



United States Department of Agriculture



Snowpack in the Priest River Watershed and Useful Online Tools for You

November 30, 2023 | Peter Youngblood, Hydrologist

Natural
Resources
Conservation
Service

nrcs.usda.gov/

Outline



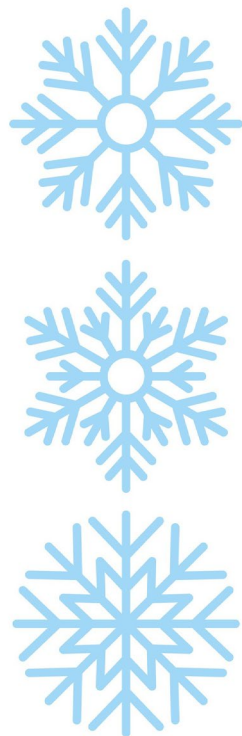
- ❖ **Snow Survey 101**
- ❖ **Snowpack Monitoring in the Priest River Watershed**
- ❖ **Useful tools for you**

Outline

Snow Survey 101

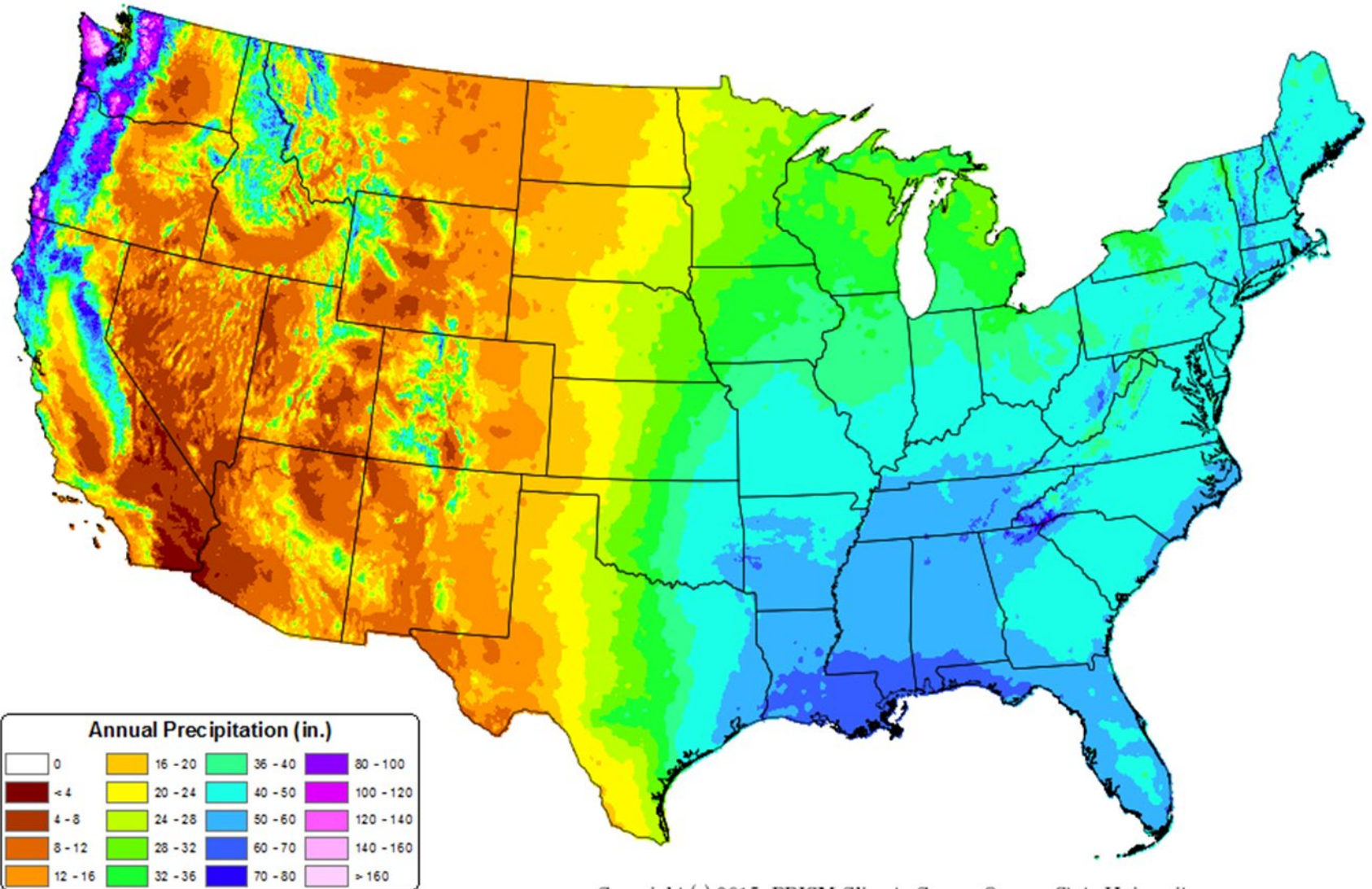
Snowpack Monitoring
In Priest River Basin

Useful tools for you

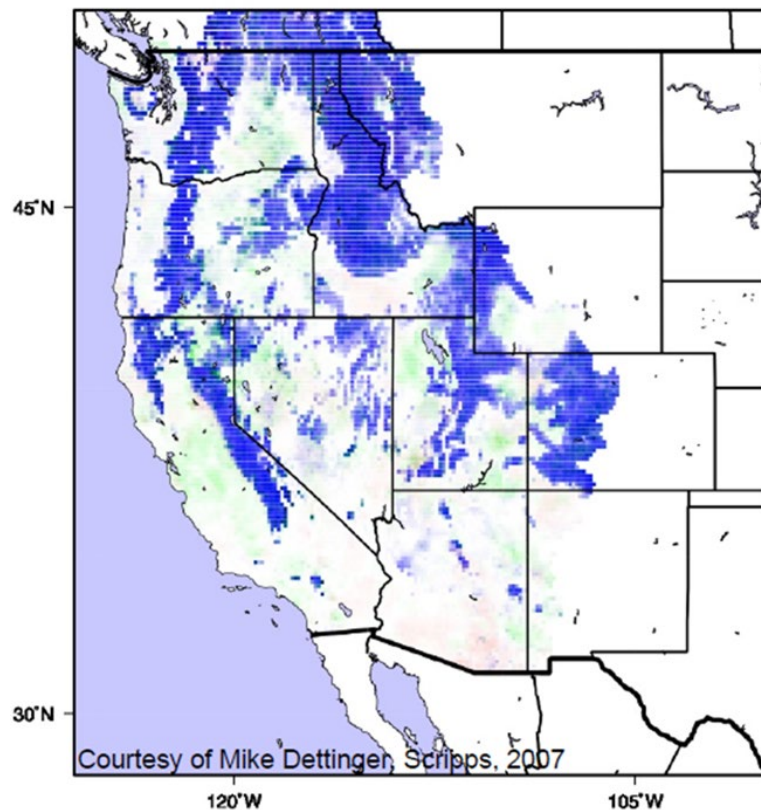
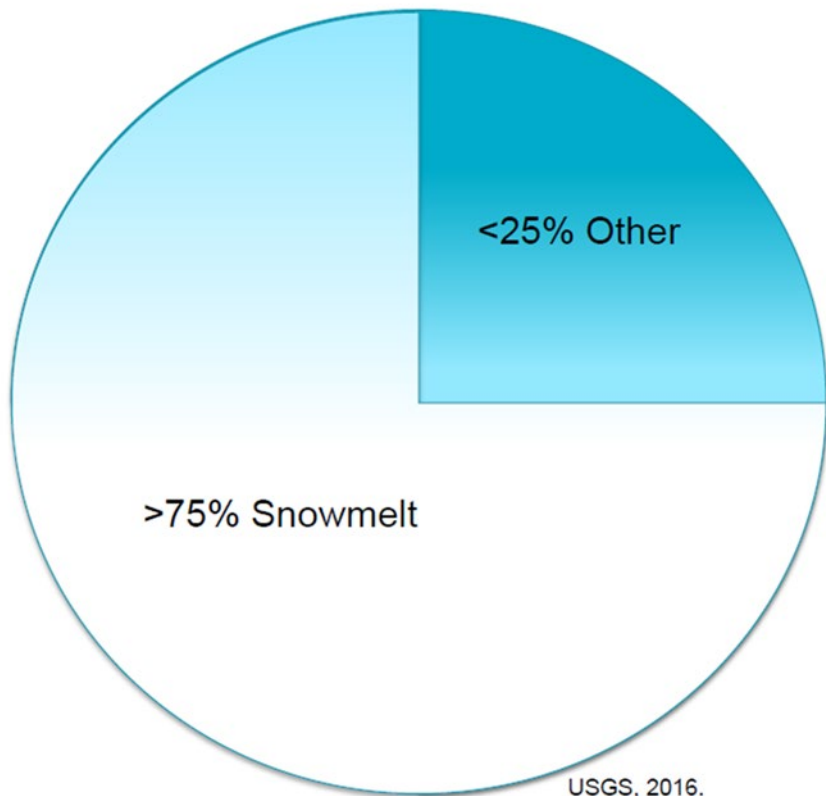


30-yr Normal Precipitation: Annual

Period: 1981-2010



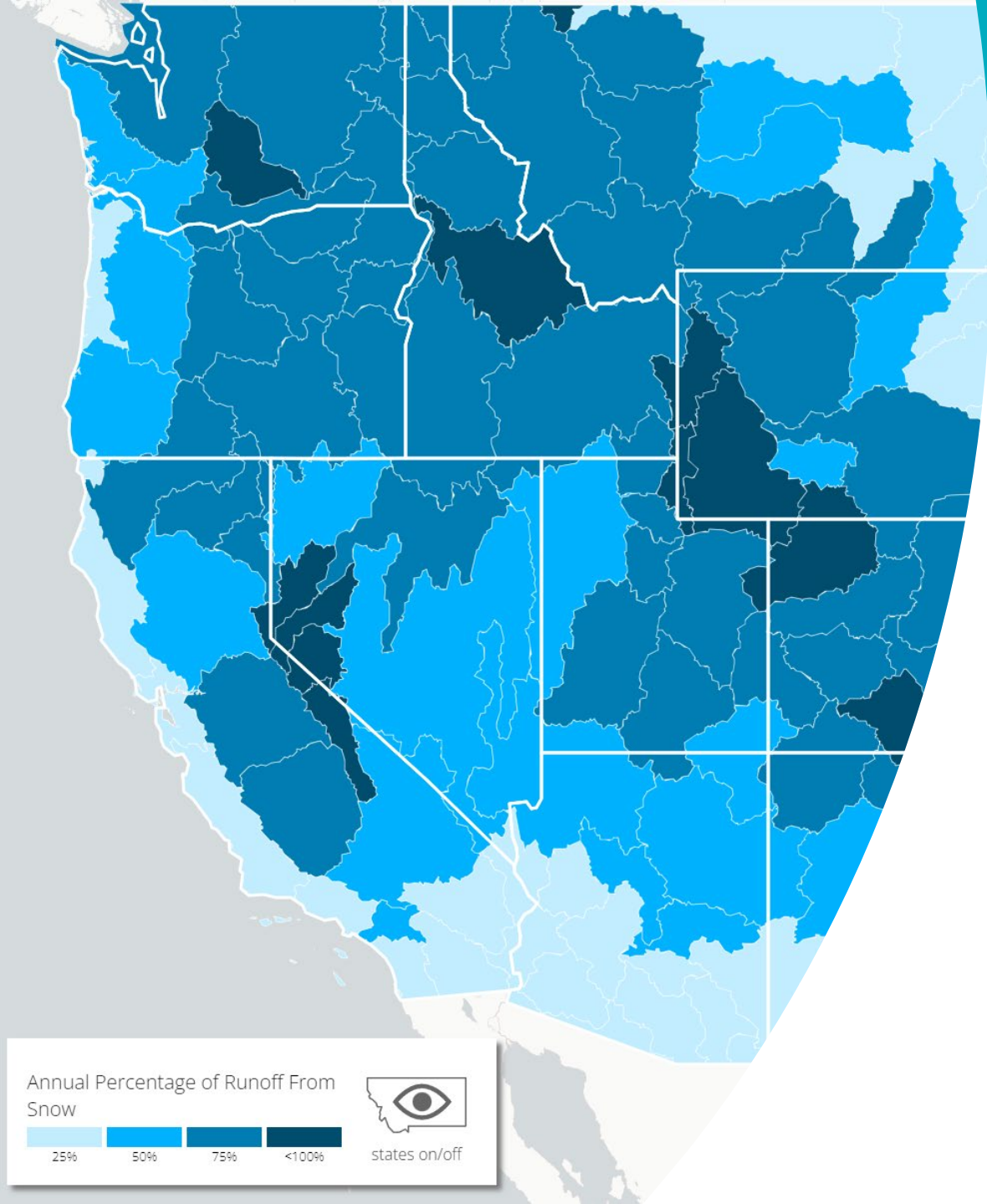
Water in the West



Natural Resources Conservation Service

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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**

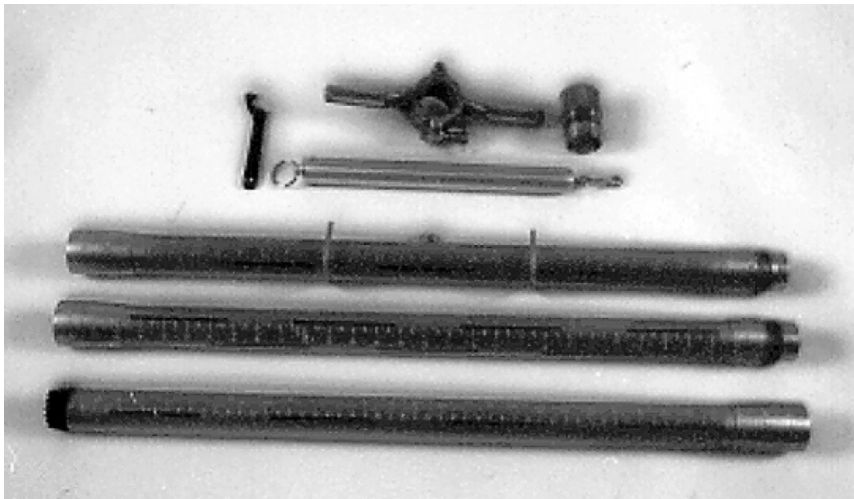
- ❖ **1908 – James Church established first snow courses**
- ❖ **1935 – Congress formed Snow Survey and Water Supply Forecasting Program**
- ❖ **Mid 1960’s – Beginning of SNOTEL**

Outline

Snow Survey 101

Snowpack Monitoring
In Priest River Basin

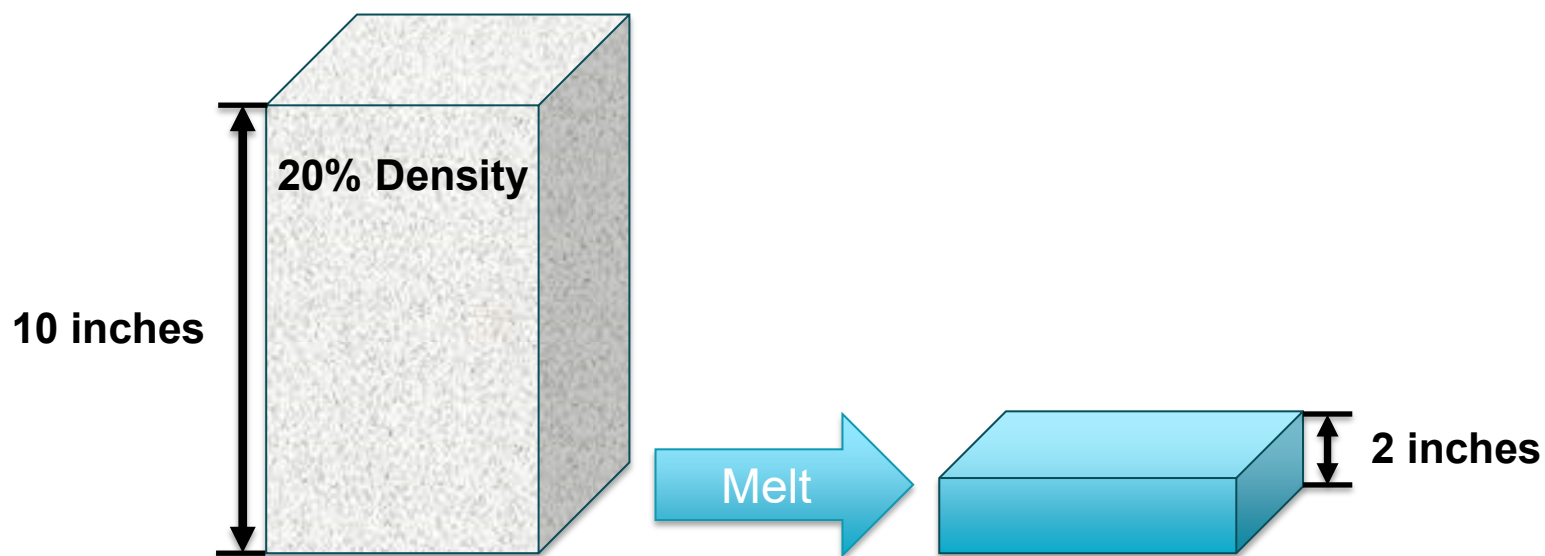
Useful Tools for You



Snow Water Equivalent (SWE)



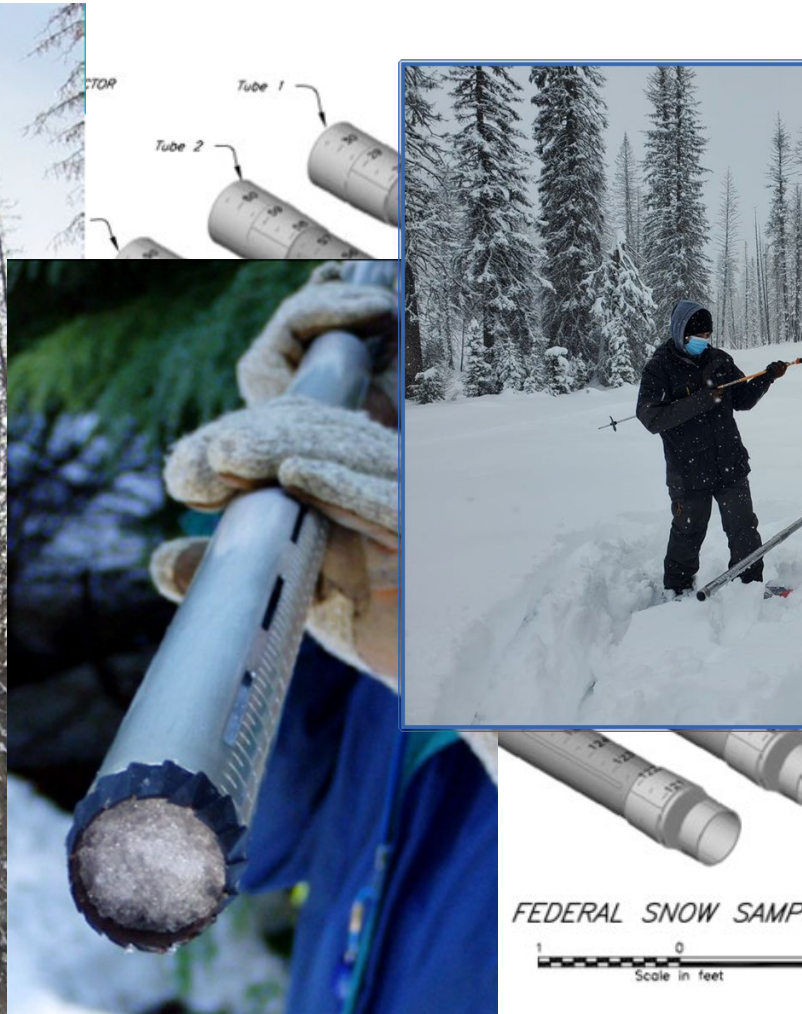
SWE is a measure of the liquid water contained in snowpack



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



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.

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.

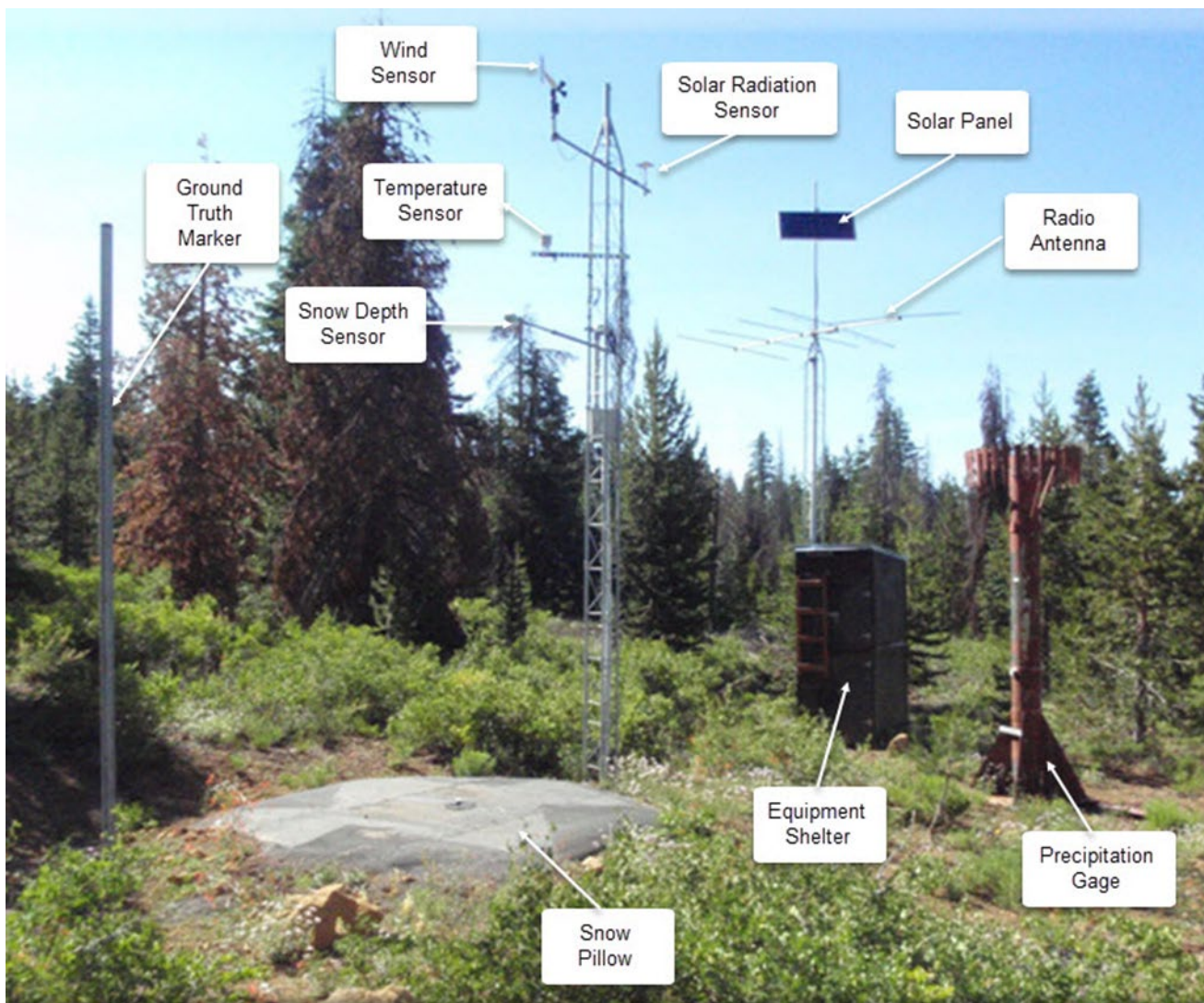
Snow Courses



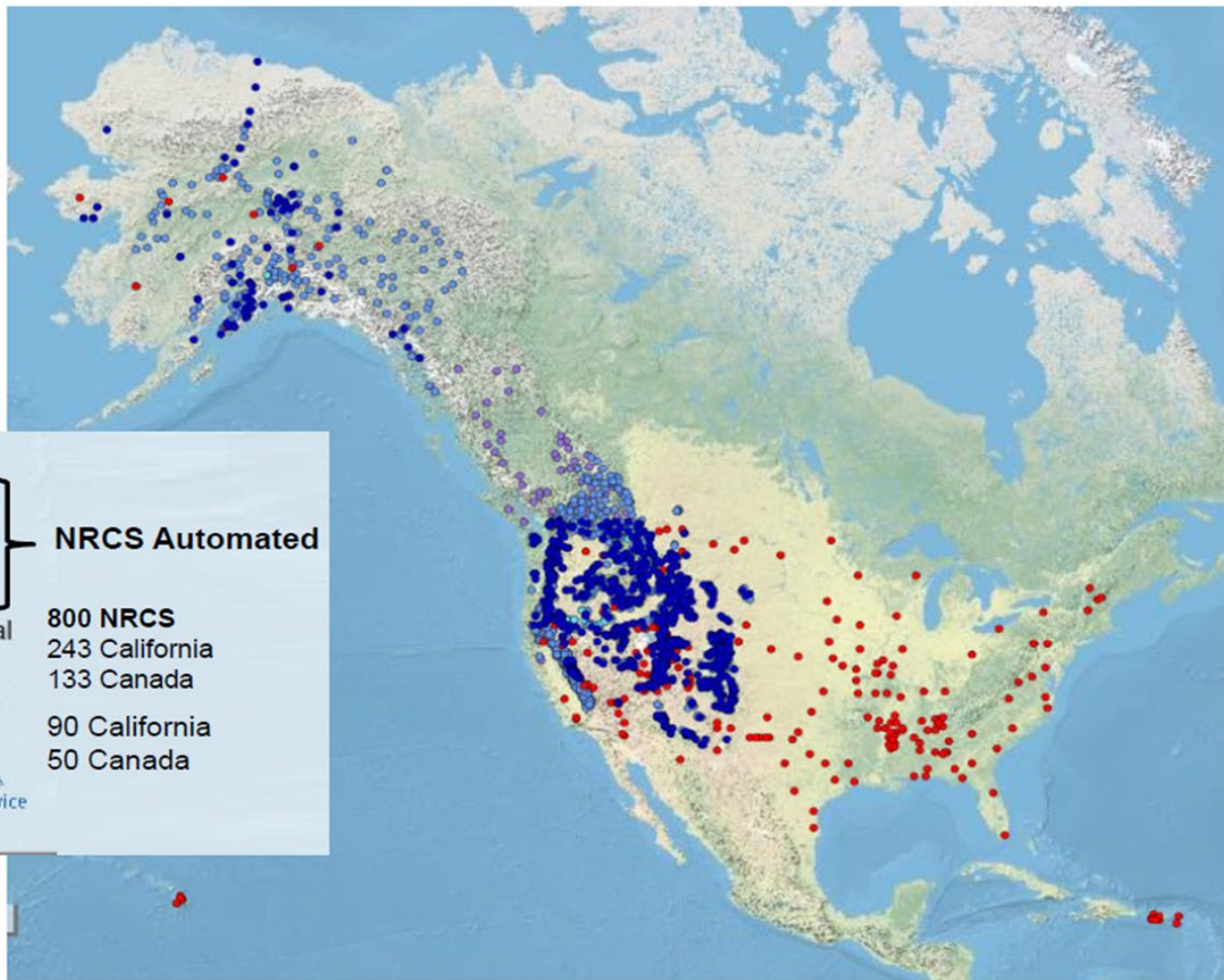
- 
- Snow courses are permanent snow measuring locations marked at endpoints by signs on poles or trees
 - Typical snow courses have 5 – 10 measurement points spaced at 50 feet
 - Middle points sometimes marked by poles too



SNOTEL Site



SNOTEL Network



Stations by Network

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

NRCS Automated

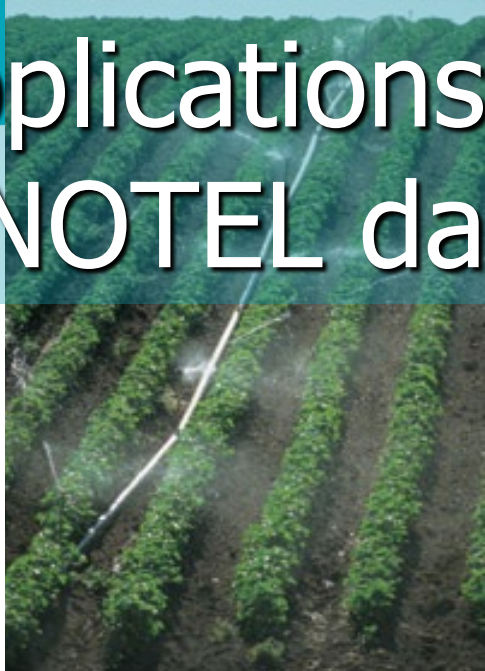
- Snow Course/Aerial Marker: 800 NRCS (243 California, 133 Canada)
- Cooperator Snow Sensors: 90 California, 50 Canada

Natural Resources Conservation Service

Created 12-02-2020, 07:22 PM PST

Natural Resources Conservation Service

Applications of SNOTEL data



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
Priest River Basin**

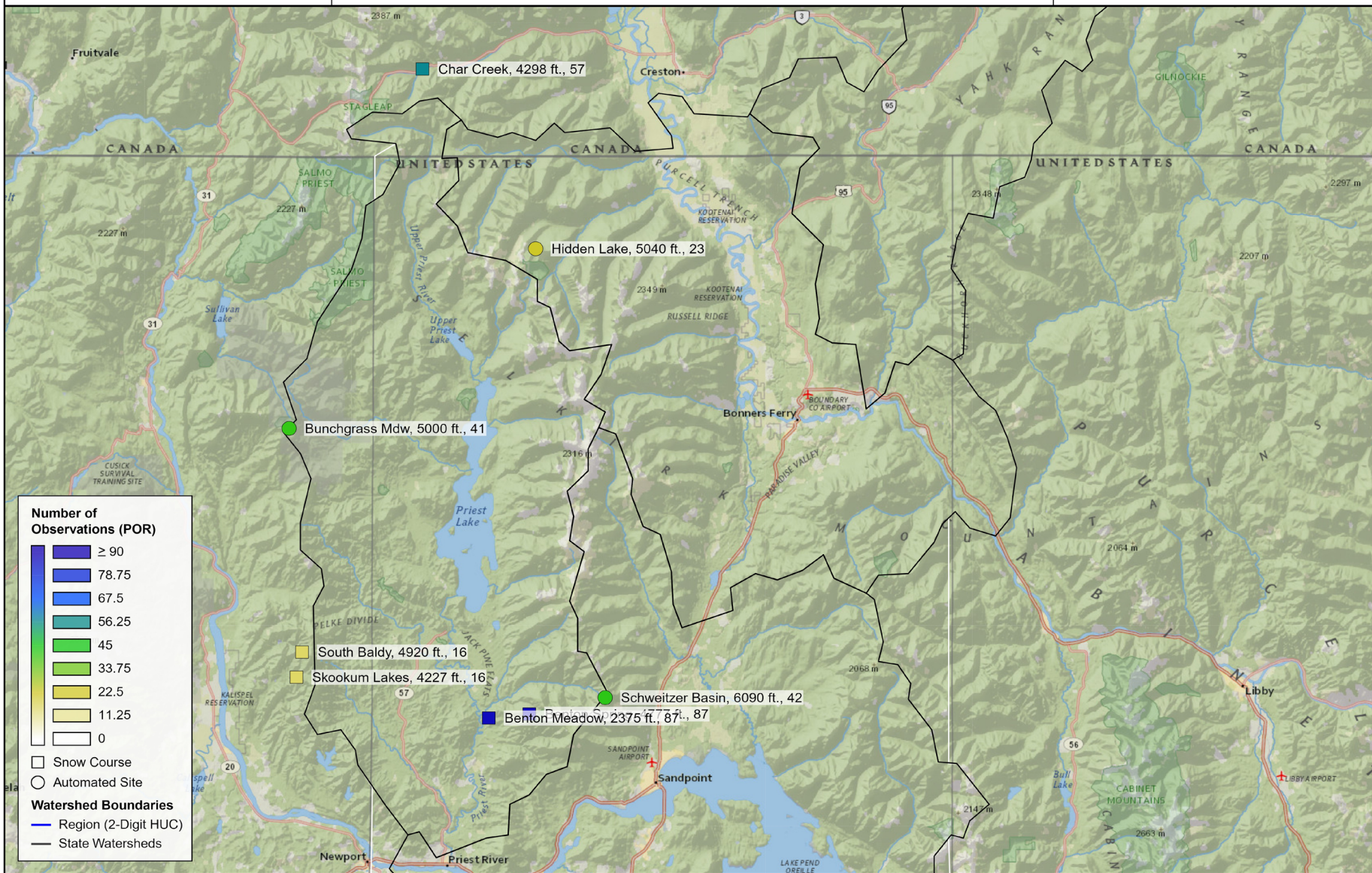
Useful Tools for You



Snow Water Equivalent

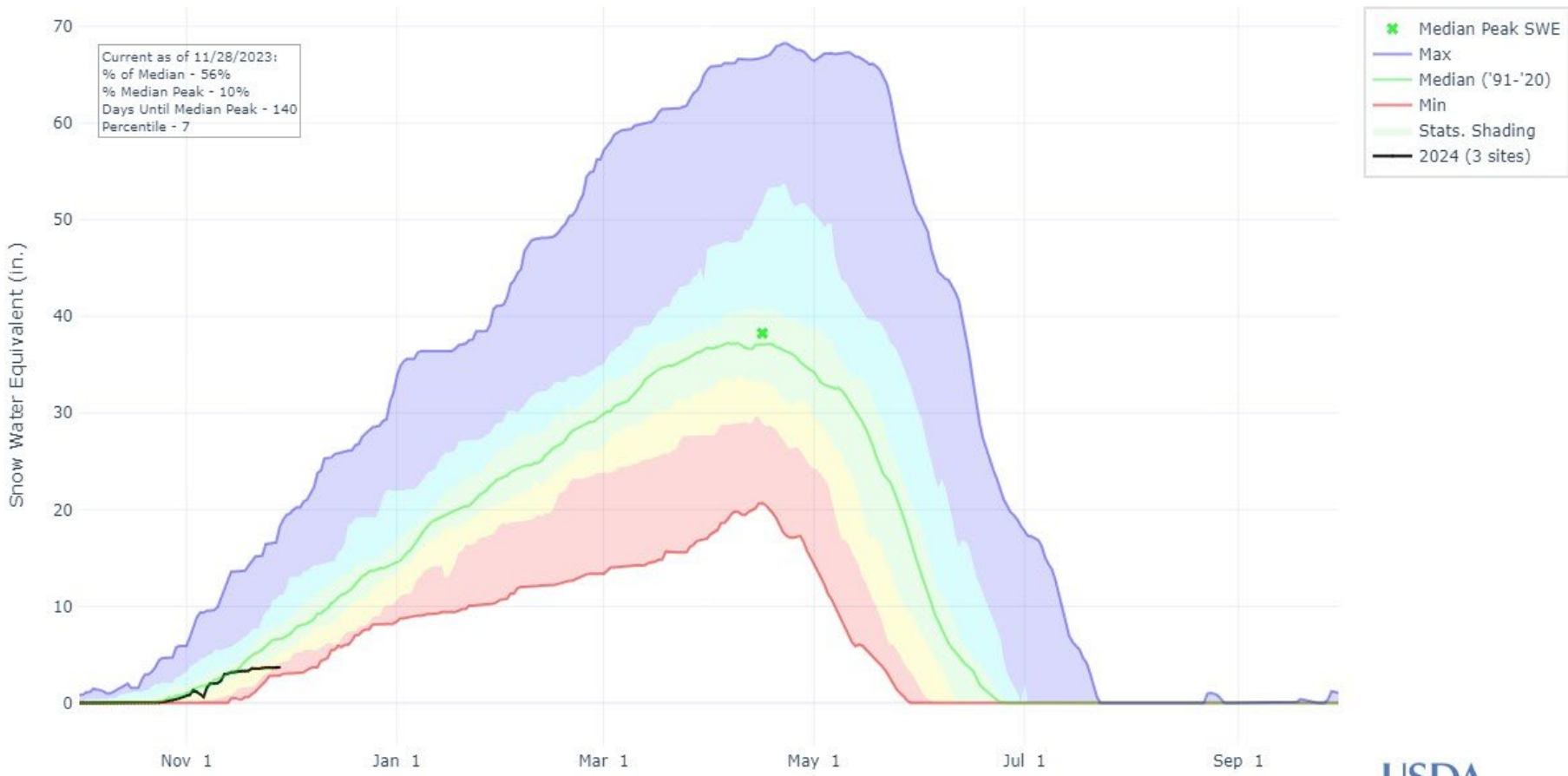
Number of Observations (POR)

April 1st



Priest River Watershed Snowpack

SNOW WATER EQUIVALENT IN PRIEST

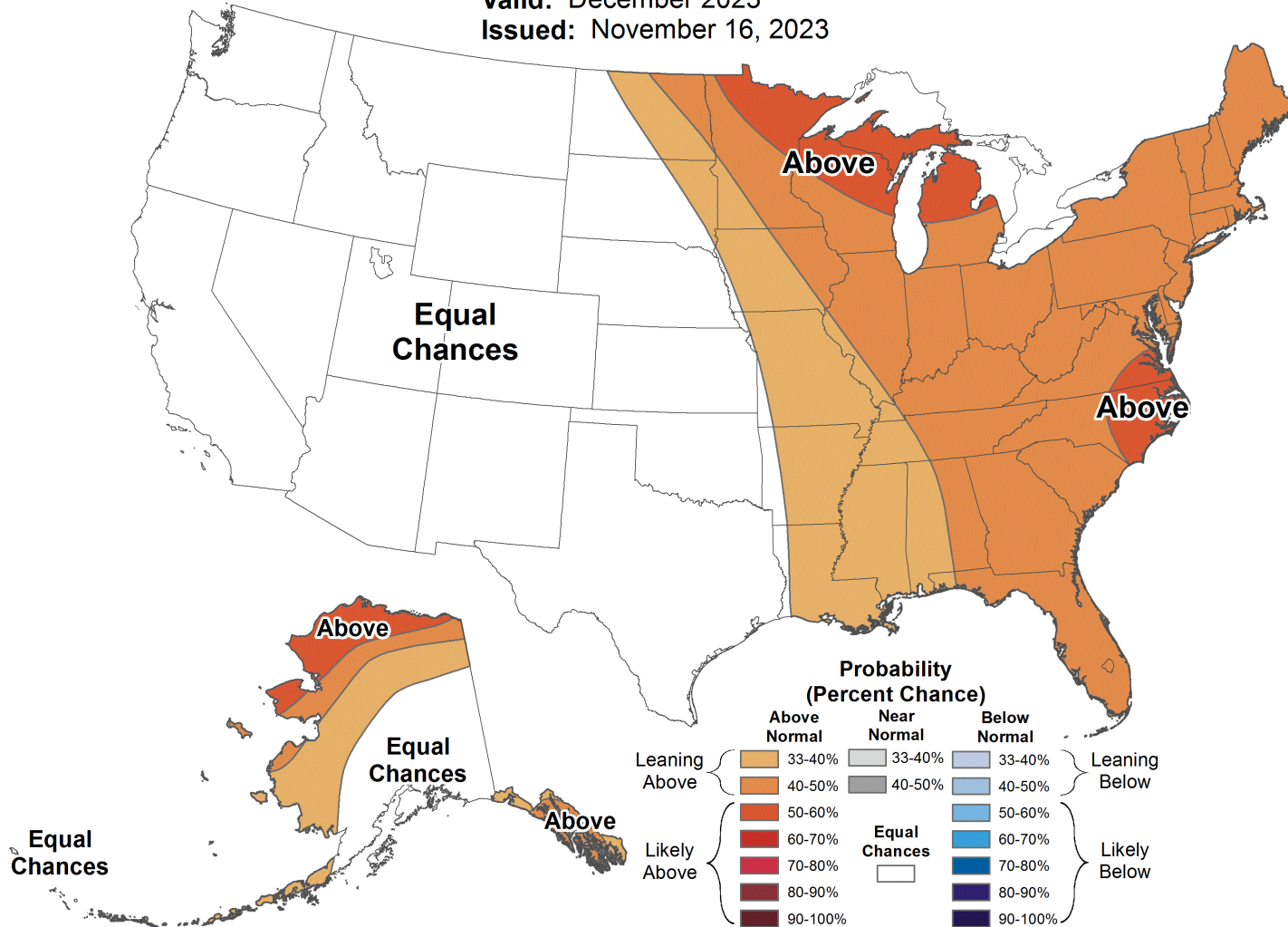




Monthly Temperature Outlook



Valid: December 2023
 Issued: November 16, 2023

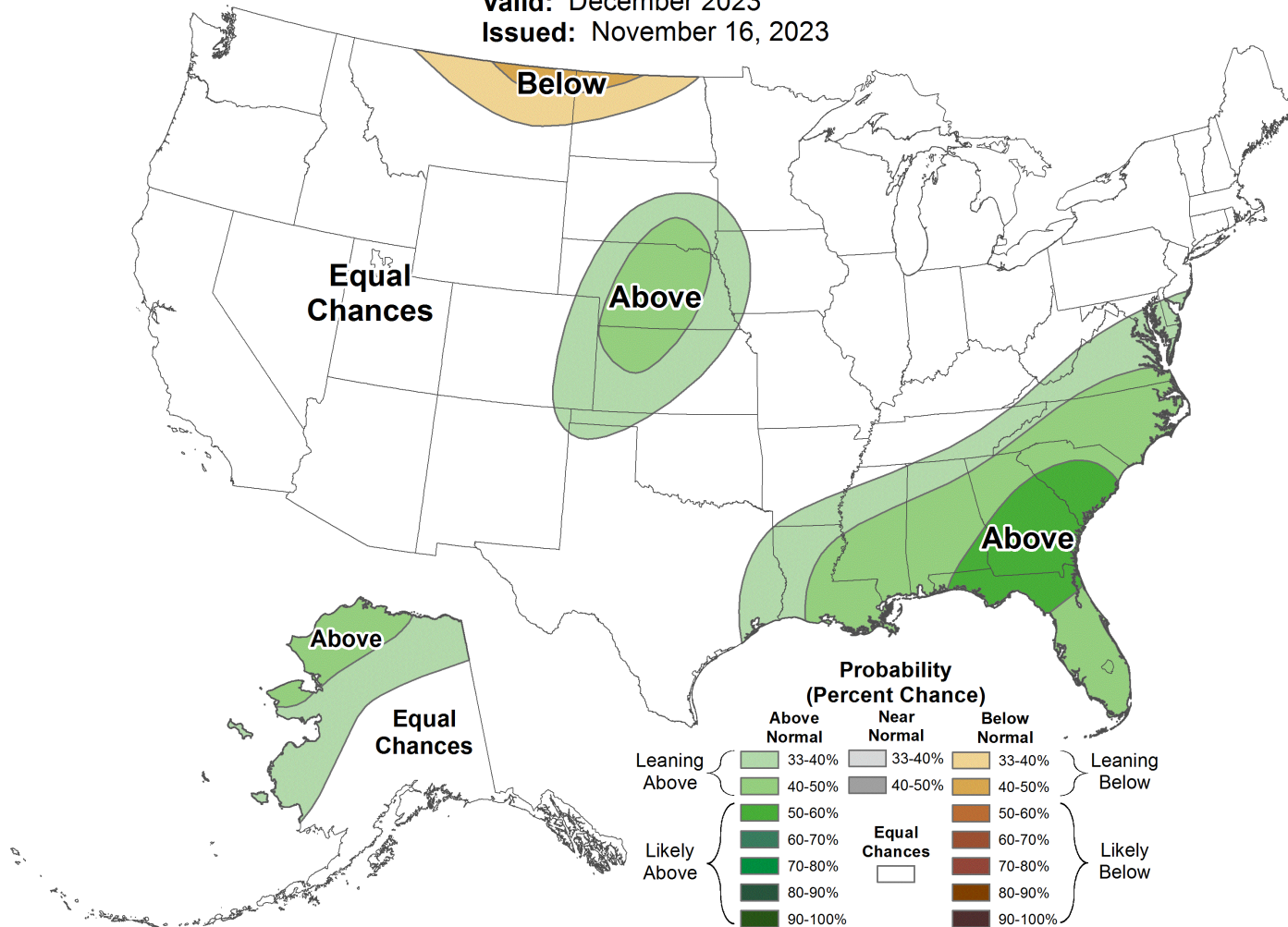




Monthly Precipitation Outlook



Valid: December 2023
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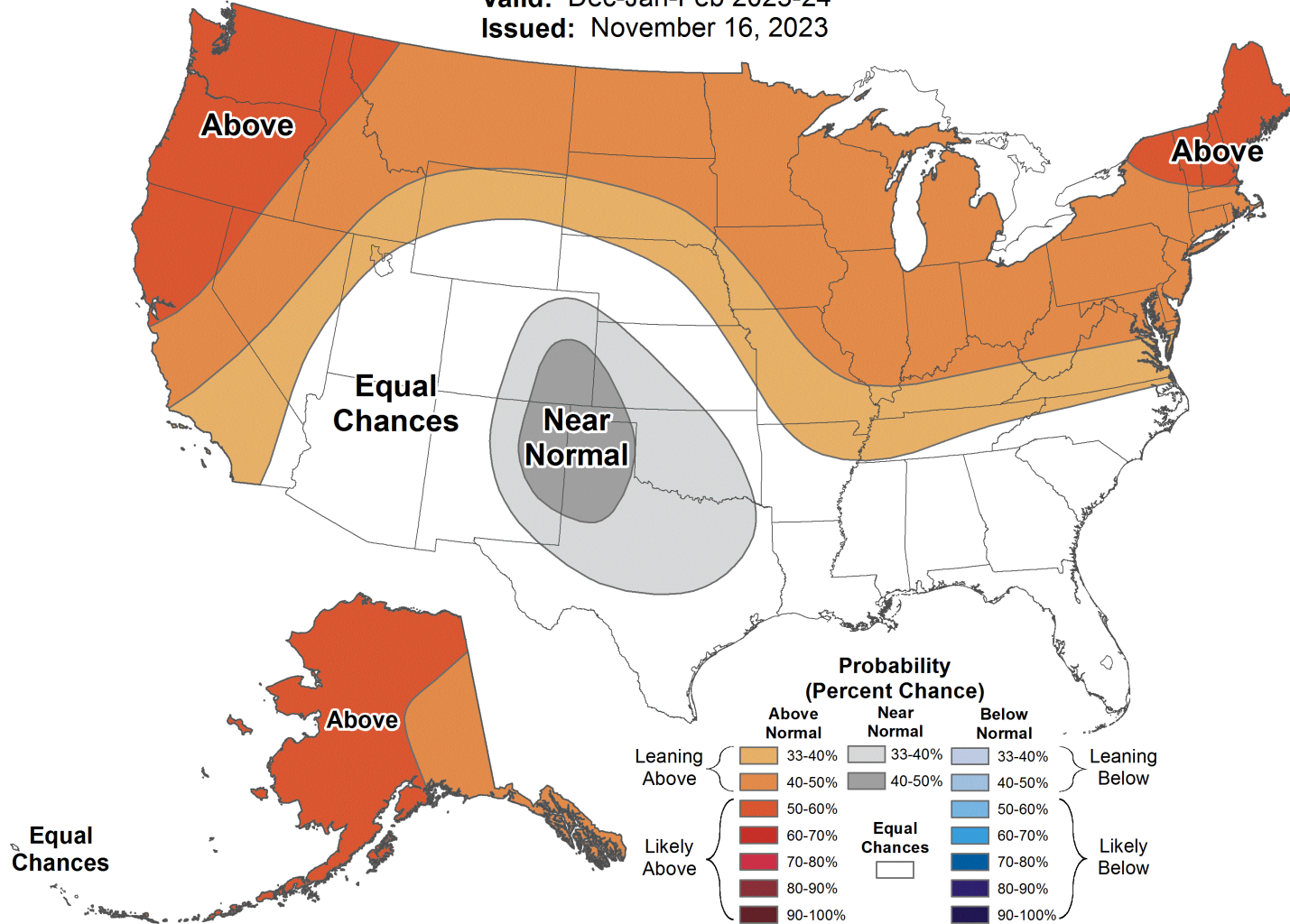




Seasonal Temperature Outlook



Valid: Dec-Jan-Feb 2023-24
 Issued: November 16, 2023



Probability (Percent Chance)

Above Normal		Near Normal		Below Normal	
Leaning Above	33-40%	33-40%	33-40%	Leaning Below	33-40%
	40-50%	40-50%	40-50%		40-50%
	50-60%				50-60%
Likely Above	60-70%				60-70%
	70-80%				70-80%
	80-90%				80-90%
	90-100%				90-100%
		Equal Chances			

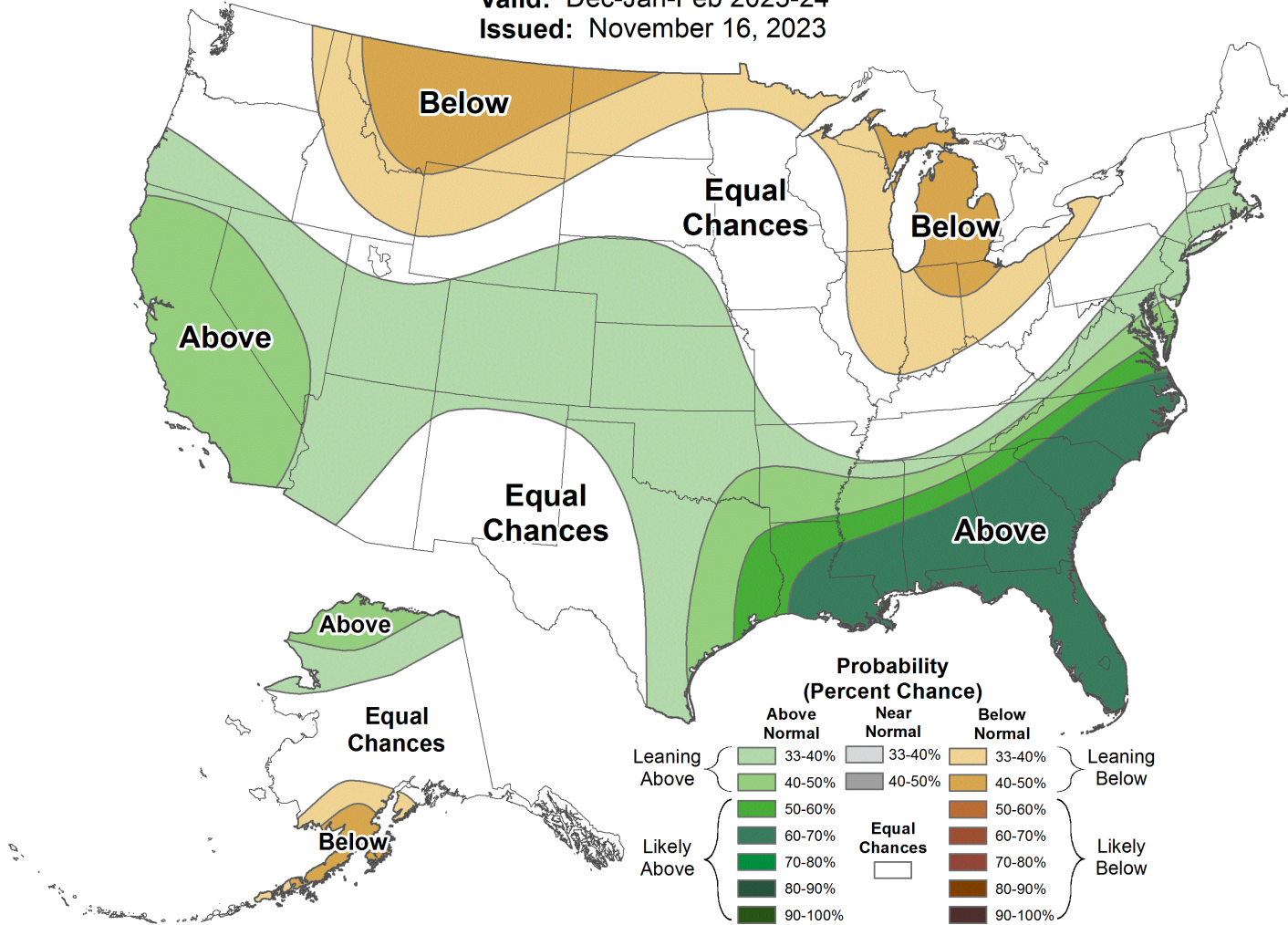




Seasonal Precipitation Outlook



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Priest River Streamflow and Forecasting

❖ Streamflow

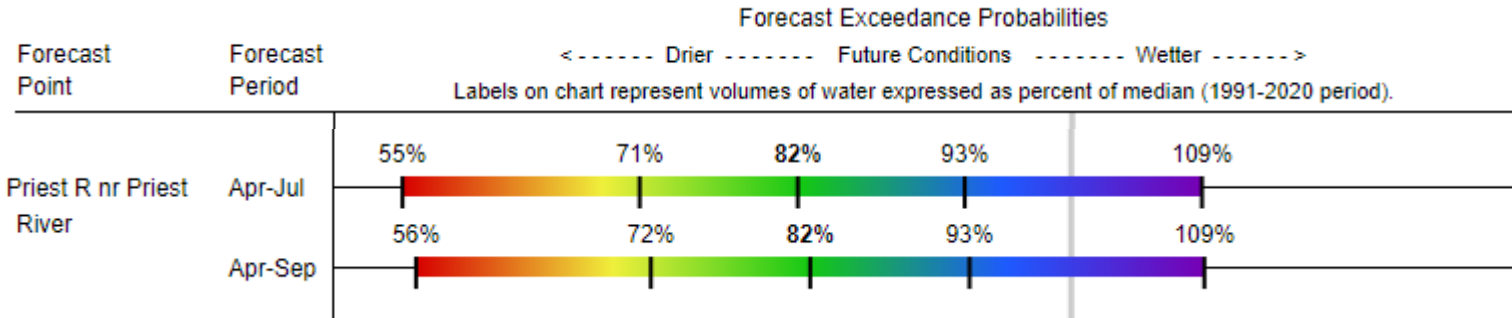
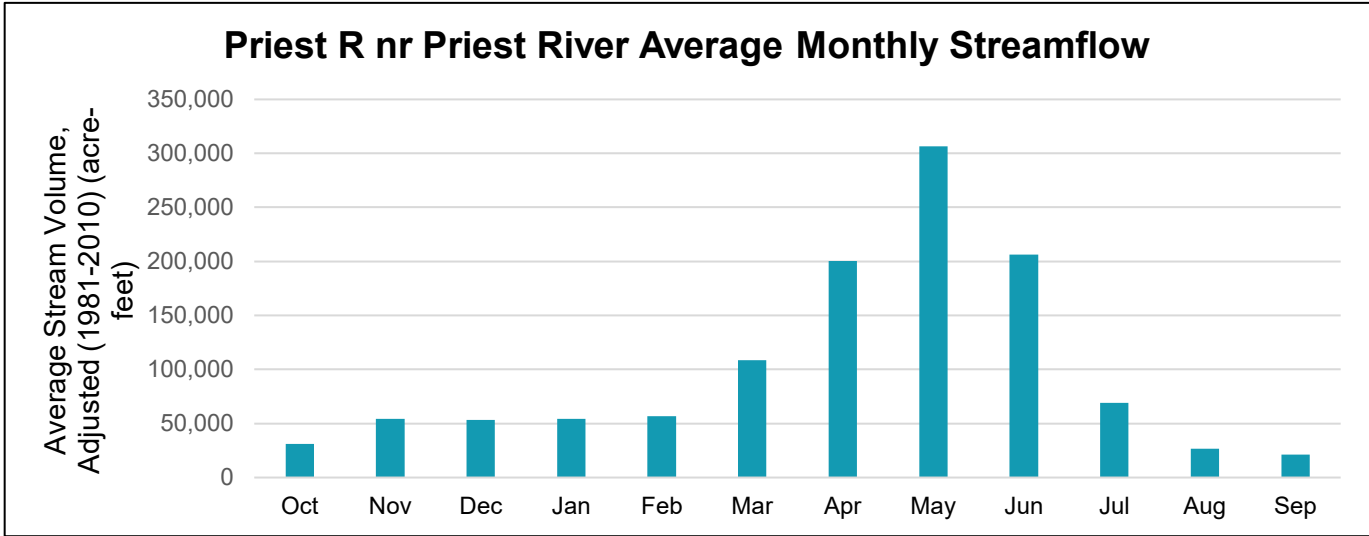
- ❖ April-July flows contribute 66% to the total annual flow volume
- ❖ March-July flows contribute 75% to the total annual flow volume

Outline

Snow Survey 101

[Snowpack Monitoring in the Priest River Basin](#)

Useful Tools for You



Resources

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





Thank You!

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