

Section H

Glossary for Adopt-a-SNOTEL Site: Snow Survey Dictionary

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A

Accumulation season: That portion of the year when snow water content is building towards its maximum value for the year

Acre-Feet or AF: Unit of volume measure for stream and reservoir storage. One acre covered with one foot of water, 43,560 cubic feet. Acre-feet are often given in units of 1,000 acre feet (denoted as "KAF") due to the large volume.

Aerial Marker: A vertical marker with equally spaced crossbars. The depth of snow at these remote sites is determined by observation from low-flying aircraft. Snow water equivalent is calculated by using snowpack density measurements from nearby snow sties.

Average: The mean value for a 30-year base period. The current base period is 1971-2000 and is updated every 10 years. A 30-year period is used as opposed to the period of record because it represents the most current climatological record.

B

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Basin: Major drainage area in which a measuring site is located.

C

Cubic Feet per Second or CFS: Measurement of volume of water, one cubic foot, passing a given point in one second.

1 CFS = 7.48 gallons per second

1 CFS = 448 Gallons per minute

1 CFS for 24 hours = 1.983 acre-feet

Changes in storage: Changes in the amount of water stored in regulated lakes and reservoirs over a period of time, usually a day or month.

D

Data: Refers to snow water equivalent or precipitation amounts.

Date collection site: Manual or automated station permanently marked or installed where climatic data is regularly collected. Primary SNOTEL data collected includes snow water equivalent, snow depth on ground, precipitation and air temperature. Data sites are usually located in small forested openings or high mountain meadows where the trees protect snow at the site from wind scour and deposition in snow drifts. Snow measuring stations are typically located in areas well protected from the wind where the natural snowfall can be measured.

Diversion: A point at which water is removed from a stream for conveyance to another point within the basin or into another basin.

Drought: Prolonged period of dryness. The governor declares a drought in a state or portion of a state, not NRCS.

E

Elevation: Vertical reference of a site location about mean sea level. Measured in feet.

El Nino: El Nino is a warming of the Pacific Ocean between South America and the International Date Line. Warming is expressed as a departure from long-term average ocean temperatures. During a typical El Nino, the ocean warms a degree or two (C) above its climatological average. A strong El Nino can warm by 3 to 4 degrees C over large areas, and even 5 degrees C in smaller regions. El Nino events usually result in drier than normal conditions in the Pacific Northwest and favor wetter winters in southwest United States. The correlation is not as strong across southern Idaho and northern Nevada and Utah.

El Nino/Southern Oscillation or ENSO: Frequent use of this acronym has arisen in the climate research community, and reflects a focus on the warm phase of the entire cycle. El Nino is just one phase of an irregular fluctuation between warmer than usual and colder than usual ocean temperatures in the Pacific region. The cold phase is known as "La Nina".

F

Forecast period: That part of the year for which streamflows are predicted which are primarily derived from snowmelt in the West. Normally the period that produces most of the spring/summer runoff that is used or stored for irrigation and other purposes.

G

Graupel: Granular ice pellets; also called soft hail.

L

La Nina: Opposite of El Nino. La Nina exists when cooler than usual ocean temperatures occur on the equator between South America and the International Date Line. The name La Nina ("the girl child") was coined to deliberately represent the opposite of El Nino ("the boy child"). La Nina occurs almost as often as El Nino. They are two faces of the same larger phenomenon. Stronger than usual trade winds accompany La Nina. These winds, from the east, push the ocean water away from the equator in each hemisphere. This is caused by the earth's rotation. Cold water from below rises to replace warm surface water which has moved away from the equator. La Nina usually favors the odds of receiving wetter than normal winter precipitation in the Pacific Northwest and below normal in the desert Southwest. As in 2001, this does not always occur. That year saw near record low snow and stream flows in the Pacific Northwest, especially northern Idaho.

M

Meteor burst technology: Method of bouncing radio signals at a steep angle off the ever present band of particle trails left by meteors entering Earth's atmosphere and disintegrating. This residue of meteorites exists from about 50 to 75 miles above the ground. Meteor burst technology can establish reliable communication with remote sites—such as SNOTEL—located behind mountains and deep in canyons.

Most probable forecast: Best estimate of streamflow volume given current conditions and based on outcome of similar past situations. “Most Probable Forecast” may not be the best term to use since it is often associated with the 50% exceeding forecast. Following are the statistical exceeding forecasts that water users and managers should use to base their decision-making on the chance of each volume occurring. For example, in a dry winter or years following a dry summer/fall, users may want to lean more toward a lesser volume of the 70% or 90% exceedance forecasts to reduce their risk and improve the chance of that volume of water materializing. In wet years, users may want to use the 30% or 10% forecasts to reduce the chance of having too much water.

90% chance of exceeding: 90% chance that actual streamflow volume will exceed forecast value; 10% chance streamflow volume will be less than forecast value

70% chance of exceeding: 70% chance that actual streamflow volume will exceed forecast value; 30% chance streamflow volume will be less than forecast value

50% chance of exceeding: 50% chance that actual streamflow volume will exceed forecast value; 50% chance streamflow volume will be less than forecast value

30% chance of exceeding: 30% chance that streamflow volume will exceed forecast value; 70% chance streamflow volume will be less than the forecast value

10% chance of exceeding: 10% chance that streamflow volume will exceed forecast value; 90% chance streamflow volume will be less than forecast value

N

Natural (adjusted) flows: Best estimate of flows that would have occurred without human influence. Calculated by adjusting observed flows for changes in storage and gauged diversions that affect streamflow volumes. Streamflow forecasts are issued for natural flows where there are no major reservoirs or diversions, such as on the Salmon River, and for the natural flow that would occur below a reservoir if the reservoir were not there.

O

Observed flows: Measured flow at a given point on a stream, regardless of the effect of upstream water management on streamflows.

P

Palmer Drought Index: A widely used measure of drought severity. Where the predominant moisture falls as snow and irrigation occurs, it may not produce the best measure of droughts. Also see Surface Water Supply Index.

Percent of Average: Value determined by dividing the current measured parameter (snow water equivalent, precipitation, streamflow) by the long-term 30-year average for that day or period. This means 100% is average and a value greater than 100% is above average, and less than 100% is below average.

Percent of Peak: Value determined by dividing the current snow water equivalent by the average seasonal peak amount that occurs around April 1. This is a useful indicator for gauging the snow water equivalent on the ground for today and comparing it to its seasonal maximum.

Precipitation: Includes rain, snow, sleet and hail, measured in tenths of an inch by NRCS. Accumulated precipitation is the total amount of precipitation that has fallen since the start of the water year—running from October 1 through September 30.

R

Reservoir: A pond, lake, basin, or other space, created in whole or in part by the building of engineered structures, so that it can be used for storage, regulation, and control of water.

Reservoir storage: Volume of water held by a reservoir. NRCS reports reservoir information in terms of useable volumes that may include active, inactive and dead storage in the facility.

Reservoir Operation Guide: Decision support tool used to help reservoir operators manage their facilities by using streamflow forecasts.

Residual streamflow forecasts: Volume of water that is still to come during the remaining forecast season.

S

SNOTEL (SNOW TELemetry) sites: Unstaffed permanent automated weather stations designed to operate in severe, remote mountainous environments. Most sites collect daily, or even hourly, snow water content, snow depth, precipitation,

and air temperature data. Enhanced sites also collect relative humidity, wind speed and direction, solar radiation, soil moisture and soil temperature.

Snow course: An area marked for measuring the snow periodically during each winter to develop the long-term historic record of snow at that site. Usually 3 to 8 samples are taken and averaged to determine the snow depth and snow water equivalent for that location.

Snow depth: Depth of snow on the ground or snow pillow, measured in inches. Snow is measured from the top of the snowpack to ground level.

Snowmelt runoff: Streamflow water originating from melting of the seasonal snowpack. In the West, over 75% of the annual streamflow come from melting snow.

Snowpack: Snowpack is a general term used in to denote large snow-covered areas. Areas may include the low- and mid-elevation valleys that may have an intermittent snowpack in the winter, as well as the high mountainous areas that store the seasonal water supply in the West. The amount of water produced by a snowpack of a given depth varies, depending on the density of the snow.

Snow pillow: Standard measuring device used to measure snow water equivalent. It is usually constructed flush with the ground level and made from synthetic rubber or steel filled with water and antifreeze. The snow pillow hydrostatically weighs the snowpack on top of it.

Snow tube: Hollow aluminum tube that is pushed down through the snow to the ground below. The snow-filled tube is then brought to the surface and weighed to determine how much water the snow contains.

Snow water content: Amount of water in between snow grains in snowpack. Note the subtle difference with "snow water equivalent," which is often used interchangeably with "snow water content."

Snow water equivalent or SWE: Amount of water in the snow if it were melted. Measured in inches. Represents the potential amount of water in the snowpack.

Southern Oscillation Index or SOI: Atmospheric barometric pressure difference between Darwin, Australia, and the island of Tahiti; SOI is tightly correlated with El Niño/La Niña. The difference, Tahiti minus Darwin, is frequently used as a convenient, simple and reasonably accurate tool to monitor the status of El Niño/La Niña. NRCS uses SOI in calculations for forecasting next year's runoff. The July-November period is when the SOI correlates closest with next spring/summer's streamflow in northern and central Idaho. The strength of the SOI

signal is at a maximum in the North Fork Clearwater River basin (Dworshak Reservoir) and decreases to the south.

Streamflow forecast: As snowpack accumulates and precipitation falls, streamflow forecasts reflect current conditions and projected amount of streamflow for spring and summer period. Streamflow forecasts are for natural (unregulated) flows and usually improve in accuracy as you near the snowmelt peak in April.

Surface Water Supply Index or SWSI: Predictive indicator of surface water available in a basin. It combines current reservoir storage and streamflow forecasts for the spring and summer water use season. In Idaho, SWSI is used in conjunction with the threshold where agricultural irrigation shortages start to assist irrigators in their decision-making process and water management.

T

Telemetry: Transmission of data captured by measuring devices from a remote station to another location where it is recorded and analyzed.

W

Watershed: An area of land drained by a stream and its tributaries.

Water year: Twelve month period beginning October 1 in one calendar year and ending September 30 of the following calendar year. The water year is designated by the calendar year in which it ends. October 1 starts the water year because it is typically when streams and reservoirs are at their minimum levels for the year, the growing season has come to a close, and Mother Nature starts her annual cycle of bring moisture across North America to replenish the water supply.

Water supply forecasting: Projections of streamflow volume in smaller basins and upstream reaches of larger streams.

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