

SnowNews

Spring 2012

Volume 1, Issue 3

Spring snowpack below average in much of the West

Automated SNOTEL and manually measured snow course sites are located throughout the West and operated by the NRCS Snow Survey and Water Supply Forecasting (SSWSF) program. These measurements are invaluable to irrigators and other water users for indicating water supply availability for the spring and summer.

Highlights

As of March 1, nearly half of the West is expected to receive below average snowmelt runoff. In a sharp contrast to the large snowpack that developed last year, snow sites in the Sierra Nevada of California are reporting record lows, overall less than 40% of average.

The Great Basin, which includes rivers in California, Nevada, and Utah, is forecast to receive significantly below average spring and summer streamflows. Southern Oregon and Idaho in the Lower Columbia River Basin, and Arizona, which covers most of the Lower Colorado River Basin, also are reporting much below average conditions.

Not quite as dry, but still near normal conditions are projected for the Columbia and Missouri River Basins including areas in Washington, Ore-

gon, Idaho, Montana, Wyoming and eastern Colorado.

A few areas are expected to receive above average streamflow, including the upper reaches of the Columbia River Basin, the Tongue-Powder region of the Missouri River Basin in Wyoming and, notably, much of Alaska.

The Kenai Peninsula has greater than 150% of average snowpack.

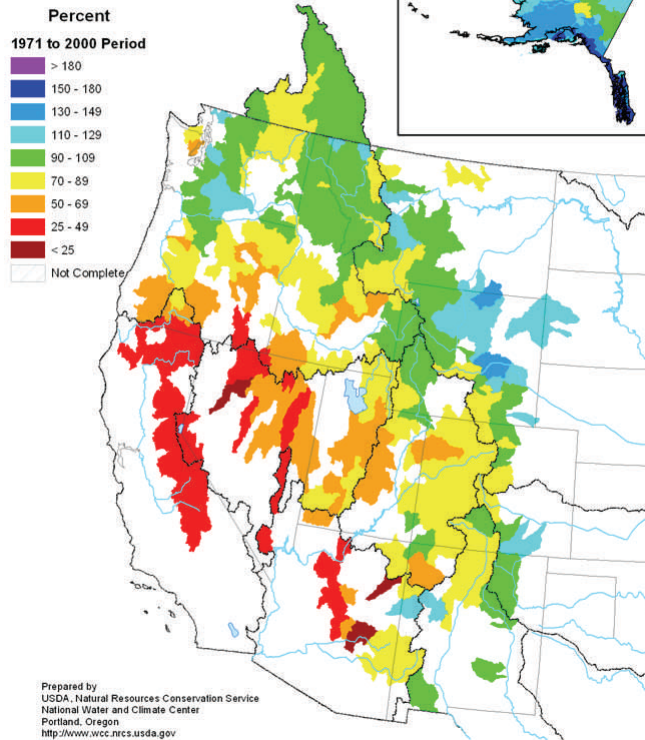
Following are more detailed projections from the National Water and Climate Center (NWCC) forecast hydrologists.

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Mountain Snowpack as of March 1, 2012



Mountain snowpack map shows many parts of the West below to well-below average on March 1.

Special points of interest:

- Missouri River flood task force update
- Interagency partnerships
- Spatial weather/climate data tools
- Snow Survey activities (1954)
- Water Supply Outlook page updated



“Those areas where reservoirs do not provide significant carryover storage from the previous year will likely face water availability issues this coming spring and summer.”

Westwide Spring forecast (cont from pg 1)

Columbia River Basin [Rashawn Tama](#)

Water supply conditions are subject to wide variability across the Columbia Basin. Based on current snowpack conditions and precipitation patterns so far this season, many watersheds are likely to see near normal runoff in the spring and summer.

From the Kootenai, Flathead, and Clark Fork Basins in Montana, through the Spokane and Clearwater in Idaho, and on to the Central Columbia and Yakima Basins in Washington, seasonal water supply forecasts are near normal.

However, there is an extremely strong North/South gradient in the Columbia Basin, with the northerly latitudes fairsing much better than those in the southern portions of the basin. For example, the Okanogan and Similkameen Rivers along the US – Canadian

border are forecast to provide over 110% of average runoff for the April through July period.

At the opposite end of the spectrum, many watersheds in southern and southeastern Oregon and southwestern Idaho are forecast to see less than 50% of average runoff for the same period. The Malheur and Owyhee Basins, along with the Oregon Closed and Upper Klamath Basins, are all facing drought-like conditions.

Those areas where reservoirs do not provide significant carryover storage from the previous year will likely face water availability issues this coming spring and summer. Even under the most optimistic future weather scenarios, seasonal runoff volumes in these basins will remain below normal.

The US Drought Monitor is indicating that more severe drought conditions are slowly working their way north from the Great Basin and California into Southern Oregon.

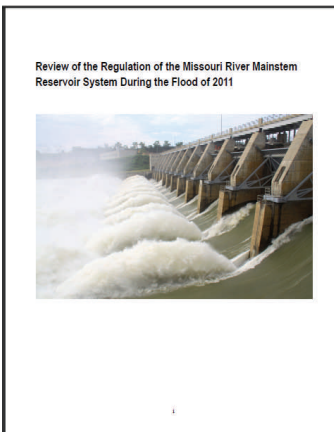
Missouri River Basin [Cara McCarthy](#)

In the headwaters of the Missouri River Basin, which span from Canada to Colorado, areas in Wyoming stand out with the highest mountain snowpack. Of particular note are the Bighorn Mountains, where the snowpack is 110-150% of average. These mountains feed the Bighorn, Tongue and Powder Rivers which experienced heavy flooding last year. Spring and summer streamflow forecasts for this region are approaching the “much above average” flow designation.

[Continued pg 14](#)

Largest runoff volume in 114 years

Missouri River Flood Task Force issues recommendations



This is an update from the last issue of *SnowNews*.

The report, “*Review of the Regulation of the Missouri River Mainstem Reservoir System during the Flood of 2011*,” was handed to the U.S. Army Corps of Engineers (Corps) last December.

The assessment was conducted by an independent review panel consisting of Neil Grigg at Colorado State University, Bill Lawrence of the National Weather Service in Tulsa, Darwin Ockerman from the U.S. Geological Survey in

Reston, Virginia, and Cara McCarthy with the NRCS National Water and Climate Center.

After several months of intense work examining records, interviewing Corps staff and others in the water resource community, and attending public meetings, the panel concluded that the unprecedented precipitation in late spring significantly contributed to the flood, the Corps followed operating guidelines before, during, and after the flood, but the Corps has room for improvement.

Recommendations included increased infrastructure support, updating the design flood, reviewing storage allocation on the river, enhanced collaboration and communication with other agencies, and an improved data network to assist in forecasting.

The 2011 flood, which went on for months, was the largest annual runoff volume in the 114 years of record.

The complete report can be found here: <http://www.nwd.usace.army.mil/docs/MRIIndependentReview-Panel.pdf>

Climate Center's maintenance facility hums

The quality of the data we collect at the National Water and Climate Center is directly influenced by the reliable operation of our Master Stations, automated SNOTEL sites and SCAN sites.

Maintaining reliable operations means equipping stations with components that can withstand the extremely harsh conditions at our sites. At the heart of this operation is the NWCC Electronics Maintenance Facility (EMF).

EMF's primary role is to ensure the Data Collection Offices (DCOs) have all the equipment and support they need to keep automated sites in top working order. Housed in a 5,000 square foot facility in Portland, Oregon, EMF is the equipment hub for the SNOTEL/SCAN network, as well as its maintenance and calibration center.

John Weeks, EMF leader and **Steve Dunn**, electronics technician comprise the EMF team. The team works closely with DCO technicians in the field to maintain stations year 'round. And, that can sometimes be a tall order.

Procurement and distribution

EMF purchases many of the parts and components required to equip the Master Stations and automated

data collection sites. They maintain a warehouse for parts and maintenance equipment. Everything from towers and antennas to power amplifiers and radios are ready for distribution to the DCOs when needed.

High quality, reliable parts
In addition to buying and warehousing equipment, EMF is responsible for the quality and reliability of the parts they purchase.

"Pressure transducers are a major component of our systems, and they cost about \$800 each," according to John Weeks, EMF leader. "In 2005, we were seeing an almost 30% field failure rate for pressure transducers."

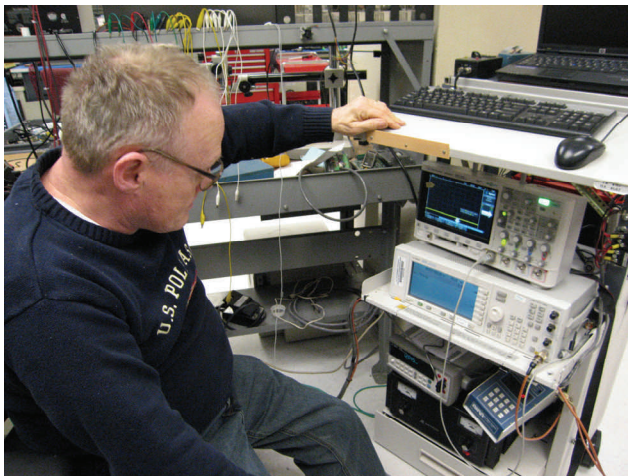
Many things contributed to this high failure rate, including the fact transducers were installed right out of the box, without any testing or burn-in period.



Environmental chamber burns in transducers in about 10 days.

In 2006, EMF installed an environmental chamber. Pressure transducers now go through 100 cycles of temperature which takes a full seven days, plus they get 1000 cycles of pressure during this time.

With inventory, setup, calibration and record keeping, it takes about 10 days for a run.



Steve Dunn monitors test equipment in the EMF lab.



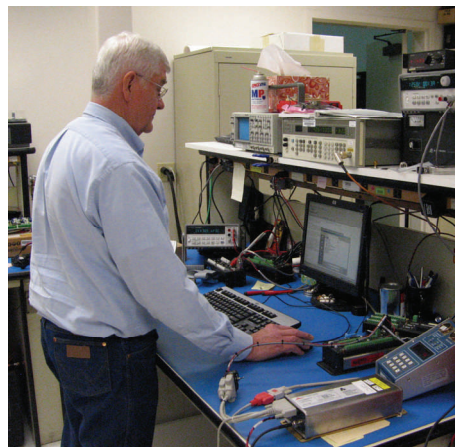
"In 2005, the field failure rate for transducers was almost 30%. Today, it's about 1%."

Continued pg 4



Maintenance facility hums (cont from page 3)

“We’ve significantly reduced our field failure rates on these critical parts,” according to John. “Our environmental chamber lets us burn-in the transducers before they go to the field. We’re able to weed out bad parts here, and then return them to the manufacturer while they’re still under warranty. It’s a lot less expensive to return a bad part from here, than to return it once it’s failed in the field.”



John Weeks in the EMF lab.

EMF also works with suppliers to solve known problems with parts and equipment. Because our application of parts often places them at or near their operating boundaries, suppliers are anxious to work with us to improve performance and reliability.

“When we saw a dramatic increase in transducer failures a few years ago, we worked closely with our primary supplier to uncover the design problems and get them resolved.”

Engineering lab

In addition to the warehouse, the team maintains an engineering lab outfitted with a wide range of test equipment,

and a parts inventory that allows them to perform repairs down to the component level.

They have also replicated a Master Station onsite to assist in troubleshooting issues at Master Stations throughout the U.S.

Master Station support

Although not their primary responsibility, our DCOs are sometimes called on to assist

with Master Station issues. The EMF team’s intimate knowledge of each Master Station’s configuration allows them to quickly assist in troubleshooting, even remotely.

Maintenance and calibration

Ongoing maintenance and calibration of components are other major responsibilities of the EMF

team.

Transducers undergo calibration every three years. Considering there are currently about 1800 transducers in the network, the team calibrates approximately 600 units every year.

EMF also maintains and calibrates sensors, gages, radios and data loggers on a regular schedule. To imagine the scope of these activities, in 2011 EMF calibrated over 100 radios.

New technology

EMF evaluates new technologies in data collection, communications and telemetry.

They are closely involved with our contractors and other suppliers in the development of next generation products.

For example, the team is supporting the pilot project to deploy and test the new “fluidless” snow pillows at two sites in Oregon. They are also working closely with suppliers to design and deliver new dataloggers and communica-



Replicated Master Station hardware in the EMF lab.

tions equipment.

All these activities may overwhelm some. However, Steve Dunn, a 28-year veteran in the EMF group sums up the team’s philosophy by saying, “We’re fanatic about what we do. It’s an important function. We know it, and we love it.”

A few statistics on EMF’s contributions:

1019 = Number of SNOTEL and SCAN stations supported.

5 = Number of Master Stations supported.

166 = Number of SCAN station frequency conversions completed in 2011.

600 = Approximate number of transducers calibrated annually.

2 = Number of NWCC employees who accomplish these tasks.

Volunteer observers measure up with CoCoRaHS

[Henry Reges](#), CoCoRaHS National Coordinator

Precipitation affects the lives and activities of nearly everyone. It may well be the most noticeable, variable, impactful element of our climate and is well suited for "backyard" observation.

[CoCoRaHS](#) (Community Collaborative Rain, Hail and Snow) is a nationwide "citizen science" precipitation monitoring network engaging thousands of people of all ages. CoCoRaHS currently has over 15,000 active volunteers. Participants use low-cost, high-capacity 4-inch rain gauges along with rulers, snow boards and foil wrapped Styrofoam "hail pads" to measure rain, hail and snow.

1. Provide educational opportunities for the public.

Data-wise, CoCoRaHS is the largest source of accurate daily precipitation measurements in the country. It's amazing to watch the [website maps](#) populate with reports each morning showing nationwide precipitation patterns.

In winter, volunteers measure the depth of new snowfall, total snow on the ground and the snow water equivalent (SWE) of both new and total snow through snow core samples. In 2011 more than half of the measurements supplied to the [National Operational Hydrologic Remote Sensing Center](#) (NOHRSC) came from CoCoRaHS volunteers.

NOAA's Meteorological Assimilation Data Ingest System (MADIS) and is archived as a part of the National Climatic Data Center's Global Historical Climate Network (GHCN).

In terms of education, CoCoRaHS is enhancing the "volunteer educational experience" by improving access to and visualization of the data collected by volunteers. This allows volunteers to be data analysts, not just collectors. New mapping capabilities are being added to view both recent and historic national, regional or local precipitation. Through collaborations with Oregon State University, volunteers will be able to view their recent precipitation data in context with 100-year time series of precipitation data for their area. Graphing capabilities are also being added.

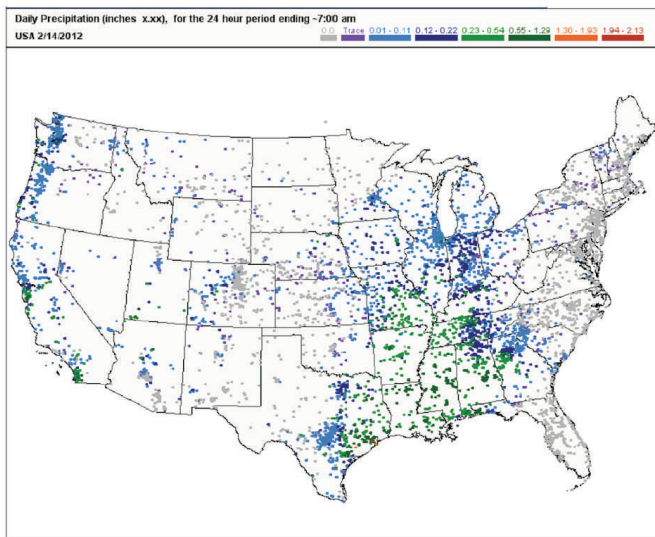
New additions in 2012

An exciting new addition for 2012 is the measurement of "reference evapotranspiration" to improve the visualization and understanding of the water cycle in action. Other newly-added features on the website include a climate guide for Master Gardeners and an educational series of live monthly webinars called CoCoRaHS [WxTalk](#) which provide opportunities for participants to learn directly from top atmospheric scientists and educators.

CoCoRaHS welcomes anyone with an interest in learning about precipitation and contributing useful local data. We encourage you to [sign up today](#) and tell others about this opportunity. For more information visit the CoCoRaHS website at <http://www.cocorahs.org/Content.aspx?>



CoCoRaHS volunteer Noah Newman, Fort Collins, CO, measures snowfall. Photo: H. Reges



Map depicting precipitation amounts at CoCoRaHS reporting sites for a given day.

Measurement and communication of precipitation information helps connect the public to atmospheric and hydrologic processes and impacts. CoCoRaHS' main mission is twofold:

1. Accurately measure and map precipitation patterns across the United States.

Data are reported daily (24 hour amounts), but when extreme weather threatens, observers can submit real-time "significant weather" reports that alarm forecasters at local National Weather Service offices around the country. Data are quality controlled and are currently ingested by



Interagency partnerships foster shared data

Part of our mission at NRCS/NWCC is to promote partnerships and joint ventures with other Federal agencies, academic partners and collaborators. We currently participate in several interagency projects, such as:

U.S. Water Monitor. This web resource is a portal to real-time and historical water data from the NRCS/NWCC, the National Oceanic and Atmospheric Administration (NOAA), the U.S. Geological Survey (USGS) and the University of Nebraska-Lincoln (UNL).



National Integrated Drought Information System (NIDIS). One of NIDIS' charters is to develop a "drought early warning system" for the U.S. As part of its implementation, NIDIS hosts a website called

the U.S. Drought Portal. The site features data from many Federal, State and academic sources, including a page on [Forecasting Hydrology](#). This page contains NRCS Streamflow and Snowpack Forecasts, river flood conditions from the Advanced Hydrologic Prediction Service (AHPS) at the National Weather Service, and soil moisture monitoring and forecast maps from the Climate Impacts Group at the University of Washington.

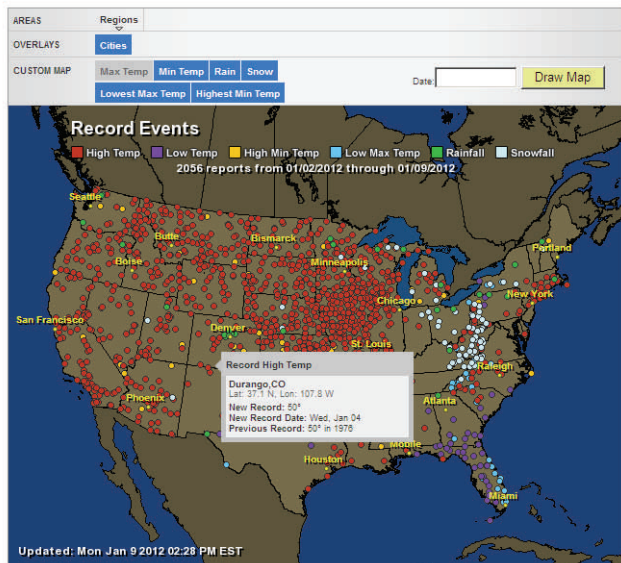
National Drought Mitigation Center (NDMC). NDMC at the University of Nebraska-Lincoln hosts the [U.S. Drought Monitor](#). The Drought Monitor is a partnership between UNL, several Federal agencies (including NRCS, NOAA and USGS), regional climate centers and state climatologists.

National Climate Assessment (NCA). The NCA is part of the U.S. Global Change

Research Program (USGCRP). The group analyzes the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems and biological diversity; and analyzes trends in global change, both human-induced and natural, and projects major trends for the subsequent 25 to 100 years. The USGCRP coordinates cutting-edge climate change research across [13 Federal agencies](#).

National Atlas. The [National Atlas](#) was originally published in 1970. Since inception, the participation of many Federal agencies has been crucial to the development of the National Atlas. Included in the Atlas are geospatial datasets, [articles](#) and dynamic maps that tell the stories behind the data, page-sized downloadable maps and traditional wall maps.

Record Events For The Past Week - National US



Was today a record-breaker?

On those days when you're experiencing a weather "extreme," whether it's temperature or precipitation, have you ever wondered if it's a record-breaker?

Hamweather.com has a web presence devoted to tracking these events. The [Records](#) page lets you see temperature, rain and snow events in an interactive map format. You can view today's records or other records in a variety of predefined formats. Hover over the event to display more detailed information.

The map on the left shows the record-setting high and low temperature, high minimum temperatures, low maximum temperatures, rainfall and snowfall events for the continental US for the first week in January 2012.

Notice that many high temperature records (red dots) were set during this one-week period over the western and central US. Florida, however, experienced many low temperature events (purple dots) during this timeframe, and the mid-Atlantic states set snowfall records (light blue dots).



Spotlight On...Rose Loehr

Rose Loehr is known to many as “Miss SNOTEL.” But, she started out life in sunny San Diego. It was growing up in California she first learned to fish; a past-time she stills loves.

Rose moved to Oregon along with her family when she was 15. She graduated from Portland Community College with an Associate degree in computer programming. While attending PCC, she worked as a keypunch operator. Within a few years, Rose was named the supervisor of the entire department.

After about four years, Rose left PCC and entered work in the private sector for Pacific Metal Company and Northwest Marine Ironworks. It was here she gained experience in computer operations and information technology. It was also during this time Rose took some time off to start a family.

In 1985, Rose moved into a contract position with the West National Technical Center in the “511 Building.” She worked for over four years as a contract employee in the computer operations area.

A full-time job opened in the Water Supply Forecasting group in 1989. Dave Johnson hired Rose as SNOTEL operations specialist. It was during this time the program was migrating to UNIX computers, and Rose took this opportunity to grow her skills as the central computer facility operator.

As with all Center employees, Rose was required to attend Snow School, and complete the overnight bivouac exercise. It was 1991 and Don

Huffman was one of the coordinators and instructors that year. Rose remembers asking Don to share the bivouac with her, thinking that Don would do most of the “heavy lifting.” No such luck, though. Don simply said, “Pick a place. Here’s your shovel.”

As the SNOTEL and SCAN networks grew, Rose had the opportunity to travel to Puerto Rico, Hawaii and Alaska to help bring new sites up or perform maintenance. She also participated in a field maintenance assignment swapping out sensors on SCAN stations. The task took the team from Maryland to New York through Ohio, and ending in St. Louis. Rose remembers seeing Niagara Falls frozen during that two-week trip.



Not afraid to get dirty, Rose was a member of the Pacific Northwest 4-Wheel Drive Association.

After more than 20 years with the program, Rose is considering retirement in the next year or so. She’s drawn to Alaska, where the fishing and camping are awesome. She also wants to join a golf club and improve her game. And, spending more time with family and her three grandchildren are high on the list.

When asked the question “what will you miss and what won’t you miss about the agency?” Rose is quick to respond. “Absolutely, number one...the people. I also love the challenge of getting the data in from problem sites and troubleshooting.”

What won’t she miss? Rose smiled and said, “Other duties as assigned.”



Landing a red sockeye salmon while fishing on the Kenai River in Alaska.

Download BC Aware, free SNOTEL iPhone app

[Eleven Solutions](#) has designed an iPhone® application that displays SNOTEL data for several western states.

The free app is called **BC Aware**. It is designed for winter outdoor enthusiasts and gives quick access to important information related to snow in the back country.

The app currently displays SNOTEL data for California, Colorado, Idaho, Montana, Washington and Wyoming.

To download, go to: <http://itunes.apple.com/us/app/bc/id480234928?mt=8> or <http://www.elevensolutions.net/index.php/apps>



Spatial weather/climate data tools improve agricultural risk management

Chris Daly, Oregon State University, PRISM Climate Group

Crop insurance is a major industry in the US, sold and delivered by private insurance companies in collaboration with the USDA Risk Management Agency (RMA). These programs help farmers insure against natural disasters, such as drought, excessive moisture, heat, cold and hail, which can partially or totally destroy crops. In 2011, Federal crop insurance programs covered about \$90 billion in crop value.

In an effort to improve the claims process and save taxpayer money, RMA partnered with the [PRISM Climate Group](#) to provide high-quality spatial weather and climate data for use in substantiating weather events and producer claims. These data sets also help the RMA determine risk levels more accurately, improving their underwriting capability.

With RMA support, PRISM is now being operated on a daily basis, producing grids of precipitation and minimum, maxi-

mum and mean temperature for the contiguous US at 800-meter resolution. For each variable, an initial map is produced within 24 hours of the end of the day. The daily map is updated approximately four days later, then monthly for the next six months, as additional station data are added and QC is performed. At the same time, a historical time series of daily grids is developed to allow construction of long-term climatologies.

Monthly time-step products are also being developed, and are the initial focus for drought and excessive moisture claims. Historical data will provide an important long-term context, i.e., what is the likelihood of a condition occurring? Is it truly unusual, or well within the expected range of events? This is done by ranking the value of a variable for a given time period (e.g., a day or month) within the 30-year normal period, or within the most recent ten years.

A plain-English interpretation of the ranking is assigned,

such as “typical,” “dry,” “unusually dry” or “unusually wet.”

A prototype, web-based spatial weather and climate portal is now online, and currently available to RMA personnel. The portal is designed to provide a simple, intuitive access point for these complex data sets.

Users can view an assessment of current conditions or data for a historical period, and determine how these conditions relate to long-term, climatic distributions. Users can also ask for a dynamically-produced report with text, tables and figures describing conditions during a selected period.

The initial reporting focus is on claims of prevented planting due to excessive moisture.

This project was a presentation topic at the American Meteorological Society’s 19th Conference on Applied Climatology.

[Recorded Presentation](#)



Upcoming events

Events of interest in the coming months.

What: U.S. Drought Monitor Forum
When: April 13-14, 2012
Where: George Mason University, Fairfax, VA
Meeting Details: <http://eastfire.gmu.edu/DMF2011/index.htm>

What: Tower Climbing Training
When: May 15-16, 2012
Where: Boise, ID
How: Contact Tony
Who: Tony Tolsdorf
tony.tolsdorf@por.usda.gov

What: Western Snow Conference
When: May 21-23, 2012
Where: Anchorage, AK
How: Register at www.westernsnowconference.org
Who: Jon Lea jon.lea@or.usda.gov

What: American Association of State Climatologists (AASC) 37th Annual Meeting
When: July 9-12, 2012
Where: Miramar Beach, FL
How: http://coaps.fsu.edu/climate_center/aascmtg2012/index.php
Who: Melissa Griffin griffen@coaps.fsu.edu

Oh no! No snow at snow school

Annual Snow Survey Training was held this January at the Granlibakken Lodge in Tahoe City, CA. This marked the 10th time the school had been held there.

Over the years snow conditions at Tahoe City have been extremely variable, making it challenging to do outdoor exercises.

But this year was the first time (in Tahoe or anywhere else) that there was absolutely no snow for snow school. Even the highest passes around the Tahoe Basin were bare.

Lack of snow meant outdoor instruction had to be particularly creative.

Avalanche instruction happened on a little ski hill that had some old, manmade snow which had morphed into a sheet of ice resembling an ice rink tilted at an angle. Students learned to probe through the ice to search for buried victims.

For snow sampling instruction, the resort ran their snow making equipment each night to build up a few small piles of fresh snow for the students to practice sampling snow deeper than 2 inches. Most of the sampling field instruction focused on bulk sampling, a snow sampling technique used when snow is shallow.

This technique is often forgotten by inexperienced samplers even though it is faster and easier than the standard sampling method. The 2012 class went home with bulk sampling firmly imprinted.

During the bivouac many students got extremely creative at their shelter construction. Snow usually would be used for construction material, but this year that was not an option. The lack of snow made available a huge quantity of forest debris that normally would be covered up. Shelters ranged from simple tarps strung over a rope, to complex and extremely functional shelters with pole beams and thatched roofs. One shelter was constructed completely from natural forest debris made of sticks, tree bows and bark.

The 2013 school is tentatively scheduled to be held at Crystal Mountain, Washington,

January 13 – 18, 2013. For more information contact Tony Tolsdorf
tony.tolsdorf@por.usda.gov



Two participants using inclinometers to measure slope to gauge for avalanche conditions.



William Gardiner's bivouac used natural forest debris.



"The Annual Snow Survey School is required training for current and new NRCS employees and cooperators. The course is an intense week of training in data collection, safety and outdoor survival."

Snow school quick facts

The Annual Snow Survey School is required training for current and new NRCS employees and cooperators that perform snow survey duties as part of their jobs. It is an intense week of training in data collection, safety and outdoor survival.

- Course work is about 50% classroom lecture and 50% field exercises.
- Most instructors are NRCS personnel who work directly in the snow survey program. Instructors in avalanche and outdoor survival are world-

renowned experts in their fields.

- The training has been held nearly every year since 1950.
- This year's school had 37 students from 12 western states.



SCAN continues to grow

The Soil Climate Analysis Network (SCAN) is a comprehensive, nationwide soil moisture and climate information system designed to provide data to support natural resource assessments and conservation activities.

The SCAN network is currently comprised of 184 active stations. Plus there's a lot of activity to build new stations across the country.

Here's a quick rundown on new sites planned for or already under construction:

California. Five "reimbursable" sites constructed in November 2011. Four new sites to be constructed in 2012.

Missouri. New sites are planned; local employees being

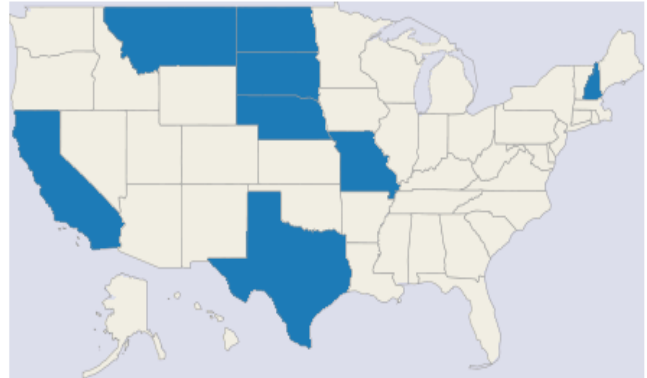
trained to do maintenance on new and existing sites.

New Hampshire. Six sites planned for this year; part of a university grant.

Texas. Five new sites underway; working with the State of Texas and cooperators.

Upper Missouri Basin (Montana, N. Dakota, S. Dakota, Nebraska). Working with basin liaison to define requirements.

For more information on SCAN, contact Tony Tolsdorf tony.tolsdorf@por.usda.gov



States where new SCAN sites are planned or under construction.

Getting to ~~S~~ know you.

Win a gift certificate!



Everyone has interesting or unusual things that have happened in their lives. We decided to share some "fun facts" about us, and let you guess who they're about.

Here's how it works. You match the fact to the person, and submit your guess to jacquie.workman@por.usda.gov

All the correct guesses will go into a hat. Each issue Mike will award a \$25 restaurant gift certificate to the name drawn.

Good luck and have fun!

Match the fact to the person

- | | |
|--|--------------------|
| 1. Weighed a healthy 35 lbs. at six months of age (photo at left). | A. Cara McCarthy |
| 2. Plays the bagpipes. | B. Lucas Zukiewicz |
| 3. On day born, Cleveland set the coldest day on record (-19°F). | C. Jan Curtis |
| 4. Worked in coal mine while in college. | D. Ron Abramovich |
| 5. Skied the Grand Teton on 21st birthday | E. Jacquie Workman |

Watch for the winner and more facts in the next issue of *SnowNews*.

Answers from last issue:

1. Completed sprint triathlon = B. Dino DiSimone
2. Ping pong champ = D. Don Huffman
3. Dog Stella R. Dendrite = A. Lucas Zukiewicz
4. Giant shark school bus = E. Daniel Fisher
5. First snow survey with father = C. Randy Julander

And the gift certificate goes to ... Ron Abramovich !

58 years later: A peek into snow survey activities, 1954

Don Huffman recently found the first issue of a newsletter devoted to snow survey activities in 1954. The author, **R.A. Work**, is well known as a key figure in the expansion of the snow survey program in the early- and mid-20th century.

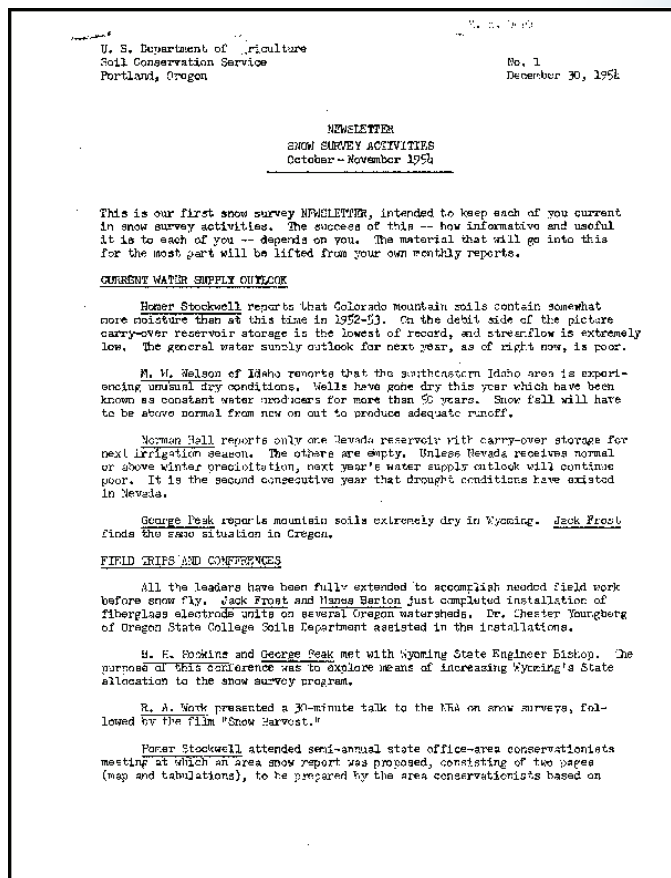
The newsletter is a unique look into forecasting, field, equipment and training activities of the time.

Those familiar with the history of the program will recognize other early surveyors, such as **Homer Stockwell** and **Jack Frost**.

Page 2 talks about how surplus materials from WWII fighter planes were being "re-used" to build over-snow machines and equip communications facilities.

Here's a [link](#) to the complete newsletter.

To learn more about the program, check out [The History of Snow Survey and Water Supply Forecasting](#), Interviews with *USDA Pioneers* (2008).



[Click here](#) to open the newsletter

Third annual Missouri Basin Forecaster's Meeting

NRCS Missouri Basin Senior Forecast Hydrologist **Cara McCarthy** traveled to Kansas City in January to participate in the third annual Missouri Basin Forecaster's Meeting.

The purpose of the meeting was to discuss improvements in streamflow forecasting, communication and data sharing, to better serve the American public. The record floods on the Missouri in 2011 provided heightened interest in these goals.

The meeting was attended by those with interest in supporting management of the Mis-

souri River Basin from local, regional and national offices of the Army Corps of Engineers, the National Weather Service, the U.S. Geological Survey, the Bureau of Reclamation and NRCS.

Cara presented a summary of the weather and streamflow conditions of last year and explained how conditions developed in the late spring of 2011 into a record-breaking snowpack during May and June. The history of the 2011 streamflow forecasts and the difficulty in predicting the record streamflows were reviewed and noted.

The presentation concluded with an assessment of the current mountain snowpack and the streamflow forecasts for the upper Missouri River Basin.

[See related article on page 2.](#)



Water Supply Outlook page redesigned

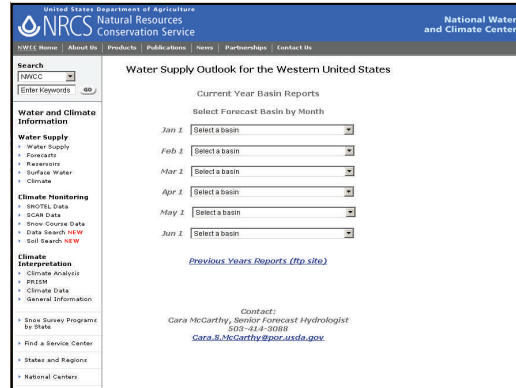
With the help **Rose Loehr** and **Rashawn Tama** from the NWCC staff and **Ray Hennings** from Portland State University, the center's Western United States Water Supply Outlook web page has been updated to use official Hydrologic Unit Code (HUC) designations for forecast point groupings.

The goal was to provide a friendlier interface for customers to find forecasts of interest and to expand the number of

forecasts available over previous years.

The link to the new and

improved Water Supply Outlook web page is: http://www.wcc.nrcs.usda.gov/wsf/west_fcst.html.



DCO News

Streamflow Adjustment Calculator, phase 2 released

DCOs and forecast hydrologists have a new tool at their disposal.

The Streamflow Adjustment Calculator is a streamflow modeling and data management tool. It consists of an equation editor and a data manager.

The equation editor lets users create, edit and run equations which adjust streamflow at

known sites in the AWDB database.

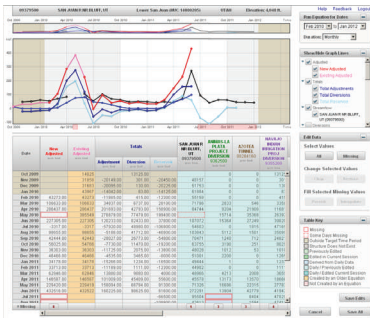
The data manager lets users edit and enter component data, and calculate and save the adjusted streamflow data. It displays data in tabular and graphical formats, with monthly/semimonthly and daily views.

Phase 1 introduced the equation editor.

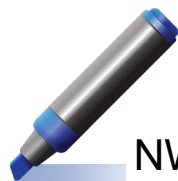
Phase 2 adds the data manager capability and integrated online help to the application.

Phase 3 is currently under development and will add multiple station capabilities to the calculator.

DCOs can contact [Gus Goodbody](#) for more information or a demonstration of the tool.



Streamflow Adjustment Calculator data manager



NWCC highlights

Dipesh Patel, lead programmer, Team Vistrionix, became a U.S. citizen on January 12.

Mike Strobel, NWCC director, represented SSRA at the Caribbean Area Quality Assurance Compliance Review in Puerto Rico in early February.

The review consisted of staff interviews where Mike, **Maxine Levin**, **Cameron Locher**, **Javier Ruiz** and Linda

Stine discussed compliance related to policy and directives with Puerto Rico staff.

While there, Mike visited a number of SCAN sites and had the opportunity to discuss data uses and needs with university researchers at a number of experimental stations, as well as observe a number of different land uses and agricultural practices.

Jean Hao, programmer, Team Vistrionix, received a Vistrionix Standard of Excellence award for the January – March 2012 period. Jean was recognized for her work prototyping a common user interface using map-based features live with zoom and pan for selected SNOTEL sites.

Photo of the month



Jan Curtis, NWCC applied climatologist, captured this lightning strike from his home near Santa Fe, New Mexico last September. Note the rain pillar surrounding the strike.

Products and resources on the web

[Pisces](#) is a tool developed by the Pacific Northwest Region of the Bureau of Reclamation. It's a desktop application that graphs and analyzes time series data. Pisces organizes, graphs and analyzes natural resource data that vary with time: gauge height, river flow, water temperature, etc.

Pisces lets you perform trend analyses, monthly summaries and simple correlations.

Pisces can also import data directly from the SNOTEL database.

[AgWeatherNet](#) (AWN) provides current and historical weather data from Washington State University's automated weather station network. The weather data, advisories, products and decision support systems can help improve production and product qual-

ity, optimize resource use and reduce environmental impact.

AWN is comprised of 137 automated weather stations located mostly in irrigated regions of eastern Washington state. Since installing the first station in 1988, the network has expanded into western Washington as well as in the dry land regions of the state.

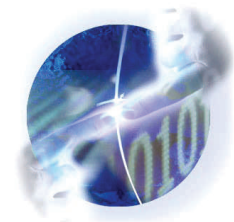
NOAA's Office of Program Planning and Integration provides a variety of [social and economic data](#) that policy makers can use to better manage the coasts and oceans.

The [Dynamic Drought Index](#) for basins in North and South Carolina is a web-based, spatial decision support system for water resource planning and management. The product uses customized weighted drought indices.

The Community, Collaborative Rain, Hail and Snow (CoCoRaHS) [Climate Resources for Master Gardener's Guide](#) introduces elements of climate which are important to gardeners. It includes an overview of climate patterns and differences and links to local climate information. Topics include: Climate and Gardening, Sunshine, Temperature, Humidity and Dew Point, Precipitation, Wind and Climate Change.

[AgWeb](#) provides agronomic, [weather](#) news and planting advice in a convenient, one-stop location. They also have a mobile application available for download.

[Texas Drought Conditions](#) is a web resource for customized drought products, including monthly societal impact reports.





Westwide Spring forecast (cont from pg 3)

In Montana, the driest region is the headwaters of the Jefferson with forecasts at 65-70% of average runoff. However, the snowpack increases downstream, and overall forecasts in the Upper Missouri range from below to near average. The Upper Yellowstone River is expected to produce near average streamflow.

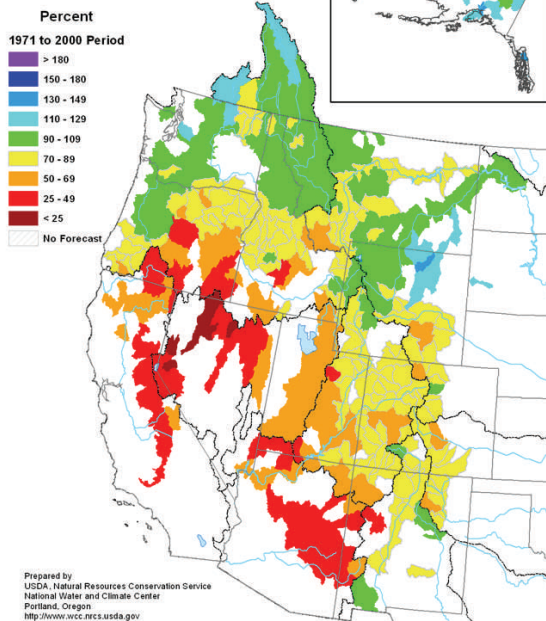
Colorado's Front Range, the snowpack varies significantly from point to point, but overall, forecasts in the upper South Platte call for just below average runoff. To the south and into northern New Mexico, summer runoff forecasts in the lower South Platte, Arkansas and Canadian Rivers remain below average.

water supply conditions would deteriorate further.

Upper Colorado Basin: A below average water supply outlook for the Upper Colorado River Basin continues despite above average precipitation across much of the basin in February. The Yampa and Little Snake Basins saw the greatest increase (~10% of average) whereas most other basins showed some improvement in water supply conditions. As a whole, the water supply outlook for the basin bumped up marginally to 67% of the 1971-2000 average inflow into Lake Powell. This equals a 3% of average increase projected for the basin from February 1.

Lower Colorado River Basin: Conditions across the Lower Colorado River Basin continue to worsen with well below average precipitation measured across the region in February.

Spring and Summer Streamflow Forecasts as of March 1, 2012



March 1 Westwide Spring and Summer streamflow forecasts mimic conditions of snowpack map in many areas.

The North Platte in Colorado is another dry region, with the streamflow forecast at only 65% of average. Again, moving downstream into Wyoming, the increased snowpack in the Laramie Mountains south of Casper significantly boosts the forecast for the lower North Platte, with an inflow prediction of 85% of average flow into Glendo Reservoir.

Along the northern half of

Colorado River/Rio Grande Basins

[Gus Goodbody](#)

Rio Grande Basin: February brought near- to above-normal precipitation across the Rio Grande Basin in Colorado and northern New Mexico. This resulted in only minor changes to the water supply outlook across the region with the Rio Grande Headwaters in Colorado pushing closer to average, and most other forecast basins to the south remaining below to slightly below average.

Long range weather forecasts for the remainder of the accumulation season continue to paint a dry and warm picture for this region, in which case

Continued pg 15



Fish Lake area in south-central Utah. Photo by Randy Julander.

Westwide Spring forecast (cont from pg 14)

Most rivers across the region are forecast to flow less than 50% of median runoff this spring. A dry outlook for the remainder of the runoff season indicates low probability of significant short-term relief from the very dry conditions.

Great Basin/California/Alaska

[Jolyne Lea](#)

Great Basin: It has been a very dry winter across the Great Basin region. The Sierra Nevada have received scant precipitation this year and remain the driest area of the West, with some stations reporting a record low snowpack for this time of year.

Precipitation since October 1 is also well behind, and dry conditions are spread across the states of California, Nevada and into Utah. NRCS forecasts on the eastside of the Sierra Nevada range from 11% to 45% of average.

The snowpack in the Wasatch Mountains of western Utah had a fairly good February with some basin snowpacks and forecasts improving from the February 1 values.

The Great Basin snowpack ranges from less than 25% of average in the lower Humboldt Basin to near average in the upper Sevier Basin.

California Central Valley:

Well below-average accumulated precipitation and snow in the Sacramento and San Joaquin Basins of the central valley of California are negatively affecting the forecasts.

A number of storms have supplied California with a small amount of precipitation to prevent a further decline that affects water supplies.

The National Weather Service (NWS) and California Department of Water Resources (DWR) forecast in the Central Valley of California range from 32% of average in the Feather River Basin to 68% of average in the McCloud River Basin.

Alaska: Alaska is a bright spot in terms of snow accumulation this year. The snow in much of Alaska is at very high to near-record conditions.



*Rain erosion on top of snow on an island in Prince William Sound, en route to the Tatitlek SNOTEL site in Alaska.
Photo by Daniel Fisher.*

The snowpack ranges from a high of above 150% of average in southern and southeast Alaska, to near average in the northern areas. Storms throughout the fall and winter have tracked well to the north, producing abundant, and in

some cases, too much snow, affecting travel and causing other disruptions. The forecasts for Alaska range from 93% to 140% of average.

More information

Here's the link to the March 1 Westwide mountain snowpack map: <http://www.wcc.nrcs.usda.gov/ftpref/support/water/westwide/snowpack/wy2012/snow1203.gif>

Here's the link to the March 1 Westwide streamflow forecast map: <http://www.wcc.nrcs.usda.gov/ftpref/support/water/westwide/streamflow/wy2012/strm1203.gif>



“Alaska is a bright spot in terms of snow accumulation this year. The snow in much of Alaska is at very high to near record conditions.”



National Water & Climate Center
 Natural Resources Conservation Service
 US Department of Agriculture

www.wcc.nrcs.usda.gov

1201 NE Lloyd Blvd.
 Suite 802
 Portland, OR 97232

Phone: 503-414-3038
 E-mail:

jacquie.workman@por.usda.gov

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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



Spring is coming and so is the busy period for data collection and forecasting.

April 1 is the standard for assessing the water supplies that will come from snow-melt, although many places are seeing the peak and initial meltout earlier than that date in recent years. This snow season has been interesting, as pointed out in some of the articles in this and earlier editions of **SnowNews**. It really emphasizes the concept of nonstationarity, where climate is in flux, and trends and drivers we saw in the past may not

be valid today. These are interesting and exciting times to be working in the field of hydrology.

We also have been facing the challenges of meeting our obligations and priorities while working with declining budgets, less personnel and travel restrictions. Although some may feel these challenges are frustrating, I feel that such challenges require us to be innovative and to embrace new ways of doing business.

We now have Video Conferencing (VTC) equipment in our conference room here in Portland and in many of the State and Field Offices. This will enable us to participate in meetings without spending time traveling, thus saving time and money.

We are evaluating our programs and looking for work elements that can be either contracted out to others or eliminated partially or entirely, thus cutting costs and required personnel. And we are

investing in new technology, both in our field operations and in our forecasting and IT areas that will make us more efficient, reduce costs and improve our data delivery.

So, while some see the reality of reduced budgets and declining personnel as only negative, I feel it provides us an opportunity to excel in advancing the program in new ways, making us stronger and better.

It was Plato around 400 BC who said "Necessity, who is the mother of invention" and really spoke for the ages. The reality is that reduced budgets and personnel will actually push us to move toward changes and improvements we have proposed and discussed for many years.

Like with the changing climate conditions I mentioned in the first paragraph, these are interesting and exciting times for our program.

Mike



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