

USES AND BENEFITS

Data collected and transmitted by SNOTEL stations and from manual collection sites are processed rigidly for quality and packaged in both raw and formatted versions on the NWCC web site. That data and information are used by many governmental and private entities:

- Program information influences production decisions on millions of acres of surface-water dependent, irrigated agricultural lands. Knowing how much water they will receive based on the available water supply and the relative seniority of their water rights helps producers make cropping decisions about what, when and how much to plant to optimize their production outcome.
- In several communities, local water commissioners operate reservoir and diversion systems based on a drought response management plan using SNOTEL data.
- In Utah, after data indicated that a river's conditions would render traditional rafting equipment inoperable, a company purchased \$50,000 of smaller craft that would function in the conditions predicted by the data. That decision resulted in a \$600,000 revenue year where the outfitter stated they would have had "a zero dollar year."
- One city began flood diversion preparations early based on SNOTEL and SSWSF data. In spite of extremely high volume of spring runoff (75,300 acre-feet of water compared to an historic average 21,000 acre-feet), flood damages were minimal. City managers estimated losses would have been over \$15 million in housing, not including the value of businesses and other infrastructure.

SNOTEL sites and the SSWSF Program continue to be of critical value to producers and residents throughout the West.

MORE INFORMATION

For more information on local snow survey data, contact the NRCS State Office:

Alaska	907-271-2424 x 117
Arizona	602-280-8786
California	530-792-5622
Colorado	720-544-2855
Idaho	208-685-6983
Montana	406-587-6843
Nevada	775-857-8500 x152
New Mexico	505-761-4431
Oregon	503-414-3270
Utah	801-524-5213 x12
Washington	360-428-7684 x141
Wyoming	307-233-6744

For information on the Snow Survey and Water Supply Forecasting Program, contact NWCC Director Mike Strobel at 503-414-3055 or michael.strobel@por.usda.gov.

NWCC Home Page:

www.wcc.nrcs.usda.gov



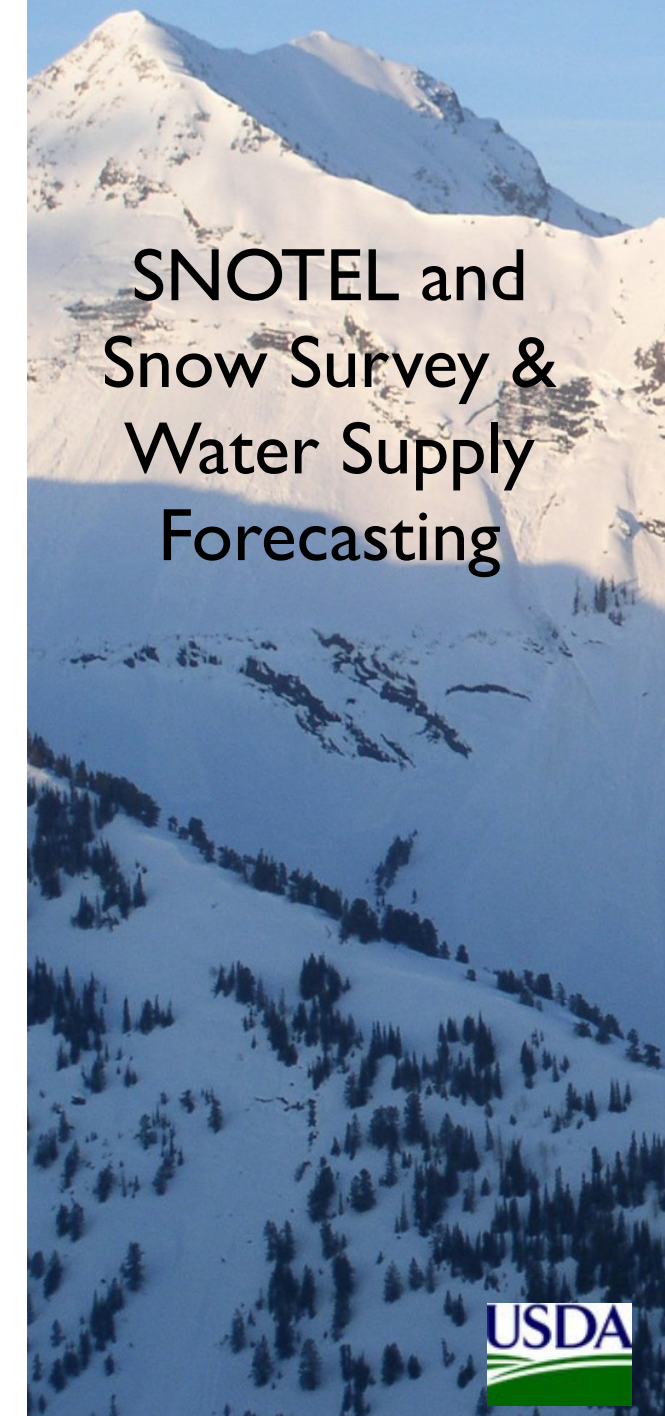
SNOTEL site—Bison Lake, CO

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Helping People Help the Land



SNOTEL and Snow Survey & Water Supply Forecasting

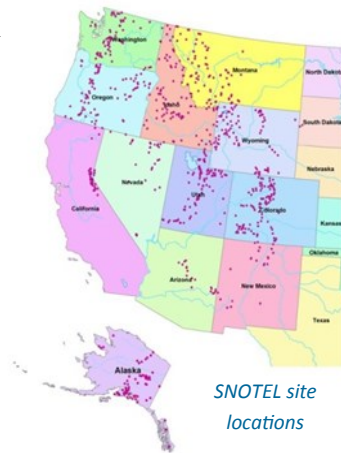


SNOTEL and the Snow Survey & Water Supply Forecasting Program

INTRODUCTION

The Natural Resources Conservation Service (NRCS) installs, operates and maintains an extensive, automated system call **SNOTEL** (short for Snow Telemetry). SNOTEL is designed to collect snowpack and related climatic data in the Western U.S. and Alaska. In 1935, NRCS, then the Soil Conservation Service, established a formal cooperative **Snow Survey and Water Supply Forecasting** (SSWSF) Program to conduct snow surveys and develop accurate and reliable water supply forecasts. The Program operates under technical guidance from the NRCS National Water and Climate Center (NWCC).

With the majority of the water supply in the West arriving in the form of snow, data on snowpack provide critical information to decision-makers and water managers. SNOTEL provides a reliable, cost effective way to collect snowpack and other meteorological data needed to produce water supply forecasts and support the resource management activities of NRCS and others.



The SSWSF Program has grown into a network of 1,185 manually-measured snow courses and 858 automated SNOTEL stations in 13 Western states, including Alaska. The Program provides streamflow forecasts at 673 stream gages in the West. The data, as well as related reports, are made available — in near real-time for SNOTEL sites — to private industry; Federal, State and local government entities; and to private citizens through an extensive [Internet delivery](#) system.

The modern SNOTEL network also provides data for climate studies, air and water quality investigations, climate change and endangered species habitat analysis. The high-elevation watershed locations, broad coverage and real-time operation of the network provide important data to researchers, river and reservoir managers, emergency managers, recreation managers and power generation companies.

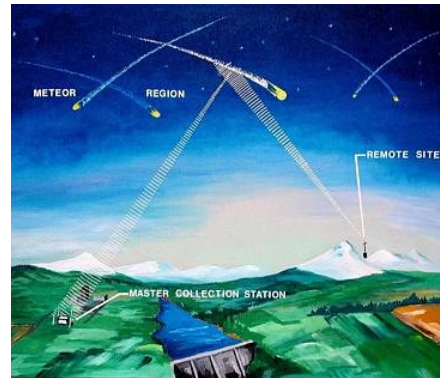
METEOR BURST TECHNOLOGY

SNOTEL uses meteor burst communications technology to communicate data in near real-time. VHF radio signals are reflected at a steep angle off the ever-present band of ionized meteors existing from about 50-75 miles above the Earth. Satellites are not involved. NRCS operates and controls the entire system.

SNOTEL sites are generally located in remote, high-elevation mountain watersheds where access is difficult or restricted. They are

designed to operate unattended and without maintenance for a year or longer with batteries charged by solar cells.

Six NRCS Data Collection Offices monitor daily site statistics. Five meteor burst Master Stations, located throughout the U.S., are the central collection point for all transmitted remote station data.



SYSTEM CAPABILITIES

The basic SNOTEL station provides snowpack water content data via a pressure-sensing snow pillow. It also collects data on snow depth, all-season precipitation accumulation and air temperature with daily maximums, minimums and averages. Many enhanced stations are also equipped to take soil moisture and temperature measurements at standard depths of 4", 8" and 20".

The atmosphere and soil moisture/temperature measurements are reported multiple times per day, with some reporting hourly. System performance is usually above 99%.

SNOTEL Standard Configuration

Parameter Measured	Data Sensing
Air Temperature	Shielded thermistor
Precipitation	Storage type gage
Snow Water Content	Snow pillow device and a pressure transducer
Snow Depth	Sonic sensor

SNOTEL Enhanced Additions

Parameter Measured	Data Sensing
Barometric Pressure	Silicon capacitive pressure sensor
Relative Humidity	Thin film capacitance-type sensor
Soil Moisture	Dielectric constant measuring
Soil Temperature	Encapsulated thermistor
Solar Radiation	Pyranometer
Wind Speed /Direction	Propeller-type anemometer