

Heat Wave Scenario is Here

Hydro Partners Briefing on Snowmelt Flooding

chris.smallcomb@noaa.gov
tim.bardsley@noaa.gov
May 19 2017



Short Attention Span Brief

- Gradual warm-up through weekend. Snowmelt increases but **mainly minor flood impacts this weekend**. Fast, cold water with more rescue issues.
- Big warmup with 85-90 likely for W Nevada cities next week. 75-80 Bridgeport. Above freezing at night even in mountains. **Dramatic rise in snowmelt flows** at all elevations. *Looking like that prolonged heat trigger scenario.*
- **Big impacts for next week:**
 - Walker - **Major to record flooding** on Walker looking likely. Could be prolonged.
 - Carson, Truckee - High confidence in **minor to moderate mainstem river flood impacts**, affecting a broader area than from earlier snowmelt in April/May.
 - **2-3x current flows** along Carson, upper Walker, Truckee tributaries, E Sierra and Tahoe creeks and streams. Localized flooding issues in mountains E Sierra, Tahoe

Situational Awareness - When Should I Freakout?

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

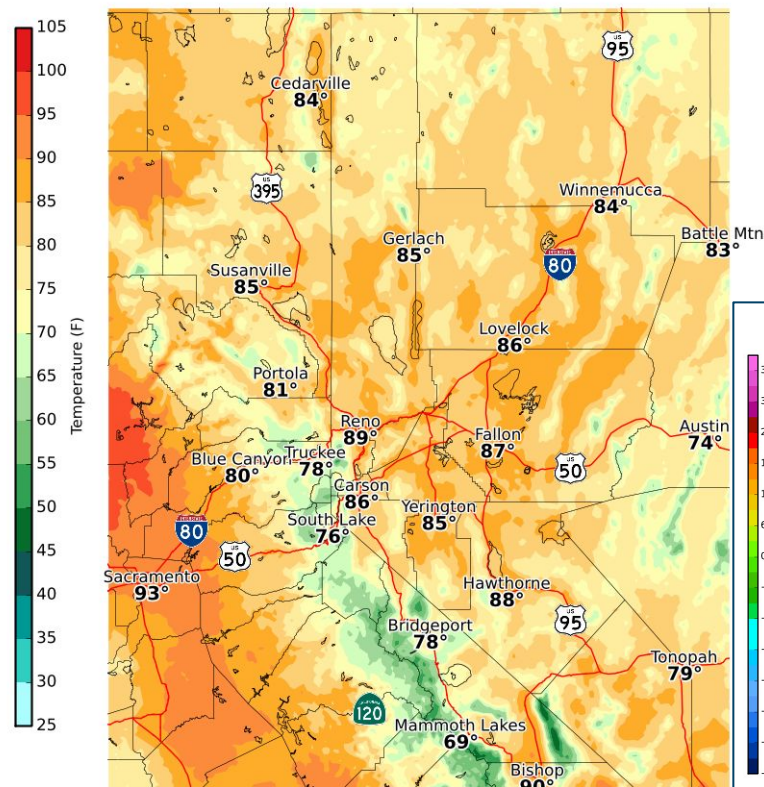
	Today ^{5/19}	Saturday ^{5/20}	Sunday ^{5/21}	Monday ^{5/22}	Tuesday ^{5/23}	Wed. ^{5/24}	Thursday ^{5/25}
Wind	generally light winds under 10 mph						
Snow	no snow						
River & Snowmelt Flooding	snowmelt flows gradually increasing as temps warm through the weekend; mainly minor flooding impacts overall			much warmer temps, rapid increase in flows especially Walker	for most areas - widespread minor to maybe moderate flooding issues as temperatures continue to warm; main-stem Walker likely to see major to record flooding!		
Flash Flooding (fast paced flooding of streams, poor drainage and steep terrain areas, rock slides, burn scar runoff)	no heavy rainfall signals, thankfully						
Thunderstorms			a few thunderstorms each afternoon/evening, mainly mountains but can't rule out valleys; no severe storms but could see localized heavy rain, gusty winds, lightning, hail				
Unusual Cold or Heat	no widespread freezes expected						
Fire Weather	conditions unfavorable for rapid fire spread				carryover grasses could dry enough from heat to burn, but no increased wind events anticipated		
What Does This Mean? Integrates impacts and confidence	No worries 	Low freakoutness 	Moderate freakoutness 	High freakoutness 	End of this (aka really bad) 		

Temperatures Heading Up

Most of next week will look like this...

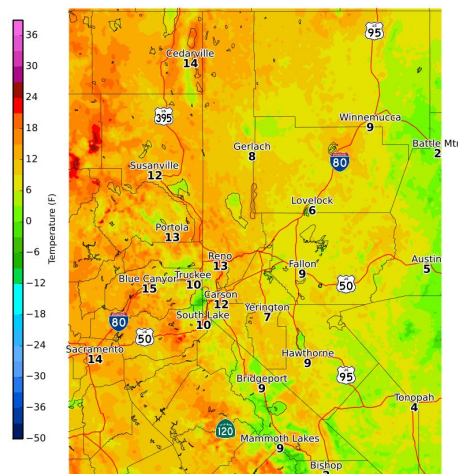
Afternoon Highs

Valid: Tuesday May 23, 2017



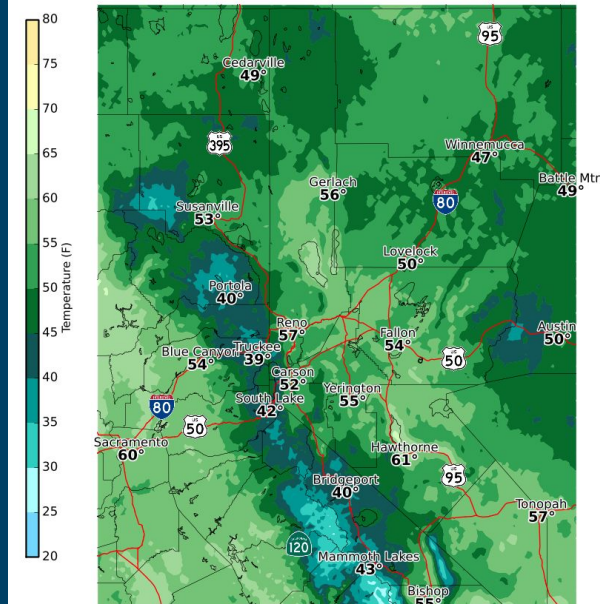
How Far Above or Below Normal

Valid: Tuesday



Morning Lows

Valid: Wednesday May 24, 2017

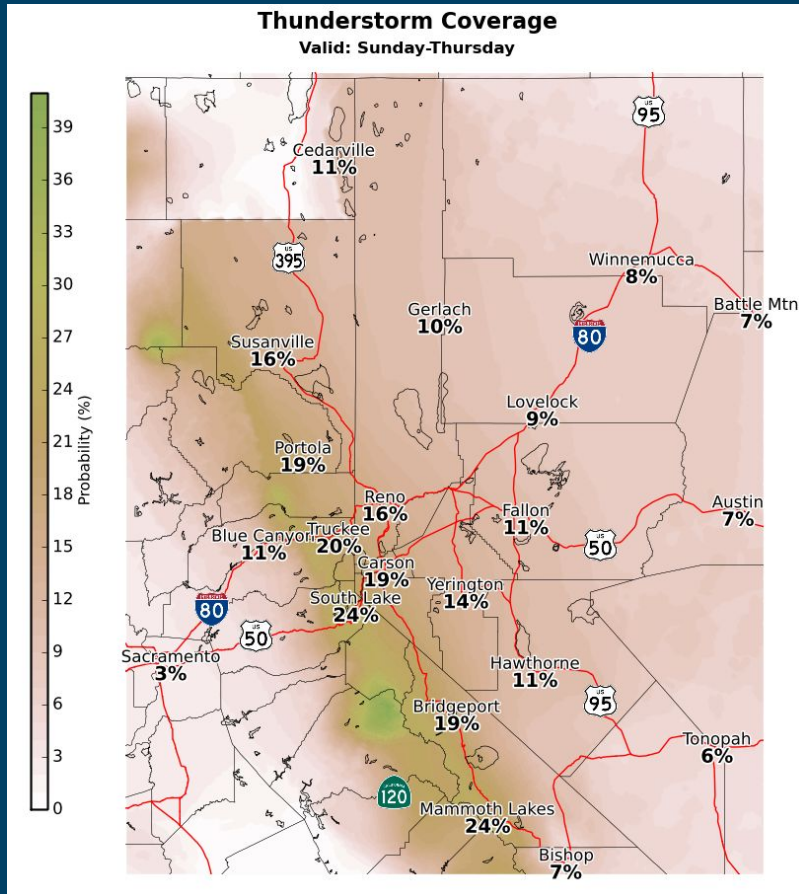


Reno National Weather Service

Forecasting for the Sierra and western Nevada since 1905



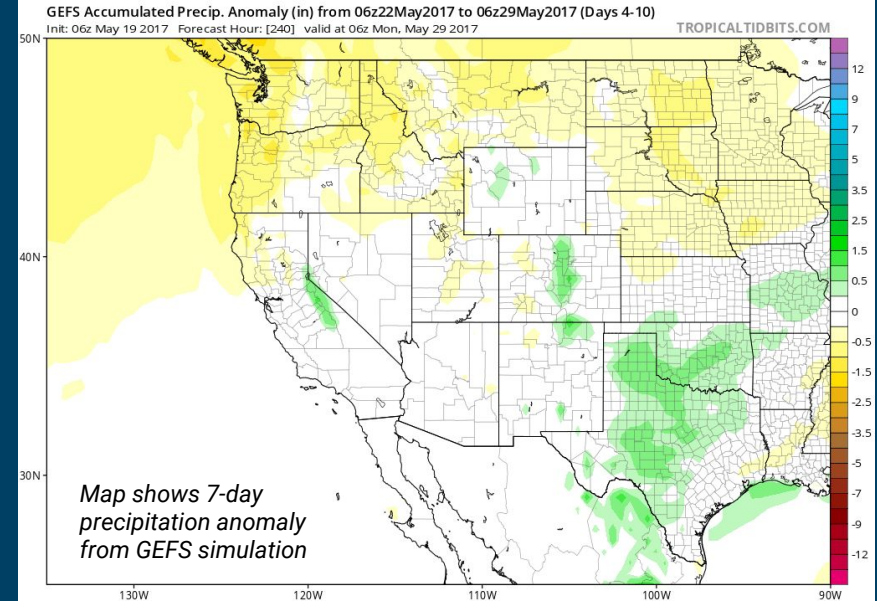
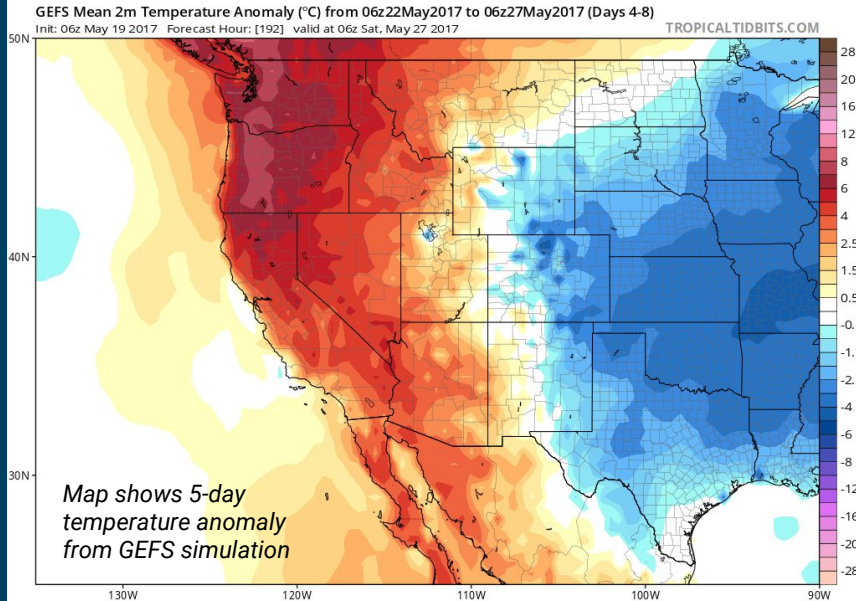
Thunderstorms Possible Each Afternoon/Evening



Potential Issues

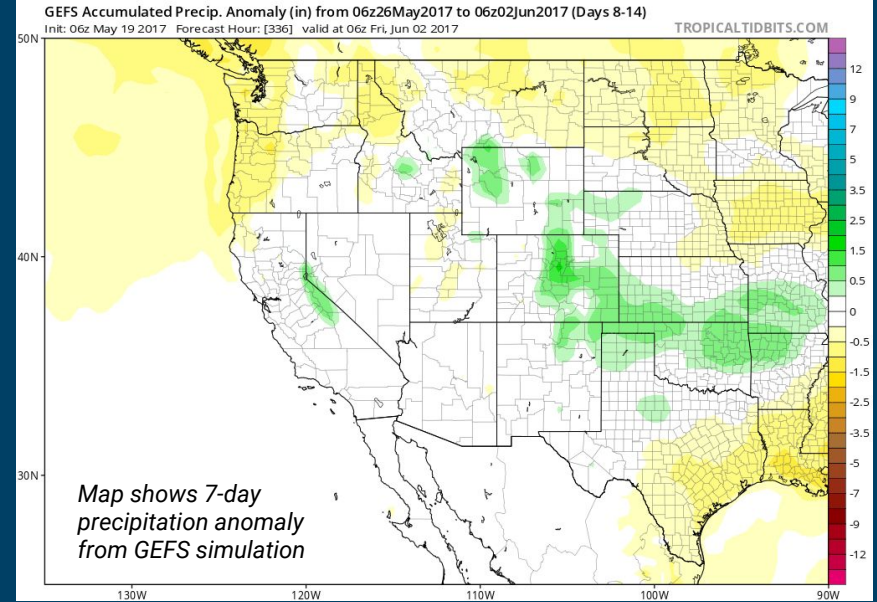
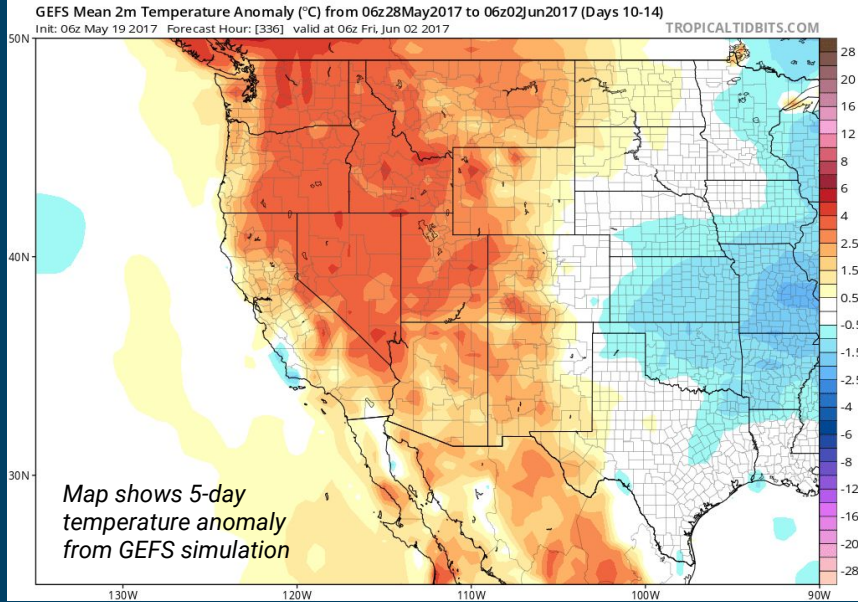
- Typical “pulse” like thunderstorms that don’t last long. No widespread severe storms or flash flooding anticipated.
- Favored timeframe - 3 PM to 8 PM
- Mainly isolated to scattered coverage over the mountains. Less likely in valley areas, but Wed and Thurs could see better coverage with SE winds.
- Hazards - lightning, brief downpours, small hail, and strong outflow winds.

Next Week Trending Much Warmer with Increasing Confidence



- Simulations unanimous showing warm temperatures next week, daily thunderstorms mainly over the mountains. Have trended higher on temps. Above normal temperatures for a prolonged period + plenty of sunshine = significant increase in snowmelt, widespread flooding issues.
- This is likely the start of core melt-off of the mid-high elevation snowpack. Plan for prolonged flooding.

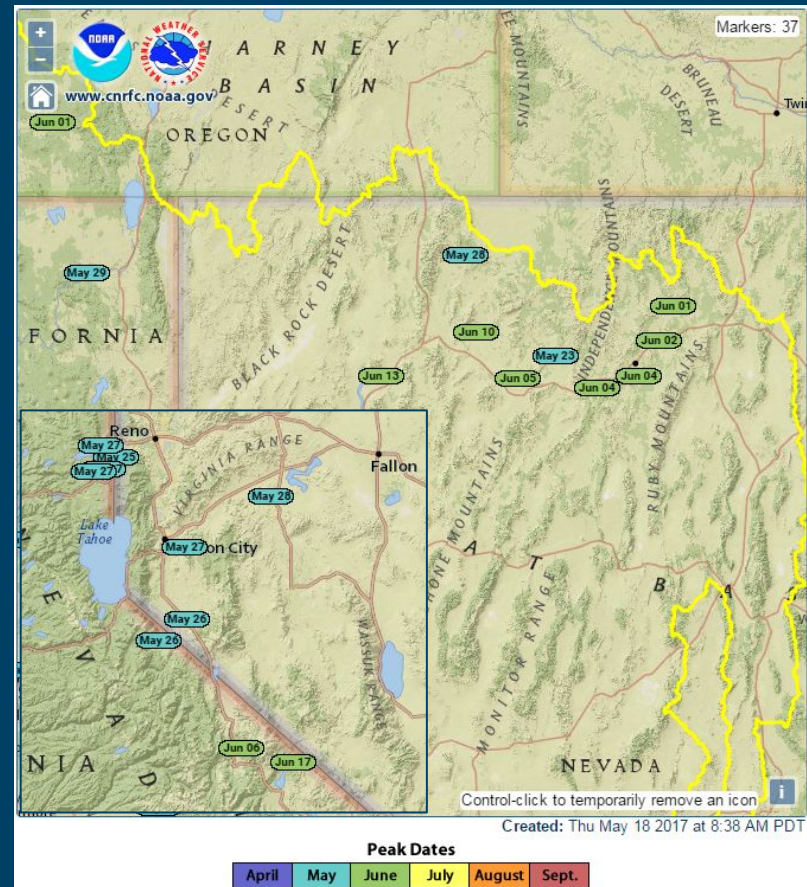
Following Week May 28 - June 3 Starting to Favor Continued Warm



- Simulations into early June are leaning more toward a warmer-than-normal outcome, with daily storms possible mainly over the mountains.
- Plan for continued flooding impacts, high flows. Severity remains lower confidence - but probably whatever happens next week will continue into early June.

Best Estimate of Peak Flow Dates

- Most likely peak flow dates in Eastern California and Western NV have shifted a bit earlier with major warm up.
- Range of likely dates are available [here](#).
- Mid-Late May warming looking similar to 1983. Increased probability of earlier vs. later peak for headwater streams.
- Although some rivers could reach peak flows as early as late next week, extended very high flows with additional peaks are likely.
- Peak flows at downstream points will be delayed and prolonged.



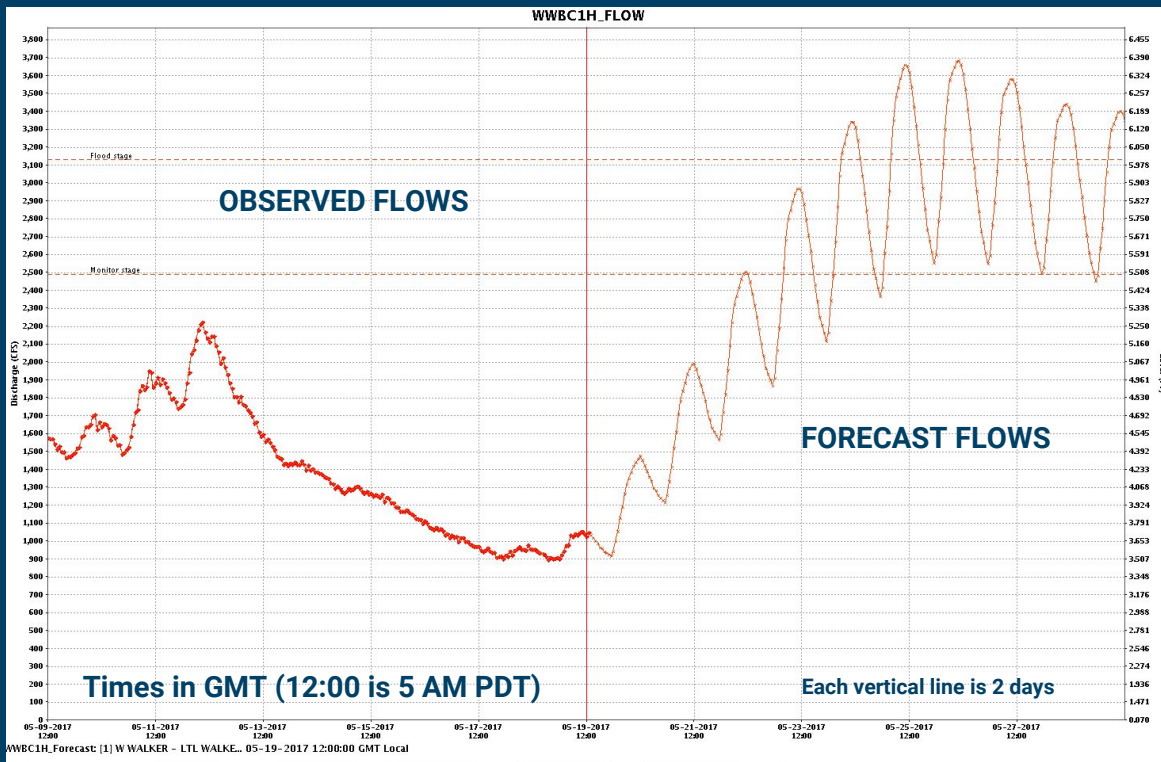
10 Day Simulation - West Walker River

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

Sonora Junction, CA

- Substantial rises in snowmelt flows due to warming temperatures starting this weekend. **3-3.5 times current flows!**
- Flood stages likely starting Tuesday-Wednesday next week. Probably continuing all week.
- Impacts - Minor to moderate flooding of pasture & rural roads in West Walker River Canyon and Antelope Valley, including Walker, Coleville, Topaz, and Smith Valley

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



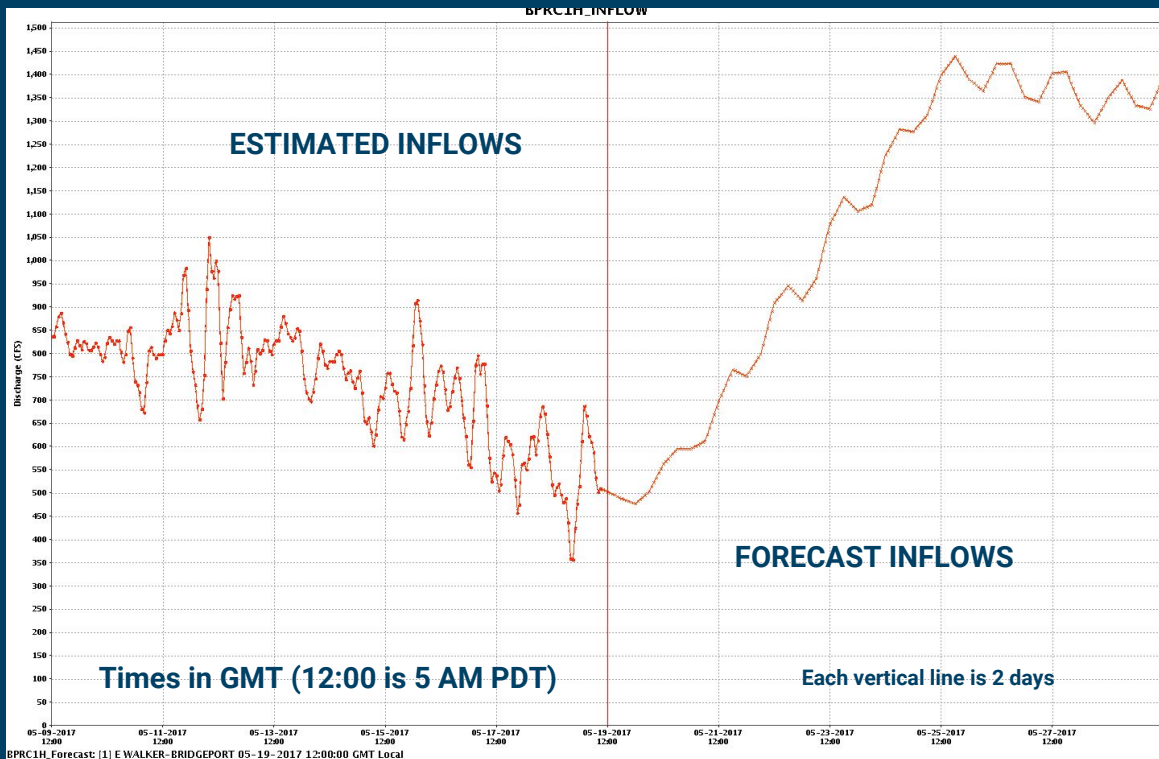
10 Day Simulation - East Walker River

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

Bridgeport Reservoir Inflows

- **IMPORTANT:** These are estimated inflows, no gauging data to calibrate from so increased margin of error.
- Substantial increase in snowmelt flows into the reservoir. **Potentially 2 to 3 times current inflows next week.**
- **Inflow expected to exceed planned increased release by Tuesday.**

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

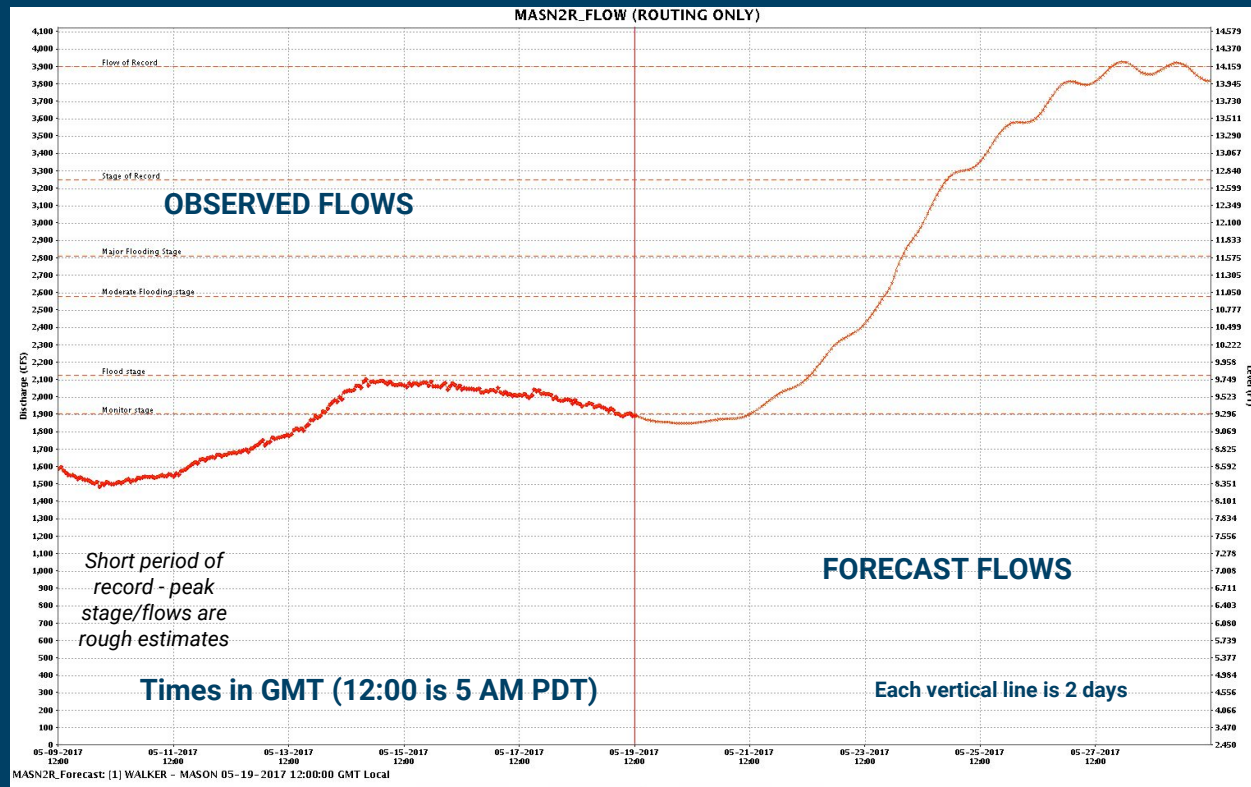


10 Day Simulation - Walker River

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

Yerington/Mason, NV

- It's **looking more and more likely that the major flood scenario will occur**, even with reservoir management changes.
- Major flooding** starting **Tuesday**. **Possible record levels**.
- Keeping it real: **We don't know how bad this will get**. **Never measured these levels before.**



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

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

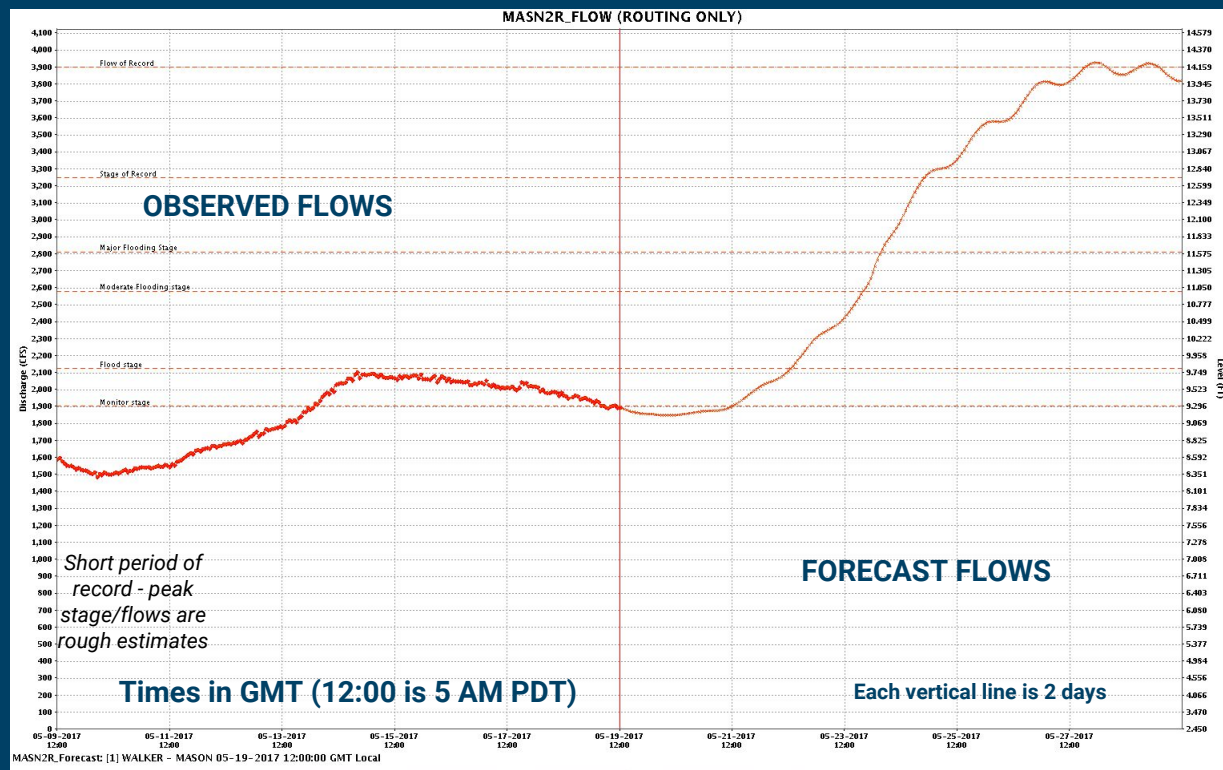


10 Day Simulation - Walker River

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

Yerington/Mason, NV

- Trending toward being **long-duration flood** as temps Memorial Day into early June are leaning warm.
- **Will this lead to an earlier peak?** Latest simulations have **tipped odds a little toward that being the case, but we have very low confidence**. Still a ton of snow left up top.



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

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

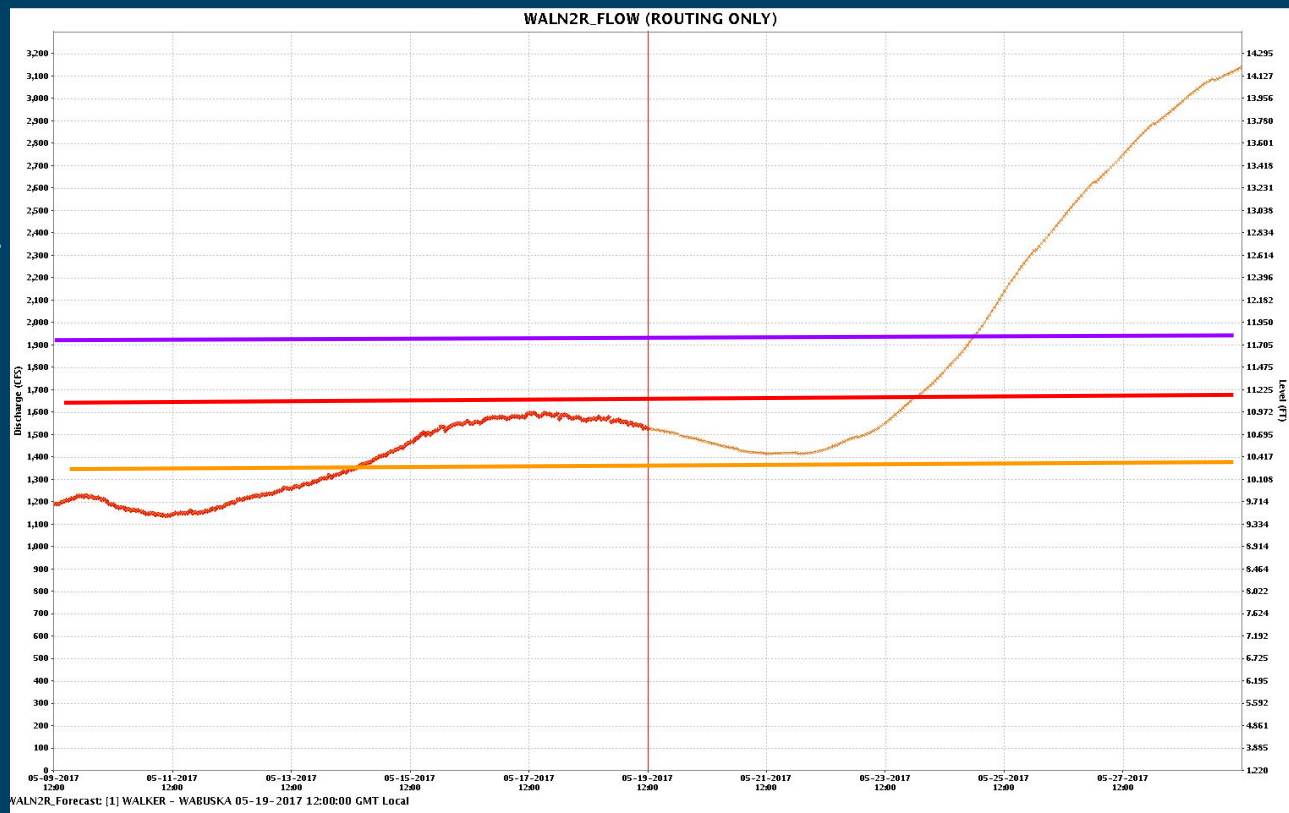


10 Day Simulation - Walker River

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

Wabuska, NV

- Major Flood Wave pushing to Wabuska and beyond to Weber Reservoir and Schurz
- Exceeding estimated major flood stage at Wabuska ~ Wednesday 5/24 afternoon.
- ~ 18 to 24 hour lag to Weber Reservoir.
- Long duration and high volume event will likely result in flood impacts below Weber Reservoir.



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

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

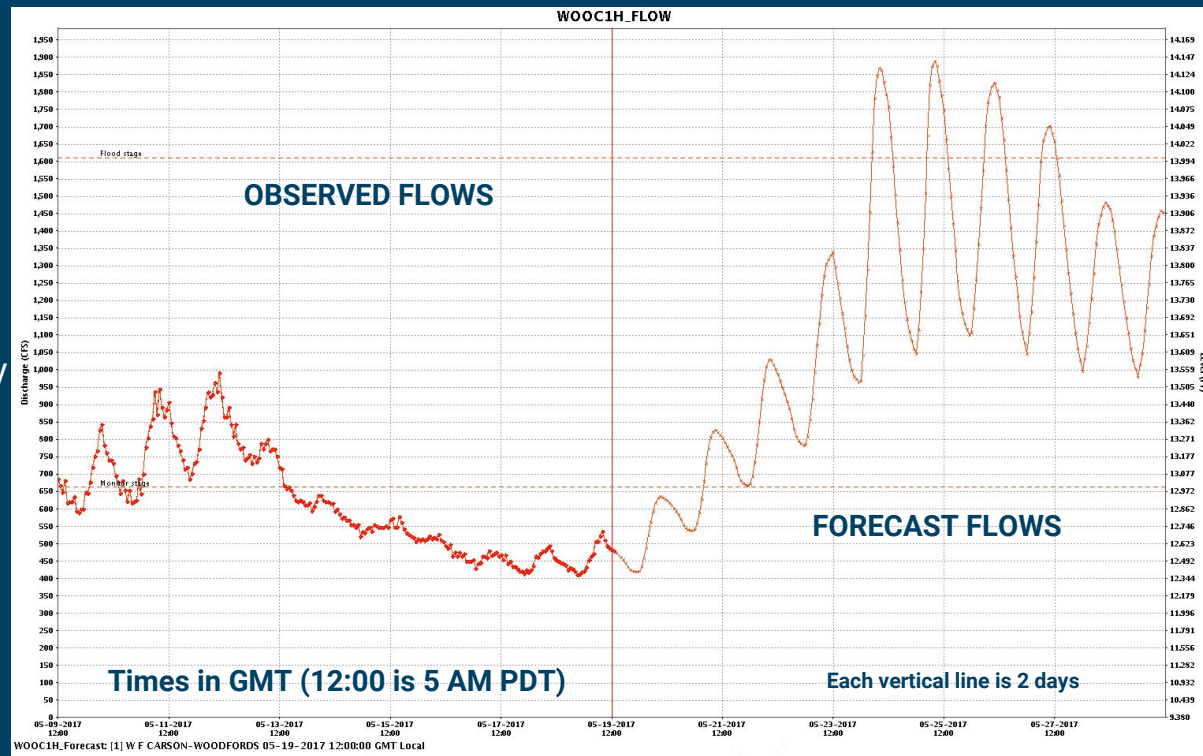


10 Day Simulation - West Carson River

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

Woodfords, CA

- Rises in snowmelt flows due to warming temperatures starting this weekend. **3-3.5 times current flows!**
- Flood stages likely starting Tuesday-Wednesday next week. Likely continuing all week.
- Impacts - Broad minor flooding in the southwestern Carson Valley between Centerville and Genoa NV.
- Odds increasing that this will be peak flows for spring-summer.



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

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

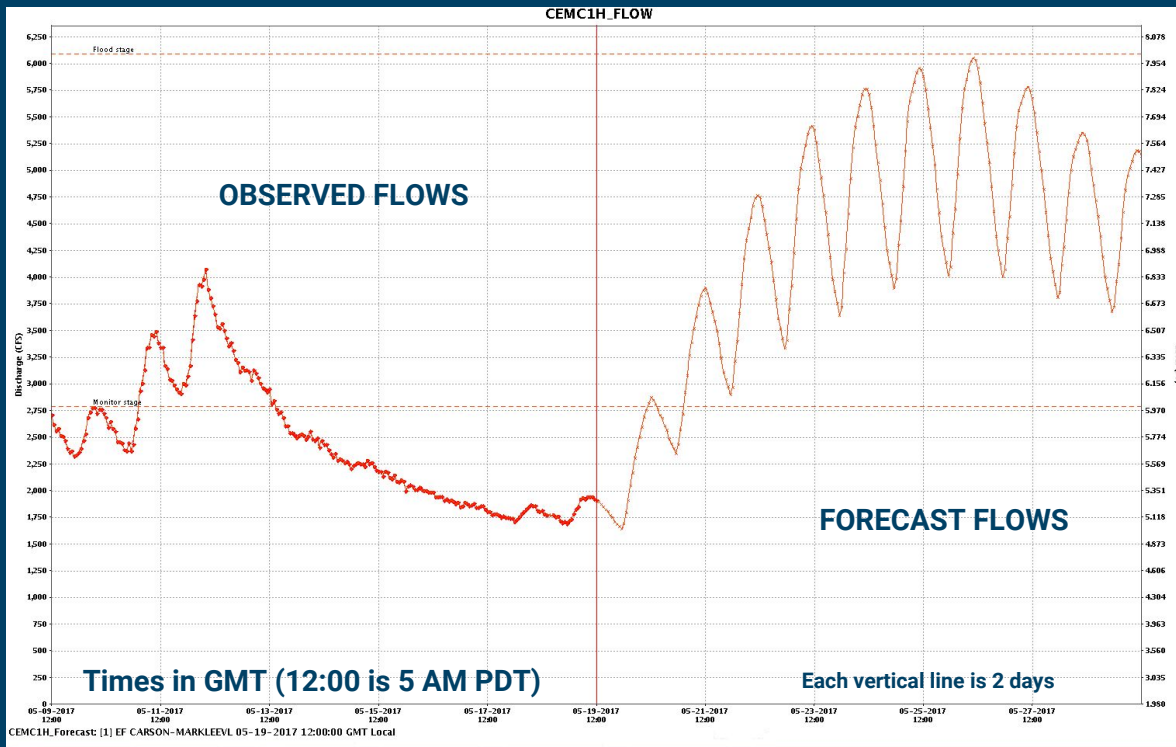


10 Day Simulation - East Carson River

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

Markleeville, CA

- Substantial rises in snowmelt flows due to warming temperatures starting this weekend. **2.5-3.5 times current flows.**
- Well into monitor stages all week, possibly approaching flood stages Wednesday-Thursday next week.
- Impacts - Broad minor flooding in lowest, flood prone portions of Carson Valley.
- Odds increasing that this will be peak flows for spring-summer.



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

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



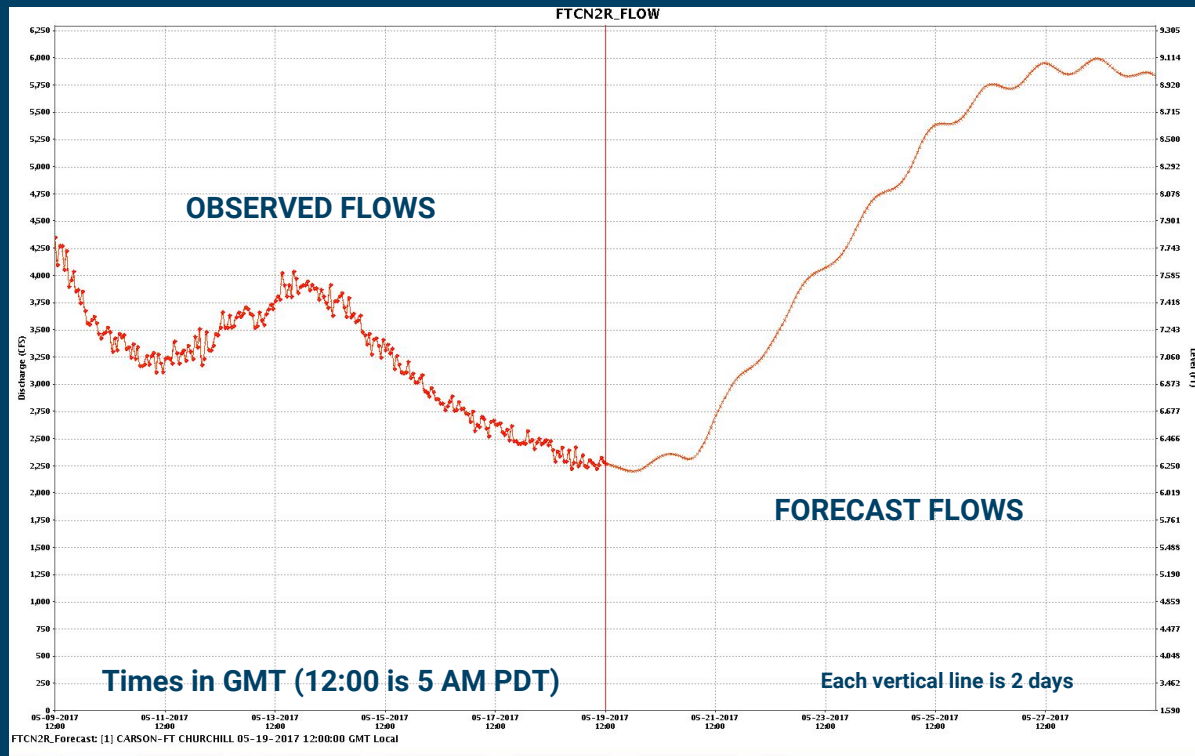
10 Day Simulation - Carson River

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

Ft. Churchill, NV

- Significant increase in snowmelt flows next week. High confidence.
- Projections for next week have **~2.5 times the current flows into Lahontan.**
- **Puts us quickly back into scenario with inflows exceeding releases.**

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



Reno National Weather Service

Forecasting for the Sierra and western Nevada since 1905

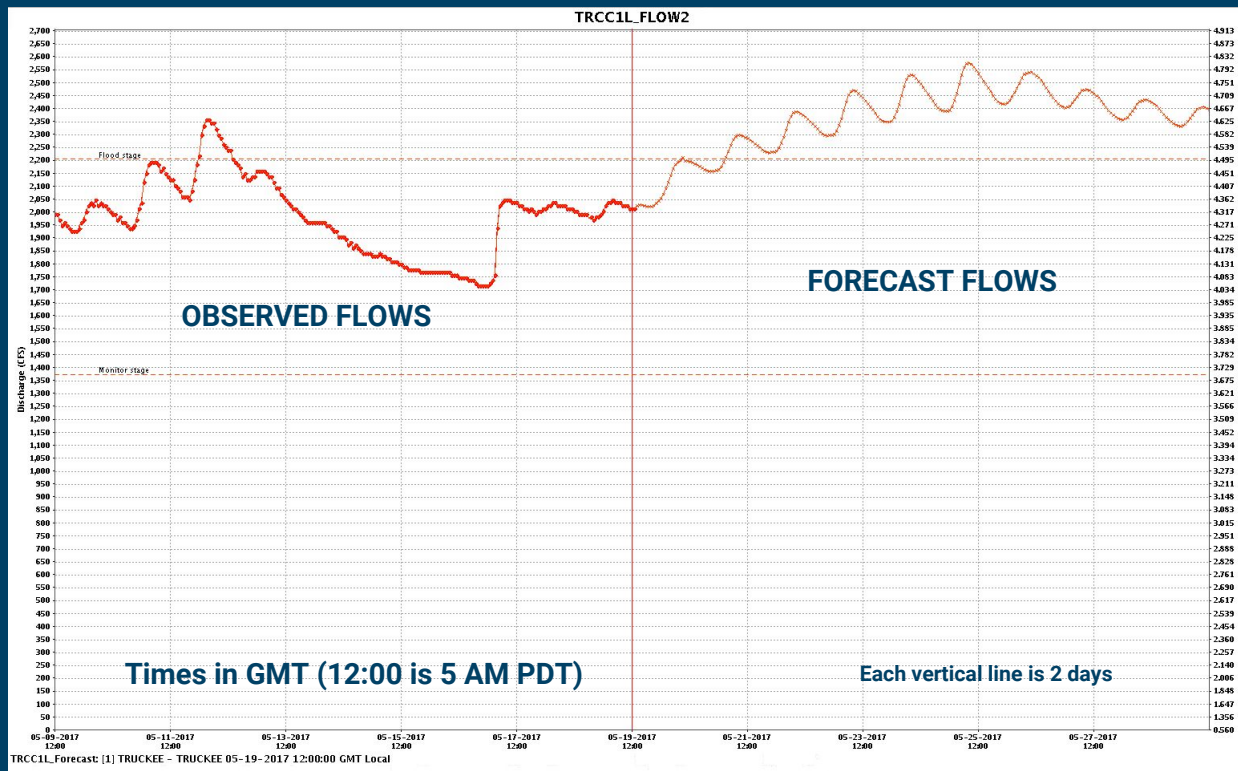


10 Day Simulation - Truckee River

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

Truckee, CA

- **IMPORTANT:** Simulation assumes status quo water management, which may change depending on later weather forecasts.
- Flows increasing next week, mainly due to increased snowmelt flows from tributaries.
- Minor flooding impacts right along the river, issues we've seen already. Some riverfront basements, yards, campgrounds impacted.
- Odds increasing that this will be peak flows for spring-summer.



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

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

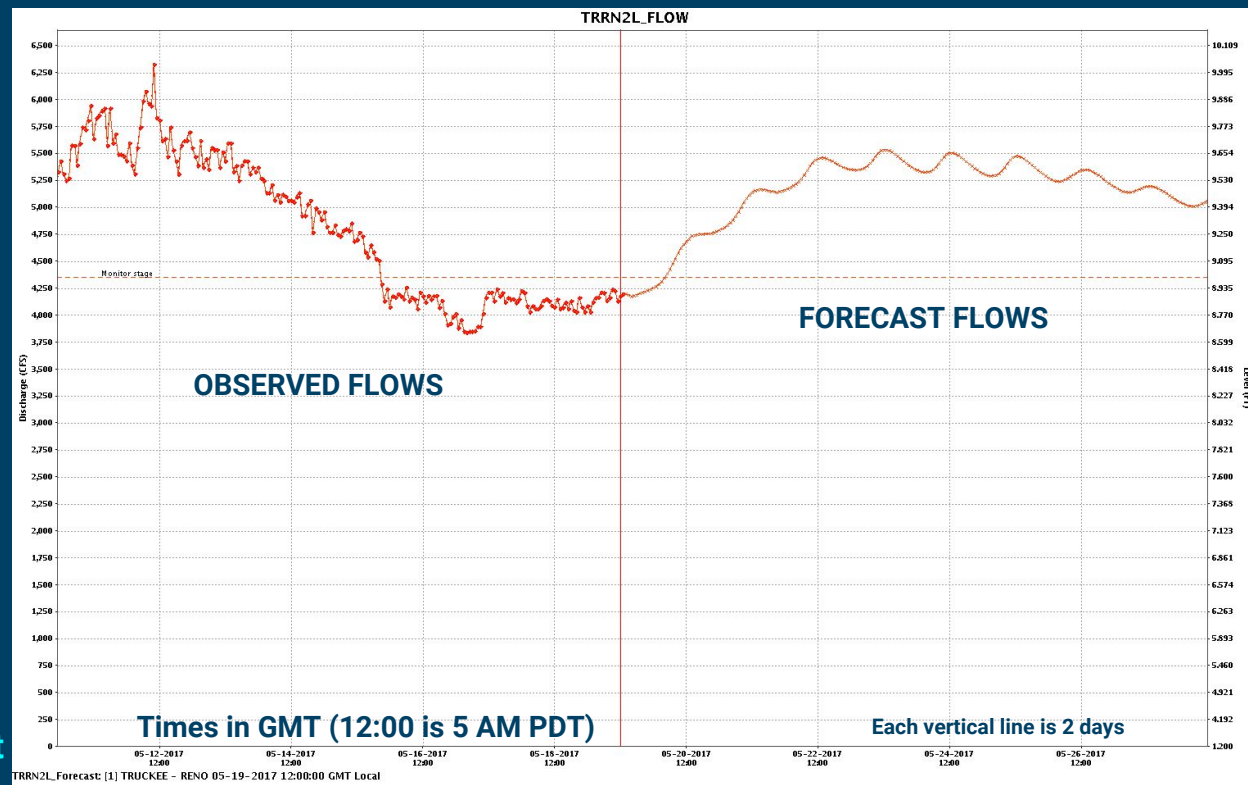


10 Day Simulation - Truckee River

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

Reno/Sparks, NV

- **IMPORTANT:** Simulation assumes status quo water management, which may change depending on later river/weather forecasts.
- Flows gradually increase due to snowmelt from tributaries + releases. Monitor stages at both Reno and Vista gauges.
- Minor flooding impacts right along the river, issues we've seen already. **Fast, cold water = increased rescue incidents when it gets warm out.**



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

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



Eastern Sierra Outlook General Guidance

Eastern Sierra Creeks/Streams

- NWS does not have specific river simulations in the eastern Sierra, aside from Walker River basin. So we use projected rises on the Walker River and internal (highly) experimental National Water Model guidance.
- Best estimate -- flows next week coming out of the unregulated eastern Sierra mountain streams and creeks are likely to be **2.5-3 times current flows. Smaller creeks likely 3-4 times current flows, especially Inyo drainages.**
- Flood impacts already observed in April/May likely to be more widespread in the coming 7-10 days. **Severity remains highly uncertain.**



Source - [LADWP Real-time data](#)



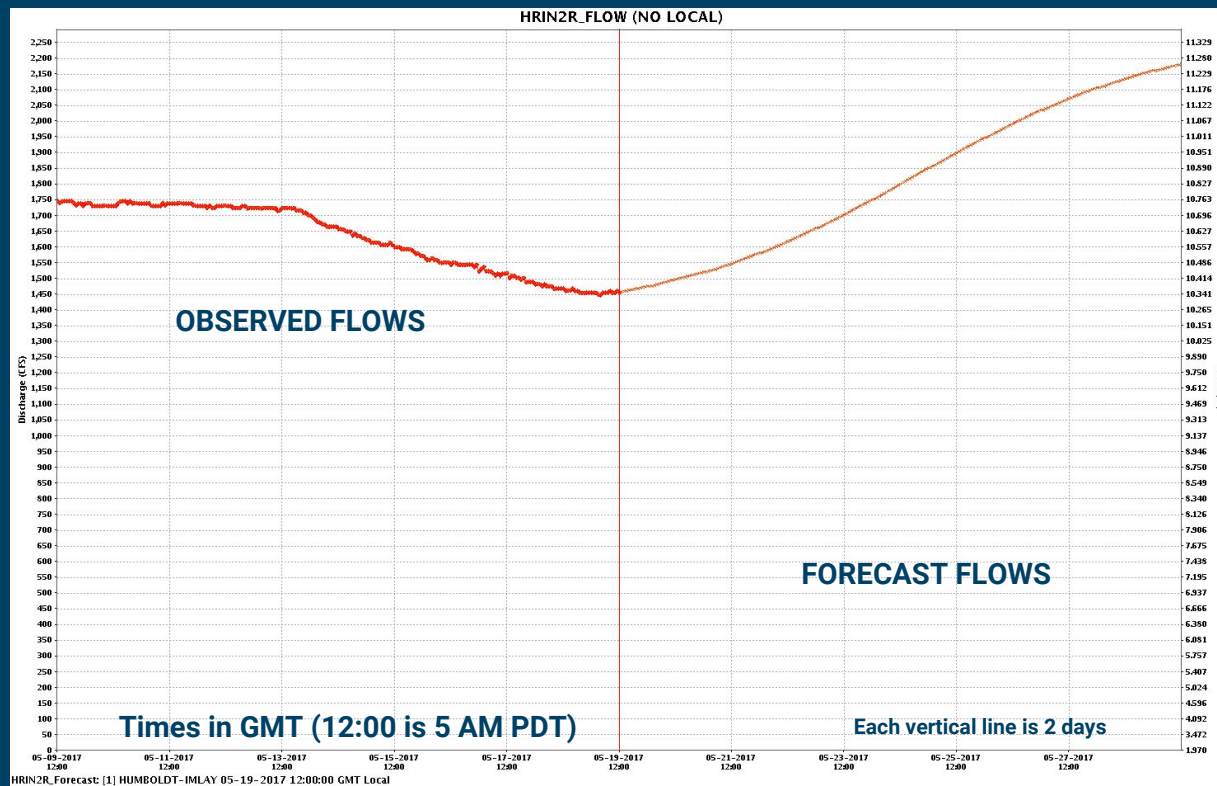
100 = not available at this time

10 Day Simulation - Humboldt River

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

Imlay/Rye Patch, NV

- Currently in minor flood stages with localized impacts to rural roads upstream of Rye Patch.
- Additional snowmelt and large, slow moving wave of increased water working down river.
- Rising to near or above moderate flood late next week. Impacts remain localized to rural roads in Pershing County.
- More water into Humboldt Sink.



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

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



Situational Awareness - When Should I Freakout?

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

	Rest of May	June	July	August
Walker River Basin	rapidly increasing flood coverage/severity due to late month warming	river basin at highest risk - major impacts Lyon County, plus impacts in Mono Co	likely on a downward trend but uncertain how quickly	high water but likely on downward trend
Carson River Basin	increasing flood coverage due to late month warming but not as high a confidence in severity	next biggest concern - esp Carson Valley, downstream of Lahontan	high water but likely on downward trend	
Truckee River Basin	heavily regulated system; main flood issues above Truckee, CA	high flows persist; flood risk depends on heavy rain trigger		
Tahoe Basin Creeks/Streams	during upcoming warm periods	big time snowpack, lots of streams		
NE California Basins				
E Sierra Creeks/Streams	during upcoming warm periods	big time snowpack, lots of streams but a number of unknowns		
Lower Humboldt River Basin	slow moving flood; impacts most substantial Winnemucca eastward			

What Does This Mean?
Integrates impacts and confidence

No worries



Low
freakoutness



Moderate
freakoutness



High
freakoutness



End of this (aka
really bad)



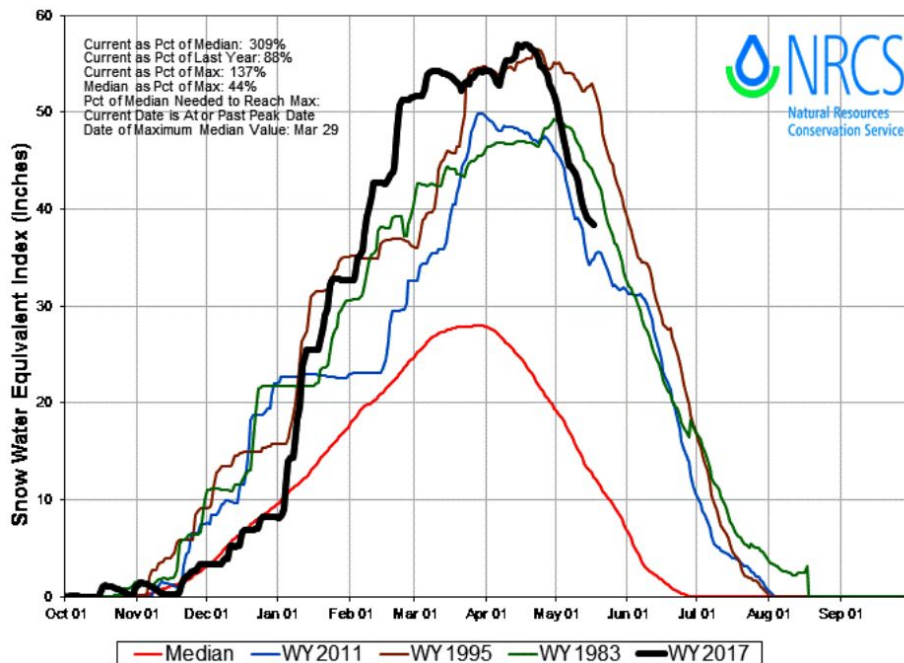
Reno National Weather Service

Forecasting for the Sierra and western Nevada since 1905

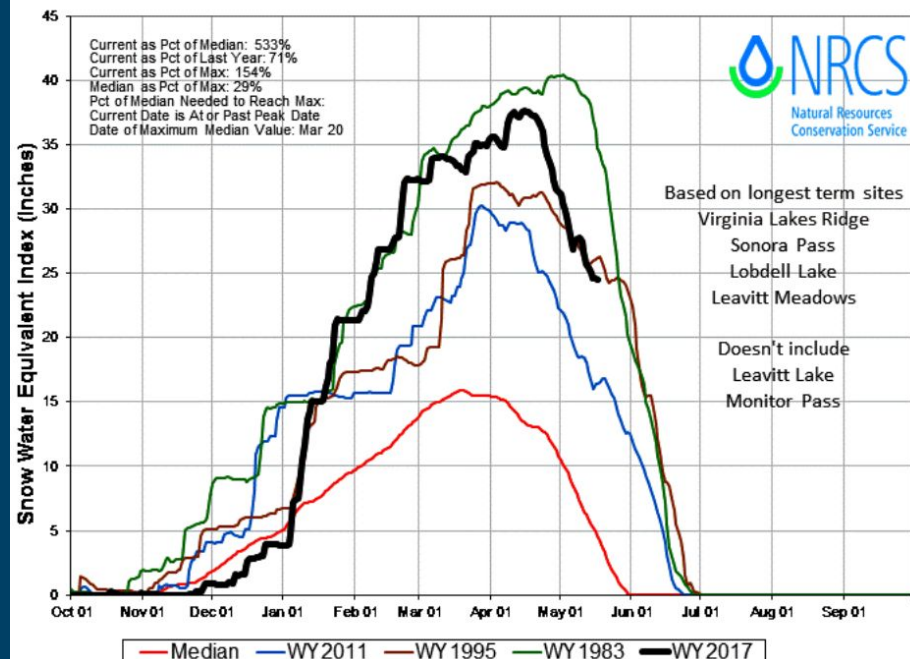


Past Peak Snowpack, But How Fast a Drop?

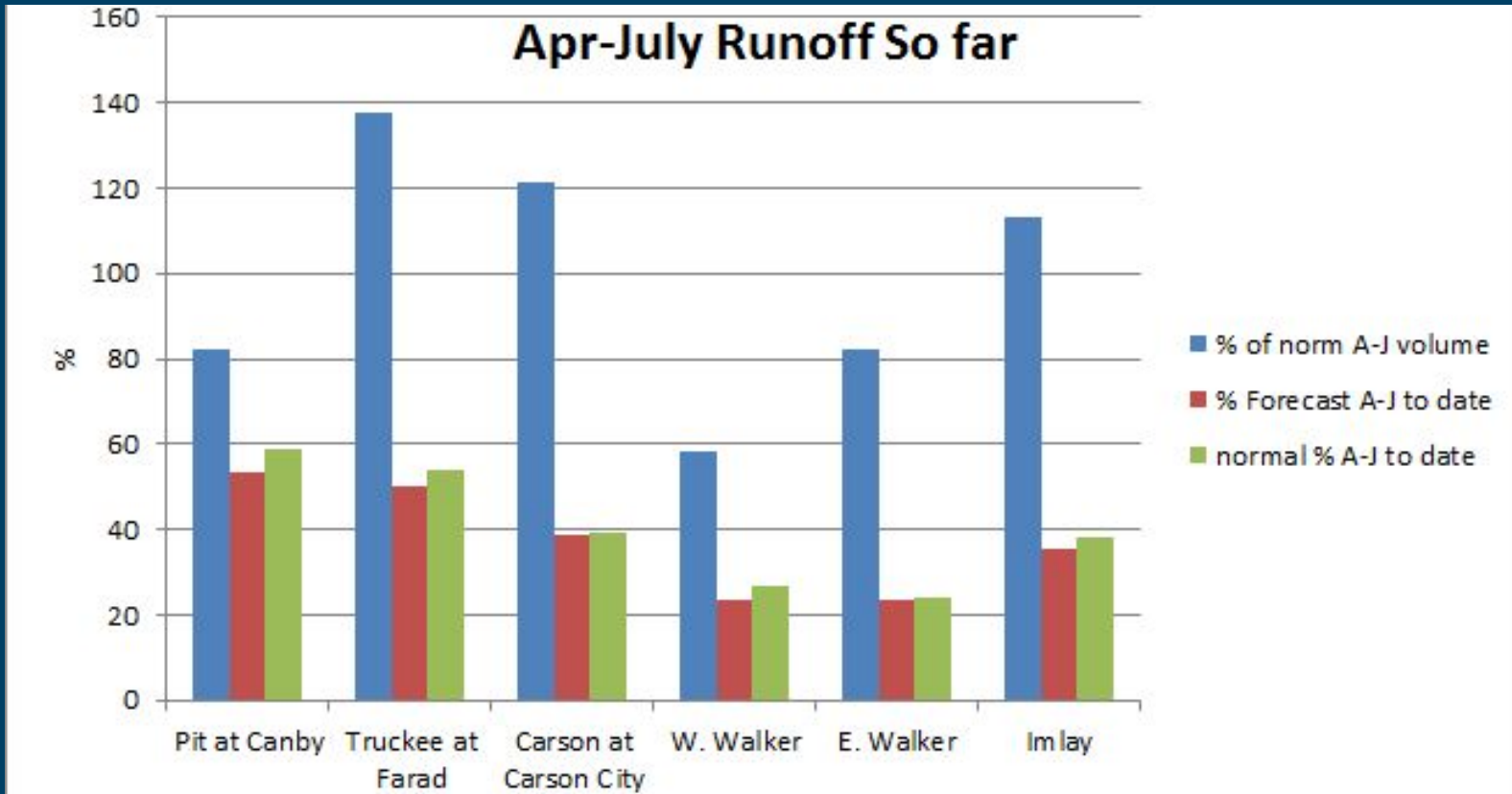
TRUCKEE RIVER BASIN Time Series Snowpack Summary
Based on Provisional SNOTEL data as of May 17, 2017



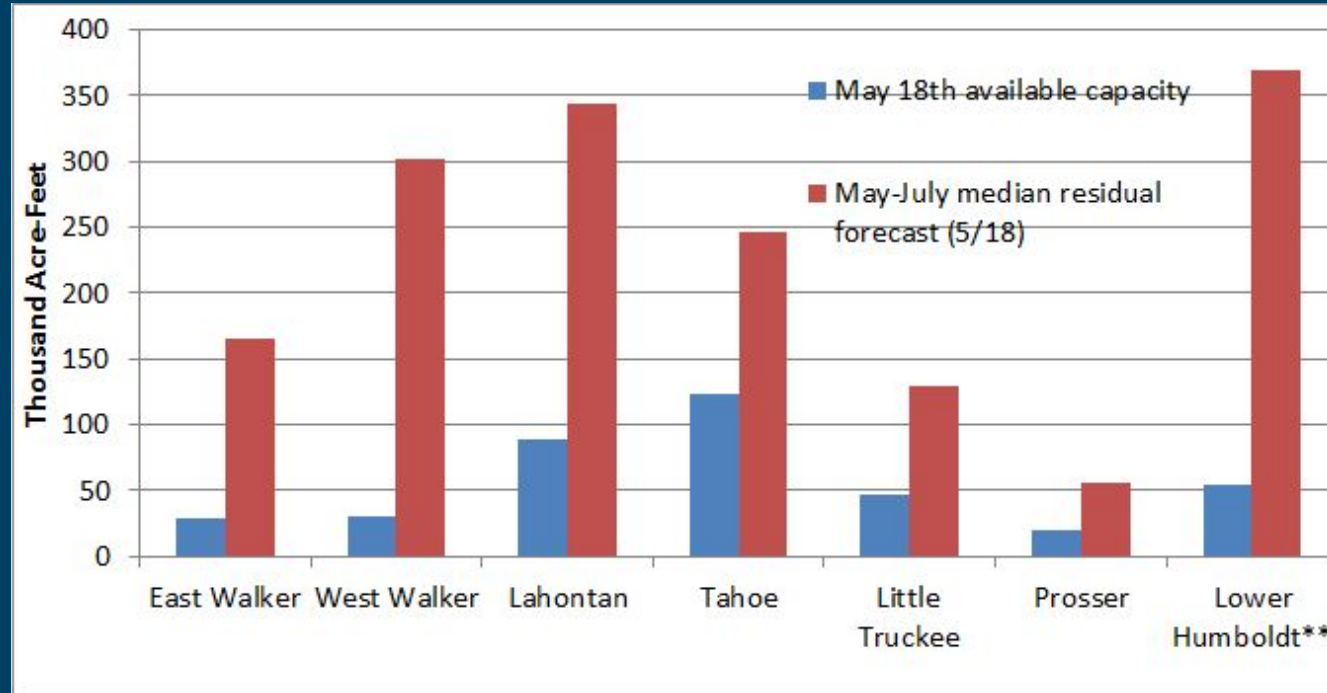
WALKER RIVER BASIN Time Series Snowpack Summary
Based on Provisional SNOTEL data as of May 17, 2017



Already Exceeding Normal April-July Flows!



Reservoir Space vs What's Coming...



Reservoirs - remains very lop-sided with far more water coming than we have storage for especially Carson, Walker, Humboldt. Does not account for terminal lakes, new diversions.