

Introduction

Let It Snow, Let It Snow, Let It Snow

Welcome to *Adopt-A-SNOTEL Site Teacher's Guide*

An Educational Program about Snow, Snow Measurement, and Water Supply in the Western United States



This *Adopt-A-SNOTEL Site Teacher's Guide* will assist you and your students in exploring the white, watery world of snow and its impact on our water supply.

Snowpack—accumulated snow mostly at higher elevations—supplies 70 percent of the West's water. Forecasting water supply by measuring snow is the job of the Natural

Resources Conservation Service (NRCS), an agency of the United State Department of Agriculture. The right tool for NRCS's snow measuring job is a system called SNOTEL—automated SNOW TELEmetry stations. SNOTEL sites—768 in all—are located throughout 13 Western states (Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, and Wyoming).

This guide contains teaching ideas, lesson plans, resource listings, information on correlations to standards, background and reference materials, and a glossary. All these educational resources are meant to make incorporating the science-based study of snow, measuring snow, and water supply prediction into your place of learning easier.

Just as NRCS scientists do, you and your students can monitor snowpack using SNOTEL (SNOW TELEmetry) data, which are freely available on the Internet. We encourage you to pick a nearby SNOTEL site to observe regularly throughout the year, while inviting you to watch other sites to broaden your understanding of variation across the country. With this near real-time data as a starting point, integrated lessons covering many areas of science, math, language arts, social studies, physical education and health, and environmental education are possible. We aim to help you develop an appreciation for and understanding of hydrology, water quality, environment, and conservation.

Adopt-a-SNOTEL Site

What is the NRCS?

Known until 1994 as the Soil Conservation Service, the Natural Resources Conservation Service (NRCS) is an agency within the United State Department of Agriculture concerned with conserving soil, water, and related resources. The agency's vision is one of "harmony between people and the land."

NRCS's mission is *"to provide leadership in a partnership effort to help people conserve, improve, and sustain our natural resources and environment."*

Since the mid-1930s, this agency has directed the Snow Survey and Water Supply Forecasting Program in the Western states. The main tool in measuring snowpack is called SNOTEL—short for SNOW TELemetry. SNOTEL is a sophisticated yet tough near-real-time hydrometeorological data collection network.

SNOTEL (say "snow-tell") provides a key to the cooperative snow survey and water supply forecasting program relied upon by irrigators, recreationists, municipal water managers, and many other water users in the West. Each day more than 700 remote data collection sites—mostly in the remote, rugged high mountains of the West—transmit snow, precipitation, and temperature data to a central computer facility in Portland, Oregon. There, the Centralized Forecasting System analyzes the data within a massive relational database, where various analyses, tables, and graphs can be generated. Current and historical data and analyses are available via the Internet.

Adopt-a-SNOTEL Site Teacher's Guide has been developed by NRCS to provide a glimpse inside this important process. SNOTEL data can be accessed by any computer equipped to access the Internet and a web browser. Linking to the World Wide Web allows you to view and gather data—from historical records many decades old to fresh readings from today.

NRCS conservationists have long supported the important role education plays in sustaining a conservation ethic. They are pleased that you have decided to bring their work into your classroom.

Goals of This Educational Program

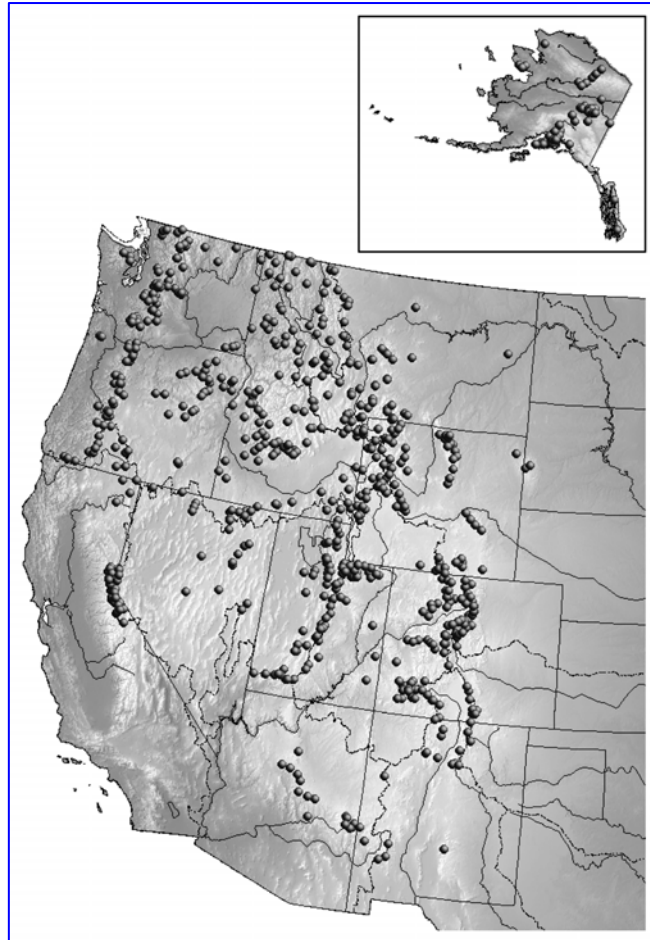
The goals of *Adopt-A-SNOTEL Site Teacher's Guide* and the program it represents are to:

- Improve awareness, among teachers and students, of SNOTEL data collection and analysis by the NRCS;
- Encourage a strong conservation ethic with respect to soil, water, and other environmental resources;
- Inspire students to explore careers in natural resources conservation;
- Promote expanded use of data and information collected by NRCS.

How the Program Operates

Adopt-A-SNOTEL Site Teacher's Guide can be used by any educator. We've worked hard to make it capable of being used readily by skilled teachers regardless of location. NRCS support for the Adopt-A-SNOTEL Site Program is open to any class or school in

the 13 western states where NRCS has a water supply forecasting program: Alaska, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, South Dakota, Utah, Washington, and Wyoming.



SNOTEL's Site Locations

West-wide Adopt-A-SNOTEL Site Program was in order, so the scientists of the Snow Survey wrote one, with significant input from teachers. They published the first edition of *Adopt-a-SNOTEL Site Teacher's Guide* was published in 1988-89.

In order to incorporate updates, especially with respect to computer access to SNOTEL data, *Adopt-a-SNOTEL Site Teacher's Guide* was revised and a second edition released in 2005. NRCS contracted with the Idaho Environmental Education Association to accomplish this revision. Several dozen educators and water supply professionals were consulted to improve the program and guide (see Acknowledgements). We hope this guide is useful, interesting, and—most of all—educational for you and your students.

You are free to adopt any site and to work with the data with as much vigor and intensity as you can muster. Because of free availability of SNOTEL readings on the Internet, you will have no shortage of data. In fact, you may find the sheer amount of SNOTEL data and information initially overwhelming. That's where this teacher's guide may assist, by showing ways of focusing your investigations and offering explanations to alleviate potential confusion.

Though we offer many suggestions, we trust in your abilities to adapt the materials to meet your specific needs. As questions arise about SNOTEL and NRCS's work, you are encouraged to contact either the nearest NRCS office or your state's NRCS Snow Survey staff.

A Guide for Teachers to Guide Their Students

For many students, relevant information means it has an observable and timely effect on their daily lives. Across the American West, snowpack and water supply forecasts meet these criteria. We hope you agree and incorporate materials and concepts contained in this guide into your lessons.

We've tried to make this guide easy to use and flexible, so you can pick and choose to meet your needs.

Comments Welcomed

Please let us know what you think. It is anticipated that additional activities, related topics, and materials will be identified by the participants. We encourage you to share those with us, so we can learn from you and pass your ideas along to other educators.

For more information, contact:

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Warning!!!

SNOTEL sites are located in remote areas. Casual visits to a site can be hazardous to those not familiar with the area and not properly equipped. The dangers can be intensified by sudden winter storms, avalanches, and other hazards. Teachers should be careful not to inadvertently suggest or condone a site visit without supervision for the students. Visits at any time of the year should only be undertaken after coordination with your local NRCS office.