2016 Statewide Snowpack Summary and Streamflow Outlook

February 17, 2016
Silver Jackets Meeting

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Reno, NV
Snow Water Equivalent (SWE) is a common snowpack measurement. It is the amount of water contained within the snowpack. It can be thought of as the depth of water that would theoretically result if you melted the entire snowpack instantaneously.

Snow Depth (in) * Density = SWE (in)
Monthly precipitation has been above normal each month October - January. February dry-spell looks to break the streak.
What is a SNOTEL Site?

Automated Weather Station that measures...
- SWE
- Cumulative precipitation
- Temperature
- Snow Depth
- Soil moisture / temperature (2”, 8”, 20”) +10yrs data
In Nevada & Eastern Sierra there are 81 SNOTEL stations

43 have data back to at least 1981
Snow Courses

Permanently marked snow measuring locations.

Average of 5-10 points spaced at 50 ft

57 snow courses measured April 1 in NV and eastern Sierra
Nevada Water Supply Outlook Report
February 1, 2016

Hole-in-Mountain SNOTEL wiped out by avalanche!

Across Nevada the first half of winter is off to an incredible start. Statewide February 1 snowpack percentages are some of the highest in the West. To date the biggest series of storms this winter occurred between mid-December and Christmas. The snowpack more than doubled its water content during that period in the mountains near Elko. The new snow load proved too much for the slope above Hole-in-Mountain SNOTEL. At 7:00am on December 23, 2015 the site sent out a report indicating 28 inches of new snow in the last 72 hours. The 8000' reading never arrived because an avalanche descended over 3,000 vertical feet, crossed one-third of a mile of flat ground, and leveled the weather station. The site’s 12 foot tall shelter was swept 200 feet away. A similar incident occurred in February 1986 which resulted in moving the SNOTEL site further away from the mountain. For 30 years that move was far enough. This summer we’ll try again and are working on permitting to re-install the site outside the debris zone of this avalanche. For the rest of this winter snow surveys will make monthly visits to the site to manually measure the snow to provide water users in Clover Valley as much information as possible about this summer’s water supply.

State of Nevada & Eastern Sierra
2/1/2016

The snowpack across Northern Nevada and the Eastern Sierra (Truckee, Tahoe, Carson and Walker basins) is much above normal at 153% of median, compared to 45% last year. Precipitation in January was much above average at 155%, which brings the seasonal accumulation (Oct-Jan) to 130% of average. Soil moisture is 53% compared to 45% last year. Reservoir storage ranges from 0% of useable capacity in Lake Tahoe to 49% of capacity in Southern Nevada.
WSOR Monthly Map
Includes QC’d SNOTEL, as well as, Snow Course data

Daily Update Map
Includes SNOTEL only
Stations may be missing if a site failed to report
Not a typical El Niño Snowpack Pattern
Sea Surface Temperature (SST) Anomalies vs. Mount Rose Snowpack (WY 1951-2015)

La Nina (Cooler)

El Nino (Warmer)

Oceanic Nino Index (ONI) 3 Month Running Mean of SST Anomalies in Nino 3.4 Region (°C)

Graphic courtesy of Bill Hauck, Truckee Meadows Water Authority
February 1, 2016 Snowpack Percent of Median

Great Basin and California Spring and Summer Streamflow Forecasts as of February 1, 2016

Most 85-125% average
PERCENT OF AVERAGE APRIL TO JULY STREAMFLOW
MOST PROBABLE FORECAST AS OF FEBRUARY 1 2016
(50 PERCENT CHANCE OF EXCEEDANCE)

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<th>NWS</th>
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<tr>
<td>MIDDLE FORK FEATHER RIVER</td>
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NA - FORECAST EITHER NOT AVAILABLE OR NOT PRODUCED FOR THIS LOCATION AT THE TIME OF THE REPORT

* - LAKE POWELL INFLOW NWS FORECAST PROVIDED BY CBRFC IN SALT LAKE CITY
@ - SNAKE AND Owyhee RIVER NWS FORECASTS PRODUCED BY NWRFC IN PORTLAND

No longer coordinated with NWS
Feb 1, 2016 Forecast

Drier than Normal Future

Normal Future Precip

Wetter than Normal Future

5 Exceedance Forecasts
CARSON R NR CARSON CITY

90% Exceedance: 23% of ave
70% Exceedance: 72% of ave
50% Exceedance: 105% of ave
30% Exceedance: 138% of ave
10% Exceedance: 186% of ave

Average = 210 KAF

Mar-Jul Forecasted Streamflow (KAF)
This is an automated product based solely on SNOTEL data, provisional data are subject to change. This product is a statistically based guidance forecast combining indices of snowpack and precipitation. **Yellow squares** are the official outlooks. **Gray background** is the historical period of record variability. This product does not consider climate information such as El Nino or short range weather forecasts, or a variety of other factors considered in the official forecasts. This product is not meant to replace or supersede the official forecasts produced in coordination with the National Weather Service. Science Contact: Cara.s.McCarthy@por.usda.gov wwwwwcc.nrcs.usda.gov/wsf/daily_forecasts.html
Summary

- 2016 Snowpack still near median despite dry-spell
- West-wide snowpack not following El Niño pattern.
- Similar El Niño years of 1983 and 1998 both ended up above normal, this year’s snow was similar or better than 1998 before dry spell. Now we’ll need a big March to match it.
- February is first month this water year will below average precipitation.
- Most Feb 1 streamflow forecasts (50% exceedance) are 85-125% of average.
- Forecast skill is still improving at this time of year and bounds on forecast (10% and 90% forecasts) cover wide range.
- Some forecasts have greater skill than others, but all get better as the months pass. Stay tuned…
When will this happen again?