



SnowNews

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Plenty of snow to go around at 2016 Snow School

[Tracy Robillard](#)

Public Affairs Specialist

Let it snow, let it snow, let it snow. That was the driving theme behind this year's West-wide Snow Survey Training, held January 10 – 15 in Bend, Oregon.

With about four feet of snow covering the training grounds, there was plenty of snow to go around for everyone.

And that snow was put to good use. Students plunged sampling tubes into it; they piled it up with shovels to build snow caves; they dug down into it to build trenches; they buried avalanche beacons beneath it to practice search-and-rescue; they sped over it on snowmobiles; but most importantly, they learned how to work in harsh conditions and return safely.



Students perform a search-and-rescue exercise to learn how to detect someone buried by an avalanche using safety beacons. NRCS photo by Tracy Robillard.

During most of the outdoor training sessions, Mother Nature graced the students with several snow showers. It was a much different environment than last year's training in Lake Tahoe,

California—where there was barely a foot of snow in the higher elevations on the training site.

The weather conditions in Bend were above normal, with a 110% of normal snowpack in the mountains and an average of four feet of snow on the training site at the Wanoga SnoPark on Mt. Bachelor. These conditions were representative of most of the state of Oregon, which experienced an above-normal snowpack statewide in January.

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Students build snow shelters during an overnight bivouac exercise at the 2016 Snow School in Bend, Oregon. NRCS photo by Jen Cole.



Plenty of snow at 2016 Snow School

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“This training is absolutely essential to sustain our snow survey program. We ensure our people are prepared in the event of an emergency and get them up-to-speed on the methods for measuring.”

USDA’s Natural Resources Conservation Service (NRCS) hosts the Westwide Snow Survey training every year to support snow surveyors across 13 western states.

“Often times our snow survey crews must traverse difficult mountain terrains to manually measure the snowpack in remote areas,” said Tony Tolsdorf of the NRCS National Water and Climate Center, and one of the organizers for this year’s training. “This training is absolutely essential to sustain our snow survey program. We ensure our people are prepared in the event of an emergency and get them up-to-speed on the methods for measuring.”

Training topics covered outdoor survival, mountain medicine, avalanche preparedness, a history of snow survey, shelter construction, methods of measurement, and more. Guest instructors included Brian Horner of Learn to Return Training based in Anchorage, Alaska and Nancy Pfeiffer of the Alaska Avalanche School also based in Anchorage.

The training requires students to build a snow shelter and camp in it overnight. Several students took advantage of the ample snow and constructed snow caves. Others opted for a more simplified approach, digging a trench and covering it with a tarp.

With 45 students in attendance this year from all over the West, the training was a hub for networking and relationship building. While most of the students are NRCS employees, several surveyors from cooperating partner groups attended the training this year.



Instructor Scott Pattee teaches students how to operate snowmobiles. NRCS photo by Tracy Robillard.



Students practice taking snow samples using a calibrated scale and tubes. NRCS photo by Tracy Robillard.

“Our cooperating partners are vital to the snow survey program,” said Michael Strobel, director of the NRCS National Water and Climate Center based in Portland. “We couldn’t

do it without them. They provide the staff and capacity to build the collaborative network of data that is essential in developing water supply forecasts throughout the West.”

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See photos from the 2016 Westwide Snow Survey Training on the NRCS Oregon Flickr page at: https://www.flickr.com/photos/nrcs_oregon/albums/72157663650884502

Watch a 2-minute video about the training, produced by Zolo Media, online at: <http://zolomedia.com/snow-surveyors-gather-in-bend-to-train/>



Students and instructors at the 2016 Westwide Snow School, held January 10-15 in Bend, Oregon. NRCS photo by Tracy Robillard.

When training and preparation pay off

[Chris Romero](#)

New Mexico Snow Survey

Aaron Miller from the Santa Fe Field Office and I were headed up to Shuree recently to measure the manual snow course and ground truth the SNOTEL site. It is approximately 20 miles through mountainous terrain on a forest road that gets snow drifts, which makes truck travel difficult, if not impossible.

We elected to use the brand new Razor UTV with the tracks, and also brought along our touring skis and survival packs.

Everything was going great and we were around 11 miles in. We made a turn at a place called Comanche Point, which

gets some of the worst snow drifts.

We made it through the drifts and were about a mile past when there was a horrible sound from beneath the Razor. We stopped, thinking we may have hit a rock under the snow, and inspected the vehicle and found no visible damage.

I attempted to move again, with no luck. It appeared as though the transmission had separated from the engine.

We used our winch and actually tied it to a deep-rooted bush in an attempt to pull the UTV forward and possibly engage the transmission. No luck.

We troubleshot for about an hour and then elected to hike it out.

It wasn't a crisis but definitely could have been if either of us were unprepared for the trip back. We still had plenty of daylight and knew the area well.

I used the SPOT satellite messenger to send a message indicating we were having difficulties, but OK. We then packed up everything we could including the sampling kit and began our trek out. It was patchy and involved taking our skis and skins on and off, and took a bit over three hours to get out. All in all, it was actually a beautiful day and, although unexpected, a good days' tour!

A conversation with a “seasoned” snow surveyor

[Randy Julander](#)
Utah Data Collection Office

February 6, 2016 – I was down to Fillmore, Utah, at my Aunt Sue’s funeral – God bless her soul. While at the cemetery, about a half dozen or so water types came up to talk shop.

“Well, Sue was a mighty fine lady, and we are going to miss her for sure, and how are we doing for water this year?”

My wife looks at me like – “Really? Is there no place in this state where people don’t know you and want to talk about water and snow?”

Among them was a fellow by the name of Cloyce Day, who had retired from a long career with the SCS about the time I came on in ‘91. He had done the snow surveys at Pine Creek long before it became a SNOTEL site, and prior to when we were measuring it from the helicopter.

He reminisced about the many trips he had made up that hill, saying they would start at 5:00

in the morning, just a stone’s throw from where we were standing on the east side of the cemetery, and wouldn’t get back until after dark.

I was thinking – holy moly – that’s nearly four miles to Pine Creek Canyon on skis through sagebrush before you get to the mouth of the canyon, and another four miles up to the site in one wicked nasty steep canyon with about a 4000 foot elevation gain. It would take them ‘til noon or early afternoon to get there and far less to get back down.

He mentioned that it was never easy, but that once in a while it was fun. He also told a story of measuring a site where they would go and spend the night at a Forest Service cabin and on one occasion he got there with his survey companion... and at this point he pointed to my brother-in-law, Jeff, who is about 6 foot 4 and 250 pounds and stated matter of factly – ‘bout twice his size... and I am thinking – “Holy bat cr@#, dude – you went up there with a 300 pounder or bigger?”

Well, on this particular occasion, someone had broken into the USFS cabin and stolen the sleeping bags SCS had stored there for the snow surveys.

So, they took the little single bed mattresses off the bunks, put one on the floor and slept with the other one on top. Can’t help but chuckle picturing this in my mind – two men taco’ed between mattresses that would not have satisfactorily fit the bigger one in a normal context.

Cloyce noted that for him at least, it was a very cold night

as the mattress didn’t cover much of him and there was a lot of breeziness betwixt him and his companion and that the big guy didn’t put off a lot of warmth even though the two were pretty much welded together. You couldn’t turn any direction for any reason without a lot of reorganization.

I asked Cloyce to write down some of his Snow Survey recollections and send them to me for our history and he said, “Heck, I’m too lazy to write it down for myself and my family. Maybe, but don’t count on it.”

Afterward, I casually went through our snow notes and found that Cloyce had measured the Pine Creek Snow course from the very early 1960s until we started using helicopters in the late 1970s. Sure would be nice to have more of these old surveyor stories documented.



Once a snow course measured by Cloyce, this is the current Pine Creek SNOTEL site in central Utah.

Hole-in-Mountain SNOTEL destroyed by massive avalanche

[Jeff Anderson](#)
Nevada Water Supply Specialist

Across Nevada, the first half of winter got off to a great start, with statewide February 1 snowpack percentages among the highest in the West. During the second half of December the snowpack more than doubled its water content in the mountains near Elko.

Unfortunately, this new snow load proved too much for the slope above the Hole-in-Mountain SNOTEL site.

The timeline of events is telling... At 7:00 am on December 23, 2015 the site sent out a report indicating 28 inches of snow over the preceding 72 hours. The 8:00 am reading never arrived. .

When a snow survey team arrived a few weeks later they found the site decimated by an avalanche.

The slide had been massive, descending over 3,000 vertical feet and crossing one-third of a mile of flat ground before reaching the site.

The site's 12-foot shelter was swept over 200 feet away from its original location.

The 20-foot tower was gone, likely bent over and buried in the snow. The antenna that was atop the tower was bent around a nearby aspen.

The 10-foot precipitation gage was gone, also buried somewhere in the debris.

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Hole-in-Mountain SNOTEL site photographed in the summer months before the most recent avalanche.



Snow surveyor Logan Jensen stands on the debris pile next to the toppled Hole-in-Mountain SNOTEL shelter.

Hole-in-Mountain SNOTEL destroyed

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A similar incident to this occurred at Hole-in-Mountain in February, 1986. After that event, the shelter and other components were moved further away from the mountain.

Although that move was sufficient for 30 years, the snow survey staff is now gaining the necessary permits for the site to be reinstalled outside the debris zone of the most recent avalanche. The plan is to reinstall the site during the summer maintenance period. And, for the remainder of this snow season, surveyors will make manual snowpack measurements at the site.

An interesting side note to this story is the technique the snow survey team used to move the dislodged shelter back to the summer road.



The team used come-alongs to winch the shelter out of the debris field.

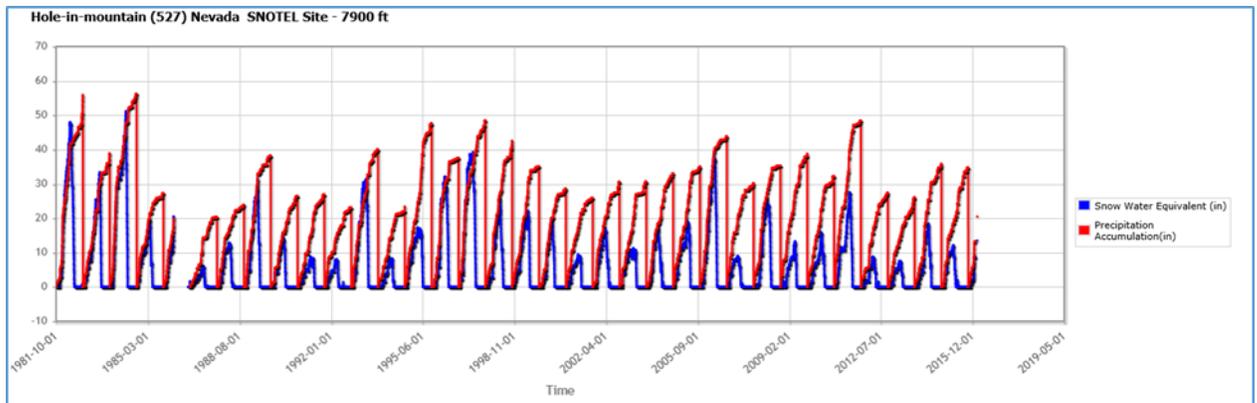
The slide had been massive, descending over 3,000 vertical feet and crossing one-third of a mile of flat ground before reaching the site.

They first used come-alongs to winch and people to push the shelter out of its hole, then unsuccessfully tried using snow-

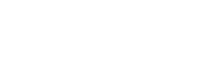
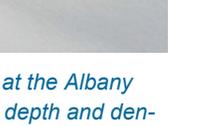
mobiles to drag it into place. They then discovered it's possible to roll a shelter on its side, like a log. Ingenious and effective.



Another view of the extent of the avalanche at Hole-in-Mountain.



Annual snow water equivalent and precipitation accumulation at the Hole-in-Mountain SNOTEL site. Note the data gaps in 1986 when the initial avalanche occurred, and in December of last year.



GPR project compares data collection methods

Matt Hoobler
Wyoming State Engineer's Office

Working in cooperation with the University of Wyoming (UW) Center for Environmental Hydrology and Geophysics (WyCEHG) and the NRCS, the Wyoming State Engineer's Office (SEO) is conducting a research project comparing ground penetrating radar (GPR) data to manually-collected data. During the 2016 snow survey season, the project will compare the data collected manually from six snow courses in the Snowy Range of Wyoming with data collected at the same site and time utilizing GPR.

The project aims to answer two questions:

1. How well does GPR data correlate with manual survey data on the six sites in the Snowy Range?
2. How much variation exists throughout the GPR data in relation to the width and length of the snow course?

With the assistance of Adam Skadsen and John Mumm (Wyoming SEO Division One), the team conducted the first round of data collection on the six snow courses in the Snowy Range:

- Old Fox Park
- New Fox Park
- Hairpin Turn
- Libby Lodge
- Albany
- Deep Lake

The process involved dragging a GPR unit mounted on a sled alongside the snow

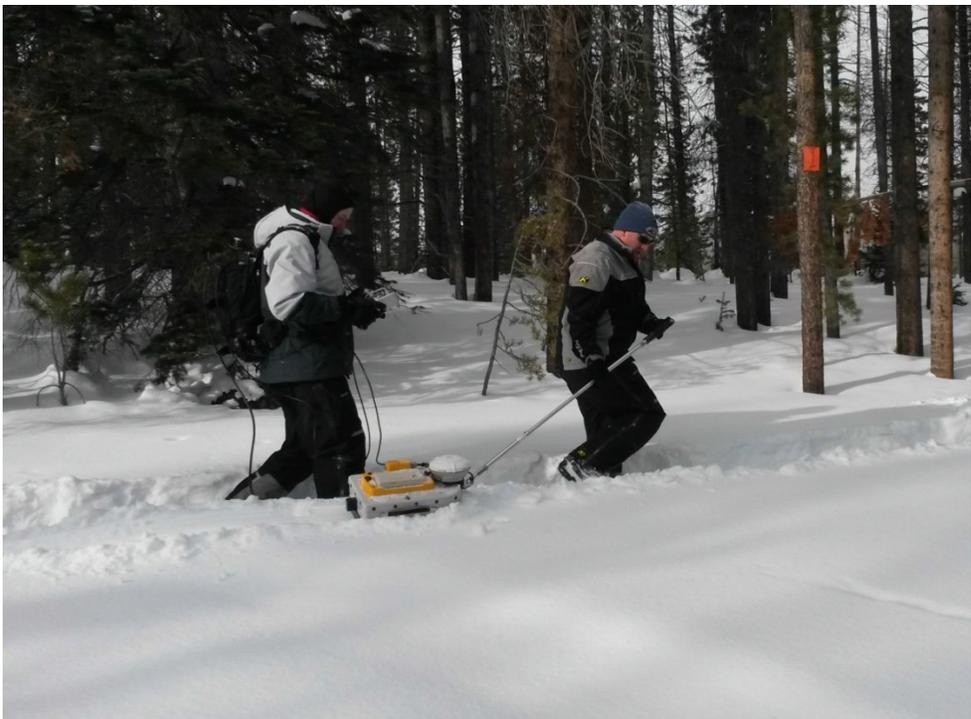
course without interfering with the manual collection points. To create an image of the snow structure, the GPR collects data at 110 nanoseconds, or 110 images per second. The snow courses ranged from 55 seconds to 1:25 minutes to conduct a full drag. Mounted on top of the GPR antenna is a GPS unit to track the exact location of the GPR-sensed data.

After the fourth and final measurement in April, a comparative analysis of the two datasets will be conducted by WyCEHG, specifically Dr. Steve Holbrook, Co-Chair. The GPR data will serve as complementary data to the manually-surveyed snow course data. Information from the January, 2016 snow

survey provided "fantastic data," according to Holbrook.

At the October 14, 2015 WyCEHG Water Interest Group, both Dr. Gern, Vice President for Research, and Wyoming State Engineer Pat Tyrrell expressed the desire and importance to move UW-based research to Wyoming on-the-ground applications. The GPR data, once correlated with historic snow course data, can be utilized to expand the snow course and SNOTEL point data to provide a more refined water supply forecast for smaller basins.

Analysis of the data collected will occur from May to July. The team will report its findings in August. Look to the fall issue of **SnowNews** for an update on the project's final report.



Matt Hoobler and Adam Skadsen utilize ground penetrating radar to gather data at the Albany snow course in the Snowy Range Mountains, Wyoming. The GPR gathers snow depth and density measurements necessary to develop a snow water equivalent value.



National Soil Moisture Network workshop planned

A National Soil Moisture Network workshop will be held at the NOAA facility in Boulder, CO, on May 24-26, 2016.

The workshop follows a 2013 meeting in Kansas City, MO, organized by the National Integrated Drought Information System (NIDIS) to articulate a plan of action for development of a Coordinated National Soil Moisture Network.

The aim of the 2013 meeting was to take stock of federal and state in-situ monitoring networks, satellite remote sensing missions, numerical modeling capabilities, and experiences in soil moisture database integration and user access.

Since then, researchers from the U.S. Geological Survey and Texas A&M University

completed a proof-of-concept pilot study providing real-time soil moisture data via standard web services for operational drought monitoring, experimental land surface modeling, and operational hydrological modeling.

Next steps include expanding the in-situ network beyond the areas used for the pilot study, incorporating remote sensing and modeling into the network design, and making this functional in producing products useful to a wide range of applications.

The workshop is intended to bring together those with interest and expertise in soil moisture to help plan the route for making the concept a reality.

The workshop organizers would like broad representation from state, local, tribal,

federal, academic, and private company interests to participate for an inclusive and cooperative effort.

For further information and updates as the workshop agenda develops, contact [Michael Strobel](#), 503-414-3055.

Upcoming events

Events of interest in the coming months.



What: Loyola University Third Annual Climate Change Conference

When: March 17-19, 2016

Where: Chicago, IL

More information:
www.luc.edu/sustainability/initiatives/cli-matechange/2016conference/

What: NASA International Snow Working Group Remote Sensing Meeting

When: March 28-31, 2016

Where: Seattle, WA

More information: <http://nasasnow-remotesensing.gi.alaska.edu/content/fourth-workshop-snow-remote-sensing>

What: 84th Western Snow Conference

When: April 18-21, 2016

Where: Seattle, WA

More information:
westernsnowconference@gmail.com

What: National Soil Moisture Network workshop

When: May 24-26, 2016

Where: Boulder, CO

More information: [Michael Strobel](#), 503-414-3055

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
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	Database Manager	Vacant	
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	Modeling Hydrologist	David Garen 503-414-3021	david.garen@por.usda.gov
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	Resource Conservationist	Vacant	
	Statistical Assistant/SCAN QC	Denice Schilling 406-727-7580	denice.schilling@mt.usda.gov



Contact Help Center

There's an 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/SSWSF Highlights

Jolyne Lea P.H., NWCC hydrologist, is the new President of the Oregon Chapter of the American Institute of Hydrology (AIH). The AIH is the society that certifies hydrology professionals. The certification of professional hydrologists is a rigorous process including college coursework and degrees, exams, and required years of experience. The Oregon Chapter has been active since the 1980s, and has

hosted the annual national conference, as well as several local conferences on regional topics, and supports the two student hydrology groups at Oregon State University and Portland State University. Congratulations, Jolyne!

After nearly 24 years of Federal service, IT Specialist **Del Gist** retired from the NWCC on March 4. In addition to her other duties, Del was instru-

mental in the development of the new cellular data transmission system for eastern SCAN sites. The NWCC wishes Del the best in the future.

Steve Dunn, NWCC's recently-retired EMF electronics technician, passed away on February 26 following a long battle with medical issues. Steve was a powerful force at the Center and will be missed by all.

Photo of the month



Preparing to deliver the precipitation gage to Younts Peak

As some may remember, the Younts Peak SNOTEL site in the Shoshone National Forest was destroyed by wildfire in the summer of 2013. Recently, a five-person work crew from the Montana Data Collection Office spent three days reconstructing the site. Three of the crew were flown into the site to remove the burned debris and begin construction; they camped at the site for two nights. Since the site is located in the Washakie Wilderness typical access is by horse. Special access was granted by the Forest Service for equipment and personnel to be transported via helicopter.

At right: Younts Peak site in northwest Wyoming after the 2013 wildfire. The hexagonal footprint of the snow pillow is apparent in the center of the photo.





Helping People Help the Land.

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For issues of **SnowNews** go to:
[www.wcc.nrcs.usda.gov/SnowNews/
SnowNews_landing.htm](http://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."

Director's Corner: Tough times, tougher people



Many people have noticed that our agency has been going through a difficult time in getting vacancies filled in a timely manner. There are many reasons for this, so we can't point fingers and try to blame any person or any process.

For one, dealing with uncertainties in the budget, where we have continuing resolutions, shut-downs, sequestration, and budget fluctuations during the past few years, has made planning for future workforce numbers challenging. Every manager must balance staffing with budgets.

There is also the financial reality that we have a good severance package and people are living longer, so government not only is paying for current positions, but also those who have retired and now earn pensions.

Another thing I've noticed is the present age of many federal em-

ployees that I deal with tends to be at or approaching retirement age (there was a large influx of hires in our field in the 1970s and 1980s). This has resulted in a surge in vacancies in the last few years.

Then, we have disruptions in the hiring process as we go through administrative transformation within NRCS, we see rule changes from OPM, and all program leaders (myself included) try to reason that our specific vacancies are critical and should move up in the queue. A major issue with the hiring process is that the same stress we feel from our own vacancies is also impacting HR itself, with more than 40% of HR positions (those needed to process the paperwork for us and advertise positions) are themselves vacant at this time.

The issue of filling vacancies is not unique to our agency, and I have heard similar concerns from colleagues throughout Federal government. It seems the workloads continue to increase while the number of workers decrease. The mantra "Do more with less" certainly is an honorable goal, but all things have their limits, and we may need to adjust our expectations and the expectations of those we service.

Here at the NWCC, we have reached a critical situation, where we presently have just one IT Specialist to handle databases and information flow, one person at the Electronic Maintenance Facility to handle master station and electronics repairs, along with calibration and testing of our field equipment, and we are down one forecast hydrologist (I will point out that our small staff of hydrologists provide water supply forecasts for the entire western U.S., and each has a critical role).

The good news is that we are in the final stages of getting some of those positions (look for the postings in the coming weeks). Moreover, even though these are tough times, our current staff is even tougher, and many of them are wearing many hats and getting the work done. It is the positive "can do" attitude, extreme dedication to the job and the service we provide, and just amazing abilities of each of these staff members that keeps them continuing to maintain operations and serving the public in a way that hopefully meets the expectations of those who use our products. Like all storms, this one will subside and we will sail in smoother waters in the future. Until then, I am very proud of how our team works together to meet and overcome all the challenges thrown at them. When the going gets tough....
Mike



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