Watershed Emergency Response Team (WERT)
2025 Pickett Fire

CA-LNU-015521

September 17, 2025

California
Department of Conservation
California Geological Survey

Contents

Appendices:

Appendix A – Pickett Fire WERT Contact List

Appendix B – Values-at-Risk Summary Table

Appendix C – Values-at-Risk Map Book

Appendix D – Values-at-Risk Detail Sheets

WERT REPORT AUTHORSHIP AND PROFESSIONAL REGISTRATION

REPORT TITLE: Watershed Emergency Response Team (WERT) Evaluation – 2025 Pickett Fire

LIMITATIONS: This report presents the results of a rapid assessment to help communities prepare after wildfire by documenting and communicating postfire risks to life, property, and infrastructure posed by debris flow, flood, and rockfall hazards. The findings included in this report are not intended to be fully comprehensive or conclusive, but rather to serve as a preliminary tool to assist responsible jurisdictions and agencies in the development of more detailed postfire emergency response plans.

PREPARED BY:

DocuSigned by:
Kevin Doherty
6130BA36B5D7486...
9/17/2025

Kevin Doherty, CEG 2666
Senior Engineering Geologist
California Geological Survey

Signed by:
Kevin Callahan
DCEB6862F6CB411...
9/17/2025

Kevin Callahan, GE 2989, PE 72202
Geotechnical Engineer
California Geological Survey

Signed by:
Fey Egan
1CE061AD715E42B...
9/17/2025

Fey Egan, RPF 3034
Forester I, Sacramento Unit
California Department of Forestry and Fire Protection

DocuSigned by:
Don Lindsay
6DF7C5F7600846B...
9/17/2025

Don Lindsay, CEG 2323, GE 3097
Supervising Engineering Geologist/Geotechnical Engineer
California Geological Survey

Pickett Fire – WERT REPORT EXECUTIVE SUMMARY

CA-LNU-015521 WERT Evaluation

Mission Statement: The California Watershed Emergency Response Team (WERT) helps communities prepare after wildfire by rapidly documenting and communicating postfire risks to life, property, and infrastructure posed by debris flow, flood, and rockfall hazards.

It should be noted that the findings included in this report are not intended to be fully comprehensive or conclusive, but rather to serve as a preliminary tool to assist Napa County Office of Emergency Services, local first responders, the California Governor's Office of Emergency Services, the United States Department of Agriculture Natural Resources Conservation Service (NRCS), Cities of Calistoga and St. Helena, utility companies, and other responsible agencies and entities in the development of more detailed postfire emergency response plans. It is intended that the agencies identified above will use the information presented in this report as a preliminary guide to complete their own more detailed evaluations, and to develop detailed emergency response plans and mitigations. This report should also be made available to local districts, residents, businesses, and property managers so that they may understand their proximity to hazard areas and to guide their planning for precautionary measures as recommended and detailed in this document.

The Pickett Fire started on 21 August 2025 near the eastern terminus of Pickett Road in Calistoga. The cause is under investigation. By 6 September 2025, the fire was 94% contained after reaching a size of 6,819 acres (10.7 mi^2). The soil burn severity inside the fire perimeter is mostly low with some moderate and small amount of high.

Due to the potential for increased postfire runoff, sediment-laden flooding, and possibly debris flows, the burned area was assessed by an interagency WERT. The WERT rapidly evaluated postfire watershed conditions, identified potential **Values-at-Risk (VARs)** related to human life safety and property, and evaluated the potential for increased postfire hazards. Where appropriate, the WERT recommends potential emergency protection measures to reduce postfire impacts to VARs.

Summary of the Key WERT Findings

- The Pickett Fire mostly reburned slopes previously impacted by the 2020 Glass Fire.
- The Pickett Fire produced mostly low and moderate soil burn severity. Pickett Fire soil burn severity: unburned to very low (9.0%), low (65.7%), moderate (24.1%), and high (1.2%).
- The degree of fire-induced damage to soil is called "soil burn severity" and is a primary influence on increased runoff, increased sediment supply, and the occurrence of postfire watershed hazards (e.g., debris flows and flooding). Moderate and high soil burn severities typically create the most impacts.
- The Pickett Fire has a potential of generating low to moderate postfire floods and debris floods following high intensity and prolonged rainstorms. Smaller basins (< 2 mi^2) with mostly moderate burn severity will experience the highest response.

- Historic postfire response inside the fire perimeter following the 2020 Glass Fire and from burn scars in the region with similar physiographic conditions suggest postfire debris flows are uncommon. Minimal dry ravel and moderate soil and debris loading observed in basins burned by the Pickett Fire, coupled with large areas of low and unburned soil burn severity in the headwaters of burned basins, suggest a lower potential for debris-flow initiation.
- The WERT identified 17 VARs inside and downslope/downstream of the fire perimeter. 8 VARs are shown as polygons, which encompass multiple individual sites subject to similar hazard and risk. The remaining 9 VARs are points, which are associated with discrete sites such as homes and road crossing structures.
- No exigent VARs, which present a more urgent threat to life-safety and/or property, were identified.
- The road network inside and downstream of the Pickett Fire perimeter will be subject to increased potential for storm damage for the next two to five years. Specific road crossing structures that provide ingress and egress to homes or along main channels were addressed as specific VARs or more broadly under general recommendations.
- Road crossings that may be impacted by increased runoff and floods are along Pickett Road, Dutch Henry Road, Lommel Road, Silverado Trail, Aetna Springs Road, and Pope Valley Road. Other road crossings, especially along unpaved roads inside the fire perimeter, may also be impacted. These crossings may be subject to potential blockage and result in overtopped roads from flooding impacts.
- Agricultural ponds within and adjacent to the burned area may be impacted by increased runoff and sediment and debris loading.
- Residents subject to postfire hazards need to have a clear understanding of the hazards and mitigation strategies (e.g., evacuation, deflection structures, culvert improvements) to effectively reduce risk to life and property. Residents should consult with representatives from Napa County Public Works or Natural Resources Conservation Service (NRCS) so that emergency protective measures can be designed to minimize nuisance flooding and property damage.
- **To trigger the National Weather Service early warning system, the WERT suggests thresholds of 0.35 inches in 15 minutes, 0.5 inches in 30 minutes, and 0.7 inches in 60 minutes.**
- Close coordination between the Napa County Office of Emergency Services, the County Sheriff, local fire and law enforcement agencies, the National Weather Service, NRCS, and other affected entities will be necessary to effectively develop and implement a response plan that will minimize risk. WERT information provides critical intelligence for response planning and implementation.

Introduction

Background

The Pickett Fire began on 21 August 2025 northeast of Calistoga near the terminus of Pickett Road. As of 6 September 2025, the fire was 94% contained and had burned 6,819 acres. The Pickett Fire destroyed 5 structures. There were no firefighter or civilian injuries.

On 24 August 2025, Napa County Chief Executive Officer and Director of Emergency Services, Ryan Alsop, issued a Proclamation of Local Emergency due to the Pickett Fire, calling out the threat to critical watershed areas and infrastructure requiring mitigation measures to prevent a reoccurrence of conditions of extreme peril to life, property and the environment. CAL FIRE Incident Commander, Dustin Martin, requested a Watershed Emergency Response Team (WERT) assessment on 25 August 2025. In response to this request, the California Geological Survey (CGS) conducted a desktop review of the burned area and determined that potential post-fire impacts to water quality, agricultural resources, residential structures, and low-volume roads by increased rockfall, flows, sediment, or debris was low to moderate. A Type III WERT was recommended to further identify and assess Values-at-Risk. See footnote for definitions of different postfire runoff hazards evaluated by the WERT[1].

During periods of thunderstorm activity and during the wet season (typically October through May), it is critical that people who live in hazard areas inside and downstream of the Pickett Fire implement emergency protection measures (EPMs) where appropriate, check weather conditions and forecasts, stay alert to National Weather Service (NWS) flash flood watches and warnings, and monitor local county resources for guidance on evacuations. This WERT report, and associated data products, provides critical intelligence for minimizing risk from postfire flood and geologic hazards.

This report presents the results of a rapid evaluation of postfire geologic and hydrologic hazards to life and property (i.e., collectively known as “Values-at-Risk” or “VARs”) for private lands affected by the Pickett Fire. Figure 1 shows the acreage and percentage of the burned area by ownership for the fire. Approximately 35% of the burned area is in private ownership, 34% non-profit, 30% state, 0.5% special district, and 0.5% federal.

The Pickett Fire WERT conducted a field assessment between 2 September and 4 September 2025. WERT representatives interacted with stakeholders during the WERT assessment (see Appendix A for a list of key contacts). Briefings providing the WERT’s preliminary findings and VARs were conducted with Napa County emergency response personnel and other responsible

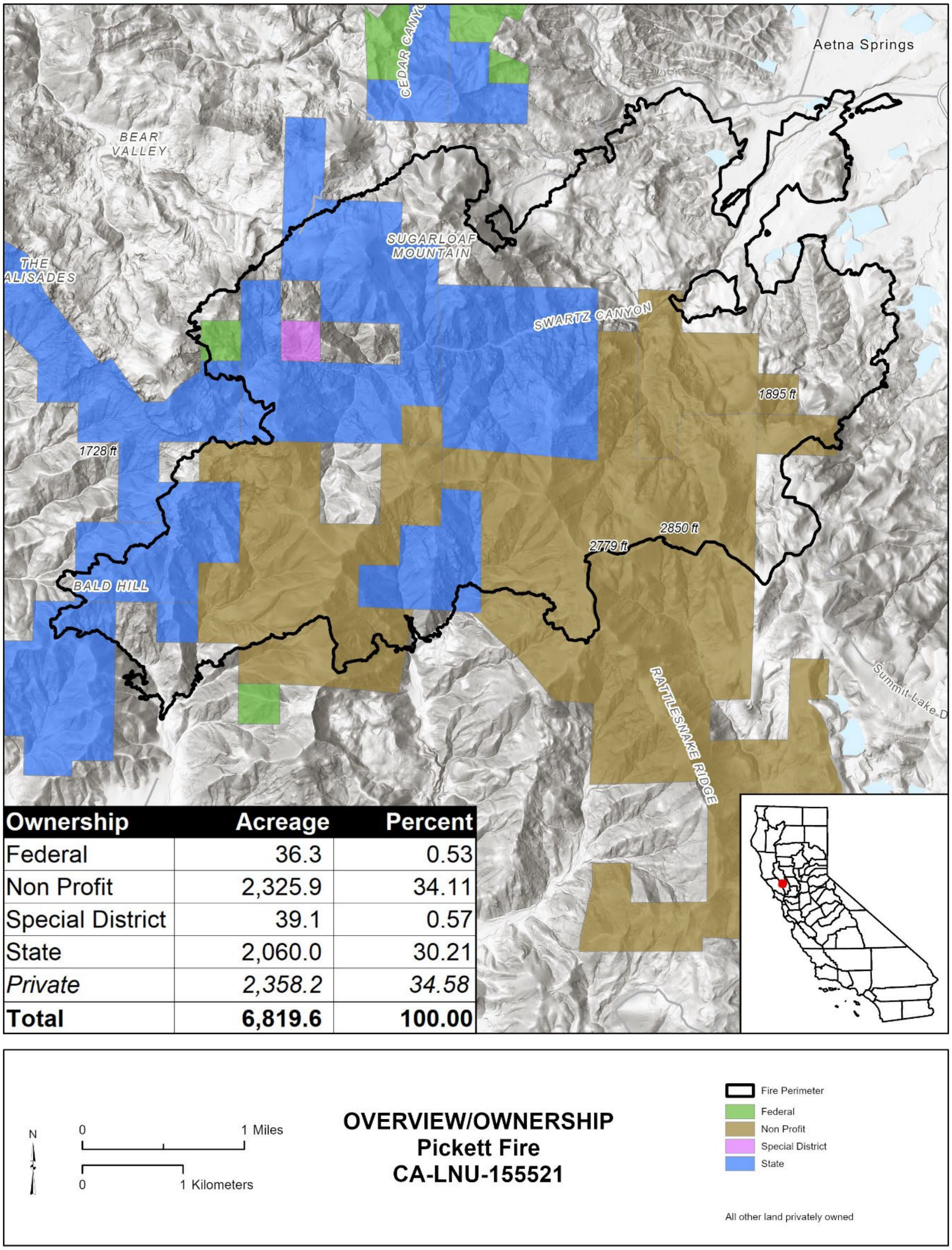
[1] Definitions of different flow types applied in this document are as follows (after Pierson (2005) and Hungr et al. (2001)):
Floods – closely resemble normal streamflow with sediment concentrations less than 20% by volume, bedload transport composed of sands to cobbles, and more predictable Newtonian fluid behavior.
Debris floods – rapid, surging flow that is heavily charged with debris and sediment. Suspended sediment composed of sand-sized particles is common with bedload transport composed of cobbles to boulders. Approximately Newtonian flow behavior and sediment concentrations by volume of 20% to 60%. Transient debris dams of boulders and woody material are common. Highly erosive.
Debris flows – rapid, surging flow composed of a slurry of sediment and water with suspended gravels and boulders. Less predictable non-Newtonian flow behavior with sediment concentrations of >50% by volume. Can cause catastrophic damage from burial and impact that can infill and divert streams, and destroy automobiles, buildings, and infrastructure.

agencies on 8 September 2025. A draft report and preliminary data release composed of a summary VAR table as a csv file (Appendix B) and a geodatabase of spatial VAR data were released to key stakeholders on 8 September 2025. Copies of the summary VAR table (Appendix B), a VAR Map Book (Appendix C), and VAR detail sheets (Appendix D) are provided in this report.

Team members for the Pickett Fire WERT are listed in Table 1.

Table 1. Pickett Fire WERT members.

Name	Position	Agency	Expertise-Position
Kevin Doherty, PG 7824, CEG 2666	Team Leader	CGS	Engineering Geology
Kevin Callahan, PE 72202, GE 2989	Team Member	CGS	Civil Engineering
Fey Egan, RPF 3034	Team Member	CAL FIRE	Safety
Matthew Boone, RPF	Team Member	CAL FIRE	Liaison
Adjunct Team			
David Cavagnaro, PhD	Adjunct Member	CGS	GIS / Geology
Michael Falsetto	Adjunct Member	CGS	GIS
Deshawn Brown	Adjunct Member	CGS	GIS



Ownership	Acreage	Percent
Federal	36.3	0.53
Non Profit	2,325.9	34.11
Special District	39.1	0.57
State	2,060.0	30.21
Private	*2,358.2*	*34.58*
Total	**6,819.6**	**100.00**

Figure 1. Ownership map of the Pickett Fire burned area

Objectives and Scope

Primary objectives for the WERT are to conduct a rapid preliminary assessment that includes the following components.

- Identify types and locations of on-site and downstream threats to life, property, and critical infrastructure (i.e., Values-at-Risk or VARs) from postfire flooding, debris flows, rockfall, erosion, and other hazards that are elevated due to postfire conditions.
- Rapidly determine relative postfire risk to these values, using a combination of state-of-the-art analytical tools (e.g., USGS postfire debris-flow likelihood model) and the best professional judgement of licensed geohazard professionals (i.e., Professional Geologists; Certified Engineering Geologists; Professional Civil Engineers).
- Develop preliminary emergency protection measures (EPMs) needed to avoid or minimize threats to life and property.
- Communicate findings to responsible entities and affected parties so that the information and intelligence collected by the WERT can be used in response planning to reduce risk from postfire watershed hazards.

It is important to emphasize that the WERT performs a rapid evaluation of postfire hazards and risk. A complete characterization of postfire hazards and/or in-depth design of protection measures is beyond the scope of the WERT evaluation. However, findings from the WERT evaluation can potentially be used to leverage emergency funds for emergency treatment implementation and more detailed site investigation and/or treatment design.

This document summarizes downslope/downstream VARs and makes specific and general recommendations to reduce exposure to postfire hazards to life and property on county and private lands. **While the report can provide useful information to emergency planners and first responders, the GIS data, in the form of a geodatabase, produced by the WERT is the most important source of information for postfire response planning. Clear communication of life and property hazards is an objective of the WERT process, and the use of these spatial data is a critical component for communicating hazards in a planning and operational context. These data have been shared with federal, state, and local responsible agencies.**

Physical Setting

Topography and Climate

The Pickett Fire is in the Palisades region of the Mayacamas Mountains, part of the northern California Coast Ranges (CGS 2002). The fire burned primarily in watersheds that drain to the Napa River and Pope Creek. Napa River tributaries drain the west side of the Pickett Fire burned area and flow into San Pablo Bay and ultimately the Pacific Ocean. Pope Creek tributaries drain the east side of the Pickett Fire burned area and flow into the Sacramento River via Lake Berryessa and Putah Creek. The city of Calistoga and town of Angwin are adjacent (southwest and southeast respectively) to the burned area.

Elevations within the Pickett Fire burned area range from approximately 500 feet above mean sea level in Simmons Canyon within the western Pickett Fire boundary to 2,988 feet at Sugarloaf Mountain, located northeast of Calistoga. Slopes within the fire perimeter range from gentle (<20%) to steep (>65%), with an average slope gradient of approximately 45% (USGS

StreamStats). Steeper slopes are located in the upper parts of Simmons Canyon, Dutch Henry Canyon, and Swartz Creek watersheds. More gentle slopes are present in Pope Valley within the northeastern Pickett Fire burned area, and within valley bottoms at lower elevations.

The burned area has a typical Mediterranean climate with warm dry summers and cool wet winters. Average annual rainfall in the fire area ranges from 38 inches in Calistoga, to an average of approximately 40 to 45 inches within the burned watersheds (USGS StreamStats). Most of the rain falls from November through April. Precipitation occurs almost entirely as rain, with rare occurrences of snow at the highest elevations.

Geology and Landslides

Bedrock underlying the Pickett Fire burned area is comprised of the Jurassic to Cretaceous-age Central Belt Franciscan Complex, Jurassic to Cretaceous-age Great Valley Sequence, and Miocene to Pleistocene-age volcanic rocks, referred locally as the Sonoma Volcanics (Graymer et al, 2007) (Figure 2). The Sonoma Volcanics underly the majority (western, central, and southern portions) of the burned area and consist of andesite, dacite, basalt, rhyolite, agglomerate, and tuff (Graymer et al. 2007). The volcanic rocks are relatively competent, forming erosion-resistant ridges in the burned area, such as Rattlesnake Ridge, Sugarloaf Mountain, and High Point. Soils overlying the volcanic rocks are generally shallow and composed of mostly gravel loams or rock outcrops. Due to their gravel-rich texture, soils overlying the volcanic rocks are reported to have low erosion factors (USDA, 2025).

Ultramafic rocks associated with the Central Belt Franciscan Complex are mapped as underlying the northernmost Pickett Fire burned area. These ultramafic rocks were once ocean sea floor and have experienced a torturous, tectonic history of emplacement leaving them highly sheared and altered. The ultramafic rocks are generally weak, support numerous landslides, and are mantled by thick, commonly clay-rich soils. Naturally occurring asbestos-forming minerals are common in ultramafic rocks and can represent a health risk to humans when inhaled (see Minerals Hazards section below).

Sandstone, shale, and mudstone of the Great Valley Sequence underlie the northeastern portion of the Pickett Fire burned area (Graymer et al. 2007). Slopes in the burned area underlain by the Great Valley Sequence are generally low to moderate-gradient and are overlain by shallow, clayey silt to silty sand soils identified as being moderately erosive (USDA, 2025). In some locations, the slopes express rounded, bench-step topography indicative of deep-seated landslides.

Quaternary-age fluvial, alluvial fan, alluvial terrace, and landslide deposits are mapped locally in the burned area along low-gradient channels and in wide fluvial valley bottoms.

Regional geologic landslide mapping (Delattre et al. 2007; Dwyer and others, 1976) identifies areas of deep-seated landsliding within the Pickett Fire burned area. Landslide mapping has been compiled by the California Geological Survey in an online inventory (Wills et al. 2011) and is shown on the attached landslide map (Figure 3). Field observations and review of available LiDAR imagery, indicate the landsliding within the burned area is composed primarily of small, shallow debris slides and flows nested within larger complexes of deep-seated landslides. Extreme short-term and long-term rainfall events are a primary trigger for initiating shallow and deep-seated landslides, respectively, in the area, while ground shaking from nearby active faults is an important process in preparing slopes for landsliding and initiating landslides (Keefer

1984). These landslide prone materials can add to the increased slope hazards (e.g. rockfall, shallow landslides), erosion, and runoff expected because of post-fire soil hydrology changes.

The southern extent of the Mayacamas Fault Zone (Jennings and Bryant 2010) is mapped approximately 5-miles to the southwest of the western Pickett Fire burned area. The nearby segment of the Mayacamas Fault is considered active and is capable of generating large earthquakes (Peterson et al. 1996). Although the threat of a large earthquake is low in the next two to five years as the slopes recover from fire, seismic-induced slope failures can contribute additional sediment into streams that can be mobilized in post-fire sediment laden flood and debris flow events increasing their magnitude and destructive power.

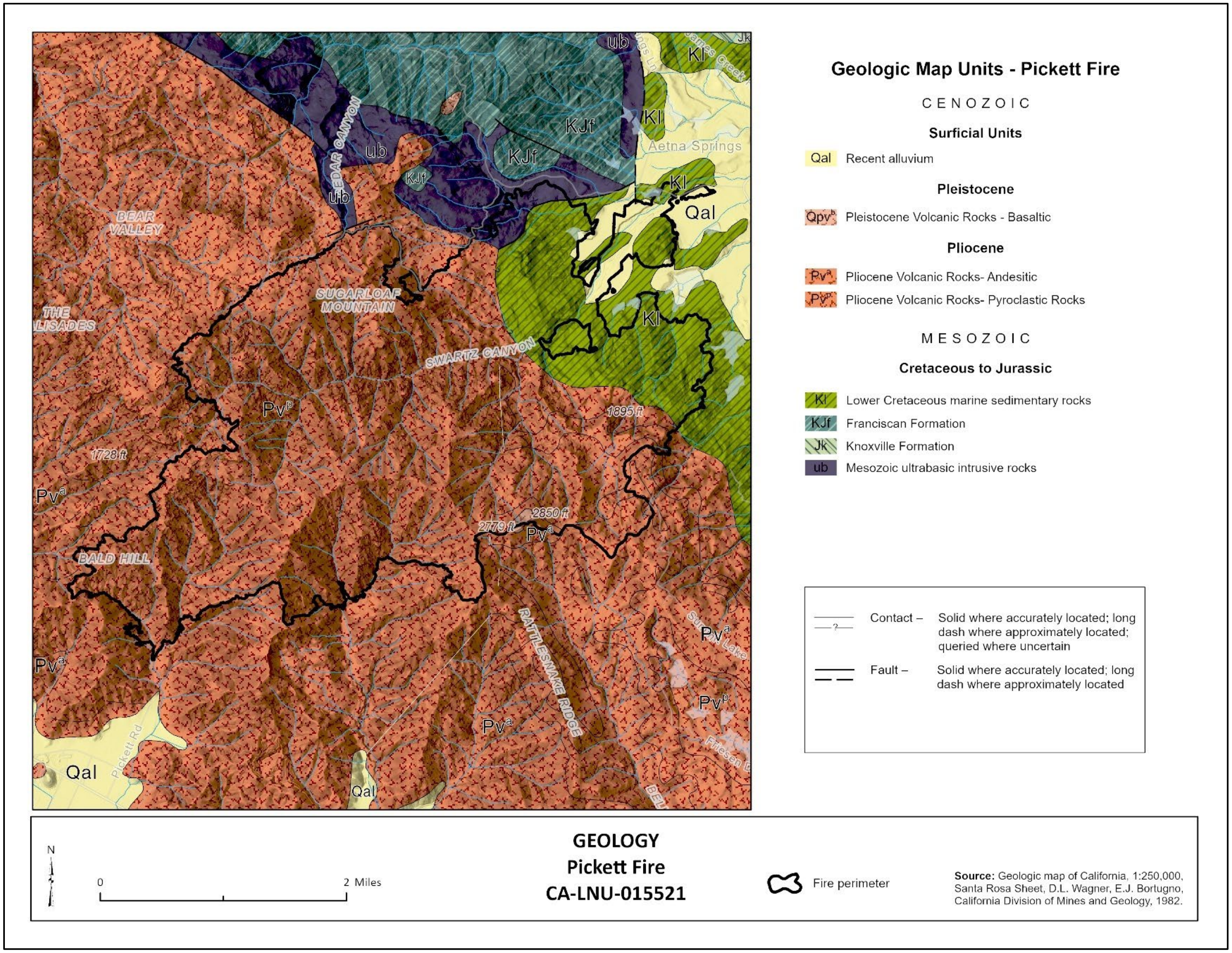


Figure 2. Geologic map for the Pickett Fire

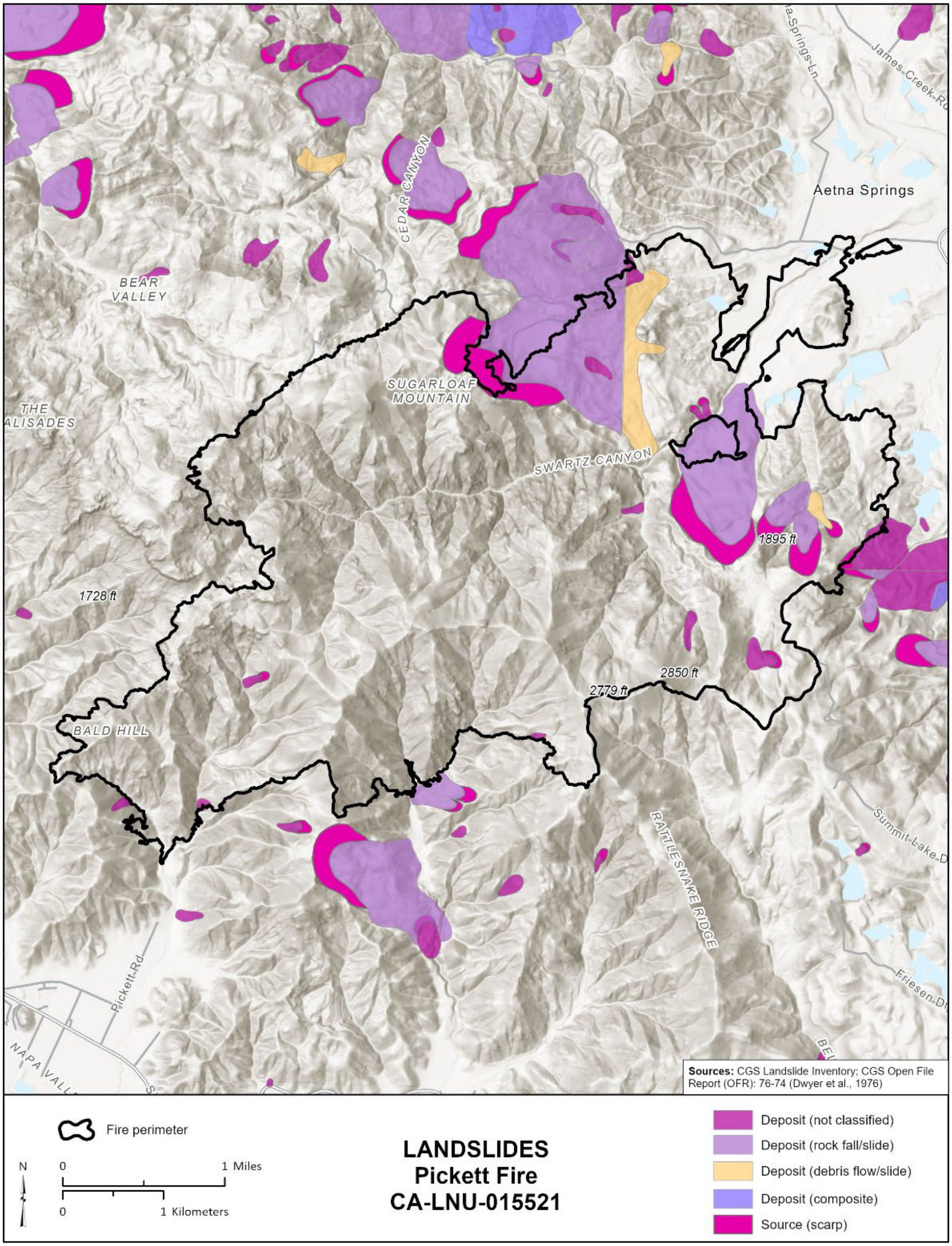


Figure 3. Landslide map for the Pickett Fire

Mineral Hazards and Wells

Hazardous minerals in the Coast Ranges province are often associated asbestos, mercury, and other heavy metals. Regional geologic mapping (Graymer et al. 2007) identifies serpentinite and other ultramafic rock units within and downstream of the northeastern portions of the Pickett Fire burned area that may contain asbestiform minerals (Figure 4). Naturally occurring chromium, manganese, and mercury are metals found in metamorphic and ultramafic rocks and there is the potential for the downstream transport of metals to local creeks and watersheds. Wildfires can also increase postfire threats by catalyzing the transformation of chromium to its carcinogenic form in soil and ash, as hexavalent chromium, particularly in areas with metal-rich geologies (Lopez et al., 2023). Based on our field observations, outcrops and road cuts of serpentinite were observed within the burned area near Aetna Springs.

There are several historic mining operations, including the Calistoga mining district, within and adjacent to the Pickett Fire burned area that may contain potentially harmful concentrations of heavy metals. The historic Aetna Mining District is a series of former mercury and manganese mines located along the flanks of Oat Hill within and downstream of the northeast Pickett Fire burned area. Primary and secondary mined minerals contain silver, mercury, copper, chromium, and manganese (https://www.mindat.org/). Mine tailings and mine waste may contain minerals with harmful concentrations of hazardous elements, including arsenic, cadmium, lead, zinc, mercury, silver, and other CA Title-22 (CAM-17) metals. These hazardous minerals may be entrained with increased surface runoff and impair water quality downslope, notably to Pope Creek tributaries, and ultimately Lake Berryessa, which provides drinking water to residents in Solano and Napa counties. Methylmercury levels in Lake Berryessa have resulted in state warnings recommending limits of fish consumption. Increased runoff associated with moderate and high soil burn severities observed within the headwaters of Pope Creek, particularly along Swartz Creek, may result in higher flows within the drainages, potentially increasing runoff or inundating the mine areas during large rain events, increasing the potential for mercury delivery to Lake Berryessa.

Geothermal wells are mapped within and downstream of the Pickett Fire burned area, particularly near the City of Calistoga to the southwest and Pope Valley to the northeast. Very little infrastructure associated with the geothermal wells was observed within the fire boundary during our field review since much of the area was difficult to access due to locked gates and poor roads. Our field evaluations were conducted over a relatively short period and should not be considered comprehensive and/or conclusive. Moderate and high soil burn severities observed within the Pickett Fire boundary will likely result in increased runoff into the mapped drainages. Geothermal well infrastructure located within the drainages may be at risk of inundation from higher flows in the drainages during large storm events.

Information regarding the hazardous minerals discussed above can be found at the California Office of Environmental Health Hazard Assessment (https://oehha.ca.gov/chemicals/).

We recommend consultation with the Bay Area Air Quality Management District (https://www.baaqmd.gov/en/about-the-air-district/in-your-community/napa-county) to develop mitigations that are centered on limiting dust generation and limiting dust exposure.

For general review information on hazardous minerals, see:

https://www.conservation.ca.gov/cgs/minerals/mineral-hazards https://www.oehha.ca.gov/air/asbestos-fact-sheet-information-health-risks-exposures-asbestos

For additional mineral hazards information, see:

https://pubs.usgs.gov/fs/2005/3014/

https://www.mindat.org/loc-3512.html
http://www.who.int/mediacentre/factsheets/fs361/en/

Department of Conservation Well Finder

https://www.conservation.ca.gov/calgem/Pages/WellFinder.aspx

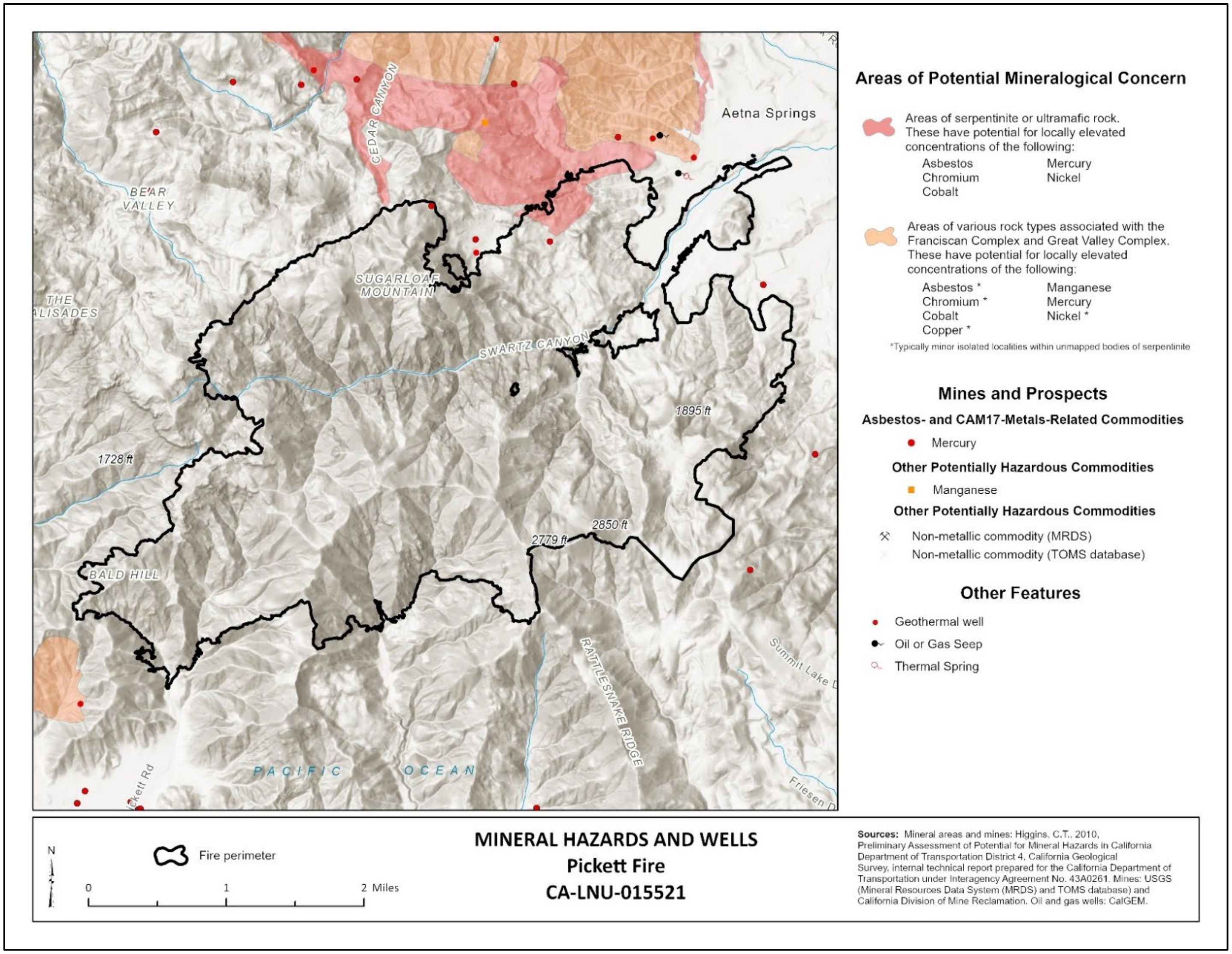


Figure 4. Mineral Hazards and Wells map for the Pickett Fire

Vegetation and Fire History

Vegetation can influence potential soil burn severity with higher unit area biomass typically resulting in higher potential burn severity. Because biomass influences burn severity, areas dominated by scrub and chaparral will typically have a higher potential soil burn severity than areas dominated by grass. Vegetation inside the Pickett Fire perimeter is largely comprised of coastal oak woodland, mixed hardwood/conifer forest, mixed chaparral, grassland, and vineyards. Coast redwood, pine species, and Douglas-fir are common conifers found throughout large parts of the fire. Annual grasslands and vineyards also comprise a significant portion of the vegetated area within the fire perimeter.

The fire history of the burned area can potentially influence postfire watershed response. The Palisades region of the Mayacamas Mountains have experienced numerous historical fires and other fires have burned inside the Pickett Fire perimeter (Figure 5). Although mapped fire perimeters in the area date back to at least 1957, many areas within the Pickett Fire perimeter have burned within the last five years, with the exception of the northeastern finger of the Pickett Fire burned area, which has no previous fire record. The most recent large fire impacting the burned area was the 2020 Glass Fire, which burned all but the northeast portion of the Pickett Fire area. Because the Pickett Fire burned area experienced a prior wildfire within the last five years, the potential for postfire response due to reduced fuel loading may be less relative to areas which have not recently burned.

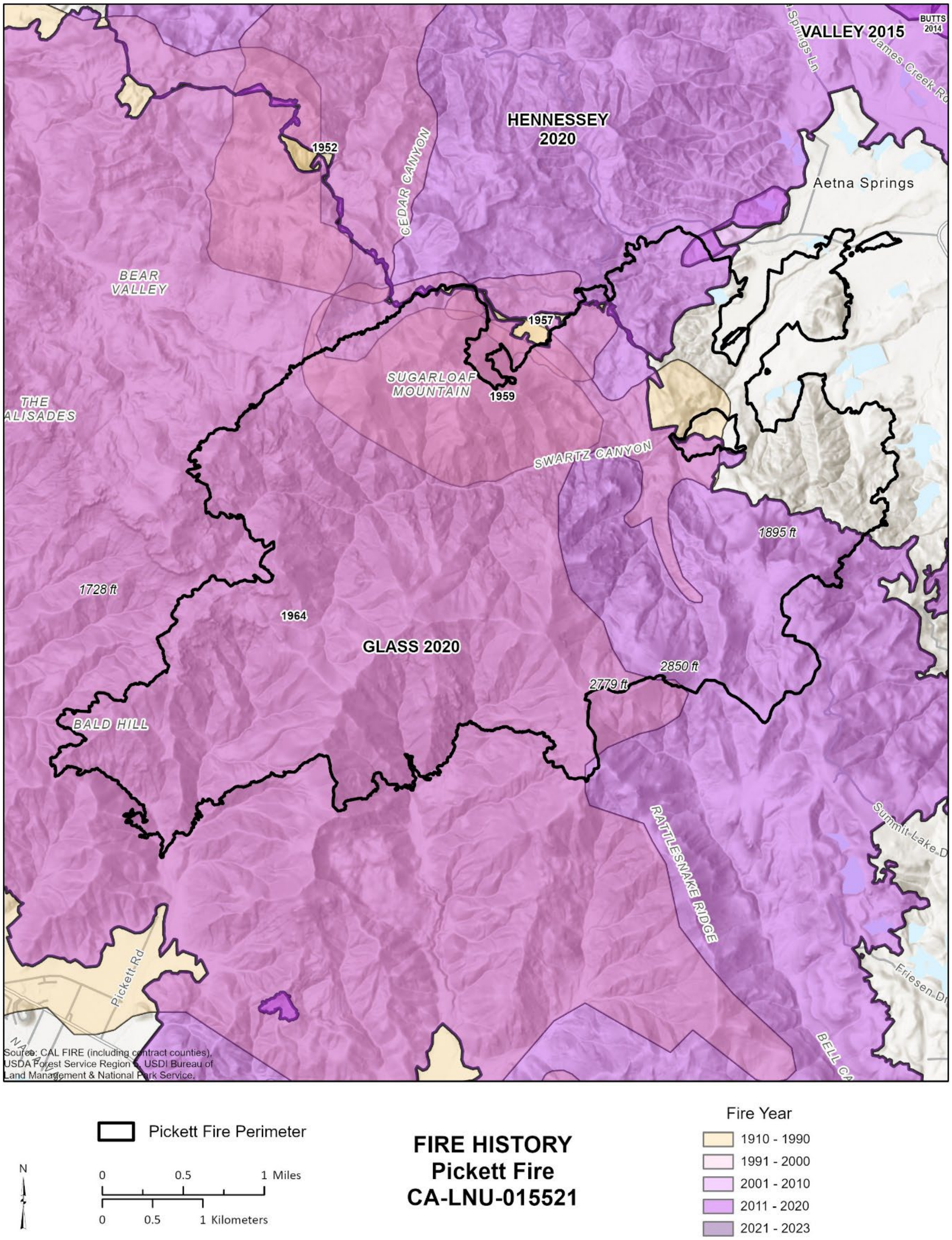


Figure 5. Fire History map for the Pickett Fire

Hydrology, Flood History, and Observed Postfire Response

High flows and flood events on creeks in the region burned in the Pickett Fire are typically associated with winter weather systems featuring long-duration and/or high magnitude atmospheric river conditions. Rapid sequencing of atmospheric river storms may also contribute to flood hazard.

The area burned by the Pickett Fire is primarily drained by Swartz Creek, which flows easterly through the burned area to Pope Creek beyond the east side of the fire perimeter. Smaller basins at the southwest portion of the fire are drained by tributaries that feed the Napa River. There are several known stream gages with a near-continuous record of flow data downstream of the burned area along the Napa River. There are no known stream gages along Pope Creek to the east of the fire perimeter. USGS stream gage 11456000 is located on the Napa River below the confluence with Sulphur Creek near St. Helena, California, approximately 7 miles south of the fire perimeter. This gage has a 79 mi^2 drainage basin and confirmed flow data from 1929 to present. The top two highest flows reported occurred during February 1986 and December 2005, with estimated annual exceedance probabilities of about 3.8% and 2.2%, respectively (Figure 6).

The majority of the flooding within Napa County occurs within the Napa Valley floor. The City of Napa and those areas surrounding the Napa-Sonoma Marshes are the most heavily affected, although Yountville, St. Helena, American Canyon, and Calistoga all have flooding from the 100-year event within their boundaries. In addition, the Napa County hazard mitigation plan states that there remains a significant threat of flooding along the many feeder streams in the Napa River watershed, even with reservoirs such as Lake Hennessy in place (Napa County 2018).

A large portion of the Pickett Fire perimeter was burned in the 2020 Glass Fire. The Glass Fire burned area experienced storm events in the years following fire. Noteworthy storms occurred in January and October of 2021, January and March of 2023, November of 2024, and February of 2025. Known post-fire response following these storms included initial increases in runoff with elevated bedload and large woody debris recruitment that caused isolated areas of flooding with no known significant impacts. This was followed by increases in landslide activity and elevated runoff in 2024 and 2025 that damaged a structure and caused localized flooding.

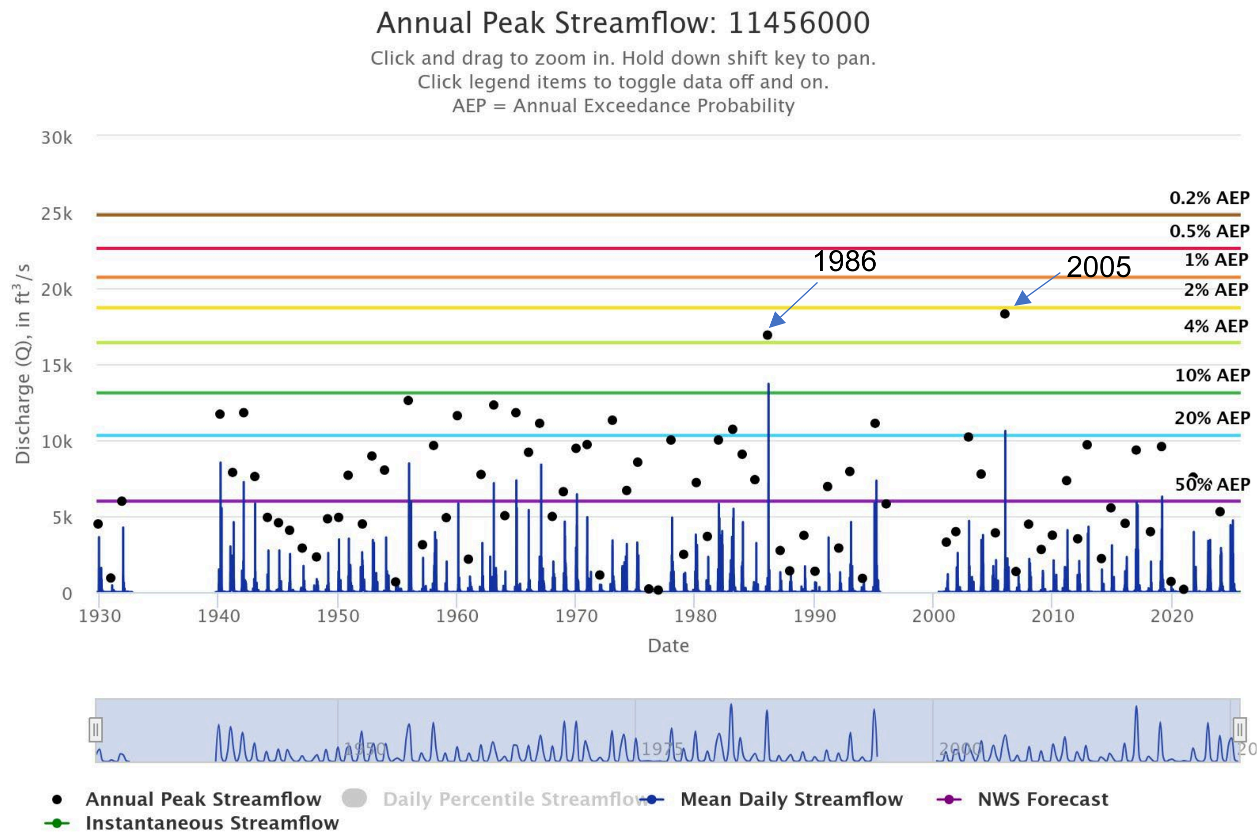


Figure 6. Annual peak streamflow for the USGS gage at Napa River near St. Helena, CA (11456000). Arrows point to the 2 highest streamflow events. For context, the 9 January 2023 event is shown inside a red pentagon. (Data source: USGS | National Water Dashboard; Plot source: USGS | StreamStats).

Modeling Postfire Response

Soil Burn Severity

The WERT assessment was conducted using a Burned Area Reflectance Classification (BARC) map that was field validated and edited to create a Soil Burn Severity (SBS) map of the burned area (Figure 7). In creating the SBS, the proportion of high and moderate soil burn severity was slightly reduced to more accurately reflect observed conditions. Slopes inside the Pickett Fire perimeter burned at mostly low (65.7%) and moderate (24.1%) with some high (1.2%) and unburned to very low (9.0%).

Postfire Debris Flow: Predicted Hazards and Thresholds

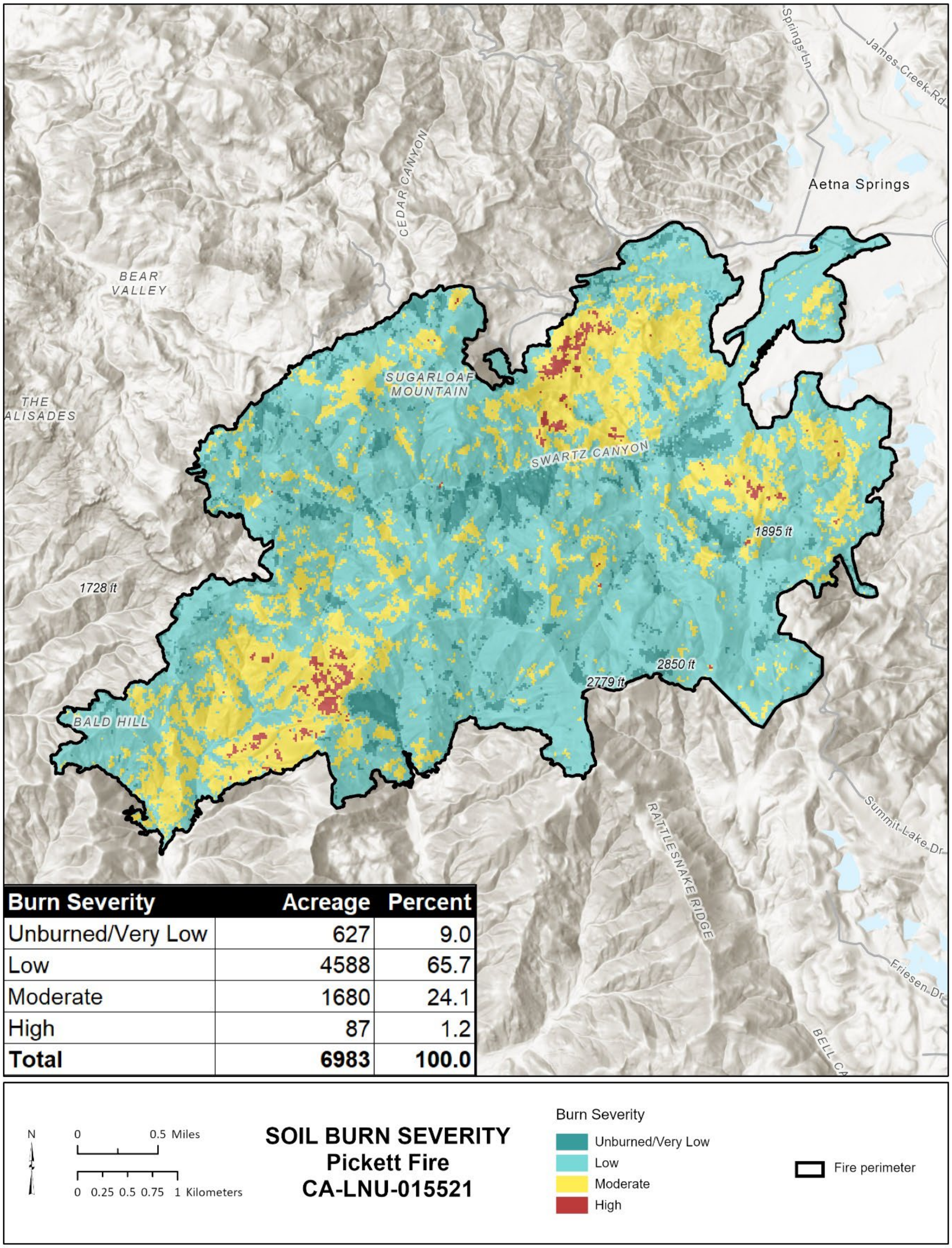
Although the primary geohazard identified for the Pickett Fire is flooding, the WERT assessment also includes consideration of debris flow hazards. The USGS postfire debris flow hazard model (Staley et al., 2016) was run using the SBS map for the Pickett Fire (Figure 8) to assist in the WERT's assessment of locations where hazards to life, property, and infrastructure may exist. The combined hazard model results reflect the potential likelihood of a debris flow occurring as well as the volumetric yield of the debris flow determined using the USGS postfire debris flow volume model (Gartner et al., 2014). These results are combined into an overall categorical ranking that range from low to high. Figure 8 shows the combined debris flow hazard for the 15-minute, 24 mm/hr (1 in/hr) intensity storm. Figure 8 indicates that the combined debris flow hazard is low to moderate. Figure 9 illustrates 15-minute rainfall intensities required to generate a 50 percent likelihood of debris flows for each basin across the burned area. The fire-wide, 15-minute rainfall intensity threshold is 43.4 mm/hr (1.7 in/hr). Because this area and nearby areas affected by wildfire typically have no reported debris flows, and because we did not encounter strong field evidence suggestive of historic debris flow activity, the results likely overpredict debris flow likelihood in the Pickett Fire.

Debris Flow Model Accuracy and Limitations

For basins burned in the Pickett Fire, the results of the USGS debris flow model (Staley et al., 2016) produce a relative indication of potential postfire watershed response and may not accurately predict debris-flow likelihood or volume for a given design storm. In steep basins, the model predicts a moderate likelihood of debris flows (Figure 8), especially in the western portion of the fire and in small basins that flank Swartz Creek. Evidence of historic, large-volume debris flows was minimal. Steep channels were typically bedrock- or boulder-rich with minimal thin soils overlying bedrock and minimal observed dry-ravel in upland source areas. Because of these reasons, we expect that moderate- to large-volume debris flows will be uncommon after the fire and will only be triggered during extreme precipitation events in steep, headwater basins.

The USGS model results do not constitute a site-specific analysis of debris-flow hazards. Additional on-the-ground evaluation should be conducted by qualified and licensed professionals where necessary and appropriate rather than taking the model results at face value. The model results are also limited in that they do not show hazards for basins that are less than approximately 5 acres in area. For areas not shown as having a debris flow hazard along a segment that is associated with a drainage network, a hazard may still be present yet undefined because the segment model results are limited based on the resolution of the input digital elevation model (DEM). Additionally, other hillslope processes such as rockfall, debris slides, and deep-seated slides are not included in the model results.

It should also be noted that the debris-flow model does not predict runout and inundation areas beyond the modeled source basin and does not consider potential increased hazards from multiple storm events that may load channels with sediment that could be entrained in future debris flows.



Burn Severity	Acreage	Percent
Unburned/Very Low	627	9.0
Low	4588	65.7
Moderate	1680	24.1
High	87	1.2
Total	**6983**	**100.0**

Figure 7. Soil Burn Severity map for the Pickett Fire

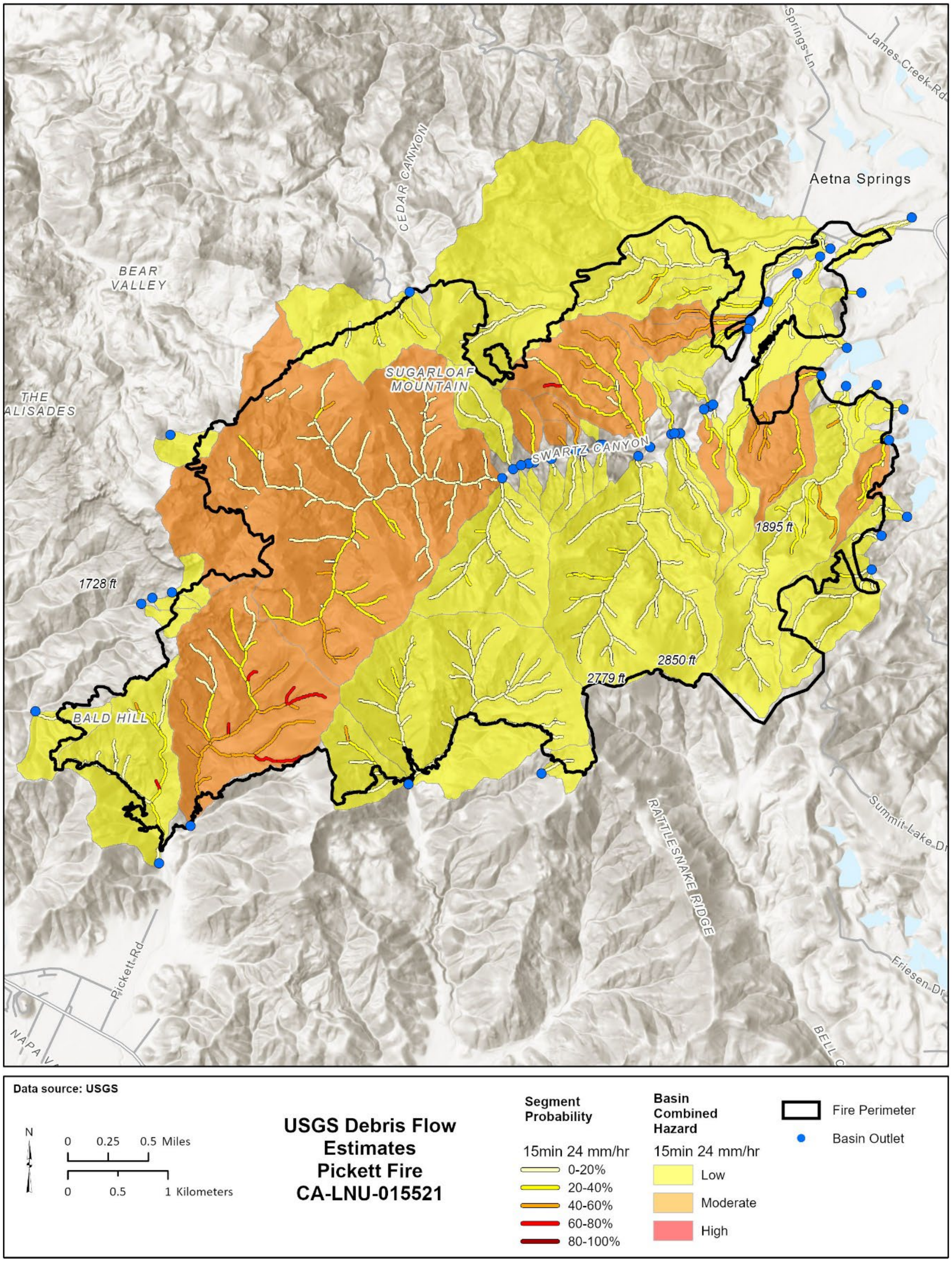


Figure 8. Combined debris flow hazard for the Pickett Fire for a 24 mm/hr (0.94 in/hr) 15-minute storm event

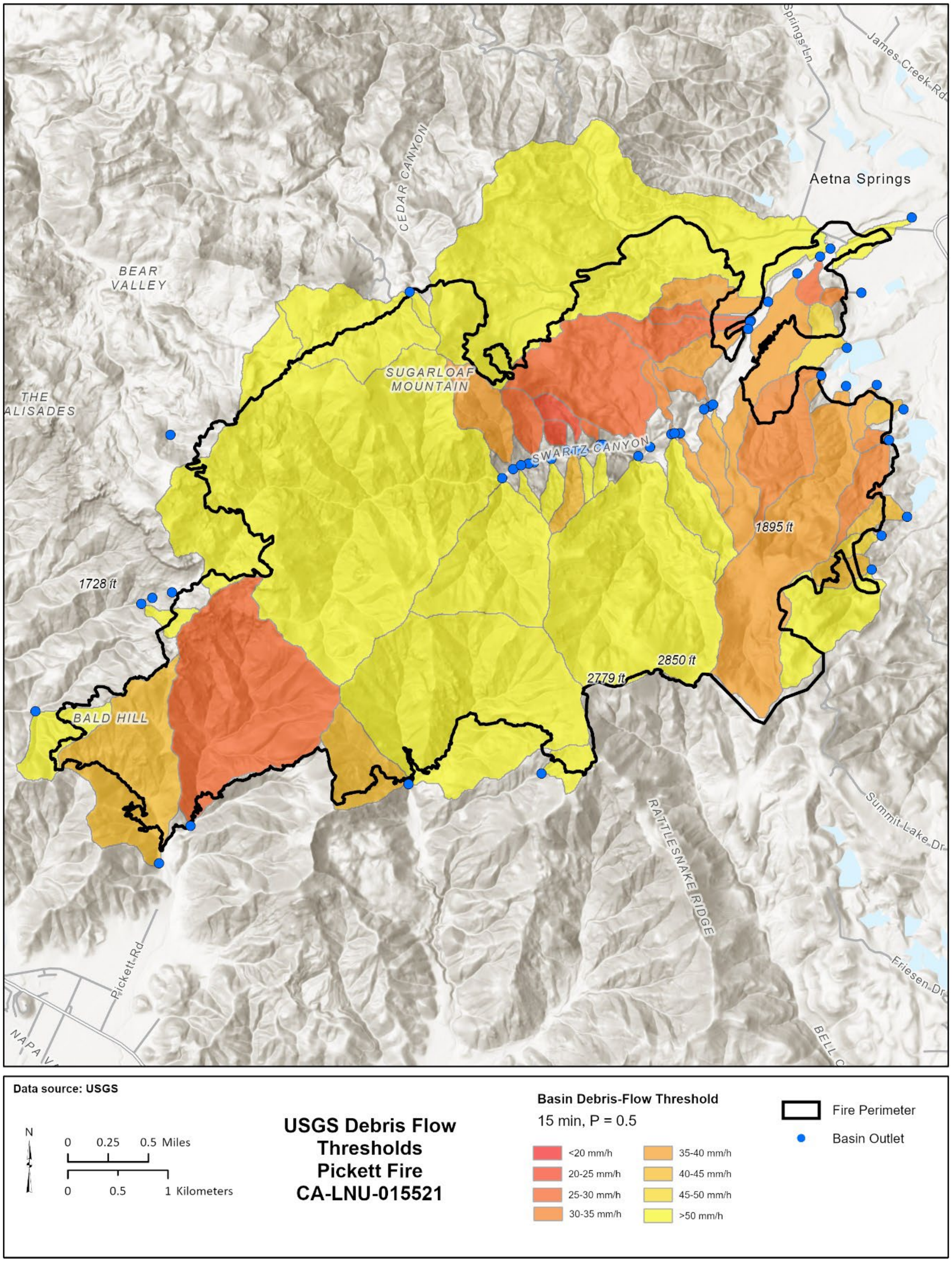


Figure 9. Predicted 15-minute rainfall intensity with a 50 percent likelihood of triggering a debris flow for the Pickett Fire

Postfire Hydrology

Peak flows typically increase following wildfire due to reduced vegetation, surface cover, and infiltration rates, and the formation of water repellent soils. The largest peak flows occur during intense, short-duration rainfall events in watersheds with steep slopes (Neary et al., 2005). Research conducted in southern California indicates that postfire peak flows can increase as much as 30-fold for moderate storms (0.1- to 5-year recurrence interval) and approximately 2- to 3-fold for large magnitude storms (5- to 100-year recurrence interval) (Rowe et al., 1949; Moody and Martin, 2001). Kinoshita et al. (2014) reported that commonly used flood flow prediction methods have lower confidence with larger recurrence interval events (25- and 50-year). We chose to analyze pre- and postfire flows assuming a 2-year storm event because of the higher confidence in predicting postfire impacts and because 2-year storm events are more likely to occur relative to longer recurrence interval storms in the few years following wildfire when postfire impacts are highest.

The WERT selected six “pour points” (PP) to estimate potential postfire peak flow increases to Values-at-Risk (VAR) from flood to debris flood hazards. Figure 10 shows the six pour point locations that include catchments with identified VARs in or downgradient of the burned area. The pour points represent elevated flood and debris flood hazards to agricultural water infrastructure, road crossings, rural residences, and agricultural ponds. Pour points located close to or within watersheds burned at moderate and high soil burn severity (SBS) yield larger postfire flow increases than those far below the fire perimeter or burned at lower severity.

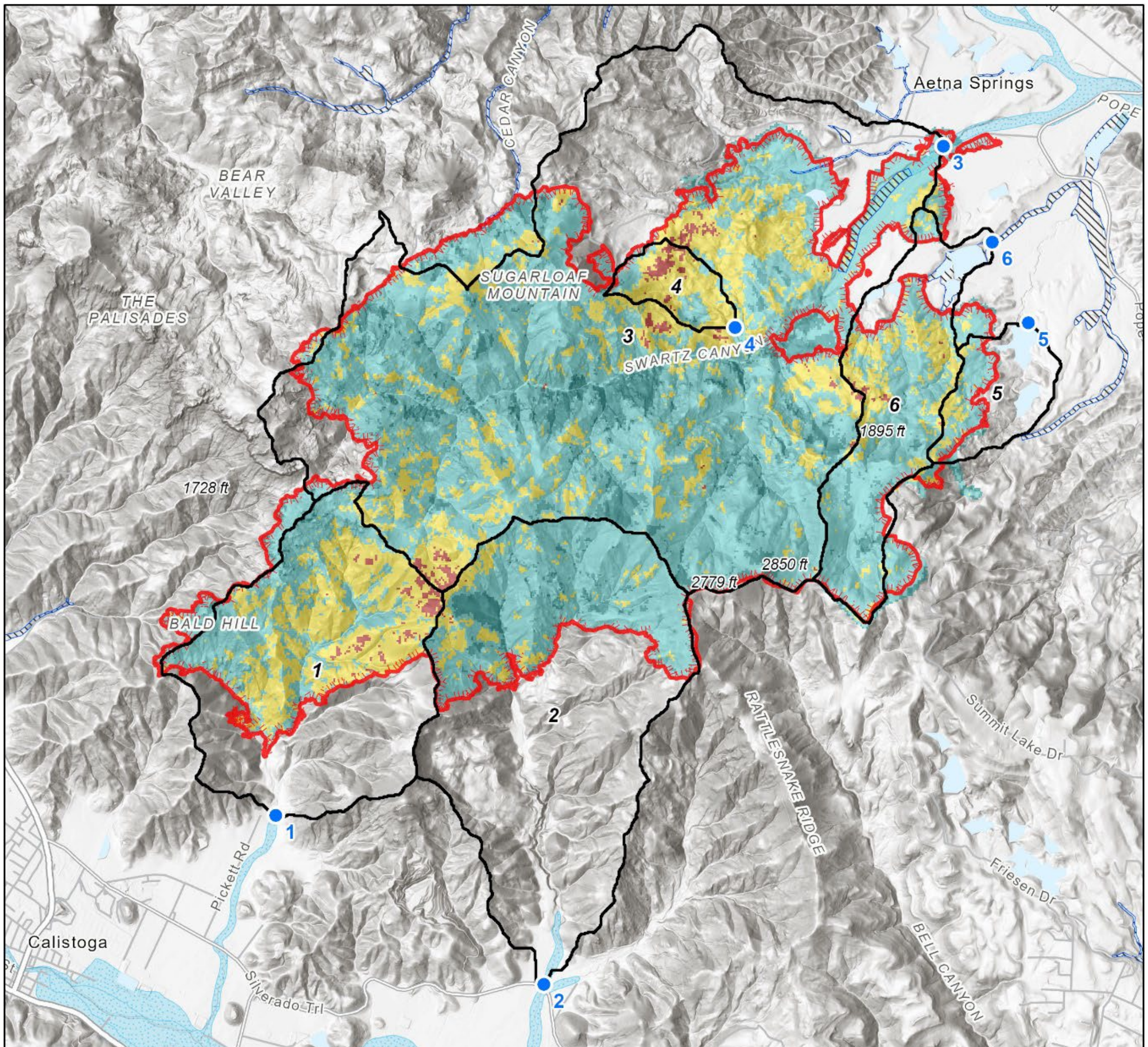
Prefire peak flow estimates were first produced for the six pour point watersheds using the North Coast USGS regional regression equations for 2-year recurrence interval discharges (USGS StreamStats, 2025; Gotvald et al., 2012). Changes in postfire peak flows were estimated using two methods. The first method used procedures outlined by USFS BAER teams (unpublished), referred to here as the BAER method. The BAER method uses the proportions of the watershed that are unburned and burned at low, moderate, and high SBS to account for postfire runoff increases. For this analysis, the postfire, 2-year recurrence interval flow was estimated by assuming areas that are unburned or have low SBS undergo no change in runoff (Q2); runoff from moderate SBS areas were assumed to respond similarly to a 5-year recurrence interval discharge (Q5); and runoff from the high SBS areas are assumed to respond similarly to a 10-year recurrence interval discharge (Q10). Applicable USGS regression equations for the Q2, Q5, and Q10 flows were applied to each category (USGS StreamStats, 2025; Gotvald et al., 2012). The area-weighted flow estimates by soil burn severity class were then summed to derive the runoff response that would typically generate a postfire, 2-year peak flow. Because the USGS regression equations were developed using gaged streamflow data spanning a wide range of flow conditions, including flow that was bulked by sediment and debris following fire, an additional bulking factor that accounts for sediment loading was not applied to estimate postfire peak flow.

The second method estimates postfire peak flow using Moody’s level 2 empirical model (Moody, 2012) and calculates a post-fire runoff coefficient for a burned watershed as a function of mean difference in normalized burn ratio (dNBR), 30-minute rainfall intensities in excess of 7.6 mm/h (0.3 in/h), and basin area in square kilometers.

Field experience shows that the BAER method generally underestimates peak flows in northern California, particularly for short return-period storms (< 5 year recurrence interval, RI) and for small watersheds that respond quickly to high-intensity, short-duration (< 30 min.) rainfall. Conversely, Moody's (2012) empirical model, which is derived using data from geoclimatic unique regions along the front range of the Rocky Mountains and from southern California and northern Nevada, generally overestimates peak flows in northern California.

To account for the range in model results, we present low (BAER method), high (Moody method), and average (mean of both methods) flow estimates at the six pour points (Table 2). The predicted postfire peak flow for the 2-year storm events were then compared to flow frequencies derived for each modeled watershed using the USGS Regional Regression Equation for the Northern Coast (StreamStats, 2025; Gotvald et al., 2012) and reported in Table 2. Results indicate that the 2-year storm can result in postfire flows that have flow multipliers (defined here as the ratio of Q2 postfire/Q2 prefire) ranging up to 2.4 and can result in average flow responses equivalent to 2- to 10-year recurrence interval floods. The estimated flow results calculated by these two approaches assume bulked-flow conditions. Flooding in excess of the postfire responses presented here may occur within steep watersheds burned at moderate or high that will be responsive to short-duration, high-intensity rainfall. Examples of basins meeting these conditions include Simmons Canyon, upstream of confluences with unburned basins, and small basins along the northern flank of Swartz Canyon in the northeastern portion of the burned area. Moreover, excessive flooding may also occur at tributary confluences, bridges directly below tributary confluences, or other areas that trap large wood if high volumes of woody debris are transported.

Postfire discharge can be estimated by multiplying a relevant flow multiplier (Table 2) to prefire discharge estimated with the USGS Regional Regression Equations (StreamStats) at the point of interest in a basin. The reported postfire flow estimates are intended for emergency response planning purposes only and are not to be used for design. Moreover, they are most appropriately applied to flows within the first year following the fire or until ground cover within the burned area is well established. As knowledge is obtained through monitoring the runoff response of stressing storms in the first wet season after fire or as the slopes in the watersheds become revegetated, these flow multipliers may be adjusted down to decrease predicted postfire flows and reduce conservatism.



Pour Point	Unburned/Very Low		Low		Moderate		High		Outside Fire		Total	Total
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	km^2
PP-01	12.2	0.8	378.5	25.8	439.3	29.9	26.7	1.8	610.4	41.6	1,467.1	5.94
PP-02	73.5	3.6	593.5	29.1	87.6	4.3	1.0	0.0	1,286.0	63.0	2,041.7	8.26
PP-03	433.1	7.9	2,808.0	51.2	930.1	17.0	54.3	1.0	1,259.5	23.0	5,485.0	22.20
PP-04	1.8	1.1	40.1	24.6	102.4	62.8	16.0	9.8	2.9	1.8	163.1	0.66
PP-05	3.7	1.3	79.2	28.2	24.0	8.5	0.1	0.0	174.2	61.9	281.1	1.14
PP-06	27.7	3.6	449.9	58.3	148.8	19.3	4.4	0.6	140.9	18.3	771.7	3.12

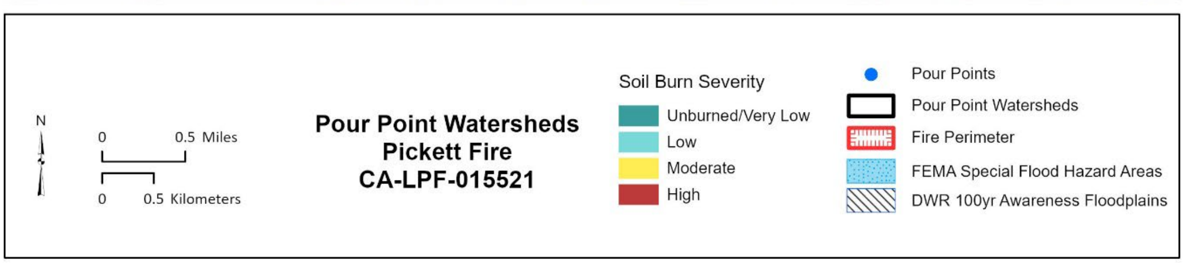
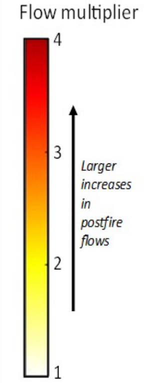


Figure 10. Pour Point locations for the Pickett Fire

Table 2. Basin metrics, pre- and postfire Q2 flow estimates, postfire Q2 recurrence intervals, and prefire Q2 flow multipliers used to estimate increased relative flood response for watersheds assessed for flood hazard (i.e., "Pour Points")

Pour Point #	Description	Anticipated flow type based on channel morphology and historic record	Basin Area (mi^2)	Relief (feet)	Mean Basin Elevation (feet)	% Unburned/very low	% Low SBS	% Moderate SBS	% High SBS
PP-1	Picket Road	Flood/Debris Flood	2.29	2197	466	42	26	30	2
PP-2	Dutch Henry Canyon Road	Debris Flood/Flow	3.19	2425	880	67	29	4	0
PP-3	Swartz Creek Bridge at Aetna Springs Road	Debris Flood/Flow	8.57	2259	995	31	51	17	1
PP-4	Trib to Swartz Creek	Debris Flood	0.25	1335	1416	3	25	63	10
PP-5	Pond Outlet near Pope Valley Rd	Flood/Debris Flood	0.44	1126	1013	63	28	9	0
PP-6	Duvall Lake Outlet	Flood/Debris Flood	1.21	1724	1529	4	58	19	1

Pour Point #	Description	Q2 prefire flow (CFS)[1]	Q2 postfire flow (CFS) following BAER[2]	Q2 postfire flow (CFS) following Moody[3]	Average Q2 postfire flow (CFS) average between BAER and Moody	Average postfire flow equivalent recurrence interval (RI) (Gotvald, 2012)	Q2 prefire to postfire flow multiplier (Postfire Q2/Q2) for Flood-Debris Flood/ Debris Flow[4]			Interpreted Postfire Response[5]
							Low (BAER)	High (Moody)	Average	
PP-1	Picket Road	155	206	236	221	3-year RI	1.3	1.5	1.4	
PP-2	Dutch Henry Canyon Road	210	218	209	214	2-year RI	1.0	1.0	1.0	
PP-3	Swartz Creek Bridge at Aetna Springs Road	519	610	957	784	3-year RI	1.2	1.8	1.5	
PP-4	Trib to Swartz Creek	21	39	62	51	10-year RI	1.9	3.0	2.4	
PP-5	Pond Outlet near Pope Valley Rd	32	35	32	33	2-year RI	1.1	1.0	1.1	
PP-6	Duvall Lake Outlet	82	99	144	121	3-year RI	1.2	1.8	1.5	

[1]2-yr Recurrence Interval (Q2) flow estimated using USGS regional regression equations (basins between 0.04 to 850 mi^2) (Gotvald, 2012).

[2]Postfire, 2-yr Recurrence Interval storm (Q2) flow (clearwater) following BAER protocol based on Soil Burn Severity: non&low = Q2; moderate = Q5; High =Q10. See

[3]Postfire flow using Moody's Level 2 empirical model (Moody, 2012).

[4]Flow multipliers based on BAER, Moody (2012), and Average of the two methods indicating relative magnitude of prefire to postfire change in peak flow.

[5]Localized flooding in excess of the postfire responses presented may occur immediately downslope of basins burned at a high severity, at tributary confluence, and at crossing structures if high volumes of woody debris and large boulders are transported

Postfire Hydrologic and Hydraulic Models

The peak flow estimates and flow multipliers summarized in Table 2 are best used to evaluate the relative magnitude of change from prefire to postfire runoff. However, because the methods applied only allow for peak flow to be estimated, they do not provide a complete runoff hydrograph needed to conduct unsteady 1D and 2D hydraulic modeling, which would inform flow conveyance and inundation extent within and downslope of burned areas. Postfire hydraulic modeling is time intensive and is outside the scope of this assessment. Upon request, the WERT can assist in developing postfire runoff hydrographs used to conduct hydraulic modeling.

VAR Observations and Discussion

This evaluation is not intended to be comprehensive and/or conclusive. Additional VARs may be identified through more detailed evaluation by responsible agencies. This includes more detailed site investigation for the development and design of appropriate mitigation measures. Several limitations are summarized below. Not all roadway culverts and bridges in and adjacent to the burned area were evaluated. Some potential VARs were not evaluated, or evaluated from a distance, due to access challenges. VAR evaluation was not conducted within all mapped flood hazard areas that are downstream of the fire perimeter. Risk of flooding in these areas is preexisting and is anticipated to be increased by postfire runoff and/or blockage of drainage structures (e.g., culverts and bridges) by postfire debris. As such, local agencies should consider these previously mapped hazard areas in addition to the VARs identified in this report.

Specific Values-at-Risk (VARs) are contained within the geodatabase (VAR point and polygon feature classes) created by WERT, and these are the best product for use in response planning because they provide spatial location along with attribute data captured in the field. Detailed observations and potential mitigations are provided in the geodatabase (VAR point and polygon feature classes), VAR summary table (Appendix B), and VAR site information sheets (Appendix C and D). A summary of VARs by relative risk to life and property are shown in Table 3.

Exigent Values-at-Risk

Exigent VARs are those that should receive priority attention for pre-planning and emergency protection measure implementation. Exigent VARs contain high risk to life and/or property. No exigent VARs were identified on the Pickett Fire.

VAR Details

The 17 VARs on the Pickett Fire are VARs with low to moderate risk to life and/or property (Table 3). For the purpose of clarity, the burned area is divided into two regions draining to the Napa River (southwest) and Pope Creek/Lake Berryessa (northeast). The VARs are presented in this context and discussed below.

Napa River Watershed:

Simmons Canyon along Pickett Road (VAR-01, VAR-02, VAR-03, VAR-04, VAR-05, VAR-06, VAR-07, VAR-08, VAR-09): Approximately 32 percent of the southwest-facing slopes within Simmons Canyon are burned at moderate and high soil burn severity. What appear to be commercial agricultural (vineyard) operations and associated infrastructure were observed within and downstream of Simmons Canyon. Agricultural infrastructure, including a bridge, water tanks, a pump station, and permanent paved and unpaved roads, were observed along low-lying alluvial terraces adjacent to the drainage channel within Simmons Canyon. Per USGS debris flow model results for the Pickett Fire, the bridge (VAR-03), which spans the channel approximately 5 feet above the channel bottom, is located just below the mouth of an approximately 610-acre subbasin with a 42 percent likelihood of debris flow initiation (USGS, 2025). Water storage tanks and a pump station (VAR-04) were observed along a low-lying alluvial terrace approximately 700 to 800 feet downstream of the bridge. Several plastic and steel water pipes that appear to connect the water storage tanks and pump station with agricultural infrastructure and vineyards across Simmons Canyon were noted to be elevated 3 to 4 feet above the Simmons Canyon channel. The bridge, water storage infrastructure on the low-lying terrace, and channel-spanning pipes may be at risk of inundation from increased post-fire flows.

An existing residential structure was noted above the western channel bank near the mouth of Simmons Canyon. While the residential structure appears to be located along the higher inner edge of the terrace, 8 to 10 cars were noted within a parking area (VAR-06) adjacent to the residence along the outer edge of the terrace. The parking area was observed being accessed by agricultural staff, suggesting it is used as parking for the vineyards. Several steel pipes (VAR-05) that appear to transport water from upstream storage tanks to vineyards downstream of Simmons Canyon were noted to be elevated 5 to 6 feet above the Simmons Canyon channel at the upstream end of the terrace. Metal fencing was observed to span the channel below the pipes. Based on the pipes, fencing, and observed channel morphology upstream of the terrace, the location may be a point of avulsion of the channel onto the low-lying terrace and through the parking area during increased post-fire flows.

Pickett Road crosses the Simmons Canyon drainage near the mouth of the burned catchment approximately 2,000 feet downstream of the southwestern Pickett Fire boundary via a 5-foot diameter corrugated metal pipe (CMP) and adjacent 5-foot high and 8.5-foot-wide squash CMP (VAR-07). The crossing appears to be the only access to two upstream residential structures. Emergency access to the residential structures could be compromised if the crossing were to overtop or fail as a result of increased post-fire flows. An approximately 1,000-foot-long and 4 to 5-foot-high rock and earthen berm was observed above the western channel bank between the channel and an existing vineyard downstream of the Pickett Road crossing. The berm appeared loose and quickly constructed, suggesting it may have been constructed to keep high flows along the channel from inundating the adjacent vineyard. Portions of the channel downstream of the earthen berm were observed to have been modified with rock armored banks (VAR-08), which may partially constrict the natural channel width. Small stretches of additional rock berms were noted above the modified channel.

Many of the residential, commercial, and agricultural developments within and downstream of Simmons Canyon are constructed on fluvial, alluvial fan, and alluvial terrace deposits and may experience a higher risk of flooding because of their location. Many of the fan surfaces are graded and developed, making it difficult to discern the fan surfaces in the field. Review of LiDAR imagery shows what appear to be areas of shallow- and deep-seated landsliding within the Simmons Canyon burned area which appear to confirm active hillslope processes. These processes can provide material to stream channels that can be mobilized by subsequent flood flows, debris floods, and debris flows. Increased postfire runoff and sediment transport may increase the potential of flooding to the houses, barns, vineyards, and outbuildings located within and downstream of the Simmons Canyon drainage. The channel crosses under Silverado Trail, a Napa County maintained road, via two 6.5-foot-high and 12-foot-wide concrete box culverts (VAR-09) approximately 4,000 feet downstream of the Pickett Road crossing. The culverts generally appeared free from debris, with a minor amount noted within the western culvert. Vegetation and a buried tree were noted in the channel partially blocking the outlet of the box culverts. Based on flow calculations conducted as part of this evaluation and discussed in this report, post-fire flows downstream of the Pickett Road crossing correspond to a 3-year recurrence interval, suggesting a minor post-fire increase in runoff downstream of Simmons Canyon. To maintain available capacity, we recommend clearing and maintaining the channel and observed crossings downstream of Simmons Canyon. The property owners and local community within and downstream of Simmons Canyon should be aware of the potential risks and watch for storm warnings (for example, the National Weather Service Flash Flood Watches and Warnings).

Dutch Henry Canyon along Dutch Henry Canyon Road (VAR-10): The majority (approximately 96 percent) of the southwest-facing slopes within Dutch Henry Canyon are burned at low and very low soil burn severity or are located outside of the Pickett Fire burned area. Many of the residential, commercial, and agricultural developments within and downstream of Dutch Henry Canyon are constructed on fluvial, alluvial fan, and alluvial terrace deposits. Many of the fan surfaces are graded and developed, making it difficult to discern the fan surfaces in the field. Review of LiDAR imagery shows what appear to be areas of shallow- and deep-seated landsliding within the Dutch Henry Canyon burned area which appear to confirm active hillslope processes. These processes can provide material to stream channels that can be mobilized by subsequent flood flows, debris floods, and debris flows. Increased postfire runoff and sediment transport may increase the potential of flooding to the houses, barns, vineyards, and outbuildings located within and downstream of the Dutch Henry Canyon drainage. During our review, structures and infrastructure within and downstream of Dutch Henry Canyon generally appeared located high on slopes or along elevated alluvial terraces above the Dutch Henry Canyon channel which, coupled with the high percentage of low soil burn severity within burned portion of the watershed, suggests that the risk of inundation from increased post-fire flows is very low.

The Dutch Henry Canyon channel intersects with another large, unburned drainage (Biter Creek) approximately 1,500 to 2,000 feet downstream of the Pickett Fire burned area, where both drainages are directed at a sharp angle under the Silverado Trail, a Napa County maintained road, via four 6-foot-high and 8-foot-wide concrete box culverts. Rock and fine sediment was observed deposited at the inlet of the Silverado Trail crossing, where it appears the sharp turn in the channels results in a reduction in flow velocity and, consequently, bedload from both streams is deposited before entering the culverts. The culverts generally were free from debris during our review, suggesting that they are functioning and are maintained.

Approximately 100 feet upstream of the confluence with Biter Creek, the Dutch Henry Canyon channel is crossed by Lommel Road, a residential access road, near the intersection with Dutch Henry Canyon Road. The crossing consists of a 6-foot diameter steel pipe and adjacent 4-foot high and 6-foot-wide squash CMP (VAR-10). Vegetation and large lobes of rock and sediment were noted at the culvert inlets and outlets. Sediment at the outlet may be partially related to backwater deposition from the confluence of the Dutch Henry Canyon drainage and Biter Creek below the Silverado Trail crossing downstream. An approximately 200-foot long and 3 to 4-foot-high rock berm was observed along the west edge of Lommel Road above the confluence of the two drainages, which appears to confirm that backwater flooding occurs. A large depression in the deposited sediment was observed the outlet of the Lommel Road crossing, indicating that high flows travel through the culverts at high velocity. Woody debris was observed at the top of the crossing along the Lommel Road shoulder indicating that the crossing has previously overtopped, suggesting that the crossing is undersized to accommodate high flows and is a likely point of avulsion for increased post-fire flows. Overtopping flows, which appear to currently constitute a risk to the Silverado Trail approximately 50 feet downstream, may be exacerbated by post-fire flows. To maintain available capacity and minimize the potential for risks to

Silverado Trail, clearing, monitoring, and maintaining the crossings prior to and during high volume rain events is recommended. The property owners and local community within and downstream of Dutch Henry Canyon should be aware of the potential risks and watch for storm warnings (for example, the National Weather Service Flash Flood Watches and Warnings).

Pope Creek/Lake Berryessa Watershed:

Historic Aetna Springs Swartz Creek Bridge (VAR-13): A historic bridge (circa 1912) with 42-foot-wide by 11-ft-high arched opening is located on Aetna Springs Road over Swartz Creek within the DWR 100-year floodplain. The upstream drainage area is relatively large (8.6 sq. mi.), spanning much of the area burned in the Pickett Fire. Approximately 80 percent of this drainage burned at low, very low, or unburned while 18 percent was burned at moderate with some high. The post-fire flow response is expected to be low within this drainage. The potential hazard is flooding with entrained woody debris plugging the creek at the bridge. Potential for backwater to inundate areas adjacent to upstream side of bridge is moderate, with low potential to reach road surface. Recommended emergency protective measures include monitor and maintain, signage, and early warning.

Historic Mineral Springs Resort (VAR-14): Structures making up a historic mineral springs resort are located adjacent to a tributary to Swartz Creek in the vicinity of the bridge. The area is currently an unused recreational area with plans for future renovation and reopening in 2026. Access is maintained, including a stone footbridge that spans the channel. The mineral springs structures are well outside of the DWR 100-year floodplain of Swartz Creek. The tributary's drainage area was largely burned at very low, low, or unburned, with small patches of moderate and high. The potential hazard is flood flows impacting structures associated with historic spa improvements that are located directly within and adjacent to the channel. Risk level was predicted to be low with minor consequences; however, the probability of impact to the spa structure is likely given its placement within the channel. The recommended emergency protective measures include early warning and restriction of access when intense storms are predicted.

Remote Residential Structure (VAR-17): A residential structure with outbuildings is located on an old deep-seated landslide bench, which is elevated above two small drainages on either side of the bench. A well is located at the top of the landslide just below the head of the drainage. Though the residence did not burn, it is well interior of the fire perimeter and the surrounding drainages burned largely at moderate and high severity. The same drainages burned similarly during the Glass Fire five years prior. The current resident recalled some elevated flow in the western drainage during the following rainy season, though flows did not reach the road or structures. Though the eastern drainage is smaller, a 12-inch-diameter culvert allows for flow under the access road to the residence and could easily be blocked, damaged, and/or overtopped, which could damage the road to the home. The potential hazard is isolated to the flooding of access roads. The residence and associated structures appear elevated above flood flows.

Agricultural Ponds (VAR-11, VAR-12, VAR-15, VAR-16): Several agricultural ponds are located within and adjacent to the fire perimeter in the Aetna Springs area in the northeastern portion of the burned area. The potential hazard is post-fire bulked runoff entering the pond system that exceeds outflow capacity. The loss of storage volume due to sediment deposition is also a concern. **VAR-11** includes the lower pond in a system of two ponds, with 38 percent of the tributary area to the lower pond within the burn perimeter (8.5 percent burned at moderate).

The USGS model indicates a 30 percent likelihood of debris flow initiation with a moderate combined hazard for the primary tributary basin that feeds into the pond from the east. Basins that feed the upstream pond were generally not impacted by fire. The outlet at the lower pond includes a trapezoidal spillway with a 2.5-foot-high by 27-foot-wide check dam with steep side slopes (approx. 0.5:1 h:v) that rise about 8 feet above the check dam crest. The lower pond appears to be approximately 3 feet below capacity. **VAR-12** includes a system of 7 ponds with about 82 percent of the tributary area within the burn perimeter (20 percent burned at moderate). The USGS model indicates a 32 percent likelihood of debris flow initiation with a moderate combined hazard for primary tributaries to the upper ponds. The outlet of the lower pond includes a 4-foot-high by 4-foot-wide concrete box structure that extends through the earthen dam. The inlet to the box is a 4-foot-wide by 8-foot-long by 6-foot-deep vertical drop structure and the outlet is a concrete spillway. This inlet is potentially at risk of plugging with debris and it is recommended that log booms or a debris rack be installed to help maintain outflow.

VAR-15 includes a system of two ponds downstream of a small drainage with low relief that is completely within the fire perimeter and burned mostly at moderate with some low. The USGS model indicates a 36 percent likelihood of debris flow with a low combined hazard for the upstream basin. An unarmored trapezoidal spillway (4-foot-deep by 14-foot-wide) drains to a smaller pond to the southwest. Miscellaneous equipment and a large shed structure are located on the downstream side of earthen dam. The larger, upstream pond has about 10 feet of remaining capacity.

VAR-16 includes a single pond where 98 percent of the tributary area is within the fire perimeter, with 73 percent burned at moderate with some high. The USGS model indicates a 33 percent likelihood of debris flow initiation with a moderate combined hazard for the primary tributary basin. The pond outlet includes a rock-lined spillway notch at the crest of the earthen dam that measures 48-inches-deep by 20-inches-wide at the base and 42-inches wide at top. This spillway drains directly into a small tributary to Swartz Creek. The outlet spillway is potentially at risk of plugging with debris and it is recommended that log booms or a debris rack be installed to help maintain outflow.

Table 3. Values-at-Risk (VARs) classified by risk to life and property. Risk to life encompasses all potential direct and indirect postfire geohazard risks (e.g., debris flows, debris floods, landslides, rockfall, floods) that may cause injury or death to humans.

		Risk to Life		
		Low	Moderate	High
Risk to Property	Low	VAR-01, VAR-05, VAR-06, VAR-07, VAR-08, VAR-10, VAR-11, VAR-12, VAR-14, VAR-15, VAR-16, VAR-17		
	Moderate	VAR-02, VAR-03, VAR-04, VAR-09, VAR-13		
	High			

Key Infrastructure

Key infrastructure within and downslope of the Pickett Fire perimeter includes high tension power lines, Napa County maintained and local roads, and agricultural ponds. Monitoring, maintenance, and repair costs to roads and flood-control infrastructure may be increased relative to prefire costs until the Pickett Fire burned area revegetates and recovers. The recovery period typically takes 2 to 5 years, but may occur faster in some areas where the soil burn severity is less severe.

The public road and storm drain network potentially affected by the Pickett Fire was not completely evaluated during the WERT investigation. All roads, stream crossings, and drainages structures downstream and downslope of burned hillslopes are at risk of storm damage and may become plugged and overtopped, leading to crossings being compromised and access restricted.

Due to the prevalence of steep slopes and postfire impacts to soil, nuisance flooding of muddy flows is likely to occur along roads inside the fire perimeter and especially along roads at the base of mountain slopes. Many small drainages flow directly to roads and signage should be installed along these roads to warn drivers of the flooding risks.

Crossings and drainage associated with county roads within and downstream of the burned area should be evaluated and maintained as soon as possible after significant storm events. We recommend receiving regional alerts (for example, the National Weather Service) and watching storm forecasts so problematic roads can be avoided during storms.

Rockfall Hazards exist where cliffs and hillslopes are steep and produce cobble- and boulder-sized clasts. Increased rock exposure and root damage from the fire will increase in areas with pre-existing rockfall hazards.

General Hazards to Water Quality

Five structures were reported to be destroyed in the Pickett Fire. Destroyed structures adjacent to watercourses have the potential to transfer contaminated soils, large and small debris, and hazardous materials into waterways which can impact water quality downstream. Based on current understanding of impacts on burned residential homes and structures from wildfires, the resulting ash and debris can contain concentrated and toxic amounts of polycyclic aromatic hydrocarbons and heavy metals such as antimony, arsenic, cadmium, copper, lead, and zinc.

The characterization of hazardous materials and their impacts on the environment and water resources is outside the purview of the WERT and is generally under the review of other State and Federal Agencies, such as the State Water Quality Control Board, the Department of Toxic Substances Control, the California Department of Office of Emergency Services (Cal OES), the California Department of Conservation's Geological Energy Management Division (CalGEM), and the Federal Environmental Protections Agency. To protect water quality and human health from burned structures, local agencies may request assistance from the Cal OES Watershed Mitigation, Coordination, and Outreach unit to deploy emergency protective measures (EPMs) in areas with high potential for hazardous material runoff and increased sedimentation within the watershed.

General Recommendations

Implement an Early Warning System

An effective early warning system requires the implementation of different components (Figure 11) for hazard and risk reduction, as well as linkages between these components so that the goals of protecting life, safety, and property are accomplished. In previous sections, this report characterizes the spatial distribution of hazard and risk within and downstream of the burned area, greatly increasing knowledge about potential risk from postfire hazards. This report also contains a fire-specific rainfall threshold to be used as a trigger point for forecast-based watches and warnings. Each VAR is characterized by the potential postfire hazard, relative risk from the hazard, and the potential emergency protective measures that can be implemented for risk reduction. The granular nature of VAR characterization allows for more targeted communication and response planning by emergency responders, public works/flood control agencies, and other entities tasked with implementing risk reduction activities (e.g., NRCS).

Increasing Knowledge of Risk

- Characterizing soil damage within burned area
- Spatial distribution of postfire flooding, debris flows, and rockfall
- Spatial distribution of values-at-risk (VARs); relative risk determined for VARs

Warning Dissemination and Communication

- Use of alert systems and media for issuance of watches and warnings
- Targeted communication to those most at risk (i.e., identified VARs)
- Signage in areas of dispersed hazards
- Focus communication on preparedness and self-preventative measures

Monitoring and Warning

- Utilize fire-specific WERT-derived rainfall thresholds
- Weather forecasting
- Issuance of "watches" and "warnings" based on fire-specific rainfall thresholds
- Weather and watershed response monitoring; Refinement of thresholds

Refining Response Capability

- Storm event pre-planning
- Development of operational response plans based on spatial distribution of hazard and risk
- Trigger points for phased operational response using weather forecasts
- Implementation of emergency protection measures recommended by WERT

Red text indicates where WERT products or CGS expertise can be utilized

Figure 11. The four components of "people-centered" early warning systems (adapted from Garcia and Fearnley, 2012), along with steps necessary to implement each component specific to minimizing risks from postfire watershed hazards. This WERT report provides knowledge to implement each of these components in a manner specific to the fire.

Prescribed Rainfall Thresholds

Initial rainfall thresholds in the first year following fire are determined by WERT for the Pickett Fire by considering data such as the USGS modeled rainfall thresholds, regional debris-flow thresholds, previous flood and rainfall history, geologic/geomorphic conditions of the burned area, and the hazard and relative risk associated with each VAR. On the northwest side of the fire above Swarz Creek, Sugarloaf Mountain (38.6395°, -122.5298) has a 2-yr 15-minute rainfall intensity of 1.46 in/hr (NOAA Atlas 14, Moody and Martin, 2001). Additionally, the 2-yr 15-minute rainfall intensities from the pour point watersheds range from about 1.2 to 1.4 in/hr. These values are all less than the fire-wide 15-minute rainfall intensity threshold of 1.7 in/hr predicted from the USGS debris flow likelihood model. Because there is limited evidence of prior debris flows in the Pickett Fire area, no reported debris flows in the vicinity of the burn area following the 2020 Glass Fire, and the predominantly low burn severity, the primary postfire concern is flood hazard. Therefore, the following recommended Year 1 rainfall thresholds are lower than the USGS modeled rainfall thresholds and correlate to about a 2-yr recurrence interval (Table 4).

Table 4. Year 1 rainfall thresholds for the Pickett Fire.

Duration	Year 1 Threshold Intensity mm/hr (in/hr)	Year 1 Threshold Depth mm (in)	Recurrence Interval
15 minutes	35 (1.40)	9 (0.35)	~2 year
30 minutes	25 (1.00)	13 (0.50)	~2 year
60 minutes	18 (0.70)	18 (0.70)	~2 year

The WERT strongly recommends that Napa County Public Works, Napa County Office of Emergency Services, and the California Governor's Office of Emergency Services work with the National Weather Service and the California Geological Survey to monitor forecasts and rainfall intensity during storms, as well as observe postfire response following storm events. If the initial rainfall threshold is too conservative, and little response occurs during storm events, data and observations can be used to adjust the threshold upward in a defensible manner. Alternatively, rainfall thresholds can also be lowered based on gage data and observations.

Existing early warning systems should be used and iteratively improved such that residents can be alerted to incoming storms, allowing enough time to safely vacate hazard areas. In areas where cellular reception is poor or non-existent, methods should be developed to effectively contact residents. For example, installation of temporary mobile cellular towers should be considered. Early warning systems for the Pickett Fire should take advantage of the services described below.

Utilize National Weather Service Forecasting

Flash flood and debris flow warnings with practical lead times of several hours must come from a combination of weather forecasts, rainfall measurements of approaching storms, and knowledge of triggering thresholds. The following information is from the National Weather Service (NWS); they provide flash flood and postfire debris flow "watch" and "warning" notifications in burned areas.

> **Watches** are issued when the likelihood of hazardous weather or a hydrologic event has increased significantly, but its occurrence, location, and/or timing is still uncertain. Watches provide lead time for pre-storm planning and response.
>
> **Warnings** are issued when hazardous weather or hydrologic events are occurring, are imminent, or have a very high probability of occurring.

For additional information, see the NWS San Francisco Bay Area Forecast Office webpage (https://www.weather.gov/mtr/).

Residents Potentially Affected by Postfire Hazards Should Sign Up for Alerts

This report identifies areas within and downstream of the Pickett Fire perimeter with the highest potential for postfire flooding, debris flood, and rockfall. Napa County has implemented ALERT

Napa County, a state-of-the-art emergency notification system to alert residents and businesses about natural disasters and other crises. The emergency notification system enables Napa County to provide essential information quickly in a variety of situations, including in the event of fire-induced flooding and debris flows. **Residents can sign up for ALERT Napa County through the following link**: https://www.countyofnapa.org/2481/Emergency-Notifications.

Wireless Emergency Alerts (WEA)

Residents should be aware of what to do when receiving an alert through WEA. WEA is an alert system originated by the NWS that can inform residents, visitors, and businesses of flash flood warnings and other potential hazards. WEA alerts are emergency messages sent by authorized government alerting authorities through mobile carriers. Government partners include local and state public safety agencies, FEMA, the FCC, the Department of Homeland Security, and the National Weather Service. **No signup is required**, and alerts are automatically sent to WEA-capable phones during an emergency. Since WEA alerts can be disabled by phone users, residents and businesses potentially subject to hazards associated with the Pickett Fire are urged not to opt out of WEA. You can find more information at the following link: https://www.weather.gov/crp/wea.

Communicating Hazard and Risk Associated with Pickett Fire

Increasing awareness is key to minimizing risk on the Pickett Fire. While the potential for debris flows exists within and downstream of the Pickett Fire, the primary hazard of concern is flooding along waterways that drain the area impacted by the Pickett Fire. These hazards constitute a potential threat to life and property. Residents and property owners downstream of burned areas should be aware that flood severity and frequency may increase.

Postfire increases in runoff response indicate that a 2-yr, short-duration storm will likely result in as minor as a 2-yr or 3-yr storm for most analyzed drainages with one of the analyzed drainages reaching a more significant 10-yr response. Localized flooding may occur, primarily in areas that experienced moderate and high severity burning, though most postfire increases are expected to be minor. Low-volume access roads may flood during intense storms, temporarily limiting ingress and egress to agricultural infrastructure and dispersed residential structures that may leave residents stranded after storm events and prevent the delivery of emergency services. Public outreach should focus on communicating these findings to affected residents and property owners.

Signage has been used effectively in similar situations on previous fires to inform the public traveling key corridors. Signage placed along portions of the county and state road network can help alert drivers of potential debris flow, flooding, and/or rockfall hazards during periods of rainfall. Owners of non-public road networks should be aware of the potential hazards along roadways following fire and should implement signage accordingly.

The following links are to additional information about postfire geohazards:

- CGS Burned Watershed Geohazards website: https://www.conservation.ca.gov/cgs/bwg/program
- CAL FIRE post wildfire safety website: https://readyforwildfire.org/post-wildfire/
- Cal OES postfire geohazards article: https://news.caloes.ca.gov/flood-after-fire-preparing-for-the-post-disaster-danger

- FEMA postfire factsheet: https://www.fema.gov/sites/default/files/documents/fema_flood-after-fire_factsheet_nov20.pdf

Response Planning for the Pickett Fire

An objective of the WERT process is to provide operational intelligence to those tasked with implementing risk reduction activities (e.g., emergency planners, fire departments, flood control agencies). WERT information should be used to narrow the decision-space for operational planning, strategy, and tactics. Key information provided by the WERT is listed below.

- VAR location (map and spatial data)
- Whether the VAR is a discrete structure (point) or a grouping of structures (polygon)
- The types of hazards posing risk to the VAR
  - The report discusses whether hazards are debris flows, debris flood/flooding, or rockfall
- What is the relative risk to life and/or property?
  - Relative risk is characterized as low, moderate, and high
  - Response efforts should prioritize VARs with moderate to high life and/or property risk
  - Low risk is associated with a nuisance level of hazard
- Emergency protective measures are recommended to reduce risk
  - WERT does not design direct protection measures (e.g., deflection structures)
  - Some measures need more intensive evaluation and design to reduce risk

Informing and empowering the public is a key step in risk reduction. Napa County Office of Emergency Services has resources listed that can help reduce risk from postfire flooding and debris flows. This includes tips for storm preparedness guidelines, links to weather resources (i.e., rain gages and weather radar), and links for purchasing flood insurance.

https://www.countyofnapa.org/353/Office-of-Emergency-Services

The WERT recommends that local government conduct public outreach so that residents and property owners can make informed decisions that reduce their risk exposure to postfire hazards.

Utilize NRCS's EWP Program to Implement Emergency Protection Measures

The National Resource Council Service's (NRCS) Emergency Watershed Protection (EWP) Program offers technical and financial assistance to help local communities relieve imminent threats to life and property caused by disasters such as wildfires. Many of the VARs documented in the Pickett Fire are associated with hazards such as flooding and sedimentation which may not necessarily pose a risk to life and safety but can result in significant damage to residential properties. In many instances, these risks can be mitigated with carefully designed emergency protective measures. NRCS provides planning, design, and construction oversight of the potential recovery measures. NRCS may also pay up to 75 percent of the cost of the recovery measures, and up to 90 percent when communities are designated as limited resource areas. However, NRCS must work with a project sponsor to provide EWP Program assistance. Project sponsors must be a state, a state agency, a legal subdivision of a state government, a local unit of government (i.e., county or city), or a Native American Tribe or Tribal organization with a legal interest in or responsibility for the areas threatened by a watershed emergency.

For sponsors, the point of contact for the EWP Program for the Pickett Fire is the following:

Evelyn Denzin-District Conservationist
707-690-3126
evelyn.denzin@usda.gov

Additional information on the NRCS's EWP Program can be found at:
https://www.nrcs.usda.gov/programs-initiatives/ewp-emergency-watershed-protection

Road Drainage Systems, Storm Monitoring, and Storm Maintenance

Due to the presence of areas burned at moderate and high soil burn severity, increased flows on slopes and onto the road and storm drain systems can be expected. Increased erosion can inundate roads and plug these drainage systems. Flows could be diverted down roads and cause erosion and possible blockage, and/or loss of portions of the road infrastructure and structures along roads. The WERT did not evaluate the potential for rockfall, sedimentation, flooding, or debris-flow hazards at all roads or watercourse crossings along federal, state, county, or municipal road corridors. Existing road drainage systems should be inspected by the appropriate controlling agency to evaluate potential impacts from floods, debris floods, debris flows, and sedimentation resulting from storm events. Equipment should be staged in areas where risk is high and access is necessary. Spatial data generated by the USGS and the WERT (e.g., USGS debris-flow model and flood flow predictions) can be used to screen potential at-risk areas for increased monitoring and maintenance presence.

Rockfall Hazards

Rockfall hazards exist along roads where cliffs or steep hillslopes with cobbles and boulders are present. Due to the rapid nature of the evaluation, a fully comprehensive evaluation of rockfall hazard was not possible. Many low traffic roads inside the fire perimeter may experience rockfall and travelers should be cautious of rockfall hazards.

References

CAL FIRE and CGS (California Department of Forestry and Fire Protection and California Geological Survey). 2020. Procedural guide for Watershed Emergency Response Teams. Sacramento, CA. 63 p dated April 27, 2020.

CGS, 2002. California geomorphic provinces. California Geological Survey, Note 36, 4 p.

DeGraff, M.V., Gallegos, A., 2012, The Challenge of Improving Identification of Rockfall Hazard after Wildfires, Environmental and Engineering Geoscience, Vol. 18, No. 4, pp 389-397.

Delattre, M. P., and Gutierrez, C.I., 2013, Preliminary Geologic Map of the Calistoga 7.5' quadrangle, Sonoma and Napa Counties, California: A digital database: California Geological Survey website, https://www.conservation.ca.gov/cgs/maps-data/rgm/preliminary

Dwyer, M.J., Noguchi, N., and O'Rouke, J., 1976, Reconnaissance photointerpretation map of landslides in 24 selected 7.5-minute quadrangles in Lake, Napa, Solano, and Sonoma Counties, California: U.S. Geological Survey Open-File Map 76-74, map scale 1:24,000.

FEMA (Federal Emergency Management Agency). 2008. FEMA Flood Map Service Center. https://msc.fema.gov/portal

Garcia, C., Fearnley, C., 2012. Evaluating Critical Links in Early Warning Systems for Natural Hazards. *Environmental Hazards*, 11(2):123-137. https://doi.org/10.1080/17477891.2011.609877.

Gartner, J.E., S. H. Cannon, P. M. Santi, 2014, Empirical models for predicting volumes of sediment deposited by debris flows and sediment-laden floods in the transverse ranges of southern California, Engineering Geology, Volume 176, 2014, Pages 45-56, ISSN 0013-7952, https://doi.org/10.1016/j.enggeo.2014.04.008.

Gotvald, A.J.; Barth, N.A.; Veilleux, A.G.; Parrett, C., 2012. Methods for determining magnitude and frequency of floods in California, based on data through water year 2006. U.S. Geological Survey Scientific Investigations Report 2012–5113. 38 p., 1 pl.

Graymer, R.W., Brabb, E.E., Jones, D.L., Barnes, J., Nicholson, R.S., and Stamski, R.E., 2007; Geologic Map and Map Database of Eastern Sonoma and Western Napa Counties, California: U.S. Geological Survey Scientific Investigations Map 2956.

Jennings, C.W., Bryant, W.A., 2010. Fault Activity Map of California. California Geological Survey, Map 6.

Hungr, O., Evans, S.G., Bovis, M.J., Hutchinson, J.N., 2001. A review of the classification of landslides of the flow type. *Environmental & Engineering Geoscience* 2001; 7 (3): 221–238. https://doi.org/10.2113/gseegeosci.7.3.221.

Kinoshita, A.M., Hogue, T.S., Napper, C., 2014. Evaluating pre-and post-fire peak discharge predictions across western US watersheds. *Journal of the American Water Resources Association*, 50(6), pp.1540-1557.

Keefer, D. K., 1984; Landslides caused by earthquakes: GSA Bulletin, Vol. 95, p. 406-421.

Lopez, A.M., Pacheco, J.L. and Fendorf, S, 2023. Metal toxin threat in wildland fires determined by geology and fire severity. *Nat Commun* **14**, 8007. https://doi.org/10.1038/s41467-023-43101-9

Moody, J.A., 2012. An analytical method for predicting post wildfire peak discharges: U.S. Geological Survey Scientific Investigations Report 2011–5236, 36 p.

Moody, J.A., Martin, D.A., 2001. Post-fire, rainfall intensity–peak discharge relations for three mountainous watersheds in the western USA. *Hydrological processes*, 15(15), pp.2981-2993.National Oceanic and Atmospheric Administration Atlas 14 Point Precipitation Frequency Estimates: California. https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html. Accessed 20 January 2024.

Napa County. 2007. 4.11 Hydrology and water quality. Napa County General Plan Update. Draft Environmental Impact Report. Napa, CA. 77 p. https://www.countyofnapa.org/DocumentCenter/View/7937/411-Hydrology-General-Plan-DEIR-PDF

Napa County. 2018. Napa County operational area hazard mitigation plan 2013-2018. County Executive Office, Emergency Services Division. Napa, CA. https://www.countyofnapa.org/DocumentCenter/View/779/Napa-Operational-Area-Hazard-Mitigation-Plan-2013-PDF

Neary, D.G., Ryan, K.C. and DeBano, L.F., 2005. Wildland fire in ecosystems: effects of fire on soils and water. Gen. Tech. Rep. RMRS-GTR-42-vol. 4. Ogden, UT: US Department of Agriculture, Forest Service, Rocky Mountain Research Station. 250 p., 42.

Parsons, A.; Robichaud, P.R.; Lewis, S.A.; Napper,C.; Clark, J.T. 2010. Field guide for mapping post-fire soil burn severity. Gen. Tech. Rep. RMRS-GT-243. Fort Collins, CO. U.S.D.A., Forest Service, Rocky Mountain Research Station. 49 p.

Pierson, T.C., 2005. Distinguishing between debris flows and floods from field evidence in small watersheds: U.S. Geological Survey Fact Sheet 2004-3142, 4 p.

Peterson, M.D., Bryant, W.A., Cramer, C.H., Cao, T., Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic Seismic Hazard Assessment for the State of California: California Division of Mines and Geology, Open File Report 96-08.

Rowe, P.B., Countryman, C.M. and Storey, H.C., 1949. Probable peak discharges and erosion rates from southern California watersheds as influenced by fire. US Department of Agriculture, Forest Service, California Forest and Range Experiment Station. 107 p.

SFBRWQCB (San Francisco Bay Regional Water Quality Control Board). 2018. Napa Valley post-fire water quality monitoring fact sheet. Oakland, CA. 2 p.

Staley, D.M., Negri, J.A., Kean, J.W., Laber, J.L., Tillery, A.C. and Youberg, A.M., 2016. Updated logistic regression equations for the calculation of postfire debris-flow likelihood in the western United States (p. 13). US Department of the Interior, US Geological Survey.

United States Geological Survey (USGS StreamStats), accessed September 2025. Stream Stats. https://streamstats.usgs.gov/ss.

United States Department of Agriculture (USDA), Web Soil Survey, accessed September 2025. Web Soil Survey

Wills, C.J., Perez, F.G., and Gutierrez, C.I., 2011; Susceptibility to Deep-Seated Landslides in California: California Geological Survey, Map Sheet 58, landslide inventory available online at https://maps.conservation.ca.gov/cgs/lsi/app/

Appendix A – Pickett Fire WERT Contact List

Appendix A: Pickett Fire Contacts

Name	Affiliation	Position	Email	Phone Number
Don Lindsay	California Geological Survey	BWG Program Manager	don.lindsay@conservation.ca.gov	530-360-6948
Kevin Doherty	California Geologic Survey	WERT Lead	kevin.doherty@conservation.ca.gov	707-599-0448
Mathew Boone	CAL FIRE	WERT Liason	mathew.boone@fire.ca.gov	530-789-1985
Kevin Callahan	California Geologic Survey	WERT Team member	kevin.callahan@conservation.ca.gov	916-584-6050
Fey Egan	CAL FIRE	WERT Team member	fey.egan@fire.ca.gov	916-216-0270
Katherine Barnitz	BLM	Agency Representative	kbarnitz@blm.gov	707-830-0767
Mitch Celaya	City of Calistoga	Interim City Manager	mcelaya@calistogaca.gov	707-942-2805
Jed Matcham	City of Calistoga	Fire Chief	jmatcham@calistogaca.gov	707-534-0366
Shannon Damonte	Howell Mountain Mutual Water Co.	Interim GM	Hmmwco@napanet.net	707-260-5391
Dave Caldwell	Napa County Roads	Road Supervisor	Dave.Caldwell@countyofnapa.org	707-363-1004
Mike Wilson	Napa Firewise	Director of Veg Management	Mike@napafirewise.org	707-292-4273
Steve Burgess	Napa Firewise	Project Coordinator	steven@napafirewise.org	415-246-4294
Emily Guidas	Napa Firewise	GIS and Soils	emily@napafirewise.org	
Christopher Thompson	Napa Firewise	Chairman of The Board	cthompson@napafirewise.org	707-260-4418
John Walsh	PG&E	Agency Representative	JTWP@pge.com	925-817-7274
Rob Buckhout	Cal OES	Assistent Chief Region 3	robert.buckhout@caloes.ca.gov	916-402-0685
Corey Oakley	Napa Valley Expo	CEO	Coreyo@napavalleyexpo.com	707-889-6719
Bill Birmingham	Napa County RCD	Senior Project Manager, Restoration	Bill@NapaRCD.org	707-690-3116
Evelyn Denzin	NRCS	District Conservationist	evelyn.denzin@usda.gov	707-690-3126
Alison Blodorn	Napa RCD	Program Director, Forest Health & Restoration	Alison@NapaRCD.org	707-690-3115
Robert Picket	State Parks	Peace Officer Ranger	Robert.pickett@parks.ca.gov	707-938-9548
Sarah Gibson	State Parks	Statewide Burn Boss	sarah.gibson@parks.ca.gov	916-268-7295
Jessie Moran	Pickett Fire Resource Advisor - IC Cooperator	Forestry Assistant II, State Parks	Jessie.Moran@parks.ca.gov	707-769-5652 x207
Jason Jordan	Napa Valley State Parks	Park Steward	Jason.Jordan@countyofnapa.org	707-299-2171
Matt Ryan	CAL FIRE	LNU Unit Chief	Matt.Ryan@fire.ca.gov	707-738-4148
Mike Wink	CAL FIRE	LNU Assistant Chief - Vegetation Management	mike.wink@fire.ca.gov	707-889-4225
JC Greenberg	CAL FIRE	LNU Deputy Fire Chief - Napa County	jc.greenberg@fire.ca.gov	707-337-5780
Mara Zaver	CAL FIRE	Deputy Chief - Team 4 Liaison	Mara.Zaver@fire.ca.gov	559-706-8802
Dave Pender	San Marco Fire	Battalion Chief - Team 4 Liaison	dpender@san-marcos.net	760-533-1634
Dusty Martin	CAL FIRE	IC	Dustin.martin@fire.ca.gov	530-708-2708

Appendix A: Pickett Fire Contacts

Name	Affiliation	Position	Email	Phone Number
Emily Smith	CAL FIRE	IC	Emily.Smith@fire.ca.gov	916-659-0130
Andy Turner	CAL FIRE	IC	Andy.Turner@fire.ca.gov	559-326-6318
Scott Corn	CAL FIRE	IC	Scott.corn@fire.ca.gov	530-448-2403
Brian Garcia	NWS	Monterey Warning Coord. Meteorologist	brian.garcia@noaa.gov	
Carolina Walbrun	NWS	Monterey Hydrologist	carolina.walbrun@noaa.gov	

Appendix B – Values -at-Risk Summary Table

Pickett Fire
Values-at-Risk Table

Site Number	Community / Local Area	Latitude	Longitude	Potential hazard / Field observation	Remarks	Hazard Category	Specific at-risk feature	Feature Category	Potential hazard to life	Potential hazard to property	Expected Probability	Expected Consequence	Risk Level	EPM	EPM2	EPM3	EPM4	EPM Text
VAR-01	Pickett Road			Potential hazard is flood and debris flood impacting water tanks located at the base of a steep, narrow catchment. The current flow path is diverted into a rocky swale that directs runoff west around the tank pad.	Upstream catchment burned at moderate. Potential for large woody debris, cobbles, and sediment in channel to be mobilized. Tanks are elevated and removed from larger adjacent drainages to the east and west. Tanks access road has potential to be impacted at low water crossings during storm events.	debris flow / flood	Water tanks	utilities	low	low	likely	minor	low	Deflection structure	Monitor and maintain			
VAR-02	Pickett Road			Potential hazard is flood and debris flood impacting potable water tanks, associated electrical and piping infrastructure, and upstream water line crossing.	Water tank improvements are located adjacent to shallow, narrow watercourse. Just upstream, and 8" plastic pipe that houses two smaller pipes (2.5" and 3.5") crosses over channel. Upstream drainage partially burned at low and moderate. USGS model indicates low likelihood (16%) of debris flow with low combined hazard.	debris flow / flood	Water tanks, water line crossing	recreational	low	moderate	possible	minor	low	Monitor and maintain	Deflection structure			
VAR-03	Pickett Road	38.596822	-122.552105	Potential hazard is flood and debris flood impacting low bridge crossing over narrow channel. Potential for woody debris to dam up at bridge, resulting in overtopping.	Bridge with wood deck and steel I-beam supports span 35-40' across channel with plastic and metal pipes strung below the bridge deck. Bridge provides access to water tanks. Upstream basin burned mostly at moderate with some low and some high. USGS model indicates moderate likelihood (42%) of debris flow in upstream drainage with moderate combined hazard for the basin. Large cobbles and boulders are prevalent in channel at bridge location.	debris flow / flood	Bridge	drainage structure	low	moderate	possible	moderate	intermediate	Early Warning	Monitor and maintain			
VAR-04	Simmons Canyon			Potential hazard is flood and debris flood impacting pump house, water tanks, and water line infrastructure located adjacent to two drainages. Potential for increased flows to overtop banks and inundate area.	Structures slightly elevated on terrace above two watercourses that drain moderately sized basins burned at low and moderate, with some unburned contributing area. 8-inch water line and electrical lines encased in steel pipes (two 12" and one 16") cross over channel about 5' above channel bottom. Soft bottom crossing to improvements at risk of washing out. USGS model indicates low and moderate combined hazards for the two contributing basins.	debris flow / flood	Pump station, water tanks, water lines	utilities	low	moderate	possible	moderate	intermediate	Monitor and maintain	Early Warning	Deflection structure		Deflection structure, such as sandbags or Hesco barriers, may be used to help deflect overtopping flows back into channel.
VAR-05	Simmons Canyon	38.593446	-122.551068	Potential hazard is flood and debris flood impacting water line crossing over narrow watercourse.	Several water line and electrical lines encased in steel pipes (two 12" and one 16") cross over channel about 5.5' above channel bottom. USGS model indicates low and moderate combined hazards for the two contributing burned basins, which account for about 40% of watershed at this location.	debris flow / flood	Water lines	utilities	low	low	possible	minor	low	Monitor and maintain				
VAR-06	Simmons Canyon	38.592969	-122.550939	Potential hazard is flood flows avulsing or overtopping watercourse and impacting winery parking lot on low terrace.	Low lying parking lot, low point at head of terrace is potential avulsion point. Upstream watershed partially burned at low and moderate.	flood	Parking lot	business	low	low	possible	minor	low	Deflection structure	Early Warning			Restrict access to parking lot if intense precipitation is predicted.
VAR-07	Simmons Canyon	38.591640	-122.551025	Potential hazard is plugging of double barrel CMP crossing, resulting in overtopping of paved road surface. Crossing is at low point in road and flow would continue across road and back into channel.	5' diameter CMP and 5' x 8.5' squashed CMP with about 18" freeboard. Backwater effects could locally impact adjacent vineyards with nuisance flooding. Just downstream of crossing the right bank has been modified with a levee consisting of cobble and boulder piles, which suggests that the watercourse has been prone to overtopping in the past. Presumably the levee was constructed to help protect adjacent vineyards from flood hazard. About 58% of the contributing watershed was burned (32% at moderate). A 1.4 flow multiplier is estimated at this crossing.	debris flow / flood	Culverted crossing	drainage structure	low	low	likely	minor	low	Clear and maintain culvert	Early Warning	Monitor and maintain		
VAR-08	Pickett Road			Potential hazard is flood flows overtopping confined channel and impacting adjacent vineyards and structures with nuisance flooding and sediment. Several small vehicle bridges cross channel that could be plugged with debris, resulting in local inundation.	Channel is armored, north side of channel has rock levee at double barreled crossing, channel is 18-20'wide and 6' deep, residential structure along lower channel bank, channel is 8' deep and 20' wide.	flood	Small bridges, vineyards, structures	multiple	low	low	likely	minor	low	Monitor and maintain				
VAR-09	Silverado Trail Road	38.579957	-122.557352	Potential hazard is plugging of double box culvert with woody debris. Backwater effects could lead to local flood impacts to adjacent vineyards. Low potential for overtopping of Silverado Trail.	Box culvert is located at a bend in the channel. Right bank box includes up to a about 1' of sediment with a tree partially blocking outlet. Left side clear. Each box 6.5' H x 12'W. Homeowner on south side of road has owned since the 70s with no history of flooding.	flood	Double box RCP culvert crossing	drainage structure	low	moderate	possible	moderate	intermediate	Monitor and maintain	Early Warning	Clear and maintain culvert	Signage	
VAR-10	Dutch Henry Creek	38.577168	-122.519710	Potential hazard is plugging of undersized double barrel culvert, resulting in overtopping of Lommel Rd. Very low potential for avulsion of flood flows onto Silverado Trail.	Squashed 4' x 6' CMP and 6' diameter steel pipe. Sediment accumulation at inlet and scour at outlet suggests undersized culvert. Potential avulsion is low but may be directed to Silverado Trail 40-50' downstream. This crossing is 100' upstream of Silverado Trail crossing, which drains both subject and adjacent basins. Some backwater likely occurs. A long rock berm is present along rural road to restrict backwater, and dried wood/sticks seem to indicate past overtopping. Only upper part of basin was burned and at low severity.	flood	Culverted crossing and roadway	drainage structure	low	low	possible	minor	low	Early Warning	Clear and maintain culvert	Monitor and maintain		
VAR-11	Aetna Springs			Potential hazard is post-fire bulked runoff entering agricultural pond that exceeds output flow capacity. The loss of storage volume due to sediment deposition is also a concern.	Downstream pond in a system of two ponds; tributary area to upstream pond was minimally impacted by fire. Lower pond is about 3 ft from capacity. Outlet includes a trapezoidal spillway with 2.5'H by 27'W check dam and 0.5:1 side slopes to ~8' above check dam. About 38% of tributary area is within the burn perimeter, with only 8.5% burned at moderate. USGS model indicates a 30% likelihood of debris flow with a moderate combined hazard for a primary tributary basin.	debris flow / flood	Agricultural pond	other	low	low	unlikely	moderate	low	Early Warning	Monitor and maintain			
VAR-12	Aetna Springs			Potential hazard is post-fire bulked runoff entering agricultural ponds that exceeds output flow capacity. The loss of storage volume due to sediment deposition is also a concern.	Outlet of lower pond includes a concrete inlet structure on dam face 4'x 8'dropdown to a 4' x 4' lateral box, which outlets to a spillway. About 82% of tributary area is within the burn perimeter, with 20% burned at moderate. USGS model indicates a 32% likelihood of debris flow with a moderate combined hazard for primary tributaries to the upper ponds.	debris flow / flood	Agricultural ponds	other	low	low	unlikely	moderate	low	Early Warning	Monitor and maintain			Log booms or debris racks may help mitigate plugging of outlet structures.
VAR-13	Swartz Creek/Aetna Springs	38.653420	-122.476488	Potential hazard is flooding with entrained woody debris plugging the arch bridge.	Swartz Creek Bridge (built 1912) is 42' W x 11'H with arched opening. Sediment deposition observed under bridge and in approaches. Large watershed extends through the fire footprint and is burned at low mod and high. Potential for backwater to inundate areas adjacent to upstream side of bridge, with low potential to reach road surface. About 77% of tributary area is within the burn perimeter, with 18% burned at moderate and high.	flood	Historic bridge	drainage structure	low	moderate	possible	moderate	intermediate	Early Warning	Monitor and maintain	Signage		

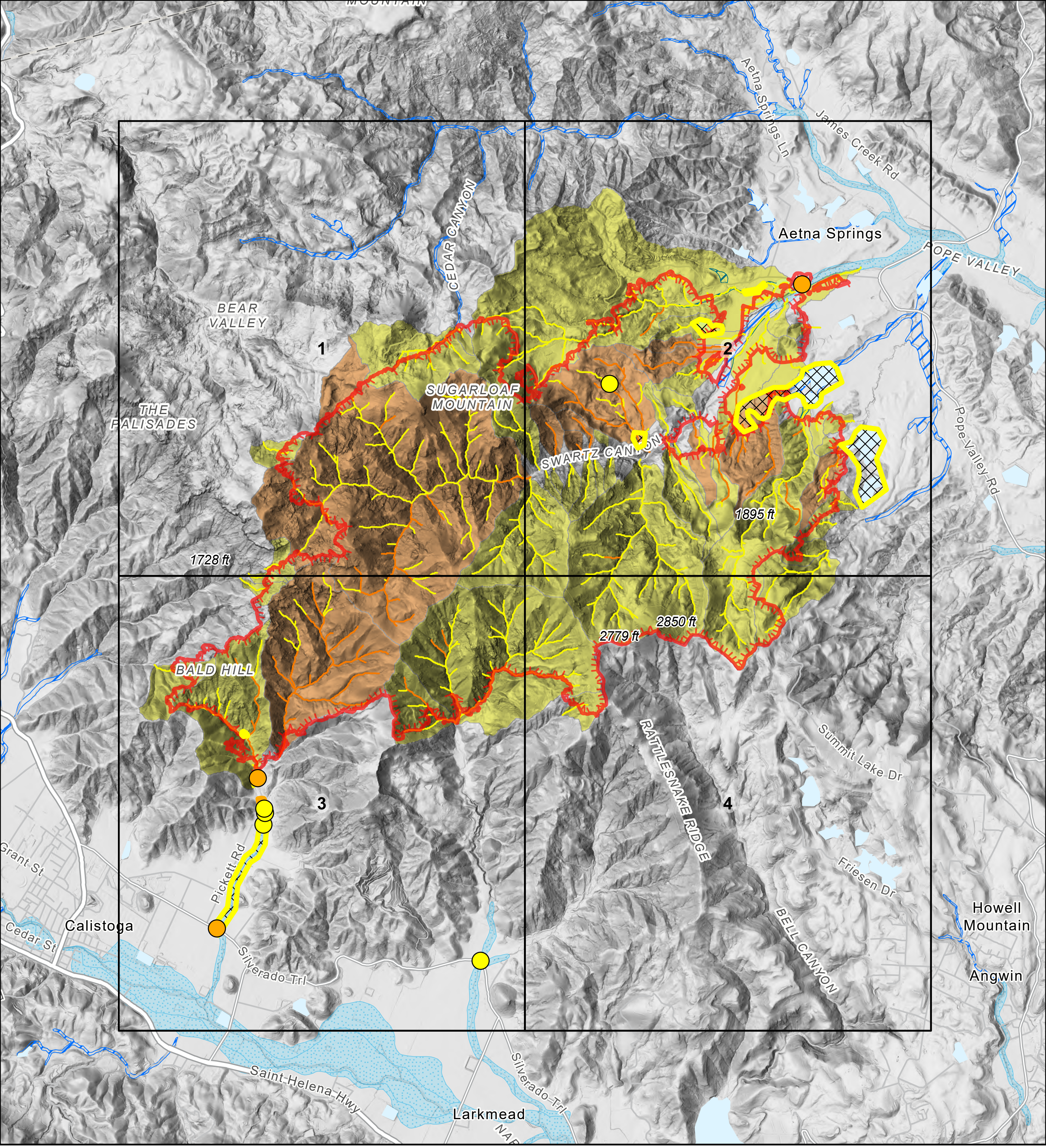
Pickett Fire
Values-at-Risk Table

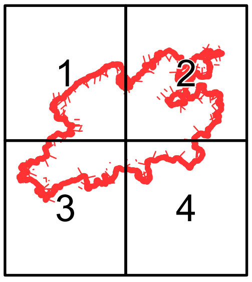
Site Number	Community / Local Area	Latitude	Longitude	Potential hazard / Field observation	Remarks	Hazard Category	Specific at-risk feature	Feature Category	Potential hazard to life	Potential hazard to property	Expected Probability	Expected Consequence	Risk Level	EPM	EPM2	EPM3	EPM4	EPM Text
VAR-14	Aetna Springs			Potential hazard is flood flows impacting structures associated with historic spa that are located within a watercourse.	Historic spa buildings are located in and adjacent to watercourse. Access is easy and appears maintained but unknown if actively used. Hot tub structure is in within the channel. The upstream basin has been partially burned, mostly at low severity.	flood	Historic spa buildings	recreational	low	low	likely	minor	low	Early Warning				Restrict access when intense storms are predicted
VAR-15	Aetna Springs			Potential hazard is post-fire bulked runoff entering agricultural ponds that exceeds output flow capacity. The loss of storage volume due to sediment deposition is also a concern.	Low upstream relief. Small basin burned at moderate with some low. Unarmored spillway drains to smaller pond to the southwest. Misc equipment and large shed structure on downstream side of dam. About 10 ft of remaining capacity. Trapezoidal spillway measures about 4'D x 14'W.	flood	Agricultural ponds	other	low	low	unlikely	moderate	low	Early Warning	Monitor and maintain			
VAR-16	Aetna Springs			Potential hazard is post-fire bulked runoff entering agricultural ponds that exceeds output flow capacity. The loss of storage volume due to sediment deposition is also a concern.	Pond outlet includes a rock-lined notch at top of dam with spillway measuring 48"D x 20"W at base and 42"W at crest. Drains to tributary to Swartz Creek. About 98% of tributary area is within the burn perimeter, with 73% burned at moderate and high. USGS model indicates a 33% likelihood of debris flow with a moderate combined hazard for the primary tributary basin.	debris flow / flood	Agricultural pond	other	low	low	possible	minor	low	Early Warning	Monitor and maintain			Log booms or debris racks may help mitigate plugging at narrow outlet.
VAR-17	Aetna Springs	38.641777	-122.503523	Potential hazard is flood and debris flood impacting access to the residence and misc. structures situated adjacent to drainage channel. House and pool are well removed from the drainage path.	Residence is located on a bench within deep seated landslide. Drainage channels generated from the slide appear on both sides of bench, with the home and pool elevated above channels. Occupant said higher flows in drainages were observed after the 2020 glass fire. A water pump/well is located at top of slope just below burned slope/head of drainage, and small pond adjacent to the west side of house where tributary drainages converge. East drainage is smaller but flows past access road via 12"CMP that is at risk for overtopping and damage, which could restrict ingress/egress to home.	debris flow / flood	Access driveway, misc. structures	home	low	low	likely	minor	low	Early Warning				

Summary of General Recommendations and Findings

•Utilize early warning systems available to property and homeowners, particularly those located in flood-prone areas. The WERT recommends using the National Weather Service early warning system and forecasts.
•Increase the situational awareness of affected residents and communities regarding the hazards and risks associated with living downstream/downslope of burned areas.
•The WERT strongly recommends that Napa County Public Works, Napa County OES, Napa County Fire, and Napa County Sheriff's Office work with the NWS and the California Geological Survey to monitor forecasts and rainfall intensity during storms, as well as observe postfire response following storm events. The initial rainfall thresholds can be adjusted accordingly after assessing hydrological response to storms.
•Monitor and/or remove accumulated debris from culverts and channels that are upstream of areas that are subject to postfire flooding where there is an elevated risk to life and/or property.
•While a low potential for debris flow exists within and downstream of the Pickett Fire burned area, the primary hazard of concern is flooding and debris floods.
•Vineyards adjacent to watercourses and crossings, and agricultural ponds within and adjacent to the burned area may be impacted by increased runoff and floods.
•Crossing structures are subject to blockage with potential for roads to overtop along portions of Pickett Road, Dutch Henry Road, Lommel Road, Silverado Trail, Aetna Springs Road, Pope Valley Road, and rural road networks, with impacts to ingress and egress, particularly on rural roads with low crossings. These hazards constitute a potential threat to life-safety and property. If these roads are affected by postfire hazards, they may leave residents stranded after storm events and prevent the delivery of emergency services.
•The WERT recommends that local government conduct public outreach so that residents and property owners can make informed decisions that reduce their risk exposure to postfire hazards.
•Close coordination between Napa County Office of Emergency Services, the National Weather Service, and local first responders will be necessary to effectively implement a response plan that will minimize risk.

Appendix C – Values-at-Risk Map Book





Incident: Pickett Fire (CA-LNU-015521)

Values at Risk (Polygon)

Risk Level

- Very low
- Low
- Intermediate
- High
- Very high

Value at Risk (Point)

Risk Level

- Very low
- Low
- Intermediate
- High
- Very high

Combined Hazard (Basin)

15 min 24 mm/h

- Low
- Moderate
- High

Combined Hazard (Segment)

15 min 24 mm/h

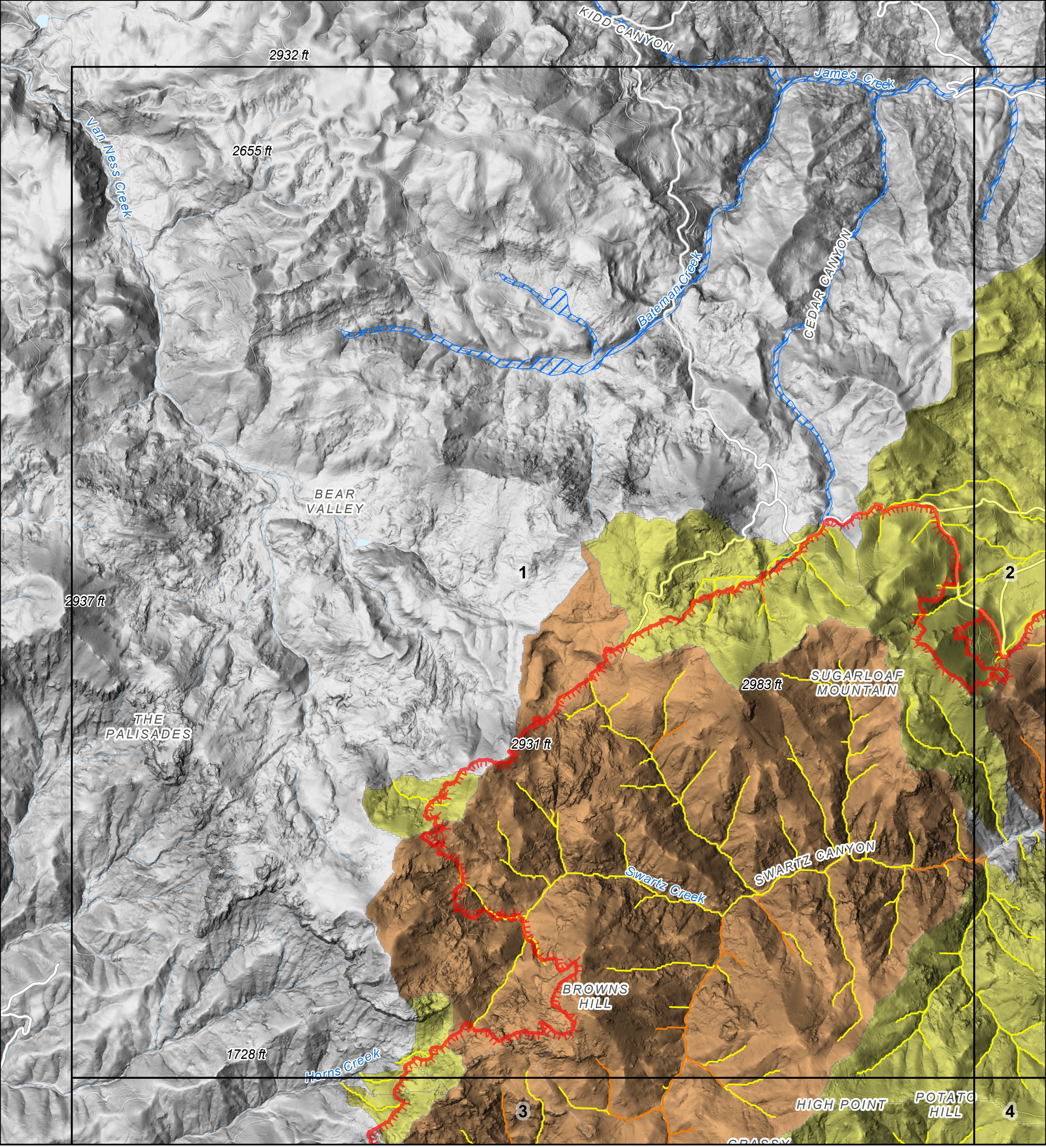
- Low
- Moderate
- High

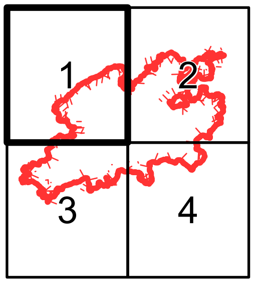
N

0 2,500 5,000 ft

0 500 1,000 m

- Fire Perimeter
- FEMA Special Flood Hazard Areas
- DWR 100yr Awareness Floodplains





Incident: Pickett Fire (CA-LNU-015521)

Values at Risk (Polygon)

Risk Level

- Very low
- Low
- Intermediate
- High
- Very high

Value at Risk (Point)

Risk Level

- Very low
- Low
- Intermediate
- High
- Very high

Combined Hazard (Basin)

15 min 24 mm/h

- Low
- Moderate
- High

Combined Hazard (Segment)

15 min 24 mm/h

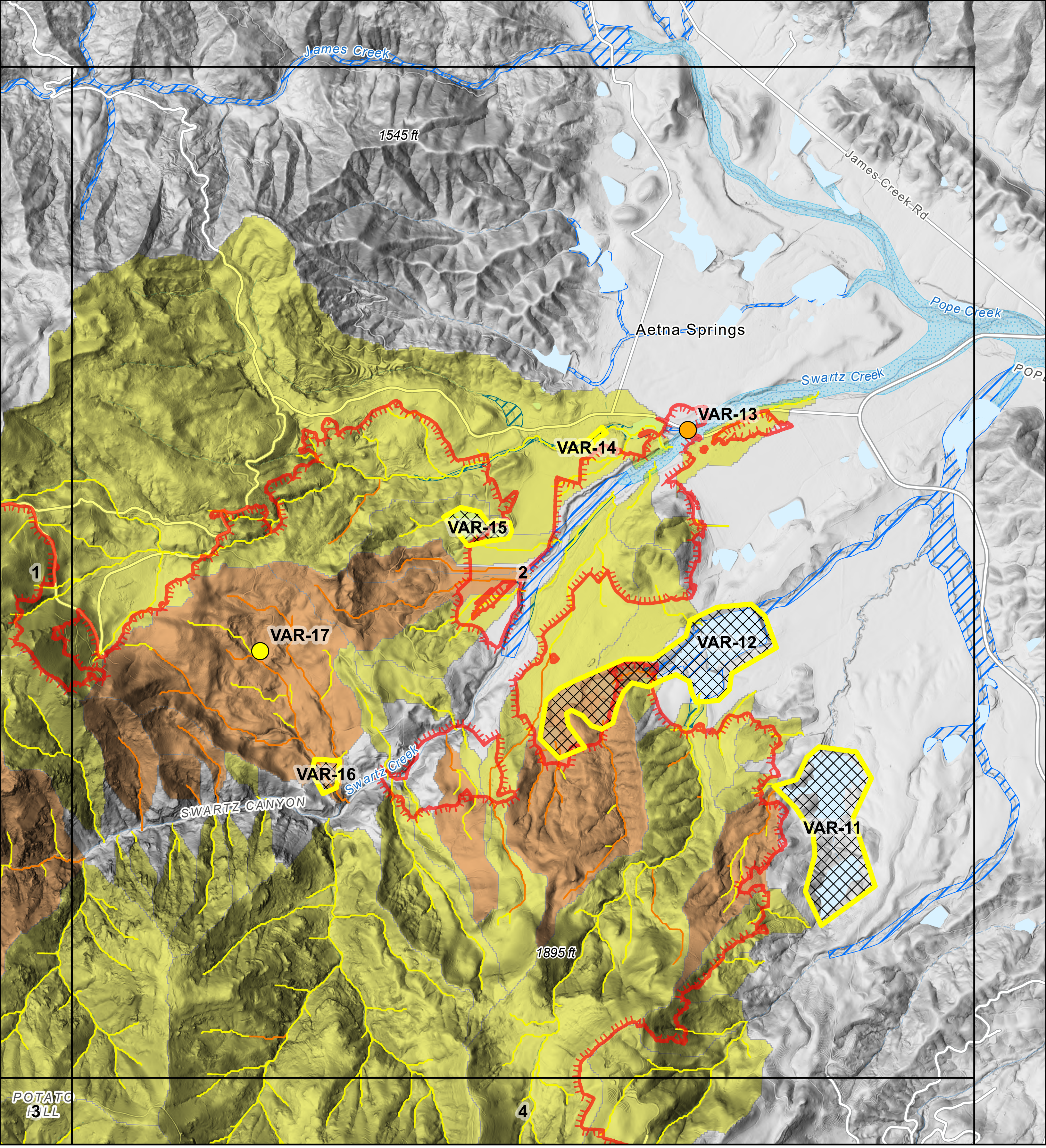
- Low
- Moderate
- High

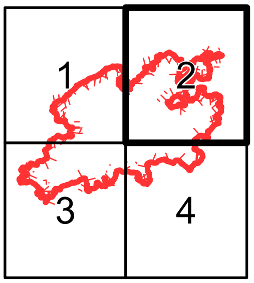
N

0 1,000 2,000 ft

0 260 520 m

- Fire Perimeter
- FEMA Special Flood Hazard Areas
- DWR 100yr Awareness Floodplains





Incident: Pickett Fire (CA-LNU-015521)

Values at Risk (Polygon)
Risk Level
- Very low
- Low
- Intermediate
- High
- Very high

Value at Risk (Point)
Risk Level
- Very low
- Low
- Intermediate
- High
- Very high

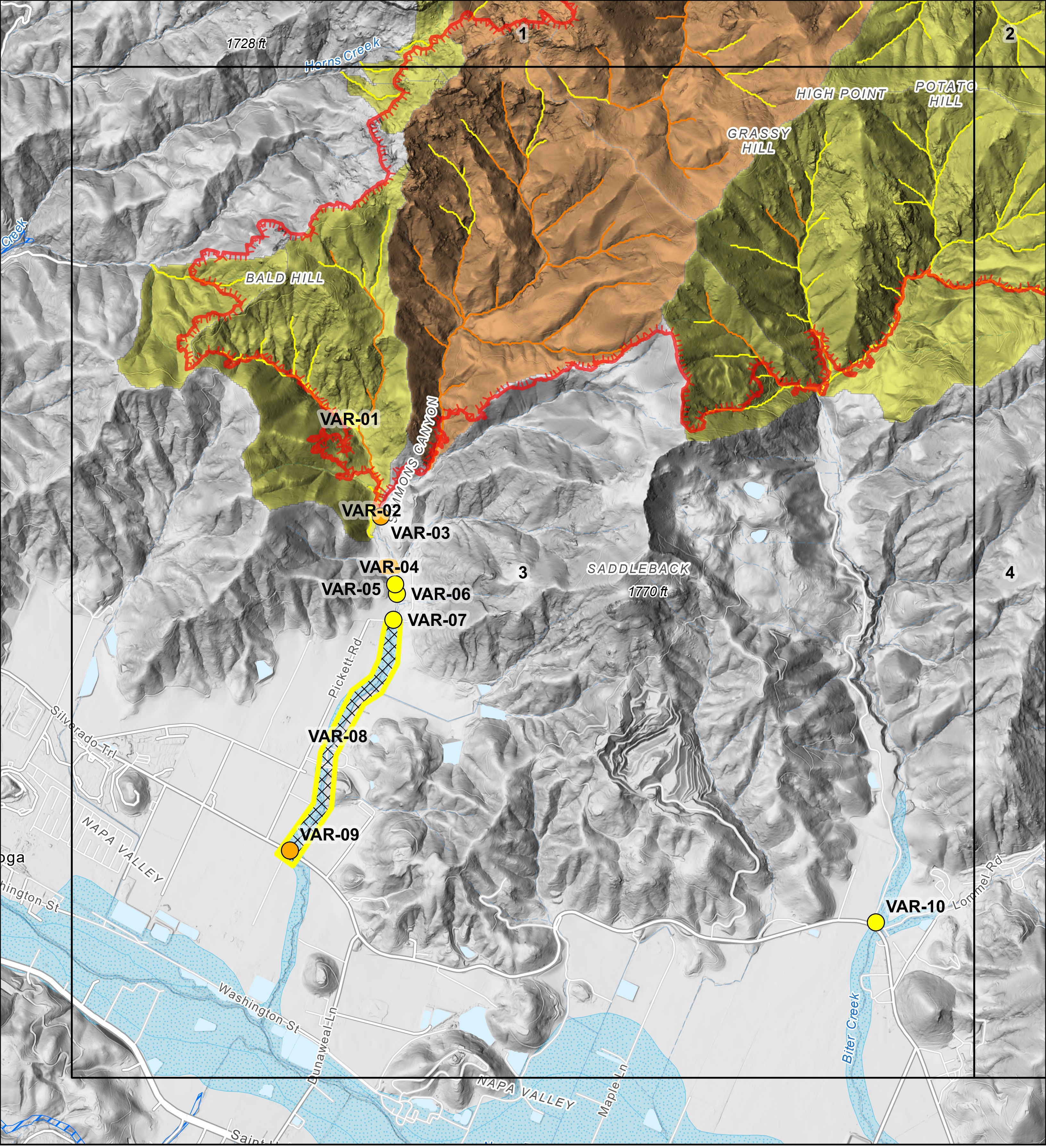
Combined Hazard (Basin)
15 min 24 mm/h
- Low
- Moderate
- High

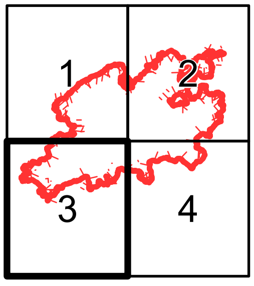
Combined Hazard (Segment)
15 min 24 mm/h
- Low
- Moderate
- High

N

0 1,000 2,000 ft
0 260 520 m

- Fire Perimeter
- FEMA Special Flood Hazard Areas
- DWR 100yr Awareness Floodplains





Incident: Pickett Fire (CA-LNU-015521)

Values at Risk (Polygon)
Risk Level
- Very low
- Low
- Intermediate
- High
- Very high

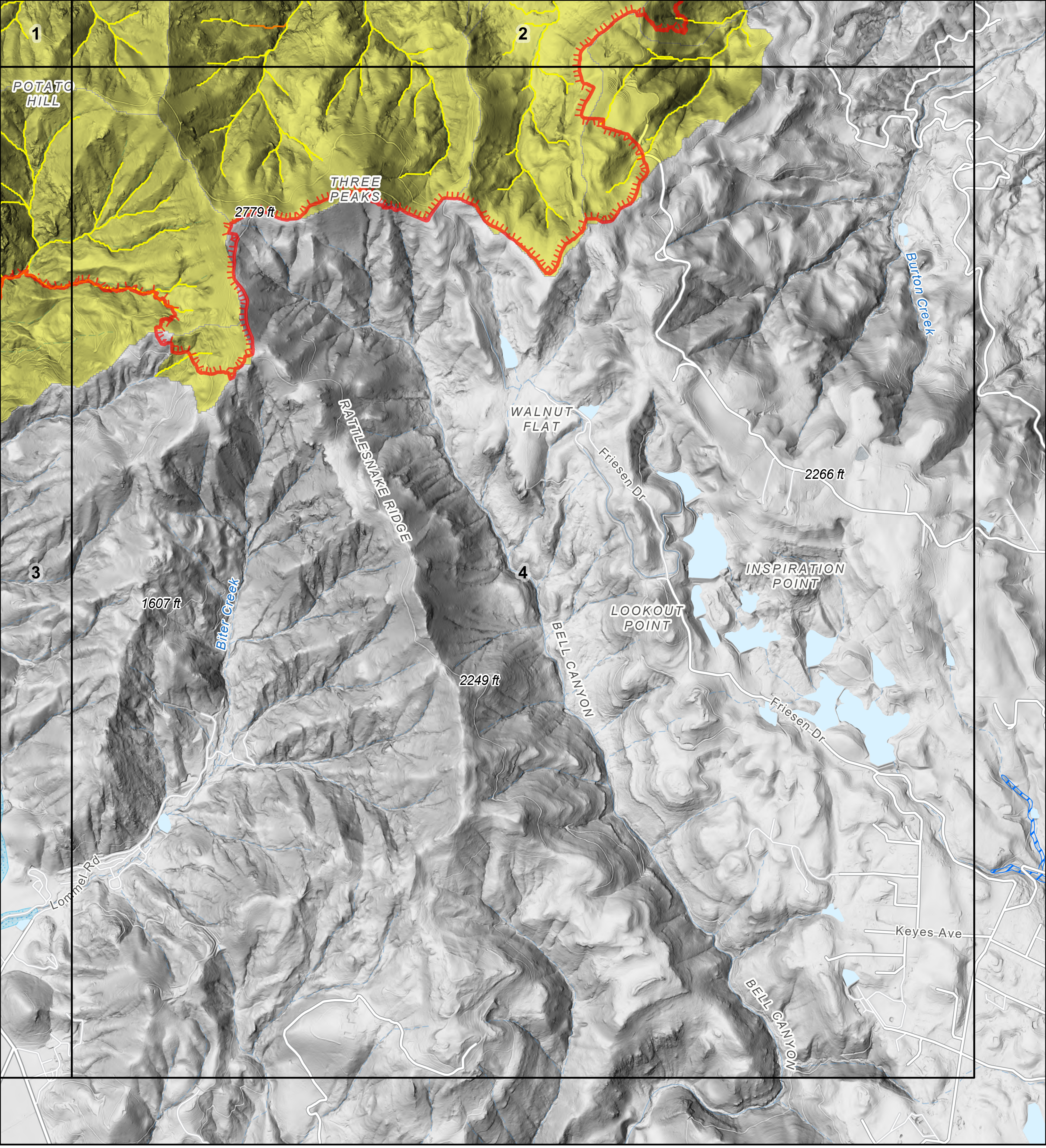
Value at Risk (Point)
Risk Level
- Very low
- Low
- Intermediate
- High
- Very high

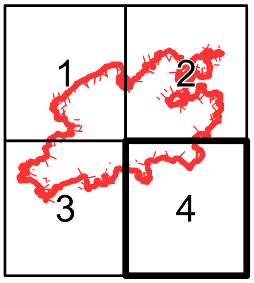
Combined Hazard (Basin)
15 min 24 mm/h
- Low
- Moderate
- High

Combined Hazard (Segment)
15 min 24 mm/h
- Low
- Moderate
- High

N
0 1,000 2,000 ft
0 260 520 m

- Fire Perimeter
- FEMA Special Flood Hazard Areas
- DWR 100yr Awareness Floodplains





Incident: Pickett Fire (CA-LNU-015521)

Values at Risk (Polygon)

Risk Level

- Very low
- Low
- Intermediate
- High
- Very high

Value at Risk (Point)

Risk Level

- Very low
- Low
- Intermediate
- High
- Very high

Combined Hazard (Basin)

15 min 24 mm/h

- Low
- Moderate
- High

Combined Hazard (Segment)

15 min 24 mm/h

- Low
- Moderate
- High

N

0 1,000 2,000 ft

0 260 520 m

- Fire Perimeter
- FEMA Special Flood Hazard Areas
- DWR 100yr Awareness Floodplains

Appendix D – Values-at-Risk Detail Sheets

VALUE AT RISK DETAIL

Incident: *Pickett Fire* — *Incident Number: CA-LNU-015521*

Community: **Pickett Road**

Site Number: **VAR-01**

Feature: **Water tanks**

Feature Category: **utilities**

Field Observation or Potential Hazard: Potential hazard is flood and debris flood impacting water tanks located at the base of a steep, narrow catchment. The current flow path is diverted into a rocky swale that directs runoff west around the tank pad.

Potential Hazard to Life: **low**

Potential Hazard to Property: **low**

Expected Probability: **likely**

Expected Consequences: **minor**

Risk Level: **low**

Preliminary Emergency Protective Measures:

(1) **Deflection structure**

(2) **Monitor and maintain**

(3) **NA**

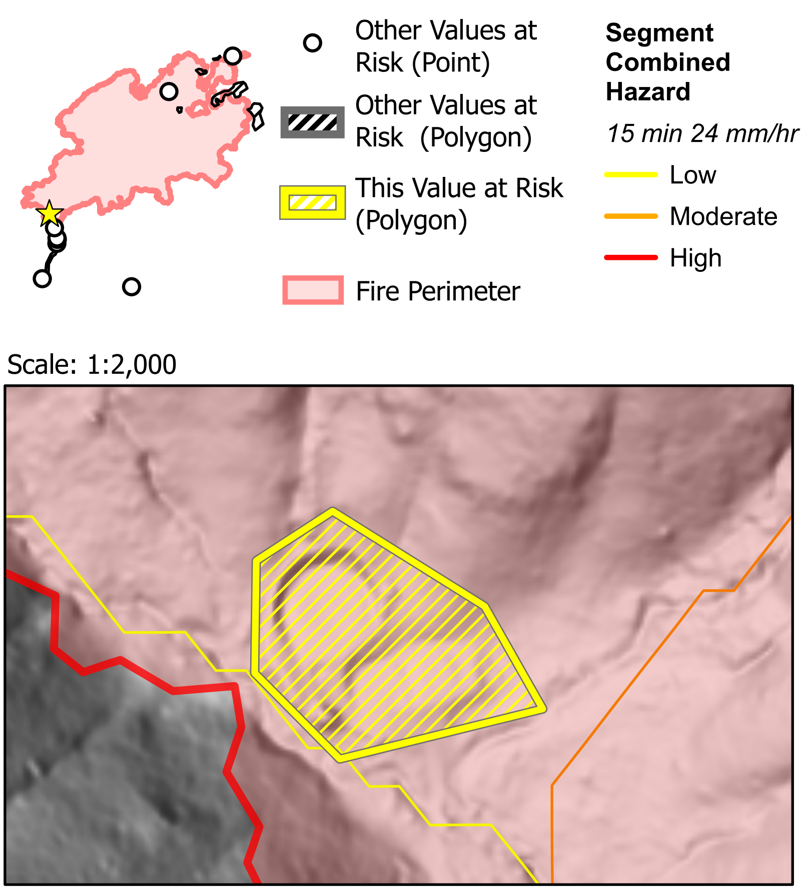
(4) **NA**

Text: NA

Description of Site:

Upstream catchment burned at moderate. Potential for large woody debris, cobbles, and sediment in channel to be mobilized. Tanks are elevated and removed from larger adjacent drainages to the east and west. Tanks access road has potential to be impacted at low water crossings during storm events.

LOCATION AND PHOTO



VALUE AT RISK DETAIL

Incident: Pickett Fire — *Incident Number:* CA-LNU-015521

Community: **Pickett Road**

Site Number: **VAR-02**

Feature: **Water tanks, water line crossing**

Feature Category: **recreational**

Field Observation or Potential Hazard: Potential hazard is flood and debris flood impacting potable water tanks, associated electrical and piping infrastructure, and upstream water line crossing.

Potential Hazard to Life: **low**
Potential Hazard to Property: **moderate**

Expected Probability: **possible**
Expected Consequences: **minor**

Risk Level: **low**

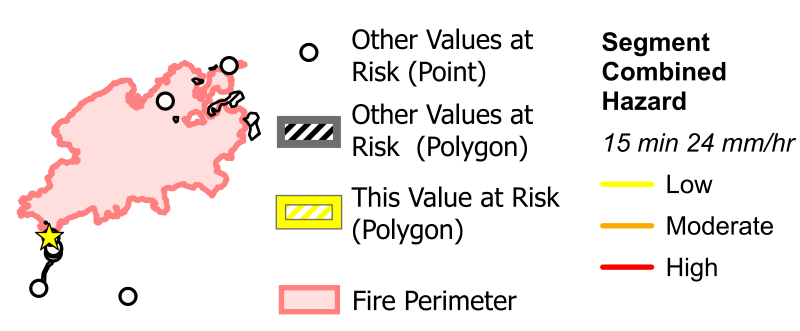
Preliminary Emergency Protective Measures:

(1) **Monitor and maintain**
(2) **Deflection structure**
(3) **NA**
(4) **NA**

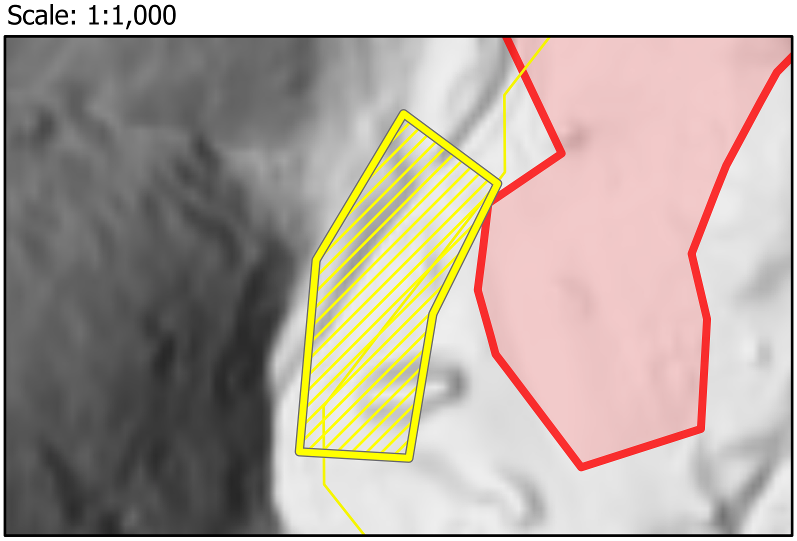
Text: NA

Description of Site:
Water tank improvements are located adjacent to shallow, narrow watercourse. Just upstream, and 8” plastic pipe that houses two smaller pipes (2.5" and 3.5") crosses over channel. Upstream drainage partially burned at low and moderate. USGS model indicates low likelihood (16%) of debris flow with low combined hazard.

LOCATION AND PHOTO



Scale: 1:1,000



VALUE AT RISK DETAIL

Incident: Pickett Fire   *Incident Number:* CA-LNU-015521

Community: **Pickett Road**

Site Number: **VAR-03**

Feature: **Bridge**

Feature Category: **drainage structure**

Field Observation or Potential Hazard: Potential hazard is flood and debris flood impacting low bridge crossing over narrow channel. Potential for woody debris to dam up at bridge, resulting in overtopping.

Potential Hazard to Life: **low**
Potential Hazard to Property: **moderate**

Expected Probability: **possible**
Expected Consequences: **moderate**

Risk Level: **intermediate**

Preliminary Emergency Protective Measures:

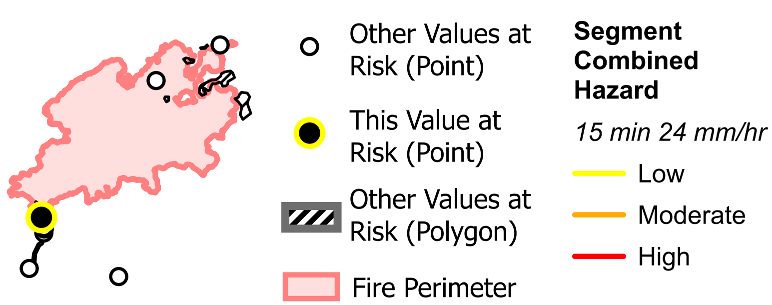
(1) **Early Warning**
(2) **Monitor and maintain**
(3) **NA**
(4) **NA**

Text: NA

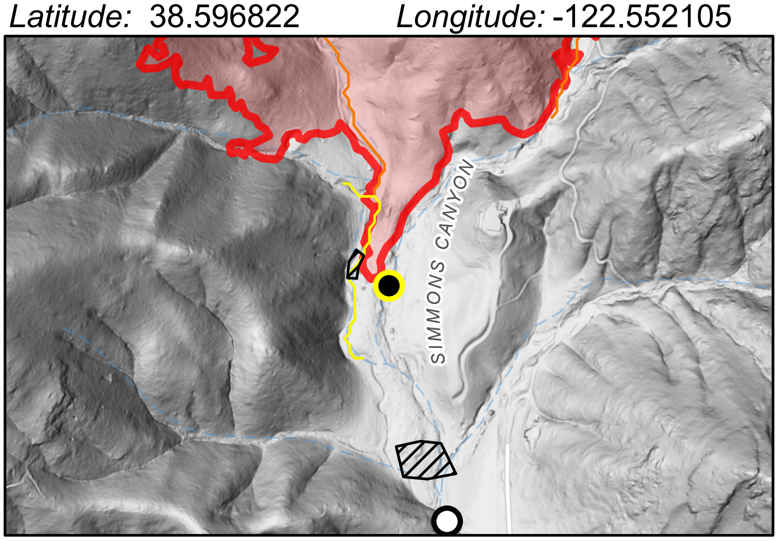
Description of Site:

Bridge with wood deck and steel I-beam supports span 35-40' across channel with plastic and metal pipes strung below the bridge deck. Bridge provides access to water tanks. Upstream basin burned mostly at moderate with some low and some high. USGS model indicates moderate likelihood (42%) of debris flow in upstream drainage with moderate combined hazard for the basin. Large cobbles and boulders are prevalent in channel at bridge location.

LOCATION AND PHOTO



Latitude: 38.596822   *Longitude:* -122.552105



VALUE AT RISK DETAIL

Incident: Pickett Fire — *Incident Number:* CA-LNU-015521

Community: **Simmons Canyon**

Site Number: **VAR-04**

Feature: **Pump station, water tanks, water lines**

Feature Category: **utilities**

Field Observation or Potential Hazard: Potential hazard is flood and debris flood impacting pump house, water tanks, and water line infrastructure located adjacent to two drainages. Potential for increased flows to overtop banks and inundate area.

Potential Hazard to Life: **low**

Potential Hazard to Property: **moderate**

Expected Probability: **possible**

Expected Consequences: **moderate**

Risk Level: **intermediate**

Preliminary Emergency Protective Measures:

(1) **Monitor and maintain**

(2) **Early Warning**

(3) **Deflection structure**

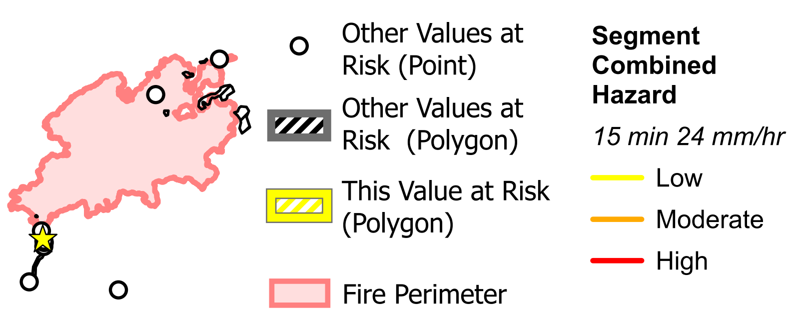
(4) **NA**

Text: Deflection structure, such as sandbags or Hesco barriers, may be used to help deflect overtopping flows back into channel.

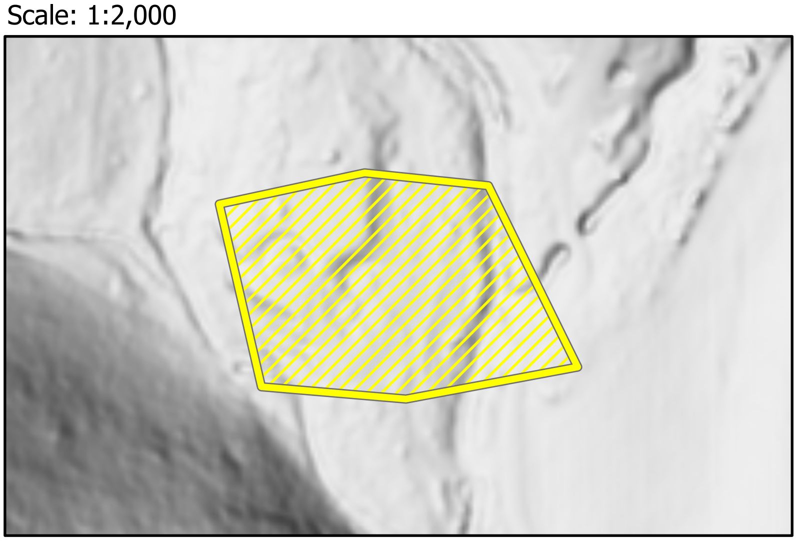
Description of Site:

Structures slightly elevated on terrace above two watercourses that drain moderately sized basins burned at low and moderate, with some unburned contributing area. 8-inch water line and electrical lines encased in steel pipes (two 12” and one 16”) cross over channel about 5’ above channel bottom. Soft bottom crossing to improvements at risk of washing out. USGS model indicates low and moderate combined hazards for the two contributing basins.

LOCATION AND PHOTO



Scale: 1:2,000



VALUE AT RISK DETAIL

Incident: Pickett Fire — ***Incident Number: CA-LNU-015521***

Community: **Simmons Canyon**

Site Number: **VAR-05**

Feature: **Water lines**

Feature Category: **utilities**

Field Observation or Potential Hazard: Potential hazard is flood and debris flood impacting water line crossing over narrow watercourse.

Potential Hazard to Life: **low**

Potential Hazard to Property: **low**

Expected Probability: **possible**

Expected Consequences: **minor**

Risk Level: **low**

Preliminary Emergency Protective Measures:

(1) **Monitor and maintain**

(2) **NA**

(3) **NA**

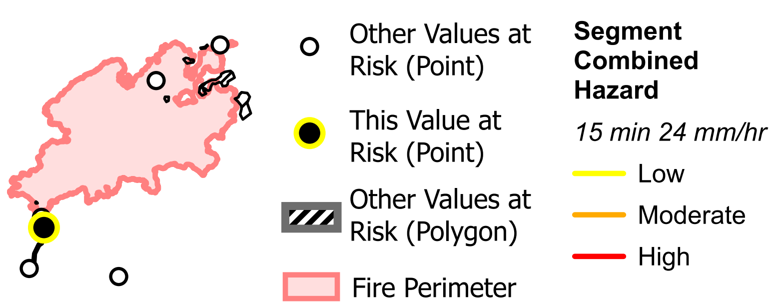
(4) **NA**

Text: NA

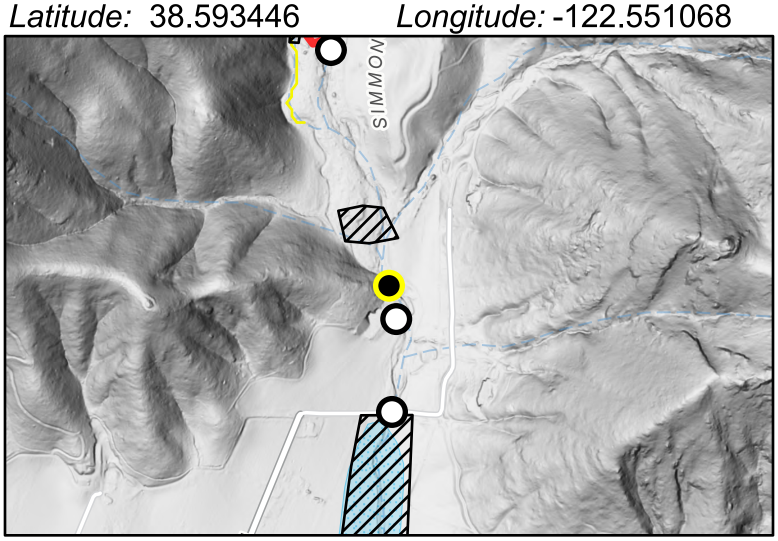
Description of Site:

Several water line and electrical lines encased in steel pipes (two 12” and one 16”) cross over channel about 5.5’ above channel bottom. USGS model indicates low and moderate combined hazards for the two contributing burned basins, which account for about 40% of watershed at this location.

LOCATION AND PHOTO



Latitude: 38.593446 *Longitude:* -122.551068



VALUE AT RISK DETAIL

Incident: Pickett Fire — *Incident Number: CA-LNU-015521*

Community: **Simmons Canyon**

Site Number: **VAR-06**

Feature: **Parking lot**

Feature Category: **business**

Field Observation or Potential Hazard: Potential hazard is flood flows avulsing or overtopping watercourse and impacting winery parking lot on low terrace.

Potential Hazard to Life: **low**

Potential Hazard to Property: **low**

Expected Probability: **possible**

Expected Consequences: **minor**

Risk Level: **low**

Preliminary Emergency Protective Measures:

(1) **Deflection structure**

(2) **Early Warning**

(3) **NA**

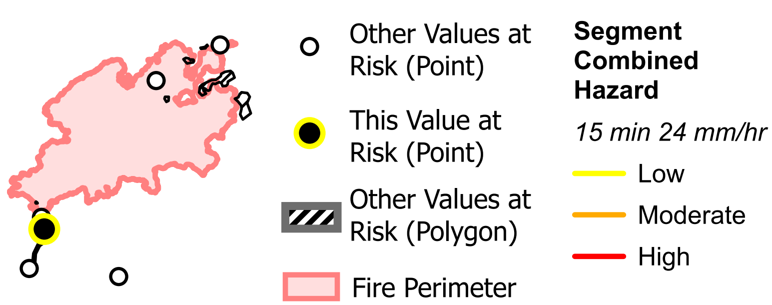
(4) **NA**

Text: Restrict access to parking lot if intense precipitation is predicted.

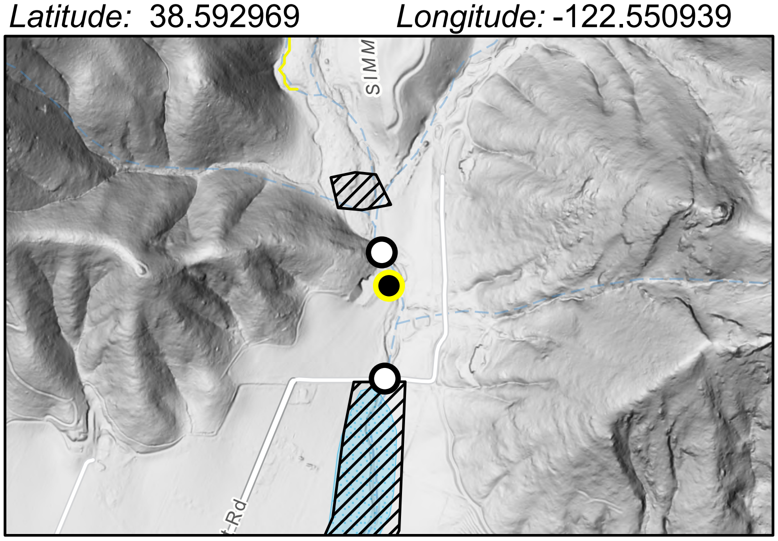
Description of Site:

Low lying parking lot, low point at head of terrace is potential avulsion point. Upstream watershed partially burned at low and moderate.

LOCATION AND PHOTO



Latitude: 38.592969 *Longitude:* -122.550939



VALUE AT RISK DETAIL

Incident: Pickett Fire — *Incident Number:* CA-LNU-015521

Community: **Simmons Canyon**

Site Number: **VAR-07**

Feature: **Culverted crossing**

Feature Category: **drainage structure**

Field Observation or Potential Hazard: Potential hazard is plugging of double barrel CMP crossing, resulting in overtopping of paved road surface. Crossing is at low point in road and flow would continue across road and back into channel.

Potential Hazard to Life: **low**
Potential Hazard to Property: **low**

Expected Probability: **likely**
Expected Consequences: **minor**

Risk Level: **low**

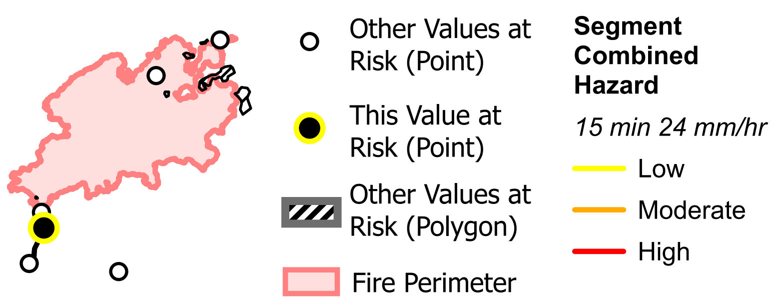
Preliminary Emergency Protective Measures:

(1) **Clear and maintain culvert**
(2) **Early Warning**
(3) **Monitor and maintain**
(4) **NA**

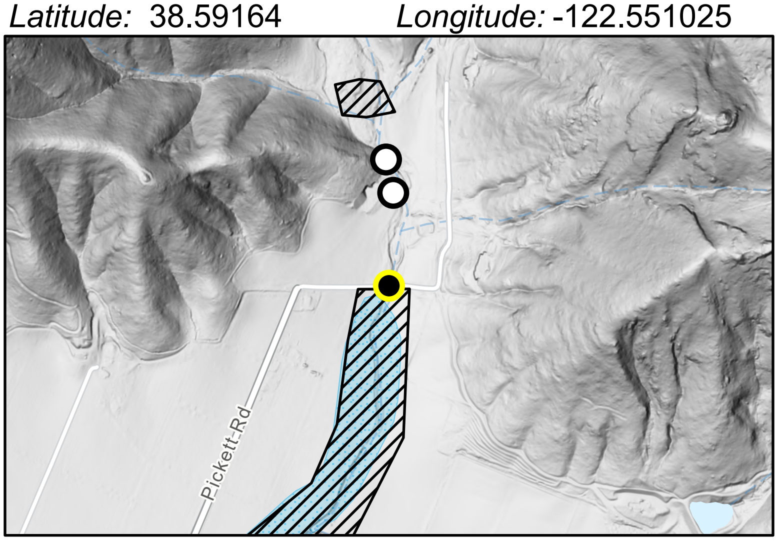
Text: NA

Description of Site:
5' diameter CMP and 5' x 8.5' squashed CMP with about 18" freeboard. Backwater effects could locally impact adjacent vineyards with nuisance flooding. Just downstream of crossing the right bank has been modified with a levee consisting of cobble and boulder piles, which suggests that the watercourse has been prone to overtopping in the past. Presumably the levee was constructed to help protect adjacent vineyards from flood hazard. About 58% of the contributing watershed was burned (32% at moderate). A 1.4 flow multiplier is estimated at this crossing.

LOCATION AND PHOTO



Latitude: 38.59164 *Longitude:* -122.551025



VALUE AT RISK DETAIL

Incident: ***Pickett Fire*** *Incident Number:* ***CA-LNU-015521***

Community: **Pickett Road**

Site Number: **VAR-08**

Feature: **Small bridges, vineyards, structures**

Feature Category: **multiple**

Field Observation or Potential Hazard: Potential hazard is flood flows overtopping confined channel and impacting adjacent vineyards and structures with nuisance flooding and sediment. Several small vehicle bridges cross channel that could be plugged with debris, resulting in local inundation.

Potential Hazard to Life: **low**
Potential Hazard to Property: **low**

Expected Probability: **likely**
Expected Consequences: **minor**

Risk Level: **low**

Preliminary Emergency Protective Measures:

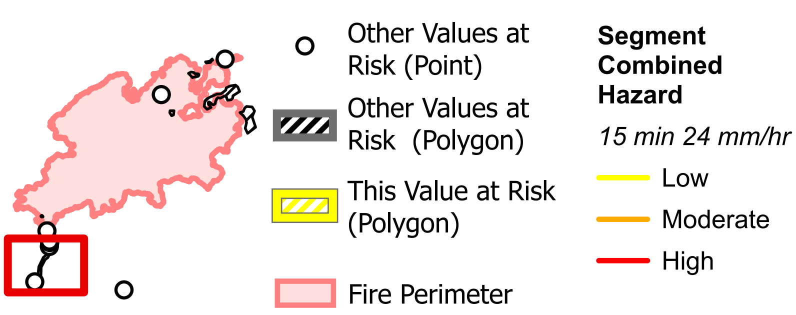
(1) **Monitor and maintain**
(2) **NA**
(3) **NA**
(4) **NA**

Text: NA

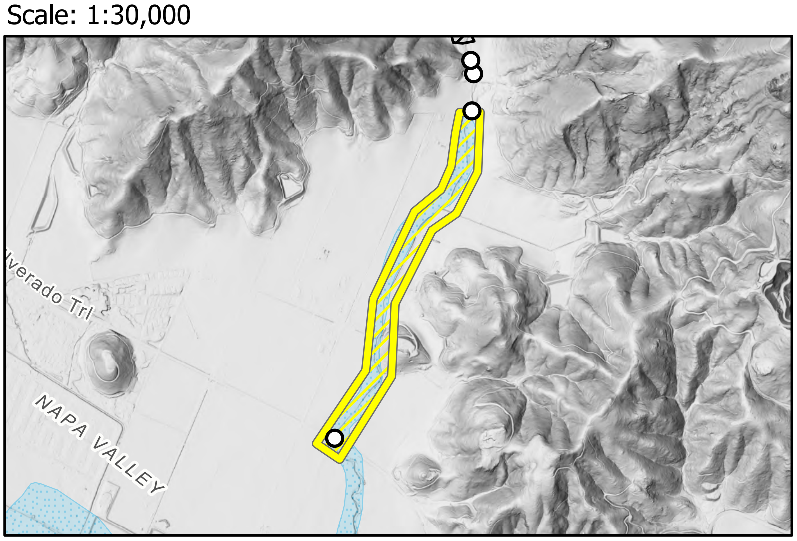
Description of Site:

Channel is armored, north side of channel has rock levee at double barreled crossing, channel is 18-20'wide and 6' deep, residential structure along lower channel bank, channel is 8' deep and 20' wide.

LOCATION AND PHOTO



Scale: 1:30,000



VALUE AT RISK DETAIL

Incident: Pickett Fire *Incident Number: CA-LNU-015521*

Community: **Silverado Trail Road**

Site Number: **VAR-09**

Feature: **Double box RCP culvert crossing**

Feature Category: **drainage structure**

Field Observation or Potential Hazard: Potential hazard is plugging of double box culvert with woody debris. Backwater effects could lead to local flood impacts to adjacent vineyards. Low potential for overtopping of Silverado Trail.

Potential Hazard to Life: **low**
Potential Hazard to Property: **moderate**

Expected Probability: **possible**
Expected Consequences: **moderate**

Risk Level: **intermediate**

Preliminary Emergency Protective Measures:

(1) **Monitor and maintain**

(2) **Early Warning**

(3) **Clear and maintain culvert**

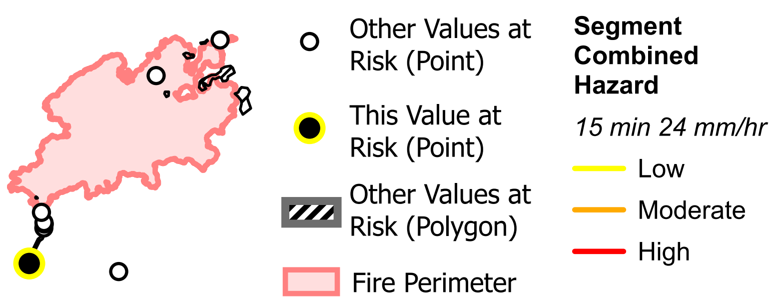
(4) **Signage**

Text: NA

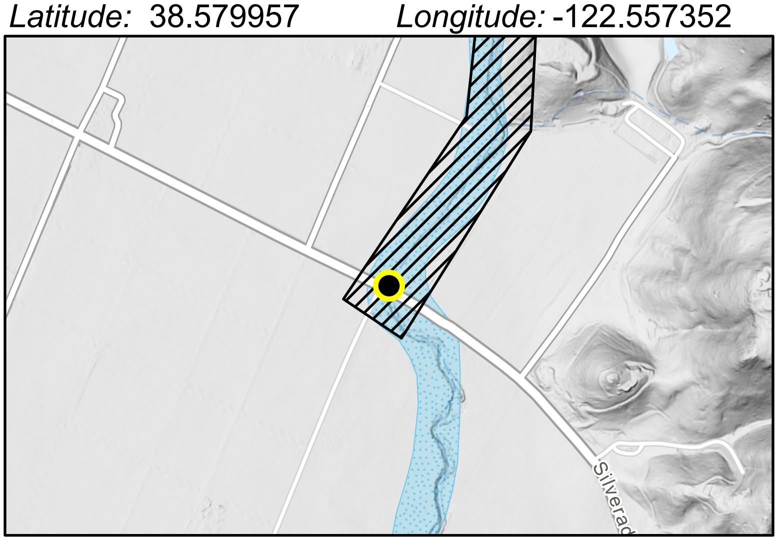
Description of Site:

Box culvert is located at a bend in the channel. Right bank box includes up to a about 1' of sediment with a tree partially blocking outlet. Left side clear. Each box 6.5' H x 12'W. Homeowner on south side of road has owned since the 70s with no history of flooding.

LOCATION AND PHOTO



Latitude: 38.579957 *Longitude:* -122.557352



VALUE AT RISK DETAIL

Incident: Pickett Fire *Incident Number: CA-LNU-015521*

Community: **Dutch Henry Creek**

Site Number: **VAR-10**

Feature: **Culverted crossing and roadway**

Feature Category: **drainage structure**

Field Observation or Potential Hazard: Potential hazard is plugging of undersized double barrel culvert, resulting in overtopping of Lommel Rd. Very low potential for avulsion of flood flows onto Silverado Trail.

Potential Hazard to Life: **low**
Potential Hazard to Property: **low**

Expected Probability: **possible**
Expected Consequences: **minor**

Risk Level: **low**

Preliminary Emergency Protective Measures:

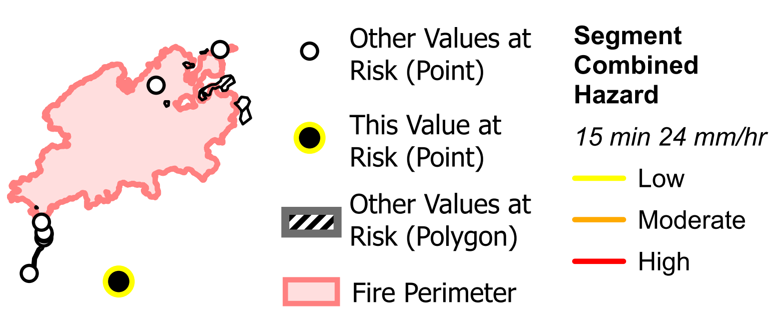
(1) **Early Warning**
(2) **Clear and maintain culvert**
(3) **Monitor and maintain**
(4) **NA**

Text: NA

Description of Site:

Squashed 4' x 6' CMP and 6' diameter steel pipe. Sediment accumulation at inlet and scour at outlet suggests undersized culvert. Potential for avulsion is very low but may be directed to Silverado Trail 40-50’ downstream. This crossing is 100’ upstream of Silverado Trail crossing, which drains both subject and adjacent basins. Some backwater likely occurs. A long rock berm is present along rural road to restrict backwater, and dried wood/sticks seem to indicate past overtopping. 37% of tributary area was burned (4% at moderate). Increase in flood flow as a result of fire is predicted to be very low.

LOCATION AND PHOTO



Latitude: 38.577168 *Longitude:* -122.51971

VALUE AT RISK DETAIL

Incident: Pickett Fire *Incident Number: CA-LNU-015521*

Community: **Aetna Springs**

Site Number: **VAR-11**

Feature: **Agricultural pond**

Feature Category: **other**

Field Observation or Potential Hazard: Potential hazard is post-fire bulked runoff entering agricultural pond that exceeds output flow capacity. The loss of storage volume due to sediment deposition is also a concern.

Potential Hazard to Life: **low**
Potential Hazard to Property: **low**

Expected Probability: **unlikely**
Expected Consequences: **moderate**

Risk Level: **low**

Preliminary Emergency Protective Measures:

(1) **Early Warning**

(2) **Monitor and maintain**

(3) **NA**

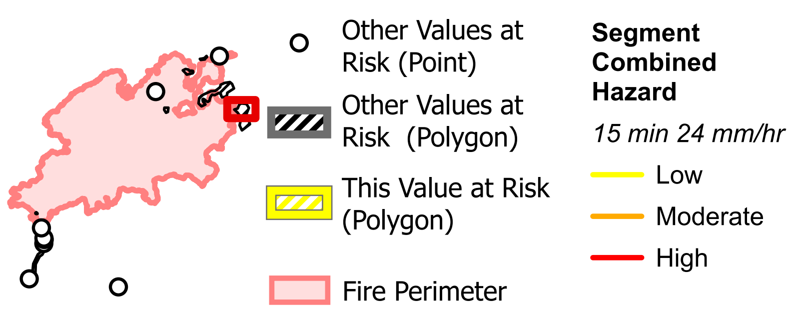
(4) **NA**

Text: NA

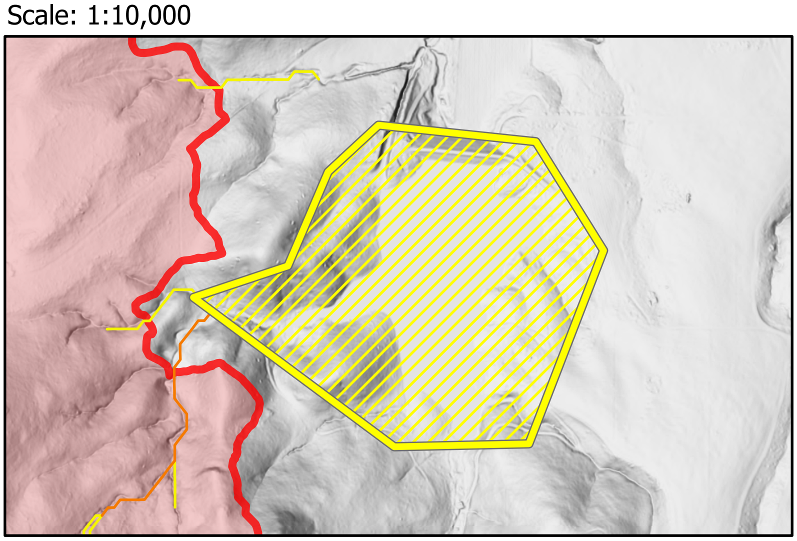
Description of Site:

Downstream pond in a system of two ponds; tributary area to upstream pond was minimally impacted by fire. Lower pond is about 3 ft from capacity. Outlet includes a trapezoidal spillway with 2.5'H by 27'W check dam and 0.5:1 side slopes to ~8' above check dam. About 38% of tributary area is within the burn perimeter, with only 8.5% burned at moderate. USGS model indicates a 30% likelihood of debris flow with a moderate combined hazard for a primary tributary basin.

LOCATION AND PHOTO



Scale: 1:10,000



VALUE AT RISK DETAIL

Incident: Pickett Fire — *Incident Number: CA-LNU-015521*

Community: **Aetna Springs**

Site Number: **VAR-12**

Feature: **Agricultural ponds**

Feature Category: **other**

Field Observation or Potential Hazard: Potential hazard is post-fire bulked runoff entering agricultural ponds that exceeds output flow capacity. The loss of storage volume due to sediment deposition is also a concern.

Potential Hazard to Life: **low**
Potential Hazard to Property: **low**

Expected Probability: **unlikely**
Expected Consequences: **moderate**

Risk Level: **low**

Preliminary Emergency Protective Measures:

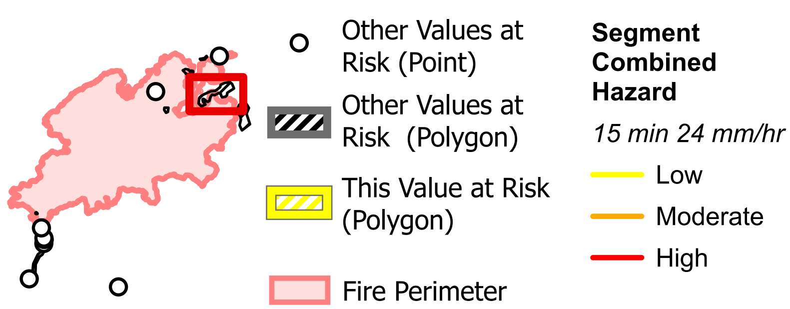
(1) **Early Warning**
(2) **Monitor and maintain**
(3) **NA**
(4) **NA**

Text: Log booms or debris racks may help mitigate plugging of outlet structures.

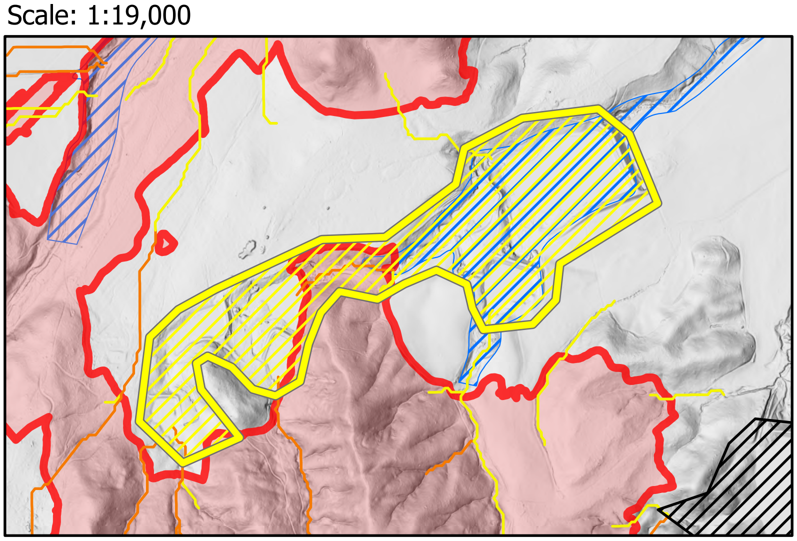
Description of Site:

Outlet of lower pond includes a concrete inlet structure on dam face 4'x 8'dropdown to a 4' x 4' lateral box, which outlets to a spillway. About 82% of tributary area is within the burn perimeter, with 20% burned at moderate. USGS model indicates a 32% likelihood of debris flow with a moderate combined hazard for primary tributaries to the upper ponds.

LOCATION AND PHOTO



Scale: 1:19,000



VALUE AT RISK DETAIL

Incident: Pickett Fire *Incident Number: CA-LNU-015521*

Community: **Swartz Creek/Aetna Springs**

Site Number: **VAR-13**

Feature: **Historic bridge**

Feature Category: **drainage structure**

Field Observation or Potential Hazard: Potential hazard is flooding with entrained woody debris plugging the arch bridge.

Potential Hazard to Life: **low**
Potential Hazard to Property: **moderate**

Expected Probability: **possible**
Expected Consequences: **moderate**

Risk Level: **intermediate**

Preliminary Emergency Protective Measures:

(1) **Early Warning**

(2) **Monitor and maintain**

(3) **Signage**

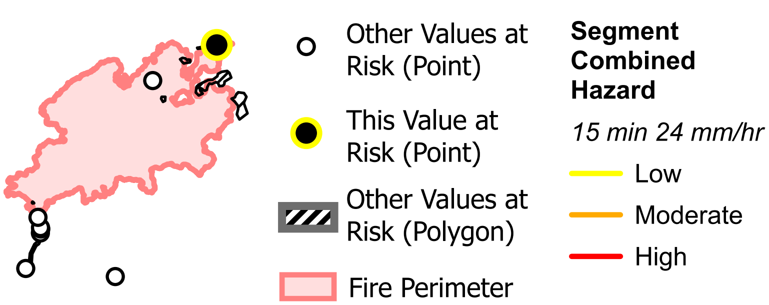
(4) **NA**

Text: NA

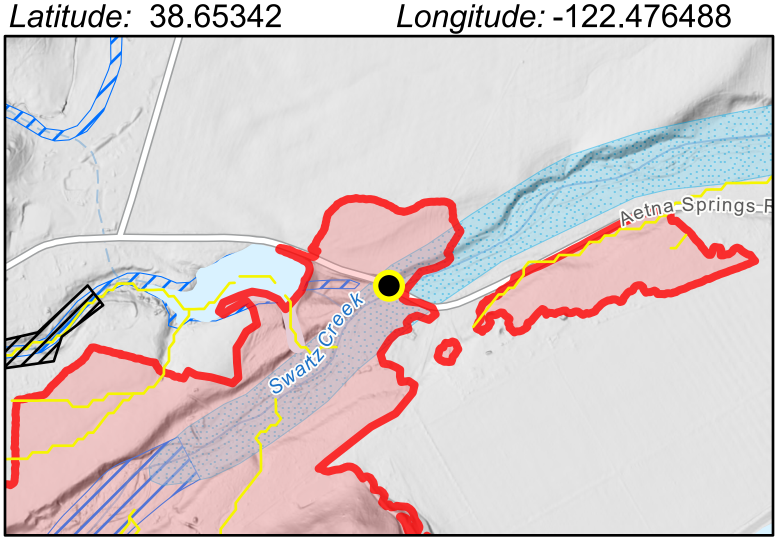
Description of Site:

Swartz Creek Bridge (built 1912) is 42' W x 11'H with arched opening. Sediment deposition observed under bridge and in approaches. Large watershed extends through the fire footprint and is burned at low mod and high. Potential for backwater to inundate areas adjacent to upstream side of bridge, with low potential to reach road surface. About 77% of tributary area is within the fire burn perimeter, with 18% burned at moderate and high.

LOCATION AND PHOTO



Latitude: 38.65342 *Longitude:* -122.476488



VALUE AT RISK DETAIL

Incident: Pickett Fire *Incident Number: CA-LNU-015521*

Community: **Aetna Springs**

Site Number: **VAR-14**

Feature: **Historic spa buildings**

Feature Category: **recreational**

Field Observation or Potential Hazard: Potential hazard is flood flows impacting structures associated with historic spa that are located within a watercourse.

Potential Hazard to Life: **low**
Potential Hazard to Property: **low**

Expected Probability: **likely**
Expected Consequences: **minor**

Risk Level: **low**

Preliminary Emergency Protective Measures:

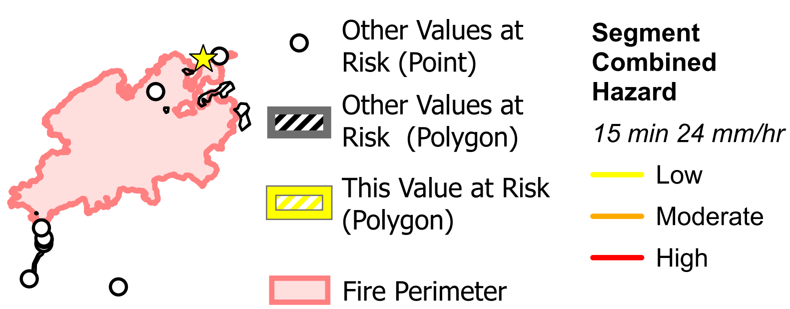
(1) **Early Warning**
(2) **NA**
(3) **NA**
(4) **NA**

Text: Restrict access when intense storms are predicted

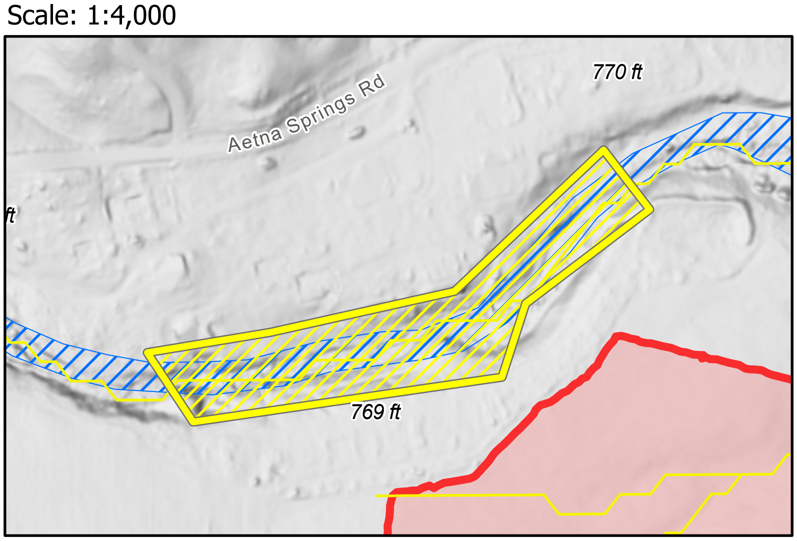
Description of Site:

Historic spa buildings are located in and adjacent to watercourse. Access is easy and appears maintained but unknown if actively used. Hot tub structure is in within the channel. The upstream basin has been partially burned, mostly at low severity.

LOCATION AND PHOTO



Scale: 1:4,000



VALUE AT RISK DETAIL

Incident: Pickett Fire **_Incident Number: CA-LNU-015521_**

Community: **Aetna Springs**

Site Number: **VAR-15**

Feature: **Agricultural ponds**

Feature Category: **other**

Field Observation or Potential Hazard: Potential hazard is post-fire bulked runoff entering agricultural ponds that exceeds output flow capacity. The loss of storage volume due to sediment deposition is also a concern.

Potential Hazard to Life: **low**
Potential Hazard to Property: **low**

Expected Probability: **unlikely**
Expected Consequences: **moderate**

Risk Level: **low**

Preliminary Emergency Protective Measures:

(1) **Early Warning**

(2) **Monitor and maintain**

(3) **NA**

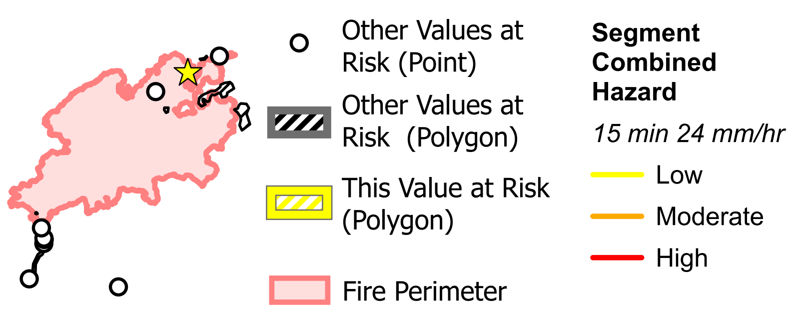
(4) **NA**

Text: NA

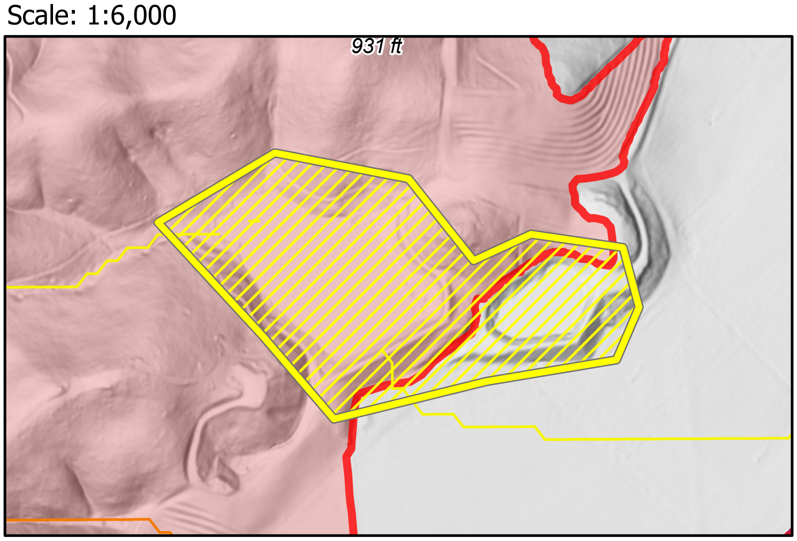
Description of Site:

Low upstream relief. Small basin burned at moderate with some low. Unarmored spillway drains to smaller pond to the southwest. Misc equipment and large shed structure on downstream side of dam. About 10 ft of remaining capacity. Trapezoidal spillway measures about 4’D x 14’W.

LOCATION AND PHOTO



Scale: 1:6,000



VALUE AT RISK DETAIL

Incident: *Pickett Fire* — *Incident Number: CA-LNU-015521*

Community: **Aetna Springs**

Site Number: **VAR-16**

Feature: **Agricultural pond**

Feature Category: **other**

Field Observation or Potential Hazard: Potential hazard is post-fire bulked runoff entering agricultural ponds that exceeds output flow capacity. The loss of storage volume due to sediment deposition is also a concern.

Potential Hazard to Life: **low**
Potential Hazard to Property: **low**

Expected Probability: **possible**
Expected Consequences: **minor**

Risk Level: **low**

Preliminary Emergency Protective Measures:

(1) **Early Warning**

(2) **Monitor and maintain**

(3) **NA**

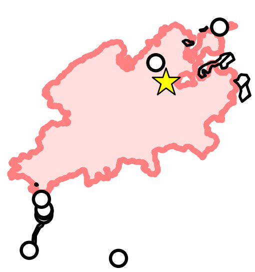
(4) **NA**

Text: Log booms or debris racks may help mitigate plugging at narrow outlet.

Description of Site:

Pond outlet includes a rock-lined notch at top of dam with spillway measuring 48”D x 20”W at base and 42”W at crest. Drains to tributary to Swartz Creek. About 98% of tributary area is within the burn perimeter, with 73% burned at moderate and high. USGS model indicates a 33% likelihood of debris flow with a moderate combined hazard for the primary tributary basin.

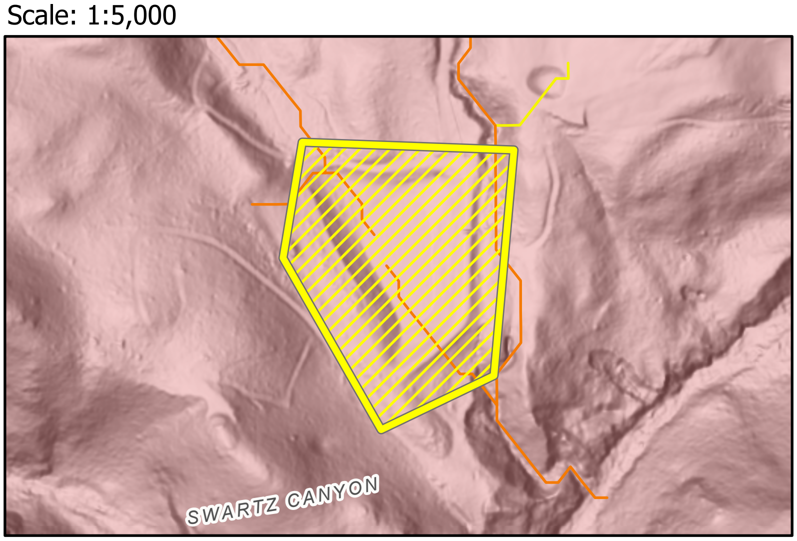
LOCATION AND PHOTO



Other Values at Risk (Point)
Other Values at Risk (Polygon)
This Value at Risk (Polygon)
Fire Perimeter

Segment Combined Hazard
15 min 24 mm/hr
Low
Moderate
High

Scale: 1:5,000



VALUE AT RISK DETAIL

Incident: Pickett Fire — *Incident Number:* CA-LNU-015521

Community: **Aetna Springs**

Site Number: **VAR-17**

Feature: **Access driveway, misc. structures**

Feature Category: **home**

Field Observation or Potential Hazard: Potential hazard is flood and debris flood impacting access to the residence and misc. structures situated adjacent to drainage channel. House and pool are well removed from the drainage path.

Potential Hazard to Life: **low**
Potential Hazard to Property: **low**

Expected Probability: **likely**
Expected Consequences: **minor**

Risk Level: **low**

Preliminary Emergency Protective Measures:

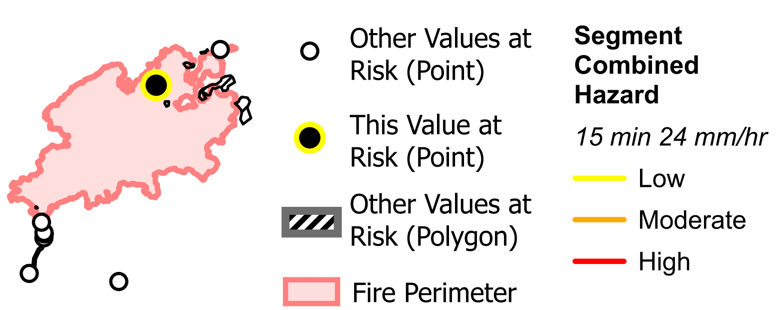
(1) **Early Warning**
(2) **NA**
(3) **NA**
(4) **NA**

Text: NA

Description of Site:

Residence is located on a bench within deep seated landslide. Drainage channels generated from the slide appear on both sides of bench, with the home and pool elevated above channels. Occupant said higher flows in drainages were observed after the 2020 glass fire. A water pump/well is located at top of slope just below burned slope/head of drainage, and small pond adjacent to the west side of house where tributary drainages converge. East drainage is smaller but flows past access road via 12"CMP that is at risk for overtopping and damage, which could restrict ingress/egress to home.

LOCATION AND PHOTO



Latitude: 38.641777 *Longitude:* -122.503523