



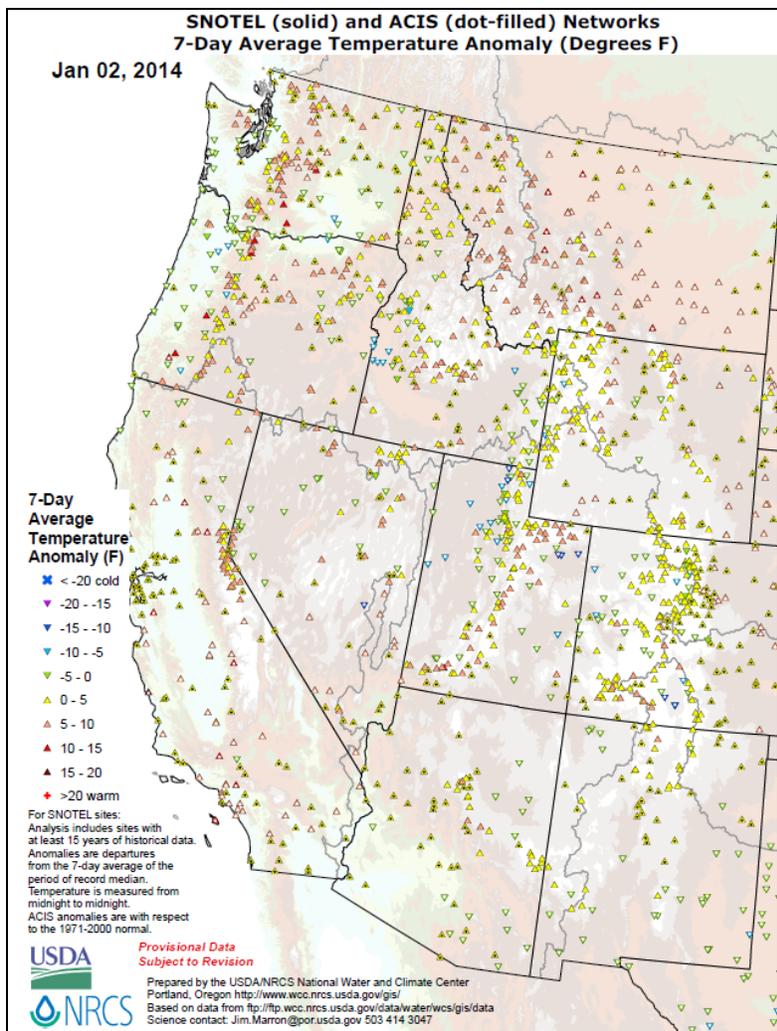
Natural Resources Conservation Service  
 P.O. Box 2890  
 Washington, D.C. 20013

## Weekly Snowpack / Drought Monitor Update

January 2, 2014

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### Temperature



SNOTEL and ACIS [7-day temperature anomaly](#) map shows temperatures above normal over the Cascades, Sierra, and Northern Rockies. The remainder of the West experienced near normal or slightly below normal temperatures.

*Click map to enlarge and see latest available update.*

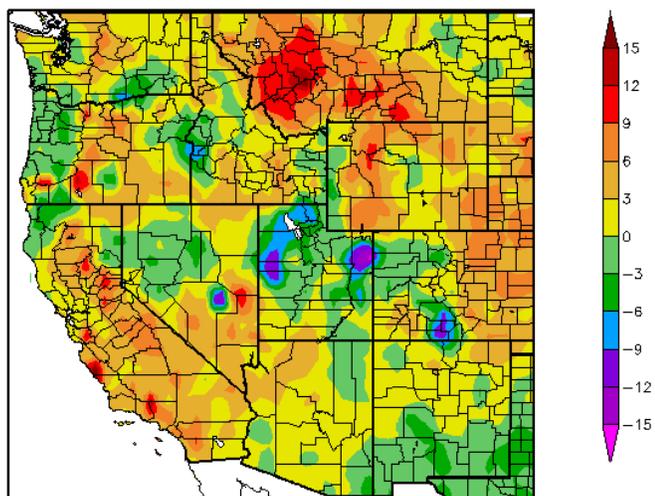
The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment

## Weekly Snowpack and Drought Monitor Update Report

[ACIS](#) 7-day average temperature anomalies, ending January 1, show the greatest negative temperature departures over parts of central Nevada, eastern and western Utah, and south-central Colorado ( $<-9^{\circ}\text{F}$ ). The greatest positive temperature departures occurred over the Montana Rockies ( $>+12^{\circ}\text{F}$ ).

Also see [Dashboard](#) and the [Westwide Drought Tracker](#).

Departure from Normal Temperature (F)  
12/26/2013 - 1/1/2014



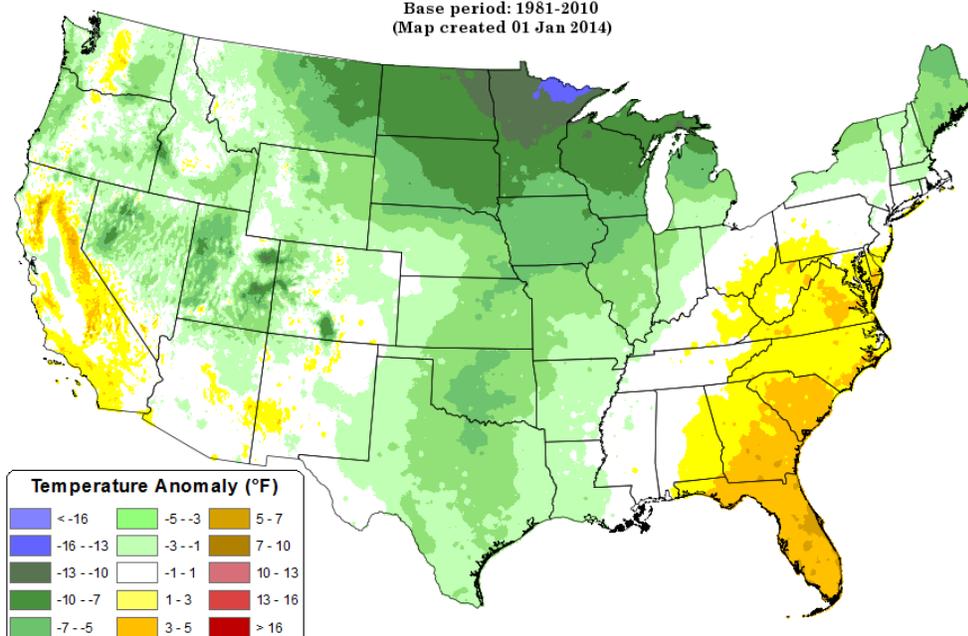
Generated 1/2/2014 at HPRCC using provisional data.

Regional Climate Centers

### Daily Mean Temperature Anomaly: 01 December 2013 - 31 December 2013

Period ending 7 AM EST 31 Dec 2013  
Base period: 1981-2010  
(Map created 01 Jan 2014)

This preliminary [PRISM](#) temperature map contains all available network data, including SNOTEL data, and will be updated periodically as additional data become available and are quality controlled.



Copyright (c) 2014, PRISM Climate Group, Oregon State University

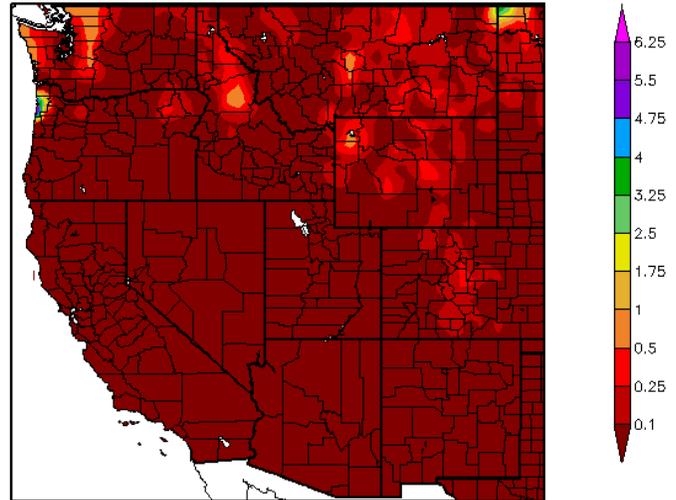
For December, it was particularly cold over the northern tier states; especially over the arrowhead area of Minnesota ( $<-13^{\circ}\text{F}$  departure). Warmer than normal temperatures occurred over the Southeastern states and the Sierra Mountains ( $>+5^{\circ}\text{F}$ ).



## Weekly Snowpack and Drought Monitor Update Report

[ACIS 7-day](#) average precipitation amounts show another week with very limited precipitation across the West.  
→

Precipitation (in)  
12/26/2013 - 1/1/2014



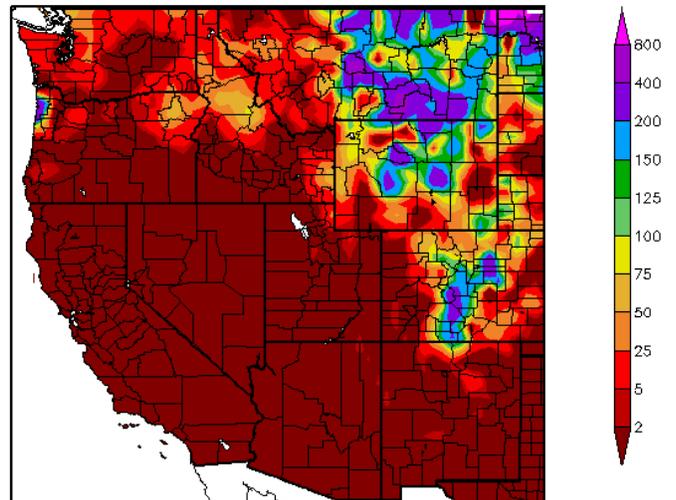
Generated 1/2/2014 at HPRCC using provisional data.

Regional Climate Centers

This [map](#) shows that the bulk of precipitation by percent of normal occurred across scattered regions of eastern Montana to central Colorado.

It should be noted that these ACIS maps reflect only low-elevation stations where precipitation is typically light this time of year.

Percent of Normal Precipitation (%)  
12/26/2013 - 1/1/2014



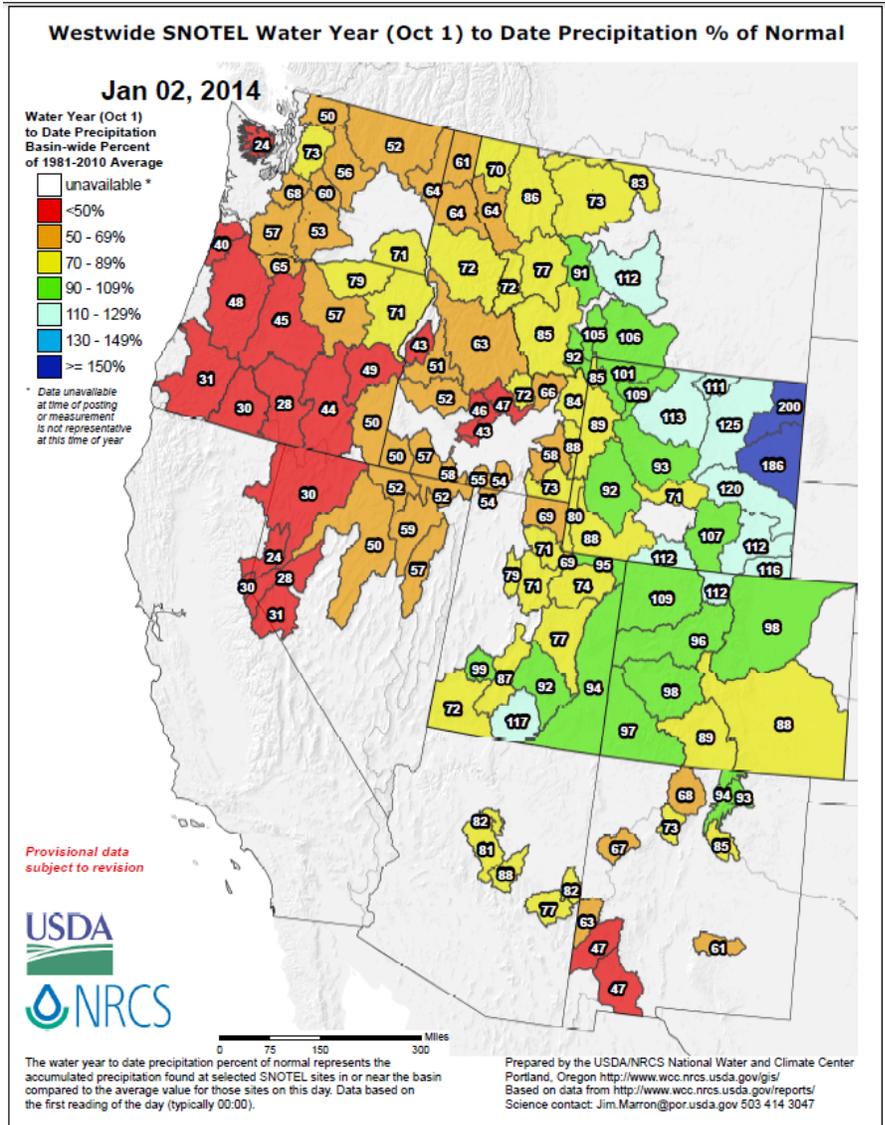
Generated 1/2/2014 at HPRCC using provisional data.

Regional Climate Centers

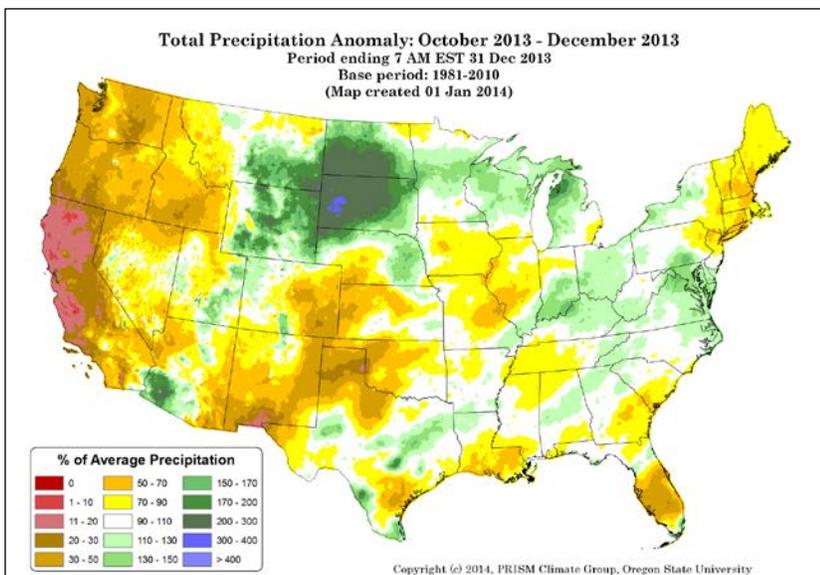
## Weekly Snowpack and Drought Monitor Update Report

For the [2014 Water Year](#) that began on October 1, 2013, the ENSO pattern is quite dry over the western half of the West. Southwest New Mexico is also showing significant deficits.

Areas east of the Continental Divide have fared better. However, these values are also declining in recent weeks.



[Click image for latest available update](#)

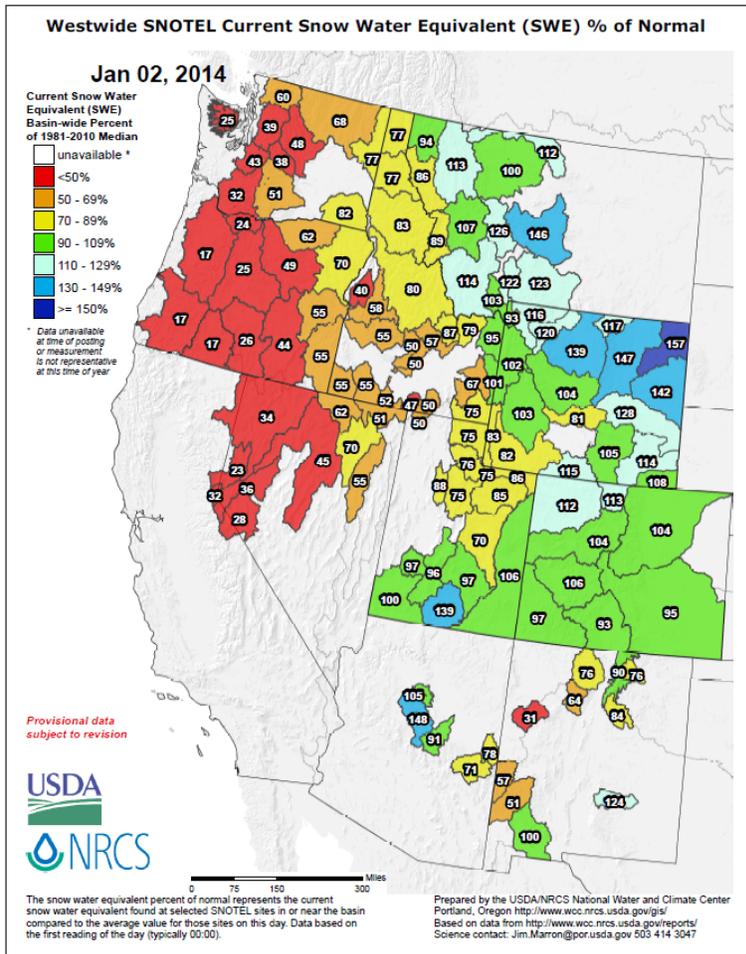


In this PRISM map, preliminary data reflect a similar pattern of wetter and drier conditions across the West, as noted in the figure above. Resolution for this PRISM map is 4x4 km.

With the exception of south-central and eastern Montana, most of Wyoming, and southwestern Arizona, precipitation is well behind the 30-year averages; especially over California.

# Weekly Snowpack and Drought Monitor Update Report

## Snow



**Snow Water Equivalent (SWE)** values are doing well east of the Continental Divide and in parts of southern Utah and central Arizona.

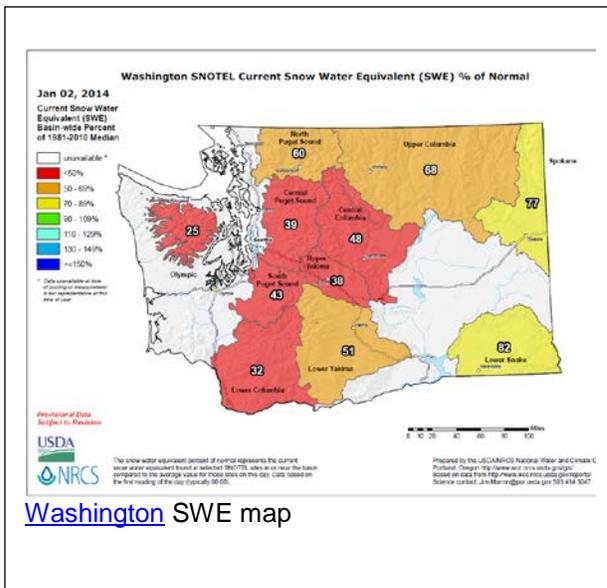
Conditions west of the Continental Divide are continuing to get drier.

Note: It is quite common for the precipitation and SWE values to be somewhat different during the early water-year when precipitation falls mostly as rain instead of snow. Compare this map to the one on the previous page; especially over Arizona and New Mexico to see an example of this factor.

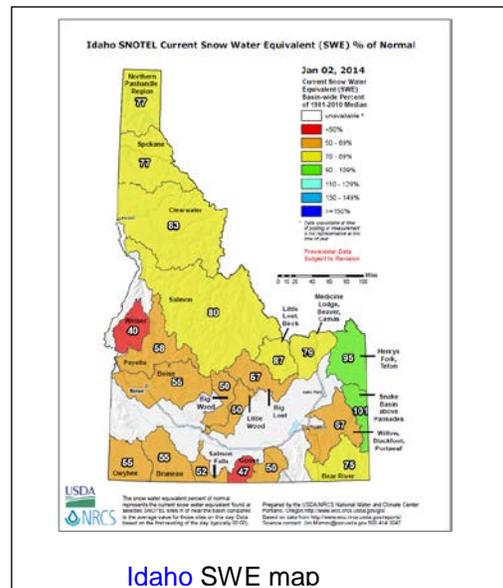
The all-important April 1 SWE date will best determine the water supply forecasts issued by the [National Water and Climate Center](#).

See latest [National Snow Analysis](#)

[Precipitation thus far over New Mexico](#)



[Washington SWE map](#)



[Idaho SWE map](#)

SWE deficits persist over Washington and Idaho. Conditions are expected to deteriorate further during the next few weeks as high pressure remains fixed over this region.

# Weekly Snowpack and Drought Monitor Update Report

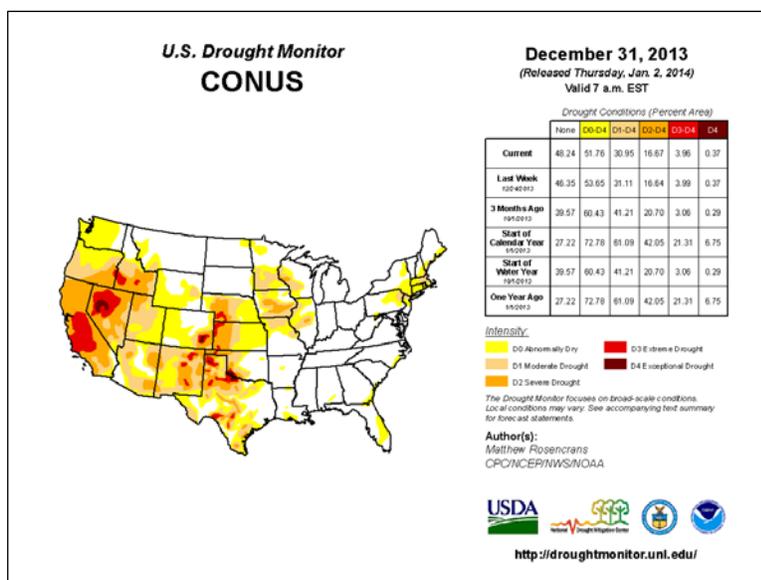
## Weather and Drought Summary

National Drought Summary – December 31, 2013

The following **Weather and Drought Summary** is provided by this week's NDMC Drought Author, Matthew Rosencrans (CPC/NCEP/NWS/NOAA).

[USDM Map Services](#): (contains archived maps)

[Current Drought Monitor](#) weekly summary. The exceptional D4 levels of drought are scattered across NV, CO, TX, and OK.



The latest [drought indicator blend and component percentiles](#) spreadsheet is a great resource for climate division drought statistics. This link is for the latest [Drought Outlook](#) (forecast). See [climatological rankings](#).

For more drought news, see [Drought Impact Reporter](#).

### Drought Management Resources (✓):

- ✓ [Watch AgDay TV](#)
- ✓ [Drought Impacts Webinar Series](#)

Latest Drought [Impacts](#) during the past week

Total Impacts | All States

54

Category			
Agriculture	17	Energy	1
Fire	5	Plants & Wildlife	11
Relief, Response & Restrictions	<a href="#">26</a>	Society & Public Health	11
Tourism & Recreation	2	Water Supply & Quality	33

**Summary:** "The week began with a sprawling area of high pressure across much of the contiguous 48 states before two low-pressure systems moved across the country. The first system intensified over the Great Lakes and pushed a cold front to the southeast. The next storm system moved across the western portions of the contiguous 48 states and tracked from the central Rockies to the Great Lakes. As a result, most of the wet weather was confined to east of the Rockies, with the heaviest rains across the southeast. Some light precipitation was recorded across portions of the Pacific Northwest."

- Matthew Rosencrans (CPC/NCEP/NWS/NOAA)

"During the past week, SNOTEL and ACIS [7-day temperature anomaly](#) map shows temperatures above normal over the Cascades, Sierra, and Northern Rockies. The remainder of the West experienced near normal or slightly below normal temperatures. SNOTEL [month to date](#) (December) precipitation percent of normal shows a mostly drier month for much of the West. Extreme deficits are noted over parts of Washington, Oregon, Idaho, California and Nevada. Another region with deficits occurred over parts of Arizona and New Mexico. Substantial surpluses are noted over a few river basins in central Montana and over northwestern and northeastern Wyoming." - Jan Curtis, NRCS

A comprehensive narrative describing drought conditions across other parts of the nation can be found toward the end of this document. For drought impacts definitions for the figures below, click [here](#).

# Weekly Snowpack and Drought Monitor Update Report

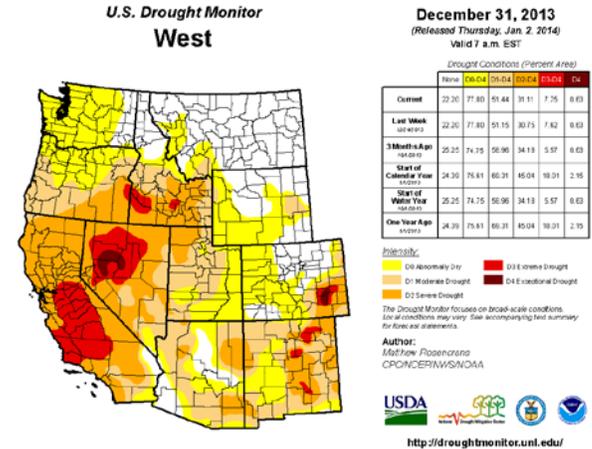
- ✓ Drought Monitor for the [Western States](#)
- ✓ Drought Impact Reporter for [New Mexico](#)
- ✓ [California Data Exchange Center](#) & [Flood Management](#)
- ✓ [Intermountain West Climate Dashboard](#)
- ✓ [Great Basin Dashboard](#)

## California Drought Impacts

Impacts   California	
12-02-2013 - 01-02-2014	
Total Impacts	22
Statewide Impacts	7
Category	
Agriculture	5
Fire	4
Plants & Wildlife	5
Relief, Response & Restrictions	9
Society & Public Health	6
Tourism & Recreation	1
Water Supply & Quality	12
Report Source	
Media	22

← California has the most impacts during the past month for any state in the nation.

See a special report at the end of this week's issue.



Note that there were no changes this week. [Click to enlarge](#)

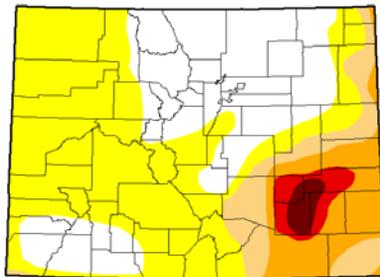
## [The Rockies Westward to The Pacific Coast](#)

“A reassessment of conditions prompted the removal of extreme drought from near Kiowa County in Colorado. Recent conditions have been dry, but a wet period from Mid-July to Mid-October has mitigated the impacts, so the area is now designated at D2 (severe drought), more consistent with impacts reported by local extension agents.

Dry conditions have persisted across California and Oregon, so D1 (moderate drought) was expanded across much of western Oregon and D2 (severe drought) was expanded across much of northern California. According to the California Department of Water Resources, Lake Shasta is currently at just 58 percent of average for this time of year (37 percent of capacity).”

– Matthew Rosenkrans

## U.S. Drought Monitor Colorado



No changes have occurred during the past week.

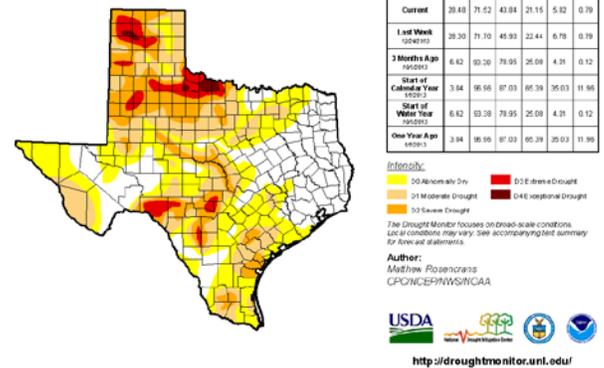
## State with D-4 Exceptional Drought

- ✓ Texas Drought [Website](#).
- ✓ [Texas Reservoirs](#).
- ✓ [Texas Drought Monitor Coordination Conference Call](#): on Monday's 2:00 PM - 3:00 PM CST

## Texas Impacts:

Impacts   Texas	
12-02-2013 - 01-02-2014	
Total Impacts	6
Statewide Impacts	1
Category	
Agriculture	3
Relief, Response & Restrictions	3
Society & Public Health	1
Water Supply & Quality	3
Report Source	
Media	6

## U.S. Drought Monitor Texas

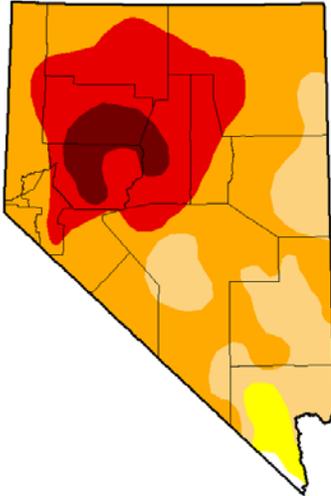


Note slight improvement in D1 to D3 categories during the past week.

# Weekly Snowpack and Drought Monitor Update Report

## State with D-4 Exceptional Drought

### U.S. Drought Monitor Nevada



**December 31, 2013**  
(Released Thursday, Jan. 2, 2014)  
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	0.39	99.61	96.81	77.66	28.55	5.37
<b>Last Week</b> 12/24/2013	0.39	99.61	96.81	77.66	28.55	5.37
<b>3 Months Ago</b> 10/1/2013	0.39	99.61	96.79	79.11	28.55	5.37
<b>Start of Calendar Year</b> 01/01/13	0.00	100.00	94.13	62.22	16.46	0.00
<b>Start of Water Year</b> 10/1/2012	0.39	99.61	96.79	79.11	28.55	5.37
<b>One Year Ago</b> 01/01/13	0.00	100.00	94.13	62.22	16.46	0.00

**Intensity:**  
■ D0 Abnormally Dry     ■ D3 Extreme Drought  
■ D1 Moderate Drought     ■ D4 Exceptional Drought  
■ D2 Severe Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

**Author:**  
Matthew Rosencrans  
CPC/NCEP/NWS/NOAA



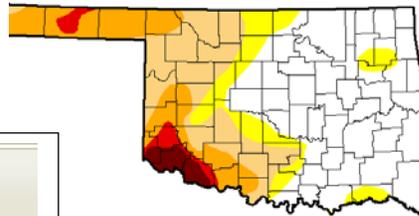
<http://droughtmonitor.unl.edu/>

**Note: No changes occurred this past week.**

## State with D-4 Exceptional Drought

### U.S. Drought Monitor Oklahoma

**Note: No changes occurred this past week.**



**December 31, 2013**  
(Released Thursday, Jan. 2, 2014)  
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
<b>Current</b>	50.84	48.16	30.17	18.99	4.04	2.40
<b>Last Week</b> 12/24/2013	50.84	48.16	38.17	18.99	4.84	2.40
<b>3 Months Ago</b> 10/1/2013	21.74	78.26	43.00	17.62	4.42	1.45
<b>Start of Calendar Year</b> 01/01/13	0.00	100.00	100.00	100.00	94.89	37.06
<b>Start of Water Year</b> 10/1/2012	21.74	78.26	43.00	17.62	4.42	1.45
<b>One Year Ago</b> 01/01/13	0.00	100.00	100.00	100.00	94.89	37.06

**Intensity:**  
■ D0 Abnormally Dry     ■ D3 Extreme Drought  
■ D1 Moderate Drought     ■ D4 Exceptional Drought  
■ D2 Severe Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

**Author:**  
Matthew Rosencrans  
CPC/NCEP/NWS/NOAA



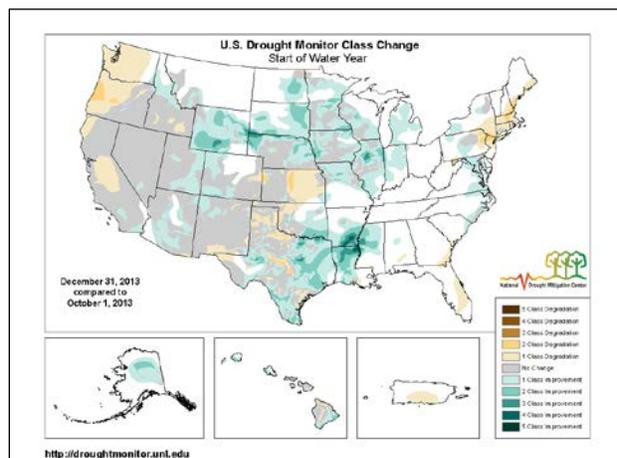
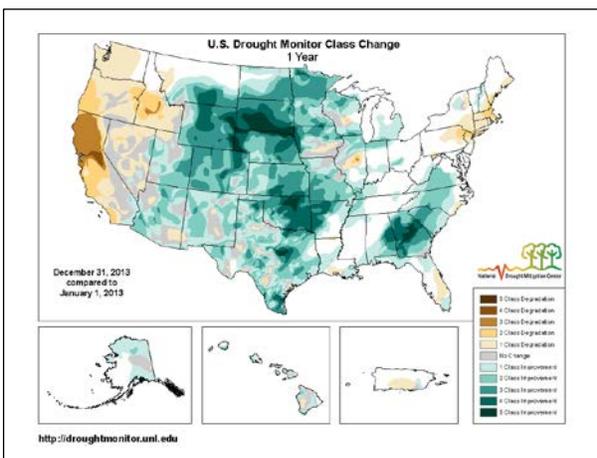
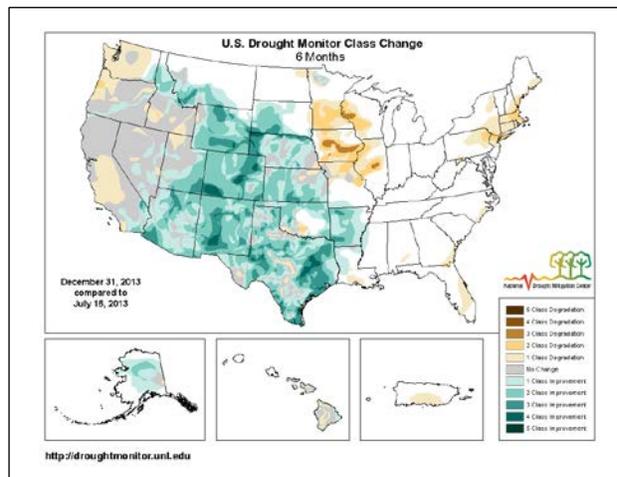
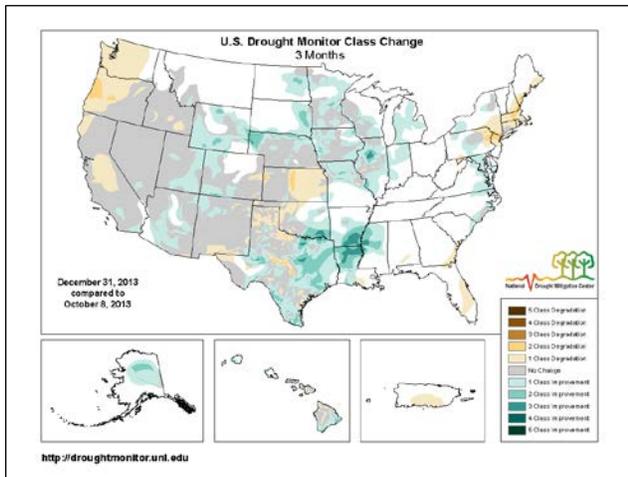
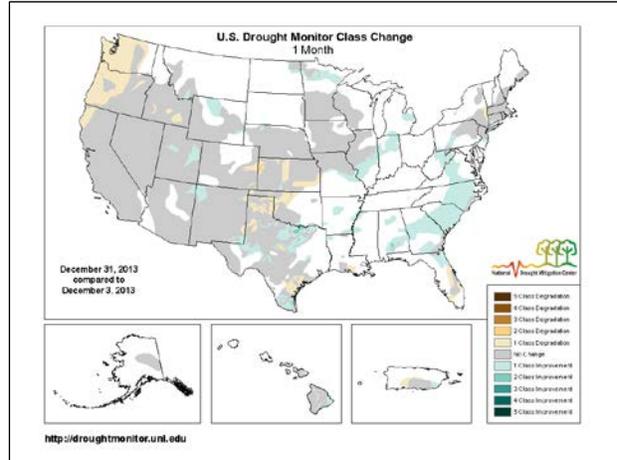
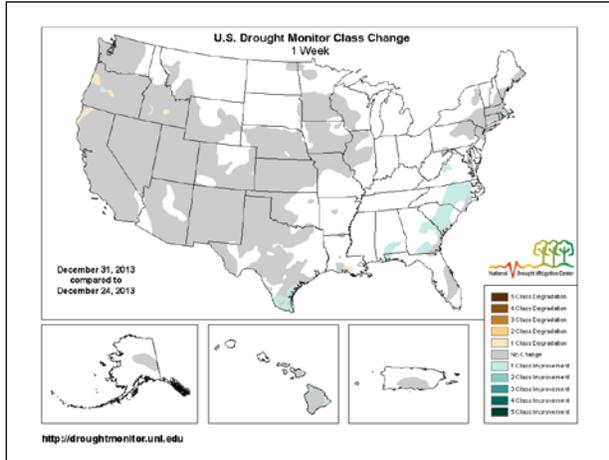
<http://droughtmonitor.unl.edu/>

#### Impacts | Oklahoma 12-02-2013 - 01-02-2014

<b>Total Impacts</b>	<b>6</b>
<b>Statewide Impacts</b>	<b>2</b>
<b>Category</b>	
<span style="color: green;">●</span> Agriculture	4
<span style="color: olive;">●</span> Plants & Wildlife	1
<span style="color: orange;">●</span> Relief, Response & Restrictions	1
<span style="color: purple;">●</span> Society & Public Health	2
<span style="color: blue;">●</span> Water Supply & Quality	4

# Weekly Snowpack and Drought Monitor Update Report

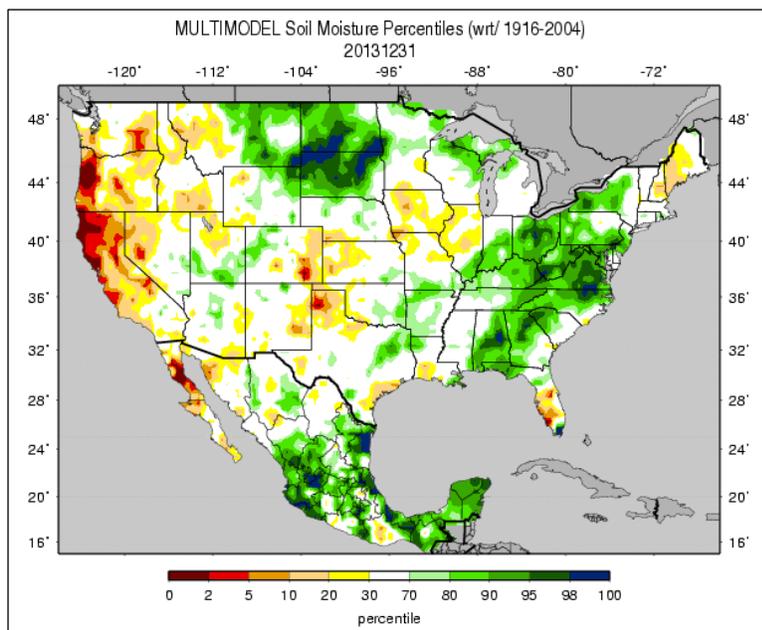
New Feature: [Changes in Drought Monitor Categories](#) (over various time periods)



Winter time changes to the drought monitor are usually minimal. However, over the past several months, drought conditions have improved significantly over a vast portion of the center of the U.S.

# Weekly Snowpack and Drought Monitor Update Report

## Soil Moisture



Soil moisture ranking in [percentile](#) as of December 31 shows considerable dryness over western Oregon and northern California. Moist soils dominate the Northern Plains and much of the Eastern States.

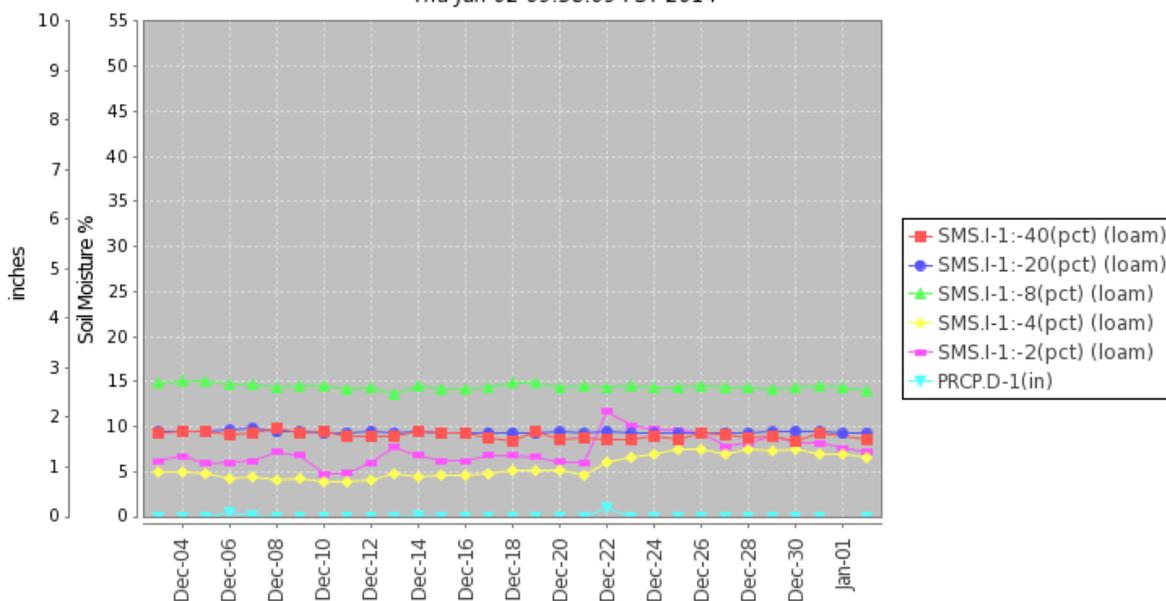
Useful Hydrological Links: [Crop Moisture Index](#); [Palmer Drought Severity Index](#); [Standardized Precipitation Index](#); [Surface Water Supply Index](#); [Weekly supplemental maps](#), [Minnesota Climate Working Group](#); [Experimental High Resolution Drought Trigger Tool](#); [NLDAS Drought Monitor](#); [Soil Moisture](#).

[Soil Health-unlock your farm's potential](#)

**Note:** As the ground freezes, accuracy of measured moisture decreases.

## Soil Climate Analysis Network ([SCAN](#))

Station (2171) MONTH=2013-12-03 (Daily) NRCS National Water and Climate Center - Provisional Data - subject to revision  
Thu Jan 02 09:58:09 PST 2014



This NRCS resource shows a site over [central New Mexico](#) with steady but dry soil moisture. Note little precipitation falling during the past month (light blue line).

Useful Agriculture Links: [Vegetation Drought Response Index](#); [Evaporative Stress Index](#); [Vegetation Health Index](#); [NDVI Greenness Map](#); [GRACE-Based Surface Soil Moisture](#); [North American Soil Moisture Network](#). [Monthly Wild Fire Forecast Report](#).

## Weekly Snowpack and Drought Monitor Update Report

The following **Drought Summary** is provided by this week's NDMC Author: Matthew Rosencrans (CPC/NCEP/NWS/NOAA)

### Hawaii, Alaska, and Puerto Rico

"Light to moderate precipitation fell across the Alaskan Panhandle, but not enough to alleviate impacts of an earlier dry period, so D0 was returned to the Alaskan Panhandle. Moderate rains (1.0 – 2.0 inches) fell across portions of the Big Island of Hawaii, so small areas of drought were removed from the depiction.

### The Lower Mississippi Valley and Southern Plains

Light to moderate rains (0.5 to 1.6 inches) fell across southern Texas, prompting a 1-category improvement across most of the region. A reassessment of conditions led to the removal of the extreme drought (D3) near Corpus Christi, as that was introduced due to an analysis error last week. A slight adjustment to the placement of the abnormally dry (D0) area was made across southern Louisiana as well, reflecting better alignment with Standardized Precipitation Index (SPI) values out through 12 months and soil moisture model outputs (NASA GRACE-LDAS).

### The Mid-Atlantic and Southeast

An area of abnormal dryness (D0) were removed from central VA as that area is over 150% of normal rainfall over the last 30 days (widespread 4-5 inch totals). Base streamflow has improved significantly at the stream gauges in that region as well since Thanksgiving. The D0 area across western MD was retained and adjusted to fit the areas where 30-, 60-, and 90-day percent of normal precipitation data indicated the largest deficits.

Most of the abnormal dryness (D0) was removed from NC, SC, and GA, with the remaining D0 along the immediate coast. Deficits in the coastal areas of the southeast are shrinking but remain at 1 inch, for 30 days and up to 12 inches for 180 days. Due to the intermediate wet period out to 60 days, the impacts are being designated as short-term. Rains totaling 1-3 inches during the past 7 days according to the Advanced Hydrologic Prediction System (AHPS) precipitation estimates across Alabama prompted a 1-category improvement there.

### The Northeast

Moderate precipitation (0.5 – 1.5 inches) fell across the portions of the northeast, so some D1 (moderate drought) was removed from Rhode Island and Massachusetts. Some stations in Massachusetts are reporting month-to-date precipitation totals in excess of 4.25 inches. The rest of the northeast remained the same as last week due to impacts from longer-term dryness (90-day precipitation totals at or below 50 percent).

### The Northern and Central Plains and the Midwest

No changes were made to the depiction of drought across this region as most of the ground is frozen so little evaporation or recharge can take place.

### Looking Ahead

During Jan 1 - 5, moderate precipitation (up to 1.8 inches locally) is forecast across the Gulf coast with lighter amounts through the Tennessee and Ohio Valleys. Snowfall is also likely across the Great Lakes and Northeast. Elsewhere, light precipitation at most is forecast for the remainder of the contiguous 48 states.

For the ensuing 5 days (Jan 6-10), the odds favor above-median precipitation from the northern Rockies to the central and southern Great Plains, as well as the Great Lakes and Northeast. Dry conditions are favored across the southwest and eastern Alaska. A storm track into western Alaska should result in above-median precipitation."

\*\*\*\*\*

# Weekly Snowpack and Drought Monitor Update Report

## State Activities

[State government drought activities](#) can be tracked through their drought plans. NRCS Snow Survey and Water Supply Forecasting (SSWSF) Program State Office personnel are participating in state drought committee meetings and providing the committees and media with appropriate [SSWSF information](#). Additional information describing the [tools](#) available from the Drought Monitor can also be found at the [U.S. Drought Portal](#).

## More Information

The National Water and Climate Center (NWCC) [Homepage](#) provides the latest available snowpack and water supply information. This document is available [weekly](#). CONUS Snowpack and Drought Reports from 2007 are available online. Reports from 2001-2006 are available on request.

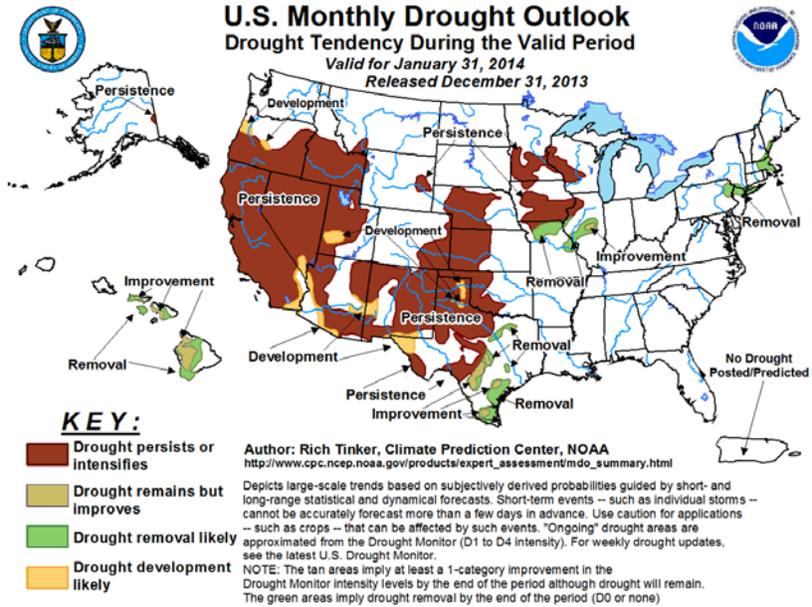
This report uses data and products provided by the Interagency Drought Monitor Consortium members and the National Interagency Fire Center.

/s/  
Micheal L. Golden  
Deputy Chief, Soil Science and Resource Assessment

\*\*\*\*\*

# Weekly Snowpack and Drought Monitor Update Report

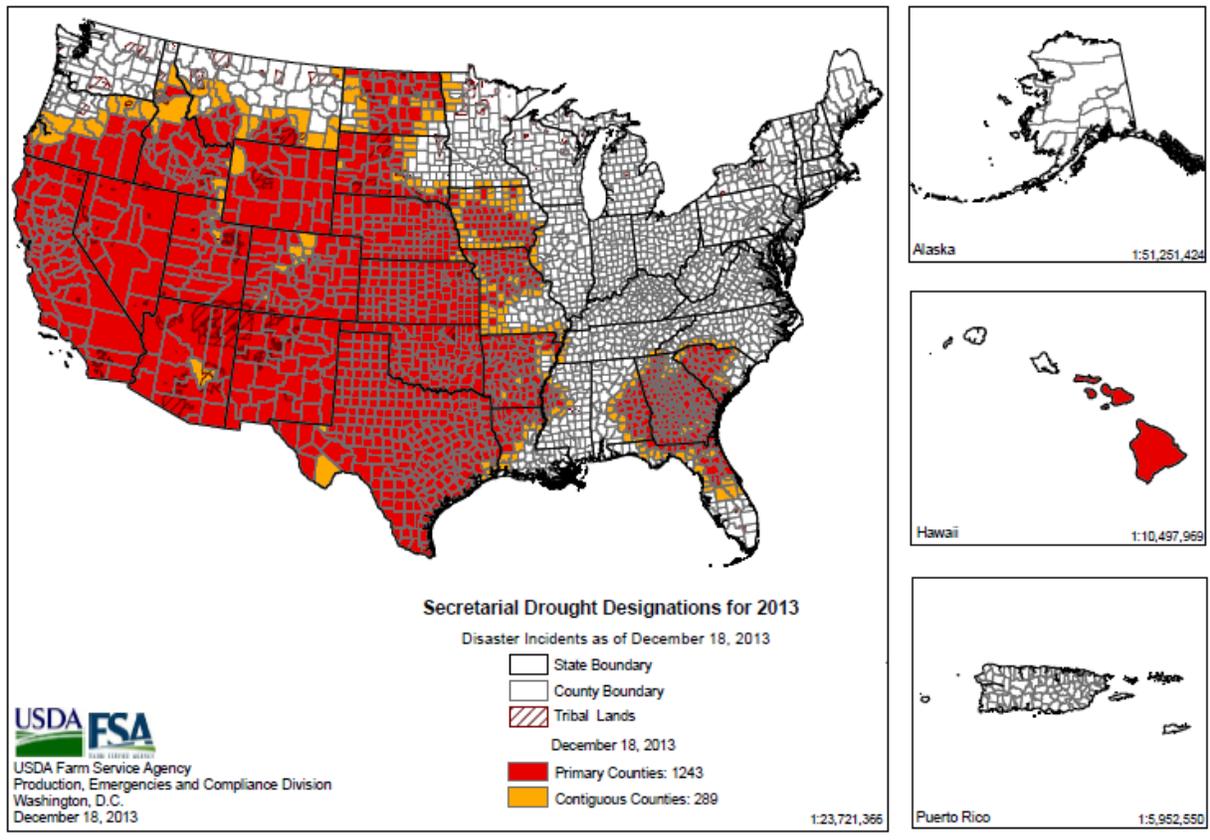
## Drought Outlook



U.S. Seasonal Drought Outlook for January shows:

- Drought is expected to improve over parts of central Texas, northern Missouri, central Illinois, and southern New England. Elsewhere, drought is expected to persist over much of the Great Basin, California, southern Pacific Northwest, the Southwest, the southern Rockies, the Upper Mississippi River Valley, and the south-central Plains. Drought is expected to develop over parts of the Southwest.
- ✓ Also see: [National Significant Wildland Fire Potential Outlook](#) (updated on the 1<sup>st</sup> of each month) and contains a nice content summary of the previous month's conditions.

## 2013 Secretarial Drought Designations - All Drought



Refer to the USDA Drought Assistance [website](#) and [National Sustainable Agriculture Information Service](#). Read about the new [USDA Regional Climate Hubs](#).

# Weekly Snowpack and Drought Monitor Update Report

## Supplemental Drought News

This is a collection of drought-related news stories from the past week. Impact information from these articles is entered into the **Drought Impact Reporter**. A number of these articles will also be posted on the **Drought Headlines** page at the NDMC website.

## Wyoming – NRCS

### Report #10 Monday Morning Snow Report Dec, 30<sup>th</sup>, 2013

Good morning everyone. This is the 10<sup>th</sup> Monday Snow Report for the 2013-2014 snow season. Last year about this time the state median was 85% with a low of 29% and a high of 115% of median. This year the state median is 115% with a low of 82% and a high of 152% of median. See the table & map below for more information. The map may differ slightly from the table depending upon how many stations were reporting at the time or date.

For those of you with INTERNET capability, this report and map showing SWE percentages for the state can be found at "<http://www.wrds.uwyo.edu/wrds/nrcs/nrcs.html>". Go to [http://www.wcc.nrcs.usda.gov/normals/median\\_average.htm](http://www.wcc.nrcs.usda.gov/normals/median_average.htm) for median.

Figure 1 -- SNOW WATER EQUIVALENT AS PERCENT OF MEDIAN. The following table shows the current, last year's ending weeks and 2012 equivalent (SWE) amounts for Wyoming basins. Median is based on all reporting SNOTEL sites in the basin, not the snow courses. The reference period for average comparison is 1981-2010.

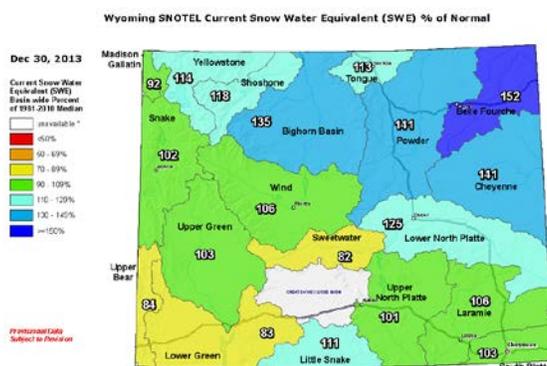
DRAINAGE BASIN	12/30/2013	12/23/2013	12/16/2013	12/30/2012	12/23/2012
SNAKE RIVER	102	105	113	115	123
MADISON	92	96	105	111	115
YELLOWSTONE	114	115	121	112	117
WIND RIVER	106	109	113	98	104
BIGHORN BASIN	135	134	141	91	92
SHOSHONE RIVER	118	122	131	115	123
POWDER	141	139	153	95	97
TONGUE	113	111	121	69	74
BELLE FOURCHE	152	200	236*	52	83
CHEYENNE	141	147	160	52	53
UPPER N. PLATTE	101	100	102	80	75
SWEETWATER	82	90	94	99	112
LOWER N. PLATTE	125	123	124	29	22
LARAMIE	106	106	110	76	72
S. PLATTE	103	103	108	66	62
LITTLE SNAKE RIVER	111	114	115	92	82
UPPER GREEN	103	111	120	106	115
LOWER GREEN	83	86	92	107	109
UPPER BEAR	84	87	81	104	103
Weighted State Average	115	119	122	85	88

red = down

blue = up

green = even

\* data is suspect



← Click on map for update.

For more information, contact: Lee Hackleman or Ken Von Buettner (307) 233-6744, 6743, NRCS Snow Surveys 100 East B St., Room 3124, Casper, WY

## Weekly Snowpack and Drought Monitor Update Report

### Other Tea Cup depictions:

<http://www.usbr.gov/uc/water/basin/> ← Upper Colorado  
[http://www.usbr.gov/uc/wcao/water/basin/tc\\_gr.html](http://www.usbr.gov/uc/wcao/water/basin/tc_gr.html); ← Upper Snake  
<http://www.usbr.gov/pn/hydromet/burtea.html> ← Upper Colorado  
[http://www.usbr.gov/uc/water/basin/tc\\_cr.html](http://www.usbr.gov/uc/water/basin/tc_cr.html) ← Upper Colorado  
<http://www.usbr.gov/pn/hydromet/select.html> ← Pacific Northwest  
<http://www.sevierriver.org/reservoirs/teacup-diagram-of-reservoirs/> ← Sevier River Water (UT)

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### Special Report (California) Provided by Atmospheric Group International

**Dan Gudgel**

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**HISTORIC 2013 DROUGHT SHATTERS PREVIOUS RECORDS!** (Important Details below↓) The outlook for precip is becoming a major concern as official news of the severity of the 2013 Drought is published. The 16Day Outlook from the GFS ending Thursday, January 16th shows most of CA bone **DRY!** The numbers crunched today highlight the seriousness of the developing Drought situation, which is in new record territory for the State of CA.

**Wx Headline; Critical Temps are likely Wednesday morning at the coldest Stations, with freezing temps at the coldest Ag Stations for the next week.**

**...and the seemingly endless broken record continues with dry air** producing clear skies with a wide range of diurnal temps. Sunny skies and record-setting warm afternoon temps followed by clear skies overnight producing rapid radiational cooling for cold frosty minimum temps in the morning. The trend for wide diurnal temp spreads continues this week with minor fluctuations occurring each day. Many Eastside Citrus Belt Stations are experiencing nightly episodes of downsloping drainage winds overnight which modifies temps by a few degrees thru adiabatic heating and this is likely to continue. Regions along the Westside, Lake Bottoms and wind sheltered spots of the Eastside continue to experience strong radiational cooling with **22 SJV stations reporting Critical temps 28° or below last night, with the coldest temp in the SJV Ag Districts dipping to 25°!** The easterly downsloping winds each night are continuing to advect extremely dry air into CENCAL, thereby compounding the extreme variance in the diurnal temp range.

**HISTORIC RECORD-SETTING DRYNESS** occurred Tuesday, New Years Eve at most official Stations throughout the entire State of CA for the Annual Calendar Year, Jan-Dec 2013 Precip Total (Not the Water Year Oct-Sep). Many NWS WFO's are still sifting thru their Record Books, so the list below is still incomplete, but many of the precip totals listed are extraordinary and supersede the greatest drought years in CA history by leaps! For example, San Francisco (the oldest wx record in CA) shattered its previous record 1917, 96 years ago by a whopping shortage of -3.41 inches, a 38% decrease from the previous record! In addition **one of the most stunning new records is at one of the most important Stations in CA, Shasta Dam, which shattered its previous dry year by a whopping -11.10 inches!** The list below ↓ illustrates how many Stations smashed their old records from the Great 1976 Drought Year! All the Stations listed below recorded new record dryness for the 12 month period. None is more impressive than the 7.50 inch record at Ukiah, beating the old record set in 1976 of 14.10 by 47%! WOW! We will add to the list as they are compiled. The future Water Outlook is appearing more bleak by the day as the GFS forecast model remains steadfastly DRY thru Jan 15th. Here is a preliminary glance at a few of the NEW RECORD-SETTING LOW PRECIP totals for 2013 (more to come);

## Weekly Snowpack and Drought Monitor Update Report

<u>Station</u>	<u>2013 New Record</u>	<u>Previous Record</u>	<u>Average</u>	
NO Sierra 8-Stn Index	16.48	18.90 set in 1976	50.00	Important Water Supply Index
	record beat by -2.42 inches, 13% decrease			
SO Sierra 5-Stn Index	10.48	17.92 set in 1908	40.80	Important Water Supply Index
	record shattered by -7.44 inches, 41% decrease			
Fresno	3.01	3.55 set in 1947	11.50	
Hanford	2.24	3.37 set in 1947	8.96	
Lindsay	2.91	4.03 set in 1947	12.46	
Los Banos	2.28	2.98 set in 1953	9.95	
Modesto	4.45	5.70 set in 1929	12.14	
Merced	3.79	6.00 set in 2007	12.50	
Visalia	3.47	4.10 set in 1910	10.93	
Lodgepole	11.73	18.54 set in 1953	45.48	
S Entrance YNP	10.84	13.65 set in 1976	41.25	
YNP	11.24	14.84 set in 1976	35.95	
Crescent City	28.92	33.21 set in 1976	64.03	
Eureka	16.40	21.17 set in 1976	40.33	
Ukiah	7.50 (Wow)	14.10 set in 1976	37.35	
<b>Shasta Dam</b>	16.89	27.99 set in 1976	62.72	Shattering the previous record
	by -11.10 inches, a decrease of 40%			
San Francisco	5.59 (Wow)	9.00 set in 1917	23.65	Shattering the previous 96
	year old record by a huge 62%!			
SFO	3.38	9.22 set in 1953	20.65	
Gilroy	2.56	11.88 set in 2007, 1977	20.54	
Los Gatos	3.24	9.47 set in 2007	23.08	
Newark	3.36	6.90 set in 1976	15.09	
Redwood City	3.36	8.03 set in 1976	20.32	
San Jose	3.80	6.04 set in 1929	14.90	
Oakland Dwntwn	4.24	10.02 set in 1976	23.96	Shatters the previous record by
	a decrease of -5.28 inches, 58%!			
OAK	4.89	8.65 set in 1976	20.81	
San Rafael	5.59	13.41 set in 1990	35.23	Shatters the previous record by
	-7.82 inches, a decrease by 58%			
Petaluma	5.62	8.99 set in 1976	26.65	
Calistoga	6.13	12.43 set in 1976	40.87	
Richmond	6.47	8.98 set in 1976	24.93	
Mt Diablo	6.56	8.91 set in 1976	25.04	
Ben Lomond	6.57	20.45 set in 1976	50.48	Obliterates the prior record by -
	<b>13.88 inches...a whopping 68%!</b>			
Livermore	4.50	6.41 set in 1976	15.23	
Saint Helena	4.72	10.42 set in 1976	36.64	
Napa	6.74	10.39 set in 1939	27.71	
Berkeley	6.76	9.92 set in 1929	26.74	
Cloverdale	7.77	14.52 set in 1976	43.13	
Kentfield	7.80	20.30 set in 1939	47.98	Shatters the prior record by -
	12.50 inches, a decrease by a huge 62%!			
Muir Woods	12.69	16.82 set in 1976	38.26	
Occidental	15.45	20.76 set in 1976	56.99	
King City	1.98	3.14 set in 1953	12.06	
Pinnacles	2.70	6.08 set in 1947	17.24	
Watsonville	3.18	10.66 set in 1976	23.50	
Salinas Apt	3.27	5.76 set in 1953	12.83	
Salinas	3.94	7.33 set in 1961	15.45	
Monterey	4.19	8.96 set in 1953	21.10	
Santa Cruz	5.07	11.86 set in 1929	31.35	

## Weekly Snowpack and Drought Monitor Update Report

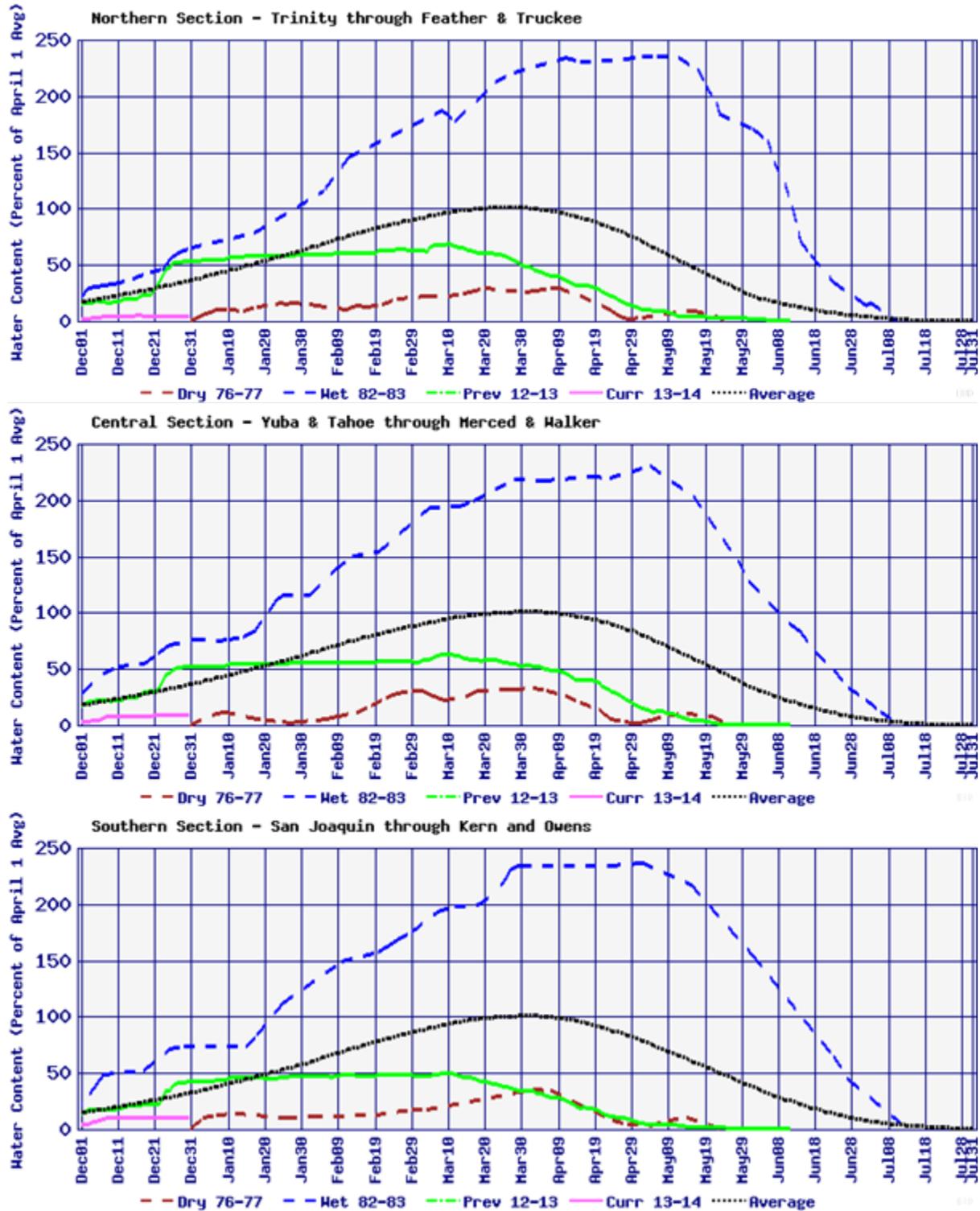
Tahoe City	8.08	9.34 set in 1976	31.55
Sacramento	6.12	6.67 set in 1976	n/a
LA Dwntrwn	3.60	4.08 set in 1953	"
Burbank	3.03	3.55 set in 1947	"
Camarillo	2.97	3.44 set in 2007	"
Santa Maria	2.99	3.30 set in 1989	"
Paso Robles	1.92	4.20 set in 2007	"

**Special Notation; THE BOTTOM LINE**...The 2013 Drought numbers tallied on Tuesday and are set forth as illustrated above and that list is incomplete by the way. The new record dry precip totals are stunning from a climate stand point. We knew that they were going to be dry, but didn't expect the magnitude of the dryness, especially spread over such a vast area. Reviewing them in detail is mindboggling to meteorologists and climatologists, and putting this bluntly...the Drought of 2013 appears to be in a new category all by itself according to how the new records fit into past climate records. The previous historic dry records have been completely demolished, being shattered by very large deficit numbers which are staggering with complications for the future health and well being of the CA economy and CA AG! With the GFS 16Day QPF Outlook not cooperating with the hint of rainfall...the news thus far this season for water is dismal at best. It would require biblical epic-type rainfall across CA to mitigate the damage that is setting up in the river water basins and the snowpack. At this point, unless the GFS radically changes its tune, thusly creating a Miracle February and a Miracle March, the CA water supply is heading for severe restrictions. The past month of December 2013 had record-setting cold, record-setting heat, record-setting dryness for the month and also ended 2013 with a truly historic unprecedented Drought! This also comes at a time in which the CPC is forecasting a hotter than average summer for CA.



## Weekly Snowpack and Drought Monitor Update Report

**CALIFORNIA SNOW WATER CONTENT;** Percent of April 1 Average, December 30, 2013 (Note the short pink lines representing the current season)



## Weekly Snowpack and Drought Monitor Update Report

Fresno had the **5th driest** start to the **Rainfall Year** on record for the 6 month period July to December

- 1) 1917 0.49
- 2) 1929 0.51
- 3) 1999 0.52
- 4) 1980 0.67
- 5) **2013 0.73**
- 6)

San Francisco had the **4th driest** start to the **Rainfall Year** on record for the 6 month period July to December

- 1) 1917 1.55
- 2) 1958 1.78
- 3) 1956 1.89
- 4) **2013 2.08**
- 5)

**Observations** this morning show the nearest precip to CA is into western MT. Satellite Imagery this morning shows a rapidly decaying cold front fizzling out over CENCAL with diminishing cloudiness. A pocket of dry air remains in the Kern River basin with dewpoints dipping into the single digits, meanwhile dewpoints are recovering slowly over the rest of CENCAL.

**24hr Precip** Summary highlights; none

**Current Synoptic RAP Charts:** The **300mb** chart shows High Pressure offshore producing a NW flow pattern aloft over the entire State of CA. A 110kt Jet Stream is diving SE into central WA, heading into ID. The **500mb** chart shows a weak NW flow pattern over CA with -14°C temps and 576dm heights over Arcata to Tahoe and 582dm heights SW of San Diego. The **700mb Freezing Line** runs from Arcata to Mt Shasta to Sierraville, with +6°C temps into the Imperial Valley. The flow pattern at this level of the atmosphere is from the NW up to 15kts. Most of CA is covered with 0.3 inch PWAT moisture with 0.4 inches from the Bay region N and NE. This dry air will allow for large diurnal swings in temps with chilly nights and mild afternoons, with some new record max temps possible. With a **MSLP of 1028mb** High Pressures across UT versus 1016mb near Imperial providing a generalized NE offshore flow pattern at the surface with light winds over the SJV with weak Santa Ana conditions for SOCAL. **Freezing Levels** over CENCAL today are up to 12,100ft, 12,100ft on Wednesday, 11,400ft on Thursday, 11,200ft on Friday, 11,600ft on Saturday, 12,000ft on Sunday.

### FORECAST SUMMARIES

**Days 1-7;**  
**Tue, Dec 31<sup>st</sup>**

**NEW YEARS EVE;** the resilient High Pressure ridge anchored near the West Coast intensifies and steepens, with the active storm track moving a long-fetched **Atmospheric River (AR)** into BC, Canada and the southern Alaskan panhandle, with heavy/warm rains trailing SW to the Dateline at 25N. Several disturbances are imbedded in the westerly flow pattern across the WPAC. Fair/mild conditions continue over CA with SJV temps in the upper 60°s to lower 70°s with **record-setting heat**, and partly cloudy skies passing thru NORCAL. Overnight mins dip down to 26° at the coldest SJV Stations. **The year ends with historic record-setting dryness for many official Stations in CA, which shatter the previous records!**

**Wed, Jan 1<sup>st</sup>**

**HAPPY NEW YEAR;** the strong resilient 576dm High Pressure moves onshore over the West Coast and into western Canada. The ridge builds northward into the Yukon, Canada, with the heavy **AR** warm rains continuing into southern Alaska, the BC, Canada and WA coastal regions along the western flank of the ridge. CA remains tranquil, fair and mild with a weak NE flow pattern and some cloudiness over NORCAL. Overnight the warm rains spread down to southern OR, then trail to the SW to a Low Pressure trough developing north of Hawaii. In addition to the WPAC **AR**, a new subtropical plume of moisture erupts at 140W and flows northward, attaching to the main AR that is already

## Weekly Snowpack and Drought Monitor Update Report

flowing into Vancouver and WA. SJV temps range from the upper 60°s to lower 70°s with **record-setting heat possible**, as minimums dipping as low as 27°/28°

**Thu, Jan 2<sup>nd</sup>**

As the offshore High Pressure flattens a vort disturbance approaches the Olympic Peninsula producing heavy rains into WA. The warm **AR** rains spread thru OR, with partly cloudy skies reaching NORCAL. The trough north of Hawaii develops into a strong Low Pressure storm near 40N 160W, which pulls a subtropical plume of moisture northward at 140W that flows into the **AR** moisture plume which is traveling into Vancouver and the PACNW. Overnight High Pressure once again noses northward and severs the AR moisture feed into the PACNW. Fair skies continuing over CENCAL produce max temps into the upper 60°s with the hot spots reaching 70° and minimum temps dipping as low as the upper 20°s and lower 30°s.

**Fri, Jan 3<sup>rd</sup>**

A split flow pattern develops in the mid PAC basin near 160W with a mid Low Pressure anchoring the southern branch split, with the northern branch Jet Stream traveling thru southern Alaska. The southern branch Jet Stream is aimed near Hawaii at 110kts from the NW and continues to reach eastward toward 140W. High Pressure offshore west of CA blocks all storm activity northward into southern Alaska and the BC, Canada coastline with heavy rains. Fair skies and mild temps near persistence continue over CENCAL with a northerly flow aloft developing over CA. SJV Temps range into the 60°s with mins down as low as 30°

**Sat, Jan 4<sup>th</sup>**

The resident and very resilient 576dm High Pressure ridge moves over CA and to the NW, with a NW flow pattern developing over the PACNW as cold air slides down the eastern flank of the ridge down thru BC, Canada and a broad trough digs SW into the Midwest States. The large Low Pressure trough at 40N 150W continues to pump up a subtropical plume of moisture along 140W which travels northward partially wrapping around the storm center and partially tearing away and moving toward the Vancouver and Olympic region while CA remains fair/dry with SJV temps in the 60°s and mins down to 28° at the cold spots.

**Sun, Jan 5<sup>th</sup>**

The mega ridge extends from west of CA, NW into the North Pole region with ARCTIC air spilling southward along the east flank of the ridge into central Canada and then dives southward into the CONUS with the base of the ARCTIC trough reaching the SE States! The large storm system in the mid PAC continues to influence the subtropical plume of moisture erupting from the ITCZ at 140W, flowing northward with some of that moisture reaching the BC, Canada coastline and the bulk of the moisture wrapping into the main storm circulation moving into southern Alaska. CA remains fair/mild and dry with SJV temps cooling slightly.

**Mon, Jan 6<sup>th</sup>**

The High Pressure ridge moves onshore over the West Coast with minor vort disturbances moving into western Canada carrying a long-fetched Atmospheric River of moisture into the Alaskan peninsula and BC, Canada, spreading southward to southern OR, as the subtropical moisture plume erupting at 140W flows toward NORCAL. Partly cloudy skies and showers reach the NW coastal region. CENCAL remains mostly fair/mild and dry.

**Days 8-16, Long Range into Fantasyland Outlook; Day 8 begins;**

**Interesting notation;** the GFS suggests a **Tropical Cyclone** development in the WPAC around Jan 11th. Models have been suggesting this feature for several days so it has growing confidence. By Jan 12<sup>th</sup> the GFS suggests that the Tropical Cyclone will begin to transport copious amts of moisture northward into the westerlies. The infusion of energy and moisture into the Westerlies generates a long-fetched **Atmospheric River** crossing the PAC basin with the moisture flowing into southern Alaska and BC, Canada. The end of the Fantasyland GFS forecast charts on Thu, Jan 16<sup>th</sup> shows the

## Weekly Snowpack and Drought Monitor Update Report

Tropical Cyclone dissipating with the remnant moisture field attached to the long-fetched **Atmospheric River**, feeding high PWAT moisture content across the entire PAC basin into the Alaskan Panhandle and western Canada.

**Tue, Jan 7<sup>th</sup>** shows weak High Pressure nosing over CA as a weak front dies out as it reaches into NORCAL, with the impressively long **AR** reaching across the entire PAC basin from the ITCZ at 140E NE all the way to southern Alaska down to WA with heavy warm rains. The position of the ridge nosing over NORCAL creates a NE flow pattern over CA with a few clouds spilling over the ridge into NV.

**Wed, Jan 8<sup>th</sup>** shows the long-fetched **AR** still flowing across the PAC basin with torrential flooding rains pounding the BC, Canada coastline, as High Pressure creates a north flow pattern over CA with partly cloudy skies reaching into NORCAL.

**Thu, Jan 9<sup>th</sup>** shows High Pressure dominant offshore west of CA, with a zonal westerly moist flow stretching across the PAC basin from Japan to BC, Canada, with the downwind flank of the ridge carrying some moisture into parts of NV while most of CA has an offshore NE flow pattern.

**Fri, Jan 10<sup>th</sup>** shows 576dm High Pressure over all of CA, with an clockwise circulation producing an offshore flow over SOCAL. The moist zonal westerly flow continues across the PAC basin with several disturbances imbedded within the flow aiming for BC, Canada.

**Sat, Jan 11<sup>th</sup>** shows a lull in the storm activity over the GOA with a disturbance moving eastward thru BC, Canada and partly cloudy skies over far NORCAL, with an offshore flow over SOCAL.

**Sun, Jan 12<sup>th</sup>** shows the redevelopment of strong High Pressure offshore west of CA rebuilding northward into the GOA and southern Alaska at 140W, with the resurgence of colder air diving southward thru western Canada into ID. Fair/mild/dry conditions continue over CA.

**Mon, Jan 13<sup>th</sup>** shows the High Pressure ridge alignment north/south at 130W with cold air diving southward into TX! CA remains fair/mild/dry, while the storm track is displaced northward into the Alaskan panhandle and southern Alaska and clearing skies spread across BC, Canada. A north flow pattern develops over CA.

**Tue, Jan 14<sup>th</sup>** shows High Pressure moving onshore over CA/OR/WA, with rains returning into BC, Canada. CA is very quiet with a 582dm High Pressure center located west of Pt Conception.

**Wed, Jan 15<sup>th</sup>**, shows the strong mega High Pressure ridge moving onshore over the West Coast, with a 582dm center nearing Pt Conception with CA maintaining fair/mild/dry conditions and the storm track displaced well to the north into the Alaskan panhandle region.

**Thu, Jan 16<sup>th</sup>**, the end of the Fantasyland GFS forecast charts shows **impressively strong 582dm High Pressure intensifying** over most of CA with warming temps and dry conditions continuing. Meanwhile, a large trough is locked into place mid PAC with the moisture feeding in a long sinuous curve originating from the ITCZ at 160E moving northward into the westerly flow and then traveling NE into BC, Canada.

### TEMPS

#### NEW RECORD TEMPS

<u>Station</u>	<u>New Record</u>	<u>Old Record</u>
Merced	63°	61° set in 1999
Madera	64°	58° set in 2003
Hanford	66°	61° set in 2003
Fresno	67° (Ties)	67° set in <b>1904 (A 109 year old record!)</b>
Oakland Dwntwn	64°	63° set in 1997
San Jose	66° (Ties)	66° set in 1958
SAC Exe	62°	61° set in 2011
SAC Dwntwn	62°	61° set in 2011
Paso Robles	74°	71° set in 2000

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**SJV Min Temp** highlights this morning include the following **22** Stations which reached **CRITICAL Temps of 28° or below**; **28°** at Porterville, Lindcove, New Columbia, Cow Camp, Cal Farms, Lost Hills, Scofield, Cuber, Alpaugh, Shafter, Buena Vista Lake, **27°** at Gustine, Fowler, Orange Cove, Sanger, Belridge, Orosi, Exeter, Tulare Lake, Kern Lake, **25°** at Kesterson, Lindsay

**SJV Max Temp** highlights yesterday afternoon include the following; **74°** at Lemon Cove,, Fountain Springs, Trimmer, Jasmine, Scofield, Cal Farms, Lindsay, Ivanhoe/Rayo, **75°** at Strathmore, Lindcove, Terra Bella, Kern Cyn Powerhouse, **77°** at A.G. Wishon Powerhouse, **78°** at Ducor, Sherwood.

**Minimum Temps** this morning at the **Paramount Citrus** Stations ranged from the coolest minimum of a **27°** at Orosi and Belridge, rising to the warmest minimum of **35°** at Loma.

**Maximum Temps** yesterday afternoon at the Paramount Citrus Stations ranged from the coolest maximum of **66°** at Horizon and Root Creek and rising to the warmest maximum of **78°** at Ducor.

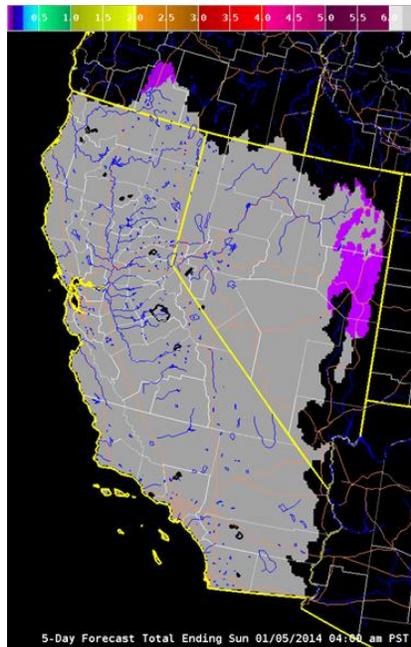
### PRECIPITATION FORECAST

#### Day 1 - 5 QPF:

At 12Z (9am) Tuesday thru the period day Saturday night (Sunday @4am) shows;

**Tue/Wed/Thu/Fri/Sat** shows all of CA **DRY**.

#### 5DAY ACCUMULATION CHART:



**Days 6 & 7 QPF** thru next **Sun/Mon** shows light amts of precip over NORCAL with up to 0.2 inches, with light amts spreading into the northern portion of CENCAL.

**16-Day QPF** estimates (from the 12Z GFS) for;

**Days 1-8** shows CA remains mostly **DRY**, with light precip >0.2 inch for NORCAL with some precip spreading into the northern portion of CENCAL.

**Days 9-16** shows CEN/SOCAL remaining **DRY** with up to 0.2 inch for the far NW Coastal region.

## Weekly Snowpack and Drought Monitor Update Report

**0Z Operational GFS 384hr, 16Day QPF Chart;** showing most of CA bone **DRY** thru Thursday, Jan 16th!

