



# DEBRIS FLOW HAZARDS UPDATE

FEBRUARY 2021

EMERGENCY REVIEW & PREPARATION



# GOALS & OBJECTIVES

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- REVIEW recent storm/evacuation
- UPDATE the community about debris flow risks
- UPDATE on monitoring procedures
- REVIEW/Feedback on evacuation notification and process



# AGENDA

- Debris Flow Trigger **REMINDER**
- Recent Storm Event & Evacuation
- **UPDATED** Hazards and Risk Areas
- Who is at risk **REMINDER**
- County Steps to Protect Lives
- Evacuation planning **REVIEW**
- Public Communication & Messaging



Salinas Area  
1/27/2021



Salinas Area  
1/27/2021

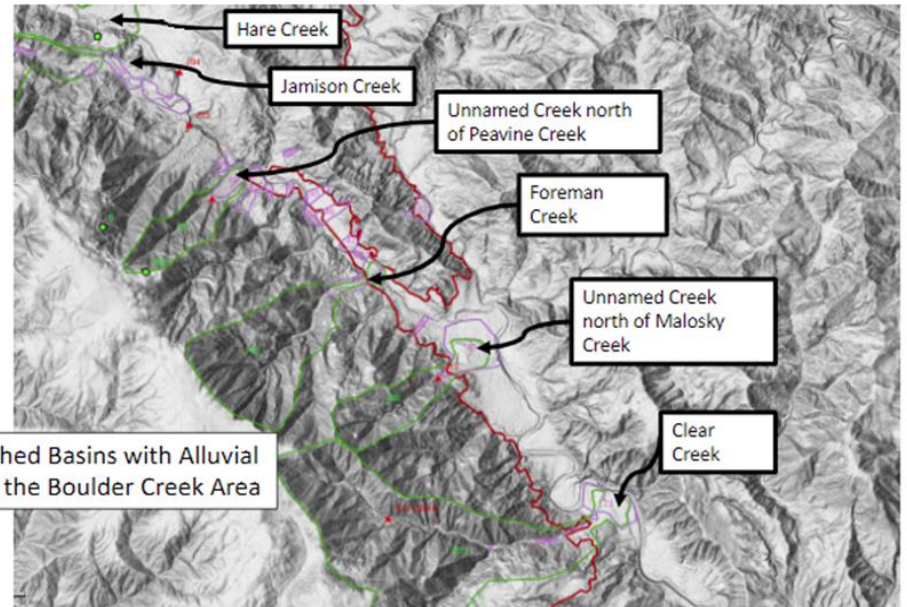
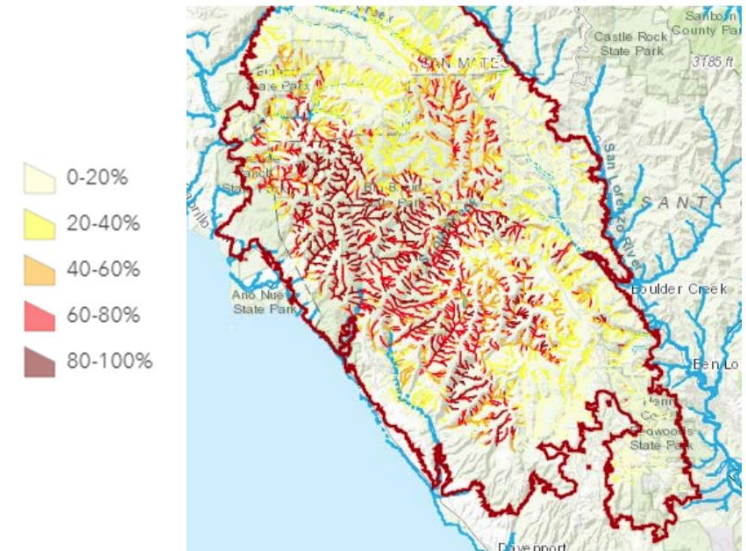
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# POST-FIRE DEBRIS FLOW RISKS

## INITIAL ANALYSIS

- The post-fire Watershed Emergency Response Team (WERT) preliminary report indicated a high probability of debris flows.
- Many areas downslope of the burn area have evidence indicating past debris flows.

Debris Flow Segment Probability – 24 mm per hour storm  
(≈ 0.25 inches in 15 minutes)



# REMINDER

## POST FIRE DEBRIS FLOWS

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- They are typically triggered by intense rainfall
- Intense rainfall saturates upper soil, **hits water repellent layer** running off before penetrating into deeper soil layers creating a moving mass with trees and other debris that travels downslope.
- Debris flows can travel more than 30 mph



Santa Cruz Mountains  
During & After  
Storm Event

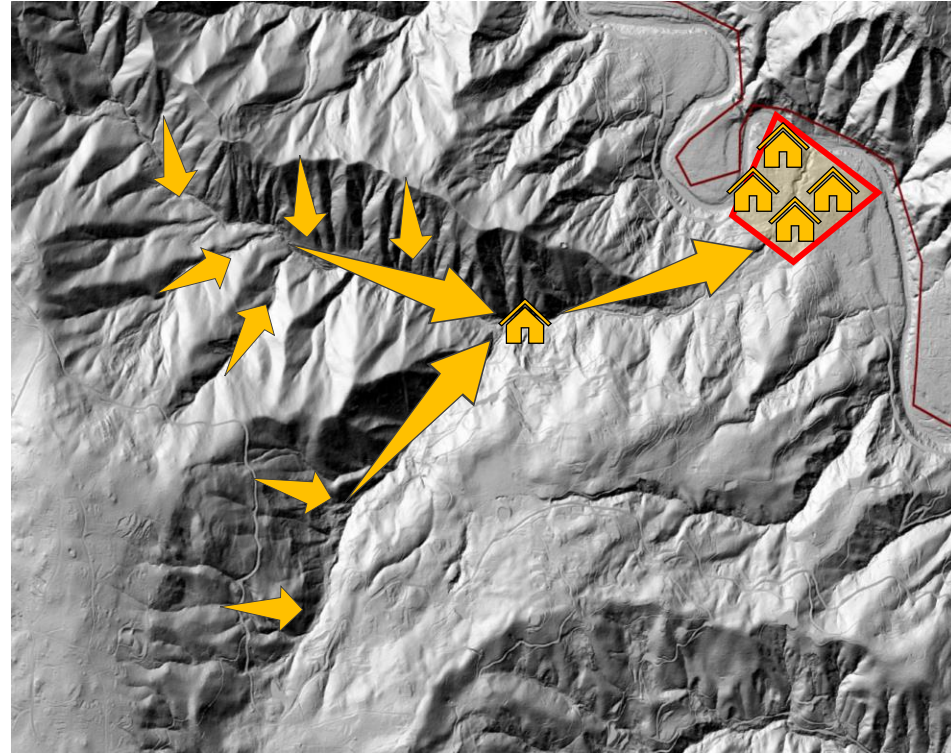


# WHO IS AT RISK?

## REMINDER

People living downslope of the burn area have an increased risk:

- In or near drainage channels
- On or below a burned slope
- At the mouth of a drainage basin



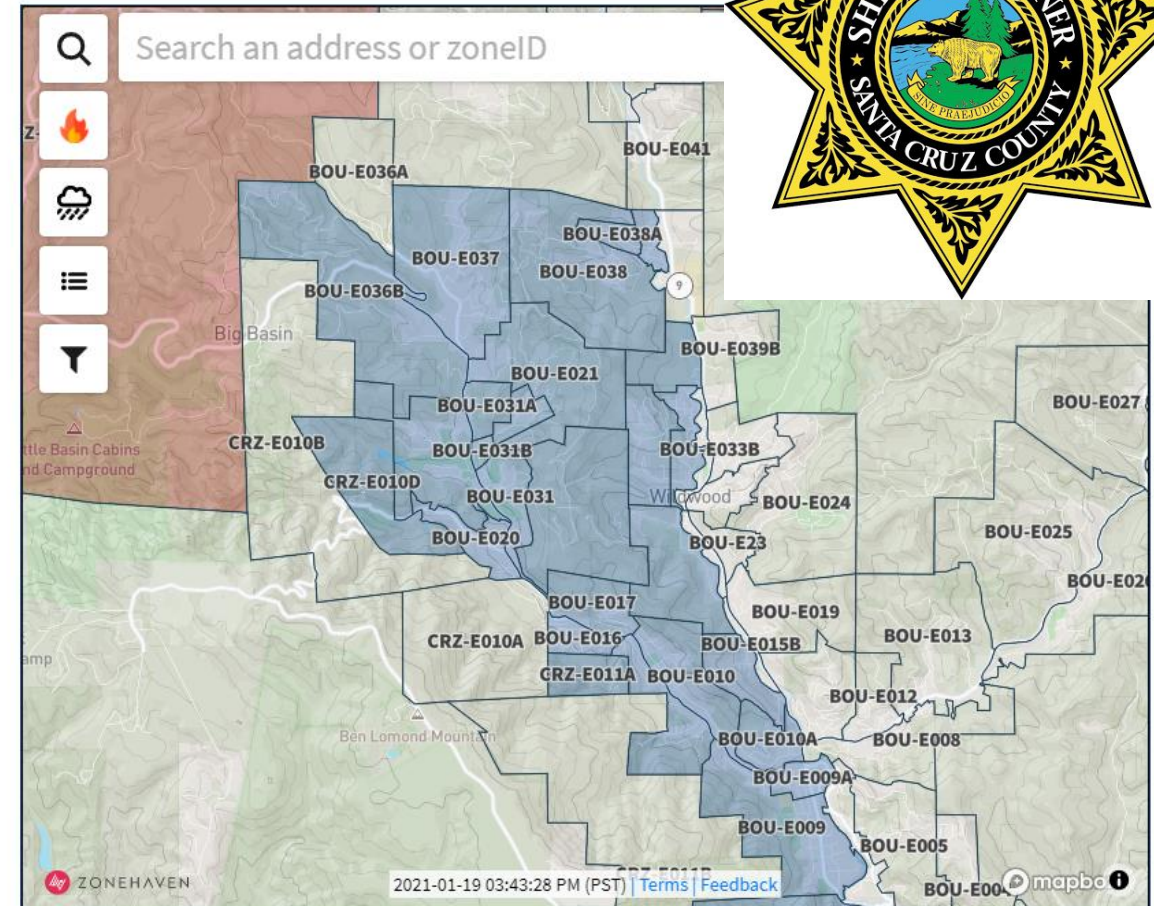
# RECENT STORM EVENT

- Weather Forecasting identified potential storm event
- **CONFIRMED** 48-72 Hour Forecast
- Evacuation **WARNING** Issued
  - Sunday January 24th, 6:00pm
- Evacuation **ORDER** Issued
  - Monday January 25th, 9:00am



# RECENT STORM EVENT EVACUATIONS

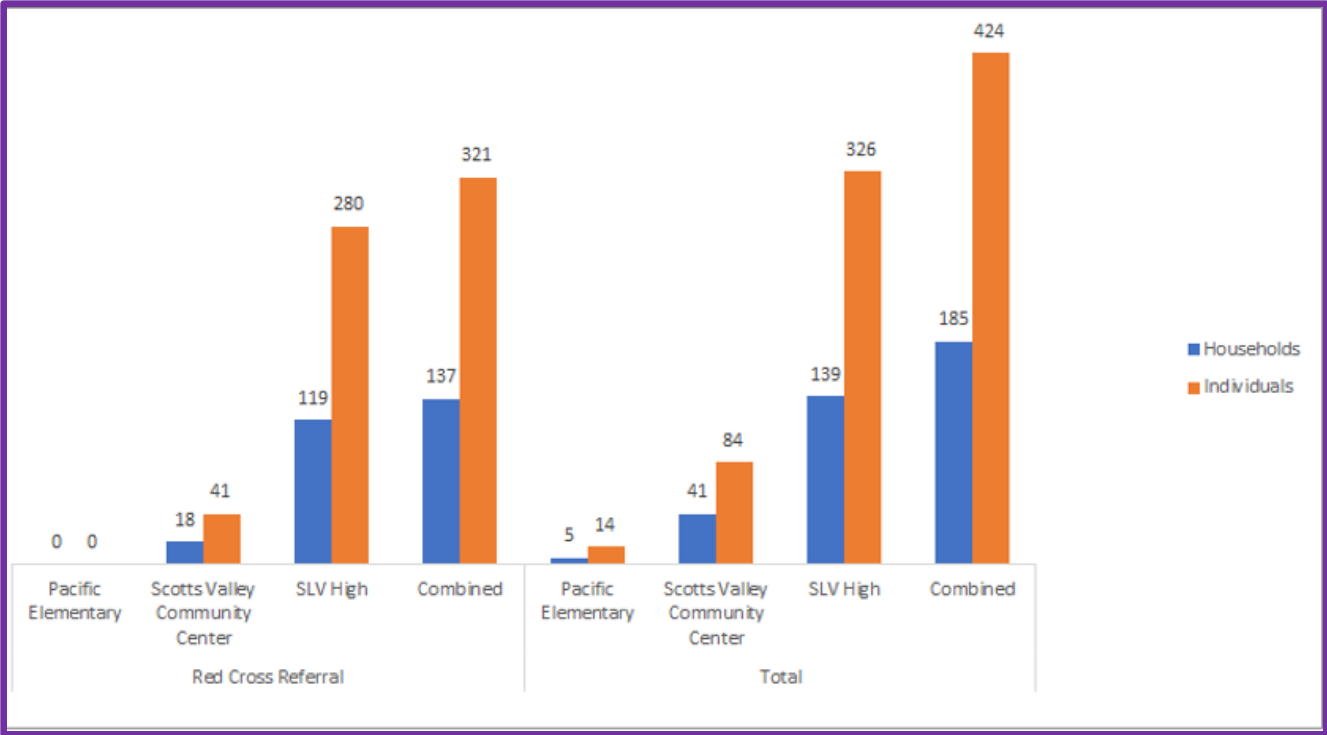
- ~2,800 Parcels
- >5,000 People
- Search and Rescue Team staged in Felton
- Increased patrols by Sheriff



The map above shows evacuation zones and debris flow risk throughout the CZU Lightning Complex fire zone. Please use the search bar to look up your address to determine whether you are in an evacuation zone.

# RECENT STORM EVENT EVACUATIONS

- 3 Temporary Evacuation Points (TEPs) **OPENED**
- Hundreds of Residents checked in at TEPs
- 200+ Red Cross Hotel Room vouchers



# RECENT STORM EVENT

January 26-January 29  
Atmospheric River Radar  
Loop



# RECENT STORM EVENT

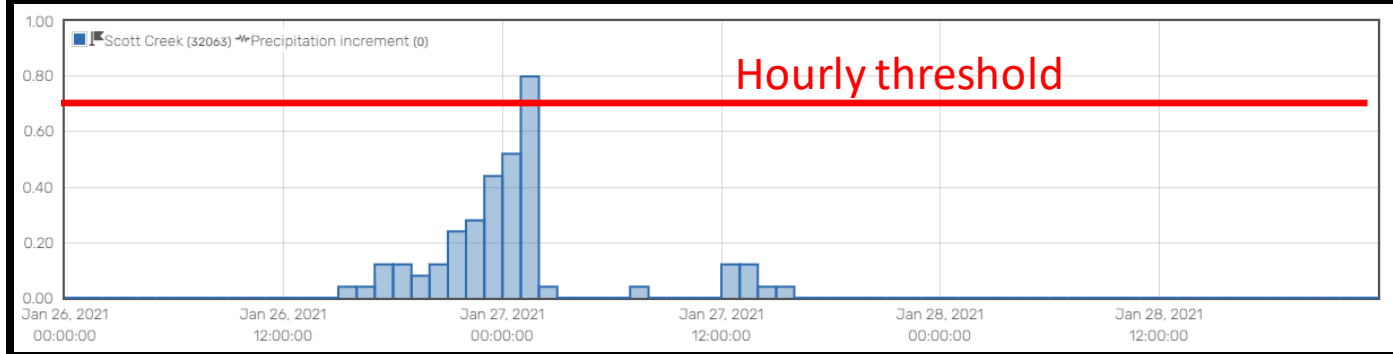
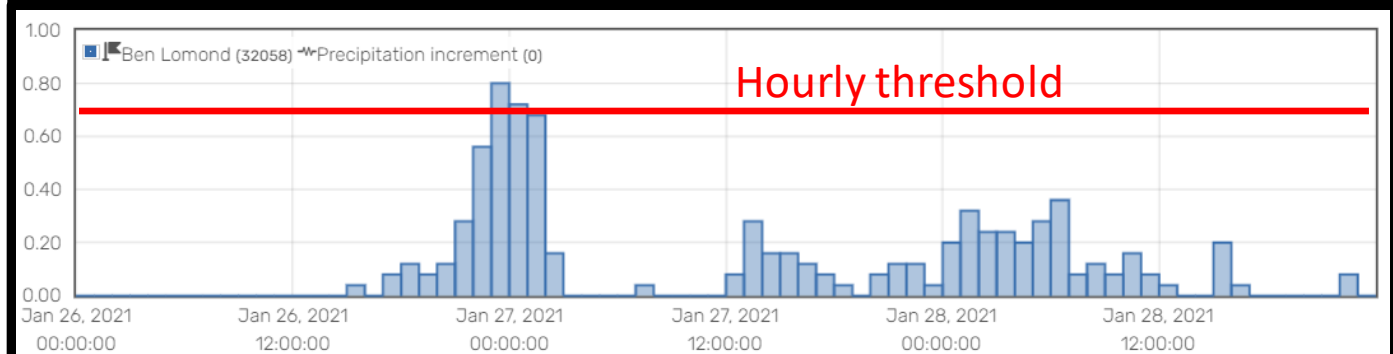
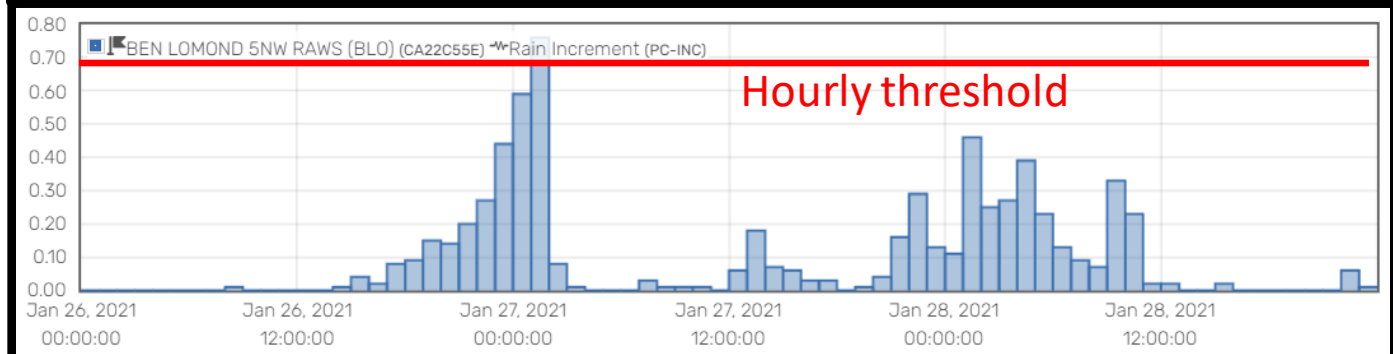
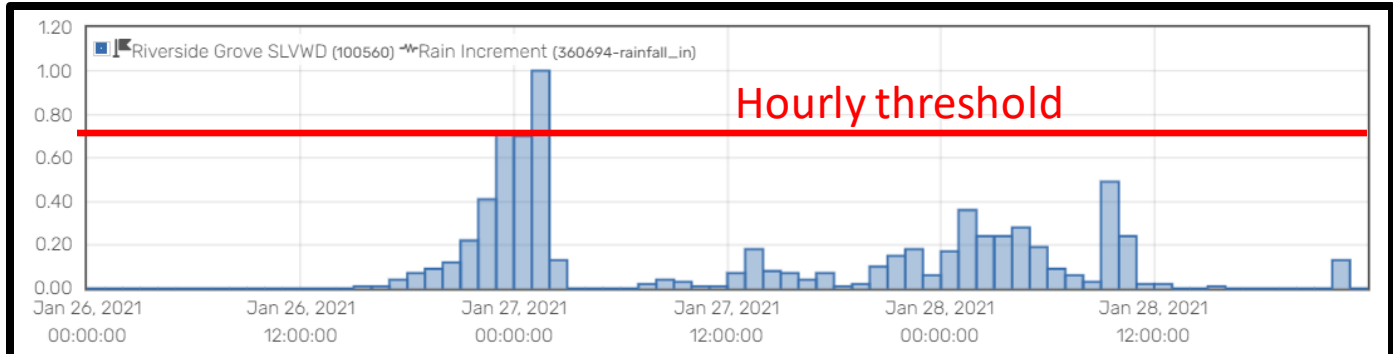
## Rain Gages Jan. 26-Jan. 28

Riverside Grove

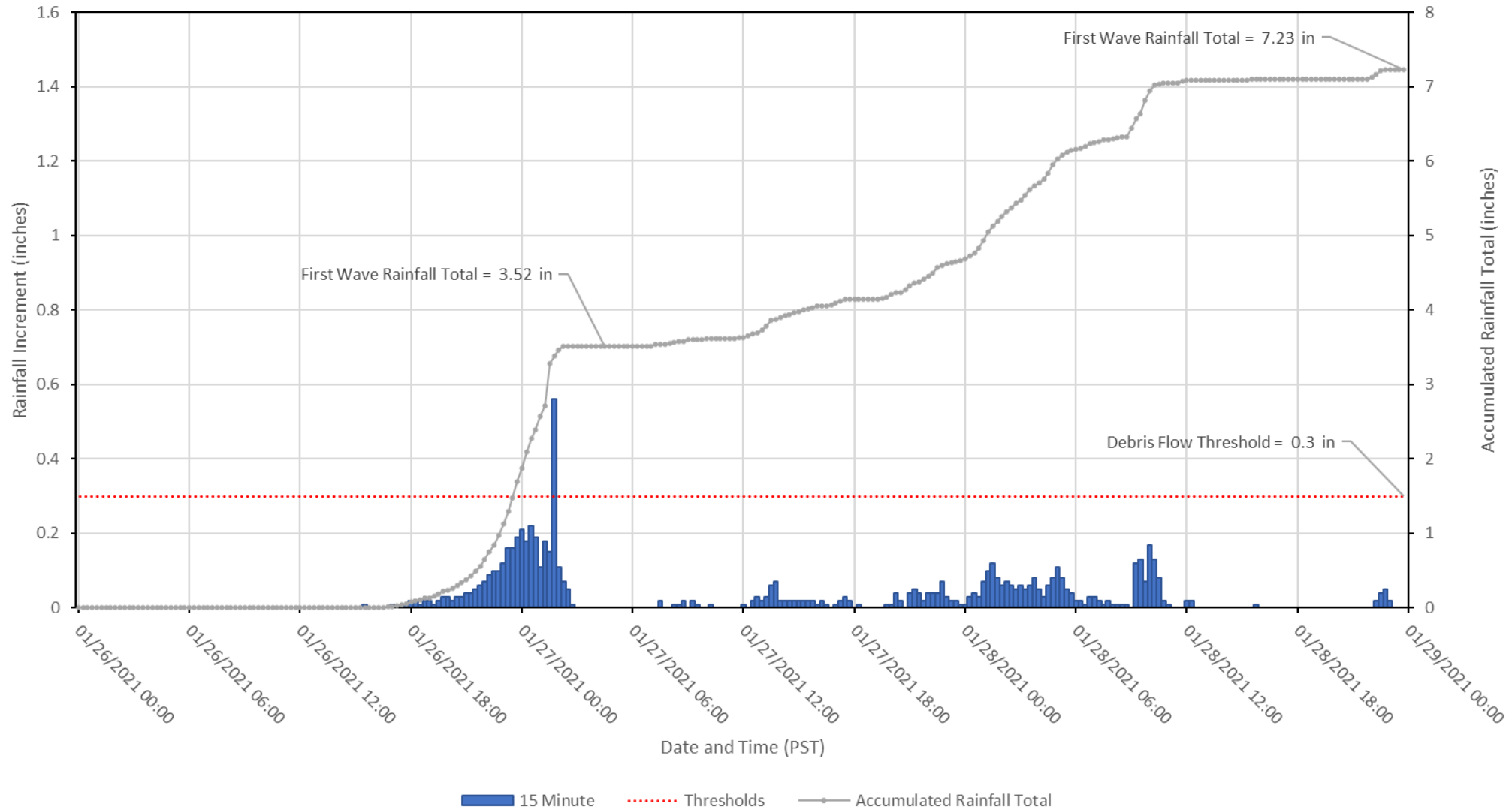
Ben Lomond RAWS  
(CalFire Camp on Empire  
Grade)

Ben Lomond (@Transfer  
Station)

Scott Creek (Lockheed)

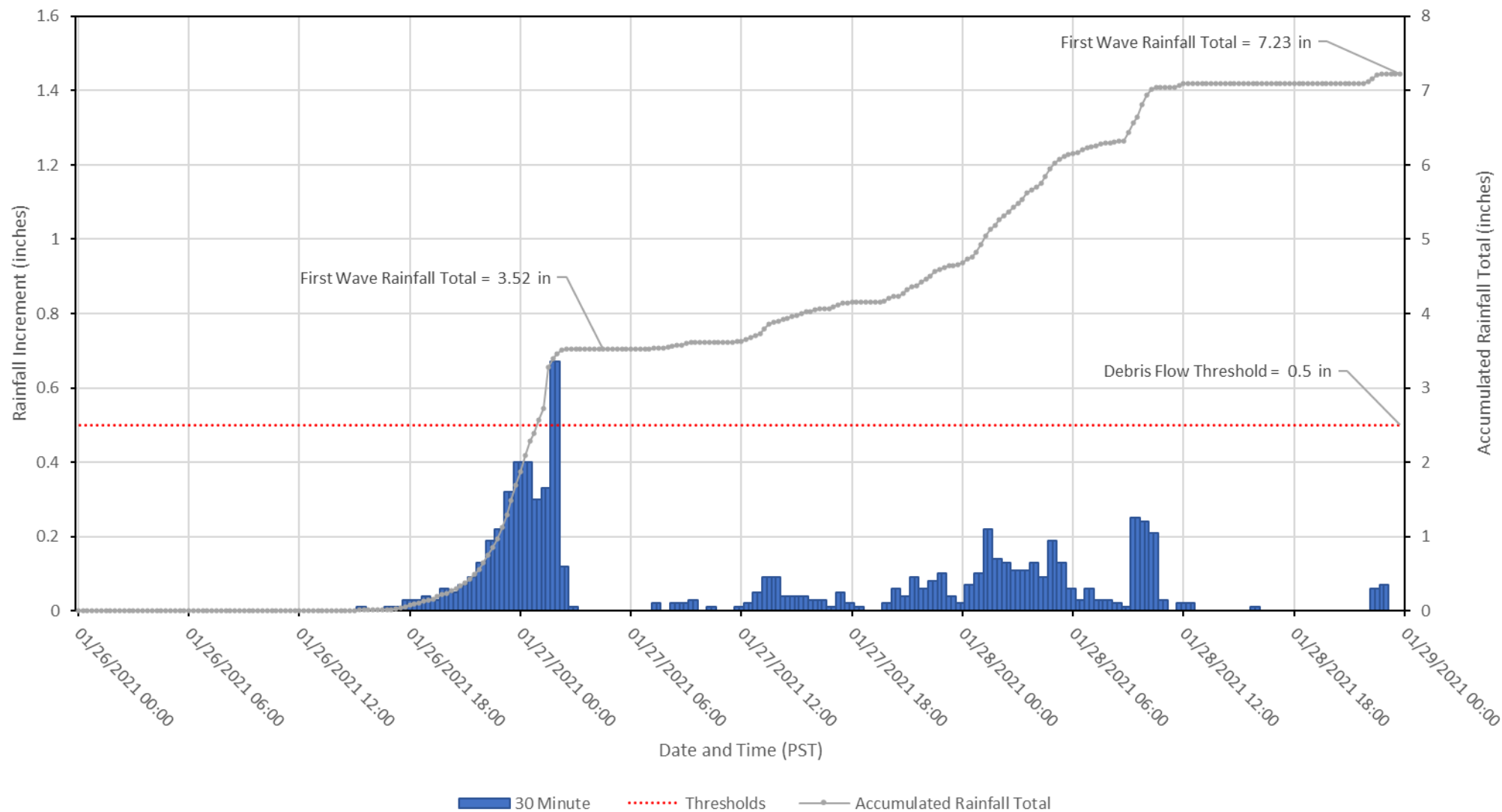


### Riverside Grove SLVWD Rain Gage 15-Minute Rainfall Data





### Riverside Grove SLVWD Rain Gage 30-Minute Rainfall Data





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# Where was the most intense rainfall? What happened?

## Scott Creek, **Peak intensity 1.73 in/hr**

Near Last Chance drainage, ~4 km west of Scott Creek Rain Gage. High burn severity. Photos Matt Thomas



**DEBRIS FLOW  
EVIDENCE**

Small, runoff-generated debris flow (no landslide headscarp) with well-developed levees



# Where was the most intense rainfall? What happened? USGS BALT CZU monitoring site - **Peak intensity 0.87 in/hr**

Moderate/high burn severity. Photos Matt Thomas



Probable small, runoff-generated debris flow below site.  
New channel incision into swale

Small shallow landslide on slope nearby.

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## Where was the most intense rainfall? What happened?

### Penstock Rd - **Peak intensity 0.94 in/hr**

Near Berry Creek drainage and confluence with Big Creek. Photos courtesy of Amy East



Small debris flow. Style of initiation unknown. One of three debris flows observed in vicinity.



## REMINDER

# POST-FIRE DEBRIS FLOW HAZARDS ARE INCREASED

- Wildfire burned organic matter, creating water repellent soil layer (hydrophobic).
- Steep, burned and denuded slopes deposit rocks, soil, and trees into swales and drainages.
- **Even after recent rainfall the hydrophobic layer is still intact**



**DRY SOIL**  
just beneath the surface  
**AFTER 1/26-27**  
rain event

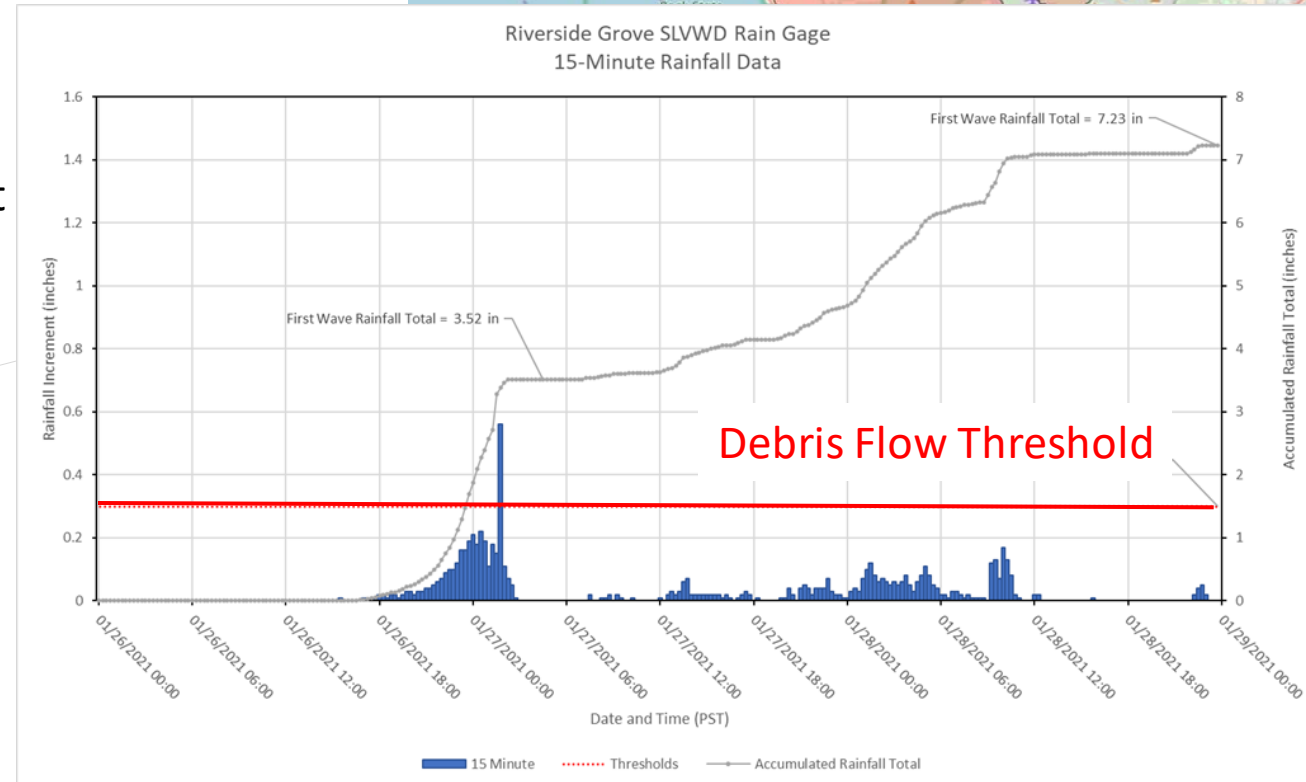
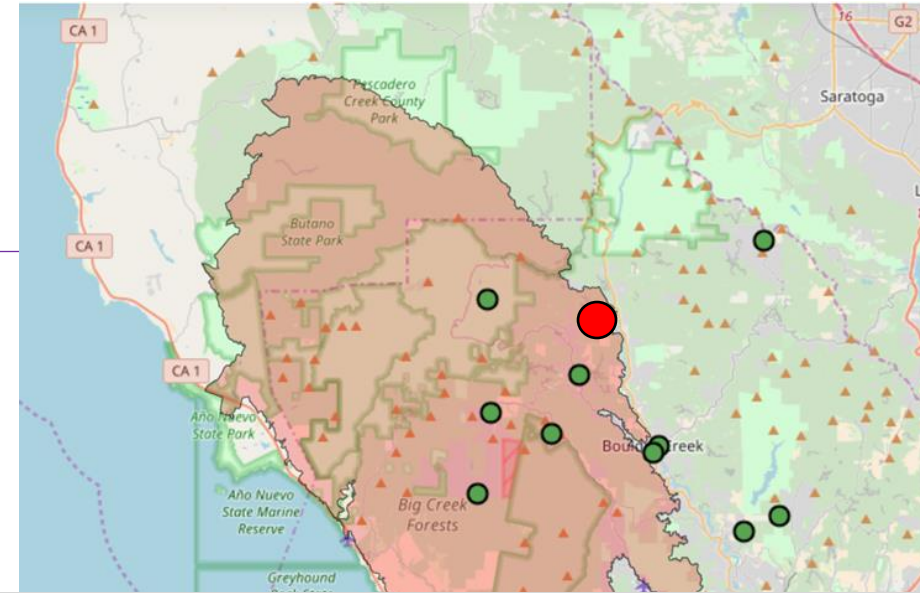






# COUNTY STEPS TO PROTECT LIVES

- **UPDATED** Hazard Mapping & Evacuation Areas
  - Refined since initial WERT assessments
  - Working with Fire Agencies & County Geologist
- Detailed Weather Forecasts from the National Weather Service
  - USGS/Cal Geologic Society/CalFire **calibrated rainfall intensity thresholds**
  - **Rain Gauges located near Debris Flow Hazard Areas**
    - Tuned to provide alerts when thresholds are met
- Evacuation Planning & Communication
  - Social Media
    - County of Santa Cruz – FB, Twitter
    - County Sheriff – FB, Twitter
    - CALFire
  - CODE Red
  - ZoneHaven – Evacuation Notification Tool
  - Reverse 911

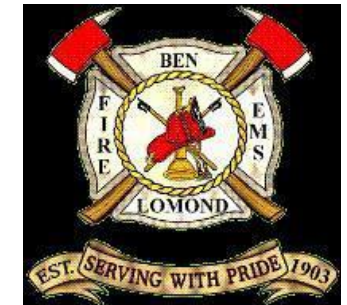
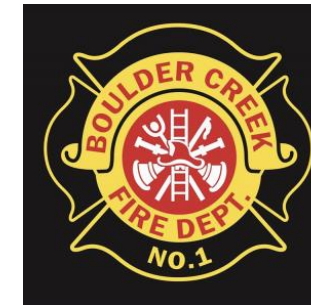
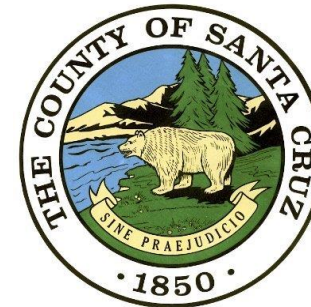




# COUNTY STEPS TO PROTECT LIVES – **REVIEW/REMININD**

## Communication to the Public (In English and Spanish)

- Clearly communicate risks and evacuation plans to public
- Issue **WARNINGS** as far in advance as possible
- Messaging in clear terminology
- Social media, virtual community meetings, press briefings
- ZONEHAVEN - Publicize temporary evacuation point locations - **AFTER** evacuation **ORDER** notice





## WHAT DID YOU DO?

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Sign up for emergency alerts and pay attention to weather forecasts for the burn area.



Make a plan. May be evacuated again.



Evacuate! No way to precisely predict when and where they will happen.



Do not wait for someone to tell you to evacuate. Self monitor, if you don't feel safe – leave!



During a storm that could cause a debris flow, stay alert and awake in order to heed evacuation warnings.



# SURVEY – Q&A

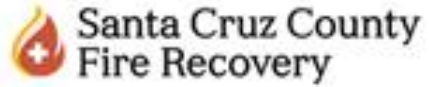
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- Please take some time to fill out the survey and provide your experience and feedback. The link is in the chat.
- If you can't access the chat, please use the link below to answer the survey after the presentation

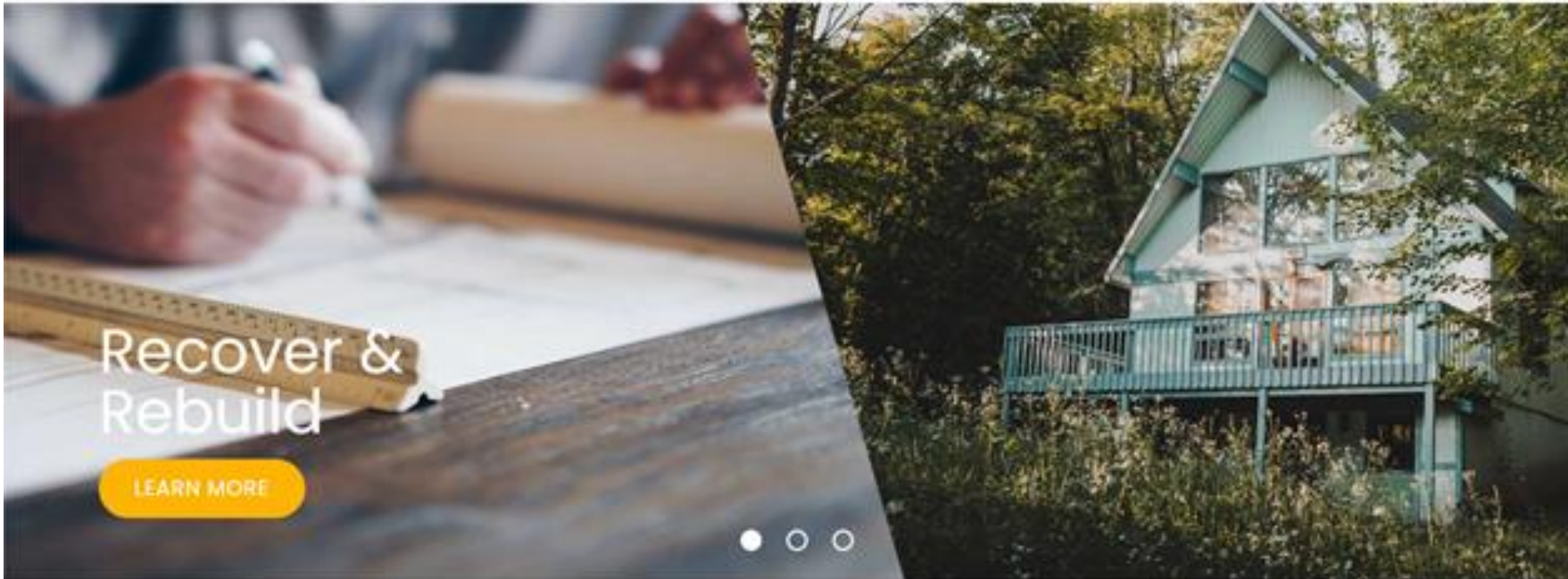
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- Post-meeting questions can also get sent to:
- <http://www.co.santa-cruz.ca.us/FireRecovery/AsktheRecoveryTeam.aspx>

# REMINDER: UPCOMING COMMUNITY MEETINGS



About ▾ Debris Flow ▾ Debris Removal ▾ Recover & Rebuild ▾ Resilience



Monday, February 8th, 5:30 to 7:30 PM Primarily for those OUTSIDE the coastal zone.

Thursday, February 11th, 5:30 to 7:30 PM Primarily for those INSIDE the coastal zone.