



United States Department of Agriculture

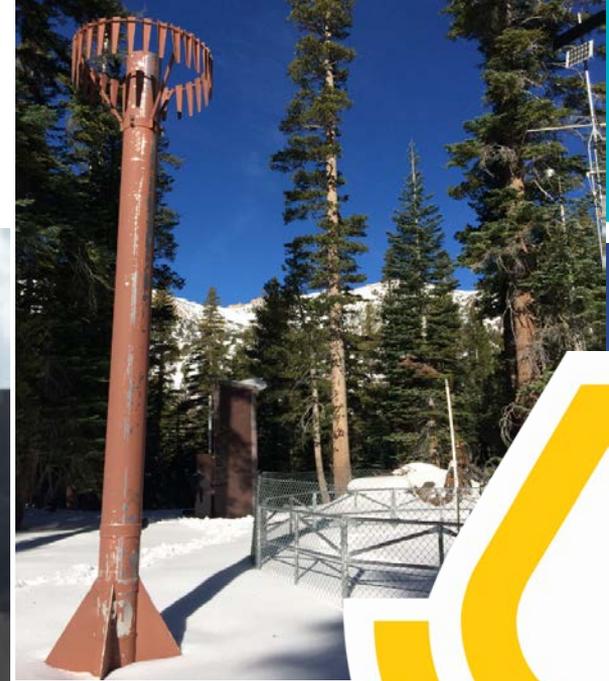
2019 SNOTEL Status and Streamflow Outlook for Truckee, Carson, Walker and Humboldt Basin

March 12, 2019
Nevada Division of Water Resources

*Leavitt Lake, CA
7/26/18*

Jeff Anderson
Nevada NRCS Snow Survey

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jeff.anderson@nv.usda.gov



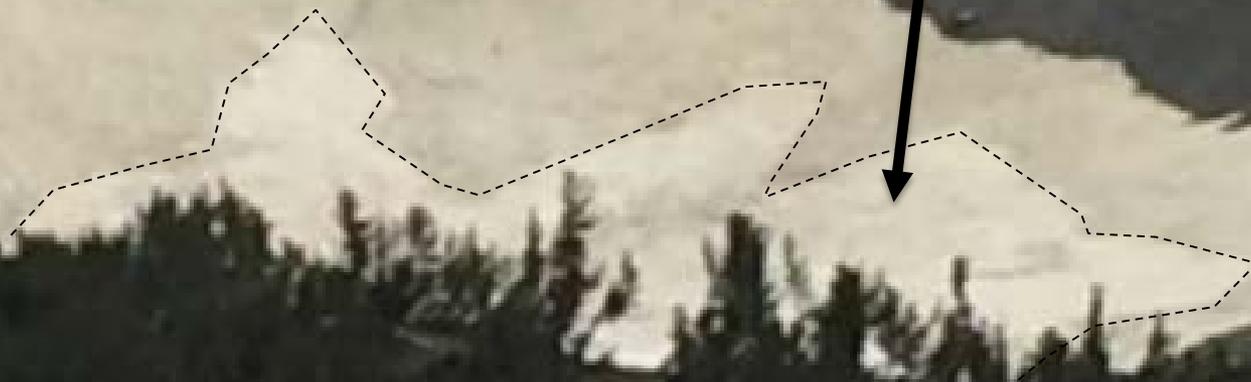
Natural
Resources
Conservation
Service

www.nv.nrcs.usda.gov/snow

Darker snow remaining from winter of 2017



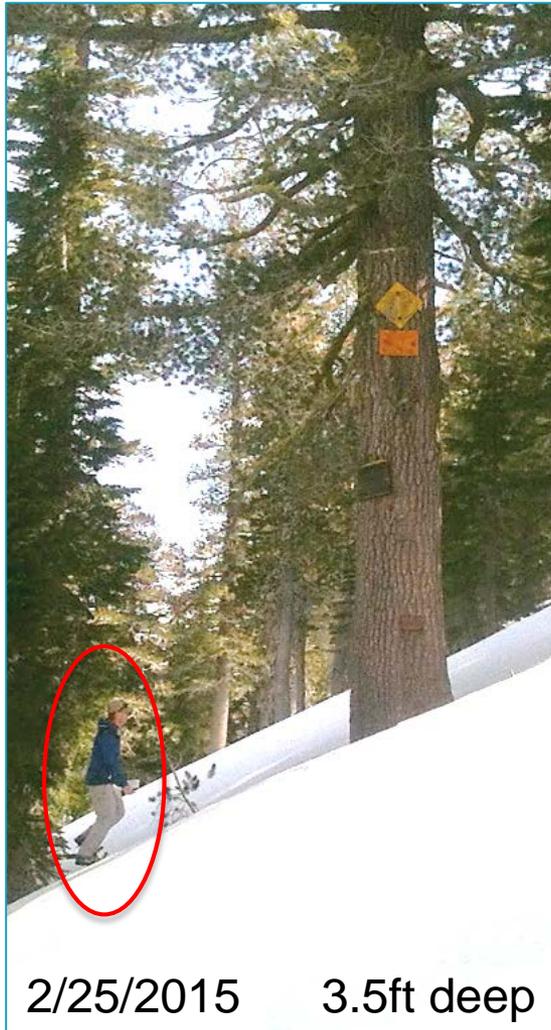
Lighter snow from winter of 2018



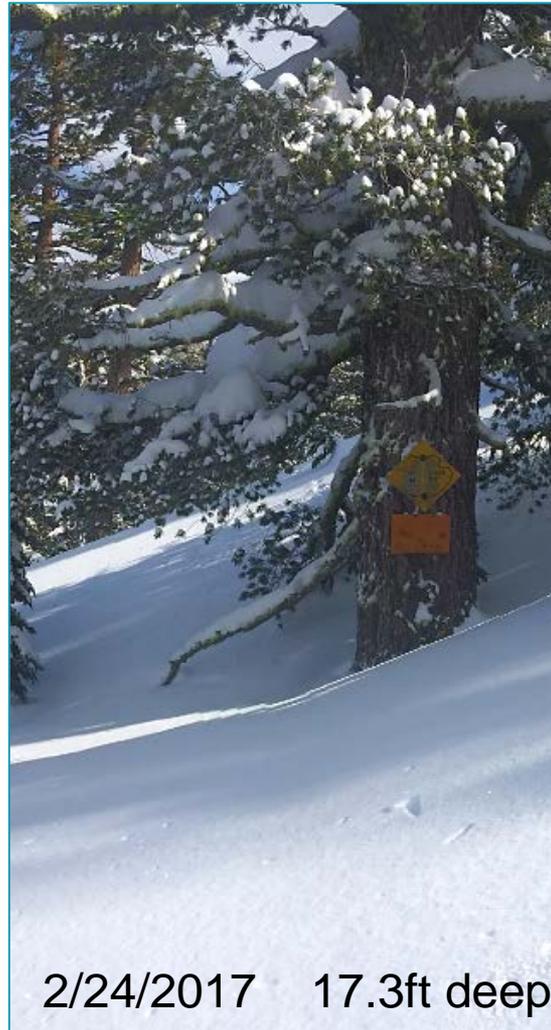
Leavitt Lake, CA
7/26/2018



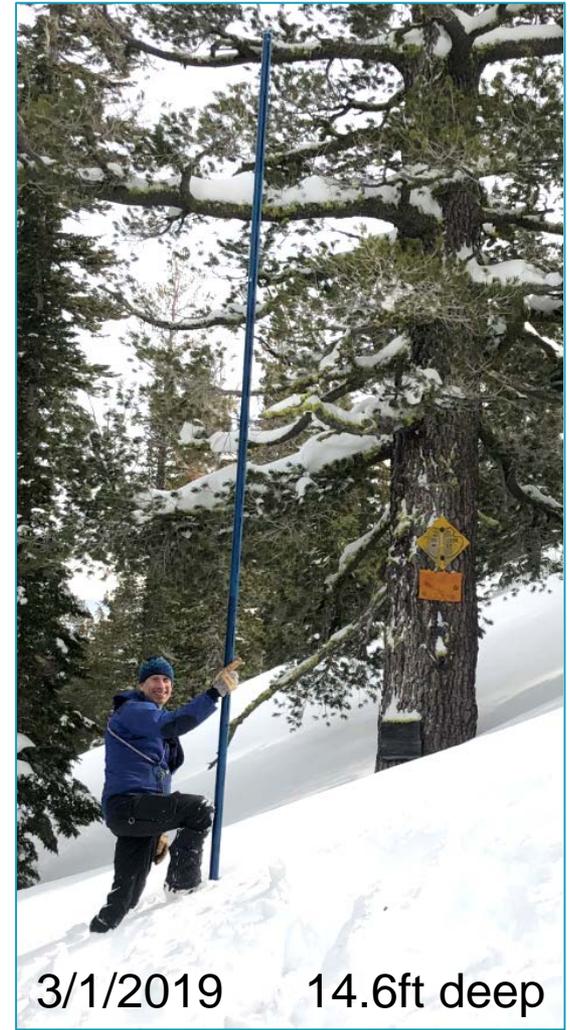
Rubicon #1 Snow Course (8,100feet) - West Shore Lake Tahoe



2/25/2015 3.5ft deep

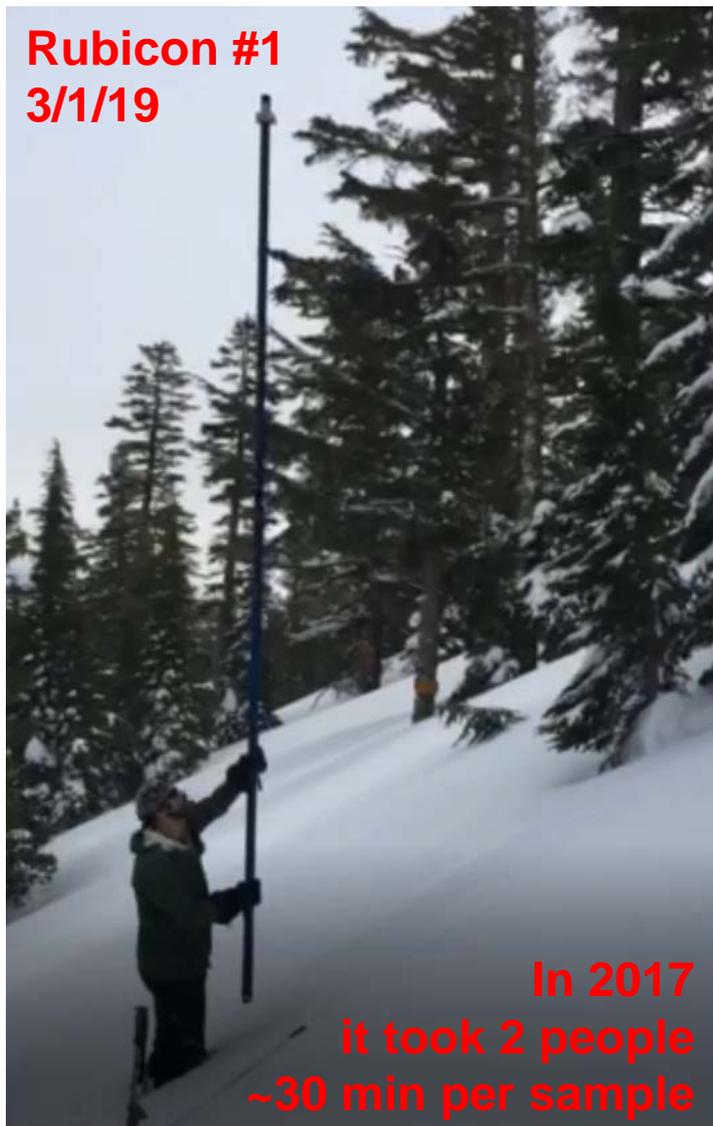


2/24/2017 17.3ft deep



3/1/2019 14.6ft deep

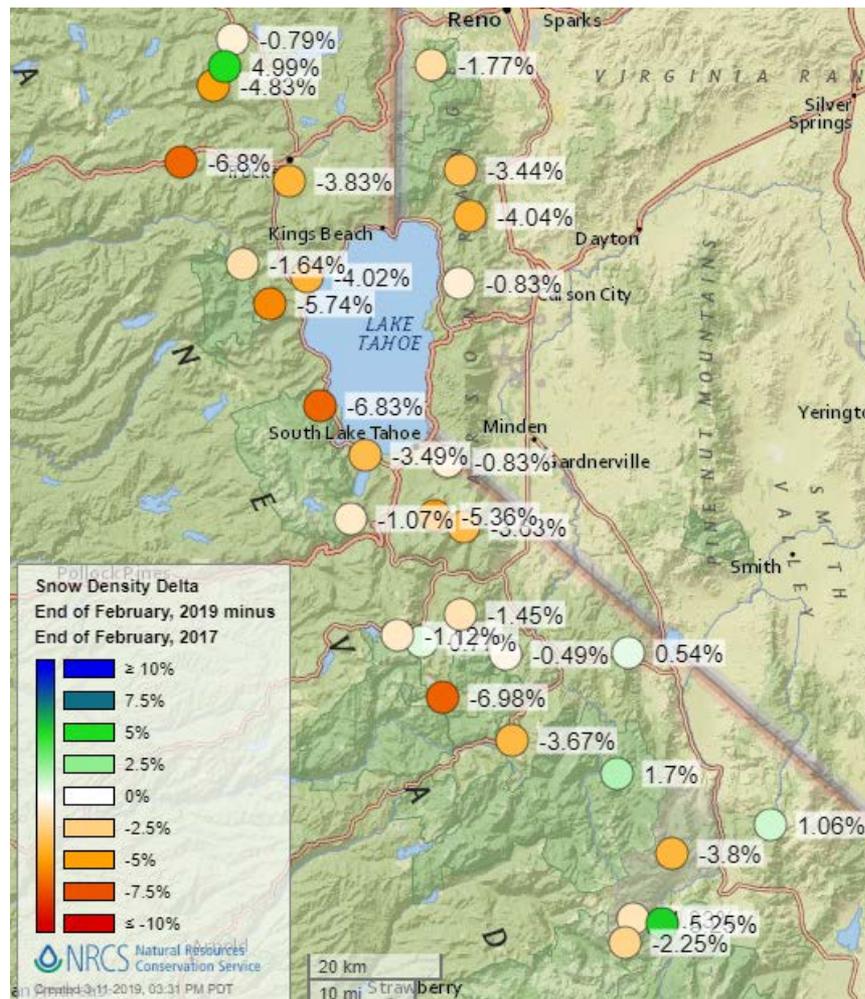
Rubicon #1
3/1/19



In 2017
it took 2 people
~30 min per sample

Snowpack Character

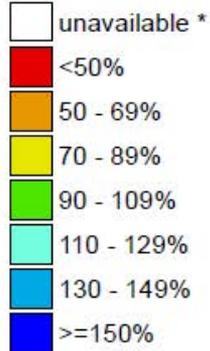
Less Dense
Less Ice Layers



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

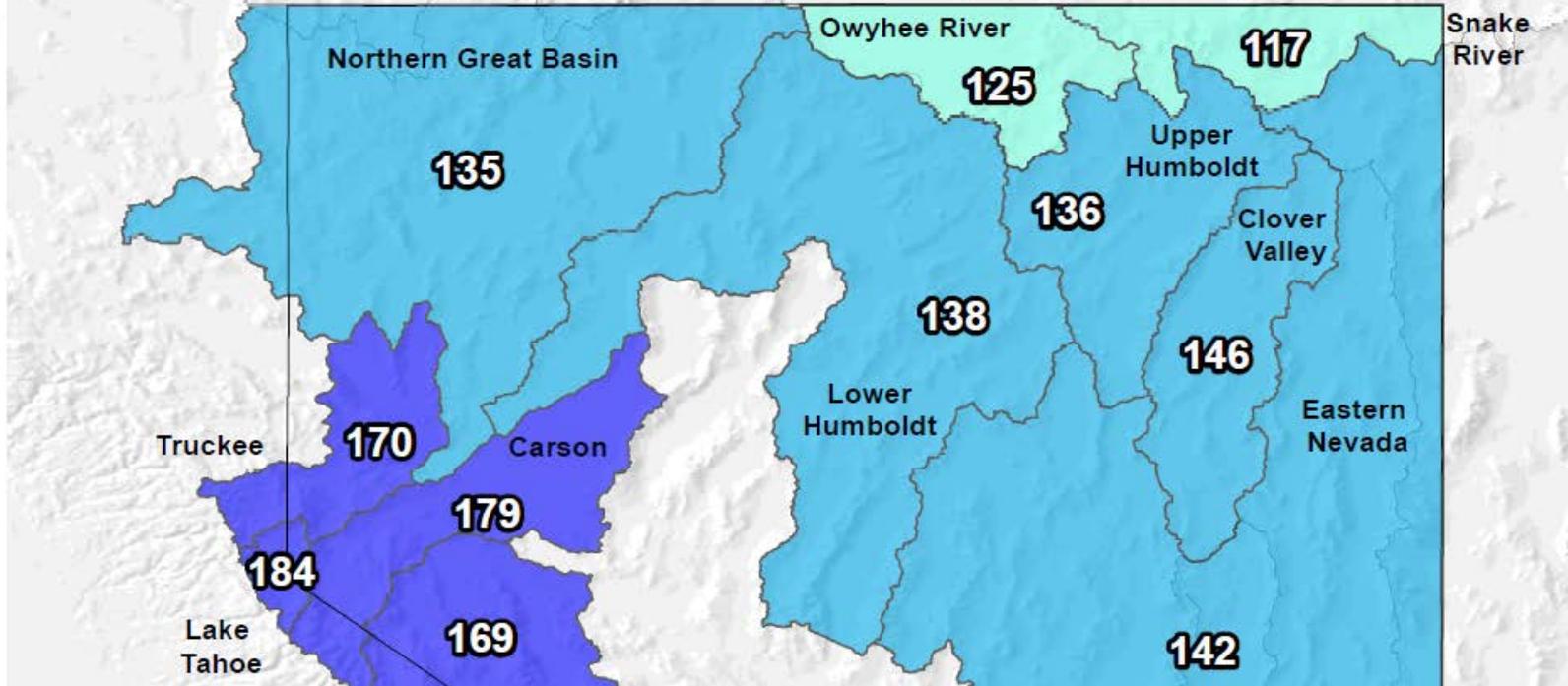
Mar 11, 2019

Current Snow Water Equivalent Basin-wide Percent of 1981-2010 Median



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

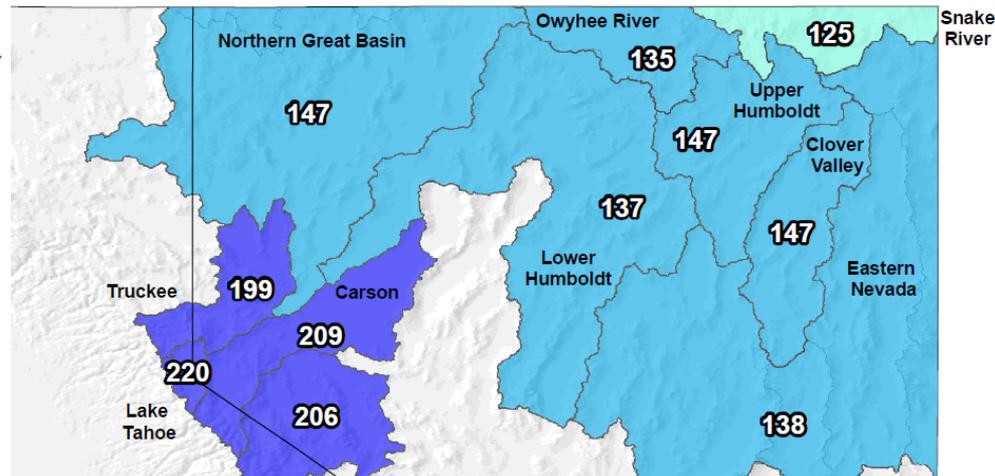
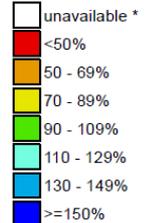
Provisional data subject to revision

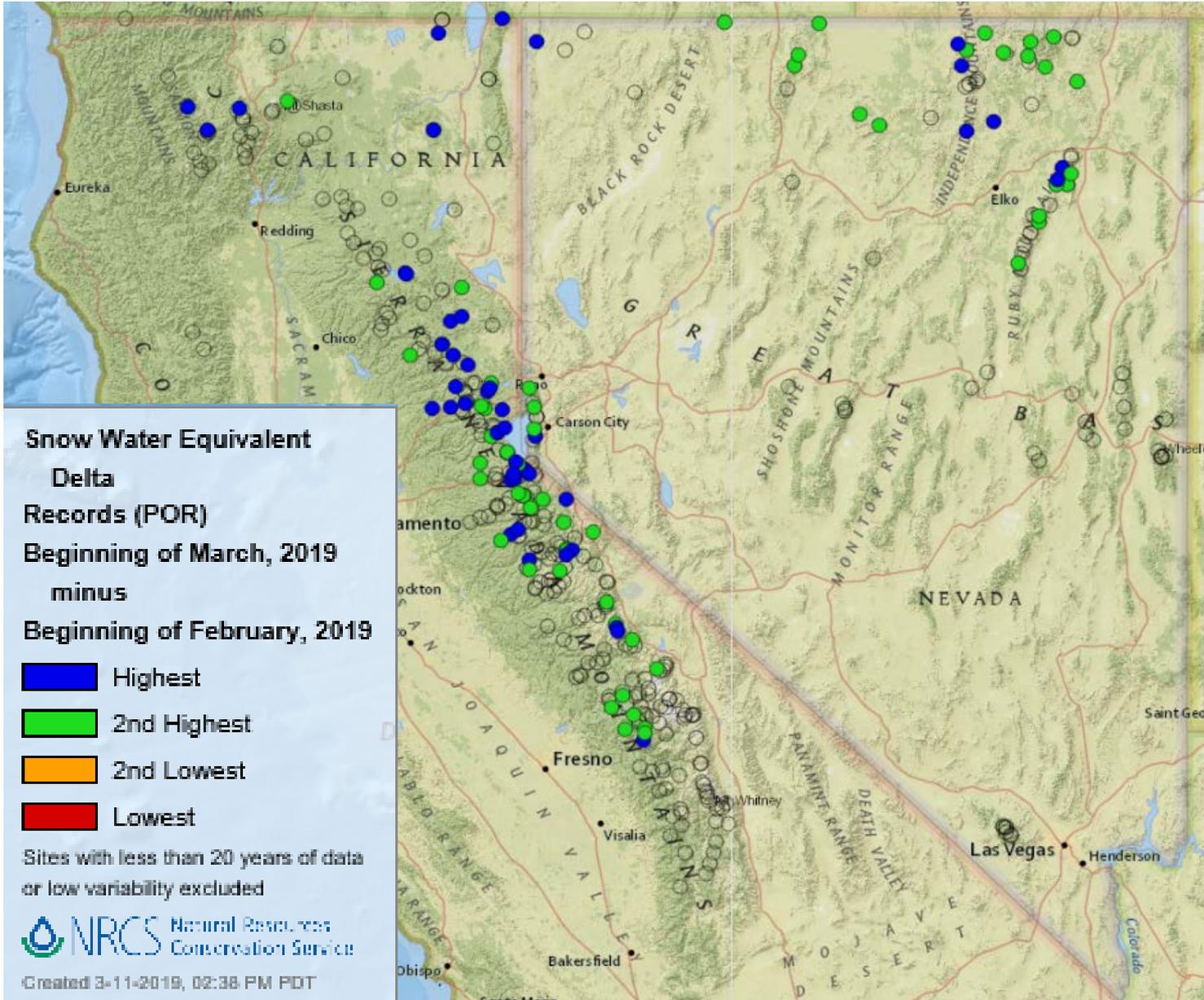


Nevada/California SNOTEL Current Snow Water Equivalent (SWE) % of Normal

Mar 11, 2017

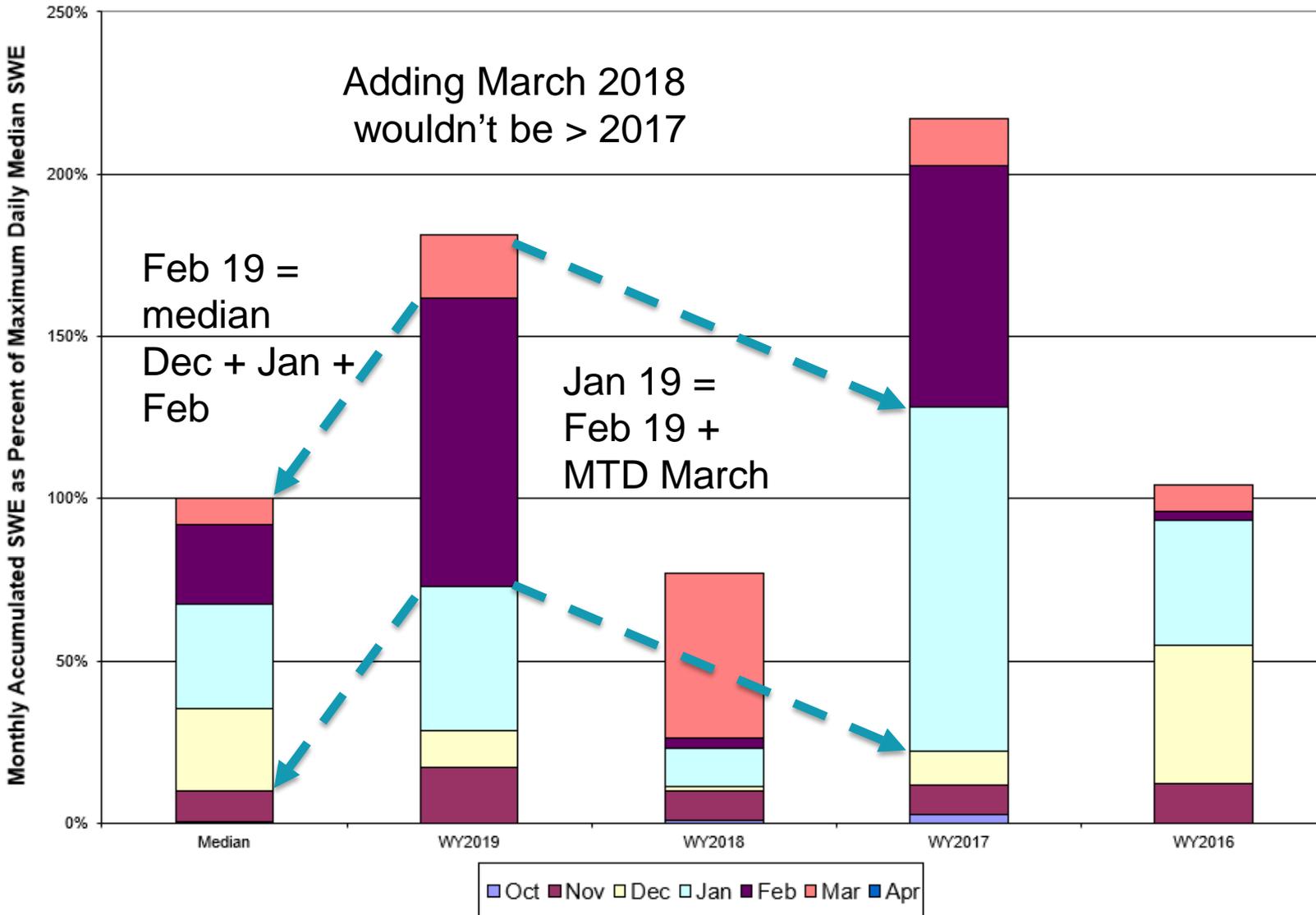
Current Snow Water Equivalent Basin-wide Percent of 1981-2010 Median





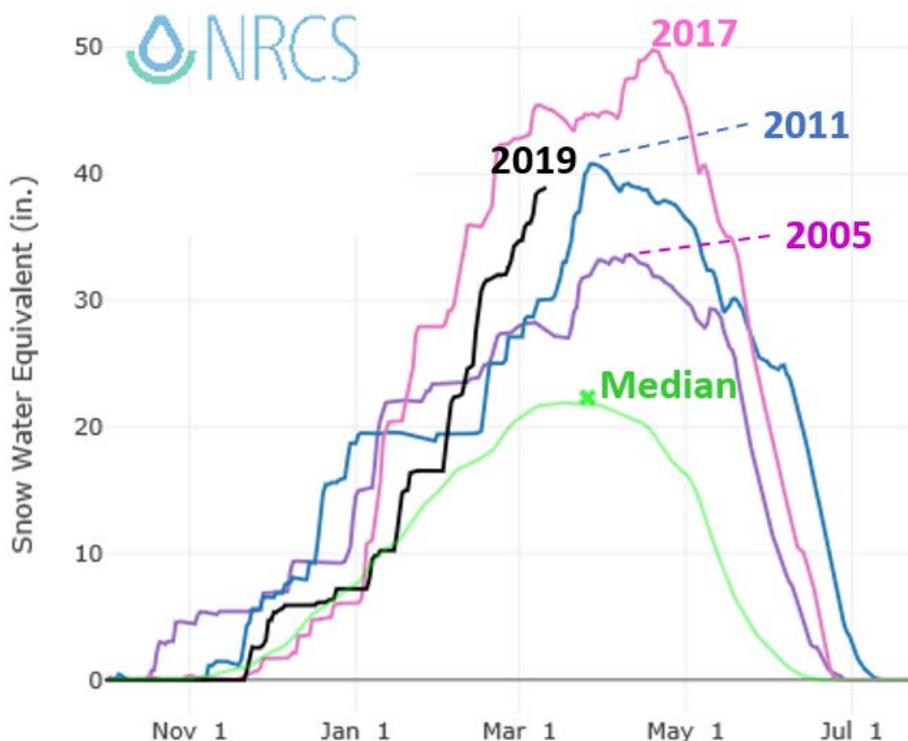
February
2019
Record to
Near-Record
Increase in
SWE

LAKE TAHOE BASIN Time Series Monthly Snowpack Summary
Based on Provisional SNOTEL data as of Mar 11, 2019



2019 Snowpack >> Median Peak

Snow Water Equivalent in Carson River Basin



California/Nevada SNOTEL Snowpack Update Report

Based on Mountain Data from NRCS SNOTEL Sites

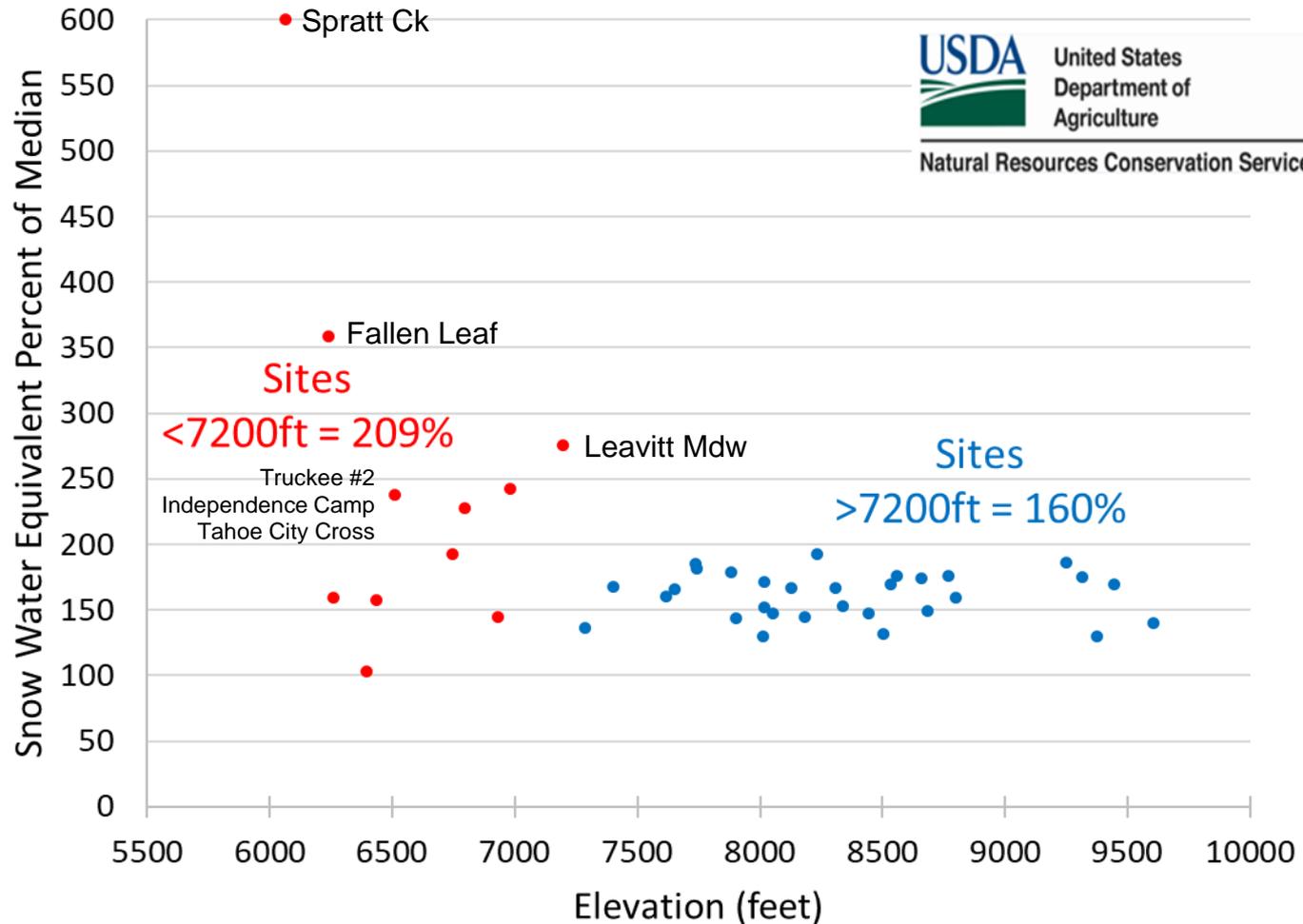
Provisional data, subject to revision

Data based on the first reading of the day (typically 00:00) for Monday, March 11, 2019

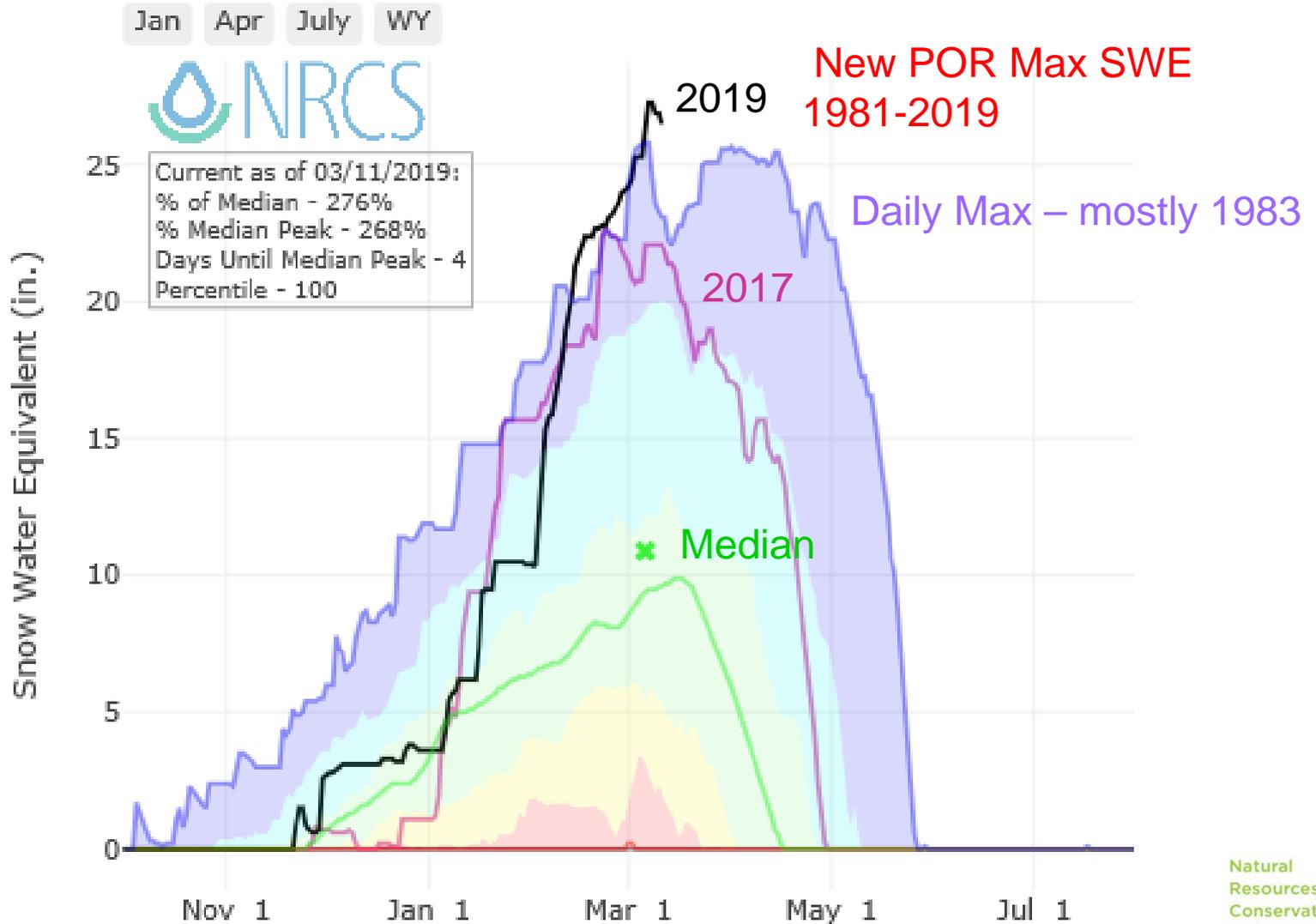
Basin Site Name	Elev (ft)	Snow Water Equivalent				Percent of	
		Current (in)	Today's Median (in)	Median Peak (in)	Median Peak Date	Today's Median	Median Peak
LAKE TAHOE							
Basin Index (%)						184	177
TRUCKEE RIVER							
Basin Index (%)						170	161
CARSON RIVER							
Basin Index (%)						179	169
WALKER RIVER							
Basin Index (%)						169	157
NORTHERN GREAT BASIN							
Basin Index (%)						135	125
NEVADA							
UPPER HUMBOLDT RIVER							
Basin Index (%)						136	128
LOWER HUMBOLDT RIVER							
Basin Index (%)						138	128

State of Nevada and the Eastern Sierra March 11, 2019 Snowpack Percent of Median vs Elevation

(Data based on SNOTEL data)

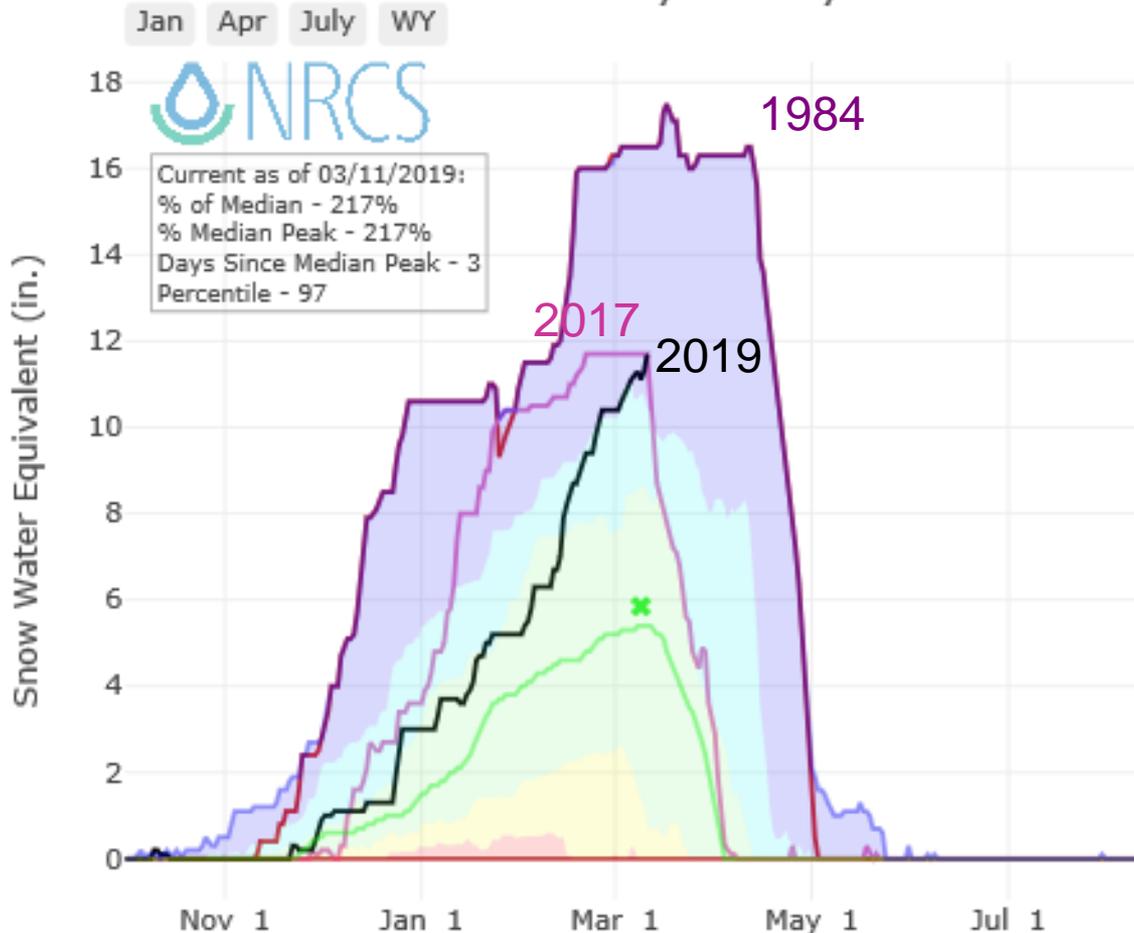


West Walker Basin Elev. 7198ft Snow Water Equivalent at Leavitt Meadows



Upper Humboldt Basin Elev. 6325ft

Snow Water Equivalent at
Taylor Canyon



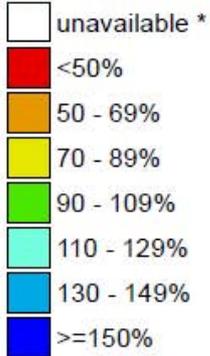
4th highest peak
on record in
last 38 winters

Also of note:
Tremewan Ranch
Snow Course
at 5700ft
in Upper Humboldt
was 5th highest
since 1932.
Only 0.6in SWE
from record

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

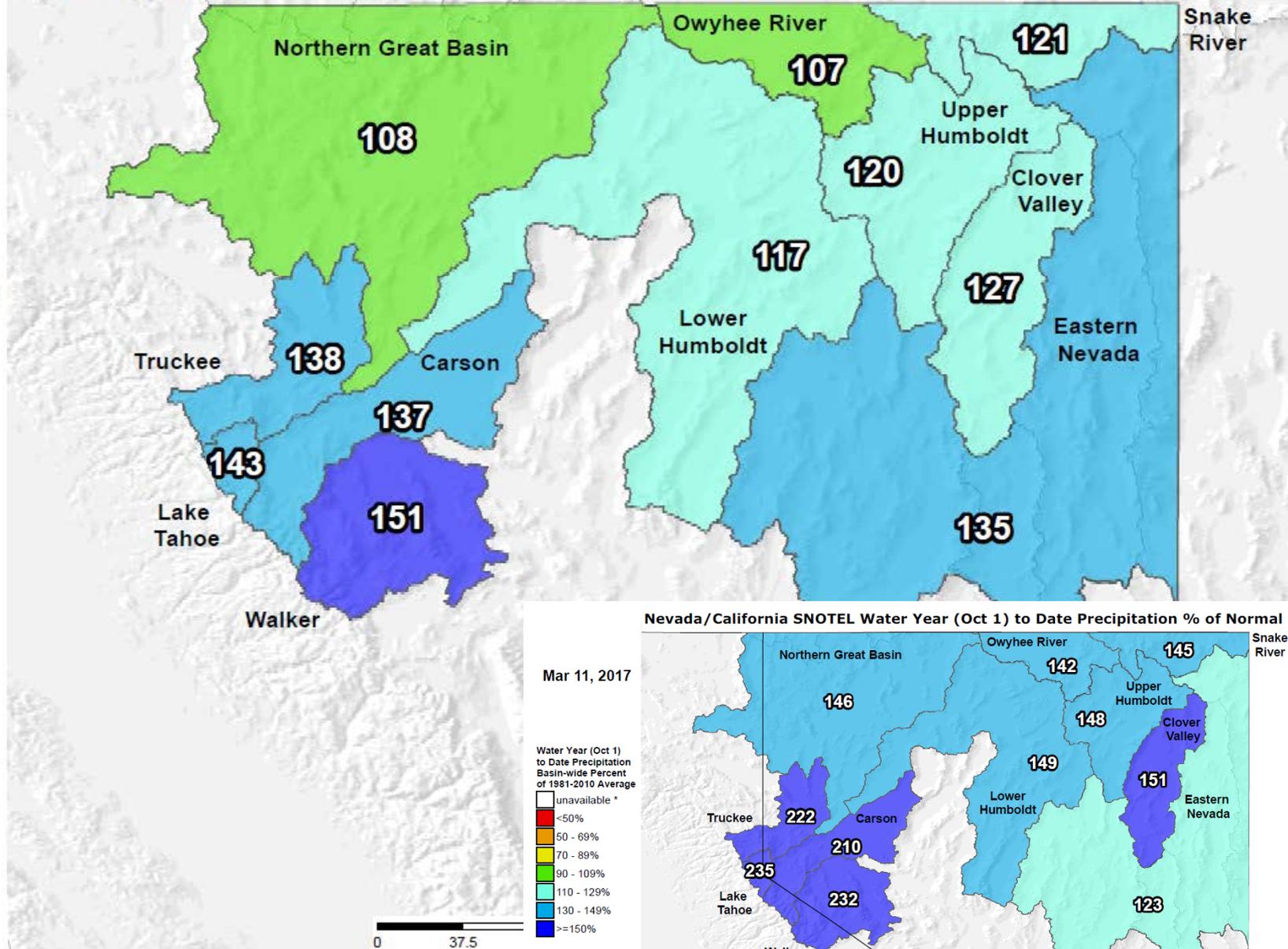
Mar 11, 2019

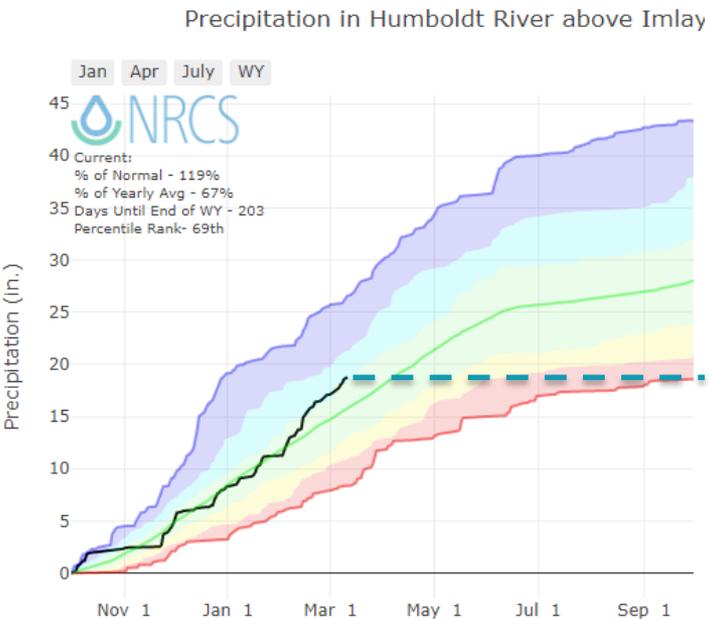
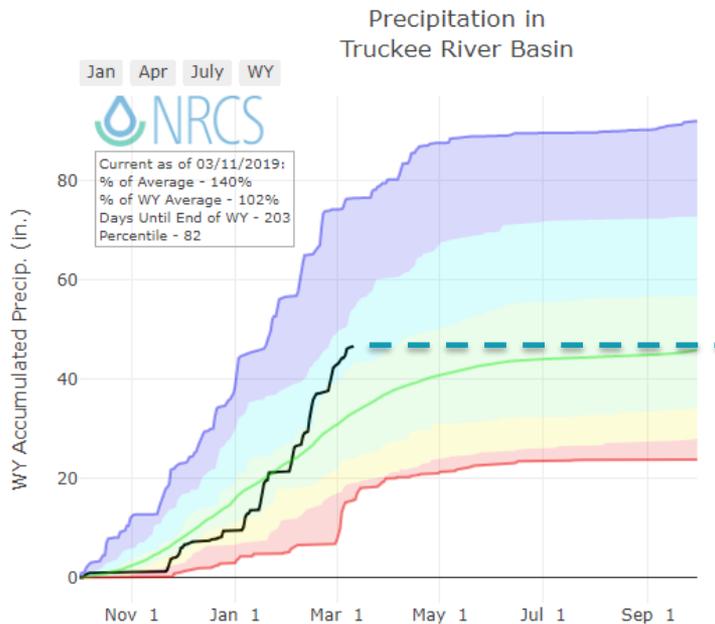
Water Year (Oct 1) to Date Precipitation Basin-wide Percent of 1981-2010 Average



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

Provisional data subject to revision





Water Year Precip > Ave Annual Total in Sierra

California/Nevada SNOTEL Precipitation Summary 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 Monday, March 11, 2019							
Basin Site Name	Elev (ft)	Month to Date Precipitation (in)	Average Monthly Total (in)	Pct of Monthly Total	Water Year to Date Precipitation (in)	Average Annual Total (in)	Pct of Annual Total
LAKE TAHOE							
Basin Index (%)				67			105
TRUCKEE RIVER							
Basin Index (%)				53			101
CARSON RIVER							
Basin Index (%)				77			100
WALKER RIVER							
Basin Index (%)				89			109
UPPER HUMBOLDT RIVER							
Basin Index (%)				50			67
LOWER HUMBOLDT RIVER							
Basin Index (%)				46			69

% of Ave
March Total
to date

% of Ave
Water Yr Total
to date

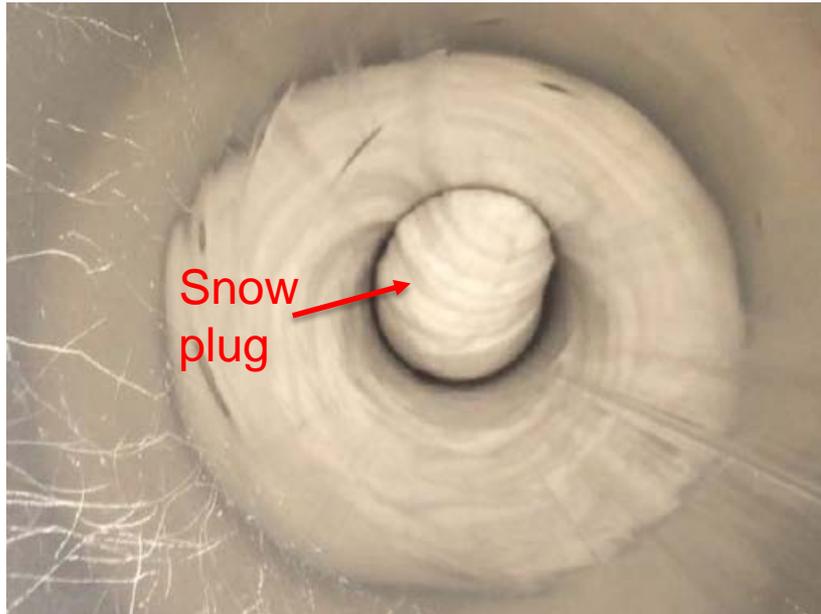
California/Nevada SNOTEL Snow/Precipitation Update Report

Based on Mountain Data from NRCS SNOTEL Sites

****Provisional data, subject to revision****

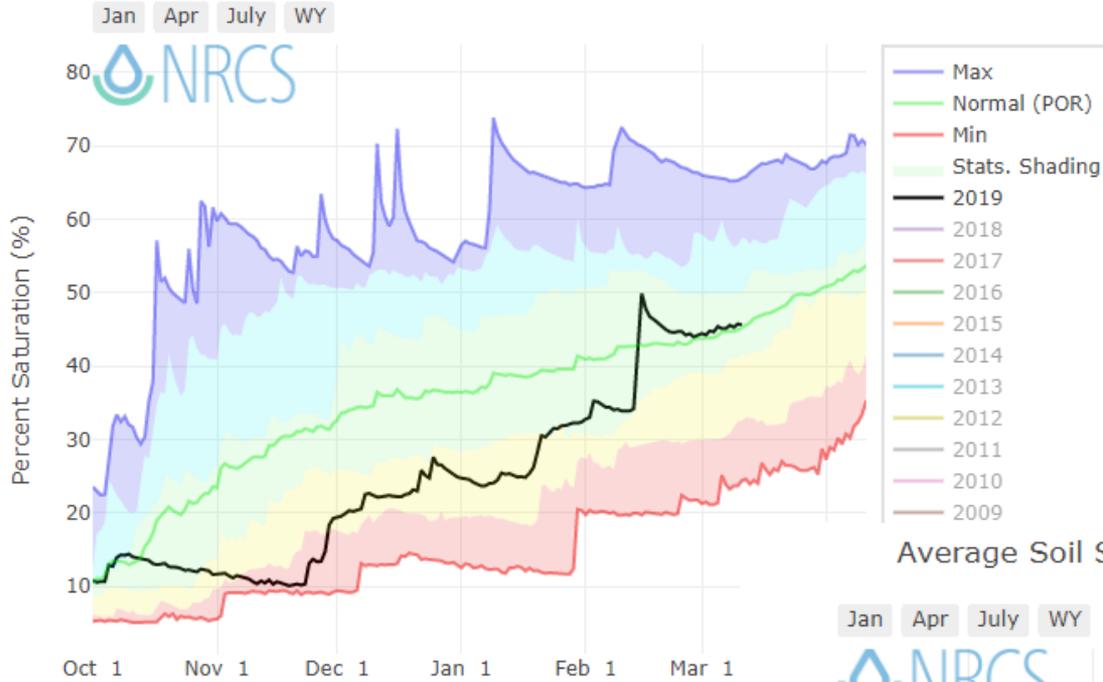
Data based on the first reading of the day (typically 00:00) for Friday, March 08, 2019

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
LAKE TAHOE							
Heavenly Valley	8534	36.0	21.0	171	-M	22.5	*
Marlette Lake	7884	38.6	21.4	180	-M	23.6	*
Hagans Meadow	7742	28.3	15.4	184	30.5	21.2	144
Echo Peak	7653	64.3	38.3	168	-M	43.2	*
Rubicon #2	7619	39.0	24.3	160	-M	29.7	*
Tahoe City Cross	6797	29.6	13.0	228	42.6	26.6	160
Ward Creek #3	6745	62.0	32.0	194	-M	50.6	*
Fallen Leaf	6242	16.6	5.0	332	34.0	23.6	144
Basin Index (%)				185			150*
TRUCKEE RIVER							
Mt Rose Ski Area	8801	56.2	34.6	162	60.2	39.5	152
Independence Lake	8338	59.3	37.8	157	-M	33.7	*
Big Meadow	8235	37.3	18.9	197	-M	22.0	*
Squaw Valley G.C.	8013	60.3	45.8	132	-M	46.3	*
Independence Camp	6980	39.4	15.8	249	-M	23.3	*
Css Lab	6894	61.7	32.6	189	65.3	47.9	136
Little Valley	6493	24.9	N/A	*	32.8	N/A	*
Truckee #2	6509	-M	14.2	*	39.1	24.8	158
Independence Creek	6436	21.8	13.9	157	-M	23.6	*
Basin Index (%)				169			147*



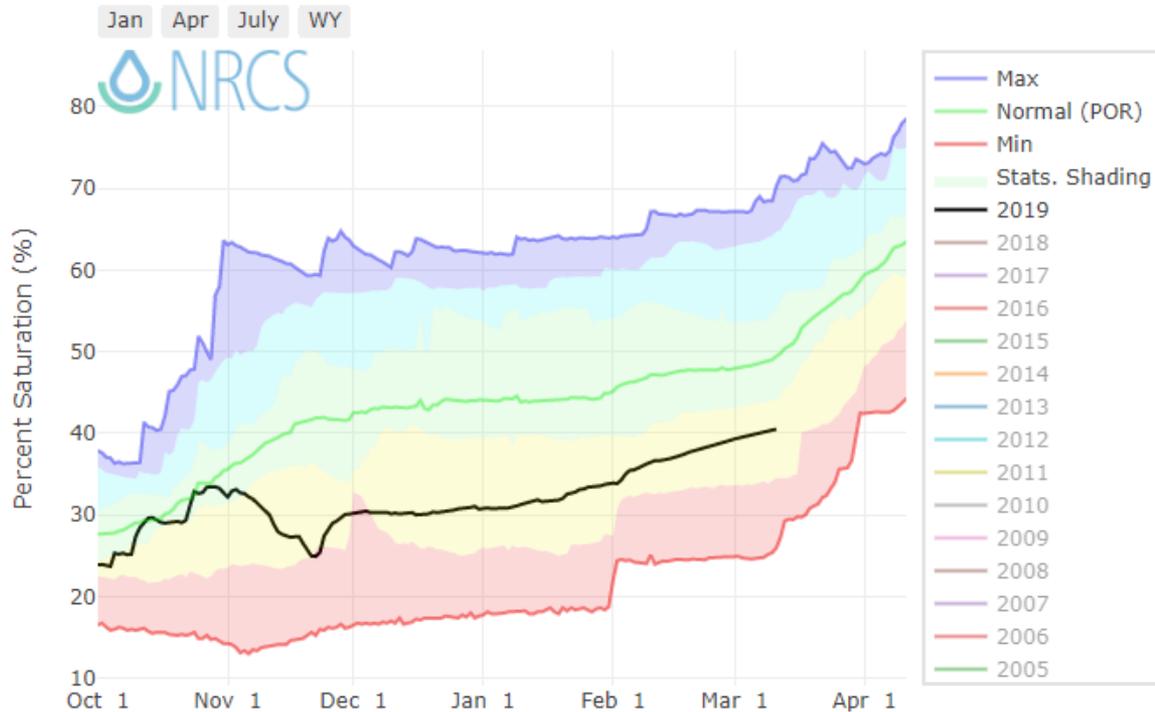
- Up to 27 out of 32 Precipitation Gages in the Eastern Sierra have been plugged with Snow.
- Currently 18 gages have plugs containing 2in to 18in of water.

Average Soil Saturation in Truckee River Basin



Soil moisture recovered where enough rain fell to penetrate snow.

Average Soil Saturation in Humboldt River above Imlay



Soil moisture remains below average at higher elevations and in Humboldt Basin

Water Supply Forecast Chart

State: Nevada
Basin: State of Nevada Summary
Publication Year: 2019
Publication Date: March 1

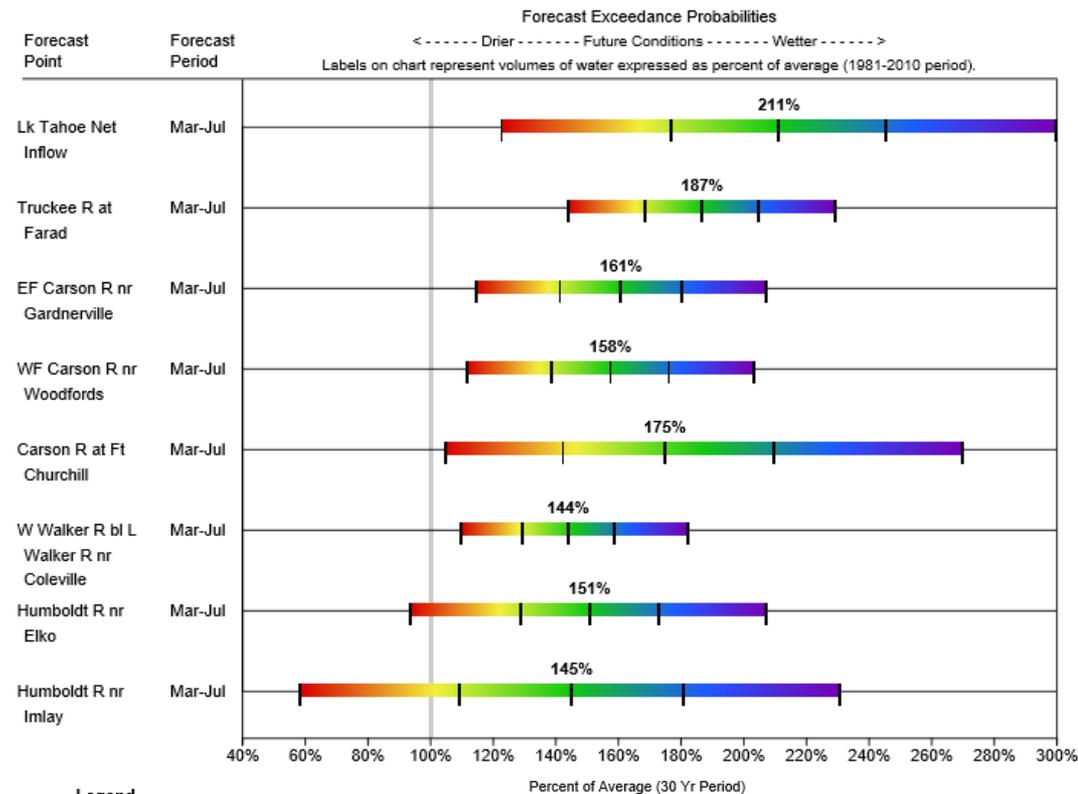
Forecast Periods: All, February-July, February-September, **March-July**, March-August, March-September, April-July, April-August, April-September, May-July, May-September, June-July, June-September

Normal Type: Average, Median
Label Units: Volume in KAF, **Percent of Normal**
Forecast Labels: All Exceedances, 50% Exceedance Only

Include on Chart: Observed, Normal, Max, Min, Years of Observed Data
 with label, with label, with year, with year, with year

Display Options: Only Show Points With Forecast For Selected Period
Chart Width: 800

State of Nevada Summary Water Supply Forecasts March 1, 2019



Legend



When selected, the following historic streamflow values and statistics will be shown.

| Period of Record Minimum Streamflow KAF (Year)
| 1981-2010 Normal Streamflow KAF
| Observed Streamflow KAF
| Period of Record Maximum Streamflow KAF (Year)

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 Nevada
 United States Department of Agriculture
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Snow Survey

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.

Nevada Water Supply Outlook Report
 March 1, 2019

 2019 Snowpack - Something to Celebrate
February's series of cold, snow storms have caused many precipitation gages in the eastern Sierra to be plugged with snow. Data are being estimated as staffing allows. Precipitation data should be considered provisional.

(Click on image to get report)

Latest Snow & Water Supply Information:

[March 1, 2019 Water Supply Outlook Report](#)

[March 1, 2019 Streamflow Forecast Table](#)

Today's Snow & Precipitation Update Reports

- > [Snow and Precipitation - Percent of Normal](#)
- > [Precipitation - Month to Date | % Monthly Average](#)
- > [Snowpack - Percent of Normal Peak](#)
- > [Maps: Snow | Water Year Prec | Monthly Prec](#)
- > [Interactive Basin Graphs - snow, prec, soil moisture](#)

February's series of cold, snow storms have caused many precipitation gages in the eastern Sierra to be plugged with snow. Data are being estimated as staffing allows. Precipitation data should be considered provisional.

Snow Survey Data

- > **Site Pages:** Leavitt Meadows, CA (575)
- > **Interactive Map:** (zoom, click site for data)
 SNOTEL | Snow Course | SCAN
- > **Interactive Map Conditions Links**
- > **Current and Historic Data Reports**
- > **Back Estimated SNOTEL Data**
- > **Snow Course Data**

Water Supply Information

- > **Outlook Reports:** Select a month
- > **Streamflow Forecasts**
- > **Reservoir Data**
- > **Streamflow Data**
- > **Water Supply Presentations**



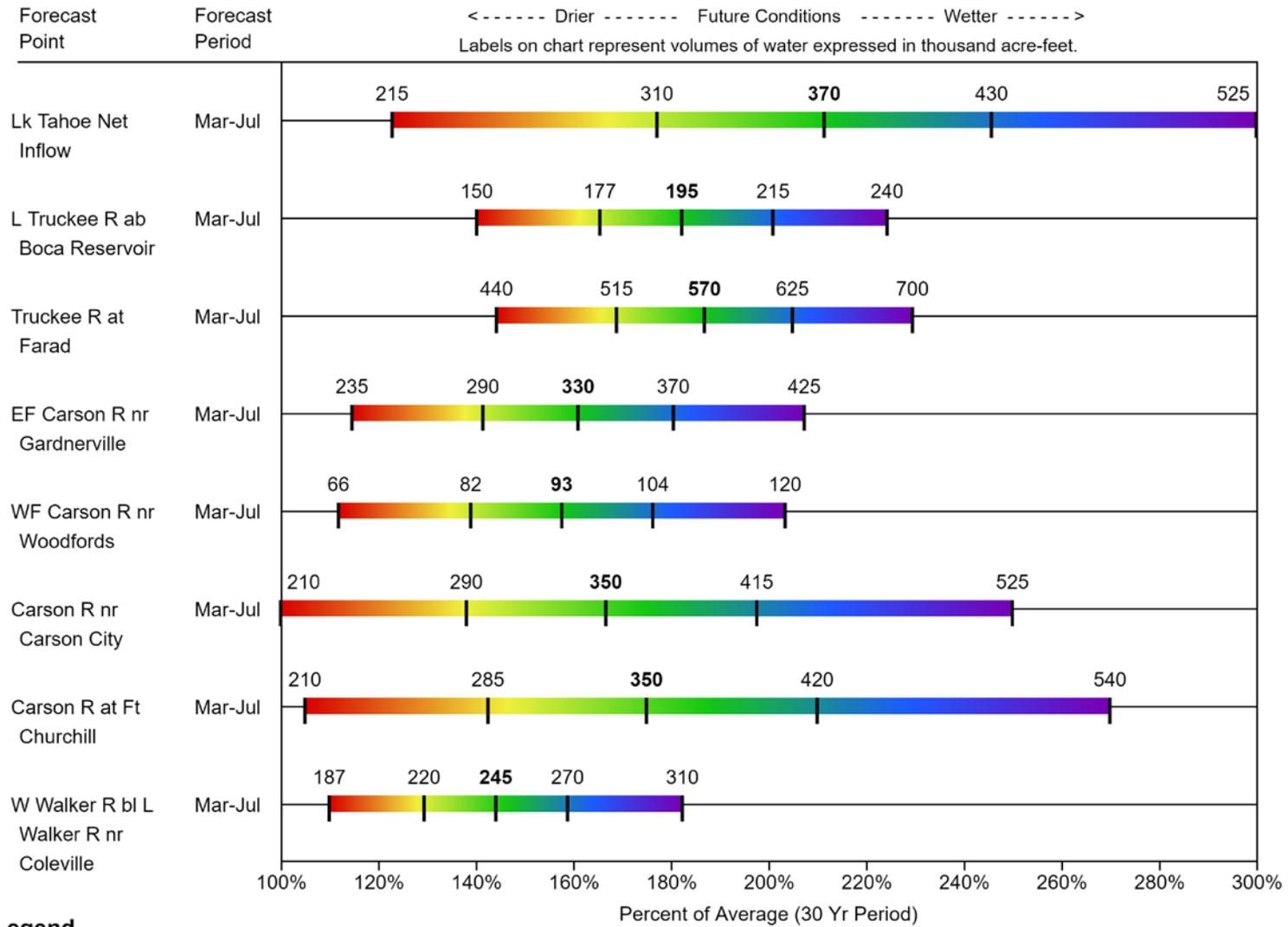
Eastern Sierra Basin Summary

Water Supply Forecasts

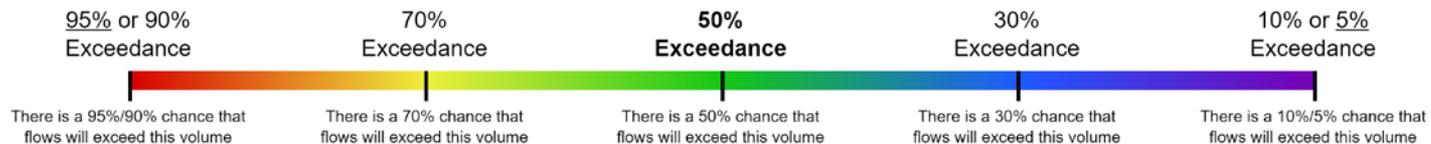
March 1, 2019

Forecast Exceedance Probabilities

<----- Drier ----- Future Conditions ----- Wetter ----->
Labels on chart represent volumes of water expressed in thousand acre-feet.



Legend



Eastern Sierra Basin Summary

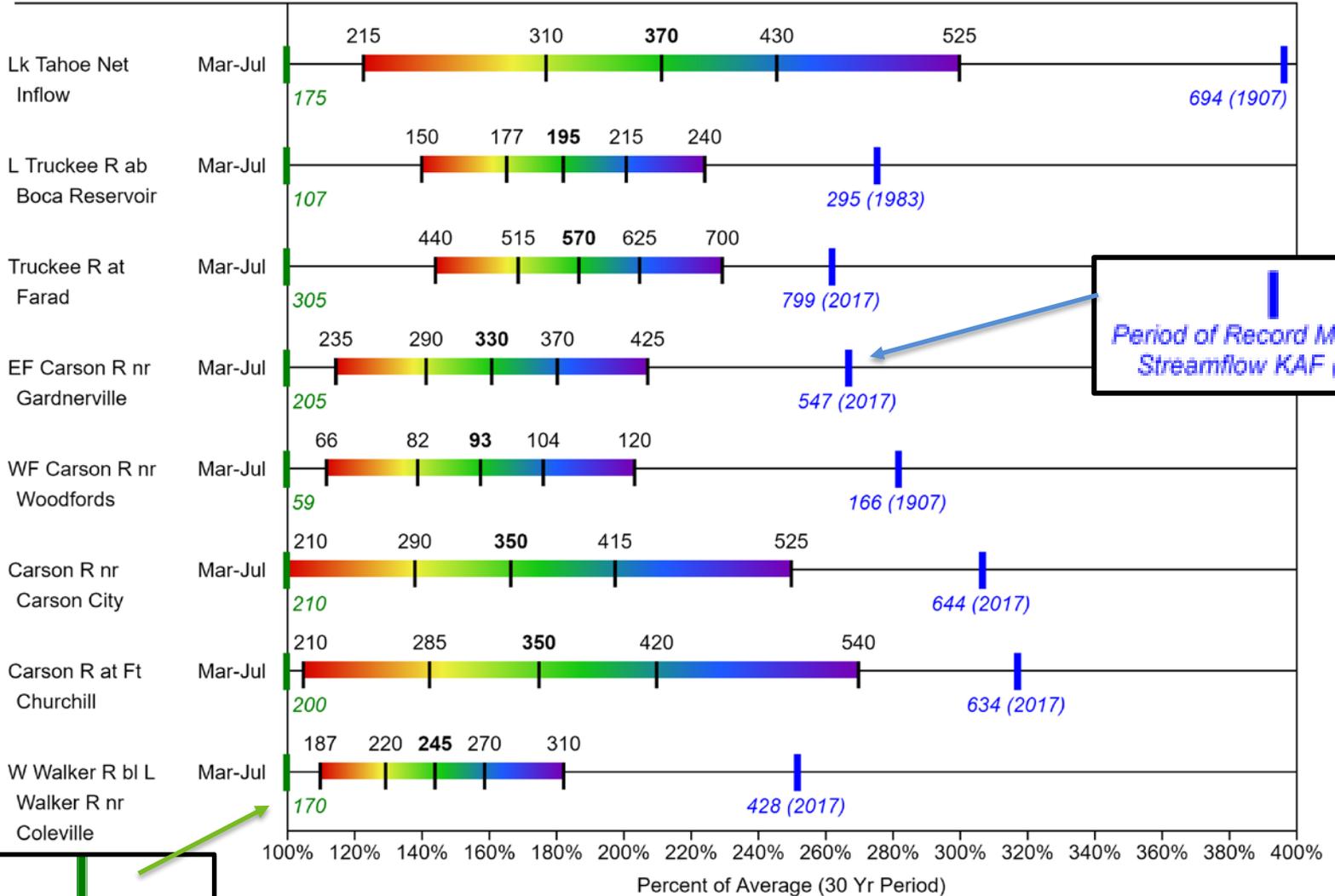
Water Supply Forecasts

March 1, 2019

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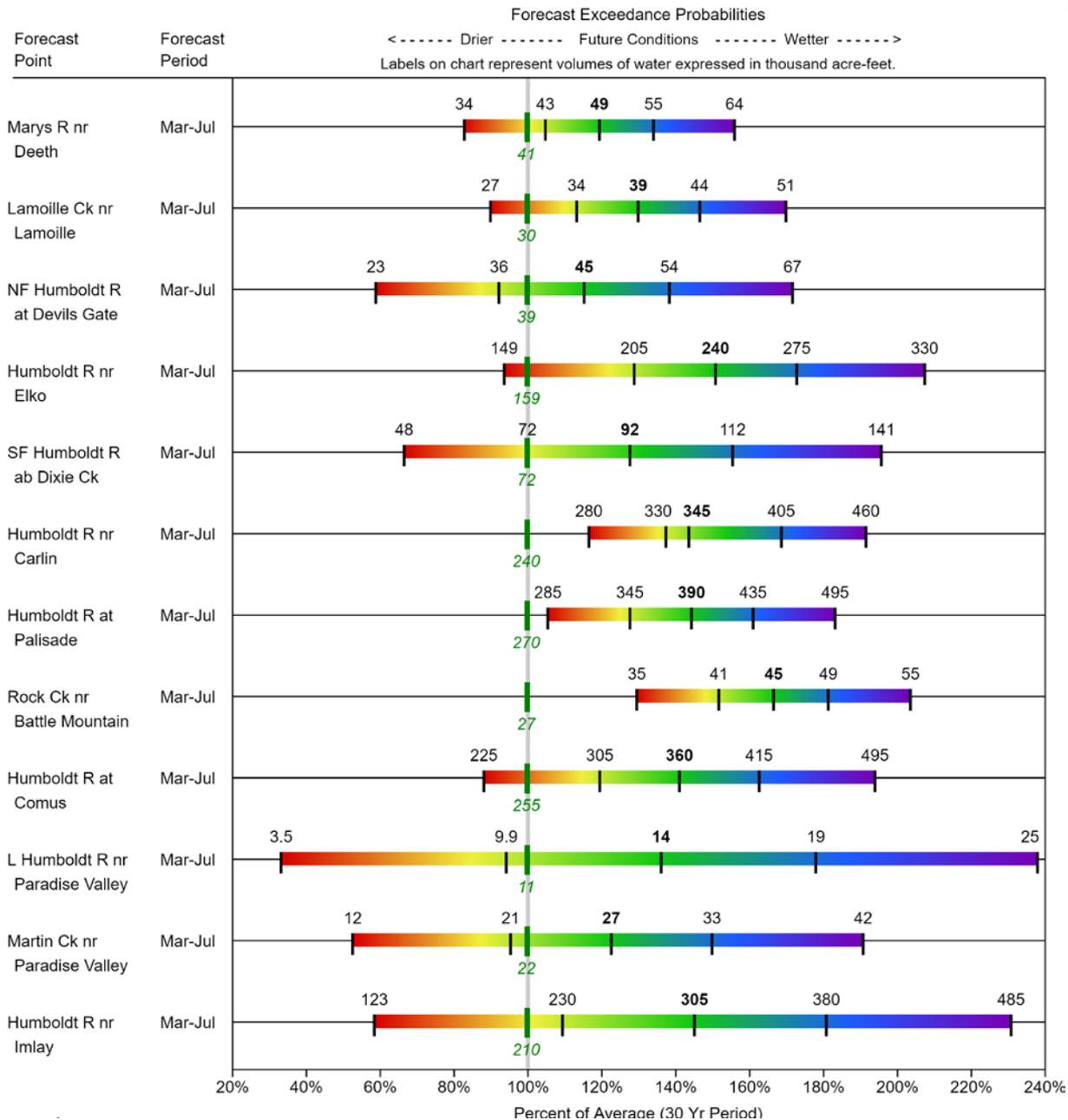
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Period of Record Maximum Streamflow KAF (Year)

1981-2010 Normal Streamflow KAF

Humboldt River Summary Water Supply Forecasts March 1, 2019



Key Points:

Snowpack:

- February another Costco Sized 1-month Storm Pack
- Snowpack already above median peak
 - Sierra +160% median peak, Humboldt +125% median peak
- Middle Elevations (5700-7200ft) near record high, even greater than 2017

Precipitation:

- Sierra already exceeded average annual total but lots of plugged gages
- Humboldt nearly 70% of annual total
- Far less precip than in 2017, especially in the Fall leading to lower soil moisture

Streamflow Forecasts:

- Most forecasts increased 40-70 percentage points from Feb 1 to Mar 1
- In Sierra most 50% exceedance forecasts are 145-185%, but even 90% exceedance forecasts are above average.
- For Humboldt most 50% exceedance forecasts are 120-150% of average.





Bonus Slides



Precipitation Data should be considered Provisional at this Point

Watch for shifts in the data as plugs begin to register

California/Nevada SNOTEL Snow/Precipitation Update Report

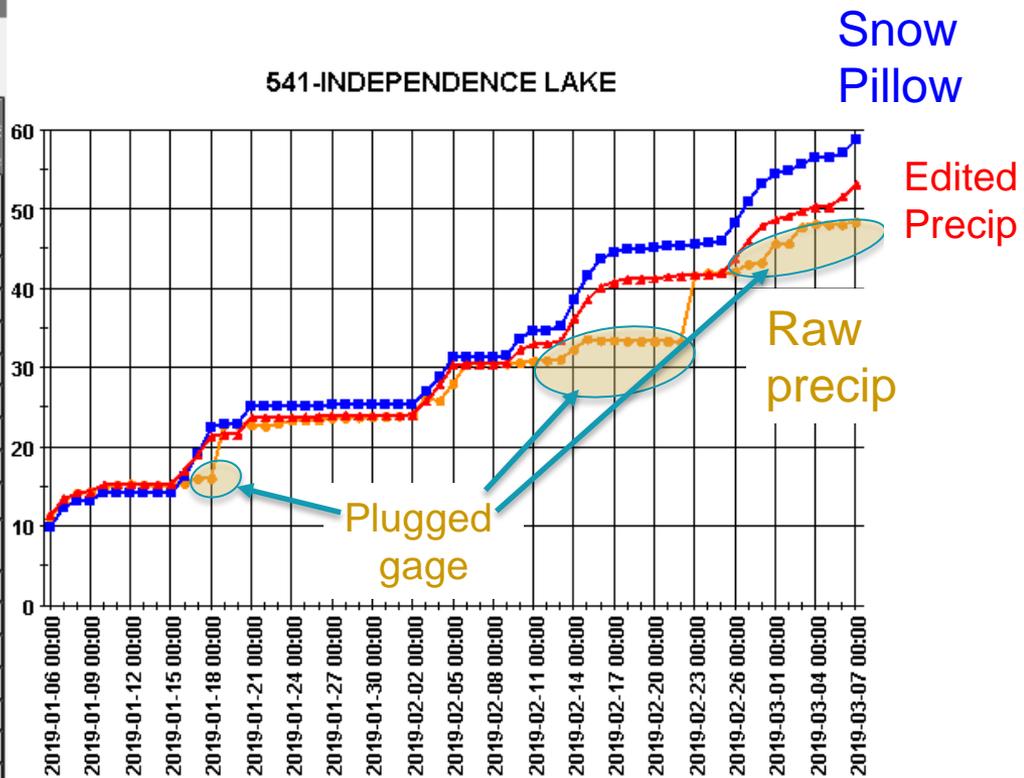
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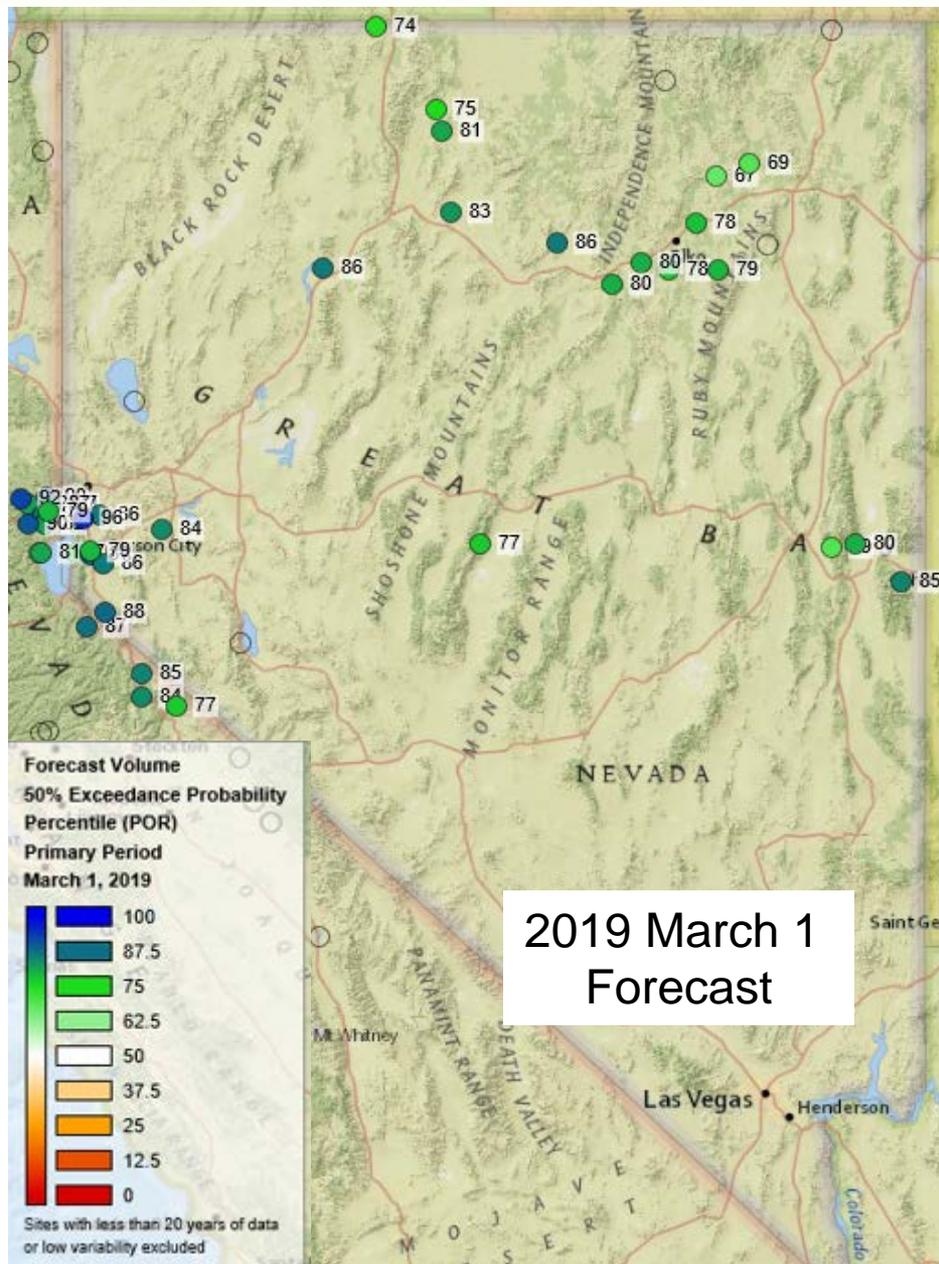
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541-INDEPENDENCE LAKE

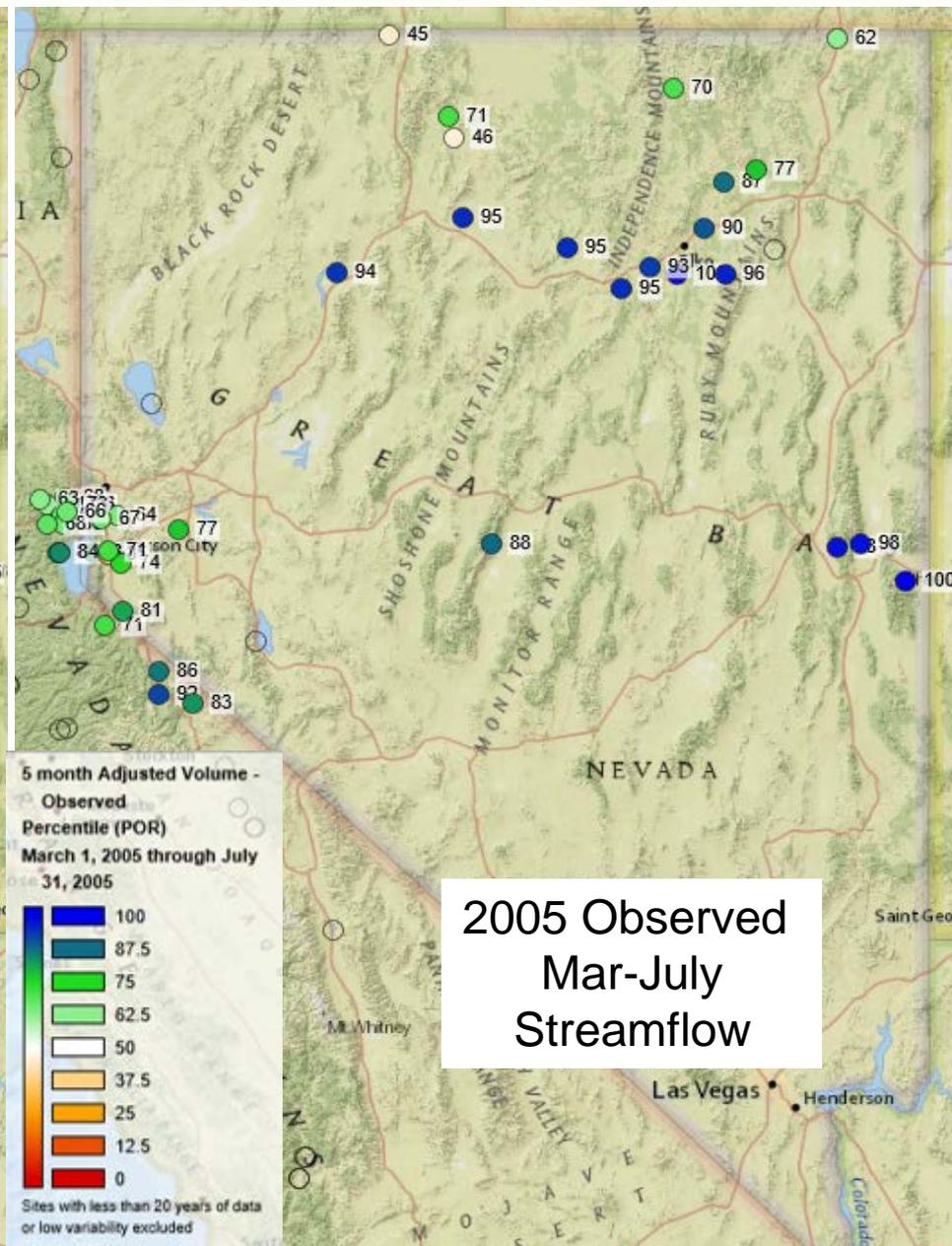


Edited Precip

Streamflow Forecast Percentile Comparison

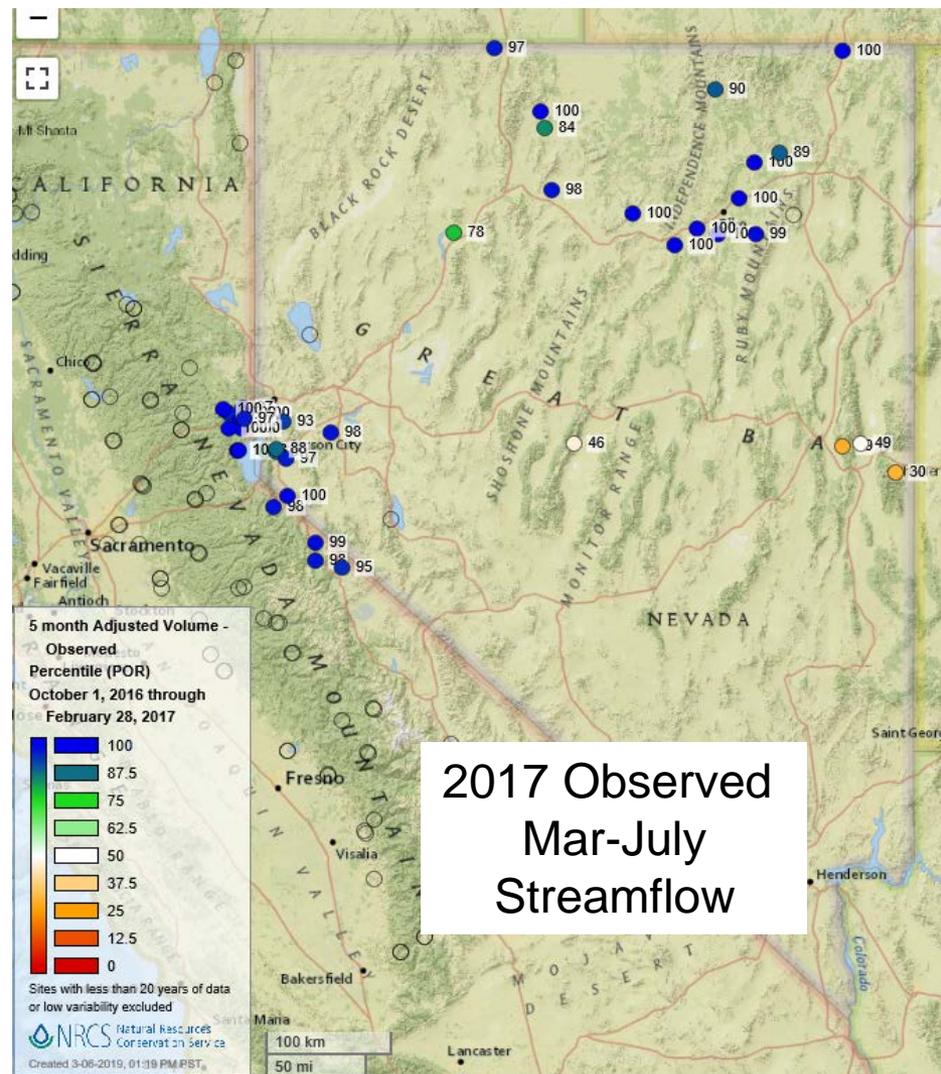
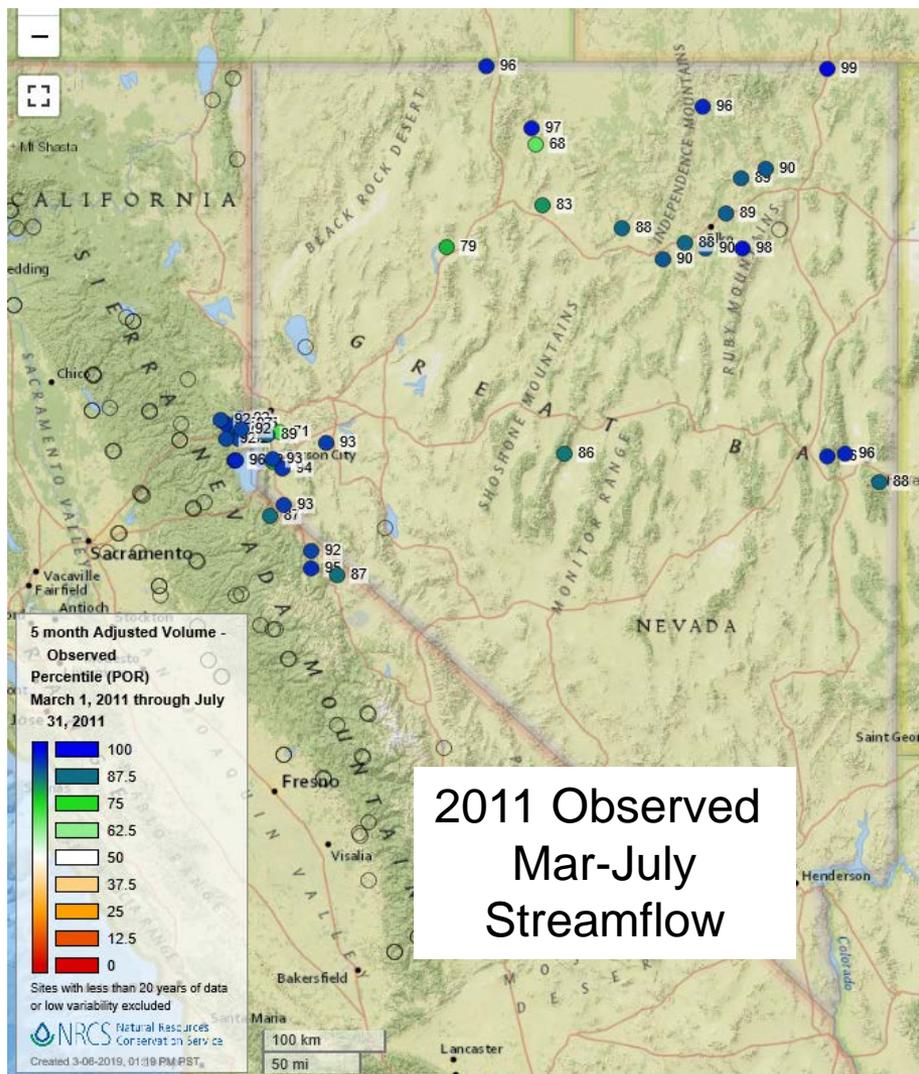


2019 March 1
Forecast

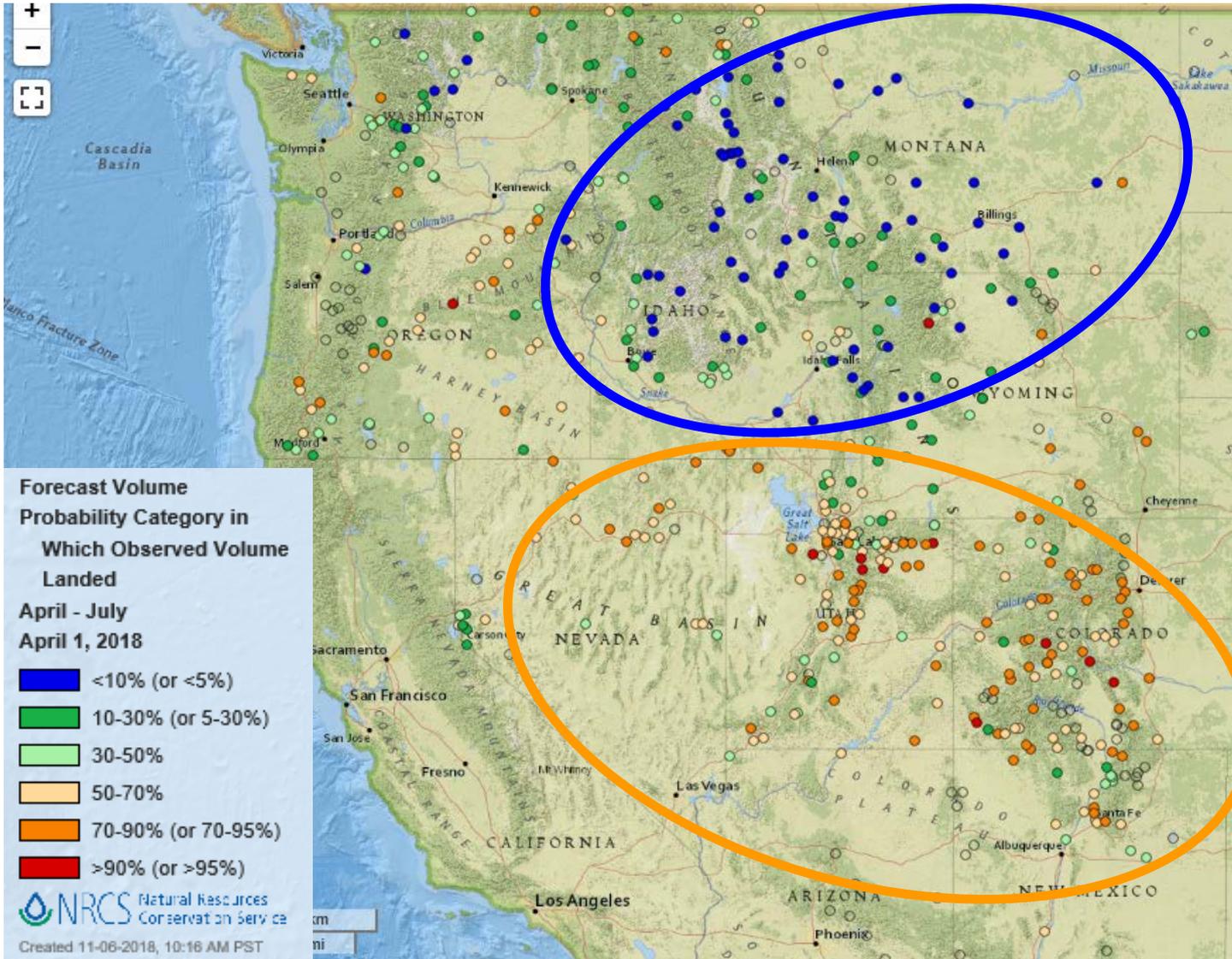


2005 Observed
Mar-July
Streamflow

Streamflow Forecast Percentile Comparison

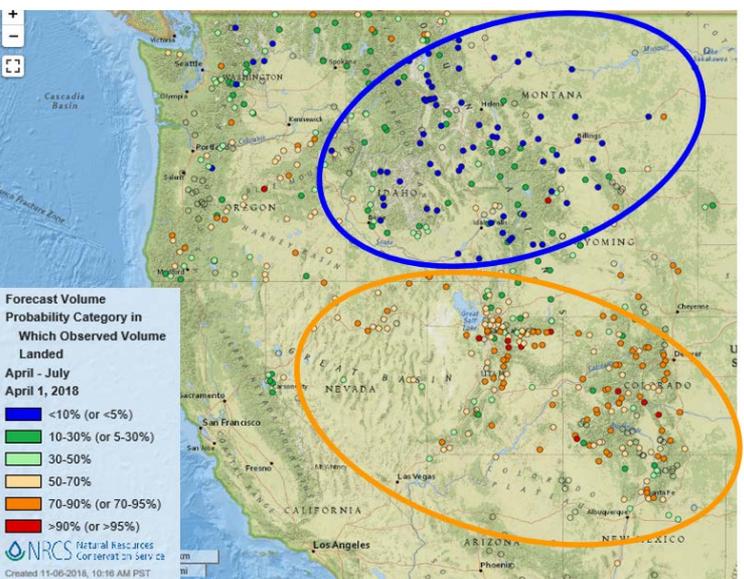
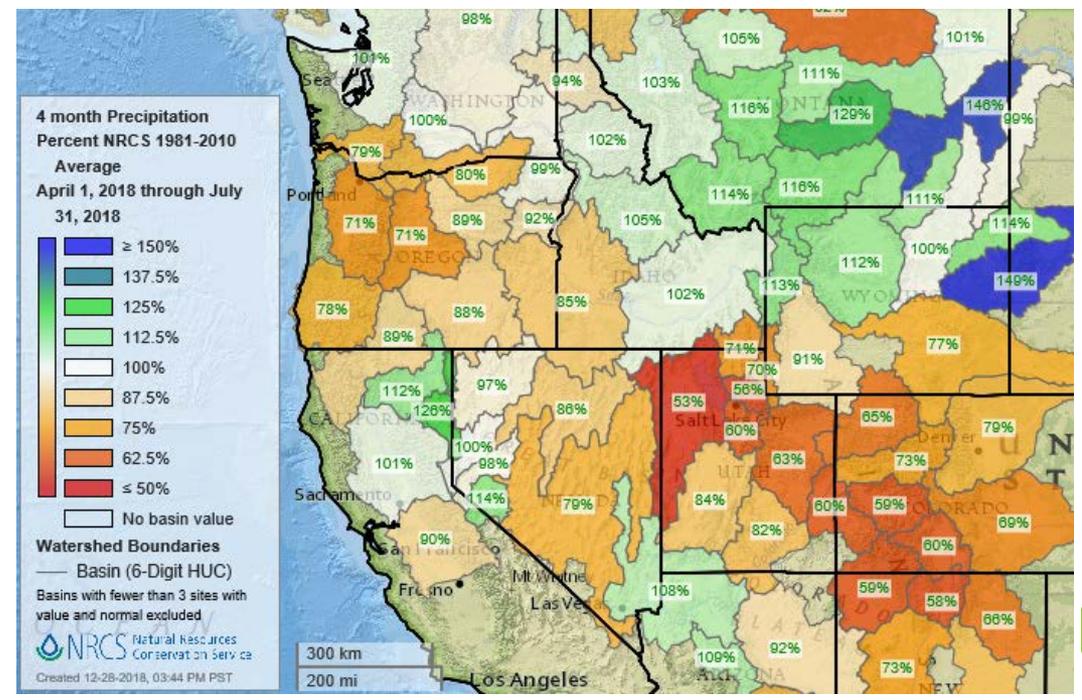
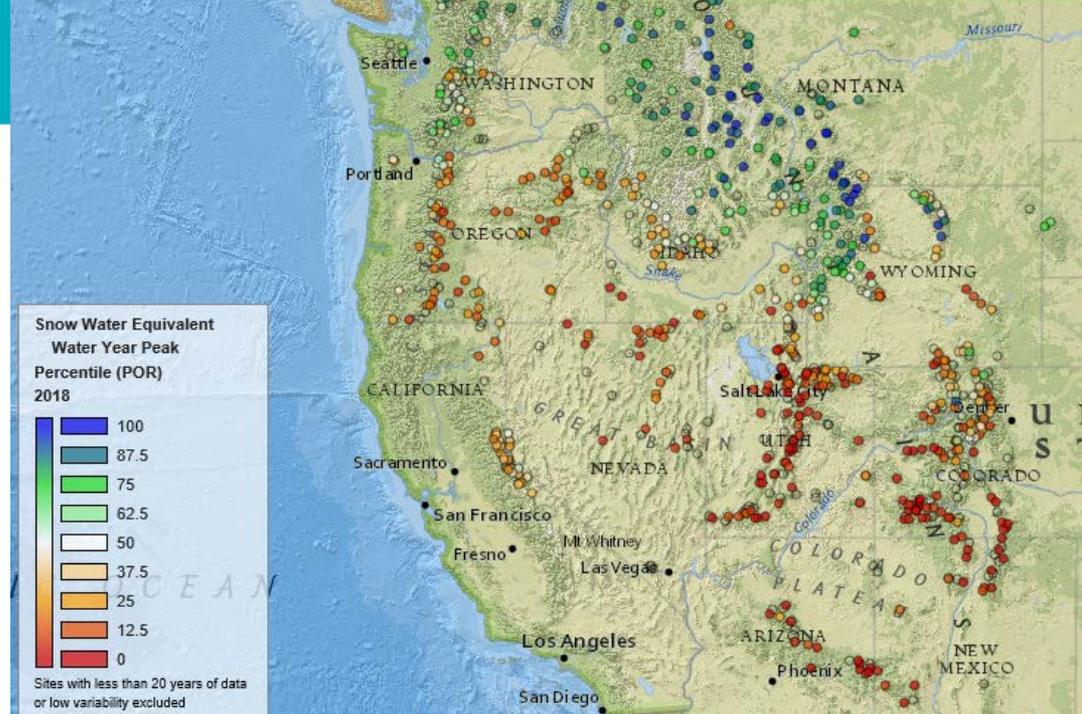


New - Forecast Verification Products

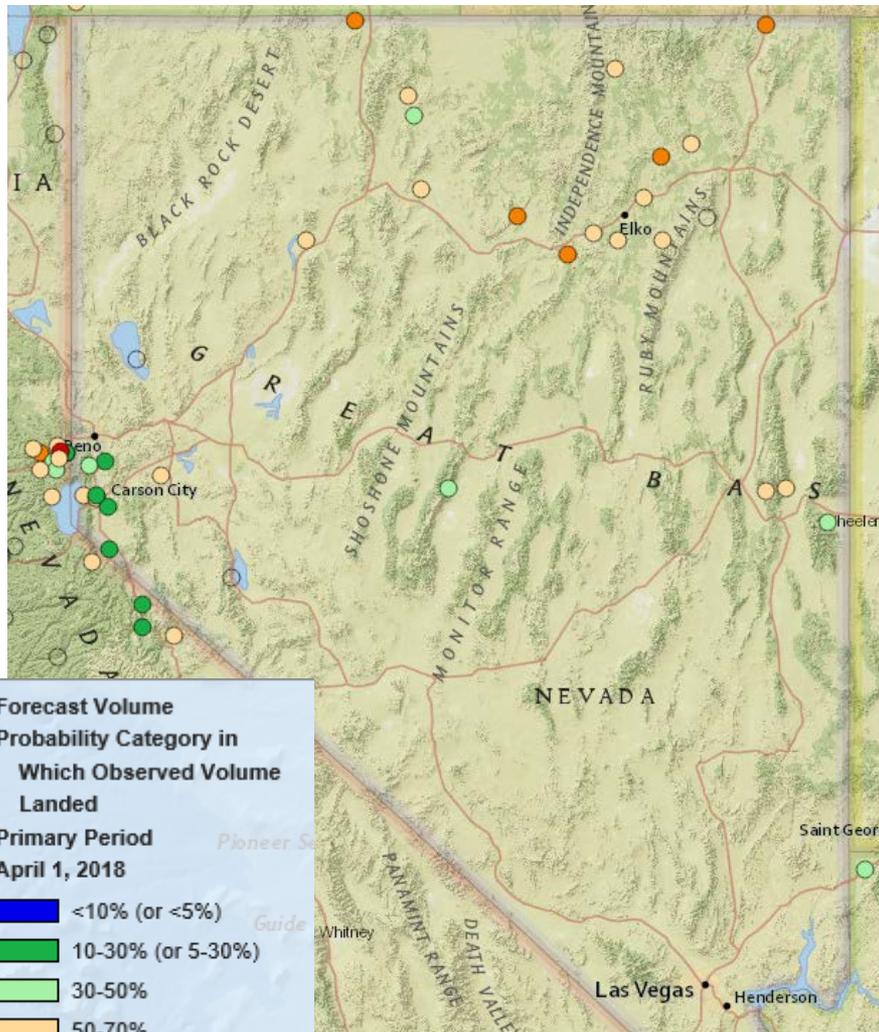


Observed was often more than 10% exceedance forecast

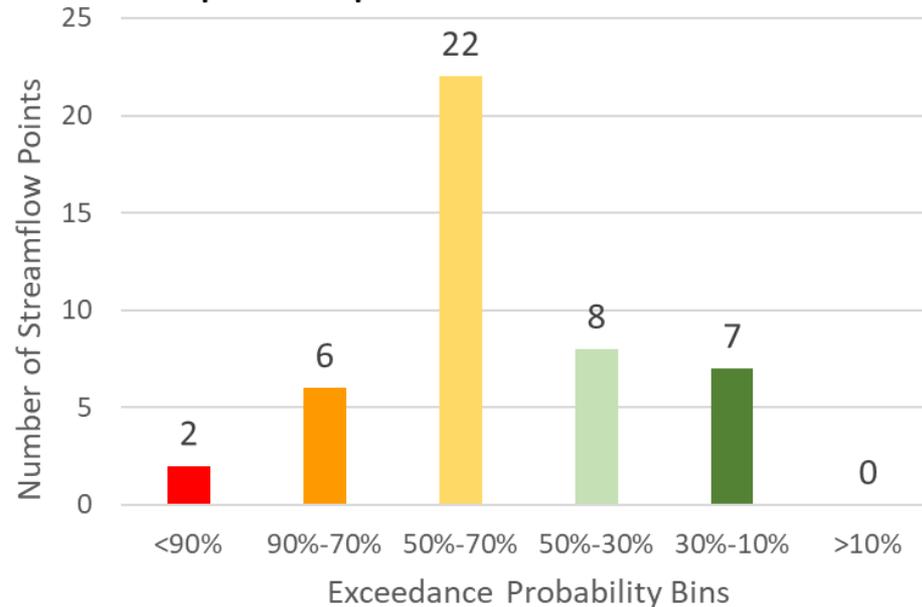
Observed was often between 70 and 90 exceedance forecast



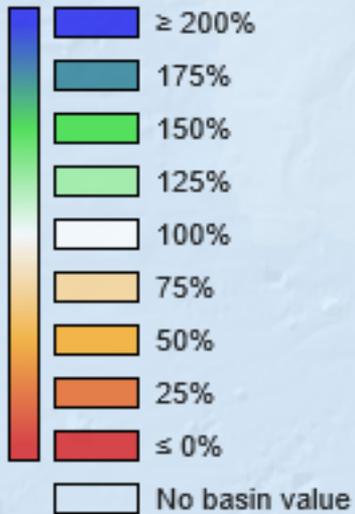
2018 Nevada Forecast Review



**2018 Observed April-July Runoff
Grouped into April 1 Forecast Exceedance Bins**



**4 month Precipitation
Percent NRC S 1981-2010
Average
April 1, 2018 through July
31, 2018**



⊖ No current value

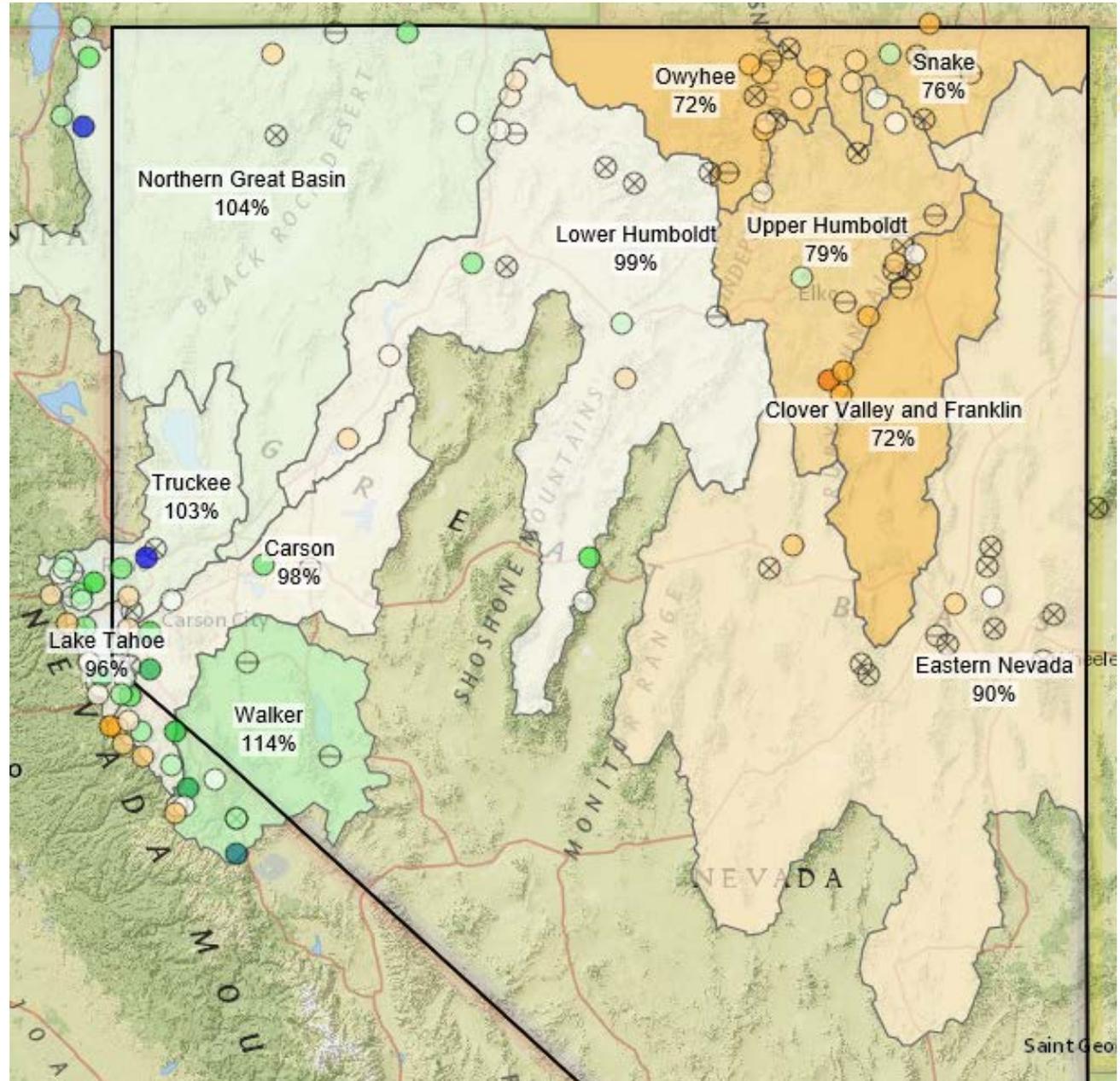
⊕ Average is zero

⊗ No average

Watershed Boundaries

— State Watersheds

Basins with fewer than 3 sites with value and normal excluded

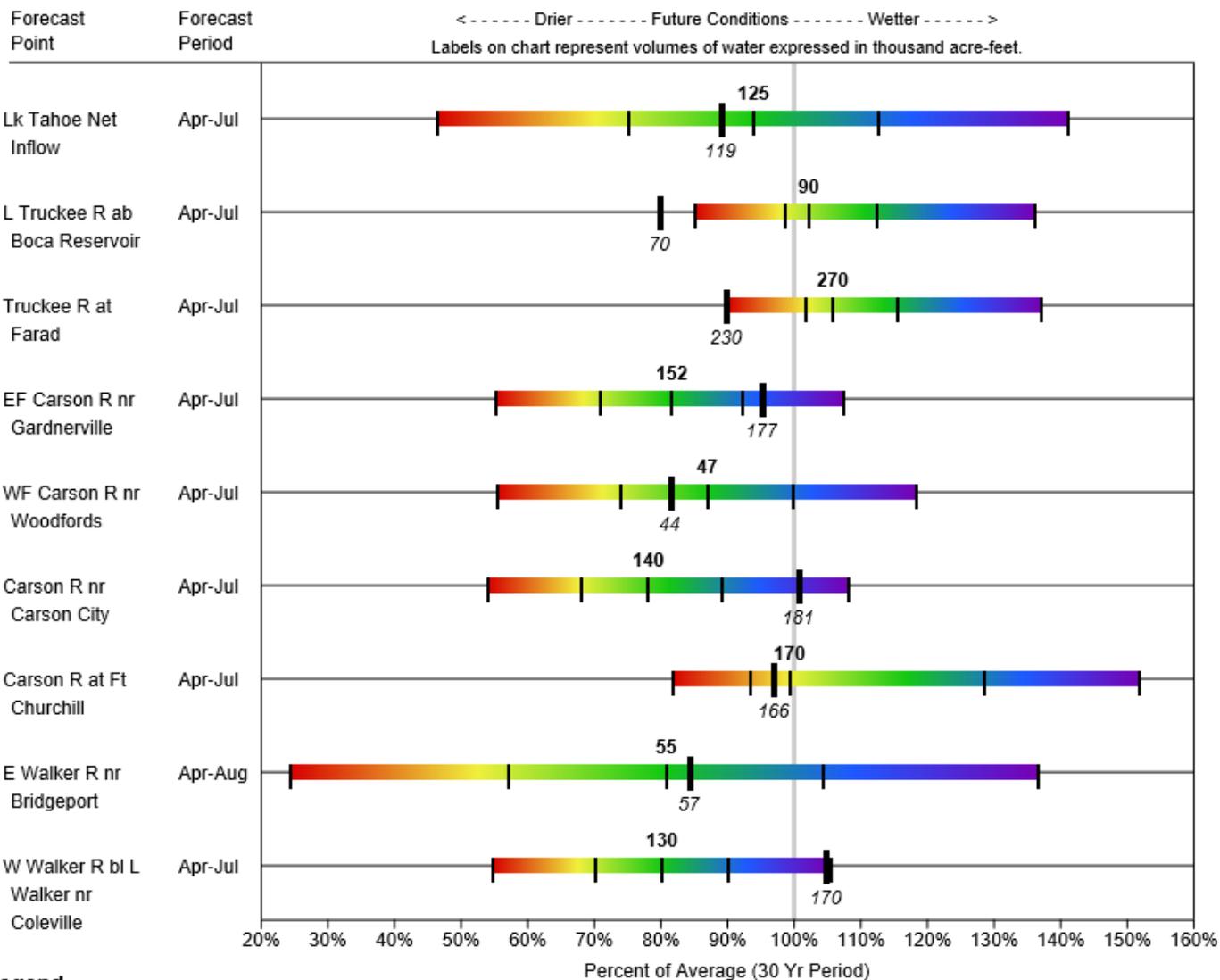


Eastern Sierra Basin Summary

Water Supply Forecasts

April 1, 2018

Forecast Exceedance Probabilities



Legend



Humboldt River Summary Water Supply Forecasts April 1, 2018

