

**Oregon's Integrated Water Resources Strategy  
2016-17 Policy Advisory Group  
March 30, 2016 Meeting Notes  
(Approved June 28, 2016)**



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**Contents:** March 30, 2016 meeting notes, drought matrix, intro powerpoint, Dello/Drought presentation.

**Members present:**

Robert "Will" Collin	Gayle Killam	Craig Pope
Suzanne DeLorenzo	Craig Lacy	Brent Stevenson
Arlene Dietz	Hiram Li	Stan van de Wetering
Rebecca Geisen	Tracey Liskey	Mary Wahl
TJ Hansell	Peggy Lynch	
Valerie Kelley	Curtis Martin	

**Members not present:**

Ron Foggin

**Staff / Presenters:**

Lauri Aunan, Ofc of Governor Brown	Tom Byler, WRD	Wade Peerman, DEQ
Brenda Bateman, WRD	Kathie Dello, OCCRI	Racquel Rancier, WRD
Bob Baumgartner, WRC	Danette Faucera, ODFW	Karen Tarnow, DEQ

**Audience members:**

Leslie Bach, TNC	Mary Ann Nash, OFB	April Snell, OWRC
Harmony Burrigh, WRD	Kim Ogren, WRD	Gail Snyder, Coalition for the Deschutes
Craig Kohanek, WRD	Steve Parrett, WRD	Doug Woodcock, WRD
Susan Liskey, Liskey Farms	Tracy Rutten, LOC	
Samantha Murray, OEC	Lauren Smith, OWRC	

**I. Welcome and Introductions**

Water Resources Commissioner Bob Baumgartner welcomed Policy Advisory Group (PAG) members and observers, thanking the members on behalf of the Commission for their time and commitment to this process. Water Resources Department Director Tom Byler added his welcome, provided additional context, and introduced agency partners also sitting at the table.

**II. Agenda Review**

Facilitator Brenda Bateman reviewed the agenda and invited the group to add additional items; none were added. Resources for this and other meetings are available on the state's IWRS webpage:  
[http://www.oregon.gov/owrd/Pages/law/integrated\\_water\\_supply\\_strategy.aspx](http://www.oregon.gov/owrd/Pages/law/integrated_water_supply_strategy.aspx)

**III. Introductions**

The members and agency introduced themselves, providing insights about their "claim to fame," and shared their personal aspirations for the 2016-17 IWRS development process. Audience members also introduced themselves by name and affiliation.

If members would like to share any of their own articles or publications with the group, please send links, pdfs, or other information to [Brenda.o.bateman@state.or.us](mailto:Brenda.o.bateman@state.or.us).

#### **IV. Roles, Responsibilities, and Decision-Making**

The group briefly reviewed a charter including membership roles, responsibilities, and the process for group decision-making. One modification was offered and supported, adding “After conferring with other boards and commissions...” to paragraph 1G. The facilitator will update the document and bring the resulting version to the next meeting.

The Department confirmed that alternates would be permitted, if a member had to miss a meeting.

#### **V. Oregon’s 2012 Integrated Water Resources Strategy, 2012-17 Implementation, and 2017 Update**

Staff presented a brief history of the Integrated Water Resources Strategy and discussed the state’s planned process for developing the 2017 update. This presentation is appended to the end of these notes. The approach for developing the 2017 update includes:

- 2017 update will be surgical (see 2017 Development Plan)
- Comprehensive revision will occur at the ten-year mark
- Governor’s has directed the state to address drought & climate change in the 2017 update
- Some gaps = preparation for extreme weather, seismic events, aging infrastructure
- Project partners will report on progress made since 2012, in the text of the update
- WRC will notify other boards/commissions prior to adoption
- 2017 IWRS must be adopted by WRC

Plans for public involvement & stakeholder engagement include:

- Listserv news
- Online survey
- Public meetings / open houses in May or June
- Stakeholder briefings
- Public Comment

Members volunteered additional ideas with regard to the 2016-17 participation process:

- Visit with / brief the Environmental Justice Task Force and other citizen advisory boards
- Provide “notice” in newspapers, through members’ networks, senior centers / bulletin boards, industry newsletters, radio spots, social media, and other organizations’ events.
- Provide child care during events
- Be clear about the “why you should care.”

Project team members—from the Water Resources Department, Department of Environmental Quality, and Department of Fish and Wildlife—then presented progress thus far on the implementation of the 2012 Integrated Water Resources Strategy. Q&A followed. Highlights included:

OWRD Successes as reported by the agency: *Long-Term Water Demand Forecast, 2016 Monitoring Strategy, Willamette Basin Reservoir Study*, designation of two new scenic waterways in 2016 (reaches of the Molalla and Chetco rivers), and a new Water Resources Development Program.

DEQ Successes as reported by the agency: groundwater quality studies (including nitrates and pesticides), interagency review of loan and grant applications, and surface water / total maximum daily loads as an ongoing priority.

ODFW Successes as reported by the agency: progress on instream protections (including seasonally varying flows, base flow studies, and instream water rights, both new and old applications), prevention of aquatic invasive species, fish passage and screening, and a newly revised *Conservation Strategy*.

Members requested the following information:

- Provide notations on the 2012 workplan: what dollars, staffing requests, and policy requests were successful, and to what degree?
- Distribute technical reports, or set up a reference library for the publications noted above, plus: any methods documents available for instream water rights applications, and any description of available natural resources funding sources.

## **VI. Drought Resiliency – 2015 Impacts and Research Underway**

During its afternoon session, the group heard presentations from drought experts at the state level. Lauri Aunan from the Office of Gov. Brown thanked the members for their service and presented the Governor's 2015 Executive Order (15-09), which directs state agencies to reduce non-essential water consumption by 15 percent or more by December 31, 2020 and also directs the state to build drought resiliency into its 2017 Integrated Water Resources Strategy. Tom Byler, WRD Director, described the contents of Oregon's newly published 2016 Drought Annex and 2016 legislation, establishing a drought task force. All of these documents are part of the on-line meeting materials.

Kathie Dello, the state climatologist from the Oregon Climate Change Research Institute, shared the latest data related to climate change trends. Her powerpoint is attached as well.

Members received a "drought matrix" (see attached), laying out a framework for how other states and jurisdictions have addressed drought issues. Bring this to subsequent meetings for further discussion.

The group then spent a few minutes discussing the day's presentations and outlining their own vision for issues to be taken up in future PAG meetings. (Members also added post-its to the wall and sent subsequent emails with additional topics; these are included in the list below.) Discussion of these topics will be taken up further in subsequent PAG meetings.

Some of the ideas offered included:

- Monitoring...we're not done
- Determine whether any more "available" water exists for development (e.g., winter water for storage, already-existing agricultural reservations, etc.)
- In Oregon, how can we quantify / monetize water left instream, used for ag, used for municipal, etc.
- Will instream needs change, with higher temperatures? Are there any available streamflow temperature forecasts with regard to climate change?
- Measurement (i.e., how much water is instream, how much groundwater is there, how much is being used, how big are the gaps between demand and supply?)
- Anticipate and prepare for effects of extreme events (flood, drought, fire, seismic)
- Drought: prioritization of water use
- Drought: economic incentives toolbox, such as instream leases, irrigation fees, mortgage subsidies
- Oregon Resiliency Plan – tie to its recommended actions regarding water supply (conduct seismic risk assessments, encourage seismic design requirements, post-earthquake compliance, develop mitigation)
- Land-use and water intersection. Needs more work
- Infrastructure, including storage
- Public education, perception, buy-in. Need partners for easements, storage, conservation, etc.
- Interaction with federal policies (wild and scenic rivers, endangered species act, etc.). How are we doing?
- Water conservation and efficiency. Driving down demand. Consider setting numeric goals. Look at water-user policies at irrigation districts. Be mindful of the unintended consequences of water conservation. Related topics: water used for in-conduit hydro, do water users / sectors have disincentives in place, what's "waste."
- Why isn't water reuse more prevalent?
- Look into other sources? (e.g., mitigation, desalination, etc.)
- Burden of proof, or the "precautionary principle," in decision-making

- Balance instream protections & economic development; is there systemic bias toward one or the other?
- Water right transfers and reviews, including irrigation district transfers and expansion of urban growth boundaries. How are we doing?
- Ensure adequate field staff, for distribution of water, enforcement, conflict resolution, water user education
- Ensure adequate permitting staff, for timely decision-making, response to requests
- Instream protections, especially baseflow studies
- Groundwater protection (quantity and quality) — drinking water source, emergency / back-up supplies, drought resource, mined versus sustainable source.
- DEQ's toxics reduction strategy, pesticide management plans, status of pesticide use & reporting system
- Protect vulnerable populations
- Maintain public funding programs for core needs, not just inter-agency, integrated needs
- Agency funding: adequate for the job? How do we measure "enough"?

## **VII. Public Comments**

Two members of the public shared comments with the group at the end of the day. Their comments were wide-ranging and included:

- Some of the unique water challenges currently underway in the Deschutes Basin, and the question: are land-use laws working?
- Encouragement to keep the group's work focused on state-wide, not basin-specific issues.

## **VIII. Meeting Recap and Feedback**

The facilitator invited feedback from the members about how process time and content might be improved if future meetings.

Specifically, the facilitator asked whether planned meeting dates (June 8, Sept. 14, and Nov. 30) would work for the majority of participants. Responses included the following:

- Meetings need to be at least a full day, if not two-day.
- If the group goes to two-day meetings, try it once first, before converting all the meetings to two-day.
- Please reconsider dates, because all of these coincide with Board of Ag meetings.
- Find a place with more convenient parking.
- ODFW offered to look into the use of its facilities.
- The Department will put together a Doodle poll to determine whether different dates and longer meetings would work.
- Consider a 5<sup>th</sup> meeting, mid 2017 to give PAG members an early look at the 2017 IWRS.

The facilitator also asked whether members would like to have more technical presentations as part of their meetings or more time for discussion amongst themselves. Members asked to have technical reports sent ahead of time so that they could prepare questions and receive much-shorter briefings.

## **IX. Adjourn**

The meeting adjourned at 3:15.

A Sampling of Drought Readiness Techniques Used throughout the U.S. at State and Local Levels					
Drought Readiness Techniques	Incentive: voluntary approach	Regulation: mandatory approach	Assistance: technical approach	Pricing: market approach	Information: educational approach
Supply-Side Management					
Inter-ties	7B				
Multiple / Diversified Sources					
Mitigation Programs	10D		10D		
Desalination					
Re-Use	10C		10C		
Above-Ground Storage	10B		10B		
Below-Ground Storage	10B		10B		
Infrastructure Maintenance	7B				
GW Protection					
SW Protection		11B			
Wetlands & Forest Protection		11A			
Demand-Side Management					
HOA Covenants					
Water-Use Efficiency & Conservation <sup>1</sup>	10A				10A
Water-Use Curtailment <sup>2</sup>					
Zoning <sup>3</sup>		6A			
Assistance for domestic well owners			12A		12A
Data Management					
Quantifying Meteorological Drought					
Quantifying Hydrological Drought					
Quantifying Agricultural Drought					
Quantifying Socioeconomic Drought					
Developing Drought Plans					

Questions for Discussion:

Question 1. Which of the drought readiness techniques in column 1 should the 2017 IWRS feature as recommended actions? Note: numeric-letter codes in the above table refer to recommended actions already set forth in Oregon's 2012 *Integrated Water Resources Strategy*.

Question 2. Which of the approaches in columns 2-6 might the PAG want to suggest using?

Question 3. Are there other techniques or approaches not mentioned here that the PAG should consider?

This list of above techniques is drawn from:

State of Oregon. *Integrated Water Resources Strategy*. August 2012.

State of Oregon. *State of Oregon Emergency Operations Plan: Drought Annex*. Oregon Office of Emergency Management and Oregon Water Resources Department. January 2016.

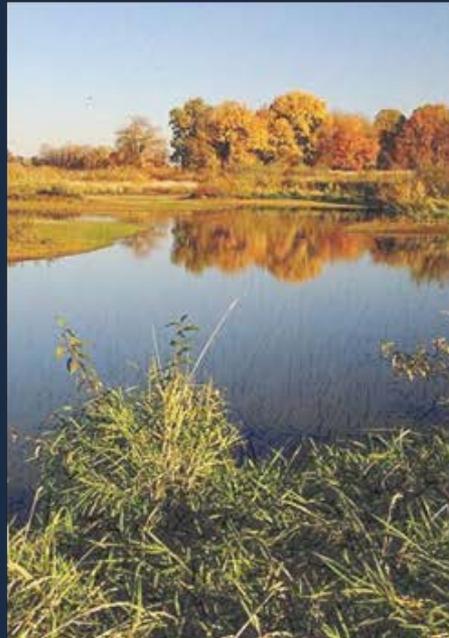
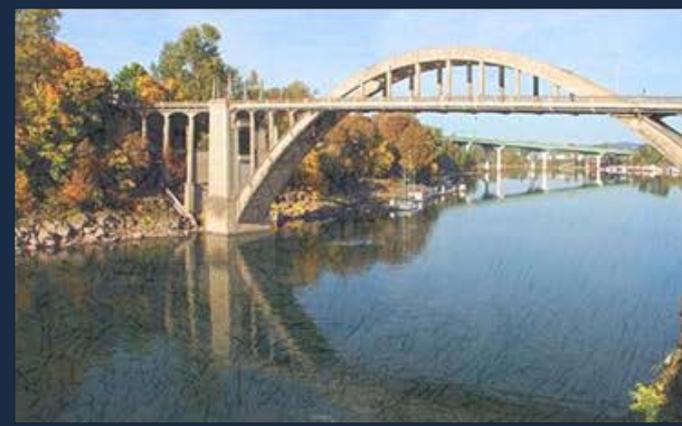
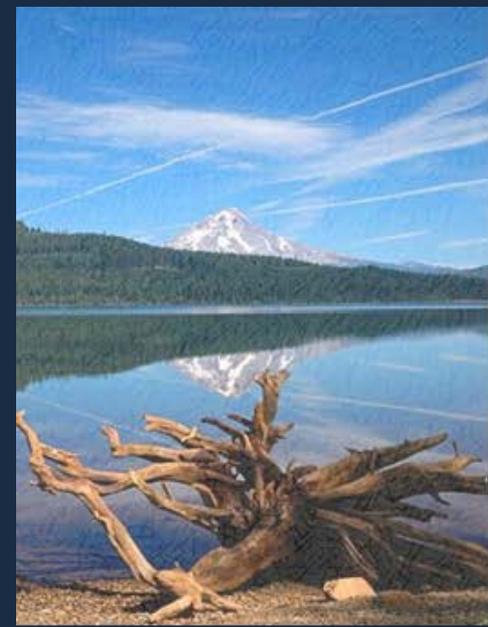
American Water Resources Association. *Proactive Flood and Drought Management: A Selection of Applied Strategies and Lesson Learned from around the United States*. AWRA Policy Committee. September 2013.

American Water Resources Association. *Proactive Flood and Drought Management, Volume II: A Selection of Applied Strategies and Lesson Learned from around the United States*. AWRA Policy Committee. 2016 – still in draft.

<sup>1</sup> To preserve resources and prevent depletion (dictionary.com).

<sup>2</sup> To cut short; abridge (dictionary.com).

<sup>3</sup> To divide into areas according to existing characteristics or as distinguished for some purpose (dictionary.com).



# *Oregon's Integrated Water Resources Strategy*

Policy Advisory Group Meeting  
March 30, 2016



# Oregon's Integrated Water Resources Strategy

## Three Parts to this Presentation:

- 1. Developing Oregon's first IWRS & Implementation Workplan (2012 – 2017)**
- 2. Developing the 2017 IWRS**
- 3. Implementation Highlights from Agencies**

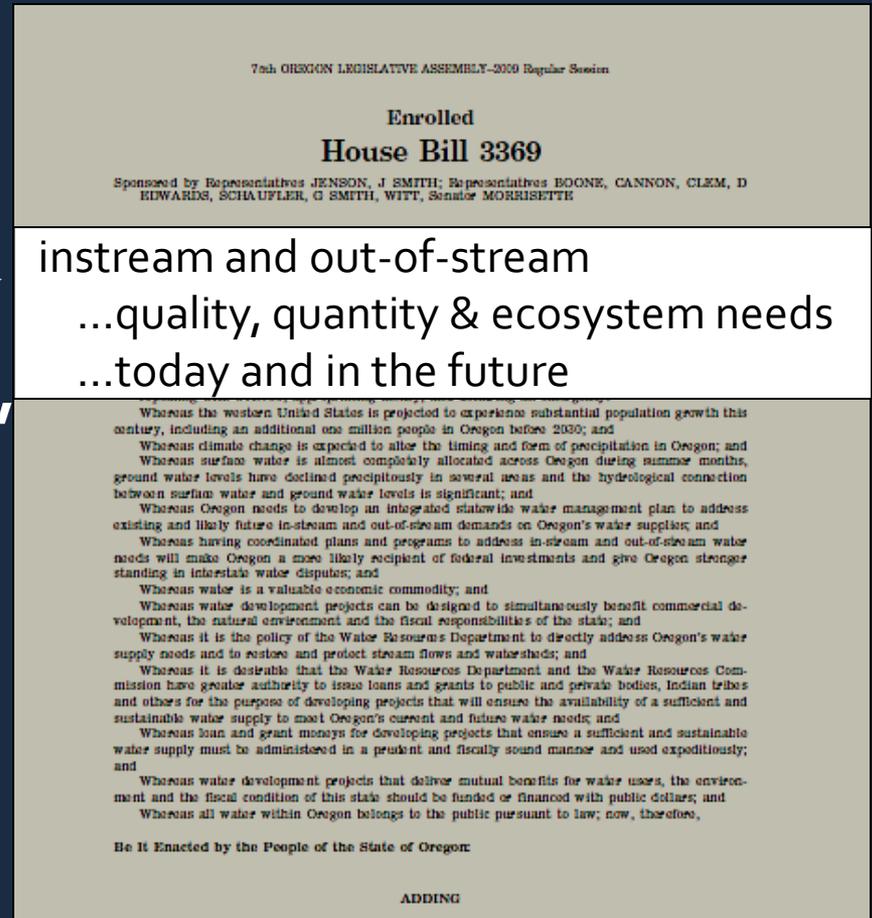
**Developing the  
2012 Integrated Water Resources Strategy**



# The Charge to Develop the Strategy

## Oregon's House Bill 3369 (2009)

- Directed WRD to lead efforts to “understand and meet” Oregon’s water needs” →
- To partner with water quality, fish & wildlife, agriculture, other agencies, tribes, stakeholders, & public
- To account for coming pressures





# Five Phases of Development

## Phase 1: Setting the Stage

- Workplan, issue papers, key principles, public involvement plan, listserv, 3 advisory groups

## Phase 2: Identifying Water Needs

- 12 Open Houses, 1 survey, stakeholder workshops & briefings

## Phase 3: Developing Recommended Actions

- Progress report, bulletins, public comment, discussion drafts

## Phase 4: Producing Oregon's First IWRS

- More public comment, boards/commissions, final draft June 2012

## Phase 5: Implementation and Evaluation

- Adoption August 2012, foundation for budget and policy packages in 2013 & 2015 Legislatures, support & momentum



# The Goals and Objectives

## GOALS:

- Improve our understanding of Oregon's water resources
- Meet Oregon's water resources needs

## OBJECTIVES:

- Understand water resources today
- Understand instream and out-of-stream needs
- Understand the coming pressures that affect our needs & supplies
- Meet Oregon's instream and out-of-stream needs



# The Critical Water-Related Issues

- Limited water supplies & systems
- Water quality & quantity information
- Water management institutions
- Further define out-of-stream needs/demands
- Further define instream needs/demands
- Economic development
- Population growth
- Climate change
- Water & energy nexus
- Infrastructure
- Water & land use
- Education & outreach
- Place-based efforts
- Healthy ecosystems
- Water management & development
- Public Health
- Funding

# Oregon's Integrated Water Resources Strategy

## Framework

### Goal 1: Improve Our Understanding of Oregon's Water Resources

#### Understand Water Resources Today

Further Understand Limited Water Supplies & Systems  
(groundwater, surface water and their interaction)

Improve Water Quality & Water Quantity Information

Further Understand Our Water Management Institutions

#### Understanding Water Resources / Supplies / Institutions

- 1a. Conduct additional groundwater investigations
- 1b. Improve water resource data collection and monitoring
- 1c. Coordinate inter-agency data collection, processing, and use in decision-making

← OBJECTIVES →

← CRITICAL ISSUES →

← RECOMMENDED ACTIONS →

### Goal 1 (continued)

#### Understand Instream and Out-of-Stream Needs

Further Define Out-of-Stream Needs / Demands  
(i.e., diverted water)

Further Define Instream Needs / Demands  
(i.e., left-in-place water)

#### Understanding Oregon's Out-of-Stream Needs/Demands

- 2a. Update long-term water demand forecasts
- 2b. Improve water-use measurement & reporting
- 2c. Determine pre-1909 water right claims
- 2d. Update water right records with contact information
- 2e. Update Oregon's water-related permitting guide

#### Understanding Oregon's Instream Needs/Demands

- 3a. Determine flows needed (quality & quantity) to support instream needs
- 3b. Determine needs of groundwater dependent ecosystems

### Goal 1 (continued)

#### Understand the Coming Pressures That Affect Our Needs and Supplies

Economic Development

Water & Energy Nexus

Water & Land Use Nexus

Population Growth

Climate Change

Infrastructure

Education & Outreach

#### The Water-Energy Nexus

- 4a. Analyze the effects on water from energy development projects & policies
- 4b. Take advantage of existing infrastructure to develop hydroelectric power
- 4c. Promote strategies that increase/integrate energy & water savings

#### Climate Change

- 5a. Support continued basin-scale climate change research efforts
- 5b. Assist with climate change adaptation and resiliency strategies

#### Economic Development & Population Growth (See Actions 2.A. and 3.A.)

#### The Water and Land Use Nexus

- 6a. Improve integration of water information into land use planning (& vice versa)
- 6b. Update state agency coordination plans
- 6c. Encourage low-impact development practices

#### Infrastructure

- 7a. Develop and upgrade water & wastewater infrastructure
- 7b. Encourage regional (sub-basin) approaches to water and wastewater systems

#### Education and Outreach

- 8a. Support Oregon's K-12 environmental literacy plan
- 8b. Provide education and training for Oregon's next generation of water experts
- 8c. Promote community education and training opportunities
- 8d. Identify ongoing water-related research needs

← OBJECTIVES →

← CRITICAL ISSUES →

← RECOMMENDED ACTIONS →

### Goal 2: Meet Oregon's Water Resource Needs

#### Meet Oregon's Instream and Out-of-Stream Needs

Place-Based Efforts

Water Management & Development

Healthy Ecosystems

Public Health

Funding

#### Place-Based Efforts

- 9a. Undertake place-based integrated, water resources planning
- 9b. Coordinate implementation of existing natural resource plans
- 9c. Partner with federal agencies, tribes, and neighboring states in long-term water resources management

#### Healthy Ecosystems

- 11a. Improve watershed healthy, resiliency, and capacity for natural storage
- 11b. Develop additional instream protections
- 11c. Prevent and eradicate invasive species
- 11d. Protect and restore instream habitat and habitat access for fish & wildlife

#### Public Health

- 12a. Ensure the safety of Oregon's drinking water
- 12b. Reduce the use of and exposure to toxics and other pollutants
- 12c. Implement water quality pollution control plans

#### Water Management & Development

- 10a. Improve water-use efficiency and water conservation
- 10b. Improve access to built storage
- 10c. Encourage additional water reuse projects
- 10d. Reach environmental outcomes with non-regulatory alternatives
- 10e. Authorize and fund a water supply development program

#### Funding

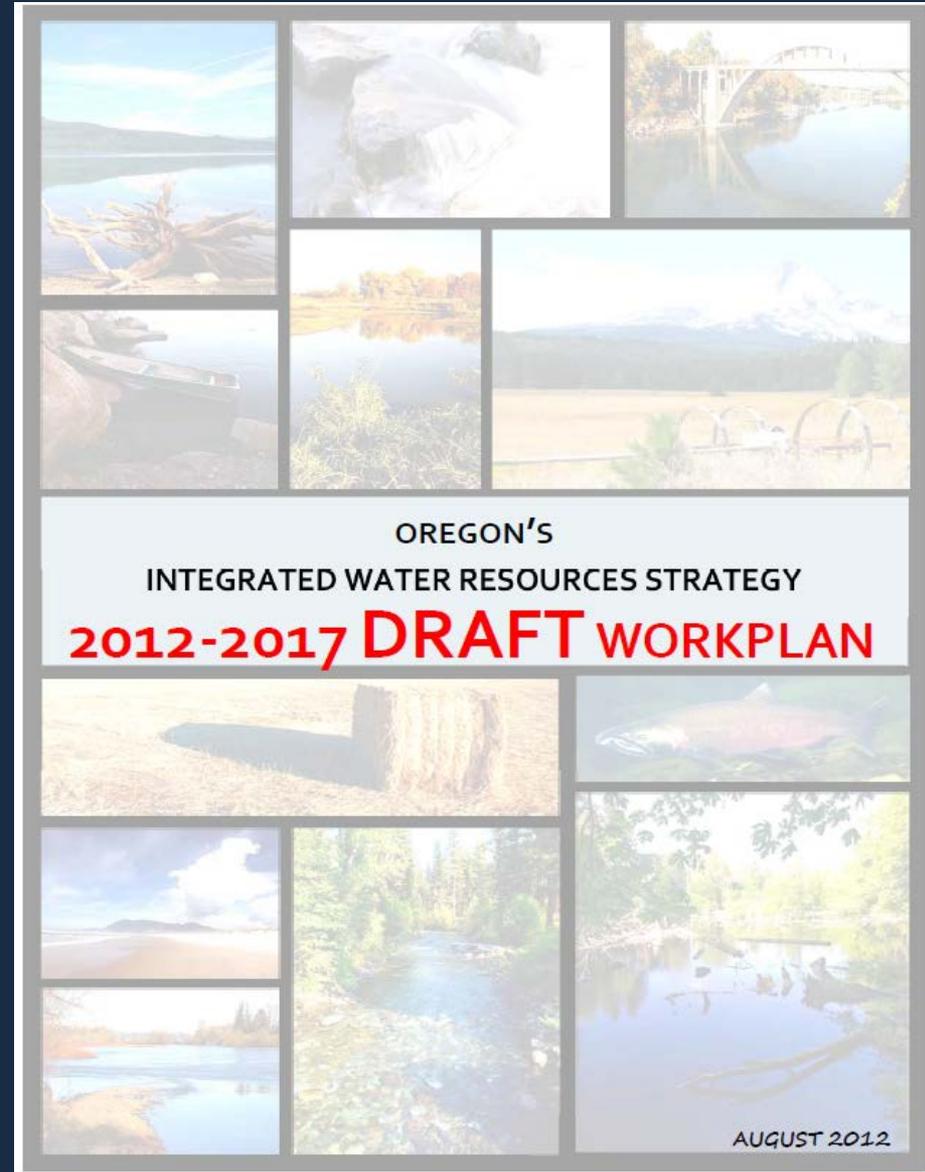
- 13a. Fund development & implementation of Oregon's IWRS
- 13b. Fund water resources management at the state level
- 13c. Fund communities needing feasibility studies for water conservation, storage, and reuse projects



# 2012-2017 Implementation Workplan

## Breaks Actions down by:

- Steps already underway (2011-2013)
- New steps requiring legislative assistance (2013-2015)
- Steps requiring no legislative assistance (2015-2017)
- Steps requiring legislative assistance (2015-2017)
- Evaluated our progress against this workplan



**Developing the  
2017 Integrated Water Resources Strategy**



# The 2017 Development Plan

## APPROACH

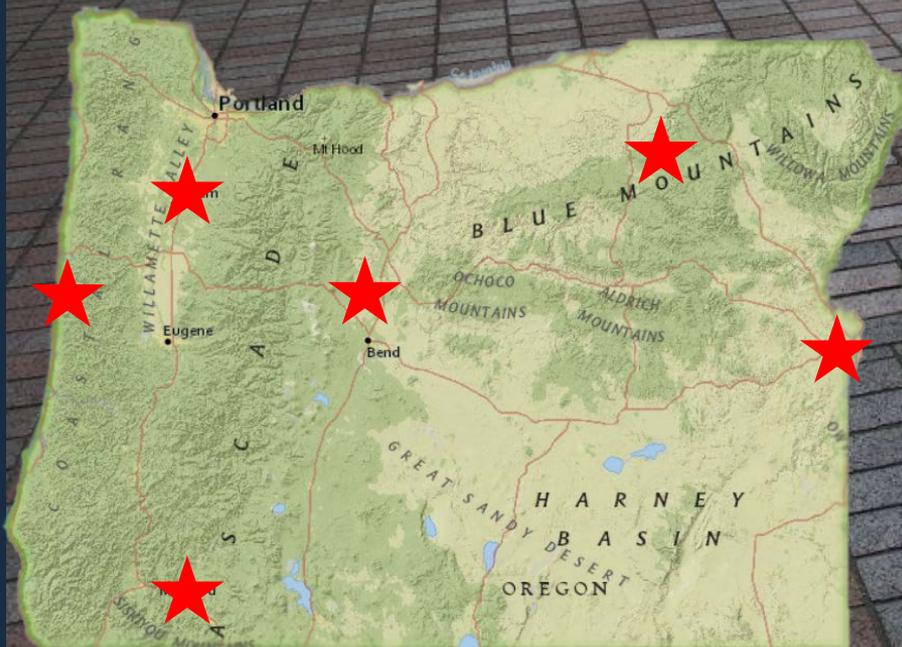
- Comprehensive revision will occur at the ten-year mark
- 2017 Update will be surgical (see 2017 Development Plan)
- Governor's July 2015 directive on drought & climate change
- Gaps = preparation for extreme weather, seismic events, aging infrastructure
- Project partners will report on progress made since 2012
- WRC will notify other boards/commissions prior to adoption
- 2017 IWRS must be adopted by WRC



# The 2017 Development Plan

## PUBLIC INVOLVEMENT & STAKEHOLDER ENGAGEMENT

- Listserv news
- Online survey
- Public meetings (★ open houses) in May or June
- Stakeholder briefings
- Public Comment





# The 2017 Development Plan

## 2016 POLICY ADVISORY GROUP MEMBERS

**Will Collin**

Environmental Justice Advocate

**Valerie Kelley**

(retired hydrologist)

**Curtis Martin**

Oregon Cattlemen's Association

**Suzanne DeLorenzo**

Clackamas River Water District

**Gayle Killam**

River Network

**Craig Pope**

Polk County Commissioner

**Arlene Dietz**

Rice Farms

**Craig Lacy**

(retired fly-fishing outfitter)

**Brent Stevenson**

Santiam Water Control District

**Ron Foggin**

City Manager

**Hiram Li**

(retired biologist)

**Stan van de Wetering**

Confederated Tribes of Siletz Indians

**Rebecca Geisen**

Portland Water Bureau

**Tracey Liskey**

Liskey Farms

**Mary Wahl**

Wahl Ranch

**TJ Hansell**

Hansell Farms

**Peggy Lynch**

League of Women Voters  
of Oregon



# The 2017 Development Plan

## PROJECT SCHEDULE

	2016												2017											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Launch IWRS Update 2017	■																							
Convene IWRS Project Team		■																						
Drought Survey		■																						
Open Houses (4-5)				■																				
Stakeholder Briefings			■																					
PAG Meetings			1		2		3		4															
Commission Updates		■			■		■		■															
Legislative Session		■											■	■	■	■	■	■	■	■	■	■	■	■
Draft Progress Report			■																					
Revised Progress Report					■																			
Draft Drought Chapter & Actions							■																	
Draft IWRS Released										■														
Public Comment Period										■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Final revisions and formatting													■	■	■	■	■	■	■	■	■	■	■	■
Notify other boards/commissions															■	■	■	■	■	■	■	■	■	■
Adoption																						■	■	■

# Implementation Highlights from State Agencies



# DRAFT Progress Report (Version 2)

DRAFT



## Oregon's Integrated Water Resources Strategy Progress Report

February 2016

### ABOUT THIS DOCUMENT

This at-a-glance implementation document uses a five-point bar scale to help illustrate progress made under Oregon's 2012 Integrated Water Resources Strategy (IWRs). In March 2015, the IWRs Project Team shared its first progress report, a "roadmap to implementation," with the Water Resources Commission. The first report evaluated progress made under the IWRs 2012-2017 implementation workplan. A progress bar with 4 squares [■■■■] means the Department and its partners fully met the commitments of that recommended action, as described in the implementation workplan. A progress bar with no squares means little to no work has been completed under that recommended action.

This new format condenses the March 2015 progress report into a short summary tool. As we gather more implementation updates from our sister agencies, stakeholders, and other public and private organizations, the Water Resources Department will continue to evaluate and revise future iterations of this progress report.

### Objective 1: Understand Water Resources Today

- 1A. Conduct additional groundwater investigations
- 1B. Improve water resources data collection and monitoring
- 1C. Coordinate inter-agency data collection, processing, and use in decision-making

### Objective 2: Understand Instream and Out-of-Stream Needs

- 2A. Update long-term water demand forecasts
- 2B. Improve water-use measurement and reporting
- 2C. Determine pre-1909 water right claims
- 2D. Update water right records with contact information
- 2E. Update Oregon's water-related permitting guide
- 3A. Determine flows needed (quality & quantity) to support instream needs
- 3B. Determine needs of groundwater-dependent ecosystems

### Objective 3: Understand the Coming Pressures that affect our Needs and Supplies

- 4A. Analyze effects on water from energy development projects and policies
- 4B. Take advantage of existing infrastructure to develop hydroelectric power
- 4C. Promote strategies that increase/integrate energy and water savings
- 5A. Support continued basin-scale climate change research efforts
- 5B. Assist with climate change adaptation and resiliency strategies
- 6A. Improve integration of water info into land use planning (vice versa)
- 6B. Update state agency coordination plans
- 6C. Encourage low impact development practices
- 7A. Develop and upgrade water & wastewater infrastructure
- 7B. Encourage regional (sub-basin) approaches to water/ wastewater systems
- 8A. Support implementation of Oregon's K-12 environmental literacy plan
- 8B. Provide education & training for Oregon's next generation of water experts
- 8C. Promote community education and training opportunities
- 8D. Identify ongoing water-related research needs

### Objective 4: Meet Oregon's Instream and Out-of-Stream Needs

- 9A. Undertake place-based integrated, water resources planning
- 9B. Coordinate implementation of existing natural resource plans
- 9C. Partner with federal agencies, tribes, and neighboring states in long-term water resources management
- 10A. Improve water-use efficiency and water conservation
- 10B. Improve access to built storage
- 10C. Encourage additional water reuse projects
- 10D. Reach environmental outcomes with non-regulatory alternatives
- 10E. Authorize and fund a water supply development program
- 11A. Improve watershed health, resiliency, and capacity for natural storage
- 11B. Develop additional instream protections
- 11C. Prevent and eradicate invasive species
- 11D. Protect and restore instream habitat and habitat access for fish & wildlife
- 12A. Ensure the safety of Oregon's drinking water
- 12B. Reduce the use of and exposure to toxics and other pollutants
- 12C. Implement water quality pollution control plans
- 13A. Fund development and implementation of Oregon's IWRs
- 13B. Fund water resources management activities at the state level
- 13C. Fund communities needing feasibility studies for water conservation, storage, and reuse projects



## Implementation Highlights

- **Racquel Rancier, Water Resources Department**
- **Karen Tarnow, Department of Environmental Quality**
- **Danette Fucera, Department of Fish and Wildlife**
- **Margaret Matter, Department of Agriculture**



is this our new normal?  
putting climate into context in Oregon

Kathie Dello

Associate Director, Oregon Climate Change Research Institute  
Oregon State University

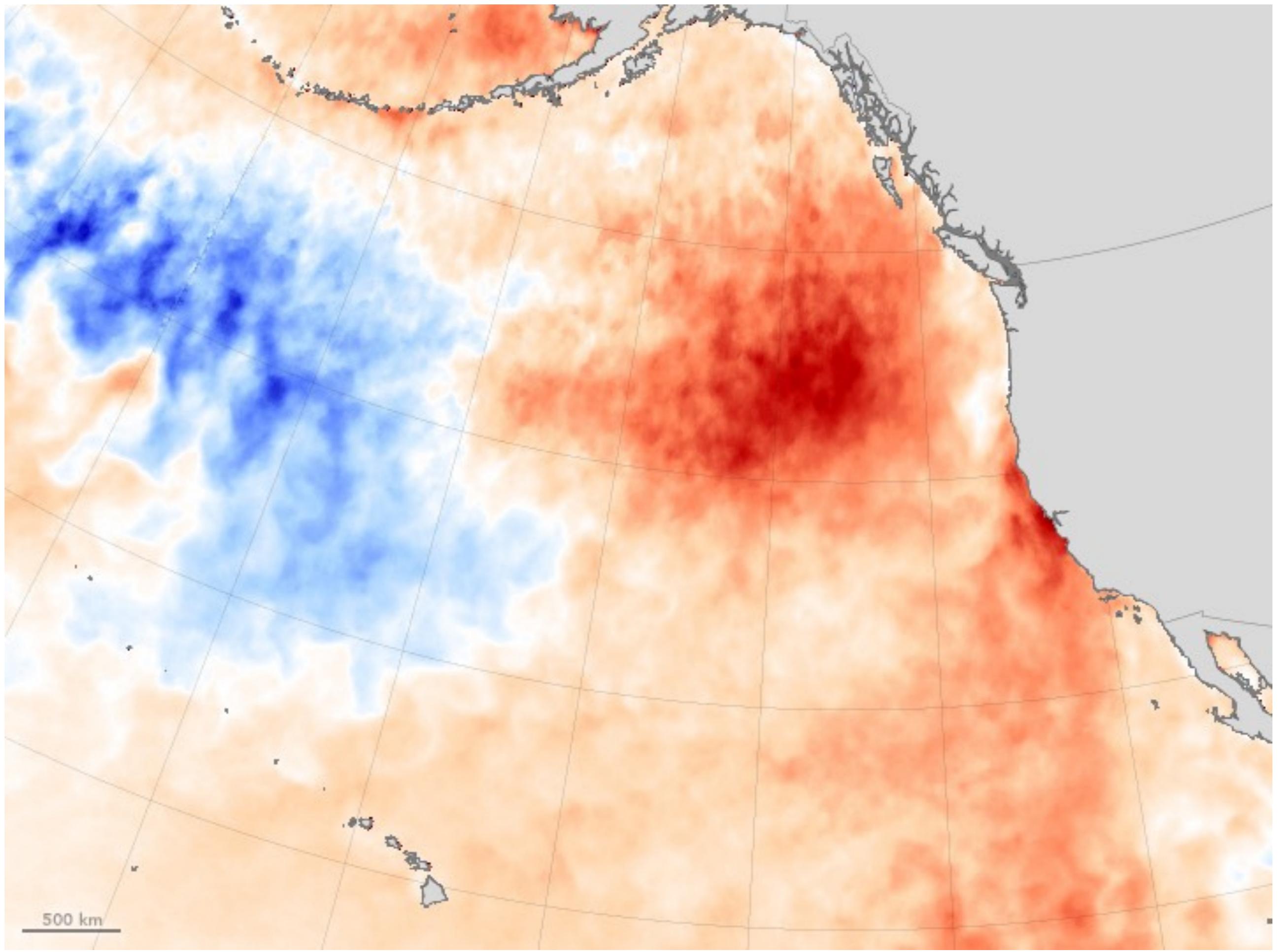


Photo: Brent Drinkut, Statesman Journal

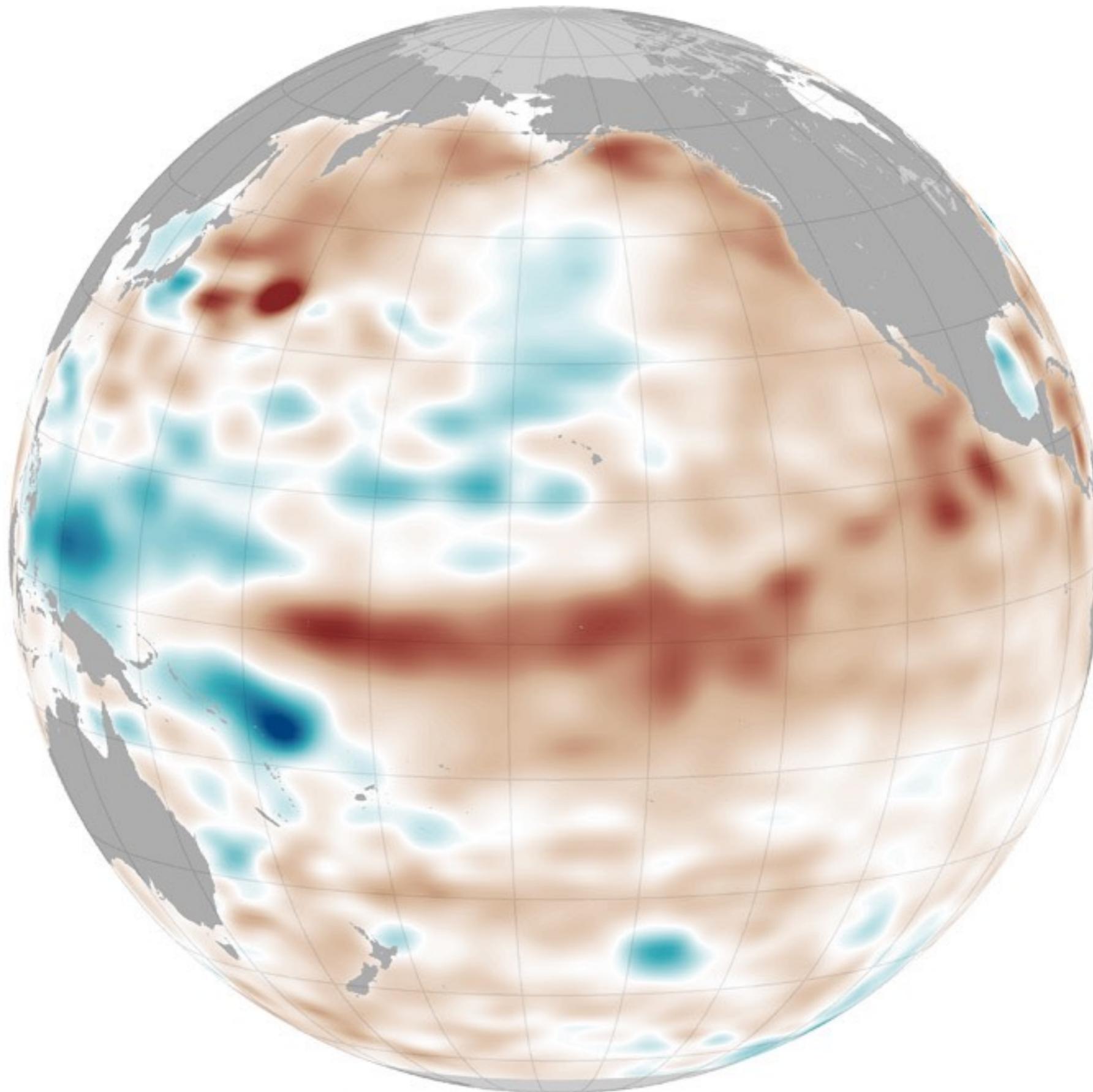


NASA's Earth Observatory

Wednesday, March 30, 16



Wednesday, March 30, 16

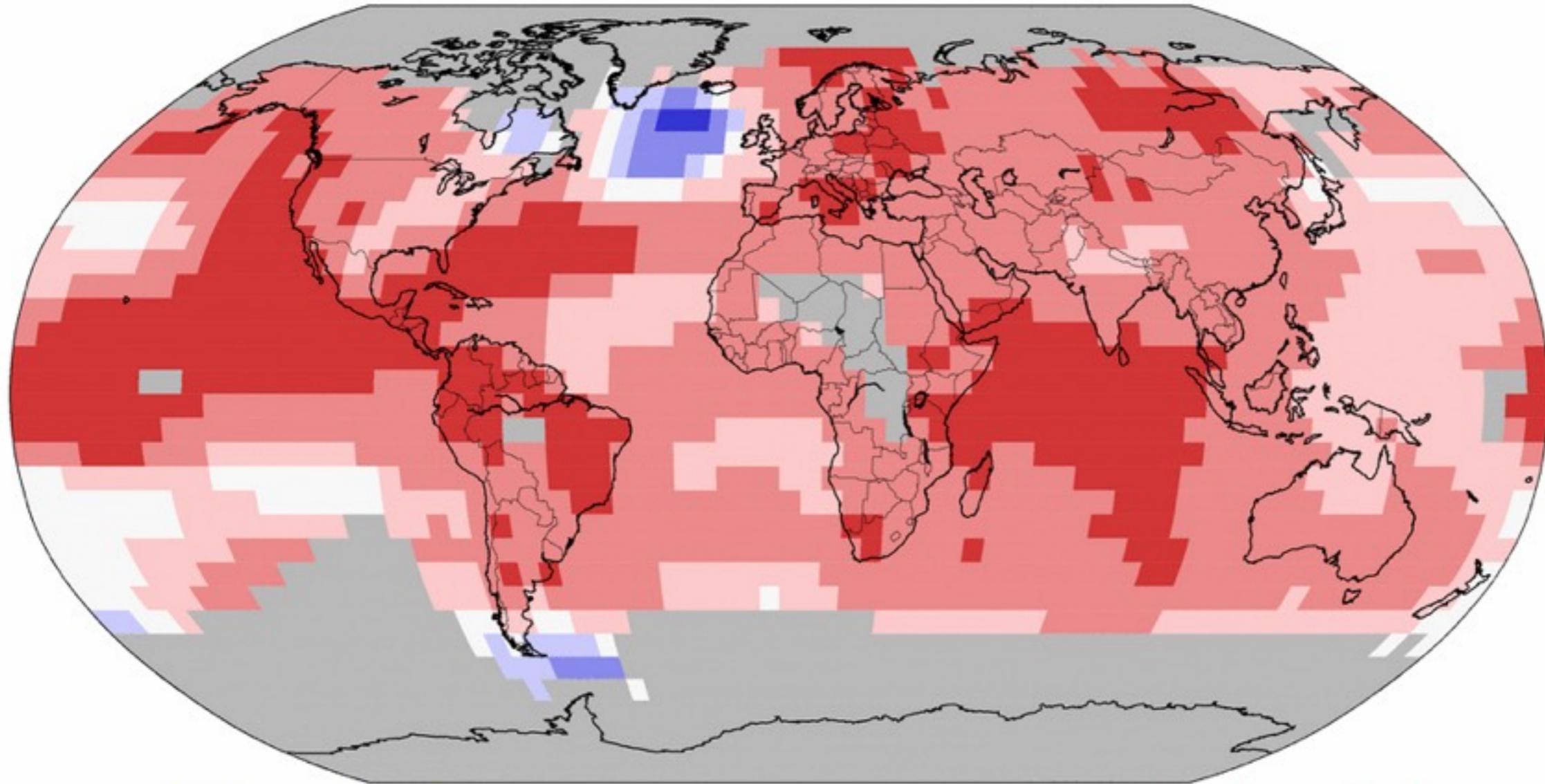


**Sea Surface Height Anomaly (mm)**  
-220 0 220

# Land & Ocean Temperature Percentiles Jan–Dec 2015

NOAA's National Centers for Environmental Information

Data Source: GHCN–M version 3.3.0 & ERSST version 4.0.0



**Record Coldest**



**Much Cooler than Average**



**Cooler than Average**



**Near Average**



**Warmer than Average**



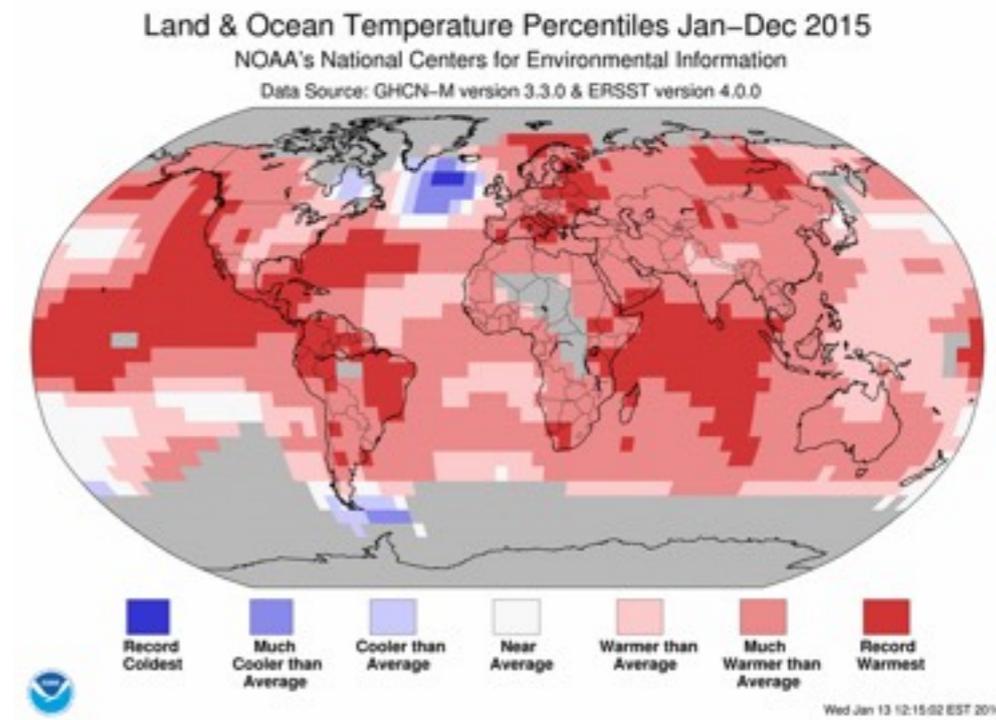
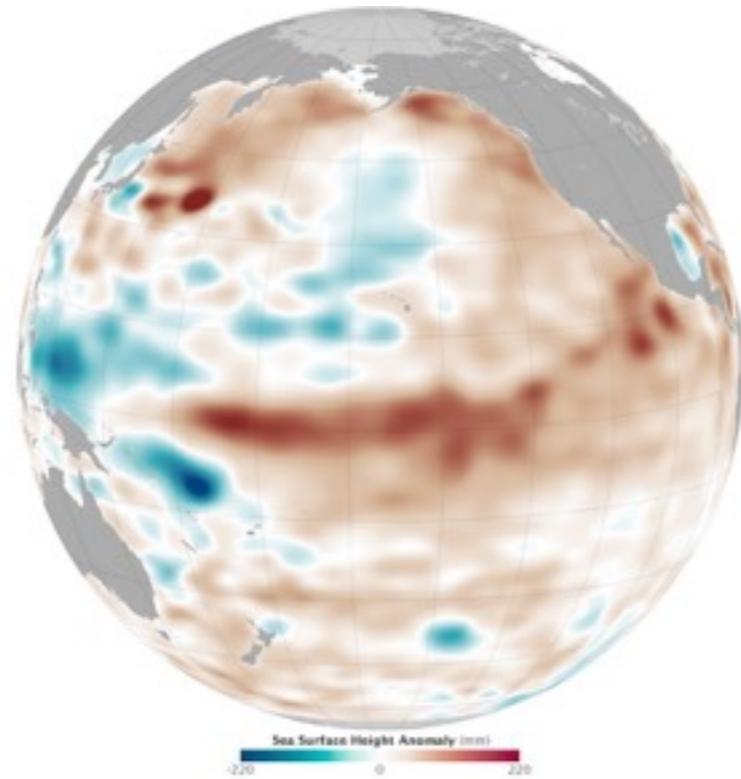
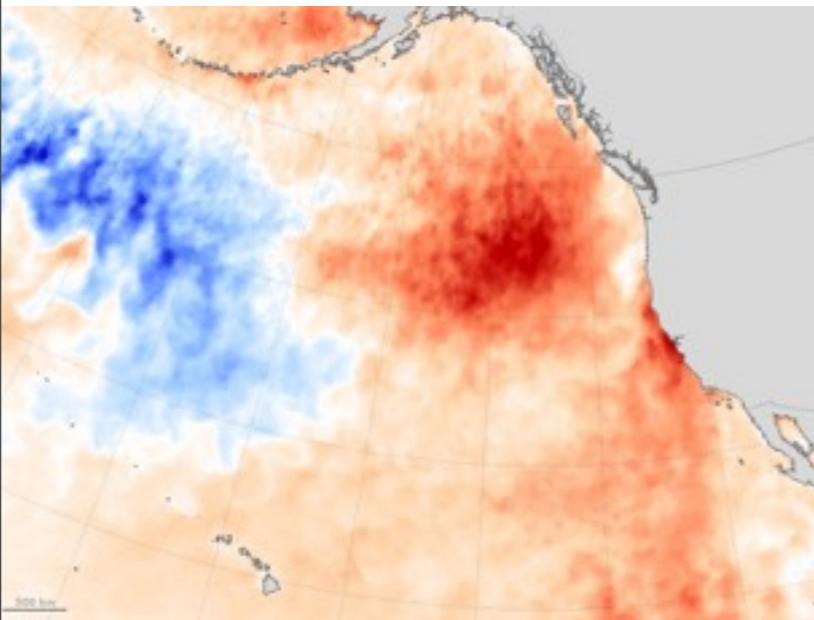
**Much Warmer than Average**



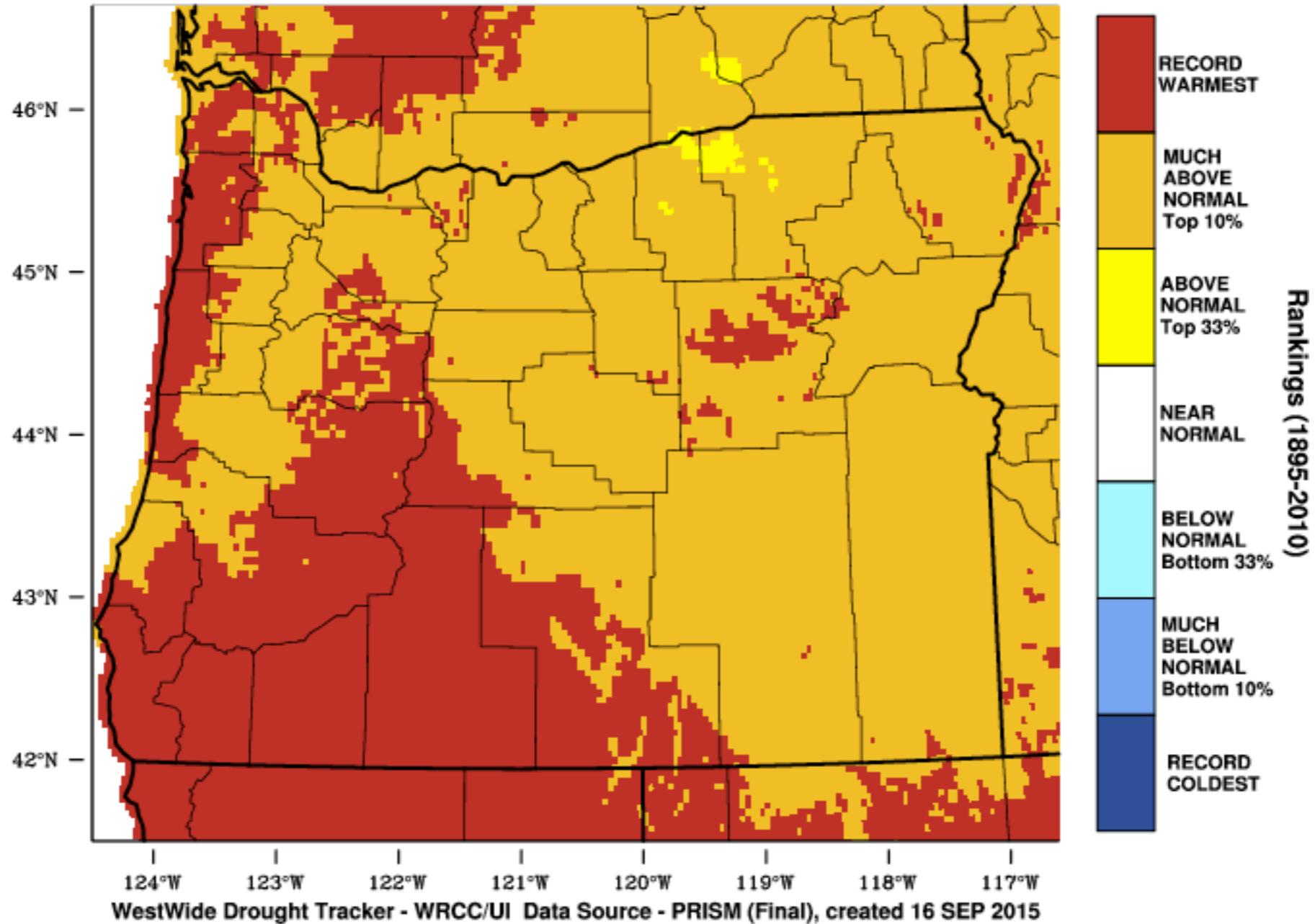
**Record Warmest**



Wed Jan 13 12:15:02 EST 2016



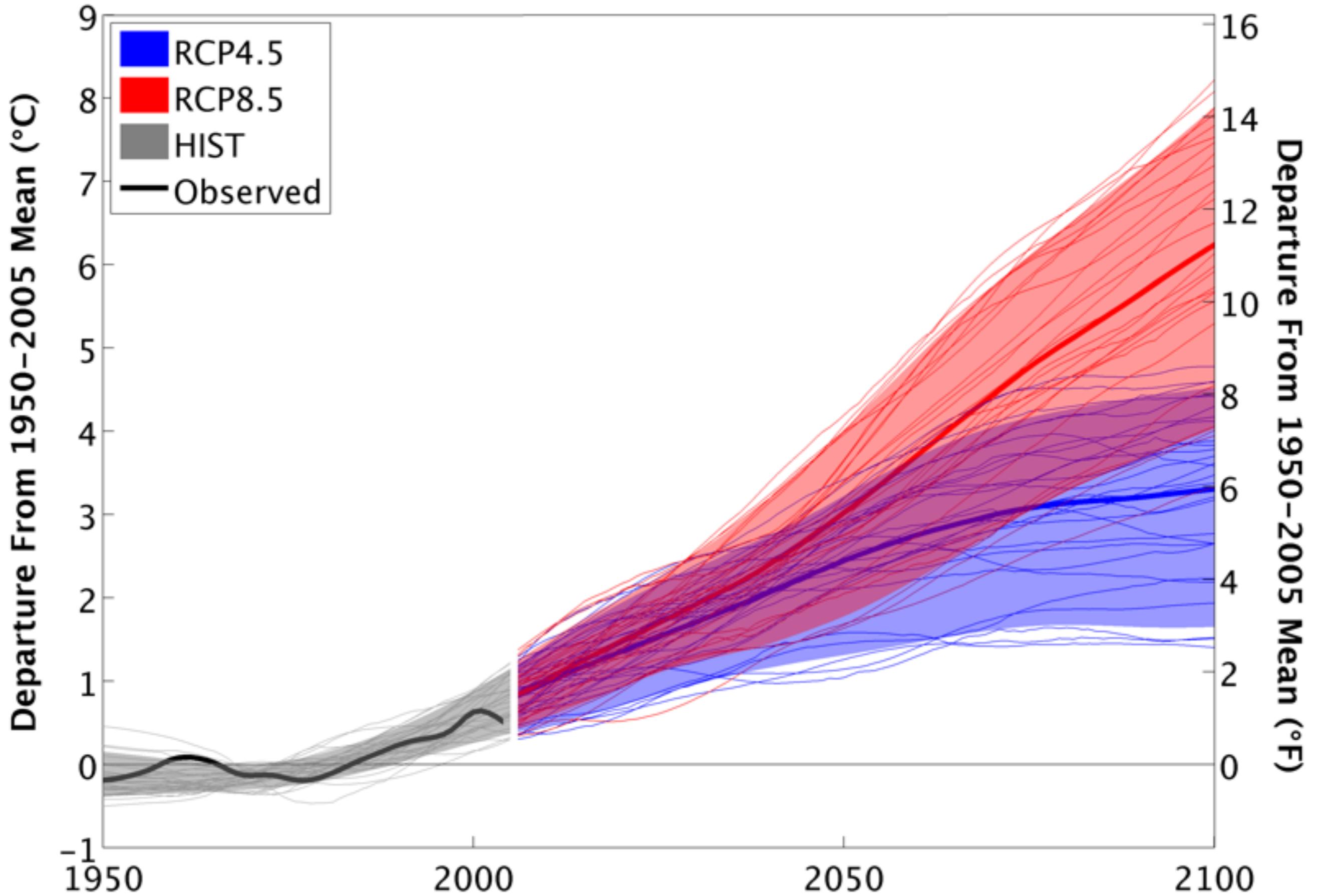
Oregon - Mean Temperature  
December-February 2015 Percentile



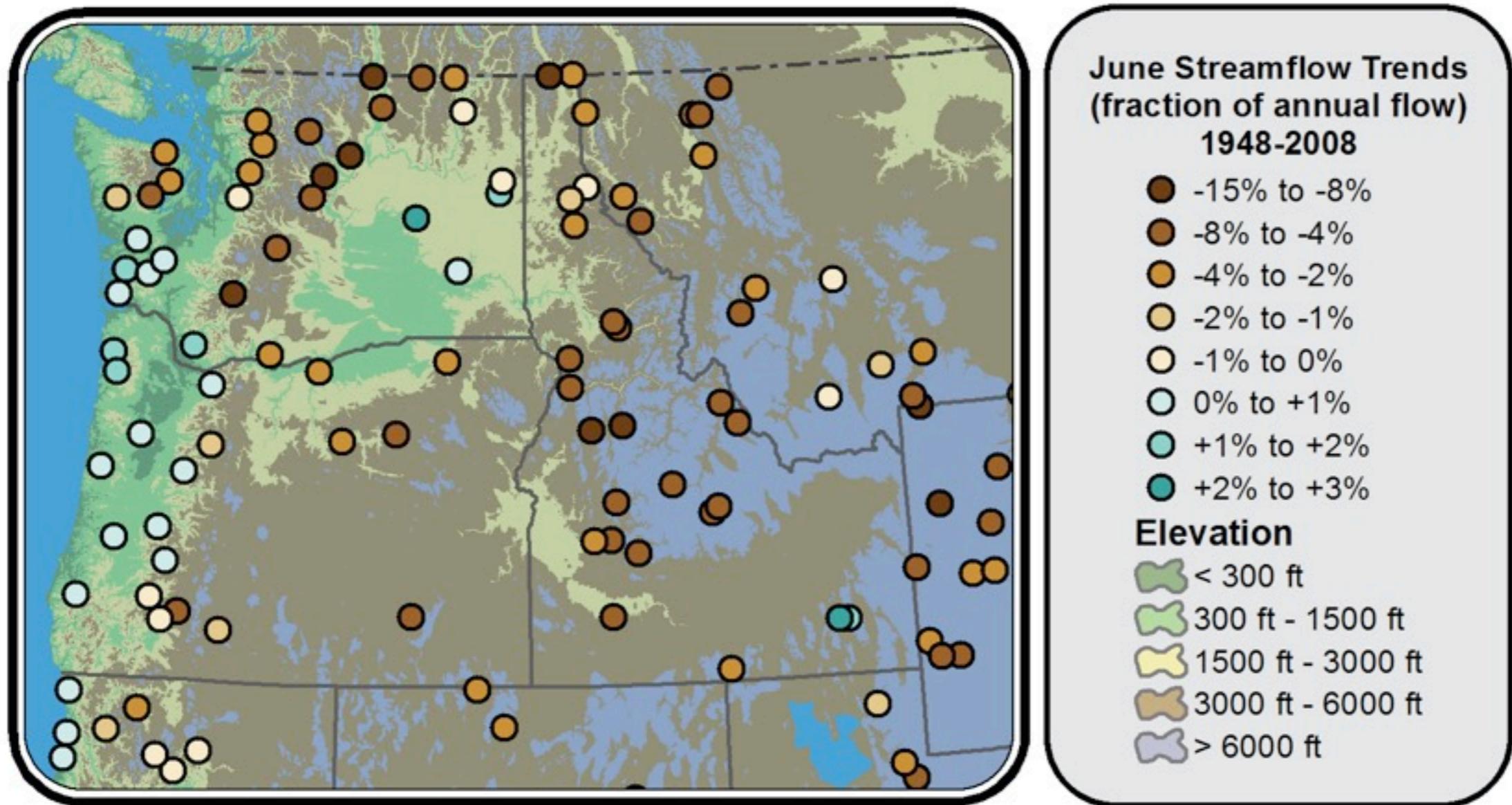
our water supply is mostly vulnerable to changing temperatures, not precipitation\*

\*potentially wetter winters & drier summers

# projected mean temperatures for the PNW



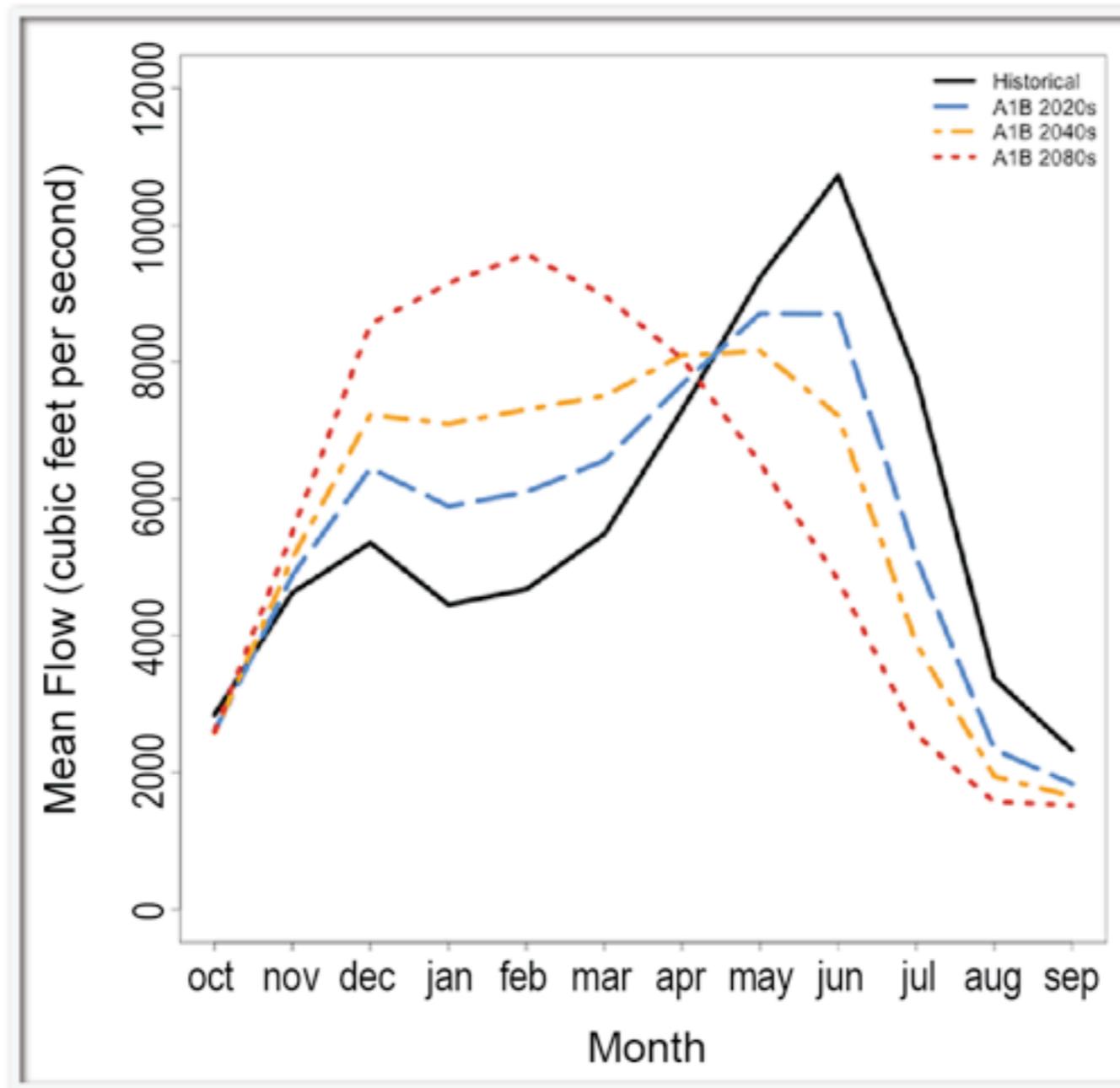
Changes in the timing of streamflow related to changing snowmelt have occurred and will continue



Dalton et al. 2013

# future flows in the Yakima River

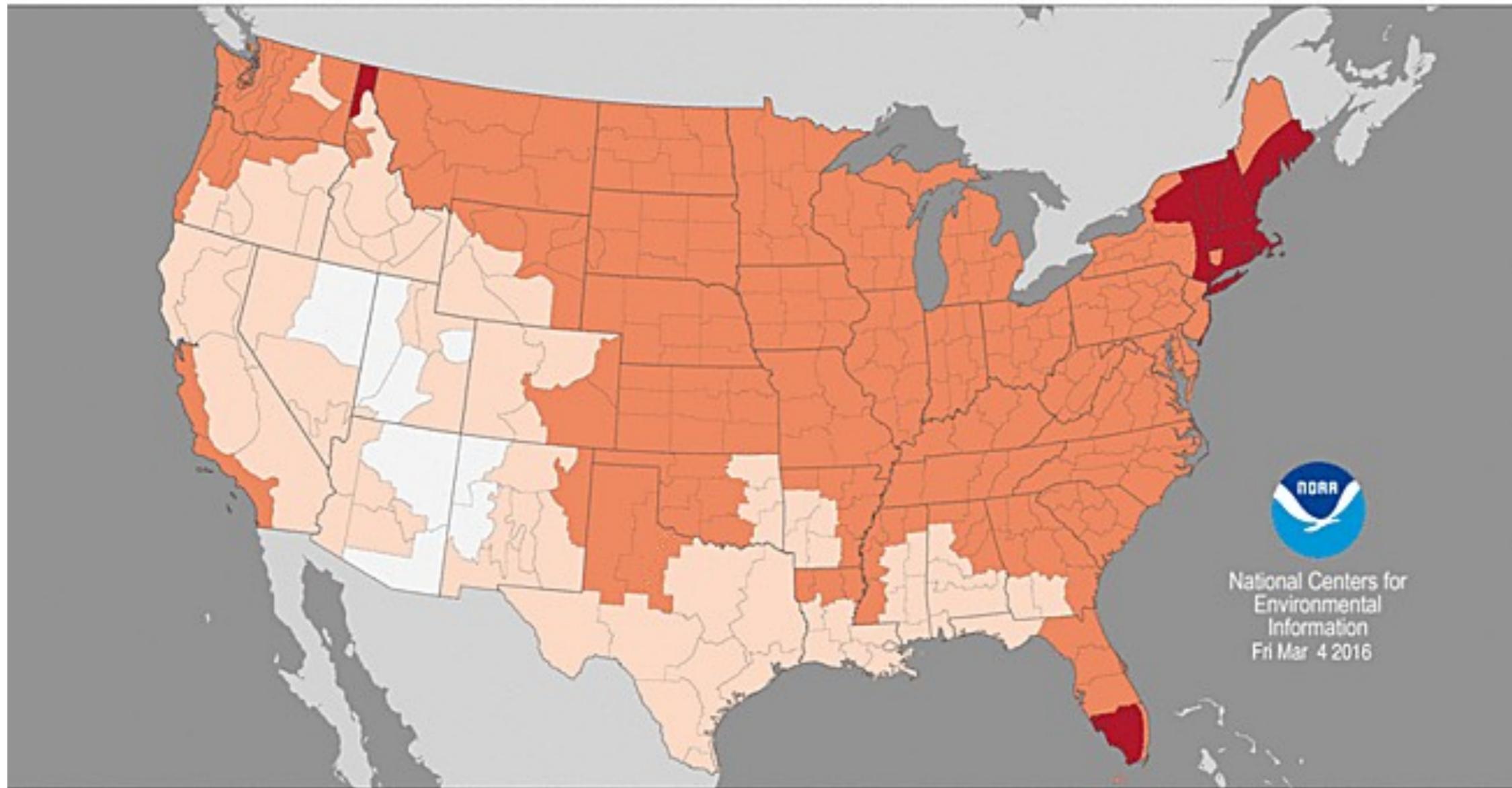
Future Shift in Timing of Stream Flows



# Divisional Minimum Temperature Ranks

December 2015–February 2016

Period: 1895–2016



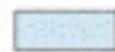
National Centers for  
Environmental  
Information  
Fri Mar 4 2016



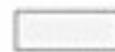
Record  
Coldest



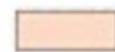
Much  
Below  
Average



Below  
Average



Near  
Average



Above  
Average



Much  
Above  
Average

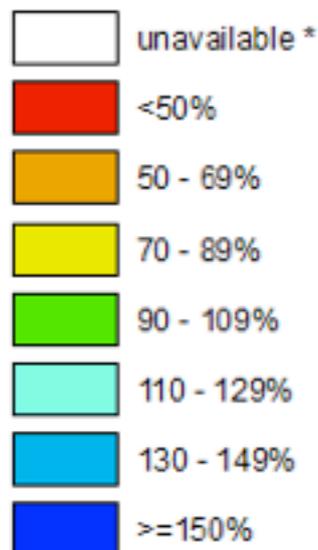


Record  
Warmest

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

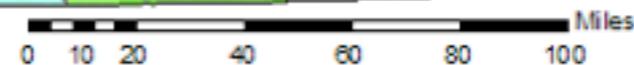
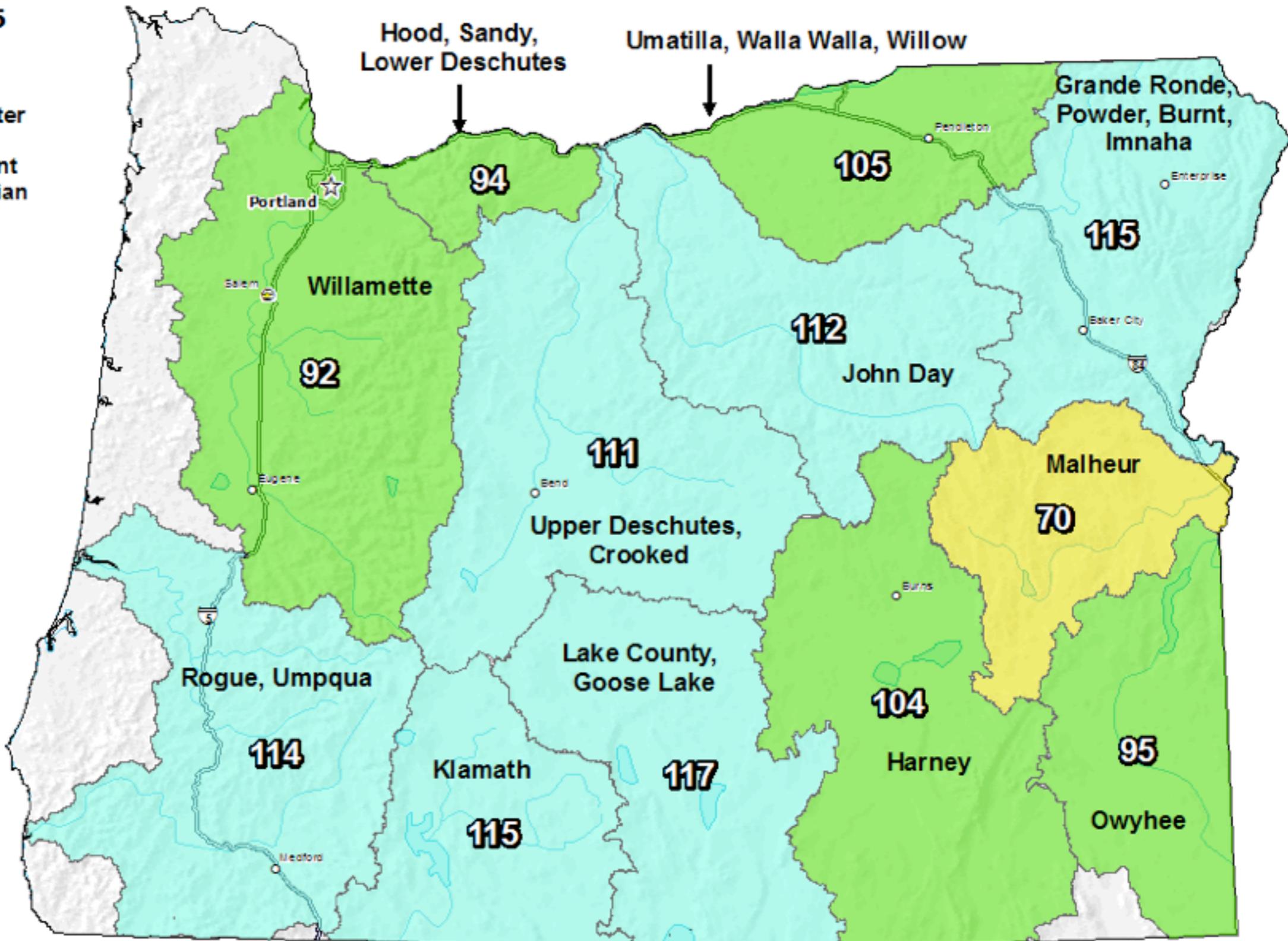
Mar 30, 2016

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



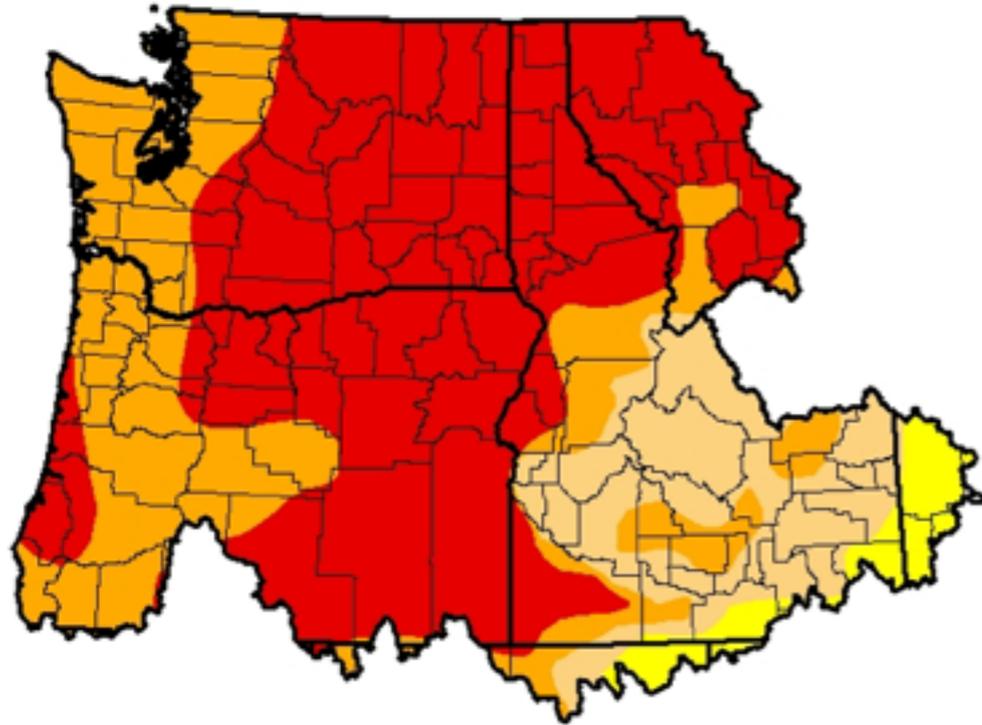
\* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional Data  
Subject to Revision



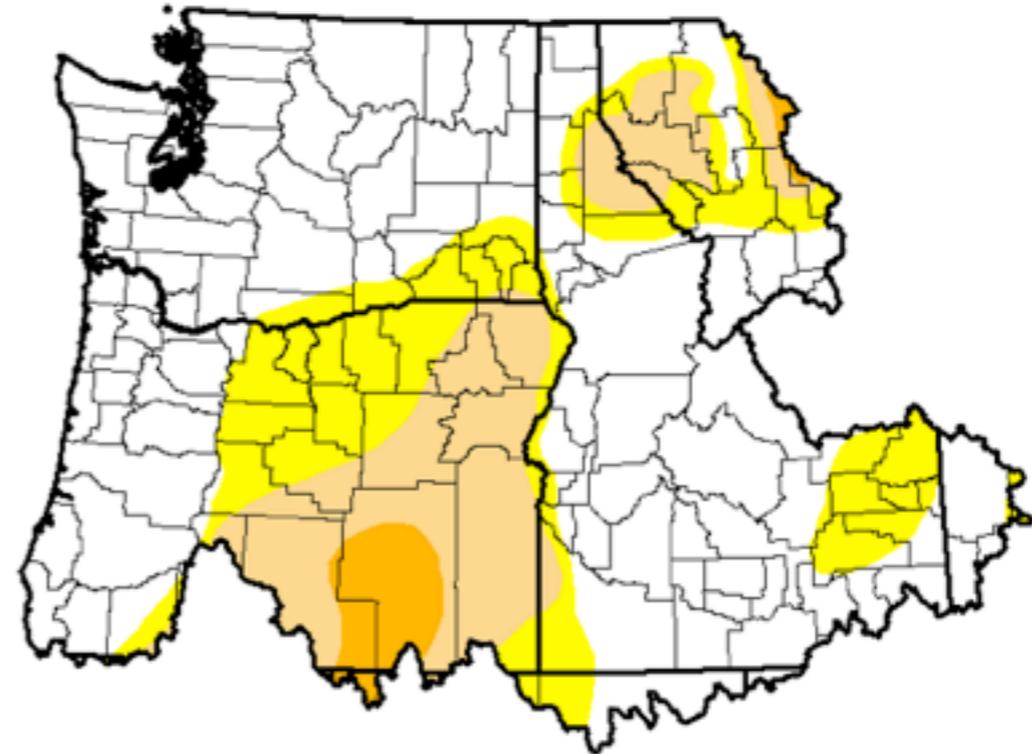
# September 2015

*U.S. Drought Monitor*  
**Pacific Northwest Watershed**



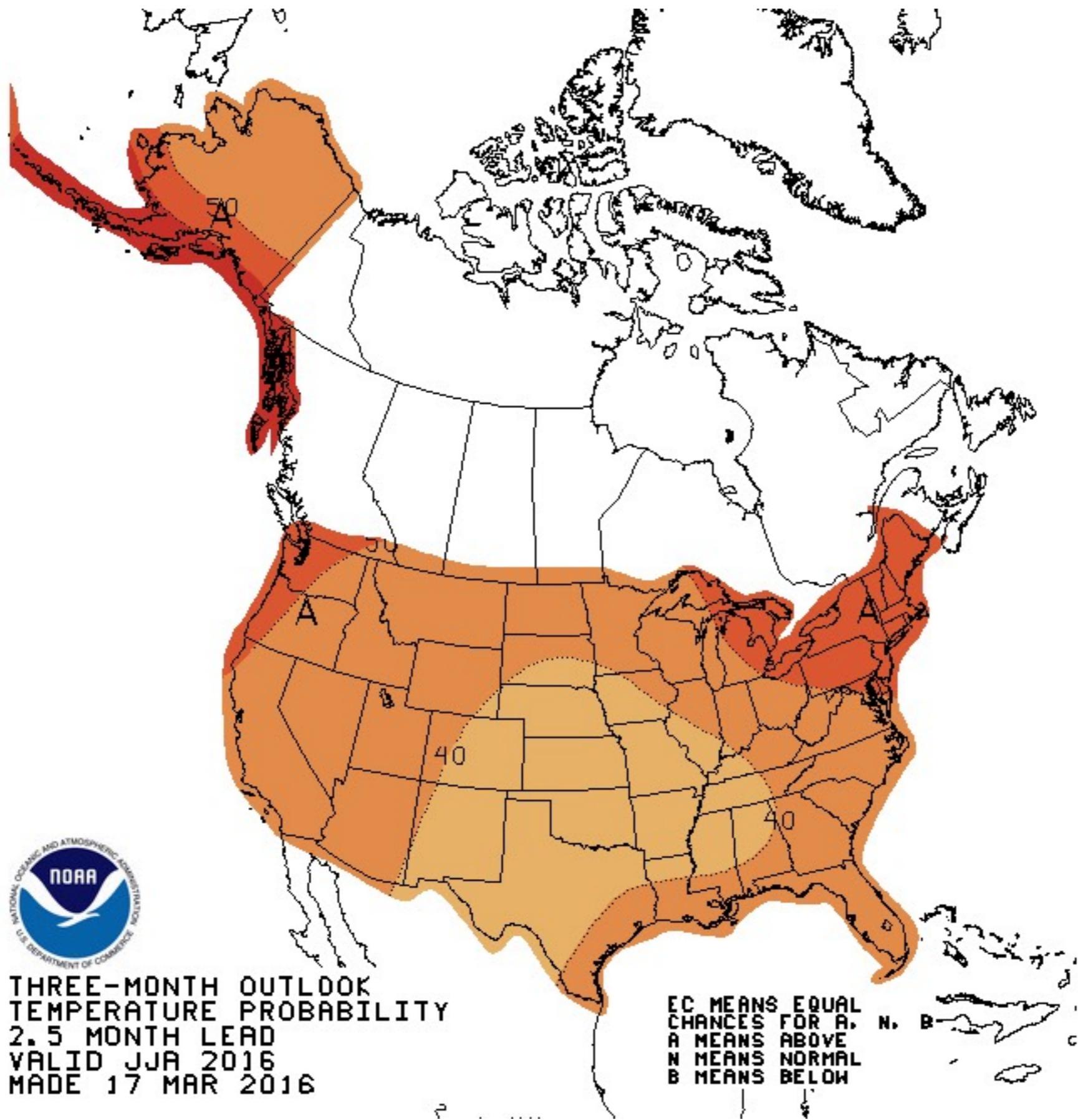
# March 2016

*U.S. Drought Monitor*  
**Pacific Northwest Watershed**



Intensity:

- |   |  |
|---|--|
|  D0 Abnormally Dry   |  D3 Extreme Drought     |
|  D1 Moderate Drought |  D4 Exceptional Drought |
|  D2 Severe Drought   |  |



**THREE-MONTH OUTLOOK**  
**TEMPERATURE PROBABILITY**  
**2.5 MONTH LEAD**  
**VALID JJA 2016**  
**MADE 17 MAR 2016**

**EC MEANS EQUAL**  
**CHANCES FOR A. N. B**  
**A MEANS ABOVE**  
**N MEANS NORMAL**  
**B MEANS BELOW**

# closing thoughts

- 2015 was exceptional & it was our environment's warning shot
- loading the deck with more low snowpack years, but normal and big years will still happen
- temperature, not precipitation is our biggest problem
- moving rapidly into a different Oregon