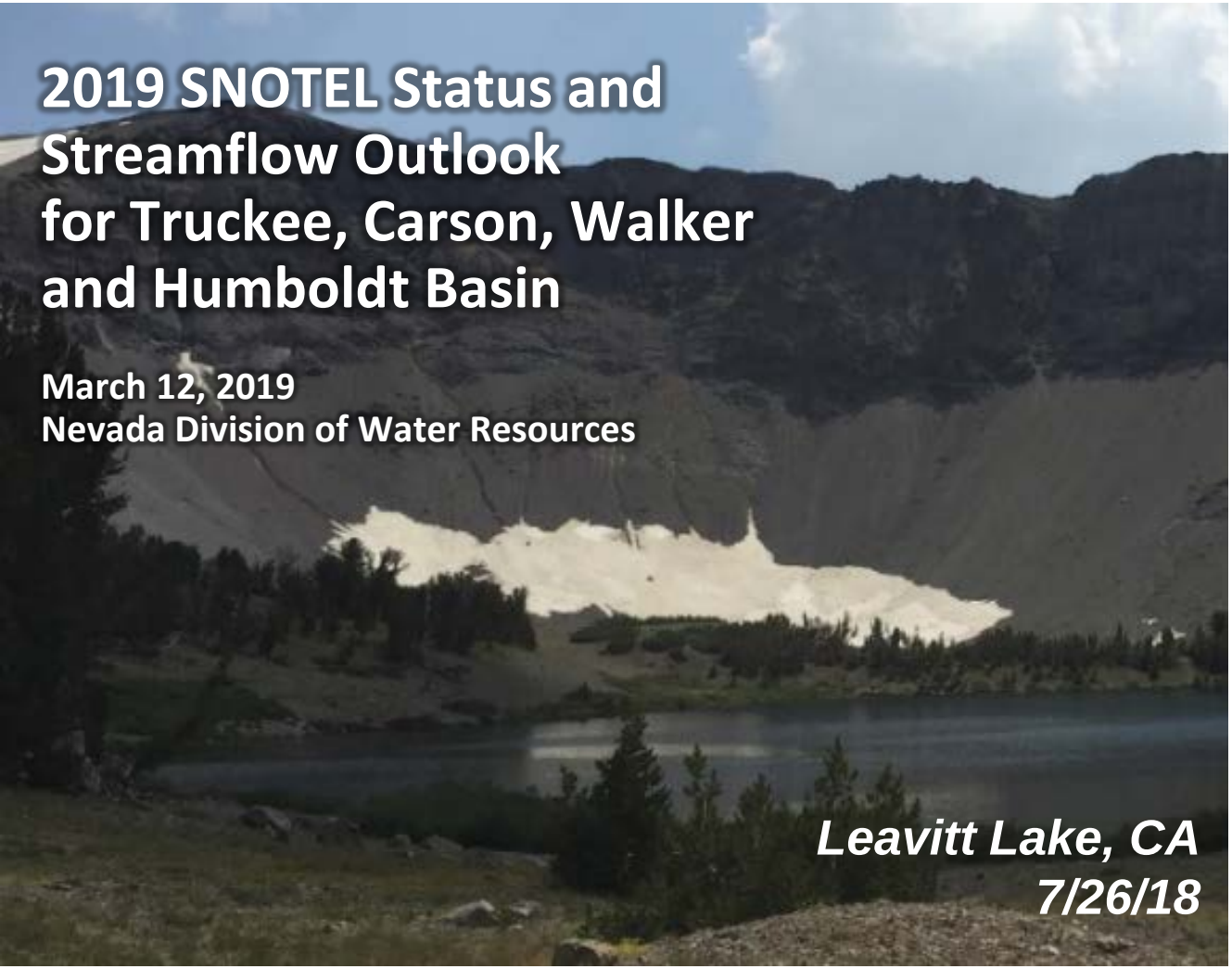
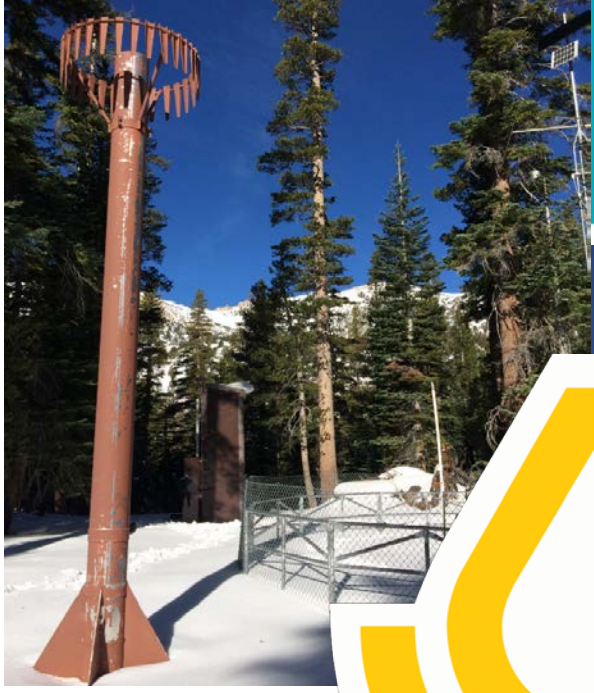
United States Department of Agriculture

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



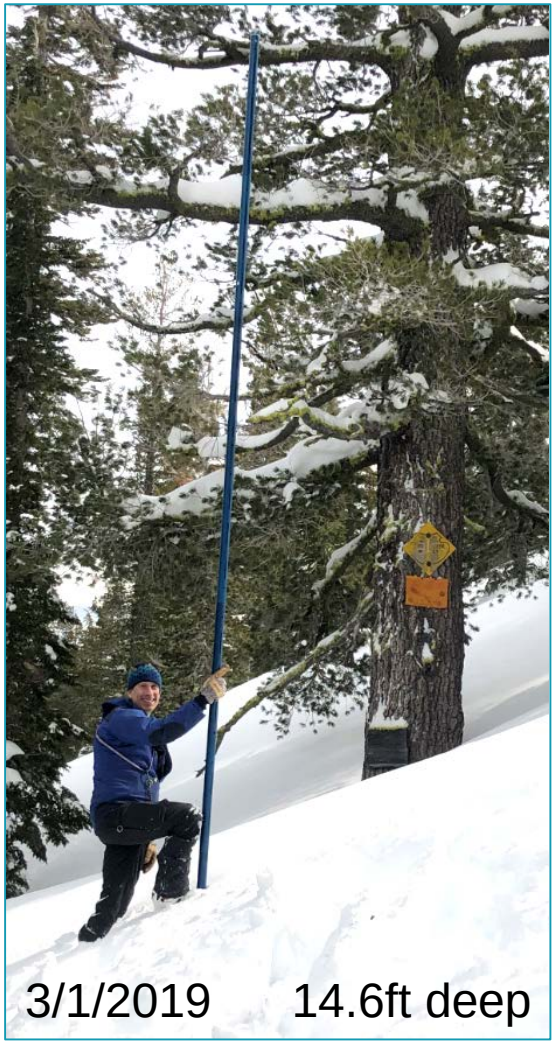
Jeff Anderson
Nevada NRCS Snow Survey

(775) 857-8500 x152
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

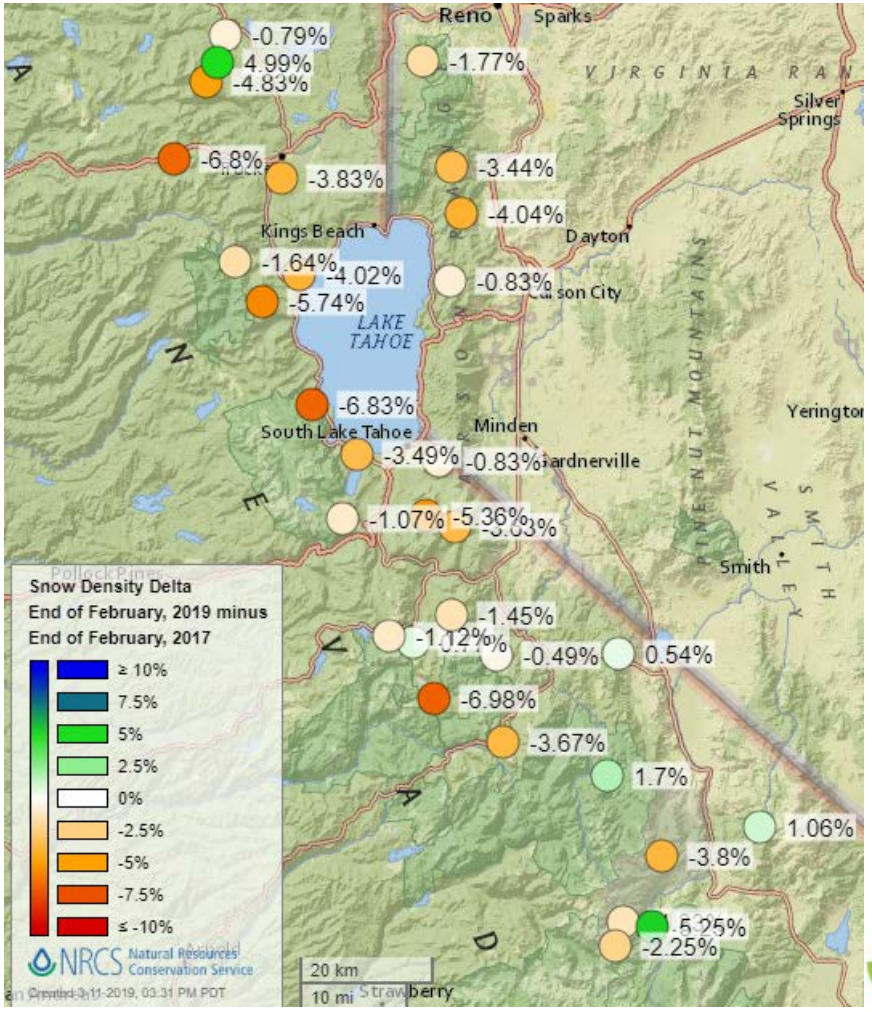
Rubicon #1 Snow Course (8,100feet) - West Shore Lake Tahoe



Snowpack Character

Less Dense

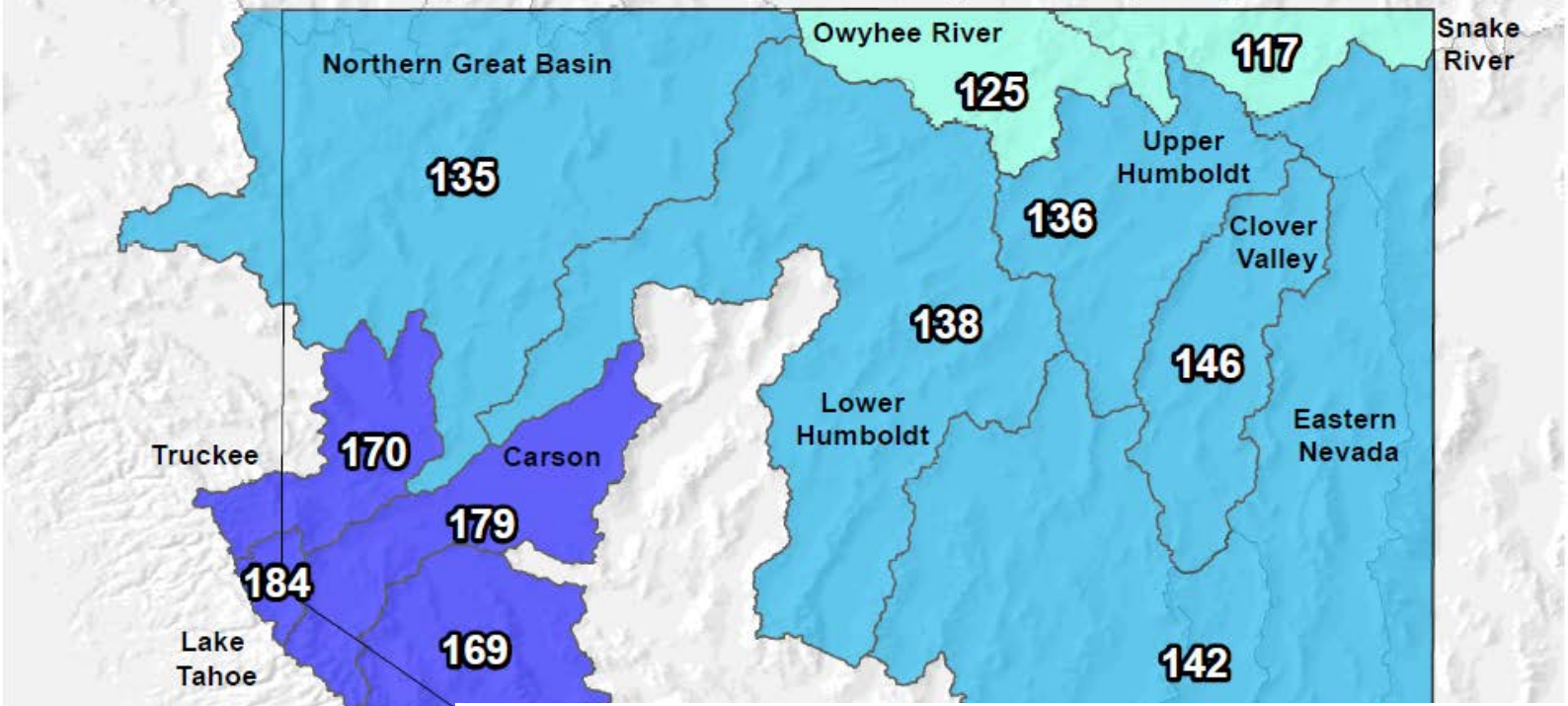
Less Ice Layers



United States Department of Agriculture

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

Mar 11, 2019

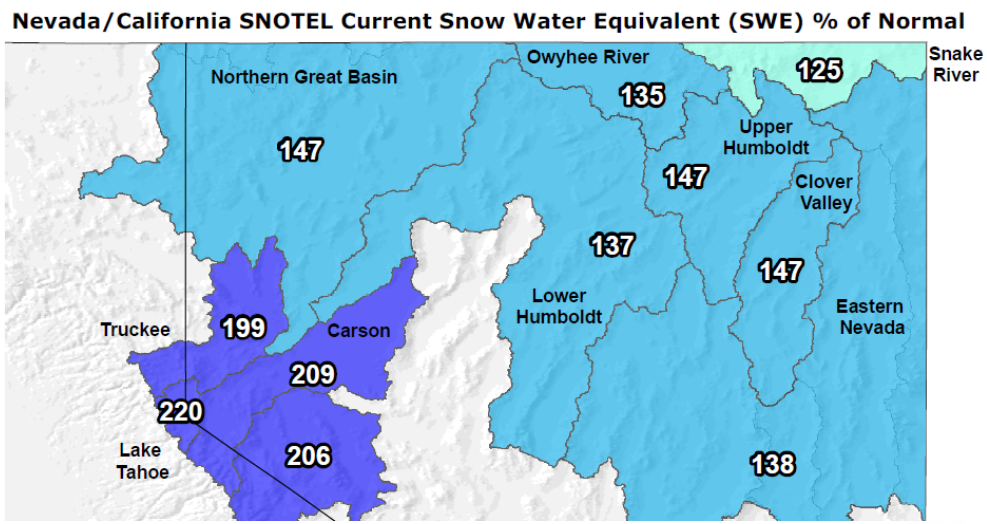


Current Snow Water Equivalent Basin-wide Percent of 1981-2010 Median

- unavailable *
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >=150%

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

Mar 11, 2017



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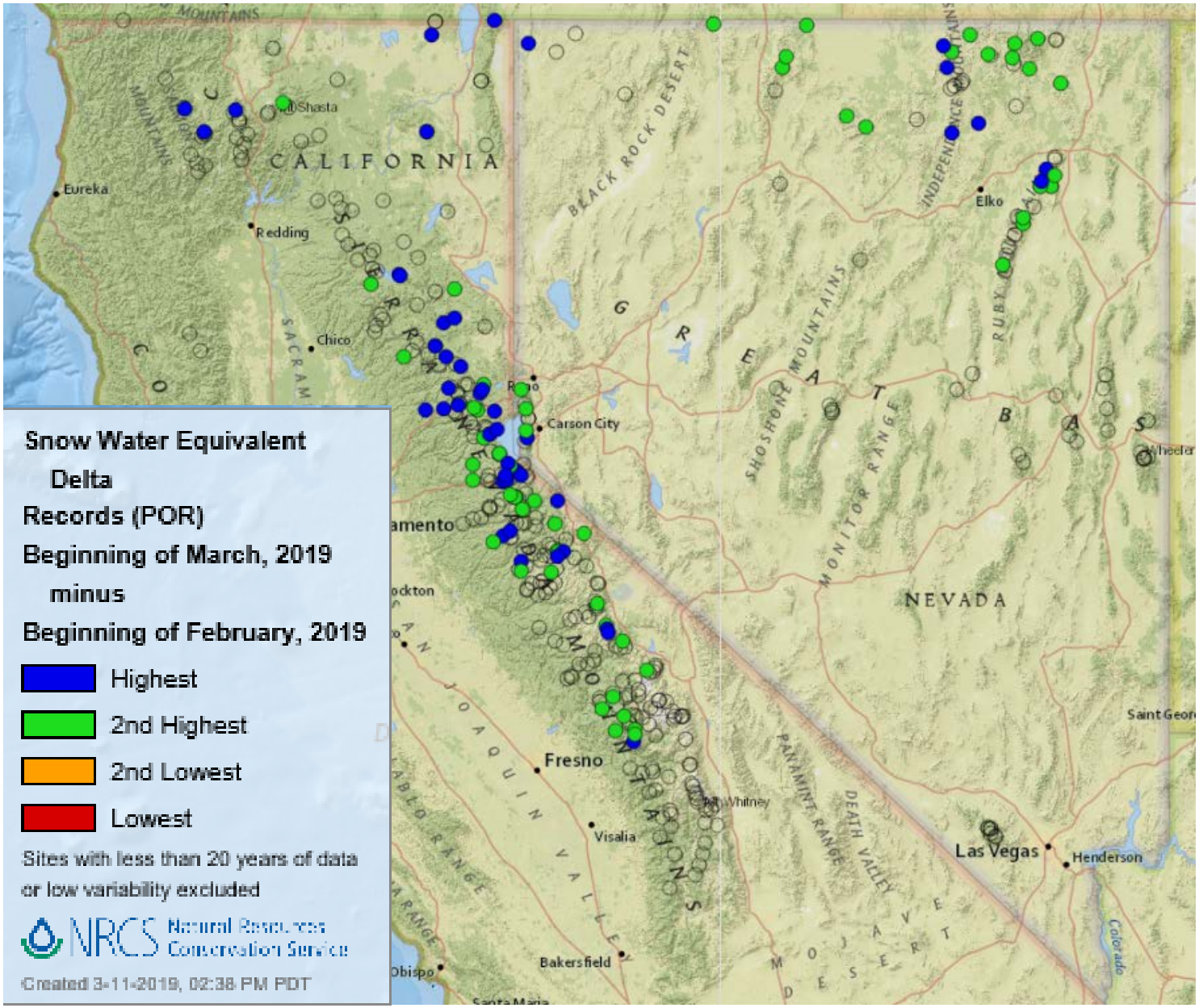
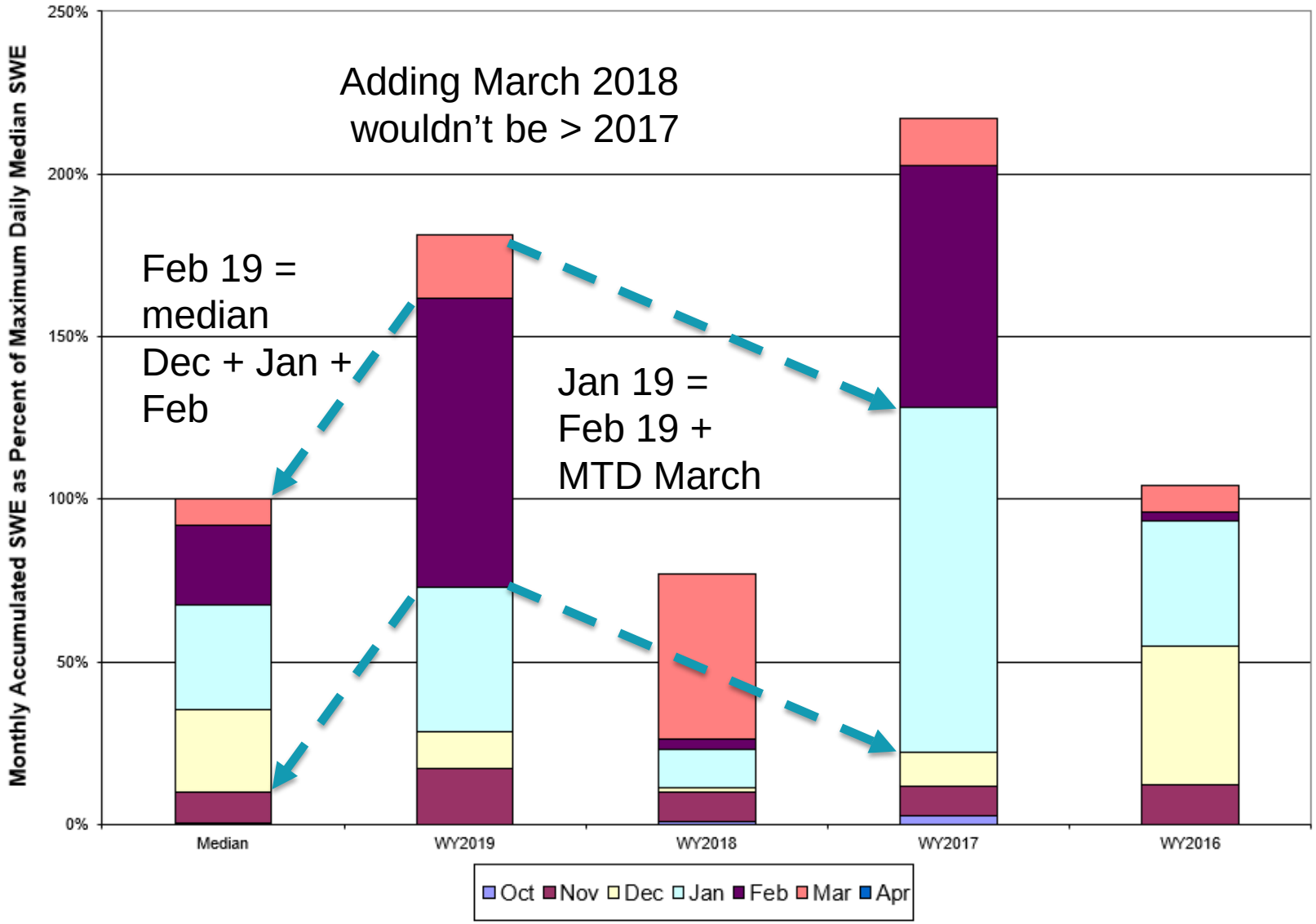
Provisional data subject to revision

USDA

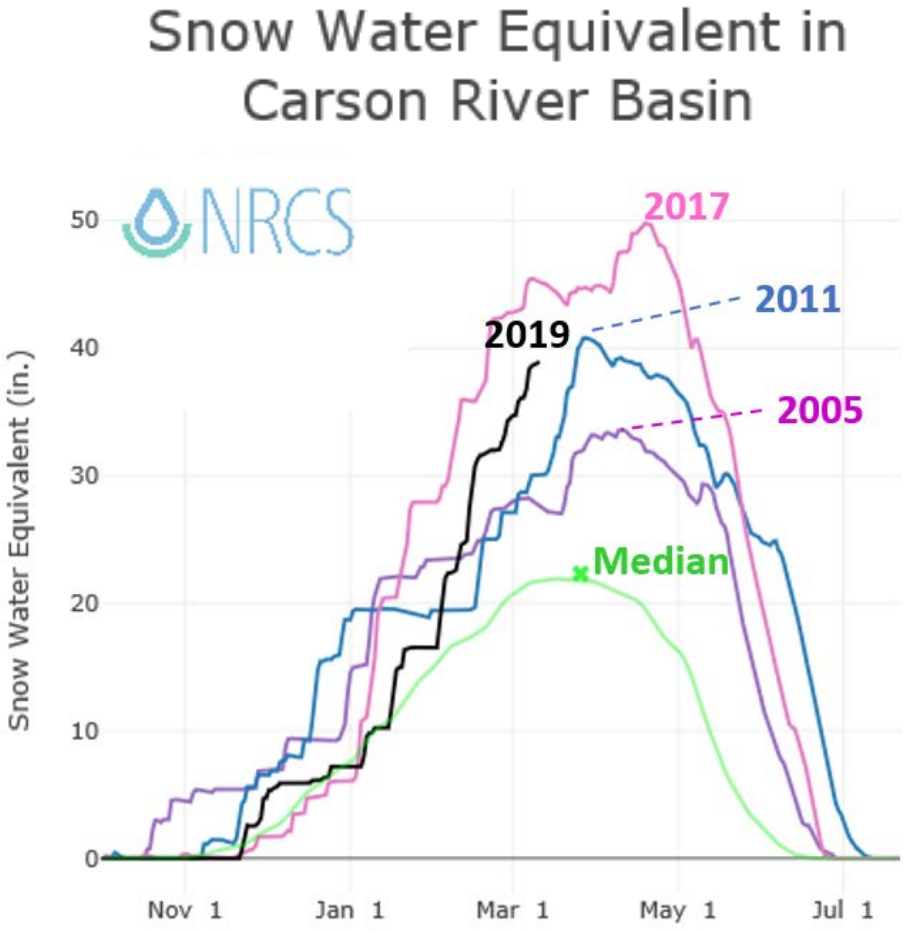


February 2019 Record to Near-Record Increase in SWE

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



2019 Snowpack >> Median Peak



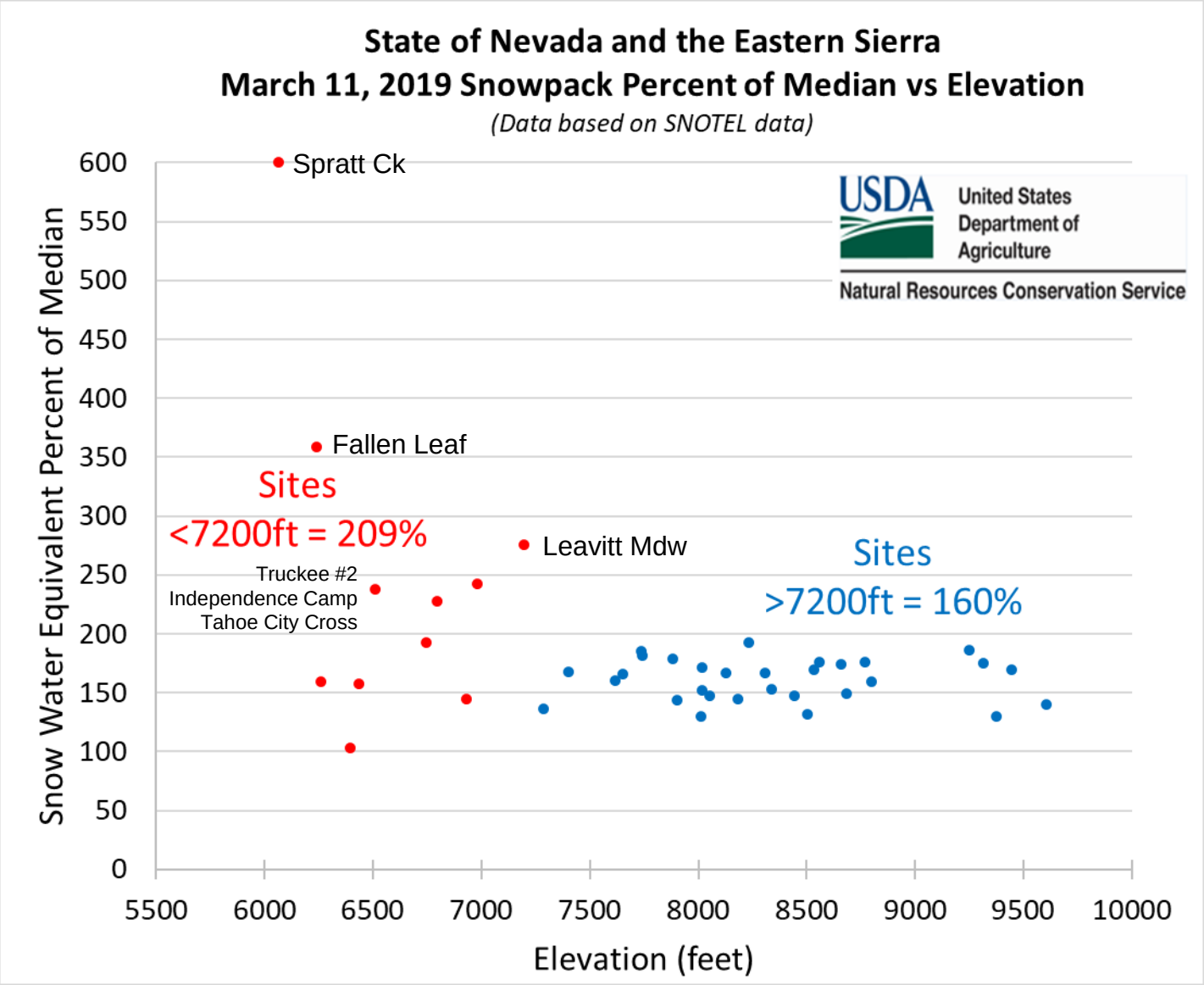
California/Nevada SNOTEL Snowpack Update Report

Based on Mountain Data from NRCS SNOTEL Sites

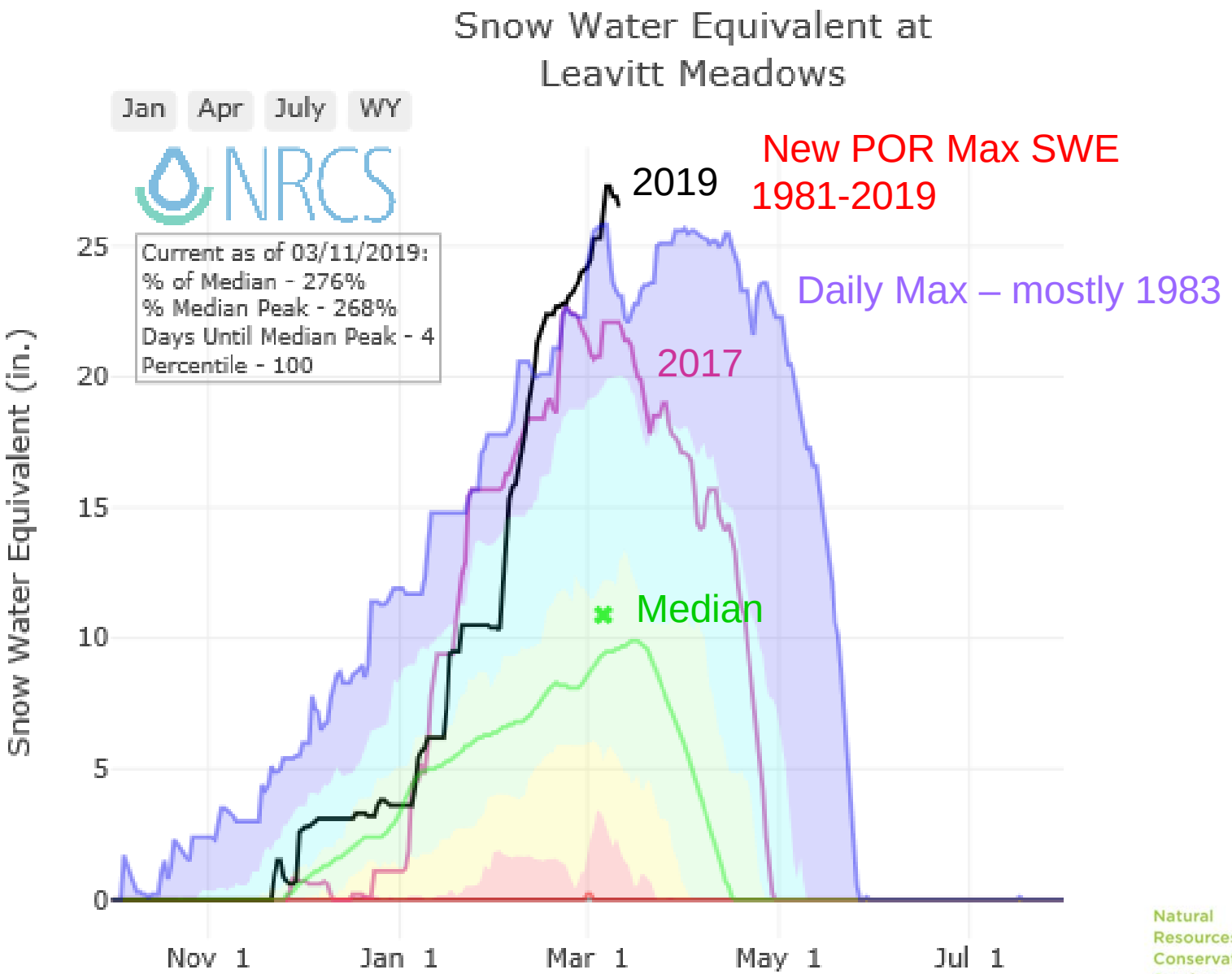
Provisional data, subject to revision

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

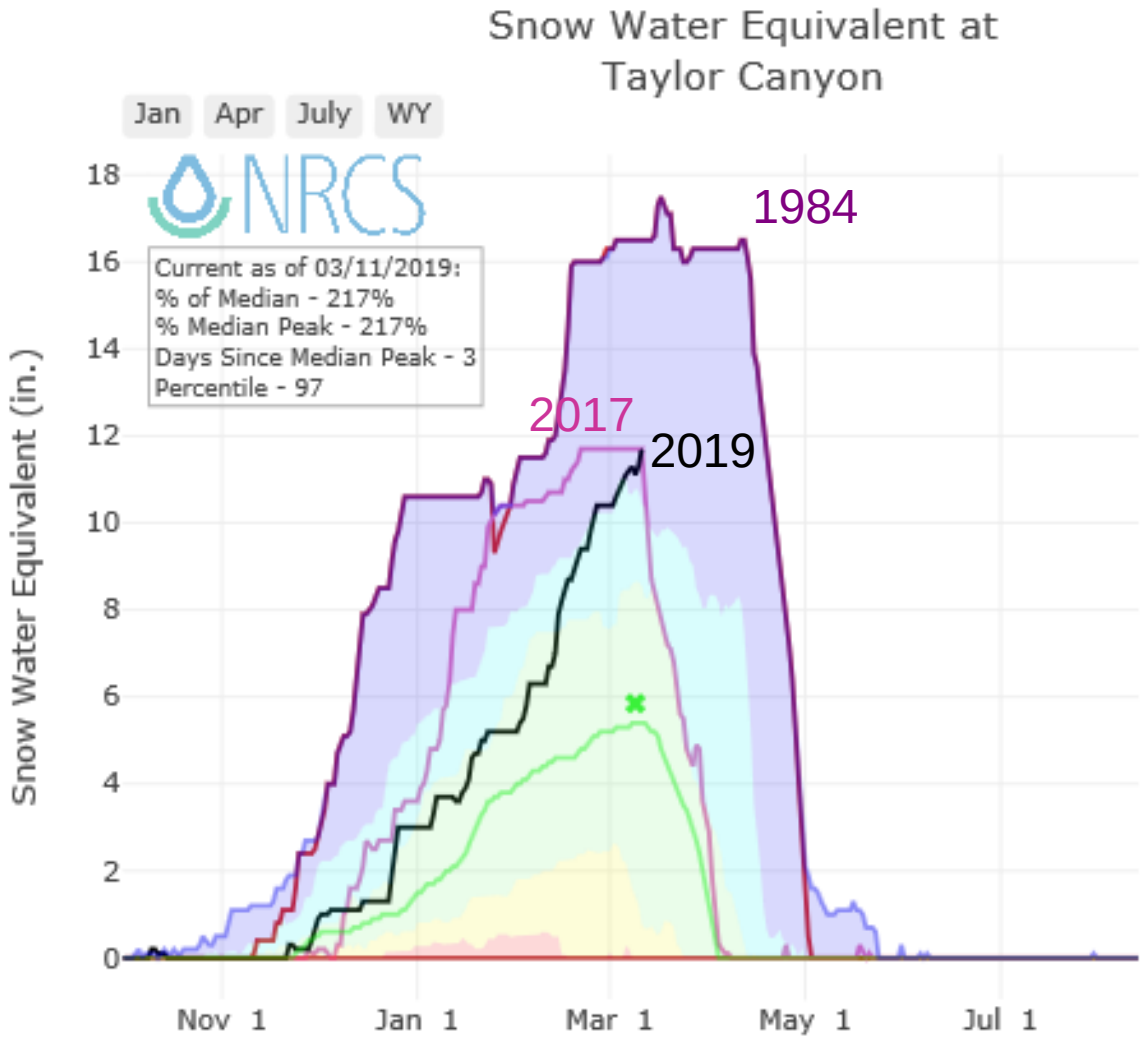
Basin Site Name	Elev (ft)	Snow Water Equivalent				Percent of	
		Current (in)	Today's Median (in)	Median Peak (in)	Median Peak Date	Today's Median	Median Peak
LAKE TAHOE							
Basin Index (%)						**184**	**177**
TRUCKEE RIVER							
Basin Index (%)						**170**	**161**
CARSON RIVER							
Basin Index (%)						**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)
Spratt Ck
Fallen Leaf
Leavitt Mdw
Sites
<7200ft = 209%
Truckee #2
Independence Camp
Tahoe City Cross
Sites
>7200ft = 160%
USDA
United States Department of Agriculture
Natural Resources Conservation Service
Snow Water Equivalent Percent of Median
0
50
100
150
200
250
300
350
400
450
500
550
600
5500
6000
6500
7000
7500
8000
8500
9000
9500
10000
Elevation (feet)

West Walker Basin Elev. 7198ft



Upper Humboldt Basin
Elev. 6325ft

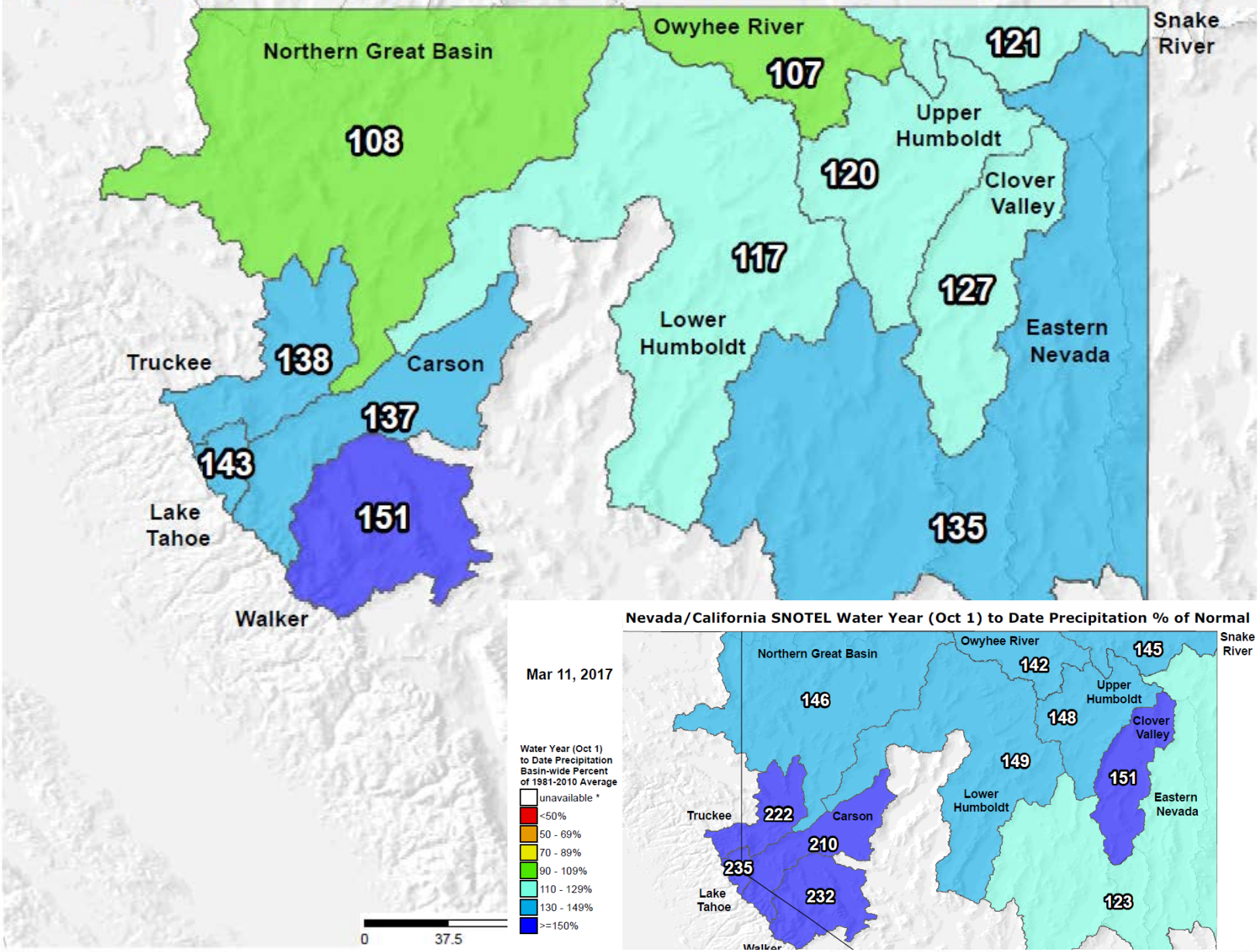


4th highest peak on record in last 38 winters

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

- unavailable *
- <50%
- 50 - 69%
- 70 - 89%
- 90 - 109%
- 110 - 129%
- 130 - 149%
- >=150%

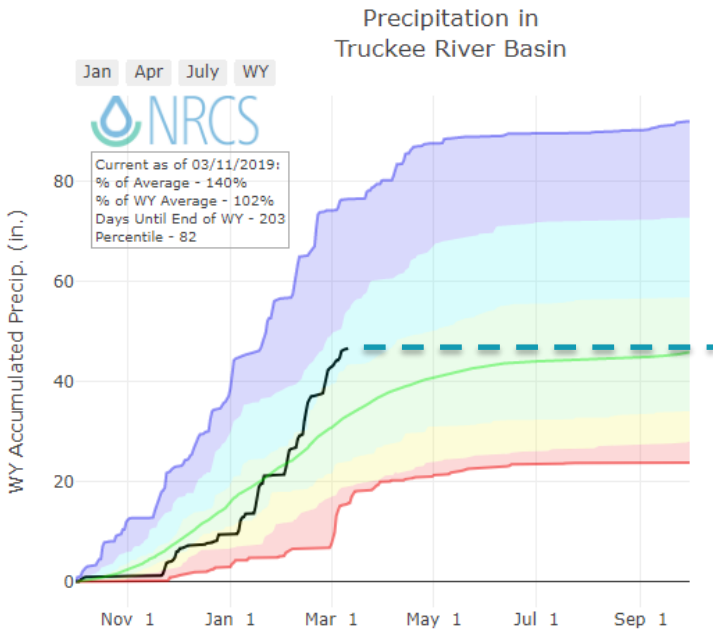
* *Data unavailable at time of posting or measurement is not representative at this time of year*

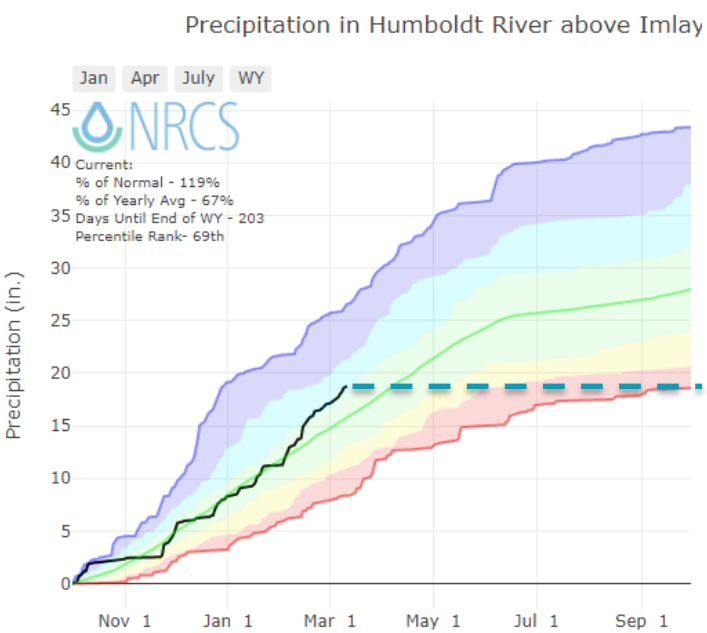
Provisional data subject to revision

USDA

USDA
United States Department of Agriculture

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

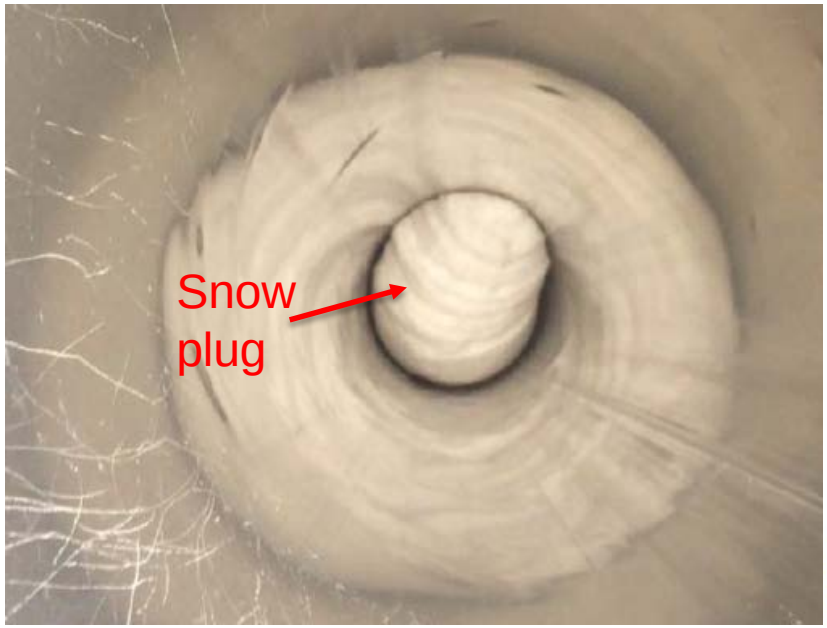
Based on Mountain Data from NRCS SNOTEL Sites

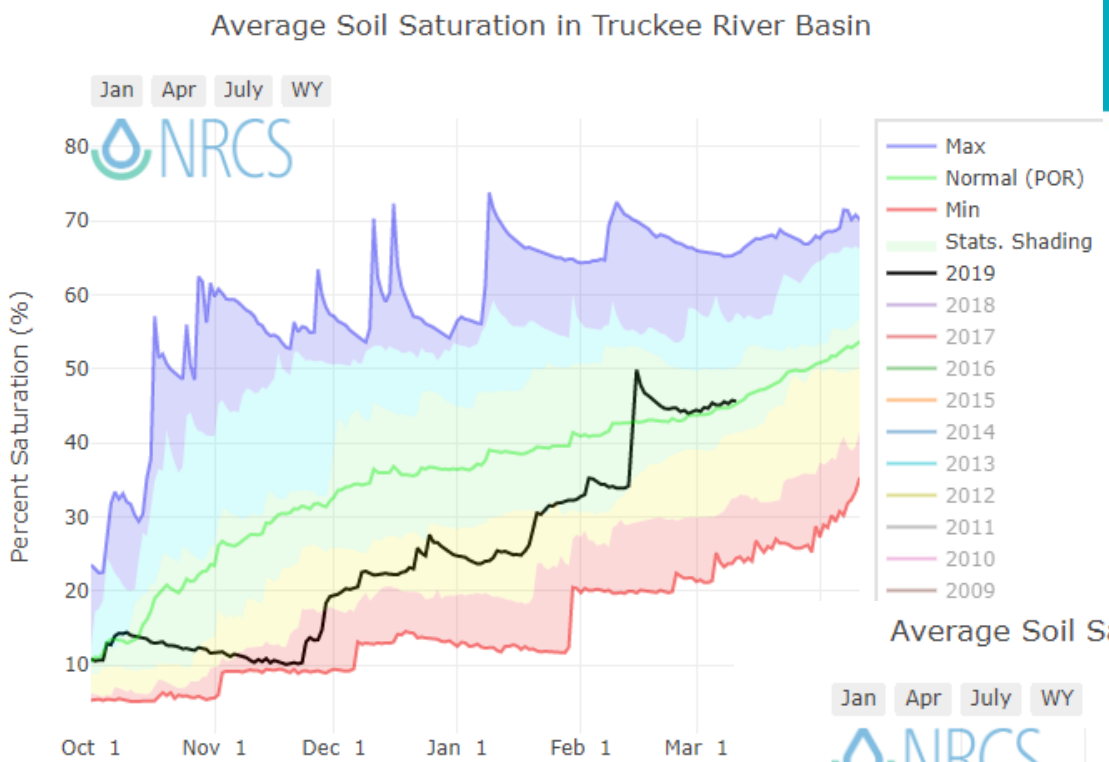
Provisional data, subject to revision

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

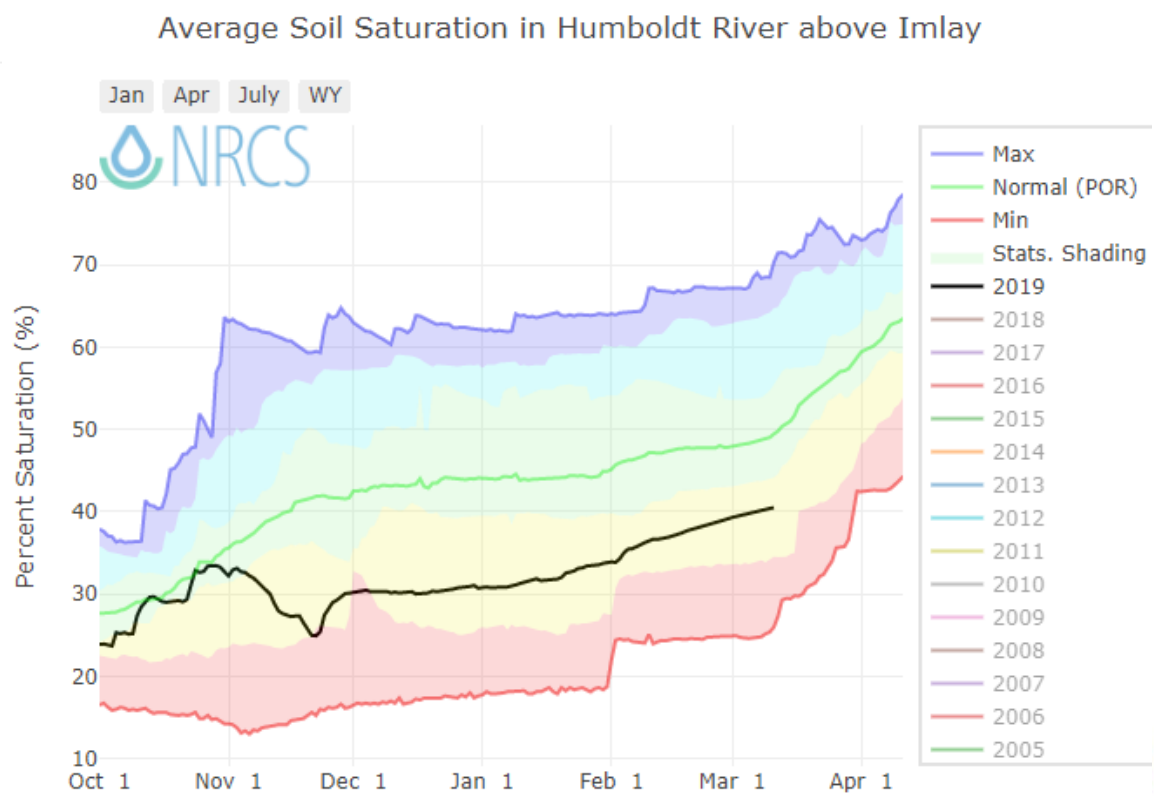
Basin Site Name	Elev (ft)	Snow Water Equivalent Current (in)	Snow Water Equivalent Median (in)	Snow Water Equivalent Pct of Median	Water Year-to-Date Precipitation Current (in)	Water Year-to-Date Precipitation Average (in)	Water Year-to-Date Precipitation Pct of Average
LAKE TAHOE							
Heavenly Valley	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.





Soil moisture recovered where enough rain fell to penetrate snow.



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 (with label), Normal (with label), Max (with label, with year), Min (with label, with year), Years of Observed Data

Display Options: Only Show Points With Forecast For Selected Period

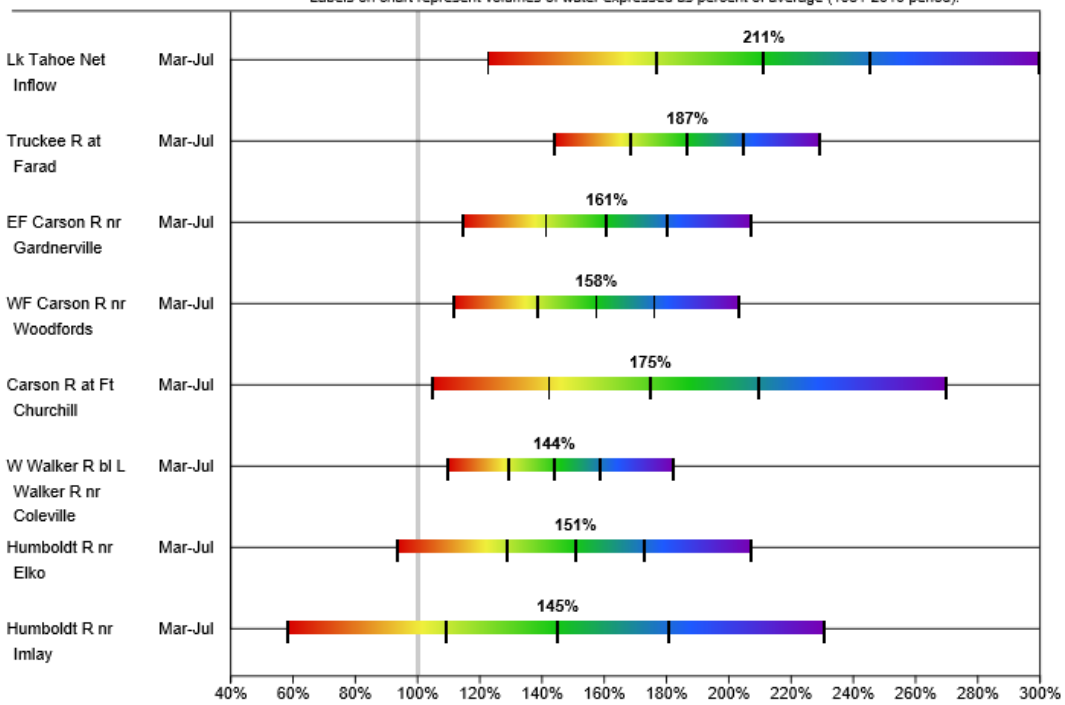
Chart Width: 800

State of Nevada Summary
Water Supply Forecasts
March 1, 2019

Forecast Exceedance Probabilities

< - - - - - - Drier - - - - - - - Future Conditions - - - - - - - Wetter - - - - - - >

Labels on chart represent volumes of water expressed as percent of average (1981-2010 period).



Legend

95% or 90% Exceedance	70% Exceedance	50% Exceedance	30% Exceedance	10% or 5% Exceedance
There is a 95%/90% chance that flows will exceed this volume	There is a 70% chance that flows will exceed this volume	There is a 50% chance that flows will exceed this volume	There is a 30% chance that flows will exceed this volume	There is a 10%/5% chance that flows will exceed this volume

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)*

USDA Natural Resources Conservation Service
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.

(*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

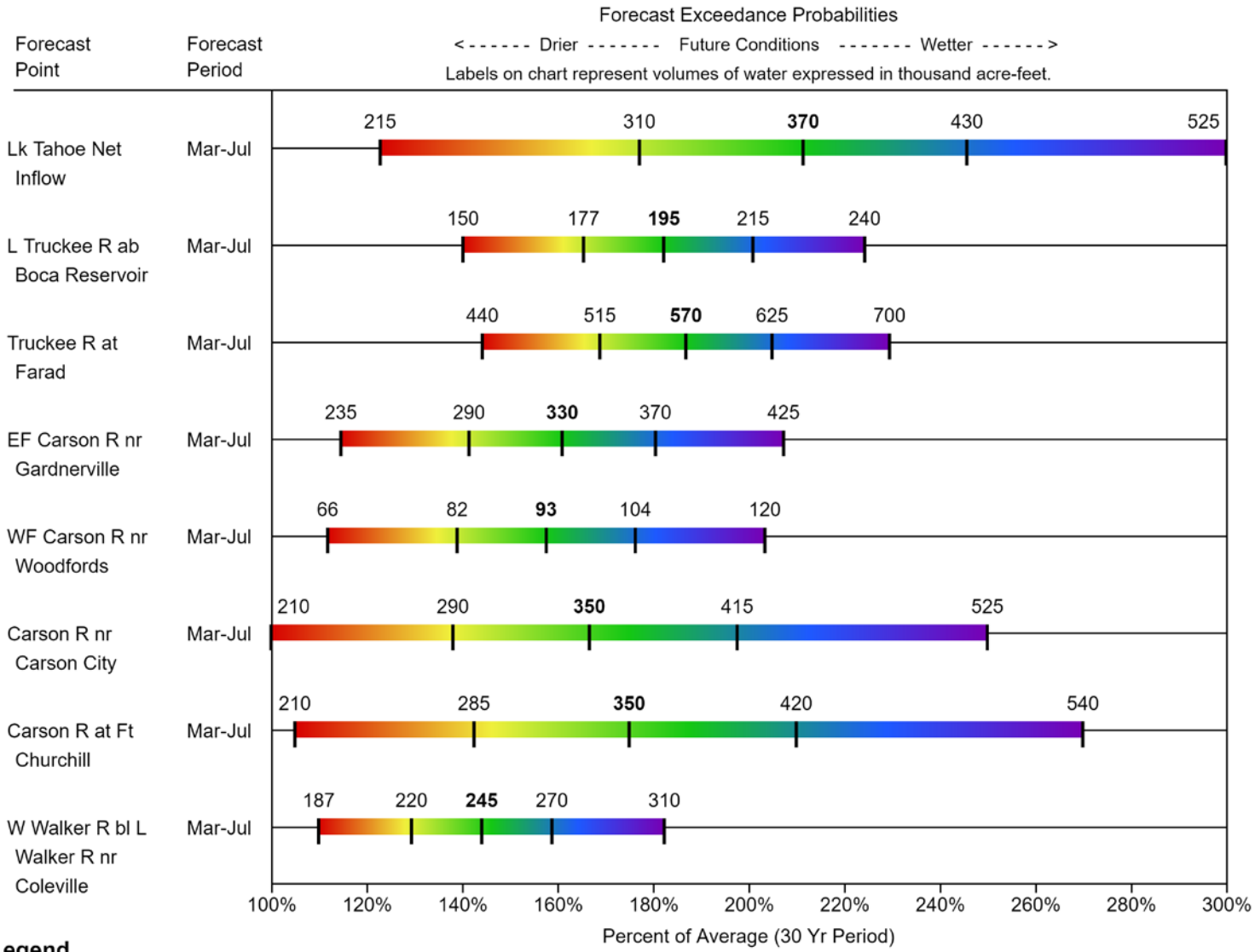
- **Outlook Reports:** Select a month
- **Streamflow Forecasts**
- **Reservoir Data**
- **Streamflow Data**
- **Water Supply Presentations**

Natural Resources Conservation Service

Eastern Sierra Basin Summary

Water Supply Forecasts

March 1, 2019



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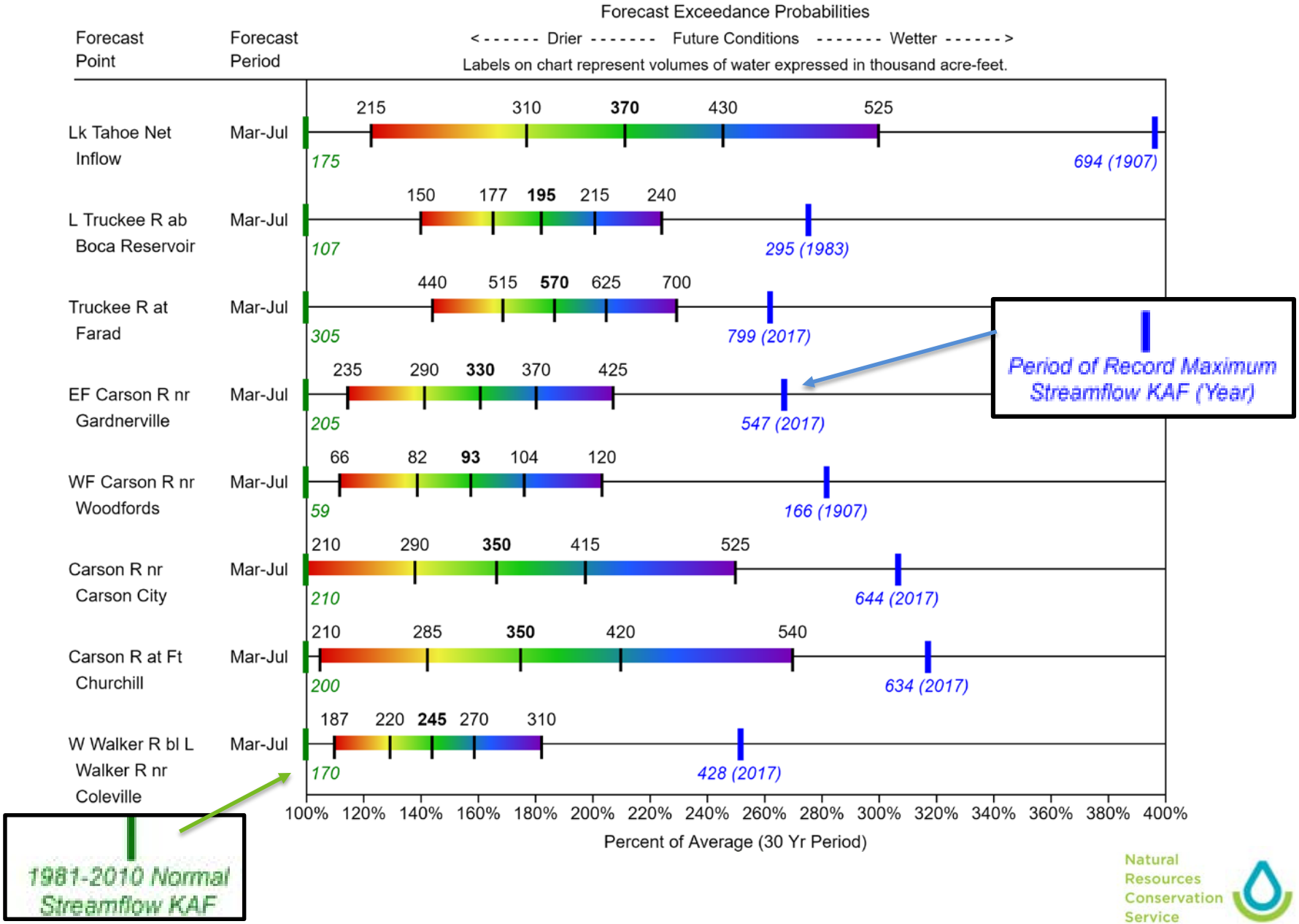
Natural Resources Conservation Service

Eastern Sierra Basin Summary

Water Supply Forecasts

March 1, 2019



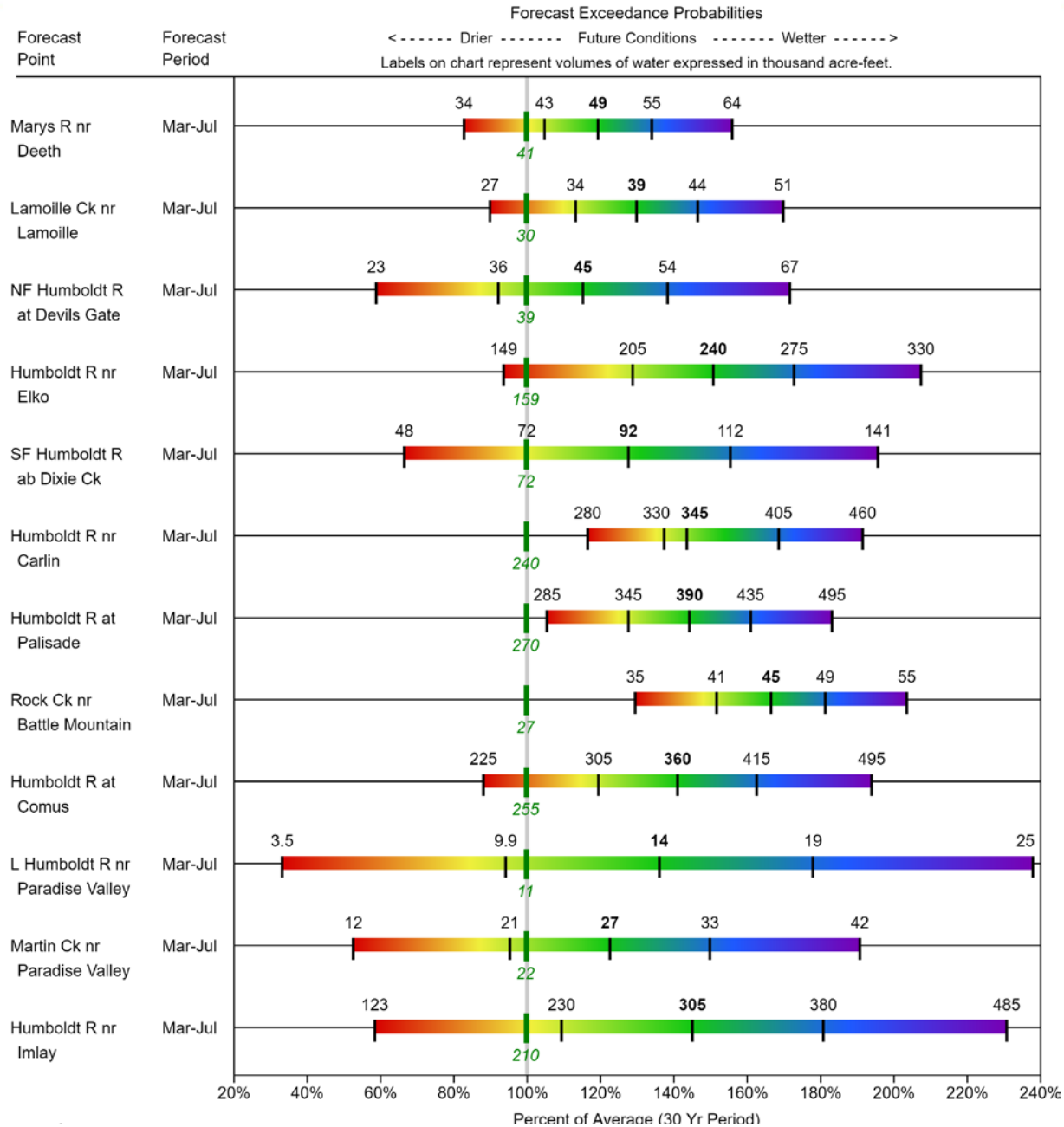
Natural Resources Conservation Service

USDA United States Departm

Humboldt River Summary

Water Supply Forecasts

March 1, 2019



Natural Resources Conservation Service

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

Based on Mountain Data from NRCS SNOTEL Sites

Provisional data, subject to revision

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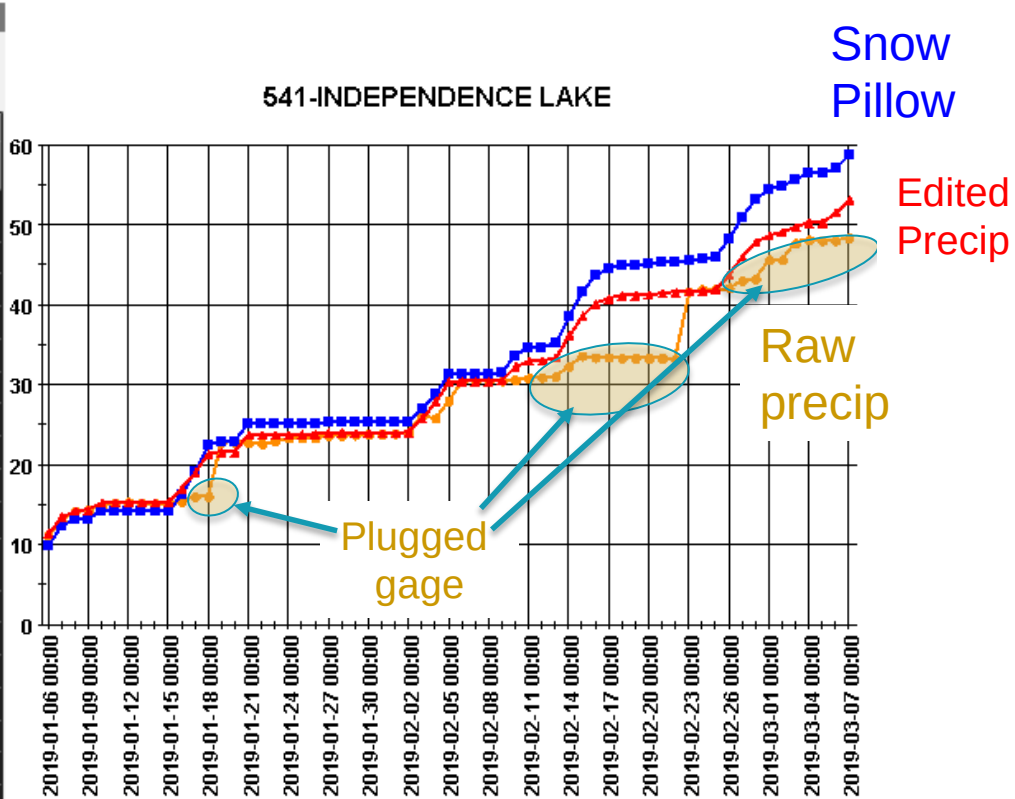
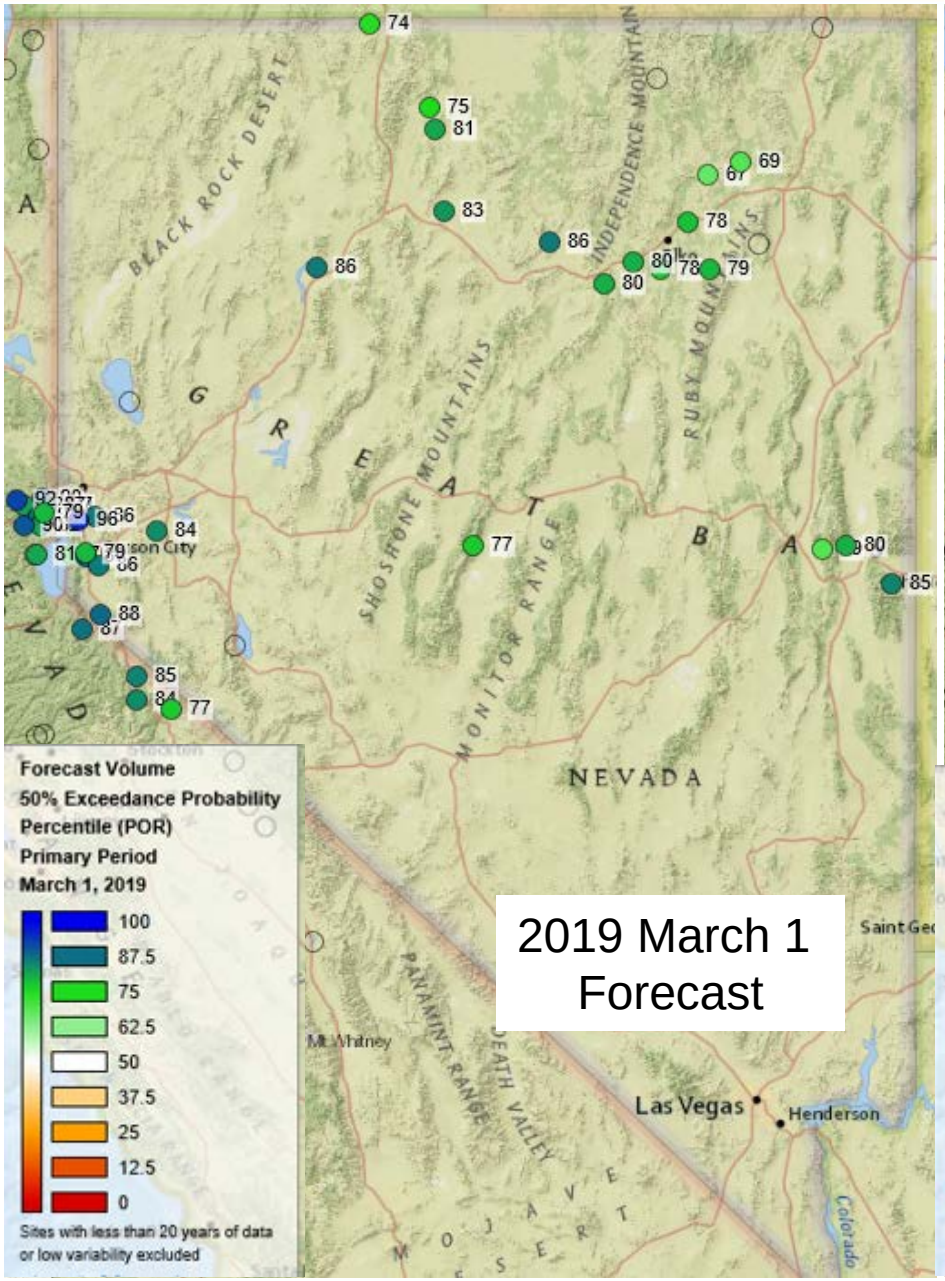
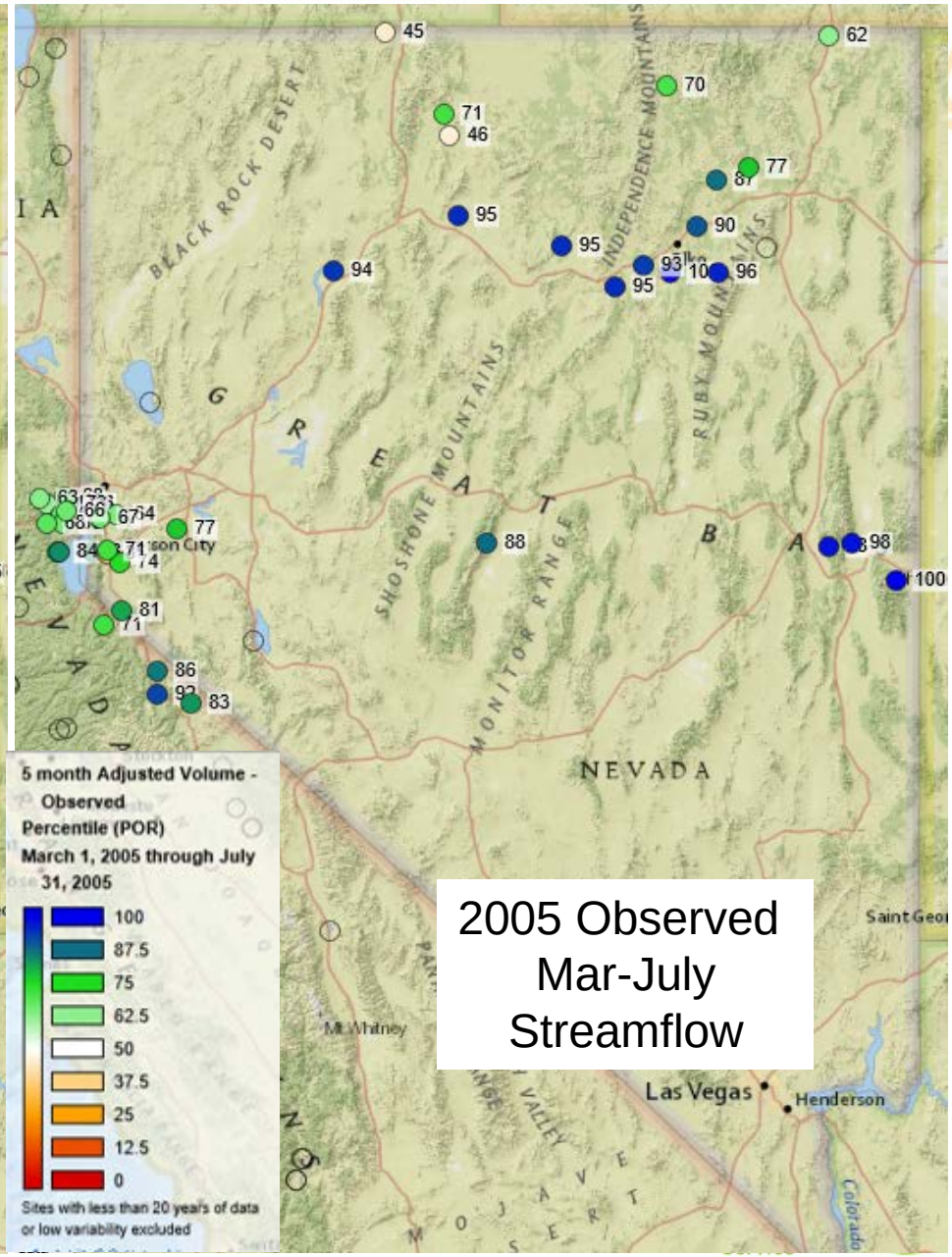
Basin Index (%)				**173**			**141**

Edited Precip

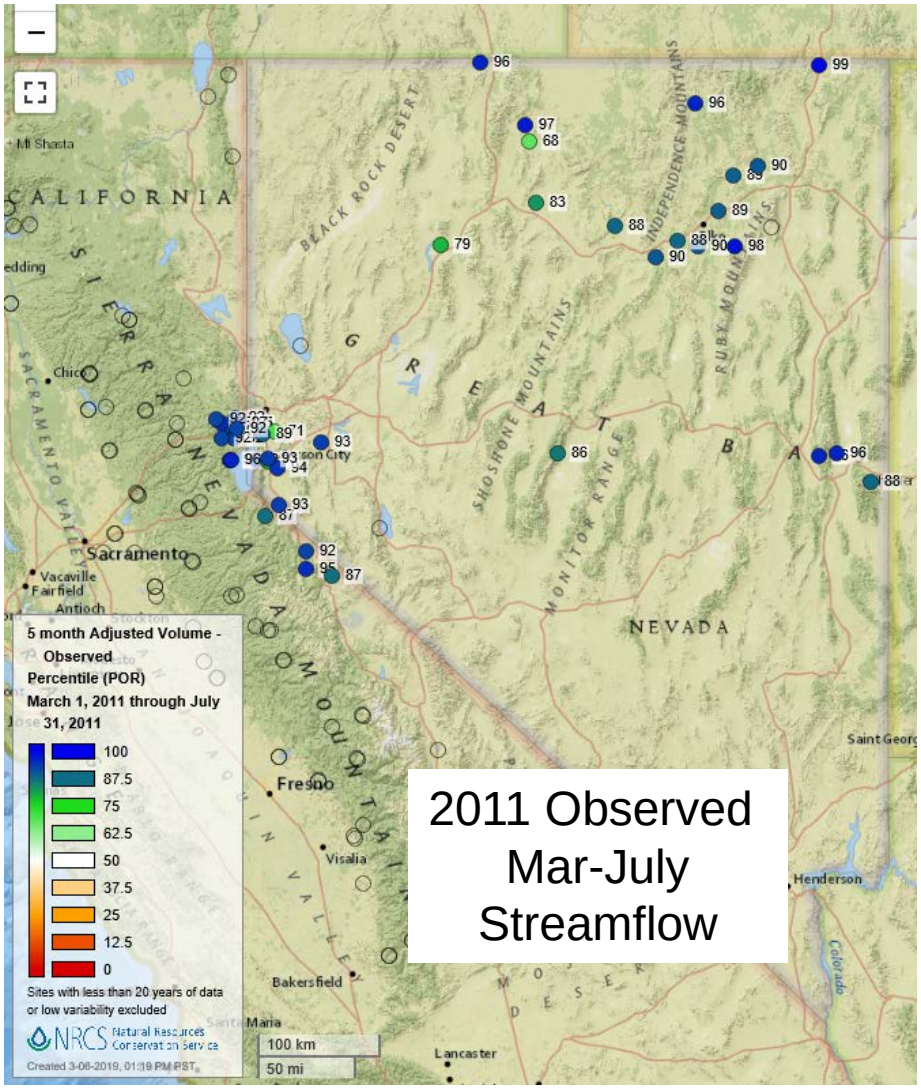


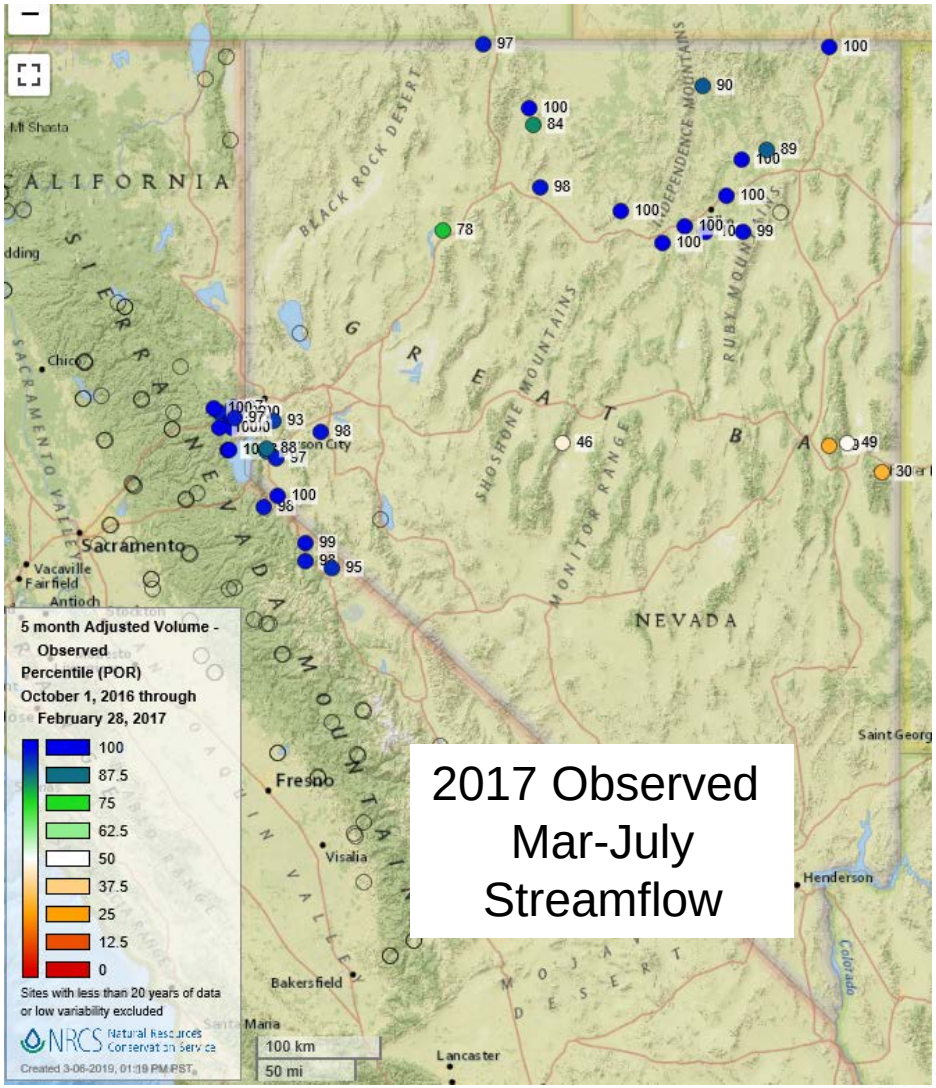
Streamflow Forecast Percentile Comparison



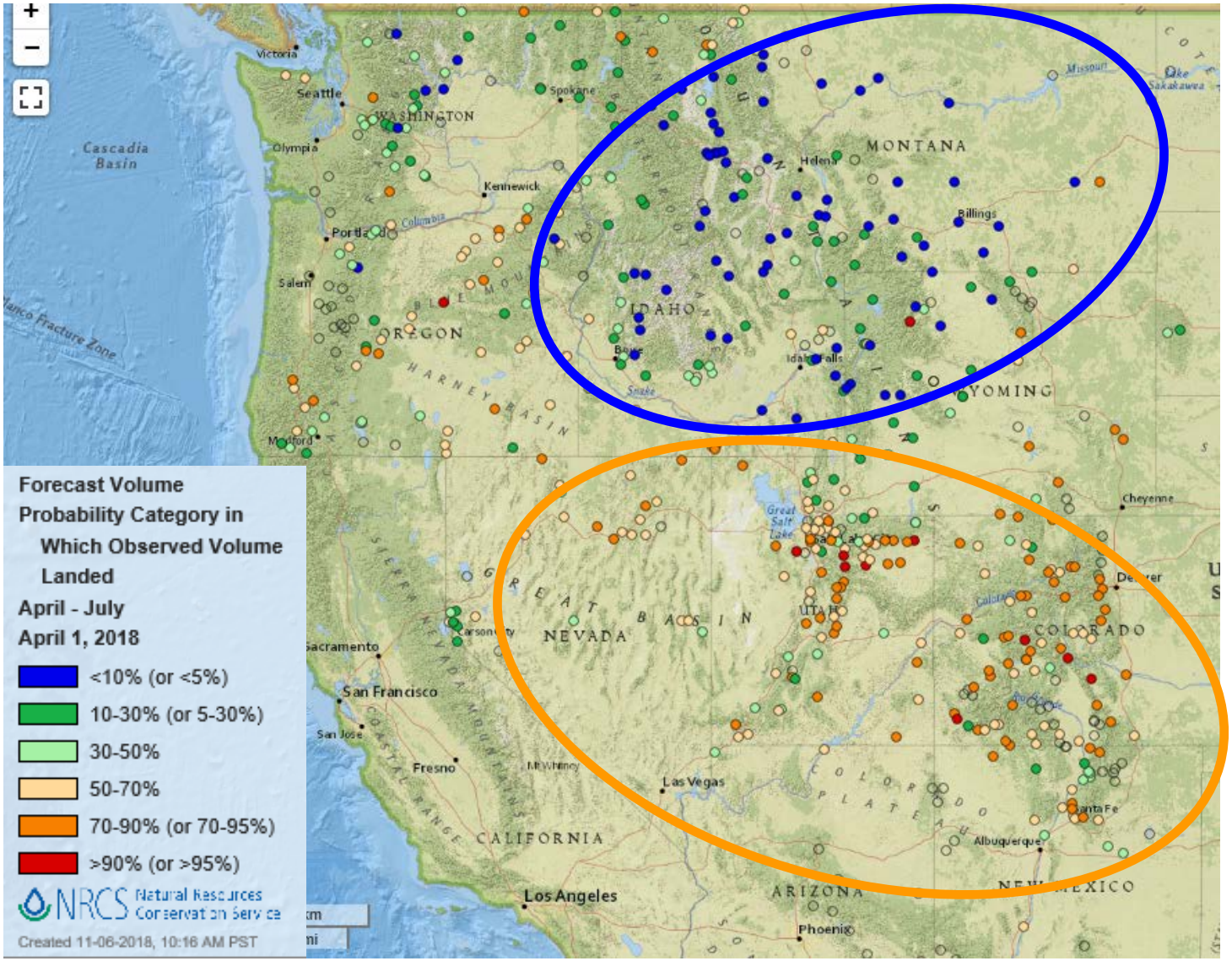


Streamflow Forecast Percentile Comparison





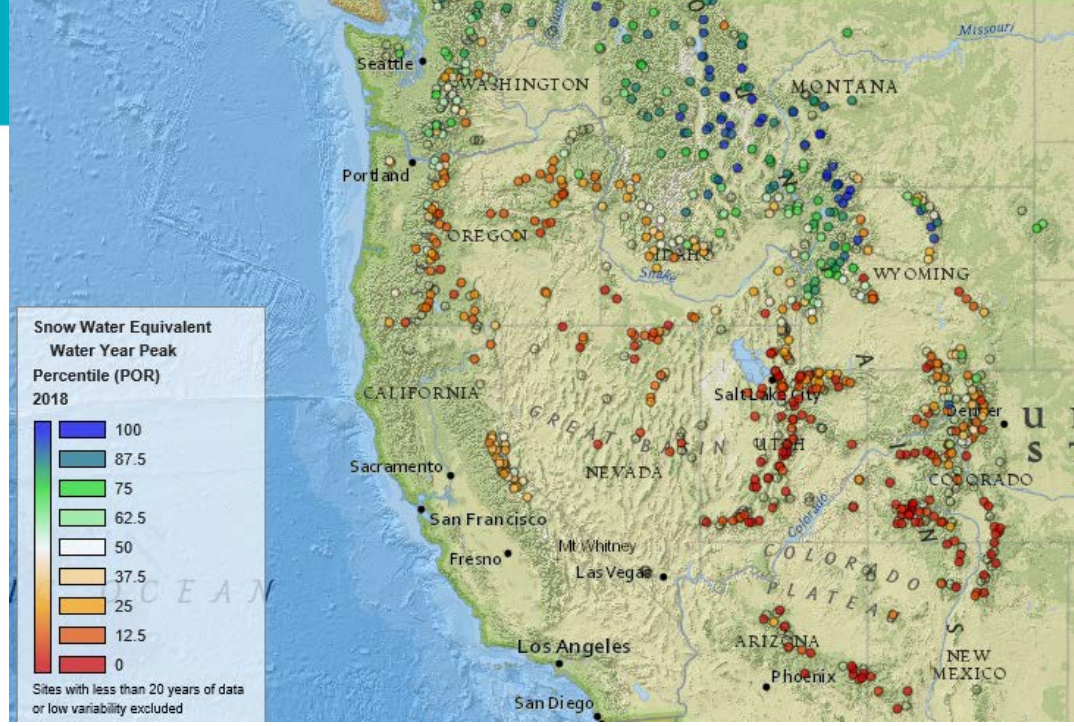
New - Forecast Verification Products

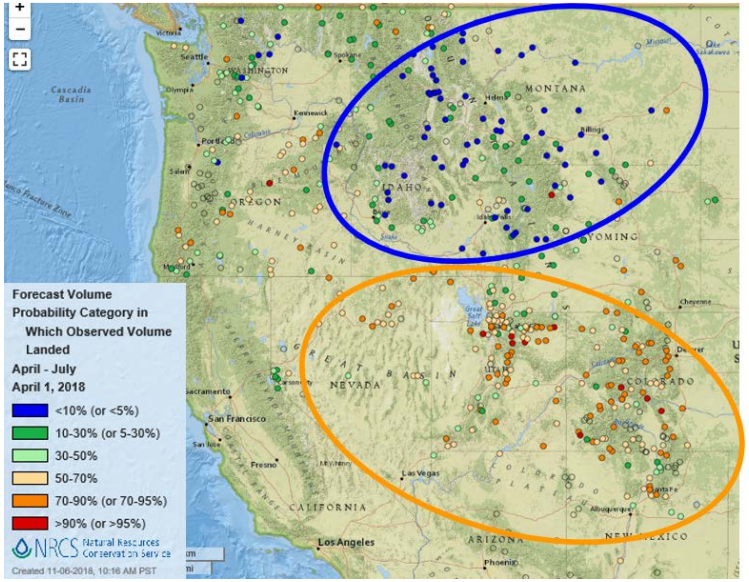


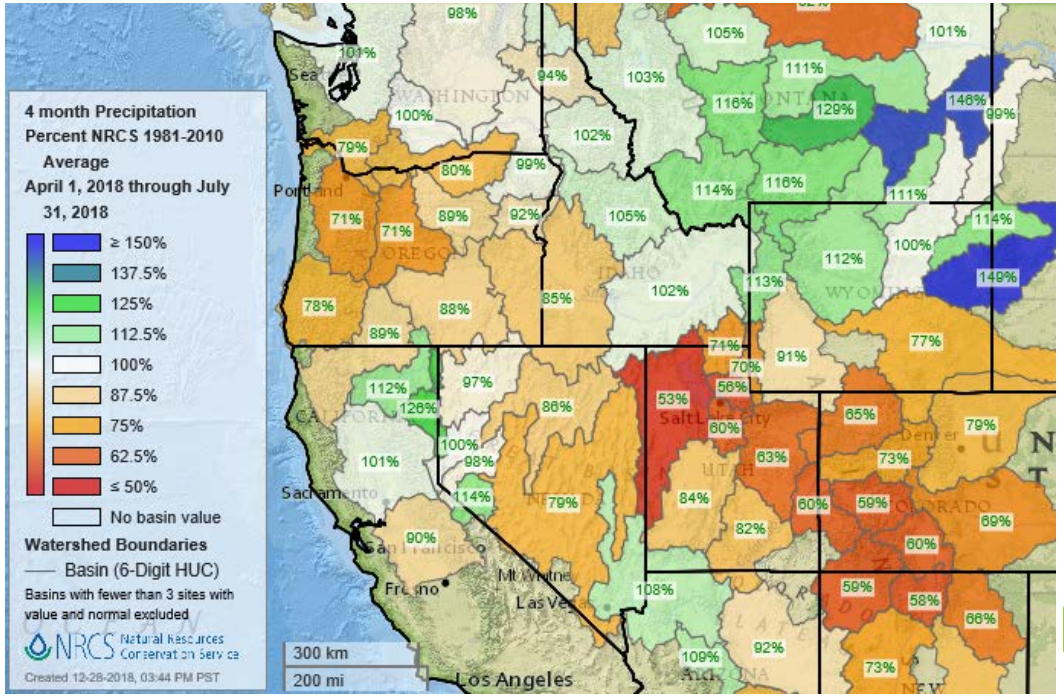
Observed was often more than 10% exceedance forecast

Observed was often between 70 and 90 exceedance forecast

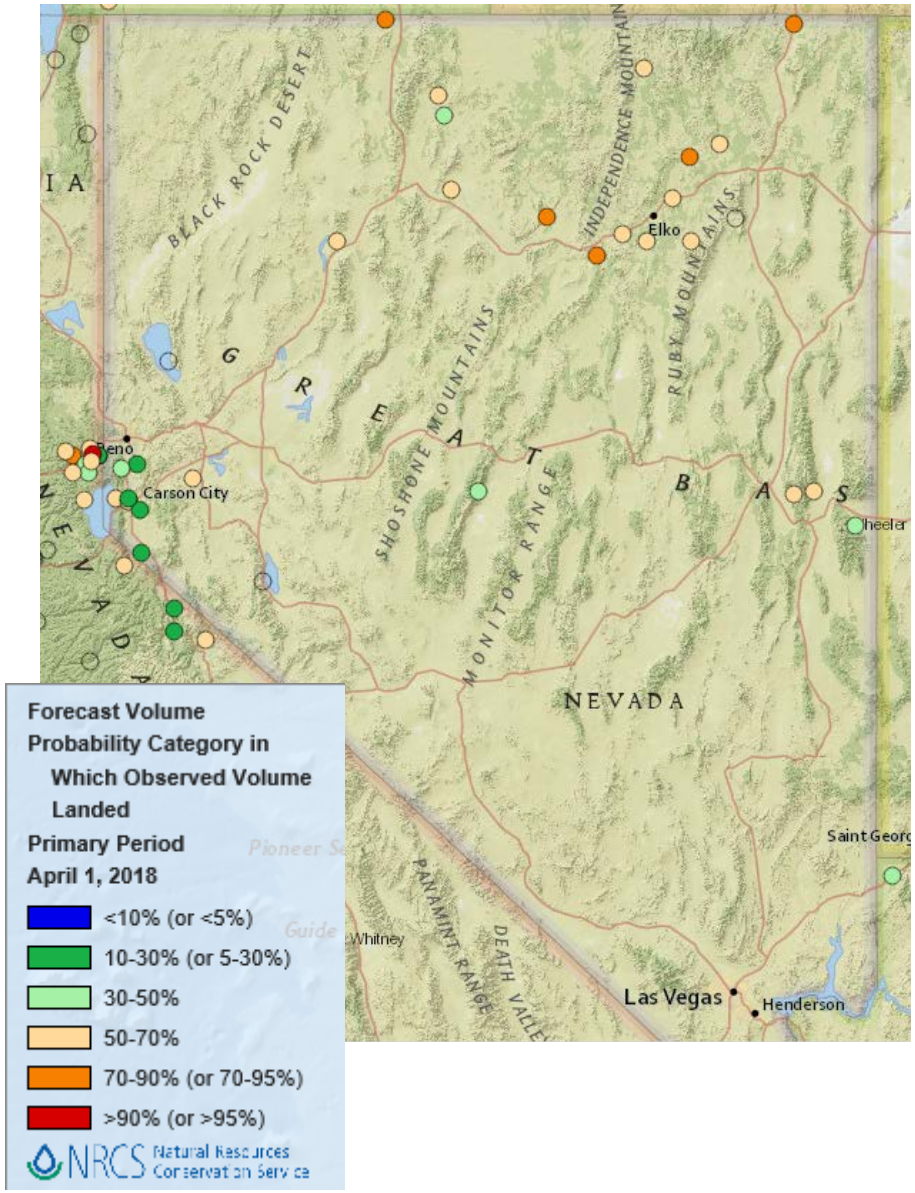
Natural Resources Conservation Service

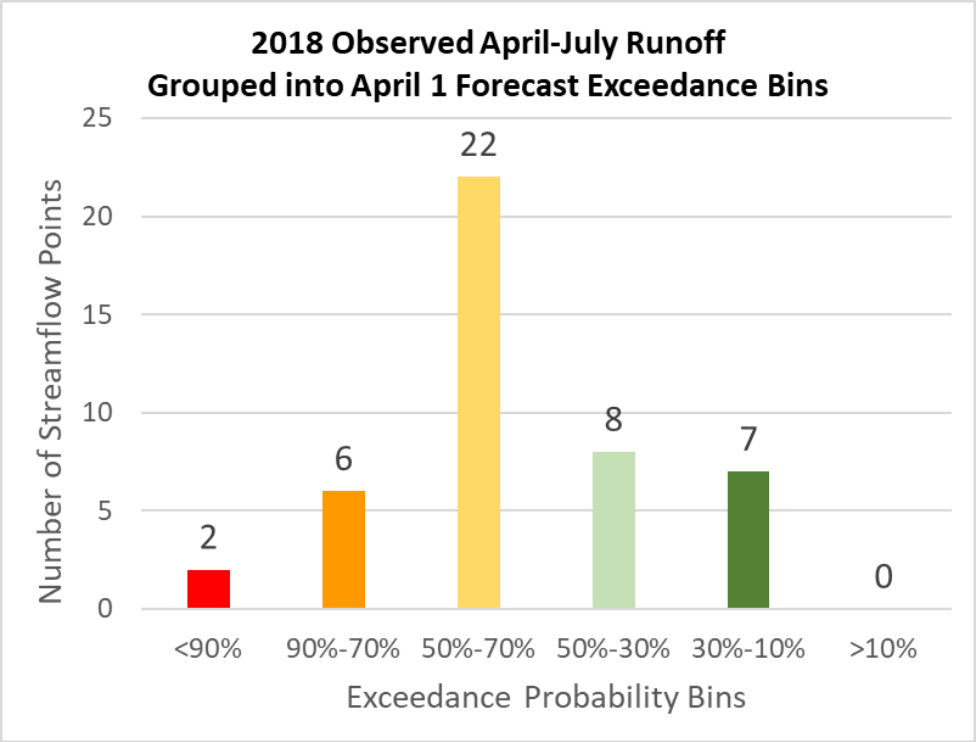

Snow Water Equivalent
Water Year Peak
Percentile (POR)
2018
100
87.5
75
62.5
50
37.5
25
12.5
0
Sites with less than 20 years of data or low variability excluded
Seattle
WASHINGTON
MONTANA
Portland
OREGON
IDAHO
WYOMING
CALIFORNIA
Salt Lake City
Denver
UTAH
Sacramento
NEVADA
COLORADO
San Francisco
Fresno
Mt Whitney
Las Vegas
Los Angeles
ARIZONA
Phoenix
NEW MEXICO
San Diego


Forecast Volume
Probability Category in
Which Observed Volume
Landed
April - July
April 1, 2018
<10% (or <5%)
10-30% (or 5-30%)
30-50%
50-70%
70-90% (or 70-95%)
>90% (or >95%)
NRCS Natural Resources Conservation Service
Created 11-06-2018, 10:16 AM PST


4 month Precipitation
Percent NRCS 1981-2010
Average
April 1, 2018 through July
31, 2018
≥ 150%
137.5%
125%
112.5%
100%
87.5%
75%
62.5%
≤ 50%
No basin value
Watershed Boundaries
Basin (6-Digit HUC)
Basins with fewer than 3 sites with value and normal excluded
NRCS Natural Resources Conservation Service
Created 12-28-2018, 03:44 PM PST
300 km
200 mi
Portland
Sacramento
San Francisco
Fresno
Mt Whitney
Las Vegas
Los Angeles
Salt Lake City
Denver

2018 Nevada Forecast Review





4 month Precipitation Percent NRCS 1981-2010 Average
April 1, 2018 through July 31, 2018

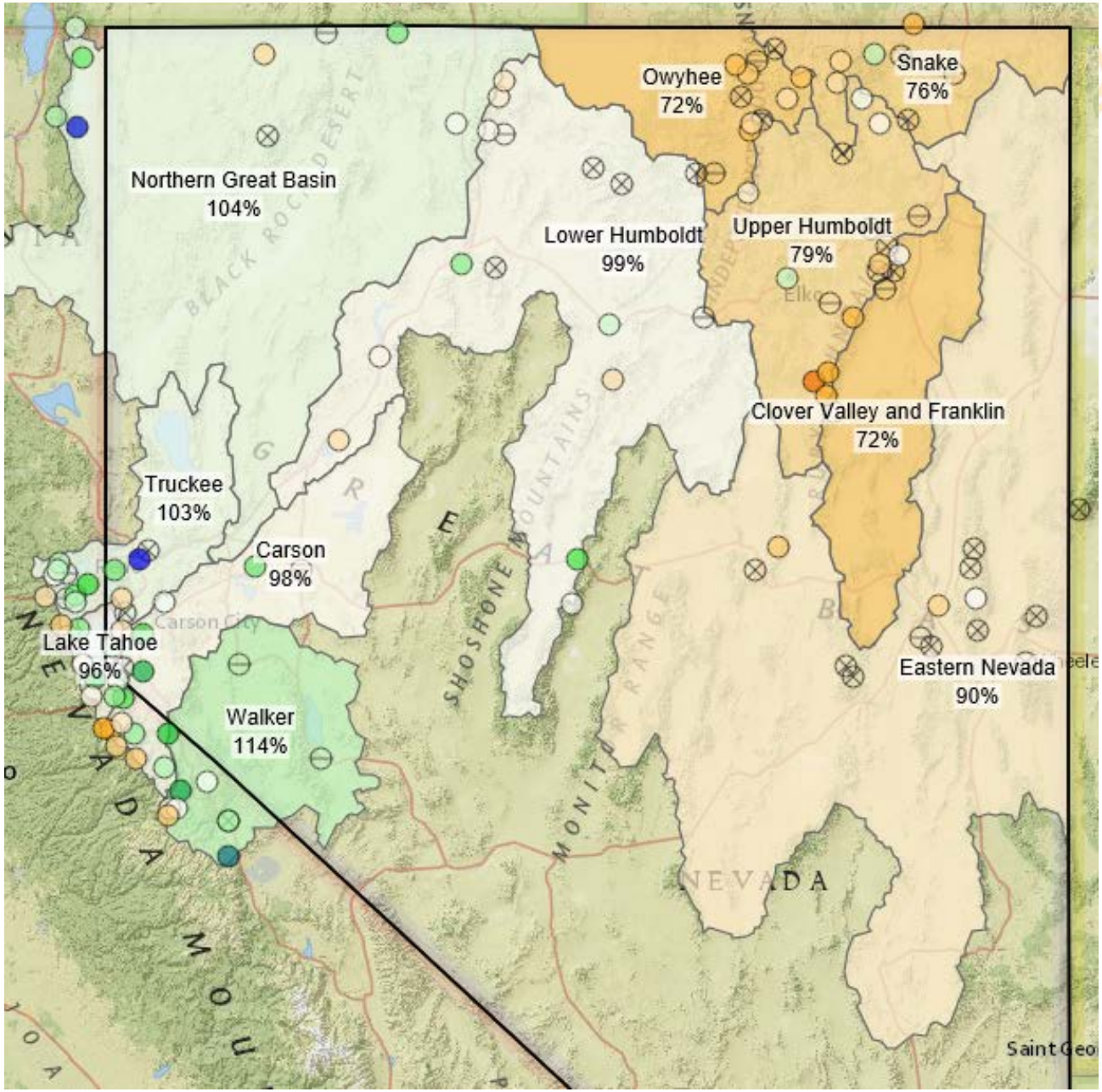
- ≥ 200%
- 175%
- 150%
- 125%
- 100%
- 75%
- 50%
- 25%
- ≤ 0%
- No basin value

⊖ No current value
⦶ Average is zero
⊗ No average

Watershed Boundaries
— State Watersheds

Basins with fewer than 3 sites with value and normal excluded

NRCS Natural Resources Conservation Service

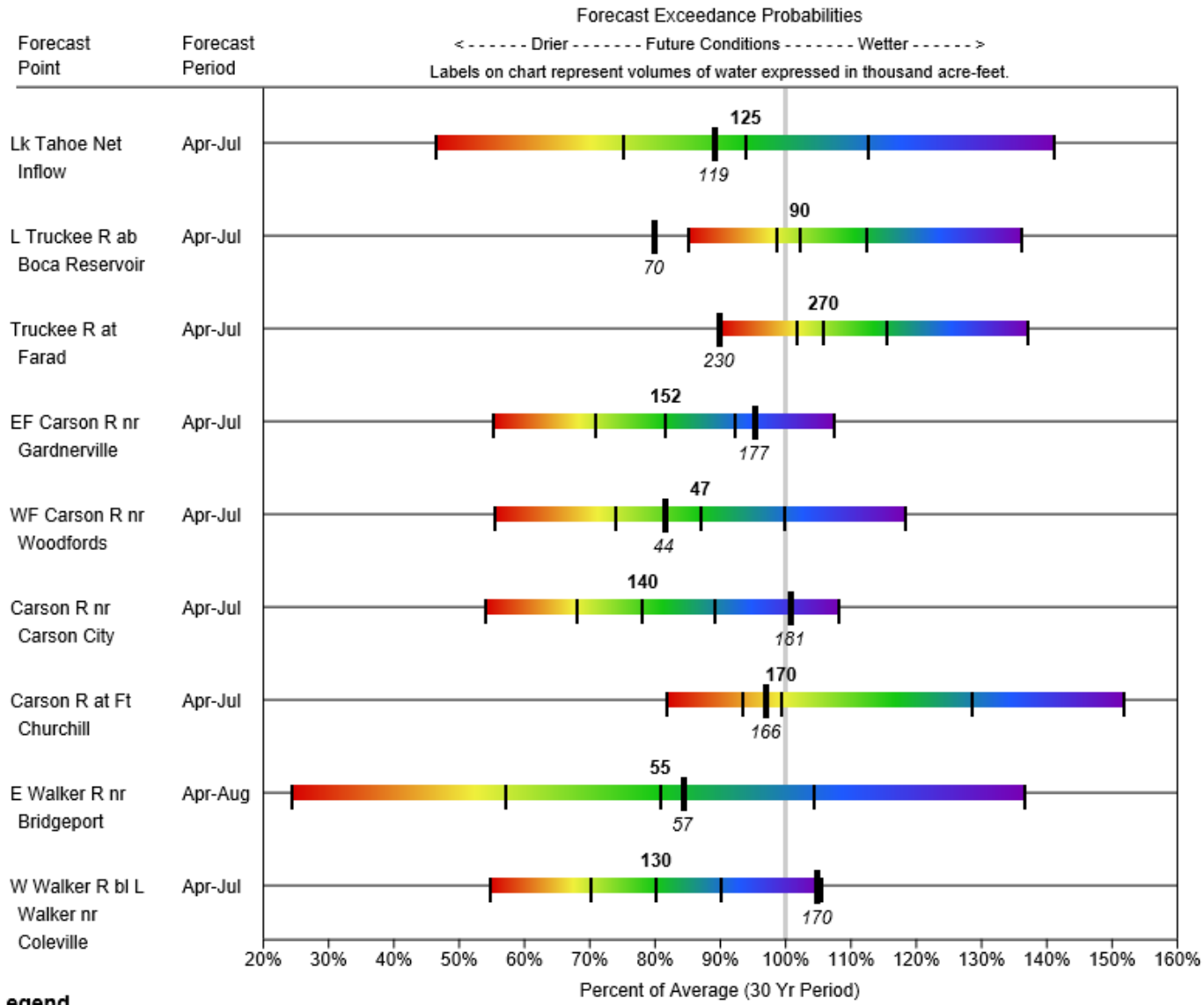


USDA United S

Eastern Sierra Basin Summary

Water Supply Forecasts

April 1, 2018



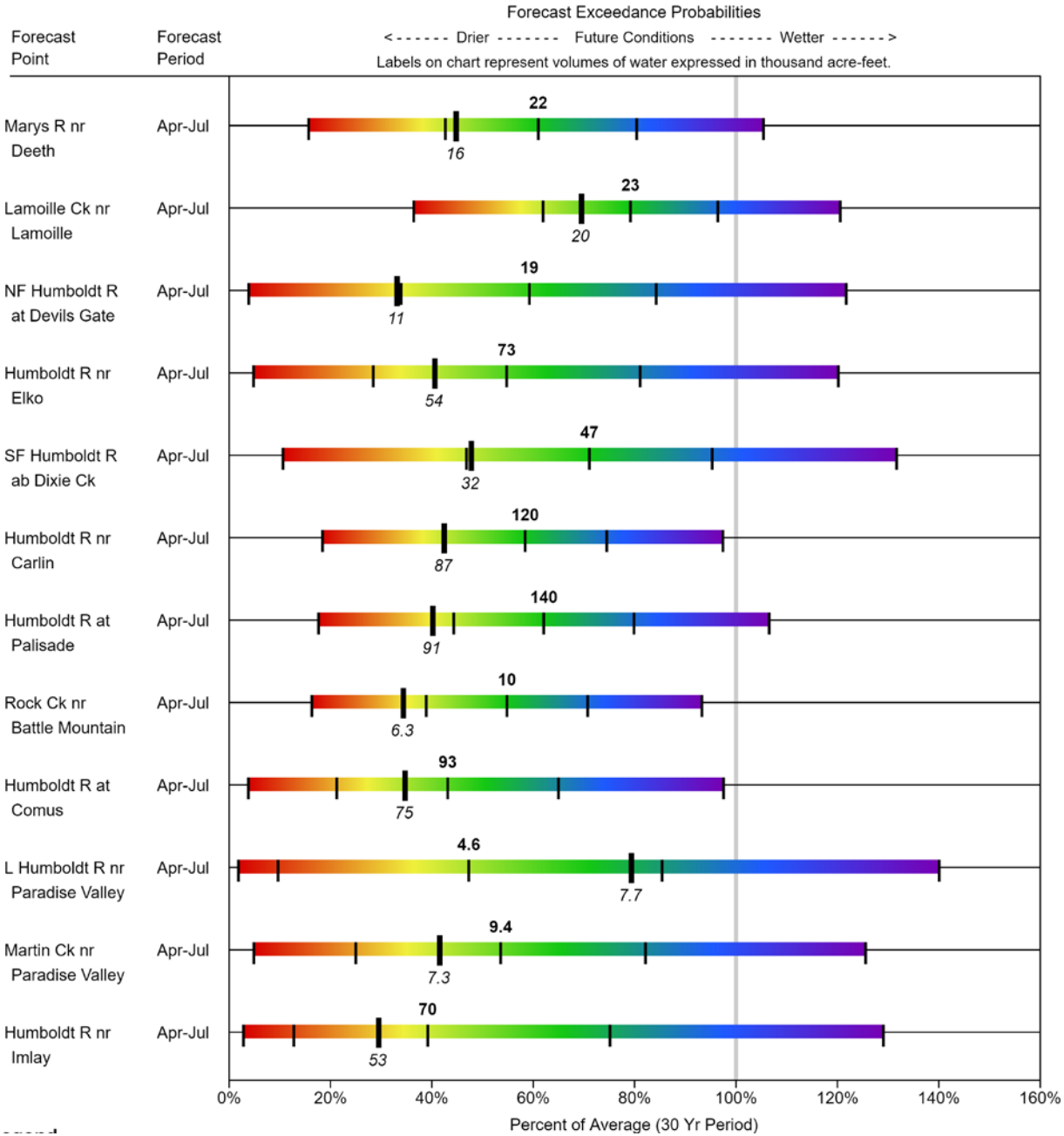
Legend

95% or 90% Exceedance	70% Exceedance	**50% Exceedance**	30% Exceedance	10% or 5% Exceedance
There is a 95%/90% chance that flows will exceed this volume	There is a 70% chance that flows will exceed this volume	There is a 50% chance that flows will exceed this volume	There is a 30% chance that flows will exceed this volume	There is a 10%/5% chance that flows will exceed this volume

Natural Resources Conservation Service

https://www.wcc.nrcs.usda.gov/wsf/Fcst_Chart/

Humboldt River Summary

Water Supply Forecasts

April 1, 2018