

2015 Snowpack Status and Streamflow Outlook for the Truckee, Carson, Walker, and Humboldt River Drainages

January 9, 2015

Jeff Anderson

USDA-NRCS

Snow Survey / Water Supply Forecasting Program

Reno, NV

Hot off the press yesterday...

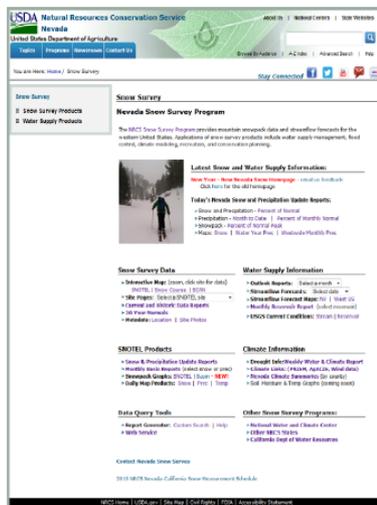
- Provides summary of snow, precipitation, soil moisture, reservoir storage, and streamflow forecasts for Nevada

- Also,
- Updated webpage
 - New Snow Products Section



Natural Resources Conservation Service

Nevada Water Supply Outlook Report January 1, 2015



New Year – New Nevada Snow Survey Homepage
www.nv.nrcs.usda.gov/snow/

This month marks the debut of a new Nevada Snow Survey Program homepage. The page provides links to snow survey data and products, as well as, water supply and climate information. Use the links to *Today's Update Reports* to find information about "percent of normal" conditions for snow and precipitation. Dropdown links access current and past *Water Supply Outlook Reports* and the most recent *Streamflow Forecast* tables. Be sure to check out the *Interactive Map* to access SNOTEL and other snow survey data. The *Snowpack Graphs* will help you track basin snowpack conditions compared to recent years. Read more about these snow graphs inside this report. Please get in touch with Jeff Anderson using the *Contact Nevada Snow Survey* link if you have questions or need help finding specific information.

Goal for 2015 – Reduce Hardcopy Mailings

- Sign up for email list
 - Get one of my cards and email me
- Why?
 - Big in-house workload ~130 people on list. FedEx color printing / postage \$9/report. Future months will be B&W, still ~\$4 each.
- This month's mailing
 - Federal Employees – letter coming pointing you to internet for future.
 - Non Federal – survey requesting change to email

Nevada Water Supply Outlook Report Mailing List Revision Survey

I would like to receive an email notification when the Nevada Water Supply Outlook Report is available online:

My Email is: _____

Please choose one of the following:

- Please take me off of the hardcopy mailing list
- Please continue to send me a hard copy version of the Nevada Water Supply Outlook Report. Please note any corrections to your mailing address below:

Paste address label here

Name: _____

Company: _____

Street: _____

City, State, Zip Code: _____

Notify us of your preference by mailing this survey or emailing your responses:

Jeff.Anderson@nv.usda.gov

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USDA Natural Resources Conservation Service
Attn: Snow Survey
1365 Corporate Blvd
Reno, NV 89502

Google: "Nevada Snow Survey" Or www.nv.nrcs.usda.gov/snow/

Nevada Snow Survey Program

The **NRCS Snow Survey Program** provides mountain snowpack data and streamflow forecasts for the western United States. Applications of snow survey products include water supply management, flood control, climate modeling, recreation, and conservation planning.



Latest Snow and Water Supply Information:

The January 1, 2015 Water Supply Outlook Report is online

New Year - New Nevada Snow Homepage - email us feedback
Click [here](#) for the old homepage

Today's Nevada Snow and Precipitation Update Reports:

- > Snow and Precipitation - Percent of Normal
- > Precipitation - Month to Date | Percent of Monthly Normal
- > Snowpack - Percent of Normal Peak
- > Maps: Snow | Water Year Prec | Westwide Monthly Prec

Snow Survey Data

- > **Interactive Map:** (zoom, click site for data)
SNOTEL | Snow Course | SCAN
- > **Site Pages:**
- > **Current and Historic Data Reports**
- > **30 Year Normals**
- > **Metadata:** Location | Site Photos

SNOTEL Products

- > **Snow & Precipitation Update Reports**
- > **Monthly Basin Reports** (select snow or prec)
- > **Snowpack Graphs:** SNOTEL | Basin - **NEW!**
- > **Daily Map Products:** Snow | Prec | Temp

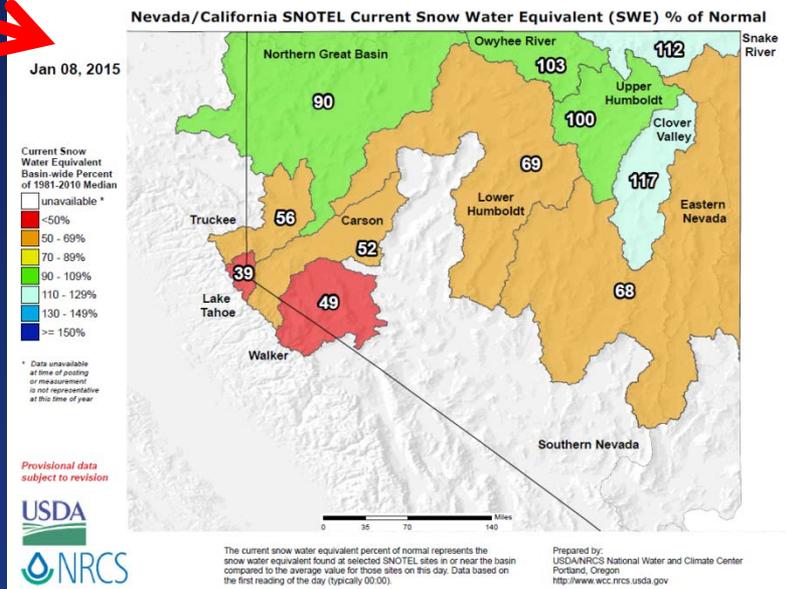
Water Supply Information

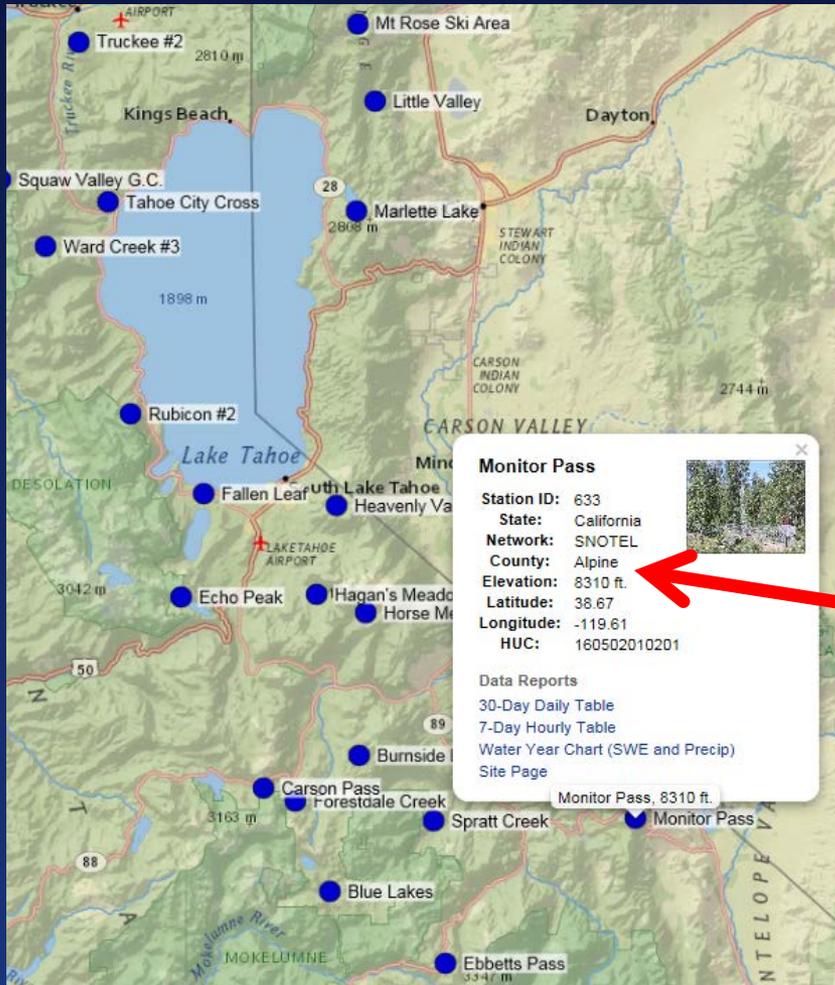
- > **Outlook Reports:**
- > **Streamflow Forecasts:**
- > **Streamflow Forecast Maps:** NV | West US
- > **Monthly Reservoir Report** (select reservoir)
- > **USGS Current Conditions:** Stream | Reservoir

Climate Information

- > **Drought Info: Weekly Water & Climate Report**
- > **Climate Links:** (PRISM, AgACIS, Wind data)
- > **Nevada Climate Summaries** (by county)
- > **Soil Moisture & Temp Graphs** (coming soon)

California/Nevada SNOTEL Snow/Precipitation Update Report							
Based on Mountain Data from NRCS SNOTEL Sites							
Provisional data, subject to revision							
Data based on the first reading of the day (typically 00:00) for Thursday, January 08, 2015							
Basin Site Name	Elev (ft)	Snow Water Equivalent			Water Year-to-Date Precipitation		
		Current (in)	Median (in)	Pct of Median	Current (in)	Average (in)	Pct of Average
NORTHERN GREAT BASIN							
Sheldon	5860	0.8	0.0	0	5.7	3.1	184
Disaster Peak	6500	2.6	3.1	84	7.9	8.2	96
Cedar Pass	7030	4.8	7.3	66	13.1	11.6	113
Dismal Swamp	7360	11.0	10.9	101	19.0	18.3	104
Summit Lk	7609	4.3	N/A	0	7.3	N/A	0
Basin Index (%)				90			111
TRUCKEE RIVER							
Mt Rose Ski Area	8801	8.4	15.6	54	11.5	21.6	53
Independence Lake	8352	11.8	15.3	77	14.1	18.1	78
Big Meadow	8249	5.2	7.2	72	7.8	11.7	67
Squaw Valley G.C.	8029	12.5	18.7	67	15.9	26.6	60
Independence Camp	7003	1.6	7.2	22	8.6	12.8	67
Css Lab	6855	6.7	14.3	47	21.1	26.1	81
Independence Creek	6456	1.6	5.7	28	7.6	12.9	59
Truckee #2	6509	3.4	7.1	48	8.5	13.4	63
Basin Index (%)				56			66





Snow Survey

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- > [Snowpack - Percent of Normal Peak](#)
- > [Maps: Snow](#) | [Water Year Prec](#) | [Westwide Monthly Prec](#)

Snow Survey Data

- > [Interactive Map](#): (zoom, click site for data)
[SNOTEL](#) | [Snow Course](#) | [SCAN](#)
- > [Site Pages](#):
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- > [Outlook Reports](#):
- > [Streamflow Forecasts](#):
- > [Streamflow Forecast Maps](#): [NV](#) | [West US](#)
- > [Monthly Reservoir Report](#) (select reservoir)
- > [USGS Current Conditions](#): [Stream](#) | [Reservoir](#)

SNOTEL Products

- > [Snow & Precipitation Update Reports](#)
- > [Monthly Basin Reports](#) (select snow or prec)
- > [Snowpack Graphs](#): [SNOTEL](#) | [Basin](#) - **NEW!**
- > [Daily Map Products](#): [Snow](#) | [Prec](#) | [Temp](#)

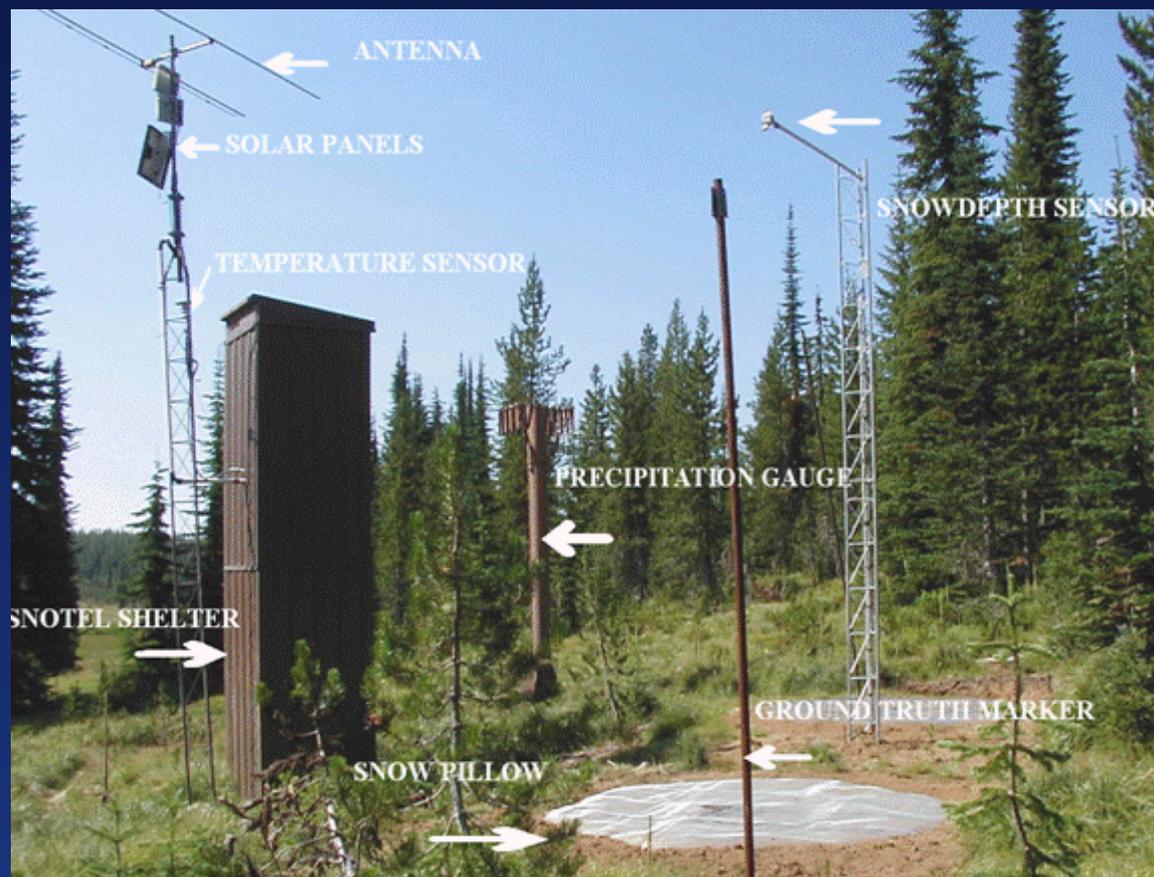
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What is a SNOTEL Site?

Automated Weather Station
that measures...

- SWE
- Cumulative precipitation
- Temperature
- Snow Depth
- Soil moisture / temperature
(2",8",20") +10yrs data
- In NV & East Sierra
43 sites have data
back to 1981



Snow Water Equivalent (SWE) is a common snowpack measurement. It is the amount of **water** contained within the snowpack. It can be thought of as the depth of **water** that would theoretically result if you melted the entire snowpack instantaneously.

$$\text{Snow Depth (in)} * \text{Density} = \text{SWE (in)}$$

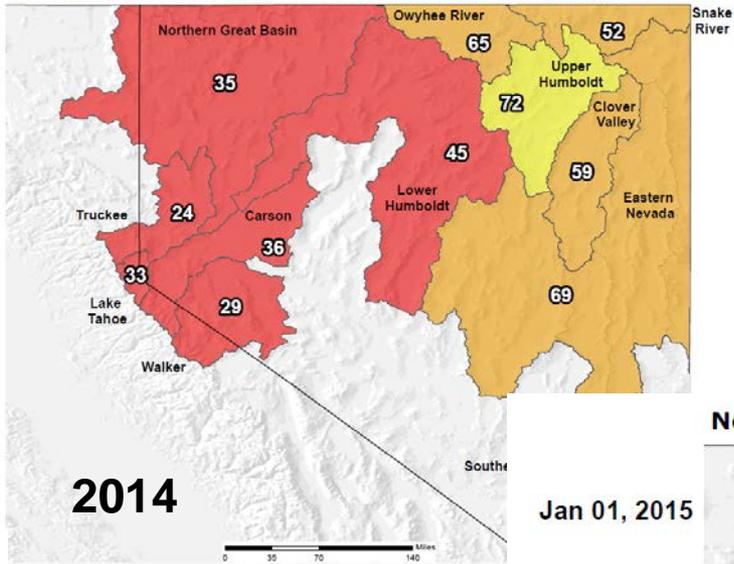
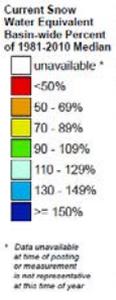


Nevada/California SNOTEL Current Snow Water Equivalent (SWE) % of Normal



Snowpack

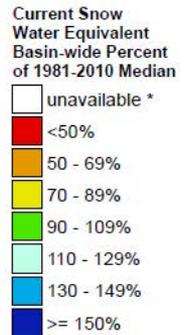
Jan 01, 2014



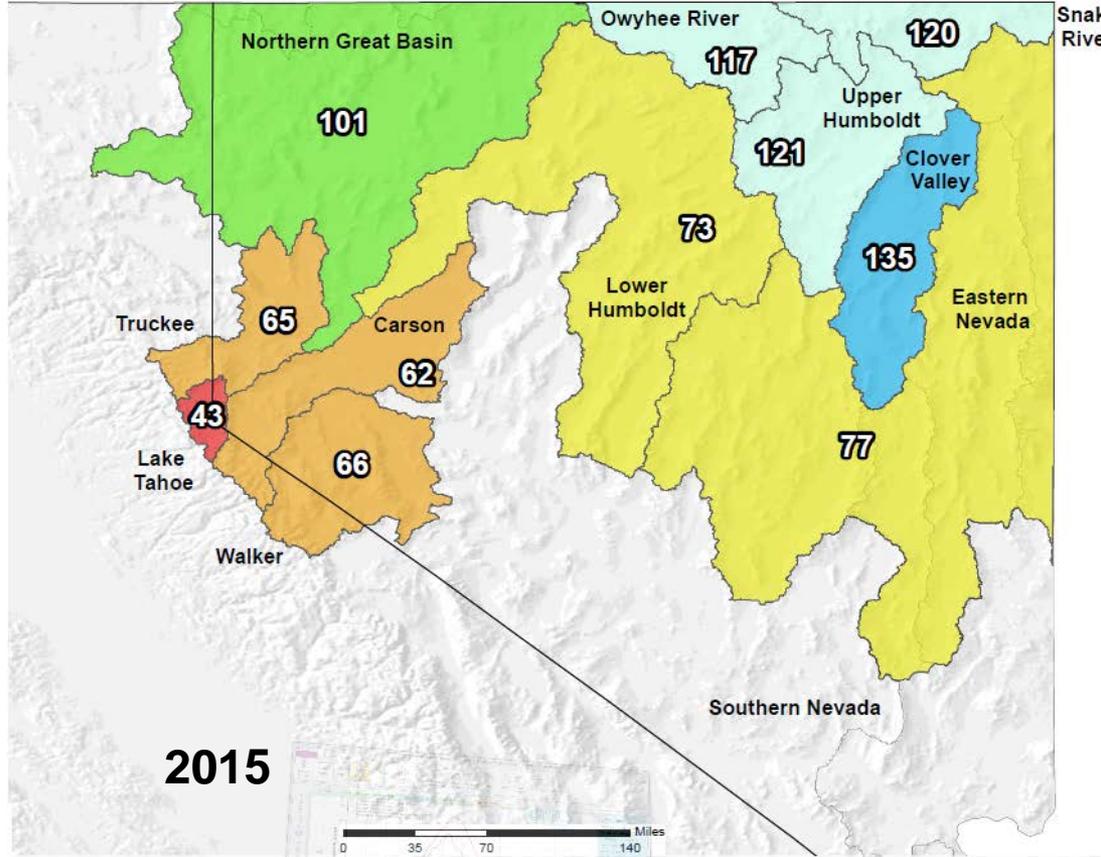
2014

The current snow water equivalent percent of normal represents the snow water equivalent found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Jan 01, 2015



Nevada/California SNOTEL Current Snow Water Equivalent (SWE) % of Normal



2015

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Prepared by: USDA/NRCS National Water and Climate Center Portland, Oregon <http://www.wcc.nrcs.usda.gov>

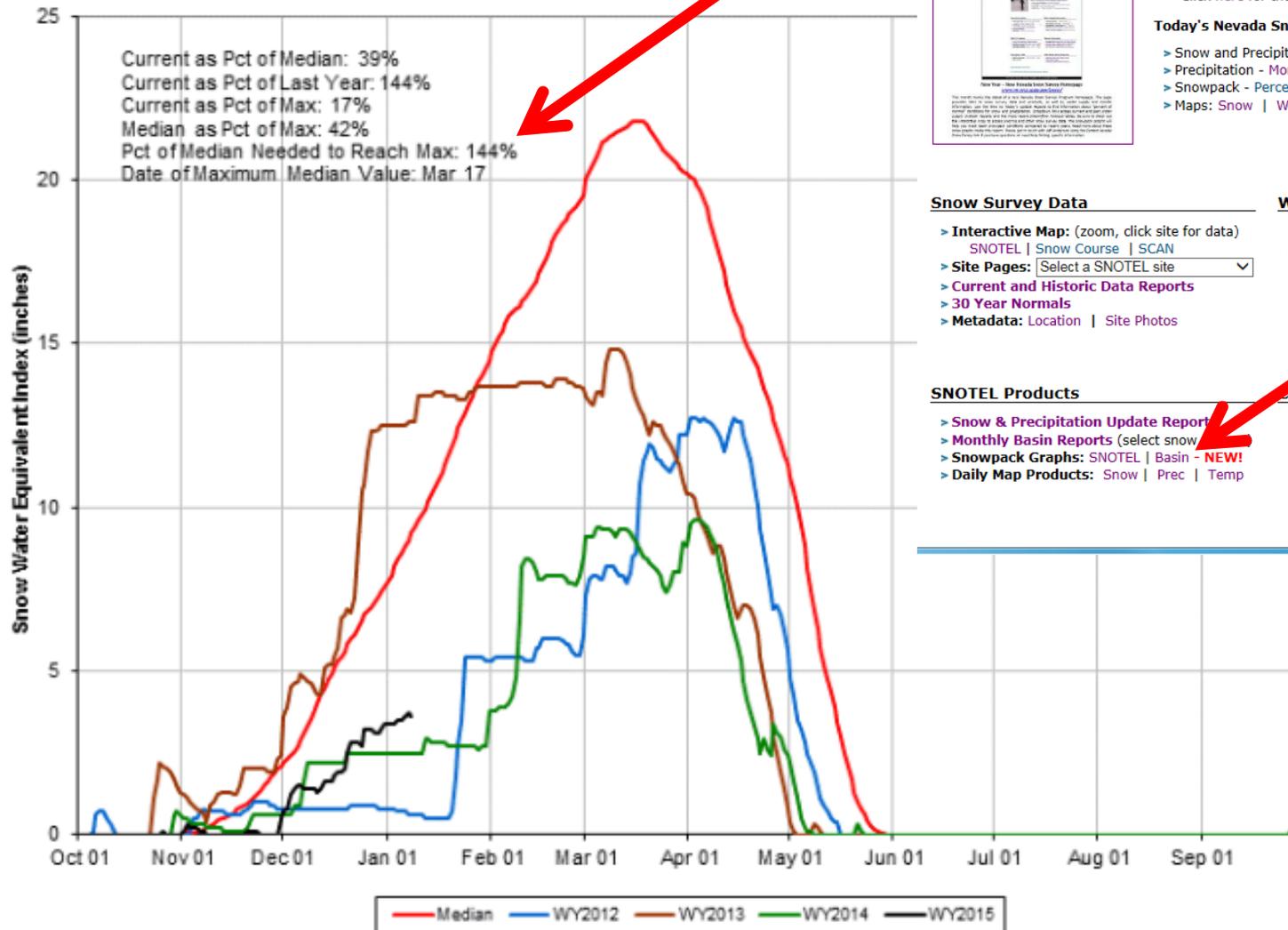
January 1 snowpack is 2-3 times better than last year.

Provisional data subject to revision



United States Department of Agriculture Natural Resources Conservation Service

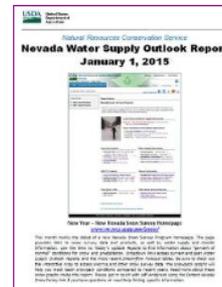
Lake Tahoe



Snow Survey

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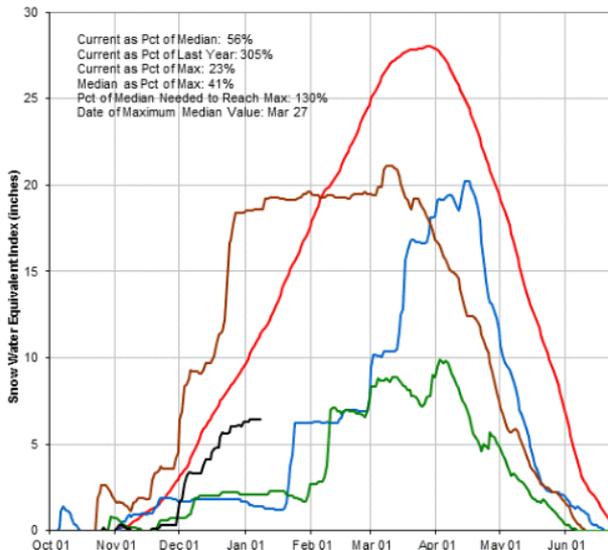
SNOTEL Products

- > Snow & Precipitation Update Report
- > Monthly Basin Reports (select snow)
- > Snowpack Graphs: [SNOTEL](#) | Basin - **NEW!**
- > Daily Map Products: [Snow](#) | [Prec](#) | [Temp](#)

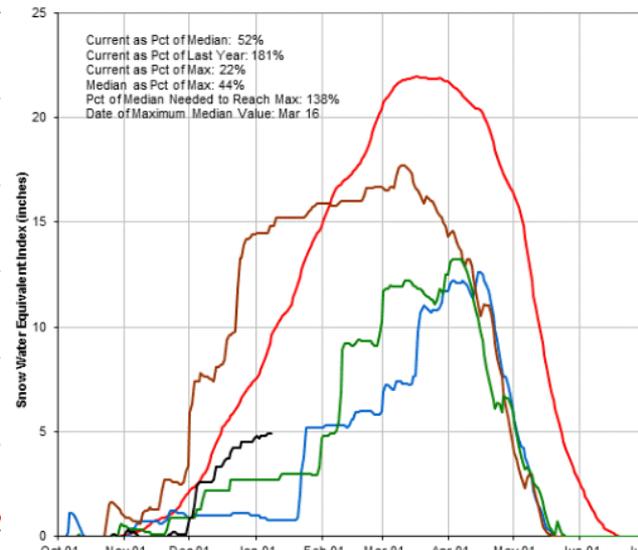
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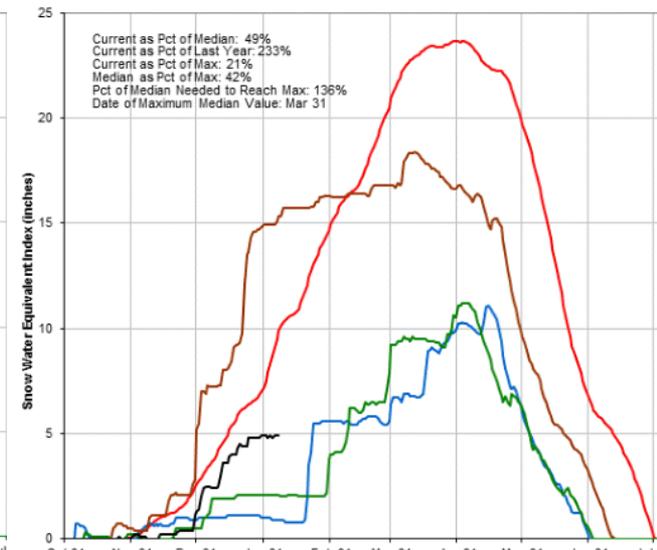
Truckee Basin



Carson Basin



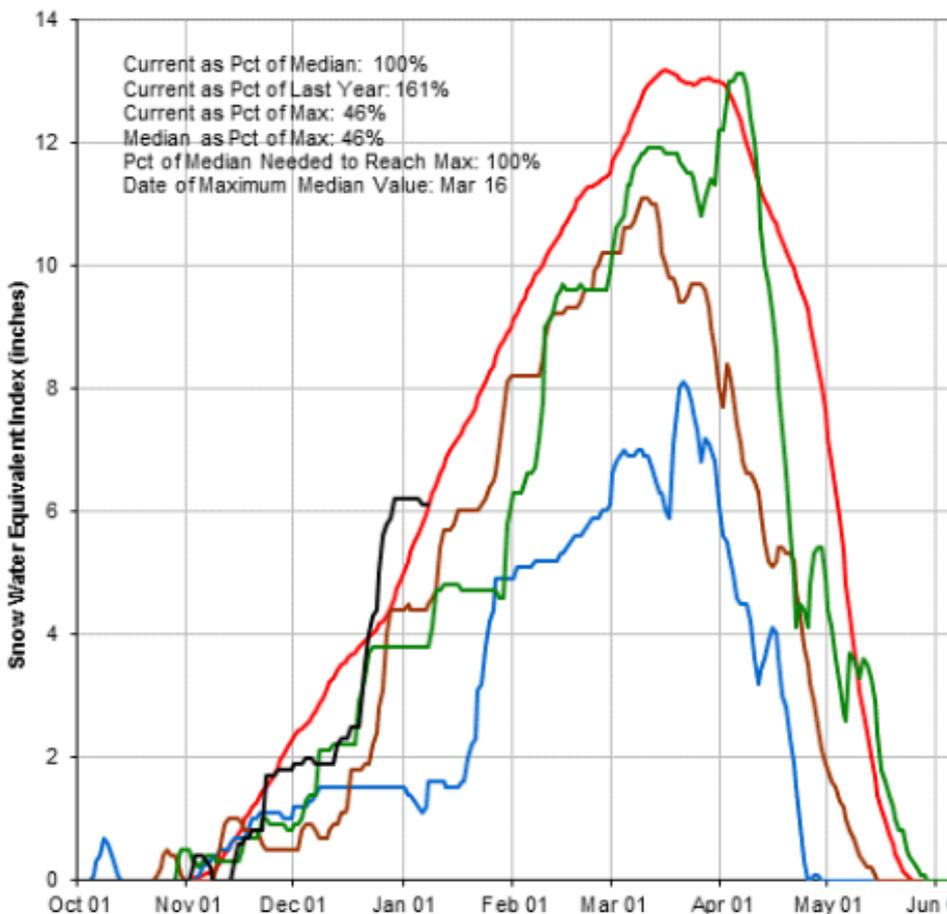
Walker Basin



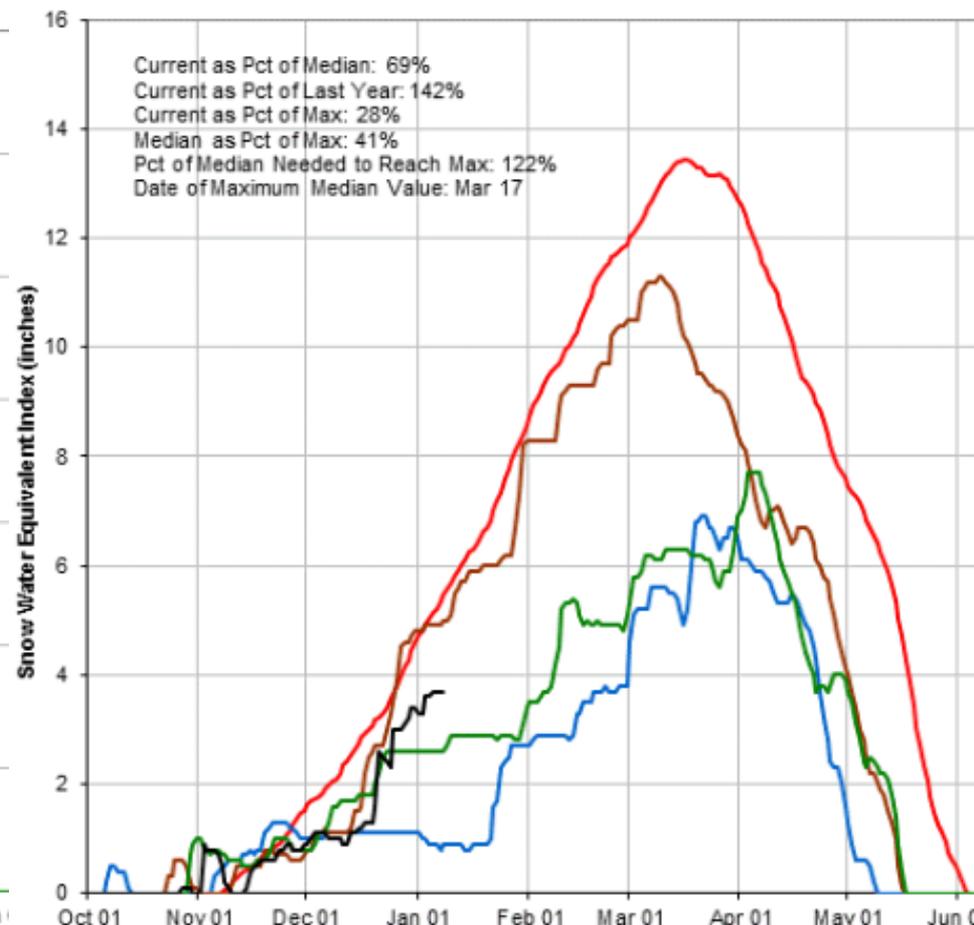
Again, 2015 Better than 2012 and 2014

But, 130-138% of normal snow is needed to reach normal peak.

Upper Humboldt Basin

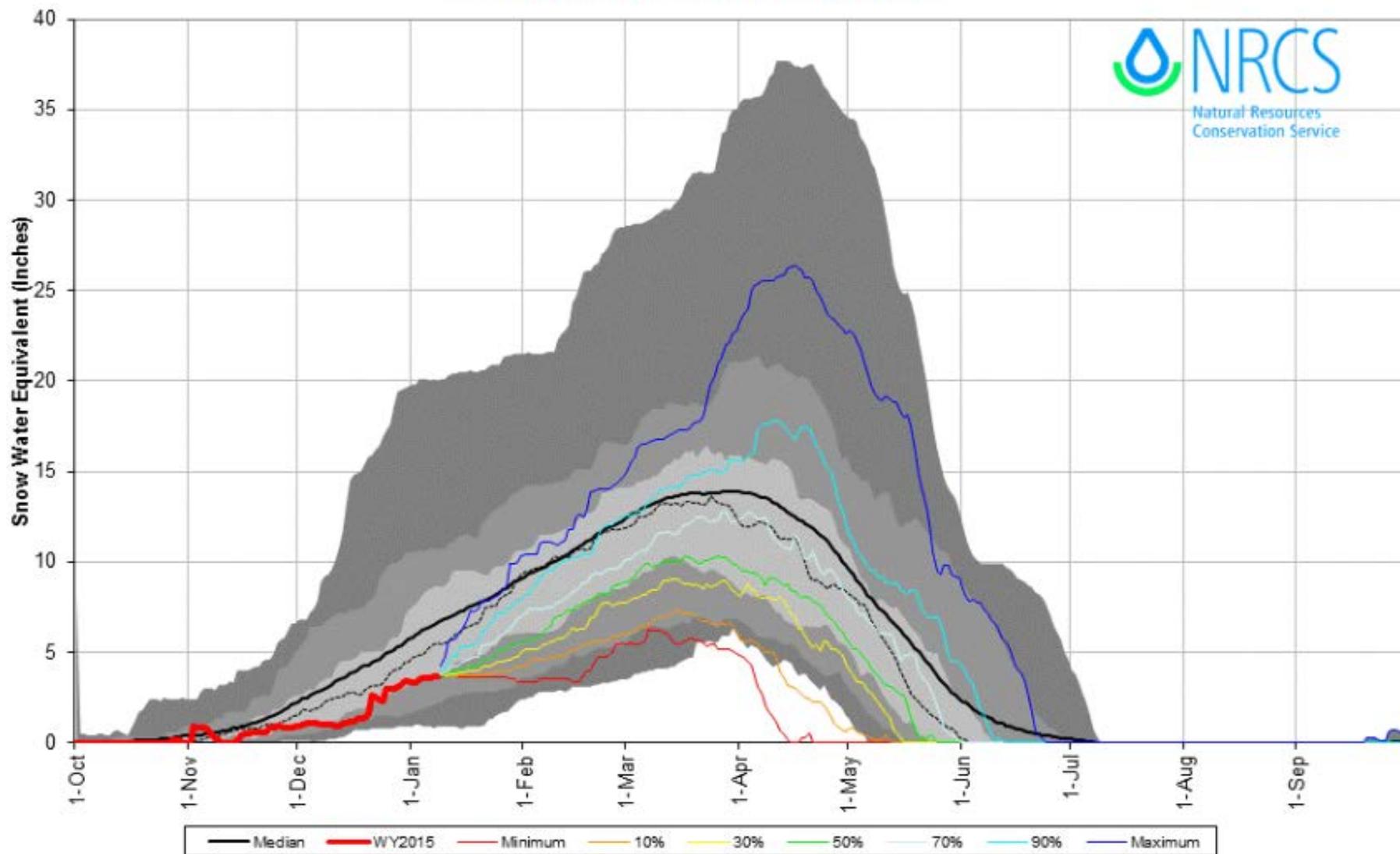


Lower Humboldt Basin



Lower Humboldt with Non-Exceedence Projections

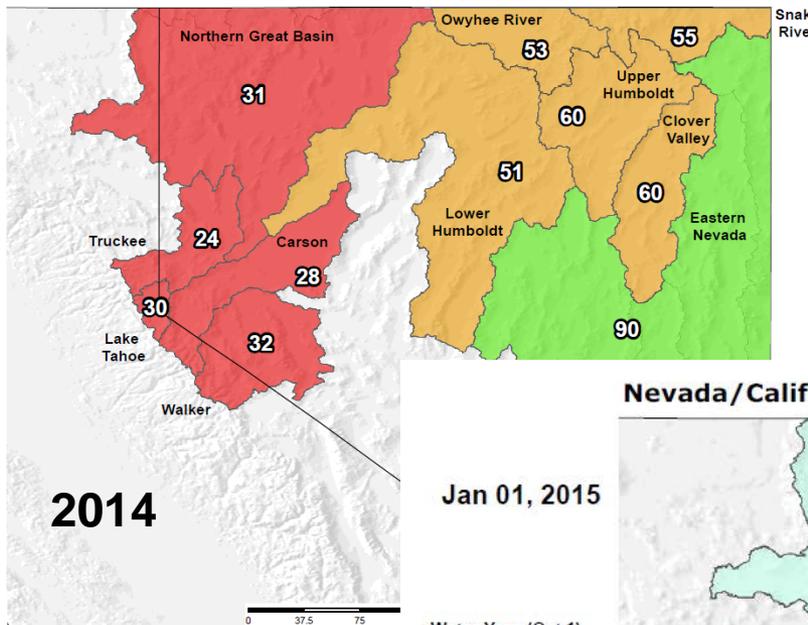
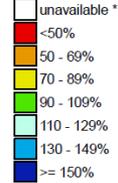
Based on Provisional SNOTEL Data as of Jan 08, 2015



Precipitation

Jan 01, 2014

Water Year (Oct 1) to Date Precipitation Basin-wide Percent of 1981-2010 Average



* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional data subject to revision

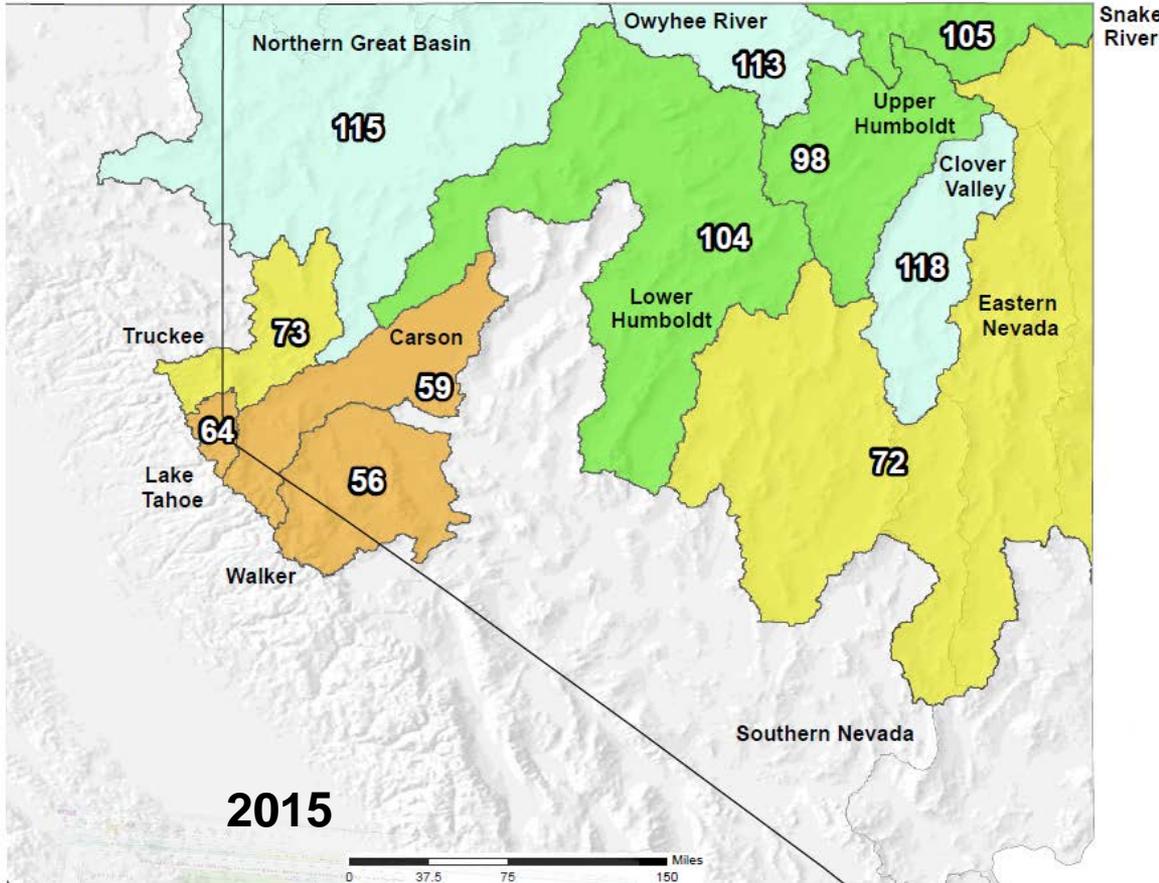
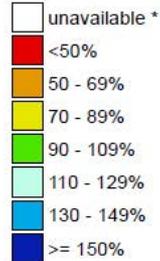


2014

Nevada/California SNOTEL Water Year (Oct 1) to Date Precipitation % of Normal

Jan 01, 2015

Water Year (Oct 1) to Date Precipitation Basin-wide Percent of 1981-2010 Average



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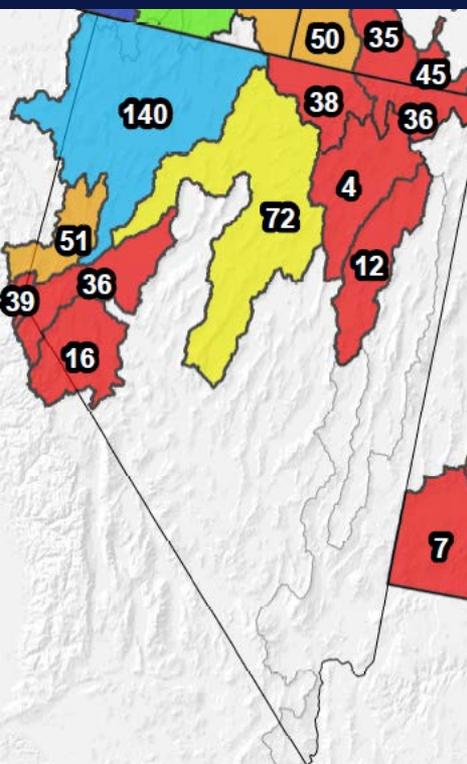


2015

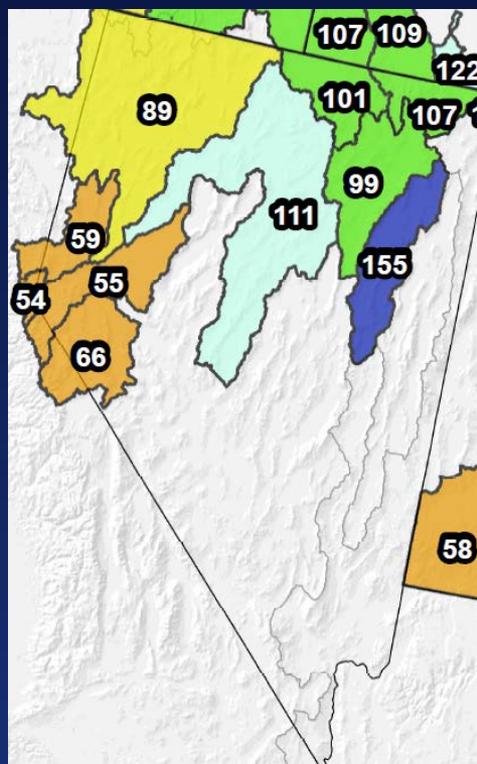
The water year to date precipitation percent of normal represents the accumulated precipitation found at selected SNOTEL sites in or near the basin compared to the average value for those sites on this day. Data based on the first reading of the day (typically 00:00).

Prepared by:
USDA/NRCS National Water and Climate Center
Portland, Oregon
<http://www.wcc.nrcs.usda.gov>

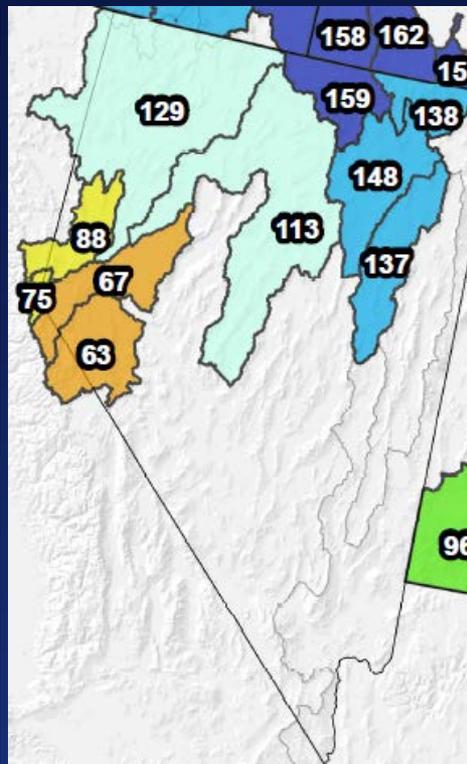
Monthly SNOTEL Precipitation as % of Average



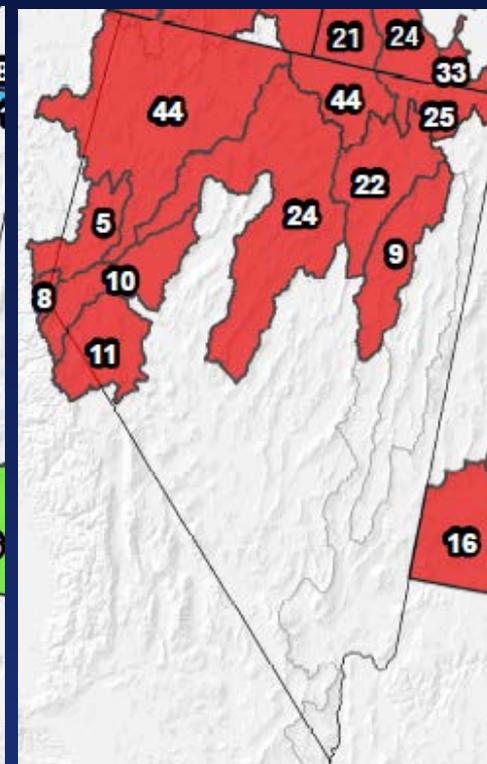
October 2014



November 2014



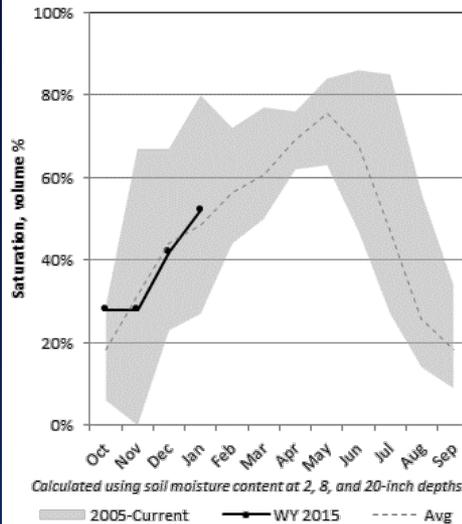
December 2014



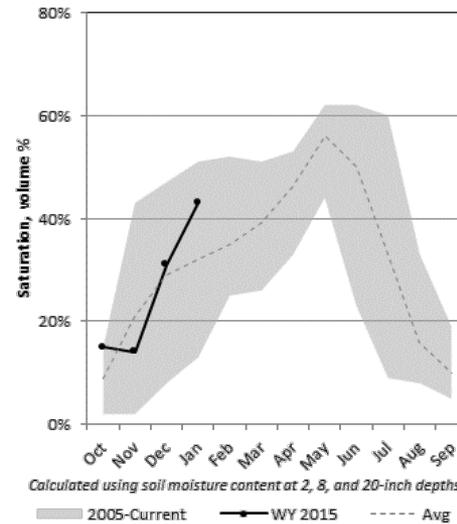
January 1-8, 2015

Soil
Moisture
is
average
or
better

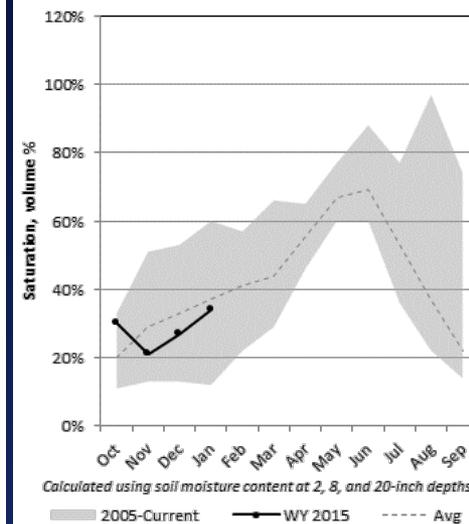
Lake Tahoe Basin



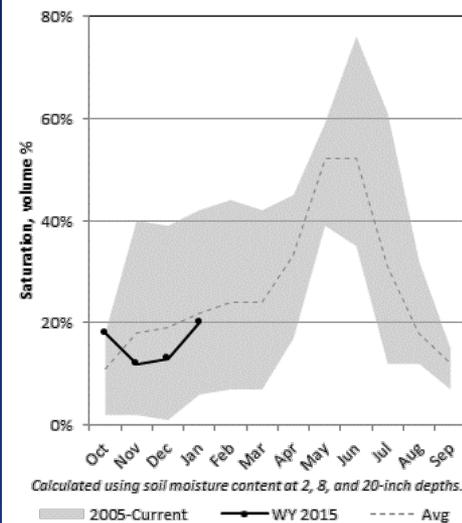
Truckee River Basin



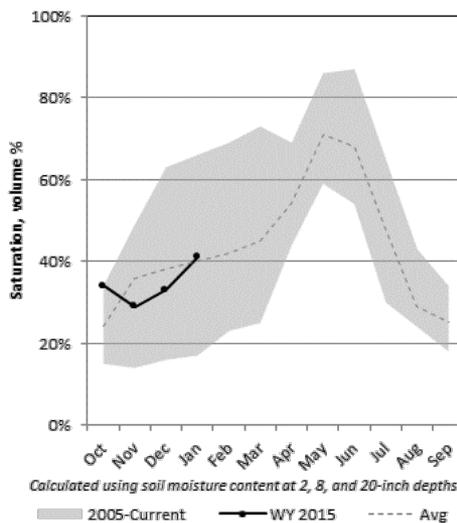
Carson River Basin



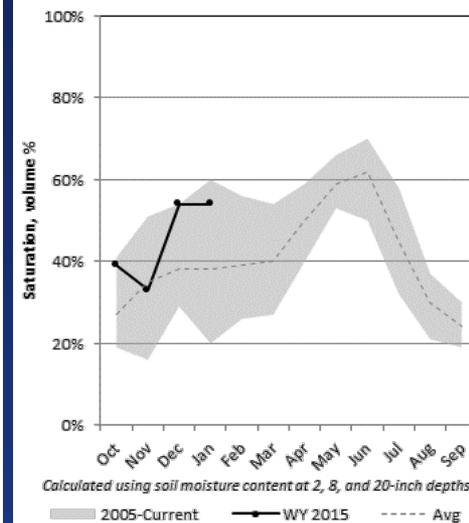
Walker River Basin



Upper Humboldt River Basin

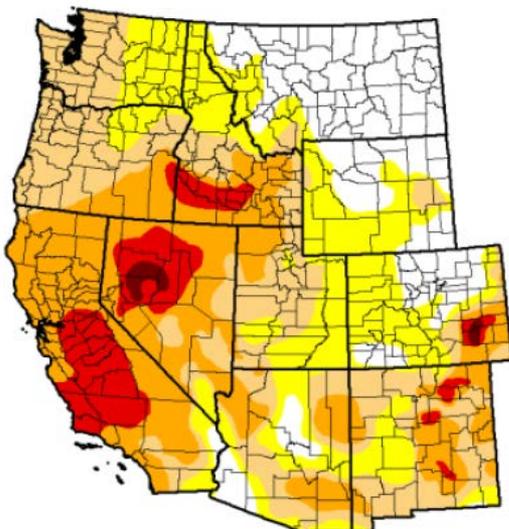


Lower Humboldt River Basin

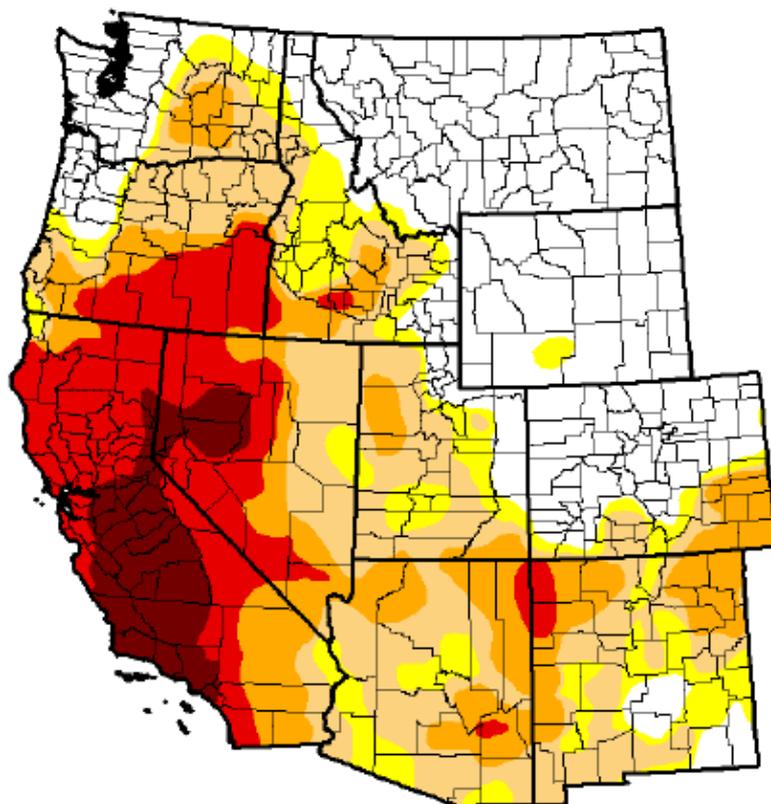


Status of the Drought

January 7, 2014
(Released Thursday, Jan. 9, 2014)
Valid 7 a.m. EST



U.S. Drought Monitor West



January 6, 2015
(Released Thursday, Jan. 8, 2015)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	34.82	65.18	54.24	33.31	18.57	5.40
Last Week 12/30/2014	34.78	65.24	54.48	33.50	18.68	5.40
3 Months Ago 10/7/2014	31.51	68.48	55.52	35.65	19.95	8.90
Start of Calendar Year 12/01/2014	34.78	65.24	54.48	33.50	18.68	5.40
Start of Water Year 09/01/2014	31.48	68.52	55.57	35.65	19.95	8.90
One Year Ago 1/7/2014	18.66	81.34	57.47	32.31	8.20	0.53

Intensity:

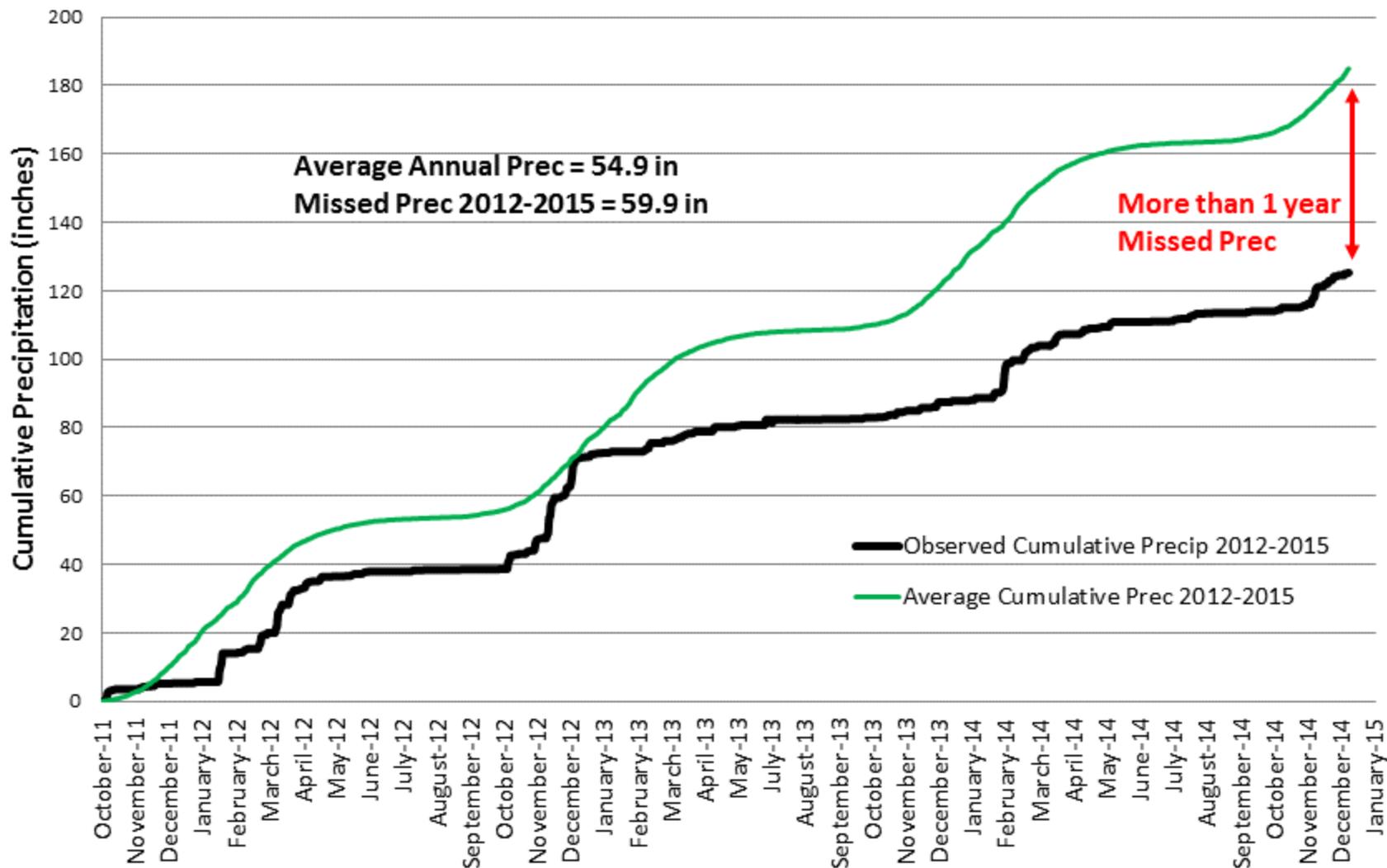
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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

Author:
Brad Rippey
U.S. Department of Agriculture



Mt Rose SNOTEL Precipitation Accumulation WY 2012-2015





(Lower Humboldt Basin)

Biggest Losers - Nevada Drought By Basin

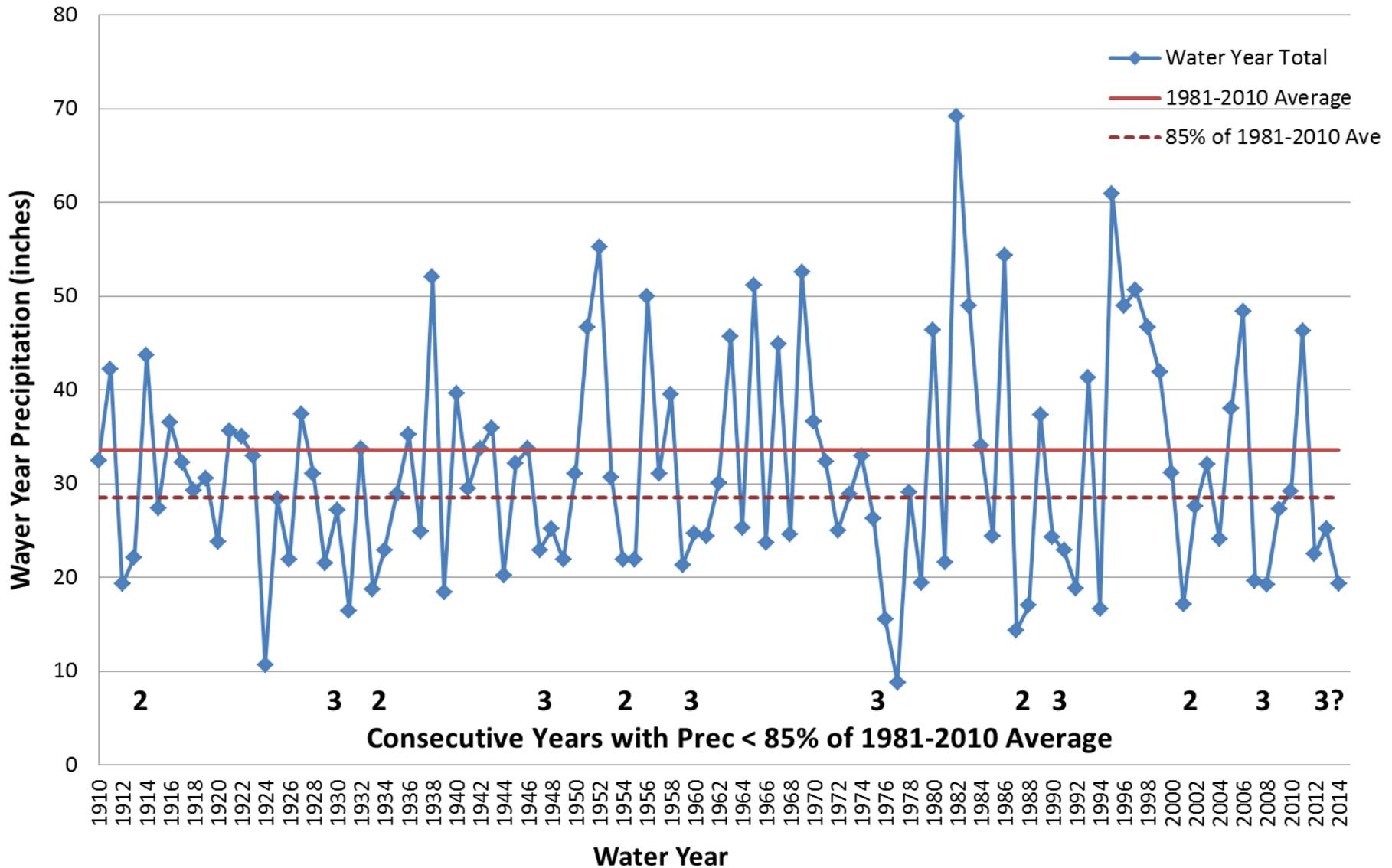
Name	# Sites	Average # Yrs Missed Prec
Walker	6	1.1
Carson	7	1.1
Truckee	8	1.0
Tahoe	7	0.8
Humboldt	10	0.6
Middle Snake - Owyhee, Burneau, Sam Falls	9	0.4
Eastern Nevada	3	0.4

Biggest Losers - Nevada Drought

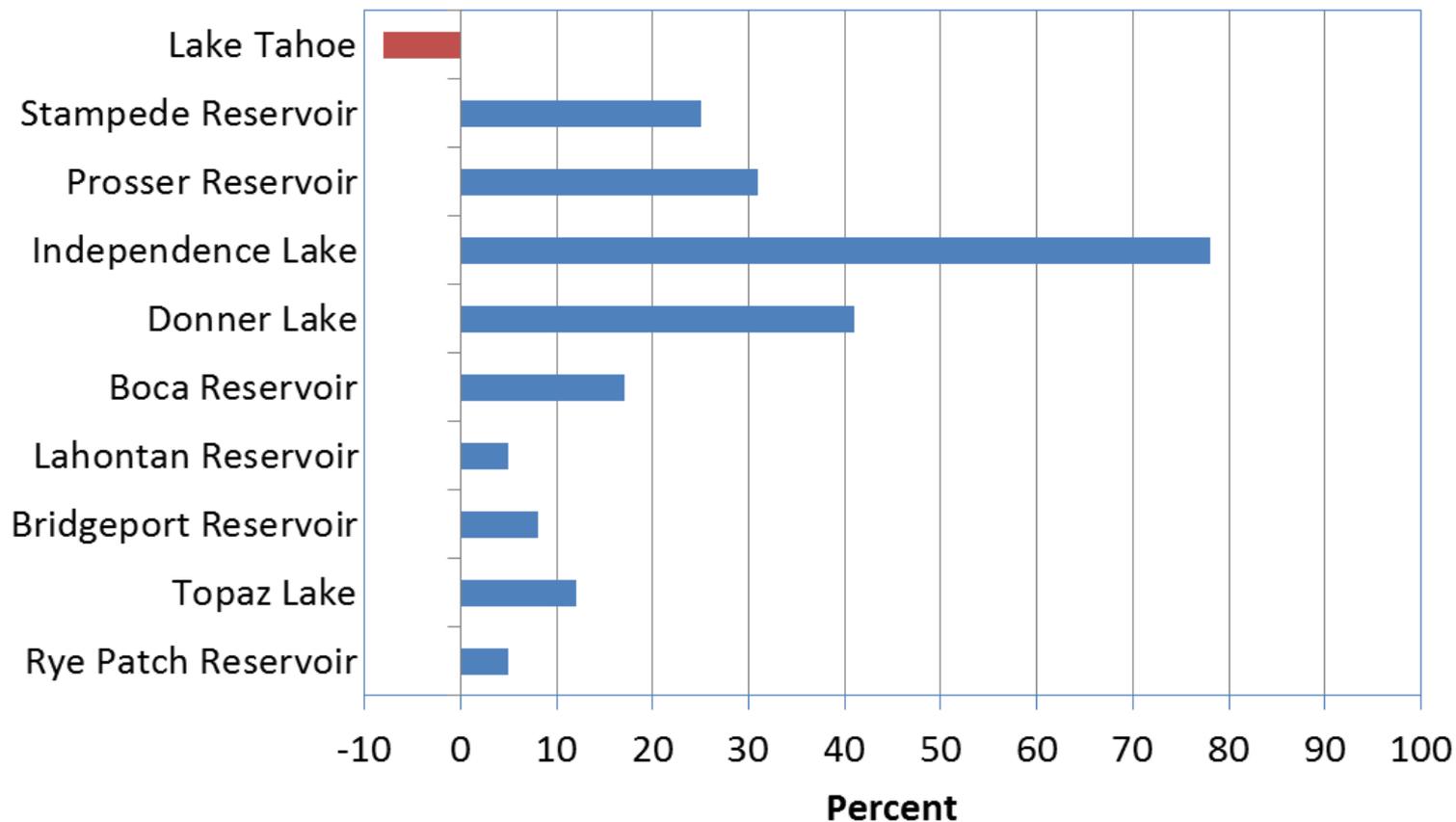
By SNOTEL Site

Station Name	Basin	2012-2015 Prec Missed	Years Prec Missed
Virginia Lakes Ridge	Walker	35.2	1.3
Poison Flat	Carson	41.7	1.3
Sonora Pass	Walker	47.0	1.3
Blue Lakes	San Joaquin	55.0	1.2
Independence Camp	Truckee	41.0	1.2
Carson Pass	Sacramento	56.2	1.2
Monitor Pass	Carson	27.8	1.2
Independence Creek	Truckee	38.3	1.2
Lobdell Lake	Walker	27.7	1.1
Burnside Lake	Carson	46.6	1.1
Leavitt Lake	Walker	59.8	1.1
Rubicon #2	Tahoe	45.9	1.1
Mt Rose Ski Area	Truckee	59.5	1.1
Squaw Valley G.C.	Truckee	70.2	1.1
Forestdale Creek	Carson	53.8	1.1
Big Meadow	Truckee	32.7	1.0
Leavitt Meadows	Walker	32.5	1.0
Spratt Creek	Carson	31.2	1.0
Truckee #2	Truckee	33.7	1.0
Horse Meadow	Carson	25.4	1.0

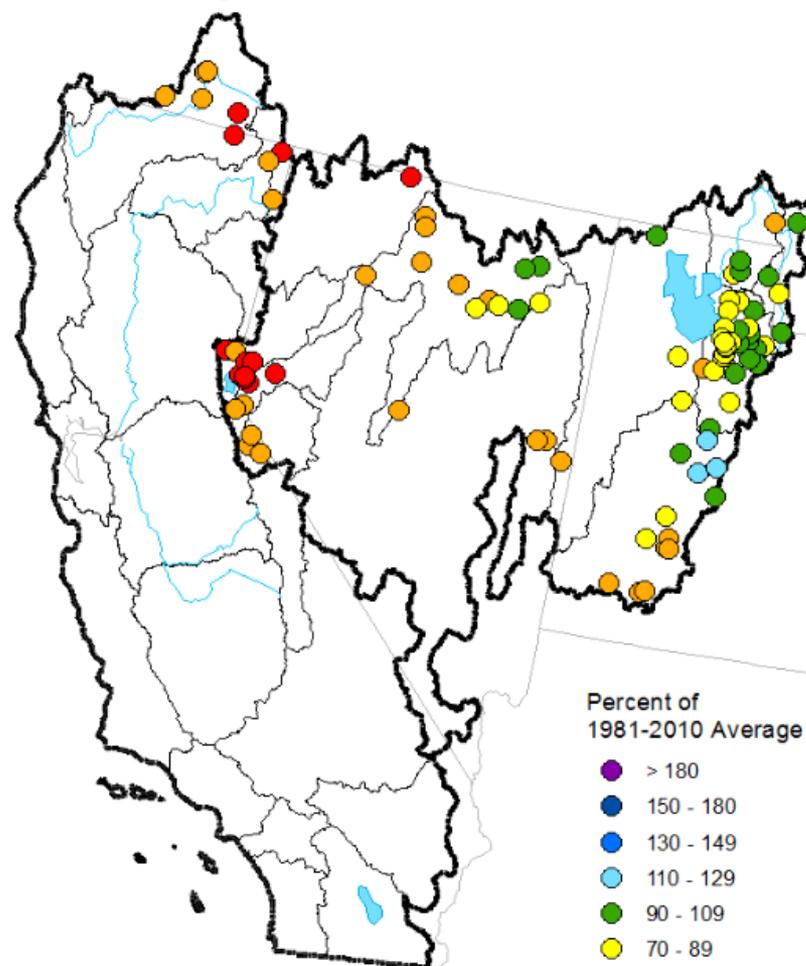
Tahoe City Precipitation (Source WRCC-DRI)



December 31, 2014 Reservoir Storage as Percent of Capacity

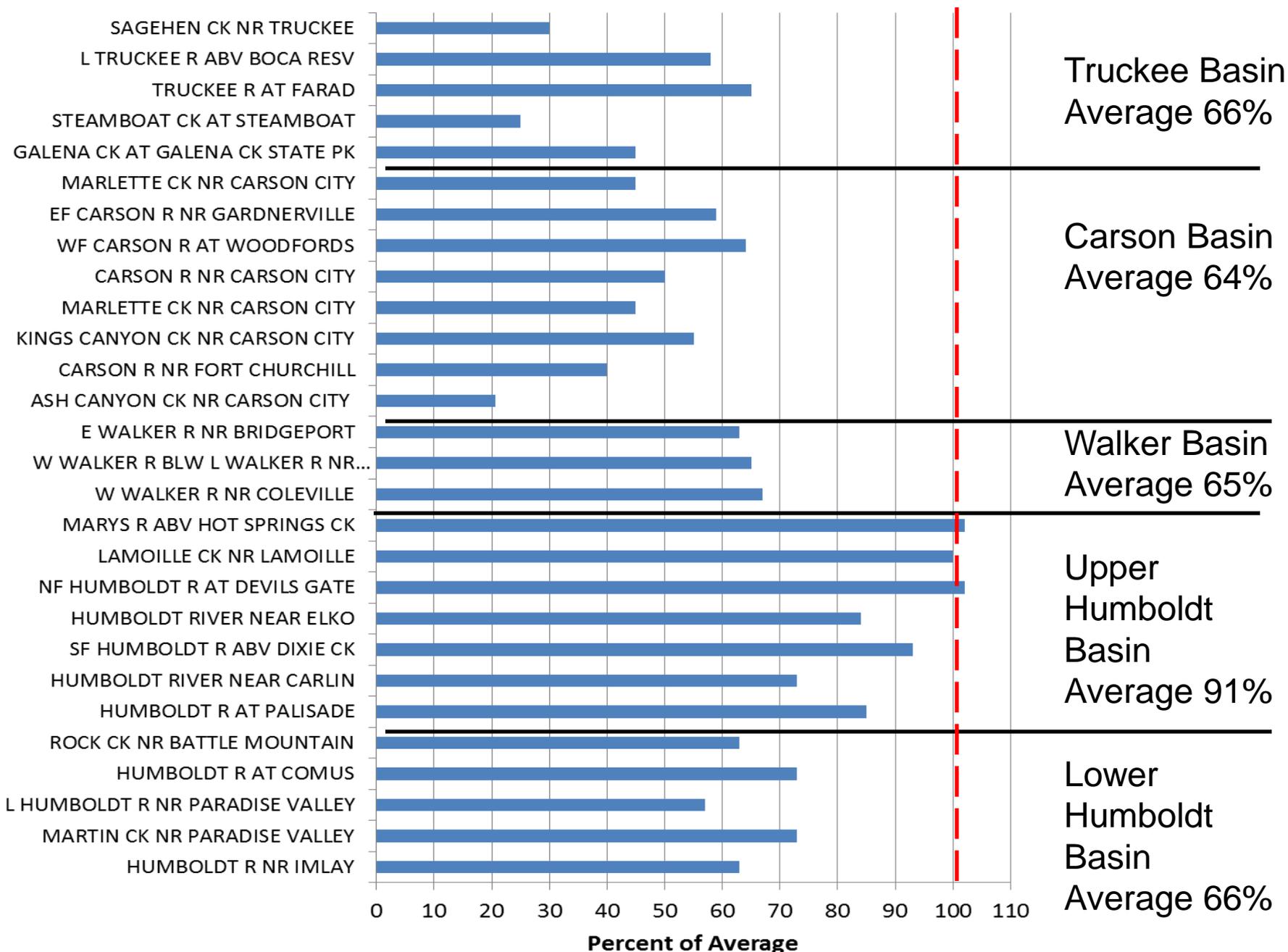


Great Basin and California Spring and Summer Streamflow Forecasts as of January 1, 2015



Prepared by:
USDA Natural Resources Conservation Service
National Water and Climate Center
Portland, Oregon

Streamflow Forecasts - 50% Exceedance - March to July Period



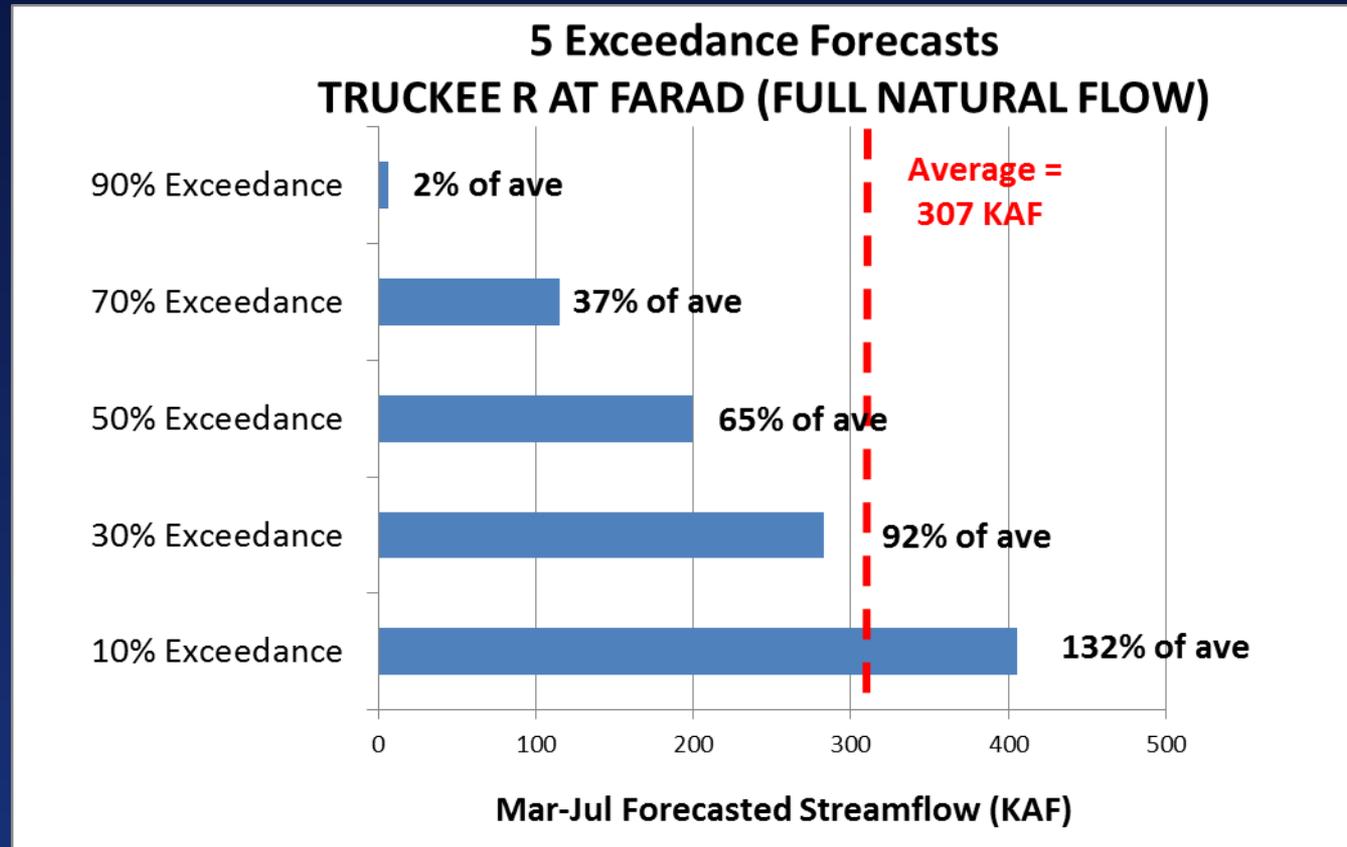
Drier than
Normal
Future



Normal Future
Precip



Wetter than
Normal
Future



Truckee River at Farad (FNL)

FULL FARAD NATURAL FLOW =
Truckee River at Farad observed
– Lake Tahoe Release observed
+ Δ Prosser
+ Δ Boca
+ Δ Stampede
+ Δ Donner
+ Δ Martis
+ Δ Independence
+ Sierra Valley Diversion

Truckee at Farad Streamflow Averages (KAF)

	Mar-Jul	Apr-Jul	May-Jul
New	307	255	183
Last Year	306	260	193

(previous equation did not include red italic)

Little Truckee River above Boca

FULL FARAD NATURAL FLOW =
Truckee River at Farad observed
+ Δ Stampede

+ Δ *Independence*

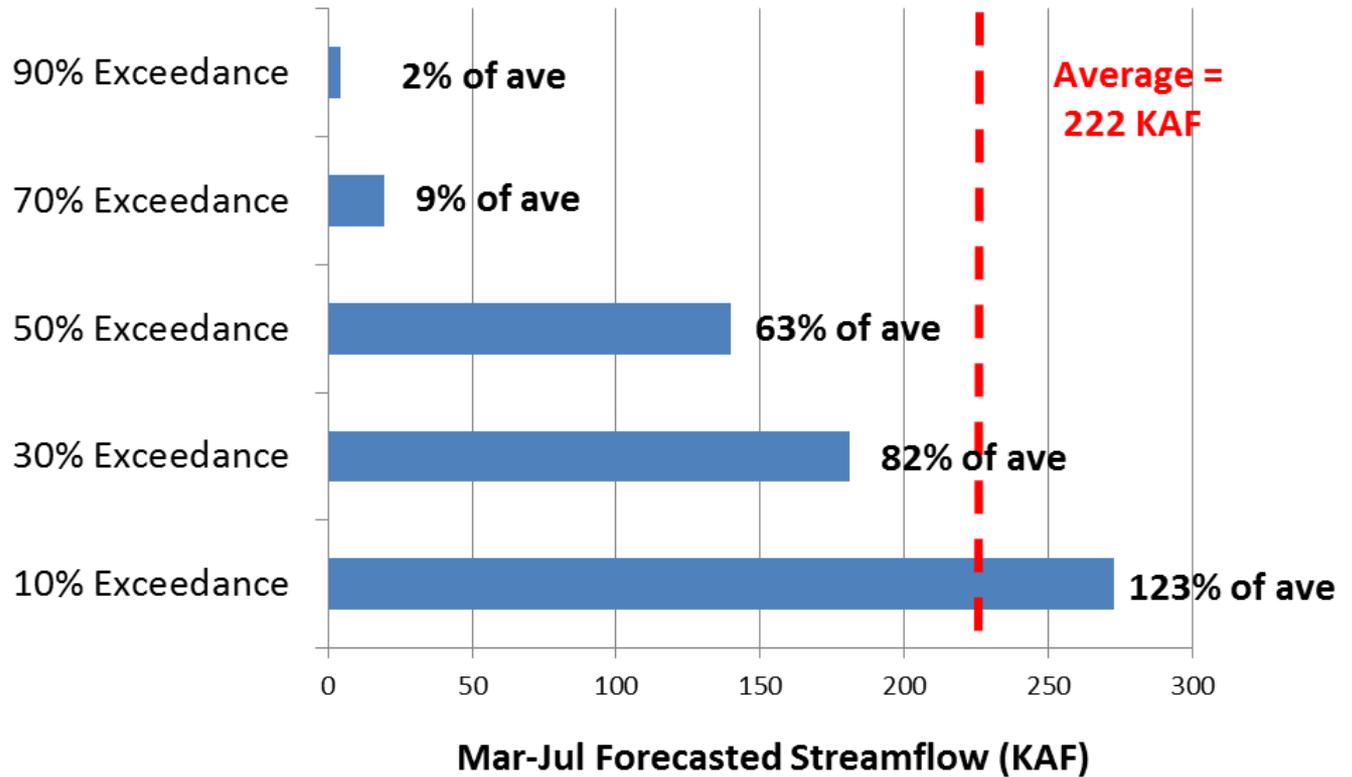
+ *Sierra Valley Diversion*

*(previous equation did
not include red italic)*

L Truckee above Boca Streamflow Averages (KAF)

	Mar-Jul	Apr-Jul	May-Jul
New	99	84	60
Last Year	90	80	63

5 Exceedance Forecasts HUMBOLDT R NR IMLAY



Drier than
Normal
Future

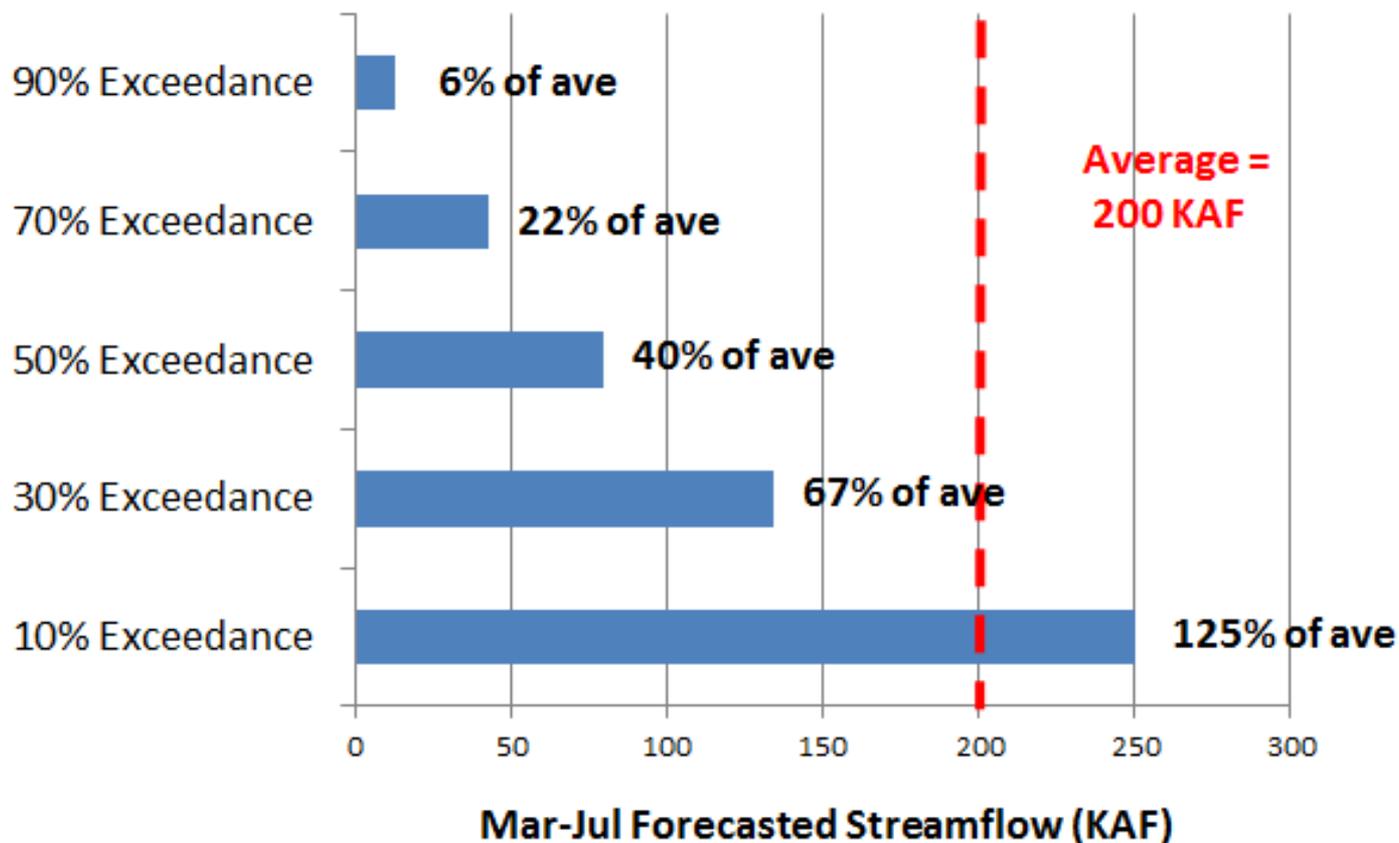


Normal Future
Precip



Wetter than
Normal
Future

5 Exceedance Forecasts CARSON R NR FORT CHURCHILL



Drier than
Normal
Future



Normal Future
Precip



Wetter than
Normal
Future

Summary

- Reasons for a little optimism
 - 2015 snow way better than 2014, particularly in Upper Humboldt
 - Average or better soil moisture - the sponge is moist to wet
 - There is still time to catch up to near normal or above based on snow projection graphs and 30% and 10% streamflow exceedances
 - 4 years of drought is uncommon based on +100 yrs of observation
- Reasons for some healthy pessimism
 - Jan 1 snow was ~2/3 normal in Sierra and Lower Humboldt, same 2 out of 3 pattern as last three years.
 - Jan prec has been minimal, January is historically the biggest prec month
 - There is little to no reservoir storage to rely on.
 - After three years of drought stream baseflows are low.
 - Hedging towards drier forecasts probably wise at this point.

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When will this happen again?