The Importance of Snow in Idaho
February 2, 2023
5th Grade Classes Barbara Morgan Elementary School

**Snow is our Frozen Liquid Gold
When it Melts Becomes Our Lifeblood**

Ron Abramovich

What are some of the uses of Snow & Water ?

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

When snow melts and fills our rivers and reservoirs. How is this water used:

- **Fishing**
- **Rafting**
- **Hydropower**
- **Irrigation**
- **Drinking water**
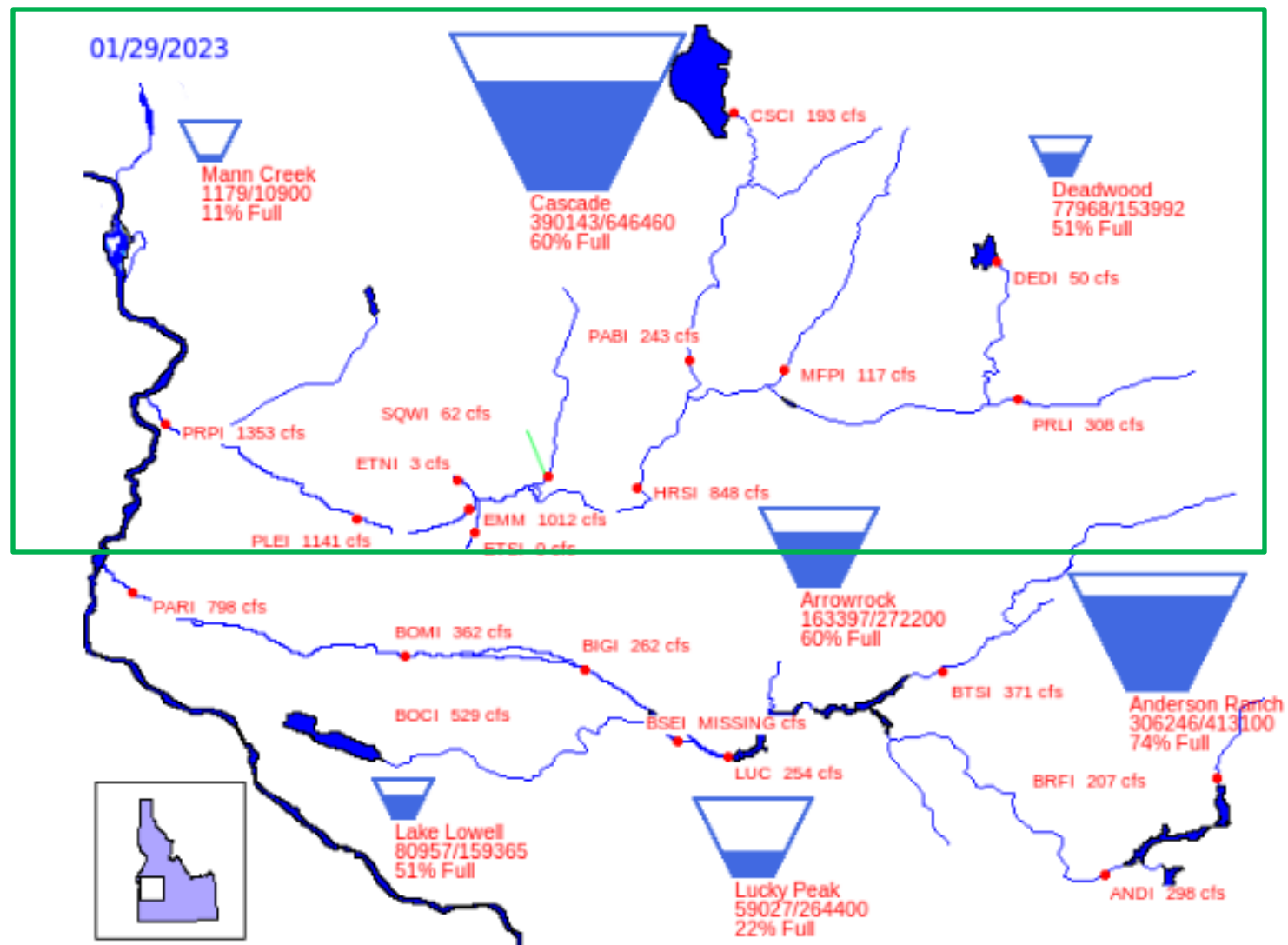- **Groundwater recharge**

Snow Data is used for:

- **Skiing & Snowmobiling**
- **Animal Migration**
- **Avalanche Forecasting**
- **Roof Snow Loads**

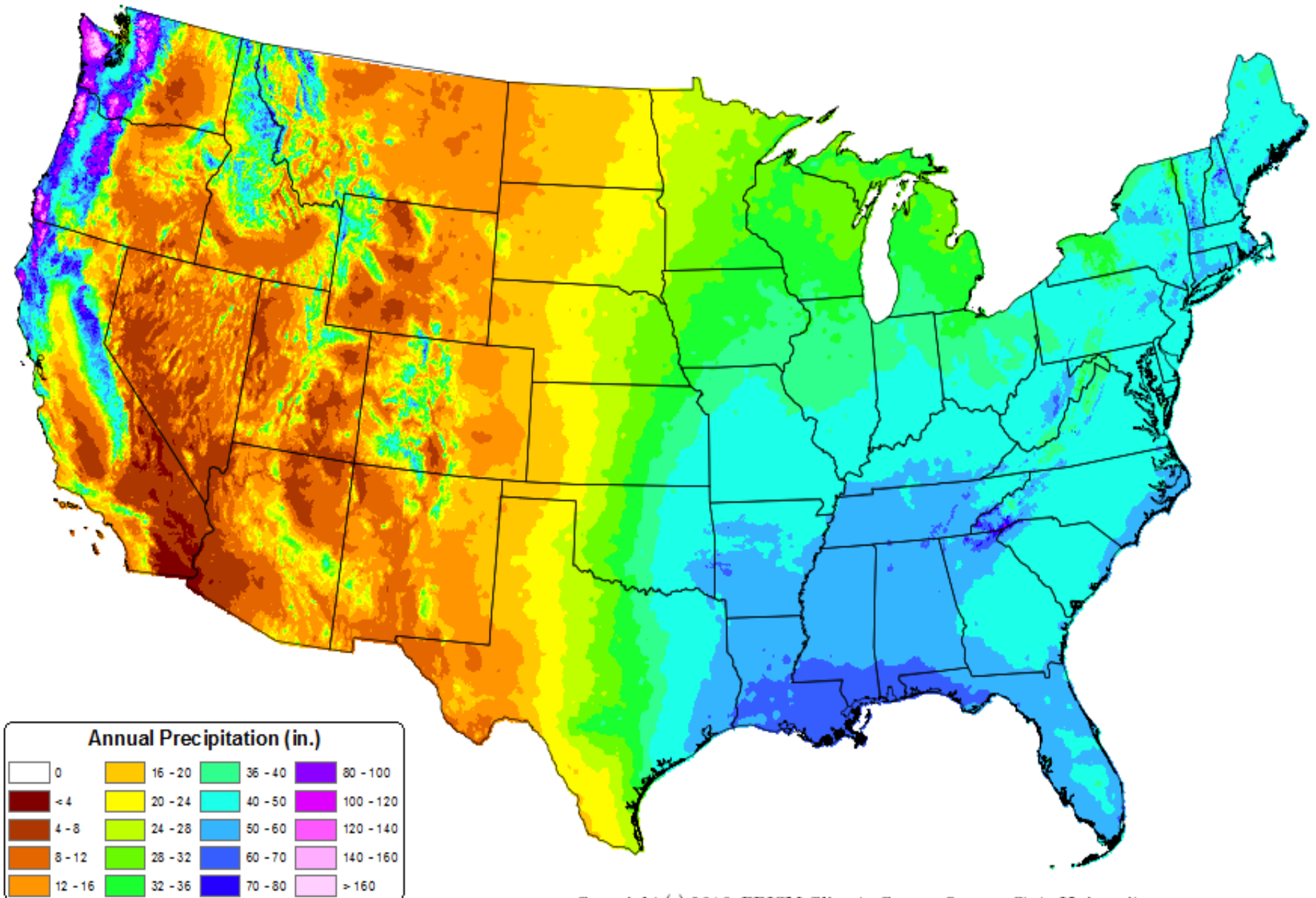Below – Brundage Reservoir, Payette Lake Dam & Lake Cascade spillway

Payette Reservoir System is 58% Full

Bureau of Reclamation, Pacific Northwest Region
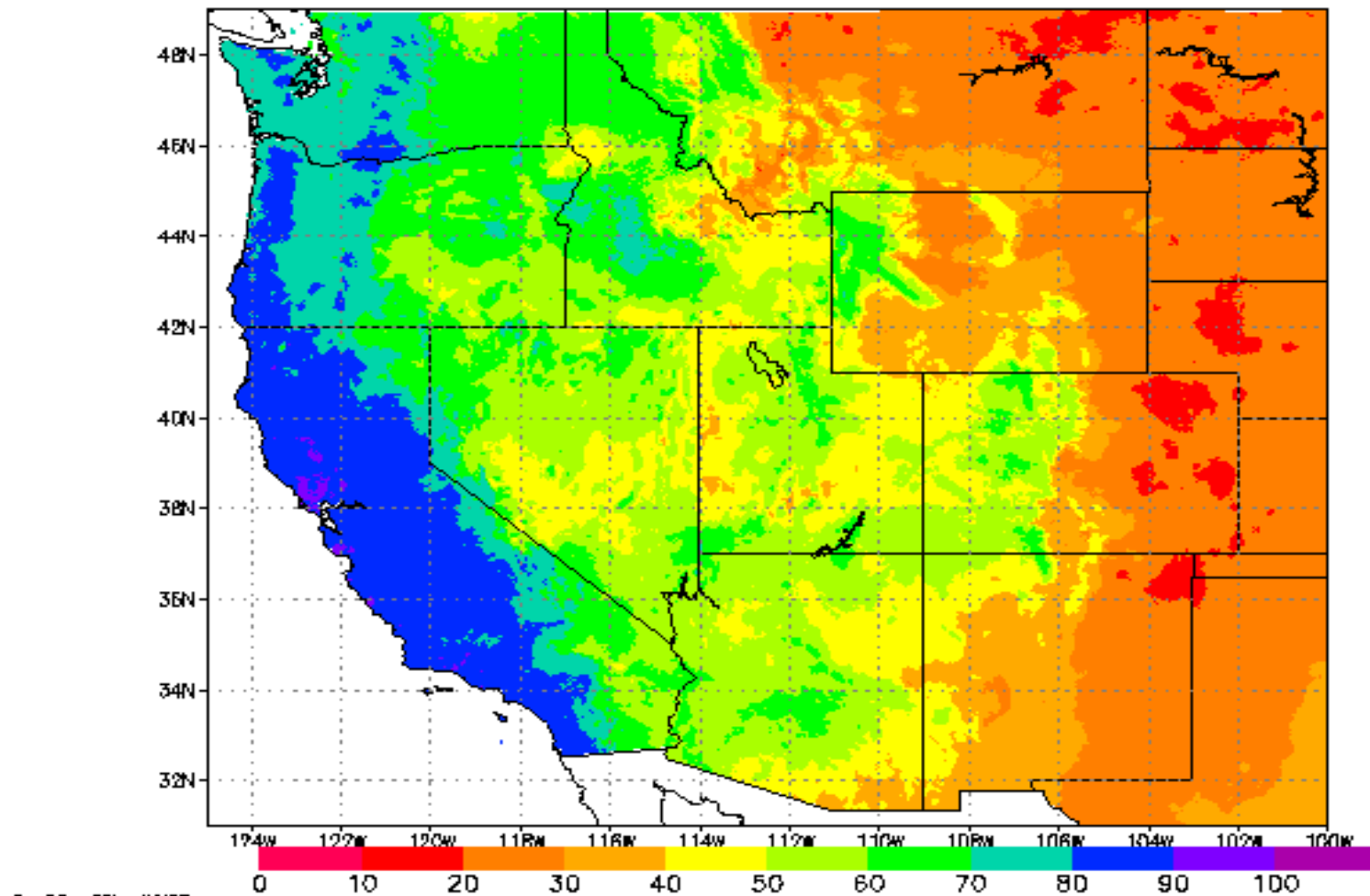Major Storage Reservoirs in the Boise & Payette River Basins

01/29/2023

CSCI 193 cfs

Mann Creek
1179/10900
11% Full

Cascade
390143/646460
60% Full

Deadwood
77968/153992
51% Full

DEDI 50 cfs

PABI 243 cfs

MFPI 117 cfs

SQWI 62 cfs

PRLI 308 cfs

PRPI 1353 cfs

ETNI 3 cfs

HRSI 848 cfs

EMM 1012 cfs

PLEI 1141 cfs

ETSI 0 cfs

PARI 798 cfs

Arrowrock
163397/272200
60% Full

BOMI 362 cfs

BIGI 262 cfs

BTSI 371 cfs

BOCI 529 cfs

BSEI MISSING cfs

Anderson Ranch
306246/413100
74% Full

LUC 254 cfs

BRFI 207 cfs

Lake Lowell
80957/159365
51% Full

Lucky Peak
59027/264400
22% Full

ANDI 298 cfs

30-yr Normal Precipitation: Annual
Period: 1981-2010

Annual Precipitation (in.)

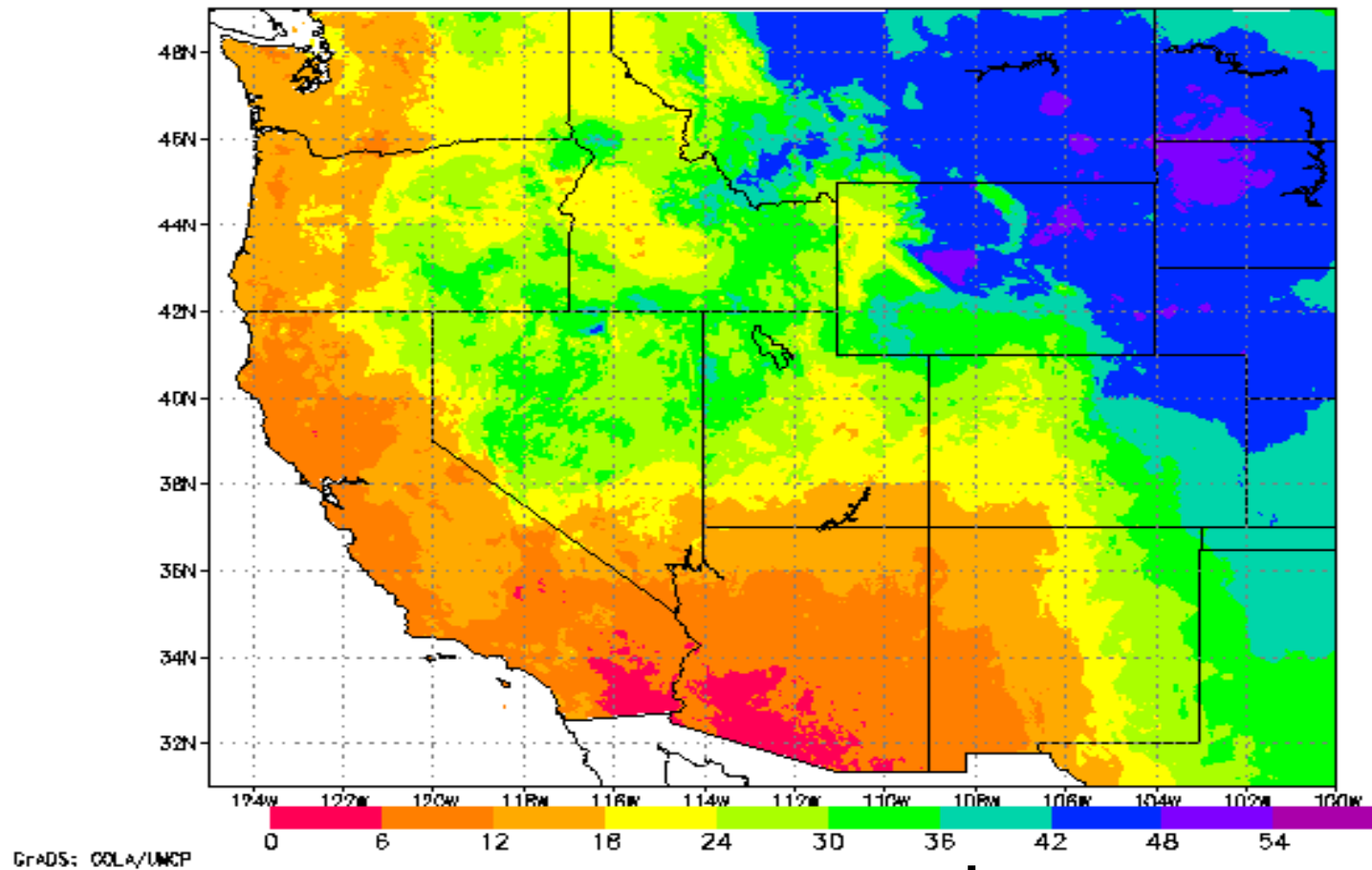|			
0	16 – 20	36 – 40	80 – 100
< 4	20 – 24	40 – 50	100 – 120
4 – 8	24 – 28	50 – 60	120 – 140
8 – 12	28 – 32	60 – 70	140 – 160
12 – 16	32 – 36	70 – 80	> 160

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

40 - 80%

Oct - Mar

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

GrADS: COLA/UMCP

0   6   12   18   24   30   36   42   48   54

15 - 40%

Apr - Jun

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

GrADS: COLA/UMCP
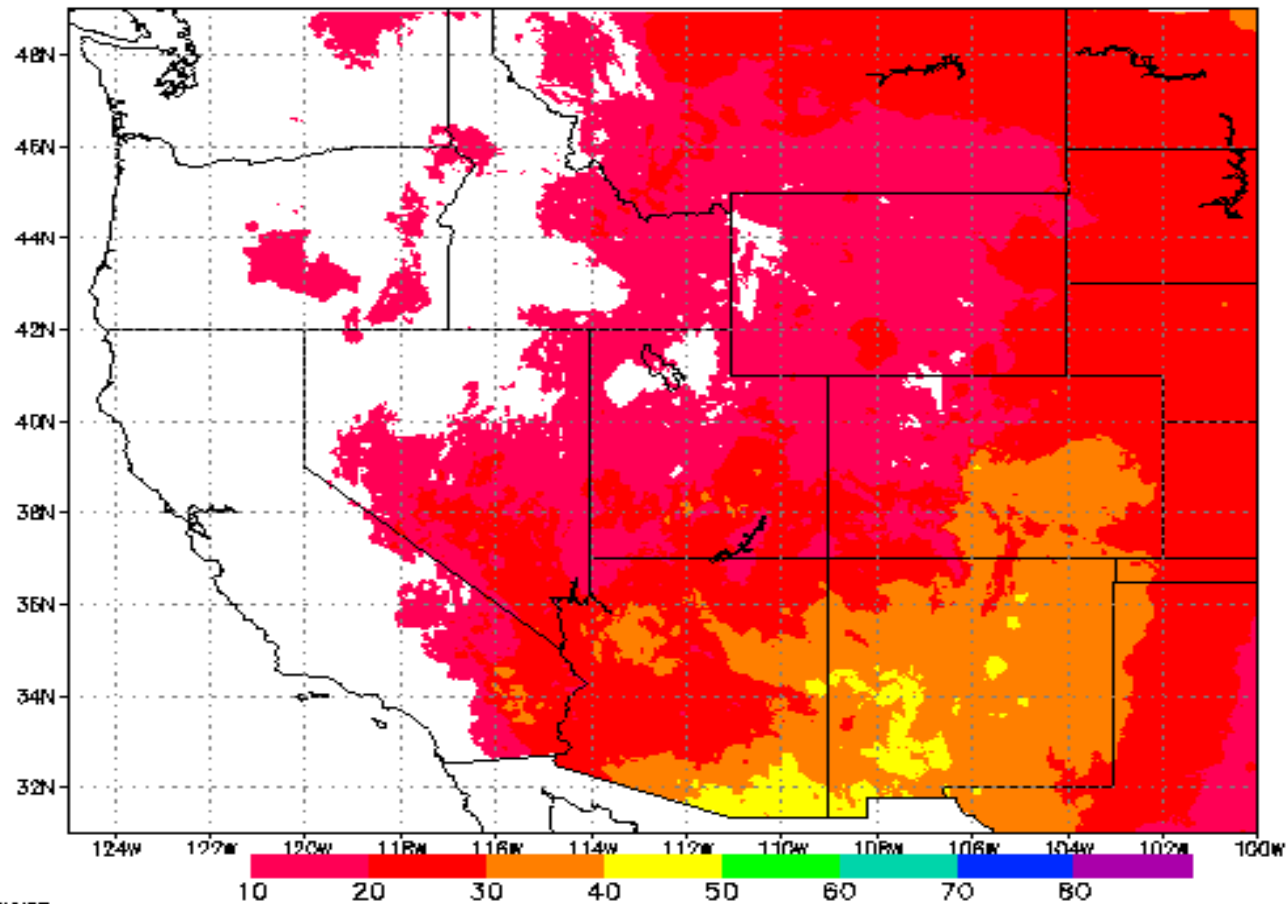
0 – 10%

Jul - Aug

Summer time in Idaho!

Streams have receded from the 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.

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

Percent of Average Annual Precip in Jul-Aug (PRISM OSU/WRCC)
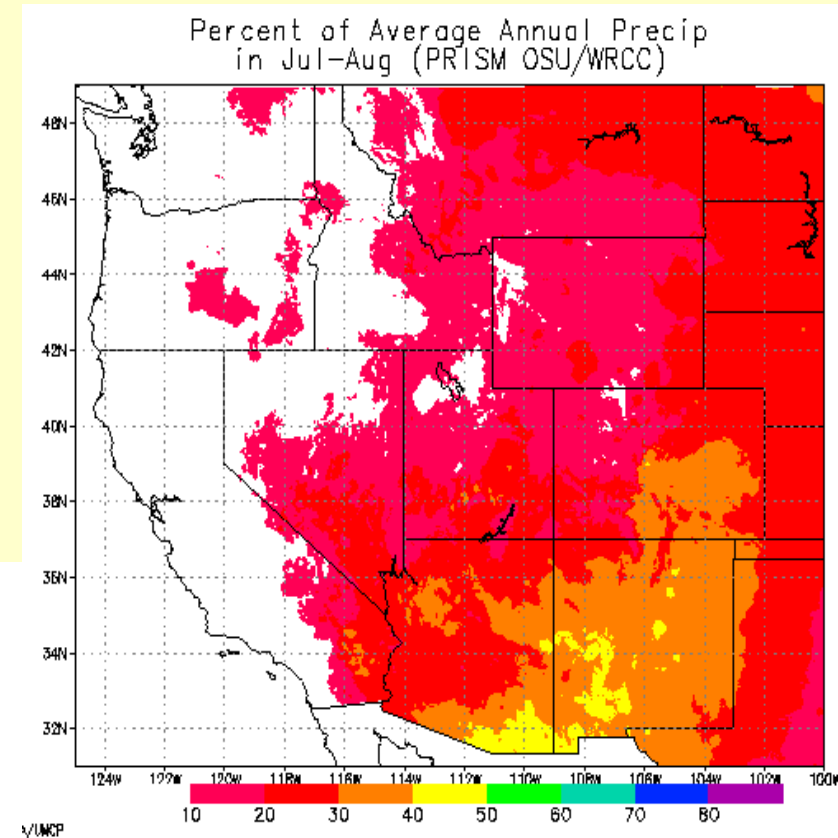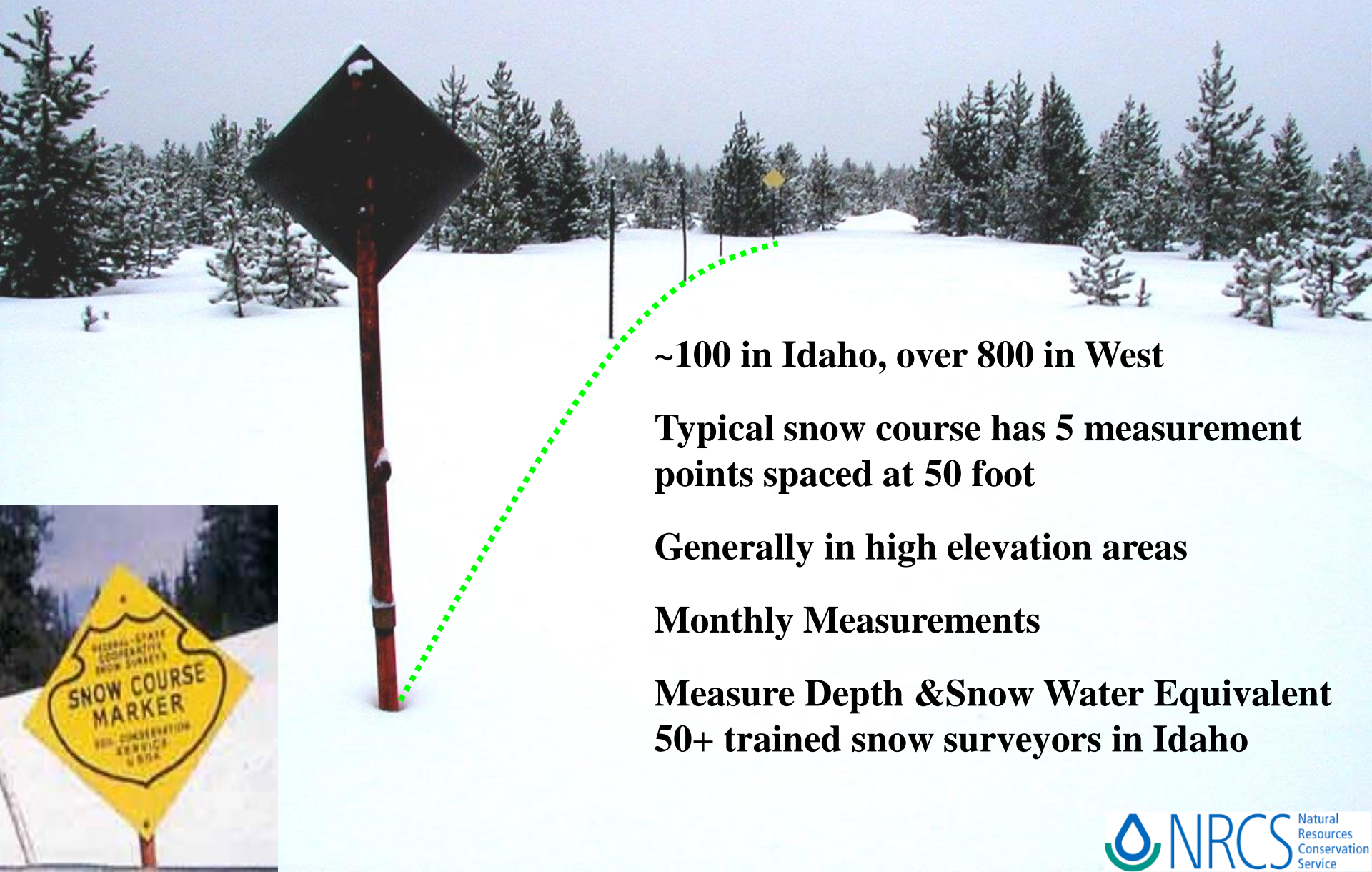
McCall NWS Temperature & Precipitation
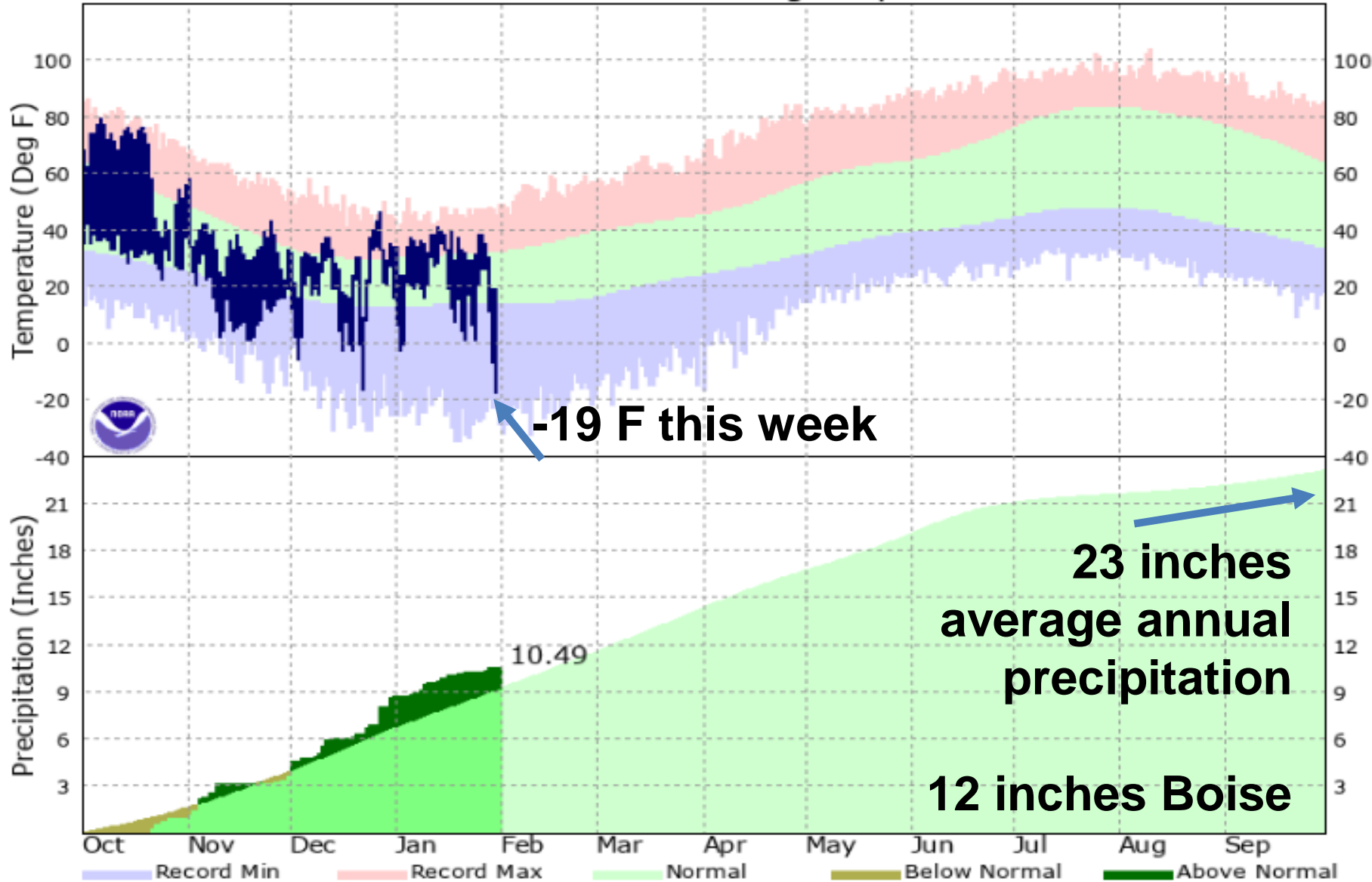
Dr. Church started the first snow surveys in Lake Tahoe area in early 1900s.

Snow Course – some were originally Aerial Markers with snow depth measured by flying over in an airplane

~100 in Idaho, over 800 in West

Typical snow course has 5 measurement points spaced at 50 foot
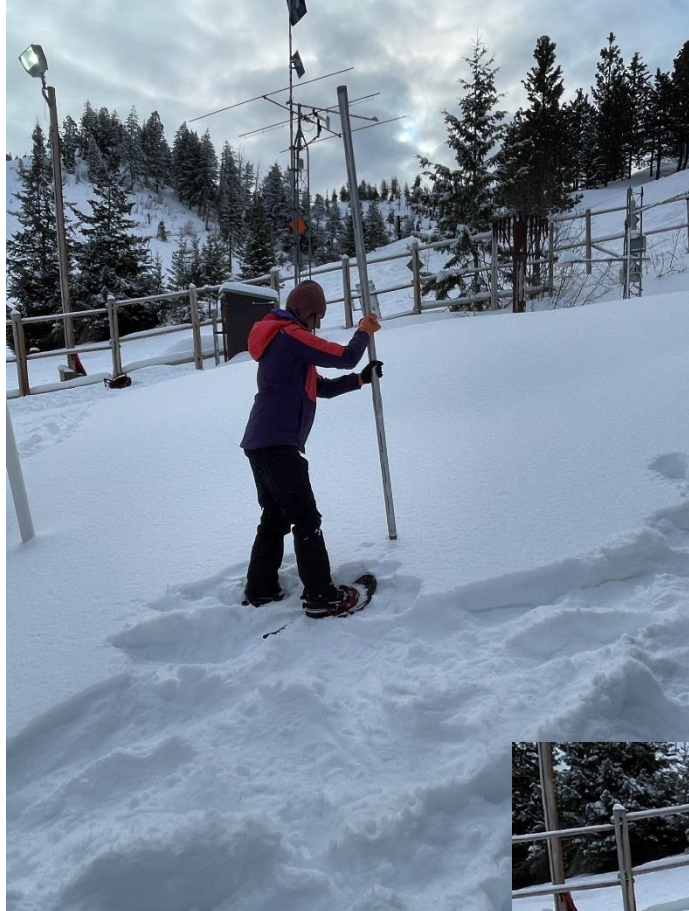
Generally in high elevation areas

Monthly Measurements

Measure Depth &Snow Water Equivalent 50+ trained snow surveyors in Idaho

Now let's see how these snow tubes work and see how much snow we measured this morning in McCall.
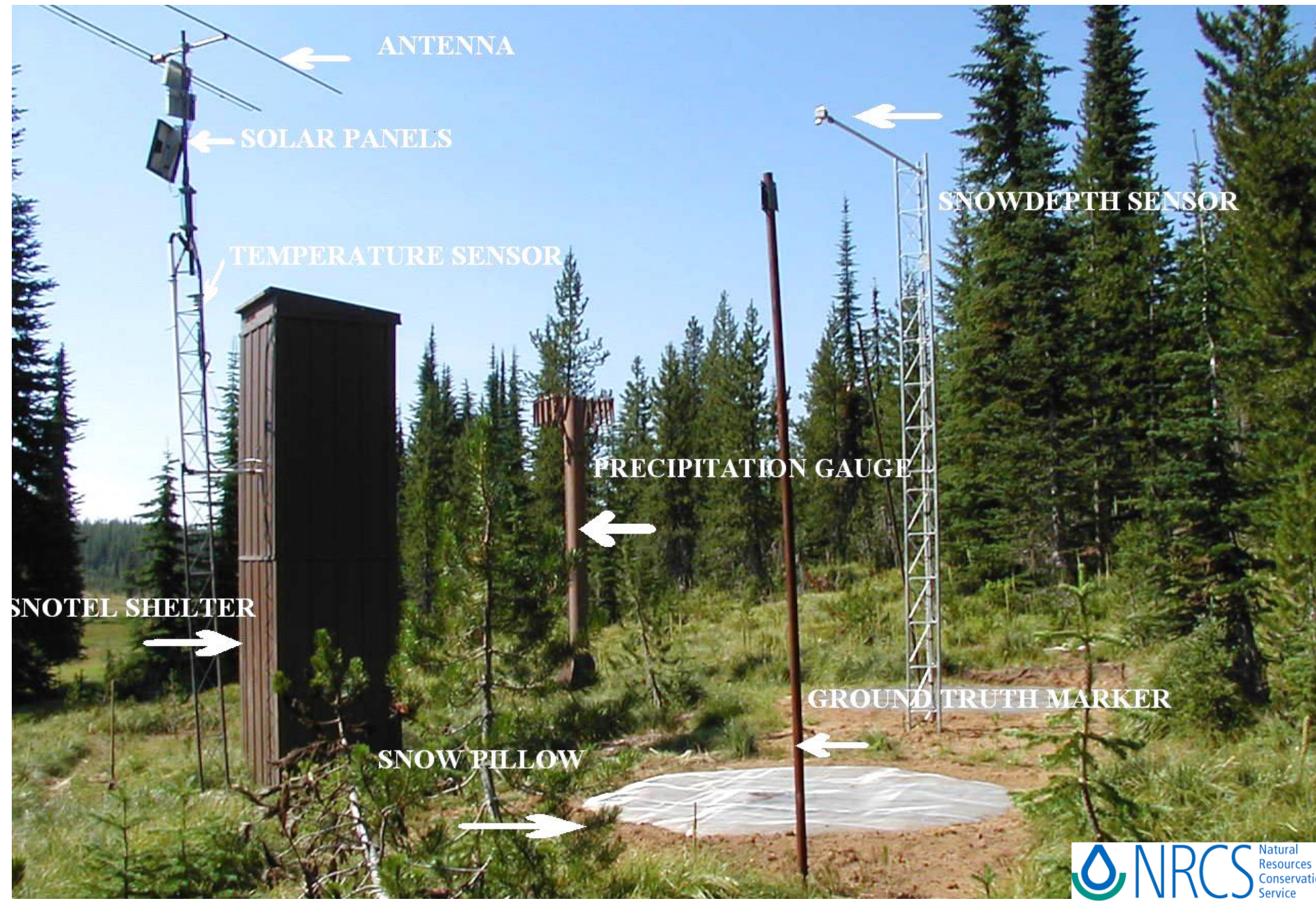

Bogus Basin Snow Course

Jan 31, 2023

Brundage Reservoir SNOTEL Site
Summer & Winter

2023 Brundage Reservoir Snow Water Equivalent 104% of Median and 58% of Seasonal Peak that occurs April 12.
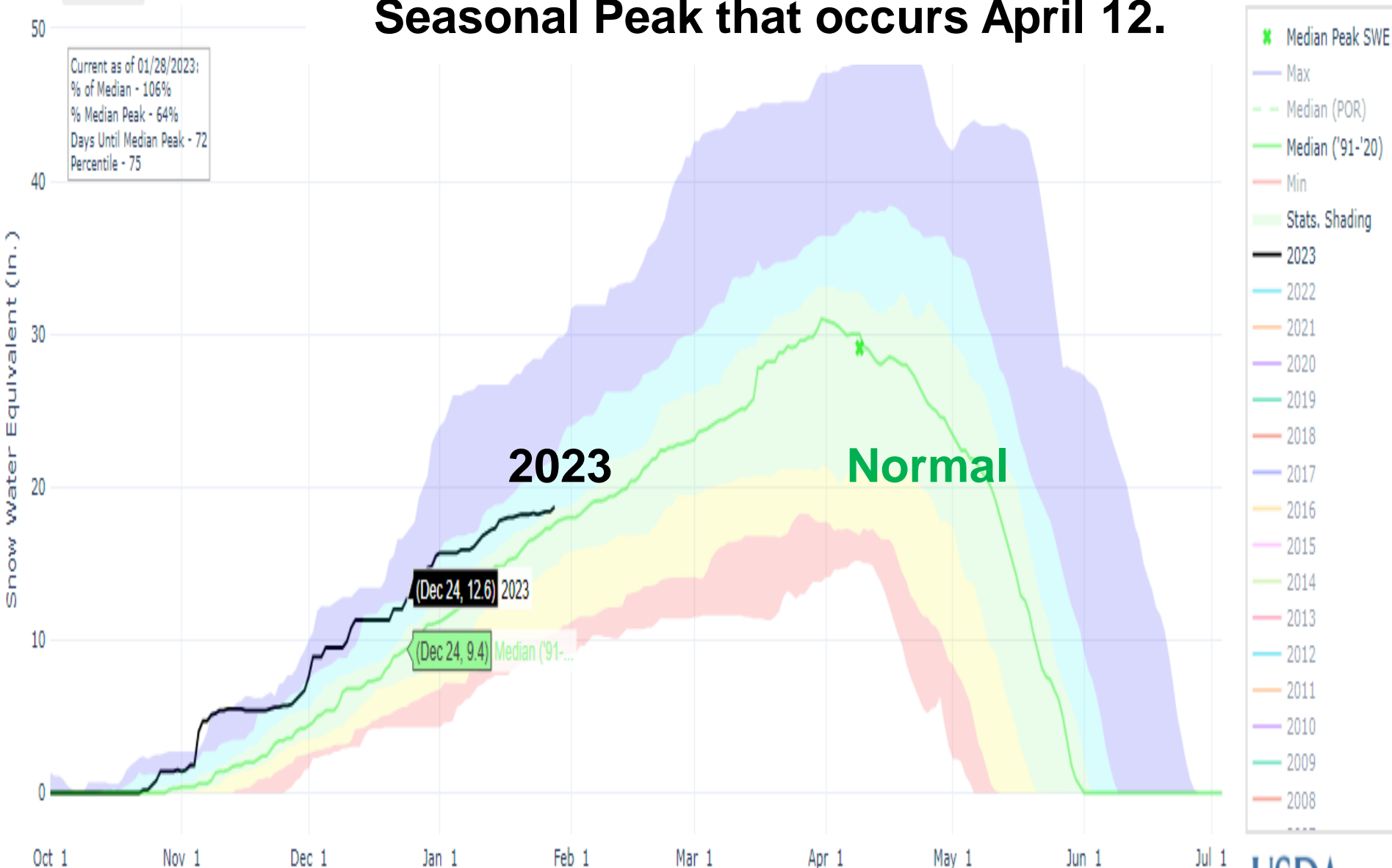
SNOW WATER EQUIVALENT AT
BRUNDAGE RESERVOIR

Reset Range

Link to data: CSV / JSON

Current as of 01/28/2023:
% of Median - 106%
% Median Peak - 64%
Days Until Median Peak - 72
Percentile - 75

Snow Water Equivalent (In.)

2023

Normal

2022

(May 21, 14.6) 2022
(May 21, 9.3) Median ('91-...
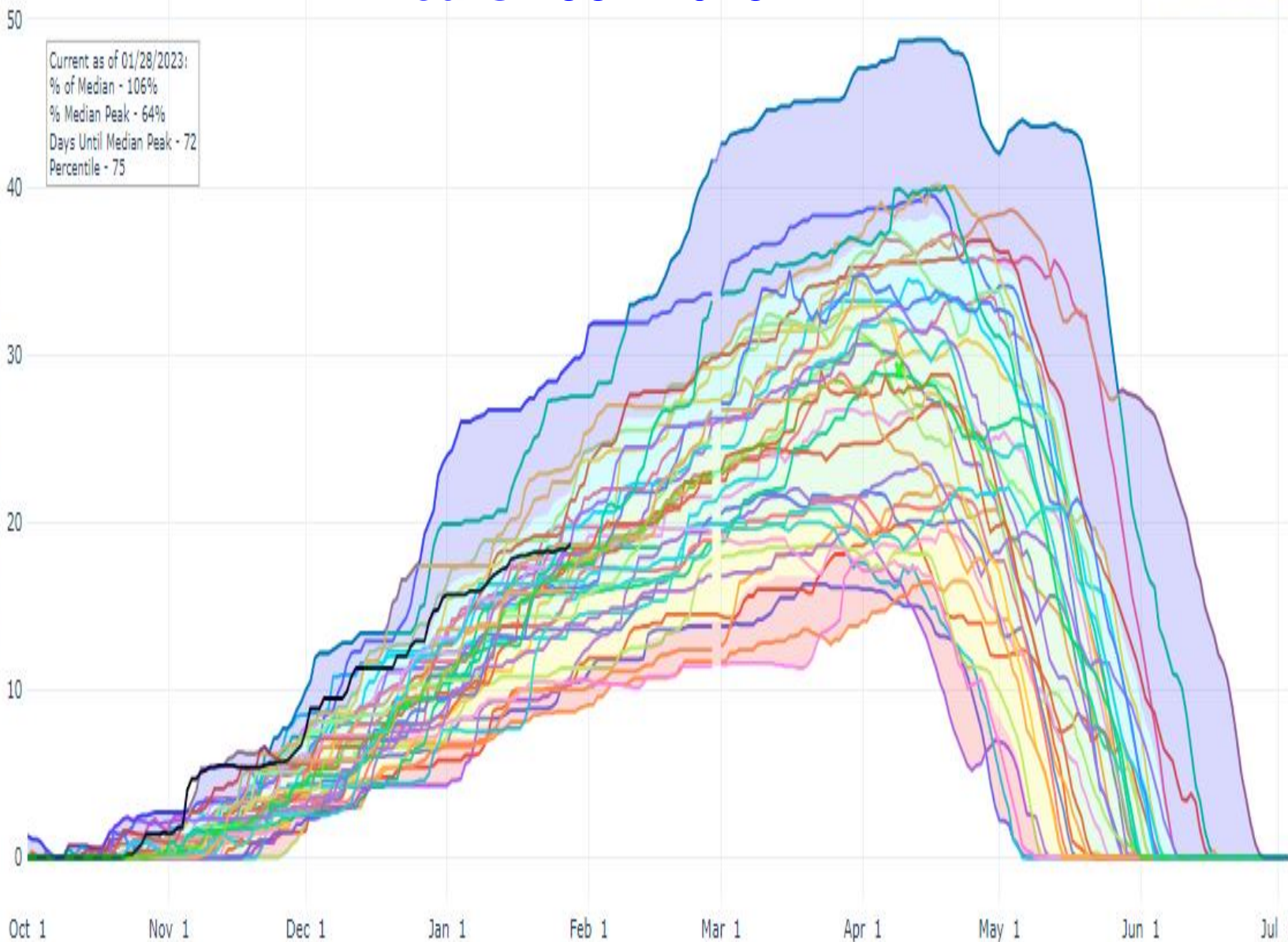
- ✱ Median Peak SWE
- Max
- Median (POR)
- Median ('91-'20)
- Min
- Stats. Shading
- 2023
- 2022
- 2021
- 2020
- 2019
- 2018
- 2017
- 2016
- 2015
- 2014
- 2013
- 2012
- 2011
- 2010
- 2009
- 2008

USDA

SNOW WATER EQUIVALENT AT
BRUNDAGE RESERVOIR

SNOW WATER EQUIVALENT AT BRUNDAGE RESERVOIR

All Snow Water Equivalent Years 1981-2023

Historic data now provides the foundation and our ability to forecast streams. Lewis Lake Divide Snow Course started in 1919

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)

Average

April 1 Snow Water Content as % of Average
Snake River at Heise Apr-Sep as % of Average

Percent of Average

Years

* For the 11-year period 1919-1930, the April 1 values were estimated from the March 15 and April 15 measurement

NRCS Natural Resources Conservation Service
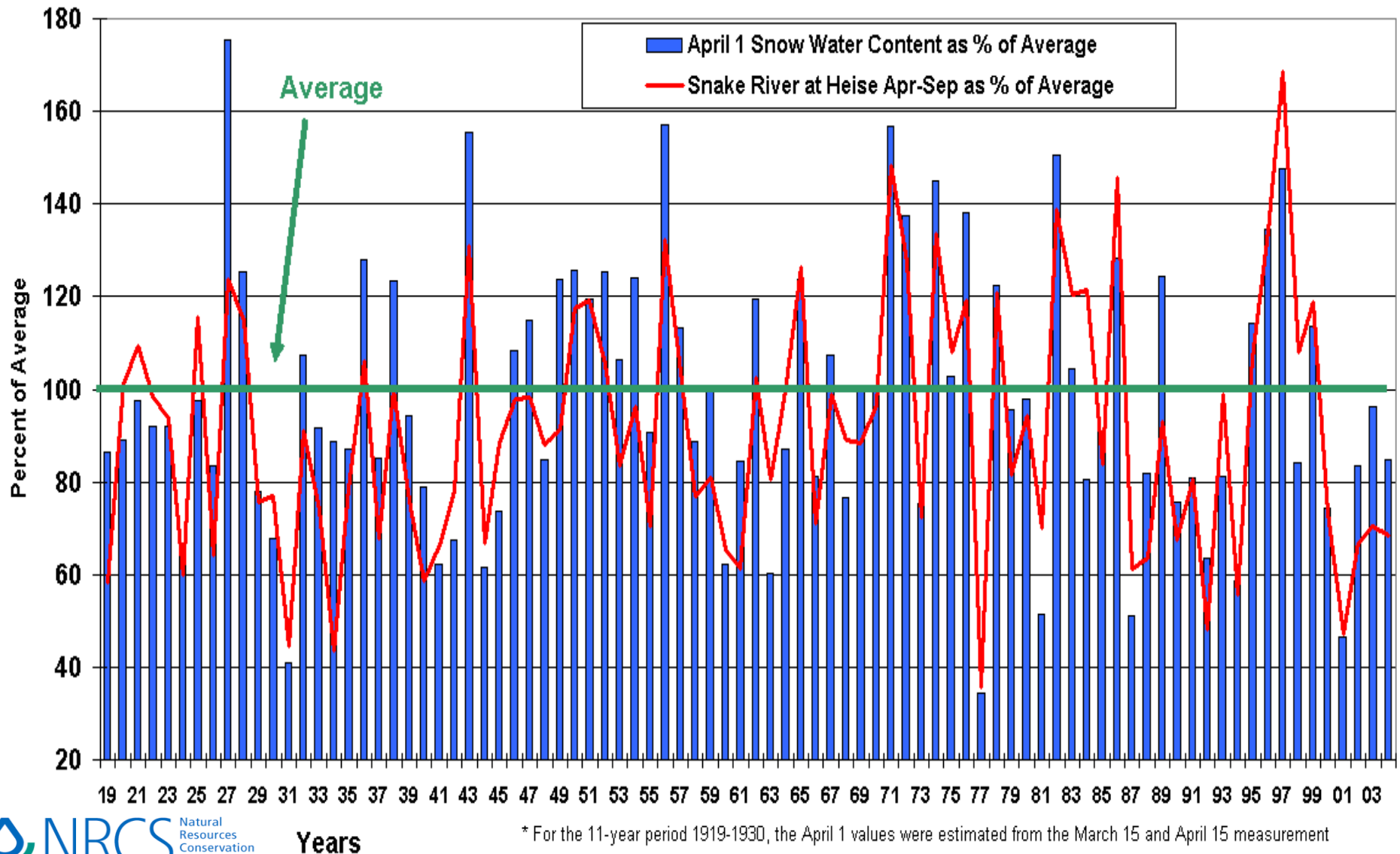
April 1 Snow Sorted from Low to High with Apr-Sep Streamflow – record starts 1919

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)

Legend:
- April 1 Snow Water Content as % of Average
- Snake River at Heise Apr-Sep as % of Average
- Linear (Snake River at Heise Apr-Sep as % of Average)

Y-axis: Percent of Average

X-axis: Years
77 01 81 63 41 92 42 45 73 68 40 91 93 26 98 48 37 35 34 20 85 22 39 03 25 69 59 83 32 46 99 47 62 38 65 89 52 36 96 76 97 43 56

* For the 11-year period 1919-1930, the April 1 values were estimated from the March 15 and April 15 measurement

NRCS Natural Resources Conservation Service
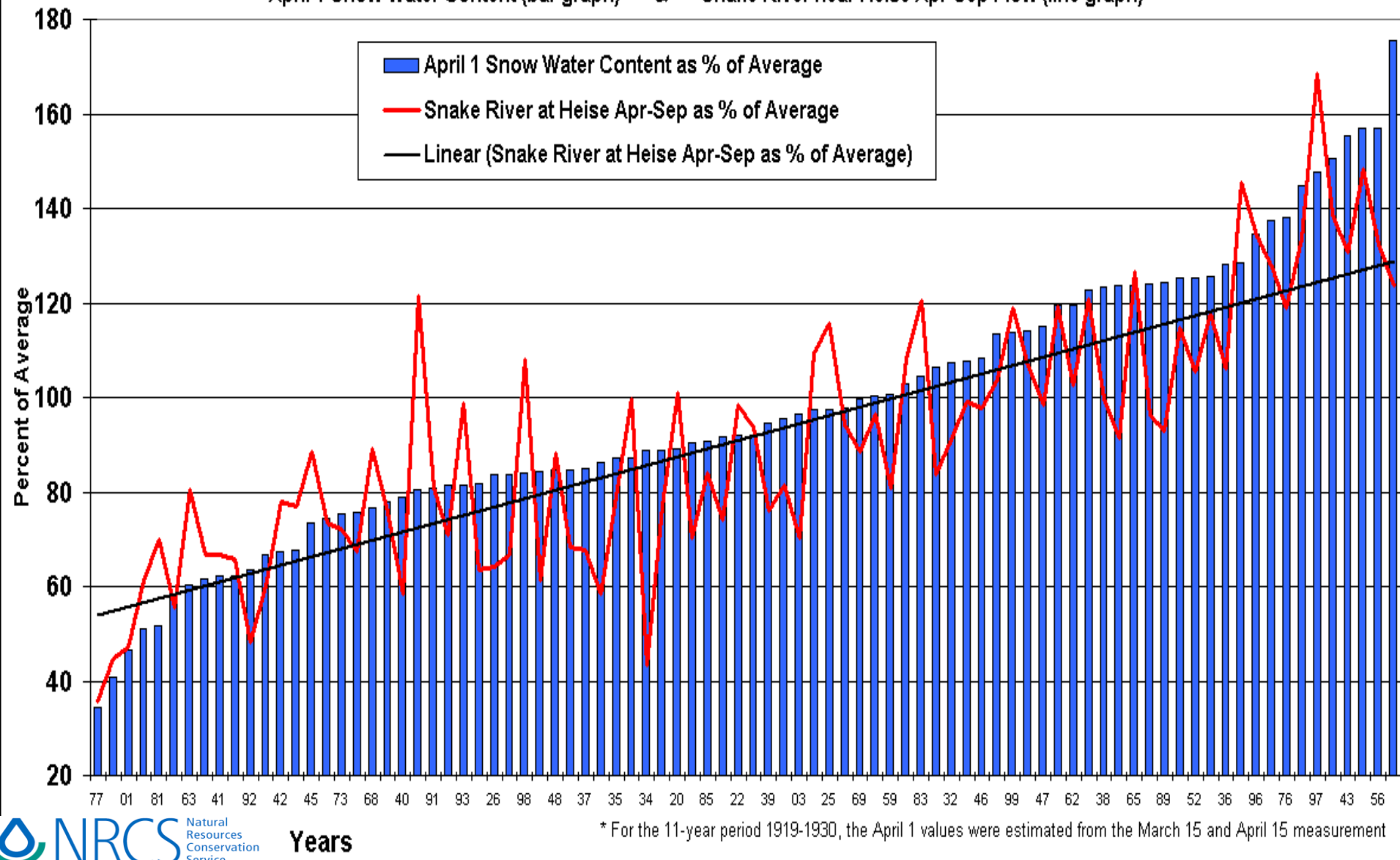
Snowfall & precipitation increases with elevation from Boise to Deadwood Summit.
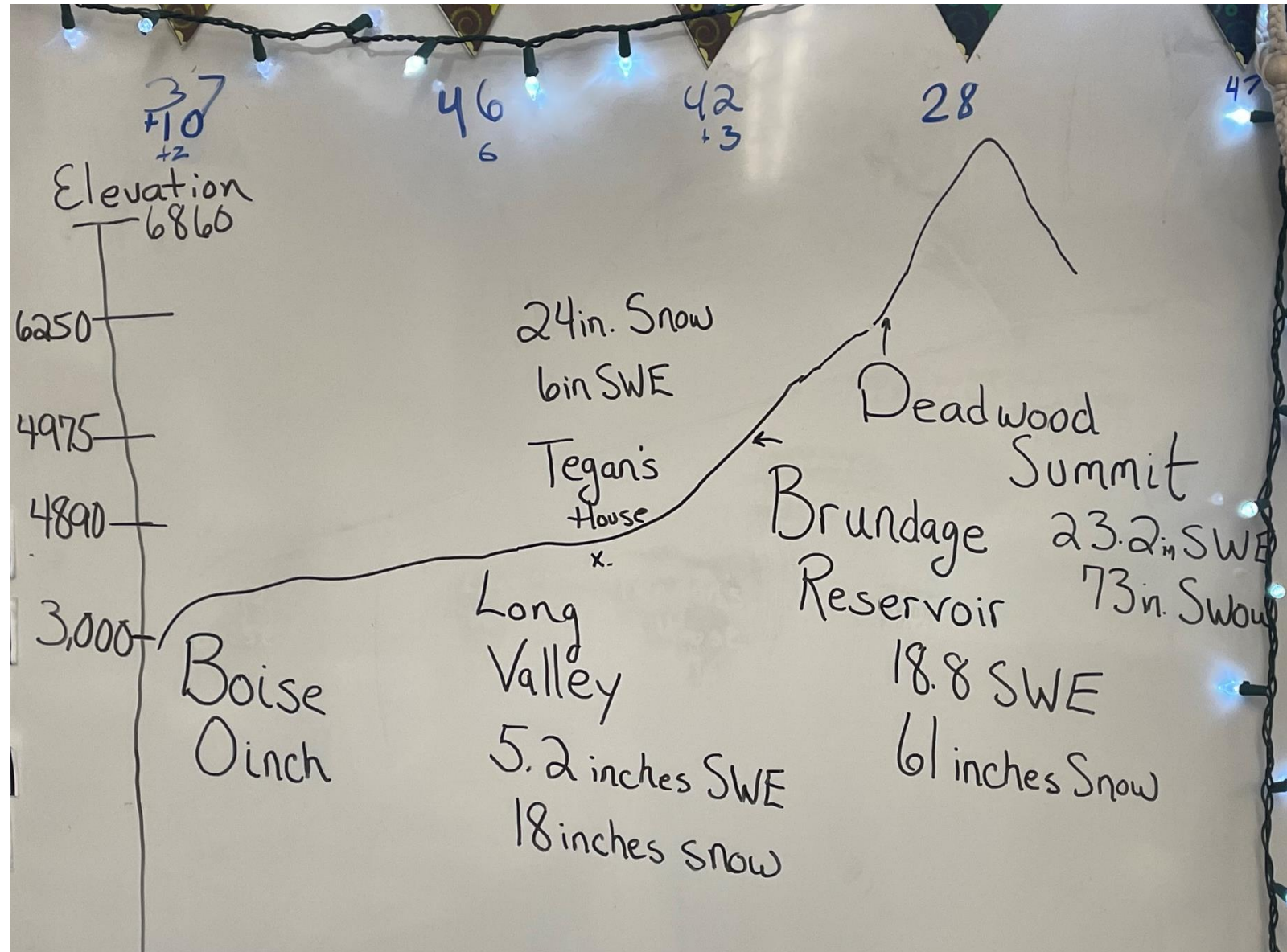
Homework - What will the peak Snow Water Content at Brundage Reservoir SNOTEL be this year ?

Bonus – date of peak snow water and peak snow depth.

Brundage Reservoir SNOTEL Site
Elevation 6,250 feet

2023 value of 18.7 inches is from January 28, 2023
Normal peak SWE occurs on April 12

Sorted by years

Water Year	Maximum Snow Water Equivalent Inches	Maximum Snow Depth Inches
1987	16.3	
1988	19.8	
1989	29.2	
1990	22.0	
1991	22.2	
1992	20.1	
1993	33.5	
1994	18.7	
1995	27.0	
1996	32.9	
1997	39.6	
1998	27.1	
1999	48.8	
2000	30.6	
2001	16.5	
2002	34.5	
2003	37.2	
2004	31.8	
2005	19.5	65
2006	40.1	106
2007	21.9	79
2008	36.8	107
2009	28.9	86
2010	23.5	79
2011	38.6	105
2012	32.1	87
2013	21.7	70
2014	37.4	101
2015	19.8	61
2016	34.4	89
2017	35.0	112
2018	29.0	94
2019	40.0	119
2020	33.0	102
2021	28.4	103
2022	22.1	68
2023	18.7	64

Sorted by SWE from High to Low

Water Year	Maximum Snow Water Equivalent Inches	Maximum Snow Depth Inches
1999	48.8	
2006	40.1	106
2019	40.0	119
1997	39.6	
2011	38.6	105
2014	37.4	101
2003	37.2	
2008	36.8	107
2017	35.0	112
2002	34.5	
2016	34.4	89
1993	33.5	
2020	33.0	102
1996	32.9	
2012	32.1	87
2004	31.8	
2000	30.6	
1989	29.2	
2018	29.0	94
2009	28.9	86
2021	28.4	103
1998	27.1	
1995	27.0	
2010	23.5	79
1991	22.2	
2022	22.1	68
1990	22.0	
2007	21.9	79
2013	21.7	70
1992	20.1	
1988	19.8	
2015	19.8	61
2005	19.5	65
1994	18.7	
2023	18.7	64
2001	16.5	
1987	16.3	

Your Name

_____

Your guess of Peak SWE for 2023

_____Inches

Your guess for Date of peak SWE for 2023?

_____ Date

Your guess for peak snow depth for 2023?

_____Inches

2023 value of 18.7 inches is from January 28, 2023
SNOTEL Site installed summer 1986   Snow Depth data is only available since 2005

Extra slides

Who did we miss…..

- **Power Boat Sales**
- **Hunters**
- **Tire Sales**
- **Windshield Repair Business**
- **School Bus Drivers & Highway Departments - SNOW DAY!**
- **Teachers & School Children – Adopt–a-SNOTEL Program**
- **Ski Stores**
- **Homeowners**
- **Fire Weather Forecasters**
- **Range Management**
- **Pizza Sales**
- **Restaurant Owners**
- **Coal & Natural Gas Producers**
- **Federal Reserve Board**
- **Anheuser-Busch**
- **USDA – RMA, crop insurance**
- **Roof Snow loads**

NRCS Natural Resources Conservation Service

October 2007, visiting Iraqis learning about SNOTEL at the Bogus Basin SNOTEL site.

Who else?

- Navigation on the Columbia & Missouri Rivers
- Global Warming, Climatic Change Research
- **Liz Claiborne – hired a Climatologist**
- **Target – has a "climate team"**
- Blogs….
- Lake Water Quality Studies
- Leaky Sewer Lines
- Sizing Evaporation Ponds Subdivisions
- Weekly Updates for:
  US Drought Monitor
  & Mt St. Helens activity
- Huckleberry pickers
- Bull Trout habitat

- **Glacier Recession**

Typical Idaho snow sites are 6,000 – 8,500 feet in elevation - <u>the snow accumulation zone that stores the greatest snow water and provides our water supply.</u>

- **Weather happens above & below these elevations**

Looking into Salmon River Headwaters June 12, 2008

High elevation zone – produces late summer streamflows

Mid elevations – produces majority of annual streamflow

Lower elevations – populated valleys - often transient snowpacks that are more influenced by rainfall and potential for rain-on-snow events.

Water User Needs Timeline

NRCS — Natural Resources Conservation Service

Preparation

Planning   Operations   Preparation

Critical Threshold Forecasts

Timing of Snowmelt
Peak Streamflows

Volume
Forecasts

Low Flow
Forecasts

Scenarios for
Coming Year

Scenarios for
Next Year

Aug   Oct   Jan   Apr   May   Jun   Jul   Sep   Jan

Monthly Precipitation BasinTotals as Percent of Annual Total

Monthly Precipitation as Percent of Yearly Total

Legend:
- Snake
- Boise
- N Fk Clearwater

Nov - Mar precipitation normally accounts for 57-67% of annual precipitation

Months: Oct, Nov, Dec, Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep

Y-axis: 0%, 2%, 4%, 6%, 8%, 10%, 12%, 14%, 16%

NRCS Natural Resources Conservation Service