# Plumas County Hazardous Fuels Assessment

Prepared for the
Plumas County Fire Safe Council by
Deer Creek Resources

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# DISCLAIMER

This document analyzes wildfire hazard across Plumas County and makes recommendations on ways that residents and organizations can reduce their collective exposure to wildfire-caused losses.

Within this document, areas are prioritized for hazard reduction based upon factors including potential wildfire behavior, density of structures, proximity to wildland vegetation, and prevailing fire-season weather and winds. The fact that an area may be mapped as *lower* priority in this document does **NOT** mean that that area is safe from wildfires. Rather, it means that there were other areas where targeted wildfire hazard reduction projects or public education might benefit a greater number of residents.

Under typical summer wildfire burning conditions, any area within the Plumas County has the potential to support rapid rates of wildfire spread and high intensity burning. **There are NO low-priority areas for regular fire hazard mitigation in the project area.**

Wildfire behavior is the product of numerous factors, some of which are weather-dependent and difficult or impossible to quantify. The recommendations in this assessment are based upon field surveys, technical analysis, and the professional experience of the authors. Errors may exist in this analysis and could include improper recording of field data due to GPS accuracy or surveyor error, computational errors, data entry mistakes and any other conceivable cause. This data comprises a simplification of the physical environment intended to allow the authors to make general recommendations about reducing potential fire behavior at the community scale.

While this data is useful in assessing relative risk between the many ecoregions, micro-climates, and vegetation-types present in the Plumas County, site-specific changes in fuel hazard and wildfire risk (such as annual mowing, grazing, weed clearance, the growth of flammable ornamental plants and native vegetation, and other changes in the physical environment) will quickly render this data inaccurate.

This assessment does not consider structure-to-structure fire spread or urban conflagration risk. Only wildfire exposure and structure vulnerability to wildland fire and ember intrusion are evaluated.

**THE HAZARD MAPPING IN THIS DOCUMENTIS A SNAPSHOT OF VEGETATION AND WILDFIRE HAZARD CONDITIONS IN PLUMAS COUNTY FROM SEPTEMBER 2024 THROUGH SEPTEMBER 2025.**

**ANY FUTURE USE OF THIS DATA FOR OTHER PLANNING, CODE ENFORCEMENT, OR HAZARD MITIGATION WORK REQUIRES CHECKING ACTUAL PHYSICAL CONDITIONS ON THE GROUND.**

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## Abbreviations & Acronyms

| | |
|---|---|
| **CAL FIRE** | California Department of Forestry and Fire Protection |
| **CALVEG** | Classification and Assessment with Landsat of Visible Ecological Groupings |
| **CARX** | California State Fire Marshal-Certified Prescribed Fire Burn Boss |
| **CDFW** | California Department of Fish and Wildlife |
| **CPUC** | California Public Utilities Commission |
| **CWPP** | Community Wildfire Protection Plan |
| **DEM** | Digital Elevation Model |
| **DOC** | California Department of Conservation |
| **FARSITE** | Fire Area Simulator |
| **FIA** | Forest Inventory and Analysis (U.S. Forest Service) |
| **FHSZ** | Fire Hazard Severity Zone |
| **FRAP** | Fire and Resource Assessment Program (CAL FIRE) |
| **FSC** | Fire Safe Council |
| **GIS** | Geographic Information System |
| **HFRA** | Healthy Forests Restoration Act |
| **HVRA** | Highly Valued Resources or Assets |
| **IFTDSS** | Interagency Fuel Treatment Decision Support System |
| **LANDFIRE** | Landscape Fire and Resource Management Planning Tools |
| **LCP** | Landscape File (used in FlamMap modeling) |
| **LiDAR** | Light Detection and Ranging |
| **LRA** | Local Responsibility Area |
| **NAIP** | National Agriculture Imagery Program |
| **NFPA** | National Fire Protection Association |
| **NOAA** | National Oceanic and Atmospheric Administration |
| **PBA** | Prescribed Burn Association |
| **PG&E** | Pacific Gas and Electric Company |
| **PIG** | Probability of Ignition |
| **PPZ** | Potential Project Zones |
| **PRC** | Public Resources Code (California) |
| **PUC** | Plumas Underburn Cooperative |
| **RAWS** | Remote Automated Weather Station |
| **RCD** | Resource Conservation District |
| **RFFC** | Regional Forest and Fire Capacity (Program, California DOC) |
| **RH** | Relative Humidity |
| **SPI** | Sierra Pacific Industries |
| **SRA** | State Responsibility Area |
| **TREX** | Prescribed Fire Training Exchange |
| **USFS** | United States Forest Service |
| **USFWS** | United States Fish and Wildlife Service |
| **USGS** | United States Geological Survey |
| **WUI** | Wildland Urban Interface |
| **WUIx** | Wildland Urban Intermix |
| **ZOI** | Zone of Influence (used in spatial analysis context) |

# 1. Executive Summary

Over the past two decades, the wildfire landscape in Plumas County has changed dramatically. The original 2004 Hazardous Fuel Assessment provided a foundation for early fuels reduction work and community wildfire planning. But in the years since, the pace and scale of change, driven by catastrophic wildfires, altered forest dynamics, and a rapidly warming climate, have rendered much of the original data obsolete. This updated assessment is a critical step toward understanding today's conditions and developing strategies that match the current and future wildfire reality.

**Why This Update Is Necessary**

Recent wildfires—particularly the 2021 Dixie Fire—have fundamentally transformed vegetation patterns, created new fuel arrangements, and redefined fire behavior potential across large portions of the county. At the same time, climate-driven stressors such as drought, extreme heat, and erratic weather have increased fire frequency and intensity. These same stressors have also weakened forest health, making trees more vulnerable to bark beetle infestations. The resulting widespread tree mortality has left extensive areas of dry, standing, and downed fuels that further elevate wildfire risk. Relying on old models and maps no longer supports safe, science-based decisions. An updated, high-resolution assessment is essential for guiding effective fuels treatment, project prioritization, grant applications, and community protection strategies.

**Major Ecological and Fuel Changes Since 2004**

- Post-fire landscapes, particularly those affected by the Dixie Fire, now contain vast expanses of standing dead trees, exposed slopes, and regenerating brush, all of which create volatile fuel beds.
- Unburned forests continue to accumulate hazardous fuels due to decades of fire exclusion, resulting in densely packed stands and ladder fuels.
- Climate change has intensified fuel drying, extended the fire season, and increased the likelihood of large, fast-moving fires.
- Vegetation recovery varies significantly, producing a mosaic of fuel types and fire risks that were not present or predictable in 2004.

**Key Findings and Areas of Elevated Risk**

The updated modeling reveals several pressing concerns:

- Some previously burned areas are now entering a phase of hazardous regrowth, particularly where chaparral and young conifers are returning densely.
- Many existing fuel breaks have degraded due to lack of maintenance or have been overtaken by new growth.
- New developments in the Wildland Urban Interface (WUI) have expanded the number of homes at risk, often in areas with limited access and few defensible zones.
- High-risk zones are concentrated along steep slopes, around unmaintained

infrastructure corridors, and in transitional areas where unburned forests abut populated communities.

**Recommended Strategies and Community Projects**
This assessment provides a prioritized framework for action:

- Conduct targeted fuels reduction in newly identified high-risk areas, informed by vegetation data and updated fire modeling.
- Re-treat and maintain aging fuel breaks to restore their effectiveness, especially along key evacuation corridors.
- Develop strategic ridgeline fuel breaks and anchor points to support future prescribed fire or suppression efforts.
- Implement community-scale projects focused on defensible space, home hardening, and preparedness, with an emphasis on localized risk profiles.
- Invest in ongoing monitoring, using high-resolution data to track changes and adapt strategies over time.

**Advancing the Fire Safe Council's Mission**
The Plumas County Fire Safe Council exists to reduce the loss of natural resources and human values caused by wildfire through Firewise Community programs and pre-fire activities. This updated assessment equips the Council with a modern, science-driven roadmap for action. It strengthens the ability to secure grant funding, coordinate with partners, and deliver on-the-ground results that reflect today's fire challenges.

Ultimately, this assessment is a recalibration that positions Plumas County to face the next decade with clear priorities, actionable strategies, and a shared commitment to living more safely and sustainably with wildfire.

## 2. Introduction

Plumas County's forests have always carried fire. For thousands of years, Indigenous peoples actively shaped the landscape through intentional burning practices. Fire was used as a cultural and ecological tool: to maintain healthy plant communities, clear travel routes, enhance hunting and foraging grounds, and sustain biodiversity. These low-intensity cultural burns occurred regularly and at landscape scale, helping to reduce the build-up of dead vegetation and creating fire-adapted ecosystems that were more resilient to large, destructive wildfires.

This long-standing relationship between people, fire, and place was severely disrupted over the past 100 years, as fire suppression policies and settlement patterns removed Indigenous land stewardship from the landscape. As a result, fire-adapted ecosystems became overgrown and unbalanced. In many areas, dense tree stands, heavy underbrush, and ladder fuels replaced the open forests maintained by Indigenous fire. Without regular fire, fuels have accumulated to the point where today's wildfires burn hotter, spread faster, and pose greater threats to human life and natural resources than ever before.

Recognizing these conditions, the Plumas County Fire Safe Council is undertaking a major update to its wildfire hazard planning with this document and accompanying digital mapping products. While the written report will describe existing conditions, methodology, threat analysis, and instructions for using the data, **the bulk of the project's substance will be conveyed through the interactive maps and spatial datasets** delivered to the Fire Safe Council. These products are designed to guide project planning, grant applications, and collaborative mitigation efforts beyond the scope of this document.

While the 2004 assessment was a milestone in its time, it relied on generalized vegetation maps, coarse-scale modeling, and limited data. Since then, wildfire science and technology have advanced, and the county's landscape has changed dramatically. The 2021 Dixie Fire, which burned nearly one million acres across Northern California and destroyed the town of Greenville, exemplifies the scale and severity of today's wildfire problem. It transformed entire watersheds, left behind massive patches of standing dead trees, and reshaped fuel conditions for decades to come. Even in unburned areas, decades without fire have created continuous, heavy fuels that are primed for high-intensity fire.

To address these conditions and support a more fire-resilient future, this assessment integrates several major areas of work:

**High-Resolution Fuels Mapping**

The 2025 assessment relies on high-resolution aerial imagery and updated satellite data to map fuels in three dimensions across Plumas County. These products capture key drivers of fire behavior, including canopy height, midstory density, and surface fuel loads.

The mapping highlights areas of dense brush, ladder fuels beneath tall conifers, and regenerating vegetation within recent burn scars, showing where fuel continuity is likely to support rapid fire spread. Three-dimensional data also reveal subtle variations in canopy structure, pockets of heavy surface fuels, and steep slopes where fuels and topography may interact to produce extreme fire behavior.

The resulting GIS products are interactive and scalable, enabling seamless transitions from a countywide overview to parcel-level analysis. Planners can identify areas where fuel continuity poses elevated risk, while agencies and landowners can evaluate how local vegetation patterns influence potential fire behavior in their communities.

By combining high-resolution imagery with detailed spatial modeling, the 2025 assessment provides a clear, actionable baseline of current fuel conditions. This supports more targeted mitigation planning, better grant applications, and consistent decision-making across Plumas County's diverse fire-adapted landscapes.

**Post-Fire Landscape Analysis**
Since the county's 2004 hazardous fuel assessment, wildfire and ecological change have reshaped Plumas County's landscapes. The most transformative event is the 2021 Dixie Fire, which left widespread standing dead trees, exposed slopes, and fast-growing shrub fields. These post-fire conditions create volatile fuel beds where heavy snags and dense regrowth pose both immediate and long-term hazards to nearby communities and ecosystems.

Large areas of unburned forest, meanwhile, remain heavily overstocked after more than a century of fire exclusion. Dense layers of small and intermediate trees now act as ladder fuels, increasing the likelihood of crown fire and reducing the effectiveness and safety of suppression efforts. The result is a landscape marked by extremes: expansive shrub-dominated burn scars alongside dense, fire-suppressed conifer stands—conditions far less pronounced in 2004.

Climate change compounds these challenges. Hotter summers, drier autumns, declining snowpack, and more variable precipitation have extended the fire season and stressed forests, making fuels combustible for longer periods. These trends increase the potential for large, fast-moving fires that can overwhelm suppression strategies, even in areas once considered moderate-risk.

Vegetation recovery within recent burn footprints adds further complexity. Some slopes are rapidly filling with chaparral, others are regenerating dense young conifers, and some remain largely barren. This mosaic of fuel types creates highly variable fire risk that requires site-specific analysis.

Drawing from modern ecological science, the assessment shows that Plumas County's fire environment has fundamentally changed since 2004. The county now faces both continued fuel accumulation in unburned forests and new, volatile post-fire landscapes created by large, high-severity wildfires, underscoring the need for updated, adaptive fuel-management strategies.

**Fire Behavior Modeling**
Using the fuels mapping as a foundation, advanced fire behavior models simulate how wildfires could spread under various weather and fuel conditions. Outputs include projected flame lengths, rates of spread, ember production, and likely direction of travel. These simulations reveal which ridgelines, slopes, and valleys may drive dangerous fire behavior, and where natural barriers or historical burn patterns might help moderate spread.

**Updated WUI Boundaries and HVRA Analysis**
The assessment incorporates the county's updated 2023 Wildland Urban Interface (WUI) boundaries alongside a Highly Valued Resources and Assets (HVRA) analysis. This spatial layer identifies where homes, infrastructure, cultural sites, and critical ecological resources overlap with wildfire risk. Integrating WUI and HVRA data provides a clear framework for directing resources to protect the county's most important and vulnerable places.

**Identification of Priority Treatment Areas**
By combining fuels data, fire behavior modeling, topography, and regrowth patterns, the assessment highlights areas where mitigation will have the greatest impact, including:

- Community-adjacent zones with dense vegetation that directly threaten homes and infrastructure.
- Strategic gaps between past treatments where continuity is needed to strengthen landscape-scale protection.
- Steep, fuel-rich slopes with high fire spread potential.
- Recent fire scar footprints suitable for prescribed fire to reduce surface fuels and support resilient vegetation recovery.
- Private timberlands where prescribed burning can maintain fuel breaks and reduce long-term wildfire risk.
- Public lands with dense stands and ladder fuels prioritized for mechanical thinning to restore forest health and lower fire intensity.

**Tools for Grant Funding and Planning**
The assessment's geospatial datasets, prioritization maps, and project justifications are formatted to meet competitive grant funding requirements. Users can export maps and data directly for proposals, permitting, and coordination with partner agencies.

This Plumas County Fuels and Wildfire Threat Mapping Assessment is both a written plan and a digital toolkit. The narrative document explains the context and methodology, while the interactive mapping products deliver actionable, location-specific information to plan, prioritize, and implement wildfire mitigation projects for years to come.

**Scope Limitation: Structure-to-Structure and Urban Conflagration Risk**
This assessment evaluates wildfire exposure based on landscape-scale fire behavior, fuels, topography, weather, and the vulnerability of individual structures to wildland fire. It does not evaluate structure-to-structure ignition pathways, radiant heat transfer between buildings, or other dynamics associated with urban conflagration or community-scale fire spread. Areas characterized by dense development, small lot sizes, or continuous building patterns are therefore assessed only in terms of their exposure to wildland fire and ember intrusion, and not for risks related to urban fire spread or building-to-building ignition.

# 3. Methodology

## 3.1 Data Sources

The data sources used in this hazard assessment form the foundation of its analytical accuracy and local relevance. Effective wildfire planning requires integrating the most current, detailed, and context-specific information available. This assessment combines high-resolution spatial datasets with authoritative local inputs to produce an up-to-date representation of fuels, topography, ignition patterns, and past fire behavior across Plumas County.

Recognizing that wildfire risk is dynamic and conditions shift rapidly following major fire events or vegetation changes, data selection prioritized both recency and precision. High-resolution imagery, current vegetation and fuels layers, and verified local datasets were favored over outdated or generalized records. By emphasizing modern datasets such as NAIP imagery, recent satellite products, and post-fire vegetation mapping, the assessment ensures that its analyses and recommendations reflect the true, present-day landscape and provide a sound technical basis for planning and decision-making.

**NAIP Imagery**

The National Agriculture Imagery Program (NAIP) offers aerial imagery updated every two years, giving the assessment team a clear and consistent view of the county's vegetation patterns. NAIP imagery is particularly valuable because it is true-color and near-infrared, allowing for interpretation of both visible land cover and vegetation health.

For this project, 2024 NAIP imagery was used to validate vegetation classifications, confirm the accuracy of mapped treatment areas, and cross-check conditions observed during field visits. Because NAIP imagery is collected during the growing season at relatively fine resolution (typically one meter), it provides an invaluable "snapshot" of the county's landscape at the time of analysis.

**Satellite Data**

The project also used recent satellite data (including Sentinel-2 and Landsat 8 imagery) to monitor vegetation conditions over time. Satellite platforms provide consistent coverage across the county and allow analysts to detect seasonal changes in vegetation moisture, a key factor in fire behavior modeling.

Satellite data was especially important for identifying post-fire vegetation recovery in areas affected by recent large incidents, such as the Camp Fire, North Complex, and Dixie Fire. These areas are undergoing rapid ecological transition, with new vegetation establishing quickly. Legacy datasets from older projects would not capture these changes, making high-frequency satellite data a critical input to ensure the hazard assessment reflects current reality.

## LiDAR

LiDAR data was collected across Plumas County as part of the Sierra Nevada Lidar Project. This effort, funded by United States Geological Survey (USGS) and University of California-San Diego, had the express purpose of assessing topographic and geophysical properties to support fire mitigation and natural disaster mitigation mapping. This mapping effort began in the fall of 2021, with the majority of data collected in 2022. LiDAR point densities averaged over 18 points per square meter for first returns and over 6 point per square meter for ground classified returns. The timeframe, after recent historic large wildfires, and high density data collection allows for a variety of data products to be produced and analyzed to aid in fire behavior modeling and vegetation assessments.

## Fire History

Historical fire records provided essential context for understanding wildfire risk in Plumas County. The assessment incorporated California's Fire and Resource Assessment Program (FRAP) fire perimeter database, which maps the extent of wildfires over the last century. By examining these perimeters, the team identified patterns of repeated fire occurrence and areas where vegetation has not burned in decades, leading to heavy fuel accumulation.

## Integrating Data for a Comprehensive Picture

Each data source contributes a piece of the puzzle: NAIP for land cover confirmation, satellite imagery for change detection, fire history for long-term patterns, ignition points for human risk factors, and local expertise for ground truth. Together, these datasets were integrated into a geospatial framework that allows users to zoom from a countywide perspective down to individual treatment areas.

The result is a hazard assessment that not only maps where fuels are located, but also explains why certain areas carry elevated risk, where fire is most likely to start, and how conditions are changing over time. This comprehensive approach ensures that the Plumas County Hazard Assessment can serve as a practical, reliable tool for prioritizing treatments, guiding funding applications, and protecting communities against the growing threat of wildfire.

## 3.2 Mapping and Analysis Techniques

The Plumas County Hazard Assessment was built on a combination of high-resolution geospatial data, advanced fire modeling, and ground truthing to ensure that results were both scientifically rigorous and operationally relevant. The following subsections describe the major components of the mapping and analysis process.

**High-Resolution Vegetation and Fuel Layers**

The foundation of the assessment was a countywide set of 5-meter vegetation and fuel layers. These layers were created by integrating multiple data sources, including multispectral aerial imagery, U.S. Forest Service Forest Inventory and Analysis (FIA) tree species aboveground biomass data, Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG) vegetation datasets, CTrees canopy height models, and recent post-fire recovery mapping. Regression models, both linear and random forests, based on plot-level data were utilized to create the canopy-based outputs in a similar process to Sheridan et al. (2014).

Vegetation types for use as representative fuel models were created using a combination of deep learning packages for Sentinel-2 imagery as well as supervised classification utilizing trained samples to classify vegetation cover into fuel model categories. Processing outputs included canopy segmentation, classification of vegetation types, and estimation of canopy height, canopy base height, canopy bulk density, and surface fuel load. The 5-meter resolution allowed for capturing fine-scale variations in forest structure and shrub cover, which are critical for understanding ladder fuel continuity, crown fire potential, and differences in vegetation recovery across burn scars. This resolution represents a significant improvement over legacy 30-meter datasets, which can obscure the patchwork fuel mosaics characteristic of Plumas County's mixed-conifer and post-fire landscapes.

**Ladder Fuels Analysis**

Within the high-resolution vegetation mapping, ladder fuels density analysis provides a critical dataset to determine fuel loading and location. Advanced data analysis packages allow for the stratification of LiDAR returns at varying intervals above the ground surface. This technique provides the user with the ability to "see" vegetation densities below the tree canopy within a selected height range, such as vegetation densities within 2-10 feet above the ground surface. Similarly, ladder fuels analysis aids in determining where existing fuels projects have been completed.

*Figure 1: Oblique image showing the hillside south of Quincy. Note how the majority of vegetation cover appears similar throughout the hillside.*

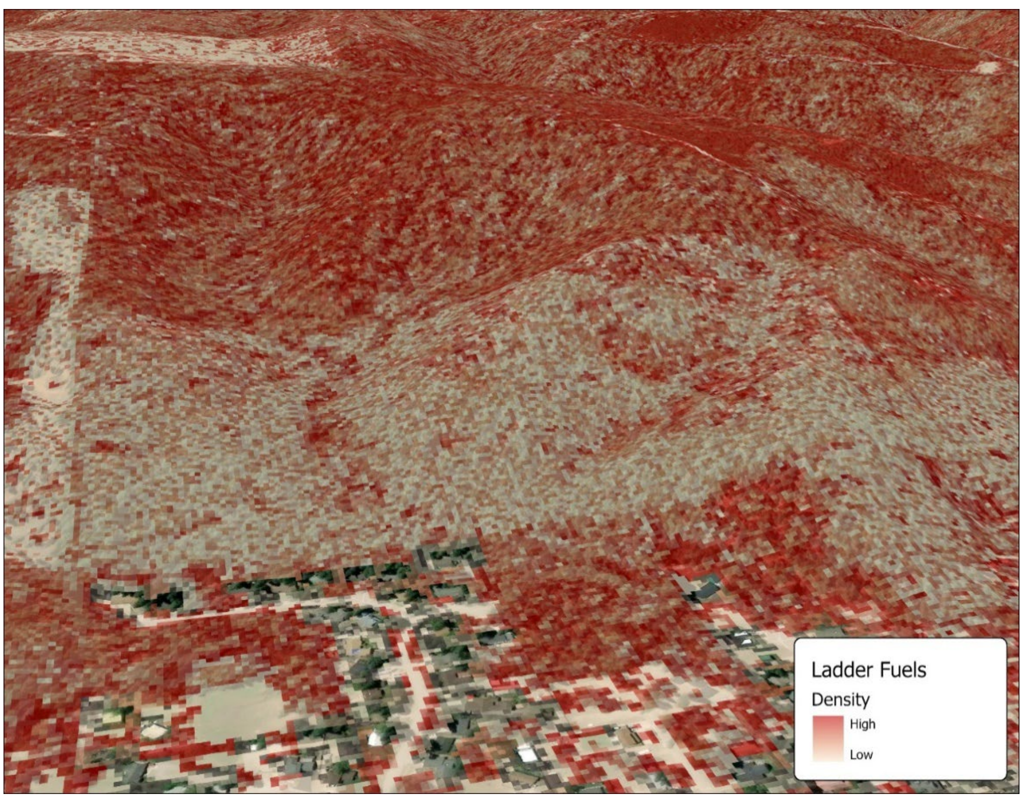



*Figure 2: Image showing the ladder fuels density of the same hillside as the previous image. Despite the similarity in canopy structure, major differences in ladder fuels density are seen.*

**Fire Behavior Modeling and Calibration**

Using the fuel layers as inputs, we applied a suite of fire behavior modeling tools designed to simulate how wildfire would spread and behave under a range of environmental conditions. Tools included FlamMap and FARSITE for spatial fire growth simulations, and supporting modules for calculating flame length, rate of spread, and crown fire activity. To improve reliability, the models were calibrated using historical fire perimeters, observed fire behavior from recent incidents (including the 2021 Dixie Fire, the 2018 Camp Fire, and the 2007 Moonlight Fire), and fire weather records from nearby Remote Automated Weather Stations (RAWS). Calibration ensured that simulated flame lengths and spread rates aligned closely with what has been observed under comparable conditions in the northern Sierra Nevada, rather than relying solely on generic or national-level fuel assumptions.

Initial broad-scale fire behavior modeling was completed within the Interagency Fuel Treatment Decision Support System (IFTDSS) using LANDFIRE inputs for the landscape file. LANDFIRE is a standardized geospatial dataset that provides baseline information on vegetation, fuels, and topography across the United States for use in fire behavior modeling. LANDFIRE data provides consistent base data that is commonly updated with higher-resolution data to improve accuracy when available. The IFTDSS modeling outputs were utilized to evaluate further higher-resolution outputs during field verification visits.

Fire behavior modeling utilized the USGS 2022 LiDAR datasets to compile a Landscape File (LCP) within the FlamMap software program. Similar to LANDFIRE data but at a higher resolution, the LiDAR-based LCP includes base data such as a Digital Elevation Model, slope, and aspect as well as fuel specific inputs including a Canopy Height Model, Canopy Bulk Density, and Canopy Cover. These inputs are then combined with a representative fuel model which details the specific surface fuel types.

The fuel model input was created using high-resolution satellite imagery, from both Sentinel-2 and the National Aerial Imagery Program (NAIP), via deep learning packages and supervised classification to reflect current surface fuel types. These LiDAR-based inputs are preferred over LANDFIRE data because of their high-resolution and recent time frame of data collection. While computationally difficult, the 5-meter resolution input data offers increased accuracy in heterogenous land cover areas compared to 30-meter LANDFIRE data inputs. Additionally, with historic weather data from nearby weather stations, specific weather information is added into the program; such as wind speed and wind direction, as well as fuel moisture data to simulate a wildfire occurrence on the modeled landscape.

Fuel moistures and weather assumptions were adapted from IFTDSS auto97th conditions and slightly modified. The fuel moisture values used were:

- 1-hour: 4%
- 10-hour: 5%
- 100 hour: 6%
- Live herbaceous: 45%
- Live woody: 60%

Wind speed was set at 20mph and several wind directions were taken from historic wind data. Gridded winds were used for all scenarios, as well as fuel moisture conditioning.

Fuel moistures and weather inputs were adapted from the IFTDSS Auto97th percentile framework to represent severe but historically observed fire weather rather than average conditions. IFTDSS Auto97th conditions are derived by analyzing historical weather observations from representative RAWS stations and identifying the 97th percentile of key fire weather variables (including fuel moistures and wind) during the local fire season. The Auto97th percentile is commonly used in fire behavior modeling and wildfire protection planning to approximate the upper range of historical fire weather conditions under which large, fast-moving, high-intensity fires are most likely to occur and where suppression effectiveness is typically limited. In the Sierra Nevada and adjacent landscapes, the most damaging wildfires typically occur during extreme weather windows characterized by critically low dead fuel moistures, seasonally cured live fuels, and strong winds. Modeling under these conditions provides a more realistic assessment of potential worst-case fire behavior than using mean or median weather, which can substantially underrepresent wildfire hazard and operational risk.

Multiple modeling runs were performed using standardized weather and fuel moisture scenarios to represent high fire danger conditions commonly associated with large wildfire growth. Wind speed was held constant while several wind directions, derived from historical observations, were applied to account for directional variability and uncertainty. Gridded wind fields were used to better reflect terrain-driven wind patterns across the landscape, and fuel moisture conditioning was applied to incorporate spatial variation in fuel dryness. Model outputs were interpreted as generalized indicators of potential fire behavior that allow for comparison across different vegetation types and terrain settings.

Fire behavior modeling inherently involves simplification and uncertainty, and the results should be interpreted as potential fire behavior under defined conditions, not as predictions of future fire events. Model outputs are sensitive to assumptions about fuels, weather, and wind, and small changes in these inputs can influence estimated fire behavior. This approach is consistent with best practices for fire planning, where the goal is to identify broad patterns of hazardous conditions and support strategic decision-making rather than operational fire prediction. Modeling outputs were field-verified during multiple site visits to visually assess on-the-ground conditions and expected fire behavior and further adjust modeling inputs and assumptions.

**Ground-Truthing and Field Verification**
Model outputs were tested and refined through an iterative process of field verification and project team review. Staff conducted ground-truthing visits across a range of fuel types, elevations, and post-fire recovery zones to confirm canopy height estimates, surface fuel loads, and ladder fuel density. These visits helped identify important discrepancies, such as areas where heavy shrub regrowth after wildfire had been underestimated in the models. This combination of empirical field data and technical review was essential for refining project recommendations, removing non-strategic sites, and ensuring the final analysis supported practical on-the-ground implementation.

**Fuel Moisture and Fire Weather Data**
The modeling environment incorporated detailed fuel moisture and weather datasets to better represent the changing climatic conditions that shape wildfire behavior in Plumas County. Historical records from RAWS stations were analyzed to establish baseline patterns for temperature, relative humidity, wind, and precipitation. Declining snowpack trends and earlier spring melt were factored into live and dead fuel moisture curves, capturing the reality that fuels are now drying earlier in the year and remaining flammable longer into the fall. Extreme weather scenarios, including downslope wind events that have historically driven the county's largest fires, were also modeled to evaluate worst-case fire behavior potential. By grounding the analysis in both historic and projected climate stressors, the assessment accounts for current variability and prepares for future conditions likely to increase wildfire frequency and severity.

**Wildfire Mitigation Framework**
To further hone the threat analysis for this project Deer Creek Resources developed a wildfire mitigation framework, similar to a WUI, tailored to Plumas County's landscape, where small, forest-embedded communities face complex wildfire risk. By using both local Structure Density and Structure Separation Distance as well as percentage of cover by wildland vegetation, this framework developed by DCR improves upon traditional and modern methods that either use structure density or structure separation distance alone.

This framework was divided into five categories: Low Density Intermix, Low Density Interface, Medium Density Intermix, Medium Density Interface, and High Density Urban areas. These zones guide the placement of defensible space treatments, shaded fuel breaks, and prescribed burns at increasing distances from community cores. Intermix zones are characterized as having above 50% cover by wildland vegetation, whereas Interface zones have below 50% cover (according to the 2024 NLCD). This tiered design allows for phased implementation, coordinated funding, and prioritization across public, private, tribal, and federal lands.

It is important to note that while similar, this framework developed by DCR is not meant to replace the WUI adopted by the Plumas Board of Supervisors in 2023, but was implemented for the purposes of project planning in this assessment.

**Integrated Approach to Project Prioritization**
By combining these elements—high-resolution fuel mapping, calibrated fire behavior models, ground-truthing, the wildfire mitigation framework, and climate-informed fuel moisture analysis—the assessment produced a robust dataset of fire risk patterns across Plumas County. This integrated approach ensured that recommended treatments were not only based on modeled fire behavior, but also validated by real-world conditions and informed by local knowledge. The result is a planning framework that balances scientific accuracy with practical application, supporting both immediate project design and long-term community and ecological resilience.

The process of recommending treatment areas and assigning priority to each project involved the following steps:

1. **Define Potential Project Zones (PPZ)**: The CALVEG dataset was used to divide the county into manageable vegetation-based planning zones, referred to as Potential Project Zones (PPZs).
2. **Calculate Zonal Statistics**: The average value of each of the following Fire Behavior Metrics was calculated within each PPZ (Flame Length, Fireline Intensity, Ladder Fuel Density, Canopy Cover, Slope, Crown Fire Potential, and Canopy Height).
3. **Apply HVRA and WUI Score:** Two scores were applied to each PPZ depending on where it was located within both the HVRA and the WUI as a method of weighing the zone's strategic importance.

| HVRA Score | HVRA Grade | WUI Zone | WUI Classification |
|---|---|---|---|
| 0-3 | 0 | Low Density – Intermix | 1 |
| 3-5 | 1 | Low Density - Interface | 2 |
| 5-10 | 2 | Medium Density - Intermix | 3 |
| 10-20 | 3 | Medium Density - Interface | 4 |
| 20-75 | 4 | Urban | 5 |

4. **Calculate Adjusted Severity Metric:** The logarithm of the Average Fireline Intensity within each PPZ was used as a method of weighing the Zone's fuel conditions.
5. **Identify Primary Project Recommendations:** Recommended treatment locations and types were identified by passing PPZs through DCR's Project Selection tool which used Ladder Fuel Density and Crown Fire Activity as metrics for severity, Canopy Cover for local vegetative cover and other metrics in step 2 as selecting factors.

    - **Hand Thinning:** Where slopes were above 17.5.
    - **Mastication or Hand Thinning:** Where slopes were below 17.5.
    - **Mechanical Thinning or Logging:** Where canopy heights were above 75ft.
    - **Rx Burning or Mowing:** Areas where ladder fuels are moderate or above, but predicted Flame Length and Crown Fire potential is low.
    - **Roadside Thinning:** Where within 300ft of a key access route showed high severity.

6. **Identify Secondary Project Recommendations:** Secondary Projects were selected if they met slightly relaxed thresholds and neighbored Primary Project Areas. (Explained in more detail in Section 6.1.)
7. **Validate Recommended Projects:** Projects selected by models were validated through direct observation during the project's field work.
8. **Repeat steps 5, 6, and 7**: This section of the process was repeated and refined until satisfactory project recommendations were achieved.
9. **Add Projects Based on Unique Considerations**: Guided by FSC input, some projects were added manually to account for unique considerations.
10. **Scoring Project Priority:** Final Recommended Projects were scored for priority based on strategic location (HVRA Grade and WUI Classification) and fuel conditions (Adjusted Severity Metric).

See section 6.1 for further information on the reasoning for this methodology.

**HVRA Analysis**
To further determine priority areas for wildfire mitigation, a comprehensive High Value Resources and Assets (HVRA) analysis was conducted using a spatial modeling tool developed by Deer Creek Resources to identify concentrations of critical community assets. This analysis allows fire planners to strategically prioritize areas for fire prevention and response by scoring the landscape based on proximity to assets vital to community functioning and safety.

The HVRA modeling process uses a combination of geospatial data inputs, including building footprints, infrastructure, and community service locations, to generate a weighted map that highlights areas of highest value. Each input is assigned buffer zones and corresponding scores based on how important that asset is to the community. For example, assets within 100 feet of structures, key roads, or communication towers receive higher point values due to their significance in life safety, emergency response, and community continuity.

Some of the inputs used in this CWPP's HVRA analysis included:

- **Structures** – scored up to 10 points depending on proximity within 100 to 1,000 feet
- **Key access roads** (e.g., evacuation routes) – scored up to 10 points
- **Communications towers** – within 300 feet: 10 points
- **Community assets**, such as schools, health clinics, post offices, and markets – within 300 feet: 5 points
- **Power lines** – within 100 feet: 3 points
- **Electrical substations** – within 300 feet: 10 points
- **Summer camps**, often located in remote or forested areas with vulnerable populations – within 500 feet: 10 points

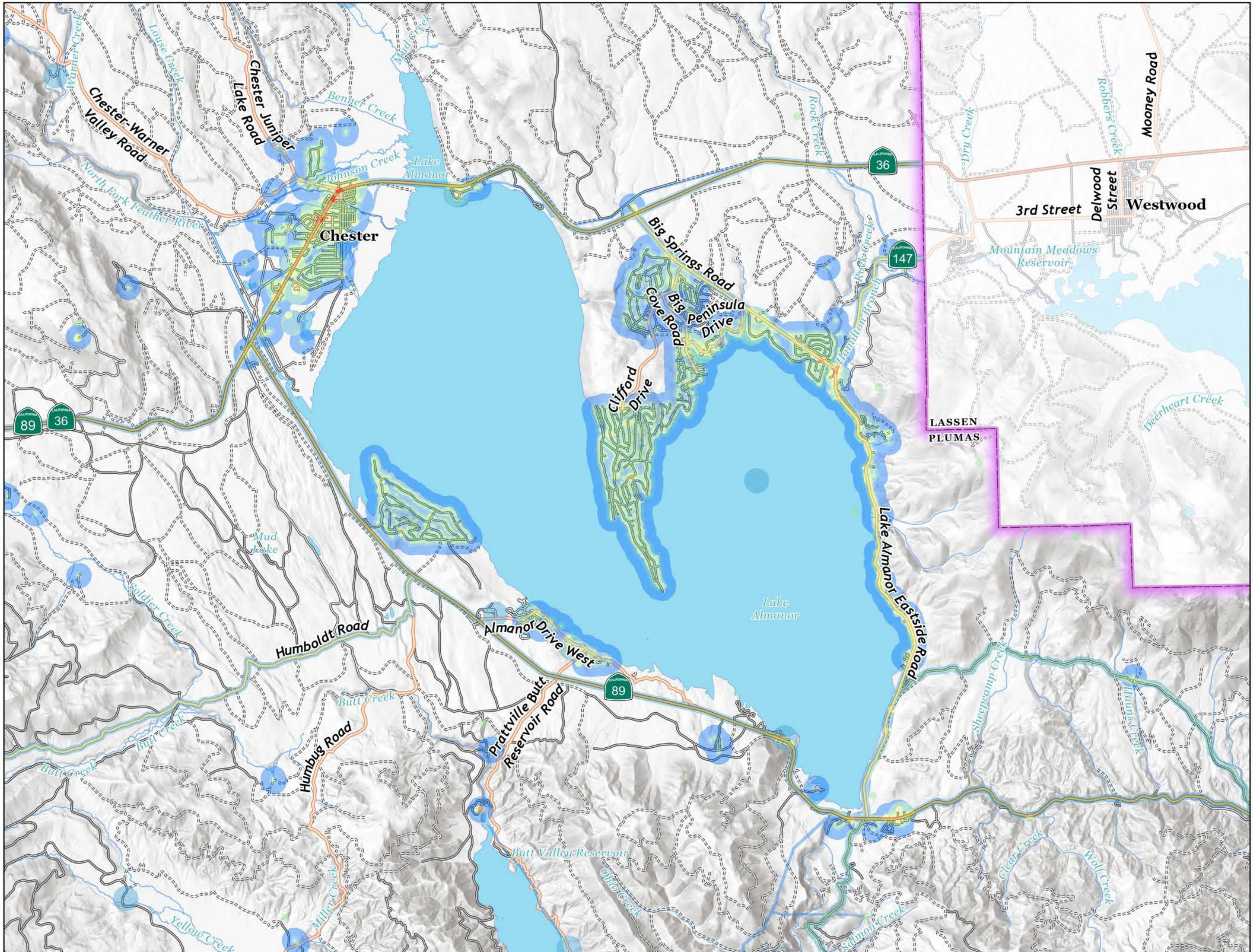
The process is iterative and guided by local knowledge. Decision makers, including local fire departments and emergency planners, received a presentation on how weightings were assigned for each input based on its relative importance to fire planning efforts in the region.

The HVRA model outputs a ranked map showing high to low priority areas for wildfire mitigation. Locations scoring highest contain clusters of high-value assets in close proximity, indicating that a wildfire in those zones could have the greatest impact on community function and safety.

The methodology relies on thoroughly vetted spatial datasets, including building footprints from Microsoft's Building Footprints layer, PG&E data for power infrastructure, and communication tower data verified via satellite imagery. A specific dataset of community assets, licensed from the commercial entries in Google Maps, was filtered to include facilities relevant to Northern California fire planning efforts. These include schools, day care locations, fuel stations, airports, healthcare facilities, grocery stores, post offices, fire stations, libraries, campgrounds, restaurants, and religious institutions.

The HVRA analysis provides a defensible, data-driven foundation for wildfire risk reduction by identifying where valuable community assets are most at risk and directing mitigation resources to those locations accordingly. This targeted approach increases the effectiveness of shaded fuel breaks, roadside thinning, and defensible space efforts around the highest-priority areas.

The following maps display HVRA analysis for the Chester/Lake Almanor area, the Greenville/Indian Valley area, Quincy, Portola, Beckwourth, Bucks Lake, the Graeagle/Blairsden area, and Greenhorn.




Plumas Hazard Assessment

# High Value Resources & Assets Map

## *Almanor/Chester Area*

**HVRA**

- Highest Value
- Lowest Value
- Counties
- Collector
- Major Road
- Minor Road
- Service
- Track

N

0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

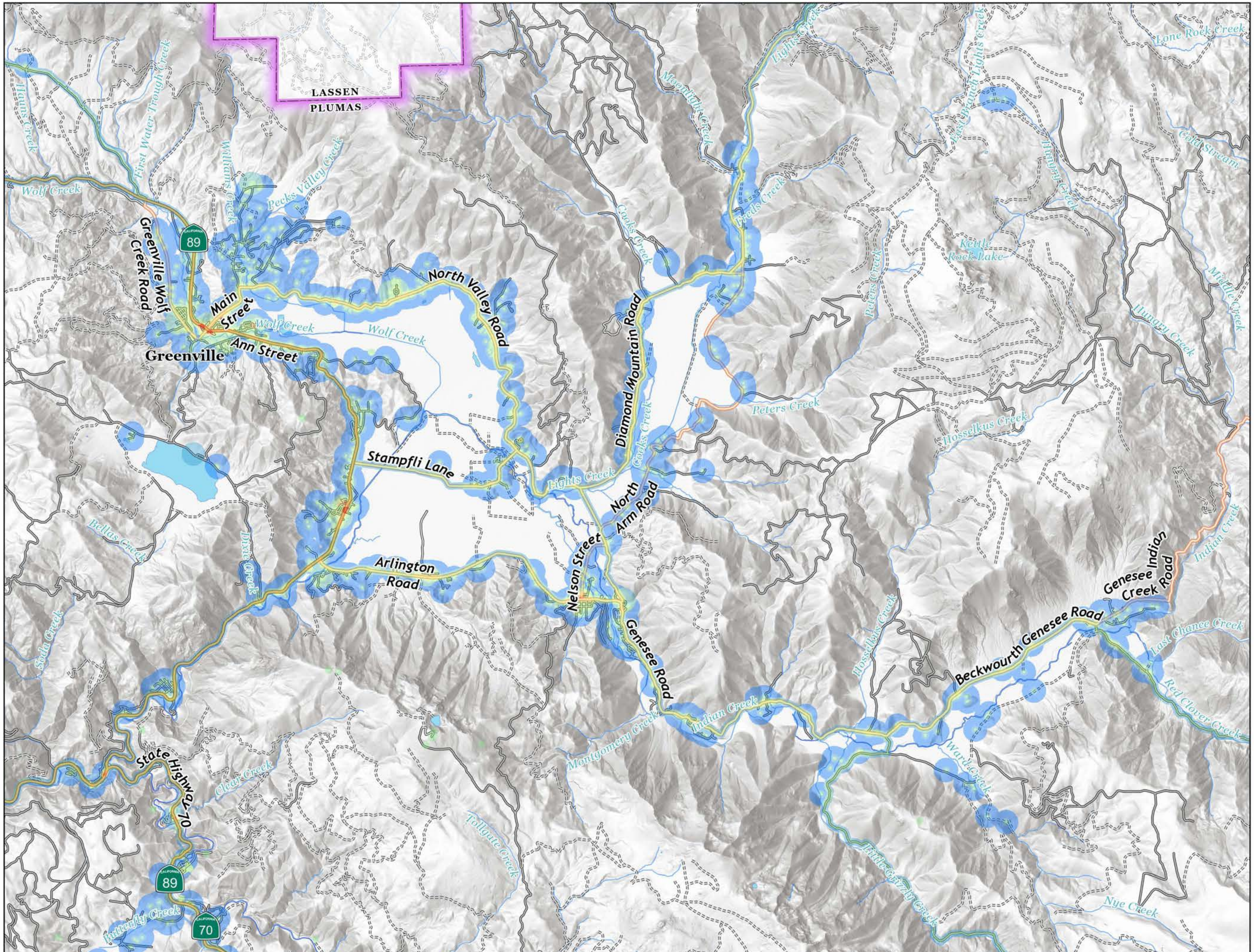
1:85,000

DEER CREEK RESOURCES

*Updated: 11/6/2025*

# High Value Resources & Assets Map

## *Greenville/Indian Valley Area*




**HVRA**

- Highest Value
- Lowest Value
- Counties
- Collector
- Major Road
- Minor Road
- Service
- Track

0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

1:90,000

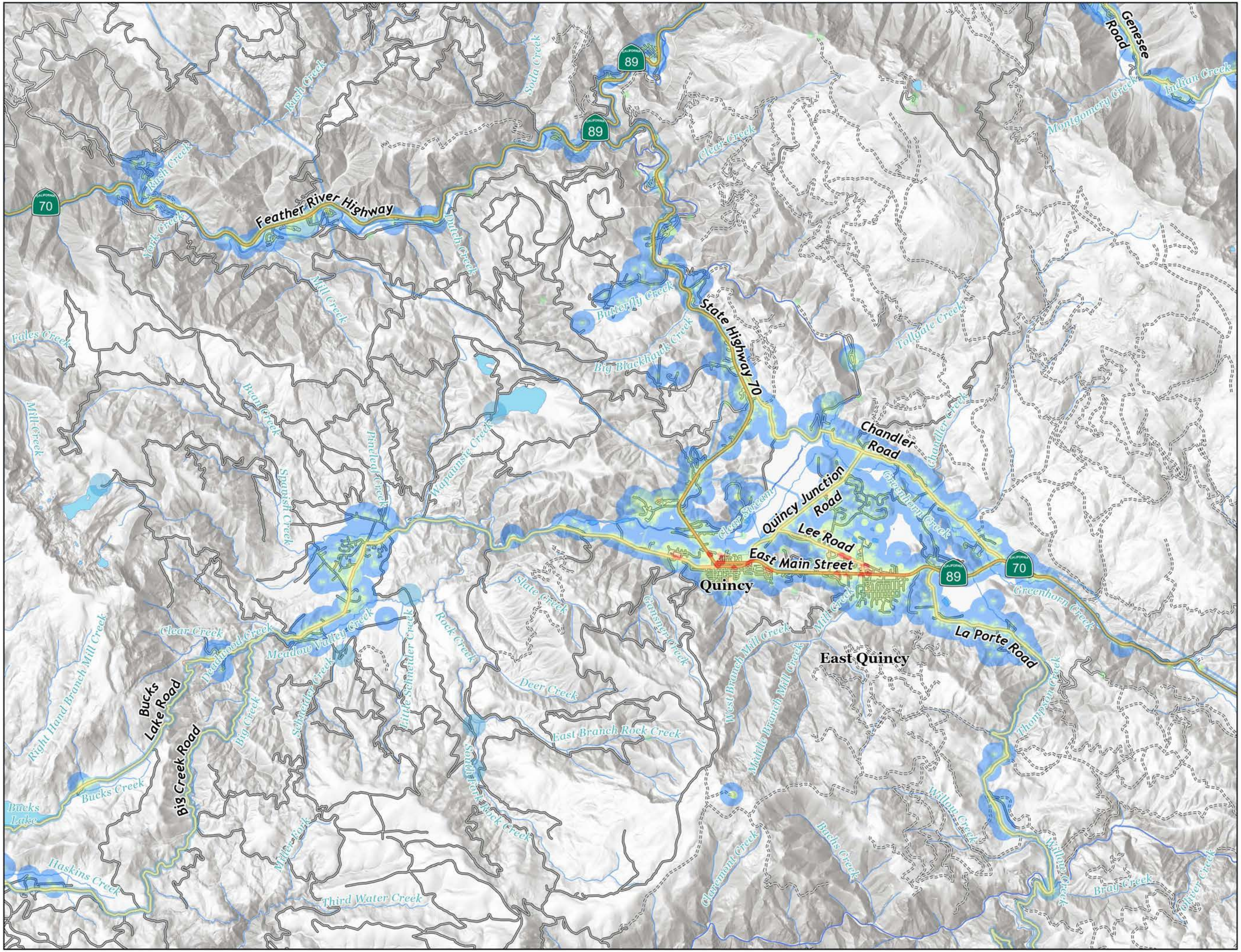
DEER CREEK RESOURCES

Updated: 11/6/2025

Plumas Hazard Assessment

# High Value Resources & Assets Map

*Quincy Area*




**HVRA**

- Highest Value
- Lowest Value
- Counties
- Collector
- Major Road
- Minor Road
- Service
- Track

N

0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

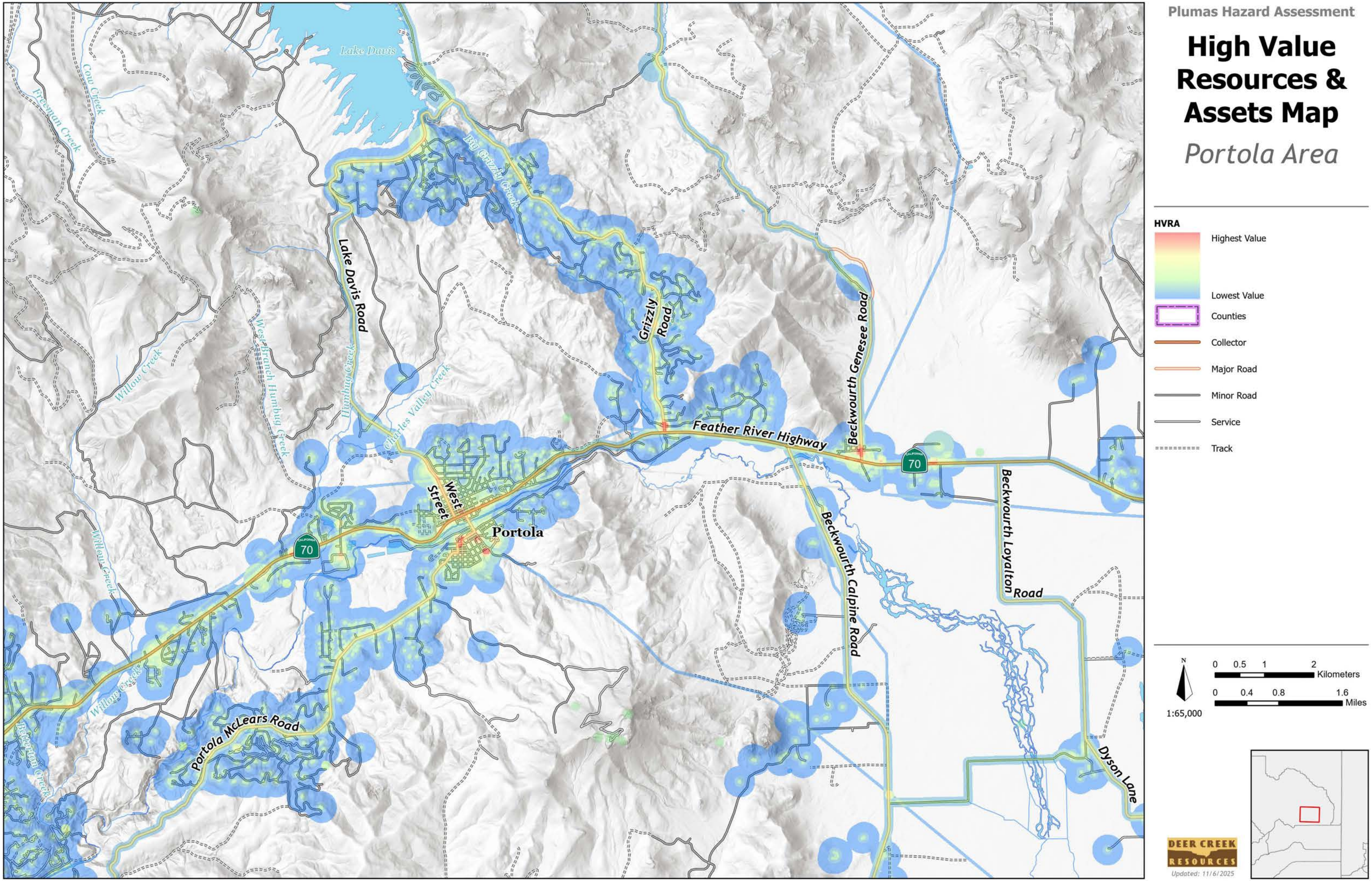
1:90,000

DEER CREEK RESOURCES

Updated: 11/6/2025

# High Value Resources & Assets Map

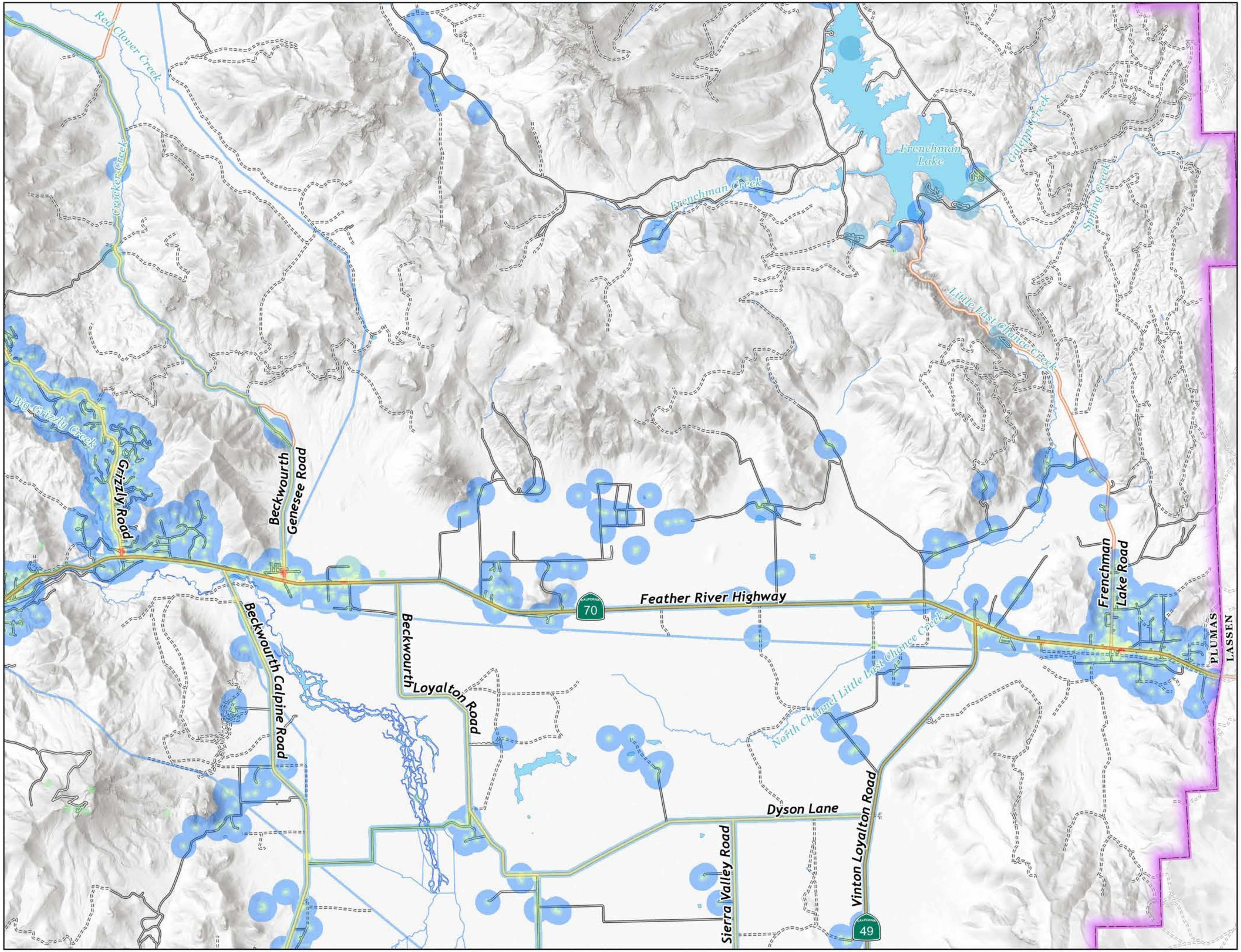
## *Portola Area*



Plumas Hazard Assessment

# High Value Resources & Assets Map

## *Beckwourth Area*




HVRA

Highest Value

Lowest Value

Counties

Collector

Major Road

Minor Road

Service

Track

N

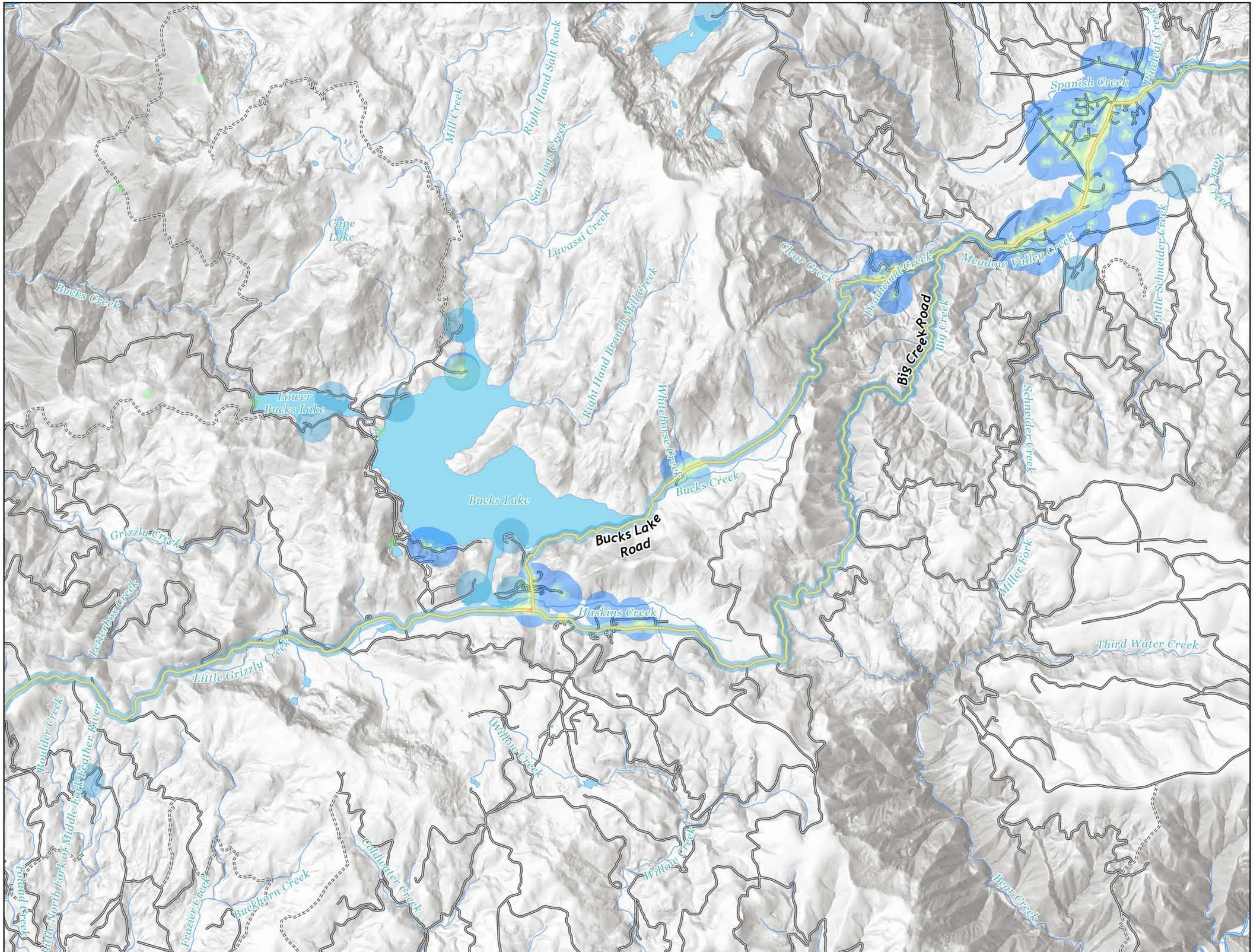
0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

1:85,000

DEER CREEK RESOURCES

Updated: 11/6/2025






# High Value Resources & Assets Map

*Bucks Lake Area*

**HVRA**

Highest Value

Lowest Value

Counties

Major Road

Minor Road

Service

Track

N

0 0.47 0.95 1.9 Kilometers

0 0.35 0.7 1.4 Miles

1:60,000

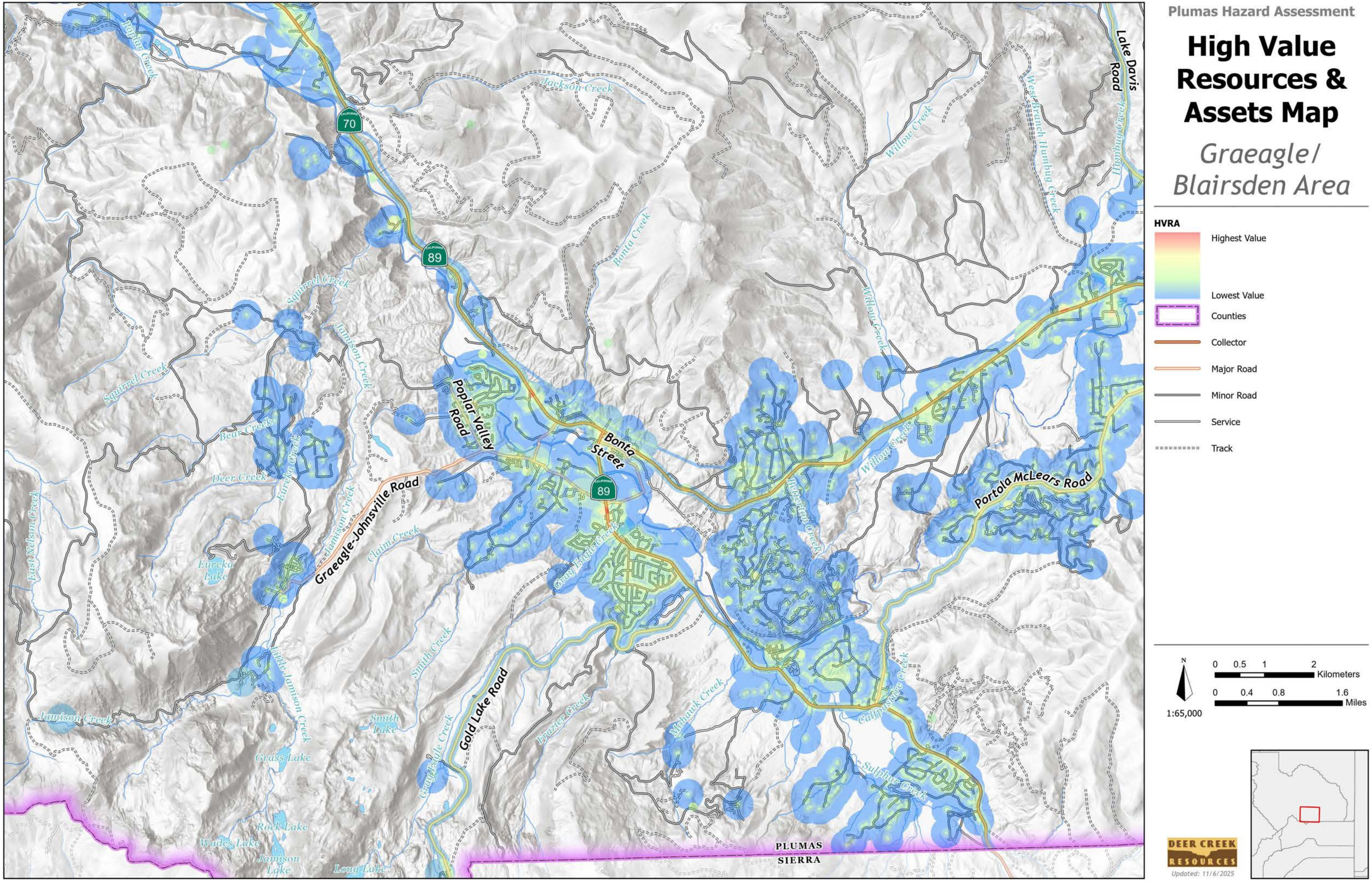
DEER CREEK RESOURCES

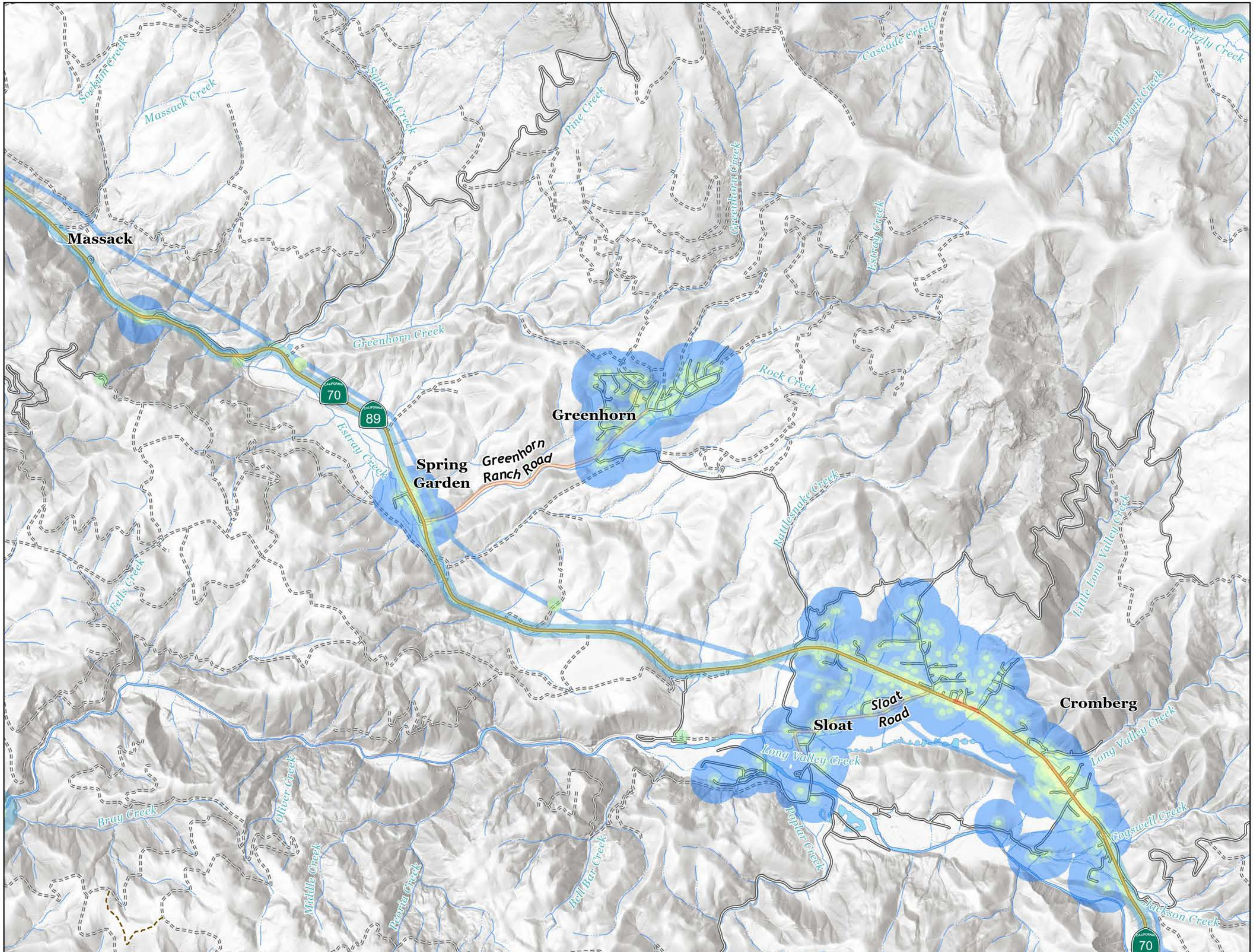
Updated: 11/6/2025

Plumas Hazard Assessment

# High Value Resources & Assets Map

*Graeagle/ Blairsden Area*






Plumas Hazard Assessment

# High Value Resources & Assets Map

*Greenhorn Area*

**HVRA**

- Highest Value
- Lowest Value
- Counties
- Collector
- Major Road
- Minor Road
- Service
- Path
- Track

N

1:45,000

0 0.35 0.7 1.4 Kilometers

0 0.28 0.55 1.1 Miles

DEER CREEK RESOURCES

Updated: 11/6/2025

## 4. Existing Conditions

Plumas County, located in the northern Sierra Nevada, is a landscape shaped by fire—ecologically, socially, and economically. Its dense mixed-conifer forests, steep terrain, and dry summers have always made it fire-prone, but in recent decades, climate change, prolonged fire suppression, and growing human development have turned the region into one of California's most wildfire-vulnerable areas. The 2021 Dixie Fire, the largest single (non-complex) wildfire in California history, crystallized this reality, burning over 963,000 acres across five counties and leaving an indelible mark on Plumas County's forests and communities.

Before the Dixie Fire, Plumas County had already endured a series of large wildfires, including the Storrie Fire (2000), Chips Fire (2012), and Walker Fire (2019). Each burned through steep, densely forested terrain where fuels had built up over time. But the Dixie Fire dwarfed them all, igniting on July 13, 2021, in Butte County and rapidly spreading northeast into Plumas. Driven by strong winds and critically dry fuels, it devastated the town of Greenville, destroyed hundreds of structures, and torched vast areas of mixed-conifer forest, rangeland, and WUI zones. Nearly half of the Dixie Fire's total footprint occurred within Plumas County.

The fire's behavior was extreme: long-range spotting, pyrocumulus development, and fast rates of spread were common throughout its run. It burned through forest types ranging from lower-elevation ponderosa (*Pinus ponderosa*) and Jeffrey pine (*Pinus jeffreyi*) stands to higher-elevation red fir (*Abies magnifica*) and mixed conifer, in many cases transitioning into crown fire with little warning. In areas with dense ladder fuels and high canopy continuity, the fire exhibited plume-dominated behavior, resistant to suppression and too dangerous to fight directly. In the Feather River Canyon and up through Indian Valley, steep slopes further accelerated the fire's spread.

Much of Plumas County's forest is made up of westside and eastside mixed conifer, where tree species such as Douglas-fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), incense cedar (*Calocedrus decurrens*), sugar pine (*Pinus lambertiana)*, and California black oak (*Quercus kelloggii*) form closed canopies. These forests evolved with frequent low- to moderate-intensity fire, but decades of suppression have allowed fuels to accumulate unnaturally. In untreated areas, the Dixie Fire turned what might have once been a beneficial ground fire into stand-replacing, high-intensity burns (Shive et al., 2024). Fire behavior modeling conducted before and after the event supports this: flame lengths, rates of spread, and crown fire potential all exceeded operational thresholds for safe firefighting in untreated zones.

Post-fire assessments of the 2021 Dixie Fire show a mosaic of burn severity, with substantial areas classified as low to moderate severity, indicative of fire that remained on or near the ground and burned at lower intensity (Taylor et al., 2022). But in many other areas, it killed nearly all vegetation, leaving vast tracts of standing dead timber, heavy surface fuels, and a complex mix of sprouting shrubs and grasses. These regenerating areas now face high risk of reburn in the coming decades, especially as climate conditions become warmer and drier.

The Dixie Fire also transformed how communities and agencies think about fire in Plumas County. Chester narrowly escaped destruction, and recovery efforts in Canyondam and Greenville have been slow and painful. Many residents remain displaced. Evacuation, smoke impacts, and economic losses from the fire affected nearly every community in the county. The event underscored the importance of planning not just for suppression, but for resilience through home hardening, defensible space, and landscape-scale fuel reduction.

Vegetation structure and fuel types across the county now reflect a complicated mix of legacy fire suppression, post-fire regeneration, and active management. Surface fuels remain high in many unburned areas, while the Dixie burn scar contributes additional dead wood and downed debris that will influence fire behavior for years to come. Ladder fuels, particularly young conifers and resprouting hardwoods, are returning quickly. These patterns, combined with steep topography and seasonal winds, drive this project's -specific modeling outputs that continue to show high fire potential across much of the county, especially in untreated or lightly treated areas.

To address these risks, local organizations like the Plumas County Fire Safe Council and the Plumas Underburn Cooperative (PUC) implement prescribed fire as a landscape-scale management tool to reduce hazardous surface and ladder fuels while reintroducing low-severity fire consistent with historical fire regimes in mixed-conifer forests of Plumas County. These strategically placed underburns are designed to increase forest resilience by lowering fuel continuity and fire intensity potential. In addition to reducing wildfire risk, low-intensity prescribed fires conducted by PUC contribute to ecological restoration objectives, including promoting native understory regeneration and improving habitat structure for species associated with open forest conditions (Plumas Underburn Cooperative, n.d.; Plumas Sun, 2025).

But despite this momentum, challenges remain. Many areas impacted by the Dixie Fire are remote, difficult to access, or have complicated landownership patterns. Coordinating across federal, tribal, private, and local lands requires continued investment, staffing, and partnership. And even where treatments occur, success is measured over decades, not months, requiring long-term maintenance and monitoring to ensure they remain effective.

The Dixie Fire has become a defining event for Plumas County—a painful example of what happens when fire returns under extreme conditions to a landscape unprepared for it. But it also serves as a catalyst. In its wake, residents, agencies, and practitioners are thinking differently about the role of fire in forest management and community safety. With sustained commitment, Plumas County can shift toward a future where fire plays a more balanced role, both as a natural force and a managed tool for ecological and social resilience.

## 4.1 Fire Behavior Modeling

Modeled fire behavior scenarios were developed in FlamMap to evaluate potential wildfire behavior under critical weather conditions. Each scenario incorporated combinations of fuel moisture and wind inputs designed to reflect critical fire weather conditions that have previously been observed. Live and dead fuel moistures were assigned to represent fine and intermediate fuels that respond quickly to low humidity and high temperatures and curing of grasses, shrubs and tree canopies common in mixed-conifer forests of the Sierra Nevada. These values are consistent with measurements from regional RAWS and fuel moisture sampling during major fire years, and they capture the conditions under which fires exhibit rapid spread, high energy release, and sustained crown fire activity.

Gridded winds were applied across the landscape to simulate strong, sustained winds capable of driving large fire runs. Several wind directions were tested, based on nearby RAWS data to capture the dominant patterns influencing the region. The resulting model runs produced spatially explicit high-resolution outputs of flame length, fireline intensity, and crown fire activity, highlighting areas most susceptible to extreme fire behavior under these modeled conditions.

The modeled outputs provide critical insight into areas of heightened wildfire hazard and support proactive planning efforts. Zones exhibiting high flame lengths, extreme fireline intensities, and/or active crown fire potential indicate locations where suppression efforts would likely be difficult or unsafe under severe weather. These modeled outputs informed the community descriptions in the following section.

## 4.2 Fuels and Vegetation Mapping

Plumas County spans diverse ecosystems shaped by elevation and land use: from mixed-conifer forests to eastside pine woodlands and chaparral slopes. Historically, frequent low- to moderate-intensity fires kept fuels in check, but drought, insects, development, and 100 years of aggressive fire suppression, have led to hazardous surface and ladder fuels accumulating across nearly all forest types.

The Dixie Fire dramatically reshaped fuels. In high-severity patches, especially west of Lake Almanor, the landscape is now dominated by snag fields, deep woody debris, and dense fire-following shrubs. These fuels can become highly flammable within a relatively short period: research shows that fine woody debris and shrub fuels often accumulate to high levels within about 5-9 years after severe wildfire, contributing to elevated potential for future fire spread and intensity (Kennedy et al., 2021). By contrast, areas that burned at low- to moderate-severity, often where thinning or prescribed burns had occurred before 2021, retained more green canopy and lower fuel loads. These spots illustrate the resilience benefits of proactive fuel treatments.

Because of its ecological diversity and varying post-fire conditions, Plumas County requires a flexible, place-based approach to fuels management. In the west, the challenge lies in stabilizing and managing rapidly accumulating post-fire fuels. In the central and eastern portions of the county, where dense forests remain largely unburned, heavy fuel loads and unbroken canopy layers continue to pose a significant wildfire threat. Each of these fuel environments requires a different mix of treatments, from salvage logging and strategic pile burning to landscape-scale prescribed fire and defensible space programs in the WUI.

Many Plumas County communities contain undeveloped or intermittently maintained private lots embedded within otherwise developed neighborhoods. These parcels accumulate brushy fuels that create horizontal and vertical fuel continuity adjacent to homes, roads, and evacuation corridors. Where maintenance is limited or absent, such inholdings can function as localized ignition and fire spread pathways, increasing structure exposure to both direct flame contact and ember production. This condition is not unique to any single community and has been observed in varying degrees in mountain resort subdivisions, rural residential tracts, and historic townsites throughout the county.

Community responses to wildfire and adaptation to ongoing environmental changes remain critical considerations for Plumas County. Household and neighborhood initiatives, such as defensible space programs, can generate significant collective benefits by reducing fire risk at multiple scales. In addition, hardening existing structures to minimize ignition potential, coupled with rigorous enforcement of Part 7 of California's WUI Building Code for new construction, is essential for protecting homes and investments. The role of individual actions, including the maintenance of defensible space and management of fuels around properties, should not be underestimated. Recent research highlights the effectiveness of home hardening and the establishment of a Zone 0 defensible space free of vegetation in reducing wildfire damage (Zamanialaei et al., 2025).

Looking forward, a resilient future for Plumas County will depend on sustained investment in fuel reduction, restoration, and local fire capacity. This includes expanding all fuels reduction and prescribed fire treatments, engaging communities in fire-adapted planning, and supporting the work of local organizations and prescribed burn associations. Coordinated post-fire recovery and restoration strategies, informed by ecological conditions and fire history, will be essential for reducing long-term wildfire risk while supporting ecosystem health and rural economies.

**Chester and the Almanor Basin**

The 2021 Dixie Fire burned through large swaths of forest around Chester and the Lake Almanor basin, leaving a patchwork of burn severities. In the hardest-hit areas near communities like Lake Almanor West and Prattville, nearly all the mature trees were killed, resulting in stands of blackened snags with 100% tree mortality. These standing dead trees still hold significant dry fuel and can serve as a catalysts for future fires if ignited. Canopy continuity in these high-severity burn patches is effectively broken; the overstory is gone, and sunlight now reaches the forest floor unimpeded. This has led to vigorous regrowth of grasses, forbs, and brush in the burn scar; within a year after the fire, wildflowers and other understory plants began re-colonizing the area. The new vegetation adds fine surface fuels, which ignite easily and can spread fire quickly when dry. In moderate burn areas around the Almanor Basin, some larger trees survived and patches of green canopy remain, but the understory was largely cleared by the fire. Overall, the post-fire landscape is a mosaic of charred open areas and surviving tree clumps, with many downed logs and standing snags contributing to the heavy fuel load.

Unburned forested areas around Chester and along portions of the Lake Almanor shoreline remain characterized by dense, green conifer stands. These forests reflect a long period of fire exclusion that has resulted in stand structures far more crowded than historical conditions. Whereas frequent low-severity fire once maintained relatively open forests, often supporting 40-150 trees per acre, many contemporary stands in the region now contain 300-600 or more trees per acre, largely composed of small- and intermediate-diameter conifers (Stephens et al., 2007; Collins et al., 2011; North et al., 2015). This elevated stand density has produced abundant ladder fuels, including dense understory trees and shrubs, that facilitate the vertical spread of fire from the forest floor into the canopy following ignition.

*Figure 11: Heavy roadside vegetation around homes on the East Shore of Lake Almanor.*

Where the Dixie Fire was stopped around Chester, the contrast between burned and unburned landscapes is stark. Along Highway 89 north of Canyondam and throughout much of the Almanor Basin, extensive stretches of fire-killed trees line the roadway, while adjacent pockets of unburned forest remain intact. Within these green islands, heavy accumulations of surface fuels persist at high continuity and volume. In the absence of recent fire or fuel treatment, these conditions continue to pose a substantial wildfire hazard and increase the potential for future high-intensity fire behavior (Collins et al., 2011; North et al., 2015).

Within Chester and nearby lakeside communities, the built environment largely survived the Dixie Fire's onslaught. Most homes and buildings in Chester, Lake Almanor West, and Prattville remain intact, but they are now often bordered by burn scars on one side and dense forest on the other. Lot density in Chester is moderate, with structures clustered in town blocks and landscaping and trees intermixed. Many properties, particularly on the town outskirts and in lakeshore subdivisions, retain mature pines and firs adjacent to homes. This pattern of development within surrounding vegetation highlights the importance of defensible space, though conditions within the 0-100 foot zone vary substantially by parcel and were not evaluated at the individual property level as part of this assessment.

*Figure 12: At the entrance of Lake Almanor West, the east side of Highway 89 received fire damage, but was largely spared.*


*Figure 13: The same location showing the west side of Highway 89, which was devastated.*

Some homeowners cleared vegetation around structures as the fire approached in 2021, which contributed to the community's avoidance of major structure loss. In portions of Lake Almanor West, ongoing Firewise efforts encourage residents to prune trees and remove brush near homes. However, unmaintained lots, greenbelts, and undeveloped parcels can create localized concentrations of fuel that increase exposure for adjacent neighborhoods. Around the Almanor basin, these areas range from lakeside meadows to previously forested parcels; where unburned, they may contain dense brush or timber, and where burned, they may now support recovering shrubs or fine fuels. In Prattville, surviving structures are surrounded by a mosaic of open, burned forest and patches of residual tree cover.

Overall, the Chester/Lake Almanor area exhibits a complex post-fire fuels environment: fire-cleared areas with regenerating light fuels interspersed with intact pockets of heavier vegetation in close proximity to homes and infrastructure. While this study does not provide parcel-level defensible space evaluations, it identifies landscape-scale conditions that can help Fire Protection Districts, Firewise leaders, and the Plumas County Fire Safe Council prioritize where detailed site assessments, homeowner outreach, and vegetation management efforts are likely to be most critical.

**Greenville, Indian Valley, and Crescent Mills**

The Dixie Fire devastated much of Indian Valley in 2021, dramatically altering the fuels profile of this area. Nearly all the forested slopes surrounding Greenville and Crescent Mills burned, much of it at high intensity. Large contiguous areas experienced complete overstory loss: roughly half of the entire Dixie Fire footprint burned at high severity with near 100% tree mortality, and Indian Valley was at the center of this burn. The once-dense conifer forests on the hills and mountains around communities like Greenville are now dominated by standing dead trees (snags) and charred logs on the ground. These snags remain a significant fuel component; even blackened, dead trees contain dry combustible material and can contribute to fire spread if ignited. Canopy continuity has been largely eliminated in the severely burned zones and there are vast expanses with no live canopy at all.

Since the fire, understory vegetation has begun to rebound vigorously. Grasses and fire-following shrubs (such as ceanothus and manzanita) are emerging across the burn scar, sprouting from surviving root systems or seeds stimulated by the fire. This shrub regrowth and grass flush creates a new layer of continuous surface and ladder fuels on the valley hillsides. By contrast, a few areas in Indian Valley burned at lower intensity or were protected by fuel treatments. For example, a treated stand near Round Valley Reservoir survived the fire's passage). In those spots, some live trees remain and the ground fire cleared out underbrush. Thus, the current vegetative fuels across Greenville and Indian Valley range from open, snag-filled high-severity patches with burgeoning brush fields, to isolated green stands where mature trees and reduced surface fuels coexist. Overall, though, the dominant condition is a landscape of heavy post-fire fuels encircling the valley floor.

*Figure 14: Shrubby vegetation regrowth off Highway 89 immediately outside of Greenville.*

The floor of Indian Valley itself is a mix of meadows, pastures, and riparian zones that mostly did not carry high-intensity fire. These more open areas of grass and agricultural fields now act as a partial buffer around the area's settlements since they lack heavy timber fuels. However, dry grasses and weeds in the summer create a flash fuel bed that can still burn rapidly. The valley's edges, where fire swept through, often have a sharp transition from green pastures to blackened forest. In some places, the fire burned into the valley margins, consuming shrubs and trees along creeks and fence lines, but much of the broad valley bottom stayed unburned. Now, those unburned areas have their usual seasonal fine fuels (cured grasses, hay stubble, etc.), while the burned perimeters are carpeted with young shrubs and volunteer grasses. Importantly, thousands of fire-killed trees remain standing on the slopes around communities like Greenville and Indian Falls. These dead trees are gradually dropping limbs and will eventually fall, contributing additional heavy woody fuel to the ground over time. Until they are removed or decay over years, they pose both a falling hazard and a concentrated fuel source in the event of any new fire ignition.

*Figure 15: Typical post-fire fuels off Highway 89 outside of Greenville.*

The built environment in Greenville was largely destroyed by the Dixie Fire, drastically reducing the structural fuel load within the town. Over 200 homes and most downtown buildings were lost. Today, Greenville consists of a sparse scatter of surviving structures and new builds amid cleared lots. Lot density is very low in the burn area, and many lots remain vacant, having been cleared of debris during cleanup efforts. With fewer buildings, there is less immediate structure-to-structure fire risk inside the town; however, the absence of buildings has allowed vegetation to start reclaiming some empty parcels. Grasses and ruderal weeds have grown up on vacant lots and along roadsides. If not managed, these fine fuels could carry fire through the town footprint in the dry season.

*Figure 16: Weed and grass regrowth on an empty lot in Greenville.*

In contrast, the small communities on the periphery of Indian Valley that escaped major fire damage still have their pre-fire structures and vegetation. Taylorsville was spared by the fire's extreme behavior. There, homes and farms are interspersed with deciduous trees, pines, and irrigated pastures, much as before 2021. Defensible space efforts in these unburned communities are variable; some properties have mowed fields or clearance around buildings, while others have trees overhanging roofs or wood piles next to structures.

*Figure 17: Heavily forested areas remain immediately south of Taylorsville.*

*Figure 18: Roadside vegetation immediately east of Taylorsville.*

In Crescent Mills, the fire burned the forested ridge just west of town but did not obliterate the town itself. Residents still face typical WUI conditions: houses abut thick forest on one side and open valley on the other. Greenbelt conditions here include the Indian Valley golf course and ranch lands, which provide breaks in woody fuels. However, along the burned ridge behind

Crescent Mills, thousands of snags now loom over the community. The removal of some hazard trees has likely occurred along roadways, but many remain on the slopes. In summary, Greenville and Indian Valley's current fuel profile is marked by extensive post-fire woody debris and regenerating brush in the wildlands, contrasted with pockets of intact vegetation and structures that survived on the valley margins. The challenge moving forward is that the valley's surroundings, once dense forest, are now a different kind of hazard comprised of post-fire complex fuels: a combination of dead trees and young, fast-growing fuels with very few natural barriers left to slow a future fire.

*Figure 19: A burned area near Indian Falls showing standing dead conifers and shrubby regrowth.*

**Quincy, East Quincy, and Meadow Valley**

Although the Quincy area has been repeatedly threatened by large wildfires over the past two decades, the town itself and surrounding communities like East Quincy and Meadow Valley have largely escaped direct wildfire impacts. As a result, the forests immediately adjacent to these communities remain mature, continuous, and largely untouched. Mixed-conifer stands of pine, fir, and cedar blanket the surrounding slopes and drainages, with dense canopy cover and minimal breaks. Many areas contain thick understory growth, including young conifers, oaks, and brush, which act as ladder fuels capable of carrying fire into the canopy. Surface fuels such as pine needles, leaf litter, downed branches, and beetle-killed logs are widespread, contributing to uninterrupted vertical and horizontal fuel continuity. These fuel layers dry out significantly each summer, and ongoing drought and elevated temperatures have reduced live fuel moisture even in healthy trees. Altogether, the Quincy area's current vegetative fuels form a heavy and continuous load, highly susceptible to intense fire behavior if ignited.

Within Meadow Valley, similar conditions prevail. Meadow Valley is surrounded by thick forests of pine and fir, with only small breaks in continuity such as the valley's namesake meadows and a few wet riparian zones. Those natural meadows provide some reduction in fuel density, but by late summer the grasses cure and themselves become fast-burning fine. The community of Meadow Valley has many homes tucked into the trees, some on large lots.

*Figure 20: Typical fuels conditions within Meadow Valley.*

Nearly all the hillsides above the community are still fully forested. Notably, portions of the Plumas National Forest south of this area did burn in 2020 (Claremont Fire/North Complex), but the Meadow Valley and Quincy side was largely spared. Thus, south and west of Quincy there are some previously burned patches from 2020 that have reduced fuels with standing snags and regrowth. However, north and east of Quincy, and immediately around Meadow Valley, the terrain remains in a late-successional fuel state, meaning heavy timber and brush. Any lightning strike or ember that lands in those forests has ample fuel to catch and spread.


*Figure 21: Treated roadside hillside on Bucks Lake Road, outside of Quincy.*

The built environment of Quincy and East Quincy is more developed than most other Plumas County communities, but it still interfaces closely with wildland fuels. Lot density in Quincy proper is relatively high and the town center has residential neighborhoods with homes on small lots and a defined urban grid. In these central areas, the primary fuels are ornamental vegetation, like landscaping shrubs and shade trees, and incidental accumulations of pine needles or wood piles. Many streets are lined with large trees, some of which overhang structures. As one moves to the outskirts of Quincy and into East Quincy, the housing becomes more spread out and trees more numerous on each property. East Quincy in particular has a more suburban-rural feel, with many houses set among the pines on larger parcels. Here, defensible space conditions are mixed; some homeowners have cleared brush and limbed up trees around their houses, but others still have thick vegetation right up to buildings. Needles and leaves tend to blanket yards in the fall, and if not removed can create a receptive bed of flammable material next to homes.


*Figure 22: Fuels in East Quincy at 3rd Street and Mansell Street, looking south to the forested hillside.*

There are also a number of undeveloped parcels and greenbelt areas around Quincy, such as open fields near the airport, along the Spanish Creek, and the larger American Valley. These open areas can act as fuel breaks in some cases because they lack dense woody vegetation. However, if left unmanaged, they often fill in with tall grasses, weeds, or shrubs. For instance, vacant lots on the edge of East Quincy might have a dense growth of bitterbrush (*Purshia tridentata*) or young pines. During peak fire season, those fine fuels could ignite easily and carry fire to the edge of town. Overall, Quincy and Meadow Valley present a classic wildland urban interface scenario: a concentration of structures in or adjacent to fire-prone wildlands. The abundant forest fuels surrounding the communities combined with variable defensible space means that current fuel conditions are ripe for intense fire behavior should an ignition occur near these towns. Local awareness is high, but as of now the landscape remains largely unchanged and vulnerable.

*Figure 23: Open grassland in the American Valley, north of Radio Hill.*

**Portola and Eastern Plumas County**

Eastern Plumas County exhibits a mix of post-fire landscapes and unburned wildland fuels, reflecting the impact of the 2021 Beckwourth Complex and adjacent areas that have not burned in recent decades. The Beckwourth Complex (which included the Dotta and Sugar Fires) charred portions of eastern Plumas north of Portola, particularly around Frenchman Lake and near the small community of Chilcoot-Vinton. In those burned areas, the current vegetative fuels are similar to the Dixie Fire footprint: patches of dead standing trees, scattered surviving pockets, and a flush of new growth on the ground. For example, on the ridges and forestlands north of Chilcoot and along the east shore of Frenchman Lake, high-severity burn zones have left expansive stands of snags. The canopy is mostly gone, so sunlight has stimulated thick regrowth of brush and grass on the forest floor. This regrowth provides ample fine fuels (grass, seedlings, young shrubs) amid the heavier coarse fuels of logs and dead trees. Canopy continuity in these burn areas is low overall, though some stringers of green trees remain where the fire burned in mosaic fashion.

On the western and southern edges of the Beckwourth Complex footprint, near Lake Davis and approaching Portola, the fire severity was mixed. Some stands were thinned by the fire but not entirely killed, leaving a more open forest with reduced ladder fuels, whereas other patches were completely consumed. Thus, the current fuel condition north of Portola is a heterogeneous post-fire terrain, with a combination of open shrub fields, standing dead timber, and some live forest stands that have less underbrush than before.

*Figure 24: Typical vegetation conditions immediately north of Portola on Lake Davis Road.*

In contrast, areas of Eastern Plumas that were not touched by recent fires still harbor heavy and continuous fuels. The city of Portola and communities to its south and west (such as Graeagle and Clio in the Mohawk Valley) are surrounded by intact forest. Around Portola, extensive pine and fir forests cover the slopes, particularly to the south toward the Lakes Basin and up to the ridge separating Portola from Sierra Valley. These unburned forests are generally dense. In many places, trees grow close together with a full canopy cover. The understory includes brush species like buckbrush (*Ceanothus cuneatus*) and manzanita, along with young conifers, all providing ladder fuels up into the crowns. Years of fire exclusion have allowed dead woody material to accumulate as well. This results in a fuel load of high tree density, abundant surface litter, and ladder fuels making for vertical continuity. Malcolm North's 2022 assessment noted that forests in the northern Sierra region are too crowded compared to historical conditions.

*Figure 25: Crowded timber around structures south of Portola near Timber Lane and Hemlock Drive.*

Clio and the Graeagle/Blairsden area, situated along the edge of the Lakes Basin, feature a distinctive blend of forest and open meadow. Expansive mountain meadows and golf courses interspersed throughout these communities offer some natural breaks in fuel continuity. Clio, for example, borders the broad grasslands of the Mohawk Valley. However, the adjacent slopes, such as Gold Mountain and Mills Peak, remain densely forested with mixed conifer. During the summer, the meadows cure to dry golden grass, which, although less intense than timber fuels, can still sustain rapid fire spread. The transition from open grasslands to thick forest is abrupt, creating conditions where a fast-moving grassfire could quickly intensify into a crown fire upon reaching the tree line.

*Figure 26: On Highway 70, just east of Grizzly Ranch Road where forested areas transition to high desert grass and sage.*

Residential areas in Clio and nearby Whitehawk are often located within mature pine stands, with many homes directly abutting wildland fuels. Larger lot sizes provide some spacing between structures, but many properties are surrounded by dense vegetation. If a crown fire becomes established in the surrounding forest, embers could easily be lofted into these neighborhoods, threatening multiple homes. Some homeowners have completed defensible space improvements such as removing ladder fuels and clearing accumulated pine needles. Nonetheless, undeveloped parcels and greenbelt corridors throughout the Clio and Graeagle area can become quickly overgrown with manzanita, young fir, and other brushy fuels. These unmanaged areas create continuous fuel beds that can carry fire directly to the edges of residential properties.

*Figure 27: Crowded large conifers in Graeagle.*

Human settlements in eastern Plumas are a combination of small towns and rural developments, each with distinct built-environment fuel considerations. Portola is the largest town in this region, with an urban core of closely spaced homes and businesses mainly on the valley floor along the Middle Fork Feather River. Within the town center, structure density is relatively high and there are fewer large trees on individual lots. The main wildfire concern in the town core would be embers landing on roofs or in yards from fires on the outskirts. On the periphery of Portola, however, many homes sit on wooded lots that blend into the forest. Especially on the south side of town and in nearby subdivisions (Iron Horse and Lake Davis area), houses are surrounded by pine stands. Defensible space status in these outskirt areas is variable. While some owners have cleared around structures, many still have dense pine and brush right up to back decks. There are also undeveloped parcels around Portola's edges that contain thick brush or forest growth, effectively acting as fuel islands within or adjacent to the community.

*Figure 28: Residential neighborhood fuel conditions in north Portola.*

The Chilcoot-Vinton area, in contrast, lies in a more open sagebrush-steppe landscape at the eastern end of Sierra Valley. Homes in Chilcoot and Vinton are few and scattered, mostly on ranch properties with significant separation between structures. This low structure density inherently provides some buffer as fires have less human-made fuel to propagate between buildings. However, the natural fuels in that area are primarily grasses, sagebrush (*Artemisia tridentata*), and scattered junipers (*Juniperus spp.*). During peak dry conditions, the fine fuels (grass and sage) could support a fast-moving wildfire across the valley floor. Without many trees, the flame lengths might be lower, but wind-driven grassfires can still quickly threaten isolated homes, especially if they have not cleared the brush immediately around them. Some ranches maintain green pastures or irrigated fields which can serve as protective greenbelts if kept moist. Others have outbuildings and corrals surrounded by weeds and tumbleweeds that could ignite.

## 4.3 Weather & Climate

Plumas County's fire seasons are strongly dictated by patterns in temperature, precipitation, wind, and lightning, all of which vary dramatically across the county's diverse topography and ecological zones. From the snow-laden Sierra Nevada ridges to the arid sagebrush valleys near the Great Basin, Plumas County experiences a wide range of microclimates that directly influence vegetation growth, fuel moisture, and ultimately, fire potential.

Fire season typically begins in late spring and can extend well into the fall, often starting as early as May in low-snowpack years and continuing into November when precipitation is delayed. As summer progresses, fuels dry out significantly: live fuel moisture in shrubs and small trees often drops below critical thresholds, and dead fuels become increasingly flammable. During this extended dry period, any ignition can lead to rapid fire spread, especially under windy conditions and in steep terrain.

However, fire behavior in Plumas County is far from uniform. Localized interactions between weather, fuels, and topography create distinct fire regimes across the landscape. In areas including the American Valley, Long Valley, Gray Eagle Valley, and Humbug Valley decades of fire suppression have led to dense mid-elevation forests with heavy accumulations of surface and ladder fuels. On hot, dry, and windy days, these forests are highly susceptible to crown fires that can move rapidly upslope through steep terrain. Smoke inversions are also common in these valleys, impeding visibility and complicating suppression efforts.

In contrast, the eastern portion of the county including Portola, Sierra Valley, and parts of the Great Basin transition zone, is dominated by grasses, bitterbrush, and sagebrush. While fires here tend to burn with lower intensity due to a lack of tall canopy fuels, they spread quickly and can be difficult to suppress under moderate winds. Dry lightning storms and red flag conditions frequently lead to multiple ignitions across this open landscape, where homes and infrastructure are often situated close to continuous shrubland fuels.

Post-Dixie areas such as Chester and Greenville now contain abundant snags and fine fuels that dry rapidly. Although current crown-fire potential may be lower in some of these areas, continued shrub growth and tree regeneration will increase future fire risk as fuels re-accumulate. At the same time, climate change is not simply lengthening the fire season; it is amplifying the region's hydroclimate, producing more extreme swings between very wet and very dry conditions. As described by Swain and colleagues, warming is increasing the amplitude of the wet/dry cycle, with wetter wet seasons followed by hotter, drier dry seasons and more frequent "hydroclimate whiplash" between the two (Swain et al., 2024). In practical terms, wet periods promote rapid growth of grasses, shrubs, and ladder fuels, which then dry more completely and earlier during increasingly intense dry seasons. This combination of enhanced fuel production followed by deeper desiccation allows fires to start earlier, spread more rapidly, and persist longer than under historical conditions. Together, these trends create a more complex and volatile fire environment, making local knowledge of weather-fuel interactions essential for effective planning.

The result is a fire environment that is increasingly complex and variable, with fire behavior that shifts dramatically from ridge to valley and from one side of the county to the other. Understanding these weather-driven patterns is essential for anticipating fire behavior and guiding fuel management strategies. To be effective, wildfire mitigation in Plumas County must be grounded in site-specific knowledge of how local climate, weather patterns, and topography interact to shape the character of fire across the landscape.

### Precipitation & Snowpack

Precipitation in Plumas County exhibits stark contrasts depending on elevation and geography. The high-elevation western and central Sierra Nevada, including areas such as Bucks Lake, La Porte, and Lake Almanor, receive over 50 inches of precipitation annually, the majority of which falls as snow. This snow accumulates into a snowpack that traditionally melts gradually through late spring, providing sustained moisture to deep soils, large logs, and live vegetation. The slow release of water delays the onset of critically dry conditions and keeps larger fuels damp well into the fire season.

By contrast, the eastern half of the county receives less than 20 inches of precipitation each year. Snowpack in these zones is limited and melts more quickly, offering little buffering against mid-summer aridity. Vegetation here adapts to a semi-arid regime, with drought-tolerant shrubs, sagebrush, juniper, and grasses dominating the landscape.

**Long-Term Declines in Snowpack**

Review of statewide snowpack data reveals notable declines over the past two decades. The Sierra snowpack experienced episodic peaks—including an exceptional 2023 surge at 252% of average—but remained well below trend for many years. Overall, experts estimate a roughly 41% decline in Sierra snow mass since 1982, with snow season length shrinking by approximately 34 days (Molteni). California-wide studies also document a 25% drop in snowpack volume at mid- and lower-elevations.

During the 2021 water year, encompassing the 2020-2021 winter, the Sierra snowpack peaked at just 59% of its historical average on April 1. That year ranked among the driest on record, resulting in extremely low runoff and dried vegetation that became highly flammable.

While 2023 and 2024 produced above-average snowpacks, these wetter years are likely exceptions in a warming climate. Scientists warn that “snow deluges” like 2023 will become increasingly rare, with future events expected to be up to 58% smaller by century's end (Beam).

As diminished snow levels melt earlier under warming spring temperatures, soils and vegetation dry out sooner, extending the period of low fuel moisture well into the summer. With less snow retained across the landscape, both live and dead fuels cure more rapidly, reaching flammable conditions weeks earlier than in the past and remaining susceptible to ignition for longer stretches. Reduced runoff further compounds drought stress by limiting groundwater recharge, streamflow, and vegetation recovery, creating broader moisture deficits that heighten the potential for large, intense wildfires during summer and fall. At the same time, the loss of snow’s natural thermal buffer allows heat waves to drive fuel moisture downward more quickly, accelerating the development of red-flag conditions. Together, these changes contribute to a longer, more volatile fire season across the region.

### Temperature, Relative Humidity, and Probability of Ignition

Temperature and relative humidity are two of the most critical environmental variables that influence the onset, intensity, and spread of wildfire in Plumas County. Together, they define not only the combustibility of fine surface fuels, but also the rate at which fire spreads and the potential for large-scale fire growth. In turn, these variables determine Probability of Ignition (PIG), a fire behavior metric used to estimate the likelihood that a firebrand or heat source will successfully ignite surrounding fuels.

Across most of Plumas County, summer temperatures from June through September are consistently high, particularly in lower- and mid-elevation valleys. Communities such as Quincy, Taylorsville, and the Sierra Valley routinely experience daytime highs in the mid-80s to low 90s (°F) during fire season, with extended heatwaves pushing temperatures even higher. Even higher-elevation areas such as Chester, Bucks Lake, and La Porte are not immune to prolonged warm periods and heat spikes during the summer months. These elevated temperatures accelerate the drying of both live and dead fuels, effectively lowering fuel moisture to critical levels early in the fire season.

Relative humidity (RH) during the summer fire season is commonly below 20% in the afternoons, especially on south- and west-facing slopes that are exposed to full solar radiation. In some interior valleys and canyons, RH values can drop into the single digits during extreme heat events, creating volatile fire conditions. These low RH conditions are exacerbated by diurnal wind patterns, particularly upslope and canyon winds, that drive evaporation and promote rapid fuel desiccation.

This combination of high temperature and low relative humidity drives up Probability of Ignition (PIG) values during the core fire months. PIG is strongly correlated with fuel moisture content, air temperature, and RH. For example:

- At 90°F and 15% RH, PIG can exceed 80%, meaning embers or sparks have a high likelihood of igniting receptive fuels.
- Even at moderate temperatures (75-80°F), if RH falls below 20%, PIG values remain elevated, often above 60%.
- In the eastern parts of the county where precipitation is scarce and vegetation is composed largely of fine, flashy fuels like cheatgrass (*Bromus tectorum*) and sagebrush, PIG values can reach extreme levels even earlier in the season.

This means that during much of the summer, large portions of the county are in a state where any ignition source has a high chance of resulting in fire. The potential for rapid spread is especially heightened in areas with slope, wind exposure, or continuous fuel beds.

Even in higher-elevation zones with traditionally cooler climates, the shortening of the snow retention period and earlier seasonal drying have shifted the fire season earlier into the calendar year, often beginning in May and extending well into the fall. As a result, high PIG conditions are persisting longer and covering more terrain than in previous decades.

In summary, Plumas County's fire season is marked by prolonged periods of elevated temperatures, critically low afternoon humidity, and consistently high probability of ignition values across a range of fuel types and elevations. These fire-weather parameters make clear that the county is increasingly prone to large, fast-moving wildfires, and underscore the need for localized fuel management strategies that account for extreme heat, low moisture conditions, and flammability of both live and dead fuels.

**Chester and Greenville (Western Sierra, Post-Dixie Fire Landscape)**
In the Chester and Greenville area, the fire season typically begins in late spring as snowpack recedes earlier due to warming trends. Daytime summer temperatures in these mid-elevation zones range from the upper 70s to mid-80s°F, moderated slightly by elevation but often spiking during heat waves. Afternoon relative humidity frequently dips below 20%, especially on south-facing slopes exposed to direct sunlight.

Post-Dixie Fire, the landscape is dominated by standing dead trees, regenerating shrubs, and grass understory, which dry rapidly under these weather conditions. The Probability of Ignition here remains high, often exceeding 75% during peak summer afternoons due to the abundance of fine, cured surface fuels. The area's complex terrain channels upslope winds that further dry fuels and promote fire spread. Even modest ember showers or human-caused sparks have a high likelihood of ignition, and rapid surface fire spread can be expected under these conditions.

**Quincy and Indian Valley (Mixed-Conifer Forest Zone)**
The Quincy and Indian Valley area occupies mid- to upper-elevation mixed-conifer forests, with relatively dense vegetation and abundant ladder fuels. Temperatures during summer afternoons frequently climb into the upper 80s and low 90s (°F), while relative humidity regularly falls below 15–20%, especially during heat waves and prolonged dry spells. These conditions create an environment conducive to rapid fuel drying, particularly in understory grasses and shrubs that serve as surface fuels.

The Probability of Ignition in this region is notably high during July through September, often exceeding 80% on days with critical heat and low humidity. Dense forest canopies and ladder fuels increase the risk of crown fire initiation once surface fires ignite. Additionally, smoke inversions in the valley can trap smoke and reduce visibility, complicating firefighting efforts and enabling fires to grow unchecked during critical early hours.

**Portola and the Eastern High Desert Transition Zone**
The Portola area and eastern portions of Plumas County lie in a transition zone to Great Basin-type ecosystems dominated by sagebrush, bitterbrush, and grasses. This region is characterized by lower precipitation, hotter summer temperatures, and generally drier fuels. Daytime highs often reach the mid-90s°F or higher in summer, and relative humidity routinely falls below 10-15%, making it one of the most fire-prone parts of the county in terms of fuel dryness.

Probability of Ignition values here often peak earlier and remain elevated longer than in more forested zones, regularly exceeding 85% during the peak summer months. The continuous, flashy fuels—cured grasses, sagebrush, and shrubs—allow fires to ignite and spread rapidly. Wind events common in the open terrain can propel fast-moving surface fires that are difficult to contain. Despite the lower fuel load per acre compared to forested areas, the rapid fire spread and challenging suppression conditions make this zone a significant wildfire hazard.

## Wind

Wind is among the most critical meteorological factors influencing wildfire ignition, spread, and suppression in Plumas County. The county's rugged terrain, defined by deep canyons, narrow river corridors, and steep ridges, interacts with prevailing winds to create localized acceleration zones that can greatly intensify fire behavior.

### Summer Wind Patterns and Funneling Effects

During the summer fire season, prevailing winds generally flow from the southwest to west-southwest, driven by the Pacific high-pressure system and diurnal heating cycles. Afternoon heating strengthens upslope (anabatic) winds that move from valley bottoms toward ridgelines, often peaking in intensity during the hottest hours of the day.

Steep topography funnels and accelerates these winds in major drainages such as the Feather River and Middle Fork Feather River canyons, where narrow valleys act as natural wind tunnels. These conditions increase oxygen supply and push fire fronts rapidly upslope, complicating containment.

At night, winds reverse direction as cooler air sinks into valleys, producing downslope (katabatic) flows. These sudden shifts in direction and speed can cause erratic fire movement and flare-ups, a common characteristic of the county's most destructive wildfires.

### Fall Downslope Winds

In fall, Plumas County periodically experiences strong, dry northeast or east winds similar to California's "Diablo" and "Mono" winds. These events occur when high pressure over the Great Basin interacts with lower pressure along the coast, creating steep pressure gradients that drive hot, dry air downslope through mountain passes and canyons.

As air descends, it warms adiabatically, reducing humidity and drying fuels. Sustained winds of 20-30 mph with gusts over 40 mph are common. When aligned with the county's canyons and ridges, these winds are further funneled and accelerated, producing explosive fire spread both downslope and across ridgelines. Such conditions contributed to the extreme fire behavior seen during the 2018 Camp Fire and 2021 Dixie Fire.

These episodes often coincide with fully cured vegetation and critically low fuel moisture, meaning even small ignitions can quickly become large, uncontrollable wildfires driven by rapid spread and long-range spotting.

**Other Notable Wind Influences**

- Valley Wind Systems: Localized breezes driven by temperature gradients can shift direction rapidly, producing erratic fire behavior.
- Open-Terrain Gusts: In eastern areas like Portola and Sierra Valley, open landscapes allow stronger gusts that carry fire quickly across grass and shrub fuels.
- Nighttime Events: Though nights are usually calmer, persistent downslope winds can sustain active fire spread beyond typical afternoon peaks.

### Lightning and Wildfire Ignition

Lightning is a major natural ignition source in Plumas County, particularly during summer months when convective storms increase. Thunderstorms typically occur from late June through September, peaking in July and August, especially at higher elevations and along east-facing ridges where topography enhances uplift. Many of these storms produce dry lightning, where strikes occur with little or no rainfall.

Dry lightning is especially hazardous because it can ignite multiple fires across vast, remote areas. These smoldering ignitions often begin in duff layers or heavy understory fuels and may go undetected for days before flaring under hot, dry, and windy conditions.

CAL FIRE's *Lassen Modoc Unit Strategic Fire Plan* (2025) indicates that the northern Sierra Nevada is among California's most lightning-prone regions. Combined with abundant fuels, rugged terrain, and variable weather, this makes lightning a major driver of wildfire risk in Plumas County.

**Notable Lightning-Caused Fires**

- 2008 Canyon Complex Fire: Lightning-caused complex that grew quickly in steep, timbered terrain, straining initial attack resources and requiring extended containment efforts.
- 2020 North Complex Fire: Lightning-caused wildfire that rapidly expanded under extreme fire weather, resulting in prolonged suppression operations and widespread impacts across the northern Sierra region.
- 2021 Beckwourth Complex Fire: Lightning-caused incident that progressed into a multi-fire complex during a period of high fire danger, challenging access, evacuation planning, and coordination across jurisdictions.
- 2024 Gold Complex: Lightning-caused fires that spread rapidly and simultaneously, overwhelming initial-attack capacity and exposing shortcomings in interagency dispatch, communication, and situational awareness during fast-moving wildfire events. (Note that CAL FIRE's GIS data for historical fires labels this incident as the Mill Fire, thus the labeling on the map in Section 4.4.)

**Management Challenges**

Lightning-ignited fires in Plumas County can be difficult to detect and control. Remote terrain and dense forests often conceal smoldering ignitions for days, delaying response until fires have grown. Dry thunderstorms can trigger multiple starts at once, stretching firefighting resources and complicating suppression priorities. These events often coincide with hot, dry, and windy conditions that drive rapid fire spread. Steep, inaccessible terrain further limits containment efforts, allowing small ignitions to quickly escalate into large wildfires.

## 4.4 Wildfire History

Fire has long shaped Plumas. Historically it was managed by Indigenous peoples for ecosystem health, but recent decades of fire suppression, land-use change, and warming have built up fuels and led to more destructive wildfires. In the early 2000s, Plumas saw some of California's largest fires of the time. For example, the 2000 Storrie Fire burned over 55,000 acres, and the 2012 Chips Fire about 75,000 acres. These incidents were harbingers of what would become a decade of escalating fire activity across the region.

The summer of 2020 marked a turning point. Lightning storms ignited hundreds of fires across Northern California, including the North Complex Fire, which began in Plumas and neighboring counties. Initially burning in remote areas, the fire exploded in size after a wind-driven run on September 8, 2020. It ultimately burned over 318,000 acres and claimed 16 lives, making it one of the deadliest fires in modern California history. That same season, the Loyalton Fire ignited near the eastern edge of Plumas County and became notorious for generating a rare fire tornado.

But one year later, it was the Dixie Fire that redefined the fire history of Plumas County. Sparked on July 13 near Cresta Dam in Butte County by a Pacific Gas & Electric (PG&E) power line, the fire moved quickly into Plumas County, driven by dry fuels, gusty winds, and steep terrain. Over the course of more than three months, it burned 963,309 acres, making it the largest single (non-complex) wildfire in California history. Entire landscapes were transformed.

No place felt the devastation of the Dixie Fire more acutely than Greenville. On August 4, after a day of red flag conditions and shifting winds, the fire barreled into the historic town with shocking speed. In under an hour, Greenville was almost completely destroyed. Homes, businesses, schools, and civic buildings were consumed by flame. For the residents who returned later, the town was unrecognizable. The destruction displaced hundreds of people, many of whom are still navigating the long and difficult path to recovery.

Elsewhere in Plumas County, the fire left a patchwork of impacts. In the Feather River Canyon, steep slopes have been stripped of stabilizing vegetation, making them highly prone to erosion and debris flows during subsequent winter and atmospheric-river storms, and these hazards have led to repeated roadway closures and infrastructure impacts that are expected to continue as the landscape recovers (California Geological Survey, n.d.; Caltrans, 2025; Sierra Nevada Ally, 2025).

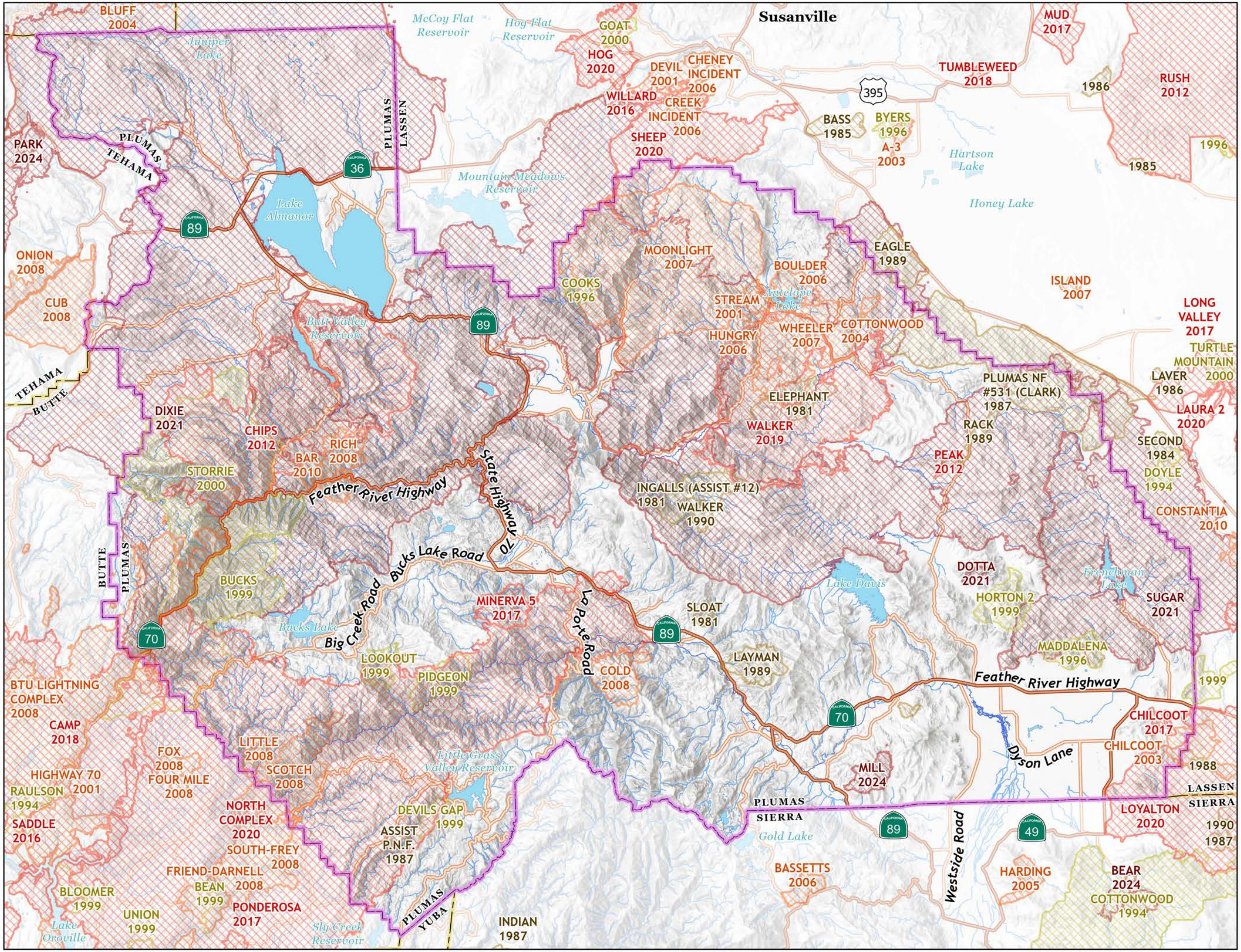
Near Chester and Lake Almanor, the fire created complex mosaics of burn severity: some areas scorched to mineral soil, others spared entirely. Post-fire assessments found that while some forest stands had been obliterated by high-intensity crown fire, others experienced low- to moderate-severity fire, creating opportunities for ecological recovery and forest resilience.

The Dixie Fire did not just alter the landscape, it shifted the community's understanding of wildfire risk. Local agencies, federal land managers, and nonprofits have since launched ambitious recovery and resilience efforts. These include hazard tree removal, post-fire watershed protection, and long-term reforestation. Conversations about rebuilding now include how to design fire-resistant homes and reestablish communities in ways that acknowledge the ongoing threat of wildfire.

The aftermath of Dixie exposed weaknesses, but it also showcased community strength and the importance of coordinated recovery. Plumas' recent fire history is written in both burn scars and in the changing strategies to cope with fire. Prescribed burns, mechanical thinning, and managed wildfires are increasingly used to reduce fuels and restore natural fire regimes. At the same time, the emotional scars of Dixie remain fresh, a sobering reminder of the megafire risk posed by our changing climate.

Plumas Hazard Assessment

# Fire History Map




Fire Perimeters

By Decade

- 2021 - 2025
- 2011 - 2020
- 2001 - 2010
- 1991 - 2000
- 1981 - 1990
- Counties
- Arterial
- Collector
- Major Road

0 2.75 5.5 11 Kilometers

0 2 4 8 Miles

1:360,000

DEER CREEK RESOURCES

Updated: 11/12/2025

# 5. Wildfire Threat Analysis

## 5.1 Assets at Risk

The threat analysis conducted for this project evaluated wildfire exposure to residential areas across the County, with particular focus on WUI zones where homes meet or intermingle with flammable vegetation. The communities of Quincy, Chester, Portola, Greenville, and numerous smaller developments throughout the county were assessed for housing density, access and egress limitations, defensible space, and proximity to high-fuel load areas. Transportation corridors including State Routes 70, 89, and 36 were also analyzed for their roles as both evacuation routes and potential ignition corridors.

Utility infrastructure represents another key asset class at risk. PG&E maintains transmission and distribution lines throughout the County, many of which traverse fire-prone terrain. Wildfire damage to this infrastructure can result in prolonged power outages, disruption to communications, and cascading impacts on water and medical services. Community water systems, communication towers, and emergency response facilities such as fire stations and hospitals were also inventoried during the asset analysis. Several small communities depend on independent or mutual water systems, which may be especially vulnerable to fire-related disruptions.

Vulnerable populations were identified as a priority for protection during wildfire events. These include elderly residents, individuals with disabilities, those with limited transportation access, and economically disadvantaged households. Many of these individuals reside in isolated areas or within aging housing stock that may lack adequate defensible space or retrofitting. Evacuation planning and communication strategies must account for these groups to ensure equitable protection during emergencies. Seasonal populations, including second-home owners and visitors, add complexity to emergency response during peak summer months.

Natural and cultural assets are integral to Plumas County’s identity and economy. The assessment included key ecological features such as mixed-conifer forests, montane meadows, and riparian corridors that support biodiversity, water supply, and carbon storage. Cultural features include tribal lands and heritage sites associated with the Mountain Maidu people and other Indigenous communities. These lands are sacred, historically significant, and often vulnerable to wildfire impacts. Collaborative approaches to fuels reduction, including cultural burning and Indigenous stewardship, can help protect and restore these values.

**Quincy**, the county seat and largest community, includes residential development surrounded by national forest lands. The town is bisected by Highway 70 and flanked by forested slopes that pose a significant fire threat. Critical infrastructure such as the Plumas District Hospital, government offices, and educational institutions add to Quincy's vulnerability. The surrounding neighborhoods of East Quincy, Chandler Road, and American Valley face similar risks from adjacent fuels and limited egress options. Quincy also serves as a hub for emergency response, resource distribution, and regional governance.

*Figure 30: East Quincy, example of dense vegetation with continuity of fuels from ground to canopy.*

**Chester**, located on the north shore of Lake Almanor, is a key population and tourism hub in western Plumas County. While much of the dense forest surrounding the town was destroyed and rendered barren by the 2021 Dixie Fire, the landscape is already beginning to regenerate. As brush and ladder fuel vegetation rapidly returns, now is a critical time to plan for the future. Strategic reentry into these areas presents an opportunity to guide regrowth, implement landscape-scale fuel breaks, and expand defensible space buffers before hazardous conditions reestablish themselves. The town's economy depends heavily on tourism and outdoor recreation, making the protection of lake access, campgrounds, residential areas, and commercial zones essential. Chester's proximity to Lassen National Forest and the Feather River watershed further reinforces the need for proactive wildfire planning, coordinated evacuation strategies, and long-term land stewardship.

*Figure 31: Regrowth west of Chester in the Dixie Fire scar.*

**Portola**, the only incorporated city in Plumas County, lies along the Middle Fork of the Feather River and Highway 70. The town is vulnerable to both fire and smoke impacts due to its position in a river valley where smoke can settle. Portola also serves as a gateway to the Lakes Basin Recreation Area and is home to critical infrastructure including schools, healthcare facilities, and the Western Pacific Railroad Museum. Maintaining defensible space and ingress/egress routes is a top priority for wildfire resilience, especially in nearby neighborhoods such as Iron Horse and subdivisions along West Street and Highway A-15.


*Figure 32: Dense timber fuels near the intersection of Iron Horse Drive and Highway A-15.*

South of Portola lies the **Nakoma/Gold Mountain developments**, which feature high-end custom homes, a resort hotel, golf course, and forested greenbelts. Though the community has Firewise recognition and maintains internal fuel reduction standards, its setting within dense forest and elevated terrain poses considerable risk. Many homes are large, multi-story structures with complex access routes and limited backup infrastructure. Collaborative planning with the local homeowners' association, continued maintenance of strategic fuel breaks, and improved coordination with emergency services will be key to protecting this growing development.

**Greenville**, once a vibrant town with deep cultural roots and historic structures, was nearly destroyed by the Dixie Fire in 2021. Rebuilding efforts have begun, but the community remains highly vulnerable. The loss of housing, businesses, and public infrastructure has underscored the importance of pre-fire mitigation, fire-adapted rebuilding practices, and honoring the town's cultural legacy in the recovery process. Continued support for defensible space, community engagement, and strategic fuels management will be essential for Greenville's long-term viability and resilience.

*Figure 33: Greenville regrowth within the Dixie Fire scar.*

The **Graeagle**, **Blairsden**, and **Plumas Eureka** communities form a significant residential, recreational, and economic hub in eastern Plumas County. Graeagle serves as a small resort town with commercial amenities and historic charm, while Blairsden and Plumas Eureka are primarily residential communities. The area is surrounded by dense mixed-conifer forest and intersected by Highway 89, creating high wildfire exposure and reliance on limited evacuation routes. However, meadows, golf courses, and other open landscapes help to break up fuel continuity and can serve as important buffers during fire events. Key recreational and cultural features include the Feather River Inn, the Graeagle Mill Pond, and the local golf courses. A large seasonal population during the summer months heightens the need for visitor education and coordinated evacuation planning.

*Figure 34: While the Graeagle area contains heavy forest fuels, features such as the Mill Pond, meadows, and golf courses help reduce fuel continuity and can serve as fire breaks.*

The unincorporated community of **Greenhorn**, located between Quincy and Portola, is characterized by its location in steep, heavily vegetated terrain and its challenging access conditions. The community has one primary ingress/egress route, which would be easily compromised in the event of a fast-moving fire. Homes in Greenhorn are situated within dense conifer and mixed brush, and while some residents have undertaken defensible space work, many parcels remain highly vulnerable. The combination of heavy fuels, steep slopes, and single-access roads makes Greenhorn a priority area for fuel reduction, shaded fuel breaks, and evacuation planning enhancements.

*Figure 35: Heavy roadside fuels in the Greenhorn community.*

Smaller communities such as **Meadow Valley**, **La Porte**, **Crescent Mills**, and **Johnsville** were also included in the asset risk analysis to ensure that vulnerable rural areas are adequately represented in the countywide assessment. These communities, while limited in size and population, contain assets of high local and regional importance, including historic districts, recreation infrastructure, and residential enclaves situated in high-hazard landscapes. Their small populations, limited ingress and egress routes, and dependence on volunteer or remote emergency services increase both structural and life-safety vulnerability during wildfire events.

*Figure 36: Johnsville hillside below town, relatively dense vegetation with steep slopes both above and below the community.*

Each of these communities represents a distinct set of values and risks. La Porte, for instance, is a remote mountain settlement with significant Gold Rush-era structures and a largely seasonal population, creating unique challenges for evacuation and structure protection. Meadow Valley faces high exposure due to dense fuels and narrow, winding access roads. Crescent Mills contains critical community infrastructure within a wildland urban interface corridor that has seen multiple nearby fire events in recent decades. Johnsville, within the Plumas Eureka State Park area, combines residential, cultural, and recreational assets, including historic mining buildings, a museum, and well-used trail systems, all of which contribute to local heritage and tourism but heighten exposure to wildfire.

*Figure 37: Dense roadside vegetation around summer cabin residences in the La Porte area.*

## 5.2 Exposure and Defensibility Mapping

The wildfire risk maps developed for this assessment provide a spatial understanding of where people, infrastructure, and natural resources are most exposed to fire hazards in Plumas County. These products integrate high-resolution fuels data, fire behavior modeling, and asset inventories to identify specific locations where risk reduction projects and planning efforts will be most effective.

The maps highlight areas of greatest exposure, where communities, critical infrastructure, and valued resources overlap with zones of high flame length, crown fire potential, and severe slope-driven fire behavior. The approach taken in this analysis used a combination of categorized values to determine current risk level based on several raster inputs.

The specific raster datasets used in this analysis were: Flame Length, Slope, Canopy Bulk Density, and Ladder Fuels Density. To identify areas of elevated wildfire risk across the landscape the input rasters were individually re-categorized into groups based on breaks in their values. For example, flame length values were broken into five categories based on the modeled heights in feet: 0-1 feet were given a score of 0, 1-4 feet were given a value of 1, 8-12 feet were given a value of 2, 12-16 were given a value of 3, and 16+ feet were given a value of 4. Similarly, slope angles were broken into three categories based on their values in degrees: 0-10 degrees were given a value of 0, 10-30 degrees were given a value of 1, and 30+ degrees were given a value of 2. All input rasters were then combined with the resulting output showing a range of values from moderate to extreme risk.

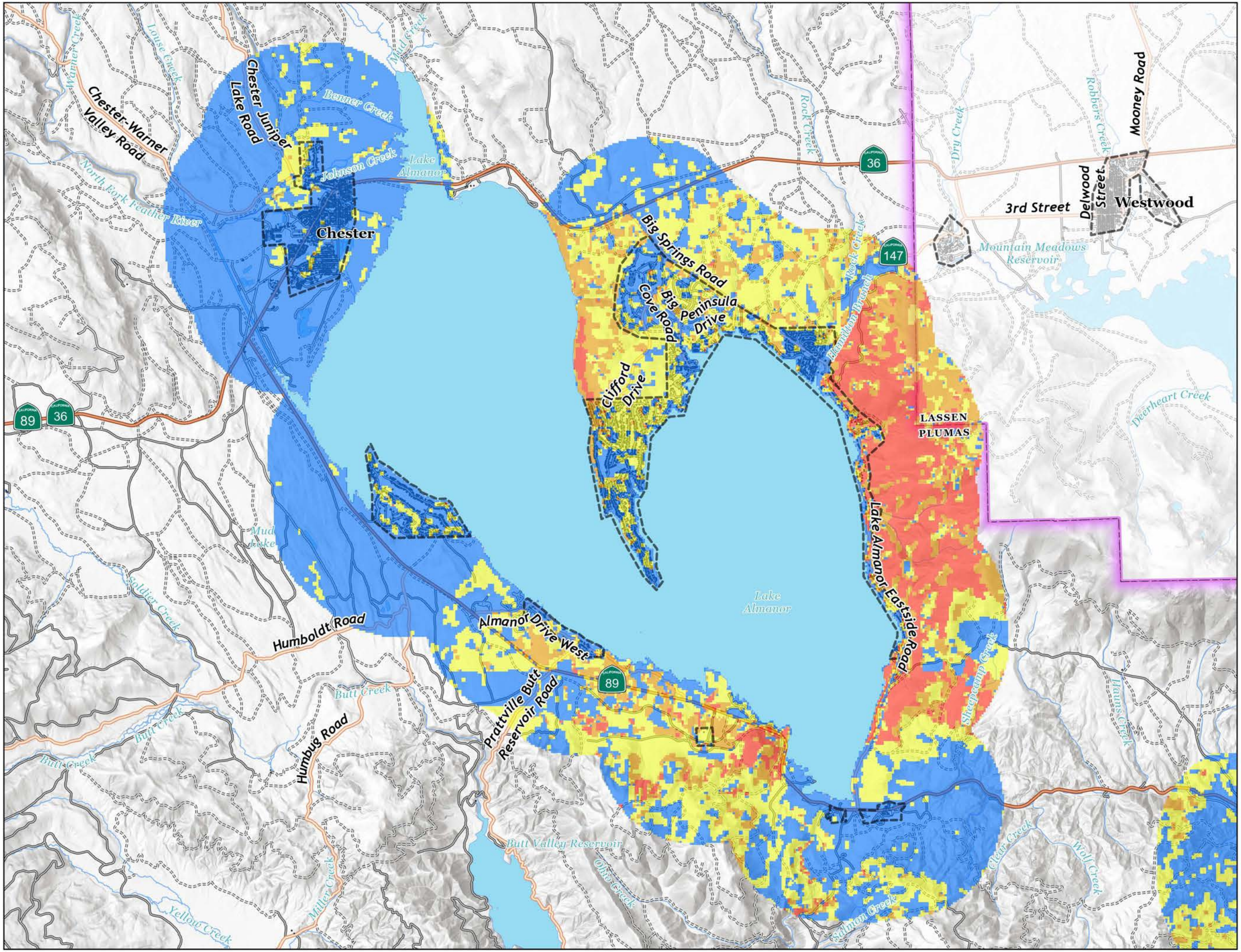
This methodology is similar to statewide Fire Hazard Severity Zone (FHSZ) mapping, which also emphasizes fuels and topography, but differs by incorporating high-resolution outputs that capture dynamic fire behavior under extreme weather conditions. Flame length reflects potential fire intensity under modeled conditions, while slope influences expected rates of spread and operational difficulty. Canopy bulk density and ladder-fuel density quantify the vertical continuity of fuels and the likelihood of surface fires transitioning into the canopy, allowing the model to highlight zones with high crown-fire potential.

In this analysis, “Threat Zones” are defined strictly as areas of elevated wildfire hazard based on landscape conditions and modeled fire behavior. The threat mapping focuses on where the landscape is most likely to support high-intensity or difficult-to-control fire due to fuels, topography, and potential fire behavior. Threat categories (moderate, high, very high, and extreme) represent relative increases in modeled fire behavior potential, with higher classes corresponding to longer flame lengths, steeper slopes, and greater vertical fuel continuity. These zones are intended to delineate where hazardous fire behavior is most likely to occur if a fire starts and serve as critical tools for prioritizing fuels reduction, planning community protection projects, and supporting long-term resilience in Plumas County.

Plumas Hazard Assessment

# Current Threat Map

## *Almanor/Chester Area*




- Counties
- WUI - Urban Core
- Building Footprint
- Collector
- Major Road
- Minor Road
- Service
- Track

**Threat Zones**

- Moderate
- High
- Very High
- Extreme

Note: This product is compiled from current data and represents current risk. It does not represent future wildfire threats that will change based on future conditions

N

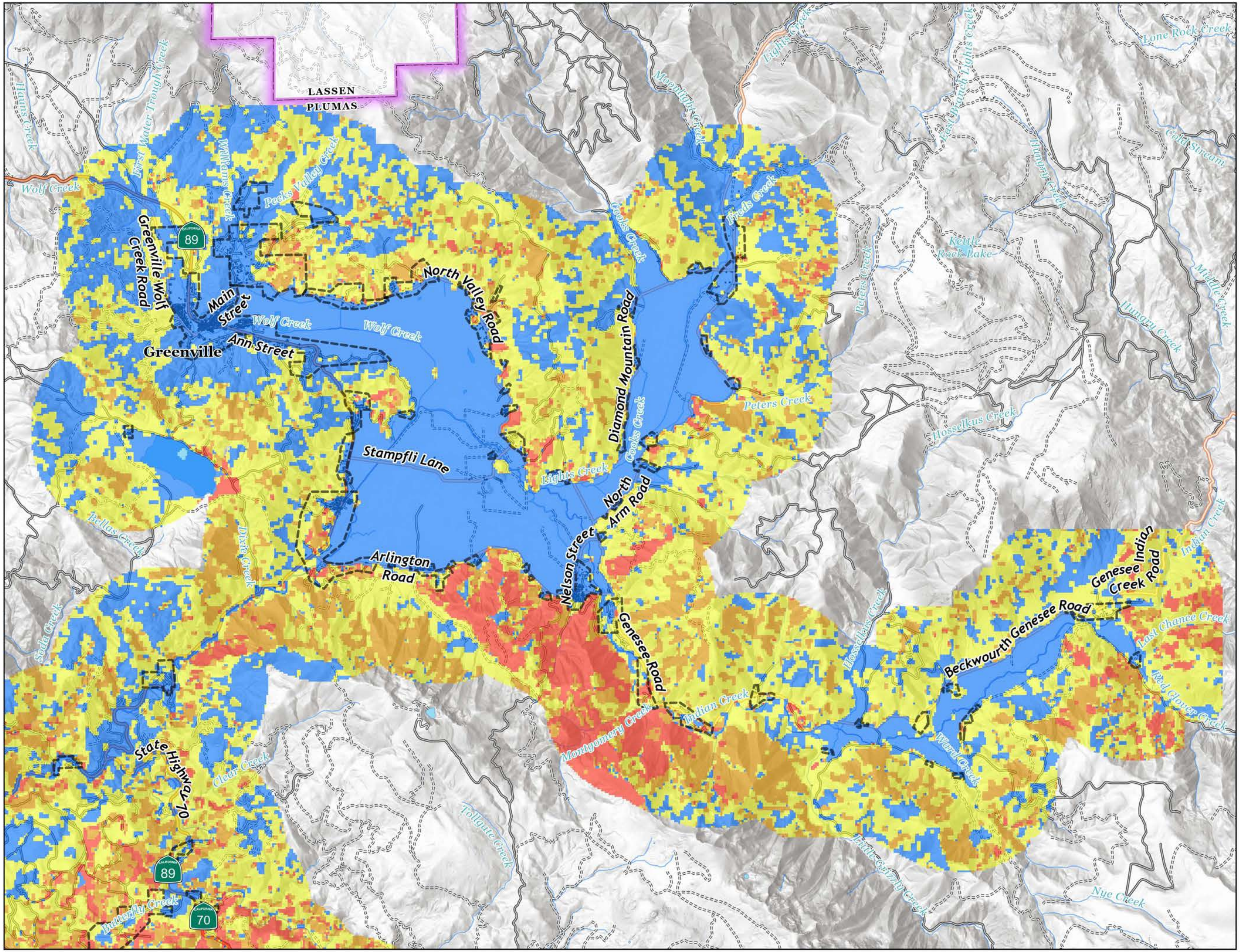
0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

1:85,000

DEER CREEK RESOURCES

Updated: 10/31/2025




Plumas Hazard Assessment

# Current Threat Map

## Greenville/Indian Valley Area

Counties
WUI - Urban Core
Building Footprint
Collector
Major Road
Minor Road
Service
Track

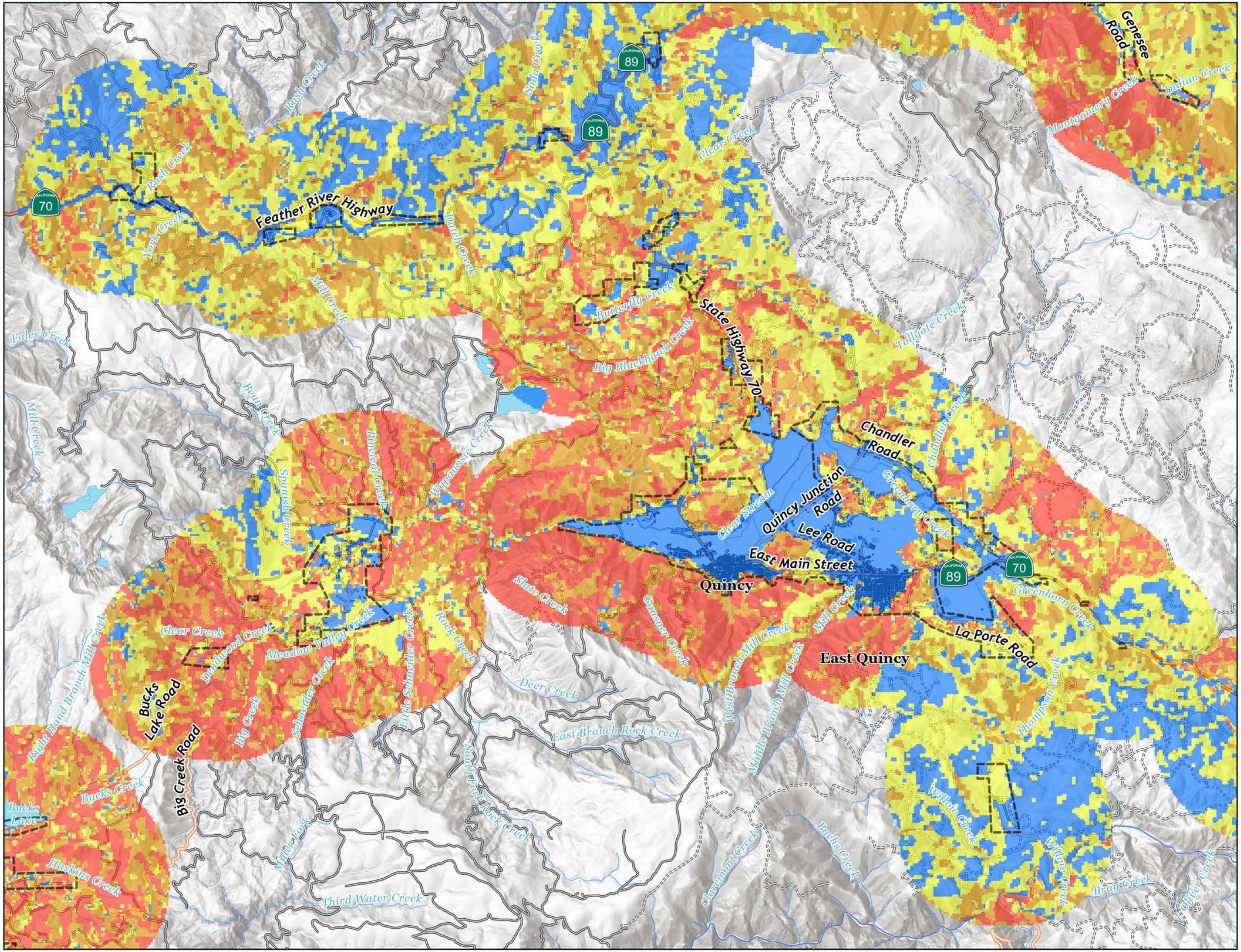
**Threat Zones**

Moderate
High
Very High
Extreme

Note: This product is compiled from current data and represents current risk. It does not represent future wildfire threats that will change based on future conditions

N
0 0.5 1 2 Kilometers
0 0.5 1 2 Miles
1:90,000

DEER CREEK RESOURCES
Updated: 10/31/2025




Plumas Hazard Assessment

# Current Threat Map

*Quincy Area*

- Counties
- WUI - Urban Core
- Building Footprint
- Collector
- Major Road
- Minor Road
- Service
- Track

**Threat Zones**

- Moderate
- High
- Very High
- Extreme

Note: This product is compiled from current data and represents current risk. It does not represent future wildfire threats that will change based on future conditions

N

0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

1:90,000

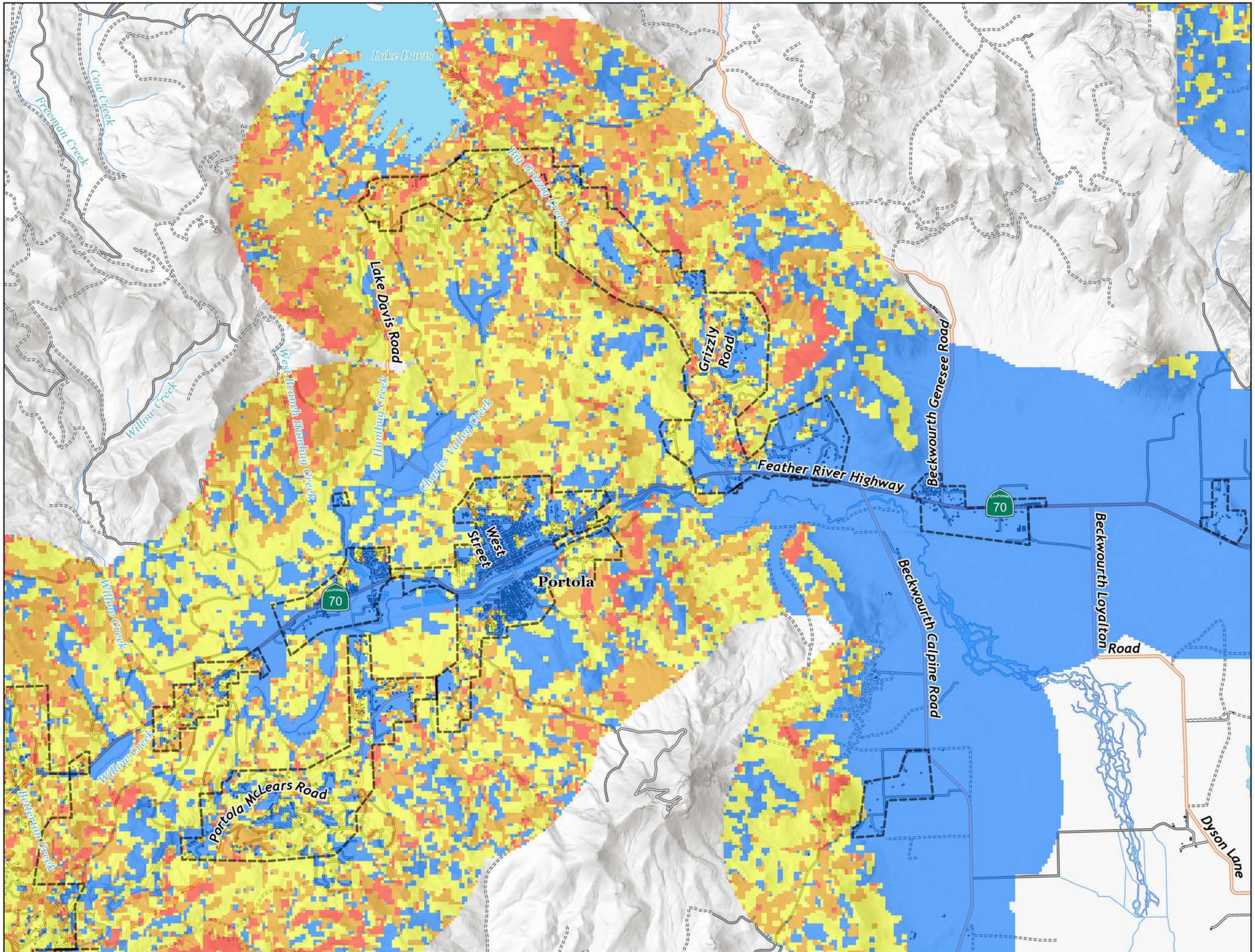
DEER CREEK RESOURCES

Updated: 10/31/2025

Plumas Hazard Assessment

# Current Threat Map

*Portola Area*




- Counties
- WUI - Urban Core
- Building Footprint
- Collector
- Major Road
- Minor Road
- Service
- Track

**Threat Zones**

- Moderate
- High
- Very High
- Extreme

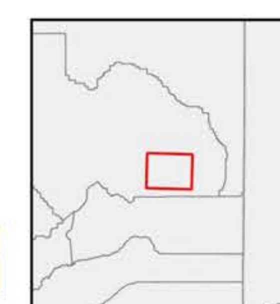
Note: This product is compiled from current data and represents current risk. It does not represent future wildfire threats that will change based on future conditions

N

1:65,000

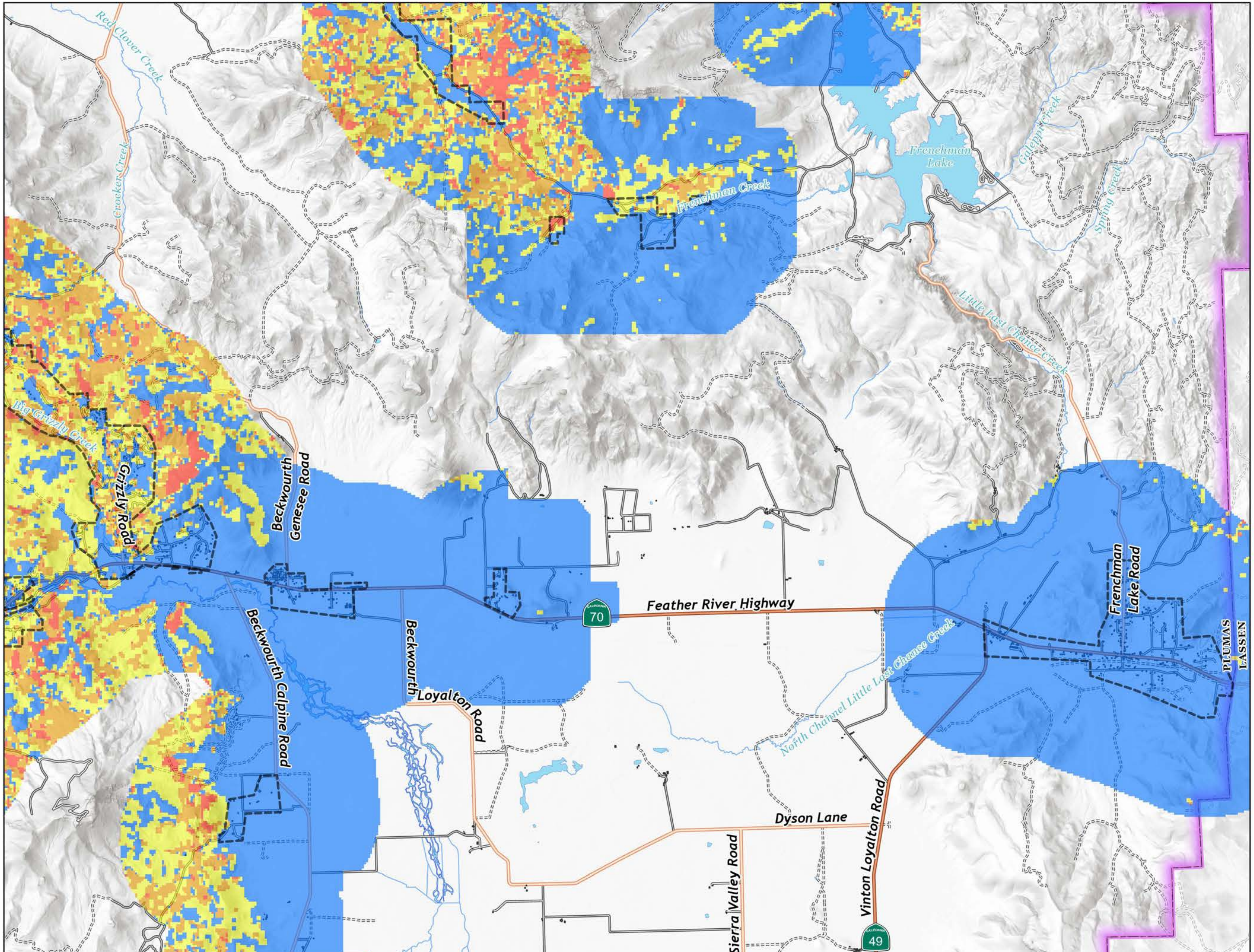
0 0.5 1 2 Kilometers

0 0.4 0.8 1.6 Miles



DEER CREEK RESOURCES

Updated: 10/31/2025




Plumas Hazard Assessment

# Current Threat Map

## *Beckwourth Area*

Counties

WUI - Urban Core

Building Footprint

Collector

Major Road

Minor Road

Service

Track

**Threat Zones**

Moderate

High

Very High

Extreme

Note: This product is compiled from current data and represents current risk. It does not represent future wildfire threats that will change based on future conditions

N

0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

1:85,000

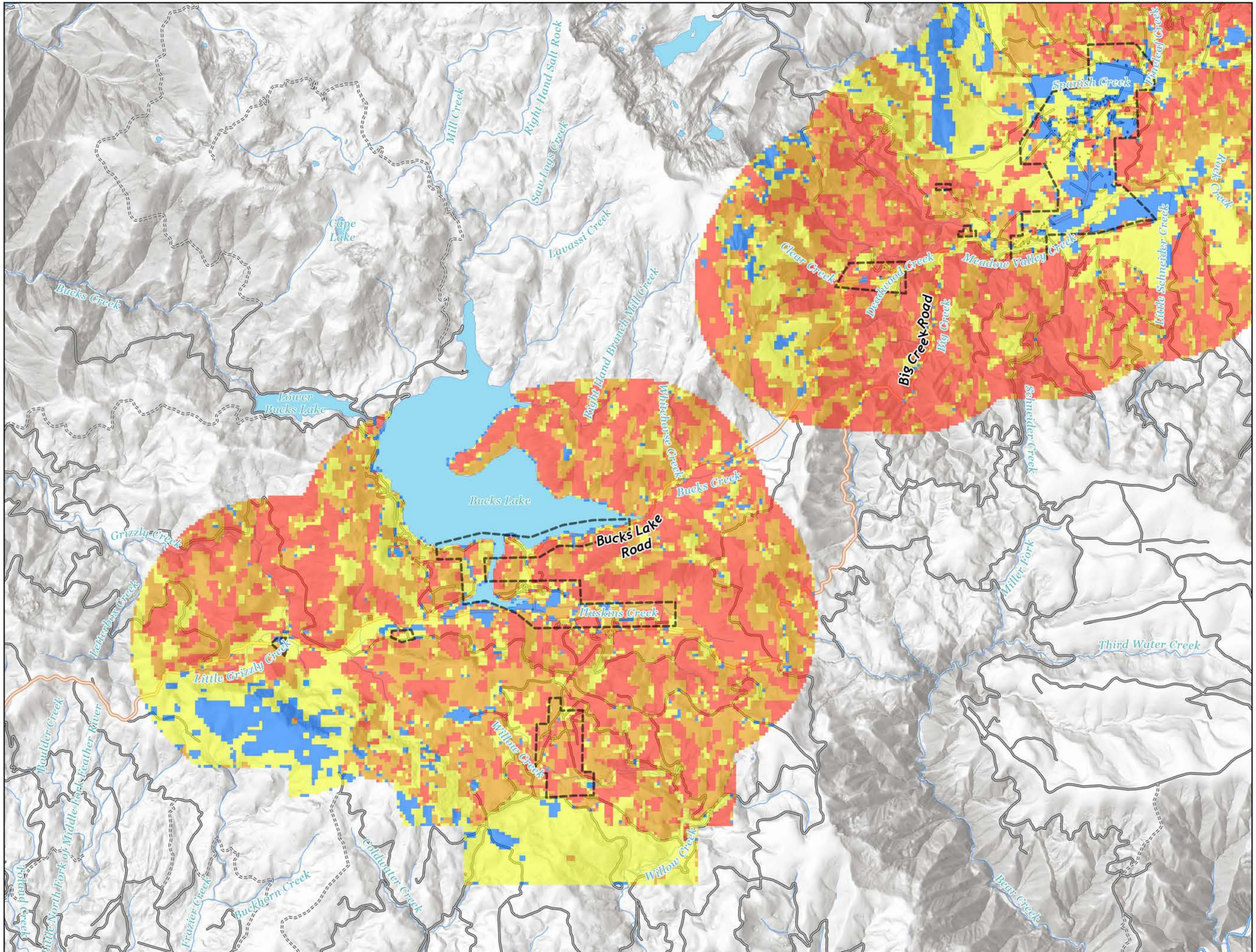
DEER CREEK RESOURCES

Updated: 10/31/2025

Plumas Hazard Assessment

# Current Threat Map

*Bucks Lake Area*

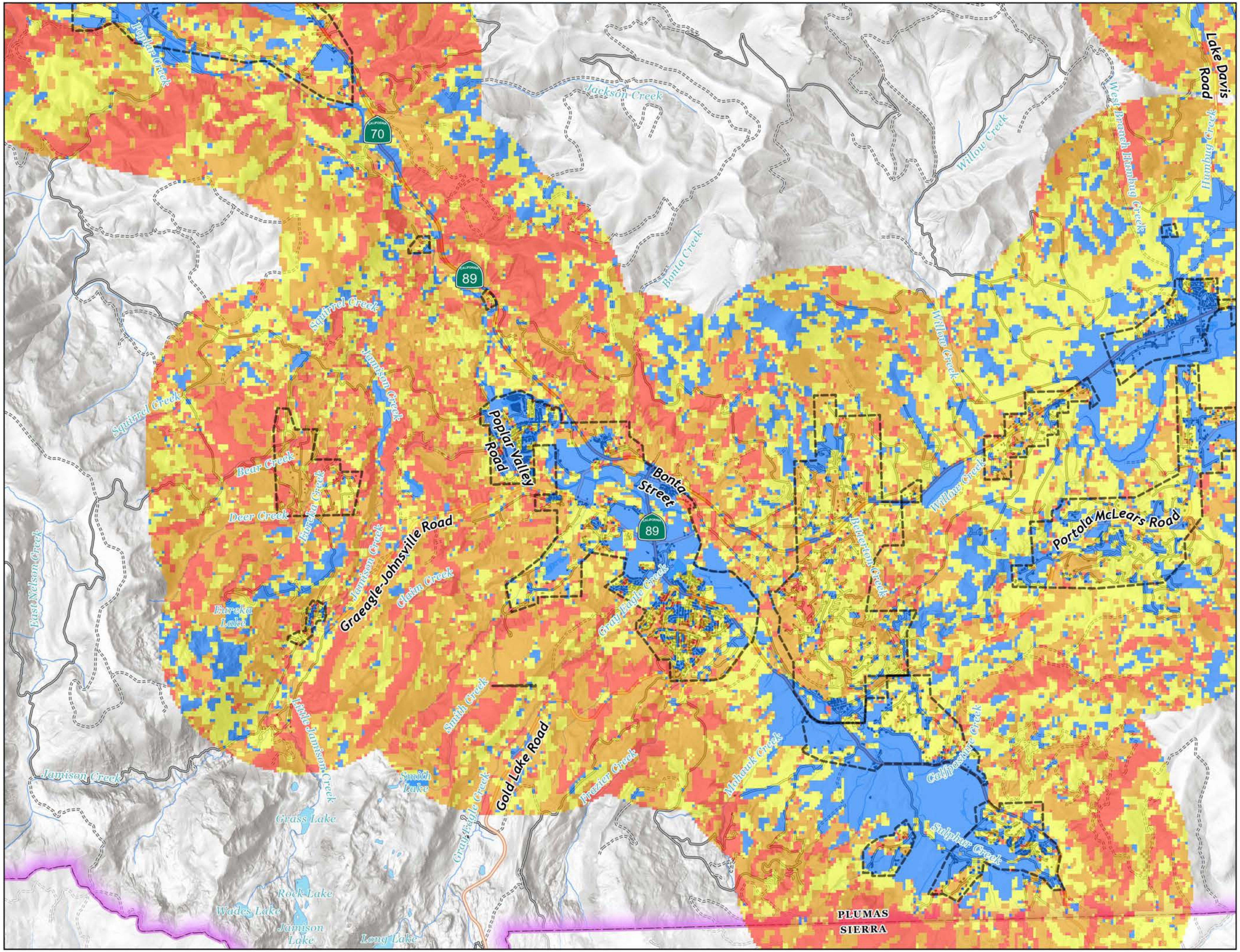





Note: This product is compiled from current data and represents current risk. It does not represent future wildfire threats that will change based on future conditions

N
1:60,000
0 0.47 0.95 1.9 Kilometers
0 0.35 0.7 1.4 Miles

DEER CREEK RESOURCES
Updated: 10/31/2025




Plumas Hazard Assessment

# Current Threat Map

## *Graeagle/ Blairsden Area*

- Counties
- WUI - Urban Core
- Building Footprint
- Collector
- Major Road
- Minor Road
- Service
- Track

**Threat Zones**

- Moderate
- High
- Very High
- Extreme

Note: This product is compiled from current data and represents current risk. It does not represent future wildfire threats that will change based on future conditions

N

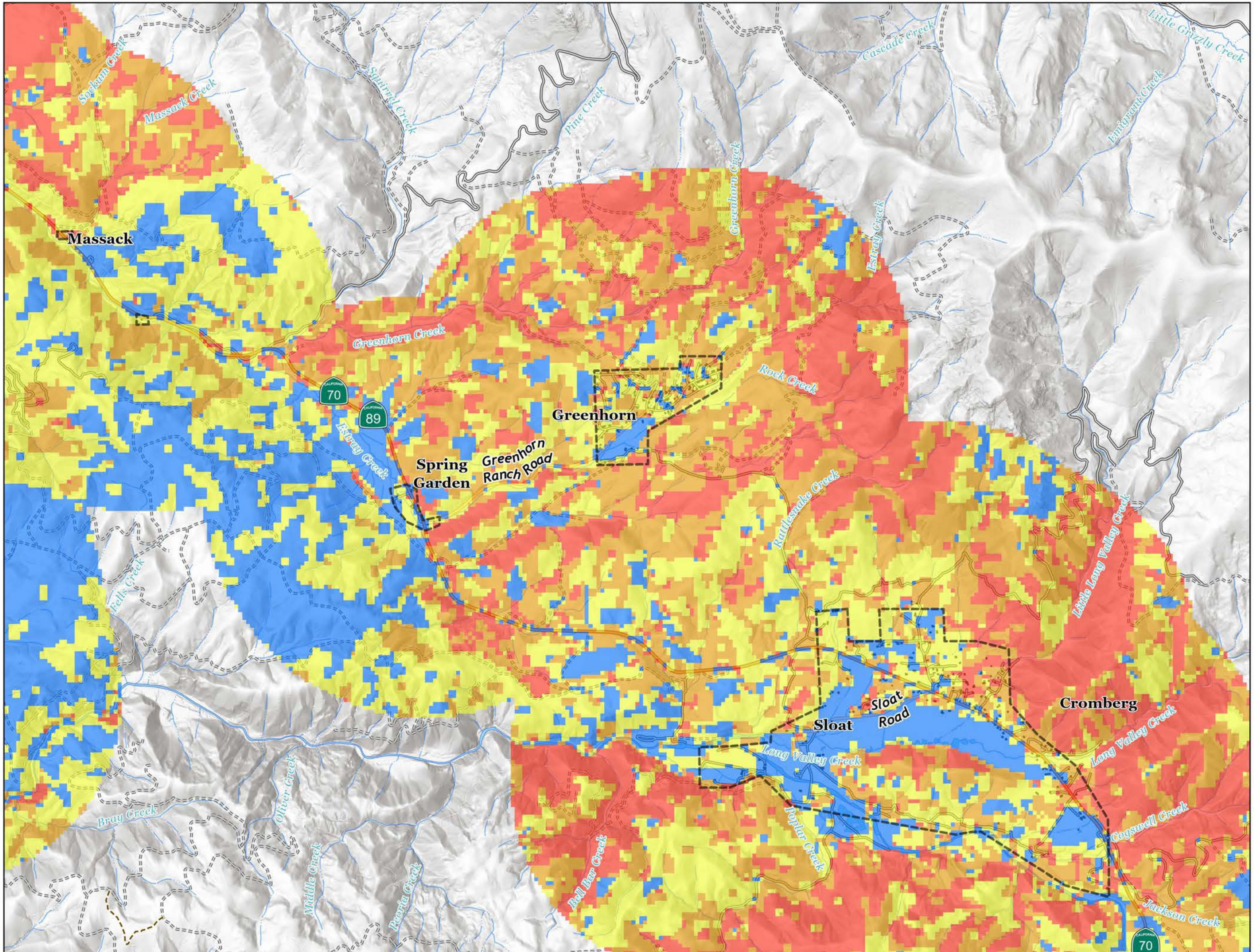
0 0.5 1 2 Kilometers

0 0.4 0.8 1.6 Miles

1:65,000

DEER CREEK RESOURCES

Updated: 10/31/2025




Plumas Hazard Assessment

# Current Threat Map

## *Greenhorn Area*

- Counties
- WUI - Urban Core
- Building Footprint
- Collector
- Major Road
- Minor Road
- Service
- Path
- Track

**Threat Zones**

- Moderate
- High
- Very High
- Extreme

Note: This product is compiled from current data and represents current risk. It does not represent future wildfire threats that will change based on future conditions

N

0 0.35 0.7 1.4 Kilometers

0 0.28 0.55 1.1 Miles

1:45,000

DEER CREEK RESOURCES

Updated: 10/31/2025

# 6. Fuels Treatment Strategies

## 6.1 Strategic Project Identification

Strategic project identification in this assessment was guided by an integrated analytical framework that combines high-resolution fuels data, fire behavior modeling, and HVRA analysis. The goal was to identify where treatments will provide the greatest reduction in wildfire risk to communities, infrastructure, and ecological resources. Rather than selecting projects based on pre-defined locations or legacy priorities, the process was driven by data, focusing on where modeled fire intensity, ignition likelihood, and asset concentration intersect (see Section 3.2). This approach ensures that each recommended project directly targets measurable risk factors and aligns with current on-the-ground conditions across Plumas County.

A key methodological component of this process was the use of the CALVEG classification system to divide the county into manageable planning zones, referred to as Potential Project Zones (PPZs). CALVEG provides a consistent vegetation-based framework that reflects both ecological and management boundaries. By using vegetation cover types to define PPZs, the analysis created discrete zones that follow natural topographic features and human development patterns, improving spatial precision and interpretability. This vegetation-based zoning system also helps planners contextualize each project within its ecological setting, whether mixed conifer, eastside pine, or chaparral, and allows for meaningful comparison of fire behavior potential among similar fuel environments. In practice, the CALVEG boundaries aligned closely with modeled Fire Threat Zones, providing a coherent structure for organizing and prioritizing treatments. Because CALVEG data are widely used across state and federal agencies, the resulting PPZ framework is interoperable with other planning tools and supports efficient data sharing and coordination in future Fire Safe Council projects.

Within each PPZ, the project team combined LiDAR-derived fuel metrics, FlamMap fire behavior modeling outputs, WUI zones, and HVRA results to determine if a certain project type was recommended and to evaluate where recommended treatments would have the highest benefit-to-effort ratio. Recommended Project type was determined based on multiple factors, including Flame Length, Ladder Fuel Density, Canopy Cover, Slope, Crown Fire Potential, and Canopy Height.

Secondary projects were selected if they neighbored the primary recommended project areas and met slightly relaxed thresholds. This secondary neighboring selection process connected otherwise isolated project areas into larger contiguous project areas. Recommended projects were given a priority score based on the logarithm of Fireline Intensity, which WUI zone the project fell within, and HVRA scores indicating concentrations of structures, roads, or critical community assets.

Strategies accounting for recently burned areas were of major concern within Plumas county. Vegetation models and fire behavior models were calibrated as described in section 3.2 to account for post-fire conditions. In areas where post-fire regrowth was driving renewed hazard, particularly within and adjacent to the 2021 Dixie Fire footprint, project identification emphasized maintenance of existing fuel breaks, re-entry burns, and strategic thinning to prevent future high-severity reburns. In unburned forests, where canopy continuity and ladder fuels remain dense, the focus shifted toward restoring historical forest structure through thinning and underburning.

The criteria for prioritizing and sequencing treatments included four primary categories: (1) potential for risk reduction to life and property, (2) alignment with existing or planned treatments, (3) feasibility of implementation, and (4) ecological co-benefits. **Areas with high HVRA scores, proximity to development, and higher threat severity were assigned the greatest urgency**. Proximity to existing shaded fuel breaks or past projects also elevated priority, as connecting treatments amplifies landscape-level effectiveness. Feasibility factors, including slope, access, and landownership complexity, helped determine sequencing order: easily accessible, high-impact projects are implemented first, while more remote or technically challenging sites follow as capacity and funding allow. Finally, projects providing additional ecological or cultural benefits, such as habitat restoration or support for prescribed fire programs, were favored when ranking comparable options.

Cross-boundary collaboration was an essential lens applied throughout project identification. Many high-risk project areas extend across public, private, and tribal lands, underscoring the need for coordination among the U.S. Forest Service, CAL FIRE, local Fire Safe Councils, and private landowners. The shared CALVEG-based zoning facilitated this coordination by giving all parties a common spatial language for describing vegetation types and treatment objectives. These partnerships will allow for consistent treatment prescriptions, shared resources, and seamless transitions between jurisdictions.

Ultimately, the strategic identification process is adaptive and iterative. As vegetation regrows, treatments are completed, or new fires alter landscape conditions, project recommendation boundaries and priority rankings can be updated within the GIS environment. Because each project polygon carries embedded metadata, including vegetation type, modeled fire behavior metrics, HVRA scores, and more, the Fire Safe Council can dynamically track where risk is decreasing and where new vulnerabilities are emerging. This data-rich framework ensures that future updates and funding applications remain grounded in the most current science and spatial analysis available. By integrating CALVEG classification, LiDAR-based fuel metrics, HVRA scoring, and cross-boundary coordination, the 2025 Plumas County Fuels and Wildfire Threat Mapping Assessment provides a transparent, repeatable, and defensible method for selecting and sequencing the county’s highest-priority wildfire mitigation projects.

## 6.2 Emphasis on Prescribed Fire

Prescribed fire in Plumas County depends on a “burn prescription” window: fuels must be dry enough to carry fire, but not so dry that flame lengths, spotting, or escape potential exceed control limits. In many forest types, especially mixed conifer and ponderosa pine, good burning conditions usually occur when surface litter and fine fuels will ignite and spread, while larger fuels remain damp enough to moderate fire intensity. Where ladder fuels are present prescribed fire becomes more sensitive to timing, and units often need additional prep work (mastication, thinning, pile burning, or handline improvement) to keep fire behavior predictable.

Weather is often the deciding factor, even when fuels look "ready." Successful operations typically require moderate temperatures, good overnight humidity recovery, and steady winds that support safe ignition patterns and containment. At the same time, smoke dispersal needs to be adequate, especially near communities and in valleys where inversions can trap smoke overnight and push impacts into the next day. In complex mountain terrain, local winds can shift quickly, and slope-driven fire behavior can change dramatically over short distances, so burn plans have to account for aspect, elevation, drainage winds, and the location of control features like roads, ridgetops, and existing fuel breaks.

In practice, this means most broadcast prescribed burning happens within short "shoulder season" windows: late fall after the first wetting rains, or in spring before sustained drying. These windows can open and close quickly depending on storm timing, snowpack, and short-term weather patterns. Even during a good season, a limited number of burn days may meet all requirements for control, smoke management, staffing availability, and operational readiness. When those days align with crew capacity, permitting, and air-quality constraints, prescribed fire becomes one of the most efficient tools available for reducing long-term wildfire risk.

Climate change is making prescribed-fire "sweet spots" harder to find by increasing weather volatility and shifting fuels out of prescription more quickly. In the northern Sierra Nevada, Fossum et al. (2024) found that prescribed-fire weather windows decreased in Plumas County from 2000-2022 (even as winter opportunities increased), suggesting fewer reliably moderate days for safe, effective burning. Across the western U.S., Swain et al. (2023) similarly project that ~2°C of warming could reduce suitable prescribed-fire days overall, especially in spring and summer, while winter may become a comparatively more favorable window in some northern areas.

Prescribed fire is a cornerstone of Plumas County's wildfire mitigation strategy, essential for reducing hazardous fuels and restoring ecological function across fire-adapted landscapes. When applied at appropriate scales and intervals, it effectively lowers wildfire severity, maintains manageable fuel loads, and promotes forest health. It also supports suppression efforts by creating defensible terrain and sustaining fuel breaks across the landscape.

Feasibility varies by location. Low- to mid-elevation mixed conifer and ponderosa pine forests, where fire historically burned frequently, offer the best opportunities for prescribed burning, especially where road access, fuel breaks, and community support already exist. Higher elevations and steep terrain pose greater safety and logistical challenges, often requiring mechanical treatment before burning. Near communities, burns must be carefully timed to meet air-quality standards and protect sensitive populations.

While prescribed fire is widely recognized as a best practice, its use is constrained by social, ecological, and regulatory factors. Public concern over smoke, liability, and escaped fire can limit implementation. Heavy fuel accumulations increase risk in untreated stands, and permitting requirements through the Northern Sierra Air Quality Management District and NEPA/CEQA processes can restrict burn windows.

Despite these challenges, Plumas County has strong local capacity to expand prescribed fire. The Plumas Underburn Cooperative (PUC) and Feather River Resource Conservation District (FRRCD) have mobilized landowners, developed burn plans, and coordinated operations with CAL FIRE and the U.S. Forest Service. These partnerships demonstrate the value of coordinated cross-boundary fire use at both parcel and landscape scales.

Ongoing investments in training and coordination, through programs such as TREX (Prescribed Fire Training Exchanges), cooperative burn days, and standardized burn plan templates, will continue to strengthen local capacity. Improved smoke management, communication tools, and real-time air-quality monitoring can further build public confidence and enable prescribed fire to play its full role in maintaining resilient, fire-adapted ecosystems.

**California Black Oak Restoration**

Decades of fire suppression have allowed conifers to encroach upon and outcompete California black oak (*Quercus kelloggii*) stands, resulting in significant habitat loss across much of Plumas County (Stephens et al., 2023). Prescribed fire provides a powerful tool for reversing this trend, offering dual benefits of reducing hazardous fuels and promoting black oak regeneration. When applied strategically, prescribed burns can mimic the low- to moderate-intensity fires that historically maintained oak woodlands, opening the canopy and creating the light conditions needed for black oak sprouting and growth.

Recent post-fire landscapes also present important opportunities for restoration. In the aftermath of the 2021 Dixie Fire, Stephens et al. (2023) found that while 100% of conifers in monitored plots were killed, 61% of black oaks successfully re-sprouted after being top-killed. These findings suggest that, with targeted management, including invasive species control, selective snag removal, and follow-up prescribed burning, large areas of black oak habitat can be effectively restored within recent burn scars. Restoring these stands will not only enhance biodiversity and cultural values but also contribute to long-term fire resilience by maintaining more open, patchy forest structures less prone to severe crown fire.

**Standard Strategic WUI**

Developed by Terra Fuego, the Standard Strategic WUI system is a coordinated wildfire mitigation framework tailored to Plumas County’s landscape, where small, forest-embedded communities face complex wildfire risk. It organizes mitigation into a three-tiered spatial structure—Primary, Secondary, and Tertiary WUI zones—that guide the placement of defensible space treatments, shaded fuel breaks, and prescribed burns at increasing distances from community cores. This tiered design allows for phased implementation, coordinated funding, and prioritization across public, private, tribal, and federal lands. Central to the system are Community Encompassing Fire Lines, strategically located fuel breaks that follow natural terrain rather than property lines. These fire lines enhance suppression effectiveness, create anchor points for prescribed fire, and improve firefighter safety by establishing predictable access and control features across jurisdictions.

At its core, the system integrates prescribed fire as both a community protection tool and an ecological restoration practice. By promoting frequent, low-intensity burns, it seeks to restore natural fire regimes while maintaining defensible landscapes around communities. Countywide recommendations emphasize: developing a prescribed fire framework that connects local fuel reduction to inter-community burning; prioritizing treatments in the Primary WUI; designing burn units that cross ownership boundaries and can be re-burned cyclically; supporting local capacity through tribal fire programs, Prescribed Burn Associations, and volunteer departments; and tracking outcomes through field monitoring and remote sensing. Implementation will require sustained, multi-year investment, a unified GIS planning framework, and formalized stewardship agreements among agencies and landowners. Together, these actions shift Plumas County toward a proactive, science-based approach that aligns home protection, ecological health, and fire-adapted community planning.

Please note that this “Standard Strategic WUI” should not be confused with the administrative and legal definition of the Wildland Urban Interface (WUI) designations, as adopted by the Plumas County Board of Supervisors in 2023.

## 7. Recommendations

The primary outcome of this hazard assessment is a GIS data package that maps wildfire hazards, fuels, fire history, and priority treatment areas across Plumas County. Designed as a practical planning tool for the Fire Safe Council, local agencies, and communities, it supports project development, partner coordination, and preparation of competitive grant applications. The package includes detailed information for each WUI community, helping users identify urgent needs such as evacuation-route clearance as well as longer-term strategies like landscape-scale fuel breaks and ecological restoration.

This document summarizes the GIS deliverables and provides guidance on their use, describing key layers, methods, and assumptions, and showing how the data can inform real-world decisions. While the narrative sections offer context and recommendations, the GIS products are the core deliverable—a parcel-to-landscape resource that can be updated over time and integrated into CWPP updates, fuels reduction planning, and local grant proposals.

**How to Use the GIS Data Package**

The GIS data package provided with this hazard assessment is the primary deliverable. It contains spatial datasets and map products that allow users to visualize wildfire hazards, assess treatment priorities, and plan future projects at both community and landscape scales. This section explains the contents of the package and provides guidance on how to use it effectively.

**Contents of the GIS Package**

The package includes the following key datasets and map layers:

- Vegetation and Fuel Models: Classifications of surface, ladder, and canopy fuels derived from NAIP imagery and satellite data.
- Wildfire Threat Mapping: Modeled wildfire behavior outputs (rate of spread, flame length, ember potential) under severe weather conditions.
- Proposed Treatment Areas: Recommended zones for immediate action (e.g., roadside clearance, defensible space buffers, fuel breaks) by Priority and by Treatment Type.
- High-Value Resource and Assets (HVRA) Mapping: A weighted map layer that highlights areas of highest community value.
- Community-Encompassing Fire Line (CEFL) Mapping: Strategic locations to construct and maintain long-term fire lines.
- Fire History: Wildfire perimeters, ignition points, and burn severity for past incidents.
- WUI Community Boundaries: Delineations of each Wildland Urban Interface community in Plumas County.
- Existing Project Treatments: Treatment polygons from the Forest Service’s Hazardous Fuel Treatment Reduction program and the Integrated Interagency Fuels Treatments datasets.

All data is delivered as both GIS shapefiles/geodatabases (for advanced users) and KMZ files (for easy visualization in Google Earth).

### Navigating the Data

- GIS Software Users (ArcGIS, QGIS):
  Load the shapefiles or geodatabase into your GIS platform to view, query, and edit the data. Users can zoom to specific communities, overlay datasets (e.g., fuels with fire history), and generate custom maps for project planning or grant proposals.

- Google Earth Users:
  Open the provided KML files to quickly explore treatment areas and hazard zones in an intuitive, 3D environment. This is ideal for public meetings, presentations, or site-level planning with landowners.

### Applying the Data

The GIS package is intended to be an **action-oriented planning tool**. Key applications include:

- Project Development: Identify parcels, roadsides, or forest stands where fuel conditions are highest and develop proposals for treatment.
- Grant Writing: Use hazard maps and priority treatment layers as supporting evidence in applications to CAL FIRE, FEMA, USFS, and other funders.
- CWPP Updates: Integrate updated hazard layers directly into Community Wildfire Protection Plan maps and text.
- Monitoring & Maintenance: Revisit mapped treatment areas over time to track progress, update condition data, and document compliance.
- Public Outreach: Share simplified maps with residents to illustrate local risk and explain defensible space priorities.

### Prioritization Framework

The data is structured to support decision-making at multiple scales:

- Countywide Scale: Compare risk across all WUI communities to guide funding allocation and regional strategy.
- Community Scale: Zoom in on Chester, Quincy, Graeagle, Portola, and other WUI areas to identify treatment needs specific to each community.
- Parcel Scale: Evaluate vegetation and defensible space conditions at the lot level to guide inspections, resident assistance programs, and neighborhood-scale projects.

**Keeping the Data Current**
The GIS package provides a strong foundation but should be treated as a living dataset. To maintain relevance:

- Incorporate new wildfire perimeters, ignition points, and fuel data as they become available.
- Add polygons for completed fuel treatments to track accomplishments and avoid duplication.
- Use post-treatment monitoring to refine hazard ratings and update community priorities.
- Synchronize data with state and federal repositories (FRAP, CAL FIRE, USFS) to ensure consistency.

**Support and Training**
The Fire Safe Council may wish to provide basic GIS training sessions for staff and partners, focusing on:

- Loading and navigating the data.
- Generating custom maps for grant applications.
- Updating layers with new treatments and field observations.
- Exporting simplified versions for community outreach.

## 7.1 Community-Specific Priorities

This section presents general guidance for hazardous fuels treatment across the major communities of Plumas County. Each narrative outlines a combination of short-term (1-3 years) and longer-term (3-10 years) strategies aimed at reducing wildfire risk in and around developed areas. The recommendations reflect the current vegetation conditions, fire history, and built environment characteristics of each community, as well as the broader regional context of post-Dixie Fire recovery and long-standing fuel accumulation in unburned forests. These narratives are intended to guide local partners, Fire Safe Councils, resource agencies, and community leaders in identifying priority areas and actions that support wildfire resilience at both the parcel and landscape scale.

While the guidance provided here is necessarily broad—highlighting key zones for defensible space expansion, perimeter fuel breaks, roadside vegetation clearance, and coordinated treatment corridors—it is designed to be used in conjunction with the GIS database and maps delivered with this report. Those spatial products offer more detailed and site-specific recommendations, identifying polygons where fuel treatments are most urgent based on vegetation type, slope, housing density, and proximity to critical infrastructure or known ignition zones. Users are encouraged to overlay the narrative guidance with these mapped outputs to refine their implementation plans and prioritize investments where risk is highest.

This work should balance the urgency of near-term fire preparedness with the long view of landscape-scale fire adaptation. In many areas, this means linking treated zones into broader fuel break networks, coordinating with landowners to manage regrowth in burn scars, and gradually transitioning vegetation in the WUI toward more fire-resistant, drought-adapted conditions. These approaches reflect widely accepted best practices in fire-prone landscapes and are aligned with Plumas County's Five-Year Strategic Plan for wildfire mitigation and resilience.

Ultimately, these recommendations are not intended to be prescriptive checklists, but rather foundational guidance to support local decision-making, collaboration, and project development. As conditions change and treatment projects evolve, the general narratives and GIS data together can serve as living tools to inform CWPP updates, grant proposals, and adaptive fuels management across the county. Users should revisit and update priorities regularly to account for new fire events, fuel regrowth, and progress in treatment implementation.

## Chester / Lake Almanor Basin

**Urgent Priorities:** The most urgent fuel-reduction needs center on reinforcing community perimeters and securing evacuation routes where dense conifer fuels, steep terrain, and concentrated WUI development create elevated hazard. The highest-risk areas are concentrated along the east side of the lake where roadside thinning and shaded fuel breaks are critical to keeping Highways 147, 36, and 89 open and defensible during an emergency. Additional priority areas on the west shore underscore the need to strengthen WUI buffers where heavy fuels press directly against residential neighborhoods. Across these zones, the immediate emphasis is on evacuation-route hardening, strategic thinning along community edges, and the removal of ladder fuels within and adjacent to homesites. These treatments reduce flame lengths, slow fire spread, and help prevent a surface fire from escalating into a crown fire as it approaches populated areas.

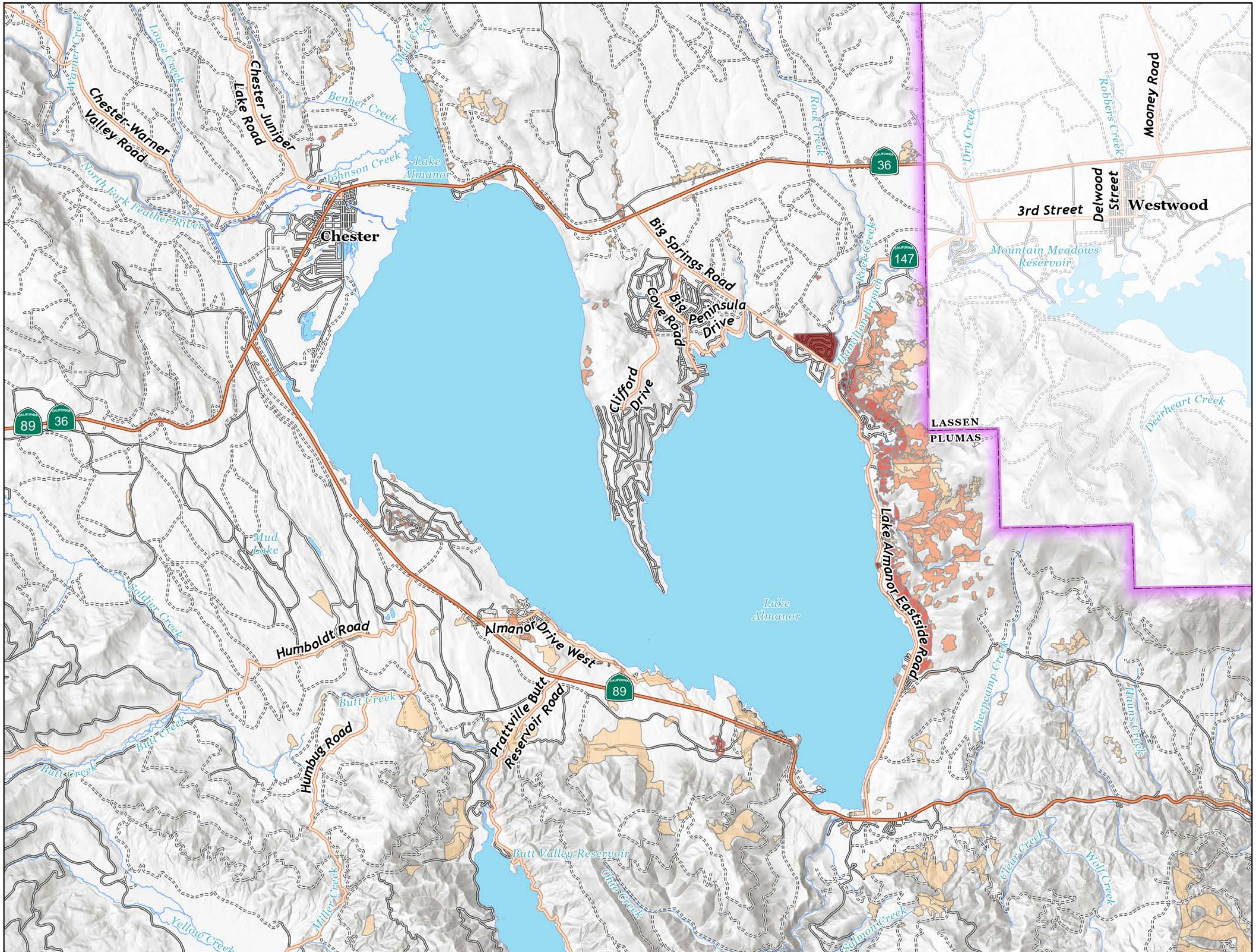
**Longer-Term Strategies:** Planning more landscape-scale fuel treatments to provide lasting protection. A key long-term strategy is to develop and maintain a shaded fuel break that stretches from the outskirts of Chester to the nearby Collins Pine timberlands. This would leverage existing logging roads and management corridors on the timber company's property to create a wide, continuous belt of thinned forest. The fuel break would be shaded, meaning large healthy trees might remain for canopy cover, but brush and excess small trees are removed, resulting in a landscape that can slow down a wildfire while still looking like a forest. Such a corridor would connect community lands with actively managed private timberlands, forming a broad defensive barrier against fires moving in from the wildland.

In tandem with these, there should be an emphasis on strengthening community preparedness. Local authorities should plan to expand defensible space inspections and outreach programs, working through initiatives like Firewise USA to educate and encourage homeowners in maintaining safe property conditions. Regular inspections, community clean-up days, and educational workshops are strategies to keep the importance of defensible space in the public eye. Finally, the long-term approach will incorporate innovative maintenance techniques to deal with regrowing vegetation. In meadows and mixed-conifer understories, consider the use of grazing livestock or mechanical mastication to keep fuels from building up again. These methods can be cost-effective ways to maintain open, low-fuel conditions over large areas. By integrating ongoing maintenance, the community can ensure that today's fuel reductions remain effective years into the future.

Plumas Hazard Assessment

# Recommended Projects Map

## *Almanor/Chester Area*




Recommended Projects

Priority Rank

- Moderate
- High
- Very High
- Extreme
- Counties
- Collector
- Major Road
- Minor Road
- Service
- Track

N

0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

1:85,000

DEER CREEK RESOURCES

Updated: 3/12/2026

## Greenville / Indian Valley

**Urgent Priorities:** In Greenville and the wider Indian Valley, protecting rebuilt and surviving structures requires an immediate focus on reinforcing the zones where dense fuels meet community edges. The highest priority areas form a band around Crescent Mills and Taylorsville, along the lower mountain slopes and at the base of Keddie Ridge, where strategic thinning and shaded fuel breaks are needed to slow downhill fire spread into populated areas. Strengthening these WUI perimeters, especially south of Crescent Mills and along the approaches to Taylorsville, will help disrupt the continuity of heavy conifer fuels that have historically funneled fire toward the valley floor. Maintaining safe evacuation routes is equally critical, especially along Highway 89, where targeted roadside thinning will improve visibility, reduce flame length potential, and ensure reliable access for both evacuees and first responders.

Residents and landowners also play a key role in reducing structure vulnerability. Clearing flammable vegetation within the 100-foot defensible space zone and eliminating ladder fuels beneath remaining conifers significantly reduces the likelihood that a surface fire will transition into the canopy. Combined with strategic community-edge treatments, these local actions form the backbone of near-term wildfire protection for Indian Valley.

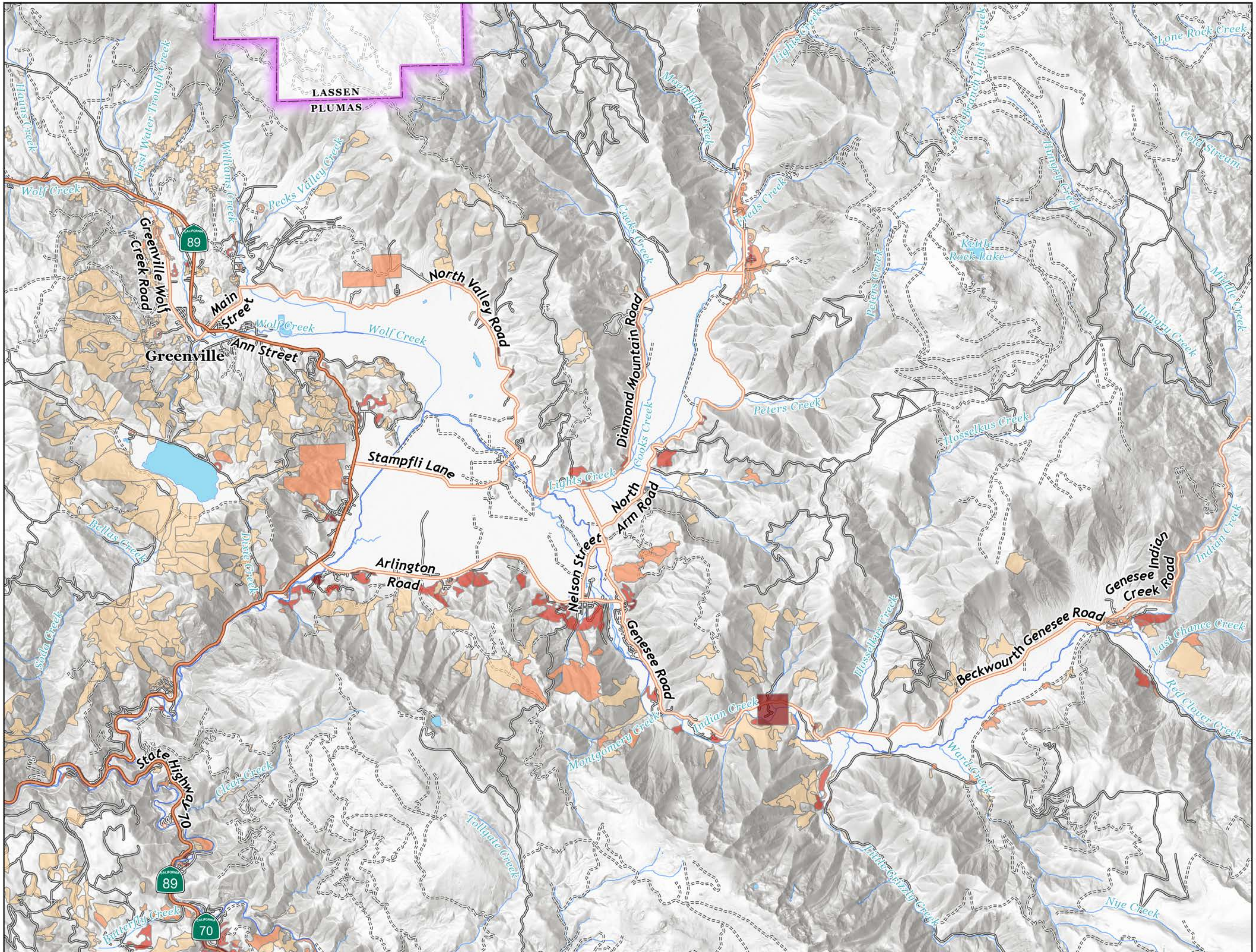
**Longer-Term Strategies:** A focus should be on developing landscape-scale fuel breaks and treated zones that tie into the valley's natural features. For instance, connecting the open, defensible spaces within the valley (such as irrigated pastures or previously burned areas) to new or existing fuel breaks on the forested slopes above. Through collaboration with the U.S. Forest Service and private landowners, the community can create a patchwork of treated areas along ridge lines, roads, or old fire lines that collectively function as a broad shield around Indian Valley. The idea is that any wildfire coming down from the surrounding mountains would encounter one treated area after another, losing intensity before it ever reaches homes or town centers. The slopes above Crescent Mills present an excellent opportunity for a black oak restoration project.

Residents should organize through local Fire Safe Councils and participate in programs like Firewise USA, which provide education on defensible space and home hardening. Regular community meetings, demonstration projects, and even school programs are tools to keep wildfire preparedness a constant part of life.

Plumas Hazard Assessment

# Recommended Projects Map

## Greenville/Indian Valley Area




Recommended Projects
Priority Rank

- Moderate
- High
- Very High
- Extreme
- Counties
- Collector
- Major Road
- Minor Road
- Service
- Track

N

0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

1:90,000

DEER CREEK RESOURCES

Updated: 3/12/2026

## Quincy / East Quincy

**Urgent Priorities:** The most urgent fuel-reduction needs lie along the lower slopes and drainages that frame American Valley, where large, contiguous blocks of high and very high priority treatments cluster upslope from residential areas. The steep terrain to the south and east, including the flanks of Radio Hill, Claremont Ridge, and the drainages feeding Spanish, Gansner, and Mill Creeks. forms a broad arc of elevated hazard where strategic thinning and shaded fuel breaks are essential to slow uphill and downhill fire spread toward town. Maintaining safe evacuation corridors remains critical as well; roadside treatments along Highway 70, Chandler Road, and surrounding connector roads will improve visibility, reduce flame lengths, and keep these lifelines open during an emergency. Within the WUI surrounding Quincy, dense mixed-conifer stands and heavy surface fuels require targeted thinning and ladder-fuel removal to create a more effective defensive buffer around neighborhoods. Combined, these actions strengthen the community's perimeter, enhance evacuation safety, and reduce the likelihood that a slope-driven fire will reach homes in American Valley.

**Longer-Term Strategies:** One major strategy is to create a greenbelt of fuel-treated lands wrapping around the west and south sides of the community. This greenbelt would be a wide band of thinned forest and cleared understory that serves as a robust fire break. Not only would it help protect Quincy from fires approaching through the forests, but if planned thoughtfully, it could double as a recreation area, with trails or open space where residents can hike, bike, and enjoy nature while helping to maintain a low-fuel environment.

Quincy works closely with Feather River College to maintain and showcase fuels reduction projects. The college campus should be used as a demonstration site for effective fuel management, from clearing brush and thinning trees, to creating defensible space around buildings. This creates a learning opportunity where students and community members can see first-hand what a well-maintained, fire-resistant landscape looks like.

In addition to managing the wildland fuels, consider the community's built environment. Encourage the adoption of fire-resistant building retrofits throughout Quincy and East Quincy, recognizing that structure-hardening goes hand in hand with vegetation management. Home and business owners should be informed about the benefits of upgrading to ember-resistant vents, Class A fire-rated roofing materials, dual-pane windows, and other improvements that make buildings less likely to ignite during a wildfire. To support this, explore incentive programs that would help offset the cost for property owners who invest in these safety measures.

# Recommended Projects Map

## *Quincy Area*


Recommended Projects

Priority Rank

- Moderate
- High
- Very High
- Extreme
- Counties
- Collector
- Major Road
- Minor Road
- Service
- Track

N

1:90,000

0 0.5 1 2 Kilometers

0 0.5 1 2 Miles

DEER CREEK RESOURCES

Updated: 3/12/2026

## Graeagle / Blairsden / Plumas Eureka

**Urgent Priorities:** In the Graeagle, Blairsden, and Plumas Eureka area, the highest fuel-reduction priorities are concentrated along the lower slopes and drainages that rise immediately above neighborhoods, where dense pine stands and heavy surface fuels create a continuous pathway for fire to move toward homes. The most extensive high-priority units lie south and west of Plumas Eureka, along Jamison Creek, Eureka Peak Road, and the slopes surrounding Eureka Lake, where strategic thinning and ladder-fuel removal are essential to prevent a surface fire from transitioning into the canopy. Additional high-priority areas along Highway 70 near Blairsden highlight the need to maintain safe travel routes and ensure that evacuation and fire-response access are not compromised by overgrown roadside vegetation.

Within and adjacent to residential areas, mixed conifer pine stands contain abundant young regeneration and understory growth that require pruning, thinning, and surface fuel cleanup to reduce flame lengths and crown-fire potential. Wildland patches bordering golf courses, resort areas, and scattered homes have also accumulated significant downed needles and branches that can carry fire into developed areas if left untreated. Taken together, these conditions point to an urgent focus on WUI-edge thinning, roadside corridor treatments, and the reduction of heavy surface fuels in key wildland pockets.

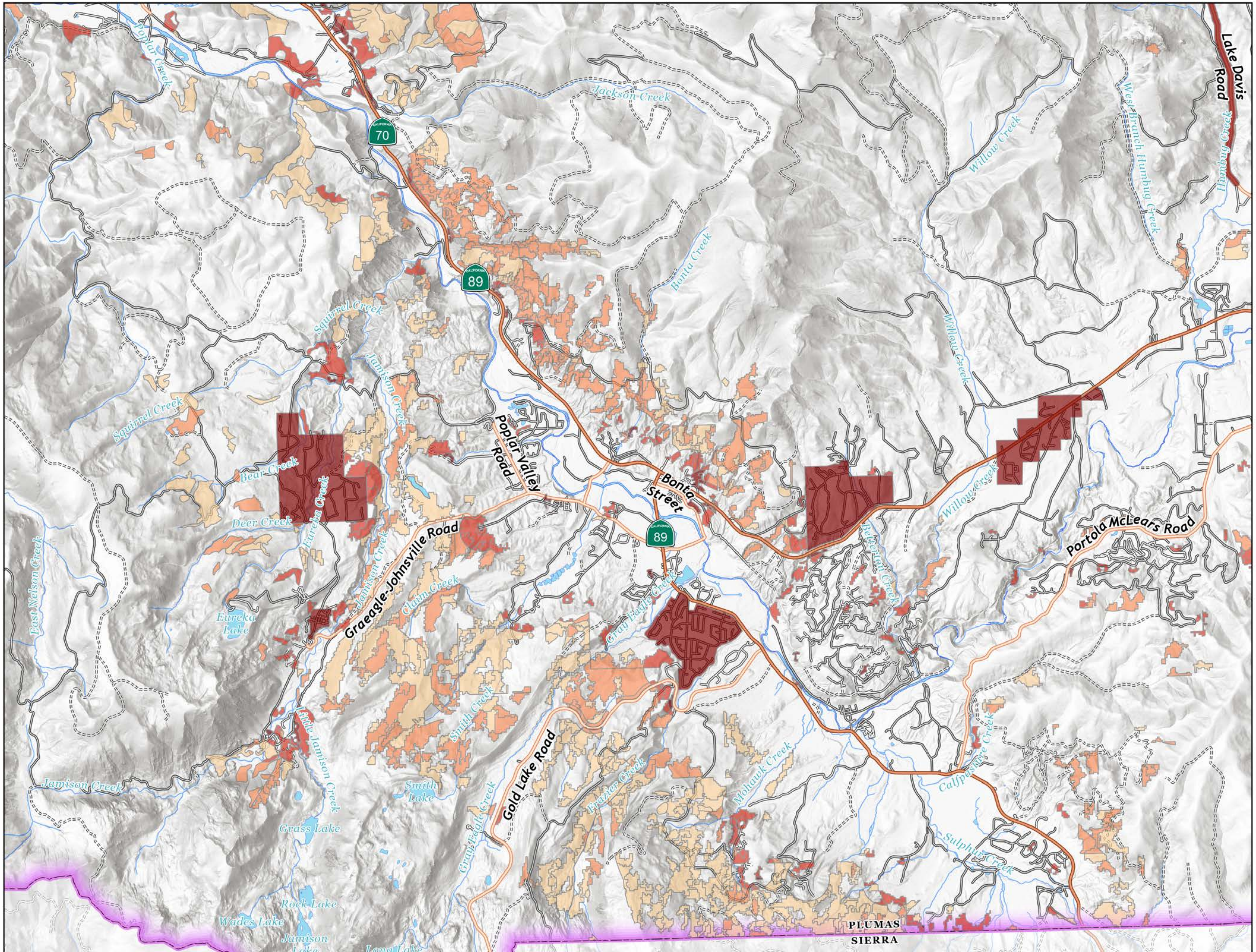
**Longer-Term Strategies:** Plan a cohesive, large-scale approach to fuel management that knits together efforts on both public and private lands. Given that these communities are adjacent to extensive National Forest areas, local fire planners should collaborate with the Forest Service to design landscape treatments that extend from the wilderness right up to people's backyards. The goal is to create a continuous band of treated forest from the community boundaries outward into the National Forest. By reducing fuel loads in a graduated way as one moves closer to the communities, any wildfire coming out of the wildlands should begin to lose intensity before it reaches the first homes.

Property owners should maintain defensible space and low-fuel conditions, an effort that calls for strong local organization. The plan is to support defensible space maintenance through partnerships with HOAs and regular inspections. Many neighborhoods in Graeagle and Blairsden have active HOAs, which can help by disseminating fire-safe information, organizing community work days, and even enforcing rules about property cleanup in common areas. Forming a volunteer-based fuels crew program can provide training and equipment to local volunteers to assist with routine fuels reduction projects.

Plumas Hazard Assessment

# Recommended Projects Map

## *Graeagle/ Blairsden Area*




Recommended Projects

Priority Rank

- Moderate
- High
- Very High
- Extreme
- Counties
- Collector
- Major Road
- Minor Road
- Service
- Track

N

1:65,000

0 0.5 1 2 Kilometers

0 0.4 0.8 1.6 Miles

DEER CREEK RESOURCES

Updated: 3/12/2026

## Portola

**Urgent Priorities:** In the Portola area, the most urgent fuel-reduction needs are concentrated along the wildland edges north and west of town, where steep slopes and dense mixed-conifer stands create clear pathways for fire to move toward residential neighborhoods. High-priority treatment areas cluster along Lake Davis Road, the Iron Horse residential area, and the forested interface north of Portola, indicating the need for strategic thinning and ladder-fuel removal to reduce the likelihood of slope-driven fire spreading into town. Within Portola itself, improving defensible space remains critical, particularly in mobile home parks and densely built neighborhoods on the community's margins. Removing dry grasses, low limbs and latter fuels, and accumulated surface fuels will increase structure survivability during ember-driven fire events.

Highway 70 continues to function as Portola's primary evacuation route and a recurring source of roadside ignitions, and the map highlights several high-priority polygons along the corridor west of town near the Chalet View Lodge and to the east near Feather River RV and Mobile Home Park. Clearing back brush and trimming overgrown trees along these segments is essential to maintain safe passage for evacuees and responder access during wildfire emergencies.

North of Portola, the Lake Davis residential area sits in dense conifer forests, steep terrain, and limited access routes. Fuel-reduction work, particularly thinning, roadside corridor treatment, and understory cleanup, should be prioritized here to slow potential fire spread, protect homes, and ensure that narrow roads remain viable during an evacuation.

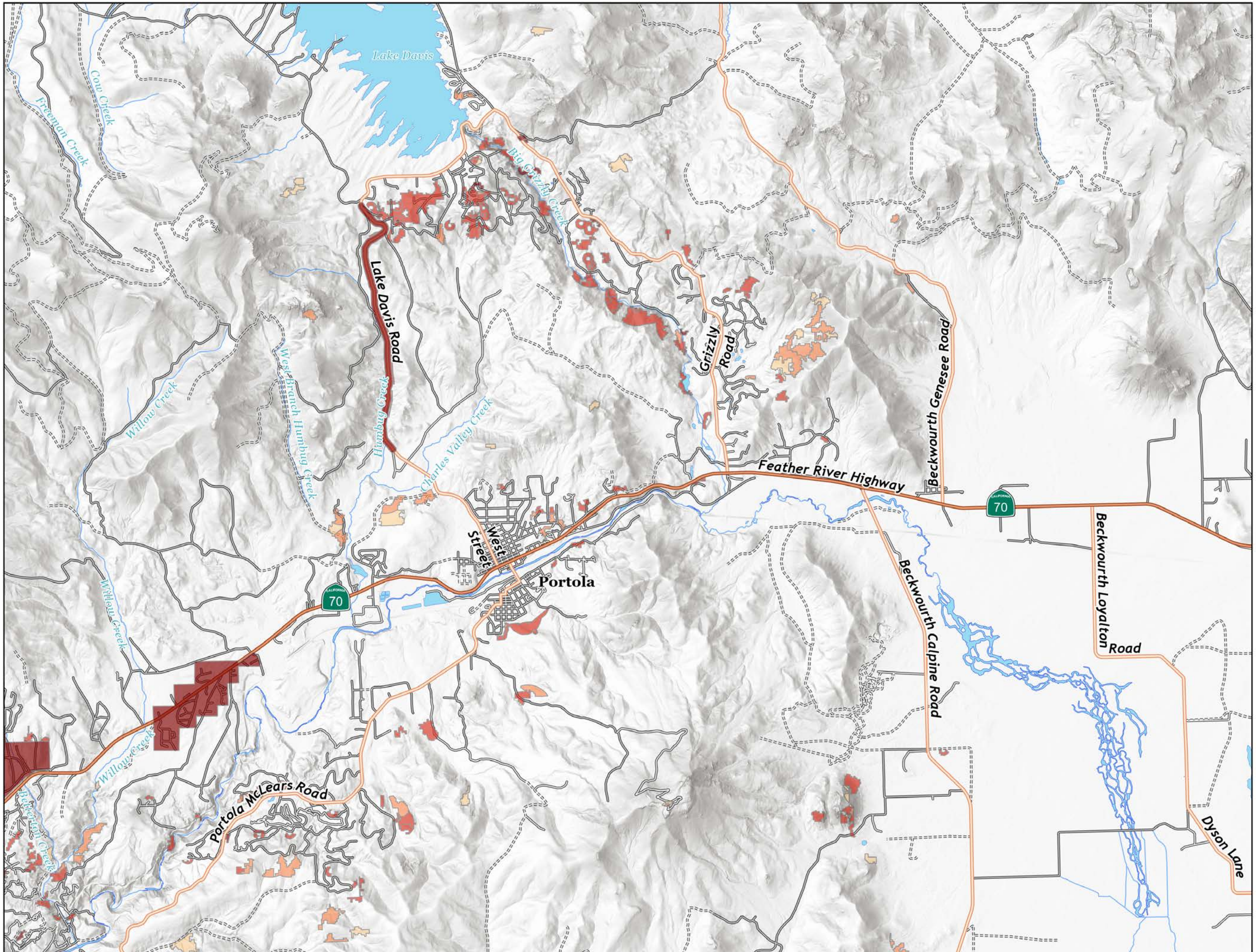
**Longer-Term Strategies:** Portola's long-term fire mitigation strategies should emphasize regional partnerships, community-scale support systems, and a shift toward fire-adapted landscaping across neighborhoods. Given the city's position within a larger wildland matrix, local planners and leaders are encouraged to coordinate with the U.S. Forest Service to extend fuel treatment efforts into adjacent national forest lands. Treatments should be strategically placed beyond the urban edge, such as thinning dense forest stands on nearby ridges or reinforcing perimeter fuel breaks, to slow the spread of wildfire toward residential areas. Establishing this kind of collaborative buffer zone could significantly enhance the city's protection and give firefighters a tactical advantage during future fire events.

Portola should promote a gradual shift toward fire-adapted landscaping, particularly in higher-density residential zones. Educational materials, demonstration gardens, and community workshops can introduce residents to plant species with lower flammability, drought tolerance, and local suitability. Homeowners should be encouraged to replace resinous shrubs with hardscaped features like stone borders or gravel paths, which break up fuel continuity around structures. Municipal properties and parks can lead by example, showcasing attractive and resilient landscaping that aligns with defensible space principles.

Plumas Hazard Assessment

# Recommended Projects Map

## *Portola Area*




Recommended Projects

Priority Rank

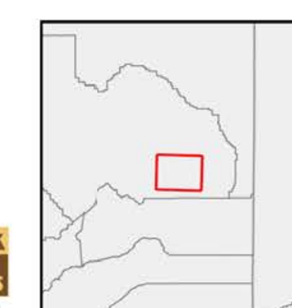
- Moderate
- High
- Very High
- Extreme
- Counties
- Collector
- Major Road
- Minor Road
- Service
- Track

N

1:65,000

0 0.5 1 2 Kilometers

0 0.4 0.8 1.6 Miles



DEER CREEK RESOURCES

Updated: 3/12/2026

### Outlying Communities (Greenhorn, Bucks Lake, La Porte, Canyondam)

**Urgent Priorities:** The mapped priority areas in these outlying communities indicate that evacuation-route hardening is the most urgent need, particularly in locations where narrow, winding roads form the sole ingress and egress for residents. In Greenhorn, heavy fuels lie directly upslope from the community and along Greenhorn Ranch Road, making roadside thinning essential for keeping these constrained corridors open during an emergency. At Bucks Lake, priority areas extend along Bucks Lake Road, the shoreline road network, and key access points near Bucks Lodge and Haskins Creek, highlighting the importance of vegetation clearance to maintain safe travel during peak fire season. La Porte similarly depends on a small set of steep, sinuous roads, and the mapped treatment zones along Quincy-La Porte Road and Valley Creek show where visibility improvements and fuels removal will be necessary to ensure passable evacuation routes.

Across all four communities, defensible-space improvements around homes, especially in older subdivisions where lots are wooded and closely spaced, remain a high-value near-term action. Dense mixed conifer stands, abundant understory growth, and accumulations of pine needles and surface fuels pose a consistent structural ignition threat, particularly in Greenhorn and the dispersed cabins around Bucks Lake.

In places such as Canyondam and portions of Bucks Lake, the maps show priority units in areas recovering from recent wildfires, where dense patches of young conifers and shrubs are forming hazardous post-fire fuel beds. Early intervention treatments (sapling thinning, brush mowing, and targeted understory reduction) are recommended to limit rapid fuel accumulation and reduce the likelihood that regenerating stands transition into continuous ladder fuels.

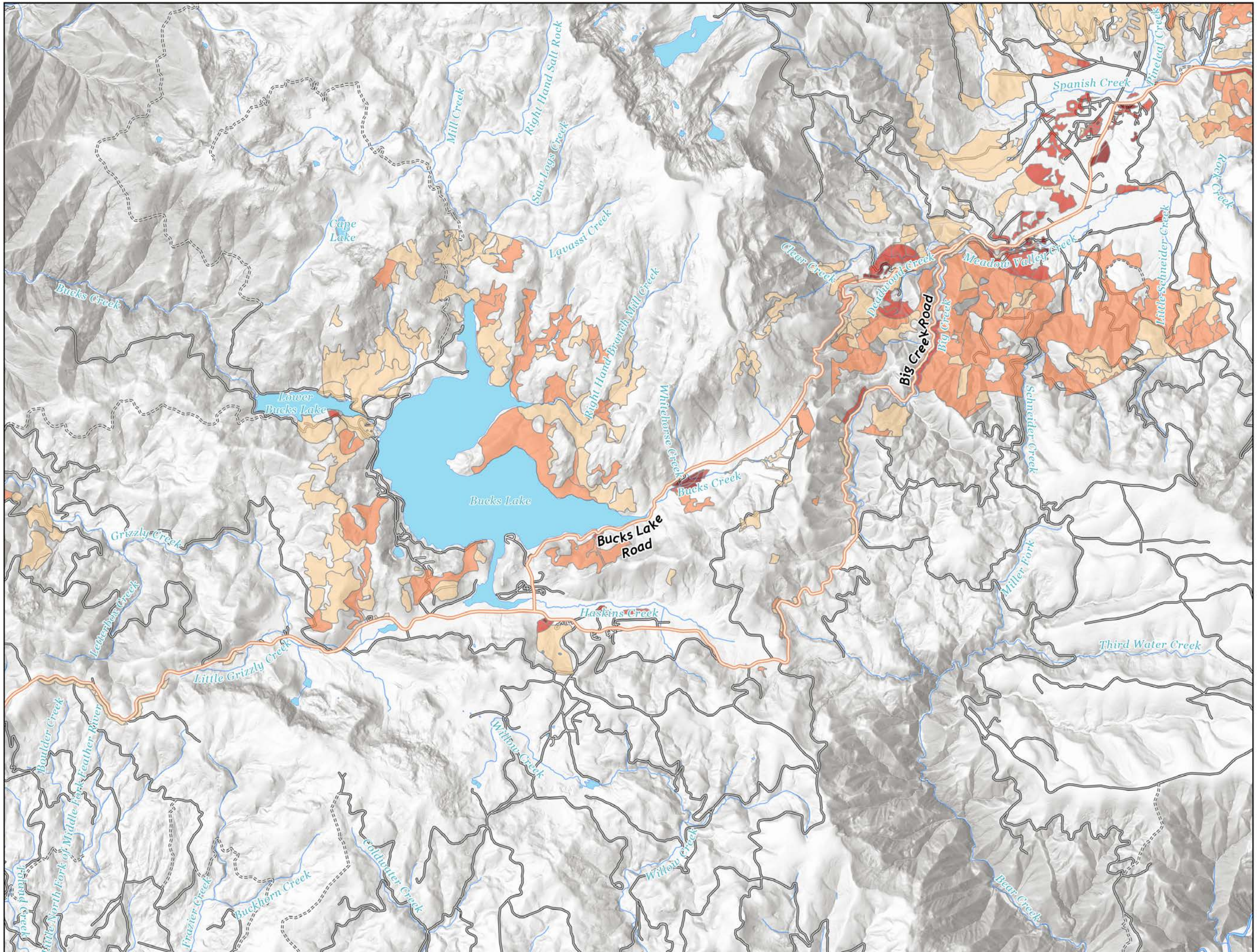
Longer-term resilience in these dispersed communities requires a connected network of fuel breaks that align with the natural topography and existing road infrastructure. The priority areas around Greenhorn present opportunities to strengthen links to Highway 70, while the Bucks Lake treatment areas create potential ridge and roadside anchor points that could tie into more regularly maintained portions of the Plumas National Forest. In La Porte, treatments along ridgelines flanking Valley Creek and Slate Creek could form part of a broader containment grid across the southern portion of the county. Creating these strategic, interconnected breaks will help moderate fire spread across larger landscapes and improve suppression access.

Recreation sites such as Bucks Lake and trailhead areas near La Porte should also be treated as high-priority mitigation zones due to high seasonal visitor during times of elevated ignition potential. Shaded fuel breaks that reduce surface and ladder fuels while retaining canopy cover are appropriate tools in these settings. Pairing physical mitigation with education, signage, burn restrictions, and long-term maintenance agreements will help ensure these treatments remain effective over time. Coordinated action across communities, federal lands, and private holdings, these outlying areas can serve as key defensive nodes in a broader countywide wildfire resilience strategy.

Plumas Hazard Assessment

# Recommended Projects Map

## *Bucks Lake Area*




Recommended Projects

Priority Rank

- Moderate
- High
- Very High
- Extreme
- Counties
- Major Road
- Minor Road
- Service
- Track

N

0 0.47 0.95 1.9 Kilometers

0 0.35 0.7 1.4 Miles

1:60,000

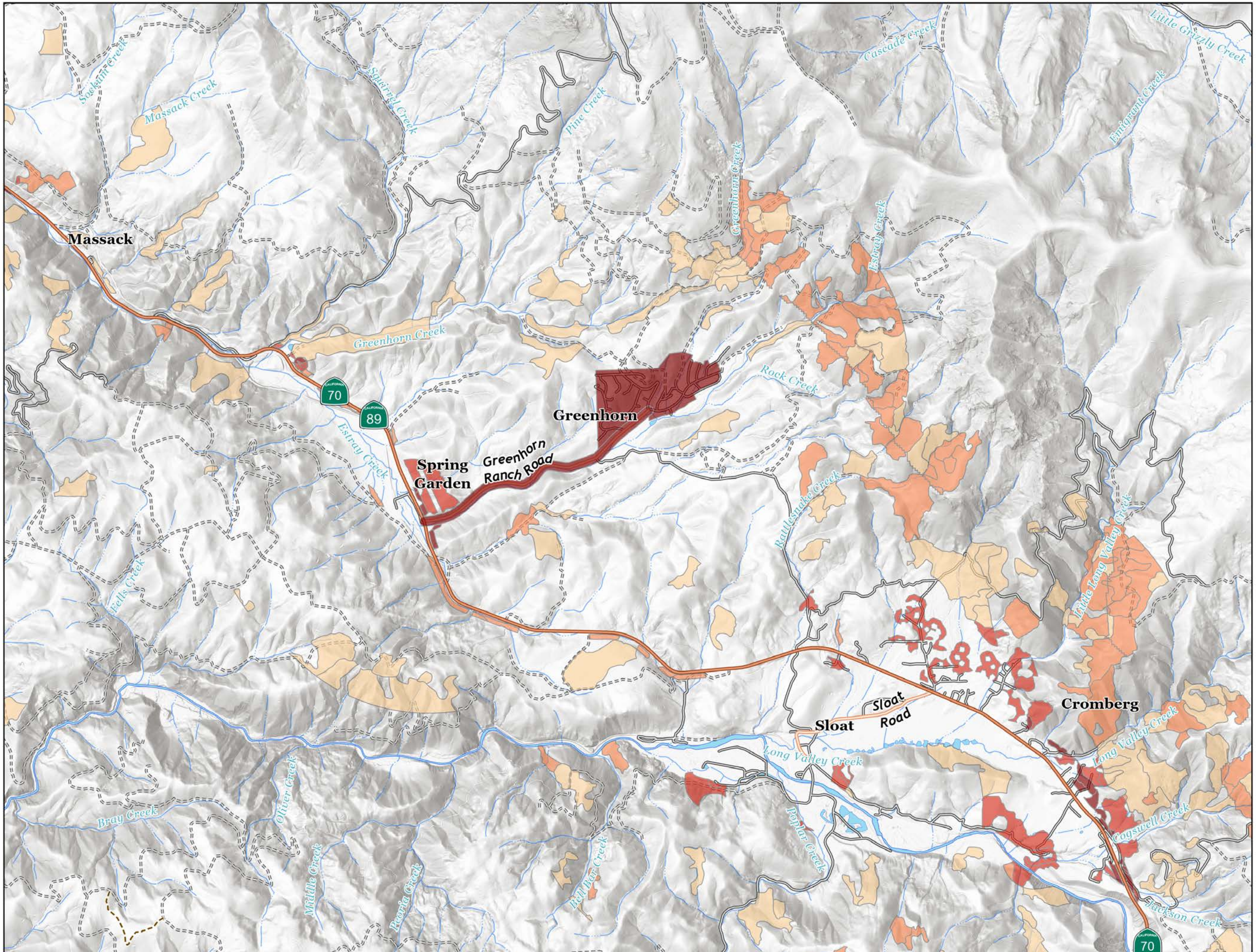
DEER CREEK RESOURCES

Updated: 3/12/2026

Plumas Hazard Assessment

# Recommended Projects Map

## *Greenhorn Area*




Recommended Projects

Priority Rank

- Moderate
- High
- Very High
- Extreme
- Counties
- Collector
- Major Road
- Minor Road
- Service
- Path
- Track

N

1:45,000

0 0.35 0.7 1.4 Kilometers

0 0.28 0.55 1.1 Miles

DEER CREEK RESOURCES

Updated: 3/12/2026

## 7.2 Ladder Fuels Treatments

Fuels treatments are a key component of California's wildfire mitigation strategy, as outlined in CAL FIRE's 2021 Fuels Reduction Guide. These treatments focus on reducing combustible vegetation, especially along roads and near communities, to decrease wildfire intensity, improve suppression efforts, and enhance safety for both the public and firefighters. A primary objective is to create defensible space and establish buffers that help keep wildfires from reaching neighborhoods. Treatments are intended not only to slow fire spread but to create conditions where firefighting resources can successfully defend lives, property, and infrastructure.

### *Ladder Fuels Treatments*

Ladder fuels—dense shrubs, low branches, and overcrowded young trees—enable fire to climb from surface to canopy, increasing the likelihood of torching, crown fire development, and long-range spotting – all of which dramatically increase the difficulty of fire suppression.

This assessment prioritizes ladder fuels reduction in zones where high modeled flame lengths and fireline intensity overlap with high-value resource and asset (HVRA) areas.

Plumas County's diverse vegetation presents significant post-treatment regrowth challenges. Fuel reduction treatments that open the canopy often increase sunlight on the forest floor, stimulating rapid regrowth of shrubs and small trees if not followed by maintenance. To ensure long-term effectiveness, it is essential to retain some canopy cover where appropriate and to plan for follow-up treatments such as prescribed fire, targeted grazing, or herbicide application. Without continued management, initial thinning efforts lose their effectiveness within just a few growing seasons, particularly in lower elevation or eastside pine areas where vegetation rebounds quickly.

Given the county's size and terrain, a landscape-wide treatment strategy is impractical. Instead, this project identifies strategic priority zones for fuel reduction, focused near HVRAs, in areas with high modeled flame lengths, and where existing treatments can be expanded. These zones offer the greatest mitigation potential by buffering communities and enabling more effective wildfire suppression.

**Best Management Practices** for ladder fuels reduction include:

- Limbing trees up to at least 8 feet from the ground and removing saplings
- Thinning dense brush beneath pine and oak stands.
- Using managed grazing in inaccessible or regrowth-prone areas.
- Scheduling prescribed fire reentry to maintain undergrowth.
- Applying selective herbicides for persistent resprouting.
- Timing treatments to avoid sensitive habitat and minimize erosion.
- Retain strategic canopy cover for ecological balance and erosion control.

*Treatment Types*

**Mechanical Thinning/Logging**
Mechanical thinning or logging involves the use of heavy equipment such as feller-bunchers, skidders, or harvesters to remove selected trees and dense vegetation. This treatment is typically applied in forested areas with merchantable timber and aims to reduce stand density, ladder fuels, and crown continuity to lower wildfire intensity and rate of spread. Residual vegetation is left more widely spaced, improving access and ecological resilience. Material may be removed from the site or processed into biomass.

**Mastication**
Mastication uses specialized equipment to shred or chip smaller-diameter trees, shrubs, and brush in place, leaving the resulting material on the forest floor as a mulch layer. Rather than removing fuels from the site, mastication modifies fuel structure by converting standing and ladder fuels into surface fuels and reducing vertical fuel continuity. This can lower the potential for crown fire initiation and help moderate fire behavior in dense understory or shrub-dominated areas, particularly in the WUI where reducing fire intensity is a priority. Mastication is most effective when combined with follow-up treatments such as prescribed fire or biomass removal to address surface fuel loads.

**Prescribed Burning or Mowing**
These are both methods used to treat surface fuels or ladder fuels that exist in areas where predicted Flame Length and Crown Fire potential is low. Dependent on current conditions, broadcast burning or mowing may be more appropriate in these proposed project areas.

Prescribed burning is the planned and controlled application of fire to a defined area under specific weather, fuel, and operational conditions to reduce surface fuels, alter fuel structure, manage vegetation, and restore fire-adapted ecosystems. In addition to serving as a maintenance treatment, prescribed fire can function as a first-entry treatment in some landscapes and is widely used in forested systems as well as in grasslands and open woodlands. Because it most closely replicates natural fire as an ecological process, broadcast burning is often considered the preferred long-term tool for sustaining desired fuel conditions and ecosystem function where it can be safely and feasibly implemented.

Mowing, by contrast, relies on mechanical equipment to cut grasses and small shrubs near the ground and is primarily used to manage fine fuels in defensible space and other accessible areas. While both treatments can be effective for maintaining previously treated sites, prescribed fire plays a broader ecological and fuel-management role. For the purposes of this analysis, the definition of prescribed burning was applied more narrowly to ensure consistency in treatment classification, but this should not be interpreted as limiting its full range of appropriate uses.

**Hand Thinning and Pile Burning**
Hand thinning involves crews using chainsaws and hand tools to cut small trees, brush, and ladder fuels. Cut material is often piled by hand and burned on-site under controlled conditions (pile burning) or removed for chipping or biomass use. This treatment is suitable for areas with limited access for heavy equipment, such as steep slopes or sensitive habitats. It provides precise control over vegetation removal and is commonly used around homes, infrastructure, and high-value ecological areas.

**Herbicide**
Follow up herbicide treatments can be used to control the regrowth of vegetation following mechanical thinning, logging, mastication, or prescribed burning. Targeted application can suppress the re-establishment of invasive species, highly flammable shrubs, or dense hardwood sprouts that would otherwise rebuild hazardous fuel loads within a few growing seasons. Herbicide use can extend the effectiveness of initial fuel treatments, reduce the frequency of re-entry for maintenance, and help maintain shaded fuel breaks or defensible space zones in a cost-effective manner.

### *How to Use Treatment Type Mapping*

This assessment identifies 4,771 treatment areas based on a combination of fire behavior modeling, recent and planned fuels treatments, and field verification. These areas are prioritized into four categories of relative risk and urgency: Extreme (332 projects), Very High (1,047), High (1,086), and Moderate (1,983).

Each treatment area also includes a suggested fuel treatment type based on vegetation, topography, and strategic placement. Treatment types may include:

- Mechanical Thinning/Logging
- Mastication/Hand Thinning
- Prescribed Burning or Mowing
- Hand Thinning and Pile Burning
- Thinning/Oak Restoration

Because many of the treatment areas in Plumas County are relatively small, irregularly shaped, or located within complex terrain, users are encouraged to utilize the GIS data provided with this Hazardous Fuels Assessment. These web-based tools allow users to zoom in to the parcel level, overlay infrastructure and previous fuel treatments, and evaluate how individual treatment areas might connect to form strategic fuel breaks or contribute to larger, landscape-scale mitigation projects.

## 7.3 Community Encompassing Fire Lines

One of the more innovative strategies highlighted in the Plumas County Hazardous Fuel Assessment is the concept of Community-Encompassing Fire Lines (CEFLs), a framework originally developed by Bill Jacks of Terra Fuego, a California-based nonprofit focused on strategic wildfire resilience planning. CEFLs are envisioned as continuous, strategically placed fuel reduction corridors that surround or partially surround vulnerable WUI communities. By design, they create a buffer between communities and adjacent wildlands, providing opportunities for firefighters to anchor suppression efforts and reducing the likelihood that fast-moving wildfires will reach homes, infrastructure, and evacuation routes.

While constructing fire lines has long been a standard firefighting tactic during suppression operations, the CEFL concept adapts this practice into a proactive, long-term planning tool for community protection. At its core, the CEFL approach calls for the creation of continuous, strategically located corridors that trace the outer perimeter of a community. These lines are designed to:

- Reduce wildfire intensity before it reaches homes and critical infrastructure.
- Provide safe anchor points for suppression crews during active incidents.
- Enhance strategic continuity by linking roads, ridgelines, fuel treatments, and other natural or built features into one coherent defense system.

CEFLs are not intended to replace parcel-level defensible space or landscape-scale restoration, but rather to complement them as part of a layered defense strategy. By building protective measures at multiple scales, from individual homes to whole-community perimeters, Plumas County communities can better withstand the increasing frequency and severity of wildfire events.

In this assessment, the CEFL framework is applied using modern mapping tools, including LiDAR, historical dozer line records, and fire behavior modeling, to trace potential fire line alignments around high-risk WUI communities such as Quincy, Portola, and Greenhorn. The resulting draft CEFLs are included in the GIS package provided with this report and serve as a starting point for discussion, collaborative planning, and future project development aimed at advancing community-scale wildfire resilience.

**CEFLs in the GIS Package**

The GIS mapping package included with this project identifies multiple draft CEFL alignments around priority communities such as Quincy, Portola, Greenhorn, Chester, and Graeagle. These alignments were derived by overlaying several key data sources:

- 2022 LiDAR Data: Provided the ability to look beneath tree canopies and identify structural changes in vegetation. LiDAR clearly distinguishes between treated/thinned areas and dense, untreated fuels, making it possible to map corridors where surface and ladder fuels have already been reduced. Bare earth elevation models also allow for visualizing historic roads and trails that are not identified in current road network data. Utilizing decommissioned roads and trails is encouraged in order to limit the amount of construction and grading required.

- Historical Dozer Line Data: Suppression activities during past wildfires left a network of dozer lines around community perimeters. These features, many of which remain visible in both LiDAR and aerial imagery, form the backbone of several proposed CEFLs.
- Fire History and Modeling: Fire perimeter data and modeled flame lengths and spread rates highlighted where wildfires are most likely to approach communities and where CEFLs would have the greatest benefit.
- Roads, Utility Corridors, and Topography: CEFLs often align with ridgelines, utility corridors, rail lines, and decommissioned or existing roads, which offer both strategic suppression advantages and practical access for future maintenance.

Each CEFL included in the GIS package is delivered as a standalone map layer. Users can zoom to the county scale to view the emerging network of CEFLs or focus on a single community to examine individual line segments. Each CEFL feature is attributed with information about origin (LiDAR-derived, dozer line, or modeled priority) and treatment needs.

**Guide for Designing Additional CEFLs**

The methodology used in this project can be applied across Plumas County and beyond. The following step-by-step guide outlines how communities, agencies, or Fire Safe Council partners can design and map new CEFLs using the tools and data provided:

*Define the Community Perimeter*

- Use WUI boundaries and parcel data from the GIS package to delineate the area to be protected.
- Consider not just homes but also schools, critical infrastructure, water systems, and evacuation corridors.

*Compile Available Data*

- LiDAR: Look for canopy gaps, treated areas, and subtle linear clearings that may align with potential CEFLs.
- Historical Fire Suppression Lines: Import dozer line shapefiles from past incidents or interpret them from aerial imagery.
- Fire History and Models: Overlay fire perimeters and modeled fire behavior to see where communities are most at risk.
- Topography: Identify ridgelines, slopes, and drainages that naturally channel fire behavior.

*Draft CEFL Alignments*

- Trace alignments that connect logical anchor points (roads, ridges, meadows, existing fuel breaks).
- Ensure that alignments fully encompass evacuation routes and critical assets.
- Consider alternative alignments where sensitive habitats or steep terrain limit feasibility.

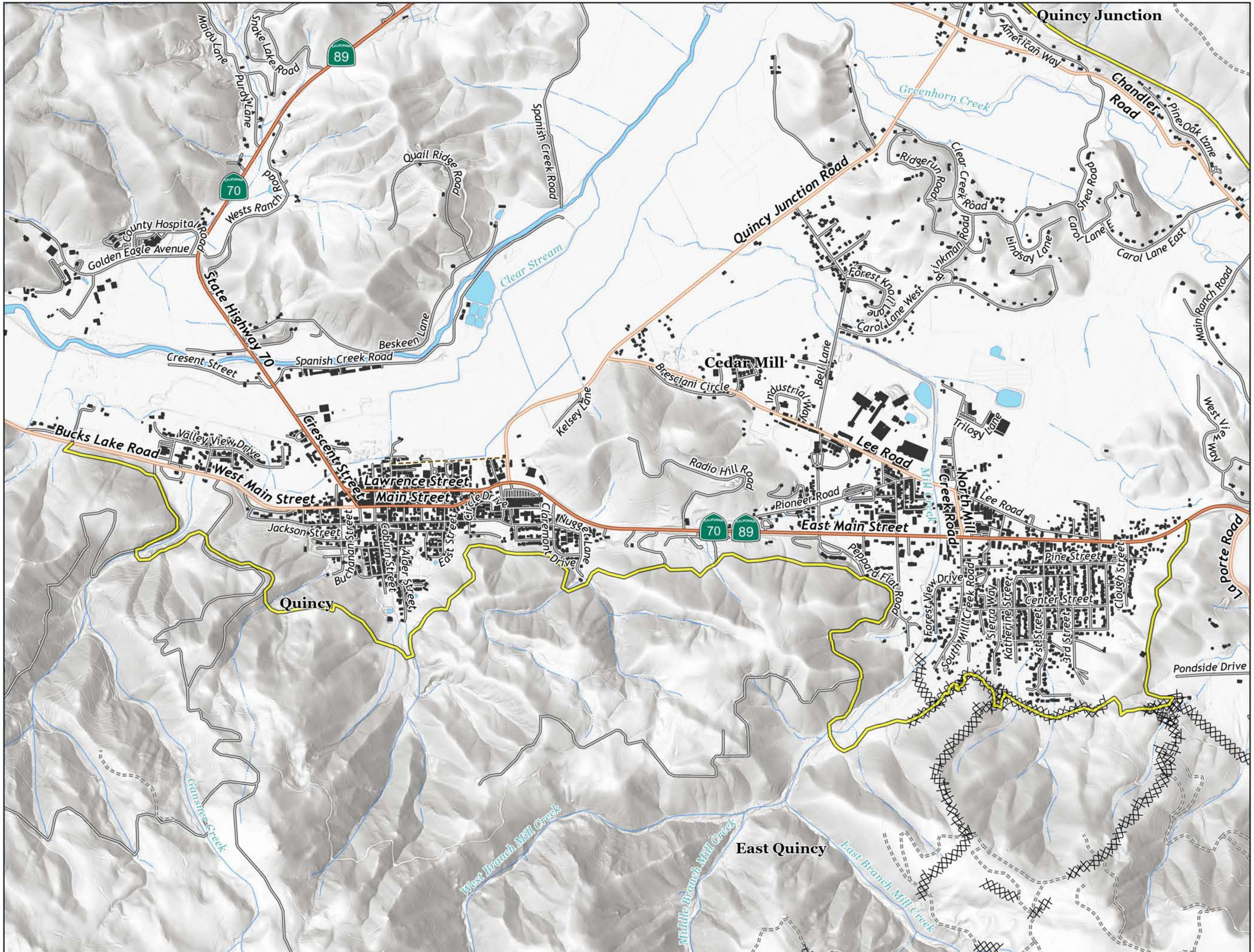
*Assess Feasibility*

- Overlay parcel ownership to determine which agencies or landowners would need to participate.
- Identify "low-hanging fruit" segments where public ownership or existing treatments already provide a starting point.
- Flag difficult segments for later discussion with private landowners or agencies.

*Attribute and Add to GIS*

- Digitize the CEFL into the GIS package.
- Store the line as part of the CEFL planning layer so it can be used in mapping, proposals, and outreach.

The following pages show example CEFLs in Quincy and Greenhorn, layers also included in the GIS database.




Plumas Hazard Assessment

# Proposed Community Encompassing Fireline

## *Quincy*

- Proposed CEFL
- Previous Dozer Line
- Building Footprint
- Collector
- Major Road
- Minor Road
- Service
- Path
- Track

N

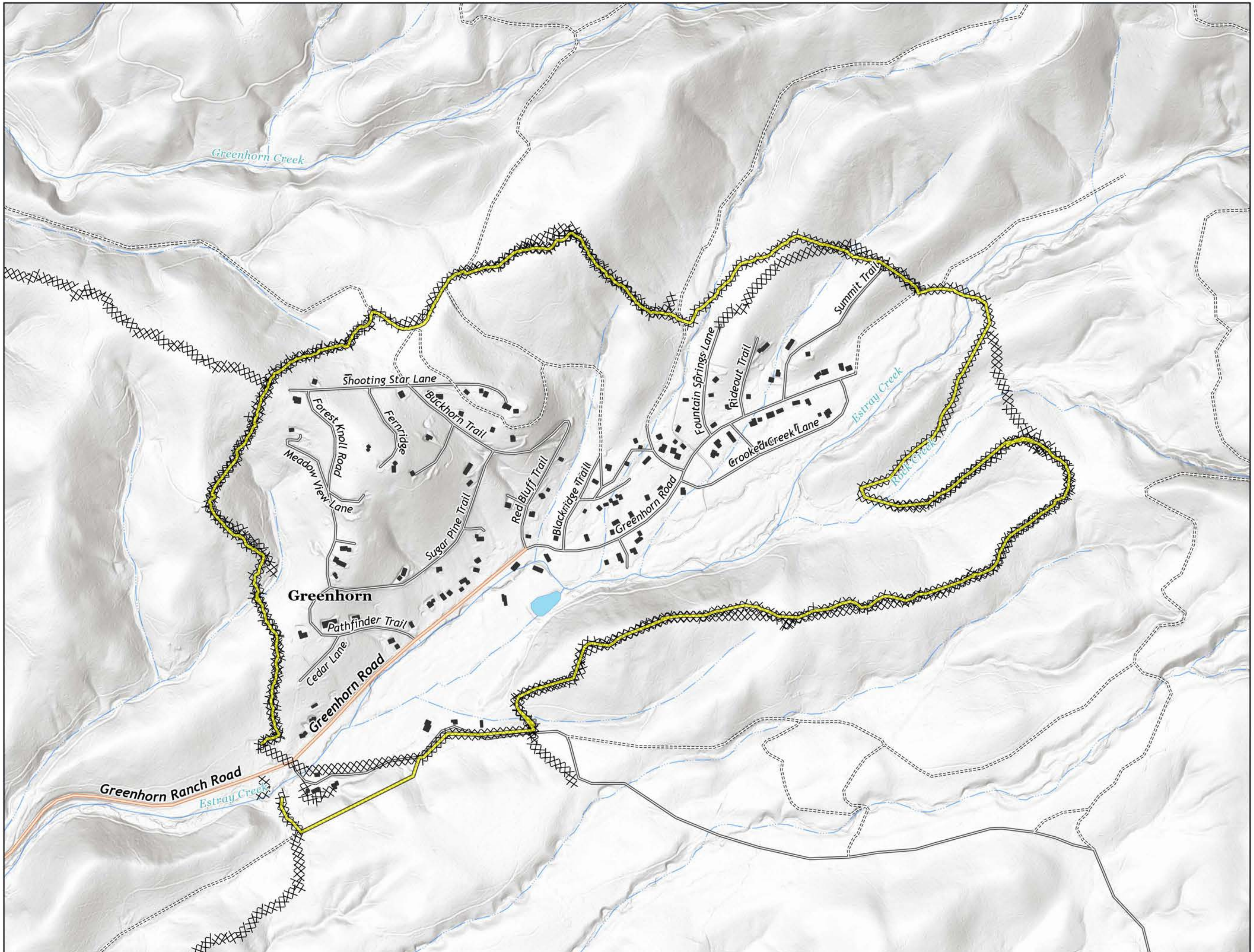
1:22,000

0 0.17 0.35 0.7 Kilometers

0 0.13 0.25 0.5 Miles

DEER CREEK RESOURCES

Updated: 11/6/2025




Plumas Hazard Assessment

# Proposed Community Encompassing Fireline

## *Greenhorn*

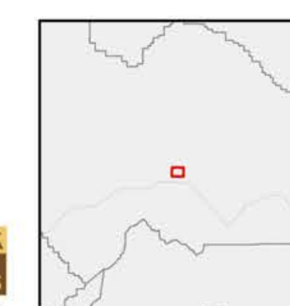
- Proposed CEFL
- Previous Dozer Line
- Building Footprint
- Major Road
- Minor Road
- Service
- Track

N

1:10,000

0 0.07 0.15 0.3 Kilometers

0 0.05 0.1 0.2 Miles



DEER CREEK RESOURCES

Updated: 11/6/2025

## 7.4 Prescribed Fire as a Management Tool

Prescribed fire remains one of the most ecologically effective and cost-efficient tools for reducing hazardous fuels, restoring fire-adapted ecosystems, and increasing landscape resilience across Plumas County. Implementation of prescribed burning must consider local conditions such as elevation, vegetation type, proximity to smoke-sensitive communities, and land ownership patterns.

Plumas County benefits from an established community-led prescribed fire effort through the Plumas Underburn Cooperative (PUC), a volunteer-based Prescribed Burn Association (PBA) that provides education, training, and implementation support for landowners interested in using fire as a land management tool. The PUC plays a vital role in coordinating burns across private lands, promoting fire as an accepted and beneficial practice, and building capacity for landowners to conduct burns safely and legally. Their work complements the efforts of state, federal, and Tribal partners, including CAL FIRE, the U.S. Forest Service, the Feather River Resource Conservation District (RCD), and private fire practitioners such as Terra Fuego.

Collaboration among these partners has helped increase the pace and scale of prescribed fire in Plumas County, especially in mixed-ownership landscapes where jurisdictional boundaries complicate fire planning. Expanding the role of the PUC through increased funding, staffing, and interagency support would allow more landowners to participate in prescribed fire, particularly those managing small parcels or working forestlands. PUC’s local leadership and volunteer base make it well-positioned to anchor an expanded, countywide prescribed fire strategy.

Prescribed fire in Plumas County also builds on a deep legacy of Tribal stewardship and cultural burning. The Maidu and other Indigenous communities have long used fire to promote ecosystem health, manage resources, and sustain cultural traditions. Cultural burns are typically small in footprint, low in intensity, and tailored to specific seasonal windows and landscape features, with objectives often focused on renewing culturally significant plant species, enhancing wildlife habitat, and maintaining traditional food and fiber sources.

Partnerships with Tribes such as through the Maidu Summit Consortium offer a pathway to reintroduce Traditional Ecological Knowledge (TEK) into land management practices. Integrating cultural fire into broader prescribed fire efforts ensures that burn objectives align with both ecological and cultural values, while building long-term local capacity.

However, prescribed fire remains underutilized across much of Plumas County due to a combination of liability concerns, limited burn windows, smoke restrictions, and implementation capacity. These barriers are particularly acute on industrial timberlands, where owners such as Sierra Pacific Industries have historically been hesitant to use prescribed fire unless liability and execution are absorbed by a qualified third party. Partnering with private contractors like Terra Fuego, CAL FIRE-certified CARX Burn Bosses, and local Tribal fire crews can help overcome these barriers and support more complex or large-scale burns.

## Funding Strategy to Expand and Sustain Prescribed Fire Capacity

The Plumas Underburn Cooperative (PUC) is already a statewide leader in community-led prescribed fire, with the distinction of employing California's first full-time Prescribed Burn Association (PBA) coordinator. This strong foundation positions Plumas County to scale up prescribed burning efforts in ways that few other counties can currently match. To build on this success and meet growing demand, strategic investment is needed to expand implementation capacity, improve interagency coordination, support workforce development, and increase access to equipment and liability resources.

Key funding needs include:

### Expand On-the-Ground Implementation Capacity

Although the PUC has coordination infrastructure in place, actual burn implementation is still constrained by limited qualified personnel, equipment, and resources. Funding should support:

- Contracting with certified burn bosses (CARX) to lead more complex or large-scale burns
- Hiring seasonal or part-time burn crew members to assist with project execution
- Stipends or per diem support for trained community volunteers during burn days
- Pre-burn preparation activities, such as fire line construction and unit prep

This funding could come from sources such as CAL FIRE's Wildfire Prevention or Fire Prevention Grants, Sierra Nevada Conservancy's Resilient Forests and Fire Recovery grants, and Regional Forest and Fire Capacity (RFFC) program allocations.

### Training and Workforce Development

To sustain and grow prescribed fire efforts in Plumas County, a pipeline of trained local practitioners must be maintained. Funding is needed for:

- Hosting Certified Burner and TREX-style training exchanges
- Supporting Tribal cultural fire practitioner involvement
- Offering local burn training sessions for volunteers, landowners, and agency staff

These activities may be supported through the CAL FIRE Workforce Development Grant Program, WRTC's Fire Practitioners Exchange, or Fire Adapted Communities Learning Network resources.

**Shared Equipment and Resource Cache**

Investment in a shared equipment cache (radios, drip torches, pumps, PPE, and signage) would improve safety and reduce logistical burdens for the PUC, partner organizations, and landowners. Mobile water tanks and trailers to support remote burns should also be considered. Potential funding sources include:

- FEMA Pre-Disaster Mitigation or Hazard Mitigation Grant Programs
- Title III Secure Rural Schools funds
- Local air district funding for emissions-reducing projects

**Liability Coverage and Risk Management Tools**

Even with community support, liability remains a limiting factor for many landowners and practitioners. Funding could help:

- Support membership in pooled insurance programs (such as through the California Prescribed Burn Association)
- Cover the cost of CARX certification or insurance for private burn bosses
- Develop a county-level prescribed fire liability mitigation framework in coordination with CAL FIRE, PUC, and the Feather River RCD

**Monitoring and Evaluation**

To maintain public and regulatory support for prescribed fire, long-term funding should include monitoring of burn outcomes, including fuel reduction efficacy, ecological response, and smoke impacts. This data can be used to:

- Inform adaptive management
- Communicate success to funders and the public
- Strengthen future grant applications

Grants from the USDA Joint Chiefs' Landscape Restoration Partnership, NRCS Conservation Incentive Contracts, or philanthropic sources such as the Water Foundation could help fund monitoring efforts.

The Plumas Underburn Coalition has already laid the groundwork for a successful and scalable prescribed fire program. What is needed now is investment in the tools, people, and partnerships required to expand and sustain implementation. With the first full-time PBA coordinator in the state and strong community engagement, Plumas County is uniquely positioned to lead the way in returning good fire to the land.

## 8. Collaboration and Coordination

Reducing wildfire risk in Plumas County requires coordination among a wide range of partners, each bringing unique expertise, responsibilities, and resources. The county's mixed-ownership landscape, comprised of federal lands, tribal territories, industrial timber holdings, and private properties, demands a collaborative approach to fuel reduction, fire response, and long-term forest stewardship. This section identifies key partners, outlines existing cooperative frameworks, clarifies roles at the local level, and highlights opportunities to strengthen coordination across boundaries.

**Key Stakeholders**

The following organizations and groups are integral to the planning and implementation of wildfire mitigation strategies in Plumas County:

**U.S. Forest Service (USFS)**

The USFS manages the majority of land in Plumas County through the Plumas National Forest, Lassen National Forest, and adjacent administrative units. The agency is responsible for planning and executing large-scale fuels reduction, prescribed burning, post-fire recovery, and restoration treatments, typically under the National Environmental Policy Act (NEPA). The Forest Service also manages key access routes and infrastructure for wildfire suppression and has been an essential partner in collaborative fire planning efforts such as the Sierra-Cascade Landscape Resilience Project and the Shared Stewardship Framework.

**Tribal Governments and Cultural Fire Practitioners**

Tribes are essential partners in fire resilience work. Indigenous communities with ancestral ties to lands in and around Plumas County bring knowledge and stewardship practices, including traditional burning, that support holistic, ecologically grounded approaches to wildfire mitigation. For example, Indigenous-led stewardship of cultural sites, such as the Tásmam Koyóm Maidu Cultural Park, demonstrates how planning, cultural burning, and habitat restoration can help restore fire-adapted landscapes. Greater inclusion of tribal representatives in project planning, burn units, and training programs can help maintain traditional knowledge and advance landscape-scale fire resilience goals.

**Industrial Timber Companies**

Large timberland owners such as Sierra Pacific Industries, W.M. Beaty & Associates and Collins Pine Company manage extensive acreage adjacent to communities and federal lands. These companies often maintain shaded fuel breaks, fire roads, and fuel reduction zones within their ownership, and they frequently participate in Fire Safe Council and CAL FIRE-sponsored projects. Opportunities for enhanced coordination include aligning treatment timing across boundaries, expanding shaded fuel breaks in strategic WUI areas, and leveraging private forestry capacity for implementing state- or federally-funded grants.

**Local Fire Protection Agencies and Volunteer Fire Departments (VFDs)**
Plumas County's dozens of VFDs provide critical fire protection, initial attack, emergency medical services, and support for evacuation. These departments are often understaffed and underfunded but offer deep local knowledge and strong community relationships. They also play a central role in defensible space enforcement, burn permit issuance, and community fire safety education. Support for VFDs in the form of training, funding, equipment, and planning integration, is vital to ensure safe and timely response to fire events.

**Plumas County Fire Safe Council (PCFSC)**
The PCFSC is the county's central hub for community wildfire planning, funding acquisition, public education, and collaborative project implementation. It administers federal and state grants, supports neighborhood Firewise efforts, coordinates contractors and landowners, and leads countywide risk assessments. The PCFSC is instrumental in preparing and updating Community Wildfire Protection Plans (CWPPs) and facilitates coordination among landowners, agencies, and contractors across diverse ownerships and jurisdictions.

**Community-Based and Nonprofit Organizations**
Several place-based nonprofits and cooperatives provide technical support, outreach, and capacity building for wildfire mitigation. These existing collaboratives in the region have the potential to facilitate, and in many cases have already implemented, cross-boundary fuels reduction, restoration, and forest health projects:

- The Feather River Resource Conservation District (FRRCD) supports fuels reduction, restoration, and forest health projects, particularly on private and small ownership lands.
- The Sierra Institute for Community and Environment advances rural-urban partnerships, workforce development, and landscape-scale forest restoration throughout the northern Sierra and southern Cascades.
- The Feather River Stewardship Coalition (FRSC) fosters collaborative landscape-scale restoration and fuels reduction projects across public and private lands in the Feather River watershed.
- The Plumas Cal-TREX event provides hands-on training in prescribed fire and collaborative forest management through multi-day field events that bring together agencies, tribes, and community members.

### State Agencies

State-level partners provide funding, regulatory guidance, and strategic planning support:

- CAL FIRE operates both fire suppression and forest health programs. It funds fuels treatments through CCI and Forest Health grants, operates conservation camps, and coordinates with VFDs and landowners on defensible space and home hardening.
- The Sierra Nevada Conservancy (SNC) invests in landscape-scale restoration through the Watershed Improvement Program and Resilient Forests and Watershed Initiative.
- The California Department of Fish and Wildlife (CDFW) reviews project plans for habitat impacts and manages sensitive species concerns.

### Existing Cooperative Frameworks

Over the past two decades, Plumas County has built a strong collaborative foundation through multiple programs and partnerships. The original 2004 *Hazardous Fuel Assessment and Strategy* laid the groundwork for landscape-scale coordination. Since then, regional frameworks such as the *Northern Sierra Regional Forest Health Strategy*, the *Sierra-Cascade Landscape Resilience Project*, and CAL FIRE's *Regional Forest and Fire Capacity Program* have helped build alignment among landowners and agencies.

The Plumas County CWPP, first adopted in 2005 and periodically updated since, has served as a unifying plan to coordinate investments in defensible space, roadside fuel breaks, and community preparedness. The PCFSC plays a leadership role in prioritizing treatment areas, engaging landowners, and facilitating funding and permitting.

At the watershed scale, partnerships such as the South Lassen Watersheds Group and the Upper Feather River Integrated Regional Water Management Group have incorporated wildfire risk into forest and water resource planning.

While many of these efforts have succeeded in bringing stakeholders to the table, several challenges persist, including agency staffing shortfalls, permitting complexity, and difficulty sustaining long-term coordination on multi-year projects.

**Opportunities for Improved Coordination**

As fire seasons lengthen and intensify, stronger coordination across jurisdictions and landownerships is essential for effective wildfire mitigation in Plumas County. Aligning project planning and implementation across federal, tribal, and private lands can significantly improve treatment effectiveness, particularly around shared boundaries near high-risk communities. Tools such as Good Neighbor Authority and Shared Stewardship Agreements can streamline collaborative work and ensure that investments on one property reinforce those on another. Expanding prescribed fire through partnerships with the Plumas Underburn Cooperative and local burn associations will also be critical. With a full-time burn coordinator already in place, the county is well positioned to scale up controlled burning by coordinating approvals, aligning burn units, and engaging residents in fire education.

Collaboration also depends on shared data and sustained local capacity. A countywide GIS and wildfire mitigation dashboard could integrate project data, treatment maps, and risk models to improve transparency and coordination among partners. Long-term workforce investment—through training, youth programs, and contractor support led by organizations like the Sierra Institute and Feather River RCD—will ensure local crews can maintain and expand fuel treatments. Finally, integrating fuel management with evacuation and emergency response planning will strengthen community safety by aligning mitigation projects with escape routes, communication systems, and shelter strategies, ensuring that preparedness and hazard reduction advance together.

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