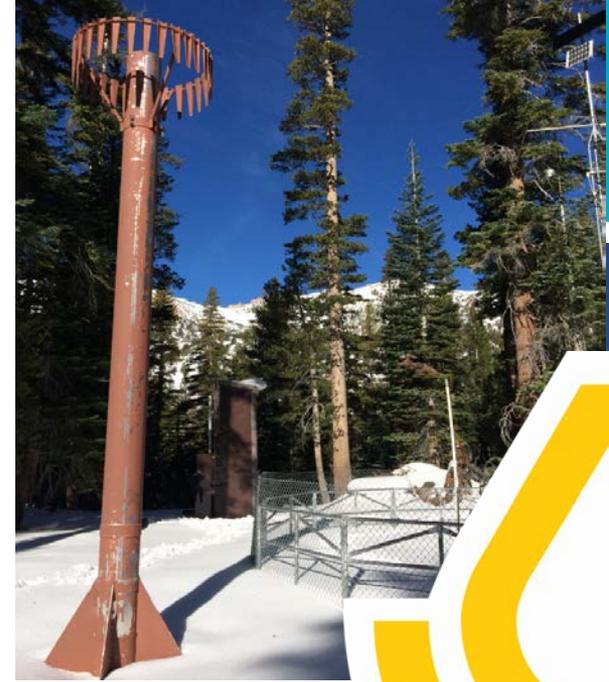
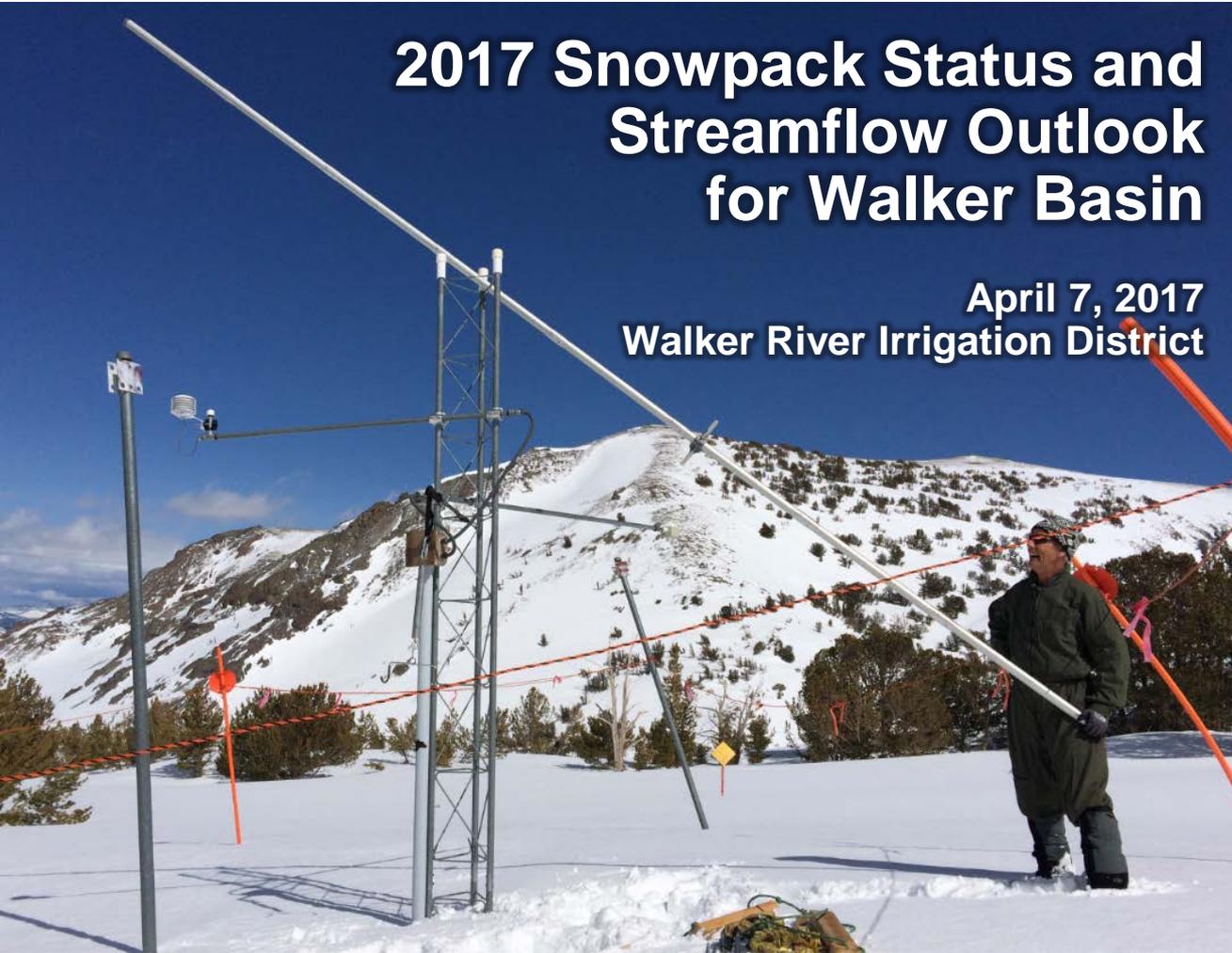




United States Department of Agriculture

2017 Snowpack Status and Streamflow Outlook for Walker Basin

April 7, 2017
Walker River Irrigation District



Leavitt Lake SNOTEL, March 27, 2017

Jeff Anderson
Nevada NRCSSnow Survey

(775) 857-8500 x152
jeff.anderson@nv.usda.gov



Natural
Resources
Conservation
Service

www.nv.nrcs.usda.gov/snow

Key Points:

- Based on April 1 SNOTEL and snow course data snowpacks in the Walker Basin are over twice normal and at, or near, record amounts.
 - West Walker 212%
 - East Walker 235%
 - Overall 217%
- Snow in Sweetwater Mtns and at lower elevations stands out, BUT... these conditions are very similar to 1983.
- Walker Basin has had record precipitation in 2017 at SNOTELs.
- Basin-wide soil moisture and snow pack density is ahead of schedule. A ripe snowpack may be a good thing for early runoff.
- NRCS forecasts predict volumes greater than 1983 on West Walker. Forecast are less than 1983 on the East Walker.

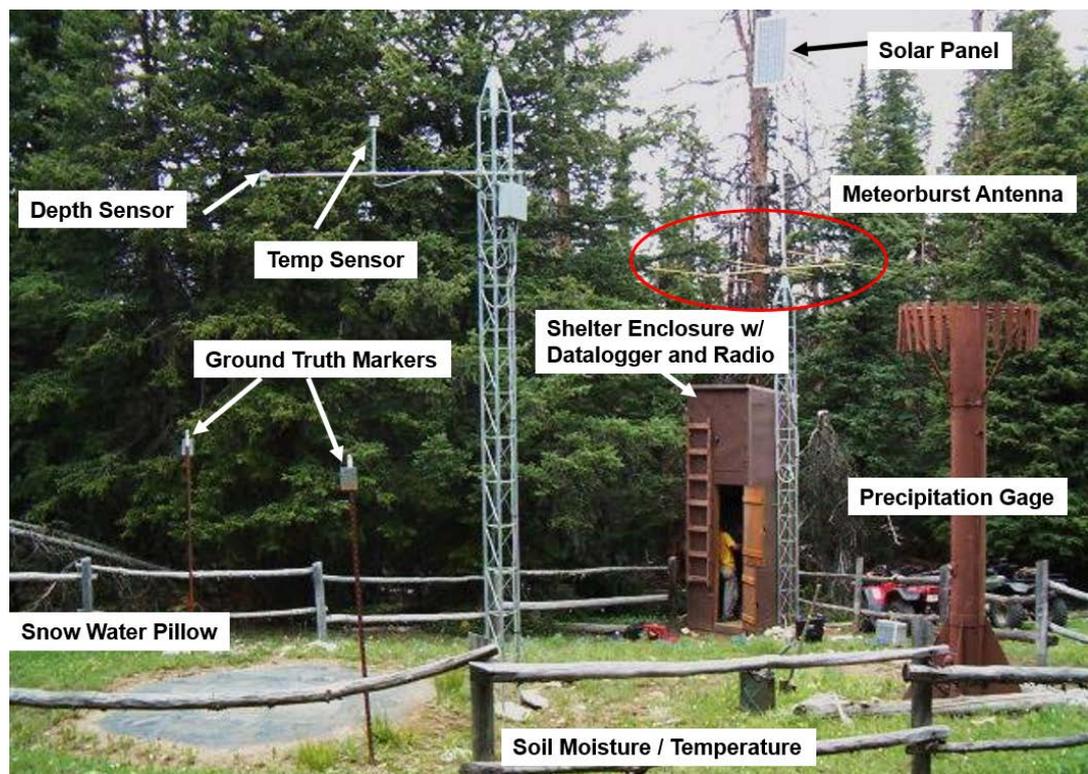


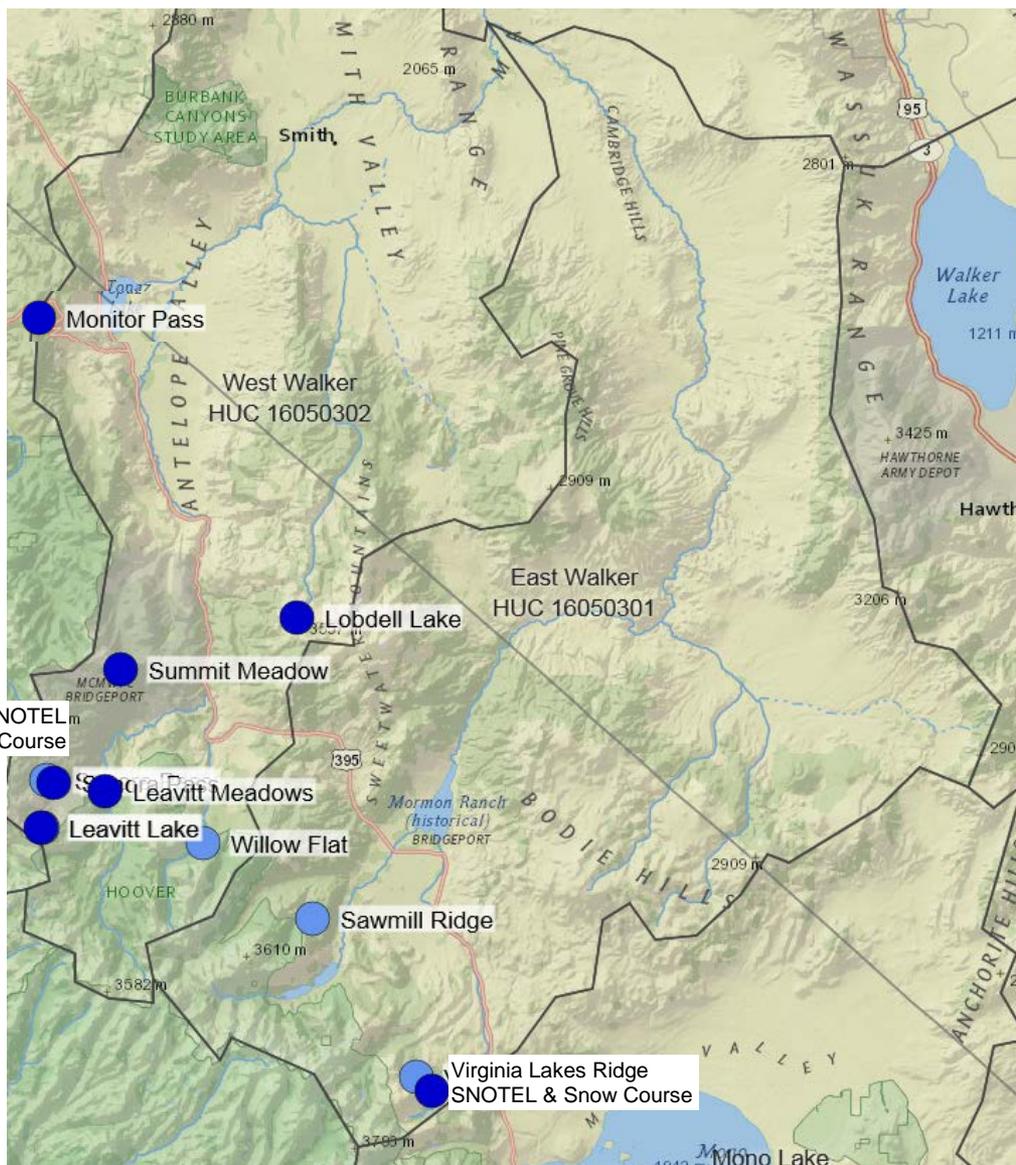
NRCS Monitoring Network

Snow Courses *snow tube transect*



SNOTEL Stations *automated weather station with snow pillow*





Stations by Network

 SNOTEL

 Snow Course

Sonora Pass SNOTEL
& Snow Course

Virginia Lakes Ridge
SNOTEL & Snow Course



SWE definition

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



Walker Basin Snowpack Summary

April 1, 2017

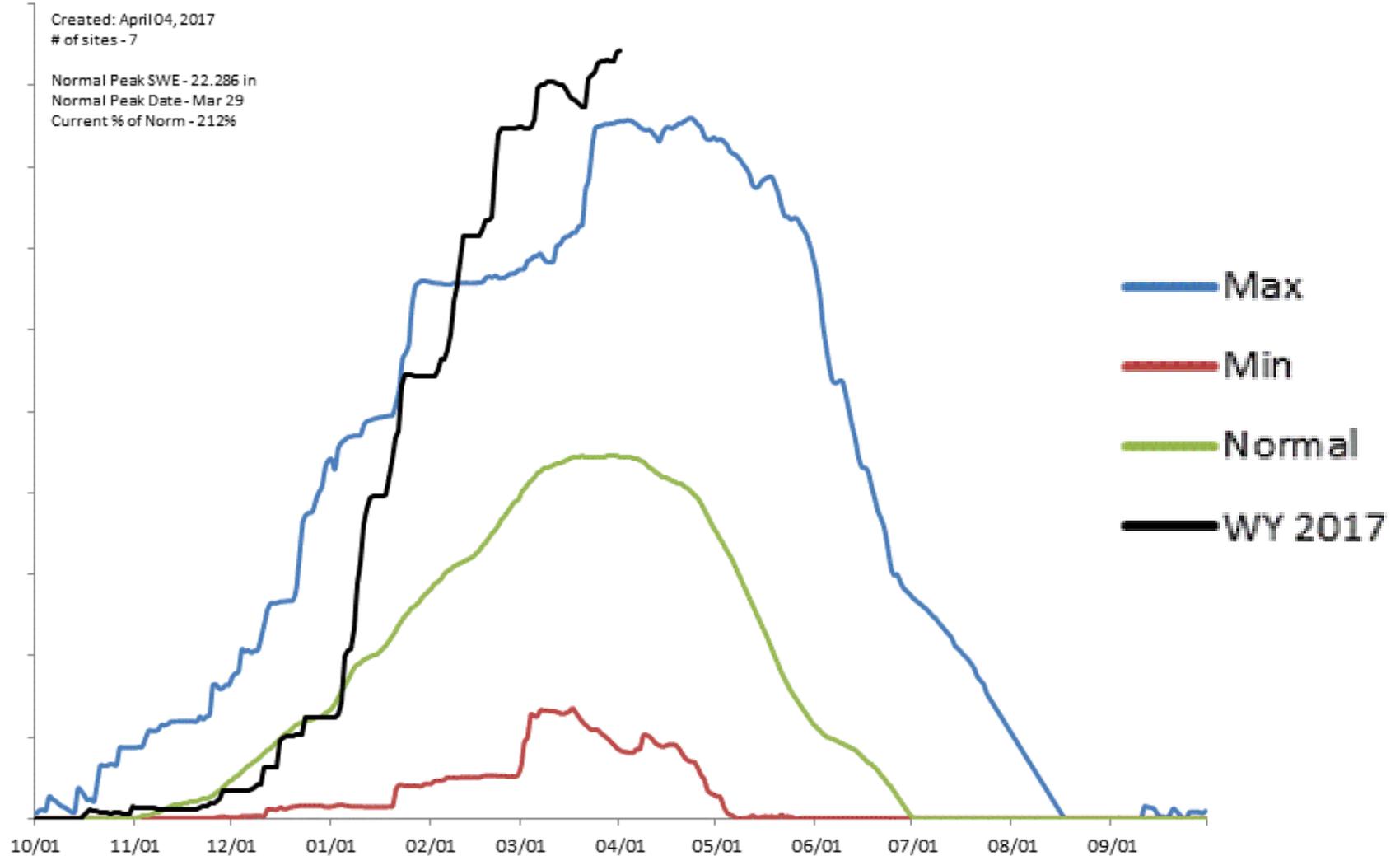
Walker River Basin	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median
Leavitt Lake	SNOTEL	9617	249	107.0	56.2	190%
Virginia Lakes Ridge	SNOTEL	9445	88	36.4	16.2	225%
Summit Meadow	SNOTEL	9313	112	48.6	23.8	204%
Lobdell Lake	SNOTEL	9233	78	37.8	15.4	245%
Sonora Pass	SNOTEL	8770	112	51.2	24.2	212%
Sonora Pass	SC	8750	111	53.0	22.9	231%
Sawmill Ridge	SC	8761	84	39.9	16.4	243%
Monitor Pass	SNOTEL	8310	77	32.1	13.9	231%
Willow Flat	SC	8231	47	21.1	9.6	220%
Leavitt Meadows	SNOTEL	7198	38	17.1	5.9	290%
Basin Index						217%
# of sites						10



Walker River Basin - SWE Index

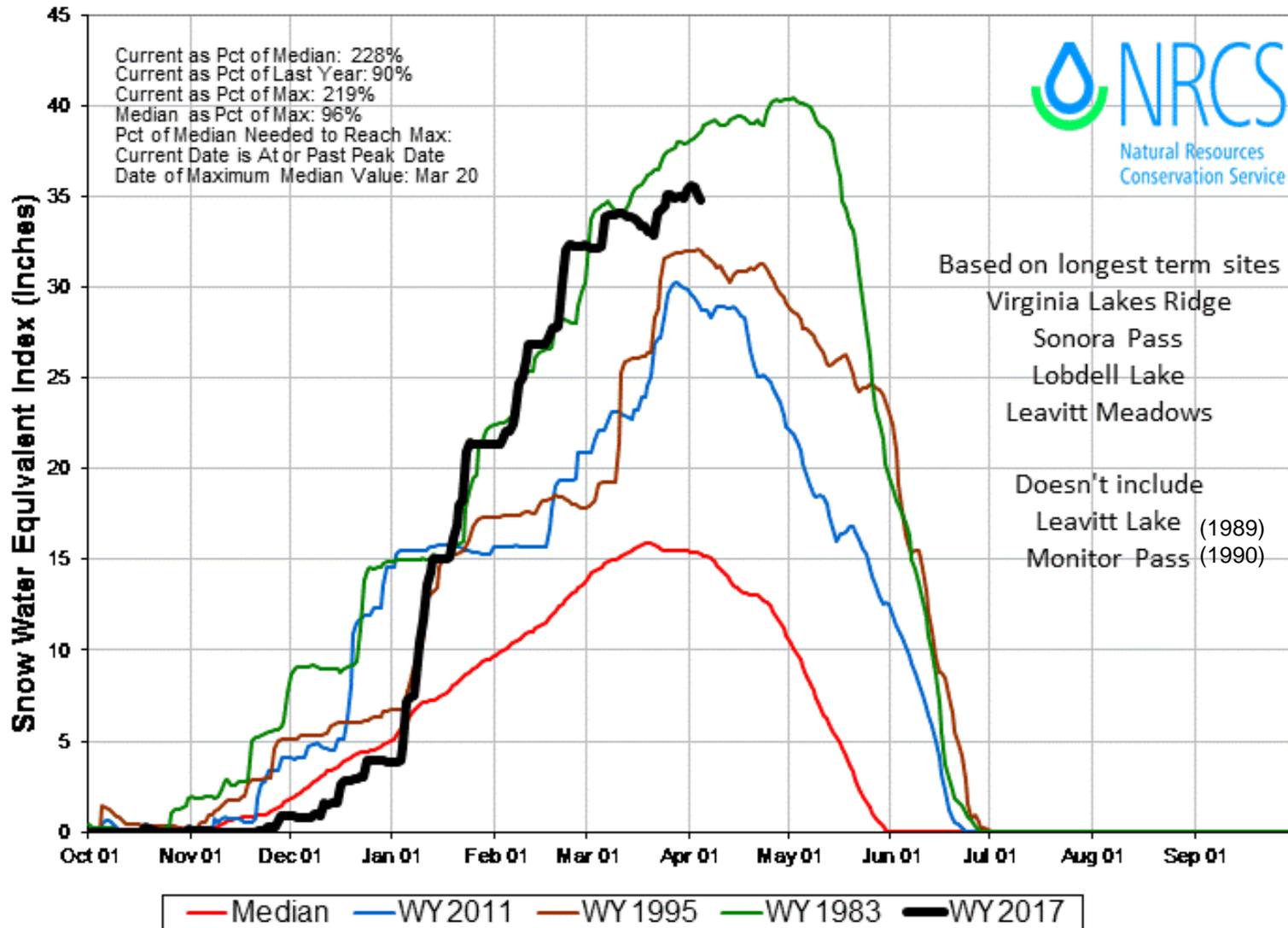
Created: April 04, 2017
 # of sites - 7
 Normal Peak SWE - 22.286 in
 Normal Peak Date - Mar 29
 Current % of Norm - 212%

Index of Snow Water Equivalent



WALKER RIVER BASIN Time Series Snowpack Summary

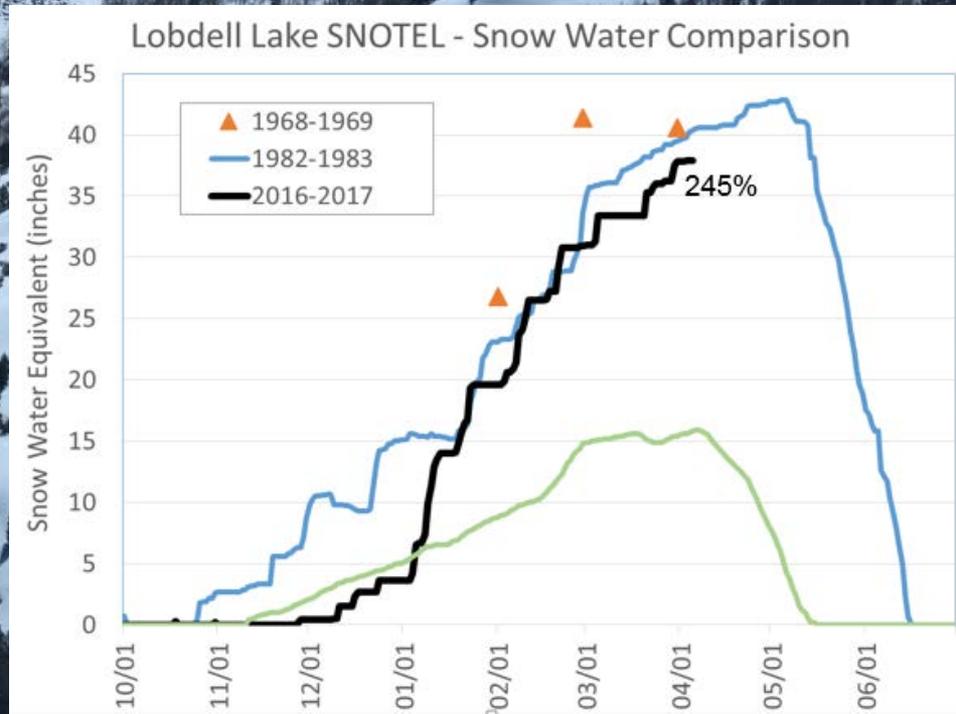
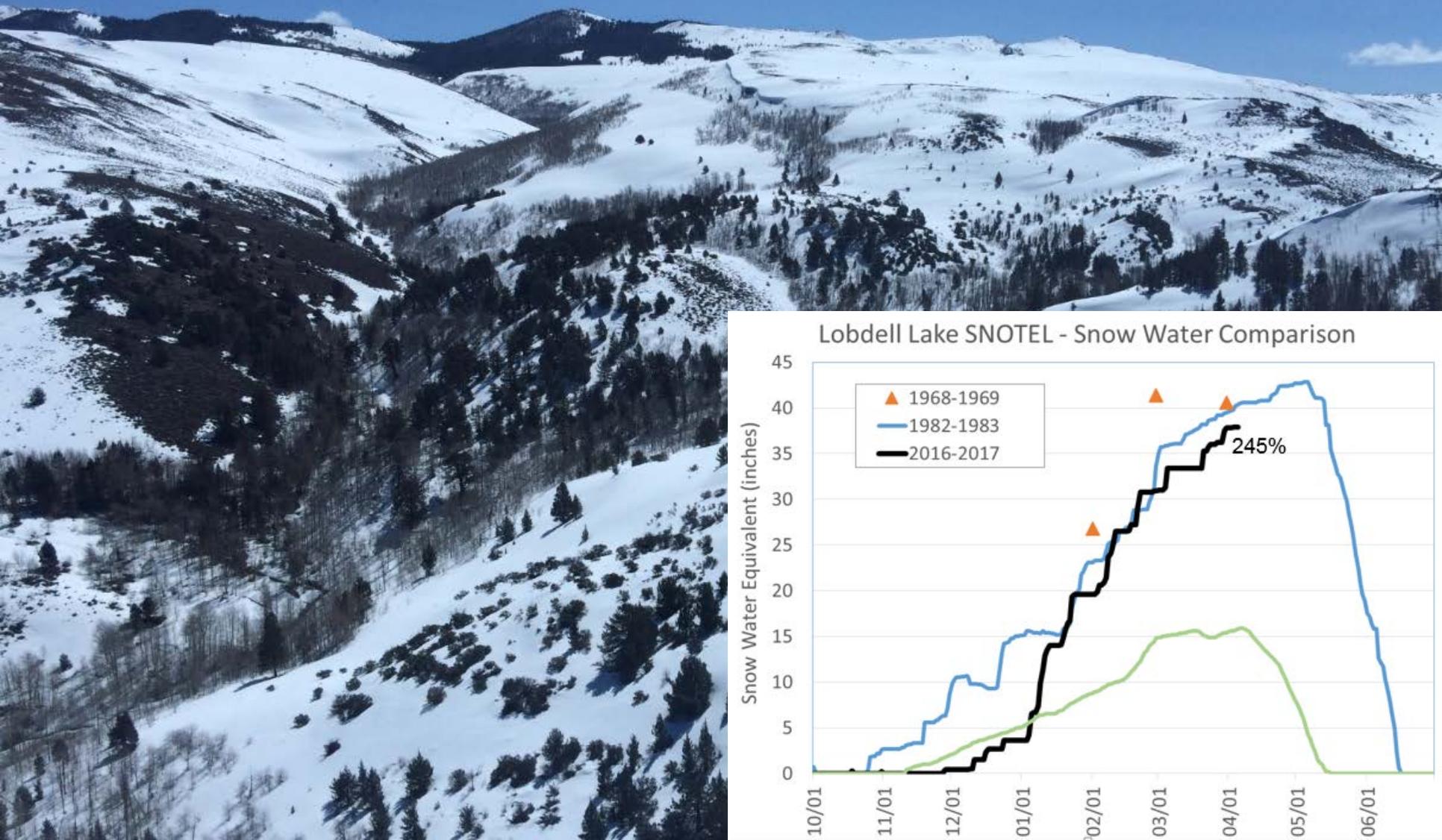
Based on Provisional SNOTEL data as of Apr 04, 2017



Sweetwater Mountains 3/27/2017



Sweetwater Mountains 3/27/2017



California/Nevada SNOTEL Snowpack Comparison 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 Saturday, April 01, 2017

Basin Site Name	Elev (ft)	Snow Water Equivalent			Current as Percent of 1983	Current as Percent of Median	1983 as Percent of Median
		Current (in)	1983 (in)	Median (in)			
WALKER RIVER							
Leavitt Lake	9604	107.0	108.0*	56.2	99	190	190
Virginia Lakes Ridge	9445	36.4	39.3	16.2	93	225	243
Summit Meadow	9313	48.6	-M	23.8 _R	*	204	*
Lobdell Lake	9249	37.8	39.5	15.4	96	245	256
Sonora Pass	8770	51.1	49.9	24.2	102	211	206
Monitor Pass	8306	32.1	-M	13.9	*	231	*
Leavitt Meadows	7198	17.1	23.6	5.9	72	290	400
Basin Index (%)					96	212	221

**Leavitt Lake 1983 data back estimated from regression with snow course, excellent correlation $R^2 = 0.95$*



East Walker River above Bridgeport	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median
Virginia Lakes Ridge	SNOTEL	9445	88	36.4	16.2	225%
Lobdell Lake	SNOTEL	9233	78	37.8	15.4	245%
Sawmill Ridge	SC	8761	84	39.9	16.4	243%
Willow Flat	SC	8231	47	21.1	9.6	220%
Basin Index						235%
# of sites						4

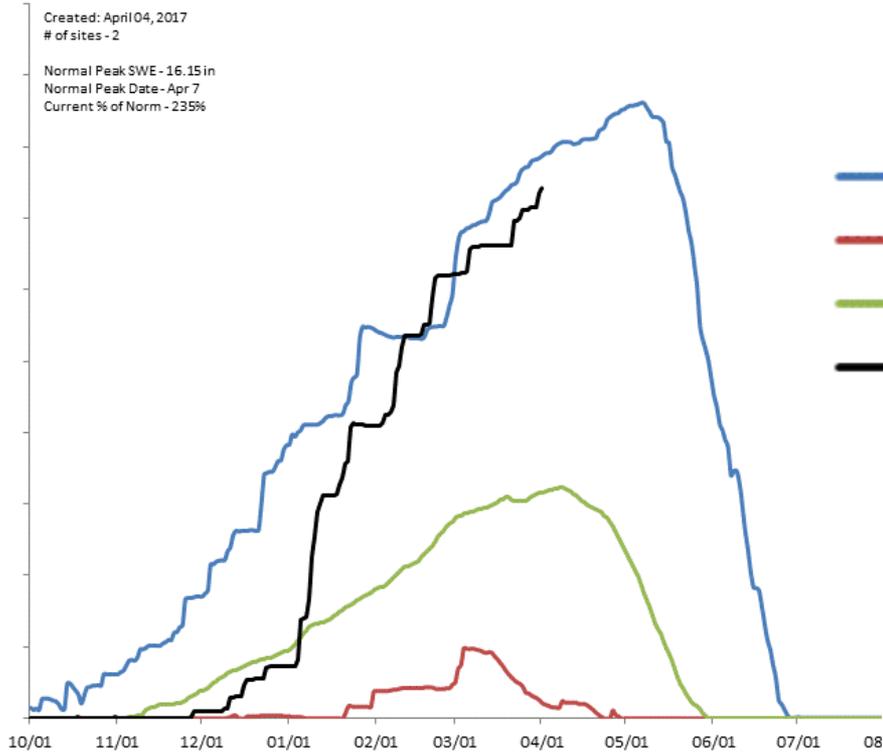
West Walker River above Coleville	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median
Leavitt Lake	SNOTEL	9617	249	107.0	56.2	190%
Summit Meadow	SNOTEL	9313	112	48.6	23.8	204%
Lobdell Lake	SNOTEL	9233	78	37.8	15.4	245%
Sonora Pass	SNOTEL	8770	112	51.2	24.2	212%
Sonora Pass	SC	8750	111	53.0	22.9	231%
Leavitt Meadows	SNOTEL	7198	38	17.1	5.9	290%
Basin Index						212%
# of sites						6



East Walker River above Bridgeport - SWE Index

Created: April 04, 2017
 # of sites - 2
 Normal Peak SWE - 16.15 in
 Normal Peak Date - Apr 7
 Current % of Norm - 235%

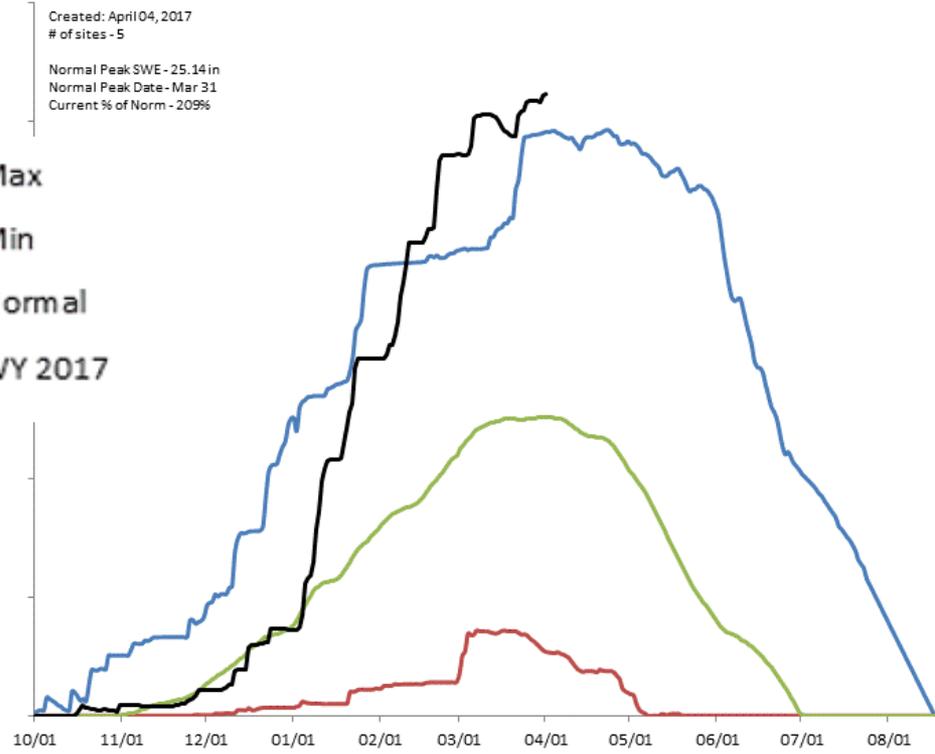
Index of Snow Water Equivalent



West Walker River above Coleville - SWE Index

Created: April 04, 2017
 # of sites - 5
 Normal Peak SWE - 25.14 in
 Normal Peak Date - Mar 31
 Current % of Norm - 209%

— Max
 — Min
 — Normal
 — WY 2017



East Walker

https://www.wcc.nrcs.usda.gov/ftpref/states/ut/nv/BI_charts/East%20Walker%20River%20above%20Bridgeport.gif

West Walker

https://www.wcc.nrcs.usda.gov/ftpref/states/ut/nv/BI_charts/West%20Walker%20River%20above%20Coleville.gif

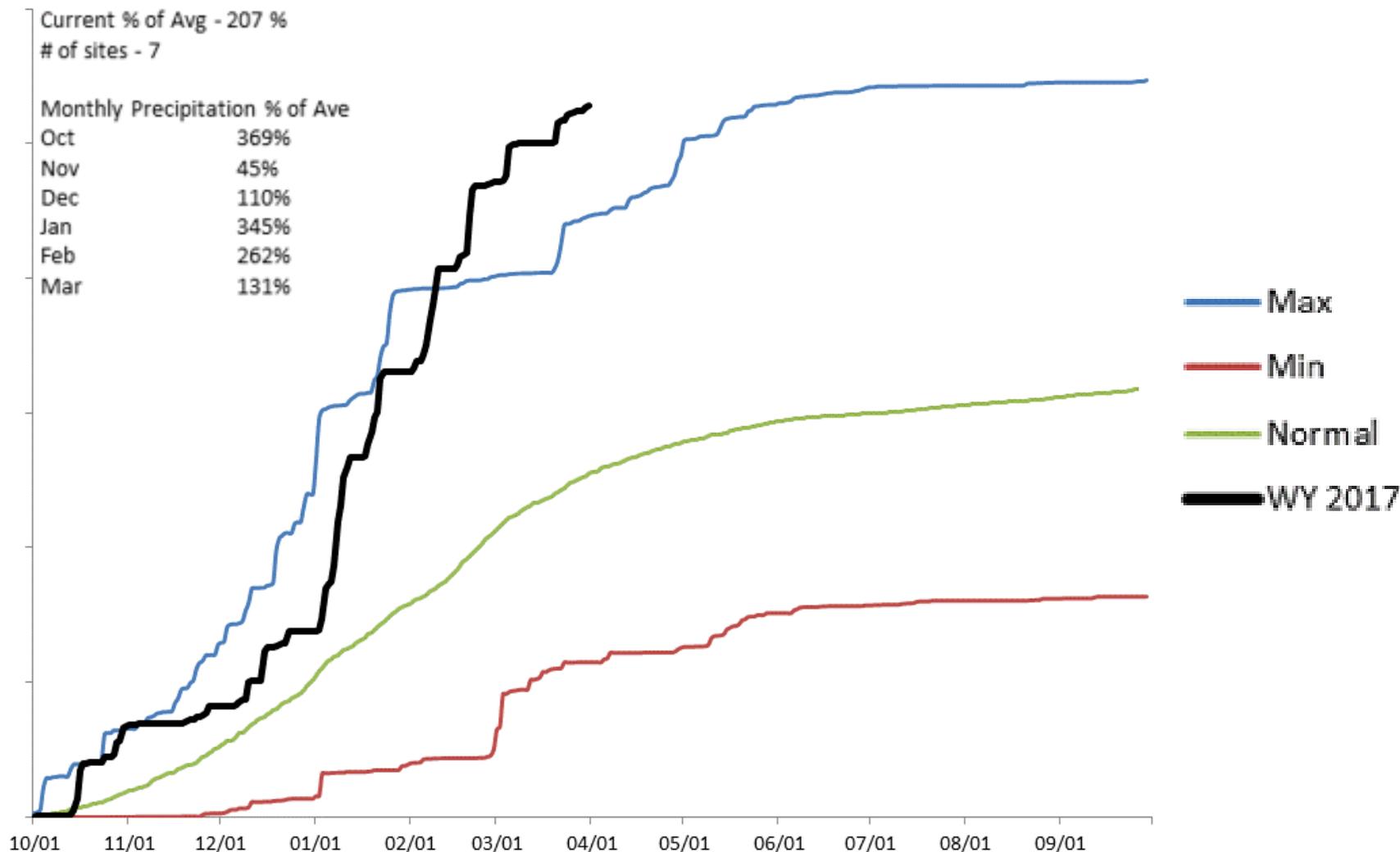
Walker River Basin Precipitation

Current % of Avg - 207 %
of sites - 7

Monthly Precipitation % of Ave

Oct	369%
Nov	45%
Dec	110%
Jan	345%
Feb	262%
Mar	131%

Basin Index



Mar 25-26 Helicopter Mission

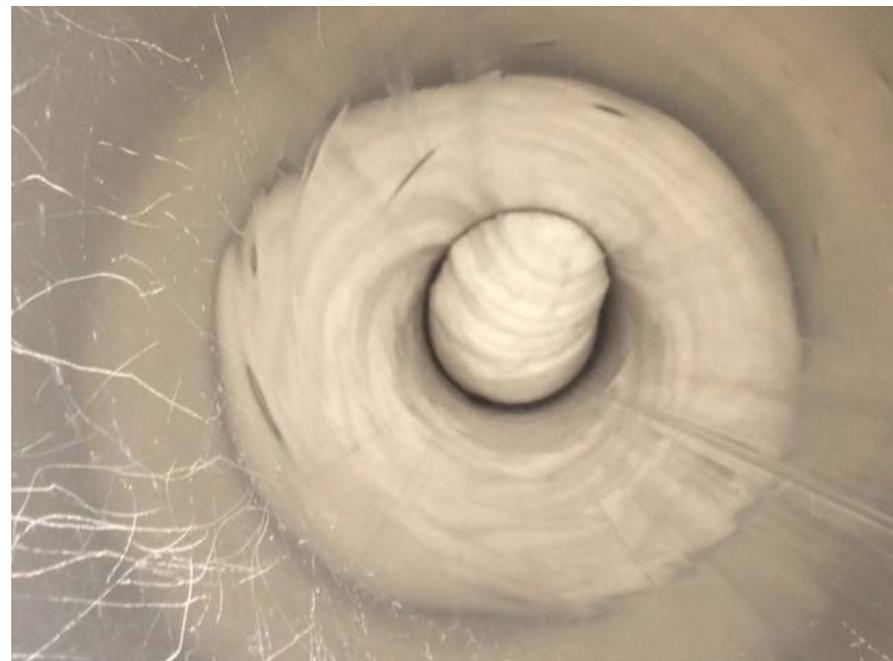
**Drain maxed out
precip gages at:**

Leavitt Meadow (67in)
Monitor Pass (37in)
Ebbetts Pass (87in)
Spratt Creek (57in)

Unplug snow plug in gage at:
Leavitt Lake (88in)

Measure snow courses at:
Sonora Pass
Willow Flat
Sawmill Ridge





3/27/2017
Leavitt Lake SNOTEL
Precipitation Gage Snow Plug

Mixing in plug caused a rise of
 ~50in in reading

Leavitt Lake SNOTEL - 28ft tall precipitation gage



Why is Leavitt Lake not reporting?

We found coaxial cable going to the antenna gnawed on by a critter. We taped it up, but Murphy's Law struck and the site shorted and went down.

Long-term Snow Course Data Summary

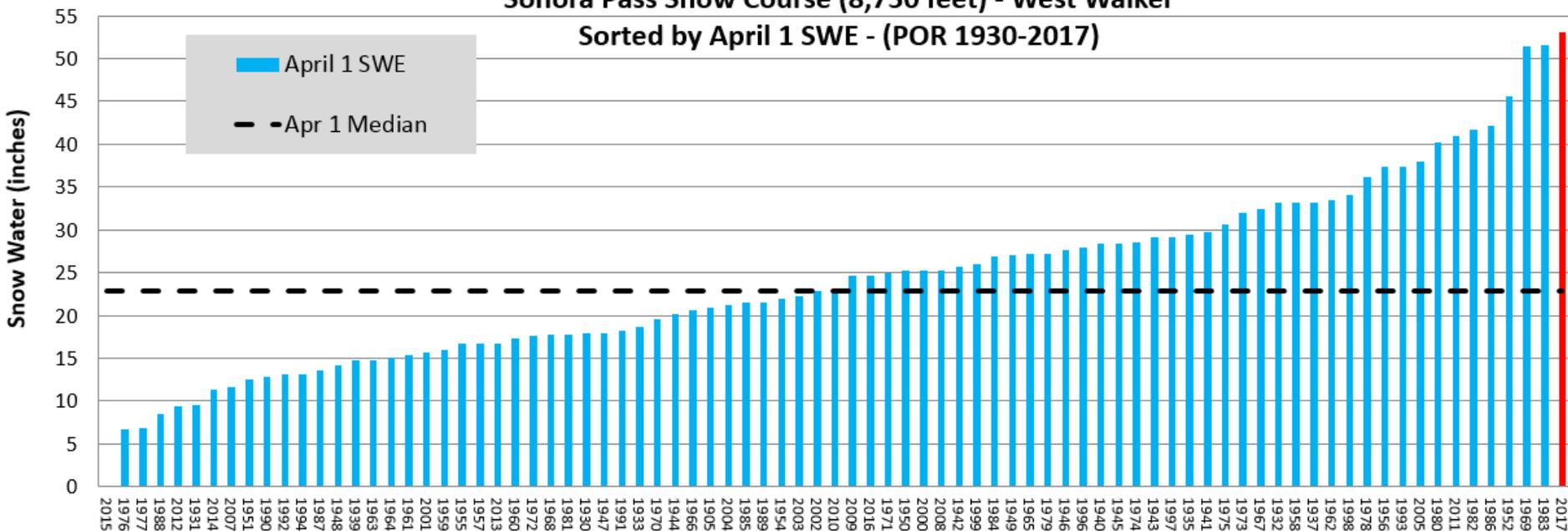
April 1, 2017

Snow Course	Basin	Elev (ft)	April 1, 2017			April 1 Rank	Years of April 1 Data	Years that were bigger
			Snow Depth (in)	Water Content (in)	% of Median			
Virginia Lakes Ridge	E. Walker	9,300	86	35	208%	3 rd Highest	49	1983 & 1969
Lobdell Lake SNOTEL*	W. Walker	9,249	78	37.8	245%	3 rd highest	54	1983 & 1969
Sawmill Flat	E. Walker	8,760	84	39.9	243%	New Record	41	-
Sonora Pass	W. Walker	8,750	129	50.0	231%	New Record	83	-
Willow Flat	W. Walker	8,230	47	21.1	220%	5 th highest	82	'69, '83, '52, '95

**Data prior to 1979 back-estimated by regression with original snow course*



Sonora Pass Snow Course (8,750 feet) - West Walker Sorted by April 1 SWE - (POR 1930-2017)

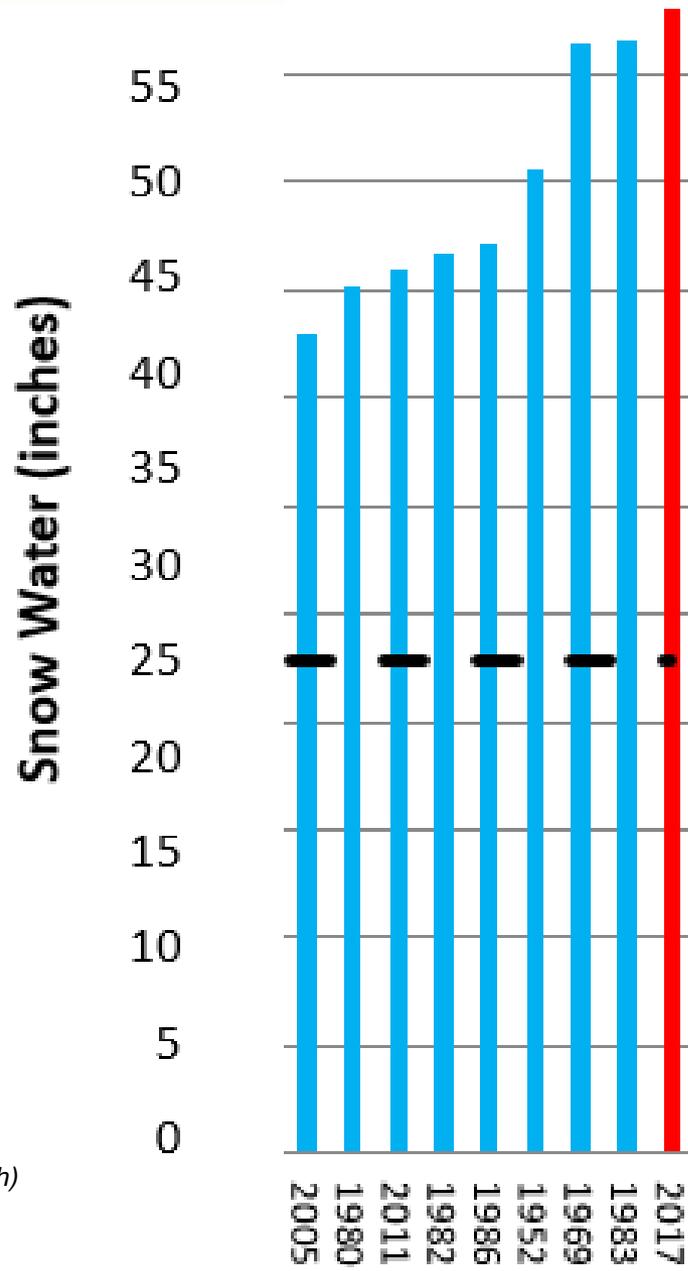


Missing Years: 1934, 1936, 1938, **1995**, 2006

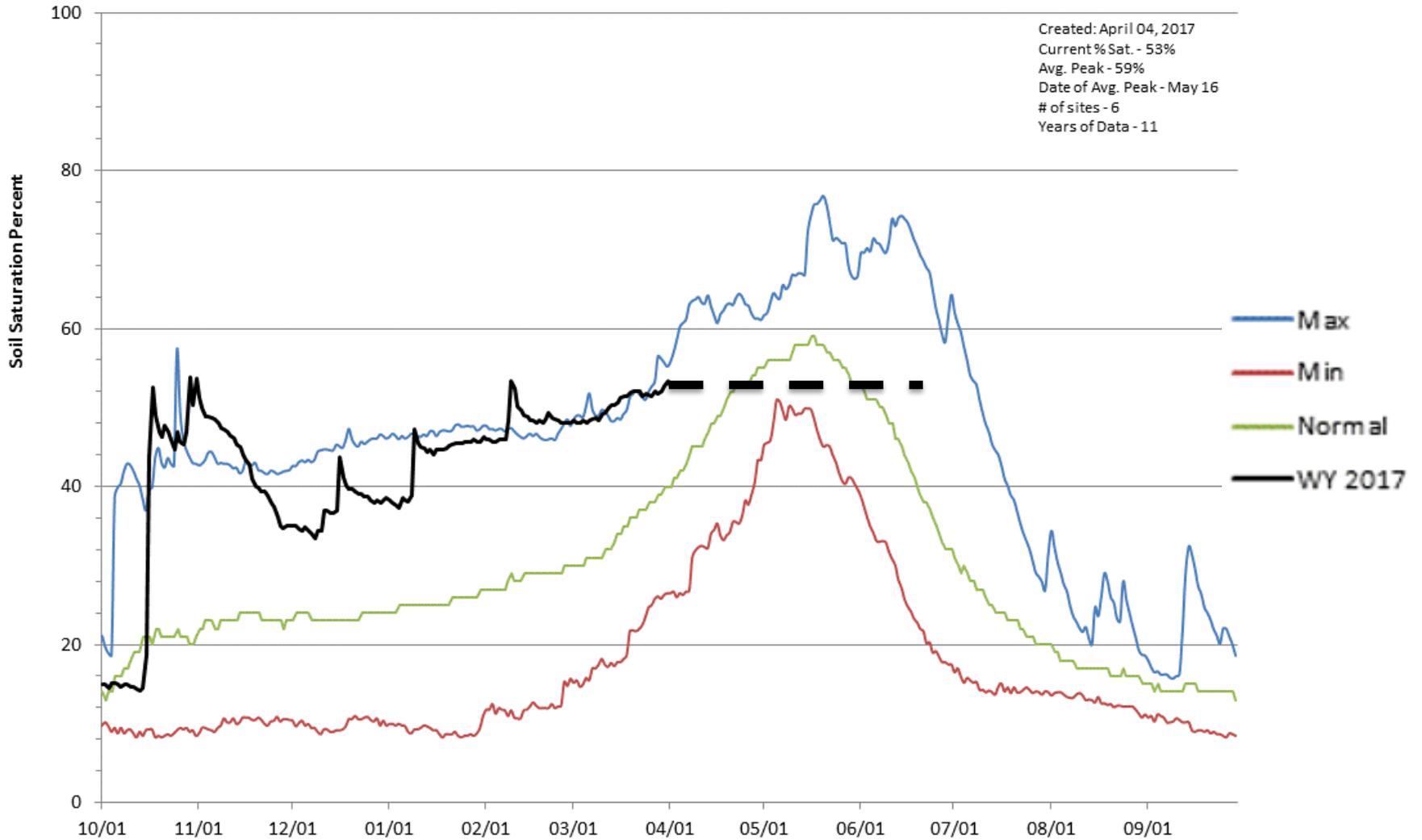
Sonora Pass Snow Course (8,750 feet) - West Walker Sorted by April 1 SWE - (POR 1930-2017)



John Kelly (El Aero helicopter pilot) and Bob Nault (NRCS Electronics Tech)
Combined snow survey experience +70 years

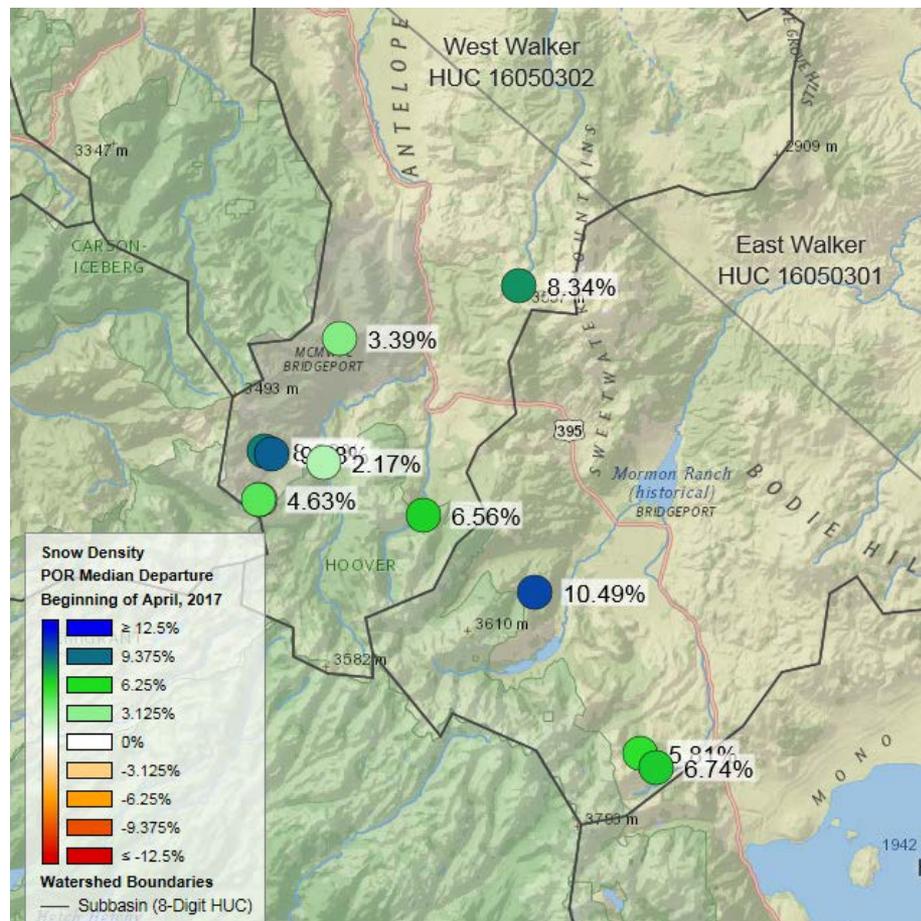
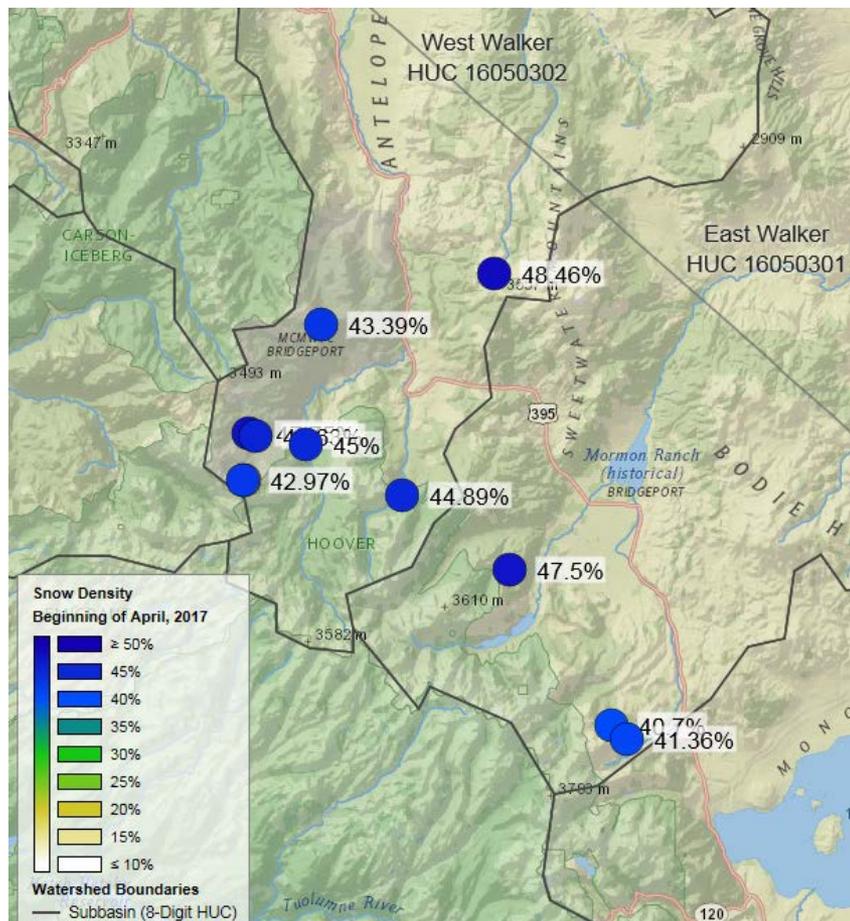


Walker River Basin - Soil Saturation



Snow Density

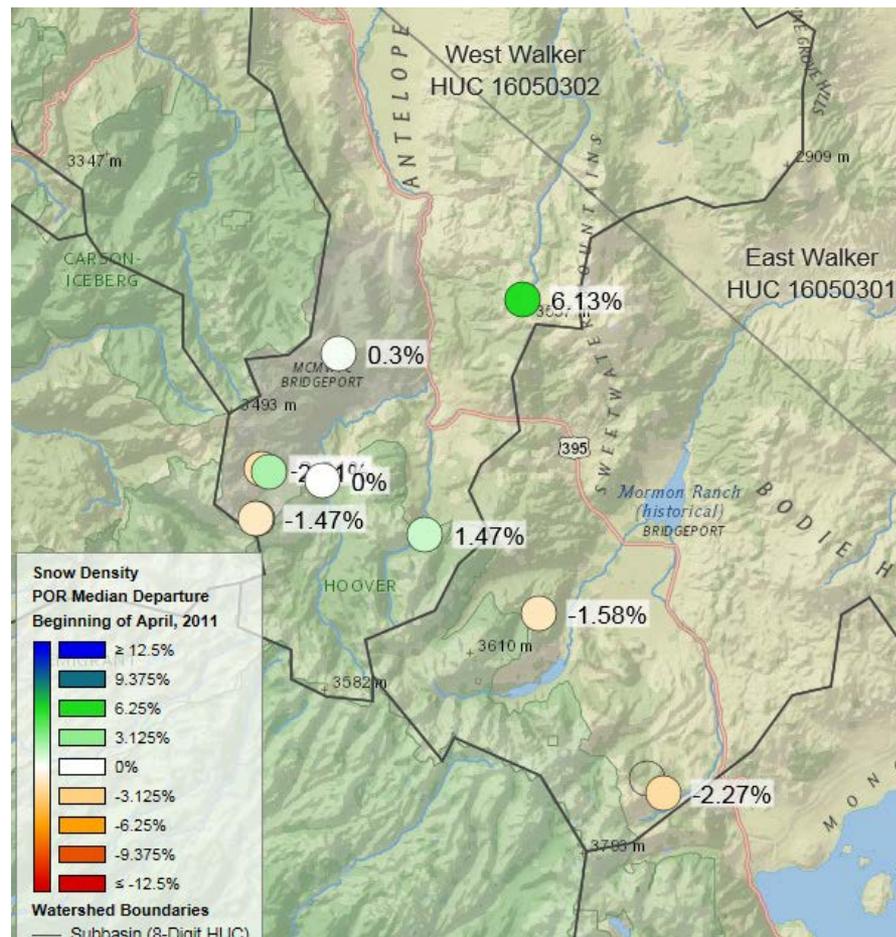
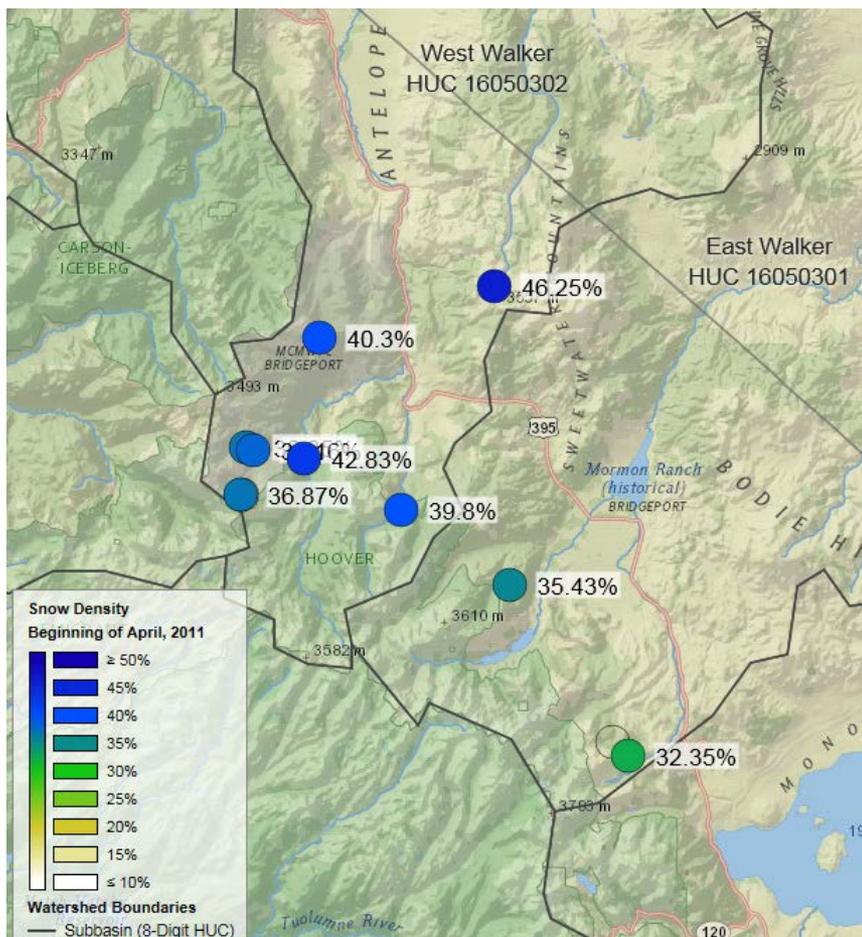
April 1, 2017



Densities are 5-10% higher than normal for April 1.
The snowpack is more ripe than normal.
Snowmelt will proceed sooner than normal.

Snow Density

April 1, 2011



April 1, 2017 NRCS Forecasts VS. 2011, 1983 & Record Volumes

Forecast Point	Forecast Period	April 1, 2017 Forecast Exceedances - KAF					2011 KAF	1983 KAF	Record	Record Year
		<---drier future-----wetter future--->								
		90%	70%	50%	30%	10%				
E Walker R nr Bridgeport	Apr-Aug	126	148	164	180	202	133	219	223	1969
W Walker R nr Coleville	Apr-Jul	289	314	330	346	371	280	292	372	1907

>2011

>1983

**New
Record**

Jolyne Lea, NRCS Forecast Hydrologist comments on East Walker...
 “The East Walker was low in comparison to other forecasts. Taking out the fall precipitation and fall streamflow adjusted the forecast up to the current level (164kaf), and is more in line with historic flows, but it is not as high as the West Walker which is a near record high forecast. The East Walker forecast is close to what was observed in 1995.”



You are Here: [Home](#) / [Snow Survey](#)



Snow Survey

- ☐ Snow Survey Products
- ☐ Water Supply Products

Subscribe
to the monthly snow and water outlook report

Join our email list

Snow Survey

Nevada NRCS 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.

USDA United States Department of Agriculture
Natural Resources Conservation Service
Nevada Water Supply Outlook Report
April 1, 2017

Same State, Same Winter

SNOWPACK AND STREAM FLOW FORECASTS FOR THE WESTERN UNITED STATES IN 2017. THE NRC'S 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:

[April 1, 2017 Water Supply Outlook Report - NEW](#)

[Snowpack Graphs - 2017 vs Big Years - updated 4/4](#)

[NWS Spring Flood Briefing - Recording](#) - 3/23

[Interactive Map 3.0 \(beta\)](#) options include delta function, snow density, water year peak, streamflow forecasts, basin reporting.

[News Release: Hole-in-Mtn SNOTEL - updated 3/1](#)

Today's Snow & Precipitation Update Reports

- > [Snow and Precipitation - Percent of Normal](#)
- > [Precipitation - Month to Date | % of Monthly Ave](#)
- > [Snowpack - Percent of Normal Peak](#)
- > [Maps: Snow | Water Year Prec | Monthly Prec](#)

Boom or Bust

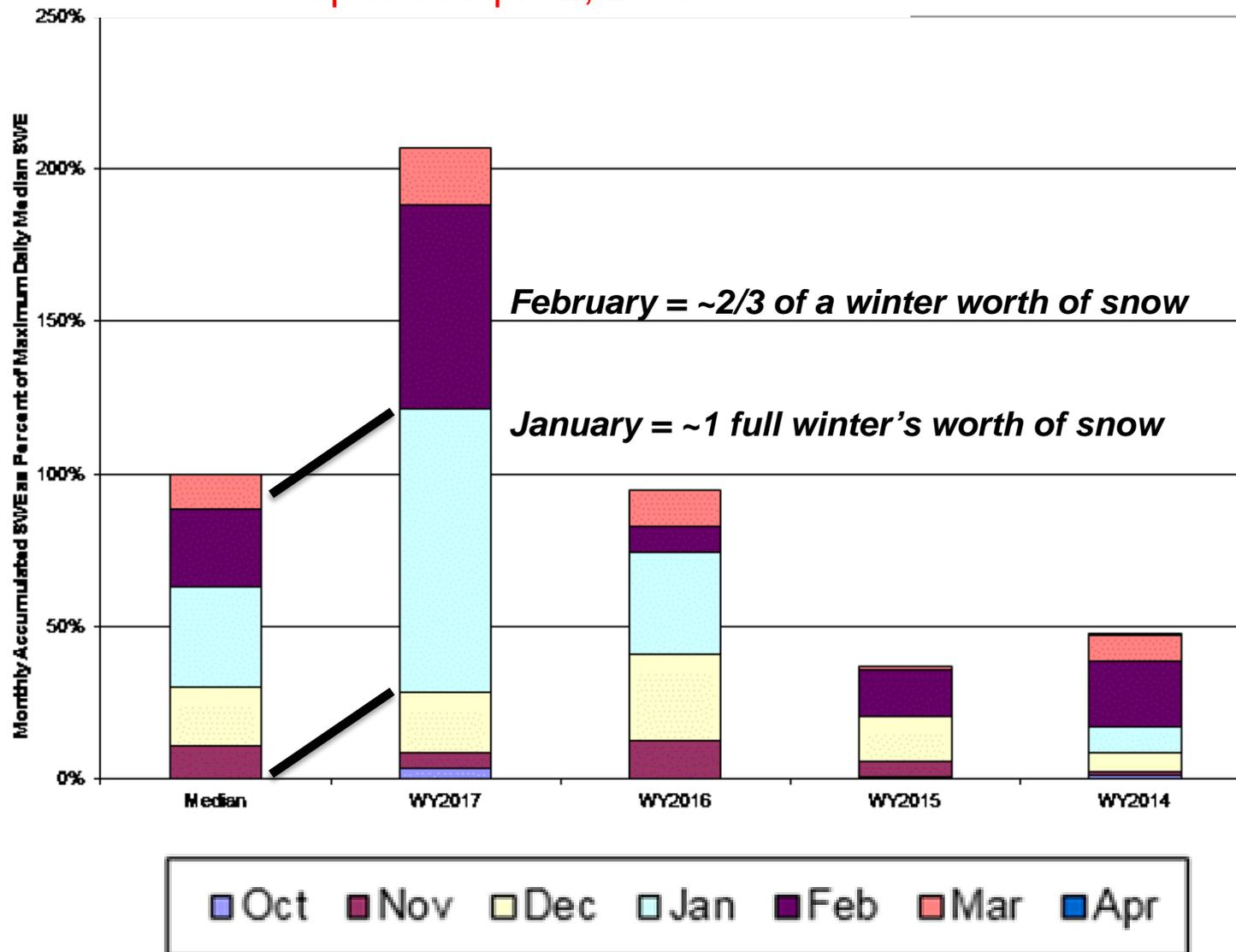


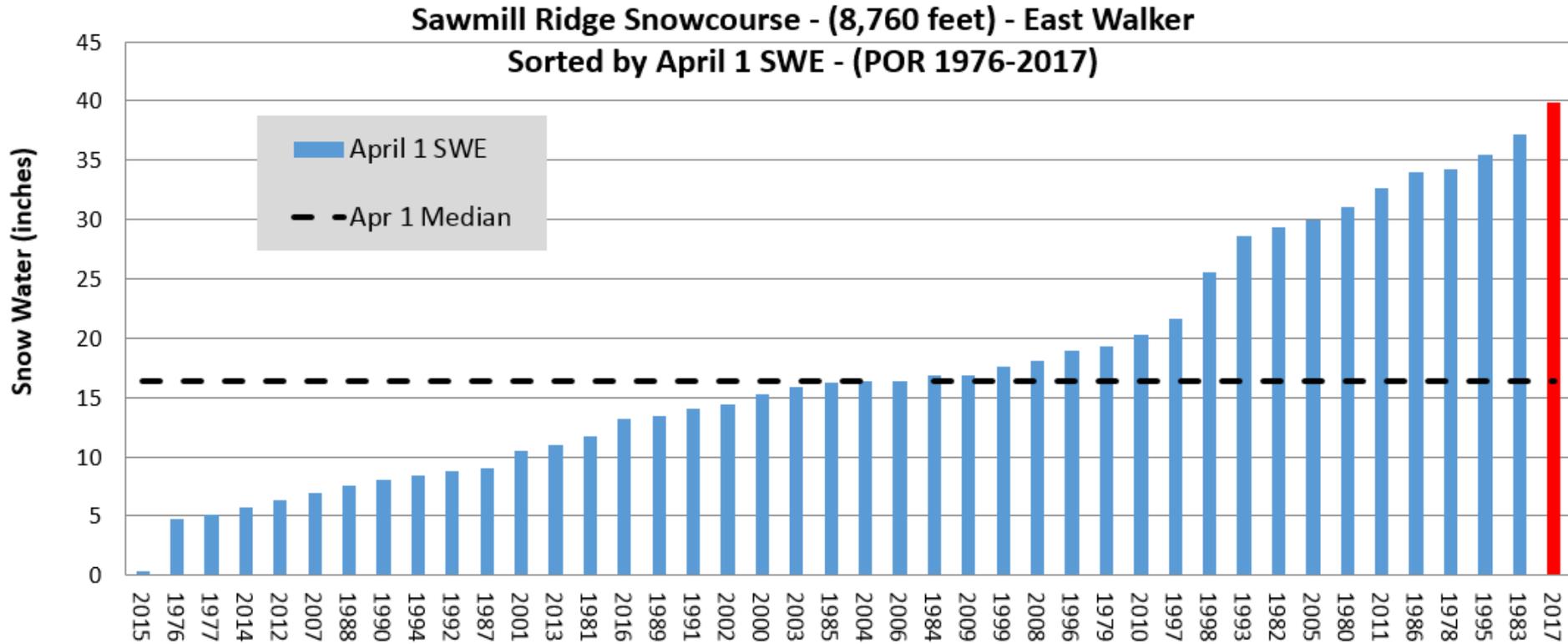
**Bonus slides
not
presented at the meeting**



Walker River Monthly Snowpack Summary

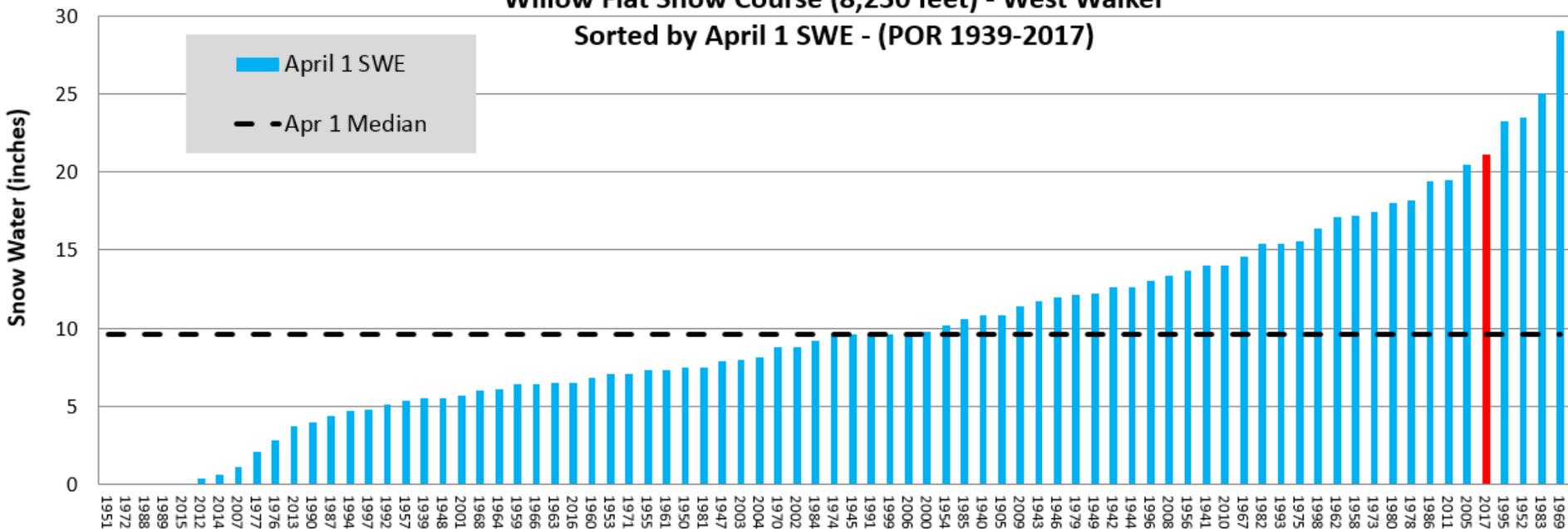
Updated April 2, 2017





1969 pre-dates Sawmill Ridge

Willow Flat Snow Course (8,230 feet) - West Walker
Sorted by April 1 SWE - (POR 1939-2017)

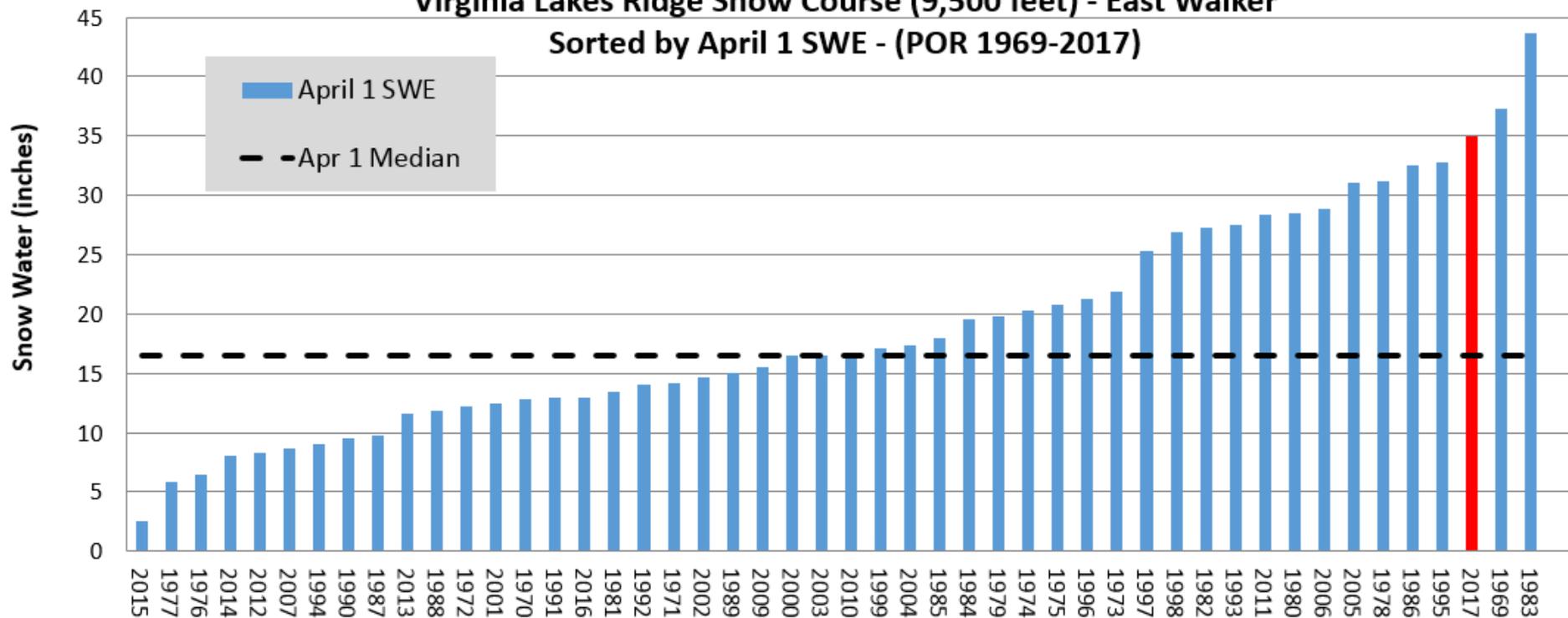


5th highest since 1939

Year	SWE
1969	29.0
1983	25.0
1952	23.5
1995	23.2
2017	21.1

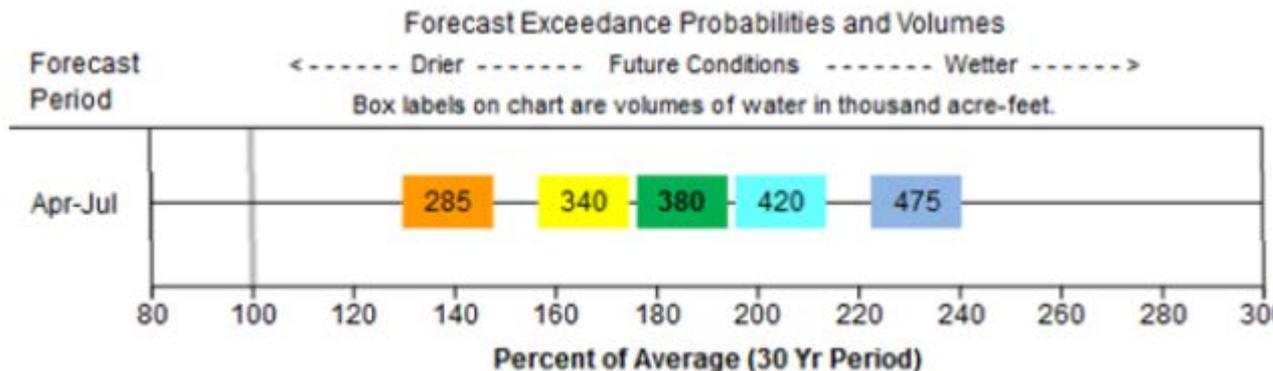


Virginia Lakes Ridge Snow Course (9,500 feet) - East Walker Sorted by April 1 SWE - (POR 1969-2017)

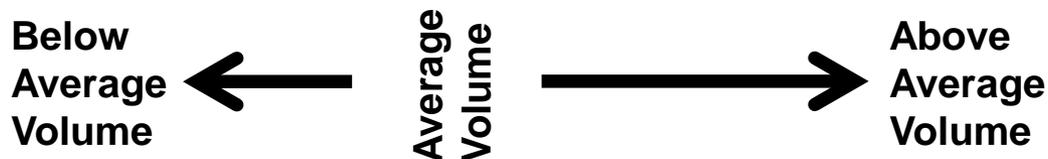


	Year	SWE
	1983	43.7
3rd highest since 1969	1969	37.3
	2017	35.0

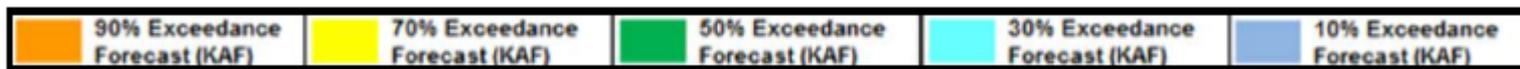
New Forecast Graphic



Numbers inside boxes are KAF for 5 exceedances

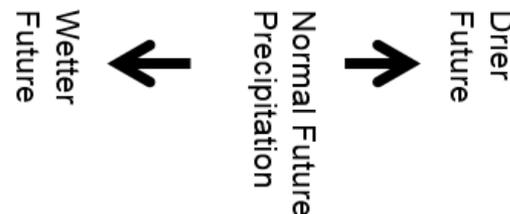
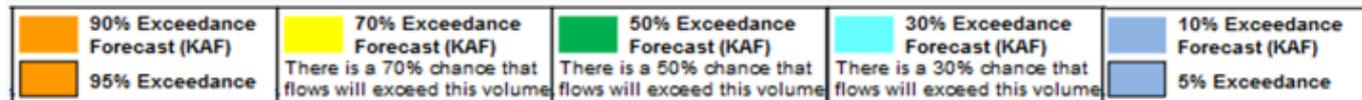
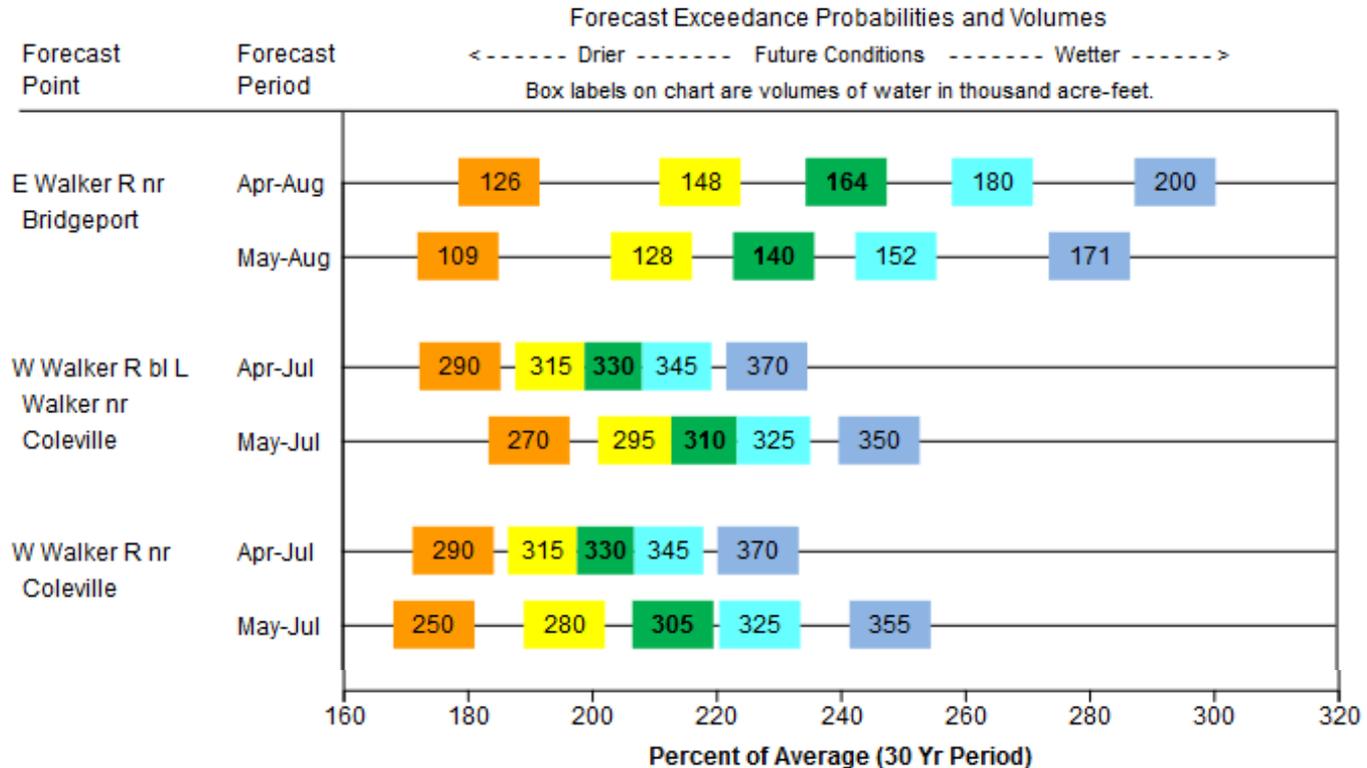


Each colored box represents different exceedance forecasts



← ----- Drier ----- Future Conditions ----- Wetter ----- →

Walker River Basin Water Supply Forecasts April 1, 2017



Forecast Point	Forecast Period	April 1, 2017 Forecast Exceedances - KAF					2011 KAF	1983 KAF	Record	Record Year
		<---drier future-----wetter future--->								
		90%	70%	50%	30%	10%				
Truckee R at Farad (Adj)	Apr-Jul	580	596	610	627	696	568	674	674	1983
EF Carson R nr Gardnerville	Apr-Jul	362	390	410	430	459	336	443	467	1890
WF Carson R at Woodfords	Apr-Jul	119	129	136	143	153	89	130	153	1907
Carson R nr Carson City	Apr-Jul	431	494	540	589	666	399	528	528	1983
Carson R nr Fort Churchill	Apr-Jul	450	490	530	550	590	390	513	513	1983
E Walker R nr Bridgeport	Apr-Aug	126	148	164	180	202	133	219	223	1969
W Walker R nr Coleville	Apr-Jul	289	314	330	346	371	280	292	372	1907

