

# Spring Flood Briefing

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May 4 2017

# Short Attention Span Hydro Key Points

- **Look Back:** April didn't help matters but didn't make them a ton worse - slowed snowmelt but no big warm rain events or unusual heat waves.
- **Next 1-2 Weeks:** Moderate rain this weekend but likely not enough to cause notable flood issues. Typical spring variability in temperatures next week. Trending drier but possible storm late week. Decent cool signal for mid-May. No major flood triggers (prolonged heat, big warm rains) but pattern could allow snowpack to linger.
- **River Response:** Rising through weekend due to current warm temps, then dropping back to "normal" snowmelt flows next week. Flooding issues minor, localized however inflows to reservoirs will start exceeding outflows.
- **Rest of May into July:** No major changes to thinking, however if mid-May indeed trends cooler that could push flood risk more into June-July with limited impacts for May.

# Situational Awareness - When Should I Freakout?

Chris & Tim's Rough Sketch on Timing the Highest Risks of Snowmelt Flooding

	Next Two Weeks	Rest of May	June	July	August
<b>Walker River Basin</b>			river basin at highest risk - could see major impacts Lyon County, plus impacts in Mono Co		
<b>Carson River Basin</b>	mainly below Lahontan	next biggest concern - esp Carson Valley, downstream of Lahontan		mainly below Lahontan	
<b>Truckee River Basin</b>	mainly above Truckee	minor flood risk unless a heavy rain event occurs			
<b>Tahoe Basin Creeks/Streams</b>			big time snowpack, lots of streams	could linger into July if May is cold	
<b>NE California Basins</b>					
<b>E Sierra Creeks/Streams</b>			big time snowpack, lots of streams but a number of unknowns	could linger into July if May is cold	
<b>Lower Humboldt River Basin</b>	slow moving snowmelt flooding; impacts most substantial Winnemucca eastward		could persist if May ends up cold		

**What Does This Mean?**  
Integrates impacts and confidence

No worries

Low level of freakoutness

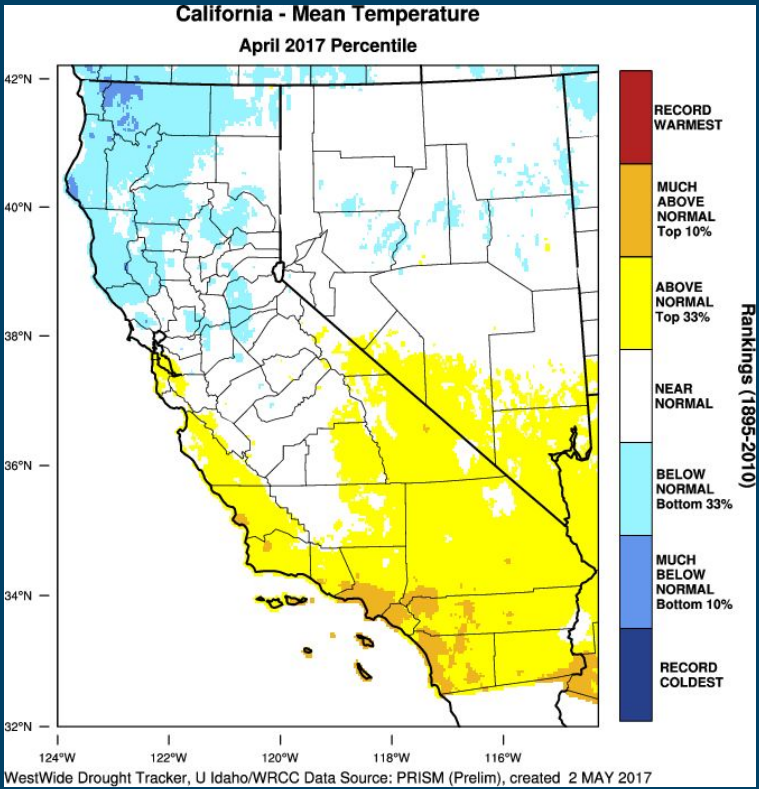
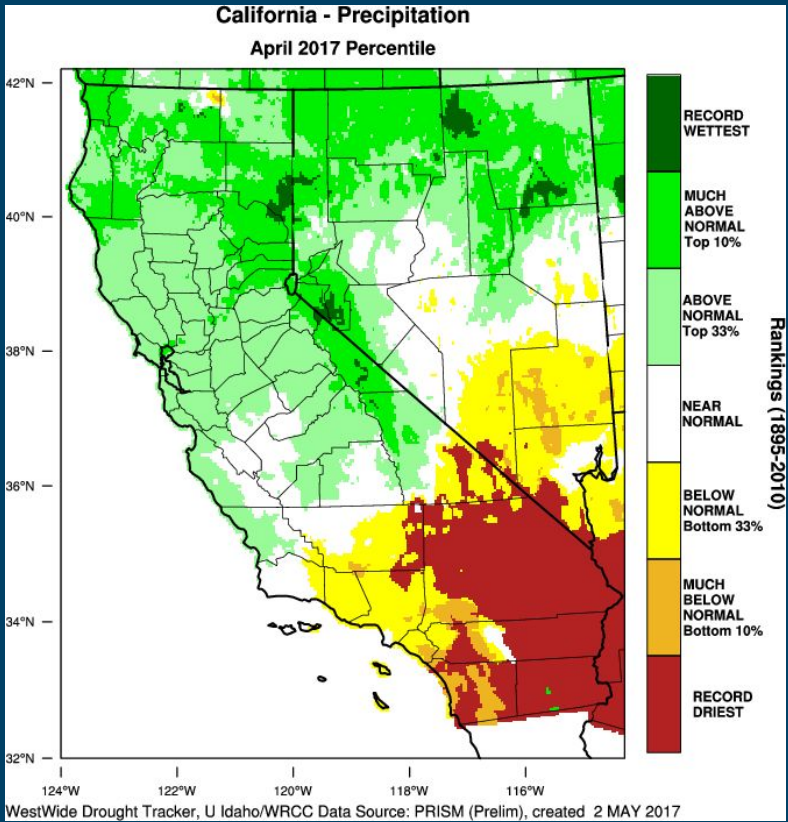
Moderate freakoutness

High freakoutness

End of this



# April Was, Well, April...

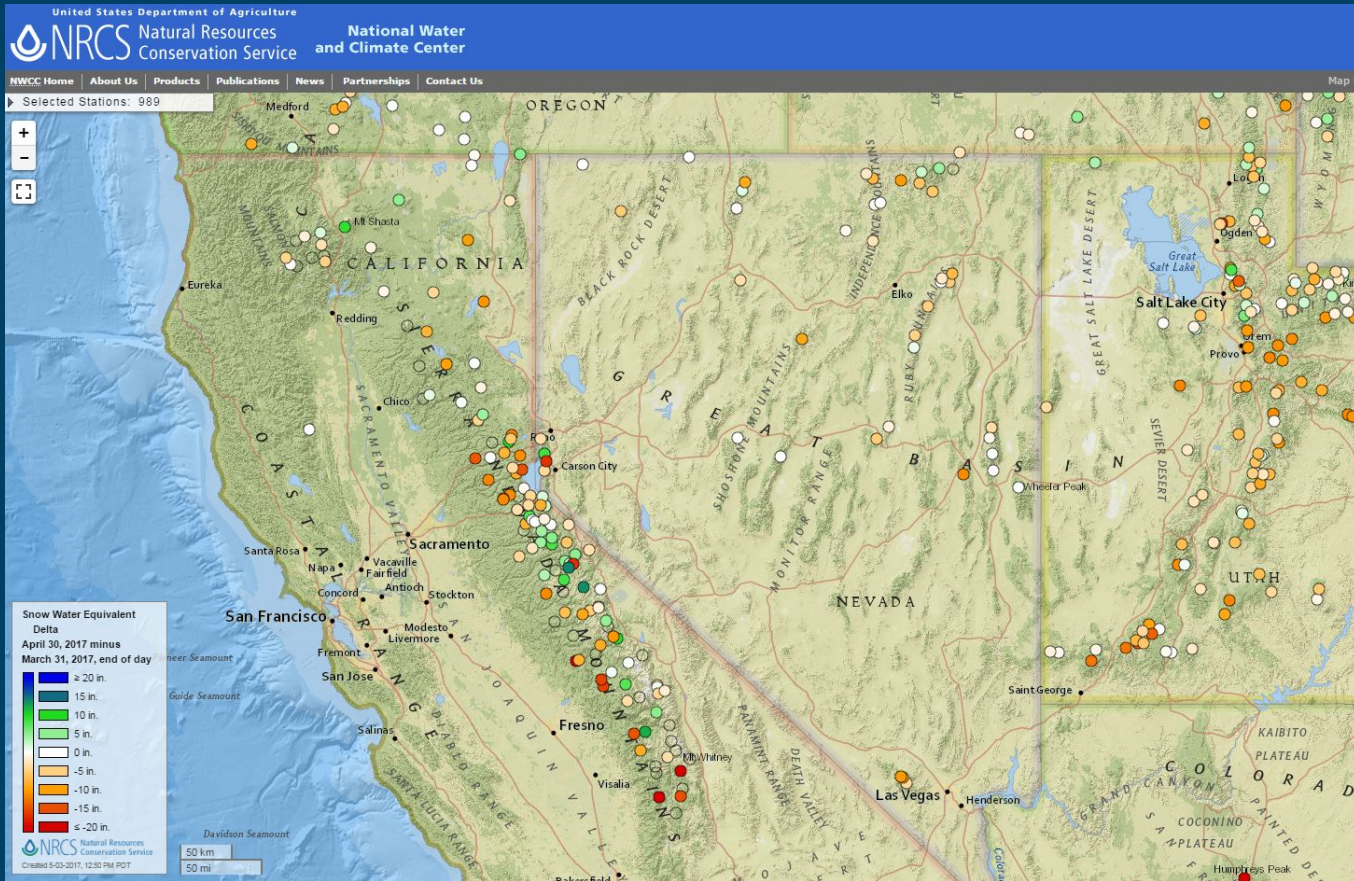


[www.wrcc.dri.edu/wwdt/index.php?folder=pon1per](http://www.wrcc.dri.edu/wwdt/index.php?folder=pon1per)



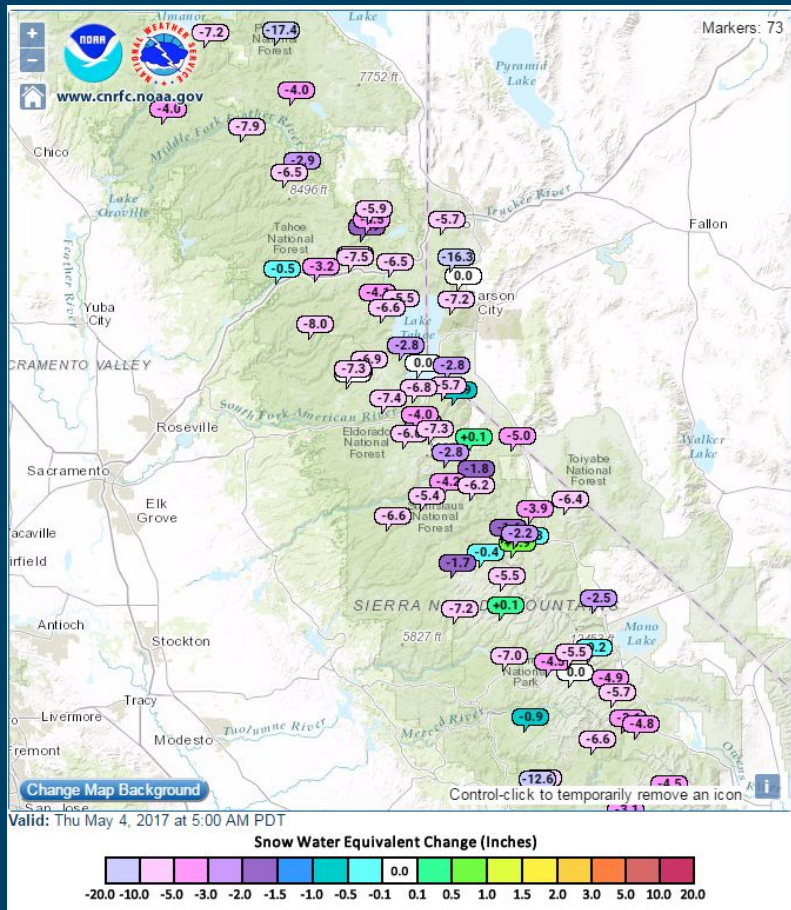


# Sierra Getting More Top-Heavy with Snow?



Snow Water Equivalent Change  
March 31 through April 30

# 5- Day SWE Change

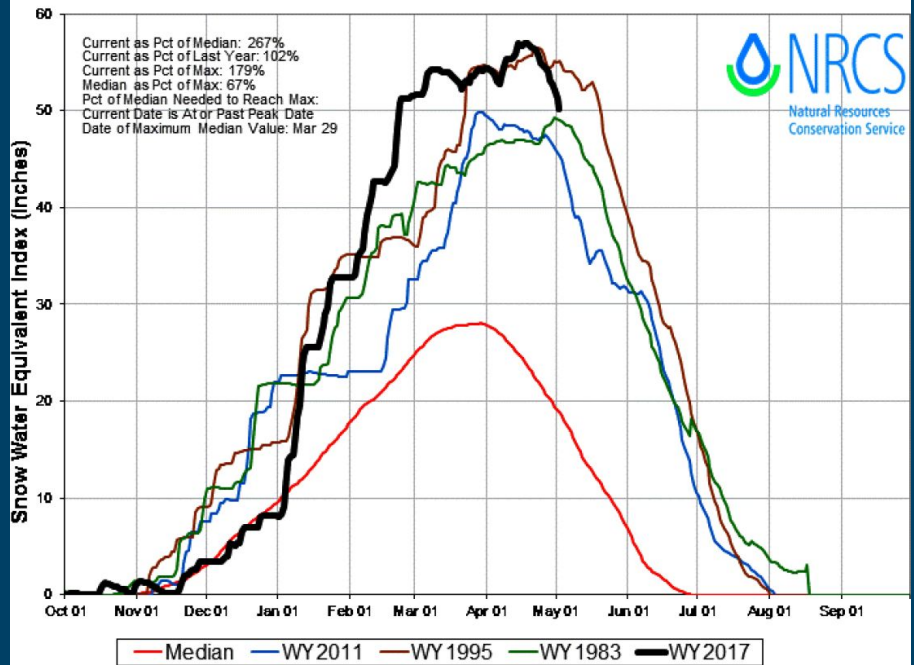


- All but the highest sights showing significant melt.
- Low elevation sites melting at near record rates for this 5-day period.
- A few extreme decreases are not representative of conditions (decreases greater than ~ 8”).

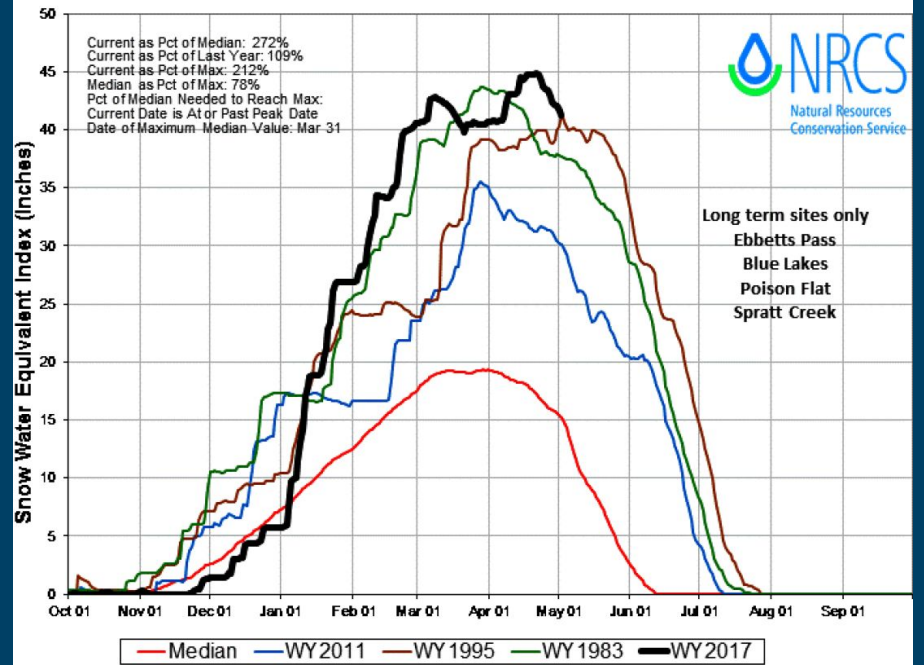


# Past Peak Snowpack, But How Fast a Drop?

**TRUCKEE RIVER BASIN Time Series Snowpack Summary**  
Based on Provisional SNOTEL data as of May 02, 2017

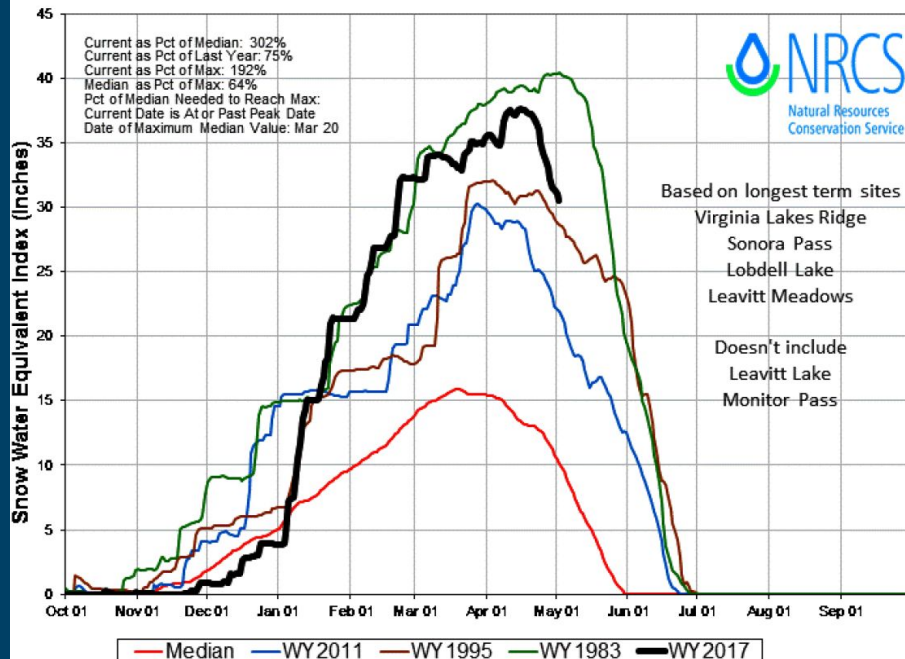


**CARSON RIVER BASIN Time Series Snowpack Summary**  
Based on Provisional SNOTEL data as of May 02, 2017

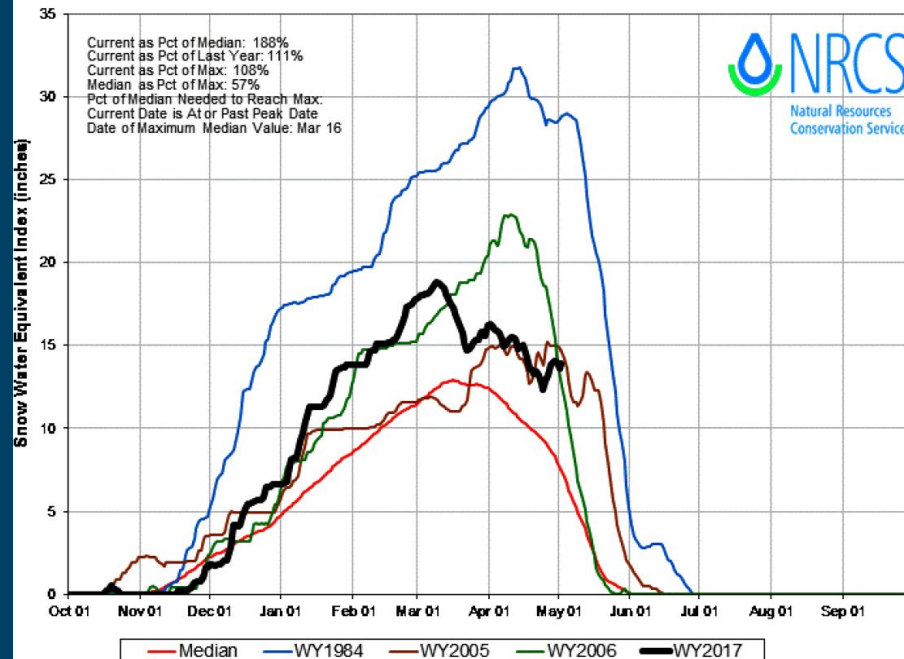


# Past Peak Snowpack?

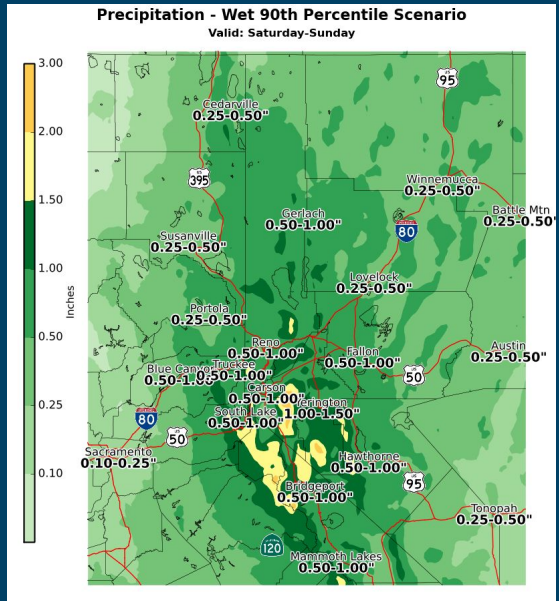
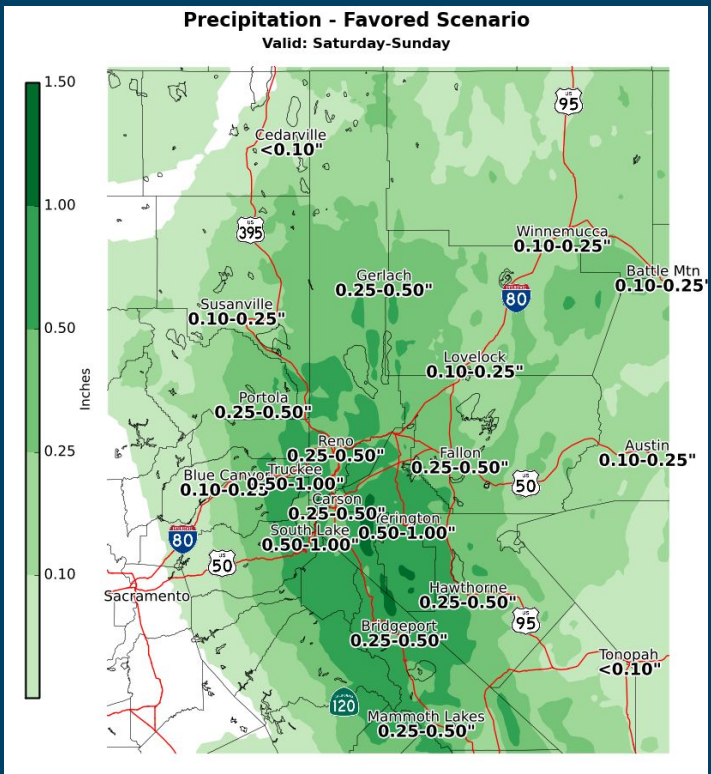
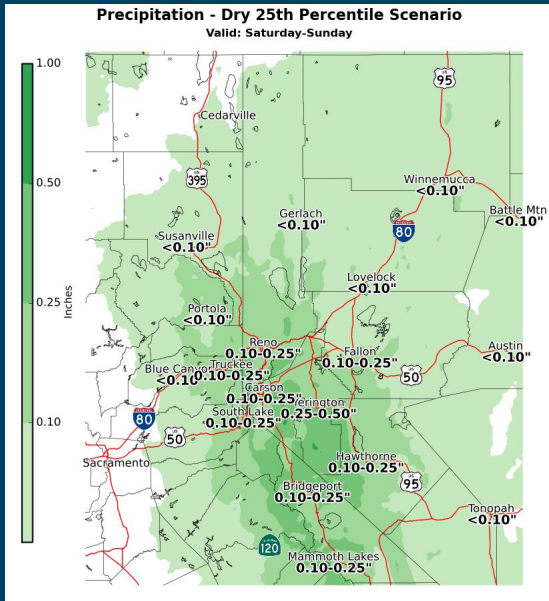
**WALKER RIVER BASIN Time Series Snowpack Summary**  
Based on Provisional SNOTEL data as of May 02, 2017



**UPPER HUMBOLDT RIVER BASIN Time Series Snowpack Summary**  
Based on Provisional SNOTEL data as of May 02, 2017



# Precipitation Scenarios Period of Rain with Mountain Snow Sat PM-Sun AM



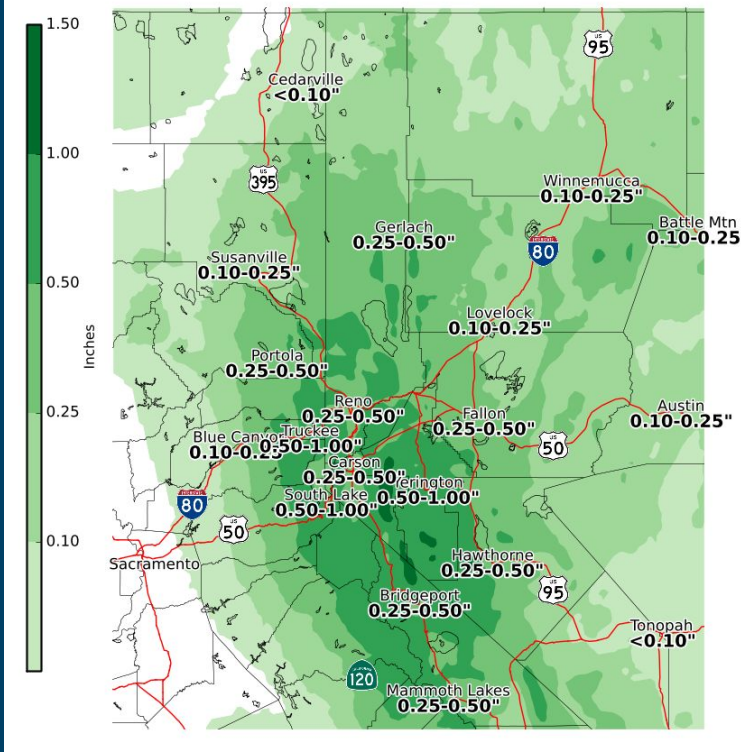
*Snow levels initially  
8000-9000 ft Saturday  
dropping to  
6000-6500 ft Sunday*



# Sierra Snowfall Impacting Passes Saturday into Sunday

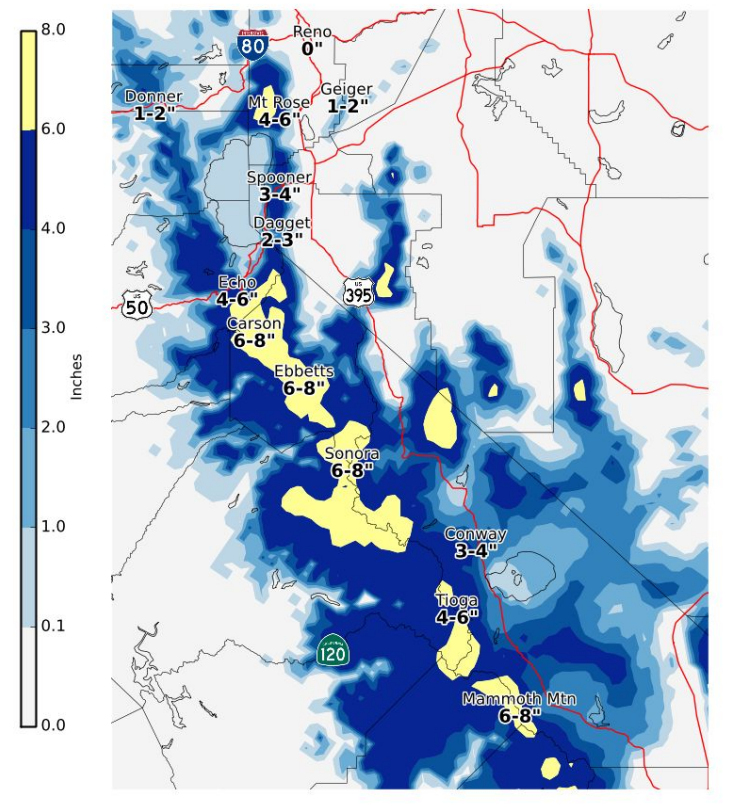
**Precipitation - Favored Scenario**

Valid: Saturday-Sunday

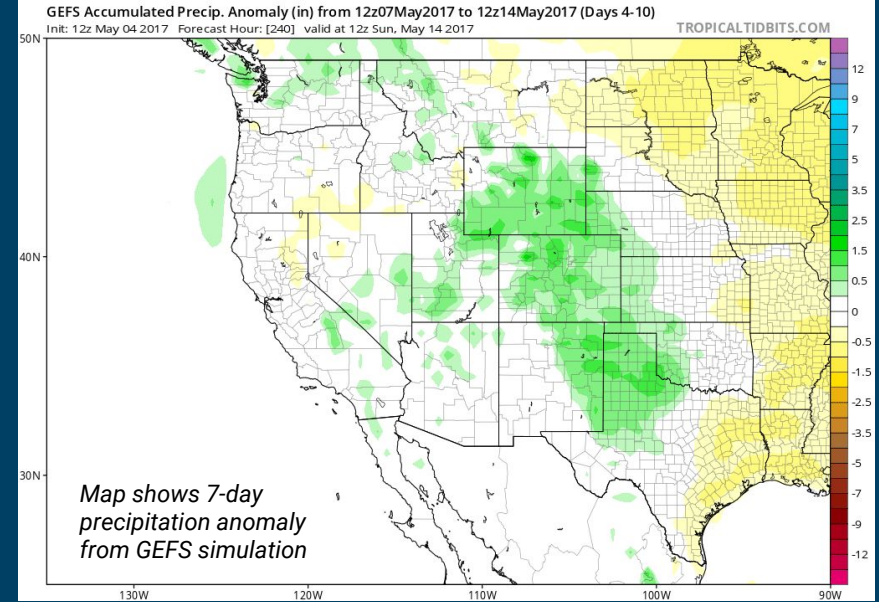
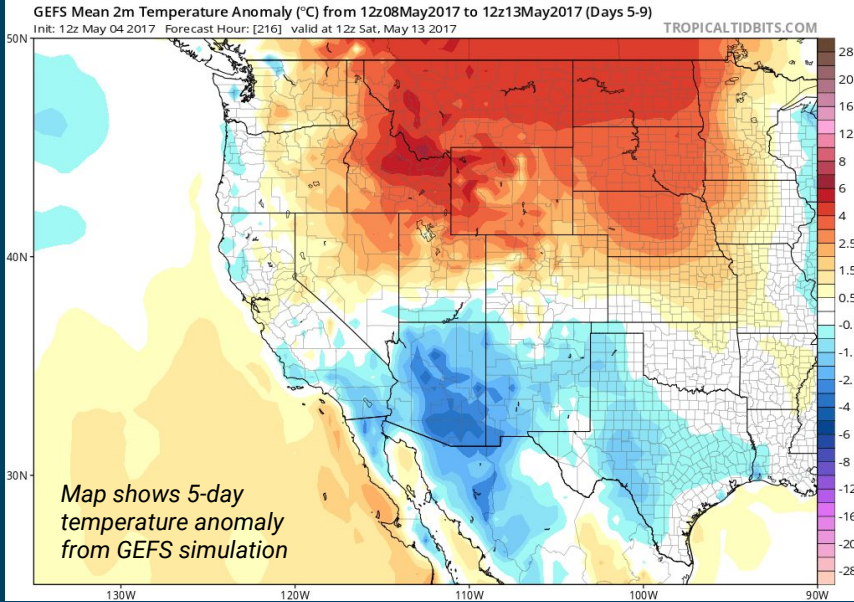


**Snowfall Using Favored Scenario**

Valid: Saturday-Sunday

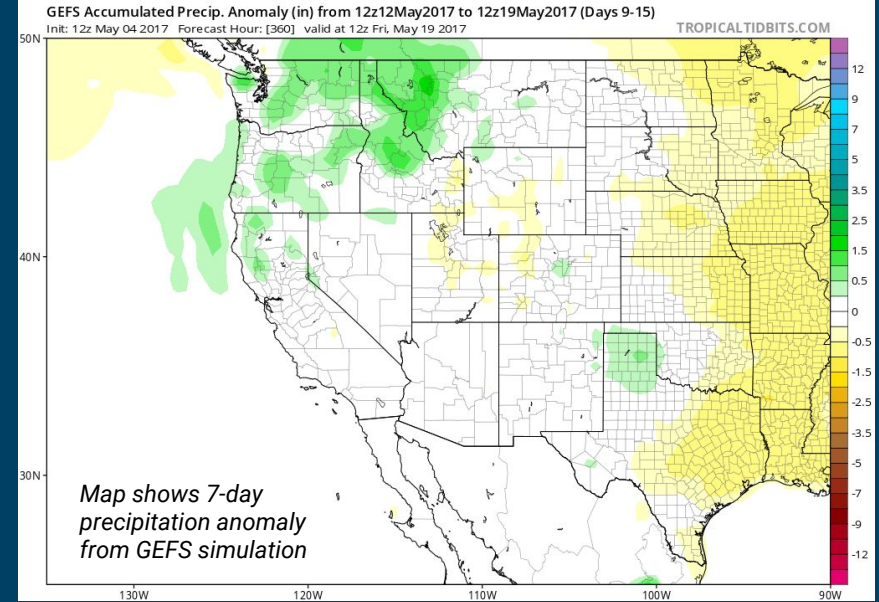
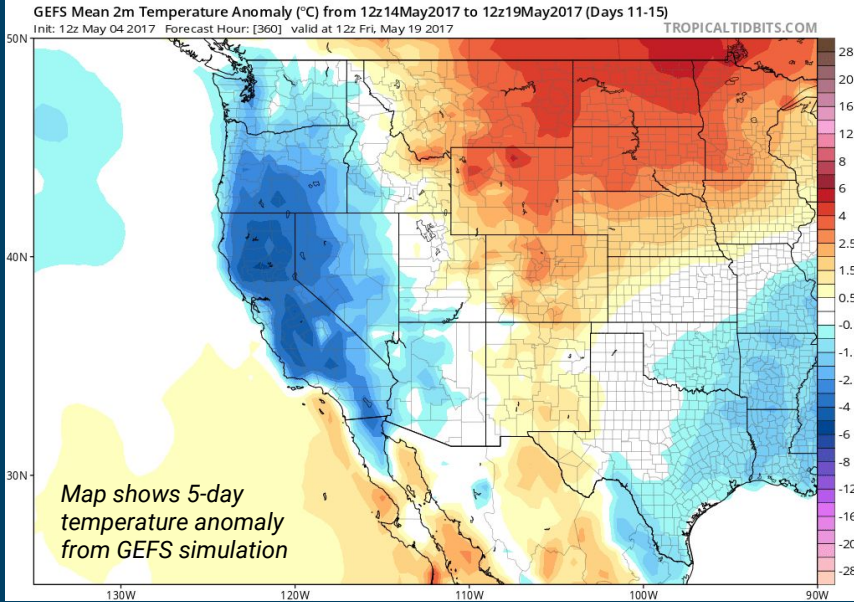


# Next Week Leaning Seasonable with Periods of Sunshine vs Showers May 7-14



- Cutoff low meandering over SW US - lowers predictability for early next week.
- Typical spring conditions with variable temperatures - starting cool then warming. Showers possible but trending drier. Late Week: Potential moderate spring storm with colder temps, strong winds.
- Snowpack melt-off "typical" for early May. No heatwave or warm, heavy rain signals.

# Middle of May Turns Cooler for May 15-19?



- Decent cold signal this far out = good confidence in not seeing heatwave. Would slow down snowmelt rates.
- Possible storm next weekend but **very low confidence on rain/snow. No clear signals through rest of May.**



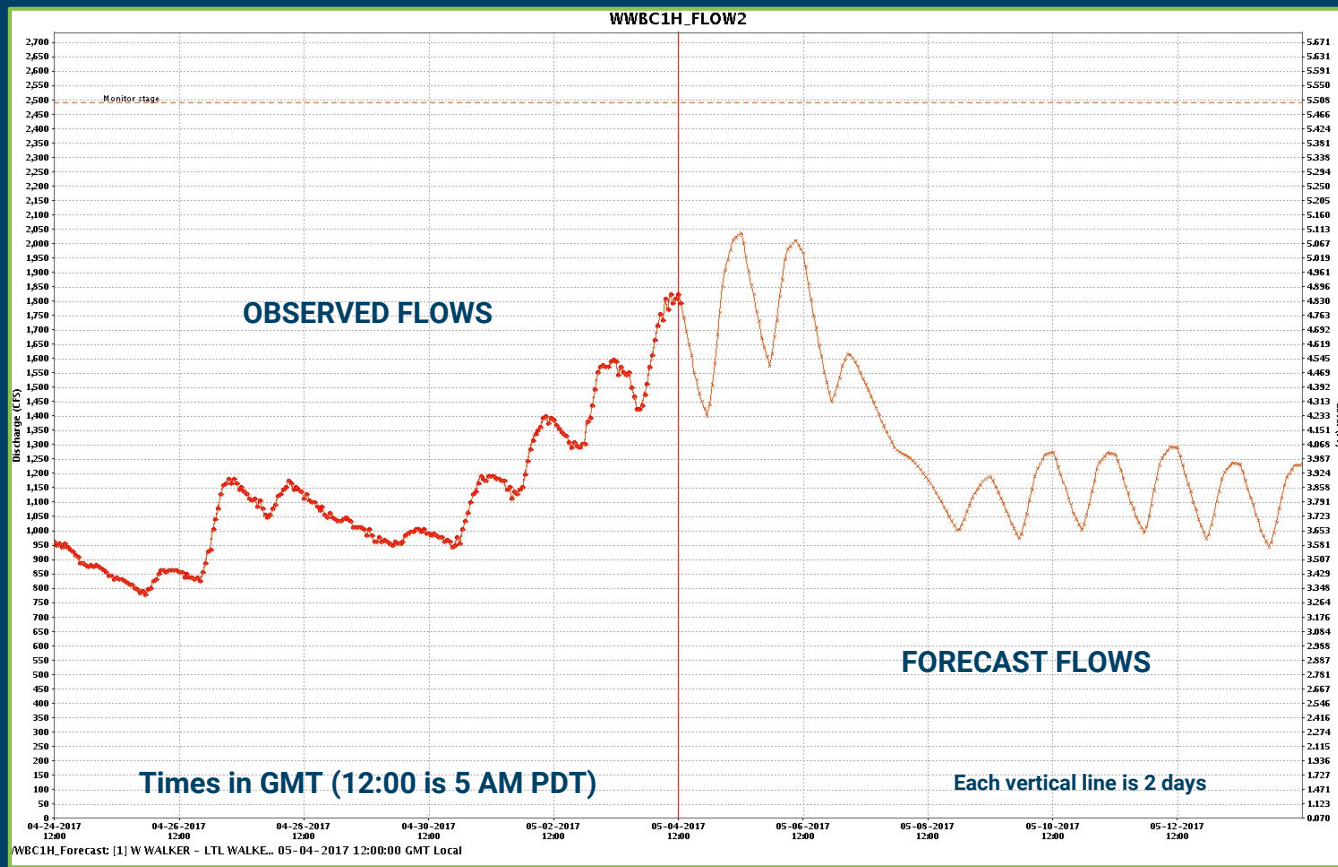
# 10 Day Simulation - West Walker River

5-day official forecasts - [CNRFC](#) or [NWS Reno](#)

## Near Sonora Jct, CA

- Rise in flows through Saturday from warm temperatures, then a drop presuming cooling conditions and light-moderate precipitation.
- Minor flooding issues downstream in Antelope Valley area start around 3100 cfs.

10-day simulations are experimental and provide rough long-range guidance for our public safety partners.



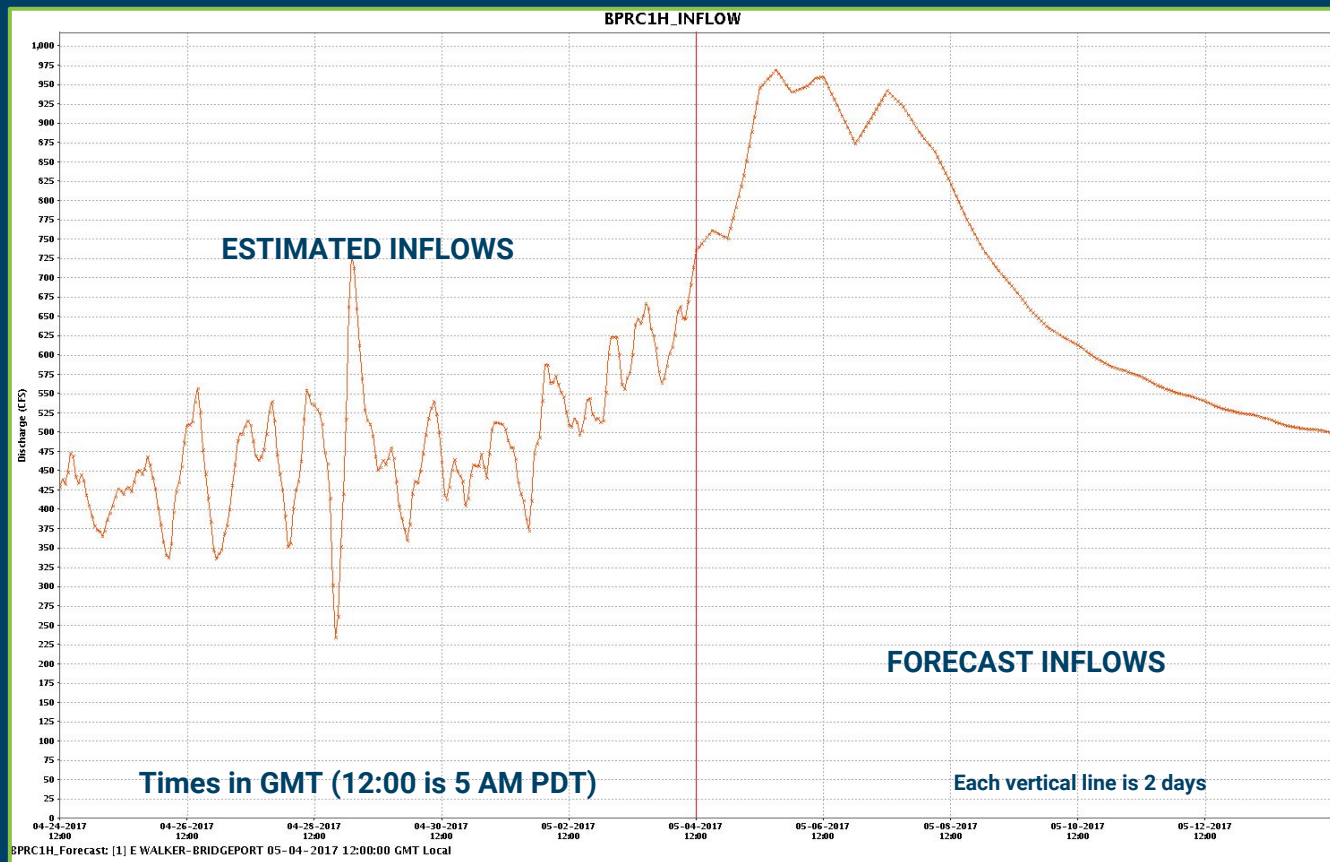
# 10 Day Simulation - East Walker

5-day official forecasts - [CNRFC](#) or [NWS Reno](#)

## Bridgeport Inflow

- These are simulated inflows based on snowmelt projections. **Greater uncertainty** due to lack of gauge network upstream of Bridgeport Reservoir, but provides a general guide.
- Rise in flows through the weekend from warm temperatures, then a drop presuming cooling conditions and light-moderate precipitation.

10-day simulations are experimental and provide rough long-range guidance for our public safety partners.





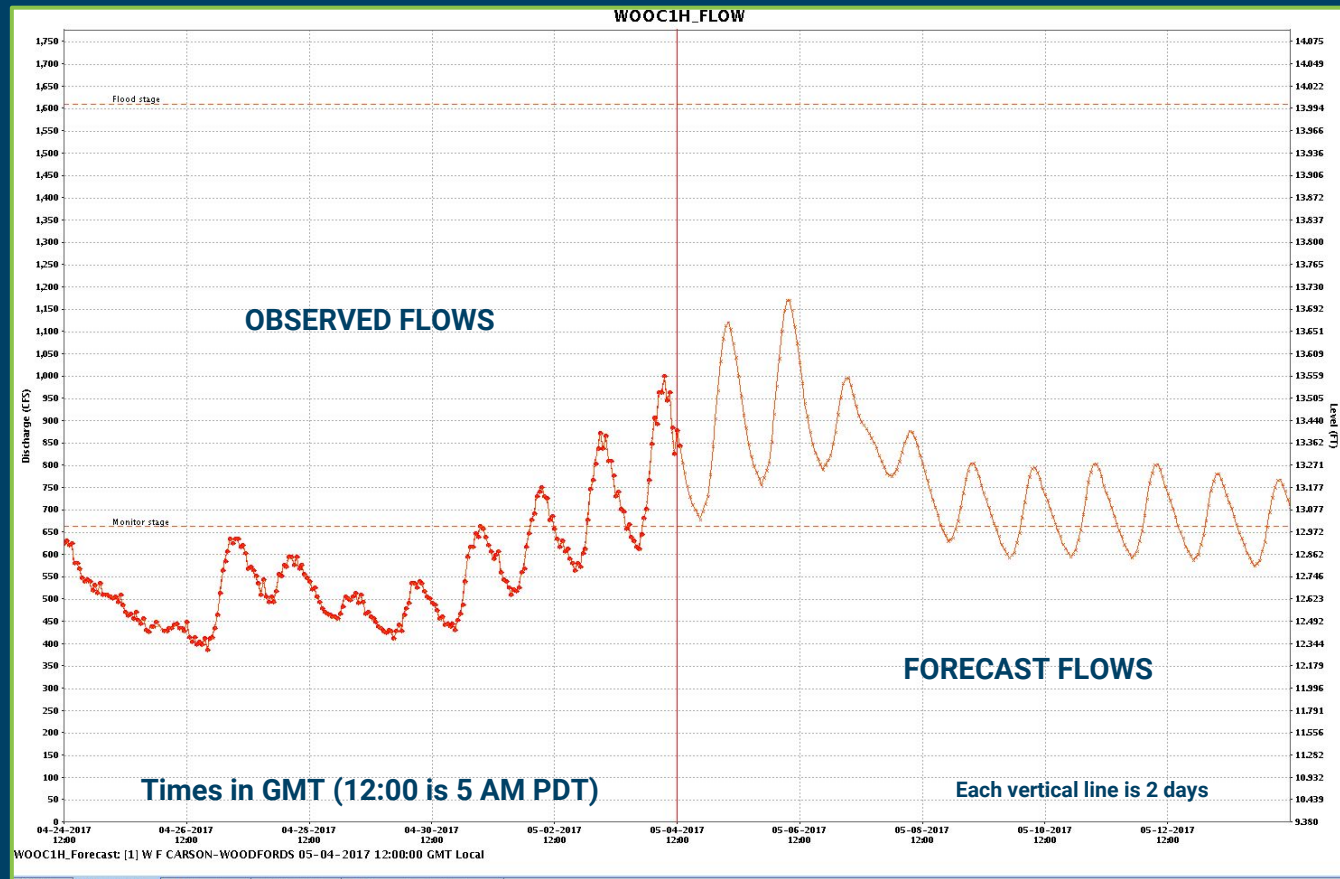
# 10 Day Simulation - West Carson River

5-day official forecasts - [CNRFC](#) or [NWS Reno](#)

## Woodfords, CA

- Rise in flows through Saturday from warm temperatures, then a drop presuming cooling conditions and light-moderate precipitation.
- Above monitor stages into early next week but remaining below flood stages. Some very minor impacts along lowest areas along river possible above ~1000cfs.

10-day simulations are experimental and provide rough long-range guidance for our public safety partners.



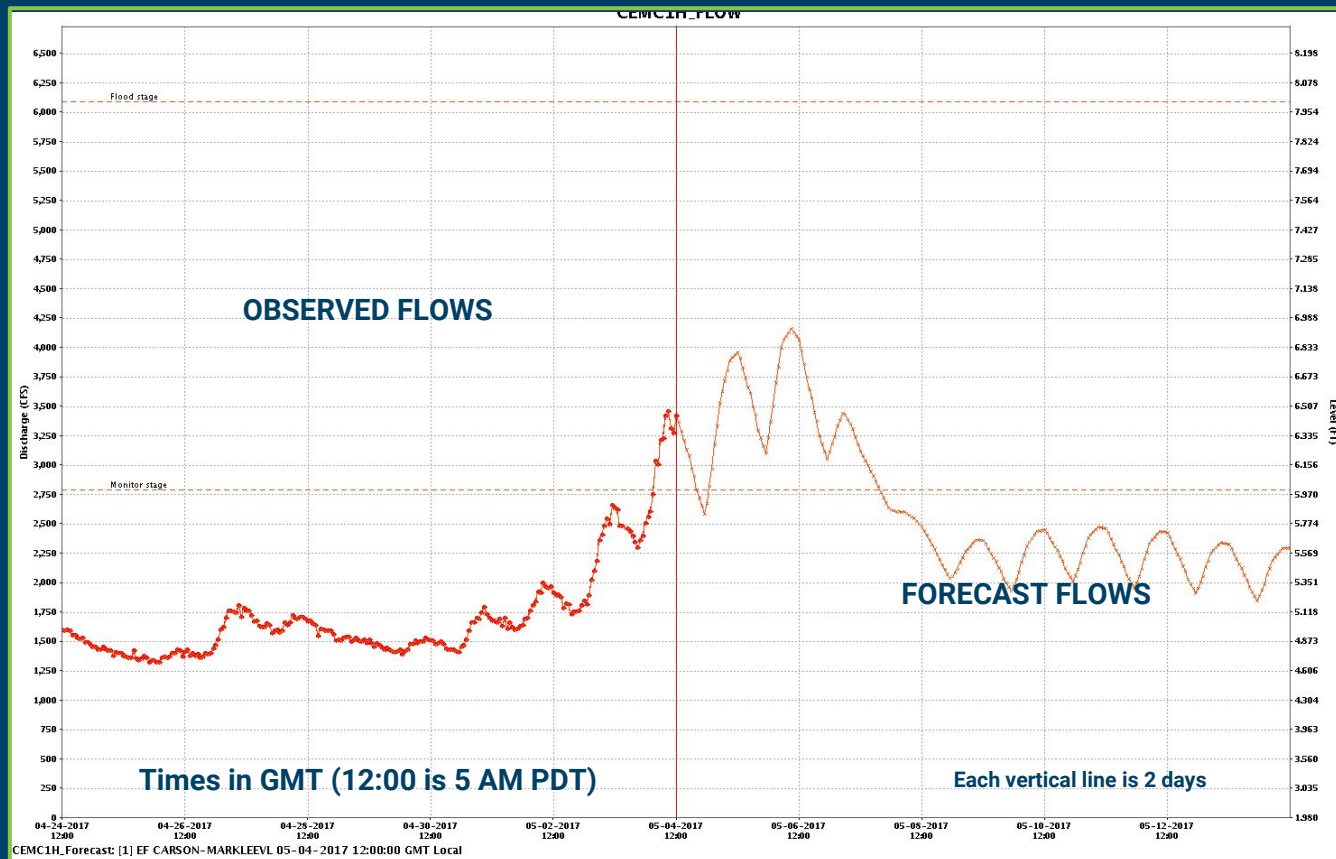
# 10 Day Simulation - East Carson River

5-day official forecasts - [CNRFC](#) or [NWS Reno](#)

## Markleeville, CA

- Rise in flows through Saturday from warm temperatures, then a drop presuming cooling conditions and light-moderate precipitation.
- Passing monitor stages Monday, but below flood status. 5,000 cfs is where lower elevations of Carson Valley near east fork begin to have very minor flood issues. 6100 cfs is official flood stage.

10-day simulations are experimental and provide rough long-range guidance for our public safety partners.

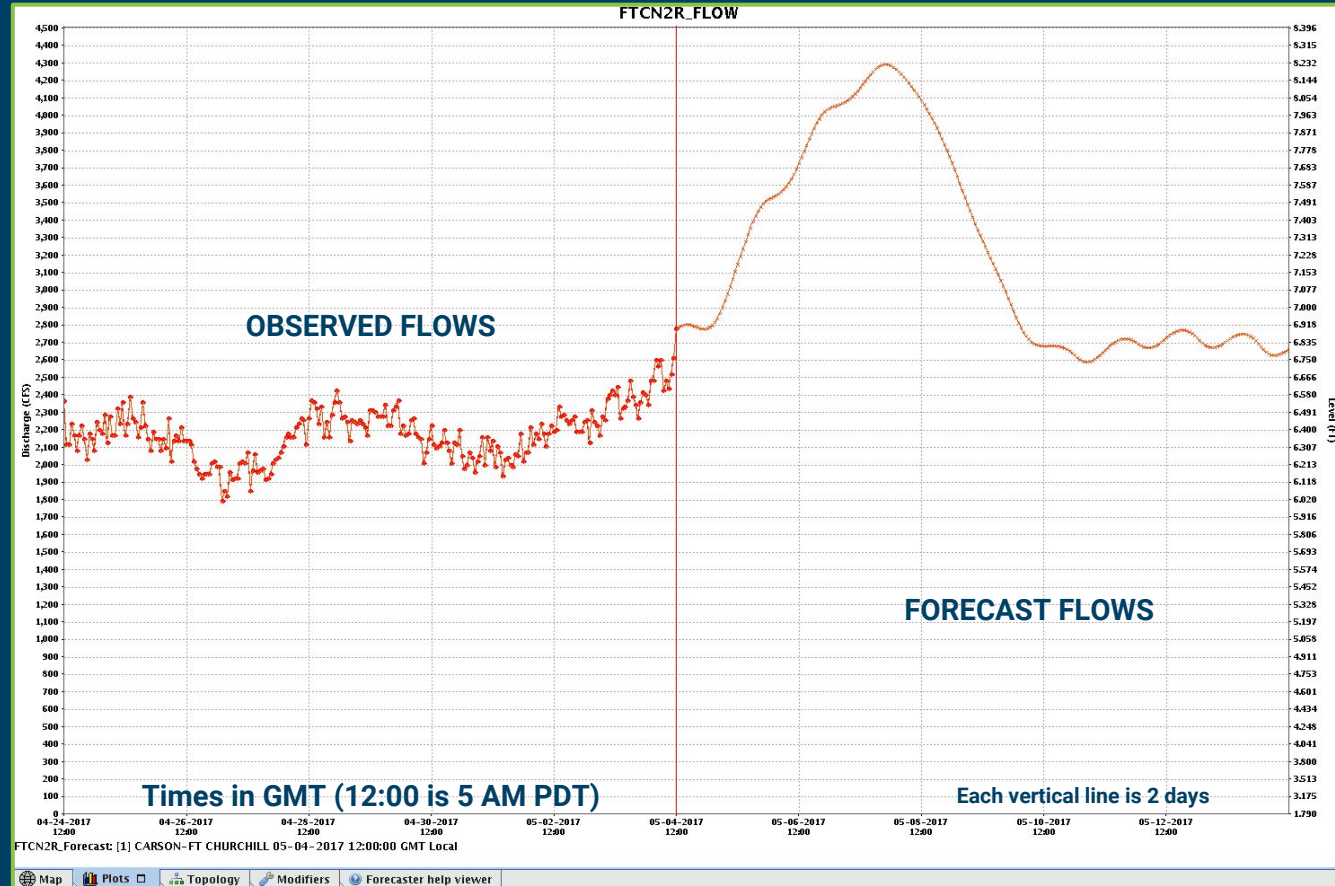


# 5 Day Simulation - Downstream Carson

5-day official forecasts - [CNRFC](#) or [NWS Reno](#)

## Ft Churchill, NV

- Rise in flows through Monday from warm temperatures, then a drop mid/late next week presuming cooling conditions and light-moderate weekend precipitation.
- Inflows will start exceeding outflows = reservoir rise.
- Monitor stages ~4000 cfs, minor flood stage along the river ~7200 cfs.



Reno National Weather Service

Forecasting for the Sierra and western Nevada since 1905



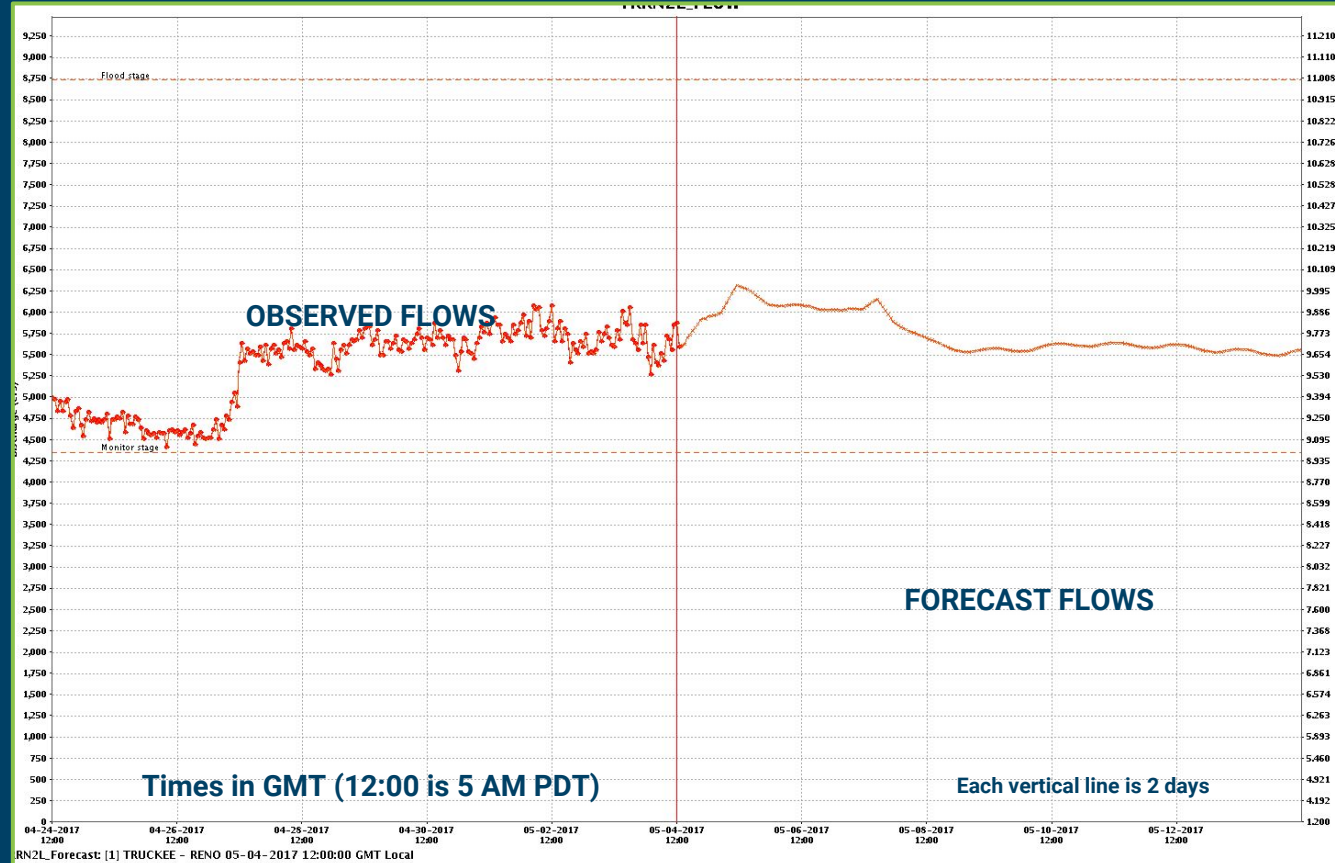
# 10 Day Simulation - Truckee River

5-day official forecasts - [CNRFC](#) or [NWS Reno](#)

## Reno, NV

- Snowmelt increases into tributaries and lakes/reservoirs but flows on Truckee are regulated by watermaster via reservoir controls.
- Results in steady flows through weekend but **remaining high, fast, cold!**
- Bike path will continue to be flooded in spots through Reno/Sparks.

10-day simulations are experimental and provide rough long-range guidance for our public safety partners.

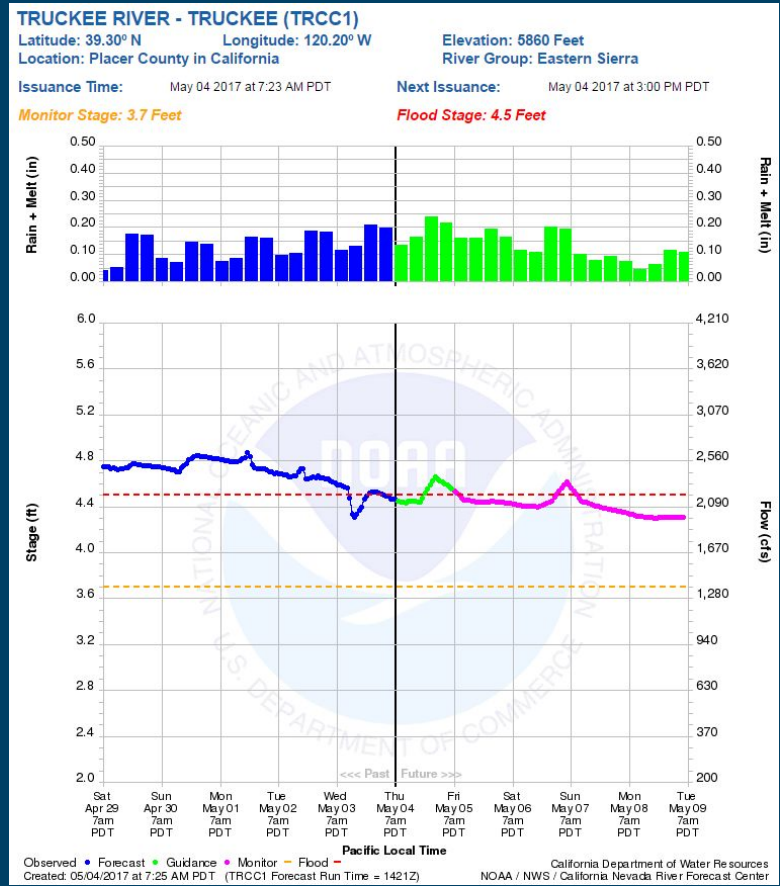


# 5 Day Simulation - Truckee River

5-day official forecasts - [CNRFC](#) or [NWS Reno](#)

## Truckee, CA

- Decreasing flows due to recent reduction in releases from Tahoe.
- Snowmelt flows will continue and increase some along creeks, streams nearby.
- Impacts mainly right along Truckee River - bike path affected. Some river home's basements, crawl spaces impacted.



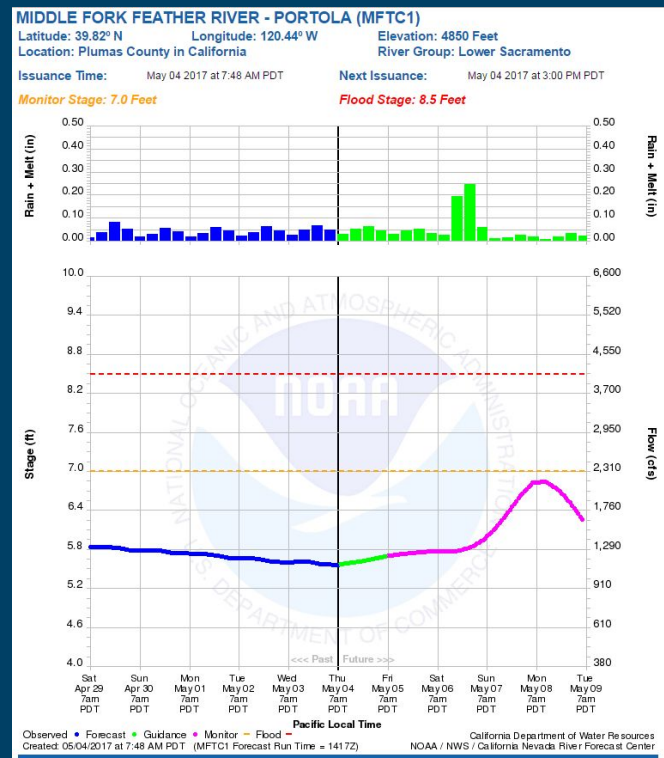
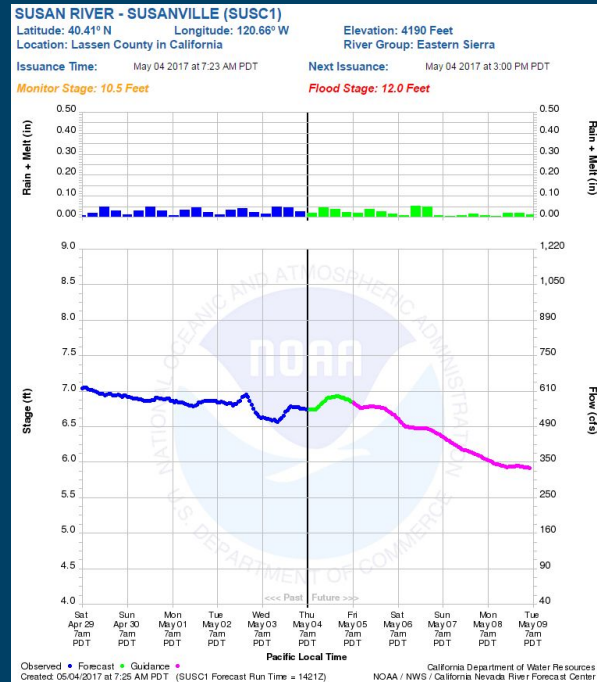


# 5 Day Simulation - Susan, Feather

5-day official forecasts - [CNRFC](#) or [NWS Reno](#)

## Susanville, CA

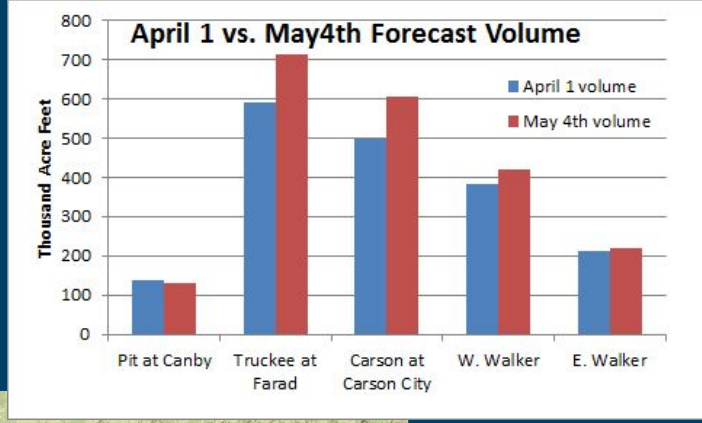
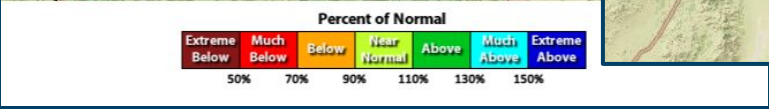
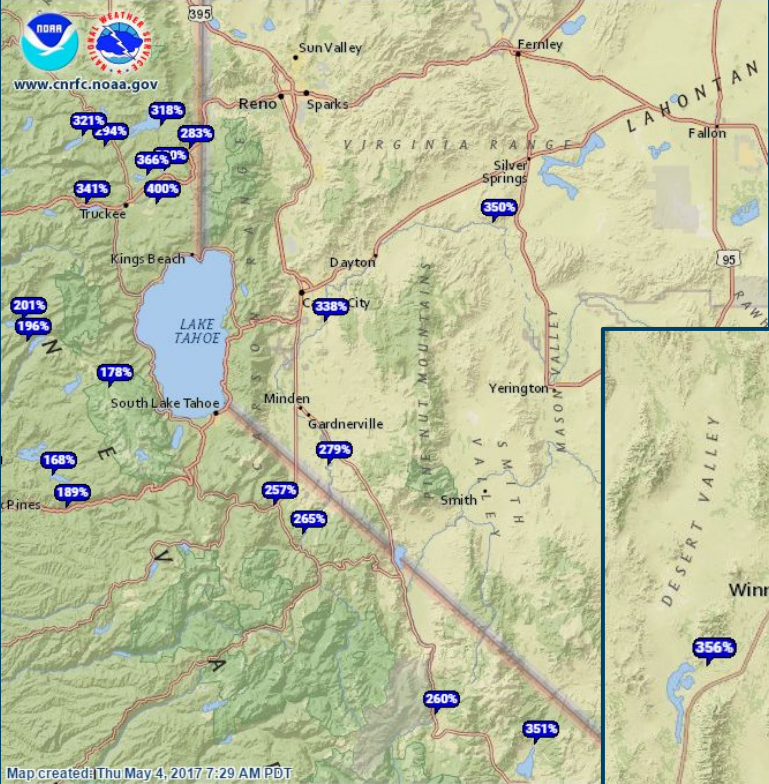
- Minimal snowmelt contribution, with gradually decreasing flows on mainstem Susan River
- Cold, fast water in area streams the main public safety issue through the weekend. Lots of water crossings!
- Feather River could rise to near monitor stages if weekend rains trend toward wetter scenarios. Area is quite saturated already.



# April-July Runoff Projections - NOAA

Water supply forecasts - [CNRFC](#)

Forecast ESP Water Supply Seasonal Volume (WY2017)





# Off to the Runoff Races...

Truckee @ Farad

**249%** of April 1 to date average

**90%** of April-July average

Walker @ Bridgeport

**306%** of April 1 to date average

**44%** of April-July average

Carson @ Ft Churchill

**310%** of April 1 to date average

**69%** of April-July average

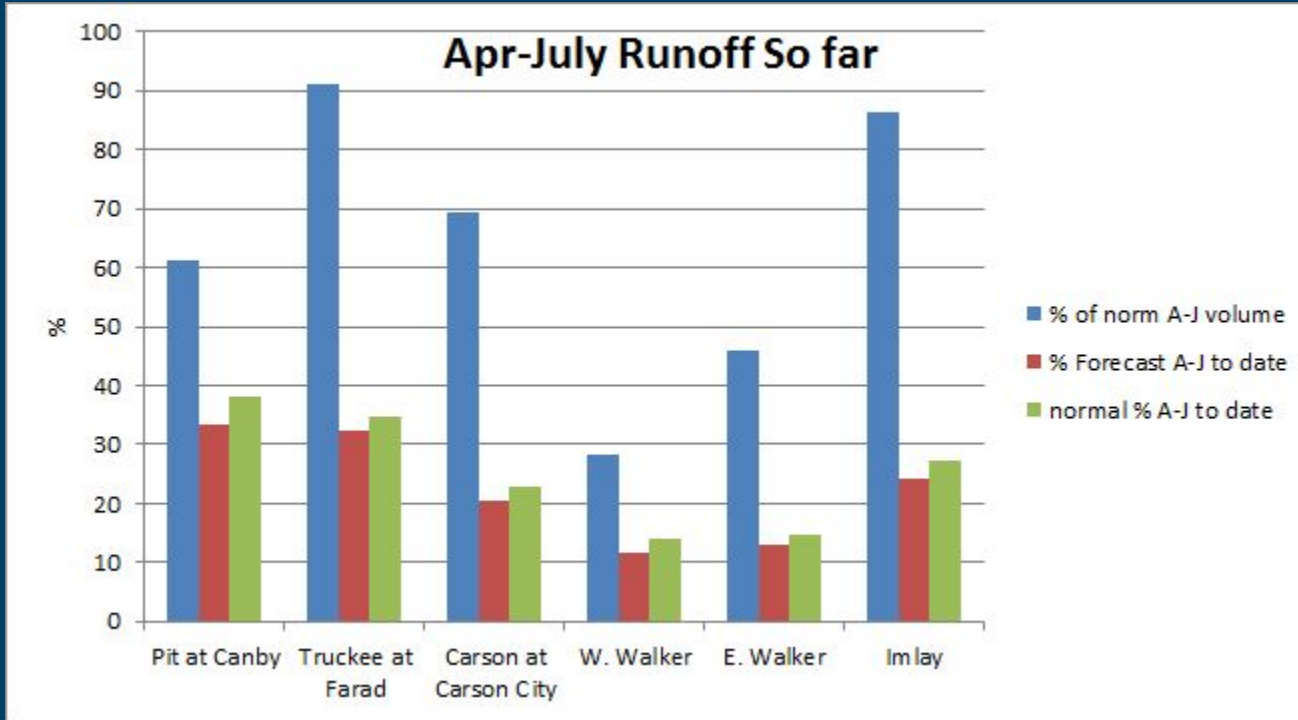
Humboldt @ Imlay

**320%** of April 1 to date average

**84%** of April-July average

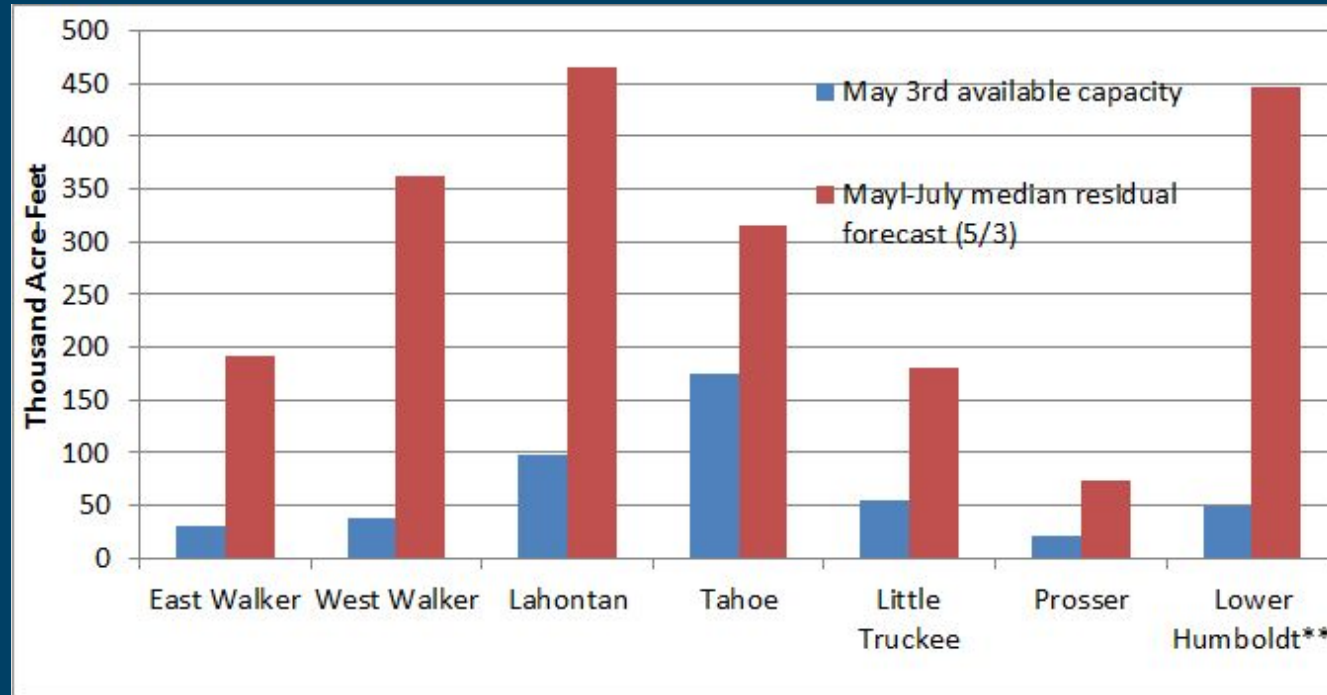


# April July Runoff to Date



- Impressive Spring time volumes, but **slightly below normal proportion** of April - July volume.
- **Runoff Slightly shifted to later in melt season.**

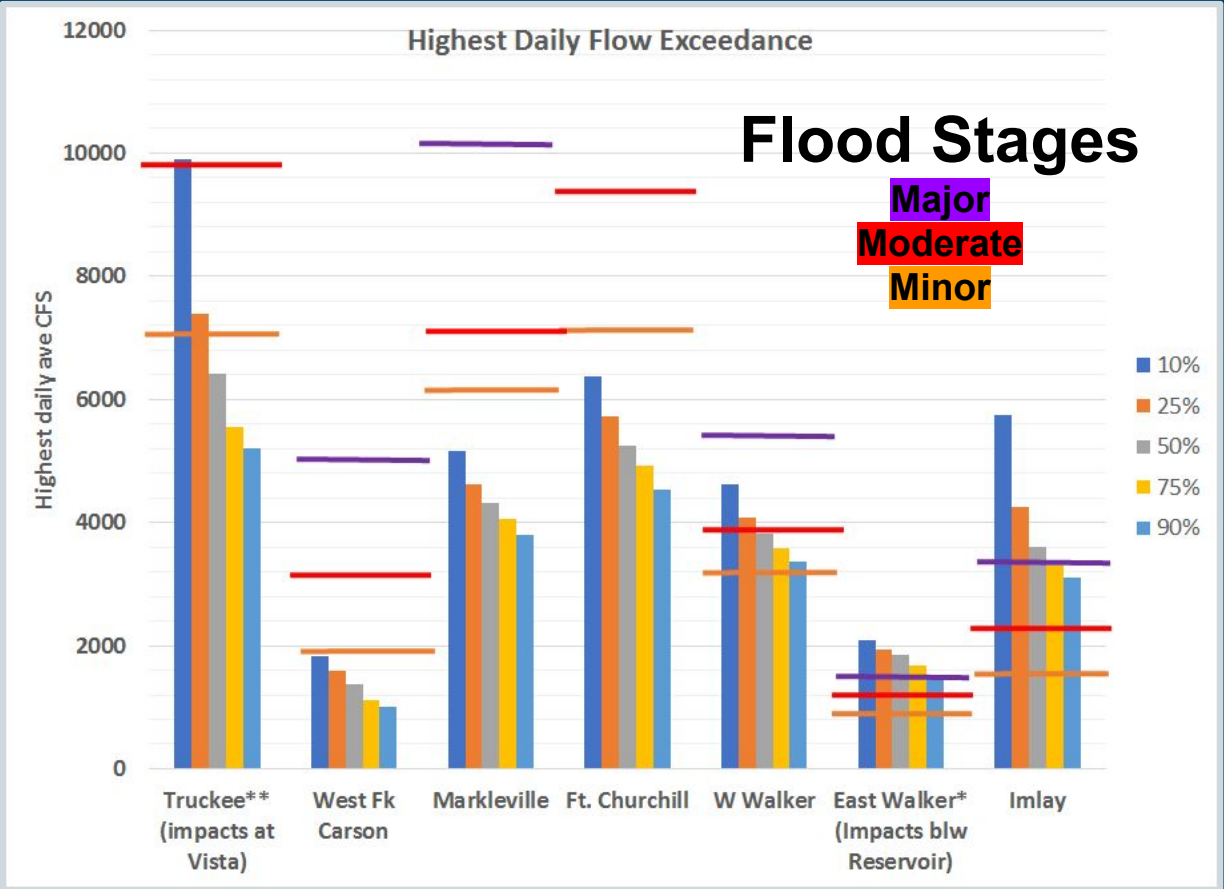
# Reservoir Space vs What's Coming...



**Reservoirs** - no big changes here; expected runoff greatly exceeds reservoir storage.



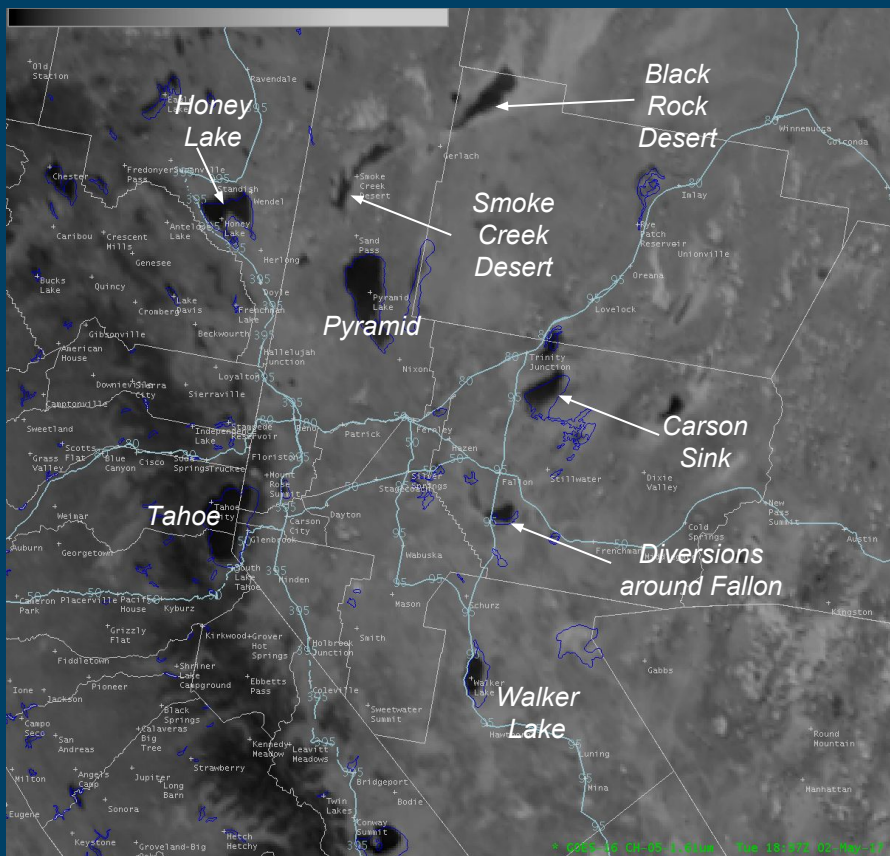
# Daily Peak Flow Exceedance Probabilities



## KEY ISSUES

- Likely range of highest daily flows
- Instantaneous flows will be higher, most dramatically at unregulated higher elevation locations
- More significant impacts may occur further downstream

# Status of Terminal Lakes - From Space



**Experimental GOES-16 imagery  
from May 2 @ 1137 AM.**

**Ch 5, 1.61 micron band  
Darkest spots = water.**

# Sierra Snowpack Melt-Off Dates

**Mt Rose - 8800 ft**

**Average Date - June 11**

**Big Snow Years - July 11-22**

**Leavitt Lake - 9600 ft**

**Average Date - July 1**

**Big Snow Years - Aug 3-17**

**So, how about my hiking trip this summer?**

**With 200+ percent of normal snowpack last winter, plan on melt-off dates similar to the “big snow years”. Or maybe later.**

*Notes: Data from NRCS Nevada Snow Survey SNOTEL sites. Using 1981-2010 for averages, 1983, 1995, 2011 for “big snow years”. Sheltered, north/east aspects remain snow covered much longer.*

Reno National Weather Service  
Forecasting for the Sierra and western Nevada since 1905



# Bonus Material

still useful content we needed to cut  
to make this 15 minutes...



*Detached anvil clouds south of Reno  
from earlier weak thunderstorms,  
5/3 ~630 PM*



# General Weather Key Points

- **Warm temperatures** continuing through Friday. Peak today with mid-80s W Nevada cities, mid-70s mountain valleys. Enjoy! Increases in snowmelt flows through Saturday as a result, but warming is too short, not intense enough for major rises. **Cold, fast water through weekend.**
- **A few thunderstorms** late afternoon through the evening, with isolated lightning, strong outflow winds, localized downpours. Low-medium confidence scenario. Best risk of storms in Oregon.
- Low pressure dropping through Friday-Sunday producing cooler temps and showers. **Likely period of “steady” rain Sat afternoon into early Sun morning** but not looking to be heavy or too impactful to rivers. **Snow issues for passes**, higher elevations Sat night into Sun as snow levels drop. Gusty SW winds this afternoon, again Friday; stronger S winds Hwy 95, Owens areas on Saturday.
- **Low pressure cutting off**, meandering eastward over SW US Sun-Wed next week. A known unknown! Predictability very low but recent trends are drier for our region with gradually warming temperatures. Rivers acting normal for early May. Possible colder, windy storm late week.

# Situational Awareness - When Should I Freakout?

Chris' 7-Day Regional Freakout Forecast for the Sierra and western Nevada

	Today	Friday	Saturday	Sunday	Monday	Tuesday	Wed+1
<b>Wind</b>	localized gusty SW winds	more widespread gusty SW winds	stronger S winds Hwy 95, Owens				
<b>Snow</b>			light snow high elevations, passes; impacts at mainly at night				
<b>River &amp; Snowmelt Flooding</b>	higher flows from snowmelt due to warmer temperatures with some spots nearing minor flood stages, but not widespread serious flood issues; rainfall Sat-Sun would enhance flows if it turns out heavier than forecast - maintain watch				likely cooler temperatures cutting back on snowmelt but flows remaining decent with monitor stages at some sites		
<b>Flash Flooding</b> (fast paced flooding of streams, poor drainage and steep terrain areas, rock slides, burn scar runoff)			Localized flash flooding in prone spots if heavier rains materialize				
<b>Thunderstorms</b>	isolated storms late day, evening	isolated storms pre-dawn					
<b>Unusual Cold or Heat</b>	starting off warm, then turning cooler - but nothing too unusual or record breaking						
<b>Fire Weather</b>	low elevation carryover grasses will dry out this week			conditions unfavorable for rapid fire spread - cooler, wetter			

## What Does This Mean?

Integrates impacts and confidence

No worries

Low level of freakoutness

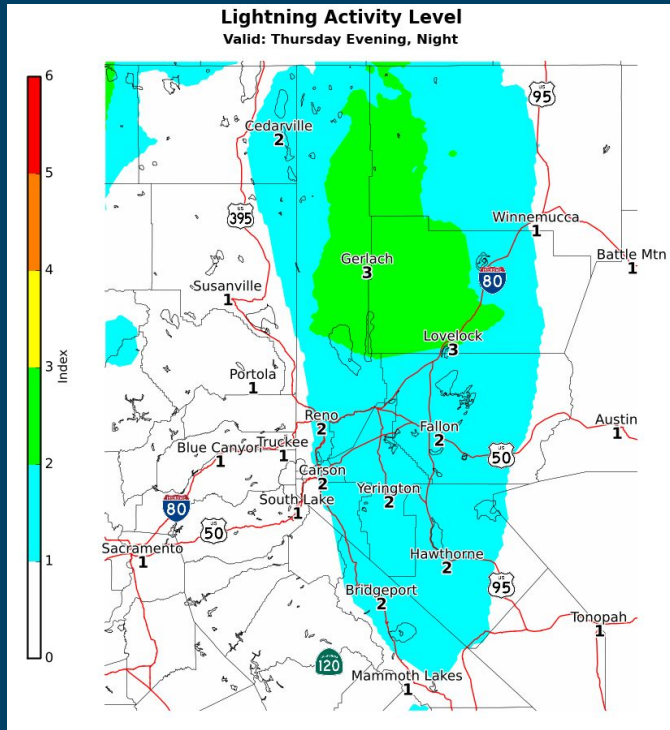
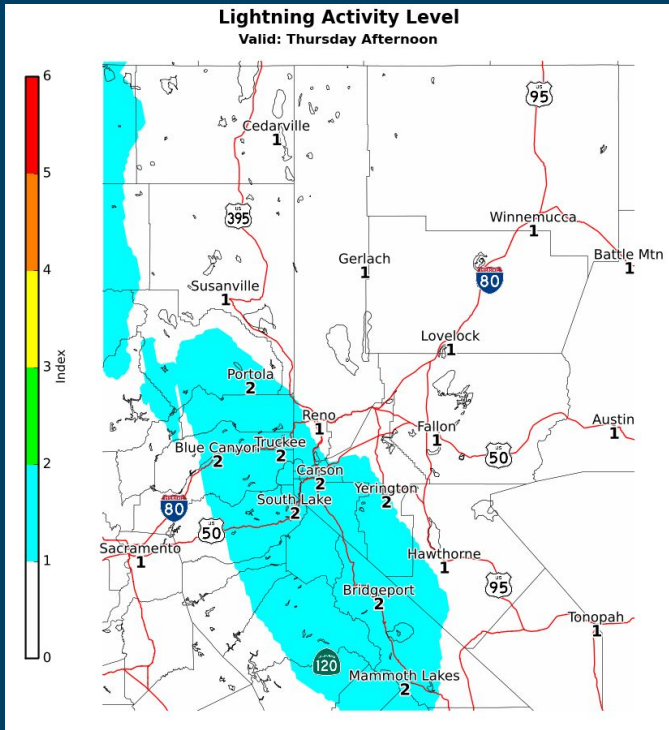
Moderate freakoutness

High freakoutness

End of this



# Thunderstorms Late Today, Tonight



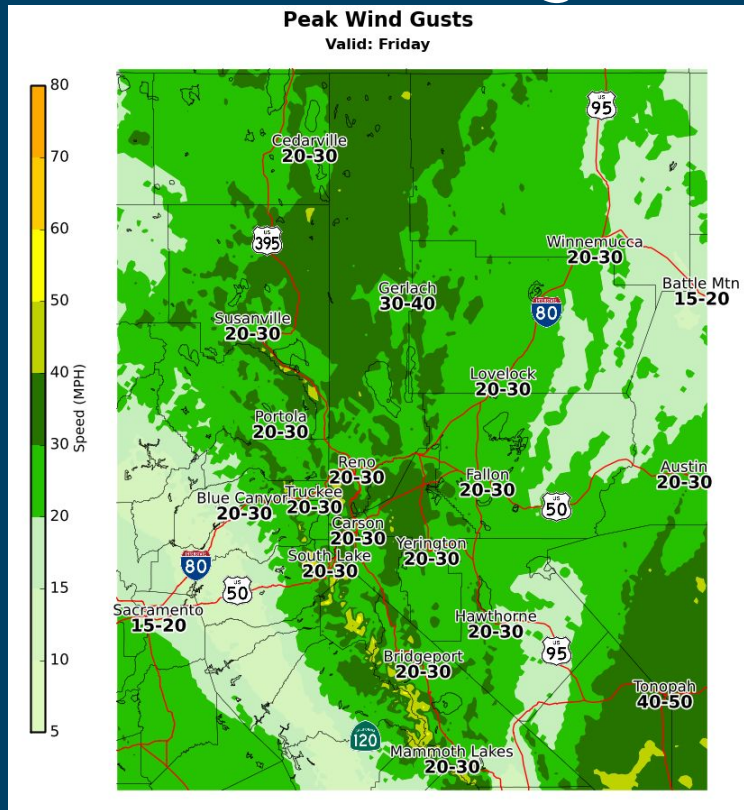
<b>What Does This Mean?</b> <small>Thunderstorm coverage</small>	No worries	Buildups, 1-2 storms	Isolated storms	Scattered storms	Numerous storms	Dry lightning!
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*Storm motions - fast to the N/E*  
*Hazards - lightning, outflow winds, brief downpours*

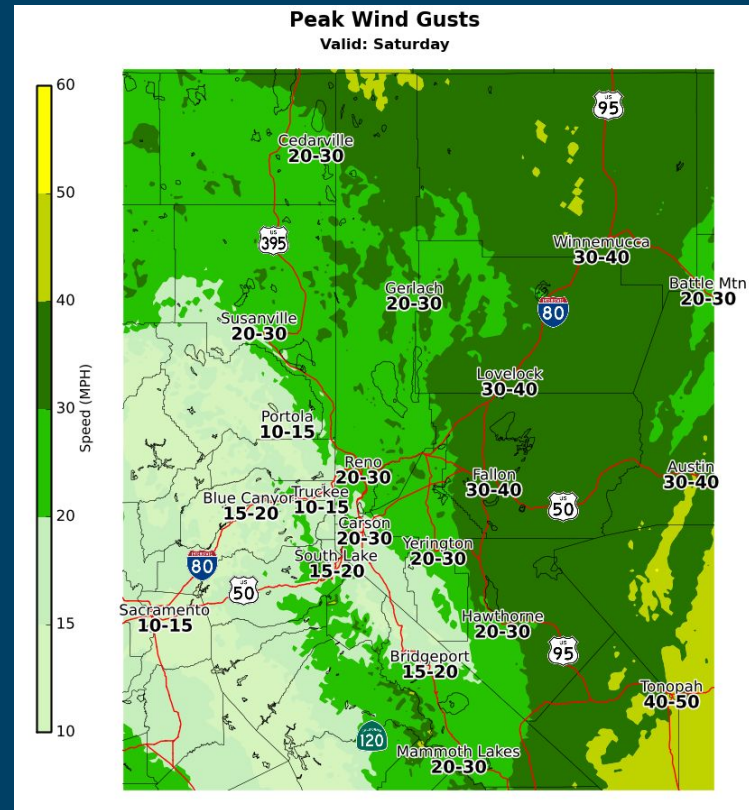
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# Localized Strong Winds Friday, Saturday



Mainly SW direction

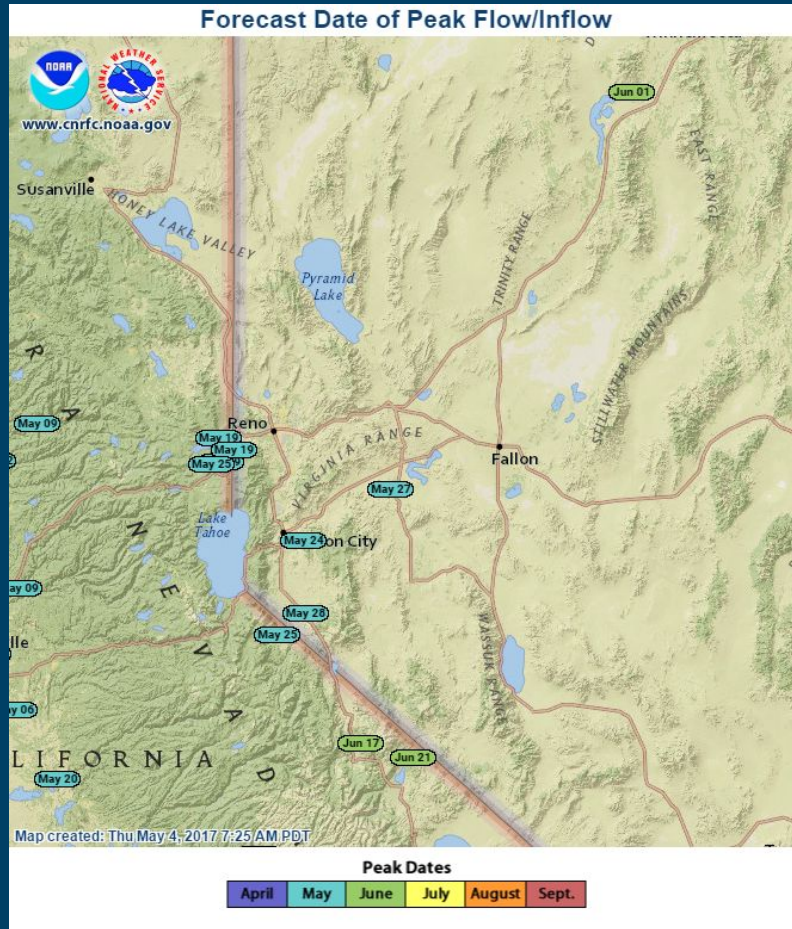


W/NW west of Hwy 95, S direction E of 95 and Owens



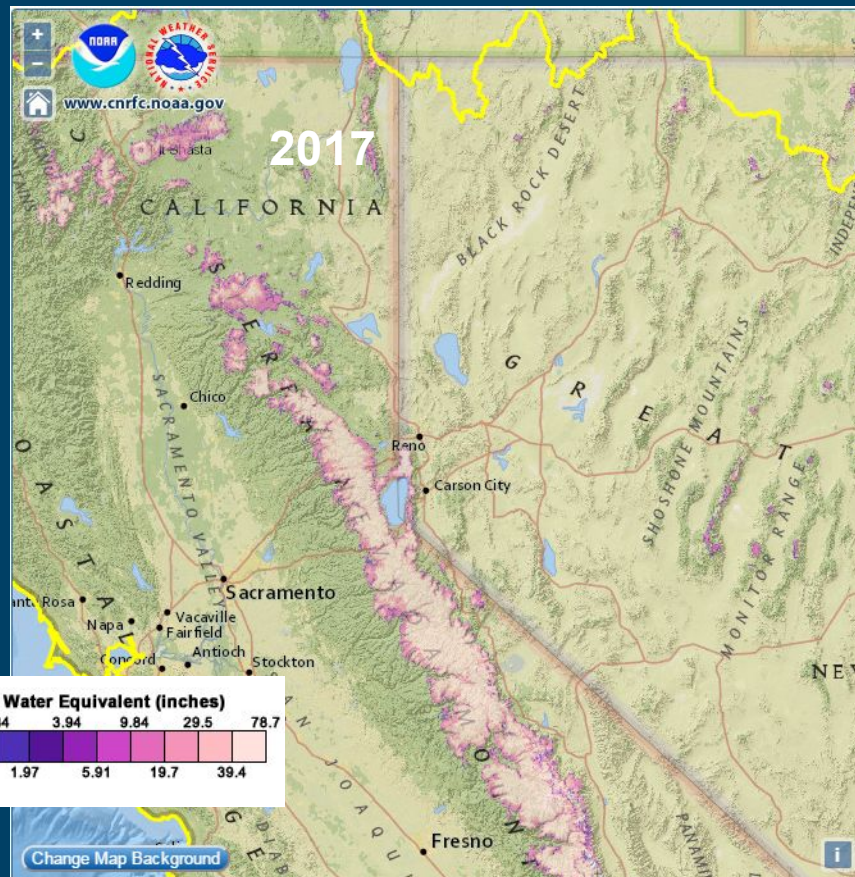


# Timing - Most Likely Peak Flow Dates



- Generally - late May into mid June for Sierra basins
- Peak dates tend to be delayed during large snowpack years.
- If cooler early-mid May forecasts pan out, these dates would end up getting pushed later.

# Modeled 2011 vs. 2017 SWE on May 4th





Snow Survey

- ☑ Snow Survey Products
- ☑ Water Supply Products



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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.



Latest Snow & Water Supply Information:

May 1, 2017 Water Supply Outlook Report - New

Snowpack Graphs - 2017 vs Big Years - 5/2

NWS Spring Flood Briefing - PDF - 5/1

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

Check out the new May Water Supply Outlook Report from NRCS Here: <https://www.nrcs.usda.gov/wps/portal/nrcs/main/nv/snow/>