Reducing rockfall risk in Yosemite National Park

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“The National Park Service and USGS geologists conducted assessments and ultimately developed maps showing hazard zones and areas of rock fall potential in Yosemite Valley… However, these maps do not predict when or frequently a rock fall will occur; consequently, neither the probability of a rock fall at any specific location nor the specific risk to people or facilities can be assessed.”

- NRC 2004 Partnerships for Reducing Landslide Risk
Runout modeling of potential future rock falls

Regional STONE simulations from all slopes $\geq 60^\circ$
Quantitative rockfall hazard assessment

Hazard line (blue) represents a 1/500 annualized probability of exceedance.

Legend

Rock-fall hazard

- Rock-fall hazard line calculated
- Rock-fall hazard line inferred
- Base of talus

Outlier boulders (m³)

- 0.02-2
- 2-20
- 20-200
- 200-2,000
- 2,000-20,000

Curry Village

Rock avalanche

Stock et al. (2014) USGS SIR
Quantitative rockfall risk assessment
Structures ranked according to their risk (exposure * position within hazard zone)
Quantitative risk assessment of structures

Structures with risk metrics >6 closed, relocated, or repurposed, *reducing risk by 95%*

![Graph showing risk metrics against order number for Yosemite Valley structures within the hazard zone.](stock et al. (2014) USGS SIR)
For Future Generations

In the past, a visit to Yosemite might have included nightly dances at Camp Curry, a glimpse of the firefly as the giant boulder was pushed from Glacier Point, and perhaps the spectacle of rangers feeding bears. Today, we recognize that while they helped create a special community at Camp Curry, some of those activities were damaging to the park's natural resources. Now, increased understanding of that damage has shifted focus away from manufacturing memories to providing opportunities for visitors to experience the natural wonder of Yosemite.

The remaining foundations, fireplaces, and stone staircases in the area beyond this sign are remnants of historic buildings that were removed after a major rockfall in October 2008, one of many in the last 150 years. Rockfalls are a regular and natural occurrence in Yosemite Valley, triggered when water, ice, and earthquakes weaken the towering granite cliffs above. These rustic buildings will not be rebuilt. As our knowledge of rockfall and other natural processes in Yosemite increases, the management of the park, and how and where we recreate, must change.

Past visitors to Yosemite fondly remember the Firefly, the bear feedings, and the tight-knit community built amongst the boulders at Camp Curry. Present and future generations of park visitors will leave Yosemite with memories enriched by a better understanding of the awesome forces at work around them.