

NRCS Water Resource Information Systems

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Supply Forecasting Program

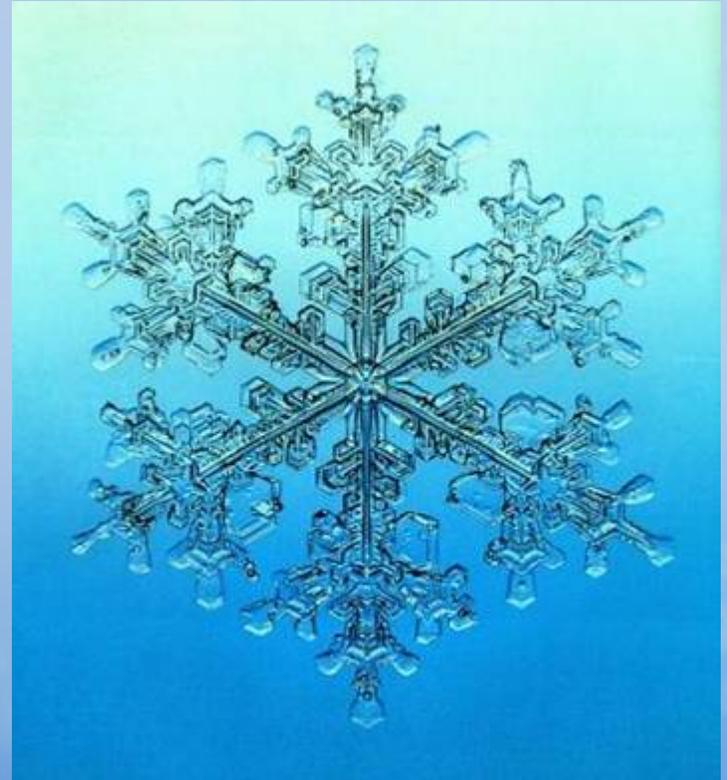
Natural Resources Conservation Service

Washington, DC

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Snow Survey and Water Supply Forecasting Program

- Mission
- Program History
- Data collection
- Water supply forecasts
- Climate services
- New products
- Future directions



Snow Survey and Water Supply Forecasting Program

Mission

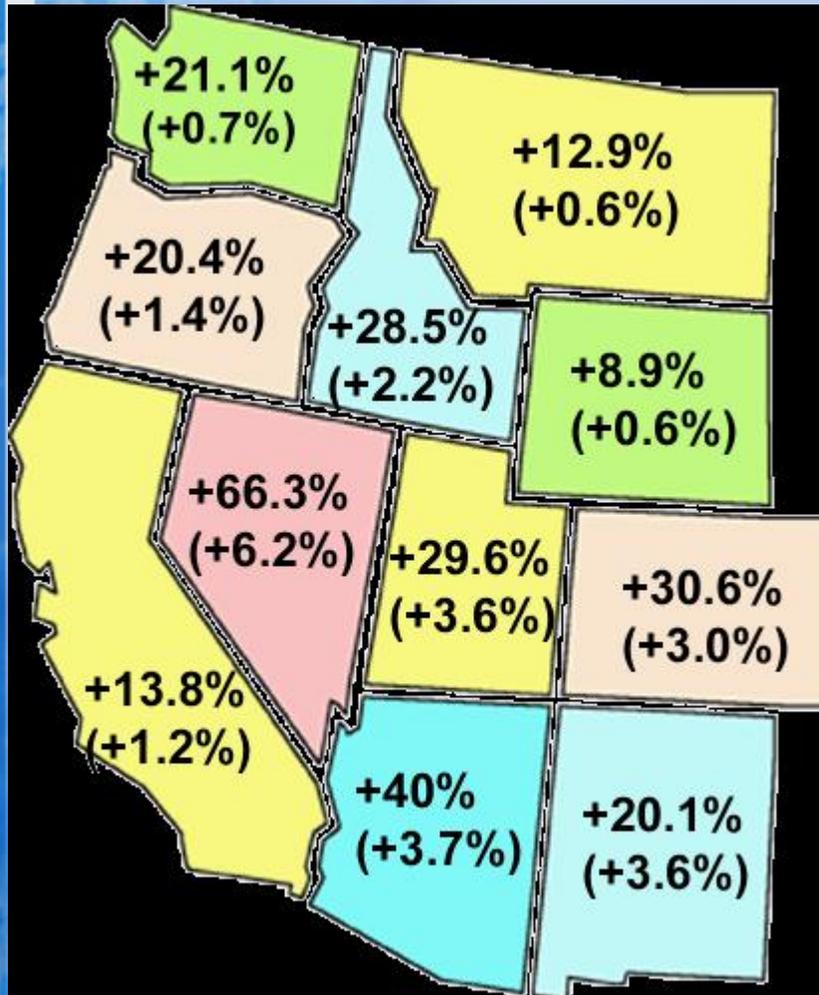
“...to lead a national cooperative program that provides snow, water and climate information.

Our products and services help people use, conserve, improve, and sustain our natural resources and environment.”

NRCS Strategic Goals

- High Quality Productive Soils
- Clean and Abundant Water
- Healthy Plant and Animal Communities
- Clean Air
- Adequate Energy Supplies
- Working with Farm and Ranch Lands

Population Increases (1990-2000)



Population increases from 1990-2000 in %

Annual electricity consumption growth rates from 1988 to 1998 (%)

Source: California Energy Commission, Electricity Analysis Office

Population Projections

Population Projections
(2000-2030)

Greatest increases expected in the driest states.

Source: U.S. Census Bureau

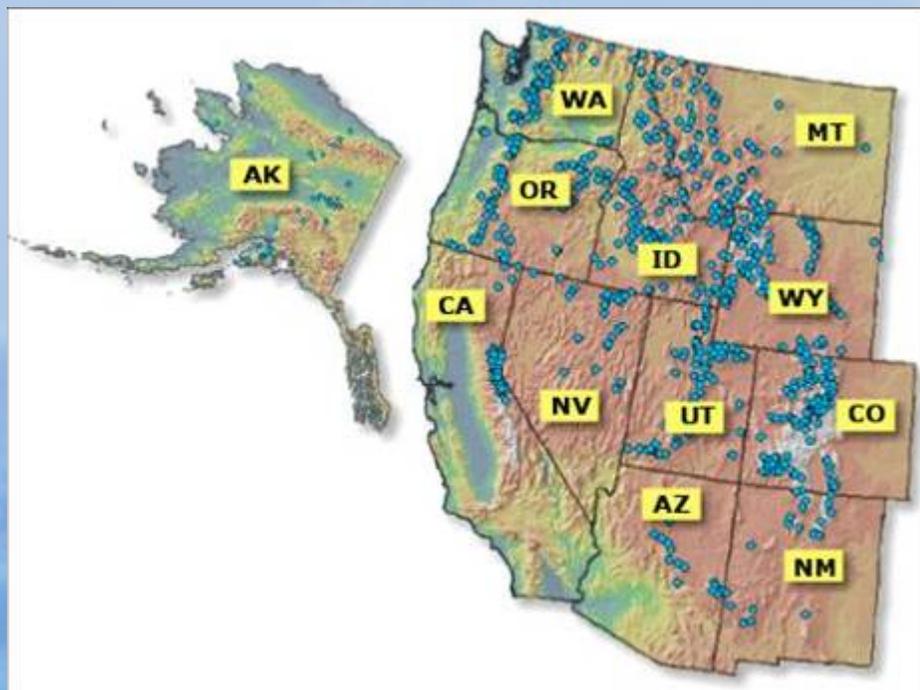
NEEDS: FRESH WATER!

	2000	2010	2020	2030	2000-2030 % Change
AZ	5,130,632	6,637,381	8,456,448	10,712,397	109%
CA	33,871,648	38,067,134	42,206,743	46,444,861	37%
CO	4,301,261	4,831,554	5,278,867	5,792,357	35%
ID	1,293,953	1,517,291	1,741,333	1,969,624	52%
MT	902,195	968,598	1,022,735	1,044,898	16%
NV	1,998,257	2,690,531	3,452,283	4,282,102	114%
NM	1,819,046	1,980,225	2,084,341	2,099,708	15%
OR	3,421,399	3,790,996	4,260,393	4,833,918	41%
UT	2,233,169	2,595,013	2,990,094	3,485,367	56%
WA	5,894,121	6,541,963	7,432,136	8,624,801	46%
WY	493,782	519,886	530,948	522,979	6%
TOTAL	61,359,463	70,140,572	79,456,321	89,813,012	46%

Source: U.S. Census Bureau, Population Division
Internet Release Date: April 21, 2005

Snow Survey and Water Supply Forecasting Program

- 12 western states including Alaska
- 60 FTE (36 Field, 24 NWCC)
- 25.5M acres of irrigated agriculture
- \$51.1B in annual market value (Ag. Census, 2002)



A Century Of Progress

- 1906 - Initial snow studies by Dr. Church Lake Tahoe
- 1906-1909 - Snow survey sampler perfected
- 1909-1910 - First water supply forecast issued
- 1930s – Cooperative Snow Survey Program Established (CFR Title 7, part 612) within USDA



Snow Survey and Water Supply Forecasting Program

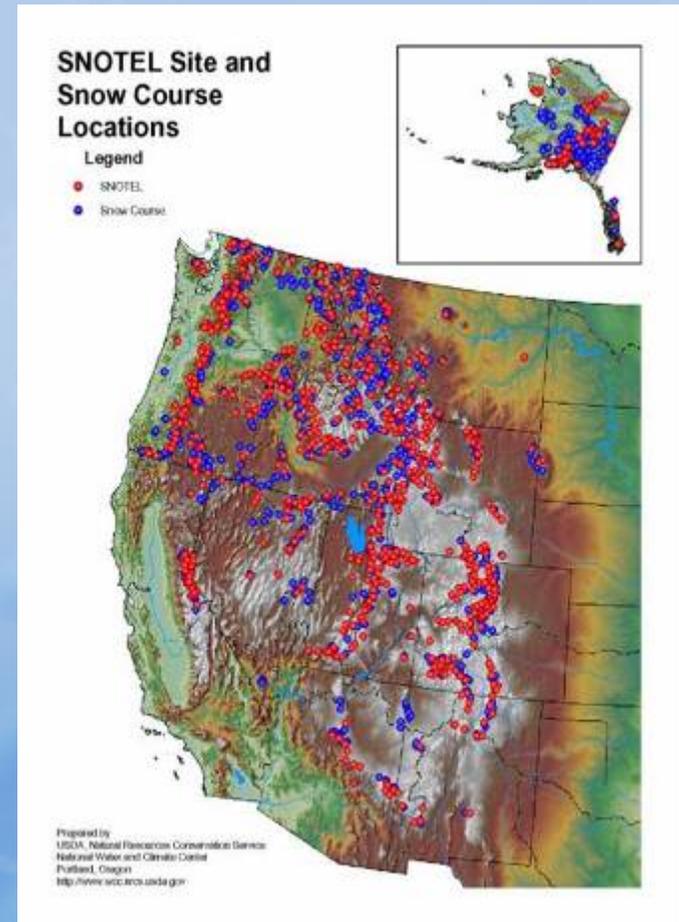
- Customers
- *Sovereign Nations*
 - Canada, Mexico, Native American Nations
 - Technology exchange with China, Mongolia, Antarctica, Europe
- *Federal Departments & Agencies*
 - Agriculture, Interior, Commerce, Defense, Energy, Bureau of Indian Affairs, Environmental Protection Agency, Bonneville Power Administration, Federal Water Masters
- *State and Local Agencies*
 - State and Interstate Organizations involved in: Drought Planning, Water Resources, Emergency Preparedness, Planning & Zoning, Forestry, Lands, Recreation and Tourism.

Snow Survey and Water Supply Forecasting Program

- Customers
- *Non-Governmental Entities*
 - Soil and Water Conservation Districts, University Researchers, Natural Resource Management Businesses, Private Citizens, Agricultural and Forestry Industry Cooperators
 - Water Utilities, Irrigation Districts, Limited Resource Farmers, Construction Contractors, Consulting Meteorologists, Hydrologists and Engineers
 - Educators and Schools, Energy and Power Generation Companies, Landscape Architects, Media, Recreational Interests and Transportation Companies.

NRCS SNOTEL Network

- SNOTEL network
 - 12 western states
 - 730+ sites
 - 16 million observations (2005)
 - 16.1 million downloads
- 920 manual snow courses

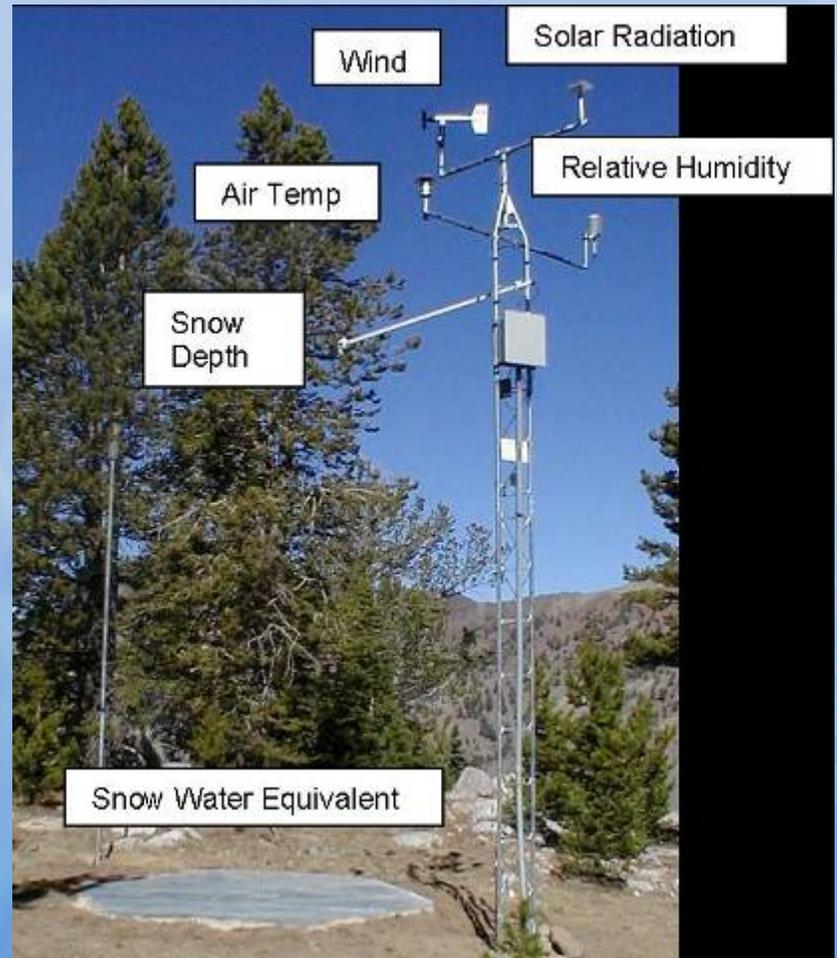


Meteor-burst Technology



SNOTEL Site Augmented Data Array

- Snow water content
- Precipitation
- Temperature
- Snow depth
- Relative humidity
- Wind speed/direction
- Solar radiation
- Soil moisture / temperature



NWCC Webpage

www.wcc.nrcs.usda.gov

United States Department of Agriculture
NRCS Natural Resources Conservation Service

National Water and Climate Center

NWCC Home | About Us | Products | Publications | News | Partnerships | Contact Us

Search
Enter Keywords

Water and Climate Information

- Water Supply
- SNOTEL Data
- Snow Course Data
- SCAN Data
- Climate
- GIS Products **NEW**

Conservation Planning Information

- Animal Waste Management
- Hydraulics & Hydrology
- Irrigation & Water Management
- Nutrient Management
- Pest Management
- Salinity Management
- Water Quality
- Wetlands & Drainage

Welcome to the NRCS
National Water & Climate Center



New State GIS Maps
The National Water and Climate Center is pleased to introduce a new suite of state-level maps displaying SNOTEL snow water equivalent, snow depth, month-to-date precipitation and water-year-to-date precipitation.
[...More Info](#)



SCAN Technology Used to Address Biomass Collection and Impacts
SCAN technology is helping to address new questions relative to large scale biomass collection efforts and the impact on soil and water resources. On July 16th, 2004, the U.S. Department of Energy and the U.S. Department of Agriculture Announce the FY2004 Joint Solicitation Awards for \$25 million in research funding to 22 biomass projects.
[...More Info](#)

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.

Highlights:

- What's New
- SNOTEL Map Interface
- GIS Products
- Snow Survey Centennial Celebration
- Snow Survey Training School 2007

Special Reports:

- Drought Reports and Information
- Klamath Basin Special Reports
- Mount St. Helens Current Snowpack Conditions

NWCC Webpage

SNOTEL Data & Products



SNOTEL Map Interface

Map-based access to data from individual SNOTEL sites. Includes all available sensors.

Click on a state from the map or select from the list below:

Select a State ▼

New! [Google Earth SNOTEL Data Layers](#)
New! [Snow and Precipitation Update Reports](#)



About SNOTEL

General SNOTEL information, site lists, fact sheets, and more...



Snow Depth*

[Products](#)



All Sensors

[Data](#) | [Products](#)
Includes SWE, precipitation, temperature, snow depth* and soil moisture/temperature data*.



Precipitation

[Data](#) | [Products](#)



Snow Water Equivalent

[Data](#) | [Products](#)



Temperature

[Data](#) | [Products](#)

NWCC Webpage

Site Information and Reports for MT ROSE SKI AREA

MT ROSE SKI AREA

Site Number: 652
Station ID: 19k07s

State: Nevada
Latitude: 39.315733
Longitude: -119.894733
Elevation: 8801 feet



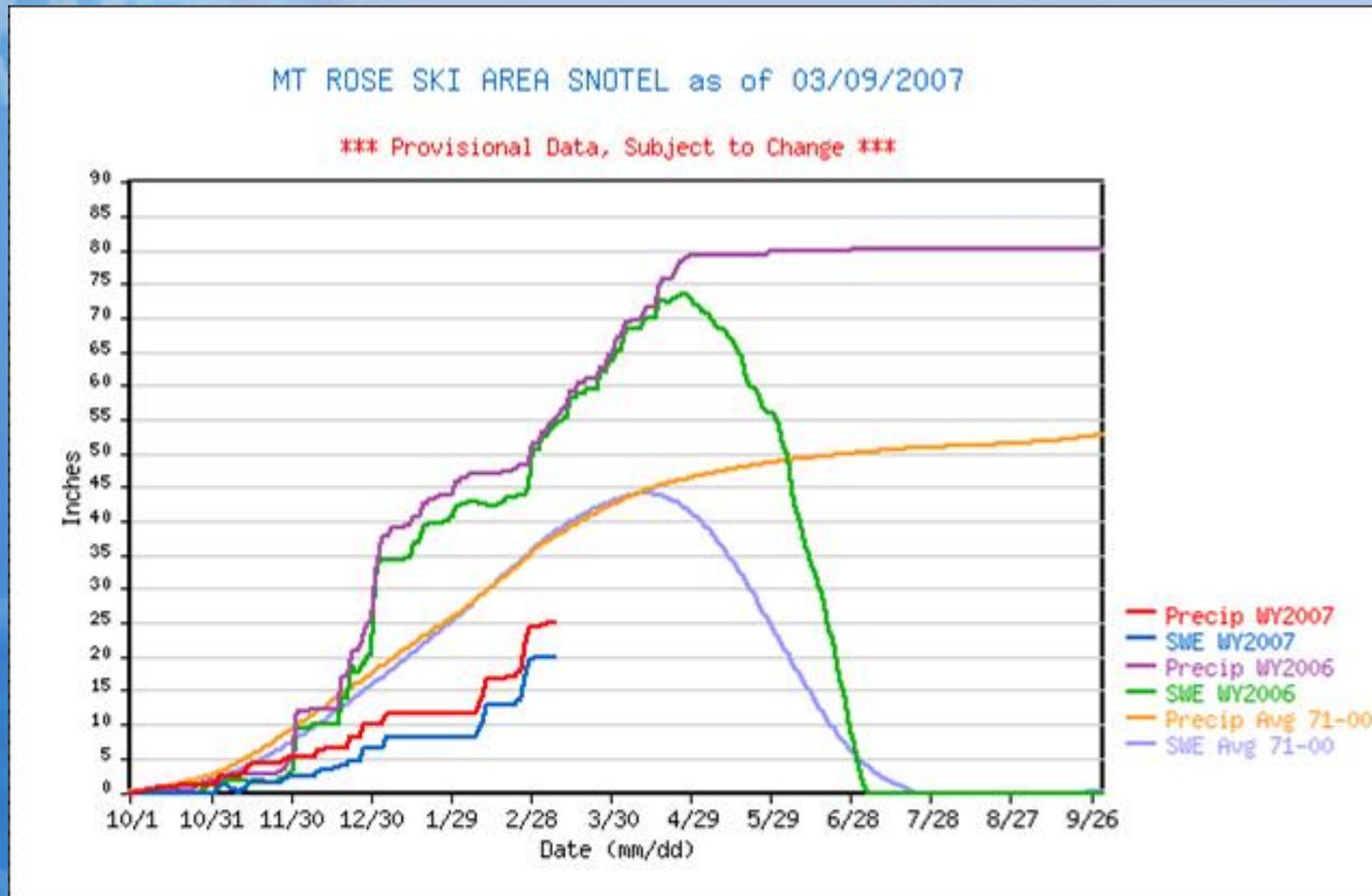
[Sensor Label Descriptions](#)
[Sensor History for this Site](#)

(Winter Photo Also Available, [Select Here](#))

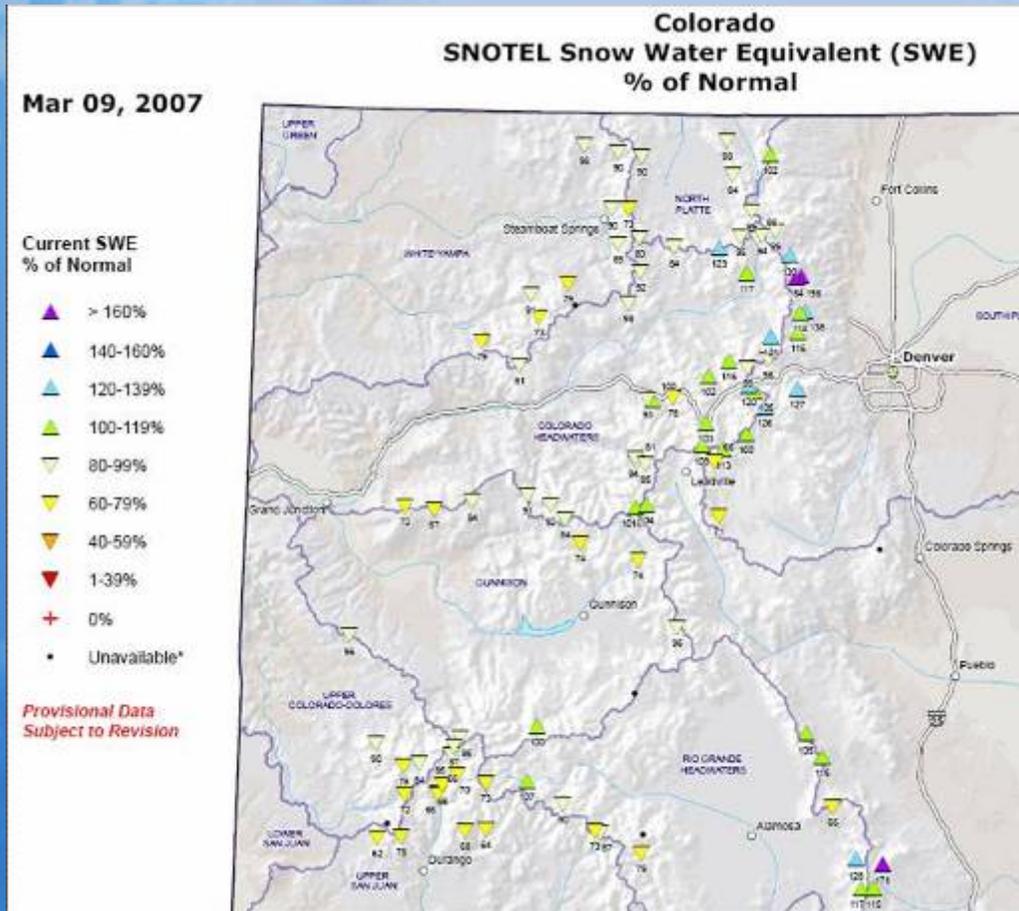
The following reports are available for this site:

Report Type	Hourly	Daily	Current Water Year*	Historical
Standard Sensors† (Most Current Data)	Last 7 Days	Last 7 Days	Daily Readings	Daily (Tab Formatted)
All Sensors (TK Format‡)	Today's Data			
Precipitation, Accumulated	Last 7 Days	Last 7 Days	Daily Table	Daily Table
Snow Depth	Last 7 Days	Last 7 Days	Daily Readings	
Snow Water Equivalent	Last 7 Days	Last 7 Days	Daily Table • Daily Graph	Daily • Monthly
Temperature	Last 7 Days	Last 7 Days	Max • Min • Avg	Max • Min • Avg

Mt. Rose SNOTEL Data



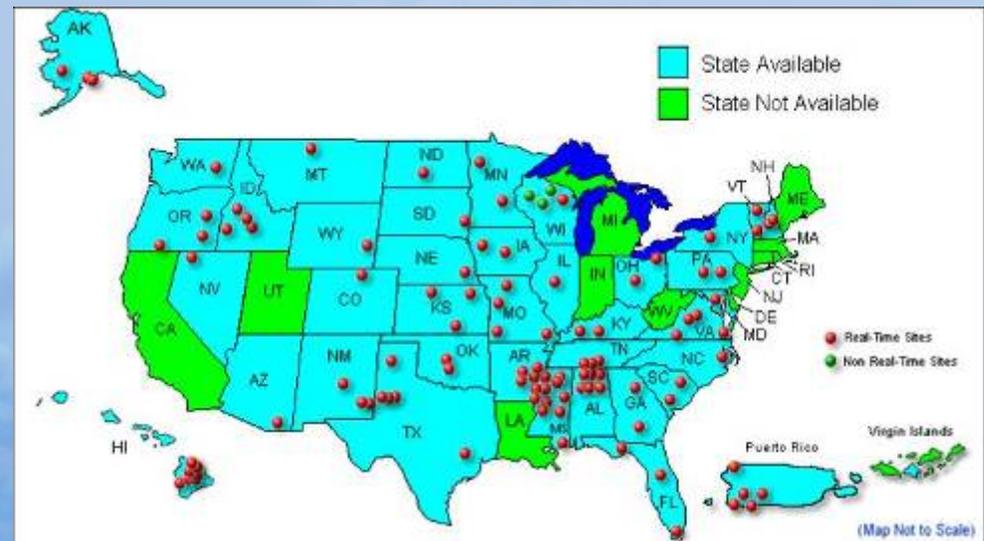
Daily State Map - Colorado



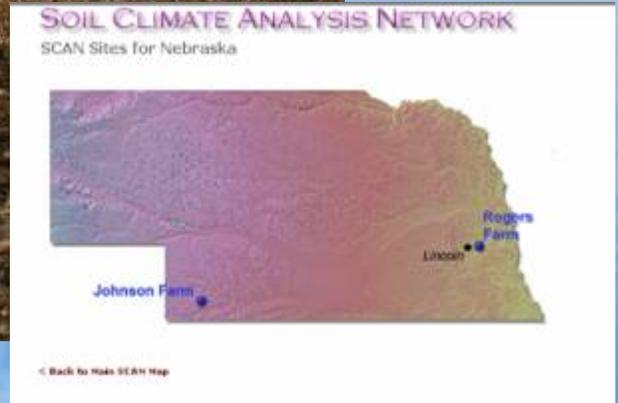
Soil Climate Analysis Network

- SCAN (Soil Climate Analysis Network)
 - 118 sites in 39 states
 - Soil-climate monitoring
 - 956K downloads in 2006
 - Critical for drought monitoring

SOIL CLIMATE ANALYSIS NETWORK

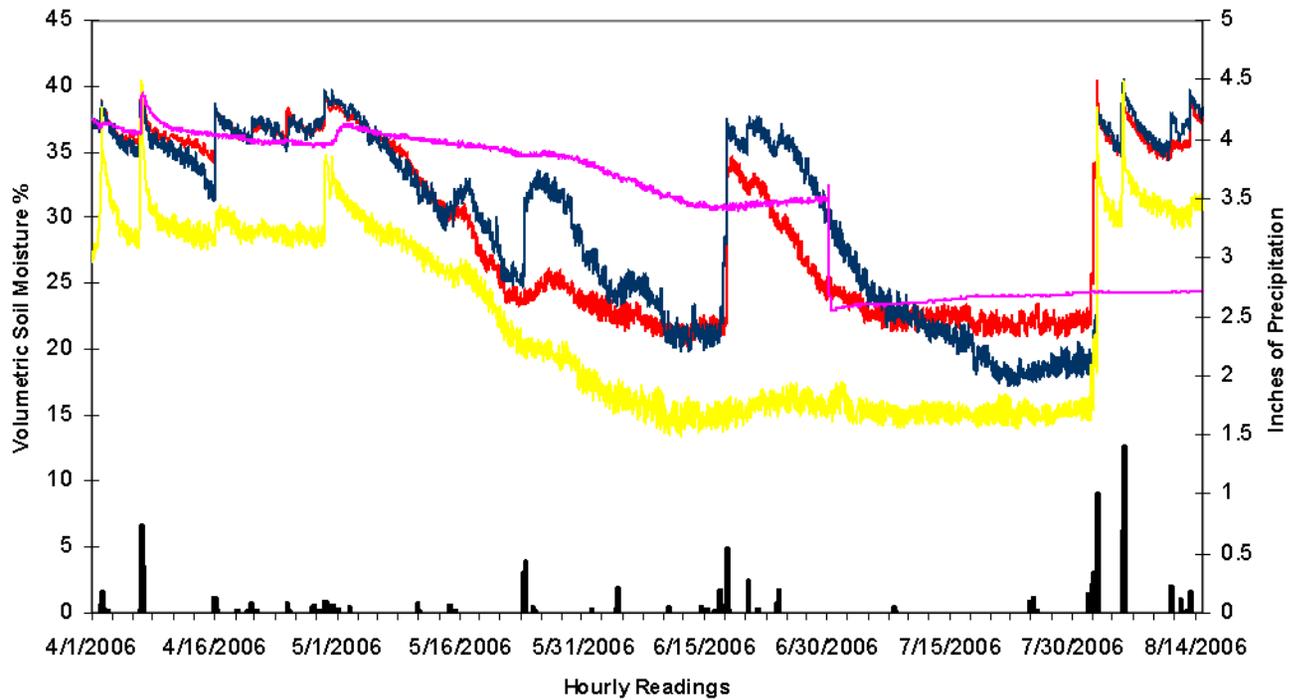


Johnson Farm, Nebraska SCAN Site



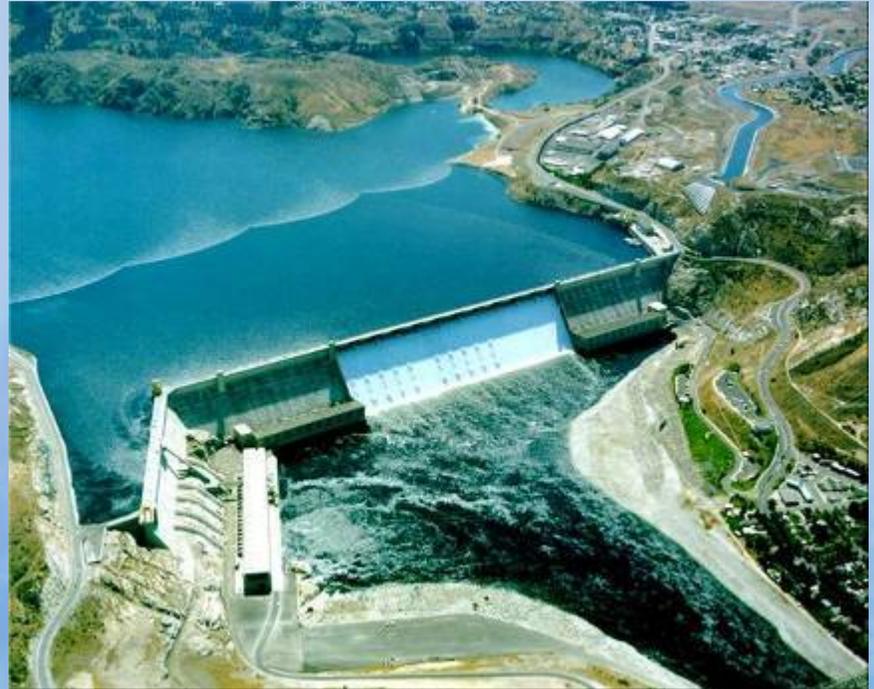
SCAN Data Plot

ERPS Data Center, South Dakota
Soil Moisture vs. Precipitation
PRELIMINARY DATA SUBJECT TO CHANGE



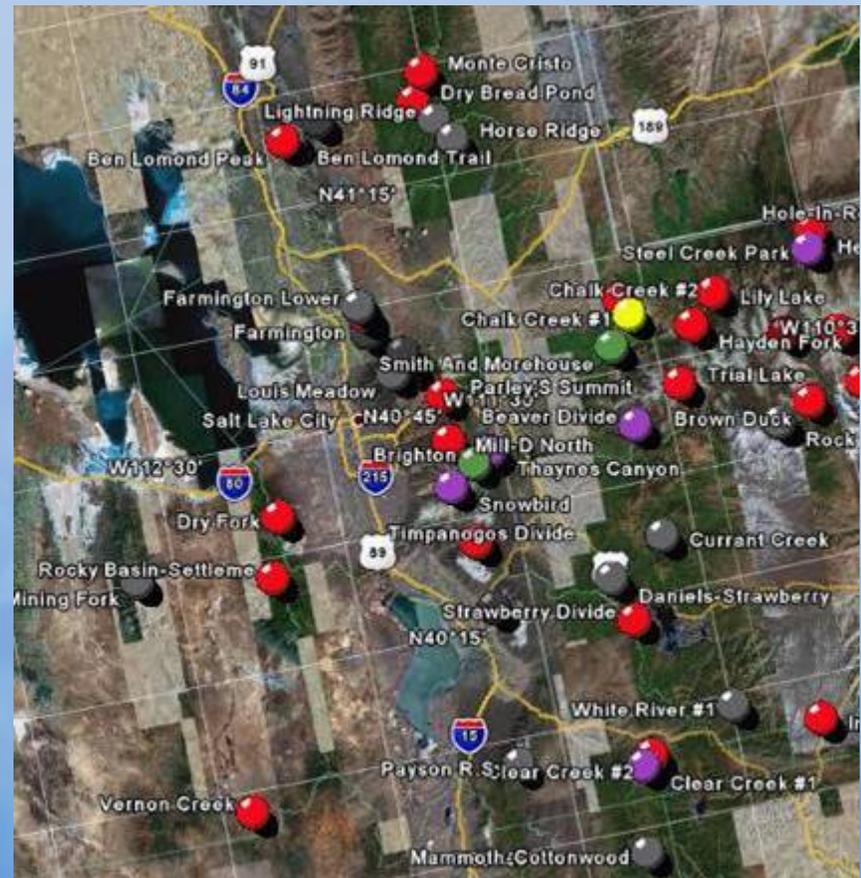
Water Supply Forecasts

- Water Year 2006
 - 740 locations forecast Jan-Jun with NWS
 - Over 11,534 forecasts issued by states to users
 - Over 1.9M visits to WSF pages

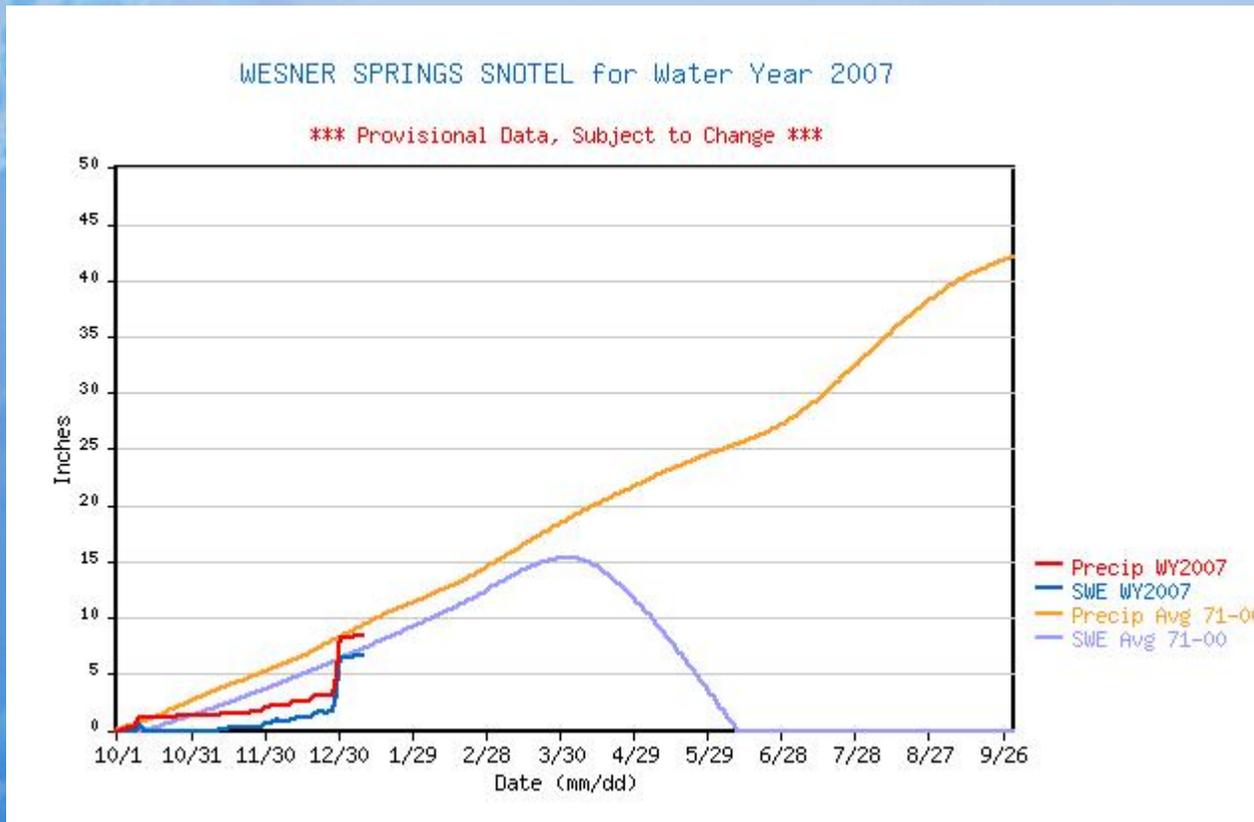


New Products - Viewers

- Google Earth
 - SNOTEL
<http://www.wcc.nrcs.usda.gov/snotel/earth/index.html>
 - Water Supply Forecasts
<http://www.wcc.nrcs.usda.gov/wsf/earth/index.html>

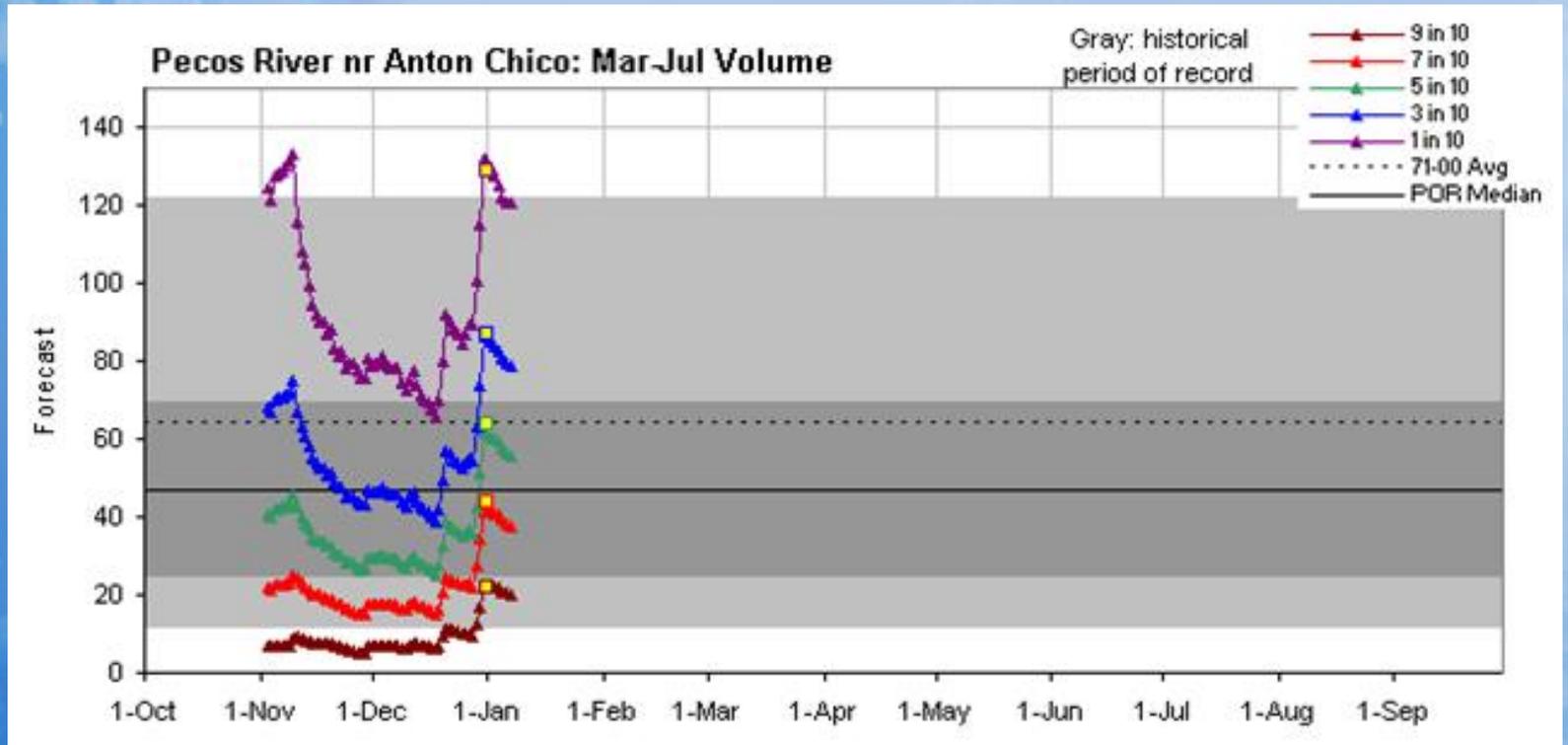


New Products - WSF



Rapid changes in snowpack affect water supply forecasts

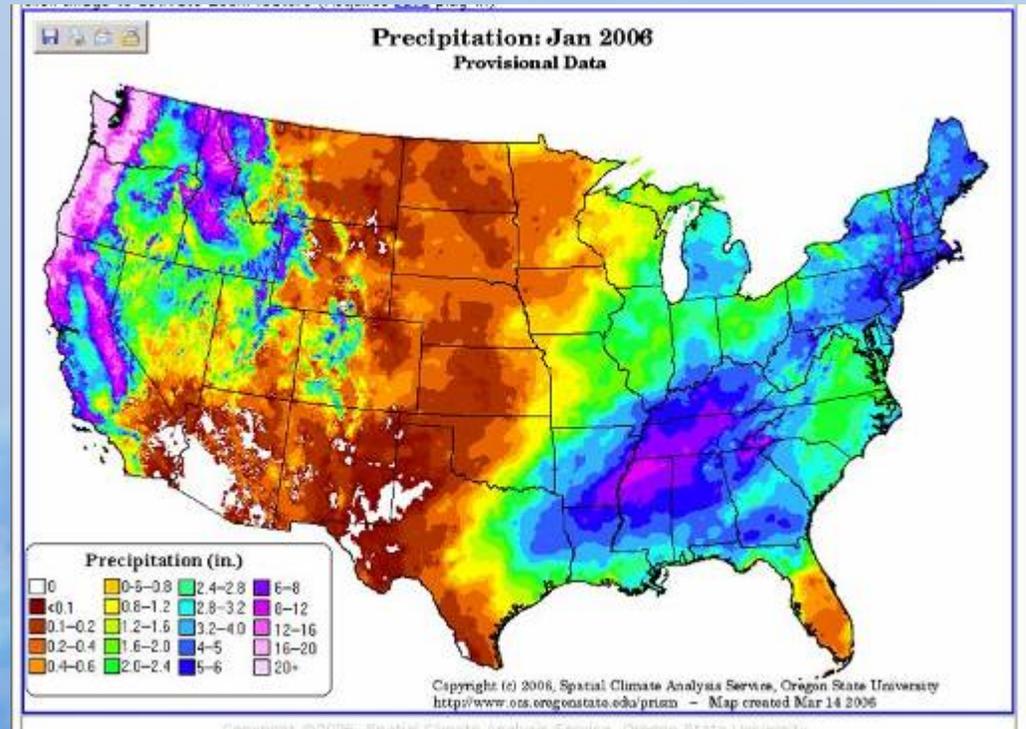
New Products - WSF



Daily water supply forecasts use daily SNOTEL data

New Products – Climate Maps

- Maps of snowpack, precipitation, temperature



Oregon State University

<http://www.ocs.orst.edu/prism/>

Future Directions

1. Further automating of manual snow courses to SNOTEL sites where real-time information is needed to provide water supply forecasts.
2. Expansion of SCAN to provide governments, water managers, agricultural producers, businesses and researchers improved information about soil moisture conditions and potential droughts.
3. Improving models and computational capacity to provide more frequent and accurate water supply forecasts and assessments of soil moisture.

Thank You!

