

Snow Measurement and Water Supply Forecasting 101

Jeff Anderson
Hydrologist
Nevada Snow Survey



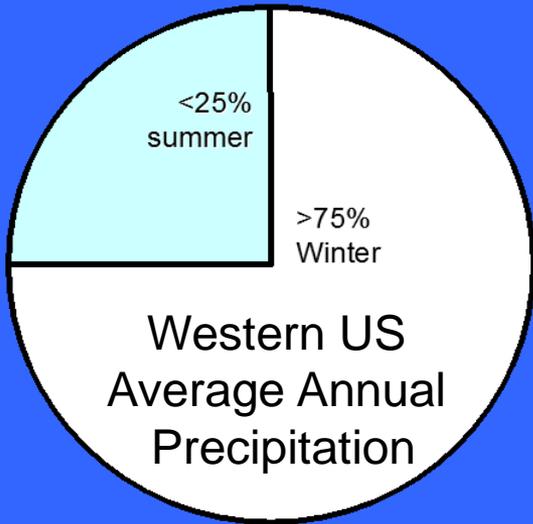
United States Department of Agriculture
Natural Resources Conservation Service



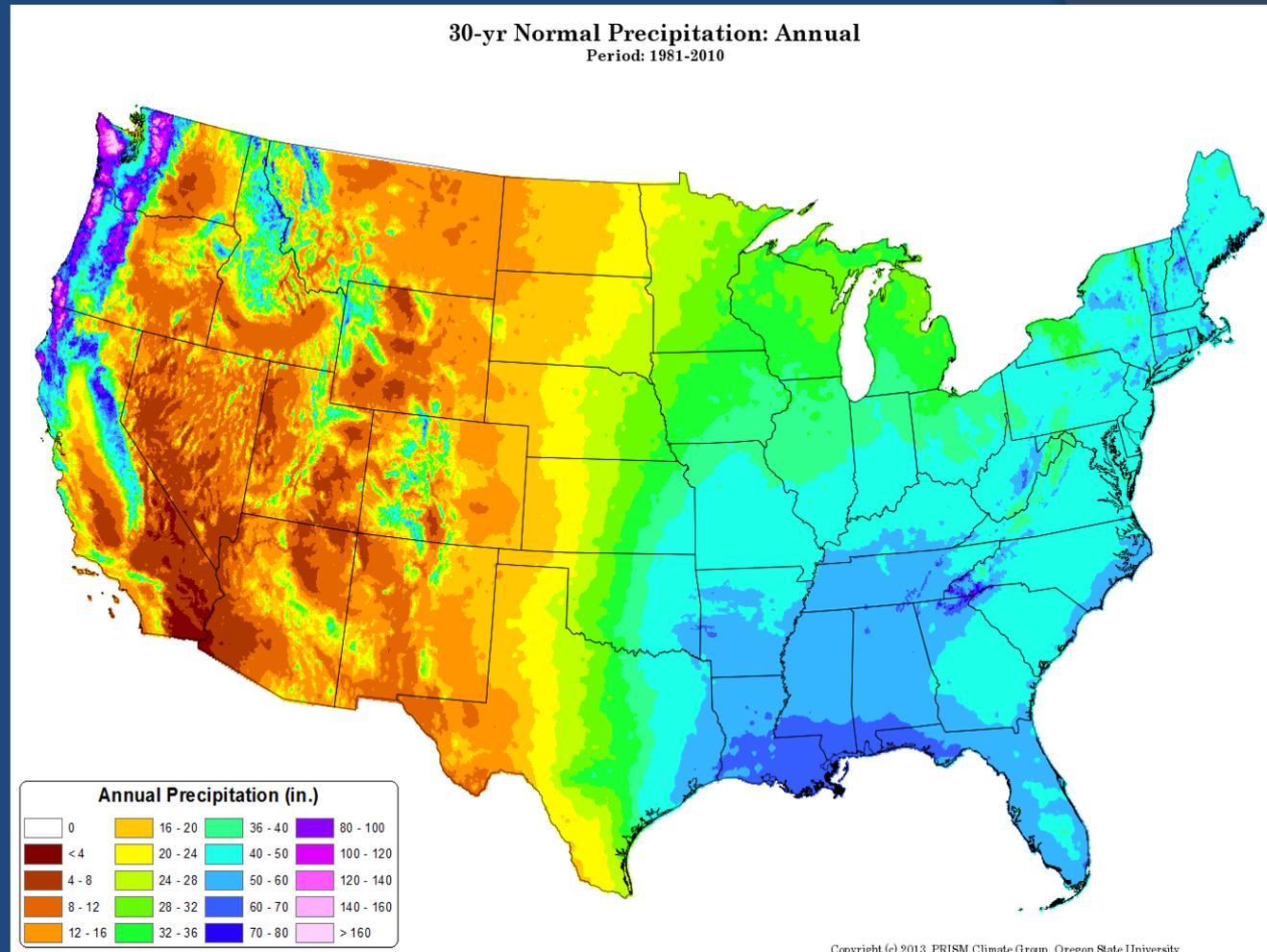
Outline

- ⦿ Background Info
 - A little history
 - Overview of NRCS monitoring network
- ⦿ How to interpret streamflow forecasts
- ⦿ Other products on our website
- ⦿ Q&A

Western Water Budget



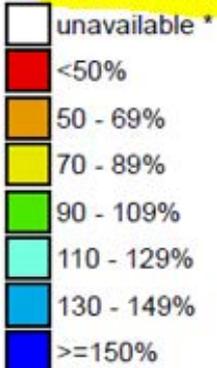
Most of the West's
water comes in the
winter and falls in the
mountains



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

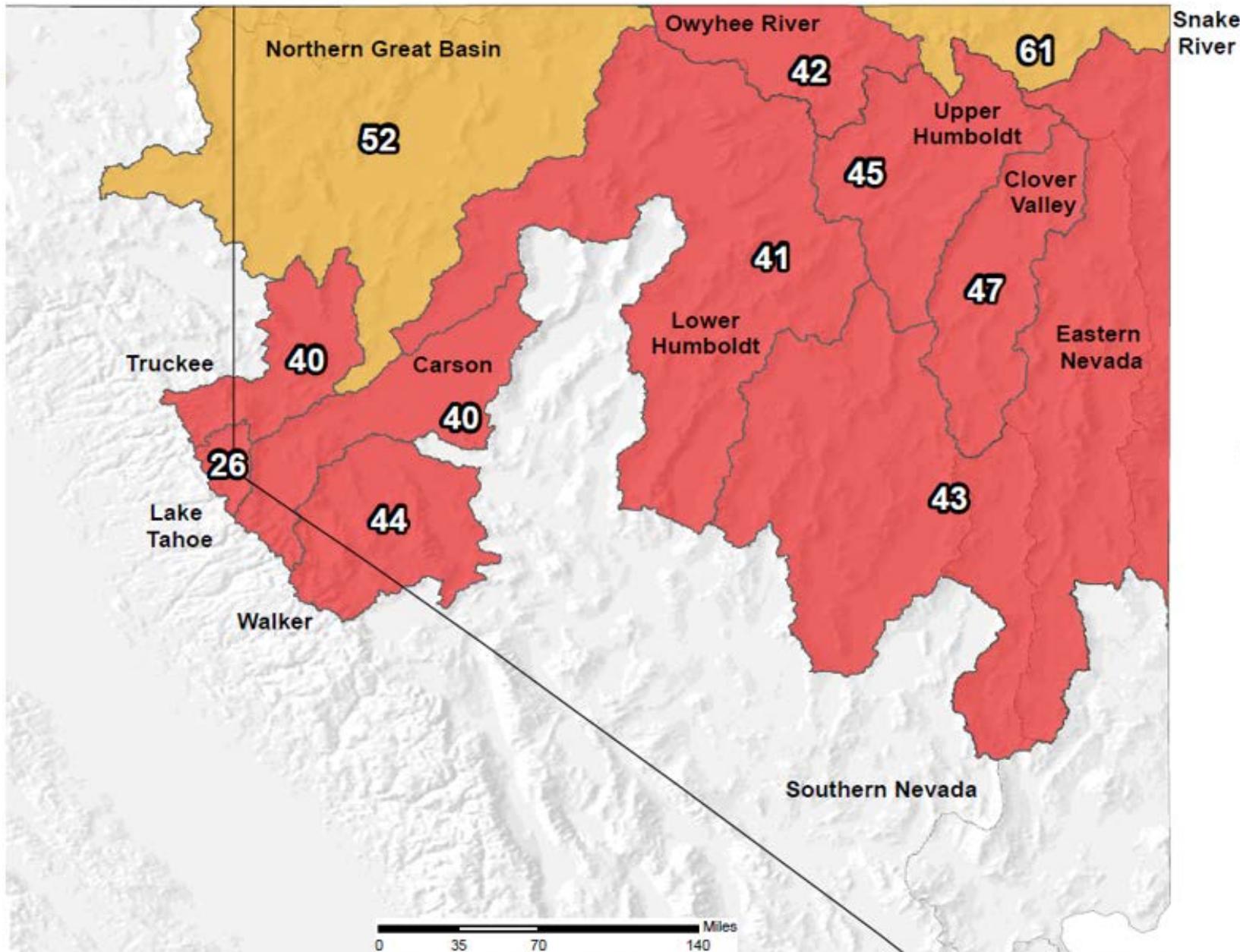
Jan 24, 2018

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

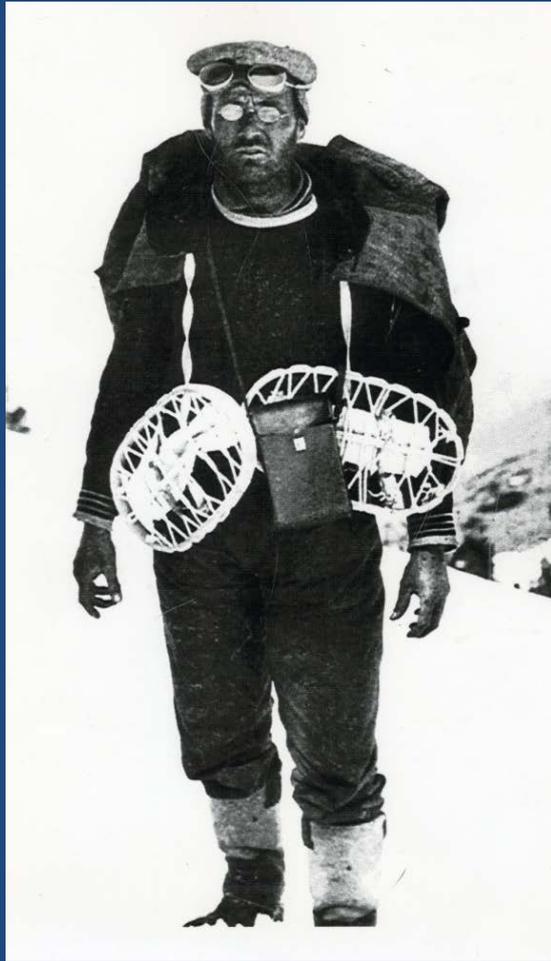


* Data unavailable at time of posting or measurement is not representative at this time of year

Provisional data subject to revision

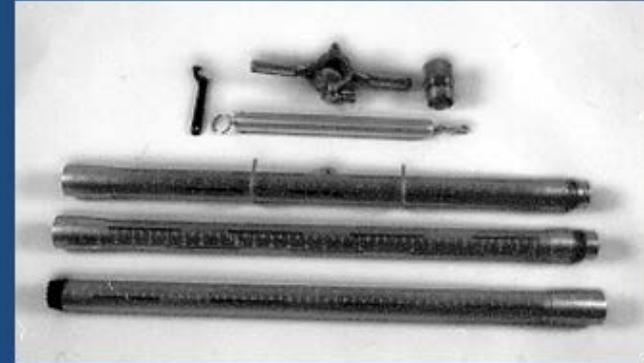


Western Snow Surveying Began Here



Father of Snow Survey
Dr. James E. Church
Classics Professor
University of Nevada, Reno

Invented
Mt Rose Sampler
1908-1909



First Western
Water Supply Forecasts
Lake Tahoe Rise
1910

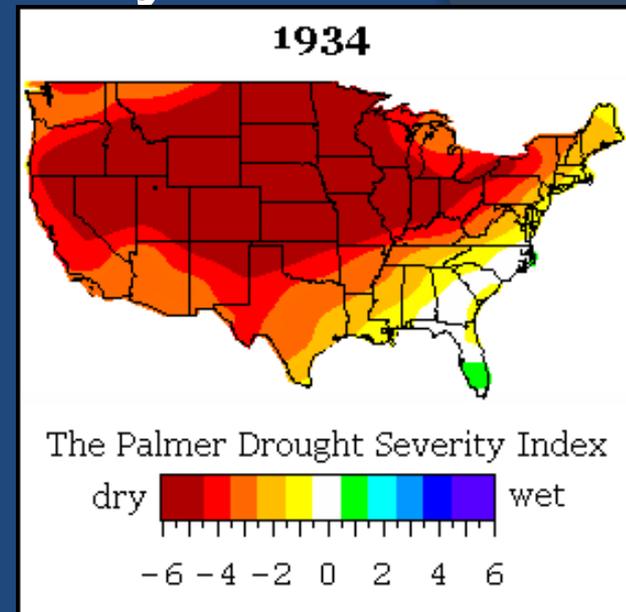


Dust Bowl leads to Federal Snow Survey

In 1935, as a result of the dust bowl, Congress appropriated \$15,000 to the Bureau of Agricultural Engineering to...

“Conduct snow surveys for the purpose of forecasting irrigation water supplies, and to develop uniform equipment and methods for snow surveying and water supply forecasting.”

The program was transferred to the SCS in 1939.



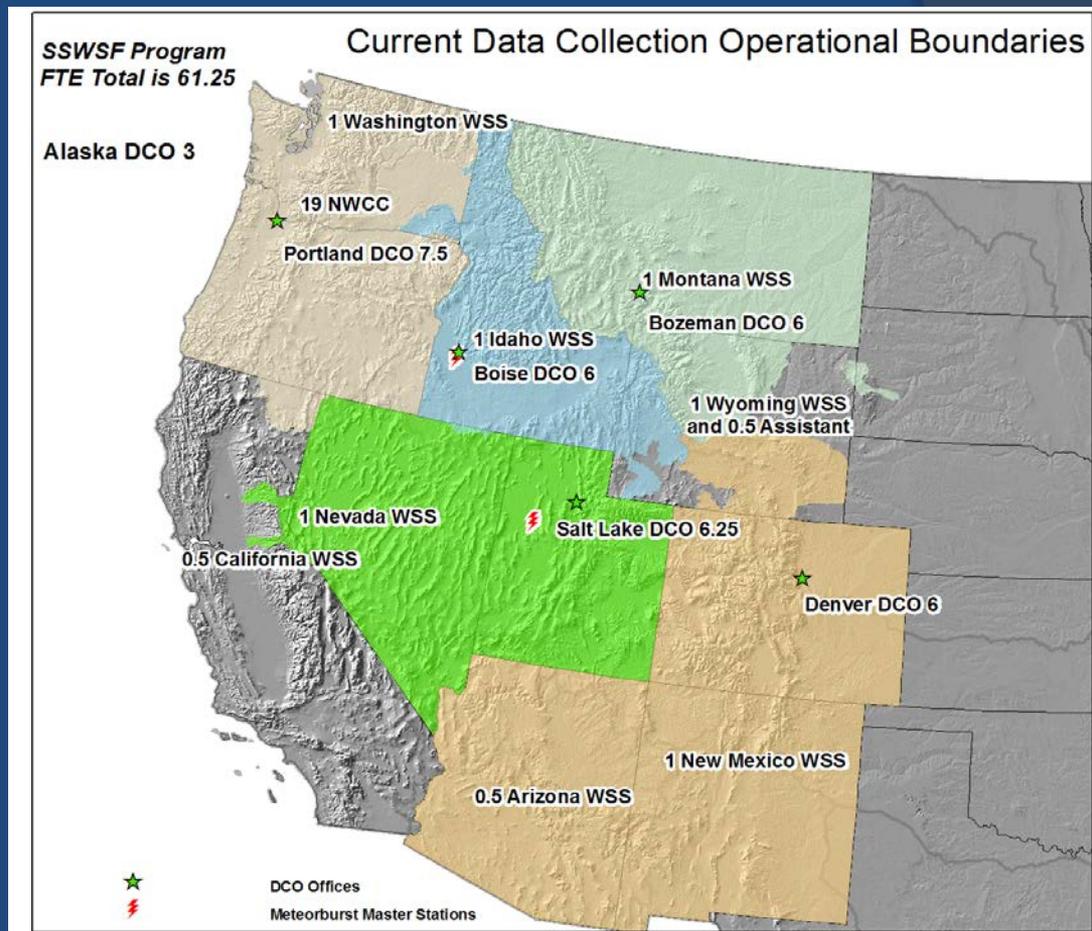
Today's Snow Program Structure

National Water and Climate Center (NWCC), Data Collection Office (DCO) Water Supply States (WSS)

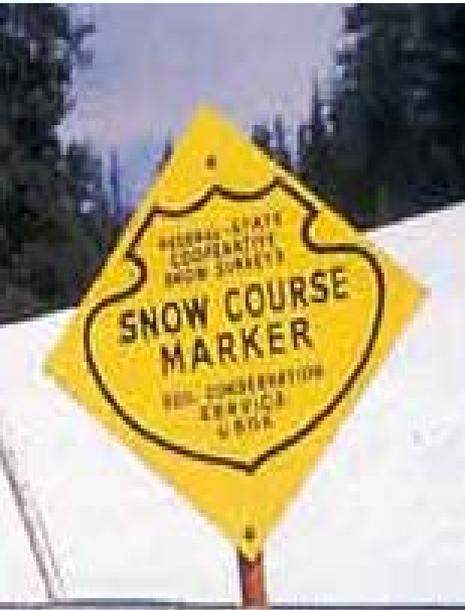
Streamflow forecasting consolidated in Portland at the NWCC

CO, ID, MT, OR and UT are DCOs overseeing data sites over multi-state boundaries,

AZ, CA, NM, NV, WA are Water Supply States that offer data dissemination and product delivery.



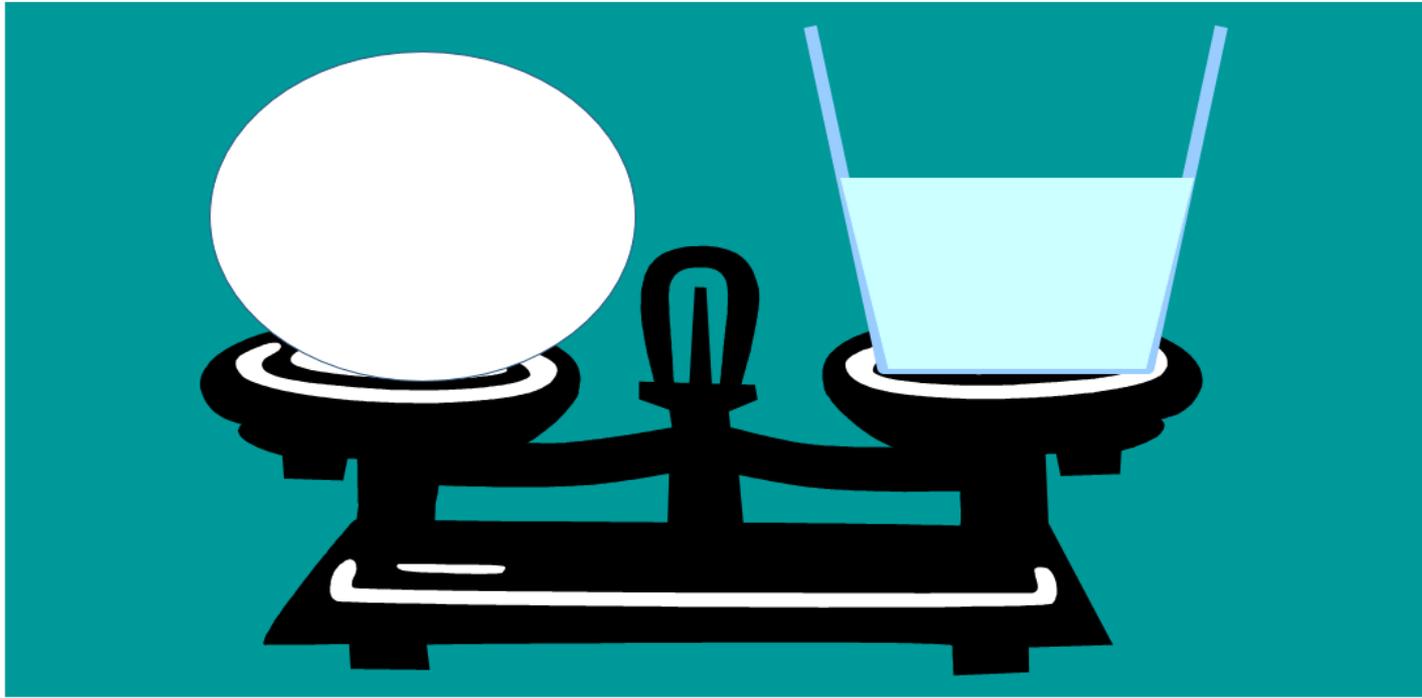
Snow Course



Snow core is removed from snowpack and weighed to measure water content

Program wide +300,000 snow course measurements to date



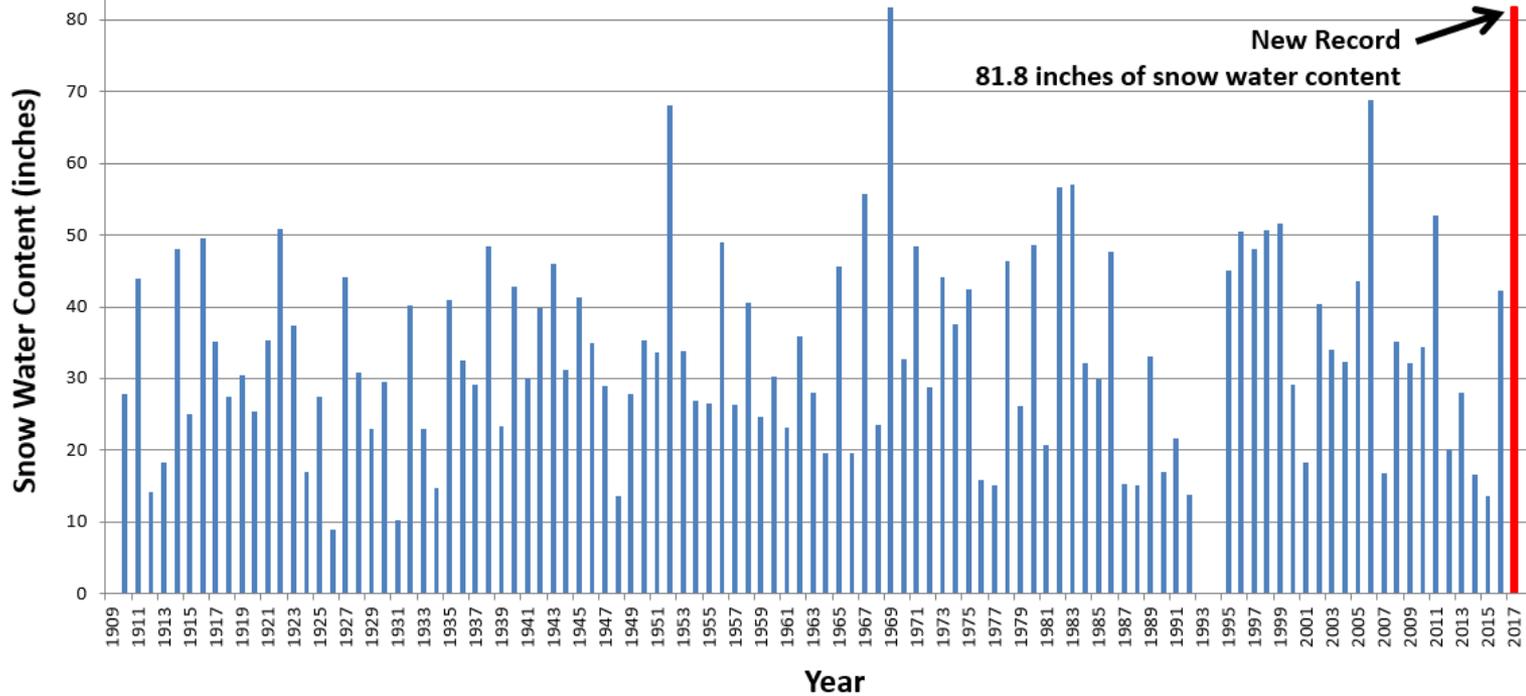


Weight of — Weight of
frozen water — liquid water

Key Vocabulary:
Snow Water Equivalent (SWE)



Mt. Rose Snow Course April 1 Data for Years 1910-2017



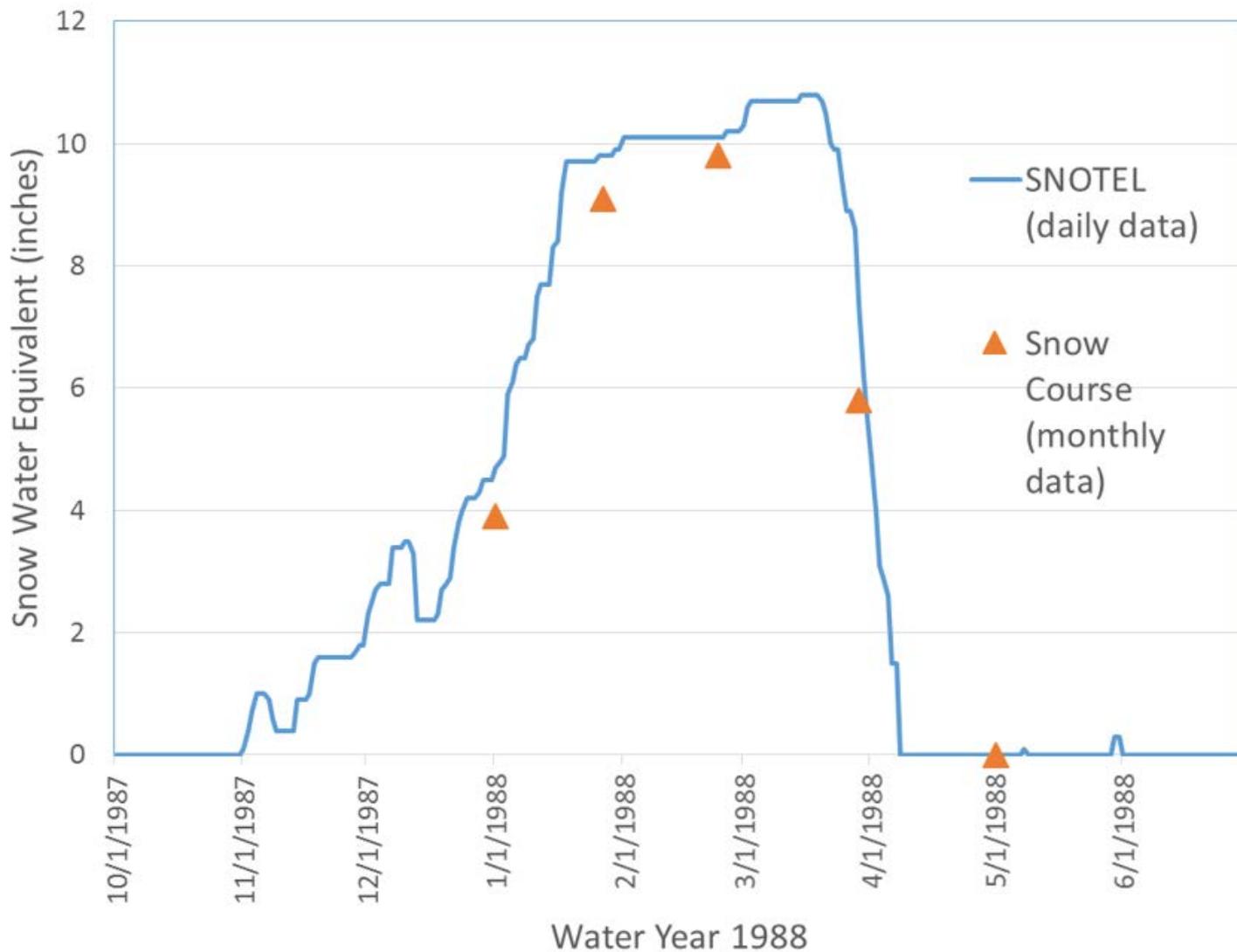


SNOTEL “Snow Telemetry”

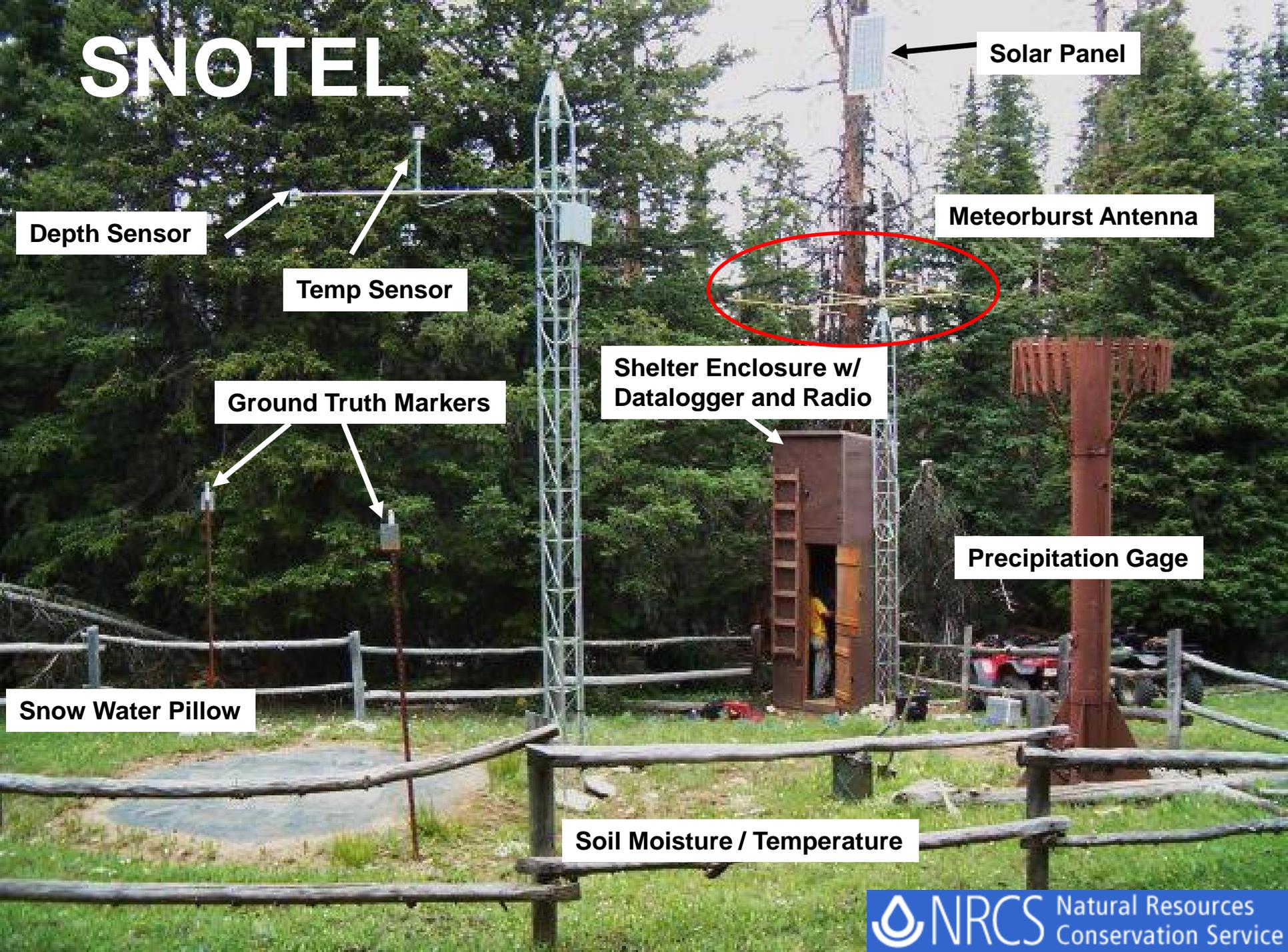


Manual 1st of Month Data

Marlette Lake, Nevada - Snow Water - 1988



SNOTEL



Solar Panel

Depth Sensor

Temp Sensor

Meteorburst Antenna

Ground Truth Markers

Shelter Enclosure w/
Datalogger and Radio

Precipitation Gage

Snow Water Pillow

Soil Moisture / Temperature



SCAN

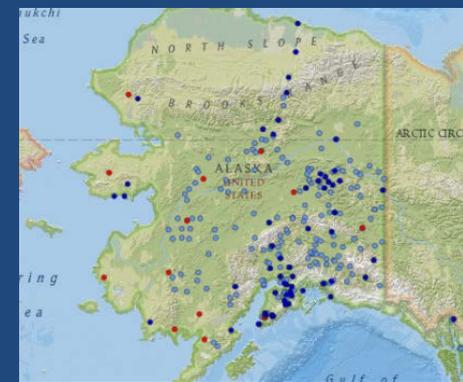
Soil Climate Analysis Network

- Liquid Precipitation
- Soil Moisture / Temp
- Air Temp
- Wind Speed / Direction
- Solar Radiation
- Relative Humidity
- Snow Depth

SNOLITE

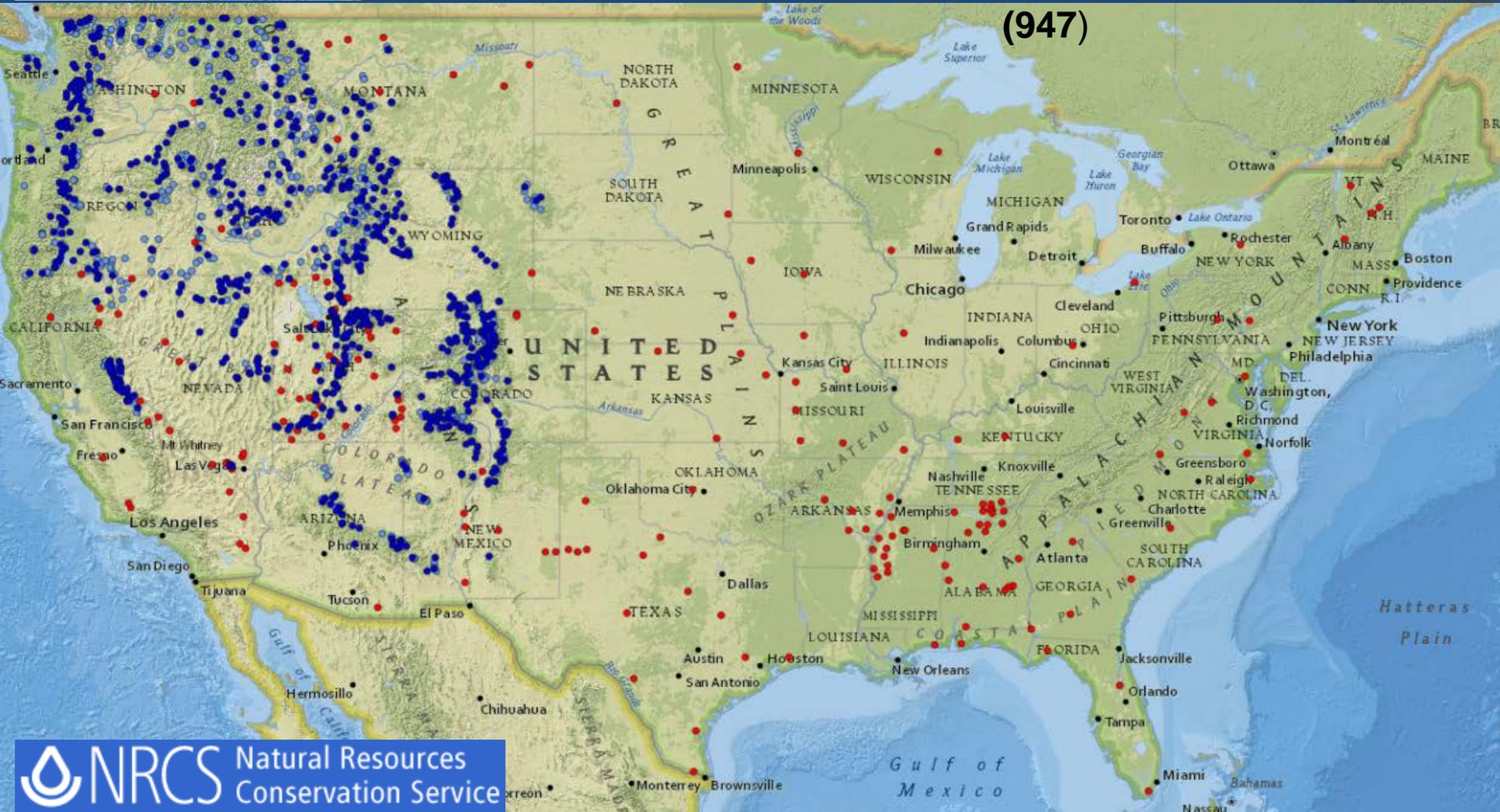
- Snow Depth
- Air Temperature
- Soil Moisture / Temp
- Precipitation



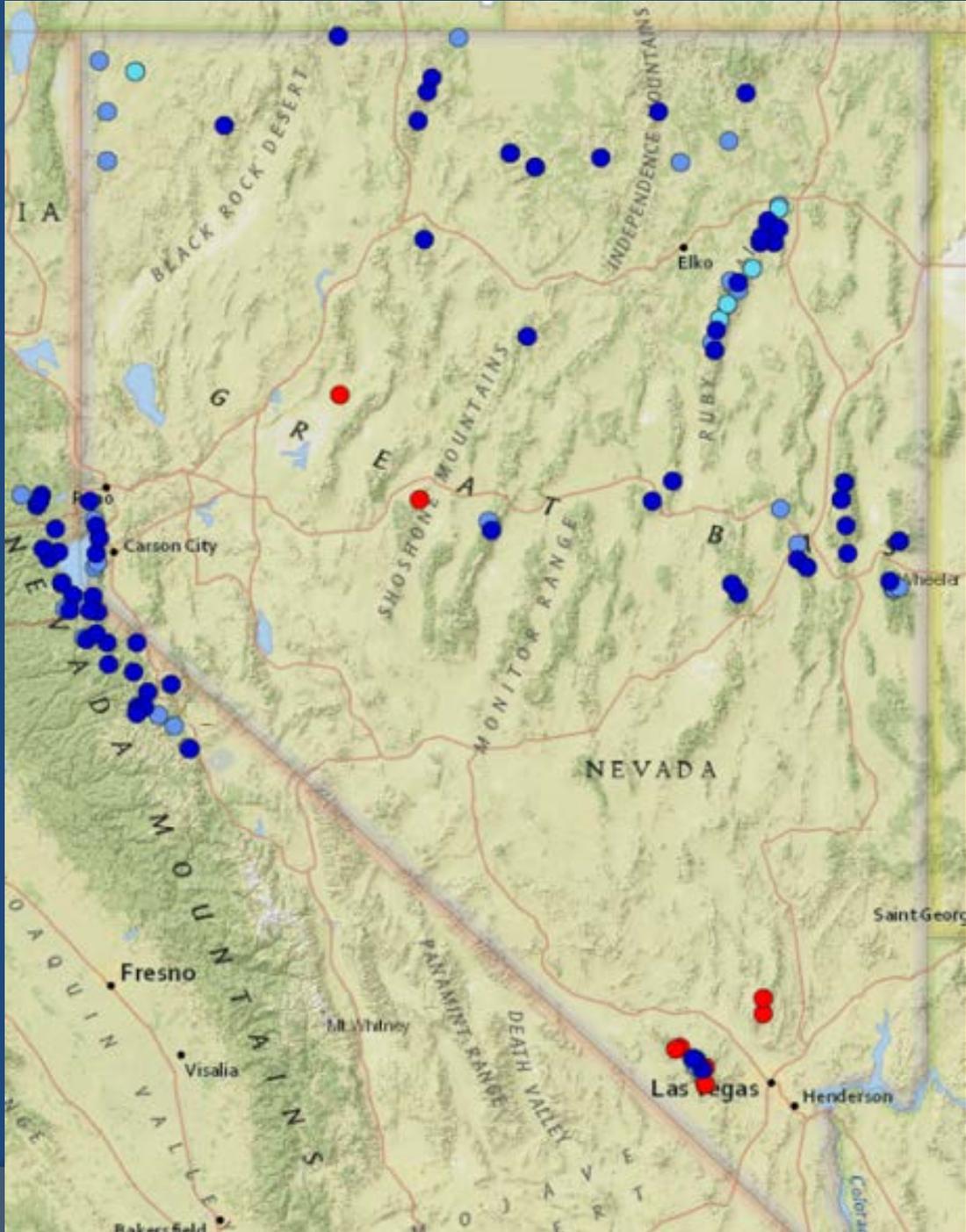


(856)

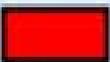
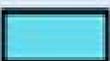
(220)



(947)



Stations by Network

	SNOTEL	(82)
	SCAN	(9)
	SNOLITE	(7)
	Snow Course	(45)

Data are ultimately used to provide water supply information to the public

Data Current as of: 1/4/2018 5:08:57 PM

Carson River Basin Streamflow Forecasts - January 1, 2018

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

Carson River Basin	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
EF Carson R nr Gardnerville	MAR-JUL	9.9	90	144	70%	198	280	205
	APR-JUL	9.3	72	127	68%	183	265	186
	200 cfs 500 cfs	06 Jun 19 May	27 Jun 07 Jun	11 Jul 20 Jun		25 Jul 03 Jul	15 Aug 22 Jul	24 Jul 30 Jun
WF Carson R nr Woodfords	MAR-JUL	4.6	30	48	81%	66	91	59
	APR-JUL	1.02	25	42	78%	59	83	54
Carson R nr Carson City	MAR-JUL	6.3	95	172	82%	250	365	210
	APR-JUL	5.4	67	138	77%	210	315	179
Marlette Lake Inflow (acre-feet) ²	MAR-JUL	-20	290	780	70%	1260	1980	1110
	APR-JUL	20	120	550	66%	980	1610	830
King Canyon Ck nr Carson City	MAR-JUL	0.02	0.1	0.3	79%	0.5	0.79	0.38
	APR-JUL	0.01	0.12	0.29	76%	0.46	0.72	0.38
Ash Canyon Ck nr Carson City	MAR-JUL	0.22	0.74	1.1	78%	1.46	1.98	1.41
	APR-JUL	0.03	0.49	0.8	71%	1.11	1.57	1.12
Carson R at Ft Churchill	MAR-JUL	29	77	130	65%	205	350	200
	APR-JUL	30	68	110	64%	185	290	171

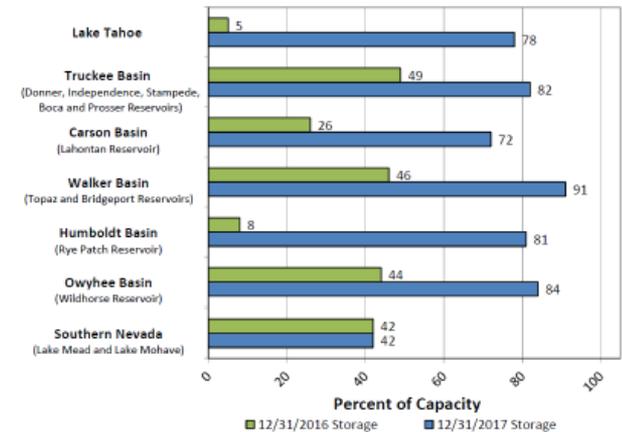
Streamflow
Forecasts



Natural Resources Conservation Service

Nevada Water Supply Outlook Report January 1, 2018

Reservoir Storage as a Percent of Capacity
Current Year (blue) versus Last Year (green)



The Best Water News in 2018, is the Water Stored from 2017

Reservoir storage across northern Nevada is much better than the same time last year thanks to record setting [snow water](#) and [water year precipitation](#) amounts in 2017 which produced [April-July streamflows](#) that were two to three times average in the Lake Tahoe, Truckee, Carson, Walker and Humboldt basins. Reservoir storage is excellent going into this winter and offers a buffer against drought for water users in basins with adequate reservoir storage.

Water Supply
Outlook Reports

Irrigation



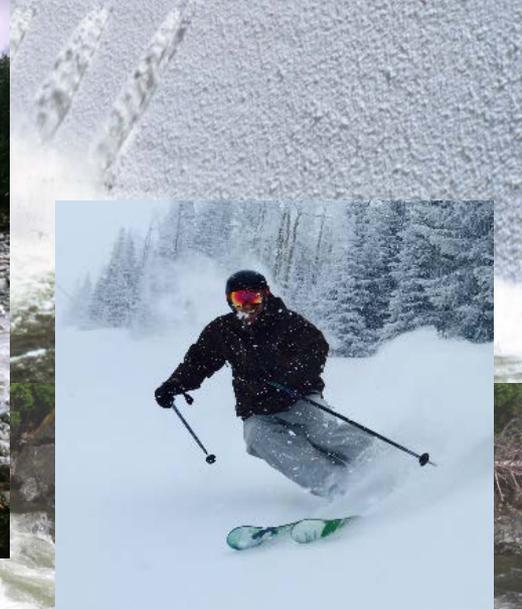
Hydro Power / Water Management



DATA and FORECAST USES



Flood Forecasting



Wildlife and Fish



Recreation

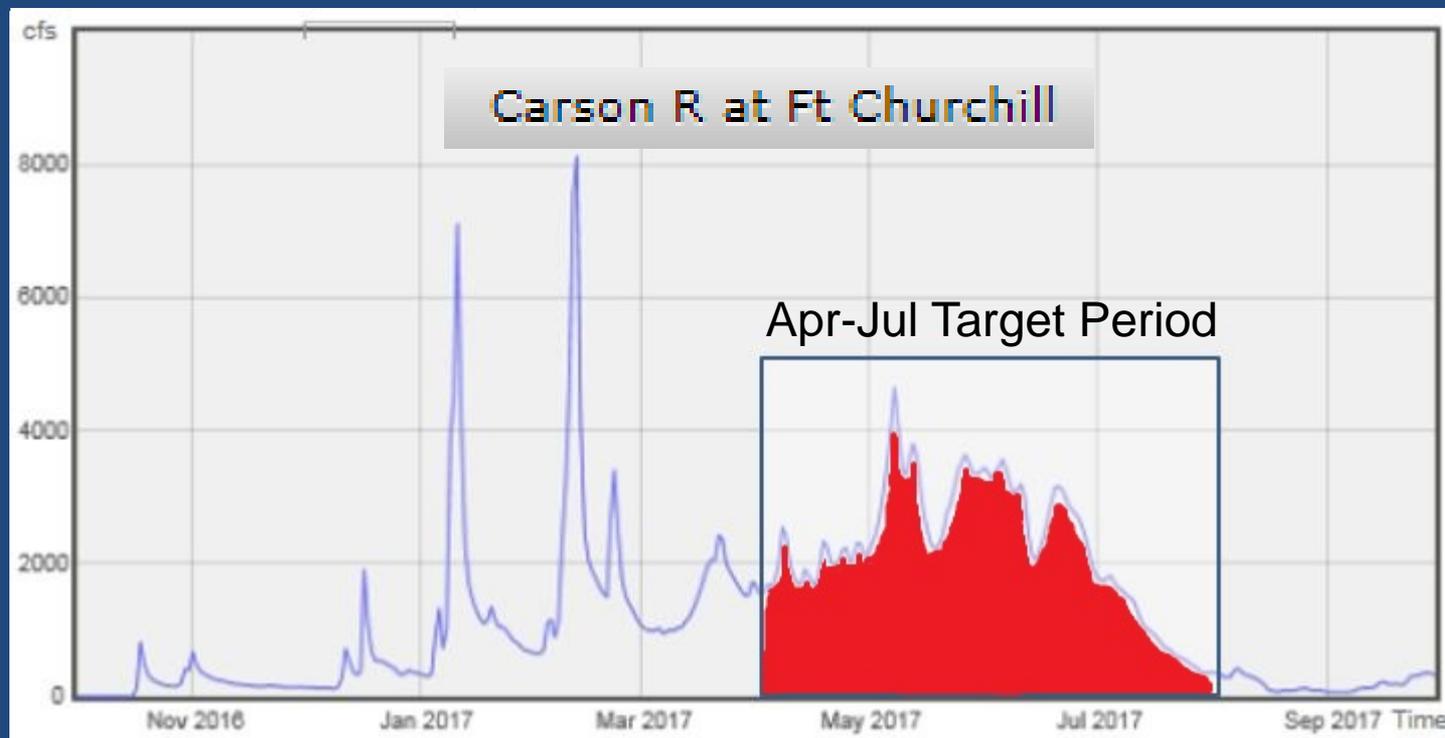
Agriculture

*A Measure of Snow
Economic Case Studies
of NRCS Snow Program
2008*

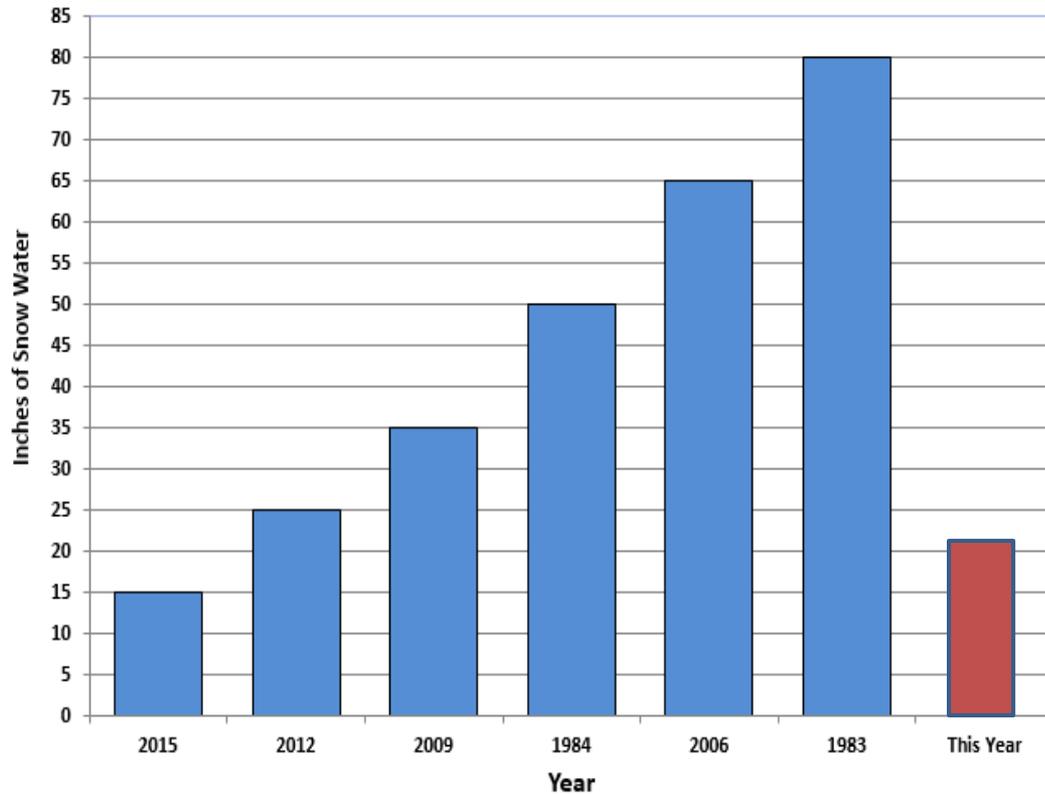


Streamflow Forecasting

- Forecasts predict the total volume of water of water that will flow past a stream gage during a specific period (generally Apr 1 – July 30).
- Volumes of water are given in thousand acre-feet (KAF)



April 1 Snowpack at Mt Rose Ski Area SNOTEL



Even a 2nd graders can grasp the basics of how the NRCS forecasts streamflow...

April-July Streamflow Volume



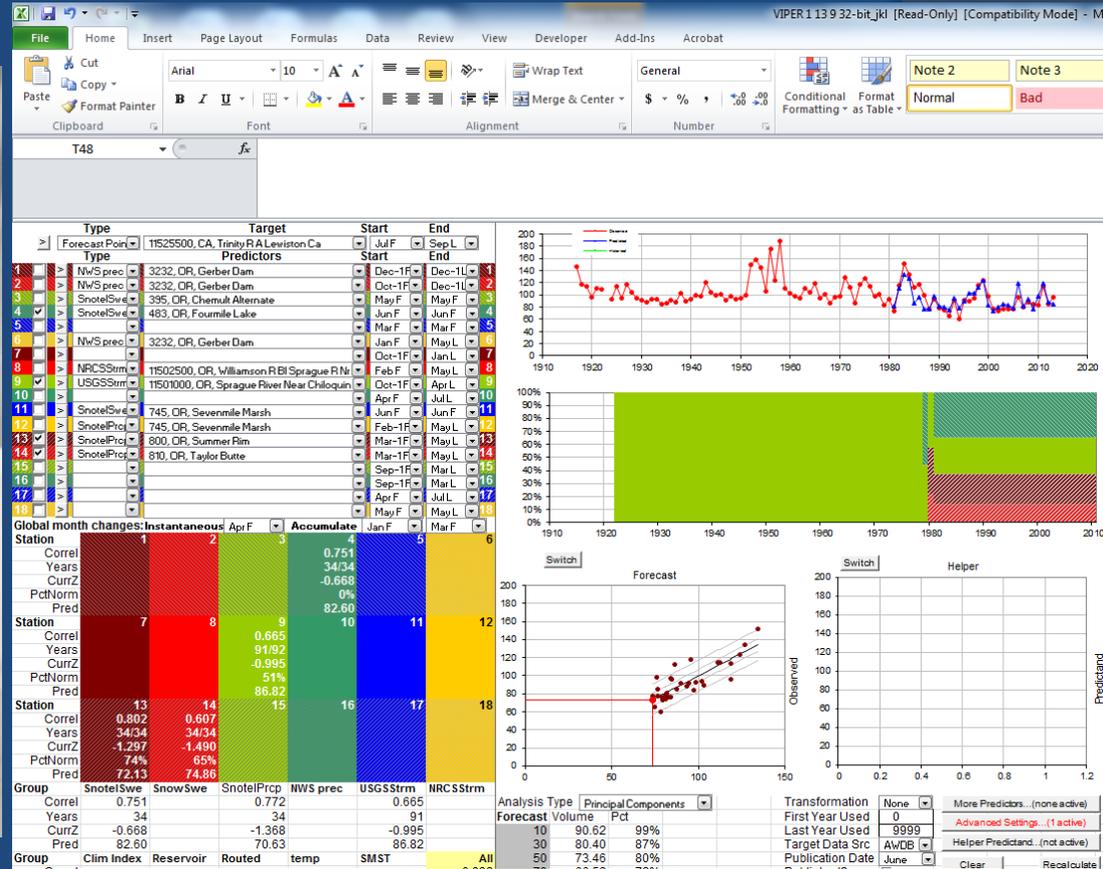
Year	'15	'12	'09	'84	'06	'83
A-J KAF	40	150	200	300	450	675

Streamflow Forecasting

- The mission of the program continues to be water supply forecasting, although the techniques have changed.



Merchant Calculator 1920-1950s



Excel – Viper Software 2000s

Streamflow Forecasting

- What forecasts tell us
 - How much water to plan for. This may help predict if a reservoir is expected to fill, and thus how much water will need to be released.
 - Will there be surface water shortages
 - Helps irrigation districts determine water allocation amounts
 - May help farmers choose what crops to plant or how many cuttings of alfalfa to expect.
- What forecasts don't tell us
 - If it will flood
 - When the peak streamflow will occur
 - When a minimum flow level will be reached

Forecast Challenges

- Early season forecasts have many unknowns based on future conditions
- Extremes
 - Record precipitation, temperatures, streamflow
 - Multi-year persistence of drought

Interpreting Streamflow Forecasts

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Carson R at Ft Churchill	MAR-JUL	29	77	130	65%	205	350	200
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Most Probable Forecasts if Future Weather is Drier than Normal

Most Probable Forecast if Future Weather is near Normal

Most Probable Forecasts if Future Weather is Wetter than Normal

1981-2010 Average

There is still a 10% chance of less water

90% and 70% chance of getting at least this much water

30% and 10% chance of getting this much water

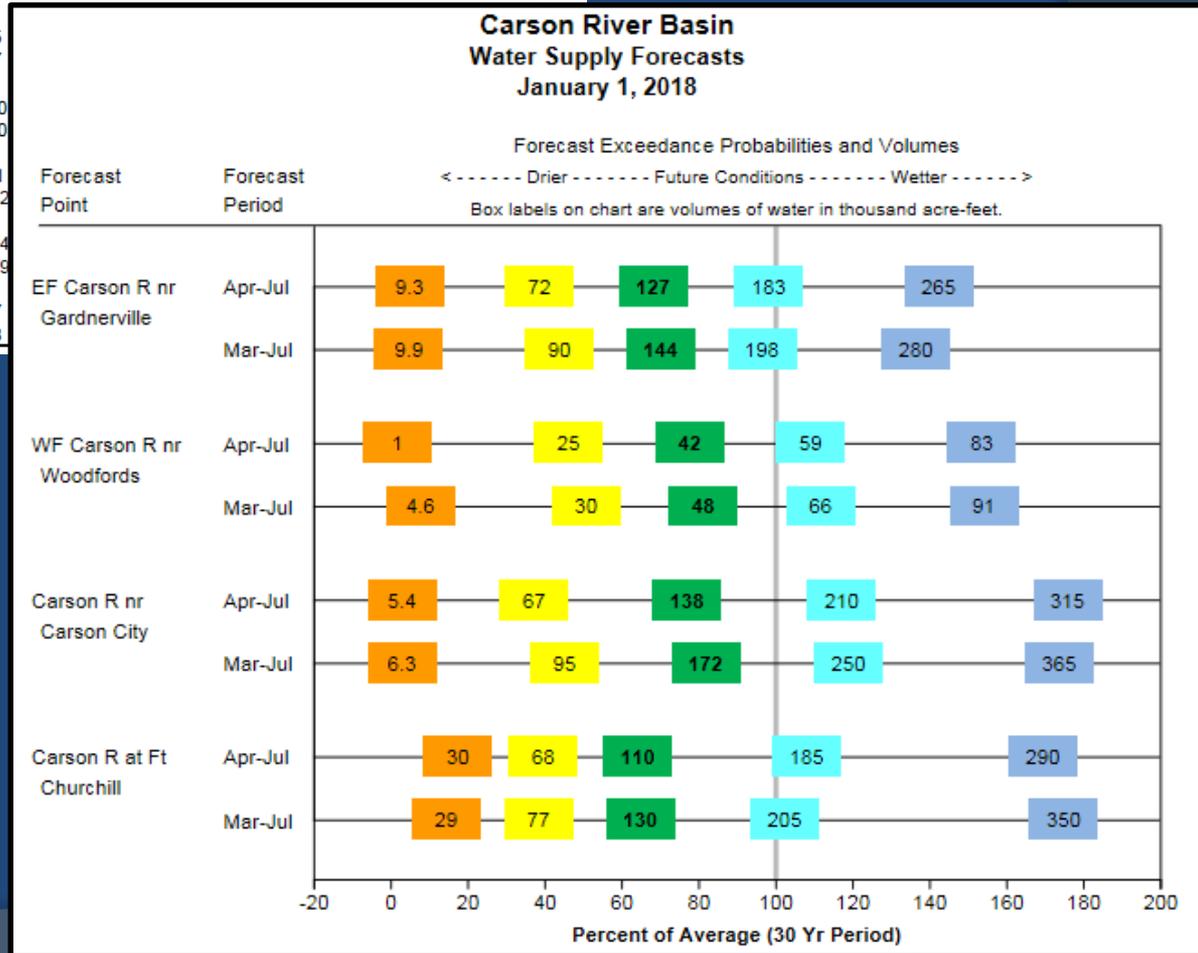
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	APR-JUL	0.03	0.49					
Carson R at Ft Churchill	MAR-JUL	29	77					
	APR-JUL	30	68					

Forecast Products



Carson River Basin Streamflow Forecasts - January 1, 2018

Forecast Exceedance Probabilities for Risk Assessment
Chance that actual volume will exceed forecast

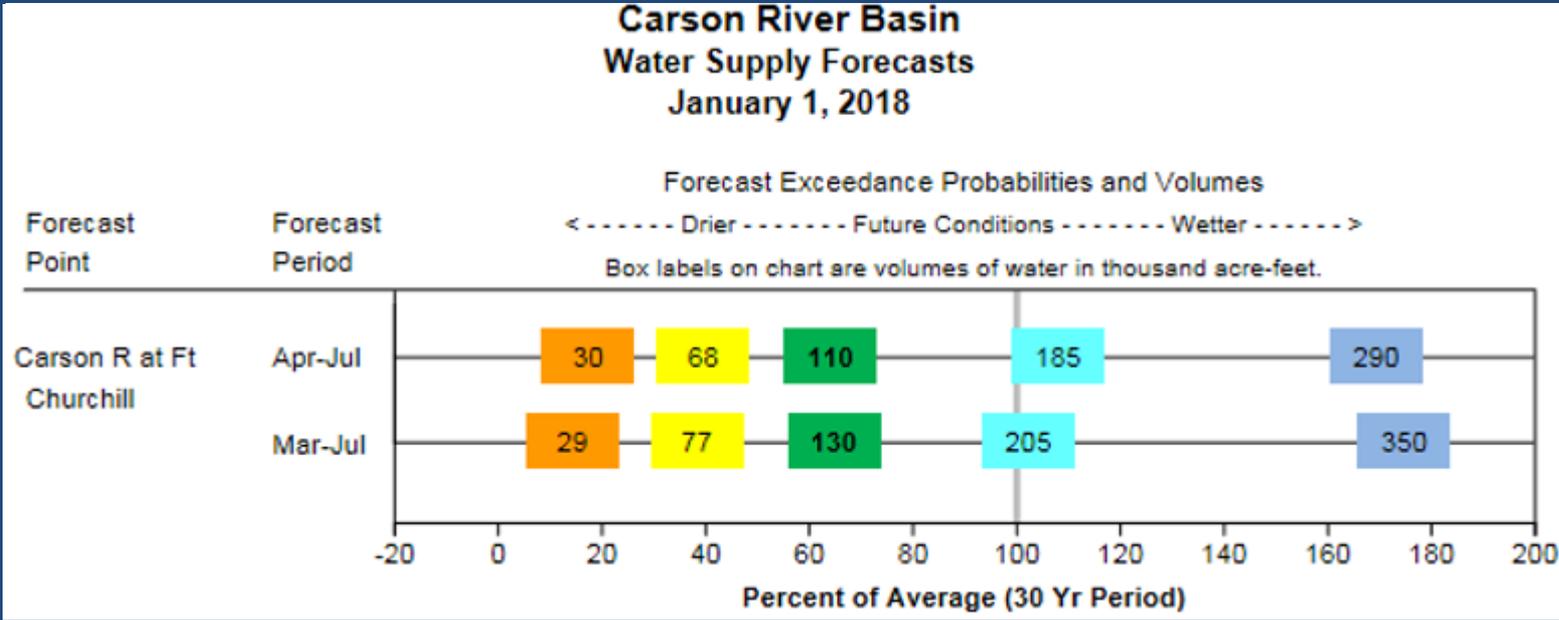
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							% Avg					
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Most Probable Forecasts if Future Weather is Drier than Normal

Most Probable Forecast if Future Weather is near Normal

Most Probable Forecasts if Future Weather is Wetter than Normal

1981-2010 Average

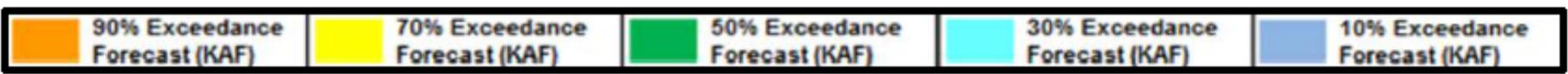


Numbers inside boxes are KAF for 5 exceedances

Below Average Volume ←

Average Volume

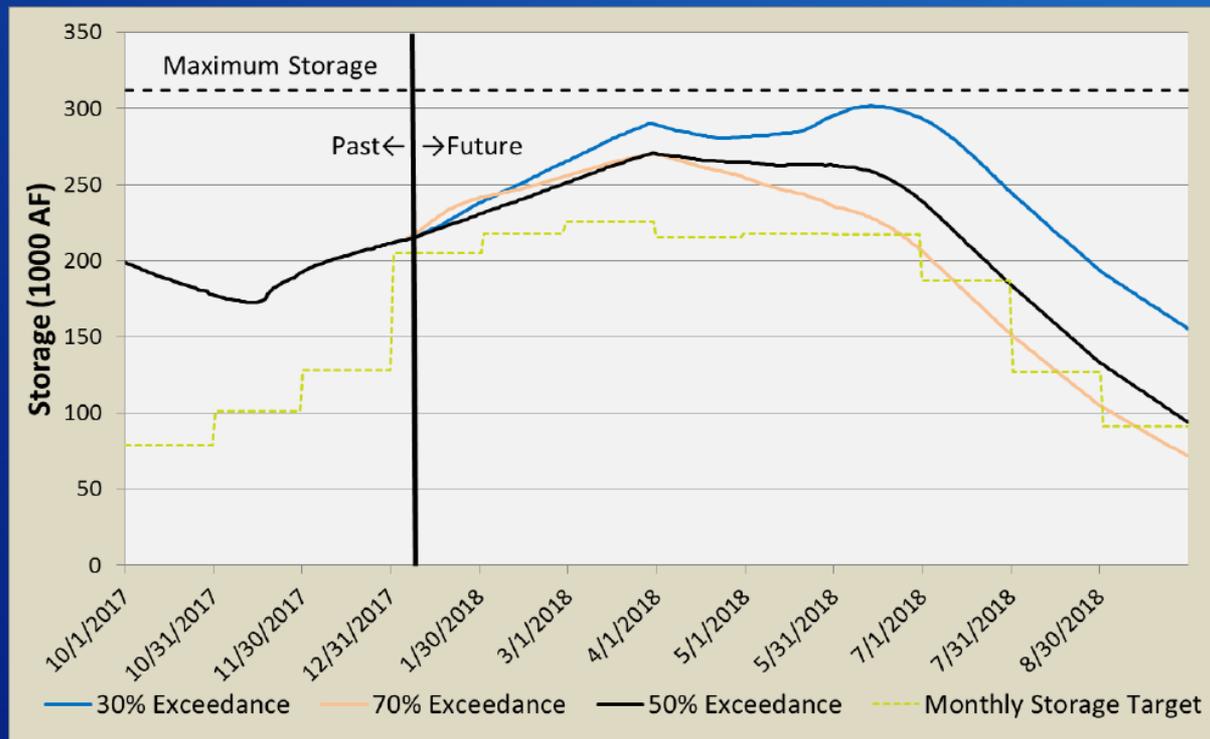
→ Above Average Volume



Current Lahontan Operations

- The 30%, 50%, and 70% exceedance runs show Lahontan Reservoir not filling in 2018 based on the January 1 NRCS A-J runoff forecast.
- There will be no diversions from the Truckee River to Lahontan Reservoir this month.
- It is too early to determine if there will be diversions from the Truckee River to Lahontan Reservoir this year.

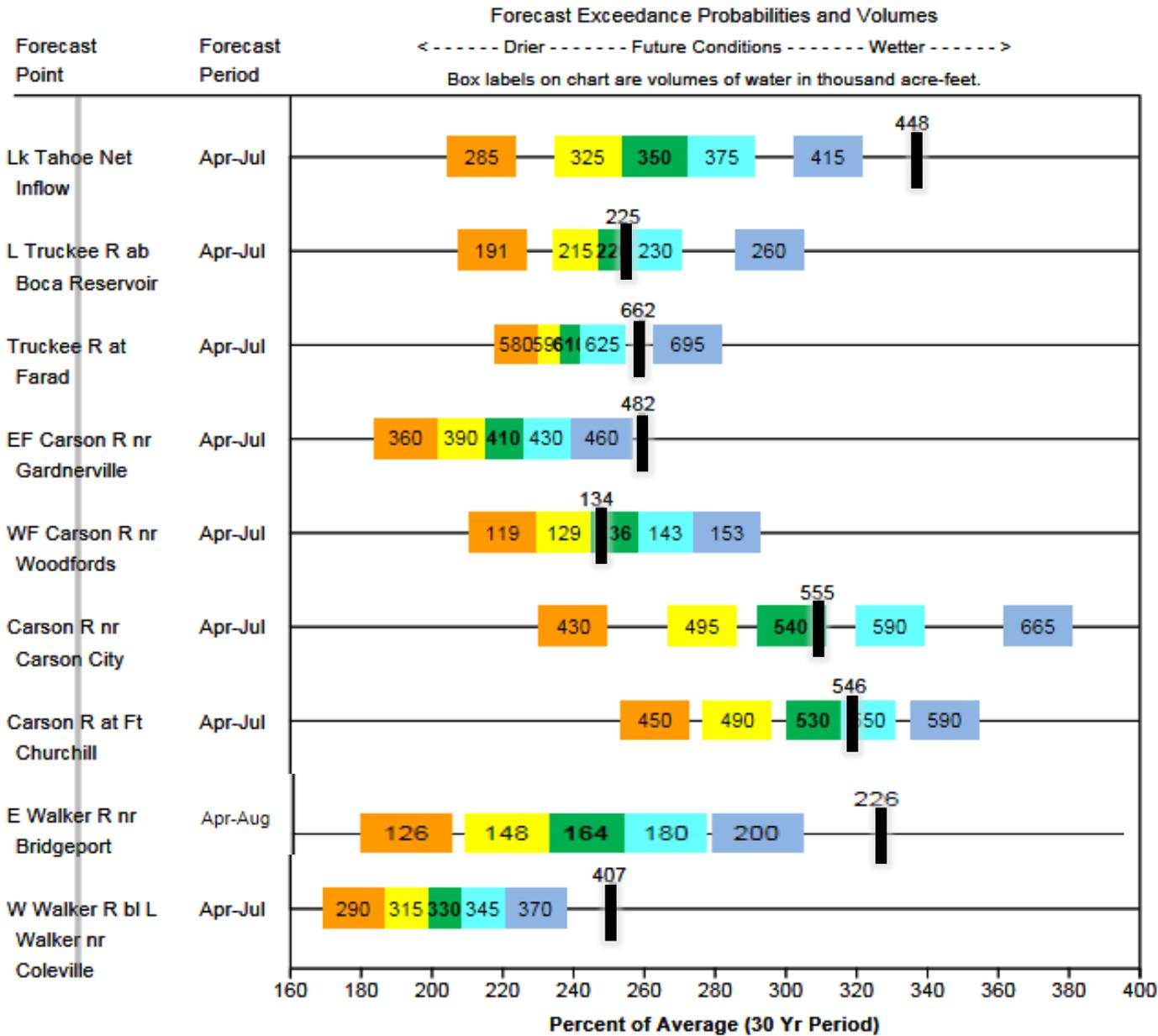
Lahontan Reservoir Storage Forecast



Eastern Sierra Basin Summary

Water Supply Forecasts

April 1, 2017



2017
Forecast
Review

Same tool
displays
observed flow
for past years

You are Here: Home / Snow Survey

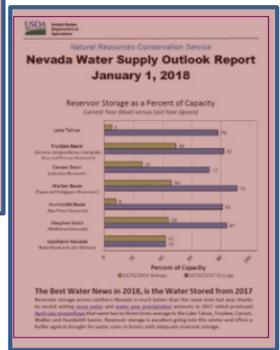
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- Snow Survey
- Snow Survey Products
- Water Supply Products

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 to the monthly snow and water outlook report
 Join our email list

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.



Latest Snow & Water Supply Information:

[January 1, 2018 Water Supply Outlook Report - New](#)

Interactive Map is now mobile friendly. Get all the features optimized for smartphones and tablets. Use this [quick overview](#) to learn about mobile map controls.

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](#)

Snow Survey Data

- > **Site Pages:**
- > **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 - New](#)
- > [30 Year Normals](#)
- > **Metadata:** [Location](#) | [Site Photos](#)

Water Supply Information

- > **Outlook Reports:**
- > [Streamflow Forecasts - New](#)
- > [Reservoir Data - New](#)
- > [Streamflow Data - New](#)
- > [Water Supply Presentations](#)

Snow Survey Products

- > [SNOTEL Snow & Precip Update Reports](#)
- > [Monthly Basin Data Reports](#)
- > **Daily Map Products:** Snow | Prec | Temp
- > [Snowpack Graphs:](#) SNOTEL | Basin
- > [Interactive Graphs - SNOTEL | Basin -New](#) (Snow, Precip, Soil Moisture, Soil Temp)

Climate and Drought Information

- > [NRCS Weekly Water & Climate Report](#)
- > [Climate Links: \(PRISM, AgACIS, Wind data\)](#)
- > [Nevada Climate Summaries](#) (by county)
- > [Great Basin Weather & Climate Dashboard](#)
- > [US Drought Monitor:](#) Nevada | West
- > [Weekly ENSO Status Update](#) (from NOAA)

Data Query Tools

- > **Report Generator:** [Custom Search](#) | [Help](#)
- > **Web Service:** [Help Center](#) | [Status](#)
- > **Power Users -** SNOTEL status email list

Other Resources:

- > [National Water and Climate Center](#)
- > [Other NRCS Snow Survey States](#)
- > [California Dept of Water Resources](#)
- > [California Data Exchange Center Map](#)
- > **Amy Advisories:** [Tahoe](#) | [Bridgeport](#)
- > [Other Related Links](#)

Contact Nevada Snow Survey

NRCS Nevada / Eastern Sierra Snow Measurement Schedule

Nevada Snow Survey Website

www.nv.nrcs.usda.gov/snow/

Nevada - Eastern Sierra Streamflow Forecasts

A **streamflow forecast** is a prediction of water volume that will flow past a point on a stream during a specified season, typically in the spring and summer. These forecasts help water managers and farmers prepare for the spring runoff. The Natural Resources Conservation Service (NRCS) issues water supply forecasts for hundreds of points in the western United States near the first of the month between January and June each year and at other times as requested. In Nevada and Eastern California a full set of streamflow forecasts are issued shortly after the first of the month. A smaller sub-set of forecasts are typically issued mid-month. The below products present streamflow forecasts as tables, graphics and maps.

To learn more about how streamflow forecasts are made and how to interpret them, choose from a [general overview](#) or a [technical description](#).

April 15, 2017

Forecast Point	Observed	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
East Fork Truckee	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Truckee at Reno	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Official Streamflow Forecast Tables
 Issued shortly after the first of the month. A smaller sub-set of forecasts are typically issued mid-month.

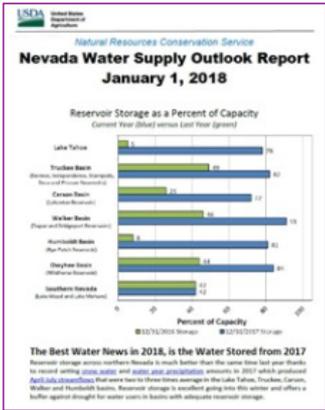
Upper Humboldt River Basin
 Water Supply Forecasts
 January 1, 2017

Forecast Point	Observed	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%	0%
Upper Humboldt	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Streamflow Forecast Graphic
 For an explanation about how to interpret this tool. [Click here](#)
 Check "show observed" box to compare observed flows to past years forecasts.

Great Basin and California Spring and Summer Streamflow Forecasts as of April 9, 2017

Streamflow Forecast GIS Maps
 Nevada (Great Basin)
 Western US



Latest Snow & Water Supply Information:

January 1, 2018 Water Supply Outlook Report - New

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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

California/Nevada SNOTEL Snow/Precipitation Update Report

Based on Mountain Data from NRCS SNOTEL Sites

Provisional data, subject to revision

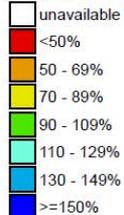
Data based on the first reading of the day (typically 00:00) for Wednesday, January 24, 2018

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	9.3	14.6	64	10.8	14.7	73
Marlette Lake	7884	N/A	12.4	-	10.8	15.4	70
Hagans Meadow	7742	0.8	10.0	8	11.0	14.0	79
Rubicon #2	7619	1.1	14.0	8	14.8	19.3	77
Echo Peak	7653	6.6	20.9	32	23.2	29.4	79
Tahoe City Cross	6797	0.3	8.8	3	13.9	17.5	79
Ward Creek #3	6745	5.7	18.0	32	29.7	33.9	88
Fallen Leaf	6242	0.1	4.5	2	14.3	15.9	90
Basin Index (%)				26			80
TRUCKEE RIVER							
Mt Rose Ski Area	8801	14.2	19.4	73	19.6	25.6	77
Independence Lake	8338	10.1	19.9	51	11.6	21.7	53
Big Meadow	8235	7.6	11.2	68	10.9	14.1	77
Squaw Valley G.C.	8013	13.5	27.7	49	23.4	31.4	75
Independence Camp	6980	2.0	9.6	21	13.3	15.2	88
Css Lab	6894	2.2	19.6	11	25.4	31.4	81
Little Valley	6493	0.4	N/A	-	14.2	N/A	-
Truckee #2	6509	0.8	9.4	9	12.2	16.2	75
Independence Creek	6436	0.0	8.0	0	11.0	15.3	72
Basin Index (%)				40			75

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

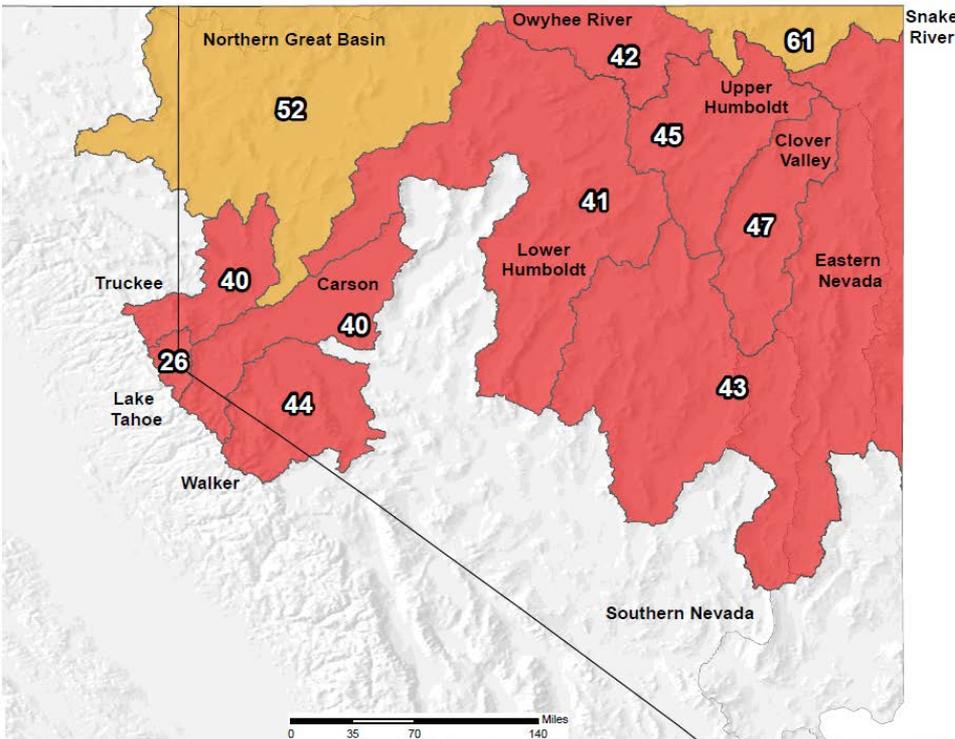
Jan 24, 2018

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



SNOTEL Site: Lamoille #3
State: Nevada
Site Number: 570
County: Elko
Latitude: 40 deg; 39 min N
Longitude: 115 deg; 23 min W
Elevation: 8051 feet
Reporting since: 1980-10-01



[Questions about this site.](#)

- [View Daily Sensor Descriptions](#)
- [View Hourly Sensor Descriptions](#)
- [View Sensor History](#)

Site Reports:

Report Type	Daily
Standard Sensors† (Most Current Data)	Last 7 Days D
Precipitation, Accumulated	Last 7 Days D
Snow Depth	Last 7 Days D
Snow Water Equivalent	Last 7 Days D
Temperature	Last 7 Days M
Soil Moisture/Temperature	

Snow Survey Data

- Site Pages: [Select a SNOTEL / SCAN site](#)
- 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 - New](#)
- > [30 Year Normals](#)
- > [Metadata: Location](#) | [Site Photos](#)

Water Supply Information

- > [Outlook Reports:](#) [Select a month](#)
- > [Streamflow Forecasts - New](#)
- > [Reservoir Data - New](#)
- > [Streamflow Data - New](#)
- > [Water Supply Presentations](#)

Snow Survey Products

Climate and Drought Information

Report Generator 2.0

View Station Information

- [Create/Modify Report](#)
- [View Report](#)
- [Report Details](#)

Output Format | Layout | Units | Time Period | Fit Table To Screen

Lamoille #3 (570)
Nevada SNOTEL Site - 8051 ft
Reporting Frequency: Daily; Date Range: 2018-01-10 to 2018-01-17

(As of: Wed Jan 17 15:45:45 GMT-08:00 2018)
 Provisional data, subject to revision

Date	Snow Water Equivalent (in) Start of Day Values	Snow Depth (in) Start of Day Values	Precipitation Accumulation (in) Start of Day Values	Air Temperature Observed (degF) Start of Day Values	Air Temperature Maximum (degF)	Air Temperature Minimum (degF)	Air Temperature Average (degF)
2018-01-10	3.5	13	8.4	36	36	28	30
2018-01-11	4.1	16	8.8	29	41	28	35
2018-01-12	4.1	15	8.9	36	39	22	31
2018-01-13	4.1	16	8.9	26	46	22	32
2018-01-14	4.1	15	8.9	33	47	30	36
2018-01-15	4.1	15	8.9	33	50	33	38
2018-01-16	4.1	15	8.9	37	44	29	36

Report Generator 2.0

Create/Modify Report

View Report

Report Details

Select Stations

Select network:

Enter station(s):

[Advanced Search](#)

Selected Stations (0)

Station Id	Name	State	Network	Actions
No stations selected				
Remove All				Sort By: <input type="text" value="Name"/>

Select Columns

Data Metadata

Element

Filter:

air temperature average
 air temperature maximum
 air temperature minimum
 air temperature observed
 precipitation accumulation
 precipitation increment
 reservoir storage volume
 snow depth

Depth

None

Value Type

Value
 QC Flag
 QA Flag
 Previous Year's Value
 Delta from Previous Value
 Collection Date
 Normal (1981-2010)
 % of Normal (1981-2010)
 Average (1981-2010)

Function

None
 Sum
 Mean
 Max
 Min

Manage Selected Columns

<input checked="" type="checkbox"/>	Data Type	Element Depth	Function	Value Type
No records found.				
Remove Selected Columns		Remove All		

Select Time Period, Layout, and Units

Interval/Duration

Daily
 Monthly
 Semi-Monthly
 Hourly
 Water Year
 Calendar Year

Time Period

Today
 Last 7 Days
 Last 30 Days
 Current Water Year
 Current Calendar Year
 Period of Record

All Months
 Jan
 Feb
 Mar
 Apr
 May

All Days
 1
 2
 3
 4
 5

Layout

- Time Series
- Stacked Time Series
- Water Year - Group by Month
- Calendar Year - Group by Month
- Chart

Units

- English
- Metric

Output Format

- HTML
- CSV

Custom Begin Date

Custom End Date

Make custom dates relative to today

Report Generator allows for custom reports.

Once a report is made it can be bookmarked so you can access it again.

There is a learning curve, but I'm happy to help out creating whatever reports you or your customers may find useful.

Snow Survey Data

- > **Site Pages:**
- > **Interactive Map:** (zoom, click site for data)
[SNOTEL](#) | [Snow Course](#) | [SCAN](#)
- > **Interactive Map Conditions Links**
- > **Current and Historic Data Reports**
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Water Supply Information

- > **Outlook Reports:**
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- > **Reservoir Data - New**
- > **Streamflow Data - New**
- > **Water Supply Presentations**

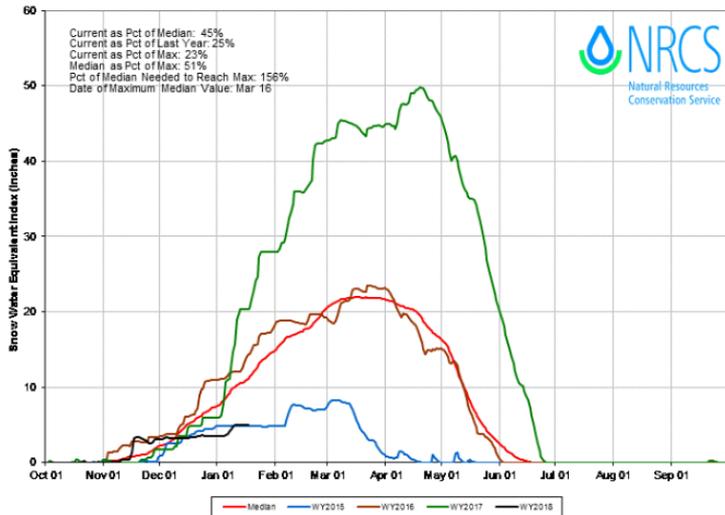
Snow Survey Products

- > **SNOTEL Snow & Precip Update Reports**
- > **Monthly Basin Data Reports**
- > **Daily Map Products:** [Snow](#) | [Prec](#) | [Temp](#)
- > **Snowpack Graphs:** [SNOTEL](#) | [Basin](#)
- > **Interactive Graphs - SNOTEL | Basin -New**
 (Snow, Precip, Soil Moisture, Soil Temp)

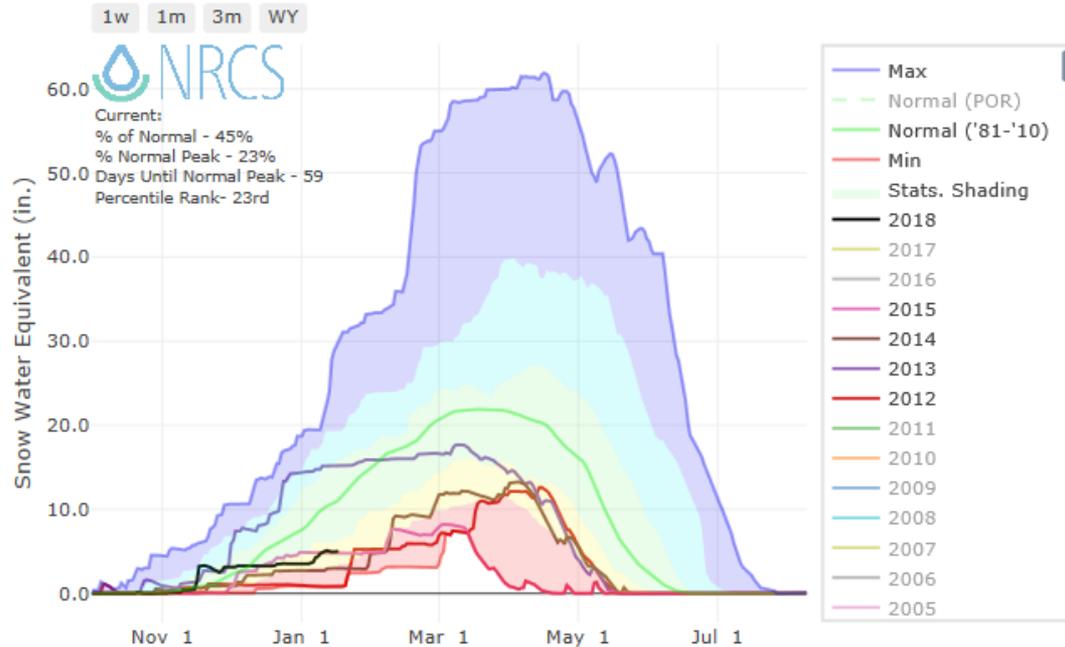
Climate and Drought Information

- > **NRCS Weekly Water & Climate Report**
- > **Climate Links:** (PRISM, AgACIS, Wind data)
- > **Nevada Climate Summaries** (by county)
- > **Great Basin Weather & Climate Dashboard**
- > **US Drought Monitor:** [Nevada](#) | [West](#)
- > **Weekly ENSO Status Update** (from NOAA)

CARSON RIVER Time Series Snowpack Summary
 Based on Provisional SNOTEL data as of Jan 17, 2018



Snow Water Equivalent in Carson River Basin

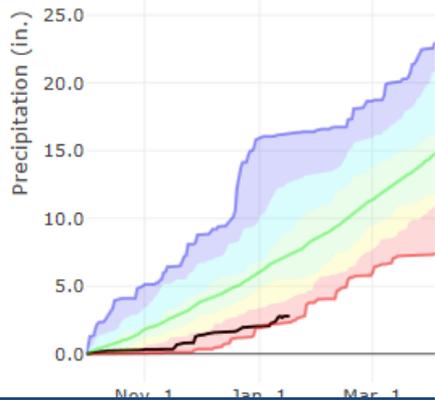
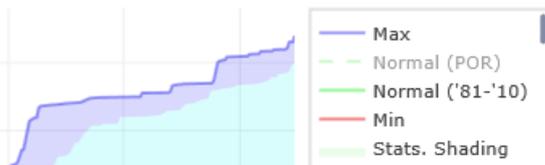


Precipitation in Eastern Nevada

1w 1m 3m WY

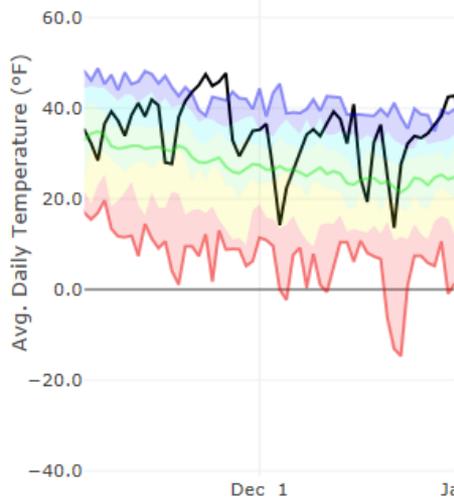


Current:
 % of Normal - 38%
 % of Yearly Avg - 11%
 Days Until End of WY - 257
 Percentile Rank- 3rd



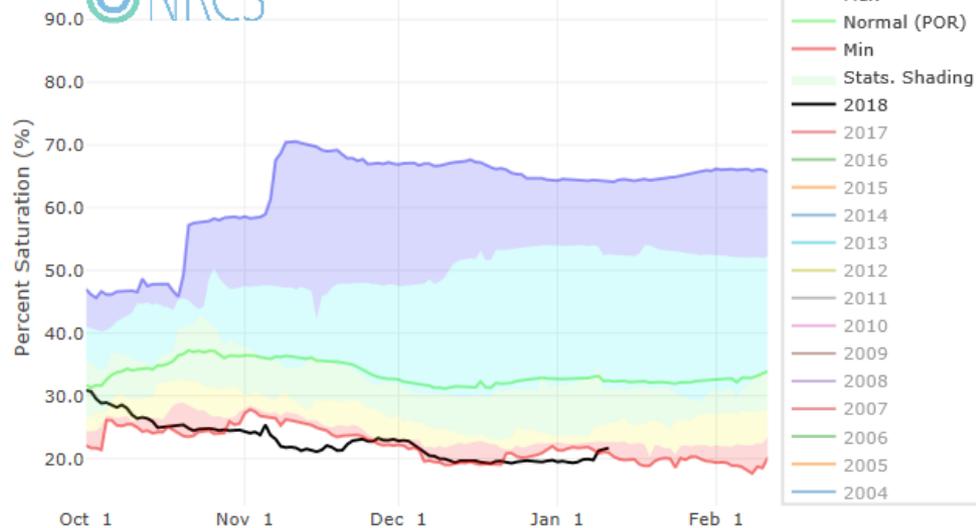
Average Daily Temperature in Eastern Nevada

1w 1m 3m WY



Average Soil Saturation in Eastern Nevada

1w 1m 3m WY



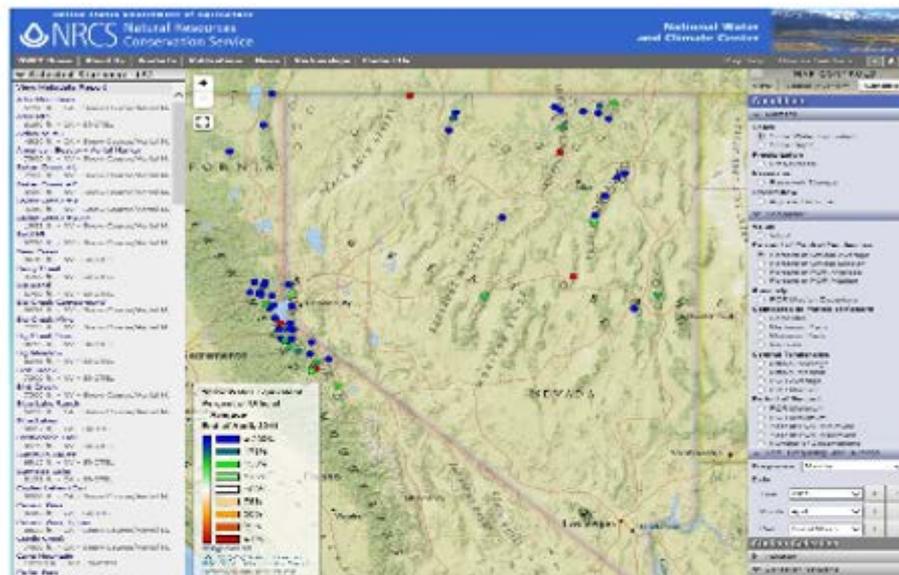
Snow Survey Data

- > **Site Pages:**
- > **Interactive Map:** (zoom, click site for data)
SNOTEL | Snow Course | SCAN
- > **Interactive Map Conditions Links**
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- > **Daily Map Products:** [Snow](#) | [Prec](#) | [Temp](#)
- > **Snowpack Graphs:** [SNOTEL](#) | [Basin](#)
- > **Interactive Graphs - SNOTEL | Basin -New**
(Snow, Precip, Soil Moisture, Soil Temp)

Interactive Map - Nevada Conditions Links



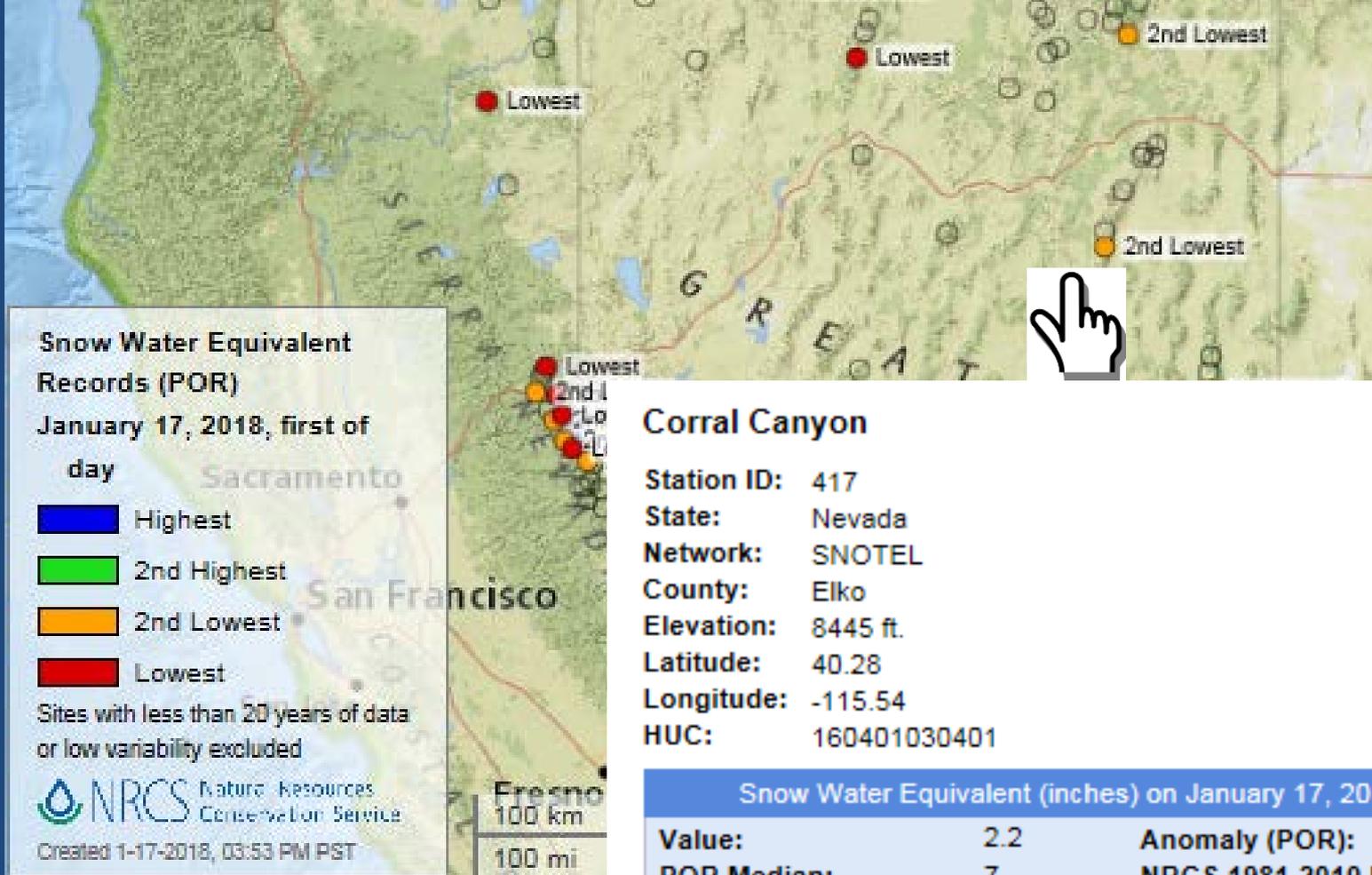
Today's SNOTEL Reports:

> Current Snow Water Equivalent

- > [Values](#) | [As a Percent of Median](#) | [Anomaly](#) | [Percentile](#) | **[Records](#)** | [Median](#)
- > [Deltas - 1 day](#) | [7 day](#) | [14 day](#) | [30 day](#)

> Precipitation

- > [Cumulative Precipitation \(for last X days\) - 1 day](#) | [7 days](#) | [14 days](#) | [30 days](#)
- > [Water Year to Date: Values](#) | [As a Percent of Average](#) | [Anomaly](#) | [Percentile](#) | [Records](#) | [Average](#)
- > [Month to Date: Values](#) | [As a Percent of Average](#) | [Anomaly](#) | [Percentile](#) | [Records](#) | [Average](#)

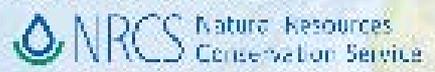


Snow Water Equivalent Records (POR)

January 17, 2018, first of day

- Highest
- 2nd Highest
- 2nd Lowest
- Lowest

Sites with less than 20 years of data or low variability excluded



Created 1-17-2018, 03:53 PM PST

Corral Canyon

Station ID: 417
State: Nevada
Network: SNOTEL
County: Elko
Elevation: 8445 ft.
Latitude: 40.28
Longitude: -115.54
HUC: 160401030401



Snow Water Equivalent (inches) on January 17, 2018, first of day			
Value:	2.2	Anomaly (POR):	-4.8
POR Median:	7	NRCs 1981-2010 Median:	7.1
% of POR Median:	31%	% of NRCs 1981-2010 Median:	31%
POR Average:	7.97	NRCs 1981-2010 Average:	8
% of POR Average:	28%	% of NRCs 1981-2010 Average:	28%
% of WY Peak:	100%	% of Average WY Peak (POR):	12%
		% of Median WY Peak (POR):	12%
Percentile (POR):	3	# of Observations (POR):	40
Maximum (POR) (year):	18 (1984)	Maximum Rank (POR):	39
Minimum (POR) (year):	1.8 (2012)	Minimum Rank (POR):	2

Field Office Support

- ⦿ Winter measurements
 - Snow Courses
 - SNOTEL ground truths
 - SNOTEL emergency repairs
- ⦿ Summer maintenance
 - Recharges
 - Vegetation Management
 - Bigger jobs – shelter / pillow replacement

Questions?

What could improve customer service?

New data products

Education

Media outreach

What kind of information could be added to help ranchers/range management?