

# OSHER LIFELONG LEARNING INSTITUTE

The Osher Lifelong Learning Institute at Boise State University is a membership-based lifelong learning program. We offer a wide variety of college-level, non-credit programs designed for intellectually curious adults age 50 and over.

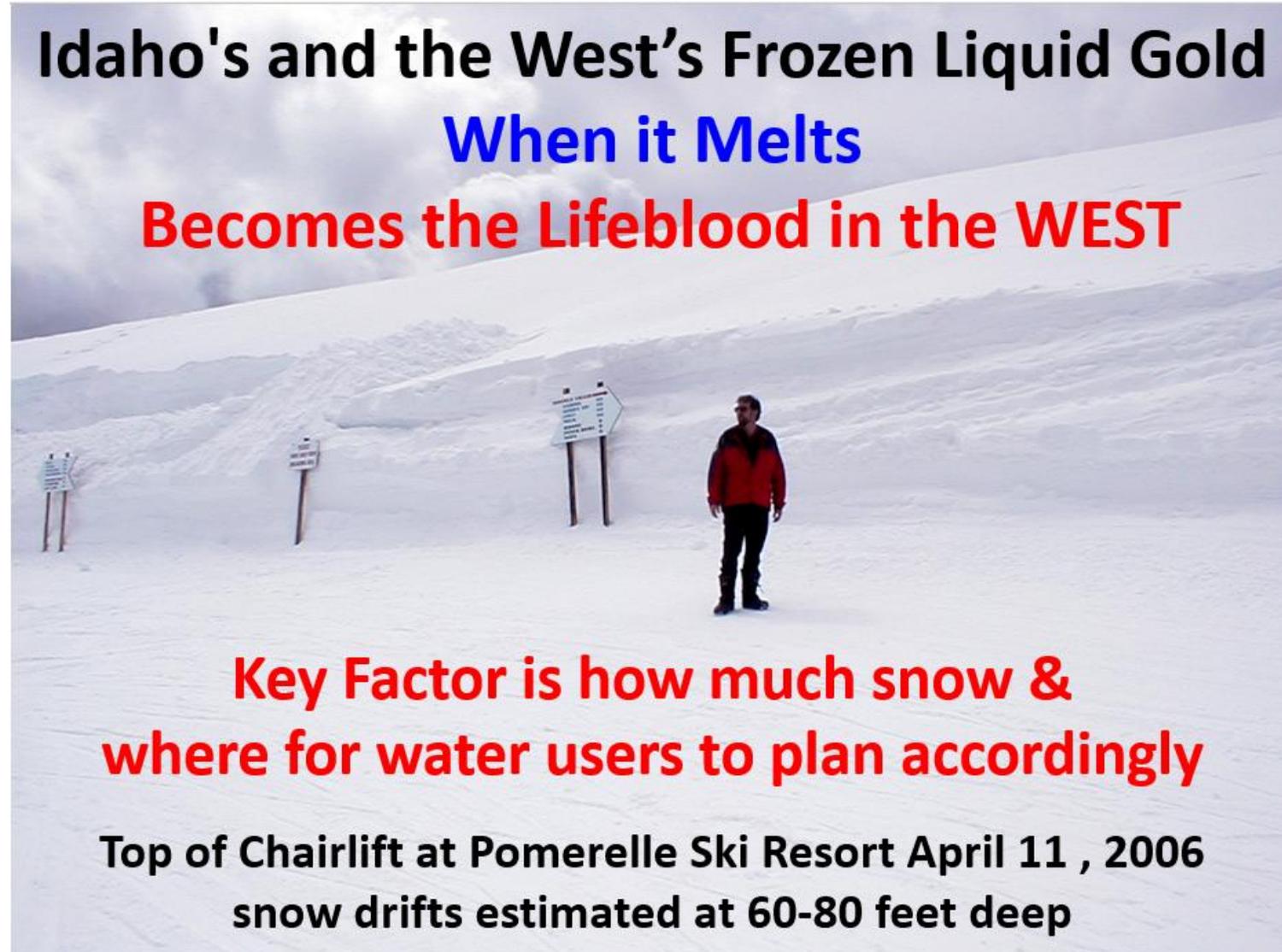
This talk & more posted at:  
[https://snowweatherandflow  
.blog/](https://snowweatherandflow.blog/)

**Ron Abramovich**  
Mostly retired  
and still watching  
the weather...

**Snow: Idaho's Frozen Liquid Gold  
(Hybrid) Part I February 18, 2026**

## Idaho's and the West's Frozen Liquid Gold When it Melts

**Becomes the Lifeblood in the WEST**



**Key Factor is how much snow &  
where for water users to plan accordingly**

**Top of Chairlift at Pomerelle Ski Resort April 11 , 2006  
snow drifts estimated at 60-80 feet deep**

## Topics:

- **History of Snow Surveys**
- **Measuring the Snow & Types of Snow Sites**
- **Morley Nelson's Snow Survey Work**
- **Water Users Needs Timeline**
- **Annual Precipitation Maps Shows Why Snow is so Critical in the Western US**
- **Historic Snow Data & Streamflow Relationships**
- **Uses of Snow Survey & Water Supply Information in Decision Making Process**



## **Snow: Idaho's Frozen Liquid Gold (Hybrid)**

This course will discuss the building of Idaho's mountain snowpack as it reaches its peak in early April and current water supply outlook.

We'll examine the history of snow surveys and the usefulness of water supply information as well as current snow levels and water supply outlook.

We also will explore the importance of understanding your watershed and what makes it flow, current snow levels, water supply outlook, and key snow, flow and weather relationships to watch as our rivers rise.

***PLEASE NOTE:*** *The first session of this course will meet on February 18, and the second session will meet on April 22.*

**Presenter: Ron Abramovich**, retired Water Supply Specialist, USDA Natural Resources Conservation Service

**Dates and time:** **Session One:** Wed., Feb. 18, 1:30-3:30 p.m.  
**Session Two:** Wed., Apr. 22, 1:30-3:30 p.m.

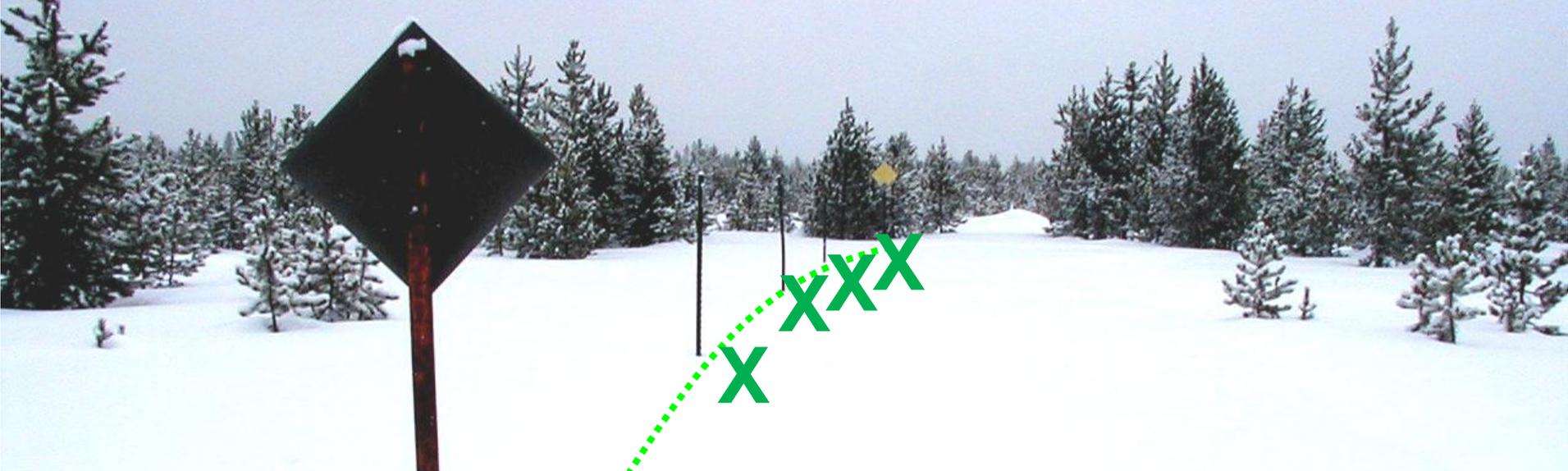
**Cost:** \$25

Watch a preview of this program here: [\*\*Snow: Idaho's Frozen Liquid Gold\*\*](#)

**Dr. Church started the first snow surveys in Lake Tahoe area in early 1900s.**



**After the development of successful techniques to measure snow and forecast water supplies - Snow Courses were installed throughout the West. Some were Aerial Markers that only measured snow depth by airplanes to estimate snow water content.**



**Typical Snow Course:**

- **Snow Depth & Snow Water Equivalent (SWE) were measured.**
- **Typical snow course had 5 or more measurement points spaced 10 to 50 foot apart that were averaged together for one value.**
- **Generally, in high elevation areas.**
- **Measured once or twice monthly.**

**Morley Nelson, right, Columbia Basin Snow Survey Supervisor 1948-1972, located many of the snow sites still used in Idaho.**





...mountain top repair service went into action when this Sno-Cat failed near snow survey course on top of a mountain 19 miles from Jarbidge, Nev. The difficulty was diagnosed as a broken piston rod. Two men carried in the Sno-Cat the men took the piston out of the motor and intended to drive it without the piston, but it failed to start because of a low battery. The engine was started later by pulling with another Sno-Cat and the Sno-Cat driven down the mountain. Working on the motor are Ellis Fuller, left, and Glenn Nelson, right. (Staff photo-engraving)

### Measuring Snow to Figure Irrigation Water Is Developing as Exact Science

...of the slant of the road, the cat, with the high altitude and the deep snow, a dozen steps were tiring. Skis were used to travel the snow measuring course.



Skating behind the Sno-Cat is part of the trip for snow survey crews to measure snow for the soil conservation service. Ellis Fuller, left, and Glenn Nelson, both Salmon Tract farmers who helped on the snow survey, ski behind the Sno-Cat on the way to the measuring course. Skis are necessary equipment for snow measuring courses because it's virtually impossible to walk in deep snow. (Staff photo-engraving)

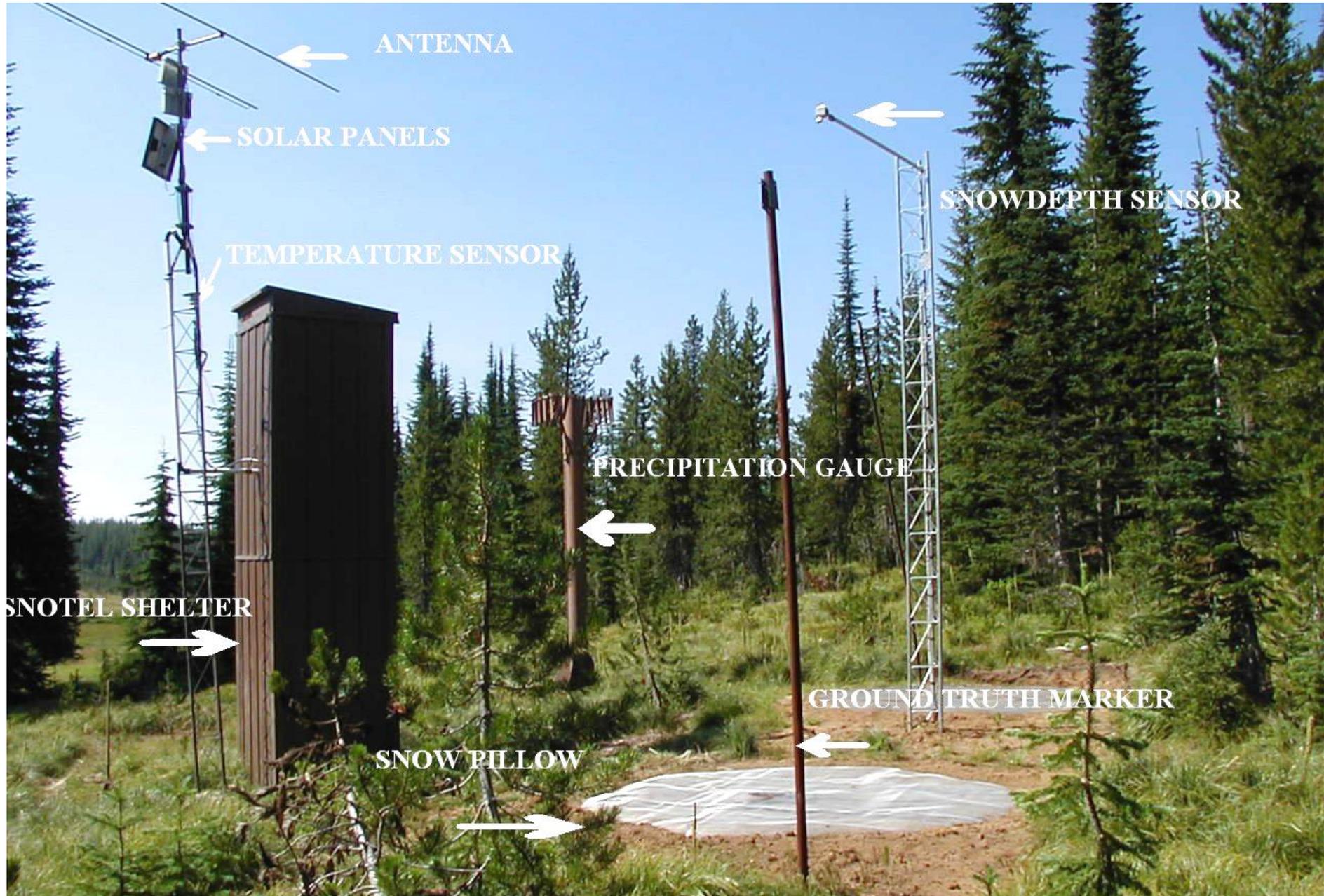


...another snow course. The men skied behind the Sno-Cat while the other drove, along with new speed on the hill run. The road from Bear creek almost 40 degrees. Here the engine had a knock, the fuel line was cleaned had a knock running again, the engine had a knock, the cat decided that since the Sno-Cat such a side slope the drive was precious, two of about on skis to the bottom were for more oil while they began to dig around the local snow to level it. Since they could be leveled then, the then they could Sno-Cat m of the hill and to the road would have only sleep, place the bottom, which morning, anyway. If the Friday morning it after it was equally as the oil would had been, as left when they again for the cat set on drive pickup a level path with tire chains began to run miles of the

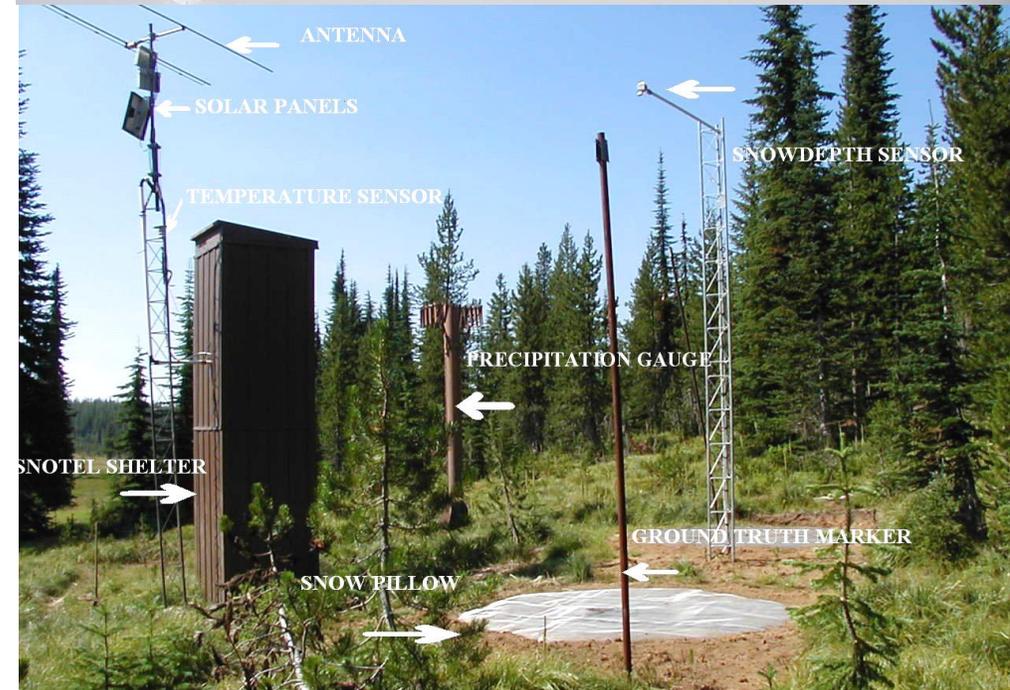




# Typical SNOTEL Site: Crater Meadows, Clearwater Basin



# Crater Meadows – Summer & Winter

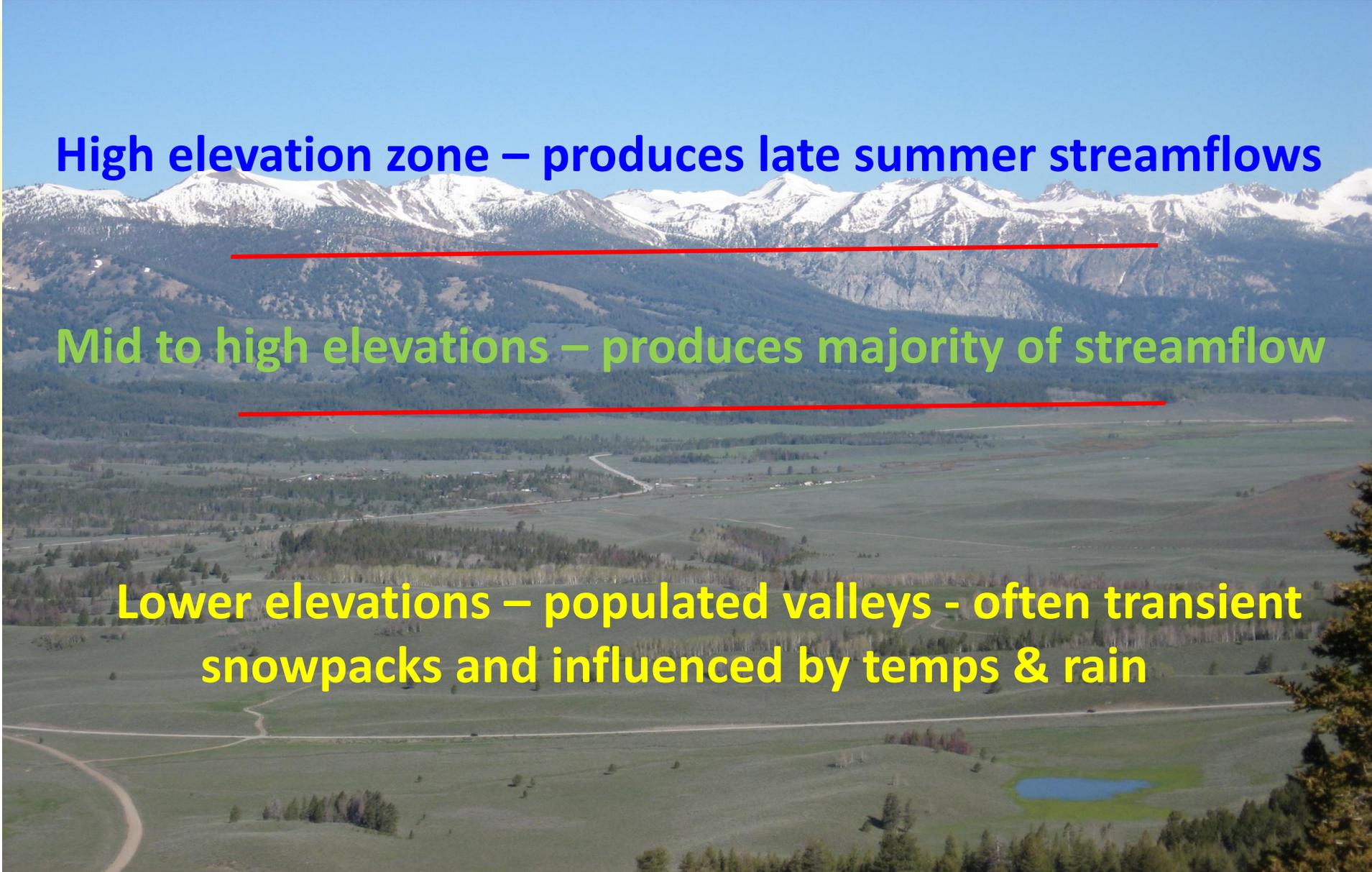


## Looking into the Salmon River Headwaters June 12, 2008

Typical Idaho snow sites are 6,000 - 8,500 feet in elevation.

This is the snow accumulation zone that stores the greatest snow water and provides our water supply.

Weather happens above & below these elevations



**High elevation zone – produces late summer streamflows**

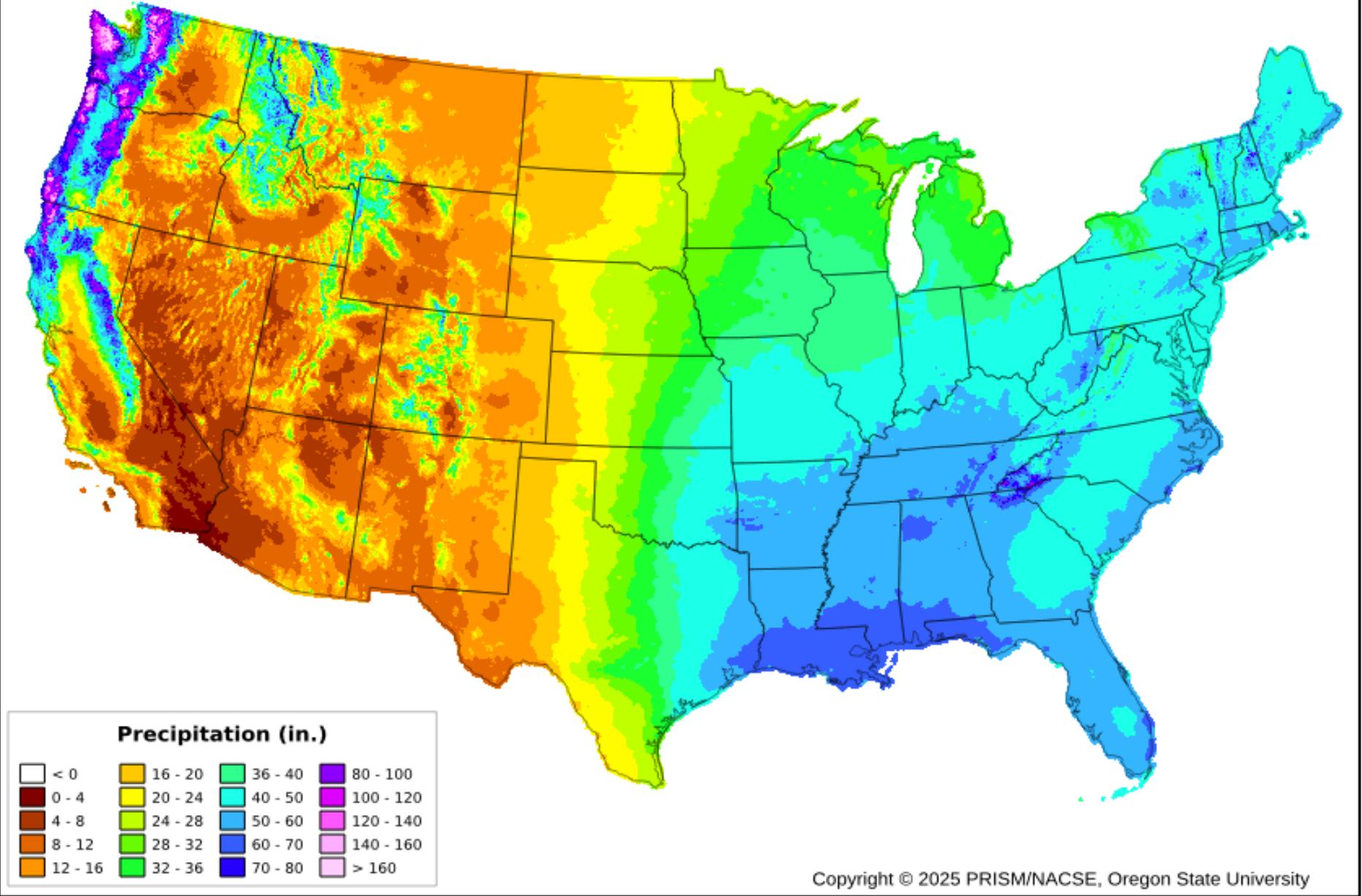
**Mid to high elevations – produces majority of streamflow**

**Lower elevations – populated valleys - often transient snowpacks and influenced by temps & rain**

# Average Annual Precipitation for US

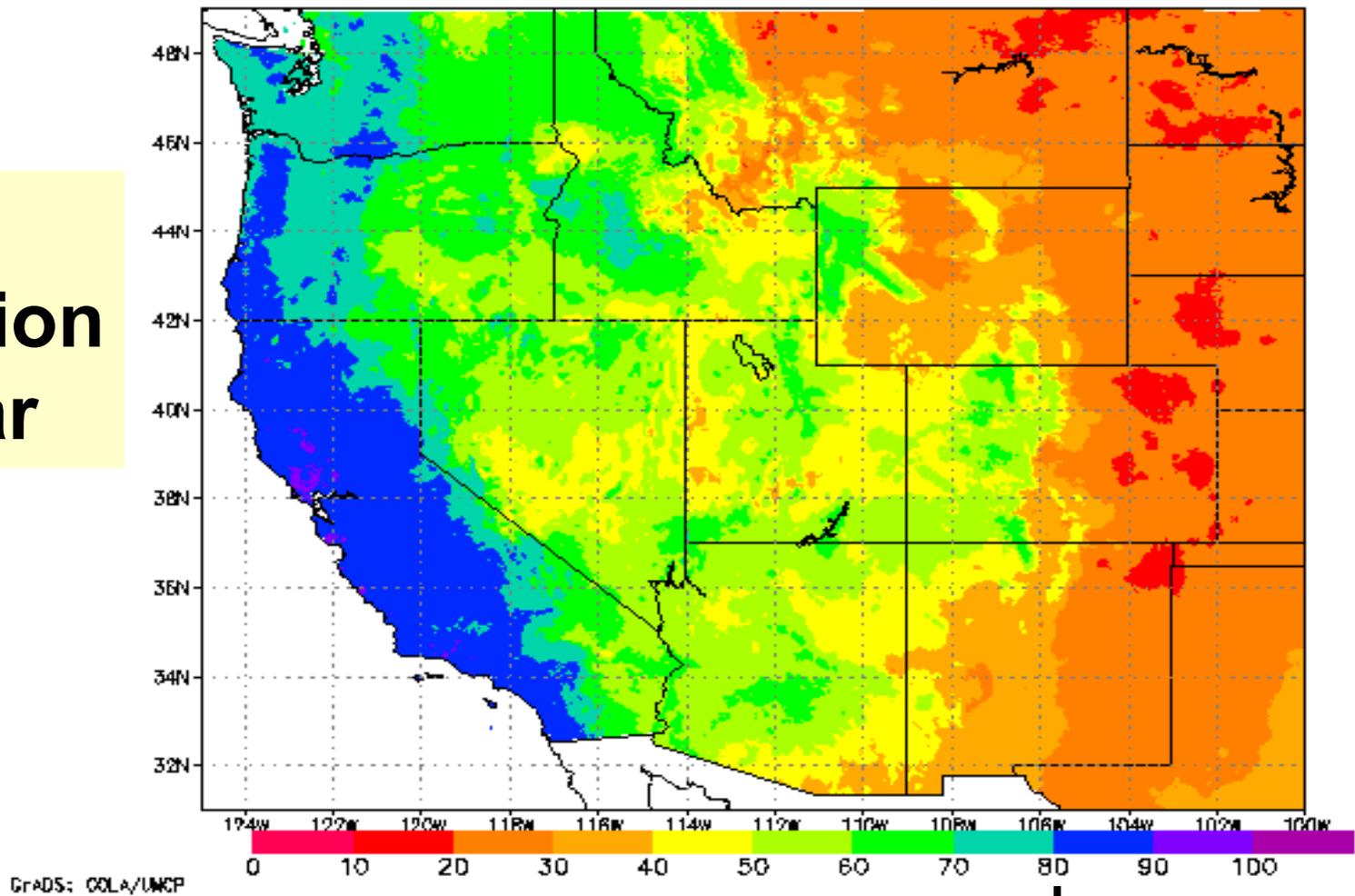
## 30-yr Normal Precipitation: Annual

Period: 1991 - 2020



# Winter Precipitation Oct - Mar

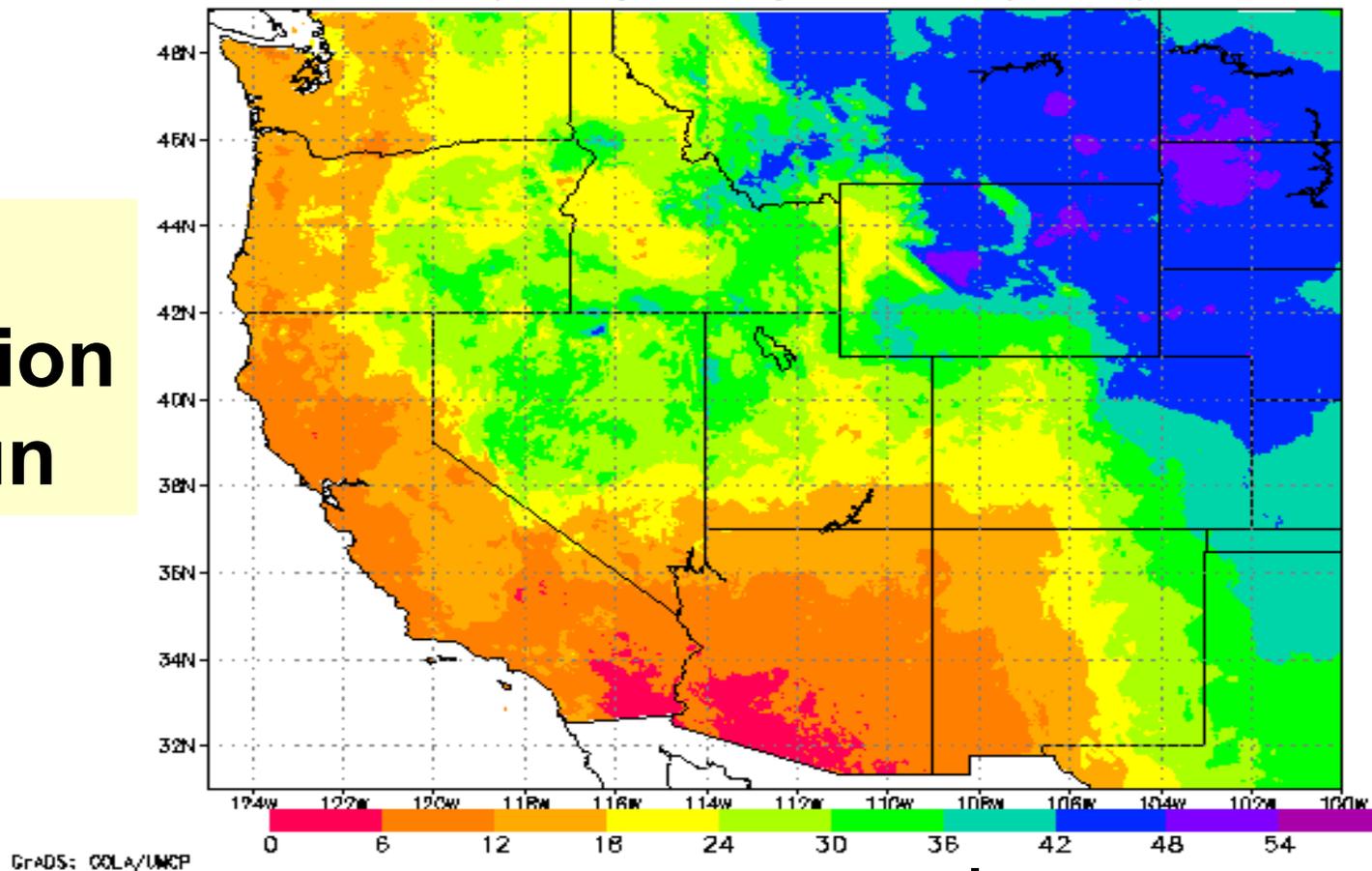
Percent of Average Annual Precip  
in Oct-Mar (PRISM OSU/WRCC)



40 - 80%  
Oct - Mar

# Spring Precipitation Apr – Jun

Percent of Average Annual Precip  
in Apr-May-Jun (PRISM OSU/WRCC)

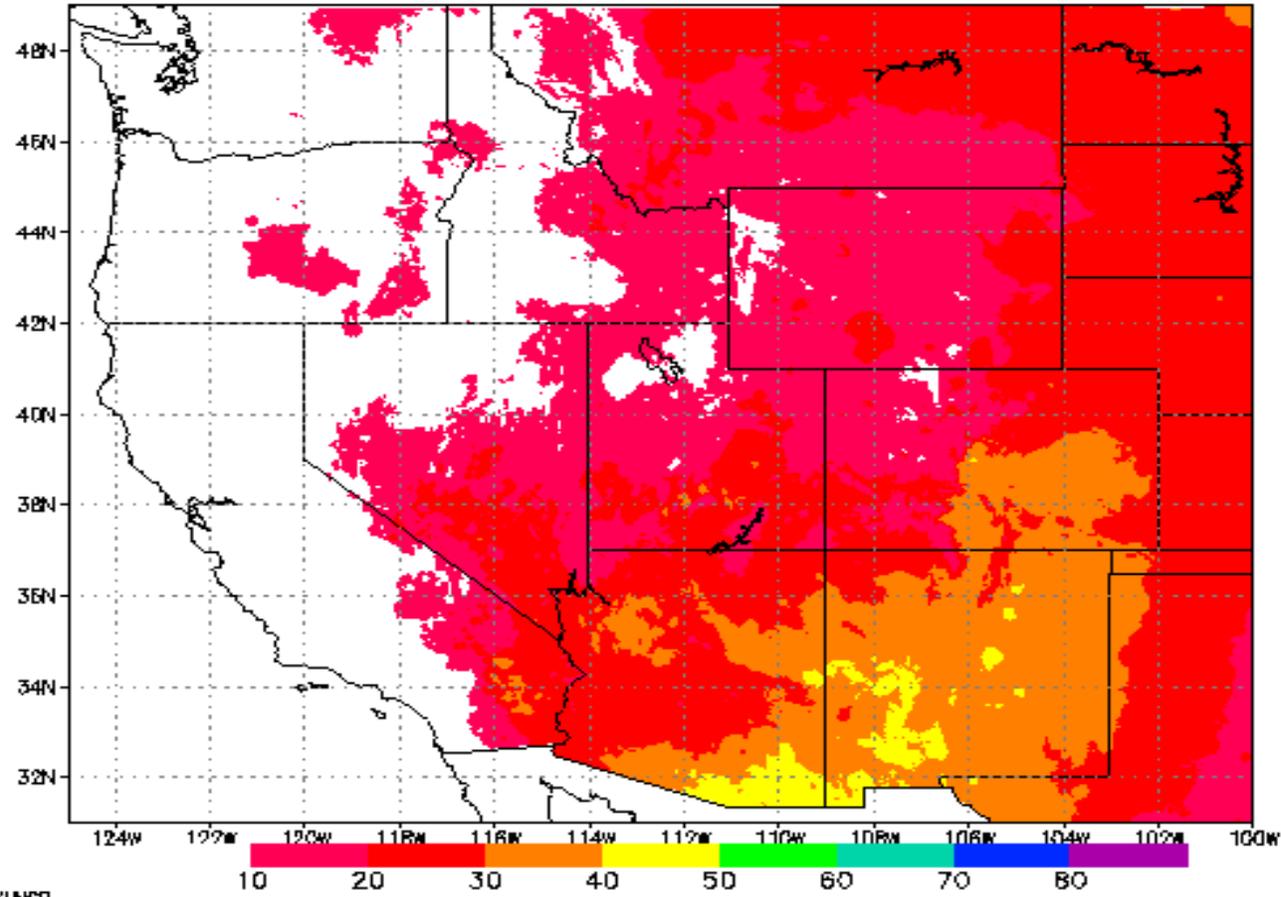


15 - 40%

Apr - Jun

# Summer Precipitation Jul - Aug

Percent of Average Annual Precip  
in Jul-Aug (PRISM OSU/WRCC)



0 – 10%

Jul - Aug

Historic snow data provided the foundation and ability to forecast streams.

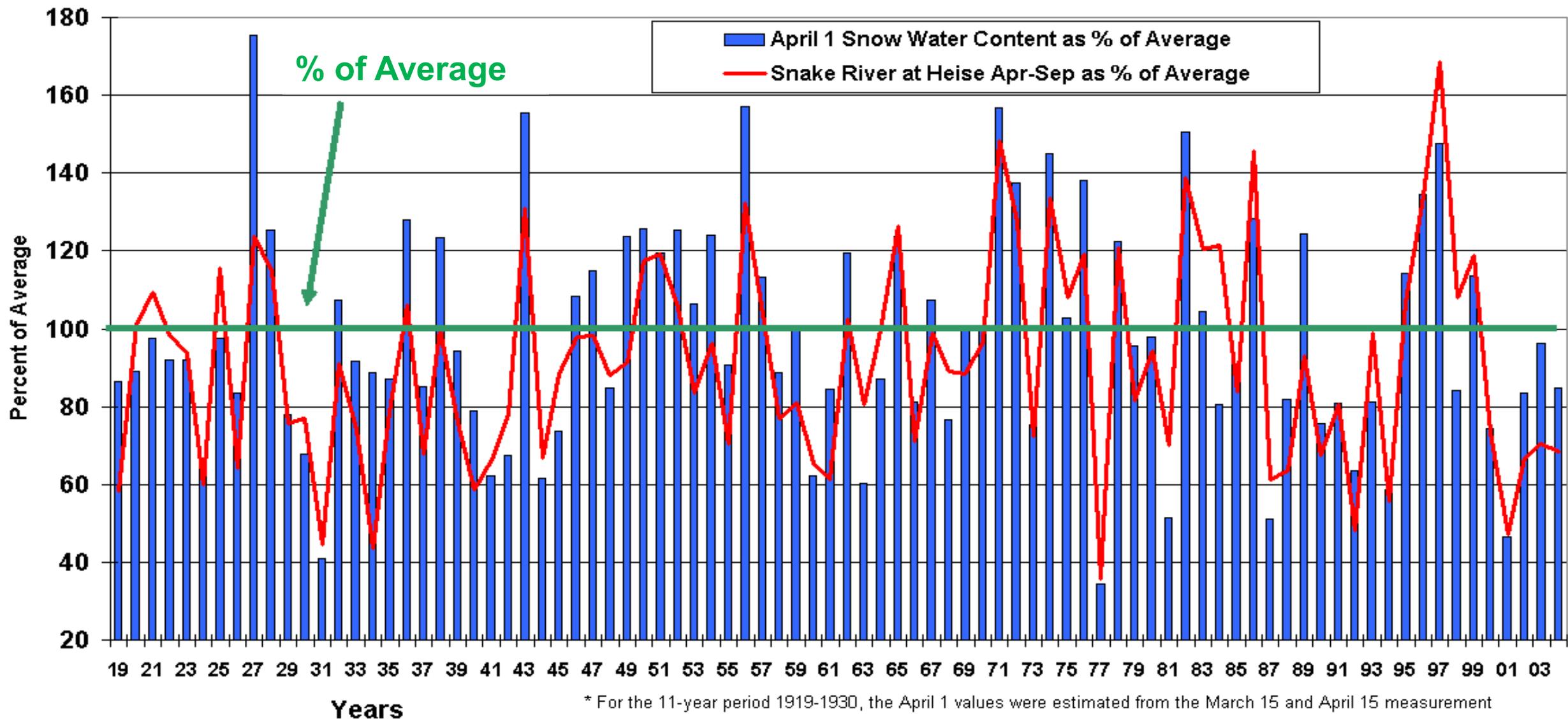
Lewis Lake Divide Snow Course in Yellowstone NP started in 1919.

Lewis Lake Divide SNOTEL Site, Wyoming  
April 1 Snow Water Content (bar graph)

1919-2004

Yellowstone National Park

& Snake River near Heise Apr-Sep Flow (line graph)



Lewis Lake Divide SNOTEL Site, Wyoming

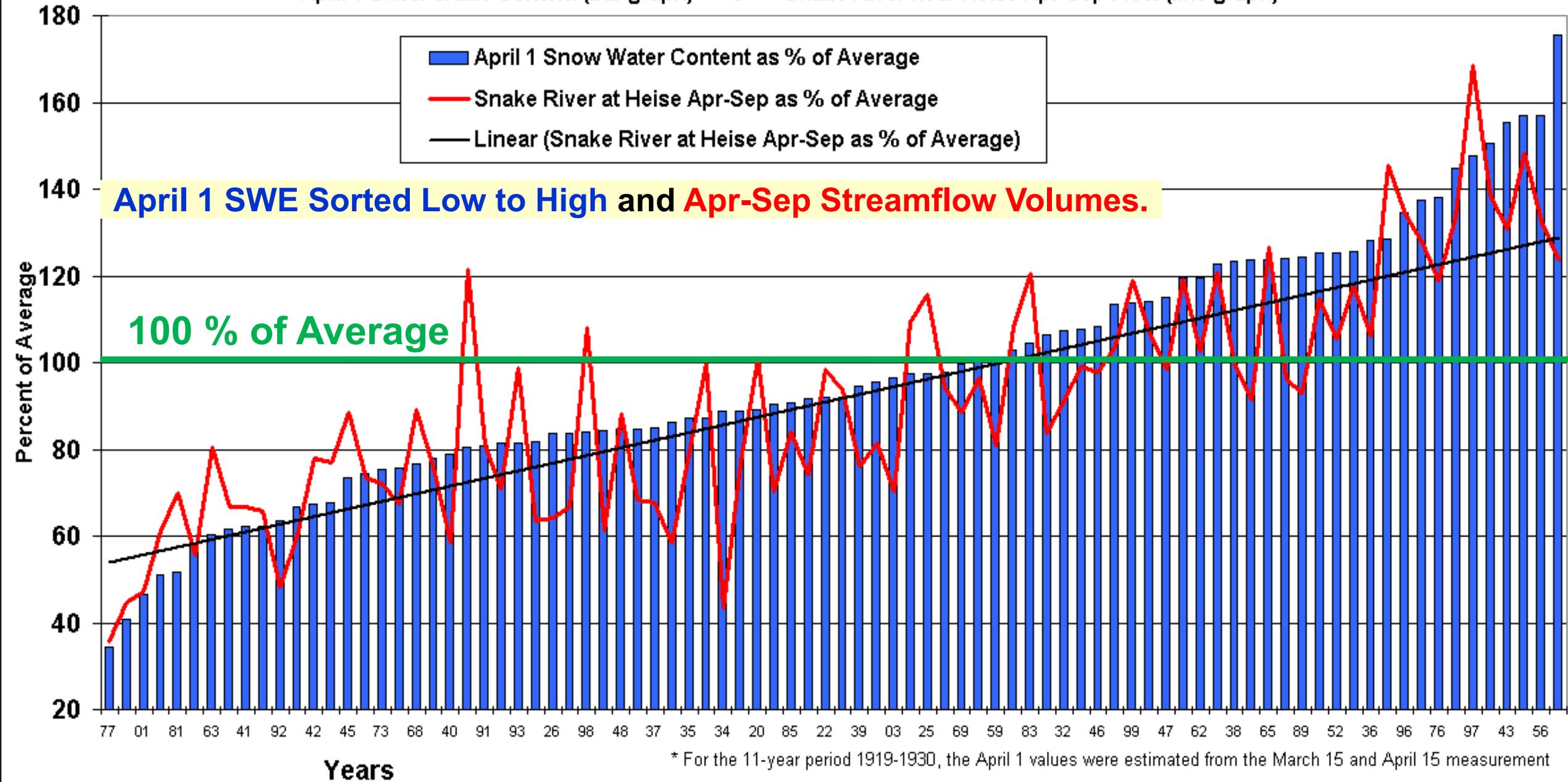
1919-2004

Yellowstone National Park

April 1 Snow Water Content (bar graph)

&

Snake River near Heise Apr-Sep Flow (line graph)

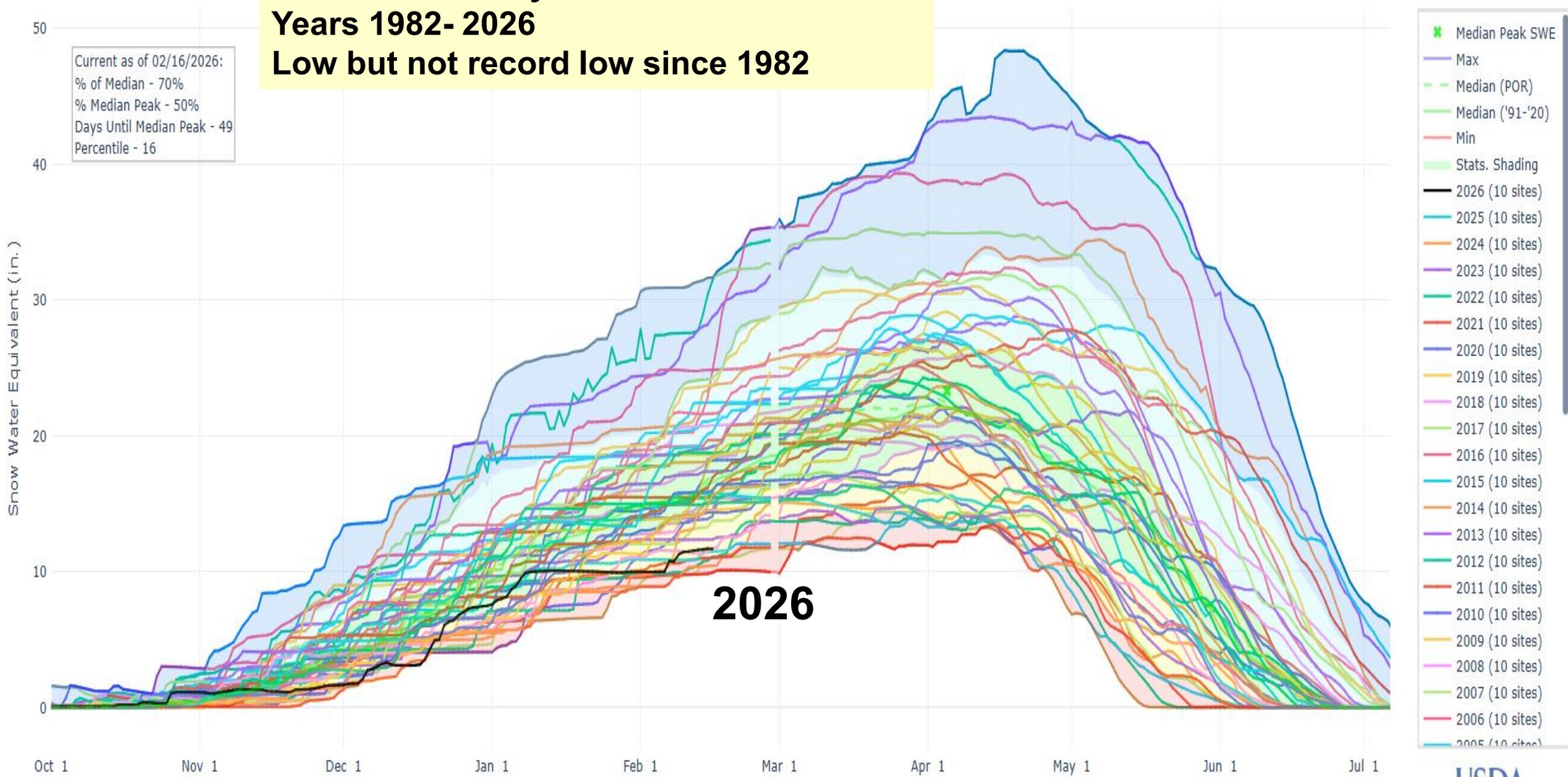


# Boise Basin Daily SWE 10 Station Index Years 1982- 2026

## Low but not record low since 1982

Current as of 02/16/2026:  
% of Median - 70%  
% Median Peak - 50%  
Days Until Median Peak - 49  
Percentile - 16

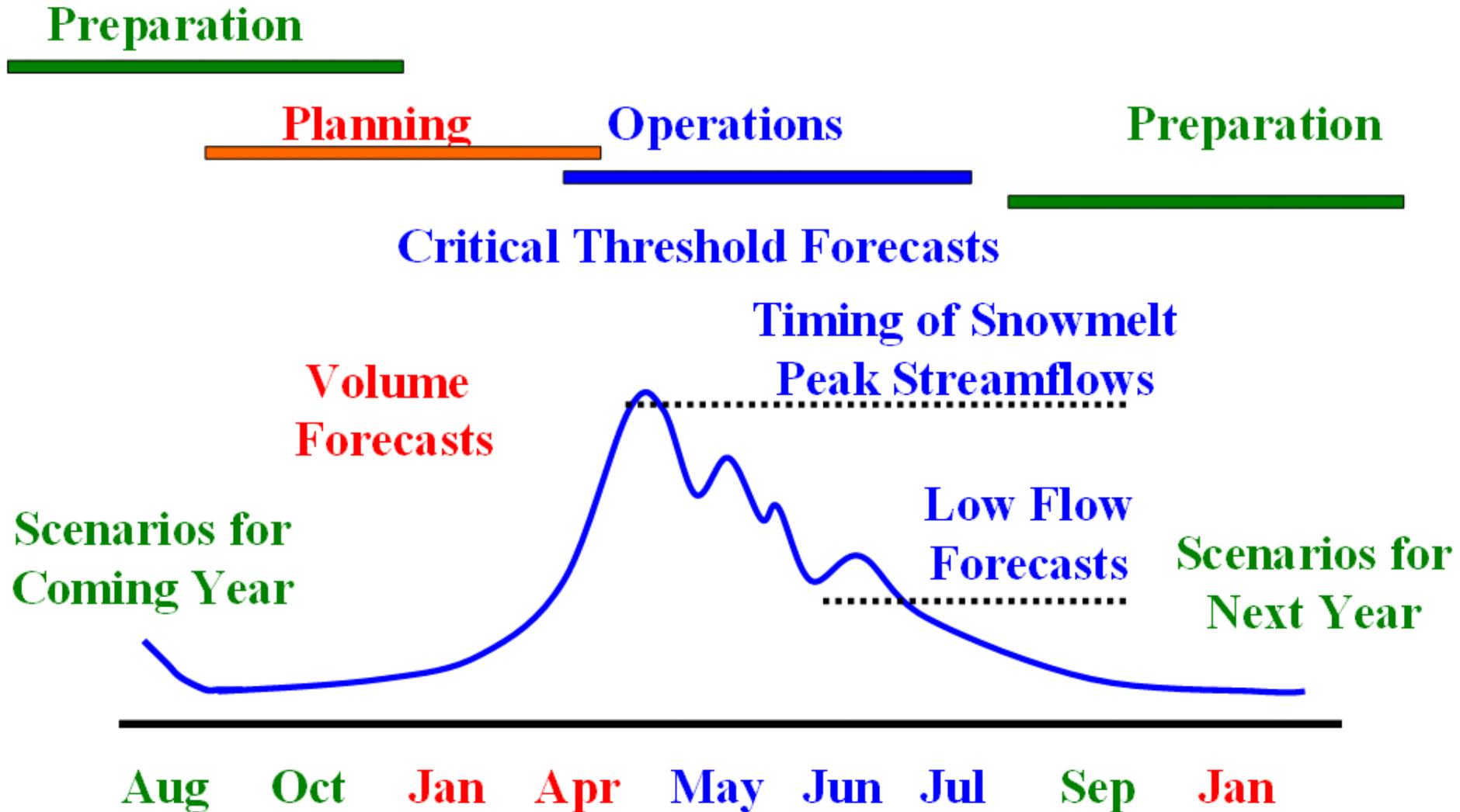
**2026**



# Uses of Snow Survey & Water Supply Information



# Water User Needs Timeline



## Winter Recreation: skiing & snowmobiling

Signs of a Snow Drought - moving ski races to locations with better snow



### Snow Depth and Snowfall Data used for:

- Animal Migration
- Elk Feeding
- Avalanche Forecasting
- Roof Snow Loads
- & More



Avalanche Forecast January 14, 2014 Big Wood Basin

**Use of Snow Survey & Water Supply Forecast Products for Financial Decisions:  
Irrigation, Crop Planting Decisions and many more.**



**Farmers start making decisions and signing contracts using Streamflow Forecasts to guide their decision.**

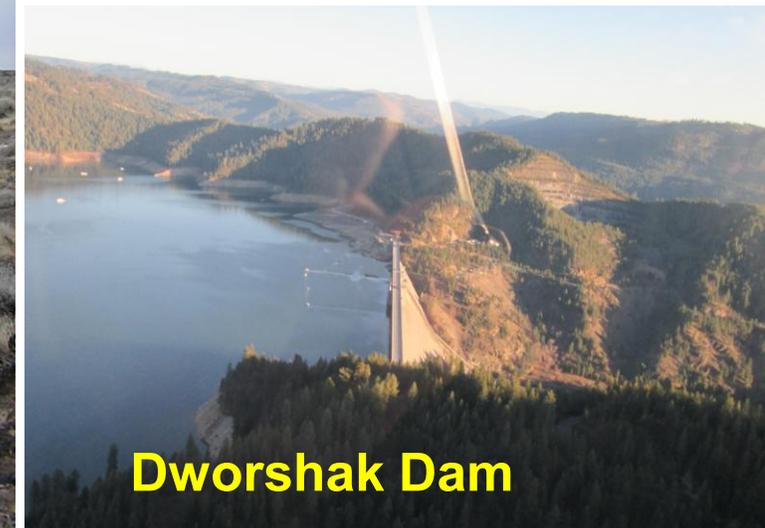
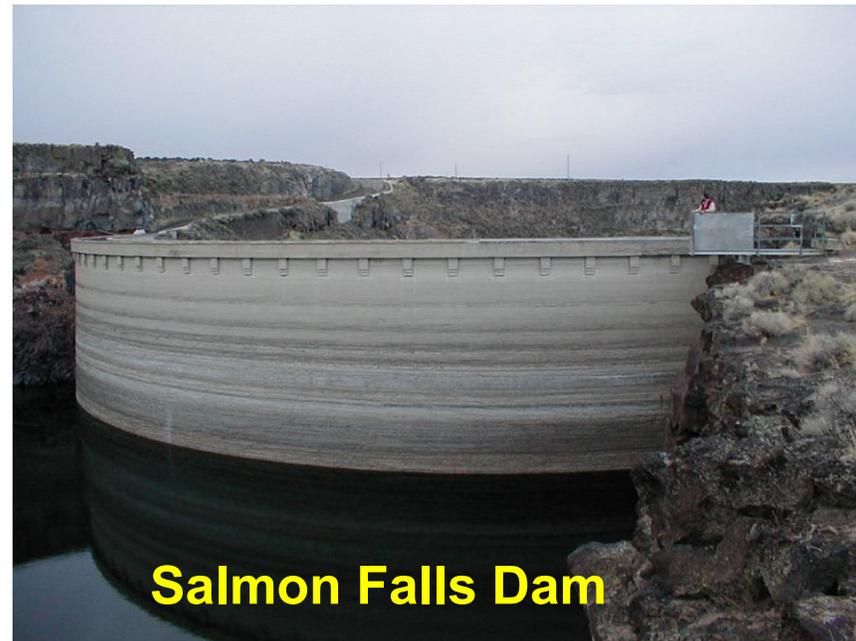
**It may be too early for some producers to tell if they will have a full water supply or not and if they need to factor in additional costs for groundwater pumping or secondary irrigation source.**

**Some irrigators are lucky and can put their decisions off until May to decide to plant higher money producing crops and number of acres in a low water year.**



## Hydropower Production & Reservoir Storage Management

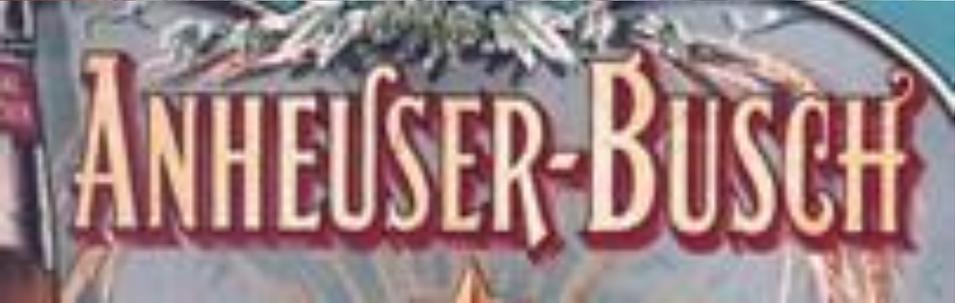
- Each spring, Idaho Power requests Power Cost Adjustments from Public Utilities Commission (PUC) based on the April 1 water supply forecasts, contracts, and **'true up'** which is based last year's streamflow forecast accuracy.
- Mid 2000s analysis: spring rains are critical for runoff and hydropower production:
  - 1" of rain or snow to fall in April in Snake River basin, at 5 cents a KW = \$30 million to Idaho Power.



Salmon Falls Dam

Dworshak Dam

# Breweries.....



# Anheuser-Busch in St Louis use of data to determine Barley and Hops Outlook in many western US states & Canada.

## Brewery Water Supply Update

April 28, 2006

### CURRENT WATER SUPPLY

Brewery	Status*	Brewery	Status*
Baldwinsville	Green	Jacksonville	Yellow
Cartersville	Green	Los Angeles	Green
Columbus	Green	Merrimack	Green
Fairfield	Green	Newark	Yellow
Ft. Collins	Green	St. Louis	Yellow
Houston	Yellow	Williamsburg	Yellow
		Stag	Green

Green	> 90 % of normal
Yellow	50 – 90 % of normal
Red	< 50 % of normal

\*Status is based on current precipitation, reservoir level and stream flow compared to 30-yr average.

#### Discussion of yellow and red status

- Precipitation is below normal in Houston, Jacksonville, Newark, St. Louis and Williamsburg. No impact to the brewery water supply is expected.

### DROUGHT FORECAST



## Agricultural Water Supply Update

April 28, 2006

### CURRENT WATER SUPPLY

Barley	Status*	Rice	Status
Idaho	Green	Arkansas	Green
N. Montana	Green	California	Green
Wyoming/S. Montana	Green	Hops	Status
MonDak	Green	Washington	Green

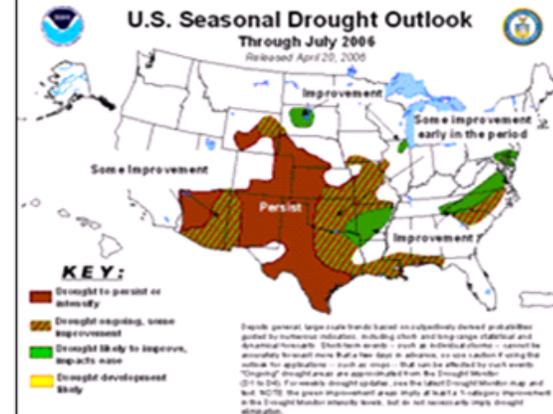
Green	> 90 % of normal
Yellow	50 – 90 % of normal
Red	< 50 % of normal

\*Status is based on current precipitation, reservoir level and stream flow compared to 30-yr average.

#### Discussion of yellow and red status

- All locations are in the green status.

### DROUGHT FORECAST



### KEY NEWS HEADLINES

No key headlines to report.

# Use of Combined Index: Reservoir Storage + Forecasted Volume = Surface Water Supply Index (SWSI)

- Uses:**
- Crop Insurance
  - Bank Loans
  - Mint Contractors
  - Water Banks
  - Surplus Water for Recharge
  - Suspension Criteria for Cloud Seeding

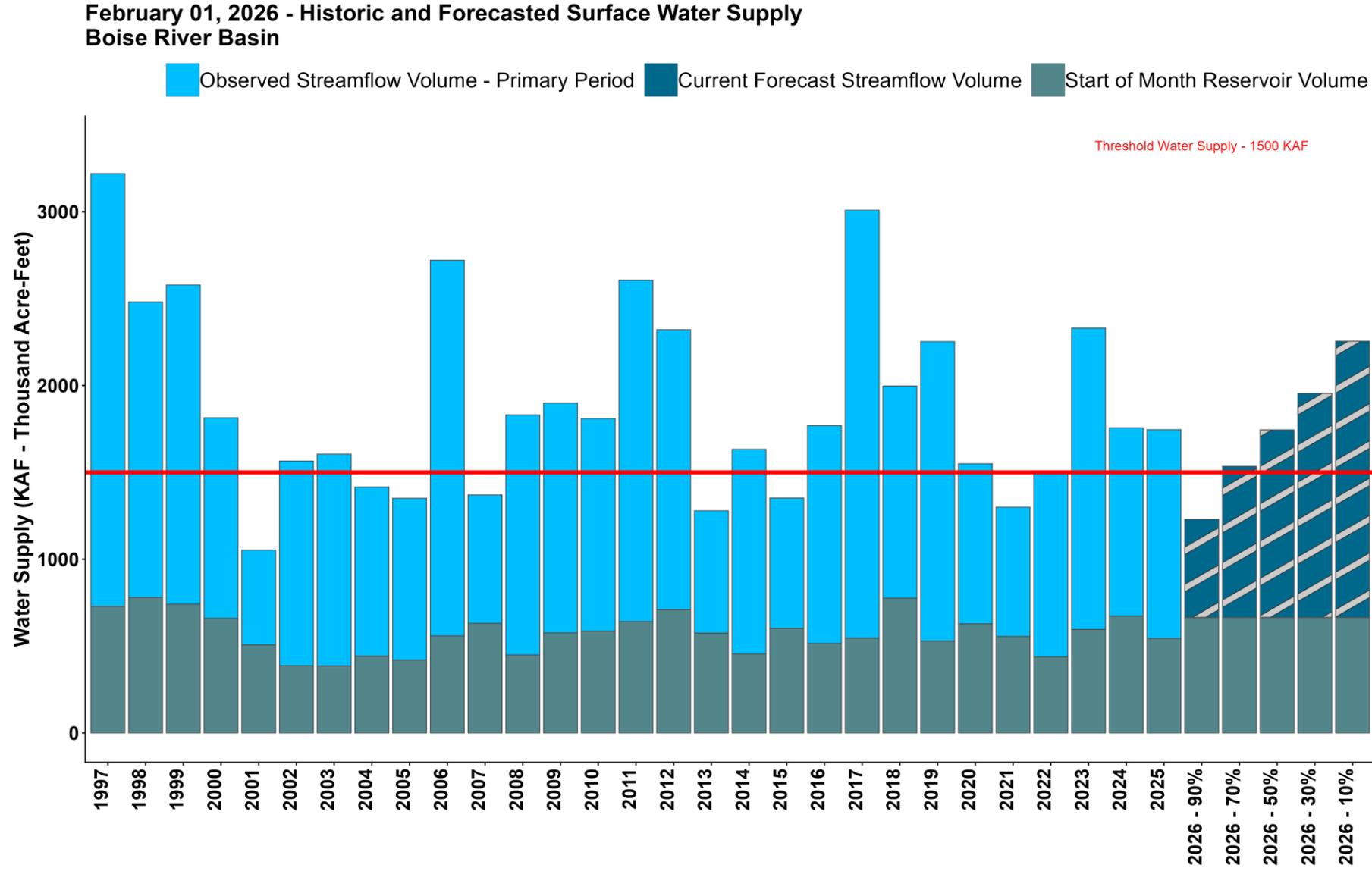
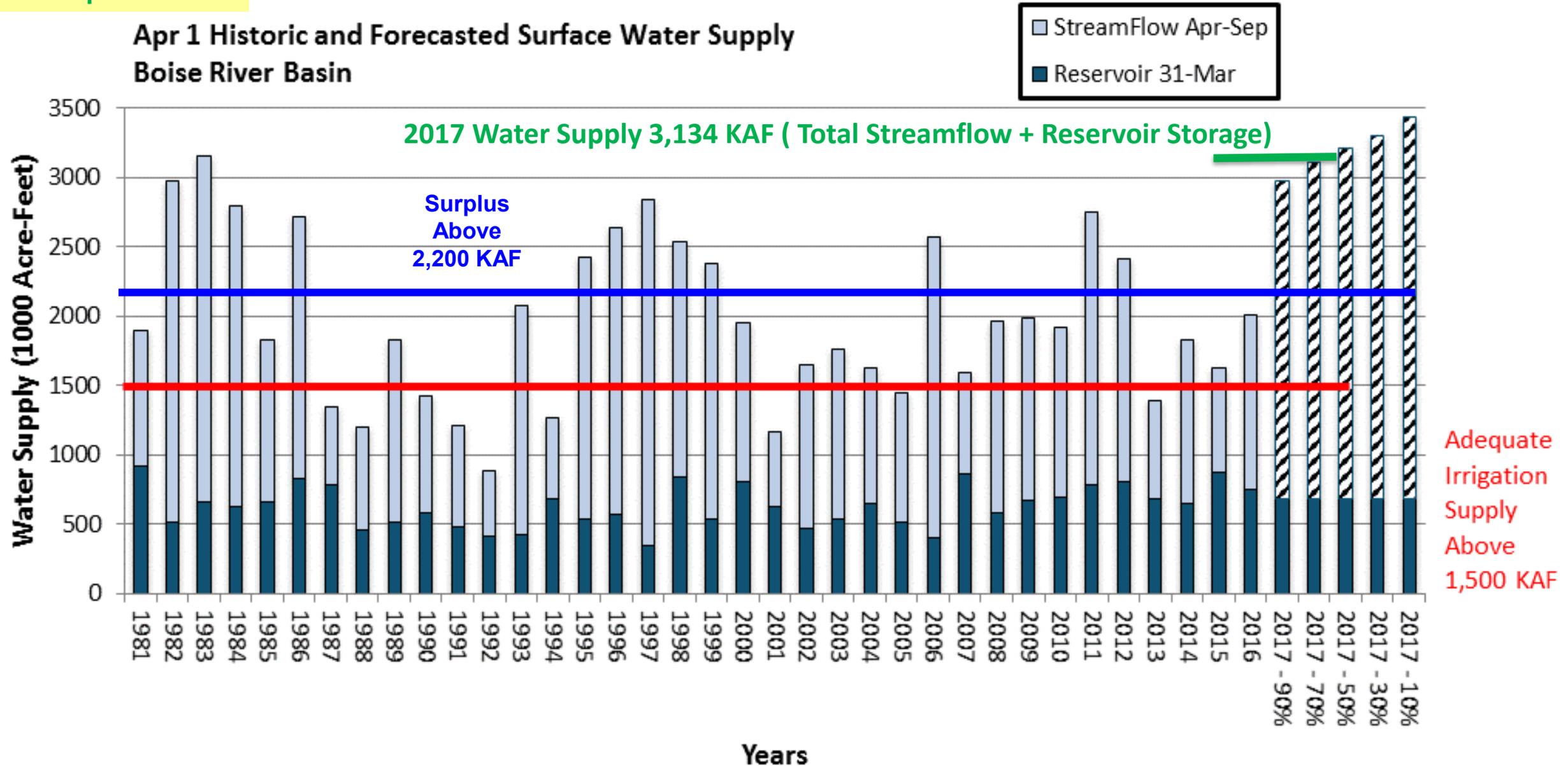


Figure 2. Surface Water Supply Index with **Shortage** and **Surplus** Thresholds.

2017 April 1 SWSI





**Summer  
Recreation:**

**Annual River  
Runners  
Questions:**

- Have the peaks occurred,
- How high & low will the rivers be?



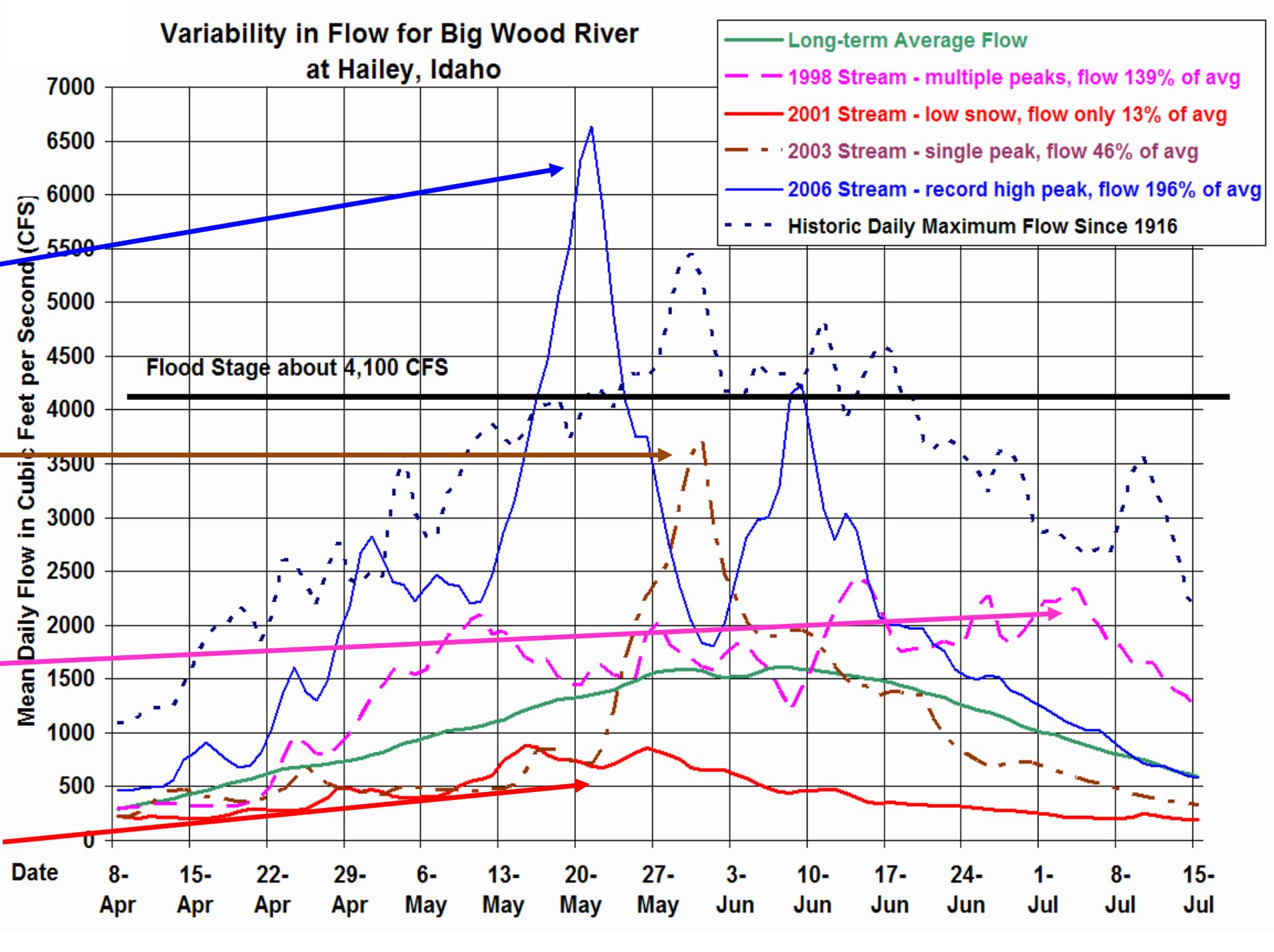
Have the rivers peaked?

Can we close the gates on the reservoir and do final fill? 2006

Will the next peak be higher than the last peak? 2003

Is there enough snow up there to produce one more peak? 1998

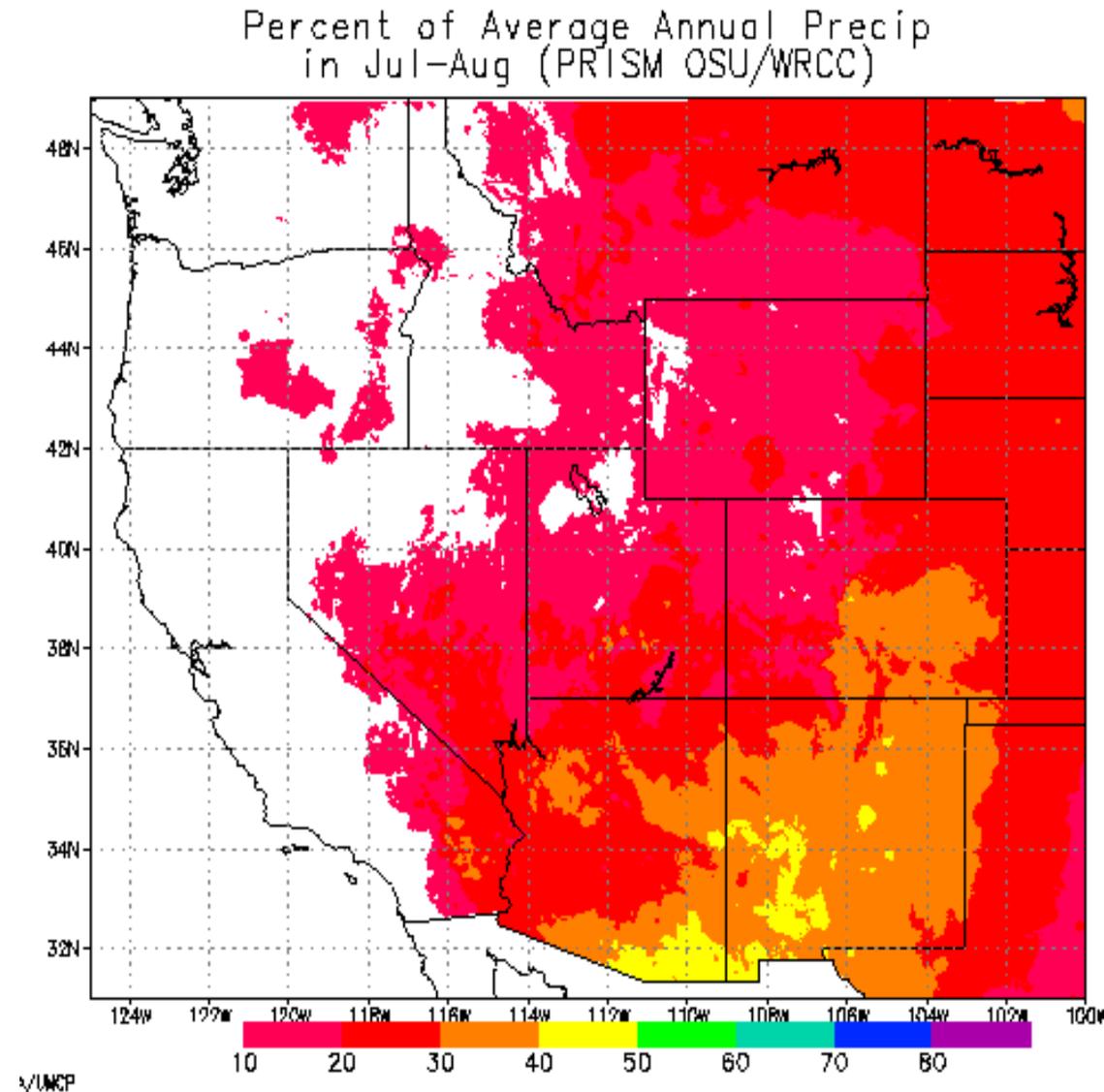
Is that all there is? 2001



# Summertime in Idaho!

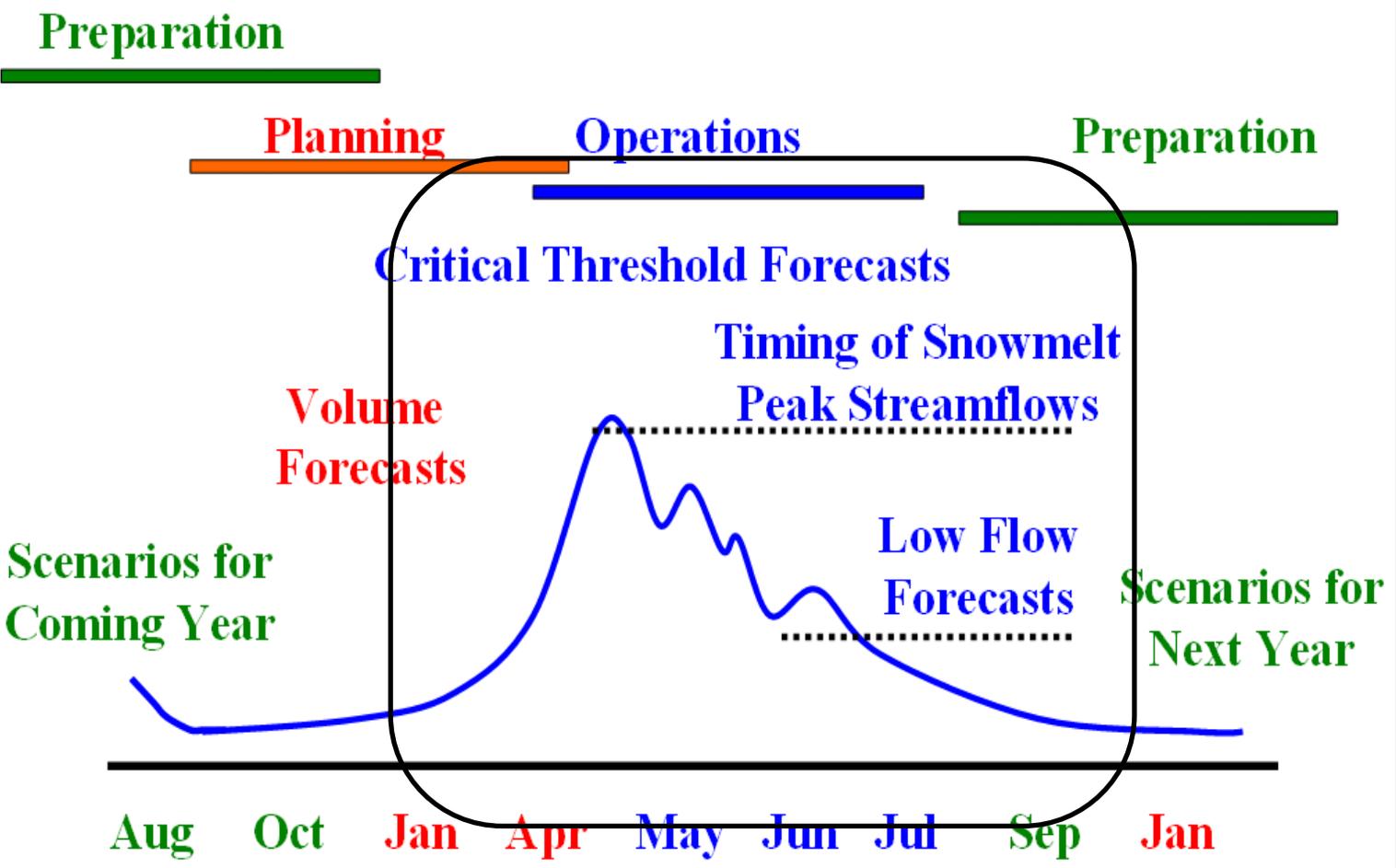
The lack of summer precipitation is the reason why our winter snowfall is so important!

- Streams have receded from snowmelt.
- Monthly precipitation amounts are <1" in the valleys and 1-2" in the mountains.
- This is enough for dryland farming to squeeze by, but not for irrigated crops.



Historically - snow surveys were made to provide spring/summer volume forecasts to plan & plant accordingly.

# Water User Needs Timeline



Over time, it was learned that water users are interested in more than just **Volume Forecasts**.

Operational Tools & Products were researched & developed to help fine tune water user's operations.

- SWSI
- Critical Flows:
  - Peak Flow Forecasts
  - Duration of High flows
  - Day Of Allocation
  - Low Flow Forecasts

Lessons learned – predicting points on the hydrograph is very useful to meet most needs and much simpler than producing daily streamflow models.

## Other Users:

- **Power Boat Sales / Restaurant Owners**
- **Hunters / Tire Sales**
- **Windshield Repair Business**
- **School Bus Drivers & Highway Departments - SNOW DAY!**
- **Winter Wildlands Alliance**  
**Snow School**
- **Ski Stores / Roof Loads**
- **Fire Weather Forecasters**
- **Range Management**
- **Pizza Sales**
- **Coal & Natural Gas Producers**
- **Federal Reserve Board**
- **Huckleberry / Morel Pickers**
- **Fish Migration / Glacier Recession**
- **Navigation on Columbia & Missouri Rivers**
- **Climatic Change - Liz Claiborne - hires Climatologist / Target - has a "climate team"**
- **Weekly US Drought Monitor**

*Take Me To the Water*

**Take me boating.**  
*Because I'm growing up too fast.*

**Take me water skiing.**  
*Because our boat's cooler than any video game.*

**Take me on the water.**  
*Before I discover girls.*

**Take me fishing.**  
*And I promise to clean my room.*

<b>Bayliner 185</b> \$19,895 <sup>00</sup> 3 only	<b>Sea Ray</b> 200 Sundeck \$38,980 <sup>00</sup> 1 only	<b>Lund</b> WC-14 w/15hp Merc & Trailer \$5,746 <sup>00</sup> 1 Red — 1 Blue
<b>Bayliner 205</b> \$23,985 <sup>00</sup> 3 only	<b>Sea Ray</b> 205 Sport \$30,533 <sup>00</sup> 1 only	<b>Lund</b> 1775 Classic \$22,478 <sup>00</sup> 2 only

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# Pictures of Yesterday's Snow Fall at Bogus Basin.

Two Day Total Snowfall:

Bogus Basin 13"

Brundage 21" Sun Valley 18"

Tamarack 20" Schweitzer 22"

Questions ??

Comments ??



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