



United States Department of Agriculture



Idaho

Natural
Resources
Conservation
Service



Snowpack in the Pend Oreille Basin

February 26, 2024 | Peter Youngblood, Hydrologist

Natural
Resources
Conservation
Service

nr.cs.usda.gov/

Outline

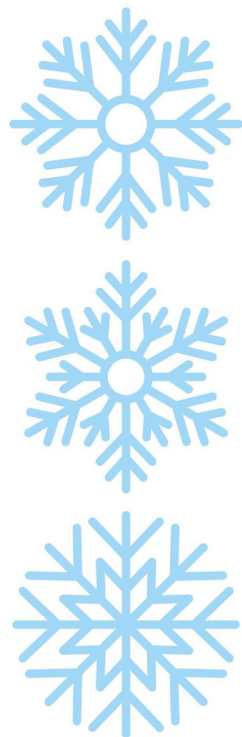
- ❖ **Snow Survey 101**
- ❖ **Snowpack Monitoring in the Pend Oreille Basin**
- ❖ **Current Conditions and Forecasting**

Outline

Snow Survey 101

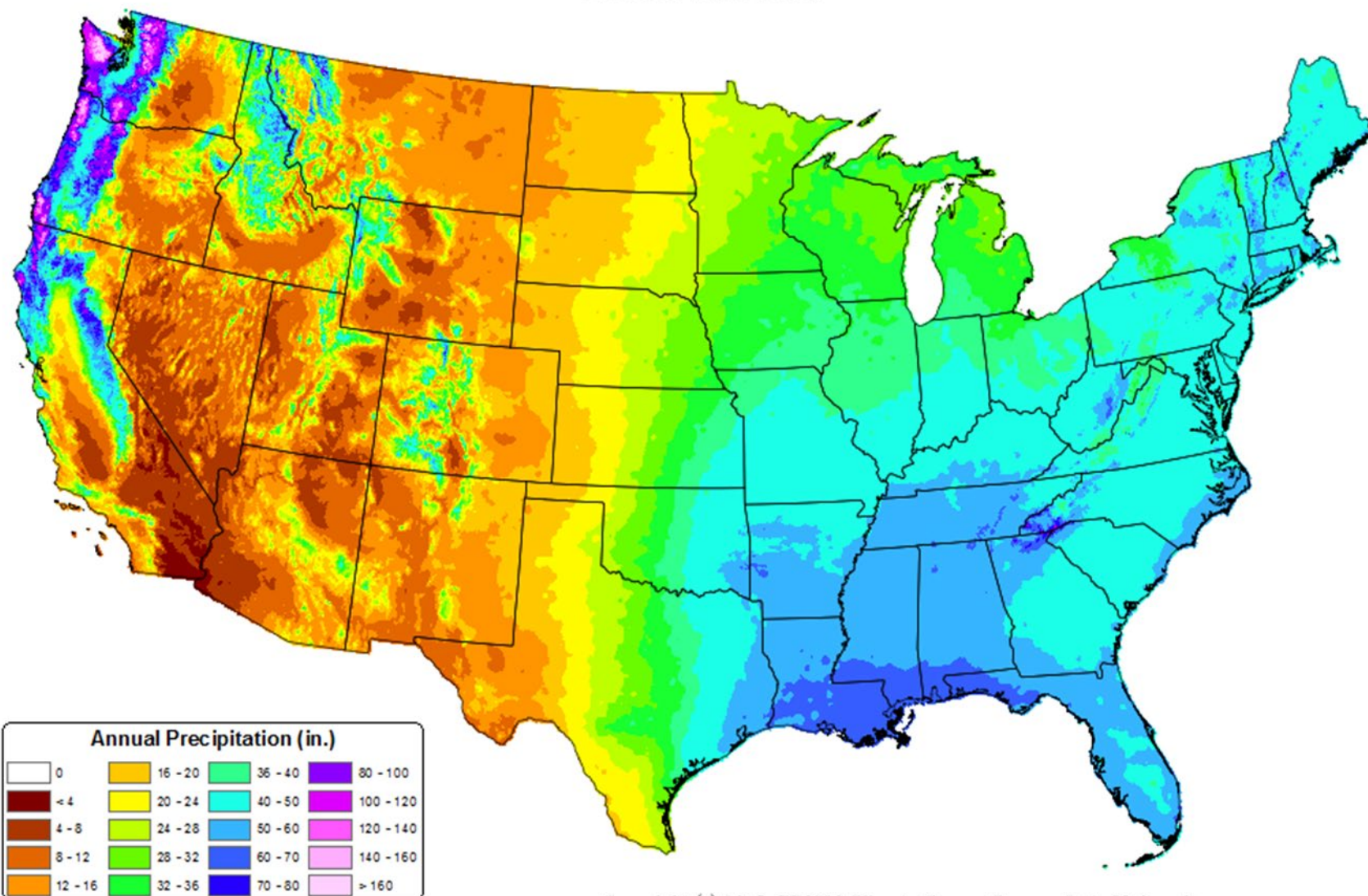
Snowpack Monitoring
In Pend Oreille Basin

Current Conditions

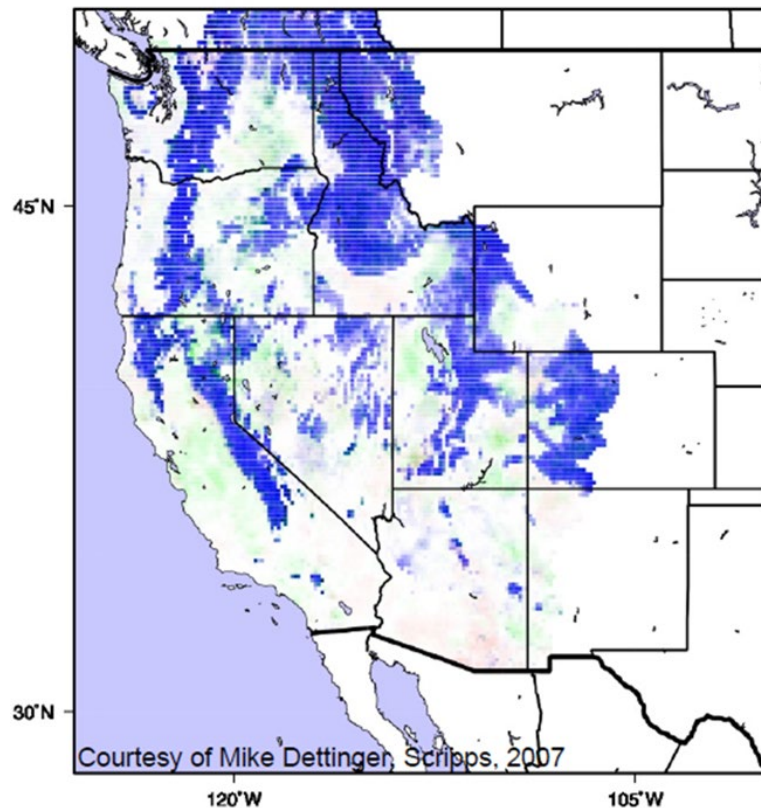
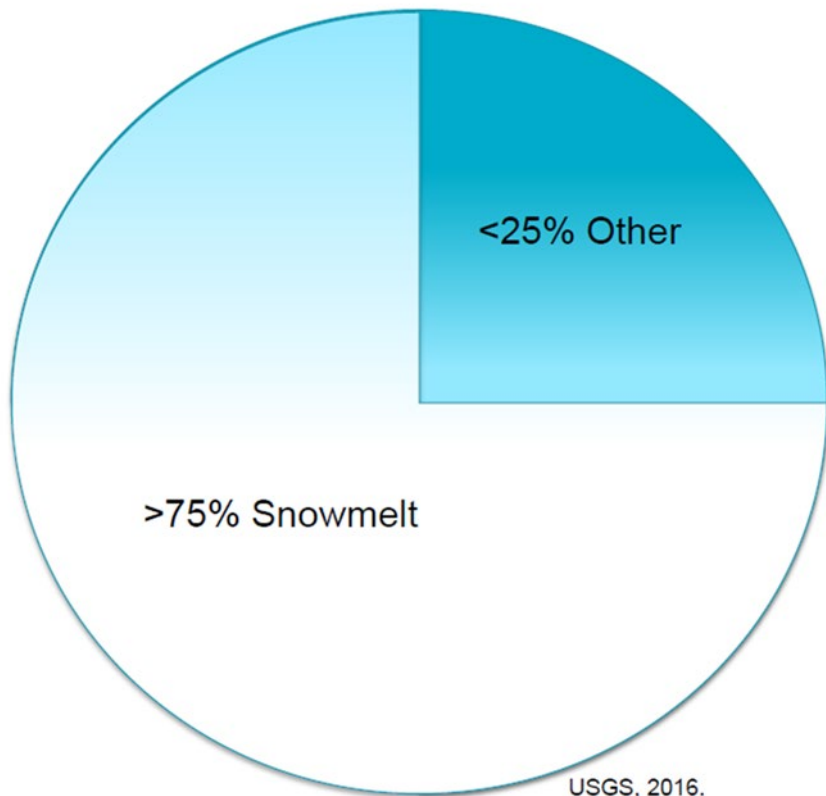


30-yr Normal Precipitation: Annual

Period: 1981-2010



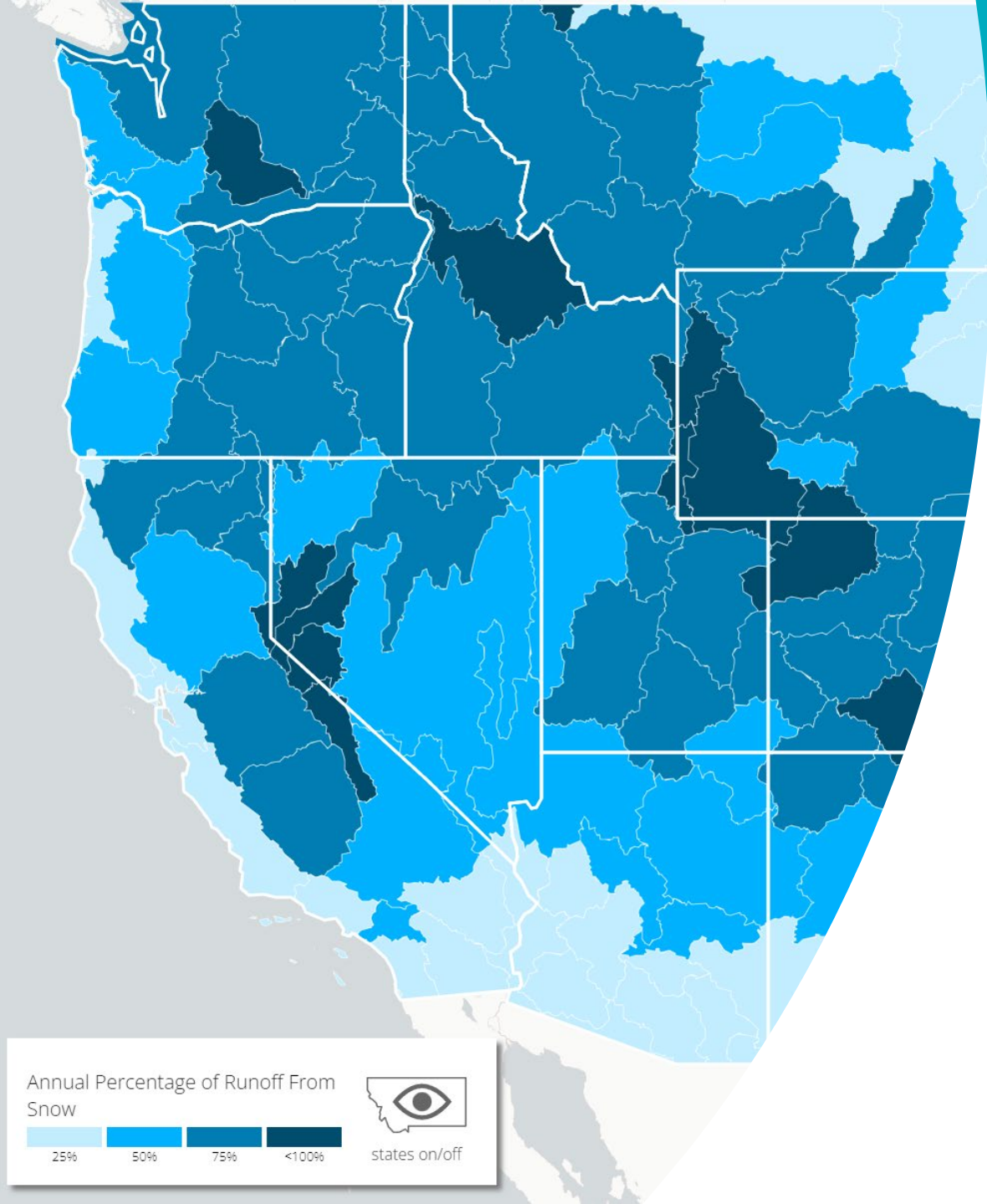
Water in the West



Natural
Resources
Conservation
Service

nrcs.usda.gov/





Pend Oreille

ANNUAL BASIN STATISTICS:

VOLUME OF RUNOFF FROM SNOW AND RAIN:

39.32M acre-feet

PERCENT OF RUNOFF FROM SNOW:
68.6%

VOLUME OF RUNOFF FROM SNOW:

26.98M acre-feet

VOLUME OF RUNOFF FROM RAIN:

12.33M acre-feet

Spokane

ANNUAL BASIN STATISTICS:

VOLUME OF RUNOFF FROM SNOW AND RAIN:

9.24M acre-feet

PERCENT OF RUNOFF FROM SNOW:
59.5%

VOLUME OF RUNOFF FROM SNOW:

5.5M acre-feet

VOLUME OF RUNOFF FROM RAIN:

3.74M acre-feet

Snow Survey 101



**“Whiskey is for drinking. Water is for fighting over.”
– Mark Twain**

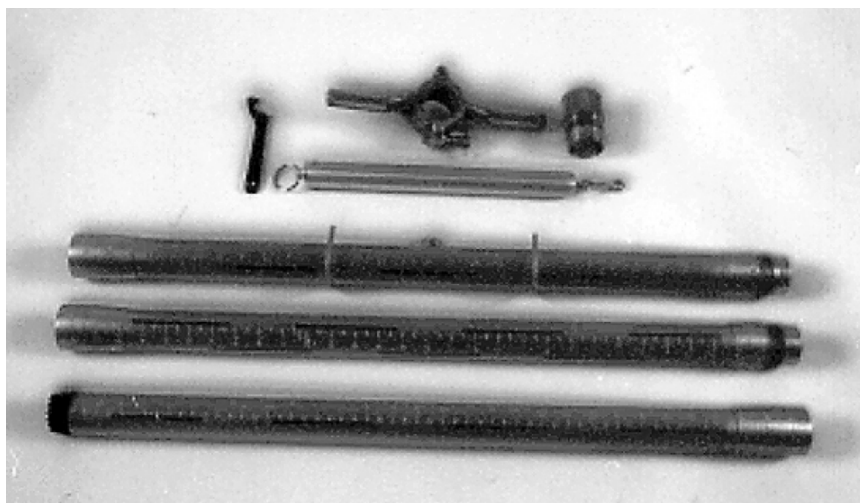
- ❖ **1908 – James Church established first snow courses**
- ❖ **1935 – Congress formed Snow Survey and Water Supply Forecasting Program**
- ❖ **Mid 1960’s – Beginning of SNOTEL**

Outline

Snow Survey 101

Snowpack Monitoring
In Pend Oreille Basin

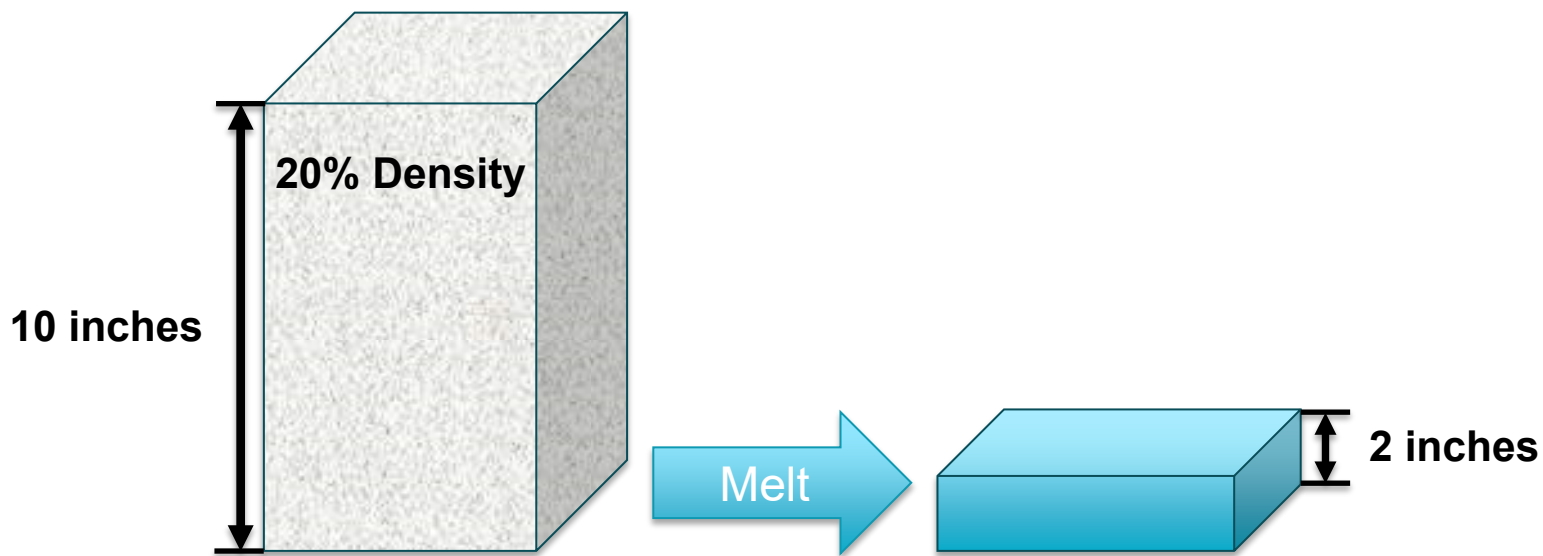
Current Conditions



Snow Water Equivalent (SWE)



SWE is a measure of the liquid water contained in snowpack



$$10'' \times 20\% = 2''$$



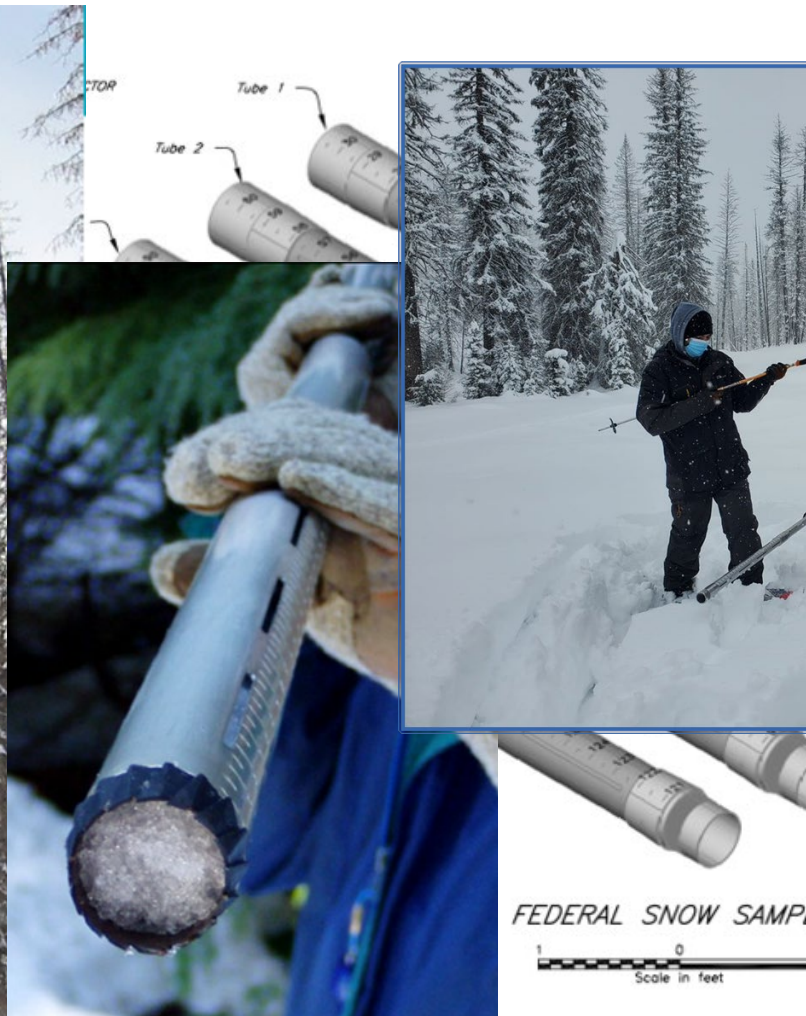
Snow Courses



- 
- Snow courses are permanent snow measuring locations marked at endpoints by signs on poles or trees
 - Typical snow courses have 5 – 10 measurement points spaced at 50 feet
 - Middle points sometimes marked by poles too



Federal Snow Sampler



UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

FEDERAL-STATE-PRIVATE
COOPERATIVE SNOW SURVEYS

Snow Course Blizzard Ridge
 Drainage Basin Missouri-Gallatin State Montana
 Sampler G. Clagett Note Taker P.E. Farnes
 Date Feb. 28, 1984 Began 1:00 p.m. Ended 2:35 p.m.

SCS-EN-708
12-79

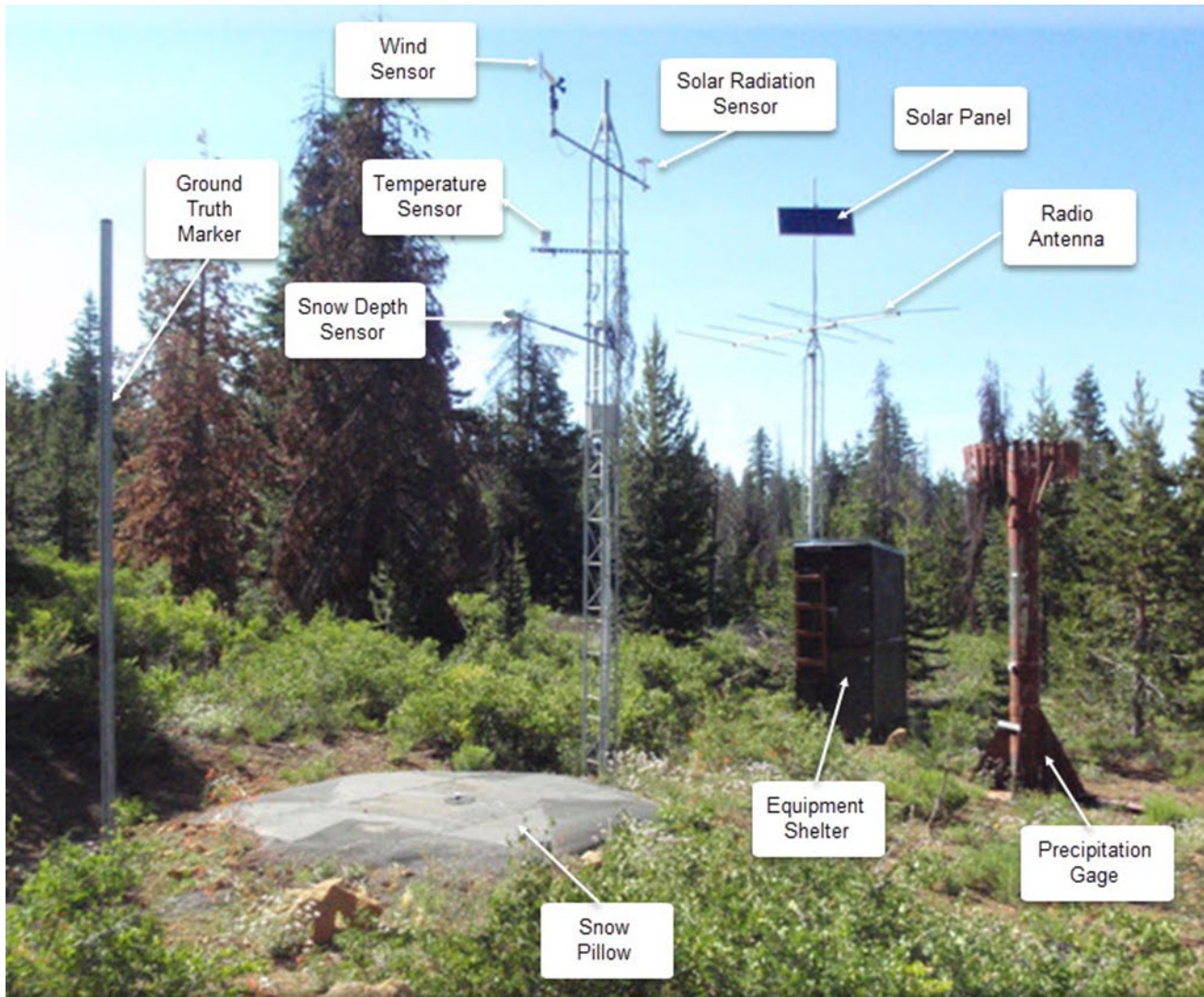
Sample Number	Depth of Snow Inches	Length of Core Inches	Weight of Tube and Core	Weight of Empty Tube	Water Content Inches	Density Percent	Remarks (See reverse)
1	94	92	62½	35	27½	29	GNE Damp
2	91	89	62		27	30	
3	92	86	62		27	29	
4	85½	79	60½		25½	30	
5	87	82½	60½	35	25½	29	Dry Soil
6	87	82	61½		26½	30	
7	83½	79	59		24	29	
8	84½	81½	60		25	30	Needles
9	85	76	80½	56	24½	29	
10	79½	71½	78½	56	22½	28	2 samples
⑩	86.9				25.5	29	Total
⑩	86.9				25.5		Average

FEDERAL SNOW SAMPLER

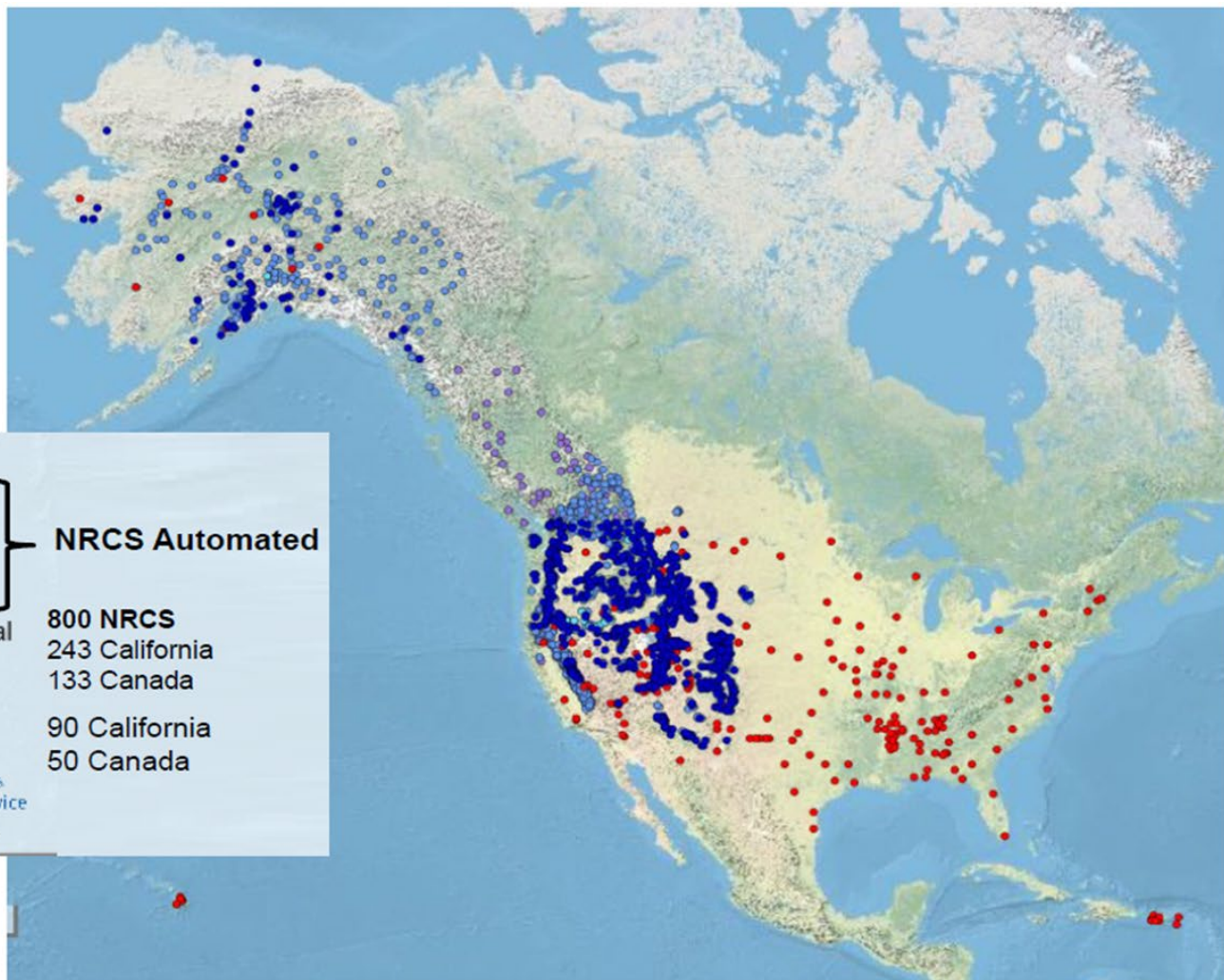


No. of tube sections used, 4
 Was driving wrench used? yes, on samples 9 and 10.
 No. 1 of 1 sheets. Comp. by P.E.F. Checked by G.C.

SNOTEL Site



SNOTEL Network



Stations by Network

- SNOTEL (875)
- SCAN (217)
- SNOLITE (41)

NRCS Automated

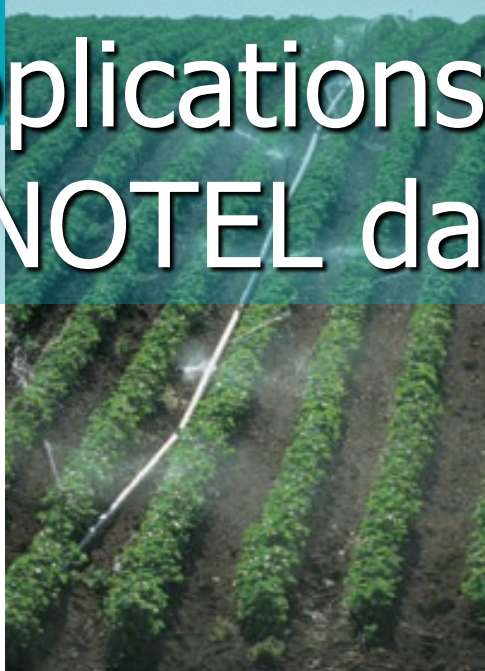
■ Snow Course/Aerial Marker

■ Cooperator Snow Sensors

800 NRCS
243 California
133 Canada

90 California
50 Canada

Applications of SNOTEL data



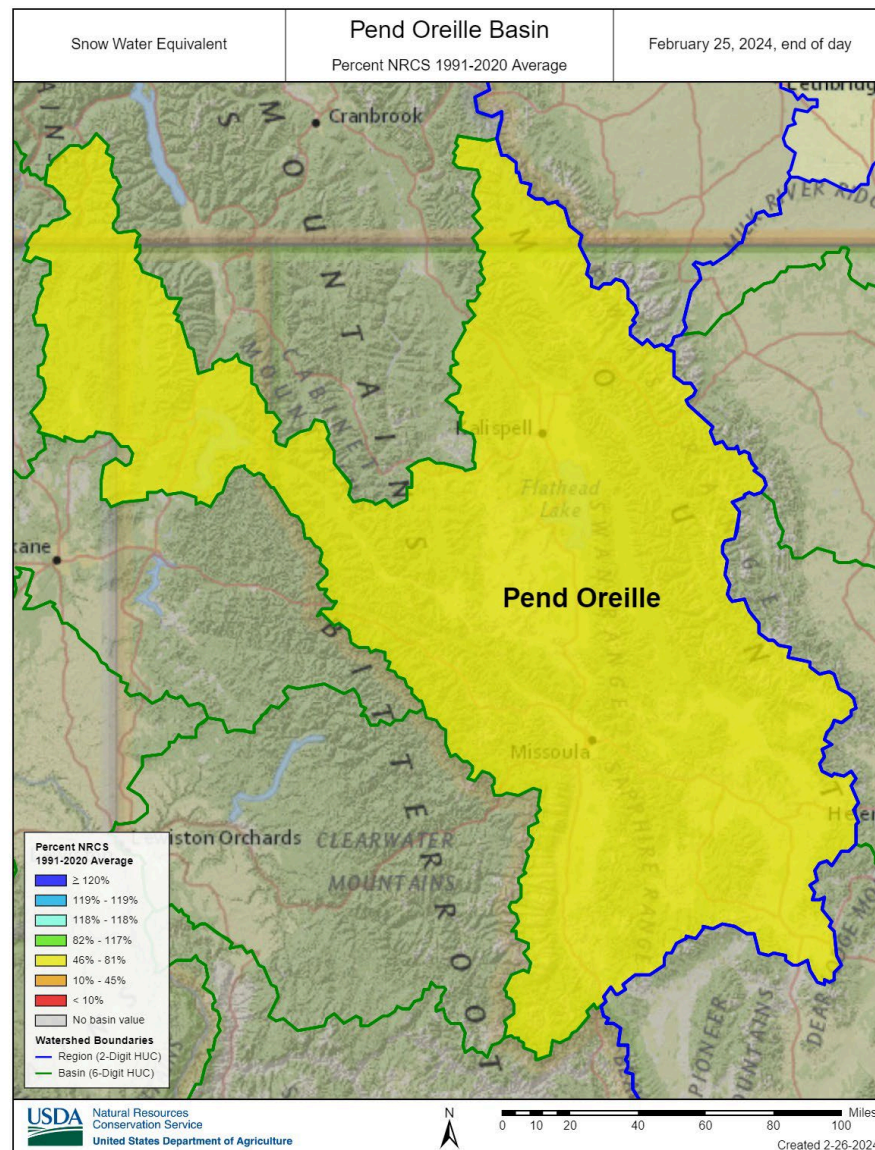
Snowpack Monitoring in the Pend Oreille Watershed

❖ SNOTEL Sites

- ❖ 40 within basin
- ❖ 8 within 3-mile buffer

❖ Snow Courses

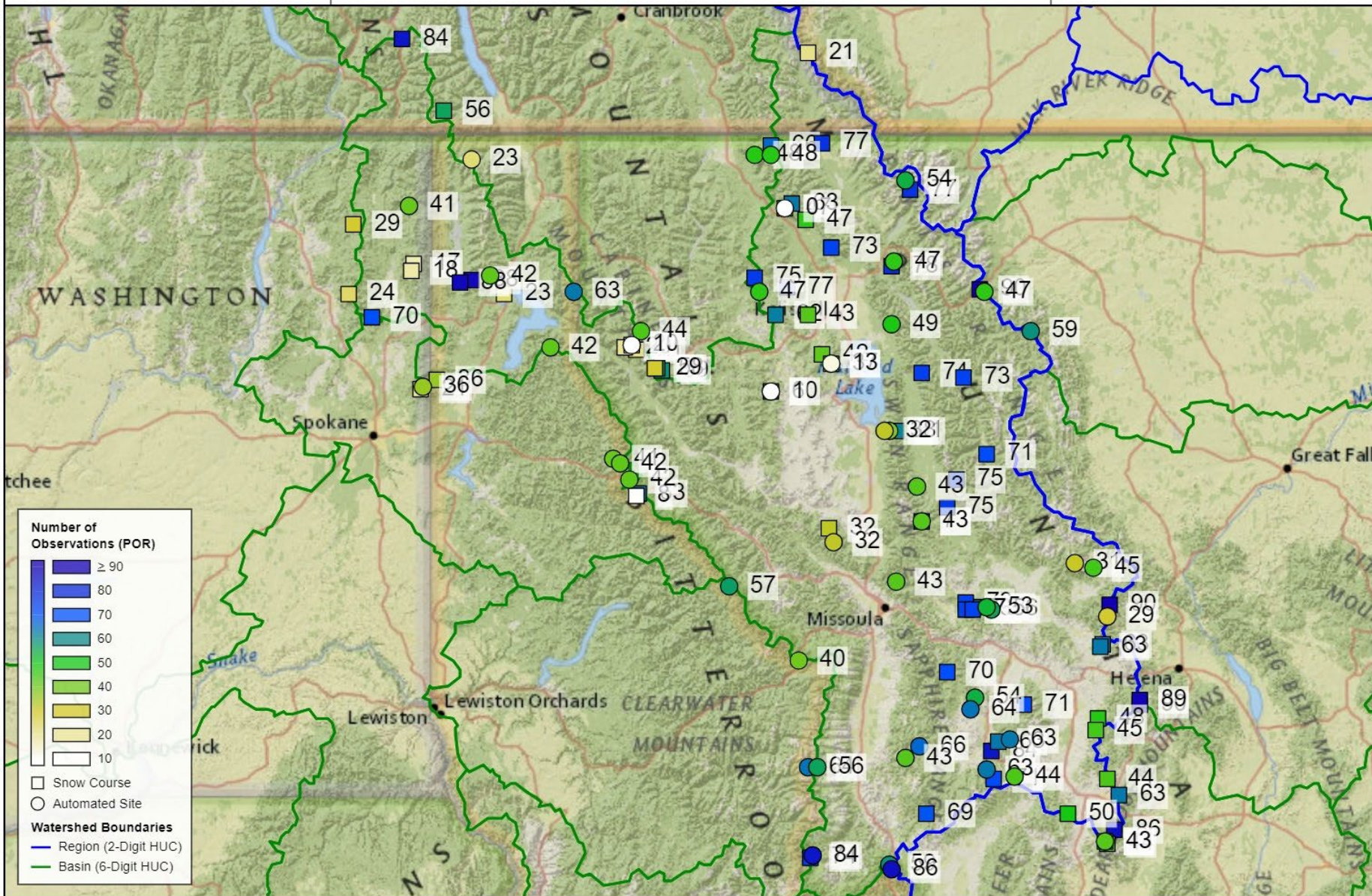
- ❖ 66 within basin
- ❖ 6 within 3-mile buffer



Snow Water Equivalent

Number of Observations (POR)

March 1st



Number of Observations (POR)

Dark Blue	≥ 90
Blue	80
Light Blue	70
Teal	60
Green	50
Light Green	40
Yellow-Green	30
Yellow	20
Light Yellow	10

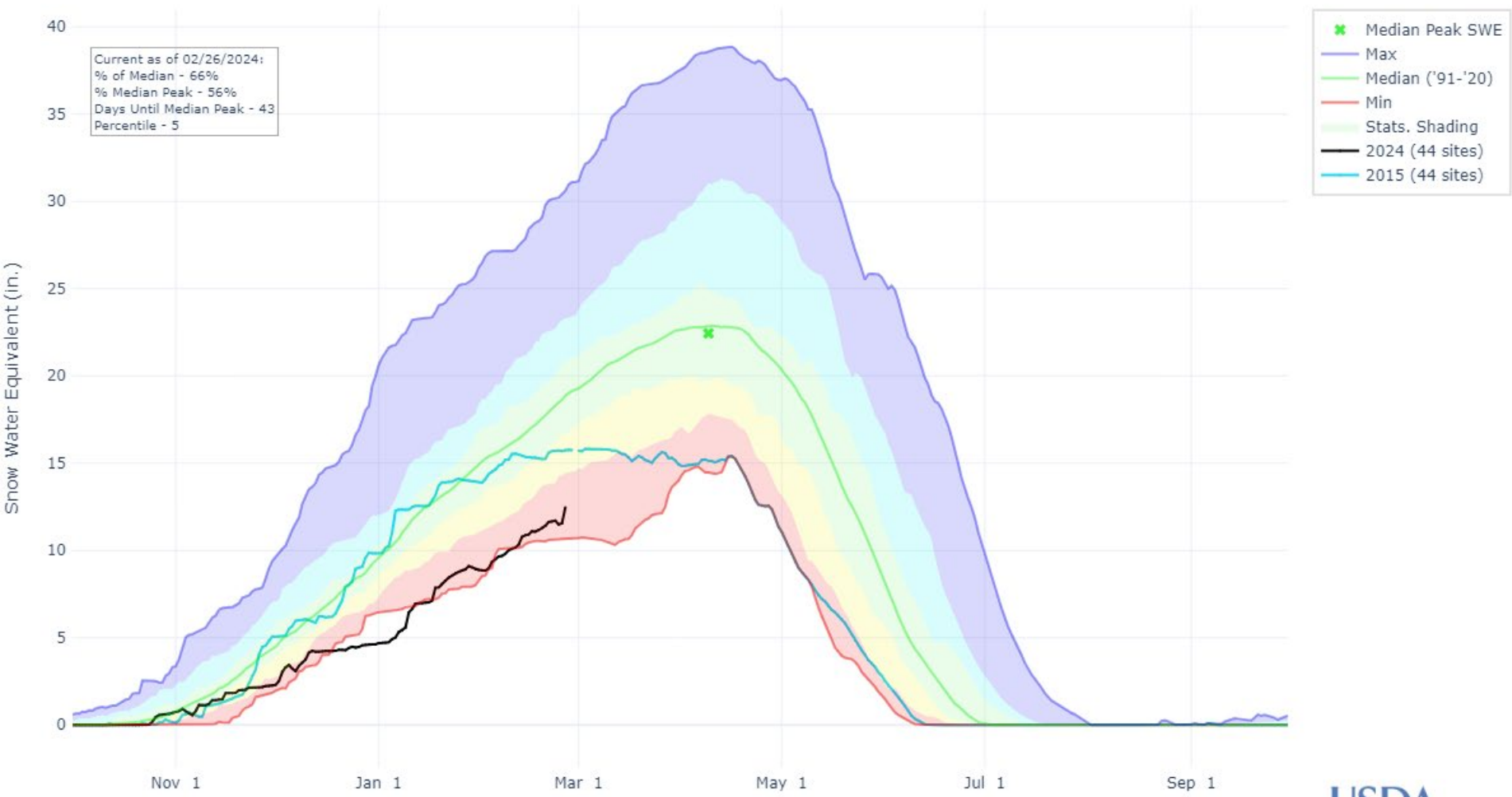
□ Snow Course
○ Automated Site

Watershed Boundaries

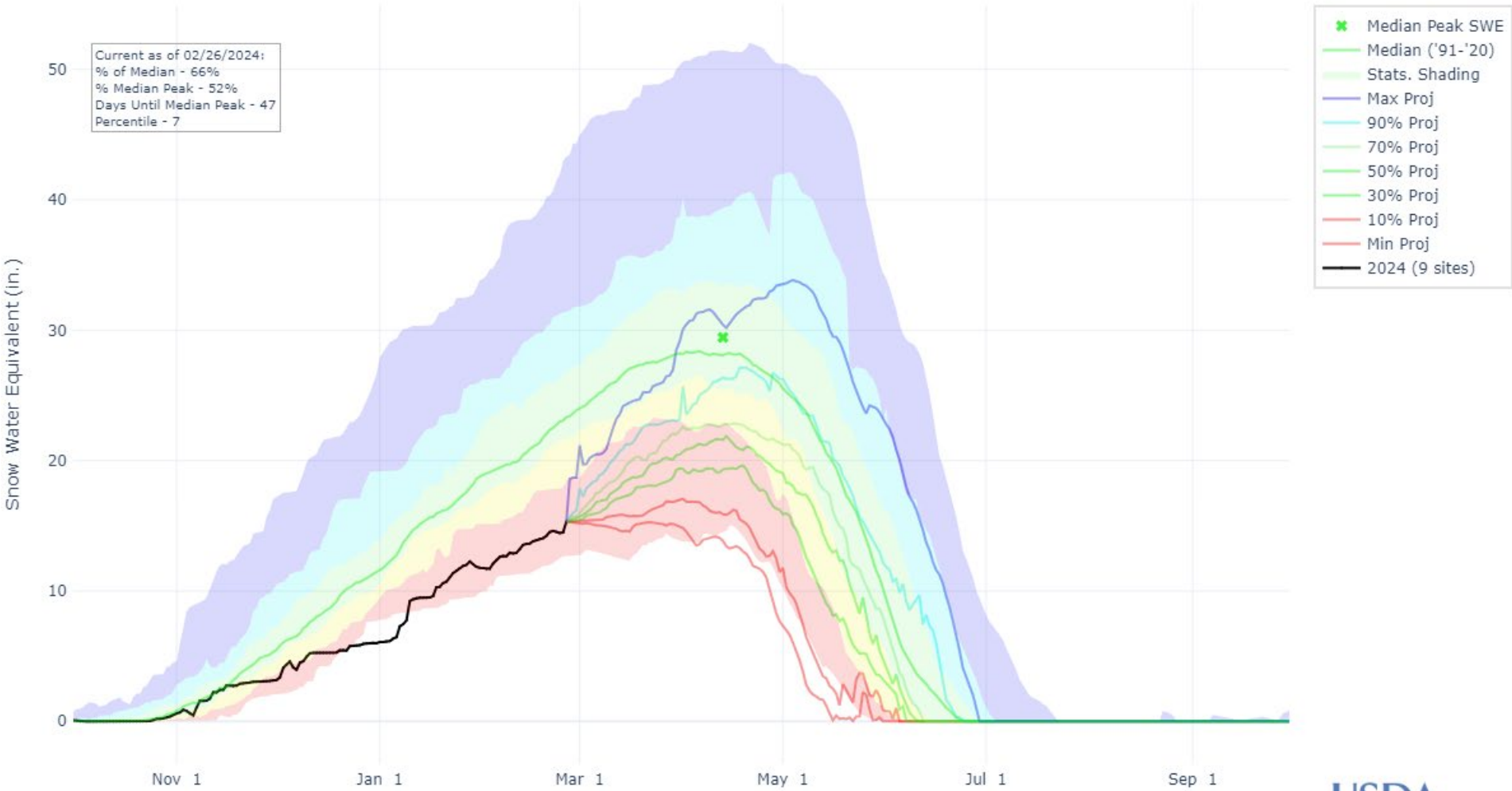
- Blue line: Region (2-Digit HUC)
- Green line: Basin (6-Digit HUC)



Pend Oreille Watershed Snowpack



Pend Oreille Watershed Snowpack Projections



Snowpack Monitoring in the Priest River Watershed

❖ SNOTEL Sites

- ❖ 2 within basin
- ❖ 1 within 3-mile buffer

❖ Snow Courses

- ❖ 2 within basin
- ❖ 4 within 3-mile buffer

Outline

Snow Survey 101

**Snowpack
Monitoring in the
Pend Oreille Basin**

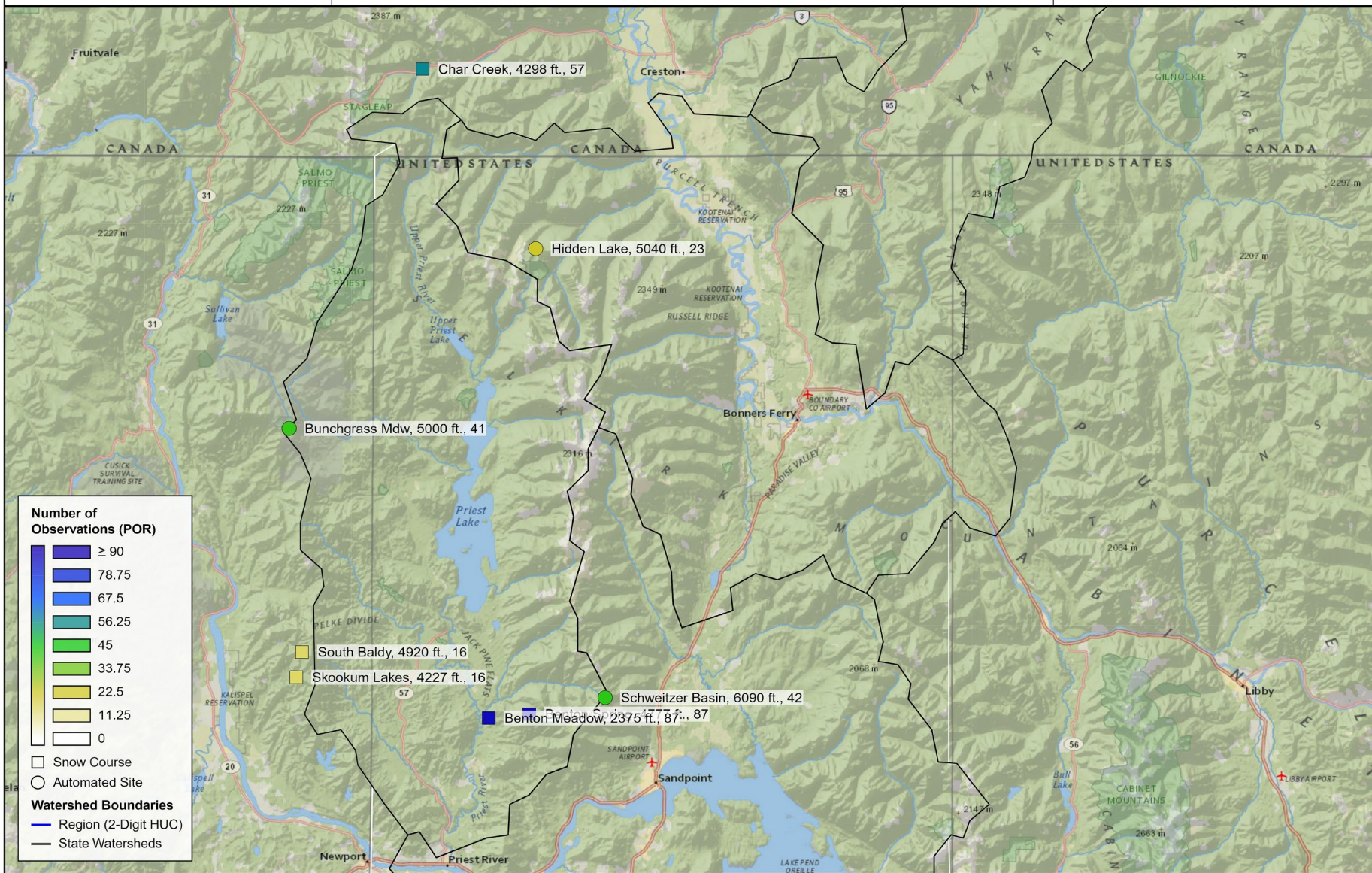
Current Conditions



Snow Water Equivalent

Number of Observations (POR)

April 1st



Number of Observations (POR)

≥ 90
78.75
67.5
56.25
45
33.75
22.5
11.25
0

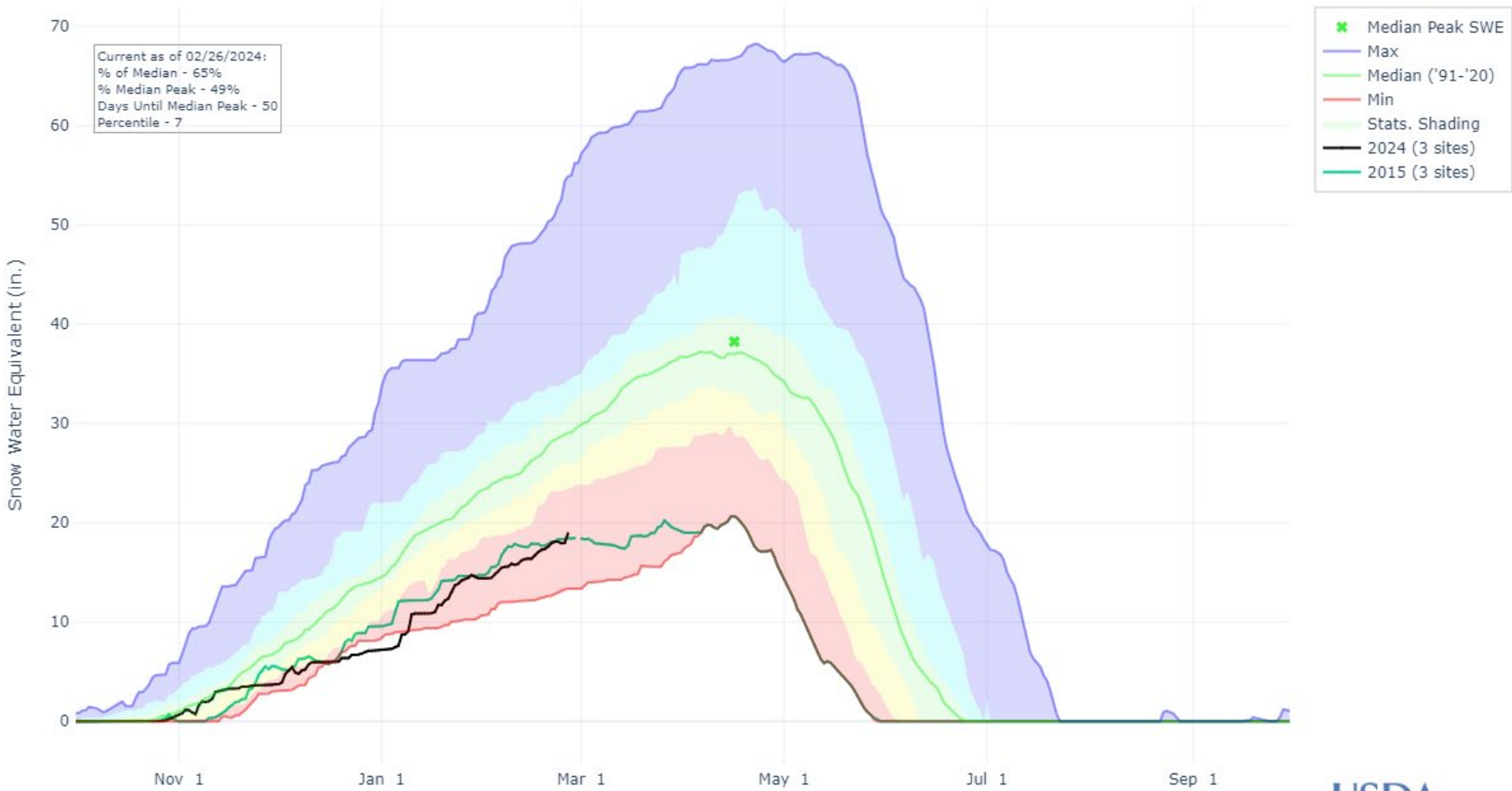
□ Snow Course
○ Automated Site

Watershed Boundaries

- Region (2-Digit HUC)
- State Watersheds



Priest River Watershed Snowpack

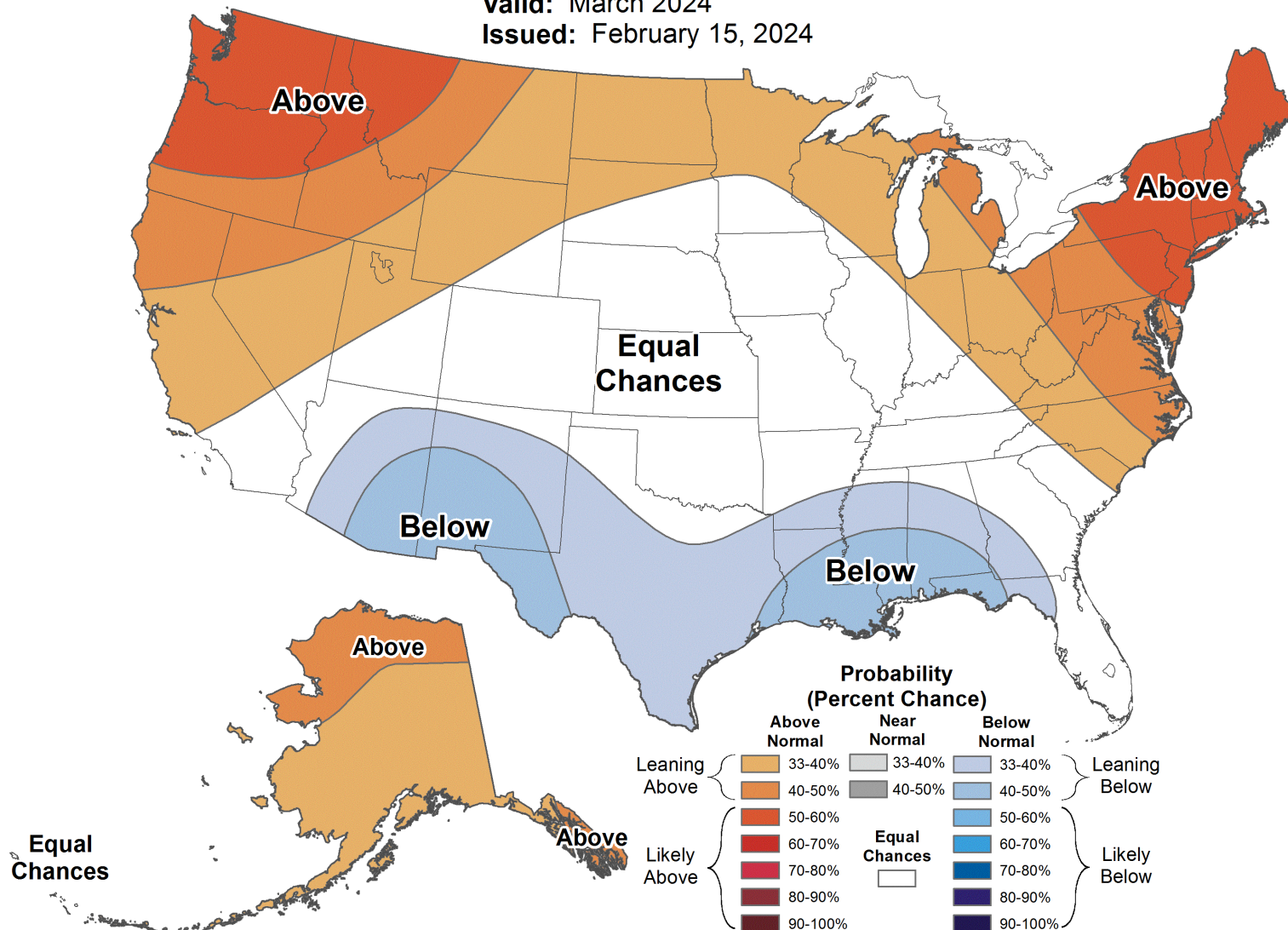




Monthly Temperature Outlook



Valid: March 2024
 Issued: February 15, 2024

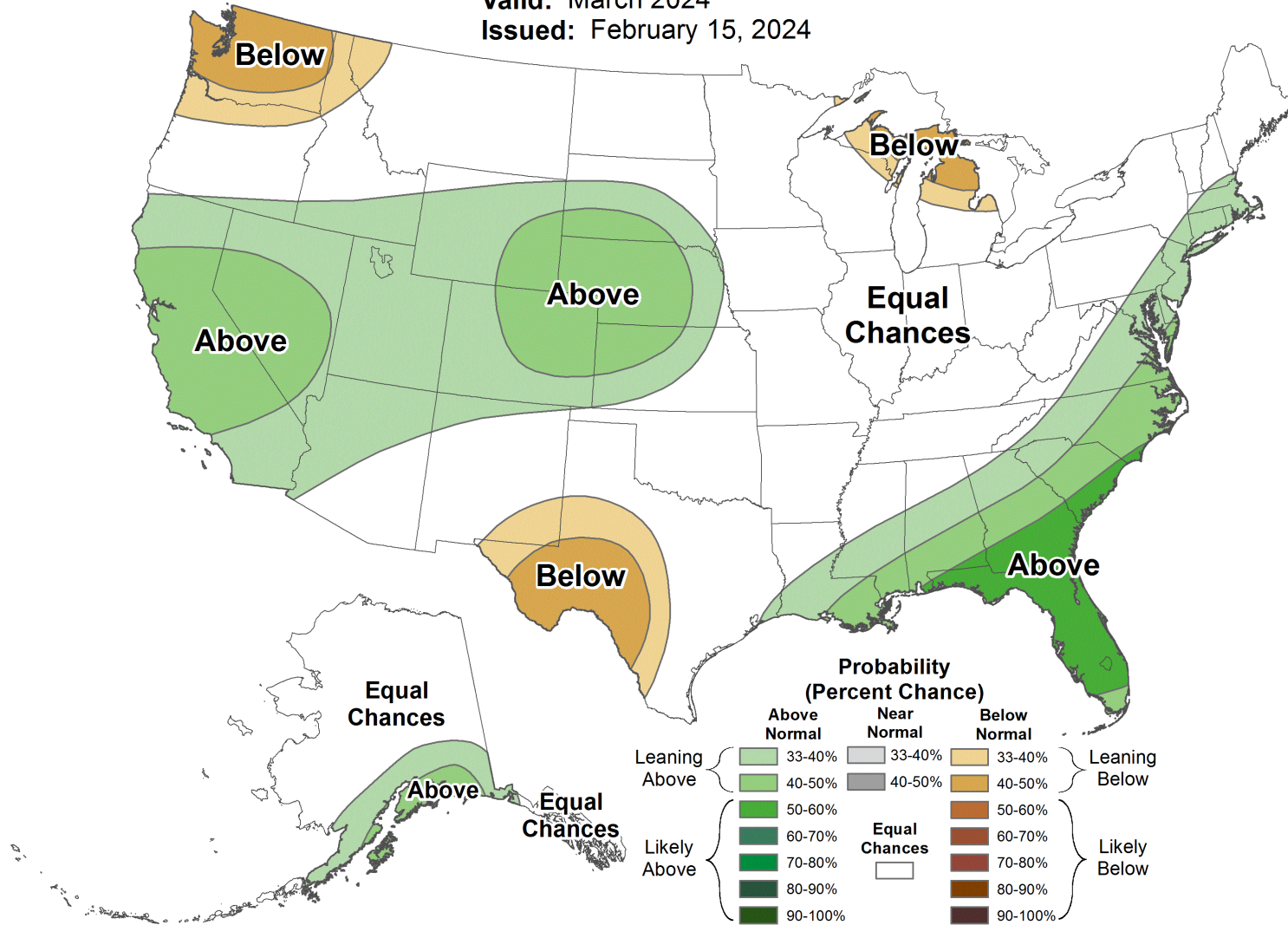




Monthly Precipitation Outlook



Valid: March 2024
 Issued: February 15, 2024

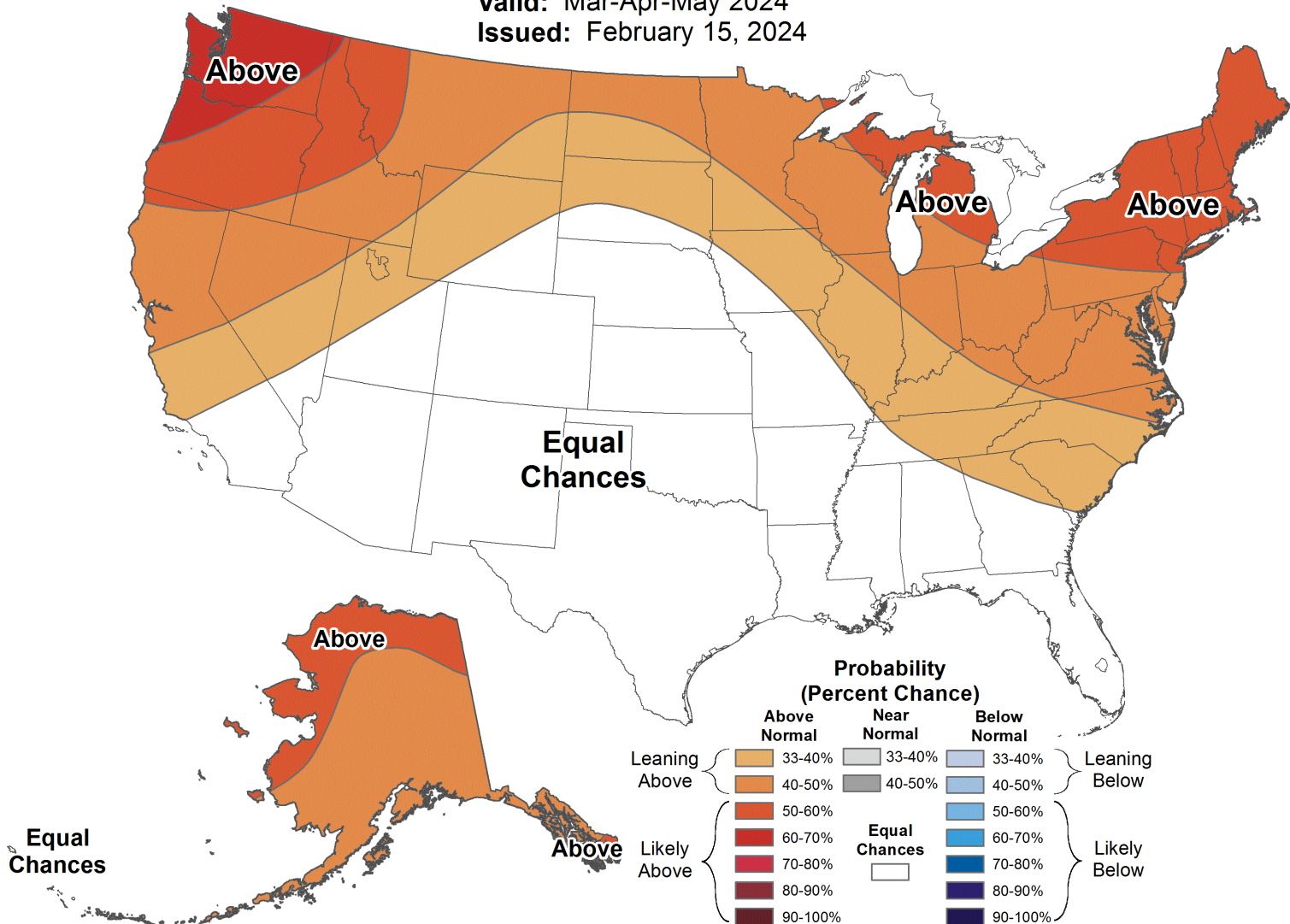




Seasonal Temperature Outlook



Valid: Mar-Apr-May 2024
 Issued: February 15, 2024

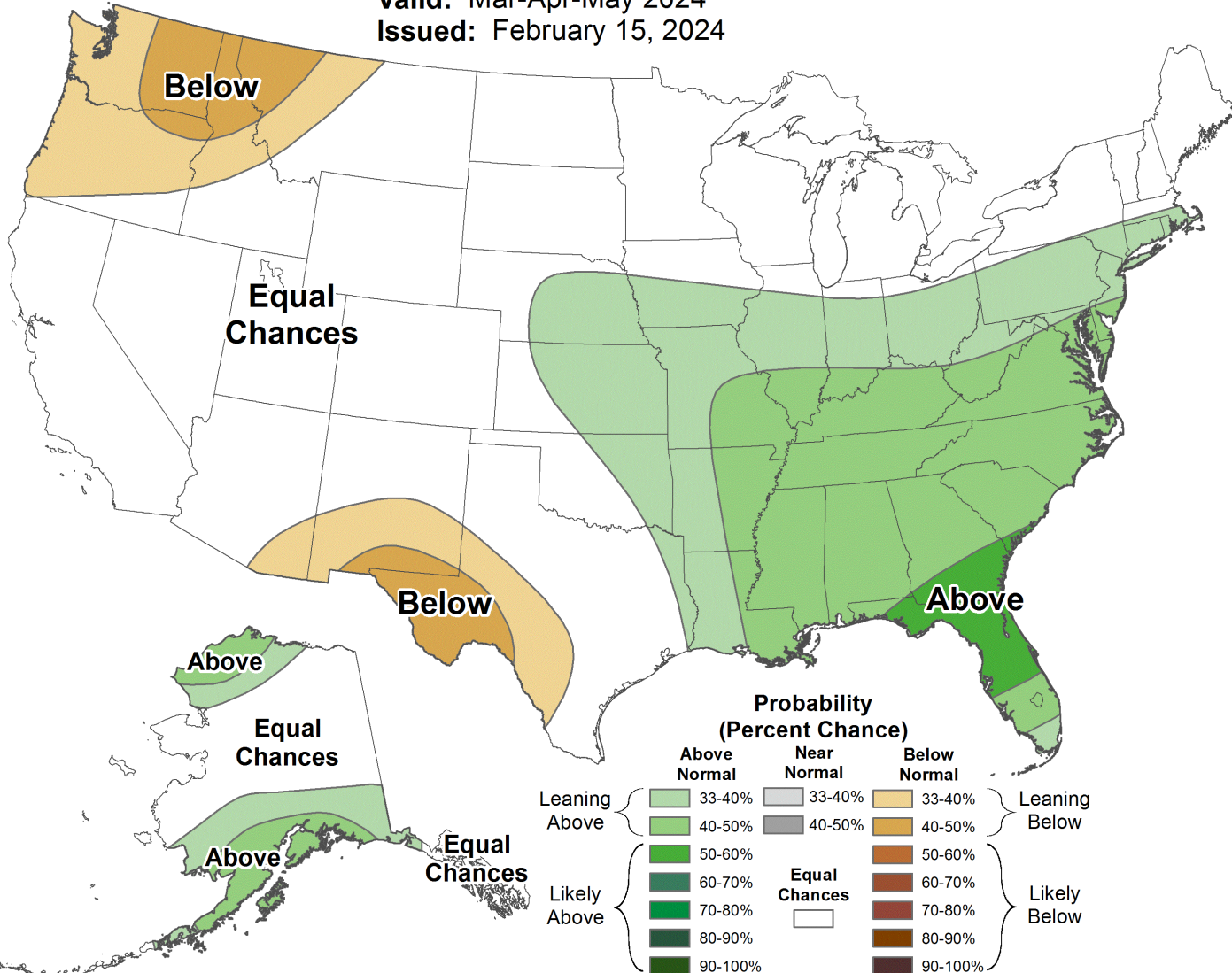




Seasonal Precipitation Outlook



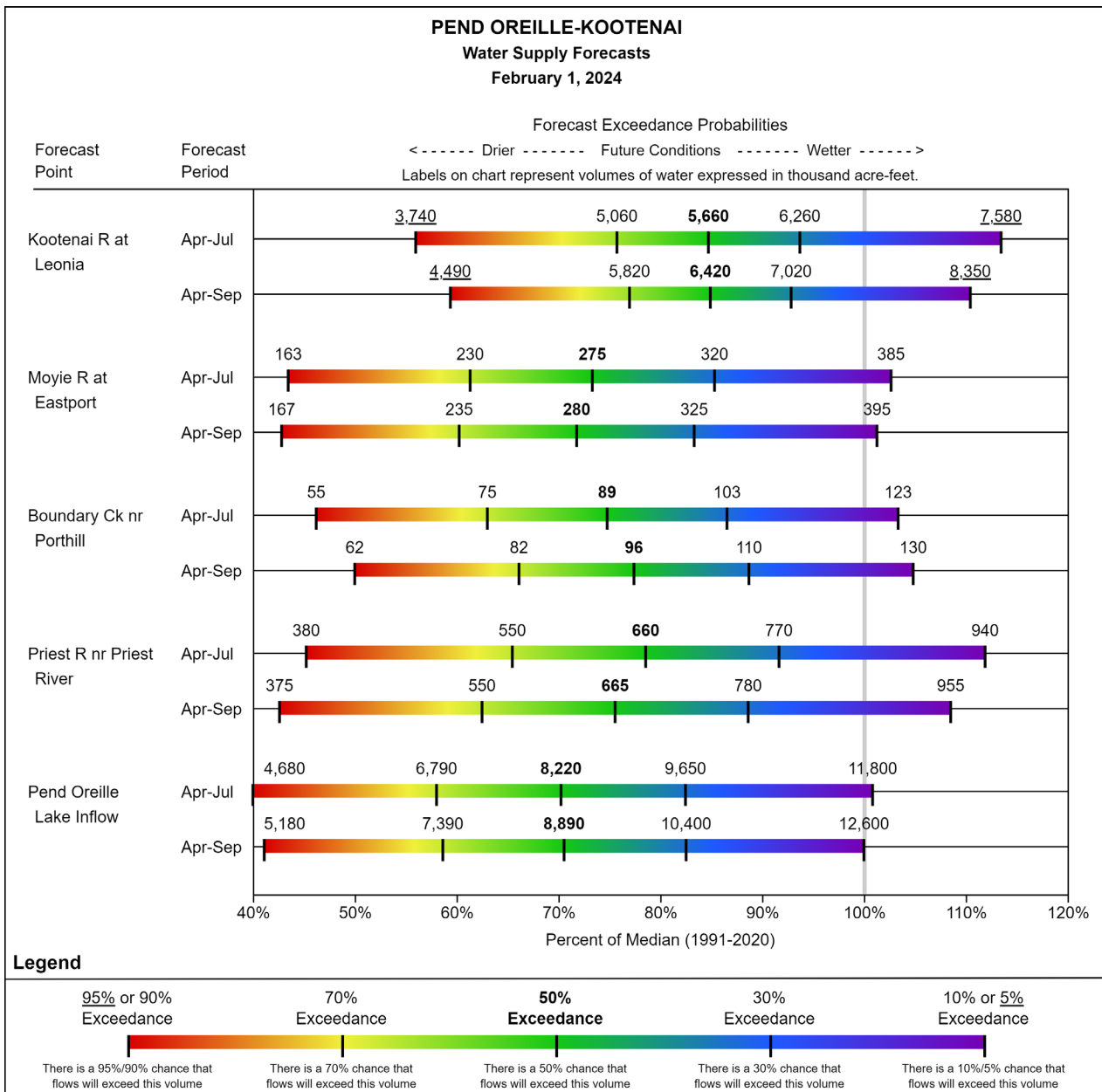
Valid: Mar-Apr-May 2024
 Issued: February 15, 2024



NWCC Streamflow Forecasts

❖ **Below normal Streamflow**

❖ 70 to 85% of normal



Resources

- ❖ [NRCS Interactive Map](#)
- ❖ [Idaho Snow Survey](#)
- ❖ [Drought.gov](#)
- ❖ [IPAC](#)





Thank You!

Peter Youngblood, Hydrologist
NRCS – Idaho Snow Survey
Peter.Youngblood@usda.gov
(208)871-1245