Debris-Flow Hazards Following Wildfire

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Wildfire increases the potential for runoff and erosion

Wildfire + steep slopes + rain = debris flow

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Fire-induced Changes That Contribute to Increased Hydrologic Hazard

Consumption of Canopy

+ Physical and Chemical Changes in Soils

Enhanced runoff and Erosion

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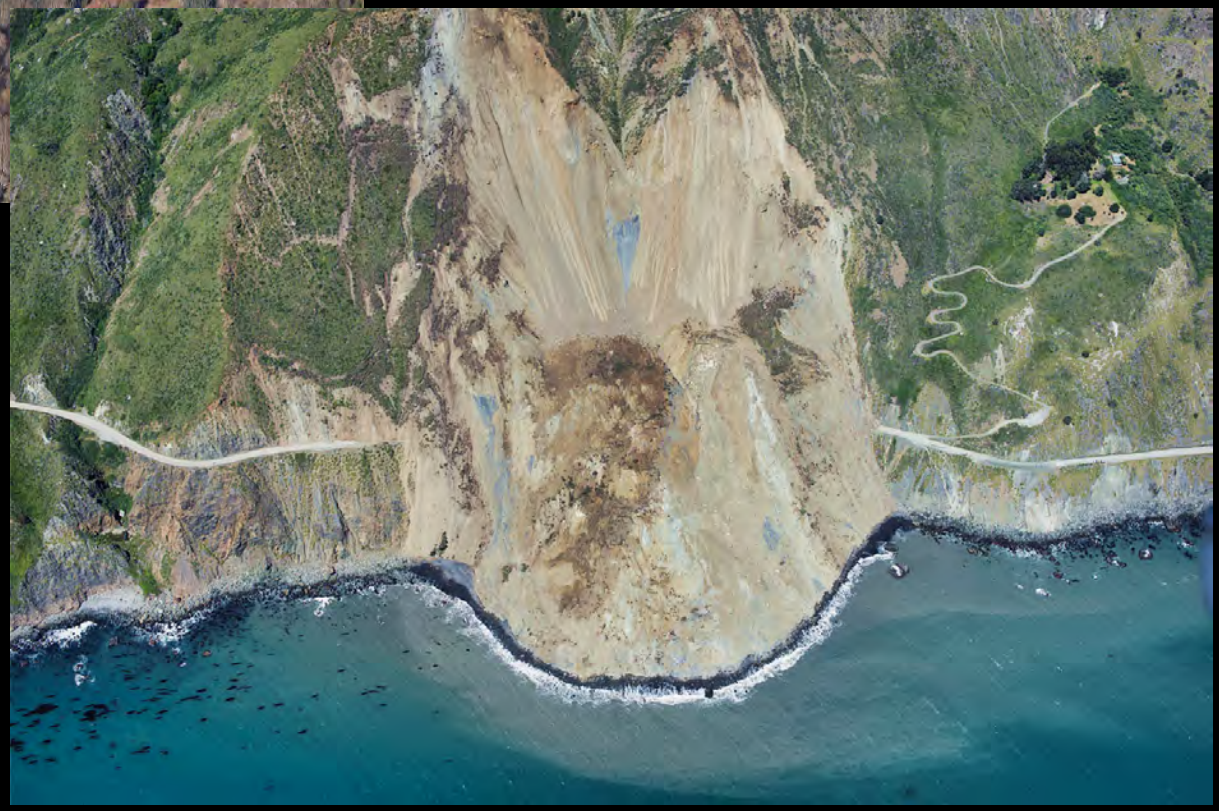
Deeply seated landslides are not post-fire debris flows

- Can occur long after rainfall
- Often show signs of small movement before catastrophic failure
- Often reactivated old slides



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Post-Fire Debris Flow – Devore CA, December 25, 2003

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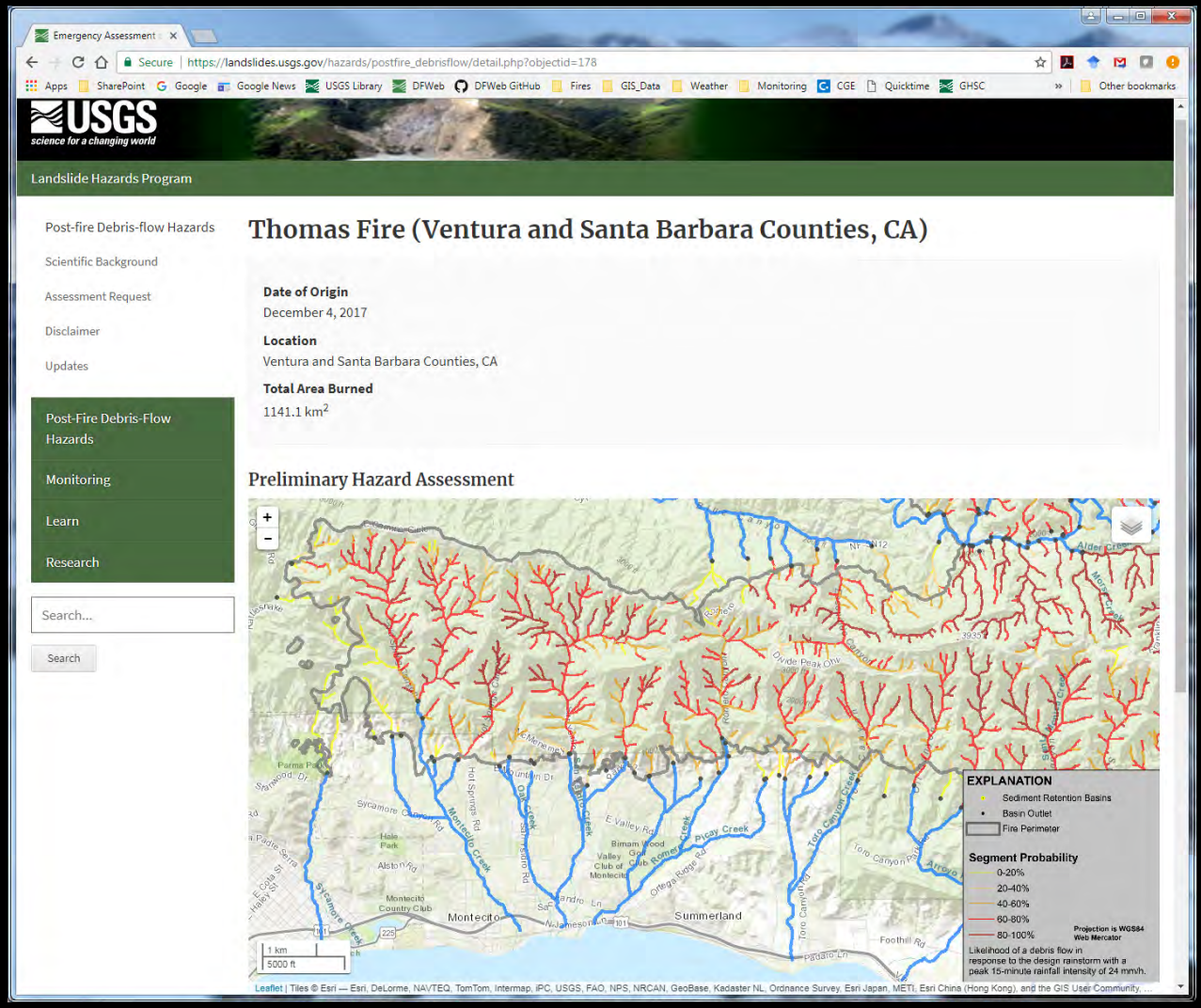
Debris Flows Travel At High Velocity And Can Be Very Destructive

Montecito, California, January 9, 2018
Storm Duration = Several Hours of low intensity rainfall, with 15 minute burst
Max 15 minute Intensity = ~4.5 in/h
Flow Duration = 15 - 30 minutes*
21 Fatalities, 2 still missing, 100+ Homes Completely Destroyed

Debris Flow Hazard Assessment

https://landslides.usgs.gov/hazards/postfire_debrisflow/



- **Likelihood of debris flow**
- **Estimated magnitude of debris flow**
- **Combined hazard**
- **Estimated rainfall-intensity duration threshold**

Take-Home Messages

- Post-fire debris flows do not require any antecedent moisture
- Post-fire debris flows can be triggered within minutes of intense rainfall
- Hazard may persist 2 – 5+ years following wildfire
- Avoidance is the best form of risk reduction