

Information collected from automated and manual processes, as well as data from other sources, are incorporated into the WCIS database.

### Data sources

In addition to the quality-controlled NRCS data collected through the automated and manual collection processes, the SSWSF Program also incorporates snow-pack, precipitation, streamflow, and reservoir data from the U.S. Army Corps of Engineers (USACE), the U.S. Bureau of Reclamation (BOR), the Applied Climate Information System (ACIS), the U.S. Geological Survey (USGS), and other entities.

All the data collected are placed in the Water and Climate Information System (WCIS) database.

### Information delivery

The Program is also responsible for making the data in the WCIS database available to its wide variety of users. An extensive internet delivery system provides data in raw format as well as processed into reports, maps, graphs, and other tools. Variables such as snow water equivalent (SWE), snow depth, precipitation, soil moisture, and soil temperature are available to all users, often in near real-time.

An interactive map provides easy navigation to NRCS and other network monitoring stations. The map displays current and historical conditions for SWE, snow depth, precipitation, streamflow, and reservoir storage.

| Water Year to Date Precipitation (inches) October 1, 2015 through August 3, 2016 |             |
|--|-------------|
| Value:   | 25.3        |
| POI Median:  | 18.7        |
| % of POI Median:   | 135%        |
| POI Average:   | 20.5        |
| % of POI Average:  | 123%        |
| Percentile:  | 100         |
| POI Max (year):  | 25.3 (2016) |
| POI Min (year):  | 17.5 (2015) |

| Anomaly: October 1, 2015 through August 3, 2016 |     |
|---|-----|
| Anomaly:  | 6.6 |
| Official Median:                                |     |
| % of Official Median:                           |     |
| Official Average:                               |     |
| % of Official Average:                          |     |
| # of Observations:                              | 3   |
| Max Rank:                                       | 1   |
| Min Rank:                                       | 3   |

The Program's interactive map shows current and historical conditions for many climatic elements. Selecting a site allows users to drill down to reports, maps, and graphs.

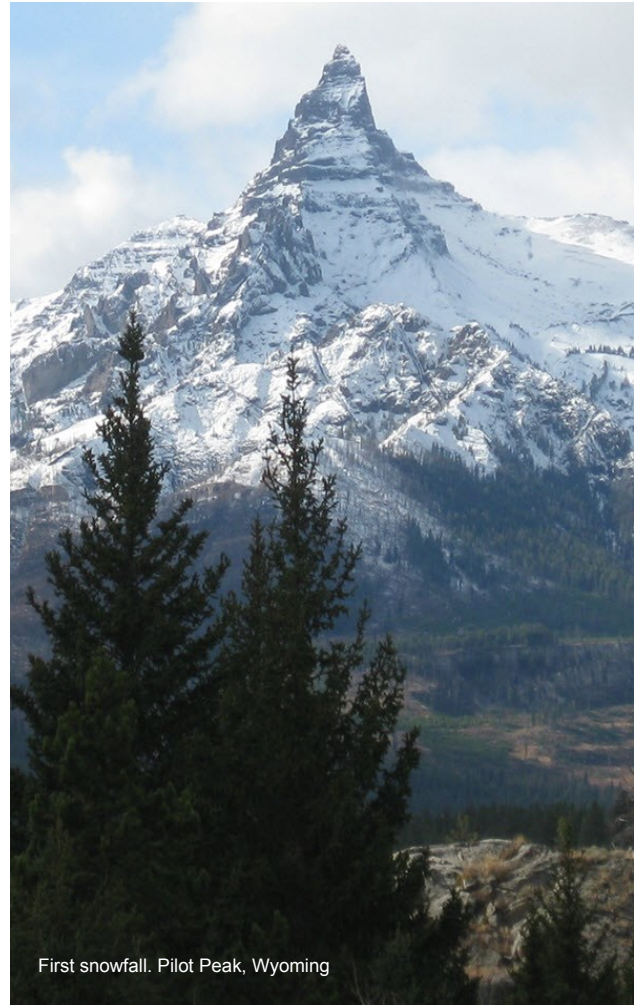
The SSWSF Program is of critical value to producers and residents throughout the West. To learn more, visit our website at [www.wcc.nrcs.usda.gov](http://www.wcc.nrcs.usda.gov).

### Contact us

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 Front page photo courtesy Lucas Zukiewicz, NRCS.



First snowfall. Pilot Peak, Wyoming

# Snow Survey & Water Supply Forecasting Program



National Water and Climate Center  
 Natural Resources Conservation Service



Manual measurement of snowpack at a snow course in Utah.

## Overview

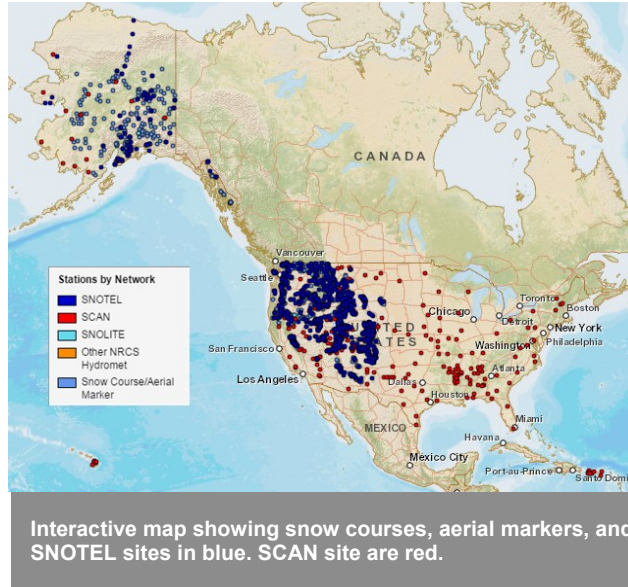
In 1935, a federal **Snow Survey and Water Supply Forecasting (SSWSF) Program** was created under the direction of the Bureau of Agricultural Engineering. In 1939, the bureau was transferred to the Soil Conservation Service (SCS); this agency, now known as the Natural Resources Conservation Service (NRCS), continues to conduct snow surveys and develop water supply forecasts for the western U.S. With the vast majority of water in the West coming from the melting of winter snowpack, data on snow provide information critical to water managers, agriculture, dam operations, municipalities, recreationists, and other businesses.

In the early days of the SSWSF Program, snow surveyors on skis or snowshoes manually measured snowpack along a series of remote, high-elevation snow courses. The invention of over-snow machines, such as snowmobiles, made travel to snow courses less challenging. Some years later, aerial markers were introduced, allowing for snow measurement using airplane flyovers.

In 1977, the automated **Snow Telemetry (SNOTEL) system** was introduced. SNOTEL sites are fully automated and designed to operate continu-

ously and unattended for up to one year. SNOTEL has grown into an extensive network of over 800 data collection sites in the West.

In 1991, the Program instituted a pilot **Soil Climate Analysis Network (SCAN)** project. SCAN stations monitor and report soil moisture, soil temperature, and other climate data at over 200 sites across the U.S., Puerto Rico, and the Virgin Islands.



Interactive map showing snow courses, aerial markers, and SNOTEL sites in blue. SCAN sites are red.

## Program organization

Organizationally, the SSWSF Program is composed of two major operations:

- A network of **Data Collection Offices (DCOs)** located in key areas of the western U.S. Each of the western states and Alaska have snow surveyors, water supply specialists, hydrologists, and technicians who gather, analyze, and disseminate snowpack and climate data for their regions.
- A centralized **National Water and Climate Center (NWCC)**. The hydrologic data collected by each of the DCOs are analyzed by hydrologists at the NWCC. During the January-June snowpack season, NWCC

staff produce detailed water supply forecasts for the western states. Each state uses these data to produce monthly Water Supply Outlook Reports.

In addition to supporting the western states with critical water supply information, the NWCC also conducts the annual **Snow Survey Training School**, an intense week of training in data collection, safety, avalanche awareness, and outdoor survival.



Students at the annual Snow Survey Training School learn outdoor survival skills.

## Telemetry and data transmission

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

SCAN sites are typically located in agricultural areas and are also designed to operate unattended for long periods.

Data are transmitted back to the National Water and Climate Center's **Water and Climate Information System (WCIS)** database using one of several telemetry systems. Depending on the site location, meteor burst radio wave communications, cellular technology, satellite communications, or line of sight telemetry is used.