



United States Department of Agriculture

2017 Snowpack Status and Streamflow Outlook Humboldt Basin

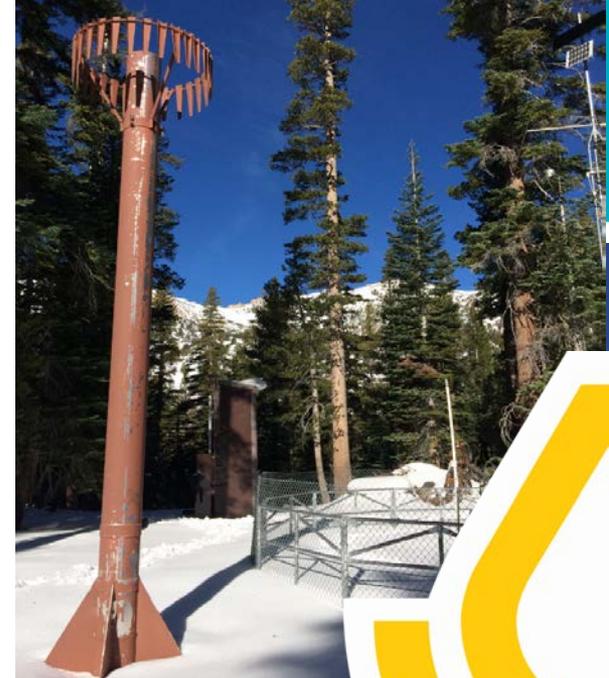
February 17, 2017
Humboldt River Basin Water Authority Meeting



Humboldt River near Winnemucca
Feb 18, 2016

Jeff Anderson
Nevada NRCSSnow Survey

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



Natural
Resources
Conservation
Service

www.nv.nrcs.usda.gov/snow



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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.

Nevada Water Supply Outlook Report
February 1, 2017



Historic Snow!

It's been a record-breaking winter for the western United States. The snow season 2016-2017 has been one of the best in decades. Snowpack is high across the West, and the snowmelt season is well underway. The snowmelt season is a key time for water supply management. The snowmelt season is a key time for water supply management. The snowmelt season is a key time for water supply management.

Latest Snow & Water Supply Information:

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

[Interactive Map 3.0 \(beta\) - NEW](#)

> [New options include: delta function, snow density, water year peak, streamflow forecasts, basin reporting](#)

[News Release: Hole-in-Mtn SNOTEL Rebuilt - NEW](#)

Today's Snow & Precipitation Update Reports

- > [Why are there missing precip data in 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](#)

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

Water Supply Information

- > **Outlook Reports:**
- > **Streamflow Forecasts:**
- > **Streamflow Forecast Maps:** [NV](#) | [West US](#)
- > **Daily Streamflow Forecasts**
- > **Monthly Reservoir Report** (select reservoir)
- > **USGS Conditions:** [Stream](#) | [Reservoir](#)
- > **Historic Monthly Streamflow Data**
- > **Past Water Supply Presentations**



Dam failure caused flash flooding in east central Elko County, Nevada. (KSL TV)

2/8/2017

MONTELLO, Nevada — A broken dam in Elko County, Nevada, flooded farmland and homes in the community of Montello, stopped Union Pacific trains nearby and prompted a warning to people in extreme northwest Utah to avoid the rural highway into the Silver State.

#Flooduary



 **USGS Nevada** @USGS_Nevada · Feb 14
No evidence of flow at 10326825 MILL CK NR BATTLE MOUNTAIN
waterdata.usgs.gov/nv/nwis/invent...



 **USGS Nevada** @USGS_Nevada · 11h
#HumboldtRiver Battle Mountain sustained flood damage today. Will repair tomorrow morning.
waterdata.usgs.gov/nv/nwis/uv/?si...



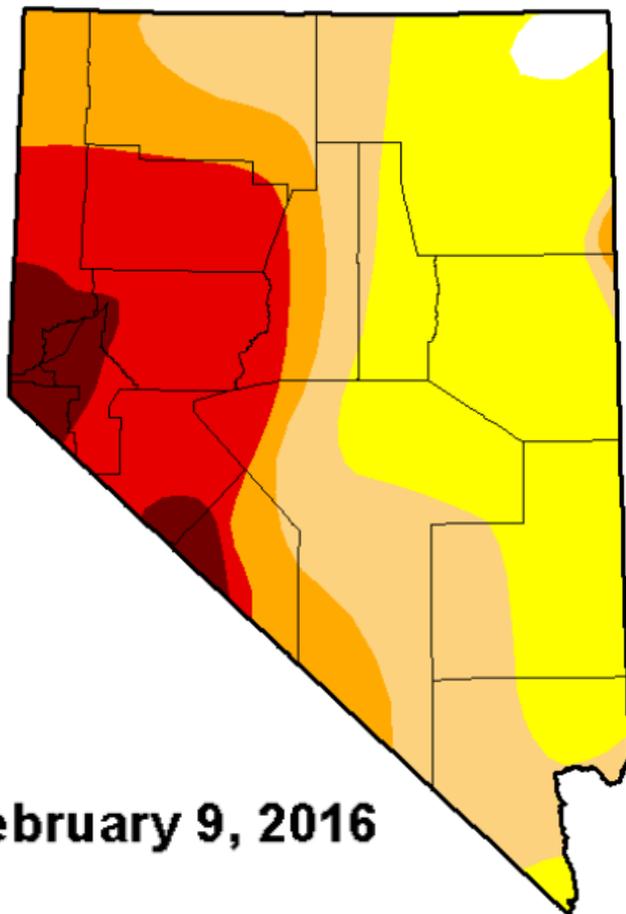
 **USGS Nevada** @USGS_Nevada · Feb 15
Very high wading measurement yesterday at 10321950 MAGGIE CK AT MAGGIE CR CYN NR CARLIN
waterdata.usgs.gov/nv/nwis/uv/?si...



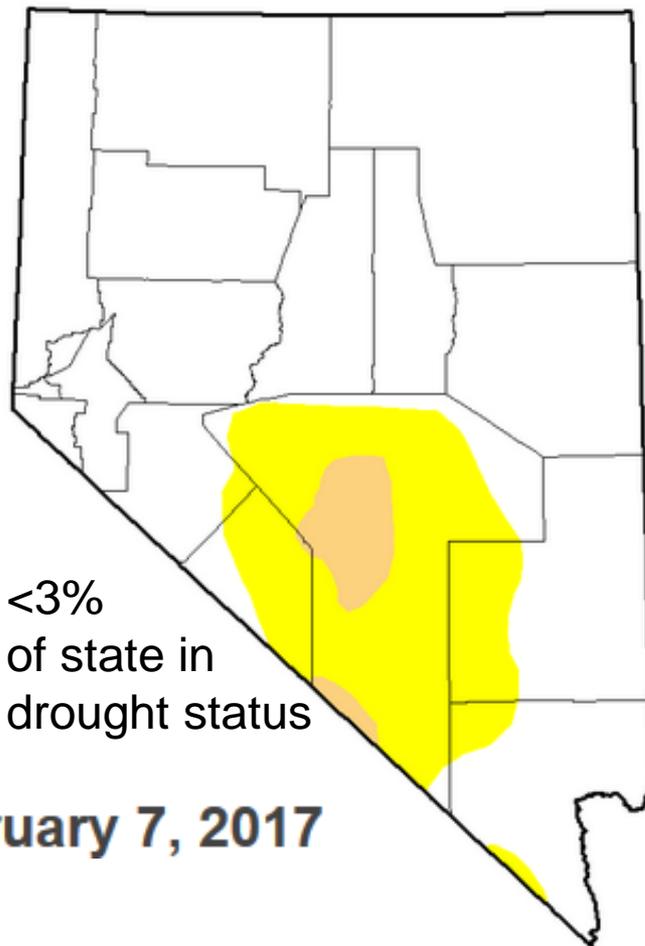
 **USGS Nevada** @USGS_Nevada · Feb 15
View from a hydrographer's perspective at 10326825 MILL CK NR BATTLE MOUNTAIN
waterdata.usgs.gov/nv/nwis/inven



U.S. Drought Monitor



February 9, 2016



<3%
of state in
drought status

February 7, 2017

Intensity:

 D0 (Abnormally Dry)

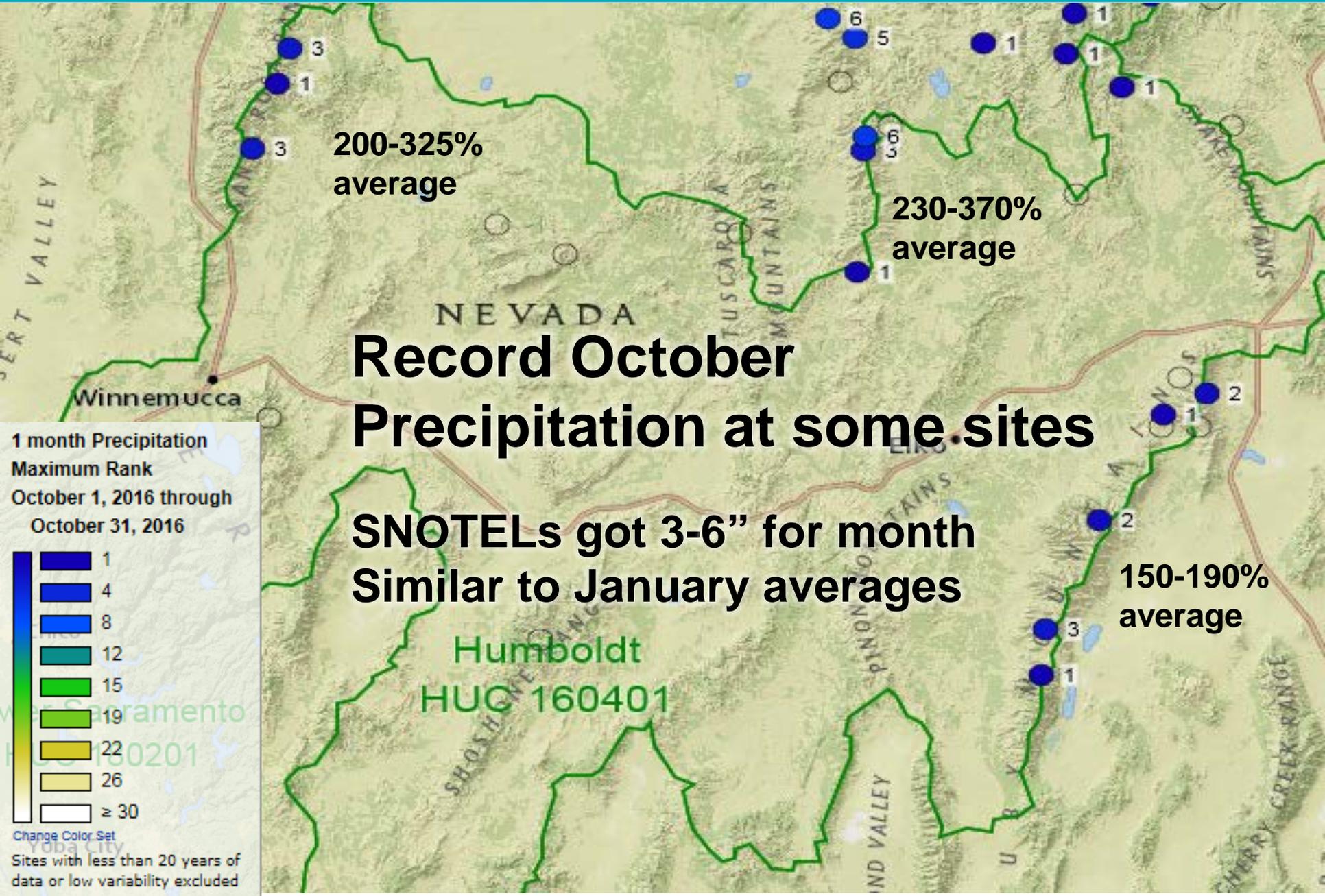
 D2 (Severe Drought)

 D4 (Exceptional Drought)

 D1 (Moderate Drought)

 D3 (Extreme Drought)





200-325%
average

230-370%
average

Record October Precipitation at some sites

SNOTELs got 3-6" for month
Similar to January averages

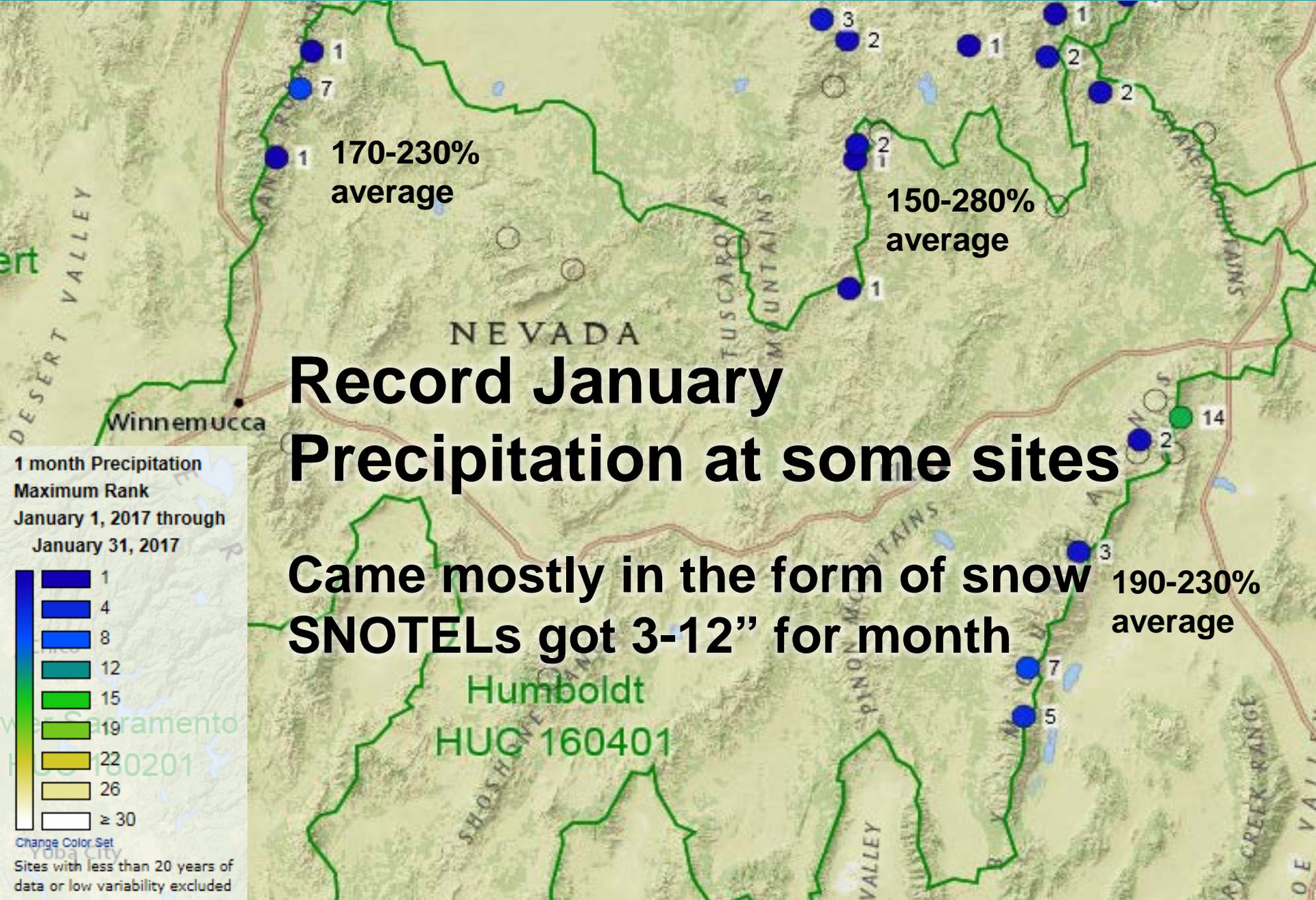
150-190%
average

Humboldt
HUG 160401

**1 month Precipitation
Maximum Rank**
October 1, 2016 through
October 31, 2016

Dark Blue	1
Blue	4
Light Blue	8
Teal	12
Green	15
Light Green	19
Yellow-Green	22
Yellow	26
White	≥ 30

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



170-230%
average

150-280%
average

Record January Precipitation at some sites

Came mostly in the form of snow
SNOTELs got 3-12" for month

190-230%
average

**1 month Precipitation
Maximum Rank**
January 1, 2017 through
January 31, 2017

1
4
8
12
15
19
22
26
≥ 30

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

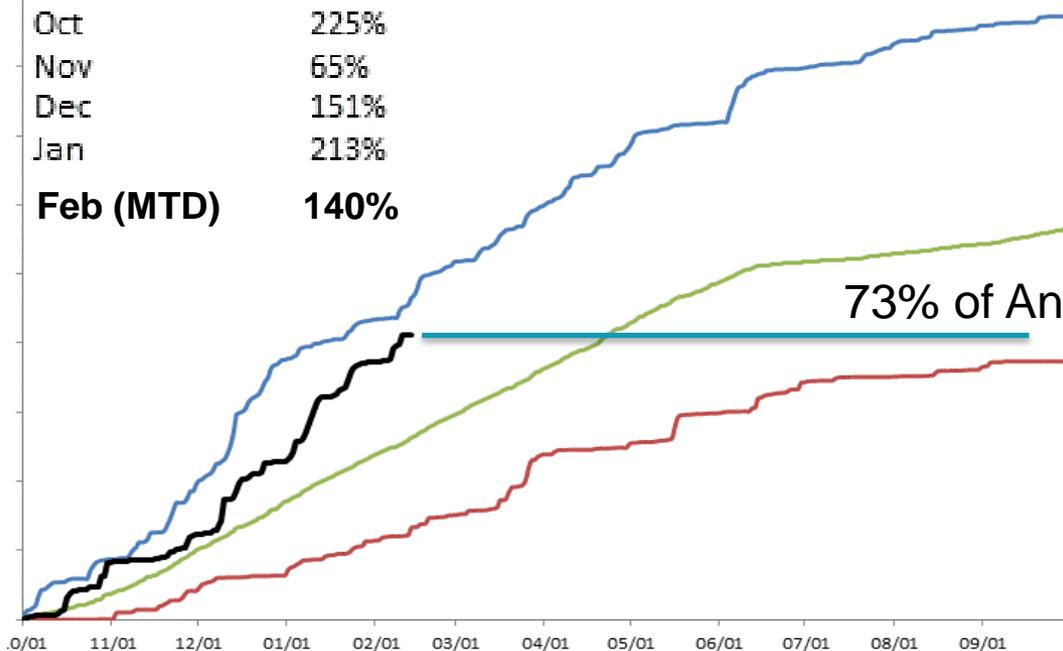
Upper Humboldt River Basin Precipitation

As of: February 14, 2017

Monthly Precipitation % of Average

Oct	225%
Nov	65%
Dec	151%
Jan	213%
Feb (MTD)	140%

Basin Index



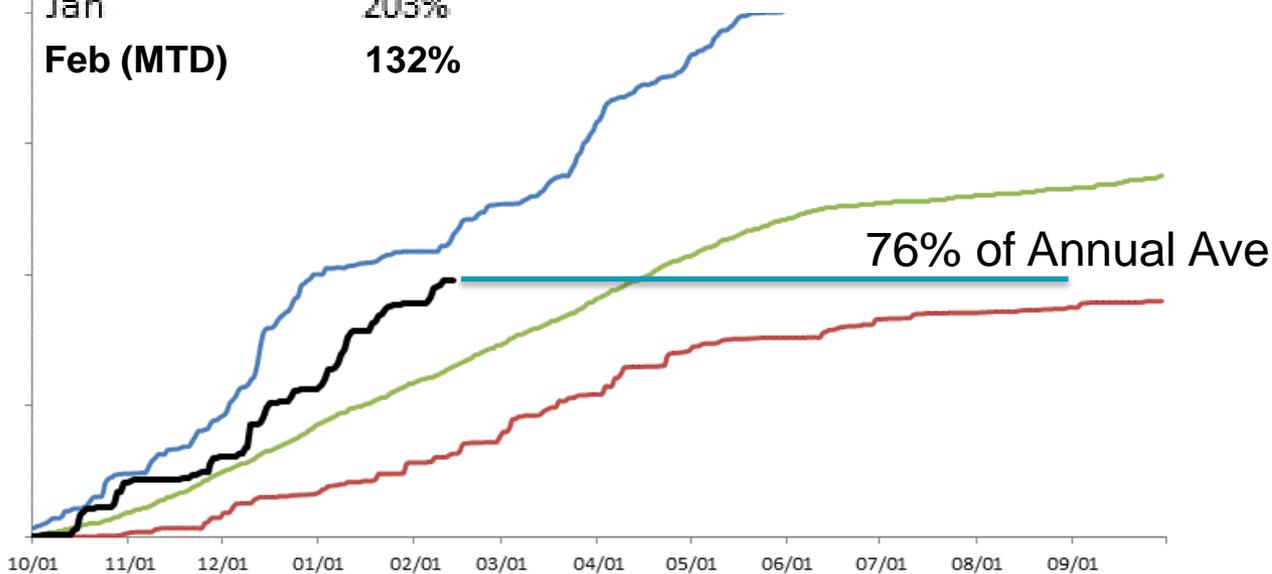
- Max
- Min
- Normal
- WY 2017

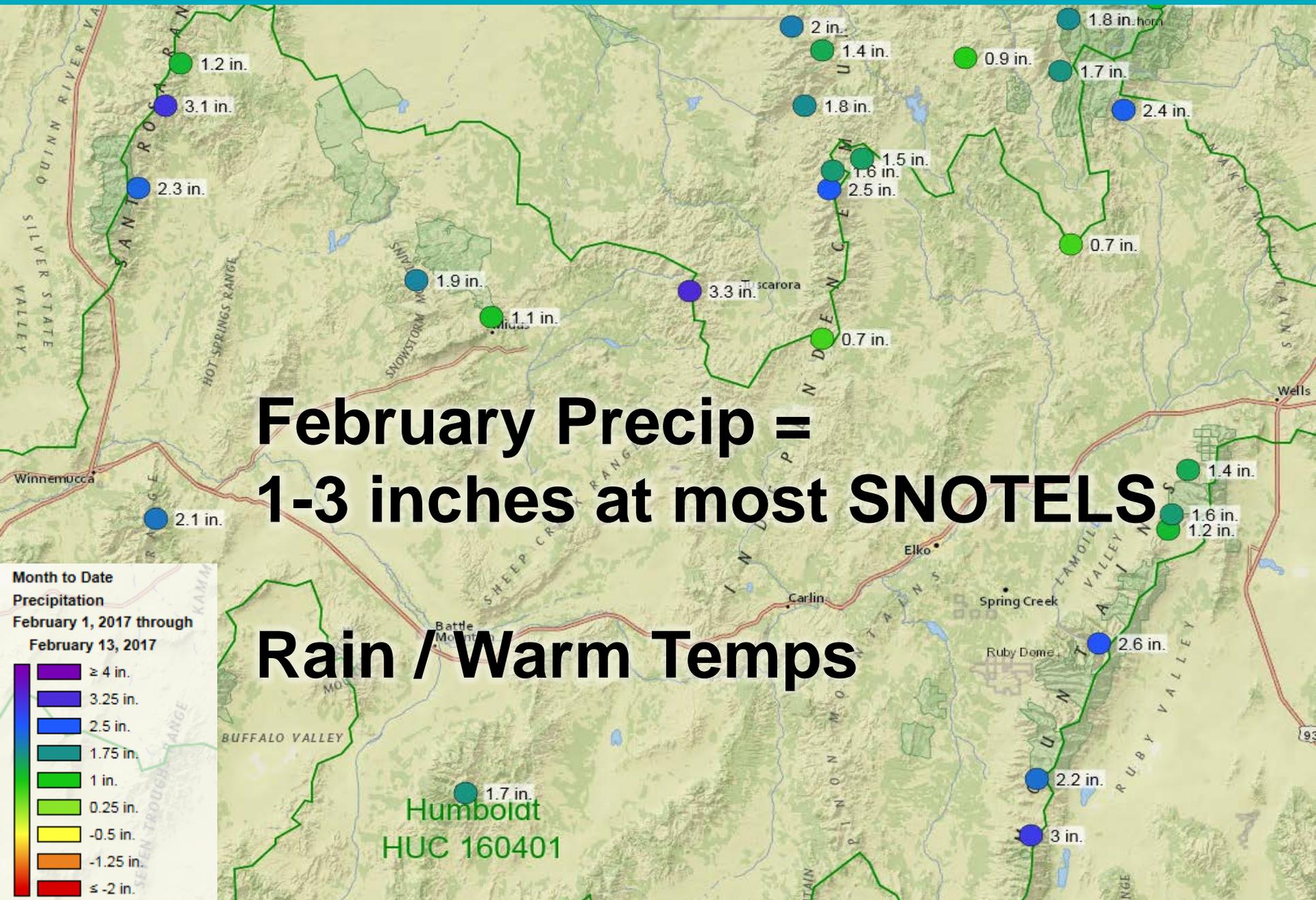
Lower Humboldt River Basin Precipitation

As of: February 14, 2017

Monthly Precipitation % of Average

Oct	230%
Nov	63%
Dec	142%
Jan	203%
Feb (MTD)	132%





**February Precip =
1-3 inches at most SNOTELS**

Rain / Warm Temps

Humboldt
HUC 160401

Lower Humboldt River Basin - SWE Index



Upper Humboldt River Basin - SWE Index



Created: February 14, 2017
of sites - 5

Normal Peak SWE - 13.42 in
Normal Peak Date - Mar 17
Current % of Norm - 130%

100% of Median Peak

Created: February 14, 2017
of sites - 9

Normal Peak SWE - 12.889 in
Normal Peak Date - Mar 16
Current % of Norm - 148%

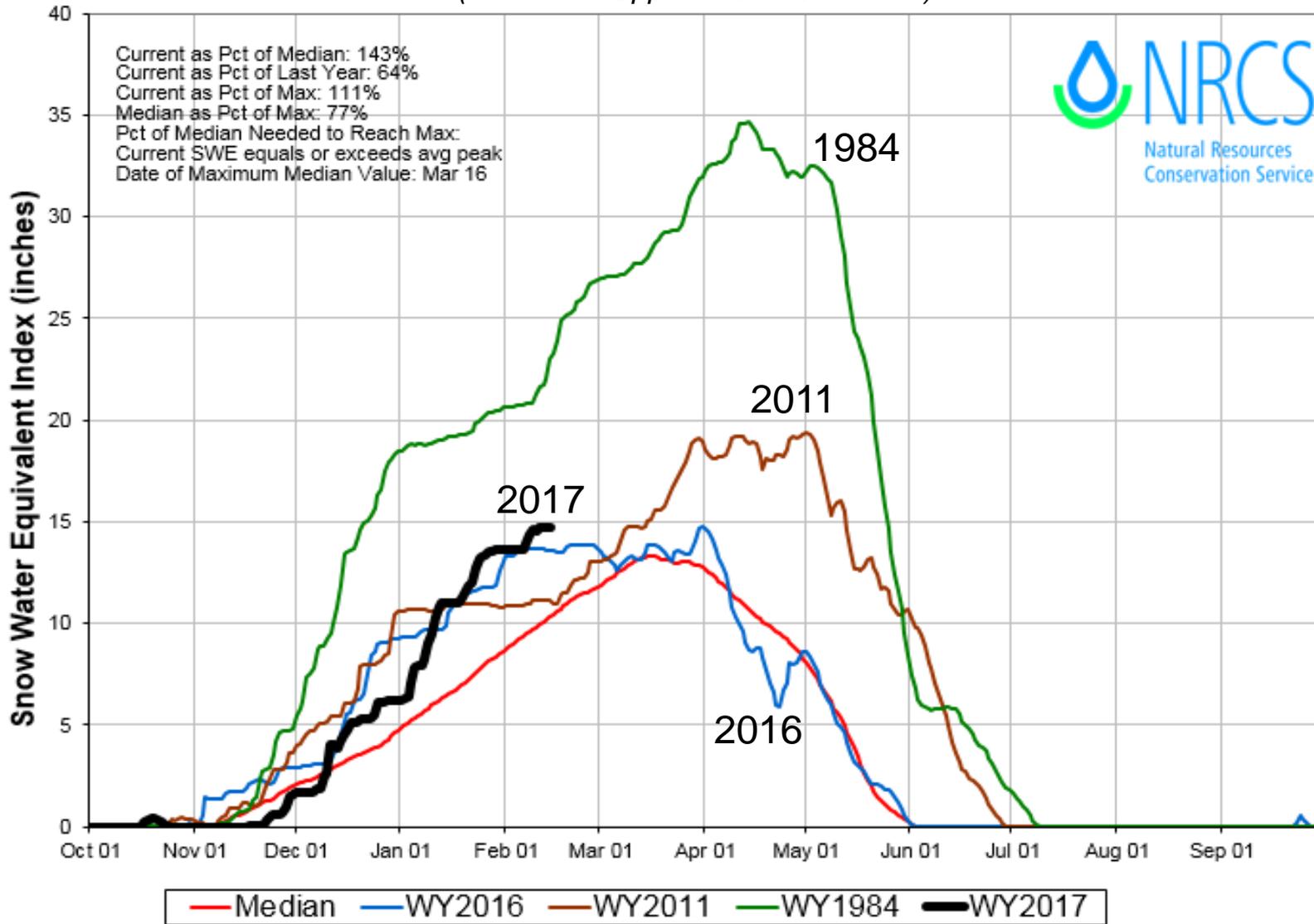
116% of Median Peak

Current snowpack already at or above normal (median) peak amounts



HUMBOLDT RIVER BASIN Time Series Snowpack Summary Based on Provisional SNOTEL data as of Feb 14, 2017

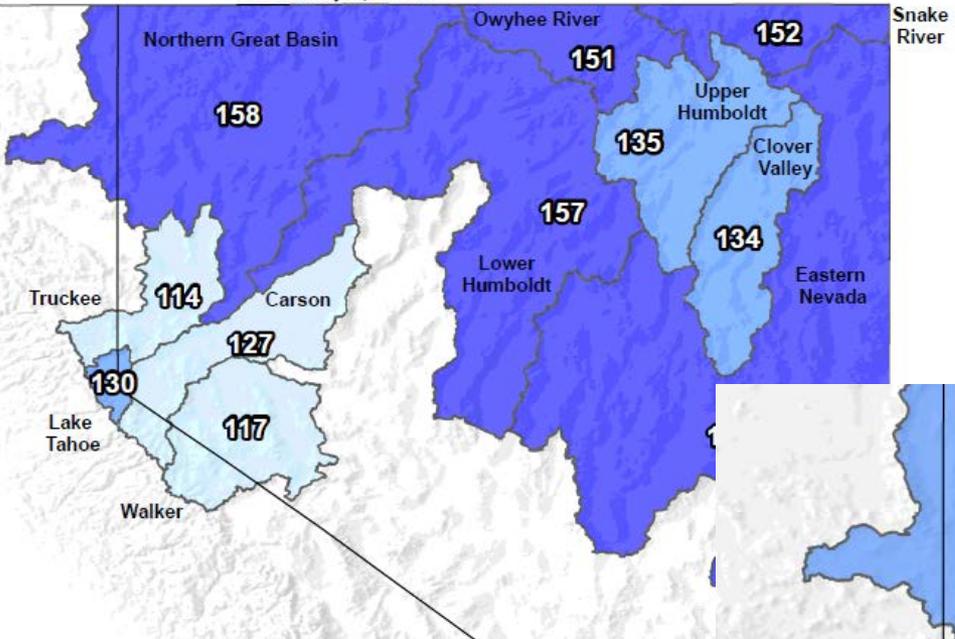
(Lower and Upper Basins Combined)



Nevada & Eastern Sierra

Percent of Median Snowpack

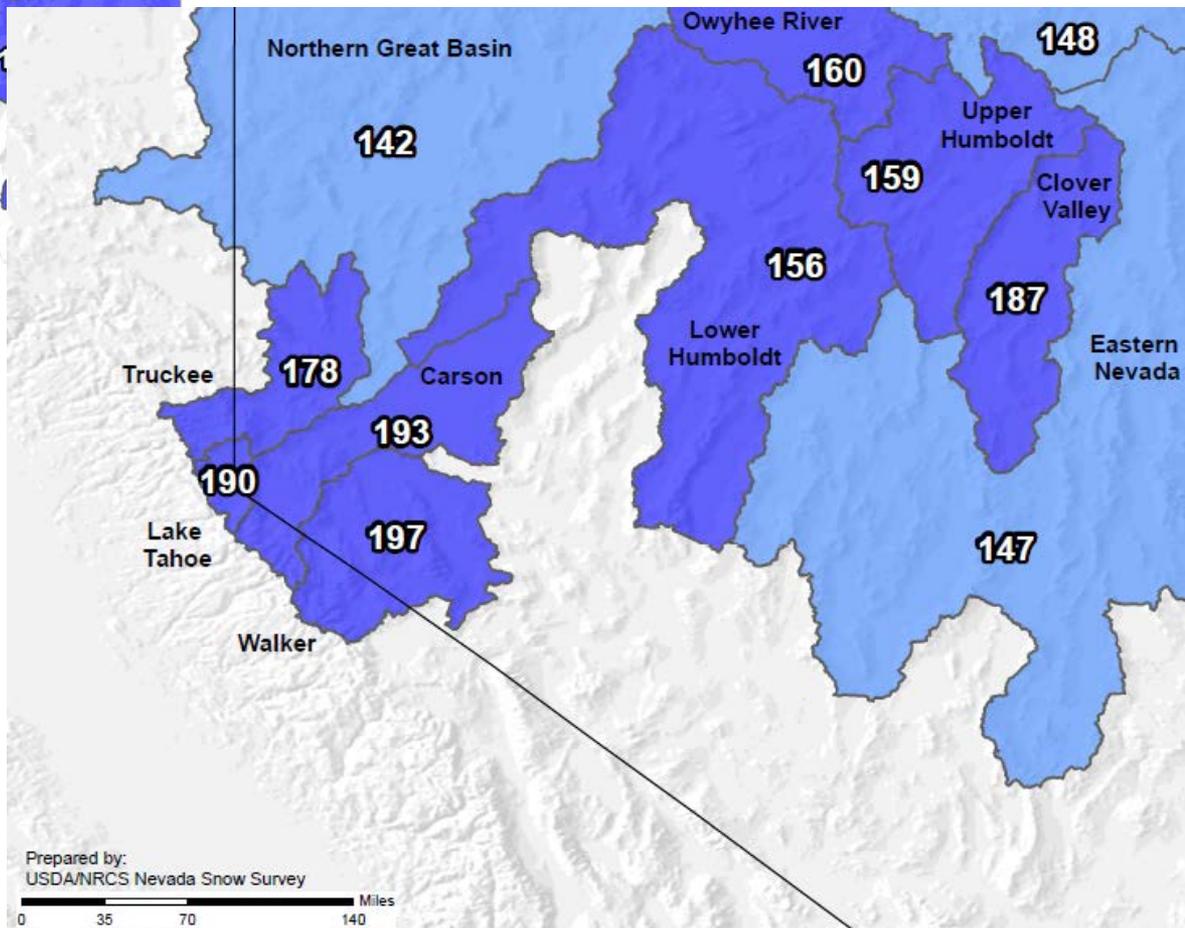
February 1, 2016



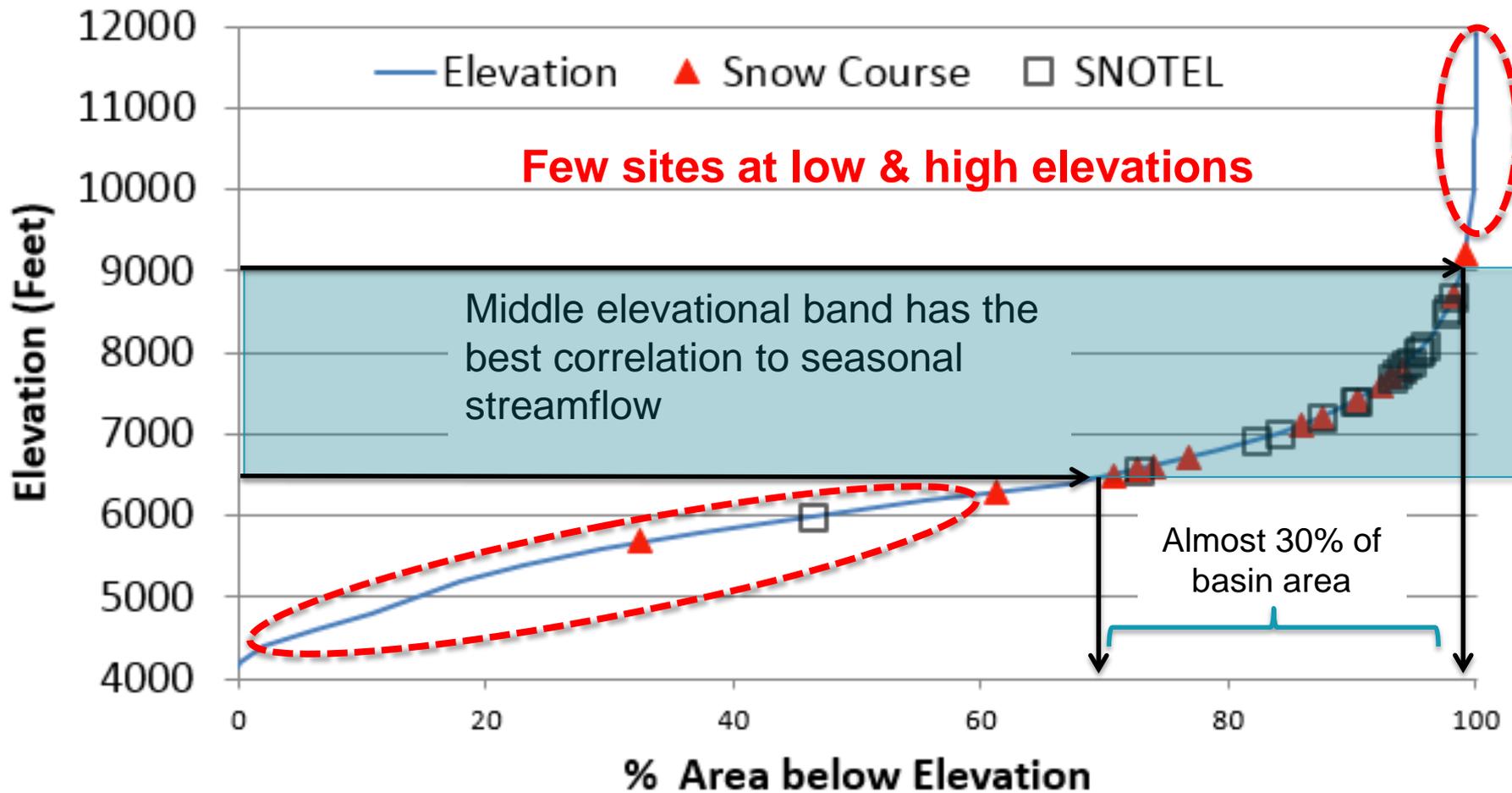
Nevada & Eastern Sierra

Percent of Median Snowpack

February 1, 2017



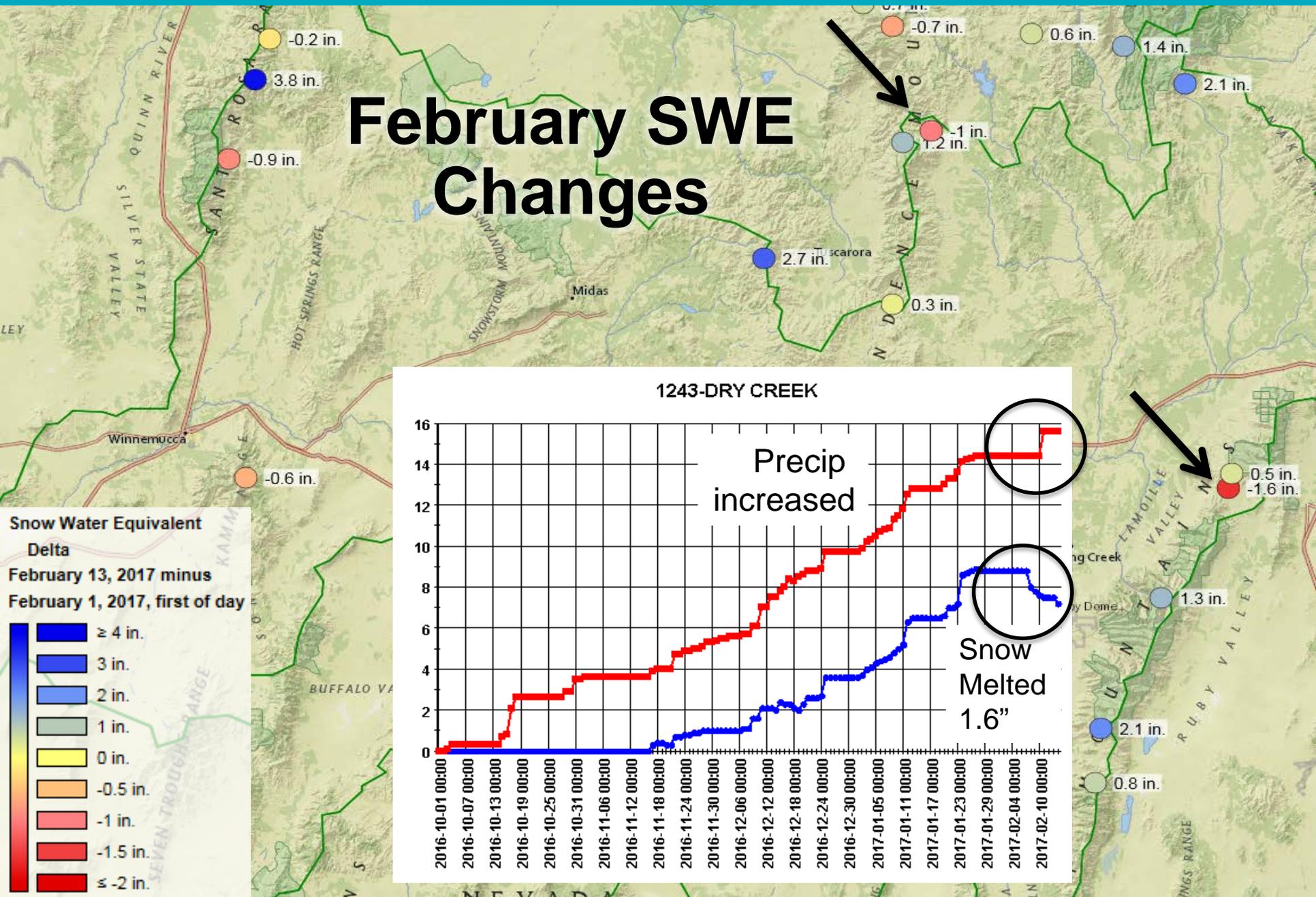
Humboldt R above Imlay Area-Elevation & Site Distribution



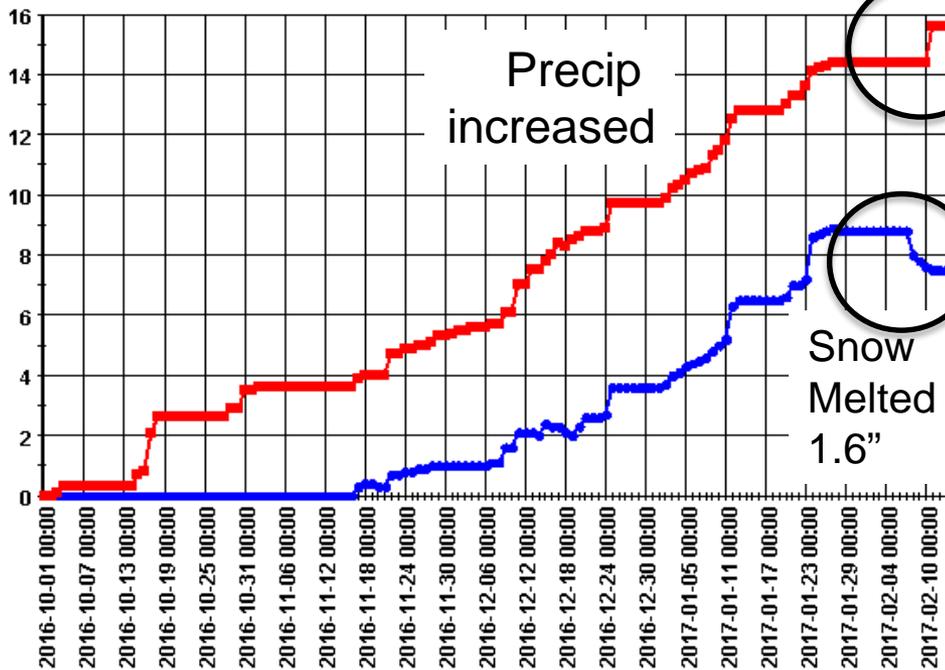
Upper Humboldt River Basin	Network	Elevation (ft)	Depth (in)	SWE (in)	Median (in)	% Median	Last Year SWE (in)	Last Year % Median
Robinson Lake - Aerial Marker	SC	9200	89	26.7	17.2	155%	24.8	144%
Lamoille #5	SC	8814	82	29.4	16.8	175%	19.6	117%
Corral Canyon	SNOTEL	8440	59	13.4	9.1	147%	16.0	176%
Jacks Peak	SNOTEL	8420	67					
Trout Creek, Upper - AM	SC	8415	53	12.2	8.8	139%	9.4	107%
Tent Mtn., Upper- Aerial Marker	SC	8315	69	15.9	13.0	122%	13.0	100%
Dorsey Basin	SNOTEL	7870	50	14.9	9.3	160%	11.9	128%
Bear Creek	SNOTEL	8040	53	14.9	11.5	130%	16.6	144%
Green Mountain	SNOTEL	8180	55	17.1	11.5	149%	17.5	152%
American Beauty - Aerial Marker	SC	7550	46	10.6	7.6	139%	8.1	107%
Stag Mountain	SNOTEL	7640	35					
Stag Mountain AM	SC	7640	36	9.4	3.8	247%	5.9	155%
Lamoille #3	SNOTEL	8025	45	13.5	8.8	153%	11.6	132%
Smith Creek	SC	7600						
Jakes Creek	SNOTEL	7380	36					
Jakes Creek - Aerial Marker	SC	7380	37	9.6	4.3	223%	5.4	126%
Lamoille #1	SC	7364	36	8.6	6.4	134%	10.4	163%
Jack Creek Upper	SNOTEL	7390	46	12.8	9.4	136%	15.4	164%
Draw Creek	SNOTEL	7330	51	14.1	6.9	204%	10.1	146%
Seventysix Creek	SNOTEL	7360	47	13.3	7.0	190%	8.9	127%
Tent Mtn Lower	SNOTEL	7100	34					
Tent Mtn., Lower - Aerial Marker	SC	7100	36	8.6	5.8	148%	9.3	160%
Trout Creek, Lower	SC	6900						
Fry Canyon	SNOTEL *	6700	27	7.2			5.8	
Fry Canyon	SC	6700	34	9.0	6.2	145%	7.0	113%
Harrison Pass #1	SC	6600	30	7.0	4.6	152%	5.0	109%
Dry Creek	SNOTEL *	6520	29	8.8			5.5	
Dry Creek	SC	6500	34	7.9	4.6	172%	6.0	130%
Taylor Canyon	SNOTEL	6325	38	10.4	4.0	260%	7.9	198%
Tremewan Ranch	SC	5700	21	4.8	2.3	209%	2.4	104%
Basin Index						159%		135%
# of sites						22		22



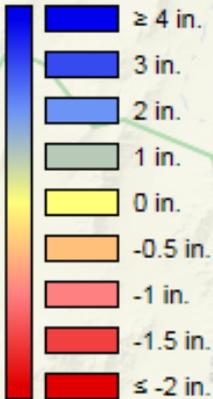
February SWE Changes



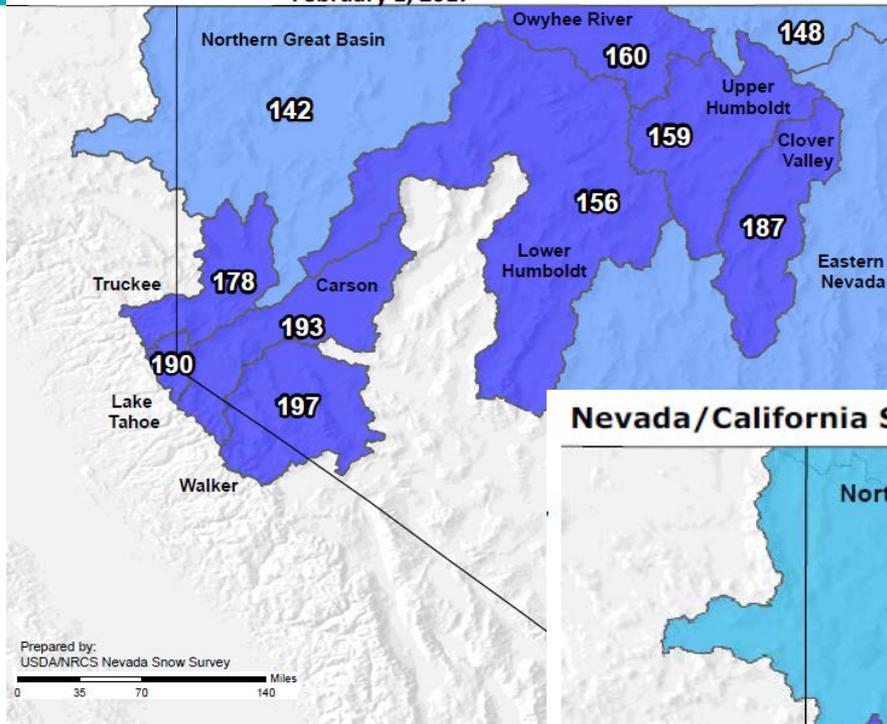
1243-DRY CREEK



Snow Water Equivalent Delta
 February 13, 2017 minus February 1, 2017, first of day



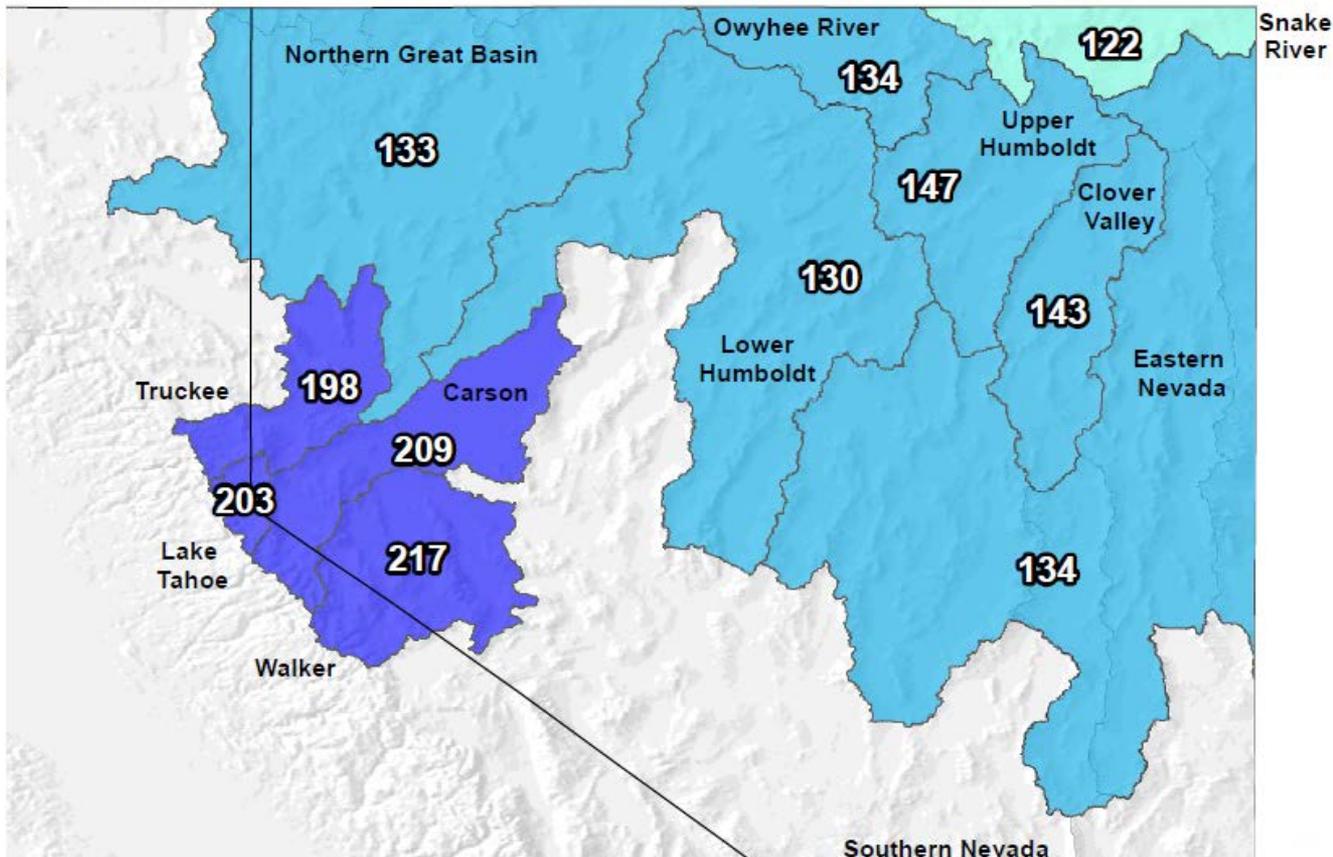
Nevada & Eastern Sierra
Percent of Median Snowpack
February 1, 2017



Snow Percentages have Decreased Since Feb 1

February 16, 2017

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

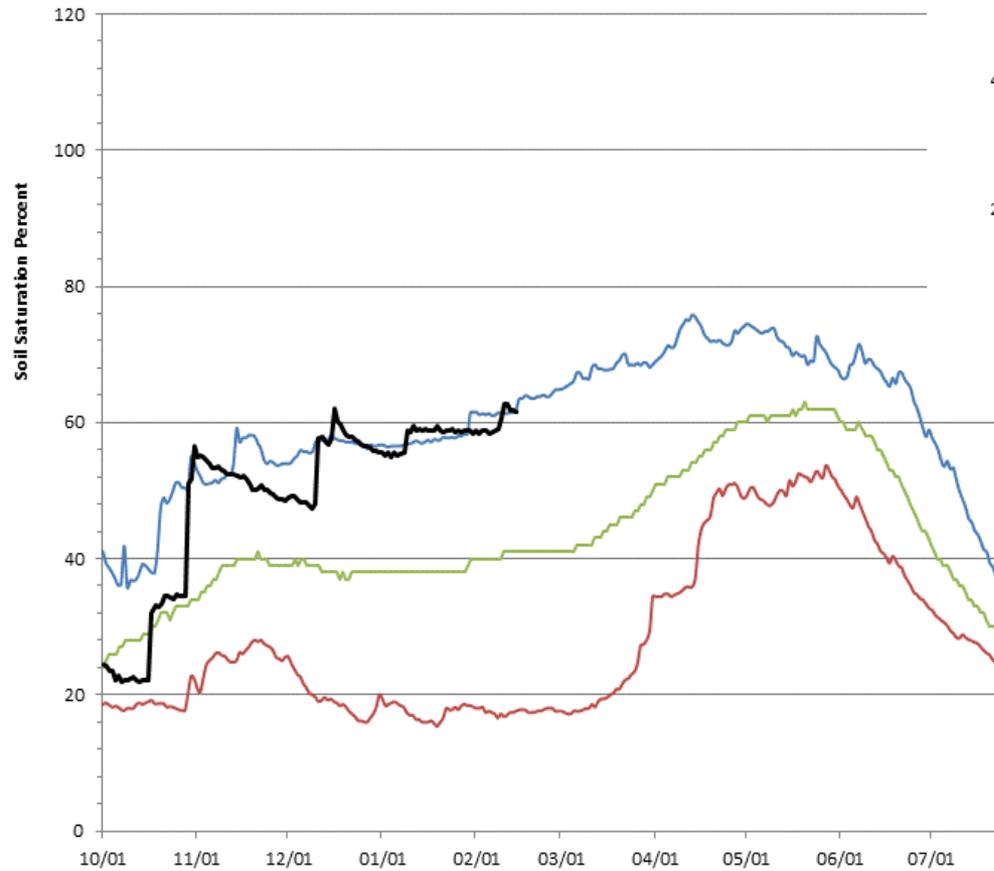


Why?

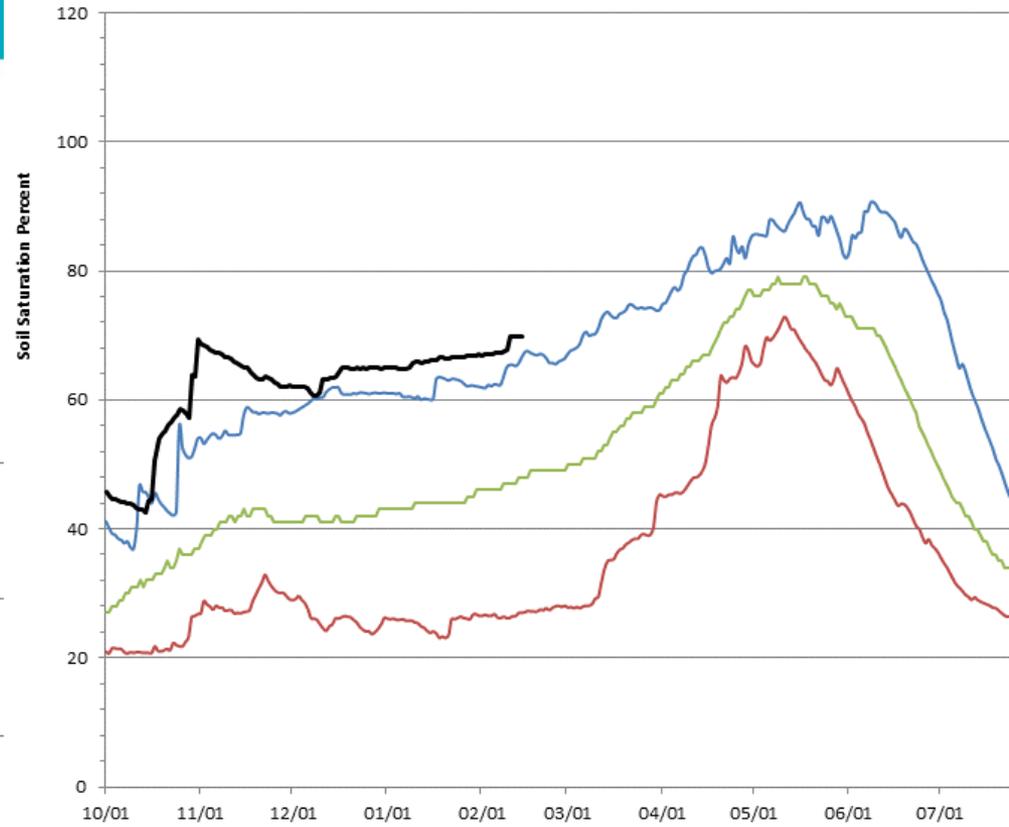
- Melt at lower elevation sites
- Averages increasing every day

Excellent Soil Moisture at SNOTEL sites

Lower Humboldt River Basin - Soil Saturation

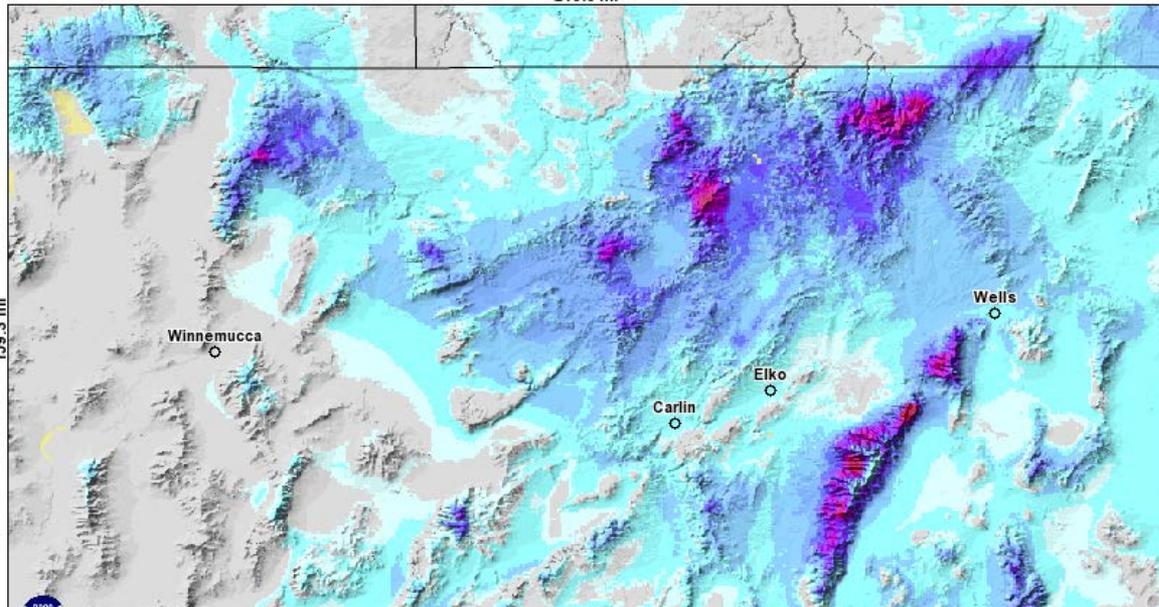


Upper Humboldt River Basin - Soil Saturation



- Max
- Min
- Normal
- WY 2017

Modeled Snow Water Equivalent for 2016 February 1, 6:00 UTC
210.8 mi



For early season flow potential
the best product comes from
NOAA not NRCS...

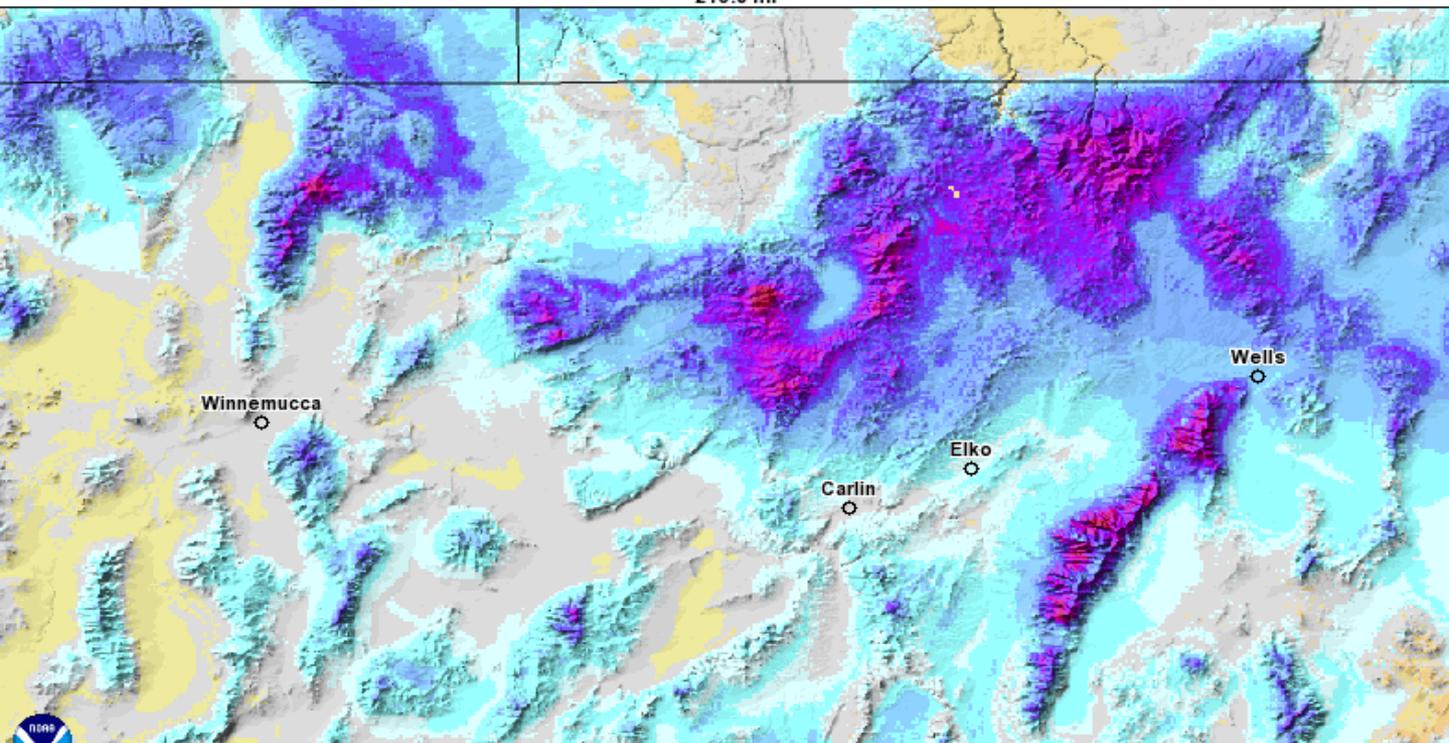


National Operational Hydrologic Remote Sensing Center

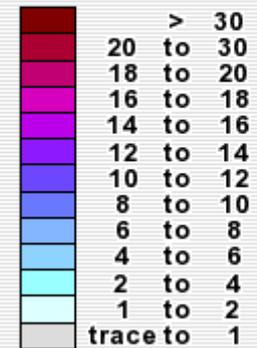
Interactive Snow Information

<http://www.noahrsc.noaa.gov>

Modeled Snow Water Equivalent for 2017 February 1, 6:00 UTC
210.8 mi



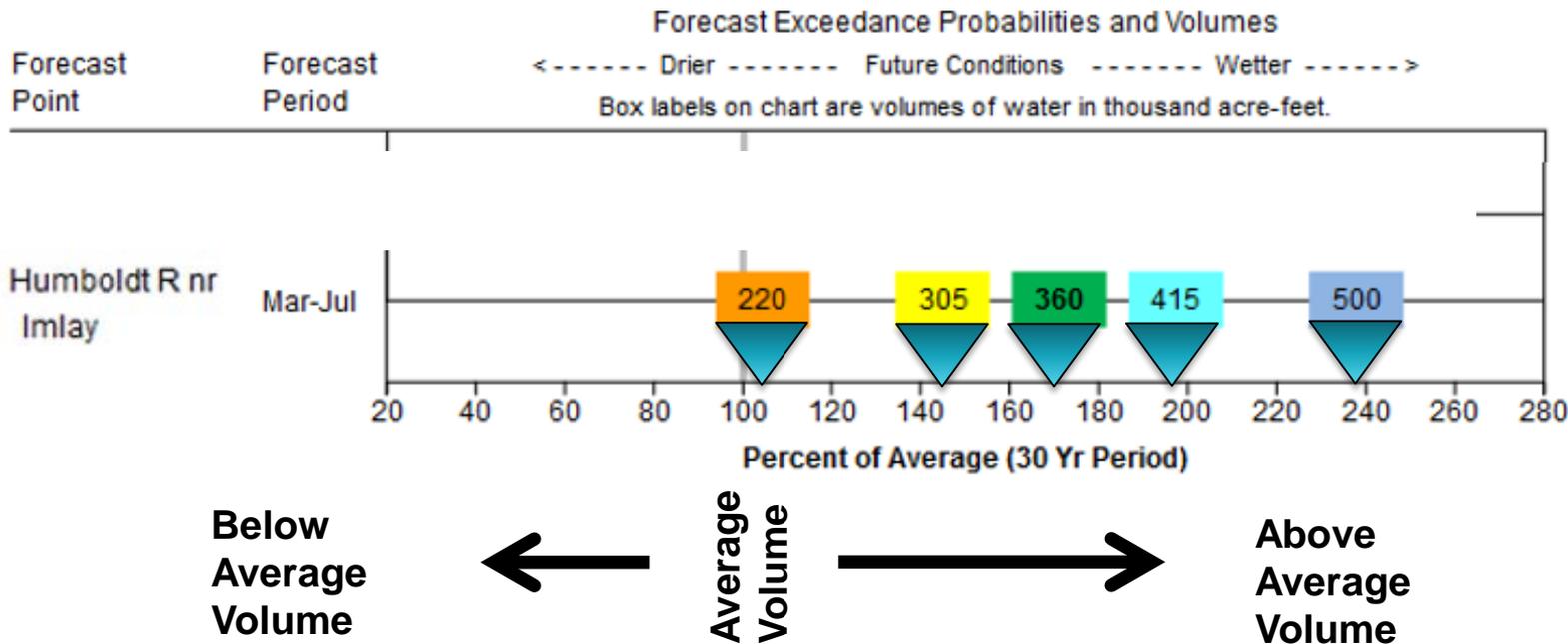
Inches of
water
equivalent



Not Estimated



Lower Humboldt River Basin Water Supply Forecasts February 1, 2017



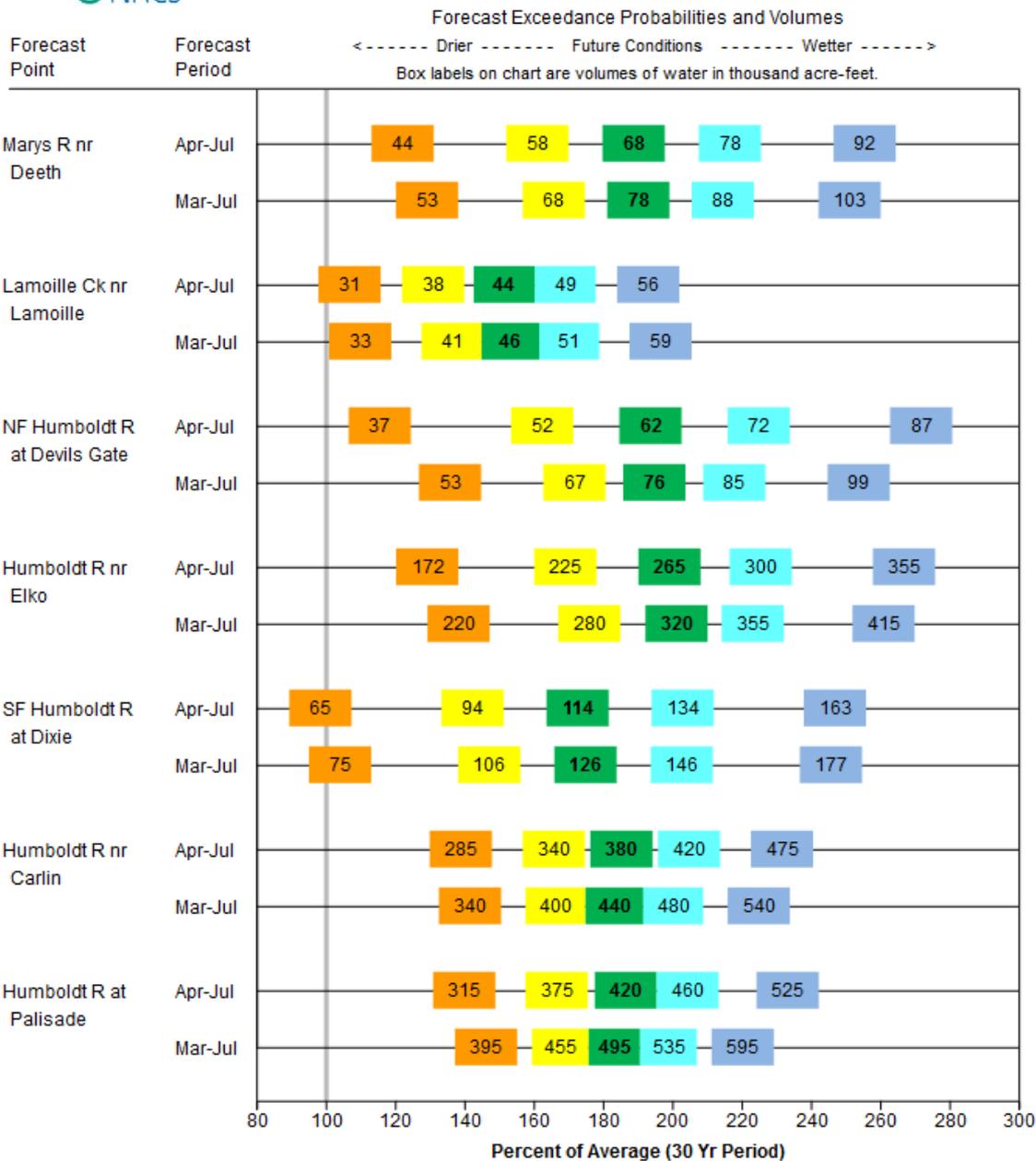
Numbers inside boxes are KAF for 5 exceedances

Colors represent different exceedance forecasts

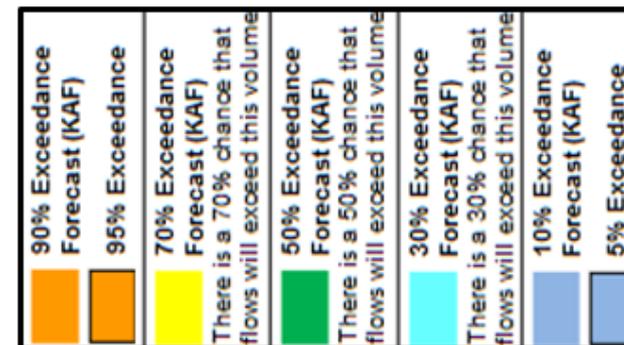
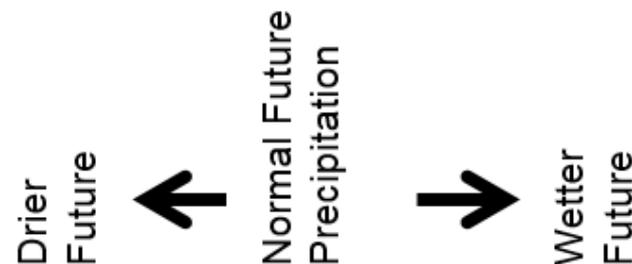
90% Exceedance Forecast (KAF)	70% Exceedance Forecast (KAF)	50% Exceedance Forecast (KAF)	30% Exceedance Forecast (KAF)	10% Exceedance Forecast (KAF)
95% Exceedance	There is a 70% chance that flows will exceed this volume	There is a 50% chance that flows will exceed this volume	There is a 30% chance that flows will exceed this volume	5% Exceedance



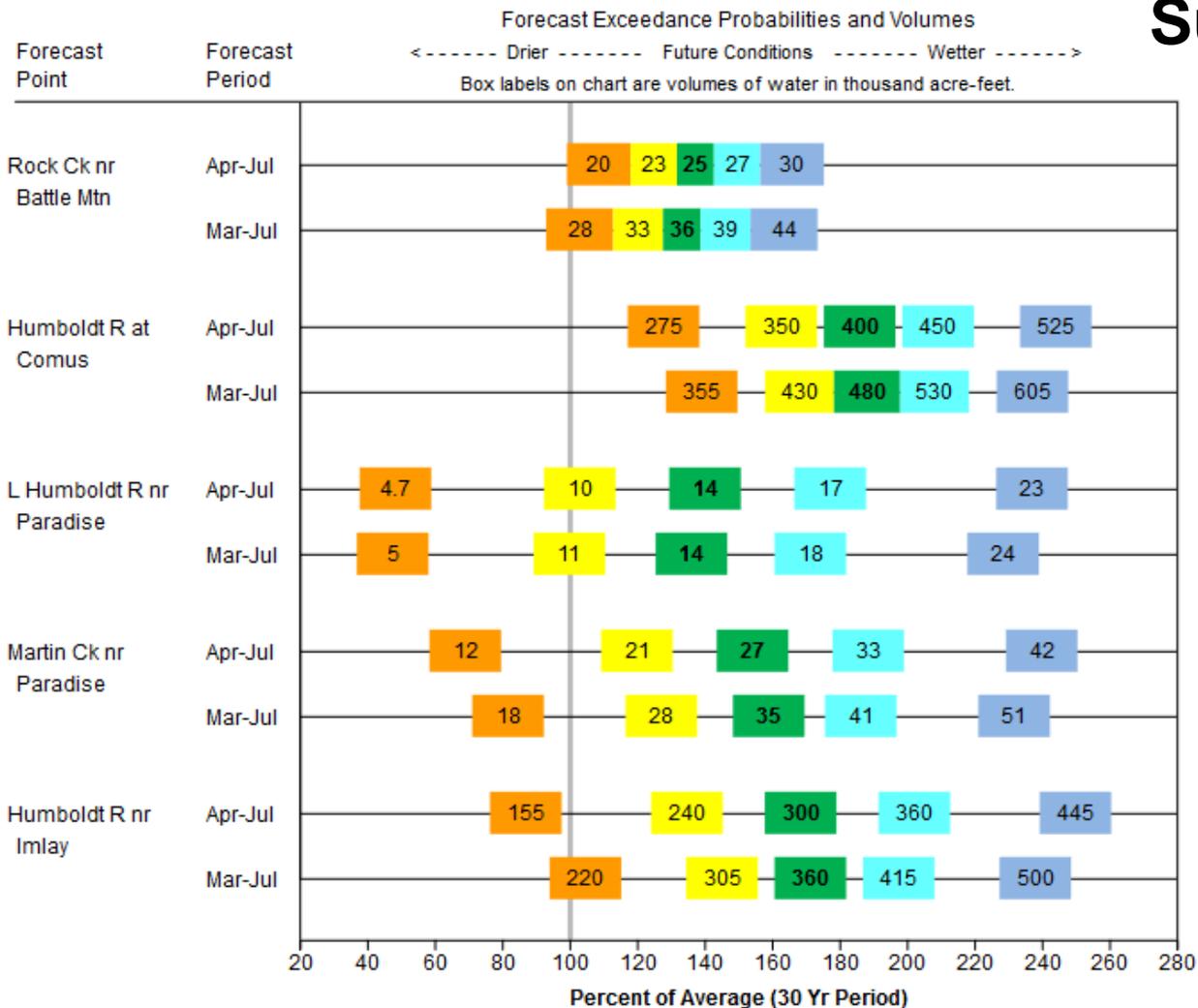
Upper Humboldt River Basin Water Supply Forecasts February 1, 2017



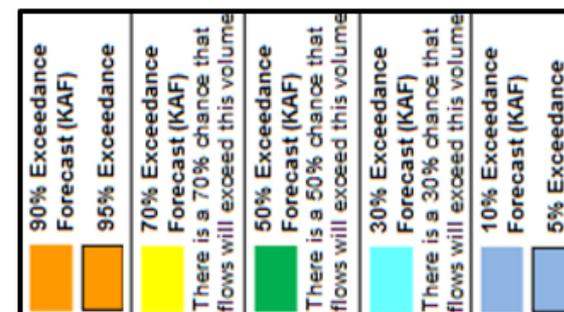
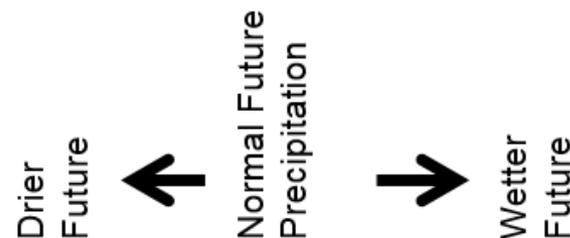
Summer Streamflow Forecasts



Lower Humboldt River Basin Water Supply Forecasts February 1, 2017



Summer Streamflow Forecasts



Feb 1, 2017 Forecasts

UPPER HUMBOLDT RIVER BASIN

Forecast Point	period	50% (KAF)	% of avg
Marys R nr Deeth	MAR-JUL	78	190
	APR-JUL	68	189
Lamoille ck nr Lamoille	MAR-JUL	46	153
	APR-JUL	44	152
NF Humboldt R at Devils Gate	MAR-JUL	76	195
	APR-JUL	62	194
Humboldt R nr Elko	MAR-JUL	320	201
	APR-JUL	265	199
SF Humboldt R ab Dixie Ck	MAR-JUL	126	175
	APR-JUL	114	173
Humboldt R nr Carlin	MAR-JUL	440	182
	APR-JUL	380	184
Humboldt R at Palisade	MAR-JUL	495	183
	APR-JUL	420	187

LOWER HUMBOLDT RIVER BASIN

Forecast Point	period	50% (KAF)	% of avg
Rock ck nr Battle Mountain	MAR-JUL	36	133
	APR-JUL	25	137
Humboldt R at Comus	MAR-JUL	480	188
	APR-JUL	400	188
L Humboldt R nr Paradise Valley	MAR-JUL	14.3	136
	APR-JUL	13.6	140
Martin ck nr Paradise valley	MAR-JUL	35	159
	APR-JUL	27	154
Humboldt R nr Imlay	MAR-JUL	360	172
	APR-JUL	300	169

Feb 13, 2017 Forecast Update

UPPER HUMBOLDT RIVER BASIN

Forecast Point	period	50% (KAF)	% of avg	Change
Humboldt R nr Elko	MAR-JUL	385	242	+65KAF / +40%
	APR-JUL	320	241	
Humboldt R at Palisade	MAR-JUL	580	215	+85KAF / +32%
	APR-JUL	475	211	

LOWER HUMBOLDT RIVER BASIN

Forecast Point	period	50% (KAF)	% of avg	Change
Humboldt R nr Imlay	MAR-JUL	490	234	+130KAF / +62%
	APR-JUL	400	225	



Feb 13, 2017 Forecasts

UPPER HUMBOLDT RIVER BASIN

Forecast Point	period	50% (KAF)	% of avg	max (KAF)	30% (KAF)	70% (KAF)	min (KAF)	30-yr avg
Humboldt R nr Elko	MAR-JUL	385	242	476	422	348	294	159
	APR-JUL	320	241	411	357	283	229	133
Humboldt R at Palisade	MAR-JUL	580	215	685	620	535	470	270
	APR-JUL	475	211	585	520	435	370	225

LOWER HUMBOLDT RIVER BASIN

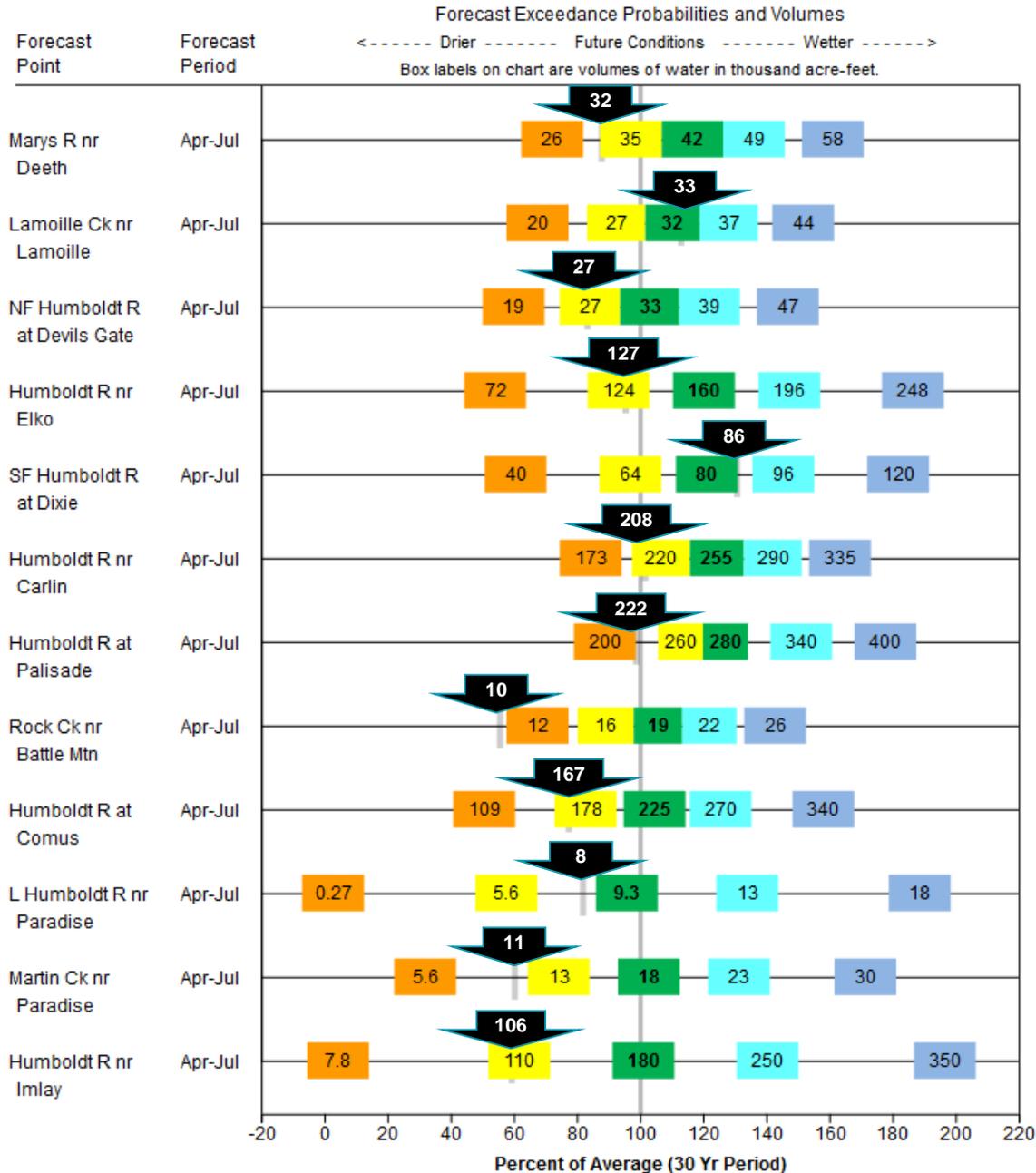
Forecast Point	period	50% (KAF)	% of avg	max (KAF)	30% (KAF)	70% (KAF)	min (KAF)	30-yr avg
Humboldt R nr Imlay	MAR-JUL	490	234	675	565	420	310	209
	APR-JUL	400	225	569	469	331	231	178



Even driest forecasts
150-184% of average



Humboldt River Summary Water Supply Forecasts April 1, 2016



2016 Forecast Review

Actual flows last summer were generally less than April 1, 2016 50% forecasts due to multi-year drought and dry summer conditions.

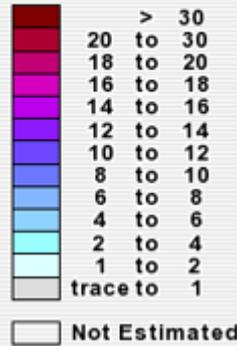
Key Points:

- Precipitation – Some SNOTELs measured record amounts in Oct & Jan
- Snowpack – Already exceeds median peak in both upper and lower basin.
 - NRCS network does poor job highlighting low elevation snow
 - New SNOTELs will help in time, once enough years are available to calc medians.
- Drought over
- Streamflow forecasts are above average, including even driest forecasts.
- Excellent chance Rye Patch reservoir will fill this year.
- Soil moisture is very high, runoff is and will be efficient.
- Actual streamflow last summer was less than April 1, 2016 50% forecasts due to multi-year drought and dry summer conditions.

Modeled Snow Water Equivalent for 2016 February 1, 6:00 UTC

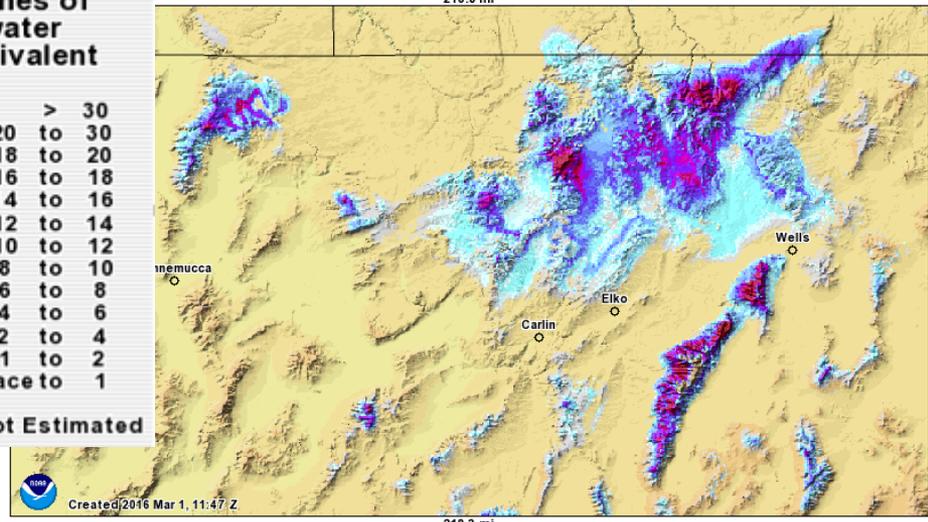
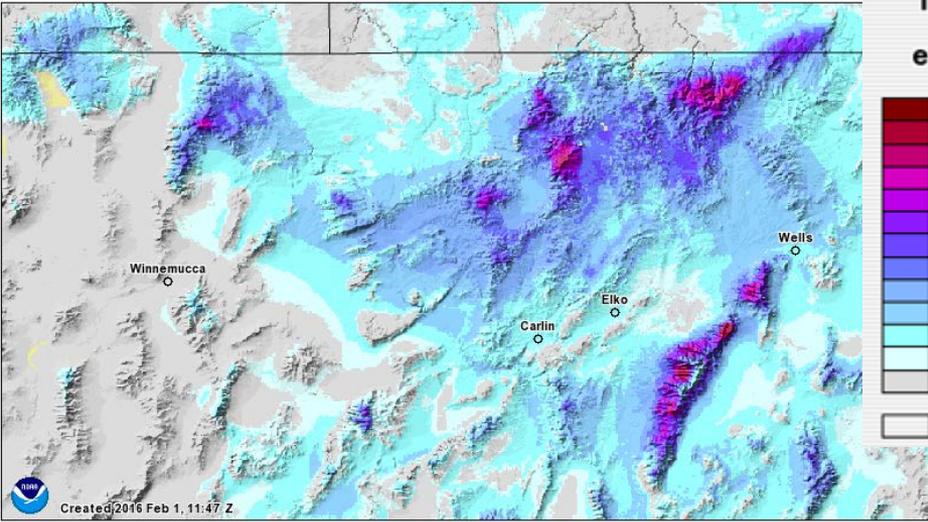
210.8 mi

Inches of water equivalent



Modeled Snow Water Equivalent for 2016 March 1, 6:00 UTC

210.8 mi

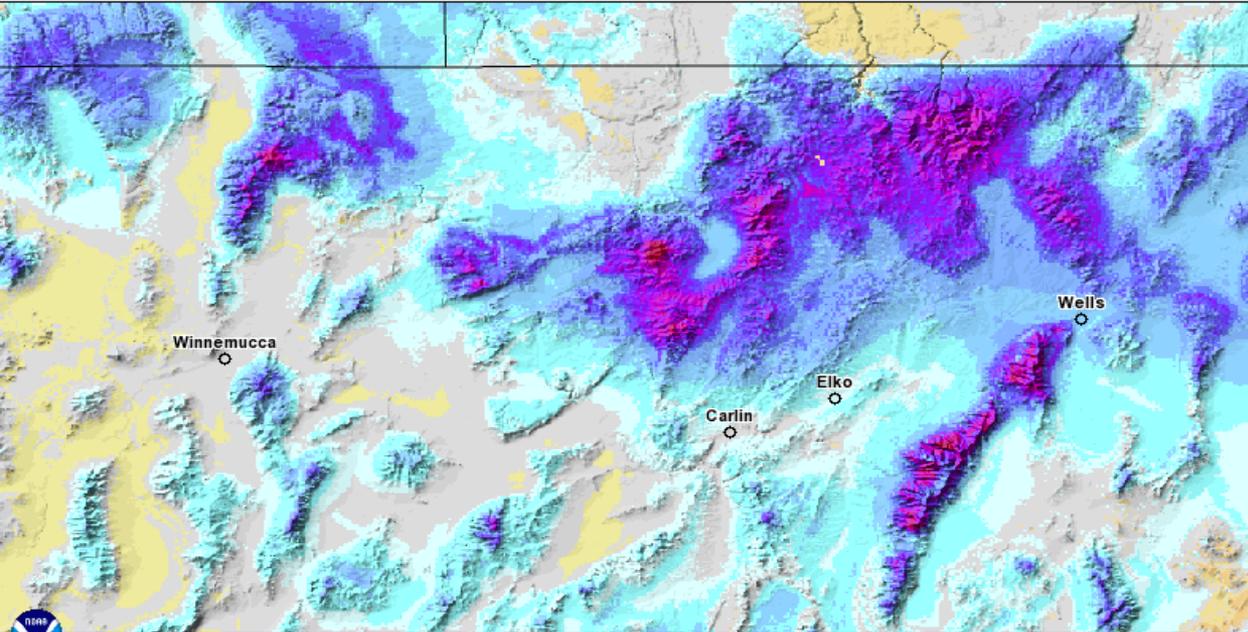


Humboldt at Comus – 2016 Peak daily cfs 1170cfs



Modeled Snow Water Equivalent for 2017 February 1, 6:00 UTC

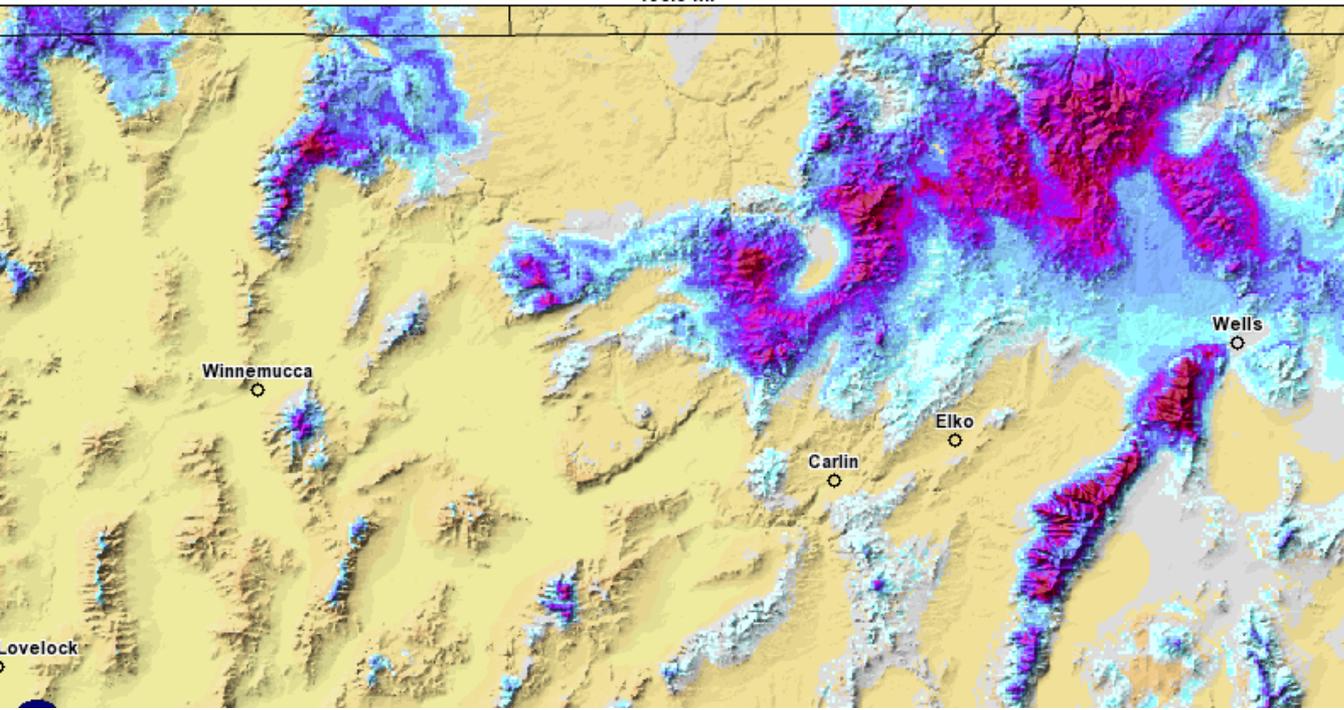
210.8 mi



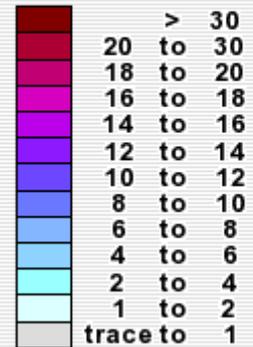
<http://www.noahrs.noaa.gov>

Modeled Snow Water Equivalent for 2017 February 16, 6:00 UTC

198.0 mi



Inches of water equivalent



Not Estimated

