

Good Morning!



top of Red Hill overlooking Reno, Sparks this morning

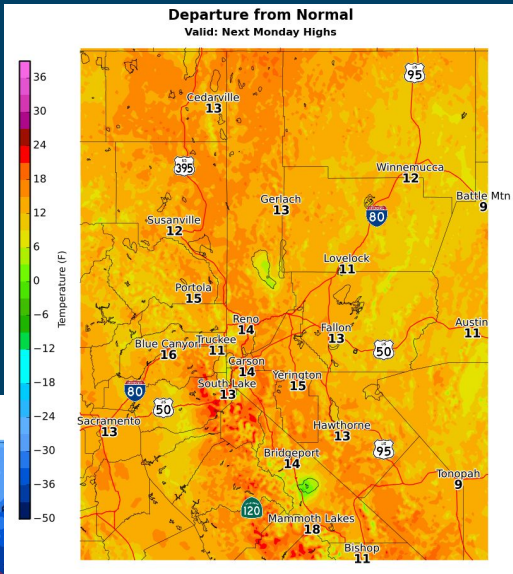
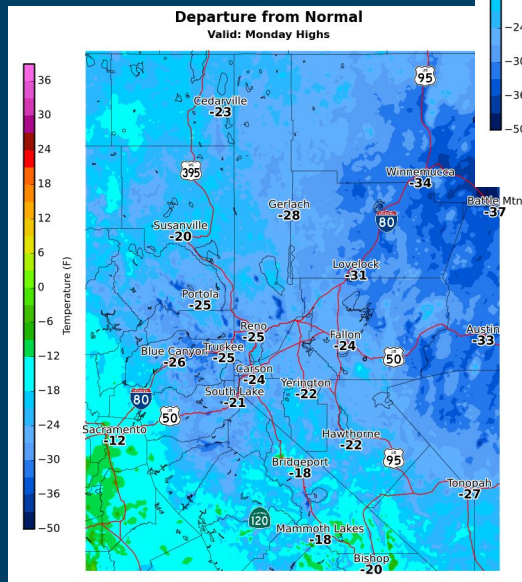
Heat & Hydrology Briefing, June 15 2017

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All in One Week!

The name of our state means “snow-covered”! Estimated 6-12 inches of snow fell in NV Mountains Monday. [#Nevada](#) [#nvwx](#)



Short Attention Span Brief Weather

- **Roaring into July!**

- **Heat turns up considerably** starting Friday. Has a **good potential of being long-lasting, through much of next week**. Solid 90's W Nevada cities. Potential for nearing 100 Monday-Thursday next week - close to records.
- Typical light slope driven or westerly afternoon zephyr winds.
- **Heat health issues possible** this weekend into next week for sensitive groups. Get work or outdoor activities done early in the day. Hydrate!
- **Thunderstorms** each afternoon over and adjacent to mountains starting Sunday. May affect peak temps.
- Simulations trending toward a **cool down very end of next week** - low to medium confidence.

Short Attention Span Brief Hydrology

- High flows returning to rivers and streams draining high elevation terrain with late week heat.
- Walker River and Mono county streams remain primary concern, and are expected to slowly return to **flows near or exceeding earlier peaks**. Flows will ramp up slowly each day with highest flows over the weekend and into early next week.
- **Long-duration high flows may cause additional and unexpected impacts.**
- **Mason Valley is likely to exceed previous peak flows** next week depending on available reservoir capacity and management.
- **Don't let your guard down on other creeks and streams** draining high elevation terrain. These will return to high flows in time for weekend recreation.
- **Lower than average river forecast confidence** related to recent “unexpected” responses of high elevation snow to cool down then heat with limited but very deep snow contributing area.

Situational Awareness - When Should I Freakout?

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

	Today ^{6/15}	Friday ^{6/16}	Saturday ^{6/17}	Sunday ^{6/18}	Monday ^{6/19}	Tuesday ^{6/20}	Wed. ^{6/21}
Wind		breezy far N Nevada	typical slope or zephyr winds, mainly under 10-15 mph				
River & Snowmelt Flooding	gradually increasing snowmelt flows; main areas to watch are eastern Sierra creeks, Walker River		appreciable increases in snowmelt flows due to temperatures rising; main areas to watch remain eastern Sierra creeks, Walker basin, and upper Carson.		potential for more widespread moderate flooding E Sierra streams, Walker River; new peak flows looking possible. Major flooding unlikely unless reservoir management can't mitigate high flows.		
Flash Flooding (fast paced, localized flooding outside of rivers)	no heavy rainfall scenarios						
Thunderstorms	not an issue		a few thunderstorms possible each afternoon/evening, mainly over and adjacent to mountains and especially over E Sierra, central Nevada				
Unusual Cold or Heat		heat health issues possible for sensitive groups but overall low risk		heat health concerns for sensitive groups & people outdoors all day in most lower elevation valleys			
Fire Weather		grasses and small vegetation drying back out due to heat, low humidity; generally light winds mitigate large fire growth potential until late next week					
Air Quality (primarily from wildfire smoke plumes and local AQMD inputs)	no widespread issues anticipated						
What Does This Mean? Integrates impacts and confidence	No worries 	Low freakoutness 	Moderate freakoutness 	High freakoutness 	End of this (aka really bad) 		

Temperature Trends Keep on Climbing!

Location: Reno Tahoe International Airport NV
Lat: 39.510, Lon: -119.780
Elev: 4436

Potential Heat Risks:

Today Fri Sat Sun Mon Tue Wed

NWS Forecast:



High 86°F Low 57°F High 92°F Low 61°F High 92°F Low 60°F High 94°F Low 63°F High 99°F Low 64°F High 100°F Low 63°F High 96°F

Location: South Lake Tahoe CA
Lat: 38.940, Lon: -119.960
Elev: 6362

Potential Heat Risks:

Today Fri Sat Sun Mon Tue Wed

NWS Forecast:



High 75°F Low 45°F High 79°F Low 48°F High 82°F Low 49°F High 83°F Low 50°F High 85°F Low 50°F High 86°F Low 50°F High 82°F

Location: Fallon NV
Lat: 39.470, Lon: -118.780
Elev: 3973

Potential Heat Risks:

Today Fri Sat Sun Mon Tue Wed

NWS Forecast:



High 86°F Low 55°F High 91°F Low 59°F High 92°F Low 58°F High 95°F Low 61°F High 100°F Low 62°F High 101°F Low 62°F High 97°F

Location: Sonora Pass CA
Lat: 38.340, Lon: -119.620
Elev: 10007

Potential Heat Risks:

Today Fri Sat Sun Mon Tue Wed

NWS Forecast:



High 59°F Low 43°F High 65°F Low 48°F High 65°F Low 48°F High 67°F Low 49°F High 69°F Low 50°F High 70°F Low 49°F High 68°F

Heat Risk Levels

Green	0	No Elevated Risk
Yellow	1	Low Risk for those extremely sensitive to heat, especially those without effective cooling and/or adequate hydration
Orange	2	Moderate Risk for those who are sensitive to heat, especially those without effective cooling and/or adequate hydration
Red	3	High Risk for much of the population, especially those who are heat sensitive and those without effective cooling and/or adequate hydration
Magenta	4	Very High Risk for entire population due to long duration heat, with little to no relief overnight

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Forecasting for the Sierra and western Nevada since 1905



Upcoming Heat in Context Unusual but Not Unheard Of

Earliest 100° Day

June 7th
2013

All-Time Record High in June

104°
June 16th 1940

During 14 Different Years

ZERO

100° Days Occurred!

June 20th

1st 100° day Forecast for 2017

Record High for June
19th

99° in 1961

Record High for June
20th

101° in 1961

Stats based on period of record at Reno International Airport since 1937

**Is seeing 7+ June
days of 90+ at
Reno unusual?**

Yes but not unheard of.

Since 1937, there have been 13 streaks of 7+ 90 degree days starting in mid-June.

Longest streak starting in mid-June: **19 days** starting June 19, 2016!

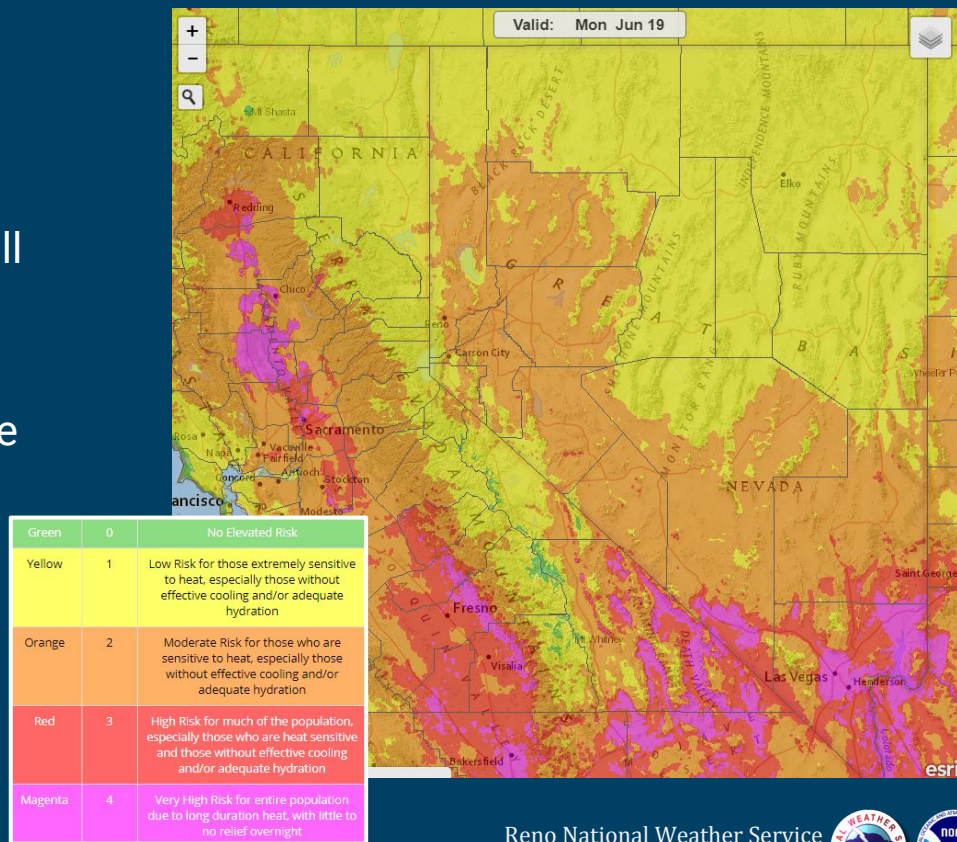
"mid-June" defined as 10th-19th.

Heat Risk

Some Areas of Heat Health Concern, Primarily Next Week

- **Timing** - Friday through next Thursday. Peak heat with highs nearing 100 W Nevada cities Monday - Wednesday.
- **Impacts** - Heat health issues for sensitive groups, first responders, those outdoors all day. Lower elevation vegetation drying rapidly.
- **Context** - First meaningful heatwave of the summer, but not widespread dangerous heat to general population. Much worse scenario for S Nevada, AZ/CA!
- **Confidence** - **High**: seeing a prolonged heatwave. **Medium**: risk of seeing 100+ in W Nevada cities or records being broken.

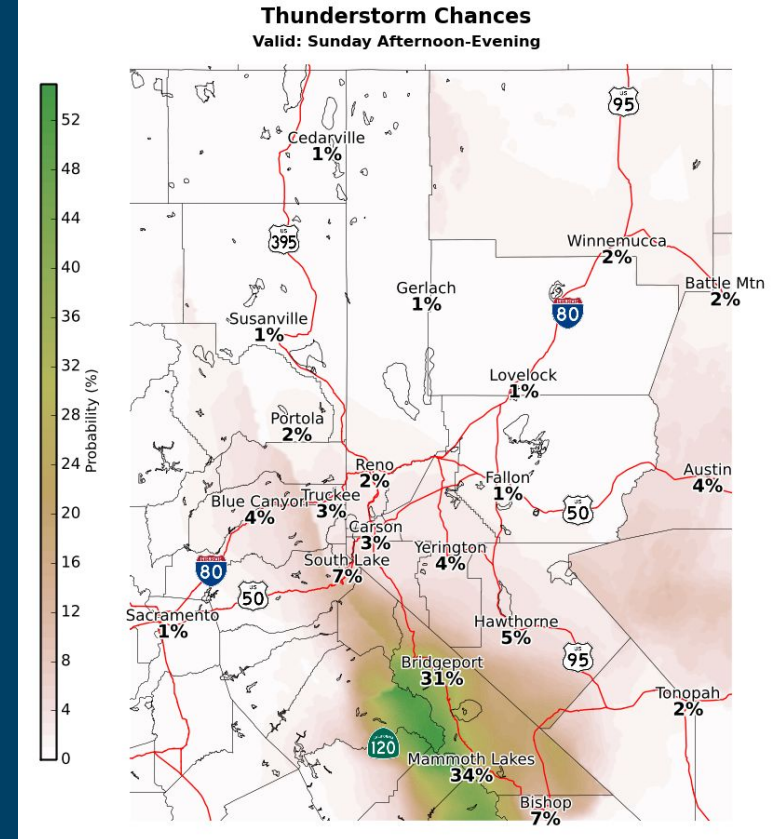
NWS Heat Risk Forecast for Monday [[data link](#)]



Thunderstorms

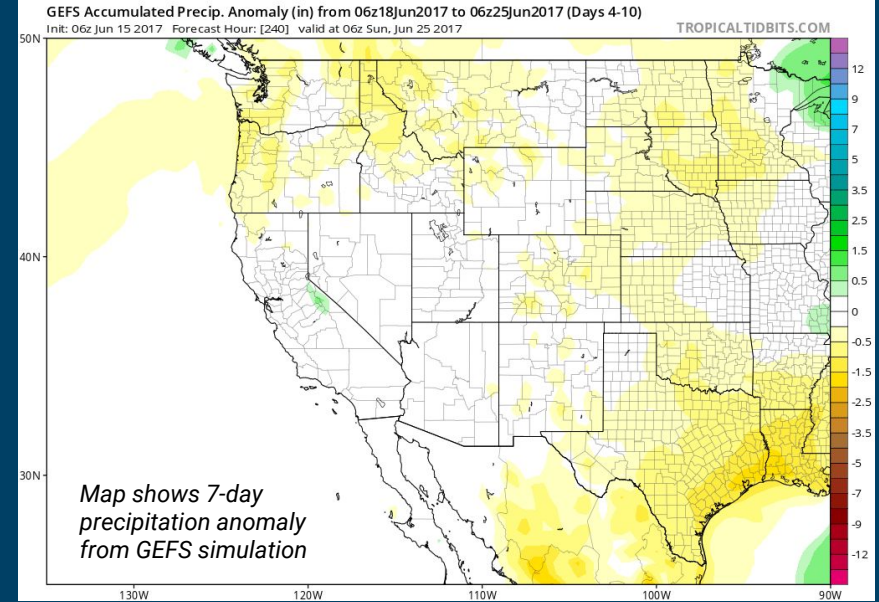
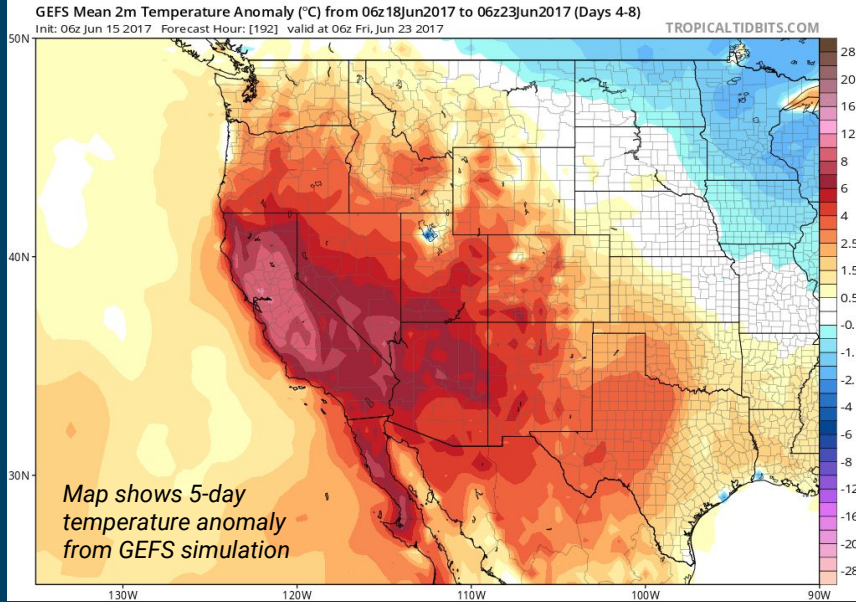
It's That Time of Year...

- **Timing** - Isolated storms mainly each afternoon and evening starting Saturday; best chances over mountains and adjacent areas of E Sierra, central Nevada.
- **Impacts** - Strong outflow winds, lightning, small hail, localized heavy rain. Could influence high temps - due to clouds, rainfall if storms widespread enough.
- **Context** - Typical storms and impacts likely. Too soon to call if severe storms or flash flooding are possible.
- **Confidence** - **Low-medium**: storm coverage, intensity each day. Just maintain general situational awareness each afternoon.



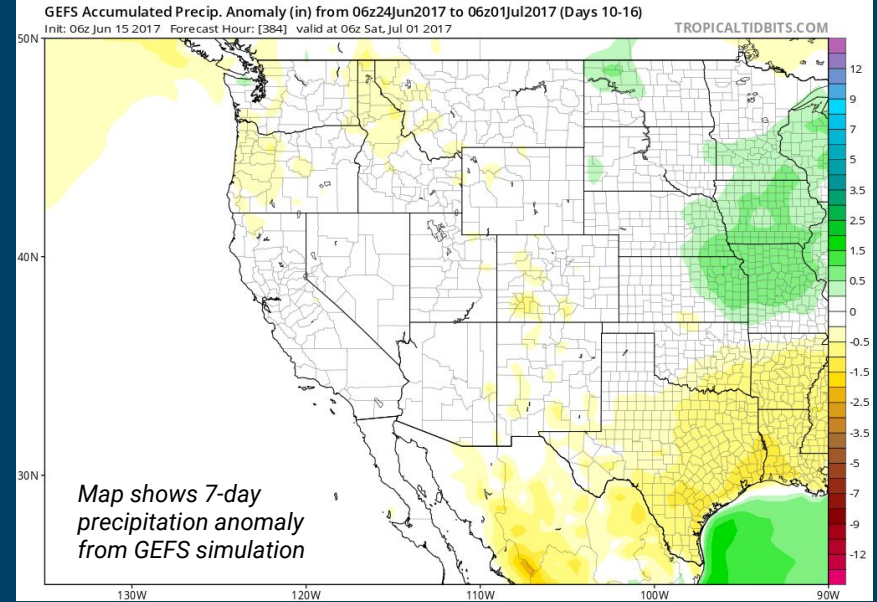
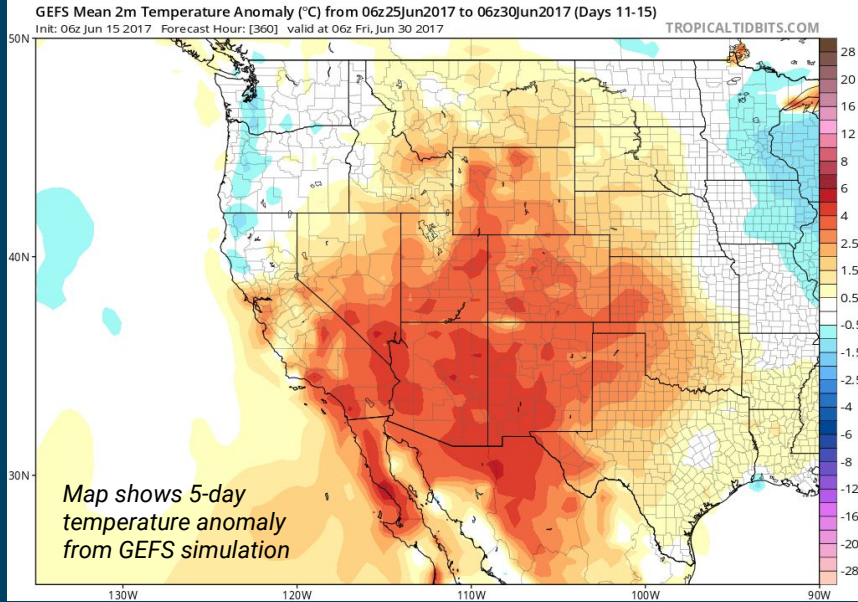
Next Week Overall

First Big Summer Heat Wave



- Nearly all simulations show **very impressive heat signal** for CA/NV/AZ next week. If warmest scenario pans out - 100's possible in W Nevada cities early/mid week.
- No clear signal on rain potential, but this pattern can produce daily storms over mountains - localized heavy rain, wind, and lightning impacts. No big monsoon push evident in simulations.

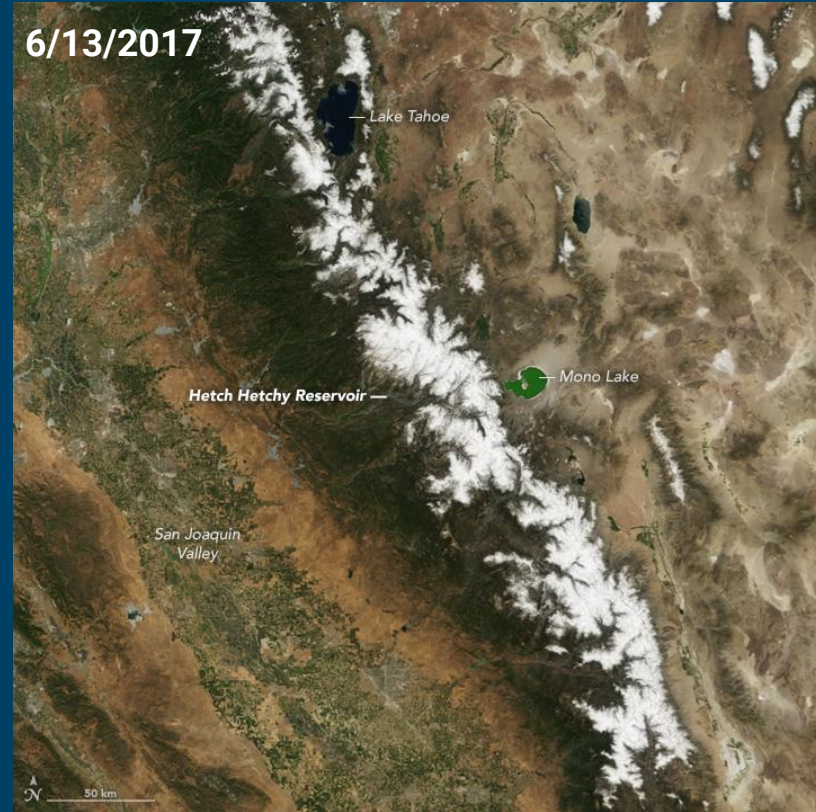
Following Week June 25 - July 1: Perhaps a Cool Down, But How Much?



- Simulations trending toward breaking down heat ridge somewhat over SW US late next week, but **low predictability** on timing and magnitude of resulting cool-down.
- Overall pattern favors **fading the heat for N Nevada with increased winds possible (fire weather)**. Big heat could continue for S Nevada and much of the SW US. No clear signal on thunderstorm risks.

Shifting into Hydrology

NASA Year to Year Snow Comparison



earthobservatory.nasa.gov

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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 June	July	August
Walker River Basin	widespread minor-moderate flooding likely with prolonged heatwave; don't let your guard down	likely on a downward trend but uncertain how quickly; maintain preparedness	high water but likely on downward trend
Carson River Basin	areas of minor flooding during heatwaves, mainly Carson Valley and upper reaches of E/W forks	above normal flows continue	
Truckee River Basin	heavily regulated system; high flows persist with main flood issues above Truckee, CA	above normal flows continue	
Tahoe Basin Creeks/Streams	high flows persist with areas or minor flooding during heatwaves	high water continues but likely on downward trend	
NE California Basins	past peak, very localized minor flooding issues		
E Sierra Creeks/Streams	many areas of minor to moderate flooding during heatwaves; don't let your guard down	high water continues but likely on downward trend	
Lower Humboldt River Basin	high water continues, possibly increased due to June 11-12 snow	gradual decrease in flows	

What Does This Mean?
Integrates impacts and confidence

No worries



Low
freakoutness



Moderate
freakoutness



High
freakoutness



End of this (aka
really bad)



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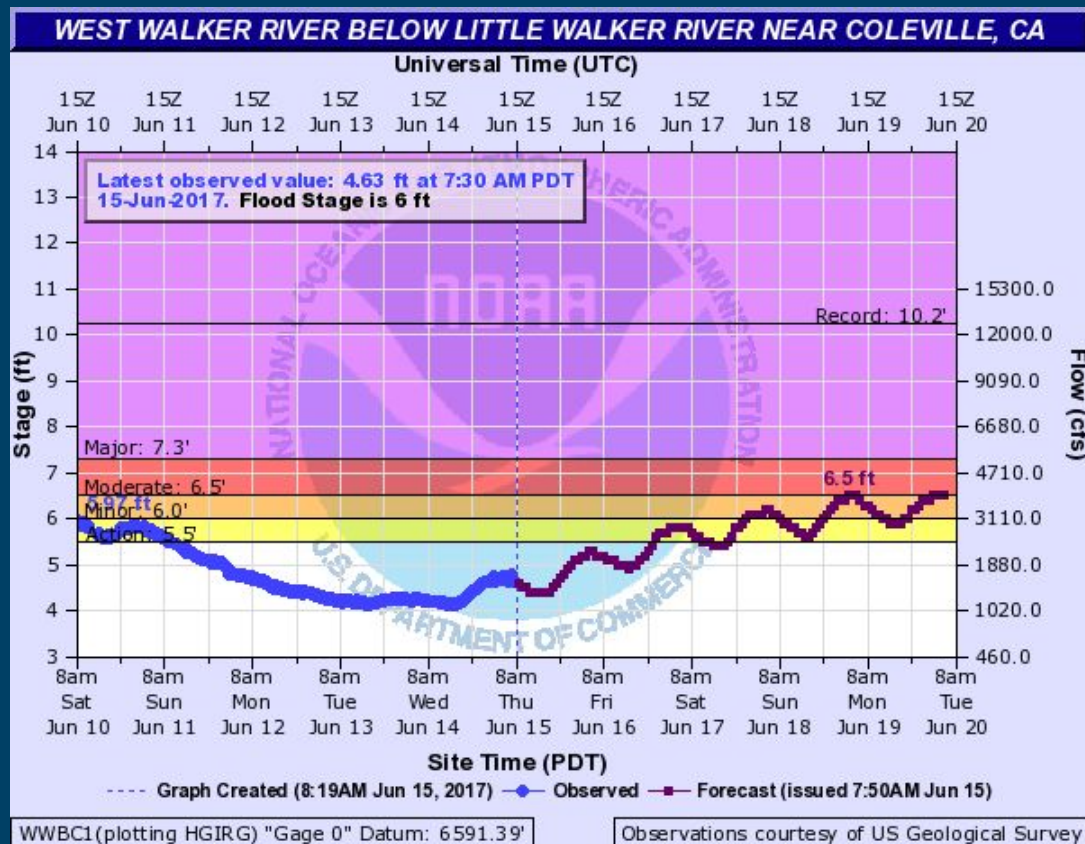
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5 Day Forecast West Walker @ Sonora Junction

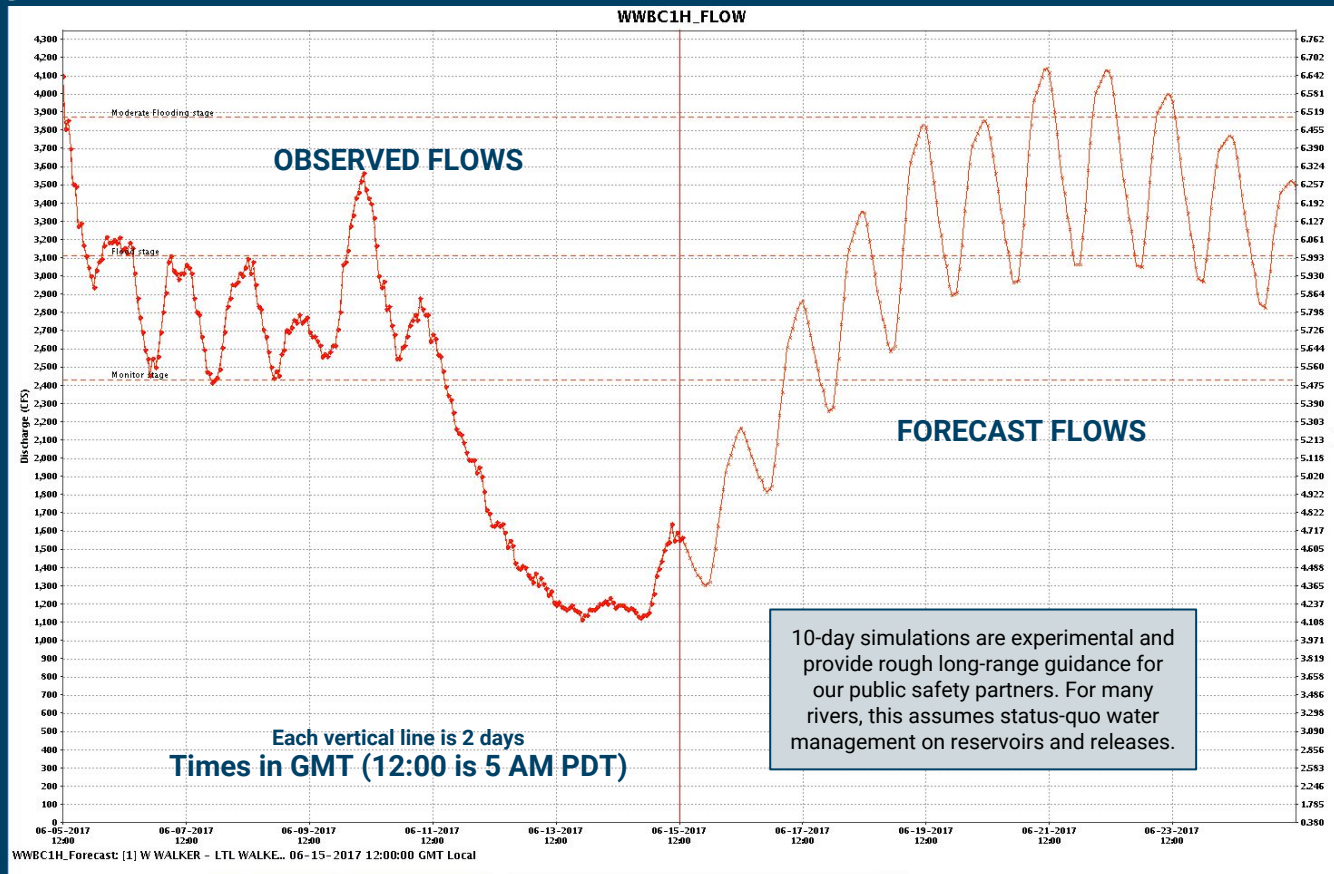
5-day official forecasts - [CNRFC](#) or [NWS Reno](#)

- Flows progressively stair stepping up each night/early morning.
- Return to **Minor flooding by the weekend** and **Moderate flooding by early next week**, impacting mainly agricultural areas in Antelope Valley. Possible impacts to recreation areas and rural roads in Walker Canyon.
- **Likely to see high flows similar to or somewhat in excess of earlier peaks.**
- W. Walker snowmelt response has been especially challenging to model leading to greater forecast uncertainty (but forecast rise last night was similar to simulation).



10 Day Simulation West Walker near Sonora Jct

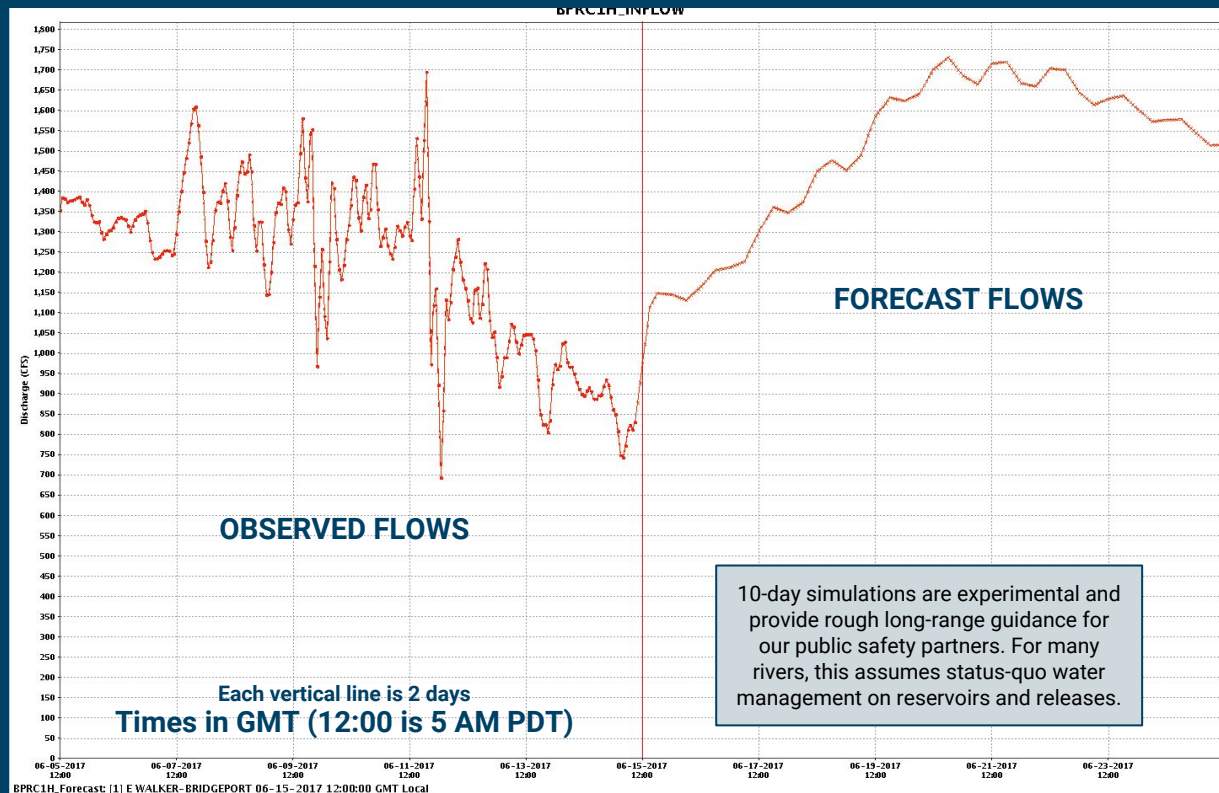
5-day official forecasts - [CNRFC](#) or [NWS Reno](#)



10 Day Simulation East Walker - Bridgeport inflow

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

- **IMPORTANT:** These are estimated inflows, no gauging data to calibrate from so increased margin of error.
- Flows increasing into early next week and perhaps beyond. **High probability that we will see higher flows than we have already observed.**
- Most probably peak date 6/24 (range 6/21-7/1)
- Long duration high flows expected.



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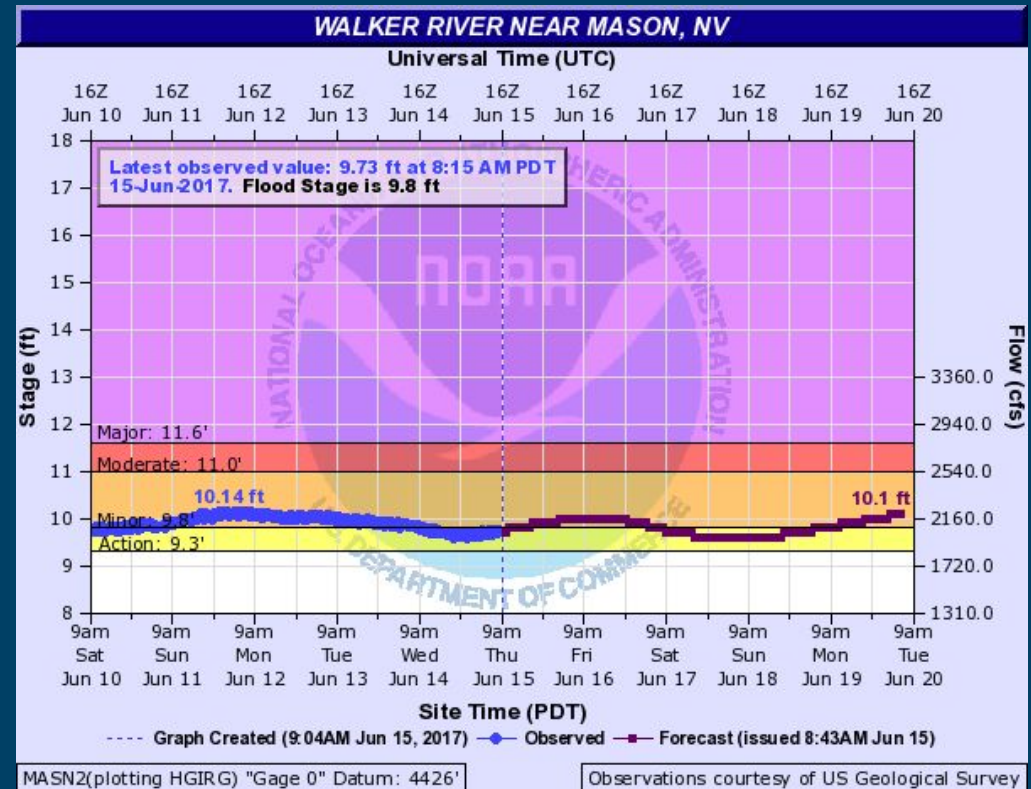
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5 Day Forecast Walker River @ Mason/Yerington

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

- River slowly rising and **expected to near earlier peaks by Friday and again early next week.**
- **Additional and higher rises likely next week** depending on West Walker snowmelt response and remaining reservoir capacity and management.
- **IMPORTANT:** Management has been very proactive and dynamic, this will lead to frequent forecast adjustments. Stay tuned.
- Sorry no 10 day available due to last minute forecast change and system upgrade!



When Will High Flows Subside?

Walker River @ Mason 2,200 cfs

Quick Scenario

June 29

Slow Scenario

July 18

Why Do I Care?

Continued high flows from snowmelt will make it easier to flood on the Walker River if we have a big heatwave before these dates. So - don't let your guard down.

The Science Details

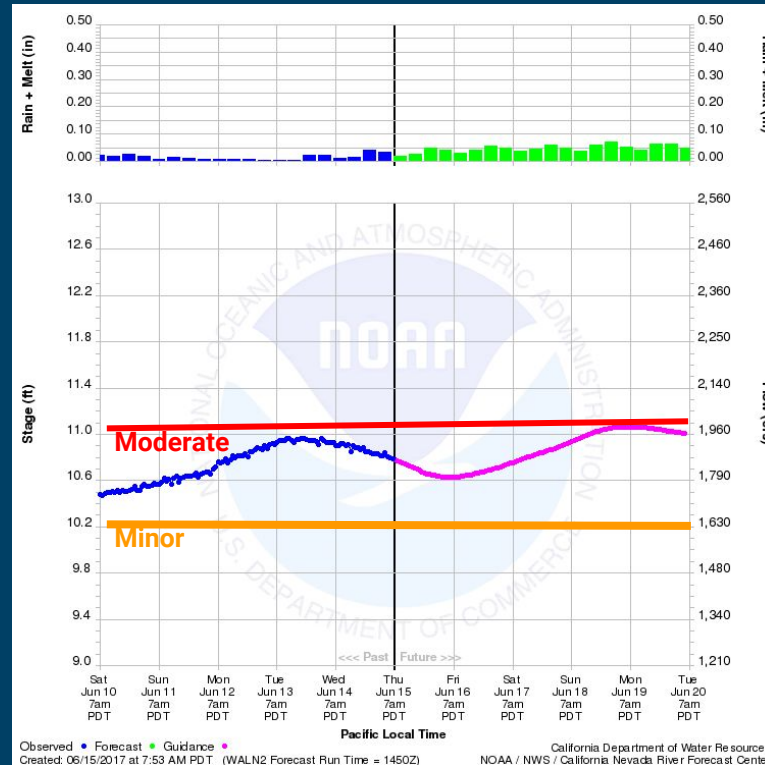
Dates of when flows on the Walker River at Mason routinely drop below ~2,200 cubic feet per second (cfs) were estimated using the latest simulations of remaining snowpack and river behavior within a variety of forecast temperature scenarios. Dates based on routing water directly through reservoirs. Once Bridgeport and Topaz Reservoirs fill, downstream flooding becomes more likely if high flows continue.



5 Day Forecast Walker River @ Wabuska

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

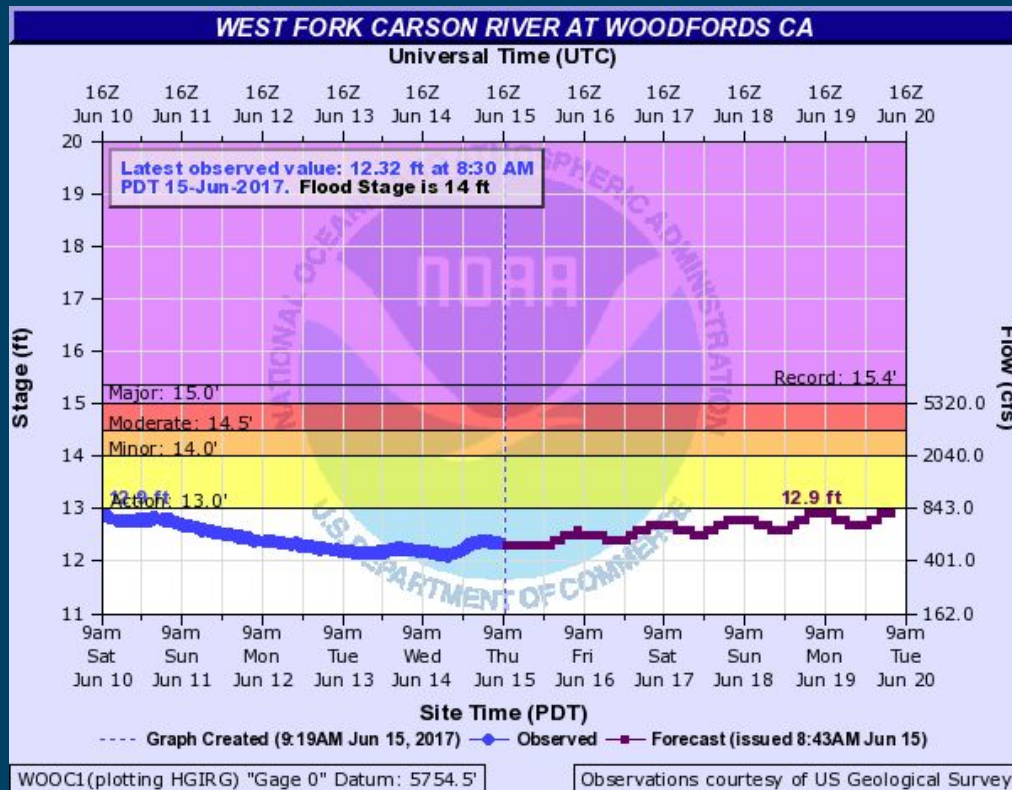
- High flows, increasing towards moderate flood stages early next week.
- **Secondary and higher rise expected late next week.**
- ~ One to three day lag to Weber Reservoir.
- **IMPORTANT:** Same forecast and management caveat from Mason apply
- Long duration and high volume event may result in minor to moderate flood impacts below Weber Reservoir.



5 Day Forecast West Carson @ Woodfords

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

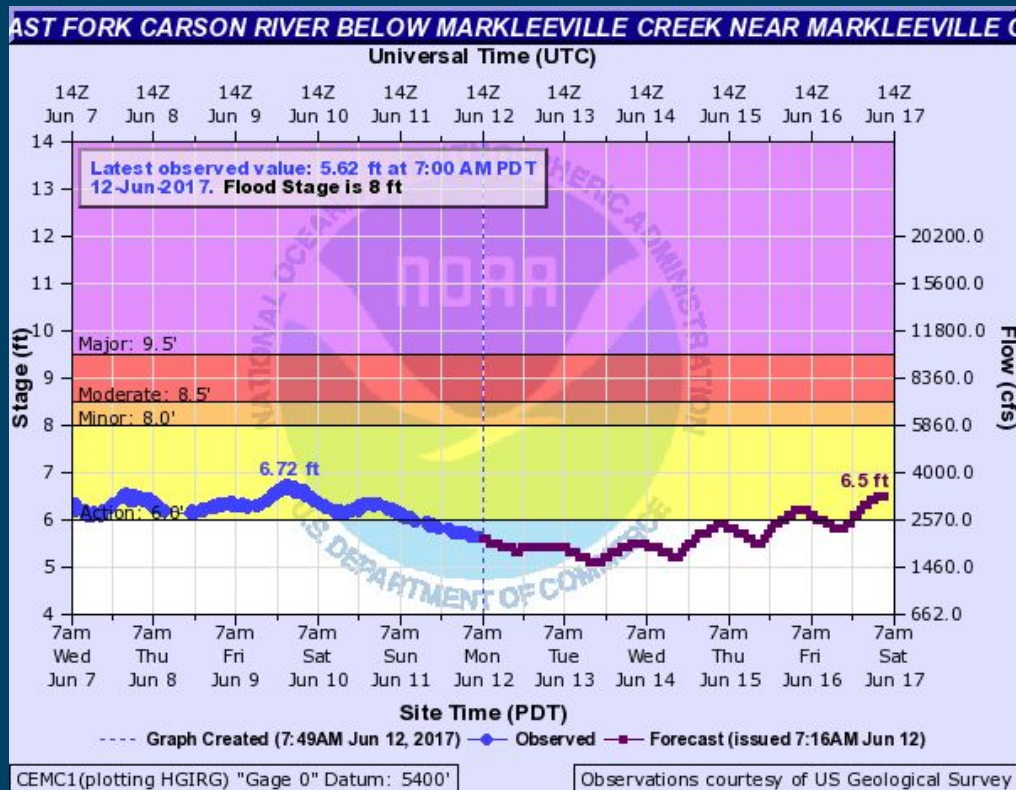
- No flooding expected, slow return to high flows.
- Keep an eye on stream response as we warm up, potential for remaining high elevation snowmelt to exceed expectations with prolonged heat.



5 Day Forecast East Carson @ Markleeville

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

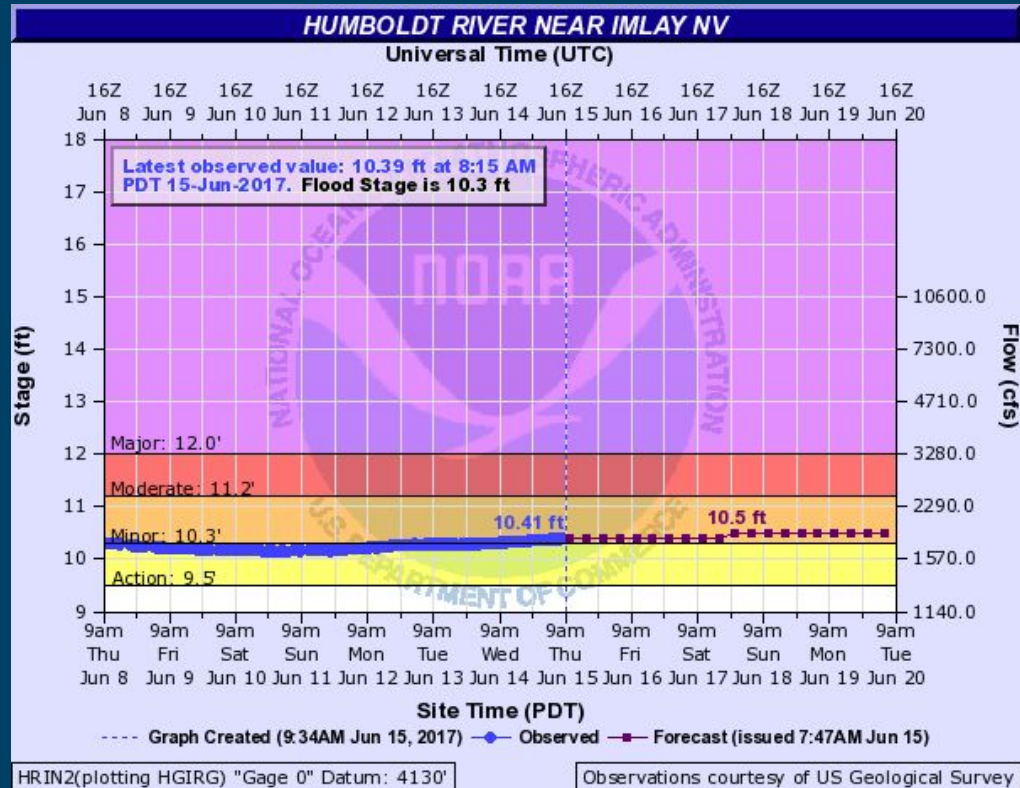
- No flooding expected, slow return to very high flows.
- Keep an eye on stream response as we warm up, potential for remaining high elevation snowmelt to exceed expectations with prolonged heat.



5 Day Forecast Humboldt at Imlay

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

- Continued prolonged minor flooding.
- Impacts limited to rural roads and agricultural areas.



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Eastern Sierra Outlook General Guidance

- High flows returning late this week and into next week
- High flows likely to be similar or higher to earlier observed flows.
- Reported impacts on Rush, Hilton, and Sherwin Creeks, additional minor to moderate impacts for areas near creeks/streams are likely.
- **Inyo NF partner reported many streams highest snowmelt flows observed in over 40 years!**



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



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.

Still a lot of snow up there!



Leavitt Lake and Leavitt Lake SNOTEL 6/6/17 as of 6/14 still
100" SWE remaining

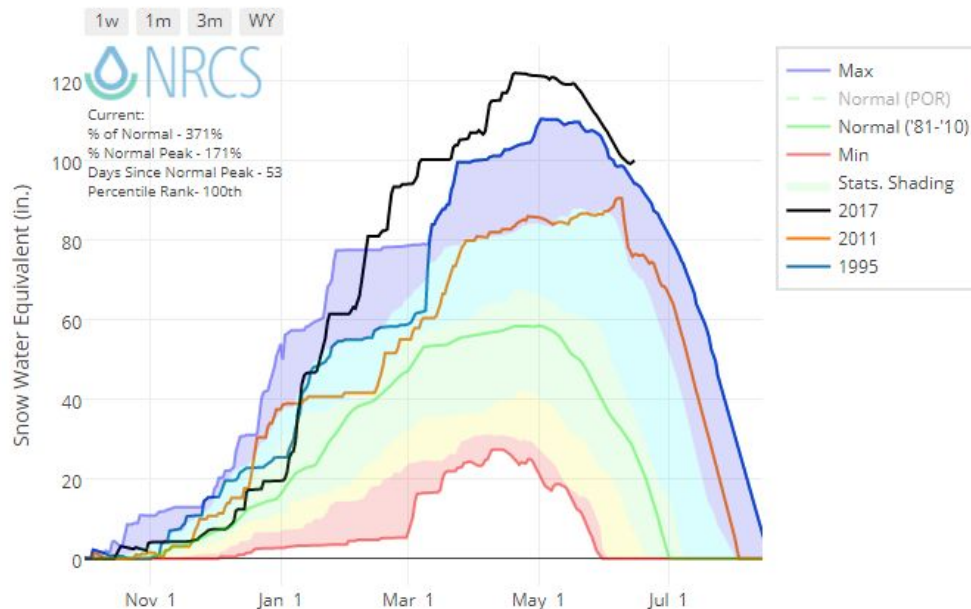
Remaining Snow at SNOTEL

- Only a handful of the highest and deepest sites still have significant snow.
- But most are more representative of forested terrain than high sub-alpine and alpine terrain.
- Leavitt Lake still has 170% of median annual peak!

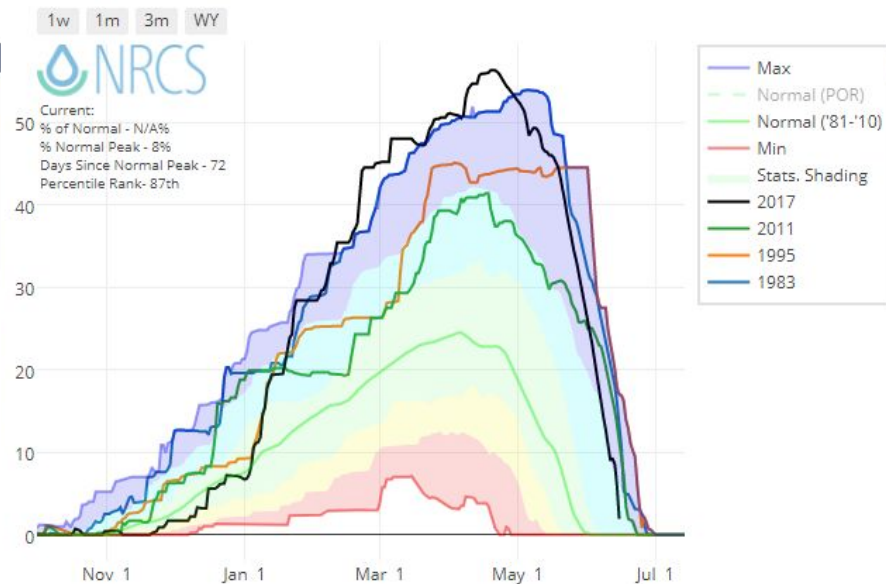
Basin Site Name	Elev (ft)	Snow Water Equivalent				Percent of	
		Current (in)	Today's Median (in)	Median Peak (in)	Median Peak Date	Today's Median	Median Peak
CARSON RIVER							
Ebbetts Pass	8661	21.1	0.0	33.2	Mar 27	*	64*
Horse Meadow	8557	13.1	0.0 _R	20.1 _R	Feb 29	*	65*
Carson Pass	8360	9.4	1.7 _R	31.3 _R	Apr 15	553*	30*
Monitor Pass	8306	0.0	0.0	15.2	Mar 07	*	0*
Burnside Lake	8129	0.0	0.0 _R	25.6 _R	Mar 19	*	0*
Blue Lakes	8067	15.0	0.0	27.9	Apr 28	*	54*
Forestdale Creek	8017	20.9	0.0 _R	32.6 _R	Mar 26	*	64*
Poison Flat	7736	0.0	0.0	16.9	Mar 15	*	0*
Spratt Creek	6063	0.0	0.0	4.4	Feb 20	*	0*
Basin Index (%)		4676*					38*
WALKER RIVER							
Leavitt Lake	9604	99.7	27.0	58.6	May 02	369	170
Virginia Lakes Ridge	9445	0.0	0.0	16.4	Apr 07	*	0*
Summit Meadow	9313	8.8	0.0 _R	23.9 _R	Apr 05	*	37*
Lobdell Lake	9249	0.0	0.0	15.9	Apr 07	*	0*
Sonora Pass	8770	1.9	0.0	24.5	Apr 05	*	8*
Monitor Pass	8306	0.0	0.0	15.2	Mar 07	*	0*
Leavitt Meadows	7198	0.0	0.0	9.9	Mar 16	*	0*
Basin Index (%)		409*					67*

More Snow Data...

Snow Water Equivalent at Leavitt Lake



Snow Water Equivalent at Sonora Pass



Melt temporarily stalled at Leavitt Lake SNOTEL, Sonora Pass likely melted out today or tomorrow (95, 2011, and 83 melted out ~ 10 days later at Sonora) [Link to new plots](#)