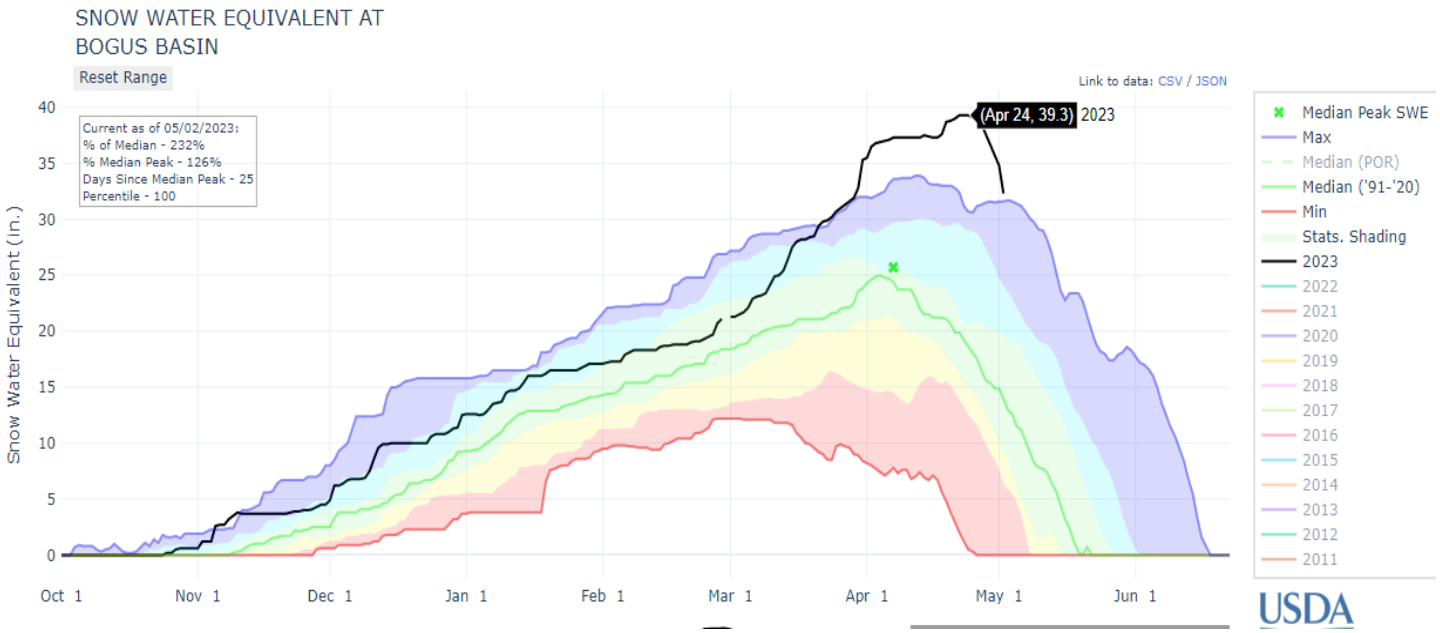
Bogus Basin Snow Summary for the 2022/23 Season

The winter of 2022 - 2023 will be the winter to remember. The ski season opened in mid-November and ended May 6 with plenty of snow to ski most of the mountain. Colder than normal temperatures kept the snow falling light producing powder days all season long. Mother Nature forgot to deliver the typical January thaw keeping the snow deeper and lighter. A mid-winter warm spell allows the snowpack to settle but not this winter. This combination of cold and lack of warm spells kept snow depths greater this year as the Snow Water Equivalent (SWE) lagged behind the depths. SWE is the amount of water (measured in inches) in the snowpack that melts each spring providing our water supply.

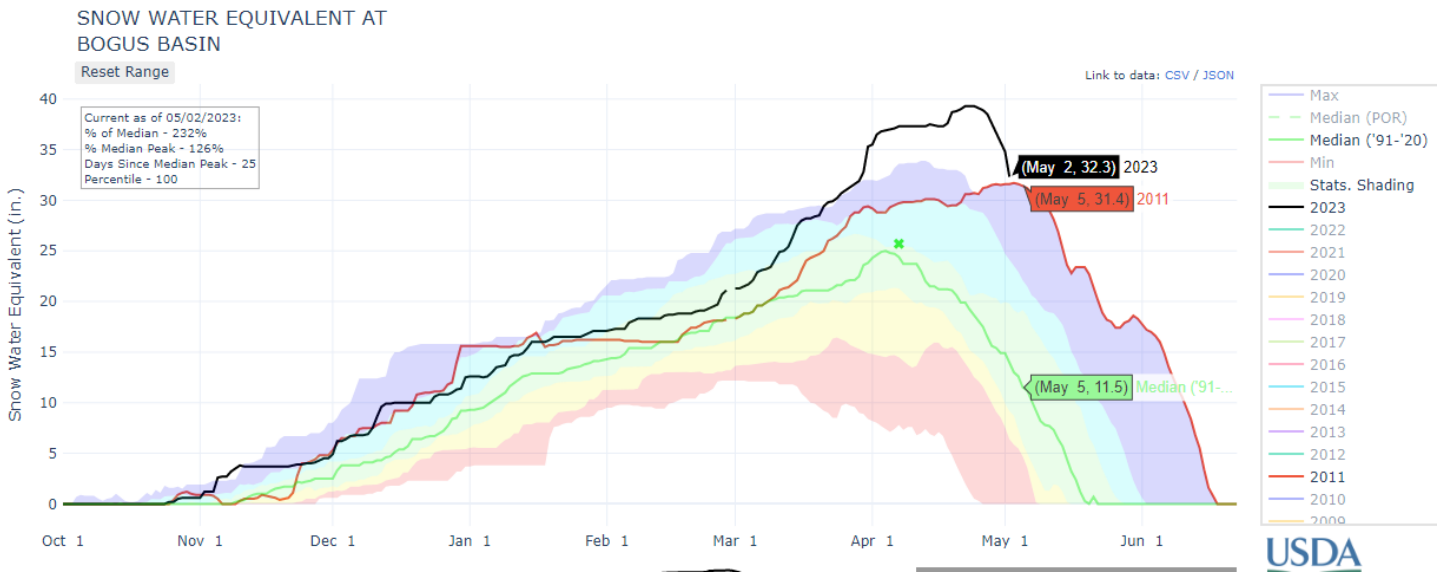
In 1942, local snow surveyors installed the Bogus Basin snow course and measured it consistently around the 1st and 15th of each month January to June. After the extreme winter of 1996/97, Bogus Basin and USDA NRCS Snow Survey partnered together to automate the snow course as a SNOTEL site. The site was installed in fall of 1999 and started transmitting daily, and now hourly data that includes SWE, snow depth on the ground, precipitation, air temperature, soil moisture, soil temperature, wind and solar. The data is transmitted by radio in near real time for mountain managers, skiers and many others to use in their decision-making process.

Following is a summary of the history of the Bogus Basin sites that are used to compare this year's snowfall to the historic data. The long-term 1942-2023 average annual snowfall at the Bogus Basin Showcase Marker is 261 inches. This is determined by using the 10% snow density rule. This rule assumes snow falls with a density of 10%, 1 inch of snow water equals 10 inches of snow depth. One could spend more time like avalanche forecasters do collecting and studying density of new snowfall, but this general rule works well.

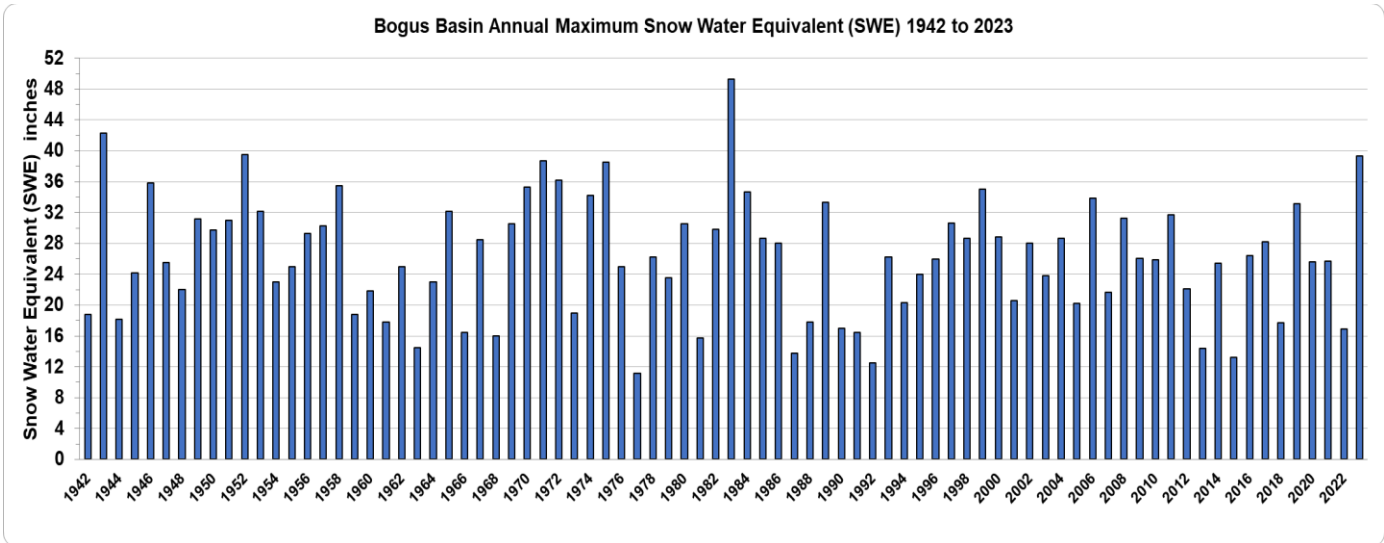
The maximum SWE measured at Bogus Basin this year was 39.3 inches on April 24, 2023. The graph below illustrates the daily SWE measured during the winter peaking at 39.3 inches. This was the highest amount measured since daily data starts in water year 2000. The shaded colors represent the historic SWE probabilities, and the green line represents the normal daily SWE amount.



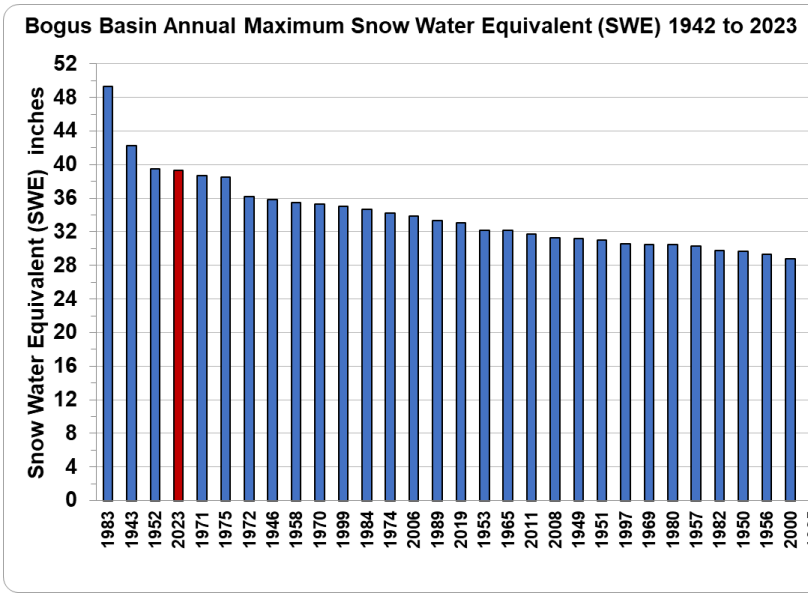
Now with 20 years of data, these NRCS graphs are a great resource to quickly compare the current year to other similar years like 2011.



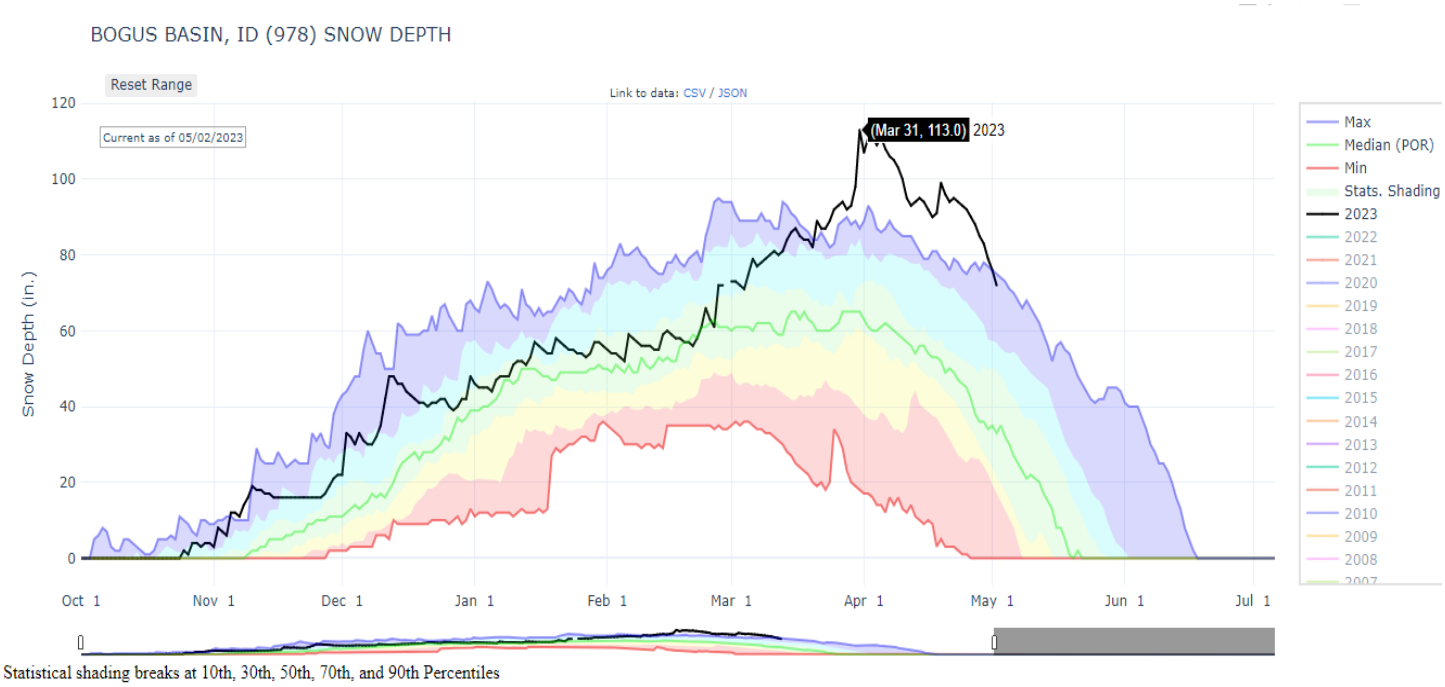
Because the SNOTEL site was installed in the same location as the snow course and they track very close, records were combined to compare current conditions with historic data. The following SWE and snow depth graphs are produced by using the long-term 1942-1999 Bogus Basin snow course and shorter-term SNOTEL data starting in 2000. The maximum SWE and snow depth from the bi-monthly measured snow course were determined and used with the actual daily maximum SWE and snow depth since 2000. Below is a graph of the long-term maximum SWE for each year.



The 39.3 inches of SWE measured this year was not a record but close. It was the 4th highest SWE since records start in 1942. The record high SWE occurred in 1983 with 49.3 inches. 2nd highest was in 1943 with 42.3 inches. The 3rd highest occurred in 1952 with 39.5 inches of SWE.

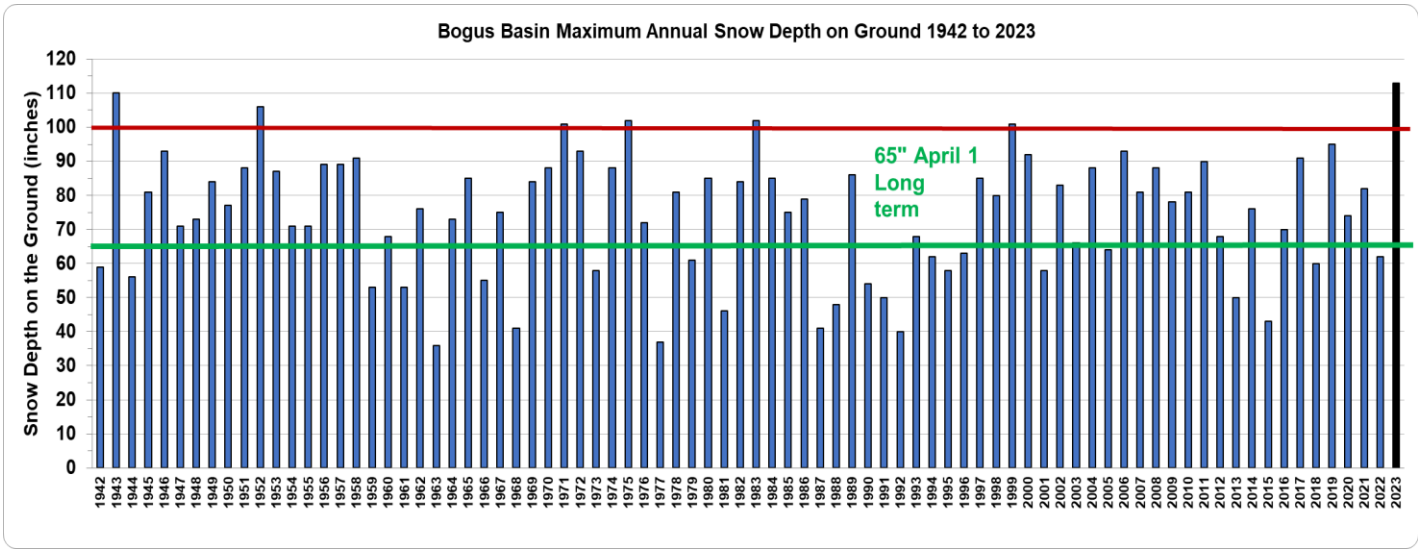


The record set this year was the greatest snow depth measured on the ground, 113 inches on March 30, 2023. This is a short- and long-term record for the deepest snow depth ever measured at Bogus Basin.



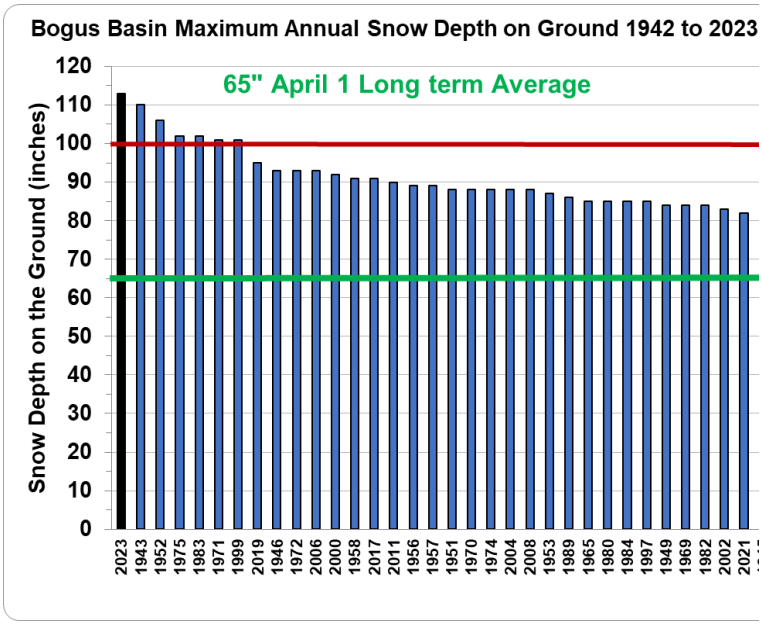
Statistical shading breaks at 10th, 30th, 50th, 70th, and 90th Percentiles

Cold temperatures and abundance storms kept snow depths deep this winter and from settling like the snowpack normally does between storms. This settling trend can also be seen in the daily snow depth graph above and how the snow naturally settles after each storm. Below is a graph of the maximum snow depth on ground since 1942.

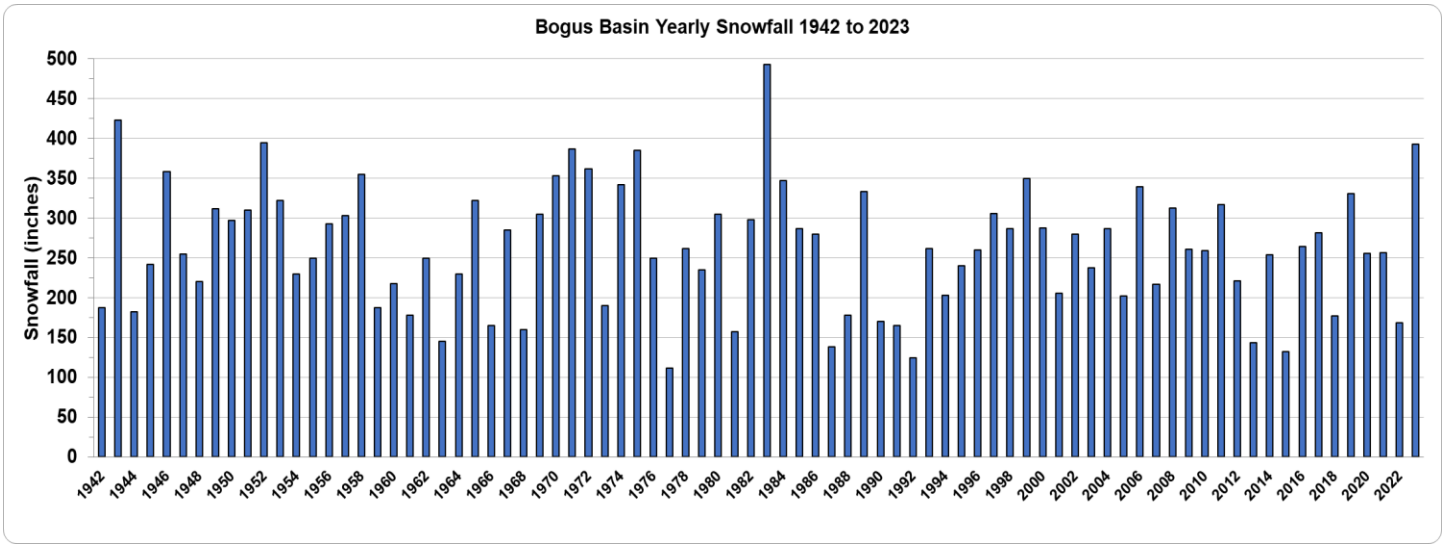


Here's a summary of other years with over 100 inches of snow measured on the ground at the Bogus Basin site:

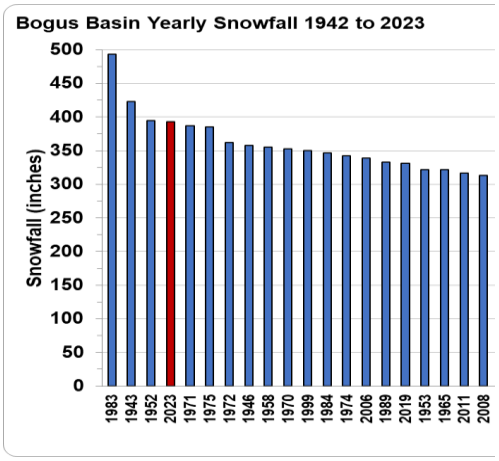
1.	2023	113	4.	1983	102
2.	1943	110	5.	1971	101
3.	1952	106	6.	1999	101



To determine the annual snowfall for each year, the 10% density rule is used to multiply the annual maximum SWE to produce the following graph. Multiplying 39.3 inches of SWE measured this year by 10% rule equals 393 inches of snowfall at Bogus Basin this winter. This shows that this year's annual snowfall was high, but not a record because the snowfall in 1983 was huge with 493 inches falling!



Years with more snowfall than this year are 1983, 1943, 1952 and 2023. Maybe next year, we'll set a snowfall record.



To illustrate the impacts of this winter's cold temperatures - below is a daily mean temperature map that shows the below normal January to March temperatures across the West.