

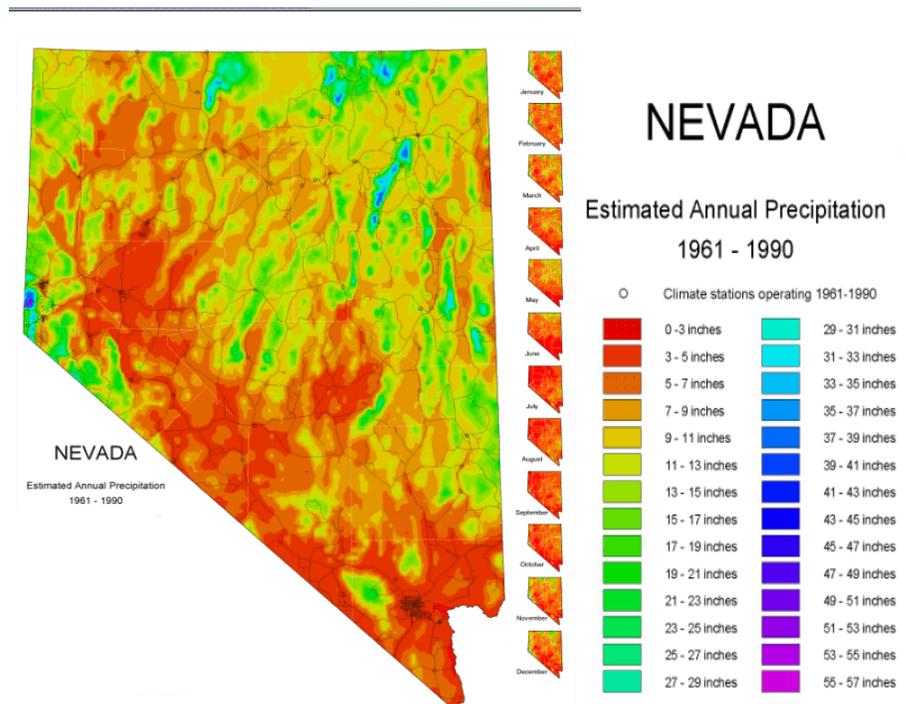
Let's Talk Water – Measuring Precipitation

By Dr. Mike Strobel

Nevada has been referred to as the driest State in the Union. Based on average annual precipitation, this is a true statement. In general, Nevada receives less than 10 inches of annual precipitation over an average year (based on records for the period 1961-1990). In times of drought, such as we have been experiencing for the last few years, decreases in the annual precipitation have put additional stress on our water resources.

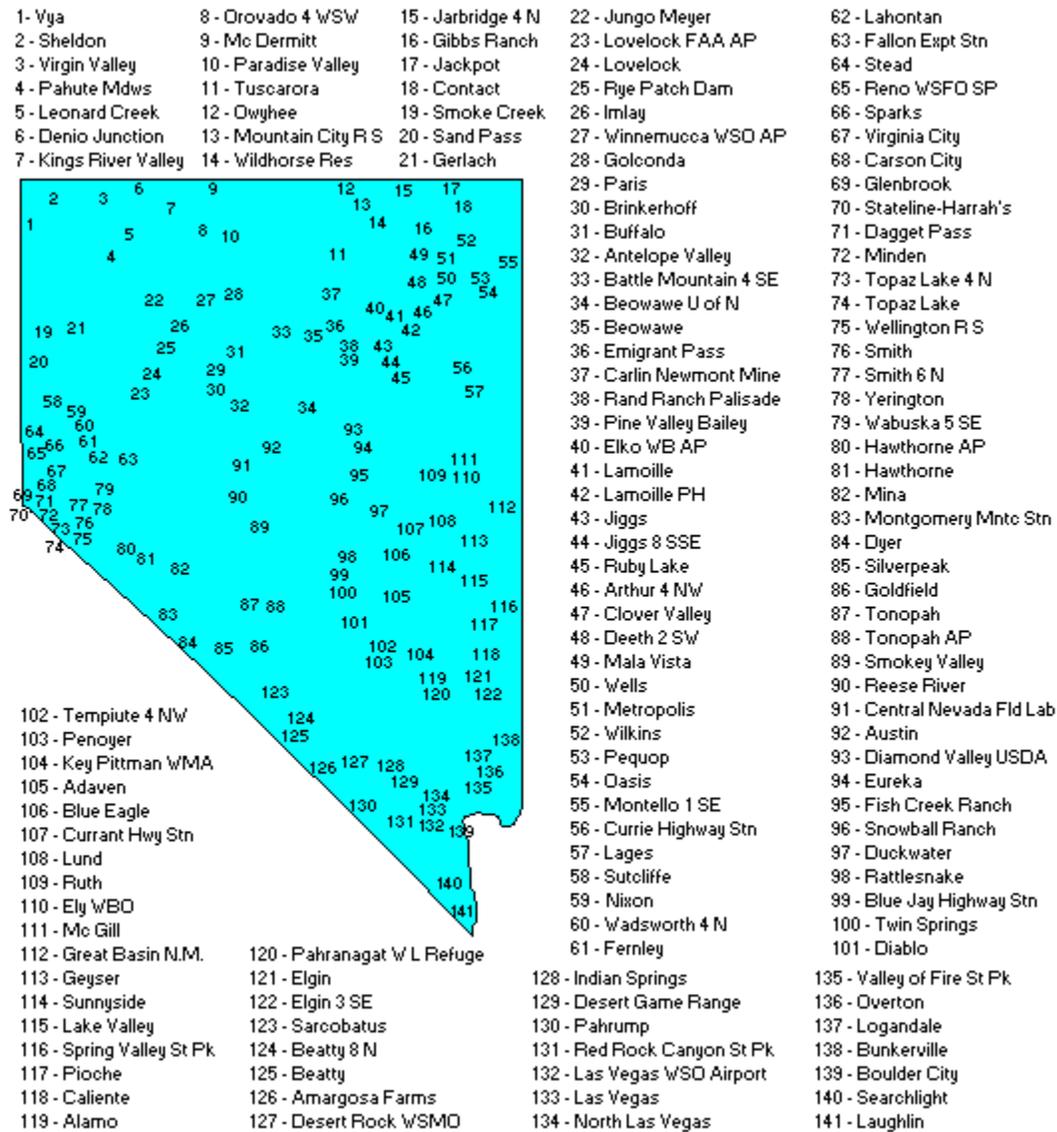
When referring to precipitation, it includes both snowfall and rainfall. In reality, snowfall and rainfall in the mountains of Nevada accounts for most of the total precipitation for the State. The reason for this is that higher elevations in the mountains cause moving air masses to rise and become cooler. As the air cools, it no longer can hold as much moisture as it could in lower, warmer elevations and the moisture condenses. The result is precipitation on the mountains.

The map below shows a graphic representation of precipitation distribution for Nevada. You can see the locations of major mountain ranges by the distribution of the precipitation.



Source: This poster was compiled from estimated annual precipitation values calculated by the PRISM Climate Mapping Program at Oregon State University. The small side maps show estimated precipitation in each month. Precipitation values are interpolated from estimates made on a 1 km grid. (<http://dcnr.nv.gov/nrp01/climate.htm>)

Precipitation is measured at various sites across the State of Nevada. Many sites are at airports and public facilities, but some sites are on private lands. In addition to precipitation, other weather data, such as temperature, wind speeds, wind directions, etc., also are recorded. These stations typically use mounted rain gages that are read regularly so that each precipitation event is recorded (date, time, and amount). A distribution of these stations in Nevada is shown below:



Source: Nevada Climate Summaries Imagemap: National Resources Conservation Service, National Water and Climate Center (<http://www.wrcc.dri.edu/summary/mapnv.html>)

Another source of precipitation data in Nevada is the National Trends Network (NTN), which is operated by the USGS. There are 2 active gages in Nevada which consist of large bucket collectors with lids. There are sensors on the lids such that as the sensors

detect moisture, the lids automatically open and collect the precipitation. These sites are visited every week and the amount of water collected as precipitation is determined by measuring the weight of the water in the collector. In addition to water volume, samples are collected and measured for chemistry (to determine what is being deposited from the atmosphere).

One more source of precipitation data in Nevada are high-altitude bulk precipitation stations. These are big towers (around 12 feet tall), made of aluminum, that collect rainfall and snowfall throughout the year. They are placed in high elevations in the mountains in order to collect data about precipitation in these remote locations. The stations are measured twice a year (typically in May and October). In addition to the precipitation collected in the towers, these stations also contain mineral oil to prevent evaporation from the collectors and antifreeze to reduce the chance of freezing during the winter months.

Measuring precipitation in Nevada is an important science because many of our estimates of water budgets are based on this information. The melting of the snow in the mountains is an important source of recharge to bedrock aquifers, springs, and streams.

If you have questions concerning water, email me at mstrobels@usgs.gov. Next week, we will discuss ground-water flow.