VOLUME IX
ISSUE 1, WINTER 2015-2016

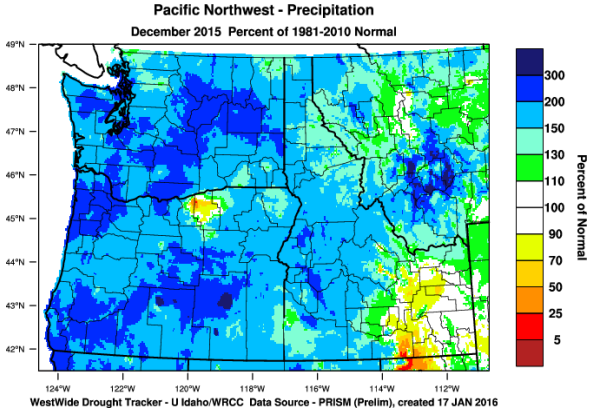
Sage Winds

NATIONAL WEATHER SERVICE BOISE

Season in Review

Joel Tannenholz

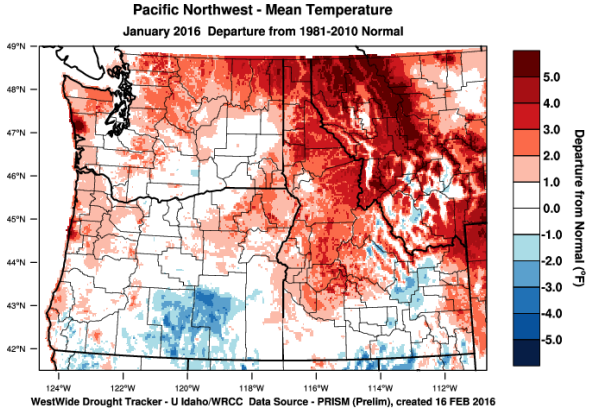
December was wet across nearly all of southeast Oregon and southwest Idaho as a series of Pacific weather systems crossed the region. The wettest of these storms, which had tapped into subtropical moisture, arrived on the 7th. Precipitation was enhanced by lifting over the higher terrain, so northern Harney County Oregon and the west central and southwest Idaho mountains, showed the greatest precipitation departures from average.

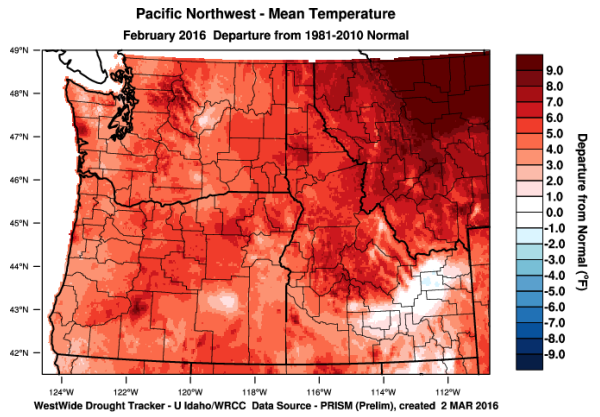


Temperatures were close to average in December, despite cold spells at the start and end of the month. Unusually mild weather from the 3rd through the 23rd more than compensated. January brought a drying and warming trend. From the 7th through the 12th, a split flow over the coast diverted storms north and south of our area. Beginning the 19th through the 27th, a high pressure ridge kept the region dry.

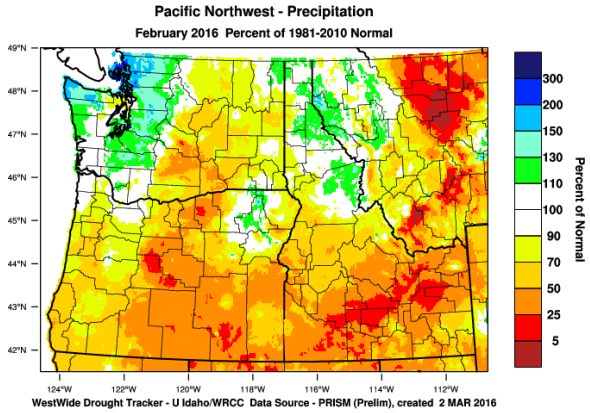
The Treasure Valley, Owyhee Mountains, and west central Idaho mountains showed the most drying and warming within the region. Little or no snow cover at lowest elevations enabled heating during sunny afternoons. The mountains benefited from the warmer-than-average air as they were mostly above valley temperature inversions.

At the same time, most of Harney County and southcentral Oregon was cooler than average, most likely due to a deep persistent snow cover from storms in December.





Through most of February, an upper level high pressure ridge kept the area drier and warmer than average. Pacific weather systems weakened considerably as they moved into the ridge. Precipitation fell mainly over the higher terrain north of Boise.



SPRING Spotter Checklist

When should you call us?

HAIL: pea size or larger.

SNOW: 1" per hour or greater OR storm total 4"+ OR snow causing road closures.

REDUCED VISIBILITY: for any reason.

WIND: Greater than 40 mph or damage.

HEAVY RAIN: ½"+ in 1 hour

FREEZING RAIN: Any amount.

FLOODING: Any water where it shouldn't be, or overflowing river.

TORNADO or **FUNNEL CLOUD**

ANY WEATHER RELATED DAMAGE, DEATH, OR INJURY

How to contact us:

1-800-882-1428

@NWSBoise

facebook.com/NWSBoise

boise.weather@noaa.gov

Severe Weather Training Workshop

Everyone is Invited!

7:00pm Thursday, March 24, 2016

Rock Creek Fire Dept.
1559 Main St N
Kimberly, ID 83341

Send us your photos on Facebook!

Trinity Mountain - Brandi Johnson

Flood Safety Awareness Week: March 27-April 2

Troy Lindquist

March 27 through April 2 is Flood Safety Awareness Week in Idaho.

Flooding is one of the most serious, devastating, and costly natural hazards that can occur almost anywhere. Many Idaho residents live near rivers, streams and lakes that are subject to periodic flooding, and those floods frequently damage roads, farmlands, and structures, disrupting lives and businesses, and occasionally causing loss of life.

Flood Safety Awareness Week is about readying communities and individuals for potentially devastating flood events. Throughout the week the National Weather Service will feature information about flood related topics and the dangers posed by floods. Idahoans are encouraged to take time during this week to review flood threats and safety practices. Being prepared for and knowing the dangers of floods will help you and your loved ones stay safe. Flood safety information can be found at www.floodsafety.noaa.gov.

Interested in measuring precipitation? Join the CoCoRaHS observing network.

Valerie Mills

There is always a need for a greater number of observations, and as the saying goes, "the rain doesn't fall the same on all." Precipitation varies greatly across our complex terrain and we need your help measuring precipitation across southwest Idaho and southeast Oregon. Additionally, we'd love your help recruiting your friends or relatives to CoCoRaHS. The more observations we have, the clearer the overall picture of where it did or did not precipitate across southwest Idaho and southeast Oregon. The program requires a physical rain guage, but does not accept automated measurements for reasons listed on its website. CoCoRaHS requests one observation per day; most observers submit their reports in the morning. A 4-inch rain guage recognized by the CoCoRaHS program currently sells for just over $30 dollars online, not including shipping.

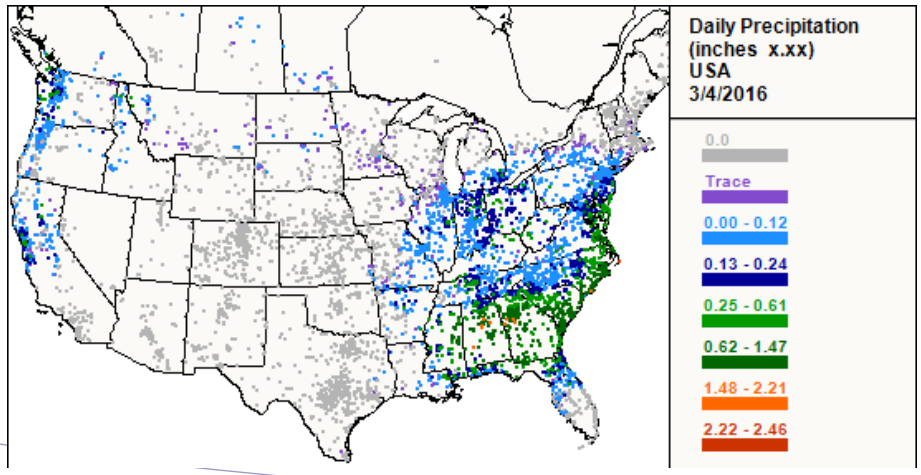
"The more observers in a community, the better the knowledge of local water resources and impacts, including floods and droughts," said Nolan Doesken, Colorado state climatologist. "CoCoRaHS is a great resource for anyone looking to see how much precipitation fell almost anywhere in the country."

And is this all just for fun? Far from it. Just a few examples of people or organizations who use CoCoRaHS data: The National Weather Service, private meteorologists, hydrologists, emergency managers, news media, city utilities, insurance adjusters, the USDA, engineers, mosquito controllers, ranchers, farmers, outdoor and recreation interests, teachers, students, and neighbors in the community.

In the figure below, you can see there are limited observations across southwest Idaho and southeast Oregon, compared to the rest of the country. To learn more about the CoCoRaHS program and to see where your fellow observers have recorded rain amounts, visit http://www.cocorahs.org/.

Invite your neighbors, relatives and friends by sending them this "Join" link:

http://www.cocorahs.org/application.aspx



CoCoRaHS rain gauge after a storm.

Want to help NOAA weather scientists with research?

If you own a smartphone or tablet download the free **mPING** app in the App Store or Google Play.

Insight into the NWS Upper Air Program and weather balloons

Wasyl Hewko

Look! Up in the sky! It's a bird! It's a plane! Wait, is that a weather balloon? Most people have a basic knowledge of the weather and understand why it occurs, but did you know that what happens at Earth's surface is influenced greatly by features and phenomena that occur in the upper atmosphere? In order to predict these features, we need weather observation data from the upper atmosphere to feed into our hungry super-computers. The upper level atmospheric data gives the weather models a starting point to forecast the intensity and movement of the upper atmosphere. But, how do we do it?

Enter the National Weather Service (NWS) Upper Air Program (to the rescue!). Yes, through the use (and launching) of weather balloons, attached to sophisticated electronic weather sensors and transmitters, we can get a look at what is happening in the atmosphere and assess how it may behave. The balloon sensor's transmitted data is received by tracking equipment at the ground which includes a passive dish antenna, a telemetry receiver, and a desktop computer with the needed software to plot and re-transmit the gathered information as formatted real-time data. This data can then be used in a myriad of weather forecasting situations.

NWS Boise employee, Valerie Mills, launches weather balloon and radiosonde

Since 1937, the NWS Upper Air Program has been consistently and faithfully preparing, launching, and tracking weather balloons twice daily, at over 92 sites throughout the United States, Alaska and in the Pacific region. Worldwide, there are over 800 upper-air observation stations and through international agreements data is exchanged between countries. These launches have been coordinated with international weather programs for synchronized weather balloon launches worldwide at 0:00 UTC and 12:00 UTC time (4:00am and 4:00pm MST). Special releases may be performed at any time when meteorologists determine there is a need for additional data between the 12-hour routine launches, usually during severe weather. At these sites, a certified weather observer will prepare a balloon train consisting of: a balloon, a parachute (for recovery), up to 120 feet of twine (to put separation between the parachute and the radiosonde), and a radiosonde. The radiosonde measures atmospheric weather conditions such as: temperature, wind, relative humidity, and pressure, and is transmitted to a receiver once per second. Once a flight is completed, the data is quality controlled and sent to the National Climatic Data Center (NCDC) to be archived.

NCDC is not the only place that receives our weather balloon flight data. Remember how I mentioned earlier how our hungry super-computers need upper-atmospheric data to aid in the forecasting process? Data from each flight is ingested into weather forecast model runs daily, in addition to satellite, radar data and weather observations taken worldwide. This is done in order to begin each model run as close to ground-truth as possible. From there, sophisticated weather models predict the movement of the atmosphere and allow meteorologists worldwide to produce the forecasts you rely on each day.

Let's get back to how these weather balloons are put together. We start by filling up the weather balloon approximately 45 minutes before each launch. A balloon is taken out to the Balloon Inflation Laboratory (BIL) where it is attached to a nozzle and filled with either helium or hydrogen. This is done so that it can lift the attached equipment, at a rate of around 5 meters per second or 300 feet per minute. The balloon is filled with enough gas to provide around 1,300 grams of lift, and can be higher or lower depending on the circumstances. A hot summer day generally needs less lift than a rainy winter day, where ice can accumulate on the balloon. Once filled, the balloon is tied off and then attached to the parachute. The parachute is used to slow down the radiosonde's return trip after balloon burst.

Once is the balloon is prepared inside the BIL, the observer will go back into the station and prepare the radiosonde. Preparation includes sensor configuration, frequency selection, battery connection, and baseline operations. Baselining is the process in which we ensure that the sensors are measuring accurate data. Once the observer is satisfied with quality control of the baseline, the radiosonde is ready for release and is launched at the specified hour (per regulation). From that point on, the balloon (actually, the radiosonde) is tracked by our software and monitored to ensure that the flight is recording data and progressing normally. Quality control and monitoring continues until the balloon bursts around 120,000 feet above mean sea level or around 5mb of atmospheric pressure (keep in mind that surface pressure is about 930mb here in Boise).

If you're the curious type, below are a few web links to sites containing more information about the NWS Upper Air Program:

http://www.wrh.noaa.gov/rev/tour/UA/introduction.php

http://www.ua.nws.noaa.gov/factsheet.htm

Balloon facts:

- The balloon expands to around 8 – 10 times its original size at the surface (about 1.0 meter).
- The balloon can be seen with the naked eye near its burst altitude of about 120,000 feet when weather conditions are clear, winds are light, and the balloon is directly overhead.
- Only about 20% of all radiosondes are recovered nationally. Most land in remote locations, lessening their recovery chances. If you ever stumble across one, please send it back to us using the directions found on the radiosonde!

Meet and Greet

Aviva Braun

NWS forecasters Jay Breidenbach, Elizabeth Padian, Korri Anderson, and Aviva Braun gather for a photo with ITD Avalanche employees Bill Nicholson (Blue) and Chantel Astorga (Pink). Excitement was high after digging a snow pit on February 26th as part of the monthly snowpack evaluation process.

At some point or another, we've all had our travel plans affected by road closures due to avalanche concerns. Within the Boise forecast area, those slated with making these decisions work for the Idaho Department of Transportation (ITD) Avalanche Center in Lowman, Idaho. The National Weather Service works closely with this office, providing up to date weather conditions for three locations highly susceptible to large natural avalanches (versus human-triggered avalanches). We thought it would be fun to meet and greet the two permanent Avalanche Center employees, Bill Nicholson and Chantel Astorga, for some hands-on training in how their operations are conducted.

NWS: Good morning! Could you introduce your office to our readers?

Avalanche: Good morning! Well, our program began about 8 years ago after realizing the need for avalanche forecasters for Highway 21, in the Boise forecast area, and Highway 12, in the Missoula forecast area. These roads had been hit by avalanches before and had put many, including the ITD maintenance staff, in danger. We now provide avalanche susceptibility ratings to the ITD staff and close down roads when avalanche dangers are high. Both of us come from ski patrol backgrounds and have a lot of experience with avalanches and understand their dynamics greatly.

NWS: How do you maintain situational awareness of current avalanche conditions?

Avalanche: We go out into the mountains (on our skis!) to evaluate the strength of the snowpack every day! We are skiers at heart for sure. Because we are out there every day, we have an idea of how much stress the snowpack can take. We always go in pairs for safety's sake. When conditions become critical, we go out in our trucks. Those are the days we are on the phone with your office the most!

NWS: What weather phenomena have the greatest impacts on avalanche conditions?

Avalanche: The biggest impacts to avalanche conditions are heat – the first warm day after we've been having precipitation is a really big stress, the first prolonged thaw– beginning at the start of that melting period until the water has made it all the way down to the bottom of the snowpack, and finally, during big precipitation events. In very general terms, big precipitation events are when we have more than an inch of water weight (as snow) – that's when we have to do something. An inch of water weight as rain is a really big problem! But that's rare here, luckily. The days we call your office frequently are when the rain-snow line is at a level that we're not quite comfortable with. If the snow level stays at 5500 feet, we're okay, but if it goes to 5800 feet that would really cause some issues. Another factor that can greatly influence avalanche danger is wind, but in this area, we rarely get wind-driven avalanches. Every canyon has its own personality; we have gotten to know and understand this canyon pretty well, therefore, we can predict how it'll behave with each incoming storm.

NWS: How many avalanches do we average per year here on Highway 21?

Avalanche: We average 30 to 40 avalanches per year, and these are the large, destructive kinds. We'll have days where just everything goes. On those days, the highway is closed.

NWS: How does the NWS help your office achieve its goals?

Avalanche: In 2000, one of the foremost scientists based out of the avalanche center in Calgary, Canada, estimated that with an aggressive avalanche program, the number of road closures could be limited to 30 days per year. Our current average is 15 days! Every day, NWS provides forecasts for us so that we can be up to date and ready for incoming changes to the weather – whether it is warmth, rain, or snow. Without your forecasts, the roads would be closed all of the time! When we do decide to close the road, we try to give people at least 8 hours warning. You guys make that possible because we'll see the next system coming in your forecasts. However, there are outliers to the 15-day road closure average. For example, two years ago in March 2014, we had that massive avalanche cycle that took 10 days to clean up!

Avalanche in March 2014 which took 10 days to clean up.

NWS: How does your team conduct its monthly snowpack stress tests?

Avalanche: Once a month, we do an evaluation of the snowpack within the same location at Banner Summit (7200 feet). We do this to see where the snowpack layers are located. As you know, without layers, there would be no avalanche danger. We dig a (new) pit in the snow each month with a smooth wall in which we can pick out the layers. When we think the snowpack is weak, we dig many pits to evaluate the spatial variability. Within the pit, we take the temperature every 10 cm to see if there is a gradient since that gradient drives changes in the snow. A temperature gradient increases the snowpack weakness; without a temperature gradient, the snowpack is stronger. Another test we do is a hand hardness test which relates directly to strength. However, we try to evaluate the snowpack in a general sense and not get too caught up in the specifics of each layer because sometimes the specifics can just be distractions. The end goal is to evaluate whether the snowpack can handle 1 or 2 inches of water – what will its breaking point be?. The weight of precipitation is what stresses the foundation of the whole snowpack. During a big event, snow density can change rapidly. Snowpacks are a super dynamic system and change constantly, much like weather! The thing is, we begin keeping track of weather conditions in detail November 1st, so if we are doing our job correctly, we aren't going into the pit to discover the snowpack details – we are going into the snow pit to verify what we already know.

NWS: This has been super enlightening! Thank you for speaking with us. **Avalanche**: Our pleasure.

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Vacant

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Hydrometeorlogical Technician

Wasyl Hewko

Meteorologist Interns

Aviva Braun
Jessica Caubre

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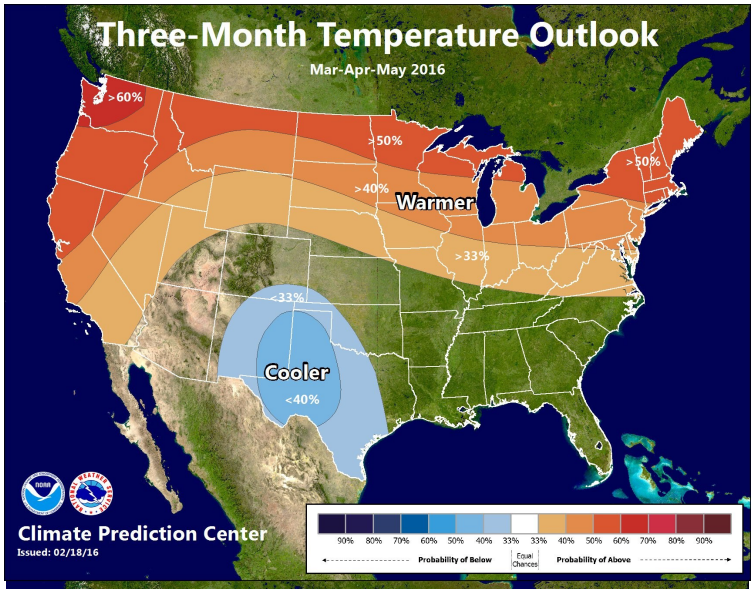
Spring Outlook

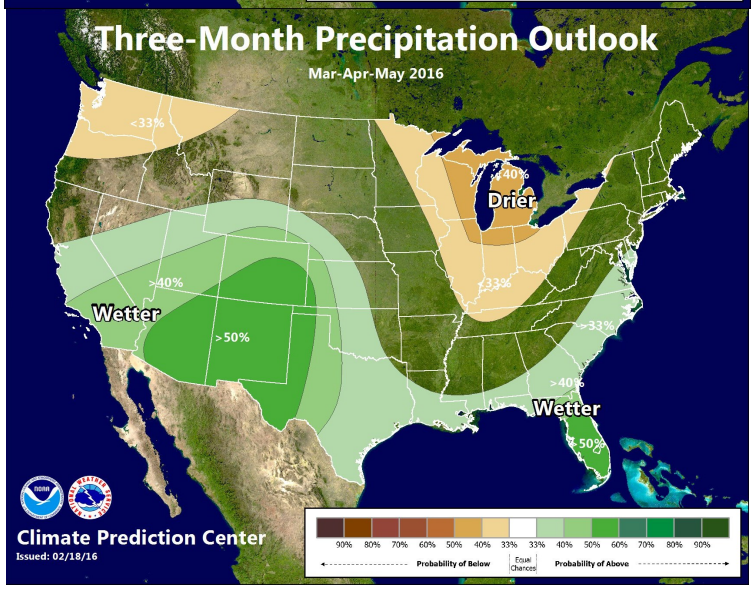
Stephen Parker

The following graphics show the official three-month outlook for the spring of 2016 (Mar-Apr-May). The country's temperature outlook is for a better chance of above-normal temperatures across the west and north, and below-normal temperatures in and near most of Texas.



As for the country's precipitation outlook, there are better chances for below-normal amounts across the Great Lakes region extending south into the Ohio Valley, as well as the far northwest, and above-normal precipitation amounts across California, most of the south, and the Atlantic coast. The chances for above-normal precipitation are highest in New Mexico and its surrounding areas, and also most of Florida.

For southeast Oregon and southwest Idaho, these charts indicate a better chance of above -normal temperatures with equal chance of both below-normal and above-normal precipitation. This means that there is no strong signal in the precipitation probability data, therefore, it is basically a forecast of "near-normal".



You may recall the winter outlook in the previous Sage Winds depended on a strong El Nino as the main basis for the forecast. At this time, the El Nino is weakening and is expected to continue weakening into this coming summer and fall. There are some indications that we could move into a weak La Nina next fall or winter, but it is too early to be sure. La Nina conditions occur when the water in the east-equatorial pacific become cooler than normal - the opposite of El Nino.

Did you know?

Elizabeth Padian

Boise has never recorded a minimum temperature of -24 °F. Boise has recorded minimum temperatures of -25°F and -23°F , however.

Rank	Temperature	Date
1	-28°F	Jan 16, 1888
2	-27°F	Jan 18, 1883
3	-26°F	Jan 15, 1888
4	-25°F	Dec 22, 1990
5	-23°F	Dec 21, 1990
	-23°F	Dec 10, 1972
6	-22°F	Dec 11, 1972

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SPRING is HERE!

Friendly reminders on keeping you and your family safe

Springtime weather to start preparing for:

- **Flooding**: Snow melt combined with rainfall can create sheet flooding, but some thunderstorms can produce heavy rainfall in a short period of time and create flash flooding. Both of these scenarios can threaten life and property.
- **Thunderstorms**: Hail, lightning, gusty winds, and flooding are all possible with thunderstorms, and can be dangerous. If you hear thunder, it is time to go indoors.

SPOTTERS! When do we want to hear from you?

- Hail is occurring – note the size in diameter. Use familiar items such as the size of a pea, quarter, etc.
- Heavy rainfall that is causing flooding of any kind.
- ANY property damage caused by wind, hail or rain.
- Funnel Cloud or Tornado

Questions? Comments? Suggestions?

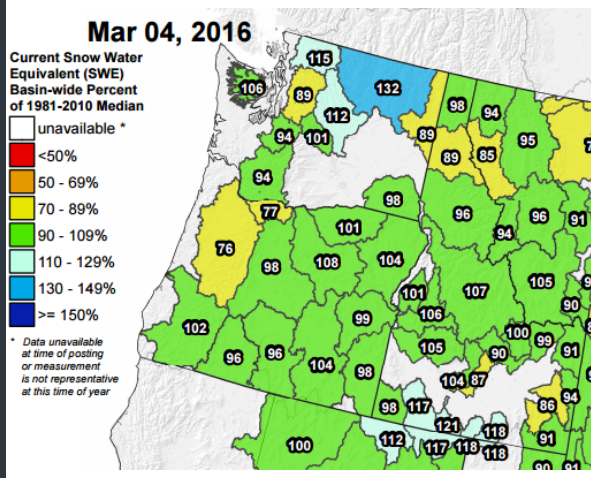
Email:

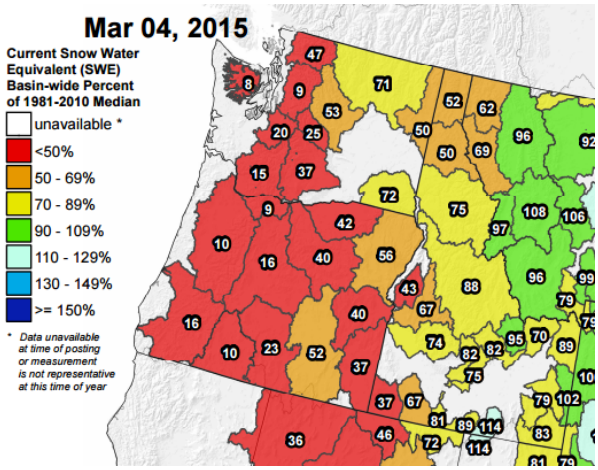
boi.spotter@noaa.gov

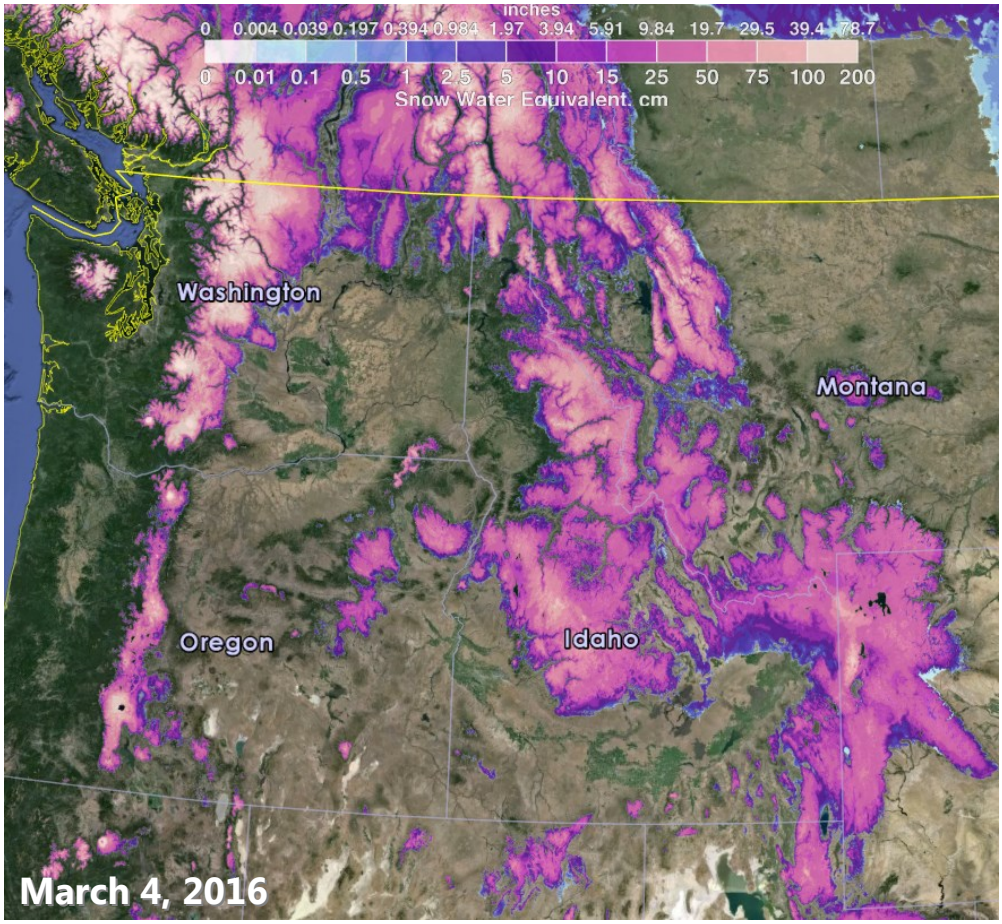
Winter Snow Accumulation

Troy Lindquist

This winter's mountain snowpack is a welcomed sight after recent years of subpar conditions. All southeast Oregon and southwest Idaho basins were holding above normal snowpack as of March 1, providing some excellent winter recreation opportunities. Snowpack in the region typically peaks between the middle of March and April 1st, and a number of basins have already reached or exceeded their normal peak. Weather patterns for the remainder of the winter and this spring will determine how robust our streamflow and water supply will be heading into the warm and dry season. For now we can be thankful that the overall water supply outlook is much better than a year ago at this time.







WATCH/WARNING/ADVISORY What is the Difference?

WATCH – Conditions are **favorable for a severe weather event** in the near future. **Be Prepared!**

WARNING – Weather is occurring or imminent and is **threatening life or property**. **Take Action!**

ADVISORY – Weather that will cause a **significant inconvenience**, and if caution is not taken, may be threatening to life or property. **Be Aware!**