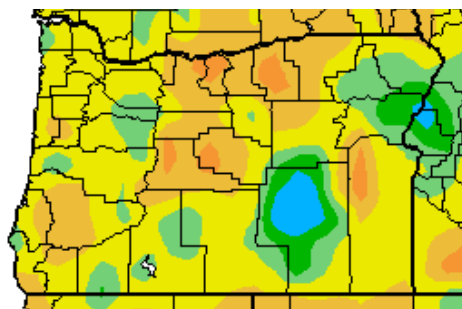
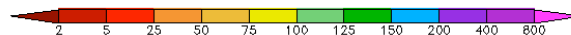
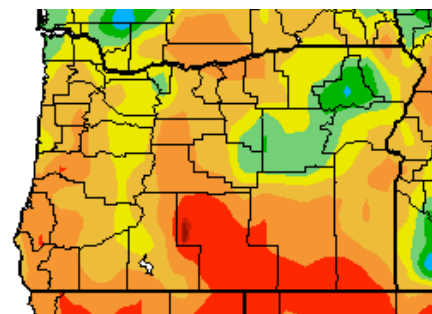


Unseasonably warm and dry January depletes snowpack



Generated 1/2/2011 at HPRCC using provisional data.

Regional Climate Centers



Generated 1/2/2011 at HPRCC using provisional data.

Regional Climate Centers

Figures 1a and b: a) Departure from Normal Temperature (°F) and b) Percent of Normal Precipitation for January (source: HPRCC)

Oregonians rang in the New Year with sub-freezing minimum temperatures. Typically one of the wettest and coldest months of the year, January started off cold and dry across most of the state. Clear skies sent overnight temperatures plummeting, and made for an icy morning commute in many places. Burns set a series of daily minimum temperature records for five consecutive days (starting Dec 31). After a few days of freezing fog and black ice a brief warm spell brought temperatures above average. A frontal passage around January 9th caused a wintry mix on the Willamette Valley floor - snow, sleet and freezing rain. A few days after this event, a “pineapple express”, or warm and wet storm system moved into the region. The unseasonable warmth really hammered the mountain snowpack. In December, the combination of above average precipitation and average temperatures had produced a robust winter snowpack. The snowmelt coupled with heavy rains caused flooding on the Sandy River, washing out a road and displacing residents. With this storm, Mt. Hood (Timberline) received 9.51” of rain in 48 hours. On the Oregon Coast, heavy rains around Seaside closed US Highway 101 due to water on the road. The heavy rain sparked a number of landslides, including a few on US Highway 20, one of the main roads over the Cascade Mountains. Though this rain event was quite substantial, the rest of the month was pretty dry -- leading to a monthly averaged precipitation that was below normal across most of the state.

The strong upper-level ridge persisted for the remainder of January. Toward the end of the month, daily maximum temperature records were broken in a number of places. On January 24, Corvallis broke a 76 year old daily maximum temperature record, topping out at 62 °F. Two days later on the Oregon Coast, temperatures rose into the 70s. Brookings recorded a temperature of 73 °F and North Bend saw 70 °F. To put it in context - the average temperature in Brookings in July is around 67 °F. However, the Willamette Valley didn’t see similarly summer-like temperatures, rather temperatures were in the 40s, because of a temperature inversion. Temperatures usually decrease as you go to higher altitudes, but on this day, it was the reverse. The temperature on Mt. Hood at 7000 ft. (Magic Mile Chair) was 7 °F warmer than Hillsboro (from NWS Portland). We sometimes get temperature inversions in the Willamette Valley in instances of strong high pressure, where the air is often stagnant and nights are clear and calm. The surface cools overnight, and as the day progresses, the calm winds do not allow for the warmer air aloft to mix and it effectively acts as a lid, trapping in the cooler temps. Often inversions impact air quality, as pollution is also trapped in the stagnant air mass.

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- Page 2: La Niña Update
- Page 3: Seasonal Outlook
- Page 4: Flooding Impacts
- Page 5: Station Records
- Page 6: Snowpack Update

It's warm and dry - what happened to La Niña?

According to NOAA, a moderate to strong La Niña still persists in the Equatorial Pacific -- and is expected to continue well into Northern Hemisphere spring.

A few months ago, talks of a cooler and wetter (or, snowier) winter seemed to be everywhere. Skiers rushed out to purchase season passes with the hope of a phenomenal winter sports season. Precipitation was well above average in December, snowpack was abundant, it was shaping up to be the kind of winter that snow enthusiasts love. A look at the other side of the country reveals that the East Coast is in the midst of a relentless winter. Storm after storm keeps dumping feet of snow. We've had a few questions - what's going on here? Why are we so warm and dry?

Well, it hasn't been a dry winter -- yet.

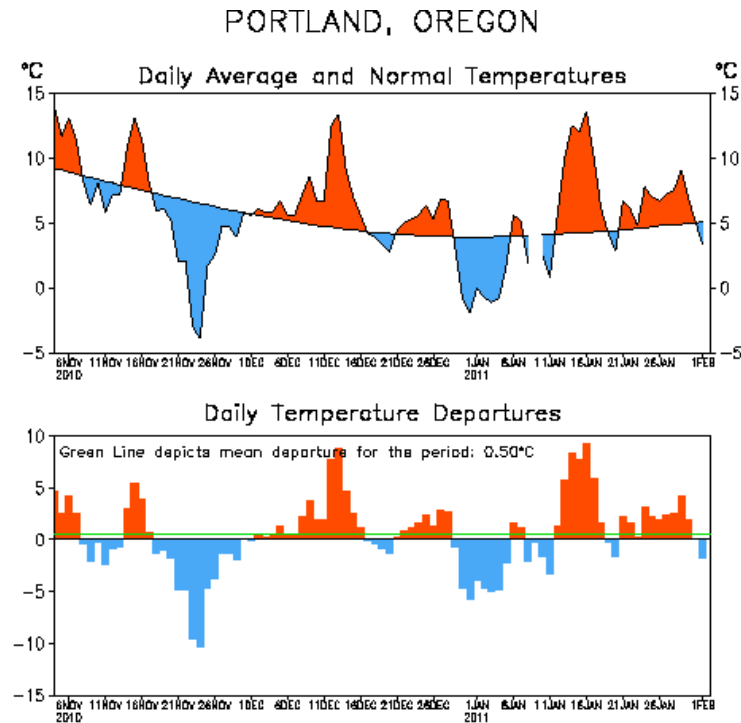
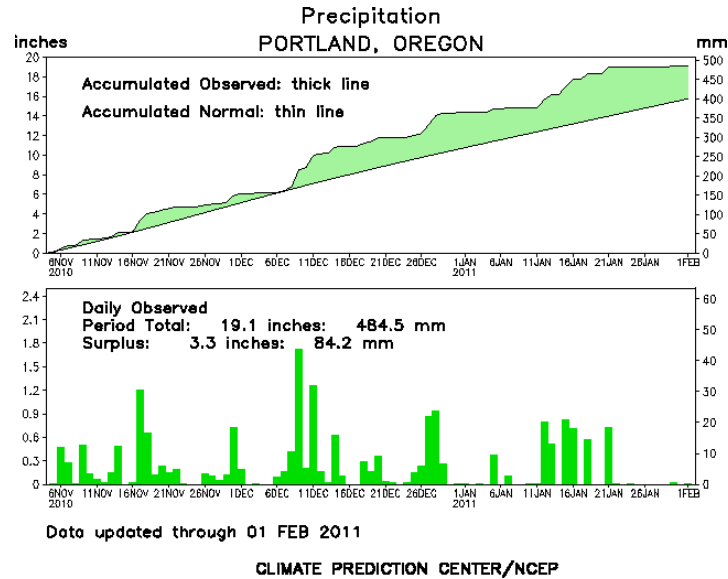
Figure 2a below shows accumulated precipitation in Portland for the past 90 days. Observed accumulated precipitation is plotted against the smooth line, which is the normal. Green shading shows surplus; In Portland, there is an accumulated surplus of over 3" for the season.

So what is the reason for a depleted snowpack?

Temperature. With a warmer than average air temperature, you not only melt the snow that's on the ground, the precipitation that does fall may fall as rain. Even higher up in the Cascades, where we almost always expect cooler temperatures than on the valley floor, temperatures have spiked above freezing for a number of days

Figure 2b shows the same sort of plot as the precipitation - observed values plotted against the normal. In Oregon, it's common to alternate between warm and cold snaps in any given winter. However, this winter, with the exception of the extended cooler than average period at the end of December/beginning of January, temperatures have been above normal or around average for most of December and January. Temperatures were mostly above normal every time that it rained, indicative of zonal flow/pineapple express events. There's still a chance for a snowpack rebound.

When we talk of colder and wetter winters - we talk about a seasonal average. That is, that there are ups and downs (weather) but averaged over a season precipitation is usually above average with a moderate to strong La Niña. And no two La Niña winters are alike. While the odds are greater for wetter/colder, sometimes it just doesn't pan out that way.



Figures 2a and b: a) accumulated precipitation b) observed temperature for past 90 days for Portland, OR (source: HPRCC)

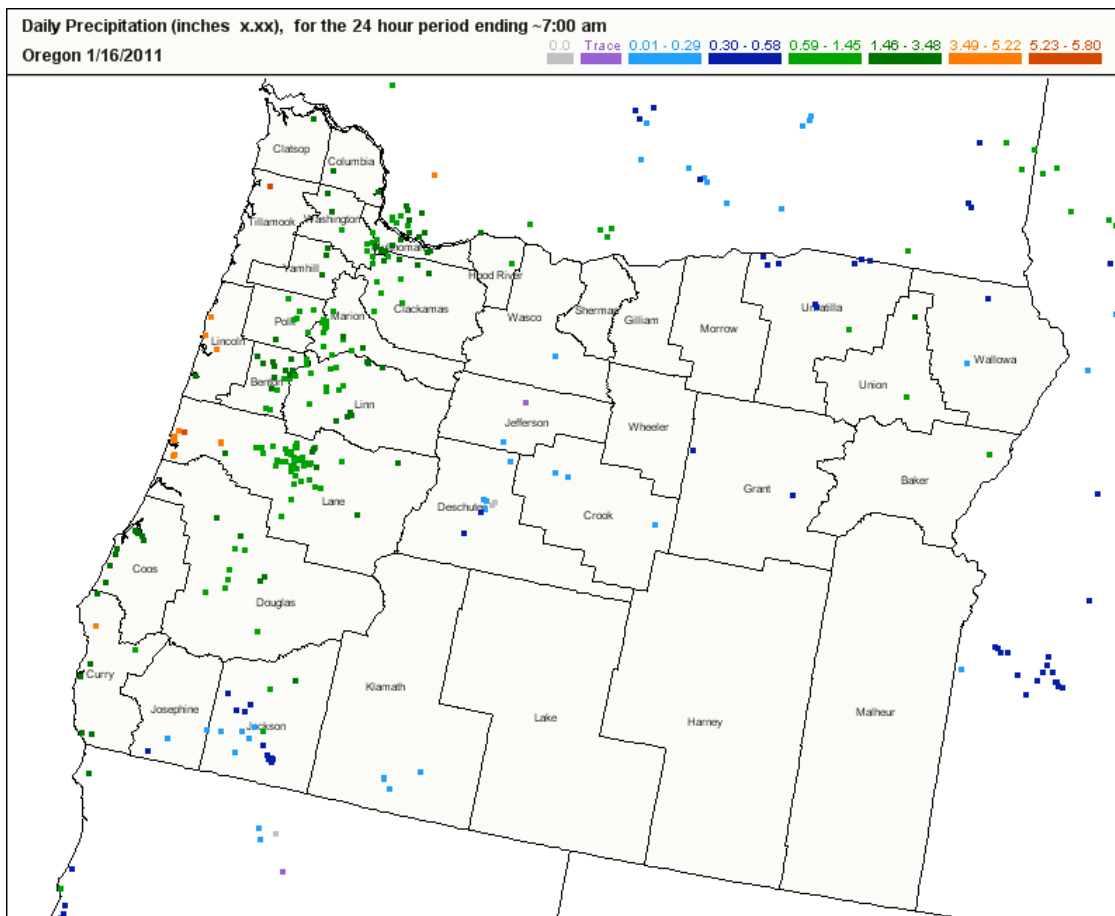
Three-month outlook



Figures 3 a and b. Three-Month Outlook (January, February, March) for a) temperature and b) Precipitation for the Pacific Northwest from Climate Prediction Center/NOAA

NOAA's three month outlook from the Climate Prediction Center for the months of February, March and April reveals a greater chance for below average temperatures statewide. The greatest chance, corresponding to the darker blue color, covers most of the state with the exception of southwest Oregon (Figure 3a). Most of the state shows an equal chance of above below or above average precipitation during the time period (FMA). Northeastern Oregon shows a chance of above average precipitation averaged over the next three months.

Heavy rain, snowmelt causes significant flooding



CoCoRaHS precipitation totals reported on the morning of January 16, 2011 at the height of the mid-month heavy rain event. More flooding impacts on next page.

Mid-month warm, wet storm system causes flooding

Oregon's rising rivers have caused problems over much of the western portion of the state. Landslides and washouts have interrupted traffic, power, and phone service in several locations, and some residents have been evacuated from their homes.



Lolo Pass Road, photo credits: Gary Randall, Precision Artists

Sandy and Zigzag Rivers

Floods caused by a combination of heavy rains and unseasonal snowmelt destroyed a section of road on the western slope of Mount Hood in Oregon on Monday, stranding some 250 residents.

The Sandy River washed out the road connecting remote residents with the main highway over the mountain into Portland. A bridge over the river's Zig Zag tributary was also closed due to the rising waters. The rising Sandy River wiped out a 300-foot section of Lolo Pass Road. The course of the Sandy River altered as it rose out of its stream bed and flowed over the road. Heavy rains or snow melts can quickly overflow the stream bed. More than six inches of rain fell on January 16-17th, and rising temperatures added an additional two inches from snowmelt to the river. It took workers nine days to open East Lolo Pass Road after the Sandy River washed it out.

Tillamook

Tillamook was the scene of flooding and what Oregon State Police (OSP) troopers described as a major landslide on Highway 6 near Tillamook. Power and phone service was cut off for customers in the immediate area. The Wilson River Highway, where the slide occurred, has received national attention in the past due to extreme flooding.



Flooding near Tillamook, photo credit: Oregon State Police

Portland

Portland switched its water source from the Bull Run Reservoir on Mount Hood's northern slope to a series of wells due to extreme turbulence in the reservoir's water following the heavy rains.

Three Rivers Highway

Approximately 50 feet of the westbound lane of Oregon Highway 22W has eroded from the heavy rains. It was reported that the sinkhole measures 4 feet by 20 feet by 4 inches deep.

Santiam Highway

A landslide blocked traffic along US 20 approximately 17 miles east of Sweet Home. ODOT crews removed debris from a large slide, several smaller slides, and two blocked culverts before reopening the road.

Seaside

U.S. 101 South of Seaside at Beerman Creek was closed due to high standing water.

Flooding story Credit: Tim King, Salem-News.com

January Station Records

Precipitation (liquid water equivalent)

station	date	new record (in.)	old record (yr)	yrs in record
Astoria	January 16	1.7"	1.47" (1961)	121

Minimum Temperatures

station	date	new record (° F)	old record (yr)	yrs in record
Burns	January 1	-25	-10 (1983)	72
Burns	January 2	-8	-7 (1983)	72
Burns	January 3	-10	-7 (1952)	72
Burns	January 4	-16	-14 (1949)	72
Burns	January 11	-12	-8 (1982)	72
Seneca	January 11	-20	-18 (1974)	61

Maximum Temperatures

station	date	new record (° F)	old record (yr)	yrs in record
Salem	January 15	59	58 (1974)	119
Hillsboro	January 15	58 (tied)	58 (1991)	63
Meacham	January 16	50	48 (1971)	63
The Dalles	January 16	58	57 (1989)	63
The Dalles	January 24	59	57 (1971)	63
Redmond	January 27	61 (tied)	61 (1984)	62
North Bend	January 27	70	67 (1938)	80
Roseburg	January 24	64 (tied)	64 (1935)	80
Corvallis	January 25	62	61 (1935)	122

Tables 1, 2, 3. Individual station records for maximum temperature, minimum temperature and precipitation for selected stations in Oregon (via NWS and OSU)

Snowpack

Despite an active start to the winter season, an unseasonably warm and dry January depleted the once above average statewide snowpack to below average amounts. There are still ample chances for the snowpack to rebound over the next two months. Late winter/early spring snow is certainly common in the mountains here in Oregon, and a few quick passing storms could help recharge the snowpack.

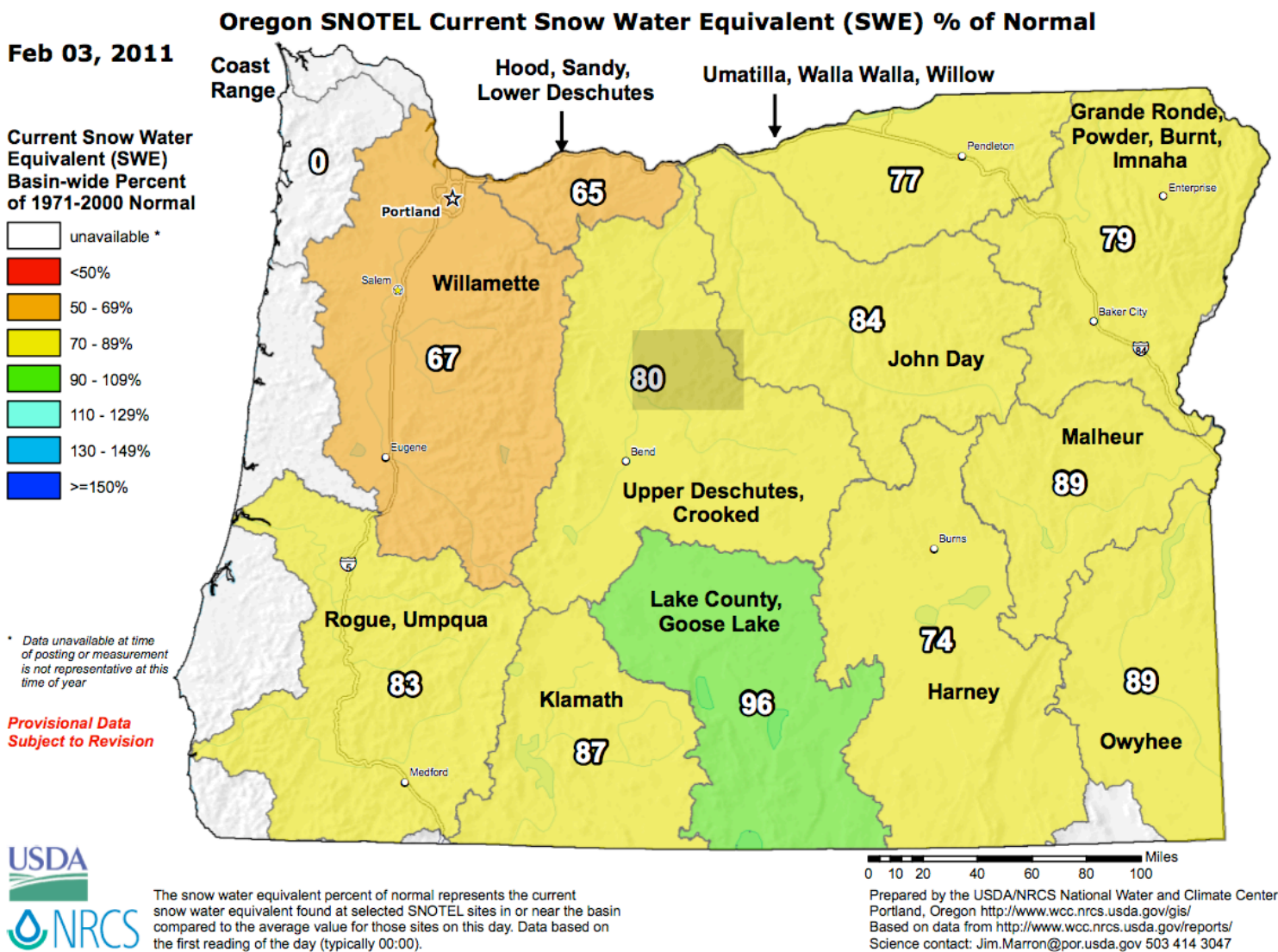


Figure 5. Oregon SNOTEL measurements as of February 3, 2011 by major river basin (credit: NRCS)