March 4, 2026 • 11 a.m.–12:30 p.m.

Hybrid Meeting • MS Teams or Public Works Headquarters Building Roundabout Room

Water Advisory Group

Lori Faha, PE, Environmental Resources Manager • Jeremy Giffin and Carolyn Sufit, Oregon Water Resources Department • Aubrie Koenig, Facilitator

Purpose & Agenda

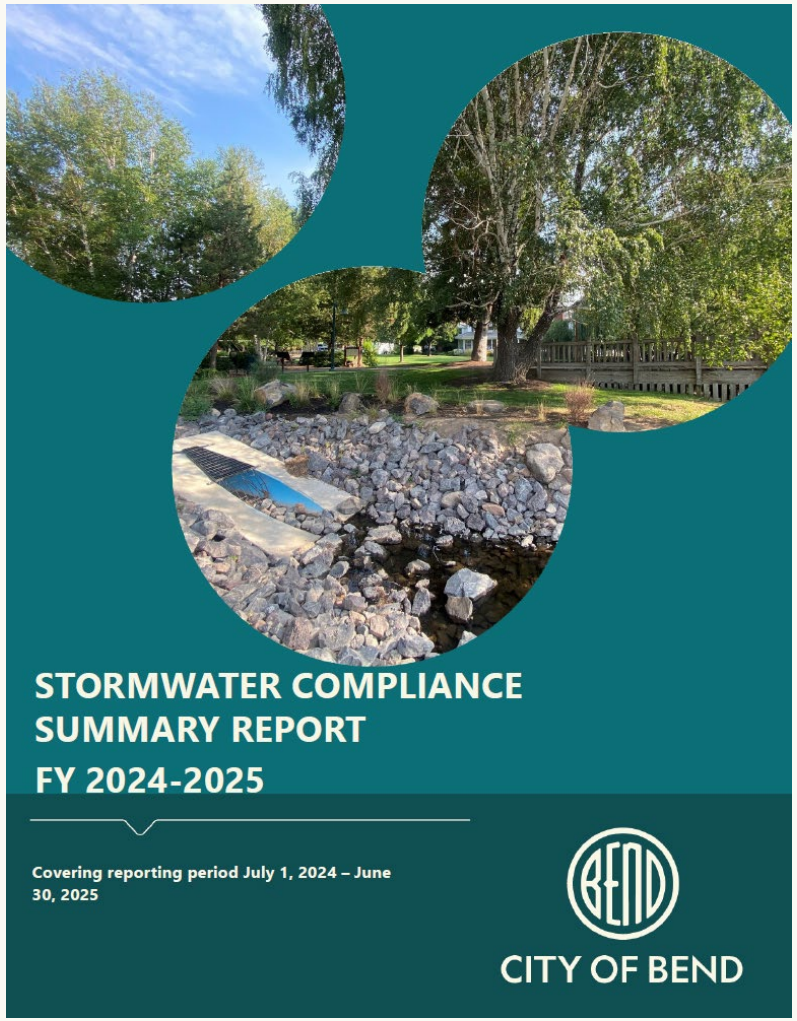
Summarize key aspects of water rights in Oregon and Bend and discuss how this relates to planning, resiliency, and response to situations like drought.

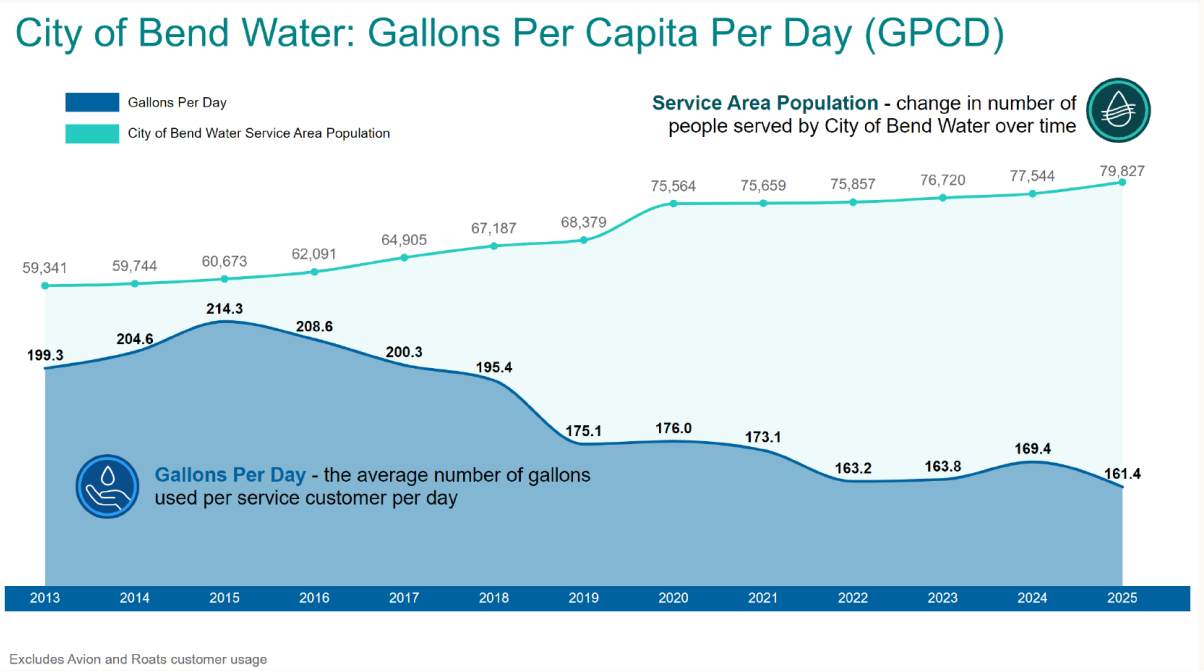
1. Welcome and Introductions
2. 100 Years of Water Update
3. Oregon Water Law and Deschutes Basin Water Rights 101
4. Discussion and Questions
5. Summary and Closing

February meeting reflections: graywater topic

- Plenty of homeowner interest, but permitting and logistics can be a barrier
- Helpful to have education materials to explain permitting pathways (state, local, resale)
- Designing separate system can be cost prohibitive for development and housing goals, could consider 'regional' approach or incentives
- For outdoor systems, climate can limit season of use/return on investment, also best-suited for larger lot sizes (vs. current denser development)
- Maintenance can be a challenge (esp. for cluster housing, homeowners), need to prevent potential contamination
- New development versus redevelopment may impact ease of installation and permitting
- Helpful to further research or evaluate conservation potential relative to:
  - Indoor reuse vs outdoor irrigation use (all year benefit versus seasonal, outdoor requires DEQ permitting)
  - Customer type (especially commercial, industrial)
  - Land use and lot size

Annual reporting highlights shared with agenda





CITY OF BEND

100 Years of Water Update

Learn more: bendoregon.gov/celebrate-water

DEPARTMENTS • PUBLIC WORKS • ABOUT WATER SERVICES

I ♥ BEND WATER — CELEBRATING 100 YEARS

For a century, Bend has been sustained by clean, clear, mountain water. We're celebrating this remarkable milestone, and we want you to join us.

CITY OF BEND

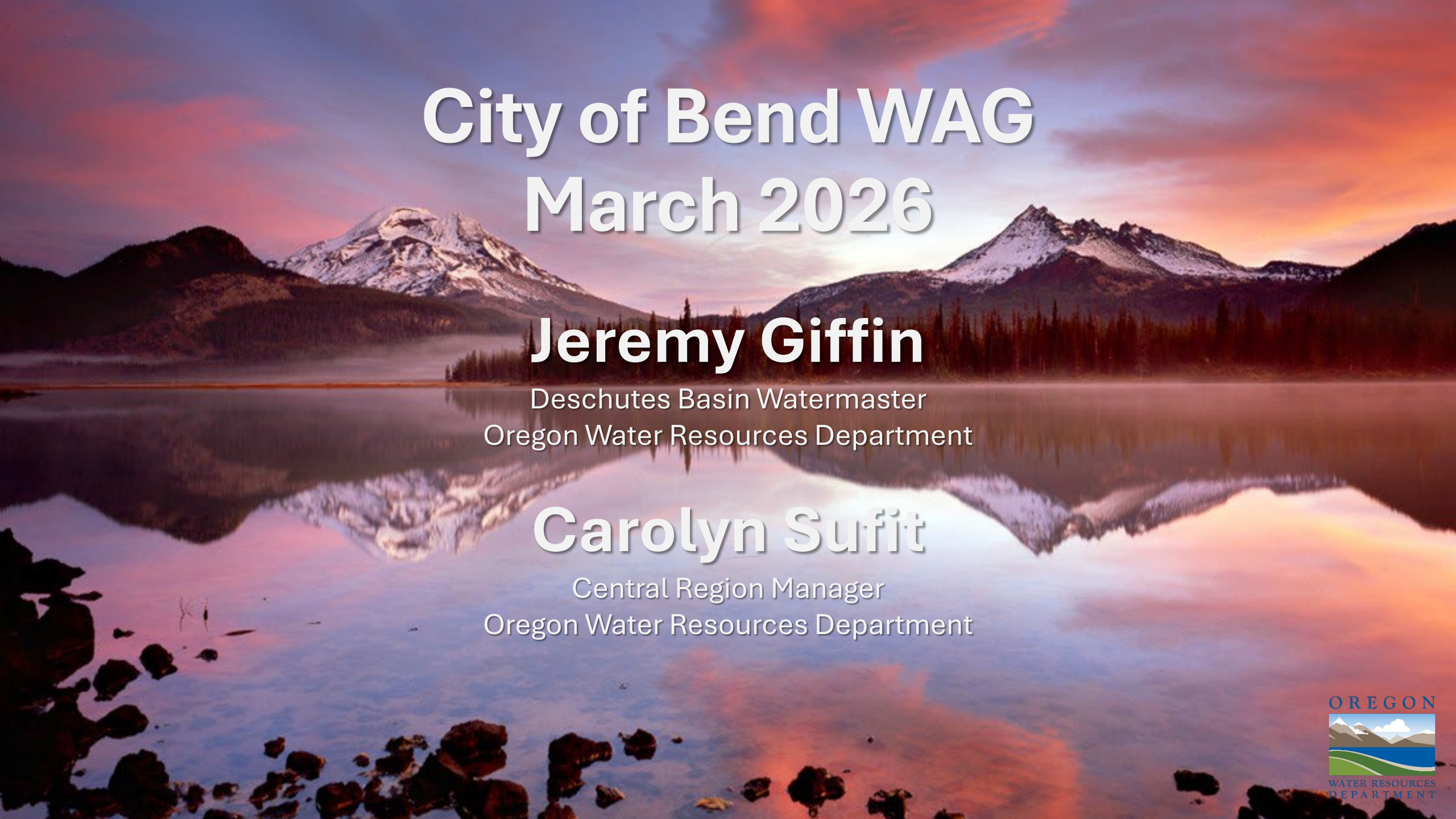
Bend water history video premiere

CITY OF BEND

Find out More and Participate

bendoregon.gov/celebrate-water

CITY OF BEND



City of Bend WAG
March 2026

Jeremy Giffin

Deschutes Basin Watermaster
Oregon Water Resources Department

Carolyn Sufit

Central Region Manager
Oregon Water Resources Department

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Talk Outline

- OWRD Overview
- Deschutes History
- Regional Geology & Hydrogeology
- Basin Challenges
- Conservation Efforts
- Current Water Conditions
- Q&A

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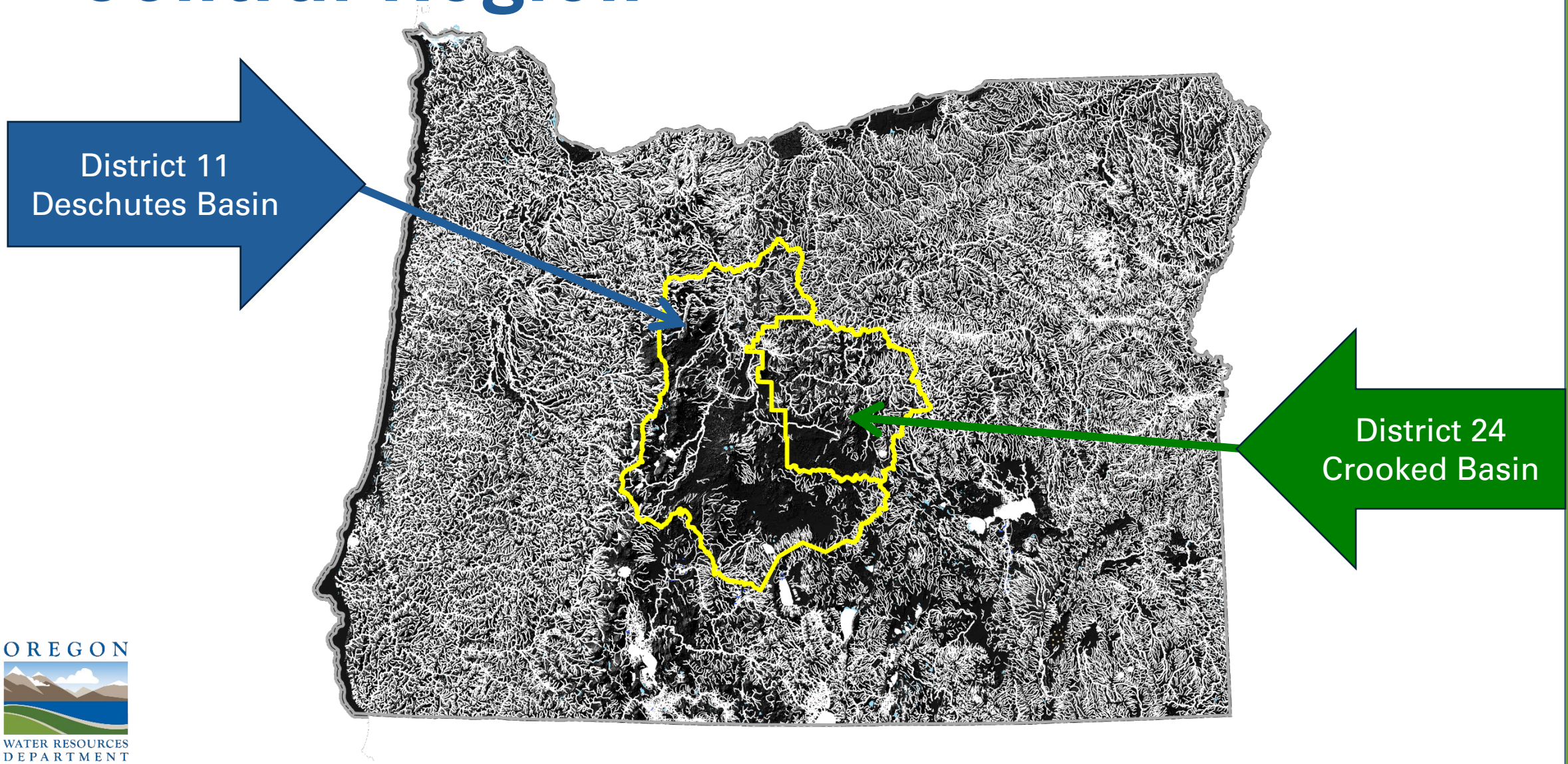
Central Region



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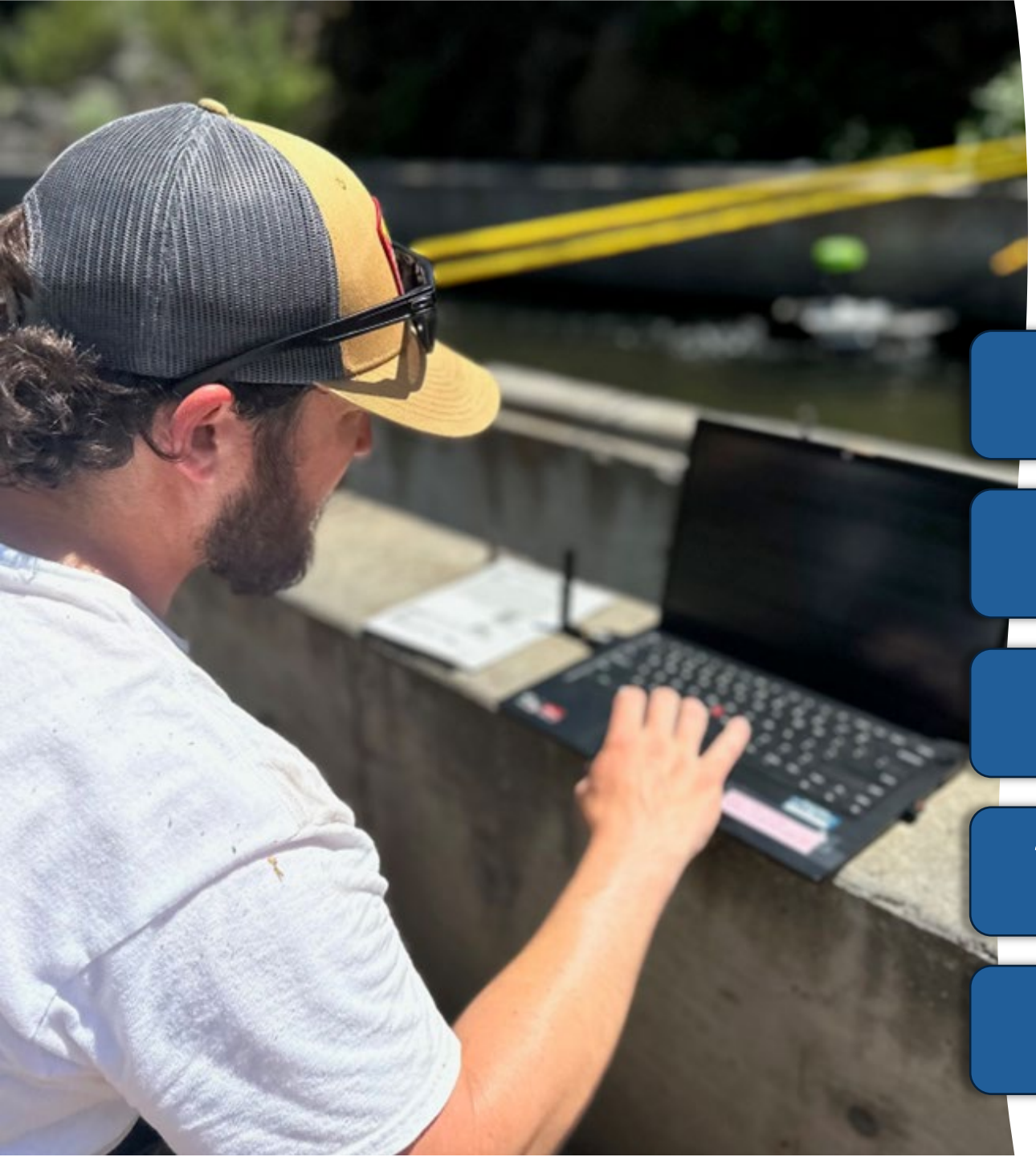

Central Region Overview

- **11,727** Square Miles
- **~3,500** Water rights
- **~125,000** acres of groundwater rights
- **~260,000** acres of surface water rights
- ~60 active gaging stations

OWRD Regional Role

- Water distribution and regulation
- Monitor daily river flows and reservoir contents
  - Agriculture
  - Municipal
  - Environmental
- Collection and monitoring streamflow data
- Basin Storage Report
- Dam Safety Inspections
- Well Inspections
- Regulation and Curtailment

Deschutes History

- Central Oregon largely passed by
- Carey Act (1894)
- Reclamation Act (1902)
- Deschutes River fully appropriated (1913)
- Reservoir development(1922-1949)
- Gentleman's agreement (1962)
- Instream water rights act (1987)
- Shift from timber and agriculture to scenic recreation in modern times

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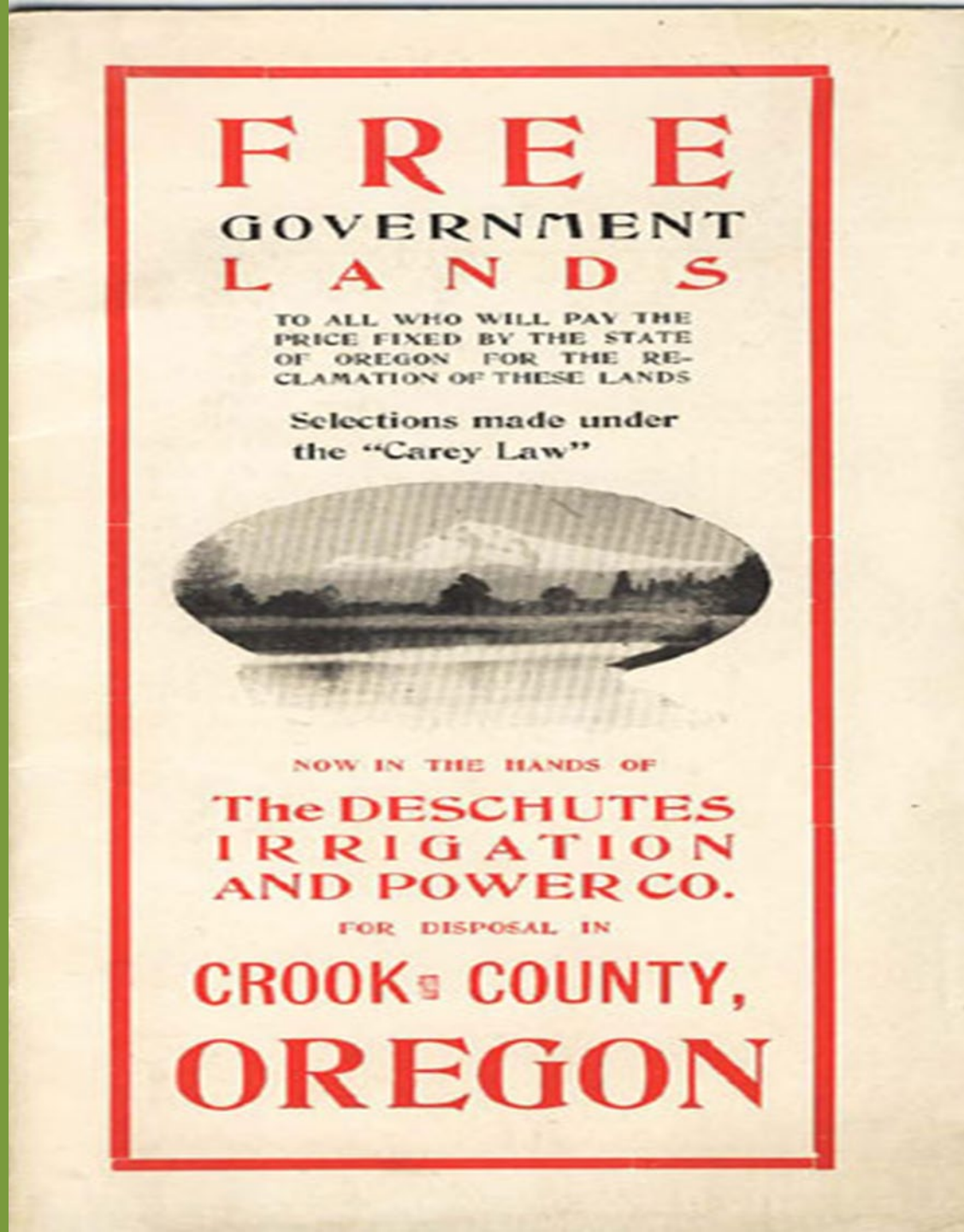
Carey Act (1894)

- Oregon accepted the Carey Act in 1901 on condition that private developers front the capital to make the project viable.
- Citizens given 160 acres of land as long as you irrigated at least 20 acres.



Carey Act (1894)

- Projects grossly over exaggerated/underfunded.
- All ditch companies were dismal failures in Central Oregon, Oregon required the developer to lure in homesteaders.
- You simply could not financially establish a project without full federal government backing.

B.C.M.L.D. P-8

May 1, 1926 WESTERN FARMER (199) 7

A Larger Chance to Get Ahead In a Finer Place to Live—*on the*

Tumalo Project

—in Scenic Central Oregon, near Bend

Where Fertile Soil, an Abundant Supply of Water and an Ideal Climate Meet

Served by the Bend-McKenzie and The Dalles-California Highways; good market roads; good schools; two railroads; adequate markets; in the heart of an ideal recreation playground, where life holds the better things and there is an added joy in living.

In no part of the West is there a better opportunity for the farmer of small means and a willingness to work than is offered by the Tumalo Project near Bend, Oregon. The price of success here for the farmer, as elsewhere, is work and ability, but the farmer will find here the rewards of planning, working and saving are rich and sure and lasting.

The Tumalo Project consists of 15,389 acres of irrigable land located from four to fourteen miles from Bend. A large part of this project consists of developed farms which are producing splendid crops and bringing satisfactory returns. There are approximately 1600 acres of undeveloped Carey Act land which is being offered for sale at $1 an acre, with an additional charge of $58 an acre for water, payments for which are spread over a period of 17 years. The district owns about 4000 acres of partially improved Carey Act and deeded lands which are being sold for $5 to $20 an acre with water right additional.

The Tumalo Project has one of the best water rights in the West. The lands within its boundaries are entitled to three acre feet of water during the irrigation season, delivered to the settler's ranch.

The Central Oregon climate is suitable to all kinds of stock and poultry and the farmer who will milk several cows, raise a flock of poultry, keep a few head of sheep or hogs, a few stands of bees, will be well repaid for his time and effort.

Alfalfa grown here is unsurpassed in feeding quality, which, with root crops, small grains and silage, furnishes ideal rations for milk and butterfat production.

While all kinds of root crops do exceptionally well, the crop for which Central Oregon is famous is the Deschutes Netted Gem potato, which has won prizes wherever shown, and brings a premium on the market. For seed, potatoes grown here cannot be surpassed and find a ready market in the potato-growing sections of Oregon, Washington and California.

Truck gardening has been carried on on a small scale and is capable of greater development. Growing alfalfa and clover seed has proved very profitable.

That poultry and egg production on a commercial scale is a profitable industry is shown by the fact that laying stock has trebled in the past two years and eggs are now being shipped in carload lots to New York City. There is need here for many more poultry producers, which will make it possible to ship eggs in carload lots more often.

If you want to own a good irrigated farm at low cost, if you want to enjoy the best recreational advantages in the world, come and we shall welcome you among us and help you find a location to your liking.

The Tumalo Project is indorsed and recommended to homeseekers by the Land Settlement Department of the Portland Chamber of Commerce. This indorsement is a compliment to the project and the possibilities here. The Bend Commercial Club indorses the Tumalo Project and is assisting in completing settlement.

Three Acre Feet of water for *Each Acre* *of Land*

For Full Information Address

E. M. WRIGHT, *Pres. Board of Directors*

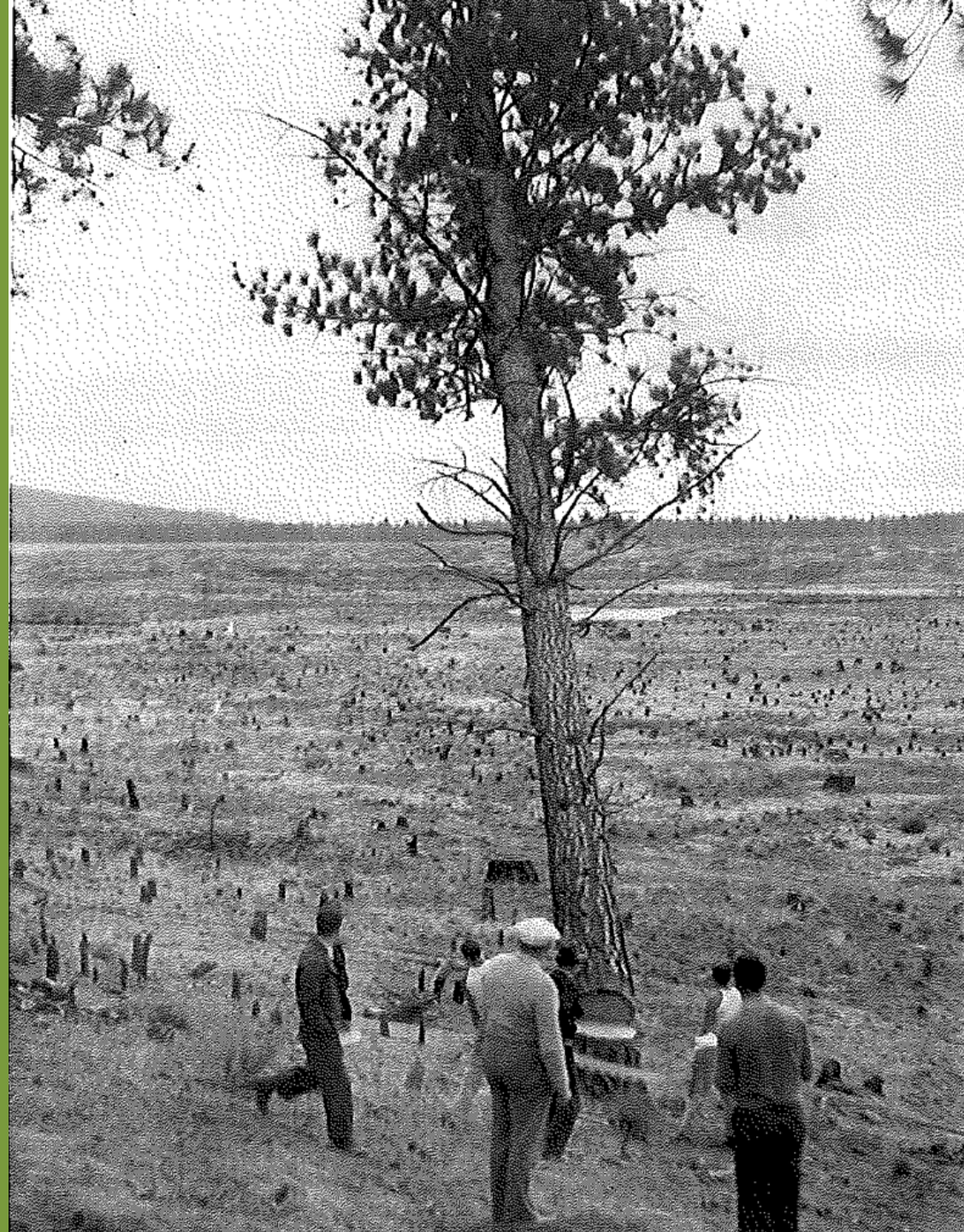
DESCHUTES COUNTY MUNICIPAL IMPROVEMENT DISTRICT

Motor Route "B" BEND, OREGON

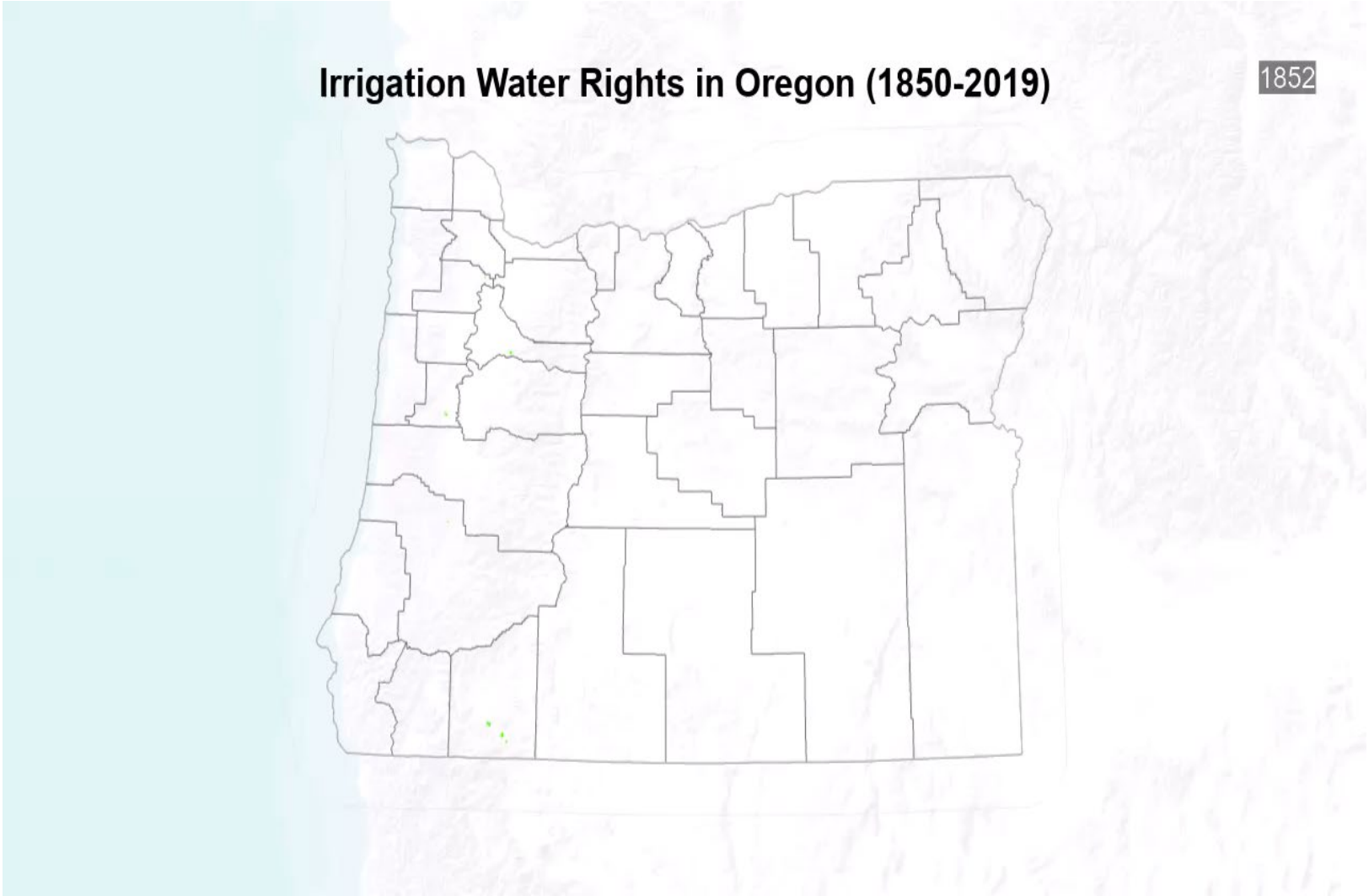
This Land (Carey Act) costs you only *$1 an Acre* *Plus Water Cost*

Reclamation Act (1902)

- Early studies by BOR said it was crazy to invest in lava landscape that loses half the water.
- Depression caused government to look again. (FDR-New Deal/Civilian Conservation Corps/Conscientious objectors)
- Built Prineville Res.
- Re-built Ochoco Res.
- Built Wickiup Reservoir
- Re-built Crane Prairie
- Re-built Crescent lake



Water development across Oregon



Deschutes River Then and Now

Then

- 1913 All surface water appropriated.
- 1922-1949 Storage facilities in place.
- Next 50+ years the river system operates “normally” under this regulating system.

Now

- Habitat conservation plan (spotted frog).
- Increased flows below Bend from 30 CFS to 140 CFS through leasing and conserved water.
- Flows in the Upper Deschutes increase from 20 CFS to 100 CFS

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Geology and Geography

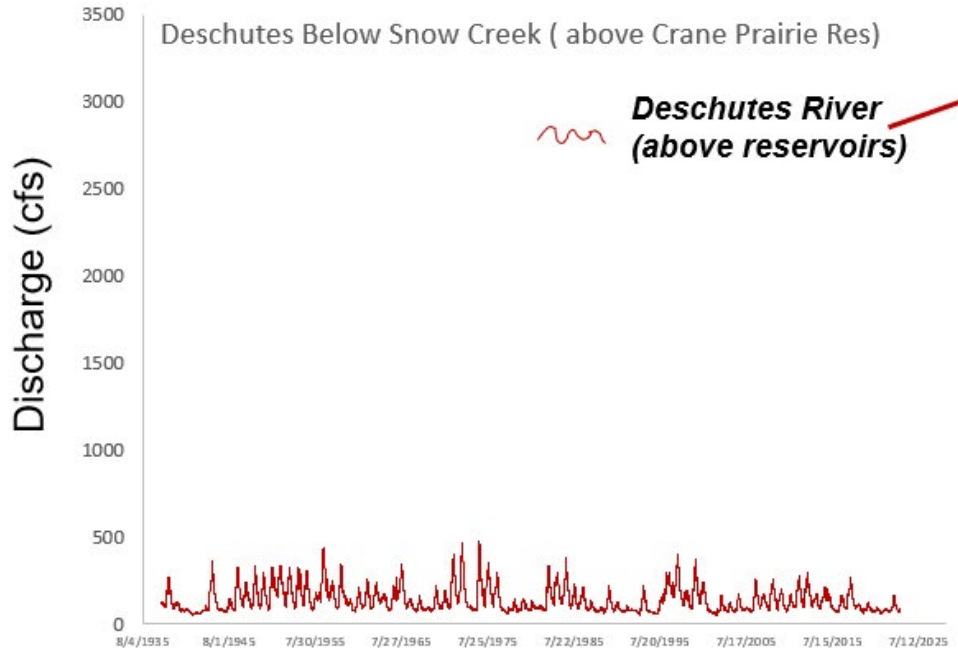
- High Cascades
  - 150 -200” precip/year
- High Desert
  - Young lavas, tuffs, sands, gravels (very transmissive)
- Large, porous “sponge” creates Deschutes aquifer
- Spring fed system
  - Attenuated spring flow = drought resiliency
  - Minimal surface water flows

Deschutes River Surface Flows

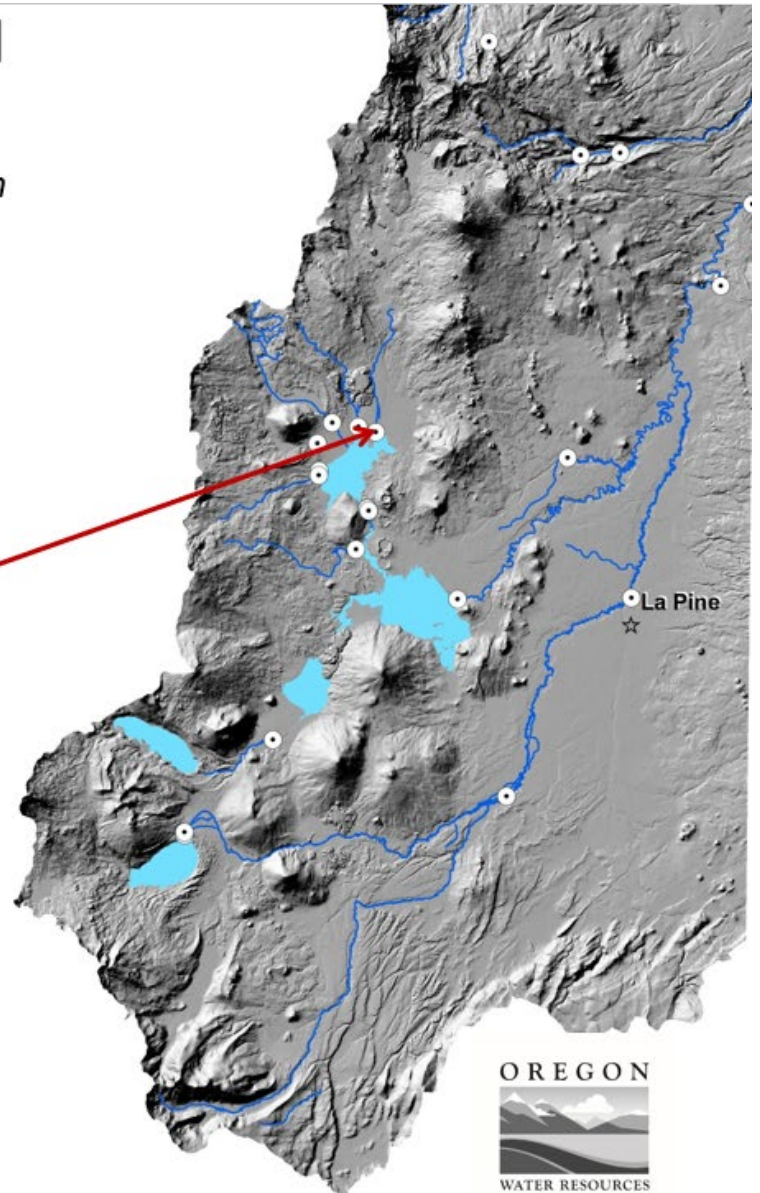
Extremely uniform flow year-round and year to year

"The flow of the River is more remarkably uniform than that of any other river in the United States comparable with it in size,…"

Deschutes River, Oregon and Its Utilization , Henshaw, Lewis and McCaustland, 1914



Deschutes River (above reservoirs)



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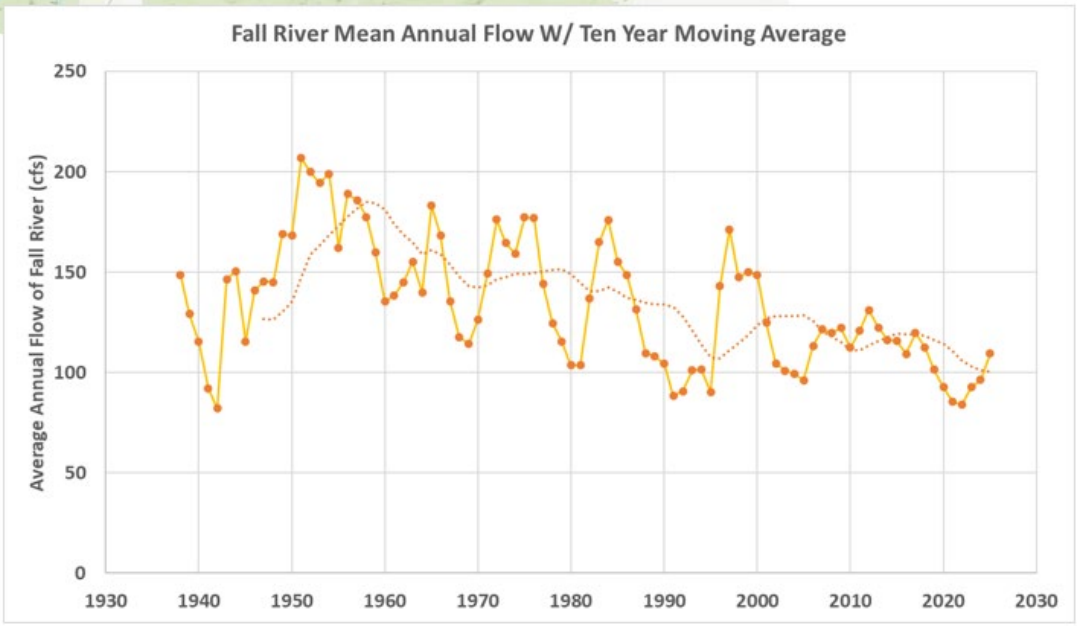
Deschutes River Surface Flows

Surface Water Flows



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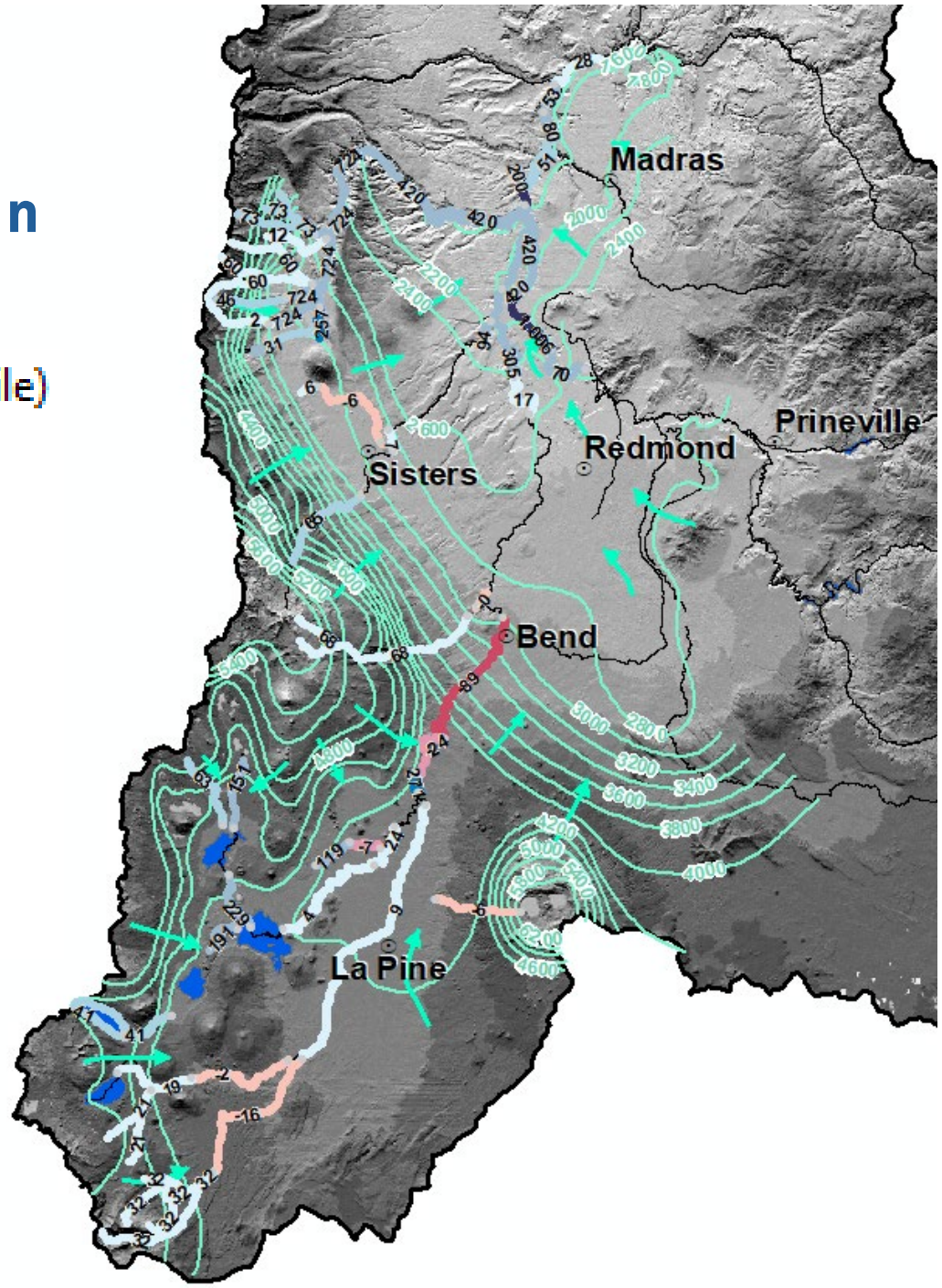
Deschutes River:

Surface and groundwater interaction

Estimated ground water gain & loss (cfs/mile)

- -5 to -6
- -1 to -5
- 0 to -1
- 0 to 5
- 5 to 10
- 10 to 50
- 50 to 100
- 100 to 150



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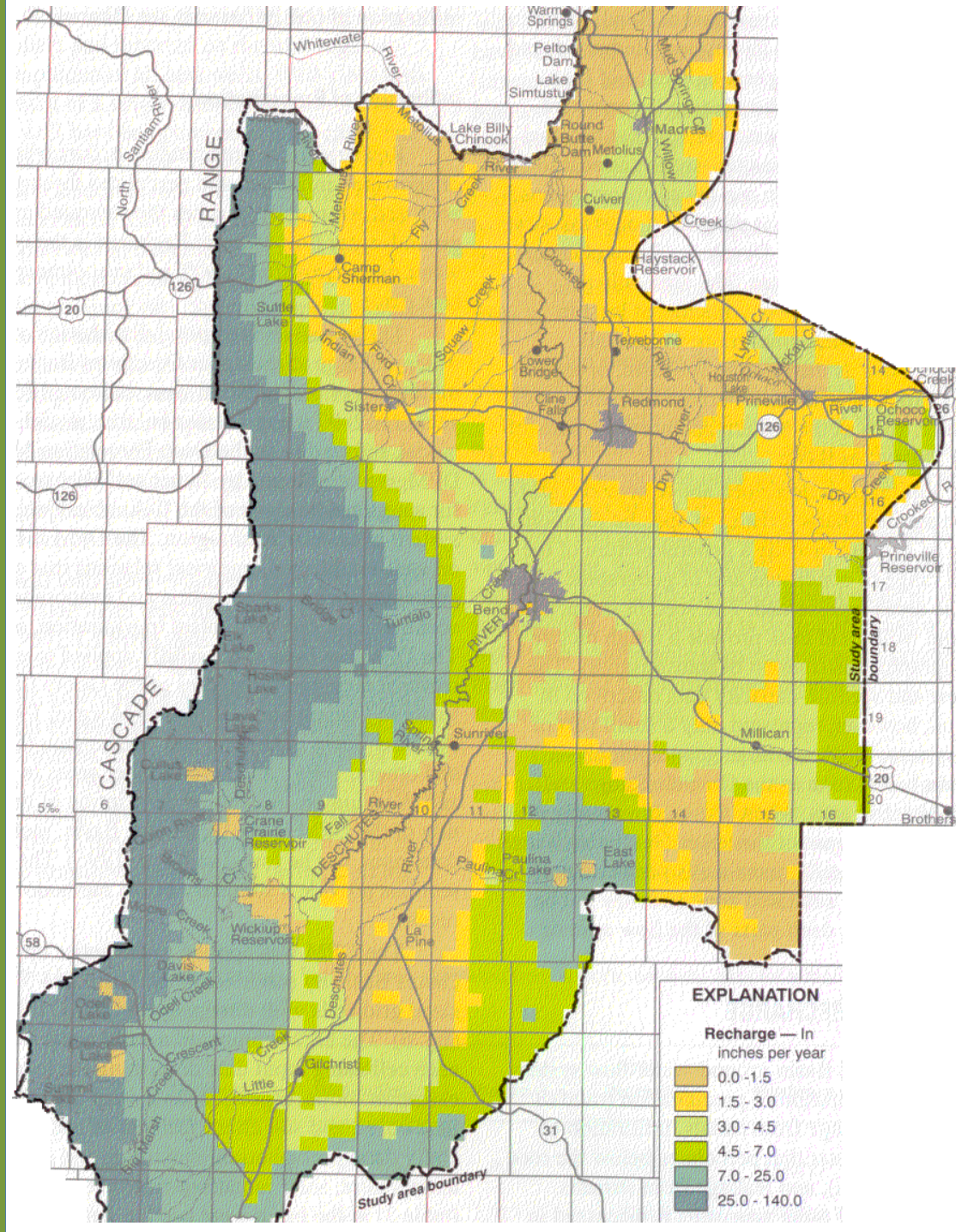
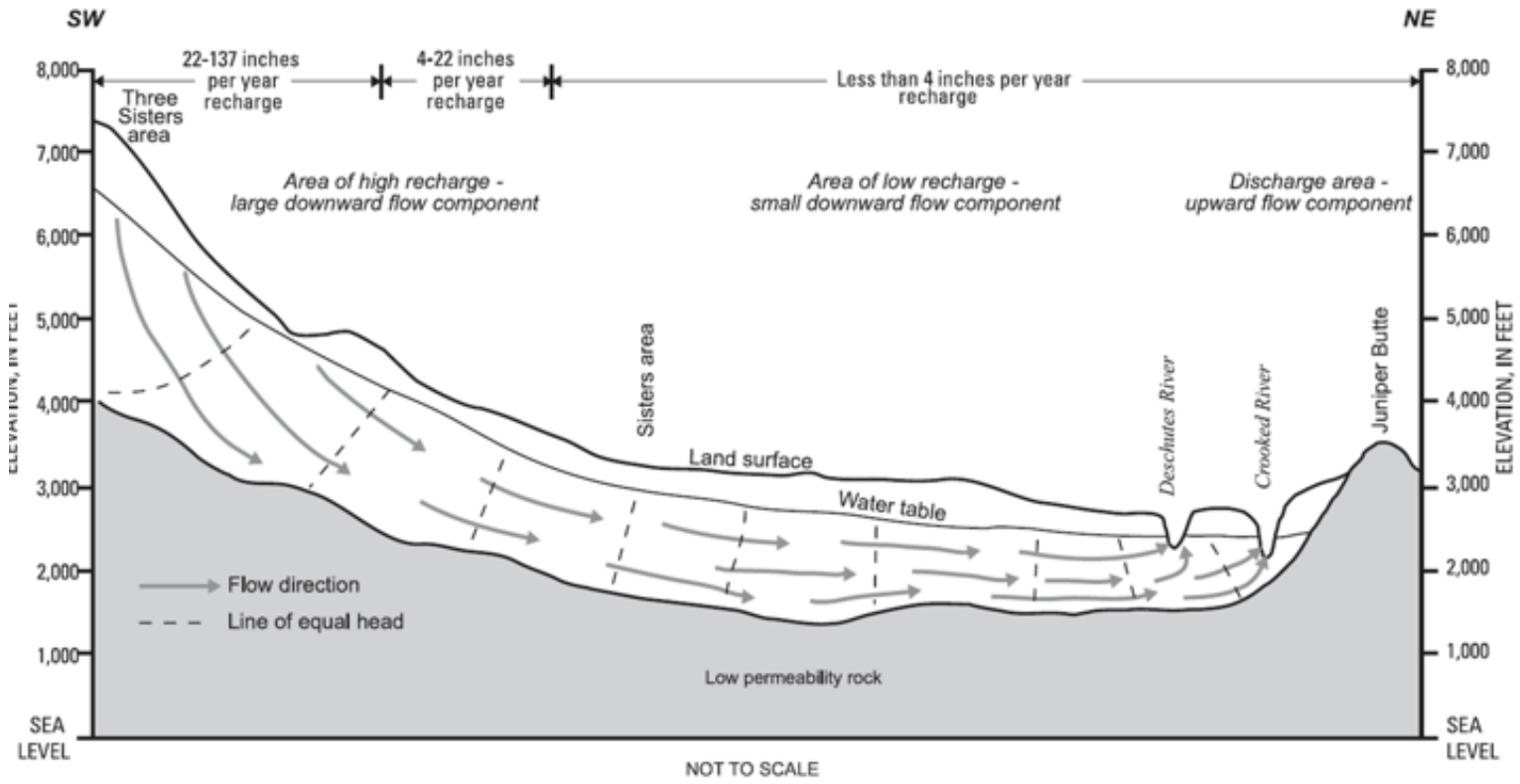
Groundwater Recharge

Where does aquifer recharge happen to give us our Deschutes River and robust aquifer?

- Gains and Losses surface-groundwater in the upper watershed to Bend.
- Groundwater reemerges around Crooked River Ranch, Opal Springs area



Deschutes Groundwater System



Source: Gannett, M.W., Lite, Jr., K.E., Morgan, D.S., and Collins, C.A., 2001, Ground-water hydrology of the upper Deschutes Basin, Oregon: U.S. Geological Survey Water-Resources Investigations Report 00-4162, 74 p.

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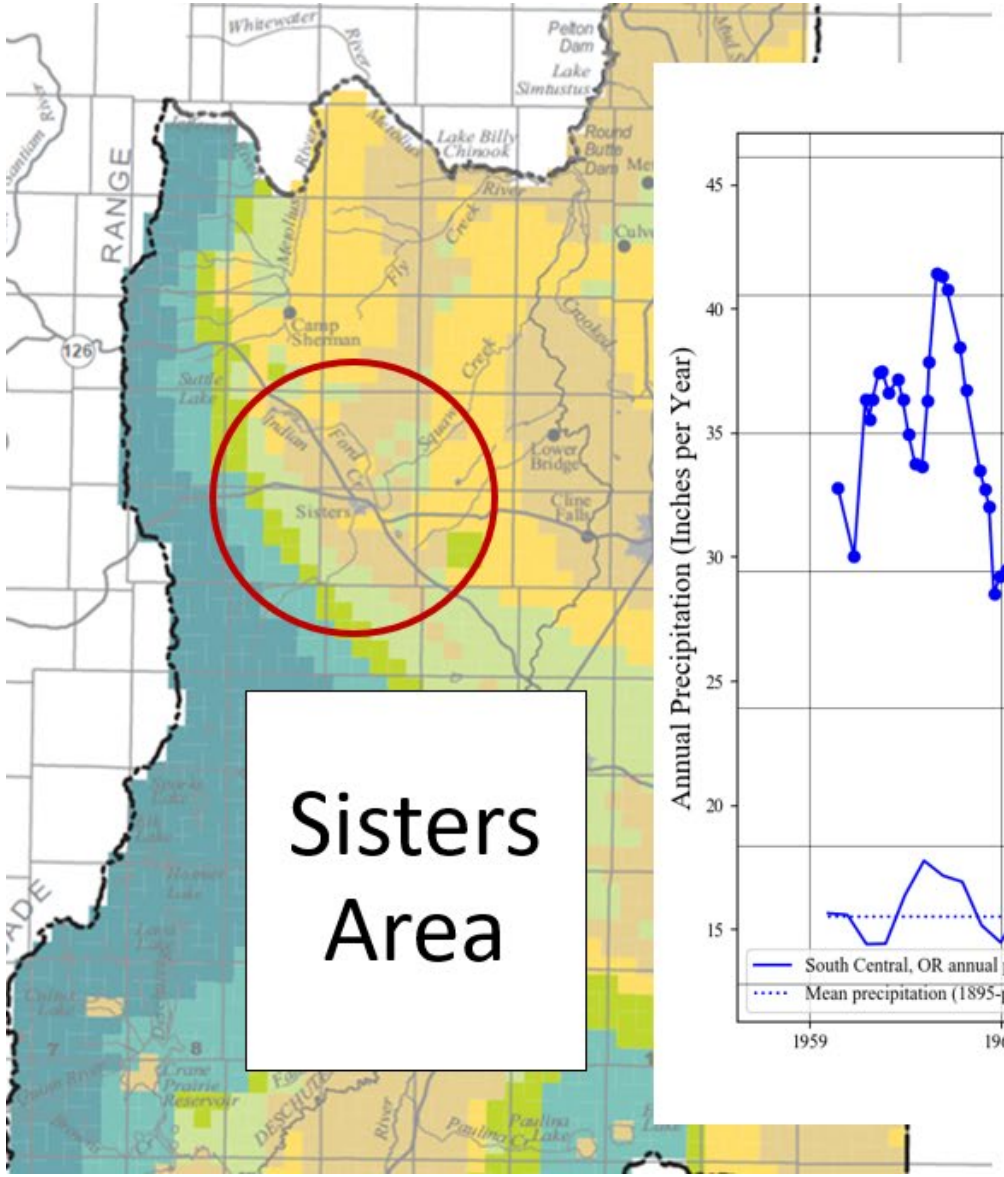

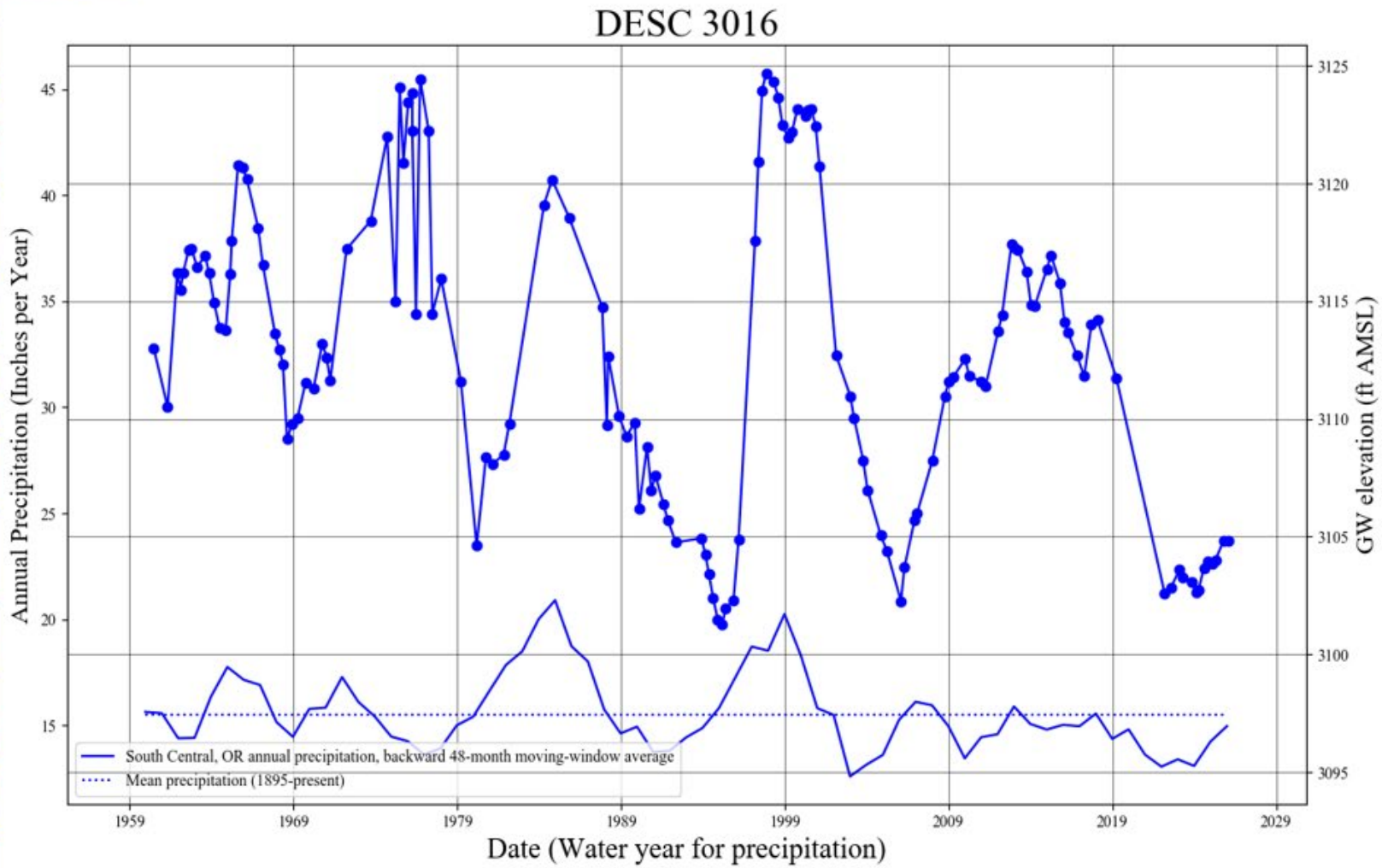

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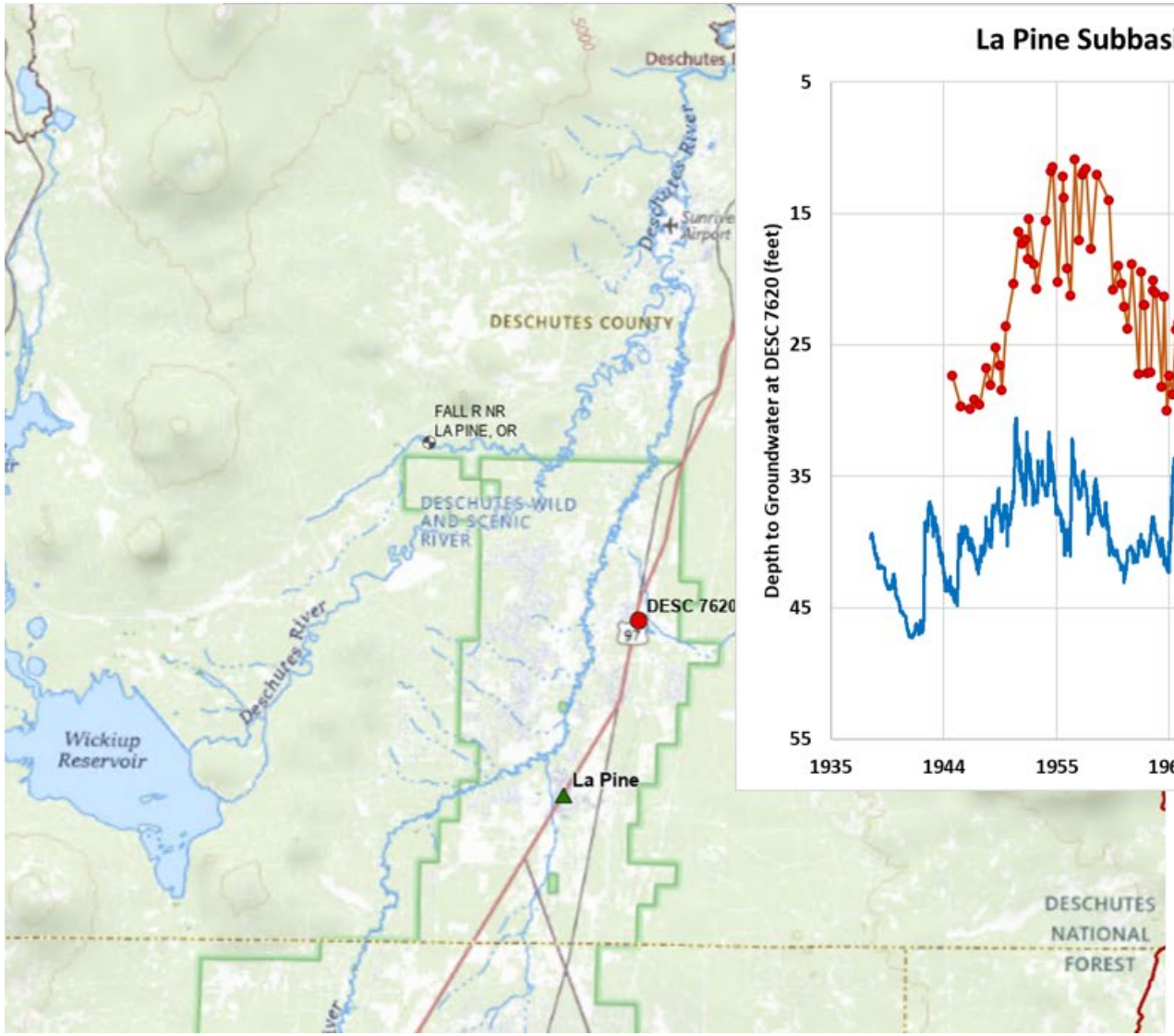

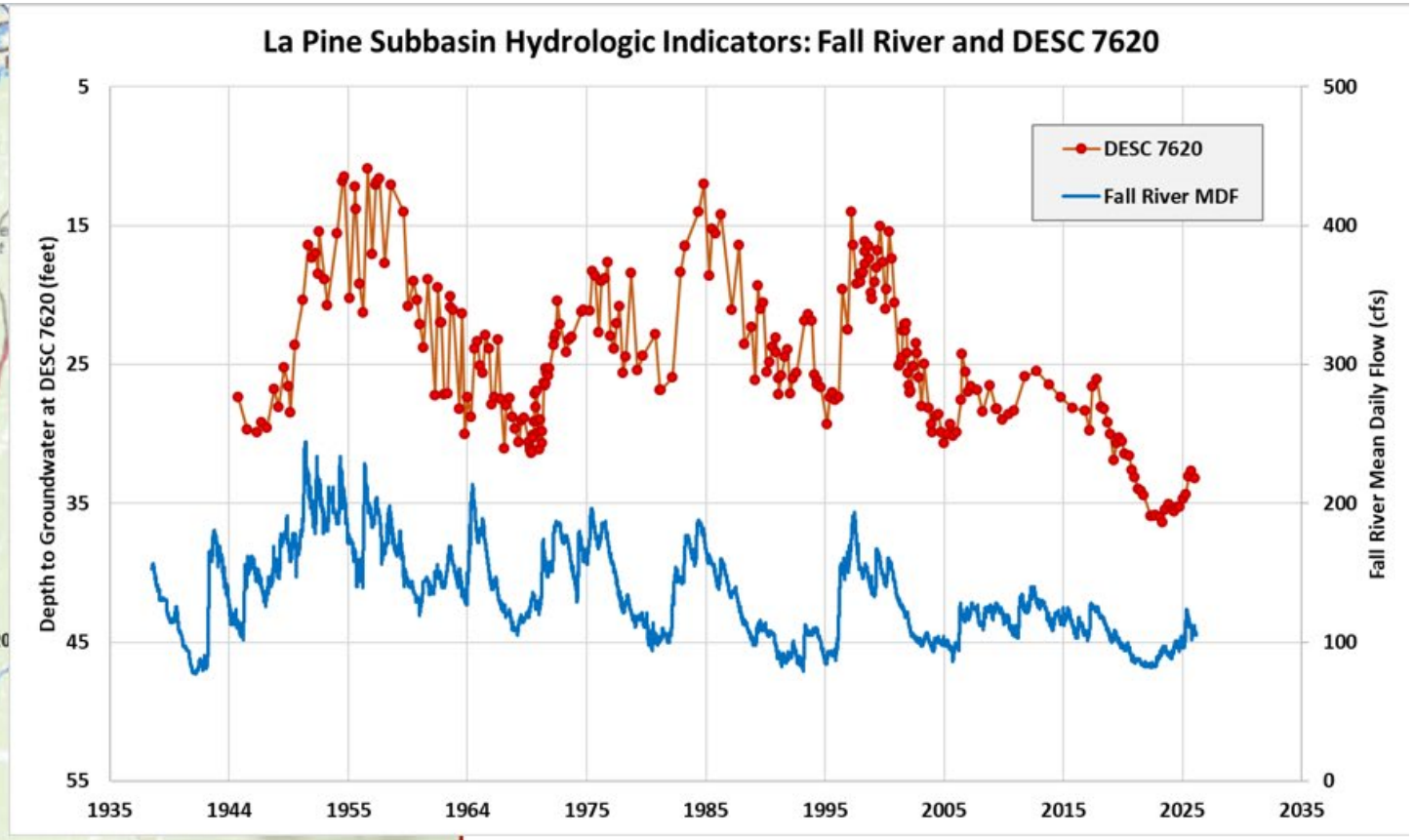

La Pine Area

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Basin Challenges: Water Scarcity and Competing Interests

Rising population, shrinking water: Central Oregon works to solve chronic water troubles

From the Growth in Central Oregon: A yearlong series series

By MICHAEL KOHN The Bulletin Mar 24, 2024 Updated Sep 27, 2024 0 6 min to read

Central Oregon FOLLOW 9 Followers

Irrigation districts, Deschutes River Conservancy promote canal piping as key amid drought, farmers' water crisis

SOURCE WEEKLY CULTURE NEWS & FEATURE FOOD & DRINK

Water Woes For Farmers

Drought and river conservation measures have left Central Oregon farmers with less water — though some are harder hit than others.

BY HANNA MERZBACH

Group threatens to sue over federal plan for upper Deschutes, citing risks to imperiled frog

By Brian Bull (KLCC)

Tug of water: Plan restores flows to Upper Deschutes but may fall short for threatened species

By Bradley W. Parks (OPB)
Bend, Ore. Dec. 2, 2020 6 a.m.

North Unit cuts water allotments to patrons amid historic heat wave

By MICHAEL KOHN The Bulletin Jul 1, 2021 Updated Aug 6, 2022 0

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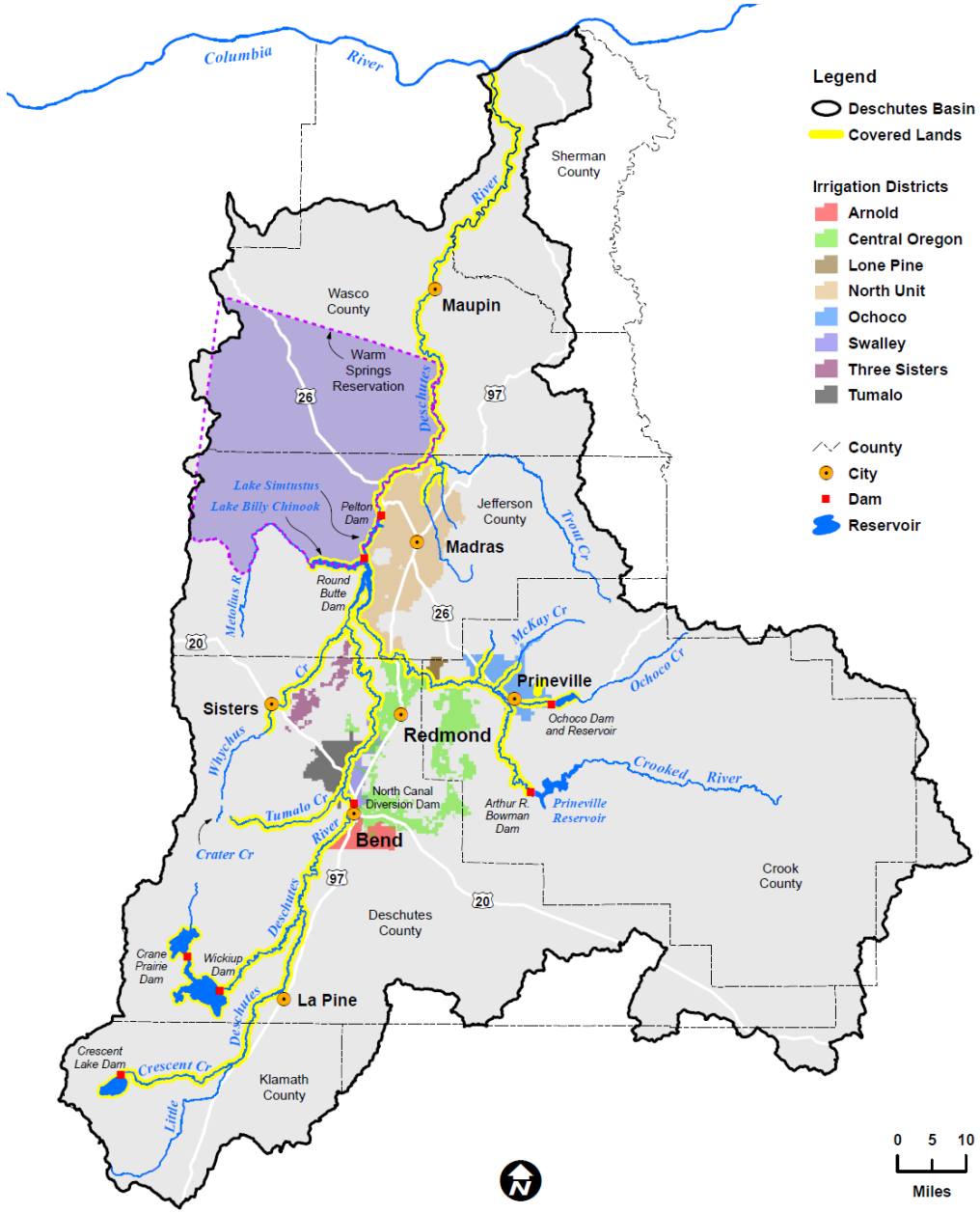
Agriculture in the High Desert



DBBC

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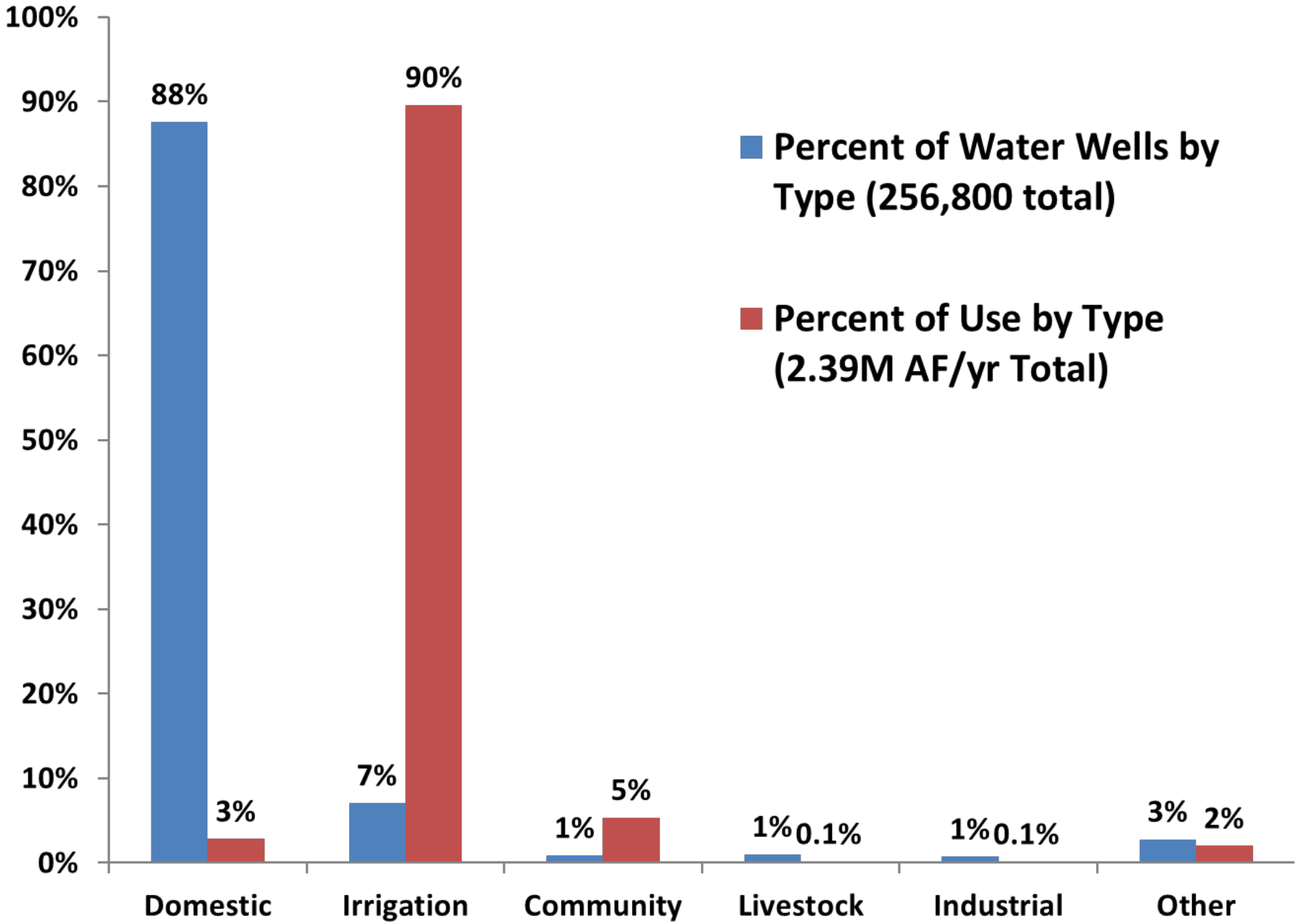

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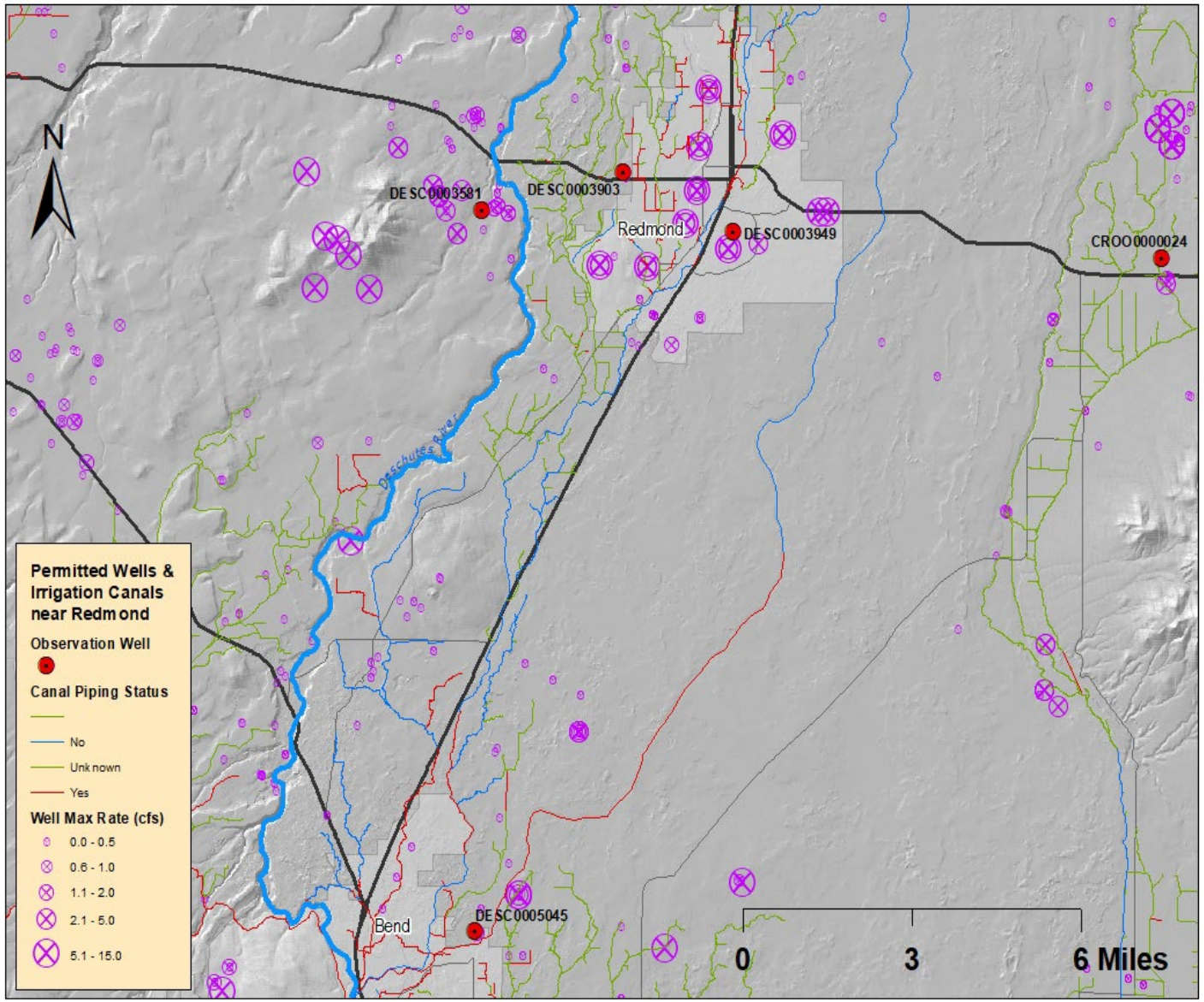
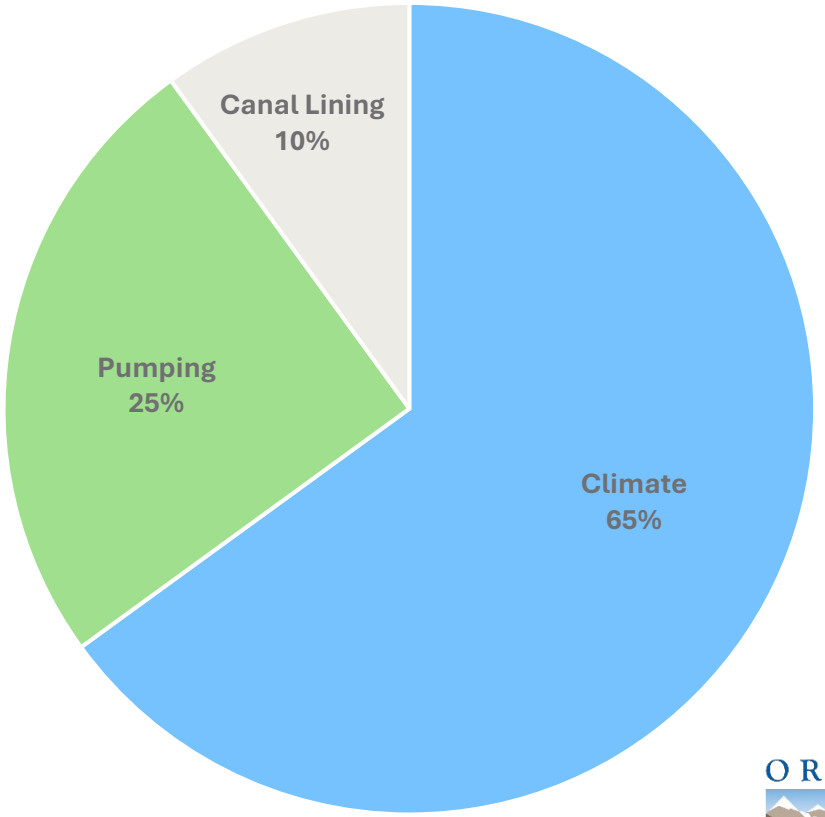
Groundwater Declines



Estimated Relative Contribution to Groundwater Declines in Redmond Area (Gannett and Lite, 2013)



*Canal lining as of 2016

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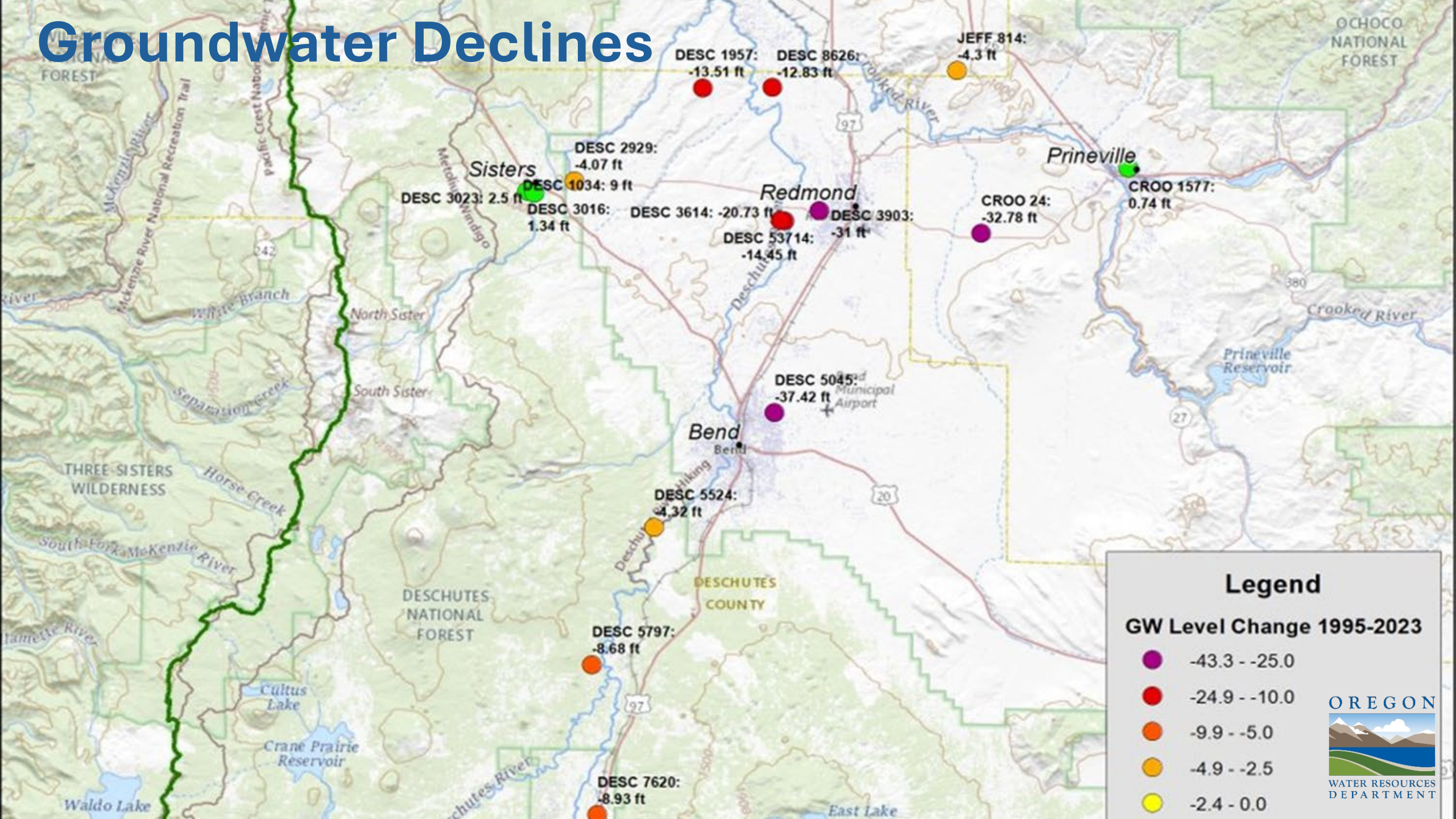
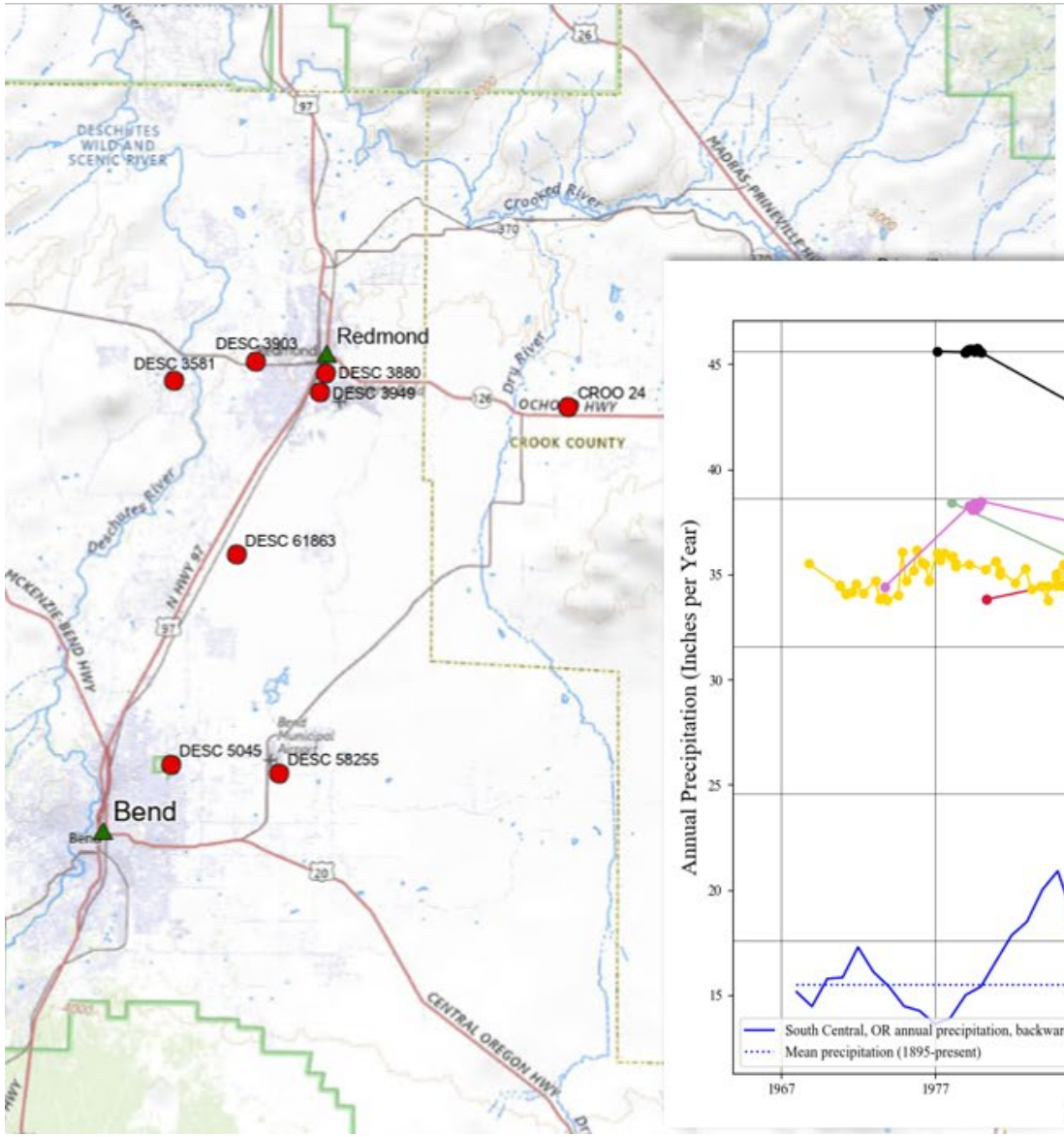
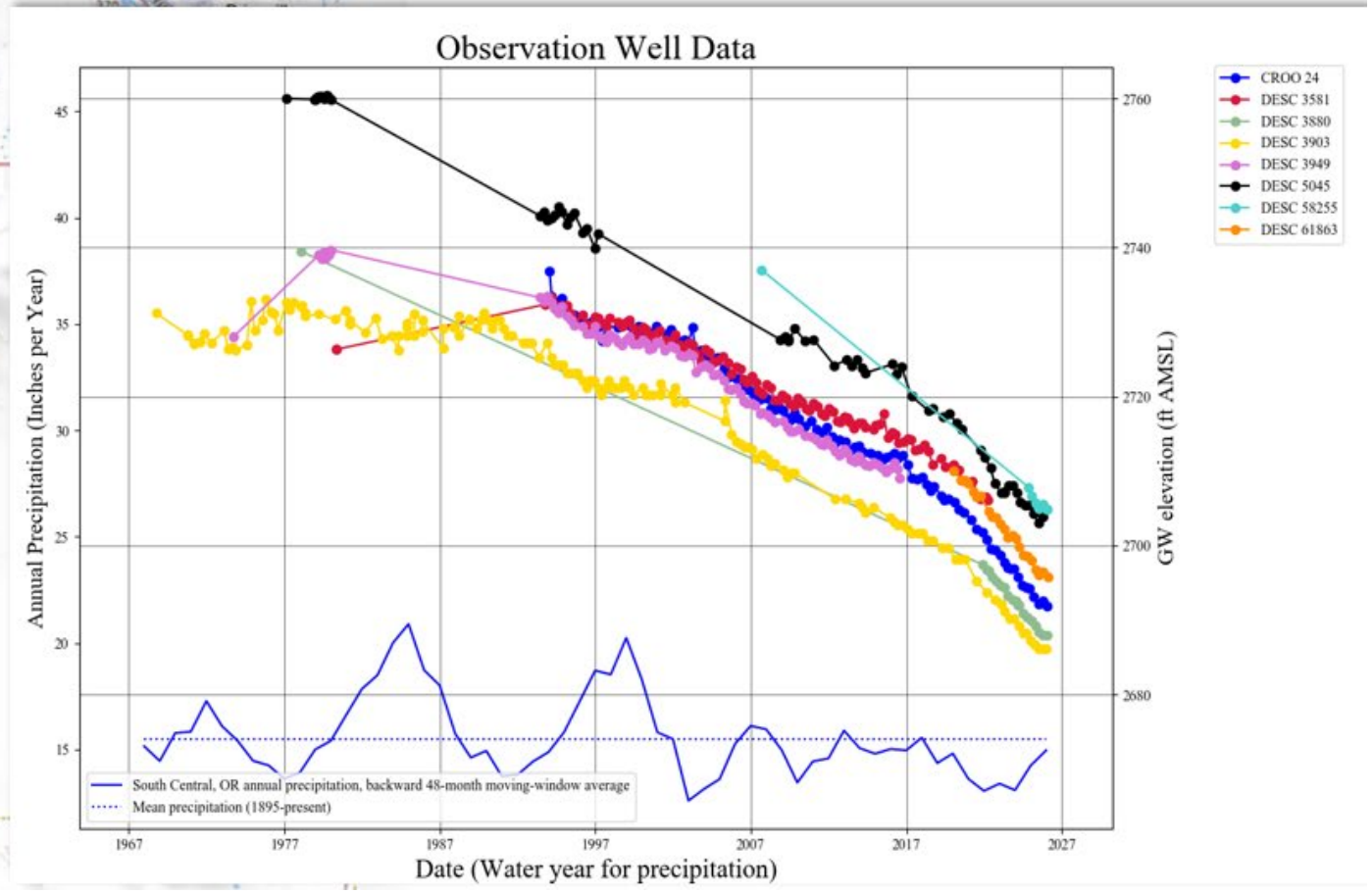
Groundwater Declines



Groundwater Declines



Redmond to Horse Ridge



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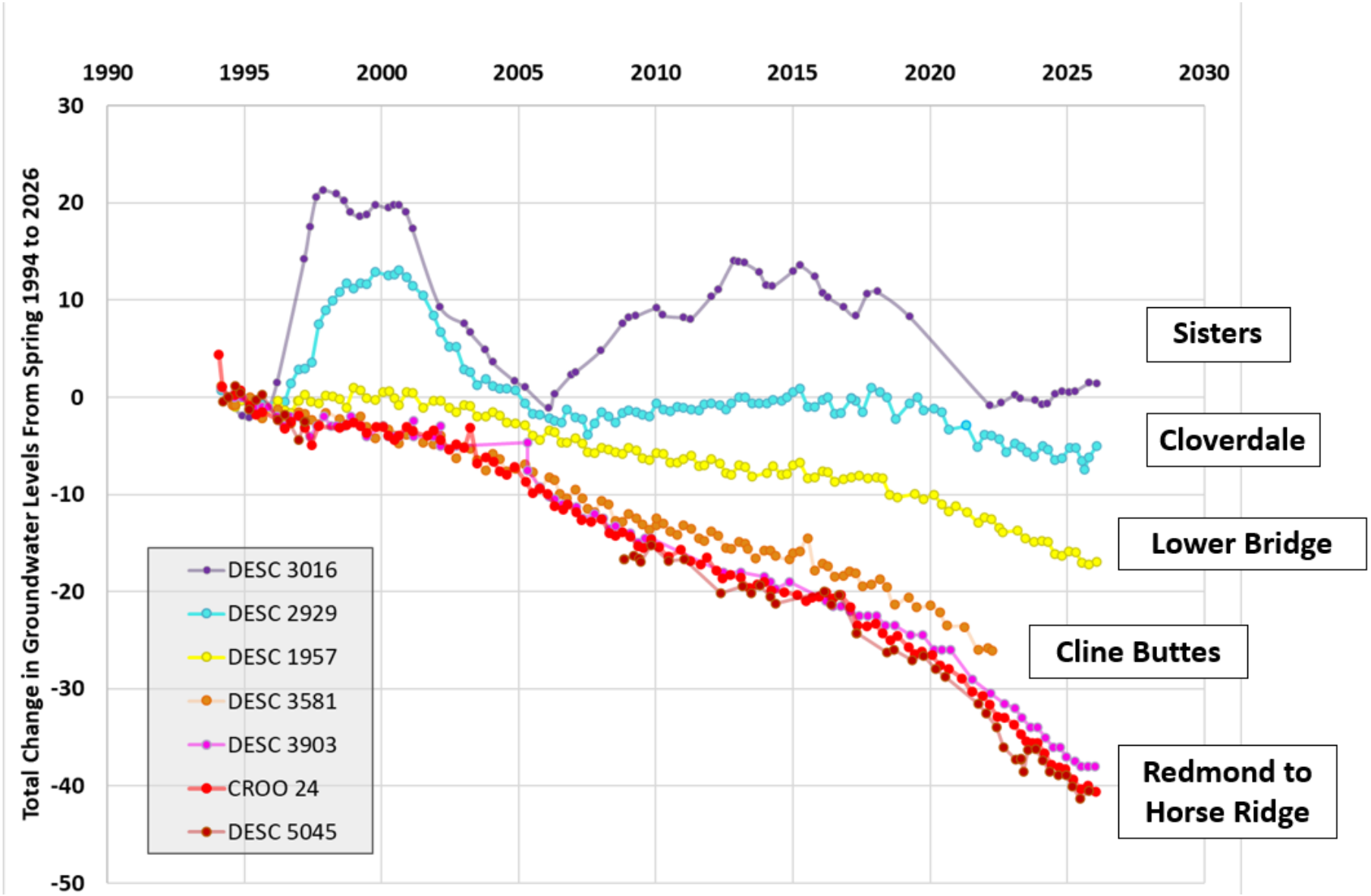
Groundwater Declines



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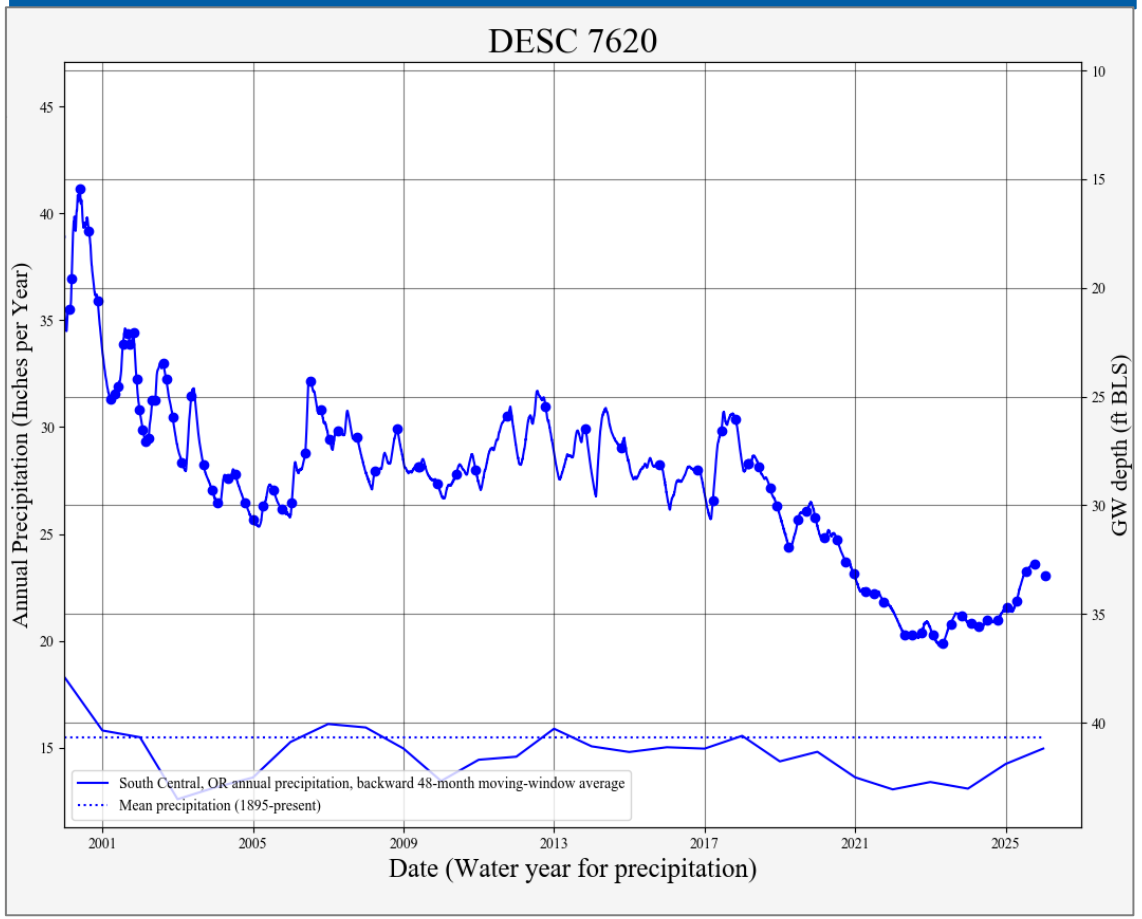
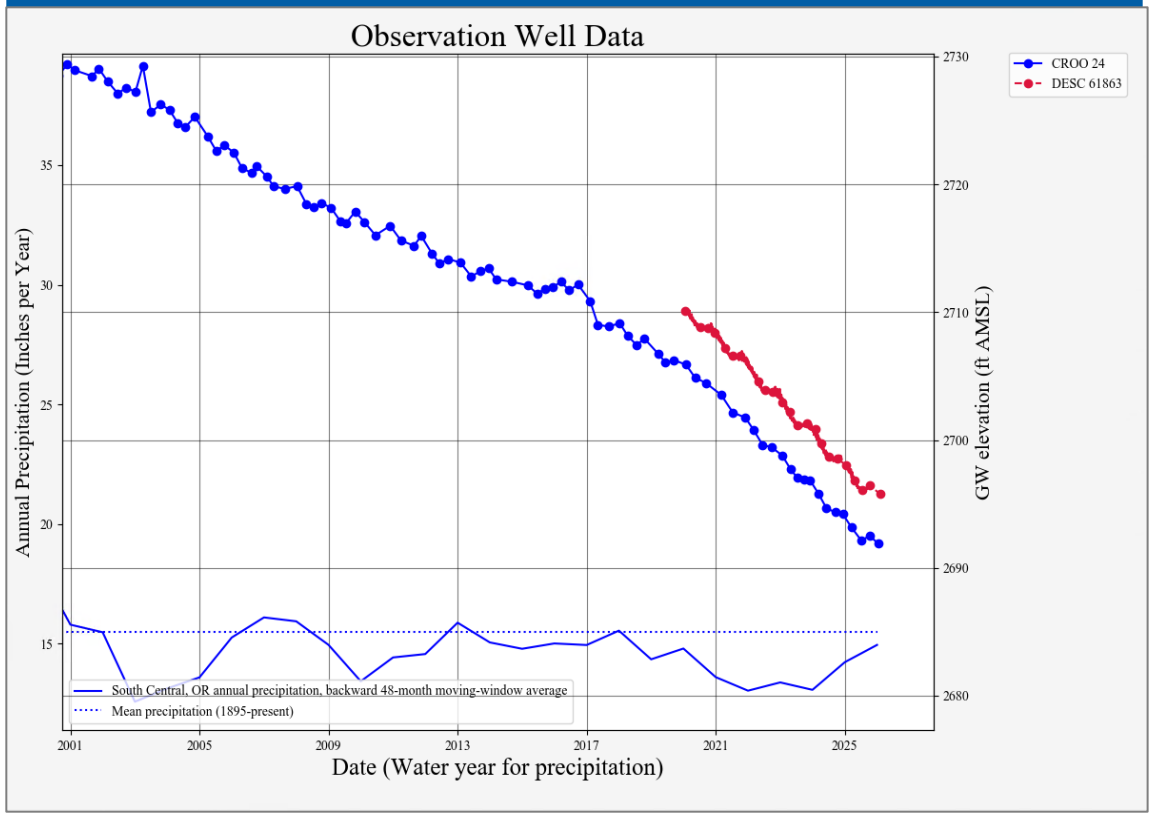
Groundwater Declines

Looking ahead: La Pine



Looking ahead: Redmond



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Changing Legislative and Regulatory Landscape

Groundwater Allocation Rules: OAR Chapter 690, Division 8

OAR 690-008-0001 (9): "**Reasonably Stable Groundwater Levels**" means that Annual High Water Levels, based on observed trends over time, remain within a range consistent with sustaining the function and character of a groundwater reservoir indefinitely, and:

1. The Annual High Water Levels as measured at one or more representative wells in a groundwater reservoir or part thereof:

    2. indicate no decline or an average rate of decline of less than 0.6 feet per year over any immediately preceding averaging period with duration between 5 and 20 years. Four Annual High Water Levels are required to calculate the rate of change; one must have been measured in the year to which the evaluation of reasonably stable applies, and at least one must have been measured between 5 and 20 years prior; and

    3. **have not declined by more than 25 feet from a reference level to the level in the year to which the evaluation of reasonably stable applies. The reference level shall be the highest known water level unless Annual High Water Levels have been measurably increased by human activity, in which case the Department may set a different reference level using best available information.**

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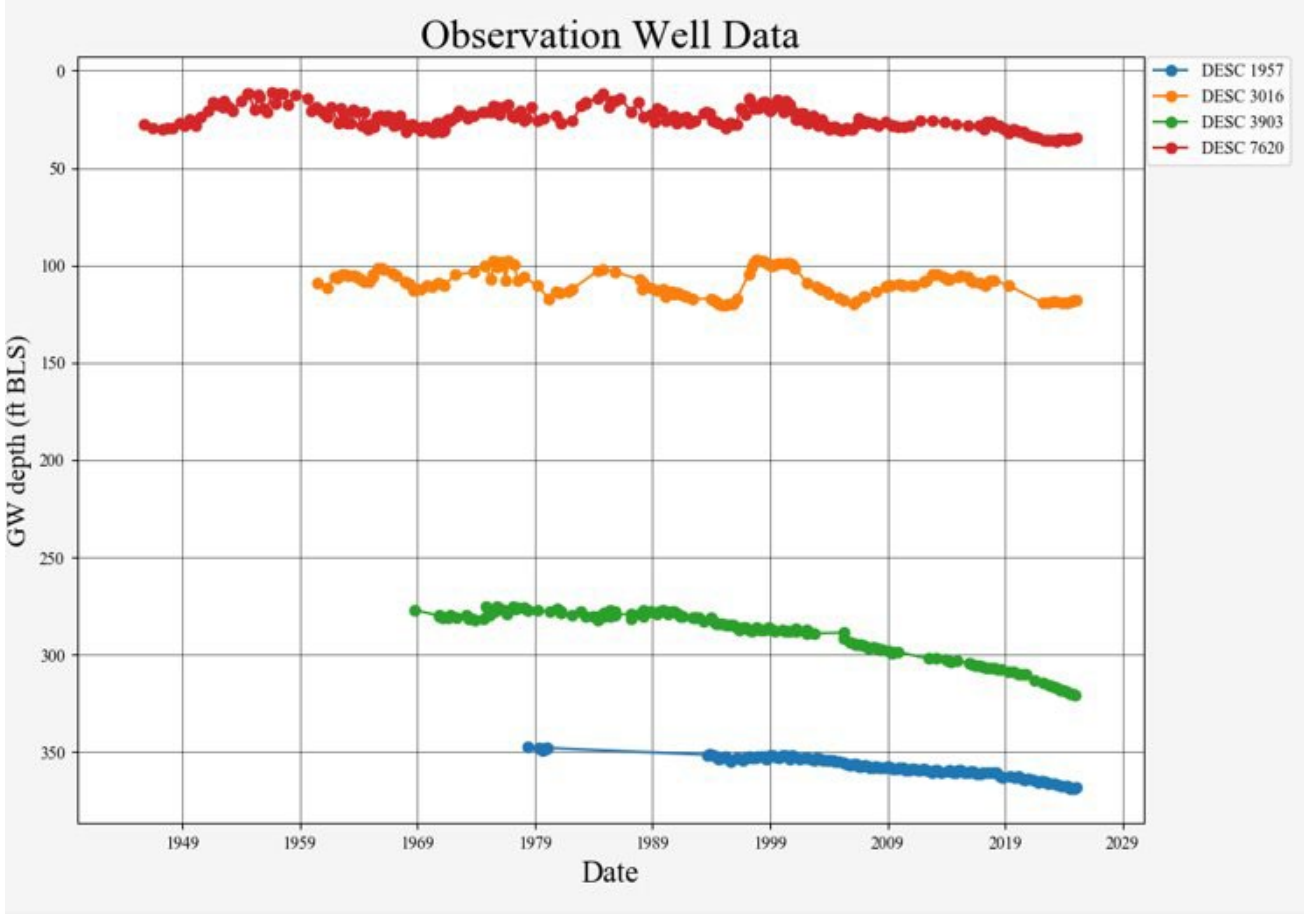
Changing Legislative and Regulatory Landscape

- Need for more data and studies



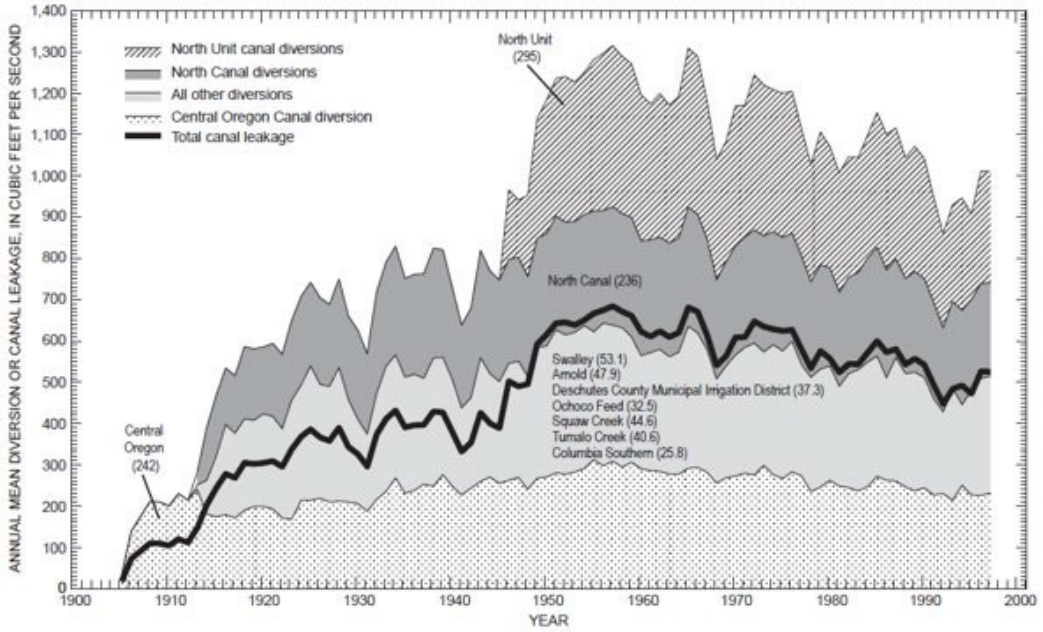


Figure 10. Annual canal diversions and estimated annual mean canal leakage in the upper Deschutes Basin, Oregon, 1905–97. (Mean annual discharge, in cubic feet per second, is shown in parentheses for the period of record for each diversion.)

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Cultural Shift

- Robust, engaged regional community
- Environmental and recreational interests
- Everyone wants to come to Central Oregon!

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We've had to get creative...

- Deschutes Basin Mitigation Program
- Instream Transfers and Leasing
- Allocation of Conserved Water
- Deschutes Basin Alternative Pathway
- Organized Regional Partnerships
  - CTWS
  - DRC
  - DBWC
  - DBBC
  - WAG
  - COCO
  - COLW
  - Many more...

Regional Partnerships

CONFEDERATED TRIBES OF WARM SPRINGS 1855

CENTRAL OREGON LANDWATCH

DESCHUTES RIVER CONSERVANCY

DBBC

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Upper Deschutes Groundwater Study and Mitigation

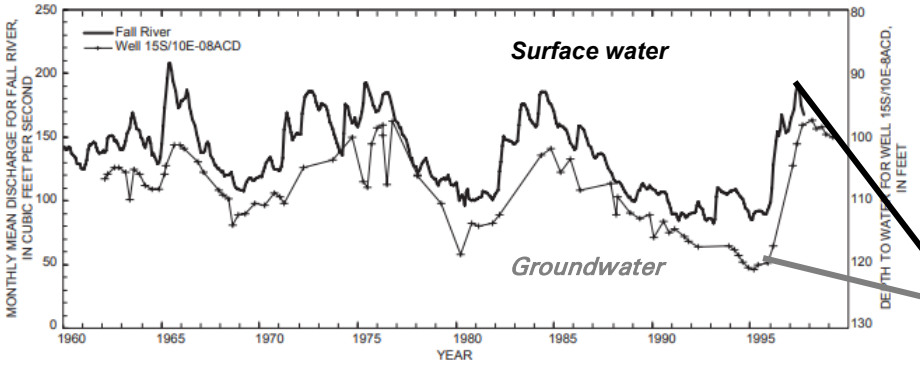
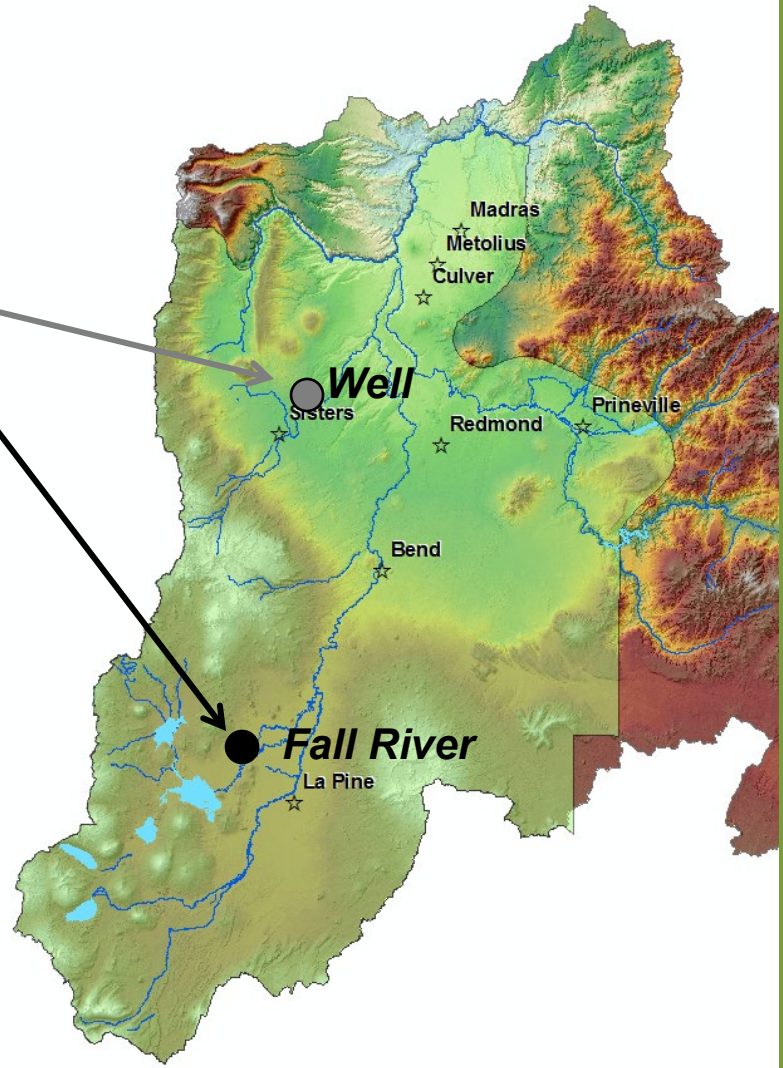


Figure 38. Relation between monthly mean discharge of Fall River and static water-level variation in a well near Sisters, Oregon, 1962–97.

- USGS/OWRD Ground Water Study 1998
  - *direct connection between surface water and groundwater, thus Scenic Waterway would be affected by any new ground water rights.*
- Mitigation required for new ground water rights in the Deschutes Basin study area.
  - September 13, 2002 rules adopted for mitigation and mitigation banks (Division 505 and 521).
  - HB 3494 passed in 2005 confirming mitigation rules..



Upper Deschutes Zone of Impact

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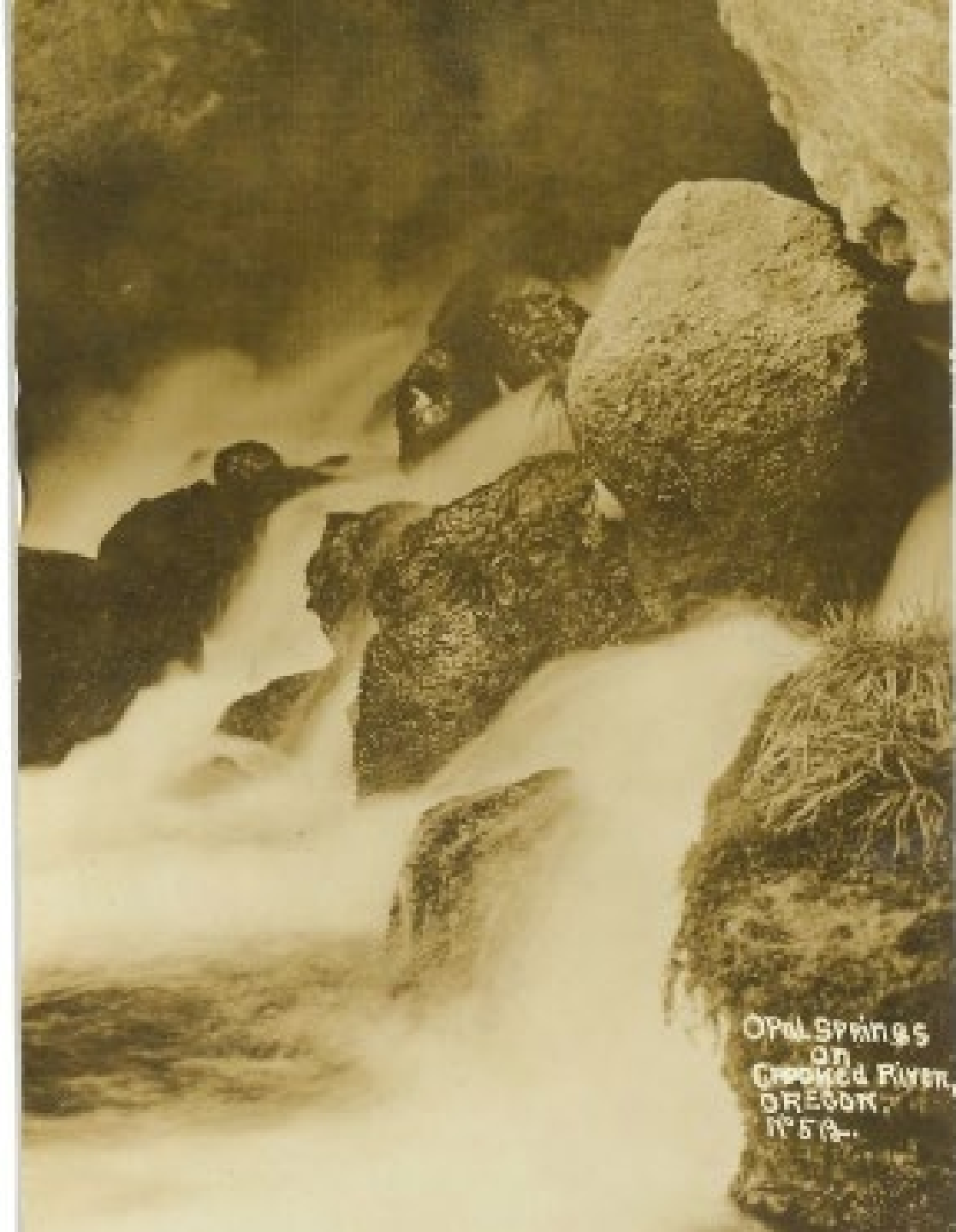
Deschutes Basin Mitigation Program

- Any new water right use in the “zone of impact” must be offset (i.e., mitigated)
- Mitigate for the consumptive use only (“bucket taken out, bucket put back in”)
- Domestic (exempt) wells are not included
- Offset new consumptive use with existing surface water right
- 2005 appeals ruling overturns rules
- HB 3494
- Originating surface water flow need to be present at least 50% of the time
- Established zones of impact
- 200 CFS mitigation cap



Instream Water Rights

- 1987 Instream Water Right Act
- Held in Trust by the State
- Applied for By State Agencies-Junior
- Bought transferred instream-Senior
- Over 200 in Deschutes Basin

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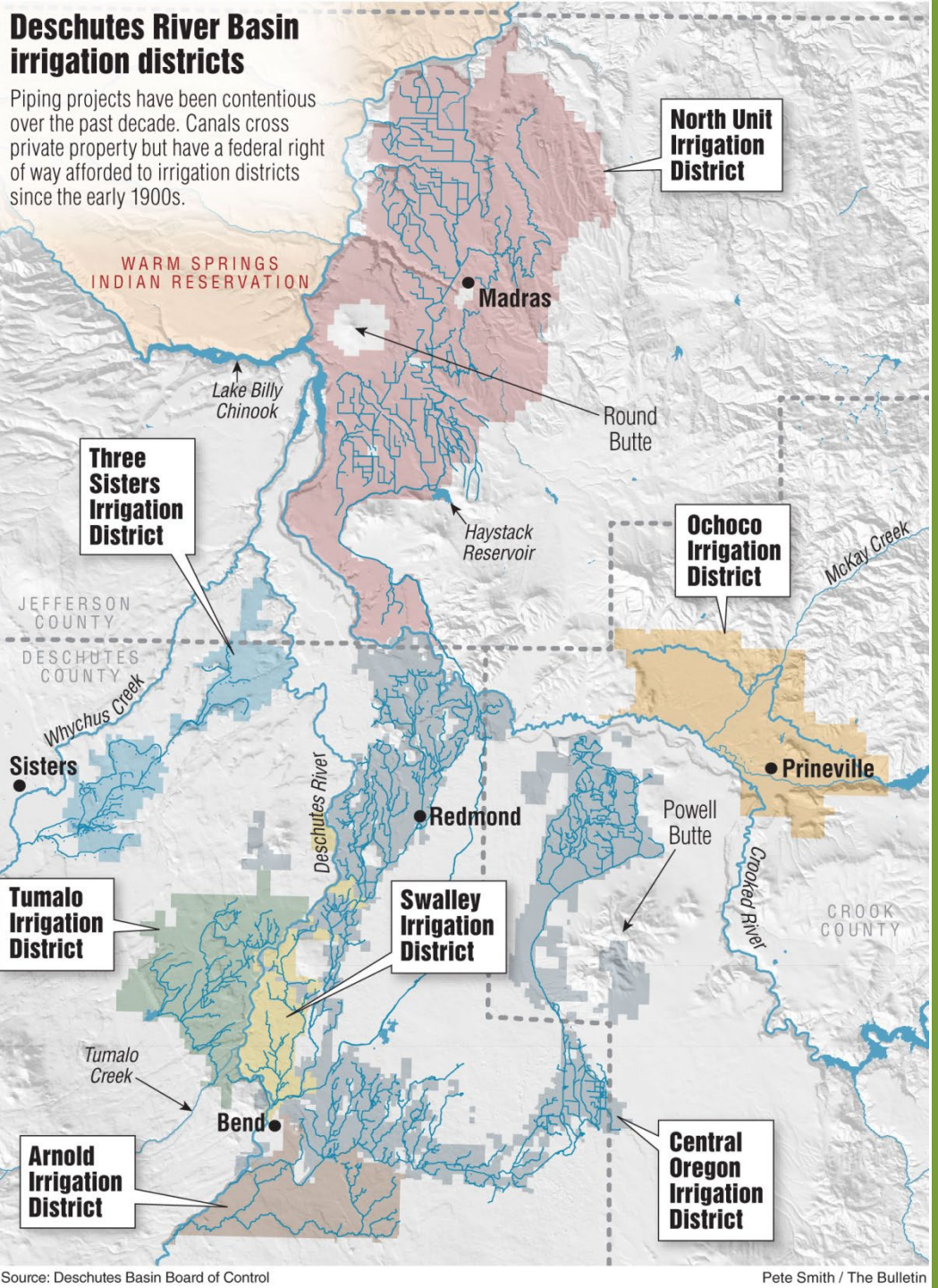
Whychus Creek below TSID diversion prior to 1998



Conservation: Leasing and Irrigation Districts

- Most of leasing is with irrigation districts
- 8 Districts in Central Oregon
- Divert about 95% of water
- Diversions have been decreasing since 1960's
- Sprinklers, measurement, lining, instream transfers and leases, **PIPING**

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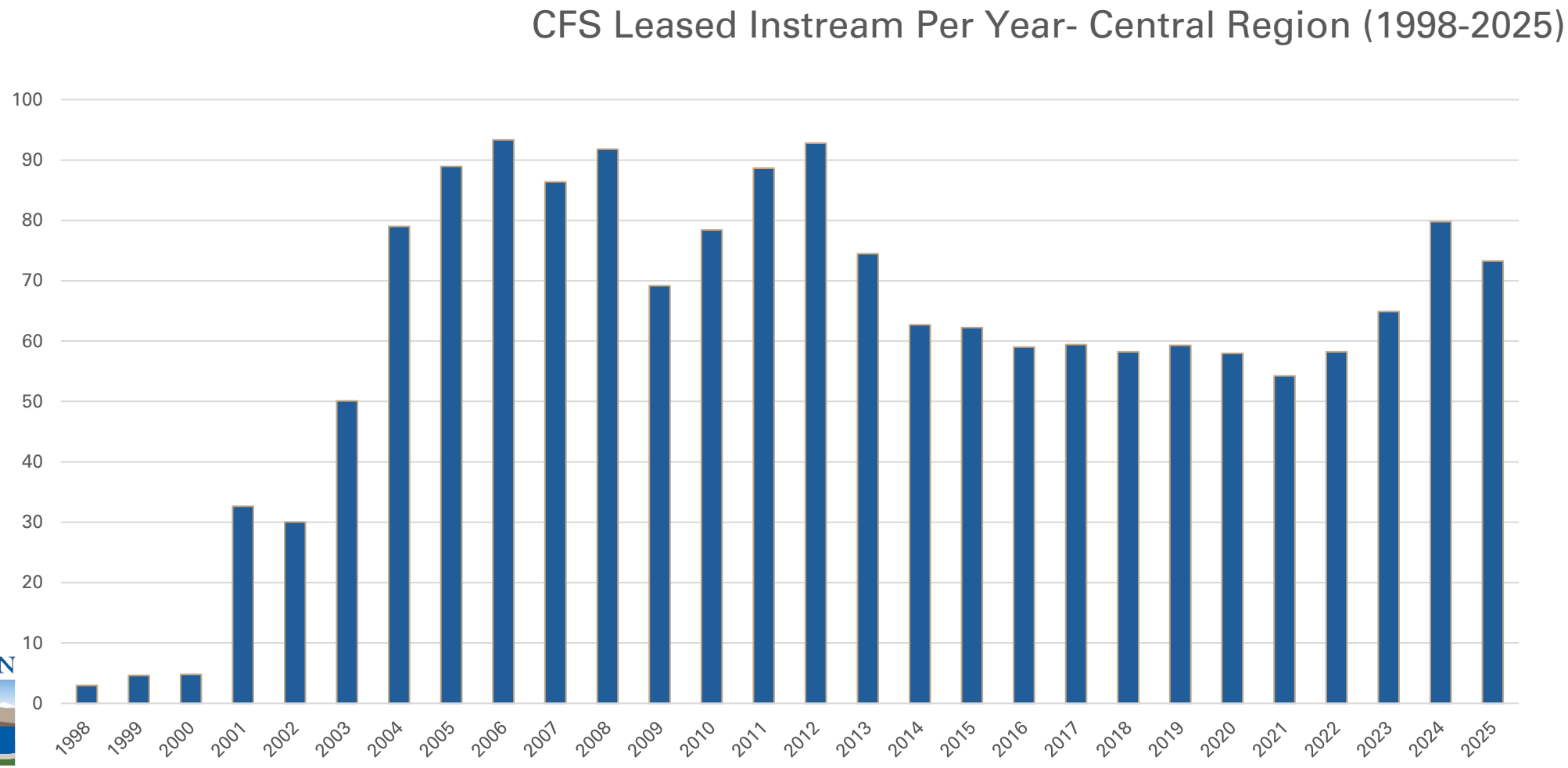
Conservation Efforts

Instream Leasing

DESCHUTES RIVER CONSERVANCY



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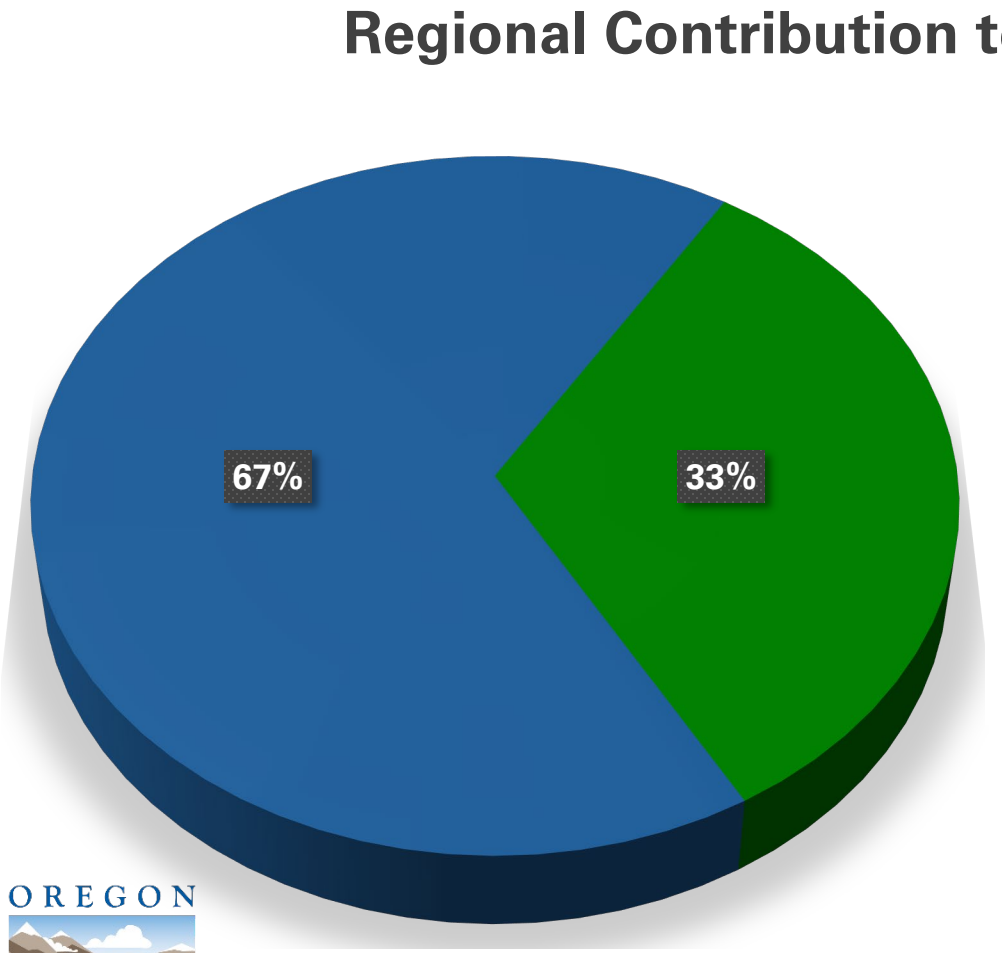
Conservation Efforts

Allocation of Conserved Water



- Legal enlargement
- Until the DBHCP, this program was the standard for water conservation in Central Oregon
- Middle Deschutes, Tumalo Creek and Whychus Creek hugely benefitted from ACW

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The DBHCP

- Deschutes Basin Habitat Conservation Plan sets instream flow targets
- Reservoir operations aligned with biological needs
- Quantified habitat actions (restoration, screening, passage)
- Monitoring & adaptive management
- ESA coverage for participating district

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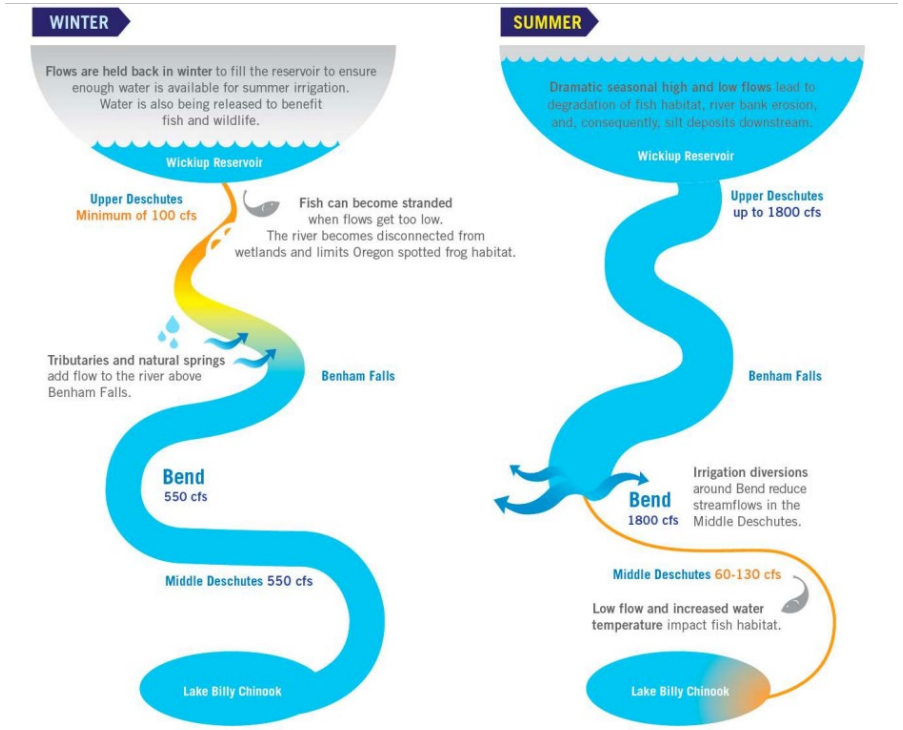

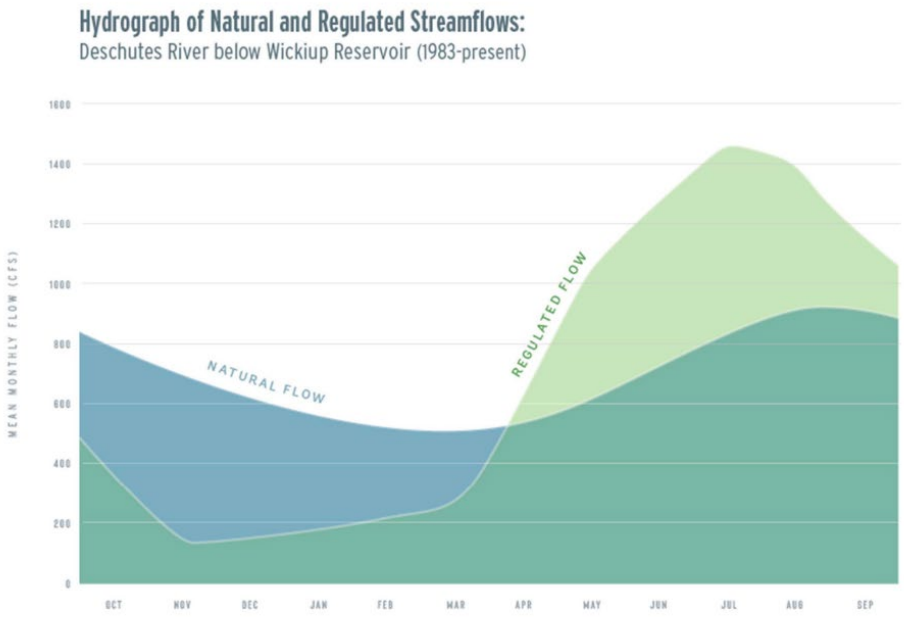

DBHCP Impacts: Restoring Balance

- **Wickup winter flows**
  - Current: **100 cfs**
  - 2028: **300 cfs**
  - 2034: **400-500 cfs**
- **Wickiup stores the majority of NUID's irrigation water**
- **NUID is one of the most productive farming areas in the basin**
- **NUID is also the most junior district- relies on Wickiup storage**

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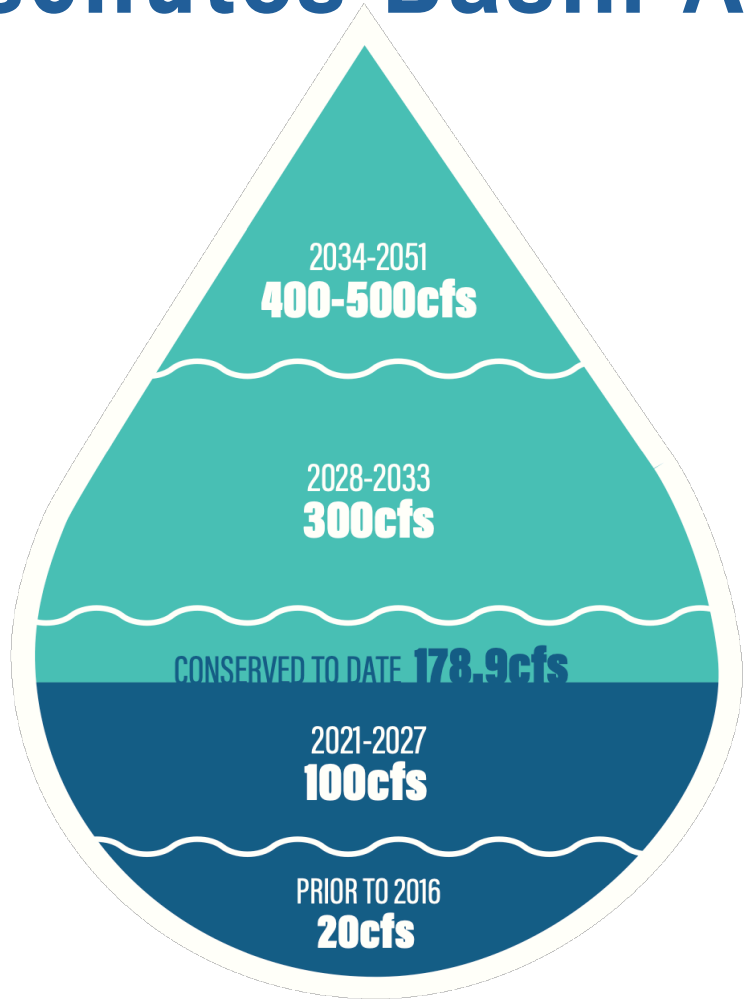
Conservation Efforts

Deschutes Basin Alternative Pathway



DBBC

Voluntary pathway for conserved water projects in response to HCP requirements

Conserved live flow goes to NUID for irrigation

Equivalent Wickiup storage released by NUID in winter for flow augmentation

Legal protections ensure water stays instream

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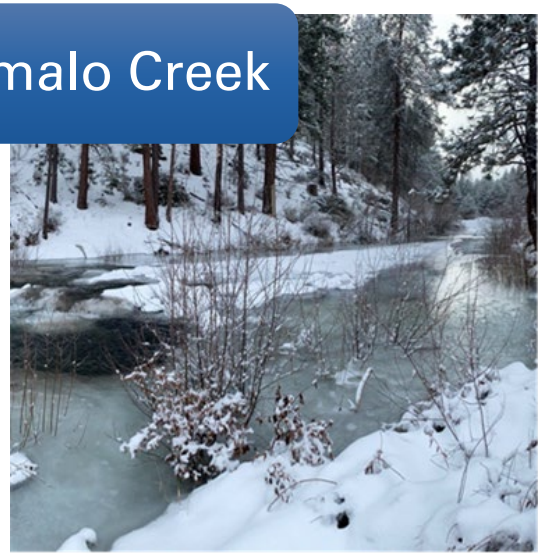
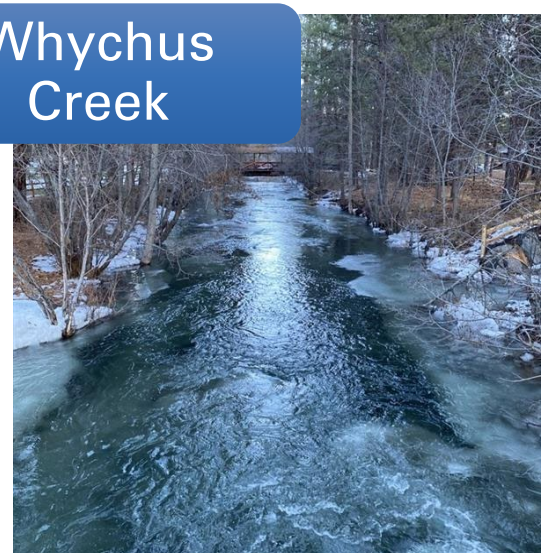
Conservation Successes

Middle Deschutes

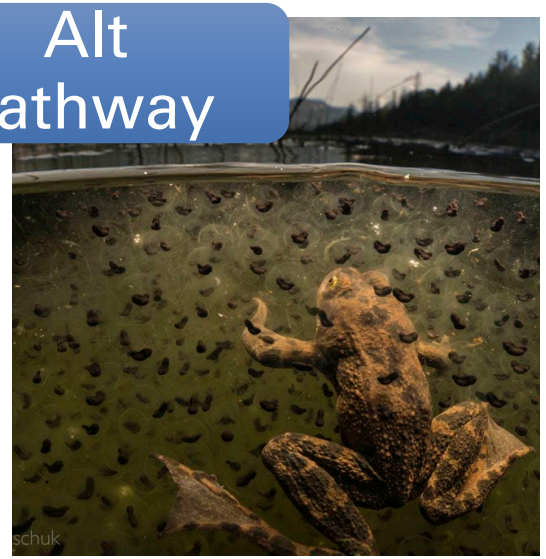
Tumalo Creek



Whychus Creek



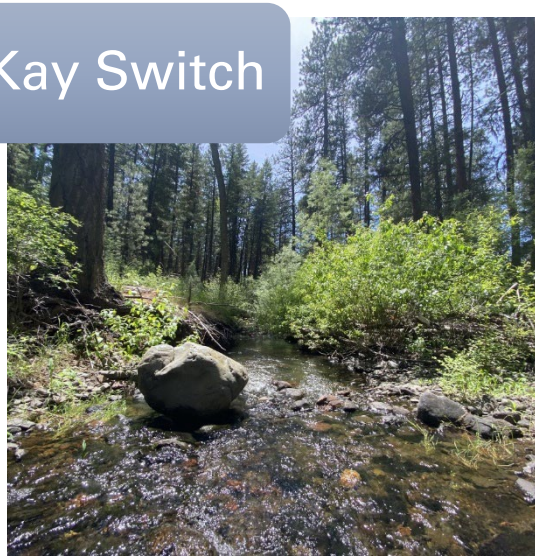
Alt Pathway



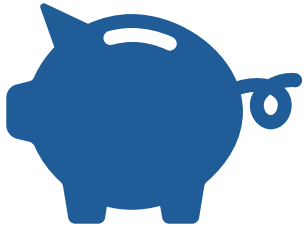
DBWC

Oregon Water Resources Department

McKay Switch



Conservation Challenges



Funding

Time

Staff Capacity

Legislation

Process Flexibility

Climate

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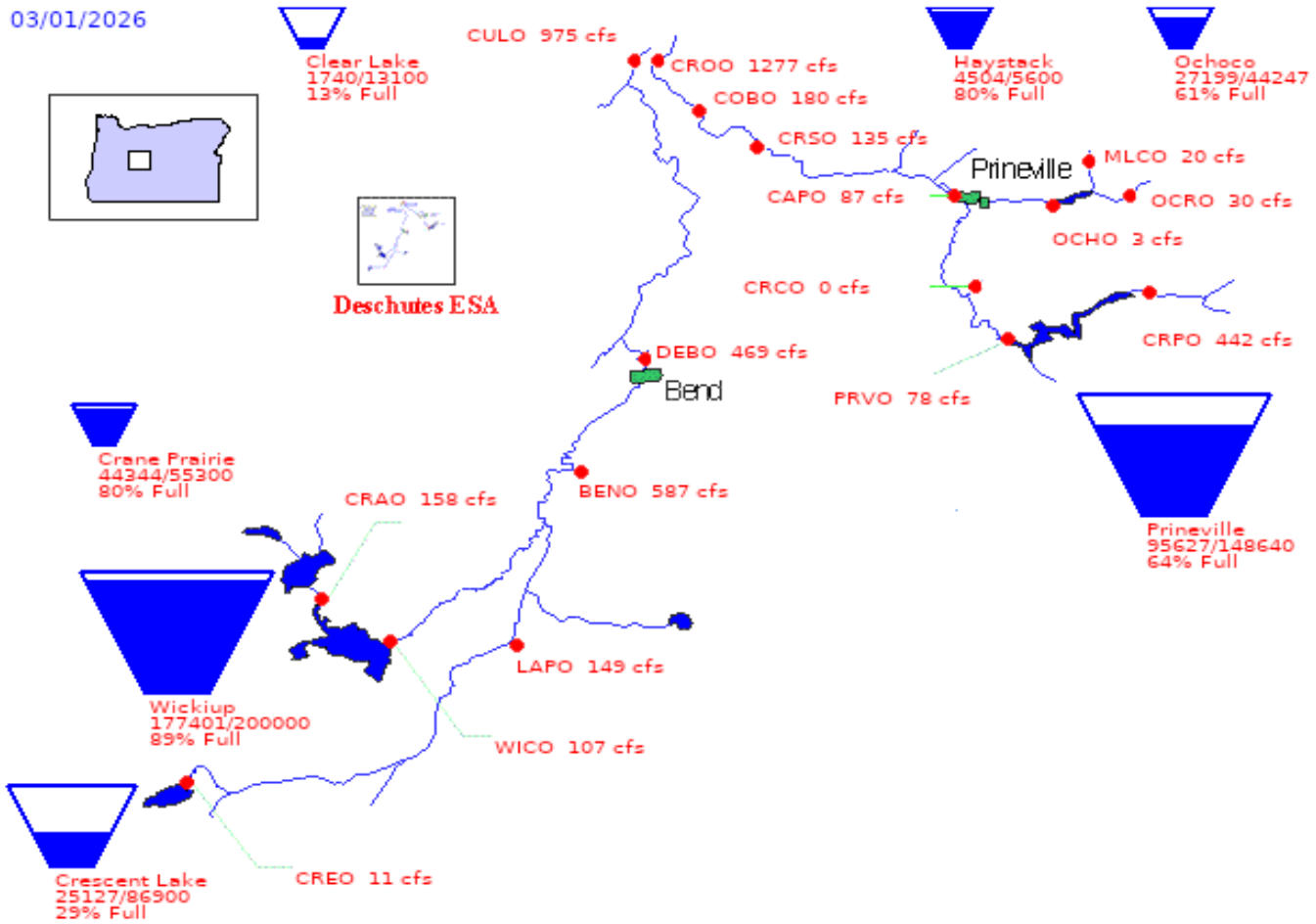
Current Conditions- 3/2/2026

US Bureau of Reclamation, Pacific Northwest Region
Major Storage Reservoirs in the Deschutes River Basin



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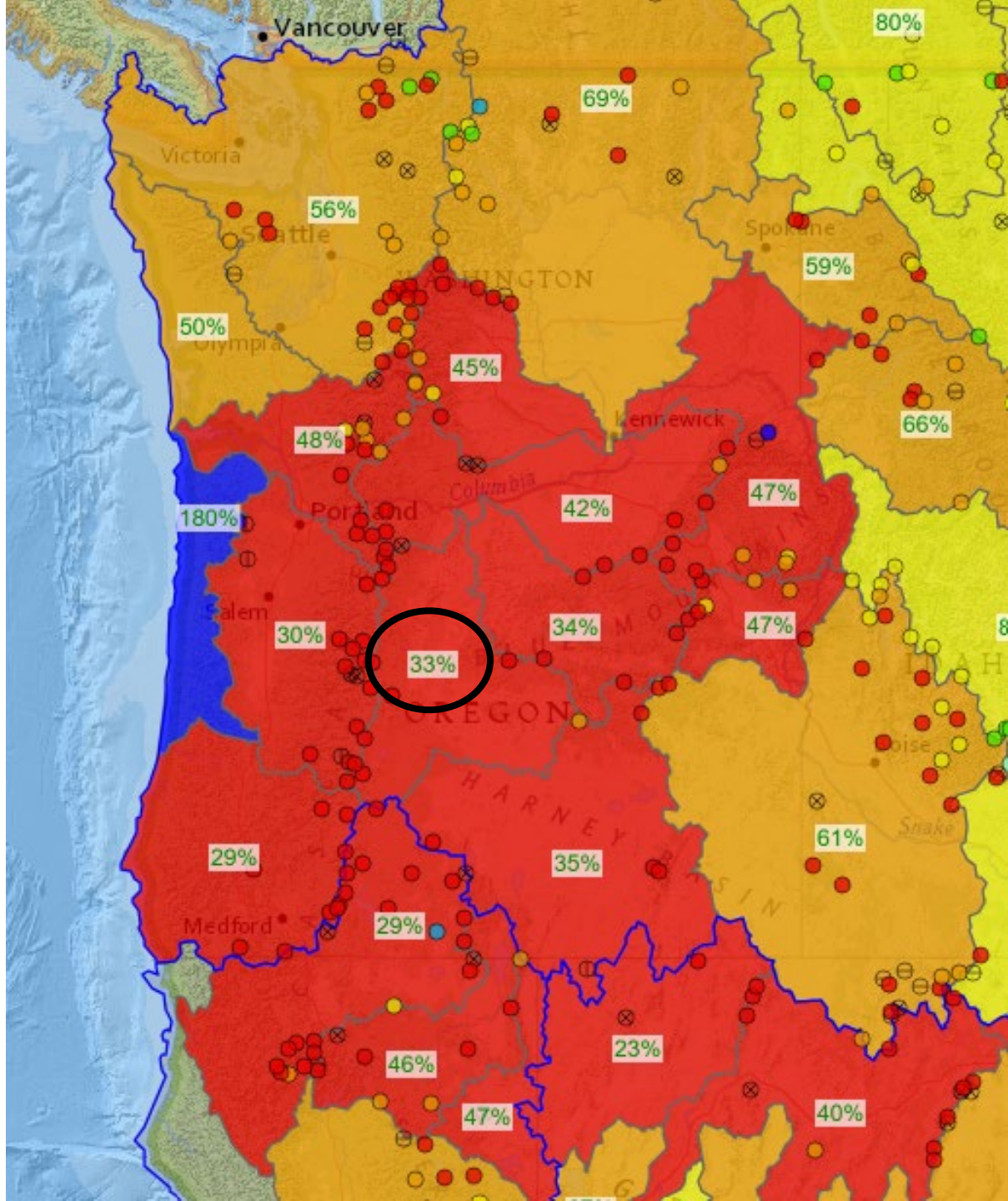
SNOWPACK in the PNW as of 2/27/26:

- Possibly the 3rd worst snowpack in the past 50 years



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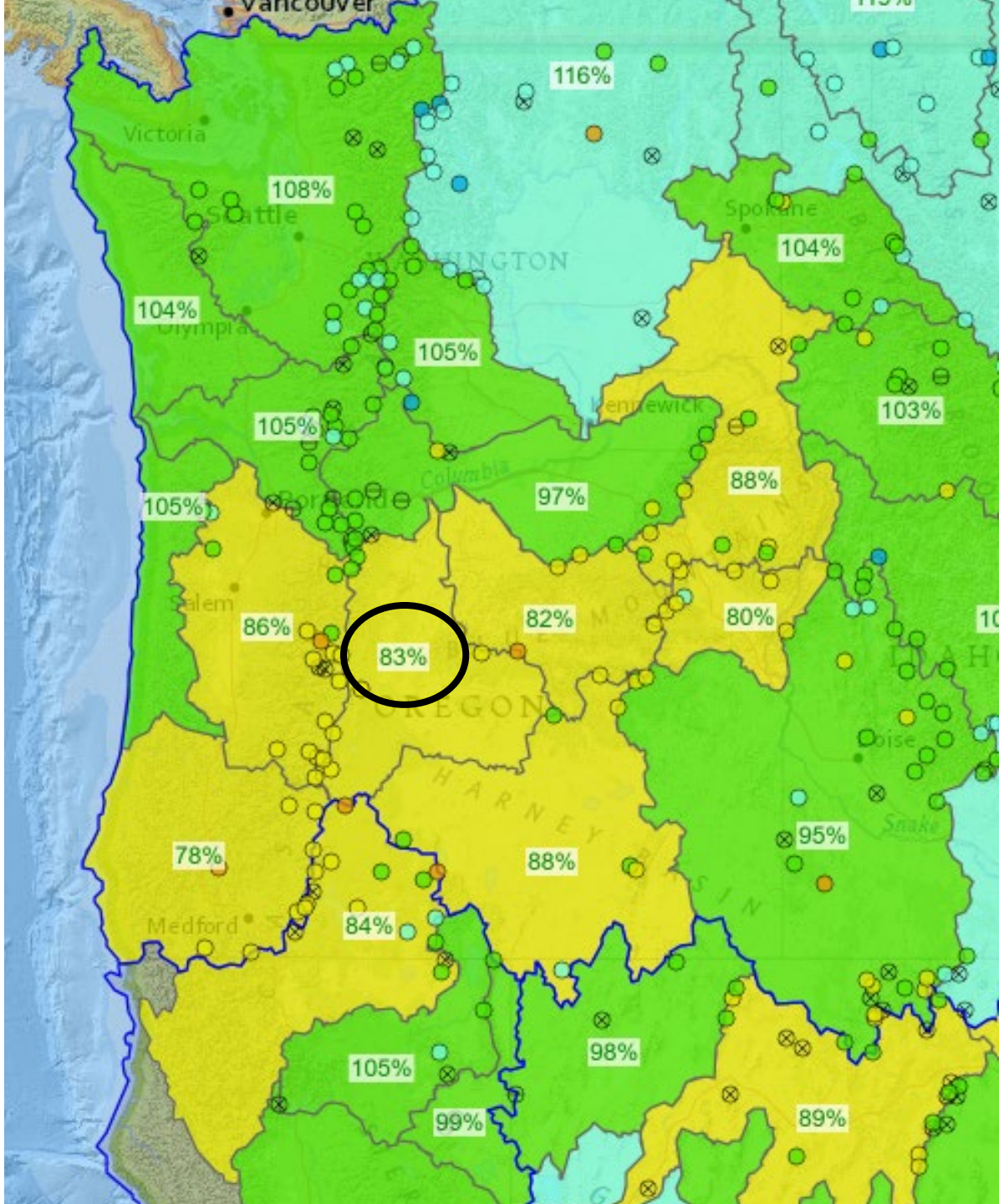
Water Year PRECIPITATION in the PNW as of 2/27/26:

83% for the Deschutes



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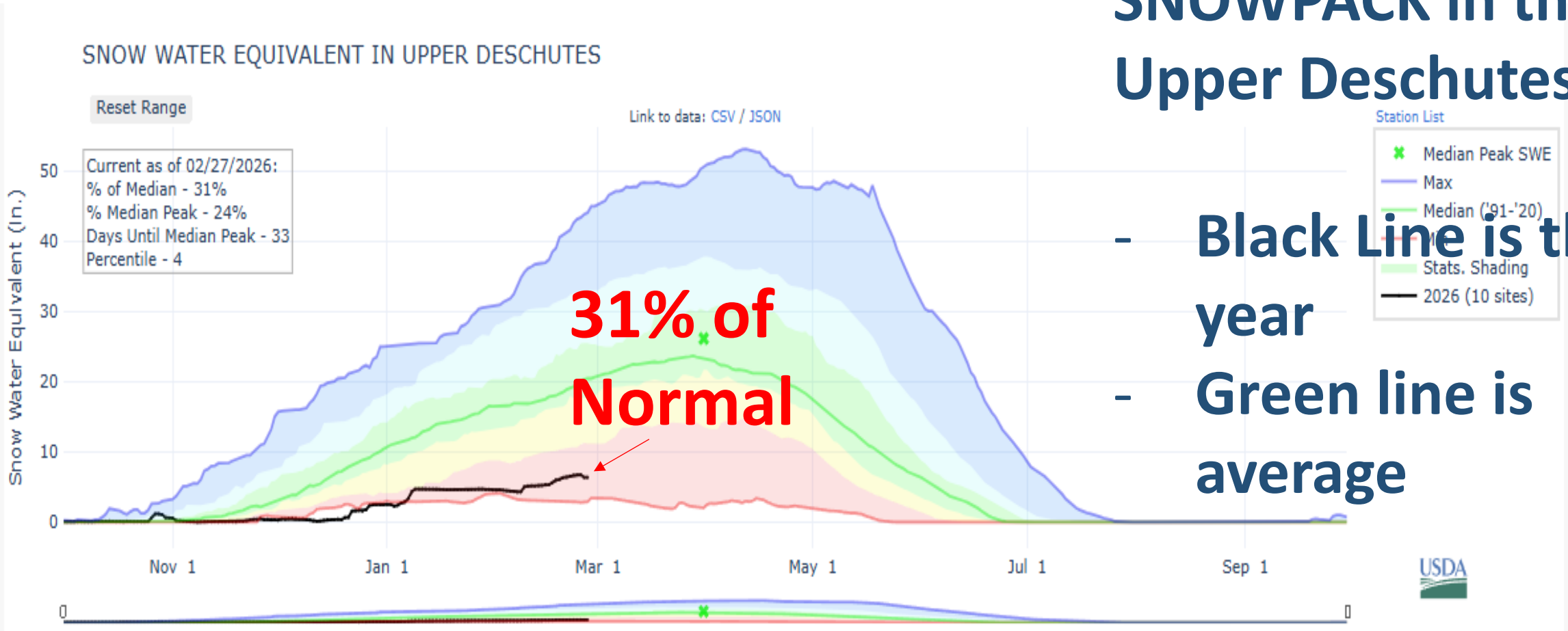
SNOWPACK in the Upper Deschutes



31% of Normal

- Black Line is this year
- Green line is average

Statistical shading percentiles are calculated from period of record (POR) data, excluding the current water year. Percentile categories range from: minimum to 10th percentile , 10th - 30th , 30th - 70th , 70th - 90th , and 90th - maximum.

nore information visit: 30-Year Hydroclimatic Normals

ated: Friday, Feb 27, 2026 09 AM CST

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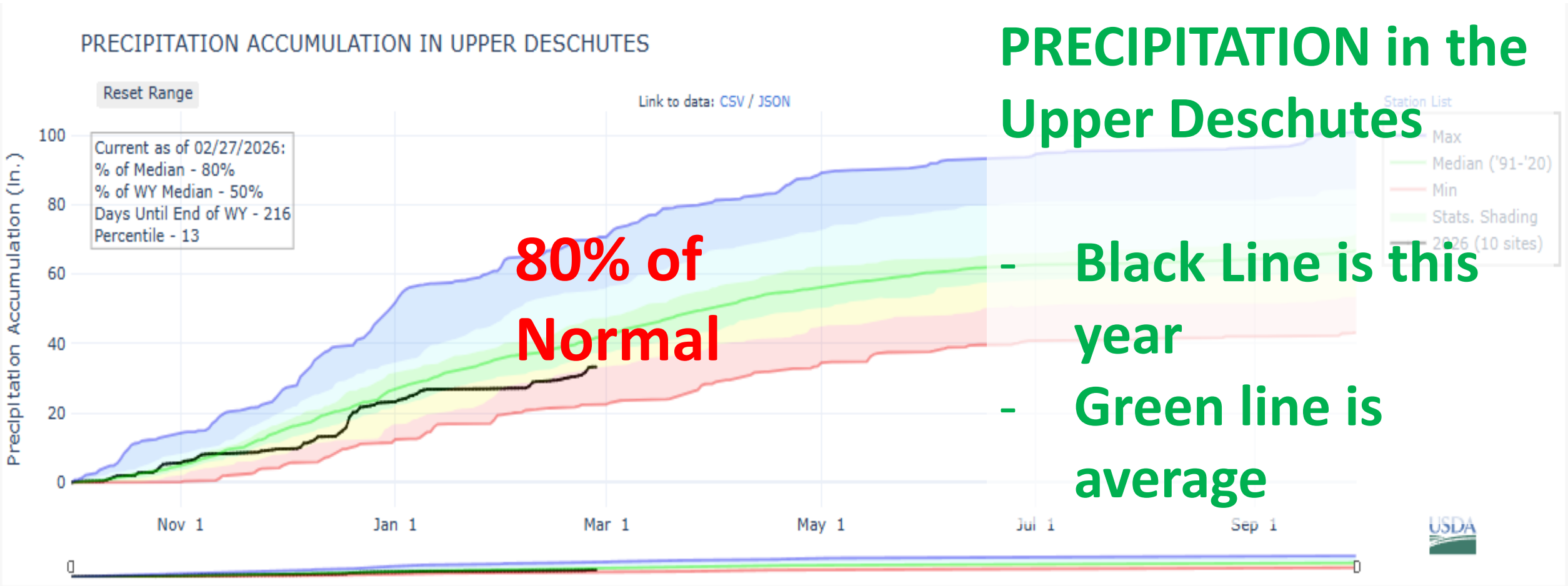
PRECIPITATION in the Upper Deschutes



80% of Normal

- Black Line is this year
- Green line is average

Statistical shading percentiles are calculated from period of record (POR) data, excluding the current water year. Percentile categories range from: minimum to 10th percentile , 10th - 30th , 30th - 70th , 70th - 90th , and 90th - maximum.

formation visit: 30-Year Hydroclimatic Normals

iday, Feb 27, 2026 09 AM CST

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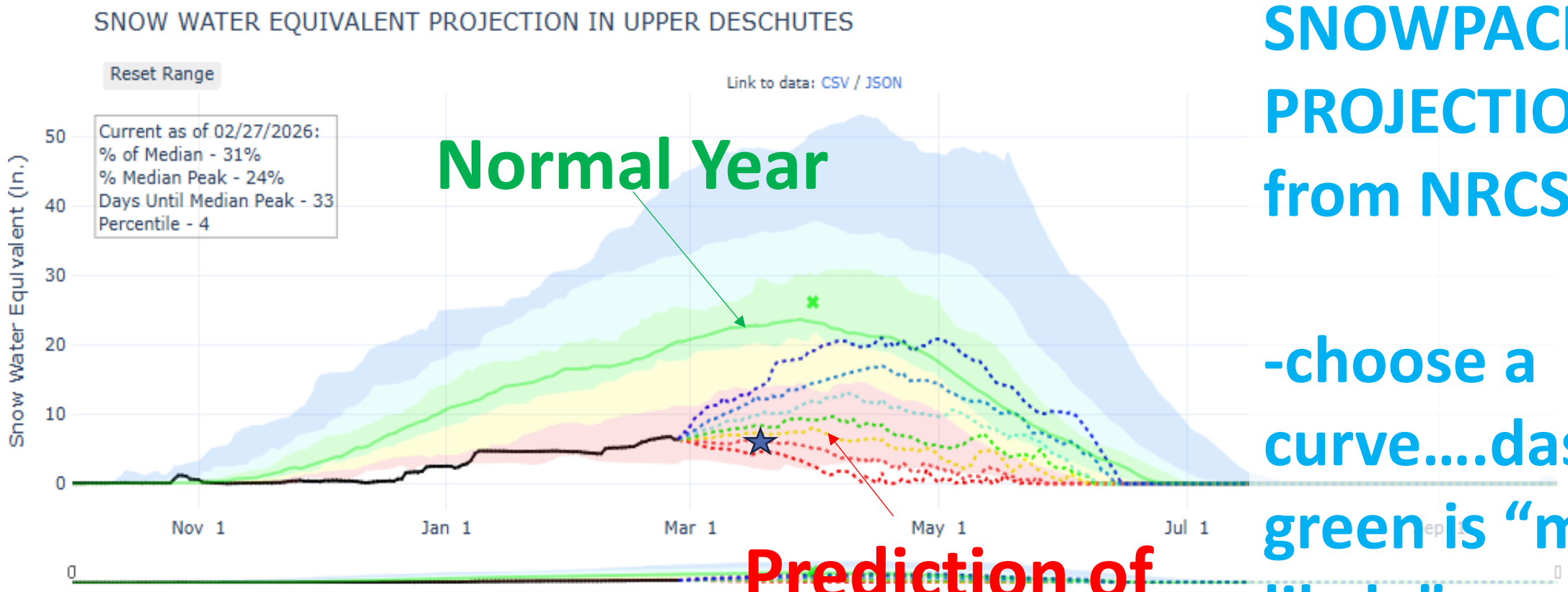
UPPER DESCHUTES Prediction Today



Normal Year

Prediction of ~35% of Normal

SNOWPACK PROJECTIONS from NRCS

-choose a curve….dashed green is “most likely”

Statistical shading percentiles are calculated from period of record (POR) data, excluding the current water year. Percentile categories range from: minimum to 10th percentile , 10th - 30th , 30th - 70th , 70th - 90th , and 90th - maximum.

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iday, Feb 27, 2026 09 AM CST

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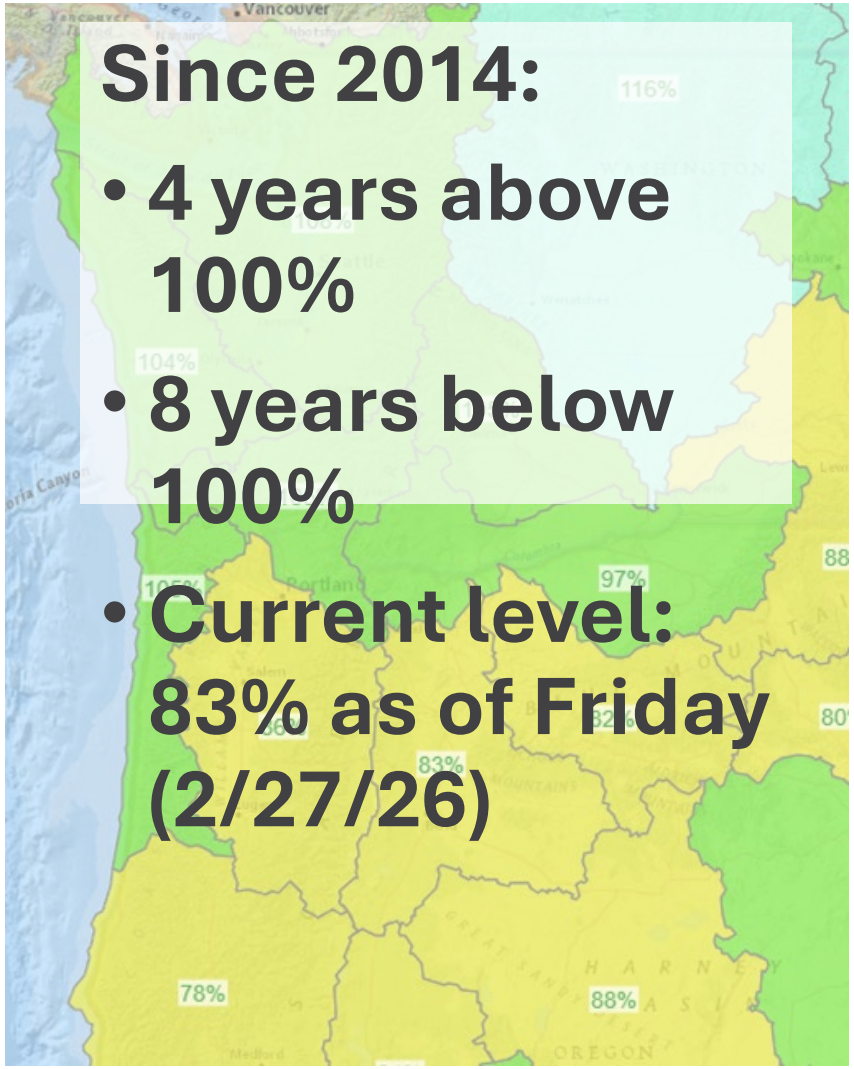
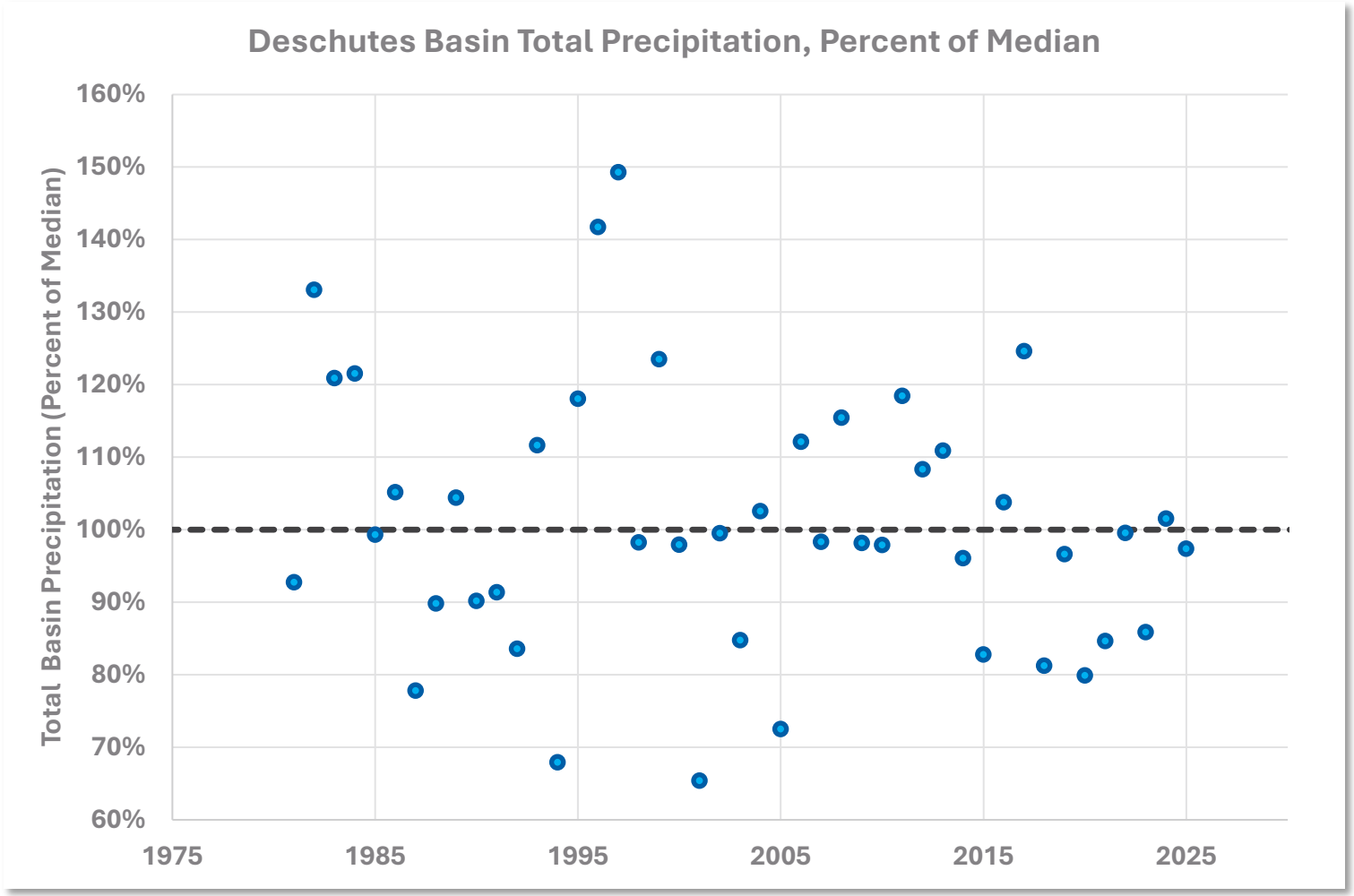
Total Precipitation is the Key



Since 2014:

- 4 years above 100%
- 8 years below 100%
- Current level: 83% as of Friday (2/27/26)



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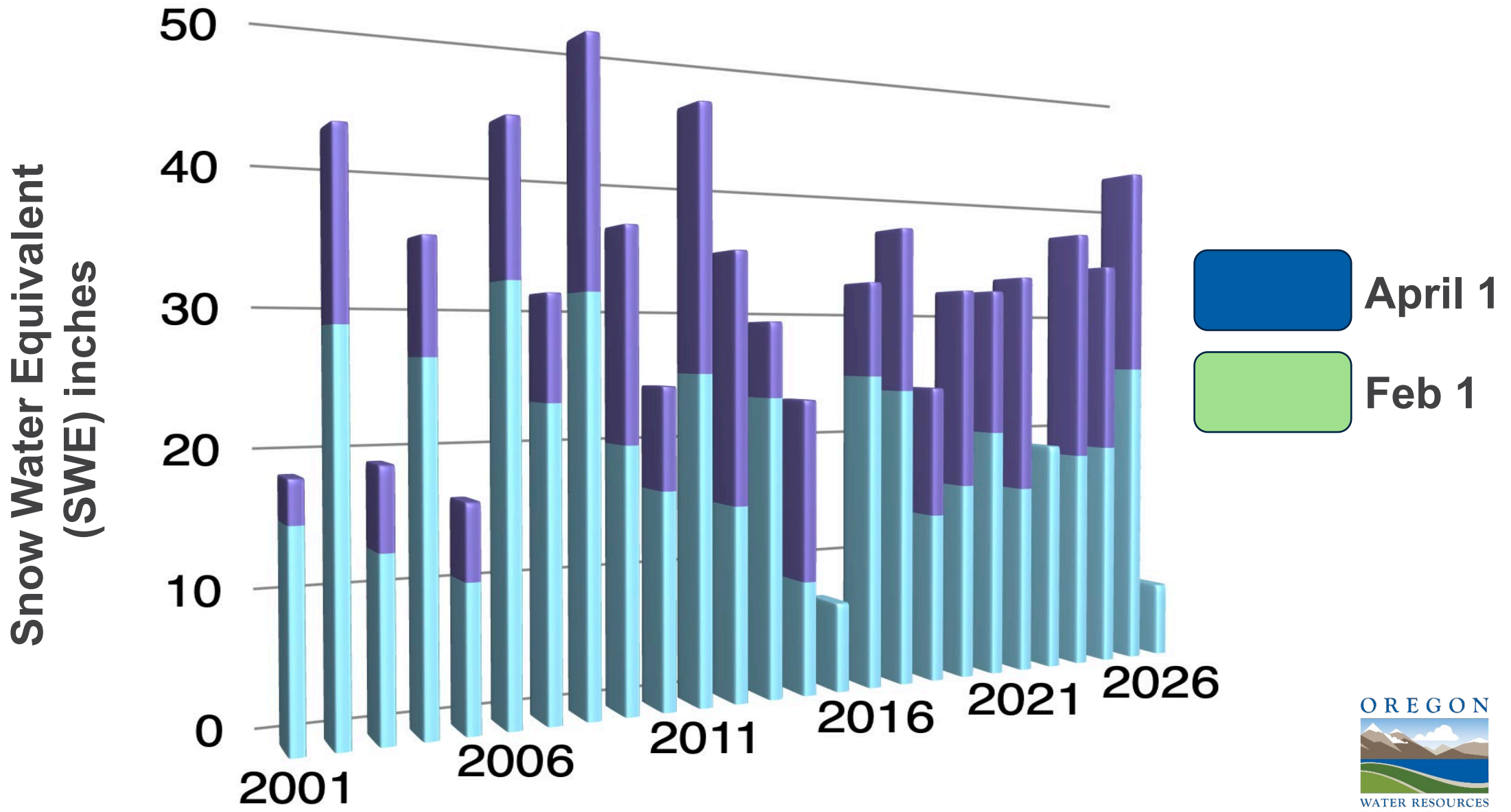
If we get 30” of water in the snowpack at Cascade Summit by April 1st we will be alright.-*Awbrey Perry Deschutes Watermaster 1933-1960.*



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Summary

There is no singular magic solution

- Central Oregon has a unique geologic, hydrologic, and cultural make up
- Climate trends continue to not be favorable
- Resources are stretched thin

HOWEVER…

- This is a region championed for collaboration and innovation
- Working together has been our only way forward

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Questions?

Aubrey Perry (Watermaster 1933-1960) and Jack Frost (NRCS) measuring snowpack in Dutchman Flat area Circa 1940-1945.

www.oregon.gov/owrd (our website)

https://apps.wrd.state.or.us/apps/sw/hydro_near_real_time/ (NRT)

www.or.nrcs.usda.gov/snow/data/current.html *(SNOTEL)*

www.usbr.gov/pn/hydromet/destea.html *(Deschutes Basin Interactive Gages)*

Jeremy.T.Giffin@Oregon.gov

(541) 306-6885

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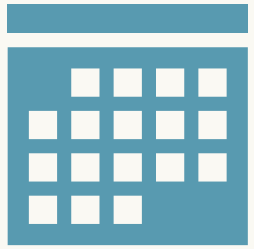
Discussion & Feedback

Look ahead



April 1, 2026: Drainage and Density Implementation
11 a.m.-12:30 p.m. Hybrid Meeting (new Headquarters Building or MS Teams)

May 6, 2026: Stormwater Program Update and WaterWise/FireWise Discussion
11 a.m.-12:30 p.m. Hybrid Meeting (new Headquarters Building or MS Teams)

June 3, 2026: In-person Tour!

Thank you!

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