



SnowNews

Spring 2015

Volume 4, Issue 2

Interactive Map 2.0 displays current conditions, more reports

The National Water and Climate Center recently released a new version of its popular [Interactive Map](#).

The map provides spatial visualization of hydrometeorological data collected by the Natural Resources Conservation Service and other monitoring agencies. The map also provides station inventories based on sensor and geographic filters.

The new version builds on the first release, adding current and historic climatic conditions and new reports to the application.

Users can now choose from two display views: **Conditions View** or **Station Inventory View**.

Conditions View displays stations based on three criteria the user supplies: the Element (such as Precipitation), the Parameter (such as Period of Record), and the desired Frequency and Duration. Once these are selected, one can drill down to more information by simply hovering over or clicking on a station.

Stations View is essentially a site-selector, allowing the user to filter the display of stations by climatic Element, Location, and Data Collection Network.

To change the display, select the view at the top of the map controls.

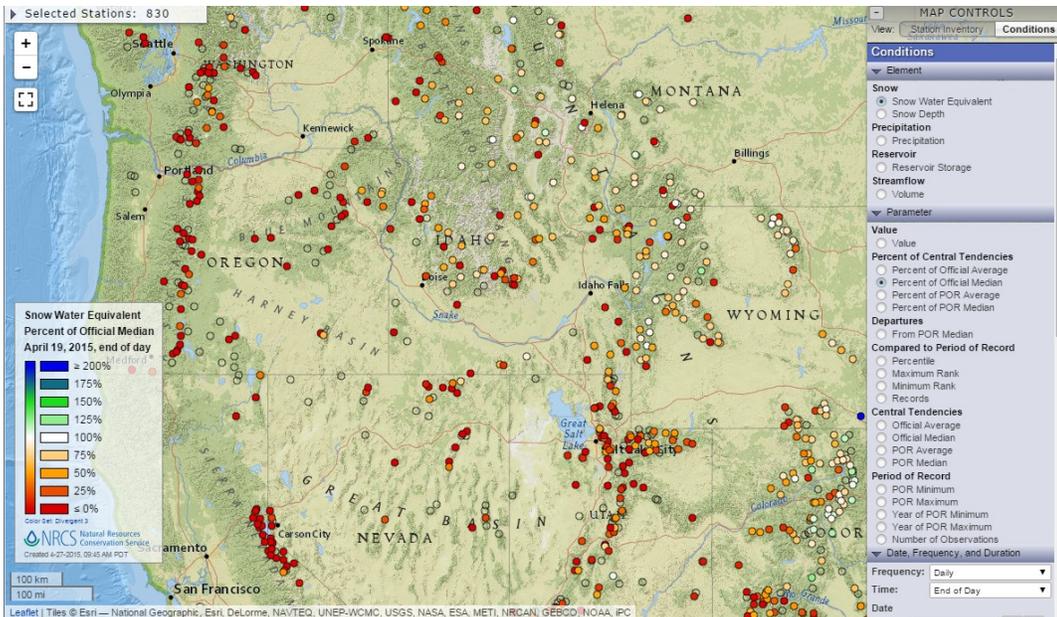
One of the new features in this release is the ability to quickly display summary data for a station. Simply click on a station to show summary information and a selection of predefined data reports. One can also jump to the Site Page for the selected station, providing access to even more reports and data.

Another new feature is the ability to show labels for both stations and watersheds.

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Release 2.0 of the Interactive Map includes a new Conditions View. In this map, Snow Water Equivalent Percent of Official Median data are shown.

Interactive Map, Release 2.0

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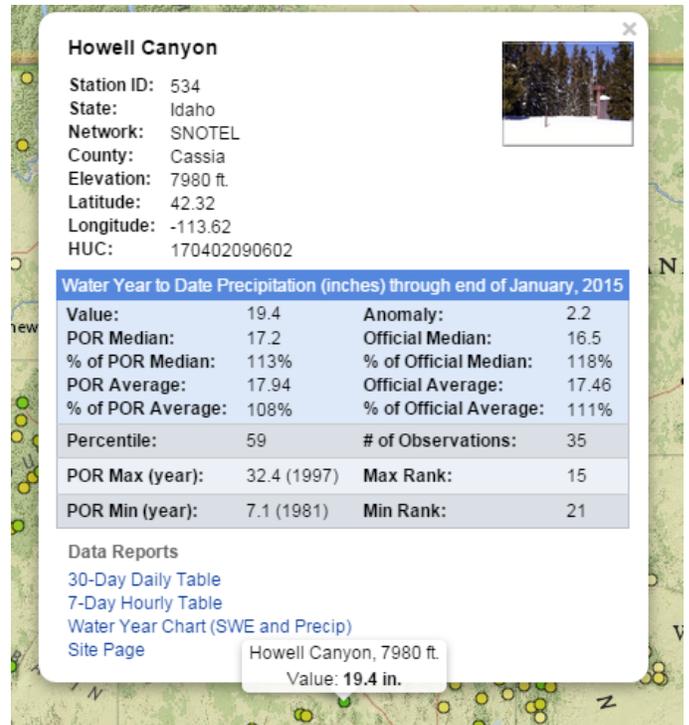
The legend on the Interactive Map now changes depending on the view and the selected elements and value types. The legend also contains a label describing the type of data displayed on the map and if any overlays, such as watershed boundaries, are used.

The legend shows the date and time the map was created. And, if a change in color scheme displayed on the map is preferred, click the **Change Color Set** link on the legend to toggle through several color choices for the map display.

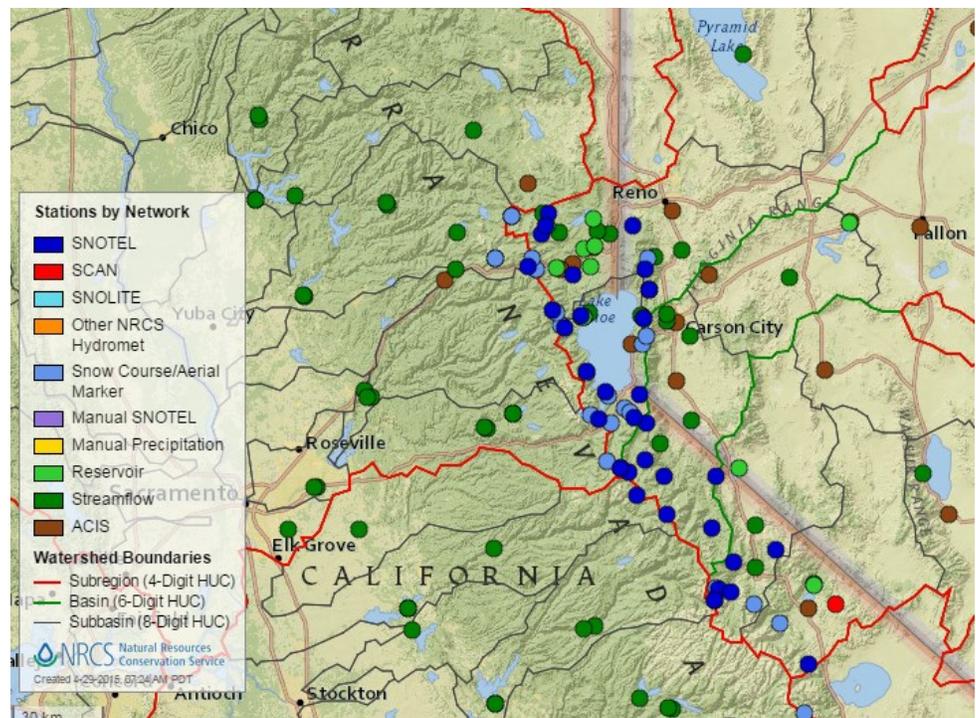
An [Interactive Map Help Center](#) is now available for new users.

And, please use the "Give us Feedback" feature to provide ideas for how we can improve the map in the future.

"The new version of the map builds on the first release, adding current and historic climatic conditions and new reports to the application."



Hover over a station to display abbreviated information. Click on a station to display summary data and a selection of pre-defined reports.



Map of the Lake Tahoe area in California and Nevada with 4-, 6- and 8-digit HUCs used as an overlay. Note that the legend changes to identify the HUC layers.

Highlights from the Western Snow Conference

[Jolyne Lea](#)
NWCC Forecast Hydrologist

Over 100 representatives from many western states and Canada converged in Grass Valley, CA for the 83rd Annual Western Snow Conference.

The conference was held April 20-23, and featured a short course, oral and poster presentations, vendor exhibits, and a day-long technical tour.

The Monday session of the conference featured the short course "LiDAR Basics, Applications, and Use in Snow Hydrology and Field Studies."

Dr. Tom Painter began the session with an overview on current research and operational use of LiDAR in the Tuolumne basin in the southern Sierra Nevada.

Each flight gathers 1TB of data on the snowpack depth during the 3-4 hour flight of the basin. To make this operationally useful for water supply forecasting, they require a 24-hour turnaround for data analysis. Products are a map of spatial distribution of snow,

SWE and albedo at a 50m resolution.

Jeff Deems of the National Snow and Ice Data Center gave an in-depth review on how the LiDAR laser works. There was also a discussion on vegetation cover and tree canopy, platforms, assumptions, and eye safety.

McKenzie Skyles from Cal-Tech discussed flight planning and Google Earth tools for planning altitude, overlap, swath width and orientation.

Next, Brandon Collins from the USFS and Cal-Berkley gave a talk on LiDAR applications to forest structure, fire and fuel management.

Jeff Deems then returned and discussed accuracy of LiDAR, errors and post processing. He also mentioned some collaboration with Danny Marks with iSNOBAL, and use in hydrologic models PRMS (HRU mean snow), and others. Plans are to expand the system to the whole west slope of the Sierra, upper Rio Grande (CO), Green and

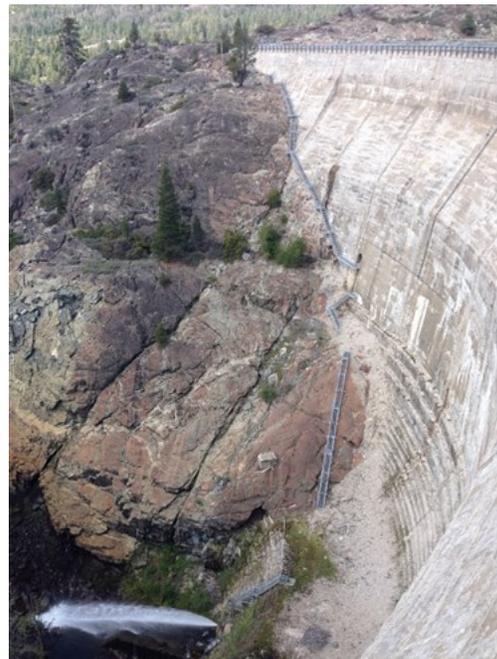
Upper Colorado (WY), and Wasatch (UT). This may eventually cover the entire west as a commercial venture.

The main conference had two invited speakers from irrigation districts in the area that are impacted by the drought and rely on snow for their operations.

Tuesday was devoted to two series of oral sessions; the morning topics being related to Climatology of Droughts and Climate Change and the afternoon to Public Communication and Observed Trends in Snowpack Conditions.

Oral sessions continued on Wednesday, with presentations related to Spatial Variation in Snowpack and Melt Conditions and Remote Sensing of Snow Cover and Terrestrial Snow Cover Monitoring.

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Lake Spaulding (left) behind the 275' dam (right) owned and operated by Pacific Gas and Electric in the headwaters of the South Fork of the Yuba River in the high Sierra.

Western Snow Conference highlights

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There were over 20 posters presented, and 11 vendors, many with new and updated products and software. The papers will be posted to the [website](#) this summer, and the oral papers and narration may be available then for those who want to watch the presentations.

Wednesday night was the gala conference banquet and awards presentation. Banquet keynote speaker, Pat Armstrong, is a decades-long snow surveyor who contracts with CA-DWR and NRCS.

Pat performs snow surveys on wooden skis, often for 100-plus mile treks to remote snow courses and overnights in snow survey cabins in the high Sierra. He has also surveyed the Santa Rosas in Nevada and Rockies in Idaho.

“The conference was a great opportunity to network with colleagues from the western states, snow and hydrology experts, and university and student researchers.”



Hydraulic mining or placer mining used water guns such as these to wash away the sediment for alluvial gold mining. Sediment was collected and separated from the gold in a variety of methods.

Pat is a great storyteller and has recently chronicled his adventures, including some of the stories left in journals in these remote cabins, in a book “The Log of a Snow Survey: Skiing and Working in a Mountain Winter World.”

The conference was a great opportunity to network with colleagues from the western states, snow and hydrology experts, and university and student researchers.

The conference wrapped up Thursday with a bus tour which took participants from Grass Valley up into gold country.

The tour started at the [Nevada County Historical Society Museum](#) in Grass Valley. There were many different sizes and kinds of 1800's Pelton wheels, including the largest Pelton wheel ever constructed (30 feet in diameter) that was still operational, demonstrating water power that was the mainstay for powering lights and machines of the area.

The group then toured several reservoirs and release facilities, and viewed powerhouses, including a tour into a powerhouse with extensive security.



A variety of Pelton wheels using water power during the gold rush mining days in Grass Valley, CA.

Field Operations Workshop 2015

Members of the NWCC conducted a 3-day field operations workshop for electronics technicians, hydrologic technicians and others in the Snow Survey and Water Supply Forecasting Program.

The training was held April 14-16, 2015. It was hosted by **Phil Morrisey** and **Ron Abramovich** from the Idaho Data Collection Office, and **Rod Kyar**, Program Manager (acting). Planning and conference coordination was handled by **John Weeks**, Electronics Maintenance Facility (EMF) lead technician.

The first day of the workshop was primarily devoted to updates from each of the states

on their field operations and maintenance activities.

Wednesday morning's sessions focused on the new MRC 565 radio, which is currently being deployed in the field. **Tom Donich** from Maiden Rock Communications described many of the features and improvements in the radios.

Tom along with **Melissa Webb**, Oregon DCO, also participated in a discussion on system performance and the effects of sporadic E and performance of the Meteor Burst system.

To round out the morning session, **Laurel Grimsted**, NWCC Information Systems Team Lead, gave an overview of her

team's responsibilities and described some of the new applications under development at the Center.

Alex Rebentisch, Idaho DCO, presented a new CR1000 data logger program, which could potentially be used as a "universal" program for both the SCAN and SNOTEL networks.

Following Alex, **Dirk Baker** from Campbell Scientific Incorporated (CSI) discussed new products under development including CR1000 new features and data collection product alternatives.

John Weeks presented information about activities at EMF, including new uses for the facility's environmental chambers.

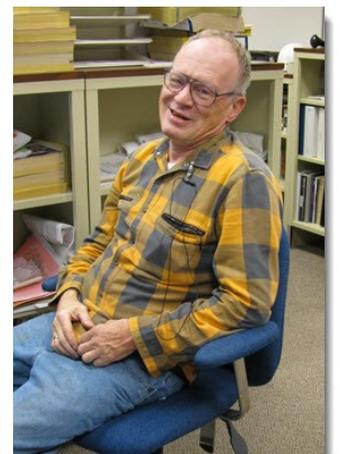
cont. pg. 8



Electronics technicians, hydrologic technicians and support staff from the Snow Survey and Water Supply Forecasting program recently participated in a three-day training workshop in Boise, ID. Front row kneeling: Tony Tolsdorf, Alex Re- bentisch, Bill Overman, Amy Burke. Front row, standing: Danny Tappa, Austin Beard, Eric Larson, Dan Kenney, Billy Patterson, Dan Fries, Beau Uriona, Jeff O'Connell, Deb Harms, Kent Sutcliffe, Laurel Grimsted. Back row, standing: Chad Gipson, Mike Ardison, Travis Kolling, Troy Brosten, John Weeks, Butch Horner, Zack Wilson, Ivan Geroy, Melissa Webb, Jeff Graham.

Praise the ship! Steve Dunn bids us farewell

After 32 years' service to NRCS, electronics technician Steve Dunn retired on January 31 of this year. The Center threw Steve a retirement party in March and many of Steve's colleagues, both current and past, were there to reminisce, share stories, and wish him well. Here are a few pictures of Steve throughout his career.





California drought visualization website

The U.S. Geological Survey has introduced a [website](#) that provides atlas-like, state-wide coverage of the drought and a timeline of its impacts on water resources.

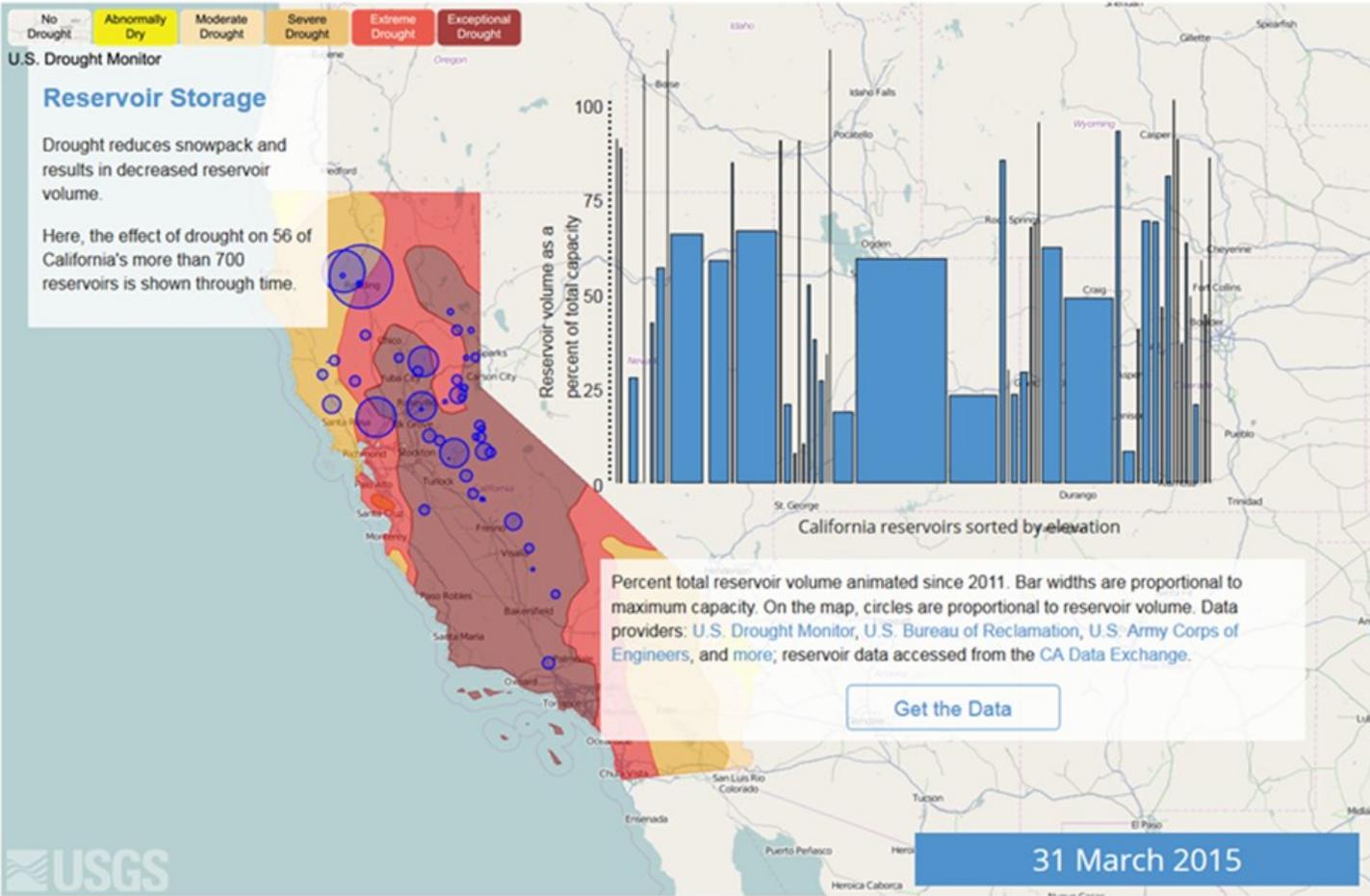
Many State, Federal, and Tribal agencies make routine observations of the water cycle. This website graphically visualizes these data to help understand the effect of

drought on rivers, streams, lakes, and reservoirs.

The data are drawn from free, publicly-accessible sources. In addition, the analytical, graphical, and software tools used are open-source and available for public re-use.

Note: The Firefox browser is recommended for the best viewing experience.

For more information about drought and science-based decision making in California, visit the [USGS California Water Science Center webpage](#).



Example page from the California drought visualization website



Developing a coordinated National Soil Moisture Network

There is a critical need for soil moisture data for assessing drought conditions, flood potential, estimates of crop yields, water supply forecasting, hydrologic models, and impacts of climate change. As part of meeting the goals of the President's [Climate Action Plan](#), and as a participant in the [National Drought Resilience Partnership](#), NRCS is working with the National Integrated Drought Information System (NIDIS) team and researchers from NOAA, USGS, NASA, Texas A&M University and others to develop a coordinated network for addressing soil moisture conditions.

There are many different sources of soil moisture information available today, and these sources can be highly variable in spatial distribution,

vertical data coverage, sensor types, scale, temporal measurements, data storage, and applications. The goal of the National Soil Moisture Network (NSMN) is to integrate information from in-situ networks, remote sensing and modeling activities, and provide these data as a single product.

Some of the use cases for such a product would be: operational drought monitoring for NOAA and the U.S. Drought Monitor, experimental land surface modeling, as applied by NOHRSC and in snow modeling, and for operational hydrological modeling, as utilized by the NOAA River Forecast Centers.

The first step in developing a NSMN is to complete a pilot study, which is presently underway. The in-situ networks used for the pilot project include the

Oklahoma Mesonet, West Texas Mesonet, NWS Climate Reference Network, and NRCS Soil Climate Analysis Network (SCAN). The site metadata and soil characteristics are from the North American Soil Moisture Database (NASMD). The modeled/assimilated data are from the North America Land Data Assimilation System (NLDAS).

The pilot study began in January of this year and is planned for completion by July. The pilot will be demonstrated/tested during July and August, and the final project report will be completed by the end of August.

After the issues of integrating the different data into a single system are addressed, the effort will be expanded to cover the entire U.S. and will incorporate many of the other sources of information.

Field Operations Workshop 2015

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Deb Harms, NWCC Hydrologist, provided an overview of how to install Hydra Probe soil moisture sensors for both SNOTEL and SCAN installations. She also described how to properly collect and prepare soil samples for analysis by the National Soil Survey Center in Lincoln, NE.

Deb also stressed the importance of new shipping regulations as it relates to transporting soil samples across state boundaries.

Wednesday's session concluded with a presentation on the evolution of the Judd snow depth sensor by **Dan Judd**.

Thursday was a full day of presentations and discussion at the workshop.

Alex Rebentisch started the day

with a discussion of an investigation he's performed which compares the Vaisala WXT "all purpose sensor" to our current configuration of discrete sensors.

Tony Tolsdorf then gave a brief overview of the proposed, new organization for the Snow Survey and Water Supply Forecasting Program.

Tony continued with an update on fluidless snow pillow testing. Fluidless pillows have now been installed in Alaska, Washington and Idaho, and comparison data are rolling in.

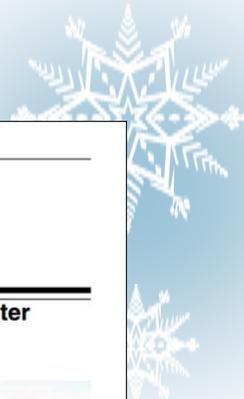
Tony then followed up with a presentation about the Program's plan to replace the telemetry for SCAN stations in the eastern U.S. with cellular modems. This project is cur-

rently underway, with the goal to install up to 100 cellular modems across the eastern states during this maintenance season.

A surprise guest at Thursday's session was **Billy Patterson**, a retired, long-time electronics technician from the Boise Data Collection Office.

On Thursday afternoon, participants held a final discussion on general maintenance issues, followed by a tour of the Boise Master Station to get a firsthand look at the newly-upgraded hardware and software at the site.

Participants agreed the training was a good opportunity to share insights, techniques and new product developments. The plan is to conduct similar workshops on a regular schedule.



National Engineering Handbook update complete

Tony Tolsdorf
Water and Climate
Monitoring Team Lead

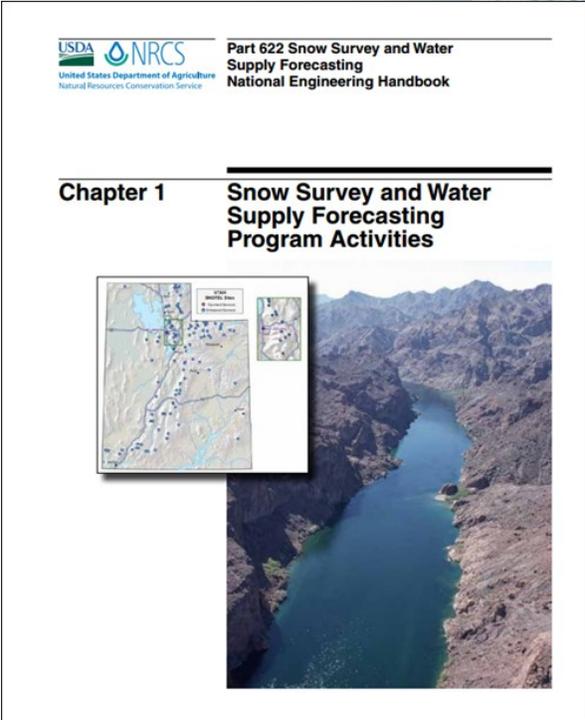
Thanks to the efforts of numerous contributors and reviewers, we recently completed a comprehensive revision to the National Engineering Handbook, Part 622, Snow Survey and Water Supply Forecasting.

Last updated in 1972, the Handbook required significant additions and updates.

For example, the automated Snow Telemetry (SNOTEL) network did not exist in the early 1970s. Neither did many of the processes and services the Program currently provides.

The new version of the Handbook contains a program overview, plus chapters on specifying and installing new data collection sites, calibration and maintenance procedures, data management, water supply forecasting, and standards and specifications.

The Handbook is available on the NRCS eDirectives Electronic Directives System web site at: <http://directives.sc.egov.usda.gov/ViewerFS.aspx?hid=32040>



Upcoming events

Events of interest in the coming months.



What: Tower Climbing Safety Training
When: May 19-20, 2015
Where: Boise, ID
More information: [Tony Tolsdorf](#), 503-414-7006.

What: 10th International Conference on Climate Change
When: June 11-12, 2015
Where: Washington, D.C.
More Information: [Jim Lakely](#), 312-377-4000.

What: American Association of State Climatologists Annual Meeting
When: June 23-26, 2015
Where: Cap May, NJ
More information: www.stateclimate.org/meetings/

What: American Meteorological Society 27th Conference on Weather Analysis and Forecasting
When: June 29-July 3, 2015
Where: Chicago, IL
More Information: www.ametsoc.org/meet/fainst/201527waf.html

What: United Nations Framework Convention on Climate Change, Conferences of the Parties, 21st meeting (COP21)
When: November 30-December 11, 2015
Where: Paris, France
More Information: <http://www.cop21.gouv.fr/en>



Snow Survey and Water Supply Forecasting Program Resource Locator

Here's a handy reference for finding resources in the Snow Survey and Water Supply Forecasting Program.

Where	What	Who	How
Alaska	Forecast Hydrologist	Jolyne Lea 503-414-3040	jolyne.lea@por.usda.gov
	Data Collection Office Supervisor	Daniel Fisher 907-671-7746	daniel.fisher@ak.usda.gov
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	Water Supply Specialist	Dino De Simone 602-280-8786	dino.desimone@az.usda.gov
California	Forecast Hydrologist	Jolyne Lea 503-414-3040	jolyne.lea@por.usda.gov
	Water Supply Specialist	Greg Norris 530-792-5609	greg.norris@ca.usda.gov
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	Hydrologist	Vacant	
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	Water Supply Specialist	Ron Abramovich 208-378-5741	ron.abramovich@id.usda.gov
Montana	Data Collection Office Supervisor	Mage Hultstrand 720-544-2855	mage.hultstrand@co.usda.gov
	Forecast Hydrologist	Cara McCarthy 503-414-3088	cara.s.mccarthy@por.usda.gov
	Water Supply Specialist	Lucas Zukiewicz 406-587-6843	lucas.zukiewicz@mt.usda.gov
Nevada	Forecast Hydrologist	Jolyne Lea 503-414-3040	jolyne.lea@por.usda.gov
	Water Supply Specialist	Jeff Anderson 775-857-8500 x152	jeff.anderson@ut.usda.gov
New Mexico	Forecast Hydrologist	Gus Goodbody 503-414-3033	angus.goodbody@por.usda.gov
	Water Supply Specialist	Chris Haines 520-292-2999 x107	chris.haines@nm.usda.gov
Oregon	Forecast Hydrologist	Rashawn Tama 503-414-3010	rashawn.tama@por.usda.gov
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Utah	Forecast Hydrologist	Gus Goodbody 503-414-3033	angus.goodbody@por.usda.gov
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Washington	Forecast Hydrologist	Rashawn Tama 503-414-3010	rashawn.tama@por.usda.gov
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	Database Manager	Del Gist 503-414-3007	del.gist@por.usda.gov
	Hydrologist (Water & Climate Monitoring)	Deb Harms 503-414-3050	deb.harms@por.usda.gov
	Modeling Hydrologist	David Garen 503-414-3021	david.garen@por.usda.gov
	Operations Specialist (SNOTEL/SCAN)	Vacant	
	Resource Conservationist	Vacant	
Statistical Assistant/SCAN QC	Denice Schilling 406-727-7580	denice.schilling@mt.usda.gov	

New!
Contact Help Center

There's a new online tool to help locate resources within the Snow Survey and Water Supply Forecasting Program.

Click [here](#) to open the **Contact Help Center**. Don't forget to bookmark the url.



NWCC/Snow Survey Program highlights

Mage Hultstrand is the new Data Collection Office (DCO) Supervisor for the state of Montana. Before joining the Montana team, Mage served as Assistant DCO Supervisor in Colorado, and as a Hydrologist with the Oregon Snow Survey program. Congratulations, Mage!

Electronics Technician **Steve Dunn** retired from the NRCS

in January after more than 37 years with the agency. See page 8 of this issue for some of our favorite photos of Steve and his coworkers.

Members of the NWCC Water and Climate Services (WCS) team recently participated in planning events throughout the western U.S. In February, WCS Team Lead, **Cara McCarthy**, attended the an-

nual Missouri River Basin Forecaster's Meeting. Hydrologist **Gus Goodbody** participated in the Rio Grande Snowmelt Runoff Meeting in April. And, **David Garen**, Hydrologist, travelled to Boise, ID to meet with members of the Agricultural Research Service on ongoing modeling projects.



Photo of the month



Lexi Landers and Zack Wilson, Colorado DCO, weigh a snow sample in Rocky Mountain National Park, March 30, 2015. Photo by Pamela Johnson, Loveland, CO Reporter-Herald.

Products and resources on the web

cli-MATE offers Freezing Degree Days tool

The Midwestern Regional Climate Center at Illinois State University has added a new feature to its [cli-MATE](#) tool for accessing climate data.

The new Freezing Degree Days tool finds the number of days the mean temperature is below a 32°F temperature base.

The tool will also display the number of Thawing Degree Days, or days the mean temperature is above freezing, as well as displaying both regular accumulation of Freezing Degree Days, and the Net Accumulation, which subtracts Thawing Degree Days from the total.

Lightning strike and wildfire depictions

On average, lightning sparks about 9,000 wildfires in the U.S. each year.*

There are lots of resources available which show recent lightning strikes across the country. Here are just a few:

- [Intellicast Lightning Strikes](#)
- [Weather.com Lightning Strikes](#)

- [StrikeStarUS](#)
- [Vaisala Free Lightning Explorer](#)

You can also track active wildfires via the National Wildfire Coordinating Group [InciWeb Incident Information System](#) or the National Interagency Fire Center [Safety Alert System](#)

* Source: National Interagency Fire Center (2008-2012 data).





Helping People Help the Land.

National Water & Climate Center
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www.wcc.nrcs.usda.gov/SnowNews/SnowNews_landing.htm

Our mission is: *"To lead the development and transfer of water and climate information and technology which support natural resource conservation."*



With a vision of the future as:

"A globally-recognized source for a top quality spatial snow, water, climate, and hydrologic network of information and technology."

From the Director's desk Change in the Climate of Diversity



There was a recent email from one of our employees, Rashawn Tama, acknowledging Mage Hultstrand as the first female Data Collection Office (DCO) Supervisor in our program. Rashawn brought up other items, such as the percent of female employees in NRCS (<http://bestplacestowork.org/BPTW/rankings/detail/AG16>) and the distribution of employees by grade level within USDA.

Rashawn's email got me thinking about diversity in the Snow Survey program and wondering how we're doing. I looked at the numbers for our offices across the 12 western states and found that, at present, there are 56 employees; 42 are men and 14 are women. That means only 25% of our current staff are women. Within the 12 state offices, that percentage is lower, with

only about 14% of the positions being held by women.

Although these numbers are disappointing to me, one also needs to look at where we're heading. At the NWCC, we presently have 14 staff on board, with 8 of these positions, or about 57%, held by women. There are three Team Leaders at NWCC, and two of them are women. A few years ago, NWCC met two milestones hiring the first woman and African-American Team Leader. And the previous two Program Managers for the Snow Survey and Water Supply Forecasting program were women.

My point is that we do not have as diverse a workforce within the program as we should, but we are headed in the right direction. We will continue to see improvements in diversity as we move into the future, not just in our program but for our entire workforce.

One indicator of this, for me, was to visit my college Geology Field Camp in 2013. When I went to field camp 31 years prior (was it really that long ago?), we had 12 women students out of a total of 57. Although I didn't count numbers

during my visit in 2013, I would estimate that the number of women students was equal, if not greater, than the number of men. Across the country, we're seeing more women majoring in the sciences. With these increasing numbers will come increasing percentages of women in the workplace, including our program.

One area where we do not have much diversity in our program is in ethnicity. Our program has few individuals who would fall into any underrepresented groups based on race. This is an issue and we need to make an effort to look at recruitment and informational/outreach resources for opportunities to improve.

In summary, our numbers are not where they should be, but we've come a long way and things are improving. I do look forward to the day when we don't even think about the numbers of women or African-Americans or whoever in any program, and only consider the number of people employed. After all, I feel the goal is to see people for who they are, not what they are. There have been many changes in my lifetime, and I hope to see us reach this level of equality during my career.

Mike



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