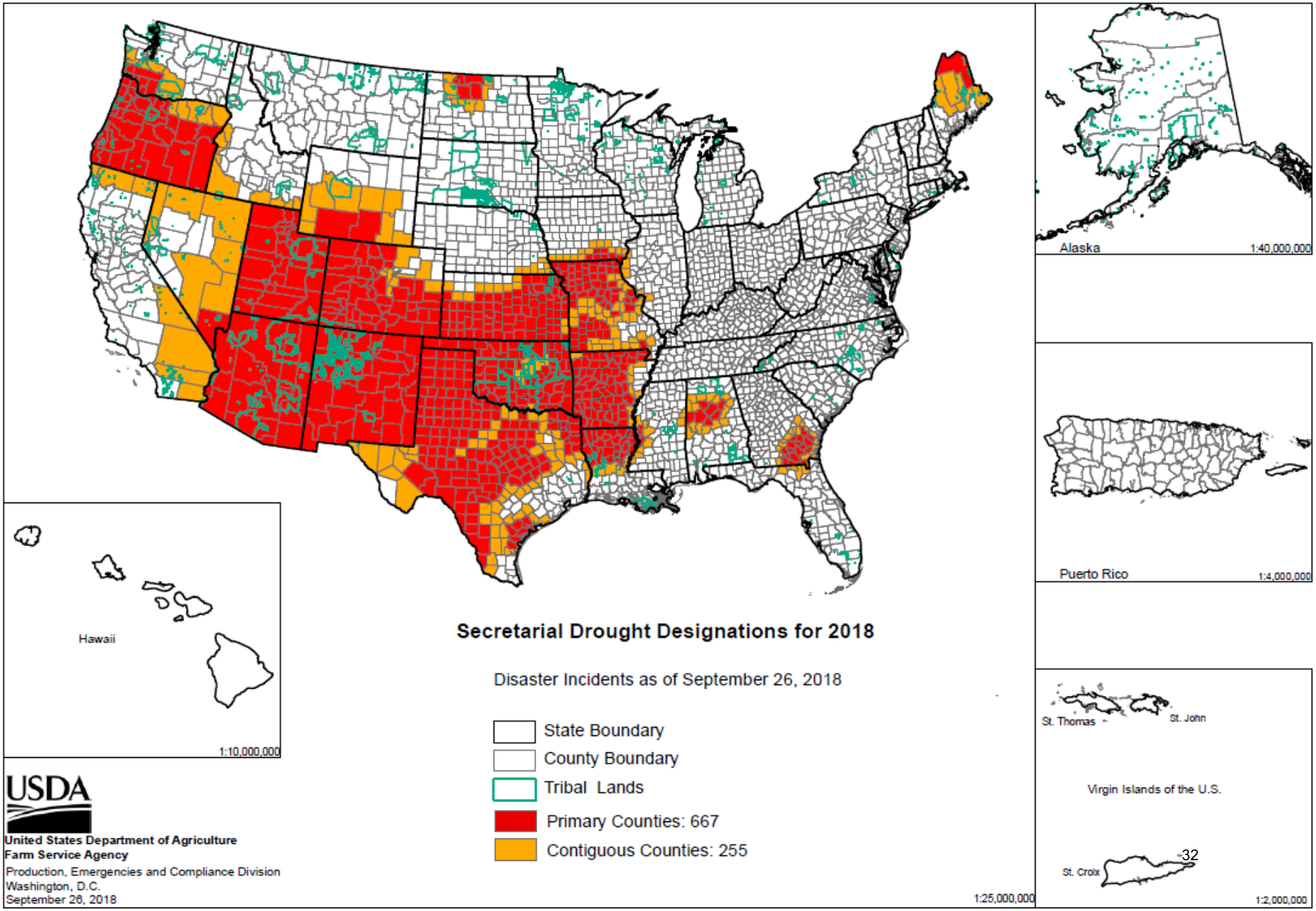
October 2018

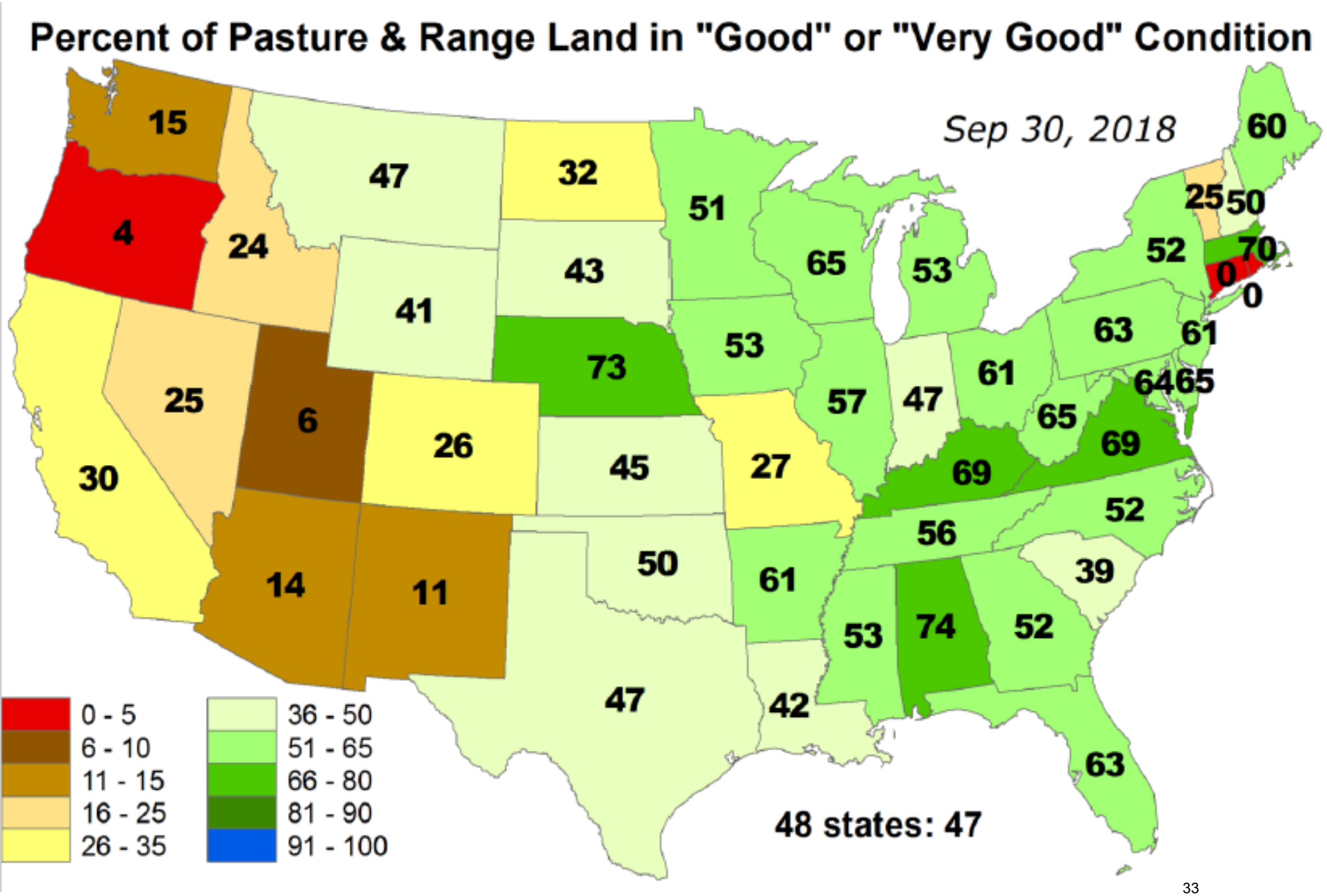


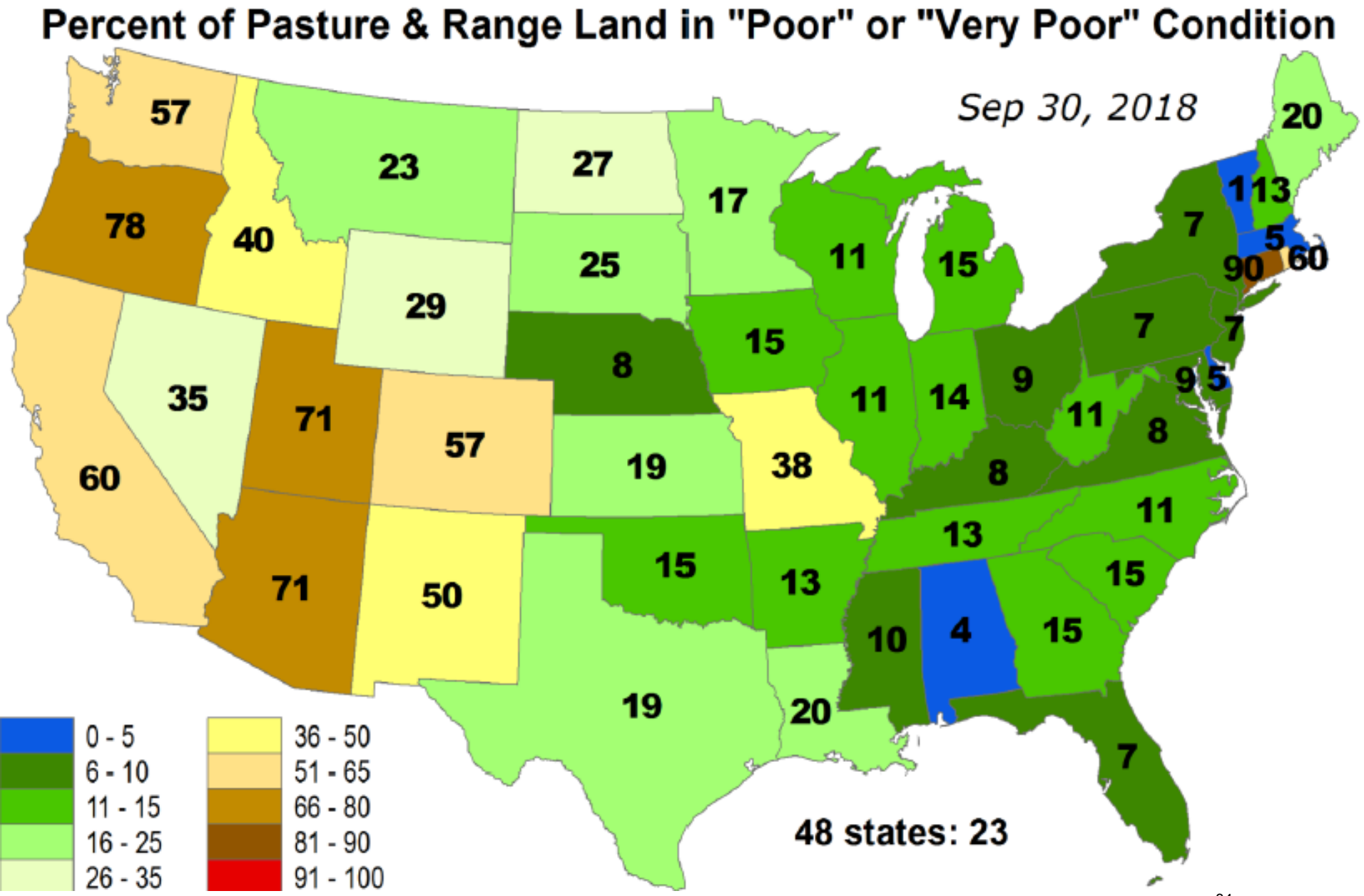
Oregon Water Resources Department
725 Summer St. NE Suite A
Salem, OR 97301
www.oregon.gov/owrd

Updated: 10/2/2018 8:34 AM
Projection: Oregon Lambert NAD 83
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

2018 Secretarial Drought Designations - All Drought




Percent of Pasture & Range Land in "Good" or "Very Good" Condition
Sep 30, 2018
15
4
24
47
32
41
43
51
65
53
60
25
50
52
70
0
0
63
61
73
53
57
47
61
64
65
25
6
26
45
27
69
69
30
56
52
50
61
39
14
11
53
74
52
47
42
63
48 states: 47
0 - 5
6 - 10
11 - 15
16 - 25
26 - 35
36 - 50
51 - 65
66 - 80
81 - 90
91 - 100


Percent of Pasture & Range Land in "Poor" or "Very Poor" Condition
Sep 30, 2018
57
23
27
17
20
78
40
25
11
15
7
113
5
90
60
29
15
7
7
8
35
71
57
19
38
11
14
9
9
5
11
8
60
8
71
50
13
15
11
13
15
10
4
15
19
20
7
48 states: 23
0 - 5
6 - 10
11 - 15
16 - 25
26 - 35
36 - 50
51 - 65
66 - 80
81 - 90
91 - 100

OREGON
WATER RESOURCES DEPARTMENT

Thank you.

DECLARATION OF STATE OF EMERGENCY

BEFORE THE COUNTY COURT

FOR MALHEUR COUNTY

MALHEUR COUNTY, OR 2018-3739
MRCOUNTY COURT
DOCUMENT 10/03/2018 09:16 AM
Cnt=1 Pgs=2 Total:$0.00

00052015201800037390020021

I, Gayle V. Trotter, County Clerk for Malheur County, Oregon certify that the instrument identified herein was recorded in the Clerk records.
Gayle V. Trotter - County Clerk

In the Matter of Declaring)
A State of Emergency within)
Malheur County)

RESOLUTION

This matter came before the County Court at a regular meeting dated the 3rd Day of October, 2018, the Malheur County Court finds that the Malheur County agricultural and livestock industries, and related economy are suffering widespread and severe economic damage, potential injuries and loss of property resulting from **Extreme drought conditions;** and

WHEREAS, as of September 20, 2018, drought conditions have deteriorated to EXTREME conditions by the U.S. Drought Monitor, with roughly 60% of Malheur County designated in the D3 or "Extreme Drought" category due to a hot summer and very little precipitation; and

WHEREAS, all, or many, stock ponds on publicly owned lands are at zero (empty) capacity and ranchers have to truck water into their livestock. Livestock have to walk greater distances to get water and this is contributing to exaggerated numbers of "dust pneumonia" cases in calves. Many ranchers began bringing their cattle in as early as July of this year due to the dry conditions on grazing lands. However, many of their pastures were not ready for livestock because of the dry conditions. Some of the ranchers have lost pastures, this summer, due to fire or grasshopper infestation.

WHEREAS, on August 1, 2018, the U.S. Secretary of Agriculture designated Malheur County and 26 other contiguous counties as primary natural disaster areas due to the drought conditions ; and

WHEREAS, the Malheur County Court determines that extraordinary measures must be taken to alleviate suffering of people and livestock and to protect or mitigate economic loss, and to be responsive to the threat of wildfires.

NOW, THEREFORE, BE IT PROCLAIMED by the Malheur County Court that:

1. A local disaster is declared within Malheur County.
2. The Malheur County Drought Emergency Management Plan has been implemented.
3. Pursuant to ORS 401.015 (2), we find that appropriate response is beyond the capability of Malheur County. We are declaring a state of emergency for the purpose of assessment, evaluation and acquiring the ability to provide appropriate available resources.
4. **Request:** The Honorable Kate Brown, Governor of Oregon, declare a Drought Emergency for all of Malheur County under the provisions of ORS 401.055 due to severe and continuing drought conditions beginning at this time and continuing for an unknown period of time; **and** direct the Oregon Department of Water Resources to make available in Malheur County: Temporary Transfers of Water Rights, Emergency Water Use Permits, Use of Existing Right Option/Agreement; **and** other federal and state drought assistance and programs as needed.
5. This proclamation shall take effect immediately from and after its issuance.

MALHEUR COUNTY COURT

Dan P. Joyce

County Judge Dan Joyce

Don Hodge

Commissioner Don Hodge

Larry Wilson

Commissioner Larry Wilson

Predicting the Hydrologic Response of the Columbia River System to Climate Change

David Rupp

Presentation to the Oregon Drought Readiness Council

Salem, OR, October 11, 2018

UW HYDRO
COMPUTATIONAL HYDROLOGY
DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
UNIVERSITY of WASHINGTON

OCCRI

Project team

Computational Hydrology Group,
Department of Civil and Environmental Engineering, University of Washington

- Bart Nijssen (PI)
- Oriana Chegwidden

Oregon Climate Change Research Institute,
Oregon State University

- Phil Mote (co-PI)
- David Rupp

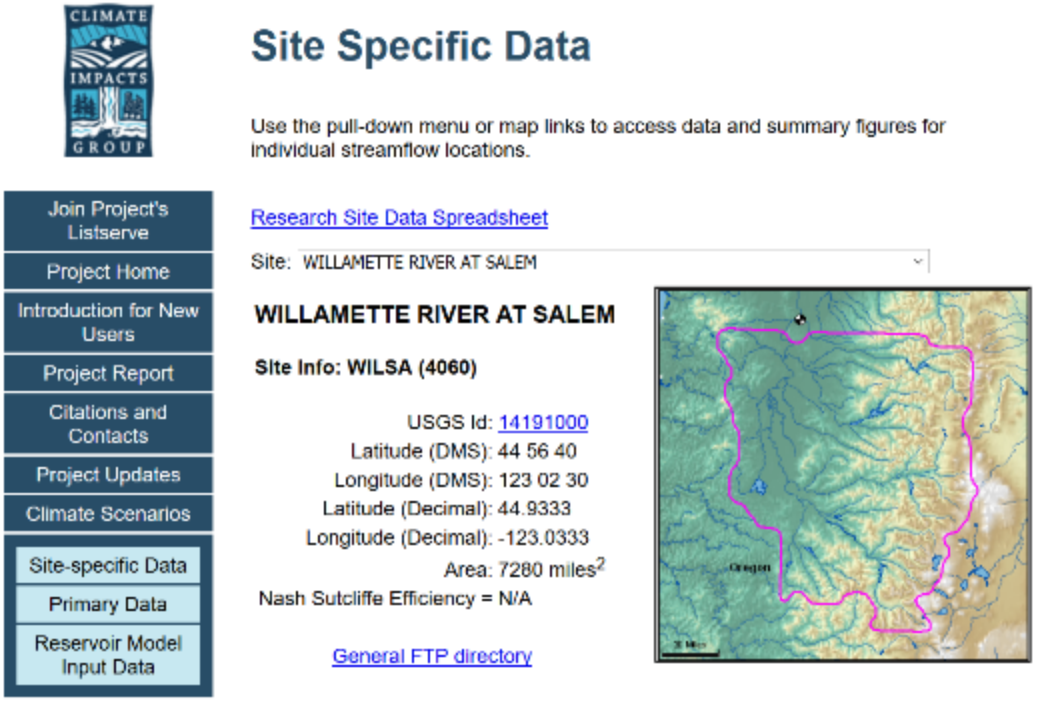



PNW Hydroclimate Scenarios Project (2860)

Streamflow* projections for ~300 streamflow locations in the Columbia River basin and selected coastal drainages west of the Cascades.

Completed in 2010.

Why do another study?



*Non-regulated, no irrigation (NRNI), i.e. "natural".

Why do another study?

New climate change projections from new generation of global climate models (CMIP3 -> CMIP5)

- New emissions scenarios (SRES -> RCP)
- Finer spatial resolution
- Other climate model enhancements
- More daily output data

Improved statistical downscaling methods (MACA)

Hydrological model improvements

- New calibration
- Glacier submodel

Research question: Can we better assess the effects of our study design decisions/assumptions (the known unknows)?

TIP 304: Predicting the Hydrologic Response of the Columbia River System to Climate Change

Project goals

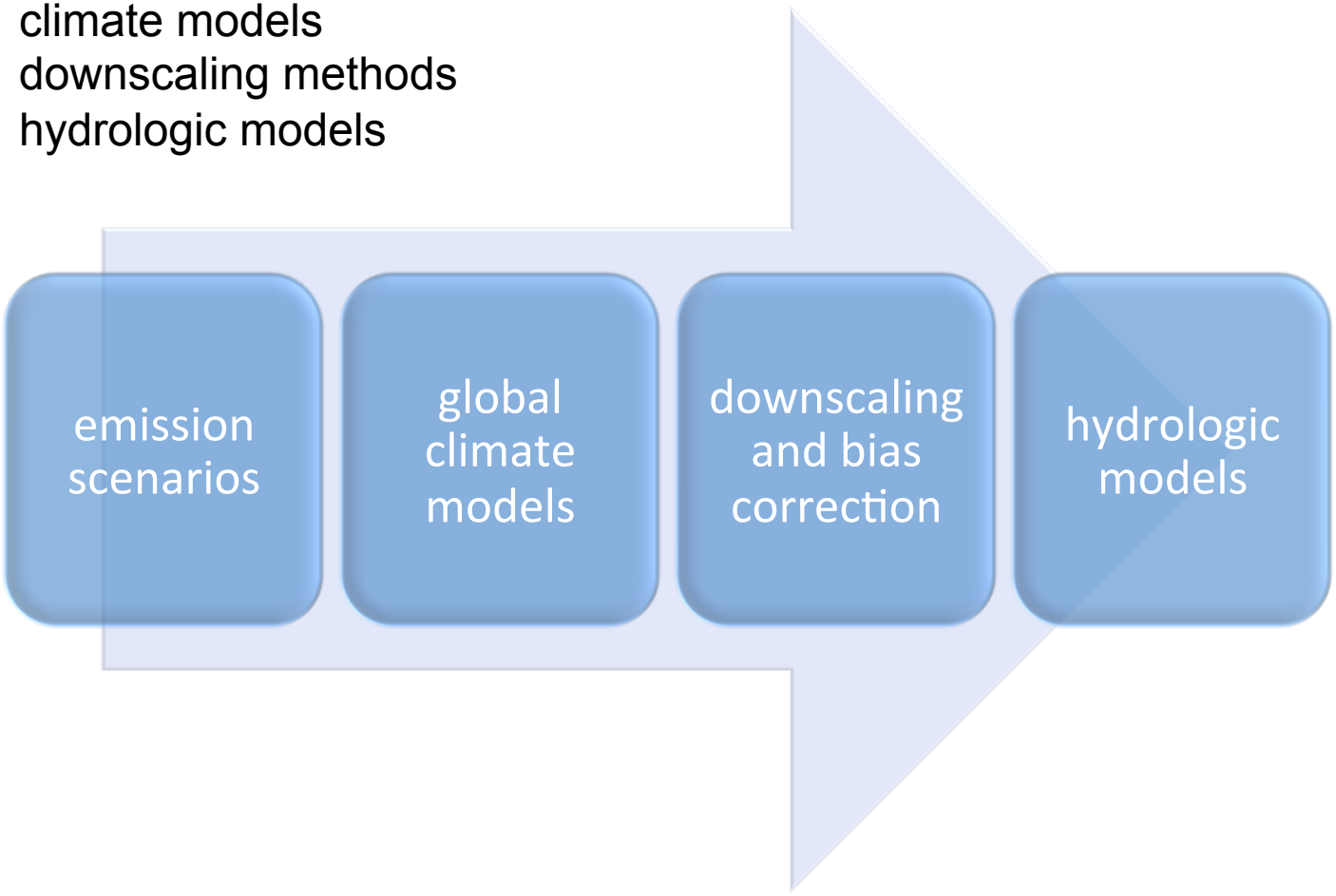
- **Update:** Evaluate the implications of climate change – as projected by the CMIP5 global model simulations – for the hydrology of the Columbia River Basin

- **Extension:** Assess the effects of methodological choices on the hydrologic projections (e.g. global climate model,downscaling method, hydrologic model)

Hydrologic simulations

172 representations of the future hydrology of the Columbia River Basin based on different combinations of

- emission scenarios
- climate models
- downscaling methods
- hydrologic models



Emission scenarios

- **RCP 4.5**
- **RCP 8.5**

Emission scenarios

Global climate models

- CanESM2
- CCSM4
- CNRM-CM5
- CSIRO-Mk3-6-0
- GFDL-ESM2M
- HadGEM2-CC
- HadGEM2-ES
- inmcm4
- IPSL-CM5A-MR
- MIROC5

Emission scenarios

Global climate models

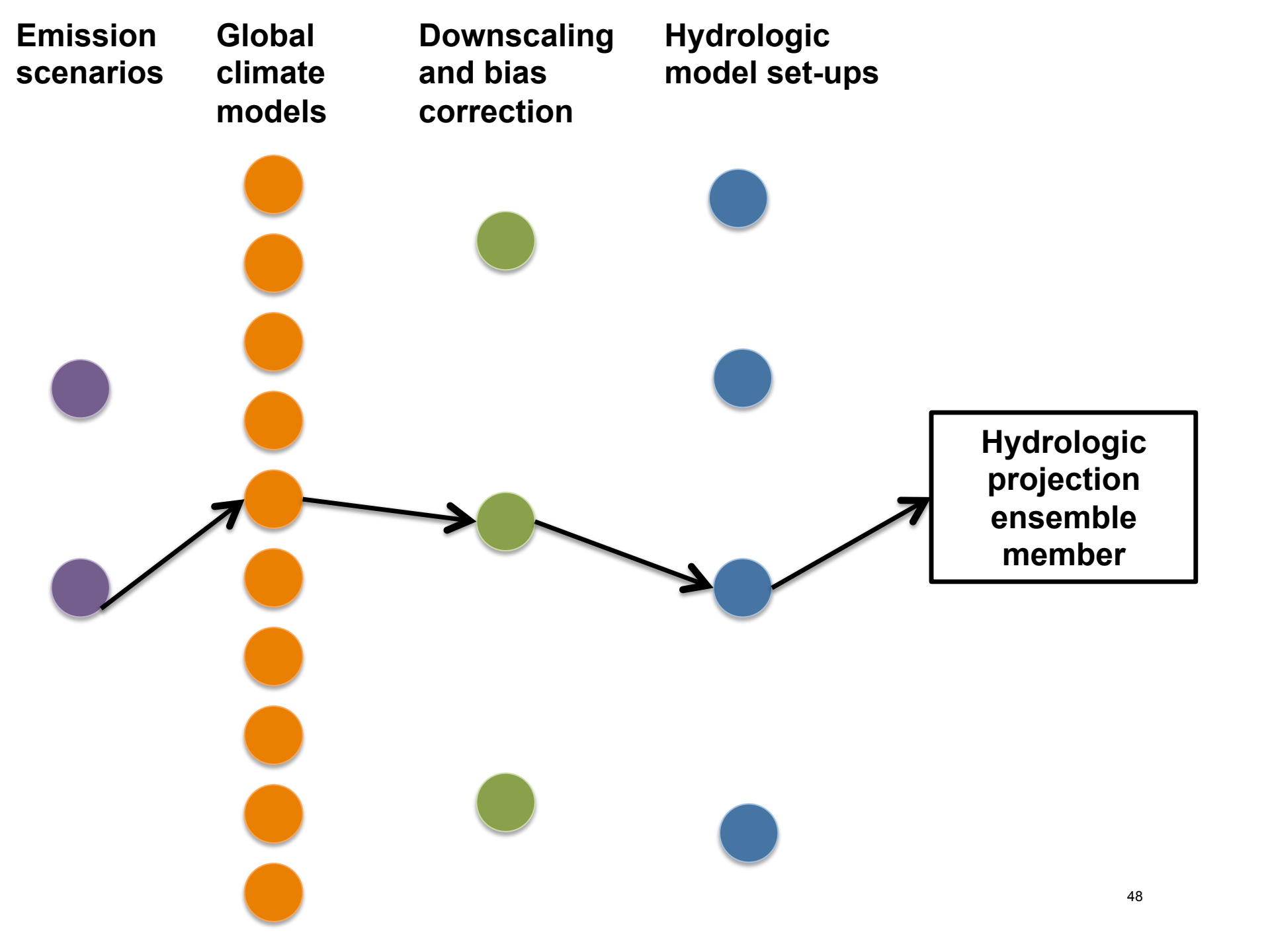
Downscaling and bias correction

Bias Corrected Spatial Disaggregation (BCSD)

Multivariate Adaptive Constructed Analogs (MACA)

Dynamical Downscaling

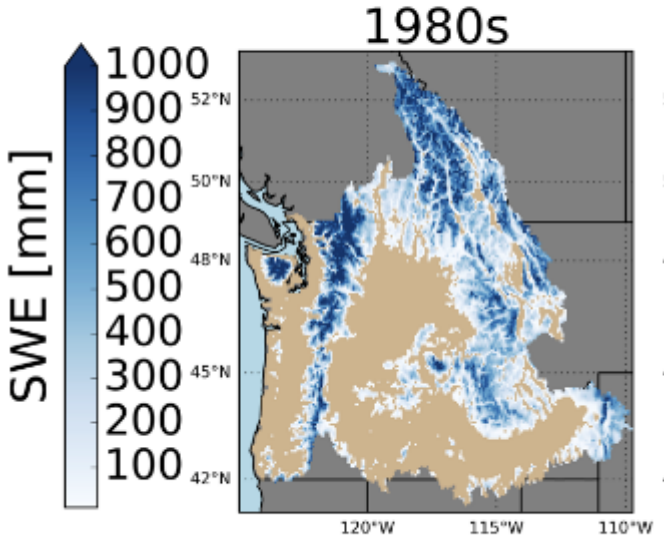

Emission scenarios
Global climate models
Downscaling and bias correction
Hydrologic model set-ups
VIC-1
VIC-2
VIC-3
PRMS


Emission scenarios
Global climate models
Downscaling and bias correction
Hydrologic model set-ups
Hydrologic projection ensemble member

Climate change effects: snow

UW HYDRO
COMPUTATIONAL HYDROLOGY

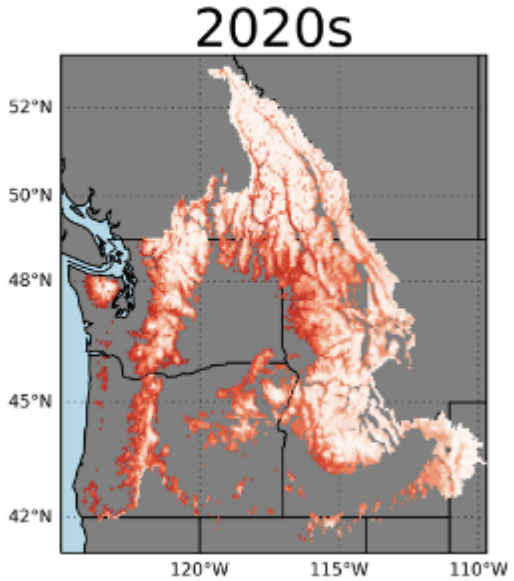
Figure courtesy USDA

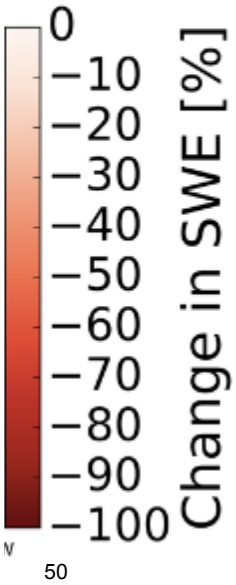


Historical April 1 SWE

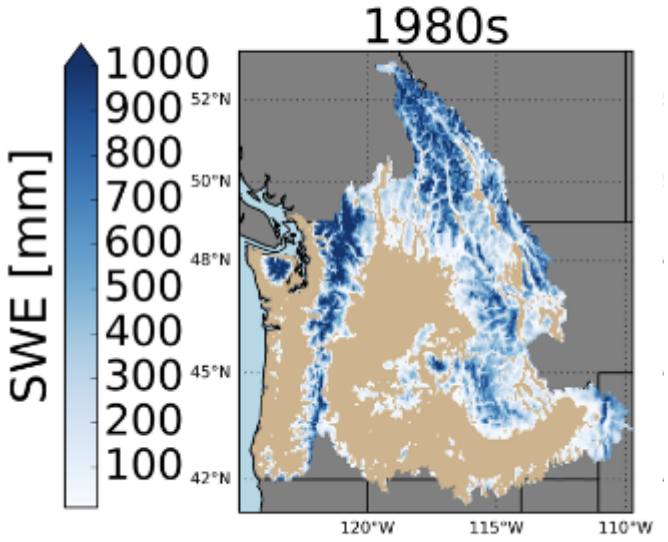
Areas in tan: < 10 mm April 1 SWE

%-change in April 1 SWE





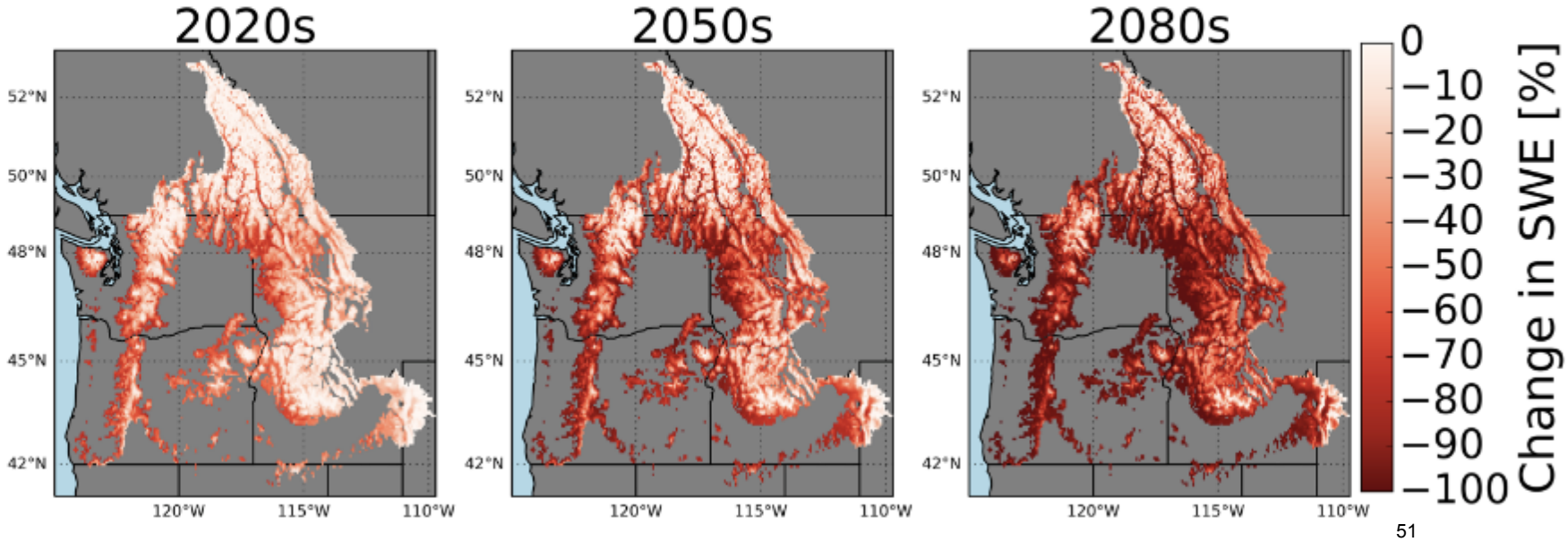
RCP8.5 – GCM mean – BCSD – VIC – UW



Historical April 1 SWE

Areas in tan: < 10 mm April 1 SWE

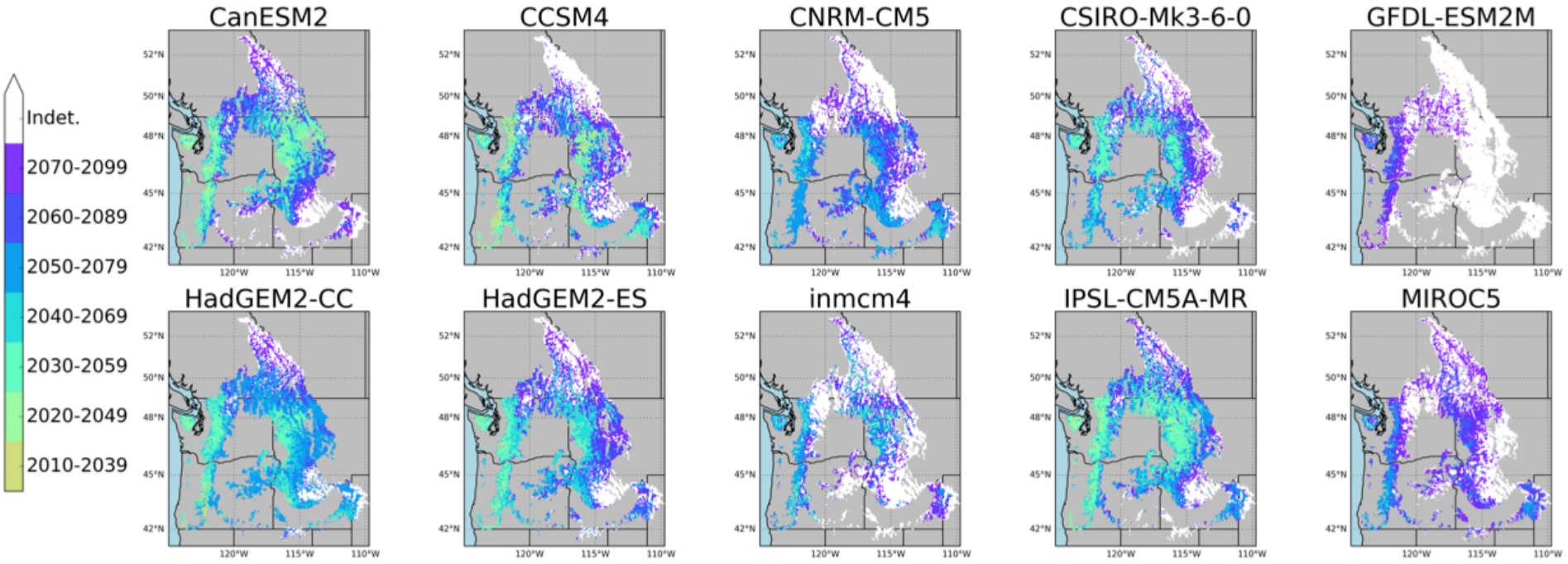
%-change in April 1 SWE



RCP8.5 – GCM mean – BCSD – VIC – UW

When do low snow years events become common?

When will the 10th percentile SWE for 1980-2009 become the 50th percentile?



RCP8.5 – all GCMs – BCSD – VIC – UW

Climate change effects: streamflow

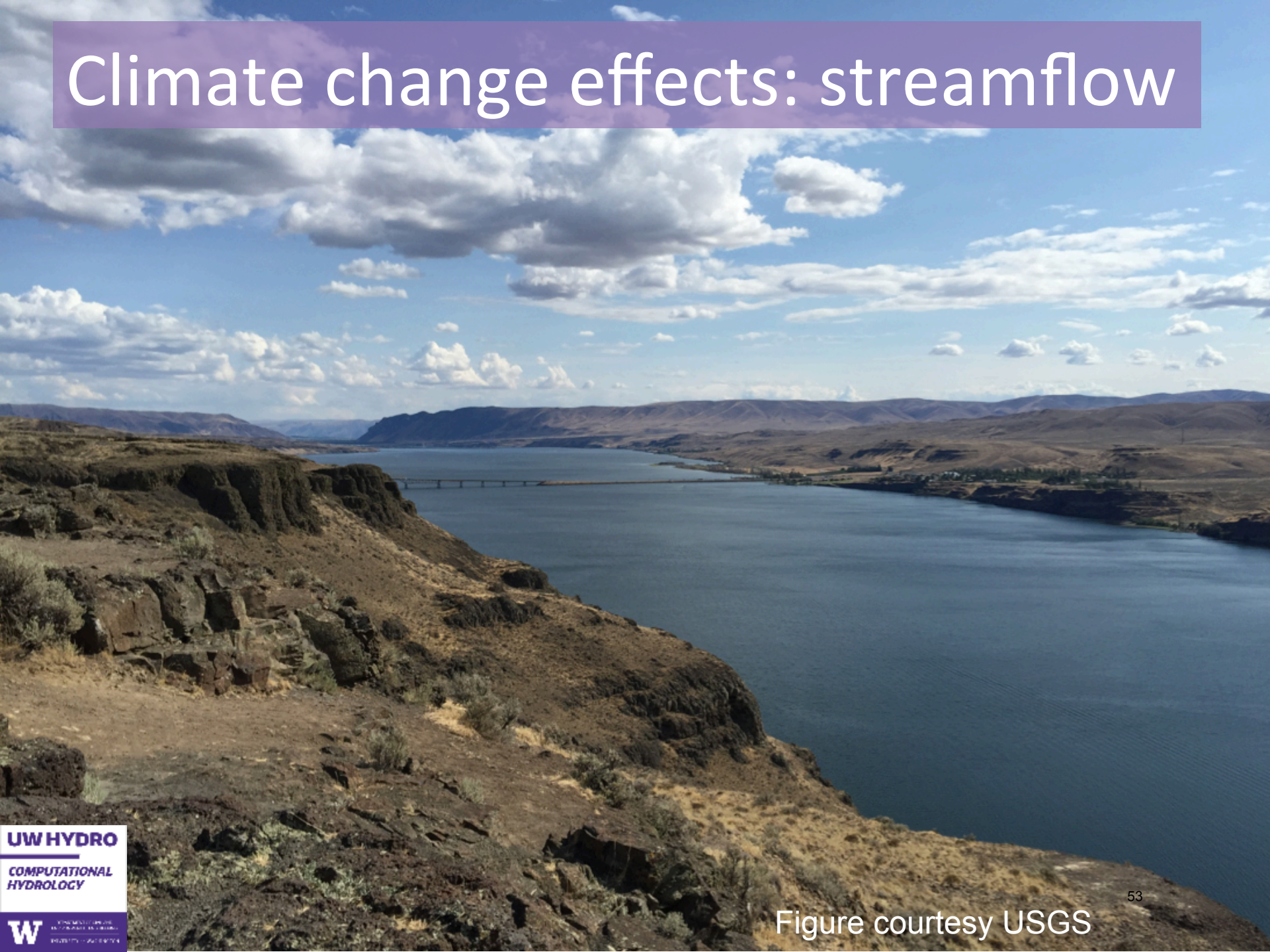
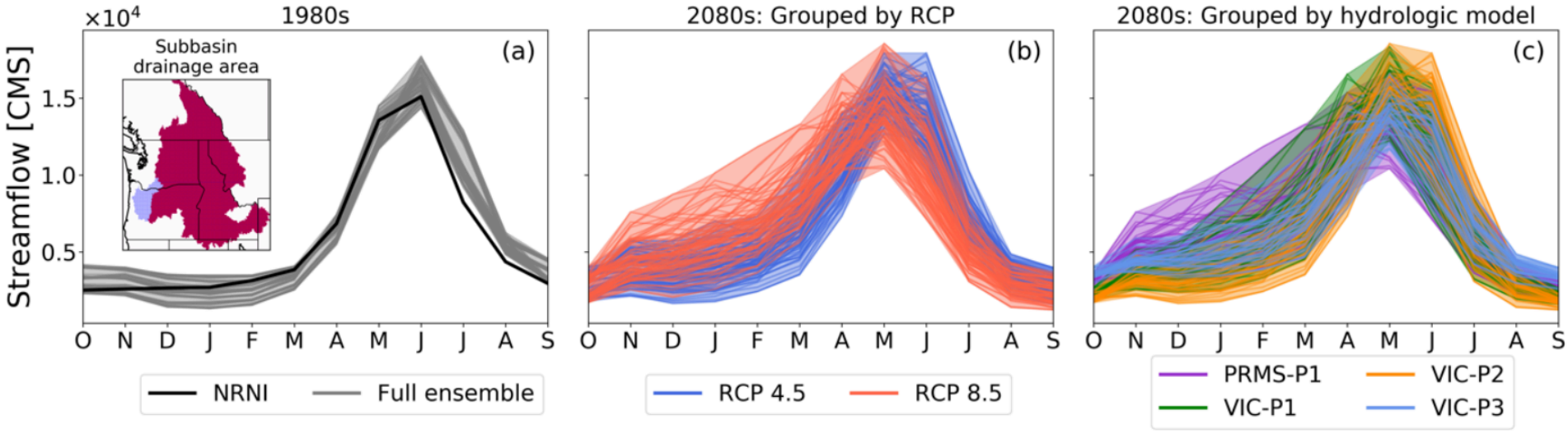


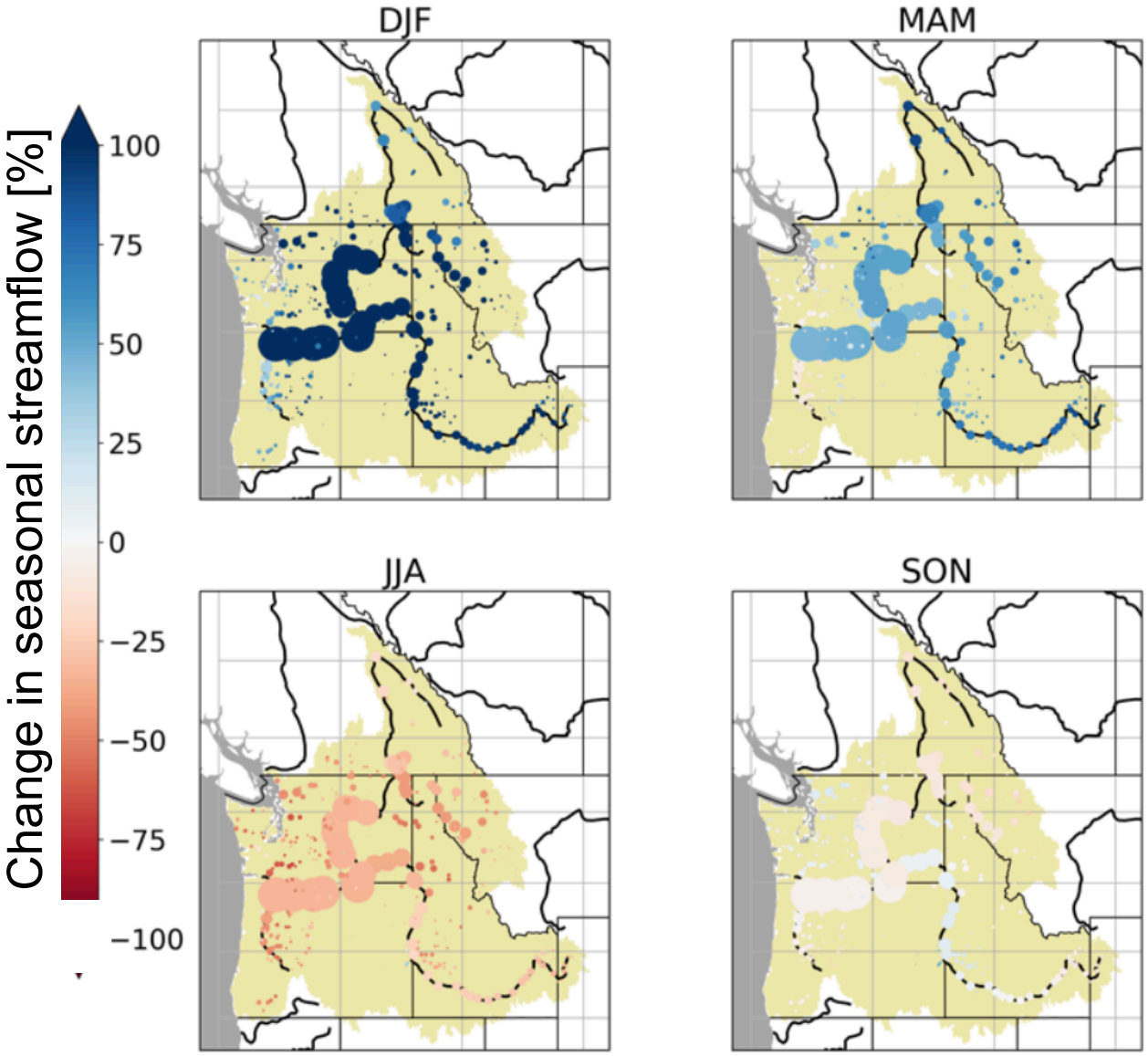
Figure courtesy USGS

Mean monthly streamflow at The Dalles

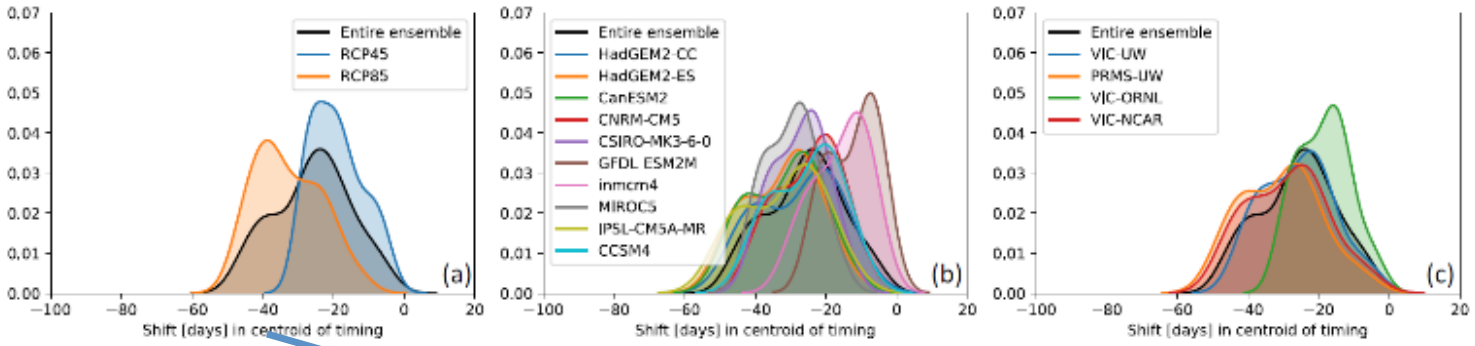


Source: Chegwiddon et al. (submitted to Earth's Future)

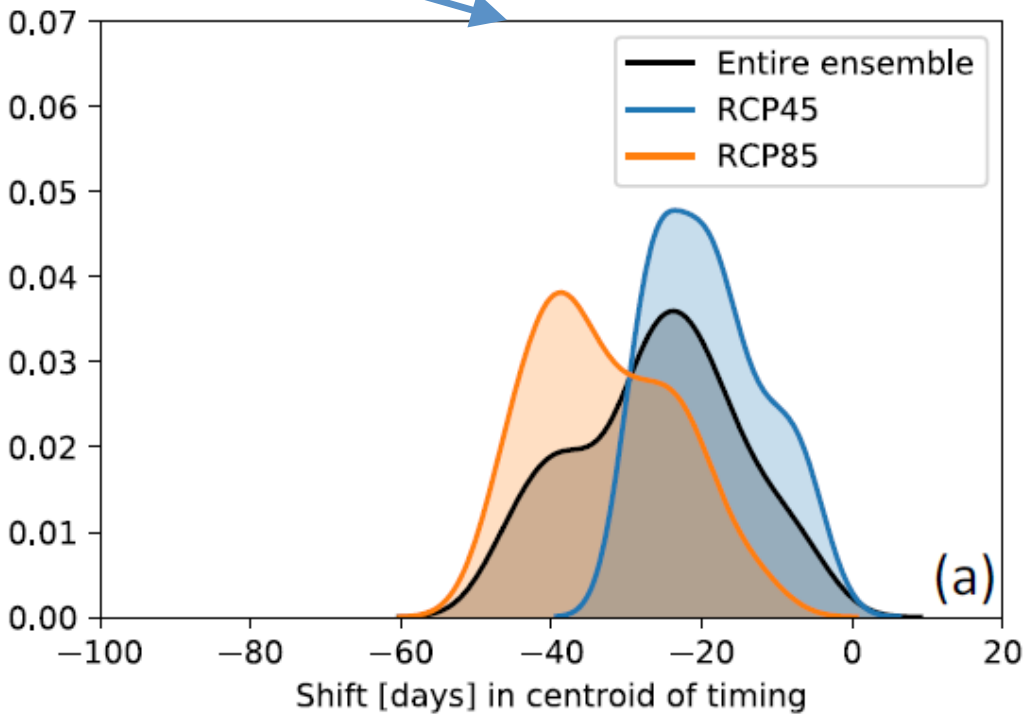
Mean seasonal streamflow changes
1980s to 2080s



Change in streamflow timing at The Dalles

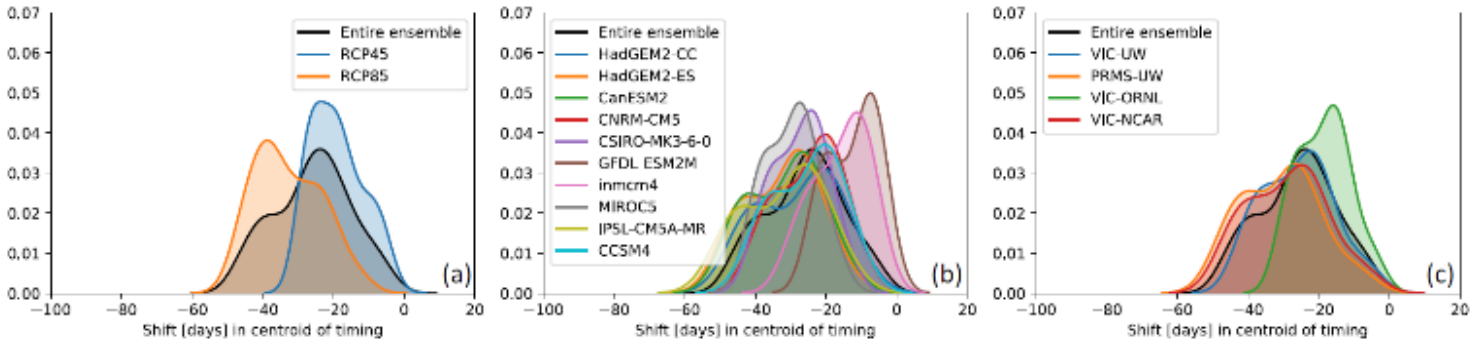


1980s to 2080s

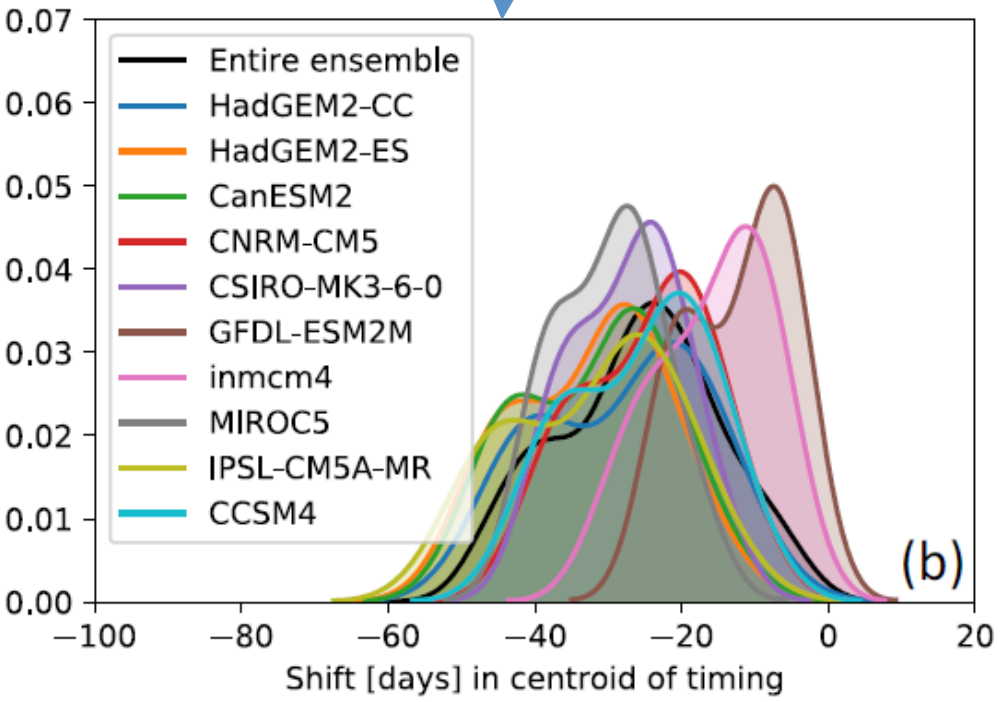


Source: Chegwiddon et al. (submitted to Earth's Future)

Change in streamflow timing at The Dalles

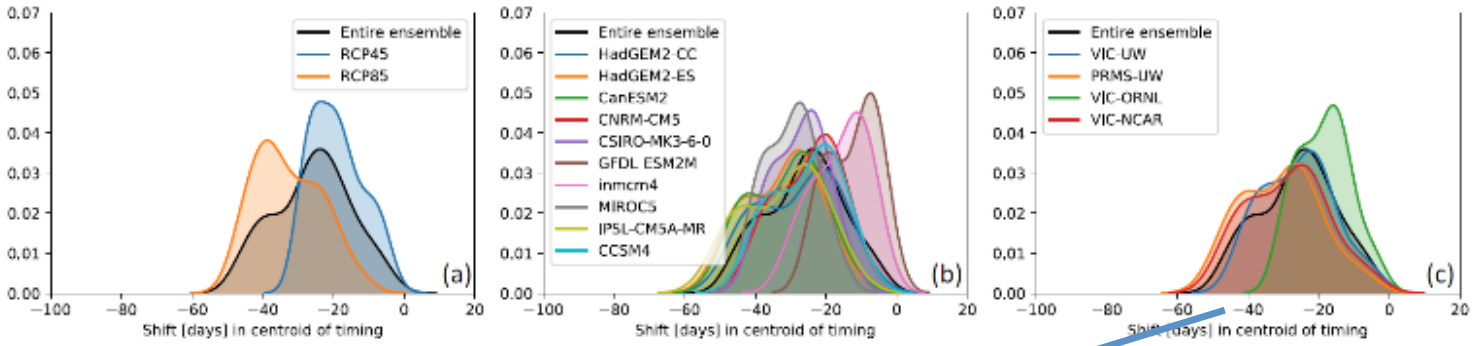


1980s to 2080s

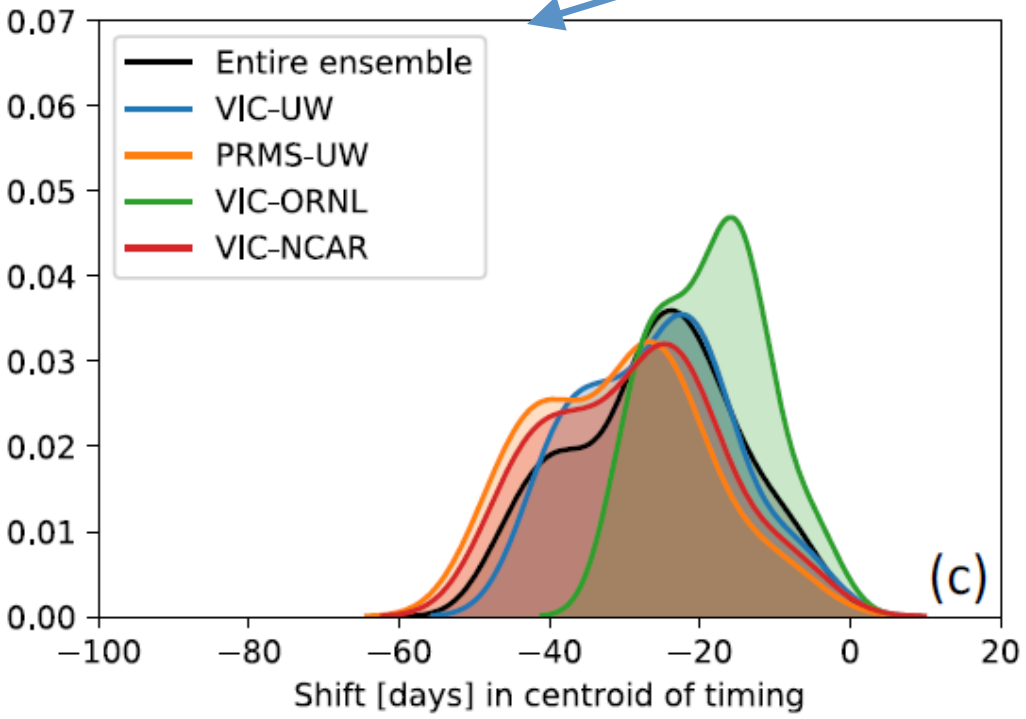


Source: Chegwiddon et al. (submitted to Earth's Future)

Change in streamflow timing at The Dalles

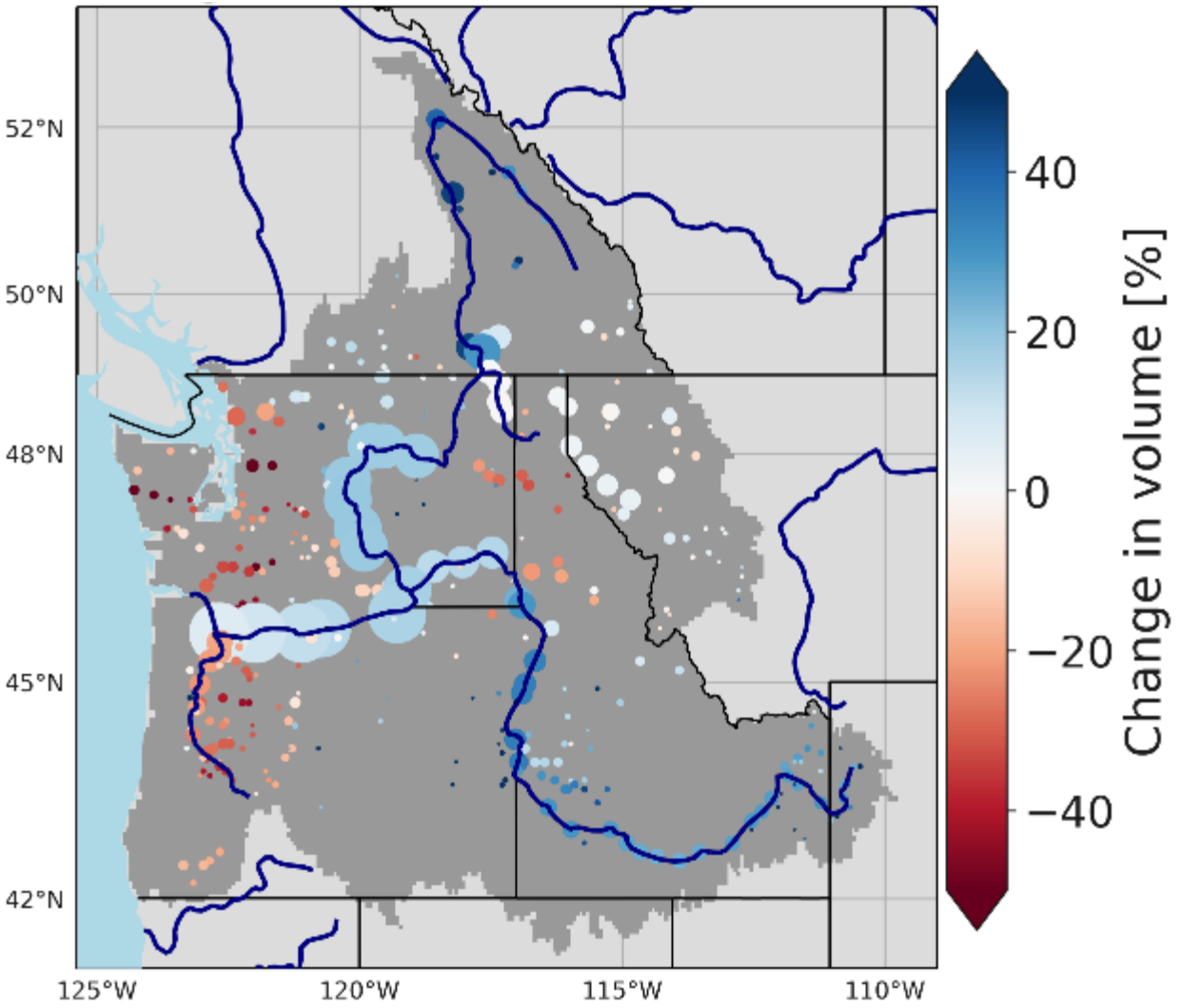


1980s to 2080s

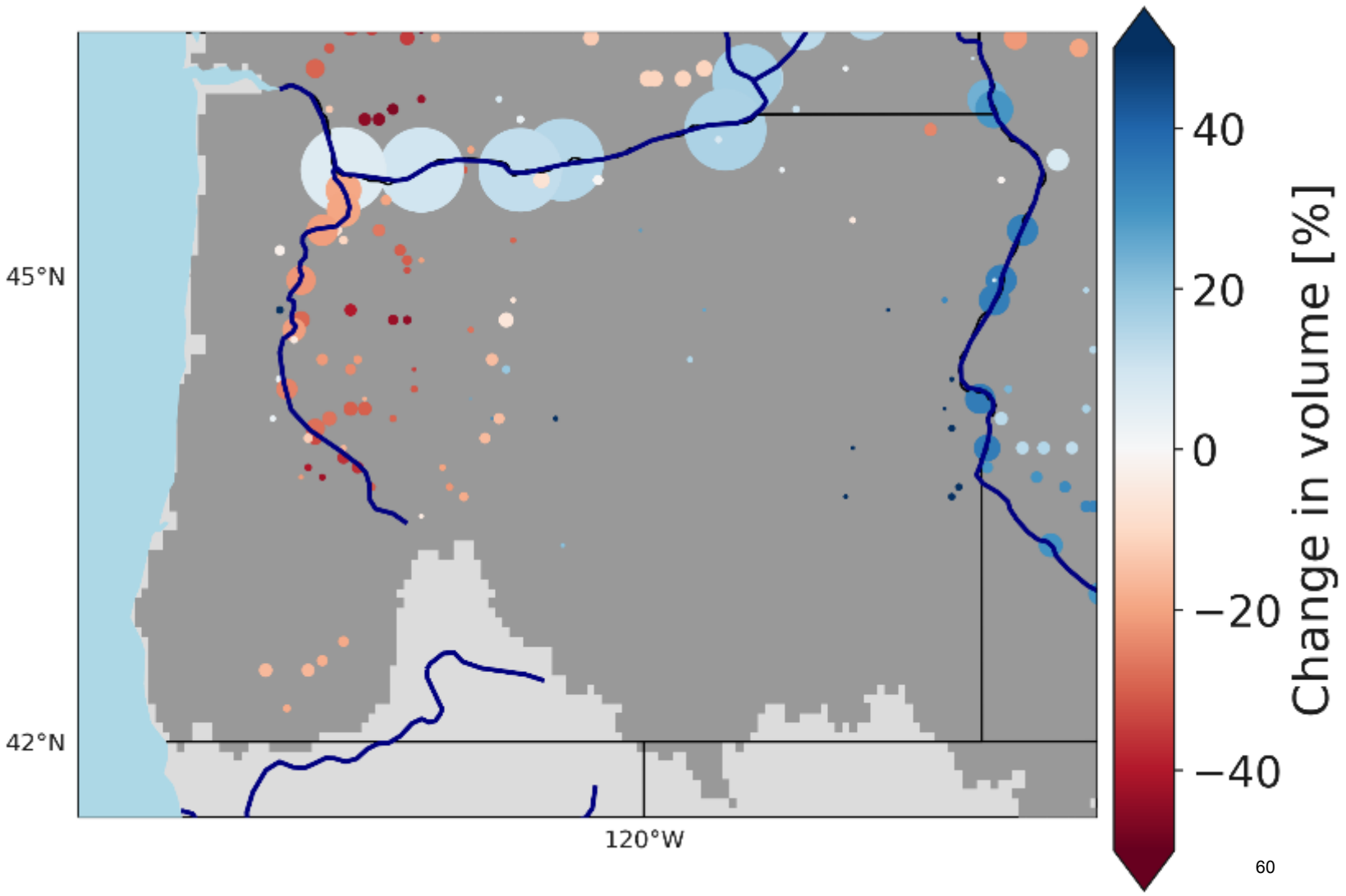


Source: Chegwiddon et al. (submitted to Earth's Future)

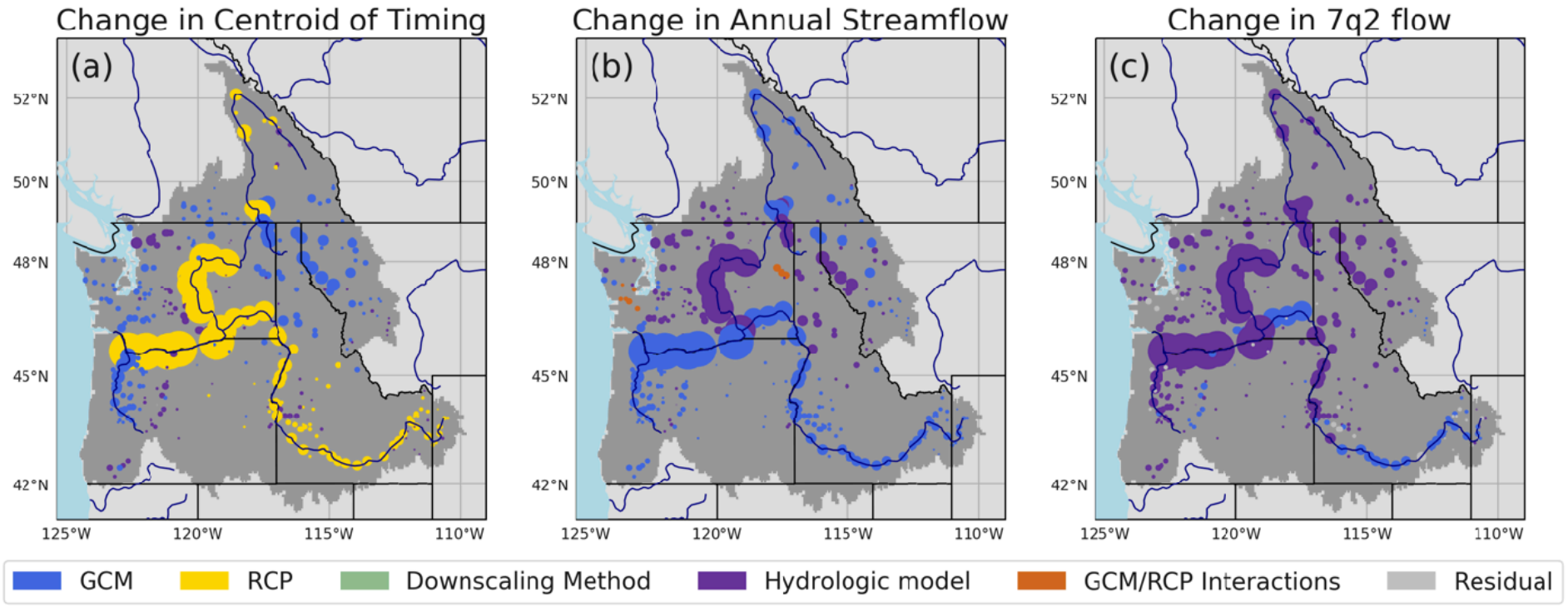
Change in 2-year return period annual minimum 7-day average flow, 1980s to 2080s



Change in 2-year return period annual minimum 7-day average flow, 1980s to 2080s



Dominant contributor to variability in hydrologic projections



7q2 = 2-year return period annual minimum 7-day average flow.

Source: Chegwiddon et al. (submitted to Earth's Future)

What have we learned (or relearned)?

Overall, projections of hydrological impacts have not change considerably over time

Which decisions in the modeling chain have the largest greatest effect depends on

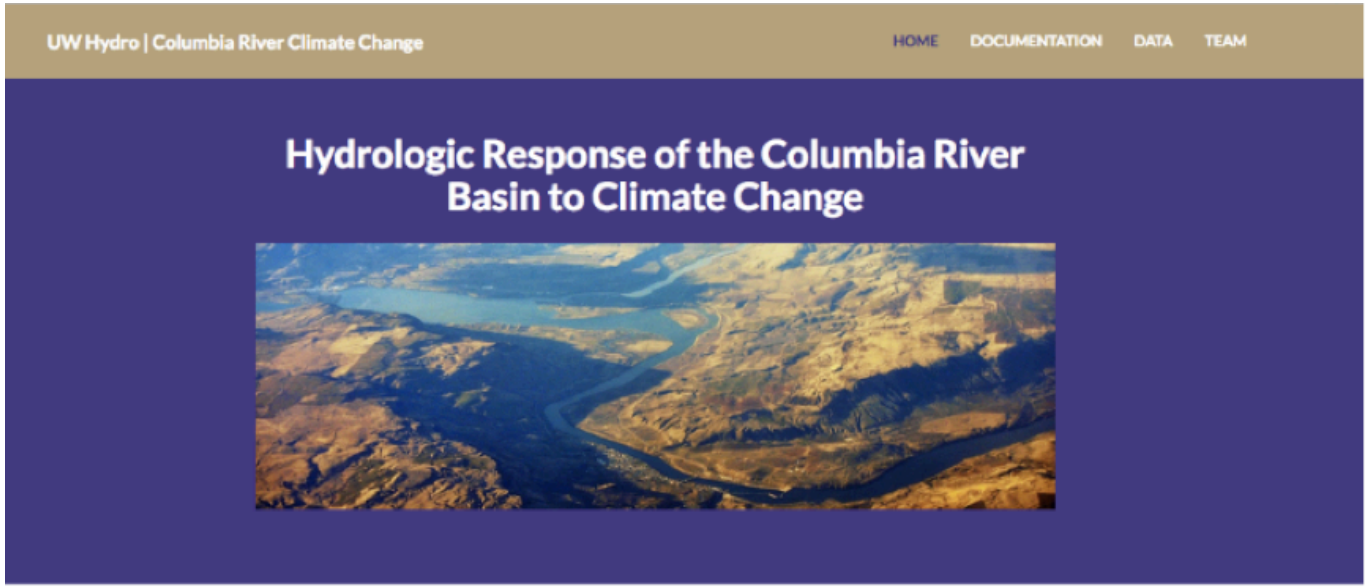
a. the variable of interest

b. where you are

For projecting changes in summer drought flows, focus on hydrological model improvement should be priority

There is a large spread among the hydrological projections so our systems should be robust to a large range of possibilities

Data publicly available at: hydro.washington.edu/CRCC



Acknowledgments

Bonneville Power Administration

United States Army Corps of Engineers

Bureau of Reclamation

Attendees to the many Transboundary Climate Workshops

John Abatzoglou, Martyn Clark, Alan Hamlet, Katherine Hegewisch, Shih-Chieh Kao, Naoki Mizukami, Ming Pan, Eric Salathé

UW Hydro | Computational Hydrology

Q&A