


Item available for public inspection in the Clerk's office during regular business hours (Monday - Friday, 9 AM - 5 PM)

March 12, 2024

Regular Meeting

Item #7a. - Presentation

An aerial photograph of a snow-covered mountain slope. A prominent gully runs down the center of the slope. The snow is bright white, and the shadows in the gully and on the ridges are a deep blue-grey. The overall scene is a high-altitude, winter landscape.

Mono County Avalanche Program 2016-2024

Avalanche program overview

Weather stations

How it works

Avalanche areas

Avalanche Forecasting Roads and Highways

Challenges

Natural triggers, direct action
avalanches

sparse network of weather
stations

- **Site-specific avalanche warnings:**
- **What is the likelihood of avalanche release in one or more specific paths. High uncertainty!!!**



Twin Lakes Bridgeport

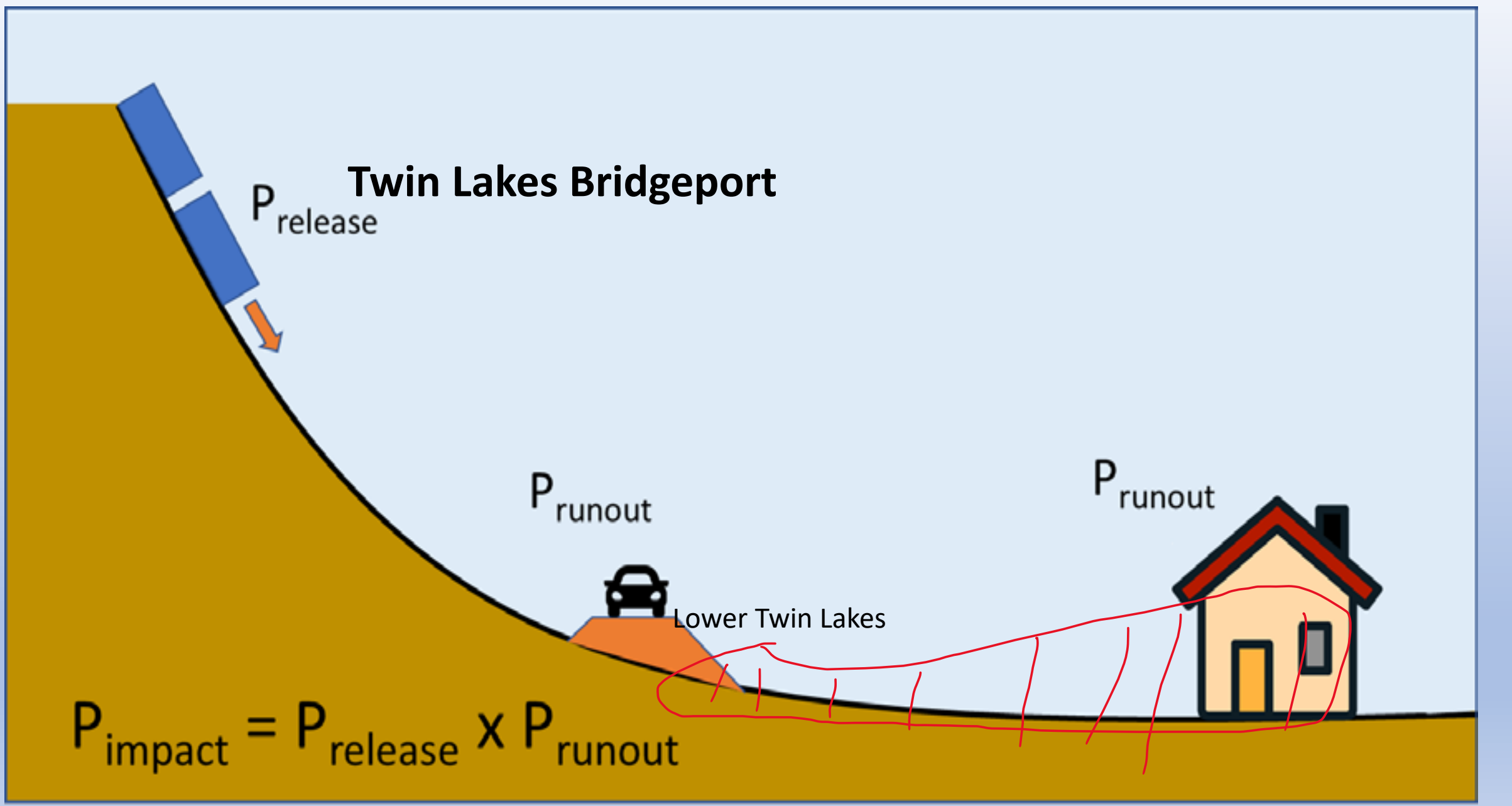
P_{release}

P_{runout}

P_{runout}

Lower Twin Lakes

$$P_{\text{impact}} = P_{\text{release}} \times P_{\text{runout}}$$



Standard Highway Forecasting Avalanche
Warning Levels, Appendix G (SWAG, 2010,
2022)

LEVEL	Description: Avalanche size	Description: Impact on Roads	OPERATIONAL PROCEDURES
NONE	Natural avalanches are very unlikely to reach the highway	Insufficient snow to reach the highways. Snow may be present in Runout zones, no disruption to travel	No operational changes for avalanche hazard
NOTICE	Natural avalanches are unlikely to significantly impact highway operations. Small D1-D2 avalanches in starting zones	Avalanches may run within .25 miles of the highway. Avalanche hazard is increasing as weather conditions change. Storm intensity monitored closely.	Avalanche rescue equipment required. Do not stop in avalanche areas Advise travelers to move out of avalanche areas
CAUTION	Large natural avalanches up to D2 -D3 can reach upper runouts or tracks. Possible avalanches reaching near roadways. (possible)	Avalanches that run onto the highway will require a snowplow to clear debris. Local disruption to travel due to temp road closures.	Do not stop traffic in avalanche areas Do not work outside of vehicle Use a spotter when working in avalanche area
WARNING	Large Natural avalanches are almost certain to affect highway operations	Avalanches large enough to bury passenger vehicles and damage maintenance vehicles are likely. Residential homes likely damaged. Danger to life due to avalanche impact forces	Maintenance work limited to non-avalanche area. Consult senior supervisor before entering avalanche areas. Road closures.

Comparison Mono County Warning vs ESAC Backcountry warnings

DATE	Backcountry rating	Road Hazard Scale
03-Dec	HIGH	NONE
04-Dec	HIGH	CAUTION
10-Dec	HIGH	CAUTION
11-Dec	HIGH	WARNING
27-Dec	HIGH	NONE
28-Dec	HIGH	WARNING
30-Dec	HIGH	WARNING
31-Dec	HIGH	WARNING
01-Jan	CONSIDERABLE	WARNING
02-Jan	CONSIDERABLE	CAUTION
03-Jan	CONSIDERABLE	WARNING
04-Jan	CONSIDERABLE	CAUTION
05-Jan	HIGH	CAUTION
06-Jan	CONSIDERABLE	CAUTION
14-Jan	HIGH	WARNING
15-Jan	CONSIDERABLE	WARNING
16-Jan	HIGH	WARNING
05-Feb	HIGH	CAUTION
24-Feb	HIGH	NONE
25-Feb	HIGH	CAUTION
26-Feb	HIGH	WARNING
27-Feb	HIGH	WARNING
28-Feb	HIGH	WARNING

27 Backcountry HIGH ratings
19 Road Warnings/closures

DATE	Backcountry rating	Road Hazard Scale
01-Mar	HIGH	CAUTION
05-Mar	HIGH	WARNING
08-Mar	CONSIDERABLE	NONE
09-Mar	HIGH	CAUTION
10-Mar	HIGH	WARNING
11-Mar	HIGH	WARNING
12-Mar	HIGH	CAUTION
13-Mar	CONSIDERABLE	NONE
14-Mar	HIGH	NONE
20-Mar	HIGH	WARNING
21-Mar	HIGH	WARNING
28-Mar	CONSIDERABLE	WARNING
29-Mar	HIGH	WARNING
10-Apr	CONSIDERABLE	None
11-Apr	CONSIDERABLE	None

Mono County Weather Stations





MONO COUNTY AVALANCHE AREAS





February
1978



Twin Lakes, Bridgeport





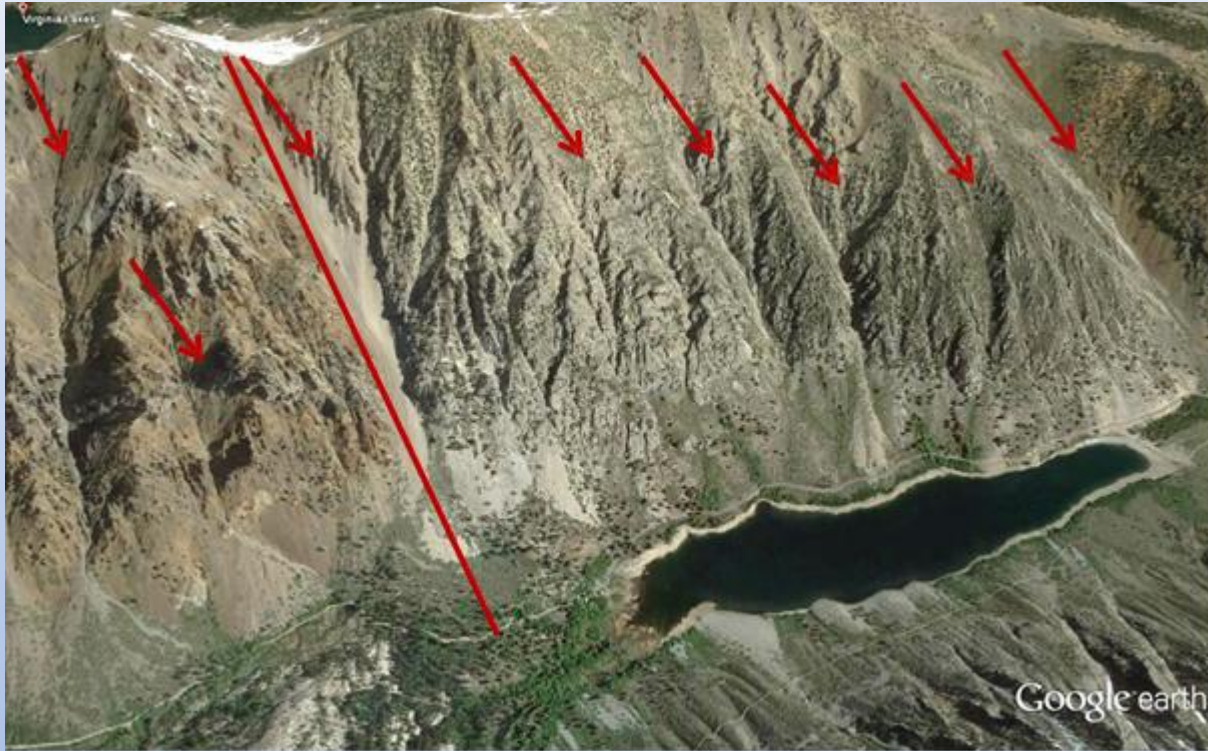
February
1986

Snocat, 2006.





Lundy Canyon, Spring Road opening



Poole Power Plant Road



Carson Peak
Devil's Slide
Dream Mountain



Lakeview Drive March 2023



Long Valley 2016



Long Valley Jan 23 2017











CAR

CAR

BOAT

CAR

McGee Mountain

January 9-10 2023

- Trailer Park Gully







Jan 9-10 2023
Trailer Park Gully

Mixed Snow avalanche
Dry snow in starting zone, rain line 8500 to 9000 ft.

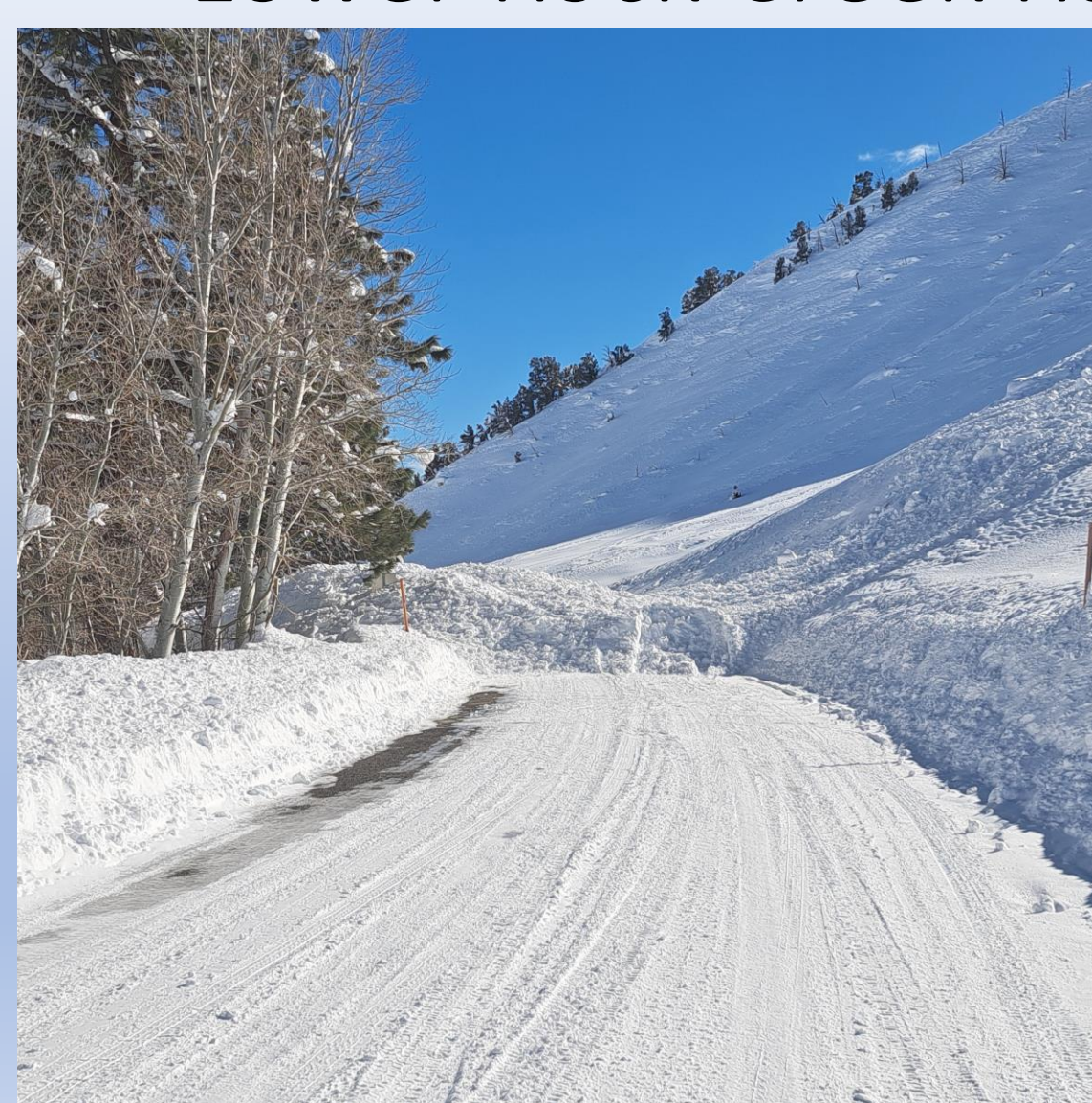
Photo credits: Claude Fiddler



How often do skiers/sleds, snowboards trigger avalanches above roads?



Lower Rock Creek Road







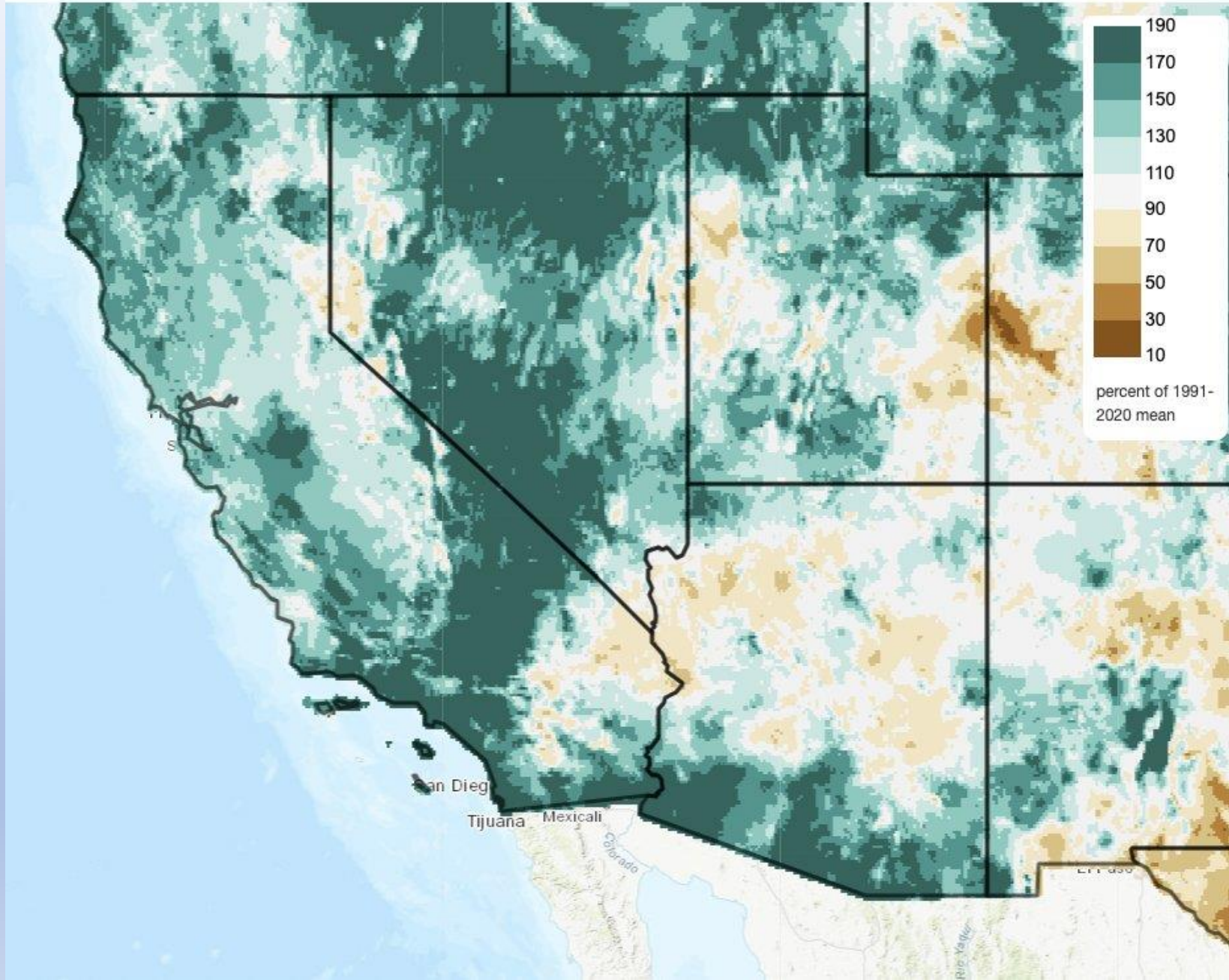






Total Precipitation Anomaly, Since Jan 1st

2024/01/01 - 2024/02/21





Out the Window

Regional Briefing for the Sierra & Western Nevada

weather.gov/reno

Weather Forecast Office

Reno, NV

Sunday, March 3

775-673-8100



Peak wind gust at KMMH reached 85 mph, with a 99 mph gust at Convict Lake Road and 110 mph at South Landing Road along US-395 south of Mammoth (SCE sites) overnight.

Ground blizzard this morning near Mammoth. Left: from the Mammoth-Yosemite Airport. Below: US-395 @ Obsidian Dome.



Sunday, March 03, 2024 07:30:04 PST



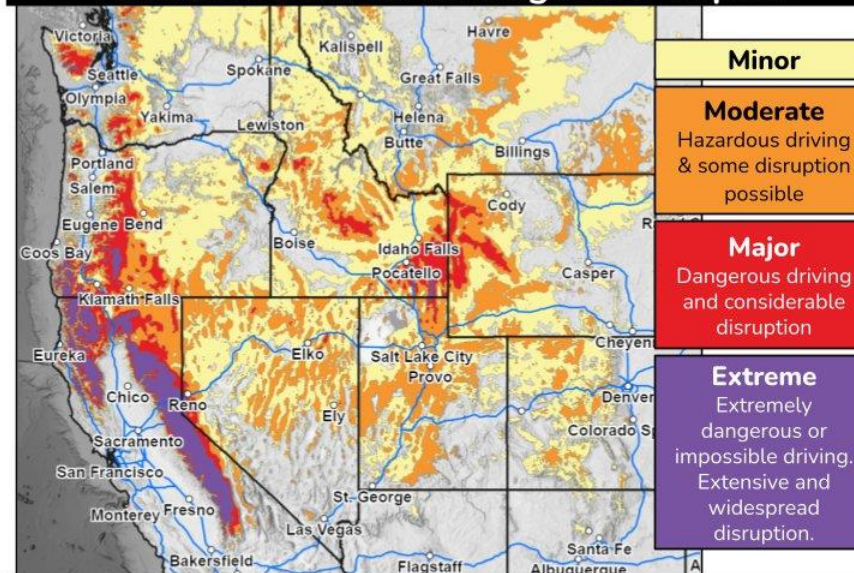
Key Messages for Major Western Winter Storm

Updated Feb 29, 2024
10:00 AM PST

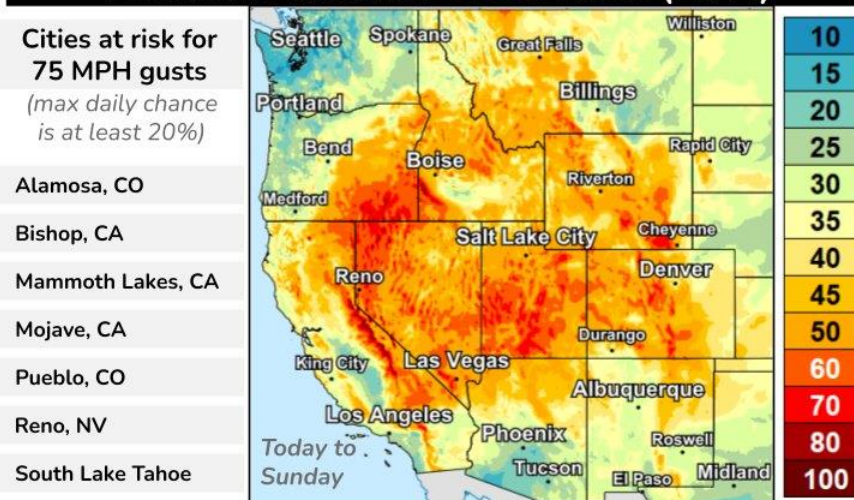
Heavy snow for many West Coast mountain ranges; powerful Sierra Nevada blizzard

- Heavy Mountain Snow Affecting Many Passes**
 Multiple feet of snow are likely (over 80% chance) for higher elevations, especially above 5000 ft, including the Sierra Nevada passes (such as I-80). Extremely heavy snow rates surpassing 3 inches per hour are likely.
- Blizzard Conditions Expected in Sierra Nevada**
 Very strong winds will cause significant blowing/drifted snow and whiteout conditions, making travel impossible in the Sierra Nevada. There is a high chance (over 70%) of substantial, long-lasting disruptions to daily life in the higher elevations of the Sierra Nevada Friday-Sunday, where blizzard conditions and 5-12 ft of snow (and locally higher) are expected.
- Widespread Damaging Wind in the Western U.S.**
 Wind gusts of 55+ mph are forecast across much of the West, particularly across higher elevations and the Intermountain West where 75+ mph gusts are possible. These winds will likely down trees and power lines, resulting in widespread power outages.
- Cold Air Will Lower Snow Levels This Weekend**
 As the storm moves south, snow levels will lower into some northern California and Sierra foothill communities. Much colder air is forecast by the weekend, with temperatures 10-20 degrees below normal.

Potential Snow & Blowing Snow Impact



Forecast Maximum Wind Gusts (MPH)



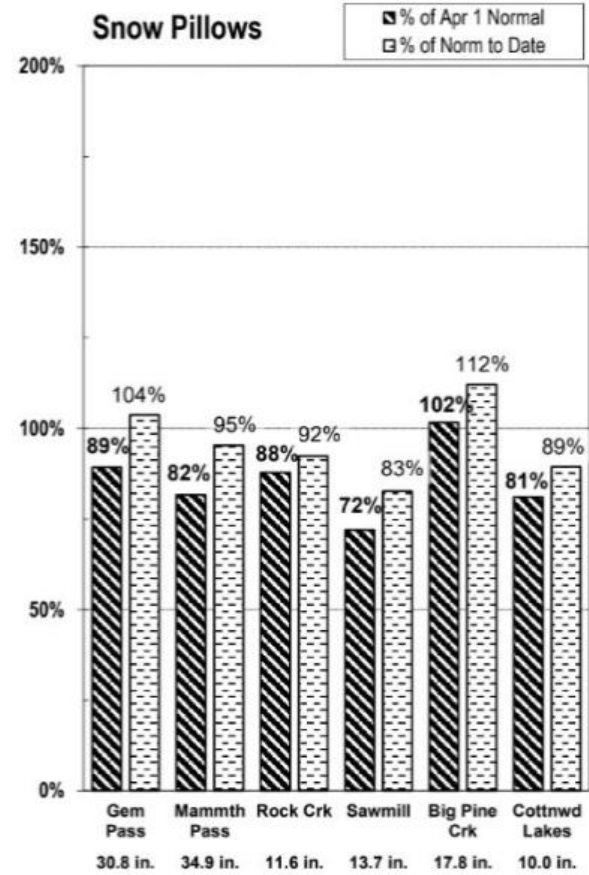
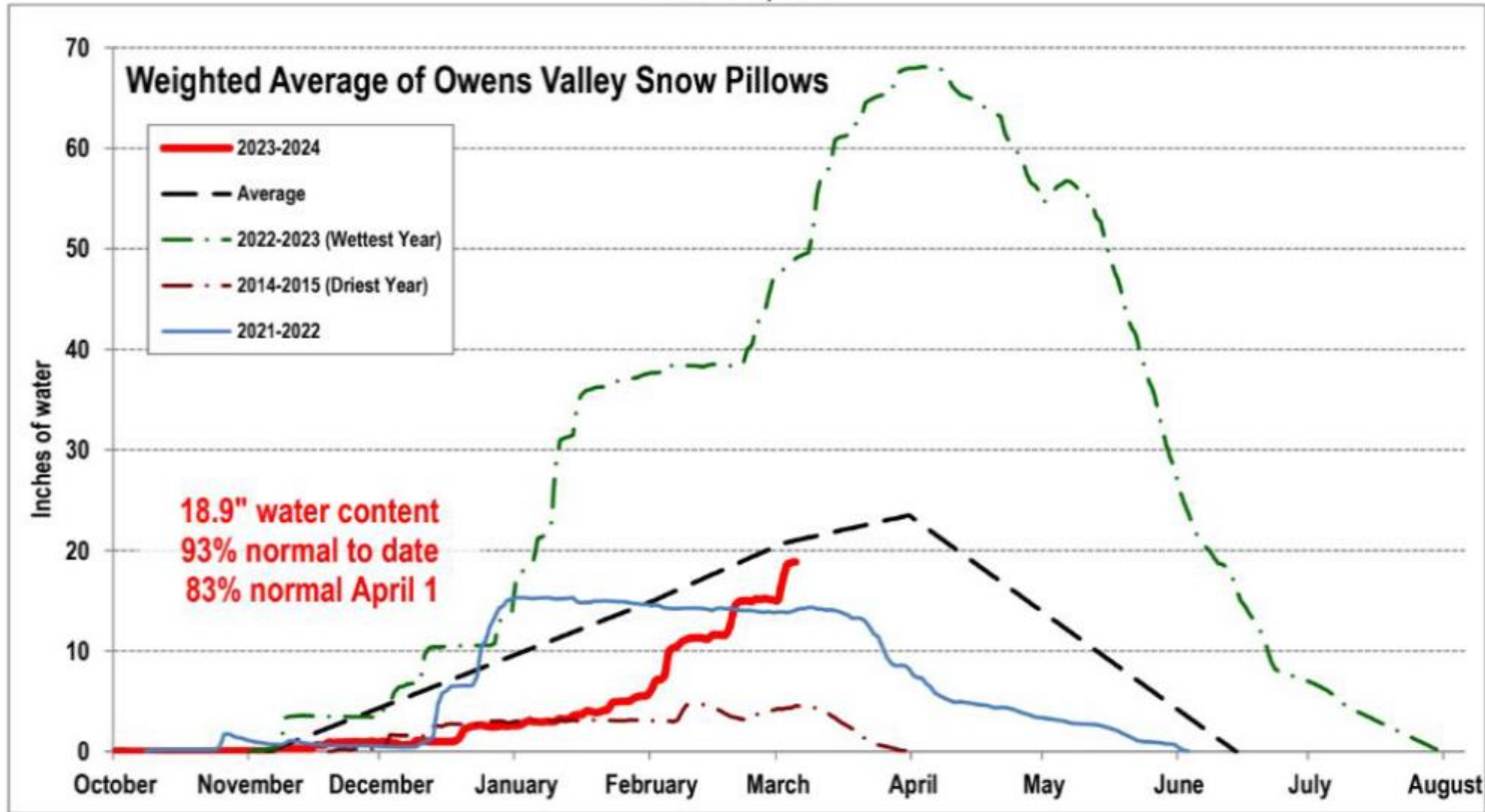


Owens Valley Snowpack

Weather Forecast Office
Reno, NV
Thursday, March 7

EASTERN SIERRA

March 5, 2024



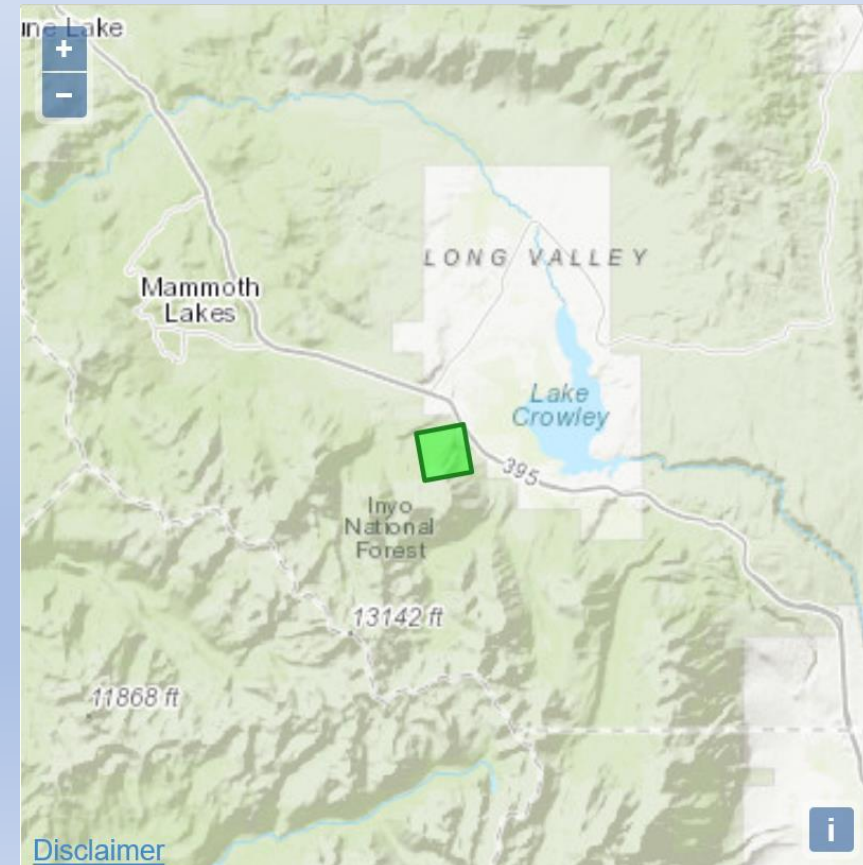
Synopsis Feb 29-Mar 3 2024

Active 1-3. snow over forecasted

Winds verified

Temperatures over forecasted

Why? Weather model grid size too small. Each grid is 1.8 square miles.
1.8 square miles in the Eastern Sierra can include 12,000 ft to 7,000 ft!
Grid sizes need to be 0.25 square miles!!





Out the Window

Regional Briefing for the Sierra & Western Nevada

weather.gov/reno

Weather Forecast Office

Reno, NV

Sunday, March 3

775-673-8100



Peak wind gust at KMMH reached 85 mph, with a 99 mph gust at Convict Lake Road and 110 mph at South Landing Road along US-395 south of Mammoth (SCE sites) overnight.

Ground blizzard this morning near Mammoth. Left: from the Mammoth-Yosemite Airport. Below: US-395 @ Obsidian Dome.



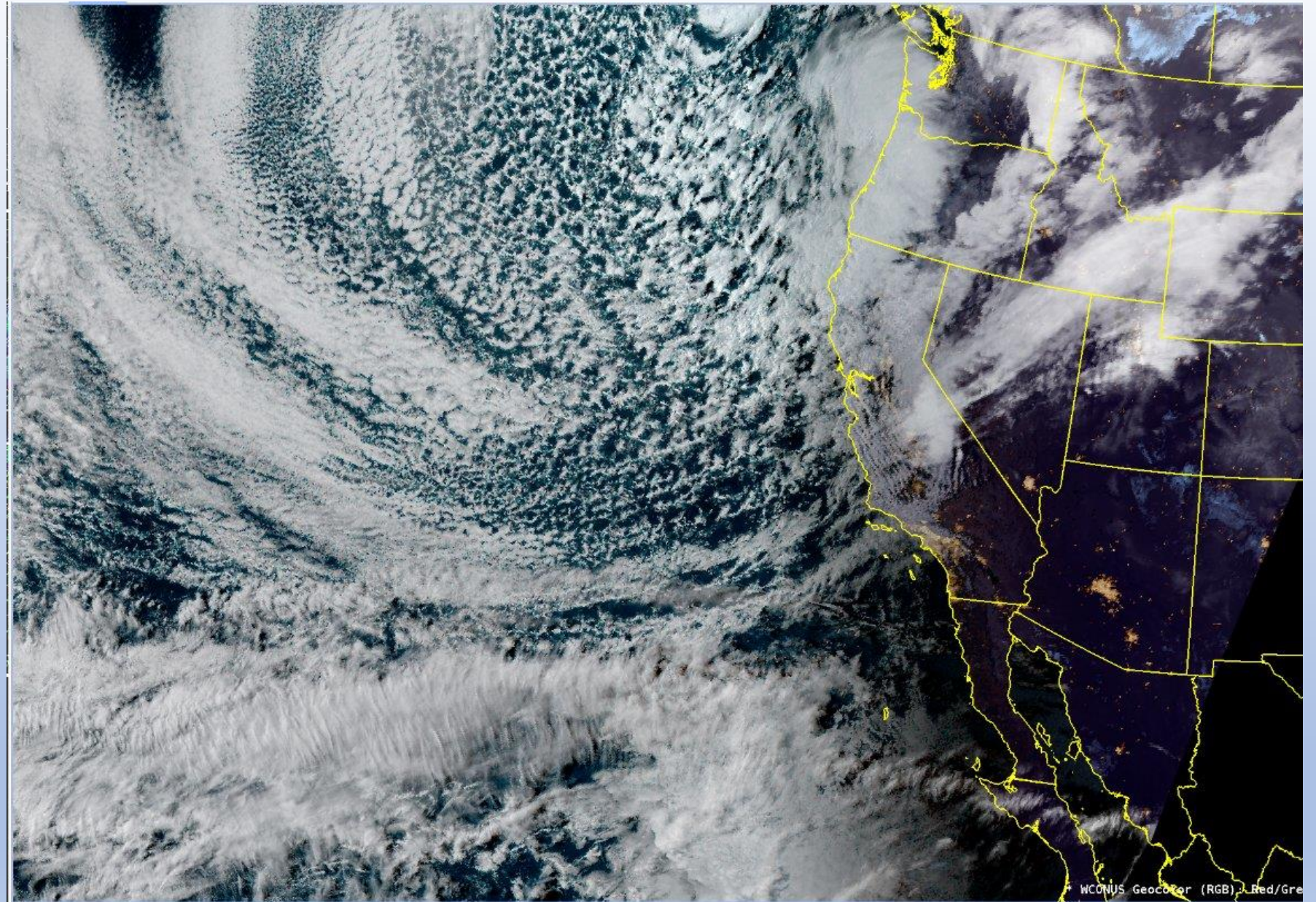
March 1 2024

Very Cold Air!

Popcorn clouds

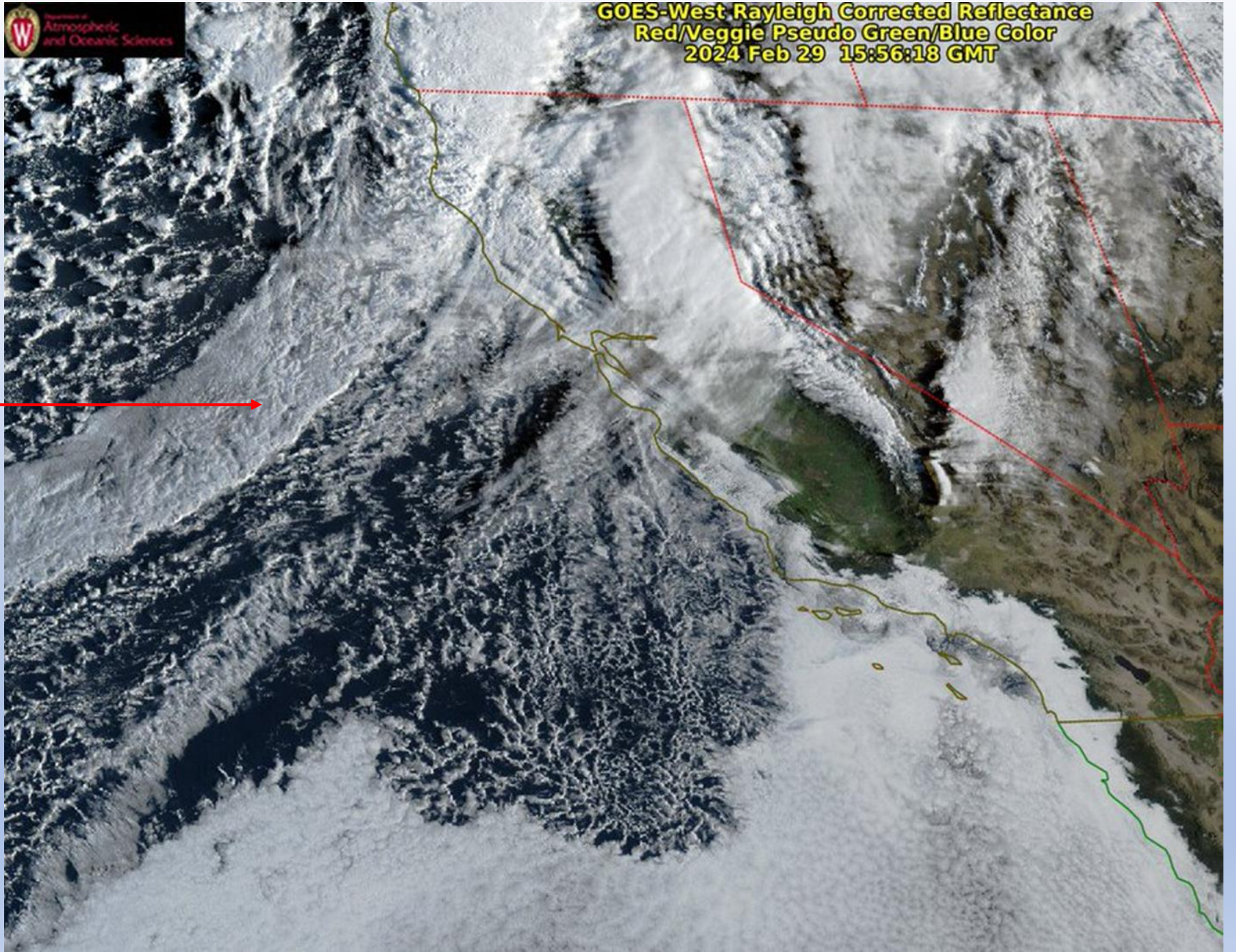
individual
thunderstorms

Towering
cumulus





GOES-West Rayleigh Corrected Reflectance
Red/Veggie Pseudo Green/Blue Color
2024 Feb 29 15:56:18 GMT



March 2 2024

Well defined cold front





Cold front
Barely any clouds,
partly cloudy skies
Over Pacific.
Cold pool huge area
popcorn convective
clouds,
Hundreds of showers
and individual
thunderstorms.
Swirl is embedded
thunderstorms
making a bee line to
N Cal/Tahoe.



QUESTIONS?

Thank you for your support!!





Standard Highway Forecasting Avalanche
Warning Levels, Appendix G (SWAG, 2010,
2022)

LEVEL	Description: Avalanche size	Description: Impact on Roads	OPERATIONAL PROCEDURES
NONE	Natural avalanches are very unlikely to reach the highway	Insufficient snow to reach the highways. Snow may be present in Runout zones, no disruption to travel	No operational changes for avalanche hazard
NOTICE	Natural avalanches are unlikely to significantly impact highway operations. Small D1-D2 avalanches in starting zones	Avalanches may run within .25 miles of the highway. Avalanche hazard is increasing as weather conditions change. Storm intensity monitored closely.	Avalanche rescue equipment required. Do not stop in avalanche areas Advise travelers to move out of avalanche areas
CAUTION	Large natural avalanches up to D2 -D3 can reach upper runouts or tracks. Possible avalanches reaching near roadways. (possible)	Avalanches that run onto the highway will require a snowplow to clear debris. Local disruption to travel due to temp road closures.	Do not stop traffic in avalanche areas Do not work outside of vehicle Use a spotter when working in avalanche area
WARNING	Large Natural avalanches are almost certain to affect highway operations	Avalanches large enough to bury passenger vehicles and damage maintenance vehicles are likely. Residential homes likely damaged. Danger to life due to avalanche impact forces	Maintenance work limited to non-avalanche area. Consult senior supervisor before entering avalanche areas. Road closures.